

June 30, 2020

TRANSPORTATION IMPACT STUDY  
FOR THE  
PITTSBURGH TECHNOLOGY CENTER (PTC)  
GARAGE 3  
DEVELOPMENT

Pittsburgh Technology Center  
3000 Technology Drive

City of Pittsburgh  
Allegheny County, Pennsylvania

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## **1.0 INTRODUCTION AND EXECUTIVE SUMMARY**

## **1.1 Purpose of Report and Study Objectives**

This report provides the results of the transportation impact study prepared for the proposed Pittsburgh Technology Center (PTC) Garage 3 development, the composition and location of which are detailed below. The study, as documented in this report, was performed in order to meet the study requirements of the City of Pittsburgh Department of Mobility and Infrastructure (DOMI) as detailed in their *Transportation Impact Review Guidelines*, 2018 publication.

The study objectives were to identify the potential transportation impacts of the proposed PTC Garage 3 development, and if necessary, develop appropriate mitigation measures.

## **1.2 Executive Summary**

An overview of the project description, principal findings resulting from the analysis, and recommended mitigation strategies are presented in this summary.

### **1.2.1 Site Location and Study Area**

The site is located on Technology Drive, within the Pittsburgh Technology Center in the South Oakland Neighborhood of the City of Pittsburgh, Allegheny County, Pennsylvania as shown in Figure 1. The proposed street address for this garage is 3000 Technology Drive.

The following intersections were selected for study:

- Second Avenue and Bates Street/Technology Drive (existing signalized);
- Second Avenue and Middle Access Road (existing signalized); and
- Second Avenue and Western Access Road (existing signalized).

A total of three (3) existing intersections were included in the scope of the study. The study intersections with respect to the site are shown in Figure 2.

### **1.2.2 Development Description**

The proposed PTC Garage 3 development is anticipated to consist of a new 600 space parking garage to be open in the year 2021. The proposed 600 space PTC Garage 3 will support current and future developments within the Pittsburgh Technology Center as part of the overall master plan for the PTC. The build condition capacity analyses contained within this report represent potential projected conditions upon full-build out of the PTC site as detailed in the URA August 2019 exhibit (Figure 3).

### **1.2.3 Land Development Control Status**

The site is currently zoned SP-1. No change in zoning status is proposed as part of this project.

## **1.2.4 Principal Findings**

### **Parking Analysis**

The proposed 600 space PTC Garage 3 will support current and future developments within the Pittsburgh Technology Center as part of the overall master plan for the PTC. It should be noted, however, that parking garages alone do not generate parking demand and are therefore not subject to a parking analysis.

According to Section 914.05.D of the *City of Pittsburgh Urban Zoning Code*, the proposed 600 space parking garage is required to provide bicycle parking at a ratio of one (1) space for every 10 vehicular parking spaces. Therefore, it is anticipated that 60 bicycle parking spaces will be incorporated into the proposed PTC Garage 3 development.

### **Trip Generation**

As previously mentioned, the proposed PTC Garage 3 is being developed in order to support current and future developments within the PTC as part of the overall master plan for the site. However, parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate the trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network.

However, in order to evaluate the potential traffic impacts associated with future PTC master plan developments (not yet constructed), vehicular trip generation projections were made based on the PTC master plan exhibit prepared by the Urban Redevelopment Authority (URA) and dated August 2019.

Vehicular trip generation for these future PTC master plan developments were projected based upon data published by the Institute of Transportation Engineers (ITE) in their *Trip Generation*, Tenth Edition, 2017. It is expected that the future PTC master plan developments are to be comprised of a mix of office space, research space, and light industrial space. In order to provide a conservative analysis, Land Use Code 710, General Office Building, was used to estimate the trip generation the proposed Future 150,000 GSF office building, the 87,000 GSF CMRI expansion, and the Future 160,000 GSF building adjacent to 2000 Technology Drive. Land Use Code 110, General Light Industrial, was used to estimate the trip generation of the proposed 40,000 GSF Pitt Biotech expansion. Further details of the trip generation calculations are presented in Table 3 and Section 4.0 of this report.

### **Traffic Analysis**

As previously mentioned, parking garages do not generate trips. It is the adjacent land uses associated with the parking garage that generate trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network. The build condition capacity analyses contained within this report represent potential projected conditions upon full-build out of the PTC master plan as detailed in the URA August 2019 exhibit (Figure 3). The results of the build conditions

capacity analyses are calculated for information purposes for long range planning of the PTC site.

As stated in the City of Pittsburgh Transportation Impact Study Review Guidelines, 2018: *“The TIS shall compare the LOS and delay of the future year conditions without the development to the future year conditions with the development. An impact occurs when the overall intersection LOS degrades and the average delay per vehicle increases more than 10.0 seconds. When an intersection is anticipated to operate at LOS F during the future conditions without development, the 10.0 second allowable increase shall apply.”*

The results of the capacity calculations performed using the opening year 2021 build conditions (with PTC master plan developments) and design year 2031 build conditions (with PTC master plan developments) revealed the following:

- Second Avenue with Bates Street/Technology Drive: The overall intersection LOS is anticipated to continue to operate at an overall intersection LOS D during the weekday A.M. and the weekday P.M. peak hours. No degradations in LOS are projected for this study intersection.
- Second Avenue with Middle Access Road: The overall intersection LOS is anticipated to continue to operate at a LOS A during the weekday A.M. peak hour. The overall intersection LOS is anticipated to decrease from a LOS A to a LOS B during the weekday P.M. peak hour. Although the LOS is anticipated to decrease during the P.M. peak hour, the overall intersection delay is projected to increase by less than three (3) seconds. This increase in delay is within the acceptable 10-second delay degradation limit established within aforementioned City of Pittsburgh Transportation Impact Review Guidelines.
- Second Avenue with Western Access Road: The overall intersection LOS is anticipated to continue to operate at a LOS A during the weekday A.M. peak hour and LOS B during the weekday P.M. peak hour. No degradations in LOS are projected for this study intersection.

Additionally, based on the results of the analyses, the 95<sup>th</sup> percentile queue lengths under opening year 2021 build (with PTC master plan developments) and design year 2031 build conditions (with PTC master plan developments) are not expected to have a significant increase over the opening year 2021 no-build (base) and design year 2031 no-build (base) conditions. Any potential increases in queue lengths are projected to be approximately three (3) vehicles or fewer. The reported 95<sup>th</sup> percentile queue lengths that are projected to queue beyond their storage or block lengths are projected to occur with or without the proposed PTC master plan developments. The potential minor increases in queue length are not expected to have a significant impact on the operations of the study network.

Further details of the traffic analyses are presented in Section 4.0 and Section 5.0 of this report.



### **1.2.5 Recommendations**

This study has been performed in order to determine the transportation impacts of the proposed PTC Garage 3 development. These impacts were evaluated based upon the criteria published in the City of Pittsburgh's *Transportation Impact Review Guidelines, 2018*.

The proposed PTC Garage 3 is being developed in order to support current and future developments within the PTC as part of the overall master plan for the site. However, parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate the trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network. The build condition capacity analyses contained within this report represent potential projected conditions upon full-build out of the PTC master plan as detailed in the URA August 2019 exhibit (Figure 3). The results of the build conditions capacity analyses are calculated for information purposes for long range planning of the PTC site.

According to Section 914.05.D of the *City of Pittsburgh Urban Zoning Code*, the proposed 600 space parking garage is required to provide bicycle parking at a ratio of one (1) space for every 10 vehicular parking spaces. Therefore, it is anticipated that 60 bicycle parking spaces will be incorporated into the proposed PTC Garage 3 development.

Based on the results of the capacity analyses, the proposed development is not expected to have a significant impact on the surrounding roadway network. The study intersections are controlled by actuated traffic signal controllers, which are anticipated to accommodate the future traffic volumes with acceptable levels of service. In order to continue to provide efficient traffic progression through the study intersections, it is expected that optimized traffic signal timings would be implemented as future developments within the PTC or other developments within the study area are completed. No further mitigation measures are necessary in order to accommodate the projected trips generated by the potential future PTC master plan developments.

## **2.0 PROPOSED DEVELOPMENT**

## **2.1 Summary of Development**

A description of the proposed development is presented in this section.

### **2.1.1 Location**

The site is located at on Technology Drive, within the Pittsburgh Technology Center in the South Oakland Neighborhood of the City of Pittsburgh, Allegheny County, Pennsylvania as shown in Figure 1. The proposed street address for this garage is 3000 Technology Drive.

### **2.1.2 Development Plan**

The proposed PTC Garage 3 development is anticipated to consist of a new 600 space parking garage to be constructed in the year 2021. The proposed 600 space PTC Garage 3 will support current and future developments within the Pittsburgh Technology Center as part of the overall master plan for the PTC. The build condition capacity analyses contained within this report represent potential projected conditions upon full-build out of the PTC site as detailed in the URA August 2019 exhibit (Figure 3).

## **2.2 Land Development Control Status**

### **2.2.1 Existing and Proposed Zoning**

The site is currently zoned SP-1. No change in zoning status is proposed as part of this project.

### **2.2.2 Subdivision**

It is CEC's understanding that development of the proposed PTC Garage 3 is to be constructed on a portion of Parcel No. 7 along Technology Drive at Second Avenue. Pursuant to an agreement between the URA and Hitachi Rail STS USA, Inc. (Hitachi), Parcel No. 7 will be subdivided. Hitachi will retain ownership of the currently existing parking garage that is located on Parcel No. 7A and the proposed PTC Garage 3 will be constructed on Parcel No. 7B (to be owned by the URA).

### **3.0 AREA CONDITIONS**

### **3.1 Study Area**

The study area for the site has been determined based upon the area of influence and the area of significant traffic impact. The boundaries of the study area were developed in coordination with representatives from the City of Pittsburgh's Department of Mobility and Infrastructure (DOMI) as well as based on CEC's experience with similar projects within the City of Pittsburgh.

#### **3.1.1 Area of Influence and Significant Traffic Impact**

The area of significant traffic impact for the proposed development will be on the streets immediately adjacent to the development along Second Avenue. Therefore, the following intersections were selected for study:

- Second Avenue and Bates Street/Technology Drive (existing signalized);
- Second Avenue and Middle Access Road (existing signalized); and
- Second Avenue and Western Access Road (existing signalized).

A total of three (3) existing intersections were studied. The study intersections associated with the site are presented in Figure 2.

### **3.2 Study Area Land Use**

#### **3.2.1 Existing Land Use**

The site of the proposed development currently consists of an approximately 80-space surface parking lot.

#### **3.2.2 Anticipated Future Developments**

The Riviera development, which consists of a 155,000 GSF office building, is currently under construction on Parcel 4B of the PTC, which is located along Technology Drive between the existing University of Pittsburgh Biotech building and the Bridgeside II building. This development was originally scheduled to be completed in 2019 but has not yet been completed. Therefore, trip generation estimates for the Riviera development were projected as part of the background developments.

In addition to The Riviera development, The Elmhurst PTC development to be located along Technology Drive between the Western Access Road and the Middle Access Road is anticipated to be constructed and fully occupied by year 2021. This development is projected to consist of two (2) separate buildings providing a total of 111,792 GSF of office space and 60,196 GSF of light industrial space with an on-street parking supply of approximately 108 spaces.

These developments are expected to be open and fully occupied by year 2021.

### **3.2.3 Existing Zoning and Anticipated Changes**

See Section 2.2.

### **3.2.4 Existing Travel Mode Splits**

The location of the site provides numerous opportunities for multi-modal travel including public transit, bicycles, and pedestrians.

Access to public transit is provided by the Port Authority of Allegheny County (PAAC). PAAC Bus Routes 56, 57, and 58 travel along Second Avenue, adjacent to the PTC, with bus stops located at each signalized study intersection. These routes provide regional connections to the greater Pittsburgh area including the City of Pittsburgh Central Business District and the Oakland section of the City of Pittsburgh. It should also be noted that both the University of Pittsburgh and Carnegie Mellon University provide shuttles from their Oakland campuses to the Pittsburgh Technology Center.

The Three Rivers Heritage Trail, a multi-use rail trail, runs parallel to Second Avenue to the north. A sidewalk connection is provided between the trail and the traffic signal at the intersection of Second Avenue with Middle Access Road. Internal multi-use trails are also provided within the Pittsburgh Technology Center that connect to the trail system. The trail system also crosses the Monongahela River along the Hot Metal Bridge.

Multiple studies documenting multi-modal commuter travel behavior within the City of Pittsburgh are available. According to the 2015 City of Pittsburgh *Make My Trip Count Survey*, commuter trips within the Oakland section of the City were comprised of 61% automobile, 26.1% transit, 7.2% walk, and 5.7% bicycle trips. The Make My Trip Count survey was later updated in 2018. According to this updated study, the PTC site was included within the South Side neighborhood of the City. Within this study area, commuter trips were comprised of 80% automobile and 20% alternative mode of travel. Finally, according to PGHSNAP data, 2011, the PTC site is included within the South Oakland section of the City. Within this study area, commuter trips are comprised of 55.8% automobile, 14% transit, 0% bicycle, and 30.2% walk. In order to provide a conservative analysis, all commuter travel modes documented in these surveys were aggregated to develop an estimated multi-modal split for the PTC site. Therefore, for analysis purposes, it was assumed that for developments within the PTC site, commuter trips would be comprised of 80% automobile, 15% transit, and 5% bicycle. No pedestrian modal split was assumed for analysis purposes due to the low number of pedestrians documented in the data collection efforts performed for the study intersections.

### **3.3 Site Accessibility**

#### **3.3.1 Public and Private Roadway Systems**

The existing roadway system, including traffic control devices, is documented in this section.

##### **3.3.1.1 Existing Area Roadway System**

The existing area roadway system is presented in Figure 1. Details at each of the existing study intersections are presented below:

#### **Second Avenue**

Within the study area, Second Avenue is a principal arterial roadway providing a 58-foot wide cartway with concrete curbs. Sidewalks are provided on both the northern and southern sides of Second Avenue. The posted speed limit of Second Avenue is 35 miles per hour.

At its intersection with Bates Street/Technology Drive, Second Avenue provides a three (3) lane approach to Bates Street/Technology Drive for eastbound traffic (an exclusive left turn lane, an exclusive through lane, and a shared through/right turn lane) and a three (3) lane approach to Bates Street/Technology Drive for westbound traffic (an exclusive left turn lane, an exclusive through lane, and a shared through/right turn lane). The intersection of Second Avenue with Bates Street/Technology Drive is controlled by a fully-actuated traffic signal.

At its intersection with Middle Access Road, Second Avenue provides a two (2) lane approach to Middle Access Road for eastbound traffic (an exclusive through lane, and a shared through/right turn lane) and a three (3) lane approach to Middle Access Road for westbound traffic (an exclusive left turn lane and two (2) exclusive through lanes). The intersection of Second Avenue with Middle Access Road is controlled by a fully-actuated traffic signal.

At its intersection with Western Access Road, Second Avenue provides a two (2) lane approach to Western Access Road for eastbound traffic (an exclusive through lane, and a shared through/right turn lane) and a three (3) lane approach to Western Access Road for westbound traffic (an exclusive left turn lane and two (2) exclusive through lanes). The intersection of Second Avenue with Western Access Road is controlled by a fully-actuated traffic signal.

#### **Technology Drive**

Within the study area, Technology drive provides a 33-foot wide cartway with concrete curbs and sidewalks

on both the northern and southern sides. On-street metered parking is provided on the southern side of Technology Drive between Western Access Road and Technology Drive (approaching Bates Street intersection). West of the Western Access Road, Technology Drive is a private URA owned roadway. No on-street parking is provided along this section of Technology Drive. The posted speed limit of Second Avenue is 35 miles per hour.

At its intersection with Second Avenue, Technology Drive provides a 56-foot wide cartway with an eight-foot (8) wide concrete median and concrete curbs. A sidewalk is provided on the western side of Technology Drive. Technology Drive provides a two (2) lane approach to Second Avenue for northbound traffic (a shared left turn/through lane and an exclusive right turn lane). The posted speed limit of Technology Drive is 25 miles per hour.

### **Bates Street**

At its intersection with Second Avenue, Bates Street is a principal arterial roadway providing a 59-foot wide cartway with concrete curbs. A sidewalk is provided on the western side of Bates Street. At its intersection with Second Avenue, Bates Street provides a three (3) lane approach to Second Avenue for southbound traffic (an exclusive left turn lane, a shared left turn/through lane, and an exclusive right turn lane). The posted speed limit of Bates Street is 25 miles per hour.

### **Middle Access Road**

At its intersection with Second Avenue, Middle Access Road provides a 38-foot wide cartway with a 10-foot wide concrete median and concrete curbs. Sidewalks are provided on both the eastern and western sides of Middle Access Road. At its intersection with Second Avenue, Middle Access Road provides a one (1) lane approach to Second Avenue for northbound traffic (a shared left turn/right turn lane). The speed limit of Middle Access Road is not posted.

### **Western Access Road**

At its intersection with Second Avenue, Western Access Road provides a 62-foot wide cartway with 14-foot wide concrete median and concrete curbs. A sidewalk is provided on both the eastern and western sides of Western Access Road. At its intersection with Second Avenue, Western Access Road provides a two (2) lane approach to Second Avenue for northbound traffic (an exclusive left turn lane and an exclusive right turn lane). The speed limit of Western Access Road is not posted.

#### **3.3.1.2 *Future Area Roadway Systems***

No major changes in the study area corridors are currently approved. No changes in the City roadway system, traffic flow directions or intersection traffic controls have been assumed on public roadways.



### **3.3.1.3 Existing Transit Routes and Service**

Access to public transit is provided by the Port Authority of Allegheny County (PAAC). PAAC Bus Routes 56, 57, and 58 travel along Second Avenue, adjacent to the PTC, with bus stops located at each signalized study intersection. These routes provide regional connections to the greater Pittsburgh area including the City of Pittsburgh Central Business District and the Oakland section of the City of Pittsburgh. It should also be noted that both the University of Pittsburgh and Carnegie Mellon University provide shuttles from their Oakland campuses to the Pittsburgh Technology Center.

A map of the PAAC bus routes and bus stop locations are presented Figure 4.

### **3.3.1.4 Existing Multi-Use Trail System**

The Three Rivers Heritage Trail, a multi-use rail trail, runs parallel to Second Avenue to the north. This trail system consists of a 34-mile nonlinear system with segments on both banks of the three rivers. A connection to the trail is provided at the intersection of Second Avenue with Middle Access Road. Additionally, internal multi-use trails within the PTC connect with the trail system at the Hot Metal Street Bridge section.

A map of the existing trail system is presented Figure 5.

## **3.3.2 Existing Traffic Volumes**

Documentation of existing vehicular, pedestrian and bicycle volumes and conditions in the study area are documented in this section.

### **3.3.2.1 Data Collection**

As a result of measures put in place to prevent the spread of COVID-19 including stay at home orders, canceling of events and public gatherings, business closures, university and school closures, increased telecommuting, and increased jobless numbers, traffic volumes throughout the area are significantly lower than during typical conditions. Therefore, in order to project transportation impacts for new developments, it is necessary to utilize historic traffic count data. As agreed upon with representatives of the City of Pittsburgh DOMI, historic traffic counts previously collected for the subject study intersections can be utilized to prepare transportation impact analyses. CEC previously performed turning movement counts including pedestrian and bicycles count data for the study intersections in November 2018. These counts were performed during the following peak periods:

- Weekday AM peak period – 7:00 AM to 9:00 AM
- Weekday PM peak period – 4:00 PM to 6:00 PM

It should be noted that these traffic counts were performed after the opening of the Hotel Indigo and therefore should be considered as an accurate representation of traffic conditions within the study area.

Additional data collection efforts included the following items:

- Field reconnaissance of the study area and intersections, including roadway geometry, crosswalk locations, bicycle facilities, public transit stops, and existing traffic control; and
- Acquisition of intersection signal permit drawings and signal phasing and timing information from the City of Pittsburgh Department of Public Works.

### **3.3.2.2 Automatic Traffic Recorder Counts**

No automatic traffic recorder counts (ATR) were conducted during this study.

### **3.3.2.3 Peak Hours**

Manual turning movement counts of automobiles, bicycles, and pedestrians were performed by CEC at the study intersections from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on Wednesday, November 13, 2018.

The overall peak hours determined from these counts are as follows:

- AM Peak Hour - 7:30 AM to 8:30 AM
- PM Peak Hour - 4:00 PM to 5:00 PM

### **3.3.2.4 Peak Hour Traffic Volumes**

The 2018 existing peak hour traffic volumes are presented in Figure 6. Summaries of the data collected including peak hour bicycle and pedestrian volumes are included in Appendix A to this report.

### **3.3.2.5 2018 Existing Conditions – Intersection Levels of Service**

Capacity calculations for the study intersection were performed using Synchro, Version 10, Traffic Signal Timing and Analysis Software. Level of Service (LOS) grades were assigned to the intersections based on the methodologies published by the Transportation Research Board in their *Highway Capacity Manual, Sixth Edition*, 2017. This methodology determines how well an intersection, approach to an intersection,

or movement at an intersection operates, and assigns to it a LOS A through F, with LOS A representing the best operating conditions and LOS F, the worst. Detailed definitions of LOS have been included in Appendix B to this report.

The results of the capacity analyses are summarized in Figure 7, as well as in Tables 1 and 2 for the A.M. and P.M. peak hours, respectively. Based on the results of the capacity analyses performed, the overall intersection levels of service currently operate at LOS C or better for each study intersection.

Detailed capacity and levels of service printouts for 2018 existing conditions are provided in Appendix C to this report.

#### **4.0 PROJECTED TRAFFIC VOLUMES AND INTERSECTION CAPACITY ANALYSIS**

## **4.1 Site Generated Traffic –Background Developments**

### **4.1.1 Vehicular Trip Generation**

The Riviera development, which consists of a 155,000 GSF office building, is currently under construction on Parcel 4B of the PTC, which is located along Technology Drive between the existing University of Pittsburgh Biotech building and the Bridgeside II building. This development was originally scheduled to be completed in 2019 but has not yet been completed. Therefore, trip generation estimates for the Riviera development were projected as part of the background developments.

Vehicular trip generation for The Riviera development was projected based upon data published by the Institute of Transportation Engineers (ITE) in their Trip Generation, Tenth Edition, 2017. Land Use Code 710, General Office Building, was used to estimate the trip generation of the proposed development. As previously mentioned, the Riviera development is expected to generate multi-modal trips. Based on commuter survey data detailed in Section 3.2.4 of this report, it was determined that a modal split of 80% vehicular trips, 15% transit, and 5% bicycle would provide a conservative approximation for the site location. This multi-modal split is also consistent with other recent studies prepared for developments within the PTC.

Using this methodology, the 155,000 GSF The Riviera development can be anticipated to generate a total of 172 new trips during the weekday A.M. peak hour (148 trips entering/24 trips exiting). Of these trips, a total of 138 new trips are projected to be made by automobile (119 trips entering/19 trips exiting). During the P.M. peak hour, The Riviera development can be anticipated to generate a total of 173 new trips (28 trips entering/145 trips exiting). Of these trips, a total of 139 new trips are projected to be made by automobile (23 trips entering/116 trips exiting).

In addition to The Riviera development, The Elmhurst PTC development to be located along Technology Drive between the Western Access Road and the Middle Access Road is anticipated to be constructed and fully occupied by year 2021. This development is projected to consist of two (2) separate buildings providing a total of 111,792 GSF of office space and 60,196 GSF of light industrial space with an on-street parking supply of approximately 108 spaces.

Vehicular trip generation for the Elmhurst PTC development was obtained from the Transportation Impact Study prepared in April, 2019 for Desmone Architects. As stated in the study, the Elmhurst PTC development is also anticipated to generate multi-modal trips at a ratio of 80% vehicular trips, 15% transit, and 5% bicycle. According to this study, the proposed Elmhurst PTC development is anticipated to generate a total of 214 new trips during the weekday A.M. peak hour (188 trips entering/26 trips exiting). Of these trips, a total of 178 new trips are projected to be made by automobile (156 trips entering/22 trips

exiting). During the P.M. peak hour, The Elmhurst PTC development can be anticipated to generate a total of 214 new trips (37 trips entering/177 trips exiting). Of these trips, a total of 176 new trips are projected to be made by automobile (30 trips entering/146 trips exiting).

Detailed trip generation calculations are summarized in Table 3.

Copies of the trip generation calculations are included in Appendix D to this report.

#### **4.1.2 Vehicular Trip Arrival and Departure Distributions – Background Developments**

Vehicular arrival/departure distributions developed for the background developments, The Riviera development and the Elmhurst PTC development, were based on existing peak hour traffic volume distributions observed along Second Avenue. The resultant arrival/departure distributions for primary trips generated by the background developments are presented in Figure 8.

#### **4.1.3 Vehicular Trip Assignment – Determination of Site Generated Traffic**

The forecasted trips to be generated by the background developments were distributed onto the study roadways and through the study intersections based on the trip arrival/departure distribution presented in Figure 8. The resultant background development site generated trips are shown in Figure 9.

### **4.2 Site Generated Traffic –PTC Master Plan Developments**

#### **4.2.1 Vehicular Trip Generation**

The proposed PTC Garage 3 development is anticipated to consist of a new 600 space parking garage to be open in the year 2021. It should be noted, however, that parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network.

However, in order to evaluate the potential traffic impacts associated with future PTC master plan developments (not yet constructed), vehicular trip generation projections were made based on the PTC master plan exhibit prepared by the Urban Redevelopment Authority (URA) and dated August 2019. According to this exhibit, the following future land uses are anticipated for the full-build out of the PTC:

- Pitt Biotech expansion – 40,000 GSF
- Future Office Building (southeast corner of Second Avenue and Middle Access Road) – 150,000 GSF

- CMRI Expansion – 87,000 GSF
- Future Building (adjacent to 2000 Technology Drive) – 160,000 GSF

Vehicular trip generation for these future PTC master plan developments was projected based upon data published by the Institute of Transportation Engineers (ITE) in their Trip Generation, Tenth Edition, 2017. It is expected that the future PTC master plan developments are to be comprised of a mix of office space, research space, and light industrial space. In order to provide a conservative analysis, Land Use Code 710, General Office Building, was used to estimate the trip generation the proposed Future 150,000 GSF office building, the 87,000 GSF CMRI expansion, and the Future 160,000 GSF building adjacent to 2000 Technology Drive. Land Use Code 110, General Light Industrial, was used to estimate the trip generation of the proposed 40,000 GSF Pitt Biotech expansion.

Based on commuter survey data detailed in Section 3.2.4 of this report, it was determined that a modal split of 80% vehicular trips, 15% transit, and 5% bicycle would provide a conservative approximation for the site location. This multi-modal split is also consistent with other recent studies prepared for developments within the PTC.

Using this methodology and land use assumptions, the future PTC master plan developments are conservatively estimated to generate a total of 475 new trips during the weekday A.M. peak hour (409 trips entering/66 trips exiting). Of these trips, a total of 380 new trips are projected to be made by automobile (326 trips entering/54 trips exiting). During the P.M. peak hour, the future PTC master plan developments are conservatively estimated to generate a total of 465 new trips (73 trips entering/392 trips exiting). Of these trips, a total of 373 new trips are projected to be made by automobile (60 trips entering/313 trips exiting).

#### **4.2.2     *Bicycle Trip Generation***

Site generated bicycle trips were projected as described in Section 3.2.4 and 4.2. Based on the existing bicycle volumes, it was assumed that all new site generated bicycle traffic would utilize the existing internal and external trail system and would not travel on Second Avenue within the study area.

Detailed trip generation calculations are summarized in Table 4.

#### **4.2.3     *Pedestrian Trip Generation***

As detailed in section 3.2.4, No pedestrian modal split was assumed for analysis purposes due to the low number of pedestrians documented in the data collection efforts performed for the study intersections. Any new pedestrian trips, exclusive of persons walking to/from bus stops, are assumed to utilize the existing internal and external sidewalk connections or the adjacent multi-use trail systems. These pedestrian

connections lead to adjacent developments as well as the South Side neighborhood of the City via the Hot Metal Street Bridge without requiring travel through the Second Avenue study intersections.

#### **4.2.4 Vehicular Trip Arrival and Departure Distributions – PTC Master Plan Developments**

Vehicular arrival/departure distributions developed for the future PTC Master Plan developments (Figure 3) were based on existing peak hour traffic volume distributions observed during the turning movement counts performed for the study intersections along Second Avenue. As a result, the resultant arrival/departure distributions for primary trips generated by the future PTC Master Plan developments matches the distributions developed for the background developments. The trip arrival/departure distributions are presented in Figure 8.

#### **4.2.5 Vehicular Trip Assignment – Determination of Site Generated Traffic**

The forecasted trips to be generated by the future PTC master plan developments were distributed onto the study roadways and through the study intersections based on the trip arrival/departure distribution presented in Figure 8. The resultant PTC master plan developments site generated trips are shown in Figure 10.

### **4.2 Background Traffic (Base Traffic)**

#### **4.2.1 Background Traffic Growth**

The proposed 600 space PTC Garage 3 is anticipated to be constructed in the year 2021. In order to project opening year 2021 and design year 2031 traffic volumes, an annual traffic growth factor was determined and applied to all of the existing traffic volume data. According to the Southwestern Pennsylvania Commission (SPC) Cycle 10 projections, traffic in this section of the City of Pittsburgh has a linear growth rate of 0.5 percent annually.

This background traffic growth rate does not include trip projections for the background developments including The Riviera and the Elmhurst PTC development, for which site generated trips were developed as described in Section 4.1 of this report.

#### **4.2.2 2021 Opening Year No-Build (Base) Conditions Traffic Volumes (Without Development)**

Forecasted 2021 opening year no-build (base) conditions traffic volumes for each of the peak periods analyzed were determined by applying the aforementioned background growth rate of 0.5% per year, linear to the existing 2018 traffic volumes (Figure 6). The forecasted trips to be generated by the background developments (The Riviera and the Elmhurst PTC development) presented in Figure 9 were then added to these volumes. The resultant forecasted opening year 2021 no-build (base) conditions traffic volumes are presented in Figure 11.



#### **4.2.3 2021 Opening Year No-Build Base Conditions - Intersection Levels of Service**

Using the analysis methodologies described in Section 3.3.2.5, intersection levels of service were determined at all of the study intersections under opening year 2021 no-build (base) conditions. The results of the capacity analyses are summarized in Table 1 for the weekday A.M. peak hour and in Table 2 for the weekday P.M. peak hour. Results of the opening year 2021 no-build (base) conditions are also presented graphically in Figure 12.

The results of the capacity calculations performed using forecasted opening year 2021 no-build (base) condition traffic volumes revealed that each of the study intersections can be anticipated to operate at an overall intersection Level of Service D or better during the weekday A.M. and weekday P.M. peak hours.

Detailed capacity and levels of service printouts are provided in Appendix E to this report.

#### **4.3 Build Traffic Volumes (With Development)**

##### **4.3.1 Opening Year 2021 Build Conditions Traffic Volumes (With PTC Master Plan Developments)**

As described in Section 4.2.1, the proposed PTC Garage 3 development is anticipated to consist of a new 600 space parking garage. This garage is being developed in order to support current and future developments within the PTC as part of the overall master plan for the site. However, parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate the trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network.

However, in order to evaluate the potential traffic impacts associated with future PTC master plan developments (not yet constructed), vehicular trip generation projections were made based on the PTC master plan exhibit prepared by the Urban Redevelopment Authority (URA) and dated August 2019.

The forecasted opening year 2021 build traffic volumes (with future PTC master plan developments) for the A.M. and P.M. peak hours were determined by adding the forecasted trips to be generated by future PTC master plan developments (Figure 10) to the opening year 2021 no-build (base) traffic volumes (Figure 11). The resultant forecasted opening year 2021 build traffic volumes (with future PTC master plan developments) are presented in Figure 13.

##### **4.3.2 Opening Year 2021 Build Conditions (With PTC Master Plan Developments) - Intersections Levels of Service**

Using the methodologies described in Section 3.3.2.5, intersection levels of service were determined at all of the study intersections under opening year 2021 build conditions (with PTC master plan developments).

As previously stated, the proposed PTC Garage 3 is being developed in order to support current and future developments within the PTC as part of the overall master plan for the site. However, parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate the trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network. The build condition capacity analyses contained within this report represent potential projected conditions upon full-build out of the PTC site as detailed in the URA August 2019 exhibit (Figure 3). The results of the build conditions capacity analyses are therefore, for information purposes for long range planning of the PTC site.

As stated in the City of Pittsburgh *Transportation Impact Study Review Guidelines*, 2018: “The TIS shall compare the LOS and delay of the future year conditions without the development to the future year conditions with the development. An impact occurs when the overall intersection LOS degrades and the average delay per vehicle increases more than 10.0 seconds. When an intersection is anticipated to operate at LOS F during the future conditions without development, the 10.0 second allowable increase shall apply.”

The results of the capacity calculations performed using the opening year 2021 build conditions (with PTC master plan developments) are summarized in Figure 14 for the weekday A.M. and weekday P.M. peak hours, as well as in Tables 1 and 2, respectively. The results of the capacity calculations performed revealed the following:

- Second Avenue with Bates Street/Technology Drive: The overall intersection LOS is anticipated to continue to operate at an overall intersection LOS D during the weekday A.M. and the weekday P.M. peak hours. No degradations in LOS are projected for this study intersection.
- Second Avenue with Middle Access Road: The overall intersection LOS is anticipated to continue to operate at a LOS A during the weekday A.M. peak hour. The overall intersection LOS is anticipated to decrease from a LOS A to a LOS B during the weekday P.M. peak hour. Although the LOS is anticipated to decrease during the P.M. peak hour, the overall intersection delay is projected to increase by only 2.6 seconds. This increase in delay is within the acceptable 10-second delay degradation limit established within aforementioned City of Pittsburgh Transportation Impact Review Guidelines.
- Second Avenue with Western Access Road: The overall intersection LOS is anticipated to continue to operate at a LOS A during the weekday A.M. peak hour and LOS B during the weekday P.M. peak hour. No degradations in LOS are projected for this study intersection.

Detailed capacity and levels of service printouts are provided in Appendix F to this report.

#### **4.3.3 Design Year 2031 No-Build (Base) Conditions Traffic Volumes (Without Development)**

As previously mentioned, the proposed PTC Garage 3 is anticipated to be constructed in 2021 (“opening year”). Therefore, traffic volumes were also projected for the study intersections for design year 2031 conditions, ten (10) years beyond the anticipated opening year, in order to provide a conservative analysis for impacts related to future PTC master plan developments. This 10 year projection is consistent with the City of Pittsburgh Department of Mobility and Infrastructure *Transportation Impact Review Guidelines*, 2018 for master plan developments.

Forecasted design year 2031 no-build (base) conditions traffic volumes for each of the peak periods analyzed were determined by applying the aforementioned background growth rate of 0.5% per year, linear to the existing 2018 traffic volumes (Figure 6). The forecasted trips to be generated by the background developments (The Riviera and the Elmhurst PTC development) presented in Figure 9 were then added to these volumes. The resultant forecasted design year 2031 no-build (base) conditions traffic volumes are presented in Figure 15.

#### **4.3.4 Design Year 2031 No-Build (Base) Conditions – Intersections Levels of Service**

Using the analysis methodologies described in Section 3.3.2.5, intersection levels of service were determined at all of the study intersections under design year 2031 no-build (base) conditions. The results of the capacity calculations performed using design year 2031 no-build (base) conditions weekday A.M. and P.M. peak hour volumes are summarized in Table 1 and Table 2, respectively. Results of the design year 2031 no-build (base) conditions are also presented graphically in Figure 16.

The results of the capacity calculations performed using forecasted design year 2031 no-build (base) condition traffic volumes revealed that each of the study intersections can be anticipated to operate at an overall intersection Level of Service D or better during the weekday A.M. and weekday P.M. peak hours.

Detailed capacity and levels of service printouts are provided in Appendix G to this report.

#### **4.3.5 Design Year 2031 Build Conditions Traffic Volumes (With PTC Master Plan Developments)**

As described in Section 4.2.1, the proposed PTC Garage 3 development is anticipated to consist of a new 600 space parking garage. This garage is being developed in order to support current and future developments within the PTC as part of the overall master plan for the site. However, parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate the trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network.

However, in order to evaluate the potential traffic impacts associated with future PTC master plan developments (not yet constructed), vehicular trip generation projections were made based on the PTC master plan exhibit prepared by the Urban Redevelopment Authority (URA) and dated August 2019.

The forecasted opening year 2021 build traffic volumes (with future PTC master plan developments) for the weekday A.M. and weekday P.M. peak hours were determined by adding the forecasted trips to be generated by future PTC master plan developments (Figure 10) to the design year 2031 no-build (base) traffic volumes (Figure 15). The resultant forecasted opening year 2021 build traffic volumes (with future PTC master plan developments) are presented in Figure 17.

#### **4.3.6 Design Year 2031 Build Conditions (With PTC Master Plan Developments) – Intersections Levels of Service**

Using the methodologies described in Section 3.3.2.5, intersection levels of service were determined at all of the study intersections under design year 2031 build conditions (with PTC master plan developments).

As previously stated, the proposed PTC Garage 3 is being developed in order to support current and future developments within the PTC as part of the overall master plan for the site. However, parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate the trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network. The build condition capacity analyses contained within this report represent potential projected conditions upon full-build out of the PTC site as detailed in the URA August 2019 exhibit (Figure 2). The results of the build conditions capacity analyses are therefore, for information purposes for long range planning of the PTC site.

As stated in the City of Pittsburgh *Transportation Impact Study Review Guidelines*, 2018: “*The TIS shall compare the LOS and delay of the future year conditions without the development to the future year conditions with the development. An impact occurs when the overall intersection LOS degrades and the average delay per vehicle increases more than 10.0 seconds. When an intersection is anticipated to operate at LOS F during the future conditions without development, the 10.0 second allowable increase shall apply.*”

The results of the capacity calculations performed using the design year 2031 build conditions (with PTC master plan developments) are summarized in Figure 18 for the A.M. and P.M. peak hours, as well as in Tables 1 and 2, respectively. The results of the capacity calculations performed revealed the following:

- Second Avenue with Bates Street/Technology Drive: The overall intersection LOS is anticipated to continue to operate at an overall intersection LOS D during the weekday A.M. and the weekday P.M. peak hours. No degradations in LOS are projected for this study intersection.
- Second Avenue with Middle Access Road: The overall intersection LOS is anticipated to continue to operate at a LOS A during the weekday A.M. peak hour. The overall intersection LOS is anticipated to decrease from a LOS A to a LOS B during the weekday P.M. peak hour. Although the LOS is anticipated to decrease during the P.M. peak hour, the overall intersection delay is projected to increase by only 2.7 seconds. This increase in delay is within the acceptable 10-second delay degradation limit established within aforementioned City of Pittsburgh Transportation Impact Review Guidelines.
- Second Avenue with Western Access Road: The overall intersection LOS is anticipated to continue to operate at a LOS A during the weekday A.M. peak hour and LOS B during the weekday P.M. peak hour. No degradations in LOS are projected for this study intersection.

Detailed capacity and levels of service printouts are provided in Appendix H to this report.

## 5.0 SUPPLEMENTARY ANALYSES

### **5.1 Parking Analysis**

The proposed 600 space PTC Garage 3 is being developed to support current and future developments within the Pittsburgh Technology Center as part of the overall master plan for the PTC. It should be noted, however, that parking garages alone do not generate parking demand and therefore are not subject to a parking analysis.

According to Section 914.05.D of the City of Pittsburgh Urban Zoning Code, the proposed 600 space parking garage is required to provide bicycle parking at a ratio of 1 space for every 10 vehicular parking spaces. Therefore, it is anticipated that 60 bicycle parking spaces will be incorporated into the proposed PTC Garage 3 development.

### **5.2 Loading Analysis**

Not applicable. Loading spaces are not required for a parking garage.

### **5.3 Queuing Analysis**

As stated in the City of Pittsburgh Transportation Impact Study Review Guidelines, 2018: *“When all of the study intersections within the study area operate at LOS D or better, the queuing from Synchro may be reported.”* Based on the results of the capacity analyses performed, all study intersections are anticipated to operate at an overall intersection LOS D or better during both the A.M. and P.M. peak hours. Furthermore, all movements are projected to operate with volume to capacity ratios less than 1.0. Therefore, as instructed by the City of Pittsburgh guidelines, the 95<sup>th</sup> percentile queue lengths calculated using Synchro Traffic Signal Coordination Software, Version 10 were reported.

Based on the results of these analyses, the 95th percentile queue lengths under opening year 2021 build (with PTC master plan developments) and design year 2031 build conditions (with PTC master plan developments) are not expected to have a significant increase over the opening year 2021 no-build (base) and design year 2031 no-build (base) conditions. Any potential increases in queue lengths are projected to be approximately three (3) vehicles or fewer.

It should be noted that at the intersection of Second Avenue with Bates Street/Technology Drive, the southbound Bates Street movements are anticipated to queue back past its intersection with the ramp leading to I-376 eastbound due to the short block length between these intersections. This 95th percentile queue length is anticipated to occur under existing conditions and well as all future no-build and build (with PTC master plan developments) conditions during the weekday A.M. and weekday P.M. peak hours.

It should also be noted that at the intersection of Second Avenue with Bates Street/Technology Drive, the

westbound Second Avenue through movement 95<sup>th</sup> percentile queue lengths are projected to queue back past its intersection with Hot Metal Street. This queue length is also anticipated to occur under existing conditions and projected no-build and build (with PTC master plan developments) conditions analyses during the weekday A.M. peak hour.

These calculated queueing conditions are expected to occur with or without the proposed PTC master plan developments. The potential minor increases in queue length are not expected to have a significant impact on the operations of the study network; therefore, no mitigations are recommended.

The 95<sup>th</sup> percentile queue lengths during the weekday A.M. peak hour and weekday P.M. peak hour are summarized in Tables 4 and 5, respectively.

Detailed Synchro queueing reports are included with the capacity calculations provided in the Appendix to this report.

#### **5.4 *Traffic Signal Warrants***

Actuated traffic signal controls currently exists at all study intersections. Therefore, no signal warrant analyses were performed.

#### **5.5 *Auxiliary Turn Lane Warrants***

Auxiliary left turn lanes are currently provided into the PTC site at all study intersections. Therefore, no auxiliary turn lane warrant analyses were performed.

#### **5.6 *Transportation Demand Management Plan***

As previously stated, the proposed PTC Garage 3 is being developed in order to support current and future developments within the PTC as part of the overall master plan for the site. However, parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate the trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network and would not require a transportation demand management plan. However, it is expected that as future developments occur within the study area including future PTC master plan developments, transportation demand management strategies would be investigated at that time.



## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

## **6.1 Conclusions and Recommendations**

This study has been performed in order to determine the transportation impacts of the proposed PTC Garage 3 development. These impacts were evaluated based upon the criteria published in the City of Pittsburgh's Transportation Impact Review Guidelines, 2018.

The proposed PTC Garage 3 is being developed in order to support current and future developments within the PTC as part of the overall master plan for the site. However, parking garages themselves do not generate trips. It is the adjacent land uses associated with the parking garage that generate the trips. Therefore, the proposed PTC Garage 3 parking garage would not, by itself, generate traffic impacts on the surrounding roadway network. The build condition capacity analyses contained within this report represent potential projected conditions upon full-build out of the PTC master plan as detailed in the URA August 2019 exhibit (Figure 3). The results of the build conditions capacity analyses are calculated for information purposes for long range planning of the PTC site.

According to Section 914.05.D of the City of Pittsburgh Urban Zoning Code, the proposed 600 space parking garage is required to provide bicycle parking at a ratio of one (1) space for every 10 vehicular parking spaces. Therefore, it is anticipated that 60 bicycle parking spaces will be incorporated into the proposed PTC Garage 3 development.

Based on the results of the capacity analyses, the proposed development is not expected to have a significant impact on the surrounding roadway network. The study intersections are controlled by actuated traffic signal controllers, which are anticipated to accommodate the future traffic volumes with acceptable levels of service. In order to continue to provide efficient traffic progression through the study intersections, it is expected that optimized traffic signal timings would be implemented as future developments within the PTC or other developments within the study area are completed. No further mitigation measures are necessary in order to accommodate the projected trips generated by the potential future PTC master plan developments.

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## **TABLES**

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**TABLE 1  
CAPACITY ANALYSIS SUMMARY  
Pittsburgh Technology Center (PTC) Garage 3 Transportation Impact Study  
City of Pittsburgh, Allegheny County, Pennsylvania**

Approach/ Movement/ Intersection	Movement	Level of Service (Delay) <sup>(1)</sup>				
		A.M. Peak Hour				
		2018 Existing	2021 No-Build (Base)	2021 Build (with PTC Master Plan Developments)	2031 No-Build (Base)	2031 Build (with PTC Master Plan Developments)
<b>Second Avenue and Bates Street/Technology Drive</b>						
<b>Eastbound</b> <i>Second Avenue</i>	Left Turn	E (61.9)	E (69.2)	E (77.8)	E (69.4)	E (76.5)
	Through	B (12.9)	B (16.7)	B (18.2)	B (16.9)	B (18.5)
	Right Turn	B (12.9)	B (16.7)	B (18.2)	B (16.9)	B (18.5)
	Approach	C (30.6)	D (35.6)	D (39.6)	D (35.8)	D (39.4)
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	D (54.2)	E (59.5)	E (61.1)	E (60.4)	E (61.4)
	Through	C (27.9)	C (33.6)	D (38.8)	D (37.4)	D (45.5)
	Right Turn	C (30.8)	D (35.4)	D (42.2)	D (40.4)	D (52.0)
	Approach	C (30.0)	D (36.7)	D (42.4)	D (40.6)	D (49.8)
<b>Northbound</b> <i>Technology Drive</i>	Left Turn	D (52.4)	D (52.7)	D (54.7)	D (53.5)	D (54.9)
	Through	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
	Right Turn	D (45.7)	D (42.5)	D (42.7)	D (43.2)	D (42.8)
	Approach	D (50.0)	D (47.6)	D (48.3)	D (48.4)	D (48.4)
<b>Southbound</b> <i>Bates Street</i>	Left Turn	D (46.9)	D (49.7)	D (54.2)	D (52.5)	E (55.4)
	Through	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
	Right Turn	C (31.7)	C (32.8)	D (35.9)	C (32.9)	D (35.3)
	Approach	D (43.4)	D (45.5)	D (48.6)	D (47.6)	D (49.3)
<b>Overall Intersection</b>		<b>C (33.9)</b>	<b>D (39.0)</b>	<b>D (43.8)</b>	<b>D (41.8)</b>	<b>D (47.9)</b>
<b>Second Avenue and Middle Access Road</b>						
<b>Eastbound</b> <i>Second Avenue</i>	Approach	A (6.5)	A (7.7)	A (9.1)	A (7.8)	A (8.9)
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	C (23.3)	C (21.4)	C (22.4)	C (21.5)	C (23.1)
	Through	A (2.8)	A (2.8)	A (2.9)	A (2.9)	A (2.9)
	Approach	A (3.5)	A (4.6)	A (5.8)	A (4.6)	A (5.7)
<b>Northbound</b> <i>Middle Access Rd</i>	Approach	D (46.2)	C (27.6)	C (24.9)	C (27.7)	C (25.8)
<b>Overall Intersection</b>		<b>A (4.7)</b>	<b>A (5.9)</b>	<b>A (7.2)</b>	<b>A (5.9)</b>	<b>A (7.1)</b>

**TABLE 1 (continued)**  
**CAPACITY ANALYSIS SUMMARY**  
**Pittsburgh Technology Center (PTC) Garage 3 Transportation Impact Study**  
**City of Pittsburgh, Allegheny County, Pennsylvania**

Approach/ Movement/ Intersection	Movement	Level of Service (Delay) <sup>(1)</sup>				
		A.M. Peak Hour				
		2018 Existing	2021 No-Build (Base)	2021 Build (with PTC Master Plan Developments)	2031 No-Build (Base)	2031 Build (with PTC Master Plan Developments)
<b>Second Avenue and Western Access Road</b>						
<b>Eastbound</b> <i>Second Avenue</i>	Approach	A (7.4)	A (7.4)	A (9.7)	A (7.4)	A (9.7)
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	C (20.3)	C (23.0)	C (26.6)	C (23.4)	C (27.0)
	Through	A (2.8)	A (2.7)	A (2.6)	A (2.7)	A (2.6)
	Approach	A (4.0)	A (4.1)	A (6.8)	A (4.0)	A (6.7)
<b>Northbound</b> <i>Western Access Rd</i>	Left Turn	C (23.7)	C (24.0)	C (25.9)	C (24.4)	C (26.4)
	Right Turn	C (21.0)	C (20.2)	C (24.4)	C (20.5)	C (24.8)
	Approach	C (22.8)	C (23.5)	C (25.5)	C (23.9)	C (25.9)
<b>Overall Intersection</b>		<b>A (5.5)</b>	<b>A (5.9)</b>	<b>A (8.6)</b>	<b>A (5.8)</b>	<b>A (8.5)</b>

(1) Level of service and vehicular delay calculated using HCM 6th Edition module in Synchro Traffic Signal Coordination Software, Version 10.

**TABLE 2**  
**CAPACITY ANALYSIS SUMMARY**  
**Pittsburgh Technology Center (PTC) Garage 3 Transportation Impact Study**  
**City of Pittsburgh, Allegheny County, Pennsylvania**

Approach/ Movement/ Intersection	Movement	Level of Service (Delay) <sup>(1)</sup>				
		P.M. Peak Hour				
		2018 Existing	2021 No-Build (Base)	2021 Build (with PTC Master Plan Developments)	2031 No-Build (Base)	2031 Build (with PTC Master Plan Developments)
<b>Second Avenue and Bates Street/Technology Drive</b>						
<b>Eastbound</b> <i>Second Avenue</i>	Left Turn	D (50.7)	E (55.7)	E (67.1)	E (59.8)	E (70.0)
	Through	B (19.3)	C (23.2)	C (26.6)	C (23.6)	C (26.3)
	Right Turn	B (19.2)	C (23.1)	C (26.5)	C (23.4)	C (26.2)
	Approach	C (26.9)	C (31.3)	D (37.0)	C (32.6)	D (37.5)
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	D (54.6)	D (53.3)	E (57.8)	E (55.3)	E (58.8)
	Through	C (31.2)	D (36.2)	D (43.7)	D (37.9)	D (44.5)
	Right Turn	D (42.5)	D (54.6)	E (69.2)	E (60.5)	E (74.1)
	Approach	D (37.7)	D (46.6)	E (57.3)	D (50.5)	E (60.3)
<b>Northbound</b> <i>Technology Drive</i>	Left Turn	D (54.0)	E (56.1)	E (60.8)	E (61.5)	E (71.8)
	Through	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
	Right Turn	D (43.5)	D (44.8)	E (56.5)	D (47.5)	E (65.0)
	Approach	D (50.8)	D (51.1)	E (58.7)	E (55.3)	E (68.4)
<b>Southbound</b> <i>Bates Street</i>	Left Turn	D (40.4)	D (43.0)	D (48.6)	D (45.7)	D (50.5)
	Through	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
	Right Turn	C (22.0)	C (22.3)	C (24.1)	C (22.7)	C (23.9)
	Approach	D (37.8)	D (40.0)	D (44.5)	D (42.4)	D (46.1)
<b>Overall Intersection</b>		<b>C (33.7)</b>	<b>D (39.0)</b>	<b>D (46.4)</b>	<b>D (41.5)</b>	<b>D (48.9)</b>
<b>Second Avenue and Middle Access Road</b>						
<b>Eastbound</b> <i>Second Avenue</i>	Approach	A (5.7)	A (7.5)	A (9.7)	A (7.6)	A (10.0)
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	E (57.2)	D (45.0)	D (46.1)	D (46.1)	D (47.3)
	Through	A (1.9)	A (2.6)	A (3.4)	A (2.6)	A (3.4)
	Approach	A (3.0)	A (4.6)	A (6.5)	A (4.6)	A (6.5)
<b>Northbound</b> <i>Middle Access Rd</i>	Approach	C (32.6)	D (35.5)	C (33.9)	D (36.4)	C (34.7)
<b>Overall Intersection</b>		<b>A (5.6)</b>	<b>A (8.6)</b>	<b>B (11.2)</b>	<b>A (8.6)</b>	<b>B (11.3)</b>

**TABLE 2 (continued)**  
**CAPACITY ANALYSIS SUMMARY**  
**Pittsburgh Technology Center (PTC) Garage 3 Transportation Impact Study**  
**City of Pittsburgh, Allegheny County, Pennsylvania**

Approach/ Movement/ Intersection	Movement	Level of Service (Delay) <sup>(1)</sup>				
		P.M. Peak Hour				
		2018 Existing	2021 No-Build (Base)	2021 Build (with PTC Master Plan Developments)	2031 No-Build (Base)	2031 Build (with PTC Master Plan Developments)
<b>Second Avenue and Western Access Road</b>						
<b>Eastbound</b> <i>Second Avenue</i>	Approach	A (7.2)	A (8.9)	B (12.0)	A (9.0)	B (12.4)
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	E (73.7)	E (75.7)	D (41.2)	E (76.6)	D (42.0)
	Through	A (2.8)	A (3.7)	A (4.8)	A (3.7)	A (4.8)
	Approach	A (3.2)	A (4.1)	A (6.4)	A (4.1)	A (6.4)
<b>Northbound</b> <i>Western Access Rd</i>	Left Turn	C (31.4)	C (31.2)	C (31.6)	C (32.1)	C (32.4)
	Right Turn	C (26.4)	C (25.0)	C (25.8)	C (25.7)	C (26.4)
	Approach	C (30.3)	C (30.3)	C (30.1)	C (31.1)	C (30.8)
<b>Overall Intersection</b>		<b>A (8.3)</b>	<b>B (10.4)</b>	<b>B (13.8)</b>	<b>B (10.5)</b>	<b>B (14.1)</b>

(1) Level of service and vehicular delay calculated using HCM 6th Edition module in Synchro Traffic Signal Coordination Software, Version 10.

**TABLE 3  
TRIP GENERATION SUMMARY  
Pittsburgh Technology Center (PTC) Garage 3 Transportation Impact Study  
City of Pittsburgh, Allegheny County, Pennsylvania**

Development Component	Size	ITE Land Use Code	Trip Type <sup>(2)</sup>	Trip Generation <sup>(1)</sup>					
				A.M. Peak Hour			P.M. Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
<b>Background Developments</b>									
Riviera	155,000 GSF	710	Auto	119	19	138	23	116	139
			Transit	22	4	26	4	22	26
			Walk	0	0	0	0	0	0
			Bicycle	7	1	8	1	7	8
			SubTotal	148	24	172	28	145	173
Elmhurst	111,792SF Office / 60,196 SF General Light Industrial	710/110	Auto	156	22	178	30	146	176
			Transit	24	3	27	5	23	28
			Walk	0	0	0	0	0	0
			Bicycle	8	1	9	2	8	10
			SubTotal	188	26	214	37	177	214
Total Auto Trips			<b>Total</b>	<b>275</b>	<b>41</b>	<b>316</b>	<b>53</b>	<b>262</b>	<b>315</b>

<b>Pittsburgh Technology Center Master Plan Future Sites</b>									
Pitt Biotech Expansion	40,000 GSF	110	Auto	16	3	19	3	13	16
			Transit	3	0	3	0	3	3
			Walk	0	0	0	0	0	0
			Bicycle	1	0	1	0	1	1
			SubTotal	20	3	23	3	17	20
Parcel 8B	150,000 GSF	710	Auto	115	19	134	21	113	134
			Transit	22	3	25	4	21	25
			Walk	0	0	0	0	0	0
			Bicycle	7	1	8	1	7	8
			SubTotal	144	23	167	26	141	167
CMRI Expansion	87,000 GSF	710	Auto	74	12	86	13	67	80
			Transit	14	2	16	2	13	15
			Walk	0	0	0	0	0	0
			Bicycle	5	1	6	1	4	5
			SubTotal	93	15	108	16	84	100
PTC 2 West	160,000 GSF	710	Auto	121	20	141	23	120	143
			Transit	23	4	27	4	23	27
			Walk	0	0	0	0	0	0
			Bicycle	8	1	9	1	7	8
			SubTotal	152	25	177	28	150	178
SubTotal, All Travel Modes				409	66	475	73	392	465
Total Auto Trips				326	54	380	60	313	373

(1) Total number of vehicle trips generated determined through the use of methodologies presented in *Trip Generation, Tenth Edition* published by the Institute of Transportation Engineers (ITE).

(2) Modal split reductions are expected for the proposed development. According to the 2015 City of Pittsburgh Make My Trip Count Survey, commuter trips within the Oakland section of the City were comprised of 61% automobile, 26.1% transit, 7.2% walk, and 5.7% bicycle trips. The Make My Trip Count survey was later updated in 2018. According to this data, the PTC is included within the South Side section of Pittsburgh. Within this study area, commuter trips were comprised of 80% automobile and 20% alternative mode of travel. Finally, according to PGHSNAP data, 2011, PTC is included within the South Oakland section of the City. Within this study area, commuter trips are comprised of 55.8% automobile, 14% transit, 0% bicycle, and 30.2% walk. In order to provide a conservative analysis, all commuter modes from these surveys were compiled to develop an estimate for the PTC. Therefore, for analysis purposes, it was assumed that site generated trips for developments within the PTC would be comprised of 80% automobile, 15% transit, and 5% bicycle. No pedestrian split was assumed for analysis purposes due to the low number of pedestrians counted during the intersection turning movement counts performed at the study intersections.



**TABLE 4**  
**QUEUE ANALYSIS SUMMARY**  
**Pittsburgh Technology Center (PTC) Garage 3 Transportation Impact Study**  
**City of Pittsburgh, Allegheny County, Pennsylvania**

Approach	Movement	Existing Queue Capacity (Feet) <sup>(2)</sup>	95th Percentile Queue Length (Feet) <sup>(1)</sup>				
			A.M. Peak Hour				
			2018 Existing	2021 No-Build (Base)	2021 Build (with PTC Master Plan Developments)	2031 No-Build (Base)	2031 Build (with PTC Master Plan Developments)
<b>Second Avenue and Bates Street/Technology Drive</b>							
<b>Eastbound</b> <i>Second Avenue</i>	Left Turn	580	224	244	263	248	268
	Through/Right Turn	900	85	106	110	108	115
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	100	67	154	179	154	179
	Through/Right Turn	500	569	635	699	687	763
<b>Northbound</b> <i>Technology Drive</i>	Left Turn/Through	155+	36	46	57	46	57
	Right Turn	155+	15	24	32	24	32
<b>Southbound</b> <i>Bates Street</i>	Left Turn	180	322	354	385	390	409
	Left Turn/Through	180	325	366	389	395	408
	Right Turn	85	129	150	208	155	212
<b>Second Avenue and Middle Access Road</b>							
<b>Eastbound</b> <i>Second Avenue</i>	Through/Right Turn	850	77	98	124	104	135
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	200	26	56	114	58	118
	Through	850	61	67	80	71	85
<b>Northbound</b> <i>Middle Access Rd</i>	Left Turn/Right Turn	155+	6	16	31	16	32
<b>Second Avenue and Western Access Road</b>							
<b>Eastbound</b> <i>Second Avenue</i>	Through/Right Turn	850	100	117	168	123	177
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	180	43	58	135	60	135
	Through	850	61	65	61	69	65
<b>Northbound</b> <i>Western Access Rd</i>	Left Turn	125+	11	29	44	29	44
	Right Turn	125+	6	8	18	8	18

(1) Queue lengths reported represent the 95th percentile queue lengths calculated using Synchro Traffic Signal Coordination Software, Version 10. For analysis purposes vehicle car lengths are assumed to equal 25 feet.

(2) Available queue storage obtained from Google Earth, rounded to the nearest 5 feet.

**TABLE 5**  
**QUEUE ANALYSIS SUMMARY**  
**Pittsburgh Technology Center (PTC) Garage 3 Transportation Impact Study**  
**City of Pittsburgh, Allegheny County, Pennsylvania**

Approach	Movement	Existing Queue Capacity (Feet) <sup>(2)</sup>	95th Percentile Queue Length (Feet) <sup>(1)</sup>				
			P.M. Peak Hour				
			2018 Existing	2021 No-Build (Base)	2021 Build (with PTC Master Plan Developments)	2031 No-Build (Base)	2031 Build (with PTC Master Plan Developments)
<b>Second Avenue and Bates Street/Technology Drive</b>							
<b>Eastbound</b> <i>Second Avenue</i>	Left Turn	580	338	384	452	413	467
	Through/Right Turn	900	322	378	430	395	442
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	100	26	49	54	49	54
	Through/Right Turn	500	323	366	382	385	413
<b>Northbound</b> <i>Technology Drive</i>	Left Turn/Through	175	196	243	324	256	337
	Right Turn	155+	52	100	144	102	150
<b>Southbound</b> <i>Bates Street</i>	Left Turn	180	290	307	307	329	329
	Left Turn/Through	180	293	306	314	327	333
	Right Turn	85	60	64	73	67	74
<b>Second Avenue and Middle Access Road</b>							
<b>Eastbound</b> <i>Second Avenue</i>	Through/Right Turn	850	228	281	337	302	359
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	200	17	32	45	32	45
	Through	850	33	46	54	48	56
<b>Northbound</b> <i>Middle Access Rd</i>	Left Turn/Right Turn	155+	42	101	150	101	151
<b>Second Avenue and Western Access Road</b>							
<b>Eastbound</b> <i>Second Avenue</i>	Through/Right Turn	850	270	317	353	340	379
<b>Westbound</b> <i>Second Avenue</i>	Left Turn	180	8	8	35	8	35
	Through	850	46	60	75	62	78
<b>Northbound</b> <i>Western Access Rd</i>	Left Turn	125+	109	163	216	163	216
	Right Turn	125+	24	23	36	23	36

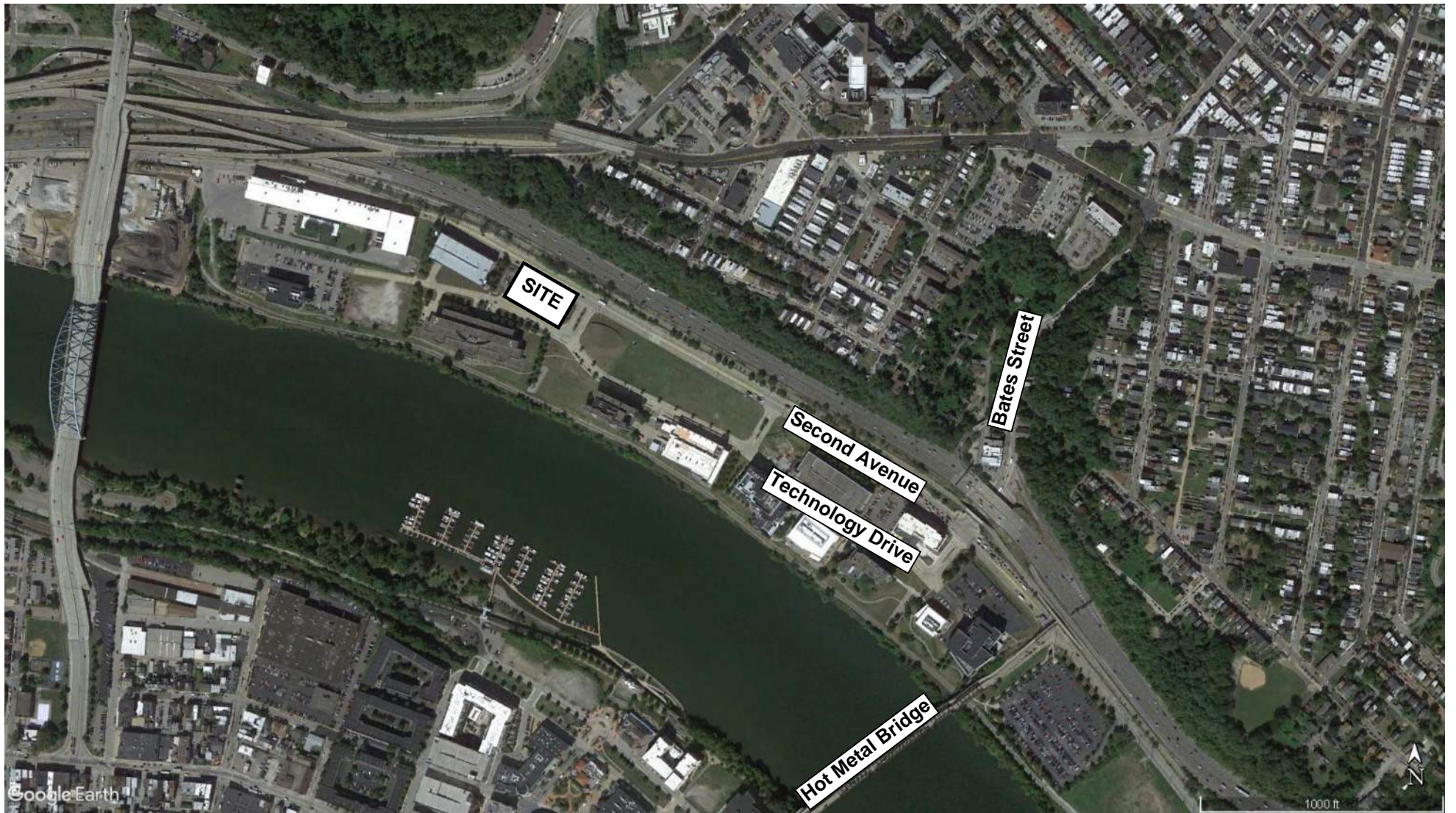
(1) Queue lengths reported represent the 95th percentile queue lengths calculated using Synchro Traffic Signal Coordination Software, Version 10. For analysis purposes vehicle car lengths are assumed to equal 25 feet.

(2) Available queue storage obtained from Google Earth, rounded to the nearest 5 feet.

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## FIGURES

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Pittsburgh Technology Center  
 PTC Garage 3  
 Transportation Impact Study

Site Location

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	



Google Earth

600 ft

Legend:



- Signalized Study Intersection



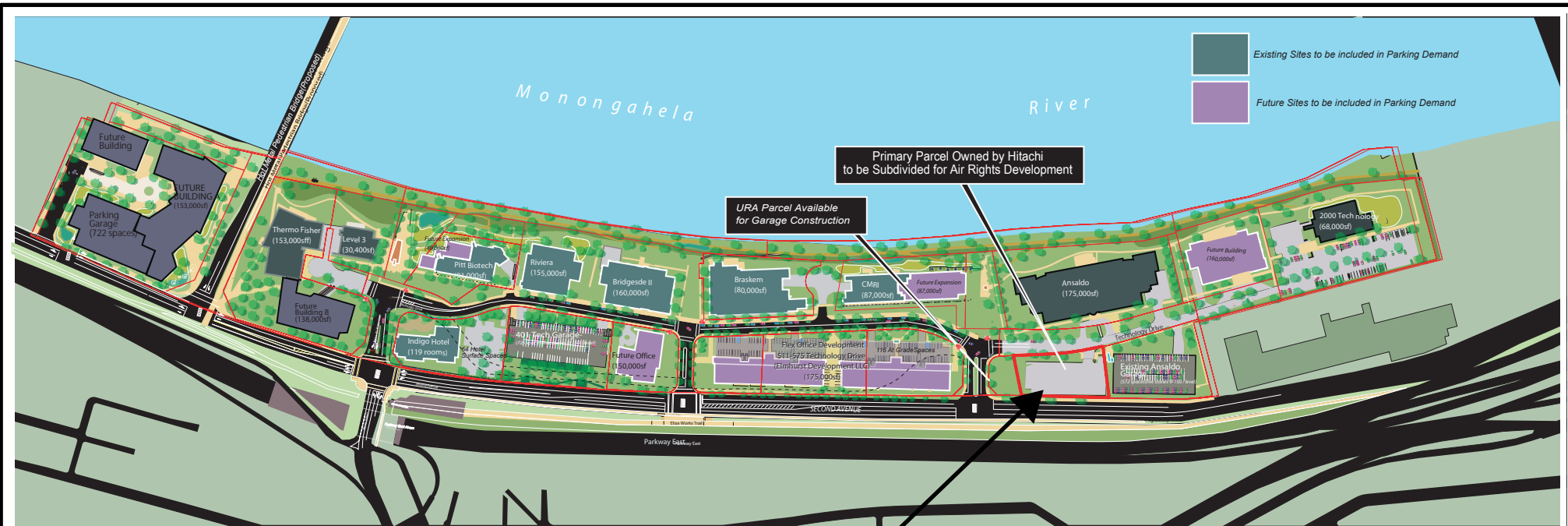
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Study Intersections

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	

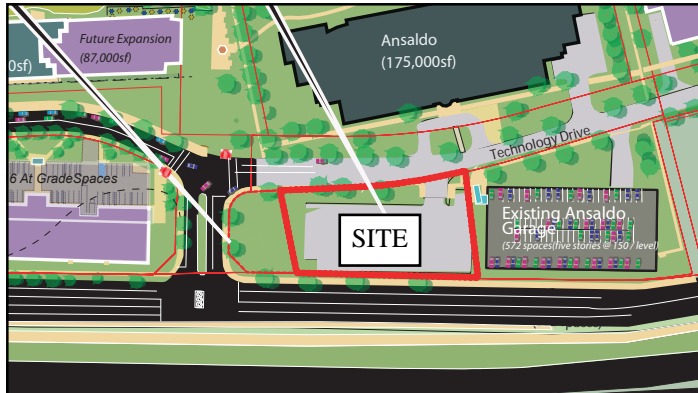
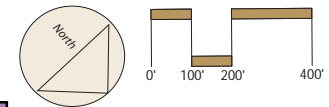


Existing Sites to be included in Parking Demand  
 Future Sites to be included in Parking Demand

Pittsburgh Technology Center  
 Garage RFP Exhibit



August 2019



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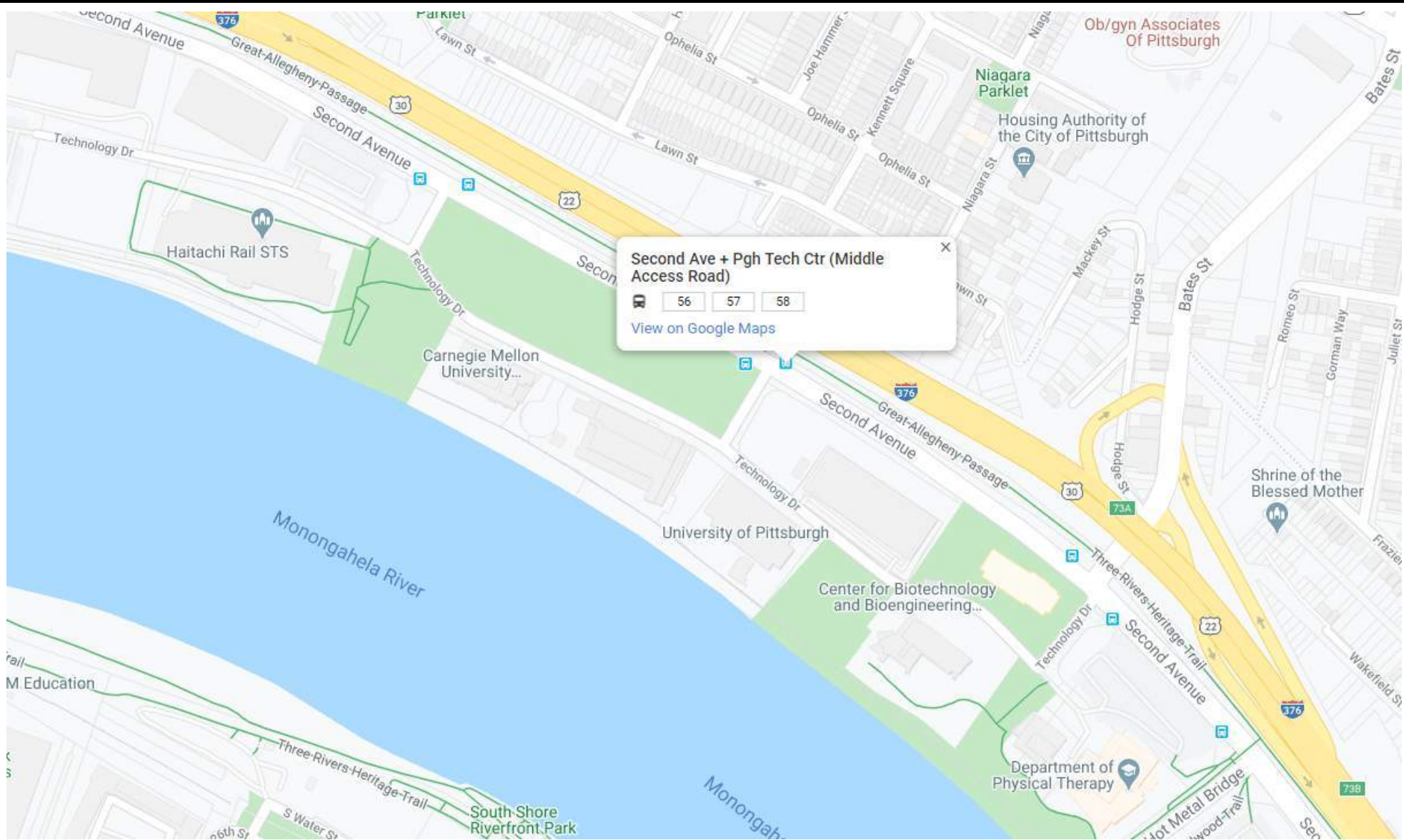
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Pittsburgh Technology Center  
 PTC Garage 3  
 Transportation Impact Study

---

Site Plan / PTC Master Plan

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	

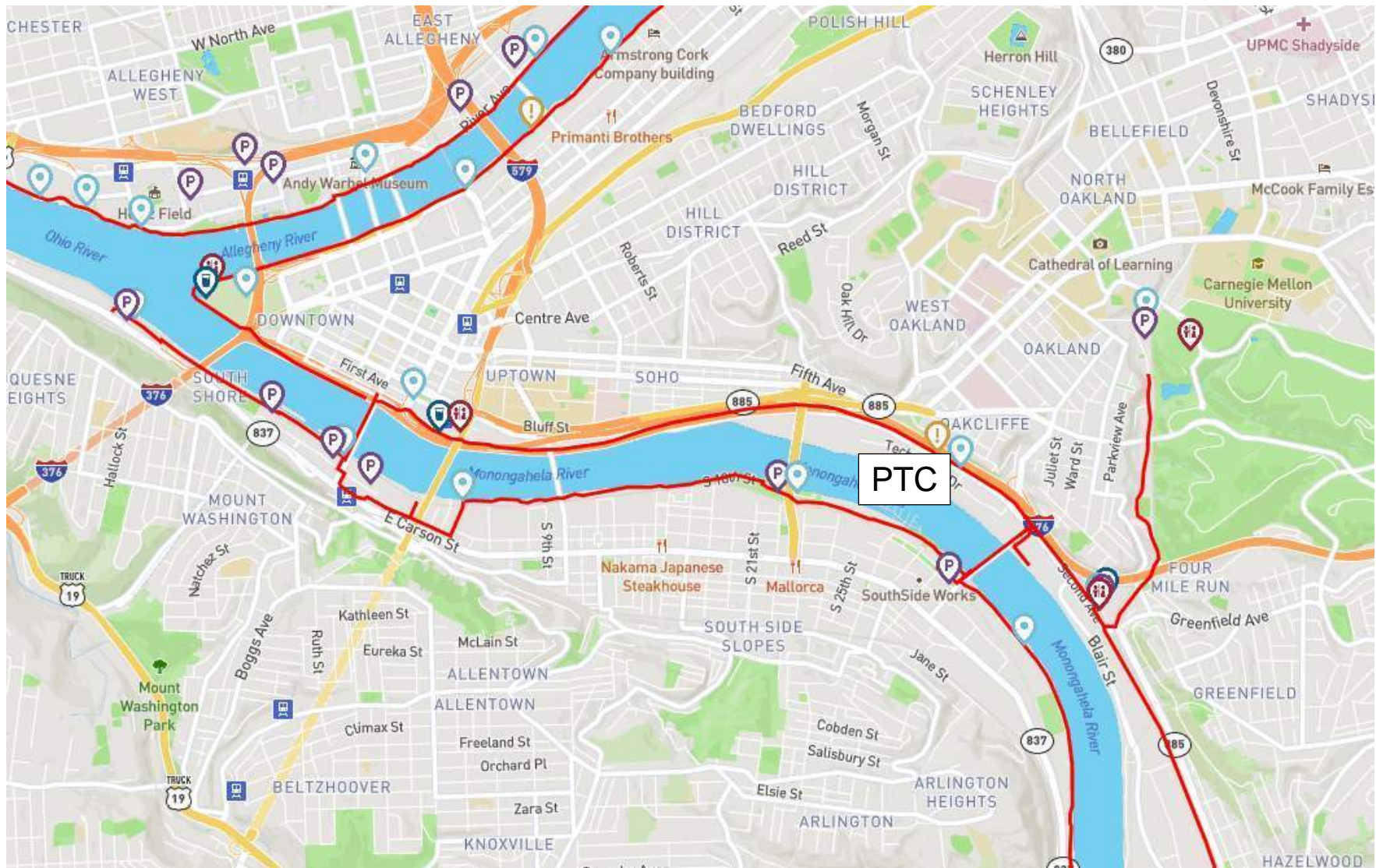


  
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Pittsburgh Technology Center  
 PTC Garage 3  
 Transportation Impact Study  
 Port Authority of Allegheny County Transit Routes  
 and Bus Stop Locations

Source: www.portauthority.org

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	4



  
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 Three Rivers Heritage Trail Map

Source: www.friendsoftheriverfront.org

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	





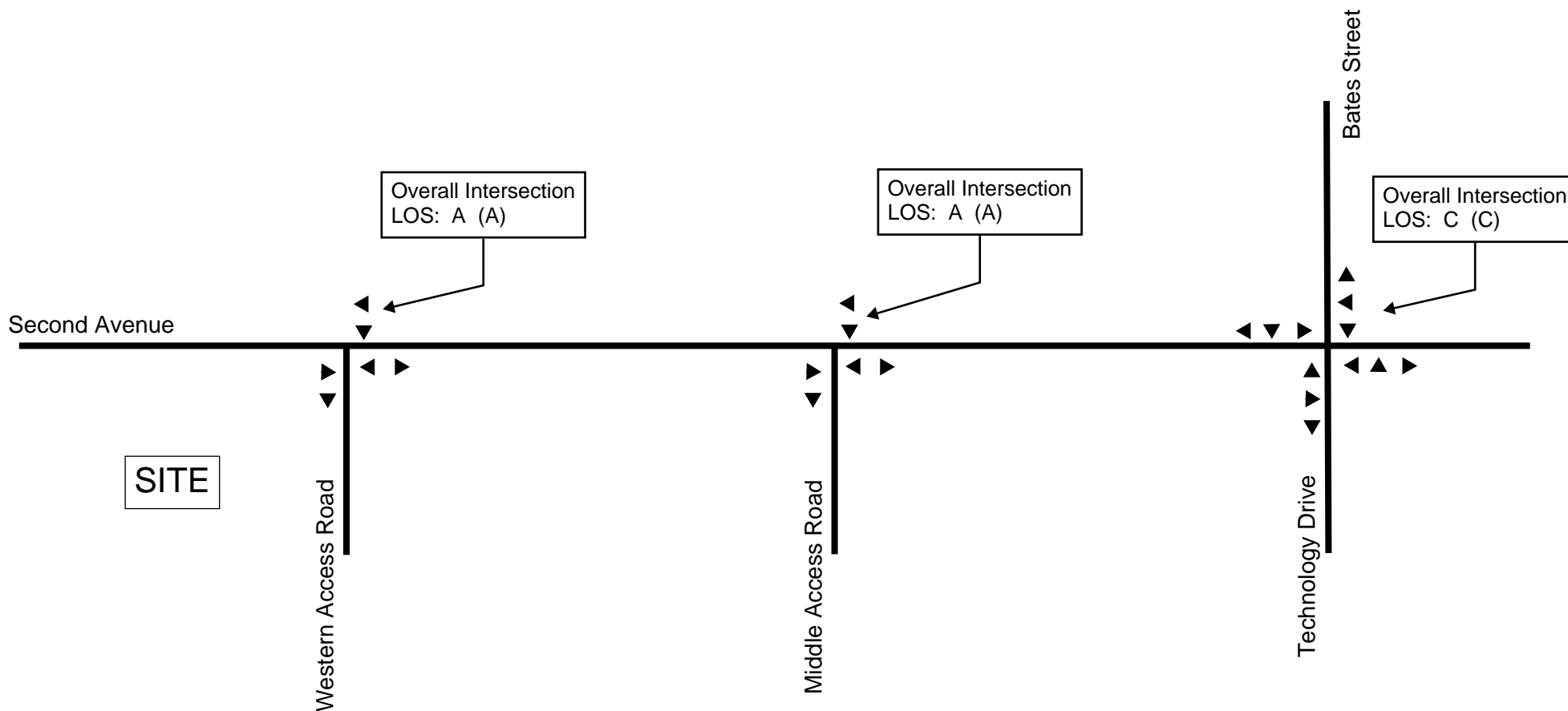
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Pittsburgh Technology Center  
 PTC Garage 3  
 Transportation Impact Study

2018 Existing Conditions Peak Hour Traffic Volumes

**Legend:**  
 123 - A.M. Peak Hour Traffic Volumes  
 (123) - P.M. Peak Hour Traffic Volumes

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	

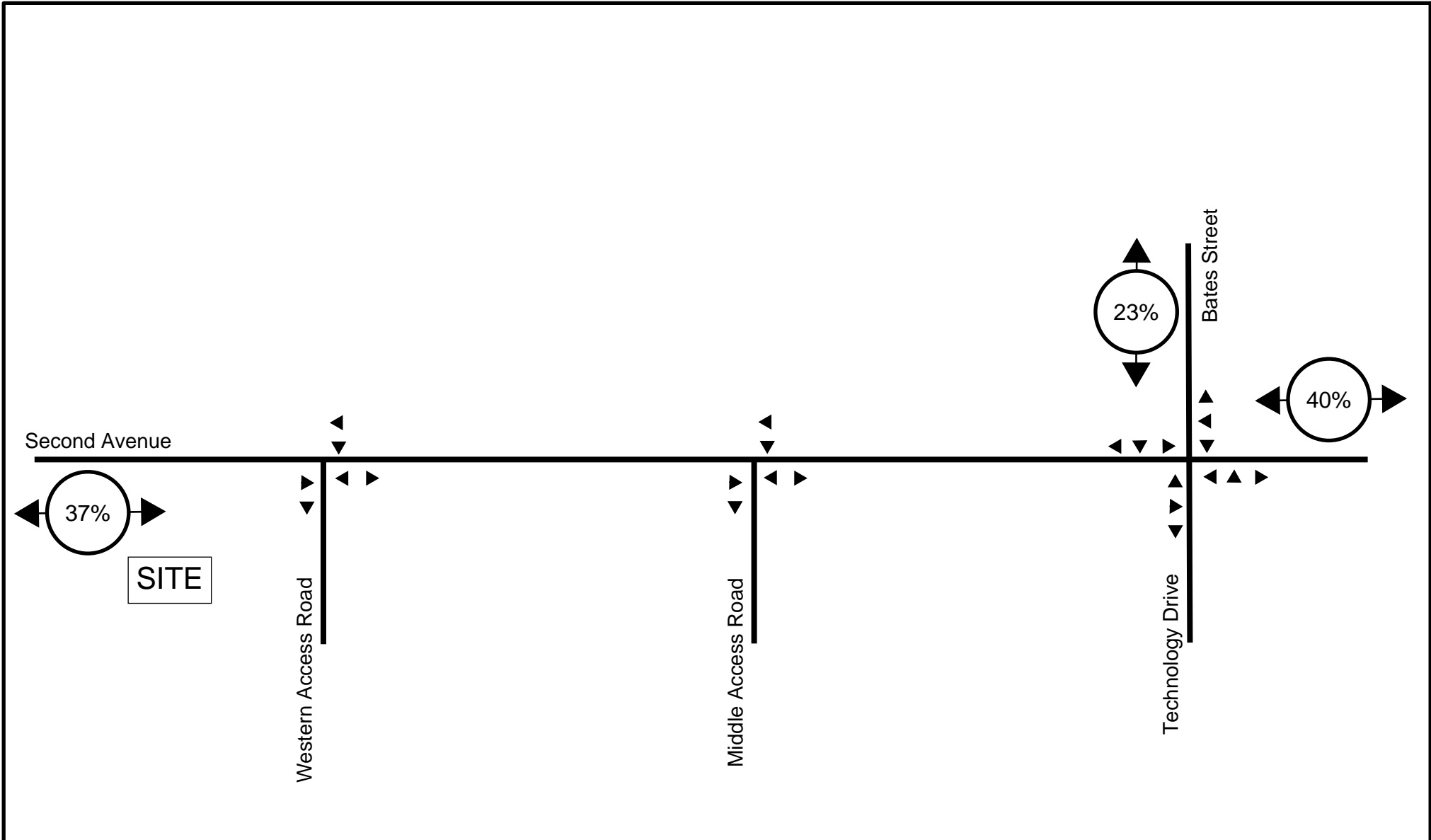


**Legend:**  
 A - A.M. Peak Hour Level of Service  
 (A) - P.M. Peak Hour Level of Service

  
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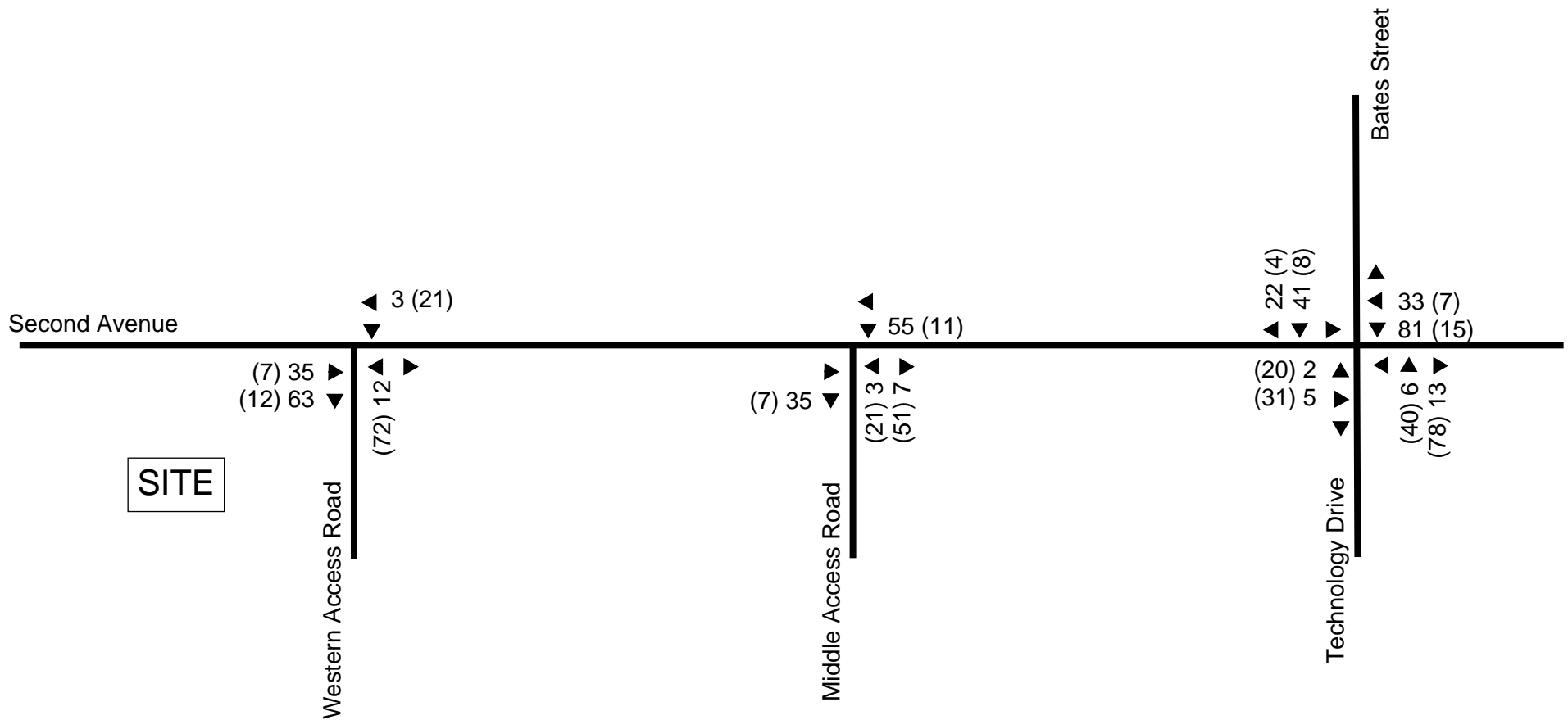
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 PTC Garage 3  
 Transportation Impact Study  
 2018 Existing Conditions Peak Hour Levels of Service

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	



**Legend:**  
 123 - A.M. Peak Hour Traffic Volumes  
 (123) - P.M. Peak Hour Traffic Volumes

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		Trip Arrival/Departure Distribution	
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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	



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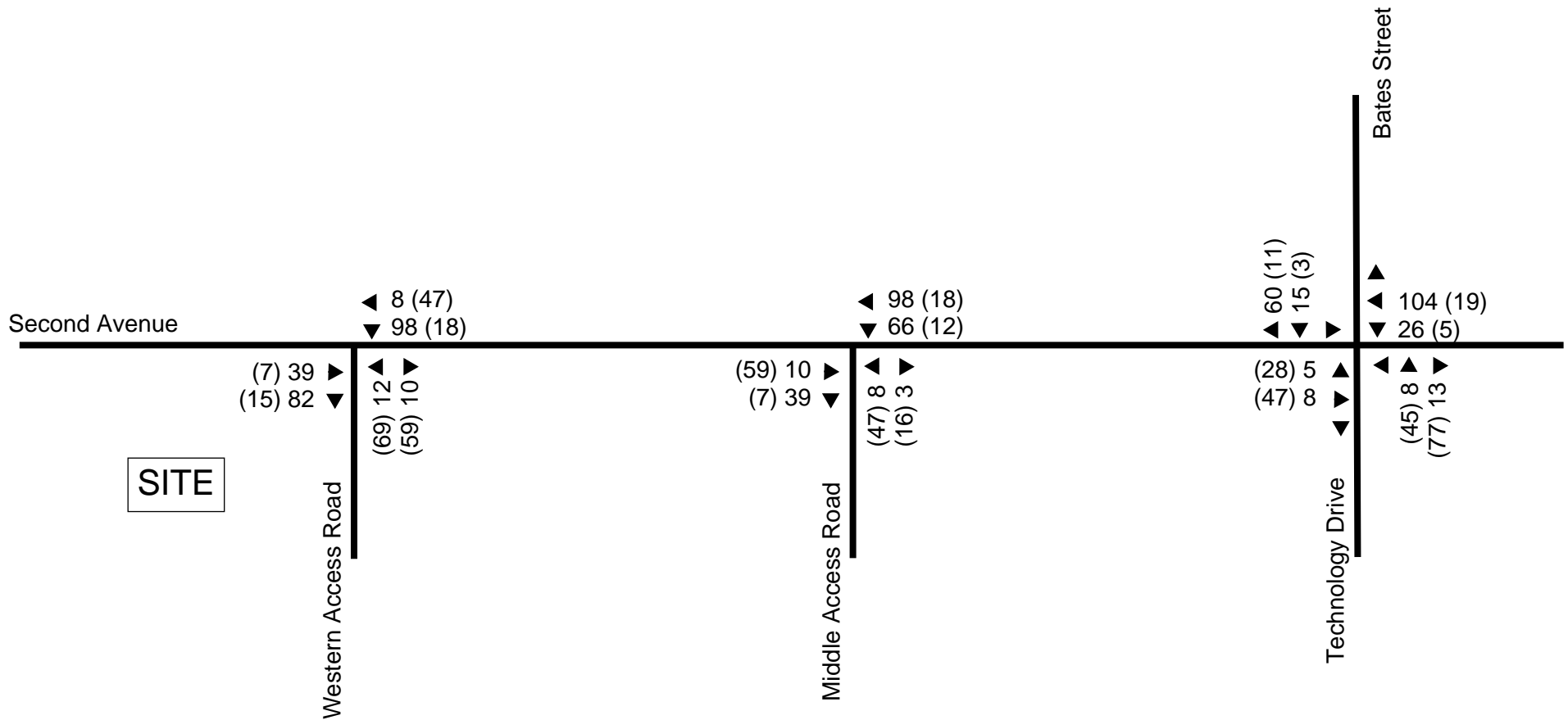
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Pittsburgh Technology Center  
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Peak Hour Site Generated Vehicular Trips  
 Background Developments

Legend:  
 123 - A.M. Peak Hour Traffic Volumes  
 (123) - P.M. Peak Hour Traffic Volumes

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	



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Peak Hour Site Generated Vehicular Trips  
 PTC Master Plan Developments

Legend:  
 123 - A.M. Peak Hour Traffic Volumes  
 (123) - P.M. Peak Hour Traffic Volumes

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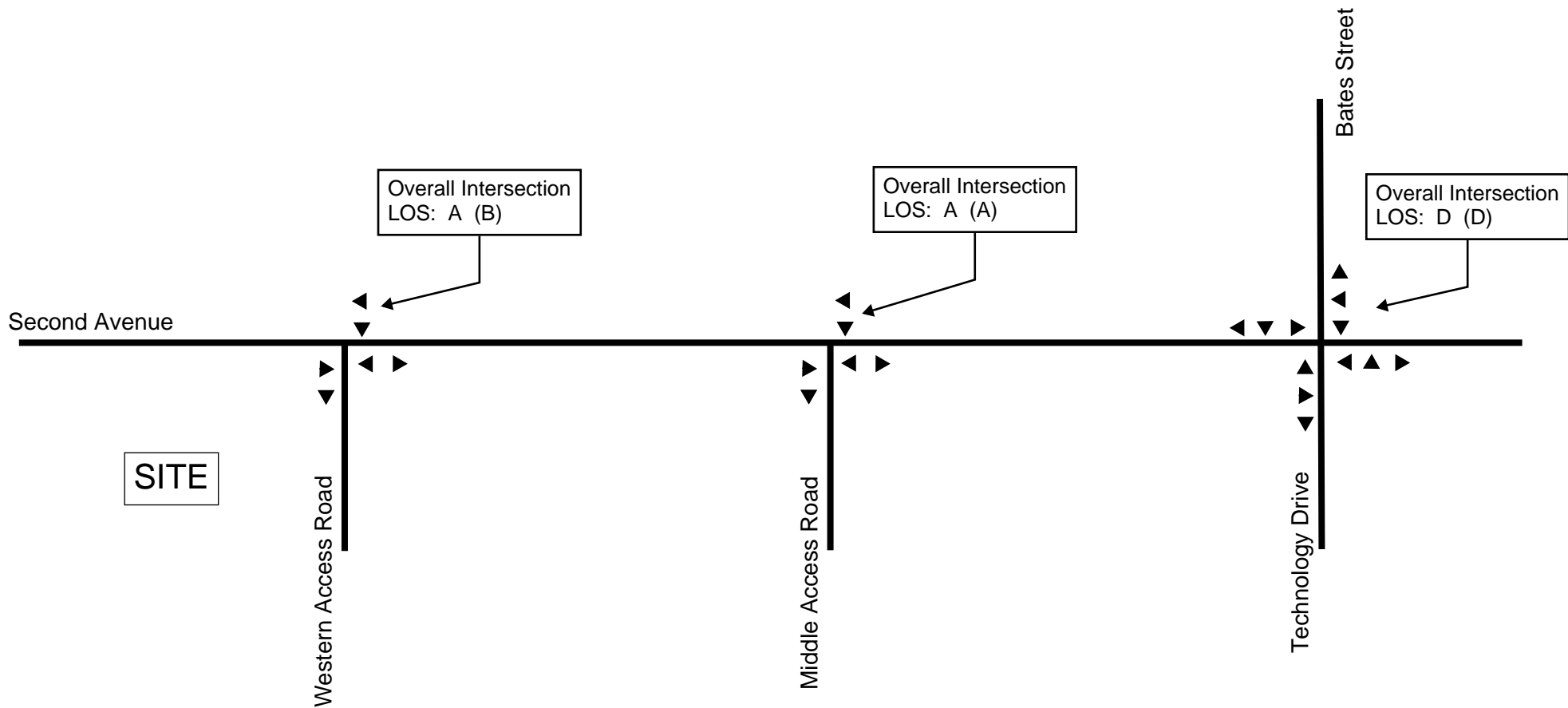
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Opening Year 2021 No-Build (Base) Conditions  
 Peak Hour Traffic Volumes

**Legend:**  
 123 - A.M. Peak Hour Traffic Volumes  
 (123) - P.M. Peak Hour Traffic Volumes

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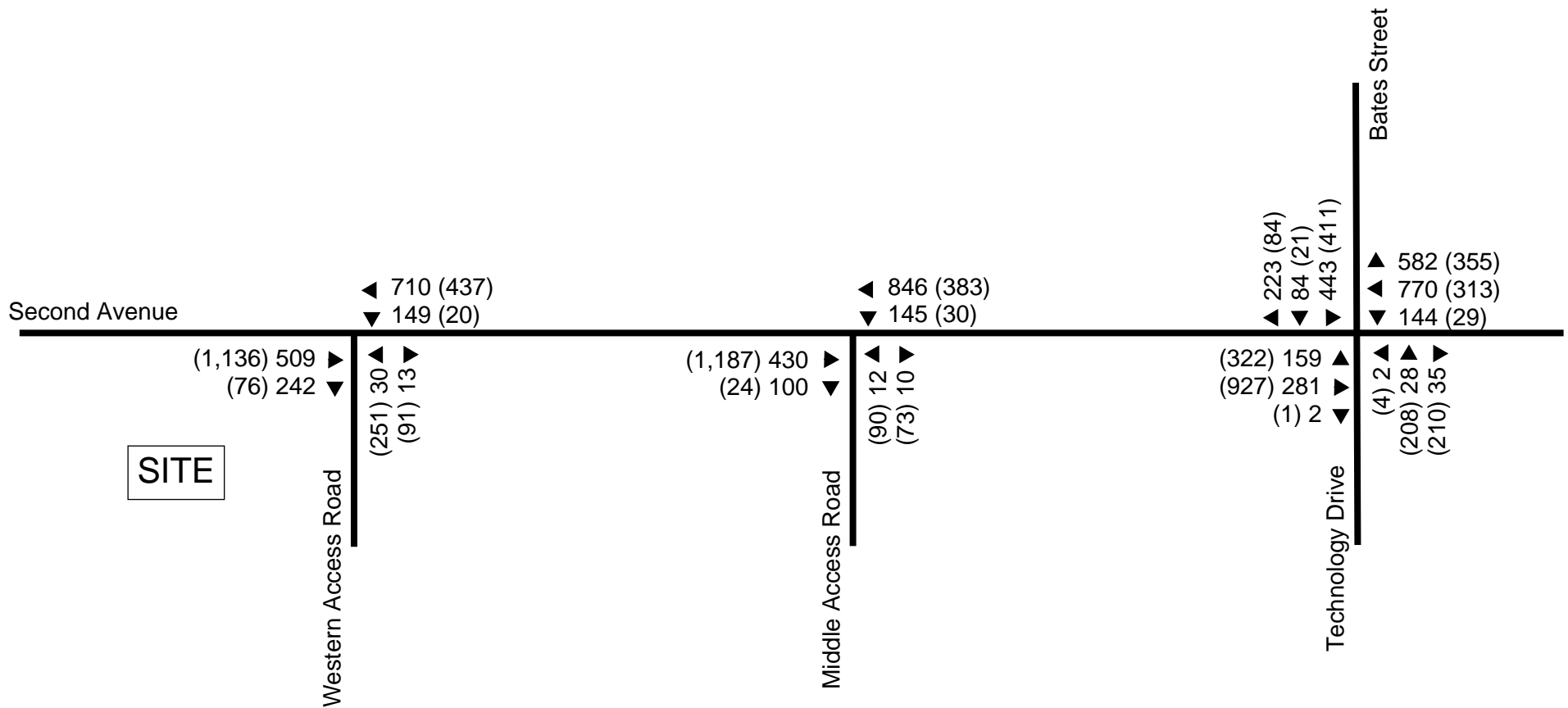


**Legend:**  
 A - A.M. Peak Hour Level of Service  
 (A) - P.M. Peak Hour Level of Service

  
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 PTC Garage 3  
 Transportation Impact Study  
 Opening Year 2021 No-Build (Base) Conditions  
 Levels of Service

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	



SITE

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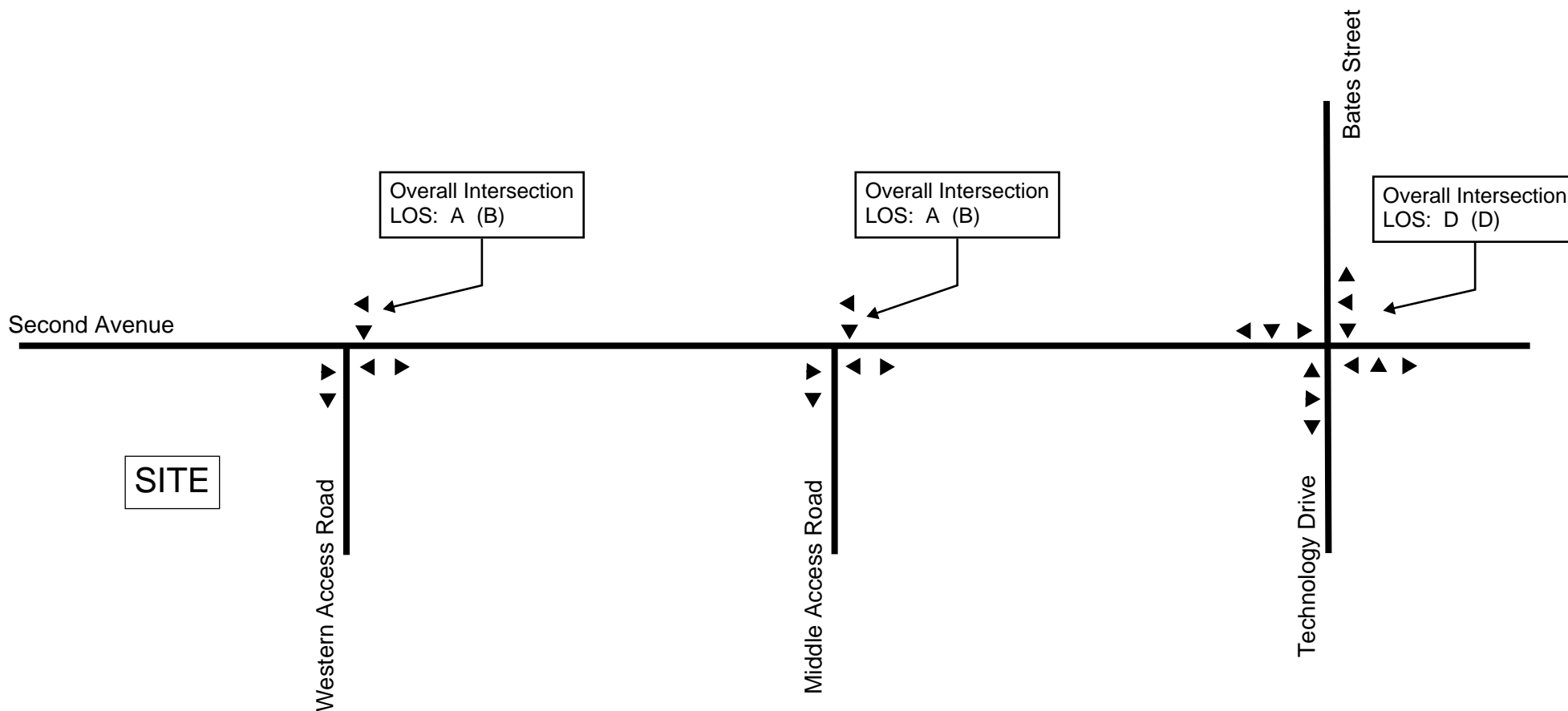
Pittsburgh Technology Center  
 PTC Garage 3  
 Transportation Impact Study

Opening Year 2021 Build (with PTC Master Plan Developments)  
 Peak Hour Traffic Volumes

**Legend:**  
 123 - A.M. Peak Hour Traffic Volumes  
 (123) - P.M. Peak Hour Traffic Volumes

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	





SITE

Overall Intersection  
LOS: A (B)

Overall Intersection  
LOS: A (B)

Overall Intersection  
LOS: D (D)

Second Avenue

Western Access Road

Middle Access Road

Technology Drive

Bates Street



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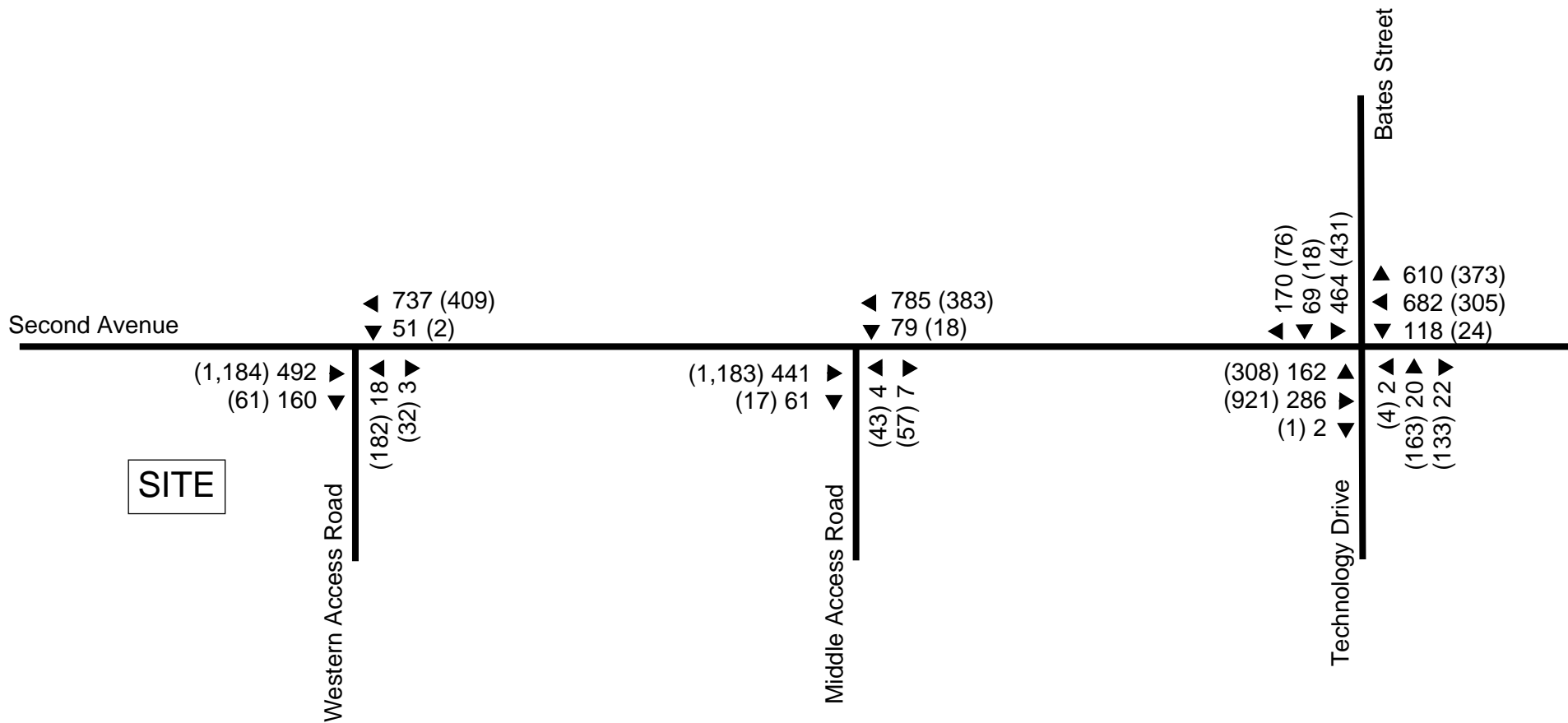
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Transportation Impact Study

Opening Year 2021 Build (with PTC Master Plan Developments)  
Levels of Service

**Legend:**  
A - A.M. Peak Hour Level of Service  
(A) - P.M. Peak Hour Level of Service

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	



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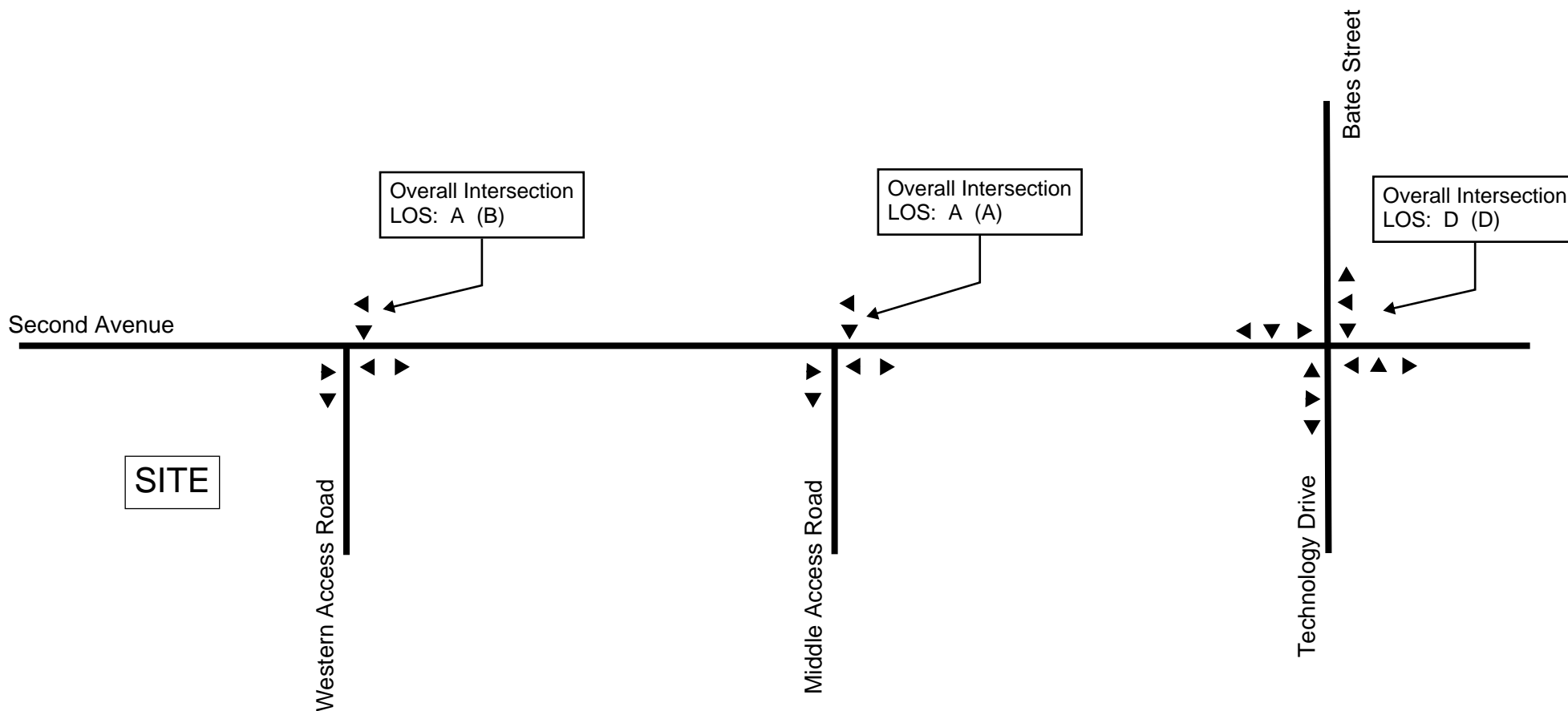
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Pittsburgh Technology Center  
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Design Year 2031 No-Build (Base) Conditions  
 Peak Hour Traffic Volumes

Legend:  
 123 - A.M. Peak Hour Traffic Volumes  
 (123) - P.M. Peak Hour Traffic Volumes

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DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	

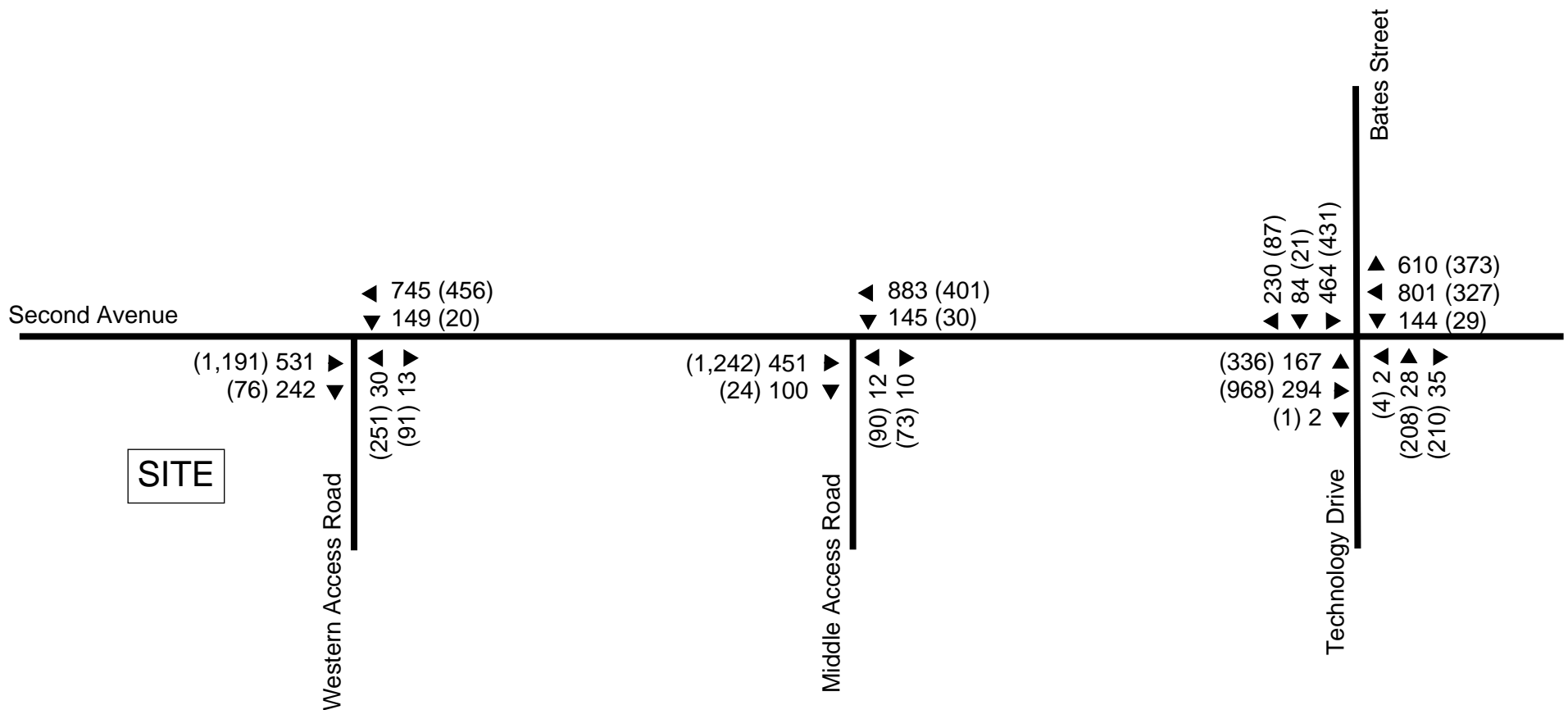


**Legend:**  
 A - A.M. Peak Hour Level of Service  
 (A) - P.M. Peak Hour Level of Service

  
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Pittsburgh Technology Center  
 PTC Garage 3  
 Transportation Impact Study  
 Design Year 2031 No-Build (Base) Conditions  
 Levels of Service

DRAWN BY: cd	CHECKED BY: jmd	APPROVED BY: CAD	FIGURE NO.:
DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	16



**Legend:**  
 123 - A.M. Peak Hour Traffic Volumes  
 (123) - P.M. Peak Hour Traffic Volumes

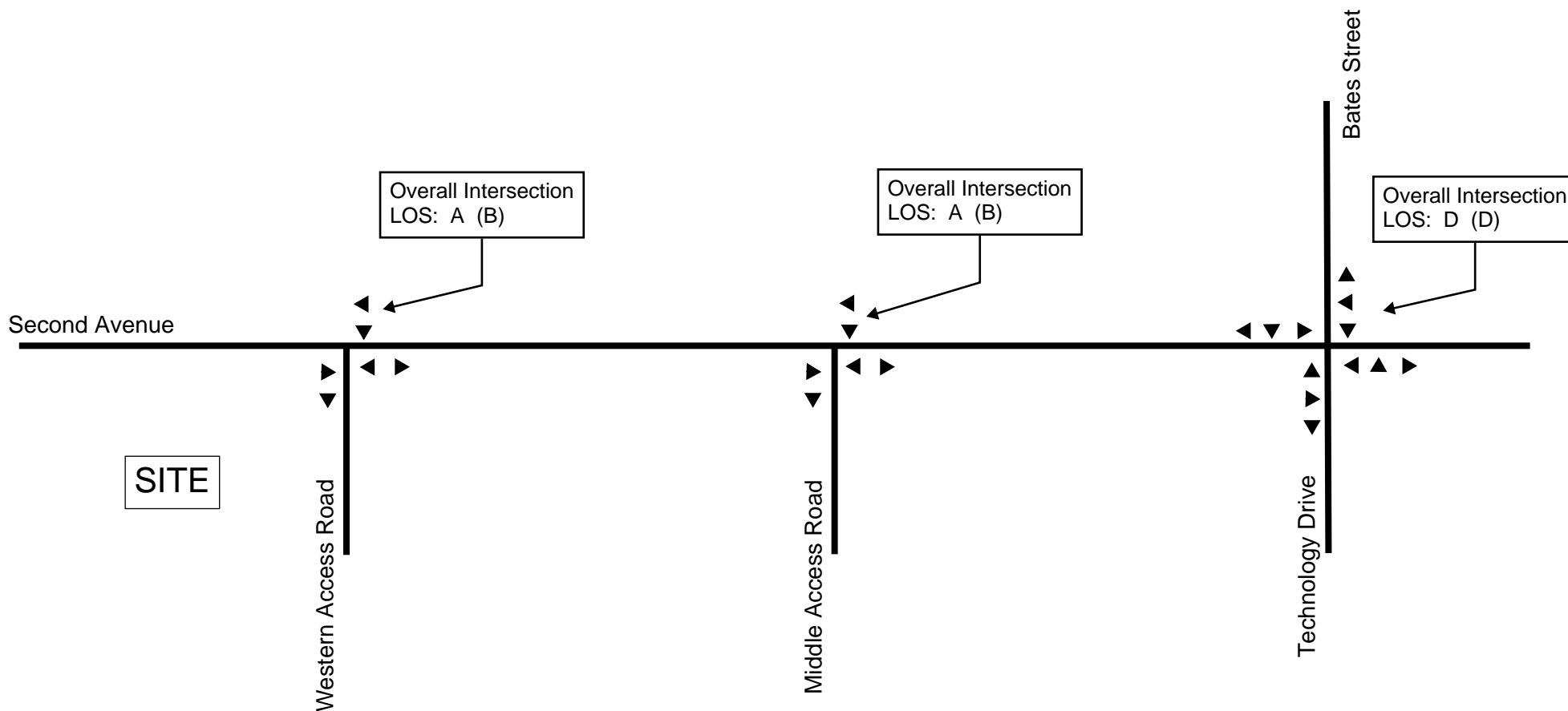
  
**Civil & Environmental Consultants, Inc.**  
 333 Baldwin Road · Pittsburgh, PA 15205  
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Pittsburgh Technology Center  
 PTC Garage 3  
 Transportation Impact Study

---

Design Year 2031 Build (with PTC Master Plan Developments)  
 Peak Hour Traffic Volumes

DRAWN BY: cd	CHECKED BY: jmd	APPROVED BY: CAD	FIGURE NO.:
DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	17



**Legend:**  
 A - A.M. Peak Hour Level of Service  
 (A) - P.M. Peak Hour Level of Service

  
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Pittsburgh Technology Center  
 PTC Garage 3  
 Transportation Impact Study  
 Design Year 2031 Build (with PTC Master Plan Developments)  
 Levels of Service

DRAWN BY: cd	CHECKED BY: jmd	APPROVED BY: CAD	FIGURE NO.: 18
DATE: June 2020	DWG SCALE: nts	PROJECT NO: 300-725	

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**APPENDIX A**

**TURNING MOVEMENT COUNT SUMMARIES AND  
TRAFFIC SIGNAL PERMIT PLANS**

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# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Bates\_St\_AM  
Site Code :  
Start Date : 11/13/2018  
Page No : 1

## Groups Printed- Lights - Buses - Trucks

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Drive Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	29	71	0	0	100	7	138	152	0	297	1	1	2	0	4	109	6	25	0	140	541
07:15 AM	41	71	0	0	112	9	157	155	0	321	0	0	0	0	0	110	9	23	0	142	575
07:30 AM	41	74	0	0	115	13	142	159	0	314	2	4	1	0	7	109	8	30	0	147	583
07:45 AM	32	63	0	0	95	8	159	141	0	308	0	1	3	0	4	128	5	40	0	173	580
Total	143	279	0	0	422	37	596	607	0	1240	3	6	6	0	15	456	28	118	0	602	2279
08:00 AM	41	59	0	0	100	8	162	138	0	308	0	4	4	0	8	105	7	33	0	145	561
08:15 AM	36	68	2	0	106	8	146	135	0	289	0	5	1	0	6	94	8	36	0	138	539
08:30 AM	25	65	0	0	90	9	146	152	0	307	0	3	1	0	4	91	12	29	0	132	533
08:45 AM	28	66	3	0	97	14	104	131	0	249	0	2	1	0	3	104	9	35	0	148	497
Total	130	258	5	0	393	39	558	556	0	1153	0	14	7	0	21	394	36	133	0	563	2130
Grand Total	273	537	5	0	815	76	1154	1163	0	2393	3	20	13	0	36	850	64	251	0	1165	4409
Apprch %	33.5	65.9	0.6	0		3.2	48.2	48.6	0		8.3	55.6	36.1	0		73	5.5	21.5	0		
Total %	6.2	12.2	0.1	0	18.5	1.7	26.2	26.4	0	54.3	0.1	0.5	0.3	0	0.8	19.3	1.5	5.7	0	26.4	
Lights	257	457	5	0	719	72	1107	1091	0	2270	3	15	12	0	30	815	63	246	0	1124	4143
% Lights	94.1	85.1	100	0	88.2	94.7	95.9	93.8	0	94.9	100	75	92.3	0	83.3	95.9	98.4	98	0	96.5	94
Buses	8	54	0	0	62	1	18	32	0	51	0	4	1	0	5	13	0	2	0	15	133
% Buses	2.9	10.1	0	0	7.6	1.3	1.6	2.8	0	2.1	0	20	7.7	0	13.9	1.5	0	0.8	0	1.3	3
Trucks	8	26	0	0	34	3	29	40	0	72	0	1	0	0	1	22	1	3	0	26	133
% Trucks	2.9	4.8	0	0	4.2	3.9	2.5	3.4	0	3	0	5	0	0	2.8	2.6	1.6	1.2	0	2.2	3

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Drive Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	41	74	0	0	115	13	142	159	0	314	2	4	1	0	7	109	8	30	0	147	583
07:45 AM	32	63	0	0	95	8	159	141	0	308	0	1	3	0	4	128	5	40	0	173	580
08:00 AM	41	59	0	0	100	8	162	138	0	308	0	4	4	0	8	105	7	33	0	145	561
08:15 AM	36	68	2	0	106	8	146	135	0	289	0	5	1	0	6	94	8	36	0	138	539
Total Volume	150	264	2	0	416	37	609	573	0	1219	2	14	9	0	25	436	28	139	0	603	2263
% App. Total	36.1	63.5	0.5	0		3	50	47	0		8	56	36	0		72.3	4.6	23.1	0		
PHF	.915	.892	.250	.000	.904	.712	.940	.901	.000	.971	.250	.700	.563	.000	.781	.852	.875	.869	.000	.871	.970
Lights	142	226	2	0	370	35	587	534	0	1156	2	11	8	0	21	421	27	137	0	585	2132
% Lights	94.7	85.6	100	0	88.9	94.6	96.4	93.2	0	94.8	100	78.6	88.9	0	84.0	96.6	96.4	98.6	0	97.0	94.2
Buses	4	29	0	0	33	0	12	15	0	27	0	2	1	0	3	6	0	2	0	8	71
% Buses	2.7	11.0	0	0	7.9	0	2.0	2.6	0	2.2	0	14.3	11.1	0	12.0	1.4	0	1.4	0	1.3	3.1
Trucks	4	9	0	0	13	2	10	24	0	36	0	1	0	0	1	9	1	0	0	10	60
% Trucks	2.7	3.4	0	0	3.1	5.4	1.6	4.2	0	3.0	0	7.1	0	0	4.0	2.1	3.6	0	0	1.7	2.7

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Bates\_St\_AM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Bicycles on Road

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Drive Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Drive Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Bates\_St\_AM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Pedestrians

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Drive Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
07:15 AM	0	0	0	2	2	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	1
07:30 AM	0	0	0	7	7	0	0	0	0	0	0	0	0	3	3	0	0	0	1	1	1
07:45 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	10	10	0	0	0	1	1	0	0	0	5	5	0	0	0	2	2	2
08:00 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1
08:15 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
08:30 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1
08:45 AM	0	0	0	5	5	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Total	0	0	0	7	7	0	0	0	2	2	0	0	0	1	1	0	0	0	3	3	3
Grand Total	0	0	0	17	17	0	0	0	3	3	0	0	0	6	6	0	0	0	5	5	5
Apprch %	0	0	0	100		0	0	0	100		0	0	0	100		0	0	0	100		
Total %	0	0	0	54.8	54.8	0	0	0	9.7	9.7	0	0	0	19.4	19.4	0	0	0	16.1	16.1	

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Drive Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	7	7	0	0	0	0	0	0	0	0	3	3	0	0	0	1	1	1
07:45 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1
08:15 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total Volume	0	0	0	9	9	0	0	0	1	1	0	0	0	3	3	0	0	0	3	3	3
% App. Total	0	0	0	100		0	0	0	100		0	0	0	100		0	0	0	100		
PHF	.000	.000	.000	.321	.321	.000	.000	.000	.250	.250	.000	.000	.000	.250	.250	.000	.000	.000	.750	.750	.364

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Bates\_St\_PM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Lights - Buses - Trucks

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Dr Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	52	163	1	0	216	2	70	91	0	163	1	37	10	0	48	92	3	13	0	108	535
04:15 PM	85	243	0	0	328	1	63	101	0	165	2	32	12	0	46	95	2	11	0	108	647
04:30 PM	70	207	0	0	277	2	62	87	0	151	0	21	16	0	37	112	1	23	0	136	601
04:45 PM	63	223	0	0	286	4	85	71	0	160	1	33	17	0	51	106	4	21	0	131	628
Total	270	836	1	0	1107	9	280	350	0	639	4	123	55	0	182	405	10	68	0	483	2411
05:00 PM	31	111	0	0	142	2	77	93	0	172	3	30	17	0	50	94	5	17	0	116	480
05:15 PM	38	103	0	0	141	3	55	86	0	144	1	41	9	0	51	120	1	25	0	146	482
05:30 PM	37	117	0	0	154	2	88	111	0	201	0	32	9	0	41	98	2	23	0	123	519
05:45 PM	25	119	0	0	144	2	63	102	0	167	2	15	17	0	34	124	4	16	0	144	489
Total	131	450	0	0	581	9	283	392	0	684	6	118	52	0	176	436	12	81	0	529	1970
Grand Total	401	1286	1	0	1688	18	563	742	0	1323	10	241	107	0	358	841	22	149	0	1012	4381
Apprch %	23.8	76.2	0.1	0		1.4	42.6	56.1	0		2.8	67.3	29.9	0		83.1	2.2	14.7	0		
Total %	9.2	29.4	0	0	38.5	0.4	12.9	16.9	0	30.2	0.2	5.5	2.4	0	8.2	19.2	0.5	3.4	0	23.1	
Lights	397	1252	1	0	1650	17	535	714	0	1266	10	234	105	0	349	828	21	144	0	993	4258
% Lights	99	97.4	100	0	97.7	94.4	95	96.2	0	95.7	100	97.1	98.1	0	97.5	98.5	95.5	96.6	0	98.1	97.2
Buses	3	32	0	0	35	0	27	18	0	45	0	6	2	0	8	6	0	2	0	8	96
% Buses	0.7	2.5	0	0	2.1	0	4.8	2.4	0	3.4	0	2.5	1.9	0	2.2	0.7	0	1.3	0	0.8	2.2
Trucks	1	2	0	0	3	1	1	10	0	12	0	1	0	0	1	7	1	3	0	11	27
% Trucks	0.2	0.2	0	0	0.2	5.6	0.2	1.3	0	0.9	0	0.4	0	0	0.3	0.8	4.5	2	0	1.1	0.6

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Dr Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	52	163	1	0	216	2	70	91	0	163	1	37	10	0	48	92	3	13	0	108	535
04:15 PM	85	243	0	0	328	1	63	101	0	165	2	32	12	0	46	95	2	11	0	108	647
04:30 PM	70	207	0	0	277	2	62	87	0	151	0	21	16	0	37	112	1	23	0	136	601
04:45 PM	63	223	0	0	286	4	85	71	0	160	1	33	17	0	51	106	4	21	0	131	628
Total Volume	270	836	1	0	1107	9	280	350	0	639	4	123	55	0	182	405	10	68	0	483	2411
% App. Total	24.4	75.5	0.1	0		1.4	43.8	54.8	0		2.2	67.6	30.2	0		83.9	2.1	14.1	0		
PHF	.794	.860	.250	.000	.844	.563	.824	.866	.000	.968	.500	.831	.809	.000	.892	.904	.625	.739	.000	.888	.932
Lights	267	816	1	0	1084	9	258	334	0	601	4	120	54	0	178	395	10	65	0	470	2333
% Lights	98.9	97.6	100	0	97.9	100	92.1	95.4	0	94.1	100	97.6	98.2	0	97.8	97.5	100	95.6	0	97.3	96.8
Buses	3	18	0	0	21	0	21	8	0	29	0	3	1	0	4	4	0	1	0	5	59
% Buses	1.1	2.2	0	0	1.9	0	7.5	2.3	0	4.5	0	2.4	1.8	0	2.2	1.0	0	1.5	0	1.0	2.4
Trucks	0	2	0	0	2	0	1	8	0	9	0	0	0	0	0	6	0	2	0	8	19
% Trucks	0	0.2	0	0	0.2	0	0.4	2.3	0	1.4	0	0	0	0	0	1.5	0	2.9	0	1.7	0.8

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Bates\_St\_PM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Bicycles on Road

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Dr Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Dr Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Bates\_St\_PM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Pedestrians

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Dr Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	7	7	0	0	0	0	0	0	0	0	6	6	0	0	0	1	1	14
04:15 PM	0	0	0	4	4	0	0	0	1	1	0	0	0	3	3	0	0	0	2	2	10
04:30 PM	0	0	0	14	14	0	0	0	1	1	0	0	0	8	8	0	0	0	3	3	26
04:45 PM	0	0	0	12	12	0	0	0	1	1	0	0	0	7	7	0	0	0	5	5	25
Total	0	0	0	37	37	0	0	0	3	3	0	0	0	24	24	0	0	0	11	11	75
05:00 PM	0	0	0	6	6	0	0	0	0	0	0	0	0	3	3	0	0	0	3	3	12
05:15 PM	0	0	0	2	2	0	0	0	1	1	0	0	0	1	1	0	0	0	2	2	6
05:30 PM	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4
05:45 PM	0	0	0	6	6	0	0	0	0	0	0	0	0	3	3	0	0	0	1	1	10
Total	0	0	0	17	17	0	0	0	1	1	0	0	0	7	7	0	0	0	7	7	32
Grand Total	0	0	0	54	54	0	0	0	4	4	0	0	0	31	31	0	0	0	18	18	107
Apprch %	0	0	0	100		0	0	0	100		0	0	0	100		0	0	0	100		
Total %	0	0	0	50.5	50.5	0	0	0	3.7	3.7	0	0	0	29	29	0	0	0	16.8	16.8	

Start Time	Second Ave Eastbound					Second Ave Westbound					Technology Dr Northbound					Bates St Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	7	7	0	0	0	0	0	0	0	0	6	6	0	0	0	1	1	14
04:15 PM	0	0	0	4	4	0	0	0	1	1	0	0	0	3	3	0	0	0	2	2	10
04:30 PM	0	0	0	14	14	0	0	0	1	1	0	0	0	8	8	0	0	0	3	3	26
04:45 PM	0	0	0	12	12	0	0	0	1	1	0	0	0	7	7	0	0	0	5	5	25
Total Volume	0	0	0	37	37	0	0	0	3	3	0	0	0	24	24	0	0	0	11	11	75
% App. Total	0	0	0	100		0	0	0	100		0	0	0	100		0	0	0	100		
PHF	.000	.000	.000	.661	.661	.000	.000	.000	.750	.750	.000	.000	.000	.750	.750	.000	.000	.000	.550	.550	.721



# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Middle\_Access\_Drive\_AM

Site Code :

Start Date : 11/13/2018

Page No : 1

Groups Printed- Bicycles on Road

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Middle\_Access\_Drive\_AM

Site Code :

Start Date : 11/13/2018

Page No : 1

Groups Printed- Pedestrians

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
<b>Grand Total</b>	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	3
Apprch %	0	0	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Volume</b>	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
<b>% App. Total</b>	0	0	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Middle\_Access\_Drive\_PM

Site Code :

Start Date : 11/13/2018

Page No : 1

Groups Printed- Cars - Buses - Trucks

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	245	2	0	247	1	98	0	0	99	9	0	2	0	11	0	0	0	0	0	357
04:15 PM	0	307	3	0	310	2	67	0	0	69	4	0	1	0	5	0	0	0	0	0	384
04:30 PM	0	282	3	0	285	2	90	0	0	92	5	0	2	0	7	0	0	0	0	0	384
04:45 PM	0	277	2	0	279	2	105	0	0	107	4	0	1	0	5	0	0	0	0	0	391
<b>Total</b>	<b>0</b>	<b>1111</b>	<b>10</b>	<b>0</b>	<b>1121</b>	<b>7</b>	<b>360</b>	<b>0</b>	<b>0</b>	<b>367</b>	<b>22</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1516</b>
05:00 PM	0	133	1	0	134	2	92	0	0	94	7	0	3	0	10	0	0	0	0	0	238
05:15 PM	0	143	2	0	145	1	78	0	0	79	7	0	2	0	9	0	0	0	0	0	233
05:30 PM	0	142	3	0	145	0	109	0	0	109	2	0	3	0	5	0	0	0	0	0	259
05:45 PM	0	156	1	0	157	1	84	0	0	85	2	0	2	0	4	0	0	0	0	0	246
<b>Total</b>	<b>0</b>	<b>574</b>	<b>7</b>	<b>0</b>	<b>581</b>	<b>4</b>	<b>363</b>	<b>0</b>	<b>0</b>	<b>367</b>	<b>18</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>976</b>
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	1685	17	0	1702	11	723	0	0	734	40	0	16	0	56	0	0	0	0	0	2492
Apprch %	0	99	1	0		1.5	98.5	0	0		71.4	0	28.6	0		0	0	0	0		
Total %	0	67.6	0.7	0	68.3	0.4	29	0	0	29.5	1.6	0	0.6	0	2.2	0	0	0	0	0	0
Cars	0	1646	15	0	1661	8	694	0	0	702	39	0	16	0	55	0	0	0	0	0	2418
% Cars	0	97.7	88.2	0	97.6	72.7	96	0	0	95.6	97.5	0	100	0	98.2	0	0	0	0	0	97
Buses	0	35	1	0	36	3	26	0	0	29	0	0	0	0	0	0	0	0	0	0	65
% Buses	0	2.1	5.9	0	2.1	27.3	3.6	0	0	4	0	0	0	0	0	0	0	0	0	0	2.6
Trucks	0	4	1	0	5	0	3	0	0	3	1	0	0	0	1	0	0	0	0	0	9
% Trucks	0	0.2	5.9	0	0.3	0	0.4	0	0	0.4	2.5	0	0	0	1.8	0	0	0	0	0	0.4

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 06:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	245	2	0	247	1	98	0	0	99	9	0	2	0	11	0	0	0	0	0	357
04:15 PM	0	307	3	0	310	2	67	0	0	69	4	0	1	0	5	0	0	0	0	0	384
04:30 PM	0	282	3	0	285	2	90	0	0	92	5	0	2	0	7	0	0	0	0	0	384
04:45 PM	0	277	2	0	279	2	105	0	0	107	4	0	1	0	5	0	0	0	0	0	391
<b>Total Volume</b>	<b>0</b>	<b>1111</b>	<b>10</b>	<b>0</b>	<b>1121</b>	<b>7</b>	<b>360</b>	<b>0</b>	<b>0</b>	<b>367</b>	<b>22</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1516</b>
<b>% App. Total</b>	<b>0</b>	<b>99.1</b>	<b>0.9</b>	<b>0</b>		<b>1.9</b>	<b>98.1</b>	<b>0</b>	<b>0</b>		<b>78.6</b>	<b>0</b>	<b>21.4</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		
PHF	.000	.905	.833	.000	.904	.875	.857	.000	.000	.857	.611	.000	.750	.000	.636	.000	.000	.000	.000	.000	.969
Cars	0	1087	9	0	1096	5	337	0	0	342	22	0	6	0	28	0	0	0	0	0	1466
% Cars	0	97.8	90.0	0	97.8	71.4	93.6	0	0	93.2	100	0	100	0	100	0	0	0	0	0	96.7
Buses	0	21	0	0	21	2	20	0	0	22	0	0	0	0	0	0	0	0	0	0	43
% Buses	0	1.9	0	0	1.9	28.6	5.6	0	0	6.0	0	0	0	0	0	0	0	0	0	0	2.8
Trucks	0	3	1	0	4	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	7
% Trucks	0	0.3	10.0	0	0.4	0	0.8	0	0	0.8	0	0	0	0	0	0	0	0	0	0	0.5



# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Middle\_Access\_Drive\_PM

Site Code :

Start Date : 11/13/2018

Page No : 1

Groups Printed- Bicycles on Road

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Grand Total</b>	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Apprch %	0	0	100	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %	0	0	100	0	100	0	0	0	0		0	0	0	0		0	0	0	0		

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Volume</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>% App. Total</b>	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Middle\_Access\_Drive\_PM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Pedestrians

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	1	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	4
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	1	1	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	8
05:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	3
05:30 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	6
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	1	1	0	0	0	13	13	0	0	0	0	0	0	0	0	0	0	14
Apprch %	0	0	0	100		0	0	0	100		0	0	0	0		0	0	0	0		
Total %	0	0	0	7.1	7.1	0	0	0	92.9	92.9	0	0	0	0	0	0	0	0	0	0	

Start Time	Second Ave Eastbound					Second Ave Westbound					Middle Access Drive Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	1	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	4
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	0	0	1	1	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	8
% App. Total	0	0	0	100		0	0	0	100		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.250	.250	.000	.000	.000	.583	.583	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Western\_Drive\_AM

Site Code :

Start Date : 11/13/2018

Page No : 1

Groups Printed- Lights - Buses - Trucks

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	118	28	0	146	11	134	0	0	145	0	0	1	0	1	0	0	0	0	0	292
07:15 AM	0	107	18	0	125	9	139	0	0	148	2	0	0	0	2	0	0	0	0	0	275
07:30 AM	0	113	15	0	128	10	155	0	0	165	0	0	1	0	1	0	0	0	0	0	294
07:45 AM	0	105	20	0	125	11	189	0	0	200	1	0	1	0	2	0	0	0	0	0	327
<b>Total</b>	<b>0</b>	<b>443</b>	<b>81</b>	<b>0</b>	<b>524</b>	<b>41</b>	<b>617</b>	<b>0</b>	<b>0</b>	<b>658</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1188</b>
08:00 AM	0	105	31	0	136	15	180	0	0	195	3	0	0	0	3	0	0	0	0	0	334
08:15 AM	0	106	31	0	137	15	165	0	0	180	2	0	1	0	3	0	0	0	0	0	320
08:30 AM	0	90	28	0	118	17	129	0	0	146	1	0	2	0	3	0	0	0	0	0	267
08:45 AM	0	101	29	0	130	8	123	0	0	131	0	0	1	0	1	0	0	0	0	0	262
<b>Total</b>	<b>0</b>	<b>402</b>	<b>119</b>	<b>0</b>	<b>521</b>	<b>55</b>	<b>597</b>	<b>0</b>	<b>0</b>	<b>652</b>	<b>6</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1183</b>
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	845	200	0	1045	96	1214	0	0	1310	9	0	7	0	16	0	0	0	0	0	2371
Apprch %	0	80.9	19.1	0		7.3	92.7	0	0		56.2	0	43.8	0		0	0	0	0		
Total %	0	35.6	8.4	0	44.1	4	51.2	0	0	55.3	0.4	0	0.3	0	0.7	0	0	0	0	0	
Lights	0	758	196	0	954	95	1170	0	0	1265	9	0	7	0	16	0	0	0	0	0	2235
% Lights	0	89.7	98	0	91.3	99	96.4	0	0	96.6	100	0	100	0	100	0	0	0	0	0	94.3
Buses	0	64	4	0	68	0	22	0	0	22	0	0	0	0	0	0	0	0	0	0	90
% Buses	0	7.6	2	0	6.5	0	1.8	0	0	1.7	0	0	0	0	0	0	0	0	0	0	3.8
Trucks	0	23	0	0	23	1	22	0	0	23	0	0	0	0	0	0	0	0	0	0	46
% Trucks	0	2.7	0	0	2.2	1	1.8	0	0	1.8	0	0	0	0	0	0	0	0	0	0	1.9

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	113	15	0	128	10	155	0	0	165	0	0	1	0	1	0	0	0	0	0	294
07:45 AM	0	105	20	0	125	11	189	0	0	200	1	0	1	0	2	0	0	0	0	0	327
08:00 AM	0	105	31	0	136	15	180	0	0	195	3	0	0	0	3	0	0	0	0	0	334
08:15 AM	0	106	31	0	137	15	165	0	0	180	2	0	1	0	3	0	0	0	0	0	320
Total Volume	0	429	97	0	526	51	689	0	0	740	6	0	3	0	9	0	0	0	0	0	1275
% App. Total	0	81.6	18.4	0		6.9	93.1	0	0		66.7	0	33.3	0		0	0	0	0		
PHF	.000	.949	.782	.000	.960	.850	.911	.000	.000	.925	.500	.000	.750	.000	.750	.000	.000	.000	.000	.000	.954
Lights	0	383	95	0	478	51	665	0	0	716	6	0	3	0	9	0	0	0	0	0	1203
% Lights	0	89.3	97.9	0	90.9	100	96.5	0	0	96.8	100	0	100	0	100	0	0	0	0	0	94.4
Buses	0	35	2	0	37	0	12	0	0	12	0	0	0	0	0	0	0	0	0	0	49
% Buses	0	8.2	2.1	0	7.0	0	1.7	0	0	1.6	0	0	0	0	0	0	0	0	0	0	3.8
Trucks	0	11	0	0	11	0	12	0	0	12	0	0	0	0	0	0	0	0	0	0	23
% Trucks	0	2.6	0	0	2.1	0	1.7	0	0	1.6	0	0	0	0	0	0	0	0	0	0	1.8

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Western\_Drive\_AM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Bicycles on Road

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Western\_Drive\_AM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Pedestrians

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Western\_Drive\_PM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Bicycles on Road

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

# Civil & Environmental Consultants, Inc.

333 Baldwin Ave  
Pittsburgh, PA 15205

File Name : Second\_Ave\_and\_Western\_Drive\_PM

Site Code :

Start Date : 11/13/2018

Page No : 1

## Groups Printed- Pedestrians

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Grand Total	0	0	0	1	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	4
Apprch %	0	0	0	100		0	0	0	100		0	0	0	0		0	0	0	0		
Total %	0	0	0	25	25	0	0	0	75	75	0	0	0	0	0	0	0	0	0	0	

Start Time	Second Ave Eastbound					Second Ave Westbound					Western Access Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
% App. Total	0	0	0	0		0	0	0	100		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM



DISTRICT	COUNTY	ROUTE	SECTION	SHEET
11-0	ALLEGHENY	0885	A36	1 OF 4
CITY OF PITTSBURGH				
REVISION NUMBER	REVISIONS	DATE	BY	

**ACCESSIBLE PEDESTRIAN SIGNAL NOTES:**

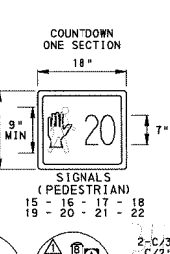
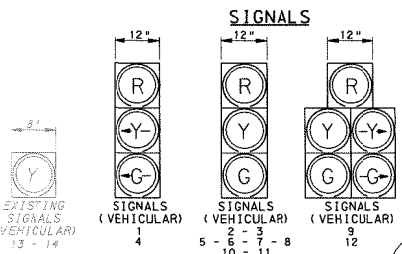
- 1) ALL PUSH BUTTONS EQUIPPED WITH LOCATOR TONES.
- 2) ALL WALK INTERVALS TO HAVE VERBAL MESSAGE DETAILING WALK DIRECTION.
- 3) VERBAL MESSAGE TO BE PLAYED DURING WALK INTERVAL WHEN PUSH BUTTON IS PRESSED.
- 4) ALL PUSH BUTTONS TO BE LOCATED AT 42" ABOVE GROUND.
- 5) ALL PUSH BUTTONS TO BE EQUIPPED WITH VIBROTACTILE ARROW.
- 6) VIBROTACTILE ARROWS TO VIBRATE DURING WALK INTERVAL.

- SIGNAL NOTES:**
- 1) ALL SIGNAL HEADS EQUIPPED WITH TUNNEL VISORS.
  - 2) INTERSECTION INCORPORATED INTO CITY'S C.T.R.T.C.S.
  - 3) ALL SIGNALS RED, YELLOW, GREEN AND ARROW (LED) MODULES. PORTLAND ORANGE FULL "PEDESTRIAN HAND" AND "COUNTDOWN", AND WHITE FULL "WALKING PERSON", SYMBOLS (LED) MODULES
  - 4) INCANDESCENT - ALUMINUM HOUSING.
  - 5) CONTROLLER CABINET BASE MOUNTED WITH 12" RISER.
  - 6) MOUNT CAMERAS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
  - 7) FINAL SIGNAL HEAD PLACEMENT WILL BE DETERMINED BY A REPRESENTATIVE OF THE DISTRICT TRAFFIC UNIT PRIOR TO SIGNAL BEING TURNED ON.

**PAVEMENT MARKING NOTES:**

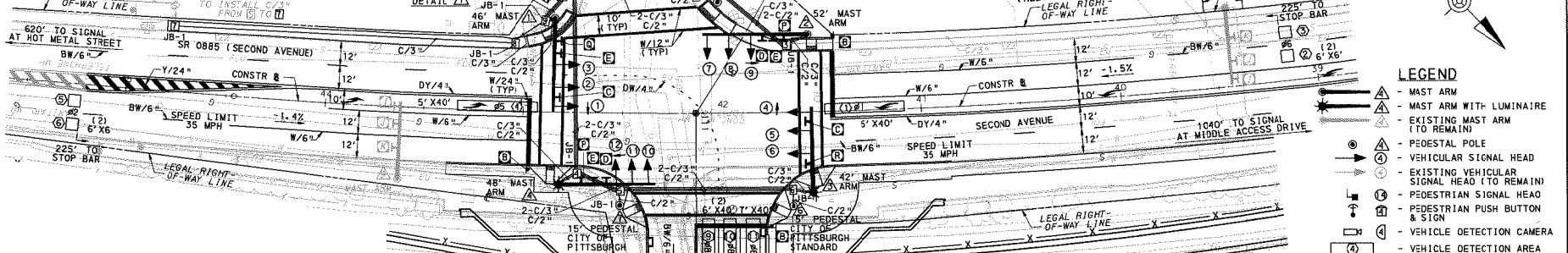
STOP BARS WHITE 24 INCH LINES.

CROSSWALKS WHITE 12 INCH LINES 10 FEET APART.



**CONTROL ASSEMBLY TYPE I MOUNTING ELECTRICAL SERVICE TYPE C (POWER SOURCE SAME AS EXISTING)**

**CITY OF PITTSBURGH TO INSTALL C/3 FROM 5 TO 7**



- LEGEND**
- MAST ARM
  - MAST ARM WITH LUMINAIRE
  - EXISTING MAST ARM (TO REMAIN)
  - PEDESTAL POLE
  - VEHICULAR SIGNAL HEAD
  - EXISTING VEHICULAR SIGNAL HEAD (TO REMAIN)
  - PEDESTRIAN SIGNAL HEAD
  - PEDESTRIAN PUSH BUTTON & SIGN
  - VEHICLE DETECTION CAMERA
  - VEHICLE DETECTION AREA
  - CONTROLLER ASSEMBLY (CC1)
  - EXISTING CONTROLLER ASSEMBLY (CC2) (TO REMAIN)
  - JUNCTION BOX
  - EXISTING SPLICE BOX
  - CONDUIT/SIZE
  - EXISTING CONDUIT/SIZE
  - OVERHEAD SIGN
  - EXISTING OVERHEAD SIGN (TO REMAIN)
  - POST MOUNTED SIGN
  - EXISTING POST MOUNTED SIGN (TO REMAIN)
  - ACCESS RAMP
  - W/6" - SOLID WHITE LINE/WIDTH
  - Y/4" - SOLID YELLOW LINE/WIDTH
  - OY/4" - DOUBLE SOLID YELLOW LINE/WIDTH
  - BW/6" - BROKEN WHITE LINE/WIDTH
  - OW/4" - DOTTED WHITE EXTENSION LINE/WIDTH

**SIGNS**

PLAN SYMBO.	NOMEN-CLATURE	DESCRIPTION	SIZE	QUANT
A	R10-3E	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER	9"x14"	8
B	R10-6AL	STOP HERE ON RED	24"x30"	4
C	R10-10L	LEFT TURN SIGNAL	30"x36"	2
D	R10-10R	RIGHT TURN SIGNAL	30"x36"	2
E	R10-11	NO TURN ON RED	24"x30"	3
F	SS-1	LEFT TURN (NO TRUCKS)	36"x48"	1
G	R3-6LS	OPTIONAL LEFT TURN	30"x36"	1
H	R3-SR	RIGHT TURN	30"x36"	1
I	R3-SL	LEFT TURN (TO REMAIN)	30"x36"	2
J	R3-SS	STRAIGHT THROUGH (TO REMAIN)	30"x36"	2
K	R3-6SR	OPTIONAL RIGHT TURN (TO REMAIN)	30"x36"	2
L	R3-6R	RIGHT TURN (TO REMAIN)	30"x36"	1
M	R3-6LS	OPTIONAL LEFT TURN (TO REMAIN)	30"x36"	1
N	R3-3	SIGNAL AHEAD (INTERVALLY ILLUMINATED) (TO REMAIN)	30"x36"	1
O	R3-8A	LANE USE CONTROL (TO REMAIN)	30"x30"	1
P	SS-2	Second Ave	72"x24"	2
Q	SS-3	Bates St Technology Or	96"x36"	1
R	SS-4	Technology Or Bates St	96"x36"	1

\* ARROW TO POINT IN THE DIRECTION OF CROSSING.

**DETECTION ZONES**

CAMERA	ZONE	PHASE
1	1	01
2	2	02
3	3	03
4	4	04
5	5	05
6	6	06

COUNTY : ALLEGHENY

MUNICIPALITY : CITY OF PITTSBURGH

INTERSECTION : SR 0885 (BATES STREET), SECOND AVENUE, AND TECHNOLOGY DRIVE

RECOMMENDED :

DISTRICT TRAFFIC ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

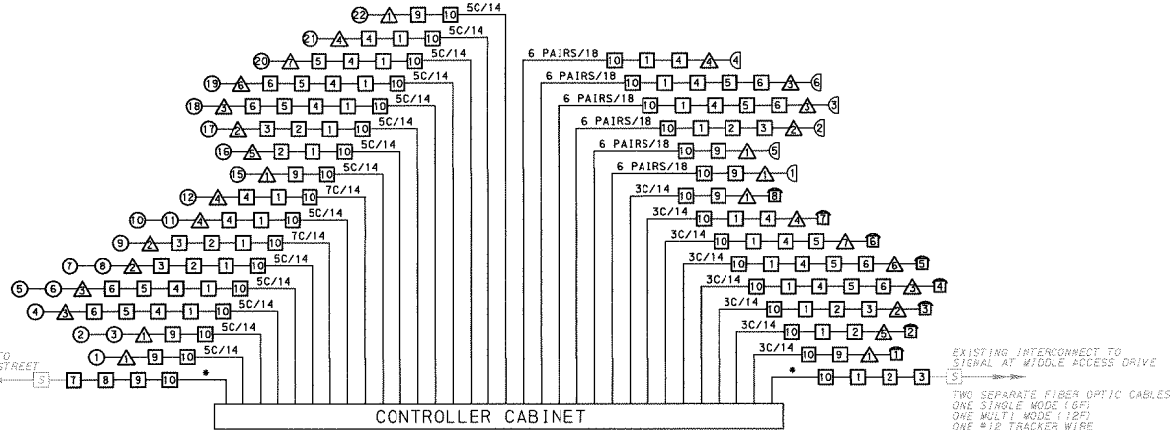
SCALE : 0 25 50 FEET

DRAWN BY : LEJ  
CHECKED BY : KOF

PHASING DIAGRAM

SIGNALS	PHASE 1 + 5			PHASE 1 + 6			PHASE 2 + 5				PHASE 2 + 6				PHASE 4					PHASE 8					E F L A O R S N H I Y N C Y
	1	2	3	1	2	3	1	2	3	4	1	2	3	4	1	2	3	4	5	1	2	3	4	5	
1	-G-	-Y-	R	-G-	-Y-	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	OFF
2-3	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
4	-G-	-Y-	R	R	R	R	R	-G-	-Y-	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	OFF
5-6	R	R	R	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
7-8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	Y	R
9	RZG	RZY	R	RZG	RZY	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	Y	OFF
10-11	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
12	RZG	RZY	R	R	R	R	R	RZG	RZY	R	R	R	R	R	R	R	R	R	R	R	G	G	Y	OFF	
15-16	DW	DW	DW	W	FD	DW	DW	DW	DW	DW	DW	W	FD	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OFF
17-18	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FD	DW	DW	DW	OFF
19-20	DW	DW	DW	DW	DW	DW	DW	W	FD	DW	DW	DW	W	FD	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OFF
21-22	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FD	DW	DW	DW	DW	DW	DW	DW	OFF
FIXED	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MINIMUM	7			7				7				15				7				7					3
PASSAGE	3			3				3				6				3				3					3
MAX 1	12			12				12				40				25				25					
PEDESTRIAN *												13	20			3	4	18		3	4	18			
MEMORY	NL			NL				NL								NL				NL					

\* UPON PEDESTRIAN ACTUATION OTHERWISE, "DON'T WALK" AT ALL TIMES.



WIRING DIAGRAM

- SC/14 - CABLE (NO. OF CONDUCTORS/SIZE AWG)
- ① - VEHICLE SIGNAL    ▲ - TRAFFIC SIGNAL SUPPORT
  - ② - PEDESTRIAN SIGNAL    □ - JUNCTION BOX
  - ③ - VEHICLE DETECTION CAMERA    ▢ - EXISTING SPLICE BOX
  - ④ - PEDESTRIAN PUSH BUTTON

NOTE:  
\* THE CITY OF PITTSBURGH WILL BE RESPONSIBLE FOR PROVIDING ALL INFORMATION AND MATERIALS REGARDING THE INTERCONNECTION SYSTEM.

DRAWN BY LEJ  
CHECKED BY KDF

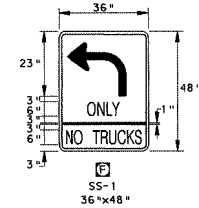
- CONSTRUCTION NOTES:
- ALL JUNCTION BOXES SHALL BE CITY STANDARD JB-1 WITH BOTTOM STANDARD 12" HEIGHT.
  - NO SIGNAL WIRE SPLICING.
  - SERVICE WIRE FROM CONTROLLER CABINET TO POWER SOURCE SHALL BE PLACED IN SEPARATE CONDUIT.
  - ALL STREET LIGHTING WIRING SHALL BE PLACED IN SEPARATE CONDUIT RUN.
  - CONTRACTOR TO COORDINATE WITH THE CITY OF PITTSBURGH AS NECESSARY TO LOCATE ALL REQUIRED EXISTING CONDUIT AND WIRE PRIOR TO RELOCATING TO NEW JUNCTION BOX.
  - ALL FIBER OPTIC CABLE SHALL BE PLACED IN SEPARATE CONDUIT RUN.

- SIGNAL INTERVAL NOTES:
- ① -G- IF FOLLOWED BY PHASE 1 + 6
  - ② -G IF FOLLOWED BY PHASE 2 + 6
  - ③ -G- IF FOLLOWED BY PHASE 2 + 5
  - ④ RZG- IF FOLLOWED BY PHASE 1 + 6
  - ⑤ RZG- IF FOLLOWED BY PHASE 2 + 5
  - ⑥ TIMING WILL BE AS SHOWN IN PHASE 2 + 6. INTERVALS 1 AND 2 MAY TIME OUT IN THE PHASE OR MAY BE COMPLETED IN PHASE 2 + 6.

- MEMORY:
- MN - MINIMUM RECALL
  - MX - MAXIMUM RECALL
  - L - LOCKING
  - NL - NON-LOCKING
  - PR - PEDESTRIAN RECALL

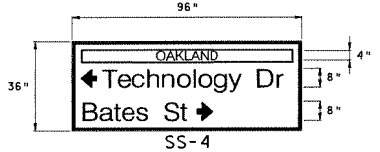
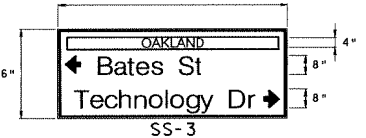
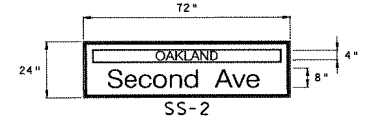
DISTRICT	COUNTY	ROUTE	SECTION	SHEET
11-D	ALLEGHENY	0885	A36	2 OF 4
CITY OF PITTSBURGH				
REVISION NUMBER	REVISIONS	DATE	BY	

SIGNING DETAILS



6" SERIES B LETTERING  
3/4" BORDER WITH 1" RADIUS  
BACKGROUND - WHITE REFLECTORIZED  
LEGEND AND BORDER - BLACK NON-REFLECTORIZED

STREET SIGNS (TYPE A)

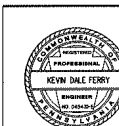


- NOTES
- CENTER LEGEND ON SIGN.
  - WHITE LEGEND AND BORDER ON A BLUE BACKGROUND.

COUNTY : ALLEGHENY  
MUNICIPALITY : CITY OF PITTSBURGH  
INTERSECTION : SR 0885 (BATES STREET),  
SECOND AVENUE, AND TECHNOLOGY DRIVE

RECOMMENDED :  
DISTRICT TRAFFIC ENGINEER DATE

SCALE : 0 25 50 FEET







INTERSECTION : BATES SECOND  
 FLASH YELLOW : SECOND  
 MS. LOCATION : NONE

TS: 64 DATE:03/27/13  
 MODEM : SM  
 SITE CODE : SOK  
 TRACT # : 409

TYPE OPERATE : FULL ACTUATED  
 MAN. NAME & # : SAFETRAN 170E  
 SOFTWARE PROG. : 170 WAPITI 4IKS

TOTAL UNITS: 20 IN CDBG AREA : Y  
 POLE UNITS: 8 SYSTEM # : 0  
 MAST UNITS: 12 SYSTEM TYPE : TBC  
 SPAN UNITS: 0 NUMBER SPLITS: 0

LAST P.M.C. : 08/18/12  
 LAST P.M.LOW : 10/05/04  
 LAST P.M.HIGH : 04/04/06

	LEDS	LAMP	PAR	LED	LAMP
RED	:0 12	0 0	0 0		
YEL	:0 10	0 0	0 0		
GRN	:0 10	0 0	0 0		
YEL>	:0 4	0 0	0 0		
GRN>	:0 6	0 0	0 0		
DW	:0 0	0 0	CD/WD		
WK	:0 0	0 0	8		

WORK ORDER # : 10579  
 COMP. DATE : 11/11/11  
 PAGES USED : 3  
 # RADAR DET : 0  
 # CAMERAS : 6  
 # DETECTOR LOOPS: 0  
 # PED BUTTONS : 8  
 # AUDIBLE PEDS : 8  
 # FIB.OPTIC SIGN: 0

FLASH TIME : 24 HR STOP & GO TERRITORY : 4310  
 REVISION DATE : 03/26/13 ORIGINAL INSTALLATION : 11/11/11 LED TYPE :  
 REMARKS : Power Contracting responsible during construction 5-9-11  
 : MAX 2 14:30 - 18:30 MON-FRI

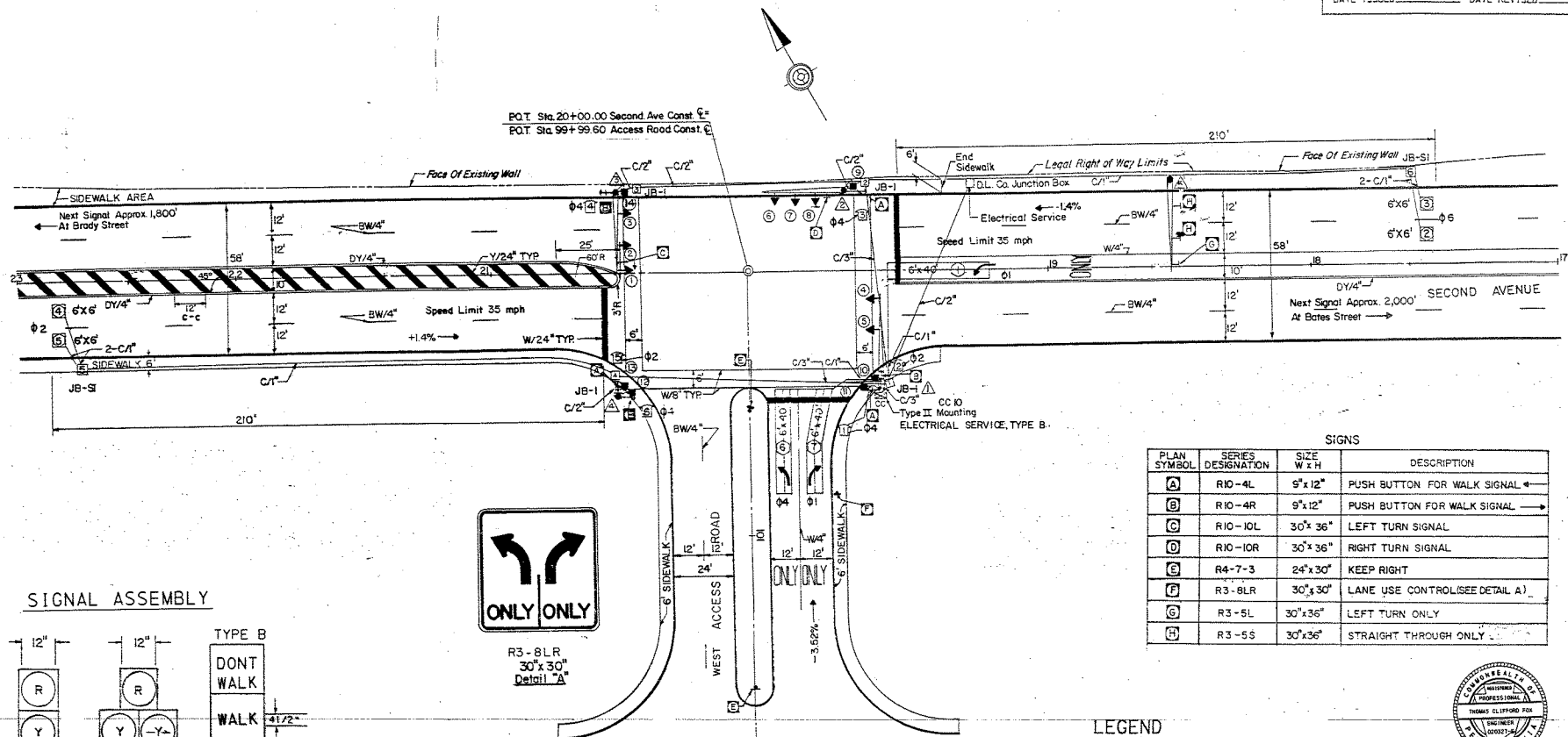
CYCLE	LENGTH	OFFSETS			
		1.	2.	3.	4.
A	0	0	0	0	0
B	0	0	0	0	0
C	0	0	0	0	0

TS # 64 : BATES SECOND  
 ( 0 + key)

AT C:\TV\NONCBD\INT3

FUNCTION	PHASES	FUNCTION	(phase + key)							
			15	26	3	4	51	62	7	8
VEH. RECALL	2 6	0 MAX I	20	31	0	25	15	31	0	30
PED. RECALL	0	1 MAX II/HFDW	0	0	0	0	0	0	0	0
RED LOCK	0	2 WALK	0	11	0	4	0	11	0	4
YELLOW LOCK	0	3 FLASH DW	0	20	0	18	0	20	0	18
PERMIT	12 456 8	4 MAX INITIAL	0	0	0	0	0	0	0	0
PED PHASES	2 4 6 8	5 MIN GREEN	7	15	0	7	7	15	0	7
LEAD PHASES	1 3 5 8	6 T B R	10	10	0	10	10	10	0	10
DOUBLE ENTRY	0	7 T T R	5	10	0	10	5	10	0	10
SEQ. TIMING	0	8 OBSERVE GAP								
START UP GRN	2 6	9 PASSAGE	3.0	6.0	0.0	3.0	3.0	6.0	0.0	3.0
OVERLAP A	0	A MIN GAP	2.0	3.0	0.0	2.0	2.0	4.0	0.0	2.0
OVERLAP B	0	B ADDED/ACT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OVERLAP C	0	C YELLOW	3.0	4.0	0.0	3.0	3.0	4.0	0.0	3.0
OVERLAP D	0	D RED CLEAR	3.0	2.0	0.0	3.0	3.0	2.0	0.0	3.0
EXCLUSIVE	4 8	E RED REVERT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SIM. GAP	0	F WALK II	0	0	0	3	0	0	0	3

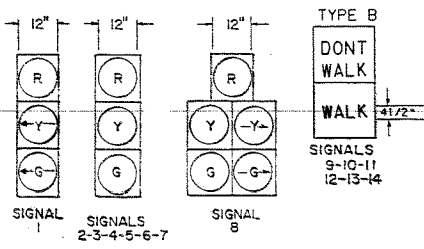
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SIGNS

PLAN SYMBOL	SERIES DESIGNATION	SIZE W x H	DESCRIPTION
A	R10-4L	9"x12"	PUSH BUTTON FOR WALK SIGNAL ←
B	R10-4R	9"x12"	PUSH BUTTON FOR WALK SIGNAL →
C	R10-10L	30"x36"	LEFT TURN SIGNAL
D	R10-10R	30"x36"	RIGHT TURN SIGNAL
E	R4-7-3	24"x30"	KEEP RIGHT
F	R3-8LR	30"x30"	LANE USE CONTROL(SEE DETAIL A)
G	R3-5L	30"x36"	LEFT TURN ONLY
H	R3-5S	30"x36"	STRAIGHT THROUGH ONLY

SIGNAL ASSEMBLY



SIGNAL ASSEMBLY NOTES

- NOTES: 1) MIN / MAX HEIGHT FOR OVERHEAD SIGNALS 15' / 18'  
 2) MIN / MAX HEIGHT FOR POLE MOUNTED SIGNALS 10' / 12'  
 3) ALL SIGNALS EQUIPPED WITH TUNNEL VISORS  
 4) ALL SIGNALS SHALL BE ALUMINUM

**CONSTRUCTION NOTE**  
 THIS DIAGRAM ILLUSTRATES BOTH EXISTING AND PROPOSED ITEMS. ONLY THOSE ITEMS TABULATED ARE TO BE CONSTRUCTED.

- LEGEND**
- ▲ MAST ARM
  - STRAIN POLE
  - PEDESTAL
  - ⊙ VEHICULAR SIGNAL HEAD
  - ⊙ PEDESTRIAN SIGNAL HEAD
  - ⊙ SIGN
  - ⊙ VEHICLE DETECTOR
  - ⊙ PEDESTRIAN PUSH BUTTON/SIGN
  - ⊙ CONTROLLER ASSEMBLY
  - ⊙ JUNCTION BOX
  - C/4" — CONDUIT/SIZE
  - W/4" SOLID WHITE LINE/WIDTH
  - BW/4" BROKEN WHITE LINE/WIDTH
  - Y/4" SOLID YELLOW LINE/WIDTH
  - BY/4" BROKEN YELLOW LINE/WIDTH
  - DY/4" DOUBLE SOLID YELLOW LINE/WIDTH



COUNTY: ALLEGHENY  
 MUNICIPALITY: CITY OF PITTSBURGH  
 INTERSECTION: SECOND AVE & WEST ACCESS ROAD

ACCEPTED AND APPROVED:  
*End Brindley* Dec 12, '99  
 MUNICIPAL REPRESENTATIVE DATE

RECOMMENDED:  
*[Signature]* 12-13-99  
 ASST. DIST. TRAFFIC ENGINEER DATE

SCALE: 0 20 40 60

TYPE 170 CONTROLLER W/MANUAL CORD & PHONE COMMUNICATION  
MOVEMENT, SEQUENCE AND TIMING

Phase	1+6			2+6				4				EMERGENCY FLASHING	
	Interval	1	2	3	1	2	3	4	1	2	3		4
Signal													
1	G	Y	R		R	R	R	R	R	R	R	R	off
2-3	G	Y	R		G	G	Y	R		R	R	R	Y
4-5	R	R	R		G	G	Y	R		R	R	R	Y
6-7	R	R	R		R	R	R	R		G	G	Y	R
B	G	Y	R		R	R	R	R		G	G	Y	R
9-10-13-14	D	W	D	W	D	W	D	W	D	W	D	W	off
11-12	D	W	D	W		W	FD	D	W	D	W	D	W
FIXED		3.4	2.6			3.4	2.6				3.2	2.8	
MINIMUM		5		15						5			
ADDED INIT.				2.1									
MAX. INITIAL				26.8									
PASSAGE		3		10						5			
TIME TO REDUCE				15									
TIME BEFORE RED				15									
MIN. GAP		3		6						5			
MAXIMUM		20		60				20					
PEDESTRIAN				17	23					14	19		
MEMORY		NL			MN						NL		

\*UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE DONT WALK AT ALL TIMES

MEMORY INCLUDES:

- PEDESTRIAN RECALL (PR)
- MINIMUM RECALL (MN)
- MAXIMUM RECALL (MX)
- LOCKING (L)
- NON-LOCKING (NL)

NOTES:

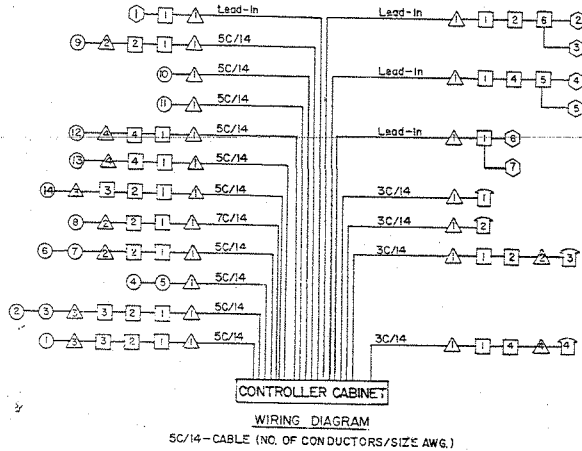
- ① G IF FOLLOWED BY PHASE 2+6
- ② G IF FOLLOWED BY PHASE 1+6
- ③ IF FOLLOWED BY PHASE 4
- ④ Y IF FOLLOWED BY PHASE 1+6
- ⑤ R IF FOLLOWED BY PHASE 1+6

COORDINATION PLAN

EVENT	TIME	PLAN	OFFSET	DAY OF WEEK							CYCLE	FORCE OFF								
				S	M	T	W	T	F	S		1	2	3	4	5	6			
0	0000	F		X	X	X	X	X	X	X										
1	0500			X	X	X	X	X	X	X										
2	0600	2		X	X	X	X	X	X	X										
3	0900	1		X	X	X	X	X	X	X										
4	1500	3		X	X	X	X	X	X	X										
5	1900	1		X	X	X	X	X	X	X										
6	2300	F		X	X	X	X	X	X	X										
7																				
8																				
9																				
A																				
B																				
C																				
D																				
E																				
F																				

PLAN (PLN) = 1...9 (DIAL)  
(FREE)  
(FLASH)

OFFSET (OFT) = A...C



WIRING DIAGRAM  
5C/14-CABLE (INC. OF CONDUCTORS/SIZE AWG.)

- LEGEND
- ▲ - MAST ARM
  - - STRAIN POLE/MESSENGER CABLE
  - - PEDESTAL
  - ⊙ - VEHICULAR SIGNAL HEAD
  - ⊙ - PEDESTRIAN SIGNAL HEAD
  - ⊙ - SIGN
  - ⊙ - VEHICLE DETECTOR
  - - PEDESTRIAN PUSH BUTTON/SIGN
  - ⊙ - CONTROLLER ASSEMBLY
  - ⊙ - JUNCTION BOX
  - C/4 - CONDUIT/SIZE
  - W/4" - SOLID WHITE LINE/WIDTH
  - BW/4" - BROKEN WHITE LINE/WIDTH
  - Y/4" - SOLID YELLOW LINE/WIDTH
  - BY/4" - BROKEN YELLOW LINE/WIDTH
  - DY/4" - DOUBLE SOLID YELLOW LINE/WIDTH

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
11-0	ALLEGHENY	2ND. AVE.		37 OF 40

PERMIT NO. 1-092-90 SHEET 3 OF 3  
DATE ISSUED \_\_\_\_\_ DATE REVISED \_\_\_\_\_

GENERAL NOTES

INSTALL, OPERATE AND MAINTAIN THIS TRAFFIC SIGNAL IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION REGULATIONS ON OFFICIAL TRAFFIC CONTROL DEVICES.

NO MODIFICATION OF THIS INSTALLATION IS PERMITTED UNLESS PRIOR APPROVAL IS GRANTED, IN WRITING, BY THE DEPARTMENT.

ALL MAINTENANCE NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS, INCLUDING TRIMMING TREES, IS THE RESPONSIBILITY OF THE PERMITTEE.

THE PERMITTEE INSTALLS AND MAINTAINS ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING WHICH ARE CONSIDERED PART OF THE PERMIT, UNLESS OTHERWISE INDICATED. THE DEPARTMENT MAINTAINS THE LONGITUDINAL PAVEMENT MARKINGS ON STATE HIGHWAYS.

INSTALL POST MOUNTED SIGNALS WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF THE CURB OR EDGE OF THE SHOULDER. ALSO, INSTALL SUPPORT POLES FOR OVERHEAD SIGNALS WITH A MINIMUM HORIZONTAL CLEARANCE OF 2 FEET.

INSTALL SIGNAL HEADS AND SIGNS ERECTED OVER THE ROADWAY WITH THE BOTTOMS NOT LESS THAN 17 FEET NOR MORE THAN 18 FEET ABOVE THE ROADWAY.

INSTALL POST MOUNTED SIGNAL HEADS WITH BOTTOMS NOT LESS THAN 10 FEET NOR MORE THAN 15 FEET ABOVE THE SIDEWALK OR PAVEMENT GRADE.

INSTALL SIGNAL HEADS WITH A MINIMUM HORIZONTAL DISTANCE OF 8 FEET BETWEEN THE HEADS AS MEASURED AT RIGHT ANGLES TO THE APPROACH.

IN ADDITION TO THIS SIGNAL PERMIT, THE PERMITTEE MUST OBTAIN A HIGHWAY OCCUPANCY PERMIT PRIOR TO ANY OPENINGS BEING MADE IN OR UNDER ANY PORTION OF A STATE HIGHWAY.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLETES WITH THE PROVISIONS OF ACT 38, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION CONSULT WITH UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.



1-092-070  
COUNTY: ALLEGHENY  
MUNICIPALITY: PITTSBURGH  
INTERSECTION: SECOND AVE. & WEST ACCESS RD.

ACCEPTED AND APPROVED:  
*Fred Reynolds* Dec. 12, 97  
MUNICIPAL REPRESENTATIVE DATE

RECOMMENDED:  
*William E. Smith* 12-17-97  
DISTRICT TRAFFIC ENGINEER DATE

SCALE: 0 20 40 60  
1-092-90

INTERSECTION : SECOND  
FLASH YELLOW : SECOND  
MS. LOCATION : NONE

WEST\_ACCESS\_RD.

TS:612 DATE: 05/18/98

POLICE BUTTON: T

TYPE OPERATE : FULL ACTUATED

SYSTEM #: 0

SYSTEM TYPE : ---

MAN. NAME & # : SAFETRAN 170

TYPE CONTROL: S

NUMBER SPLITS: 0

LAST P.M.C. : 07/23/97

WORK ORDER #: 8788

COMP. DATE : 04/28/98

LAST P.M.LOW : 07/24/97

LAST P.M.HIGH : 07/30/97

# LIGHTS : 14

# PHASES USED : 3

# S.HD 8 : 0

# DETECTOR LOOPS : 7

# S.HD12 : 8

# PED BUTTONS : 6

# P.HD 9 : 6

# P.HD12 : 0

# POLE LIGHTS : 6

# ASPECTS: 0

# MAST ARM LIGHTS : 8

# 5 POS. : 1

# SPAN LIGHTS : 0

SERVICE 1 : 04/28/98 402,

SERVICE 2 : 04/09/98 308,

SERVICE 3 : 03/17/98 402,

SERVICE 4 : 02/25/98 283,

SERVICE 5 : 11/18/97 261,

FLASH TIME : 24 HR STOP & GO

TERRITORY : 4309

REVISION DATE : 02/22/89 ORIGINAL INSTALLATION : / /

ORIGINAL W.O.# 0

REMARKS :

TS : 612

SAFETRAN 170

PHASES	1.	2.	3.	4.	5.	6.	7.	8.
ACT. BEFORE ADDING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINIMUM GREEN	5.0	15.0	0.0	5.0	0.0	15.0	0.0	0.0
SECONDS PER ACT.	0.0	2.1	0.0	0.0	0.0	2.1	0.0	0.0
WALK	0.0	17.0	0.0	14.0	0.0	17.0	0.0	0.0
WALK CLEARANCE	0.0	23.0	0.0	19.0	0.0	23.0	0.0	0.0
PASSAGE	3.0	10.0	0.0	5.0	0.0	10.0	0.0	0.0
TIME BEFORE REDUCING	0.0	15.0	0.0	0.0	0.0	15.0	0.0	0.0
TIME TO REDUCE	0.0	15.0	0.0	0.0	0.0	15.0	0.0	0.0
MINIMUM GAP	3.0	6.0	0.0	5.0	0.0	6.0	0.0	0.0
MAXIMUM GREEN 1	20.0	60.0	0.0	20.0	0.0	60.0	0.0	0.0
MAXIMUM GREEN 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YELLOW	4.0	4.0	0.0	3.5	0.0	4.0	0.0	0.0
RED CLEARANCE	2.0	2.0	0.0	2.5	0.0	2.0	0.0	0.0
RED REVERT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAXIMUM INITIAL	0.0	27.0	0.0	0.0	0.0	27.0	0.0	0.0

REMARKS:





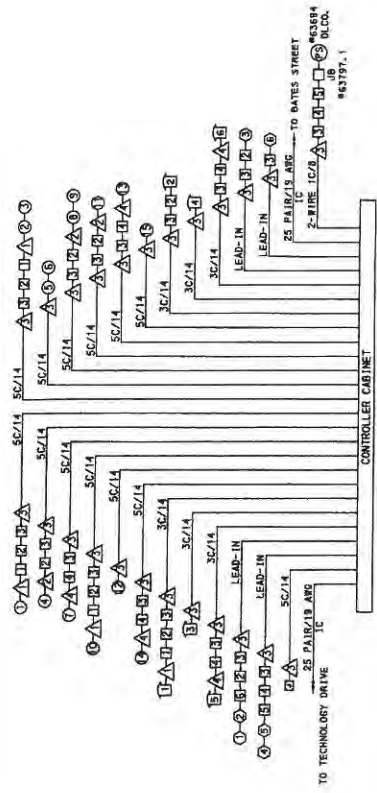
**PHASING DIAGRAM**

TYPE 1 TO CONTROL WITH MANUAL COORD	PHASE 1+8			PHASE 2+6			PHASE 3+8		
	INTERVAL	1	2	3	4	1	2	3	4
1. SIGNAL									
2. 3. 4	R	R	R	R	R	R	R	R	R
5. 6. 7	G	G	G	G	G	G	G	G	G
8. 9	R	R	R	R	R	R	R	R	R
10. 11. 12. 13	DM	DM	DM	DM	DM	DM	DM	DM	DM
14. 15	DM	DM	DM	DM	DM	DM	DM	DM	DM
16	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
FIXED									
PRINTING									
MESSAGE									
TR									
MIN. GAP									
MAX. I									
PEDESTRIAN *									
MEMORY									

\* MEMORY PRESERVE IN ACTUATION ONLY, OTHERWISE DON'T WALK AT ALL TIMES.

① - 6 IF FOLLOWED BY 2+6

**MEMORY INCLUDES**  
 MR - MINIMUM RECALL  
 MA - MAXIMUM RECALL  
 PM - PERSEVERANT RECALL  
 LK - LOCKING  
 NL - NON-LOCKING



**WIRING DIAGRAM**  
 SC/14 - CABLE (NO. OF CONDUCTORS / AWG SIZE)

- LEGEND**
- ① SIGNAL HEADS
  - ⊓ JUNCTION BOX
  - ⊓ MUST ARM
  - ⊓ LOOP DETECTORS
  - ⊓ PUSH BUTTON DETECTOR



RECORD DRAWINGS  
 URBAN REDEVELOPMENT AUTHORITY  
 OF PITTSBURGH  
 PITTSBURGH TECHNOLOGY CENTER  
 PUBLIC IMPROVEMENTS  
 SITE PREPARATION CONTRACT NO. 11  
 CITY OF PITTSBURGH  
 DEPARTMENT OF PUBLIC WORKS  
 BUREAU OF  
 TRANSPORTATION AND ENGINEERING  
**TRAFFIC SIGNAL PLAN**

SCALE AS SHOWN SHEET NO. \_\_\_\_\_ ACCESSION NO. \_\_\_\_\_  
 DATE 02/11/08 36 OF 64 CASE NO. \_\_\_\_\_

COUNTY: ALLEGHENY  
 MUNICIPALITY: CITY OF PITTSBURGH  
 INTERSECTION: SECOND AVENUE AND  
 MIDDLE ACCESS STREET (TO BE DETERMINED)

REVIEWED: \_\_\_\_\_  
 DISTRICT TRAFFIC ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_  
 SCALE: 20 0 20 40

DATE	BY	REVISIONS

RECORDED DRAWINGS: 10-3-05

TS-671KR-1034

INTERSECTION : SECOND MIDDLE\_ACCESS\_RD  
 FLASH YELLOW : SECOND  
 MS. LOCATION : NONE

TS:671 DATE:08/21/09  
 POLICE BUTTON: F  
 SITE CODE : SOK  
 TRACT # : 409  
 IN CDBG AREA : Y  
 SYSTEM # : 0  
 SYSTEM TYPE : FOS  
 NUMBER SPLITS: 0

TYPE OPERATE : FULL ACTUATED  
 MAN. NAME & # : SAFETRAN 170E  
 SOFTWARE PROG.: 170 WAPITI 4IKS

TOTAL UNITS: 15  
 POLE UNITS: 8  
 MAST UNITS: 7  
 SPAN UNITS: 0

LAST P.M.C. : / /  
 LAST P.M.LOW : / /  
 LAST P.M.HIGH : / /

	LEDS	LAMP	PAR
	8 12	8 12	LED LAMP
RED	:0 9	0 0	0 0
YEL	:0 8	0 0	0 0
GRN	:0 8	0 0	0 0
YEL>	:0 1	0 0	0 0
GRN>	:0 1	0 0	0 0
DW	:0 0	0 0	CD/WD
WK	:0 0	0 0	6

WORK ORDER # : 9967  
 COMP. DATE : 01/07/09  
 MONITOR ID # :  
 MODEM : 0  
 # PHASES USED : 4  
 # DETECTOR LOOPS: 6  
 # PED BUTTONS : 6  
 # AUDIBLE PEDS : 0  
 # FIB.OPTIC SIGN: 0

FLASH TIME : 24HR STOP & GO  
 REVISION DATE : 01/07/09 ORIGINAL INSTALLATION : 01/07/09 ORIGINAL W.O.#: 0  
 REMARKS : INSTALLED ON 1/07/09

FUNCTION	PHASES 12345678	key FUNCTION	(phase + key)							
			1	2	3	4	5	6	7	8
VEH. RECALL	2 6	0 MAX I	20	60	0	0	0	60	0	20
PED. RECALL	0	1 MAX II/HFDW	0	0	0	0	0	0	0	0
RED LOCK	1	2 WALK	0	17	0	0	0	0	0	14
YELLOW LOCK	0	3 FLASH DW	0	23	0	0	0	0	0	20
PERMIT	12 6 8	4 MAX INITIAL	0	25	0	0	0	25	0	0
PED PHASES	2 8	5 MIN GREEN	5	15	0	0	0	15	0	5
LEAD PHASES	1 3 5 7	6 T B R	5	15	0	0	0	15	0	5
DOUBLE ENTRY	0	7 T T R	5	15	0	0	0	15	0	5
SEQ. TIMING	0	8 OBSERVE GAP								
START UP GRN	2 6	9 PASSAGE	3.0	010	0.0	0.0	0.0	010	0.0	3.0
OVERLAP A	0	A MIN GAP	3.0	6.0	0.0	0.0	0.0	6.0	0.0	3.0
OVERLAP B	0	B ADDED/ACT	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0
OVERLAP C	0	C YELLOW	3.5	4.0	0.0	0.0	0.0	4.0	0.0	3.5
OVERLAP D	0	D RED CLEAR	2.5	2.0	0.0	0.0	0.0	2.0	0.0	2.5
EXCLUSIVE	0	E RED REVERT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SIM. GAP	0	F WALK II	0	0	0	0	0	0	0	0

---

**APPENDIX B**

**LEVEL OF SERVICE DEFINITIONS**

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## LEVELS OF SERVICE

Intersection levels of service (LOS) were determined through implementation of the methodology presented in the *Highway Capacity Manual 6<sup>th</sup> Edition*, published by the Transportation Research Board.

### i. Signalized Intersections

An explanation of level of service at signalized intersections is as follows:

This subsection describes the LOS criteria for the motorized vehicle mode. The criteria for the motorized vehicle mode are different from those for other modes. Specifically, the motorized vehicle mode criteria are based on performance measures that are field measurable and perceivable by travelers. The criteria for other modes are based on scores reported by travelers indicating their perception of service quality.

LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection of an approach. Control delay and volume-to-capacity ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control. It is also a surrogate measure of driver discomfort and fuel consumption. The volume-to-capacity ratio quantifies the degree to which a phase's capacity is utilized by a lane group. The following paragraphs describe each LOS.

LOS A describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

A lane group can incur a delay less than 80 s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicates that cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 s/veh represents failure from a delay perspective).

Exhibit 19-8 lists the LOS thresholds established for the motor vehicle mode at a signalized intersection.

**Exhibit 19-8**

LOS Criteria: Signalized Intersection

Control Delay (s/veh)	LOS by Volume-to-Capacity (v/c) Ratio <sup>(1)</sup>	
	v/c ≤ 1.0	v/c > 1.0
≤ 10	A	F
> 10 – 20	B	F
> 20 – 35	C	F
> 35 – 55	D	F
> 55 – 80	E	F
> 80	F	F

(1) For approach-based and intersectionwide assessments, LOS is defined solely by control delay.

## ii. Unsignalized Intersections

The following level-of-service criteria for two-way stop-controlled and all-way stop-controlled intersections differ from the criteria for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from various kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Thus, a higher level of control delay is acceptable at a signalized intersection for the same level of service.

Level of service for two-way stop-controlled (TWSC) intersections and an all-way stop control intersections is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement), as well as the major-street left turns, by using the criteria given in Exhibit 20-2 and Exhibit 21-8. For TWSC intersections, LOS is not defined for the intersection as a whole or for major –street approaches for three primary reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles a typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay for all vehicles; and (c) the resulting low delay can mask LOS deficiencies for minor movements. Level of service for two-way stop control is not defined for the intersection as a whole, while level of service for all-way stop control is defined for the intersection as a whole. Level of service criteria are given in Exhibit 20-2 (two-way stop-controlled intersections) and Exhibit 21-8 (all-way stop controlled intersections).

### Exhibit 20-2 and Exhibit 21-8

LOS Criteria: Two-Way and All-Way Stop Controlled Intersections

Control Delay (s/veh)	LOS by Volume-to-Capacity (v/c) Ratio <sup>(1)(2)</sup>	
	v/c ≤ 1.0	v/c > 1.0
0 – 10	A	F
> 10 – 15	B	F
> 15 – 25	C	F
> 25 – 35	D	F
> 35 – 50	E	F
> 50	F	F

- (1) TWSC: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.
- (2) AWSC: For approaches and intersectionwide assessment, LOS is defined solely by control delay.

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**APPENDIX C**

**2018 EXISTING CONDITIONS CAPACITY CALCULATIONS**

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# HCM 6th Signalized Intersection Summary

## 1: Technology Dr/Bates St & Second Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	264	2	37	609	573	2	14	9	436	28	139
Future Volume (veh/h)	150	264	2	37	609	573	2	14	9	436	28	139
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1904	1769	1769	1864	1879	1879	1781	1781	1932	1934	1919	2042
Adj Flow Rate, veh/h	155	272	2	38	628	591	2	14	9	470	0	143
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
Percent Heavy Veh, %	5	14	14	5	4	4	21	21	11	3	4	1
Cap, veh/h	187	1822	13	79	847	753	8	53	127	601	0	456
Arrive On Green	0.10	0.53	0.53	0.04	0.47	0.47	0.03	0.03	0.03	0.16	0.00	0.16
Sat Flow, veh/h	1813	3419	25	1776	1785	1588	221	1549	1570	3683	0	1702
Grp Volume(v), veh/h	155	134	140	38	628	591	16	0	9	470	0	143
Grp Sat Flow(s),veh/h/ln	1813	1680	1764	1776	1785	1588	1770	0	1570	1842	0	1702
Q Serve(g_s), s	8.9	4.3	4.3	2.2	30.4	33.2	0.9	0.0	0.6	13.0	0.0	7.2
Cycle Q Clear(g_c), s	8.9	4.3	4.3	2.2	30.4	33.2	0.9	0.0	0.6	13.0	0.0	7.2
Prop In Lane	1.00		0.01	1.00		1.00	0.12		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	187	895	940	79	847	753	61	0	127	601	0	456
V/C Ratio(X)	0.83	0.15	0.15	0.48	0.74	0.78	0.26	0.00	0.07	0.78	0.00	0.31
Avail Cap(c_a), veh/h	255	946	993	117	871	775	116	0	176	760	0	530
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.9	12.6	12.6	49.7	22.7	23.5	50.1	0.0	45.5	42.8	0.0	31.3
Incr Delay (d2), s/veh	15.1	0.3	0.3	4.5	5.1	7.3	2.3	0.0	0.2	4.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	1.6	1.7	1.1	13.3	13.3	0.5	0.0	0.2	6.3	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	12.9	12.9	54.2	27.9	30.8	52.4	0.0	45.7	46.9	0.0	31.7
LnGrp LOS	E	B	B	D	C	C	D	A	D	D	A	C
Approach Vol, veh/h		429			1257			25				613
Approach Delay, s/veh		30.6			30.0			50.0				43.4
Approach LOS		C			C			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.0	56.5		9.7	10.7	62.8		23.4				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	15.0	52.0		7.0	7.0	60.0		22.0				
Max Q Clear Time (g_c+I1), s	10.9	35.2		2.9	4.2	6.3		15.0				
Green Ext Time (p_c), s	0.2	15.3		0.0	0.0	7.6		1.7				

### Intersection Summary

HCM 6th Ctrl Delay	33.9
HCM 6th LOS	C

### Notes

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (veh/h)	414	26	24	737	1	1
Future Volume (veh/h)	414	26	24	737	1	1
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1731	1731	1744	1909	2018	2018
Adj Flow Rate, veh/h	427	27	25	760	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	11	11	13	2	0	0
Cap, veh/h	1378	87	51	2340	3	3
Arrive On Green	0.44	0.44	0.03	0.64	0.00	0.00
Sat Flow, veh/h	3228	198	1661	3723	624	624
Grp Volume(v), veh/h	223	231	25	760	3	0
Grp Sat Flow(s),veh/h/ln	1645	1695	1661	1814	1873	0
Q Serve(g_s), s	3.0	3.0	0.5	3.2	0.1	0.0
Cycle Q Clear(g_c), s	3.0	3.0	0.5	3.2	0.1	0.0
Prop In Lane		0.12	1.00		0.33	0.33
Lane Grp Cap(c), veh/h	721	744	51	2340	8	0
V/C Ratio(X)	0.31	0.31	0.49	0.32	0.39	0.00
Avail Cap(c_a), veh/h	2116	2181	826	7107	602	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.2	6.2	16.3	2.7	17.0	0.0
Incr Delay (d2), s/veh	0.2	0.2	7.0	0.1	29.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.6	0.3	0.2	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.5	6.5	23.3	2.8	46.2	0.0
LnGrp LOS	A	A	C	A	D	A
Approach Vol, veh/h	454			785	3	
Approach Delay, s/veh	6.5			3.5	46.2	
Approach LOS	A			A	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.1	21.0		6.1		28.1
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	17.0	44.0		11.0		67.0
Max Q Clear Time (g_c+I1), s	2.5	5.0		2.1		5.2
Green Ext Time (p_c), s	0.0	7.4		0.0		16.8

### Intersection Summary

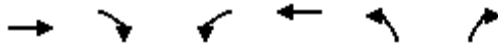
HCM 6th Ctrl Delay	4.7
HCM 6th LOS	A

### Notes

User approved volume balancing among the lanes for turning movement.

# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↙	↗
Traffic Volume (veh/h)	429	97	51	689	6	3
Future Volume (veh/h)	429	97	51	689	6	3
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1716	1716	1939	1879	2018	2018
Adj Flow Rate, veh/h	456	103	54	733	6	3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	0	4	0	0
Cap, veh/h	1151	258	107	2349	23	20
Arrive On Green	0.43	0.43	0.06	0.66	0.01	0.01
Sat Flow, veh/h	2732	594	1847	3665	1922	1710
Grp Volume(v), veh/h	280	279	54	733	6	3
Grp Sat Flow(s),veh/h/ln	1630	1609	1847	1785	1922	1710
Q Serve(g_s), s	4.3	4.3	1.0	3.2	0.1	0.1
Cycle Q Clear(g_c), s	4.3	4.3	1.0	3.2	0.1	0.1
Prop In Lane		0.37	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	709	700	107	2349	23	20
V/C Ratio(X)	0.39	0.40	0.51	0.31	0.26	0.15
Avail Cap(c_a), veh/h	1974	1949	864	6584	582	518
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.0	7.0	16.6	2.7	17.8	17.8
Incr Delay (d2), s/veh	0.4	0.4	3.7	0.1	5.9	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.9	0.5	0.2	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.4	7.4	20.3	2.8	23.7	21.0
LnGrp LOS	A	A	C	A	C	C
Approach Vol, veh/h	559			787	9	
Approach Delay, s/veh	7.4			4.0	22.8	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.1	21.8			29.9	6.4
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	17.0	44.0			67.0	11.0
Max Q Clear Time (g_c+I1), s	3.0	6.3			5.2	2.1
Green Ext Time (p_c), s	0.1	9.5			16.0	0.0
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			5.5			
HCM 6th LOS			A			

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	264	2	37	609	573	2	14	9	436	28	139
Future Volume (vph)	150	264	2	37	609	573	2	14	9	436	28	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%				-2%
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	3		3	3		3	9		1	1		9
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
Heavy Vehicles (%)	5%	14%	0%	5%	4%	7%	0%	21%	11%	3%	4%	1%
Shared Lane Traffic (%)										47%		
Lane Group Flow (vph)	155	274	0	38	1219	0	0	16	9	238	240	143
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left			Left			Left			Left		
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	21.0	66.0		13.0	58.0		13.0	13.0	13.0	28.0	28.0	21.0
Total Split (%)	17.5%	55.0%		10.8%	48.3%		10.8%	10.8%	10.8%	23.3%	23.3%	17.5%
Maximum Green (s)	15.0	60.0		7.0	52.0		7.0	7.0	7.0	22.0	22.0	15.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.72	0.15		0.33	0.85			0.14	0.06	0.78	0.78	0.27
Control Delay	65.5	12.8		60.4	33.4			55.2	30.9	60.8	60.7	25.9
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	65.5	12.8		60.4	33.4			55.2	30.9	60.8	60.7	25.9
Queue Length 50th (ft)	102	44		25	353			11	6	161	162	63
Queue Length 95th (ft)	#224	85		67	#569			36	15	#322	#325	129
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	245	1960		114	1652			115	139	360	363	558
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.63	0.14		0.33	0.74			0.14	0.06	0.66	0.66	0.26

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 102.6  
 Natural Cycle: 95  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave

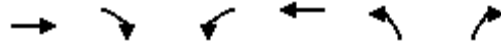


Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Traffic Volume (vph)	414	26	24	737	1	1
Future Volume (vph)	414	26	24	737	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)						1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	11%	4%	13%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	454	0	25	760	2	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	50.0		23.0	73.0	17.0	
Total Split (%)	55.6%		25.6%	81.1%	18.9%	
Maximum Green (s)	44.0		17.0	67.0	11.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.16		0.11	0.23	0.01	
Control Delay	3.4		18.6	1.3	19.5	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	3.4		18.6	1.3	19.5	
Queue Length 50th (ft)	0		4	0	0	
Queue Length 95th (ft)	77		26	61	6	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	3073		646	3557	486	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.15		0.04	0.21	0.00	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 40.7  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave



Lanes, Volumes, Timings  
6: Western Access & Second Ave

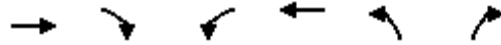


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	↗
Traffic Volume (vph)	429	97	51	689	6	3
Future Volume (vph)	429	97	51	689	6	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	12%	2%	0%	4%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	559	0	54	733	6	3
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	50.0		23.0	73.0	17.0	17.0
Total Split (%)	55.6%		25.6%	81.1%	18.9%	18.9%
Maximum Green (s)	44.0		17.0	67.0	11.0	11.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						



# Lanes, Volumes, Timings

## 6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.23		0.18	0.22	0.02	0.01
Control Delay	5.4		17.6	1.3	18.8	15.0
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	5.4		17.6	1.3	18.8	15.0
Queue Length 50th (ft)	0		9	0	1	0
Queue Length 95th (ft)	100		43	61	11	6
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	3019		738	3489	516	464
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	0.19		0.07	0.21	0.01	0.01

### Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 40.4  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Western Access & Second Ave



# HCM 6th Signalized Intersection Summary

## 1: Technology Dr/Bates St & Second Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	836	1	9	280	350	4	123	55	405	10	68
Future Volume (veh/h)	270	836	1	9	280	350	4	123	55	405	10	68
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.87	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1964	1949	1949	1939	1819	1819	2067	2067	2067	1934	1979	1995
Adj Flow Rate, veh/h	290	899	1	10	301	376	4	132	59	443	0	73
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	2	2	0	8	8	2	2	2	3	0	4
Cap, veh/h	333	1825	2	31	553	475	5	173	161	653	0	582
Arrive On Green	0.18	0.48	0.48	0.02	0.32	0.32	0.09	0.09	0.09	0.18	0.00	0.18
Sat Flow, veh/h	1870	3795	4	1847	1728	1484	61	2003	1526	3683	0	1585
Grp Volume(v), veh/h	290	439	461	10	301	376	136	0	59	443	0	73
Grp Sat Flow(s),veh/h/ln	1870	1851	1948	1847	1728	1484	2064	0	1526	1842	0	1585
Q Serve(g_s), s	15.2	16.2	16.2	0.5	14.4	23.2	6.5	0.0	3.6	11.3	0.0	3.1
Cycle Q Clear(g_c), s	15.2	16.2	16.2	0.5	14.4	23.2	6.5	0.0	3.6	11.3	0.0	3.1
Prop In Lane	1.00		0.00	1.00		1.00	0.03		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	890	937	31	553	475	178	0	161	653	0	582
V/C Ratio(X)	0.87	0.49	0.49	0.32	0.54	0.79	0.76	0.00	0.37	0.68	0.00	0.13
Avail Cap(c_a), veh/h	502	1013	1065	129	602	517	246	0	212	806	0	648
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	17.7	17.7	48.8	28.1	31.1	44.9	0.0	42.1	38.7	0.0	21.9
Incr Delay (d2), s/veh	10.5	1.5	1.5	5.7	3.0	11.4	9.0	0.0	1.4	1.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	6.9	7.3	0.3	6.2	9.5	3.8	0.0	1.4	5.3	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.7	19.3	19.2	54.6	31.2	42.5	54.0	0.0	43.5	40.4	0.0	22.0
LnGrp LOS	D	B	B	D	C	D	D	A	D	D	A	C
Approach Vol, veh/h		1190			687			195				516
Approach Delay, s/veh		26.9			37.7			50.8				37.8
Approach LOS		C			D			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	23.9	38.2		14.7	7.7	54.4		23.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	27.0	35.0		12.0	7.0	55.0		22.0				
Max Q Clear Time (g_c+I1), s	17.2	25.2		8.5	2.5	18.2		13.3				
Green Ext Time (p_c), s	0.7	7.0		0.2	0.0	24.4		1.6				

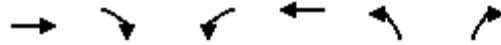
### Intersection Summary

HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C

### Notes

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (veh/h)	1111	10	7	360	22	6
Future Volume (veh/h)	1111	10	7	360	22	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1504	1849	2018	2018
Adj Flow Rate, veh/h	1145	10	7	371	23	6
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	29	6	0	0
Cap, veh/h	2302	20	13	2652	48	12
Arrive On Green	0.64	0.64	0.01	0.75	0.03	0.03
Sat Flow, veh/h	3692	31	1432	3606	1432	374
Grp Volume(v), veh/h	564	591	7	371	30	0
Grp Sat Flow(s),veh/h/ln	1771	1859	1432	1757	1868	0
Q Serve(g_s), s	9.5	9.5	0.3	1.6	0.9	0.0
Cycle Q Clear(g_c), s	9.5	9.5	0.3	1.6	0.9	0.0
Prop In Lane		0.02	1.00		0.77	0.20
Lane Grp Cap(c), veh/h	1133	1189	13	2652	62	0
V/C Ratio(X)	0.50	0.50	0.53	0.14	0.48	0.00
Avail Cap(c_a), veh/h	1720	1805	202	4281	297	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.4	5.4	27.9	1.9	26.9	0.0
Incr Delay (d2), s/veh	0.3	0.3	29.3	0.0	5.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	2.3	0.2	0.2	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.7	5.7	57.2	1.9	32.6	0.0
LnGrp LOS	A	A	E	A	C	A
Approach Vol, veh/h	1155			378	30	
Approach Delay, s/veh	5.7			3.0	32.6	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.5	42.2		7.9		48.7
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	8.0	55.0		9.0		69.0
Max Q Clear Time (g_c+I1), s	2.3	11.5		2.9		3.6
Green Ext Time (p_c), s	0.0	24.7		0.0		6.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			5.6			
HCM 6th LOS			A			
<b>Notes</b>						
User approved volume balancing among the lanes for turning movement.						

# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	↵
Traffic Volume (veh/h)	1105	49	2	364	110	32
Future Volume (veh/h)	1105	49	2	364	110	32
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1939	1864	2003	2018
Adj Flow Rate, veh/h	1139	51	2	375	113	33
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	5	1	0
Cap, veh/h	2112	95	5	2528	167	150
Arrive On Green	0.61	0.61	0.00	0.71	0.09	0.09
Sat Flow, veh/h	3547	155	1847	3635	1908	1710
Grp Volume(v), veh/h	584	606	2	375	113	33
Grp Sat Flow(s),veh/h/ln	1771	1837	1847	1771	1908	1710
Q Serve(g_s), s	11.5	11.6	0.1	2.0	3.5	1.1
Cycle Q Clear(g_c), s	11.5	11.6	0.1	2.0	3.5	1.1
Prop In Lane		0.08	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1083	1123	5	2528	167	150
V/C Ratio(X)	0.54	0.54	0.40	0.15	0.68	0.22
Avail Cap(c_a), veh/h	1496	1551	153	3636	505	453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.8	6.8	30.1	2.8	26.7	25.6
Incr Delay (d2), s/veh	0.4	0.4	43.6	0.0	4.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	3.2	0.1	0.4	1.7	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.2	7.2	73.7	2.8	31.4	26.4
LnGrp LOS	A	A	E	A	C	C
Approach Vol, veh/h	1190			377	146	
Approach Delay, s/veh	7.2			3.2	30.3	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.2	42.9			49.1	11.3
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	5.0	51.0			62.0	16.0
Max Q Clear Time (g_c+I1), s	2.1	13.6			4.0	5.5
Green Ext Time (p_c), s	0.0	23.4			6.8	0.3






















### Intersection Summary

HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

### Notes

User approved volume balancing among the lanes for turning movement.

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	836	1	9	280	350	4	123	55	405	10	68
Future Volume (vph)	270	836	1	9	280	350	4	123	55	405	10	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%			-2%	
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	11		24	24		11	3		37	37		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	0%	0%	8%	5%	0%	2%	2%	3%	0%	4%
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	290	900	0	10	677	0	0	136	59	222	224	73
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left						Left					
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	33.0	61.0		13.0	41.0		18.0	18.0	13.0	28.0	28.0	33.0
Total Split (%)	27.5%	50.8%		10.8%	34.2%		15.0%	15.0%	10.8%	23.3%	23.3%	27.5%
Maximum Green (s)	27.0	55.0		7.0	35.0		12.0	12.0	7.0	22.0	22.0	27.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

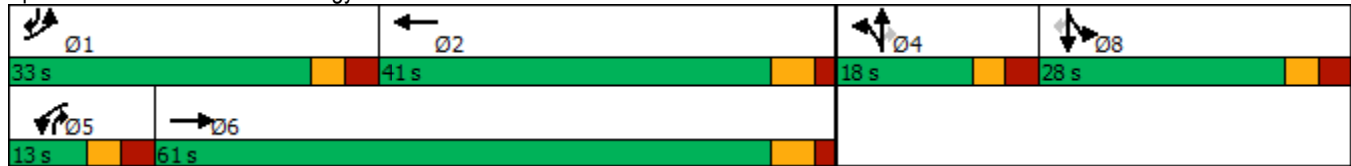
Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.81	0.56		0.09	0.92dr			0.68	0.22	0.77	0.78	0.12
Control Delay	59.6	24.0		55.0	45.9			66.7	25.6	62.5	62.6	18.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	59.6	24.0		55.0	45.9			66.7	25.6	62.5	62.6	18.8
Queue Length 50th (ft)	202	256		7	243			98	24	163	165	30
Queue Length 95th (ft)	#338	322		26	323			#196	52	#290	#293	60
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	444	1918		115	1044			223	268	348	350	708
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.65	0.47		0.09	0.65			0.61	0.22	0.64	0.64	0.10

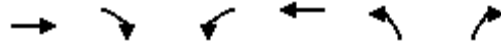
Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 105.6  
 Natural Cycle: 95  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave

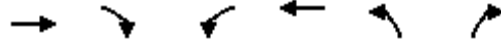


Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Traffic Volume (vph)	1111	10	7	360	22	6
Future Volume (vph)	1111	10	7	360	22	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)					1	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	10%	29%	6%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1155	0	7	371	29	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	61.0		14.0	75.0	15.0	
Total Split (%)	67.8%		15.6%	83.3%	16.7%	
Maximum Green (s)	55.0		8.0	69.0	9.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.37		0.05	0.12	0.14	
Control Delay	3.9		36.9	1.6	35.4	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	3.9		36.9	1.6	35.4	
Queue Length 50th (ft)	0		2	0	8	
Queue Length 95th (ft)	228		17	33	42	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	3092		187	3117	287	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.37		0.04	0.12	0.10	

Intersection Summary

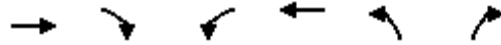
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 63  
 Natural Cycle: 50  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave





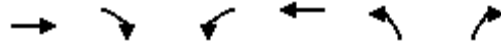
Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	↙
Traffic Volume (vph)	1105	49	2	364	110	32
Future Volume (vph)	1105	49	2	364	110	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Confl. Peds. (#/hr)					3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	4%	0%	5%	1%	0%
Shared Lane Traffic (%)						10%
Lane Group Flow (vph)	1190	0	2	375	116	30
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	57.0		11.0	68.0	22.0	22.0
Total Split (%)	63.3%		12.2%	75.6%	24.4%	24.4%
Maximum Green (s)	51.0		5.0	62.0	16.0	16.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			

# Lanes, Volumes, Timings

## 6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.47		0.01	0.15	0.42	0.12
Control Delay	7.5		37.0	4.0	34.5	13.0
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	7.5		37.0	4.0	34.5	13.0
Queue Length 50th (ft)	104		1	24	49	0
Queue Length 95th (ft)	270		8	46	109	24
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2692		136	3027	466	416
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		0.01	0.12	0.25	0.07

### Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	66.9
Natural Cycle:	55
Control Type:	Actuated-Uncoordinated

### Splits and Phases: 6: Western Access & Second Ave



---

**APPENDIX D**

**TRIP GENERATION CALCULATIONS**

---

DATA SOURCE:

Trip Gen Manual, 10th Ed

New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

710

LAND USE GROUP:

(700-799) Office

LAND USE:

710 - General Office Building

LAND USE SUBCATEGORY:

All Sites

INDEPENDENT VARIABLE (IV):

1000 Sq. Ft. GFA

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:

General Urban/Suburban

TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

160

Calculate

General Office Building (710) [Click for more details](#)

Independent Variable:

1000 Sq. Ft. GFA

Time Period:

Weekday  
Peak Hour of Adjacent Street Traffic  
One Hour Between 7 and 9 a.m.

Setting/Location:

General Urban/Suburban

Trip Type:

Vehicle

Number of Studies:

35

Avg. 1000 Sq. Ft. GFA:

117

Average Rate:

1.16

Range of Rates:

0.37 - 4.23

Standard Deviation:

0.47

Fitted Curve Equation:

$T = 0.94(X) + 26.49$

R<sup>2</sup>:

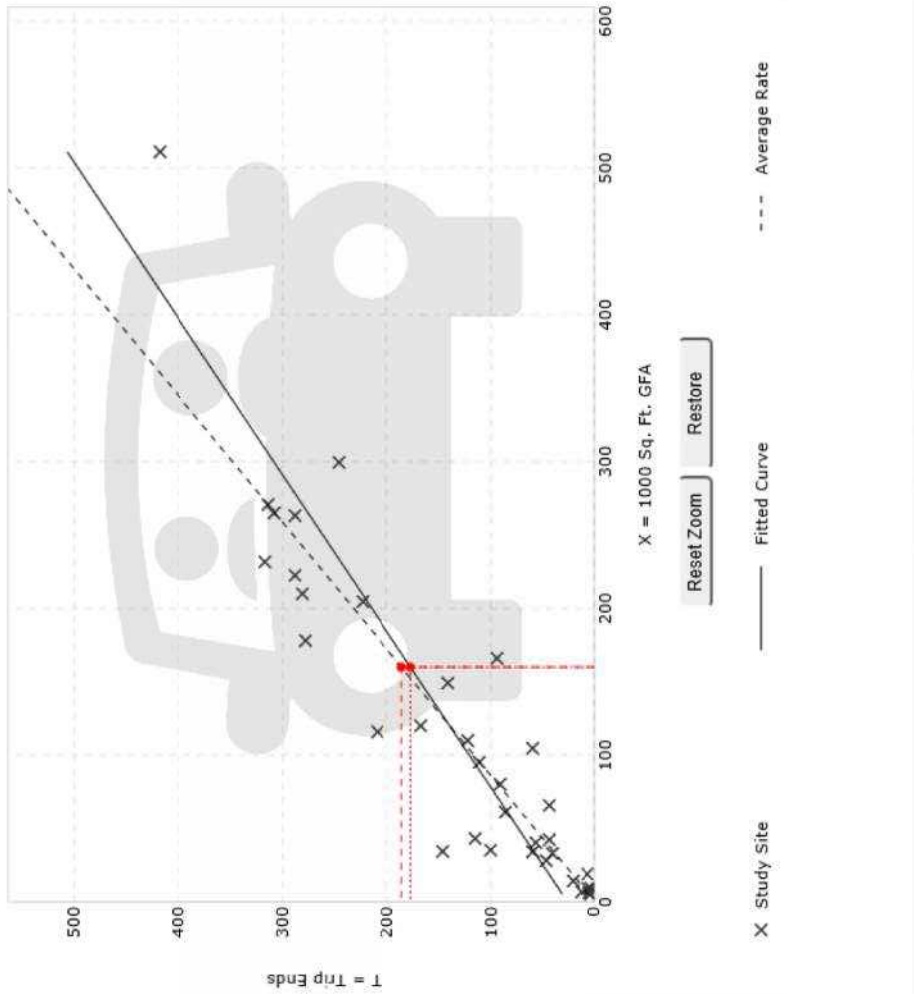
0.85

Directional Distribution:

86% entering, 14% exiting

Calculated Trip Ends:

Average Rate: 186 (Total), 160 (Entry), 26 (Exit)  
Fitted Curve: 177 (Total), 152 (Entry), 25 (Exit)



Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.

DATA SOURCE:

Trip Gen Manual, 10th Ed

New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

710

LAND USE GROUP:

(700-799) Office

LAND USE:

710 - General Office Building

LAND USE SUBCATEGORY:

All Sites

INDEPENDENT VARIABLE (IV):

1000 Sq. Ft. GFA

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:

General Urban/Suburban

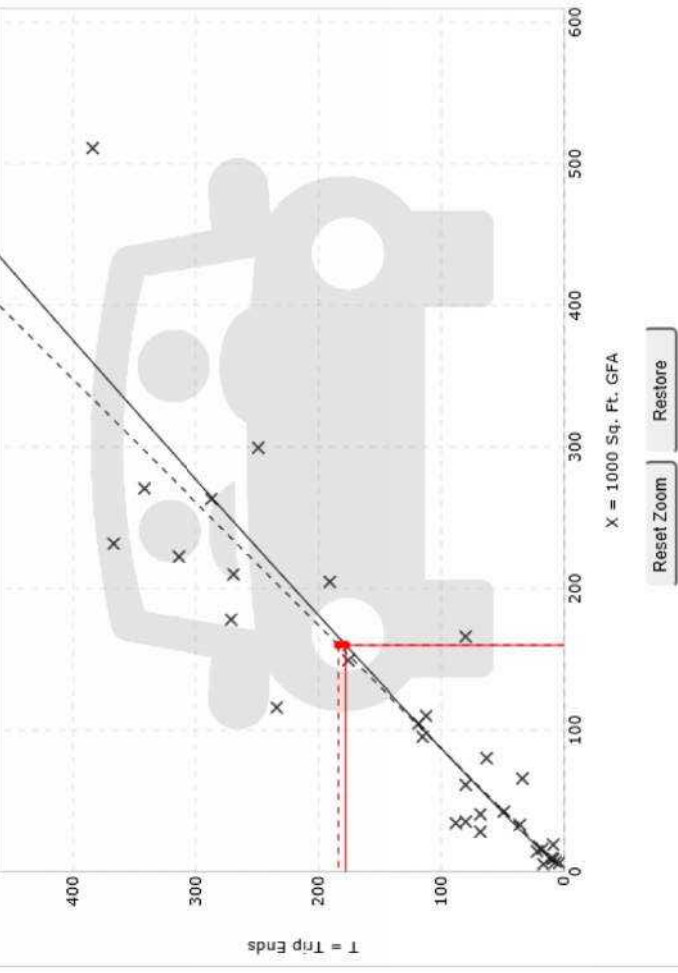
TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

160

Calculate



Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.

Independent Variable:  
1000 Sq. Ft. GFA

Time Period:  
Weekday  
Peak Hour of Adjacent Street Traffic  
One Hour Between 4 and 6 p.m.

Setting/Location:  
General Urban/Suburban

Trip Type:  
Vehicle

Number of Studies:  
32

Avg. 1000 Sq. Ft. GFA:  
114

Average Rate:  
1.15

Range of Rates:  
0.47 - 3.23

Standard Deviation:  
0.42

Fitted Curve Equation:  
 $\ln(T) = 0.95 \ln(X) + 0.36$

R<sup>2</sup>:  
0.88

Directional Distribution:  
16% entering, 84% exiting

Calculated Trip Ends:  
Average Rate: 184 (Total), 29 (Entry), 155 (Exit)  
Fitted Curve: 178 (Total), 28 (Entry), 150 (Exit)

**DATA SOURCE:**  
 Trip Gen Manual, 10th Ed

*New data edition is available. [Click here to upgrade.](#)*

**SEARCH BY LAND USE CODE:**  
 710

**LAND USE GROUP:**  
 (700-799) Office

**LAND USE:**  
 710 - General Office Building

**LAND USE SUBCATEGORY:**  
 All Sites

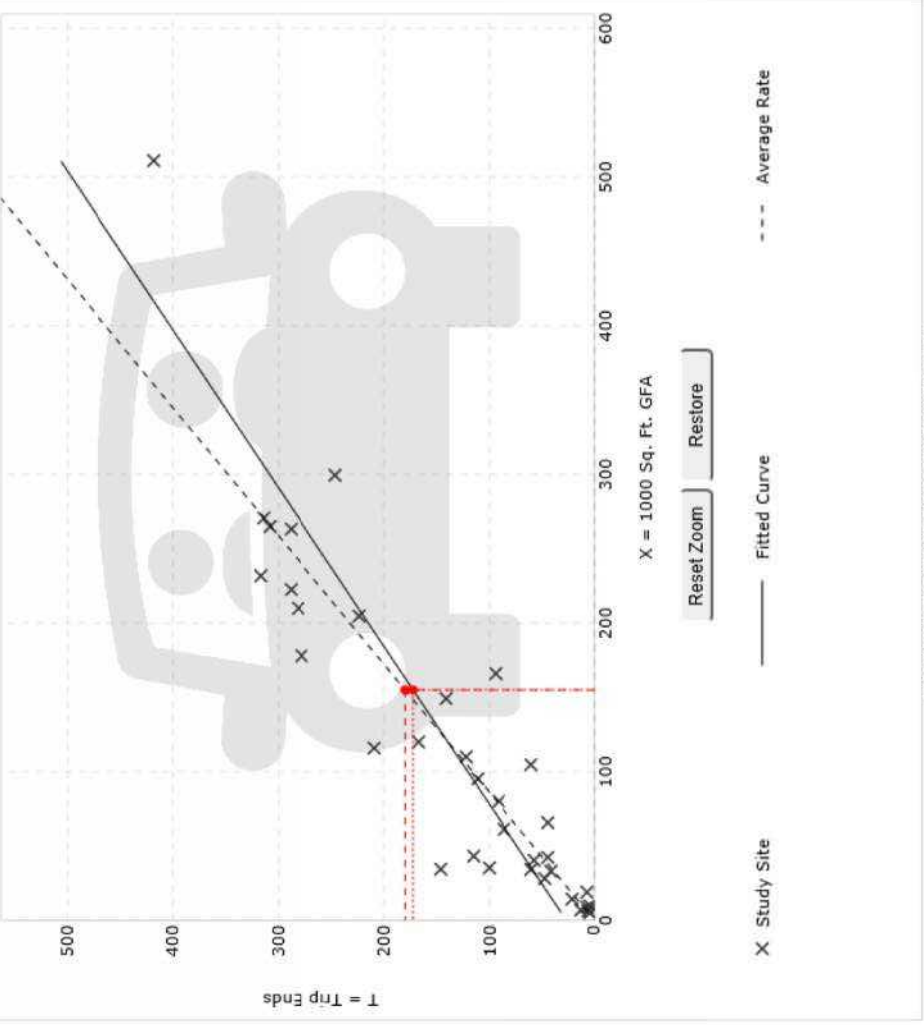
**INDEPENDENT VARIABLE (IV):**  
 1000 Sq. Ft. GFA

**TIME PERIOD:**  
 Weekday, Peak Hour of Adjacent Street Traffic

**SETTING/LOCATION:**  
 General Urban/Suburban

**TRIP TYPE:**  
 Vehicle

**ENTER IV VALUE TO CALCULATE TRIPS:**  
 155



Use the mouse wheel to Zoom Out or Zoom In.  
 Hover the mouse pointer on data points to view X and T values.

<b>Independent Variable:</b> 1000 Sq. Ft. GFA
<b>Time Period:</b> Weekday Peak Hour of Adjacent Street Traffic One Hour Between 7 and 9 a.m.
<b>Setting/Location:</b> General Urban/Suburban
<b>Trip Type:</b> Vehicle
<b>Number of Studies:</b> 35
<b>Avg. 1000 Sq. Ft. GFA:</b> 117
<b>Average Rate:</b> 1.16
<b>Range of Rates:</b> 0.37 - 4.23
<b>Standard Deviation:</b> 0.47
<b>Fitted Curve Equation:</b> $T = 0.94(X) + 26.49$
<b>R<sup>2</sup>:</b> 0.85
<b>Directional Distribution:</b> 86% entering, 14% exiting
<b>Calculated Trip Ends:</b> Average Rate: 180 (Total), 155 (Entry), 25 (Exit) Fitted Curve: 172 (Total), 148 (Entry), 24 (Exit)

DATA SOURCE:

Trip Gen Manual, 10th Ed

New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

710

LAND USE GROUP:

(700-799) Office

LAND USE:

710 - General Office Building

LAND USE SUBCATEGORY:

All Sites

INDEPENDENT VARIABLE (IV):

1000 Sq. Ft. GFA

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:

General Urban/Suburban

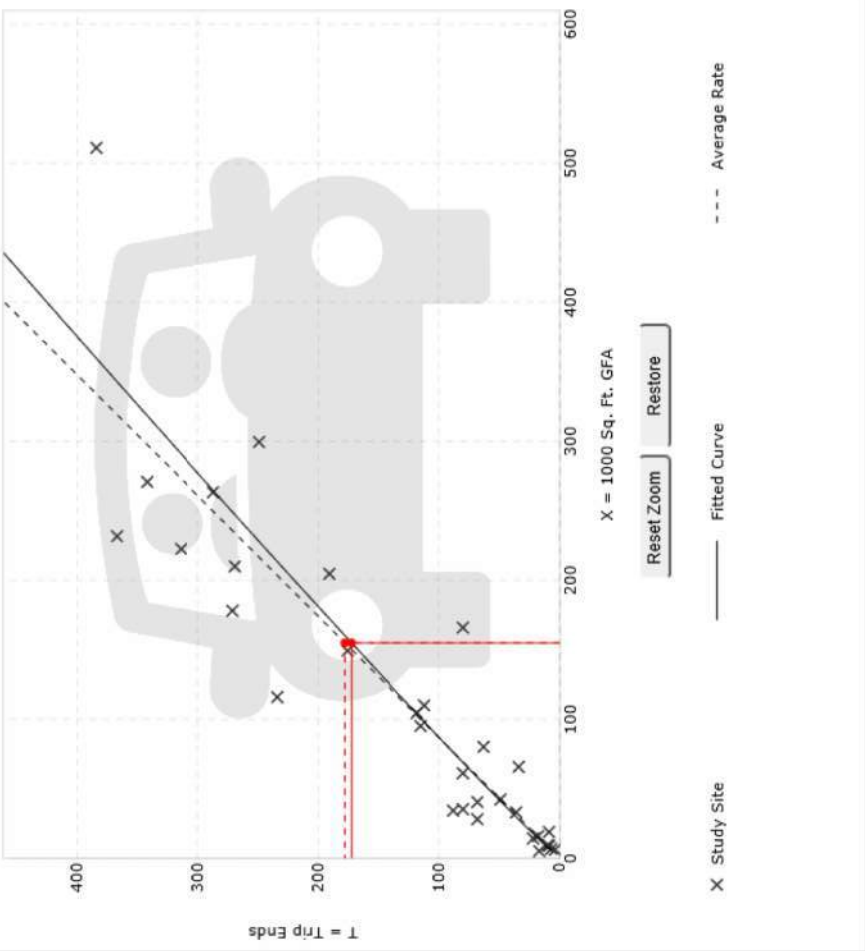
TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

155

Calculate



Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.

General Office Building (710) [Click for more details](#)

Independent Variable:	1000 Sq. Ft. GFA
Time Period:	Weekday
Setting/Location:	Peak Hour of Adjacent Street Traffic
Trip Type:	One Hour Between 4 and 6 p.m.
Vehicle:	General Urban/Suburban
Number of Studies:	32
AVG. 1000 Sq. Ft. GFA:	114
Average Rate:	1.15
Range of Rates:	0.47 - 3.23
Standard Deviation:	0.42
Fitted Curve Equation:	$\ln(T) = 0.95 \ln(X) + 0.36$
R <sup>2</sup> :	0.88
Directional Distribution:	16% entering, 84% exiting
Calculated Trip Ends:	Average Rate: 178 (Total), 28 (Entry), 150 (Exit)
	Fitted Curve: 173 (Total), 28 (Entry), 145 (Exit)

DATA SOURCE: Trip Gen Manual, 10th Ed   
New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE: 710

LAND USE GROUP: (700-799) Office

LAND USE: 710 - General Office Building

LAND USE SUBCATEGORY: All Sites

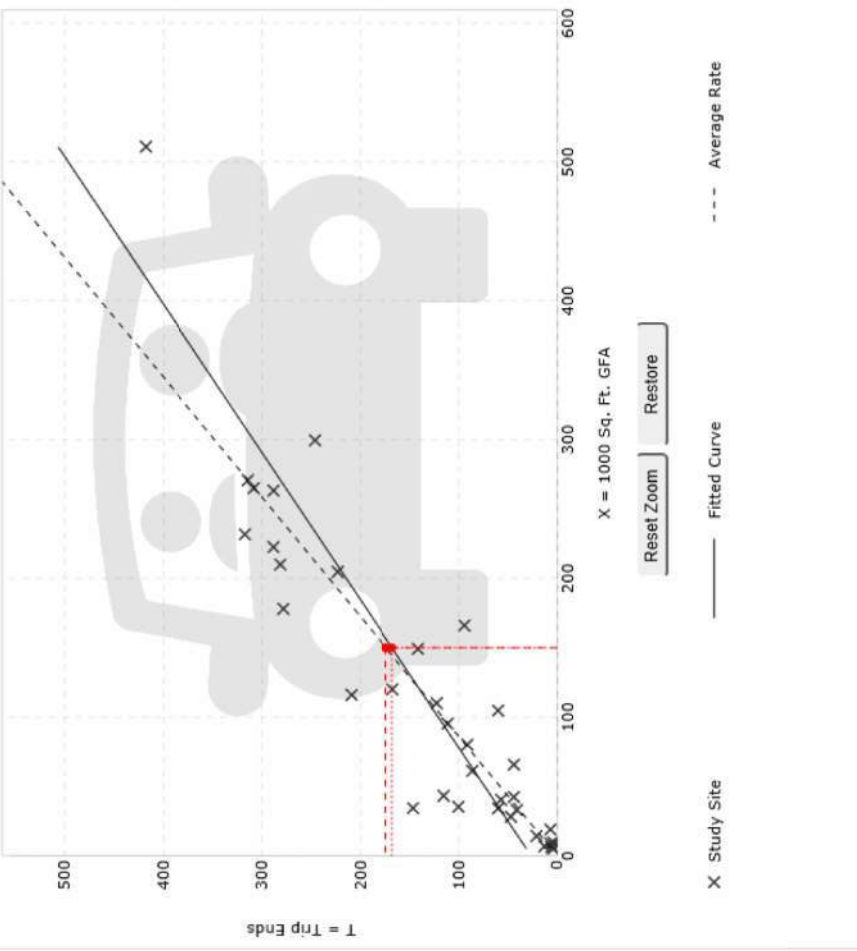
INDEPENDENT VARIABLE (IV): 1000 Sq. FL GFA

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION: General Urban/Suburban

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 150



Use the mouse wheel to Zoom Out or Zoom In.   
 Hover the mouse pointer on data points to view X and T values.

General Office Building (710) [Click for more details](#)

<b>Independent Variable:</b>	1000 Sq. Ft. GFA
<b>Time Period:</b>	Weekday
<b>Setting/Location:</b>	Peak Hour of Adjacent Street Traffic One Hour Between 7 and 9 a.m.
<b>Trip Type:</b>	General Urban/Suburban
<b>Vehicle:</b>	Vehicle
<b>Number of Studies:</b>	35
<b>Avg. 1000 Sq. Ft. GFA:</b>	117
<b>Average Rate:</b>	1.16
<b>Range of Rates:</b>	0.37 - 4.23
<b>Standard Deviation:</b>	0.47
<b>Fitted Curve Equation:</b>	$T = 0.94(X) + 26.49$
<b>R<sup>2</sup>:</b>	0.85
<b>Directional Distribution:</b>	85% entering, 14% exiting
<b>Calculated Trip Ends:</b>	Average Rate: 174 (Total), 150 (Entry), 24 (Exit) Fitted Curve: 167 (Total), 144 (Entry), 23 (Exit)



DATA SOURCE: Trip Gen Manual, 10th Ed

New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

LAND USE GROUP: (100-199) Industrial

LAND USE: 110 - General Light Industrial

LAND USE SUBCATEGORY: All Sites

INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GFA

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

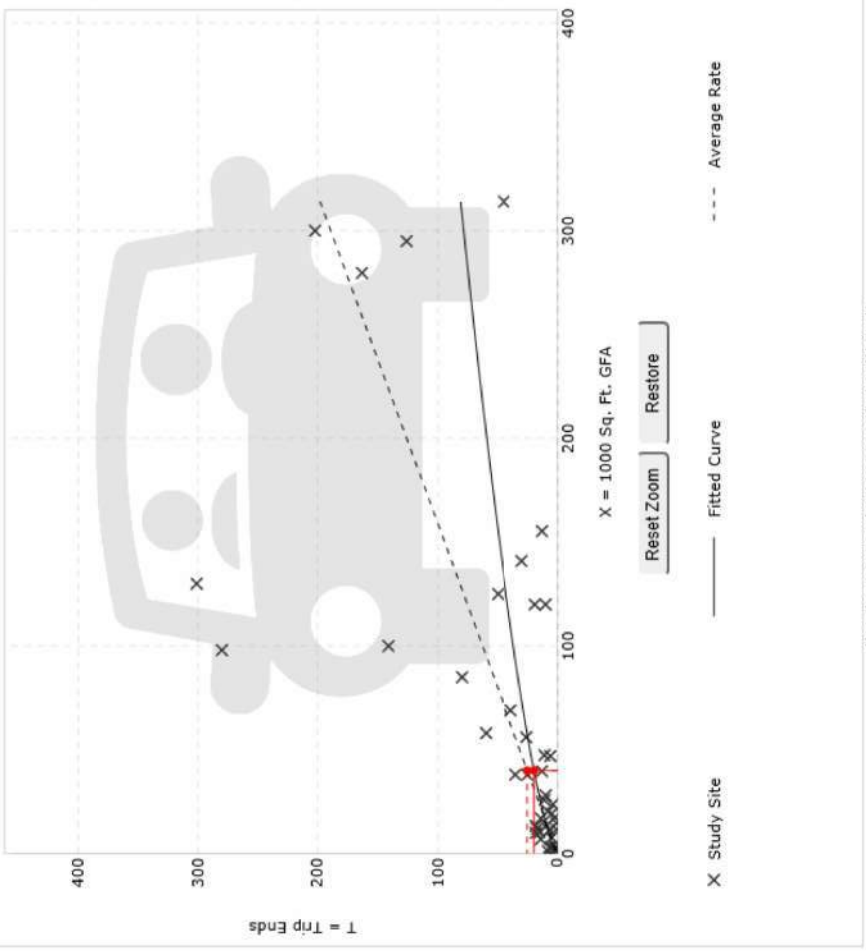
SETTING/LOCATION: General Urban/Suburban

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

General Light Industrial (110) [Click for more details](#)

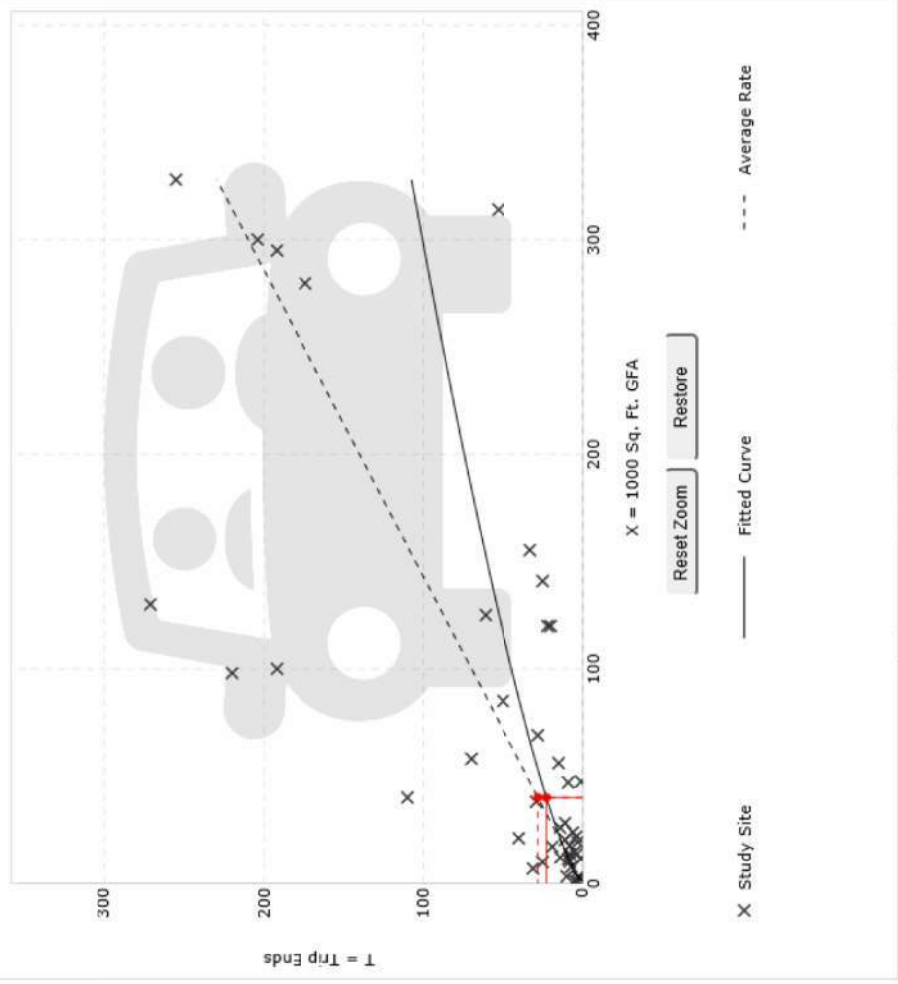
Independent Variable:	1000 Sq. Ft. GFA
Time Period:	Weekday
Setting/Location:	Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m.
Trip Type:	General Urban/Suburban
Vehicle:	Vehicle
Number of Studies:	44
Avg. 1000 Sq. Ft. GFA:	67
Average Rate:	0.63
Range of Rates:	0.07 - 7.02
Standard Deviation:	0.68
Fitted Curve Equation:	$\ln(T) = 0.69 \ln(X) + 0.43$
R <sup>2</sup> :	0.52
Directional Distribution:	13% entering, 87% exiting
Calculated Trip Ends:	Average Rate: 25 (Total), 3 (Entry), 22 (Exit) Fitted Curve: 20 (Total), 3 (Entry), 17 (Exit)



Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.

General Light Industrial (110) [Click for more details](#)

<b>Independent Variable:</b>	1000 Sq. Ft. GFA
<b>Time Period:</b>	Weekday
<b>Peak Hour of Adjacent Street Traffic</b>	One Hour Between 7 and 9 a.m.
<b>Setting/Location:</b>	General Urban/Suburban
<b>Trip Type:</b>	Vehicle
<b>Number of Studies:</b>	45
<b>Avg. 1000 Sq. Ft. GFA:</b>	73
<b>Average Rate:</b>	0.70
<b>Range of Rates:</b>	0.02 - 4.46
<b>Standard Deviation:</b>	0.65
<b>Fitted Curve Equation:</b>	$\ln(T) = 0.74 \ln(X) + 0.39$
<b>R<sup>2</sup>:</b>	0.52
<b>Directional Distribution:</b>	88% entering, 12% exiting
<b>Calculated Trip Ends:</b>	Average Rate: 28 (Total), 25 (Entry), 3 (Exit)
<b>Fitted Curve:</b>	23 (Total), 20 (Entry), 3 (Exit)



Use the mouse wheel to Zoom Out or Zoom In.  
 Hover the mouse pointer on data points to view X and T values.

**DATA SOURCE:** Trip Gen Manual, 10th Ed [New data edition is available. Click here to upgrade.](#)

**SEARCH BY LAND USE CODE:** 110

**LAND USE GROUP:** (100-199) Industrial

**LAND USE:** 110 - General Light Industrial

**LAND USE SUBCATEGORY:** All Sites

**INDEPENDENT VARIABLE (IV):** 1000 Sq. Ft. GFA

**TIME PERIOD:** Weekday, Peak Hour of Adjacent Street Traffic

**SETTING/LOCATION:** General Urban/Suburban

**TRIP TYPE:** Vehicle

**ENTER IV VALUE TO CALCULATE TRIPS:** 40

DATA SOURCE:

Trip Gen Manual, 10th Ed

New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

710

LAND USE GROUP:

(700-799) Office

LAND USE:

710 - General Office Building

LAND USE SUBCATEGORY:

All Sites

INDEPENDENT VARIABLE (IV):

1000 Sq. Ft. GFA

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:

General Urban/Suburban

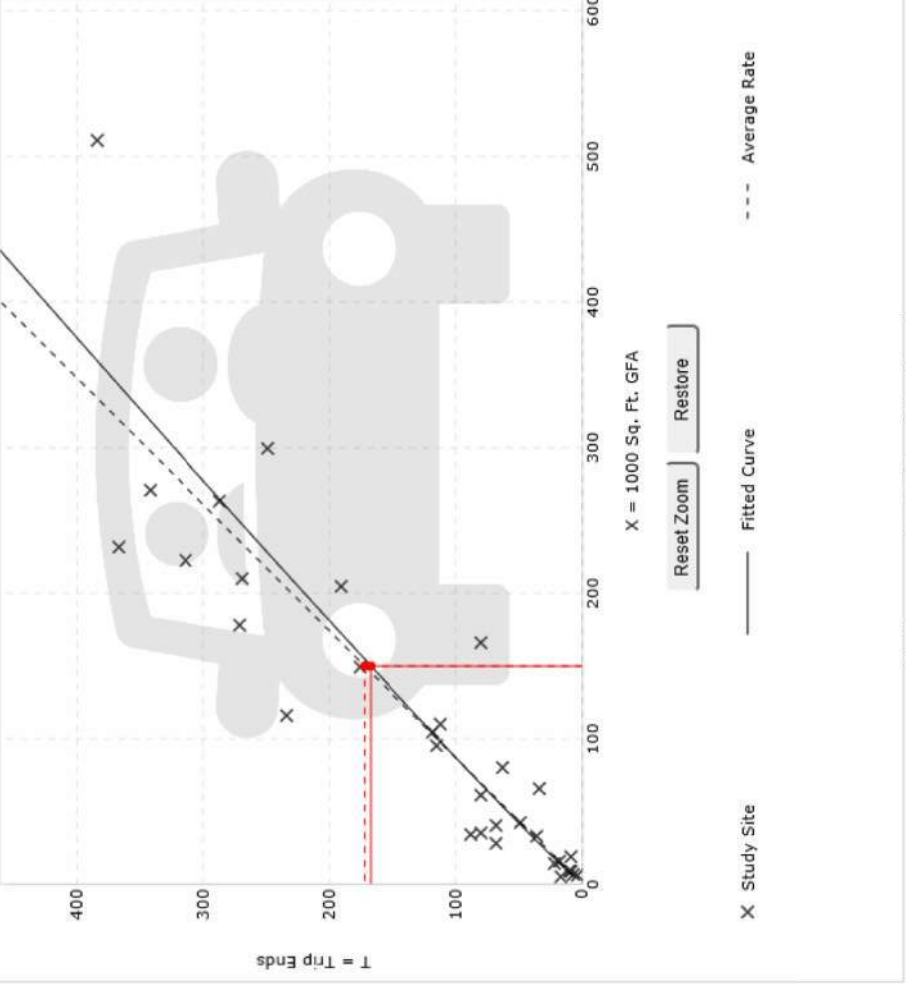
TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

150

Calculate



Use the mouse wheel to Zoom Out or Zoom In.

Hover the mouse pointer on data points to view X and T values.

Independent Variable:	1000 Sq. Ft. GFA
Time Period:	Weekday Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m.
Setting/Location:	General Urban/Suburban
Trip Type:	Vehicle
Number of Studies:	32
Avg. 1000 Sq. Ft. GFA:	114
Average Rate:	1.15
Range of Rates:	0.47 - 3.23
Standard Deviation:	0.42
Fitted Curve Equation:	$\ln(T) = 0.95 \ln(X) + 0.36$
R <sup>2</sup> :	0.88
Directional Distribution:	16% entering, 84% exiting
Calculated Trip Ends:	Average Rate: 173 (Total), 28 (Entry), 145 (Exit) Fitted Curve: 167 (Total), 26 (Entry), 141 (Exit)

DATA SOURCE:

Trip Gen Manual, 10th Ed

New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

710

LAND USE GROUP:

(700-799) Office

LAND USE :

710 - General Office Building

LAND USE SUBCATEGORY:

All Sites

INDEPENDENT VARIABLE (IV):

1000 Sq. Ft. GFA

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:

General Urban/Suburban

TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

87

Calculate

General Office Building (710) [Click for more details](#)

Independent Variable:

1000 Sq. Ft. GFA

Time Period:

Weekday

Peak Hour of Adjacent Street Traffic

One Hour Between 7 and 9 a.m.

Setting/Location:

General Urban/Suburban

Trip Type:

Vehicle

Number of Studies:

35

AVG. 1000 Sq. Ft. GFA:

117

Average Rate:

1.16

Range of Rates:

0.37 - 4.23

Standard Deviation:

0.47

Fitted Curve Equation:

$T = 0.94(X) + 26.49$

R<sup>2</sup>:

0.85

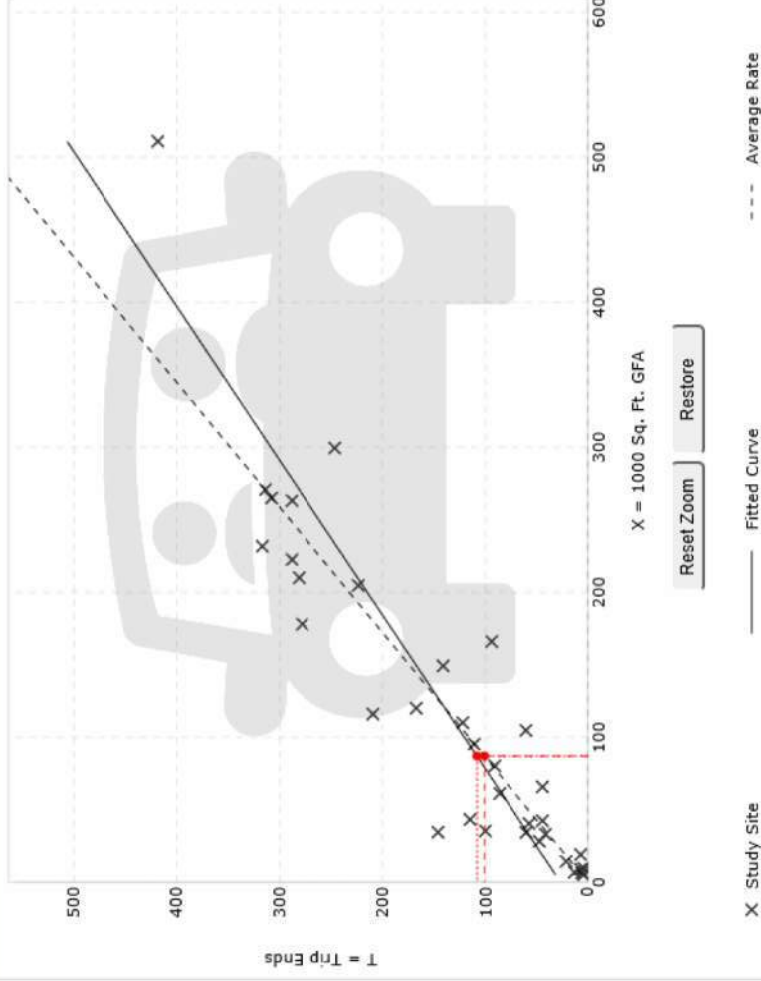
Directional Distribution:

86% entering, 14% exiting

Calculated Trip Ends:

Average Rate: 101 (Total), 87 (Entry), 14 (Exit)

Fitted Curve: 108 (Total), 93 (Entry), 15 (Exit)



Use the mouse wheel to Zoom Out or Zoom In.  
 Hover the mouse pointer on data points to view X and T values.

DATA SOURCE:    
New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

LAND USE GROUP:

LAND USE:

LAND USE SUBCATEGORY:

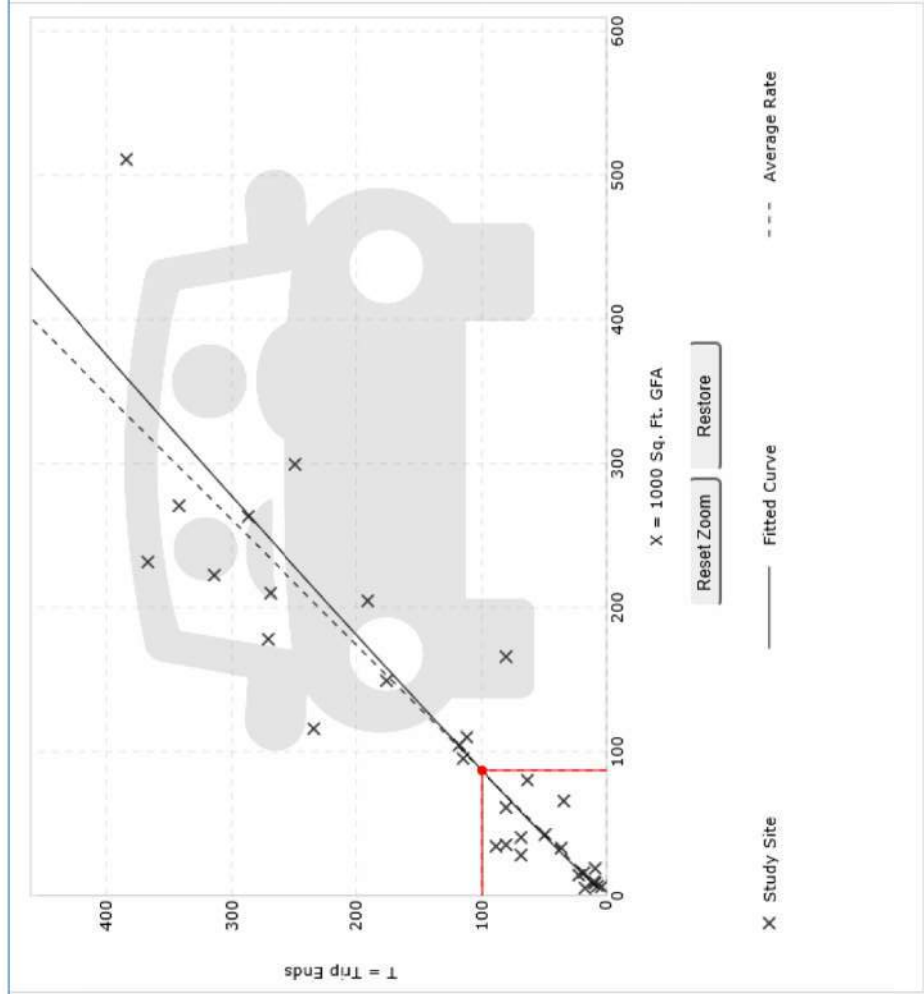
INDEPENDENT VARIABLE (IV):

TIME PERIOD:

SETTING/LOCATION:

TRIP TYPE:

ENTER IV VALUE TO CALCULATE TRIPS:



Use the mouse wheel to Zoom Out or Zoom In.  
 Hover the mouse pointer on data points to view X and T values.

General Office Building (710) [Click for more details](#)

<b>Independent Variable:</b>	1000 Sq. Ft. GFA
<b>Time Period:</b>	Weekday
<b>Peak Hour of Adjacent Street Traffic</b>	One Hour Between 4 and 6 p.m.
<b>Setting/Location:</b>	General Urban/Suburban
<b>Trip Type:</b>	Vehicle
<b>Number of Studies:</b>	32
<b>AVG. 1000 Sq. Ft. GFA:</b>	114
<b>Average Rate:</b>	1.15
<b>Range of Rates:</b>	0.47 - 3.23
<b>Standard Deviation:</b>	0.42
<b>Fitted Curve Equation:</b>	$\ln(T) = 0.95 \ln(X) + 0.38$
<b>R<sup>2</sup>:</b>	0.88
<b>Directional Distribution:</b>	16% entering, 84% exiting
<b>Calculated Trip Ends:</b>	Average Rate: 100 (Total), 16 (Entry), 84 (Exit) Fitted Curve: 100 (Total), 16 (Entry), 84 (Exit)

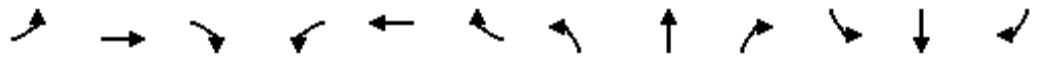
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**APPENDIX E**

**OPENING YEAR 2021 NO-BUILD (BASE) CONDITIONS CAPACITY  
CALCULATIONS**

---

HCM 6th Signalized Intersection Summary  
 1: Technology Dr/Bates St & Second Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	273	2	118	651	582	2	20	22	443	69	163
Future Volume (veh/h)	154	273	2	118	651	582	2	20	22	443	69	163
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1904	1769	1769	1864	1879	1879	1781	1781	1932	1934	1919	2042
Adj Flow Rate, veh/h	159	281	2	122	671	600	2	21	23	508	0	168
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
Percent Heavy Veh, %	5	14	14	5	4	4	21	21	11	3	4	1
Cap, veh/h	189	1642	12	151	827	729	7	77	214	628	0	471
Arrive On Green	0.10	0.48	0.48	0.09	0.46	0.46	0.05	0.05	0.05	0.17	0.00	0.17
Sat Flow, veh/h	1813	3420	24	1776	1793	1581	154	1619	1567	3683	0	1703
Grp Volume(v), veh/h	159	138	145	122	668	603	23	0	23	508	0	168
Grp Sat Flow(s),veh/h/ln	1813	1680	1764	1776	1785	1589	1774	0	1567	1842	0	1703
Q Serve(g_s), s	9.6	5.2	5.2	7.5	35.7	36.6	1.4	0.0	1.4	14.7	0.0	8.8
Cycle Q Clear(g_c), s	9.6	5.2	5.2	7.5	35.7	36.6	1.4	0.0	1.4	14.7	0.0	8.8
Prop In Lane	1.00		0.01	1.00		0.99	0.09		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	189	807	847	151	823	732	85	0	214	628	0	471
V/C Ratio(X)	0.84	0.17	0.17	0.81	0.81	0.82	0.27	0.00	0.11	0.81	0.00	0.36
Avail Cap(c_a), veh/h	229	807	847	272	837	745	112	0	238	764	0	534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.8	16.3	16.3	49.8	25.8	26.0	51.0	0.0	42.3	44.3	0.0	32.4
Incr Delay (d2), s/veh	20.4	0.4	0.3	9.7	7.9	9.4	1.7	0.0	0.2	5.4	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	2.0	2.1	3.7	16.2	15.1	0.7	0.0	0.6	7.2	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	16.7	16.7	59.5	33.6	35.4	52.7	0.0	42.5	49.7	0.0	32.8
LnGrp LOS	E	B	B	E	C	D	D	A	D	D	A	C
Approach Vol, veh/h		442			1393			46			676	
Approach Delay, s/veh		35.6			36.7			47.6			45.5	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.6	57.1		11.3	15.4	59.3		24.9				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	14.0	52.0		7.0	17.0	49.0		23.0				
Max Q Clear Time (g_c+I1), s	11.6	38.6		3.4	9.5	7.2		16.7				
Green Ext Time (p_c), s	0.1	12.5		0.0	0.2	7.3		1.7				

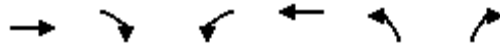
**Intersection Summary**

HCM 6th Ctrl Delay	39.0
HCM 6th LOS	D

**Notes**

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (veh/h)	420	61	79	748	4	7
Future Volume (veh/h)	420	61	79	748	4	7
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1731	1731	1744	1909	2018	2018
Adj Flow Rate, veh/h	433	63	81	771	4	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	11	11	13	2	0	0
Cap, veh/h	1189	172	128	2374	9	16
Arrive On Green	0.41	0.41	0.08	0.65	0.02	0.02
Sat Flow, veh/h	2970	417	1661	3723	599	1048
Grp Volume(v), veh/h	246	250	81	771	12	0
Grp Sat Flow(s),veh/h/ln	1645	1656	1661	1814	1797	0
Q Serve(g_s), s	3.8	3.8	1.7	3.4	0.2	0.0
Cycle Q Clear(g_c), s	3.8	3.8	1.7	3.4	0.2	0.0
Prop In Lane		0.25	1.00		0.33	0.58
Lane Grp Cap(c), veh/h	678	683	128	2374	28	0
V/C Ratio(X)	0.36	0.37	0.63	0.32	0.43	0.00
Avail Cap(c_a), veh/h	1764	1776	1005	6684	543	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	7.4	7.4	16.3	2.8	17.7	0.0
Incr Delay (d2), s/veh	0.3	0.3	5.1	0.1	9.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.9	0.7	0.2	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.7	7.7	21.4	2.8	27.6	0.0
LnGrp LOS	A	A	C	A	C	A
Approach Vol, veh/h	496			852	12	
Approach Delay, s/veh	7.7			4.6	27.6	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.8	21.0		6.6		29.8
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	22.0	39.0		11.0		67.0
Max Q Clear Time (g_c+I1), s	3.7	5.8		2.2		5.4
Green Ext Time (p_c), s	0.2	7.9		0.0		17.1

### Intersection Summary

HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A

### Notes

User approved volume balancing among the lanes for turning movement.



# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	↵
Traffic Volume (veh/h)	470	160	51	702	18	3
Future Volume (veh/h)	470	160	51	702	18	3
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1716	1716	1939	1879	2018	2018
Adj Flow Rate, veh/h	500	170	54	747	19	3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	0	4	0	0
Cap, veh/h	1151	389	103	2437	52	46
Arrive On Green	0.48	0.48	0.06	0.68	0.03	0.03
Sat Flow, veh/h	2478	809	1847	3665	1922	1710
Grp Volume(v), veh/h	340	330	54	747	19	3
Grp Sat Flow(s),veh/h/ln	1630	1571	1847	1785	1922	1710
Q Serve(g_s), s	5.6	5.7	1.2	3.5	0.4	0.1
Cycle Q Clear(g_c), s	5.6	5.7	1.2	3.5	0.4	0.1
Prop In Lane		0.51	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	785	756	103	2437	52	46
V/C Ratio(X)	0.43	0.44	0.52	0.31	0.37	0.06
Avail Cap(c_a), veh/h	1895	1826	671	5966	419	373
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.0	7.0	19.0	2.6	19.7	19.6
Incr Delay (d2), s/veh	0.4	0.4	4.1	0.1	4.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.3	0.5	0.3	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.4	7.4	23.0	2.7	24.0	20.2
LnGrp LOS	A	A	C	A	C	C
Approach Vol, veh/h	670			801	22	
Approach Delay, s/veh	7.4			4.1	23.5	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.3	25.9			34.2	7.1
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	15.0	48.0			69.0	9.0
Max Q Clear Time (g_c+I1), s	3.2	7.7			5.5	2.4
Green Ext Time (p_c), s	0.1	12.2			16.5	0.0
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			5.9			
HCM 6th LOS			A			

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	273	2	118	651	582	2	20	22	443	69	163
Future Volume (vph)	154	273	2	118	651	582	2	20	22	443	69	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%			-2%	
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	3		3	3		3	9		1	1		9
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
Heavy Vehicles (%)	5%	14%	0%	5%	4%	7%	0%	21%	11%	3%	4%	1%
Shared Lane Traffic (%)										43%		
Lane Group Flow (vph)	159	283	0	122	1271	0	0	23	23	260	268	168
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left			Left			Left			Left		
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	20.0	55.0		23.0	58.0		13.0	13.0	23.0	29.0	29.0	20.0
Total Split (%)	16.7%	45.8%		19.2%	48.3%		10.8%	10.8%	19.2%	24.2%	24.2%	16.7%
Maximum Green (s)	14.0	49.0		17.0	52.0		7.0	7.0	17.0	23.0	23.0	14.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.79	0.20		0.63	0.90			0.22	0.10	0.83	0.85	0.32
Control Delay	76.8	20.4		62.6	38.6			58.7	23.7	66.7	68.2	28.1
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	76.8	20.4		62.6	38.6			58.7	23.7	66.7	68.2	28.1
Queue Length 50th (ft)	123	70		91	482			17	9	206	212	92
Queue Length 95th (ft)	#244	106		154	#635			46	24	#354	#366	150
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	212	1508		256	1539			106	289	350	354	533
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.75	0.19		0.48	0.83			0.22	0.08	0.74	0.76	0.32

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 109  
 Natural Cycle: 95  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave



Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (vph)	420	61	79	748	4	7
Future Volume (vph)	420	61	79	748	4	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)						1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	11%	4%	13%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	496	0	81	771	11	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	45.0		28.0	73.0	17.0	
Total Split (%)	50.0%		31.1%	81.1%	18.9%	
Maximum Green (s)	39.0		22.0	67.0	11.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave

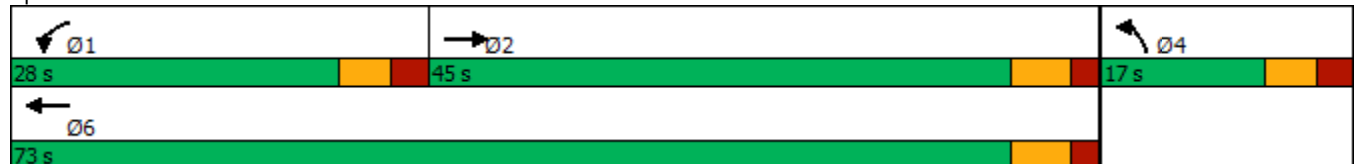


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.24		0.27	0.23	0.04	
Control Delay	7.4		17.9	1.4	18.6	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	7.4		17.9	1.4	18.6	
Queue Length 50th (ft)	27		15	0	2	
Queue Length 95th (ft)	98		56	67	16	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2990		836	3557	479	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.17		0.10	0.22	0.02	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 40.8  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave

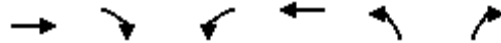


Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↙	↗
Traffic Volume (vph)	470	160	51	702	18	3
Future Volume (vph)	470	160	51	702	18	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	12%	2%	0%	4%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	670	0	54	747	19	3
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	54.0		21.0	75.0	15.0	15.0
Total Split (%)	60.0%		23.3%	83.3%	16.7%	16.7%
Maximum Green (s)	48.0		15.0	69.0	9.0	9.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						

Lanes, Volumes, Timings  
 6: Western Access & Second Ave

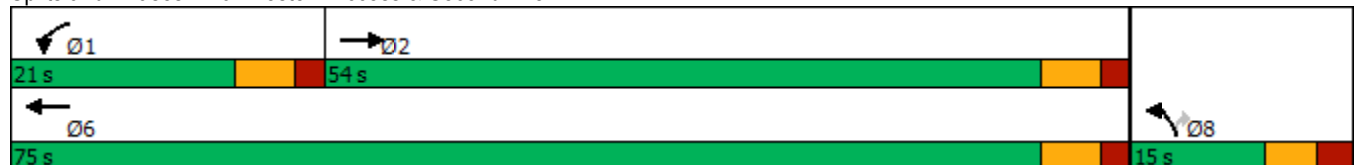


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.27		0.20	0.24	0.08	0.01
Control Delay	5.8		25.3	2.1	27.0	21.0
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	5.8		25.3	2.1	27.0	21.0
Queue Length 50th (ft)	0		9	0	3	0
Queue Length 95th (ft)	117		58	65	29	8
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2825		574	3394	373	336
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	0.24		0.09	0.22	0.05	0.01

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 48.9  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Western Access & Second Ave



# HCM 6th Signalized Intersection Summary

## 1: Technology Dr/Bates St & Second Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	294	880	1	24	291	355	4	163	133	411	18	73
Future Volume (veh/h)	294	880	1	24	291	355	4	163	133	411	18	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.90	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1964	1949	1949	1939	1819	1819	2067	2067	2067	1934	1979	1995
Adj Flow Rate, veh/h	316	946	1	26	313	382	4	175	143	456	0	78
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	2	2	0	8	8	2	2	2	3	0	4
Cap, veh/h	356	1711	2	65	512	438	5	221	234	646	0	600
Arrive On Green	0.19	0.45	0.45	0.04	0.30	0.30	0.11	0.11	0.11	0.18	0.00	0.18
Sat Flow, veh/h	1870	3795	4	1847	1728	1479	46	2018	1573	3683	0	1584
Grp Volume(v), veh/h	316	461	486	26	313	382	179	0	143	456	0	78
Grp Sat Flow(s),veh/h/ln	1870	1851	1948	1847	1728	1479	2064	0	1573	1842	0	1584
Q Serve(g_s), s	17.3	19.1	19.1	1.4	16.3	25.7	8.9	0.0	9.0	12.2	0.0	3.4
Cycle Q Clear(g_c), s	17.3	19.1	19.1	1.4	16.3	25.7	8.9	0.0	9.0	12.2	0.0	3.4
Prop In Lane	1.00		0.00	1.00		1.00	0.02		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	356	835	878	65	512	438	226	0	234	646	0	600
V/C Ratio(X)	0.89	0.55	0.55	0.40	0.61	0.87	0.79	0.00	0.61	0.71	0.00	0.13
Avail Cap(c_a), veh/h	482	865	910	176	527	451	295	0	287	773	0	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.4	21.1	21.1	49.5	31.7	35.0	45.5	0.0	42.2	40.7	0.0	22.2
Incr Delay (d2), s/veh	14.3	2.1	2.0	3.9	4.5	19.6	10.5	0.0	2.6	2.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	8.4	8.8	0.7	7.3	11.3	5.2	0.0	3.7	5.8	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	23.2	23.1	53.3	36.2	54.6	56.1	0.0	44.8	43.0	0.0	22.3
LnGrp LOS	E	C	C	D	D	D	E	A	D	D	A	C
Approach Vol, veh/h		1263			721			322				534
Approach Delay, s/veh		31.3			46.6			51.1				40.0
Approach LOS		C			D			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	26.0	37.0		17.5	9.7	53.3		24.4				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	27.0	32.0		15.0	10.0	49.0		22.0				
Max Q Clear Time (g_c+I1), s	19.3	27.7		11.0	3.4	21.1		14.2				
Green Ext Time (p_c), s	0.7	3.3		0.5	0.0	20.7		1.6				

### Intersection Summary

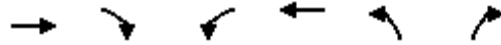
HCM 6th Ctrl Delay	39.0
HCM 6th LOS	D

### Notes

User approved volume balancing among the lanes for turning movement.



## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (veh/h)	1128	17	18	365	43	57
Future Volume (veh/h)	1128	17	18	365	43	57
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1504	1849	2018	2018
Adj Flow Rate, veh/h	1163	18	19	376	44	59
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	29	6	0	0
Cap, veh/h	2149	33	32	2543	58	78
Arrive On Green	0.60	0.60	0.02	0.72	0.08	0.08
Sat Flow, veh/h	3664	55	1432	3606	748	1004
Grp Volume(v), veh/h	577	604	19	376	104	0
Grp Sat Flow(s),veh/h/ln	1771	1855	1432	1757	1769	0
Q Serve(g_s), s	11.6	11.6	0.8	2.0	3.5	0.0
Cycle Q Clear(g_c), s	11.6	11.6	0.8	2.0	3.5	0.0
Prop In Lane		0.03	1.00		0.42	0.57
Lane Grp Cap(c), veh/h	1066	1116	32	2543	137	0
V/C Ratio(X)	0.54	0.54	0.59	0.15	0.76	0.00
Avail Cap(c_a), veh/h	1466	1535	166	3665	439	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	7.1	7.1	29.2	2.6	27.3	0.0
Incr Delay (d2), s/veh	0.4	0.4	15.7	0.0	8.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	3.3	0.4	0.3	1.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.5	7.5	45.0	2.6	35.5	0.0
LnGrp LOS	A	A	D	A	D	A
Approach Vol, veh/h	1181			395	104	
Approach Delay, s/veh	7.5			4.6	35.5	
Approach LOS	A			A	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.4	42.3		10.7		49.7
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	7.0	50.0		15.0		63.0
Max Q Clear Time (g_c+I1), s	2.8	13.6		5.5		4.0
Green Ext Time (p_c), s	0.0	22.7		0.2		6.9

### Intersection Summary

HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

### Notes

User approved volume balancing among the lanes for turning movement.

# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	↙
Traffic Volume (veh/h)	1129	61	2	390	182	32
Future Volume (veh/h)	1129	61	2	390	182	32
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1939	1864	2003	2018
Adj Flow Rate, veh/h	1164	63	2	402	188	33
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	5	1	0
Cap, veh/h	1999	108	5	2412	252	226
Arrive On Green	0.58	0.58	0.00	0.68	0.13	0.13
Sat Flow, veh/h	3511	185	1847	3635	1908	1710
Grp Volume(v), veh/h	603	624	2	402	188	33
Grp Sat Flow(s),veh/h/ln	1771	1831	1847	1771	1908	1710
Q Serve(g_s), s	13.8	13.8	0.1	2.6	6.1	1.1
Cycle Q Clear(g_c), s	13.8	13.8	0.1	2.6	6.1	1.1
Prop In Lane		0.10	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1036	1071	5	2412	252	226
V/C Ratio(X)	0.58	0.58	0.40	0.17	0.75	0.15
Avail Cap(c_a), veh/h	1323	1367	144	3251	564	505
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	8.4	32.0	3.7	26.8	24.7
Incr Delay (d2), s/veh	0.5	0.5	43.7	0.0	4.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	4.2	0.1	0.6	3.0	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.9	8.9	75.7	3.7	31.2	25.0
LnGrp LOS	A	A	E	A	C	C
Approach Vol, veh/h	1227			404	221	
Approach Delay, s/veh	8.9			4.1	30.3	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.2	43.6			49.8	14.5
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	5.0	48.0			59.0	19.0
Max Q Clear Time (g_c+I1), s	2.1	15.8			4.6	8.1
Green Ext Time (p_c), s	0.0	21.8			7.3	0.6

### Intersection Summary

HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

### Notes

User approved volume balancing among the lanes for turning movement.

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	880	1	24	291	355	4	163	133	411	18	73
Future Volume (vph)	294	880	1	24	291	355	4	163	133	411	18	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%			-2%	
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	11		24	24		11	3		37	37		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	0%	0%	8%	5%	0%	2%	2%	3%	0%	4%
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	316	947	0	26	695	0	0	179	143	230	231	78
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left			Left								
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	33.0	55.0		16.0	38.0		21.0	21.0	16.0	28.0	28.0	33.0
Total Split (%)	27.5%	45.8%		13.3%	31.7%		17.5%	17.5%	13.3%	23.3%	23.3%	27.5%
Maximum Green (s)	27.0	49.0		10.0	32.0		15.0	15.0	10.0	22.0	22.0	27.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

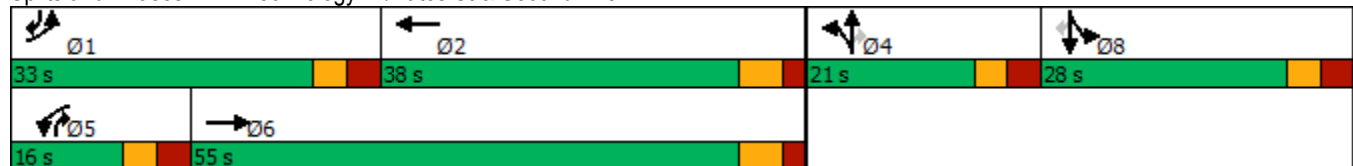


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.86	0.66		0.20	0.97dr			0.76	0.45	0.81	0.80	0.12
Control Delay	65.7	29.9		55.2	53.0			69.4	27.0	67.5	67.0	19.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	65.7	29.9		55.2	53.0			69.4	27.0	67.5	67.0	19.2
Queue Length 50th (ft)	235	300		19	269			136	61	180	181	34
Queue Length 95th (ft)	#384	378		49	#366			#243	100	#307	#306	64
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	420	1628		156	905			264	339	330	333	683
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.75	0.58		0.17	0.77			0.68	0.42	0.70	0.69	0.11

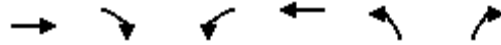
Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 110.4  
 Natural Cycle: 105  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave



Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (vph)	1128	17	18	365	43	57
Future Volume (vph)	1128	17	18	365	43	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)					1	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	10%	29%	6%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1181	0	19	376	103	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	56.0		13.0	69.0	21.0	
Total Split (%)	62.2%		14.4%	76.7%	23.3%	
Maximum Green (s)	50.0		7.0	63.0	15.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.48		0.15	0.14	0.41	
Control Delay	9.2		39.8	3.8	37.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	9.2		39.8	3.8	37.3	
Queue Length 50th (ft)	101		8	24	43	
Queue Length 95th (ft)	281		32	46	101	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2534		142	2935	398	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.47		0.13	0.13	0.26	

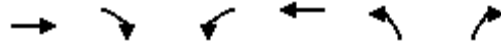
Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 70.5  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave



Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	↙
Traffic Volume (vph)	1129	61	2	390	182	32
Future Volume (vph)	1129	61	2	390	182	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Confl. Peds. (#/hr)					3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	4%	0%	5%	1%	0%
Shared Lane Traffic (%)						10%
Lane Group Flow (vph)	1227	0	2	402	191	30
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	54.0		11.0	65.0	25.0	25.0
Total Split (%)	60.0%		12.2%	72.2%	27.8%	27.8%
Maximum Green (s)	48.0		5.0	59.0	19.0	19.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			

# Lanes, Volumes, Timings

## 6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.56		0.02	0.18	0.59	0.10
Control Delay	10.0		37.5	5.4	36.7	11.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	10.0		37.5	5.4	36.7	11.4
Queue Length 50th (ft)	128		1	31	80	0
Queue Length 95th (ft)	317		8	60	163	23
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2354		119	2825	485	431
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	0.52		0.02	0.14	0.39	0.07

### Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	72.9
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated

### Splits and Phases: 6: Western Access & Second Ave





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**APPENDIX F**

**OPENING YEAR 2021 (WITH PTC MASTER PLAN DEVELOPMENTS)  
CAPACITY CALCULATIONS**

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# HCM 6th Signalized Intersection Summary

## 1: Technology Dr/Bates St & Second Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	159	281	2	144	755	582	2	28	35	443	84	223
Future Volume (veh/h)	159	281	2	144	755	582	2	28	35	443	84	223
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1904	1769	1769	1864	1879	1879	1781	1781	1932	1934	1919	2042
Adj Flow Rate, veh/h	164	290	2	148	778	600	2	29	36	519	0	230
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
Percent Heavy Veh, %	5	14	14	5	4	4	21	21	11	3	4	1
Cap, veh/h	192	1606	11	178	898	677	6	89	248	624	0	472
Arrive On Green	0.11	0.47	0.47	0.10	0.46	0.46	0.05	0.05	0.05	0.17	0.00	0.17
Sat Flow, veh/h	1813	3421	24	1776	1937	1460	115	1661	1564	3683	0	1703
Grp Volume(v), veh/h	164	142	150	148	716	662	31	0	36	519	0	230
Grp Sat Flow(s),veh/h/ln	1813	1680	1764	1776	1785	1611	1776	0	1564	1842	0	1703
Q Serve(g_s), s	10.3	5.7	5.7	9.5	41.5	43.3	1.9	0.0	2.3	15.8	0.0	13.1
Cycle Q Clear(g_c), s	10.3	5.7	5.7	9.5	41.5	43.3	1.9	0.0	2.3	15.8	0.0	13.1
Prop In Lane	1.00		0.01	1.00		0.91	0.06		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	192	789	828	178	828	747	95	0	248	624	0	472
V/C Ratio(X)	0.85	0.18	0.18	0.83	0.86	0.89	0.33	0.00	0.15	0.83	0.00	0.49
Avail Cap(c_a), veh/h	204	789	828	291	833	752	107	0	259	700	0	507
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.9	17.8	17.8	51.1	27.8	28.2	52.8	0.0	42.4	46.5	0.0	35.1
Incr Delay (d2), s/veh	27.0	0.4	0.4	10.0	11.0	14.0	2.0	0.0	0.3	7.7	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	2.3	2.4	4.7	19.4	18.8	0.9	0.0	0.9	7.9	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	77.8	18.2	18.2	61.1	38.8	42.2	54.7	0.0	42.7	54.2	0.0	35.9
LnGrp LOS	E	B	B	E	D	D	D	A	D	D	A	D
Approach Vol, veh/h		456			1526			67				749
Approach Delay, s/veh		39.6			42.4			48.3				48.6
Approach LOS		D			D			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.3	59.7		12.2	17.6	60.3		25.6				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	13.0	54.0		7.0	19.0	48.0		22.0				
Max Q Clear Time (g_c+I1), s	12.3	45.3		4.3	11.5	7.7		17.8				
Green Ext Time (p_c), s	0.0	8.4		0.0	0.2	7.5		1.5				

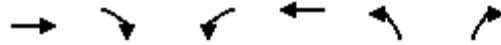
### Intersection Summary

HCM 6th Ctrl Delay	43.8
HCM 6th LOS	D

### Notes

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (veh/h)	430	100	145	846	12	10
Future Volume (veh/h)	430	100	145	846	12	10
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1731	1731	1744	1909	2018	2018
Adj Flow Rate, veh/h	443	103	149	872	12	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	11	11	13	2	0	0
Cap, veh/h	1058	244	199	2429	27	22
Arrive On Green	0.40	0.40	0.12	0.67	0.03	0.03
Sat Flow, veh/h	2740	612	1661	3723	952	794
Grp Volume(v), veh/h	273	273	149	872	23	0
Grp Sat Flow(s),veh/h/ln	1645	1621	1661	1814	1825	0
Q Serve(g_s), s	4.8	4.8	3.4	4.2	0.5	0.0
Cycle Q Clear(g_c), s	4.8	4.8	3.4	4.2	0.5	0.0
Prop In Lane		0.38	1.00		0.52	0.43
Lane Grp Cap(c), veh/h	656	646	199	2429	51	0
V/C Ratio(X)	0.42	0.42	0.75	0.36	0.45	0.00
Avail Cap(c_a), veh/h	1450	1429	1130	6213	460	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.6	8.6	16.9	2.9	19.0	0.0
Incr Delay (d2), s/veh	0.4	0.4	5.5	0.1	6.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.2	1.4	0.3	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.0	9.1	22.4	2.9	24.9	0.0
LnGrp LOS	A	A	C	A	C	A
Approach Vol, veh/h	546			1021	23	
Approach Delay, s/veh	9.1			5.8	24.9	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.8	21.8		7.1		32.6
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	27.0	35.0		10.0		68.0
Max Q Clear Time (g_c+I1), s	5.4	6.8		2.5		6.2
Green Ext Time (p_c), s	0.5	8.3		0.0		20.4

### Intersection Summary

HCM 6th Ctrl Delay	7.2
HCM 6th LOS	A

### Notes

User approved volume balancing among the lanes for turning movement.






















# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	↵
Traffic Volume (veh/h)	509	242	149	710	30	13
Future Volume (veh/h)	509	242	149	710	30	13
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1716	1716	1939	1879	2018	2018
Adj Flow Rate, veh/h	541	257	159	755	32	14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	0	4	0	0
Cap, veh/h	1038	492	216	2564	90	80
Arrive On Green	0.48	0.48	0.12	0.72	0.05	0.05
Sat Flow, veh/h	2232	1017	1847	3665	1922	1710
Grp Volume(v), veh/h	411	387	159	755	32	14
Grp Sat Flow(s),veh/h/ln	1630	1533	1847	1785	1922	1710
Q Serve(g_s), s	8.9	8.9	4.2	3.9	0.8	0.4
Cycle Q Clear(g_c), s	8.9	8.9	4.2	3.9	0.8	0.4
Prop In Lane		0.66	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	789	742	216	2564	90	80
V/C Ratio(X)	0.52	0.52	0.74	0.29	0.35	0.17
Avail Cap(c_a), veh/h	1373	1291	796	4964	263	234
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.1	9.1	21.8	2.6	23.6	23.4
Incr Delay (d2), s/veh	0.5	0.6	4.8	0.1	2.4	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	2.3	1.9	0.4	0.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.6	9.7	26.6	2.6	25.9	24.4
LnGrp LOS	A	A	C	A	C	C
Approach Vol, veh/h	798			914	46	
Approach Delay, s/veh	9.7			6.8	25.5	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.0	30.7			42.7	8.4
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	22.0	43.0			71.0	7.0
Max Q Clear Time (g_c+I1), s	6.2	10.9			5.9	2.8
Green Ext Time (p_c), s	0.4	13.8			16.8	0.0
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.6			
HCM 6th LOS			A			

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	281	2	144	755	582	2	28	35	443	84	223
Future Volume (vph)	159	281	2	144	755	582	2	28	35	443	84	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%			-2%	
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1023			612			255			258	
Travel Time (s)		19.9			11.9			7.0			7.0	
Confl. Peds. (#/hr)	3		3	3		3	9		1	1		9
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
Heavy Vehicles (%)	5%	14%	0%	5%	4%	7%	0%	21%	11%	3%	4%	1%
Shared Lane Traffic (%)										41%		
Lane Group Flow (vph)	164	292	0	148	1378	0	0	31	36	270	274	230
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left						Left					
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	19.0	54.0		25.0	60.0		13.0	13.0	25.0	28.0	28.0	19.0
Total Split (%)	15.8%	45.0%		20.8%	50.0%		10.8%	10.8%	20.8%	23.3%	23.3%	15.8%
Maximum Green (s)	13.0	48.0		19.0	54.0		7.0	7.0	19.0	22.0	22.0	13.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.87	0.20		0.69	0.92			0.31	0.14	0.88	0.88	0.46
Control Delay	90.4	21.1		64.5	40.6			62.0	24.3	75.0	74.6	32.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	90.4	21.1		64.5	40.6			62.0	24.3	75.0	74.6	32.2
Queue Length 50th (ft)	128	74		111	533			24	15	217	221	135
Queue Length 95th (ft)	#263	110		179	#699			57	32	#385	#389	208
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	188	1443		274	1541			101	305	320	325	501
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.87	0.20		0.54	0.89			0.31	0.12	0.84	0.84	0.46

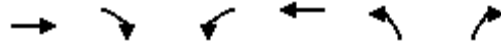
Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 112.5  
 Natural Cycle: 105  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave



Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (vph)	430	100	145	846	12	10
Future Volume (vph)	430	100	145	846	12	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)						1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	11%	4%	13%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	546	0	149	872	22	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	41.0		33.0	74.0	16.0	
Total Split (%)	45.6%		36.7%	82.2%	17.8%	
Maximum Green (s)	35.0		27.0	68.0	10.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.31		0.41	0.26	0.09	
Control Delay	9.4		20.9	1.2	24.0	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	9.4		20.9	1.2	24.0	
Queue Length 50th (ft)	33		24	0	4	
Queue Length 95th (ft)	124		114	80	31	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2663		965	3473	417	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.21		0.15	0.25	0.05	

Intersection Summary

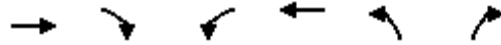
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 45.8  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave



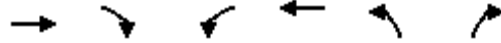


Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	↗
Traffic Volume (vph)	509	242	149	710	30	13
Future Volume (vph)	509	242	149	710	30	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	12%	2%	0%	4%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	798	0	159	755	32	14
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	49.0		28.0	77.0	13.0	13.0
Total Split (%)	54.4%		31.1%	85.6%	14.4%	14.4%
Maximum Green (s)	43.0		22.0	71.0	7.0	7.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						

Lanes, Volumes, Timings  
 6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.49		0.49	0.25	0.16	0.07
Control Delay	11.1		32.0	2.4	36.0	19.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	11.1		32.0	2.4	36.0	19.5
Queue Length 50th (ft)	98		53	44	11	0
Queue Length 95th (ft)	168		135	61	44	18
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2289		645	3265	222	210
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	0.35		0.25	0.23	0.14	0.07

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 63.6  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Western Access & Second Ave



# HCM 6th Signalized Intersection Summary

## 1: Technology Dr/Bates St & Second Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	322	927	1	29	310	355	4	208	210	411	21	84
Future Volume (veh/h)	322	927	1	29	310	355	4	208	210	411	21	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.92	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1964	1949	1949	1939	1819	1819	2067	2067	2067	1934	1979	1995
Adj Flow Rate, veh/h	346	997	1	31	333	382	4	224	226	458	0	90
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	2	2	0	8	8	2	2	2	3	0	4
Cap, veh/h	378	1680	2	71	481	411	5	285	294	620	0	608
Arrive On Green	0.20	0.44	0.44	0.04	0.28	0.28	0.14	0.14	0.14	0.17	0.00	0.17
Sat Flow, veh/h	1870	3795	4	1847	1728	1475	36	2029	1613	3683	0	1579
Grp Volume(v), veh/h	346	486	512	31	333	382	228	0	226	458	0	90
Grp Sat Flow(s),veh/h/ln	1870	1851	1948	1847	1728	1475	2065	0	1613	1842	0	1579
Q Serve(g_s), s	20.7	22.7	22.7	1.9	19.6	28.7	12.2	0.0	15.3	13.5	0.0	4.3
Cycle Q Clear(g_c), s	20.7	22.7	22.7	1.9	19.6	28.7	12.2	0.0	15.3	13.5	0.0	4.3
Prop In Lane	1.00		0.00	1.00		1.00	0.02		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	378	819	862	71	481	411	290	0	294	620	0	608
V/C Ratio(X)	0.91	0.59	0.59	0.44	0.69	0.93	0.79	0.00	0.77	0.74	0.00	0.15
Avail Cap(c_a), veh/h	426	819	862	211	485	414	290	0	294	710	0	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.5	24.0	24.0	53.6	36.8	40.0	47.4	0.0	44.7	45.0	0.0	23.9
Incr Delay (d2), s/veh	22.5	2.6	2.5	4.2	6.9	29.1	13.4	0.0	11.8	3.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.8	10.2	10.7	0.9	9.1	13.5	7.4	0.0	7.1	6.5	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.1	26.6	26.5	57.8	43.7	69.2	60.8	0.0	56.5	48.6	0.0	24.1
LnGrp LOS	E	C	C	E	D	E	E	A	E	D	A	C
Approach Vol, veh/h		1344			746			454				548
Approach Delay, s/veh		37.0			57.3			58.7				44.5
Approach LOS		D			E			E				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	29.1	37.8		22.0	10.4	56.5		25.2				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	26.0	32.0		16.0	13.0	45.0		22.0				
Max Q Clear Time (g_c+I1), s	22.7	30.7		17.3	3.9	24.7		15.5				
Green Ext Time (p_c), s	0.4	1.0		0.0	0.0	16.5		1.4				

### Intersection Summary

HCM 6th Ctrl Delay	46.4
HCM 6th LOS	D

### Notes

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Traffic Volume (veh/h)	1187	24	30	383	90	73
Future Volume (veh/h)	1187	24	30	383	90	73
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1504	1849	2018	2018
Adj Flow Rate, veh/h	1224	25	31	395	93	75
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	29	6	0	0
Cap, veh/h	2036	42	47	2450	120	97
Arrive On Green	0.57	0.57	0.03	0.70	0.12	0.12
Sat Flow, veh/h	3643	72	1432	3606	994	802
Grp Volume(v), veh/h	611	638	31	395	169	0
Grp Sat Flow(s),veh/h/ln	1771	1851	1432	1757	1807	0
Q Serve(g_s), s	14.8	14.8	1.4	2.5	6.0	0.0
Cycle Q Clear(g_c), s	14.8	14.8	1.4	2.5	6.0	0.0
Prop In Lane		0.04	1.00		0.55	0.44
Lane Grp Cap(c), veh/h	1016	1062	47	2450	219	0
V/C Ratio(X)	0.60	0.60	0.66	0.16	0.77	0.00
Avail Cap(c_a), veh/h	1256	1313	174	3236	471	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.2	9.2	31.6	3.4	28.1	0.0
Incr Delay (d2), s/veh	0.6	0.6	14.6	0.0	5.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	4.8	0.7	0.6	2.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.7	9.7	46.1	3.4	33.9	0.0
LnGrp LOS	A	A	D	A	C	A
Approach Vol, veh/h	1249			426	169	
Approach Delay, s/veh	9.7			6.5	33.9	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	43.9		14.0		52.0
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	8.0	46.8		17.2		60.8
Max Q Clear Time (g_c+I1), s	3.4	16.8		8.0		4.5
Green Ext Time (p_c), s	0.0	21.0		0.4		7.2

### Intersection Summary

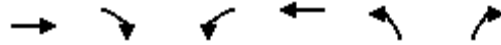
HCM 6th Ctrl Delay	11.2
HCM 6th LOS	B

### Notes

User approved volume balancing among the lanes for turning movement.

# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	↙
Traffic Volume (veh/h)	1136	76	20	437	251	91
Future Volume (veh/h)	1136	76	20	437	251	91
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1939	1864	2003	2018
Adj Flow Rate, veh/h	1171	78	21	451	259	94
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	5	1	0
Cap, veh/h	1834	122	44	2318	331	296
Arrive On Green	0.54	0.54	0.02	0.65	0.17	0.17
Sat Flow, veh/h	3464	224	1847	3635	1908	1710
Grp Volume(v), veh/h	615	634	21	451	259	94
Grp Sat Flow(s),veh/h/ln	1771	1824	1847	1771	1908	1710
Q Serve(g_s), s	16.9	16.9	0.8	3.5	9.0	3.3
Cycle Q Clear(g_c), s	16.9	16.9	0.8	3.5	9.0	3.3
Prop In Lane		0.12	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	964	993	44	2318	331	296
V/C Ratio(X)	0.64	0.64	0.47	0.19	0.78	0.32
Avail Cap(c_a), veh/h	1145	1179	133	2849	603	540
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.1	11.1	33.5	4.8	27.5	25.2
Incr Delay (d2), s/veh	0.9	0.9	7.7	0.0	4.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	5.8	0.4	0.9	4.4	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.0	12.0	41.2	4.8	31.6	25.8
LnGrp LOS	B	B	D	A	C	C
Approach Vol, veh/h	1249			472	353	
Approach Delay, s/veh	12.0			6.4	30.1	
Approach LOS	B			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.7	43.9			51.5	18.1
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	5.0	45.0			56.0	22.0
Max Q Clear Time (g_c+I1), s	2.8	18.9			5.5	11.0
Green Ext Time (p_c), s	0.0	19.0			8.3	1.0

### Intersection Summary

HCM 6th Ctrl Delay	13.8
HCM 6th LOS	B

### Notes

User approved volume balancing among the lanes for turning movement.

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	322	927	1	29	310	355	4	208	210	411	21	84
Future Volume (vph)	322	927	1	29	310	355	4	208	210	411	21	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%				-2%
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	11		24	24		11	3		37	37		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	0%	0%	8%	5%	0%	2%	2%	3%	0%	4%
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	346	998	0	31	715	0	0	228	226	230	235	90
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left			Left			Left			Left		
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	32.0	51.0		19.0	38.0		22.0	22.0	19.0	28.0	28.0	32.0
Total Split (%)	26.7%	42.5%		15.8%	31.7%		18.3%	18.3%	15.8%	23.3%	23.3%	26.7%
Maximum Green (s)	26.0	45.0		13.0	32.0		16.0	16.0	13.0	22.0	22.0	26.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.93	0.72		0.20	0.97dr			0.88	0.63	0.82	0.83	0.14
Control Delay	77.1	33.9		52.7	56.9			81.8	30.3	70.4	71.0	20.0
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	77.1	33.9		52.7	56.9			81.8	30.3	70.4	71.0	20.0
Queue Length 50th (ft)	266	338		23	279			176	97	180	184	40
Queue Length 95th (ft)	#452	430		54	#382			#324	144	#307	#314	73
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	385	1441		193	863			268	394	313	317	644
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.90	0.69		0.16	0.83			0.85	0.57	0.73	0.74	0.14

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 114.6  
 Natural Cycle: 105  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave



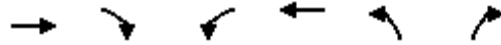
Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Traffic Volume (vph)	1187	24	30	383	90	73
Future Volume (vph)	1187	24	30	383	90	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)					1	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	10%	29%	6%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1249	0	31	395	168	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	52.8		14.0	66.8	23.2	
Total Split (%)	58.7%		15.6%	74.2%	25.8%	
Maximum Green (s)	46.8		8.0	60.8	17.2	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			



Lanes, Volumes, Timings  
 2: Middle Access & Second Ave

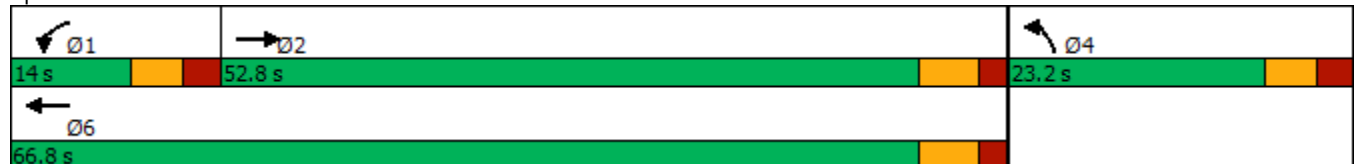


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.59		0.26	0.17	0.58	
Control Delay	12.3		41.8	5.0	39.1	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	12.3		41.8	5.0	39.1	
Queue Length 50th (ft)	137		13	31	68	
Queue Length 95th (ft)	337		45	54	150	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2200		140	2791	402	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.57		0.22	0.14	0.42	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	76.2
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave



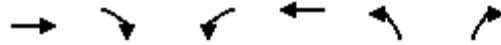
Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	↙
Traffic Volume (vph)	1136	76	20	437	251	91
Future Volume (vph)	1136	76	20	437	251	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Confl. Peds. (#/hr)					3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	4%	0%	5%	1%	0%
Shared Lane Traffic (%)						10%
Lane Group Flow (vph)	1249	0	21	451	268	85
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	51.0		11.0	62.0	28.0	28.0
Total Split (%)	56.7%		12.2%	68.9%	31.1%	31.1%
Maximum Green (s)	45.0		5.0	56.0	22.0	22.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			

# Lanes, Volumes, Timings

## 6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.63		0.18	0.21	0.68	0.21
Control Delay	14.2		42.3	6.8	37.8	8.2
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	14.2		42.3	6.8	37.8	8.2
Queue Length 50th (ft)	153		9	41	111	0
Queue Length 95th (ft)	353		35	75	216	36
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2220		119	2640	564	536
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	0.56		0.18	0.17	0.48	0.16

### Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	74.2
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated

### Splits and Phases: 6: Western Access & Second Ave



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**APPENDIX G**

**DESIGN YEAR 2031 NO-BUILD (BASE) CONDITIONS  
CAPACITY CALCULATIONS**

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# HCM 6th Signalized Intersection Summary

## 1: Technology Dr/Bates St & Second Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	286	2	118	682	610	2	20	22	464	69	170
Future Volume (veh/h)	162	286	2	118	682	610	2	20	22	464	69	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1904	1769	1769	1864	1879	1879	1781	1781	1932	1934	1919	2042
Adj Flow Rate, veh/h	167	295	2	122	703	629	2	21	23	529	0	175
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
Percent Heavy Veh, %	5	14	14	5	4	4	21	21	11	3	4	1
Cap, veh/h	197	1649	11	151	824	722	7	77	213	635	0	482
Arrive On Green	0.11	0.48	0.48	0.08	0.46	0.46	0.05	0.05	0.05	0.17	0.00	0.17
Sat Flow, veh/h	1813	3421	23	1776	1799	1576	154	1619	1566	3683	0	1704
Grp Volume(v), veh/h	167	145	152	122	698	634	23	0	23	529	0	175
Grp Sat Flow(s),veh/h/ln	1813	1680	1764	1776	1785	1590	1774	0	1566	1842	0	1704
Q Serve(g_s), s	10.2	5.5	5.5	7.6	39.1	40.5	1.4	0.0	1.5	15.6	0.0	9.3
Cycle Q Clear(g_c), s	10.2	5.5	5.5	7.6	39.1	40.5	1.4	0.0	1.5	15.6	0.0	9.3
Prop In Lane	1.00		0.01	1.00		0.99	0.09		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	197	810	850	151	818	728	84	0	213	635	0	482
V/C Ratio(X)	0.85	0.18	0.18	0.81	0.85	0.87	0.27	0.00	0.11	0.83	0.00	0.36
Avail Cap(c_a), veh/h	242	810	850	268	824	734	110	0	236	720	0	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.3	16.5	16.5	50.6	27.1	27.5	51.8	0.0	43.0	45.0	0.0	32.4
Incr Delay (d2), s/veh	20.2	0.4	0.4	9.8	10.3	12.9	1.7	0.0	0.2	7.5	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	2.2	2.3	3.8	18.2	17.2	0.7	0.0	0.6	7.8	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.4	16.9	16.9	60.4	37.4	40.4	53.5	0.0	43.2	52.5	0.0	32.9
LnGrp LOS	E	B	B	E	D	D	D	A	D	D	A	C
Approach Vol, veh/h		464			1454			46			704	
Approach Delay, s/veh		35.8			40.6			48.4			47.6	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.2	57.6		11.3	15.6	60.3		25.4				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	15.0	52.0		7.0	17.0	50.0		22.0				
Max Q Clear Time (g_c+I1), s	12.2	42.5		3.5	9.6	7.5		17.6				
Green Ext Time (p_c), s	0.1	9.1		0.0	0.2	7.8		1.4				

### Intersection Summary

HCM 6th Ctrl Delay	41.8
HCM 6th LOS	D

### Notes

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (veh/h)	441	61	79	785	4	7
Future Volume (veh/h)	441	61	79	785	4	7
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1731	1731	1744	1909	2018	2018
Adj Flow Rate, veh/h	455	63	81	809	4	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	11	11	13	2	0	0
Cap, veh/h	1206	166	127	2380	9	16
Arrive On Green	0.42	0.42	0.08	0.66	0.02	0.02
Sat Flow, veh/h	2990	400	1661	3723	599	1048
Grp Volume(v), veh/h	257	261	81	809	12	0
Grp Sat Flow(s),veh/h/ln	1645	1659	1661	1814	1797	0
Q Serve(g_s), s	4.0	4.0	1.7	3.6	0.2	0.0
Cycle Q Clear(g_c), s	4.0	4.0	1.7	3.6	0.2	0.0
Prop In Lane		0.24	1.00		0.33	0.58
Lane Grp Cap(c), veh/h	683	689	127	2380	28	0
V/C Ratio(X)	0.38	0.38	0.64	0.34	0.43	0.00
Avail Cap(c_a), veh/h	1799	1815	1000	6748	491	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	7.4	7.4	16.4	2.8	17.8	0.0
Incr Delay (d2), s/veh	0.3	0.3	5.2	0.1	9.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.9	0.7	0.2	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.7	7.8	21.5	2.9	27.7	0.0
LnGrp LOS	A	A	C	A	C	A
Approach Vol, veh/h	518			890	12	
Approach Delay, s/veh	7.8			4.6	27.7	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.8	21.2		6.6		30.0
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	22.0	40.0		10.0		68.0
Max Q Clear Time (g_c+I1), s	3.7	6.0		2.2		5.6
Green Ext Time (p_c), s	0.2	8.3		0.0		18.4

### Intersection Summary

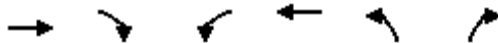
HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A

### Notes

User approved volume balancing among the lanes for turning movement.

# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	↵
Traffic Volume (veh/h)	492	160	51	737	18	3
Future Volume (veh/h)	492	160	51	737	18	3
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1716	1716	1939	1879	2018	2018
Adj Flow Rate, veh/h	523	170	54	784	19	3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	0	4	0	0
Cap, veh/h	1186	384	103	2456	52	46
Arrive On Green	0.49	0.49	0.06	0.69	0.03	0.03
Sat Flow, veh/h	2508	784	1847	3665	1922	1710
Grp Volume(v), veh/h	351	342	54	784	19	3
Grp Sat Flow(s),veh/h/ln	1630	1575	1847	1785	1922	1710
Q Serve(g_s), s	5.9	5.9	1.2	3.7	0.4	0.1
Cycle Q Clear(g_c), s	5.9	5.9	1.2	3.7	0.4	0.1
Prop In Lane		0.50	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	798	771	103	2456	52	46
V/C Ratio(X)	0.44	0.44	0.53	0.32	0.37	0.07
Avail Cap(c_a), veh/h	1860	1797	658	5854	411	366
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.0	7.0	19.3	2.6	20.1	20.0
Incr Delay (d2), s/veh	0.4	0.4	4.1	0.1	4.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.3	0.6	0.3	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.4	7.4	23.4	2.7	24.4	20.5
LnGrp LOS	A	A	C	A	C	C
Approach Vol, veh/h	693			838	22	
Approach Delay, s/veh	7.4			4.0	23.9	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.3	26.6			34.9	7.1
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	15.0	48.0			69.0	9.0
Max Q Clear Time (g_c+I1), s	3.2	7.9			5.7	2.4
Green Ext Time (p_c), s	0.1	12.7			17.7	0.0
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			5.8			
HCM 6th LOS			A			

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	286	2	118	682	610	2	20	22	464	69	170
Future Volume (vph)	162	286	2	118	682	610	2	20	22	464	69	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%			-2%	
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	3		3	3		3	9		1	1		9
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
Heavy Vehicles (%)	5%	14%	0%	5%	4%	7%	0%	21%	11%	3%	4%	1%
Shared Lane Traffic (%)										43%		
Lane Group Flow (vph)	167	297	0	122	1332	0	0	23	23	272	277	175
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left			Left			Left			Left		
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	21.0	56.0		23.0	58.0		13.0	13.0	23.0	28.0	28.0	21.0
Total Split (%)	17.5%	46.7%		19.2%	48.3%		10.8%	10.8%	19.2%	23.3%	23.3%	17.5%
Maximum Green (s)	15.0	50.0		17.0	52.0		7.0	7.0	17.0	22.0	22.0	15.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	



Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.81	0.20		0.64	0.93			0.23	0.10	0.88	0.89	0.34
Control Delay	78.2	20.0		64.3	42.0			59.3	24.0	75.1	75.6	28.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	78.2	20.0		64.3	42.0			59.3	24.0	75.1	75.6	28.6
Queue Length 50th (ft)	128	73		91	522			17	10	220	224	96
Queue Length 95th (ft)	#248	108		154	#687			46	24	#390	#395	155
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	218	1488		246	1475			102	279	321	325	533
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.77	0.20		0.50	0.90			0.23	0.08	0.85	0.85	0.33

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 112.3  
 Natural Cycle: 105  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave

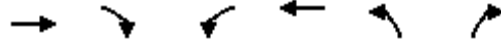


Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (vph)	441	61	79	785	4	7
Future Volume (vph)	441	61	79	785	4	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)						1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	11%	4%	13%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	518	0	81	809	11	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	46.0		28.0	74.0	16.0	
Total Split (%)	51.1%		31.1%	82.2%	17.8%	
Maximum Green (s)	40.0		22.0	68.0	10.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.24		0.27	0.24	0.04	
Control Delay	7.4		18.2	1.4	19.1	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	7.4		18.2	1.4	19.1	
Queue Length 50th (ft)	28		15	0	2	
Queue Length 95th (ft)	104		58	71	16	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2989		832	3557	433	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.17		0.10	0.23	0.03	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 41.2  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave



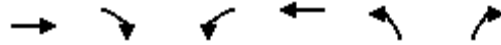
Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	↗
Traffic Volume (vph)	492	160	51	737	18	3
Future Volume (vph)	492	160	51	737	18	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	12%	2%	0%	4%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	693	0	54	784	19	3
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	54.0		21.0	75.0	15.0	15.0
Total Split (%)	60.0%		23.3%	83.3%	16.7%	16.7%
Maximum Green (s)	48.0		15.0	69.0	9.0	9.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						

# Lanes, Volumes, Timings

## 6: Western Access & Second Ave

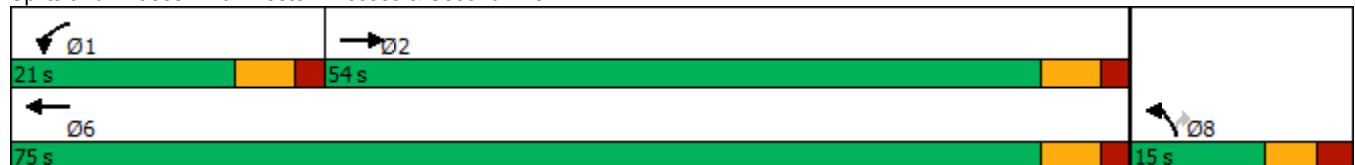


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.27		0.20	0.25	0.08	0.01
Control Delay	5.9		25.9	2.1	27.7	21.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	5.9		25.9	2.1	27.7	21.7
Queue Length 50th (ft)	0		9	0	3	0
Queue Length 95th (ft)	123		60	69	29	8
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2806		570	3372	370	333
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	0.25		0.09	0.23	0.05	0.01

### Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 49.7  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

### Splits and Phases: 6: Western Access & Second Ave



# HCM 6th Signalized Intersection Summary

## 1: Technology Dr/Bates St & Second Ave

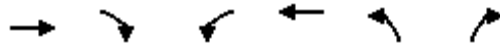
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	308	921	1	24	305	373	4	163	133	431	18	76
Future Volume (veh/h)	308	921	1	24	305	373	4	163	133	431	18	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.90	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1964	1949	1949	1939	1819	1819	2067	2067	2067	1934	1979	1995
Adj Flow Rate, veh/h	331	990	1	26	328	401	4	175	143	477	0	82
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	2	2	0	8	8	2	2	2	3	0	4
Cap, veh/h	369	1750	2	65	517	443	5	217	230	646	0	611
Arrive On Green	0.20	0.46	0.46	0.04	0.30	0.30	0.11	0.11	0.11	0.18	0.00	0.18
Sat Flow, veh/h	1870	3795	4	1847	1728	1480	46	2018	1571	3683	0	1584
Grp Volume(v), veh/h	331	483	508	26	328	401	179	0	143	477	0	82
Grp Sat Flow(s),veh/h/ln	1870	1851	1948	1847	1728	1480	2064	0	1571	1842	0	1584
Q Serve(g_s), s	18.8	20.7	20.7	1.5	17.8	28.3	9.2	0.0	9.3	13.3	0.0	3.7
Cycle Q Clear(g_c), s	18.8	20.7	20.7	1.5	17.8	28.3	9.2	0.0	9.3	13.3	0.0	3.7
Prop In Lane	1.00		0.00	1.00		1.00	0.02		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	369	854	898	65	517	443	222	0	230	646	0	611
V/C Ratio(X)	0.90	0.57	0.57	0.40	0.63	0.91	0.81	0.00	0.62	0.74	0.00	0.13
Avail Cap(c_a), veh/h	465	854	898	170	525	449	266	0	264	746	0	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.6	21.3	21.3	51.3	32.9	36.6	47.4	0.0	43.9	42.4	0.0	22.6
Incr Delay (d2), s/veh	17.2	2.2	2.1	4.0	4.9	23.9	14.2	0.0	3.5	3.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	9.1	9.6	0.8	8.0	12.9	5.6	0.0	3.9	6.4	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.8	23.6	23.4	55.3	37.9	60.5	61.5	0.0	47.5	45.7	0.0	22.7
LnGrp LOS	E	C	C	E	D	E	E	A	D	D	A	C
Approach Vol, veh/h		1322			755			322				559
Approach Delay, s/veh		32.6			50.5			55.3				42.4
Approach LOS		C			D			E				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	27.4	38.5		17.7	9.8	56.1		25.1				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	27.0	33.0		14.0	10.0	50.0		22.0				
Max Q Clear Time (g_c+I1), s	20.8	30.3		11.3	3.5	22.7		15.3				
Green Ext Time (p_c), s	0.6	2.2		0.4	0.0	21.0		1.5				

Intersection Summary												
HCM 6th Ctrl Delay				41.5								
HCM 6th LOS				D								

### Notes

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Traffic Volume (veh/h)	1183	17	18	383	43	57
Future Volume (veh/h)	1183	17	18	383	43	57
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1504	1849	2018	2018
Adj Flow Rate, veh/h	1220	18	19	395	44	59
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	29	6	0	0
Cap, veh/h	2183	32	32	2564	58	78
Arrive On Green	0.61	0.61	0.02	0.73	0.08	0.08
Sat Flow, veh/h	3667	53	1432	3606	748	1003
Grp Volume(v), veh/h	605	633	19	395	104	0
Grp Sat Flow(s),veh/h/ln	1771	1855	1432	1757	1768	0
Q Serve(g_s), s	12.6	12.6	0.8	2.1	3.6	0.0
Cycle Q Clear(g_c), s	12.6	12.6	0.8	2.1	3.6	0.0
Prop In Lane		0.03	1.00		0.42	0.57
Lane Grp Cap(c), veh/h	1082	1133	32	2564	137	0
V/C Ratio(X)	0.56	0.56	0.59	0.15	0.76	0.00
Avail Cap(c_a), veh/h	1422	1489	161	3553	426	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	7.2	7.2	30.2	2.6	28.2	0.0
Incr Delay (d2), s/veh	0.5	0.4	16.0	0.0	8.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	3.6	0.4	0.4	1.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.6	7.6	46.1	2.6	36.4	0.0
LnGrp LOS	A	A	D	A	D	A
Approach Vol, veh/h	1238			414	104	
Approach Delay, s/veh	7.6			4.6	36.4	
Approach LOS	A			A	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.4	44.1		10.8		51.5
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	7.0	50.0		15.0		63.0
Max Q Clear Time (g_c+I1), s	2.8	14.6		5.6		4.1
Green Ext Time (p_c), s	0.0	23.5		0.2		7.3

### Intersection Summary

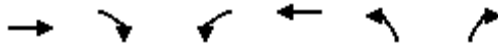
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

### Notes

User approved volume balancing among the lanes for turning movement.

# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	↵
Traffic Volume (veh/h)	1184	61	2	409	182	32
Future Volume (veh/h)	1184	61	2	409	182	32
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1939	1864	2003	2018
Adj Flow Rate, veh/h	1221	63	2	422	188	33
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	5	1	0
Cap, veh/h	2032	105	5	2432	251	225
Arrive On Green	0.59	0.59	0.00	0.69	0.13	0.13
Sat Flow, veh/h	3520	177	1847	3635	1908	1710
Grp Volume(v), veh/h	630	654	2	422	188	33
Grp Sat Flow(s),veh/h/ln	1771	1833	1847	1771	1908	1710
Q Serve(g_s), s	14.8	14.9	0.1	2.8	6.3	1.1
Cycle Q Clear(g_c), s	14.8	14.9	0.1	2.8	6.3	1.1
Prop In Lane		0.10	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1050	1087	5	2432	251	225
V/C Ratio(X)	0.60	0.60	0.40	0.17	0.75	0.15
Avail Cap(c_a), veh/h	1289	1334	140	3168	549	493
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.5	8.5	32.8	3.7	27.6	25.4
Incr Delay (d2), s/veh	0.6	0.5	43.8	0.0	4.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	4.6	0.1	0.6	3.1	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.0	9.0	76.6	3.7	32.1	25.7
LnGrp LOS	A	A	E	A	C	C
Approach Vol, veh/h	1284			424	221	
Approach Delay, s/veh	9.0			4.1	31.1	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.2	45.1			51.3	14.7
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	5.0	48.0			59.0	19.0
Max Q Clear Time (g_c+I1), s	2.1	16.9			4.8	8.3
Green Ext Time (p_c), s	0.0	22.2			7.8	0.6

### Intersection Summary

HCM 6th Ctrl Delay	10.5
HCM 6th LOS	B

### Notes

User approved volume balancing among the lanes for turning movement.



Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	308	921	1	24	305	373	4	163	133	431	18	76
Future Volume (vph)	308	921	1	24	305	373	4	163	133	431	18	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%			-2%	
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	11		24	24		11	3		37	37		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	0%	0%	8%	5%	0%	2%	2%	3%	0%	4%
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	331	991	0	26	729	0	0	179	143	241	241	82
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left			Left								
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	33.0	56.0		16.0	39.0		20.0	20.0	16.0	28.0	28.0	33.0
Total Split (%)	27.5%	46.7%		13.3%	32.5%		16.7%	16.7%	13.3%	23.3%	23.3%	27.5%
Maximum Green (s)	27.0	50.0		10.0	33.0		14.0	14.0	10.0	22.0	22.0	27.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

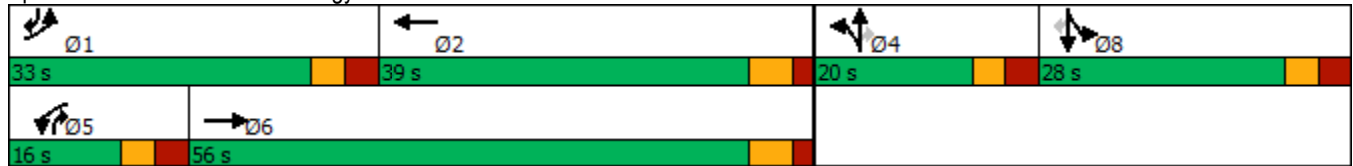
Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.89	0.67		0.20	0.99dr			0.80	0.47	0.84	0.83	0.13
Control Delay	69.3	29.8		55.5	54.6			75.4	28.4	71.7	70.6	19.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	29.8		55.5	54.6			75.4	28.4	71.7	70.6	19.3
Queue Length 50th (ft)	249	314		19	283			137	62	190	190	35
Queue Length 95th (ft)	#413	395		49	#385			#256	102	#329	#327	67
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	409	1616		152	906			240	325	320	324	674
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.81	0.61		0.17	0.80			0.75	0.44	0.75	0.74	0.12

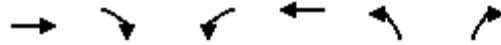
Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 112.8  
 Natural Cycle: 105  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave



Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (vph)	1183	17	18	383	43	57
Future Volume (vph)	1183	17	18	383	43	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)					1	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	10%	29%	6%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1238	0	19	395	103	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	56.0		13.0	69.0	21.0	
Total Split (%)	62.2%		14.4%	76.7%	23.3%	
Maximum Green (s)	50.0		7.0	63.0	15.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.50		0.16	0.15	0.42	
Control Delay	9.4		39.9	3.8	37.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	9.4		39.9	3.8	37.7	
Queue Length 50th (ft)	108		8	25	43	
Queue Length 95th (ft)	302		32	48	101	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2512		138	2908	388	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.49		0.14	0.14	0.27	

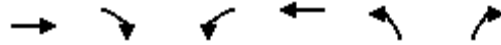
Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 71.5  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave



Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	↙
Traffic Volume (vph)	1184	61	2	409	182	32
Future Volume (vph)	1184	61	2	409	182	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Confl. Peds. (#/hr)					3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	4%	0%	5%	1%	0%
Shared Lane Traffic (%)						10%
Lane Group Flow (vph)	1284	0	2	422	191	30
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	54.0		11.0	65.0	25.0	25.0
Total Split (%)	60.0%		12.2%	72.2%	27.8%	27.8%
Maximum Green (s)	48.0		5.0	59.0	19.0	19.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			

# Lanes, Volumes, Timings

## 6: Western Access & Second Ave

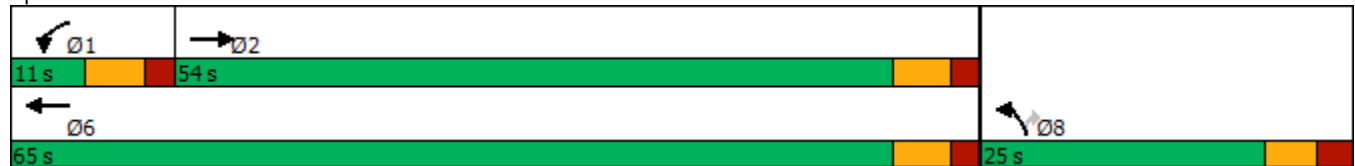


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.58		0.02	0.19	0.59	0.10
Control Delay	10.3		37.5	5.4	36.8	11.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	10.3		37.5	5.4	36.8	11.4
Queue Length 50th (ft)	138		1	33	80	0
Queue Length 95th (ft)	340		8	62	163	23
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2340		118	2825	481	428
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	0.55		0.02	0.15	0.40	0.07

### Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	73.2
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated

### Splits and Phases: 6: Western Access & Second Ave



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**APPENDIX H**

**DESIGN YEAR 2031 BUILD (WITH PTC MASTER PLAN  
DEVELOPMENTS)  
CAPACITY CALCULATIONS**

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# HCM 6th Signalized Intersection Summary

## 1: Technology Dr/Bates St & Second Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↑↑		↵	↑↑			↑	↵	↵	↑	↵
Traffic Volume (veh/h)	167	294	2	144	786	610	2	28	35	464	84	230
Future Volume (veh/h)	167	294	2	144	786	610	2	28	35	464	84	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1904	1769	1769	1864	1879	1879	1781	1781	1932	1934	1919	2042
Adj Flow Rate, veh/h	172	303	2	148	810	629	2	29	36	540	0	237
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
Percent Heavy Veh, %	5	14	14	5	4	4	21	21	11	3	4	1
Cap, veh/h	200	1596	11	178	884	666	6	89	248	638	0	486
Arrive On Green	0.11	0.47	0.47	0.10	0.46	0.46	0.05	0.05	0.05	0.17	0.00	0.17
Sat Flow, veh/h	1813	3422	23	1776	1937	1459	115	1661	1564	3683	0	1704
Grp Volume(v), veh/h	172	149	156	148	744	695	31	0	36	540	0	237
Grp Sat Flow(s),veh/h/ln	1813	1680	1764	1776	1785	1611	1776	0	1564	1842	0	1704
Q Serve(g_s), s	10.8	6.0	6.0	9.5	45.1	47.8	2.0	0.0	2.3	16.5	0.0	13.4
Cycle Q Clear(g_c), s	10.8	6.0	6.0	9.5	45.1	47.8	2.0	0.0	2.3	16.5	0.0	13.4
Prop In Lane	1.00		0.01	1.00		0.91	0.06		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	200	784	823	178	814	735	95	0	248	638	0	486
V/C Ratio(X)	0.86	0.19	0.19	0.83	0.91	0.95	0.33	0.00	0.15	0.85	0.00	0.49
Avail Cap(c_a), veh/h	219	784	823	291	815	736	107	0	259	698	0	514
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.7	18.1	18.1	51.2	29.4	30.2	52.9	0.0	42.5	46.5	0.0	34.6
Incr Delay (d2), s/veh	25.7	0.4	0.4	10.1	16.0	21.8	2.0	0.0	0.3	8.9	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	2.4	2.5	4.7	22.0	22.1	0.9	0.0	0.9	8.4	0.0	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.5	18.5	18.5	61.4	45.5	52.0	54.9	0.0	42.8	55.4	0.0	35.3
LnGrp LOS	E	B	B	E	D	D	D	A	D	E	A	D
Approach Vol, veh/h		477			1587			67			777	
Approach Delay, s/veh		39.4			49.8			48.4			49.3	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.8	58.9		12.2	17.6	60.1		26.1				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	14.0	53.0		7.0	19.0	48.0		22.0				
Max Q Clear Time (g_c+I1), s	12.8	49.8		4.3	11.5	8.0		18.5				
Green Ext Time (p_c), s	0.1	3.1		0.0	0.2	7.9		1.3				

### Intersection Summary

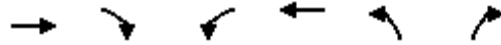
HCM 6th Ctrl Delay	47.9
HCM 6th LOS	D

### Notes

User approved volume balancing among the lanes for turning movement.



## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (veh/h)	451	100	145	883	12	10
Future Volume (veh/h)	451	100	145	883	12	10
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1731	1731	1744	1909	2018	2018
Adj Flow Rate, veh/h	465	103	149	910	12	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	11	11	13	2	0	0
Cap, veh/h	1115	245	199	2471	27	22
Arrive On Green	0.42	0.42	0.12	0.68	0.03	0.03
Sat Flow, veh/h	2766	590	1661	3723	952	794
Grp Volume(v), veh/h	284	284	149	910	23	0
Grp Sat Flow(s),veh/h/ln	1645	1625	1661	1814	1825	0
Q Serve(g_s), s	5.0	5.1	3.6	4.4	0.5	0.0
Cycle Q Clear(g_c), s	5.0	5.1	3.6	4.4	0.5	0.0
Prop In Lane		0.36	1.00		0.52	0.43
Lane Grp Cap(c), veh/h	684	676	199	2471	51	0
V/C Ratio(X)	0.42	0.42	0.75	0.37	0.45	0.00
Avail Cap(c_a), veh/h	1394	1378	1086	5975	442	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.5	8.5	17.6	2.8	19.7	0.0
Incr Delay (d2), s/veh	0.4	0.4	5.6	0.1	6.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.3	1.5	0.4	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.9	8.9	23.1	2.9	25.8	0.0
LnGrp LOS	A	A	C	A	C	A
Approach Vol, veh/h	568			1059	23	
Approach Delay, s/veh	8.9			5.7	25.8	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.9	23.2		7.2		34.1
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	27.0	35.0		10.0		68.0
Max Q Clear Time (g_c+I1), s	5.6	7.1		2.5		6.4
Green Ext Time (p_c), s	0.5	8.6		0.0		21.7

### Intersection Summary

HCM 6th Ctrl Delay	7.1
HCM 6th LOS	A

### Notes

User approved volume balancing among the lanes for turning movement.

# HCM 6th Signalized Intersection Summary

## 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	↵
Traffic Volume (veh/h)	531	242	149	745	30	13
Future Volume (veh/h)	531	242	149	745	30	13
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1716	1716	1939	1879	2018	2018
Adj Flow Rate, veh/h	565	257	159	793	32	14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	0	4	0	0
Cap, veh/h	1068	485	216	2579	90	80
Arrive On Green	0.49	0.49	0.12	0.72	0.05	0.05
Sat Flow, veh/h	2265	989	1847	3665	1922	1710
Grp Volume(v), veh/h	422	400	159	793	32	14
Grp Sat Flow(s),veh/h/ln	1630	1538	1847	1785	1922	1710
Q Serve(g_s), s	9.3	9.3	4.3	4.1	0.8	0.4
Cycle Q Clear(g_c), s	9.3	9.3	4.3	4.1	0.8	0.4
Prop In Lane		0.64	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	799	754	216	2579	90	80
V/C Ratio(X)	0.53	0.53	0.74	0.31	0.36	0.18
Avail Cap(c_a), veh/h	1349	1273	782	4879	259	230
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.1	9.1	22.2	2.6	24.0	23.8
Incr Delay (d2), s/veh	0.5	0.6	4.9	0.1	2.4	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.4	2.0	0.5	0.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.7	9.7	27.0	2.6	26.4	24.8
LnGrp LOS	A	A	C	A	C	C
Approach Vol, veh/h	822			952	46	
Approach Delay, s/veh	9.7			6.7	25.9	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.1	31.5			43.5	8.4
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	22.0	43.0			71.0	7.0
Max Q Clear Time (g_c+I1), s	6.3	11.3			6.1	2.8
Green Ext Time (p_c), s	0.4	14.2			18.1	0.0
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.5			
HCM 6th LOS			A			

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	294	2	144	786	610	2	28	35	464	84	230
Future Volume (vph)	167	294	2	144	786	610	2	28	35	464	84	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%				-2%
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	3		3	3		3	9		1	1		9
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
Heavy Vehicles (%)	5%	14%	0%	5%	4%	7%	0%	21%	11%	3%	4%	1%
Shared Lane Traffic (%)										41%		
Lane Group Flow (vph)	172	305	0	148	1439	0	0	31	36	282	283	237
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left						Left					
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	20.0	54.0		25.0	59.0		13.0	13.0	25.0	28.0	28.0	20.0
Total Split (%)	16.7%	45.0%		20.8%	49.2%		10.8%	10.8%	20.8%	23.3%	23.3%	16.7%
Maximum Green (s)	14.0	48.0		19.0	53.0		7.0	7.0	19.0	22.0	22.0	14.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.87	0.21		0.70	0.97			0.31	0.15	0.92	0.90	0.46
Control Delay	88.9	21.1		65.5	48.8			62.4	24.3	80.9	78.6	31.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	88.9	21.1		65.5	48.8			62.4	24.3	80.9	78.6	31.8
Queue Length 50th (ft)	134	77		111	~624			24	15	229	229	138
Queue Length 95th (ft)	#268	115		179	#763			57	32	#409	#408	212
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	199	1456		269	1480			99	299	313	318	513
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.86	0.21		0.55	0.97			0.31	0.12	0.90	0.89	0.46

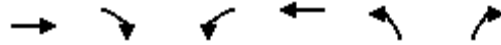
Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 114.3  
 Natural Cycle: 115  
 Control Type: Actuated-Uncoordinated  
 ~ 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.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave

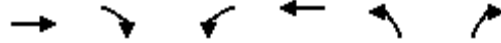


Lanes, Volumes, Timings  
2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Traffic Volume (vph)	451	100	145	883	12	10
Future Volume (vph)	451	100	145	883	12	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)						1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	11%	4%	13%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	568	0	149	910	22	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	41.0		33.0	74.0	16.0	
Total Split (%)	45.6%		36.7%	82.2%	17.8%	
Maximum Green (s)	35.0		27.0	68.0	10.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave

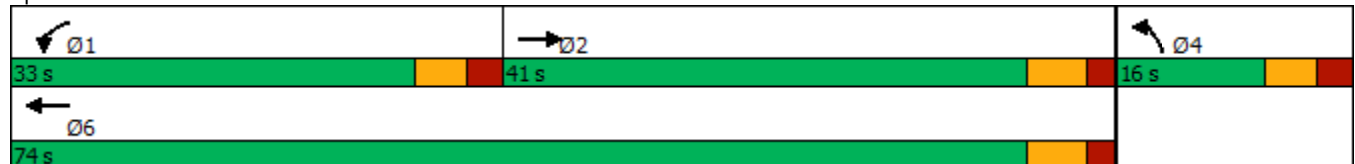


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.32		0.41	0.27	0.09	
Control Delay	9.6		21.3	1.2	25.2	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	9.6		21.3	1.2	25.2	
Queue Length 50th (ft)	35		24	0	4	
Queue Length 95th (ft)	135		118	85	32	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2630		952	3441	412	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.22		0.16	0.26	0.05	

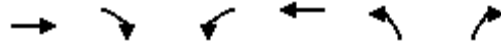
Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 47  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave

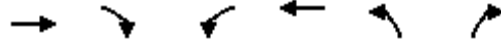


Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	↗
Traffic Volume (vph)	531	242	149	745	30	13
Future Volume (vph)	531	242	149	745	30	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	12%	2%	0%	4%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	822	0	159	793	32	14
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	49.0		28.0	77.0	13.0	13.0
Total Split (%)	54.4%		31.1%	85.6%	14.4%	14.4%
Maximum Green (s)	43.0		22.0	71.0	7.0	7.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						

Lanes, Volumes, Timings  
 6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.50		0.50	0.27	0.17	0.08
Control Delay	11.2		32.9	2.4	36.8	19.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	11.2		32.9	2.4	36.8	19.5
Queue Length 50th (ft)	106		62	47	13	0
Queue Length 95th (ft)	177		135	65	44	18
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2244		627	3265	216	205
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	0.37		0.25	0.24	0.15	0.07

Intersection Summary






















Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 65.2  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Western Access & Second Ave





HCM 6th Signalized Intersection Summary  
 1: Technology Dr/Bates St & Second Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	336	968	1	29	324	373	4	208	210	431	21	87
Future Volume (veh/h)	336	968	1	29	324	373	4	208	210	431	21	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.91	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1964	1949	1949	1939	1819	1819	2067	2067	2067	1934	1979	1995
Adj Flow Rate, veh/h	361	1041	1	31	348	401	4	224	226	479	0	94
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	2	2	0	8	8	2	2	2	3	0	4
Cap, veh/h	391	1729	2	70	492	420	5	263	274	625	0	622
Arrive On Green	0.21	0.46	0.46	0.04	0.28	0.28	0.13	0.13	0.13	0.17	0.00	0.17
Sat Flow, veh/h	1870	3795	4	1847	1728	1477	36	2029	1601	3683	0	1580
Grp Volume(v), veh/h	361	508	534	31	348	401	228	0	226	479	0	94
Grp Sat Flow(s),veh/h/ln	1870	1851	1948	1847	1728	1477	2065	0	1601	1842	0	1580
Q Serve(g_s), s	21.9	23.8	23.8	1.9	20.9	30.9	12.5	0.0	15.0	14.4	0.0	4.6
Cycle Q Clear(g_c), s	21.9	23.8	23.8	1.9	20.9	30.9	12.5	0.0	15.0	14.4	0.0	4.6
Prop In Lane	1.00		0.00	1.00		1.00	0.02		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	391	843	887	70	492	420	267	0	274	625	0	622
V/C Ratio(X)	0.92	0.60	0.60	0.44	0.71	0.95	0.85	0.00	0.82	0.77	0.00	0.15
Avail Cap(c_a), veh/h	420	843	887	191	492	420	267	0	274	699	0	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.9	23.7	23.7	54.5	37.1	40.7	49.4	0.0	46.8	45.9	0.0	23.8
Incr Delay (d2), s/veh	25.1	2.6	2.5	4.3	7.3	33.4	22.5	0.0	18.2	4.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.7	10.7	11.2	1.0	9.7	14.9	8.2	0.0	7.7	7.0	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	26.3	26.2	58.8	44.5	74.1	71.8	0.0	65.0	50.5	0.0	23.9
LnGrp LOS	E	C	C	E	D	E	E	A	E	D	A	C
Approach Vol, veh/h		1403			780			454				573
Approach Delay, s/veh		37.5			60.3			68.4				46.1
Approach LOS		D			E			E				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	30.2	39.0		21.0	10.4	58.8		25.7				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	26.0	33.0		15.0	12.0	47.0		22.0				
Max Q Clear Time (g_c+I1), s	23.9	32.9		17.0	3.9	25.8		16.4				
Green Ext Time (p_c), s	0.3	0.1		0.0	0.0	17.5		1.4				

Intersection Summary		
HCM 6th Ctrl Delay		48.9
HCM 6th LOS		D

Notes

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary 2: Middle Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Volume (veh/h)	1242	24	30	401	90	73
Future Volume (veh/h)	1242	24	30	401	90	73
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1504	1849	2018	2018
Adj Flow Rate, veh/h	1280	25	31	413	93	75
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	29	6	0	0
Cap, veh/h	2065	40	47	2467	120	97
Arrive On Green	0.58	0.58	0.03	0.70	0.12	0.12
Sat Flow, veh/h	3647	69	1432	3606	994	802
Grp Volume(v), veh/h	638	667	31	413	169	0
Grp Sat Flow(s),veh/h/ln	1771	1852	1432	1757	1807	0
Q Serve(g_s), s	16.0	16.0	1.4	2.7	6.1	0.0
Cycle Q Clear(g_c), s	16.0	16.0	1.4	2.7	6.1	0.0
Prop In Lane		0.04	1.00		0.55	0.44
Lane Grp Cap(c), veh/h	1029	1076	47	2467	218	0
V/C Ratio(X)	0.62	0.62	0.66	0.17	0.78	0.00
Avail Cap(c_a), veh/h	1230	1286	169	3165	454	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.3	9.3	32.4	3.4	28.9	0.0
Incr Delay (d2), s/veh	0.7	0.7	14.9	0.0	5.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	5.2	0.7	0.6	2.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.0	10.0	47.3	3.4	34.7	0.0
LnGrp LOS	A	A	D	A	C	A
Approach Vol, veh/h	1305			444	169	
Approach Delay, s/veh	10.0			6.5	34.7	
Approach LOS	A			A	C	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	45.3		14.2		53.5
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	8.0	47.0		17.0		61.0
Max Q Clear Time (g_c+I1), s	3.4	18.0		8.1		4.7
Green Ext Time (p_c), s	0.0	21.4		0.4		7.6

### Intersection Summary

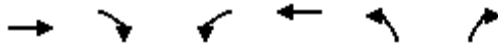
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

### Notes

User approved volume balancing among the lanes for turning movement.

## HCM 6th Signalized Intersection Summary

### 6: Western Access & Second Ave



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	↵
Traffic Volume (veh/h)	1191	76	20	456	251	91
Future Volume (veh/h)	1191	76	20	456	251	91
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1864	1939	1864	2003	2018
Adj Flow Rate, veh/h	1228	78	21	470	259	94
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	5	1	0
Cap, veh/h	1862	118	44	2333	329	295
Arrive On Green	0.55	0.55	0.02	0.66	0.17	0.17
Sat Flow, veh/h	3476	215	1847	3635	1908	1710
Grp Volume(v), veh/h	642	664	21	470	259	94
Grp Sat Flow(s),veh/h/ln	1771	1826	1847	1771	1908	1710
Q Serve(g_s), s	18.2	18.3	0.8	3.7	9.2	3.4
Cycle Q Clear(g_c), s	18.2	18.3	0.8	3.7	9.2	3.4
Prop In Lane		0.12	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	975	1005	44	2333	329	295
V/C Ratio(X)	0.66	0.66	0.48	0.20	0.79	0.32
Avail Cap(c_a), veh/h	1121	1156	130	2790	590	529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.3	11.3	34.3	4.8	28.2	25.8
Incr Delay (d2), s/veh	1.2	1.1	7.8	0.0	4.2	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	6.3	0.4	1.0	4.5	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.4	12.4	42.0	4.8	32.4	26.4
LnGrp LOS	B	B	D	A	C	C
Approach Vol, veh/h	1306			491	353	
Approach Delay, s/veh	12.4			6.4	30.8	
Approach LOS	B			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.7	45.1			52.8	18.3
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	5.0	45.0			56.0	22.0
Max Q Clear Time (g_c+I1), s	2.8	20.3			5.7	11.2
Green Ext Time (p_c), s	0.0	18.9			8.7	1.0






















#### Intersection Summary

HCM 6th Ctrl Delay		14.1	
HCM 6th LOS		B	

#### Notes

User approved volume balancing among the lanes for turning movement.

Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	336	968	1	29	324	373	4	208	210	431	21	87
Future Volume (vph)	336	968	1	29	324	373	4	208	210	431	21	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	12	10	12	12	12	12	12	11	11	13
Grade (%)		-2%			-1%			-5%			-2%	
Storage Length (ft)	580		0	100		0	0		0	0		85
Storage Lanes	1		0	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		35			35			25				25
Link Distance (ft)		1023			612			255				258
Travel Time (s)		19.9			11.9			7.0				7.0
Confl. Peds. (#/hr)	11		24	24		11	3		37	37		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	2%	0%	0%	8%	5%	0%	2%	2%	3%	0%	4%
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	361	1042	0	31	749	0	0	228	226	241	245	94
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left						Left					
Leading Detector (ft)	40	231		40	231		20	40	40	40	40	40
Trailing Detector (ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Position(ft)	0	225		0	225		0	0	0	0	0	0
Detector 1 Size(ft)	40	6		40	6		20	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6		5	2		4	4	5	8	8	1
Permitted Phases									4			8
Detector Phase	1	6		5	2		4	4	5	8	8	1
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	37.0		13.0	37.0		13.0	13.0	13.0	28.0	28.0	13.0
Total Split (s)	32.0	53.0		18.0	39.0		21.0	21.0	18.0	28.0	28.0	32.0
Total Split (%)	26.7%	44.2%		15.0%	32.5%		17.5%	17.5%	15.0%	23.3%	23.3%	26.7%
Maximum Green (s)	26.0	47.0		12.0	33.0		15.0	15.0	12.0	22.0	22.0	26.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		11.0			11.0					4.0	4.0	
Flash Dont Walk (s)		20.0			20.0					18.0	18.0	

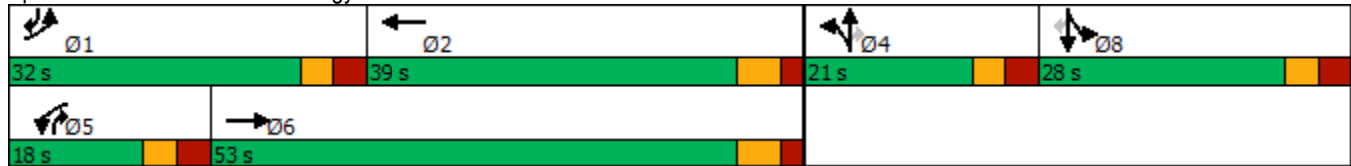
Lanes, Volumes, Timings  
 1: Technology Dr/Bates St & Second Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)		0			0					0	0	
v/c Ratio	0.96	0.72		0.21	0.99dr			0.93	0.66	0.86	0.86	0.15
Control Delay	84.0	33.4		53.5	57.3			93.8	33.6	75.0	75.1	20.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	0.0
Total Delay	84.0	33.4		53.5	57.3			93.8	33.6	75.0	75.1	20.2
Queue Length 50th (ft)	281	354		23	293			178	98	190	193	42
Queue Length 95th (ft)	#478	442		54	#402			#337	150	#329	#333	75
Internal Link Dist (ft)		943			532			175			178	
Turn Bay Length (ft)	580			100								85
Base Capacity (vph)	375	1461		174	868			245	362	306	310	637
Starvation Cap Reductn	0	0		0	0			0	0	0	0	0
Spillback Cap Reductn	0	0		0	0			0	0	0	0	0
Storage Cap Reductn	0	0		0	0			0	0	0	0	0
Reduced v/c Ratio	0.96	0.71		0.18	0.86			0.93	0.62	0.79	0.79	0.15

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 116.9  
 Natural Cycle: 105  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Technology Dr/Bates St & Second Ave



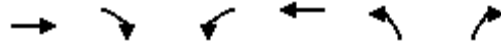
## Lanes, Volumes, Timings

### 2: Middle Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Traffic Volume (vph)	1242	24	30	401	90	73
Future Volume (vph)	1242	24	30	401	90	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Right Turn on Red		Yes				No
Link Speed (mph)	35			35	25	
Link Distance (ft)	977			1023	246	
Travel Time (s)	19.0			19.9	6.7	
Confl. Peds. (#/hr)					1	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	10%	29%	6%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1305	0	31	413	168	0
Number of Detectors	2		1	2	1	
Detector Template			Left		Left	
Leading Detector (ft)	261		40	261	40	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		40	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	
Minimum Split (s)	21.0		11.5	21.0	11.5	
Total Split (s)	53.0		14.0	67.0	23.0	
Total Split (%)	58.9%		15.6%	74.4%	25.6%	
Maximum Green (s)	47.0		8.0	61.0	17.0	
Yellow Time (s)	4.0		3.5	4.0	3.5	
All-Red Time (s)	2.0		2.5	2.0	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag	Lag		Lead			

Lanes, Volumes, Timings  
 2: Middle Access & Second Ave

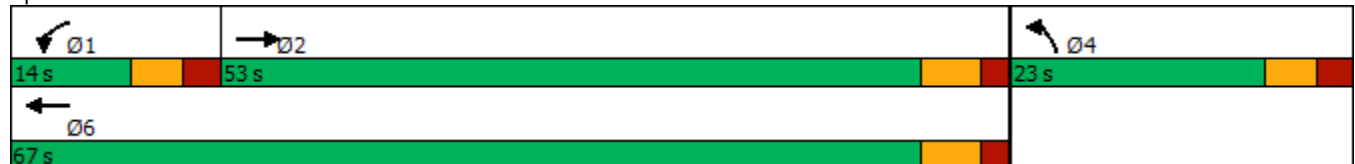


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Minimum Gap (s)	6.0		3.0	6.0	3.0	
Time Before Reduce (s)	15.0		5.0	15.0	5.0	
Time To Reduce (s)	15.0		5.0	15.0	5.0	
Recall Mode	Min		None	Min	None	
v/c Ratio	0.61		0.26	0.18	0.58	
Control Delay	12.6		42.0	5.0	39.6	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	12.6		42.0	5.0	39.6	
Queue Length 50th (ft)	147		13	33	68	
Queue Length 95th (ft)	359		45	56	151	
Internal Link Dist (ft)	897			943	166	
Turn Bay Length (ft)			200			
Base Capacity (vph)	2185		139	2767	393	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.60		0.22	0.15	0.43	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 76.9  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Middle Access & Second Ave



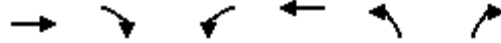
Lanes, Volumes, Timings  
6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	↙
Traffic Volume (vph)	1191	76	20	456	251	91
Future Volume (vph)	1191	76	20	456	251	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	12	12	12
Grade (%)	1%			-1%	-3%	
Storage Length (ft)		0	230		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	673			977	192	
Travel Time (s)	13.1			19.0	5.2	
Confl. Peds. (#/hr)					3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	4%	0%	5%	1%	0%
Shared Lane Traffic (%)						10%
Lane Group Flow (vph)	1306	0	21	470	268	85
Number of Detectors	2		1	2	1	1
Detector Template						
Leading Detector (ft)	261		40	261	40	40
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		40	6	40	40
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	255			255		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	5.0	5.0
Minimum Split (s)	21.0		11.0	21.0	11.0	11.0
Total Split (s)	51.0		11.0	62.0	28.0	28.0
Total Split (%)	56.7%		12.2%	68.9%	31.1%	31.1%
Maximum Green (s)	45.0		5.0	56.0	22.0	22.0
Yellow Time (s)	4.0		4.0	4.0	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lag		Lead			



Lanes, Volumes, Timings  
 6: Western Access & Second Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	6.0		3.0	6.0	5.0	5.0
Time Before Reduce (s)	15.0		0.0	15.0	0.0	0.0
Time To Reduce (s)	15.0		0.0	15.0	0.0	0.0
Recall Mode	Min		None	Min	None	None
v/c Ratio	0.66		0.18	0.22	0.68	0.21
Control Delay	14.7		42.4	6.8	38.1	8.2
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	14.7		42.4	6.8	38.1	8.2
Queue Length 50th (ft)	164		9	43	111	0
Queue Length 95th (ft)	379		35	78	216	36
Internal Link Dist (ft)	593			897	112	
Turn Bay Length (ft)			230			
Base Capacity (vph)	2187		117	2640	556	529
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	0.60		0.18	0.18	0.48	0.16

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 74.7  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Western Access & Second Ave

