5757 Collins Avenue
March 23, 2018
c/o Mr. Matthew A. Barnes, AICP
Consultant
Akerman, LLP
98 Southeast Seventh Street, Suite 1100
Miami, Florida 33131

Re: Review Report - Traffic Study 5775 Collins - Response to Review Comments (March 20, 2018)

Dear Matt:
We received traffic-related comments in connection with the 5775 Collins Development project. The responses to the traffic-related comments are provided below:

1. Please clarify the land use code and the ITE trip generation edition used. There are conflicting references within the document.
The land use code is LUC 222 and the ITE trip generation edition is the $10^{\text {th }}$. The text in the report was revised accordingly.
2. It seems that the study used the average rate to determine the trip generation for land use code 222. The best fit formula should be used.
The best fit formula was used for the trip generation calculations. The trip generation was revised accordingly.
3. The project is located in TAZ 627 not 527 . Please review Table 2 and the proposed traffic assignment.
Table 2 was revised and the project traffic assignment was updated.
4. Figure 3 should identify the trips assigned to the intersection of 63 rd street at Indian Creek and Collins Avenue.
Trips assigned to the intersection of 63rd street at Indian Creek and Collins Avenue were added to Figure 3.
5. Intersection Analysis
a. The synchro models should include all the intersections to be analyzed.

Please model the intersection of Collins Avenue at 5875 Block.
The updated SYNCHRO files include the intersections analyzed.
b. The synchro file models are showing the intersection at 65th street. However, there was no reference to them on the study.
The $65^{\text {th }}$ Street intersection was deleted from the SYNCHRO file.
c. The signal timings or existing volumes for the intersections of 63rd street at Indian Creek and Collins Avenue were not provided within the appendix. Timings and volumes were added to Appendix B.

## 6. Valet Operations

a. Please indicate how the service rate was determined. The study assumes various times for different parts of the service, but it doesn't indicate how those times were determined.
The service rate includes four components (ticket processing time, driving time, parking time and walking period). Since the parking garage is on site, the driving time to a parking space was assumed to be 2 minutes and the walking time through the building at 1 minute. Based on discussions with mechanical lifts manufacturers and as used in other projects in Miami Beach, 2 minutes appears to be the average time to park or unpark a vehicle from a mechanical parking system. For purposes of this evaluation, we used 3 minutes.
b. Please indicate the type of mechanical parking system and its operational characteristics.
c. The type of mechanical parking system has not been selected yet. It will likely between Klaus or ParkPlus.
7. Figures 1-3 should include the complete study area. Figure 3 has a typo in the legend.
Figures 1-3 were revised accordingly.
8. Please provide figures summarizing the intersections existing background and expected volumes.
Figures 4, 5, and 6 were added to Appendix E
9. Appendix E - shows that a growth rate of $1.5 \%$ was used in the analysis. Please provide supportive documentation.
Documentation supporting the $1.5 \%$ growth rate was added to Appendix B.
10. Loading and Trash Pickup - Please indicate the type of loading vehicles that will be serving the project and provide a loading zone maneuverability analysis. In addition, please discuss the garbage pickup operations and provide maneuverability analysis diagrams for this operation as well. The attached diagram depicts the trash pickup route.
11. This project requires the installation of bike racks. Please show their location on the proposed site plan.
The attached plan shows the bike racks within the site.
12. The trip distribution and circulation section has a typo indicating a restaurant use.
The text in the report was revised.



| 5775 COLLINS AVE | GARAGE - EL. -3.6' NGVD |  | 2018.03.23 | A-1-01 |
| :---: | :---: | :---: | :---: | :---: |
| MULTIPLAN | $0^{05}{ }^{30}$ - |  | AROUI | ONICA |



March 22, 2018

## 5757 Collins Avenue

c/o Mr. Matthew A. Barnes, AICP
Consultant
Akerman, LLP
98 Southeast Seventh Street, Suite 1100
Miami, Florida 33131

## Re: 5775 Collins Avenue - Traffic Study

Dear Matt:

Traf Tech Engineering, Inc. is pleased to provide you with the results of the traffic study conducted for the proposed re-development of the existing residential development located at 5775 Collins Avenue in the City of Miami Beach in Miami-Dade County, Florida. Figure 1 depicts the location of the project site and the nearby transportation network. The existing residential development will be replaced with a less-intense residential building consisting of 89 high-rise residential units. Even though the existing residential development currently has 10 residential units currently occupied, the new project impacts associated with all 89 high-rise units will be assessed herein. It is important to note that the current residential development is more intense (more residential units) than the proposed building and the current building can be fully occupied without the need for a traffic study. However, as discussed with the City of Miami Beach, the future traffic impacts with the 89 high-rise units are documented herein.

This following section addresses the existing roadway system located in the vicinity of the project site, nearby U-turn locations, traffic counts, trip generation and trip distribution.

## Existing Roadway Conditions

The roadway system located near the project site includes Collins Avenue. Collins Avenue is a six-lane divided arterial roadway with a one-lane frontage road on the east side of the roadway. The driveway to the future high-rise development will remain unchanged (right-turns only).

## Nearby U-Turn Locations

For ingress and egress purposes, U-turns are expected at the signalized U-turn location at the 5800 block (north of the project site) and at a directional median opening located south of the 5775 Collins project.

Figure 2 shows the existing lane geometry of the two U-turn locations.
8400 North University Drive, Suite 309, Tamarac, Florida 33321
Tel: (954) 582-0988 Fax: (954) 582-0989

## Traffic Counts

Traf Tech Engineering, Inc., in association with Video Data Solutions, Inc., collected traffic data at the two U-turn locations. These traffic counts were collected for information purposes.

The intersection turning movement counts were collected on Friday, March 10, 2017 during the PM peak period (4:00 PM to 7:00 PM). As indicated in the traffic counts, the amount of U-turn currently occurring at the two U-turn locations is minimal (less than one vehicle per minute). The existing PM peak hour traffic counts are contained in Appendix B.

## Trip Generation Estimation

The trip generation for the project was based on information contained in the Institute of Transportation Engineer's (ITE) Trip Generation Manual (10th Edition). According to the subject ITE manual, the most appropriate "land use" category for the proposed land use is: Land Use 222 - High Rise Apartment. Table 1 below summarizes the external trips associated with the proposed 5775 Collins residential development.

| TABLE 1 <br> Trip Generation Summary <br> 5775 Collins |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | Size | Daily <br> Trips | AM (PM) Peak Hour |  |  |
| Land Use | Ins | Out | Total |  |  |
| High-Rise | 89 | 562 | $9(24)$ | $29(15)$ | $38(39)$ |

SOURCE: ITE Trip Generation Manual ( $10^{\text {th }}$ Edition)
As indicated in Table 1, the proposed development is anticipated to generate approximately 562 new daily trips and approximately $38 / 39$ new trips ( $9 / 24$ inbound and $29 / 15$ outbound) during the typical AM/PM peak hour. Hence, the new trips generated by the 5775 Collins development are considered minimal from a traffic engineering standpoint (one new peak hour trip every two minutes).

ITE Land Use 222 - High Rise Residential Condominium
Weekday Trip Generation
T = 3.94 (X) +211.81
Where $\mathrm{T}=$ number of weekday trips and $\mathrm{X}=$ number of units
Weekday AM Peak Hour of Adjacent Street
$\mathrm{T}=0.28(\mathrm{X})+12.86$ ( $24 \%$ inbound and $76 \%$ outbound)
Where $T$ = number of weekday PM peak hour trips and $X=$ number of units

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Weekday PM Peak Hour of Adjacent Street
$\mathrm{T}=0.34(\mathrm{X})+8.56$ ( $61 \%$ inbound and $39 \%$ outbound)
Where $\mathrm{T}=$ number of weekday PM peak hour trips and
$\mathrm{X}=$ number of units

## Trip Distribution and Traffic Circulation

The trip distribution and traffic assignment for the project were based on Miami-Dade County's Cardinal Distribution information for the study area. Table 2 summarizes the County's cardinal distribution data for Traffic Analysis Zone 627, which is applicable to the project site from the latest SERPM data published by Miami-Dade County.

| TABLE 2 <br> Project Trip Distribution <br> 5775 Collins |  |  |
| :--- | :--- | :---: |
|  | Direction | \% of Total Trips |
| North: | Northwest | 24.7 |
|  | Northeast | 4.7 |
| South: | Southwest | 31.7 |
|  | Southeast | 0.0 |
| East: | Northeast | 0.0 |
|  | Southeast | 0.0 |
| West: | Northwest | 12.9 |
|  | Southwest | 26.0 |
|  |  | $100.00 \%$ |

Source: Miami-Dade County (2040 SERPM)
Based on the above, the following traffic assignment was assumed for the proposed development:

- $42 \%$ to/from the north via Collins Avenue
- $58 \%$ to/from the south via Collins Avenue

The new peak hour traffic generated by the project was assigned to the nearby transportation network using the traffic assignment documented above. The new project traffic assignment is summarized in Figure 3. As depicted in Figure 3, the projected Uturns at the north and south median openings are minimal (less than one new vehicle trip every six minutes).

The traffic circulation within the site consists of the following:

- All inbound vehicles will enter via the south driveway from the Collins Avenue frontage road and drop-off at the porte-cochere area near the center of the site. The south driveway is restricted to right-turns-in only. Vehicles will be parked by entering via the north ramp that leads to the parking garage. Vehicles are

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retrieved from the parking garage and returned to the porte-cochere via the south ramp. From the porte-cochere all exiting vehicles exit onto the Collins Avenue frontage road via the north driveway which is restricted to right-turns-out only.

## Pedestrian Circulation

A 9-foot four-inch sidewalk is located in front of the 5775 Collins Avenue site (east side of Collins Avenue/frontage road). The wide-sidewalk provides north-south pedestrian mobility within the immediate area of the project. From the sidewalk, access to the subject residential development is provided via a pedestrian access path/stairs located between the sidewalk and the porte-cochere. Moreover, a signalized pedestrian crossing is provided at the 5800 block approximately 625 feet north of the site.

## Pedestrian Facilities Analysis (Sidewalks and Crosswalks)

Based on the traffic counts contained in Appendix B, approximately 22 pedestrians used the signalized pedestrian crosswalk located at the 5800 -block during the peak pedestrian hour. As shown in the signal timing plans contained in Appendix C for the signalized located at the 5800 block (timing plan refers to the location as the 5875 block, but the street sign indicates 5800 block), the subject pedestrian crossing operates with a signal cycle of 140 seconds, which results in approximately 25 pedestrian crossing opportunities per hour. Hence, the signalized pedestrian crossing at the 5800 block has 25 opportunities per hour to accommodate 22 pedestrians per hour (sufficient pedestrian capacity is available at the subject signalized pedestrian crossing).

The traffic counts contained in Appendix B show a maximum of 27 pedestrians during the peak 15 -minute period using the sidewalk located on the east side of Collins Avenue/frontage road (west of the site, refer to ped column on westbound approach at Collins Ave at 5701 Block). With a sidewalk width of 9.33 feet ( 9 feet, 4 inches), the resulting pedestrian flow rate is approximately 0.193 pedestrians/minute/foot of sidewalk width ( 27 pedestrians per peak 15 -minute period divided by 15 divided by 9.33 ). According the 2010 Highway Capacity Manual (refer to Appendix D), the resulting level of service of the sidewalk adjacent to the site is " A ".

## Transit Service

Miami-Dade County transit service has three (3) bus routes that travel north and south along Collins Avenue. These bus routes include S, L and 120. There is a bus stop (with a bus bench) in front of the 5775 Collins Avenue site for northbound traveling passengers. Similarly, there is another bus stop (with a bus shelter) for southbound traffic on the west side of Collins Avenue approximately 100 feet north of the 5775 Collins Avenue site.

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## DecoBike

DecoBike is the Official City of Miami Beach Bike Sharing \& Rental program. It provides new alternative mode of transportation for both residents and visitors of the City of Miami Beach. The DecoBike Program features a network of 100 solar-powered bike rental \& sharing stations. Station 302 is located within walking distance (at the 5300 block) from the 5775 Collins Site.

## Transportation Demand Management

Travel Demand Management plans (TDM) establish policies and mechanisms to reduce automobile trips to and from designated facilities. TDM plans usually use several approaches to address all modes of transportation likely to be used to provide access to a facility such as single occupant driving, carpooling, transit, bicycling and walking. The goal of TDM plans is to increase the use of alternatives modes to single occupant driving, i.e., to reduce the number of automobile trips to and from the facility and consequently, minimizing automobile traffic impacts on the street system.

Successful TDM plans not only address all modes of transportation, but also use policies such as inducements for alternative modes, physical enhancements (bike lockers, preferential parking for carpools) and disincentives for automobile use..

Potential measures for each mode are addressed below.

## Pedestrian Access

Walking not only reduces automobile trips and their contribution to congestion and emissions, it also provides health benefits to the residents who use this mode of transportation. In addition, the area near the subject mixed-use project is a high pedestrian traffic area and densely populated residential area and therefore, many future residents of the 5775 Collins development are expected to regularly choose walking over alternative transportation methods. Sidewalks exist on the east and south sides of Collins Avenue as well as safe pedestrian crosswalks (with ramps and pedestrian signals) at the signalized intersection of Collins Avenue and the 5800 Block.

## Bicycling

The site of the 5775 Collins offers a potential approach to encourage cycling vi the use of the DecoBike program.

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Use of DecoBikes will be encouraged by facilitating the acquisition of monthly passes on site. Monthly passes are $\$ 15.00$ for unlimited 30 minute rides and $\$ 25.00$ for unlimited 60 minute rides. Within the immediate area of the project, there is one convenient DecoBike rental stations (Station 302: Collins Avenue at the 5300 Block). Residents will be informed of DecoBike Stations 302. (Goal: 4 Residents).

## Mass Transit

There are transit options for the 5775 Collins development. These transit routes include $120, \mathrm{~L}$ and S . The nearest bus stop for these services is located adjacent to the project (on both sides of Collins Avenue). These transit routes provide frequent service and access to all of Miami-Dade County as well as connections to other destinations outside of the County. Residents will be informed of the transit routes available.

## Carpooling

Carpooling is historically the least effective alternative transportation mode, even when implemented on a regional basis. It is unlikely that carpooling will provide a significant amount of trip reduction. However, preferential parking could be made available to residents that carpool. (Goal: 2 Residents).

## TDM Program Management

An employee of the future 5775 Collins building will be designated as the "TDM Manager" and will have assigned duties that include establishment and management of the TDM program. Said employee will need to be able to explain the bicycling, mass transit and carpooling options to residents. In addition, said employee will advise residents of the benefits relative to each mode of transportation. Materials describing the TDM program will be made available to all residents. The TDM Manager will coordinate with the City of Miami Beach, and potentially with MDT and DECOBIKES LLC for monthly transit passes and DecoBike passes respectively. The TDM Manager will need to set up a method and a schedule to monitor participation of residents for each mode of transportation. The person assigned to manage the TDM plan will be identified at the time of permitting.

## Level of Service

Level of service analyses were undertaken for the AM and PM peak hours for the intersections of $63^{\text {rd }}$ Street at both Indian Creek Drive and Collins Avenue. The analyses conducted for the 6372 Collins project were used as background conditions and the projected trips associated with this project were added to the above-referenced intersection system. As indicated in the SYNCHRO analyses contained in Appendix E, the impacts created by the 5775 Collins project are minimal.

| TABLE 3 <br> Intersection Level of Service <br> 5775 Collins |  |  |  |
| :--- | :---: | :---: | :---: |
|  |  | Future Traffic Conditions |  |
|  | Existing | Future <br> w/o Project | Future <br> With Project |
| Intersection | F (F) | F (F) | F (F) |
| Indian Creek Drive \& W 63 <br> (sd <br> (signalized) | B (C) | C (C) | C (C) |
| Collins Avenue \& W 63 <br> rd <br> (signalized) | Street | - | - |
| Collins and 5875 Block (signalized) | (A) |  |  |

Source: Highway Capacity Manual
Legend: AM (PM)
The projected impact to the northbound U-turn at the 5800 block is projected to be minimal. Based on the project trips depicted in Figure 3, a maximum of nine (9) vehicles will impact the subject northbound U-turn during the AM peak hour, which is one new vehicle trip every six minutes and 40 seconds (approximately one vehicle trip every 3 signal cycles).

## Valet Service and Queuing

In order to determine the potential on-site vehicle stacking at the valet station as a result of the proposed mechanical parking, a queuing analysis was undertaken. The length of queue anticipated at the valet station using information contained in ITE's Transportation and Land Development, Chapter $8^{1}$. For this analysis, the following input variables were used:

- Service Rate: For purposes of this evaluation, it was assumed that each valet runner would take approximately seven (7) minutes to park/unpark a valet vehicle. This assumption is based on the following: (1 minute for ticket processing time, 2 minutes of driving time, 3 minutes to park/unpark a vehicle within the mechanical parking system, and 1 minute of walking time back to the valet station).
- Demand Rate: As indicated in Table 1, a maximum of 39 inbound/outbound vehicles will arrive/depart during the highest hour.

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Using equation 8-9b and Table 8-11 of ITE's Transportation and Land Development, the maximum length of queue anticipated at the $95 \%$ confidence level is eight (8) vehicle. Therefore, the on-site queueing at the valet station is not anticipated to be a problem with up to six (6) valet runners. The results of the ITE queuing procedure are contained in Appendix F.

It has been a pleasure working with you on this project.








## APPENDIX A

## Site Plan - 5775 Collins



## APPENDIX B

## Traffic Counts and Growth Rate Information

# Video Data Solutions, Inc. 

A Traffic Data Collection Company
O. (305)253-1553 F.(305)235-7703
CLIENT: TRAF TECH Engineering
JOB NO : $2017-26$
PROJECT: Collins Ave
COUNTY : Miami-Dade

File Name : 1- Collins Ave at 5800 Block
Site Code : 00000000 Start Date : 3/10/2017
Page No : 1

Groups Printed- Auto - Heavy Vehicles

|  | Collins Ave Southbound |  |  |  |  | 5800 Block Westbound |  |  |  |  | Collins Ave Northbound |  |  |  |  | 5800 Block <br> Eastbound |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Start Time | Right | Thru | Left | U-Tums | App. Total | Right | Thru | Left | U-Turs | App. Total | Right | Thru | Left | U-Tums | App. Total | Right | Thru | Left | U-Turns | App. Total | Int. Total |
| 16:30 | 0 | 230 | 0 | 1 | 231 | 0 | 0 | 0 | 0 | 0 | 0 | 279 | 0 | 15 | 294 | 0 | 0 | 0 | 0 | 0 | 525 |
| 16:45 | 0 | 235 | 0 | 3 | 238 | 0 | 0 | 0 | 0 | 0 | 0 | 295 | 0 | 9 | 304 | 0 | 0 | 0 | 0 | 0 | 542 |
| Total | 0 | 465 | 0 | 4 | 469 | 0 | 0 | 0 | 0 | 0 | 0 | 574 | 0 | 24 | 598 | 0 | 0 | 0 | 0 | 0 | 1067 |
| 17:00 | 0 | 234 | 0 | 6 | 240 | 0 | 0 | 0 | 0 | 0 | 0 | 300 | 0 | 7 | 307 | 0 | 0 | 0 | 0 | 0 | 547 |
| 17:15 | 0 | 246 | 0 | 3 | 249 | 0 | 0 | 0 | 0 | 0 | 0 | 325 | 0 | 8 | 333 | 0 | 0 | 0 | 0 | 0 | 582 |
| 17:30 | 0 | 255 | 0 | 4 | 259 | 0 | 0 | 0 | 0 | 0 | 0 | 339 | 0 | 6 | 345 | 0 | 0 | 0 | 0 | 0 | 604 |
| 17:45 | 0 | 242 | 0 | 2 | 244 | 0 | 0 | 0 | 0 | 0 | 0 | 340 | 0 | 9 | 349 | 0 | 0 | 0 | 0 | 0 | 593 |
| Total | 0 | 977 | 0 | 15 | 992 | 0 | 0 | 0 | 0 | 0 | 0 | 1304 | 0 | 30 | 1334 | 0 | 0 | 0 | 0 | 0 | 2326 |
| 18:00 | 0 | 215 | 0 | 2 | 217 | 0 | 0 | 0 | 0 | 0 | 0 | 329 | 0 | 8 | 337 | 0 | 0 | 0 | 0 | 0 | 554 |
| 18:15 | 0 | 221 | 0 | 3 | 224 | 0 | 0 | 0 | 0 | 0 | 0 | 314 | 0 | 7 | 321 | 0 | 0 | 0 | 0 | 0 | 545 |
| 18:30 | 0 | 205 | 0 | 0 | 205 | 0 | 0 | 0 | 0 | 0 | 0 | 305 | 0 | 0 | 305 | 0 | 0 | 0 | 0 | 0 | 510 |
| 18:45 | 0 | 195 | 0 | 0 | 195 | 0 | 0 | 0 | 0 | 0 | 0 | 289 | 0 | 0 | 289 | 0 | 0 | 0 | 0 | 0 | 484 |
| Total | 0 | 836 | 0 | 5 | 841 | 0 | 0 | 0 | 0 | 0 | 0 | 1237 | 0 | 15 | 1252 | 0 | 0 | 0 | 0 | 0 | 2093 |
| Grand Total | 0 | 2278 |  |  |  |  |  |  |  |  |  | 3115 | 0 | 69 | 3184 | 0 | 0 | 0 | 0 | 0 | 5486 |
| Apprch \% | 0 | 99 | 0 | 1 |  | 0 | 0 | 0 | 0 |  | 0 | 97.8 | 0 | 2.2 |  | 0 | 0 | 0 | 0 |  |  |
| Total \% | 0 | 41.5 | 0 | 0.4 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 56.8 | 0 | 1.3 | 58 | 0 | 0 | 0 | 0 | 0 |  |
| Auto | 0 | 2246 | 0 | 24 | 2270 | 0 | 0 | 0 | 0 | 0 | 0 | 3078 | 0 | 69 | 3147 | 0 | 0 | 0 | 0 | 0 | 5417 |
| \% Auto | 0 | 98.6 | 0 | 100 | 98.6 | 0 | 0 | 0 | 0 | 0 | 0 | 98.8 | 0 | 100 | 98.8 | 0 | 0 | 0 | 0 | 0 | 98.7 |
| Heavy Vehicles \% Heavy Vehicles | 0 | 1.4 | 0 | 0 | 1.4 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 | 0 | 0 | 1.2 | 0 | 0 | 0 | 0 | 0 | 1.3 |

## Video Data Solutions, Inc.

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File Name : 1-Collins Ave at 5800 Block
Site Code : 00000000
Page No : 2


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File Name : 1-Collins Ave at 5800 Block

Site Code : 00000000
Start Date : 3/10/2017
Page No : 4

|  | Collins Ave Southbound |  |  |  |  | 5800 Block Westbound |  |  |  |  | Collins Ave Northbound |  |  |  |  | 5800 Block Eastbound |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Start Time | Right | Thru | Left | U-Turns | App. Total | Right | Thru | Left | U-Turns | App. Total | Right | Thru | Left | U-Turns | App. Total | Right | Thru | Left | U-Turns | App. Total | Int. Total |
| Peak Hour Analysis From 16:30 to 18:45-Peak 1 of 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Peak Hour for Entire Intersection Begins at 17:15 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17:15 | 0 | 246 | 0 | 3 | 249 | 0 | 0 | 0 | 0 | 0 | 0 | 325 | 0 | 8 | 333 | 0 | 0 | 0 | 0 | 0 | 582 |
| 17:30 | 0 | 255 | 0 | 4 | 259 | 0 | 0 | 0 | 0 | 0 | 0 | 339 | 0 | 6 | 345 | 0 | 0 | 0 | 0 | 0 | 604 |
| 17:45 | 0 | 242 | 0 | 2 | 244 | 0 | 0 | 0 | 0 | 0 | 0 | 340 | 0 | 9 | 349 | 0 | 0 | 0 | 0 | 0 | 593 |
| 18:00 | 0 | 215 | 0 | 2 | 217 | 0 | 0 | 0 | 0 | 0 | 0 | 329 | 0 | 8 | 337 | 0 | 0 | 0 | 0 | 0 | 554 |
| Total Volume \% App. Total | 0 | 958 | 0 | 11 | 969 | 0 | 0 | 0 | 0 | 0 | 0 | 1333 | 0 | 31 | 1364 | 0 | 0 | 0 | 0 | 0 | 2333 |
| PHF | . 000 | . 939 | . 000 | . 688 | . 935 | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 980 | . 000 | . 861 | . 977 | . 000 | . 000 | . 000 | . 000 | . 000 | . 966 |



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File Name : 1- Collins Ave at 5800 Block

Site Code : 00000000
Start Date: 3/10/2017
Page No : 1


| 16:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 16:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 4 |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 9 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| 17:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 4 |
| 17:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 4 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 22 |
| 18:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| 18:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| 18:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 6 |
| 18:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 18 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 | 44 |
| Apprch \% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |  |
| Total \% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |  |

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|  | Collins Ave Southbound |  |  |  |  | 5800 Block Westbound |  |  |  |  | Collins Ave Northbound |  |  |  |  | 5800 Block Eastbound |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 16:30 to 18:45-Peak 1 of 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Peak Hour fo | Entire | Inters | ction | Begin | at 17:00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | 0 | 0 | 0 | 9 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 |
| 17:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 4 |
| 17:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 4 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 22 | 0 | 0 | 0 | 0 | 0 | 22 |
| \% App. Total | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 100 |  | 0 | 0 | 0 | 0 |  |  |
| PHF | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 000 | . 611 | . 611 | . 000 | . 000 | . 000 | . 000 | . 000 | . 611 |



# Video Data Solutions, Inc. 

A Traffic Data Collection Company
O. (305)253-1553 F.(305)235-7703
CLIENT: TRAF TECH Engineering
JOB NO : $2017-26$
PROJECT: Collins Ave
COUNTY : Miami-Dade

File Name : 2- Collins Ave at 5701 Block
Site Code : 00000000 Start Date : 3/10/2017
Page No : 1

|  | Collins Ave Southbound |  |  |  |  | 5701 Block Westbound |  |  |  |  | Collins Ave Northbound |  |  |  |  | 5701 Block Eastbound |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Start Time | Thru | Left | U-Turn A | U-Turn B | App. Total | Right | Thru | Left | U-Turs | App. Total | Right | Thru | Left | U-Turns | App. Total | Right | Thru | Left | U-Turns | App. Total | Int. Total |
| 16:30 | 221 | 6 | 4 | 7 | 238 | 1 | 0 | 1 | 0 | 2 | 3 | 309 | 0 | 7 | 319 | 0 | 0 | 0 | 0 | 0 | 559 |
| 16:45 | 226 | 5 | 3 | 11 | 245 | 1 | 0 | 0 | 0 | 1 | 2 | 313 | 0 | 7 | 322 | 0 | 0 | 0 | 0 | 0 | 568 |
| Total | 447 | 11 | 7 | 18 | 483 | 2 | 0 | 1 | 0 | 3 | 5 | 622 | 0 | 14 | 641 | 0 | 0 | 0 | 0 | 0 | 1127 |
| 17:00 | 231 | 3 | 1 | 5 | 240 | 2 | 0 | 1 | 0 | 3 | 5 | 325 | 0 | 2 | 332 | 0 | 0 | 0 | 0 | 0 | 575 |
| 17:15 | 233 | 2 | 0 | 5 | 240 | 1 | 0 | 1 | 0 | 2 | 4 | 347 | 0 | 5 | 356 | 0 | 0 | 0 | 0 | 0 | 598 |
| 17:30 | 232 | 0 | 2 | 2 | 236 | 2 | 0 | 0 | 0 | 2 | 5 | 372 | 0 | 3 | 380 | 0 | 0 | 0 | 0 | 0 | 618 |
| 17:45 | 219 | 1 | 11 | 15 | 246 | 0 | 0 | 0 | 0 | 0 | 1 | 360 | 0 | 11 | 372 | 0 | 0 | 0 | 0 | 0 | 618 |
| Total | 915 | 6 | 14 | 27 | 962 | 5 | 0 | 2 | 0 | 7 | 15 | 1404 | 0 | 21 | 1440 | 0 | 0 | 0 | 0 | 0 | 2409 |
| 18:00 | 207 | 2 | 8 | 8 | 225 | 1 | 0 | 0 | 0 | 1 | 2 | 350 | 0 | 8 | 360 | 0 | 0 | 0 | 0 | 0 | 586 |
| 18:15 | 201 | 3 | 3 | 5 | 212 | 1 | 0 | 0 | 0 | 1 | 3 | 342 | 0 | 7 | 352 | 0 | 0 | 0 | 0 | 0 | 565 |
| 18:30 | 194 | 1 | 4 | 4 | 203 | 2 | 0 | 0 | 0 | 2 | 3 | 336 | 0 | 7 | 346 | 0 | 0 | 0 | 0 | 0 | 551 |
| 18:45 | 197 | 2 | 3 | 5 | 207 | 1 | 0 | 0 | 0 | 1 | 2 | 327 | 0 | 5 | 334 | 0 | 0 | 0 | 0 | 0 | 542 |
| Total | 799 | 8 | 18 | 22 | 847 | 5 | 0 | 0 | 0 | 5 | 10 | 1355 | 0 | 27 | 1392 | 0 | 0 | 0 | 0 | 0 | 2244 |
| Grand Total | 2161 | 25 | 39 | 67 | 2292 | 12 | 0 | 3 | 0 | 15 | 30 | 3381 | 0 | 62 | 3473 | 0 | 0 | 0 | 0 | 0 | 5780 |
| Apprch \% | 94.3 | 1.1 | 1.7 | 2.9 |  | 80 | 0 | 20 | 0 |  | 0.9 | 97.4 | 0 | 1.8 |  | 0 | 0 | 0 | 0 |  |  |
| Total \% | 37.4 | 0.4 | 0.7 | 1.2 | 39.7 | 0.2 | 0 | 0.1 | 0 | 0.3 | 0.5 | 58.5 | 0 | 1.1 | 60.1 | 0 | 0 | 0 | 0 | 0 |  |
| Auto | 2135 | 25 | 39 | 67 | 2266 | 12 | 0 | 3 | 0 | 15 | 30 | 3353 | 0 | 62 | 3445 | 0 | 0 | 0 | 0 | 0 | 5726 |
| \% Auto | 98.8 | 100 | 100 | 100 | 98.9 | 100 | 0 | 100 | 0 | 100 | 100 | 99.2 | 0 | 100 | 99.2 | 0 | 0 | 0 | 0 | 0 | 99.1 |
| Heavy Vehicles <br> \% Heavy Vehicles | 1.2 | 0 | 0 | 0 | 1.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0.9 |

## Video Data Solutions, Inc.

A Traffic Data Collection Company
O.(305)253-1553 F.(305)235-7703

CLIENT : TRAF TECH Engineering<br>JOB NO : 2017-26<br>PROJECT: Collins Ave<br>COUNTY : Miami-Dade

File Name : 2- Collins Ave at 5701 Block
Site Code : 00000000
Start Date : 3/10/2017
Page No : 2


## Video Data Solutions, Inc.

A Traffic Data Collection Company
O.(305)253-1553 F.(305)235-7703

CLIENT : TRAF TECH Engineering<br>JOB NO : 2017-26<br>PROJECT: Collins Ave

File Name : 2- Collins Ave at 5701 Block
Site Code : 00000000
Start Date : 3/10/2017
Page No : 4

|  | Collins Ave Southbound |  |  |  |  | 5701 Block Westbound |  |  |  |  | Collins Ave Northbound |  |  |  |  | 5701 Block Eastbound |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Start Time | Thru | Left | U-Turn A | U-Turn B | App. Total | Right | Thru | Left | U-Turns | App. Total | Right | Thru | Left | U-Turns | App. Total | Right | Thru | Left | U-Turns | App. Total | Int. Total |
| Peak Hour Analysis From 16:30 to 18:45-Peak 1 of 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Peak Hour for Entire Intersection Begins at 17:15 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17:15 | 233 | 2 | 0 | 5 | 240 | 1 | 0 | 1 | 0 | 2 | 4 | 347 | 0 | 5 | 356 | 0 | 0 | 0 | 0 | 0 | 598 |
| 17:30 | 232 | 0 | 2 | 2 | 236 | 2 | 0 | 0 | 0 | 2 | 5 | 372 | 0 | 3 | 380 | 0 | 0 | 0 | 0 | 0 | 618 |
| 17:45 | 219 | 1 | 11 | 15 | 246 | 0 | 0 | 0 | 0 | 0 | 1 | 360 | 0 | 11 | 372 | 0 | 0 | 0 | 0 | 0 | 618 |
| 18:00 | 207 | 2 | 8 | 8 | 225 | 1 | 0 | 0 | 0 | 1 | 2 | 350 | 0 | 8 | 360 | 0 | 0 | 0 | 0 | 0 | 586 |
| Total Volume \% App. Total | 891 | 5 | 21 | 30 | 947 | 4 | 0 | 1 | 0 | 5 | 12 | 1429 | 0 | 27 | 1468 | 0 | 0 | 0 | 0 | 0 | 2420 |
| PHF | . 956 | . 625 | . 477 | . 500 | . 962 | . 500 | . 000 | . 250 | . 000 | . 625 | . 600 | . 960 | . 000 | . 614 | . 966 | . 000 | . 000 | . 000 | . 000 | . 000 | . 979 |



# Video Data Solutions, Inc. 

A Traffic Data Collection Company
O. (305)253-1553 F.(305)235-7703

CLIENT : TRAF TECH Engineering<br>JOB NO : 2017-26<br>PROJECT: Collins Ave<br>COUNTY : Miami-Dade

File Name : 2- Collins Ave at 5701 Block

Site Code : 00000000
Start Date: 3/10/2017
Page No : 1


| 16:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 2 | 11 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 16:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 7 | 14 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 9 | 25 |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 18 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 19 |
| 17:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 26 |
| 17:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 18 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 18 | 81 |
| 18:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 10 | 39 |
| 18:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 7 | 31 |
| 18:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 5 | 23 |
| 18:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 17 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 78 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 25 | 110 |


| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 145 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 52 | 216 |  |  |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Apprch \% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 100 | 0 | 0 | 0 |

TRAFFIC SURVEY SPECIALISTS, INC.

```
63RD ATREET & COLLINS AVENUE
MIAMI BEACH, FLORIDA
85 SE 4TH AVENUE, UNIT 109
Site Code : 00170131
COUNTED BY: ADAM JOHNSON
SIGNALIZED
DELRAY BEACH, FLORIDA
Start Date: 08/04/17
    PHONE (561)272-3255
File I.D. : 63STCOLL
Page : 1
```

ALL VEHICLES




63RD ATREET \& COLLINS AVENUE MIAMI BEACH, FLORIDA
COUNTED BY: ADAM JOHNSON SIGNALIZED

TRAFFIC SURVEY SPECIALISTS, INC.
85 SE 4TH AVENUE, UNIT 109
Site Code : 00170131
DELRAY BEACH, FLORIDA
Start Date: 08/04/17
File I.D. : 63STCOLL
Page : 2
all vehicles


Peak Hour Analysis By Entire Intersection for the Period: 07:00 to 09:00 on 08/04/17

| Peak star | 08:00 |  |  |  | 08:00 |  |  |  | 08:00 |  |  |  | 08:00 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 176 | 541 | 2 | 4 | 428 | 16 | 0 |
| Percent | 0\% | 0\% | 0\% | 0\% | 0\% | 0\% | 0\% | 0\% | 0\% | 24\% | 75\% | $0 \%$ | 1\% | 96\% | 4\% | 0\% |
| Pk total | 0 |  |  |  | 0 |  |  |  | 719 |  |  |  | 448 |  |  |  |
| Highest | 07:00 |  |  |  | 07:00 |  |  |  | 08:45 |  |  |  | 08:45 |  |  |  |
| Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 154 | 1 | 2 | 114 | 5 | 0 |
| Hi total | 0 |  |  |  | 0 |  |  |  | 203 |  |  |  | 121 |  |  |  |
| PHF | . 0 |  |  |  | . 0 |  |  |  | . 89 |  |  |  | . 93 |  |  |  |



## 63RD STREET



63RD ATREET \& COLLINS AVENUE MIAMI BEACH, FLORIDA COUNTED BY: ADAM JOHNSON SIGNALIZED

85 SE 4TH AVENUE, UNIT 109
DELRAY BEACH, FLORIDA
PHONE (561)272-3255

Site Code : 00170131
Start Date: 08/04/17
File I.D. : 63STCOLL
Page : 3

ALL VEHICLES


TRAFFIC SURVEY SPECIALISTS, INC.

| 63RD ATREET \& COLLINS AVENUE | 85 SE 4TH AVENUE, UNIT 109 | Site Code : 00170131 |
| :---: | :---: | :---: |
| MIAMI BEACH, FLORIDA | DELRAY BEACH, FLORIDA | Start Date: 08/04/17 |
| COUNTED BY: ADAM JOHNSON | PHONE (561)272-3255 | File I.D. : 63STCOLL |
| SIGNALI ZED |  | Page : 1 |

PEDESTRIANS \& BIKES


| 07:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 07:15 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 5 |
| 07:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 | 9 |
| 07:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 |
| Hr Total | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 17 | 26 |
| 08:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 8 |
| 08:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 7 | 11 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 6 |
| 08:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 5 | 11 |
| Hr Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 22 | 0 | 1 | 0 | 12 | 36 |

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| *TOTAL* | 0 | 0 | 0 | 0 \| | 0 | 2 | 0 | 2 | 0 | 5 | 0 | 77 | 0 | 3 | 0 | 91 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |



Miami Beach, Florida
June 20,2014 drawn by. Luis Palomino


TRAFFIC SURVEY SPECIALISTS, INC.

| 63RD STREET \& INDIAN CREEK DRIVE | 85 SE 4TH AVENUE, UNIT 109 | Site Code : 00170131 |
| :--- | ---: | :--- |
| MIAMI BEACH, FLORIDA | DELRAY BEACH, FLORIDA | Start Date: $08 / 04 / 17$ |
| COUNTED BY: S. SALVO \& W. DE LUNA VARGAS | PHONE (561)272-3255 | File I.D. : 63 STINDI |
| SIGNALIZED |  | Page |

ALL VEHICLES


| 16:00 | 1 | 21 | 207 | 329 | 0 | 7 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 230 | 152 | 27 | 1018 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 16:15 | 2 | 21 | 193 | 333 | 0 | 8 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 285 | 189 | 35 | 1106 |
| 16:30 | 1 | 27 | 237 | 328 | 0 | 11 | 0 | 68 | 0 | 0 | 0 | 0 | 0 | 232 | 167 | 37 | 1108 |
| 16:45 | 4 | 17 | 194 | 309 | 1 | 7 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 252 | 177 | 33 | 1044 |
| Hr Total | 8 | 86 | 831 | 1299 | 1 | 33 | 0 | 202 | 0 | 0 | 0 | 0 | 0 | 999 | 685 | 132 | 4276 |
| 17:00 | 0 | 23 | 188 | 370 | 1 | 4 | 0 | 69 | 0 | 0 | 0 | 0 | 0 | 288 | 182 | 28 | 1153 |
| 17:15 | 4 | 17 | 211 | 338 | 0 | 9 | 0 | 56 | 0 | 0 | 0 | 0 | 0 | 305 | 192 | 23 | 1155 |
| 17:30 | 2 | 14 | 198 | 308 | 0 | 11 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 271 | 169 | 24 | 1063 |
| 17:45 | 0 | 26 | 184 | 339 | 0 | 14 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 278 | 170 | 25 | 1079 |
| Hr Total | 6 | 80 | 781 | 1355 | 1 | 38 | 0 | 234 | 0 | 0 | 0 | 0 | 0 | 1142 | 713 | 100 | 4450 |



TRAFFIC SURVEY SPECIALISTS, INC.

| 63RD STREET \& INDIAN CREEK DRIVE | 85 SE 4TH AVENUE, UNIT 109 | Site Code : 00170131 |
| :---: | :---: | :---: |
| MIAMI BEACH, FLORIDA | DELRAY BEACH, FLORIDA | Start Date: 08/04/17 |
| COUNTED BY: S. SALVO \& W. DE LUNA VARGAS | PHONE (561)272-3255 | File I.D. : 63STINDI |
| SIGNALI ZED |  | Page : 2 |

SIGNALIZED
ALL VEHICLES


TRAFFIC SURVEY SPECIALISTS, INC.
63RD STREET \& INDIAN CREEK DRIVE
MIAMI BEACH, FLORIDA
COUNTED BY: S. SALVO \& W. DE LUNA VARGAS
SIGNALIZED 85 SE 4TH AVENUE, UNIT 109

Site Code : 00170131 DELRAY BEACH, FLORIDA PHONE (561)272-3255

Start Date: 08/04/17
File I.D. : 63STINDI
Page : 3

ALL VEHICLES



Peak Hour Analysis By Entire Intersection for the Period: 16:00 to 18:00 on $08 / 04 / 17$

| Peak star | 16:30 |  |  |  | 16:30 |  |  |  | 16:30 |  |  |  | 16:30 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Volume | 9 | 84 | 830 | 1345 | 2 | 31 | 0 | 243 | 0 | 0 | 0 | 0 | 0 | 1077 | 718 | 121 |
| Percent | 0\% | 4\% | 37\% | 59\% | 1\% | 11\% | 0\% | 88\% | 0\% | 0\% | 0\% | 0\% | 0\% | 56\% | 37\% | 6\% |
| Pk total | 2268 |  |  |  | 276 |  |  |  | 0 |  |  |  | 1916 |  |  |  |
| Highest | 16:30 |  |  |  | 16:30 |  |  |  | 07:00 |  |  |  | 17:15 |  |  |  |
| Volume | 1 | 27 | 237 | 328 | 0 | 11 | 0 | 68 | 0 | 0 | 0 | 0 | 0 | 305 | 192 | 23 |
| Hi total | 593 |  |  |  | 79 |  |  |  | 0 |  |  |  | 520 |  |  |  |
| PHF | . 96 |  |  |  | . 87 |  |  |  | . 0 |  |  |  | . 92 |  |  |  |





TRAFFIC SURVEY SPECIALISTS, INC.

| 63RD STREET \& INDIAN CREEK DRIVE | 85 SE 4TH AVENUE, UNIT 109 | Site Code : 00170131 |
| :--- | ---: | :--- |
| MIAMI BEACH, FLORIDA | DELRAY BEACH, FLORIDA | Start Date: $08 / 04 / 17$ |
| COUNTED BY: S. SALVO \& W. DE LUNA VARGAS | PHONE (561)272-3255 | File I.D. |
| SIGNALIZED |  |  |

PEDESTRIANS \& BIKES


| 07:00 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 10 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 07:15 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 6 |
| 07:30 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 5 | 0 | 1 | 0 | 1 | 10 |
| 07:45 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 10 |
| Hr Total | 0 | 1 | 0 | 5 | 0 | 1 | 0 | 5 | 0 | 1 | 0 | 20 | 0 | 2 | 0 | 1 | 36 |
| 08:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 0 | 1 | 0 | 0 | 10 |
| 08:15 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 6 | 0 | 1 | 0 | 2 | 13 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 7 |
| 08:45 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| Hr Total | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 17 | 0 | 3 | 0 | 2 | 32 |

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| 16:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 2 | 0 | 2 | 9 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 16:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 9 |
| 16:30 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 5 |
| 16:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 7 |
| Hr Total | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 12 | 0 | 9 | 0 | 4 | 30 |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 4 | 9 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 7 | 0 | 1 | 0 | 7 | 17 |
| 17:30 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 6 |
| 17:45 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 0 | 2 | 0 | 1 | 13 |
| Hr Total | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 19 | 0 | 3 | 0 | 15 | 45 |



Miami beach, florida August 04, 2017
drawn by. Luis palomino signalized
COUNTY: 87 - MIAMI-DADE
SITE: 2541 - SR A1A/COLLINS AVE, 500' S OF 63 ST (MIAMI BEACH)

| YEAR | AADT |  | DIRECTION 1 |  | DIRECTION 2 | *K FACTOR | D FACTOR | T FACTOR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2016 | 21000 | C | N | 21000 | 0 | 9.00 | 99.90 | 7.80 |
| 2015 | 20000 | C | N | 20000 | 0 | 9.00 | 99.90 | 4.60 |
| 2014 | 21500 | C | N | 21500 |  | 9.00 | 99.90 | 5.10 |
| 2013 | 21000 | C | N | 21000 | 0 | 9.00 | 99.90 | 6.10 |
| 2012 | 19000 | C | N | 19000 | 0 | 9.00 | 99.90 | 8.40 |
| 2011 | 17000 | C | N | 17000 | 0 | 9.00 | 99.90 | 7.50 |
| 2010 | 15000 | C | N | 15000 | 0 | 8.98 | 99.99 | 8.80 |
| 2009 | 21000 | C | N | 21000 | 0 | 8.99 | 99.99 | 8.40 |
| 2008 | 18000 | C | N | 18000 | 0 | 9.09 | 99.99 | 5.30 |
| 2007 | 16000 | S |  | 0 | 0 | 8.01 | 99.99 | 4.90 |
| 2006 | 16000 | F |  |  |  | 7.97 | 99.99 | 2.20 |
| 2005 | 16000 | C | N | 16000 |  | 8.80 | 99.90 | 5.50 |
| 2004 | 17000 | C | N | 17000 |  | 9.00 | 99.90 | 8.20 |
| 2003 | 18000 | C | N | 18000 |  | 8.80 | 99.90 | 4.90 |
| 2002 | 18500 | C | N | 18500 |  | 9.80 | 99.90 | 2.60 |
| 2001 | 18500 | C | N | 18500 |  | 8.20 | 99.90 | 3.00 |

AADT FLAGS: $C=$ COMPUTED; $E=$ MANUAL ESTIMATE; $F=$ FIRST YEAR ESTIMATE $\mathrm{S}=$ SECOND YEAR ESTIMATE; $\mathrm{T}=\mathrm{THIRD}$ YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE $\mathrm{V}=\mathrm{FIFTH}$ YEAR ESTIMATE; $6=$ SIXTH YEAR ESTIMATE; X = UNKNOWN *K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2.0
SR A1A/COLLINS AVE -- 500 ' S OF 63 ST


| County: | Miami-Dade |
| :---: | :---: |
| Station \#: | 2541 |
| Highway: | SR A1A/COLLINS AVE |



| Year | Traffic (ADT/AADT) |  |
| :---: | :---: | :---: |
|  | Count* | Trend** |
| 2012 | 19000 | 19900 |
| 2013 | 21000 | 20200 |
| 2014 | 21500 | 20500 |
| 2015 | 20000 | 20800 |
| 2016 | 21000 | 21100 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| 2017 Opening Year Trend |  |  |
| 2017 | N/A | 21400 |
| 2018 Mid-Year Trend |  |  |
| 2018 | N/A | 21700 |
| 2018 Design Year Trend |  |  |
| 2018 | N/A | 21700 |
| TRANPLAN Forecasts/Trends |  |  |
|  |  |  |
|  |  |  |

*Axle-Adjusted

## APPENDIX C

## Signal Timing Plan

(Collins Avenue and 5800/5875 Block)

## TOD Schedule Report



| Phase | Phase Bank | Don't Walk | Min Initial | Veh Ext | Max Limit | Max 2 | Yellow | Red |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 123 | 123 | 123 | $1 \begin{array}{lll}1 & 2\end{array}$ | 23 | 123 |  |  |
| 1 SBL | 0-0-0 | 0-0-0 | 5-5-5 | 2-2-2 | 15-15-15 | 30-28-28\| | 3.7 | 2.3 |
| 2 NBT | 0-0-0 | 0-0-0 | 16-16-16 | 1-1-1 | 30-30-30 | 0-0-0 | 4 | 2.3 |
| 3 NWT | 0-0-0 | 0-0-0 | $5-5-5$ | $2-2-2$ | 9-9-9 | 12-12-12 | 4 | 3.3 |
| 4 PED | $5-5-5$ | 27-27-27 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 3.7 | 2.3 |
| 5 - | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 6 SBT | 0-0-0 | 0-0-0 | 16-16-16 | 1-1-1 | 30-30-30 | 0-0-0 | 4 | 2.3 |
| 7 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | $0-0-0$ | 0 | 0 |
| 8 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |

Last In Service Date: unknown

| Permitted Phases |  |
| :---: | :---: |
|  | 12345678 |
| Default | 1234-6-- |
| External Permit 0 | --- |
| External Permit 1 | -- |
| External Permit 2 | ----- |

## TOD Schedule Report

| Green Time |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Current <br> TOD Schedule | Plan | Cycle | $\begin{gathered} \mathbf{1} \\ \text { SBL } \end{gathered}$ | $\begin{gathered} \mathbf{2} \\ \mathrm{NBT} \end{gathered}$ | $\begin{gathered} 3 \\ \text { NWT } \end{gathered}$ | $\begin{gathered} 4 \\ \text { PED } \end{gathered}$ | 5 | $\begin{gathered} \mathbf{6} \\ \mathrm{SBT} \end{gathered}$ | 7 | 8 | Ring Offset | Offset |
|  | 2 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 35 |
| 0700 | 18 | 140 | ** | 77 | 11 | 33 | 0 | 77 | 0 | 0 | 0 | 101 |
| 0930 | 2 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 35 |
| 1500 | 19 | 140 | ** | 77 | 11 | 33 | 0 | 77 | 0 | 0 | 0 | 11 |
| $\underline{2200}$ | 2 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 35 |
|  | 1 | 90 | ** | 30 | 8 | 33 | 0 | 30 | 0 | 0 | 0 | 79 |
|  | 3 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 49 |
|  | 4 | 140 | ** | 78 | 10 | 33 | 0 | 78 | 0 | 0 | 0 | 59 |
|  | 5 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 44 |
|  | 6 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 44 |
|  | 8 | 105 | ** | 42 | 11 | 33 | 0 | 42 | 0 | 0 | 0 | 6 |
|  | 9 | 105 | ** | 42 | 11 | 33 | 0 | 42 | 0 | 0 | 0 | 8 |
|  | 10 | 120 | ** | 58 | 10 | 33 | 0 | 58 | 0 | 0 | 0 | 62 |
|  | 11 | 140 | ** | 78 | 10 | 33 | 0 | 78 | 0 | 0 | 0 | 6 |
|  | 12 | 120 | ** | 57 | 11 | 33 | 0 | 57 | 0 | 0 | 0 | 84 |
|  | 13 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 44 |
|  | 14 | 105 | ** | 42 | 11 | 33 | 0 | 42 | 0 | 0 | 0 | 59 |
|  | 15 | 120 | ** | 57 | 11 | 33 | 0 | 57 | 0 | 0 | 0 | 84 |
|  | 16 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 45 |
|  | 17 | 100 | ** | 37 | 11 | 33 | 0 | 37 | 0 | 0 | 0 | 35 |
|  | 20 | 120 | ** | 58 | 10 | 33 | 0 | 58 | 0 | 0 | 0 | 62 |
|  | 21 | 120 | ** | 58 | 10 | 33 | 0 | 58 | 0 | 0 | 0 | 62 |
|  | 22 | 90 | ** | 28 | 10 | 33 | 0 | 28 | 0 | 0 | 0 | 55 |
|  | 23 | 90 | ** | 28 | 10 | 33 | 0 | 28 | 0 | 0 | 0 | 55 |


| Local TOD Schedule |  |  |  |
| :---: | :---: | :---: | :---: |
| Time | Plan | DOW |  |
| 0000 | 1 | Su | S |
| 0000 | 2 | M TW ThF |  |
| 0700 | 18 | M TW ThF |  |
| 0930 | 2 | M TW ThF |  |
| 1000 | 2 | Su | S |
| 1500 | 19 | M TW ThF |  |
| 2000 | 1 | Su | S |
| 2200 | 2 | M TW ThF |  |


| Current Time of Day Function |  |  |  | Local Time of Day Function |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | Function | Settings * | Day of Week | Time | Function | Settings* | Day of Week |
| 0000 | TOD OUTPUTS | -------- | SuM T W ThF S | 0000 | TOD OUTPUTS | -------- | SuM T W ThF S |

## * Settings

Blank - FREE - Phase Bank 1, Max 1 Blank - Plan - Phase Bank 1, Max 2
1 - Phase Bank 2, Max 1
2 - Phase Bank 2, Max 2
3 - Phase Bank 3, Max 1
4 - Phase Bank 3, Max 2
5 - EXTERNAL PERMIT 1
6 - EXTERNAL PERMIT 2
7 - X-PED OMIT
8 - TBA

## TOD Schedule Report

No Calendar Defined/Enabled

| Asset | Intersection | $\begin{gathered} \text { TOD } \\ \underline{\text { Schedule }} \end{gathered}$ | Op Mode | Plan \# | Cycle | Offset | $\frac{\text { TOD }}{\text { Setting }}$ | Active <br> PhaseBank | $\begin{gathered} \underline{\text { Active }} \\ \underline{\text { Maximum }} \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2689 | Collins Av\&63 St | DOW-7 |  | N/A | 0 | 0 | N/A | 0 | Max 0 |

## Splits

| $\underline{\text { PH 1 }}$ | $\underline{\text { PH 2 }}$ | $\underline{\text { PH 3 }}$ | $\underline{\text { PH 4 }}$ | $\underline{\text { PH 5 }}$ | $\underline{\text { PH 6 }}$ | $\underline{\text { PH 7 }}$ | $\underline{\text { PH 8 }}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | NBT | - | EBT | - | - | - | - |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |


| Phase | Phase Bank 1 |  |  | Veh Ext | Max Limit | Max 2 | Yellow | Red |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Walk Phase Bank | Don't Walk | Min Initial |  |  |  |  |  |
|  | 123 | 123 | 123 | 123 | 123 | 123 |  |  |
| 1 - | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| $2 \quad$ NBT | 7-7-7 | 22-22-22 | 7-7-7 | 1-1-1 | 40-40-40 | 0-50-50 | 4 | 1 |
| 3 - | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 4 EBT | 7-7-7 | 19-19-19 | 7-7-7 | 1-1-1 | 26-26-26 | 47-47-47 | 4 | 1 |
| 5 - | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 6 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| $7 \quad-$ | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 8 - | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |

Last In Service Date: unknown

| Permitted Phases |  |
| :---: | :---: |
|  | 12345678 |
| Default | -2-4---- |
| External Permit 0 | -------- |
| External Permit 1 | -------- |
| External Permit 2 | -------- |


| Green Time |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Current <br> TOD Schedule Plan | Cycle | 1 | $\begin{gathered} \mathbf{2} \\ \text { NBT } \end{gathered}$ |  | $4$ <br> EBT | 5 - | 6 - | 7 | 8 | Ring Offset | Offset |
| 1 | 90 | 0 | 53 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 20 |
| 2 | 90 | 0 | 45 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 90 | 0 | 53 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 80 |
| 4 | 80 | 0 | 43 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 55 |
| 5 | 120 | 0 | 70 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 84 |
| 6 | 80 | 0 | 43 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 55 |
| 7 | 90 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 9 |
| 8 | 80 | 0 | 44 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 20 |
| 9 | 90 | 0 | 53 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10 | 80 | 0 | 43 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 36 |
| 11 | 80 | 0 | 43 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 55 |
| 12 | 100 | 0 | 49 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 45 |
| 13 | 80 | 0 | 43 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 35 |
| 14 | 90 | 0 | 53 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 76 |
| 15 | 90 | 0 | 45 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 36 |
| 16 | 90 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 9 |
| 17 | 90 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 27 |
| 18 | 90 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 36 |
| 19 | 120 | 0 | 73 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 32 |
| 20 | 90 | 0 | 39 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 10 |
| 21 | 120 | 0 | 73 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 80 | 0 | 43 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 55 |
| 23 | 80 | 0 | 43 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 55 |


| Local TOD Schedule |  |  |  |
| :---: | :---: | :---: | :---: |
| Time | Plan | DOW |  |
| 0000 | 13 | Su | S |
| 0000 | 14 | M TW Th F |  |
| 0600 | 1 | M TW Th F |  |
| 0800 | 2 | Su | S |
| 0930 | 17 | M T W Th F |  |
| 1045 | 18 | M TW Th F |  |
| 1300 | 15 | M TW Th F |  |
| 1500 | 16 | M TW Th F |  |
| 1615 | 7 | M T W Th F |  |
| 1630 | 12 | Su | S |
| 1745 | 20 | M T W Th F |  |
| 1830 | 10 | Su | S |
| 1845 | 19 | M T W Th F |  |
| 2100 | 13 | Su | S |
| 2100 | 3 | M T W Th F |  |
| 2200 | 14 | M T W Th F |  |

## Current Time of Day Function

| Time | Function <br> 0000 | $\underline{\text { Settings * }}$ | Dav of Week <br> TOD OUTPUTS |
| :--- | :--- | :--- | :--- |

## Local Time of Day Function

| $\underline{\text { Time }}$ | $\frac{\text { Function }}{0000}$ | $\underline{\text { Settings * }}$ | Day of Week <br> TOD OUTPUTS |
| :--- | :--- | :--- | :--- |
| -------- | SuM T W ThF S |  |  |

* Settings

Blank - FREE - Phase Bank 1, Max 1 Blank - Plan - Phase Bank 1, Max 2
1 - Phase Bank 2, Max 1
2 - Phase Bank 2, Max 2
3 - Phase Bank 3, Max 1
4 - Phase Bank 3, Max 2
5 - EXTERNAL PERMIT 1
6 - EXTERNAL PERMIT 2
7 - X-PED OMIT
8 - TBA

## TOD Schedule Report

| Print Date: 1/13/2014 | for 2721: Indian Creek Dr\&63 St |  |  |  |  |  |  |  | $\begin{gathered} \text { Print Time: } \\ \text { 8:05 AM } \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Asset | Intersection | $\frac{\text { TOD }}{\text { Schedule }}$ | Op Mode | Plan\# | Cycle | Offset | $\frac{\text { TOD }}{\underline{\text { Setting }}}$ | Active <br> PhaseBank | Active <br> Maximum |
| 2721 | Indian Creek Dr\&63 St | DOW-2 |  | N/A | 0 | 0 | N/A | 0 | Max 0 |

## Splits

| PH 1 | $\underline{\text { PH 2 }}$ | $\underline{\text { PH 3 }}$ | $\underline{\text { PH 4 }}$ | $\underline{\text { PH 5 }}$ | $\underline{\text { PH 6 }}$ | PH 7 | $\underline{\text { PH 8 }}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | SBT | - | - | - | WBL | EBT |  |
|  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |


| Phase | $\begin{array}{ccc}\text { Bank: } & \text { Phase Bank 1 } \\ \text { Walk } & \text { Don't Walk } & \text { Min Initial }\end{array}$ |  |  | Veh Ext | Max Limit | Max 2 | Yellow | Red |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Walk <br> Phase Bank | Don't Walk | Min Initial |  |  |  |  |  |
|  | 123 | $1 \quad 23$ | $1 \quad 23$ | 132 | 132 | 132 |  |  |
| 1 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 2 SBT | 6-6-6 | 19-19-19 | 7-7-7 | 1-1-1 | 40-40-40 | 0-40-40 | 4 | 4 |
| 3 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 4 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 5 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 6 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0-0-0 | 0 | 0 |
| 7 WBL | 0-0-0 | 0-0-0 | 5-5-5 | 2-2-2 | 7-7-7 | 12-12-12 | 3.4 | 2.9 |
| 8 EBT | 6-6-6 | 16-16-16 | 7-7-7 | 5-5-5 | 24-24-24 | 125-125-12 | 4 | 2.9 |

Last In Service Date: unknown

| Permitted Phases |  |
| :---: | :---: |
|  | 12345678 |
| Default | -2----78 |
| External Permit 0 | -------- |
| External Permit 1 | ---- |
| External Permit 2 | -------- |


| Current <br> TOD Schedule | Cycle | Green Time |  |  |  |  |  |  |  | Ring Offset | Offset |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{gathered} \mathbf{2} \\ \text { SBT } \end{gathered}$ |  |  |  |  | 7 | 8 |  |  |
|  |  |  |  |  |  |  |  | WBL | EBT |  |  |
| 1 | 180 | 0 | 92 | 0 | 0 | 0 | 0 | 8 | 59 | 0 | 0 |
| 2 | 90 | 0 | 37 | 0 | 0 | 0 | 0 | 9 | 23 | 0 | 69 |
| 4 | 180 | 0 | 130 | 0 | 0 | 0 | 0 | 6 | 23 | 0 | 47 |
| 5 | 120 | 0 | 45 | 0 | 0 | 0 | 0 | 6 | 48 | 0 | 15 |
| 8 | 80 | 0 | 27 | 0 | 0 | 0 | 0 | 6 | 26 | 0 | 39 |
| 9 | 90 | 0 | 38 | 0 | 0 | 0 | 0 | 8 | 23 | 0 | 62 |
| 10 | 80 | 0 | 27 | 0 | 0 | 0 | 0 | 7 | 25 | 0 | 17 |
| 11 | 80 | 0 | 30 | 0 | 0 | 0 | 0 | 6 | 23 | 0 | 21 |
| 12 | 100 | 0 | 32 | 0 | 0 | 0 | 0 | 8 | 39 | 0 | 27 |
| 13 | 80 | 0 | 27 | 0 | 0 | 0 | 0 | 6 | 26 | 0 | 19 |
| 14 | 90 | 0 | 35 | 0 | 0 | 0 | 0 | 7 | 27 | 0 | 63 |
| 15 | 180 | 0 | 60 | 0 | 0 | 0 | 0 | 7 | 92 | 0 | 11 |
| 16 | 180 | 0 | 50 | 0 | 0 | 0 | 0 | 7 | 102 | 0 | 86 |
| 17 | 180 | 0 | 74 | 0 | 0 | 0 | 0 | 7 | 78 | 0 | 7 |
| 18 | 180 | 0 | 64 | 0 | 0 | 0 | 0 | 7 | 88 | 0 | 15 |
| 20 | 80 | 0 | 30 | 0 | 0 | 0 | 0 | 6 | 23 | 0 | 21 |
| 22 | 80 | 0 | 30 | 0 | 0 | 0 | 0 | 6 | 23 | 0 | 55 |
| 23 | 80 | 0 | 30 | 0 | 0 | 0 | 0 | 6 | 23 | 0 | 70 |


| Local TOD Schedule |  |  |  |
| :---: | :---: | :---: | :---: |
| Time | Plan | DOW |  |
| 0000 | 13 | Su | S |
| 0000 | 14 | M T W Th F |  |
| 0100 | 8 | Su | S |
| 0600 | 10 | Su | S |
| 0700 | 1 | M T W Th F |  |
| 0800 | 14 | Su | S |
| 0930 | 17 | M T W Th F |  |
| 1000 | 2 | Su | S |
| 1045 | 18 | M T W Th F |  |
| 1300 | 15 | M TW Th F |  |
| 1500 | 16 | M T W Th F |  |
| 1630 | 12 | Su | S |
| 1830 | 10 | Su | S |
| 1845 | 5 | M T W Th F |  |
| 2100 | 13 | Su | S |
| 2100 | 14 | M T W Th F |  |


| Current Time of Day Function |  |  |  | Local Time of Day Function |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Time | Function | Settings * | Day of Week | Time | Function | Settings * | Day of Week |
| 0000 | TOD OUTPUTS | ------- | SuM T W ThF S | 0000 | TOD OUTPUTS | -------- | SuM T W ThF S |


| * Settings |
| :--- | :--- |
| Blank - FREE - Phase Bank 1, Max 1 |
| Blank - Plan - Phase Bank 1, Max 2 |
| 1 - Phase Bank 2, Max 1 |
| 2 - Phase Bank 2, Max 2 |
| 3 - Phase Bank 3, Max 1 |
| 4 - Phase Bank 3, Max 2 |
| 5 - EXTERNAL PERMIT 1 |
| 6 - EXTERNAL PERMIT 2 |
| 7 - X-PED OMIT |
| 8 - TBA |

## No Calendar Defined/Enabled

## APPENDIX D

## Pedestrian LOS <br> (Source: $\mathbf{2 0 1 0} \mathbf{H C M}$ )

parts of the walkway. In cross-flow locations, the LOS E-F threshold is $13 \mathrm{ft}^{2} / \mathrm{p}$, as indicated in the notes for Exhibit 23-1 and Exhibit 23-2.

| LOS | Average Space ( $\mathrm{ft}^{2} / \mathrm{p}$ ) | Related Measures |  |  | Comments |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Flow Rate $(\mathrm{p} / \mathrm{min} / \mathrm{ft})^{a}$ | Average Speed (ft/s) | $v / C$ Ratio ${ }^{\text {b }}$ |  |
| A | >60 | $\leq 5$ | >4.25 | $\leq 0.21$ | Ability to move in desired path, no need to alter movements |
| B | >40-60 | >5-7 | >4.17-4.25 | >0.21-0.31 | Occasional need to adjust path to avoid conflicts |
| C | >24-40 | >7-10 | >4.00-4.17 | >0.31-0.44 | Frequent need to adjust path to avoid conflicts |
| D | >15-24 | >10-15 | >3.75-4.00 | >0.44-0.65 | Speed and ability to pass slower pedestrians restricted |
| E | $>8-15^{c}$ | >15-23 | >2.50-3.75 | >0.65-1.00 | Speed restricted, very limited ability to pass slower pedestrians |
| F | $\leq 8^{\text {c }}$ | Variable | $\leq 2.50$ | Variable | Speeds severely restricted, frequent contact with other users |

Notes: Exhibit 23-1 does not apply to walkways with steep grades ( $>5 \%$ ). See the Special Cases section for further discussion.
${ }^{a}$ Pedestrians per minute per foot of walkway width.
${ }^{b} \mathrm{~V} / \mathrm{c}$ ratio $=$ flow rate $/ 23$. LOS is based on average space per pedestrian.
${ }^{c}$ In cross-flow situations, the LOS E-F threshold is $13 \mathrm{ft}^{2} / \mathrm{p}$.

| LOS | Average Space ( $\mathrm{ft}^{2} / \mathrm{p}$ ) | Related Measure Flow Rate ${ }^{a}$ $(\mathrm{p} / \mathrm{min} / \mathrm{ft})^{b}$ | Comments |
| :---: | :---: | :---: | :---: |
| A | >530 | $\leq 0.5$ | Ability to move in desired path, no need to alter movements |
| B | >90-530 | >0.5-3 | Occasional need to adjust path to avoid conflicts |
| C | >40-90 | >3-6 | Frequent need to adjust path to avoid conflicts |
| D | >23-40 | >6-11 | Speed and ability to pass slower pedestrians restricted |
| E | $>11-23^{\text {c }}$ | >11-18 | Speed restricted, very limited ability to pass slower pedestrians |
| F | $\leq 11^{\text {c }}$ | >18 | Speeds severely restricted, frequent contact with other users |

Notes: ${ }^{a}$ Rates in the table represent average flow rates over a 5 -min period. Flow rate is directly related to space; however, LOS is based on average space per pedestrian.
${ }^{b}$ Pedestrians per minute per foot of walkway width.
${ }^{c}$ In cross-flow situations, the LOS E-F threshold is $13 \mathrm{ft}^{2} / \mathrm{p}$.

## Stairways

Exhibit 23-3 provides the LOS criteria for stairways.

|  | $\begin{array}{c}\text { Average } \\ \text { Space } \\ \left(\mathbf{f t}^{2} / \mathbf{p}\right)\end{array}$ | $\begin{array}{c}\text { Related Measures } \\ \text { Flow Rate } \\ (\mathbf{p} / \mathbf{m i n} / \mathrm{ft})^{\boldsymbol{a}}\end{array}$ |  | $\mathbf{v} / \boldsymbol{c}$ Ratio $^{\boldsymbol{b}}$ |
| :---: | :---: | :---: | :---: | :--- |$)$ Comments | LOS |
| :---: |
| A |
| $>20$ |

Notes: ${ }^{a}$ Pedestrians per minute per foot of walkway width.
${ }^{b} \mathrm{~V} / \mathrm{c}$ ratio $=$ flow rate/15. LOS is based on average space per pedestrian.

Exhibit 23-1
Average Flow LOS Criteria for Walkways

Exhibit 23-2
Platoon-Adjusted LOS Criteria for Walkways

Exhibit 23-3
LOS Criteria for Stairways

## APPENDIX E

SYNCHRO Analyses (Source 6372 Collins)

FUTURE TURNING MOVEMENT VOLUME ANALYSIS
Collins Avenue and 63rd Street
Weekday AM Peak Hour Analysis

| Description | Collins Avenue Northbound |  |  | Southbound |  |  | 63rd Street Eastbound |  |  | Westbound |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| Existing Traffic (8/4/2017) Season Adjustment Factor | $\begin{aligned} & 176 \\ & 1.04 \end{aligned}$ | $\begin{aligned} & 541 \\ & 1.04 \end{aligned}$ | 1.04 | 1.04 | 1.04 | 1.04 | $\begin{aligned} & 432 \\ & 1.04 \end{aligned}$ | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 |
| 2016 Peak Season Traffic | 183 | 563 | 0 | 0 | 0 | 0 | 449 | 0 | 0 | 0 | 0 | 0 |
| Annual Growth Rate 2018 Growth Traffic 6372 Project Trips | $\begin{gathered} 1.5 \% \\ 186 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 571 \\ 11 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 456 \\ 21 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ |
| 2018 Background Traffic | 186 | 582 | 0 | 0 | 0 | 0 | 477 | 0 | 0 | 0 | 0 | 0 |
| 5775 Collins |  | 12 |  |  |  |  |  |  |  |  |  |  |
| 2018 Total Traffic | 186 | 594 | 0 | 0 | 0 | 0 | 477 | 0 | 0 | 0 | 0 | 0 |

FUTURE TURNING MOVEMENT VOLUME ANALYSIS
Collins Avenue and 63rd Street
Weekday PM Peak Hour Analysis

| Description | Collins Avenue Northbound |  |  | Southbound |  |  | 63rd Street Eastbound |  |  | Westbound |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| Existing Traffic (8/4/2017) Season Adjustment Factor | $\begin{aligned} & 286 \\ & 1.04 \end{aligned}$ | $\begin{gathered} 1,230 \\ 1.04 \end{gathered}$ | 1.04 | 1.04 | 1.04 | 1.04 | $\begin{aligned} & 809 \\ & 1.04 \end{aligned}$ | 1.04 | $\begin{gathered} 0 \\ 1.04 \end{gathered}$ | 1.04 | 1.04 | 1.04 |
| 2016 Peak Season Traffic | 297 | 1,279 | 0 | 0 | 0 | 0 | 841 | 0 | 0 | 0 | 0 | 0 |
| Annual Growth Rate 2018 Growth Traffic 6372 Project Trips | $\begin{gathered} 1.5 \% \\ 302 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 1,298 \\ 14 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 854 \\ 20 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ |
| 2018 Background Traffic | 302 | 1,312 | 0 | 0 | 0 | 0 | 874 | 0 | 0 | 0 | 0 | 0 |
| 5775 Collins |  | 6 |  |  |  |  |  |  |  |  |  |  |
| 2018 Total Traffic | 302 | 1,318 | 0 | 0 | 0 | 0 | 874 | 0 | 0 | 0 | 0 | 0 |

FUTURE TURNING MOVEMENT VOLUME ANALYSIS
Indian Creek Drive and W 63th Street
Weekday AM Peak Hour Analysis

| Description | Northbound |  |  | Indian Creek Drive Southbound |  |  | W 63rd Street Eastbound |  |  | Westbound |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| Existing Traffic (8/4/2017) Season Adjustment Factor | 1.04 | 1.04 | 1.04 | $\begin{gathered} 67 \\ 1.04 \end{gathered}$ | $\begin{gathered} 1,260 \\ 1.04 \end{gathered}$ | $\begin{gathered} 2,157 \\ 1.04 \end{gathered}$ | $\begin{aligned} & 357 \\ & 1.04 \end{aligned}$ | $\begin{aligned} & 409 \\ & 1.04 \end{aligned}$ | $\begin{gathered} 68 \\ 1.04 \end{gathered}$ | $\begin{gathered} 56 \\ 1.04 \end{gathered}$ | 1.04 | $\begin{aligned} & 115 \\ & 1.04 \end{aligned}$ |
| 2016 Peak Season Traffic | 0 | 0 | 0 | 70 | 1,310 | 2,243 | 371 | 425 | 71 | 58 | 0 | 120 |
| Annual Growth Rate 2018 Growth Traffic 6372 Project Trips | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 71 \\ 13 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 1,330 \\ 8 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 2,277 \\ 6 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 377 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 432 \\ 8 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 72 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 59 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 121 \end{gathered}$ |
| 2018 Background Traffic | 0 | 0 | 0 | 84 | 1,338 | 2,283 | 377 | 440 | 72 | 59 | 0 | 121 |
| 5775 Collins |  |  |  |  | 4 |  |  |  |  |  |  |  |
| 2018 Total Traffic | 0 | 0 | 0 | 84 | 1,342 | 2,283 | 377 | 440 | 72 | 59 | 0 | 121 |

FUTURE TURNING MOVEMENT VOLUME ANALYSIS

Indian Creek Drive and W 63th Street
Weekday PM Peak Hour Analysis

| Description | Northbound |  |  | Indian Creek Drive Southbound |  |  | W 63rd Street Eastbound |  |  | Westbound |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| Existing Traffic (8/4/2017) Season Adjustment Factor | 1.04 | 1.04 | 1.04 | $\begin{gathered} 93 \\ 1.04 \end{gathered}$ | $\begin{aligned} & 830 \\ & 1.04 \end{aligned}$ | $\begin{gathered} 1,345 \\ 1.04 \end{gathered}$ | $\begin{gathered} 1,077 \\ 1.04 \end{gathered}$ | $\begin{aligned} & 718 \\ & 1.04 \end{aligned}$ | $\begin{aligned} & 121 \\ & 1.04 \end{aligned}$ | $\begin{gathered} 33 \\ 1.04 \end{gathered}$ | 1.04 | $\begin{aligned} & 243 \\ & 1.04 \end{aligned}$ |
| 2016 Peak Season Traffic | 0 | 0 | 0 | 97 | 863 | 1,399 | 1,120 | 747 | 126 | 34 | 0 | 253 |
| Annual Growth Rate 2018 Growth Traffic 6372 Project Trips | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 98 \\ 10 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 876 \\ 15 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 1,420 \\ 10 \end{gathered}$ | $\begin{aligned} & 1.5 \% \\ & 1,137 \end{aligned}$ | $\begin{gathered} 1.5 \% \\ 758 \\ 10 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 128 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 35 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{aligned} & 1.5 \% \\ & 257 \end{aligned}$ |
| 2018 Background Traffic | 0 | 0 | 0 | 108 | 891 | 1,430 | 1,137 | 768 | 128 | 35 | 0 | 257 |
| 5775 Collins |  |  |  |  | 10 |  |  |  |  |  |  |  |
| 2018 Total Traffic | 0 | 0 | 0 | 108 | 901 | 1,430 | 1,137 | 768 | 128 | 35 | 0 | 257 |

FUTURE TURNING MOVEMENT VOLUME ANALYSIS
Collins Avenue and 5875 Block
Weekday PM Peak Hour Analysis

| Description | Collins Avenue Northbound |  |  | Collins Avenue Southbound |  |  | Eastbound |  |  | Westbound |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | U-turn | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| Existing Traffic (3/10/2017) Season Adjustment Factor | 1.00 | $\begin{gathered} 1,333 \\ 1.00 \end{gathered}$ | 1.00 | 1.00 | $\begin{aligned} & 958 \\ & 1.00 \end{aligned}$ | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2016 Peak Season Traffic | 0 | 1,333 | 0 | 0 | 958 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Annual Growth Rate 2018 Growth Traffic | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{aligned} & 1.5 \% \\ & 1,353 \end{aligned}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{aligned} & 1.5 \% \\ & 972 \end{aligned}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ | $\begin{gathered} 1.5 \% \\ 0 \end{gathered}$ |
| 2018 Background Traffic | 0 | 1,353 | 0 | 0 | 972 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Net New Project Trips | 17 |  |  |  |  |  |  |  |  |  |  |  |
| 2018 Total Traffic | 17 | 1,353 | 0 | 0 | 972 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |





c Critical Lane Group

101: Indian Creek Drive \& W 63 Street


Queues
101: Indian Creek Drive \& W 63 Street

|  | $\Rightarrow$ | $\rightarrow$ | - | 4 | $\downarrow$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | WBL | WBR | SBT | SBR |
| Lane Group Flow (vph) | 363 | 579 | 63 | 130 | 1500 | 2438 |
| v/c Ratio | 0.47 | 0.73 | 0.90 | 0.70 | 0.85 | 1.24 |
| Control Delay | 54.7 | 62.6 | 163.1 | 31.7 | 40.7 | 127.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 54.7 | 62.6 | 163.1 | 31.7 | 40.7 | 127.8 |
| Queue Length 50th (ft) | 205 | 353 | 75 | 0 | 780 | $\sim 1575$ |
| Queue Length 95th (ft) | 252 | 413 | \#179 | \#90 | 969 | \#1684 |
| Internal Link Dist (ft) |  | 365 |  |  | 1320 |  |
| Turn Bay Length (ft) | 250 |  |  |  |  |  |
| Base Capacity (vph) | 885 | 909 | 70 | 185 | 1760 | 1972 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.41 | 0.64 | 0.90 | 0.70 | 0.85 | 1.24 |
| Intersection Summary |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| ~ Volume exceeds capacity, queue is theoretically infinite. |  |  |  |  |  |  |
| \# 95th percentile volume exceeds capacity, queue may be longer. |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

HCM Signalized Intersection Capacity Analysis
102: Collins Avenue \& W 63 Street

c Critical Lane Group

## Timings

102: Collins Avenue \& W 63 Street


|  | $\uparrow$ |  |
| :--- | ---: | ---: |
|  | EBL | NBT |
| Lane Group | 499 | 829 |
| Lane Group Flow (vph) | 499 |  |
| v/c Ratio | 0.80 | 0.28 |
| Control Delay | 44.3 | 7.2 |
| Queue Delay | 0.9 | 0.0 |
| Total Delay | 45.2 | 7.2 |
| Queue Length 50th (ft) | 141 | 64 |
| Queue Length 95th (ft) | 181 | 102 |
| Internal Link Dist (ft) | 170 | 216 |
| Turn Bay Length (ft) |  |  |
| Base Capacity (vph) | 886 | 2970 |
| Starvation Cap Reductn | 168 | 0 |
| Spillback Cap Reductn | 0 | 0 |
| Storage Cap Reductn | 0 | 0 |
| Reduced v/c Ratio | 0.69 | 0.28 |

[^1]

c Critical Lane Group

101: Indian Creek Drive \& W 63 Street


Queues
101: Indian Creek Drive \& W 63 Street

|  | * | $\rightarrow$ | $\checkmark$ | 4 | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | WBL | WBR | SBT | SBR |
| Lane Group Flow (vph) | 1027 | 1049 | 35 | 264 | 1000 | 1457 |
| $\mathrm{v} / \mathrm{c}$ Ratio | 0.66 | 0.66 | 0.58 | 0.86 | 1.14 | 1.16 |
| Control Delay | 29.9 | 29.4 | 120.1 | 32.7 | 133.2 | 104.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 29.9 | 29.4 | 120.1 | 32.7 | 133.2 | 104.7 |
| Queue Length 50th (ft) | 480 | 485 | 42 | 0 | ~724 | $\sim 726$ |
| Queue Length 95th (ft) | 568 | 573 | \#96 | \#150 | \#865 | \#876 |
| Internal Link Dist (ft) |  | 365 |  |  | 1320 |  |
| Turn Bay Length (ft) | 250 |  |  |  |  |  |
| Base Capacity (vph) | 1550 | 1584 | 61 | 309 | 877 | 1255 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.66 | 0.66 | 0.57 | 0.85 | 1.14 | 1.16 |
| Intersection Summary |  |  |  |  |  |  |
| $\sim$ Volume exceeds capacity, queue is theoretically infinite. |  |  |  |  |  |  |
| Queue shown is maximum after two cycles. |  |  |  |  |  |  |
| \# 95th percentile volume exceeds capacity, queue may be longer. |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

HCM Signalized Intersection Capacity Analysis
102: Collins Avenue \& W 63 Street

c Critical Lane Group

## Timings

102: Collins Avenue \& W 63 Street


|  |  | $\uparrow$ |
| :--- | ---: | ---: |
|  | EBL | NBT |
| Lane Group | 867 | 1625 |
| Lane Group Flow (vph) | 0.85 | 0.68 |
| v/c Ratio | 36.5 | 18.4 |
| Control Delay | 9.0 | 0.0 |
| Queue Delay | 45.5 | 18.4 |
| Total Delay | 234 | 238 |
| Queue Length 50th (ft) | 275 | 341 |
| Queue Length 95th (ft) | 270 |  |
| Internal Link Dist (ft) | 170 | 216 |
| Turn Bay Length (ft) |  |  |
| Base Capacity (vph) | 1330 | 2390 |
| Starvation Cap Reductn | 429 | 0 |
| Spillback Cap Reductn | 0 | 0 |
| Storage Cap Reductn | 0 | 0 |
| Reduced v/c Ratio | 0.96 | 0.68 |

[^2]

c Critical Lane Group

101: Indian Creek Drive \& W 63 Street


Queues
101: Indian Creek Drive \& W 63 Street

|  | $\Rightarrow$ | $\rightarrow$ | - | $\pm$ | $\downarrow$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | WBL | WBR | SBT | SBR |
| Lane Group Flow (vph) | 369 | 597 | 64 | 132 | 1545 | 2482 |
| v/c Ratio | 0.47 | 0.74 | 0.91 | 0.71 | 0.89 | 1.27 |
| Control Delay | 54.0 | 62.4 | 166.4 | 31.6 | 43.9 | 141.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 54.0 | 62.4 | 166.4 | 31.6 | 43.9 | 141.7 |
| Queue Length 50th (ft) | 206 | 362 | 77 | 0 | 845 | $\sim 1644$ |
| Queue Length 95th (ft) | 258 | 428 | \#184 | \#90 | \#1075 | \#1753 |
| Internal Link Dist (ft) |  | 365 |  |  | 1320 |  |
| Turn Bay Length (ft) | 250 |  |  |  |  |  |
| Base Capacity (vph) | 885 | 909 | 70 | 187 | 1742 | 1959 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.42 | 0.66 | 0.91 | 0.71 | 0.89 | 1.27 |
| $\underline{\text { Intersection Summary }}$ ~ Volume exceeds capacity, queue is theoretically infinite |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| ~ Volume exceeds capacity, queue is theoretically infinite. |  |  |  |  |  |  |
| \# 95th percentile volume exceeds capacity, queue may be longer. |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

HCM Signalized Intersection Capacity Analysis
102: Collins Avenue \& W 63 Street

c Critical Lane Group

## Timings

102: Collins Avenue \& W 63 Street


|  | $\uparrow$ |  |
| :--- | ---: | ---: |
|  | EBL | NBT |
| Lane Group | 530 | 854 |
| Lane Group Flow (vph) | 0.82 | 0.29 |
| v/c Ratio | 44.6 | 7.6 |
| Control Delay | 1.5 | 0.0 |
| Queue Delay | 46.0 | 7.6 |
| Total Delay | 150 | 68 |
| Queue Length 50th (ft) | 192 | 106 |
| Queue Length 95th (ft) | 170 | 216 |
| Internal Link Dist (ft) |  |  |
| Turn Bay Length (ft) | 886 | 2934 |
| Base Capacity (vph) | 0 |  |
| Starvation Cap Reductn | 186 | 0 |
| Spillback Cap Reductn | 0 | 0 |
| Storage Cap Reductn | 0 | 0 |
| Reduced v/c Ratio | 0.76 | 0.29 |

[^3]
c Critical Lane Group

101: Indian Creek Drive \& W 63 Street

|  | * | $\rightarrow$ | $\checkmark$ | 1 | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | WBL | WBR | SBT | SBR |
| Lane Configurations | \% | fi | \% | 7 | $4 \uparrow$ | $7{ }^{7}$ |
| Traffic Volume (vph) | 1137 | 768 | 35 | 257 | 891 | 1430 |
| Future Volume (vph) | 1137 | 768 | 35 | 257 | 891 | 1430 |
| Turn Type | Split | NA | Prot | Perm | NA | Perm |
| Protected Phases | 8 | 8 | 7 |  | 2 |  |
| Permitted Phases |  |  |  | 7 |  | 2 |
| Detector Phase | 8 | 8 | 7 | 7 | 2 | 2 |
| Switch Phase |  |  |  |  |  |  |
| Minimum Initial (s) | 7.0 | 7.0 | 5.0 | 5.0 | 7.0 | 7.0 |
| Minimum Split (s) | 28.9 | 28.9 | 13.0 | 13.0 | 33.0 | 33.0 |
| Total Split (s) | 109.0 | 109.0 | 13.0 | 13.0 | 58.0 | 58.0 |
| Total Split (\%) | 60.6\% | 60.6\% | 7.2\% | 7.2\% | 32.2\% | 32.2\% |
| Yellow Time (s) | 4.0 | 4.0 | 3.4 | 3.4 | 4.0 | 4.0 |
| All-Red Time (s) | 2.9 | 2.9 | 2.9 | 2.9 | 4.0 | 4.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 6.9 | 6.9 | 6.3 | 6.3 | 8.0 | 8.0 |
| Lead/Lag | Lag | Lag | Lead | Lead |  |  |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes |  |  |
| Recall Mode | None | None | None | None | C-Min | C-Min |
| Act Effct Green (s) | 102.1 | 102.1 | 6.7 | 6.7 | 50.0 | 50.0 |
| Actuated g/C Ratio | 0.57 | 0.57 | 0.04 | 0.04 | 0.28 | 0.28 |
| $\mathrm{v} / \mathrm{c}$ Ratio | 0.67 | 0.68 | 0.61 | 0.86 | 1.18 | 1.19 |
| Control Delay | 29.9 | 29.7 | 100.5 | 44.9 | 144.8 | 116.4 |
| Queue Delay | 0.0 | 50.7 | 0.0 | 56.2 | 0.0 | 0.0 |
| Total Delay | 29.9 | 80.4 | 100.5 | 101.0 | 144.9 | 116.4 |
| LOS | C | F | F | F | F | F |
| Approach Delay |  | 55.6 |  |  | 128.1 |  |
| Approach LOS |  | E |  |  | F |  |
| Intersection Summary |  |  |  |  |  |  |
| Cycle Length: 180 |  |  |  |  |  |  |
| Actuated Cycle Length: 180 |  |  |  |  |  |  |
| Offset: 86 (48\%), Referenced to phase 2:SBTL and 6:, Start of Yellow |  |  |  |  |  |  |
| Natural Cycle: 90 |  |  |  |  |  |  |
| Control Type: Actuated-Coordinated |  |  |  |  |  |  |
| Maximum v/c Ratio: 1.19 |  |  |  |  |  |  |
| Intersection Signal Delay: 95.4 |  |  |  |  | Intersection | ion LOS: F |
| Intersection Capacity Utilization 80.8\% ICU Level of Service D |  |  |  |  |  |  |
| Analysis Period (min) 15 |  |  |  |  |  |  |
| Splits and Phases: 101: Indian Creek Drive \& W 63 Street |  |  |  |  |  |  |
| $\downarrow$ - $\varnothing 2$ (R) |  | $\checkmark$ | ¢ $¢ 7$ | 4 ¢ |  |  |
| 58 s |  | 13 | s - 1 | 109 s |  |  |

Queues
101: Indian Creek Drive \& W 63 Street

|  | $\Rightarrow$ | $\rightarrow$ | $\checkmark$ | 4 | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | WBL | WBR | SBT | SBR |
| Lane Group Flow (vph) | 1042 | 1075 | 36 | 268 | 1041 | 1490 |
| v/c Ratio | 0.67 | 0.68 | 0.61 | 0.86 | 1.18 | 1.19 |
| Control Delay | 29.9 | 29.7 | 100.5 | 44.9 | 144.8 | 116.4 |
| Queue Delay | 0.0 | 50.7 | 0.0 | 56.2 | 0.0 | 0.0 |
| Total Delay | 29.9 | 80.4 | 100.5 | 101.0 | 144.9 | 116.4 |
| Queue Length 50th (ft) | 488 | 502 | 44 | 79 | ~762 | ~776 |
| Queue Length 95th (ft) | 576 | 590 | m60 | \#260 | \#905 | \#1140 |
| Internal Link Dist (ft) |  | 365 |  |  | 1320 |  |
| Turn Bay Length (ft) | 250 |  |  |  |  |  |
| Base Capacity (vph) | 1553 | 1587 | 59 | 311 | 880 | 1248 |
| Starvation Cap Reductn | 0 | 0 | 0 | 113 | 0 | 0 |
| Spillback Cap Reductn | 0 | 769 | 0 | 0 | 6 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.67 | 1.31 | 0.61 | 1.35 | 1.19 | 1.19 |
| 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
102: Collins Avenue \& W 63 Street

c Critical Lane Group


Queues
102: Collins Avenue \& W 63 Street

|  |  | $\uparrow$ |
| :--- | ---: | ---: |
| Lane Group | EBL | NBT |
| Lane Group Flow (vph) | 901 | 1664 |
| v/c Ratio | 0.85 | 0.68 |
| Control Delay | 48.5 | 17.5 |
| Queue Delay | 2.2 | 0.0 |
| Total Delay | 50.7 | 17.5 |
| Queue Length 50th (ft) | 427 | 235 |
| Queue Length 95th ft$)$ | m 362 | 341 |
| Internal Link Dist (ft) | 170 | 216 |
| Turn Bay Length (ft) |  |  |
| Base Capacity (vph) | 1373 | 2456 |
| Starvation Cap Reductn | 324 | 0 |
| Spillback Cap Reductn | 0 | 41 |
| Storage Cap Reductn | 0 | 0 |
| Reduced v/c Ratio | 0.86 | 0.69 |
| Intersection Summary |  |  |
| Volume for 95th percentile queue is metered by upstream signal. |  |  |


c Critical Lane Group

Timings
103: Collins Avenue \& 5875 Block


Queues
103: Collins Avenue \& 5875 Block

|  | 71 |  | $\downarrow$ |
| :---: | :---: | :---: | :---: |
| Lane Group | NBU | NBT | SBT |
| Lane Group Flow (vph) | 18 | 1409 | 1013 |
| v/c Ratio | 0.23 | 0.28 | 0.21 |
| Control Delay | 71.6 | 0.1 | 1.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 |
| Total Delay | 71.6 | 0.1 | 1.0 |
| Queue Length 50th (ft) | 16 | 0 | 0 |
| Queue Length 95th (ft) | 43 | 0 | 59 |
| Internal Link Dist (ft) |  | 590 | 631 |
| Turn Bay Length (ft) |  |  |  |
| Base Capacity (vph) | 138 | 5085 | 4781 |
| Starvation Cap Reductn | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.13 | 0.28 | 0.21 |
| Intersection Summary |  |  |  |

## APPENDIX F

## Valet Queuing

## Queuing Analysis based on ITE Procedures

$\mathrm{q}=39 \mathrm{veh} / \mathrm{hr}$ (demand rate)
$\mathrm{Q}=8.5 \mathrm{veh} / \mathrm{hr}$ (service rate at 7 minutes per veh)
$p=\frac{q}{N Q}=0.7647(N=6$ valet runners $)$
$Q_{M}=0.4536$
Using Acceptable Probability of 5\% (95\% Confidence Level)
$M=\left(\frac{\operatorname{Ln}(x>M)-\operatorname{Ln}\left(Q_{M}\right)}{\operatorname{Ln}(p)}\right)-1$
$M=\left(\frac{\operatorname{Ln}(0.05)-\operatorname{Ln}(0.4536)}{\operatorname{Ln}(0.7647)}\right)-1$
$M=\left(\frac{-2.9957-(-0.7905)}{-0.2683}\right)-1$
$M=8.1-1=7.2$, say 8 vehicle
location, a $5 \%$ probability of back-up onto the adjacent street is judged to be acceptable. Demand on the system for design is expected to be 110 vehicles in a 45 -minute period. Average service time was expected to be 2.2 minutes. is the queue storage adequate?

Such problems can be quickly solved using Equation (8-9b) given in Table 8-10 and repeated below for convenience.

$$
M=\left[\frac{\ln P(x>M)-\ln Q_{M}}{\ln p}\right]-1
$$

where:
$M=$ queue length which is exceeded $p$ percent of the time
$N=$ number of service channels (drive-in positions)
$Q=$ service rate per channel (vehicles per hour)
$\rho=\frac{\text { demand rate }}{\text { service rate }}=\frac{q}{N Q}=$ utilization factor
$q=$ demand rate on the system (vehicles per hour)
$Q_{\text {时 }}=$ tabled values of the relationship between queue length, number of channels, and utilization factor (see Table 8.11)

TABLE $8-11$
Table of $Q_{M}$ Values

|  | $N=1$ | 2 | 3 | 4 | 6 | 8 | 10 |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| 0.0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |  |  |  |
| 0.1 | .1000 | .0182 | .0037 | .0008 | .0000 | 0.0000 | 0.0000 |
| 2 | .2000 | .0666 | .0247 | .0096 | .0015 | .0002 | .0000 |
| .3 | .3000 | .1385 | .0700 | .0370 | .0111 | .0036 | .0011 |
| .4 | .4000 | .2286 | .1411 | .0907 | .0400 | .0185 | .0088 |
| .5 | .5000 | .3333 | .2368 | .1739 | .0991 | .0591 | .0360 |
| .6 | .6000 | .4501 | .3548 | .2870 | .1965 | 1395 | .1013 |
| 7 | .7000 | .5766 | .4923 | .4866 | .3359 | .2700 | .2218 |
| $\rightarrow .8$ | .8000 | .7111 | .6472 | .5964 | .5178 | .4576 | .4093 |
| .9 | .9000 | .8526 | .8172 | .7878 | .7401 | .7014 | .6687 |
| 1.0 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

$\rho=\frac{q}{N Q}=\frac{\text { arival rate, total }}{\text { (number of channels) (service rate per channel) }}$

$N=$ number of channels (service positions

## Solution

$0.8=0.5178$
Step 1: $Q=\frac{60 \mathrm{~min} / \mathrm{hr}}{2.2 \mathrm{~min} / \mathrm{service}}=27.3$ services per hour
Step 2: $\quad$ q $=(110 \mathrm{veh} / 45 \mathrm{~min}) \times(60 \mathrm{~min} / \mathrm{hr})=146.7$ vehicles per hour
Step 3: $\rho=\frac{q}{N Q}=\frac{146.7}{(6)(27.3)}=0.8956$


Step 4: $Q_{m}=0.7303$ by interpolation between 0.8 and 0.9 for $N=6$ from the table of $Q_{\text {d }}$ values (see Table 8-11).
Step 5: The acceptable probability of the queue, $M$, being longer than the storage, 18 spaces in this example, was stated to be $5 \% . P(x>M)=0.05$, and:

$$
\begin{aligned}
M & =\left[\frac{\ln 0.05-\ln 0.7303}{\ln 0.8956}\right]-1=\left[\frac{-2.996-(-0.314)}{-0.110}\right]-1 \\
& =24.38-1=23.38, \text { say } 23 \text { vehicles. }
\end{aligned}
$$


[^0]:    ${ }^{1}$ By Vergil G. Stover and Frank J. Koepke.

[^1]:    Intersection Summary

[^2]:    Intersection Summary

[^3]:    Intersection Summary

