



## TRIP GENERATION

This section outlines the transportation demand of the Project. It summarizes the projected trip generation of the site by mode and land use, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

The proposed trip generation for the Project assumed 456 residential units, 11,000 square feet of retail and/or restaurant space, 9,000 square feet of arts/cultural space, and a 176-student education/daycare facility.

Given that the most recent analysis for this building was completed in 2007, updated methodology was used to determine the projected trip generation. As an update to the 2007 trip generation analysis, a multi-modal trip generation methodology was applied using ITE 9<sup>th</sup> Edition rates for all land uses. Mode split assumptions were based on census data and other resources.

Residential trip generation was calculated based on ITE land use 220, Apartment, splitting trips into different modes using assumptions derived from census data for the residents that currently live near the site. The vehicular mode split was then adjusted to reflect the parking supply and other developments with similar proximity to Metrorail.

Although the specific use of the Arts/Cultural space is not known at this time, the trip generation was conservatively calculated based on ITE land use 444, Theatre, splitting trips into different modes using assumptions derived ridership data. The vehicular mode split was then adjusted to reflect the

parking supply and other developments with similar proximity to Metrorail.

Trip generation for retail was broken out into two different types of retail: general retail that could draw regional trips and neighborhood retail that is intended to serve the immediate neighborhood. Trip generation for both types of retail was calculated based on ITE land use 820, Shopping Center, with neighborhood retail generating a significantly higher percentage of walking trips as compared to general retail.

Education/Daycare trip generation was calculated based on ITE land use 565, Daycare, splitting trips into different modes based on information provided by the school and comparable education sites in the District.

A summary of the sites mode splits assumptions are shown in Table 2. A summary of the multimodal trip generation is provided in Table 3 for both peak hours. The Project is expected to generate 173 trips in the morning peak hour (58 inbound, 115 outbound) and 204 trips in the afternoon peak hour (122 inbound, 82 outbound). Detailed calculations are included in the Technical Attachments.

**Table 2: Proposed Mode Split – 1000 4<sup>th</sup> Street, SW**

| Land Use            | Mode  |         |      |      |
|---------------------|-------|---------|------|------|
|                     | Drive | Transit | Bike | Walk |
| Residential         | 45%   | 35%     | 5%   | 15%  |
| General Retail      | 30%   | 35%     | 5%   | 30%  |
| Neighborhood Retail | 15%   | 15%     | 10%  | 60%  |
| Arts/Cultural       | 45%   | 25%     | 5%   | 25%  |
| Education           | 50%   | 15%     | 0%   | 35%  |

Table 3: 2018 Trip Generation Summary – 1000 4<sup>th</sup> Street, SW

| Mode    | Land Use                   | AM Peak Hour |                  |                   | PM Peak Hour      |                   |                  |
|---------|----------------------------|--------------|------------------|-------------------|-------------------|-------------------|------------------|
|         |                            | In           | Out              | Total             | In                | Out               | Total            |
| Auto    | <i>Apartments</i>          | 20 veh/hr    | 83 veh/hr        | 103 veh/hr        | 79 veh/hr         | 41 veh/hr         | 120 veh/hr       |
|         | <i>General Retail</i>      | 1 veh/hr     | 0 veh/hr         | 1 veh/hr          | 2 veh/hr          | 2 veh/hr          | 4 veh/hr         |
|         | <i>Neighborhood Retail</i> | 1 veh/hr     | 0 veh/hr         | 1 veh/hr          | 2 veh/hr          | 1 veh/hr          | 3 veh/hr         |
|         | <i>Arts/Cultural</i>       | 1 veh/hr     | 0 veh/hr         | 1 veh/hr          | 10 veh/hr         | 5 veh/hr          | 15 veh/hr        |
|         | <i>Education</i>           | 35 veh/hr    | 32 veh/hr        | 67 veh/hr         | 29 veh/hr         | 33 veh/hr         | 62 veh/hr        |
|         | <b>Total</b>               |              | <b>58 veh/hr</b> | <b>115 veh/hr</b> | <b>173 veh/hr</b> | <b>122 veh/hr</b> | <b>82 veh/hr</b> |
| Transit | <i>Apartments</i>          | 18 ppl/hr    | 72 ppl/hr        | 90 ppl/hr         | 69 ppl/hr         | 37 ppl/hr         | 106 ppl/hr       |
|         | <i>General Retail</i>      | 1 ppl/hr     | 1 ppl/hr         | 2 ppl/hr          | 5 ppl/hr          | 5 ppl/hr          | 10 ppl/hr        |
|         | <i>Neighborhood Retail</i> | 1 ppl/hr     | 1 ppl/hr         | 2 ppl/hr          | 3 ppl/hr          | 3 ppl/hr          | 6 ppl/hr         |
|         | <i>Arts/Cultural</i>       | 1 ppl/hr     | 0 ppl/hr         | 1 ppl/hr          | 10 ppl/hr         | 5 ppl/hr          | 15 ppl/hr        |
|         | <i>Education</i>           | 22 ppl/hr    | 20 ppl/hr        | 42 ppl/hr         | 18 ppl/hr         | 21 ppl/hr         | 39 ppl/hr        |
|         | <b>Total</b>               |              | <b>43 ppl/hr</b> | <b>94 ppl/hr</b>  | <b>137 ppl/hr</b> | <b>105 ppl/hr</b> | <b>71 ppl/hr</b> |
| Bike    | <i>Apartments</i>          | 3 ppl/hr     | 10 ppl/hr        | 13 ppl/hr         | 10 ppl/hr         | 5 ppl/hr          | 15 ppl/hr        |
|         | <i>General Retail</i>      | 0 ppl/hr     | 0 ppl/hr         | 0 ppl/hr          | 1 ppl/hr          | 0 ppl/hr          | 1 ppl/hr         |
|         | <i>Neighborhood Retail</i> | 1 ppl/hr     | 0 ppl/hr         | 1 ppl/hr          | 2 ppl/hr          | 2 ppl/hr          | 4 ppl/hr         |
|         | <i>Arts/Cultural</i>       | 0 ppl/hr     | 0 ppl/hr         | 0 ppl/hr          | 2 ppl/hr          | 1 ppl/hr          | 3 ppl/hr         |
|         | <i>Education</i>           | 0 ppl/hr     | 0 ppl/hr         | 0 ppl/hr          | 0 ppl/hr          | 0 ppl/hr          | 0 ppl/hr         |
|         | <b>Total</b>               |              | <b>4 ppl/hr</b>  | <b>10 ppl/hr</b>  | <b>14 ppl/hr</b>  | <b>15 ppl/hr</b>  | <b>8 ppl/hr</b>  |
| Walk    | <i>Apartments</i>          | 8 ppl/hr     | 31 ppl/hr        | 39 ppl/hr         | 30 ppl/hr         | 15 ppl/hr         | 45 ppl/hr        |
|         | <i>General Retail</i>      | 1 ppl/hr     | 1 ppl/hr         | 2 ppl/hr          | 4 ppl/hr          | 4 ppl/hr          | 8 ppl/hr         |
|         | <i>Neighborhood Retail</i> | 4 ppl/hr     | 3 ppl/hr         | 7 ppl/hr          | 12 ppl/hr         | 11 ppl/hr         | 23 ppl/hr        |
|         | <i>Arts/Cultural</i>       | 1 ppl/hr     | 0 ppl/hr         | 1 ppl/hr          | 10 ppl/hr         | 5 ppl/hr          | 15 ppl/hr        |
|         | <i>Education</i>           | 51 ppl/hr    | 47 ppl/hr        | 98 ppl/hr         | 43 ppl/hr         | 48 ppl/hr         | 91 ppl/hr        |
|         | <b>Total</b>               |              | <b>65 ppl/hr</b> | <b>82 ppl/hr</b>  | <b>147 ppl/hr</b> | <b>99 ppl/hr</b>  | <b>83 ppl/hr</b> |

### 3: IMPACTS REVIEW

This section of the report focuses on the influence and impact site generated traffic will have on the local transportation network, with the following purpose:

- To provide information to the District Department of Transportation (DDOT) and other agencies on how the development of the site will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the site and where these trips are expected to travel to and from.
- To determine if development of the site will lead to adverse impact on the local transportation network. This report accomplishes this by projecting future conditions with and without development of the site and performing analysis of intersection delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area.

#### 3.1 Site Transportation Demand

##### 3.1.1 Base Trip Generation

Traditionally, trip generation for a development is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 9<sup>th</sup> Edition. For this report, the methodology was supplemented to account for the urban nature of the site (*Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes. The following summarizes the methodology that was used in this study.

First, ITE Trip Generation was used to develop base vehicular-trip rates, not accounting for reductions due to mode split. Following the base vehicular-trip rate calculations, the vehicle-trips were converted to person-trips by assuming an average vehicle occupancy of 1.1 persons per vehicle for residential use and 1.8 persons per vehicle for the retail and cultural uses, based on the Census Data Transportation Planning Package (CTPP) 2000. Table 5 shows the base number of trips generated by the proposed development. As shown, the trip generation analysis is based on a previous version of the development plan that assumed 550 dwelling units, 16,000 square feet of retail space, and 40,000 square feet of cultural space.

**Table 5: Base Vehicle- and Person-Trip Generation**

| Proposed Development                                 | Quantity  | AM Peak Hour |            |            | PM Peak Hour |            |            |
|--|-----------|--------------|------------|------------|--------------|------------|------------|
|  |           | In           | Out        | Total      | In           | Out        | Total      |
| Residential Component                                | 550 DU    | 55           | 218        | 273        | 208          | 112        | 320        |
| <b>Converted Person Trips at 1.1 persons/vehicle</b> |           | <b>61</b>    | <b>240</b> | <b>300</b> | <b>229</b>   | <b>123</b> | <b>352</b> |
| Retail/Commercial Component                          | 16,000 sf | 9            | 6          | 15         | 28           | 31         | 59         |
| Cultural Component                                   | 40,000 sf | 9            | 2          | 11         | 1            | 6          | 7          |
| <b>Converted Person Trips at 1.8 persons/vehicle</b> |           | <b>32</b>    | <b>14</b>  | <b>47</b>  | <b>52</b>    | <b>67</b>  | <b>119</b> |
| <b>Net Vehicle-Trips before Non-Auto Reduction</b>   |           | <b>73</b>    | <b>226</b> | <b>299</b> | <b>237</b>   | <b>149</b> | <b>386</b> |
| <b>Net Person-Trips</b>                              |           | <b>93</b>    | <b>254</b> | <b>347</b> | <b>281</b>   | <b>190</b> | <b>471</b> |

##### 3.1.2 Mode Split

Following base trip generation, the trips were split into each mode: public transportation, walking, bicycle, and vehicle. Each land use was analyzed by mode separately in order to account for varying mode splits. The residential mode split was determined based on the 2011 U.S. Census data for Tract 105, in which the development is located. For this tract, a mode split of 47% vehicle, 45% public transit, 5% walking, and 3% biking was determined.

The mode split estimates for the retail component was based on survey information contained in WMATA's 2005 *Development-Related Ridership Survey*. The retail component was based on the average mode split among all retail sites analyzed with a slight increase in vehicular mode split to account for a longer distance to the nearest Metro station and to maintain a conservative analysis. Thus, the retail mode split is assumed to be 40% vehicle, 35% public transit, 20% walking, and 5% biking.

The museum mode split was also based on information contained in the *Ridership Survey*. During the weekday AM and PM peak hours, it is anticipated that people traveling to and from the museum will primarily consist of museum employees with some visitors. Although there is no mode split data available specific to museum uses, it was assumed that the mode split for the museum during these times would consist of a split between office and retail mode split. The average of office mode split for suburban areas inside the beltway and all retail sites analyzed was calculated giving a museum mode split of 50% vehicle, 35% public transit, 10% walking, and 5% biking.

The weekday peak hour mode split is summarized below in Table 6 for all land uses.

**Table 6: Mode Split Summary**

| Land Use    | Mode Split     |      |         |            |
|-------------|----------------|------|---------|------------|
|             | Public Transit | Walk | Bicycle | Automobile |
| Residential | 45%            | 5%   | 3%      | 47%        |
| Retail      | 35%            | 20%  | 5%      | 40%        |
| Cultural    | 35%            | 10%  | 5%      | 50%        |

As discussed previously in the parking sections, Gorove/Slade concludes that the retail and cultural uses will not have a 50% automobile mode split but somewhere closer to 25%. This report recognizes this disconnect, which is due to the limited nature of quality mode split data in addition to the above sources and the desire to keep the vehicular capacity analyses conservative. In essence, traffic impacts are exaggerated in order to help identify potential impacts to the network.

### 3.1.3 Multi-Modal Trip Generation

Based on the trip generation calculations and mode split assumptions shown previously, Table 7 shows the resulting calculations by mode. The proposed development will generate approximately 140 vehicular trips, 152 transit trips, 22 walking trips, and 11 bike trips during the morning peak hour; and 176 vehicular trips, 201 transit trips, 40 walking trips, and 17 bike trips during the afternoon peak hour.

Table 7: Multi-Modal Trip Generation

| Trip Generation by Land Use & Mode | AM Peak Hour |           |            | PM Peak Hour |            |            |            |
|------------------------------------|--------------|-----------|------------|--------------|------------|------------|------------|
|                                    | In           | Out       | Total      | In           | Out        | Total      |            |
| <b>Residential</b>                 |              |           |            |              |            |            |            |
| Transit Person-Trips               | 45%          | 28        | 108        | 135          | 103        | 55         | 158        |
| Walking Person-Trips               | 5%           | 3         | 12         | 15           | 11         | 6          | 18         |
| Bicycling Person-Trips             | 3%           | 2         | 7          | 9            | 7          | 4          | 11         |
| Vehicular Person-Trips             | 47%          | 28        | 113        | 141          | 108        | 58         | 165        |
| <b>Vehicle-Trips</b>               |              | <b>25</b> | <b>103</b> | <b>128</b>   | <b>98</b>  | <b>52</b>  | <b>150</b> |
| <b>Retail</b>                      |              |           |            |              |            |            |            |
| Transit Person-Trips               | 35%          | 6         | 4          | 10           | 17         | 20         | 38         |
| Walking Person-Trips               | 20%          | 3         | 2          | 5            | 10         | 11         | 21         |
| Bicycling Person-Trips             | 5%           | 1         | 1          | 1            | 3          | 3          | 5          |
| Vehicular Person-Trips             | 40%          | 6         | 4          | 11           | 20         | 22         | 42         |
| <b>Vehicle-Trips</b>               |              | <b>3</b>  | <b>2</b>   | <b>6</b>     | <b>11</b>  | <b>12</b>  | <b>23</b>  |
| <b>Cultural</b>                    |              |           |            |              |            |            |            |
| Transit Person-Trips               | 35%          | 5         | 2          | 7            | 1          | 4          | 5          |
| Walking Person-Trips               | 10%          | 2         | 0          | 2            | 0          | 1          | 1          |
| Bicycling Person-Trips             | 5%           | 1         | 0          | 1            | 0          | 1          | 1          |
| Vehicular Person-Trips             | 50%          | 8         | 2          | 10           | 1          | 5          | 6          |
| <b>Vehicle-Trips</b>               |              | <b>4</b>  | <b>1</b>   | <b>6</b>     | <b>1</b>   | <b>3</b>   | <b>3</b>   |
| <b>Overall Trip Generation</b>     |              |           |            |              |            |            |            |
| Transit Person-Trips               |              | 39        | 113        | 152          | 121        | 79         | 201        |
| Walking Person-Trips               |              | 8         | 14         | 22           | 21         | 18         | 40         |
| Bicycling Person-Trips             |              | 4         | 8          | 11           | 10         | 8          | 17         |
| Vehicular Person-Trips             |              | 42        | 119        | 162          | 129        | 85         | 213        |
| <b>Total Person-Trips</b>          |              | <b>93</b> | <b>254</b> | <b>347</b>   | <b>281</b> | <b>190</b> | <b>471</b> |
| <b>Total Vehicle-Trips</b>         |              | <b>32</b> | <b>106</b> | <b>140</b>   | <b>110</b> | <b>67</b>  | <b>176</b> |

### 3.2 Vehicular Impacts

This section details the vehicular trips generated in the study area along the vehicular access routes, defines the analysis assumptions, analyzes the vehicular impacts of the impacts of the proposed development, and makes recommendations for improvements where needed.

#### 3.2.1 Scope of Analysis

The purpose of the vehicular capacity analysis is to determine the existing conditions of the intersections located in the immediate vicinity of the proposed development. The following intersections were selected, as shown in Figure 11:

1. I Street SW & South Capitol Street
2. I Street SW & Half Street SW
3. I Street SW & Delaware Avenue SW
4. I Street SW & 4<sup>th</sup> Street SW
5. I Street SW & 7<sup>th</sup> Street SW
6. Maine Avenue SW & 7<sup>th</sup> Street SW
7. H Street SW & 1<sup>st</sup> Street SW
8. I Street SW & 1<sup>st</sup> Street SW
9. Site Driveway at H Street SW



## TRIP GENERATION

This section outlines the transportation demand of the project. It summarizes the projected trip generation of the project by mode and forms the basis for the chapters that follow.

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10<sup>th</sup> Edition. Additionally, DDOT has recently adopted use of the TripsDC tool for trip generation projections. The TripsDC tool is a locally calibrated and validated trip generation tool based on more than 50 residential over retail developments within the District. The TripsDC tool directly estimates the total person trips and is sensitive to the number of parking spaces provided at the site as well as proximity to Metrorail stations and nearby employment. The nature of the project, which includes residential, hotel, office and retail uses, requires that both ITE Trip Generation Manual and Trip DC methodologies be employed.

For Building 1 (hotel over retail) and Building 2 (residential over office) a multi-modal trip generation is projected based on ITE methodology. ITE Land Use Code 310 was used for hotel, Land Use Code 820 was used for retail, and Land Use Code 710 was used for office. The mode split assumptions proposed for Building 1 and 2 take into consideration Census Data to/from the site TAZ, State of the Commute of District Residents, and WMATA Ridership Survey.

The trip generation projections for Building 3 (residential only) are calculated based on the TripsDC tool. The TripsDC tool calculates multimodal splits for both the AM and PM peak hours individually.

A summary of the multimodal trip generation for Building 1 and 2 is provided in Table 2. The mode split assumptions for Building 3 is summarized in Table 3. A trip generation summary for all three (3) buildings is outlined in Table 4. Detailed calculations are included in the Technical Appendix.

**Table 2: Building 1 Mode Split**

| Land Use                | Mode Split |         |      |      |
|-------------------------|------------|---------|------|------|
|                         | Drive      | Transit | Bike | Walk |
| Building 1: Hotel       | 55%        | 25%     | 5%   | 15%  |
| Building 1: Retail      | 45%        | 10%     | 10%  | 35%  |
| Building 2: Residential | 40%        | 40%     | 5%   | 15%  |
| Building 2: Office      | 60%        | 30%     | 3%   | 7%   |

**Table 3: Building 2/3 Mode Split**

| Land Use                | Time Period  | Mode Split |         |      |      |
|-------------------------|--------------|------------|---------|------|------|
|                         |              | Drive      | Transit | Bike | Walk |
| Building 3: Residential | AM Peak Hour | 34%        | 21%     | 5%   | 40%  |
|                         | PM Peak Hour | 24%        | 12%     | 4%   | 59%  |



Table 4: Trip Generation Summary

| Mode         | Building     | Land Use    | AM Peak Hour     |                   |                   | PM Peak Hour      |                   |                   |                   |
|--------------|--------------|-------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|              |              |             | In               | Out               | Total             | In                | Out               | Total             |                   |
| Auto         | Building 1   | Hotel       | 31 veh/hr        | 20 veh/hr         | 51 veh/hr         | 34 veh/hr         | 32 veh/hr         | 66 veh/hr         |                   |
|              |              | Retail      | 3 veh/hr         | 1 veh/hr          | 4 veh/hr          | 8 veh/hr          | 8 veh/hr          | 16 veh/hr         |                   |
|              | Building 2   | Residential | 19 veh/hr        | 53 veh/hr         | 72 veh/hr         | 55 veh/hr         | 35 veh/hr         | 90 veh/hr         |                   |
|              |              | Office      | 33 veh/hr        | 6 veh/hr          | 39 veh/hr         | 4 veh/hr          | 25 veh/hr         | 29 veh/hr         |                   |
|              | Building 3   | Residential | 46 veh/hr        | 152 veh/hr        | 198 veh/hr        | 75 veh/hr         | 44 veh/hr         | 119 veh/hr        |                   |
|              | <b>Total</b> |             |                  | <b>132 veh/hr</b> | <b>232 veh/hr</b> | <b>364 veh/hr</b> | <b>176 veh/hr</b> | <b>144 veh/hr</b> | <b>320 veh/hr</b> |
|              | Transit      | Building 1  | Hotel            | 23 ppl/hr         | 16 ppl/hr         | 39 ppl/hr         | 26 ppl/hr         | 25 ppl/hr         | 51 ppl/hr         |
| Retail       |              |             | 1 ppl/hr         | 1 ppl/hr          | 2 ppl/hr          | 3 ppl/hr          | 4 ppl/hr          | 7 ppl/hr          |                   |
| Building 2   |              | Residential | 22 ppl/hr        | 63 ppl/hr         | 85 ppl/hr         | 65 ppl/hr         | 41 ppl/hr         | 106 ppl/hr        |                   |
|              |              | Office      | 20 ppl/hr        | 3 ppl/hr          | 23 ppl/hr         | 3 ppl/hr          | 14 ppl/hr         | 17 ppl/hr         |                   |
| Building 3   |              | Residential | 28 ppl/hr        | 94 ppl/hr         | 122 ppl/hr        | 75 ppl/hr         | 44 ppl/hr         | 119 ppl/hr        |                   |
| <b>Total</b> |              |             | <b>94 ppl/hr</b> | <b>177 ppl/hr</b> | <b>271 ppl/hr</b> | <b>172 ppl/hr</b> | <b>128 ppl/hr</b> | <b>300 ppl/hr</b> |                   |
| Bike         |              | Building 1  | Hotel            | 5 ppl/hr          | 3 ppl/hr          | 8 ppl/hr          | 5 ppl/hr          | 5 ppl/hr          | 10 ppl/hr         |
|              | Retail       |             | 1 ppl/hr         | 1 ppl/hr          | 2 ppl/hr          | 3 ppl/hr          | 4 ppl/hr          | 7 ppl/hr          |                   |
|              | Building 2   | Residential | 3 ppl/hr         | 8 ppl/hr          | 11 ppl/hr         | 8 ppl/hr          | 5 ppl/hr          | 13 ppl/hr         |                   |
|              |              | Office      | 2 ppl/hr         | 0 ppl/hr          | 2 ppl/hr          | 0 ppl/hr          | 2 ppl/hr          | 2 ppl/hr          |                   |
|              | Building 3   | Residential | 7 ppl/hr         | 22 ppl/hr         | 29 ppl/hr         | 18 ppl/hr         | 10 ppl/hr         | 28 ppl/hr         |                   |
|              | <b>Total</b> |             |                  | <b>18 ppl/hr</b>  | <b>34 ppl/hr</b>  | <b>52 ppl/hr</b>  | <b>34 ppl/hr</b>  | <b>26 ppl/hr</b>  | <b>60 ppl/hr</b>  |
|              | Walk         | Building 1  | Hotel            | 14 ppl/hr         | 9 ppl/hr          | 23 ppl/hr         | 16 ppl/hr         | 14 ppl/hr         | 30 ppl/hr         |
| Retail       |              |             | 4 ppl/hr         | 2 ppl/hr          | 6 ppl/hr          | 12 ppl/hr         | 11 ppl/hr         | 23 ppl/hr         |                   |
| Building 2   |              | Residential | 8 ppl/hr         | 24 ppl/hr         | 32 ppl/hr         | 24 ppl/hr         | 16 ppl/hr         | 40 ppl/hr         |                   |
|              |              | Office      | 5 ppl/hr         | 0 ppl/hr          | 5 ppl/hr          | 1 ppl/hr          | 3 ppl/hr          | 4 ppl/hr          |                   |
| Building 3   |              | Residential | 54 ppl/hr        | 179 ppl/hr        | 232 ppl/hr        | 142 ppl/hr        | 84 ppl/hr         | 226 ppl/hr        |                   |
| <b>Total</b> |              |             | <b>85 ppl/hr</b> | <b>214 ppl/hr</b> | <b>298 ppl/hr</b> | <b>195 ppl/hr</b> | <b>128 ppl/hr</b> | <b>323 ppl/hr</b> |                   |



## TRIP GENERATION

This section outlines the transportation demand of the M Street Sites. It summarizes the projected trip generation of the sites by mode and land use, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

Given that the most recent analysis for the M Street Buildings was completed in 2007, we used updated methodology to determine the projected trip generation. The original analysis assumed that the retail space would generate local pedestrian or transit traffic only and was not included in the vehicular trip generation calculations. Additionally, an 80% non-auto reduction was used for the office use, which would be considered too high under today's standards. The 2007 trip generation is summarized in Table 2 below and an excerpt from the 2007 TIS is included in the Technical Attachments. For comparison purposes, the difference in trip generation between the 2007 development program and the 2017 development program is shown using the updated trip generation/mode split methodology.

As an update to the 2007 trip generation analysis, a multi-modal trip generation methodology was applied using ITE rates for all land uses. Mode split assumptions were based on census data and other resources.

Residential trip generation was calculated based on ITE land use 220, Apartment, splitting trips into different modes using assumptions derived from census data for the residents that currently live near the sites. The vehicular mode split was then adjusted to reflect the parking supply and other developments with similar proximity to Metrorail.

Office trip generation was calculated based on ITE land use 710, General office, splitting trips into different modes using assumptions derived from census data for the employees in the region that travel to the sites. The vehicular mode split was then adjusted to reflect the parking supply and other developments with similar proximity to Metrorail.

Retail trip generation for the 2017 development program was calculated based on ITE land use 820, Shopping Center, splitting trips into different modes using assumptions based on ridership data.

Proposed trip generation for the East Building assumed 309 apartments, 18,660 square feet of office space, and 21,930 square feet of retail space. Of note, this differs slightly from what was ultimately proposed for the East Building, which includes 308 apartments and 18,640 square feet of office space. The proposed trip generation for the West Building assumed 296 apartments, 19,450 square feet of office space, and 19,940 square feet of retail space. Mode split assumptions are shown in Table 3 and Table 4 for East Building and West Building, respectively. A summary of the multimodal trip generation for the East Building is provided in Table 5 for both peak hours and a summary of the multimodal trip generation for the West Building is provided in Table 6 for both peak hours. A summary of the combined trip generation for both buildings is shown in Table 7. Detailed calculations are included in the Technical Appendix. A summary of the multi-modal trip generation for the 2007 development program using current trip generation methodology is shown on Table 8. A comparison of 2007 vs. 2017 Trip generation Projections using current trip gen methodology is shown in Table 9.

The change in land use results in a shift in the inbound/outbound trip generation. This is expected given the change from primarily office use to primarily residential use (i.e. there are more people leaving the sites in the morning than coming to the sites). However, the overall vehicular trip generation significantly decreases as a result of the updated development program when compared using consistent mode split methodology. Industry standards show that when all other factors are the same, residential land uses generate fewer vehicular trips than office land uses.





Table 2: 2007 TIS Trip Generation Projections

| Building      |                      | AM Peak Hour |           |             | PM Peak Hour |            |             |
|---------------|----------------------|--------------|-----------|-------------|--------------|------------|-------------|
|               |                      | IB trips     | OB trips  | Total Trips | IB trips     | OB trips   | Total Trips |
| East Building | Total Trips          | 400          | 54        | 454         | 71           | 346        | 417         |
|               | 80% Reduction        | -320         | -43       | -363        | -57          | -277       | -334        |
|               | <b>Vehicle Trips</b> | <b>80</b>    | <b>11</b> | <b>91</b>   | <b>14</b>    | <b>69</b>  | <b>83</b>   |
| West Building | Total Trips          | 426          | 58        | 484         | 76           | 369        | 445         |
|               | 80% Reduction        | -341         | -46       | -387        | -61          | -295       | -356        |
|               | <b>Vehicle Trips</b> | <b>85</b>    | <b>12</b> | <b>97</b>   | <b>15</b>    | <b>74</b>  | <b>89</b>   |
| Total         | Total Trips          | 826          | 112       | 938         | 147          | 715        | 862         |
|               | 80% Reduction        | -661         | -89       | -750        | -118         | -572       | -690        |
|               | <b>Vehicle Trips</b> | <b>165</b>   | <b>23</b> | <b>188</b>  | <b>29</b>    | <b>143</b> | <b>172</b>  |

Table 3: Proposed Mode Split – East Building

| Land Use               | Mode  |         |      |      |
|------------------------|-------|---------|------|------|
|                        | Drive | Transit | Bike | Walk |
| Residential Mode Split | 45%   | 35%     | 5%   | 15%  |
| Retail Mode Split      | 30%   | 35%     | 5%   | 30%  |
| Office Mode Split      | 50%   | 45%     | 2%   | 3%   |

Table 4: Proposed Mode Split – West Building

| Land Use               | Mode  |         |      |      |
|------------------------|-------|---------|------|------|
|                        | Drive | Transit | Bike | Walk |
| Residential Mode Split | 45%   | 35%     | 5%   | 15%  |
| Retail Mode Split      | 30%   | 35%     | 5%   | 30%  |
| Office Mode Split      | 50%   | 45%     | 2%   | 3%   |

Table 5: 2017 Trip Generation Summary – East Building

| Mode    | Land Use     | AM Peak Hour     |                  |                  | PM Peak Hour     |                  |                   |
|---------|--------------|------------------|------------------|------------------|------------------|------------------|-------------------|
|         |              | In               | Out              | Total            | In               | Out              | Total             |
| Auto    | Apartments   | 14 veh/hr        | 56 veh/hr        | 70 veh/hr        | 55 veh/hr        | 29 veh/hr        | 84 veh/hr         |
|         | Retail       | 4 veh/hr         | 2 veh/hr         | 6 veh/hr         | 12 veh/hr        | 12 veh/hr        | 24 veh/hr         |
|         | Office       | 13 veh/hr        | 2 veh/hr         | 15 veh/hr        | 3 veh/hr         | 11 veh/hr        | 14 veh/hr         |
|         | <b>Total</b> | <b>31 veh/hr</b> | <b>60 veh/hr</b> | <b>91 veh/hr</b> | <b>70 veh/hr</b> | <b>52 veh/hr</b> | <b>122 veh/hr</b> |
| Transit | Apartments   | 12 ppl/hr        | 49 ppl/hr        | 61 ppl/hr        | 48 ppl/hr        | 26 ppl/hr        | 74 ppl/hr         |
|         | Retail       | 8 ppl/hr         | 5 ppl/hr         | 13 ppl/hr        | 24 ppl/hr        | 26 ppl/hr        | 50 ppl/hr         |
|         | Office       | 13 ppl/hr        | 2 ppl/hr         | 15 ppl/hr        | 3 ppl/hr         | 11 ppl/hr        | 14 ppl/hr         |
|         | <b>Total</b> | <b>33 veh/hr</b> | <b>56 veh/hr</b> | <b>89 veh/hr</b> | <b>75 veh/hr</b> | <b>63 veh/hr</b> | <b>138 ppl/hr</b> |
| Bike    | Apartments   | 2 ppl/hr         | 7 ppl/hr         | 9 ppl/hr         | 7 ppl/hr         | 4 ppl/hr         | 11 ppl/hr         |
|         | Retail       | 1 ppl/hr         | 1 ppl/hr         | 2 ppl/hr         | 3 ppl/hr         | 4 ppl/hr         | 7 ppl/hr          |
|         | Office       | 1 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 1 ppl/hr          |
|         | <b>Total</b> | <b>4 veh/hr</b>  | <b>8 veh/hr</b>  | <b>12 veh/hr</b> | <b>10 veh/hr</b> | <b>9 veh/hr</b>  | <b>19 ppl/hr</b>  |
| Walk    | Apartments   | 5 ppl/hr         | 21 ppl/hr        | 26 ppl/hr        | 21 ppl/hr        | 11 ppl/hr        | 32 ppl/hr         |
|         | Retail       | 7 ppl/hr         | 4 ppl/hr         | 11 ppl/hr        | 21 ppl/hr        | 22 ppl/hr        | 43 ppl/hr         |
|         | Office       | 1 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 1 ppl/hr          |
|         | <b>Total</b> | <b>13 veh/hr</b> | <b>25 veh/hr</b> | <b>38 veh/hr</b> | <b>42 veh/hr</b> | <b>34 veh/hr</b> | <b>76 ppl/hr</b>  |



Table 6: 2017 Trip Generation Summary – West Building

| Mode    | Land Use          | AM Peak Hour     |                  |                  | PM Peak Hour     |                  |                   |
|---------|-------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
|         |                   | In               | Out              | Total            | In               | Out              | Total             |
| Auto    | <i>Apartments</i> | 13 veh/hr        | 54 veh/hr        | 67 veh/hr        | 52 veh/hr        | 29 veh/hr        | 81 veh/hr         |
|         | <i>Retail</i>     | 3 veh/hr         | 3 veh/hr         | 6 veh/hr         | 11 veh/hr        | 11 veh/hr        | 22 veh/hr         |
|         | <i>Office</i>     | 13 veh/hr        | 2 veh/hr         | 15 veh/hr        | 3 veh/hr         | 12 veh/hr        | 15 veh/hr         |
|         | <b>Total</b>      | <b>29 veh/hr</b> | <b>59 veh/hr</b> | <b>88 veh/hr</b> | <b>66 veh/hr</b> | <b>52 veh/hr</b> | <b>118 veh/hr</b> |
| Transit | <i>Apartments</i> | 12 ppl/hr        | 47 ppl/hr        | 59 ppl/hr        | 46 ppl/hr        | 25 ppl/hr        | 71 ppl/hr         |
|         | <i>Retail</i>     | 7 ppl/hr         | 5 ppl/hr         | 12 ppl/hr        | 22 ppl/hr        | 24 ppl/hr        | 46 ppl/hr         |
|         | <i>Office</i>     | 13 ppl/hr        | 2 ppl/hr         | 15 ppl/hr        | 3 ppl/hr         | 12 ppl/hr        | 15 ppl/hr         |
|         | <b>Total</b>      | <b>32 ppl/hr</b> | <b>54 ppl/hr</b> | <b>86 ppl/hr</b> | <b>71 ppl/hr</b> | <b>61 ppl/hr</b> | <b>132 ppl/hr</b> |
| Bike    | <i>Apartments</i> | 2 ppl/hr         | 6 ppl/hr         | 8 ppl/hr         | 7 ppl/hr         | 3 ppl/hr         | 10 ppl/hr         |
|         | <i>Retail</i>     | 1 ppl/hr         | 1 ppl/hr         | 2 ppl/hr         | 3 ppl/hr         | 4 ppl/hr         | 7 ppl/hr          |
|         | <i>Office</i>     | 1 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 1 ppl/hr          |
|         | <b>Total</b>      | <b>4 ppl/hr</b>  | <b>7 ppl/hr</b>  | <b>11 ppl/hr</b> | <b>10 ppl/hr</b> | <b>8 ppl/hr</b>  | <b>18 ppl/hr</b>  |
| Walk    | <i>Apartments</i> | 5 ppl/hr         | 20 ppl/hr        | 25 ppl/hr        | 20 ppl/hr        | 10 ppl/hr        | 30 ppl/hr         |
|         | <i>Retail</i>     | 6 ppl/hr         | 4 ppl/hr         | 10 ppl/hr        | 19 ppl/hr        | 21 ppl/hr        | 40 ppl/hr         |
|         | <i>Office</i>     | 1 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 1 ppl/hr          |
|         | <b>Total</b>      | <b>12 ppl/hr</b> | <b>24 ppl/hr</b> | <b>36 ppl/hr</b> | <b>39 ppl/hr</b> | <b>32 ppl/hr</b> | <b>71 ppl/hr</b>  |

Table 7: 2017 Combined Trip Generation Summary

| Mode           | AM Peak Hour |            |            | PM Peak Hour |            |            |
|----------------|--------------|------------|------------|--------------|------------|------------|
|                | In           | Out        | Total      | In           | Out        | Total      |
| <b>Auto</b>    | 60 veh/hr    | 119 veh/hr | 179 veh/hr | 136 veh/hr   | 104 veh/hr | 240 veh/hr |
| <b>Transit</b> | 65 ppl/hr    | 110 ppl/hr | 175 ppl/hr | 146 ppl/hr   | 124 ppl/hr | 270 ppl/hr |
| <b>Bike</b>    | 8 ppl/hr     | 15 ppl/hr  | 23 ppl/hr  | 20 ppl/hr    | 17 ppl/hr  | 37 ppl/hr  |
| <b>Walk</b>    | 25 ppl/hr    | 49 ppl/hr  | 74 ppl/hr  | 81 ppl/hr    | 66 ppl/hr  | 147 ppl/hr |



Table 8: 2007 Trip Generation Summary (using current trip gen methodology)

| Mode    | Land Use     | AM Peak Hour      |                  |                   | PM Peak Hour      |                   |                   |
|---------|--------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|
|         |              | In                | Out              | Total             | In                | Out               | Total             |
| Auto    | Office       | 418 veh/hr        | 56 veh/hr        | 474 veh/hr        | 72 veh/hr         | 356 veh/hr        | 428 veh/hr        |
|         | Retail       | 6 veh/hr          | 6 veh/hr         | 12 veh/hr         | 22 veh/hr         | 22 veh/hr         | 44 veh/hr         |
|         | <b>Total</b> | <b>424 veh/hr</b> | <b>62 veh/hr</b> | <b>486 veh/hr</b> | <b>94 veh/hr</b>  | <b>378 veh/hr</b> | <b>472 veh/hr</b> |
| Transit | Office       | 424 veh/hr        | 59 veh/hr        | 483 veh/hr        | 74 veh/hr         | 360 veh/hr        | 434 veh/hr        |
|         | Retail       | 14 veh/hr         | 10 veh/hr        | 24 veh/hr         | 44 veh/hr         | 48 veh/hr         | 40 veh/hr         |
|         | <b>Total</b> | <b>438 veh/hr</b> | <b>69 veh/hr</b> | <b>507 veh/hr</b> | <b>118 veh/hr</b> | <b>408 veh/hr</b> | <b>474 veh/hr</b> |
| Bike    | Office       | 19 veh/hr         | 2 veh/hr         | 21 veh/hr         | 4 veh/hr          | 15 veh/hr         | 19 veh/hr         |
|         | Retail       | 2 veh/hr          | 2 veh/hr         | 4 veh/hr          | 6 veh/hr          | 8 veh/hr          | 14 veh/hr         |
|         | <b>Total</b> | <b>21 veh/hr</b>  | <b>4 veh/hr</b>  | <b>25 veh/hr</b>  | <b>10 veh/hr</b>  | <b>23 veh/hr</b>  | <b>33 veh/hr</b>  |
| Walk    | Office       | 28 veh/hr         | 4 veh/hr         | 32 veh/hr         | 5 veh/hr          | 24 veh/hr         | 29 veh/hr         |
|         | Retail       | 12 veh/hr         | 8 veh/hr         | 20 veh/hr         | 38 veh/hr         | 42 veh/hr         | 80 veh/hr         |
|         | <b>Total</b> | <b>40 veh/hr</b>  | <b>12 veh/hr</b> | <b>52 veh/hr</b>  | <b>43 veh/hr</b>  | <b>66 veh/hr</b>  | <b>109 veh/hr</b> |

Table 9: Comparison of 2007 vs. 2017 Trip generation Projections (using current trip gen methodology)

| Mode       | Land Use | AM Peak Hour       |                  |                    | PM Peak Hour     |                    |                    |
|------------|----------|--------------------|------------------|--------------------|------------------|--------------------|--------------------|
|            |          | In                 | Out              | Total              | In               | Out                | Total              |
| 2017       | Auto     | 60 veh/hr          | 119 veh/hr       | 179 veh/hr         | 136 veh/hr       | 104 veh/hr         | 240 veh/hr         |
|            | Non-Auto | 98 ppl/hr          | 174 ppl/hr       | 272 ppl/hr         | 247 ppl/hr       | 207 ppl/hr         | 454 ppl/hr         |
| 2007       | Auto     | 424 veh/hr         | 62 veh/hr        | 486 veh/hr         | 94 veh/hr        | 378 veh/hr         | 472 veh/hr         |
|            | Non-Auto | 499 ppl/hr         | 85 ppl/hr        | 584 ppl/hr         | 171 ppl/hr       | 497 ppl/hr         | 616 ppl/hr         |
| Difference | Auto     | <b>-364 veh/hr</b> | <b>57 veh/hr</b> | <b>-307 veh/hr</b> | <b>42 veh/hr</b> | <b>-274 veh/hr</b> | <b>-232 veh/hr</b> |
|            | Non-Auto | <b>-401 ppl/hr</b> | <b>89 ppl/hr</b> | <b>-312 ppl/hr</b> | <b>76 ppl/hr</b> | <b>-290 ppl/hr</b> | <b>-162 ppl/hr</b> |



## TRIP GENERATION

This section outlines the transportation demand of the proposed 501 Eye Street SW project. It summarizes the projected trip generation of the site by mode, which forms the basis for the chapters that follow.

Because there is no comparable ITE land use for the proposed STC use, trip generation projections for the STC use were based on survey results and discussions with STC, while residential trip generation was based on ITE methodology.

### RESIDENTIAL TRIP GENERATION

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 9<sup>th</sup> Edition. This methodology was supplemented to account for the urban nature of the site (the *Trip Generation Manual* provides data for non-urban, low transit use sites) and to generate trips for multiple modes.

Residential trip generation was calculated based on ITE land use 220, Apartment, splitting trips into different modes using assumptions derived from census data for the residents that currently live near the site. The residential mode split is shown on Table 6. The residential component of the site is expected to generate 17 vehicular trips (4 in, 13 out) during the morning peak hour, and 25 vehicular trips (16 in, 9 out) during the afternoon peak hour.

Of note, apartments allocated to STC actors/fellows are not expected to generate any vehicle trips as actors are not expected to have a car on site. Additionally, the majority of STC actors/fellows are expected to be on-site during weekday peak hours.

**Table 6: Proposed Residential Mode Split**

| Land Use    | Mode  |         |      |      |
|-------------|-------|---------|------|------|
|             | Drive | Transit | Bike | Walk |
| Residential | 45%   | 40%     | 5%   | 10%  |

### STC TRIP GENERATION

The overall transportation demand for STC is a combination of multiple user groups. Each user group's demand was assembled using survey information compiled from existing employees and information provided by STC. The general schedule of employees and events, the number of people expected for each user group, and expected mode splits are

summarized previously in Table 4 and Table 5. A summary of mode splits by user group is shown on Table 7.

From the information provided in Table 4 and Table 5 and additional information from STC, the morning and afternoon peak hours were determined and used to determine the peak hour trip generation of STC. It should be noted that although all user groups were used to determine the transportation demand, not all user groups are expected to be traveling to and from the site during the weekday commuter peak hours. Nor is every user group expected to be on site at the same time of year or same time of day. As stated previously in the Project Design section, programming for STC is limited by the amount of space available, such that not all user groups are able to be on site at the same time. For example, some education activities are only possible when rehearsal space is not in use.

As scoped with DDOT, the STC trip generation was based on the highest activity non-summer day, which is expected to occur in May when the most rehearsal and education activities are anticipated. Based on the data provided, the morning peak hour for STC is expected to occur 9 to 10 AM and the afternoon peak hour is expected to occur from 6 to 7 PM. During these times, the STC component of the site is expected to generate 37 vehicular trips (31 in, 6 out) during the morning peak hour, and 38 vehicular trips (28 in, 10 out) during the afternoon peak hour.

Not all vehicular trips are expected to go directly to the garage. For example, some employees will be parking in designated off-site parking spaces and some visitors will be parking in other off-site parking garages. To effectively account for off-site parking, 30 percent of STC trips were routed to an off-site garage, while the remaining trips were routed to the on-site garage.

Furthermore, some on-site vehicular activity will be pick-up/drop-off only. As such, on-site STC trips shown in Table 8 include pick-up/drop-off activity. Pick-up/drop-off activity was conservatively routed to and from the garage, but is expected to remain along Eye Street within the designated pick-up/drop-off area.

### TRIP GENERATION SUMMARY

A summary of the multimodal trip generation for the overall site is provided in Table 8. The 501 Eye Street SW project is expected to generate 54 vehicular trips (35 in, 19 out) during the morning peak hour, and 63 vehicular trips (44 in, 19 out)



during the afternoon peak hour. Again, please note that 30 percent of the STC trips will be to off-site garages and not the site. Furthermore, of the remaining STC trips, some of those trips will be pick-up/drop-off only. Detailed calculations are included in the Technical Appendix.

**Table 7: STC Mode Split - Survey Results**

| User Group                   | Mode Split |         |      |      |                |
|------------------------------|------------|---------|------|------|----------------|
|                              | Auto       | Transit | Walk | Bike | Housed On-Site |
| <b>Office User Groups</b>    |            |         |      |      |                |
| Full-Time Staff              | 30%        | 45%     | 4%   | 4%   | 17%            |
| Part-time staff              | 50%        | 50%     | 0%   | 0%   | 0%             |
| Volunteers                   | 60%        | 40%     | 0%   | 0%   | 0%             |
| <b>Education User Groups</b> |            |         |      |      |                |
| Summer Camp                  | 67%        | 25%     | 8%   | 0%   | 0%             |
| MAC                          | 70%        | 20%     | 10%  | 0%   | 0%             |
| Home School                  | 80%        | 20%     | 0%   | 0%   | 0%             |
| After School Class           | 0%         | 100%    | 0%   | 0%   | 0%             |
| Workshops & Training         | 25%        | 50%     | 10%  | 15%  | 0%             |
| <b>Rehearsal User Groups</b> |            |         |      |      |                |
| STC Actors                   | 10%        | 20%     | 0%   | 20%  | 50%            |
| ACA Rehearsals               | 10%        | 80%     | 5%   | 5%   | 0%             |
| Ford Theater Rehearsals      | 20%        | 60%     | 8%   | 12%  | 0%             |

**Table 8: Trip Generation Summary**

| Mode           | Land Use       | AM Peak Hour     |                  |                  | PM Peak Hour     |                  |                  |
|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                |                | In               | Out              | Total            | In               | Out              | Total            |
| <b>Auto</b>    | Residential    | 4 veh/hr         | 13 veh/hr        | 17 veh/hr        | 16 veh/hr        | 9 veh/hr         | 25 veh/hr        |
|                | STC (on-site)  | 22 veh/hr        | 4 veh/hr         | 26 veh/hr        | 20 veh/hr        | 7 veh/hr         | 27 veh/hr        |
|                | STC (off-site) | 9 veh/hr         | 2 veh/hr         | 11 veh/hr        | 8 veh/hr         | 3 veh/hr         | 11 veh/hr        |
|                | <b>Total</b>   | <b>35 veh/hr</b> | <b>19 veh/hr</b> | <b>54 veh/hr</b> | <b>44 veh/hr</b> | <b>19 veh/hr</b> | <b>63 veh/hr</b> |
| <b>Transit</b> | Residential    | 4 ppl/hr         | 13 ppl/hr        | 17 ppl/hr        | 16 ppl/hr        | 9 ppl/hr         | 25 ppl/hr        |
|                | STC            | 43 ppl/hr        | 2 ppl/hr         | 45 ppl/hr        | 8 ppl/hr         | 13 ppl/hr        | 21 ppl/hr        |
|                | <b>Total</b>   | <b>47 ppl/hr</b> | <b>15 ppl/hr</b> | <b>62 ppl/hr</b> | <b>24 ppl/hr</b> | <b>22 ppl/hr</b> | <b>46 ppl/hr</b> |
| <b>Bike</b>    | Residential    | 0 ppl/hr         | 2 ppl/hr         | 2 ppl/hr         | 2 ppl/hr         | 1 ppl/hr         | 3 ppl/hr         |
|                | STC            | 3 ppl/hr         | 0 ppl/hr         | 3 ppl/hr         | 0 ppl/hr         | 1 ppl/hr         | 1 ppl/hr         |
|                | <b>Total</b>   | <b>3 ppl/hr</b>  | <b>2 ppl/hr</b>  | <b>5 ppl/hr</b>  | <b>2 ppl/hr</b>  | <b>2 ppl/hr</b>  | <b>4 ppl/hr</b>  |
| <b>Walk</b>    | Residential    | 1 ppl/hr         | 3 ppl/hr         | 4 ppl/hr         | 4 ppl/hr         | 2 ppl/hr         | 6 ppl/hr         |
|                | STC            | 3 ppl/hr         | 0 ppl/hr         | 3 ppl/hr         | 4 ppl/hr         | 1 ppl/hr         | 5 ppl/hr         |
|                | <b>Total</b>   | <b>4 ppl/hr</b>  | <b>3 ppl/hr</b>  | <b>7 ppl/hr</b>  | <b>8 ppl/hr</b>  | <b>3 ppl/hr</b>  | <b>11 ppl/hr</b> |



## TRIP GENERATION

This section outlines the transportation demand of the proposed Wharf Phase 2 project. It summarizes the projected trip generation of the site by mode, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

### First-Stage vs Second-Stage Development Program

The overall development for Phase 2 has been slightly modified from the development program analyzed as part of the First-Stage PUD. Apart from the addition of the hotel uses to Parcel 8, the change in Phase 2's development program from the First-Stage PUD is consistent with flexibility that was approved as part of the First-Stage PUD and subsequent approvals.

### Methodology

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 9<sup>th</sup> Edition. This methodology was supplemented to account for the urban nature of the site (the *Trip Generation Manual* provides data for non-urban, low transit use sites) and to generate trips for multiple modes, as vetted and approved by DDOT.

Residential trip generation was calculated based on ITE land use 220, Apartment, and on ITE land use 230, Condo/Townhome, splitting trips into different modes using assumptions derived from 2015 census data for the residents that currently live near the site. The vehicular mode split was then adjusted to reflect the parking supply and other developments with similar proximity to Metrorail. The condo component was adjusted upwards based on assumed increased auto usage.

Retail trip generation was calculated based on ITE land use 820, Shopping Center. Mode splits for the retail portion of the site were based on information about similar sites with retail contained in WMATA's 2005 *Development-Related Ridership Survey* and mode splits used in the Wharf Phase 1 Second-Stage CTR.

Office trip generation was calculated based on ITE land use 710, General Office Building, splitting trips into different modes using assumptions derived from census data for the employees

that currently work near the site. The mode splits were then adjusted to reflect the parking supply, the proximity to Metrorail, and the improved bicycle facilities in the area. The office mode split was primarily based on the mode split used in the Wharf Phase 1 Second-Stage CTR.

Hotel trip generation was calculated based on ITE land use 310, Hotel. Mode splits for the hotel portion of the site were based on information about similar hotels contained in WMATA's 2005 *Development-Related Ridership Survey*. The proximity of the site to Metrorail was also a determinant factor for assigning hotel mode split.

Trip associated with the Wharf Marina were accounted for in two ways: (1) the 94 boat slips used by live-aboard slip license holders were calculated using the same methodology as the non-ownership residential uses of Phase 2; and (2) the trip generation for the 156 recreational boat slips was calculated based on ITE land use 420, Marina. Mode splits for the Marina portion of the site were based on information provided by the Applicant, which estimated that about 50% of recreational boat slip users drive to the site.

The mode split assumptions for all land uses within the development is summarized in Table 7. A summary of the multimodal trip generation for Phase 2 of the Wharf is provided in Table 8 for both peak hours. Detailed calculations are included in the Technical Appendix.

**Table 7: Summary of Mode Split Assumptions**

| Land Use                | Mode |         |      |      |
|-------------------------|------|---------|------|------|
|                         | Auto | Transit | Bike | Walk |
| Residential (Apartment) | 25%  | 50%     | 10%  | 15%  |
| Residential (Condo)     | 40%  | 40%     | 5%   | 15%  |
| Retail                  | 19%  | 56%     | 15%  | 10%  |
| Office                  | 42%  | 47%     | 8%   | 3%   |
| Hotel                   | 40%  | 40%     | 5%   | 15%  |
| Marina                  | 50%  | 25%     | 10%  | 15%  |

**Table 8: Phase 2 Multi-Modal Trip Generation Summary**

| Mode           | AM Peak Hour |            |            | PM Peak Hour |            |             |
|----------------|--------------|------------|------------|--------------|------------|-------------|
|                | In           | Out        | Total      | In           | Out        | Total       |
| <b>Auto</b>    | 379 veh/hr   | 108 veh/hr | 487 veh/hr | 176 veh/hr   | 396 veh/hr | 570 veh/hr  |
| <b>Transit</b> | 578 ppl/hr   | 217 ppl/hr | 793 ppl/hr | 500 ppl/hr   | 789 ppl/hr | 1291 ppl/hr |
| <b>Bike</b>    | 108 ppl/hr   | 43 ppl/hr  | 150 ppl/hr | 116 ppl/hr   | 168 ppl/hr | 284 ppl/hr  |
| <b>Walk</b>    | 63 ppl/hr    | 46 ppl/hr  | 109 ppl/hr | 96 ppl/hr    | 109 ppl/hr | 206 ppl/hr  |

**Mode Split Assumptions - DDOT HQ**

**Office Component**

**Description of project:**

The development will contain 190,000 S.F. of office and 13,000 S.F. of retail

**Pertinent Mode Split data from other sources:**

| Information Source                           | Mode |         |         |      |      |             |       |
|--|------|---------|---------|------|------|-------------|-------|
|  | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| Workplace TAZ Data (20367)                   | 67%  |         | 30%     | 3%   |      |             | ---   |
| WMATA Ridership Survey (Office Sites in CBD) | 21%  |         | 74%     | 5%   |      |             | ---   |
| DC Water Headquarters                        | 45%  |         | 45%     | 10%  |      |             | ---   |

**Mode Split assumed in TIS:**

| Use               | Mode  |         |      |      |                   |
|-------------------|-------|---------|------|------|-------------------|
|                   | Drive | Transit | Bike | Walk | Telecommute/Other |
| Office Mode Split | 40%   | 40%     | 5%   | 15%  | ---               |

Notes: - Proximity to Metrorail influenced mode splits

- Mode Split compared to DC Water Headquarters

**Retail Component**

**Pertinent Mode Split data from other sources:**

| Information Source   | Mode |         |         |      |      |             |       |
|--|------|---------|---------|------|------|-------------|-------|
|  | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| WMATA Ridership Survey Table 12 (U Street Main Street Retail)        | 19%  |         | 57%     | 25%  |      |             | ---   |
| WMATA Ridership Survey Table 12 (Crystal City - Crystal Plaza Shops) | 24%  |         | 41%     | 36%  |      |             | ---   |
| WMATA Ridership Survey Table 12 (Retail Sites)                       | 36%  |         | 37%     | 27%  |      |             | ---   |

**Mode Split assumed in TIS:**

| Use               | Mode  |         |      |      |                   |
|-------------------|-------|---------|------|------|-------------------|
|                   | Drive | Transit | Bike | Walk | Telecommute/Other |
| Retail Mode Split | 25%   | 35%     | 20%  | 20%  | ---               |



**Mode Split Assumptions - DDOT HQ**

**Office Component**

**Description of project:**

The development will contain 190,000 S.F. of office and 13,000 S.F. of retail

**Pertinent Mode Split data from other sources:**

| Information Source                           | Mode |         |         |      |      |             |       |
|--|------|---------|---------|------|------|-------------|-------|
|  | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| Workplace TAZ Data (20367)                   | 67%  |         | 30%     | 3%   |      |             | ---   |
| WMATA Ridership Survey (Office Sites in CBD) | 21%  |         | 74%     | 5%   |      |             | ---   |
| DC Water Headquarters                        | 45%  |         | 45%     | 10%  |      |             | ---   |

**Mode Split assumed in TIS:**

| Use               | Mode  |         |      |      |                   |
|-------------------|-------|---------|------|------|-------------------|
|                   | Drive | Transit | Bike | Walk | Telecommute/Other |
| Office Mode Split | 40%   | 40%     | 5%   | 15%  | ---               |

Notes: - Proximity to Metrorail influenced mode splits

- Mode Split compared to DC Water Headquarters

**Retail Component**

**Pertinent Mode Split data from other sources:**

| Information Source   | Mode |         |         |      |      |             |       |
|--|------|---------|---------|------|------|-------------|-------|
|  | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| WMATA Ridership Survey Table 12 (U Street Main Street Retail)        | 19%  |         | 57%     | 25%  |      |             | ---   |
| WMATA Ridership Survey Table 12 (Crystal City - Crystal Plaza Shops) | 24%  |         | 41%     | 36%  |      |             | ---   |
| WMATA Ridership Survey Table 12 (Retail Sites)                       | 36%  |         | 37%     | 27%  |      |             | ---   |

**Mode Split assumed in TIS:**

| Use               | Mode  |         |      |      |                   |
|-------------------|-------|---------|------|------|-------------------|
|                   | Drive | Transit | Bike | Walk | Telecommute/Other |
| Retail Mode Split | 25%   | 35%     | 20%  | 20%  | ---               |

E: Trip Generation for Background Developments

**Trip Generation - DDOT HQ**  
Office (190,000 S.F.), Retail (13,000 S.F.)

Step 1: Base trip generation using ITEs' Trip Generation

| Land Use             | Land Use Code | Quantity (x) | AM Peak Hour |           |                     | PM Peak Hour |            |                           | Daily   |         |                          |
|----------------------|---------------|--------------|--------------|-----------|---------------------|--------------|------------|---------------------------|---------|---------|--------------------------|
|                      |               |              | In           | Out       | Total               | In           | Out        | Total                     | In      | Out     | Total                    |
| Office               | 710           | 190,000 sf   | 176 veh/hr   | 29 veh/hr | 205 veh/hr          | 33 veh/hr    | 176 veh/hr | 209 veh/hr                | 989 veh | 989 veh | 1978 veh                 |
| Calculation Details: |               |              | 86%          | 14%       | =0.94(X/1000)+26.49 | 16%          | 84%        | Ln(T)=0.95Ln(X/1000)+0.36 | 50%     | 50%     | Ln(T)=0.97Ln(X/1000)+2.5 |
| Retail               | 820           | 13,000 sf    | 7 veh/hr     | 5 veh/hr  | 12 veh/hr           | 24 veh/hr    | 26 veh/hr  | 50 veh/hr                 | 246 veh | 245 veh | 491 veh                  |
| Calculation Details: |               |              | 62%          | 38%       | =0.94(X/1000)       | 48%          | 52%        | =3.81(X/1000)             | 50%     | 50%     | =37.75(X/1000)           |

Step 2: Convert to people per hour, before applying mode splits

| Land Use | People/Car (from 2017 NHTS, Table 16) | AM Peak Hour |           |            | PM Peak Hour |            |            | Daily    |             |          |
|----------|---------------------------------------|--------------|-----------|------------|--------------|------------|------------|----------|-------------|----------|
|          |                                       | In           | Out       | Total      | In           | Out        | Total      | In       | Out         | Total    |
| Office   | 1.18 ppl/veh                          | 208 ppl/hr   | 34 ppl/hr | 242 ppl/hr | 39 ppl/hr    | 208 ppl/hr | 247 ppl/hr | 1167 ppl | 1167 veh/hr | 2334 ppl |
| Retail   | 1.82 ppl/veh                          | 13 ppl/hr    | 9 ppl/hr  | 22 ppl/hr  | 44 ppl/hr    | 47 ppl/hr  | 91 ppl/hr  | 448 ppl  | 446 veh/hr  | 894 ppl  |

Step 3: Split between modes, per assumed Mode Splits

| Land Use | Mode    | Split | AM Peak Hour |           |           | PM Peak Hour |           |           | Daily   |         |         |
|----------|---------|-------|--------------|-----------|-----------|--------------|-----------|-----------|---------|---------|---------|
|          |         |       | In           | Out       | Total     | In           | Out       | Total     | In      | Out     | Total   |
| Office   | Auto    | 40%   | 83 ppl/hr    | 14 ppl/hr | 97 ppl/hr | 15 ppl/hr    | 84 ppl/hr | 99 ppl/hr | 467 ppl | 467 ppl | 934 ppl |
| Office   | Transit | 40%   | 84 ppl/hr    | 13 ppl/hr | 97 ppl/hr | 16 ppl/hr    | 83 ppl/hr | 99 ppl/hr | 467 ppl | 467 ppl | 934 ppl |
| Office   | Bike    | 5%    | 10 ppl/hr    | 2 ppl/hr  | 12 ppl/hr | 2 ppl/hr     | 10 ppl/hr | 12 ppl/hr | 58 ppl  | 58 ppl  | 116 ppl |
| Office   | Walk    | 15%   | 31 ppl/hr    | 5 ppl/hr  | 36 ppl/hr | 6 ppl/hr     | 31 ppl/hr | 37 ppl/hr | 175 ppl | 175 ppl | 350 ppl |
| Retail   | Auto    | 25%   | 3 ppl/hr     | 3 ppl/hr  | 6 ppl/hr  | 11 ppl/hr    | 12 ppl/hr | 23 ppl/hr | 112 ppl | 112 ppl | 224 ppl |
| Retail   | Transit | 35%   | 4 ppl/hr     | 4 ppl/hr  | 8 ppl/hr  | 15 ppl/hr    | 17 ppl/hr | 32 ppl/hr | 156 ppl | 156 ppl | 312 ppl |
| Retail   | Bike    | 20%   | 3 ppl/hr     | 1 ppl/hr  | 4 ppl/hr  | 9 ppl/hr     | 9 ppl/hr  | 18 ppl/hr | 90 ppl  | 89 ppl  | 179 ppl |
| Retail   | Walk    | 20%   | 3 ppl/hr     | 1 ppl/hr  | 4 ppl/hr  | 9 ppl/hr     | 9 ppl/hr  | 18 ppl/hr | 90 ppl  | 89 ppl  | 179 ppl |

Step 4: Convert auto trips back to vehicles/hour

| Land Use | People/Car (from 2017 NHTS, Table 16) | AM Peak Hour |           |           | PM Peak Hour |           |           | Daily   |           |         |
|----------|---------------------------------------|--------------|-----------|-----------|--------------|-----------|-----------|---------|-----------|---------|
|          |                                       | In           | Out       | Total     | In           | Out       | Total     | In      | Out       | Total   |
| Office   | 1.18 ppl/veh                          | 70 veh/hr    | 12 veh/hr | 82 veh/hr | 13 veh/hr    | 71 veh/hr | 84 veh/hr | 396 veh | 396 veh   | 792 veh |
| Retail   | 1.82 ppl/veh                          | 2 veh/hr     | 1 veh/hr  | 3 veh/hr  | 6 veh/hr     | 7 veh/hr  | 13 veh/hr | 62 veh  | 61 veh/hr | 123 veh |

Trip Gen Summary for Parcel I

| Mode    | AM Peak Hour |           |            | PM Peak Hour |            |            | Daily   |         |          |
|---------|--------------|-----------|------------|--------------|------------|------------|---------|---------|----------|
|         | In           | Out       | Total      | In           | Out        | Total      | In      | Out     | Total    |
| Auto    | 72 veh/hr    | 13 veh/hr | 85 veh/hr  | 19 veh/hr    | 78 veh/hr  | 97 veh/hr  | 458 veh | 457 veh | 915 veh  |
| Transit | 88 ppl/hr    | 17 veh/hr | 105 ppl/hr | 31 ppl/hr    | 100 ppl/hr | 131 ppl/hr | 623 ppl | 623 ppl | 1246 ppl |
| Bike    | 13 ppl/hr    | 3 veh/hr  | 16 ppl/hr  | 11 ppl/hr    | 19 ppl/hr  | 30 ppl/hr  | 148 ppl | 147 ppl | 295 ppl  |
| Walk    | 34 ppl/hr    | 6 veh/hr  | 40 ppl/hr  | 15 ppl/hr    | 40 ppl/hr  | 55 ppl/hr  | 265 ppl | 264 ppl | 529 ppl  |



# From The Yards Parcel G CTR

## TRIP GENERATION

This section outlines the forecasted transportation demand of the project. It summarizes the projected trip generation of the project by mode and forms the basis for the chapters that follow. Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10<sup>th</sup> Edition. In accordance with DDOT's guidelines this report's methodology is supplemented to account for the urban nature of the site (the *Trip Generation Manual* provides data for non-urban, low transit use sites) and to generate trips for multiple modes.

Office trip generation was calculated based on ITE land use 710, General Office and retail trip generation was calculated based on ITE land use 820, Retail. Trips were split into different modes using assumptions derived from census data for employees that currently travel near the site.

A summary of the multimodal trip generation for the project is provided in Table 3 for the morning and afternoon peak hours. The mode split assumptions for all land uses within the project is summarized in Table 2. The mode split for the office use is higher than desirable, thus providing a conservative estimate for the purposes of this CTR. Detailed calculations are included in the Technical Appendix.

**Table 2: Summary of Mode Split Assumptions**

| Land Use | Mode  |         |      |      |
|----------|-------|---------|------|------|
|          | Drive | Transit | Bike | Walk |
| Retail   | 25%   | 35%     | 20%  | 20%  |
| Office   | 40%   | 40%     | 5%   | 15%  |

**Table 3: Multi-Modal Trip Generation Summary**

| Mode    | AM Peak Hour |           |            | PM Peak Hour |            |            |
|---------|--------------|-----------|------------|--------------|------------|------------|
|         | In           | Out       | Total      | In           | Out        | Total      |
| Auto    | 109 veh/hr   | 18 veh/hr | 127 veh/hr | 27 veh/hr    | 116 veh/hr | 143 veh/hr |
| Transit | 131 ppl/hr   | 23 ppl/hr | 154 ppl/hr | 40 ppl/hr    | 146 ppl/hr | 186 ppl/hr |
| Bike    | 19 ppl/hr    | 4 ppl/hr  | 23 ppl/hr  | 12 ppl/hr    | 26 ppl/hr  | 38 ppl/hr  |
| Walk    | 50 ppl/hr    | 10 ppl/hr | 60 ppl/hr  | 18 ppl/hr    | 58 ppl/hr  | 76 ppl/hr  |

**Mode Split Assumptions - Parcel I**

**Residential Component**

**Description of residential component of project:**

The development will contain approximately 379 residential dwelling units, 18,000 S.F. of retail

**Pertinent Mode Split data from other sources:**

| Information Source   | Mode |         |         |      |      |             |       |
|--|------|---------|---------|------|------|-------------|-------|
|  | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| CTPP - Adjacent TAZ Residents (10369)  | 35%  | 2%      | 32%     | 5%   | 18%  | 7%          | 1%    |
| CTPP - Adjacent TAZ Residents (20372)  | 32%  | 3%      | 33%     | 2%   | 24%  | 4%          | 2%    |
| Census Tract 72 Residents  | 32%  | 4%      | 37%     | 0%   | 19%  | 3%          | 5%    |
| WMATA Ridership Survey Table 9<br>(U Street/African-Amer Civil War Memorial/Cardozo) | 22%  |         | 51%     | 27%  |      | ---         |       |
| WMATA Ridership Survey Table 10<br>(Residential Mode Share: Inside Beltway)          | 39%  |         | 49%     | 14%  |      | ---         |       |

**Mode Split assumed in TIS:**

| Land Use               | Mode  |         |      |      |                   |
|------------------------|-------|---------|------|------|-------------------|
|                        | Drive | Transit | Bike | Walk | Telecommute/Other |
| Residential Mode Split | 35%   | 45%     | 10%  | 10%  | ---               |

Notes: -Census data (CTPP) used as basis for assumptions

'-Census data adjusted based on parking supply

**Retail Component**

**Pertinent Mode Split data from other sources:**

| Information Source  | Mode |         |         |      |      |             |       |
|---|------|---------|---------|------|------|-------------|-------|
|   | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| WMATA Ridership Survey Table 12<br>(U Street Main Street Retail)        | 19%  |         | 57%     | 25%  |      | ---         |       |
| WMATA Ridership Survey Table 12<br>(Crystal City - Crystal Plaza Shops) | 24%  |         | 41%     | 36%  |      | ---         |       |
| WMATA Ridership Survey Table 12<br>(Retail Sites)                       | 36%  |         | 37%     | 27%  |      | ---         |       |

**Mode Split assumed in TIS:**

| Use               | Mode  |         |         |      |      |                   |
|-------------------|-------|---------|---------|------|------|-------------------|
|                   | Drive | Pass-by | Transit | Bike | Walk | Telecommute/Other |
| Retail Mode Split | 25%   |         | 35%     | 20%  | 20%  | ---               |

Notes: Retail mode split is based on the neighborhood-serving nature of component and available parking supply.

## E: Trip Generation for Background Developments

### Trip Generation - Parcel I

Residential ( 379 du), Retail (18,000 S.F.)

Step 1: Base trip generation using ITEs' Trip Generation

| Land Use                    | Land Use Code | Quantity (x) | AM Peak Hour |            |               | PM Peak Hour |           |               | Daily    |          |                |
|-----------------------------|---------------|--------------|--------------|------------|---------------|--------------|-----------|---------------|----------|----------|----------------|
|                             |               |              | In           | Out        | Total         | In           | Out       | Total         | In       | Out      | Total          |
| Apartments                  | 221           | 379 du       | 35 veh/hr    | 101 veh/hr | 136 veh/hr    | 102 veh/hr   | 65 veh/hr | 167 veh/hr    | 1031 veh | 1031 veh | 2062 veh       |
| <i>Calculation Details:</i> |               |              | 26%          | 74%        | =0.36X        | 61%          | 39%       | =0.44X        | 50%      | 50%      | =5.44X         |
| Retail                      | 820           | 18,000 sf    | 11 veh/hr    | 6 veh/hr   | 17 veh/hr     | 33 veh/hr    | 36 veh/hr | 69 veh/hr     | 340 veh  | 340 veh  | 680 veh        |
| <i>Calculation Details:</i> |               |              | 62%          | 38%        | =0.94(X/1000) | 48%          | 52%       | =3.81(X/1000) | 50%      | 50%      | =37.75(X/1000) |

Step 2: Convert to people per hour, before applying mode splits

| Land Use   | People/Car<br>(from 2017 NHTS, Table 16) | AM Peak Hour |            |            | PM Peak Hour |           |            | Daily    |             |          |
|------------|--|--------------|------------|------------|--------------|-----------|------------|----------|-------------|----------|
|            |  | In           | Out        | Total      | In           | Out       | Total      | In       | Out         | Total    |
| Apartments | 1.18 ppl/veh                             | 41 ppl/hr    | 119 ppl/hr | 160 ppl/hr | 120 ppl/hr   | 77 ppl/hr | 197 ppl/hr | 1217 ppl | 1216 veh/hr | 2433 ppl |
| Retail     | 1.82 ppl/veh                             | 20 ppl/hr    | 11 ppl/hr  | 31 ppl/hr  | 60 ppl/hr    | 66 ppl/hr | 126 ppl/hr | 619 ppl  | 619 veh/hr  | 1238 ppl |

Step 3: Split between modes, per assumed Mode Splits

| Land Use   | Mode    | Split | AM Peak Hour |           |           | PM Peak Hour |           |           | Daily   |         |          |
|------------|---------|-------|--------------|-----------|-----------|--------------|-----------|-----------|---------|---------|----------|
|            |         |       | In           | Out       | Total     | In           | Out       | Total     | In      | Out     | Total    |
| Apartments | Auto    | 35%   | 14 ppl/hr    | 42 ppl/hr | 56 ppl/hr | 42 ppl/hr    | 26 ppl/hr | 68 ppl/hr | 426 ppl | 426 ppl | 852 ppl  |
| Apartments | Transit | 45%   | 19 ppl/hr    | 53 ppl/hr | 72 ppl/hr | 54 ppl/hr    | 35 ppl/hr | 89 ppl/hr | 548 ppl | 547 ppl | 1095 ppl |
| Apartments | Bike    | 10%   | 4 ppl/hr     | 12 ppl/hr | 16 ppl/hr | 12 ppl/hr    | 8 ppl/hr  | 20 ppl/hr | 122 ppl | 121 ppl | 243 ppl  |
| Apartments | Walk    | 10%   | 4 ppl/hr     | 12 ppl/hr | 16 ppl/hr | 12 ppl/hr    | 8 ppl/hr  | 20 ppl/hr | 122 ppl | 121 ppl | 243 ppl  |
| Retail     | Auto    | 25%   | 5 ppl/hr     | 3 ppl/hr  | 8 ppl/hr  | 15 ppl/hr    | 17 ppl/hr | 32 ppl/hr | 155 ppl | 155 ppl | 310 ppl  |
| Retail     | Transit | 35%   | 7 ppl/hr     | 4 ppl/hr  | 11 ppl/hr | 21 ppl/hr    | 23 ppl/hr | 44 ppl/hr | 217 ppl | 216 ppl | 433 ppl  |
| Retail     | Bike    | 20%   | 4 ppl/hr     | 2 ppl/hr  | 6 ppl/hr  | 12 ppl/hr    | 13 ppl/hr | 25 ppl/hr | 124 ppl | 124 ppl | 248 ppl  |
| Retail     | Walk    | 20%   | 4 ppl/hr     | 2 ppl/hr  | 6 ppl/hr  | 12 ppl/hr    | 13 ppl/hr | 25 ppl/hr | 124 ppl | 124 ppl | 248 ppl  |

Step 4: Convert auto trips back to vehicles/hour

| Land Use   | People/Car<br>(from 2017 NHTS, Table 16) | AM Peak Hour |           |           | PM Peak Hour |           |           | Daily   |           |         |
|------------|--|--------------|-----------|-----------|--------------|-----------|-----------|---------|-----------|---------|
|            |  | In           | Out       | Total     | In           | Out       | Total     | In      | Out       | Total   |
| Apartments | 1.18 ppl/veh                             | 12 veh/hr    | 35 veh/hr | 47 veh/hr | 36 veh/hr    | 22 veh/hr | 58 veh/hr | 361 veh | 361 veh   | 722 veh |
| Retail     | 1.82 ppl/veh                             | 3 veh/hr     | 1 veh/hr  | 4 veh/hr  | 8 veh/hr     | 10 veh/hr | 18 veh/hr | 85 veh  | 85 veh/hr | 170 veh |

Trip Gen Summary for Parcel I

| Mode    | AM Peak Hour |           |           | PM Peak Hour |           |            | Daily   |         |          |
|---------|--------------|-----------|-----------|--------------|-----------|------------|---------|---------|----------|
|         | In           | Out       | Total     | In           | Out       | Total      | In      | Out     | Total    |
| Auto    | 15 veh/hr    | 36 veh/hr | 51 veh/hr | 44 veh/hr    | 32 veh/hr | 76 veh/hr  | 446 veh | 446 veh | 892 veh  |
| Transit | 26 ppl/hr    | 57 veh/hr | 83 ppl/hr | 75 ppl/hr    | 58 ppl/hr | 133 ppl/hr | 765 ppl | 763 ppl | 1528 ppl |
| Bike    | 8 ppl/hr     | 14 veh/hr | 22 ppl/hr | 24 ppl/hr    | 21 ppl/hr | 45 ppl/hr  | 246 ppl | 245 ppl | 491 ppl  |
| Walk    | 8 ppl/hr     | 14 veh/hr | 22 ppl/hr | 24 ppl/hr    | 21 ppl/hr | 45 ppl/hr  | 246 ppl | 245 ppl | 491 ppl  |

**Mode Split Assumptions - Parcel F1**

**Retail Component**

**Description of retail component of project:**

The development will contain approximately 600 seats.

**Pertinent Mode Split data from other sources:**

| Information Source  | Mode |         |         |      |      |             |       |
|---|------|---------|---------|------|------|-------------|-------|
|   | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| WMATA Ridership Survey Table 12<br>(U Street Main Street Retail)        | 19%  |         | 57%     | 25%  |      | ---         |       |
| WMATA Ridership Survey Table 12<br>(Crystal City - Crystal Plaza Shops) | 24%  |         | 41%     | 36%  |      | ---         |       |
| WMATA Ridership Survey Table 12<br>(Retail Sites)                       | 36%  |         | 37%     | 27%  |      | ---         |       |

**Mode Split assumed in TIS:**

| Use               | Mode  |         |         |      |      |                   |
|-------------------|-------|---------|---------|------|------|-------------------|
|                   | Drive | Pass-by | Transit | Bike | Walk | Telecommute/Other |
| Retail Mode Split | 35%   |         | 35%     | 15%  | 15%  | ---               |
|                   |       |         |         |      |      |                   |

Notes: Mode split assumed based on neighborhood serving retail, considering additional regional attraction by theater.

E: Trip Generation for Background Developments

**Trip Generation - Parcel F1**

Theater (600 seats)

Step 1: Base trip generation using ITEs' Trip Generation

| Land Use             | Land Use Code | Quantity (x) | AM Peak Hour |          |          | PM Peak Hour |           |           | Daily   |         |          |
|----------------------|---------------|--------------|--------------|----------|----------|--------------|-----------|-----------|---------|---------|----------|
|                      |               |              | In           | Out      | Total    | In           | Out       | Total     | In      | Out     | Total    |
| Theater              | 444           | 600 seats    | 0 veh/hr     | 0 veh/hr | 0 veh/hr | 30 veh/hr    | 24 veh/hr | 54 veh/hr | 528 veh | 528 veh | 1056 veh |
| Calculation Details: |               |              | 50%          | 50%      | =0X      | 55%          | 45%       | =0.09X    | 50%     | 50%     | =1.76X   |

Step 2: Convert to people per hour, before applying mode splits

| Land Use | People/Car (from 2017 NHTS, Table 16) | AM Peak Hour |          |          | PM Peak Hour |           |            | Daily    |             |          |
|----------|---------------------------------------|--------------|----------|----------|--------------|-----------|------------|----------|-------------|----------|
|          |                                       | In           | Out      | Total    | In           | Out       | Total      | In       | Out         | Total    |
| Theater  | 2.10 ppl/veh                          | 0 ppl/hr     | 0 ppl/hr | 0 ppl/hr | 63 ppl/hr    | 50 ppl/hr | 113 ppl/hr | 1109 ppl | 1109 ppl/hr | 2218 ppl |

Step 3: Split between modes, per assumed Mode Splits

| Land Use | Mode    | Split | AM Peak Hour |          |          | PM Peak Hour |           |           | Daily   |         |         |
|----------|---------|-------|--------------|----------|----------|--------------|-----------|-----------|---------|---------|---------|
|          |         |       | In           | Out      | Total    | In           | Out       | Total     | In      | Out     | Total   |
| Theater  | Auto    | 35%   | 0 ppl/hr     | 0 ppl/hr | 0 ppl/hr | 22 ppl/hr    | 18 ppl/hr | 40 ppl/hr | 388 ppl | 388 ppl | 776 ppl |
| Theater  | Transit | 35%   | 0 ppl/hr     | 0 ppl/hr | 0 ppl/hr | 22 ppl/hr    | 18 ppl/hr | 40 ppl/hr | 388 ppl | 388 ppl | 776 ppl |
| Theater  | Bike    | 15%   | 0 ppl/hr     | 0 ppl/hr | 0 ppl/hr | 9 ppl/hr     | 8 ppl/hr  | 17 ppl/hr | 166 ppl | 167 ppl | 333 ppl |
| Theater  | Walk    | 15%   | 0 ppl/hr     | 0 ppl/hr | 0 ppl/hr | 9 ppl/hr     | 8 ppl/hr  | 17 ppl/hr | 166 ppl | 167 ppl | 333 ppl |

Step 4: Convert auto trips back to vehicles/hour

| Land Use | People/Car (from 2017 NHTS, Table 16) | AM Peak Hour |          |          | PM Peak Hour |          |           | Daily   |            |         |
|----------|---------------------------------------|--------------|----------|----------|--------------|----------|-----------|---------|------------|---------|
|          |                                       | In           | Out      | Total    | In           | Out      | Total     | In      | Out        | Total   |
| Theater  | 2.10 ppl/veh                          | 0 veh/hr     | 0 veh/hr | 0 veh/hr | 10 veh/hr    | 9 veh/hr | 19 veh/hr | 185 veh | 185 veh/hr | 370 veh |

**Trip Gen Summary for Parcel F1**

| Mode    | AM Peak Hour |          |          | PM Peak Hour |           |           | Daily   |         |         |
|---------|--------------|----------|----------|--------------|-----------|-----------|---------|---------|---------|
|         | In           | Out      | Total    | In           | Out       | Total     | In      | Out     | Total   |
| Auto    | 0 veh/hr     | 0 veh/hr | 0 veh/hr | 10 veh/hr    | 9 veh/hr  | 19 veh/hr | 185 veh | 185 veh | 370 veh |
| Transit | 0 ppl/hr     | 0 veh/hr | 0 ppl/hr | 22 ppl/hr    | 18 ppl/hr | 40 ppl/hr | 388 ppl | 388 ppl | 776 ppl |
| Bike    | 0 ppl/hr     | 0 veh/hr | 0 ppl/hr | 9 ppl/hr     | 8 ppl/hr  | 17 ppl/hr | 166 ppl | 167 ppl | 333 ppl |
| Walk    | 0 ppl/hr     | 0 veh/hr | 0 ppl/hr | 9 ppl/hr     | 8 ppl/hr  | 17 ppl/hr | 166 ppl | 167 ppl | 333 ppl |

**Mode Split Assumptions - Parcel A1**

**Office Component**

**Description of residential component of project:**

The development will contain approximately 300,000 sf of office space and 12,500 sf of retail

**Pertinent Mode Split data from other sources:**

| Information Source   | Mode |         |         |      |      |             |       |
|--|------|---------|---------|------|------|-------------|-------|
|  | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| CTPP - Adjacent TAZ Residents (10369)  | 35%  | 2%      | 32%     | 5%   | 18%  | 7%          | 1%    |
| CTPP - Adjacent TAZ Residents (20372)  | 32%  | 3%      | 33%     | 2%   | 24%  | 4%          | 2%    |
| Census Tract 72 Residents  | 32%  | 4%      | 37%     | 0%   | 19%  | 3%          | 5%    |
| WMATA Ridership Survey Table 9<br>(U Street/African-Amer Civil War Memorial/Cardozo) | 22%  |         | 51%     | 27%  |      | ---         |       |
| WMATA Ridership Survey Table 10<br>(Residential Mode Share: Inside Beltway)          | 39%  |         | 49%     | 14%  |      | ---         |       |

**Mode Split assumed in TIS:**

| Land Use               | Mode  |         |      |      |                   |
|------------------------|-------|---------|------|------|-------------------|
|                        | Drive | Transit | Bike | Walk | Telecommute/Other |
| Residential Mode Split | 35%   | 45%     | 10%  | 10%  | ---               |

Notes: -Census data (CTPP) used as basis for assumptions  
 -Census data adjusted based on parking supply

**Office Component**

**Pertinent Mode Split data from other sources:**

| Information Source                           | Mode |         |         |      |      |             |       |
|--|------|---------|---------|------|------|-------------|-------|
|  | SOV  | Carpool | Transit | Bike | Walk | Telecommute | Other |
| Workplace TAZ Data (20367)                   | 67%  |         | 30%     | 3%   |      | ---         |       |
| WMATA Ridership Survey (Office Sites in CBD) | 21%  |         | 74%     | 5%   |      | ---         |       |
| DC Water Headquarters                        | 45%  |         | 45%     | 10%  |      | ---         |       |

**Mode Split assumed in TIS:**

| Use               | Mode  |         |      |      |                   |
|-------------------|-------|---------|------|------|-------------------|
|                   | Drive | Transit | Bike | Walk | Telecommute/Other |
| Retail Mode Split | 40%   | 40%     | 5%   | 15%  | ---               |

Notes: - Proximity to Metrorail influenced mode splits  
 - Mode Split compared to DC Water Headquarters



E: Trip Generation for Background Developments

**Trip Generation - Parcel A1**

Office (300,000 sf), Retail (12,500 S.F.)

Step 1: Base trip generation using ITEs' Trip Generation

| Land Use             | Land Use Code | Quantity (x) | AM Peak Hour |           |               | PM Peak Hour |            |               | Daily    |          |                |
|----------------------|---------------|--------------|--------------|-----------|---------------|--------------|------------|---------------|----------|----------|----------------|
|                      |               |              | In           | Out       | Total         | In           | Out        | Total         | In       | Out      | Total          |
| Office               | 310           | 300,000 sf   | 299 veh/hr   | 49 veh/hr | 348 veh/hr    | 55 veh/hr    | 290 veh/hr | 345 veh/hr    | 1461 veh | 1461 veh | 2922 veh       |
| Calculation Details: |               |              | 86%          | 14%       | =1.16(X/1000) | 16%          | 84%        | =1.15(X/1000) | 50%      | 50%      | =9.74(X/1000)  |
| Retail               | 820           | 12,500 sf    | 7 veh/hr     | 5 veh/hr  | 12 veh/hr     | 23 veh/hr    | 25 veh/hr  | 48 veh/hr     | 236 veh  | 236 veh  | 472 veh        |
| Calculation Details: |               |              | 62%          | 38%       | =0.94(X/1000) | 48%          | 52%        | =3.81(X/1000) | 50%      | 50%      | =37.75(X/1000) |

Step 2: Convert to people per hour, before applying mode splits

| Land Use | People/Car (from 2017 NHTS, Table 16) | AM Peak Hour |           |            | PM Peak Hour |            |            | Daily    |             |          |
|----------|---------------------------------------|--------------|-----------|------------|--------------|------------|------------|----------|-------------|----------|
|          |                                       | In           | Out       | Total      | In           | Out        | Total      | In       | Out         | Total    |
| Office   | 1.18 ppl/veh                          | 353 ppl/hr   | 58 ppl/hr | 411 ppl/hr | 65 ppl/hr    | 342 ppl/hr | 407 ppl/hr | 1724 ppl | 1724 veh/hr | 3448 ppl |
| Retail   | 1.82 ppl/veh                          | 13 ppl/hr    | 9 ppl/hr  | 22 ppl/hr  | 42 ppl/hr    | 46 ppl/hr  | 87 ppl/hr  | 430 ppl  | 429 veh/hr  | 859 ppl  |

Step 3: Split between modes, per assumed Mode Splits

| Land Use | Mode    | Split | AM Peak Hour |           |            | PM Peak Hour |            |            | Daily   |         |          |
|----------|---------|-------|--------------|-----------|------------|--------------|------------|------------|---------|---------|----------|
|          |         |       | In           | Out       | Total      | In           | Out        | Total      | In      | Out     | Total    |
| Office   | Auto    | 35%   | 124 ppl/hr   | 20 ppl/hr | 144 ppl/hr | 23 ppl/hr    | 119 ppl/hr | 142 ppl/hr | 603 ppl | 604 ppl | 1207 ppl |
| Office   | Transit | 45%   | 159 ppl/hr   | 26 ppl/hr | 185 ppl/hr | 29 ppl/hr    | 154 ppl/hr | 183 ppl/hr | 776 ppl | 776 ppl | 1552 ppl |
| Office   | Bike    | 10%   | 35 ppl/hr    | 6 ppl/hr  | 41 ppl/hr  | 7 ppl/hr     | 34 ppl/hr  | 41 ppl/hr  | 172 ppl | 173 ppl | 345 ppl  |
| Office   | Walk    | 10%   | 35 ppl/hr    | 6 ppl/hr  | 41 ppl/hr  | 7 ppl/hr     | 34 ppl/hr  | 41 ppl/hr  | 172 ppl | 173 ppl | 345 ppl  |
| Retail   | Auto    | 40%   | 5 ppl/hr     | 4 ppl/hr  | 9 ppl/hr   | 17 ppl/hr    | 18 ppl/hr  | 35 ppl/hr  | 172 ppl | 172 ppl | 344 ppl  |
| Retail   | Transit | 40%   | 5 ppl/hr     | 4 ppl/hr  | 9 ppl/hr   | 17 ppl/hr    | 18 ppl/hr  | 35 ppl/hr  | 172 ppl | 172 ppl | 344 ppl  |
| Retail   | Bike    | 5%    | 1 ppl/hr     | 0 ppl/hr  | 1 ppl/hr   | 2 ppl/hr     | 2 ppl/hr   | 4 ppl/hr   | 22 ppl  | 21 ppl  | 43 ppl   |
| Retail   | Walk    | 15%   | 2 ppl/hr     | 1 ppl/hr  | 3 ppl/hr   | 6 ppl/hr     | 7 ppl/hr   | 13 ppl/hr  | 65 ppl  | 64 ppl  | 129 ppl  |

Step 4: Convert auto trips back to vehicles/hour

| Land Use | People/Car (from 2017 NHTS, Table 16) | AM Peak Hour |           |            | PM Peak Hour |            |            | Daily   |           |          |
|----------|---------------------------------------|--------------|-----------|------------|--------------|------------|------------|---------|-----------|----------|
|          |                                       | In           | Out       | Total      | In           | Out        | Total      | In      | Out       | Total    |
| Office   | 1.18 ppl/veh                          | 105 veh/hr   | 17 veh/hr | 122 veh/hr | 19 veh/hr    | 101 veh/hr | 120 veh/hr | 511 veh | 512 veh   | 1023 veh |
| Retail   | 1.82 ppl/veh                          | 3 veh/hr     | 2 veh/hr  | 5 veh/hr   | 9 veh/hr     | 10 veh/hr  | 19 veh/hr  | 95 veh  | 94 veh/hr | 189 veh  |

**Trip Gen Summary for Parcel A1**

| Mode    | AM Peak Hour |           |            | PM Peak Hour |            |            | Daily   |         |          |
|---------|--------------|-----------|------------|--------------|------------|------------|---------|---------|----------|
|         | In           | Out       | Total      | In           | Out        | Total      | In      | Out     | Total    |
| Auto    | 108 veh/hr   | 19 veh/hr | 127 veh/hr | 28 veh/hr    | 111 veh/hr | 139 veh/hr | 606 veh | 606 veh | 1212 veh |
| Transit | 164 ppl/hr   | 30 veh/hr | 194 ppl/hr | 46 ppl/hr    | 172 ppl/hr | 218 ppl/hr | 948 ppl | 948 ppl | 1896 ppl |
| Bike    | 36 ppl/hr    | 6 veh/hr  | 42 ppl/hr  | 9 ppl/hr     | 36 ppl/hr  | 45 ppl/hr  | 194 ppl | 194 ppl | 388 ppl  |
| Walk    | 37 ppl/hr    | 7 veh/hr  | 44 ppl/hr  | 13 ppl/hr    | 41 ppl/hr  | 54 ppl/hr  | 237 ppl | 237 ppl | 474 ppl  |

## Travel Demand Assumptions

This chapter outlines the Project's transportation demand. It summarizes the projected trip generation of the proposed Project by mode, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 10<sup>th</sup> Edition. This methodology was supplemented to account for the urban nature of the project (*Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes, as vetted and approved by DDOT.

### Existing Trip Generation

Parcel F is currently occupied by an 85-space surface parking lot which is used primarily for sporting events. The surface parking lot is assumed to have a peak occupancy outside of the typical weekday morning and afternoon peak hours. Therefore, conservatively, the existing trips for the surface parking lot will not be included as a credit for the trip generation.

### Proposed Trip Generation

Proposed residential and retail trip generation was calculated based on ITE land use 710, *General Office Building* and ITE land use 820, *Shopping Center*, respectively.

Trips were split into different modes using assumptions derived from census data for the commuters that currently work near the site, WMATA ridership survey data, and the proposed parking supply. A summary of the mode split assumptions is provided in Table 3.

**Table 4: ITE Multi-Modal Trip Generation Summary**

| Mode                       | AM Peak Hour |     |       | PM Peak Hour |     |       | Daily Total | Saturday Peak Hour |     |       |
|----------------------------|--------------|-----|-------|--------------|-----|-------|-------------|--------------------|-----|-------|
|                            | In           | Out | Total | In           | Out | Total |             | In                 | Out | Total |
| <b>Office (279,295 sf)</b> |              |     |       |              |     |       |             |                    |     |       |
| Auto (veh/hr)              | 100          | 15  | 115   | 19           | 101 | 120   | 1,149       | 32                 | 27  | 59    |
| Transit (ppl/hr)           | 118          | 18  | 136   | 23           | 119 | 142   | 1,356       | 38                 | 32  | 70    |
| Bike (ppl/hr)              | 15           | 2   | 17    | 3            | 15  | 18    | 170         | 5                  | 4   | 9     |
| Walk (ppl/hr)              | 43           | 9   | 52    | 8            | 46  | 54    | 509         | 13                 | 13  | 26    |
| <b>Retail (22,776 sf)</b>  |              |     |       |              |     |       |             |                    |     |       |
| Auto (veh/hr)              | 3            | 2   | 5     | 10           | 12  | 22    | 215         | 25                 | 23  | 48    |
| Transit (ppl/hr)           | 8            | 5   | 13    | 27           | 28  | 55    | 548         | 64                 | 58  | 122   |
| Bike (ppl/hr)              | 5            | 3   | 8     | 15           | 17  | 32    | 313         | 36                 | 34  | 70    |
| Walk (ppl/hr)              | 5            | 2   | 7     | 15           | 16  | 31    | 313         | 36                 | 34  | 70    |
| <b>Total</b>               |              |     |       |              |     |       |             |                    |     |       |
| Auto (veh/hr)              | 103          | 17  | 120   | 29           | 113 | 142   | 1,364       | 57                 | 50  | 107   |
| Transit (ppl/hr)           | 126          | 23  | 149   | 50           | 147 | 197   | 1,904       | 102                | 90  | 192   |
| Bike (ppl/hr)              | 20           | 5   | 25    | 18           | 32  | 50    | 483         | 41                 | 38  | 79    |
| Walk (ppl/hr)              | 48           | 11  | 59    | 23           | 62  | 85    | 822         | 49                 | 47  | 96    |

A summary of the multimodal trip generation for the proposed development based on ITE is provided in Table 4 for the morning, afternoon, and Saturday peak hours. Detailed calculations are included in the Technical Attachments.

**Table 3: Mode Split Assumptions**

| Land Use | Mode  |         |      |      |
|----------|-------|---------|------|------|
|          | Drive | Transit | Bike | Walk |
| Office   | 40%   | 40%     | 5%   | 15%  |
| Retail   | 25%   | 35%     | 20%  | 20%  |

As shown on Table 4, the Yards West – Parcel F Project is expected to generate trips on the surrounding transportation network across all modes. The AM peak hour trip generation is projected to include 120 vehicles/hour, 149 transit riders/hour, 25 bicycle trips/hour, and 59 walking trips/hour. The PM peak hour trip generation is projected to include 142 vehicles/hour, 197 transit riders/hour, 50 bicycle trips/hour, and 85 walking trips/hour. The Saturday peak hour trip generation is projected to include 107 vehicles/hour, 192 transit riders/hour, 79 bicycle trips/hour, and 96 walking trips/hour.

It is conservatively assumed that the current use of the site does not contribute existing peak hour trip generation. Therefore, the net increase in vehicular trip generation is equal to the proposed Project-related trip generation. As shown in Table 4, the Project results in an increase in vehicular trip generation during the morning peak hour, with 120 additional vehicle trips (103 additional inbound and 17 additional outbound), and an increase in vehicular trip generation during the afternoon peak hour, with 142 additional trips (29 additional inbound and 113 additional outbound).

As shown on Table 6, the Mixed-Use development scheme of the 5 M Street SW development is expected to generate trips on the surrounding transportation network across all modes. The AM peak hour trip generation is projected to include 192 vehicles/hour, 172 transit riders/hour, 41 bicycle trips/hour, and 93 walking trips/hour. The PM peak hour trip generation is projected to include 225 vehicles/hour, 214 transit riders/hour, 62 bicycle trips/hour, and 202 walking trips/hour. The Saturday peak hour trip generation is projected to include 99 vehicles/hour, 107 transit riders/hour, 29 bicycle trips/hour, and 78 walking trips/hour.

A comparison of the vehicle trip generation between the existing site and the proposed Mixed-Use development scheme is presented in Table 7. As shown on Table 7, the 5 M Street SW development results in an overall net increase in vehicular trip generation, with 78 additional vehicle trips (55 inbound and 23 outbound) during the morning peak hour and 127 additional vehicle trips (44 inbound and 83 outbound) during the afternoon peak hour.

### **Residential Scheme**

Residential trip generation was calculated based on ITE land use 221, *Multifamily Housing (Mid-Rise)*. Trip generation for the neighborhood-serving retail components of the site was calculated based on ITE land use 820, *Shopping Center*. Trip generation for the potential grocer component of the site was calculated based on ITE land use 850, *Supermarket*.

Trips were split into different modes using assumptions derived from census data for the residents that currently live near the site, census data for the commuters that currently work near the site, WMATA ridership survey data, and the proposed parking supply. A summary of the mode split assumptions is provided in Table 5.

Pass-by trips are vehicular trips that are already present on the road network that now deviate from their existing route due to the addition of the proposed development. A pass-by reduction of 25 percent has been applied to the weekday AM and PM peak

hours, as vetted and approved by DDOT. These pass-by rates are available on the ITE Trip Generation Handbook, 3<sup>rd</sup> Edition, for the potential grocer (ITE Land Use 850). A pass-by rate of 25 percent is applied to the Saturday peak hour to be consistent with the weekday AM and PM peak hours. The net site-generated vehicular trip results after pass-by reduction is summarized in Table 8.

A summary of the multimodal trip generation for the proposed Residential development scheme of the 5 M Street SW development based on ITE is provided in Table 9 for the morning, afternoon, and Saturday peak hours. Detailed calculations are included in the Technical Attachments.

**Table 5: Mode Split Assumptions – Residential Scheme**

| Land Use    | Mode  |         |      |      |
|-------------|-------|---------|------|------|
|             | Drive | Transit | Bike | Walk |
| Residential | 35%   | 45%     | 10%  | 10%  |
| Retail      | 5%    | 5%      | 10%  | 80%  |
| Grocer*     | 30%   | 20%     | 10%  | 40%  |

\* Assumes 25% Pass-By trips

As shown on Table 8, the Residential development scheme of the 5 M Street SW development is expected to generate trips on the surrounding transportation network across all modes. The AM peak hour trip generation is projected to include 103 vehicles/hour, 151 transit riders/hour, 40 bicycle trips/hour, and 79 walking trips/hour. The PM peak hour trip generation is projected to include 144 vehicles/hour, 209 transit riders/hour, 66 bicycle trips/hour, and 183 walking trips/hour. The Saturday peak hour trip generation is projected to include 89 vehicles/hour, 132 transit riders/hour, 36 bicycle trips/hour, and 77 walking trips/hour.

A comparison of the vehicle trip generation between the existing site and the proposed Residential development scheme is presented in Table 9. As shown on Table 9, the 5 M Street SW development results in a net increase in vehicular trip generation during the morning peak hour, with 11 fewer vehicle trips (47 fewer inbound and 36 additional outbound), and a net increase in vehicular trip generation during the afternoon peak hour, with 46 additional trips (55 inbound and 9 fewer outbound).

**Table 8: ITE Multi-Modal Trip Generation Summary – Residential Scheme**

| Mode   | AM Peak Hour |     |       | PM Peak Hour |     |       | Saturday Peak Hour |     |       | Daily Total |
|--|--------------|-----|-------|--------------|-----|-------|--------------------|-----|-------|-------------|
|  | In           | Out | Total | In           | Out | Total | In                 | Out | Total |             |
| <b>Residential (688 Units)</b>                 |              |     |       |              |     |       |                    |     |       |             |
| Auto (veh/hr)                                  | 23           | 35  | 47    | 35           | 22  | 57    | 37                 | 39  | 76    | 707         |
| Transit (ppl/hr)                               | 34           | 98  | 132   | 98           | 63  | 161   | 56                 | 60  | 116   | 1,990       |
| Bike (ppl/hr)                                  | 8            | 21  | 29    | 22           | 14  | 36    | 13                 | 13  | 26    | 442         |
| Walk (ppl/hr)                                  | 7            | 22  | 29    | 22           | 14  | 36    | 13                 | 13  | 26    | 443         |
| <b>Neighborhood-Serving Retail (10,755 SF)</b> |              |     |       |              |     |       |                    |     |       |             |
| Auto (veh/hr)                                  | 1            | 0   | 1     | 1            | 1   | 2     | 1                  | 0   | 1     | 20          |
| Transit (ppl/hr)                               | 1            | 0   | 1     | 2            | 2   | 4     | 1                  | 0   | 1     | 37          |
| Bike (ppl/hr)                                  | 1            | 1   | 2     | 4            | 4   | 8     | 1                  | 2   | 3     | 74          |
| Walk (ppl/hr)                                  | 8            | 6   | 14    | 28           | 31  | 59    | 11                 | 10  | 21    | 591         |
| <b>Grocer (13,095 SF)</b>                      |              |     |       |              |     |       |                    |     |       |             |
| Auto (veh/hr)                                  | 7            | 4   | 11    | 14           | 13  | 27    | 5                  | 4   | 9     | 314         |
| Auto (25% Pass-by) (veh/hr)                    | 2            | 2   | 4     | 5            | 4   | 9     | 1                  | 2   | 3     | 105         |
| Transit (ppl/hr)                               | 11           | 7   | 18    | 23           | 21  | 44    | 8                  | 7   | 15    | 509         |
| Bike (ppl/hr)                                  | 6            | 3   | 9     | 11           | 11  | 22    | 4                  | 3   | 7     | 254         |
| Walk (ppl/hr)                                  | 22           | 14  | 36    | 45           | 43  | 88    | 15                 | 15  | 30    | 1,018       |
| <b>Total</b>                                   |              |     |       |              |     |       |                    |     |       |             |
| Auto (veh/hr)                                  | 31           | 68  | 99    | 79           | 56  | 135   | 43                 | 43  | 86    | 1,646       |
| Auto (25% Pass-by) (veh/hr)                    | 2            | 2   | 4     | 5            | 4   | 9     | 1                  | 2   | 3     | 105         |
| Transit (ppl/hr)                               | 46           | 105 | 151   | 123          | 86  | 209   | 65                 | 67  | 132   | 2,536       |
| Bike (ppl/hr)                                  | 15           | 25  | 40    | 37           | 29  | 66    | 18                 | 18  | 36    | 770         |
| Walk (ppl/hr)                                  | 37           | 42  | 79    | 95           | 88  | 183   | 39                 | 38  | 77    | 2,052       |

**Table 9: Net Vehicular Trip Generation – Residential Scheme**

| Mode                                 | AM Peak Hour |            |            | PM Peak Hour |           |            |
|--------------------------------------|--------------|------------|------------|--------------|-----------|------------|
|                                      | In           | Out        | Total      | In           | Out       | Total      |
| <b>Existing Auto Trips (veh/hr)</b>  |              |            |            |              |           |            |
| Convenience Market                   | 25           | 25         | 50         | 20           | 19        | 39         |
| Parking Lot                          | 55           | 9          | 64         | 9            | 50        | 59         |
| Existing Total                       | 80           | 34         | 114        | 29           | 69        | 98         |
| <b>Proposed Auto Trips (veh/hr)*</b> |              |            |            |              |           |            |
| Residential Scheme Total             | 33           | 70         | 103        | 84           | 60        | 144        |
| <b>Net Auto Trips (veh/hr)</b>       | <b>-47</b>   | <b>+36</b> | <b>-11</b> | <b>+55</b>   | <b>-9</b> | <b>+46</b> |

\* Includes auto and pass-by trips

E: Trip Generation for Background Developments

**Background Development Trip Generation: 1000 South Capitol Street SE**

14,000 SF retail, 244 dwelling units

Step 1: Base trip generation using ITEs' Trip Generation

| Land Use             | Land Use Code | Quantity (x) | AM Peak Hour |           |               | PM Peak Hour |           |               | Weekday Total        |
|----------------------|---------------|--------------|--------------|-----------|---------------|--------------|-----------|---------------|----------------------|
|                      |               |              | In           | Out       | Total         | In           | Out       | Total         |                      |
| Retail               | 820           | 14,000 sf    | 8 veh/hr     | 5 veh/hr  | 13 veh/hr     | 25 veh/hr    | 28 veh/hr | 53 veh/hr     | 529 veh              |
| Calculation Details: |               |              | 62%          | 38%       | =0.94(X/1000) | 48%          | 52%       | =3.81(X/1000) | =37.75(X/1000)       |
| High-rise Apt.       | 222           | 244 du       | 19 veh/hr    | 62 veh/hr | 81 veh/hr     | 56 veh/hr    | 36 veh/hr | 92 veh/hr     | 507 veh              |
| Calculation Details: |               |              | 24%          | 76%       | =0.28x+12.86  | 61%          | 39%       | =0.34x+8.56   | Ln(T)=0.84Ln(X)+1.61 |

Note: The setting used for the calculation above was General Urban/Suburban

Step 2: Convert to people per hour, before applying mode splits

| Land Use       | People/Car (from 2017 NHTS, Table 16) | AM Peak Hour |           |           | PM Peak Hour |           |            | Weekday Total |
|----------------|---------------------------------------|--------------|-----------|-----------|--------------|-----------|------------|---------------|
|                |                                       | In           | Out       | Total     | In           | Out       | Total      |               |
| Retail         | 1.82 ppl/veh                          | 15 ppl/hr    | 9 veh/hr  | 24 ppl/hr | 46 ppl/hr    | 50 veh/hr | 96 ppl/hr  | 963 ppl       |
| High-rise Apt. | 1.18 ppl/veh                          | 22 ppl/hr    | 74 veh/hr | 96 ppl/hr | 66 ppl/hr    | 43 veh/hr | 109 ppl/hr | 598 ppl       |

Step 3: Split between modes, per assumed Mode Splits

| Land Use       | Mode    | Split | AM Peak Hour |           |           | PM Peak Hour |           |           | Weekday Total |
|----------------|---------|-------|--------------|-----------|-----------|--------------|-----------|-----------|---------------|
|                |         |       | In           | Out       | Total     | In           | Out       | Total     |               |
| Retail         | Auto    | 45%   | 7 ppl/hr     | 4 veh/hr  | 11 ppl/hr | 21 ppl/hr    | 22 veh/hr | 43 ppl/hr | 433 ppl       |
| Retail         | Transit | 10%   | 2 ppl/hr     | 0 veh/hr  | 2 ppl/hr  | 5 ppl/hr     | 5 veh/hr  | 10 ppl/hr | 96 ppl        |
| Retail         | Bike    | 10%   | 2 ppl/hr     | 0 veh/hr  | 2 ppl/hr  | 5 ppl/hr     | 5 veh/hr  | 10 ppl/hr | 96 ppl        |
| Retail         | Walk    | 35%   | 4 ppl/hr     | 5 veh/hr  | 9 ppl/hr  | 15 ppl/hr    | 18 veh/hr | 33 ppl/hr | 338 ppl       |
| High-rise Apt. | Auto    | 35%   | 8 ppl/hr     | 26 veh/hr | 34 ppl/hr | 23 ppl/hr    | 15 veh/hr | 38 ppl/hr | 209 ppl       |
| High-rise Apt. | Transit | 40%   | 9 ppl/hr     | 29 veh/hr | 38 ppl/hr | 26 ppl/hr    | 18 veh/hr | 44 ppl/hr | 239 ppl       |
| High-rise Apt. | Bike    | 5%    | 1 ppl/hr     | 4 veh/hr  | 5 ppl/hr  | 3 ppl/hr     | 2 veh/hr  | 5 ppl/hr  | 30 ppl        |
| High-rise Apt. | Walk    | 20%   | 4 ppl/hr     | 15 veh/hr | 19 ppl/hr | 14 ppl/hr    | 8 veh/hr  | 22 ppl/hr | 120 ppl       |

Step 4: Convert auto trips back to vehicles/hour

| Land Use       | People/Car (from 2017 NHTS, Table 16) | AM Peak Hour |           |           | PM Peak Hour |           |           | Weekday Total |
|----------------|---------------------------------------|--------------|-----------|-----------|--------------|-----------|-----------|---------------|
|                |                                       | In           | Out       | Total     | In           | Out       | Total     |               |
| Retail         | 1.82 ppl/veh                          | 4 veh/hr     | 2 veh/hr  | 6 veh/hr  | 12 veh/hr    | 12 veh/hr | 24 veh/hr | 238 veh       |
| High-rise Apt. | 1.18 ppl/veh                          | 7 veh/hr     | 22 veh/hr | 29 veh/hr | 19 veh/hr    | 13 veh/hr | 32 veh/hr | 177 veh       |

Trip Gen Summary

| Mode    | AM Peak Hour |           |           | PM Peak Hour |           |           | Weekday Total |
|---------|--------------|-----------|-----------|--------------|-----------|-----------|---------------|
|         | In           | Out       | Total     | In           | Out       | Total     |               |
| Auto    | 11 veh/hr    | 24 veh/hr | 35 veh/hr | 31 veh/hr    | 25 veh/hr | 56 veh/hr | 415 veh       |
| Transit | 11 ppl/hr    | 29 veh/hr | 40 ppl/hr | 31 ppl/hr    | 23 veh/hr | 54 ppl/hr | 335 ppl       |
| Bike    | 3 ppl/hr     | 4 veh/hr  | 7 ppl/hr  | 8 ppl/hr     | 7 veh/hr  | 15 ppl/hr | 126 ppl       |
| Walk    | 8 ppl/hr     | 20 veh/hr | 28 ppl/hr | 29 ppl/hr    | 26 veh/hr | 55 ppl/hr | 458 ppl       |

## Travel Demand Assumptions

This chapter outlines the 1319 South Capitol Street SW development's transportation demand. It summarizes the projected trip generation of the proposed project by mode, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 10<sup>th</sup> Edition. This methodology was supplemented to account for the urban nature of the project (*Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes, as vetted and approved by DDOT.

### Existing Trip Generation

The site is currently occupied by eight (8) rowhouses and a 50-space surface parking lot.

Residential trip generation is based on the existing eight (8) rowhouses and was calculated based on ITE land use 210, *Single-Family Detached Housing*. Trips were split into auto and non-auto modes using assumptions derived from census data for the residents that currently live near the site, census data for the commuters that currently work near the site, and WMATA ridership survey data. As such, a 35% auto/65% non-auto mode split was assumed for the rowhouses. Detailed calculations are included in the Technical Attachments.

The existing 50-space surface parking lot is used primarily for sporting events and is assumed to have a peak occupancy outside of the typical weekday morning and afternoon peak hours. Therefore, it is conservatively assumed that the existing trips for the surface parking lot will not be included as a credit for the trip generation.

### Proposed Trip Generation

Proposed residential and retail trip generation was calculated based on ITE land use 221, *Multifamily Housing (Mid-Rise)* and ITE land use 820, *Shopping Center*, respectively. To provide a more conservative approach, the trip generation assumes a 10%

flexibility in the number of units. As such, the trip generation was assumed with a development program of 341 residential units and 3,479 SF of retail use.

Trips were split into different modes using assumptions derived from census data for the residents that currently live near the site, census data for the commuters that currently work near the site, WMATA ridership survey data, and the proposed parking supply. A summary of the mode split assumptions is provided in Table 3.

A summary of the multimodal trip generation for the proposed development based on ITE is provided in Table 4 for the morning, afternoon, and Saturday peak hours. Detailed calculations are included in the Technical Attachments.

**Table 3: Mode Split Assumptions**

| Land Use    | Mode  |         |      |      |
|-------------|-------|---------|------|------|
|             | Drive | Transit | Bike | Walk |
| Residential | 35%   | 45%     | 10%  | 10%  |
| Retail      | 10%   | 5%      | 10%  | 75%  |

As shown on Table 4, the 1319 South Capitol Street SW development is expected to generate trips on the surrounding transportation network across all modes. The AM peak hour trip generation is projected to include 44 vehicles/hour, 65 transit riders/hour, 15 bicycle trips/hour, and 18 walking trips/hour. The PM peak hour trip generation is projected to include 54 vehicles/hour, 81 transit riders/hour, 20 bicycle trips/hour, and 36 walking trips/hour. The Saturday peak hour trip generation is projected to include 38 vehicles/hour, 58 transit riders/hour, 15 bicycle trips/hour, and 31 walking trips/hour.

A comparison of the vehicle trip generation between the existing site and the proposed development is presented in Table 5. As shown on Table 5, the 1319 South Capitol Street SW development results in a net increase in vehicular trip generation during the morning peak hour, with 41 additional vehicle trips (10 additional inbound and 31 additional outbound), and a net increase in vehicular trip generation during the afternoon peak hour, with 51 additional trips (31 additional inbound and 20 additional outbound).

**Table 4: ITE Multi-Modal Trip Generation Summary**

| Mode  | AM Peak Hour |     |       | PM Peak Hour |     |       | Saturday Peak Hour |     |       | Daily Total |
|---|--------------|-----|-------|--------------|-----|-------|--------------------|-----|-------|-------------|
|   | In           | Out | Total | In           | Out | Total | In                 | Out | Total |             |
| <b>Residential (341 Units)</b>                |              |     |       |              |     |       |                    |     |       |             |
| Auto (veh/hr)                                 | 11           | 32  | 43    | 32           | 21  | 53    | 19                 | 18  | 37    | 650         |
| Transit (ppl/hr)                              | 17           | 48  | 65    | 49           | 31  | 80    | 28                 | 29  | 57    | 986         |
| Bike (ppl/hr)                                 | 4            | 11  | 15    | 11           | 7   | 18    | 6                  | 7   | 13    | 219         |
| Walk (ppl/hr)                                 | 4            | 10  | 14    | 11           | 6   | 17    | 6                  | 7   | 13    | 219         |
| <b>Neighborhood-Serving Retail (3,479 SF)</b> |              |     |       |              |     |       |                    |     |       |             |
| Auto (veh/hr)                                 | 0            | 1   | 1     | 1            | 0   | 1     | 1                  | 0   | 1     | 13          |
| Transit (ppl/hr)                              | 0            | 0   | 0     | 1            | 0   | 1     | 1                  | 0   | 1     | 12          |
| Bike (ppl/hr)                                 | 0            | 0   | 0     | 1            | 1   | 2     | 1                  | 1   | 2     | 24          |
| Walk (ppl/hr)                                 | 4            | 0   | 4     | 8            | 11  | 19    | 10                 | 8   | 18    | 178         |
| <b>Total</b>                                  |              |     |       |              |     |       |                    |     |       |             |
| Auto (veh/hr)                                 | 11           | 33  | 44    | 33           | 21  | 54    | 20                 | 18  | 38    | 663         |
| Transit (ppl/hr)                              | 17           | 48  | 65    | 50           | 31  | 81    | 29                 | 29  | 58    | 998         |
| Bike (ppl/hr)                                 | 4            | 11  | 15    | 12           | 8   | 20    | 7                  | 8   | 15    | 243         |
| Walk (ppl/hr)                                 | 8            | 10  | 18    | 19           | 17  | 36    | 16                 | 15  | 31    | 397         |

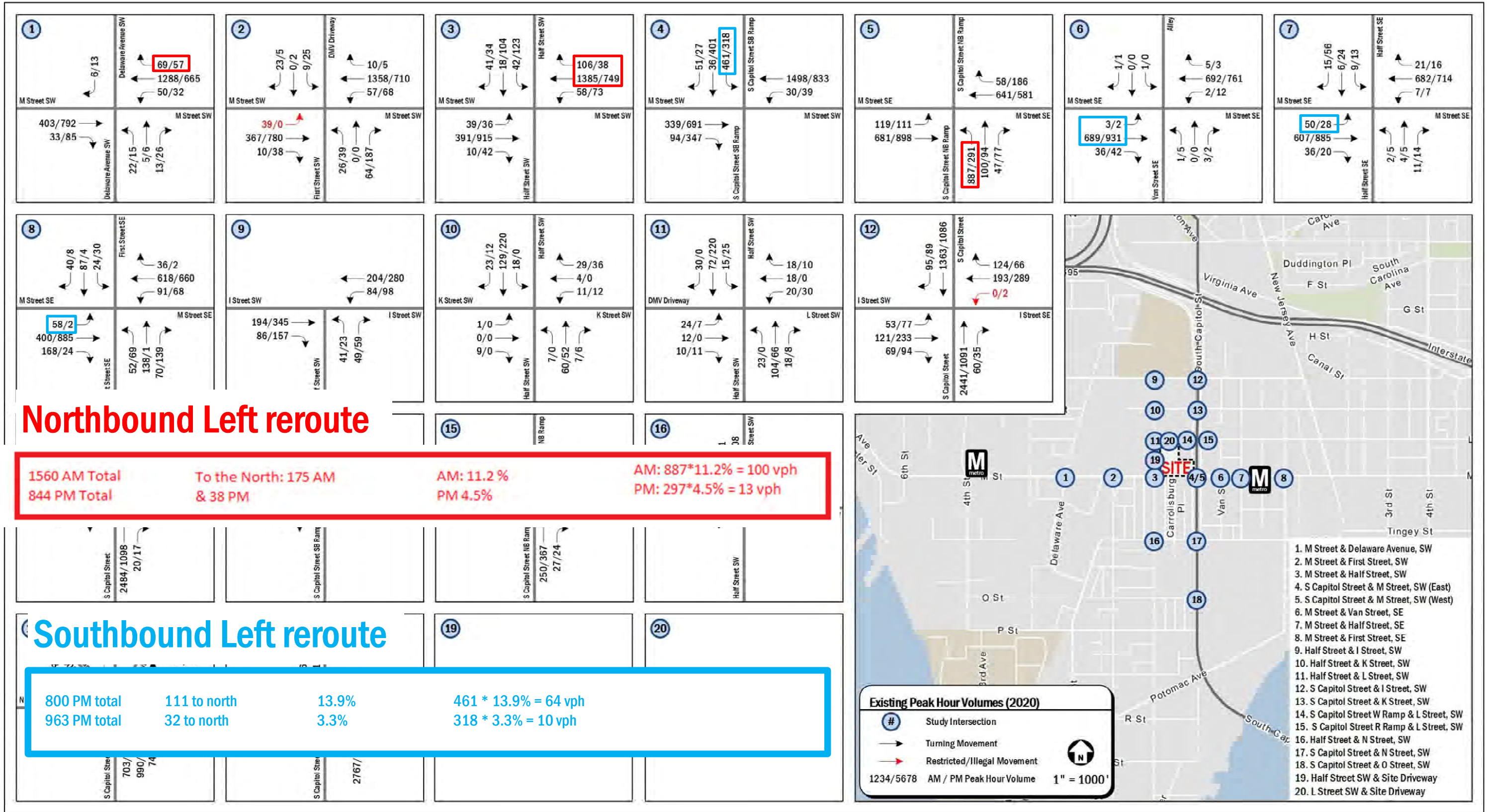
**Table 5: Net Vehicular Trip Generation**

| Mode                                | AM Peak Hour |            |            | PM Peak Hour |            |            |
|-------------------------------------|--------------|------------|------------|--------------|------------|------------|
|                                     | In           | Out        | Total      | In           | Out        | Total      |
| <b>Existing Auto Trips (veh/hr)</b> |              |            |            |              |            |            |
| Rowhouses                           | 1            | 2          | 3          | 2            | 1          | 3          |
| <b>Proposed Auto Trips (veh/hr)</b> |              |            |            |              |            |            |
| Residential                         | 11           | 32         | 43         | 32           | 21         | 53         |
| Retail                              | 0            | 1          | 1          | 1            | 0          | 1          |
| Total                               | 11           | 33         | 44         | 33           | 21         | 54         |
| <b>Net Auto Trips (veh/hr)</b>      | <b>+10</b>   | <b>+31</b> | <b>+41</b> | <b>+31</b>   | <b>+20</b> | <b>+51</b> |

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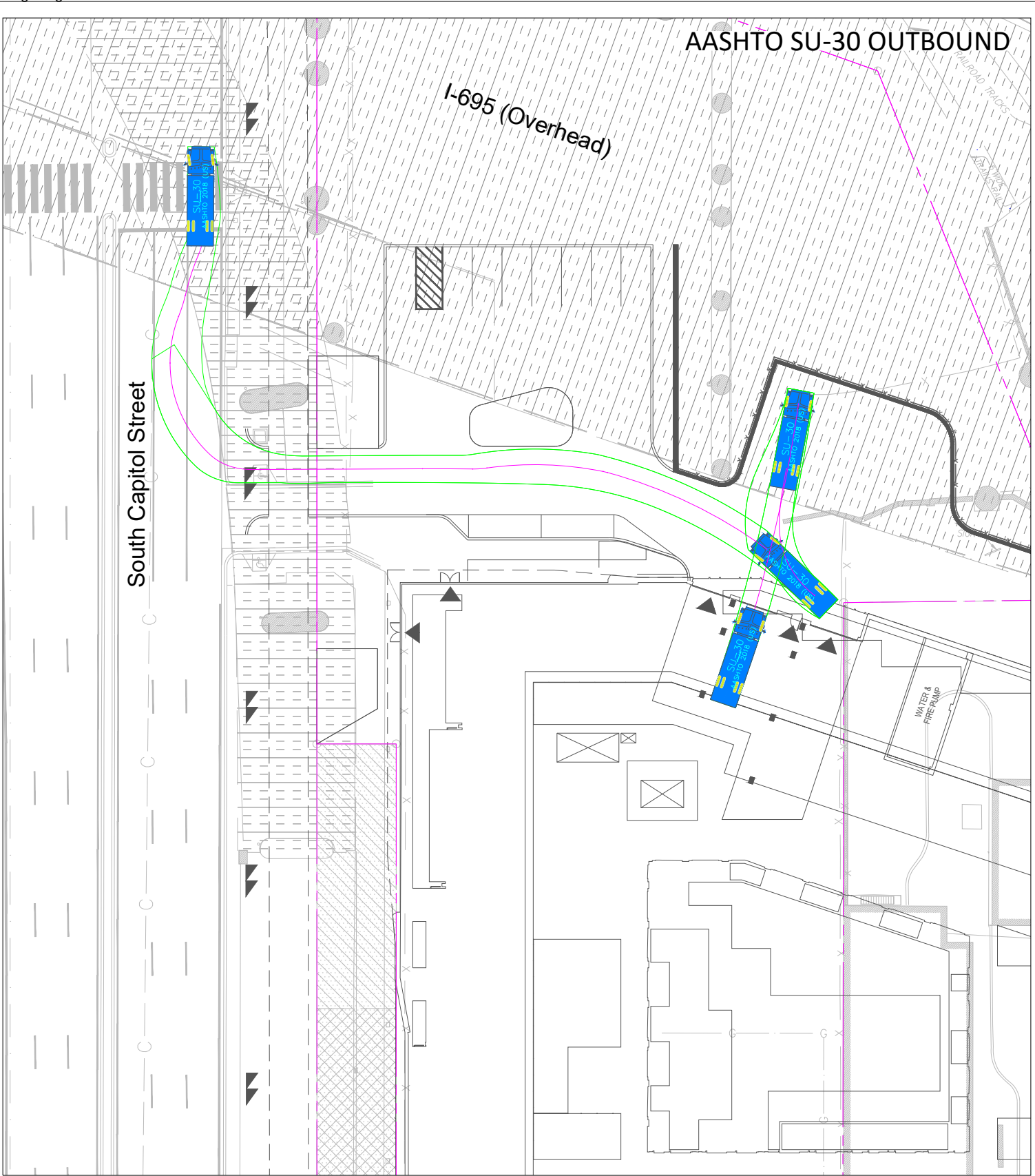
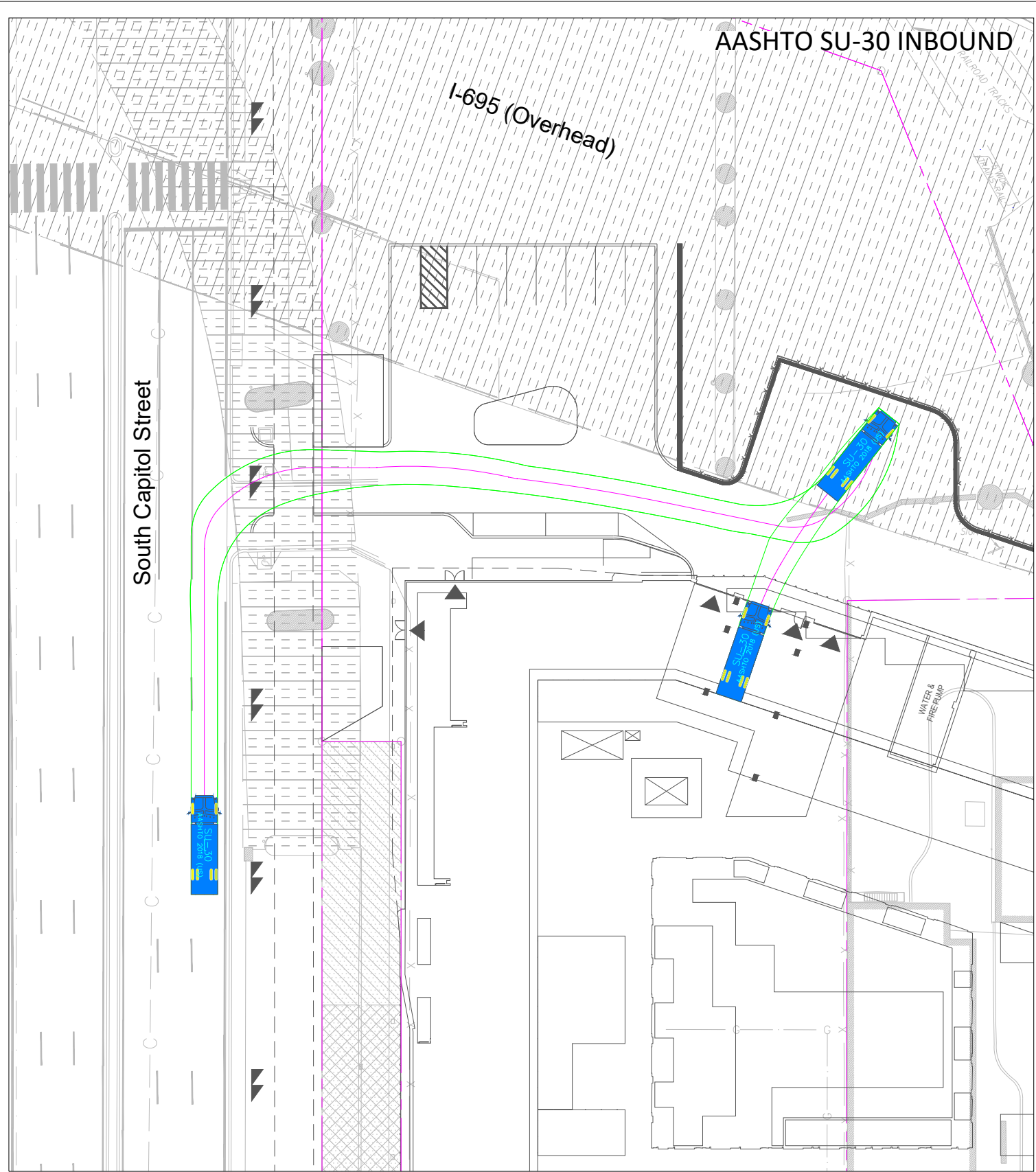
F. 5 M Street SW CTR Volume Data Used to Determine Volumes Rerouted by South Capitol Street Corridor Project



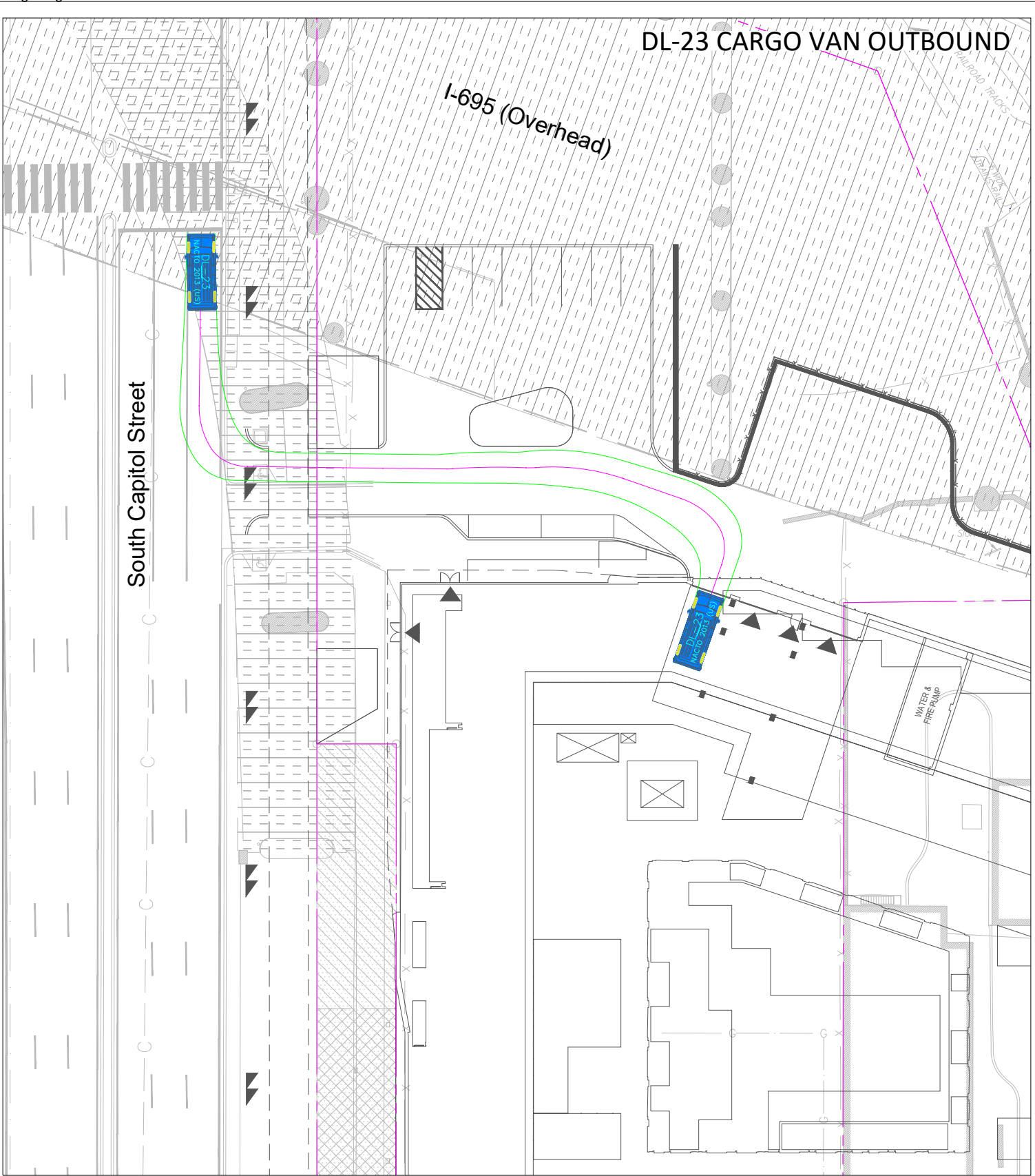
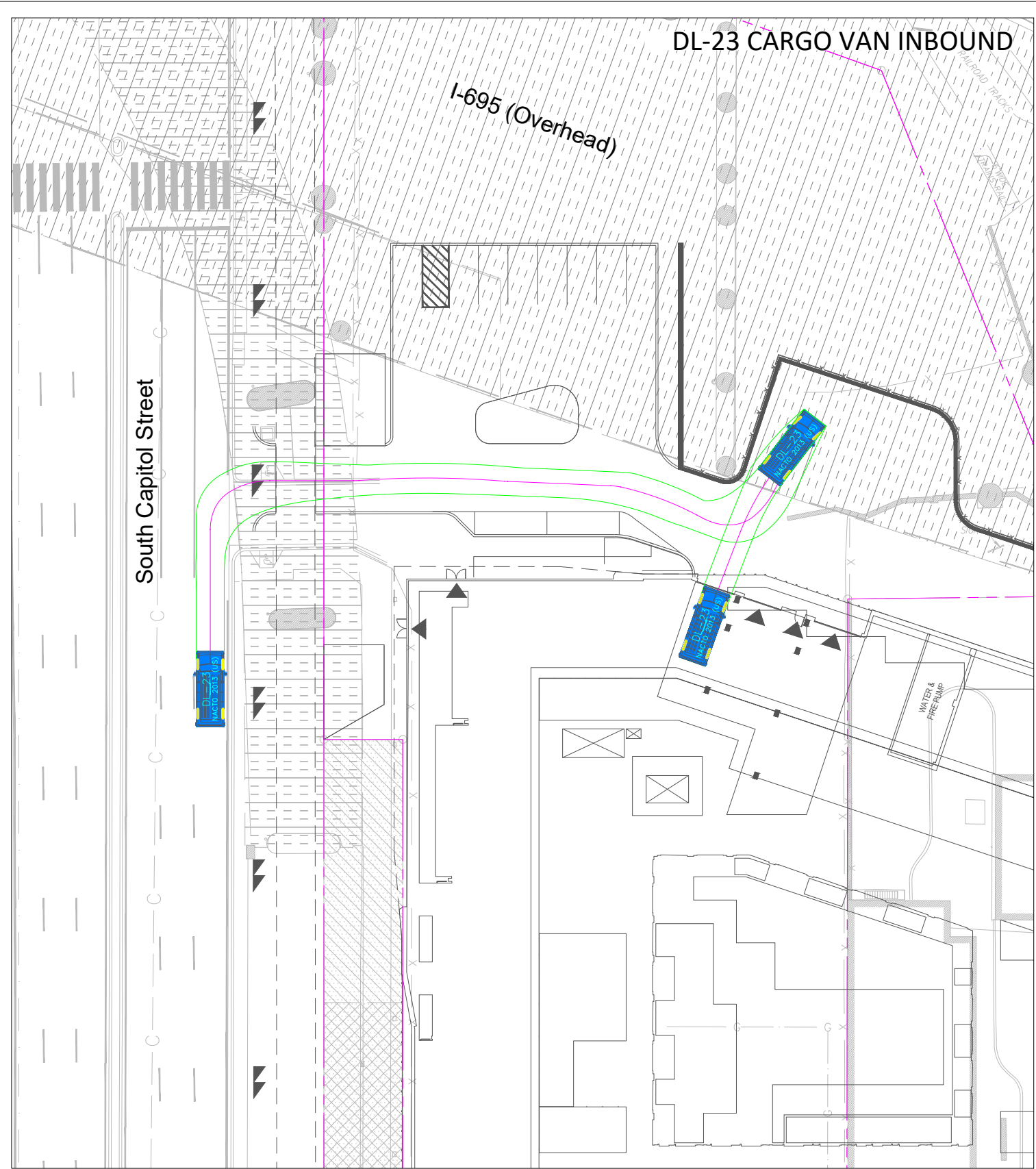


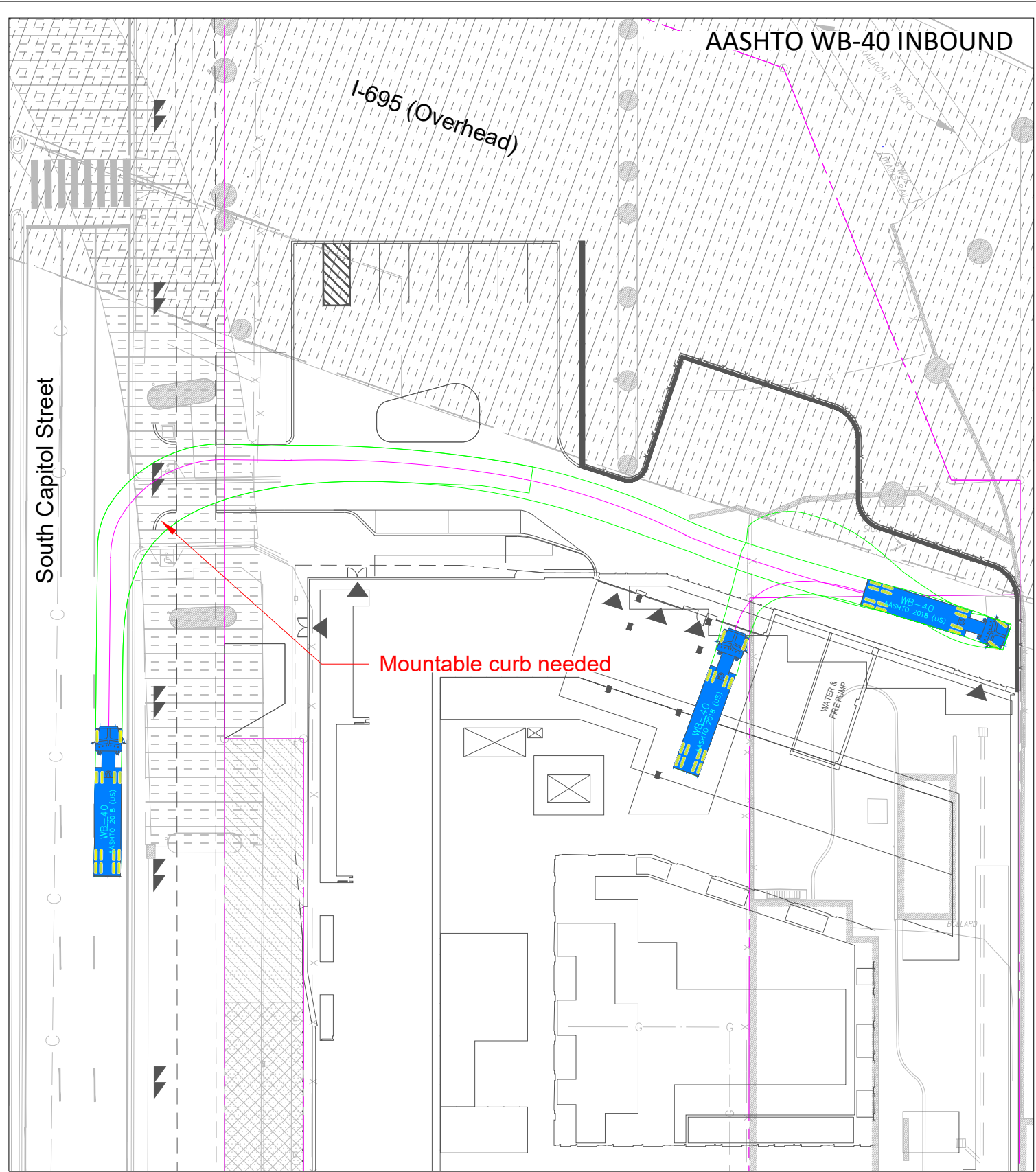
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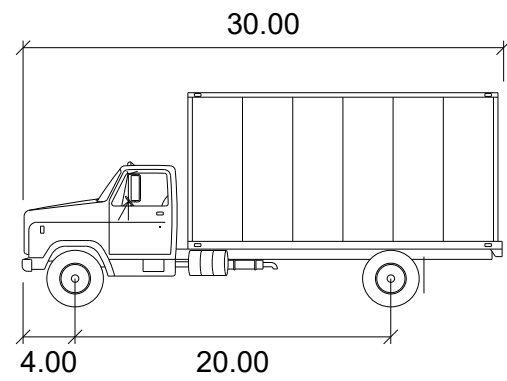
## G. Truck Maneuvering Diagrams





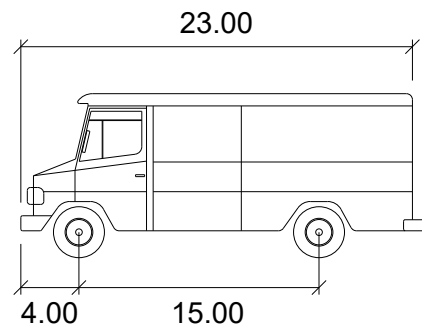






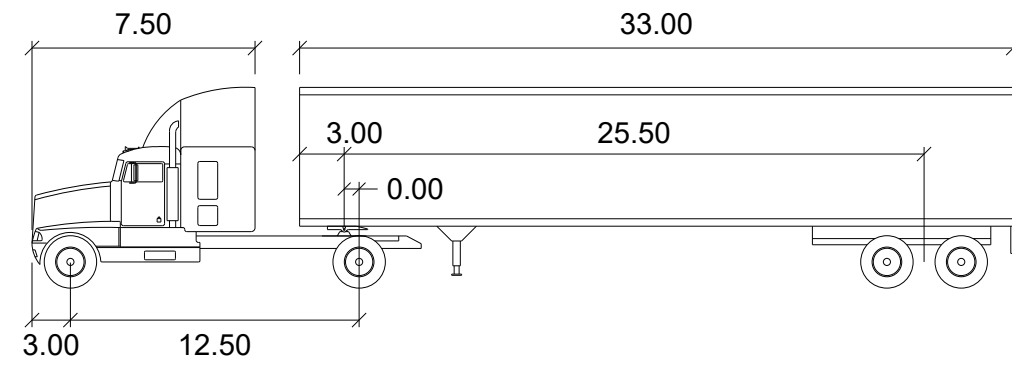
**SU-30**

|                   |        |
|-------------------|--------|
|                   | feet   |
| Width             | : 8.00 |
| Track             | : 8.00 |
| Lock to Lock Time | : 6.0  |
| Steering Angle    | : 31.8 |



**DL-23**

|                   |        |
|-------------------|--------|
|                   | feet   |
| Width             | : 8.50 |
| Track             | : 8.50 |
| Lock to Lock Time | : 6.0  |
| Steering Angle    | : 40.4 |



**WB-40**

|                   |         |                    |        |
|-------------------|---------|--------------------|--------|
|                   | feet    |                    |        |
| Tractor Width     | : 8.00  | Lock to Lock Time  | : 6.0  |
| Tractor Track     | : 8.00  | Steering Angle     | : 20.3 |
| Tractor Wheelbase | : 12.50 | Articulating Angle | : 70.0 |
| Tractor Overhang  | : 3.00  |                    |        |
| Trailer Width     | : 8.00  |                    |        |
| Trailer Track     | : 8.00  |                    |        |

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## H. Vehicle Level of Service Definitions





## A. LEVEL OF SERVICE DEFINITIONS

All capacity analyses are based on the procedures specified by the Transportation Research Board, Special Report 209: Highway Capacity Manual (HCM), 2000. Levels of service (LOS) range from A to F. A brief description of each level of service for signalized and unsignalized intersections is provided below.

### SIGNALIZED INTERSECTIONS

Level of service is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- **LOS A** describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.
- **LOS B** describes operations with average delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
- **LOS C** describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.
- **LOS D** describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures, where all waiting vehicles do not clear the intersection during a single green time, are noticeable. This is generally considered the lower end of the range of the acceptable level of service in urban areas.
- **LOS E** describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. LOS E has been set as the limit of acceptable conditions.
- **LOS F** describes operations with average delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a flow rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

### UNSIGNALIZED INTERSECTIONS

At an unsignalized intersection, the major street through traffic and right turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn.

The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.





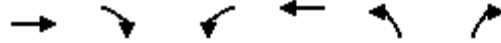
The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the results from this analysis usually indicate worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- **LOS A** describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total delay of less than 10.0 seconds per vehicle.
- **LOS B** describes operations with average total delay in the range of 10.1 to 15.0 seconds per vehicle.
- **LOS C** describes operations with average total delay in the range of 15.1 to 25.0 second per vehicle.
- **LOS D** describes operations with average total delay in the range of 25.1 to 35.0 seconds per vehicle.
- **LOS E** describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.
- **LOS F** describes operations with average total delay of 50 seconds per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal driver behavior.

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## I. Intersection Capacity Analysis – Existing Conditions (2021 Existing Conditions)

HCM Unsignalized Intersection Capacity Analysis  
2: Half St SW & Eye St SW



| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               | →           |             |             | ←                    | ↔    | ↔    |
| Traffic Volume (veh/h)            | 205         | 45          | 108         | 276                  | 64   | 59   |
| Future Volume (Veh/h)             | 205         | 45          | 108         | 276                  | 64   | 59   |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Peak Hour Factor                  | 0.89        | 0.89        | 0.92        | 0.92                 | 0.85 | 0.85 |
| Hourly flow rate (vph)            | 230         | 51          | 117         | 300                  | 75   | 69   |
| Pedestrians                       | 3           |             |             | 2                    | 21   |      |
| Lane Width (ft)                   | 12.0        |             |             | 12.0                 | 12.0 |      |
| Walking Speed (ft/s)              | 4.0         |             |             | 4.0                  | 4.0  |      |
| Percent Blockage                  | 0           |             |             | 0                    | 2    |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             | None                 |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              | 470         |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      | 0.92 |      |
| vC, conflicting volume            | 302         |             |             | 814                  |      | 278  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 302         |             |             | 753                  |      | 278  |
| tC, single (s)                    | 4.1         |             |             | 6.4                  |      | 6.2  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             | 3.5                  |      | 3.3  |
| p0 queue free %                   | 91          |             |             | 76                   |      | 91   |
| cM capacity (veh/h)               | 1237        |             |             | 308                  |      | 746  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 281         | 417         | 144         |                      |      |      |
| Volume Left                       | 0           | 117         | 75          |                      |      |      |
| Volume Right                      | 51          | 0           | 69          |                      |      |      |
| cSH                               | 1700        | 1237        | 428         |                      |      |      |
| Volume to Capacity                | 0.17        | 0.09        | 0.34        |                      |      |      |
| Queue Length 95th (ft)            | 0           | 8           | 36          |                      |      |      |
| Control Delay (s)                 | 0.0         | 3.0         | 17.6        |                      |      |      |
| Lane LOS                          |             | A           | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 3.0         | 17.6        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     | 4.5         |             |             |                      |      |      |
| Intersection Capacity Utilization | 56.6%       |             |             | ICU Level of Service | B    |      |
| Analysis Period (min)             | 15          |             |             |                      |      |      |

Queues

3: South Capitol St & Eye St SW/Eye St SE



| Lane Group              | EBT  | EBR  | WBT  | WBR  | NBT  | SBT  | SBR  |
|-------------------------|------|------|------|------|------|------|------|
| Lane Group Flow (vph)   | 231  | 85   | 178  | 203  | 2843 | 1483 | 201  |
| v/c Ratio               | 0.90 | 0.22 | 0.44 | 0.48 | 0.92 | 0.48 | 0.20 |
| Control Delay           | 89.2 | 6.3  | 51.8 | 27.7 | 25.6 | 38.1 | 15.8 |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 58.8 | 71.9 |
| Total Delay             | 89.2 | 6.3  | 51.8 | 27.7 | 25.6 | 96.9 | 87.7 |
| Queue Length 50th (ft)  | 220  | 0    | 148  | 83   | 795  | 560  | 151  |
| Queue Length 95th (ft)  | #383 | 32   | 226  | 167  | 881  | m493 | m115 |
| Internal Link Dist (ft) | 390  |      | 201  |      | 332  | 76   |      |
| Turn Bay Length (ft)    |      | 300  |      |      |      |      |      |
| Base Capacity (vph)     | 258  | 387  | 405  | 419  | 3090 | 3112 | 1012 |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    | 2787 | 875  |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.90 | 0.22 | 0.44 | 0.48 | 0.92 | 4.56 | 1.47 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

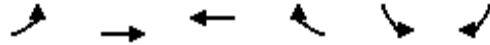
HCM Signalized Intersection Capacity Analysis  
3: South Capitol St & Eye St SW/Eye St SE



| Movement               | EBL  | EBT   | EBR  | WBL  | WBT  | WBR  | NBL  | NBT   | NBR  | SBL  | SBT   | SBR   |
|------------------------|------|-------|------|------|------|------|------|-------|------|------|-------|-------|
| Lane Configurations    |      | ↕     | ↗    |      | ↕    | ↗    |      | ↕↗↘   |      |      | ↕↗↘   | ↗     |
| Traffic Volume (vph)   | 76   | 139   | 79   | 0    | 166  | 189  | 0    | 2455  | 189  | 0    | 1379  | 187   |
| Future Volume (vph)    | 76   | 139   | 79   | 0    | 166  | 189  | 0    | 2455  | 189  | 0    | 1379  | 187   |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  |
| Total Lost time (s)    |      | 5.0   | 5.0  |      | 5.0  | 5.0  |      | 4.0   |      |      | 4.0   | 4.0   |
| Lane Util. Factor      |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 0.91  |      |      | 0.91  | 1.00  |
| Frbp, ped/bikes        |      | 1.00  | 0.89 |      | 1.00 | 0.99 |      | 1.00  |      |      | 1.00  | 0.96  |
| Flpb, ped/bikes        |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00  |      |      | 1.00  | 1.00  |
| Frt                    |      | 1.00  | 0.85 |      | 1.00 | 0.85 |      | 0.99  |      |      | 1.00  | 0.85  |
| Flt Protected          |      | 0.98  | 1.00 |      | 1.00 | 1.00 |      | 1.00  |      |      | 1.00  | 1.00  |
| Satd. Flow (prot)      |      | 1559  | 1261 |      | 1644 | 1391 |      | 4450  |      |      | 4489  | 1371  |
| Flt Permitted          |      | 0.66  | 1.00 |      | 1.00 | 1.00 |      | 1.00  |      |      | 1.00  | 1.00  |
| Satd. Flow (perm)      |      | 1047  | 1261 |      | 1644 | 1391 |      | 4450  |      |      | 4489  | 1371  |
| Peak-hour factor, PHF  | 0.93 | 0.93  | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93  | 0.93 | 0.93 | 0.93  | 0.93  |
| Adj. Flow (vph)        | 82   | 149   | 85   | 0    | 178  | 203  | 0    | 2640  | 203  | 0    | 1483  | 201   |
| RTOR Reduction (vph)   | 0    | 0     | 64   | 0    | 0    | 77   | 0    | 6     | 0    | 0    | 0     | 62    |
| Lane Group Flow (vph)  | 0    | 231   | 21   | 0    | 178  | 126  | 0    | 2837  | 0    | 0    | 1483  | 139   |
| Confl. Peds. (#/hr)    | 2    |       | 73   | 73   |      | 2    | 25   |       | 24   | 24   |       | 25    |
| Heavy Vehicles (%)     | 9%   | 7%    | 3%   | 2%   | 4%   | 3%   | 2%   | 3%    | 10%  | 2%   | 4%    | 2%    |
| Turn Type              | Perm | NA    | Perm |      | NA   | Perm |      | NA    |      |      | NA    | Perm  |
| Protected Phases       |      | 4     |      |      | 8    |      |      | 12    |      |      |       | 12    |
| Permitted Phases       | 4    |       | 4    |      |      | 8    |      |       |      |      |       | 12    |
| Actuated Green, G (s)  |      | 35.0  | 35.0 |      | 35.0 | 35.0 |      | 102.0 |      |      | 102.0 | 102.0 |
| Effective Green, g (s) |      | 37.0  | 37.0 |      | 37.0 | 37.0 |      | 104.0 |      |      | 104.0 | 104.0 |
| Actuated g/C Ratio     |      | 0.25  | 0.25 |      | 0.25 | 0.25 |      | 0.69  |      |      | 0.69  | 0.69  |
| Clearance Time (s)     |      | 7.0   | 7.0  |      | 7.0  | 7.0  |      | 6.0   |      |      | 6.0   | 6.0   |
| Lane Grp Cap (vph)     |      | 258   | 311  |      | 405  | 343  |      | 3085  |      |      | 3112  | 950   |
| v/s Ratio Prot         |      |       |      |      | 0.11 |      |      | c0.64 |      |      | 0.33  |       |
| v/s Ratio Perm         |      | c0.22 | 0.02 |      |      | 0.09 |      |       |      |      |       | 0.10  |
| v/c Ratio              |      | 0.90  | 0.07 |      | 0.44 | 0.37 |      | 0.92  |      |      | 0.48  | 0.15  |
| Uniform Delay, d1      |      | 54.6  | 43.3 |      | 47.7 | 46.8 |      | 19.5  |      |      | 10.5  | 7.9   |
| Progression Factor     |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00  |      |      | 3.58  | 16.82 |
| Incremental Delay, d2  |      | 34.5  | 0.4  |      | 3.4  | 3.0  |      | 5.8   |      |      | 0.0   | 0.0   |
| Delay (s)              |      | 89.1  | 43.7 |      | 51.2 | 49.8 |      | 25.2  |      |      | 37.8  | 132.1 |
| Level of Service       |      | F     | D    |      | D    | D    |      | C     |      |      | D     | F     |
| Approach Delay (s)     |      | 76.9  |      |      | 50.5 |      |      | 25.2  |      |      | 49.1  |       |
| Approach LOS           |      | E     |      |      | D    |      |      | C     |      |      | D     |       |

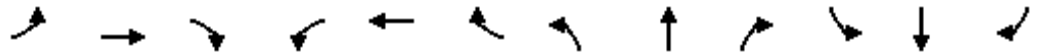
| Intersection Summary              |        |                           |      |
|-----------------------------------|--------|---------------------------|------|
| HCM 2000 Control Delay            | 37.9   | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio | 1.01   |                           |      |
| Actuated Cycle Length (s)         | 150.0  | Sum of lost time (s)      | 22.0 |
| Intersection Capacity Utilization | 110.8% | ICU Level of Service      | H    |
| Analysis Period (min)             | 15     |                           |      |
| c Critical Lane Group             |        |                           |      |

HCM Unsignalized Intersection Capacity Analysis  
4: Eye St SE & Site Dwy



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↶           | ↷           |                      | ↷    |      |
| Traffic Volume (veh/h)            | 10          | 320         | 353         | 3                    | 0    | 4    |
| Future Volume (Veh/h)             | 10          | 320         | 353         | 3                    | 0    | 4    |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Peak Hour Factor                  | 0.92        | 0.92        | 0.92        | 0.92                 | 0.92 | 0.92 |
| Hourly flow rate (vph)            | 11          | 348         | 384         | 3                    | 0    | 4    |
| <b>Pedestrians</b>                |             |             |             |                      |      |      |
| Lane Width (ft)                   |             |             |             |                      |      |      |
| Walking Speed (ft/s)              |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             | None        | None        |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              |             | 281         |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      | 0.96 |      |
| vC, conflicting volume            | 387         |             |             |                      | 756  | 386  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 387         |             |             |                      | 723  | 386  |
| tC, single (s)                    | 4.1         |             |             |                      | 6.4  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             |                      | 3.5  | 3.3  |
| p0 queue free %                   | 99          |             |             |                      | 100  | 99   |
| cM capacity (veh/h)               | 1171        |             |             |                      | 373  | 662  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 359         | 387         | 4           |                      |      |      |
| Volume Left                       | 11          | 0           | 0           |                      |      |      |
| Volume Right                      | 0           | 3           | 4           |                      |      |      |
| cSH                               | 1171        | 1700        | 662         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.23        | 0.01        |                      |      |      |
| Queue Length 95th (ft)            | 1           | 0           | 0           |                      |      |      |
| Control Delay (s)                 | 0.3         | 0.0         | 10.5        |                      |      |      |
| Lane LOS                          | A           |             | B           |                      |      |      |
| Approach Delay (s)                | 0.3         | 0.0         | 10.5        |                      |      |      |
| Approach LOS                      |             |             | B           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.2         |                      |      |      |
| Intersection Capacity Utilization |             |             | 37.7%       | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
5: Half St SE/Coal Yard Dwy & Eye St SE



| Movement                          | EBL  | EBT  | EBR   | WBL  | WBT                  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-----------------------------------|------|------|-------|------|----------------------|------|------|------|------|------|------|------|
| Lane Configurations               |      | ↕    |       |      | ↕                    |      |      | ↕    |      |      | ↕    |      |
| Traffic Volume (veh/h)            | 2    | 202  | 25    | 15   | 382                  | 0    | 61   | 0    | 17   | 0    | 0    | 0    |
| Future Volume (Veh/h)             | 2    | 202  | 25    | 15   | 382                  | 0    | 61   | 0    | 17   | 0    | 0    | 0    |
| Sign Control                      |      | Free |       |      | Free                 |      |      | Stop |      |      | Stop |      |
| Grade                             |      | 0%   |       |      | 0%                   |      |      | 0%   |      |      | 0%   |      |
| Peak Hour Factor                  | 0.90 | 0.85 | 0.85  | 0.85 | 0.85                 | 0.90 | 0.85 | 0.90 | 0.85 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph)            | 2    | 238  | 29    | 18   | 449                  | 0    | 72   | 0    | 20   | 0    | 0    | 0    |
| Pedestrians                       |      | 22   |       |      | 81                   |      |      | 11   |      |      |      |      |
| Lane Width (ft)                   |      | 12.0 |       |      | 12.0                 |      |      | 12.0 |      |      |      |      |
| Walking Speed (ft/s)              |      | 4.0  |       |      | 4.0                  |      |      | 4.0  |      |      |      |      |
| Percent Blockage                  |      | 2    |       |      | 7                    |      |      | 1    |      |      |      |      |
| Right turn flare (veh)            |      |      |       |      |                      |      |      |      |      |      |      |      |
| Median type                       |      | None |       |      | None                 |      |      |      |      |      |      |      |
| Median storage (veh)              |      |      |       |      |                      |      |      |      |      |      |      |      |
| Upstream signal (ft)              |      | 429  |       |      |                      |      |      |      |      |      |      |      |
| pX, platoon unblocked             |      |      |       |      |                      |      |      |      |      |      |      |      |
| vC, conflicting volume            | 449  |      |       | 278  |                      |      | 774  | 752  | 344  | 842  | 767  | 471  |
| vC1, stage 1 conf vol             |      |      |       |      |                      |      |      |      |      |      |      |      |
| vC2, stage 2 conf vol             |      |      |       |      |                      |      |      |      |      |      |      |      |
| vCu, unblocked vol                | 449  |      |       | 278  |                      |      | 774  | 752  | 344  | 842  | 767  | 471  |
| tC, single (s)                    | 4.1  |      |       | 4.1  |                      |      | 7.1  | 6.5  | 6.2  | 7.1  | 6.5  | 6.2  |
| tC, 2 stage (s)                   |      |      |       |      |                      |      |      |      |      |      |      |      |
| tF (s)                            | 2.2  |      |       | 2.2  |                      |      | 3.5  | 4.0  | 3.3  | 3.5  | 4.0  | 3.3  |
| p0 queue free %                   | 100  |      |       | 99   |                      |      | 76   | 100  | 97   | 100  | 100  | 100  |
| cM capacity (veh/h)               | 1111 |      |       | 1273 |                      |      | 301  | 330  | 645  | 252  | 324  | 582  |
| Direction, Lane #                 | EB 1 | WB 1 | NB 1  | SB 1 |                      |      |      |      |      |      |      |      |
| Volume Total                      | 269  | 467  | 92    | 0    |                      |      |      |      |      |      |      |      |
| Volume Left                       | 2    | 18   | 72    | 0    |                      |      |      |      |      |      |      |      |
| Volume Right                      | 29   | 0    | 20    | 0    |                      |      |      |      |      |      |      |      |
| cSH                               | 1111 | 1273 | 340   | 1700 |                      |      |      |      |      |      |      |      |
| Volume to Capacity                | 0.00 | 0.01 | 0.27  | 0.00 |                      |      |      |      |      |      |      |      |
| Queue Length 95th (ft)            | 0    | 1    | 27    | 0    |                      |      |      |      |      |      |      |      |
| Control Delay (s)                 | 0.1  | 0.4  | 19.4  | 0.0  |                      |      |      |      |      |      |      |      |
| Lane LOS                          | A    | A    | C     | A    |                      |      |      |      |      |      |      |      |
| Approach Delay (s)                | 0.1  | 0.4  | 19.4  | 0.0  |                      |      |      |      |      |      |      |      |
| Approach LOS                      |      |      | C     | A    |                      |      |      |      |      |      |      |      |
| <b>Intersection Summary</b>       |      |      |       |      |                      |      |      |      |      |      |      |      |
| Average Delay                     |      |      | 2.4   |      |                      |      |      |      |      |      |      |      |
| Intersection Capacity Utilization |      |      | 52.6% |      | ICU Level of Service |      |      |      | A    |      |      |      |
| Analysis Period (min)             |      |      | 15    |      |                      |      |      |      |      |      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
6: First St SE/CSX East Dwy & Eye St SE



| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    |      |      |      |      |      |      |      |      |      |      |      |      |
| Sign Control           | Stop |      |      |      | Stop |      |      | Stop |      |      | Stop |      |
| Traffic Volume (vph)   | 0    | 157  | 64   | 57   | 252  | 0    | 79   | 0    | 69   | 0    | 0    | 0    |
| Future Volume (vph)    | 0    | 157  | 64   | 57   | 252  | 0    | 79   | 0    | 69   | 0    | 0    | 0    |
| Peak Hour Factor       | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 0    | 174  | 71   | 63   | 280  | 0    | 88   | 0    | 77   | 0    | 0    | 0    |

| Direction, Lane #     | EB 1 | EB 2  | WB 1 | NB 1 | NB 2  | SB 1 |
|-----------------------|------|-------|------|------|-------|------|
| Volume Total (vph)    | 0    | 245   | 343  | 88   | 77    | 0    |
| Volume Left (vph)     | 0    | 0     | 63   | 88   | 0     | 0    |
| Volume Right (vph)    | 0    | 71    | 0    | 0    | 77    | 0    |
| Hadj (s)              | 0.00 | -0.09 | 0.12 | 0.58 | -0.67 | 0.00 |
| Departure Headway (s) | 5.4  | 5.3   | 5.5  | 6.7  | 5.4   | 6.5  |
| Degree Utilization, x | 0.00 | 0.36  | 0.52 | 0.16 | 0.12  | 0.00 |
| Capacity (veh/h)      | 653  | 656   | 641  | 501  | 608   | 498  |
| Control Delay (s)     | 7.2  | 10.0  | 14.2 | 9.8  | 7.9   | 9.5  |
| Approach Delay (s)    | 10.0 |       | 14.2 | 8.9  |       | 0.0  |
| Approach LOS          | B    |       | B    | A    |       | A    |

Intersection Summary

|                                   |       |
|-----------------------------------|-------|
| Delay                             | 11.7  |
| Level of Service                  | B     |
| Intersection Capacity Utilization | 55.5% |
| ICU Level of Service              | B     |
| Analysis Period (min)             | 15    |



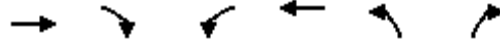
HCM Unsignalized Intersection Capacity Analysis  
7: New Jersey Ave SE & Eye St SE



| Movement               | EBL  | EBT   | EBR   | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|-------|-------|------|-------|------|------|------|------|------|------|------|
| Lane Configurations    |      |       |       |      |       |      |      |      |      |      |      |      |
| Sign Control           | Stop |       |       |      | Stop  |      |      | Stop |      |      | Stop | Stop |
| Traffic Volume (vph)   | 124  | 82    | 19    | 10   | 139   | 95   | 43   | 97   | 9    | 13   | 90   | 126  |
| Future Volume (vph)    | 124  | 82    | 19    | 10   | 139   | 95   | 43   | 97   | 9    | 13   | 90   | 126  |
| Peak Hour Factor       | 0.88 | 0.88  | 0.88  | 0.88 | 0.88  | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Hourly flow rate (vph) | 141  | 93    | 22    | 11   | 158   | 108  | 49   | 110  | 10   | 15   | 102  | 143  |
| Direction, Lane #      | EB 1 | EB 2  | WB 1  | NB 1 | SB 1  |      |      |      |      |      |      |      |
| Volume Total (vph)     | 141  | 115   | 277   | 169  | 260   |      |      |      |      |      |      |      |
| Volume Left (vph)      | 141  | 0     | 11    | 49   | 15    |      |      |      |      |      |      |      |
| Volume Right (vph)     | 0    | 22    | 108   | 10   | 143   |      |      |      |      |      |      |      |
| Hadj (s)               | 0.53 | -0.01 | -0.14 | 0.10 | -0.27 |      |      |      |      |      |      |      |
| Departure Headway (s)  | 6.7  | 6.2   | 5.6   | 6.0  | 5.5   |      |      |      |      |      |      |      |
| Degree Utilization, x  | 0.26 | 0.20  | 0.43  | 0.28 | 0.40  |      |      |      |      |      |      |      |
| Capacity (veh/h)       | 497  | 540   | 599   | 534  | 604   |      |      |      |      |      |      |      |
| Control Delay (s)      | 10.9 | 9.5   | 12.7  | 11.3 | 12.0  |      |      |      |      |      |      |      |
| Approach Delay (s)     | 10.3 |       | 12.7  | 11.3 | 12.0  |      |      |      |      |      |      |      |
| Approach LOS           | B    |       | B     | B    | B     |      |      |      |      |      |      |      |

| Intersection Summary              |  |       |                      |   |
|-----------------------------------|--|-------|----------------------|---|
| Delay                             |  |       | 11.6                 |   |
| Level of Service                  |  |       | B                    |   |
| Intersection Capacity Utilization |  | 62.9% | ICU Level of Service | B |
| Analysis Period (min)             |  | 15    |                      |   |

HCM Unsignalized Intersection Capacity Analysis  
2: Half St SW & Eye St SW



| Movement                          | EBT         | EBR         | WBL         | WBT   | NBL                  | NBR  |
|-----------------------------------|-------------|-------------|-------------|-------|----------------------|------|
| Lane Configurations               | →           |             |             | ←     | ←                    | ↗    |
| Traffic Volume (veh/h)            | 263         | 203         | 100         | 247   | 34                   | 47   |
| Future Volume (Veh/h)             | 263         | 203         | 100         | 247   | 34                   | 47   |
| Sign Control                      | Free        |             |             | Free  | Stop                 |      |
| Grade                             | 0%          |             |             | 0%    | 0%                   |      |
| Peak Hour Factor                  | 0.95        | 0.95        | 0.94        | 0.94  | 0.92                 | 0.92 |
| Hourly flow rate (vph)            | 277         | 214         | 106         | 263   | 37                   | 51   |
| Pedestrians                       |             |             |             | 2     | 15                   |      |
| Lane Width (ft)                   |             |             |             | 12.0  | 12.0                 |      |
| Walking Speed (ft/s)              |             |             |             | 4.0   | 4.0                  |      |
| Percent Blockage                  |             |             |             | 0     | 1                    |      |
| Right turn flare (veh)            |             |             |             |       |                      |      |
| Median type                       | None        |             |             | None  |                      |      |
| Median storage (veh)              |             |             |             |       |                      |      |
| Upstream signal (ft)              |             |             |             | 470   |                      |      |
| pX, platoon unblocked             |             |             |             |       | 0.93                 |      |
| vC, conflicting volume            |             |             |             | 506   | 874                  | 401  |
| vC1, stage 1 conf vol             |             |             |             |       |                      |      |
| vC2, stage 2 conf vol             |             |             |             |       |                      |      |
| vCu, unblocked vol                |             |             |             | 506   | 828                  | 401  |
| tC, single (s)                    |             |             |             | 4.1   | 6.4                  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |       |                      |      |
| tF (s)                            |             |             |             | 2.2   | 3.5                  | 3.3  |
| p0 queue free %                   |             |             |             | 90    | 87                   | 92   |
| cM capacity (veh/h)               |             |             |             | 1045  | 282                  | 640  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |       |                      |      |
| Volume Total                      | 491         | 369         | 88          |       |                      |      |
| Volume Left                       | 0           | 106         | 37          |       |                      |      |
| Volume Right                      | 214         | 0           | 51          |       |                      |      |
| cSH                               | 1700        | 1045        | 417         |       |                      |      |
| Volume to Capacity                | 0.29        | 0.10        | 0.21        |       |                      |      |
| Queue Length 95th (ft)            | 0           | 8           | 20          |       |                      |      |
| Control Delay (s)                 | 0.0         | 3.3         | 15.9        |       |                      |      |
| Lane LOS                          |             | A           | C           |       |                      |      |
| Approach Delay (s)                | 0.0         | 3.3         | 15.9        |       |                      |      |
| Approach LOS                      |             |             | C           |       |                      |      |
| <b>Intersection Summary</b>       |             |             |             |       |                      |      |
| Average Delay                     |             |             |             | 2.8   |                      |      |
| Intersection Capacity Utilization |             |             |             | 66.3% | ICU Level of Service | C    |
| Analysis Period (min)             |             |             |             | 15    |                      |      |

Queues

3: South Capitol St & Eye St SW/Eye St SE



| Lane Group              | EBT  | EBR  | WBT  | WBR  | NBT  | SBT  | SBR  |
|-------------------------|------|------|------|------|------|------|------|
| Lane Group Flow (vph)   | 325  | 72   | 180  | 166  | 1646 | 1272 | 218  |
| v/c Ratio               | 0.91 | 0.16 | 0.36 | 0.34 | 0.56 | 0.43 | 0.23 |
| Control Delay           | 80.8 | 3.1  | 43.8 | 18.1 | 16.1 | 40.3 | 19.2 |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 54.5 | 66.2 |
| Total Delay             | 80.8 | 3.1  | 43.8 | 18.1 | 16.1 | 94.8 | 85.4 |
| Queue Length 50th (ft)  | 308  | 0    | 139  | 46   | 314  | 471  | 137  |
| Queue Length 95th (ft)  | #487 | 16   | 208  | 110  | 348  | 515  | m222 |
| Internal Link Dist (ft) | 390  |      | 201  |      | 332  | 76   |      |
| Turn Bay Length (ft)    |      | 300  |      |      |      |      |      |
| Base Capacity (vph)     | 356  | 462  | 498  | 490  | 2920 | 2929 | 966  |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    | 2423 | 777  |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.91 | 0.16 | 0.36 | 0.34 | 0.56 | 2.51 | 1.15 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

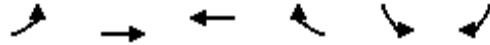
HCM Signalized Intersection Capacity Analysis  
3: South Capitol St & Eye St SW/Eye St SE



| Movement               | EBL  | EBT   | EBR  | WBL  | WBT  | WBR  | NBL  | NBT   | NBR  | SBL  | SBT  | SBR   |
|------------------------|------|-------|------|------|------|------|------|-------|------|------|------|-------|
| Lane Configurations    |      | ↕     | ↗    |      | ↕    | ↗    |      | ↕↗↘   |      |      | ↕↗↘  | ↗     |
| Traffic Volume (vph)   | 87   | 202   | 64   | 0    | 160  | 148  | 0    | 1439  | 26   | 0    | 1132 | 194   |
| Future Volume (vph)    | 87   | 202   | 64   | 0    | 160  | 148  | 0    | 1439  | 26   | 0    | 1132 | 194   |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900 | 1900  |
| Total Lost time (s)    |      | 5.0   | 5.0  |      | 5.0  | 5.0  |      | 4.0   |      |      | 4.0  | 4.0   |
| Lane Util. Factor      |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 0.91  |      |      | 0.91 | 1.00  |
| Frbp, ped/bikes        |      | 1.00  | 0.91 |      | 1.00 | 1.00 |      | 1.00  |      |      | 1.00 | 0.97  |
| Flpb, ped/bikes        |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00  |      |      | 1.00 | 1.00  |
| Frt                    |      | 1.00  | 0.85 |      | 1.00 | 0.85 |      | 1.00  |      |      | 1.00 | 0.85  |
| Flt Protected          |      | 0.99  | 1.00 |      | 1.00 | 1.00 |      | 1.00  |      |      | 1.00 | 1.00  |
| Satd. Flow (prot)      |      | 1629  | 1303 |      | 1660 | 1398 |      | 4562  |      |      | 4577 | 1387  |
| Flt Permitted          |      | 0.72  | 1.00 |      | 1.00 | 1.00 |      | 1.00  |      |      | 1.00 | 1.00  |
| Satd. Flow (perm)      |      | 1187  | 1303 |      | 1660 | 1398 |      | 4562  |      |      | 4577 | 1387  |
| Peak-hour factor, PHF  | 0.89 | 0.89  | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89  | 0.89 | 0.89 | 0.89 | 0.89  |
| Adj. Flow (vph)        | 98   | 227   | 72   | 0    | 180  | 166  | 0    | 1617  | 29   | 0    | 1272 | 218   |
| RTOR Reduction (vph)   | 0    | 0     | 50   | 0    | 0    | 71   | 0    | 1     | 0    | 0    | 0    | 78    |
| Lane Group Flow (vph)  | 0    | 325   | 22   | 0    | 180  | 95   | 0    | 1645  | 0    | 0    | 1272 | 140   |
| Confl. Peds. (#/hr)    |      |       | 57   | 57   |      |      | 9    |       | 10   | 10   |      | 9     |
| Heavy Vehicles (%)     | 2%   | 4%    | 2%   | 2%   | 3%   | 4%   | 2%   | 2%    | 2%   | 2%   | 2%   | 2%    |
| Turn Type              | Perm | NA    | Perm |      | NA   | Perm |      | NA    |      |      | NA   | Perm  |
| Protected Phases       |      | 4     |      |      | 8    |      |      | 12    |      |      |      | 12    |
| Permitted Phases       | 4    |       | 4    |      |      | 8    |      |       |      |      |      | 12    |
| Actuated Green, G (s)  |      | 43.0  | 43.0 |      | 43.0 | 43.0 |      | 94.0  |      |      | 94.0 | 94.0  |
| Effective Green, g (s) |      | 45.0  | 45.0 |      | 45.0 | 45.0 |      | 96.0  |      |      | 96.0 | 96.0  |
| Actuated g/C Ratio     |      | 0.30  | 0.30 |      | 0.30 | 0.30 |      | 0.64  |      |      | 0.64 | 0.64  |
| Clearance Time (s)     |      | 7.0   | 7.0  |      | 7.0  | 7.0  |      | 6.0   |      |      | 6.0  | 6.0   |
| Lane Grp Cap (vph)     |      | 356   | 390  |      | 498  | 419  |      | 2919  |      |      | 2929 | 887   |
| v/s Ratio Prot         |      |       |      |      | 0.11 |      |      | c0.36 |      |      |      | 0.28  |
| v/s Ratio Perm         |      | c0.27 | 0.02 |      |      | 0.07 |      |       |      |      |      | 0.10  |
| v/c Ratio              |      | 0.91  | 0.06 |      | 0.36 | 0.23 |      | 0.56  |      |      | 0.43 | 0.16  |
| Uniform Delay, d1      |      | 50.6  | 37.4 |      | 41.2 | 39.4 |      | 15.2  |      |      | 13.5 | 10.8  |
| Progression Factor     |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00  |      |      | 2.95 | 15.06 |
| Incremental Delay, d2  |      | 30.0  | 0.3  |      | 2.0  | 1.2  |      | 0.8   |      |      | 0.3  | 0.3   |
| Delay (s)              |      | 80.6  | 37.6 |      | 43.3 | 40.7 |      | 16.0  |      |      | 40.0 | 163.1 |
| Level of Service       |      | F     | D    |      | D    | D    |      | B     |      |      | D    | F     |
| Approach Delay (s)     |      | 72.8  |      |      | 42.0 |      |      | 16.0  |      |      | 58.0 |       |
| Approach LOS           |      | E     |      |      | D    |      |      | B     |      |      | E    |       |

| Intersection Summary              |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 40.3  | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio | 0.74  |                           |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s)      | 22.0 |
| Intersection Capacity Utilization | 81.7% | ICU Level of Service      | D    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

HCM Unsignalized Intersection Capacity Analysis  
4: Eye St SE & Site Dwy



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↶           | ↶           |                      | ↶    |      |
| Traffic Volume (veh/h)            | 4           | 224         | 299         | 16                   | 12   | 11   |
| Future Volume (Veh/h)             | 4           | 224         | 299         | 16                   | 12   | 11   |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Peak Hour Factor                  | 0.92        | 0.92        | 0.92        | 0.92                 | 0.92 | 0.92 |
| Hourly flow rate (vph)            | 4           | 243         | 325         | 17                   | 13   | 12   |
| <b>Pedestrians</b>                |             |             |             |                      |      |      |
| Lane Width (ft)                   |             |             |             |                      |      |      |
| Walking Speed (ft/s)              |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             | None        | None        |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              |             | 281         |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      | 0.87 |      |
| vC, conflicting volume            | 342         |             |             |                      | 584  | 334  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 342         |             |             |                      | 443  | 334  |
| tC, single (s)                    | 4.1         |             |             |                      | 6.4  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             |                      | 3.5  | 3.3  |
| p0 queue free %                   | 100         |             |             |                      | 97   | 98   |
| cM capacity (veh/h)               | 1217        |             |             |                      | 494  | 708  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 247         | 342         | 25          |                      |      |      |
| Volume Left                       | 4           | 0           | 13          |                      |      |      |
| Volume Right                      | 0           | 17          | 12          |                      |      |      |
| cSH                               | 1217        | 1700        | 578         |                      |      |      |
| Volume to Capacity                | 0.00        | 0.20        | 0.04        |                      |      |      |
| Queue Length 95th (ft)            | 0           | 0           | 3           |                      |      |      |
| Control Delay (s)                 | 0.2         | 0.0         | 11.5        |                      |      |      |
| Lane LOS                          | A           |             | B           |                      |      |      |
| Approach Delay (s)                | 0.2         | 0.0         | 11.5        |                      |      |      |
| Approach LOS                      |             |             | B           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.5         |                      |      |      |
| Intersection Capacity Utilization |             |             | 28.6%       | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
5: Half St SE/Coal Yard Dwy & Eye St SE



| Movement                          | EBL         | EBT         | EBR         | WBL         | WBT                  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-----------------------------------|-------------|-------------|-------------|-------------|----------------------|------|------|------|------|------|------|------|
| Lane Configurations               |             | ↕           |             |             | ↕                    |      |      | ↕    |      |      | ↕    |      |
| Traffic Volume (veh/h)            | 6           | 203         | 11          | 6           | 260                  | 0    | 58   | 0    | 18   | 0    | 0    | 0    |
| Future Volume (Veh/h)             | 6           | 203         | 11          | 6           | 260                  | 0    | 58   | 0    | 18   | 0    | 0    | 0    |
| Sign Control                      |             | Free        |             |             | Free                 |      |      | Stop |      |      | Stop |      |
| Grade                             |             | 0%          |             |             | 0%                   |      |      | 0%   |      |      | 0%   |      |
| Peak Hour Factor                  | 0.90        | 0.93        | 0.93        | 0.85        | 0.85                 | 0.90 | 0.85 | 0.90 | 0.85 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph)            | 7           | 218         | 12          | 7           | 306                  | 0    | 68   | 0    | 21   | 0    | 0    | 0    |
| Pedestrians                       |             | 10          |             |             | 8                    |      |      | 4    |      |      |      |      |
| Lane Width (ft)                   |             | 12.0        |             |             | 12.0                 |      |      | 12.0 |      |      |      |      |
| Walking Speed (ft/s)              |             | 4.0         |             |             | 4.0                  |      |      | 4.0  |      |      |      |      |
| Percent Blockage                  |             | 1           |             |             | 1                    |      |      | 0    |      |      |      |      |
| Right turn flare (veh)            |             |             |             |             |                      |      |      |      |      |      |      |      |
| Median type                       |             | None        |             |             | None                 |      |      |      |      |      |      |      |
| Median storage (veh)              |             |             |             |             |                      |      |      |      |      |      |      |      |
| Upstream signal (ft)              |             | 429         |             |             |                      |      |      |      |      |      |      |      |
| pX, platoon unblocked             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vC, conflicting volume            | 306         |             |             | 234         |                      |      | 572  | 562  | 236  | 587  | 568  | 316  |
| vC1, stage 1 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vC2, stage 2 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vCu, unblocked vol                | 306         |             |             | 234         |                      |      | 572  | 562  | 236  | 587  | 568  | 316  |
| tC, single (s)                    | 4.1         |             |             | 4.1         |                      |      | 7.1  | 6.5  | 6.2  | 7.1  | 6.5  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |             |                      |      |      |      |      |      |      |      |
| tF (s)                            | 2.2         |             |             | 2.2         |                      |      | 3.5  | 4.0  | 3.3  | 3.5  | 4.0  | 3.3  |
| p0 queue free %                   | 99          |             |             | 99          |                      |      | 84   | 100  | 97   | 100  | 100  | 100  |
| cM capacity (veh/h)               | 1255        |             |             | 1329        |                      |      | 421  | 430  | 795  | 403  | 426  | 718  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> | <b>SB 1</b> |                      |      |      |      |      |      |      |      |
| Volume Total                      | 237         | 313         | 89          | 0           |                      |      |      |      |      |      |      |      |
| Volume Left                       | 7           | 7           | 68          | 0           |                      |      |      |      |      |      |      |      |
| Volume Right                      | 12          | 0           | 21          | 0           |                      |      |      |      |      |      |      |      |
| cSH                               | 1255        | 1329        | 474         | 1700        |                      |      |      |      |      |      |      |      |
| Volume to Capacity                | 0.01        | 0.01        | 0.19        | 0.00        |                      |      |      |      |      |      |      |      |
| Queue Length 95th (ft)            | 0           | 0           | 17          | 0           |                      |      |      |      |      |      |      |      |
| Control Delay (s)                 | 0.3         | 0.2         | 14.3        | 0.0         |                      |      |      |      |      |      |      |      |
| Lane LOS                          | A           | A           | B           | A           |                      |      |      |      |      |      |      |      |
| Approach Delay (s)                | 0.3         | 0.2         | 14.3        | 0.0         |                      |      |      |      |      |      |      |      |
| Approach LOS                      |             |             | B           | A           |                      |      |      |      |      |      |      |      |
| <b>Intersection Summary</b>       |             |             |             |             |                      |      |      |      |      |      |      |      |
| Average Delay                     |             |             | 2.2         |             |                      |      |      |      |      |      |      |      |
| Intersection Capacity Utilization |             |             | 31.8%       |             | ICU Level of Service |      |      |      | A    |      |      |      |
| Analysis Period (min)             |             |             | 15          |             |                      |      |      |      |      |      |      |      |

HCM Unsignalized Intersection Capacity Analysis  
6: First St SE/CSX East Dwy & Eye St SE

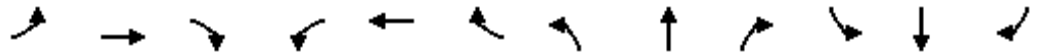


| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    |      |      |      |      |      |      |      |      |      |      |      |      |
| Sign Control           |      | Stop |      |      | Stop |      |      | Stop |      |      | Stop |      |
| Traffic Volume (vph)   | 0    | 191  | 34   | 145  | 231  | 0    | 67   | 0    | 56   | 0    | 0    | 0    |
| Future Volume (vph)    | 0    | 191  | 34   | 145  | 231  | 0    | 67   | 0    | 56   | 0    | 0    | 0    |
| Peak Hour Factor       | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Hourly flow rate (vph) | 0    | 210  | 37   | 159  | 254  | 0    | 74   | 0    | 62   | 0    | 0    | 0    |

| Direction, Lane #     | EB 1 | EB 2  | WB 1 | NB 1 | NB 2  | SB 1 |
|-----------------------|------|-------|------|------|-------|------|
| Volume Total (vph)    | 0    | 247   | 413  | 74   | 62    | 0    |
| Volume Left (vph)     | 0    | 0     | 159  | 74   | 0     | 0    |
| Volume Right (vph)    | 0    | 37    | 0    | 0    | 62    | 0    |
| Hadj (s)              | 0.00 | -0.06 | 0.11 | 0.60 | -0.67 | 0.00 |
| Departure Headway (s) | 5.4  | 5.3   | 5.4  | 6.9  | 5.6   | 6.6  |
| Degree Utilization, x | 0.00 | 0.36  | 0.62 | 0.14 | 0.10  | 0.00 |
| Capacity (veh/h)      | 657  | 656   | 655  | 483  | 584   | 484  |
| Control Delay (s)     | 7.2  | 10.1  | 16.7 | 9.8  | 8.0   | 9.6  |
| Approach Delay (s)    | 10.1 |       | 16.7 | 9.0  |       | 0.0  |
| Approach LOS          | B    |       | C    | A    |       | A    |

| Intersection Summary              |       |
|-----------------------------------|-------|
| Delay                             | 13.3  |
| Level of Service                  | B     |
| Intersection Capacity Utilization | 59.0% |
| ICU Level of Service              | B     |
| Analysis Period (min)             | 15    |

HCM Unsignalized Intersection Capacity Analysis  
7: New Jersey Ave SE & Eye St SE



| Movement               | EBL  | EBT   | EBR   | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|-------|-------|------|-------|------|------|------|------|------|------|------|
| Lane Configurations    |      |       |       |      |       |      |      |      |      |      |      |      |
| Sign Control           |      | Stop  |       |      | Stop  |      |      | Stop |      |      | Stop |      |
| Traffic Volume (vph)   | 99   | 118   | 29    | 14   | 135   | 33   | 53   | 108  | 9    | 45   | 168  | 183  |
| Future Volume (vph)    | 99   | 118   | 29    | 14   | 135   | 33   | 53   | 108  | 9    | 45   | 168  | 183  |
| Peak Hour Factor       | 0.97 | 0.97  | 0.97  | 0.97 | 0.97  | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Hourly flow rate (vph) | 102  | 122   | 30    | 14   | 139   | 34   | 55   | 111  | 9    | 46   | 173  | 189  |
| Direction, Lane #      | EB 1 | EB 2  | WB 1  | NB 1 | SB 1  |      |      |      |      |      |      |      |
| Volume Total (vph)     | 102  | 152   | 187   | 175  | 408   |      |      |      |      |      |      |      |
| Volume Left (vph)      | 102  | 0     | 14    | 55   | 46    |      |      |      |      |      |      |      |
| Volume Right (vph)     | 0    | 30    | 34    | 9    | 189   |      |      |      |      |      |      |      |
| Hadj (s)               | 0.53 | -0.10 | -0.03 | 0.07 | -0.22 |      |      |      |      |      |      |      |
| Departure Headway (s)  | 7.0  | 6.4   | 6.2   | 6.0  | 5.3   |      |      |      |      |      |      |      |
| Degree Utilization, x  | 0.20 | 0.27  | 0.32  | 0.29 | 0.61  |      |      |      |      |      |      |      |
| Capacity (veh/h)       | 470  | 514   | 524   | 533  | 641   |      |      |      |      |      |      |      |
| Control Delay (s)      | 10.6 | 10.5  | 12.0  | 11.5 | 16.2  |      |      |      |      |      |      |      |
| Approach Delay (s)     | 10.6 |       | 12.0  | 11.5 | 16.2  |      |      |      |      |      |      |      |
| Approach LOS           | B    |       | B     | B    | C     |      |      |      |      |      |      |      |

| Intersection Summary              |  |       |                      |   |
|-----------------------------------|--|-------|----------------------|---|
| Delay                             |  |       | 13.2                 |   |
| Level of Service                  |  |       | B                    |   |
| Intersection Capacity Utilization |  | 65.5% | ICU Level of Service | C |
| Analysis Period (min)             |  | 15    |                      |   |

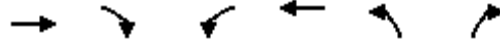


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## J. Intersection Capacity Analysis – Future Conditions without the Project (2026 Background Conditions)

# HCM Unsignalized Intersection Capacity Analysis

## 2: Half St SW & Eye St SW



| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               | ↔           |             |             | ↔                    |      |      |
| Traffic Volume (veh/h)            | 337         | 69          | 112         | 460                  | 66   | 65   |
| Future Volume (Veh/h)             | 337         | 69          | 112         | 460                  | 66   | 65   |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Peak Hour Factor                  | 0.89        | 0.89        | 0.92        | 0.92                 | 0.85 | 0.85 |
| Hourly flow rate (vph)            | 379         | 78          | 122         | 500                  | 78   | 76   |
| Pedestrians                       | 3           |             |             | 2                    | 21   |      |
| Lane Width (ft)                   | 12.0        |             |             | 12.0                 | 12.0 |      |
| Walking Speed (ft/s)              | 4.0         |             |             | 4.0                  | 4.0  |      |
| Percent Blockage                  | 0           |             |             | 0                    | 2    |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             | None                 |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              | 452         |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      | 0.88 |      |
| vC, conflicting volume            | 478         |             |             | 1186                 |      |      |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 478         |             |             | 1144                 |      |      |
| tC, single (s)                    | 4.1         |             |             | 6.4                  |      |      |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             | 3.5                  |      |      |
| p0 queue free %                   | 89          |             |             | 54                   |      |      |
| cM capacity (veh/h)               | 1065        |             |             | 169                  |      |      |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 457         | 622         | 154         |                      |      |      |
| Volume Left                       | 0           | 122         | 78          |                      |      |      |
| Volume Right                      | 78          | 0           | 76          |                      |      |      |
| cSH                               | 1700        | 1065        | 262         |                      |      |      |
| Volume to Capacity                | 0.27        | 0.11        | 0.59        |                      |      |      |
| Queue Length 95th (ft)            | 0           | 10          | 85          |                      |      |      |
| Control Delay (s)                 | 0.0         | 2.9         | 36.5        |                      |      |      |
| Lane LOS                          |             | A           | E           |                      |      |      |
| Approach Delay (s)                | 0.0         | 2.9         | 36.5        |                      |      |      |
| Approach LOS                      |             |             | E           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     | 6.0         |             |             |                      |      |      |
| Intersection Capacity Utilization | 77.4%       |             |             | ICU Level of Service | D    |      |
| Analysis Period (min)             | 15          |             |             |                      |      |      |

Queues

3: South Capitol St & Eye St SW/Eye St SE



| Lane Group              | EBT   | EBR  | WBT  | WBR  | NBL  | NBT   | SBL  | SBT  |
|-------------------------|-------|------|------|------|------|-------|------|------|
| Lane Group Flow (vph)   | 342   | 118  | 231  | 391  | 122  | 3043  | 104  | 2042 |
| v/c Ratio               | 2.80  | 0.34 | 0.60 | 1.00 | 0.41 | 1.12  | 0.76 | 0.90 |
| Control Delay           | 857.1 | 10.7 | 59.2 | 81.0 | 58.2 | 88.1  | 88.6 | 32.5 |
| Queue Delay             | 0.0   | 0.0  | 0.0  | 6.3  | 0.0  | 0.2   | 0.0  | 0.7  |
| Total Delay             | 857.1 | 10.7 | 59.2 | 87.3 | 58.2 | 88.3  | 88.6 | 33.2 |
| Queue Length 50th (ft)  | ~574  | 0    | 205  | ~275 | 106  | ~1251 | 101  | 565  |
| Queue Length 95th (ft)  | #777  | 56   | 301  | #488 | 172  | #1324 | m135 | 660  |
| Internal Link Dist (ft) | 372   |      | 210  |      |      | 191   |      | 727  |
| Turn Bay Length (ft)    |       | 300  |      |      | 200  |       | 200  |      |
| Base Capacity (vph)     | 122   | 350  | 384  | 392  | 307  | 2718  | 148  | 2279 |
| Starvation Cap Reductn  | 0     | 0    | 0    | 0    | 0    | 0     | 0    | 64   |
| Spillback Cap Reductn   | 0     | 0    | 0    | 9    | 0    | 289   | 0    | 0    |
| Storage Cap Reductn     | 0     | 0    | 0    | 0    | 0    | 0     | 0    | 0    |
| Reduced v/c Ratio       | 2.80  | 0.34 | 0.60 | 1.02 | 0.40 | 1.25  | 0.70 | 0.92 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
3: South Capitol St & Eye St SW/Eye St SE



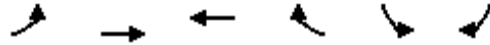
| Movement               | EBL  | EBT   | EBR  | WBL  | WBT  | WBR   | NBL  | NBT   | NBR  | SBL   | SBT  | SBR  |
|------------------------|------|-------|------|------|------|-------|------|-------|------|-------|------|------|
| Lane Configurations    |      | ↕     | ↗    |      | ↕    | ↗     | ↘    | ↕↗↘   |      | ↘     | ↕↗↘  |      |
| Traffic Volume (vph)   | 131  | 187   | 110  | 0    | 215  | 364   | 113  | 2623  | 207  | 97    | 1687 | 212  |
| Future Volume (vph)    | 131  | 187   | 110  | 0    | 215  | 364   | 113  | 2623  | 207  | 97    | 1687 | 212  |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    |      | 3.0   | 3.0  |      | 0.0  | 6.0   | 5.0  | 5.0   |      | 5.0   | 4.0  |      |
| Lane Util. Factor      |      | 1.00  | 1.00 |      | 1.00 | 1.00  | 1.00 | 0.91  |      | 1.00  | 0.91 |      |
| Frbp, ped/bikes        |      | 1.00  | 0.85 |      | 1.00 | 0.98  | 1.00 | 0.99  |      | 1.00  | 0.99 |      |
| Flpb, ped/bikes        |      | 1.00  | 1.00 |      | 1.00 | 1.00  | 1.00 | 1.00  |      | 1.00  | 1.00 |      |
| Frt                    |      | 1.00  | 0.85 |      | 1.00 | 0.85  | 1.00 | 0.99  |      | 1.00  | 0.98 |      |
| Flt Protected          |      | 0.98  | 1.00 |      | 1.00 | 1.00  | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (prot)      |      | 1553  | 1205 |      | 1644 | 1389  | 1593 | 4423  |      | 1593  | 4365 |      |
| Flt Permitted          |      | 0.36  | 1.00 |      | 1.00 | 1.00  | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (perm)      |      | 572   | 1205 |      | 1644 | 1389  | 1593 | 4423  |      | 1593  | 4365 |      |
| Peak-hour factor, PHF  | 0.93 | 0.93  | 0.93 | 0.93 | 0.93 | 0.93  | 0.93 | 0.93  | 0.93 | 0.93  | 0.93 | 0.93 |
| Adj. Flow (vph)        | 141  | 201   | 118  | 0    | 231  | 391   | 122  | 2820  | 223  | 104   | 1814 | 228  |
| RTOR Reduction (vph)   | 0    | 0     | 93   | 0    | 0    | 123   | 0    | 6     | 0    | 0     | 11   | 0    |
| Lane Group Flow (vph)  | 0    | 342   | 25   | 0    | 231  | 268   | 122  | 3037  | 0    | 104   | 2031 | 0    |
| Confl. Peds. (#/hr)    | 2    |       | 73   | 73   |      | 2     | 25   |       | 24   | 24    |      | 25   |
| Heavy Vehicles (%)     | 9%   | 7%    | 3%   | 2%   | 4%   | 3%    | 2%   | 3%    | 10%  | 2%    | 4%   | 2%   |
| Turn Type              | Perm | NA    | Perm |      | NA   | Perm  | Prot | NA    |      | Prot  | NA   |      |
| Protected Phases       |      | 4     |      |      | 8    |       | 5    | 2     |      | 1     | 6    |      |
| Permitted Phases       | 4    |       | 4    |      | 8    | 8     |      |       |      |       |      |      |
| Actuated Green, G (s)  |      | 29.1  | 29.1 |      | 29.1 | 29.1  | 27.9 | 92.0  |      | 12.9  | 77.0 |      |
| Effective Green, g (s) |      | 32.1  | 32.1 |      | 35.1 | 29.1  | 27.9 | 92.0  |      | 12.9  | 78.0 |      |
| Actuated g/C Ratio     |      | 0.21  | 0.21 |      | 0.23 | 0.19  | 0.19 | 0.61  |      | 0.09  | 0.52 |      |
| Clearance Time (s)     |      | 6.0   | 6.0  |      | 6.0  | 6.0   | 5.0  | 5.0   |      | 5.0   | 5.0  |      |
| Vehicle Extension (s)  |      | 3.0   | 3.0  |      | 3.0  | 3.0   | 3.0  | 3.0   |      | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     |      | 122   | 257  |      | 384  | 269   | 296  | 2712  |      | 136   | 2269 |      |
| v/s Ratio Prot         |      |       |      |      | 0.14 |       | 0.08 | c0.69 |      | c0.07 | 0.47 |      |
| v/s Ratio Perm         |      | c0.60 | 0.02 |      |      | 0.19  |      |       |      |       |      |      |
| v/c Ratio              |      | 2.80  | 0.10 |      | 0.60 | 1.00  | 0.41 | 1.12  |      | 0.76  | 0.90 |      |
| Uniform Delay, d1      |      | 59.0  | 47.3 |      | 51.2 | 60.4  | 53.8 | 29.0  |      | 67.1  | 32.3 |      |
| Progression Factor     |      | 1.00  | 1.00 |      | 1.00 | 1.00  | 1.00 | 1.00  |      | 0.97  | 0.87 |      |
| Incremental Delay, d2  |      | 833.8 | 0.2  |      | 2.7  | 53.2  | 0.9  | 59.5  |      | 16.1  | 4.3  |      |
| Delay (s)              |      | 892.7 | 47.5 |      | 53.9 | 113.6 | 54.8 | 88.5  |      | 81.4  | 32.4 |      |
| Level of Service       |      | F     | D    |      | D    | F     | D    | F     |      | F     | C    |      |
| Approach Delay (s)     |      | 675.9 |      |      | 91.4 |       |      | 87.2  |      |       | 34.8 |      |
| Approach LOS           |      | F     |      |      | F    |       |      | F     |      |       | C    |      |

| Intersection Summary              |        |                             |
|-----------------------------------|--------|-----------------------------|
| HCM 2000 Control Delay            | 112.4  | HCM 2000 Level of Service F |
| HCM 2000 Volume to Capacity ratio | 1.48   |                             |
| Actuated Cycle Length (s)         | 150.0  | Sum of lost time (s) 13.0   |
| Intersection Capacity Utilization | 122.6% | ICU Level of Service H      |
| Analysis Period (min)             | 15     |                             |

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Eye St SE & Site Dwy























| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↔           | ↔           |                      | ↔    |      |
| Traffic Volume (veh/h)            | 10          | 460         | 532         | 3                    | 0    | 4    |
| Future Volume (Veh/h)             | 10          | 460         | 532         | 3                    | 0    | 4    |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Peak Hour Factor                  | 0.92        | 0.92        | 0.92        | 0.92                 | 0.92 | 0.92 |
| Hourly flow rate (vph)            | 11          | 500         | 578         | 3                    | 0    | 4    |
| <b>Pedestrians</b>                |             |             |             |                      |      |      |
| Lane Width (ft)                   |             |             |             |                      |      |      |
| Walking Speed (ft/s)              |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             | None        | None        |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              |             | 290         |             |                      |      |      |
| <b>pX, platoon unblocked</b>      |             |             |             |                      |      |      |
| vC, conflicting volume            | 581         |             |             |                      | 1102 | 580  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 581         |             |             |                      | 1102 | 580  |
| tC, single (s)                    | 4.1         |             |             |                      | 6.4  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             |                      | 3.5  | 3.3  |
| p0 queue free %                   | 99          |             |             |                      | 100  | 99   |
| cM capacity (veh/h)               | 993         |             |             |                      | 232  | 515  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 511         | 581         | 4           |                      |      |      |
| Volume Left                       | 11          | 0           | 0           |                      |      |      |
| Volume Right                      | 0           | 3           | 4           |                      |      |      |
| cSH                               | 993         | 1700        | 515         |                      |      |      |
| Volume to Capacity                | 0.01        | 0.34        | 0.01        |                      |      |      |
| Queue Length 95th (ft)            | 1           | 0           | 1           |                      |      |      |
| Control Delay (s)                 | 0.3         | 0.0         | 12.1        |                      |      |      |
| Lane LOS                          | A           |             | B           |                      |      |      |
| Approach Delay (s)                | 0.3         | 0.0         | 12.1        |                      |      |      |
| Approach LOS                      |             |             | B           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.2         |                      |      |      |
| Intersection Capacity Utilization |             | 45.8%       |             | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

**HCM Unsignalized Intersection Capacity Analysis**  
**5: Half St SE/Coal Yard Dwy & Eye St SE**



| Movement                          | EBL         | EBT         | EBR         | WBL         | WBT                  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-----------------------------------|-------------|-------------|-------------|-------------|----------------------|------|------|------|------|------|------|------|
| Lane Configurations               |             | ↕           |             |             | ↕                    |      |      | ↕    |      |      | ↕    |      |
| Traffic Volume (veh/h)            | 2           | 320         | 41          | 15          | 578                  | 0    | 45   | 0    | 1    | 0    | 0    | 0    |
| Future Volume (Veh/h)             | 2           | 320         | 41          | 15          | 578                  | 0    | 45   | 0    | 1    | 0    | 0    | 0    |
| Sign Control                      |             | Free        |             |             | Free                 |      |      | Stop |      |      | Stop |      |
| Grade                             |             | 0%          |             |             | 0%                   |      |      | 0%   |      |      | 0%   |      |
| Peak Hour Factor                  | 0.95        | 0.85        | 0.85        | 0.85        | 0.85                 | 0.95 | 0.85 | 0.95 | 0.85 | 0.95 | 0.95 | 0.95 |
| Hourly flow rate (vph)            | 2           | 376         | 48          | 18          | 680                  | 0    | 53   | 0    | 1    | 0    | 0    | 0    |
| Pedestrians                       |             | 22          |             |             | 81                   |      |      | 11   |      |      |      |      |
| Lane Width (ft)                   |             | 12.0        |             |             | 12.0                 |      |      | 12.0 |      |      |      |      |
| Walking Speed (ft/s)              |             | 4.0         |             |             | 4.0                  |      |      | 4.0  |      |      |      |      |
| Percent Blockage                  |             | 2           |             |             | 7                    |      |      | 1    |      |      |      |      |
| Right turn flare (veh)            |             |             |             |             |                      |      |      |      |      |      |      |      |
| Median type                       |             | None        |             |             | None                 |      |      |      |      |      |      |      |
| Median storage (veh)              |             |             |             |             |                      |      |      |      |      |      |      |      |
| Upstream signal (ft)              |             | 448         |             |             |                      |      |      |      |      |      |      |      |
| pX, platoon unblocked             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vC, conflicting volume            | 680         |             |             | 435         |                      |      | 1153 | 1131 | 492  | 1202 | 1155 | 702  |
| vC1, stage 1 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vC2, stage 2 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vCu, unblocked vol                | 680         |             |             | 435         |                      |      | 1153 | 1131 | 492  | 1202 | 1155 | 702  |
| tC, single (s)                    | 4.1         |             |             | 4.1         |                      |      | 7.1  | 6.5  | 6.2  | 7.1  | 6.5  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |             |                      |      |      |      |      |      |      |      |
| tF (s)                            | 2.2         |             |             | 2.2         |                      |      | 3.5  | 4.0  | 3.3  | 3.5  | 4.0  | 3.3  |
| p0 queue free %                   | 100         |             |             | 98          |                      |      | 68   | 100  | 100  | 100  | 100  | 100  |
| cM capacity (veh/h)               | 912         |             |             | 1114        |                      |      | 166  | 198  | 533  | 147  | 191  | 430  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> | <b>SB 1</b> |                      |      |      |      |      |      |      |      |
| Volume Total                      | 426         | 698         | 54          | 0           |                      |      |      |      |      |      |      |      |
| Volume Left                       | 2           | 18          | 53          | 0           |                      |      |      |      |      |      |      |      |
| Volume Right                      | 48          | 0           | 1           | 0           |                      |      |      |      |      |      |      |      |
| cSH                               | 912         | 1114        | 168         | 1700        |                      |      |      |      |      |      |      |      |
| Volume to Capacity                | 0.00        | 0.02        | 0.32        | 0.00        |                      |      |      |      |      |      |      |      |
| Queue Length 95th (ft)            | 0           | 1           | 32          | 0           |                      |      |      |      |      |      |      |      |
| Control Delay (s)                 | 0.1         | 0.4         | 36.2        | 0.0         |                      |      |      |      |      |      |      |      |
| Lane LOS                          | A           | A           | E           | A           |                      |      |      |      |      |      |      |      |
| Approach Delay (s)                | 0.1         | 0.4         | 36.2        | 0.0         |                      |      |      |      |      |      |      |      |
| Approach LOS                      |             |             | E           | A           |                      |      |      |      |      |      |      |      |
| <b>Intersection Summary</b>       |             |             |             |             |                      |      |      |      |      |      |      |      |
| Average Delay                     |             |             | 1.9         |             |                      |      |      |      |      |      |      |      |
| Intersection Capacity Utilization |             |             | 64.7%       |             | ICU Level of Service |      |      |      | C    |      |      |      |
| Analysis Period (min)             |             |             | 15          |             |                      |      |      |      |      |      |      |      |

**HCM Unsignalized Intersection Capacity Analysis**  
**6: First St SE/CSX East Dwy & Eye St SE**

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|--|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |  |
| Lane Configurations               |  |  |   |   |  |   |  |  |  |   |  |  |  |
| Sign Control                      | Stop  |   |   |   | Stop  |   |  | Stop  |  |   | Stop  |   |  |
| Traffic Volume (vph)              | 35  | 214   | 72  | 101   | 297   | 15  | 79   | 26  | 71  | 22  | 12  | 120   |  |
| Future Volume (vph)               | 35  | 214   | 72  | 101   | 297   | 15  | 79   | 26  | 71  | 22  | 12  | 120   |  |
| Peak Hour Factor                  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90   | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |  |
| Hourly flow rate (vph)            | 39  | 238   | 80  | 112   | 330   | 17  | 88   | 29  | 79  | 24  | 13  | 133   |  |
| Direction, Lane #                 | EB 1  | EB 2  | WB 1  | NB 1  | NB 2  | SB 1  |  |   |   |   |   |   |  |
| Volume Total (vph)                | 39  | 318   | 459   | 117   | 79  | 170   |  |   |   |   |   |   |  |
| Volume Left (vph)                 | 39  | 0   | 112   | 88  | 0   | 24  |  |   |   |   |   |   |  |
| Volume Right (vph)                | 0   | 80  | 17  | 0   | 79  | 133   |  |   |   |   |   |   |  |
| Hadj (s)                          | 0.55  | -0.07   | 0.12  | 0.45  | -0.67   | -0.38   |  |   |   |   |   |   |  |
| Departure Headway (s)             | 7.3   | 6.6   | 6.6   | 8.0   | 6.9   | 7.3   |  |   |   |   |   |   |  |
| Degree Utilization, x             | 0.08  | 0.59  | 0.85  | 0.26  | 0.15  | 0.34  |  |   |   |   |   |   |  |
| Capacity (veh/h)                  | 468   | 513   | 526   | 421   | 482   | 455   |  |   |   |   |   |   |  |
| Control Delay (s)                 | 9.7   | 17.4  | 36.2  | 12.6  | 9.9   | 14.0  |  |   |   |   |   |   |  |
| Approach Delay (s)                | 16.5  |   | 36.2  | 11.5  |   | 14.0  |  |   |   |   |   |   |  |
| Approach LOS                      | C   |   | E   | B   |   | B   |  |   |   |   |   |   |  |
| Intersection Summary              |   |   |   |   |   |   |  |   |   |   |   |   |  |
| Delay                             |   |   | 23.0  |   |   |   |  |   |   |   |   |   |  |
| Level of Service                  |   |   | C   |   |   |   |  |   |   |   |   |   |  |
| Intersection Capacity Utilization |   |   | 76.6%   |   | ICU Level of Service  |   |  | D   |   |   |   |   |  |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |  |

Queues

7: New Jersey Ave SE & Eye St SE



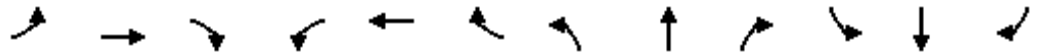
| Lane Group              | EBL  | EBT  | WBT  | NBT  | SBT  |
|-------------------------|------|------|------|------|------|
| Lane Group Flow (vph)   | 152  | 200  | 386  | 299  | 380  |
| v/c Ratio               | 0.80 | 0.41 | 0.82 | 0.40 | 0.50 |
| Control Delay           | 50.9 | 14.4 | 30.3 | 9.1  | 8.0  |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 50.9 | 14.4 | 30.3 | 9.1  | 8.0  |
| Queue Length 50th (ft)  | 39   | 38   | 84   | 47   | 41   |
| Queue Length 95th (ft)  | #119 | 79   | #203 | 89   | 93   |
| Internal Link Dist (ft) |      | 128  | 172  | 142  | 136  |
| Turn Bay Length (ft)    |      |      |      |      |      |
| Base Capacity (vph)     | 198  | 508  | 492  | 754  | 760  |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.77 | 0.39 | 0.78 | 0.40 | 0.50 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



HCM Signalized Intersection Capacity Analysis  
7: New Jersey Ave SE & Eye St SE



| Movement               | EBL   | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT   | SBR  |
|------------------------|-------|------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations    |       |      |      |      |      |      |      |      |      |      |       |      |
| Traffic Volume (vph)   | 134   | 138  | 38   | 21   | 197  | 121  | 49   | 205  | 9    | 16   | 153   | 165  |
| Future Volume (vph)    | 134   | 138  | 38   | 21   | 197  | 121  | 49   | 205  | 9    | 16   | 153   | 165  |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      |      | 4.0  |      |      | 4.0  |      |      | 4.0   |      |
| Lane Util. Factor      | 1.00  | 1.00 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00  |      |
| Frbp, ped/bikes        | 1.00  | 0.99 |      |      | 0.94 |      |      | 0.99 |      |      | 0.88  |      |
| Flpb, ped/bikes        | 0.93  | 1.00 |      |      | 1.00 |      |      | 0.98 |      |      | 0.99  |      |
| Frt                    | 1.00  | 0.97 |      |      | 0.95 |      |      | 1.00 |      |      | 0.93  |      |
| Flt Protected          | 0.95  | 1.00 |      |      | 1.00 |      |      | 0.99 |      |      | 1.00  |      |
| Satd. Flow (prot)      | 1487  | 1528 |      |      | 1451 |      |      | 1574 |      |      | 1344  |      |
| Flt Permitted          | 0.40  | 1.00 |      |      | 0.97 |      |      | 0.88 |      |      | 0.98  |      |
| Satd. Flow (perm)      | 620   | 1528 |      |      | 1414 |      |      | 1406 |      |      | 1320  |      |
| Peak-hour factor, PHF  | 0.88  | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88  | 0.88 |
| Growth Factor (vph)    | 100%  | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100%  | 100% |
| Adj. Flow (vph)        | 152   | 157  | 43   | 24   | 224  | 138  | 56   | 233  | 10   | 18   | 174   | 188  |
| RTOR Reduction (vph)   | 0     | 20   | 0    | 0    | 41   | 0    | 0    | 2    | 0    | 0    | 55    | 0    |
| Lane Group Flow (vph)  | 152   | 180  | 0    | 0    | 345  | 0    | 0    | 297  | 0    | 0    | 325   | 0    |
| Confl. Peds. (#/hr)    | 97    |      | 20   | 20   |      | 97   | 151  |      | 138  | 138  |       | 151  |
| Heavy Vehicles (%)     | 2%    | 8%   | 4%   | 2%   | 7%   | 2%   | 8%   | 3%   | 2%   | 6%   | 4%    | 2%   |
| Turn Type              | Perm  | NA   |      | Perm | NA   |      | Perm | NA   |      | Perm | NA    |      |
| Protected Phases       |       | 8    |      |      | 4    |      |      | 6    |      |      | 2     |      |
| Permitted Phases       | 8     |      |      | 4    |      |      | 6    |      | 2    |      |       |      |
| Actuated Green, G (s)  | 13.3  | 13.3 |      |      | 13.3 |      |      | 24.7 |      |      | 24.7  |      |
| Effective Green, g (s) | 15.3  | 15.3 |      |      | 15.3 |      |      | 26.7 |      |      | 26.7  |      |
| Actuated g/C Ratio     | 0.31  | 0.31 |      |      | 0.31 |      |      | 0.53 |      |      | 0.53  |      |
| Clearance Time (s)     | 6.0   | 6.0  |      |      | 6.0  |      |      | 6.0  |      |      | 6.0   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  |      |      | 3.0  |      |      | 3.0  |      |      | 3.0   |      |
| Lane Grp Cap (vph)     | 189   | 467  |      |      | 432  |      |      | 750  |      |      | 704   |      |
| v/s Ratio Prot         |       | 0.12 |      |      |      |      |      |      |      |      |       |      |
| v/s Ratio Perm         | c0.25 |      |      |      | 0.24 |      |      | 0.21 |      |      | c0.25 |      |
| v/c Ratio              | 0.80  | 0.39 |      |      | 0.80 |      |      | 0.40 |      |      | 0.46  |      |
| Uniform Delay, d1      | 16.0  | 13.6 |      |      | 15.9 |      |      | 6.9  |      |      | 7.2   |      |
| Progression Factor     | 1.00  | 1.00 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00  |      |
| Incremental Delay, d2  | 21.4  | 0.5  |      |      | 9.9  |      |      | 1.6  |      |      | 2.2   |      |
| Delay (s)              | 37.4  | 14.2 |      |      | 25.9 |      |      | 8.5  |      |      | 9.4   |      |
| Level of Service       | D     | B    |      |      | C    |      |      | A    |      |      | A     |      |
| Approach Delay (s)     |       | 24.2 |      |      | 25.9 |      |      | 8.5  |      |      | 9.4   |      |
| Approach LOS           |       | C    |      |      | C    |      |      | A    |      |      | A     |      |

| Intersection Summary              |       |
|-----------------------------------|-------|
| HCM 2000 Control Delay            | 17.4  |
| HCM 2000 Level of Service         | B     |
| HCM 2000 Volume to Capacity ratio | 0.65  |
| Actuated Cycle Length (s)         | 50.0  |
| Sum of lost time (s)              | 12.0  |
| Intersection Capacity Utilization | 79.4% |
| ICU Level of Service              | D     |
| Analysis Period (min)             | 15    |
| c Critical Lane Group             |       |

Queues

8: I 395 SB Ramp & South Capitol St & Garage Dwy & I 395 NB Ramp



| Lane Group              | EBL  | EBR  | NBL    | NBT  | SBT  | SBR2 | NER  |
|-------------------------|------|------|--------|------|------|------|------|
| Lane Group Flow (vph)   | 26   | 26   | 2529   | 752  | 387  | 26   | 1707 |
| v/c Ratio               | 0.27 | 0.31 | 1.21   | 0.25 | 0.47 | 0.06 | 0.82 |
| Control Delay           | 74.4 | 76.6 | 112.5  | 0.3  | 47.8 | 42.8 | 12.0 |
| Queue Delay             | 0.0  | 0.0  | 0.1    | 0.0  | 2.6  | 0.0  | 0.1  |
| Total Delay             | 74.4 | 76.6 | 112.6  | 0.3  | 50.4 | 42.8 | 12.2 |
| Queue Length 50th (ft)  | 25   | 25   | ~1549  | 8    | 175  | 18   | 313  |
| Queue Length 95th (ft)  | 57   | 58   | m#1239 | m7   | 237  | 41   | 434  |
| Internal Link Dist (ft) | 119  |      |        | 727  | 190  |      |      |
| Turn Bay Length (ft)    |      |      |        |      |      |      |      |
| Base Capacity (vph)     | 318  | 284  | 2082   | 3010 | 828  | 401  | 2088 |
| Starvation Cap Reductn  | 0    | 0    | 45     | 0    | 316  | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0      | 0    | 0    | 0    | 37   |
| Storage Cap Reductn     | 0    | 0    | 0      | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.08 | 0.09 | 1.24   | 0.25 | 0.76 | 0.06 | 0.83 |

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

8: I 395 SB Ramp & South Capitol St & Garage Dwy & I 395 NB Ramp

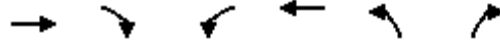


| Movement               | EBL  | EBR   | NBL2 | NBL   | NBT   | SBT   | SBR  | SBR2 | NER  |
|------------------------|------|-------|------|-------|-------|-------|------|------|------|
| Lane Configurations    | ↘    | ↗     |      | ↘↗    | ↑↑    | ↑↑    |      | ↗    | ↗↘   |
| Traffic Volume (vph)   | 25   | 25    | 25   | 2378  | 714   | 252   | 116  | 25   | 1622 |
| Future Volume (vph)    | 25   | 25    | 25   | 2378  | 714   | 252   | 116  | 25   | 1622 |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900  | 1900  | 1900 | 1900 | 1900 |
| Total Lost time (s)    | 5.0  | 5.0   |      | 5.0   | 5.0   | 5.0   |      | 5.0  | 5.0  |
| Lane Util. Factor      | 1.00 | 1.00  |      | 0.97  | 0.95  | 0.95  |      | 1.00 | 0.88 |
| Frt                    | 1.00 | 0.85  |      | 1.00  | 1.00  | 0.95  |      | 0.85 | 0.85 |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00  |      | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770 | 1583  |      | 3433  | 3343  | 3262  |      | 1583 | 2787 |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00  |      | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770 | 1583  |      | 3433  | 3343  | 3262  |      | 1583 | 2787 |
| Peak-hour factor, PHF  | 0.95 | 0.95  | 0.95 | 0.95  | 0.95  | 0.95  | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph)        | 26   | 26    | 26   | 2503  | 752   | 265   | 122  | 26   | 1707 |
| RTOR Reduction (vph)   | 0    | 0     | 0    | 0     | 0     | 0     | 0    | 0    | 398  |
| Lane Group Flow (vph)  | 26   | 26    | 0    | 2529  | 752   | 387   | 0    | 26   | 1309 |
| Heavy Vehicles (%)     | 2%   | 2%    | 2%   | 2%    | 8%    | 7%    | 2%   | 2%   | 2%   |
| Turn Type              | Prot | Perm  | Prot | Prot  | NA    | NA    |      | Perm | Prot |
| Protected Phases       | 4    |       | 5    | 5     | 2     | 6     |      |      | 5    |
| Permitted Phases       |      | 4     |      |       |       | 6     |      | 6    |      |
| Actuated Green, G (s)  | 6.9  | 6.9   |      | 91.0  | 133.1 | 37.1  |      | 37.1 | 91.0 |
| Effective Green, g (s) | 6.9  | 6.9   |      | 91.0  | 133.1 | 37.1  |      | 37.1 | 91.0 |
| Actuated g/C Ratio     | 0.05 | 0.05  |      | 0.61  | 0.89  | 0.25  |      | 0.25 | 0.61 |
| Clearance Time (s)     | 5.0  | 5.0   |      | 5.0   | 5.0   | 5.0   |      | 5.0  | 5.0  |
| Vehicle Extension (s)  | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0   |      | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 81   | 72    |      | 2082  | 2966  | 806   |      | 391  | 1690 |
| v/s Ratio Prot         | 0.01 |       |      | c0.74 | 0.22  | c0.12 |      |      | 0.47 |
| v/s Ratio Perm         |      | c0.02 |      |       |       |       |      | 0.02 |      |
| v/c Ratio              | 0.32 | 0.36  |      | 1.21  | 0.25  | 0.48  |      | 0.07 | 0.77 |
| Uniform Delay, d1      | 69.3 | 69.4  |      | 29.5  | 1.2   | 48.2  |      | 43.2 | 21.9 |
| Progression Factor     | 1.00 | 1.00  |      | 0.34  | 0.22  | 0.94  |      | 0.93 | 1.00 |
| Incremental Delay, d2  | 2.3  | 3.1   |      | 97.1  | 0.0   | 2.0   |      | 0.3  | 3.5  |
| Delay (s)              | 71.6 | 72.5  |      | 107.0 | 0.3   | 47.3  |      | 40.6 | 25.4 |
| Level of Service       | E    | E     |      | F     | A     | D     |      | D    | C    |
| Approach Delay (s)     | 72.0 |       |      |       | 82.5  | 46.9  |      |      |      |
| Approach LOS           | E    |       |      |       | F     | D     |      |      |      |

Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 61.9  | HCM 2000 Level of Service | E    |
| HCM 2000 Volume to Capacity ratio | 0.97  |                           |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s)      | 15.0 |
| Intersection Capacity Utilization | 96.7% | ICU Level of Service      | F    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

**HCM Unsignalized Intersection Capacity Analysis**  
**2: Half St SW & Eye St SW**



| Movement                          | EBT         | EBR         | WBL         | WBT   | NBL                  | NBR  |
|-----------------------------------|-------------|-------------|-------------|-------|----------------------|------|
| Lane Configurations               | →           |             |             | ←     | ↔                    | ↔    |
| Traffic Volume (veh/h)            | 389         | 223         | 107         | 431   | 41                   | 51   |
| Future Volume (Veh/h)             | 389         | 223         | 107         | 431   | 41                   | 51   |
| Sign Control                      | Free        |             |             | Free  | Stop                 |      |
| Grade                             | 0%          |             |             | 0%    | 0%                   |      |
| Peak Hour Factor                  | 0.95        | 0.95        | 0.94        | 0.94  | 0.92                 | 0.92 |
| Hourly flow rate (vph)            | 409         | 235         | 114         | 459   | 45                   | 55   |
| Pedestrians                       |             |             |             | 2     | 15                   |      |
| Lane Width (ft)                   |             |             |             | 12.0  | 12.0                 |      |
| Walking Speed (ft/s)              |             |             |             | 4.0   | 4.0                  |      |
| Percent Blockage                  |             |             |             | 0     | 1                    |      |
| Right turn flare (veh)            |             |             |             |       |                      |      |
| Median type                       | None        |             |             | None  |                      |      |
| Median storage (veh)              |             |             |             |       |                      |      |
| Upstream signal (ft)              |             |             |             | 452   |                      |      |
| pX, platoon unblocked             |             |             |             |       | 0.88                 |      |
| vC, conflicting volume            |             |             |             | 659   | 1228                 | 544  |
| vC1, stage 1 conf vol             |             |             |             |       |                      |      |
| vC2, stage 2 conf vol             |             |             |             |       |                      |      |
| vCu, unblocked vol                |             |             |             | 659   | 1193                 | 544  |
| tC, single (s)                    |             |             |             | 4.1   | 6.4                  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |       |                      |      |
| tF (s)                            |             |             |             | 2.2   | 3.5                  | 3.3  |
| p0 queue free %                   |             |             |             | 88    | 71                   | 90   |
| cM capacity (veh/h)               |             |             |             | 917   | 158                  | 532  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |       |                      |      |
| Volume Total                      | 644         | 573         | 100         |       |                      |      |
| Volume Left                       | 0           | 114         | 45          |       |                      |      |
| Volume Right                      | 235         | 0           | 55          |       |                      |      |
| cSH                               | 1700        | 917         | 257         |       |                      |      |
| Volume to Capacity                | 0.38        | 0.12        | 0.39        |       |                      |      |
| Queue Length 95th (ft)            | 0           | 11          | 44          |       |                      |      |
| Control Delay (s)                 | 0.0         | 3.2         | 27.6        |       |                      |      |
| Lane LOS                          |             | A           | D           |       |                      |      |
| Approach Delay (s)                | 0.0         | 3.2         | 27.6        |       |                      |      |
| Approach LOS                      |             |             | D           |       |                      |      |
| <b>Intersection Summary</b>       |             |             |             |       |                      |      |
| Average Delay                     |             |             |             | 3.5   |                      |      |
| Intersection Capacity Utilization |             |             |             | 86.8% | ICU Level of Service | E    |
| Analysis Period (min)             |             |             |             | 15    |                      |      |

Queues

3: South Capitol St & Eye St SW/Eye St SE



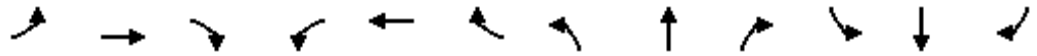
| Lane Group              | EBT   | EBR  | WBT  | WBR  | NBL  | NBT  | SBL   | SBT  |
|-------------------------|-------|------|------|------|------|------|-------|------|
| Lane Group Flow (vph)   | 454   | 88   | 244  | 312  | 65   | 2037 | 128   | 1785 |
| v/c Ratio               | 2.05  | 0.24 | 0.59 | 0.82 | 0.45 | 0.78 | 1.21  | 0.69 |
| Control Delay           | 515.4 | 17.7 | 46.3 | 44.8 | 61.7 | 22.2 | 193.9 | 18.1 |
| Queue Delay             | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  |
| Total Delay             | 515.4 | 17.7 | 46.3 | 44.8 | 61.7 | 22.2 | 193.9 | 18.1 |
| Queue Length 50th (ft)  | ~553  | 20   | 167  | 141  | 48   | 421  | ~122  | 388  |
| Queue Length 95th (ft)  | #748  | 63   | 252  | #283 | 94   | 475  | m#240 | 432  |
| Internal Link Dist (ft) | 372   |      | 210  |      |      | 81   |       | 727  |
| Turn Bay Length (ft)    |       | 120  |      |      | 200  |      | 200   |      |
| Base Capacity (vph)     | 221   | 363  | 415  | 382  | 159  | 2616 | 106   | 2576 |
| Starvation Cap Reductn  | 0     | 0    | 0    | 0    | 0    | 0    | 0     | 0    |
| Spillback Cap Reductn   | 0     | 0    | 0    | 0    | 0    | 0    | 0     | 0    |
| Storage Cap Reductn     | 0     | 0    | 0    | 0    | 0    | 0    | 0     | 0    |
| Reduced v/c Ratio       | 2.05  | 0.24 | 0.59 | 0.82 | 0.41 | 0.78 | 1.21  | 0.69 |

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 3: South Capitol St & Eye St SW/Eye St SE



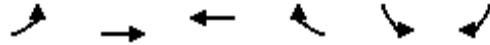
| Movement               | EBL  | EBT   | EBR  | WBL  | WBT  | WBR  | NBL  | NBT   | NBR  | SBL   | SBT  | SBR  |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations    |      | ↕     | ↗    |      | ↕    | ↗    | ↖    | ↕↗↘   |      | ↖     | ↕↗↘  |      |
| Traffic Volume (vph)   | 124  | 280   | 78   | 0    | 217  | 278  | 58   | 1750  | 63   | 114   | 1329 | 260  |
| Future Volume (vph)    | 124  | 280   | 78   | 0    | 217  | 278  | 58   | 1750  | 63   | 114   | 1329 | 260  |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    |      | 4.0   | 4.0  |      | 4.0  | 10.0 | 4.0  | 5.0   |      | 4.0   | 4.0  |      |
| Lane Util. Factor      |      | 1.00  | 1.00 |      | 1.00 | 1.00 | 1.00 | 0.91  |      | 1.00  | 0.91 |      |
| Frbp, ped/bikes        |      | 1.00  | 0.90 |      | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.00  | 0.99 |      |
| Flpb, ped/bikes        |      | 1.00  | 1.00 |      | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.00  | 1.00 |      |
| Frt                    |      | 1.00  | 0.85 |      | 1.00 | 0.85 | 1.00 | 0.99  |      | 1.00  | 0.98 |      |
| Flt Protected          |      | 0.98  | 1.00 |      | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (prot)      |      | 1629  | 1288 |      | 1660 | 1398 | 1593 | 4545  |      | 1593  | 4430 |      |
| Flt Permitted          |      | 0.54  | 1.00 |      | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (perm)      |      | 886   | 1288 |      | 1660 | 1398 | 1593 | 4545  |      | 1593  | 4430 |      |
| Peak-hour factor, PHF  | 0.89 | 0.89  | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89  | 0.89 | 0.89  | 0.89 | 0.89 |
| Adj. Flow (vph)        | 139  | 315   | 88   | 0    | 244  | 312  | 65   | 1966  | 71   | 128   | 1493 | 292  |
| RTOR Reduction (vph)   | 0    | 0     | 41   | 0    | 0    | 102  | 0    | 3     | 0    | 0     | 23   | 0    |
| Lane Group Flow (vph)  | 0    | 454   | 47   | 0    | 244  | 210  | 65   | 2034  | 0    | 128   | 1762 | 0    |
| Confl. Peds. (#/hr)    |      |       | 57   | 57   |      |      | 9    |       | 10   | 10    |      | 9    |
| Heavy Vehicles (%)     | 2%   | 4%    | 2%   | 2%   | 3%   | 4%   | 2%   | 2%    | 2%   | 2%    | 2%   | 2%   |
| Turn Type              | Perm | NA    | Perm |      | NA   | Perm | Prot | NA    |      | Prot  | NA   |      |
| Protected Phases       |      | 4     |      |      | 8    |      | 5    | 2     |      | 1     |      | 6    |
| Permitted Phases       | 4    |       | 4    |      | 8    | 8    |      |       |      |       |      |      |
| Actuated Green, G (s)  |      | 27.0  | 27.0 |      | 24.0 | 24.0 | 9.6  | 68.2  |      | 8.8   | 67.4 |      |
| Effective Green, g (s) |      | 30.0  | 30.0 |      | 30.0 | 24.0 | 9.6  | 68.2  |      | 8.8   | 68.4 |      |
| Actuated g/C Ratio     |      | 0.25  | 0.25 |      | 0.25 | 0.20 | 0.08 | 0.57  |      | 0.07  | 0.57 |      |
| Clearance Time (s)     |      | 7.0   | 7.0  |      | 10.0 | 10.0 | 4.0  | 5.0   |      | 4.0   | 5.0  |      |
| Vehicle Extension (s)  |      | 3.0   | 3.0  |      | 3.0  | 3.0  | 3.0  | 3.0   |      | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     |      | 221   | 322  |      | 415  | 279  | 127  | 2583  |      | 116   | 2525 |      |
| v/s Ratio Prot         |      |       |      |      | 0.15 |      | 0.04 | c0.45 |      | c0.08 | 0.40 |      |
| v/s Ratio Perm         |      | c0.51 | 0.04 |      |      | 0.15 |      |       |      |       |      |      |
| v/c Ratio              |      | 2.05  | 0.15 |      | 0.59 | 0.75 | 0.51 | 0.79  |      | 1.10  | 0.70 |      |
| Uniform Delay, d1      |      | 45.0  | 35.0 |      | 39.6 | 45.2 | 53.0 | 20.2  |      | 55.6  | 18.4 |      |
| Progression Factor     |      | 1.00  | 1.00 |      | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.06  | 0.92 |      |
| Incremental Delay, d2  |      | 489.8 | 0.2  |      | 2.1  | 10.8 | 3.5  | 2.5   |      | 105.4 | 1.3  |      |
| Delay (s)              |      | 534.8 | 35.2 |      | 41.7 | 56.0 | 56.4 | 22.8  |      | 164.5 | 18.3 |      |
| Level of Service       |      | F     | D    |      | D    | E    | E    | C     |      | F     | B    |      |
| Approach Delay (s)     |      | 453.7 |      |      | 49.7 |      |      | 23.8  |      |       | 28.1 |      |
| Approach LOS           |      | F     |      |      | D    |      |      | C     |      |       | C    |      |

| Intersection Summary              |       |                           |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay            | 73.8  | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 1.17  | E                         |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      |
| Intersection Capacity Utilization | 98.1% | 13.0                      |
| Analysis Period (min)             | 15    | ICU Level of Service      |
|                                   |       | F                         |

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Eye St SE & Site Dwy



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↕           | ↔           |                      | ↕    |      |
| Traffic Volume (veh/h)            | 4           | 413         | 495         | 16                   | 12   | 11   |
| Future Volume (Veh/h)             | 4           | 413         | 495         | 16                   | 12   | 11   |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Peak Hour Factor                  | 0.92        | 0.92        | 0.92        | 0.92                 | 0.92 | 0.92 |
| Hourly flow rate (vph)            | 4           | 449         | 538         | 17                   | 13   | 12   |
| <b>Pedestrians</b>                |             |             |             |                      |      |      |
| Lane Width (ft)                   |             |             |             |                      |      |      |
| Walking Speed (ft/s)              |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             | None        | None        |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              |             | 290         |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      | 0.79 |      |
| vC, conflicting volume            | 555         |             |             |                      | 1004 | 546  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 555         |             |             |                      | 874  | 546  |
| tC, single (s)                    | 4.1         |             |             |                      | 6.4  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             |                      | 3.5  | 3.3  |
| p0 queue free %                   | 100         |             |             |                      | 95   | 98   |
| cM capacity (veh/h)               | 1015        |             |             |                      | 253  | 537  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 453         | 555         | 25          |                      |      |      |
| Volume Left                       | 4           | 0           | 13          |                      |      |      |
| Volume Right                      | 0           | 17          | 12          |                      |      |      |
| cSH                               | 1015        | 1700        | 339         |                      |      |      |
| Volume to Capacity                | 0.00        | 0.33        | 0.07        |                      |      |      |
| Queue Length 95th (ft)            | 0           | 0           | 6           |                      |      |      |
| Control Delay (s)                 | 0.1         | 0.0         | 16.5        |                      |      |      |
| Lane LOS                          | A           |             | C           |                      |      |      |
| Approach Delay (s)                | 0.1         | 0.0         | 16.5        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.5         |                      |      |      |
| Intersection Capacity Utilization |             |             | 40.0%       | ICU Level of Service | A    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

**HCM Unsignalized Intersection Capacity Analysis**  
**5: Half St SE/Coal Yard Dwy & Eye St SE**



| Movement                          | EBL         | EBT         | EBR         | WBL         | WBT                  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-----------------------------------|-------------|-------------|-------------|-------------|----------------------|------|------|------|------|------|------|------|
| Lane Configurations               |             | ↕           |             |             | ↕                    |      |      | ↕    |      |      | ↕    |      |
| Traffic Volume (veh/h)            | 6           | 390         | 13          | 6           | 454                  | 0    | 58   | 0    | 15   | 0    | 0    | 0    |
| Future Volume (Veh/h)             | 6           | 390         | 13          | 6           | 454                  | 0    | 58   | 0    | 15   | 0    | 0    | 0    |
| Sign Control                      |             | Free        |             |             | Free                 |      |      | Stop |      |      | Stop |      |
| Grade                             |             | 0%          |             |             | 0%                   |      |      | 0%   |      |      | 0%   |      |
| Peak Hour Factor                  | 0.95        | 0.93        | 0.93        | 0.85        | 0.85                 | 0.95 | 0.85 | 0.95 | 0.85 | 0.95 | 0.95 | 0.95 |
| Hourly flow rate (vph)            | 6           | 419         | 14          | 7           | 534                  | 0    | 68   | 0    | 18   | 0    | 0    | 0    |
| Pedestrians                       |             | 10          |             |             | 8                    |      |      | 4    |      |      |      |      |
| Lane Width (ft)                   |             | 12.0        |             |             | 12.0                 |      |      | 12.0 |      |      |      |      |
| Walking Speed (ft/s)              |             | 4.0         |             |             | 4.0                  |      |      | 4.0  |      |      |      |      |
| Percent Blockage                  |             | 1           |             |             | 1                    |      |      | 0    |      |      |      |      |
| Right turn flare (veh)            |             |             |             |             |                      |      |      |      |      |      |      |      |
| Median type                       |             | None        |             |             | None                 |      |      |      |      |      |      |      |
| Median storage (veh)              |             |             |             |             |                      |      |      |      |      |      |      |      |
| Upstream signal (ft)              |             | 448         |             |             |                      |      |      |      |      |      |      |      |
| pX, platoon unblocked             |             |             |             | 0.84        |                      |      | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |      |
| vC, conflicting volume            | 534         |             |             | 437         |                      |      | 1000 | 990  | 438  | 1012 | 997  | 544  |
| vC1, stage 1 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vC2, stage 2 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vCu, unblocked vol                | 534         |             |             | 230         |                      |      | 903  | 891  | 231  | 917  | 899  | 544  |
| tC, single (s)                    | 4.1         |             |             | 4.1         |                      |      | 7.1  | 6.5  | 6.2  | 7.1  | 6.5  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |             |                      |      |      |      |      |      |      |      |
| tF (s)                            | 2.2         |             |             | 2.2         |                      |      | 3.5  | 4.0  | 3.3  | 3.5  | 4.0  | 3.3  |
| p0 queue free %                   | 99          |             |             | 99          |                      |      | 68   | 100  | 97   | 100  | 100  | 100  |
| cM capacity (veh/h)               | 1034        |             |             | 1116        |                      |      | 211  | 232  | 670  | 202  | 230  | 534  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> | <b>SB 1</b> |                      |      |      |      |      |      |      |      |
| Volume Total                      | 439         | 541         | 86          | 0           |                      |      |      |      |      |      |      |      |
| Volume Left                       | 6           | 7           | 68          | 0           |                      |      |      |      |      |      |      |      |
| Volume Right                      | 14          | 0           | 18          | 0           |                      |      |      |      |      |      |      |      |
| cSH                               | 1034        | 1116        | 247         | 1700        |                      |      |      |      |      |      |      |      |
| Volume to Capacity                | 0.01        | 0.01        | 0.35        | 0.00        |                      |      |      |      |      |      |      |      |
| Queue Length 95th (ft)            | 0           | 0           | 37          | 0           |                      |      |      |      |      |      |      |      |
| Control Delay (s)                 | 0.2         | 0.2         | 27.2        | 0.0         |                      |      |      |      |      |      |      |      |
| Lane LOS                          | A           | A           | D           | A           |                      |      |      |      |      |      |      |      |
| Approach Delay (s)                | 0.2         | 0.2         | 27.2        | 0.0         |                      |      |      |      |      |      |      |      |
| Approach LOS                      |             |             | D           | A           |                      |      |      |      |      |      |      |      |
| <b>Intersection Summary</b>       |             |             |             |             |                      |      |      |      |      |      |      |      |
| Average Delay                     |             |             | 2.4         |             |                      |      |      |      |      |      |      |      |
| Intersection Capacity Utilization |             |             | 43.7%       |             | ICU Level of Service |      |      |      | A    |      |      |      |
| Analysis Period (min)             |             |             | 15          |             |                      |      |      |      |      |      |      |      |

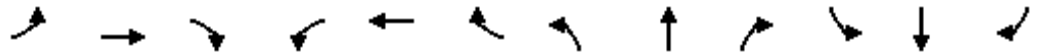


# HCM Unsignalized Intersection Capacity Analysis

CSX West

## 6: First St SE/CSX East Dwy & Eye St SE

09/26/2021



| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    |      |      |      |      |      |      |      |      |      |      |      |      |
| Sign Control           | Stop |      |      |      | Stop |      |      | Stop |      |      |      | Stop |
| Traffic Volume (vph)   | 43   | 265  | 35   | 200  | 309  | 24   | 67   | 35   | 82   | 11   | 10   | 78   |
| Future Volume (vph)    | 43   | 265  | 35   | 200  | 309  | 24   | 67   | 35   | 82   | 11   | 10   | 78   |
| Peak Hour Factor       | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Hourly flow rate (vph) | 47   | 291  | 38   | 220  | 340  | 26   | 74   | 38   | 90   | 12   | 11   | 86   |

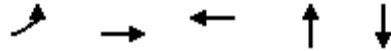
| Direction, Lane #     | EB 1 | EB 2  | WB 1 | NB 1 | NB 2  | SB 1  |
|-----------------------|------|-------|------|------|-------|-------|
| Volume Total (vph)    | 47   | 329   | 586  | 112  | 90    | 109   |
| Volume Left (vph)     | 47   | 0     | 220  | 74   | 0     | 12    |
| Volume Right (vph)    | 0    | 38    | 26   | 0    | 90    | 86    |
| Hadj (s)              | 0.53 | -0.04 | 0.08 | 0.41 | -0.67 | -0.42 |
| Departure Headway (s) | 7.0  | 6.5   | 6.4  | 7.9  | 6.8   | 7.4   |
| Degree Utilization, x | 0.09 | 0.59  | 1.04 | 0.25 | 0.17  | 0.22  |
| Capacity (veh/h)      | 494  | 537   | 558  | 436  | 500   | 456   |
| Control Delay (s)     | 9.5  | 17.2  | 74.0 | 12.3 | 10.1  | 12.5  |
| Approach Delay (s)    | 16.2 |       | 74.0 | 11.3 |       | 12.5  |
| Approach LOS          | C    |       | F    | B    |       | B     |

### Intersection Summary

|                                   |       |
|-----------------------------------|-------|
| Delay                             | 41.7  |
| Level of Service                  | E     |
| Intersection Capacity Utilization | 75.7% |
| ICU Level of Service              | D     |
| Analysis Period (min)             | 15    |

Queues

7: New Jersey Ave SE & Eye St SE



| Lane Group              | EBL  | EBT  | WBT  | NBT  | SBT  |
|-------------------------|------|------|------|------|------|
| Lane Group Flow (vph)   | 131  | 239  | 305  | 322  | 571  |
| v/c Ratio               | 0.69 | 0.51 | 0.68 | 0.42 | 0.76 |
| Control Delay           | 40.2 | 22.0 | 28.2 | 12.0 | 21.3 |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 40.2 | 22.0 | 28.2 | 12.0 | 21.3 |
| Queue Length 50th (ft)  | 53   | 82   | 115  | 72   | 160  |
| Queue Length 95th (ft)  | 98   | 122  | 165  | 171  | #433 |
| Internal Link Dist (ft) |      | 128  | 172  | 142  | 136  |
| Turn Bay Length (ft)    |      |      |      |      |      |
| Base Capacity (vph)     | 297  | 721  | 686  | 765  | 753  |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.44 | 0.33 | 0.44 | 0.42 | 0.76 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
7: New Jersey Ave SE & Eye St SE



| Movement               | EBL   | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT   | SBR  |
|------------------------|-------|------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations    |       |      |      |      |      |      |      |      |      |      |       |      |
| Traffic Volume (vph)   | 127   | 186  | 46   | 23   | 216  | 56   | 69   | 224  | 19   | 53   | 267   | 234  |
| Future Volume (vph)    | 127   | 186  | 46   | 23   | 216  | 56   | 69   | 224  | 19   | 53   | 267   | 234  |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      |      | 4.0  |      |      | 4.0  |      |      | 4.0   |      |
| Lane Util. Factor      | 1.00  | 1.00 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00  |      |
| Frbp, ped/bikes        | 1.00  | 0.98 |      |      | 0.96 |      |      | 0.98 |      |      | 0.86  |      |
| Flpb, ped/bikes        | 0.90  | 1.00 |      |      | 1.00 |      |      | 0.98 |      |      | 0.98  |      |
| Frt                    | 1.00  | 0.97 |      |      | 0.97 |      |      | 0.99 |      |      | 0.94  |      |
| Flt Protected          | 0.95  | 1.00 |      |      | 1.00 |      |      | 0.99 |      |      | 1.00  |      |
| Satd. Flow (prot)      | 1439  | 1519 |      |      | 1497 |      |      | 1536 |      |      | 1302  |      |
| Flt Permitted          | 0.43  | 1.00 |      |      | 0.96 |      |      | 0.81 |      |      | 0.94  |      |
| Satd. Flow (perm)      | 648   | 1519 |      |      | 1446 |      |      | 1260 |      |      | 1232  |      |
| Peak-hour factor, PHF  | 0.97  | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97  | 0.97 |
| Growth Factor (vph)    | 100%  | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100%  | 100% |
| Adj. Flow (vph)        | 131   | 192  | 47   | 24   | 223  | 58   | 71   | 231  | 20   | 55   | 275   | 241  |
| RTOR Reduction (vph)   | 0     | 15   | 0    | 0    | 15   | 0    | 0    | 2    | 0    | 0    | 22    | 0    |
| Lane Group Flow (vph)  | 131   | 224  | 0    | 0    | 290  | 0    | 0    | 320  | 0    | 0    | 549   | 0    |
| Confl. Peds. (#/hr)    | 91    |      | 33   | 33   |      | 91   | 140  |      | 160  | 160  |       | 140  |
| Heavy Vehicles (%)     | 2%    | 8%   | 4%   | 2%   | 7%   | 2%   | 8%   | 3%   | 2%   | 6%   | 4%    | 2%   |
| Turn Type              | Perm  | NA   |      | Perm | NA   |      | Perm | NA   |      | Perm | NA    |      |
| Protected Phases       |       | 8    |      |      | 4    |      |      | 6    |      |      | 2     |      |
| Permitted Phases       | 8     |      |      | 4    |      |      | 6    |      | 2    |      |       |      |
| Actuated Green, G (s)  | 20.6  | 20.6 |      |      | 20.6 |      |      | 42.4 |      |      | 42.4  |      |
| Effective Green, g (s) | 22.6  | 22.6 |      |      | 22.6 |      |      | 44.4 |      |      | 44.4  |      |
| Actuated g/C Ratio     | 0.30  | 0.30 |      |      | 0.30 |      |      | 0.59 |      |      | 0.59  |      |
| Clearance Time (s)     | 6.0   | 6.0  |      |      | 6.0  |      |      | 6.0  |      |      | 6.0   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  |      |      | 3.0  |      |      | 3.0  |      |      | 3.0   |      |
| Lane Grp Cap (vph)     | 195   | 457  |      |      | 435  |      |      | 745  |      |      | 729   |      |
| v/s Ratio Prot         |       | 0.15 |      |      |      |      |      |      |      |      |       |      |
| v/s Ratio Perm         | c0.20 |      |      |      | 0.20 |      |      | 0.25 |      |      | c0.45 |      |
| v/c Ratio              | 0.67  | 0.49 |      |      | 0.67 |      |      | 0.43 |      |      | 0.75  |      |
| Uniform Delay, d1      | 23.0  | 21.5 |      |      | 22.9 |      |      | 8.4  |      |      | 11.3  |      |
| Progression Factor     | 1.00  | 1.00 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00  |      |
| Incremental Delay, d2  | 8.8   | 0.8  |      |      | 3.9  |      |      | 1.8  |      |      | 7.1   |      |
| Delay (s)              | 31.7  | 22.3 |      |      | 26.8 |      |      | 10.2 |      |      | 18.3  |      |
| Level of Service       | C     | C    |      |      | C    |      |      | B    |      |      | B     |      |
| Approach Delay (s)     |       | 25.6 |      |      | 26.8 |      |      | 10.2 |      |      | 18.3  |      |
| Approach LOS           |       | C    |      |      | C    |      |      | B    |      |      | B     |      |

| Intersection Summary              |       |                           |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay            | 20.0  | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.77  | C                         |
| Actuated Cycle Length (s)         | 75.0  | Sum of lost time (s)      |
| Intersection Capacity Utilization | 85.2% | 12.0                      |
| Analysis Period (min)             | 15    | ICU Level of Service      |
|                                   |       | E                         |
| c Critical Lane Group             |       |                           |

Queues

8: I 395 SB Ramp & South Capitol St & Garage Dwy & I 395 NB Ramp



| Lane Group              | EBL  | EBR  | NBL   | NBT  | SBT  | SBR2 | NER  |
|-------------------------|------|------|-------|------|------|------|------|
| Lane Group Flow (vph)   | 26   | 26   | 1699  | 563  | 765  | 26   | 1075 |
| v/c Ratio               | 0.23 | 0.26 | 1.00  | 0.19 | 0.69 | 0.05 | 0.61 |
| Control Delay           | 57.6 | 59.1 | 36.6  | 2.1  | 36.7 | 25.4 | 8.2  |
| Queue Delay             | 0.0  | 0.0  | 0.0   | 0.0  | 4.8  | 0.0  | 0.0  |
| Total Delay             | 57.6 | 59.1 | 36.6  | 2.1  | 41.5 | 25.4 | 8.2  |
| Queue Length 50th (ft)  | 20   | 20   | ~742  | 44   | 272  | 14   | 94   |
| Queue Length 95th (ft)  | 49   | 49   | m#865 | m62  | 344  | 33   | 177  |
| Internal Link Dist (ft) | 119  |      |       | 727  | 237  |      |      |
| Turn Bay Length (ft)    |      |      |       |      |      |      |      |
| Base Capacity (vph)     | 398  | 356  | 1703  | 2940 | 1115 | 527  | 1753 |
| Starvation Cap Reductn  | 0    | 0    | 0     | 0    | 276  | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.07 | 0.07 | 1.00  | 0.19 | 0.91 | 0.05 | 0.61 |

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

8: I 395 SB Ramp & South Capitol St & Garage Dwy & I 395 NB Ramp



| Movement               | EBL  | EBR   | NBL2 | NBL   | NBT   | SBT   | SBR  | SBR2 | NER  |
|------------------------|------|-------|------|-------|-------|-------|------|------|------|
| Lane Configurations    |      |       |      |       |       |       |      |      |      |
| Traffic Volume (vph)   | 25   | 25    | 25   | 1589  | 535   | 669   | 58   | 25   | 1021 |
| Future Volume (vph)    | 25   | 25    | 25   | 1589  | 535   | 669   | 58   | 25   | 1021 |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900  | 1900  | 1900 | 1900 | 1900 |
| Total Lost time (s)    | 5.0  | 5.0   |      | 5.0   | 5.0   | 5.0   |      | 5.0  | 5.0  |
| Lane Util. Factor      | 1.00 | 1.00  |      | 0.97  | 0.95  | 0.95  |      | 1.00 | 0.88 |
| Frt                    | 1.00 | 0.85  |      | 1.00  | 1.00  | 0.99  |      | 0.85 | 0.85 |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00  |      | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770 | 1583  |      | 3433  | 3343  | 3346  |      | 1583 | 2787 |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00  |      | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770 | 1583  |      | 3433  | 3343  | 3346  |      | 1583 | 2787 |
| Peak-hour factor, PHF  | 0.95 | 0.95  | 0.95 | 0.95  | 0.95  | 0.95  | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph)        | 26   | 26    | 26   | 1673  | 563   | 704   | 61   | 26   | 1075 |
| RTOR Reduction (vph)   | 0    | 0     | 0    | 0     | 0     | 0     | 0    | 0    | 371  |
| Lane Group Flow (vph)  | 26   | 26    | 0    | 1699  | 563   | 765   | 0    | 26   | 704  |
| Heavy Vehicles (%)     | 2%   | 2%    | 2%   | 2%    | 8%    | 7%    | 2%   | 2%   | 2%   |
| Turn Type              | Prot | Perm  | Prot | Prot  | NA    | NA    |      | Perm | Prot |
| Protected Phases       | 4    |       | 5    | 5     | 2     | 6     |      |      | 5    |
| Permitted Phases       |      | 4     |      |       |       |       |      | 6    |      |
| Actuated Green, G (s)  | 6.5  | 6.5   |      | 59.5  | 103.5 | 39.0  |      | 39.0 | 59.5 |
| Effective Green, g (s) | 6.5  | 6.5   |      | 59.5  | 103.5 | 39.0  |      | 39.0 | 59.5 |
| Actuated g/C Ratio     | 0.05 | 0.05  |      | 0.50  | 0.86  | 0.32  |      | 0.32 | 0.50 |
| Clearance Time (s)     | 5.0  | 5.0   |      | 5.0   | 5.0   | 5.0   |      | 5.0  | 5.0  |
| Vehicle Extension (s)  | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0   |      | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 95   | 85    |      | 1702  | 2883  | 1087  |      | 514  | 1381 |
| v/s Ratio Prot         | 0.01 |       |      | c0.49 | 0.17  | c0.23 |      |      | 0.25 |
| v/s Ratio Perm         |      | c0.02 |      |       |       |       |      | 0.02 |      |
| v/c Ratio              | 0.27 | 0.31  |      | 1.00  | 0.20  | 0.70  |      | 0.05 | 0.51 |
| Uniform Delay, d1      | 54.5 | 54.6  |      | 30.2  | 1.4   | 35.4  |      | 27.8 | 20.4 |
| Progression Factor     | 1.00 | 1.00  |      | 0.65  | 1.38  | 0.95  |      | 0.92 | 1.00 |
| Incremental Delay, d2  | 1.6  | 2.0   |      | 14.8  | 0.1   | 3.8   |      | 0.2  | 1.3  |
| Delay (s)              | 56.0 | 56.6  |      | 34.5  | 2.0   | 37.5  |      | 25.7 | 21.8 |
| Level of Service       | E    | E     |      | C     | A     | D     |      | C    | C    |
| Approach Delay (s)     | 56.3 |       |      |       | 26.4  | 37.2  |      |      |      |
| Approach LOS           | E    |       |      |       | C     | D     |      |      |      |

Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 27.6  | HCM 2000 Level of Service | C    |
| HCM 2000 Volume to Capacity ratio | 0.85  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 15.0 |
| Intersection Capacity Utilization | 83.9% | ICU Level of Service      | E    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

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K. Intersection Capacity Analysis – Future Conditions with the Project (2026  
Total Future Conditions)

# HCM Unsignalized Intersection Capacity Analysis

## 1: South Capitol St & Site Dwy



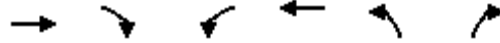
| Movement                          | WBL  | WBR  | NBT   | NBR  | SBL                  | SBT  |      |      |
|-----------------------------------|------|------|-------|------|----------------------|------|------|------|
| Lane Configurations               |      |      |       |      |                      |      |      |      |
| Traffic Volume (veh/h)            | 0    | 18   | 3128  | 14   | 0                    | 1949 |      |      |
| Future Volume (Veh/h)             | 0    | 18   | 3128  | 14   | 0                    | 1949 |      |      |
| Sign Control                      | Stop |      | Free  |      |                      | Free |      |      |
| Grade                             | 0%   |      | 0%    |      |                      | 0%   |      |      |
| Peak Hour Factor                  | 0.95 | 0.95 | 0.95  | 0.95 | 0.95                 | 0.95 |      |      |
| Hourly flow rate (vph)            | 0    | 19   | 3293  | 15   | 0                    | 2052 |      |      |
| <b>Pedestrians</b>                |      |      |       |      |                      |      |      |      |
| Lane Width (ft)                   |      |      |       |      |                      |      |      |      |
| Walking Speed (ft/s)              |      |      |       |      |                      |      |      |      |
| Percent Blockage                  |      |      |       |      |                      |      |      |      |
| Right turn flare (veh)            |      |      |       |      |                      |      |      |      |
| Median type                       | None |      |       |      | None                 |      |      |      |
| Median storage (veh)              |      |      |       |      |                      |      |      |      |
| Upstream signal (ft)              | 617  |      |       |      | 190                  |      |      |      |
| pX, platoon unblocked             | 0.44 | 0.44 |       |      |                      | 0.44 |      |      |
| vC, conflicting volume            | 3984 | 831  |       |      |                      | 3308 |      |      |
| vC1, stage 1 conf vol             |      |      |       |      |                      |      |      |      |
| vC2, stage 2 conf vol             |      |      |       |      |                      |      |      |      |
| vCu, unblocked vol                | 1422 | 0    |       |      |                      | 0    |      |      |
| tC, single (s)                    | 6.8  | 6.9  |       |      |                      | 4.1  |      |      |
| tC, 2 stage (s)                   |      |      |       |      |                      |      |      |      |
| tF (s)                            | 3.5  | 3.3  |       |      |                      | 2.2  |      |      |
| p0 queue free %                   | 100  | 96   |       |      |                      | 100  |      |      |
| cM capacity (veh/h)               | 56   | 477  |       |      |                      | 714  |      |      |
| Direction, Lane #                 | WB 1 | NB 1 | NB 2  | NB 3 | NB 4                 | SB 1 | SB 2 | SB 3 |
| Volume Total                      | 19   | 941  | 941   | 941  | 485                  | 684  | 684  | 684  |
| Volume Left                       | 0    | 0    | 0     | 0    | 0                    | 0    | 0    | 0    |
| Volume Right                      | 19   | 0    | 0     | 0    | 15                   | 0    | 0    | 0    |
| cSH                               | 477  | 1700 | 1700  | 1700 | 1700                 | 1700 | 1700 | 1700 |
| Volume to Capacity                | 0.04 | 0.55 | 0.55  | 0.55 | 0.29                 | 0.40 | 0.40 | 0.40 |
| Queue Length 95th (ft)            | 3    | 0    | 0     | 0    | 0                    | 0    | 0    | 0    |
| Control Delay (s)                 | 12.9 | 0.0  | 0.0   | 0.0  | 0.0                  | 0.0  | 0.0  | 0.0  |
| Lane LOS                          | B    |      |       |      |                      |      |      |      |
| Approach Delay (s)                | 12.9 | 0.0  |       |      |                      | 0.0  |      |      |
| Approach LOS                      | B    |      |       |      |                      |      |      |      |
| <b>Intersection Summary</b>       |      |      |       |      |                      |      |      |      |
| Average Delay                     |      |      | 0.0   |      |                      |      |      |      |
| Intersection Capacity Utilization |      |      | 55.6% |      | ICU Level of Service |      | B    |      |
| Analysis Period (min)             |      |      | 15    |      |                      |      |      |      |

# HCM Unsignalized Intersection Capacity Analysis

## 2: Half St SW & Eye St SW

CSX West

09/26/2021



| Movement                          | EBT         | EBR         | WBL         | WBT                  | NBL  | NBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               | →           |             |             | ←                    | ←    | ↗    |
| Traffic Volume (veh/h)            | 333         | 69          | 112         | 460                  | 66   | 69   |
| Future Volume (Veh/h)             | 333         | 69          | 112         | 460                  | 66   | 69   |
| Sign Control                      | Free        |             |             | Free                 | Stop |      |
| Grade                             | 0%          |             |             | 0%                   | 0%   |      |
| Peak Hour Factor                  | 0.89        | 0.89        | 0.92        | 0.92                 | 0.85 | 0.85 |
| Hourly flow rate (vph)            | 374         | 78          | 122         | 500                  | 78   | 81   |
| Pedestrians                       | 3           |             |             | 2                    | 21   |      |
| Lane Width (ft)                   | 12.0        |             |             | 12.0                 | 12.0 |      |
| Walking Speed (ft/s)              | 4.0         |             |             | 4.0                  | 4.0  |      |
| Percent Blockage                  | 0           |             |             | 0                    | 2    |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       | None        |             |             | None                 |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              | 452         |             |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      | 0.88 |      |
| vC, conflicting volume            | 473         |             |             | 1181                 | 436  |      |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 473         |             |             | 1138                 | 436  |      |
| tC, single (s)                    | 4.1         |             |             | 6.4                  | 6.2  |      |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             | 3.5                  | 3.3  |      |
| p0 queue free %                   | 89          |             |             | 54                   | 87   |      |
| cM capacity (veh/h)               | 1070        |             |             | 171                  | 608  |      |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |                      |      |      |
| Volume Total                      | 452         | 622         | 159         |                      |      |      |
| Volume Left                       | 0           | 122         | 78          |                      |      |      |
| Volume Right                      | 78          | 0           | 81          |                      |      |      |
| cSH                               | 1700        | 1070        | 269         |                      |      |      |
| Volume to Capacity                | 0.27        | 0.11        | 0.59        |                      |      |      |
| Queue Length 95th (ft)            | 0           | 10          | 86          |                      |      |      |
| Control Delay (s)                 | 0.0         | 2.9         | 35.9        |                      |      |      |
| Lane LOS                          |             | A           | E           |                      |      |      |
| Approach Delay (s)                | 0.0         | 2.9         | 35.9        |                      |      |      |
| Approach LOS                      |             |             | E           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     | 6.1         |             |             |                      |      |      |
| Intersection Capacity Utilization | 77.4%       |             |             | ICU Level of Service | D    |      |
| Analysis Period (min)             | 15          |             |             |                      |      |      |



Queues

3: South Capitol St & Eye St SW/Eye St SE



| Lane Group              | EBT   | EBR  | WBT  | WBR  | NBL  | NBT   | SBL  | SBT  |
|-------------------------|-------|------|------|------|------|-------|------|------|
| Lane Group Flow (vph)   | 342   | 118  | 231  | 394  | 122  | 3043  | 104  | 2046 |
| v/c Ratio               | 2.83  | 0.34 | 0.60 | 1.01 | 0.41 | 1.12  | 0.76 | 0.90 |
| Control Delay           | 867.5 | 10.7 | 59.2 | 83.6 | 58.2 | 88.0  | 88.4 | 32.6 |
| Queue Delay             | 0.0   | 0.0  | 0.0  | 7.7  | 0.0  | 0.2   | 0.0  | 0.8  |
| Total Delay             | 867.5 | 10.7 | 59.2 | 91.3 | 58.2 | 88.2  | 88.4 | 33.4 |
| Queue Length 50th (ft)  | ~575  | 0    | 205  | ~282 | 106  | ~1251 | 102  | 567  |
| Queue Length 95th (ft)  | #778  | 56   | 301  | #498 | 172  | #1323 | m134 | 666  |
| Internal Link Dist (ft) | 372   |      | 210  |      |      | 191   |      | 537  |
| Turn Bay Length (ft)    |       | 300  |      |      | 200  |       | 200  |      |
| Base Capacity (vph)     | 121   | 350  | 384  | 391  | 307  | 2719  | 148  | 2279 |
| Starvation Cap Reductn  | 0     | 0    | 0    | 0    | 0    | 0     | 0    | 65   |
| Spillback Cap Reductn   | 0     | 0    | 0    | 10   | 0    | 296   | 0    | 0    |
| Storage Cap Reductn     | 0     | 0    | 0    | 0    | 0    | 0     | 0    | 0    |
| Reduced v/c Ratio       | 2.83  | 0.34 | 0.60 | 1.03 | 0.40 | 1.26  | 0.70 | 0.92 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

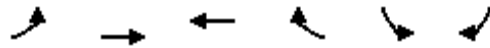
## 3: South Capitol St & Eye St SW/Eye St SE



| Movement                          | EBL  | EBT   | EBR    | WBL  | WBT  | WBR   | NBL  | NBT   | NBR  | SBL   | SBT  | SBR  |
|-----------------------------------|------|-------|--------|------|------|-------|------|-------|------|-------|------|------|
| Lane Configurations               |      | ↕     | ↗      |      | ↕    | ↗     | ↘    | ↕↗↘   |      | ↘     | ↕↗↘  |      |
| Traffic Volume (vph)              | 136  | 182   | 110    | 0    | 215  | 366   | 113  | 2628  | 202  | 97    | 1691 | 212  |
| Future Volume (vph)               | 136  | 182   | 110    | 0    | 215  | 366   | 113  | 2628  | 202  | 97    | 1691 | 212  |
| Ideal Flow (vphpl)                | 1900 | 1900  | 1900   | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)               |      | 3.0   | 3.0    |      | 0.0  | 6.0   | 5.0  | 5.0   |      | 5.0   | 4.0  |      |
| Lane Util. Factor                 |      | 1.00  | 1.00   |      | 1.00 | 1.00  | 1.00 | 0.91  |      | 1.00  | 0.91 |      |
| Frbp, ped/bikes                   |      | 1.00  | 0.85   |      | 1.00 | 0.98  | 1.00 | 0.99  |      | 1.00  | 0.99 |      |
| Flpb, ped/bikes                   |      | 1.00  | 1.00   |      | 1.00 | 1.00  | 1.00 | 1.00  |      | 1.00  | 1.00 |      |
| Frt                               |      | 1.00  | 0.85   |      | 1.00 | 0.85  | 1.00 | 0.99  |      | 1.00  | 0.98 |      |
| Flt Protected                     |      | 0.98  | 1.00   |      | 1.00 | 1.00  | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (prot)                 |      | 1551  | 1205   |      | 1644 | 1389  | 1593 | 4426  |      | 1593  | 4366 |      |
| Flt Permitted                     |      | 0.36  | 1.00   |      | 1.00 | 1.00  | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (perm)                 |      | 567   | 1205   |      | 1644 | 1389  | 1593 | 4426  |      | 1593  | 4366 |      |
| Peak-hour factor, PHF             | 0.93 | 0.93  | 0.93   | 0.93 | 0.93 | 0.93  | 0.93 | 0.93  | 0.93 | 0.93  | 0.93 | 0.93 |
| Adj. Flow (vph)                   | 146  | 196   | 118    | 0    | 231  | 394   | 122  | 2826  | 217  | 104   | 1818 | 228  |
| RTOR Reduction (vph)              | 0    | 0     | 93     | 0    | 0    | 123   | 0    | 6     | 0    | 0     | 11   | 0    |
| Lane Group Flow (vph)             | 0    | 342   | 25     | 0    | 231  | 271   | 122  | 3037  | 0    | 104   | 2035 | 0    |
| Confl. Peds. (#/hr)               | 2    |       | 73     | 73   |      | 2     | 25   |       | 24   | 24    |      | 25   |
| Heavy Vehicles (%)                | 9%   | 7%    | 3%     | 2%   | 4%   | 3%    | 2%   | 3%    | 10%  | 2%    | 4%   | 2%   |
| Turn Type                         | Perm | NA    | Perm   |      | NA   | Perm  | Prot | NA    |      | Prot  | NA   |      |
| Protected Phases                  |      | 4     |        |      | 8    |       | 5    | 2     |      | 1     |      | 6    |
| Permitted Phases                  | 4    |       | 4      |      | 8    | 8     |      |       |      |       |      |      |
| Actuated Green, G (s)             |      | 29.1  | 29.1   |      | 29.1 | 29.1  | 27.9 | 92.0  |      | 12.9  | 77.0 |      |
| Effective Green, g (s)            |      | 32.1  | 32.1   |      | 35.1 | 29.1  | 27.9 | 92.0  |      | 12.9  | 78.0 |      |
| Actuated g/C Ratio                |      | 0.21  | 0.21   |      | 0.23 | 0.19  | 0.19 | 0.61  |      | 0.09  | 0.52 |      |
| Clearance Time (s)                |      | 6.0   | 6.0    |      | 6.0  | 6.0   | 5.0  | 5.0   |      | 5.0   | 5.0  |      |
| Vehicle Extension (s)             |      | 3.0   | 3.0    |      | 3.0  | 3.0   | 3.0  | 3.0   |      | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)                |      | 121   | 257    |      | 384  | 269   | 296  | 2714  |      | 136   | 2270 |      |
| v/s Ratio Prot                    |      |       |        |      | 0.14 |       | 0.08 | c0.69 |      | c0.07 | 0.47 |      |
| v/s Ratio Perm                    |      | c0.60 | 0.02   |      |      | 0.20  |      |       |      |       |      |      |
| v/c Ratio                         |      | 2.83  | 0.10   |      | 0.60 | 1.01  | 0.41 | 1.12  |      | 0.76  | 0.90 |      |
| Uniform Delay, d1                 |      | 59.0  | 47.3   |      | 51.2 | 60.5  | 53.8 | 29.0  |      | 67.1  | 32.4 |      |
| Progression Factor                |      | 1.00  | 1.00   |      | 1.00 | 1.00  | 1.00 | 1.00  |      | 0.97  | 0.87 |      |
| Incremental Delay, d2             |      | 844.3 | 0.2    |      | 2.7  | 57.2  | 0.9  | 59.2  |      | 16.0  | 4.3  |      |
| Delay (s)                         |      | 903.3 | 47.5   |      | 53.9 | 117.7 | 54.8 | 88.2  |      | 81.2  | 32.5 |      |
| Level of Service                  |      | F     | D      |      | D    | F     | D    | F     |      | F     | C    |      |
| Approach Delay (s)                |      | 683.7 |        |      | 94.1 |       |      | 86.9  |      |       | 34.9 |      |
| Approach LOS                      |      | F     |        |      | F    |       |      | F     |      |       | C    |      |
| <b>Intersection Summary</b>       |      |       |        |      |      |       |      |       |      |       |      |      |
| HCM 2000 Control Delay            |      |       | 113.0  |      |      |       |      |       |      |       |      | F    |
| HCM 2000 Volume to Capacity ratio |      |       | 1.48   |      |      |       |      |       |      |       |      |      |
| Actuated Cycle Length (s)         |      |       | 150.0  |      |      |       |      |       |      | 13.0  |      |      |
| Intersection Capacity Utilization |      |       | 122.5% |      |      |       |      |       |      |       |      | H    |
| Analysis Period (min)             |      |       | 15     |      |      |       |      |       |      |       |      |      |
| c Critical Lane Group             |      |       |        |      |      |       |      |       |      |       |      |      |

# HCM Unsignalized Intersection Capacity Analysis

## 4: Eye St SE & Site Dwy



| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↑           | ↑           |                      | ↘    |      |
| Traffic Volume (veh/h)            | 0           | 460         | 536         | 0                    | 21   | 2    |
| Future Volume (Veh/h)             | 0           | 460         | 536         | 0                    | 21   | 2    |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Peak Hour Factor                  | 0.92        | 0.92        | 0.92        | 0.92                 | 0.92 | 0.92 |
| Hourly flow rate (vph)            | 0           | 500         | 583         | 0                    | 23   | 2    |
| <b>Pedestrians</b>                |             |             |             |                      |      |      |
| Lane Width (ft)                   |             |             |             |                      |      |      |
| Walking Speed (ft/s)              |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             | None        | None        |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              |             | 290         |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      |      |      |
| vC, conflicting volume            | 583         |             |             | 1083                 | 583  |      |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 583         |             |             | 1083                 | 583  |      |
| tC, single (s)                    | 4.1         |             |             | 6.4                  | 6.2  |      |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             | 3.5                  | 3.3  |      |
| p0 queue free %                   | 100         |             |             | 90                   | 100  |      |
| cM capacity (veh/h)               | 991         |             |             | 240                  | 512  |      |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 500         | 583         | 25          |                      |      |      |
| Volume Left                       | 0           | 0           | 23          |                      |      |      |
| Volume Right                      | 0           | 0           | 2           |                      |      |      |
| cSH                               | 1700        | 1700        | 251         |                      |      |      |
| Volume to Capacity                | 0.29        | 0.34        | 0.10        |                      |      |      |
| Queue Length 95th (ft)            | 0           | 0           | 8           |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.0         | 20.9        |                      |      |      |
| Lane LOS                          |             |             | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.0         | 20.9        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.5         |                      |      |      |
| Intersection Capacity Utilization |             |             | 41.3%       | ICU Level of Service | A    |      |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

# HCM Unsignalized Intersection Capacity Analysis

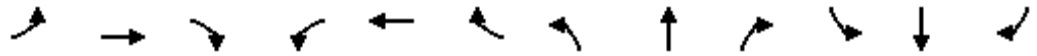
## 5: Half St SE/Coal Yard Dwy & Eye St SE



| Movement                          | EBL         | EBT         | EBR         | WBL         | WBT                  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-----------------------------------|-------------|-------------|-------------|-------------|----------------------|------|------|------|------|------|------|------|
| Lane Configurations               |             | ↕           |             |             | ↕                    |      |      | ↕    |      |      | ↕    |      |
| Traffic Volume (veh/h)            | 2           | 332         | 50          | 15          | 579                  | 0    | 45   | 0    | 1    | 0    | 0    | 0    |
| Future Volume (Veh/h)             | 2           | 332         | 50          | 15          | 579                  | 0    | 45   | 0    | 1    | 0    | 0    | 0    |
| Sign Control                      |             | Free        |             |             | Free                 |      |      | Stop |      |      | Stop |      |
| Grade                             |             | 0%          |             |             | 0%                   |      |      | 0%   |      |      | 0%   |      |
| Peak Hour Factor                  | 0.95        | 0.85        | 0.85        | 0.85        | 0.85                 | 0.95 | 0.85 | 0.95 | 0.85 | 0.95 | 0.95 | 0.95 |
| Hourly flow rate (vph)            | 2           | 391         | 59          | 18          | 681                  | 0    | 53   | 0    | 1    | 0    | 0    | 0    |
| Pedestrians                       |             | 22          |             |             | 81                   |      |      | 11   |      |      |      |      |
| Lane Width (ft)                   |             | 12.0        |             |             | 12.0                 |      |      | 12.0 |      |      |      |      |
| Walking Speed (ft/s)              |             | 4.0         |             |             | 4.0                  |      |      | 4.0  |      |      |      |      |
| Percent Blockage                  |             | 2           |             |             | 7                    |      |      | 1    |      |      |      |      |
| Right turn flare (veh)            |             |             |             |             |                      |      |      |      |      |      |      |      |
| Median type                       |             | None        |             |             | None                 |      |      |      |      |      |      |      |
| Median storage (veh)              |             |             |             |             |                      |      |      |      |      |      |      |      |
| Upstream signal (ft)              |             | 448         |             |             |                      |      |      |      |      |      |      |      |
| pX, platoon unblocked             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vC, conflicting volume            | 681         |             |             | 461         |                      |      | 1174 | 1152 | 512  | 1224 | 1182 | 703  |
| vC1, stage 1 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vC2, stage 2 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vCu, unblocked vol                | 681         |             |             | 461         |                      |      | 1174 | 1152 | 512  | 1224 | 1182 | 703  |
| tC, single (s)                    | 4.1         |             |             | 4.1         |                      |      | 7.1  | 6.5  | 6.2  | 7.1  | 6.5  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |             |                      |      |      |      |      |      |      |      |
| tF (s)                            | 2.2         |             |             | 2.2         |                      |      | 3.5  | 4.0  | 3.3  | 3.5  | 4.0  | 3.3  |
| p0 queue free %                   | 100         |             |             | 98          |                      |      | 67   | 100  | 100  | 100  | 100  | 100  |
| cM capacity (veh/h)               | 912         |             |             | 1090        |                      |      | 161  | 192  | 519  | 142  | 184  | 430  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> | <b>SB 1</b> |                      |      |      |      |      |      |      |      |
| Volume Total                      | 452         | 699         | 54          | 0           |                      |      |      |      |      |      |      |      |
| Volume Left                       | 2           | 18          | 53          | 0           |                      |      |      |      |      |      |      |      |
| Volume Right                      | 59          | 0           | 1           | 0           |                      |      |      |      |      |      |      |      |
| cSH                               | 912         | 1090        | 163         | 1700        |                      |      |      |      |      |      |      |      |
| Volume to Capacity                | 0.00        | 0.02        | 0.33        | 0.00        |                      |      |      |      |      |      |      |      |
| Queue Length 95th (ft)            | 0           | 1           | 34          | 0           |                      |      |      |      |      |      |      |      |
| Control Delay (s)                 | 0.1         | 0.4         | 37.8        | 0.0         |                      |      |      |      |      |      |      |      |
| Lane LOS                          | A           | A           | E           | A           |                      |      |      |      |      |      |      |      |
| Approach Delay (s)                | 0.1         | 0.4         | 37.8        | 0.0         |                      |      |      |      |      |      |      |      |
| Approach LOS                      |             |             | E           | A           |                      |      |      |      |      |      |      |      |
| <b>Intersection Summary</b>       |             |             |             |             |                      |      |      |      |      |      |      |      |
| Average Delay                     |             |             | 2.0         |             |                      |      |      |      |      |      |      |      |
| Intersection Capacity Utilization |             |             | 64.8%       |             | ICU Level of Service |      |      |      | C    |      |      |      |
| Analysis Period (min)             |             |             | 15          |             |                      |      |      |      |      |      |      |      |

# HCM Unsignalized Intersection Capacity Analysis

## 6: First St SE/CSX East Dwy & Eye St SE



| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    |      |      |      |      |      |      |      |      |      |      |      |      |
| Sign Control           |      | Stop |      |      | Stop |      |      | Stop |      |      | Stop |      |
| Traffic Volume (vph)   | 35   | 222  | 76   | 101  | 298  | 15   | 79   | 26   | 71   | 22   | 12   | 120  |
| Future Volume (vph)    | 35   | 222  | 76   | 101  | 298  | 15   | 79   | 26   | 71   | 22   | 12   | 120  |
| Peak Hour Factor       | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 39   | 247  | 84   | 112  | 331  | 17   | 88   | 29   | 79   | 24   | 13   | 133  |

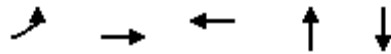
| Direction, Lane #     | EB 1 | EB 2  | WB 1 | NB 1 | NB 2  | SB 1  |
|-----------------------|------|-------|------|------|-------|-------|
| Volume Total (vph)    | 39   | 331   | 460  | 117  | 79    | 170   |
| Volume Left (vph)     | 39   | 0     | 112  | 88   | 0     | 24    |
| Volume Right (vph)    | 0    | 84    | 17   | 0    | 79    | 133   |
| Hadj (s)              | 0.55 | -0.07 | 0.12 | 0.45 | -0.67 | -0.38 |
| Departure Headway (s) | 7.3  | 6.6   | 6.7  | 8.1  | 6.9   | 7.3   |
| Degree Utilization, x | 0.08 | 0.61  | 0.85 | 0.26 | 0.15  | 0.35  |
| Capacity (veh/h)      | 468  | 514   | 524  | 409  | 479   | 453   |
| Control Delay (s)     | 9.7  | 18.3  | 37.2 | 12.7 | 10.0  | 14.1  |
| Approach Delay (s)    | 17.4 |       | 37.2 | 11.6 |       | 14.1  |
| Approach LOS          | C    |       | E    | B    |       | B     |

### Intersection Summary

|                                   |       |
|-----------------------------------|-------|
| Delay                             | 23.6  |
| Level of Service                  | C     |
| Intersection Capacity Utilization | 77.4% |
| ICU Level of Service              | D     |
| Analysis Period (min)             | 15    |

Queues

7: New Jersey Ave SE & Eye St SE



| Lane Group              | EBL  | EBT  | WBT  | NBT  | SBT  |
|-------------------------|------|------|------|------|------|
| Lane Group Flow (vph)   | 152  | 209  | 386  | 299  | 381  |
| v/c Ratio               | 0.80 | 0.43 | 0.82 | 0.40 | 0.50 |
| Control Delay           | 50.9 | 14.7 | 30.3 | 9.1  | 8.0  |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 50.9 | 14.7 | 30.3 | 9.1  | 8.0  |
| Queue Length 50th (ft)  | 39   | 40   | 84   | 47   | 41   |
| Queue Length 95th (ft)  | #119 | 84   | #203 | 89   | 93   |
| Internal Link Dist (ft) |      | 128  | 172  | 142  | 136  |
| Turn Bay Length (ft)    |      |      |      |      |      |
| Base Capacity (vph)     | 198  | 508  | 492  | 754  | 760  |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.77 | 0.41 | 0.78 | 0.40 | 0.50 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
7: New Jersey Ave SE & Eye St SE



| Movement               | EBL   | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT   | SBR  |
|------------------------|-------|------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations    |       |      |      |      |      |      |      |      |      |      |       |      |
| Traffic Volume (vph)   | 134   | 144  | 40   | 21   | 197  | 121  | 49   | 205  | 9    | 16   | 153   | 166  |
| Future Volume (vph)    | 134   | 144  | 40   | 21   | 197  | 121  | 49   | 205  | 9    | 16   | 153   | 166  |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      |      | 4.0  |      |      | 4.0  |      |      | 4.0   |      |
| Lane Util. Factor      | 1.00  | 1.00 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00  |      |
| Frbp, ped/bikes        | 1.00  | 0.99 |      |      | 0.94 |      |      | 0.99 |      |      | 0.88  |      |
| Flpb, ped/bikes        | 0.93  | 1.00 |      |      | 1.00 |      |      | 0.98 |      |      | 0.99  |      |
| Frt                    | 1.00  | 0.97 |      |      | 0.95 |      |      | 1.00 |      |      | 0.93  |      |
| Flt Protected          | 0.95  | 1.00 |      |      | 1.00 |      |      | 0.99 |      |      | 1.00  |      |
| Satd. Flow (prot)      | 1487  | 1528 |      |      | 1451 |      |      | 1574 |      |      | 1343  |      |
| Flt Permitted          | 0.40  | 1.00 |      |      | 0.97 |      |      | 0.88 |      |      | 0.98  |      |
| Satd. Flow (perm)      | 620   | 1528 |      |      | 1413 |      |      | 1405 |      |      | 1319  |      |
| Peak-hour factor, PHF  | 0.88  | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88  | 0.88 |
| Growth Factor (vph)    | 100%  | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100%  | 100% |
| Adj. Flow (vph)        | 152   | 164  | 45   | 24   | 224  | 138  | 56   | 233  | 10   | 18   | 174   | 189  |
| RTOR Reduction (vph)   | 0     | 20   | 0    | 0    | 41   | 0    | 0    | 2    | 0    | 0    | 55    | 0    |
| Lane Group Flow (vph)  | 152   | 189  | 0    | 0    | 345  | 0    | 0    | 297  | 0    | 0    | 326   | 0    |
| Confl. Peds. (#/hr)    | 97    |      | 20   | 20   |      | 97   | 151  |      | 138  | 138  |       | 151  |
| Heavy Vehicles (%)     | 2%    | 8%   | 4%   | 2%   | 7%   | 2%   | 8%   | 3%   | 2%   | 6%   | 4%    | 2%   |
| Turn Type              | Perm  | NA   |      | Perm | NA   |      | Perm | NA   |      | Perm | NA    |      |
| Protected Phases       |       | 8    |      |      | 4    |      |      | 6    |      |      | 2     |      |
| Permitted Phases       | 8     |      |      | 4    |      |      | 6    |      |      | 2    |       |      |
| Actuated Green, G (s)  | 13.3  | 13.3 |      |      | 13.3 |      |      | 24.7 |      |      | 24.7  |      |
| Effective Green, g (s) | 15.3  | 15.3 |      |      | 15.3 |      |      | 26.7 |      |      | 26.7  |      |
| Actuated g/C Ratio     | 0.31  | 0.31 |      |      | 0.31 |      |      | 0.53 |      |      | 0.53  |      |
| Clearance Time (s)     | 6.0   | 6.0  |      |      | 6.0  |      |      | 6.0  |      |      | 6.0   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  |      |      | 3.0  |      |      | 3.0  |      |      | 3.0   |      |
| Lane Grp Cap (vph)     | 189   | 467  |      |      | 432  |      |      | 750  |      |      | 704   |      |
| v/s Ratio Prot         |       | 0.12 |      |      |      |      |      |      |      |      |       |      |
| v/s Ratio Perm         | c0.25 |      |      |      | 0.24 |      |      | 0.21 |      |      | c0.25 |      |
| v/c Ratio              | 0.80  | 0.40 |      |      | 0.80 |      |      | 0.40 |      |      | 0.46  |      |
| Uniform Delay, d1      | 16.0  | 13.7 |      |      | 15.9 |      |      | 6.9  |      |      | 7.2   |      |
| Progression Factor     | 1.00  | 1.00 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00  |      |
| Incremental Delay, d2  | 21.4  | 0.6  |      |      | 9.9  |      |      | 1.6  |      |      | 2.2   |      |
| Delay (s)              | 37.4  | 14.3 |      |      | 25.9 |      |      | 8.5  |      |      | 9.4   |      |
| Level of Service       | D     | B    |      |      | C    |      |      | A    |      |      | A     |      |
| Approach Delay (s)     |       | 24.0 |      |      | 25.9 |      |      | 8.5  |      |      | 9.4   |      |
| Approach LOS           |       | C    |      |      | C    |      |      | A    |      |      | A     |      |

| Intersection Summary              |       |                           |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay            | 17.4  | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.65  | B                         |
| Actuated Cycle Length (s)         | 50.0  | Sum of lost time (s)      |
| Intersection Capacity Utilization | 79.7% | 12.0                      |
| Analysis Period (min)             | 15    | ICU Level of Service      |
| c Critical Lane Group             |       | D                         |

## Queues

## 8: I-395 SB Ramp &amp; South Capitol St &amp; Garage Dwy &amp; I 395 NB Ramp



| Lane Group              | EBL  | EBR  | NBL    | NBT  | SBT  | SBR2 | NER  |
|-------------------------|------|------|--------|------|------|------|------|
| Lane Group Flow (vph)   | 26   | 26   | 2541   | 757  | 387  | 26   | 1712 |
| v/c Ratio               | 0.27 | 0.31 | 1.22   | 0.25 | 0.47 | 0.06 | 0.82 |
| Control Delay           | 74.4 | 76.6 | 115.3  | 0.3  | 47.7 | 42.7 | 12.2 |
| Queue Delay             | 0.0  | 0.0  | 0.1    | 0.0  | 2.7  | 0.0  | 0.2  |
| Total Delay             | 74.4 | 76.6 | 115.4  | 0.3  | 50.4 | 42.7 | 12.3 |
| Queue Length 50th (ft)  | 25   | 25   | ~1561  | 8    | 175  | 18   | 318  |
| Queue Length 95th (ft)  | 57   | 58   | m#1249 | m7   | 237  | 40   | 440  |
| Internal Link Dist (ft) | 119  |      |        | 110  | 190  |      |      |
| Turn Bay Length (ft)    |      |      |        |      |      |      |      |
| Base Capacity (vph)     | 318  | 284  | 2082   | 3010 | 828  | 401  | 2088 |
| Starvation Cap Reductn  | 0    | 0    | 44     | 0    | 319  | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0      | 0    | 0    | 0    | 39   |
| Storage Cap Reductn     | 0    | 0    | 0      | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.08 | 0.09 | 1.25   | 0.25 | 0.76 | 0.06 | 0.84 |

## Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis

8: I-395 SB Ramp & South Capitol St & Garage Dwy & I 395 NB Ramp



| Movement               | EBL  | EBR   | NBL2 | NBL   | NBT   | SBT   | SBR  | SBR2 | NER  |
|------------------------|------|-------|------|-------|-------|-------|------|------|------|
| Lane Configurations    |      |       |      |       |       |       |      |      |      |
| Traffic Volume (vph)   | 25   | 25    | 25   | 2389  | 719   | 252   | 116  | 25   | 1626 |
| Future Volume (vph)    | 25   | 25    | 25   | 2389  | 719   | 252   | 116  | 25   | 1626 |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900  | 1900  | 1900 | 1900 | 1900 |
| Total Lost time (s)    | 5.0  | 5.0   |      | 5.0   | 5.0   | 5.0   |      | 5.0  | 5.0  |
| Lane Util. Factor      | 1.00 | 1.00  |      | 0.97  | 0.95  | 0.95  |      | 1.00 | 0.88 |
| Frt                    | 1.00 | 0.85  |      | 1.00  | 1.00  | 0.95  |      | 0.85 | 0.85 |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00  |      | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770 | 1583  |      | 3433  | 3343  | 3262  |      | 1583 | 2787 |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00  |      | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770 | 1583  |      | 3433  | 3343  | 3262  |      | 1583 | 2787 |
| Peak-hour factor, PHF  | 0.95 | 0.95  | 0.95 | 0.95  | 0.95  | 0.95  | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph)        | 26   | 26    | 26   | 2515  | 757   | 265   | 122  | 26   | 1712 |
| RTOR Reduction (vph)   | 0    | 0     | 0    | 0     | 0     | 0     | 0    | 0    | 398  |
| Lane Group Flow (vph)  | 26   | 26    | 0    | 2541  | 757   | 387   | 0    | 26   | 1314 |
| Heavy Vehicles (%)     | 2%   | 2%    | 2%   | 2%    | 8%    | 7%    | 2%   | 2%   | 2%   |
| Turn Type              | Prot | Perm  | Prot | Prot  | NA    | NA    |      | Perm | Prot |
| Protected Phases       | 4    |       | 5    | 5     | 2     | 6     |      |      | 5    |
| Permitted Phases       |      | 4     |      |       |       | 6     |      | 6    |      |
| Actuated Green, G (s)  | 6.9  | 6.9   |      | 91.0  | 133.1 | 37.1  |      | 37.1 | 91.0 |
| Effective Green, g (s) | 6.9  | 6.9   |      | 91.0  | 133.1 | 37.1  |      | 37.1 | 91.0 |
| Actuated g/C Ratio     | 0.05 | 0.05  |      | 0.61  | 0.89  | 0.25  |      | 0.25 | 0.61 |
| Clearance Time (s)     | 5.0  | 5.0   |      | 5.0   | 5.0   | 5.0   |      | 5.0  | 5.0  |
| Vehicle Extension (s)  | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0   |      | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 81   | 72    |      | 2082  | 2966  | 806   |      | 391  | 1690 |
| v/s Ratio Prot         | 0.01 |       |      | c0.74 | 0.23  | c0.12 |      |      | 0.47 |
| v/s Ratio Perm         |      | c0.02 |      |       |       |       |      | 0.02 |      |
| v/c Ratio              | 0.32 | 0.36  |      | 1.22  | 0.26  | 0.48  |      | 0.07 | 0.78 |
| Uniform Delay, d1      | 69.3 | 69.4  |      | 29.5  | 1.2   | 48.2  |      | 43.2 | 22.0 |
| Progression Factor     | 1.00 | 1.00  |      | 0.34  | 0.22  | 0.94  |      | 0.93 | 1.00 |
| Incremental Delay, d2  | 2.3  | 3.1   |      | 99.6  | 0.0   | 2.0   |      | 0.3  | 3.6  |
| Delay (s)              | 71.6 | 72.5  |      | 109.8 | 0.3   | 47.3  |      | 40.4 | 25.6 |
| Level of Service       | E    | E     |      | F     | A     | D     |      | D    | C    |
| Approach Delay (s)     | 72.0 |       |      |       | 84.7  | 46.8  |      |      |      |
| Approach LOS           | E    |       |      |       | F     | D     |      |      |      |

| Intersection Summary              |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 63.2  | HCM 2000 Level of Service | E    |
| HCM 2000 Volume to Capacity ratio | 0.97  |                           |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s)      | 15.0 |
| Intersection Capacity Utilization | 97.0% | ICU Level of Service      | F    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

# HCM Unsignalized Intersection Capacity Analysis

## 1: South Capitol St & Site Dwy



| Movement               | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|------------------------|------|------|------|------|------|------|
| Lane Configurations    |      |      |      |      |      |      |
| Traffic Volume (veh/h) | 0    | 11   | 2159 | 40   | 0    | 1713 |
| Future Volume (Veh/h)  | 0    | 11   | 2159 | 40   | 0    | 1713 |
| Sign Control           | Stop |      | Free |      |      | Free |
| Grade                  | 0%   |      | 0%   |      |      | 0%   |
| Peak Hour Factor       | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Hourly flow rate (vph) | 0    | 12   | 2273 | 42   | 0    | 1803 |
| Pedestrians            |      |      |      |      |      |      |
| Lane Width (ft)        |      |      |      |      |      |      |
| Walking Speed (ft/s)   |      |      |      |      |      |      |
| Percent Blockage       |      |      |      |      |      |      |
| Right turn flare (veh) |      |      |      |      |      |      |
| Median type            |      |      |      |      |      |      |
| Median storage (veh)   |      |      |      |      |      |      |
| Upstream signal (ft)   |      |      |      |      |      |      |
| pX, platoon unblocked  | 0.82 | 0.74 |      |      | 0.74 |      |
| vC, conflicting volume | 2895 | 589  |      |      | 2315 |      |
| vC1, stage 1 conf vol  |      |      |      |      |      |      |
| vC2, stage 2 conf vol  |      |      |      |      |      |      |
| vCu, unblocked vol     | 817  | 0    |      |      | 1040 |      |
| tC, single (s)         | 6.8  | 6.9  |      |      | 4.1  |      |
| tC, 2 stage (s)        |      |      |      |      |      |      |
| tF (s)                 | 3.5  | 3.3  |      |      | 2.2  |      |
| p0 queue free %        | 100  | 99   |      |      | 100  |      |
| cM capacity (veh/h)    | 258  | 806  |      |      | 494  |      |

| Direction, Lane #      | WB 1 | NB 1 | NB 2 | NB 3 | NB 4 | SB 1 | SB 2 | SB 3 |
|------------------------|------|------|------|------|------|------|------|------|
| Volume Total           | 12   | 649  | 649  | 649  | 367  | 601  | 601  | 601  |
| Volume Left            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Volume Right           | 12   | 0    | 0    | 0    | 42   | 0    | 0    | 0    |
| cSH                    | 806  | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity     | 0.01 | 0.38 | 0.38 | 0.38 | 0.22 | 0.35 | 0.35 | 0.35 |
| Queue Length 95th (ft) | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Control Delay (s)      | 9.5  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Lane LOS               |      |      |      |      |      |      |      |      |
| Approach Delay (s)     | 9.5  | 0.0  |      |      |      | 0.0  |      |      |
| Approach LOS           |      |      |      |      |      |      |      |      |

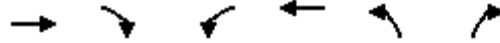
| Intersection Summary              |       |                      |
|-----------------------------------|-------|----------------------|
| Average Delay                     |       | 0.0                  |
| Intersection Capacity Utilization | 42.0% | ICU Level of Service |
| Analysis Period (min)             | 15    | A                    |

## HCM Unsignalized Intersection Capacity Analysis

### 2: Half St SW & Eye St SW

CSX West

09/26/2021



| Movement                          | EBT         | EBR         | WBL         | WBT   | NBL                  | NBR  |
|-----------------------------------|-------------|-------------|-------------|-------|----------------------|------|
| Lane Configurations               | →           |             |             | ←     | ←                    | ↗    |
| Traffic Volume (veh/h)            | 389         | 223         | 107         | 427   | 41                   | 63   |
| Future Volume (Veh/h)             | 389         | 223         | 107         | 427   | 41                   | 63   |
| Sign Control                      | Free        |             |             | Free  | Stop                 |      |
| Grade                             | 0%          |             |             | 0%    | 0%                   |      |
| Peak Hour Factor                  | 0.95        | 0.95        | 0.94        | 0.94  | 0.92                 | 0.92 |
| Hourly flow rate (vph)            | 409         | 235         | 114         | 454   | 45                   | 68   |
| Pedestrians                       |             |             |             | 2     | 15                   |      |
| Lane Width (ft)                   |             |             |             | 12.0  | 12.0                 |      |
| Walking Speed (ft/s)              |             |             |             | 4.0   | 4.0                  |      |
| Percent Blockage                  |             |             |             | 0     | 1                    |      |
| Right turn flare (veh)            |             |             |             |       |                      |      |
| Median type                       | None        |             |             | None  |                      |      |
| Median storage (veh)              |             |             |             |       |                      |      |
| Upstream signal (ft)              |             |             |             | 452   |                      |      |
| pX, platoon unblocked             |             |             |             |       | 0.89                 |      |
| vC, conflicting volume            |             |             |             | 659   | 1224                 | 544  |
| vC1, stage 1 conf vol             |             |             |             |       |                      |      |
| vC2, stage 2 conf vol             |             |             |             |       |                      |      |
| vCu, unblocked vol                |             |             |             | 659   | 1188                 | 544  |
| tC, single (s)                    |             |             |             | 4.1   | 6.4                  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |       |                      |      |
| tF (s)                            |             |             |             | 2.2   | 3.5                  | 3.3  |
| p0 queue free %                   |             |             |             | 88    | 72                   | 87   |
| cM capacity (veh/h)               |             |             |             | 917   | 159                  | 532  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> |       |                      |      |
| Volume Total                      | 644         | 568         | 113         |       |                      |      |
| Volume Left                       | 0           | 114         | 45          |       |                      |      |
| Volume Right                      | 235         | 0           | 68          |       |                      |      |
| cSH                               | 1700        | 917         | 275         |       |                      |      |
| Volume to Capacity                | 0.38        | 0.12        | 0.41        |       |                      |      |
| Queue Length 95th (ft)            | 0           | 11          | 48          |       |                      |      |
| Control Delay (s)                 | 0.0         | 3.2         | 26.9        |       |                      |      |
| Lane LOS                          |             | A           | D           |       |                      |      |
| Approach Delay (s)                | 0.0         | 3.2         | 26.9        |       |                      |      |
| Approach LOS                      |             |             | D           |       |                      |      |
| <b>Intersection Summary</b>       |             |             |             |       |                      |      |
| Average Delay                     |             |             |             | 3.7   |                      |      |
| Intersection Capacity Utilization |             |             |             | 87.3% | ICU Level of Service | E    |
| Analysis Period (min)             |             |             |             | 15    |                      |      |

Queues

3: South Capitol St & Eye St SW/Eye St SE



| Lane Group              | EBT   | EBR  | WBT  | WBR  | NBL  | NBT  | SBL   | SBT  |
|-------------------------|-------|------|------|------|------|------|-------|------|
| Lane Group Flow (vph)   | 467   | 88   | 239  | 319  | 65   | 2051 | 128   | 1799 |
| v/c Ratio               | 2.10  | 0.24 | 0.58 | 0.84 | 0.45 | 0.78 | 1.21  | 0.70 |
| Control Delay           | 536.7 | 17.7 | 45.9 | 47.0 | 61.7 | 22.4 | 193.7 | 18.3 |
| Queue Delay             | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  |
| Total Delay             | 536.7 | 17.7 | 45.9 | 47.0 | 61.7 | 22.4 | 193.7 | 18.3 |
| Queue Length 50th (ft)  | ~574  | 20   | 163  | 148  | 48   | 426  | ~123  | 390  |
| Queue Length 95th (ft)  | #770  | 63   | 246  | #296 | 94   | 482  | m#240 | 438  |
| Internal Link Dist (ft) | 372   |      | 210  |      |      | 81   |       | 526  |
| Turn Bay Length (ft)    |       | 120  |      |      | 200  |      | 200   |      |
| Base Capacity (vph)     | 222   | 363  | 415  | 382  | 159  | 2616 | 106   | 2578 |
| Starvation Cap Reductn  | 0     | 0    | 0    | 0    | 0    | 0    | 0     | 0    |
| Spillback Cap Reductn   | 0     | 0    | 0    | 0    | 0    | 0    | 0     | 0    |
| Storage Cap Reductn     | 0     | 0    | 0    | 0    | 0    | 0    | 0     | 0    |
| Reduced v/c Ratio       | 2.10  | 0.24 | 0.58 | 0.84 | 0.41 | 0.78 | 1.21  | 0.70 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
3: South Capitol St & Eye St SW/Eye St SE



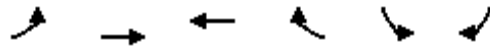
| Movement               | EBL  | EBT   | EBR  | WBL  | WBT  | WBR  | NBL  | NBT   | NBR  | SBL   | SBT  | SBR  |
|------------------------|------|-------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations    |      | ↕     | ↗    |      | ↖    | ↗    | ↖    | ↕     | ↗    | ↖     | ↕    | ↗    |
| Traffic Volume (vph)   | 138  | 278   | 78   | 0    | 213  | 284  | 58   | 1764  | 61   | 114   | 1341 | 260  |
| Future Volume (vph)    | 138  | 278   | 78   | 0    | 213  | 284  | 58   | 1764  | 61   | 114   | 1341 | 260  |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    |      | 4.0   | 4.0  |      | 4.0  | 10.0 | 4.0  | 5.0   |      | 4.0   | 4.0  |      |
| Lane Util. Factor      |      | 1.00  | 1.00 |      | 1.00 | 1.00 | 1.00 | 0.91  |      | 1.00  | 0.91 |      |
| Frbp, ped/bikes        |      | 1.00  | 0.90 |      | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.00  | 0.99 |      |
| Flpb, ped/bikes        |      | 1.00  | 1.00 |      | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.00  | 1.00 |      |
| Frt                    |      | 1.00  | 0.85 |      | 1.00 | 0.85 | 1.00 | 0.99  |      | 1.00  | 0.98 |      |
| Flt Protected          |      | 0.98  | 1.00 |      | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (prot)      |      | 1628  | 1288 |      | 1660 | 1398 | 1593 | 4546  |      | 1593  | 4431 |      |
| Flt Permitted          |      | 0.54  | 1.00 |      | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (perm)      |      | 889   | 1288 |      | 1660 | 1398 | 1593 | 4546  |      | 1593  | 4431 |      |
| Peak-hour factor, PHF  | 0.89 | 0.89  | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89  | 0.89 | 0.89  | 0.89 | 0.89 |
| Adj. Flow (vph)        | 155  | 312   | 88   | 0    | 239  | 319  | 65   | 1982  | 69   | 128   | 1507 | 292  |
| RTOR Reduction (vph)   | 0    | 0     | 41   | 0    | 0    | 102  | 0    | 3     | 0    | 0     | 23   | 0    |
| Lane Group Flow (vph)  | 0    | 467   | 47   | 0    | 239  | 217  | 65   | 2048  | 0    | 128   | 1776 | 0    |
| Confl. Peds. (#/hr)    |      |       | 57   | 57   |      |      | 9    |       | 10   | 10    |      | 9    |
| Heavy Vehicles (%)     | 2%   | 4%    | 2%   | 2%   | 3%   | 4%   | 2%   | 2%    | 2%   | 2%    | 2%   | 2%   |
| Turn Type              | Perm | NA    | Perm |      | NA   | Perm | Prot | NA    |      | Prot  | NA   |      |
| Protected Phases       |      | 4     |      |      | 8    |      | 5    | 2     |      | 1     |      | 6    |
| Permitted Phases       | 4    |       | 4    |      | 8    | 8    |      |       |      |       |      |      |
| Actuated Green, G (s)  |      | 27.0  | 27.0 |      | 24.0 | 24.0 | 9.6  | 68.2  |      | 8.8   | 67.4 |      |
| Effective Green, g (s) |      | 30.0  | 30.0 |      | 30.0 | 24.0 | 9.6  | 68.2  |      | 8.8   | 68.4 |      |
| Actuated g/C Ratio     |      | 0.25  | 0.25 |      | 0.25 | 0.20 | 0.08 | 0.57  |      | 0.07  | 0.57 |      |
| Clearance Time (s)     |      | 7.0   | 7.0  |      | 10.0 | 10.0 | 4.0  | 5.0   |      | 4.0   | 5.0  |      |
| Vehicle Extension (s)  |      | 3.0   | 3.0  |      | 3.0  | 3.0  | 3.0  | 3.0   |      | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     |      | 222   | 322  |      | 415  | 279  | 127  | 2583  |      | 116   | 2525 |      |
| v/s Ratio Prot         |      |       |      |      | 0.14 |      | 0.04 | c0.45 |      | c0.08 | 0.40 |      |
| v/s Ratio Perm         |      | c0.53 | 0.04 |      |      | 0.15 |      |       |      |       |      |      |
| v/c Ratio              |      | 2.10  | 0.15 |      | 0.58 | 0.78 | 0.51 | 0.79  |      | 1.10  | 0.70 |      |
| Uniform Delay, d1      |      | 45.0  | 35.0 |      | 39.4 | 45.5 | 53.0 | 20.4  |      | 55.6  | 18.5 |      |
| Progression Factor     |      | 1.00  | 1.00 |      | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.06  | 0.92 |      |
| Incremental Delay, d2  |      | 511.6 | 0.2  |      | 1.9  | 12.7 | 3.5  | 2.6   |      | 105.4 | 1.3  |      |
| Delay (s)              |      | 556.6 | 35.2 |      | 41.4 | 58.1 | 56.4 | 22.9  |      | 164.2 | 18.5 |      |
| Level of Service       |      | F     | D    |      | D    | E    | E    | C     |      | F     | B    |      |
| Approach Delay (s)     |      | 474.0 |      |      | 51.0 |      |      | 24.0  |      |       | 28.2 |      |
| Approach LOS           |      | F     |      |      | D    |      |      | C     |      |       | C    |      |

| Intersection Summary              |       |                           |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay            | 76.9  | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 1.18  | E                         |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      |
| Intersection Capacity Utilization | 99.5% | 13.0                      |
| Analysis Period (min)             | 15    | ICU Level of Service      |
|                                   |       | F                         |

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Eye St SE & Site Dwy























| Movement                          | EBL         | EBT         | WBT         | WBR                  | SBL  | SBR  |
|-----------------------------------|-------------|-------------|-------------|----------------------|------|------|
| Lane Configurations               |             | ↑           | ↑           |                      | ↘    |      |
| Traffic Volume (veh/h)            | 0           | 413         | 507         | 0                    | 12   | 1    |
| Future Volume (Veh/h)             | 0           | 413         | 507         | 0                    | 12   | 1    |
| Sign Control                      |             | Free        | Free        |                      | Stop |      |
| Grade                             |             | 0%          | 0%          |                      | 0%   |      |
| Peak Hour Factor                  | 0.92        | 0.92        | 0.92        | 0.92                 | 0.92 | 0.92 |
| Hourly flow rate (vph)            | 0           | 449         | 551         | 0                    | 13   | 1    |
| <b>Pedestrians</b>                |             |             |             |                      |      |      |
| Lane Width (ft)                   |             |             |             |                      |      |      |
| Walking Speed (ft/s)              |             |             |             |                      |      |      |
| Percent Blockage                  |             |             |             |                      |      |      |
| Right turn flare (veh)            |             |             |             |                      |      |      |
| Median type                       |             | None        | None        |                      |      |      |
| Median storage (veh)              |             |             |             |                      |      |      |
| Upstream signal (ft)              |             | 290         |             |                      |      |      |
| pX, platoon unblocked             |             |             |             |                      | 0.79 |      |
| vC, conflicting volume            | 551         |             |             |                      | 1000 | 551  |
| vC1, stage 1 conf vol             |             |             |             |                      |      |      |
| vC2, stage 2 conf vol             |             |             |             |                      |      |      |
| vCu, unblocked vol                | 551         |             |             |                      | 871  | 551  |
| tC, single (s)                    | 4.1         |             |             |                      | 6.4  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |                      |      |      |
| tF (s)                            | 2.2         |             |             |                      | 3.5  | 3.3  |
| p0 queue free %                   | 100         |             |             |                      | 95   | 100  |
| cM capacity (veh/h)               | 1019        |             |             |                      | 256  | 534  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>SB 1</b> |                      |      |      |
| Volume Total                      | 449         | 551         | 14          |                      |      |      |
| Volume Left                       | 0           | 0           | 13          |                      |      |      |
| Volume Right                      | 0           | 0           | 1           |                      |      |      |
| cSH                               | 1700        | 1700        | 265         |                      |      |      |
| Volume to Capacity                | 0.26        | 0.32        | 0.05        |                      |      |      |
| Queue Length 95th (ft)            | 0           | 0           | 4           |                      |      |      |
| Control Delay (s)                 | 0.0         | 0.0         | 19.3        |                      |      |      |
| Lane LOS                          |             |             | C           |                      |      |      |
| Approach Delay (s)                | 0.0         | 0.0         | 19.3        |                      |      |      |
| Approach LOS                      |             |             | C           |                      |      |      |
| <b>Intersection Summary</b>       |             |             |             |                      |      |      |
| Average Delay                     |             |             | 0.3         |                      |      |      |
| Intersection Capacity Utilization |             |             | 39.6%       | ICU Level of Service |      | A    |
| Analysis Period (min)             |             |             | 15          |                      |      |      |

**HCM Unsignalized Intersection Capacity Analysis**  
**5: Half St SE/Coal Yard Dwy & Eye St SE**



| Movement                          | EBL         | EBT         | EBR         | WBL         | WBT                  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-----------------------------------|-------------|-------------|-------------|-------------|----------------------|------|------|------|------|------|------|------|
| Lane Configurations               |             | ↕           |             |             | ↕                    |      |      | ↕    |      |      | ↕    |      |
| Traffic Volume (veh/h)            | 6           | 390         | 13          | 6           | 450                  | 0    | 56   | 0    | 15   | 0    | 0    | 0    |
| Future Volume (Veh/h)             | 6           | 390         | 13          | 6           | 450                  | 0    | 56   | 0    | 15   | 0    | 0    | 0    |
| Sign Control                      |             | Free        |             |             | Free                 |      |      | Stop |      |      | Stop |      |
| Grade                             |             | 0%          |             |             | 0%                   |      |      | 0%   |      |      | 0%   |      |
| Peak Hour Factor                  | 0.95        | 0.93        | 0.93        | 0.85        | 0.85                 | 0.95 | 0.85 | 0.95 | 0.85 | 0.95 | 0.95 | 0.95 |
| Hourly flow rate (vph)            | 6           | 419         | 14          | 7           | 529                  | 0    | 66   | 0    | 18   | 0    | 0    | 0    |
| Pedestrians                       |             | 10          |             |             | 8                    |      |      | 4    |      |      |      |      |
| Lane Width (ft)                   |             | 12.0        |             |             | 12.0                 |      |      | 12.0 |      |      |      |      |
| Walking Speed (ft/s)              |             | 4.0         |             |             | 4.0                  |      |      | 4.0  |      |      |      |      |
| Percent Blockage                  |             | 1           |             |             | 1                    |      |      | 0    |      |      |      |      |
| Right turn flare (veh)            |             |             |             |             |                      |      |      |      |      |      |      |      |
| Median type                       |             | None        |             |             | None                 |      |      |      |      |      |      |      |
| Median storage (veh)              |             |             |             |             |                      |      |      |      |      |      |      |      |
| Upstream signal (ft)              |             | 448         |             |             |                      |      |      |      |      |      |      |      |
| pX, platoon unblocked             |             |             |             | 0.84        |                      |      | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |      |
| vC, conflicting volume            | 529         |             |             | 437         |                      |      | 995  | 985  | 438  | 1007 | 992  | 539  |
| vC1, stage 1 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vC2, stage 2 conf vol             |             |             |             |             |                      |      |      |      |      |      |      |      |
| vCu, unblocked vol                | 529         |             |             | 230         |                      |      | 897  | 885  | 231  | 911  | 893  | 539  |
| tC, single (s)                    | 4.1         |             |             | 4.1         |                      |      | 7.1  | 6.5  | 6.2  | 7.1  | 6.5  | 6.2  |
| tC, 2 stage (s)                   |             |             |             |             |                      |      |      |      |      |      |      |      |
| tF (s)                            | 2.2         |             |             | 2.2         |                      |      | 3.5  | 4.0  | 3.3  | 3.5  | 4.0  | 3.3  |
| p0 queue free %                   | 99          |             |             | 99          |                      |      | 69   | 100  | 97   | 100  | 100  | 100  |
| cM capacity (veh/h)               | 1043        |             |             | 1116        |                      |      | 213  | 234  | 670  | 204  | 231  | 538  |
| <b>Direction, Lane #</b>          | <b>EB 1</b> | <b>WB 1</b> | <b>NB 1</b> | <b>SB 1</b> |                      |      |      |      |      |      |      |      |
| Volume Total                      | 439         | 536         | 84          | 0           |                      |      |      |      |      |      |      |      |
| Volume Left                       | 6           | 7           | 66          | 0           |                      |      |      |      |      |      |      |      |
| Volume Right                      | 14          | 0           | 18          | 0           |                      |      |      |      |      |      |      |      |
| cSH                               | 1043        | 1116        | 250         | 1700        |                      |      |      |      |      |      |      |      |
| Volume to Capacity                | 0.01        | 0.01        | 0.34        | 0.00        |                      |      |      |      |      |      |      |      |
| Queue Length 95th (ft)            | 0           | 0           | 36          | 0           |                      |      |      |      |      |      |      |      |
| Control Delay (s)                 | 0.2         | 0.2         | 26.6        | 0.0         |                      |      |      |      |      |      |      |      |
| Lane LOS                          | A           | A           | D           | A           |                      |      |      |      |      |      |      |      |
| Approach Delay (s)                | 0.2         | 0.2         | 26.6        | 0.0         |                      |      |      |      |      |      |      |      |
| Approach LOS                      |             |             | D           | A           |                      |      |      |      |      |      |      |      |
| <b>Intersection Summary</b>       |             |             |             |             |                      |      |      |      |      |      |      |      |
| Average Delay                     |             |             | 2.3         |             |                      |      |      |      |      |      |      |      |
| Intersection Capacity Utilization |             |             | 43.4%       |             | ICU Level of Service |      |      |      | A    |      |      |      |
| Analysis Period (min)             |             |             | 15          |             |                      |      |      |      |      |      |      |      |

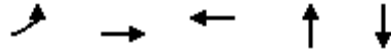
**HCM Unsignalized Intersection Capacity Analysis**  
**6: First St SE/CSX East Dwy & Eye St SE**

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|--|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |  |
| Lane Configurations               |  |  |   |   |  |   |  |  |  |   |  |  |  |
| Sign Control                      | Stop  |   |   |   | Stop  |   |  | Stop  |  |   | Stop  |   |  |
| Traffic Volume (vph)              | 43  | 265   | 35  | 200   | 305   | 24  | 67   | 35  | 82  | 11  | 10  | 78  |  |
| Future Volume (vph)               | 43  | 265   | 35  | 200   | 305   | 24  | 67   | 35  | 82  | 11  | 10  | 78  |  |
| Peak Hour Factor                  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  | 0.91   | 0.91  | 0.91  | 0.91  | 0.91  | 0.91  |  |
| Hourly flow rate (vph)            | 47  | 291   | 38  | 220   | 335   | 26  | 74   | 38  | 90  | 12  | 11  | 86  |  |
| Direction, Lane #                 | EB 1  | EB 2  | WB 1  | NB 1  | NB 2  | SB 1  |  |   |   |   |   |   |  |
| Volume Total (vph)                | 47  | 329   | 581   | 112   | 90  | 109   |  |   |   |   |   |   |  |
| Volume Left (vph)                 | 47  | 0   | 220   | 74  | 0   | 12  |  |   |   |   |   |   |  |
| Volume Right (vph)                | 0   | 38  | 26  | 0   | 90  | 86  |  |   |   |   |   |   |  |
| Hadj (s)                          | 0.53  | -0.04   | 0.08  | 0.41  | -0.67   | -0.42   |  |   |   |   |   |   |  |
| Departure Headway (s)             | 7.0   | 6.5   | 6.4   | 7.9   | 6.8   | 7.4   |  |   |   |   |   |   |  |
| Degree Utilization, x             | 0.09  | 0.59  | 1.03  | 0.25  | 0.17  | 0.22  |  |   |   |   |   |   |  |
| Capacity (veh/h)                  | 494   | 537   | 557   | 436   | 501   | 456   |  |   |   |   |   |   |  |
| Control Delay (s)                 | 9.5   | 17.1  | 71.3  | 12.3  | 10.1  | 12.5  |  |   |   |   |   |   |  |
| Approach Delay (s)                | 16.2  |   | 71.3  | 11.3  |   | 12.5  |  |   |   |   |   |   |  |
| Approach LOS                      | C   |   | F   | B   |   | B   |  |   |   |   |   |   |  |
| Intersection Summary              |   |   |   |   |   |   |  |   |   |   |   |   |  |
| Delay                             |   |   | 40.3  |   |   |   |  |   |   |   |   |   |  |
| Level of Service                  |   |   | E   |   |   |   |  |   |   |   |   |   |  |
| Intersection Capacity Utilization |   |   | 75.4%   |   | ICU Level of Service  |   |  | D   |   |   |   |   |  |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |  |



Queues

7: New Jersey Ave SE & Eye St SE



| Lane Group              | EBL  | EBT  | WBT  | NBT  | SBT  |
|-------------------------|------|------|------|------|------|
| Lane Group Flow (vph)   | 131  | 239  | 303  | 322  | 569  |
| v/c Ratio               | 0.69 | 0.51 | 0.68 | 0.42 | 0.75 |
| Control Delay           | 40.5 | 22.2 | 28.4 | 11.9 | 21.0 |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 40.5 | 22.2 | 28.4 | 11.9 | 21.0 |
| Queue Length 50th (ft)  | 53   | 82   | 115  | 71   | 158  |
| Queue Length 95th (ft)  | 98   | 122  | 164  | 170  | #431 |
| Internal Link Dist (ft) |      | 128  | 172  | 142  | 136  |
| Turn Bay Length (ft)    |      |      |      |      |      |
| Base Capacity (vph)     | 297  | 721  | 685  | 769  | 756  |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.44 | 0.33 | 0.44 | 0.42 | 0.75 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 7: New Jersey Ave SE & Eye St SE



| Movement               | EBL   | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT   | SBR  |
|------------------------|-------|------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations    |       |      |      |      |      |      |      |      |      |      |       |      |
| Traffic Volume (vph)   | 127   | 186  | 46   | 23   | 214  | 56   | 69   | 224  | 19   | 53   | 267   | 232  |
| Future Volume (vph)    | 127   | 186  | 46   | 23   | 214  | 56   | 69   | 224  | 19   | 53   | 267   | 232  |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      |      | 4.0  |      |      | 4.0  |      |      | 4.0   |      |
| Lane Util. Factor      | 1.00  | 1.00 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00  |      |
| Frbp, ped/bikes        | 1.00  | 0.98 |      |      | 0.96 |      |      | 0.98 |      |      | 0.86  |      |
| Flpb, ped/bikes        | 0.90  | 1.00 |      |      | 1.00 |      |      | 0.98 |      |      | 0.98  |      |
| Frt                    | 1.00  | 0.97 |      |      | 0.97 |      |      | 0.99 |      |      | 0.94  |      |
| Flt Protected          | 0.95  | 1.00 |      |      | 1.00 |      |      | 0.99 |      |      | 1.00  |      |
| Satd. Flow (prot)      | 1438  | 1519 |      |      | 1496 |      |      | 1535 |      |      | 1303  |      |
| Flt Permitted          | 0.43  | 1.00 |      |      | 0.96 |      |      | 0.81 |      |      | 0.94  |      |
| Satd. Flow (perm)      | 649   | 1519 |      |      | 1445 |      |      | 1260 |      |      | 1233  |      |
| Peak-hour factor, PHF  | 0.97  | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97  | 0.97 |
| Growth Factor (vph)    | 100%  | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100%  | 100% |
| Adj. Flow (vph)        | 131   | 192  | 47   | 24   | 221  | 58   | 71   | 231  | 20   | 55   | 275   | 239  |
| RTOR Reduction (vph)   | 0     | 15   | 0    | 0    | 15   | 0    | 0    | 2    | 0    | 0    | 22    | 0    |
| Lane Group Flow (vph)  | 131   | 224  | 0    | 0    | 288  | 0    | 0    | 320  | 0    | 0    | 547   | 0    |
| Confl. Peds. (#/hr)    | 91    |      | 33   | 33   |      | 91   | 140  |      | 160  | 160  |       | 140  |
| Heavy Vehicles (%)     | 2%    | 8%   | 4%   | 2%   | 7%   | 2%   | 8%   | 3%   | 2%   | 6%   | 4%    | 2%   |
| Turn Type              | Perm  | NA   |      | Perm | NA   |      | Perm | NA   |      | Perm | NA    |      |
| Protected Phases       |       | 8    |      |      | 4    |      |      | 6    |      |      | 2     |      |
| Permitted Phases       | 8     |      |      | 4    |      |      | 6    |      |      | 2    |       |      |
| Actuated Green, G (s)  | 20.5  | 20.5 |      |      | 20.5 |      |      | 42.5 |      |      | 42.5  |      |
| Effective Green, g (s) | 22.5  | 22.5 |      |      | 22.5 |      |      | 44.5 |      |      | 44.5  |      |
| Actuated g/C Ratio     | 0.30  | 0.30 |      |      | 0.30 |      |      | 0.59 |      |      | 0.59  |      |
| Clearance Time (s)     | 6.0   | 6.0  |      |      | 6.0  |      |      | 6.0  |      |      | 6.0   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  |      |      | 3.0  |      |      | 3.0  |      |      | 3.0   |      |
| Lane Grp Cap (vph)     | 194   | 455  |      |      | 433  |      |      | 747  |      |      | 731   |      |
| v/s Ratio Prot         |       | 0.15 |      |      |      |      |      |      |      |      |       |      |
| v/s Ratio Perm         | c0.20 |      |      |      | 0.20 |      |      | 0.25 |      |      | c0.44 |      |
| v/c Ratio              | 0.68  | 0.49 |      |      | 0.67 |      |      | 0.43 |      |      | 0.75  |      |
| Uniform Delay, d1      | 23.0  | 21.6 |      |      | 23.0 |      |      | 8.3  |      |      | 11.2  |      |
| Progression Factor     | 1.00  | 1.00 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00  |      |
| Incremental Delay, d2  | 8.9   | 0.8  |      |      | 3.8  |      |      | 1.8  |      |      | 6.9   |      |
| Delay (s)              | 32.0  | 22.4 |      |      | 26.8 |      |      | 10.1 |      |      | 18.1  |      |
| Level of Service       | C     | C    |      |      | C    |      |      | B    |      |      | B     |      |
| Approach Delay (s)     |       | 25.8 |      |      | 26.8 |      |      | 10.1 |      |      | 18.1  |      |
| Approach LOS           |       | C    |      |      | C    |      |      | B    |      |      | B     |      |

| Intersection Summary              |       |                           |
|-----------------------------------|-------|---------------------------|
| HCM 2000 Control Delay            | 20.0  | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.77  | B                         |
| Actuated Cycle Length (s)         | 75.0  | Sum of lost time (s)      |
| Intersection Capacity Utilization | 85.0% | 12.0                      |
| Analysis Period (min)             | 15    | ICU Level of Service      |
| c Critical Lane Group             |       | E                         |

Queues

8: I 395 SB Ramp & South Capitol St & Garage Dwy & I 395 NB Ramp



| Lane Group              | EBL  | EBR  | NBL   | NBT  | SBT  | SBR2 | NER  |
|-------------------------|------|------|-------|------|------|------|------|
| Lane Group Flow (vph)   | 26   | 26   | 1702  | 565  | 765  | 26   | 1087 |
| v/c Ratio               | 0.23 | 0.26 | 1.00  | 0.19 | 0.69 | 0.05 | 0.62 |
| Control Delay           | 57.6 | 59.1 | 37.0  | 2.1  | 36.7 | 25.4 | 8.4  |
| Queue Delay             | 0.0  | 0.0  | 0.0   | 0.0  | 4.8  | 0.0  | 0.0  |
| Total Delay             | 57.6 | 59.1 | 37.0  | 2.1  | 41.5 | 25.4 | 8.4  |
| Queue Length 50th (ft)  | 20   | 20   | ~745  | 43   | 272  | 14   | 99   |
| Queue Length 95th (ft)  | 49   | 49   | m#863 | m60  | 344  | 33   | 184  |
| Internal Link Dist (ft) | 119  |      |       | 121  | 237  |      |      |
| Turn Bay Length (ft)    |      |      |       |      |      |      |      |
| Base Capacity (vph)     | 398  | 356  | 1703  | 2940 | 1115 | 527  | 1753 |
| Starvation Cap Reductn  | 0    | 0    | 0     | 0    | 276  | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.07 | 0.07 | 1.00  | 0.19 | 0.91 | 0.05 | 0.62 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 8: I 395 SB Ramp & South Capitol St & Garage Dwy & I 395 NB Ramp



| Movement               | EBL  | EBR   | NBL2 | NBL   | NBT   | SBT   | SBR  | SBR2 | NER  |
|------------------------|------|-------|------|-------|-------|-------|------|------|------|
| Lane Configurations    |      |       |      |       |       |       |      |      |      |
| Traffic Volume (vph)   | 25   | 25    | 25   | 1592  | 537   | 669   | 58   | 25   | 1033 |
| Future Volume (vph)    | 25   | 25    | 25   | 1592  | 537   | 669   | 58   | 25   | 1033 |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900  | 1900  | 1900 | 1900 | 1900 |
| Total Lost time (s)    | 5.0  | 5.0   |      | 5.0   | 5.0   | 5.0   |      | 5.0  | 5.0  |
| Lane Util. Factor      | 1.00 | 1.00  |      | 0.97  | 0.95  | 0.95  |      | 1.00 | 0.88 |
| Frt                    | 1.00 | 0.85  |      | 1.00  | 1.00  | 0.99  |      | 0.85 | 0.85 |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00  |      | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770 | 1583  |      | 3433  | 3343  | 3346  |      | 1583 | 2787 |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00  |      | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770 | 1583  |      | 3433  | 3343  | 3346  |      | 1583 | 2787 |
| Peak-hour factor, PHF  | 0.95 | 0.95  | 0.95 | 0.95  | 0.95  | 0.95  | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph)        | 26   | 26    | 26   | 1676  | 565   | 704   | 61   | 26   | 1087 |
| RTOR Reduction (vph)   | 0    | 0     | 0    | 0     | 0     | 0     | 0    | 0    | 371  |
| Lane Group Flow (vph)  | 26   | 26    | 0    | 1702  | 565   | 765   | 0    | 26   | 716  |
| Heavy Vehicles (%)     | 2%   | 2%    | 2%   | 2%    | 8%    | 7%    | 2%   | 2%   | 2%   |
| Turn Type              | Prot | Perm  | Prot | Prot  | NA    | NA    |      | Perm | Prot |
| Protected Phases       | 4    |       | 5    | 5     | 2     | 6     |      |      | 5    |
| Permitted Phases       |      | 4     |      |       |       |       |      | 6    |      |
| Actuated Green, G (s)  | 6.5  | 6.5   |      | 59.5  | 103.5 | 39.0  |      | 39.0 | 59.5 |
| Effective Green, g (s) | 6.5  | 6.5   |      | 59.5  | 103.5 | 39.0  |      | 39.0 | 59.5 |
| Actuated g/C Ratio     | 0.05 | 0.05  |      | 0.50  | 0.86  | 0.32  |      | 0.32 | 0.50 |
| Clearance Time (s)     | 5.0  | 5.0   |      | 5.0   | 5.0   | 5.0   |      | 5.0  | 5.0  |
| Vehicle Extension (s)  | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0   |      | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 95   | 85    |      | 1702  | 2883  | 1087  |      | 514  | 1381 |
| v/s Ratio Prot         | 0.01 |       |      | c0.50 | 0.17  | c0.23 |      |      | 0.26 |
| v/s Ratio Perm         |      | c0.02 |      |       |       |       |      | 0.02 |      |
| v/c Ratio              | 0.27 | 0.31  |      | 1.00  | 0.20  | 0.70  |      | 0.05 | 0.52 |
| Uniform Delay, d1      | 54.5 | 54.6  |      | 30.2  | 1.4   | 35.4  |      | 27.8 | 20.5 |
| Progression Factor     | 1.00 | 1.00  |      | 0.66  | 1.35  | 0.95  |      | 0.92 | 1.00 |
| Incremental Delay, d2  | 1.6  | 2.0   |      | 14.9  | 0.1   | 3.8   |      | 0.2  | 1.4  |
| Delay (s)              | 56.0 | 56.6  |      | 34.9  | 1.9   | 37.6  |      | 25.7 | 21.9 |
| Level of Service       | E    | E     |      | C     | A     | D     |      | C    | C    |
| Approach Delay (s)     | 56.3 |       |      |       | 26.7  | 37.2  |      |      |      |
| Approach LOS           | E    |       |      |       | C     | D     |      |      |      |

| Intersection Summary              |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 27.8  | HCM 2000 Level of Service | C    |
| HCM 2000 Volume to Capacity ratio | 0.85  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 15.0 |
| Intersection Capacity Utilization | 84.0% | ICU Level of Service      | E    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

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L. Ramp Weaving Analysis – Future Conditions with the Project (2026 Total Future Conditions)

Phone:  
E-mail:

Fax:

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Operational Analysis  
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Analyst: DSA  
Agency/Co.: Gorove Slade  
Date Performed: 9/30/2021  
Analysis Time Period: Total Future AM  
Freeway/Dir of Travel: South Capitol St NB  
Weaving Location: Driveway to On-ramp  
Analysis Year: 2026  
Description: CSX West

-----  
Inputs  
-----

|                                |                                 |
|--------------------------------|---------------------------------|
| Segment Type                   | C-D Roadway/ Multilane Highways |
| Weaving configuration          | Two-Sided                       |
| Number of lanes, N             | 4 ln                            |
| Weaving segment length, LS     | 300 ft                          |
| Freeway free-flow speed, FFS   | 35 mi/h                         |
| Minimum segment speed, SMIN    | 15 mi/h                         |
| Freeway maximum capacity, cIFL | 2250 pc/h/ln                    |
| Terrain type                   | Level                           |
| Grade                          | 0.00 %                          |
| Length                         | 0.00 mi                         |

-----  
Conversion to pc/h Under Base Conditions  
-----

|                                  | Volume Components |       |       |       |       |
|----------------------------------|-------------------|-------|-------|-------|-------|
|                                  | VFF               | VRF   | VFR   | VRR   |       |
| Volume, V                        | 708               | 6     | 2378  | 12    | veh/h |
| Peak hour factor, PHF            | 0.95              | 0.95  | 0.95  | 0.95  |       |
| Peak 15-min volume, v15          | 186               | 2     | 626   | 3     |       |
| Trucks and buses                 | 2                 | 2     | 2     | 2     | %     |
| Recreational vehicles            | 0                 | 0     | 0     | 0     | %     |
| Trucks and buses PCE, ET         | 1.5               | 1.5   | 1.5   | 1.5   |       |
| Recreational vehicle PCE, ER     | 1.2               | 1.2   | 1.2   | 1.2   |       |
| Heavy vehicle adjustment, fHV    | 0.990             | 0.990 | 0.990 | 0.990 |       |
| Driver population adjustment, fP | 1.00              | 1.00  | 1.00  | 1.00  |       |
| Flow rate, v                     | 753               | 6     | 2528  | 13    | pc/h  |
| Volume ratio, VR                 |                   | 0.004 |       |       |       |

-----  
Configuration Characteristics  
-----

|                                     |     |        |
|-------------------------------------|-----|--------|
| Number of maneuver lanes, NWL       | 0   | ln     |
| Interchange density, ID             | 9.9 | int/mi |
| Minimum RF lane changes, LCRF       | 0   | lc/pc  |
| Minimum FR lane changes, LCFR       | 0   | lc/pc  |
| Minimum RR lane changes, LCRR       | 2   | lc/pc  |
| Minimum weaving lane changes, LCMIN | 26  | lc/h   |
| Weaving lane changes, LCW           | 26  | lc/h   |
| Non-weaving vehicle index, INW      | 976 |        |
| Non-weaving lane change, LCNW       | 69  | lc/h   |
| Total lane changes, LCALL           | 95  | lc/h   |

-----  
Weaving and Non-Weaving Speeds  
-----

|                             |       |
|-----------------------------|-------|
| Weaving intensity factor, W | 0.091 |
|-----------------------------|-------|

|                                |      |      |
|--------------------------------|------|------|
| Average weaving speed, SW      | 33.3 | mi/h |
| Average non-weaving speed, SNW | 30.9 | mi/h |

\_\_\_\_\_ Weaving Segment Speed, Density, Level of Service and Capacity \_\_\_\_\_

|                              |       |          |
|------------------------------|-------|----------|
| Weaving segment speed, S     | 30.9  | mi/h     |
| Weaving segment density, D   | 26.7  | pc/mi/ln |
| Level of service, LOS        | C     |          |
| Weaving segment v/c ratio    | 0.450 |          |
| Weaving segment flow rate, v | 3268  | veh/h    |
| Weaving segment capacity, cW | 7255  | veh/h    |

\_\_\_\_\_ Limitations on Weaving Segments \_\_\_\_\_

If limit reached, see note.

|   | Minimum | Maximum | Actual | Note |
|---|---------|---------|--------|------|
| Weaving length (ft)                       | 300     | 5764    | 300    | a,b  |
| Density-based capacity,<br>cIWL (pc/h/ln) |         | 2250    | 1832   | c    |
| v/c ratio                                 |         | 1.00    | 0.450  | d    |

Notes:

- a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.
- b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- d. Volumes exceed the weaving segment capacity. The level of service is F.

Phone:  
E-mail:

Fax:

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Operational Analysis  
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Analyst: DSA  
Agency/Co.: Gorove Slade  
Date Performed: 9/30/2021  
Analysis Time Period: Total Future PM  
Freeway/Dir of Travel: South Capitol St NB  
Weaving Location: Driveway to On-ramp  
Analysis Year: 2026  
Description: CSX West

-----  
Inputs  
-----

|                                |                                 |
|--------------------------------|---------------------------------|
| Segment Type                   | C-D Roadway/ Multilane Highways |
| Weaving configuration          | Two-Sided                       |
| Number of lanes, N             | 4 ln                            |
| Weaving segment length, LS     | 300 ft                          |
| Freeway free-flow speed, FFS   | 35 mi/h                         |
| Minimum segment speed, SMIN    | 15 mi/h                         |
| Freeway maximum capacity, cIFL | 2250 pc/h/ln                    |
| Terrain type                   | Level                           |
| Grade                          | 0.00 %                          |
| Length                         | 0.00 mi                         |

-----  
Conversion to pc/h Under Base Conditions  
-----

|                                  | Volume Components |       |       |       | veh/h |
|----------------------------------|-------------------|-------|-------|-------|-------|
|                                  | VFF               | VRF   | VFR   | VRR   |       |
| Volume, V                        | 531               | 4     | 1589  | 7     |       |
| Peak hour factor, PHF            | 0.95              | 0.95  | 0.95  | 0.95  |       |
| Peak 15-min volume, v15          | 140               | 1     | 418   | 2     |       |
| Trucks and buses                 | 2                 | 2     | 2     | 2     | %     |
| Recreational vehicles            | 0                 | 0     | 0     | 0     | %     |
| Trucks and buses PCE, ET         | 1.5               | 1.5   | 1.5   | 1.5   |       |
| Recreational vehicle PCE, ER     | 1.2               | 1.2   | 1.2   | 1.2   |       |
| Heavy vehicle adjustment, fHV    | 0.990             | 0.990 | 0.990 | 0.990 |       |
| Driver population adjustment, fP | 1.00              | 1.00  | 1.00  | 1.00  |       |
| Flow rate, v                     | 565               | 4     | 1689  | 7     | pc/h  |
| Volume ratio, VR                 |                   | 0.003 |       |       |       |

-----  
Configuration Characteristics  
-----

|                                     |     |        |
|-------------------------------------|-----|--------|
| Number of maneuver lanes, NWL       | 0   | ln     |
| Interchange density, ID             | 9.9 | int/mi |
| Minimum RF lane changes, LCRF       | 0   | lc/pc  |
| Minimum FR lane changes, LCFR       | 0   | lc/pc  |
| Minimum RR lane changes, LCRR       | 2   | lc/pc  |
| Minimum weaving lane changes, LCMIN | 14  | lc/h   |
| Weaving lane changes, LCW           | 14  | lc/h   |
| Non-weaving vehicle index, INW      | 671 |        |
| Non-weaving lane change, LCNW       | 0   | lc/h   |
| Total lane changes, LCALL           | 14  | lc/h   |

-----  
Weaving and Non-Weaving Speeds  
-----

|                             |       |
|-----------------------------|-------|
| Weaving intensity factor, W | 0.020 |
|-----------------------------|-------|



|                                |      |      |
|--------------------------------|------|------|
| Average weaving speed, SW      | 34.6 | mi/h |
| Average non-weaving speed, SNW | 32.2 | mi/h |

\_\_\_\_\_ Weaving Segment Speed, Density, Level of Service and Capacity \_\_\_\_\_

|                              |       |          |
|------------------------------|-------|----------|
| Weaving segment speed, S     | 32.2  | mi/h     |
| Weaving segment density, D   | 17.6  | pc/mi/ln |
| Level of service, LOS        | B     |          |
| Weaving segment v/c ratio    | 0.309 |          |
| Weaving segment flow rate, v | 2244  | veh/h    |
| Weaving segment capacity, cW | 7259  | veh/h    |

\_\_\_\_\_ Limitations on Weaving Segments \_\_\_\_\_

If limit reached, see note.

|  | Minimum | Maximum | Actual | Note |
|--|---------|---------|--------|------|
| Weaving length (ft)                    | 300     | 5756    | 300    | a,b  |
| Density-based capacity, cIWL (pc/h/ln) |         | 2250    | 1833   | c    |
| v/c ratio                              |         | 1.00    | 0.309  | d    |

Notes:

- In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.
- Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- Volumes exceed the weaving segment capacity. The level of service is F.