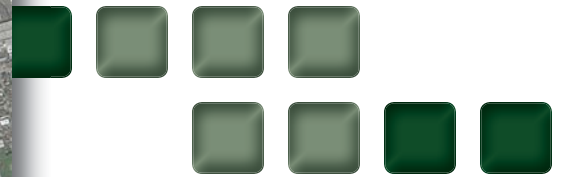


Appendix C-1

**Transportation Impact Analysis: San Francisco-Oakland
Bay Bridge Regional Bicycle & Pedestrian Connection:
Path Report**

Transportation Impact Analysis

San Francisco-Oakland Bay Bridge Regional Bicycle & Pedestrian Connection: *Path Report*



Prepared for:

T.Y. Lin International

TYLININTERNATIONAL

October 2014

Transportation Impact Analysis

San Francisco-Oakland Bay Bridge Regional Bicycle & Pedestrian Connection

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Prepared for:
T.Y. Lin International

October 2014

WC12-2992

FEHR  PEERS

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EXECUTIVE SUMMARY

This report presents the results of the Transportation Impact Analysis (TIA) conducted for the proposed bicycle/pedestrian path connection (Path) between West Oakland and the Bay Bridge Trail that connects to the East Span of the San Francisco Oakland Bay Bridge (Bay Bridge) in Oakland, California.

1.1 PROJECT DESCRIPTION AND ANALYSIS PARAMETERS

The proposed project is a new Class 1 path located in the City of Oakland, Alameda County, connecting Mandela Parkway in the east to the Bay Bridge Trail in the west, near the I-880 and I-80 interchange. The path is an elevated structure for most of the 1.14 miles length to provide access across existing freeways, railways and industrial areas.

The project could also include Class 2 bike lanes and a 100-space parking lot at the east end (Wood Street lot) of the Class 1 bike path. The Class 2 bike lanes would extend along surface streets near the east touchdown of the Path, providing connections to Mandela Parkway and to the proposed Wood Street lot.

Project impacts on the study area roadway facilities were determined by measuring the effect project traffic would have on 10 intersections in the vicinity of the site during the weekday evening (4:00 to 6:00 PM) and Saturday afternoon (2:00 to 6:00 PM) peak periods. Conditions were evaluated under Existing, Near-term and Cumulative conditions without and with the project.

1.2 FINDINGS AND RECOMMENDATIONS

Results of the analysis show that in the existing and near-term conditions, the Path project would have a less-than-significant impact to intersection levels of service based on the City of Oakland standards of significance. In the cumulative condition, Path project impacts were identified at the West Grand Avenue/Mandela Parkway intersection. Mitigation measures that would reduce the project's impact to a less-than-significant level were identified. Impacts to transit, bicycle, pedestrian and transit were also reviewed. Project impacts to transit were found to be less-than-significant. Potential bicycle and pedestrian safety impacts were identified; mitigation measures that would reduce the project's impact to a less-than-significant level were identified.



1.0 INTRODUCTION

This report presents the results of the Transportation Impact Analysis (TIA) conducted for the proposed bicycle/pedestrian path connection (Path) between West Oakland and the Bay Bridge Trail, near the I-880 and I-80 interchange, in Oakland, California. The Path would provide access to the existing bicycle/pedestrian path on the eastern span of the Bay Bridge, as well as access to existing and planned segments of the regional San Francisco Bay Trail. This chapter discusses the TIA purpose, study area, analysis methods, criteria used to identify significant impacts, and report organization.

1.1 STUDY PURPOSE

The purpose of this analysis is to evaluate the potential transportation impacts of the Path project, including impacts to intersection operations, bicycle, pedestrian and transit facilities. The proposed project is a new Class 1 path located in the City of Oakland, Alameda County, connecting Mandela Parkway in the east to the Bay Bridge Trail in the west, near the I-880 and I-80 interchange, as shown on **Figure 1**. The path is an elevated structure for most of the 1.14 miles length to provide access across existing freeways, railways and industrial areas.

The project could also include Class 2 bike lanes and a 100-space parking lot at the east end (Wood Street lot) of the Class 1 path. The Class 2 bike lanes would extend along surface streets near the east touchdown of the bike path, providing connections to Mandela Parkway and to the proposed Wood Street lot, as shown conceptually on **Figure 2**.

The Path is proposed by the Gateway Park Working Group. The Gateway Park Working Group includes the following nine local, regional and state agencies: The Bay Area Toll Authority (BATA), the California Department of Transportation (Caltrans), San Francisco Bay Conservation and Development Commission (BCDC), California Transportation Commission (CTC), East Bay Regional Park District (EBRPD), City of Oakland, Port of Oakland, East Bay Municipal Utility District (EBMUD), and Association of Bay Area Governments (ABAG's). The agency responsible for operation and maintenance of the bike path is anticipated to be Caltrans but could also be City of Oakland.

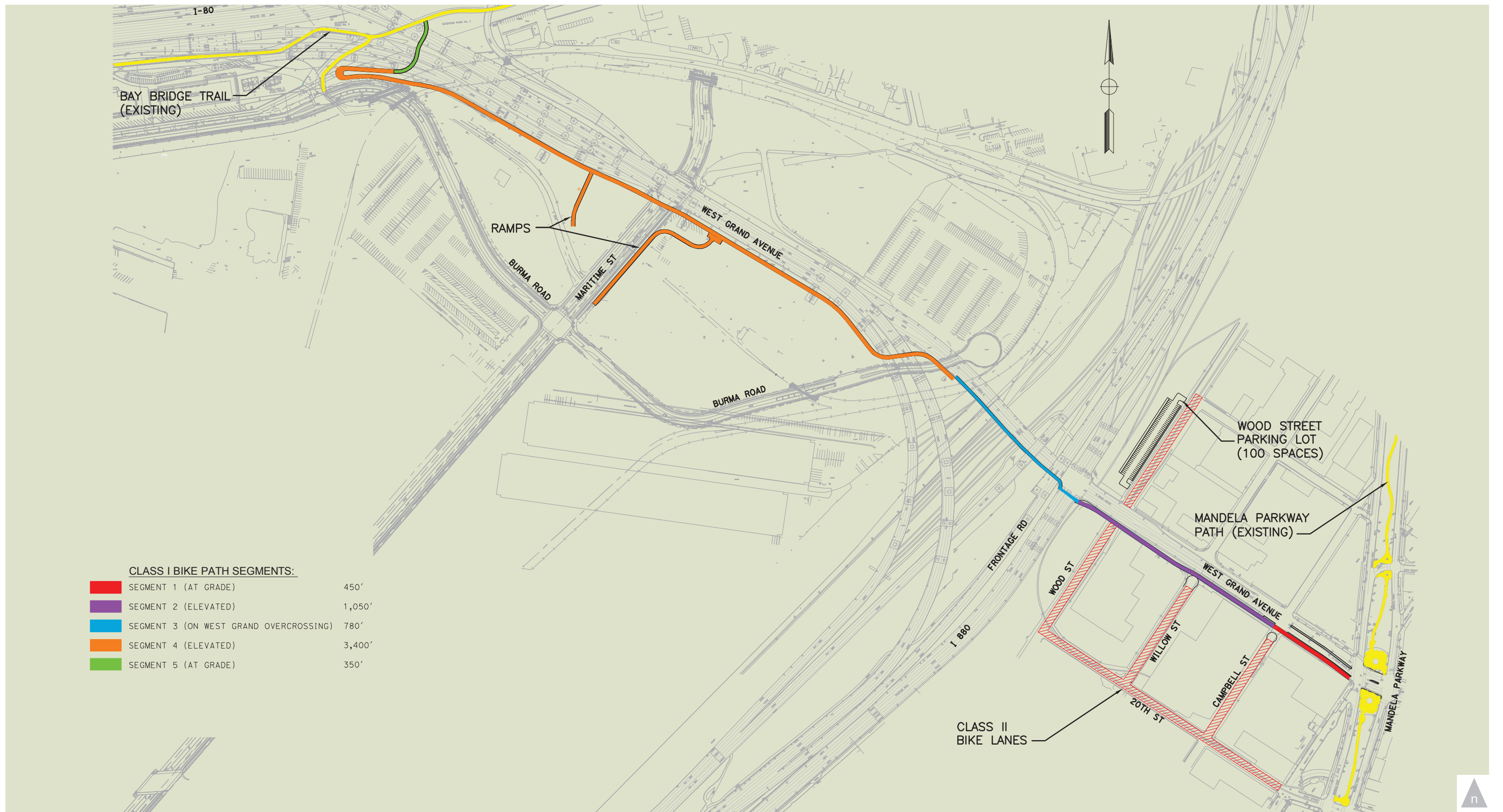




Figure 1.

Project Site Vicinity

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Source: T.Y. Lin International

Figure 2.

Conceptual Project Components

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1.2 PROJECT STUDY AREA

Project impacts on the study area roadway facilities were determined by measuring the effect project traffic would have on intersections during the weekday evening (4:00 to 6:00 PM) and weekend afternoon (Saturday 2:00 to 6:00 PM) peak periods. Based on the review of the project location, travel routes to and from the project site, and operations of intersections as presented in results of the 2012 Oakland Army Base Project Initial Study/Addendum, the following intersections and roadway segments were identified for inclusion in the analysis, as shown on **Figure 3**:

Intersections

1. Burma Road/Maritime Street (signalized)
2. I-80 Ramps/West Grand Avenue/Maritime Street/Wake Avenue (signalized)
3. West Grand Avenue/Frontage Road/I-80 Ramps (signalized)
4. West Grand Avenue/Campbell Street (side-street stop)
5. 24th Street/Mandela Parkway (side-street stop)
6. West Grand Avenue/Mandela Parkway (signalized)
7. 20th Street/Mandela Parkway (side-street stop)
8. 7th Street/I-880 NB Off-Ramp/Frontage Road (signalized)
9. 7th Street/Maritime Street (signalized)
10. West Grand Avenue/Adeline Street (signalized)

Roadway Segments

1. Maritime Road, south of Grand Avenue
2. Maritime Road, north of 7th Street
3. Grand Avenue, west of Frontage Road
4. Grand Avenue, east of Mandela Parkway
5. 7th Street, east of Maritime Street

The proposed Path project is estimated to generate less than 100 weekday PM peak hour vehicle trips (see Chapter 3) and would add less than 10 weekday PM peak hour trips to any freeway segment within the study area. Therefore, no analysis freeway analysis was conducted for the Path project.



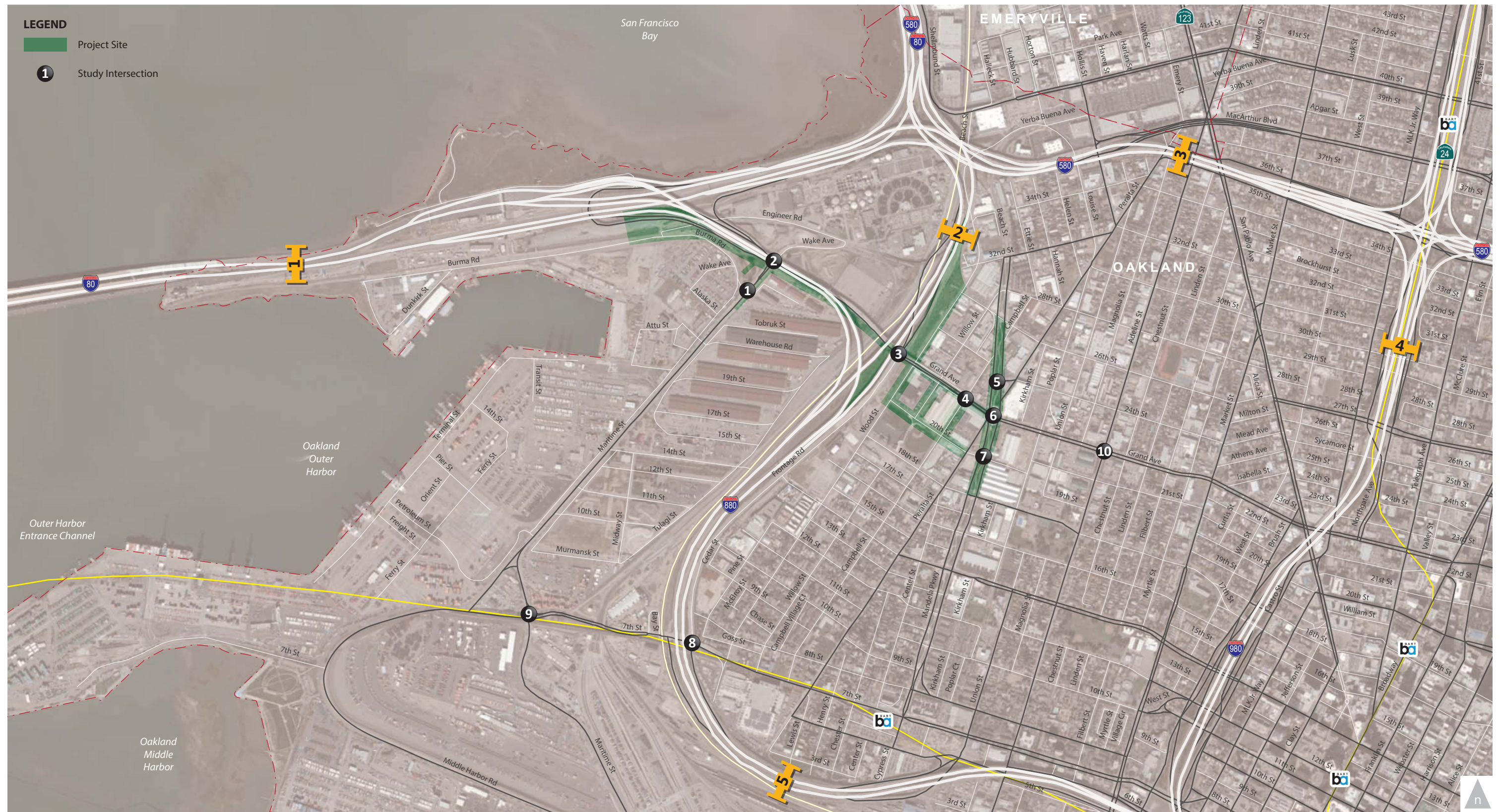


Figure 3.

Study Intersection Locations

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1.3 INTERSECTION ANALYSIS SCENARIOS

For this study, analysis was conducted for several scenarios, both without and with the project, including:

Scenario 1: Existing – Existing volumes obtained from recent traffic counts (Fall 2013) and the roadway system configuration as of October 2013.

Scenario 2: Existing with Project – Existing volumes obtained from traffic counts plus traffic estimated for the project. The roadway system is the same as Scenario 1, except for improvements that are proposed with the project.

Scenario 3: Near-term without Project – Existing volumes plus traffic estimates for approved and pending developments, and traffic increases due to regional growth. Volumes were developed through a combination of the forecasts included in the 2012 Oakland Army Base Project environmental assessment and the West Oakland Specific Plan EIR. This scenario reflects condition in the next 5 to 10 years when the project is expected to be completed.

Scenario 4: Near-term with Project – Traffic volumes from Scenario 3 plus traffic estimated for the project. The roadway system is the same as Scenario 1, except for improvements that are proposed with the project.

Scenario 5: Near-Term with Gateway Park without Project – Traffic volumes from Scenario 3 plus traffic estimated for the proposed Gateway Park project.

Scenario 6: Near-Term with Gateway Park with Project – Traffic volumes from Scenario 5 plus traffic estimated for the project, including roadway improvements proposed with the project.

Scenario 7: Far-Term (Cumulative) without Project – Projected traffic volumes and the projected roadway system for 2035. Volumes were developed through a combination of the forecasts included in the 2012 Oakland Army Base Project environmental assessment and the West Oakland Specific Plan EIR. This scenario assumes potential traffic increases from the proposed Gateway Park project.

Scenario 8: Far-Term (Cumulative) with Project – Traffic volumes from Scenario 7 plus changes from development of the project, including roadway improvements proposed with the project.



1.4 ANALYSIS METHODS

The operations of roadway facilities are described with the term “level of service” (LOS). LOS is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (i.e., best operating conditions) to LOS F (worst operating conditions). LOS E corresponds to operations “at capacity.” When volumes exceed capacity, stop-and-go conditions result and operations are designated as LOS F. The City of Oakland generally strives to maintain LOS D or better for peak hour intersection operations, although LOS E is allowed at some locations.

Signalized Intersections

Traffic conditions at signalized intersections were evaluated using the method from Chapter 16 of the Transportation Research Board’s 2000 *Highway Capacity Manual*. This operations analysis method uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 1** summarizes the relationship between average delay per vehicle and LOS for signalized intersections.

Unsignalized Intersections

Traffic conditions at unsignalized intersections were evaluated using the method from Chapter 17 of the 2000 *Highway Capacity Manual*. With this method, operations are defined by the average control delay per vehicle (measured in seconds) for each movement that must yield the right-of-way. At two-way or side street-controlled intersections, the control delay (and LOS) is calculated for each controlled movement, as well as the left-turn movement from the major street, and the entire intersection. For controlled approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. The delays for the entire intersection and for the movement or approach with the highest delay are reported. **Table 2** summarizes the relationship between delay and LOS for unsignalized intersections.

Roadway Segment

Roadway segment service levels were calculated by comparing the daily roadway volumes to the LOS thresholds presented in the HCM, as provided in **Table 3**.



TABLE 1
SIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0
E	Operations with long delays indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0

Source: *Highway Capacity Manual* (Transportation Research Board, 2000).

TABLE 2
UNSIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	> 50.0

Source: *Highway Capacity Manual* (Transportation Research Board, 2000).



TABLE 3
DAILY ROADWAY SEGMENT LOS THRESHOLDS

Number of Lanes	Facility Type	LOS A	LOS B	LOS C	LOS D	LOS E
2	Arterial	10,000	11,100	14,000	17,500	20,600
4	Arterial	23,300	25,800	32,600	40,700	47,900
6	Arterial	33,000	37,000	46,600	58,300	68,600
8	Arterial	41,100	45,700	57,600	72,000	84,700

Source: *Highway Capacity Manual* (Transportation Research Board, 2000).

1.5 SIGNIFICANCE CRITERIA

The determination of significance for project impacts is based on applicable policies, regulations, goals, and guidelines defined by the City of Oakland. The impacts of the project were evaluated by comparing the results of the level of service calculations under Existing with Project, Near-term with Project, and Cumulative with Project conditions to the results under Existing, Near-term without Project, and Cumulative without Project conditions, respectively. The detailed impact criteria for this study are presented below.

1.5.1 TRAFFIC LOAD AND CAPACITY THRESHOLDS

1. At a signalized study intersection which is located **outside the Downtown¹ area and that does not provide direct access to Downtown**, the project would cause the motor vehicle level of service (LOS) to degrade to worse than LOS D (i.e., LOS E or LOS F) and cause the total intersection average vehicle delay to increase by four (4) or more seconds (criteria applies to intersections 1, 2, 8 and 9);
2. At a signalized study intersection which is located **within the Downtown area or that provides direct access to Downtown**, the project would cause the motor vehicle LOS to degrade to worse than LOS E (i.e., LOS F) and cause the total intersection average vehicle delay to increase by four (4) or more seconds (criteria applies to intersections 3, 6 and 10);

¹ The Downtown area is defined in the Land Use and Transportation Element of the General Plan (page 67) as the area generally bounded by the West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland Estuary to the south, and I-980/Brush Street to the west. Intersections that provide direct access to downtown are generally defined as principal arterials within two (2) miles of Downtown and minor arterials within one (1) mile of Downtown, provided that the street connects directly to Downtown.



3. At a signalized study intersection **outside the Downtown area and that does not provide direct access to Downtown** where the motor vehicle level of service is LOS E, the project would cause the total intersection average vehicle delay to increase by four (4) or more seconds;
4. At a signalized study intersection **outside the Downtown area and that does not provide direct access to Downtown** where the motor vehicle level of service is LOS E, the project would cause an increase in the average delay for any of the critical movements of six (6) seconds or more;
5. At a signalized study intersection for all areas where the motor vehicle level of service is LOS F, the project would cause (a) the overall volume-to-capacity ("V/C") ratio to increase 0.03 or more or (b) the critical movement V/C ratio to increase 0.05 or more;
6. At an unsignalized study intersection the project would add ten (10) or more vehicles to the critical movement, and after project completion, satisfy the California Manual on Uniform Traffic Control Devices (MUTCD) peak-hour volume traffic signal warrant (intersections 4, 5 and 7);
7. For a roadway segment of the Congestion Management Program (CMP) Network, the project would cause (a) the LOS to degrade from LOS E or better to LOS F or (b) the V/C ratio to increase 0.03 or more for a roadway segment that would operate at LOS F without the project;²
8. Cause congestion of regional significance on a roadway segment on the Metropolitan Transportation System (MTS) evaluated per the requirements of the Land Use Analysis Program of the CMP;³
9. Result in substantially increased travel times for AC Transit buses;

1.5.2 TRAFFIC SAFETY THRESHOLDS

10. Directly or indirectly cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard due to a new or existing physical design feature or incompatible uses;
11. Directly or indirectly result in a permanent substantial decrease in pedestrian safety;
12. Directly or indirectly result in a permanent substantial decrease in bicyclist safety;
13. Directly or indirectly result in a permanent substantial decrease in bus rider safety
14. Generate substantial multi-modal traffic traveling across at-grade railroad crossings that cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard.

² Refer to the ACTC Congestion Management Program for a description of the CMP Network. In Oakland, the CMP Network includes all state highways plus the portion of Grand Avenue between I-80 and I-580.

³ Refer to ACTC's Congestion Management Program for a description of the MTS and the Land Use Analysis Program. The ACTC identified the roadway segments of the MTS that require evaluation in its letter commenting on the Notice of Preparation (NOP) issued by the City for the project (See page 4.13-119 for list of these roadway segments). Note that the City is required to send NOPs and notices of proposed general plan amendments to ACTC under the Land Use Analysis Program regardless of how many project-related trips are expected to be generated.



1.5.3 OTHER THRESHOLDS

15. Fundamentally conflict with adopted City policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment;
16. Result in a substantial, though temporary, adverse effect on the circulation system during construction of the project; or
17. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

1.5.4 CUMULATIVE IMPACTS

18. A project's contribution to cumulative impacts is considered "considerable" (i.e., significant) when the project exceeds at least one of the thresholds listed above in a future year scenario.

1.6 REPORT ORGANIZATION

This report is organized into the following chapters:

- **Chapter 1 – Introduction** describes the analysis methods used for the transportation impact assessment. This chapter also includes the study locations and significance criteria.
- **Chapter 2 – Existing Conditions** describes the transportation system near the project site, including the surrounding roadway network, weekday evening and Saturday afternoon peak period intersection turning movement volumes, existing bicycle, pedestrian, and transit facilities, and intersection levels of service. Daily roadway volumes in the study area are also presented.
- **Chapter 3 – Project Traffic** presents project information, including descriptions of the project components and project trip generation, distribution, and assignment.
- **Chapter 4 – Existing With Project Conditions** addresses the Existing with Project scenario.
- **Chapter 5 – Near-term Conditions** addresses the near-term condition (next 5 to 10 years), both without and with the project, and discusses project impacts.
- **Chapter 6 – Cumulative Conditions** addresses the cumulative conditions (next 20-years), both without and with the project, and discusses project impacts.
- **Chapter 7 – Alameda County Transportation Commission** Metropolitan Transportation System (MTS) Roadway Analysis presents the impacts of the project on the MTS roadway system.
- **Chapter 8 – Other Transportation Thresholds** evaluates the potential project effects on bicycle, pedestrian and transit networks in the project vicinity, and compares the project to traffic safety thresholds and other thresholds as discussed in the significance criteria section.



2.0 EXISTING CONDITIONS

A data collection effort was undertaken to evaluate existing transportation conditions in the study area. The assessment of existing conditions includes a description of the street and highway system, pedestrian and bicycle facilities, and public transit services near the project site. It also presents existing traffic volumes and operations for the study intersections with the results of level of service calculations.

2.1 EXISTING TRANSPORTATION FACILITIES

2.1.1 ROADWAY NETWORK

Regional access to the Path area is provided by several regional freeways, including Interstates 80 (I-80), 580 (I-580), 880 (I-880), 980 (I-980), and California State Route 24 (SR-24). Many of the roadways in the study area are also designated truck routes, as shown on **Figure 4**.

I-80 is an eight to ten-lane freeway extending west to San Francisco, and east through Berkeley, Sacramento, into Nevada and further east. Based on information from the Caltrans traffic data website reflective of 2013 data, I-80 has an annual daily traffic volume (AADT) of approximately 250,000 vehicles per day at the east of the toll plaza.

I-580 is an eight-lane east-west freeway between US 101, in Marin County, and I-5 south of Tracy. I-580 has an AADT of approximately 230,000 vehicles per day near SR 24/I-980.

I-880 is a north-south freeway that starts in the project area in Oakland with interchanges from I-80 and I-580 and runs south towards San Jose. I-880 has an AADT of approximately 74,000 vehicles per day south of I-80.

I-980 is an eight-lane north-south freeway east of the project site that connects SR 24 and I-580 to I-880. I-980 has an AADT of 113,000 vehicles in the study area.

SR 24 is an eight-lane east-west freeway between **I-580** in Oakland and Walnut Creek in the east. East of I-580, SR 24 continues as **I-980**. SR 24 has an average annual daily traffic volume (AADT) of approximately 146,000 vehicles east of I-980.

Other major roadways in the vicinity of the project include Mandela Parkway, Adeline Street, Grand Avenue, 7th Street, Frontage Road, Maritime Street, and Burma Road. The extents of these roadways in relation to the project are shown on Figure 1, and are described in more detail below.



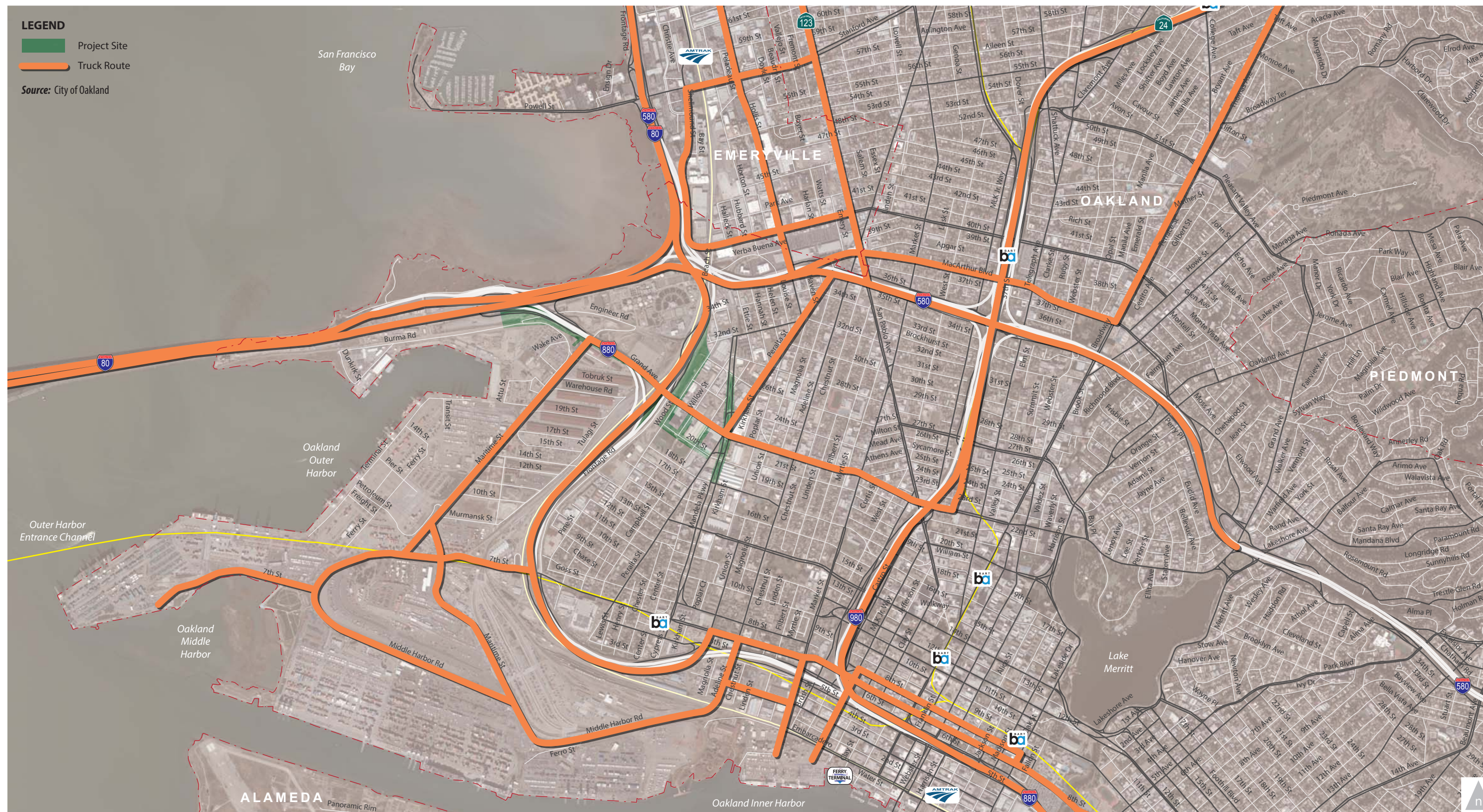


Figure 4.

Designated Truck Routes

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Mandela Parkway is a north-south four-lane arterial through the study area. It connects the West Oakland BART Station in the south to Emeryville in the north. A 70 to 100 foot wide median provides a separated pedestrian/bicycle path, many plazas, and grass areas. Mandela Parkway provides on-street parking on both side of the street, and Class 2 bike lanes in both directions. The wide median results in two separate, intersections with the northbound and southbound travel lanes at intersecting streets. Where the intersections are signalized, the traffic signals are interconnected and coordinated.

Adeline Street is a north-south four-lane arterial through the study area. It connects the Oakland Inner Harbor in the south to Berkeley in the north. Adeline Street provides on-street parking on both side of the street. It does not currently provide any bicycle facilities but is a proposed bikeway. AC Transit operates local bus line 26 along Adeline Street.

Grand Avenue is an east-west four-to-six-lane arterial through the study area. It connects the Lake Merritt neighborhoods in Oakland in the east towards the eastern end of the Bay Bridge to the west. Grand Avenue provides on-street parking on both side of the street. It currently provides bike lanes east of Market Street, while it is a proposed bikeway west of Market Street. AC Transit operates the Transbay bus line NL along Grand Avenue. Grand Avenue is a designated truck route.

7th Street is an east-west four-lane roadway through the study area. It connects the Lake Merritt BART Station in the east to the Oakland Middle Harbor in the west. 7th Street is one-way (eastbound) east of Castro Street near the I-880-I-980 Interchange. Parking is generally provided on one or both sides of the street east of Mandela Parkway. Limited bicycle facilities are provided along 7th Street, however a portion of the Bay Trail runs along it west of Wood Street towards the Middle Harbor Shoreline Park. AC Transit operates several local bus lines along 7th Street and BART runs directly above 7th Street, which provides access to both the Lake Merritt Station and the West Oakland Station. It is a designated truck route for much of its length.

Frontage Road is a four-lane road that fronts I-880 for approximately one mile from 7th Street in the south to Grand Avenue in the north. Parking is not provided along Frontage Road and it has limited access points. No formal bicycle facilities are provided along Frontage Road. Although wide shoulders could provide ample space for a bicyclist, due to its freeway-centric location, high truck volume, and limited connectivity, it is not considered a bicycle friendly street.

Maritime Street is a north-south four-lane industrial road through the study area. It extends from the Oakland Middle Harbor in the south to Grand Avenue in the north. Parking is not provided along Maritime Street. No bicycle facilities are provided along the roadway, however wide shoulders provide ample space for a bicyclist and a bikeway is proposed along the facility. It is a heavily used truck route.



Burma Road is currently a low volume two-lane local street used primarily to access the Caltrans maintenance facility and port uses in that area. Bicycle facilities are prosed for Burma Road.

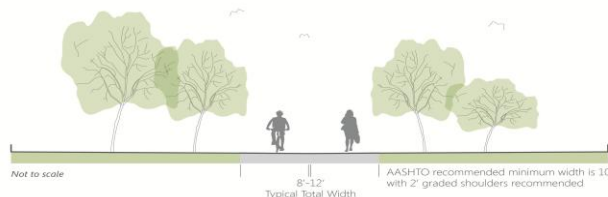
2.1.2 EXISTING PEDESTRIAN FACILITIES

Pedestrian facilities include sidewalks, pathways, crosswalks, and pedestrian signals. The City of Oakland's Pedestrian Master Plan (PMP, November 2002) designates Mandela Parkway as a City Route, and Grand Avenue as a Neighborhood Commercial Revitalization area. For each type of route, the PMP presents minimum design guidelines, which consists of the through passage zone, utility zone, and total sidewalk width. The through passage zone is the paved part of the sidewalk usable by pedestrians. The utility zone includes features such as street furnishings, vegetation, and signage. City Routes require an eight-foot through passage zone, and a four-foot utility zone, for a 12-foot total sidewalk width.

2.1.3 EXISTING BICYCLE FACILITIES

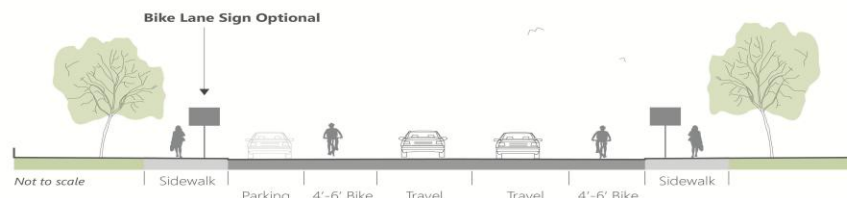
Bicycle facilities in Oakland include a number of general types, as described below, and as identified in the City of Oakland's 2007 Bicycle Master Plan Update (BMP). The graphics following the description of each type of bicycle facility are the minimum American Association of State Highway and Transportation Officials (AASHTO) standards for each type of bike facility to provide a general depiction of each type of bicycle facility. Within the City of Oakland, these standards provide a good framework for future implementation but depending on the circumstances and where feasible, the City of Oakland has chosen to go above and beyond AASHTO standards.

- Bike paths (Class 1) – Paved trails that are separated from roadways. These facilities are typically shared with pedestrians, although bicycles must yield to pedestrians. Vehicle cross-flow is minimized. Class 1 paths are typically 8 to 10 feet wide.

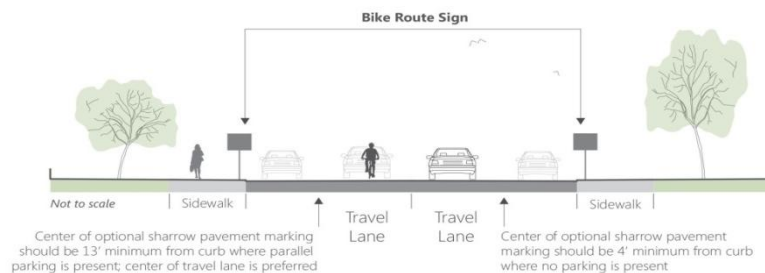


- Bike lanes (Class 2) provide restricted right-of-way and are designated for the use of bicycles with a striped lane on a street. Bicycle lanes are typically five to six feet wide. Adjacent vehicle parking and vehicle/pedestrian cross-flow are permitted.





- Bike routes (Class 3) provide for a right-of-way designated by signs or pavement markings (sharrows) for shared use with motor vehicles. Sharrows are a type of pavement marking (bike and arrow stencil) placed to guide bicyclists to the best place to ride on the road, avoid car doors, and remind drivers to share the road with cyclists.



- Class 3A Arterial Bicycle Routes are found along some arterial streets where bicycle lanes are not feasible and parallel streets do not provide adequate connectivity. Speed limits as low as 25 miles per hour (mph), and shared-lane bicycle stencils, wide curb lanes, and signage are used to encourage shared use.
- Class 3B Bicycle Boulevards are found along residential streets with low traffic volumes. Assignment of right-of-way to the route, traffic calming measures and bicycle traffic signal actuation are used to prioritize through-trips for bicycles.

A portion of the Bay Trail, a regional trail that will ultimately encircle the Bay Area, is located adjacent to the study area as an off-street trail connecting Emeryville and Berkeley to Oakland. This trail will ultimately connect the shorelines of all nine Bay Area counties, link 47 cities and cross major toll bridges with 500 miles of continuous bicycling and hiking trails. The East Span Bay Bridge Trail is partially completed and will ultimately connect Oakland to Treasure Island. A path on the west span of the Bay Bridge is also planned to be constructed, ultimately providing a connection between Oakland and San Francisco.

Figure 5 shows the extent of existing bicycle facilities in the study area, as well as proposed facilities.



2.1.4 EXISTING TRANSIT SERVICE

Transit service in the area is provided by AC Transit, Emery-Go-Round, Bay Area Rapid Transit (BART), Amtrak, and the Oakland Ferry. The extent of transit service in the study area is described below and shown on **Figure 6**.

AC Transit provides both local service and Transbay service throughout the City of Oakland and the greater East Bay and San Francisco area, while providing connections to other transit service providers. AC Transit buses connect major destinations within Alameda and Contra Costa Counties, including Downtown areas, employment centers and destinations, and transit hubs, including BART, Amtrak, and Ferry stations. Transbay route NL and Line 31 provide the closest service to the project site and operates along Grand Avenue (Route NL) and Peralta Street (Line 31). Stops are located on Grand Avenue at West Mandela Parkway (Route NL), and on Mandela Parkway (Line 31).

Emery-Go-Round is a free private shuttle providing service to all Emeryville residents, shoppers, visitors and employees. Shuttles operate five to seven days per week between 6:00 AM and 10:30 PM with 10 to 20 minute frequency. Emery-Go-Round connects with AC Transit local routes, Amtrak, and the MacArthur BART Station.

Bay Area Rapid Transit (BART) provides regional transportation connections to much of the Bay Area with several lines serving Oakland. The nearest stations are the West Oakland (1.1 miles) and MacArthur (1.6 miles) stations. The West Oakland station provides direct connections to the entire BART system, while the MacArthur Station serves the Fremont-Richmond, Pittsburg-Baypoint/SFO and Richmond/Daly City lines. BART train frequency ranges between 2-20 minutes from approximately 5:00 AM to 12:00 AM. Connections to BART are provided by AC Transit and Emery-Go-Round.



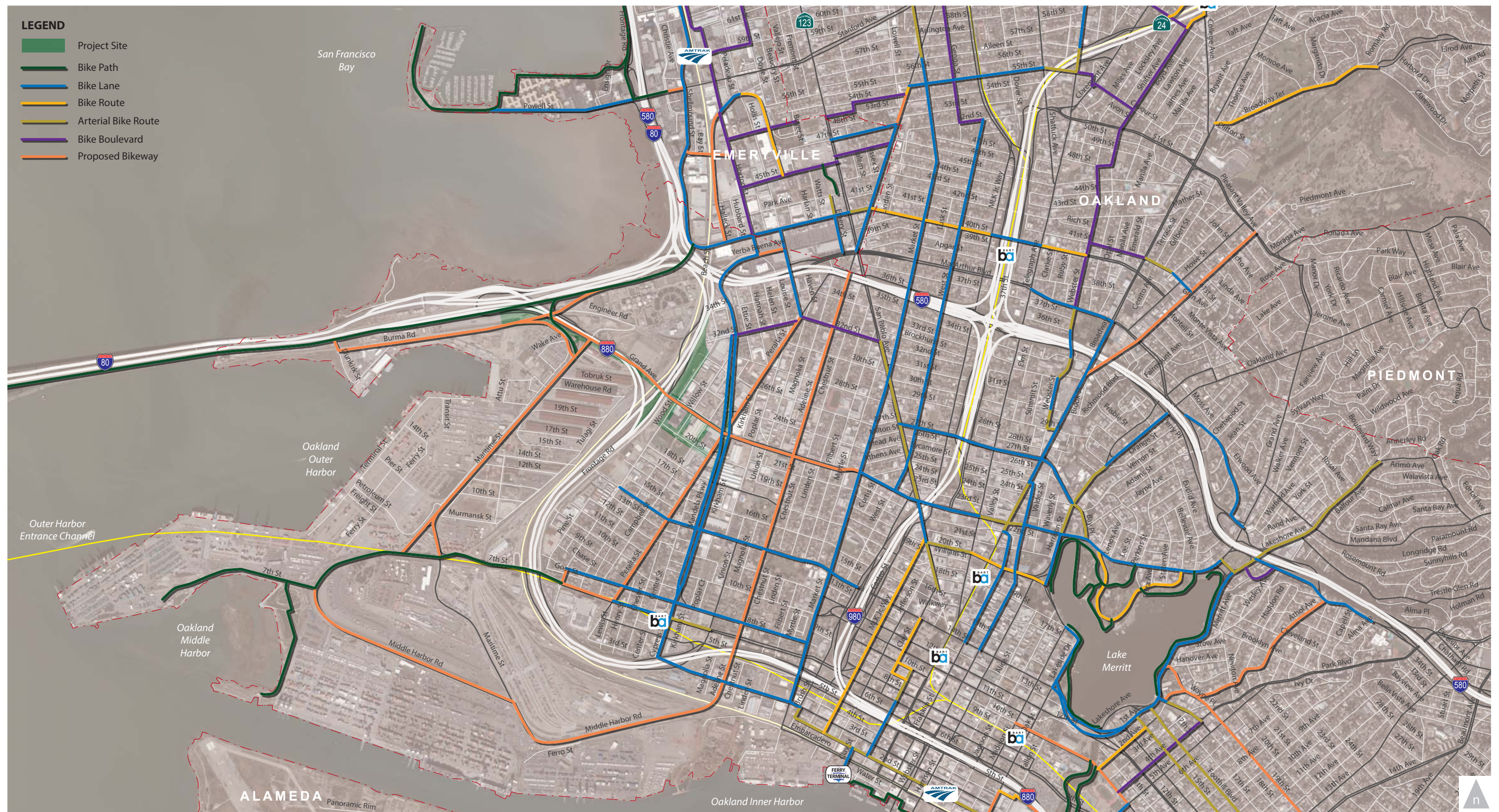


Figure 5.

Existing and Proposed Bicycle Facilities

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Figure 6.

Existing Transit Service

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Amtrak is a national train operator that connects northern California to the rest of the country via passenger rail. There are two stations in the study area, one in Emeryville and one in Oakland's Jack London Square. Both Stations serve the San Joaquin, Capitol Corridor, California Zephyr, and Coast Starlight routes. Connections to Amtrak are provided by AC Transit, Emery-Go-Round, and the Oakland Ferry.

The **Oakland Ferry** operates as part of the San Francisco Bay Ferry and provides weekday, weekend, holiday, and season services to nine terminals around the bay. The Oakland Jack London Square Terminal provides direct ferry service to the San Francisco Ferry Building, San Francisco Pier 41, AT&T Park, and South San Francisco Oyster Point. Connections to the Ferry are provided by AC Transit and Amtrak.

2.2 EXISTING INTERSECTION VOLUMES AND LANE GEOMETRIES

Weekday evening (4:00 to 6:00 PM) and Saturday afternoon (2:00 to 6:00 PM) peak period intersection turning movement counts were conducted at the study intersections in October 2013 on clear days with area schools in session. Separate counts of bicycle, pedestrian and truck activity were conducted. For the study intersections, the single hour with the highest traffic volumes during each count period was identified. Daily traffic volumes were also collected for the roadway segments in the study area. Existing lane configurations and signal controls were obtained through field observations. The vehicle volumes are presented on **Figure 7** along with the existing intersection lane configurations and traffic controls. The pedestrian and bicycle volumes are shown on **Figure 8**. Traffic count worksheets are provided in **Appendix A**.

2.3 EXISTING INTERSECTION LEVELS OF SERVICE

Existing intersection lane configurations, signal timings, and peak hour turning movement volumes were used to calculate the levels of service for the key intersections during each peak hour. The existing truck percentages were used in the analysis of intersection operations as trucks behave differently than passenger vehicles because they take longer to accelerate, decelerate, and negotiate turns and therefore affect intersection operations. Existing pedestrian and bicycle activity was also factored into the analysis.

The results of the LOS analysis using the Synchro 8.0 software program for Existing conditions are presented in **Table 4**. **Appendix B** contains the corresponding LOS calculation sheets. The results of the LOS calculations indicate most study intersections operate at overall acceptable levels of service according to their designated LOS standard during both the weekday and Saturday peak hours.



The 7th Street/Maritime Street intersection operates at LOS E during the weekday PM peak hour, which is considered deficient based on the standards set by the City of Oakland. Deficient operations are primarily caused by heavy truck movements through the intersection.

Peak hour volume traffic signal warrants⁴ were reviewed for the five unsignalized study intersections. At the West Grand Avenue/Campbell Street intersection, traffic signal warrants are satisfied during the weekday PM peak hour when considering the southbound right-turn movement; excluding the southbound right-turn movement, peak hour volume traffic signal warrants are not met. As the southbound right-turn movement operates with minimal delay and a signalized intersection (West Grand Avenue at Mandela Parkway) is located approximately 400 feet east of the intersection, signalization is not recommended. Peak hour volume warrants were not satisfied at any of the remaining unsignalized intersections during either the weekday PM or Saturday afternoon peak hour. Traffic signal warrant worksheets are provided in **Appendix C**.

2.4 DAILY TRAFFIC VOLUMES

Daily traffic counts were collected at 5-roadway segments for a seven day period, in addition to classification counts, which included bicycles and heavy vehicles, to determine the average daily traffic volumes for roadways in the vicinity of the project site. The average weekday and Saturday daily volumes are presented on Figure 7, and are summarized in **Table 5** along with the truck percentage. Pedestrian volumes were estimated based on the peak period count from the closest intersection. The corresponding daily level of service was calculated by comparing the passenger car equivalent (PCE) adjusted volume to the level of service thresholds. As trucks behave differently than passenger vehicles, each truck was considered to be 2 passenger vehicles for the purposes of calculating LOS. The results show that the roadways in the study area operate at LOS A on a daily basis on both a typical weekday and Saturday. Sunday volumes were also reviewed and are 20 to 30 percent less than Saturday volumes.

⁴ Unsignalized intersection warrant analysis is intended to examine the general correlation between existing conditions and the need to install new traffic signals. Existing peak-hour volumes are compared against a subset of the standard traffic signal warrants recommended in the MUTCD and associated State guidelines. This analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on field-measured traffic data and a thorough study of traffic and roadway conditions by an experienced engineer. Furthermore, the decision to install a signal should not be based solely on the warrants because the installation of signals can lead to certain types of collisions. The responsible State or local agency should undertake regular monitoring of actual traffic conditions and accident data and conduct a timely re-evaluation of the full set of warrants in order to prioritize and program intersections for signalization.



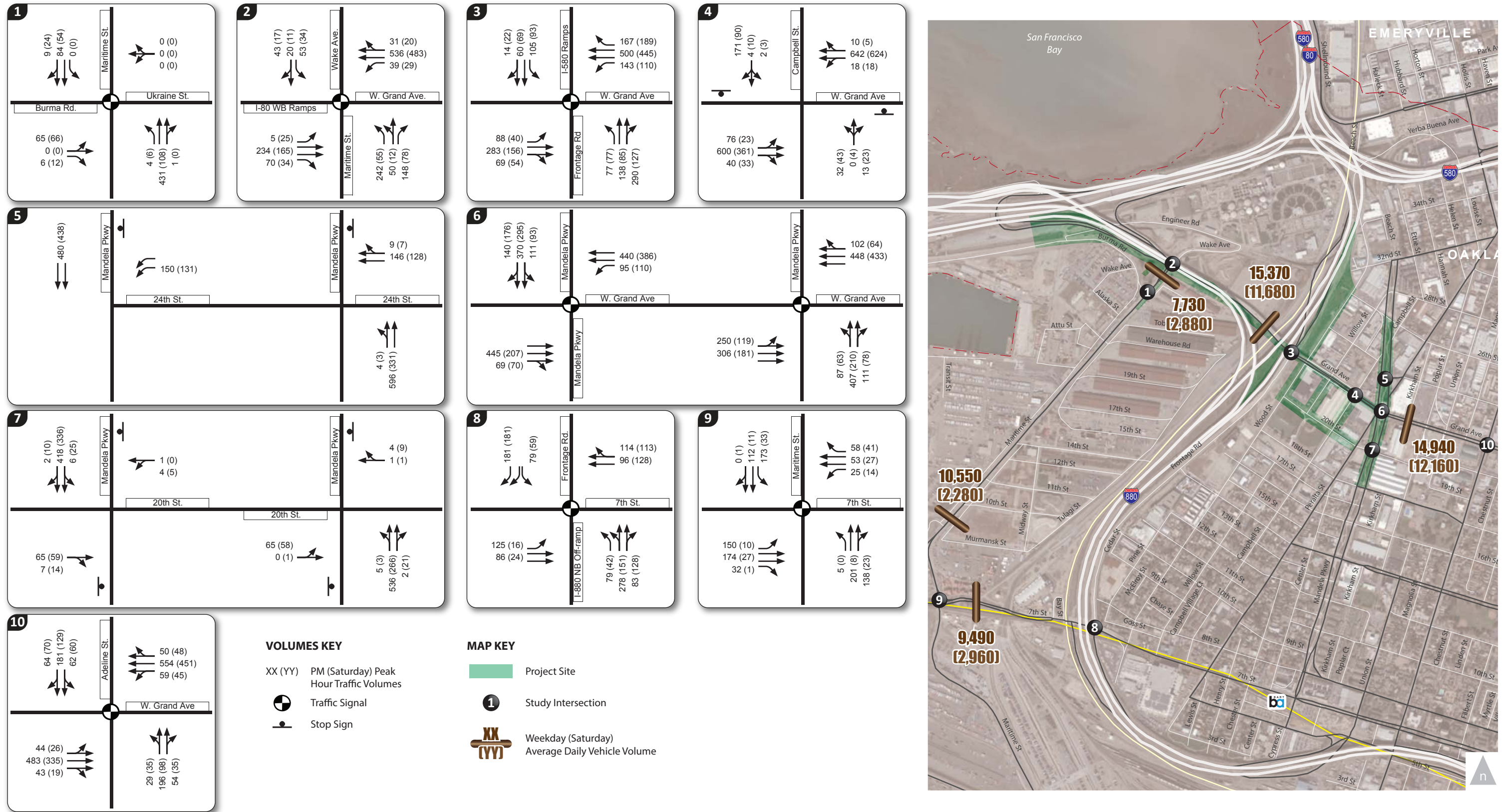


Figure 7.

Existing
Daily and Peak Hour Traffic Volumes, Lane Configurations and Traffic Control

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TABLE 4
EXISTING PEAK HOUR INTERSECTION LEVEL OF SERVICE

	Intersection	Control ¹	Peak Hour	Delay ²	LOS ³
1	Burma Road/Maritime Street	Signal	PM SAT	13.4 12.0	B B
2	I-80 Ramps/West Grand Avenue/Maritime Street/Wake Avenue ⁴	Signal	PM SAT	26.1 32.5	C C
3	West Grand Avenue/Frontage Road/I-80 Ramps ⁵	Signal	PM SAT	39.6 37.7	D D
4	West Grand Avenue/Campbell Street	SSSC	PM SAT	<10 (84.2) <10 (20.4)	A (F) A (C)
5A	24th Street/Mandela Parkway Southbound	SSSC	PM SAT	<10 (10.7) <10 (10.7)	A (B) A (B)
5B	24th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (16.3) <10 (12.7)	A (C) A (B)
6A	West Grand Avenue/Mandela Parkway Southbound	Signal	PM SAT	16.6 14.5	B B
6B	West Grand Avenue/Mandela Parkway Northbound	Signal	PM SAT	16.9 18.4	B B
7A	20th Street/Mandela Parkway Southbound	SSSC	PM SAT	<10 (13.3) <10 (12.7)	A (B) A (B)
7B	20th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (12.0) <10 (10.3)	A (B) A (B)
8	7th Street/I-880 Northbound Off-Ramp/Frontage Road ⁶	Signal	PM SAT	26.4 18.3	C B
9	7th Street/Maritime Street	Signal	PM SAT	59.1 33.5	E C
10	West Grand Avenue/Adeline Street	Signal	PM SAT	14.9 14.5	B B

Notes: **Bold** text indicates potentially unacceptable intersection operations.

- Signal = Signalized Intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
- Delay presented in seconds per vehicle; for side-street stop-controlled intersections, delay presented in Intersection average (worst approach).
- LOS = Level of Service.
- Delay presented in table for intersection average. Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: EB left = 43.2/D, EB thru = 24.5/C, EB right = 22.9/C
 - Sat Peak Hour: EB left = 68.5/E, EB thru = 29.8/C, EB right = 28.2/C
- Delay presented in table for intersection average. Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: NB left = 40.4/D, NB thru/right = 39.6/D, SB left = 41.9/D, SB thru-right = 35.7/D



- b. Sat Peak Hour: NB left = 39.6/D, NB thru-right = 36.6/D, SB left = 40.0/D, SB thru-right = 35.9/D
6. Delay presented in table for intersection average. Delay/LOS for specific movements from the off-ramp as follows:
- a. PM Peak Hour: NB left = 24.2/C, NB thru/right = 25.3/C
- b. Sat Peak Hour: NB left = 11.4/B, NB thru-right = 12.1/B

Source: Fehr & Peers, October 2014.

TABLE 5
EXISTING CONDITIONS DAILY ROADWAY SEGMENT ANALYSIS

Roadway Segment	Facility Type	# of Lanes	Average Weekday					Saturday				
			Bikes	Peds	Vehicles	% Trucks	PCE LOS	Bikes	Peds	Vehicles	% Trucks	PCE LOS
Grand Avenue, west of Frontage Road	Arterial	4	20	10	15,370	14%	A	20	30	11,680	8%	A
Grand Avenue, east of Mandela Parkway	Arterial	6	50	210	14,940	7%	A	50	300	12,160	4%	A
Maritime Street, south of Grand Avenue	Arterial	6	20	10	7,730	45%	A	10	30	2,880	15%	A
Maritime Street, north of 7th Street	Arterial	6	30	10	10,550	50%	A	20	50	2,880	17%	A
7th Street, east of Maritime Street	Arterial	4	20	40	9,490	60%	A	10	10	7,563	20%	A

Source: Fehr & Peers, October 2014.



3.0 PROJECT CHARACTERISTICS

This chapter provides an overview the project, focusing on the vehicle trip generating components of the project and addresses the proposed trip generation, distribution, and assignment characteristics. This allows for an evaluation of the impacts on the surrounding roadway network. Impacts to bicycle and pedestrian facilities are discussed in Chapter 8. The amount of traffic associated with the project was estimated using a three-step process:

1. **Trip Generation** – The *amount* of vehicle traffic entering/exiting the project site was estimated.
2. **Trip Distribution** – The *direction* trips would use to approach and depart the site was projected.
3. **Trip Assignment** – Trips were then *assigned* to specific roadway segments and intersection turning movements.

3.1 PROJECT DESCRIPTION

Although the primary purposes of the project is to provide a new bicycle and pedestrian facility that would not be expected to generate new vehicle traffic, there are project elements that could generate vehicle trips, including the Wood Street parking lot. The project would also result in intersection modifications that would change some travel patterns volumes in the study area. The following further describes the project components.

The project is a new Class 1 path located in the City of Oakland, within Alameda County connecting Mandela Parkway to the Bay Bridge Trail. The path is an elevated structure for most of its distance to provide access across existing freeways, railways and industrial areas. It is an independent structure, except over the railroad tracks where it would be on the West Grand Avenue overcrossing structure.

The project could also include Class 2 bike lanes and a 100-space parking lot at the east end of the Class 1 path, if funding is available. The Class 2 bike lanes would extend along surface streets near the east touchdown of the path, providing connections to Mandela Parkway and to the proposed Wood Street parking lot.

The path has been divided into the following five segments described below from east to west.



Segment 1 – At-Grade Connection to Mandela Parkway

The Class 1 path would be at-grade along the south side of West Grand Avenue, between Mandela Parkway and Campbell Street. This segment would be approximately 450 feet long and 17 feet wide. There would be a landscaped median on the north side of the path to separate the path from vehicular traffic. Campbell and Willow Streets at West Grand Avenue would be converted to cul-de-sacs to prevent vehicular traffic from crossing the new Class 1 path on the south side of West Grand Avenue. Closure of Campbell Street and the redistribution of existing traffic flows are considered in this assessment. Willow Street is a minor intersection that carries low traffic volumes at its intersection with West Grand Avenue and was not explicitly considered in the analysis.

Segment 2 – Separate Elevated Structure East

From Campbell Street, the Class 1 path would continue for approximately 1,050 feet as a separate structure along the south side of West Grand Avenue, with a width of 17 feet. After the Wood Street crossing, the bike path would continue on the West Grand Avenue overcrossing (refer to Segment 3 below). Construction of this segment would require permanently closing or vacating the existing Grand Avenue Alley. Grand Avenue Alley is the narrow one-way street on the south side of Grand Avenue, between Mandela Parkway and Wood Street.

Segment 3 – West Grand Avenue Overcrossing

After the Wood Street overcrossing, the Class 1 path would continue on the West Grand Avenue overcrossing for approximately 780 feet within a width of 14 feet. It would cross over the frontage road and railroad tracks (narrow gauge tracks or spur line), under the I-880 freeway structures, and over the Burlington Northern & Santa Fe Railroad and Union Pacific railroad tracks. The width of the travel lanes and striped median would be reduced to provide enough width for the path using the existing West Grand Avenue roadway structure. After the railroad crossings, the path would continue as a separate structure on the south side of West Grand Avenue (refer to Segment 4). Construction of a new structure over the railroad tracks is not feasible.

Segment 4 – Separate Elevated Structure West

After the railroad crossing, the Class 1 would continue for approximately 3,400 feet as a separate structure on the south side of West Grand Avenue with a 17 foot cross section. It would cross over Maritime Street and continue to the touchdown near the Caltrans maintenance facility. East of the Caltrans maintenance facility, the path would descend with a switchback curve.



This segment could also include two ramps, from the elevated structure to Maritime Street, that could be constructed after the Class 1 path if funding is available. On the east side of Maritime Street, there could be a 700-foot-long ramp extending to Burma Road. On the west side of Maritime Street, there could be a 250-foot-long ramp extending to a roof-top landing and rest stop on the planned Oakland Maritime Support Services building.

Segment 5 – At-Grade Connection to Bay Bridge Trail

From the west touchdown, the Class 1 path would continue another 350 feet at grade level below the I-880/80 connection and connect to the existing Bay Bridge Trail (also known as Segment 2 path).

3.1.1 CLASS 2 BIKE LANES

The project could also include Class 2 bike lane along surface streets near the east touchdown of the Class 1 path, providing connections to Mandela Parkway and the proposed Wood Street parking lot. The width of the Class 2 bike lanes, extending along each side of the street, would be 5 feet. The Class 2 bike lanes, which cover approximately 4,650 linear feet, would be constructed after the Class 1 path, if funding is available. Class 2 bike lanes would extend along the following surface streets:

- 20th Street, from Mandela Parkway (one block south of West Grand Avenue) to Wood Street
- Wood Street, from 20th Street to 24th Street
- Willow Street, from 20th Street to West Grand Avenue
- Campbell Street, from 20th Street to West Grand Avenue

3.1.2 WOOD STREET PARKING LOT

The project could include construction of a new 100-space parking lot located on the west side of Wood Street, north of West Grand Avenue, and beneath the east side of the I-880 freeway. The parking lot would cover 0.48 acres (21,217 square feet). The Wood Street parking lot would be constructed after the Class 1 path, if funding is available.

3.2 PROJECT TRIP GENERATION

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are typically created on a daily basis and for the peak one-hour period during the morning and evening commute periods when traffic volumes on the adjacent



streets are highest. For this project, estimates for weekend conditions were also prepared since higher levels of activity are expected on weekends than weekdays.

The project itself is not expected to generate vehicle traffic, as bicycle and pedestrian facilities are proposed to accommodate pedestrian and bicycle travel through the area. However, portions of the project could shift existing travel patterns, and generate new vehicle trips.

The closure of the south leg of Campbell Street at Grand Avenue would shift existing traffic that currently uses the south leg of the intersection to other roadway connections. Additionally, the Wood Street parking lot would accommodate path users that chose to drive to the area, park their vehicle, and then use the path. It is expected that some of these users would be those who currently park in other locations in the vicinity, such as in the Ikea and Target parking lots and parking areas off Burma Road. However, for the purpose of this assessment, all vehicle trips to the Wood Street parking lot are considered new trips.

To estimate the potential vehicle trip generation of the Wood Street parking lot, use of the Bay Bridge bicycle/pedestrian path was reviewed based on data collected by Caltrans in Fall of 2013⁵. The data shows that on a typical weekday, between approximately 300 pedestrians and 320 bicyclists use the Bay Bridge Path. On weekends, approximately 2,250 pedestrians and 1,800 bicyclists were observed using the path. Less than 10 percent of the daily activity was observed during the evening peak hour. On weekends, activity is dispersed throughout the day.

Based on the number of people using the Bay Bridge Path, estimates of how many pedestrian/bicycle trips on the Bay Bridge Path do not involve a vehicle, observations on the number of people in each vehicle that are parking in off-site retail lots, and the number of parking spaces available at the Wood Street lot, weekday and weekend daily and peak hour vehicle trip generation was estimated, as presented in **Table 6**. It is expected that the Wood Street parking lot could generate 400 weekday trips, including 10 morning and 50 evening peak hour trips. On a weekend, there could be 1,500 vehicle trips to the parking lot, including 150 peak hour trips.

⁵ Source: Rodney Oto, Caltrans District 4. Bicycle and pedestrian counts on Bay Bridge for October 2013. Information received via email on May 7, 2014.



TABLE 6
WOOD STREET PARKING LOT VEHICLE TRIP GENERATION

Use	Weekday							Weekend			
	Daily	AM Peak Hour			PM Peak Hour			Daily	Peak Hour		
		In	Out	Total	In	Out	Total		In	Out	Total
Wood Street Parking Lot – 100 Spaces	400	5	5	10	25	25	50	1,500	75	75	150

Source: Fehr & Peers, October 2014

3.3 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Based on the location of the site, surrounding land uses, roadway network, and relative population distribution within the greater East Bay and San Francisco, trip distribution percentages were developed. Population densities within the immediate vicinity (Oakland, Emeryville, and Berkeley) were weighed more heavily than population densities farther away (Richmond, Hayward, San Francisco). New trips to/from the Wood Street parking lot were assigned to the roadway network based on the local access characteristics and the project trip distribution estimates. Project trip distribution percentages and vehicle routes to/from the study area are depicted on **Figure 9** along with the resulting the project trip assignment.



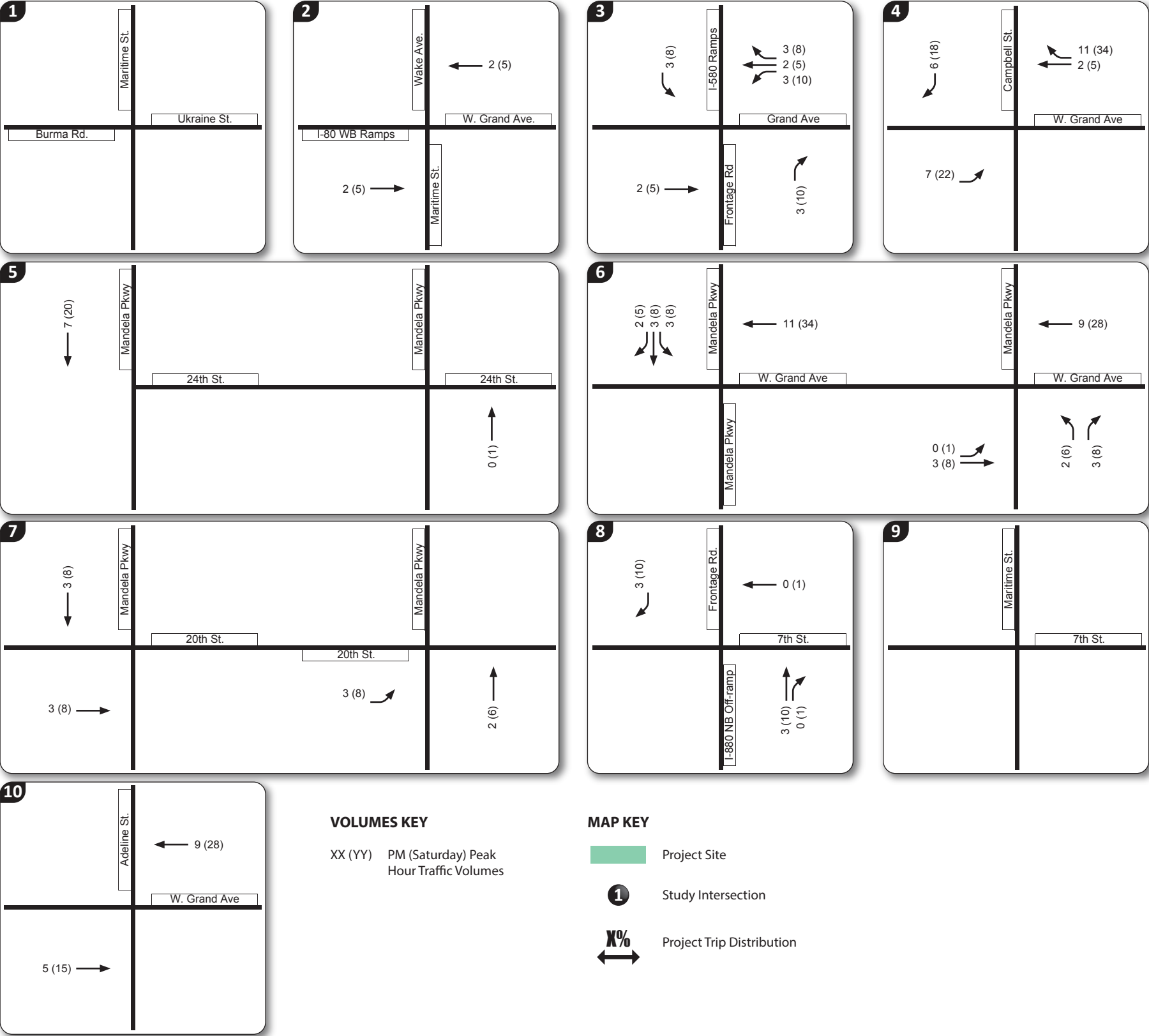


Figure 9.

Project Trip Distribution and Project Trip Assignment

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4.0 EXISTING WITH PROJECT TRAFFIC CONDITIONS

This chapter evaluates potential off-site traffic impacts under Existing with Project conditions.

4.1 EXISTING WITH PROJECT TRAFFIC VOLUMES

The project traffic volumes on Figure 9 were added to the existing traffic volumes from Figure 8 to estimate the Existing with Project traffic volumes, as shown on **Figure 10**. The with project volumes on Figure 10 also reflect traffic shifts from the closure of the southern leg of Campbell Street at Grand Avenue. The other potential roadway closures associated with the project are of minor streets that would not appreciably change traffic flows on the arterial or collector street network.

Intersection improvements at the Grand Avenue/Mandela Street intersection to accommodate enhanced bicycle and pedestrian facilities were also considered in the analysis. The lane configurations used in the analysis of Existing with Project conditions are also shown on Figure 10.

4.2 ANALYSIS OF EXISTING WITH PROJECT CONDITIONS

Existing with Project conditions were evaluated using the same methods described in Chapter 1. Traffic signal timings and truck percentages were not adjusted from the existing condition. The Existing with Project analysis results are presented in **Table 7** based on the traffic volumes presented on Figure 10. Table 7 also includes the operations results for Existing conditions for reference purposes. The addition of project traffic would increase average delay at the study intersections slightly, but would not cause overall intersection operations to degrade to unacceptable levels. Traffic shifts associated with the Campbell Street closure would improve operations at the Campbell Street/Grand Avenue intersection and would not degrade the operations of adjacent intersections. Peak hour signal warrants would continue to be satisfied at the Campbell Street/Grand Avenue intersection when considering the southbound right-turn movement. Signalization is not recommended.

The Maritime Street at 7th Street intersection currently operates at a deficient LOS E. However, the project is not projected to add vehicle traffic to this intersection; therefore, the project impact is less-than-significant.

Peak hour traffic signal warrants would not be satisfied at the other unsignalized intersections with the addition of project traffic.



TABLE 7
EXISTING WITH PROJECT PEAK HOUR INTERSECTION LEVEL OF SERVICE

	Intersection	Control ¹	Peak Hour	Existing		Existing With Project		Significant Impact?
				Delay ²	LOS ³	Delay ²	LOS ³	
1	Burma Road/Maritime Street	Signal	PM SAT	13.4 12.0	B B	13.4 12.0	B B	No No
2	I-80 Ramps/West Grand Avenue/ Maritime Street/Wake Avenue ^{4&7}	Signal	PM SAT	26.1 32.5	C C	26.1 32.6	C C	No No
3	West Grand Avenue/Frontage Road/I-80 Ramps ^{5&8}	Signal	PM SAT	39.6 37.7	D D	39.8 38.0	D D	No No
4	West Grand Avenue/Campbell Street	SSSC	PM SAT	<10 (84.2) <10 (20.4)	A (F) A (C)	<10 (11.3) <10 (10.7)	A (B) A (B)	No No
5A	24th Street/Mandela Parkway Southbound	SSSC	PM SAT	<10 (10.7) <10 (10.7)	A (B) A (B)	<10 (10.7) <10 (10.8)	A (B) A (B)	No No
5B	24th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (16.3) <10 (12.7)	A (C) A (B)	<10 (16.2) <10 (12.6)	A (C) A (B)	No No
6A	West Grand Avenue/Mandela Parkway Southbound	Signal	PM SAT	16.6 14.5	B B	17.1 14.8	B B	No No
6B	West Grand Avenue/Mandela Parkway Northbound	Signal	PM SAT	16.9 18.4	B B	17.5 19.6	B B	No No
7A	20th Street/Mandela Parkway Southbound	SSSC	PM SAT	<10 (13.3) <10 (12.7)	A (B) A (B)	<10 (14.2) <10 (14.9)	A (B) A (B)	No No
7B	20th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (12.0) <10 (10.3)	A (B) A (B)	<10 (12.6) <10 (11.9)	A (B) A (B)	No No
8	7th Street/I-880 Northbound Off- Ramp/Frontage Road ^{6&9}	Signal	PM SAT	26.4 18.3	C B	26.4 18.3	C B	No No
9	7th Street/Maritime Street	Signal	PM SAT	59.1 33.5	E C	59.1 33.5	E C	No No
10	West Grand Avenue/Adeline Street	Signal	PM SAT	14.9 14.5	B B	15.0 14.6	B B	No No

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. Signal = Signalized Intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
2. Delay presented in seconds per vehicle; for side-street stop-controlled intersections, delay presented in Intersection average (worst approach).
3. LOS = Level of Service.
4. Delay presented in table for Intersection 2 average delay/LOS. Existing Delay/LOS for specific movements from the off-ramp as follows:



- a. PM Peak Hour: EB left = 43.2/D, EB thru = 24.5/C, EB right = 22.9/C
 - b. Sat Peak Hour: EB left = 68.5/E, EB thru = 29.8/C, EB right = 28.2/C
5. Delay presented in table for Intersection 3 average delay/LOS. Existing Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 40.4/D, NB thru/right = 39.6/D, SB left = 41.9/D, SB thru-right = 35.7/D
 - b. Sat Peak Hour: NB left = 39.6/D, NB thru-right = 36.6/D, SB left = 40.0/D, SB thru-right = 35.9/D
6. Delay presented in table for Intersection 8 average delay/LOS. Existing Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 24.2/C, NB thru/right = 25.3/C
 - b. Sat Peak Hour: NB left = 11.4/B, NB thru-right = 12.1/B
7. Delay presented in table for Intersection 2 average delay/LOS. Existing + Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: EB left = 43.2/D, EB thru = 24.5/C, EB right = 22.9/C
 - b. Sat Peak Hour: EB left = 68.6/E, EB thru = 29.8/C, EB right = 28.2/C
8. Delay presented in table for Intersection 3 average delay/LOS. Existing + Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 40.4/D, NB thru/right = 39.7/D, SB left = 42.3/D, SB thru-right = 35.7/D
 - b. Sat Peak Hour: NB left = 39.6/D, NB thru-right = 36.7/D, SB left = 40.7/D, SB thru-right = 35.9/D
9. Delay presented in table for Intersection 8 average delay/LOS. Existing + Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 24.2/C, NB thru/right = 25.3/C
 - b. Sat Peak Hour: NB left = 11.4/B, NB thru-right = 12.1/B

Source: Fehr & Peers, October 2014.



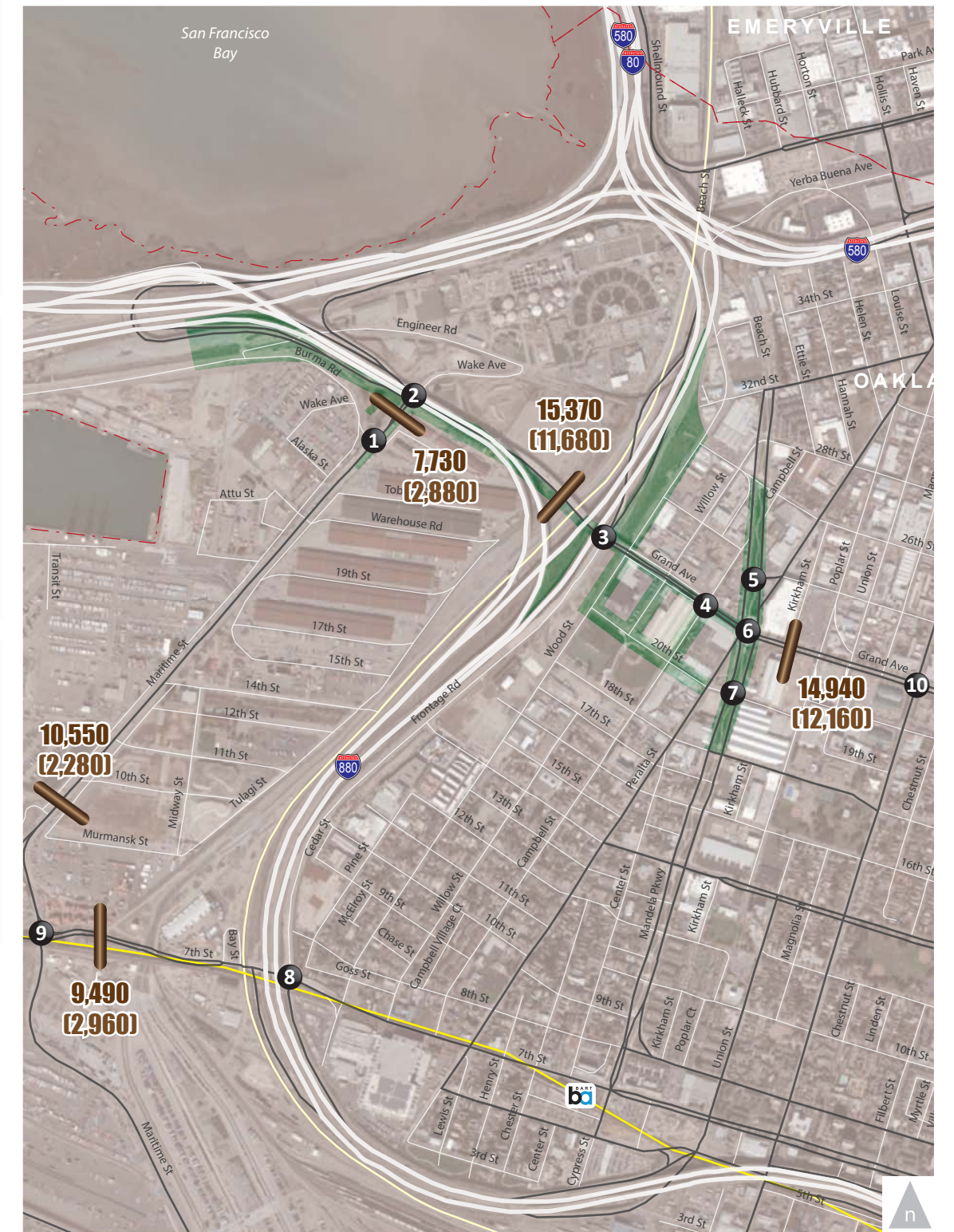
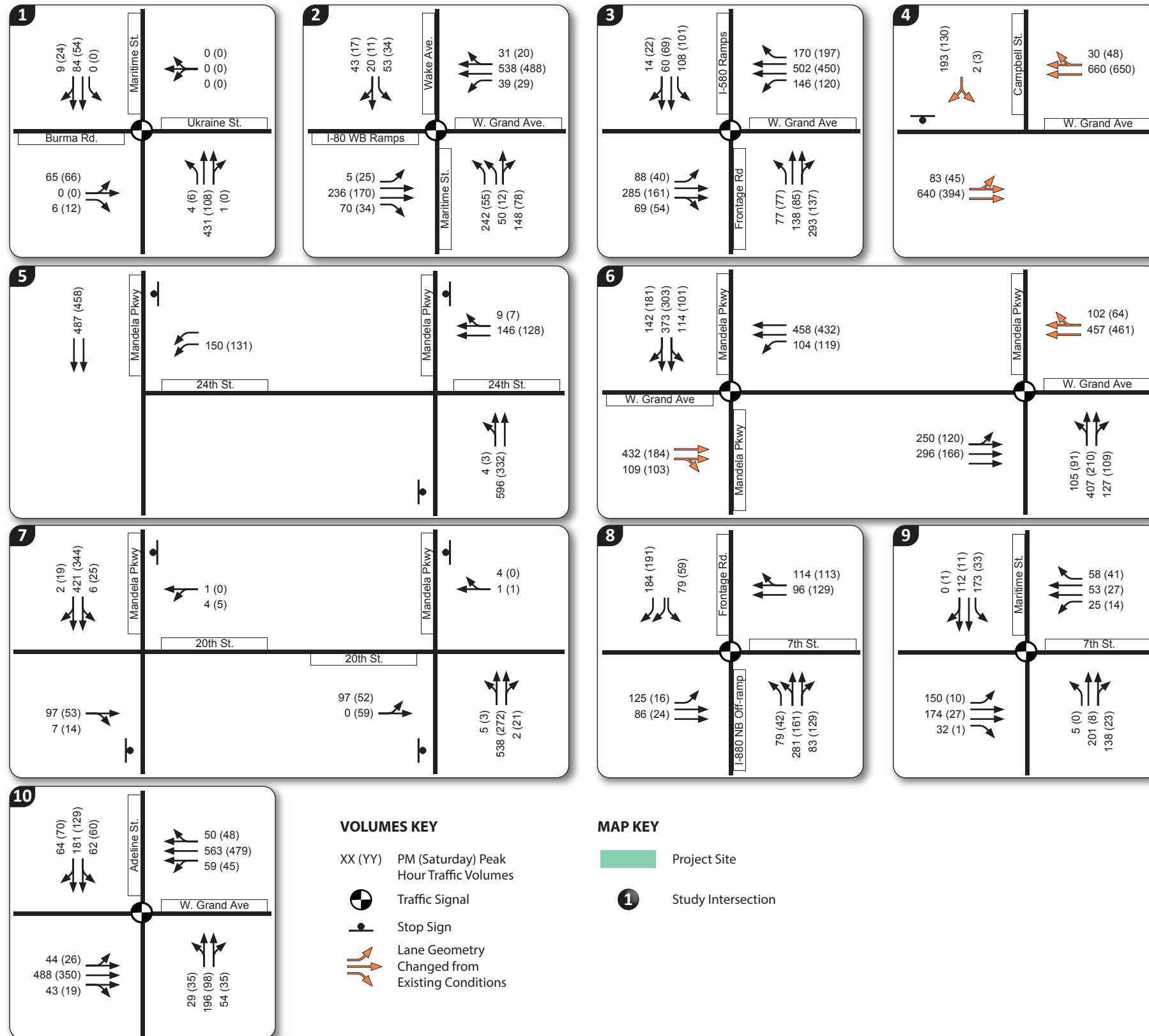


Figure 10.
Existing with Project
Peak Hour Volumes, Lane Configurations and Traffic Control

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5.0 NEAR-TERM CONDITIONS

This chapter presents the results of the level of service calculations under near-term conditions without and with the project. Near-term without Project conditions are defined as conditions around the time the project is expected to be completed and occupied within the next five to ten years. Traffic volumes for Near-term without Project conditions comprise existing volumes plus traffic generated by approved but not yet constructed and occupied developments in the area. Near-term with Project conditions are defined as Near-term without Project conditions plus net new traffic generated by the proposed project, and potential traffic shifts associated with the Campbell Street partial closure. Conditions with development of the Gateway Park project are also presented.

5.1 NEAR-TERM INTERSECTION VOLUMES

Traffic volumes for the near-term condition were developed based on a review of historical traffic counts, and review of traffic forecasts contained in the Oakland Army Base Project Initial Study/Addendum (2012) and the West Oakland Specific Plan EIR (2014). Several intersections evaluated in this project were also evaluated within those documents. Those forecasts were prepared using the then current version (June 2011) of the Alameda CTC Countywide Travel Demand Model (the Model) which is consistent with Association of Bay Area Governments' (ABAG) Projections 2009, the latest MTC Regional Transportation Plan, and the latest Alameda Countywide Plan. The 2012 Army Base Addendum contained forecasts of 2020 and 2035 conditions for the weekday morning and evening peak hours, while the 2014 EIR only contained 2035 forecasts for the weekday morning and evening peak hours. Based on our review of the forecasts and historical traffic counts, we developed a growth rate to apply to all study intersections.

Traffic counts at the same intersections collected on numerous dates within the last ten years indicate little to negative traffic growth in the study area. Greater levels of growth were projected in the 2012 and 2014 environmental documents.

For this analysis, existing (2013) traffic counts at intersections along the Grand Avenue and Mandela Parkway corridors were increased by a 2 percent annual growth rate for seven years to estimate 2020 conditions. For the two intersections on 7th Street, a 4 percent annual growth rate was applied. The same growth rate was applied to weekday PM and Saturday peak hour traffic volumes. The resulting Near-term without Project traffic volumes as shown on **Figure 11**. Project traffic was then added to develop Near-term with Project traffic volumes, as shown on **Figure 12**.



5.1.1 NEAR-TERM WITH GATEWAY PARK

The Gateway Park project could also be constructed within the near-term time frame, although that project is separate from the Path project. As it is unknown when both projects may be constructed, an analysis of near-term conditions with Gateway Park, without and with the Path project was conducted to assess the near-term impacts of the Path should the Park be constructed.

Gateway Park is located in the City of Oakland at the east touchdown of the SFOBB. Access to the bicycle/pedestrian connection on the new East Span of the Bay Bridge would be provided from the Park area as well as access to existing and planned segments of the San Francisco Bay Trail.

The trip generating potential of the Park was calculated using the average and maximum rates documented by ITE for Regional Park, which is the land use most similar to the proposed project, based on the park acreage. The potential range of trip generation for Gateway Park is shown in **Table 8**, which may overstate the potential trip generation as much of the park acreage is not used for active or passive recreation. The ITE rates suggest that weekday daily trip generation could range between 780 trips and 6,640 trips, and weekend trip generation could range between 1,090 and 7,500 daily trips. Weekday evening peak hour trip generation could range between 35 and 190 trips, while weekend peak hour trip generation could range between 70 and 395 trips.

TABLE 8
GATEWAY PARK
TYPICAL DAY VEHICLE TRIP GENERATION ESTIMATE RANGE – ITE RATES

Use	Size	Weekday			Weekend	
		Daily	AM Peak Hour	PM Peak Hour	Daily	Weekend Peak Hour
Regional Park – Average Rate	170 Acres	780	26	34	1,090	71
Regional Park – Maximum Rate	170 Acres	6,640	102	187	7,500	394

Source: Fehr & Peers, October 2014

Given the potential variability in vehicle trip generation for the park, the vehicle trip generating characteristics of a similar use in the East Bay region were reviewed for a weekend day when the trip generating potential of the project is expected to be highest for comparison purposes only. Traffic counts at the University Avenue/ West Frontage Road intersection from 2009 were obtained for the Saturday peak hour as this intersection provides the primary vehicle access to the Berkeley Marina, and adjacent Eastshore State Park and Cesar Chavez Park. This area contains active and passive recreation areas similar



to the proposed project, such as walking trails and a fishing pier with a total of approximately 170 acres of active and passive recreation areas – similar to the proposed project.

The area also contains many uses not proposed within the project site, including a marina, hotel and restaurants. The trip generating potential of the marina, hotel and restaurants, based on their estimated size and ITE trip generation rates, was subtracted from the overall vehicle counts to the area to estimate park-only vehicle trip generation. The ITE trip generation estimates from Table 8 were then compared to the estimated trip generating potential of the passive land uses at the Berkeley Marina, and the resulting trip generation is similar to the ITE prediction for Regional Park based on the maximum observed rate. Weekday PM peak period (4:00 to 6:00 PM) data was also reviewed, but as the count was conducted in January (when it is dark at 5:00 PM), park uses were found to generate less than the ITE average for regional park. It is expected that a traffic count conducted between late-spring and fall would yield higher vehicle trip generation.

In addition to the review of ITE trip generation rates and traffic count data, projected visitor information for the park was also reviewed based on information contained in *Gateway Park Programming & Governance Considerations Report, May 22, 2013* prepared by HR&A. Projections of annual park visitors were made under several scenarios, including passive to active uses, with a projected range of annual visitors between 250,000 to 2,000,000 people. The expected level of weekday and weekend vehicle trip generation on a daily and peak hour basis was calculated assuming that park attendance would vary throughout the year depending on a number of factors including the number of hours of daylight and weather. The following assumptions were used:

- Off-peak weekday demand half of peak weekday demand
- Off-peak weekend demand 80 percent of peak weekend demand
- 90 percent of person visits arrive/depart via private vehicle
- Average vehicle occupancy is 2 people per vehicle on weekday
- Average vehicle occupancy is 3 people per vehicle on weekend
- Staff/Maintenance activities would increase vehicle trip generation by 10 percent on a weekday and 5 percent on a weekend

The range of daily trip generation estimates are presented in **Table 9** and the range of peak hour trip generation estimates are presented in **Table 10**. The daily level of trip generation predicted by the maximum ITE Regional Park rate exceed the calculated trip generation for 2,000,000 annual visitors. Weekday PM and Saturday afternoon ITE trip generation is within the range of calculated trip generation for 1,000,000 to 1,500,000 annual visitors.



TABLE 9
GATEWAY PARK
DAILY TRIP GENERATION ESTIMATE RANGE – BASED ON ANNUAL VISITORS

Number of Annual Visitors	Off-Peak Weekday	Off-Peak Weekend	Peak Weekday	Peak Weekend
250,000	440	350	640	690
500,000	880	690	1,290	1,370
1,000,000	1,760	1,380	2,580	2,750
1,500,000	2,640	2,070	3,870	4,120
2,000,000	3,530	2,760	5,150	5,490

Source: Fehr & Peers, October 2014

TABLE 10
GATEWAY PARK
PEAK HOUR TRIP GENERATION ESTIMATE RANGE – BASED ON ANNUAL VISITORS

Number of Annual Visitors	Off-Peak Weekday	Off-Peak Weekend	Peak Weekday	Peak Weekend
250,000	40	46	58	90
500,000	79	90	116	178
1,000,000	158	179	232	358
1,500,000	238	269	348	536
2,000,000	318	359	464	714

Source: Fehr & Peers, October 2014

To estimate near-term conditions with the Gateway Park project, the peak hour trip generation developed using the ITE maximum rates for regional park uses were assigned to the roadway network based on similar trip distribution percentages developed for the analysis of the Path project, and added to the Near-term without Project traffic volumes. The resulting volumes are shown on **Figure 13**. Trips generated by the path project were then added to estimate Near-term conditions with both the Gateway Park and Path projects, as shown on **Figure 14**.



5.1.2 EAST SPAN BICYCLE AND PEDESTRIAN FORECASTS

Bicycle and pedestrian activity within the Park, pathways connecting to the Park, and on the East Span of the Bay Bridge was estimated based on existing volumes on the East Span path and using the approach documented in *SFOBB West Span Bicycle/Pedestrian/Maintenance Path PSR Project – Forecasting and Traffic Analysis Methodology, November 28, 2011* (provided in Appendix D). The approach uses observations of bicycle and pedestrian activity on Bay Area bridges with bicycle/pedestrian facilities, including the East Span of the Bay Bridge, and Golden Gate, Dumbarton and Carquinez bridges; the likelihood of existing trans-bay transit riders who access their home origin transit stop by bicycle switching to an all bicycle commute; new bicycle commuters; potential tourist activity; and demand from development on Treasure Island. Other approaches were considered, such as using a regional travel demand model, but the available modeling tools do not reflect a bicycle/pedestrian connection over the Bay Bridge in future years and do not forecast recreation/tourist based pedestrian and bicycle activity.

Based on this approach, a range of bicycle and pedestrian activity around the Park and East Span were estimated, as presented in **Table 11**, for near-term conditions prior to the completion of the West Span Bicycle and Pedestrian Path, and in **Table 12** for the cumulative condition, when it would be feasible to walk or ride a bicycle between Oakland and San Francisco. The low end of the range reflects observed bicycle and pedestrian activity on the partial East Span from October 2013.

In the near-term, daily pedestrian and bicycle activity within the Park and East Span could range from approximately 620 to 2,270 people. It is expected that the majority of these people would arrive to the park in a vehicle and park. A small percentage would park in the Wood Street lot or other available parking in the area and walk or ride their bikes to the Park and an even smaller percentage are likely to start their bike or walk trip from their home or place of work. In the cumulative condition when it would be feasible to walk or ride a bike between Oakland and San Francisco, some people may consider commuting via bicycle over the Bay Bridge, which is expected to range between 750 and 1,500 people on a typical weekday. Tourism and other recreational activity would likely increase, especially on weekends.

TABLE 11
NEAR-TERM EAST SPAN BICYCLE AND PEDESTRIAN FORECAST RANGE

Source of Activity	Weekday			Weekend	
	Daily	AM Peak Hour	PM Peak Hour	Daily	Peak Hour
Tourism/Recreation – Pedestrian ¹	300 – 1,070	10	40 – 200	2,250 – 3,270	290 – 420



TABLE 11
NEAR-TERM EAST SPAN BICYCLE AND PEDESTRIAN FORECAST RANGE

Source of Activity	Weekday			Weekend	
	Daily	AM Peak Hour	PM Peak Hour	Daily	Peak Hour
Tourism/Recreation – Bicycle ¹	320 – 500	20	50 – 90	1,800 – 1,830	220 – 330
Treasure Island Development – Bicycle ²	0 – 700	0 – 30	0 – 40	0 – 700	0 – 40
Total Near-term Pedestrian/ Bicycle Activity Range	620 – 2,270	30 – 60	90 – 330	4,050 – 5,800	540 – 790

Notes: 1. The low end of the range is based on counts of activity on the East Span prior to the completion of the Park and the connection to Yerba Buena Island. Maximum of the Near-term activity range is assumed to be 20 percent of observed activity on the Golden Gate Bridge on a weekday and 30 percent of observed activity on a weekend.
2. Based on the trip generation, mode choice and project trip distribution from the *Treasure Island and Yerba Buena Island Redevelopment Plan Transportation Impact Study*, July 7, 2010. Range is from 0 as it is uncertain when the Treasure Island Development would be fully-built out.

Source: Fehr & Peers, October 2014

TABLE 12
CUMULATIVE EAST SPAN BICYCLE AND PEDESTRIAN FORECAST RANGE

Source of Activity	Weekday			Weekend	
	Daily	AM Peak Hour	PM Peak Hour	Daily	Peak Hour
Tourism/Recreation – Pedestrian ¹	300 – 1,610	20	40 – 300	2,250 – 4,350	290 – 560
Tourism/Recreation – Bicycle ¹	320 – 750	30	50 – 140	1,800 – 2,440	220 – 440
Treasure Island Development – Bicycle ²	0 – 700	0 – 30	0 – 40	0 – 700	0 – 40
Commute Trips – Bicycle ³	750 – 1,490	50 – 210	50 – 270	250 – 750	50 – 140
Total Pedestrian/Bicycle Activity	1,370 – 4,550	100 – 290	140 – 750	4,300 – 8,240	560 – 1,180

Notes: 1. The low end of the range is based on counts of activity on the East Span prior to the completion of the Park and the connection to Yerba Buena Island. Maximum of the range is assumed to be 30 percent of observed activity on the Golden Gate Bridge on a weekday and 40 percent of observed activity on a weekend.
2. Based on the trip generation, mode choice and project trip distribution from the *Treasure Island and Yerba Buena Island Redevelopment Plan Transportation Impact Study*, July 7, 2010.
3. Based on estimates of existing commuters who ride their bicycles to a BART station within 15 miles of either the touchdown of either the east span or west span that might switch to only bike commuting, and the number of transbay buses each hour and estimates of bus bicycle rack activity.

Source: Fehr & Peers, October 2014



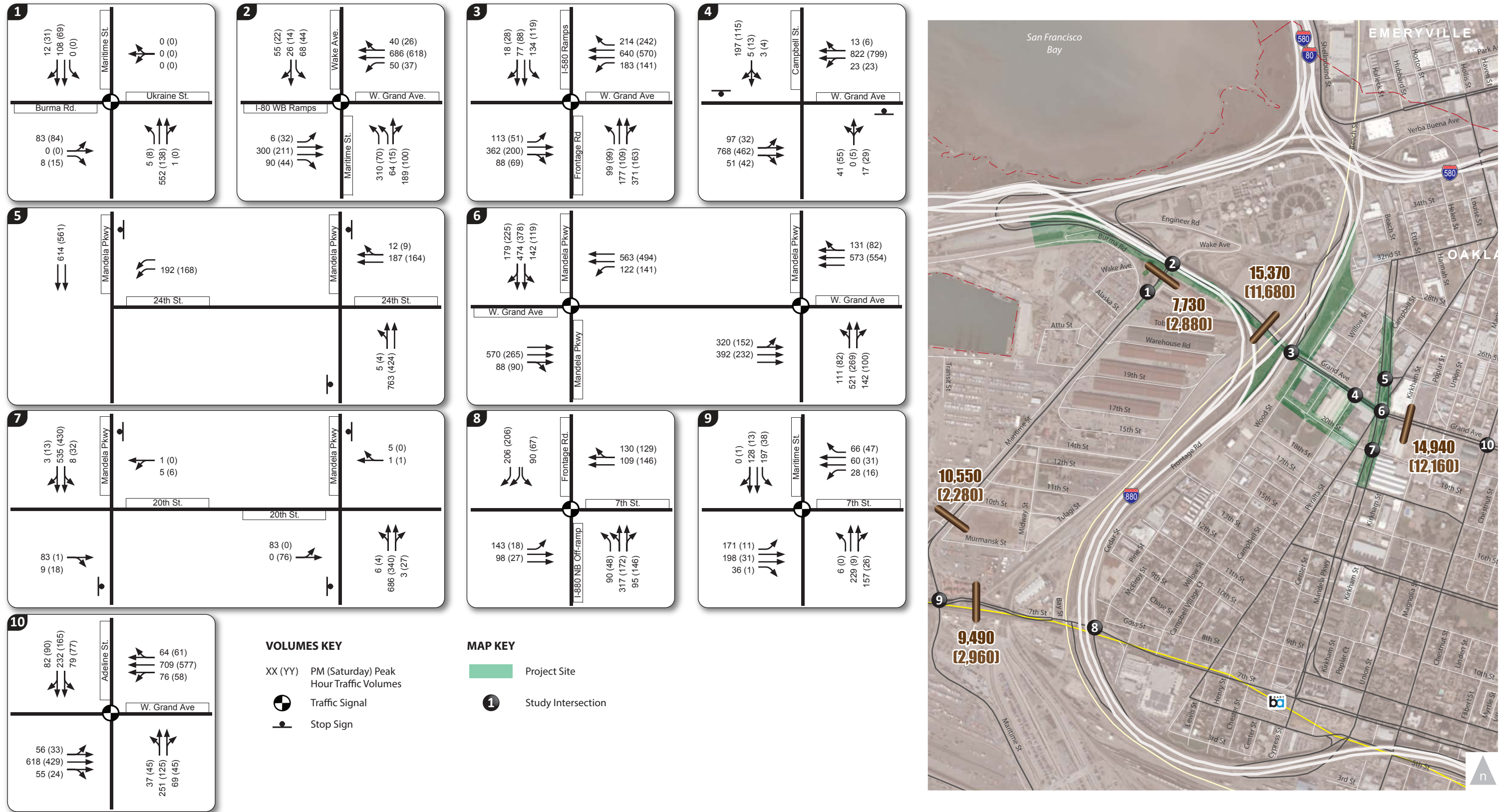


Figure 11.

Near-Term without Project
Peak Hour Volumes, Lane Configurations and Traffic Control

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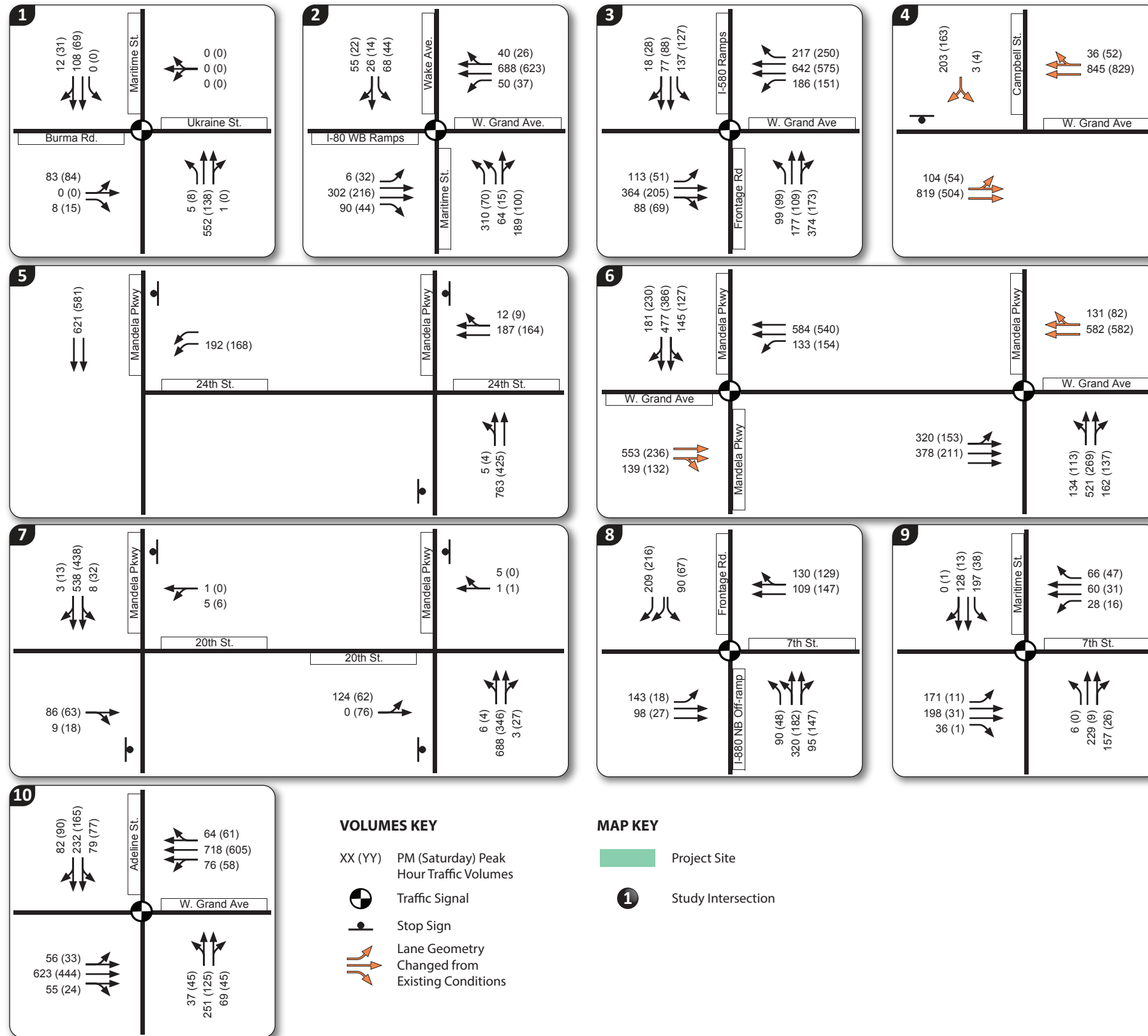


Figure 12.

Near-Term with Project

Peak Hour Volumes, Lane Configurations and Traffic Control

Graphics for Connection Report\WC12-2992_12_NT+ProjVols

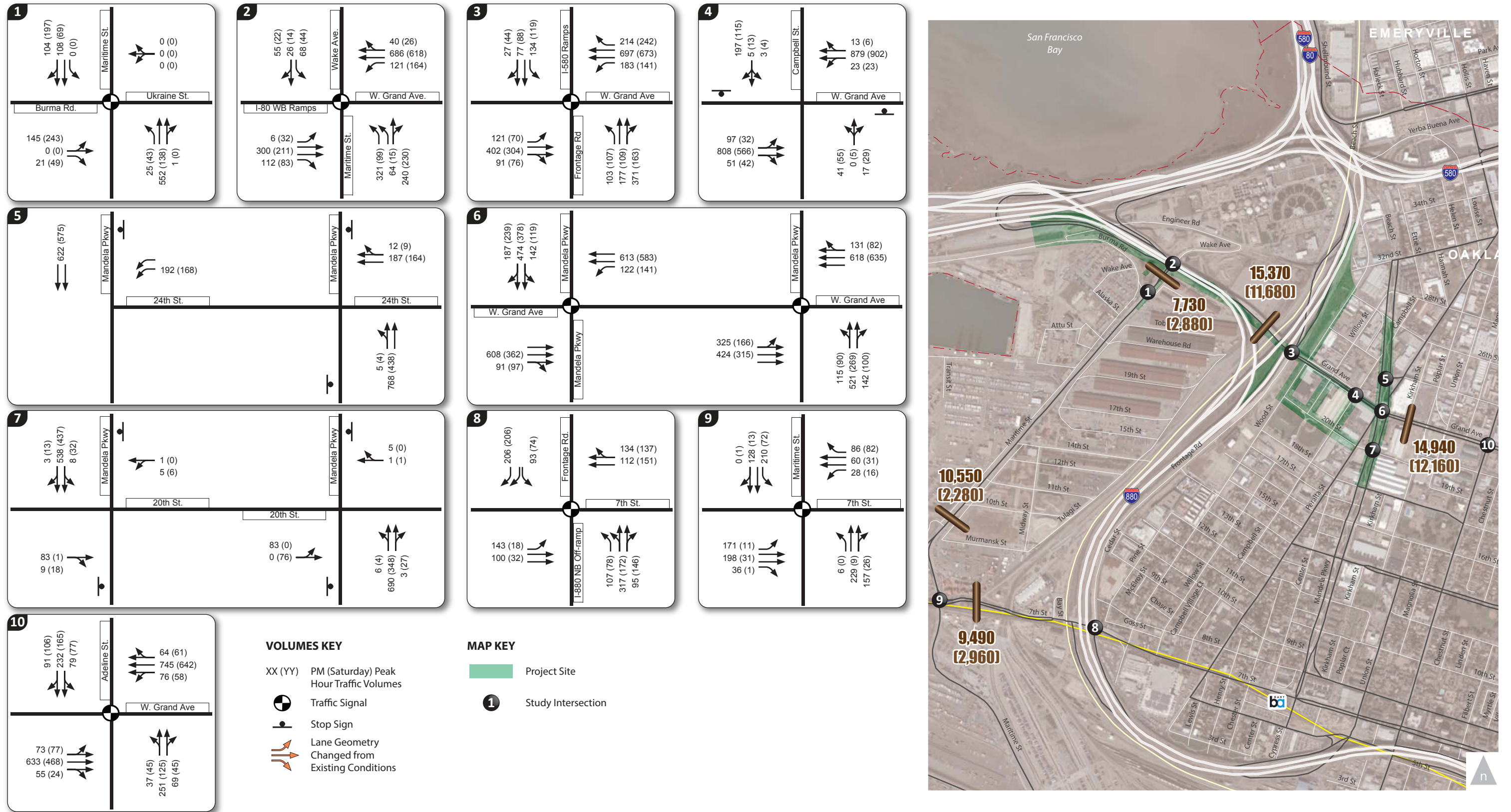


Figure 13.

Near-Term with Park and without Project
Peak Hour Volumes, Lane Configurations and Traffic Control

Graphics for Connection Report\WC12-2992_13_NT+Park+NoProj\Vols

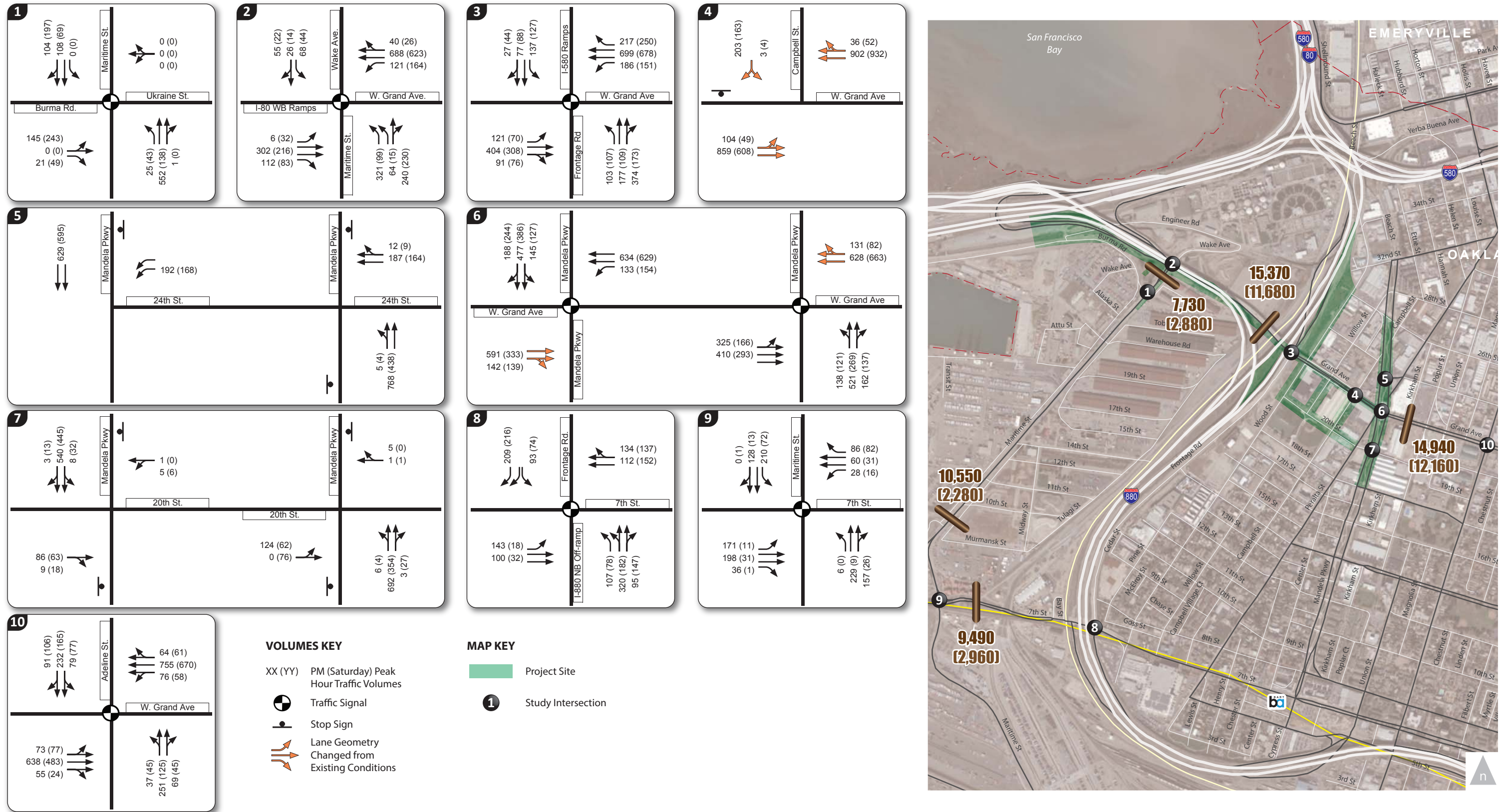


Figure 14.

Near-Term with Park and with Project
Peak Hour Volumes, Lane Configurations and Traffic Control

Graphics for Connection Report\WC12-2992_14_NT+Proj+ParkVols

5.2 BACKGROUND ROADWAY IMPROVEMENTS

No improvements were assumed at any of the study intersections for the analysis of near-term conditions without the project. Improvements at the Grand Avenue/Mandela Street intersection to better accommodate enhanced bicycle and pedestrian facilities and closure of the southern leg of the Campbell Street intersection with West Grand Avenue were considered in the analysis of project conditions.

5.3 NEAR-TERM INTERSECTION LEVELS OF SERVICE

Level of service calculations were conducted to evaluate intersection operations under near-term conditions both without and with the Path project, and for conditions considering development of the Gateway Park. Traffic signal timings and heavy vehicle percentages were unchanged from the analysis of Existing conditions. The LOS results are summarized in **Table 13** and **Table 14**. The corresponding LOS calculation sheets are included in **Appendix B**.

The results of the LOS calculations indicate that the 7th Street/Maritime Street intersection would continue to operate at an unacceptable level of service in the near-term condition. The project is not expected to increase traffic at this intersection. Considering development of the Gateway Park project in the near-term conditions, the side-street movement at the Grand Avenue/Campbell Street intersection would experience increased delay. With the closure of the south leg of the intersection and associated vehicle diversions, delay for the side-street movements would decrease. Peak hour signal warrants would continue to be satisfied at the Campbell Street/Grand Avenue intersection when considering the southbound right-turn movement. Signalization is not recommended.

Operations of the 7th Street/Maritime Street intersection would further worsen with the Gateway Park project, but the Path project is not expected to increase traffic at this intersection. The Gateway Park project would slightly increase delay at the Grand Avenue/Frontage Road intersection, although it would operate at LOS E, which is considered acceptable for this intersection. With the addition of project traffic, operations would remain at LOS E.

The remaining study intersections are projected to operate at an overall level of service D or better during both the AM and PM peak hours without or with the Path project and the Gateway Park project.

Peak hour traffic signal warrants would not be satisfied at the other unsignalized intersections with the addition of project traffic.



TABLE 13
NEAR-TERM PEAK HOUR INTERSECTION LEVEL OF SERVICE

Intersection	Control ¹	Peak Hour	Near-term without Project		Near-Term with Project		Significant Impact?
			Delay ²	LOS ³	Delay ²	LOS ³	
1 Burma Road/Maritime Street	Signal	PM SAT	14.4 12.2	B B	14.4 12.2	B B	No No
2 I-80 Ramps/West Grand Avenue/ Maritime Street/Wake Avenue ^{4&7}	Signal	PM SAT	29.4 34.6	C C	29.4 34.7	C C	No No
3 West Grand Avenue/Frontage Road/I-80 Ramps ^{5&8}	Signal	PM SAT	54.1 45.9	D D	54.5 46.6	D D	No No
4 West Grand Avenue/Campbell Street	SSSC	PM SAT	<10 (106.3) <10 (42.0)	A (F) A (E)	<10 (13.7) <10 (11.8)	A (B) A (B)	No No
5A 24th Street/Mandela Parkway Southbound	SSSC	PM SAT	<10 (11.5) <10 (11.6)	A (B) A (B)	<10 (11.6) <10 (11.7)	A (B) A (B)	No No
5B 24th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (21.7) <10 (14.5)	A (C) A (B)	<10 (21.7) <10 (14.5)	A (C) A (B)	No No
6A West Grand Avenue/Mandela Parkway Southbound	Signal	PM SAT	17.8 15.2	B B	18.7 15.6	B B	No No
6B West Grand Avenue/Mandela Parkway Northbound	Signal	PM SAT	18.1 19.1	B B	18.7 20.4	B C	No No
7A 20th Street/Mandela Parkway Southbound	SSSC	PM SAT	<10 (15.8) <10 (16.3)	A (C) A (C)	<10 (18.4) <10 (19.4)	A (C) A (C)	No No
7B 20th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (13.7) <10 (13.6)	A (B) A (B)	<10 (14.7) <10 (13.6)	A (B) A (B)	No No
8 7th Street/I-880 Northbound Off- Ramp/Frontage Road ^{6&9}	Signal	PM SAT	28.5 19.6	C B	28.6 19.6	C B	No No
9 7th Street/Maritime Street	Signal	PM SAT	69.3 33.6	E C	69.3 33.6	E C	No No
10 West Grand Avenue/Adeline Street	Signal	PM SAT	15.8 14.8	B B	15.9 14.9	B B	No No

Notes: **Bold** text indicates potentially unacceptable intersection operations.

- Signal = Signalized Intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
- Delay presented in seconds per vehicle; for side-street stop-controlled intersections, delay presented in Intersection average (worst approach).
- LOS = Level of Service.
- Delay presented in table for Intersection 2 average delay/LOS. Near-term Delay/LOS for specific movements from the off-ramp as follows:



- a. PM Peak Hour: EB left = 53.3/D, EB thru = 26.3/C, EB right = 24.2/C
 - b. Sat Peak Hour: EB left = 57.2/E, EB thru = 28.6/C, EB right = 26.8/C
 5. Delay presented in table for Intersection 3 average delay/LOS. Near-Term Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 43.2/D, NB thru/right = 42.2/D, SB left = 45.8/D, SB thru-right = 36.1/D
 - b. Sat Peak Hour: NB left = 41.9/D, NB thru-right = 37.5/D, SB left = 42.6/D, SB thru-right = 26.5/D
 6. Delay presented in table for Intersection 8 average delay/LOS. Near-Term Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 27.2/C, NB thru/right = 29.2/C
 - b. Sat Peak Hour: NB left = 12.3/B, NB thru-right = 13.2/B
 7. Delay presented in table for Intersection 2 average delay/LOS. Near-Term + Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: EB left = 53.3/D, EB thru = 26.3/C, EB right = 24.1/C
 - b. Sat Peak Hour: EB left = 58.4/E, EB thru = 28.6/C, EB right = 26.8/C
 8. Delay presented in table for Intersection 3 average delay/LOS. Near-Term + Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 43.2/D, NB thru/right = 42.2/D, SB left = 46.3/D, SB thru-right = 36.1/D
 - b. Sat Peak Hour: NB left = 41.9/D, NB thru-right = 37.6/D, SB left = 43.5/D, SB thru-right = 36.5/D
 9. Delay presented in table for Intersection 8 average delay/LOS. Near-Term + Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 27.1/C, NB thru/right = 29.3/C
 - b. Sat Peak Hour: NB left = 12.3/B, NB thru-right = 13.3/B
- Source: Fehr & Peers, October 2014.

TABLE 14
NEAR-TERM WITH GATEWAY PARK PEAK HOUR INTERSECTION LEVEL OF SERVICE

Intersection	Control ¹	Peak Hour	Near-term without Project		Near-Term with Project		Significant Impact?
			Delay ²	LOS ³	Delay ²	LOS ³	
1 Burma Road/Maritime Street	Signal	PM SAT	14.2 13.7	B B	14.4 13.7	B B	No No
2 I-80 Ramps/West Grand Avenue/ Maritime Street/Wake Avenue ^{4&7}	Signal	PM SAT	30.9 50.9	C C	30.9 50.8	C D	No No
3 West Grand Avenue/Frontage Road/I-80 Ramps ^{5&8}	Signal	PM SAT	64.5 63.8	E E	64.9 64.6	E E	No No
4 West Grand Avenue/Campbell Street	SSSC	PM SAT	<10 (97.8) <10 (67.8)	A (F) A (E)	<10 (13.7) <10 (12.1)	A (B) A (B)	No No
5A 24th Street/Mandela Parkway Southbound	SSSC	PM SAT	<10 (11.6) <10 (11.7)	A (B) A (B)	<10 (11.6) <10 (11.8)	A (B) A (B)	No No
5B 24th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (21.7) <10 (14.5)	A (C) A (B)	<10 (21.9) <10 (14.8)	A (C) A (B)	No No
6A West Grand Avenue/Mandela Parkway Southbound	Signal	PM SAT	17.7 15.3	B B	18.8 15.9	B B	No No
6B West Grand Avenue/Mandela Parkway Northbound	Signal	PM SAT	18.1 18.5	B B	18.8 20.4	B C	No No



TABLE 14
NEAR-TERM WITH GATEWAY PARK PEAK HOUR INTERSECTION LEVEL OF SERVICE

Intersection	Control ¹	Peak Hour	Near-term without Project		Near-Term with Project		Significant Impact?
			Delay ²	LOS ³	Delay ²	LOS ³	
7A 20th Street/Mandela Parkway Southbound	SSSC	PM SAT	<10 (15.8) <10 (16.5)	A (C) A (C)	<10 (18.4) <10 (19.6)	A (C) A (C)	No No
7B 20th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (13.7) <10 (13.7)	A (B) A (B)	<10 (14.8) <10 (13.6)	A (B) A (B)	No No
8 7th Street/I-880 Northbound Off-Ramp/Frontage Road ^{6&9}	Signal	PM SAT	28.8 20.3	C B	28.8 20.3	C C	No No
9 7th Street/Maritime Street	Signal	PM SAT	76.1 35.4	E D	76.1 35.4	E D	No No
10 West Grand Avenue/Adeline Street	Signal	PM SAT	16.2 15.3	B B	16.3 15.4	B B	No No

Notes: **Bold** text indicates potentially unacceptable intersection operations.

- Signal = Signalized Intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
- Delay presented in seconds per vehicle; for side-street stop-controlled intersections, delay presented in Intersection average (worst approach).
- LOS = Level of Service.
- Delay presented in table for Intersection 2 average delay/LOS. Near-Term + Park Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: EB left = 54.6/D, EB thru = 31.5/C, EB right = 28.9/C
 - Sat Peak Hour: EB left = 57.9/E, EB thru = 31.2/C, EB right = 29.4/C
- Delay presented in table for Intersection 3 average delay/LOS. Near-Term + Park Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: NB left = 43.8/D, NB thru/right = 42.2/D, SB left = 45.8/D, SB thru-right = 36.3/D
 - Sat Peak Hour: NB left = 42.9/D, NB thru-right = 37.5/D, SB left = 42.6/D, SB thru-right = 36.7/D
- Delay presented in table for Intersection 8 average delay/LOS. Near-Term + Park Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: NB left = 29.1/C, NB thru/right = 29.5/C
 - Sat Peak Hour: NB left = 13.1/B, NB thru-right = 13.4/B
- Delay presented in table for Intersection 2 average delay/LOS. Near-Term + Park + Project Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: EB left = 54.6/D, EB thru = 31.6/C, EB right = 28.9/C
 - Sat Peak Hour: EB left = 58.0/E, EB thru = 31.2/C, EB right = 29.4/C
- Delay presented in table for Intersection 3 average delay/LOS. Near-Term + Park + Project Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: NB left = 43.8/D, NB thru/right = 42.2/D, SB left = 46.3/D, SB thru-right = 36.3/D
 - Sat Peak Hour: NB left = 42.9/D, NB thru-right = 37.6/D, SB left = 43.5/D, SB thru-right = 36.7/D
- Delay presented in table for Intersection 8 average delay/LOS. Near-Term + Park + Project Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: NB left = 29.1/C, NB thru/right = 29.7/C
 - Sat Peak Hour: NB left = 13.0/B, NB thru-right = 13.5/B

Source: Fehr & Peers, October 2014.



6.0 CUMULATIVE CONDITIONS

This chapter presents the results of the level of service calculations under Cumulative conditions without and with the project.

6.1 CUMULATIVE INTERSECTION VOLUMES

Traffic volumes for the Cumulative condition were based on a similar approach to the near-term forecasts. Traffic forecasts from the near-term condition for intersections along the Grand Avenue and Mandela Parkway corridors were increased by 20 percent to forecast cumulative conditions. For the two intersections on 7th Street, 40 percent growth was used to forecast cumulative volumes. The same growth rate was applied to weekday PM and Saturday peak hour traffic volumes. Estimated traffic volumes from the Gateway Park project were then added to the resulting forecasts to develop Cumulative without Project traffic volumes as shown on **Figure 15**. Path project traffic was then added to develop Cumulative with Project traffic volumes, as shown on **Figure 16**.

6.2 CUMULATIVE ROADWAY IMPROVEMENTS

Class 2 bicycle lanes are proposed to be installed on Adeline Street and West Grand Avenue within the study area. With the installation of bicycle lanes, a reduction in the number of vehicle travel lanes would occur - commonly referred to as a road-diet. The resulting lane configurations are shown on Figure 15 for the Cumulative without Project condition.

Intersection improvements at the Grand Avenue/Mandela Street intersection to accommodate enhanced bicycle and pedestrian facilities were considered in the analysis of project conditions. The resulting lane configurations are shown on Figure 16 for the Cumulative with Project condition.



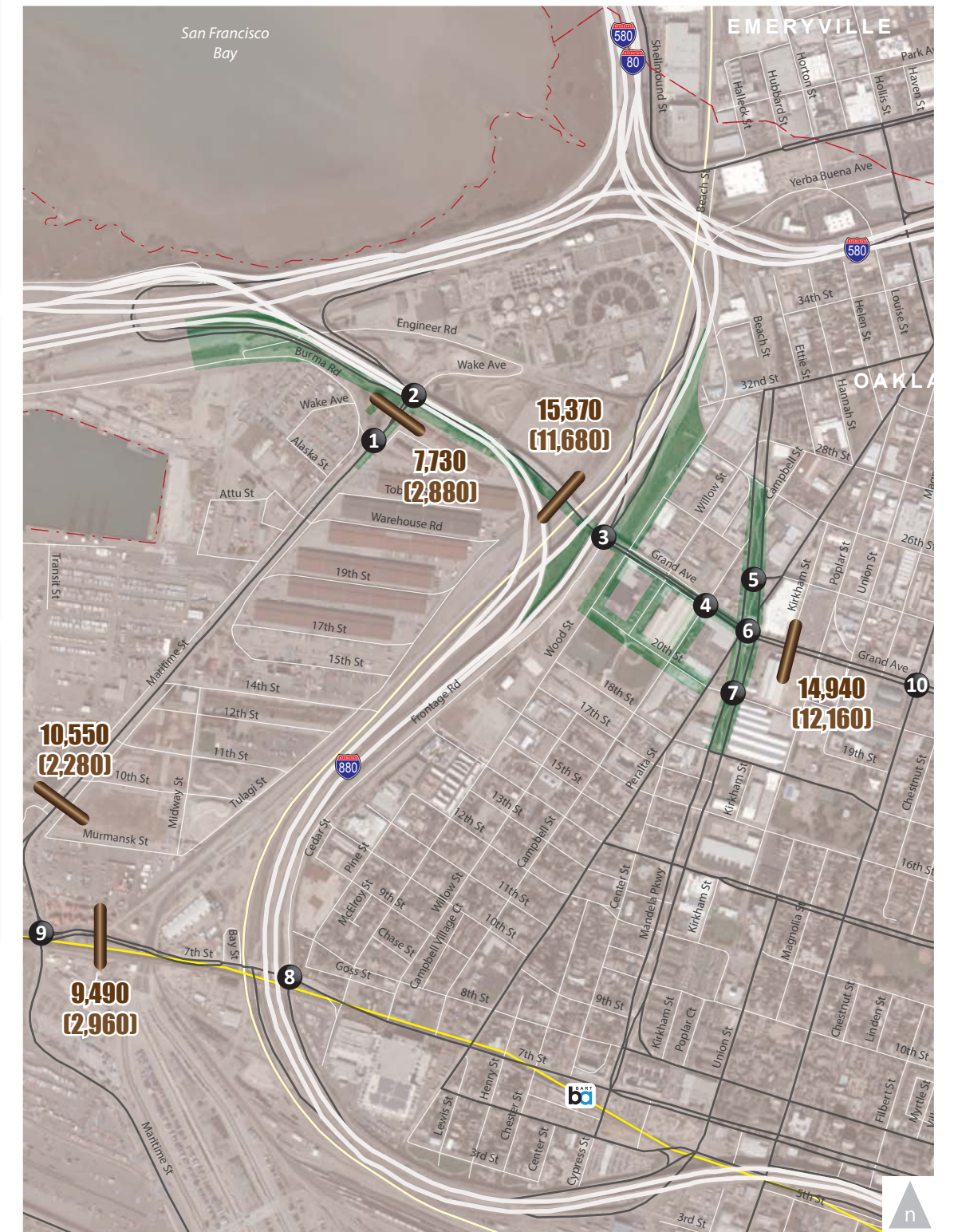
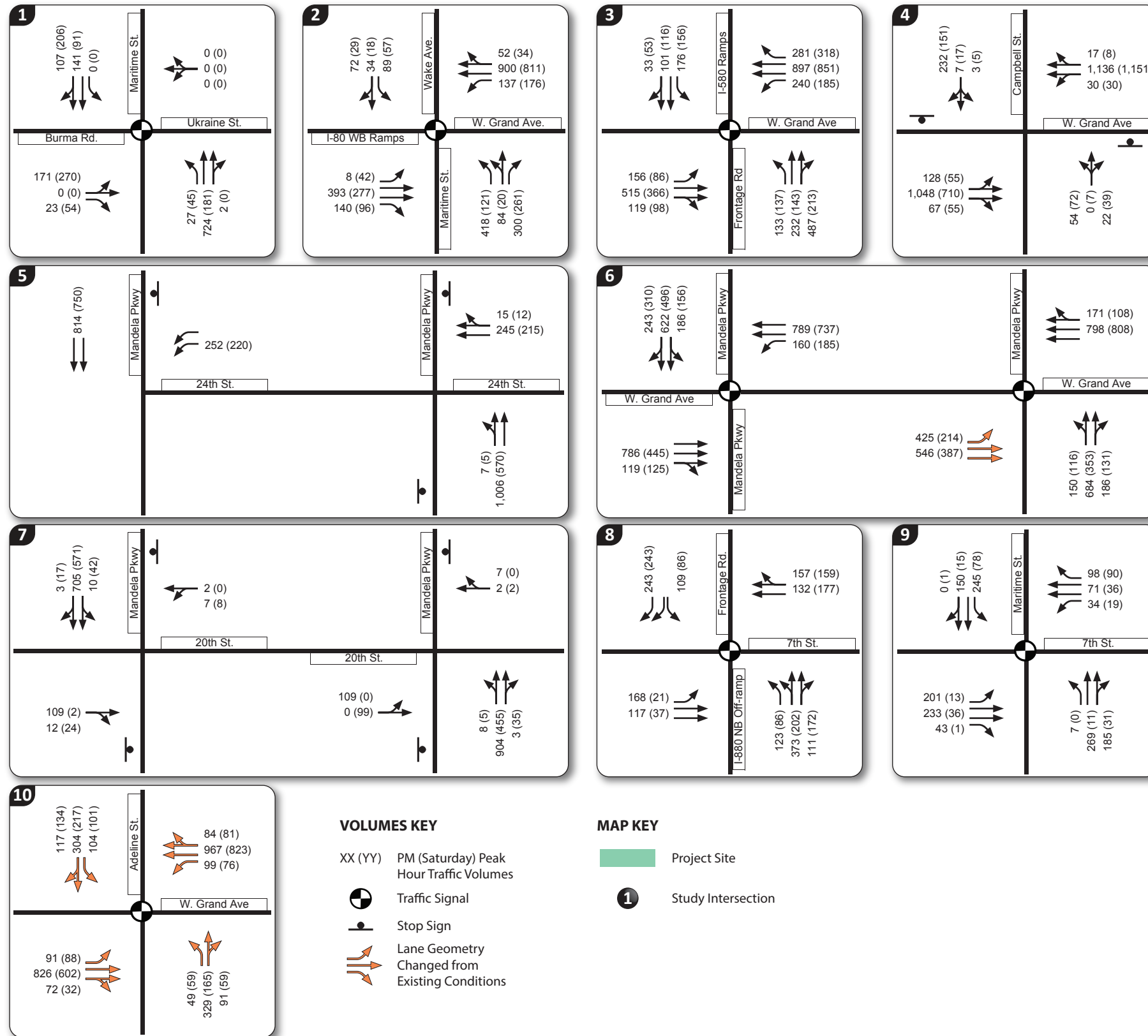


Figure 15.

Cumulative without Project
Peak Hour Volumes, Lane Configurations and Traffic Control

Graphics for Connection Report\WC12-2992_15_CumuVols

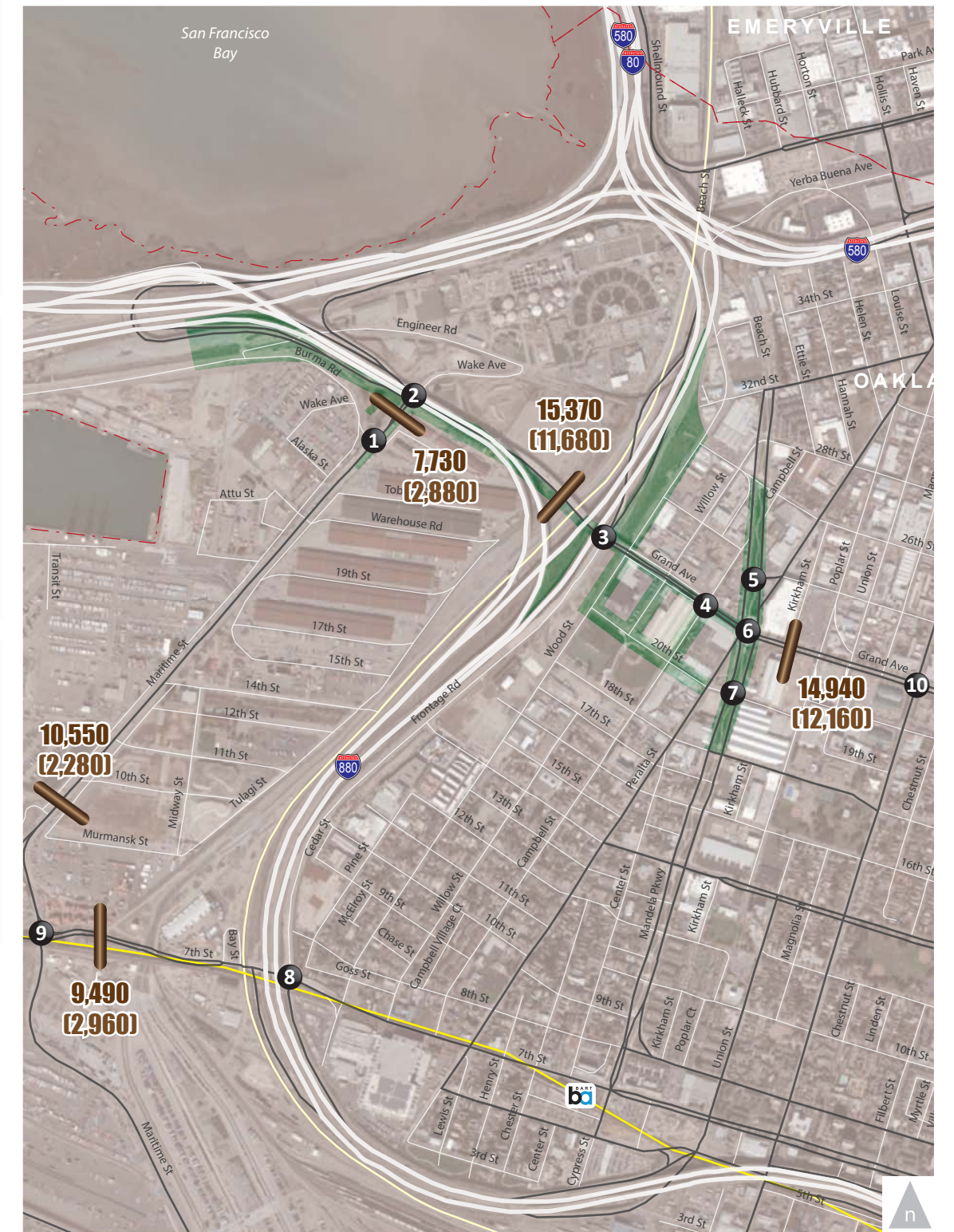
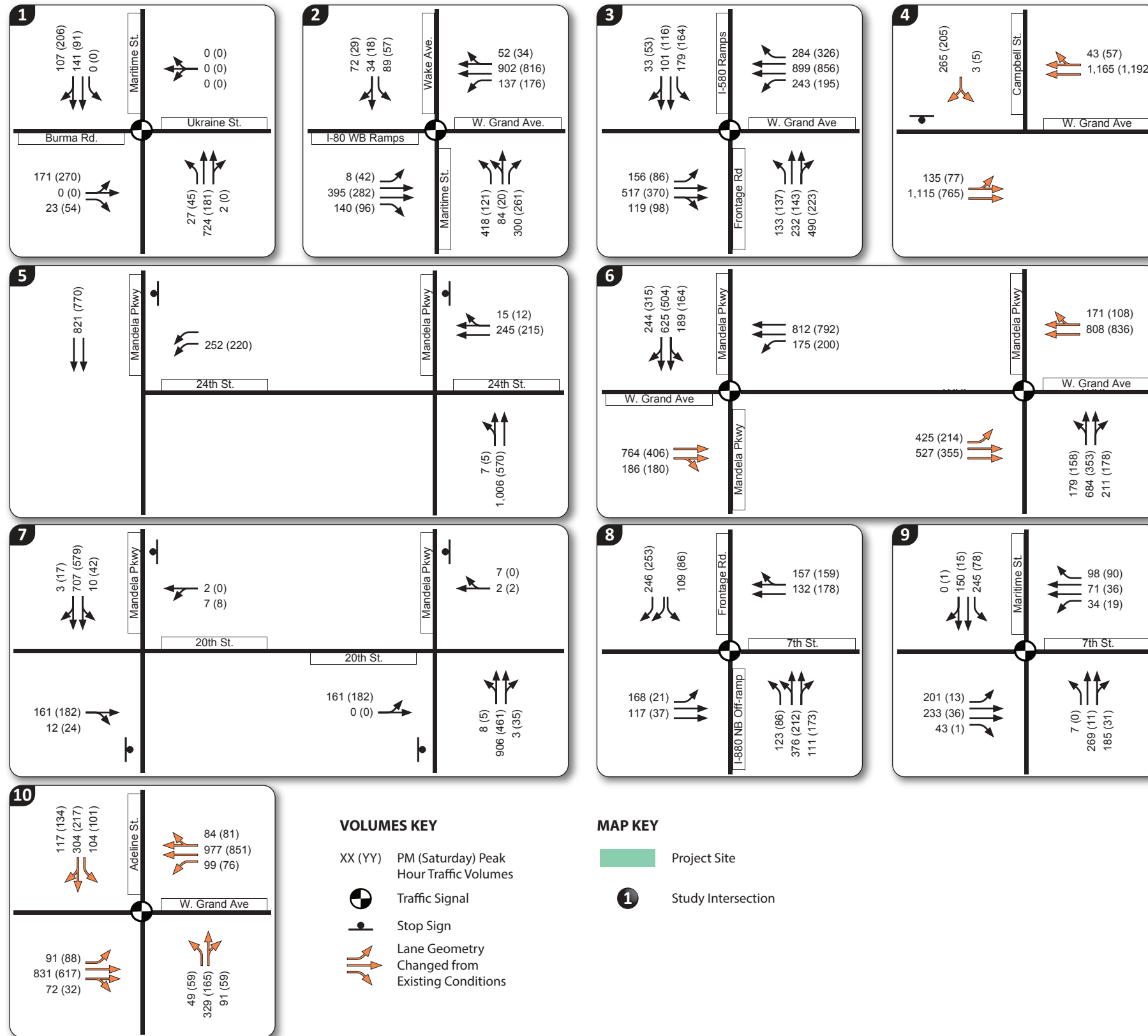


Figure 16.

Cumulative with Project
Peak Hour Volumes, Lane Configurations and Traffic Control

Graphics for Connection Report\WC12-2992_16_Cumu+ProjVols

6.3 CUMULATIVE INTERSECTION LEVELS OF SERVICE

Level of service calculations were conducted to evaluate intersection operations under Cumulative conditions both without and with the project. Traffic signal timings were optimized to better accommodate the changes to traffic flow projected at the study intersections but heavy vehicle percentages were unchanged from the analysis of Existing conditions. The LOS results are summarized in **Table 15**. The corresponding LOS calculation sheets are included in **Appendix B**.

The results of the LOS calculations indicate that in the Cumulative condition, the Grand Avenue/Frontage Road/I-580 Ramp and 7th Street/Maritime Street intersections would operate at an overall unacceptable service level during at least one peak hour. At the Grand Avenue/Campbell Street intersection, the side-street movements would experience significant delay. Peak hour signal warrants would continue to be satisfied at the Campbell Street/Grand Avenue intersection when considering the southbound right-turn movement. Signalization is not recommended.

With the addition of project traffic, the Grand Avenue/Frontage Road intersection would further degrade, but not to a level of significance. The Mandela Parkway (Northbound)/Grand Avenue intersection would degrade to LOS E in the cumulative condition prior to the addition of project traffic. With the addition of project traffic, operations would degrade to LOS F conditions. The project is not expected to increase traffic at the 7th Street/Maritime Street intersection; therefore, the impact to this intersection from the Path project is less-than-significant.

The remaining study intersections are projected to operate at an overall LOS D or better during both the weekday PM and Saturday afternoon peak hours without or with the Path project in the Cumulative condition. Peak hour traffic signal warrants would not be satisfied at the other unsignalized intersections in the cumulative condition without or with the addition of project traffic.

TABLE 15
CUMULATIVE WITHOUT AND WITH PROJECT PEAK HOUR INTERSECTION LEVEL OF SERVICE

	Intersection	Control ¹	Peak Hour	Cumulative		Cumulative with Project		Significant Impact?
				Delay ²	LOS ³	Delay ²	LOS ³	
1	Burma Road/Maritime Street	Signal	PM SAT	14.2	B	14.3	B	No
				13.1	B	13.1	B	No
2	I-80 Ramps/West Grand Avenue/ Maritime Street/Wake Avenue ^{4&7}	Signal	PM SAT	29.5	C	29.5	C	No
				45.2	C	45.5	D	No



TABLE 15
CUMULATIVE WITHOUT AND WITH PROJECT PEAK HOUR INTERSECTION LEVEL OF SERVICE

Intersection	Control ¹	Peak Hour	Cumulative		Cumulative with Project		Significant Impact?
			Delay ²	LOS ³	Delay ²	LOS ³	
3 West Grand Avenue/Frontage Road/I-80 Ramps ^{5&8}	Signal	PM SAT	119.4	F	120.8	F	No
			(v/c=0.91)	F	(v/c=0.92)	F	No
			113.5	F	114.2	F	No
4 West Grand Avenue/Campbell Street	SSSC	PM SAT	(v/c=0.74)		(v/c=0.75)		
5A 24th Street/Mandela Parkway Southbound	SSSC	PM SAT	19.3 (> 200)	A (F)	<10 (16.6)	A (C)	No
			34.0 (> 200)	A (F)	<10 (15.5)	A (C)	No
5B 24th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (13.4)	A (B)	<10 (13.4)	A (B)	No
			<10 (12.8)	A (B)	<10 (12.9)	A (B)	No
6A West Grand Avenue/Mandela Parkway Southbound	Signal	PM SAT	<10 (45.5)	A (C)	<10 (45.6)	A (E)	No
			<10 (17.4)	A (B)	<10 (17.4)	A (C)	No
6B West Grand Avenue/Mandela Parkway Northbound	Signal	PM SAT	23.9	C	25.7	C	No
			14.5	B	15.5	B	No
7A 20th Street/Mandela Parkway Southbound	SSSC	PM SAT	98.2	E	(v/c=1.66)	F	Yes
			79.3	C	42.5	D	No
7B 20th Street/Mandela Parkway Northbound	SSSC	PM SAT	<10 (21.2)	A (C)	<10 (26.9)	A (D)	No
			<10 (22.4)	A (C)	<10 (27.1)	A (D)	No
8 7th Street/I-880 Northbound Off-Ramp/Frontage Road ^{6&9}	Signal	PM SAT	<10 (17.1)	A (B)	<10 (19.7)	A (C)	No
			<10 (15.8)	A (B)	<10 (15.6)	A (C)	No
9 7th Street/Maritime Street	Signal	PM SAT	31.1	C	31.2	C	No
			19.4	B	19.4	B	No
10 West Grand Avenue/Adeline Street	Signal	PM SAT	89.0	F	89.0	F	No
			(v/c=0.75)	D	(v/c=0.75)	D	No
			36.7		36.7		

Notes: **Bold** text indicates potentially unacceptable intersection operations.

- Signal = Signalized Intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
- Delay presented in seconds per vehicle; for side-street stop-controlled intersections, delay presented in Intersection average (worst approach).
- LOS = Level of Service.
- Delay presented in table for Intersection 2 average delay/LOS. Cumulative without Project Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: EB left = 103.7/F, EB thru = 26.3/C, EB right = 23.5/C
 - Sat Peak Hour: EB left = 78.7/E, EB thru = 28.2/C, EB right = 26.3/C



5. Delay presented in table for Intersection 3 average delay/LOS. Cumulative without Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 48.4/D, NB thru/right = 63.2/E, SB left = 53.6/D, SB thru-right = 36.5/D
 - b. Sat Peak Hour: NB left = 46.5/D, NB thru-right = 38.2/D, SB left = 46.5/D, SB thru-right = 37.0/D
6. Delay presented in table for Intersection 8 average delay/LOS. Cumulative without Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 31.2/C, NB thru/right = 33.0/C
 - b. Sat Peak Hour: NB left = 14.3/B, NB thru-right = 14.8/B
7. Delay presented in table for Intersection 2 average delay/LOS. Cumulative with Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: EB left = 103.7/D, EB thru = 26.3/C, EB right = 23.5/C
 - b. Sat Peak Hour: EB left = 78.8/E, EB thru = 28.2/C, EB right = 26.2/C
8. Delay presented in table for Intersection 3 average delay/LOS. Cumulative with Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 48.4/D, NB thru/right = 67.5/E, SB left = 54.8/D, SB thru-right = 36.5/D
 - b. Sat Peak Hour: NB left = 46.5/D, NB thru-right = 38.3/D, SB left = 48.0/D, SB thru-right = 37.0/D
9. Delay presented in table for Intersection 8 average delay/LOS. Cumulative with Project Delay/LOS for specific movements from the off-ramp as follows:
 - a. PM Peak Hour: NB left = 31.2/C, NB thru/right = 33.2/C
 - b. Sat Peak Hour: NB left = 14.3/B, NB thru-right = 14.9/B

Source: Fehr & Peers, October 2014.

6.4 CUMULATIVE INTERSECTION IMPACTS AND MITIGATION MEASURES

This section evaluates the intersection LOS results presented in Table 15 compared to the results with the criteria for significant impacts, and presents mitigation measures for identified impacts.

Impact TR-1: Intersection 3 - West Grand Avenue/Frontage Road/I-80 Ramps

The addition of project-generated vehicle trips during the PM and Saturday peak hours would worsen LOS F conditions, but would not increase the v/c ratio by more than 0.03. Therefore, the impact is considered **less-than-significant** based on City of Oakland Significance Criteria 5 and 18 (see Chapter 1).

Mitigation Measure TR-1: Although the impact is less-than-significant, the project would contribute to poor intersections operations. Upgrading the traffic signal equipment at the intersection to provide video detection for vehicles and bicycles would allow for better allocation of the green time to movements, improving the LOS to D for vehicles in both the weekday PM and Saturday afternoon peak hours, as shown in **Table 16**. Should the City of Oakland and Caltrans upgrade the traffic signal equipment at this intersection, the project should make a fair-share contribution to the construction of the improvement.

Impact TR-2: Intersection 6B - West Grand Avenue/Mandela Parkway (Northbound)



The addition of project-generated vehicle trips during the weekday PM peak hours would result in LOS F conditions. This is a **significant impact** based on City of Oakland Significance Criteria 2 (see Chapter 1).

Mitigation Measure TR-2: Install protected-permitted phasing for the eastbound left-turn movement and upgrade the traffic signal equipment as necessary to provide video detection for bicyclists. This improvement would result in LOS E conditions during the weekday PM peak hour, as shown in **Table 16**. Implementation of this measure would reduce the project impact to a **less-than-significant** level.

TABLE 16
CUMULATIVE WITH PROJECT WITH MITIGATION
PEAK HOUR INTERSECTION LEVEL OF SERVICE

Intersection		Peak Hour	Cumulative without Project		Cumulative With Project		Cumulative With Project With Mitigation	
			Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²
3	West Grand Avenue/Frontage Road/I-80 Ramps ^{3,4&5}	AM	119.4		120.8			
			(v/c=0.91)	F	(v/c=0.92)	F	55.5	E
		PM	113.5	F	114.2	F	36.9	D
			(v/c=0.74)		(v/c=0.75)			
6B	West Grand Avenue/Mandela Parkway Northbound	AM	79.3	E	98.2	F	50.4	D
					(v/c=1.66)	D	25.9	C
		PM	26.8	C	42.5			

Notes: **Bold** text indicates potentially unacceptable intersection operations.

- Delay presented in seconds per vehicle
- LOS = Level of Service.
- Delay presented in table for Intersection 3 average delay/LOS. Cumulative without Project Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: NB left = 48.4/D, NB thru/right = 63.2/E, SB left = 53.6/D, SB thru-right = 36.5/D
 - Sat Peak Hour: NB left = 46.5/D, NB thru-right = 38.2/D, SB left = 46.5/D, SB thru-right = 37.0/D
- Delay presented in table for Intersection 3 average delay/LOS. Cumulative with Project Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: NB left = 48.4/D, NB thru/right = 67.5/E, SB left = 54.8/D, SB thru-right = 36.5/D
 - Sat Peak Hour: NB left = 46.5/D, NB thru-right = 38.3/D, SB left = 48.0/D, SB thru-right = 37.0/D
- Delay presented in table for Intersection 3 average delay/LOS. Cumulative with Project With Mitigation Delay/LOS for specific movements from the off-ramp as follows:
 - PM Peak Hour: NB left = 46.8/D, NB thru/right = 64.3/E, SB left = 62.2/D, SB thru-right = 39.2/D
 - Sat Peak Hour: NB left = 44.9/D, NB thru-right = 37.1/D, SB left = 45.6/D, SB thru-right = 35.8/D

Source: Fehr & Peers, October 2014.



6.4.1 IMPACTS TO TRANSIT TRAVEL TIME

This section discusses the potential of the project to substantially increase travel times for AC transit buses (Significance Criteria 9). Although the project has the potential to increase traffic volumes along Grand Avenue where AC Transit Route NL and Line 31 operate, implementation of mitigation measures TR-1 and TR-2 could decrease travel time along the corridor by reducing intersection delay. Therefore, the impact to transit travel time is considered ***less-than-significant***.



7.0 ALAMEDA COUNTY TRANSPORTATION COMMISSION ROADWAY ANALYSIS

A separate analysis of regional roadways is required to comply with requirements of the Alameda County Transportation Commission (ACTC). The ACTC requires the analysis of project impacts to Metropolitan Transportation System (MTS) roadways identified in the Congestion Management Plan (CMP) for development projects that would generate more than 100 weekday PM peak hour trips. As the project is not projected to generate more than 100 weekday PM peak hour trips, no analysis of the MTS roadway system was conducted.



8.0 OTHER TRANSPORTATION THRESHOLDS

This chapter discusses conditions in the study area for pedestrians, bicyclists and transit users with the project and reviews traffic safety thresholds and other thresholds as described in Chapter 1.

8.1 TRAFFIC SAFETY THRESHOLDS

The following traffic safety thresholds as set by the City of Oakland were reviewed:

10. Directly or indirectly cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard due to a new or existing physical design feature or incompatible uses
11. Directly or indirectly result in a permanent substantial decrease in pedestrian safety
12. Directly or indirectly result in a permanent substantial decrease in bicyclist safety
13. Directly or indirectly result in a permanent substantial decrease in bus rider safety
14. Generate substantial multi-modal traffic traveling across at-grade railroad crossings that cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard

The proposed project would increase motor vehicle traffic, pedestrian and bicycle activity in the West Oakland area. The Path project is not expected to attract new bus riders to the transit system in the area.

8.1.1 TRANSPORTATION HAZARDS

The Path project is intended to separate bicycle and pedestrian travel from motor vehicle travel, reducing potential conflicts between different roadway users. Access to the Path from the east would be from West Grand Avenue at Mandela Parkway. Access to the Path from users that park within the Wood Street parking lot would be from new Class 2 bicycle lanes marked on Wood Street, 20th Street, Willow Street and Campbell Street, connecting to the at-grade section of the path between Mandela Parkway and Campbell Street. The Path would provide a physical separation between Path users (pedestrians and bicyclists) and motor vehicle traffic for most of its length, reducing hazards.

At the West Grand Avenue/Frontage Road/I-80 Ramps intersection, the project would add pedestrian and bicycle traffic to an intersection where the current pedestrian accommodations would be insufficient to accommodate increased demand.

Impact TR-3: Intersection 3 - West Grand Avenue/Frontage Road/I-80 Ramps intersection



The Path project would add pedestrian and bicycle traffic to an intersection that provides minimal pedestrian and bicycle accommodations. This is a **significant impact** based on City of Oakland Significance Criteria Thresholds 10, 11, and 12.

Mitigation Measure TR-3: Upgrade the marked crosswalk along the south leg of the intersection to be the same width as the Path and provide a refuge area sufficient to accommodate a platoon of 5 to 10 bicyclists or pedestrians. Install a pedestrian and bicycle signals and upgrade the traffic signal equipment as necessary to accommodate the pedestrian and bicycle movement across the intersection. With installation of video detection for both bicyclists and vehicles, the improvements are not projected to degrade the automobile level of service at the intersection. Implementation of this measure would reduce the project impact to a **less-than-significant** level.

Path Design

The Path would be constructed in five sections, as described in Chapter 3, with varying widths reflective of right-of-way constraints. As the project is intended to accommodate both bicycle and pedestrian travel, there could be some conflicts between bicyclists and pedestrians. Generally, the path is being designed to provide ten feet for bicyclists (five foot lanes in each direction), a five foot area for pedestrians, and a two foot shy area for fencing within a 17-foot cross section. The Segment 3 overcrossing structure would have a width of fourteen feet (ten foot clear area and four feet for shoulders to accommodate fencing); the width is reduced in this area due to the railroad tracks. The Caltrans *Highway Design Manual* (Chapter 1000) specifies a minimum width of eight feet for a two-way bike path, with ten-feet preferred. Where a path is on a structure, the minimum width of the path is fourteen feet, to provide ten feet for travel and a four foot shoulder area.

The Path as currently proposed would meet or exceed Caltrans standards for Class 1 path design. The volume of pedestrian and bicycle travel expected along the Path is expected to be less than 10 percent of the total pedestrian and bicycle traffic that is expected through the Park area and the East Span of the Bay Bridge, as presented in Chapter 4, with higher levels of bicycle activity than pedestrian activity. This level of activity would result in 140 to 450 Path users on a typical weekday and 430 to 830 Path users on a weekend day, with less activity during an individual hour.

A Trail Level of Service (LOS) Calculator as developed by North Carolina State University and Toole Design Group, based on the Federal Highway Administration *Shared-Use Path Level of Service Calculator—A User's Guide*, July 2006, was used to assess the Pedestrian/Bicycle LOS on the Path, which considers factors such as bicyclist passing, desired buffer space between path users, and the mix of bicyclists, pedestrians, runners and child bicyclists. Based on the weekend peak hour pedestrian/bicycle volume estimate



(between 60 and 120 trail users in a peak hour) on the Path, the Trail LOS is B for the segments with a 17-foot cross section and LOS C for segments with a 14-foot cross section, meaning that pedestrians and bicyclists can generally travel fairly unimpeded along the Path, although some bicyclists may have to wait to pass a slower moving bicyclist. Trail operations would be better during other times of day and week.

Approximately 500 users per hour could be accommodated on the Path at LOS D condition, which is considered the functional capacity of a trail. When these conditions are experienced, bicyclists are likely to avoid peak periods or adjust expectations of path operations. Segment 3 of the Path constrains the volume of pedestrian and bicycle travel that could be accommodated along the entire Path corridor.

Bicycle/Pedestrian conflicts could exist where the Path would connect to the existing Bay Bridge Trail, below the I-880/I-80 connection.

Impact TR-4: Pedestrian/Bicycle Conflicts – Connection of Path to Existing Bay Bridge Trail

The Path project would add a connection to the existing Bay Bridge Trail, resulting in bicycle/pedestrian conflicts at the intersection. As this could create a hazard for pedestrians and bicyclists, this is a potentially **significant impact** based on City of Oakland Significance Criteria Threshold 10.

Mitigation Measure TR-4: Provide additional Path width in the vicinity of the Bay Bridge Trail intersection, directional signage and striping, and potentially a bicycle stop sign on the Path at the Bay Trail connection. Implementation of this measure would reduce the Pedestrian Safety impact to a **less-than-significant** level.

8.1.2 PEDESTRIAN SAFETY

The project would add a separated bicycle and pedestrian path connecting West Oakland to the Bay Bridge Trail that would be open at all times. Sidewalks and paths are provided in the project vicinity along Grand Avenue and Mandela Parkway, connecting to the Path, as well as crosswalks and pedestrian signals. Some Path pedestrians could use the Wood Street parking lot. Although sidewalks are provided on some of the streets around the parking lot, they are discontinuous in the area.

Impact TR-5: Pedestrian Safety

The Path project could add pedestrian demand between the Wood Street parking lot and the start of the Path at Mandela Parkway, a distance of approximately 1/4-mile. As sidewalks are discontinuous in this area and street lighting is intermittent, this is a



potentially **significant impact** based on City of Oakland Significance Criteria Threshold 11.

Mitigation Measure TR-5: Identify the pedestrian path of travel between the Wood Street parking lot and the Path. Install sidewalks, crosswalks, pedestrian scale lighting, and way-finding elements as necessary along the pedestrian path of travel. Implementation of this measure would reduce the Pedestrian Safety impact to a **less-than-significant** level.

8.1.3 BICYCLE SAFETY

The project would add a separated bicycle and pedestrian path connecting West Oakland to the Bay Bridge Trail which would enhance bicycle safety by adding a separated bicycle facility where there currently is none. The Path would have lighting and access provided 24-hours a day. Some Path bicyclists could use the Wood Street parking lot and access the Path from the Class 2 bicycle facilities proposed on the streets connecting the Wood Street parking lot and the Path.

Segment 4 of the Path contains a 180 degree curve on a 2 percent grade to transition from the elevated structure to grade level. Based on guidance provided in the Caltrans *Highway Design Manual*, 5 percent grade is the maximum allowed for short segments, and 2 percent is recommended for sustained grades.

Impact TR-6a: Bicycle Safety

The Path project would add bicycle demand between the Wood Street parking lot and the start of the Path at Mandela Parkway, a distance of approximately 1/4-mile. The project could add Class 2 bicycle facilities in this area, if funding is available. If the Wood Street parking lot was constructed without the accompanying bicycle facilities, this is a potentially **significant impact** based on City of Oakland Significance Criteria Threshold 12 as new bicyclists demand would be added to an area without facilities to serve them.

Mitigation Measure TR-6a: When the Wood Street parking lot is constructed, construct bicycle facilities connecting the parking lot to the path, including crossing treatments, way-finding elements, and lighting as necessary along the path of travel. Implementation of this measure would reduce this Bicycle Safety impact to a **less-than-significant** level.

Impact TR-6b: Bicycle Safety

Based on information contained in Chapter 1000 of the Caltrans *Highway Design Manual*, the minimum design speed for a bicycle path is 20 miles per hour, with the minimum



radius of curvature at that design speed of 90 feet, which is not met with the current design.

Mitigation Measure TR-6b: Warning signs should be installed at the curve approaches for Segment 4 and clear lines of sight maintained between path sections. Consider providing a wider cross-section through the curve area. Implementation of this measure would reduce this Bicycle Safety impact to a **less-than-significant** level.

8.1.4 BUS RIDER SAFETY

The project is not expected to have a significant demand for public transit, nor would it change any existing transit facility. Therefore, the impact to bus rider safety is considered a **less-than-significant**.

8.2 OTHER THRESHOLDS

The following additional transportation-related thresholds as set by the City of Oakland were reviewed:

15. Fundamentally conflict with adopted City policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment
16. Result in a substantial, though temporary, adverse effect on the circulation system during construction of the project
17. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks

8.2.1 CONSISTENCY WITH ADOPTED POLICIES, PLANS OR PROGRAMS SUPPORTING ALTERNATIVE TRANSPORTATION

The discussion of consistency with adopted policies, plans or programs supporting alternative transportation is based on application of Significance Threshold 15. A discussion of applicable policies and plans is provided below. In general, the proposed project is consistent with these policies, plans and programs, and would not cause a significant impact by conflicting with adopted policies, plans, or programs supporting public transit, bicycle, or pedestrian.

The City of Oakland General Plan Land Use Transportation Element (LUTE) and the City's Complete Streets Policy (84204 CMS), states a strong preference for encouraging the use of non-automobile transportation modes, such as transit, bicycling, and walking. The proposed project would encourage the use of non-



automobile transportation modes by providing additional bicycle and pedestrian facilities within the City of Oakland.

The proposed project would add Class 1 and Class 2 bicycle facilities along the West Grand Avenue corridor consistent with the City's *Bicycle Master Plan*. In addition, Recommendations TR-3, TR-4 and TR-5 would improve access, circulation, safety, and comfort for pedestrian and bicyclists further encouraging the use of these modes in the project vicinity. Based on our review, the Path project would not conflict with adopted City policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. This is a **less-than-significant** impact, and no mitigation measures are required.

8.2.2 CONSTRUCTION-PERIOD IMPACTS

Project construction is expected to take place over a two-year period between 2017 and 2019. During the construction period, temporary and intermittent transportation impacts may result from truck movements as well as construction worker vehicles to and from the project site. The construction-related traffic may temporarily reduce capacities of roadways in the project vicinity because of the slower movements and larger turning radii of construction trucks compared to passenger vehicles.

The City of Oakland Construction Traffic and Parking Standard Condition of Approval (SCA) requires that a Construction Traffic Management Plan be developed as part of a larger Construction Management Plan to address potentially significant impacts during the project's construction. Thus, with the implementation of this SCA, the proposed project would not result in a substantial, though temporary, adverse effect on the circulation system during construction of the project. This is a **less-than-significant** impact, and no mitigation measures are required.

8.2.3 CHANGES IN AIR TRAFFIC PATTERNS

The Oakland International Airport is located about seven miles southeast of the project site. The project would be at the same level as existing structures in the area and are not expected to interfere with current flight patterns of Oakland International Airport or other nearby airports. Therefore, the proposed project would not result in changes to air traffic patterns. This is a **less-than-significant** impact, and no mitigation measures are required.



APPENDIX A: INTERSECTION COUNT DATA SHEETS



ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-001 Maritime Street-Burma Road.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	Maritime Street Southbound					Driveway Westbound					Maritime Street Northbound					Burma Road Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	0	24	2	0	26	0	0	0	0	0	1	71	0	0	72	14	0	2	0	16	114	0
16:15	0	25	5	0	30	0	0	0	0	0	2	103	1	0	106	21	0	3	0	24	160	0
16:30	0	21	1	0	22	0	0	0	0	0	1	115	0	0	116	10	0	1	0	11	149	0
16:45	0	19	0	0	19	0	0	0	0	0	1	125	0	0	126	14	0	1	0	15	160	0
Total	0	89	8	0	97	0	0	0	0	0	5	414	1	0	420	59	0	7	0	66	583	0
17:00	0	19	3	0	22	0	0	0	0	0	0	88	0	0	88	20	0	1	0	21	131	0
17:15	0	24	1	0	25	0	0	0	0	0	0	58	0	0	58	39	0	3	0	42	125	0
17:30	0	46	2	0	48	0	0	0	0	0	0	59	0	0	59	36	0	1	0	37	144	0
17:45	1	44	1	1	47	0	0	1	0	1	1	36	0	0	37	21	0	0	0	21	106	1
Total	1	133	7	1	142	0	0	1	0	1	1	241	0	0	242	116	0	5	0	121	506	1
Grand Total	1	222	15	1	239	0	0	1	0	1	6	655	1	0	662	175	0	12	0	187	1089	1
Apprch %	0.4%	92.9%	6.3%	0.4%		0.0%	0.0%	100.0%	0.0%		0.9%	98.9%	0.2%	0.0%		93.6%	0.0%	6.4%	0.0%			
Total %	0.1%	20.4%	1.4%	0.1%	21.9%	0.0%	0.0%	0.1%	0.0%	0.1%	0.6%	60.1%	0.1%	0.0%	60.8%	16.1%	0.0%	1.1%	0.0%	17.2%	100.0%	

PM PEAK HOUR	Maritime Street Southbound					Driveway Westbound					Maritime Street Northbound					Burma Road Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	0	25	5	0	30	0	0	0	0	0	2	103	1	0	106	21	0	3	0	24	160
16:30	0	21	1	0	22	0	0	0	0	0	1	115	0	0	116	10	0	1	0	11	149
16:45	0	19	0	0	19	0	0	0	0	0	1	125	0	0	126	14	0	1	0	15	160
17:00	0	19	3	0	22	0	0	0	0	0	0	88	0	0	88	20	0	1	0	21	131
Total Volume	0	84	9	0	93	0	0	0	0	0	4	431	1	0	436	65	0	6	0	71	600
% App Total	0.0%	90.3%	9.7%	0.0%		0.0%	0.0%	0.0%	0.0%		0.9%	98.9%	0.2%	0.0%		91.5%	0.0%	8.5%	0.0%		
PHF	.000	.840	.450	.000	.775	.000	.000	.000	.000	.000	.500	.862	.250	.000	.865	.774	.000	.500	.000	.740	.938

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-002 Maritime Street-West Grand Avenue.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	Wake Avenue Southbound					West Grand Avenue Westbound					Maritime Street Northbound					I-80 Ramps Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	13	10	11	0	34	6	111	6	0	123	32	20	30	0	82	3	47	12	1	63	302	1
16:15	24	5	26	0	55	7	103	6	0	116	53	28	40	0	121	1	39	16	0	56	348	0
16:30	21	6	15	0	42	7	115	7	0	129	62	29	39	0	130	1	54	7	2	64	365	2
16:45	12	8	12	0	32	7	111	12	0	130	68	19	44	0	131	0	49	7	1	57	350	1
Total	70	29	64	0	163	27	440	31	0	498	215	96	153	0	464	5	189	42	4	240	1365	4
17:00	17	4	16	0	37	9	150	7	0	166	72	16	29	0	117	3	55	8	3	69	389	3
17:15	18	4	8	0	30	9	131	8	0	148	43	8	42	0	93	1	59	13	2	75	346	2
17:30	6	4	7	0	17	14	144	4	0	162	59	7	33	0	99	1	71	34	2	108	386	2
17:45	8	2	4	0	14	15	106	5	0	126	29	5	29	0	63	1	65	27	2	95	298	2
Total	49	14	35	0	98	47	531	24	0	602	203	36	133	0	372	6	250	82	9	347	1419	9
Grand Total	119	43	99	0	261	74	971	55	0	1100	418	132	286	0	836	11	439	124	13	587	2784	13
Apprch %	45.6%	16.5%	37.9%	0.0%		6.7%	88.3%	5.0%	0.0%		50.0%	15.8%	34.2%	0.0%		1.9%	74.8%	21.1%	2.2%			
Total %	4.3%	1.5%	3.6%	0.0%	9.4%	2.7%	34.9%	2.0%	0.0%	39.5%	15.0%	4.7%	10.3%	0.0%	30.0%	0.4%	15.8%	4.5%	0.5%	21.1%	100.0%	

PM PEAK HOUR	Wake Avenue Southbound					West Grand Avenue Westbound					Maritime Street Northbound					I-80 Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	12	8	12	0	32	7	111	12	0	130	68	19	44	0	131	0	49	7	1	57	350
17:00	17	4	16	0	37	9	150	7	0	166	72	16	29	0	117	3	55	8	3	69	389
17:15	18	4	8	0	30	9	131	8	0	148	43	8	42	0	93	1	59	13	2	75	346
17:30	6	4	7	0	17	14	144	4	0	162	59	7	33	0	99	1	71	34	2	108	386
Total Volume	53	20	43	0	116	39	536	31	0	606	242	50	148	0	440	5	234	62	8	309	1471
% App Total	45.7%	17.2%	37.1%	0.0%		6.4%	88.4%	5.1%	0.0%		55.0%	11.4%	33.6%	0.0%		1.6%	75.7%	20.1%	2.6%		
PHF	.736	.625	.672	.000	.784	.696	.893	.646	.000	.913	.840	.658	.841	.000	.840	.417	.824	.456	.667	.715	.945

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-003 Frontage Road-West Grand Avenue.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	I-80 Ramps Southbound					West Grand Avenue Westbound					Frontage Road Northbound					West Grand Avenue Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	21	17	2	0	40	26	100	54	0	180	16	33	47	0	96	22	47	18	0	87	403	0
16:15	14	17	4	0	35	31	114	50	0	195	12	50	66	0	128	24	65	21	0	110	468	0
16:30	14	11	4	0	29	34	115	38	0	187	15	34	62	0	111	23	67	20	0	110	437	0
16:45	23	13	2	0	38	46	93	36	0	175	20	46	79	0	145	22	67	13	0	102	460	0
Total	72	58	12	0	142	137	422	178	0	737	63	163	254	0	480	91	246	72	0	409	1768	0
17:00	22	14	6	0	42	43	130	41	0	214	21	35	69	0	125	17	65	21	1	104	485	1
17:15	30	12	1	0	43	30	143	49	0	222	18	34	64	0	116	22	75	21	0	118	499	0
17:30	30	21	5	0	56	24	134	41	0	199	18	23	78	0	119	26	76	14	0	116	490	0
17:45	27	16	2	0	45	38	123	37	0	198	12	24	65	0	101	13	68	14	0	95	439	0
Total	109	63	14	0	186	135	530	168	0	833	69	116	276	0	461	78	284	70	1	433	1913	1
Grand Total	181	121	26	0	328	272	952	346	0	1570	132	279	530	0	941	169	530	142	1	842	3681	1
Apprch %	55.2%	36.9%	7.9%	0.0%		17.3%	60.6%	22.0%	0.0%		14.0%	29.6%	56.3%	0.0%		20.1%	62.9%	16.9%	0.1%			
Total %	4.9%	3.3%	0.7%	0.0%	8.9%	7.4%	25.9%	9.4%	0.0%	42.7%	3.6%	7.6%	14.4%	0.0%	25.6%	4.6%	14.4%	3.9%	0.0%	22.9%	100.0%	

PM PEAK HOUR	I-80 Ramps Southbound					West Grand Avenue Westbound					Frontage Road Northbound					West Grand Avenue Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	23	13	2	0	38	46	93	36	0	175	20	46	79	0	145	22	67	13	0	102	460
17:00	22	14	6	0	42	43	130	41	0	214	21	35	69	0	125	17	65	21	1	104	485
17:15	30	12	1	0	43	30	143	49	0	222	18	34	64	0	116	22	75	21	0	118	499
17:30	30	21	5	0	56	24	134	41	0	199	18	23	78	0	119	26	76	14	0	116	490
Total Volume	105	60	14	0	179	143	500	167	0	810	77	138	290	0	505	87	283	69	1	440	1934
% App Total	58.7%	33.5%	7.8%	0.0%		17.7%	61.7%	20.6%	0.0%		15.2%	27.3%	57.4%	0.0%		19.8%	64.3%	15.7%	0.2%		
PHF	.875	.714	.583	.000	.799	.777	.874	.852	.000	.912	.917	.750	.918	.000	.871	.837	.931	.821	.250	.932	.969

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-004 Campbell Street-West Grand Avenue.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	Campbell Street Southbound					West Grand Avenue Westbound					Campbell Street Northbound					West Grand Avenue Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	0	0	28	0	28	4	148	1	1	154	9	1	9	0	19	7	104	11	3	125	326	4
16:15	0	0	32	0	32	5	157	2	0	164	6	0	6	0	12	14	122	10	1	147	355	1
16:30	1	0	38	0	39	2	148	2	1	153	8	0	2	0	10	16	135	5	3	159	361	4
16:45	1	0	38	0	39	1	159	3	1	164	5	0	0	0	5	13	141	10	10	174	382	11
Total	2	0	136	0	138	12	612	8	3	635	28	1	17	0	46	50	502	36	17	605	1424	20
17:00	0	1	47	0	48	6	151	3	0	160	13	0	3	0	16	14	135	6	6	161	385	6
17:15	0	1	48	0	49	3	173	2	1	179	7	0	4	0	11	11	163	13	6	193	432	7
17:30	1	2	38	0	41	5	159	2	1	167	7	0	6	0	13	12	161	11	4	188	409	5
17:45	1	1	31	0	33	4	151	0	0	155	16	1	2	0	19	8	140	18	4	170	377	4
Total	2	5	164	0	171	18	634	7	2	661	43	1	15	0	59	45	599	48	20	712	1603	22
Grand Total	4	5	300	0	309	30	1246	15	5	1296	71	2	32	0	105	95	1101	84	37	1317	3027	42
Apprch %	1.3%	1.6%	97.1%	0.0%		2.3%	96.1%	1.2%	0.4%		67.6%	1.9%	30.5%	0.0%		7.2%	83.6%	6.4%	2.8%			
Total %	0.1%	0.2%	9.9%	0.0%	10.2%	1.0%	41.2%	0.5%	0.2%	42.8%	2.3%	0.1%	1.1%	0.0%	3.5%	3.1%	36.4%	2.8%	1.2%	43.5%	100.0%	

PM PEAK HOUR	Campbell Street Southbound					West Grand Avenue Westbound					Campbell Street Northbound					West Grand Avenue Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	1	0	38	0	39	1	159	3	1	164	5	0	0	0	5	13	141	10	10	174	382
17:00	0	1	47	0	48	6	151	3	0	160	13	0	3	0	16	14	135	6	6	161	385
17:15	0	1	48	0	49	3	173	2	1	179	7	0	4	0	11	11	163	13	6	193	432
17:30	1	2	38	0	41	5	159	2	1	167	7	0	6	0	13	12	161	11	4	188	409
Total Volume	2	4	171	0	177	15	642	10	3	670	32	0	13	0	45	50	600	40	26	716	1608
% App Total	1.1%	2.3%	96.6%	0.0%		2.2%	95.8%	1.5%	0.4%		71.1%	0.0%	28.9%	0.0%		7.0%	83.8%	5.6%	3.6%		
PHF	.500	.500	.891	.000	.903	.625	.928	.833	.750	.936	.615	.000	.542	.000	.703	.893	.920	.769	.650	.927	.931

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-005 Mandela Parkway-24th Street.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	Mandela Parkway Southbound					24th Street Westbound					Mandela Parkway Northbound					Eastbound					Total	Utum Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	0	73	0	0	73	30	0	5	0	35	0	94	0	1	95	0	0	0	0	0	203	1
16:15	0	106	0	0	106	35	0	1	0	36	0	118	0	0	118	0	0	0	0	0	260	0
16:30	0	112	0	0	112	39	0	3	0	42	0	107	0	1	108	0	0	0	0	0	262	1
16:45	0	110	0	0	110	30	0	6	0	36	0	131	0	1	132	0	0	0	0	0	278	1
Total	0	401	0	0	401	134	0	15	0	149	0	450	0	3	453	0	0	0	0	0	1003	3
17:00	0	129	0	0	129	36	0	3	0	39	0	139	0	0	139	0	0	0	0	0	307	0
17:15	0	123	0	0	123	43	0	1	0	44	0	151	0	0	151	0	0	0	0	0	318	0
17:30	0	118	0	0	118	34	0	1	0	35	0	153	0	2	155	0	0	0	0	0	308	2
17:45	0	110	0	0	110	33	0	4	0	37	0	153	0	2	155	0	0	0	0	0	302	2
Total	0	480	0	0	480	146	0	9	0	155	0	596	0	4	600	0	0	0	0	0	1235	4
Grand Total	0	881	0	0	881	280	0	24	0	304	0	1046	0	7	1053	0	0	0	0	0	2238	7
Apprch %	0.0%	100.0%	0.0%	0.0%		92.1%	0.0%	7.9%	0.0%		0.0%	99.3%	0.0%	0.7%		0.0%	0.0%	0.0%	0.0%			
Total %	0.0%	39.4%	0.0%	0.0%	39.4%	12.5%	0.0%	1.1%	0.0%	13.6%	0.0%	46.7%	0.0%	0.3%	47.1%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	

PM PEAK HOUR	Mandela Parkway Southbound					24th Street Westbound					Mandela Parkway Northbound					Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	129	0	0	129	36	0	3	0	39	0	139	0	0	139	0	0	0	0	0	307
17:15	0	123	0	0	123	43	0	1	0	44	0	151	0	0	151	0	0	0	0	0	318
17:30	0	118	0	0	118	34	0	1	0	35	0	153	0	2	155	0	0	0	0	0	308
17:45	0	110	0	0	110	33	0	4	0	37	0	153	0	2	155	0	0	0	0	0	302
Total Volume	0	480	0	0	480	146	0	9	0	155	0	596	0	4	600	0	0	0	0	0	1235
% App Total	0.0%	100.0%	0.0%	0.0%		94.2%	0.0%	5.8%	0.0%		0.0%	99.3%	0.0%	0.7%		0.0%	0.0%	0.0%	0.0%		
PHF	.000	.930	.000	.000	.930	.849	.000	.563	.000	.881	.000	.974	.000	.500	.968	.000	.000	.000	.000	.000	.971

All Traffic Data

(916) 771-8700

orders@atdtraffic.com

City of Oakland
All Vehicles on Unshifted Tab
Bicycles on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 13-7630-006 Mandela Parkway-West Grand Avenue
Site Code : 00000000
Start Date : 10/29/2013
Page No : 1

Groups Printed- Unshifted

	Mandela Parkway Southbound						West Grand Avenue Westbound						Mandela Parkway Northbound						Peralta Street Northeastbound					West Grand Avenue Eastbound					
Start Time	Left	Thru	Bear Right	Right	Uturns	App. Total	Left	Bear Left	Thru	Right	Uturns	App. Total	Hard Left	Left	Thru	Right	Uturns	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Int. Total
16:00	23	46	6	29	0	104	13	8	113	20	0	154	0	12	61	26	0	99	0	0	0	0	0	43	50	17	7	117	474
16:15	16	68	7	48	1	140	9	11	101	28	1	150	0	17	68	16	1	102	0	0	0	0	0	55	64	5	2	126	518
16:30	29	75	17	31	1	153	7	5	112	25	0	149	0	21	79	31	0	131	0	0	0	0	0	51	70	19	4	144	577
16:45	18	76	10	38	2	144	7	9	111	28	0	155	0	15	75	28	0	118	0	0	0	0	0	52	76	13	0	141	558
Total	86	265	40	146	4	541	36	33	437	101	1	608	0	65	283	101	1	450	0	0	0	0	0	201	260	54	13	528	2127
17:00	29	80	10	43	0	162	5	13	93	29	0	140	0	26	92	32	0	150	0	0	0	0	0	56	68	14	3	141	593
17:15	24	84	11	42	3	164	12	11	121	23	0	167	0	24	102	22	0	148	0	0	0	0	0	62	90	11	1	164	643
17:30	30	76	13	34	1	154	13	10	109	22	0	154	0	19	116	31	0	166	0	0	0	0	0	62	89	19	3	173	647
17:45	22	86	10	21	2	141	14	16	117	28	1	176	0	18	97	26	0	141	0	0	0	0	0	64	59	14	4	141	599
Total	105	326	44	140	6	621	44	50	440	102	1	637	0	87	407	111	0	605	0	0	0	0	0	244	306	58	11	619	2482
Grand Total	191	591	84	286	10	1162	80	83	877	203	2	1245	0	152	690	212	1	1055	0	0	0	0	0	445	566	112	24	1147	4609
Apprch %	16.4	50.9	7.2	24.6	0.9		6.4	6.7	70.4	16.3	0.2		0	14.4	65.4	20.1	0.1		0	0	0	0		38.8	49.3	9.8	2.1		
Total %	4.1	12.8	1.8	6.2	0.2	25.2	1.7	1.8	19	4.4	0	27	0	3.3	15	4.6	0	22.9	0	0	0	0	0	9.7	12.3	2.4	0.5	24.9	

	Mandela Parkway Southbound						West Grand Avenue Westbound						Mandela Parkway Northbound						Peralta Street Northeastbound					West Grand Avenue Eastbound					
Start Time	Left	Thru	Bear Right	Right	UtURNS	App. Total	Left	Bear Left	Thru	Right	UtURNS	App. Total	Hard Left	Left	Thru	Right	UtURNS	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																													
Peak Hour for Entire Intersection Begins at 17:00																													
17:00	29	80	10	43	0	162	5	13	93	29	0	140	0	26	92	32	0	150	0	0	0	0	0	56	68	14	3	141	593
17:15	24	84	11	42	3	164	12	11	121	23	0	167	0	24	102	22	0	148	0	0	0	0	0	62	90	11	1	164	643
17:30	30	76	13	34	1	154	13	10	109	22	0	154	0	19	116	31	0	166	0	0	0	0	0	62	89	19	3	173	647
17:45	22	86	10	21	2	141	14	16	117	28	1	176	0	18	97	26	0	141	0	0	0	0	0	64	59	14	4	141	599
Total Volume	105	326	44	140	6	621	44	50	440	102	1	637	0	87	407	111	0	605	0	0	0	0	0	244	306	58	11	619	2482
% App. Total	16.9	52.5	7.1	22.5	1		6.9	7.8	69.1	16	0.2		0	14.4	67.3	18.3	0		0	0	0	0		39.4	49.4	9.4	1.8		
PHF	.875	.948	.846	.814	.500	.947	.786	.781	.909	.879	.250	.905	.000	.837	.877	.867	.000	.911	.000	.000	.000	.000	.000	.953	.850	.763	.688	.895	.959

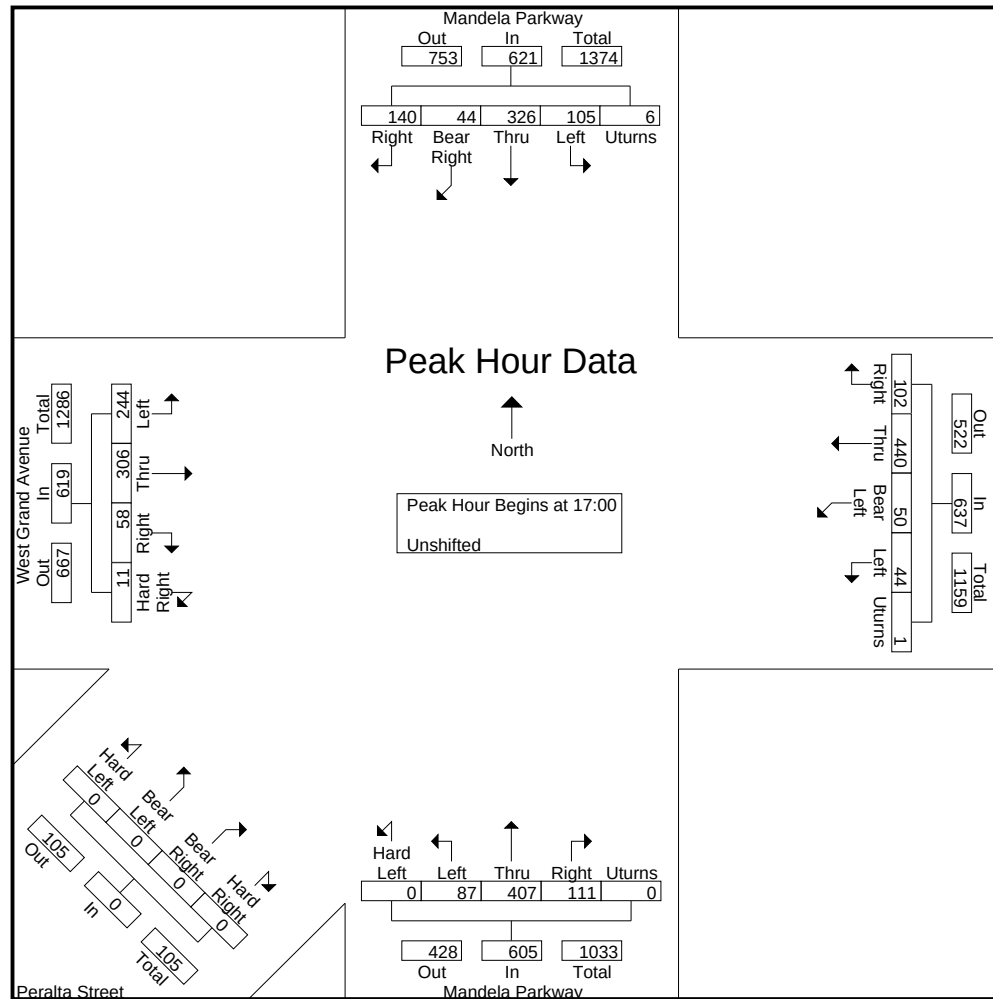
All Traffic Data

(916) 771-8700

orders@atdtraffic.com

City of Oakland
All Vehicles on Unshifted Tab
Bicycles on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 13-7630-006 Mandela Parkway-West Grand Avenue
Site Code : 00000000
Start Date : 10/29/2013
Page No : 2



All Traffic Data

(916) 771-8700

orders@atdtraffic.com

City of Oakland

All Vehicles on Unshifted Tab

Bicycles on Bank 1 Tab

Heavy Trucks on Bank 2 Tab

File Name : 13-7630-006 Mandela Parkway-West Grand Avenue

Site Code : 00000000

Start Date : 10/29/2013

Page No : 3

	Mandela Parkway Southbound						West Grand Avenue Westbound						Mandela Parkway Northbound						Peralta Street Northeastbound					West Grand Avenue Eastbound					
Start Time	Left	Thru	Bear Right	Right	Uturns	App. Total	Left	Bear Left	Thru	Right	Uturns	App. Total	Hard Left	Left	Thru	Right	Uturns	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																													
Peak Hour for Entire Intersection Begins at 17:00																													
17:00	29	80	10	43	0	162	5	13	93	29	0	140	0	26	92	32	0	150	0	0	0	0	0	56	68	14	3	141	593
17:15	24	84	11	42	3	164	12	11	121	23	0	167	0	24	102	22	0	148	0	0	0	0	0	62	90	11	1	164	643
17:30	30	76	13	34	1	154	13	10	109	22	0	154	0	19	116	31	0	166	0	0	0	0	0	62	89	19	3	173	647
17:45	22	86	10	21	2	141	14	16	117	28	1	176	0	18	97	26	0	141	0	0	0	0	0	64	59	14	4	141	599
Total Volume	105	326	44	140	6	621	44	50	440	102	1	637	0	87	407	111	0	605	0	0	0	0	0	244	306	58	11	619	2482
% App. Total	16.9	52.5	7.1	22.5	1		6.9	7.8	69.1	16	0.2		0	14.4	67.3	18.3	0		0	0	0	0		39.4	49.4	9.4	1.8		
PHF	.875	.948	.846	.814	.500	.947	.786	.781	.909	.879	.250	.905	.000	.837	.877	.867	.000	.911	.000	.000	.000	.000	.000	.953	.850	.763	.688	.895	.959

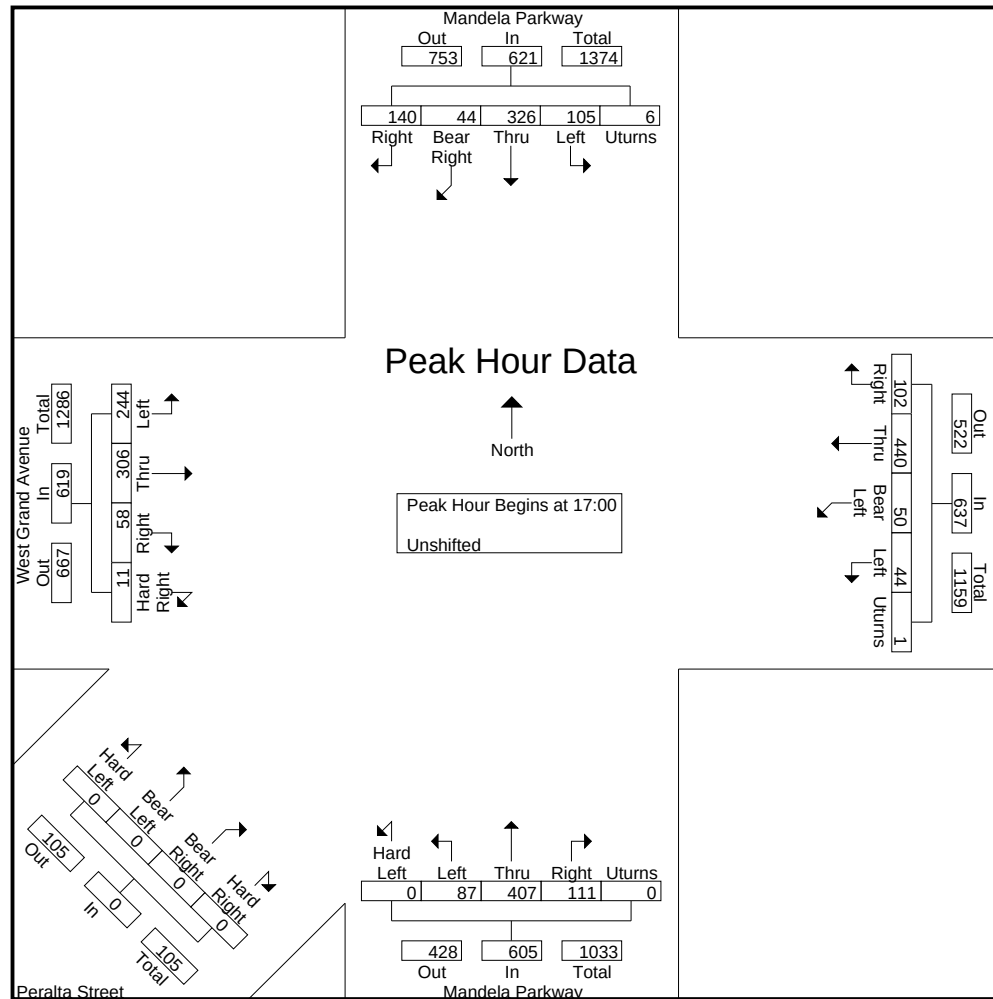
All Traffic Data

(916) 771-8700

orders@atdtraffic.com

City of Oakland
All Vehicles on Unshifted Tab
Bicycles on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 13-7630-006 Mandela Parkway-West Grand Avenue
Site Code : 00000000
Start Date : 10/29/2013
Page No : 4



ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-007 Mandela Parkway-20th Street.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	Mandela Parkway Southbound					20th Street Westbound					Mandela Parkway Northbound					20th Street Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	2	72	1	0	75	1	0	1	0	2	0	79	0	1	80	20	0	4	0	24	181	1
16:15	3	80	1	0	84	0	0	2	0	2	1	86	0	0	87	11	0	0	0	11	184	0
16:30	0	98	0	2	100	1	0	3	0	4	1	112	0	0	113	15	0	3	0	18	235	2
16:45	0	95	0	2	97	0	0	1	0	1	0	99	2	0	101	12	0	0	0	12	211	2
Total	5	345	2	4	356	2	0	7	0	9	2	376	2	1	381	58	0	7	0	65	811	5
17:00	1	96	0	0	97	2	1	1	0	4	1	139	1	1	142	16	0	4	0	20	263	1
17:15	0	107	2	0	109	0	0	2	0	2	1	124	0	0	125	16	0	0	0	16	252	0
17:30	1	107	0	0	108	1	0	0	0	1	1	151	1	0	153	18	0	1	0	19	281	0
17:45	2	108	0	2	112	1	0	1	0	2	0	122	0	1	123	15	0	2	0	17	254	3
Total	4	418	2	2	426	4	1	4	0	9	3	536	2	2	543	65	0	7	0	72	1050	4
Grand Total	9	763	4	6	782	6	1	11	0	18	5	912	4	3	924	123	0	14	0	137	1861	9
Apprch %	1.2%	97.6%	0.5%	0.8%		33.3%	5.6%	61.1%	0.0%		0.5%	98.7%	0.4%	0.3%		89.8%	0.0%	10.2%	0.0%			
Total %	0.5%	41.0%	0.2%	0.3%	42.0%	0.3%	0.1%	0.6%	0.0%	1.0%	0.3%	49.0%	0.2%	0.2%	49.7%	6.6%	0.0%	0.8%	0.0%	7.4%	100.0%	

PM PEAK HOUR	Mandela Parkway Southbound					20th Street Westbound					Mandela Parkway Northbound					20th Street Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	1	96	0	0	97	2	1	1	0	4	1	139	1	1	142	16	0	4	0	20	263
17:15	0	107	2	0	109	0	0	2	0	2	1	124	0	0	125	16	0	0	0	16	252
17:30	1	107	0	0	108	1	0	0	0	1	1	151	1	0	153	18	0	1	0	19	281
17:45	2	108	0	2	112	1	0	1	0	2	0	122	0	1	123	15	0	2	0	17	254
Total Volume	4	418	2	2	426	4	1	4	0	9	3	536	2	2	543	65	0	7	0	72	1050
% App Total	0.9%	98.1%	0.5%	0.5%		44.4%	11.1%	44.4%	0.0%		0.6%	98.7%	0.4%	0.4%		90.3%	0.0%	9.7%	0.0%		
PHF	.500	.968	.250	.250	.951	.500	.250	.500	.000	.563	.750	.887	.500	.500	.887	.903	.000	.438	.000	.900	.934

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-008 I-880 NB Off-Ramp-7th Street.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	Frontage Road Southbound					7th Street Westbound					I-880 NB Off-Ramp Northbound					7th Street Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	17	0	36	0	53	0	28	26	0	54	31	44	20	0	95	25	9	0	0	34	236	0
16:15	19	0	47	0	66	0	15	43	0	58	22	63	26	0	111	36	16	0	0	52	287	0
16:30	19	0	36	0	55	0	27	17	0	44	20	60	20	0	100	32	21	0	0	53	252	0
16:45	23	0	47	0	70	0	25	21	0	46	21	97	17	0	135	33	28	0	0	61	312	0
Total	78	0	166	0	244	0	95	107	0	202	94	264	83	0	441	126	74	0	0	200	1087	0
17:00	18	0	51	0	69	0	29	36	0	65	16	58	20	0	94	24	21	0	0	45	273	0
17:15	28	0	40	0	68	0	24	24	0	48	17	75	22	0	114	14	11	0	0	25	255	0
17:30	27	0	26	0	53	0	20	25	0	45	19	82	19	0	120	9	15	0	0	24	242	0
17:45	21	0	37	0	58	0	37	21	0	58	11	64	33	0	108	14	16	0	0	30	254	0
Total	94	0	154	0	248	0	110	106	0	216	63	279	94	0	436	61	63	0	0	124	1024	0
Grand Total	172	0	320	0	492	0	205	213	0	418	157	543	177	0	877	187	137	0	0	324	2111	0
Apprch %	35.0%	0.0%	65.0%	0.0%		0.0%	49.0%	51.0%	0.0%		17.9%	61.9%	20.2%	0.0%		57.7%	42.3%	0.0%	0.0%			
Total %	8.1%	0.0%	15.2%	0.0%	23.3%	0.0%	9.7%	10.1%	0.0%	19.8%	7.4%	25.7%	8.4%	0.0%	41.5%	8.9%	6.5%	0.0%	0.0%	15.3%	100.0%	

PM PEAK HOUR	Frontage Road Southbound					7th Street Westbound					I-880 NB Off-Ramp Northbound					7th Street Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	19	0	47	0	66	0	15	43	0	58	22	63	26	0	111	36	16	0	0	52	287
16:30	19	0	36	0	55	0	27	17	0	44	20	60	20	0	100	32	21	0	0	53	252
16:45	23	0	47	0	70	0	25	21	0	46	21	97	17	0	135	33	28	0	0	61	312
17:00	18	0	51	0	69	0	29	36	0	65	16	58	20	0	94	24	21	0	0	45	273
Total Volume	79	0	181	0	260	0	96	117	0	213	79	278	83	0	440	125	86	0	0	211	1124
% App Total	30.4%	0.0%	69.6%	0.0%		0.0%	45.1%	54.9%	0.0%		18.0%	63.2%	18.9%	0.0%		59.2%	40.8%	0.0%	0.0%		
PHF	.859	.000	.887	.000	.929	.000	.828	.680	.000	.819	.898	.716	.798	.000	.815	.868	.768	.000	.000	.865	.901

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-009 Maritime Street-7th Street.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	Maritime Street Southbound					7th Street Westbound					Maritime Street Northbound					7th Street Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	41	37	0	0	78	9	21	9	0	39	3	46	30	0	79	31	26	11	0	68	264	0
16:15	35	26	0	0	61	6	21	11	1	39	1	37	33	0	71	44	47	15	0	106	277	1
16:30	58	34	0	0	92	5	6	17	0	28	1	62	45	0	108	27	48	4	0	79	307	0
16:45	39	15	0	0	54	4	5	21	0	30	0	56	30	0	86	48	53	2	0	103	273	0
Total	173	112	0	0	285	24	53	58	1	136	5	201	138	0	344	150	174	32	0	356	1121	1
17:00	38	13	1	0	52	7	2	18	0	27	1	34	29	0	64	15	20	0	0	35	178	0
17:15	33	8	0	0	41	5	12	11	0	28	0	19	22	0	41	7	10	0	0	17	127	0
17:30	28	9	1	0	38	6	9	15	1	31	0	14	15	0	29	5	9	2	0	16	114	1
17:45	34	6	0	0	40	6	19	16	0	41	0	11	23	0	34	6	8	0	0	14	129	0
Total	133	36	2	0	171	24	42	60	1	127	1	78	89	0	168	33	47	2	0	82	548	1
Grand Total	306	148	2	0	456	48	95	118	2	263	6	279	227	0	512	183	221	34	0	438	1669	2
Apprch %	67.1%	32.5%	0.4%	0.0%		18.3%	36.1%	44.9%	0.8%		1.2%	54.5%	44.3%	0.0%		41.8%	50.5%	7.8%	0.0%			
Total %	18.3%	8.9%	0.1%	0.0%	27.3%	2.9%	5.7%	7.1%	0.1%	15.8%	0.4%	16.7%	13.6%	0.0%	30.7%	11.0%	13.2%	2.0%	0.0%	26.2%	100.0%	

PM PEAK HOUR	Maritime Street Southbound					7th Street Westbound					Maritime Street Northbound					7th Street Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	41	37	0	0	78	9	21	9	0	39	3	46	30	0	79	31	26	11	0	68	264
16:15	35	26	0	0	61	6	21	11	1	39	1	37	33	0	71	44	47	15	0	106	277
16:30	58	34	0	0	92	5	6	17	0	28	1	62	45	0	108	27	48	4	0	79	307
16:45	39	15	0	0	54	4	5	21	0	30	0	56	30	0	86	48	53	2	0	103	273
Total Volume	173	112	0	0	285	24	53	58	1	136	5	201	138	0	344	150	174	32	0	356	1121
% App Total	60.7%	39.3%	0.0%	0.0%		17.6%	39.0%	42.6%	0.7%		1.5%	58.4%	40.1%	0.0%		42.1%	48.9%	9.0%	0.0%		
PHF	.746	.757	.000	.000	.774	.667	.631	.690	.250	.872	.417	.810	.767	.000	.796	.781	.821	.533	.000	.840	.913

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-010 Adeline Street-West Grand Avenue.ppd

Date : 10/29/2013

Unshifted Count = All Vehicles

	Adeline Street Southbound					West Grand Avenue Westbound					Adeline Street Northbound					West Grand Avenue Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
16:00	14	48	19	0	81	17	124	14	2	157	3	35	28	0	66	9	96	6	0	111	415	2
16:15	14	31	9	0	54	12	123	8	1	144	5	36	20	0	61	8	92	5	0	105	364	1
16:30	21	56	17	0	94	13	113	11	0	137	6	53	19	0	78	11	122	6	2	141	450	2
16:45	15	42	21	0	78	16	125	12	2	155	8	41	15	0	64	11	103	10	0	124	421	2
Total	64	177	66	0	307	58	485	45	5	593	22	165	82	0	269	39	413	27	2	481	1650	7
17:00	20	45	13	0	78	13	133	11	2	159	3	51	11	0	65	13	116	8	0	137	439	2
17:15	11	50	13	0	74	13	163	9	1	186	8	62	12	0	82	7	119	12	0	138	480	1
17:30	16	44	17	0	77	11	133	18	1	163	10	42	16	0	68	13	145	13	0	171	479	1
17:45	14	35	14	0	63	13	147	14	1	175	6	39	7	0	52	18	102	7	0	127	417	1
Total	61	174	57	0	292	50	576	52	5	683	27	194	46	0	267	51	482	40	0	573	1815	5
Grand Total	125	351	123	0	599	108	1061	97	10	1276	49	359	128	0	536	90	895	67	2	1054	3465	12
Apprch %	20.9%	58.6%	20.5%	0.0%		8.5%	83.2%	7.6%	0.8%		9.1%	67.0%	23.9%	0.0%		8.5%	84.9%	6.4%	0.2%			
Total %	3.6%	10.1%	3.5%	0.0%	17.3%	3.1%	30.6%	2.8%	0.3%	36.8%	1.4%	10.4%	3.7%	0.0%	15.5%	2.6%	25.8%	1.9%	0.1%	30.4%	100.0%	

PM PEAK HOUR	Adeline Street Southbound					West Grand Avenue Westbound					Adeline Street Northbound					West Grand Avenue Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	15	42	21	0	78	16	125	12	2	155	8	41	15	0	64	11	103	10	0	124	421
17:00	20	45	13	0	78	13	133	11	2	159	3	51	11	0	65	13	116	8	0	137	439
17:15	11	50	13	0	74	13	163	9	1	186	8	62	12	0	82	7	119	12	0	138	480
17:30	16	44	17	0	77	11	133	18	1	163	10	42	16	0	68	13	145	13	0	171	479
Total Volume	62	181	64	0	307	53	554	50	6	663	29	196	54	0	279	44	483	43	0	570	1819
% App Total	20.2%	59.0%	20.8%	0.0%		8.0%	83.6%	7.5%	0.9%		10.4%	70.3%	19.4%	0.0%		7.7%	84.7%	7.5%	0.0%		
PHF	.775	.905	.762	.000	.984	.828	.850	.694	.750	.891	.725	.790	.844	.000	.851	.846	.833	.827	.000	.833	.947

ALL TRAFFIC DATA

City of Oakland
All Vehicles on Unshifted
Peds & Bikes on Bank 1
Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-001 Maritime Street-Burma Road.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	Maritime Street Southbound					Driveway Westbound					Maritime Street Northbound					Burma Road Eastbound					Total	Utum Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	0	14	6	0	20	0	0	0	0	0	7	18	0	0	25	5	0	2	0	7	52	0
14:15	2	9	9	2	22	0	0	1	0	1	3	15	1	0	19	17	0	4	0	21	63	2
14:30	0	11	12	0	23	0	0	2	0	2	1	9	0	0	10	11	0	1	0	12	47	0
14:45	2	10	8	3	23	0	0	2	0	2	7	16	1	0	24	19	0	5	0	24	73	3
Total	4	44	35	5	88	0	0	5	0	5	18	58	2	0	78	52	0	12	0	64	235	5
15:00	0	7	8	0	15	0	0	1	0	1	2	9	0	0	11	26	0	4	0	30	57	0
15:15	0	3	7	1	11	0	0	0	0	0	0	5	0	1	6	42	0	2	0	44	61	2
15:30	0	6	13	0	19	0	0	0	0	0	9	6	0	0	15	15	0	3	0	18	52	0
15:45	0	13	14	0	27	0	0	0	0	0	1	18	0	0	19	18	0	2	0	20	66	0
Total	0	29	42	1	72	0	0	1	0	1	12	38	0	1	51	101	0	11	0	112	236	2
16:00	0	9	6	1	16	0	0	3	0	3	2	15	0	0	17	15	0	1	0	16	52	1
16:15	0	11	11	0	22	0	0	1	0	1	3	13	0	0	16	14	1	5	0	20	59	0
16:30	0	10	6	1	17	0	0	0	0	0	0	13	1	0	14	17	0	2	0	19	50	1
16:45	0	3	8	0	11	0	0	0	0	0	2	34	0	0	36	15	0	1	0	16	63	0
Total	0	33	31	2	66	0	0	4	0	4	7	75	1	0	83	61	1	9	0	71	224	2
17:00	0	9	7	0	16	0	0	0	0	0	1	36	0	0	37	19	0	5	0	24	77	0
17:15	0	16	3	0	19	0	0	0	0	0	2	24	0	0	26	24	0	3	0	27	72	0
17:30	0	26	6	0	32	0	0	0	0	0	1	14	0	0	15	8	0	3	0	11	58	0
17:45	0	15	2	0	17	0	0	0	0	0	1	11	0	0	12	15	0	2	0	17	46	0
Total	0	66	18	0	84	0	0	0	0	0	5	85	0	0	90	66	0	13	0	79	253	0
Grand Total	4	172	126	8	310	0	0	10	0	10	42	256	3	1	302	280	1	45	0	326	948	9
Apprch %	1.3%	55.5%	40.6%	2.6%		0.0%	0.0%	100.0%	0.0%		13.9%	84.8%	1.0%	0.3%		85.9%	0.3%	13.8%	0.0%			
Total %	0.4%	18.1%	13.3%	0.8%	32.7%	0.0%	0.0%	1.1%	0.0%	1.1%	4.4%	27.0%	0.3%	0.1%	31.9%	29.5%	0.1%	4.7%	0.0%	34.4%	100.0%	

PM PEAK HOUR	Maritime Street Southbound					Driveway Westbound					Maritime Street Northbound					Burma Road Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	0	3	8	0	11	0	0	0	0	0	2	34	0	0	36	15	0	1	0	16	63
17:00	0	9	7	0	16	0	0	0	0	0	1	36	0	0	37	19	0	5	0	24	77
17:15	0	16	3	0	19	0	0	0	0	0	2	24	0	0	26	24	0	3	0	27	72
17:30	0	26	6	0	32	0	0	0	0	0	1	14	0	0	15	8	0	3	0	11	58
Total Volume	0	54	24	0	78	0	0	0	0	0	6	108	0	0	114	66	0	12	0	78	270
% App Total	0.0%	69.2%	30.8%	0.0%		0.0%	0.0%	0.0%	0.0%		5.3%	94.7%	0.0%	0.0%		84.6%	0.0%	15.4%	0.0%		
PHF	.000	.519	.750	.000	.609	.000	.000	.000	.000	.000	.750	.750	.000	.000	.770	.688	.000	.600	.000	.722	.877

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-002 Maritime Street-West Grand Avenue.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	Wake Avenue Southbound					West Grand Avenue Westbound					Maritime Street Northbound					I-80 Ramps Eastbound					Total	Utum Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	9	6	4	0	19	9	109	11	0	129	11	1	12	0	24	4	40	7	1	52	224	1
14:15	5	1	1	0	7	15	104	7	0	126	16	3	16	0	35	1	51	3	3	58	226	3
14:30	7	3	5	0	15	8	136	8	1	153	6	4	11	0	21	5	43	13	3	64	253	4
14:45	12	6	3	0	21	10	118	5	0	133	15	5	18	0	38	3	29	7	2	41	233	2
Total	33	16	13	0	62	42	467	31	1	541	48	13	57	0	118	13	163	30	9	215	936	10
15:00	6	1	2	0	9	7	117	3	0	127	18	3	16	0	37	1	42	9	2	54	227	2
15:15	9	1	7	0	17	3	112	4	0	119	16	0	33	0	49	3	51	5	6	65	250	6
15:30	8	2	4	0	14	16	117	10	0	143	8	2	11	0	21	5	37	5	1	48	226	1
15:45	5	3	6	0	14	11	97	3	0	111	14	5	18	0	37	3	42	13	1	59	221	1
Total	28	7	19	0	54	37	443	20	0	500	56	10	78	0	144	12	172	32	10	226	924	10
16:00	8	4	6	0	18	2	95	3	0	100	13	4	17	0	34	2	44	8	1	55	207	1
16:15	1	4	2	0	7	7	104	3	0	114	13	2	13	0	28	2	45	12	1	60	209	1
16:30	4	1	5	0	10	3	85	2	0	90	12	6	12	0	30	2	31	11	1	45	175	1
16:45	2	0	0	0	2	9	106	2	0	117	24	3	21	0	48	0	38	3	4	45	212	4
Total	15	9	13	0	37	21	390	10	0	421	62	15	63	0	140	6	158	34	7	205	803	7
17:00	9	1	0	0	10	5	121	5	1	132	28	3	24	0	55	2	50	10	2	64	261	3
17:15	2	0	4	0	6	9	113	4	0	126	16	5	27	0	48	1	45	11	2	59	239	2
17:30	5	3	7	0	15	12	102	3	0	117	10	1	12	0	23	2	44	17	2	65	220	2
17:45	5	4	3	0	12	6	114	1	0	121	9	2	15	0	26	4	37	6	2	49	208	2
Total	21	8	14	0	43	32	450	13	1	496	63	11	78	0	152	9	176	44	8	237	928	9
Grand Total	97	40	59	0	196	132	1750	74	2	1958	229	49	276	0	554	40	669	140	34	883	3591	36
Apprch %	49.5%	20.4%	30.1%	0.0%		6.7%	89.4%	3.8%	0.1%		41.3%	8.8%	49.8%	0.0%		4.5%	75.8%	15.9%	3.9%			
Total %	2.7%	1.1%	1.6%	0.0%	5.5%	3.7%	48.7%	2.1%	0.1%	54.5%	6.4%	1.4%	7.7%	0.0%	15.4%	1.1%	18.6%	3.9%	0.9%	24.6%	100.0%	

PM PEAK HOUR	Wake Avenue Southbound					West Grand Avenue Westbound					Maritime Street Northbound					I-80 Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 14:30 to 15:30																					
Peak Hour For Entire Intersection Begins at 14:30																					
14:30	7	3	5	0	15	8	136	8	1	153	6	4	11	0	21	5	43	13	3	64	253
14:45	12	6	3	0	21	10	118	5	0	133	15	5	18	0	38	3	29	7	2	41	233
15:00	6	1	2	0	9	7	117	3	0	127	18	3	16	0	37	1	42	9	2	54	227
15:15	9	1	7	0	17	3	112	4	0	119	16	0	33	0	49	3	51	5	6	65	250
Total Volume	34	11	17	0	62	28	483	20	1	532	55	12	78	0	145	12	165	34	13	224	963
% App Total	54.8%	17.7%	27.4%	0.0%		5.3%	90.8%	3.8%	0.2%		37.9%	8.3%	53.8%	0.0%		5.4%	73.7%	15.2%	5.8%		
PHF	.708	.458	.607	.000	.738	.700	.888	.625	.250	.869	.764	.600	.591	.000	.740	.600	.809	.654	.542	.862	.952

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-003 Frontage Road-West Grand Avenue.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	I-80 Ramps Southbound					West Grand Avenue Westbound					Frontage Road Northbound					West Grand Avenue Eastbound					Total	Utum Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	24	20	8	0	52	29	108	52	1	190	12	13	35	0	60	15	33	12	0	60	362	1
14:15	23	19	7	0	49	30	99	44	0	173	17	12	37	0	66	6	47	17	2	72	360	2
14:30	21	15	4	0	40	22	123	52	0	197	33	35	30	0	98	8	38	9	0	55	390	0
14:45	25	15	3	0	43	28	115	41	0	184	15	25	25	0	65	9	38	16	0	63	355	0
Total	93	69	22	0	184	109	445	189	1	744	77	85	127	0	289	38	156	54	2	250	1467	3
15:00	9	9	1	0	19	37	111	40	0	188	13	26	32	0	71	7	46	11	0	64	342	0
15:15	25	17	5	0	47	41	99	37	0	177	15	15	24	0	54	18	46	27	0	91	369	0
15:30	24	13	7	0	44	36	99	42	0	177	27	40	39	0	106	10	33	15	0	58	385	0
15:45	25	13	1	0	39	27	93	32	0	152	17	18	28	0	63	7	43	12	0	62	316	0
Total	83	52	14	0	149	141	402	151	0	694	72	99	123	0	294	42	168	65	0	275	1412	0
16:00	26	8	1	0	35	34	88	44	0	166	12	13	28	0	53	11	40	12	0	63	317	0
16:15	17	12	7	0	36	21	84	24	0	129	21	17	31	0	69	7	44	8	0	59	293	0
16:30	20	11	0	0	31	26	78	49	0	153	17	23	26	0	66	8	32	12	0	52	302	0
16:45	14	12	4	0	30	28	86	39	0	153	19	22	19	0	60	16	34	7	0	57	300	0
Total	77	43	12	0	132	109	336	156	0	601	69	75	104	0	248	42	150	39	0	231	1212	0
17:00	20	14	3	0	37	27	111	35	0	173	20	17	26	0	63	20	48	15	0	83	356	0
17:15	18	10	3	0	31	20	102	36	0	158	16	15	24	0	55	19	45	12	0	76	320	0
17:30	15	9	3	0	27	24	100	42	0	166	15	17	16	0	48	8	34	17	0	59	300	0
17:45	17	15	4	0	36	24	101	35	1	161	15	21	29	0	65	9	35	13	0	57	319	1
Total	70	48	13	0	131	95	414	148	1	658	66	70	95	0	231	56	162	57	0	275	1295	1
Grand Total	323	212	61	0	596	454	1597	644	2	2697	284	329	449	0	1062	178	636	215	2	1031	5386	4
Apprch %	54.2%	35.6%	10.2%	0.0%		16.8%	59.2%	23.9%	0.1%		26.7%	31.0%	42.3%	0.0%		17.3%	61.7%	20.9%	0.2%			
Total %	6.0%	3.9%	1.1%	0.0%	11.1%	8.4%	29.7%	12.0%	0.0%	50.1%	5.3%	6.1%	8.3%	0.0%	19.7%	3.3%	11.8%	4.0%	0.0%	19.1%	100.0%	

PM PEAK HOUR	I-80 Ramps Southbound					West Grand Avenue Westbound					Frontage Road Northbound					West Grand Avenue Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
14:00	24	20	8	0	52	29	108	52	1	190	12	13	35	0	60	15	33	12	0	60	362
14:15	23	19	7	0	49	30	99	44	0	173	17	12	37	0	66	6	47	17	2	72	360
14:30	21	15	4	0	40	22	123	52	0	197	33	35	30	0	98	8	38	9	0	55	390
14:45	25	15	3	0	43	28	115	41	0	184	15	25	25	0	65	9	38	16	0	63	355
Total Volume	93	69	22	0	184	109	445	189	1	744	77	85	127	0	289	38	156	54	2	250	1467
% App Total	50.5%	37.5%	12.0%	0.0%		14.7%	59.8%	25.4%	0.1%		26.6%	29.4%	43.9%	0.0%		15.2%	62.4%	21.6%	0.8%		
PHF	.930	.863	.688	.000	.885	.908	.904	.909	.250	.944	.583	.607	.858	.000	.737	.633	.830	.794	.250	.868	.940

Peak Hour Analysis From 14:00 to 15:00

Peak Hour For Entire Intersection Begins at 14:00

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-004 Campbell Street-West Grand Avenue.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	Campbell Street Southbound					West Grand Avenue Westbound					Campbell Street Northbound					West Grand Avenue Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	0	4	25	0	29	6	159	2	1	168	11	2	8	0	21	4	88	7	2	101	319	3
14:15	1	3	21	0	25	2	142	0	1	145	7	0	6	0	13	2	104	13	2	121	304	3
14:30	1	1	23	0	25	2	159	0	1	162	11	2	7	0	20	3	83	7	3	96	303	4
14:45	1	2	21	0	24	5	164	3	0	172	14	0	2	0	16	3	86	6	4	99	311	4
Total	3	10	90	0	103	15	624	5	3	647	43	4	23	0	70	12	361	33	11	417	1237	14
15:00	0	2	30	0	32	1	147	1	1	150	5	0	5	0	10	2	83	9	3	97	289	4
15:15	0	2	24	0	26	2	139	0	2	143	14	1	7	0	22	4	92	7	5	108	299	7
15:30	0	0	27	0	27	5	133	0	0	138	18	0	5	0	23	5	87	9	0	101	289	0
15:45	0	3	27	0	30	4	117	1	0	122	5	0	3	0	8	2	91	7	1	101	261	1
Total	0	7	108	0	115	12	536	2	3	553	42	1	20	0	63	13	353	32	9	407	1138	12
16:00	0	2	23	0	25	3	131	1	0	135	14	1	3	0	18	4	90	7	5	106	284	5
16:15	0	2	19	0	21	3	108	1	1	113	3	0	7	0	10	2	89	6	2	99	243	3
16:30	1	2	20	0	23	1	126	0	0	127	9	0	6	0	15	5	62	10	6	83	248	6
16:45	0	1	16	0	17	7	127	2	0	136	19	1	6	0	26	2	64	6	3	75	254	3
Total	1	7	78	0	86	14	492	4	1	511	45	2	22	0	69	13	305	29	16	363	1029	17
17:00	1	0	23	0	24	2	136	1	0	139	2	0	3	0	5	2	95	3	1	101	269	1
17:15	0	2	25	0	27	1	136	2	0	139	8	0	3	0	11	1	83	3	2	89	266	2
17:30	1	0	17	0	18	1	138	0	0	139	21	1	8	0	30	3	64	6	0	73	260	0
17:45	0	1	21	0	22	3	115	1	1	120	13	2	8	0	23	1	82	5	0	88	253	1
Total	2	3	86	0	91	7	525	4	1	537	44	3	22	0	69	7	324	17	3	351	1048	4
Grand Total	6	27	362	0	395	48	2177	15	8	2248	174	10	87	0	271	45	1343	111	39	1538	4452	47
Apprch %	1.5%	6.8%	91.6%	0.0%		2.1%	96.8%	0.7%	0.4%		64.2%	3.7%	32.1%	0.0%		2.9%	87.3%	7.2%	2.5%			
Total %	0.1%	0.6%	8.1%	0.0%	8.9%	1.1%	48.9%	0.3%	0.2%	50.5%	3.9%	0.2%	2.0%	0.0%	6.1%	1.0%	30.2%	2.5%	0.9%	34.5%	100.0%	

PM PEAK HOUR	Campbell Street Southbound					West Grand Avenue Westbound					Campbell Street Northbound					West Grand Avenue Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 14:00 to 15:00																					
Peak Hour For Entire Intersection Begins at 14:00																					
14:00	0	4	25	0	29	6	159	2	1	168	11	2	8	0	21	4	88	7	2	101	319
14:15	1	3	21	0	25	2	142	0	1	145	7	0	6	0	13	2	104	13	2	121	304
14:30	1	1	23	0	25	2	159	0	1	162	11	2	7	0	20	3	83	7	3	96	303
14:45	1	2	21	0	24	5	164	3	0	172	14	0	2	0	16	3	86	6	4	99	311
Total Volume	3	10	90	0	103	15	624	5	3	647	43	4	23	0	70	12	361	33	11	417	1237
% App Total	2.9%	9.7%	87.4%	0.0%		2.3%	96.4%	0.8%	0.5%		61.4%	5.7%	32.9%	0.0%		2.9%	86.6%	7.9%	2.6%		
PHF	.750	.625	.900	.000	.888	.625	.951	.417	.750	.940	.768	.500	.719	.000	.833	.750	.868	.635	.688	.862	.969

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-005 Mandela Parkway-24th Street.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	Mandela Parkway Southbound					24th Street Westbound					Mandela Parkway Northbound					Eastbound					Total	Utturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	0	107	0	0	107	42	0	0	0	42	0	110	0	2	112	0	0	0	0	0	261	2
14:15	0	88	0	0	88	31	0	2	0	33	0	85	0	1	86	0	0	0	0	0	207	1
14:30	0	107	0	0	107	39	0	4	0	43	0	75	0	0	75	0	0	0	0	0	225	0
14:45	0	97	0	0	97	32	0	0	0	32	0	78	0	0	78	0	0	0	0	0	207	0
Total	0	399	0	0	399	144	0	6	0	150	0	348	0	3	351	0	0	0	0	0	900	3
15:00	0	118	0	0	118	35	0	2	0	37	0	83	0	1	84	0	0	0	0	0	239	1
15:15	0	120	0	0	120	28	0	2	0	30	0	75	0	1	76	0	0	0	0	0	226	1
15:30	0	103	0	0	103	33	0	3	0	36	0	95	0	1	96	0	0	0	0	0	235	1
15:45	0	100	0	0	100	26	0	5	0	31	0	66	0	0	66	0	0	0	0	0	197	0
Total	0	441	0	0	441	122	0	12	0	134	0	319	0	3	322	0	0	0	0	0	897	3
16:00	0	107	0	0	107	30	0	2	0	32	0	78	0	0	78	0	0	0	0	0	217	0
16:15	0	100	0	0	100	33	0	1	0	34	0	65	0	0	65	0	0	0	0	0	199	0
16:30	0	96	0	0	96	26	0	3	0	29	0	60	0	0	60	0	0	0	0	0	185	0
16:45	0	89	0	0	89	36	0	0	0	36	0	56	0	1	57	0	0	0	0	0	182	1
Total	0	392	0	0	392	125	0	6	0	131	0	259	0	1	260	0	0	0	0	0	783	1
17:00	0	89	0	0	89	34	0	0	0	34	0	57	0	0	57	0	0	0	0	0	180	0
17:15	0	58	0	0	58	26	0	3	0	29	0	71	0	0	71	0	0	0	0	0	158	0
17:30	0	112	0	0	112	20	0	4	0	24	0	72	0	2	74	0	0	0	0	0	210	2
17:45	0	92	0	0	92	24	0	2	0	26	0	73	0	1	74	0	0	0	0	0	192	1
Total	0	351	0	0	351	104	0	9	0	113	0	273	0	3	276	0	0	0	0	0	740	3
Grand Total	0	1583	0	0	1583	495	0	33	0	528	0	1199	0	10	1209	0	0	0	0	0	3320	10
Apprch %	0.0%	100.0%	0.0%	0.0%		93.8%	0.0%	6.3%	0.0%		0.0%	99.2%	0.0%	0.8%		0.0%	0.0%	0.0%	0.0%			
Total %	0.0%	47.7%	0.0%	0.0%	47.7%	14.9%	0.0%	1.0%	0.0%	15.9%	0.0%	36.1%	0.0%	0.3%	36.4%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	

PM PEAK HOUR	Mandela Parkway Southbound					24th Street Westbound					Mandela Parkway Northbound					Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 14:45 to 15:45																					
Peak Hour For Entire Intersection Begins at 14:45																					
14:45	0	97	0	0	97	32	0	0	0	32	0	78	0	0	78	0	0	0	0	0	207
15:00	0	118	0	0	118	35	0	2	0	37	0	83	0	1	84	0	0	0	0	0	239
15:15	0	120	0	0	120	28	0	2	0	30	0	75	0	1	76	0	0	0	0	0	226
15:30	0	103	0	0	103	33	0	3	0	36	0	95	0	1	96	0	0	0	0	0	235
Total Volume	0	438	0	0	438	128	0	7	0	135	0	331	0	3	334	0	0	0	0	0	907
% App Total	0.0%	100.0%	0.0%	0.0%		94.8%	0.0%	5.2%	0.0%		0.0%	99.1%	0.0%	0.9%		0.0%	0.0%	0.0%	0.0%		
PHF	.000	.913	.000	.000	.913	.914	.000	.583	.000	.912	.000	.871	.000	.750	.870	.000	.000	.000	.000	.000	.949

All Traffic Data

(916) 771-8700

orders@atdtraffic.com

City of Oakland
All Vehicles on Unshifted Tab
Bicycles on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 13-7630-006 Mandela Parkway-West Grand Avenue
Site Code : 00000000
Start Date : 10/26/2013
Page No : 1

Groups Printed- Unshifted

	Mandela Parkway Southbound						West Grand Avenue Westbound						Mandela Parkway Northbound						Peralta Street Northeastbound					West Grand Avenue Eastbound						
Start Time	Left	Thru	Bear Right	Right	UtURNS	App. Total	Left	Bear Left	Thru	Right	UtURNS	App. Total	Hard Left	Left	Thru	Right	UtURNS	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	UtURNS	App. Total	Int. Total
14:00	22	57	19	47	4	149	8	12	100	24	0	144	0	18	73	23	0	114	0	0	0	0	0	39	50	8	0	0	97	504
14:15	21	46	16	36	4	123	8	9	89	14	0	120	1	14	46	18	0	79	0	0	0	0	0	47	41	19	1	1	109	431
14:30	19	64	11	44	2	140	20	11	101	11	1	144	0	15	47	13	0	75	0	0	0	1	1	35	37	17	6	0	95	455
14:45	14	51	10	55	0	130	9	14	102	20	0	145	0	16	54	26	0	96	0	0	0	1	1	26	43	7	5	0	81	453
Total	76	218	56	182	10	542	45	46	392	69	1	553	1	63	220	80	0	364	0	0	0	2	2	147	171	51	12	1	382	1843
15:00	24	79	13	34	2	152	16	11	105	17	0	149	0	15	54	19	0	88	0	0	0	1	1	33	42	15	5	0	95	485
15:15	27	60	7	43	5	142	9	19	78	16	0	122	0	15	55	20	0	90	0	0	0	0	0	25	59	14	1	0	99	453
15:30	20	46	19	45	1	131	11	15	85	15	0	126	0	8	54	19	0	81	0	0	0	0	0	34	47	8	3	0	92	430
15:45	27	59	17	29	0	132	9	13	70	12	0	104	0	19	42	15	0	76	0	0	0	0	0	29	42	16	6	0	93	405
Total	98	244	56	151	8	557	45	58	338	60	0	501	0	57	205	73	0	335	0	0	0	1	1	121	190	53	15	0	379	1773
16:00	27	62	10	42	3	144	4	10	66	12	0	92	0	19	61	17	0	97	0	0	0	0	0	30	46	10	3	0	89	422
16:15	20	61	13	31	1	126	9	6	67	15	0	97	0	17	52	13	0	82	0	0	1	0	1	35	49	15	4	0	103	409
16:30	16	64	16	27	0	123	7	7	87	13	0	114	0	18	45	14	1	78	0	0	0	0	0	28	34	6	1	0	69	384
16:45	16	52	11	44	0	123	7	7	71	11	0	96	0	21	34	15	0	70	0	0	0	0	0	29	33	7	0	0	69	358
Total	79	239	50	144	4	516	27	30	291	51	0	399	0	75	192	59	1	327	0	0	1	0	1	122	162	38	8	0	330	1573
17:00	15	55	6	42	0	118	11	9	77	16	1	114	0	16	41	24	0	81	0	0	0	0	0	26	53	18	0	0	97	410
17:15	13	35	10	28	0	86	2	11	98	13	0	124	0	16	38	24	0	78	0	0	0	0	0	32	43	13	1	0	89	377
17:30	15	75	8	32	1	131	13	4	91	11	0	119	1	17	60	20	0	98	0	0	0	0	0	18	40	5	4	0	67	415
17:45	16	51	13	39	0	119	10	9	66	13	1	99	0	13	51	21	1	86	0	0	0	0	0	30	48	8	6	0	92	396
Total	59	216	37	141	1	454	36	33	332	53	2	456	1	62	190	89	1	343	0	0	0	0	0	106	184	44	11	0	345	1598
Grand Total	312	917	199	618	23	2069	153	167	1353	233	3	1909	2	257	807	301	2	1369	0	0	1	3	4	496	707	186	46	1	1436	6787
Apprch %	15.1	44.3	9.6	29.9	1.1		8	8.7	70.9	12.2	0.2		0.1	18.8	58.9	22	0.1		0	0	25	75		34.5	49.2	13	3.2	0.1		
Total %	4.6	13.5	2.9	9.1	0.3	30.5	2.3	2.5	19.9	3.4	0	28.1	0	3.8	11.9	4.4	0	20.2	0	0	0	0	0.1	7.3	10.4	2.7	0.7	0	21.2	

All Traffic Data

(916) 771-8700

orders@atdtraffic.com

City of Oakland
All Vehicles on Unshifted Tab
Bicycles on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 13-7630-006 Mandela Parkway-West Grand Avenue
Site Code : 00000000
Start Date : 10/26/2013
Page No : 2

	Mandela Parkway Southbound						West Grand Avenue Westbound						Mandela Parkway Northbound						Peralta Street Northeastbound					West Grand Avenue Eastbound							
Start Time	Left	Thru	Bear Right	Right	Utturns	App. Total	Left	Bear Left	Thru	Right	Utturns	App. Total	Hard Left	Left	Thru	Right	Utturns	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	Utturns	App. Total	Int. Total	
Peak Hour Analysis From 14:00 to 17:45 - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 14:30																															
14:30	19	64	11	44	2	140	20	11	101	11	1	144	0	15	47	13	0	75	0	0	0	1	1	35	37	17	6	0	95	455	
14:45	14	51	10	55	0	130	9	14	102	20	0	145	0	16	54	26	0	96	0	0	0	1	1	26	43	7	5	0	81	453	
15:00	24	79	13	34	2	152	16	11	105	17	0	149	0	15	54	19	0	88	0	0	0	1	1	33	42	15	5	0	95	485	
15:15	27	60	7	43	5	142	9	19	78	16	0	122	0	15	55	20	0	90	0	0	0	0	0	25	59	14	1	0	99	453	
Total Volume	84	254	41	176	9	564	54	55	386	64	1	560	0	61	210	78	0	349	0	0	0	3	3	119	181	53	17	0	370	1846	
% App. Total	14.9	45	7.3	31.2	1.6		9.6	9.8	68.9	11.4	0.2		0	17.5	60.2	22.3	0		0	0	0	100		32.2	48.9	14.3	4.6	0			
PHF	.778	.804	.788	.800	.450	.928	.675	.724	.919	.800	.250	.940	.000	.953	.955	.750	.000	.909	.000	.000	.000	.750	.750	.850	.767	.779	.708	.000	.934	.952	

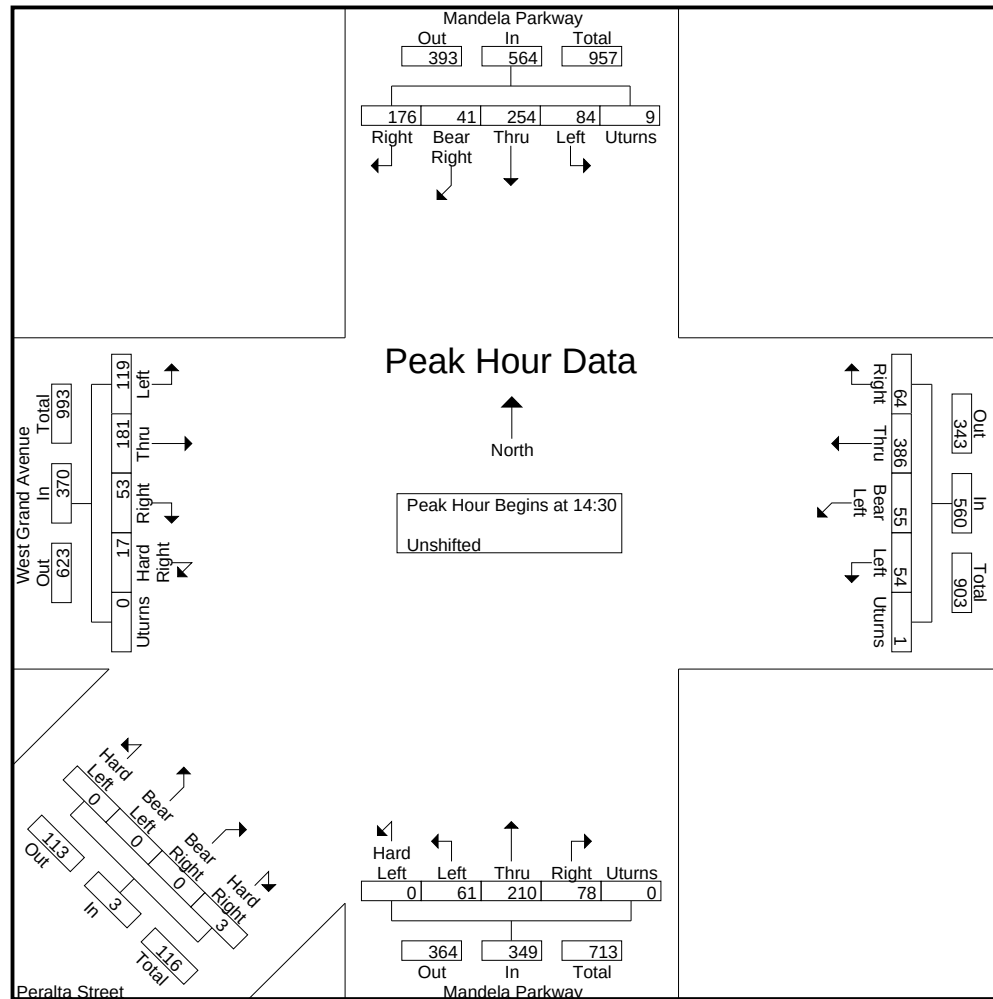
All Traffic Data

(916) 771-8700

orders@atdtraffic.com

City of Oakland
All Vehicles on Unshifted Tab
Bicycles on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 13-7630-006 Mandela Parkway-West Grand Avenue
Site Code : 00000000
Start Date : 10/26/2013
Page No : 3



ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-007 Mandela Parkway-20th Street.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	Mandela Parkway Southbound					20th Street Westbound					Mandela Parkway Northbound					20th Street Eastbound					Total	Uturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	1	70	3	0	74	1	0	3	0	4	0	92	1	1	94	15	0	4	0	19	191	1
14:15	2	66	3	2	73	1	0	2	0	3	1	62	6	0	69	10	0	3	0	13	158	2
14:30	4	95	2	4	105	1	0	4	0	5	0	62	9	0	71	5	0	3	0	8	189	4
14:45	5	59	2	4	70	1	0	3	0	4	2	71	2	0	75	17	1	6	0	24	173	4
Total	12	290	10	10	322	4	0	12	0	16	3	287	18	1	309	47	1	16	0	64	711	11
15:00	2	99	4	4	109	1	0	0	0	1	1	66	6	0	73	22	0	3	0	25	208	4
15:15	1	83	2	1	87	2	0	2	0	4	0	67	4	0	71	14	0	2	0	16	178	1
15:30	1	65	1	0	67	0	0	3	0	3	1	70	4	1	76	15	1	4	0	20	166	1
15:45	1	80	1	1	83	1	1	1	0	3	1	63	5	0	69	13	0	4	0	17	172	1
Total	5	327	8	6	346	4	1	6	0	11	3	266	19	1	289	64	1	13	0	78	724	7
16:00	0	74	2	2	78	1	0	4	0	5	0	78	1	0	79	7	0	3	0	10	172	2
16:15	0	81	1	1	83	0	0	1	0	1	0	72	0	0	72	15	0	2	0	17	173	1
16:30	2	76	1	0	79	2	0	1	0	3	0	60	5	0	65	9	0	4	0	13	160	0
16:45	1	68	0	1	70	1	0	2	0	3	1	56	0	0	57	14	0	3	0	17	147	1
Total	3	299	4	4	310	4	0	8	0	12	1	266	6	0	273	45	0	12	0	57	652	4
17:00	1	77	2	3	83	0	0	0	0	0	1	50	0	0	51	23	0	0	0	23	157	3
17:15	3	45	1	0	49	1	0	3	0	4	0	67	1	0	68	14	0	7	0	21	142	0
17:30	0	89	1	1	91	0	0	2	0	2	1	74	0	0	75	15	0	8	0	23	191	1
17:45	0	67	2	0	69	3	0	3	0	6	0	73	1	0	74	16	0	5	0	21	170	0
Total	4	278	6	4	292	4	0	8	0	12	2	264	2	0	268	68	0	20	0	88	660	4
Grand Total	24	1194	28	24	1270	16	1	34	0	51	9	1083	45	2	1139	224	2	61	0	287	2747	26
Apprch %	1.9%	94.0%	2.2%	1.9%		31.4%	2.0%	66.7%	0.0%		0.8%	95.1%	4.0%	0.2%		78.0%	0.7%	21.3%	0.0%			
Total %	0.9%	43.5%	1.0%	0.9%	46.2%	0.6%	0.0%	1.2%	0.0%	1.9%	0.3%	39.4%	1.6%	0.1%	41.5%	8.2%	0.1%	2.2%	0.0%	10.4%	100.0%	

PM PEAK HOUR	Mandela Parkway Southbound					20th Street Westbound					Mandela Parkway Northbound					20th Street Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 14:30 to 15:30																					
Peak Hour For Entire Intersection Begins at 14:30																					
14:30	4	95	2	4	105	1	0	4	0	5	0	62	9	0	71	5	0	3	0	8	189
14:45	5	59	2	4	70	1	0	3	0	4	2	71	2	0	75	17	1	6	0	24	173
15:00	2	99	4	4	109	1	0	0	0	1	1	66	6	0	73	22	0	3	0	25	208
15:15	1	83	2	1	87	2	0	2	0	4	0	67	4	0	71	14	0	2	0	16	178
Total Volume	12	336	10	13	371	5	0	9	0	14	3	266	21	0	290	58	1	14	0	73	748
% App Total	3.2%	90.6%	2.7%	3.5%		35.7%	0.0%	64.3%	0.0%		1.0%	91.7%	7.2%	0.0%		79.5%	1.4%	19.2%	0.0%		
PHF	.600	.848	.625	.813	.851	.625	.000	.563	.000	.700	.375	.937	.583	.000	.967	.659	.250	.583	.000	.730	.899

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-008 I-880 NB Off-Ramp-7th Street.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	Frontage Road Southbound					7th Street Westbound					I-880 NB Off-Ramp Northbound					7th Street Eastbound					Total	Utum Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	25	0	38	0	63	0	19	19	0	38	12	33	29	0	74	6	8	0	0	14	189	0
14:15	22	0	36	0	58	0	22	18	0	40	8	39	26	0	73	4	7	0	0	11	182	0
14:30	20	0	27	0	47	0	31	38	0	69	8	40	31	0	79	7	5	0	0	12	207	0
14:45	14	0	37	0	51	0	35	25	0	60	17	32	31	0	80	6	10	0	0	16	207	0
Total	81	0	138	0	219	0	107	100	0	207	45	144	117	0	306	23	30	0	0	53	785	0
15:00	14	0	43	0	57	0	36	28	0	64	6	29	32	0	67	4	5	0	0	9	197	0
15:15	19	0	54	0	73	0	30	18	0	48	13	30	30	0	73	1	2	0	0	3	197	0
15:30	12	0	47	0	59	0	27	42	0	69	6	60	35	0	101	5	7	0	0	12	241	0
15:45	14	0	28	0	42	0	25	20	0	45	6	29	18	0	53	4	3	0	0	7	147	0
Total	59	0	172	0	231	0	118	108	0	226	31	148	115	0	294	14	17	0	0	31	782	0
16:00	11	0	31	0	42	0	14	14	0	28	10	36	22	0	68	1	12	0	0	13	151	0
16:15	8	0	28	0	36	0	29	24	0	53	9	32	17	0	58	3	8	0	0	11	158	0
16:30	7	0	26	0	33	0	25	30	0	55	6	31	18	0	55	2	4	0	0	6	149	0
16:45	12	0	20	0	32	0	29	26	0	55	4	26	24	0	54	6	4	0	0	10	151	0
Total	38	0	105	0	143	0	97	94	0	191	29	125	81	0	235	12	28	0	0	40	609	0
17:00	18	0	23	0	41	0	19	12	0	31	5	29	16	0	50	6	12	0	0	18	140	0
17:15	15	0	27	0	42	0	24	20	0	44	2	36	27	0	65	2	5	0	0	7	158	0
17:30	12	0	24	0	36	0	13	19	0	32	1	26	15	0	42	2	7	0	0	9	119	0
17:45	17	0	35	0	52	0	24	20	0	44	7	29	13	0	49	5	8	0	0	13	158	0
Total	62	0	109	0	171	0	80	71	0	151	15	120	71	0	206	15	32	0	0	47	575	0
Grand Total	240	0	524	0	764	0	402	373	0	775	120	537	384	0	1041	64	107	0	0	171	2751	0
Apprch %	31.4%	0.0%	68.6%	0.0%		0.0%	51.9%	48.1%	0.0%		11.5%	51.6%	36.9%	0.0%		37.4%	62.6%	0.0%	0.0%			
Total %	8.7%	0.0%	19.0%	0.0%	27.8%	0.0%	14.6%	13.6%	0.0%	28.2%	4.4%	19.5%	14.0%	0.0%	37.8%	2.3%	3.9%	0.0%	0.0%	6.2%	100.0%	

PM PEAK HOUR	Frontage Road Southbound					7th Street Westbound					I-880 NB Off-Ramp Northbound					7th Street Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 14:45 to 15:45																					
Peak Hour For Entire Intersection Begins at 14:45																					
14:45	14	0	37	0	51	0	35	25	0	60	17	32	31	0	80	6	10	0	0	16	207
15:00	14	0	43	0	57	0	36	28	0	64	6	29	32	0	67	4	5	0	0	9	197
15:15	19	0	54	0	73	0	30	18	0	48	13	30	30	0	73	1	2	0	0	3	197
15:30	12	0	47	0	59	0	27	42	0	69	6	60	35	0	101	5	7	0	0	12	241
Total Volume	59	0	181	0	240	0	128	113	0	241	42	151	128	0	321	16	24	0	0	40	842
% App Total	24.6%	0.0%	75.4%	0.0%		0.0%	53.1%	46.9%	0.0%		13.1%	47.0%	39.9%	0.0%		40.0%	60.0%	0.0%	0.0%		
PHF	.776	.000	.838	.000	.822	.000	.889	.673	.000	.873	.618	.629	.914	.000	.795	.667	.600	.000	.000	.625	.873

ALL TRAFFIC DATA

City of Oakland
All Vehicles on Unshifted
Peds & Bikes on Bank 1
Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-009 Maritime Street-7th Street.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	Maritime Street Southbound					7th Street Westbound					Maritime Street Northbound					7th Street Eastbound					Total	Utturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	9	2	1	0	12	0	6	11	0	17	0	2	4	0	6	0	9	0	1	10	45	1
14:15	12	2	0	0	14	4	4	9	0	17	0	2	7	0	9	4	3	0	0	7	47	0
14:30	5	2	0	0	7	6	9	7	1	23	0	1	6	0	7	1	6	0	0	7	44	1
14:45	7	5	0	0	12	2	8	14	1	25	0	3	6	0	9	4	9	1	0	14	60	1
Total	33	11	1	0	45	12	27	41	2	82	0	8	23	0	31	9	27	1	1	38	196	3
15:00	9	5	1	0	15	1	9	5	0	15	1	2	2	0	5	1	5	0	0	6	41	0
15:15	7	0	0	0	7	1	7	15	0	23	0	3	2	0	5	0	1	0	0	1	36	0
15:30	8	2	1	0	11	5	3	4	3	15	0	1	0	0	1	4	5	0	0	9	36	3
15:45	10	1	0	0	11	4	7	2	2	15	0	1	0	0	1	4	6	0	0	10	37	2
Total	34	8	2	0	44	11	26	26	5	68	1	7	4	0	12	9	17	0	0	26	150	5
16:00	6	3	0	0	9	4	4	10	0	18	0	2	3	0	5	1	7	0	0	8	40	0
16:15	9	1	0	0	10	3	9	5	0	17	0	0	2	0	2	7	11	1	0	19	48	0
16:30	6	3	1	0	10	1	7	6	0	14	1	0	3	0	4	4	9	0	0	13	41	0
16:45	12	1	0	0	13	3	7	4	1	15	0	0	2	0	2	6	12	0	0	18	48	1
Total	33	8	1	0	42	11	27	25	1	64	1	2	10	0	13	18	39	1	0	58	177	1
17:00	14	2	2	0	18	0	2	3	0	5	0	2	2	0	4	7	17	0	0	24	51	0
17:15	7	1	0	0	8	2	4	5	0	11	0	5	1	0	6	0	5	0	0	5	30	0
17:30	8	7	1	0	16	1	7	2	0	10	0	6	5	0	11	4	5	0	0	9	46	0
17:45	8	2	0	0	10	3	8	1	0	12	0	4	1	0	5	9	7	0	0	16	43	0
Total	37	12	3	0	52	6	21	11	0	38	0	17	9	0	26	20	34	0	0	54	170	0
Grand Total	137	39	7	0	183	40	101	103	8	252	2	34	46	0	82	56	117	2	1	176	693	9
Apprch %	74.9%	21.3%	3.8%	0.0%		15.9%	40.1%	40.9%	3.2%		2.4%	41.5%	56.1%	0.0%		31.8%	66.5%	1.1%	0.6%			
Total %	19.8%	5.6%	1.0%	0.0%	26.4%	5.8%	14.6%	14.9%	1.2%	36.4%	0.3%	4.9%	6.6%	0.0%	11.8%	8.1%	16.9%	0.3%	0.1%	25.4%	100.0%	

PM PEAK HOUR	Maritime Street Southbound					7th Street Westbound					Maritime Street Northbound					7th Street Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
14:00	9	2	1	0	12	0	6	11	0	17	0	2	4	0	6	0	9	0	1	10	45
14:15	12	2	0	0	14	4	4	9	0	17	0	2	7	0	9	4	3	0	0	7	47
14:30	5	2	0	0	7	6	9	7	1	23	0	1	6	0	7	1	6	0	0	7	44
14:45	7	5	0	0	12	2	8	14	1	25	0	3	6	0	9	4	9	1	0	14	60
Total Volume	33	11	1	0	45	12	27	41	2	82	0	8	23	0	31	9	27	1	1	38	196
% App Total	73.3%	24.4%	2.2%	0.0%		14.6%	32.9%	50.0%	2.4%		0.0%	25.8%	74.2%	0.0%		23.7%	71.1%	2.6%	2.6%		
PHF	.688	.550	.250	.000	.804	.500	.750	.732	.500	.820	.000	.667	.821	.000	.861	.563	.750	.250	.250	.679	.817

Peak Hour Analysis From 14:00 to 15:00

Peak Hour For Entire Intersection Begins at 14:00

ALL TRAFFIC DATA

City of Oakland

All Vehicles on Unshifted

Peds & Bikes on Bank 1

Heavy Trucks on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 13-7630-010 Adeline Street-West Grand Avenue.ppd

Date : 10/26/2013

Unshifted Count = All Vehicles

	Adeline Street Southbound					West Grand Avenue Westbound					Adeline Street Northbound					West Grand Avenue Eastbound					Total	Utturn Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
14:00	12	28	9	1	50	8	134	10	2	154	6	32	10	0	48	7	73	7	0	87	339	3
14:15	11	26	13	0	50	8	104	9	1	122	5	22	12	0	39	11	67	5	1	84	295	2
14:30	10	40	21	0	71	8	125	11	4	148	9	23	11	0	43	3	69	3	0	75	337	4
14:45	20	28	17	0	65	14	112	10	1	137	6	28	9	0	43	5	77	9	0	91	336	1
Total	53	122	60	1	236	38	475	40	8	561	26	105	42	0	173	26	286	24	1	337	1307	10
15:00	14	30	12	0	56	9	122	10	0	141	11	27	9	0	47	12	85	1	0	98	342	0
15:15	16	31	20	0	67	8	92	17	1	118	9	20	6	0	35	5	104	6	1	116	336	2
15:30	13	46	18	0	77	13	100	10	1	124	6	29	8	0	43	8	75	5	1	89	333	2
15:45	9	31	5	0	45	6	88	14	1	109	6	18	8	0	32	5	91	6	0	102	288	1
Total	52	138	55	0	245	36	402	51	3	492	32	94	31	0	157	30	355	18	2	405	1299	5
16:00	18	37	10	0	65	7	78	12	2	99	9	22	5	0	36	10	71	8	1	90	290	3
16:15	8	46	9	0	63	7	83	9	1	100	6	27	2	0	35	10	79	7	0	96	294	1
16:30	9	32	16	0	57	8	92	9	1	110	8	20	10	0	38	11	58	2	0	71	276	1
16:45	12	31	11	0	54	9	79	4	4	96	6	18	7	0	31	10	59	3	0	72	253	4
Total	47	146	46	0	239	31	332	34	8	405	29	87	24	0	140	41	267	20	1	329	1113	9
17:00	8	30	17	0	55	10	85	10	2	107	4	21	8	0	33	4	79	4	0	87	282	2
17:15	15	26	9	0	50	12	105	10	6	133	7	33	7	0	47	7	68	7	0	82	312	6
17:30	7	32	11	0	50	7	106	5	6	124	7	32	10	0	49	11	76	2	0	89	312	6
17:45	11	23	5	0	39	19	98	14	1	132	8	27	12	0	47	7	72	10	0	89	307	1
Total	41	111	42	0	194	48	394	39	15	496	26	113	37	0	176	29	295	23	0	347	1213	15
Grand Total	193	517	203	1	914	153	1603	164	34	1954	113	399	134	0	646	126	1203	85	4	1418	4932	39
Apprch %	21.1%	56.6%	22.2%	0.1%		7.8%	82.0%	8.4%	1.7%		17.5%	61.8%	20.7%	0.0%		8.9%	84.8%	6.0%	0.3%			
Total %	3.9%	10.5%	4.1%	0.0%	18.5%	3.1%	32.5%	3.3%	0.7%	39.6%	2.3%	8.1%	2.7%	0.0%	13.1%	2.6%	24.4%	1.7%	0.1%	28.8%	100.0%	

PM PEAK HOUR	Adeline Street Southbound					West Grand Avenue Westbound					Adeline Street Northbound					West Grand Avenue Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 14:30 to 15:30																					
Peak Hour For Entire Intersection Begins at 14:30																					
14:30	10	40	21	0	71	8	125	11	4	148	9	23	11	0	43	3	69	3	0	75	337
14:45	20	28	17	0	65	14	112	10	1	137	6	28	9	0	43	5	77	9	0	91	336
15:00	14	30	12	0	56	9	122	10	0	141	11	27	9	0	47	12	85	1	0	98	342
15:15	16	31	20	0	67	8	92	17	1	118	9	20	6	0	35	5	104	6	1	116	336
Total Volume	60	129	70	0	259	39	451	48	6	544	35	98	35	0	168	25	335	19	1	380	1351
% App Total	23.2%	49.8%	27.0%	0.0%		7.2%	82.9%	8.8%	1.1%		20.8%	58.3%	20.8%	0.0%		6.6%	88.2%	5.0%	0.3%		
PHF	.750	.806	.833	.000	.912	.696	.902	.706	.375	.919	.795	.875	.795	.000	.894	.521	.805	.528	.250	.819	.988

APPENDIX B: LEVEL OF SERVICE CALCULATION WORKSHEETS



HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	0	6	0	0	0	4	431	1	0	84	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00					1.00	0.95		0.95	
Frpb, ped/bikes		1.00	0.99					1.00	1.00		1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00		1.00	
Frt		1.00	0.85					1.00	1.00		0.98	
Flt Protected		0.95	1.00					0.95	1.00		1.00	
Satd. Flow (prot)		1767	1199					1202	2735		2463	
Flt Permitted		0.76	1.00					0.69	1.00		1.00	
Satd. Flow (perm)		1408	1199					873	2735		2463	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92
Adj. Flow (vph)	69	0	6	0	0	0	4	459	1	0	89	10
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	69	2	0	0	0	4	460	0	0	93	0
Confl. Peds. (#/hr)	2		1	1		2	1		2	2		1
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		29.0	29.0				31.0	31.0			31.0	
Effective Green, g (s)		29.0	29.0				31.0	31.0			31.0	
Actuated g/C Ratio		0.41	0.41				0.44	0.44			0.44	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		583	496				386	1211			1090	
v/s Ratio Prot								c0.17			0.04	
v/s Ratio Perm		c0.05	0.00				0.00					
v/c Ratio		0.12	0.01				0.01	0.38			0.09	
Uniform Delay, d1		12.6	12.0				10.9	13.1			11.3	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.4	0.0				0.0	0.9			0.2	
Delay (s)		13.0	12.1				11.0	14.0			11.4	
Level of Service		B	B				B	B			B	
Approach Delay (s)		13.0			0.0			13.9			11.4	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)				10.0	
Intersection Capacity Utilization			51.7%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	234	70	39	536	31	242	50	148	53	20	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1495	1433	3359		1618	1345	1302	1517	1398	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1495	1433	3359		1618	1345	1302	1517	1398	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	246	74	41	564	33	255	53	156	56	21	45
RTOR Reduction (vph)	0	0	57	0	4	0	0	0	126	0	34	0
Lane Group Flow (vph)	5	246	17	41	593	0	153	155	30	56	32	0
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	1.0	16.9	16.9	4.9	20.8		14.5	14.5	14.5	18.8	18.8	
Effective Green, g (s)	1.0	16.9	16.9	4.9	20.8		14.5	14.5	14.5	18.8	18.8	
Actuated g/C Ratio	0.01	0.23	0.23	0.07	0.28		0.19	0.19	0.19	0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	20	788	336	93	930		312	259	251	379	349	
v/s Ratio Prot	0.00	0.07		c0.03	c0.18		0.09	c0.12		c0.04	0.02	
v/s Ratio Perm			0.01						0.02			
v/c Ratio	0.25	0.31	0.05	0.44	0.64		0.49	0.60	0.12	0.15	0.09	
Uniform Delay, d1	36.7	24.3	22.8	33.8	23.8		27.0	27.6	25.0	21.9	21.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.5	0.2	0.1	3.3	1.4		1.2	3.7	0.2	0.8	0.5	
Delay (s)	43.2	24.5	22.9	37.1	25.3		28.2	31.3	25.2	22.7	22.1	
Level of Service	D	C	C	D	C		C	C	C	C	C	
Approach Delay (s)		24.4			26.1			28.3			22.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			26.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			75.1			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			46.3%			ICU Level of Service			A			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	283	69	143	500	167	77	138	290	105	60	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3223		1626	3438	1495	1444	2823		1612	2833	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3223		1626	3438	1495	1444	2823		1612	2833	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	91	292	71	147	515	172	79	142	299	108	62	14
RTOR Reduction (vph)	0	22	0	0	0	142	0	252	0	0	12	0
Lane Group Flow (vph)	91	341	0	147	515	30	79	189	0	108	64	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	432	973		287	608	264	225	441		251	442	
v/s Ratio Prot	0.06	c0.11		0.09	c0.15		0.05	c0.07		c0.07	0.02	
v/s Ratio Perm						0.02						
v/c Ratio	0.21	0.35		0.51	0.85	0.12	0.35	0.43		0.43	0.15	
Uniform Delay, d1	25.0	26.1		35.7	38.2	33.2	36.2	36.6		36.6	35.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	1.0		6.4	13.7	0.9	4.3	3.0		5.3	0.7	
Delay (s)	26.1	27.1		42.1	51.9	34.1	40.4	39.6		41.9	35.7	
Level of Service	C	C		D	D	C	D	D		D	D	
Approach Delay (s)		26.9			46.5			39.8			39.3	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			39.6				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			96.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			67.7%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	76	600	40	18	642	10	32	0	13	2	4	171
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	82	645	43	19	690	11	34	0	14	2	4	184
Pedestrians								2			2	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	703			690			1402	1574	346	1236	1590	353
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	516			690			1272	1458	346	1093	1475	137
tC, single (s)	4.9			4.1			7.9	6.5	7.1	7.5	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.7	4.0	3.4	3.5	4.0	3.4
p0 queue free %	89			98			48	100	98	98	96	77
cM capacity (veh/h)	759			912			67	105	632	139	103	793
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	404	366	365	356	48	190						
Volume Left	82	0	19	0	34	2						
Volume Right	0	43	0	11	14	184						
cSH	759	1700	912	1700	90	658						
Volume to Capacity	0.11	0.22	0.02	0.21	0.54	0.29						
Queue Length 95th (ft)	9	0	2	0	60	30						
Control Delay (s)	3.2	0.0	0.7	0.0	84.2	12.7						
Lane LOS	A		A		F	B						
Approach Delay (s)	1.7		0.4		84.2	12.7						
Approach LOS					F	B						
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			66.2%		ICU Level of Service		C					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Mandela Pkwy & 24th St.

Gateway Park
Existing PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	150	0	0	0	0	480
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	155	0	0	0	0	495
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	247	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	247	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	100			100	
cM capacity (veh/h)	714	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	77	77	247	247		
Volume Left	77	77	0	0		
Volume Right	0	0	0	0		
cSH	714	714	1700	1700		
Volume to Capacity	0.11	0.11	0.15	0.15		
Queue Length 95th (ft)	9	9	0	0		
Control Delay (s)	10.7	10.7	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	10.7		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			28.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↵	↑↑						↑↑	
Volume (vph)	0	445	69	95	440	0	0	0	0	111	370	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4813		1770	3471						3375	
Flt Permitted		1.00		0.42	1.00						0.99	
Satd. Flow (perm)		4813		788	3471						3375	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	464	72	99	458	0	0	0	0	116	385	146
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	517	0	99	458	0	0	0	0	0	623	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		51.0		51.0	51.0						49.0	
Effective Green, g (s)		51.0		51.0	51.0						49.0	
Actuated g/C Ratio		0.46		0.46	0.46						0.45	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		2231		365	1609						1503	
v/s Ratio Prot		0.11			c0.13							
v/s Ratio Perm				0.13							0.18	
v/c Ratio		0.23		0.27	0.28						0.41	
Uniform Delay, d1		17.7		18.1	18.2						20.7	
Progression Factor		1.00		0.50	0.49						1.00	
Incremental Delay, d2		0.2		1.8	0.4						0.8	
Delay (s)		18.0		10.8	9.3						21.6	
Level of Service		B		B	A						C	
Approach Delay (s)		18.0			9.6			0.0			21.6	
Approach LOS		B			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			16.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			55.4%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											  	
Volume (veh/h)	0	65	7	4	1	0	0	0	0	6	418	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	70	8	4	1	0	0	0	0	6	449	2
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	467	466	230	281	468	0	455			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467	466	230	281	468	0	455			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	86	99	99	100	100	100			100		
cM capacity (veh/h)	461	494	777	575	493	1091	1114			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	77	5	231	227								
Volume Left	0	4	6	0								
Volume Right	8	0	0	2								
cSH	512	556	1636	1700								
Volume to Capacity	0.15	0.01	0.00	0.13								
Queue Length 95th (ft)	13	1	0	0								
Control Delay (s)	13.3	11.5	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	13.3	11.5	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			22.8%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	86	0	0	96	114	79	278	83	79	0	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2746		1014	2888		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2746		1014	2888		1570		2349
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	139	96	0	0	107	127	88	309	92	88	0	201
RTOR Reduction (vph)	0	0	0	0	111	0	0	20	0	0	0	174
Lane Group Flow (vph)	139	96	0	0	123	0	79	390	0	88	0	27
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		Prot
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	13.9	13.9			8.4		17.2	17.2		9.3		9.3
Effective Green, g (s)	13.9	13.9			8.4		17.2	17.2		9.3		9.3
Actuated g/C Ratio	0.20	0.20			0.12		0.25	0.25		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	234	645			335		253	722		212		317
v/s Ratio Prot	c0.12	0.03			c0.04		0.08	c0.13		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.59	0.15			0.37		0.31	0.54		0.42		0.09
Uniform Delay, d1	24.9	22.6			27.8		21.0	22.4		27.3		26.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	4.0	0.1			0.7		3.2	2.9		1.3		0.1
Delay (s)	28.9	22.7			28.4		24.2	25.3		28.6		26.1
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		26.4			28.4			25.1			26.9	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay		26.4					HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		68.8					Sum of lost time (s)		20.0			
Intersection Capacity Utilization		43.0%					ICU Level of Service		A			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	174	32	25	53	58	5	201	138	173	112	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	191	35	27	58	64	5	221	152	190	123	0
RTOR Reduction (vph)	0	0	24	0	0	56	0	104	0	0	0	0
Lane Group Flow (vph)	165	191	11	27	58	8	5	269	0	190	123	0
Confl. Bikes (#/hr)							1					
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.13	c0.08		0.02	0.03		0.00	c0.14		c0.16	0.07	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.41	0.25	0.04	0.20	0.21	0.06	0.02	0.57		1.12	0.47	
Uniform Delay, d1	31.5	29.7	27.7	47.1	47.2	46.3	34.7	40.0		51.5	47.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.8	0.3	3.1	1.7	0.9	0.2	4.8		104.1	5.8	
Delay (s)	34.6	30.5	28.0	50.2	48.9	47.2	34.8	44.8		155.6	53.1	
Level of Service	C	C	C	D	D	D	C	D		F	D	
Approach Delay (s)		32.0			48.4			44.6			115.3	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			59.1				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			47.9%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			  			  	
Volume (vph)	44	483	43	59	554	50	29	196	54	62	181	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4857			4989			3362			3301	
Flt Permitted		0.84			0.83			0.90			0.84	
Satd. Flow (perm)		4105			4170			3050			2808	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	46	508	45	62	583	53	31	206	57	65	191	67
RTOR Reduction (vph)	0	15	0	0	15	0	0	21	0	0	23	0
Lane Group Flow (vph)	0	584	0	0	683	0	0	273	0	0	300	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.8			18.8			33.6			33.6	
Effective Green, g (s)		18.8			18.8			33.6			33.6	
Actuated g/C Ratio		0.30			0.30			0.54			0.54	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1236			1256			1642			1512	
v/s Ratio Prot												
v/s Ratio Perm		0.14			c0.16			0.09			c0.11	
v/c Ratio		0.47			0.54			0.17			0.20	
Uniform Delay, d1		17.8			18.2			7.3			7.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.5			0.2			0.3	
Delay (s)		18.0			18.7			7.5			7.7	
Level of Service		B			B			A			A	
Approach Delay (s)		18.0			18.7			7.5			7.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			14.9				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			62.4				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			87.6%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	146	9	4	596	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	151	9	4	614	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	419	640	16	624	640	311	16			615		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	419	640	16	624	640	311	16			615		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	62	99	100			100		
cM capacity (veh/h)	362	395	1066	373	395	690	1615			973		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	100	59	209	410								
Volume Left	0	0	4	0								
Volume Right	0	9	0	0								
cSH	395	423	1615	1700								
Volume to Capacity	0.25	0.14	0.00	0.24								
Queue Length 95th (ft)	25	12	0	0								
Control Delay (s)	17.2	14.9	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	16.3		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			28.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			  				
Volume (vph)	250	306	0	0	448	102	87	407	111	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4784			4862			3350				
Flt Permitted		0.67			1.00			0.99				
Satd. Flow (perm)		3277			4862			3350				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	260	319	0	0	467	106	91	424	116	0	0	0
RTOR Reduction (vph)	0	0	0	0	33	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	579	0	0	540	0	0	613	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		51.0			51.0			49.0				
Effective Green, g (s)		51.0			51.0			49.0				
Actuated g/C Ratio		0.46			0.46			0.45				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1519			2254			1492				
v/s Ratio Prot					0.11							
v/s Ratio Perm		c0.18						0.18				
v/c Ratio		0.38			0.24			0.41				
Uniform Delay, d1		19.2			17.8			20.7				
Progression Factor		0.56			1.00			1.00				
Incremental Delay, d2		0.7			0.3			0.2				
Delay (s)		11.5			18.1			20.9				
Level of Service		B			B			C				
Approach Delay (s)		11.5			18.1			20.9			0.0	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM 2000 Control Delay			16.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			70.4%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	0	0	0	1	4	5	536	2	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	70	0	0	0	1	4	5	576	2	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	317	602	12	589	601	291	12			579		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317	602	12	589	601	291	12			579		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	100	100	100	100	99	100			100		
cM capacity (veh/h)	580	410	1061	391	411	711	1604			1004		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	70	5	294	290								
Volume Left	70	0	5	0								
Volume Right	0	4	0	2								
cSH	580	620	1604	1700								
Volume to Capacity	0.12	0.01	0.00	0.17								
Queue Length 95th (ft)	10	1	0	0								
Control Delay (s)	12.0	10.9	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.0	10.9	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			32.0%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	0	12	0	0	0	6	108	0	0	54	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	1.00				1.00	1.00			0.99	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.95	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1805	1615				1543	3471			3138	
Flt Permitted		0.76	1.00				0.70	1.00			1.00	
Satd. Flow (perm)		1439	1615				1132	3471			3138	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	75	0	14	0	0	0	7	123	0	0	61	27
RTOR Reduction (vph)	0	0	8	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	75	6	0	0	0	7	123	0	0	73	0
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm				Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		30.0	30.0				30.0	30.0			30.0	
Effective Green, g (s)		30.0	30.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.43	0.43				0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		616	692				485	1487			1344	
v/s Ratio Prot								c0.04			0.02	
v/s Ratio Perm		c0.05	0.00				0.01					
v/c Ratio		0.12	0.01				0.01	0.08			0.05	
Uniform Delay, d1		12.1	11.5				11.5	11.8			11.7	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.4	0.0				0.1	0.1			0.1	
Delay (s)		12.5	11.5				11.6	12.0			11.8	
Level of Service		B	B				B	B			B	
Approach Delay (s)		12.3			0.0			11.9			11.8	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.10									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			17.0%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	165	34	29	483	20	55	12	78	34	11	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1524	1687	3409		1649	1455	1495	1433	1342	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1524	1687	3409		1649	1455	1495	1433	1342	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	179	37	32	525	22	60	13	85	37	12	18
RTOR Reduction (vph)	0	0	29	0	2	0	0	0	47	0	17	0
Lane Group Flow (vph)	27	179	8	32	545	0	36	37	38	37	13	0
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	2.9	19.1	19.1	4.1	20.3		40.6	40.6	40.6	6.5	6.5	
Effective Green, g (s)	2.9	19.1	19.1	4.1	20.3		40.6	40.6	40.6	6.5	6.5	
Actuated g/C Ratio	0.03	0.21	0.21	0.05	0.22		0.45	0.45	0.45	0.07	0.07	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	43	734	322	76	766		741	654	672	103	96	
v/s Ratio Prot	c0.02	0.05		0.02	c0.16		0.02	0.03		c0.03	0.01	
v/s Ratio Perm			0.01						c0.03			
v/c Ratio	0.63	0.24	0.02	0.42	0.71		0.05	0.06	0.06	0.36	0.14	
Uniform Delay, d1	43.2	29.6	28.2	41.9	32.3		14.0	14.0	14.0	39.9	39.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	25.3	0.2	0.0	3.7	3.1		0.1	0.2	0.2	2.1	0.7	
Delay (s)	68.5	29.8	28.2	45.7	35.4		14.1	14.2	14.2	42.1	39.9	
Level of Service	E	C	C	D	D		B	B	B	D	D	
Approach Delay (s)		33.8			36.0			14.2			41.1	
Approach LOS		C			D			B			D	
Intersection Summary												
HCM 2000 Control Delay			32.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			90.3			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			38.4%			ICU Level of Service			A			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	156	54	110	445	189	77	85	127	93	69	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3254		1703	3505	1543	1583	3042		1736	2926	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3254		1703	3505	1543	1583	3042		1736	2926	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	166	57	117	473	201	82	90	135	99	73	23
RTOR Reduction (vph)	0	36	0	0	0	165	0	114	0	0	19	0
Lane Group Flow (vph)	43	187	0	117	473	36	82	111	0	99	77	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	491	982		301	620	273	247	475		271	457	
v/s Ratio Prot	0.03	c0.06		0.07	c0.13		c0.05	0.04		c0.06	0.03	
v/s Ratio Perm						0.02						
v/c Ratio	0.09	0.19		0.39	0.76	0.13	0.33	0.23		0.37	0.17	
Uniform Delay, d1	24.0	24.8		34.9	37.6	33.3	36.0	35.5		36.2	35.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4		3.8	8.6	1.0	3.6	1.2		3.8	0.8	
Delay (s)	24.4	25.2		38.7	46.2	34.3	39.6	36.6		40.0	35.9	
Level of Service	C	C		D	D	C	D	D		D	D	
Approach Delay (s)		25.1			42.1			37.4			38.0	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			37.7			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			58.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	361	33	18	624	5	43	4	23	3	10	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	24	372	34	19	643	5	44	4	24	3	10	93
Pedestrians		2										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	648			406			895	1122	203	942	1137	326
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	469			406			735	979	203	785	995	122
tC, single (s)	4.9			4.2			7.5	6.5	7.0	8.2	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.6			2.3			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	97			98			81	98	97	98	95	89
cM capacity (veh/h)	792			1114			236	223	798	201	219	837
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	210	220	340	327	72	106						
Volume Left	24	0	19	0	44	3						
Volume Right	0	34	0	5	24	93						
cSH	792	1700	1114	1700	306	612						
Volume to Capacity	0.03	0.13	0.02	0.19	0.24	0.17						
Queue Length 95th (ft)	2	0	1	0	22	16						
Control Delay (s)	1.4	0.0	0.6	0.0	20.4	12.1						
Lane LOS	A		A		C	B						
Approach Delay (s)	0.7		0.3		20.4	12.1						
Approach LOS					C	B						
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			47.7%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Mandela Pkwy & 24th St.

Gateway Park
Existing SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	131	0	0	0	0	438
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	151	0	0	0	0	503
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	252	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	252	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	100			100	
cM capacity (veh/h)	707	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	75	75	252	252		
Volume Left	75	75	0	0		
Volume Right	0	0	0	0		
cSH	707	707	1700	1700		
Volume to Capacity	0.11	0.11	0.15	0.15		
Queue Length 95th (ft)	9	9	0	0		
Control Delay (s)	10.7	10.7	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	10.7		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			22.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↵	↑↑						↑↑	
Volume (vph)	0	207	70	110	386	0	0	0	0	93	295	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.96		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4677		1765	3539						3259	
Flt Permitted		1.00		0.56	1.00						0.99	
Satd. Flow (perm)		4677		1050	3539						3259	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	220	74	117	411	0	0	0	0	99	314	187
RTOR Reduction (vph)	0	43	0	0	0	0	0	0	0	0	47	0
Lane Group Flow (vph)	0	251	0	117	411	0	0	0	0	0	553	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		46.0		46.0	46.0						54.0	
Effective Green, g (s)		46.0		46.0	46.0						54.0	
Actuated g/C Ratio		0.42		0.42	0.42						0.49	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1955		439	1479						1599	
v/s Ratio Prot		0.05			c0.12							
v/s Ratio Perm				0.11							0.17	
v/c Ratio		0.13		0.27	0.28						0.35	
Uniform Delay, d1		19.7		21.0	21.1						17.2	
Progression Factor		1.00		0.36	0.36						1.00	
Incremental Delay, d2		0.1		0.3	0.1						0.6	
Delay (s)		19.8		7.9	7.7						17.8	
Level of Service		B		A	A						B	
Approach Delay (s)		19.8			7.7			0.0			17.8	
Approach LOS		B			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			14.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			75.3%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											  	
Volume (veh/h)	0	59	14	5	0	0	0	0	0	25	336	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	66	16	6	0	0	0	0	0	28	373	11
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	434	434	193	292	440	0	384			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	434	434	193	292	440	0	384			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	100	87	98	99	100	100	100			98		
cM capacity (veh/h)	485	509	822	548	505	1091	1185			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	81	6	214	198								
Volume Left	0	6	28	0								
Volume Right	16	0	0	11								
cSH	549	548	1636	1700								
Volume to Capacity	0.15	0.01	0.02	0.12								
Queue Length 95th (ft)	13	1	1	0								
Control Delay (s)	12.7	11.6	1.1	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.7	11.6	0.6									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			21.3%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	24	0	0	128	113	42	151	128	59	0	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3078		1441	2983		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3078		1441	2983		1543		2682
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	18	28	0	0	147	130	48	174	147	68	0	208
RTOR Reduction (vph)	0	0	0	0	110	0	0	95	0	0	0	192
Lane Group Flow (vph)	18	28	0	0	167	0	43	231	0	68	0	16
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		Prot
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	2.3	2.3			8.0		18.4	18.4		4.1		4.1
Effective Green, g (s)	2.3	2.3			8.0		18.4	18.4		4.1		4.1
Actuated g/C Ratio	0.04	0.04			0.15		0.36	0.36		0.08		0.08
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	72	154			475		511	1059		122		212
v/s Ratio Prot	c0.01	0.01			c0.05		0.03	c0.08		c0.04		0.01
v/s Ratio Perm												
v/c Ratio	0.25	0.18			0.35		0.08	0.22		0.56		0.08
Uniform Delay, d1	23.9	23.8			19.6		11.1	11.7		23.0		22.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	1.8	0.6			0.5		0.3	0.5		5.4		0.2
Delay (s)	25.7	24.4			20.0		11.4	12.1		28.4		22.3
Level of Service	C	C			C		B	B		C		C
Approach Delay (s)		24.9			20.0			12.1			23.8	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			18.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			51.8				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			36.3%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	27	1	14	27	41	0	8	23	33	11	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	793	1357	3471	1328		2621		1703	2362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	793	1357	3471	1328		2621		1703	2362	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	33	1	17	33	50	0	10	28	40	13	1
RTOR Reduction (vph)	0	0	1	0	0	32	0	21	0	0	1	0
Lane Group Flow (vph)	12	33	0	17	33	18	0	17	0	40	13	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Effective Green, g (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Actuated g/C Ratio	0.08	0.32	0.32	0.12	0.37	0.37		0.25		0.13	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	150	1173	257	169	1272	486		655		227	826	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.02	0.01	
v/s Ratio Perm			0.00			c0.01						
v/c Ratio	0.08	0.03	0.00	0.10	0.03	0.04		0.03		0.18	0.02	
Uniform Delay, d1	50.8	27.6	27.3	46.5	24.3	24.4		34.0		46.2	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.0	0.0	1.2	0.0	0.1		0.1		1.7	0.0	
Delay (s)	51.8	27.6	27.4	47.7	24.3	24.5		34.0		47.8	25.5	
Level of Service	D	C	C	D	C	C		C		D	C	
Approach Delay (s)		33.9			28.4			34.0			42.1	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			  			  	
Volume (vph)	26	335	19	45	451	48	35	98	35	60	129	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4949			4961			3444			3319	
Flt Permitted		0.88			0.87			0.87			0.86	
Satd. Flow (perm)		4364			4353			3040			2895	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	26	338	19	45	456	48	35	99	35	61	130	71
RTOR Reduction (vph)	0	10	0	0	19	0	0	15	0	0	31	0
Lane Group Flow (vph)	0	373	0	0	530	0	0	154	0	0	231	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.6			15.6			33.8			33.8	
Effective Green, g (s)		15.6			15.6			33.8			33.8	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1146			1143			1729			1647	
v/s Ratio Prot												
v/s Ratio Perm		0.09			c0.12			0.05			c0.08	
v/c Ratio		0.33			0.46			0.09			0.14	
Uniform Delay, d1		17.7			18.4			5.8			6.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.3			0.1			0.2	
Delay (s)		17.8			18.7			5.9			6.2	
Level of Service		B			B			A			A	
Approach Delay (s)		17.8			18.7			5.9			6.2	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			14.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			59.4			Sum of lost time (s)				10.0		
Intersection Capacity Utilization			77.6%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	128	7	3	331	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	0	0	147	8	3	380	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	284	393	3	390	393	195	3			383		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284	393	3	390	393	195	3			383		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	73	99	100			100		
cM capacity (veh/h)	509	544	1086	533	544	817	1632			1183		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	98	57	130	254								
Volume Left	0	0	3	0								
Volume Right	0	8	0	0								
cSH	544	570	1632	1700								
Volume to Capacity	0.18	0.10	0.00	0.15								
Queue Length 95th (ft)	16	8	0	0								
Control Delay (s)	13.1	12.0	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.7		0.1									
Approach LOS	B											
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			22.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			  				
Volume (vph)	119	181	0	0	433	64	64	210	78	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4824			4978			3393				
Flt Permitted		0.68			1.00			0.99				
Satd. Flow (perm)		3360			4978			3393				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	127	193	0	0	461	68	68	223	83	0	0	0
RTOR Reduction (vph)	0	0	0	0	17	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	320	0	0	512	0	0	350	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		46.0			46.0			54.0				
Effective Green, g (s)		46.0			46.0			54.0				
Actuated g/C Ratio		0.42			0.42			0.49				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1405			2081			1665				
v/s Ratio Prot					c0.10							
v/s Ratio Perm		0.10						0.10				
v/c Ratio		0.23			0.25			0.21				
Uniform Delay, d1		20.6			20.8			15.9				
Progression Factor		0.81			1.00			1.00				
Incremental Delay, d2		0.4			0.1			0.1				
Delay (s)		17.1			20.8			16.0				
Level of Service		B			C			B				
Approach Delay (s)		17.1			20.8			16.0			0.0	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			18.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.23									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)				10.0		
Intersection Capacity Utilization			43.0%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

13: Mandela Pkwy & 20th St.

Gateway Park
Existing SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	58	1	0	0	1	9	3	266	21	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	64	1	0	0	1	10	3	296	23	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	174	348	9	327	336	172	9			332		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	174	348	9	327	336	172	9			332		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	100	100	100	99	100			100		
cM capacity (veh/h)	745	568	1069	590	576	838	1612			1225		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	66	11	151	171								
Volume Left	64	0	3	0								
Volume Right	0	10	0	23								
cSH	741	802	1612	1700								
Volume to Capacity	0.09	0.01	0.00	0.10								
Queue Length 95th (ft)	7	1	0	0								
Control Delay (s)	10.3	9.6	0.2	0.0								
Lane LOS	B	A	A									
Approach Delay (s)	10.3	9.6	0.1									
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			26.6%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	127	0	19	0	0	0	24	431	1	0	84	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.97	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.92	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1739	1164				1181	2735			2624	
Flt Permitted		0.76	1.00				0.63	1.00			1.00	
Satd. Flow (perm)		1386	1164				779	2735			2624	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92
Adj. Flow (vph)	135	0	20	0	0	0	26	459	1	0	89	110
RTOR Reduction (vph)	0	0	12	0	0	0	0	0	0	0	61	0
Lane Group Flow (vph)	0	135	8	0	0	0	26	460	0	0	138	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		29.0	29.0				31.0	31.0			31.0	
Effective Green, g (s)		29.0	29.0				31.0	31.0			31.0	
Actuated g/C Ratio		0.41	0.41				0.44	0.44			0.44	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		574	482				344	1211			1162	
v/s Ratio Prot								c0.17			0.05	
v/s Ratio Perm		c0.10	0.01				0.03					
v/c Ratio		0.24	0.02				0.08	0.38			0.12	
Uniform Delay, d1		13.3	12.1				11.2	13.1			11.5	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		1.0	0.1				0.4	0.9			0.2	
Delay (s)		14.3	12.2				11.7	14.0			11.7	
Level of Service		B	B				B	B			B	
Approach Delay (s)		14.0			0.0			13.8			11.7	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	234	92	110	536	31	253	50	199	53	20	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1433	1433	3359		1618	1355	1267	1517	1398	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1433	1433	3359		1618	1355	1267	1517	1398	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	246	97	116	564	33	266	53	209	56	21	45
RTOR Reduction (vph)	0	0	78	0	3	0	0	0	168	0	35	0
Lane Group Flow (vph)	5	246	19	116	594	0	157	162	41	56	31	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	1.0	16.0	16.0	9.9	24.9		16.0	16.0	16.0	18.8	18.8	
Effective Green, g (s)	1.0	16.0	16.0	9.9	24.9		16.0	16.0	16.0	18.8	18.8	
Actuated g/C Ratio	0.01	0.20	0.20	0.12	0.31		0.20	0.20	0.20	0.23	0.23	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	18	694	284	175	1036		320	268	251	353	325	
v/s Ratio Prot	0.00	0.07		c0.08	c0.18		0.10	c0.12		c0.04	0.02	
v/s Ratio Perm			0.01						0.03			
v/c Ratio	0.28	0.35	0.07	0.66	0.57		0.49	0.60	0.17	0.16	0.10	
Uniform Delay, d1	39.5	27.9	26.3	33.8	23.4		28.7	29.5	26.8	24.7	24.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.3	0.3	0.1	9.1	0.8		1.2	3.8	0.3	1.0	0.6	
Delay (s)	47.7	28.2	26.4	42.9	24.2		29.9	33.3	27.1	25.6	24.9	
Level of Service	D	C	C	D	C		C	C	C	C	C	
Approach Delay (s)		28.0			27.2			29.8			25.2	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			80.7			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			51.9%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	323	72	143	557	167	81	138	290	105	60	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3232		1626	3438	1495	1444	2823		1612	2725	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3232		1626	3438	1495	1444	2823		1612	2725	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	99	333	74	147	574	172	84	142	299	108	62	24
RTOR Reduction (vph)	0	20	0	0	0	142	0	252	0	0	20	0
Lane Group Flow (vph)	99	387	0	147	574	30	84	189	0	108	66	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	432	976		287	608	264	225	441		251	425	
v/s Ratio Prot	0.07	c0.12		0.09	c0.17		0.06	c0.07		c0.07	0.02	
v/s Ratio Perm						0.02						
v/c Ratio	0.23	0.40		0.51	0.94	0.12	0.37	0.43		0.43	0.15	
Uniform Delay, d1	25.1	26.6		35.7	39.0	33.2	36.3	36.6		36.6	35.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	1.2		6.4	25.0	0.9	4.7	3.0		5.3	0.8	
Delay (s)	26.4	27.8		42.1	64.1	34.1	41.0	39.6		41.9	35.8	
Level of Service	C	C		D	E	C	D	D		D	D	
Approach Delay (s)		27.5			54.7			39.9			39.2	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			43.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			67.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	66	640	40	18	699	10	32	0	13	2	4	171
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	71	688	43	19	752	11	34	0	14	2	4	184
Pedestrians								2			2	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	764			733			1454	1657	368	1298	1673	383
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	558			733			1311	1532	368	1140	1550	141
tC, single (s)	4.9			4.1			7.9	6.5	7.1	7.5	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.7	4.0	3.4	3.5	4.0	3.4
p0 queue free %	90			98			44	100	98	98	95	76
cM capacity (veh/h)	720			879			61	95	611	128	92	780
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	415	387	395	387	48	190						
Volume Left	71	0	19	0	34	2						
Volume Right	0	43	0	11	14	184						
cSH	720	1700	879	1700	83	636						
Volume to Capacity	0.10	0.23	0.02	0.23	0.58	0.30						
Queue Length 95th (ft)	8	0	2	0	65	31						
Control Delay (s)	2.9	0.0	0.7	0.0	96.5	13.1						
Lane LOS	A		A		F	B						
Approach Delay (s)	1.5		0.4		96.5	13.1						
Approach LOS					F	B						
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			68.6%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Existing Plus Park PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	150	0	0	0	0	488
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	155	0	0	0	0	503
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	252	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	252	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	100			100	
cM capacity (veh/h)	710	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	77	77	252	252		
Volume Left	77	77	0	0		
Volume Right	0	0	0	0		
cSH	710	710	1700	1700		
Volume to Capacity	0.11	0.11	0.15	0.15		
Queue Length 95th (ft)	9	9	0	0		
Control Delay (s)	10.7	10.7	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	10.7		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			28.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Existing Plus Park PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑	↑↑						↑↑	
Volume (vph)	0	483	72	95	490	0	0	0	0	111	370	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4816		1770	3471						3370	
Flt Permitted		1.00		0.40	1.00						0.99	
Satd. Flow (perm)		4816		745	3471						3370	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	503	75	99	510	0	0	0	0	116	385	154
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	560	0	99	510	0	0	0	0	0	628	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		51.0		51.0	51.0						49.0	
Effective Green, g (s)		51.0		51.0	51.0						49.0	
Actuated g/C Ratio		0.46		0.46	0.46						0.45	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		2232		345	1609						1501	
v/s Ratio Prot		0.12			0.15							
v/s Ratio Perm				0.13							0.19	
v/c Ratio		0.25		0.29	0.32						0.42	
Uniform Delay, d1		17.9		18.3	18.5						20.8	
Progression Factor		1.00		0.47	0.46						1.00	
Incremental Delay, d2		0.3		2.0	0.5						0.9	
Delay (s)		18.2		10.6	9.0						21.7	
Level of Service		B		B	A						C	
Approach Delay (s)		18.2			9.2			0.0			21.7	
Approach LOS		B			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			16.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			56.2%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	65	7	4	1	0	0	0	0	6	421	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	70	8	4	1	0	0	0	0	6	453	2
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	470	470	231	283	471	0	458			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	470	470	231	283	471	0	458			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	86	99	99	100	100	100			100		
cM capacity (veh/h)	459	492	775	573	491	1091	1111			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	77	5	233	228								
Volume Left	0	4	6	0								
Volume Right	8	0	0	2								
cSH	510	555	1636	1700								
Volume to Capacity	0.15	0.01	0.00	0.13								
Queue Length 95th (ft)	13	1	0	0								
Control Delay (s)	13.3	11.6	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	13.3	11.6	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			22.8%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	88	0	0	99	118	96	278	83	82	0	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2745		1014	2882		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2745		1014	2882		1570		2349
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	139	98	0	0	110	131	107	309	92	91	0	201
RTOR Reduction (vph)	0	0	0	0	115	0	0	20	0	0	0	173
Lane Group Flow (vph)	139	98	0	0	126	0	96	392	0	91	0	28
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	13.9	13.9			8.5		17.2	17.2		9.5		9.5
Effective Green, g (s)	13.9	13.9			8.5		17.2	17.2		9.5		9.5
Actuated g/C Ratio	0.20	0.20			0.12		0.25	0.25		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	233	642			337		252	717		215		322
v/s Ratio Prot	c0.12	0.03			c0.05		0.09	c0.14		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.60	0.15			0.37		0.38	0.55		0.42		0.09
Uniform Delay, d1	25.1	22.7			27.9		21.5	22.6		27.3		26.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	4.1	0.1			0.7		4.3	3.0		1.3		0.1
Delay (s)	29.1	22.9			28.6		25.9	25.5		28.6		26.1
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		26.5			28.6			25.6			26.9	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			26.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			69.1				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			43.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	174	32	25	53	78	5	201	138	186	112	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	191	35	27	58	86	5	221	152	204	123	0
RTOR Reduction (vph)	0	0	24	0	0	75	0	104	0	0	0	0
Lane Group Flow (vph)	165	191	11	27	58	11	5	269	0	204	123	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.13	c0.08		0.02	0.03		0.00	c0.14		c0.17	0.07	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.41	0.25	0.04	0.20	0.21	0.08	0.02	0.57		1.20	0.47	
Uniform Delay, d1	31.5	29.7	27.7	47.1	47.2	46.4	34.7	40.0		51.5	47.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.8	0.3	3.1	1.7	1.2	0.2	4.8		133.0	5.8	
Delay (s)	34.6	30.5	28.0	50.2	48.9	47.6	34.8	44.8		184.5	53.1	
Level of Service	C	C	C	D	D	D	C	D		F	D	
Approach Delay (s)		32.0			48.5			44.6			135.1	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			64.6									
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			48.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	498	43	59	590	50	29	196	54	62	181	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		4858			4994			3362			3282	
Flt Permitted		0.80			0.83			0.90			0.84	
Satd. Flow (perm)		3911			4170			3046			2797	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	524	45	62	621	53	31	206	57	65	191	77
RTOR Reduction (vph)	0	14	0	0	14	0	0	21	0	0	28	0
Lane Group Flow (vph)	0	619	0	0	722	0	0	273	0	0	305	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.5			19.5			33.5			33.5	
Effective Green, g (s)		19.5			19.5			33.5			33.5	
Actuated g/C Ratio		0.31			0.31			0.53			0.53	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1210			1290			1619			1487	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.17			0.09			c0.11	
v/c Ratio		0.51			0.56			0.17			0.21	
Uniform Delay, d1		17.8			18.2			7.6			7.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.4			0.5			0.2			0.3	
Delay (s)		18.2			18.7			7.8			8.1	
Level of Service		B			B			A			A	
Approach Delay (s)		18.2			18.7			7.8			8.1	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		15.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		63.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		88.7%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 11: Mandela Pkwy & 24th St.

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	146	9	4	601	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	151	9	4	620	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	422	645	16	629	645	314	16			621		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	422	645	16	629	645	314	16			621		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	62	99	100			100		
cM capacity (veh/h)	359	392	1066	370	392	687	1615			969		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	100	59	211	413								
Volume Left	0	0	4	0								
Volume Right	0	9	0	0								
cSH	392	420	1615	1700								
Volume to Capacity	0.26	0.14	0.00	0.24								
Queue Length 95th (ft)	25	12	0	0								
Control Delay (s)	17.3	15.0	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	16.4		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			28.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	338	0	0	493	102	91	407	111	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4789			4872			3350				
Flt Permitted		0.67			1.00			0.99				
Satd. Flow (perm)		3253			4872			3350				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	266	352	0	0	514	106	95	424	116	0	0	0
RTOR Reduction (vph)	0	0	0	0	28	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	618	0	0	592	0	0	618	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		51.0			51.0			49.0				
Effective Green, g (s)		51.0			51.0			49.0				
Actuated g/C Ratio		0.46			0.46			0.45				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1508			2258			1492				
v/s Ratio Prot					0.12							
v/s Ratio Perm		0.19						0.18				
v/c Ratio		0.41			0.26			0.41				
Uniform Delay, d1		19.5			18.0			20.7				
Progression Factor		0.53			1.00			1.00				
Incremental Delay, d2		0.8			0.3			0.2				
Delay (s)		11.2			18.3			20.9				
Level of Service		B			B			C				
Approach Delay (s)		11.2			18.3			20.9			0.0	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM 2000 Control Delay		16.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		70.8%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Existing Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	0	0	0	1	4	5	540	2	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	70	0	0	0	1	4	5	581	2	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	319	607	12	593	605	293	12			584		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	319	607	12	593	605	293	12			584		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	100	100	100	100	99	100			100		
cM capacity (veh/h)	578	408	1061	389	409	708	1604			1000		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	70	5	296	292								
Volume Left	70	0	5	0								
Volume Right	0	4	0	2								
cSH	578	618	1604	1700								
Volume to Capacity	0.12	0.01	0.00	0.17								
Queue Length 95th (ft)	10	1	0	0								
Control Delay (s)	12.1	10.9	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.1	10.9	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			32.1%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	0	46	0	0	0	41	108	0	0	54	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.95	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.88	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1773	1549				1516	3471			2951	
Flt Permitted		0.76	1.00				0.58	1.00			1.00	
Satd. Flow (perm)		1414	1549				928	3471			2951	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	256	0	52	0	0	0	47	123	0	0	61	216
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	0	0	123	0
Lane Group Flow (vph)	0	256	22	0	0	0	47	123	0	0	154	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		30.0	30.0				30.0	30.0			30.0	
Effective Green, g (s)		30.0	30.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.43	0.43				0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		606	663				397	1487			1264	
v/s Ratio Prot								0.04			c0.05	
v/s Ratio Perm		c0.18	0.01				0.05					
v/c Ratio		0.42	0.03				0.12	0.08			0.12	
Uniform Delay, d1		14.0	11.6				12.0	11.8			12.1	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		2.2	0.1				0.6	0.1			0.2	
Delay (s)		16.1	11.7				12.6	12.0			12.3	
Level of Service		B	B				B	B			B	
Approach Delay (s)		15.4			0.0			12.1			12.3	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.27									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			59.2%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	165	73	156	483	20	84	12	208	34	11	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1460	1687	3409		1649	1506	1451	1433	1342	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1460	1687	3409		1649	1506	1451	1433	1342	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	179	79	170	525	22	91	13	226	37	12	18
RTOR Reduction (vph)	0	0	63	0	2	0	0	0	129	0	17	0
Lane Group Flow (vph)	27	179	16	170	545	0	52	52	97	37	13	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	3.0	18.4	18.4	8.2	23.6		40.0	40.0	40.0	6.6	6.6	
Effective Green, g (s)	3.0	18.4	18.4	8.2	23.6		40.0	40.0	40.0	6.6	6.6	
Actuated g/C Ratio	0.03	0.20	0.20	0.09	0.25		0.43	0.43	0.43	0.07	0.07	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	43	685	288	148	863		707	646	622	101	95	
v/s Ratio Prot	0.02	0.05		c0.10	c0.16		0.03	0.03		c0.03	0.01	
v/s Ratio Perm			0.01						c0.07			
v/c Ratio	0.63	0.26	0.05	1.15	0.63		0.07	0.08	0.16	0.37	0.14	
Uniform Delay, d1	44.5	31.6	30.3	42.5	30.9		15.7	15.7	16.3	41.3	40.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	25.3	0.2	0.1	119.5	1.5		0.2	0.2	0.5	2.2	0.7	
Delay (s)	69.8	31.9	30.4	162.0	32.4		15.9	16.0	16.8	43.6	41.3	
Level of Service	E	C	C	F	C		B	B	B	D	D	
Approach Delay (s)		35.1			63.2			16.5			42.6	
Approach LOS		D			E			B			D	
Intersection Summary												
HCM 2000 Control Delay			45.4			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			93.2			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			55.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	260	61	110	548	189	85	85	127	93	69	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.91		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3309		1703	3505	1543	1583	3042		1736	2796	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3309		1703	3505	1543	1583	3042		1736	2796	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	63	277	65	117	583	201	90	90	135	99	73	40
RTOR Reduction (vph)	0	21	0	0	0	165	0	114	0	0	34	0
Lane Group Flow (vph)	63	321	0	117	583	36	90	111	0	99	79	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	491	999		301	620	273	247	475		271	436	
v/s Ratio Prot	0.04	c0.10		0.07	c0.17		c0.06	0.04		c0.06	0.03	
v/s Ratio Perm						0.02						
v/c Ratio	0.13	0.32		0.39	0.94	0.13	0.36	0.23		0.37	0.18	
Uniform Delay, d1	24.3	25.9		34.9	39.0	33.3	36.2	35.5		36.2	35.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.9		3.8	24.1	1.0	4.1	1.2		3.8	0.9	
Delay (s)	24.9	26.7		38.7	63.1	34.3	40.4	36.6		40.0	36.1	
Level of Service	C	C		D	E	C	D	D		D	D	
Approach Delay (s)		26.5			53.5			37.7			37.9	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			43.0			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			58.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	465	33	18	727	5	43	4	23	3	10	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	24	479	34	19	749	5	44	4	24	3	10	93
Pedestrians		2										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	755			513			1056	1336	257	1102	1350	379
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	530			513			861	1169	257	912	1185	117
tC, single (s)	4.9			4.2			7.5	6.5	7.0	8.2	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.6			2.3			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	97			98			76	98	97	98	94	89
cM capacity (veh/h)	727			1014			184	168	736	154	165	825
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	263	274	393	380	72	106						
Volume Left	24	0	19	0	44	3						
Volume Right	0	34	0	5	24	93						
cSH	727	1700	1014	1700	242	544						
Volume to Capacity	0.03	0.16	0.02	0.22	0.30	0.20						
Queue Length 95th (ft)	3	0	1	0	30	18						
Control Delay (s)	1.3	0.0	0.6	0.0	26.0	13.2						
Lane LOS	A		A		D	B						
Approach Delay (s)	0.6		0.3		26.0	13.2						
Approach LOS					D	B						
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			50.5%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

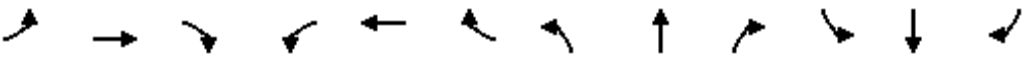
Gateway Park
Existing Plus Park SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	131	0	0	0	0	452
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	151	0	0	0	0	520
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	260	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	260	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	100			100	
cM capacity (veh/h)	699	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	75	75	260	260		
Volume Left	75	75	0	0		
Volume Right	0	0	0	0		
cSH	699	699	1700	1700		
Volume to Capacity	0.11	0.11	0.15	0.15		
Queue Length 95th (ft)	9	9	0	0		
Control Delay (s)	10.8	10.8	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	10.8		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			22.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑	↑↑						↑↑	
Volume (vph)	0	304	77	110	475	0	0	0	0	93	295	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4711		1766	3539						3251	
Flt Permitted		1.00		0.50	1.00						0.99	
Satd. Flow (perm)		4711		924	3539						3251	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	323	82	117	505	0	0	0	0	99	314	202
RTOR Reduction (vph)	0	41	0	0	0	0	0	0	0	0	54	0
Lane Group Flow (vph)	0	364	0	117	505	0	0	0	0	0	561	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		46.0		46.0	46.0						54.0	
Effective Green, g (s)		46.0		46.0	46.0						54.0	
Actuated g/C Ratio		0.42		0.42	0.42						0.49	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1970		386	1479						1595	
v/s Ratio Prot		0.08			c0.14							
v/s Ratio Perm				0.13							0.17	
v/c Ratio		0.18		0.30	0.34						0.35	
Uniform Delay, d1		20.2		21.3	21.7						17.2	
Progression Factor		1.00		0.34	0.33						1.00	
Incremental Delay, d2		0.2		0.4	0.1						0.6	
Delay (s)		20.4		7.7	7.4						17.8	
Level of Service		C		A	A						B	
Approach Delay (s)		20.4			7.5			0.0			17.8	
Approach LOS		C			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			14.5		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			75.3%		ICU Level of Service				D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	59	14	5	0	0	0	0	0	25	343	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	66	16	6	0	0	0	0	0	28	381	11
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	442	442	197	295	448	0	392			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	442	442	197	295	448	0	392			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	100	87	98	99	100	100	100			98		
cM capacity (veh/h)	479	504	817	544	500	1091	1177			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	81	6	218	202								
Volume Left	0	6	28	0								
Volume Right	16	0	0	11								
cSH	544	544	1636	1700								
Volume to Capacity	0.15	0.01	0.02	0.12								
Queue Length 95th (ft)	13	1	1	0								
Control Delay (s)	12.8	11.7	1.0	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.8	11.7	0.5									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			21.5%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	29	0	0	133	121	72	151	128	66	0	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3075		1441	2982		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3075		1441	2982		1543		2682
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	18	33	0	0	153	139	83	174	147	76	0	208
RTOR Reduction (vph)	0	0	0	0	118	0	0	96	0	0	0	192
Lane Group Flow (vph)	18	33	0	0	174	0	75	233	0	76	0	16
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.5	3.5			8.1		18.4	18.4		4.1		4.1
Effective Green, g (s)	3.5	3.5			8.1		18.4	18.4		4.1		4.1
Actuated g/C Ratio	0.07	0.07			0.15		0.35	0.35		0.08		0.08
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	107	228			469		499	1033		119		207
v/s Ratio Prot	c0.01	0.01			c0.06		0.05	c0.08		c0.05		0.01
v/s Ratio Perm												
v/c Ratio	0.17	0.14			0.37		0.15	0.23		0.64		0.08
Uniform Delay, d1	23.4	23.4			20.2		12.0	12.3		23.8		22.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.7	0.3			0.5		0.6	0.5		10.7		0.2
Delay (s)	24.2	23.7			20.7		12.6	12.8		34.5		22.9
Level of Service	C	C			C		B	B		C		C
Approach Delay (s)		23.9			20.7			12.8			26.0	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			53.1				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			37.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	27	1	14	27	76	0	8	23	67	11	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	793	1357	3471	1328		2621		1703	2362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	793	1357	3471	1328		2621		1703	2362	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	33	1	17	33	93	0	10	28	82	13	1
RTOR Reduction (vph)	0	0	1	0	0	59	0	21	0	0	1	0
Lane Group Flow (vph)	12	33	0	17	33	34	0	17	0	82	13	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Effective Green, g (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Actuated g/C Ratio	0.08	0.32	0.32	0.12	0.37	0.37		0.25		0.13	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	150	1173	257	169	1272	486		655		227	826	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.05	0.01	
v/s Ratio Perm			0.00			c0.03						
v/c Ratio	0.08	0.03	0.00	0.10	0.03	0.07		0.03		0.36	0.02	
Uniform Delay, d1	50.8	27.6	27.3	46.5	24.3	24.7		34.0		47.3	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.0	0.0	1.2	0.0	0.3		0.1		4.4	0.0	
Delay (s)	51.8	27.6	27.4	47.7	24.3	25.0		34.0		51.8	25.5	
Level of Service	D	C	C	D	C	C		C		D	C	
Approach Delay (s)		33.9			27.5			34.0			47.9	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			35.3				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.11									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	374	19	45	516	48	35	98	35	60	129	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.95	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		4949			4969			3444			3301	
Flt Permitted		0.78			0.87			0.87			0.87	
Satd. Flow (perm)		3891			4342			3029			2888	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	71	378	19	45	521	48	35	99	35	61	130	87
RTOR Reduction (vph)	0	7	0	0	17	0	0	16	0	0	39	0
Lane Group Flow (vph)	0	461	0	0	597	0	0	153	0	0	239	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.8			16.8			33.7			33.7	
Effective Green, g (s)		16.8			16.8			33.7			33.7	
Actuated g/C Ratio		0.28			0.28			0.56			0.56	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1080			1205			1687			1608	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.14			0.05			c0.08	
v/c Ratio		0.43			0.50			0.09			0.15	
Uniform Delay, d1		17.9			18.3			6.3			6.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.3			0.1			0.2	
Delay (s)		18.2			18.6			6.4			6.7	
Level of Service		B			B			A			A	
Approach Delay (s)		18.2			18.6			6.4			6.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		15.0			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.26										
Actuated Cycle Length (s)		60.5			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		80.1%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 11: Mandela Pkwy & 24th St.

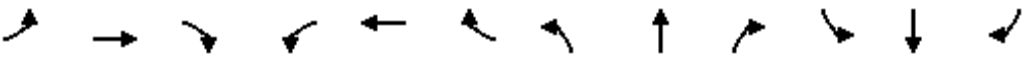
Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	128	7	3	345	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	0	0	147	8	3	397	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	292	409	3	406	409	203	3			400		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	292	409	3	406	409	203	3			400		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	72	99	100			100		
cM capacity (veh/h)	499	532	1086	519	532	808	1632			1167		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	98	57	136	264								
Volume Left	0	0	3	0								
Volume Right	0	8	0	0								
cSH	532	559	1632	1700								
Volume to Capacity	0.18	0.10	0.00	0.16								
Queue Length 95th (ft)	17	8	0	0								
Control Delay (s)	13.3	12.2	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.9		0.1									
Approach LOS	B											
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			22.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑↑				
Volume (vph)	133	264	0	0	514	64	72	210	78	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4828			4993			3392				
Flt Permitted		0.68			1.00			0.99				
Satd. Flow (perm)		3324			4993			3392				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	141	281	0	0	547	68	77	223	83	0	0	0
RTOR Reduction (vph)	0	0	0	0	14	0	0	23	0	0	0	0
Lane Group Flow (vph)	0	422	0	0	601	0	0	360	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		46.0			46.0			54.0				
Effective Green, g (s)		46.0			46.0			54.0				
Actuated g/C Ratio		0.42			0.42			0.49				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1390			2087			1665				
v/s Ratio Prot					0.12							
v/s Ratio Perm		0.13						0.11				
v/c Ratio		0.30			0.29			0.22				
Uniform Delay, d1		21.3			21.2			15.9				
Progression Factor		0.63			1.00			1.00				
Incremental Delay, d2		0.6			0.1			0.1				
Delay (s)		14.0			21.2			16.0				
Level of Service		B			C			B				
Approach Delay (s)		14.0			21.2			16.0			0.0	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay		17.7			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.26										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		45.9%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Existing Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	58	1	0	0	1	9	3	274	21	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	64	1	0	0	1	10	3	304	23	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	178	356	9	336	345	177	9			341		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178	356	9	336	345	177	9			341		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	100	100	100	99	100			100		
cM capacity (veh/h)	739	561	1069	582	570	833	1612			1216		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	66	11	156	176								
Volume Left	64	0	3	0								
Volume Right	0	10	0	23								
cSH	735	796	1612	1700								
Volume to Capacity	0.09	0.01	0.00	0.10								
Queue Length 95th (ft)	7	1	0	0								
Control Delay (s)	10.4	9.6	0.2	0.0								
Lane LOS	B	A	A									
Approach Delay (s)	10.4	9.6	0.1									
Approach LOS	B	A										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			26.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	0	6	0	0	0	4	431	1	0	84	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.99				1.00	1.00			1.00	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.98	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1767	1199				1202	2735			2463	
Flt Permitted		0.76	1.00				0.69	1.00			1.00	
Satd. Flow (perm)		1408	1199				873	2735			2463	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92
Adj. Flow (vph)	69	0	6	0	0	0	4	459	1	0	89	10
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	69	2	0	0	0	4	460	0	0	93	0
Confl. Peds. (#/hr)	2		1	1		2	1		2	2		1
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		29.0	29.0				31.0	31.0			31.0	
Effective Green, g (s)		29.0	29.0				31.0	31.0			31.0	
Actuated g/C Ratio		0.41	0.41				0.44	0.44			0.44	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		583	496				386	1211			1090	
v/s Ratio Prot								c0.17			0.04	
v/s Ratio Perm		c0.05	0.00				0.00					
v/c Ratio		0.12	0.01				0.01	0.38			0.09	
Uniform Delay, d1		12.6	12.0				10.9	13.1			11.3	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.4	0.0				0.0	0.9			0.2	
Delay (s)		13.0	12.1				11.0	14.0			11.4	
Level of Service		B	B				B	B			B	
Approach Delay (s)		13.0			0.0			13.9			11.4	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	236	70	39	538	31	242	50	148	53	20	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1495	1433	3359		1618	1345	1302	1517	1398	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1495	1433	3359		1618	1345	1302	1517	1398	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	248	74	41	566	33	255	53	156	56	21	45
RTOR Reduction (vph)	0	0	57	0	4	0	0	0	126	0	34	0
Lane Group Flow (vph)	5	248	17	41	595	0	153	155	30	56	32	0
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	1.0	16.9	16.9	4.9	20.8		14.5	14.5	14.5	18.8	18.8	
Effective Green, g (s)	1.0	16.9	16.9	4.9	20.8		14.5	14.5	14.5	18.8	18.8	
Actuated g/C Ratio	0.01	0.23	0.23	0.07	0.28		0.19	0.19	0.19	0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	20	788	336	93	930		312	259	251	379	349	
v/s Ratio Prot	0.00	0.07		c0.03	c0.18		0.09	c0.12		c0.04	0.02	
v/s Ratio Perm			0.01						0.02			
v/c Ratio	0.25	0.31	0.05	0.44	0.64		0.49	0.60	0.12	0.15	0.09	
Uniform Delay, d1	36.7	24.3	22.8	33.8	23.9		27.0	27.6	25.0	21.9	21.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.5	0.2	0.1	3.3	1.5		1.2	3.7	0.2	0.8	0.5	
Delay (s)	43.2	24.5	22.9	37.1	25.4		28.2	31.3	25.2	22.7	22.1	
Level of Service	D	C	C	D	C		C	C	C	C	C	
Approach Delay (s)		24.4			26.1			28.3			22.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			26.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			75.1			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			46.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

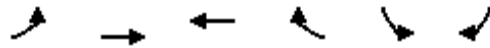
Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	285	69	146	502	170	77	138	293	108	60	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3180		1626	3438	1495	1444	2823		1612	2833	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3180		1626	3438	1495	1444	2823		1612	2833	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	91	294	71	151	518	175	79	142	302	111	62	14
RTOR Reduction (vph)	0	22	0	0	0	144	0	255	0	0	12	0
Lane Group Flow (vph)	91	343	0	151	518	31	79	189	0	111	64	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	432	960		287	608	264	225	441		251	442	
v/s Ratio Prot	0.06	c0.11		0.09	c0.15		0.05	c0.07		c0.07	0.02	
v/s Ratio Perm						0.02						
v/c Ratio	0.21	0.36		0.53	0.85	0.12	0.35	0.43		0.44	0.15	
Uniform Delay, d1	25.0	26.2		35.8	38.3	33.2	36.2	36.6		36.7	35.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	1.0		6.7	14.1	0.9	4.3	3.0		5.6	0.7	
Delay (s)	26.1	27.2		42.6	52.3	34.1	40.4	39.7		42.3	35.7	
Level of Service	C	C		D	D	C	D	D		D	D	
Approach Delay (s)		27.0			46.8			39.8			39.6	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			39.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			68.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Existing Plus Connection PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	83	640	660	30	2	193
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	89	688	710	32	2	208
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.92				0.92	0.92
vC, conflicting volume	744				1250	373
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	556				1105	154
tC, single (s)	4.9				6.8	7.1
tC, 2 stage (s)						
tF (s)	2.6				3.5	3.4
p0 queue free %	88				99	73
cM capacity (veh/h)	727				168	771
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	319	459	473	269	210	
Volume Left	89	0	0	0	2	
Volume Right	0	0	0	32	208	
cSH	727	1700	1700	1700	743	
Volume to Capacity	0.12	0.27	0.28	0.16	0.28	
Queue Length 95th (ft)	10	0	0	0	29	
Control Delay (s)	4.1	0.0	0.0	0.0	11.7	
Lane LOS	A				B	
Approach Delay (s)	1.7		0.0		11.7	
Approach LOS					B	
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			61.4%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

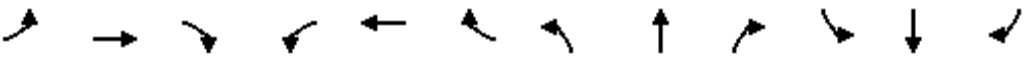
Gateway Park
Existing Plus Connection PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	150	0	0	0	0	487
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	155	0	0	0	0	502
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	251	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	100			100	
cM capacity (veh/h)	710	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	77	77	251	251		
Volume Left	77	77	0	0		
Volume Right	0	0	0	0		
cSH	710	710	1700	1700		
Volume to Capacity	0.11	0.11	0.15	0.15		
Queue Length 95th (ft)	9	9	0	0		
Control Delay (s)	10.7	10.7	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	10.7		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			28.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑↑	
Volume (vph)	0	432	109	104	458	0	0	0	0	114	373	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3321		1770	3471						3374	
Flt Permitted		1.00		0.38	1.00						0.99	
Satd. Flow (perm)		3321		713	3471						3374	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	450	114	108	477	0	0	0	0	119	389	148
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	544	0	108	477	0	0	0	0	0	632	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		51.0		51.0	51.0						49.0	
Effective Green, g (s)		51.0		51.0	51.0						49.0	
Actuated g/C Ratio		0.46		0.46	0.46						0.45	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1539		330	1609						1502	
v/s Ratio Prot		0.16			0.14							
v/s Ratio Perm				0.15							0.19	
v/c Ratio		0.35		0.33	0.30						0.42	
Uniform Delay, d1		18.9		18.7	18.3						20.8	
Progression Factor		1.00		0.49	0.48						1.00	
Incremental Delay, d2		0.6		2.5	0.4						0.9	
Delay (s)		19.6		11.5	9.3						21.7	
Level of Service		B		B	A						C	
Approach Delay (s)		19.6			9.7			0.0			21.7	
Approach LOS		B			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			17.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			61.2%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	97	7	4	1	0	0	0	0	6	421	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	104	8	4	1	0	0	0	0	6	453	2
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	470	470	231	300	471	0	458			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	470	470	231	300	471	0	458			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	79	99	99	100	100	100			100		
cM capacity (veh/h)	459	492	775	523	491	1091	1111			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	112	5	233	228								
Volume Left	0	4	6	0								
Volume Right	8	0	0	2								
cSH	504	517	1636	1700								
Volume to Capacity	0.22	0.01	0.00	0.13								
Queue Length 95th (ft)	21	1	0	0								
Control Delay (s)	14.2	12.0	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	14.2	12.0	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			24.5%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	86	0	0	96	114	79	281	83	79	0	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2746		1014	2889		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2746		1014	2889		1570		2349
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	139	96	0	0	107	127	88	312	92	88	0	204
RTOR Reduction (vph)	0	0	0	0	111	0	0	20	0	0	0	176
Lane Group Flow (vph)	139	96	0	0	123	0	79	394	0	88	0	28
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	13.9	13.9			8.4		17.2	17.2		9.3		9.3
Effective Green, g (s)	13.9	13.9			8.4		17.2	17.2		9.3		9.3
Actuated g/C Ratio	0.20	0.20			0.12		0.25	0.25		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	234	645			335		253	722		212		317
v/s Ratio Prot	c0.12	0.03			c0.04		0.08	c0.14		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.59	0.15			0.37		0.31	0.55		0.42		0.09
Uniform Delay, d1	24.9	22.6			27.8		21.0	22.4		27.3		26.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	4.0	0.1			0.7		3.2	2.9		1.3		0.1
Delay (s)	28.9	22.7			28.4		24.2	25.3		28.6		26.2
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		26.4			28.4			25.2			26.9	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			26.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			68.8				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			43.0%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	174	32	25	53	58	5	201	138	173	112	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	191	35	27	58	64	5	221	152	190	123	0
RTOR Reduction (vph)	0	0	24	0	0	56	0	104	0	0	0	0
Lane Group Flow (vph)	165	191	11	27	58	8	5	269	0	190	123	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.13	c0.08		0.02	0.03		0.00	c0.14		c0.16	0.07	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.41	0.25	0.04	0.20	0.21	0.06	0.02	0.57		1.12	0.47	
Uniform Delay, d1	31.5	29.7	27.7	47.1	47.2	46.3	34.7	40.0		51.5	47.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.8	0.3	3.1	1.7	0.9	0.2	4.8		104.1	5.8	
Delay (s)	34.6	30.5	28.0	50.2	48.9	47.2	34.8	44.8		155.6	53.1	
Level of Service	C	C	C	D	D	D	C	D		F	D	
Approach Delay (s)		32.0			48.4			44.6			115.3	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			59.1									
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			47.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	488	43	59	563	50	29	196	54	62	181	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4858			4990			3362			3301	
Flt Permitted		0.84			0.83			0.90			0.84	
Satd. Flow (perm)		4103			4172			3050			2807	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	46	514	45	62	593	53	31	206	57	65	191	67
RTOR Reduction (vph)	0	15	0	0	15	0	0	21	0	0	23	0
Lane Group Flow (vph)	0	590	0	0	693	0	0	273	0	0	300	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.9			18.9			33.6			33.6	
Effective Green, g (s)		18.9			18.9			33.6			33.6	
Actuated g/C Ratio		0.30			0.30			0.54			0.54	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1240			1261			1639			1509	
v/s Ratio Prot												
v/s Ratio Perm		0.14			c0.17			0.09			c0.11	
v/c Ratio		0.48			0.55			0.17			0.20	
Uniform Delay, d1		17.8			18.2			7.3			7.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.5			0.2			0.3	
Delay (s)		18.1			18.7			7.6			7.8	
Level of Service		B			B			A			A	
Approach Delay (s)		18.1			18.7			7.6			7.8	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			15.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			62.5				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			87.8%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

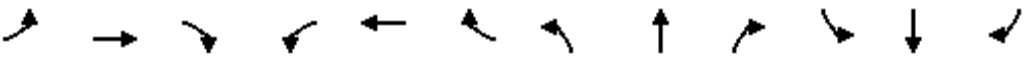
Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	146	9	4	596	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	151	9	4	614	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	419	640	16	624	640	311	16			615		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	419	640	16	624	640	311	16			615		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	62	99	100			100		
cM capacity (veh/h)	362	395	1066	373	395	690	1615			973		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	100	59	209	410								
Volume Left	0	0	4	0								
Volume Right	0	9	0	0								
cSH	395	423	1615	1700								
Volume to Capacity	0.25	0.14	0.00	0.24								
Queue Length 95th (ft)	25	12	0	0								
Control Delay (s)	17.2	14.9	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	16.3		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			28.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑			↑↑				
Volume (vph)	250	296	0	0	457	102	105	407	127	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.95			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4782			3385			3339				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3240			3385			3339				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	260	308	0	0	476	106	109	424	132	0	0	0
RTOR Reduction (vph)	0	0	0	0	17	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	568	0	0	565	0	0	645	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		51.0			51.0			49.0				
Effective Green, g (s)		51.0			51.0			49.0				
Actuated g/C Ratio		0.46			0.46			0.45				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1502			1569			1487				
v/s Ratio Prot					0.17							
v/s Ratio Perm		0.18						0.19				
v/c Ratio		0.38			0.36			0.43				
Uniform Delay, d1		19.2			19.0			21.0				
Progression Factor		0.53			1.00			1.00				
Incremental Delay, d2		0.7			0.6			0.2				
Delay (s)		10.9			19.6			21.2				
Level of Service		B			B			C				
Approach Delay (s)		10.9			19.6			21.2			0.0	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM 2000 Control Delay			17.5			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			71.3%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Existing Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	97	0	0	0	1	4	5	538	2	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	104	0	0	0	1	4	5	578	2	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	318	604	12	591	603	292	12			582		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	318	604	12	591	603	292	12			582		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	100	100	100	100	99	100			100		
cM capacity (veh/h)	579	409	1061	390	410	710	1604			1002		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	104	5	295	291								
Volume Left	104	0	5	0								
Volume Right	0	4	0	2								
cSH	579	619	1604	1700								
Volume to Capacity	0.18	0.01	0.00	0.17								
Queue Length 95th (ft)	16	1	0	0								
Control Delay (s)	12.6	10.9	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.6	10.9	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			33.8%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	0	12	0	0	0	6	108	0	0	54	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	1.00				1.00	1.00			0.99	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.95	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1805	1615				1543	3471			3138	
Flt Permitted		0.76	1.00				0.70	1.00			1.00	
Satd. Flow (perm)		1439	1615				1132	3471			3138	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	75	0	14	0	0	0	7	123	0	0	61	27
RTOR Reduction (vph)	0	0	8	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	75	6	0	0	0	7	123	0	0	73	0
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		30.0	30.0				30.0	30.0			30.0	
Effective Green, g (s)		30.0	30.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.43	0.43				0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		616	692				485	1487			1344	
v/s Ratio Prot								c0.04			0.02	
v/s Ratio Perm		c0.05	0.00				0.01					
v/c Ratio		0.12	0.01				0.01	0.08			0.05	
Uniform Delay, d1		12.1	11.5				11.5	11.8			11.7	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.4	0.0				0.1	0.1			0.1	
Delay (s)		12.5	11.5				11.6	12.0			11.8	
Level of Service		B	B				B	B			B	
Approach Delay (s)		12.3			0.0			11.9			11.8	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.10									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			17.0%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Volume (vph)	25	170	34	29	488	20	55	12	78	34	11	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1524	1687	3410		1649	1455	1495	1433	1342	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1524	1687	3410		1649	1455	1495	1433	1342	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	185	37	32	530	22	60	13	85	37	12	18
RTOR Reduction (vph)	0	0	29	0	2	0	0	0	47	0	17	0
Lane Group Flow (vph)	27	185	8	32	550	0	36	37	38	37	13	0
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	2.9	19.3	19.3	4.1	20.5		40.7	40.7	40.7	6.5	6.5	
Effective Green, g (s)	2.9	19.3	19.3	4.1	20.5		40.7	40.7	40.7	6.5	6.5	
Actuated g/C Ratio	0.03	0.21	0.21	0.05	0.23		0.45	0.45	0.45	0.07	0.07	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	43	739	324	76	771		740	653	671	102	96	
v/s Ratio Prot	c0.02	0.05		0.02	c0.16		0.02	0.03		c0.03	0.01	
v/s Ratio Perm			0.01						c0.03			
v/c Ratio	0.63	0.25	0.02	0.42	0.71		0.05	0.06	0.06	0.36	0.14	
Uniform Delay, d1	43.3	29.6	28.2	42.1	32.3		14.0	14.1	14.1	40.1	39.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	25.3	0.2	0.0	3.7	3.1		0.1	0.2	0.2	2.2	0.7	
Delay (s)	68.6	29.8	28.2	45.8	35.5		14.2	14.3	14.3	42.3	40.1	
Level of Service	E	C	C	D	D		B	B	B	D	D	
Approach Delay (s)		33.8			36.0			14.2			41.3	
Approach LOS		C			D			B			D	
Intersection Summary												
HCM 2000 Control Delay			32.6			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			90.6			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			38.5%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

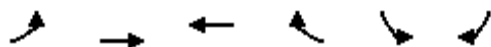
Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	161	54	120	450	197	77	85	137	101	69	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3201		1703	3505	1543	1583	3030		1736	2926	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3201		1703	3505	1543	1583	3030		1736	2926	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	171	57	128	479	210	82	90	146	107	73	23
RTOR Reduction (vph)	0	34	0	0	0	173	0	123	0	0	19	0
Lane Group Flow (vph)	43	194	0	128	479	37	82	113	0	107	77	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	491	966		301	620	273	247	473		271	457	
v/s Ratio Prot	0.03	c0.06		0.08	c0.14		c0.05	0.04		c0.06	0.03	
v/s Ratio Perm						0.02						
v/c Ratio	0.09	0.20		0.43	0.77	0.14	0.33	0.24		0.39	0.17	
Uniform Delay, d1	24.0	24.9		35.2	37.7	33.3	36.0	35.5		36.4	35.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.5		4.4	9.1	1.0	3.6	1.2		4.3	0.8	
Delay (s)	24.4	25.4		39.5	46.7	34.3	39.6	36.7		40.7	35.9	
Level of Service	C	C		D	D	C	D	D		D	D	
Approach Delay (s)		25.2			42.4			37.4			38.4	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			38.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			59.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Existing Plus Connection SAT



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	45	394	650	48	3	130
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	46	406	670	49	3	134
Pedestrians		2				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.92				0.92	0.92
vC, conflicting volume	720				991	362
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	522				816	133
tC, single (s)	4.9				7.5	7.0
tC, 2 stage (s)						
tF (s)	2.6				3.8	3.3
p0 queue free %	94				99	84
cM capacity (veh/h)	743				223	816
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	182	271	447	273	137	
Volume Left	46	0	0	0	3	
Volume Right	0	0	0	49	134	
cSH	743	1700	1700	1700	770	
Volume to Capacity	0.06	0.16	0.26	0.16	0.18	
Queue Length 95th (ft)	5	0	0	0	16	
Control Delay (s)	3.1	0.0	0.0	0.0	10.7	
Lane LOS	A				B	
Approach Delay (s)	1.2		0.0		10.7	
Approach LOS					B	
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			50.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Existing Plus Connection SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	131	0	0	0	0	458
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	151	0	0	0	0	526
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	263	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	263	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	100			100	
cM capacity (veh/h)	695	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	75	75	263	263		
Volume Left	75	75	0	0		
Volume Right	0	0	0	0		
cSH	695	695	1700	1700		
Volume to Capacity	0.11	0.11	0.15	0.15		
Queue Length 95th (ft)	9	9	0	0		
Control Delay (s)	10.8	10.8	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	10.8		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			23.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑						↑↑	
Volume (vph)	0	184	103	119	432	0	0	0	0	101	303	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		0.99		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.95		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3204		1765	3539						3260	
Flt Permitted		1.00		0.55	1.00						0.99	
Satd. Flow (perm)		3204		1021	3539						3260	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	196	110	127	460	0	0	0	0	107	322	193
RTOR Reduction (vph)	0	64	0	0	0	0	0	0	0	0	47	0
Lane Group Flow (vph)	0	242	0	127	460	0	0	0	0	0	575	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		46.0		46.0	46.0						54.0	
Effective Green, g (s)		46.0		46.0	46.0						54.0	
Actuated g/C Ratio		0.42		0.42	0.42						0.49	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1339		426	1479						1600	
v/s Ratio Prot		0.08			c0.13							
v/s Ratio Perm				0.12							0.18	
v/c Ratio		0.18		0.30	0.31						0.36	
Uniform Delay, d1		20.1		21.3	21.4						17.3	
Progression Factor		1.00		0.39	0.39						1.00	
Incremental Delay, d2		0.3		0.4	0.1						0.6	
Delay (s)		20.4		8.7	8.6						17.9	
Level of Service		C		A	A						B	
Approach Delay (s)		20.4			8.6			0.0			17.9	
Approach LOS		C			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			14.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			75.8%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	58	53	14	5	0	9	0	0	0	25	344	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	64	59	16	6	0	10	0	0	0	28	382	21
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	458	448	203	293	459	0	403			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	458	448	203	293	459	0	403			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	86	88	98	99	100	99	100			98		
cM capacity (veh/h)	462	500	811	552	493	1091	1166			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	139	16	219	212								
Volume Left	64	6	28	0								
Volume Right	16	10	0	21								
cSH	502	809	1636	1700								
Volume to Capacity	0.28	0.02	0.02	0.12								
Queue Length 95th (ft)	28	1	1	0								
Control Delay (s)	14.9	9.5	1.0	0.0								
Lane LOS	B	A	A									
Approach Delay (s)	14.9	9.5	0.5									
Approach LOS	B	A										
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			27.6%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park

Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	24	0	0	129	113	42	161	129	59	0	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3079		1441	2990		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3079		1441	2990		1543		2682
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	18	28	0	0	148	130	48	185	148	68	0	220
RTOR Reduction (vph)	0	0	0	0	110	0	0	95	0	0	0	203
Lane Group Flow (vph)	18	28	0	0	168	0	43	243	0	68	0	17
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	2.3	2.3			8.0		18.4	18.4		4.1		4.1
Effective Green, g (s)	2.3	2.3			8.0		18.4	18.4		4.1		4.1
Actuated g/C Ratio	0.04	0.04			0.15		0.36	0.36		0.08		0.08
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	72	154			475		511	1062		122		212
v/s Ratio Prot	c0.01	0.01			c0.05		0.03	c0.08		c0.04		0.01
v/s Ratio Perm												
v/c Ratio	0.25	0.18			0.35		0.08	0.23		0.56		0.08
Uniform Delay, d1	23.9	23.8			19.6		11.1	11.7		23.0		22.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	1.8	0.6			0.5		0.3	0.5		5.4		0.2
Delay (s)	25.7	24.4			20.0		11.4	12.2		28.4		22.3
Level of Service	C	C			C		B	B		C		C
Approach Delay (s)		24.9			20.0			12.1			23.7	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			18.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			51.8				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			36.9%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	27	1	14	27	41	0	8	23	33	11	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	793	1357	3471	1328		2621		1703	2362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	793	1357	3471	1328		2621		1703	2362	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	33	1	17	33	50	0	10	28	40	13	1
RTOR Reduction (vph)	0	0	1	0	0	32	0	21	0	0	1	0
Lane Group Flow (vph)	12	33	0	17	33	18	0	17	0	40	13	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Effective Green, g (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Actuated g/C Ratio	0.08	0.32	0.32	0.12	0.37	0.37		0.25		0.13	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	150	1173	257	169	1272	486		655		227	826	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.02	0.01	
v/s Ratio Perm			0.00			c0.01						
v/c Ratio	0.08	0.03	0.00	0.10	0.03	0.04		0.03		0.18	0.02	
Uniform Delay, d1	50.8	27.6	27.3	46.5	24.3	24.4		34.0		46.2	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.0	0.0	1.2	0.0	0.1		0.1		1.7	0.0	
Delay (s)	51.8	27.6	27.4	47.7	24.3	24.5		34.0		47.8	25.5	
Level of Service	D	C	C	D	C	C		C		D	C	
Approach Delay (s)		33.9			28.4			34.0			42.1	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	350	19	45	479	48	35	98	35	60	129	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4950			4965			3444			3319	
Flt Permitted		0.88			0.88			0.87			0.86	
Satd. Flow (perm)		4366			4361			3038			2893	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	26	354	19	45	484	48	35	99	35	61	130	71
RTOR Reduction (vph)	0	9	0	0	18	0	0	15	0	0	31	0
Lane Group Flow (vph)	0	390	0	0	559	0	0	154	0	0	231	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.3			16.3			33.8			33.8	
Effective Green, g (s)		16.3			16.3			33.8			33.8	
Actuated g/C Ratio		0.27			0.27			0.56			0.56	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1184			1182			1708			1627	
v/s Ratio Prot												
v/s Ratio Perm		0.09			0.13			0.05			0.08	
v/c Ratio		0.33			0.47			0.09			0.14	
Uniform Delay, d1		17.5			18.3			6.1			6.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.3			0.1			0.2	
Delay (s)		17.7			18.6			6.2			6.4	
Level of Service		B			B			A			A	
Approach Delay (s)		17.7			18.6			6.2			6.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		14.6			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.25										
Actuated Cycle Length (s)		60.1			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		78.3%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	128	7	3	332	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	0	0	147	8	3	382	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	284	395	3	392	395	196	3			385		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284	395	3	392	395	196	3			385		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	73	99	100			100		
cM capacity (veh/h)	508	543	1086	532	543	817	1632			1182		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	98	57	131	254								
Volume Left	0	0	3	0								
Volume Right	0	8	0	0								
cSH	543	570	1632	1700								
Volume to Capacity	0.18	0.10	0.00	0.15								
Queue Length 95th (ft)	16	8	0	0								
Control Delay (s)	13.1	12.0	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.7		0.1									
Approach LOS	B											
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			23.1%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	166	0	0	461	64	91	210	109	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.95			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.96				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4823			3469			3357				
Flt Permitted		0.67			1.00			0.99				
Satd. Flow (perm)		3286			3469			3357				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	128	177	0	0	490	68	97	223	116	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	34	0	0	0	0
Lane Group Flow (vph)	0	305	0	0	548	0	0	402	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		46.0			46.0			54.0				
Effective Green, g (s)		46.0			46.0			54.0				
Actuated g/C Ratio		0.42			0.42			0.49				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1374			1450			1647				
v/s Ratio Prot					c0.16							
v/s Ratio Perm		0.09						0.12				
v/c Ratio		0.22			0.38			0.24				
Uniform Delay, d1		20.5			22.1			16.2				
Progression Factor		0.94			1.00			1.00				
Incremental Delay, d2		0.4			0.2			0.1				
Delay (s)		19.7			22.3			16.3				
Level of Service		B			C			B				
Approach Delay (s)		19.7			22.3			16.3			0.0	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay		19.6			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.31										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		49.3%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Existing Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	59	0	0	1	0	3	272	21	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	58	66	0	0	1	0	3	302	23	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	167	354	9	366	343	176	9			339		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	167	354	9	366	343	176	9			339		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	88	100	100	100	100	100			100		
cM capacity (veh/h)	762	563	1069	506	571	834	1612			1219		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	123	1	154	174								
Volume Left	58	0	3	0								
Volume Right	0	0	0	23								
cSH	641	571	1612	1700								
Volume to Capacity	0.19	0.00	0.00	0.10								
Queue Length 95th (ft)	18	0	0	0								
Control Delay (s)	11.9	11.3	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	11.9	11.3	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			29.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	0	8	0	0	0	5	552	1	0	108	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.99				1.00	1.00			1.00	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.98	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1767	1199				1202	2735			2463	
Flt Permitted		0.76	1.00				0.67	1.00			1.00	
Satd. Flow (perm)		1408	1199				849	2735			2463	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92
Adj. Flow (vph)	88	0	9	0	0	0	5	587	1	0	115	13
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	88	4	0	0	0	5	588	0	0	121	0
Confl. Peds. (#/hr)	2		1	1		2	1		2	2		1
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		29.0	29.0				31.0	31.0			31.0	
Effective Green, g (s)		29.0	29.0				31.0	31.0			31.0	
Actuated g/C Ratio		0.41	0.41				0.44	0.44			0.44	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		583	496				375	1211			1090	
v/s Ratio Prot								c0.21			0.05	
v/s Ratio Perm		c0.06	0.00				0.01					
v/c Ratio		0.15	0.01				0.01	0.49			0.11	
Uniform Delay, d1		12.8	12.0				10.9	13.8			11.4	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.5	0.0				0.1	1.4			0.2	
Delay (s)		13.4	12.1				11.0	15.2			11.6	
Level of Service		B	B				B	B			B	
Approach Delay (s)		13.2			0.0			15.2			11.6	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	300	90	50	686	40	310	64	189	68	26	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1495	1433	3359		1618	1346	1302	1517	1398	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1495	1433	3359		1618	1346	1302	1517	1398	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	316	95	53	722	42	326	67	199	72	27	58
RTOR Reduction (vph)	0	0	71	0	3	0	0	0	155	0	45	0
Lane Group Flow (vph)	6	316	24	53	761	0	196	197	44	72	40	0
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	1.0	20.8	20.8	5.6	25.4		18.7	18.7	18.7	18.8	18.8	
Effective Green, g (s)	1.0	20.8	20.8	5.6	25.4		18.7	18.7	18.7	18.8	18.8	
Actuated g/C Ratio	0.01	0.25	0.25	0.07	0.30		0.22	0.22	0.22	0.22	0.22	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	17	868	370	95	1016		360	300	290	339	313	
v/s Ratio Prot	0.00	0.09		c0.04	c0.23		0.12	c0.15		c0.05	0.03	
v/s Ratio Perm			0.02						0.03			
v/c Ratio	0.35	0.36	0.06	0.56	0.75		0.54	0.66	0.15	0.21	0.13	
Uniform Delay, d1	41.1	26.1	24.1	38.0	26.4		28.8	29.7	26.2	26.5	26.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	0.3	0.1	6.9	3.1		1.7	5.1	0.2	1.4	0.8	
Delay (s)	53.3	26.3	24.2	44.9	29.4		30.5	34.8	26.5	27.9	26.8	
Level of Service	D	C	C	D	C		C	C	C	C	C	
Approach Delay (s)		26.2			30.4			30.6			27.3	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			83.9			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			53.0%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	362	88	183	640	214	99	177	371	134	77	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3223		1626	3438	1495	1444	2823		1612	2822	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3223		1626	3438	1495	1444	2823		1612	2822	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	116	373	91	189	660	221	102	182	382	138	79	19
RTOR Reduction (vph)	0	22	0	0	0	182	0	322	0	0	16	0
Lane Group Flow (vph)	116	442	0	189	660	39	102	242	0	138	82	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	432	973		287	608	264	225	441		251	440	
v/s Ratio Prot	0.08	c0.14		0.12	c0.19		0.07	c0.09		c0.09	0.03	
v/s Ratio Perm						0.03						
v/c Ratio	0.27	0.45		0.66	1.09	0.15	0.45	0.55		0.55	0.19	
Uniform Delay, d1	25.4	27.1		36.8	39.5	33.4	36.8	37.4		37.4	35.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.5		11.3	61.9	1.2	6.5	4.8		8.4	0.9	
Delay (s)	27.0	28.6		48.1	101.4	34.6	43.2	42.2		45.8	36.1	
Level of Service	C	C		D	F	C	D	D		D	D	
Approach Delay (s)		28.3			78.2			42.4			41.8	
Approach LOS		C			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			54.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			75.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	97	768	51	23	822	13	41	0	17	3	5	197
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	104	826	55	25	884	14	44	0	18	3	5	212
Pedestrians								2			2	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	900			883			1770	2013	442	1582	2034	451
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	659			883			1629	1900	442	1419	1923	158
tC, single (s)	4.9			4.1			7.9	6.5	7.1	7.5	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.7	4.0	3.4	3.5	4.0	3.4
p0 queue free %	84			97			0	100	97	96	89	72
cM capacity (veh/h)	636			774			28	51	546	73	49	744
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	517	468	467	456	62	220						
Volume Left	104	0	25	0	44	3						
Volume Right	0	55	0	14	18	212						
cSH	636	1700	774	1700	39	502						
Volume to Capacity	0.16	0.28	0.03	0.27	1.58	0.44						
Queue Length 95th (ft)	15	0	2	0	162	55						
Control Delay (s)	4.4	0.0	0.9	0.0	514.4	17.6						
Lane LOS	A		A		F	C						
Approach Delay (s)	2.3		0.5		514.4	17.6						
Approach LOS					F	C						
Intersection Summary												
Average Delay			17.7									
Intersection Capacity Utilization			78.8%		ICU Level of Service				D			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Near Term PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	192	0	0	0	0	614
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	198	0	0	0	0	633
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	316	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	100			100	
cM capacity (veh/h)	646	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	99	99	316	316		
Volume Left	99	99	0	0		
Volume Right	0	0	0	0		
cSH	646	646	1700	1700		
Volume to Capacity	0.15	0.15	0.19	0.19		
Queue Length 95th (ft)	13	13	0	0		
Control Delay (s)	11.6	11.6	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	11.6		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			34.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 						 	
Volume (vph)	0	570	88	122	563	0	0	0	0	142	474	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4813		1770	3471						3376	
Flt Permitted		1.00		0.35	1.00						0.99	
Satd. Flow (perm)		4813		643	3471						3376	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	594	92	127	586	0	0	0	0	148	494	186
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	667	0	127	586	0	0	0	0	0	804	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		51.0		51.0	51.0						49.0	
Effective Green, g (s)		51.0		51.0	51.0						49.0	
Actuated g/C Ratio		0.46		0.46	0.46						0.45	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		2231		298	1609						1503	
v/s Ratio Prot		0.14			0.17							
v/s Ratio Perm				c0.20							0.24	
v/c Ratio		0.30		0.43	0.36						0.53	
Uniform Delay, d1		18.4		19.7	19.0						22.2	
Progression Factor		1.00		0.51	0.46						1.00	
Incremental Delay, d2		0.3		4.2	0.6						1.4	
Delay (s)		18.7		14.2	9.3						23.6	
Level of Service		B		B	A						C	
Approach Delay (s)		18.7			10.2			0.0			23.6	
Approach LOS		B			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			17.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			59.7%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	83	9	5	1	0	0	0	0	8	535	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	89	10	5	1	0	0	0	0	9	575	3
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	598	597	293	360	599	0	581			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	598	597	293	360	599	0	581			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	79	99	99	100	100	100			99		
cM capacity (veh/h)	370	416	707	471	415	1091	1000			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	99	6	296	291								
Volume Left	0	5	9	0								
Volume Right	10	0	0	3								
cSH	433	461	1636	1700								
Volume to Capacity	0.23	0.01	0.01	0.17								
Queue Length 95th (ft)	22	1	0	0								
Control Delay (s)	15.8	12.9	0.3	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	15.8	12.9	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			27.0%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	98	0	0	109	130	90	317	95	90	0	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2745		1014	2888		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2745		1014	2888		1570		2349
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	159	109	0	0	121	144	100	352	106	100	0	229
RTOR Reduction (vph)	0	0	0	0	126	0	0	21	0	0	0	197
Lane Group Flow (vph)	159	109	0	0	139	0	90	447	0	100	0	32
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	15.7	15.7			8.9		17.2	17.2		10.0		10.0
Effective Green, g (s)	15.7	15.7			8.9		17.2	17.2		10.0		10.0
Actuated g/C Ratio	0.22	0.22			0.12		0.24	0.24		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	253	698			340		242	691		218		327
v/s Ratio Prot	c0.14	0.03			c0.05		0.09	c0.15		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.63	0.16			0.41		0.37	0.65		0.46		0.10
Uniform Delay, d1	25.4	22.7			29.0		22.8	24.6		28.4		27.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	4.8	0.1			0.8		4.3	4.6		1.5		0.1
Delay (s)	30.2	22.8			29.8		27.1	29.2		29.9		27.1
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		27.2			29.8			28.9			28.0	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			71.8				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			46.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	198	36	28	60	66	6	229	157	197	128	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	188	218	40	31	66	73	7	252	173	216	141	0
RTOR Reduction (vph)	0	0	27	0	0	64	0	102	0	0	0	0
Lane Group Flow (vph)	188	218	13	31	66	9	7	323	0	216	141	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.15	c0.09		0.03	0.03		0.01	c0.16		c0.18	0.08	
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.47	0.28	0.05	0.22	0.24	0.07	0.03	0.68		1.27	0.53	
Uniform Delay, d1	32.2	30.1	27.8	47.3	47.4	46.3	34.7	41.3		51.5	47.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.9	0.3	3.7	2.1	1.0	0.2	7.6		159.7	7.5	
Delay (s)	36.0	31.0	28.1	51.0	49.4	47.3	35.0	48.9		211.2	55.4	
Level of Service	D	C	C	D	D	D	C	D		F	E	
Approach Delay (s)		32.9			48.8			48.7			149.6	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			69.3									E
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			120.0							20.0		
Intersection Capacity Utilization			51.8%								A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	618	55	76	709	64	37	251	69	79	232	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0			5.0			5.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.99			0.97			0.97		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	4858			4989			3362			3300		
Flt Permitted	0.80			0.79			0.88			0.81		
Satd. Flow (perm)	3922			3955			2991			2694		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	651	58	80	746	67	39	264	73	83	244	86
RTOR Reduction (vph)	0	14	0	0	14	0	0	22	0	0	25	0
Lane Group Flow (vph)	0	754	0	0	879	0	0	354	0	0	388	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.2			23.2			33.4			33.4	
Effective Green, g (s)		23.2			23.2			33.4			33.4	
Actuated g/C Ratio		0.35			0.35			0.50			0.50	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1366			1377			1499			1351	
v/s Ratio Prot												
v/s Ratio Perm		0.19			0.22			0.12			0.14	
v/c Ratio		0.55			0.64			0.24			0.29	
Uniform Delay, d1		17.5			18.2			9.4			9.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			1.0			0.4			0.5	
Delay (s)		18.0			19.2			9.8			10.2	
Level of Service		B			B			A			B	
Approach Delay (s)		18.0			19.2			9.8			10.2	
Approach LOS		B			B			A			B	
Intersection Summary												
HCM 2000 Control Delay		15.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		66.6			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		93.3%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

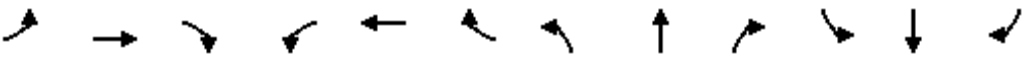
Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	187	12	5	763	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	193	12	5	787	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	531	814	16	798	814	397	16			788		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	531	814	16	798	814	397	16			788		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	38	98	100			100		
cM capacity (veh/h)	216	313	1066	279	313	607	1615			840		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	129	77	267	524								
Volume Left	0	0	5	0								
Volume Right	0	12	0	0								
cSH	313	340	1615	1700								
Volume to Capacity	0.41	0.23	0.00	0.31								
Queue Length 95th (ft)	48	21	0	0								
Control Delay (s)	24.3	18.6	0.2	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	22.2		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			34.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑↑				
Volume (vph)	320	392	0	0	573	131	111	521	142	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4784			4862			3350				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3215			4862			3350				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	333	408	0	0	597	136	116	543	148	0	0	0
RTOR Reduction (vph)	0	0	0	0	34	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	741	0	0	699	0	0	789	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		51.0			51.0			49.0				
Effective Green, g (s)		51.0			51.0			49.0				
Actuated g/C Ratio		0.46			0.46			0.45				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1490			2254			1492				
v/s Ratio Prot					0.14							
v/s Ratio Perm		c0.23						0.24				
v/c Ratio		1.24dl			0.31			0.53				
Uniform Delay, d1		20.6			18.5			22.1				
Progression Factor		0.56			1.00			1.00				
Incremental Delay, d2		1.1			0.4			0.3				
Delay (s)		12.6			18.8			22.5				
Level of Service		B			B			C				
Approach Delay (s)		12.6			18.8			22.5			0.0	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM 2000 Control Delay		18.1			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		78.5%			ICU Level of Service			D				
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	83	0	0	0	1	5	6	686	3	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	89	0	0	0	1	5	6	738	3	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	401	767	12	753	765	372	12			742		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	401	767	12	753	765	372	12			742		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	100	100	100	100	99	100			100		
cM capacity (veh/h)	503	330	1061	298	331	630	1604			874		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	89	6	375	372								
Volume Left	89	0	6	0								
Volume Right	0	5	0	3								
cSH	503	548	1604	1700								
Volume to Capacity	0.18	0.01	0.00	0.22								
Queue Length 95th (ft)	16	1	0	0								
Control Delay (s)	13.7	11.7	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	13.7	11.7	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			37.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	0	15	0	0	0	8	138	0	0	69	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	1.00				1.00	1.00			0.99	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.95	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1805	1615				1543	3471			3138	
Flt Permitted		0.76	1.00				0.68	1.00			1.00	
Satd. Flow (perm)		1439	1615				1105	3471			3138	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	95	0	17	0	0	0	9	157	0	0	78	35
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	20	0
Lane Group Flow (vph)	0	95	7	0	0	0	9	157	0	0	93	0
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		30.0	30.0				30.0	30.0			30.0	
Effective Green, g (s)		30.0	30.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.43	0.43				0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		616	692				473	1487			1344	
v/s Ratio Prot								c0.05			0.03	
v/s Ratio Perm		c0.07	0.00				0.01					
v/c Ratio		0.15	0.01				0.02	0.11			0.07	
Uniform Delay, d1		12.2	11.5				11.5	12.0			11.8	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.5	0.0				0.1	0.1			0.1	
Delay (s)		12.8	11.5				11.6	12.1			11.9	
Level of Service		B	B				B	B			B	
Approach Delay (s)		12.6			0.0			12.1			11.9	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.13									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			19.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Volume (vph)	32	211	44	37	618	26	70	15	100	44	14	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1524	1687	3410		1649	1457	1495	1433	1343	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1524	1687	3410		1649	1457	1495	1433	1343	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	229	48	40	672	28	76	16	109	48	15	24
RTOR Reduction (vph)	0	0	35	0	2	0	0	0	64	0	22	0
Lane Group Flow (vph)	35	229	13	40	698	0	46	46	45	48	17	0
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	4.5	26.1	26.1	4.1	25.7		40.9	40.9	40.9	7.3	7.3	
Effective Green, g (s)	4.5	26.1	26.1	4.1	25.7		40.9	40.9	40.9	7.3	7.3	
Actuated g/C Ratio	0.05	0.27	0.27	0.04	0.26		0.42	0.42	0.42	0.07	0.07	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	62	920	404	70	890		685	605	621	106	99	
v/s Ratio Prot	c0.03	0.07		0.02	c0.20		0.03	c0.03		c0.03	0.01	
v/s Ratio Perm			0.01						0.03			
v/c Ratio	0.56	0.25	0.03	0.57	0.78		0.07	0.08	0.07	0.45	0.17	
Uniform Delay, d1	46.0	28.4	26.8	46.3	33.8		17.3	17.3	17.3	43.6	42.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.2	0.1	0.0	10.8	4.6		0.2	0.2	0.2	3.1	0.8	
Delay (s)	57.2	28.6	26.8	57.1	38.3		17.5	17.6	17.6	46.7	43.5	
Level of Service	E	C	C	E	D		B	B	B	D	D	
Approach Delay (s)		31.5			39.4			17.5			45.3	
Approach LOS		C			D			B			D	
Intersection Summary												
HCM 2000 Control Delay			34.6			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			98.4			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			42.8%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	200	69	141	570	242	99	109	163	119	88	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3255		1703	3505	1543	1583	3043		1736	2923	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3255		1703	3505	1543	1583	3043		1736	2923	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	54	213	73	150	606	257	105	116	173	127	94	30
RTOR Reduction (vph)	0	35	0	0	0	211	0	146	0	0	25	0
Lane Group Flow (vph)	54	251	0	150	606	46	105	143	0	127	99	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	491	983		301	620	273	247	475		271	456	
v/s Ratio Prot	0.03	c0.08		0.09	c0.17		c0.07	0.05		c0.07	0.03	
v/s Ratio Perm						0.03						
v/c Ratio	0.11	0.26		0.50	0.98	0.17	0.43	0.30		0.47	0.22	
Uniform Delay, d1	24.2	25.3		35.7	39.3	33.5	36.6	35.9		36.9	35.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.6		5.8	31.0	1.3	5.3	1.6		5.7	1.1	
Delay (s)	24.6	26.0		41.4	70.3	34.8	41.9	37.5		42.6	36.5	
Level of Service	C	C		D	E	C	D	D		D	D	
Approach Delay (s)		25.8			57.0			38.7			39.6	
Approach LOS		C			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			45.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			63.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	32	462	42	23	799	6	55	5	29	4	13	115
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	33	476	43	24	824	6	57	5	30	4	13	119
Pedestrians		2										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	830			520			1150	1441	260	1211	1460	417
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	599			520			954	1275	260	1021	1296	142
tC, single (s)	4.9			4.2			7.5	6.5	7.0	8.2	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.6			2.3			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	95			98			60	96	96	97	90	85
cM capacity (veh/h)	673			1009			143	141	733	122	137	791
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	271	281	436	418	92	136						
Volume Left	33	0	24	0	57	4						
Volume Right	0	43	0	6	30	119						
cSH	673	1700	1009	1700	194	484						
Volume to Capacity	0.05	0.17	0.02	0.25	0.47	0.28						
Queue Length 95th (ft)	4	0	2	0	57	29						
Control Delay (s)	1.8	0.0	0.7	0.0	39.2	15.3						
Lane LOS	A		A		E	C						
Approach Delay (s)	0.9		0.4		39.2	15.3						
Approach LOS					E	C						
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization			62.5%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Near Term SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	168	0	0	0	0	561
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	193	0	0	0	0	645
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	322	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	322	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	100			100	
cM capacity (veh/h)	638	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	97	97	322	322		
Volume Left	97	97	0	0		
Volume Right	0	0	0	0		
cSH	638	638	1700	1700		
Volume to Capacity	0.15	0.15	0.19	0.19		
Queue Length 95th (ft)	13	13	0	0		
Control Delay (s)	11.6	11.6	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	11.6		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			27.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 						  	
Volume (vph)	0	265	90	141	494	0	0	0	0	119	378	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.96		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4676		1766	3539						3260	
Flt Permitted		1.00		0.52	1.00						0.99	
Satd. Flow (perm)		4676		958	3539						3260	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	282	96	150	526	0	0	0	0	127	402	239
RTOR Reduction (vph)	0	56	0	0	0	0	0	0	0	0	47	0
Lane Group Flow (vph)	0	322	0	150	526	0	0	0	0	0	721	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		46.0		46.0	46.0						54.0	
Effective Green, g (s)		46.0		46.0	46.0						54.0	
Actuated g/C Ratio		0.42		0.42	0.42						0.49	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1955		400	1479						1600	
v/s Ratio Prot		0.07			0.15							
v/s Ratio Perm				0.16							0.22	
v/c Ratio		0.16		0.38	0.36						0.45	
Uniform Delay, d1		20.0		22.1	21.9						18.3	
Progression Factor		1.00		0.36	0.34						1.00	
Incremental Delay, d2		0.2		0.6	0.1						0.9	
Delay (s)		20.2		8.5	7.6						19.2	
Level of Service		C		A	A						B	
Approach Delay (s)		20.2			7.8			0.0			19.2	
Approach LOS		C			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.2		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			77.0%		ICU Level of Service				D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	74	1	18	6	0	12	0	0	0	32	430	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	82	1	20	7	0	13	0	0	0	36	478	14
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	569	556	247	332	563	0	492			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	569	556	247	332	563	0	492			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	97	99	100	99	100			98		
cM capacity (veh/h)	381	432	759	562	428	1091	1082			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	103	20	274	253								
Volume Left	82	7	36	0								
Volume Right	20	13	0	14								
cSH	422	830	1636	1700								
Volume to Capacity	0.24	0.02	0.02	0.15								
Queue Length 95th (ft)	24	2	2	0								
Control Delay (s)	16.3	9.4	1.1	0.0								
Lane LOS	C	A	A									
Approach Delay (s)	16.3	9.4	0.6									
Approach LOS	C	A										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			31.1%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	27	0	0	146	129	48	172	146	67	0	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3079		1441	2982		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3079		1441	2982		1543		2682
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	21	31	0	0	168	148	55	198	168	77	0	237
RTOR Reduction (vph)	0	0	0	0	125	0	0	110	0	0	0	219
Lane Group Flow (vph)	21	31	0	0	191	0	49	262	0	77	0	18
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.6	3.6			8.4		18.4	18.4		4.1		4.1
Effective Green, g (s)	3.6	3.6			8.4		18.4	18.4		4.1		4.1
Actuated g/C Ratio	0.07	0.07			0.16		0.34	0.34		0.08		0.08
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	109	233			483		495	1025		118		205
v/s Ratio Prot	c0.01	0.01			c0.06		0.03	c0.09		c0.05		0.01
v/s Ratio Perm												
v/c Ratio	0.19	0.13			0.40		0.10	0.26		0.65		0.09
Uniform Delay, d1	23.6	23.5			20.3		11.9	12.6		24.0		23.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.9	0.3			0.5		0.4	0.6		12.2		0.2
Delay (s)	24.4	23.7			20.8		12.3	13.2		36.2		23.2
Level of Service	C	C			C		B	B		D		C
Approach Delay (s)		24.0			20.8			13.1			26.4	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			53.5				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			38.9%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park

Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	31	1	16	31	47	0	9	26	38	13	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	793	1357	3471	1328		2621		1703	2356	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	793	1357	3471	1328		2621		1703	2356	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	13	38	1	20	38	57	0	11	32	46	16	1
RTOR Reduction (vph)	0	0	1	0	0	36	0	24	0	0	1	0
Lane Group Flow (vph)	13	38	0	20	38	21	0	19	0	46	16	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Effective Green, g (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Actuated g/C Ratio	0.08	0.32	0.32	0.12	0.37	0.37		0.25		0.13	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	150	1173	257	169	1272	486		655		227	824	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.03	0.01	
v/s Ratio Perm			0.00			c0.02						
v/c Ratio	0.09	0.03	0.00	0.12	0.03	0.04		0.03		0.20	0.02	
Uniform Delay, d1	50.8	27.6	27.3	46.6	24.3	24.5		34.0		46.3	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.1	0.0	1.4	0.0	0.2		0.1		2.0	0.0	
Delay (s)	51.9	27.7	27.4	48.1	24.4	24.6		34.1		48.3	25.6	
Level of Service	D	C	C	D	C	C		C		D	C	
Approach Delay (s)		33.7			28.6			34.1			42.2	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	429	24	58	577	61	45	125	45	77	165	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0			5.0			5.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.99			0.97			0.96		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	4950			4961			3443			3319		
Flt Permitted	0.86			0.85			0.85			0.84		
Satd. Flow (perm)	4278			4250			2952			2819		
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	33	433	24	59	583	62	45	126	45	78	167	91
RTOR Reduction (vph)	0	9	0	0	18	0	0	21	0	0	37	0
Lane Group Flow (vph)	0	481	0	0	686	0	0	195	0	0	299	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.7			18.7			33.6			33.6	
Effective Green, g (s)		18.7			18.7			33.6			33.6	
Actuated g/C Ratio		0.30			0.30			0.54			0.54	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1284			1275			1592			1520	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.16			0.07			c0.11	
v/c Ratio		0.37			0.54			0.12			0.20	
Uniform Delay, d1		17.2			18.2			7.1			7.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.4			0.2			0.3	
Delay (s)		17.4			18.6			7.2			7.7	
Level of Service		B			B			A			A	
Approach Delay (s)		17.4			18.6			7.2			7.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		14.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.32										
Actuated Cycle Length (s)		62.3			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		81.9%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	164	9	4	424	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	0	0	189	10	5	487	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	362	503	3	500	503	249	3			490		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	362	503	3	500	503	249	3			490		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	60	99	100			100		
cM capacity (veh/h)	388	472	1086	444	472	756	1632			1081		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	126	73	167	325								
Volume Left	0	0	5	0								
Volume Right	0	10	0	0								
cSH	472	498	1632	1700								
Volume to Capacity	0.27	0.15	0.00	0.19								
Queue Length 95th (ft)	27	13	0	0								
Control Delay (s)	15.4	13.5	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	14.7		0.1									
Approach LOS	B											
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			27.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	152	232	0	0	554	82	82	269	100	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4824			4978			3393				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3245			4978			3393				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	247	0	0	589	87	87	286	106	0	0	0
RTOR Reduction (vph)	0	0	0	0	17	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	409	0	0	659	0	0	455	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		46.0			46.0			54.0				
Effective Green, g (s)		46.0			46.0			54.0				
Actuated g/C Ratio		0.42			0.42			0.49				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1357			2081			1665				
v/s Ratio Prot					0.13							
v/s Ratio Perm		0.13						0.13				
v/c Ratio		0.30			0.32			0.27				
Uniform Delay, d1		21.3			21.5			16.5				
Progression Factor		0.82			1.00			1.00				
Incremental Delay, d2		0.6			0.1			0.1				
Delay (s)		18.0			21.5			16.6				
Level of Service		B			C			B				
Approach Delay (s)		18.0			21.5			16.6			0.0	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay		19.1			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.29										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		49.7%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Near Term SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	76	0	0	1	0	4	340	27	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	84	0	0	1	0	4	378	30	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	207	439	9	457	424	217	9			421		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	207	439	9	457	424	217	9			421		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	83	100	100	100	100	100			100		
cM capacity (veh/h)	714	504	1069	417	514	785	1612			1137		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	84	1	193	219								
Volume Left	0	0	4	0								
Volume Right	0	0	0	30								
cSH	504	514	1612	1700								
Volume to Capacity	0.17	0.00	0.00	0.13								
Queue Length 95th (ft)	15	0	0	0								
Control Delay (s)	13.6	12.0	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	13.6	12.0	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			22.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	0	21	0	0	0	25	552	1	0	108	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.97	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.93	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1739	1164				1181	2735			2599	
Flt Permitted		0.76	1.00				0.61	1.00			1.00	
Satd. Flow (perm)		1386	1164				758	2735			2599	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92
Adj. Flow (vph)	154	0	22	0	0	0	27	587	1	0	115	113
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	63	0
Lane Group Flow (vph)	0	154	9	0	0	0	27	588	0	0	165	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		29.0	29.0				31.0	31.0			31.0	
Effective Green, g (s)		29.0	29.0				31.0	31.0			31.0	
Actuated g/C Ratio		0.41	0.41				0.44	0.44			0.44	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		574	482				335	1211			1150	
v/s Ratio Prot								c0.21			0.06	
v/s Ratio Perm		c0.11	0.01				0.04					
v/c Ratio		0.27	0.02				0.08	0.49			0.14	
Uniform Delay, d1		13.5	12.1				11.3	13.8			11.6	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		1.1	0.1				0.5	1.4			0.3	
Delay (s)		14.7	12.2				11.7	15.2			11.9	
Level of Service		B	B				B	B			B	
Approach Delay (s)		14.3			0.0			15.1			11.9	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	300	112	121	686	40	321	64	240	68	26	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1435	1433	3359		1618	1356	1265	1517	1398	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1435	1433	3359		1618	1356	1265	1517	1398	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	316	118	127	722	42	338	67	253	72	27	58
RTOR Reduction (vph)	0	0	94	0	3	0	0	0	197	0	46	0
Lane Group Flow (vph)	6	316	24	127	761	0	199	206	56	72	39	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	1.1	18.5	18.5	12.9	30.3		19.8	19.8	19.8	18.6	18.6	
Effective Green, g (s)	1.1	18.5	18.5	12.9	30.3		19.8	19.8	19.8	18.6	18.6	
Actuated g/C Ratio	0.01	0.21	0.21	0.14	0.34		0.22	0.22	0.22	0.21	0.21	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	18	722	295	205	1133		356	298	278	314	289	
v/s Ratio Prot	0.00	0.09		c0.09	c0.23		0.12	c0.15		c0.05	0.03	
v/s Ratio Perm			0.02						0.04			
v/c Ratio	0.33	0.44	0.08	0.62	0.67		0.56	0.69	0.20	0.23	0.13	
Uniform Delay, d1	44.0	31.1	28.8	36.1	25.5		31.1	32.2	28.5	29.6	29.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.6	0.4	0.1	5.5	1.6		1.9	6.8	0.4	1.7	1.0	
Delay (s)	54.6	31.5	28.9	41.6	27.1		33.0	38.9	28.9	31.3	30.0	
Level of Service	D	C	C	D	C		C	D	C	C	C	
Approach Delay (s)		31.1			29.1			33.3			30.6	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.9			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			89.8			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			57.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	402	91	183	697	214	103	177	371	134	77	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3230		1626	3438	1495	1444	2823		1612	2744	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3230		1626	3438	1495	1444	2823		1612	2744	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	125	414	94	189	719	221	106	182	382	138	79	28
RTOR Reduction (vph)	0	20	0	0	0	182	0	322	0	0	24	0
Lane Group Flow (vph)	125	488	0	189	719	39	106	242	0	138	83	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	432	975		287	608	264	225	441		251	428	
v/s Ratio Prot	0.09	c0.15		0.12	c0.21		0.07	c0.09		c0.09	0.03	
v/s Ratio Perm						0.03						
v/c Ratio	0.29	0.50		0.66	1.18	0.15	0.47	0.55		0.55	0.19	
Uniform Delay, d1	25.6	27.5		36.8	39.5	33.4	36.9	37.4		37.4	35.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	1.8		11.3	98.2	1.2	6.9	4.8		8.4	1.0	
Delay (s)	27.3	29.4		48.1	137.7	34.6	43.8	42.2		45.8	36.3	
Level of Service	C	C		D	F	C	D	D		D	D	
Approach Delay (s)		29.0			102.5			42.5			41.6	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			64.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			75.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	87	808	51	23	879	13	41	0	17	3	5	197
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	94	869	55	25	945	14	44	0	18	3	5	212
Pedestrians								2			2	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	961			926			1822	2096	464	1643	2116	482
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	693			926			1667	1977	464	1465	2000	151
tC, single (s)	4.9			4.1			7.9	6.5	7.1	7.5	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.7	4.0	3.4	3.5	4.0	3.4
p0 queue free %	85			97			0	100	97	95	88	71
cM capacity (veh/h)	604			745			26	45	528	67	44	742
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	528	489	497	487	62	220						
Volume Left	94	0	25	0	44	3						
Volume Right	0	55	0	14	18	212						
cSH	604	1700	745	1700	36	482						
Volume to Capacity	0.15	0.29	0.03	0.29	1.73	0.46						
Queue Length 95th (ft)	14	0	3	0	169	59						
Control Delay (s)	4.2	0.0	0.9	0.0	592.8	18.6						
Lane LOS	A		A		F	C						
Approach Delay (s)	2.2		0.5		592.8	18.6						
Approach LOS					F	C						
Intersection Summary												
Average Delay			19.2									
Intersection Capacity Utilization			81.2%		ICU Level of Service		D					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Park PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	192	0	0	0	0	622
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	198	0	0	0	0	641
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	321	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	100			100	
cM capacity (veh/h)	642	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	99	99	321	321		
Volume Left	99	99	0	0		
Volume Right	0	0	0	0		
cSH	642	642	1700	1700		
Volume to Capacity	0.15	0.15	0.19	0.19		
Queue Length 95th (ft)	14	14	0	0		
Control Delay (s)	11.6	11.6	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	11.6		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			34.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	 						  	
Volume (vph)	0	608	91	122	613	0	0	0	0	142	474	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4815		1770	3471						3371	
Flt Permitted		1.00		0.33	1.00						0.99	
Satd. Flow (perm)		4815		607	3471						3371	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	633	95	127	639	0	0	0	0	148	494	195
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	26	0
Lane Group Flow (vph)	0	710	0	127	639	0	0	0	0	0	811	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		51.0		51.0	51.0						49.0	
Effective Green, g (s)		51.0		51.0	51.0						49.0	
Actuated g/C Ratio		0.46		0.46	0.46						0.45	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		2232		281	1609						1501	
v/s Ratio Prot		0.15			0.18							
v/s Ratio Perm				0.21							0.24	
v/c Ratio		0.32		0.45	0.40						0.54	
Uniform Delay, d1		18.6		20.0	19.4						22.3	
Progression Factor		1.00		0.49	0.44						1.00	
Incremental Delay, d2		0.4		4.9	0.7						1.4	
Delay (s)		18.9		14.8	9.2						23.7	
Level of Service		B		B	A						C	
Approach Delay (s)		18.9			10.1			0.0			23.7	
Approach LOS		B			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			17.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			60.5%			ICU Level of Service				B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	83	9	5	1	0	0	0	0	8	538	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	89	10	5	1	0	0	0	0	9	578	3
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	601	600	295	362	602	0	585			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	601	600	295	362	602	0	585			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	78	99	99	100	100	100			99		
cM capacity (veh/h)	368	414	706	470	413	1091	997			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	99	6	298	292								
Volume Left	0	5	9	0								
Volume Right	10	0	0	3								
cSH	431	459	1636	1700								
Volume to Capacity	0.23	0.01	0.01	0.17								
Queue Length 95th (ft)	22	1	0	0								
Control Delay (s)	15.8	13.0	0.3	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	15.8	13.0	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			27.1%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	100	0	0	112	134	107	317	95	93	0	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2744		1014	2883		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2744		1014	2883		1570		2349
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	159	111	0	0	124	149	119	352	106	103	0	229
RTOR Reduction (vph)	0	0	0	0	131	0	0	21	0	0	0	197
Lane Group Flow (vph)	159	111	0	0	142	0	107	449	0	103	0	32
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	15.8	15.8			8.9		17.2	17.2		10.1		10.1
Effective Green, g (s)	15.8	15.8			8.9		17.2	17.2		10.1		10.1
Actuated g/C Ratio	0.22	0.22			0.12		0.24	0.24		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	254	701			339		242	688		220		329
v/s Ratio Prot	c0.14	0.03			c0.05		0.11	c0.16		c0.07		0.01
v/s Ratio Perm												
v/c Ratio	0.63	0.16			0.42		0.44	0.65		0.47		0.10
Uniform Delay, d1	25.4	22.7			29.2		23.3	24.7		28.5		27.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	4.8	0.1			0.8		5.8	4.8		1.6		0.1
Delay (s)	30.2	22.8			30.0		29.1	29.5		30.1		27.1
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		27.2			30.0			29.4			28.0	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			72.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			47.3%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	198	36	28	60	86	6	229	157	210	128	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	188	218	40	31	66	95	7	252	173	231	141	0
RTOR Reduction (vph)	0	0	27	0	0	83	0	102	0	0	0	0
Lane Group Flow (vph)	188	218	13	31	66	12	7	323	0	231	141	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.15	c0.09		0.03	0.03		0.01	c0.16		c0.19	0.08	
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.47	0.28	0.05	0.22	0.24	0.09	0.03	0.68		1.36	0.53	
Uniform Delay, d1	32.2	30.1	27.8	47.3	47.4	46.5	34.7	41.3		51.5	47.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.9	0.3	3.7	2.1	1.3	0.2	7.6		194.7	7.5	
Delay (s)	36.0	31.0	28.1	51.0	49.4	47.8	35.0	48.9		246.2	55.4	
Level of Service	D	C	C	D	D	D	C	D		F	E	
Approach Delay (s)		32.9			48.9			48.7			173.9	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			76.1									E
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			120.0							20.0		
Intersection Capacity Utilization			52.5%								A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	633	55	76	745	64	37	251	69	79	232	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4858			4993			3362			3285	
Flt Permitted		0.75			0.79			0.88			0.81	
Satd. Flow (perm)		3682			3945			2985			2686	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	666	58	80	784	67	39	264	73	83	244	96
RTOR Reduction (vph)	0	13	0	0	13	0	0	23	0	0	29	0
Lane Group Flow (vph)	0	788	0	0	918	0	0	353	0	0	394	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.1			24.1			33.3			33.3	
Effective Green, g (s)		24.1			24.1			33.3			33.3	
Actuated g/C Ratio		0.36			0.36			0.49			0.49	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1316			1410			1474			1327	
v/s Ratio Prot												
v/s Ratio Perm		0.21			0.23			0.12			0.15	
v/c Ratio		0.60			0.65			0.24			0.30	
Uniform Delay, d1		17.7			18.1			9.8			10.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			1.1			0.4			0.6	
Delay (s)		18.4			19.2			10.2			10.7	
Level of Service		B			B			B			B	
Approach Delay (s)		18.4			19.2			10.2			10.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		16.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		67.4			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		94.4%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	187	12	5	768	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	193	12	5	792	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	534	819	16	803	819	400	16			793		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	534	819	16	803	819	400	16			793		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	38	98	100			100		
cM capacity (veh/h)	214	311	1066	277	311	605	1615			836		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	129	77	269	528								
Volume Left	0	0	5	0								
Volume Right	0	12	0	0								
cSH	311	338	1615	1700								
Volume to Capacity	0.41	0.23	0.00	0.31								
Queue Length 95th (ft)	49	21	0	0								
Control Delay (s)	24.5	18.8	0.2	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	22.3		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			34.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑↑				
Volume (vph)	325	424	0	0	618	131	115	521	142	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4788			4870			3350				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3217			4870			3350				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	339	442	0	0	644	136	120	543	148	0	0	0
RTOR Reduction (vph)	0	0	0	0	30	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	781	0	0	751	0	0	794	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		51.0			51.0			49.0				
Effective Green, g (s)		51.0			51.0			49.0				
Actuated g/C Ratio		0.46			0.46			0.45				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1491			2257			1492				
v/s Ratio Prot					0.15							
v/s Ratio Perm		c0.24						0.24				
v/c Ratio		1.35dl			0.33			0.53				
Uniform Delay, d1		20.9			18.7			22.2				
Progression Factor		0.54			1.00			1.00				
Incremental Delay, d2		1.3			0.4			0.4				
Delay (s)		12.5			19.1			22.5				
Level of Service		B			B			C				
Approach Delay (s)		12.5			19.1			22.5			0.0	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM 2000 Control Delay		18.1			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		78.9%			ICU Level of Service			D				
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

13: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	83	0	0	0	1	5	6	690	3	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	89	0	0	0	1	5	6	742	3	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	403	771	12	757	769	375	12			746		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	403	771	12	757	769	375	12			746		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	100	100	100	100	99	100			100		
cM capacity (veh/h)	501	328	1061	296	329	628	1604			870		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	89	6	377	374								
Volume Left	89	0	6	0								
Volume Right	0	5	0	3								
cSH	501	545	1604	1700								
Volume to Capacity	0.18	0.01	0.00	0.22								
Queue Length 95th (ft)	16	1	0	0								
Control Delay (s)	13.7	11.7	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	13.7	11.7	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			37.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	243	0	49	0	0	0	43	138	0	0	69	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.95	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.89	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1773	1549				1517	3471			2963	
Flt Permitted		0.76	1.00				0.57	1.00			1.00	
Satd. Flow (perm)		1414	1549				907	3471			2963	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	276	0	56	0	0	0	49	157	0	0	78	224
RTOR Reduction (vph)	0	0	32	0	0	0	0	0	0	0	128	0
Lane Group Flow (vph)	0	276	24	0	0	0	49	157	0	0	174	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		30.0	30.0				30.0	30.0			30.0	
Effective Green, g (s)		30.0	30.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.43	0.43				0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		606	663				388	1487			1269	
v/s Ratio Prot							0.05				c0.06	
v/s Ratio Perm		c0.20	0.02				0.05					
v/c Ratio		0.46	0.04				0.13	0.11			0.14	
Uniform Delay, d1		14.2	11.6				12.1	12.0			12.1	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		2.5	0.1				0.7	0.1			0.2	
Delay (s)		16.7	11.7				12.8	12.1			12.4	
Level of Service		B	B				B	B			B	
Approach Delay (s)		15.8			0.0			12.3			12.4	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			59.3%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	211	83	164	618	26	99	15	230	44	14	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1468	1687	3410		1649	1502	1449	1433	1343	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1468	1687	3410		1649	1502	1449	1433	1343	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	229	90	178	672	28	108	16	250	48	15	24
RTOR Reduction (vph)	0	0	69	0	2	0	0	0	149	0	22	0
Lane Group Flow (vph)	35	229	21	178	698	0	62	62	101	48	17	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	4.6	23.8	23.8	8.3	27.5		40.4	40.4	40.4	7.3	7.3	
Effective Green, g (s)	4.6	23.8	23.8	8.3	27.5		40.4	40.4	40.4	7.3	7.3	
Actuated g/C Ratio	0.05	0.24	0.24	0.08	0.28		0.40	0.40	0.40	0.07	0.07	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	62	827	350	140	939		667	608	586	104	98	
v/s Ratio Prot	0.03	0.07		c0.11	c0.20		0.04	0.04		c0.03	0.01	
v/s Ratio Perm			0.01						c0.07			
v/c Ratio	0.56	0.28	0.06	1.27	0.74		0.09	0.10	0.17	0.46	0.17	
Uniform Delay, d1	46.6	31.0	29.4	45.8	32.9		18.4	18.4	19.0	44.4	43.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.2	0.2	0.1	166.4	3.2		0.3	0.3	0.6	3.2	0.8	
Delay (s)	57.9	31.2	29.4	212.1	36.1		18.6	18.8	19.6	47.6	44.2	
Level of Service	E	C	C	F	D		B	B	B	D	D	
Approach Delay (s)		33.4			71.8			19.3			46.1	
Approach LOS		C			E			B			D	
Intersection Summary												
HCM 2000 Control Delay			50.9			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			99.8			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			59.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	304	76	141	673	242	107	109	163	119	88	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.91		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3300		1703	3505	1543	1583	3043		1736	2819	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3300		1703	3505	1543	1583	3043		1736	2819	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	74	323	81	150	716	257	114	116	173	127	94	47
RTOR Reduction (vph)	0	23	0	0	0	211	0	146	0	0	40	0
Lane Group Flow (vph)	74	381	0	150	716	46	114	143	0	127	101	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	491	996		301	620	273	247	475		271	440	
v/s Ratio Prot	0.05	c0.12		0.09	c0.20		c0.07	0.05		c0.07	0.04	
v/s Ratio Perm						0.03						
v/c Ratio	0.15	0.38		0.50	1.15	0.17	0.46	0.30		0.47	0.23	
Uniform Delay, d1	24.5	26.4		35.7	39.5	33.5	36.8	35.9		36.9	35.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.1		5.8	87.0	1.3	6.1	1.6		5.7	1.2	
Delay (s)	25.1	27.5		41.4	126.5	34.8	42.9	37.5		42.6	36.7	
Level of Service	C	C		D	F	C	D	D		D	D	
Approach Delay (s)		27.2			94.2			39.0			39.5	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			63.8			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			63.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	32	566	42	23	902	6	55	5	29	4	13	115
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	33	584	43	24	930	6	57	5	30	4	13	119
Pedestrians		2										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	936			627			1311	1655	313	1371	1673	470
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	655			627			1080	1471	313	1148	1492	125
tC, single (s)	4.9			4.2			7.5	6.5	7.0	8.2	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.6			2.3			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	95			97			48	95	96	96	87	85
cM capacity (veh/h)	619			918			109	104	676	92	101	790
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	325	335	489	471	92	136						
Volume Left	33	0	24	0	57	4						
Volume Right	0	43	0	6	30	119						
cSH	619	1700	918	1700	149	415						
Volume to Capacity	0.05	0.20	0.03	0.28	0.61	0.33						
Queue Length 95th (ft)	4	0	2	0	82	35						
Control Delay (s)	1.8	0.0	0.7	0.0	61.5	17.8						
Lane LOS	A		A		F	C						
Approach Delay (s)	0.9		0.4		61.5	17.8						
Approach LOS					F	C						
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			65.3%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Park SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	168	0	0	0	0	575
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	193	0	0	0	0	661
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	330	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	330	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	100			100	
cM capacity (veh/h)	631	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	97	97	330	330		
Volume Left	97	97	0	0		
Volume Right	0	0	0	0		
cSH	631	631	1700	1700		
Volume to Capacity	0.15	0.15	0.19	0.19		
Queue Length 95th (ft)	13	13	0	0		
Control Delay (s)	11.7	11.7	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	11.7		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			27.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑	↑↑						↑↑	
Volume (vph)	0	362	97	141	583	0	0	0	0	119	378	239
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4705		1766	3539						3253	
Flt Permitted		1.00		0.44	1.00						0.99	
Satd. Flow (perm)		4705		825	3539						3253	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	385	103	150	620	0	0	0	0	127	402	254
RTOR Reduction (vph)	0	44	0	0	0	0	0	0	0	0	52	0
Lane Group Flow (vph)	0	444	0	150	620	0	0	0	0	0	731	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		46.0		46.0	46.0						54.0	
Effective Green, g (s)		46.0		46.0	46.0						54.0	
Actuated g/C Ratio		0.42		0.42	0.42						0.49	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1967		345	1479						1596	
v/s Ratio Prot		0.09			0.18							
v/s Ratio Perm				c0.18							0.22	
v/c Ratio		0.23		0.43	0.42						0.46	
Uniform Delay, d1		20.6		22.8	22.6						18.4	
Progression Factor		1.00		0.35	0.32						1.00	
Incremental Delay, d2		0.3		0.8	0.2						0.9	
Delay (s)		20.8		8.9	7.5						19.3	
Level of Service		C		A	A						B	
Approach Delay (s)		20.8			7.8			0.0			19.3	
Approach LOS		C			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.3		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			77.0%		ICU Level of Service				D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	74	1	18	6	0	12	0	0	0	32	437	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	82	1	20	7	0	13	0	0	0	36	486	14
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	577	564	251	335	571	0	500			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	577	564	251	335	571	0	500			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	97	99	100	99	100			98		
cM capacity (veh/h)	376	428	755	558	424	1091	1075			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	103	20	278	257								
Volume Left	82	7	36	0								
Volume Right	20	13	0	14								
cSH	417	828	1636	1700								
Volume to Capacity	0.25	0.02	0.02	0.15								
Queue Length 95th (ft)	24	2	2	0								
Control Delay (s)	16.5	9.5	1.1	0.0								
Lane LOS	C	A	A									
Approach Delay (s)	16.5	9.5	0.6									
Approach LOS	C	A										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			31.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park

Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	32	0	0	151	137	78	172	146	74	0	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3076		1441	2981		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3076		1441	2981		1543		2682
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	21	37	0	0	174	157	90	198	168	85	0	237
RTOR Reduction (vph)	0	0	0	0	132	0	0	111	0	0	0	219
Lane Group Flow (vph)	21	37	0	0	199	0	81	264	0	85	0	18
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.6	3.6			8.7		18.4	18.4		4.1		4.1
Effective Green, g (s)	3.6	3.6			8.7		18.4	18.4		4.1		4.1
Actuated g/C Ratio	0.07	0.07			0.16		0.34	0.34		0.08		0.08
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	108	232			497		492	1019		117		204
v/s Ratio Prot	c0.01	0.01			c0.06		0.06	c0.09		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.19	0.16			0.40		0.16	0.26		0.73		0.09
Uniform Delay, d1	23.7	23.7			20.2		12.3	12.8		24.3		23.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.9	0.3			0.5		0.7	0.6		20.0		0.2
Delay (s)	24.6	24.0			20.7		13.1	13.4		44.3		23.3
Level of Service	C	C			C		B	B		D		C
Approach Delay (s)		24.2			20.7			13.3			28.8	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			20.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			53.8				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			39.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	31	1	16	31	82	0	9	26	72	13	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	793	1357	3471	1328		2621		1703	2356	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	793	1357	3471	1328		2621		1703	2356	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	13	38	1	20	38	100	0	11	32	88	16	1
RTOR Reduction (vph)	0	0	1	0	0	63	0	24	0	0	1	0
Lane Group Flow (vph)	13	38	0	20	38	37	0	19	0	88	16	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Effective Green, g (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Actuated g/C Ratio	0.08	0.32	0.32	0.12	0.37	0.37		0.25		0.13	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	150	1173	257	169	1272	486		655		227	824	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.05	0.01	
v/s Ratio Perm			0.00			c0.03						
v/c Ratio	0.09	0.03	0.00	0.12	0.03	0.08		0.03		0.39	0.02	
Uniform Delay, d1	50.8	27.6	27.3	46.6	24.3	24.8		34.0		47.5	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.1	0.0	1.4	0.0	0.3		0.1		4.9	0.0	
Delay (s)	51.9	27.7	27.4	48.1	24.4	25.1		34.1		52.5	25.6	
Level of Service	D	C	C	D	C	C		C		D	C	
Approach Delay (s)		33.7			27.8			34.1			48.1	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			35.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.12									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			51.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	77	468	24	58	642	61	45	125	45	77	165	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0			5.0			5.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.99			0.97			0.95		
Flt Protected	0.99			1.00			0.99			0.99		
Satd. Flow (prot)	4950			4967			3443			3304		
Flt Permitted	0.75			0.85			0.85			0.84		
Satd. Flow (perm)	3742			4227			2940			2815		
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	78	473	24	59	648	62	45	126	45	78	167	107
RTOR Reduction (vph)	0	8	0	0	16	0	0	21	0	0	49	0
Lane Group Flow (vph)	0	567	0	0	753	0	0	195	0	0	303	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.8			19.8			33.5			33.5	
Effective Green, g (s)		19.8			19.8			33.5			33.5	
Actuated g/C Ratio		0.31			0.31			0.53			0.53	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1170			1322			1555			1489	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.18			0.07			c0.11	
v/c Ratio		0.48			0.57			0.13			0.20	
Uniform Delay, d1		17.6			18.2			7.5			7.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.6			0.2			0.3	
Delay (s)		17.9			18.8			7.7			8.2	
Level of Service		B			B			A			A	
Approach Delay (s)		17.9			18.8			7.7			8.2	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		15.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		63.3			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		84.7%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	164	9	4	438	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	0	0	189	10	5	503	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	371	519	3	516	519	257	3			506		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	371	519	3	516	519	257	3			506		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	59	99	100			100		
cM capacity (veh/h)	379	462	1086	433	462	747	1632			1066		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	126	73	172	336								
Volume Left	0	0	5	0								
Volume Right	0	10	0	0								
cSH	462	488	1632	1700								
Volume to Capacity	0.27	0.15	0.00	0.20								
Queue Length 95th (ft)	27	13	0	0								
Control Delay (s)	15.7	13.7	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	14.9		0.1									
Approach LOS	B											
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			27.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑↑				
Volume (vph)	166	315	0	0	635	82	90	269	100	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4827			4990			3393				
Flt Permitted		0.65			1.00			0.99				
Satd. Flow (perm)		3212			4990			3393				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	177	335	0	0	676	87	96	286	106	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	23	0	0	0	0
Lane Group Flow (vph)	0	512	0	0	748	0	0	465	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		46.0			46.0			54.0				
Effective Green, g (s)		46.0			46.0			54.0				
Actuated g/C Ratio		0.42			0.42			0.49				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1343			2086			1665				
v/s Ratio Prot					0.15							
v/s Ratio Perm		0.16						0.14				
v/c Ratio		0.38			0.36			0.28				
Uniform Delay, d1		22.1			21.9			16.5				
Progression Factor		0.65			1.00			1.00				
Incremental Delay, d2		0.8			0.1			0.1				
Delay (s)		15.2			22.0			16.6				
Level of Service		B			C			B				
Approach Delay (s)		15.2			22.0			16.6			0.0	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay		18.5			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.33										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		52.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

13: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	76	0	0	1	0	4	348	27	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	84	0	0	1	0	4	387	30	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	212	448	9	466	433	221	9			430		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	212	448	9	466	433	221	9			430		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	83	100	100	100	100	100			100		
cM capacity (veh/h)	708	498	1069	411	508	780	1612			1128		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	84	1	198	223								
Volume Left	0	0	4	0								
Volume Right	0	0	0	30								
cSH	498	508	1612	1700								
Volume to Capacity	0.17	0.00	0.00	0.13								
Queue Length 95th (ft)	15	0	0	0								
Control Delay (s)	13.7	12.1	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	13.7	12.1	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			22.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	0	8	0	0	0	5	552	1	0	108	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.99				1.00	1.00			1.00	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.98	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1767	1199				1202	2735			2463	
Flt Permitted		0.76	1.00				0.67	1.00			1.00	
Satd. Flow (perm)		1408	1199				849	2735			2463	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92
Adj. Flow (vph)	88	0	9	0	0	0	5	587	1	0	115	13
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	88	4	0	0	0	5	588	0	0	121	0
Confl. Peds. (#/hr)	2		1	1		2	1		2	2		1
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		29.0	29.0				31.0	31.0			31.0	
Effective Green, g (s)		29.0	29.0				31.0	31.0			31.0	
Actuated g/C Ratio		0.41	0.41				0.44	0.44			0.44	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		583	496				375	1211			1090	
v/s Ratio Prot								c0.21			0.05	
v/s Ratio Perm		c0.06	0.00				0.01					
v/c Ratio		0.15	0.01				0.01	0.49			0.11	
Uniform Delay, d1		12.8	12.0				10.9	13.8			11.4	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.5	0.0				0.1	1.4			0.2	
Delay (s)		13.4	12.1				11.0	15.2			11.6	
Level of Service		B	B				B	B			B	
Approach Delay (s)		13.2			0.0			15.2			11.6	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	302	90	50	688	40	310	64	189	68	26	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1495	1433	3360		1618	1346	1302	1517	1398	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1495	1433	3360		1618	1346	1302	1517	1398	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	318	95	53	724	42	326	67	199	72	27	58
RTOR Reduction (vph)	0	0	71	0	3	0	0	0	155	0	45	0
Lane Group Flow (vph)	6	318	24	53	763	0	196	197	44	72	40	0
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	1.0	20.9	20.9	5.6	25.5		18.7	18.7	18.7	18.7	18.7	
Effective Green, g (s)	1.0	20.9	20.9	5.6	25.5		18.7	18.7	18.7	18.7	18.7	
Actuated g/C Ratio	0.01	0.25	0.25	0.07	0.30		0.22	0.22	0.22	0.22	0.22	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	17	873	372	95	1021		360	300	290	338	311	
v/s Ratio Prot	0.00	0.09		c0.04	c0.23		0.12	c0.15		c0.05	0.03	
v/s Ratio Perm			0.02						0.03			
v/c Ratio	0.35	0.36	0.06	0.56	0.75		0.54	0.66	0.15	0.21	0.13	
Uniform Delay, d1	41.1	26.0	24.0	38.0	26.3		28.8	29.7	26.2	26.6	26.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	0.3	0.1	6.9	3.0		1.7	5.1	0.2	1.4	0.9	
Delay (s)	53.3	26.3	24.1	44.9	29.3		30.5	34.8	26.5	28.0	26.9	
Level of Service	D	C	C	D	C		C	C	C	C	C	
Approach Delay (s)		26.2			30.3			30.6			27.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.3			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			83.9			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			53.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

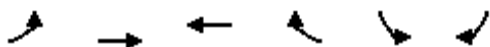
Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	364	88	186	642	217	99	177	374	137	77	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3179		1626	3438	1495	1444	2823		1612	2822	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3179		1626	3438	1495	1444	2823		1612	2822	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	116	375	91	192	662	224	102	182	386	141	79	19
RTOR Reduction (vph)	0	22	0	0	0	184	0	326	0	0	16	0
Lane Group Flow (vph)	116	444	0	192	662	40	102	242	0	141	82	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	432	960		287	608	264	225	441		251	440	
v/s Ratio Prot	0.08	c0.14		0.12	c0.19		0.07	c0.09		c0.09	0.03	
v/s Ratio Perm						0.03						
v/c Ratio	0.27	0.46		0.67	1.09	0.15	0.45	0.55		0.56	0.19	
Uniform Delay, d1	25.4	27.2		36.9	39.5	33.4	36.8	37.4		37.5	35.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.6		11.7	63.0	1.2	6.5	4.9		8.8	0.9	
Delay (s)	27.0	28.8		48.6	102.5	34.6	43.2	42.2		46.3	36.1	
Level of Service	C	C		D	F	C	D	D		D	D	
Approach Delay (s)		28.4			78.8			42.4			42.1	
Approach LOS		C			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			54.5			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			75.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Near Term Plus Connection PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	104	819	845	36	3	203
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	112	881	909	39	3	218
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	949				1594	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	700				1423	169
tC, single (s)	4.9				6.8	7.1
tC, 2 stage (s)						
tF (s)	2.6				3.5	3.4
p0 queue free %	82				97	70
cM capacity (veh/h)	605				94	728
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	405	587	606	342	222	
Volume Left	112	0	0	0	3	
Volume Right	0	0	0	39	218	
cSH	605	1700	1700	1700	663	
Volume to Capacity	0.18	0.35	0.36	0.20	0.33	
Queue Length 95th (ft)	17	0	0	0	37	
Control Delay (s)	5.4	0.0	0.0	0.0	13.1	
Lane LOS	A				B	
Approach Delay (s)	2.2		0.0		13.1	
Approach LOS					B	
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			72.9%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Connection PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	192	0	0	0	0	621
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	198	0	0	0	0	640
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	320	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	320	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	100			100	
cM capacity (veh/h)	643	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	99	99	320	320		
Volume Left	99	99	0	0		
Volume Right	0	0	0	0		
cSH	643	643	1700	1700		
Volume to Capacity	0.15	0.15	0.19	0.19		
Queue Length 95th (ft)	14	14	0	0		
Control Delay (s)	11.6	11.6	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	11.6		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			34.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	553	139	133	584	0	0	0	0	145	477	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3322		1770	3471						3375	
Flt Permitted		1.00		0.30	1.00						0.99	
Satd. Flow (perm)		3322		555	3471						3375	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	576	145	139	608	0	0	0	0	151	497	189
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	701	0	139	608	0	0	0	0	0	813	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		51.0		51.0	51.0						49.0	
Effective Green, g (s)		51.0		51.0	51.0						49.0	
Actuated g/C Ratio		0.46		0.46	0.46						0.45	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1540		257	1609						1503	
v/s Ratio Prot		0.21			0.18							
v/s Ratio Perm				c0.25							0.24	
v/c Ratio		0.45		0.54	0.38						0.54	
Uniform Delay, d1		20.1		21.1	19.2						22.3	
Progression Factor		1.00		0.51	0.45						1.00	
Incremental Delay, d2		1.0		7.1	0.6						1.4	
Delay (s)		21.0		17.9	9.3						23.7	
Level of Service		C		B	A						C	
Approach Delay (s)		21.0			10.9			0.0			23.7	
Approach LOS		C			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			18.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			67.1%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 7: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	38	86	9	5	1	0	0	0	0	8	538	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	41	92	10	5	1	0	0	0	0	9	578	3
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	601	600	295	363	602	0	585			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	601	600	295	363	602	0	585			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	78	99	99	100	100	100			99		
cM capacity (veh/h)	368	414	706	465	413	1091	997			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	143	6	298	292								
Volume Left	41	5	9	0								
Volume Right	10	0	0	3								
cSH	411	455	1636	1700								
Volume to Capacity	0.35	0.01	0.01	0.17								
Queue Length 95th (ft)	38	1	0	0								
Control Delay (s)	18.4	13.0	0.3	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	18.4	13.0	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			28.9%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	98	0	0	109	130	90	320	95	90	0	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2745		1014	2889		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2745		1014	2889		1570		2349
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	159	109	0	0	121	144	100	356	106	100	0	232
RTOR Reduction (vph)	0	0	0	0	126	0	0	21	0	0	0	200
Lane Group Flow (vph)	159	109	0	0	139	0	90	451	0	100	0	32
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	15.7	15.7			8.9		17.2	17.2		10.0		10.0
Effective Green, g (s)	15.7	15.7			8.9		17.2	17.2		10.0		10.0
Actuated g/C Ratio	0.22	0.22			0.12		0.24	0.24		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	253	698			340		242	692		218		327
v/s Ratio Prot	c0.14	0.03			c0.05		0.09	c0.16		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.63	0.16			0.41		0.37	0.65		0.46		0.10
Uniform Delay, d1	25.4	22.7			29.0		22.8	24.6		28.4		27.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	4.8	0.1			0.8		4.3	4.7		1.5		0.1
Delay (s)	30.2	22.8			29.8		27.1	29.3		29.9		27.1
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		27.2			29.8			29.0			28.0	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			71.8				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			46.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	198	36	28	60	66	6	229	157	197	128	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	188	218	40	31	66	73	7	252	173	216	141	0
RTOR Reduction (vph)	0	0	27	0	0	64	0	102	0	0	0	0
Lane Group Flow (vph)	188	218	13	31	66	9	7	323	0	216	141	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.15	c0.09		0.03	0.03		0.01	c0.16		c0.18	0.08	
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.47	0.28	0.05	0.22	0.24	0.07	0.03	0.68		1.27	0.53	
Uniform Delay, d1	32.2	30.1	27.8	47.3	47.4	46.3	34.7	41.3		51.5	47.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.9	0.3	3.7	2.1	1.0	0.2	7.6		159.7	7.5	
Delay (s)	36.0	31.0	28.1	51.0	49.4	47.3	35.0	48.9		211.2	55.4	
Level of Service	D	C	C	D	D	D	C	D		F	E	
Approach Delay (s)		32.9			48.8			48.7			149.6	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			69.3									E
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			120.0							20.0		
Intersection Capacity Utilization			51.8%								A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔↔			↔↔↔			↔↔			↔↔	
Volume (vph)	56	623	55	76	718	64	37	251	69	79	232	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4858			4990			3362			3300	
Flt Permitted		0.80			0.79			0.88			0.81	
Satd. Flow (perm)		3920			3959			2990			2693	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	59	656	58	80	756	67	39	264	73	83	244	86
RTOR Reduction (vph)	0	14	0	0	14	0	0	23	0	0	25	0
Lane Group Flow (vph)	0	759	0	0	889	0	0	353	0	0	388	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.6			23.6			33.4			33.4	
Effective Green, g (s)		23.6			23.6			33.4			33.4	
Actuated g/C Ratio		0.35			0.35			0.50			0.50	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1380			1394			1490			1342	
v/s Ratio Prot												
v/s Ratio Perm		0.19			0.22			0.12			0.14	
v/c Ratio		0.55			0.64			0.24			0.29	
Uniform Delay, d1		17.4			18.1			9.6			9.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			1.0			0.4			0.5	
Delay (s)		17.9			19.1			9.9			10.4	
Level of Service		B			B			A			B	
Approach Delay (s)		17.9			19.1			9.9			10.4	
Approach LOS		B			B			A			B	
Intersection Summary												
HCM 2000 Control Delay		15.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		67.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		93.5%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	187	12	5	763	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	193	12	5	787	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	531	814	16	798	814	397	16			788		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	531	814	16	798	814	397	16			788		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	38	98	100			100		
cM capacity (veh/h)	216	313	1066	279	313	607	1615			840		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	129	77	267	524								
Volume Left	0	0	5	0								
Volume Right	0	12	0	0								
cSH	313	340	1615	1700								
Volume to Capacity	0.41	0.23	0.00	0.31								
Queue Length 95th (ft)	48	21	0	0								
Control Delay (s)	24.3	18.6	0.2	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	22.2		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			34.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑			↑↑				
Volume (vph)	320	378	0	0	582	131	134	521	162	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.95			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4782			3385			3339				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3233			3385			3339				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	333	394	0	0	606	136	140	543	169	0	0	0
RTOR Reduction (vph)	0	0	0	0	18	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	727	0	0	724	0	0	832	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		51.0			51.0			49.0				
Effective Green, g (s)		51.0			51.0			49.0				
Actuated g/C Ratio		0.46			0.46			0.45				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1498			1569			1487				
v/s Ratio Prot					0.21							
v/s Ratio Perm		c0.22						0.25				
v/c Ratio		1.39dl			0.46			0.56				
Uniform Delay, d1		20.4			20.1			22.5				
Progression Factor		0.51			1.00			1.00				
Incremental Delay, d2		1.0			1.0			0.5				
Delay (s)		11.3			21.1			23.0				
Level of Service		B			C			C				
Approach Delay (s)		11.3			21.1			23.0			0.0	
Approach LOS		B			C			C			A	
Intersection Summary												
HCM 2000 Control Delay		18.7			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.52										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		79.7%			ICU Level of Service			D				
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	124	0	0	0	1	5	6	688	3	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	133	0	0	0	1	5	6	740	3	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	402	769	12	755	767	374	12			744		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	402	769	12	755	767	374	12			744		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	73	100	100	100	100	99	100			100		
cM capacity (veh/h)	502	329	1061	297	330	629	1604			872		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	133	6	376	373								
Volume Left	133	0	6	0								
Volume Right	0	5	0	3								
cSH	502	546	1604	1700								
Volume to Capacity	0.27	0.01	0.00	0.22								
Queue Length 95th (ft)	26	1	0	0								
Control Delay (s)	14.7	11.7	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	14.7	11.7	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			39.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	0	15	0	0	0	8	138	0	0	69	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	1.00				1.00	1.00			0.99	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.95	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1805	1615				1543	3471			3138	
Flt Permitted		0.76	1.00				0.68	1.00			1.00	
Satd. Flow (perm)		1439	1615				1105	3471			3138	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	95	0	17	0	0	0	9	157	0	0	78	35
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	20	0
Lane Group Flow (vph)	0	95	7	0	0	0	9	157	0	0	93	0
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		30.0	30.0				30.0	30.0			30.0	
Effective Green, g (s)		30.0	30.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.43	0.43				0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		616	692				473	1487			1344	
v/s Ratio Prot								c0.05			0.03	
v/s Ratio Perm		c0.07	0.00				0.01					
v/c Ratio		0.15	0.01				0.02	0.11			0.07	
Uniform Delay, d1		12.2	11.5				11.5	12.0			11.8	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.5	0.0				0.1	0.1			0.1	
Delay (s)		12.8	11.5				11.6	12.1			11.9	
Level of Service		B	B				B	B			B	
Approach Delay (s)		12.6		0.0				12.1			11.9	
Approach LOS		B		A				B			B	
Intersection Summary												
HCM 2000 Control Delay		12.2		HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio		0.13										
Actuated Cycle Length (s)		70.0		Sum of lost time (s)				10.0				
Intersection Capacity Utilization		19.6%		ICU Level of Service				A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	216	44	37	623	26	70	15	100	44	14	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1524	1687	3410		1649	1457	1495	1433	1343	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1524	1687	3410		1649	1457	1495	1433	1343	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	235	48	40	677	28	76	16	109	48	15	24
RTOR Reduction (vph)	0	0	35	0	2	0	0	0	64	0	22	0
Lane Group Flow (vph)	35	235	13	40	703	0	46	46	45	48	17	0
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	4.5	26.2	26.2	4.1	25.8		40.9	40.9	40.9	7.3	7.3	
Effective Green, g (s)	4.5	26.2	26.2	4.1	25.8		40.9	40.9	40.9	7.3	7.3	
Actuated g/C Ratio	0.05	0.27	0.27	0.04	0.26		0.42	0.42	0.42	0.07	0.07	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	61	923	405	70	893		684	604	620	106	99	
v/s Ratio Prot	c0.03	0.07		0.02	c0.21		0.03	c0.03		c0.03	0.01	
v/s Ratio Perm			0.01						0.03			
v/c Ratio	0.57	0.25	0.03	0.57	0.79		0.07	0.08	0.07	0.45	0.17	
Uniform Delay, d1	46.1	28.5	26.8	46.3	33.8		17.3	17.4	17.4	43.7	42.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.4	0.1	0.0	10.8	4.6		0.2	0.2	0.2	3.1	0.8	
Delay (s)	58.4	28.6	26.8	57.1	38.4		17.5	17.6	17.6	46.7	43.6	
Level of Service	E	C	C	E	D		B	B	B	D	D	
Approach Delay (s)		31.6			39.4			17.6			45.3	
Approach LOS		C			D			B			D	
Intersection Summary												
HCM 2000 Control Delay			34.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			98.5			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			43.0%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

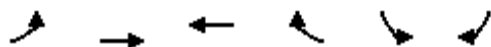
Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	205	69	151	575	250	99	109	173	127	88	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3200		1703	3505	1543	1583	3033		1736	2923	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3200		1703	3505	1543	1583	3033		1736	2923	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	54	218	73	161	612	266	105	116	184	135	94	30
RTOR Reduction (vph)	0	34	0	0	0	219	0	155	0	0	25	0
Lane Group Flow (vph)	54	257	0	161	612	47	105	145	0	135	99	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	491	966		301	620	273	247	473		271	456	
v/s Ratio Prot	0.03	c0.08		0.09	c0.17		c0.07	0.05		c0.08	0.03	
v/s Ratio Perm						0.03						
v/c Ratio	0.11	0.27		0.53	0.99	0.17	0.43	0.31		0.50	0.22	
Uniform Delay, d1	24.2	25.4		35.9	39.4	33.5	36.6	35.9		37.1	35.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.7		6.7	33.1	1.4	5.3	1.7		6.4	1.1	
Delay (s)	24.6	26.1		42.6	72.5	34.9	41.9	37.6		43.5	36.5	
Level of Service	C	C		D	E	C	D	D		D	D	
Approach Delay (s)		25.9			58.2			38.7			40.1	
Approach LOS		C			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			46.6			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			64.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Near Term Plus Connection SAT



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	54	504	829	52	4	163
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	56	520	855	54	4	168
Pedestrians		2				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	908				1253	456
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	654				1041	147
tC, single (s)	4.9				7.5	7.0
tC, 2 stage (s)						
tF (s)	2.6				3.8	3.3
p0 queue free %	91				97	78
cM capacity (veh/h)	627				146	774
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	229	346	570	338	172	
Volume Left	56	0	0	0	4	
Volume Right	0	0	0	54	168	
cSH	627	1700	1700	1700	702	
Volume to Capacity	0.09	0.20	0.34	0.20	0.25	
Queue Length 95th (ft)	7	0	0	0	24	
Control Delay (s)	3.6	0.0	0.0	0.0	11.8	
Lane LOS	A				B	
Approach Delay (s)	1.4		0.0		11.8	
Approach LOS					B	
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			60.8%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

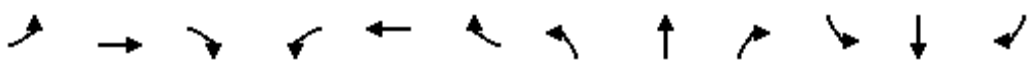
Gateway Park
Near Term Plus Connection SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	168	0	0	0	0	581
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	193	0	0	0	0	668
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	334	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	334	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	100			100	
cM capacity (veh/h)	628	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	97	97	334	334		
Volume Left	97	97	0	0		
Volume Right	0	0	0	0		
cSH	628	628	1700	1700		
Volume to Capacity	0.15	0.15	0.20	0.20		
Queue Length 95th (ft)	14	14	0	0		
Control Delay (s)	11.8	11.8	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	11.8		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			27.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑↑	
Volume (vph)	0	236	132	154	540	0	0	0	0	127	386	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		0.99		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.95		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3205		1766	3539						3260	
Flt Permitted		1.00		0.48	1.00						0.99	
Satd. Flow (perm)		3205		900	3539						3260	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	251	140	164	574	0	0	0	0	135	411	245
RTOR Reduction (vph)	0	69	0	0	0	0	0	0	0	0	47	0
Lane Group Flow (vph)	0	322	0	164	574	0	0	0	0	0	744	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		46.0		46.0	46.0						54.0	
Effective Green, g (s)		46.0		46.0	46.0						54.0	
Actuated g/C Ratio		0.42		0.42	0.42						0.49	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1340		376	1479						1600	
v/s Ratio Prot		0.10			0.16							
v/s Ratio Perm				c0.18							0.23	
v/c Ratio		0.24		0.44	0.39						0.47	
Uniform Delay, d1		20.7		22.8	22.2						18.5	
Progression Factor		1.00		0.38	0.38						1.00	
Incremental Delay, d2		0.4		0.7	0.2						1.0	
Delay (s)		21.1		9.3	8.5						19.4	
Level of Service		C		A	A						B	
Approach Delay (s)		21.1			8.7			0.0			19.4	
Approach LOS		C			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.6		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			77.7%		ICU Level of Service				D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	74	63	18	6	0	12	0	0	0	32	438	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	82	70	20	7	0	13	0	0	0	36	487	14
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	578	565	252	370	572	0	501			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	578	565	252	370	572	0	501			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	78	84	97	99	100	99	100			98		
cM capacity (veh/h)	375	427	754	462	423	1091	1074			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	172	20	279	258								
Volume Left	82	7	36	0								
Volume Right	20	13	0	14								
cSH	421	750	1636	1700								
Volume to Capacity	0.41	0.03	0.02	0.15								
Queue Length 95th (ft)	49	2	2	0								
Control Delay (s)	19.4	9.9	1.1	0.0								
Lane LOS	C	A	A									
Approach Delay (s)	19.4	9.9	0.6									
Approach LOS	C	A										
Intersection Summary												
Average Delay			5.3									
Intersection Capacity Utilization			33.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park

Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	27	0	0	147	129	48	182	147	67	0	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3080		1441	2988		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3080		1441	2988		1543		2682
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	21	31	0	0	169	148	55	209	169	77	0	248
RTOR Reduction (vph)	0	0	0	0	125	0	0	111	0	0	0	229
Lane Group Flow (vph)	21	31	0	0	192	0	49	273	0	77	0	19
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.6	3.6			8.4		18.4	18.4		4.1		4.1
Effective Green, g (s)	3.6	3.6			8.4		18.4	18.4		4.1		4.1
Actuated g/C Ratio	0.07	0.07			0.16		0.34	0.34		0.08		0.08
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	109	233			483		495	1027		118		205
v/s Ratio Prot	c0.01	0.01			c0.06		0.03	c0.09		c0.05		0.01
v/s Ratio Perm												
v/c Ratio	0.19	0.13			0.40		0.10	0.27		0.65		0.09
Uniform Delay, d1	23.6	23.5			20.3		11.9	12.7		24.0		23.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.9	0.3			0.5		0.4	0.6		12.2		0.2
Delay (s)	24.4	23.7			20.8		12.3	13.3		36.2		23.2
Level of Service	C	C			C		B	B		D		C
Approach Delay (s)		24.0			20.8			13.2			26.3	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			53.5				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			39.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	31	1	16	31	47	0	9	26	38	13	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	793	1357	3471	1328		2621		1703	2356	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	793	1357	3471	1328		2621		1703	2356	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	13	38	1	20	38	57	0	11	32	46	16	1
RTOR Reduction (vph)	0	0	1	0	0	36	0	24	0	0	1	0
Lane Group Flow (vph)	13	38	0	20	38	21	0	19	0	46	16	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Effective Green, g (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Actuated g/C Ratio	0.08	0.32	0.32	0.12	0.37	0.37		0.25		0.13	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	150	1173	257	169	1272	486		655		227	824	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.03	0.01	
v/s Ratio Perm			0.00			c0.02						
v/c Ratio	0.09	0.03	0.00	0.12	0.03	0.04		0.03		0.20	0.02	
Uniform Delay, d1	50.8	27.6	27.3	46.6	24.3	24.5		34.0		46.3	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.1	0.0	1.4	0.0	0.2		0.1		2.0	0.0	
Delay (s)	51.9	27.7	27.4	48.1	24.4	24.6		34.1		48.3	25.6	
Level of Service	D	C	C	D	C	C		C		D	C	
Approach Delay (s)		33.7			28.6			34.1			42.2	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	444	24	58	605	61	45	125	45	77	165	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4951			4964			3443			3319	
Flt Permitted		0.86			0.85			0.85			0.84	
Satd. Flow (perm)		4276			4255			2951			2817	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	33	448	24	59	611	62	45	126	45	78	167	91
RTOR Reduction (vph)	0	8	0	0	17	0	0	21	0	0	38	0
Lane Group Flow (vph)	0	497	0	0	715	0	0	195	0	0	298	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Perm	NA		Perm		NA		Perm		NA		
Protected Phases		4			8			2			6	
Permitted Phases	4			8				2		6		
Actuated Green, G (s)		19.3			19.3			33.6			33.6	
Effective Green, g (s)		19.3			19.3			33.6			33.6	
Actuated g/C Ratio		0.31			0.31			0.53			0.53	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1312			1305			1576			1504	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.17			0.07			c0.11	
v/c Ratio		0.38			0.55			0.12			0.20	
Uniform Delay, d1		17.1			18.2			7.3			7.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.5			0.2			0.3	
Delay (s)		17.3			18.6			7.5			7.9	
Level of Service		B			B			A			A	
Approach Delay (s)		17.3			18.6			7.5			7.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay	14.9			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.33											
Actuated Cycle Length (s)	62.9			Sum of lost time (s)			10.0					
Intersection Capacity Utilization	82.7%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

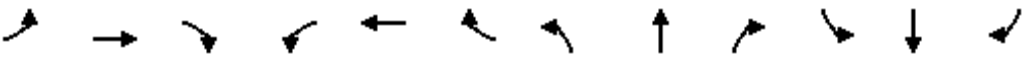
Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	164	9	4	425	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	0	0	189	10	5	489	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	363	504	3	501	504	249	3			492		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	363	504	3	501	504	249	3			492		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	60	99	100			100		
cM capacity (veh/h)	387	471	1086	444	471	755	1632			1080		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	126	73	167	326								
Volume Left	0	0	5	0								
Volume Right	0	10	0	0								
cSH	471	497	1632	1700								
Volume to Capacity	0.27	0.15	0.00	0.19								
Queue Length 95th (ft)	27	13	0	0								
Control Delay (s)	15.4	13.5	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	14.7		0.1									
Approach LOS	B											
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			27.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑			↑↑				
Volume (vph)	153	211	0	0	582	82	113	269	137	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.95			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.96				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4823			3468			3359				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3262			3468			3359				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	163	224	0	0	619	87	120	286	146	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	33	0	0	0	0
Lane Group Flow (vph)	0	387	0	0	696	0	0	519	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		46.0			46.0			54.0				
Effective Green, g (s)		46.0			46.0			54.0				
Actuated g/C Ratio		0.42			0.42			0.49				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1364			1450			1648				
v/s Ratio Prot					c0.20							
v/s Ratio Perm		0.12						0.15				
v/c Ratio		0.28			0.48			0.31				
Uniform Delay, d1		21.1			23.3			16.9				
Progression Factor		0.90			1.00			1.00				
Incremental Delay, d2		0.5			0.3			0.1				
Delay (s)		19.4			23.5			17.0				
Level of Service		B			C			B				
Approach Delay (s)		19.4			23.5			17.0			0.0	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay		20.4			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.39										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		57.3%			ICU Level of Service			B				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

13: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	62	76	0	0	1	0	4	346	27	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	69	84	0	0	1	0	4	384	30	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	211	445	9	464	430	220	9			427		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	211	445	9	464	430	220	9			427		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	83	100	100	100	100	100			100		
cM capacity (veh/h)	710	500	1069	412	510	781	1612			1130		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	153	1	197	222								
Volume Left	69	0	4	0								
Volume Right	0	0	0	30								
cSH	576	510	1612	1700								
Volume to Capacity	0.27	0.00	0.00	0.13								
Queue Length 95th (ft)	27	0	0	0								
Control Delay (s)	13.5	12.1	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	13.5	12.1	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			32.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	0	21	0	0	0	25	552	1	0	108	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.97	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.93	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1739	1164				1181	2735			2599	
Flt Permitted		0.76	1.00				0.61	1.00			1.00	
Satd. Flow (perm)		1386	1164				758	2735			2599	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92
Adj. Flow (vph)	154	0	22	0	0	0	27	587	1	0	115	113
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	63	0
Lane Group Flow (vph)	0	154	9	0	0	0	27	588	0	0	165	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		29.0	29.0				31.0	31.0			31.0	
Effective Green, g (s)		29.0	29.0				31.0	31.0			31.0	
Actuated g/C Ratio		0.41	0.41				0.44	0.44			0.44	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		574	482				335	1211			1150	
v/s Ratio Prot								c0.21			0.06	
v/s Ratio Perm		c0.11	0.01				0.04					
v/c Ratio		0.27	0.02				0.08	0.49			0.14	
Uniform Delay, d1		13.5	12.1				11.3	13.8			11.6	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		1.1	0.1				0.5	1.4			0.3	
Delay (s)		14.7	12.2				11.7	15.2			11.9	
Level of Service		B	B				B	B			B	
Approach Delay (s)		14.3			0.0			15.1			11.9	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	302	112	121	688	40	321	64	240	68	26	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1435	1433	3360		1618	1356	1265	1517	1398	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1435	1433	3360		1618	1356	1265	1517	1398	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	318	118	127	724	42	338	67	253	72	27	58
RTOR Reduction (vph)	0	0	94	0	3	0	0	0	197	0	46	0
Lane Group Flow (vph)	6	318	24	127	763	0	199	206	56	72	39	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	1.1	18.5	18.5	12.9	30.3		19.8	19.8	19.8	18.6	18.6	
Effective Green, g (s)	1.1	18.5	18.5	12.9	30.3		19.8	19.8	19.8	18.6	18.6	
Actuated g/C Ratio	0.01	0.21	0.21	0.14	0.34		0.22	0.22	0.22	0.21	0.21	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	18	722	295	205	1133		356	298	278	314	289	
v/s Ratio Prot	0.00	0.09		c0.09	c0.23		0.12	c0.15		c0.05	0.03	
v/s Ratio Perm			0.02						0.04			
v/c Ratio	0.33	0.44	0.08	0.62	0.67		0.56	0.69	0.20	0.23	0.13	
Uniform Delay, d1	44.0	31.1	28.8	36.1	25.5		31.1	32.2	28.5	29.6	29.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.6	0.4	0.1	5.5	1.6		1.9	6.8	0.4	1.7	1.0	
Delay (s)	54.6	31.6	28.9	41.6	27.1		33.0	38.9	28.9	31.3	30.0	
Level of Service	D	C	C	D	C		C	D	C	C	C	
Approach Delay (s)		31.2			29.2			33.3			30.6	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.9			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			89.8			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			57.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

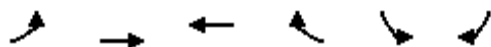
Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	404	91	186	699	217	103	177	374	137	77	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3188		1626	3438	1495	1444	2823		1612	2744	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3188		1626	3438	1495	1444	2823		1612	2744	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	125	416	94	192	721	224	106	182	386	141	79	28
RTOR Reduction (vph)	0	20	0	0	0	184	0	326	0	0	24	0
Lane Group Flow (vph)	125	490	0	192	721	40	106	242	0	141	83	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	432	963		287	608	264	225	441		251	428	
v/s Ratio Prot	0.09	c0.15		0.12	c0.21		0.07	c0.09		c0.09	0.03	
v/s Ratio Perm						0.03						
v/c Ratio	0.29	0.51		0.67	1.19	0.15	0.47	0.55		0.56	0.19	
Uniform Delay, d1	25.6	27.6		36.9	39.5	33.4	36.9	37.4		37.5	35.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	1.9		11.7	99.5	1.2	6.9	4.9		8.8	1.0	
Delay (s)	27.3	29.5		48.6	139.0	34.6	43.8	42.2		46.3	36.3	
Level of Service	C	C		D	F	C	D	D		D	D	
Approach Delay (s)		29.1			103.2			42.5			41.9	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			64.9			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			75.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Near Term Plus Both PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	104	859	902	36	3	203
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	112	924	970	39	3	218
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.88				0.88	0.88
vC, conflicting volume	1011				1677	506
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736				1494	162
tC, single (s)	4.9				6.8	7.1
tC, 2 stage (s)						
tF (s)	2.6				3.5	3.4
p0 queue free %	81				96	70
cM capacity (veh/h)	575				82	725
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	420	616	647	362	222	
Volume Left	112	0	0	0	3	
Volume Right	0	0	0	39	218	
cSH	575	1700	1700	1700	651	
Volume to Capacity	0.19	0.36	0.38	0.21	0.34	
Queue Length 95th (ft)	18	0	0	0	38	
Control Delay (s)	5.6	0.0	0.0	0.0	13.4	
Lane LOS	A				B	
Approach Delay (s)	2.3		0.0		13.4	
Approach LOS					B	
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			75.6%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Both PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	192	0	0	0	0	629
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	198	0	0	0	0	648
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	324	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	324	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	100			100	
cM capacity (veh/h)	639	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	99	99	324	324		
Volume Left	99	99	0	0		
Volume Right	0	0	0	0		
cSH	639	639	1700	1700		
Volume to Capacity	0.15	0.15	0.19	0.19		
Queue Length 95th (ft)	14	14	0	0		
Control Delay (s)	11.7	11.7	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	11.7		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			34.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	591	142	133	634	0	0	0	0	145	477	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3325		1770	3471						3371	
Flt Permitted		1.00		0.28	1.00						0.99	
Satd. Flow (perm)		3325		516	3471						3371	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	616	148	139	660	0	0	0	0	151	497	196
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	26	0
Lane Group Flow (vph)	0	745	0	139	660	0	0	0	0	0	818	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		51.0		51.0	51.0						49.0	
Effective Green, g (s)		51.0		51.0	51.0						49.0	
Actuated g/C Ratio		0.46		0.46	0.46						0.45	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1541		239	1609						1501	
v/s Ratio Prot		0.22			0.19							
v/s Ratio Perm				c0.27							0.24	
v/c Ratio		0.48		0.58	0.41						0.54	
Uniform Delay, d1		20.4		21.7	19.5						22.3	
Progression Factor		1.00		0.51	0.43						1.00	
Incremental Delay, d2		1.1		8.7	0.7						1.4	
Delay (s)		21.5		19.7	9.1						23.8	
Level of Service		C		B	A						C	
Approach Delay (s)		21.5			11.0			0.0			23.8	
Approach LOS		C			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			18.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			68.2%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											  	
Volume (veh/h)	38	86	9	5	1	0	0	0	0	8	540	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	41	92	10	5	1	0	0	0	0	9	581	3
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	603	602	296	364	604	0	587			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	603	602	296	364	604	0	587			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	78	99	99	100	100	100			99		
cM capacity (veh/h)	367	413	705	464	412	1091	996			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	143	6	299	294								
Volume Left	41	5	9	0								
Volume Right	10	0	0	3								
cSH	410	454	1636	1700								
Volume to Capacity	0.35	0.01	0.01	0.17								
Queue Length 95th (ft)	38	1	0	0								
Control Delay (s)	18.4	13.0	0.3	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	18.4	13.0	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			28.9%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				 
Volume (vph)	143	100	0	0	112	134	107	320	95	93	0	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2744		1014	2884		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2744		1014	2884		1570		2349
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	159	111	0	0	124	149	119	356	106	103	0	232
RTOR Reduction (vph)	0	0	0	0	131	0	0	21	0	0	0	199
Lane Group Flow (vph)	159	111	0	0	142	0	107	453	0	103	0	33
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	15.8	15.8			8.9		17.2	17.2		10.1		10.1
Effective Green, g (s)	15.8	15.8			8.9		17.2	17.2		10.1		10.1
Actuated g/C Ratio	0.22	0.22			0.12		0.24	0.24		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	254	701			339		242	688		220		329
v/s Ratio Prot	c0.14	0.03			c0.05		0.11	c0.16		c0.07		0.01
v/s Ratio Perm												
v/c Ratio	0.63	0.16			0.42		0.44	0.66		0.47		0.10
Uniform Delay, d1	25.4	22.7			29.2		23.3	24.8		28.5		27.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	4.8	0.1			0.8		5.8	4.9		1.6		0.1
Delay (s)	30.2	22.8			30.0		29.1	29.7		30.1		27.1
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		27.2			30.0			29.5			28.0	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			72.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			47.3%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park

Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	198	36	28	60	86	6	229	157	210	128	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	188	218	40	31	66	95	7	252	173	231	141	0
RTOR Reduction (vph)	0	0	27	0	0	83	0	102	0	0	0	0
Lane Group Flow (vph)	188	218	13	31	66	12	7	323	0	231	141	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.15	c0.09		0.03	0.03		0.01	c0.16		c0.19	0.08	
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.47	0.28	0.05	0.22	0.24	0.09	0.03	0.68		1.36	0.53	
Uniform Delay, d1	32.2	30.1	27.8	47.3	47.4	46.5	34.7	41.3		51.5	47.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.9	0.3	3.7	2.1	1.3	0.2	7.6		194.7	7.5	
Delay (s)	36.0	31.0	28.1	51.0	49.4	47.8	35.0	48.9		246.2	55.4	
Level of Service	D	C	C	D	D	D	C	D		F	E	
Approach Delay (s)		32.9			48.9			48.7			173.9	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			76.1									E
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			120.0							20.0		
Intersection Capacity Utilization			52.5%								A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	638	55	76	755	64	37	251	69	79	232	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4859			4994			3362			3285	
Flt Permitted		0.75			0.79			0.88			0.81	
Satd. Flow (perm)		3675			3944			2985			2686	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	672	58	80	795	67	39	264	73	83	244	96
RTOR Reduction (vph)	0	13	0	0	13	0	0	23	0	0	29	0
Lane Group Flow (vph)	0	794	0	0	929	0	0	353	0	0	394	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.2			24.2			33.3			33.3	
Effective Green, g (s)		24.2			24.2			33.3			33.3	
Actuated g/C Ratio		0.36			0.36			0.49			0.49	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1317			1413			1472			1325	
v/s Ratio Prot												
v/s Ratio Perm		0.22			0.24			0.12			0.15	
v/c Ratio		0.60			0.66			0.24			0.30	
Uniform Delay, d1		17.7			18.2			9.8			10.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.8			1.1			0.4			0.6	
Delay (s)		18.5			19.3			10.2			10.7	
Level of Service		B			B			B			B	
Approach Delay (s)		18.5			19.3			10.2			10.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		16.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		67.5			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		94.7%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	187	12	5	768	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	193	12	5	792	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	534	819	16	803	819	400	16			793		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	534	819	16	803	819	400	16			793		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	38	98	100			100		
cM capacity (veh/h)	214	311	1066	277	311	605	1615			836		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	129	77	269	528								
Volume Left	0	0	5	0								
Volume Right	0	12	0	0								
cSH	311	338	1615	1700								
Volume to Capacity	0.41	0.23	0.00	0.31								
Queue Length 95th (ft)	49	21	0	0								
Control Delay (s)	24.5	18.8	0.2	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	22.3		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			34.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑			↑↑				
Volume (vph)	325	410	0	0	628	131	138	521	162	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.95			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4786			3390			3339				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3237			3390			3339				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	339	427	0	0	654	136	144	543	169	0	0	0
RTOR Reduction (vph)	0	0	0	0	16	0	0	19	0	0	0	0
Lane Group Flow (vph)	0	766	0	0	774	0	0	837	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		51.0			51.0			49.0				
Effective Green, g (s)		51.0			51.0			49.0				
Actuated g/C Ratio		0.46			0.46			0.45				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1500			1571			1487				
v/s Ratio Prot					0.23							
v/s Ratio Perm		c0.24						0.25				
v/c Ratio		1.54dl			0.49			0.56				
Uniform Delay, d1		20.7			20.5			22.6				
Progression Factor		0.48			1.00			1.00				
Incremental Delay, d2		1.1			1.1			0.5				
Delay (s)		11.0			21.6			23.1				
Level of Service		B			C			C				
Approach Delay (s)		11.0			21.6			23.1			0.0	
Approach LOS		B			C			C			A	
Intersection Summary												
HCM 2000 Control Delay		18.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.54										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		80.1%			ICU Level of Service			D				
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	124	0	0	0	1	5	6	692	3	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	133	0	0	0	1	5	6	744	3	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	404	773	12	760	772	376	12			748		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	404	773	12	760	772	376	12			748		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	73	100	100	100	100	99	100			100		
cM capacity (veh/h)	500	327	1061	295	328	627	1604			869		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	133	6	378	375								
Volume Left	133	0	6	0								
Volume Right	0	5	0	3								
cSH	500	544	1604	1700								
Volume to Capacity	0.27	0.01	0.00	0.22								
Queue Length 95th (ft)	27	1	0	0								
Control Delay (s)	14.8	11.7	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	14.8	11.7	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			39.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	243	0	49	0	0	0	43	138	0	0	69	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.95	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.89	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1773	1549				1517	3471			2963	
Flt Permitted		0.76	1.00				0.57	1.00			1.00	
Satd. Flow (perm)		1414	1549				907	3471			2963	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	276	0	56	0	0	0	49	157	0	0	78	224
RTOR Reduction (vph)	0	0	32	0	0	0	0	0	0	0	128	0
Lane Group Flow (vph)	0	276	24	0	0	0	49	157	0	0	174	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		30.0	30.0				30.0	30.0			30.0	
Effective Green, g (s)		30.0	30.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.43	0.43				0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		606	663				388	1487			1269	
v/s Ratio Prot								0.05			c0.06	
v/s Ratio Perm		c0.20	0.02				0.05					
v/c Ratio		0.46	0.04				0.13	0.11			0.14	
Uniform Delay, d1		14.2	11.6				12.1	12.0			12.1	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		2.5	0.1				0.7	0.1			0.2	
Delay (s)		16.7	11.7				12.8	12.1			12.4	
Level of Service		B	B				B	B			B	
Approach Delay (s)		15.8			0.0			12.3			12.4	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			59.3%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	216	83	164	623	26	99	15	230	44	14	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1468	1687	3410		1649	1502	1449	1433	1343	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1468	1687	3410		1649	1502	1449	1433	1343	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	235	90	178	677	28	108	16	250	48	15	24
RTOR Reduction (vph)	0	0	68	0	2	0	0	0	149	0	22	0
Lane Group Flow (vph)	35	235	22	178	703	0	62	62	101	48	17	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	4.6	24.0	24.0	8.3	27.7		40.4	40.4	40.4	7.3	7.3	
Effective Green, g (s)	4.6	24.0	24.0	8.3	27.7		40.4	40.4	40.4	7.3	7.3	
Actuated g/C Ratio	0.05	0.24	0.24	0.08	0.28		0.40	0.40	0.40	0.07	0.07	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	62	833	352	140	944		666	606	585	104	98	
v/s Ratio Prot	0.03	0.07		c0.11	c0.21		0.04	0.04		c0.03	0.01	
v/s Ratio Perm			0.01						c0.07			
v/c Ratio	0.56	0.28	0.06	1.27	0.74		0.09	0.10	0.17	0.46	0.17	
Uniform Delay, d1	46.7	31.0	29.3	45.9	32.9		18.5	18.5	19.1	44.5	43.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.2	0.2	0.1	166.4	3.2		0.3	0.3	0.6	3.2	0.8	
Delay (s)	58.0	31.2	29.4	212.2	36.1		18.7	18.9	19.7	47.7	44.3	
Level of Service	E	C	C	F	D		B	B	B	D	D	
Approach Delay (s)		33.3			71.6			19.4			46.2	
Approach LOS		C			E			B			D	
Intersection Summary												
HCM 2000 Control Delay			50.8			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			59.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

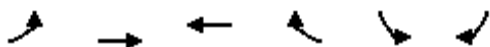
Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	308	76	151	678	250	107	109	173	127	88	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.91		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3256		1703	3505	1543	1583	3033		1736	2819	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3256		1703	3505	1543	1583	3033		1736	2819	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	74	328	81	161	721	266	114	116	184	135	94	47
RTOR Reduction (vph)	0	22	0	0	0	219	0	155	0	0	40	0
Lane Group Flow (vph)	74	387	0	161	721	47	114	145	0	135	101	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		17.0	17.0	17.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.30	0.30		0.18	0.18	0.18	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	491	983		301	620	273	247	473		271	440	
v/s Ratio Prot	0.05	c0.12		0.09	c0.21		c0.07	0.05		c0.08	0.04	
v/s Ratio Perm						0.03						
v/c Ratio	0.15	0.39		0.53	1.16	0.17	0.46	0.31		0.50	0.23	
Uniform Delay, d1	24.5	26.5		35.9	39.5	33.5	36.8	35.9		37.1	35.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.2		6.7	90.2	1.4	6.1	1.7		6.4	1.2	
Delay (s)	25.1	27.7		42.6	129.7	34.9	42.9	37.6		43.5	36.7	
Level of Service	C	C		D	F	C	D	D		D	D	
Approach Delay (s)		27.3			95.5			39.0			40.0	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			64.6			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			96.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			64.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Near Term Plus Both SAT



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	54	608	932	52	4	163
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	56	627	961	54	4	168
Pedestrians		2				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.87				0.87	0.87
vC, conflicting volume	1014				1412	509
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	710				1169	127
tC, single (s)	4.9				7.5	7.0
tC, 2 stage (s)						
tF (s)	2.6				3.8	3.3
p0 queue free %	90				96	78
cM capacity (veh/h)	576				114	776
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	265	418	641	374	172	
Volume Left	56	0	0	0	4	
Volume Right	0	0	0	54	168	
cSH	576	1700	1700	1700	681	
Volume to Capacity	0.10	0.25	0.38	0.22	0.25	
Queue Length 95th (ft)	8	0	0	0	25	
Control Delay (s)	3.5	0.0	0.0	0.0	12.1	
Lane LOS	A				B	
Approach Delay (s)	1.4		0.0		12.1	
Approach LOS					B	
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			66.5%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Both SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	168	0	0	0	0	595
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	193	0	0	0	0	684
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	342	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	342	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	100			100	
cM capacity (veh/h)	620	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	97	97	342	342		
Volume Left	97	97	0	0		
Volume Right	0	0	0	0		
cSH	620	620	1700	1700		
Volume to Capacity	0.16	0.16	0.20	0.20		
Queue Length 95th (ft)	14	14	0	0		
Control Delay (s)	11.9	11.9	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	11.9		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			27.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	333	139	154	629	0	0	0	0	127	386	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		0.99		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.96		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3235		1767	3539						3253	
Flt Permitted		1.00		0.41	1.00						0.99	
Satd. Flow (perm)		3235		756	3539						3253	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	354	148	164	669	0	0	0	0	135	411	260
RTOR Reduction (vph)	0	42	0	0	0	0	0	0	0	0	52	0
Lane Group Flow (vph)	0	460	0	164	669	0	0	0	0	0	754	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6								
Actuated Green, G (s)		46.0		46.0	46.0						54.0	
Effective Green, g (s)		46.0		46.0	46.0						54.0	
Actuated g/C Ratio		0.42		0.42	0.42						0.49	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1352		316	1479						1596	
v/s Ratio Prot		0.14			0.19							
v/s Ratio Perm				0.22							0.23	
v/c Ratio		0.34		0.52	0.45						0.47	
Uniform Delay, d1		21.7		23.8	23.0						18.6	
Progression Factor		1.00		0.36	0.35						1.00	
Incremental Delay, d2		0.7		1.3	0.2						1.0	
Delay (s)		22.4		9.9	8.2						19.6	
Level of Service		C		A	A						B	
Approach Delay (s)		22.4			8.6			0.0			19.6	
Approach LOS		C			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			77.7%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	74	63	18	6	0	12	0	0	0	32	445	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	82	70	20	7	0	13	0	0	0	36	494	14
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	586	573	255	374	580	0	509			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	586	573	255	374	580	0	509			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	78	83	97	99	100	99	100			98		
cM capacity (veh/h)	370	423	750	458	419	1091	1066			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	172	20	283	262								
Volume Left	82	7	36	0								
Volume Right	20	13	0	14								
cSH	416	747	1636	1700								
Volume to Capacity	0.41	0.03	0.02	0.15								
Queue Length 95th (ft)	50	2	2	0								
Control Delay (s)	19.6	10.0	1.1	0.0								
Lane LOS	C	A	A									
Approach Delay (s)	19.6	10.0	0.6									
Approach LOS	C	A										
Intersection Summary												
Average Delay			5.3									
Intersection Capacity Utilization			33.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park

Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	32	0	0	152	137	78	182	147	74	0	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3077		1441	2988		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3077		1441	2988		1543		2682
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	21	37	0	0	175	157	90	209	169	85	0	248
RTOR Reduction (vph)	0	0	0	0	132	0	0	111	0	0	0	229
Lane Group Flow (vph)	21	37	0	0	200	0	81	276	0	85	0	19
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.6	3.6			8.7		18.5	18.5		4.1		4.1
Effective Green, g (s)	3.6	3.6			8.7		18.5	18.5		4.1		4.1
Actuated g/C Ratio	0.07	0.07			0.16		0.34	0.34		0.08		0.08
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	108	231			496		494	1025		117		204
v/s Ratio Prot	c0.01	0.01			c0.07		0.06	c0.09		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.19	0.16			0.40		0.16	0.27		0.73		0.09
Uniform Delay, d1	23.8	23.7			20.3		12.3	12.8		24.4		23.2
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.9	0.3			0.5		0.7	0.6		20.0		0.2
Delay (s)	24.7	24.1			20.8		13.0	13.5		44.3		23.4
Level of Service	C	C			C		B	B		D		C
Approach Delay (s)		24.3			20.8			13.4			28.7	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			20.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			53.9				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			40.4%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	31	1	16	31	82	0	9	26	72	13	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	793	1357	3471	1328		2621		1703	2356	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	793	1357	3471	1328		2621		1703	2356	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	13	38	1	20	38	100	0	11	32	88	16	1
RTOR Reduction (vph)	0	0	1	0	0	63	0	24	0	0	1	0
Lane Group Flow (vph)	13	38	0	20	38	37	0	19	0	88	16	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Effective Green, g (s)	10.0	39.0	39.0	15.0	44.0	44.0		30.0		16.0	42.0	
Actuated g/C Ratio	0.08	0.32	0.32	0.12	0.37	0.37		0.25		0.13	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	150	1173	257	169	1272	486		655		227	824	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.05	0.01	
v/s Ratio Perm			0.00			c0.03						
v/c Ratio	0.09	0.03	0.00	0.12	0.03	0.08		0.03		0.39	0.02	
Uniform Delay, d1	50.8	27.6	27.3	46.6	24.3	24.8		34.0		47.5	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.1	0.0	1.4	0.0	0.3		0.1		4.9	0.0	
Delay (s)	51.9	27.7	27.4	48.1	24.4	25.1		34.1		52.5	25.6	
Level of Service	D	C	C	D	C	C		C		D	C	
Approach Delay (s)		33.7			27.8			34.1			48.1	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			35.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.12									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	77	483	24	58	670	61	45	125	45	77	165	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0			5.0			5.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.99			0.97			0.95		
Flt Protected	0.99			1.00			0.99			0.99		
Satd. Flow (prot)	4951			4970			3443			3304		
Flt Permitted	0.75			0.85			0.84			0.84		
Satd. Flow (perm)	3733			4233			2938			2813		
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	78	488	24	59	677	62	45	126	45	78	167	107
RTOR Reduction (vph)	0	7	0	0	16	0	0	21	0	0	50	0
Lane Group Flow (vph)	0	583	0	0	782	0	0	195	0	0	302	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.6			20.6			33.5			33.5	
Effective Green, g (s)		20.6			20.6			33.5			33.5	
Actuated g/C Ratio		0.32			0.32			0.52			0.52	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1199			1360			1535			1470	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.18			0.07			c0.11	
v/c Ratio		0.49			0.58			0.13			0.21	
Uniform Delay, d1		17.5			18.1			7.8			8.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.6			0.2			0.3	
Delay (s)		17.8			18.7			8.0			8.5	
Level of Service		B			B			A			A	
Approach Delay (s)		17.8			18.7			8.0			8.5	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		15.4			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.35										
Actuated Cycle Length (s)		64.1			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		85.5%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	164	9	4	438	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	0	0	189	10	5	503	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	371	519	3	516	519	257	3			506		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	371	519	3	516	519	257	3			506		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	59	99	100			100		
cM capacity (veh/h)	379	462	1086	433	462	747	1632			1066		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	126	73	172	336								
Volume Left	0	0	5	0								
Volume Right	0	10	0	0								
cSH	462	488	1632	1700								
Volume to Capacity	0.27	0.15	0.00	0.20								
Queue Length 95th (ft)	27	13	0	0								
Control Delay (s)	15.7	13.7	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	14.9		0.1									
Approach LOS	B											
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			27.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	166	293	0	0	663	82	121	269	137	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.95			0.95				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.96				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		4826			3476			3359				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3245			3476			3359				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	177	312	0	0	705	87	129	286	146	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	32	0	0	0	0
Lane Group Flow (vph)	0	489	0	0	783	0	0	529	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		46.0			46.0			54.0				
Effective Green, g (s)		46.0			46.0			54.0				
Actuated g/C Ratio		0.42			0.42			0.49				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1357			1453			1648				
v/s Ratio Prot					c0.23							
v/s Ratio Perm		0.15						0.16				
v/c Ratio		0.95dl			0.54			0.32				
Uniform Delay, d1		21.9			24.0			16.9				
Progression Factor		0.65			1.00			1.00				
Incremental Delay, d2		0.7			0.4			0.1				
Delay (s)		15.0			24.4			17.0				
Level of Service		B			C			B				
Approach Delay (s)		15.0			24.4			17.0			0.0	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay		19.7			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.42										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		60.4%			ICU Level of Service			B				
Analysis Period (min)		15										
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

13: Mandela Pkwy & 20th St.

Gateway Park
Near Term Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	62	76	0	0	1	0	4	354	27	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	69	84	0	0	1	0	4	393	30	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	215	454	9	472	439	225	9			436		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	215	454	9	472	439	225	9			436		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	83	100	100	100	100	100			100		
cM capacity (veh/h)	705	494	1069	406	504	776	1612			1122		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	153	1	201	227								
Volume Left	69	0	4	0								
Volume Right	0	0	0	30								
cSH	571	504	1612	1700								
Volume to Capacity	0.27	0.00	0.00	0.13								
Queue Length 95th (ft)	27	0	0	0								
Control Delay (s)	13.6	12.2	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	13.6	12.2	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			32.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Volume (vph)	109	0	10	0	0	0	7	724	2	0	141	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.99				1.00	1.00			1.00	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.99	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1767	1199				1202	2735			2461	
Flt Permitted		0.76	1.00				0.65	1.00			1.00	
Satd. Flow (perm)		1408	1199				820	2735			2461	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	115	0	11	0	0	0	7	762	2	0	148	16
RTOR Reduction (vph)	0	0	7	0	0	0	0	1	0	0	9	0
Lane Group Flow (vph)	0	115	4	0	0	0	7	763	0	0	155	0
Confl. Peds. (#/hr)	2		1	1		2	1		2	2		1
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		25.0	25.0				30.0	30.0			30.0	
Effective Green, g (s)		25.0	25.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.38	0.38				0.46	0.46			0.46	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		541	461				378	1262			1135	
v/s Ratio Prot								c0.28			0.06	
v/s Ratio Perm		c0.08	0.00				0.01					
v/c Ratio		0.21	0.01				0.02	0.60			0.14	
Uniform Delay, d1		13.4	12.4				9.5	13.1			10.1	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.9	0.0				0.1	2.2			0.3	
Delay (s)		14.3	12.4				9.6	15.2			10.3	
Level of Service		B	B				A	B			B	
Approach Delay (s)		14.1			0.0			15.2			10.3	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.3				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Volume (vph)	8	393	118	66	900	52	407	84	249	89	34	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1495	1433	3360		1618	1346	1302	1517	1397	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1495	1433	3360		1618	1346	1302	1517	1397	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	414	124	69	947	55	428	88	262	94	36	76
RTOR Reduction (vph)	0	0	86	0	4	0	0	0	193	0	68	0
Lane Group Flow (vph)	8	414	38	69	998	0	257	259	69	94	44	0
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	0.7	24.1	24.1	5.6	29.0		20.9	20.9	20.9	8.2	8.2	
Effective Green, g (s)	0.7	24.1	24.1	5.6	29.0		20.9	20.9	20.9	8.2	8.2	
Actuated g/C Ratio	0.01	0.31	0.31	0.07	0.37		0.27	0.27	0.27	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	13	1071	457	101	1236		429	356	345	157	145	
v/s Ratio Prot	0.01	0.12		c0.05	c0.30		0.16	c0.19		c0.06	0.03	
v/s Ratio Perm			0.03						0.05			
v/c Ratio	0.62	0.39	0.08	0.68	0.81		0.60	0.73	0.20	0.60	0.30	
Uniform Delay, d1	38.9	21.5	19.5	35.7	22.4		25.3	26.4	22.5	33.7	32.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.0	0.2	0.1	17.4	4.0		2.3	7.2	0.3	15.7	5.3	
Delay (s)	103.0	21.8	19.6	53.1	26.3		27.5	33.6	22.8	49.5	38.0	
Level of Service	F	C	B	D	C		C	C	C	D	D	
Approach Delay (s)		22.5			28.1			27.9			43.2	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			28.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			78.8			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			62.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	475	116	240	840	281	129	232	487	176	101	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3223		1626	3438	1495	1444	2823		1612	2822	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3223		1626	3438	1495	1444	2823		1612	2822	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	153	490	120	247	866	290	133	239	502	181	104	25
RTOR Reduction (vph)	0	23	0	0	0	241	0	349	0	0	21	0
Lane Group Flow (vph)	153	587	0	247	866	49	133	392	0	181	108	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.31	0.31		0.17	0.17	0.17	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	437	983		273	579	251	228	445		254	445	
v/s Ratio Prot	0.11	c0.18		0.15	c0.25		0.09	c0.14		c0.11	0.04	
v/s Ratio Perm						0.03						
v/c Ratio	0.35	0.60		0.90	1.50	0.19	0.58	0.88		0.71	0.24	
Uniform Delay, d1	25.7	28.0		38.8	39.5	34.0	37.1	39.1		38.0	35.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	2.7		34.6	232.1	1.7	10.5	21.3		15.7	1.3	
Delay (s)	27.9	30.7		73.4	271.6	35.7	47.6	60.4		53.6	36.3	
Level of Service	C	C		E	F	D	D	E		D	D	
Approach Delay (s)		30.1			187.9			58.4			46.4	
Approach LOS		C			F			E			D	
Intersection Summary												
HCM 2000 Control Delay			105.1			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			95.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			86.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	128	1008	67	30	1079	17	54	0	22	3	7	232
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	135	1061	71	32	1136	18	57	0	23	3	7	244
Pedestrians								2			2	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.88			0.97			0.89	0.89	0.97	0.89	0.89	0.88
vC, conflicting volume	1156			1134			2247	2587	568	2033	2613	579
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	901			1077			2009	2390	494	1770	2419	244
tC, single (s)	4.9			4.1			7.9	6.5	7.1	7.5	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.7	4.0	3.4	3.5	4.0	3.4
p0 queue free %	72			95			0	100	95	91	63	62
cM capacity (veh/h)	485			635			9	21	489	35	20	640
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	665	601	599	586	80	255						
Volume Left	135	0	32	0	57	3						
Volume Right	0	71	0	18	23	244						
cSH	485	1700	635	1700	12	303						
Volume to Capacity	0.28	0.35	0.05	0.34	6.66	0.84						
Queue Length 95th (ft)	28	0	4	0	Err	180						
Control Delay (s)	8.0	0.0	1.4	0.0	Err	56.8						
Lane LOS	A		A		F	F						
Approach Delay (s)	4.2		0.7		Err	56.8						
Approach LOS					F	F						
Intersection Summary												
Average Delay			294.5									
Intersection Capacity Utilization			97.5%		ICU Level of Service		F					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Cumulative PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	252	0	0	0	0	806
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	260	0	0	0	0	831
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	415	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	415	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	54	100			100	
cM capacity (veh/h)	560	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	130	130	415	415		
Volume Left	130	130	0	0		
Volume Right	0	0	0	0		
cSH	560	560	1700	1700		
Volume to Capacity	0.23	0.23	0.24	0.24		
Queue Length 95th (ft)	22	22	0	0		
Control Delay (s)	13.4	13.4	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	13.4		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			42.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	 						  	
Volume (vph)	0	748	116	160	739	0	0	0	0	186	622	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4813		1770	3471						3372	
Flt Permitted		1.00		0.28	1.00						0.99	
Satd. Flow (perm)		4813		516	3471						3372	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	779	121	167	770	0	0	0	0	194	648	245
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	26	0
Lane Group Flow (vph)	0	880	0	167	770	0	0	0	0	0	1061	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		59.0		59.0	59.0						36.0	
Effective Green, g (s)		59.0		59.0	59.0						36.0	
Actuated g/C Ratio		0.56		0.56	0.56						0.34	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		2704		289	1950						1156	
v/s Ratio Prot		0.18			0.22							
v/s Ratio Perm				c0.32							0.31	
v/c Ratio		0.33		0.58	0.39						0.92	
Uniform Delay, d1		12.3		14.9	12.9						33.1	
Progression Factor		1.00		0.63	0.48						1.00	
Incremental Delay, d2		0.3		7.5	0.5						12.9	
Delay (s)		12.7		16.8	6.7						46.0	
Level of Service		B		B	A						D	
Approach Delay (s)		12.7			8.5			0.0			46.0	
Approach LOS		B			A			A			D	
Intersection Summary												
HCM 2000 Control Delay			23.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			105.0			Sum of lost time (s)				10.0		
Intersection Capacity Utilization			112.9%			ICU Level of Service				H		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	109	12	7	2	0	0	0	0	10	702	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	115	13	7	2	0	0	0	0	11	739	3
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	766	765	375	462	766	0	745			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	766	765	375	462	766	0	745			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	66	98	98	99	100	100			99		
cM capacity (veh/h)	278	333	627	348	332	1091	870			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	127	9	380	373								
Volume Left	0	7	11	0								
Volume Right	13	0	0	3								
cSH	349	344	1636	1700								
Volume to Capacity	0.36	0.03	0.01	0.22								
Queue Length 95th (ft)	41	2	0	0								
Control Delay (s)	21.1	15.7	0.3	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	21.1	15.7	0.1									
Approach LOS	C	C										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			33.2%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	115	0	0	129	153	106	373	111	106	0	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2746		1014	2889		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2746		1014	2889		1570		2349
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	177	121	0	0	136	161	112	393	117	112	0	256
RTOR Reduction (vph)	0	0	0	0	141	0	0	21	0	0	0	220
Lane Group Flow (vph)	177	121	0	0	156	0	101	500	0	112	0	36
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	17.1	17.1			9.3		18.1	18.1		10.7		10.7
Effective Green, g (s)	17.1	17.1			9.3		18.1	18.1		10.7		10.7
Actuated g/C Ratio	0.23	0.23			0.12		0.24	0.24		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	263	726			339		244	695		223		334
v/s Ratio Prot	c0.15	0.04			c0.06		0.10	c0.17		c0.07		0.02
v/s Ratio Perm												
v/c Ratio	0.67	0.17			0.46		0.41	0.72		0.50		0.11
Uniform Delay, d1	26.5	23.3			30.6		24.1	26.2		29.8		28.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	6.6	0.1			1.0		5.1	6.3		1.8		0.1
Delay (s)	33.1	23.4			31.6		29.2	32.6		31.6		28.2
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		29.2			31.6			32.0			29.3	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			75.2				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	201	233	43	34	71	78	7	269	185	232	150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	212	245	45	36	75	82	7	283	195	244	158	0
RTOR Reduction (vph)	0	0	30	0	0	72	0	102	0	0	0	0
Lane Group Flow (vph)	212	245	15	36	75	10	7	376	0	244	158	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.17	c0.10		0.03	0.03		0.01	c0.19		c0.20	0.08	
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.52	0.32	0.05	0.26	0.27	0.08	0.03	0.79		1.44	0.60	
Uniform Delay, d1	33.0	30.5	27.8	47.5	47.6	46.4	34.7	42.6		51.5	48.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	1.1	0.4	4.5	2.4	1.1	0.2	12.5		226.1	9.6	
Delay (s)	37.8	31.6	28.2	52.0	50.0	47.5	35.0	55.1		277.6	57.9	
Level of Service	D	C	C	D	D	D	C	E		F	E	
Approach Delay (s)		33.9			49.3			54.8			191.3	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			82.2									F
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			120.0							20.0		
Intersection Capacity Utilization			57.4%								B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	74	811	72	99	931	84	49	329	91	104	304	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3378		1770	3471		1770	1770		1770	1724	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3378		1770	3471		1770	1770		1770	1724	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	854	76	104	980	88	52	346	96	109	320	114
RTOR Reduction (vph)	0	7	0	0	7	0	0	10	0	0	13	0
Lane Group Flow (vph)	78	923	0	104	1061	0	52	432	0	109	421	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.4	34.8		4.0	33.4		3.9	33.1		4.0	33.2	
Effective Green, g (s)	5.4	34.8		4.0	33.4		3.9	33.1		4.0	33.2	
Actuated g/C Ratio	0.06	0.37		0.04	0.36		0.04	0.35		0.04	0.35	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	1251		75	1234		73	623		75	609	
v/s Ratio Prot	0.04	0.27		c0.06	c0.31		0.03	0.24		c0.06	c0.24	
v/s Ratio Perm												
v/c Ratio	0.77	0.74		1.39	0.86		0.71	0.69		1.45	0.69	
Uniform Delay, d1	43.6	25.6		45.0	28.1		44.4	26.0		45.0	26.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.9	2.3		237.1	6.2		27.8	6.2		263.6	6.3	
Delay (s)	73.5	27.9		282.1	34.3		72.3	32.3		308.5	32.3	
Level of Service	E	C		F	C		E	C		F	C	
Approach Delay (s)		31.4			56.3			36.5			87.7	
Approach LOS		C			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			50.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			93.9			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			80.1%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 11: Mandela Pkwy & 24th St.

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	245	15	7	1001	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	253	15	7	1032	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	691	1063	16	1047	1063	520	16			1033		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	691	1063	16	1047	1063	520	16			1033		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	100	0	97	100			100		
cM capacity (veh/h)	0	224	1066	184	224	506	1615			680		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	168	100	351	688								
Volume Left	0	0	7	0								
Volume Right	0	15	0	0								
cSH	224	245	1615	1700								
Volume to Capacity	0.75	0.41	0.00	0.40								
Queue Length 95th (ft)	130	47	0	0								
Control Delay (s)	57.9	29.4	0.2	0.0								
Lane LOS	F	D	A									
Approach Delay (s)	47.3		0.1									
Approach LOS	E											
Intersection Summary												
Average Delay			9.8									
Intersection Capacity Utilization			42.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	420	514	0	0	753	171	146	684	186	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.91			0.95				
Frpb, ped/bikes	1.00	1.00			1.00			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.97			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1702	3406			4862			3347				
Flt Permitted	0.26	1.00			1.00			0.99				
Satd. Flow (perm)	458	3406			4862			3347				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	438	535	0	0	784	178	152	712	194	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	18	0	0	0	0
Lane Group Flow (vph)	438	535	0	0	933	0	0	1040	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)	59.0	59.0			59.0			36.0				
Effective Green, g (s)	59.0	59.0			59.0			36.0				
Actuated g/C Ratio	0.56	0.56			0.56			0.34				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	257	1913			2731			1147				
v/s Ratio Prot		0.16			0.19							
v/s Ratio Perm	c0.96							0.31				
v/c Ratio	1.70	0.28			0.34			0.91				
Uniform Delay, d1	23.0	12.0			12.5			32.9				
Progression Factor	0.83	0.51			1.00			1.00				
Incremental Delay, d2	331.7	0.3			0.3			10.3				
Delay (s)	350.7	6.5			12.8			43.2				
Level of Service	F	A			B			D				
Approach Delay (s)		161.4			12.8			43.2			0.0	
Approach LOS		F			B			D			A	
Intersection Summary												
HCM 2000 Control Delay			71.8			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.40									
Actuated Cycle Length (s)			105.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			112.9%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

13: Mandela Pkwy & 20th St.

Gateway Park
Cumulative PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	109	0	0	0	2	7	8	900	3	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	115	0	0	0	2	7	8	947	3	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	512	980	12	967	979	477	12			952		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	512	980	12	967	979	477	12			952		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	100	100	100	99	99	99			100		
cM capacity (veh/h)	414	248	1061	209	248	539	1604			730		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	115	9	482	477								
Volume Left	115	0	8	0								
Volume Right	0	7	0	3								
cSH	414	428	1604	1700								
Volume to Capacity	0.28	0.02	0.01	0.28								
Queue Length 95th (ft)	28	2	0	0								
Control Delay (s)	17.0	13.6	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	17.0	13.6	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			44.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	111	0	20	0	0	0	10	181	0	0	91	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	1.00				1.00	1.00			0.99	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.95	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1805	1615				1543	3471			3139	
Flt Permitted		0.76	1.00				0.66	1.00			1.00	
Satd. Flow (perm)		1439	1615				1079	3471			3139	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	117	0	21	0	0	0	11	191	0	0	96	42
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	23	0
Lane Group Flow (vph)	0	117	8	0	0	0	11	191	0	0	115	0
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0				29.0	29.0			29.0	
Effective Green, g (s)		26.0	26.0				29.0	29.0			29.0	
Actuated g/C Ratio		0.40	0.40				0.45	0.45			0.45	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		575	646				481	1548			1400	
v/s Ratio Prot								c0.06			0.04	
v/s Ratio Perm		c0.08	0.01				0.01					
v/c Ratio		0.20	0.01				0.02	0.12			0.08	
Uniform Delay, d1		12.7	11.8				10.1	10.5			10.3	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.8	0.0				0.1	0.2			0.1	
Delay (s)		13.5	11.8				10.2	10.7			10.5	
Level of Service		B	B				B	B			B	
Approach Delay (s)		13.3			0.0			10.7			10.5	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			11.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.16									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			22.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Volume (vph)	42	277	57	49	811	34	92	20	131	57	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1524	1687	3409		1649	1456	1495	1433	1344	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1524	1687	3409		1649	1456	1495	1433	1344	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	292	60	52	854	36	97	21	138	60	19	31
RTOR Reduction (vph)	0	0	41	0	3	0	0	0	90	0	29	0
Lane Group Flow (vph)	44	292	19	52	887	0	58	60	48	60	21	0
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	4.6	31.2	31.2	6.3	32.9		35.0	35.0	35.0	8.1	8.1	
Effective Green, g (s)	4.6	31.2	31.2	6.3	32.9		35.0	35.0	35.0	8.1	8.1	
Actuated g/C Ratio	0.05	0.31	0.31	0.06	0.33		0.35	0.35	0.35	0.08	0.08	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	62	1076	472	105	1114		573	506	520	115	108	
v/s Ratio Prot	c0.03	0.08		0.03	c0.26		0.04	c0.04		c0.04	0.02	
v/s Ratio Perm			0.01						0.03			
v/c Ratio	0.71	0.27	0.04	0.50	0.80		0.10	0.12	0.09	0.52	0.20	
Uniform Delay, d1	47.3	26.1	24.2	45.6	30.8		22.2	22.3	22.1	44.4	43.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	31.0	0.1	0.0	3.6	4.0		0.4	0.5	0.4	4.2	0.9	
Delay (s)	78.3	26.3	24.3	49.3	34.8		22.5	22.8	22.5	48.6	44.1	
Level of Service	E	C	C	D	C		C	C	C	D	D	
Approach Delay (s)		31.8			35.6			22.5			46.6	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			100.6			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			49.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	262	91	185	748	318	129	143	213	156	116	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3252		1703	3505	1543	1583	3043		1736	2923	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3252		1703	3505	1543	1583	3043		1736	2923	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	276	96	195	787	335	136	151	224	164	122	39
RTOR Reduction (vph)	0	36	0	0	0	279	0	189	0	0	32	0
Lane Group Flow (vph)	71	336	0	195	787	56	136	186	0	164	129	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.31	0.31		0.17	0.17	0.17	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	496	992		286	590	259	249	480		274	461	
v/s Ratio Prot	0.04	c0.10		0.11	c0.22		c0.09	0.06		c0.09	0.04	
v/s Ratio Perm						0.04						
v/c Ratio	0.14	0.34		0.68	1.33	0.22	0.55	0.39		0.60	0.28	
Uniform Delay, d1	24.0	25.6		37.1	39.5	34.1	36.9	35.9		37.2	35.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.9		12.4	161.6	1.9	8.4	2.4		9.3	1.5	
Delay (s)	24.6	26.5		49.5	201.1	36.0	45.2	38.2		46.5	36.8	
Level of Service	C	C		D	F	D	D	D		D	D	
Approach Delay (s)		26.2			136.7			40.1			41.7	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			86.9			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			95.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			70.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	55	606	55	30	1048	8	72	7	39	5	17	151
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	57	625	57	31	1080	8	74	7	40	5	18	156
Pedestrians		2										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.87						0.87	0.87		0.87	0.87	0.87
vC, conflicting volume	1089			681			1535	1917	341	1616	1941	546
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	810			681			1321	1759	341	1414	1787	188
tC, single (s)	4.9			4.2			7.5	6.5	7.0	8.2	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.6			2.3			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	89			96			0	89	94	90	72	78
cM capacity (veh/h)	522			874			55	64	649	49	62	713
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	369	369	571	548	122	178						
Volume Left	57	0	31	0	74	5						
Volume Right	0	57	0	8	40	156						
cSH	522	1700	874	1700	79	294						
Volume to Capacity	0.11	0.22	0.04	0.32	1.53	0.61						
Queue Length 95th (ft)	9	0	3	0	247	92						
Control Delay (s)	3.4	0.0	1.0	0.0	384.1	34.5						
Lane LOS	A		A		F	D						
Approach Delay (s)	1.7		0.5		384.1	34.5						
Approach LOS					F	D						
Intersection Summary												
Average Delay			25.3									
Intersection Capacity Utilization			81.1%		ICU Level of Service		D					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Cumulative SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	220	0	0	0	0	736
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	232	0	0	0	0	775
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	387	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	60	100			100	
cM capacity (veh/h)	581	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	116	116	387	387		
Volume Left	116	116	0	0		
Volume Right	0	0	0	0		
cSH	581	581	1700	1700		
Volume to Capacity	0.20	0.20	0.23	0.23		
Queue Length 95th (ft)	18	18	0	0		
Control Delay (s)	12.7	12.7	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	12.7		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			33.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑	↑↑						↑↑	
Volume (vph)	0	348	118	185	648	0	0	0	0	156	496	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.96		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4678		1767	3539						3259	
Flt Permitted		1.00		0.46	1.00						0.99	
Satd. Flow (perm)		4678		857	3539						3259	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	366	124	195	682	0	0	0	0	164	522	312
RTOR Reduction (vph)	0	69	0	0	0	0	0	0	0	0	62	0
Lane Group Flow (vph)	0	421	0	195	682	0	0	0	0	0	936	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		38.0		38.0	38.0						37.0	
Effective Green, g (s)		38.0		38.0	38.0						37.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.44	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		2091		383	1582						1418	
v/s Ratio Prot		0.09			0.19							
v/s Ratio Perm				c0.23							0.29	
v/c Ratio		0.20		0.51	0.43						0.66	
Uniform Delay, d1		14.3		16.8	16.1						19.0	
Progression Factor		1.00		0.41	0.36						1.00	
Incremental Delay, d2		0.2		1.0	0.2						2.4	
Delay (s)		14.5		7.9	5.9						21.4	
Level of Service		B		A	A						C	
Approach Delay (s)		14.5			6.4			0.0			21.4	
Approach LOS		B			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			14.4		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			85.0		Sum of lost time (s)				10.0			
Intersection Capacity Utilization			103.3%		ICU Level of Service				G			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	97	2	24	8	0	15	0	0	0	42	564	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	102	2	25	8	0	16	0	0	0	44	594	18
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	707	691	307	413	700	0	612			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	707	691	307	413	700	0	612			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	66	99	96	98	100	99	100			97		
cM capacity (veh/h)	300	360	695	483	356	1091	977			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	129	24	341	315								
Volume Left	102	8	44	0								
Volume Right	25	16	0	18								
cSH	339	759	1636	1700								
Volume to Capacity	0.38	0.03	0.03	0.19								
Queue Length 95th (ft)	44	2	2	0								
Control Delay (s)	22.1	9.9	1.1	0.0								
Lane LOS	C	A	A									
Approach Delay (s)	22.1	9.9	0.6									
Approach LOS	C	A										
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			37.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	32	0	0	172	151	56	202	172	79	0	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3080		1441	2982		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3080		1441	2982		1543		2682
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	34	0	0	181	159	59	213	181	83	0	256
RTOR Reduction (vph)	0	0	0	0	133	0	0	125	0	0	0	231
Lane Group Flow (vph)	22	34	0	0	207	0	53	275	0	83	0	25
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.6	3.6			8.8		16.4	16.4		5.1		5.1
Effective Green, g (s)	3.6	3.6			8.8		16.4	16.4		5.1		5.1
Actuated g/C Ratio	0.07	0.07			0.17		0.31	0.31		0.10		0.10
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	110	236			512		446	924		148		258
v/s Ratio Prot	c0.01	0.01			c0.07		0.04	c0.09		c0.05		0.01
v/s Ratio Perm												
v/c Ratio	0.20	0.14			0.41		0.12	0.30		0.56		0.10
Uniform Delay, d1	23.3	23.2			19.7		13.1	13.9		22.8		21.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.9	0.3			0.5		0.5	0.8		4.8		0.2
Delay (s)	24.2	23.5			20.2		13.6	14.7		27.6		22.0
Level of Service	C	C			C		B	B		C		C
Approach Delay (s)		23.8			20.2			14.6			23.3	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.1				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			52.9				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			42.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park

Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	36	1	19	36	55	0	11	31	44	15	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	794	1357	3471	1328		2621		1703	2356	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	794	1357	3471	1328		2621		1703	2356	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	38	1	20	38	58	0	12	33	46	16	1
RTOR Reduction (vph)	0	0	1	0	0	35	0	23	0	0	1	0
Lane Group Flow (vph)	14	38	0	20	38	23	0	22	0	46	16	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	4.0	39.0	39.0	5.0	40.0	40.0		30.0		6.0	32.0	
Effective Green, g (s)	4.0	39.0	39.0	5.0	40.0	40.0		30.0		6.0	32.0	
Actuated g/C Ratio	0.04	0.39	0.39	0.05	0.40	0.40		0.30		0.06	0.32	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	72	1407	309	67	1388	531		786		102	753	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.03	0.01	
v/s Ratio Perm			0.00			c0.02						
v/c Ratio	0.19	0.03	0.00	0.30	0.03	0.04		0.03		0.45	0.02	
Uniform Delay, d1	46.4	18.8	18.6	45.8	18.2	18.3		24.7		45.4	23.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.0	0.0	11.0	0.0	0.2		0.1		13.7	0.1	
Delay (s)	52.4	18.8	18.6	56.9	18.2	18.5		24.8		59.1	23.3	
Level of Service	D	B	B	E	B	B		C		E	C	
Approach Delay (s)		27.7			25.0			24.8			49.5	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			31.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.08									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	563	32	76	758	81	59	165	59	101	217	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3443		1805	3447		1805	1813		1770	1737	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3443		1805	3447		1805	1813		1770	1737	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	44	569	32	77	766	82	60	167	60	102	219	119
RTOR Reduction (vph)	0	5	0	0	9	0	0	13	0	0	18	0
Lane Group Flow (vph)	44	596	0	77	839	0	60	214	0	102	320	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.3	27.5		4.1	28.3		4.4	34.2		4.1	33.9	
Effective Green, g (s)	3.3	27.5		4.1	28.3		4.4	34.2		4.1	33.9	
Actuated g/C Ratio	0.04	0.31		0.05	0.32		0.05	0.39		0.05	0.39	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	67	1077		84	1109		90	705		82	669	
v/s Ratio Prot	0.02	0.17		c0.04	c0.24		0.03	0.12		c0.06	c0.18	
v/s Ratio Perm												
v/c Ratio	0.66	0.55		0.92	0.76		0.67	0.30		1.24	0.48	
Uniform Delay, d1	41.7	25.1		41.7	26.7		41.0	18.6		41.9	20.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.8	0.6		70.2	3.0		17.1	1.1		178.6	2.4	
Delay (s)	62.6	25.7		112.0	29.7		58.1	19.7		220.5	22.8	
Level of Service	E	C		F	C		E	B		F	C	
Approach Delay (s)		28.2			36.5			27.7			68.6	
Approach LOS		C			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			39.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			87.9			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			74.2%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	215	12	5	556	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	226	13	5	585	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	434	602	3	599	602	298	3			588		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	434	602	3	599	602	298	3			588		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	45	98	100			100		
cM capacity (veh/h)	283	414	1086	377	414	703	1632			994		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	151	88	200	390								
Volume Left	0	0	5	0								
Volume Right	0	13	0	0								
cSH	414	440	1632	1700								
Volume to Capacity	0.36	0.20	0.00	0.23								
Queue Length 95th (ft)	41	18	0	0								
Control Delay (s)	18.6	15.2	0.2	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	17.4		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			33.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  			 				
Volume (vph)	200	304	0	0	727	108	108	353	131	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.91			0.95				
Frpb, ped/bikes	1.00	1.00			1.00			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.98			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1752	3374			4977			3394				
Flt Permitted	0.27	1.00			1.00			0.99				
Satd. Flow (perm)	495	3374			4977			3394				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	320	0	0	765	114	114	372	138	0	0	0
RTOR Reduction (vph)	0	0	0	0	23	0	0	30	0	0	0	0
Lane Group Flow (vph)	211	320	0	0	856	0	0	594	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)	38.0	38.0			38.0			37.0				
Effective Green, g (s)	38.0	38.0			38.0			37.0				
Actuated g/C Ratio	0.45	0.45			0.45			0.44				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	221	1508			2225			1477				
v/s Ratio Prot		0.09			0.17							
v/s Ratio Perm	c0.43							0.17				
v/c Ratio	0.95	0.21			0.38			0.40				
Uniform Delay, d1	22.7	14.4			15.7			16.4				
Progression Factor	0.91	0.77			1.00			1.00				
Incremental Delay, d2	48.3	0.3			0.1			0.2				
Delay (s)	68.9	11.4			15.8			16.6				
Level of Service	E	B			B			B				
Approach Delay (s)		34.3			15.8			16.6			0.0	
Approach LOS		C			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			20.9				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			85.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			103.3%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Cumulative SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	99	0	0	2	0	5	447	35	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	104	0	0	2	0	5	471	37	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	256	540	9	565	521	267	9			520		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	256	540	9	565	521	267	9			520		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	76	100	100	100	100	100			100		
cM capacity (veh/h)	658	442	1069	328	453	730	1612			1045		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	104	2	241	272								
Volume Left	0	0	5	0								
Volume Right	0	0	0	37								
cSH	442	453	1612	1700								
Volume to Capacity	0.24	0.00	0.00	0.16								
Queue Length 95th (ft)	23	0	0	0								
Control Delay (s)	15.6	13.0	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	15.6	13.0	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			25.6%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	0	23	0	0	0	27	724	2	0	141	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.97	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.94	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1741	1165				1184	2735			2575	
Flt Permitted		0.76	1.00				0.59	1.00			1.00	
Satd. Flow (perm)		1388	1165				736	2735			2575	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	180	0	24	0	0	0	28	762	2	0	148	113
RTOR Reduction (vph)	0	0	15	0	0	0	0	1	0	0	61	0
Lane Group Flow (vph)	0	180	9	0	0	0	28	763	0	0	200	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		25.0	25.0				30.0	30.0			30.0	
Effective Green, g (s)		25.0	25.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.38	0.38				0.46	0.46			0.46	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		533	448				339	1262			1188	
v/s Ratio Prot								c0.28			0.08	
v/s Ratio Perm		c0.13	0.01				0.04					
v/c Ratio		0.34	0.02				0.08	0.60			0.17	
Uniform Delay, d1		14.1	12.4				9.8	13.1			10.2	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		1.7	0.1				0.5	2.2			0.3	
Delay (s)		15.9	12.5				10.3	15.2			10.5	
Level of Service		B	B				B	B			B	
Approach Delay (s)		15.5			0.0			15.1			10.5	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	393	140	137	900	52	418	84	300	89	34	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1442	1433	3360		1618	1351	1267	1517	1397	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1442	1433	3360		1618	1351	1267	1517	1397	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	414	147	144	947	55	440	88	316	94	36	76
RTOR Reduction (vph)	0	0	111	0	4	0	0	0	218	0	68	0
Lane Group Flow (vph)	8	414	36	144	998	0	264	264	98	94	44	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	0.7	19.7	19.7	10.7	29.7		21.6	21.6	21.6	8.2	8.2	
Effective Green, g (s)	0.7	19.7	19.7	10.7	29.7		21.6	21.6	21.6	8.2	8.2	
Actuated g/C Ratio	0.01	0.25	0.25	0.13	0.37		0.27	0.27	0.27	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	13	860	354	191	1244		435	363	341	155	142	
v/s Ratio Prot	0.01	0.12		c0.10	c0.30		0.16	c0.20		c0.06	0.03	
v/s Ratio Perm			0.03						0.08			
v/c Ratio	0.62	0.48	0.10	0.75	0.80		0.61	0.73	0.29	0.61	0.31	
Uniform Delay, d1	39.6	25.9	23.4	33.5	22.6		25.6	26.6	23.2	34.5	33.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.0	0.4	0.1	15.5	3.8		2.4	7.1	0.5	16.4	5.5	
Delay (s)	103.7	26.3	23.5	48.9	26.4		28.0	33.7	23.7	50.8	38.9	
Level of Service	F	C	C	D	C		C	C	C	D	D	
Approach Delay (s)		26.7			29.3			28.2			44.4	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			29.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			80.2			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			65.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	156	515	119	240	897	281	133	232	487	176	101	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3228		1626	3438	1495	1444	2823		1612	2762	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3228		1626	3438	1495	1444	2823		1612	2762	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	161	531	123	247	925	290	137	239	502	181	104	34
RTOR Reduction (vph)	0	21	0	0	0	241	0	340	0	0	29	0
Lane Group Flow (vph)	161	633	0	247	925	49	137	401	0	181	109	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			3									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.31	0.31		0.17	0.17	0.17	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	437	985		273	579	251	228	445		254	436	
v/s Ratio Prot	0.11	c0.20		0.15	c0.27		0.09	c0.14		c0.11	0.04	
v/s Ratio Perm						0.03						
v/c Ratio	0.37	0.64		0.90	1.60	0.19	0.60	0.90		0.71	0.25	
Uniform Delay, d1	25.8	28.5		38.8	39.5	34.0	37.2	39.3		38.0	35.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	3.2		34.6	277.0	1.7	11.2	23.9		15.7	1.4	
Delay (s)	28.2	31.7		73.4	316.5	35.7	48.4	63.2		53.6	36.5	
Level of Service	C	C		E	F	D	D	E		D	D	
Approach Delay (s)		31.0			219.7			60.9			46.2	
Approach LOS		C			F			E			D	
Intersection Summary												
HCM 2000 Control Delay			119.4			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			95.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			86.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	128	1048	67	30	1136	17	54	0	22	3	7	232
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	135	1103	71	32	1196	18	57	0	23	3	7	244
Pedestrians								2			2	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.87			0.95			0.89	0.89	0.95	0.89	0.89	0.87
vC, conflicting volume	1216			1176			2319	2689	589	2114	2715	609
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	941			1073			1969	2384	454	1740	2413	240
tC, single (s)	4.9			4.1			7.9	6.5	7.1	7.5	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.7	4.0	3.4	3.5	4.0	3.4
p0 queue free %	71			95			0	100	95	91	63	62
cM capacity (veh/h)	459			621			9	21	508	36	20	635
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	686	622	629	616	80	255						
Volume Left	135	0	32	0	57	3						
Volume Right	0	71	0	18	23	244						
cSH	459	1700	621	1700	13	302						
Volume to Capacity	0.29	0.37	0.05	0.36	6.36	0.84						
Queue Length 95th (ft)	30	0	4	0	Err	182						
Control Delay (s)	8.8	0.0	1.4	0.0	Err	57.9						
Lane LOS	A		A		F	F						
Approach Delay (s)	4.6		0.7		Err	57.9						
Approach LOS					F	F						
Intersection Summary												
Average Delay			284.4									
Intersection Capacity Utilization			100.2%		ICU Level of Service				G			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Park PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	252	0	0	0	0	814
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	260	0	0	0	0	839
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	420	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	420	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	53	100			100	
cM capacity (veh/h)	557	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	130	130	420	420		
Volume Left	130	130	0	0		
Volume Right	0	0	0	0		
cSH	557	557	1700	1700		
Volume to Capacity	0.23	0.23	0.25	0.25		
Queue Length 95th (ft)	22	22	0	0		
Control Delay (s)	13.4	13.4	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	13.4		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			42.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	 						  	
Volume (vph)	0	786	119	160	789	0	0	0	0	186	622	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4815		1770	3471						3368	
Flt Permitted		1.00		0.26	1.00						0.99	
Satd. Flow (perm)		4815		488	3471						3368	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	819	124	167	822	0	0	0	0	194	648	253
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	924	0	167	822	0	0	0	0	0	1068	0
Confl. Peds. (#/hr)										7		3
Confl. Bikes (#/hr)						1						36
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		59.0		59.0	59.0						36.0	
Effective Green, g (s)		59.0		59.0	59.0						36.0	
Actuated g/C Ratio		0.56		0.56	0.56						0.34	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		2705		274	1950						1154	
v/s Ratio Prot		0.19			0.24							
v/s Ratio Perm				c0.34							0.32	
v/c Ratio		0.34		0.61	0.42						0.93	
Uniform Delay, d1		12.5		15.3	13.2						33.2	
Progression Factor		1.00		0.63	0.47						1.00	
Incremental Delay, d2		0.3		8.9	0.6						13.7	
Delay (s)		12.8		18.5	6.8						47.0	
Level of Service		B		B	A						D	
Approach Delay (s)		12.8			8.8			0.0			47.0	
Approach LOS		B			A			A			D	
Intersection Summary												
HCM 2000 Control Delay			23.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			105.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			114.1%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	109	12	7	2	0	0	0	0	10	705	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	115	13	7	2	0	0	0	0	11	742	3
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	769	768	377	463	769	0	748			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	769	768	377	463	769	0	748			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	65	98	98	99	100	100			99		
cM capacity (veh/h)	276	332	625	347	331	1091	867			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	127	9	382	374								
Volume Left	0	7	11	0								
Volume Right	13	0	0	3								
cSH	348	343	1636	1700								
Volume to Capacity	0.37	0.03	0.01	0.22								
Queue Length 95th (ft)	41	2	0	0								
Control Delay (s)	21.2	15.8	0.3	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	21.2	15.8	0.1									
Approach LOS	C	C										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			33.2%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				 
Volume (vph)	168	117	0	0	132	157	123	373	111	109	0	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2746		1014	2884		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2746		1014	2884		1570		2349
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	177	123	0	0	139	165	129	393	117	115	0	256
RTOR Reduction (vph)	0	0	0	0	144	0	0	21	0	0	0	219
Lane Group Flow (vph)	177	123	0	0	160	0	116	502	0	115	0	37
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	17.1	17.1			9.5		18.1	18.1		10.8		10.8
Effective Green, g (s)	17.1	17.1			9.5		18.1	18.1		10.8		10.8
Actuated g/C Ratio	0.23	0.23			0.13		0.24	0.24		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	262	723			345		243	691		224		336
v/s Ratio Prot	c0.15	0.04			c0.06		0.11	c0.17		c0.07		0.02
v/s Ratio Perm												
v/c Ratio	0.68	0.17			0.46		0.48	0.73		0.51		0.11
Uniform Delay, d1	26.7	23.5			30.6		24.6	26.4		29.9		28.2
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	6.7	0.1			1.0		6.6	6.6		2.0		0.1
Delay (s)	33.4	23.6			31.6		31.2	33.0		31.9		28.3
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		29.4			31.6			32.7			29.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			75.5				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			52.4%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park

Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	201	233	43	34	71	98	7	269	185	245	150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	212	245	45	36	75	103	7	283	195	258	158	0
RTOR Reduction (vph)	0	0	30	0	0	90	0	102	0	0	0	0
Lane Group Flow (vph)	212	245	15	36	75	13	7	376	0	258	158	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.17	c0.10		0.03	0.03		0.01	c0.19		c0.21	0.08	
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.52	0.32	0.05	0.26	0.27	0.10	0.03	0.79		1.52	0.60	
Uniform Delay, d1	33.0	30.5	27.8	47.5	47.6	46.5	34.7	42.6		51.5	48.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	1.1	0.4	4.5	2.4	1.5	0.2	12.5		260.7	9.6	
Delay (s)	37.8	31.6	28.2	52.0	50.0	48.0	35.0	55.1		312.2	57.9	
Level of Service	D	C	C	D	D	D	C	E		F	E	
Approach Delay (s)		33.9			49.4			54.8			215.6	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			89.0			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			58.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	91	826	72	99	967	84	49	329	91	104	304	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3379		1770	3473		1770	1770		1770	1717	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3379		1770	3473		1770	1770		1770	1717	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	96	869	76	104	1018	88	52	346	96	109	320	123
RTOR Reduction (vph)	0	7	0	0	7	0	0	10	0	0	14	0
Lane Group Flow (vph)	96	938	0	104	1099	0	52	432	0	109	429	0
Confl. Peds. (#/hr)	20		12	12		20	17		11	11		17
Confl. Bikes (#/hr)			10			8			12			9
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.2	34.9		4.0	32.7		3.9	33.1		4.0	33.2	
Effective Green, g (s)	6.2	34.9		4.0	32.7		3.9	33.1		4.0	33.2	
Actuated g/C Ratio	0.07	0.37		0.04	0.35		0.04	0.35		0.04	0.35	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	116	1254		75	1208		73	623		75	606	
v/s Ratio Prot	0.05	0.28		c0.06	c0.32		0.03	0.24		c0.06	c0.25	
v/s Ratio Perm												
v/c Ratio	0.83	0.75		1.39	0.91		0.71	0.69		1.45	0.71	
Uniform Delay, d1	43.4	25.7		45.0	29.2		44.5	26.1		45.0	26.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.2	2.5		237.1	10.3		27.8	6.2		263.6	6.8	
Delay (s)	79.5	28.2		282.1	39.5		72.3	32.3		308.6	33.0	
Level of Service	E	C		F	D		E	C		F	C	
Approach Delay (s)		32.9			60.4			36.5			87.4	
Approach LOS		C			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			52.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			94.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			82.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	245	15	7	1006	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	253	15	7	1037	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	694	1069	16	1053	1069	523	16			1038		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	694	1069	16	1053	1069	523	16			1038		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	100	0	97	100			100		
cM capacity (veh/h)	0	222	1066	182	222	504	1615			677		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	168	100	353	691								
Volume Left	0	0	7	0								
Volume Right	0	15	0	0								
cSH	222	243	1615	1700								
Volume to Capacity	0.76	0.41	0.00	0.41								
Queue Length 95th (ft)	132	47	0	0								
Control Delay (s)	58.9	29.7	0.2	0.0								
Lane LOS	F	D	A									
Approach Delay (s)	48.0		0.1									
Approach LOS	E											
Intersection Summary												
Average Delay			9.9									
Intersection Capacity Utilization			42.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  			 				
Volume (vph)	425	546	0	0	798	171	150	684	186	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.91			0.95				
Frpb, ped/bikes	1.00	1.00			1.00			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.97			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1702	3406			4868			3346				
Flt Permitted	0.24	1.00			1.00			0.99				
Satd. Flow (perm)	430	3406			4868			3346				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	443	569	0	0	831	178	156	712	194	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	18	0	0	0	0
Lane Group Flow (vph)	443	569	0	0	980	0	0	1044	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)	59.0	59.0			59.0			36.0				
Effective Green, g (s)	59.0	59.0			59.0			36.0				
Actuated g/C Ratio	0.56	0.56			0.56			0.34				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	241	1913			2735			1147				
v/s Ratio Prot		0.17			0.20							
v/s Ratio Perm	c1.03							0.31				
v/c Ratio	1.84	0.30			0.36			0.91				
Uniform Delay, d1	23.0	12.1			12.6			33.0				
Progression Factor	0.80	0.49			1.00			1.00				
Incremental Delay, d2	391.5	0.4			0.4			10.6				
Delay (s)	410.0	6.3			13.0			43.5				
Level of Service	F	A			B			D				
Approach Delay (s)		183.0			13.0			43.5			0.0	
Approach LOS		F			B			D			A	
Intersection Summary												
HCM 2000 Control Delay			79.3			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.48									
Actuated Cycle Length (s)			105.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			114.1%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

13: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Park PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	109	0	0	0	2	7	8	904	3	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	115	0	0	0	2	7	8	952	3	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	514	985	12	971	983	479	12			956		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	514	985	12	971	983	479	12			956		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	100	100	100	99	99	99			100		
cM capacity (veh/h)	412	246	1061	207	247	537	1604			727		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	115	9	484	479								
Volume Left	115	0	8	0								
Volume Right	0	7	0	3								
cSH	412	426	1604	1700								
Volume to Capacity	0.28	0.02	0.01	0.28								
Queue Length 95th (ft)	28	2	0	0								
Control Delay (s)	17.1	13.6	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	17.1	13.6	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			44.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	0	54	0	0	0	45	181	0	0	91	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.96	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.90	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1776	1550				1520	3471			2983	
Flt Permitted		0.76	1.00				0.56	1.00			1.00	
Satd. Flow (perm)		1415	1550				898	3471			2983	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	0	57	0	0	0	47	191	0	0	96	217
RTOR Reduction (vph)	0	0	34	0	0	0	0	0	0	0	120	0
Lane Group Flow (vph)	0	284	23	0	0	0	47	191	0	0	193	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0				29.0	29.0			29.0	
Effective Green, g (s)		26.0	26.0				29.0	29.0			29.0	
Actuated g/C Ratio		0.40	0.40				0.45	0.45			0.45	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		566	620				400	1548			1330	
v/s Ratio Prot								0.06			c0.06	
v/s Ratio Perm		c0.20	0.01				0.05					
v/c Ratio		0.50	0.04				0.12	0.12			0.14	
Uniform Delay, d1		14.6	11.9				10.5	10.5			10.7	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		3.2	0.1				0.6	0.2			0.2	
Delay (s)		17.8	12.0				11.1	10.7			10.9	
Level of Service		B	B				B	B			B	
Approach Delay (s)		16.8			0.0			10.8			10.9	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			60.8%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	277	96	176	811	34	121	20	261	57	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1474	1687	3409		1649	1489	1449	1433	1344	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1474	1687	3409		1649	1489	1449	1433	1344	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	292	101	185	854	36	127	21	275	60	19	31
RTOR Reduction (vph)	0	0	72	0	3	0	0	0	181	0	28	0
Lane Group Flow (vph)	44	292	29	185	887	0	74	74	94	60	22	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	4.7	29.2	29.2	9.4	33.9		34.6	34.6	34.6	8.2	8.2	
Effective Green, g (s)	4.7	29.2	29.2	9.4	33.9		34.6	34.6	34.6	8.2	8.2	
Actuated g/C Ratio	0.05	0.29	0.29	0.09	0.33		0.34	0.34	0.34	0.08	0.08	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	62	999	424	156	1139		562	508	494	115	108	
v/s Ratio Prot	0.03	0.08		c0.11	c0.26		0.04	0.05		c0.04	0.02	
v/s Ratio Perm			0.02						c0.06			
v/c Ratio	0.71	0.29	0.07	1.19	0.78		0.13	0.15	0.19	0.52	0.20	
Uniform Delay, d1	47.7	28.1	26.2	46.0	30.4		23.0	23.2	23.5	44.7	43.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	31.0	0.2	0.1	130.7	3.4		0.5	0.6	0.9	4.2	0.9	
Delay (s)	78.7	28.2	26.3	176.7	33.8		23.5	23.8	24.4	48.9	44.4	
Level of Service	E	C	C	F	C		C	C	C	D	D	
Approach Delay (s)		32.9			58.4			24.1			46.9	
Approach LOS		C			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			45.2			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			101.4			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			65.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Volume (vph)	86	366	98	185	851	318	137	143	213	156	116	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.91		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3291		1703	3505	1543	1583	3043		1736	2840	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3291		1703	3505	1543	1583	3043		1736	2840	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	91	385	103	195	896	335	144	151	224	164	122	56
RTOR Reduction (vph)	0	25	0	0	0	279	0	189	0	0	47	0
Lane Group Flow (vph)	91	463	0	195	896	56	144	186	0	164	131	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.31	0.31		0.17	0.17	0.17	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	496	1004		286	590	259	249	480		274	448	
v/s Ratio Prot	0.06	c0.14		0.11	c0.26		c0.09	0.06		c0.09	0.05	
v/s Ratio Perm						0.04						
v/c Ratio	0.18	0.46		0.68	1.52	0.22	0.58	0.39		0.60	0.29	
Uniform Delay, d1	24.3	26.7		37.1	39.5	34.1	37.1	35.9		37.2	35.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.5		12.4	242.0	1.9	9.4	2.4		9.3	1.6	
Delay (s)	25.1	28.2		49.5	281.5	36.0	46.5	38.2		46.5	37.0	
Level of Service	C	C		D	F	D	D	D		D	D	
Approach Delay (s)		27.7			192.1			40.5			41.5	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			113.5			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			95.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			70.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Campbell St. & W. Grand Ave

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	55	710	55	30	1151	8	72	7	39	5	17	151
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	57	732	57	31	1187	8	74	7	40	5	18	156
Pedestrians		2										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)		1120			405							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	1195			789			1695	2130	394	1776	2155	599
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	868			789			1459	1973	394	1554	2002	165
tC, single (s)	4.9			4.2			7.5	6.5	7.0	8.2	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.6			2.3			3.5	4.0	3.3	3.8	4.0	3.3
p0 queue free %	88			96			0	84	93	85	60	78
cM capacity (veh/h)	477			795			36	45	599	35	43	716
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	423	423	624	602	122	178						
Volume Left	57	0	31	0	74	5						
Volume Right	0	57	0	8	40	156						
cSH	477	1700	795	1700	54	232						
Volume to Capacity	0.12	0.25	0.04	0.35	2.26	0.77						
Queue Length 95th (ft)	10	0	3	0	305	137						
Control Delay (s)	3.6	0.0	1.0	0.0	741.3	58.5						
Lane LOS	A		A		F	F						
Approach Delay (s)	1.8		0.5		741.3	58.5						
Approach LOS					F	F						
Intersection Summary												
Average Delay			43.3									
Intersection Capacity Utilization			86.8%		ICU Level of Service		E					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Park SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	220	0	0	0	0	750
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	232	0	0	0	0	789
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	395	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	395	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	60	100			100	
cM capacity (veh/h)	574	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	116	116	395	395		
Volume Left	116	116	0	0		
Volume Right	0	0	0	0		
cSH	574	574	1700	1700		
Volume to Capacity	0.20	0.20	0.23	0.23		
Queue Length 95th (ft)	19	19	0	0		
Control Delay (s)	12.8	12.8	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	12.8		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			33.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑	↑↑						↑↑	
Volume (vph)	0	445	125	185	737	0	0	0	0	156	496	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4700		1767	3539						3254	
Flt Permitted		1.00		0.40	1.00						0.99	
Satd. Flow (perm)		4700		740	3539						3254	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	468	132	195	776	0	0	0	0	164	522	326
RTOR Reduction (vph)	0	60	0	0	0	0	0	0	0	0	62	0
Lane Group Flow (vph)	0	540	0	195	776	0	0	0	0	0	950	0
Confl. Peds. (#/hr)			4	4						4		2
Confl. Bikes (#/hr)			3			2						21
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		38.0		38.0	38.0						37.0	
Effective Green, g (s)		38.0		38.0	38.0						37.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.44	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		2101		330	1582						1416	
v/s Ratio Prot		0.11			0.22							
v/s Ratio Perm				c0.26							0.29	
v/c Ratio		0.26		0.59	0.49						0.67	
Uniform Delay, d1		14.7		17.7	16.6						19.1	
Progression Factor		1.00		0.42	0.34						1.00	
Incremental Delay, d2		0.3		2.6	0.2						2.5	
Delay (s)		15.0		10.0	5.9						21.7	
Level of Service		B		A	A						C	
Approach Delay (s)		15.0			6.7			0.0			21.7	
Approach LOS		B			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			14.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			105.4%			ICU Level of Service			G			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	97	2	24	8	0	15	0	0	0	42	571	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	102	2	25	8	0	16	0	0	0	44	601	18
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	714	698	310	416	707	0	619			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	714	698	310	416	707	0	619			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	66	99	96	98	100	99	100			97		
cM capacity (veh/h)	297	357	691	480	353	1091	971			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	129	24	345	318								
Volume Left	102	8	44	0								
Volume Right	25	16	0	18								
cSH	335	756	1636	1700								
Volume to Capacity	0.39	0.03	0.03	0.19								
Queue Length 95th (ft)	44	2	2	0								
Control Delay (s)	22.4	9.9	1.1	0.0								
Lane LOS	C	A	A									
Approach Delay (s)	22.4	9.9	0.6									
Approach LOS	C	A										
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			37.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	37	0	0	177	159	86	202	172	86	0	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3077		1441	2981		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3077		1441	2981		1543		2682
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	39	0	0	186	167	91	213	181	91	0	256
RTOR Reduction (vph)	0	0	0	0	139	0	0	125	0	0	0	231
Lane Group Flow (vph)	22	39	0	0	214	0	82	278	0	91	0	25
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.6	3.6			8.9		16.4	16.4		5.1		5.1
Effective Green, g (s)	3.6	3.6			8.9		16.4	16.4		5.1		5.1
Actuated g/C Ratio	0.07	0.07			0.17		0.31	0.31		0.10		0.10
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	110	235			516		445	922		148		258
v/s Ratio Prot	c0.01	0.01			c0.07		0.06	c0.09		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.20	0.17			0.41		0.18	0.30		0.61		0.10
Uniform Delay, d1	23.3	23.3			19.7		13.4	13.9		23.0		21.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.9	0.3			0.5		0.9	0.8		7.4		0.2
Delay (s)	24.2	23.6			20.3		14.3	14.8		30.4		22.0
Level of Service	C	C			C		B	B		C		C
Approach Delay (s)		23.8			20.3			14.7			24.2	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			53.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			43.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	36	1	19	36	90	0	11	31	78	15	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	794	1357	3471	1328		2621		1703	2356	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	794	1357	3471	1328		2621		1703	2356	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	38	1	20	38	95	0	12	33	82	16	1
RTOR Reduction (vph)	0	0	1	0	0	57	0	23	0	0	1	0
Lane Group Flow (vph)	14	38	0	20	38	38	0	22	0	82	16	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	4.0	39.0	39.0	5.0	40.0	40.0		30.0		6.0	32.0	
Effective Green, g (s)	4.0	39.0	39.0	5.0	40.0	40.0		30.0		6.0	32.0	
Actuated g/C Ratio	0.04	0.39	0.39	0.05	0.40	0.40		0.30		0.06	0.32	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	72	1407	309	67	1388	531		786		102	753	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.05	0.01	
v/s Ratio Perm			0.00			c0.03						
v/c Ratio	0.19	0.03	0.00	0.30	0.03	0.07		0.03		0.80	0.02	
Uniform Delay, d1	46.4	18.8	18.6	45.8	18.2	18.5		24.7		46.4	23.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.0	0.0	11.0	0.0	0.3		0.1		47.2	0.1	
Delay (s)	52.4	18.8	18.6	56.9	18.2	18.8		24.8		93.6	23.3	
Level of Service	D	B	B	E	B	B		C		F	C	
Approach Delay (s)		27.7			23.6			24.8			81.5	
Approach LOS		C			C			C			F	
Intersection Summary												
HCM 2000 Control Delay			40.8				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.12									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	602	32	76	823	81	59	165	59	101	217	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3445		1805	3451		1805	1813		1770	1729	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3445		1805	3451		1805	1813		1770	1729	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	89	608	32	77	831	82	60	167	60	102	219	135
RTOR Reduction (vph)	0	5	0	0	8	0	0	13	0	0	22	0
Lane Group Flow (vph)	89	635	0	77	905	0	60	214	0	102	332	0
Confl. Peds. (#/hr)	6		3	3		6	6		5	5		6
Confl. Bikes (#/hr)			15			13			14			11
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.0	32.1		4.0	30.1		6.1	33.0		4.0	30.9	
Effective Green, g (s)	6.0	32.1		4.0	30.1		6.1	33.0		4.0	30.9	
Actuated g/C Ratio	0.07	0.35		0.04	0.33		0.07	0.36		0.04	0.34	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	118	1213		79	1140		120	656		77	586	
v/s Ratio Prot	c0.05	0.18		0.04	c0.26		0.03	0.12		c0.06	c0.19	
v/s Ratio Perm												
v/c Ratio	0.75	0.52		0.97	0.79		0.50	0.33		1.32	0.57	
Uniform Delay, d1	41.8	23.4		43.5	27.7		41.0	21.0		43.5	24.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.5	0.4		92.0	3.9		3.3	1.3		211.9	3.9	
Delay (s)	65.4	23.8		135.5	31.6		44.3	22.3		255.4	28.6	
Level of Service	E	C		F	C		D	C		F	C	
Approach Delay (s)		28.9			39.7			26.9			79.3	
Approach LOS		C			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			42.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			91.1			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			77.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	215	12	5	570	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	226	13	5	600	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	441	617	3	614	617	305	3			603		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	441	617	3	614	617	305	3			603		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	44	98	100			100		
cM capacity (veh/h)	275	406	1086	368	406	695	1632			982		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	151	88	205	400								
Volume Left	0	0	5	0								
Volume Right	0	13	0	0								
cSH	406	432	1632	1700								
Volume to Capacity	0.37	0.20	0.00	0.24								
Queue Length 95th (ft)	42	19	0	0								
Control Delay (s)	19.0	15.5	0.2	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	17.7		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			33.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  			 				
Volume (vph)	214	387	0	0	808	108	116	353	131	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.91			0.95				
Frpb, ped/bikes	1.00	1.00			1.00			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.98			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1752	3374			4987			3393				
Flt Permitted	0.24	1.00			1.00			0.99				
Satd. Flow (perm)	435	3374			4987			3393				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	225	407	0	0	851	114	122	372	138	0	0	0
RTOR Reduction (vph)	0	0	0	0	20	0	0	30	0	0	0	0
Lane Group Flow (vph)	225	407	0	0	945	0	0	602	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)	38.0	38.0			38.0			37.0				
Effective Green, g (s)	38.0	38.0			38.0			37.0				
Actuated g/C Ratio	0.45	0.45			0.45			0.44				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	194	1508			2229			1476				
v/s Ratio Prot		0.12			0.19							
v/s Ratio Perm	c0.52							0.18				
v/c Ratio	1.16	0.27			0.42			0.41				
Uniform Delay, d1	23.5	14.8			16.0			16.5				
Progression Factor	0.81	0.64			1.00			1.00				
Incremental Delay, d2	112.4	0.4			0.1			0.2				
Delay (s)	131.4	9.9			16.2			16.7				
Level of Service	F	A			B			B				
Approach Delay (s)		53.2			16.2			16.7			0.0	
Approach LOS		D			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			26.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			85.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			105.4%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Park SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	99	0	0	2	0	5	455	35	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	104	0	0	2	0	5	479	37	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	260	548	9	573	530	271	9			529		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	260	548	9	573	530	271	9			529		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	76	100	100	100	100	100			100		
cM capacity (veh/h)	654	437	1069	323	448	725	1612			1037		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	104	2	245	276								
Volume Left	0	0	5	0								
Volume Right	0	0	0	37								
cSH	437	448	1612	1700								
Volume to Capacity	0.24	0.00	0.00	0.16								
Queue Length 95th (ft)	23	0	0	0								
Control Delay (s)	15.8	13.1	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	15.8	13.1	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization			25.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	0	10	0	0	0	7	724	2	0	141	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.99				1.00	1.00			1.00	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.99	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1767	1199				1202	2735			2461	
Flt Permitted		0.76	1.00				0.65	1.00			1.00	
Satd. Flow (perm)		1408	1199				820	2735			2461	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	115	0	11	0	0	0	7	762	2	0	148	16
RTOR Reduction (vph)	0	0	7	0	0	0	0	1	0	0	9	0
Lane Group Flow (vph)	0	115	4	0	0	0	7	763	0	0	155	0
Confl. Peds. (#/hr)	2		1	1		2	1		2	2		1
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		25.0	25.0				30.0	30.0			30.0	
Effective Green, g (s)		25.0	25.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.38	0.38				0.46	0.46			0.46	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		541	461				378	1262			1135	
v/s Ratio Prot								c0.28			0.06	
v/s Ratio Perm		c0.08	0.00				0.01					
v/c Ratio		0.21	0.01				0.02	0.60			0.14	
Uniform Delay, d1		13.4	12.4				9.5	13.1			10.1	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.9	0.0				0.1	2.2			0.3	
Delay (s)		14.3	12.4				9.6	15.2			10.3	
Level of Service		B	B				A	B			B	
Approach Delay (s)		14.1			0.0			15.2			10.3	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.3				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	395	118	66	902	52	407	84	249	89	34	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1495	1433	3360		1618	1346	1302	1517	1397	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1495	1433	3360		1618	1346	1302	1517	1397	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	416	124	69	949	55	428	88	262	94	36	76
RTOR Reduction (vph)	0	0	86	0	4	0	0	0	193	0	68	0
Lane Group Flow (vph)	8	416	38	69	1000	0	257	259	69	94	44	0
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	0.7	24.2	24.2	5.6	29.1		20.9	20.9	20.9	8.2	8.2	
Effective Green, g (s)	0.7	24.2	24.2	5.6	29.1		20.9	20.9	20.9	8.2	8.2	
Actuated g/C Ratio	0.01	0.31	0.31	0.07	0.37		0.26	0.26	0.26	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	13	1075	458	101	1239		428	356	344	157	145	
v/s Ratio Prot	0.01	0.12		c0.05	c0.30		0.16	c0.19		c0.06	0.03	
v/s Ratio Perm			0.03						0.05			
v/c Ratio	0.62	0.39	0.08	0.68	0.81		0.60	0.73	0.20	0.60	0.30	
Uniform Delay, d1	39.0	21.5	19.5	35.8	22.4		25.4	26.4	22.5	33.8	32.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.0	0.2	0.1	17.4	3.9		2.4	7.2	0.3	15.7	5.3	
Delay (s)	103.0	21.7	19.5	53.2	26.3		27.7	33.6	22.8	49.5	38.0	
Level of Service	F	C	B	D	C		C	C	C	D	D	
Approach Delay (s)		22.4			28.0			28.0			43.3	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			28.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			78.9			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			62.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

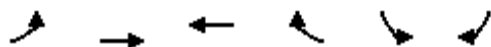
Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	477	116	243	842	284	129	232	490	179	101	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3179		1626	3438	1495	1444	2823		1612	2822	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3179		1626	3438	1495	1444	2823		1612	2822	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	153	492	120	251	868	293	133	239	505	185	104	25
RTOR Reduction (vph)	0	22	0	0	0	244	0	339	0	0	21	0
Lane Group Flow (vph)	153	590	0	251	868	49	133	405	0	185	108	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.31	0.31		0.17	0.17	0.17	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	437	970		273	579	251	228	445		254	445	
v/s Ratio Prot	0.11	c0.19		0.15	c0.25		0.09	c0.14		c0.11	0.04	
v/s Ratio Perm						0.03						
v/c Ratio	0.35	0.61		0.92	1.50	0.20	0.58	0.91		0.73	0.24	
Uniform Delay, d1	25.7	28.2		38.9	39.5	34.0	37.1	39.3		38.1	35.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	2.8		37.2	233.6	1.7	10.5	25.4		16.7	1.3	
Delay (s)	27.9	31.0		76.0	273.1	35.7	47.6	64.7		54.8	36.3	
Level of Service	C	C		E	F	D	D	E		D	D	
Approach Delay (s)		30.4			188.8			62.1			47.2	
Approach LOS		C			F			E			D	
Intersection Summary												
HCM 2000 Control Delay			106.6			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			95.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			86.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Cumulative Plus Connection PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	135	1075	1108	43	3	265
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	142	1132	1166	45	3	279
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.87				0.89	0.87
vC, conflicting volume	1214				2041	608
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	954				1776	260
tC, single (s)	4.9				6.8	7.1
tC, 2 stage (s)						
tF (s)	2.6				3.5	3.4
p0 queue free %	69				93	55
cM capacity (veh/h)	456				46	621
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	519	754	778	434	282	
Volume Left	142	0	0	0	3	
Volume Right	0	0	0	45	279	
cSH	456	1700	1700	1700	545	
Volume to Capacity	0.31	0.44	0.46	0.26	0.52	
Queue Length 95th (ft)	33	0	0	0	74	
Control Delay (s)	9.3	0.0	0.0	0.0	18.5	
Lane LOS	A				C	
Approach Delay (s)	3.8		0.0		18.5	
Approach LOS					C	
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			92.2%		ICU Level of Service	F
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

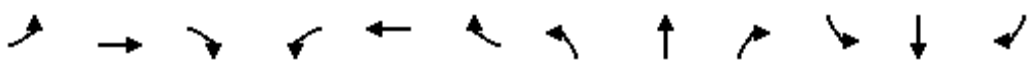
Gateway Park
Cumulative Plus Connection PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	252	0	0	0	0	813
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	260	0	0	0	0	838
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	419	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	419	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	53	100			100	
cM capacity (veh/h)	557	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	130	130	419	419		
Volume Left	130	130	0	0		
Volume Right	0	0	0	0		
cSH	557	557	1700	1700		
Volume to Capacity	0.23	0.23	0.25	0.25		
Queue Length 95th (ft)	22	22	0	0		
Control Delay (s)	13.4	13.4	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	13.4		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			42.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑↑	
Volume (vph)	0	726	183	175	762	0	0	0	0	189	625	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		0.99		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3282		1763	3471						3345	
Flt Permitted		1.00		0.24	1.00						0.99	
Satd. Flow (perm)		3282		441	3471						3345	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	756	191	182	794	0	0	0	0	197	651	247
RTOR Reduction (vph)	0	21	0	0	0	0	0	0	0	0	26	0
Lane Group Flow (vph)	0	926	0	182	794	0	0	0	0	0	1069	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			75			75						50
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		59.0		59.0	59.0						36.0	
Effective Green, g (s)		59.0		59.0	59.0						36.0	
Actuated g/C Ratio		0.56		0.56	0.56						0.34	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1844		247	1950						1146	
v/s Ratio Prot		0.28			0.23							
v/s Ratio Perm				0.41							0.32	
v/c Ratio		0.50		0.74	0.41						0.93	
Uniform Delay, d1		14.0		17.2	13.1						33.3	
Progression Factor		1.00		0.64	0.46						1.00	
Incremental Delay, d2		1.0		14.7	0.5						14.7	
Delay (s)		15.0		25.7	6.6						48.1	
Level of Service		B		C	A						D	
Approach Delay (s)		15.0			10.1			0.0			48.1	
Approach LOS		B			B			A			D	
Intersection Summary												
HCM 2000 Control Delay			25.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			105.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			128.6%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 7: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	161	12	7	2	0	0	0	0	10	705	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	169	13	7	2	0	0	0	0	11	742	3
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	769	768	377	490	769	0	748			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	769	768	377	490	769	0	748			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	49	98	97	99	100	100			99		
cM capacity (veh/h)	276	332	625	271	331	1091	867			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	182	9	382	374								
Volume Left	0	7	11	0								
Volume Right	13	0	0	3								
cSH	343	282	1636	1700								
Volume to Capacity	0.53	0.03	0.01	0.22								
Queue Length 95th (ft)	74	3	0	0								
Control Delay (s)	26.8	18.2	0.3	0.0								
Lane LOS	D	C	A									
Approach Delay (s)	26.8	18.2	0.1									
Approach LOS	D	C										
Intersection Summary												
Average Delay			5.4									
Intersection Capacity Utilization			35.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				 
Volume (vph)	168	115	0	0	129	153	106	376	111	106	0	246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2746		1014	2890		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2746		1014	2890		1570		2349
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	177	121	0	0	136	161	112	396	117	112	0	259
RTOR Reduction (vph)	0	0	0	0	141	0	0	21	0	0	0	222
Lane Group Flow (vph)	177	121	0	0	156	0	101	503	0	112	0	37
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	17.1	17.1			9.3		18.1	18.1		10.7		10.7
Effective Green, g (s)	17.1	17.1			9.3		18.1	18.1		10.7		10.7
Actuated g/C Ratio	0.23	0.23			0.12		0.24	0.24		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	263	726			339		244	695		223		334
v/s Ratio Prot	c0.15	0.04			c0.06		0.10	c0.17		c0.07		0.02
v/s Ratio Perm												
v/c Ratio	0.67	0.17			0.46		0.41	0.72		0.50		0.11
Uniform Delay, d1	26.5	23.3			30.6		24.1	26.3		29.8		28.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	6.6	0.1			1.0		5.1	6.5		1.8		0.1
Delay (s)	33.1	23.4			31.6		29.2	32.7		31.6		28.2
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		29.2			31.6			32.2			29.3	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			75.2				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	201	233	43	34	71	78	7	269	185	232	150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	212	245	45	36	75	82	7	283	195	244	158	0
RTOR Reduction (vph)	0	0	30	0	0	72	0	102	0	0	0	0
Lane Group Flow (vph)	212	245	15	36	75	10	7	376	0	244	158	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.17	c0.10		0.03	0.03		0.01	c0.19		c0.20	0.08	
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.52	0.32	0.05	0.26	0.27	0.08	0.03	0.79		1.44	0.60	
Uniform Delay, d1	33.0	30.5	27.8	47.5	47.6	46.4	34.7	42.6		51.5	48.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	1.1	0.4	4.5	2.4	1.1	0.2	12.5		226.1	9.6	
Delay (s)	37.8	31.6	28.2	52.0	50.0	47.5	35.0	55.1		277.6	57.9	
Level of Service	D	C	C	D	D	D	C	E		F	E	
Approach Delay (s)		33.9			49.3			54.8			191.3	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			82.2									F
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			57.4%									B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	74	816	72	99	940	84	49	329	91	104	304	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3355		1770	3445		1770	1761		1770	1711	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3355		1770	3445		1770	1761		1770	1711	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	859	76	104	989	88	52	346	96	109	320	114
RTOR Reduction (vph)	0	7	0	0	7	0	0	10	0	0	13	0
Lane Group Flow (vph)	78	928	0	104	1070	0	52	432	0	109	421	0
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			75			75			20			20
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.4	34.9		4.0	33.5		3.9	33.1		4.0	33.2	
Effective Green, g (s)	5.4	34.9		4.0	33.5		3.9	33.1		4.0	33.2	
Actuated g/C Ratio	0.06	0.37		0.04	0.36		0.04	0.35		0.04	0.35	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	1245		75	1227		73	620		75	604	
v/s Ratio Prot	0.04	0.28		c0.06	c0.31		0.03	0.25		c0.06	c0.25	
v/s Ratio Perm												
v/c Ratio	0.77	0.75		1.39	0.87		0.71	0.70		1.45	0.70	
Uniform Delay, d1	43.7	25.7		45.0	28.2		44.5	26.1		45.0	26.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.9	2.5		237.1	7.1		27.8	6.4		263.6	6.5	
Delay (s)	73.6	28.2		282.1	35.3		72.3	32.5		308.6	32.6	
Level of Service	E	C		F	D		E	C		F	C	
Approach Delay (s)		31.7			57.0			36.7			88.0	
Approach LOS		C			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			51.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			94.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			81.6%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	245	15	7	1001	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	253	15	7	1032	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	691	1063	16	1047	1063	520	16			1033		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	691	1063	16	1047	1063	520	16			1033		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	100	0	97	100			100		
cM capacity (veh/h)	0	224	1066	184	224	506	1615			680		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	168	100	351	688								
Volume Left	0	0	7	0								
Volume Right	0	15	0	0								
cSH	224	245	1615	1700								
Volume to Capacity	0.75	0.41	0.00	0.40								
Queue Length 95th (ft)	130	47	0	0								
Control Delay (s)	57.9	29.4	0.2	0.0								
Lane LOS	F	D	A									
Approach Delay (s)	47.3		0.1									
Approach LOS	E											
Intersection Summary												
Average Delay			9.8									
Intersection Capacity Utilization			42.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Volume (vph)	420	495	0	0	762	171	175	684	211	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.97			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1696	3406			3356			3311				
Flt Permitted	0.23	1.00			1.00			0.99				
Satd. Flow (perm)	408	3406			3356			3311				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	438	516	0	0	794	178	182	712	220	0	0	0
RTOR Reduction (vph)	0	0	0	0	18	0	0	20	0	0	0	0
Lane Group Flow (vph)	438	516	0	0	954	0	0	1094	0	0	0	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			75			75			50			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)	59.0	59.0			59.0			36.0				
Effective Green, g (s)	59.0	59.0			59.0			36.0				
Actuated g/C Ratio	0.56	0.56			0.56			0.34				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	229	1913			1885			1135				
v/s Ratio Prot		0.15			0.28							
v/s Ratio Perm	c1.07							0.33				
v/c Ratio	1.91	0.27			0.51			0.96				
Uniform Delay, d1	23.0	11.9			14.1			33.9				
Progression Factor	0.78	0.52			1.00			1.00				
Incremental Delay, d2	423.6	0.3			1.0			18.5				
Delay (s)	441.6	6.5			15.1			52.3				
Level of Service	F	A			B			D				
Approach Delay (s)		206.3			15.1			52.3			0.0	
Approach LOS		F			B			D			A	
Intersection Summary												
HCM 2000 Control Delay			88.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.55									
Actuated Cycle Length (s)			105.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			128.6%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Connection PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	161	0	0	0	2	7	8	902	3	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	169	0	0	0	2	7	8	949	3	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	513	982	12	969	981	478	12			954		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	513	982	12	969	981	478	12			954		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	59	100	100	100	99	99	99			100		
cM capacity (veh/h)	413	247	1061	208	247	538	1604			728		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	169	9	483	478								
Volume Left	169	0	8	0								
Volume Right	0	7	0	3								
cSH	413	427	1604	1700								
Volume to Capacity	0.41	0.02	0.01	0.28								
Queue Length 95th (ft)	49	2	0	0								
Control Delay (s)	19.7	13.6	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	19.7	13.6	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			47.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	111	0	20	0	0	0	10	181	0	0	91	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	1.00				1.00	1.00			0.99	
Flpb, ped/bikes		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.95	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1805	1615				1543	3471			3139	
Flt Permitted		0.76	1.00				0.66	1.00			1.00	
Satd. Flow (perm)		1439	1615				1079	3471			3139	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	117	0	21	0	0	0	11	191	0	0	96	42
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	23	0
Lane Group Flow (vph)	0	117	8	0	0	0	11	191	0	0	115	0
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0				29.0	29.0			29.0	
Effective Green, g (s)		26.0	26.0				29.0	29.0			29.0	
Actuated g/C Ratio		0.40	0.40				0.45	0.45			0.45	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		575	646				481	1548			1400	
v/s Ratio Prot								c0.06			0.04	
v/s Ratio Perm		c0.08	0.01				0.01					
v/c Ratio		0.20	0.01				0.02	0.12			0.08	
Uniform Delay, d1		12.7	11.8				10.1	10.5			10.3	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.8	0.0				0.1	0.2			0.1	
Delay (s)		13.5	11.8				10.2	10.7			10.5	
Level of Service		B	B				B	B			B	
Approach Delay (s)		13.3			0.0			10.7			10.5	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			11.4				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.16									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			22.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	282	57	49	816	34	92	20	131	57	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1524	1687	3409		1649	1456	1495	1433	1344	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1524	1687	3409		1649	1456	1495	1433	1344	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	297	60	52	859	36	97	21	138	60	19	31
RTOR Reduction (vph)	0	0	41	0	3	0	0	0	90	0	29	0
Lane Group Flow (vph)	44	297	19	52	892	0	58	60	48	60	21	0
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	4.6	31.5	31.5	6.3	33.2		35.0	35.0	35.0	8.1	8.1	
Effective Green, g (s)	4.6	31.5	31.5	6.3	33.2		35.0	35.0	35.0	8.1	8.1	
Actuated g/C Ratio	0.05	0.31	0.31	0.06	0.33		0.35	0.35	0.35	0.08	0.08	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	61	1083	475	105	1121		572	505	518	115	107	
v/s Ratio Prot	c0.03	0.09		0.03	c0.26		0.04	c0.04		c0.04	0.02	
v/s Ratio Perm			0.01						0.03			
v/c Ratio	0.72	0.27	0.04	0.50	0.80		0.10	0.12	0.09	0.52	0.20	
Uniform Delay, d1	47.5	26.1	24.2	45.8	30.8		22.3	22.4	22.2	44.5	43.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	34.1	0.1	0.0	3.6	4.0		0.4	0.5	0.4	4.2	0.9	
Delay (s)	81.6	26.2	24.2	49.4	34.8		22.7	22.9	22.6	48.8	44.3	
Level of Service	F	C	C	D	C		C	C	C	D	D	
Approach Delay (s)		32.0			35.6			22.7			46.7	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			100.9			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			49.3%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

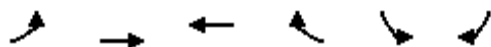
Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	267	91	195	753	326	129	143	223	164	116	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3197		1703	3505	1543	1583	3036		1736	2923	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3197		1703	3505	1543	1583	3036		1736	2923	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	281	96	205	793	343	136	151	235	173	122	39
RTOR Reduction (vph)	0	35	0	0	0	285	0	198	0	0	32	0
Lane Group Flow (vph)	71	342	0	205	793	58	136	188	0	173	129	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.31	0.31		0.17	0.17	0.17	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	496	975		286	590	259	249	479		274	461	
v/s Ratio Prot	0.04	c0.11		0.12	c0.23		c0.09	0.06		c0.10	0.04	
v/s Ratio Perm						0.04						
v/c Ratio	0.14	0.35		0.72	1.34	0.22	0.55	0.39		0.63	0.28	
Uniform Delay, d1	24.0	25.7		37.4	39.5	34.1	36.9	35.9		37.4	35.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.0		14.3	165.9	2.0	8.4	2.4		10.6	1.5	
Delay (s)	24.6	26.7		51.7	205.4	36.1	45.2	38.3		48.0	36.8	
Level of Service	C	C		D	F	D	D	D		D	D	
Approach Delay (s)		26.3			138.6			40.1			42.6	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			88.0			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			95.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			71.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Cumulative Plus Connection SAT



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	77	661	1089	57	5	205
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	79	681	1123	59	5	211
Pedestrians		2				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.86				0.86	0.86
vC, conflicting volume	1181				1652	593
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	878				1426	191
tC, single (s)	4.9				7.5	7.0
tC, 2 stage (s)						
tF (s)	2.6				3.8	3.3
p0 queue free %	83				92	70
cM capacity (veh/h)	478				68	698
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	307	454	748	433	216	
Volume Left	79	0	0	0	5	
Volume Right	0	0	0	59	211	
cSH	478	1700	1700	1700	572	
Volume to Capacity	0.17	0.27	0.44	0.25	0.38	
Queue Length 95th (ft)	15	0	0	0	44	
Control Delay (s)	5.6	0.0	0.0	0.0	15.1	
Lane LOS	A				C	
Approach Delay (s)	2.3		0.0		15.1	
Approach LOS					C	
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			75.6%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Connection SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	220	0	0	0	0	756
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	232	0	0	0	0	796
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	398	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	60	100			100	
cM capacity (veh/h)	572	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	116	116	398	398		
Volume Left	116	116	0	0		
Volume Right	0	0	0	0		
cSH	572	572	1700	1700		
Volume to Capacity	0.20	0.20	0.23	0.23		
Queue Length 95th (ft)	19	19	0	0		
Control Delay (s)	12.9	12.9	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	12.9		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			33.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	309	173	200	703	0	0	0	0	164	504	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		0.98		1.00	1.00						0.98	
Flpb, ped/bikes		1.00		0.99	1.00						1.00	
Frt		0.95		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3152		1757	3539						3224	
Flt Permitted		1.00		0.43	1.00						0.99	
Satd. Flow (perm)		3152		789	3539						3224	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	325	182	211	740	0	0	0	0	173	531	317
RTOR Reduction (vph)	0	91	0	0	0	0	0	0	0	0	61	0
Lane Group Flow (vph)	0	416	0	211	740	0	0	0	0	0	960	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			75			75						50
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6								
Actuated Green, G (s)		38.0		38.0	38.0						37.0	
Effective Green, g (s)		38.0		38.0	38.0						37.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.44	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1409		352	1582						1403	
v/s Ratio Prot		0.13			0.21							
v/s Ratio Perm				c0.27							0.30	
v/c Ratio		0.30		0.60	0.47						0.68	
Uniform Delay, d1		15.0		17.8	16.4						19.3	
Progression Factor		1.00		0.41	0.39						1.00	
Incremental Delay, d2		0.5		2.3	0.2						2.7	
Delay (s)		15.5		9.6	6.6						22.0	
Level of Service		B		A	A						C	
Approach Delay (s)		15.5			7.2			0.0			22.0	
Approach LOS		B			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			15.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			114.1%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	182	24	8	0	0	0	0	0	42	572	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	192	25	8	0	0	0	0	0	44	602	18
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	699	699	311	512	708	0	620			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	699	699	311	512	708	0	620			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	100	46	96	96	100	100	100			97		
cM capacity (veh/h)	309	356	691	237	352	1091	970			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	217	8	345	319								
Volume Left	0	8	44	0								
Volume Right	25	0	0	18								
cSH	378	237	1636	1700								
Volume to Capacity	0.57	0.04	0.03	0.19								
Queue Length 95th (ft)	86	3	2	0								
Control Delay (s)	26.6	20.7	1.1	0.0								
Lane LOS	D	C	A									
Approach Delay (s)	26.6	20.7	0.6									
Approach LOS	D	C										
Intersection Summary												
Average Delay			7.1									
Intersection Capacity Utilization			35.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park

Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	32	0	0	173	151	56	212	173	79	0	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3080		1441	2987		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3080		1441	2987		1543		2682
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	34	0	0	182	159	59	223	182	83	0	266
RTOR Reduction (vph)	0	0	0	0	133	0	0	126	0	0	0	240
Lane Group Flow (vph)	22	34	0	0	208	0	53	285	0	83	0	26
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.6	3.6			8.8		16.4	16.4		5.1		5.1
Effective Green, g (s)	3.6	3.6			8.8		16.4	16.4		5.1		5.1
Actuated g/C Ratio	0.07	0.07			0.17		0.31	0.31		0.10		0.10
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	110	236			512		446	926		148		258
v/s Ratio Prot	c0.01	0.01			c0.07		0.04	c0.10		c0.05		0.01
v/s Ratio Perm												
v/c Ratio	0.20	0.14			0.41		0.12	0.31		0.56		0.10
Uniform Delay, d1	23.3	23.2			19.7		13.1	13.9		22.8		21.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.9	0.3			0.5		0.5	0.9		4.8		0.2
Delay (s)	24.2	23.5			20.2		13.6	14.8		27.6		22.0
Level of Service	C	C			C		B	B		C		C
Approach Delay (s)		23.8			20.2			14.7			23.3	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.1				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			52.9				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			43.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	36	1	19	36	55	0	11	31	44	15	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	794	1357	3471	1328		2621		1703	2356	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	794	1357	3471	1328		2621		1703	2356	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	38	1	20	38	58	0	12	33	46	16	1
RTOR Reduction (vph)	0	0	1	0	0	35	0	23	0	0	1	0
Lane Group Flow (vph)	14	38	0	20	38	23	0	22	0	46	16	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	4.0	39.0	39.0	5.0	40.0	40.0		30.0		6.0	32.0	
Effective Green, g (s)	4.0	39.0	39.0	5.0	40.0	40.0		30.0		6.0	32.0	
Actuated g/C Ratio	0.04	0.39	0.39	0.05	0.40	0.40		0.30		0.06	0.32	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	72	1407	309	67	1388	531		786		102	753	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.03	0.01	
v/s Ratio Perm			0.00			c0.02						
v/c Ratio	0.19	0.03	0.00	0.30	0.03	0.04		0.03		0.45	0.02	
Uniform Delay, d1	46.4	18.8	18.6	45.8	18.2	18.3		24.7		45.4	23.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.0	0.0	11.0	0.0	0.2		0.1		13.7	0.1	
Delay (s)	52.4	18.8	18.6	56.9	18.2	18.5		24.8		59.1	23.3	
Level of Service	D	B	B	E	B	B		C		E	C	
Approach Delay (s)		27.7			25.0			24.8			49.5	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			31.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.08									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	578	32	76	786	81	59	165	59	101	217	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3426		1805	3407		1805	1802		1770	1710	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3426		1805	3407		1805	1802		1770	1710	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	44	584	32	77	794	82	60	167	60	102	219	119
RTOR Reduction (vph)	0	5	0	0	9	0	0	13	0	0	18	0
Lane Group Flow (vph)	44	611	0	77	867	0	60	214	0	102	320	0
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			75			75			20			20
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.3	28.3		4.1	29.1		4.4	34.2		4.1	33.9	
Effective Green, g (s)	3.3	28.3		4.1	29.1		4.4	34.2		4.1	33.9	
Actuated g/C Ratio	0.04	0.32		0.05	0.33		0.05	0.39		0.05	0.38	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	67	1093		83	1117		89	694		81	653	
v/s Ratio Prot	0.02	0.18		c0.04	c0.25		0.03	0.12		c0.06	c0.19	
v/s Ratio Perm												
v/c Ratio	0.66	0.56		0.93	0.78		0.67	0.31		1.26	0.49	
Uniform Delay, d1	42.1	25.0		42.2	26.9		41.4	19.0		42.3	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.8	0.6		74.1	3.5		18.3	1.2		184.8	2.6	
Delay (s)	63.0	25.7		116.2	30.3		59.7	20.2		227.1	23.5	
Level of Service	E	C		F	C		E	C		F	C	
Approach Delay (s)		28.1			37.3			28.4			70.7	
Approach LOS		C			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			39.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			88.7			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			77.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	215	12	5	557	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	226	13	5	586	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	434	603	3	600	603	298	3			589		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	434	603	3	600	603	298	3			589		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	45	98	100			100		
cM capacity (veh/h)	283	413	1086	376	413	702	1632			993		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	151	88	201	391								
Volume Left	0	0	5	0								
Volume Right	0	13	0	0								
cSH	413	439	1632	1700								
Volume to Capacity	0.36	0.20	0.00	0.23								
Queue Length 95th (ft)	41	18	0	0								
Control Delay (s)	18.6	15.2	0.2	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	17.4		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			33.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Volume (vph)	201	273	0	0	755	108	150	353	178	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			1.00			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.98			0.96				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1752	3374			3467			3361				
Flt Permitted	0.21	1.00			1.00			0.99				
Satd. Flow (perm)	396	3374			3467			3361				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	212	287	0	0	795	114	158	372	187	0	0	0
RTOR Reduction (vph)	0	0	0	0	13	0	0	42	0	0	0	0
Lane Group Flow (vph)	212	287	0	0	896	0	0	675	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)	38.0	38.0			38.0			37.0				
Effective Green, g (s)	38.0	38.0			38.0			37.0				
Actuated g/C Ratio	0.45	0.45			0.45			0.44				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	177	1508			1549			1463				
v/s Ratio Prot		0.09			0.26							
v/s Ratio Perm	c0.54							0.20				
v/c Ratio	1.20	0.19			0.58			0.46				
Uniform Delay, d1	23.5	14.2			17.5			17.0				
Progression Factor	0.98	0.86			1.00			1.00				
Incremental Delay, d2	127.7	0.3			0.5			0.2				
Delay (s)	150.8	12.5			18.1			17.2				
Level of Service	F	B			B			B				
Approach Delay (s)		71.3			18.1			17.2			0.0	
Approach LOS		E			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			30.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			85.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			114.1%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Connection SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	182	0	0	0	2	0	5	453	35	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	192	0	0	0	2	0	5	477	37	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	259	546	9	519	528	270	9			527		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	259	546	9	519	528	270	9			527		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	100	100	100	100	100	100			100		
cM capacity (veh/h)	655	438	1069	432	449	726	1612			1039		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	192	2	244	275								
Volume Left	192	0	5	0								
Volume Right	0	0	0	37								
cSH	655	449	1612	1700								
Volume to Capacity	0.29	0.00	0.00	0.16								
Queue Length 95th (ft)	30	0	0	0								
Control Delay (s)	12.8	13.1	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.8	13.1	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			37.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	0	23	0	0	0	27	724	2	0	141	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.97	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.94	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1741	1165				1184	2735			2575	
Flt Permitted		0.76	1.00				0.59	1.00			1.00	
Satd. Flow (perm)		1388	1165				736	2735			2575	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	180	0	24	0	0	0	28	762	2	0	148	113
RTOR Reduction (vph)	0	0	15	0	0	0	0	1	0	0	61	0
Lane Group Flow (vph)	0	180	9	0	0	0	28	763	0	0	200	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	2%	0%	33%	0%	0%	0%	50%	32%	0%	0%	49%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		25.0	25.0				30.0	30.0			30.0	
Effective Green, g (s)		25.0	25.0				30.0	30.0			30.0	
Actuated g/C Ratio		0.38	0.38				0.46	0.46			0.46	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		533	448				339	1262			1188	
v/s Ratio Prot							c0.28				0.08	
v/s Ratio Perm		c0.13	0.01				0.04					
v/c Ratio		0.34	0.02				0.08	0.60			0.17	
Uniform Delay, d1		14.1	12.4				9.8	13.1			10.2	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		1.7	0.1				0.5	2.2			0.3	
Delay (s)		15.9	12.5				10.3	15.2			10.5	
Level of Service		B	B				B	B			B	
Approach Delay (s)		15.5		0.0			15.1				10.5	
Approach LOS		B		A			B				B	
Intersection Summary												
HCM 2000 Control Delay		14.2		HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio		0.48										
Actuated Cycle Length (s)		65.0		Sum of lost time (s)			10.0					
Intersection Capacity Utilization		51.7%		ICU Level of Service			A					
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	395	140	137	902	52	418	84	300	89	34	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1504	3505	1442	1433	3360		1618	1351	1267	1517	1397	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1504	3505	1442	1433	3360		1618	1351	1267	1517	1397	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	416	147	144	949	55	440	88	316	94	36	76
RTOR Reduction (vph)	0	0	111	0	4	0	0	0	218	0	68	0
Lane Group Flow (vph)	8	416	36	144	1000	0	264	264	98	94	44	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	20%	3%	8%	26%	3%	68%	6%	76%	24%	19%	50%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	0.7	19.7	19.7	10.7	29.7		21.6	21.6	21.6	8.2	8.2	
Effective Green, g (s)	0.7	19.7	19.7	10.7	29.7		21.6	21.6	21.6	8.2	8.2	
Actuated g/C Ratio	0.01	0.25	0.25	0.13	0.37		0.27	0.27	0.27	0.10	0.10	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	13	860	354	191	1244		435	363	341	155	142	
v/s Ratio Prot	0.01	0.12		c0.10	c0.30		0.16	c0.20		c0.06	0.03	
v/s Ratio Perm			0.03						0.08			
v/c Ratio	0.62	0.48	0.10	0.75	0.80		0.61	0.73	0.29	0.61	0.31	
Uniform Delay, d1	39.6	25.9	23.4	33.5	22.6		25.6	26.6	23.2	34.5	33.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.0	0.4	0.1	15.5	3.9		2.4	7.1	0.5	16.4	5.5	
Delay (s)	103.7	26.3	23.5	48.9	26.5		28.0	33.7	23.7	50.8	38.9	
Level of Service	F	C	C	D	C		C	C	C	D	D	
Approach Delay (s)		26.7			29.3			28.2			44.4	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			29.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			80.2			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			65.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

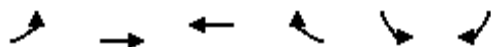
Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	156	517	119	243	899	284	133	232	490	179	101	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.90		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1433	3186		1626	3438	1495	1444	2823		1612	2762	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1433	3186		1626	3438	1495	1444	2823		1612	2762	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	161	533	123	251	927	293	137	239	505	185	104	34
RTOR Reduction (vph)	0	21	0	0	0	244	0	331	0	0	29	0
Lane Group Flow (vph)	161	635	0	251	927	49	137	413	0	185	109	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75									
Heavy Vehicles (%)	26%	8%	10%	11%	5%	8%	25%	23%	11%	12%	18%	50%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.31	0.31		0.17	0.17	0.17	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	437	972		273	579	251	228	445		254	436	
v/s Ratio Prot	0.11	c0.20		0.15	c0.27		0.09	c0.15		c0.11	0.04	
v/s Ratio Perm						0.03						
v/c Ratio	0.37	0.65		0.92	1.60	0.20	0.60	0.93		0.73	0.25	
Uniform Delay, d1	25.8	28.6		38.9	39.5	34.0	37.2	39.5		38.1	35.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	3.4		37.2	278.5	1.7	11.2	28.0		16.7	1.4	
Delay (s)	28.2	32.1		76.0	318.0	35.7	48.4	67.5		54.8	36.5	
Level of Service	C	C		E	F	D	D	E		D	D	
Approach Delay (s)		31.3			220.5			64.5			46.9	
Approach LOS		C			F			E			D	
Intersection Summary												
HCM 2000 Control Delay			120.8			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			95.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			86.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Cumulative Plus Both PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	135	1115	1165	43	3	265
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	142	1174	1226	45	3	279
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.86				0.89	0.86
vC, conflicting volume	1274				2122	638
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	994				1745	256
tC, single (s)	4.9				6.8	7.1
tC, 2 stage (s)						
tF (s)	2.6				3.5	3.4
p0 queue free %	67				93	55
cM capacity (veh/h)	431				47	616
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	533	782	818	454	282	
Volume Left	142	0	0	0	3	
Volume Right	0	0	0	45	279	
cSH	431	1700	1700	1700	543	
Volume to Capacity	0.33	0.46	0.48	0.27	0.52	
Queue Length 95th (ft)	36	0	0	0	74	
Control Delay (s)	10.1	0.0	0.0	0.0	18.6	
Lane LOS	B				C	
Approach Delay (s)	4.1		0.0		18.6	
Approach LOS					C	
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			94.9%		ICU Level of Service	F
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Both PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	252	0	0	0	0	821
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	260	0	0	0	0	846
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	423	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	423	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	53	100			100	
cM capacity (veh/h)	554	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	130	130	423	423		
Volume Left	130	130	0	0		
Volume Right	0	0	0	0		
cSH	554	554	1700	1700		
Volume to Capacity	0.23	0.23	0.25	0.25		
Queue Length 95th (ft)	23	23	0	0		
Control Delay (s)	13.5	13.5	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	13.5		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			42.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	764	186	175	812	0	0	0	0	189	625	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		0.99		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3286		1763	3471						3342	
Flt Permitted		1.00		0.22	1.00						0.99	
Satd. Flow (perm)		3286		412	3471						3342	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	796	194	182	846	0	0	0	0	197	651	254
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	970	0	182	846	0	0	0	0	0	1075	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			75			75						50
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		59.0		59.0	59.0						36.0	
Effective Green, g (s)		59.0		59.0	59.0						36.0	
Actuated g/C Ratio		0.56		0.56	0.56						0.34	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1846		231	1950						1145	
v/s Ratio Prot		0.30			0.24							
v/s Ratio Perm				c0.44							0.32	
v/c Ratio		0.53		0.79	0.43						0.94	
Uniform Delay, d1		14.3		18.1	13.3						33.4	
Progression Factor		1.00		0.63	0.45						1.00	
Incremental Delay, d2		1.1		19.2	0.6						15.5	
Delay (s)		15.4		30.6	6.5						48.9	
Level of Service		B		C	A						D	
Approach Delay (s)		15.4			10.8			0.0			48.9	
Approach LOS		B			B			A			D	
Intersection Summary												
HCM 2000 Control Delay			25.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			105.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			129.6%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	161	12	7	2	0	0	0	0	10	707	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	169	13	7	2	0	0	0	0	11	744	3
Pedestrians		3						1				
Lane Width (ft)		12.0						0.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	771	770	378	492	771	0	750			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	771	770	378	492	771	0	750			0		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	49	98	97	99	100	100			99		
cM capacity (veh/h)	275	331	624	270	330	1091	866			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	182	9	383	375								
Volume Left	0	7	11	0								
Volume Right	13	0	0	3								
cSH	342	281	1636	1700								
Volume to Capacity	0.53	0.03	0.01	0.22								
Queue Length 95th (ft)	74	3	0	0								
Control Delay (s)	26.9	18.3	0.3	0.0								
Lane LOS	D	C	A									
Approach Delay (s)	26.9	18.3	0.1									
Approach LOS	D	C										
Intersection Summary												
Average Delay			5.5									
Intersection Capacity Utilization			35.9%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				 
Volume (vph)	168	117	0	0	132	157	123	376	111	109	0	246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.97		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1160	3195			2746		1014	2885		1570		2349
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1160	3195			2746		1014	2885		1570		2349
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	177	123	0	0	139	165	129	396	117	115	0	259
RTOR Reduction (vph)	0	0	0	0	144	0	0	21	0	0	0	222
Lane Group Flow (vph)	177	123	0	0	160	0	116	505	0	115	0	37
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	40%	13%	0%	0%	18%	21%	62%	15%	13%	15%	0%	21%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	17.1	17.1			9.5		18.1	18.1		10.8		10.8
Effective Green, g (s)	17.1	17.1			9.5		18.1	18.1		10.8		10.8
Actuated g/C Ratio	0.23	0.23			0.13		0.24	0.24		0.14		0.14
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	262	723			345		243	691		224		336
v/s Ratio Prot	c0.15	0.04			c0.06		0.11	c0.18		c0.07		0.02
v/s Ratio Perm												
v/c Ratio	0.68	0.17			0.46		0.48	0.73		0.51		0.11
Uniform Delay, d1	26.7	23.5			30.6		24.6	26.5		29.9		28.2
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	6.7	0.1			1.0		6.6	6.7		2.0		0.1
Delay (s)	33.4	23.6			31.6		31.2	33.2		31.9		28.3
Level of Service	C	C			C		C	C		C		C
Approach Delay (s)		29.4			31.6			32.8			29.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.2				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			75.5				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			52.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park

Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	201	233	43	34	71	98	7	269	185	245	150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1245	2375	832	1107	2201	1062	1003	1970		1203	1870	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	212	245	45	36	75	103	7	283	195	258	158	0
RTOR Reduction (vph)	0	0	30	0	0	90	0	102	0	0	0	0
Lane Group Flow (vph)	212	245	15	36	75	13	7	376	0	258	158	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	45%	52%	94%	63%	64%	50%	80%	79%	62%	50%	93%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Effective Green, g (s)	39.0	39.0	39.0	15.0	15.0	15.0	29.0	29.0		17.0	17.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.12	0.12	0.12	0.24	0.24		0.14	0.14	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	404	771	270	138	275	132	242	476		170	264	
v/s Ratio Prot	c0.17	c0.10		0.03	0.03		0.01	c0.19		c0.21	0.08	
v/s Ratio Perm			0.02			0.01						
v/c Ratio	0.52	0.32	0.05	0.26	0.27	0.10	0.03	0.79		1.52	0.60	
Uniform Delay, d1	33.0	30.5	27.8	47.5	47.6	46.5	34.7	42.6		51.5	48.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	1.1	0.4	4.5	2.4	1.5	0.2	12.5		260.7	9.6	
Delay (s)	37.8	31.6	28.2	52.0	50.0	48.0	35.0	55.1		312.2	57.9	
Level of Service	D	C	C	D	D	D	C	E		F	E	
Approach Delay (s)		33.9			49.4			54.8			215.6	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			89.0			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			58.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	831	72	99	977	84	49	329	91	104	304	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3357		1770	3448		1770	1761		1770	1703	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3357		1770	3448		1770	1761		1770	1703	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	96	875	76	104	1028	88	52	346	96	109	320	123
RTOR Reduction (vph)	0	7	0	0	7	0	0	10	0	0	14	0
Lane Group Flow (vph)	96	944	0	104	1109	0	52	432	0	109	429	0
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			75			75			20			20
Heavy Vehicles (%)	2%	5%	7%	2%	2%	2%	2%	3%	4%	2%	3%	9%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.0	36.3		4.0	33.3		4.0	32.9		4.0	32.9	
Effective Green, g (s)	7.0	36.3		4.0	33.3		4.0	32.9		4.0	32.9	
Actuated g/C Ratio	0.07	0.38		0.04	0.35		0.04	0.35		0.04	0.35	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	130	1280		74	1206		74	608		74	588	
v/s Ratio Prot	0.05	c0.28		c0.06	c0.32		0.03	0.25		c0.06	c0.25	
v/s Ratio Perm												
v/c Ratio	0.74	0.74		1.41	0.92		0.70	0.71		1.47	0.73	
Uniform Delay, d1	43.2	25.4		45.6	29.7		45.0	27.0		45.6	27.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.5	2.3		245.2	11.2		26.0	6.9		272.1	7.7	
Delay (s)	62.7	27.6		290.8	40.9		71.0	33.9		317.7	35.0	
Level of Service	E	C		F	D		E	C		F	C	
Approach Delay (s)		30.8			62.2			37.8			90.8	
Approach LOS		C			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			53.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			95.2			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			82.4%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	245	15	7	1006	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	0	253	15	7	1037	0	0	0	0
Pedestrians		16			1						3	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	694	1069	16	1053	1069	523	16			1038		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	694	1069	16	1053	1069	523	16			1038		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	100	0	97	100			100		
cM capacity (veh/h)	0	222	1066	182	222	504	1615			677		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	168	100	353	691								
Volume Left	0	0	7	0								
Volume Right	0	15	0	0								
cSH	222	243	1615	1700								
Volume to Capacity	0.76	0.41	0.00	0.41								
Queue Length 95th (ft)	132	47	0	0								
Control Delay (s)	58.9	29.7	0.2	0.0								
Lane LOS	F	D	A									
Approach Delay (s)	48.0		0.1									
Approach LOS	E											
Intersection Summary												
Average Delay			9.9									
Intersection Capacity Utilization			42.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Volume (vph)	425	527	0	0	808	171	179	684	211	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			1.00			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.97			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1702	3406			3389			3336				
Flt Permitted	0.21	1.00			1.00			0.99				
Satd. Flow (perm)	379	3406			3389			3336				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	443	549	0	0	842	178	186	712	220	0	0	0
RTOR Reduction (vph)	0	0	0	0	17	0	0	20	0	0	0	0
Lane Group Flow (vph)	443	549	0	0	1003	0	0	1098	0	0	0	0
Confl. Peds. (#/hr)	2					2			4	4		
Confl. Bikes (#/hr)			1						44			
Heavy Vehicles (%)	6%	6%	3%	2%	4%	1%	3%	4%	1%	4%	1%	1%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)	59.0	59.0			59.0			36.0				
Effective Green, g (s)	59.0	59.0			59.0			36.0				
Actuated g/C Ratio	0.56	0.56			0.56			0.34				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	212	1913			1904			1143				
v/s Ratio Prot		0.16			0.30							
v/s Ratio Perm	c1.17							0.33				
v/c Ratio	2.09	0.29			0.53			0.96				
Uniform Delay, d1	23.0	12.0			14.3			33.8				
Progression Factor	0.76	0.50			1.00			1.00				
Incremental Delay, d2	502.9	0.3			1.0			17.8				
Delay (s)	520.3	6.3			15.4			51.6				
Level of Service	F	A			B			D				
Approach Delay (s)		235.8			15.4			51.6			0.0	
Approach LOS		F			B			D			A	
Intersection Summary												
HCM 2000 Control Delay			98.2			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.66									
Actuated Cycle Length (s)			105.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			129.6%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 13: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Both PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	161	0	0	0	2	7	8	906	3	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	169	0	0	0	2	7	8	954	3	0	0	0
Pedestrians		12			1						1	
Lane Width (ft)		12.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	515	987	12	973	985	480	12			958		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515	987	12	973	985	480	12			958		
tC, single (s)	7.7	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	59	100	100	100	99	99	99			100		
cM capacity (veh/h)	411	246	1061	207	246	537	1604			726		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	169	9	485	480								
Volume Left	169	0	8	0								
Volume Right	0	7	0	3								
cSH	411	425	1604	1700								
Volume to Capacity	0.41	0.02	0.01	0.28								
Queue Length 95th (ft)	49	2	0	0								
Control Delay (s)	19.7	13.7	0.2	0.0								
Lane LOS	C	B	A									
Approach Delay (s)	19.7	13.7	0.1									
Approach LOS	C	B										
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			47.6%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Maritime St. & Burma Rd./Ukraine St.

Gateway Park

Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	0	54	0	0	0	45	181	0	0	91	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00				1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.96				1.00	1.00			0.96	
Flpb, ped/bikes		0.98	1.00				0.98	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.90	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1776	1550				1520	3471			2983	
Flt Permitted		0.76	1.00				0.56	1.00			1.00	
Satd. Flow (perm)		1415	1550				898	3471			2983	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	0	57	0	0	0	47	191	0	0	96	217
RTOR Reduction (vph)	0	0	34	0	0	0	0	0	0	0	120	0
Lane Group Flow (vph)	0	284	23	0	0	0	47	191	0	0	193	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	17%	4%	0%	0%	13%	0%
Turn Type	Perm	NA	Perm	Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0				29.0	29.0			29.0	
Effective Green, g (s)		26.0	26.0				29.0	29.0			29.0	
Actuated g/C Ratio		0.40	0.40				0.45	0.45			0.45	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)		566	620				400	1548			1330	
v/s Ratio Prot								0.06			c0.06	
v/s Ratio Perm		c0.20	0.01				0.05					
v/c Ratio		0.50	0.04				0.12	0.12			0.14	
Uniform Delay, d1		14.6	11.9				10.5	10.5			10.7	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		3.2	0.1				0.6	0.2			0.2	
Delay (s)		17.8	12.0				11.1	10.7			10.9	
Level of Service		B	B				B	B			B	
Approach Delay (s)		16.8			0.0			10.8			10.9	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			60.8%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Maritime St./Wake Ave. & I-80 WB Ramps/W. Grand Ave.

Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	282	96	176	816	34	121	20	261	57	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1357	3471	1474	1687	3409		1649	1489	1449	1433	1344	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1357	3471	1474	1687	3409		1649	1489	1449	1433	1344	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	297	101	185	859	36	127	21	275	60	19	31
RTOR Reduction (vph)	0	0	72	0	3	0	0	0	181	0	29	0
Lane Group Flow (vph)	44	297	29	185	892	0	74	74	94	60	21	0
Confl. Peds. (#/hr)			20						20			
Heavy Vehicles (%)	33%	4%	6%	7%	4%	35%	4%	50%	8%	26%	45%	18%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4						6			
Actuated Green, G (s)	4.7	29.5	29.5	9.4	34.2		34.6	34.6	34.6	8.2	8.2	
Effective Green, g (s)	4.7	29.5	29.5	9.4	34.2		34.6	34.6	34.6	8.2	8.2	
Actuated g/C Ratio	0.05	0.29	0.29	0.09	0.34		0.34	0.34	0.34	0.08	0.08	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	62	1006	427	155	1146		561	506	492	115	108	
v/s Ratio Prot	0.03	0.09		c0.11	c0.26		0.04	0.05		c0.04	0.02	
v/s Ratio Perm			0.02						c0.06			
v/c Ratio	0.71	0.30	0.07	1.19	0.78		0.13	0.15	0.19	0.52	0.20	
Uniform Delay, d1	47.8	28.0	26.1	46.1	30.3		23.2	23.3	23.7	44.9	43.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	31.0	0.2	0.1	133.7	3.4		0.5	0.6	0.9	4.2	0.9	
Delay (s)	78.8	28.2	26.2	179.9	33.8		23.7	23.9	24.5	49.1	44.6	
Level of Service	E	C	C	F	C		C	C	C	D	D	
Approach Delay (s)		32.8			58.8			24.3			47.0	
Approach LOS		C			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			45.5			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			101.7			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			65.3%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Frontage Rd/I-580 Ramps & Grand Ave

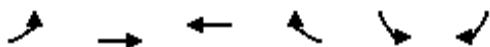
Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	370	98	195	856	326	137	143	223	164	116	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.91		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	3244		1703	3505	1543	1583	3036		1736	2840	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1626	3244		1703	3505	1543	1583	3036		1736	2840	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	91	389	103	205	901	343	144	151	235	173	122	56
RTOR Reduction (vph)	0	25	0	0	0	285	0	198	0	0	47	0
Lane Group Flow (vph)	91	467	0	205	901	58	144	188	0	173	131	0
Confl. Peds. (#/hr)			20	1								
Confl. Bikes (#/hr)			75			3						
Heavy Vehicles (%)	11%	4%	13%	6%	3%	3%	14%	5%	10%	4%	12%	41%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	29.0	29.0		16.0	16.0	16.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.31	0.31		0.17	0.17	0.17	0.16	0.16		0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	496	990		286	590	259	249	479		274	448	
v/s Ratio Prot	0.06	c0.14		0.12	c0.26		c0.09	0.06		c0.10	0.05	
v/s Ratio Perm						0.04						
v/c Ratio	0.18	0.47		0.72	1.53	0.22	0.58	0.39		0.63	0.29	
Uniform Delay, d1	24.3	26.8		37.4	39.5	34.1	37.1	35.9		37.4	35.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.6		14.3	245.7	2.0	9.4	2.4		10.6	1.6	
Delay (s)	25.1	28.4		51.7	285.2	36.1	46.5	38.3		48.0	37.0	
Level of Service	C	C		D	F	D	D	D		D	D	
Approach Delay (s)		27.9			193.2			40.5			42.4	
Approach LOS		C			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			114.2			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			95.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			71.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: W. Grand Ave & Campbell St.

Gateway Park
Cumulative Plus Both SAT



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Volume (veh/h)	77	765	1192	57	5	205
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	79	789	1229	59	5	211
Pedestrians		2				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1120	405			
pX, platoon unblocked	0.83				0.83	0.83
vC, conflicting volume	1288				1811	646
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	937				1568	164
tC, single (s)	4.9				7.5	7.0
tC, 2 stage (s)						
tF (s)	2.6				3.8	3.3
p0 queue free %	82				90	70
cM capacity (veh/h)	435				51	703
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	342	526	819	468	216	
Volume Left	79	0	0	0	5	
Volume Right	0	0	0	59	211	
cSH	435	1700	1700	1700	539	
Volume to Capacity	0.18	0.31	0.48	0.28	0.40	
Queue Length 95th (ft)	17	0	0	0	48	
Control Delay (s)	6.0	0.0	0.0	0.0	16.1	
Lane LOS	A				C	
Approach Delay (s)	2.4		0.0		16.1	
Approach LOS					C	
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			81.3%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Both SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	220	0	0	0	0	770
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	232	0	0	0	0	811
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			444			
pX, platoon unblocked						
vC, conflicting volume	405	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	405	0			0	
tC, single (s)	6.9	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	59	100			100	
cM capacity (veh/h)	566	1091			1636	
Direction, Lane #	WB 1	WB 2	SB 1	SB 2		
Volume Total	116	116	405	405		
Volume Left	116	116	0	0		
Volume Right	0	0	0	0		
cSH	566	566	1700	1700		
Volume to Capacity	0.20	0.20	0.24	0.24		
Queue Length 95th (ft)	19	19	0	0		
Control Delay (s)	13.0	13.0	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	13.0		0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			34.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

6: Mandela Pkwy/Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑↑	
Volume (vph)	0	406	180	200	792	0	0	0	0	164	504	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frpb, ped/bikes		0.98		1.00	1.00						0.98	
Flpb, ped/bikes		1.00		0.99	1.00						1.00	
Frt		0.95		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3184		1759	3539						3218	
Flt Permitted		1.00		0.36	1.00						0.99	
Satd. Flow (perm)		3184		667	3539						3218	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	427	189	211	834	0	0	0	0	173	531	332
RTOR Reduction (vph)	0	59	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	557	0	211	834	0	0	0	0	0	990	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			75			75						50
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		38.0		38.0	38.0						37.0	
Effective Green, g (s)		38.0		38.0	38.0						37.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.44	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1423		298	1582						1400	
v/s Ratio Prot		0.17			0.24							
v/s Ratio Perm				c0.32							0.31	
v/c Ratio		0.39		0.71	0.53						0.71	
Uniform Delay, d1		15.7		19.0	17.0						19.6	
Progression Factor		1.00		0.40	0.36						1.00	
Incremental Delay, d2		0.8		6.0	0.3						3.0	
Delay (s)		16.6		13.7	6.4						22.6	
Level of Service		B		B	A						C	
Approach Delay (s)		16.6			7.9			0.0			22.6	
Approach LOS		B			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			15.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			10.0			
Intersection Capacity Utilization			117.0%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											 	
Volume (veh/h)	0	182	24	8	0	0	0	0	0	42	579	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	192	25	8	0	0	0	0	0	44	609	18
Pedestrians								1				
Lane Width (ft)								0.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											655	
pX, platoon unblocked												
vC, conflicting volume	707	707	315	515	716	0	627			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	707	707	315	515	716	0	627			0		
tC, single (s)	7.7	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	100	46	96	96	100	100	100			97		
cM capacity (veh/h)	305	353	687	234	349	1091	964			1636		
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	217	8	349	323								
Volume Left	0	8	44	0								
Volume Right	25	0	0	18								
cSH	374	234	1636	1700								
Volume to Capacity	0.58	0.04	0.03	0.19								
Queue Length 95th (ft)	88	3	2	0								
Control Delay (s)	27.1	21.0	1.1	0.0								
Lane LOS	D	C	A									
Approach Delay (s)	27.1	21.0	0.6									
Approach LOS	D	C										
Intersection Summary												
Average Delay			7.2									
Intersection Capacity Utilization			35.6%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

8: I-880 NB Off-ramp/Frontage Rd. & 7th St.

Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	37	0	0	178	159	86	212	173	86	0	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.93		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1624	3471			3078		1441	2987		1543		2682
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1624	3471			3078		1441	2987		1543		2682
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	39	0	0	187	167	91	223	182	91	0	266
RTOR Reduction (vph)	0	0	0	0	139	0	0	124	0	0	0	240
Lane Group Flow (vph)	22	39	0	0	215	0	82	290	0	91	0	26
Confl. Peds. (#/hr)	6					6						
Confl. Bikes (#/hr)			6			3						
Heavy Vehicles (%)	0%	4%	0%	0%	9%	7%	14%	7%	9%	17%	0%	6%
Parking (#/hr)	0											
Turn Type	Split	NA			NA		Split	NA		Prot		custom
Protected Phases	4	4			8		2	2		6		6
Permitted Phases												
Actuated Green, G (s)	3.6	3.6			8.9		16.4	16.4		5.1		5.1
Effective Green, g (s)	3.6	3.6			8.9		16.4	16.4		5.1		5.1
Actuated g/C Ratio	0.07	0.07			0.17		0.31	0.31		0.10		0.10
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	110	235			516		445	924		148		258
v/s Ratio Prot	c0.01	0.01			c0.07		0.06	c0.10		c0.06		0.01
v/s Ratio Perm												
v/c Ratio	0.20	0.17			0.42		0.18	0.31		0.61		0.10
Uniform Delay, d1	23.3	23.3			19.7		13.4	14.0		23.0		21.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.9	0.3			0.5		0.9	0.9		7.4		0.2
Delay (s)	24.2	23.6			20.3		14.3	14.9		30.4		22.0
Level of Service	C	C			C		B	B		C		C
Approach Delay (s)		23.8			20.3			14.8			24.2	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			53.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			44.1%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Maritime St. & 7th St.

Gateway Park

Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	36	1	19	36	90	0	11	31	78	15	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.89		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3610	794	1357	3471	1328		2621		1703	2356	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1805	3610	794	1357	3471	1328		2621		1703	2356	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	38	1	20	38	95	0	12	33	82	16	1
RTOR Reduction (vph)	0	0	1	0	0	58	0	23	0	0	1	0
Lane Group Flow (vph)	14	38	0	20	38	37	0	22	0	82	16	0
Confl. Peds. (#/hr)			4	4								
Confl. Bikes (#/hr)			4			2						3
Heavy Vehicles (%)	0%	0%	100%	33%	4%	20%	0%	38%	17%	6%	55%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	4.0	39.0	39.0	4.0	39.0	39.0		30.0		7.0	33.0	
Effective Green, g (s)	4.0	39.0	39.0	4.0	39.0	39.0		30.0		7.0	33.0	
Actuated g/C Ratio	0.04	0.39	0.39	0.04	0.39	0.39		0.30		0.07	0.33	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lane Grp Cap (vph)	72	1407	309	54	1353	517		786		119	777	
v/s Ratio Prot	0.01	0.01		c0.01	0.01			c0.01		c0.05	c0.01	
v/s Ratio Perm			0.00			c0.03						
v/c Ratio	0.19	0.03	0.00	0.37	0.03	0.07		0.03		0.69	0.02	
Uniform Delay, d1	46.4	18.8	18.6	46.8	18.8	19.1		24.7		45.4	22.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.0	0.0	18.4	0.0	0.3		0.1		27.9	0.0	
Delay (s)	52.4	18.8	18.6	65.2	18.8	19.4		24.8		73.4	22.7	
Level of Service	D	B	B	E	B	B		C		E	C	
Approach Delay (s)		27.7			25.3			24.8			64.7	
Approach LOS		C			C			C			E	
Intersection Summary												
HCM 2000 Control Delay			36.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.12									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			51.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Adeline St. & W. Grand Ave

Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	617	32	76	851	81	59	165	59	101	217	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3430		1805	3414		1805	1801		1770	1699	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3430		1805	3414		1805	1801		1770	1699	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	89	623	32	77	860	82	60	167	60	102	219	135
RTOR Reduction (vph)	0	4	0	0	8	0	0	13	0	0	22	0
Lane Group Flow (vph)	89	651	0	77	934	0	60	214	0	102	332	0
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			75			75			20			20
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	2%	4%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.4	31.8		4.0	30.4		3.8	33.4		4.0	33.6	
Effective Green, g (s)	5.4	31.8		4.0	30.4		3.8	33.4		4.0	33.6	
Actuated g/C Ratio	0.06	0.35		0.04	0.33		0.04	0.37		0.04	0.37	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	106	1195		79	1138		75	659		77	625	
v/s Ratio Prot	c0.05	0.19		0.04	c0.27		0.03	0.12		c0.06	c0.20	
v/s Ratio Perm												
v/c Ratio	0.84	0.54		0.97	0.82		0.80	0.32		1.32	0.53	
Uniform Delay, d1	42.5	23.9		43.5	27.9		43.3	20.8		43.6	22.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	41.2	0.5		92.0	4.9		43.9	1.3		211.9	3.2	
Delay (s)	83.7	24.4		135.6	32.8		87.2	22.1		255.5	25.8	
Level of Service	F	C		F	C		F	C		F	C	
Approach Delay (s)		31.5			40.5			35.7			77.2	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			44.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			91.2			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			78.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

11: Mandela Pkwy & 24th St.

Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	215	12	5	570	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	226	13	5	600	0	0	0	0
Pedestrians		3			3						2	
Lane Width (ft)		0.0			12.0						0.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								536				
pX, platoon unblocked												
vC, conflicting volume	441	617	3	614	617	305	3			603		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	441	617	3	614	617	305	3			603		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	44	98	100			100		
cM capacity (veh/h)	275	406	1086	368	406	695	1632			982		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2								
Volume Total	151	88	205	400								
Volume Left	0	0	5	0								
Volume Right	0	13	0	0								
cSH	406	432	1632	1700								
Volume to Capacity	0.37	0.20	0.00	0.24								
Queue Length 95th (ft)	42	19	0	0								
Control Delay (s)	19.0	15.5	0.2	0.0								
Lane LOS	C	C	A									
Approach Delay (s)	17.7		0.1									
Approach LOS	C											
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			34.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

12: Mandela Pkwy & W. Grand Ave

Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Volume (vph)	214	355	0	0	836	108	158	353	178	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			1.00			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.98			0.96				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1752	3374			3473			3361				
Flt Permitted	0.18	1.00			1.00			0.99				
Satd. Flow (perm)	332	3374			3473			3361				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	225	374	0	0	880	114	166	372	187	0	0	0
RTOR Reduction (vph)	0	0	0	0	12	0	0	41	0	0	0	0
Lane Group Flow (vph)	225	374	0	0	982	0	0	684	0	0	0	0
Confl. Peds. (#/hr)	1					1			8			
Confl. Bikes (#/hr)			2			2			27			
Heavy Vehicles (%)	3%	7%	4%	2%	2%	2%	2%	1%	1%	2%	5%	3%
Turn Type	Perm	NA			NA		Perm	NA				
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)	38.0	38.0			38.0			37.0				
Effective Green, g (s)	38.0	38.0			38.0			37.0				
Actuated g/C Ratio	0.45	0.45			0.45			0.44				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	148	1508			1552			1463				
v/s Ratio Prot		0.11			0.28							
v/s Ratio Perm	c0.68							0.20				
v/c Ratio	1.52	0.25			0.63			0.47				
Uniform Delay, d1	23.5	14.6			18.1			17.0				
Progression Factor	0.82	0.68			1.00			1.00				
Incremental Delay, d2	262.0	0.3			0.9			0.2				
Delay (s)	281.4	10.3			19.0			17.3				
Level of Service	F	B			B			B				
Approach Delay (s)		112.1			19.0			17.3			0.0	
Approach LOS		F			B			B			A	
Intersection Summary												
HCM 2000 Control Delay			42.5		HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			85.0		Sum of lost time (s)			10.0				
Intersection Capacity Utilization			117.0%		ICU Level of Service			H				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

13: Mandela Pkwy & 20th St.

Gateway Park
Cumulative Plus Both SAT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	182	0	0	0	2	0	5	461	35	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	192	0	0	0	2	0	5	485	37	0	0	0
Pedestrians		9			13							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			1							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											608	
pX, platoon unblocked												
vC, conflicting volume	263	555	9	527	536	274	9			535		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263	555	9	527	536	274	9			535		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	100	100	100	100	100	100			100		
cM capacity (veh/h)	650	433	1069	426	444	722	1612			1032		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	192	2	248	279								
Volume Left	192	0	5	0								
Volume Right	0	0	0	37								
cSH	650	444	1612	1700								
Volume to Capacity	0.29	0.00	0.00	0.16								
Queue Length 95th (ft)	31	0	0	0								
Control Delay (s)	12.8	13.1	0.2	0.0								
Lane LOS	B	B	A									
Approach Delay (s)	12.8	13.1	0.1									
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			37.5%		ICU Level of Service				A			
Analysis Period (min)			15									

APPENDIX C: TRAFFIC SIGNAL WARRANT WORKSHEETS



Major Street W. Grand Ave
Minor Street Campbell St.

Project Gateway Park Connection
Scenario Existing Conditions
Peak Hour PM

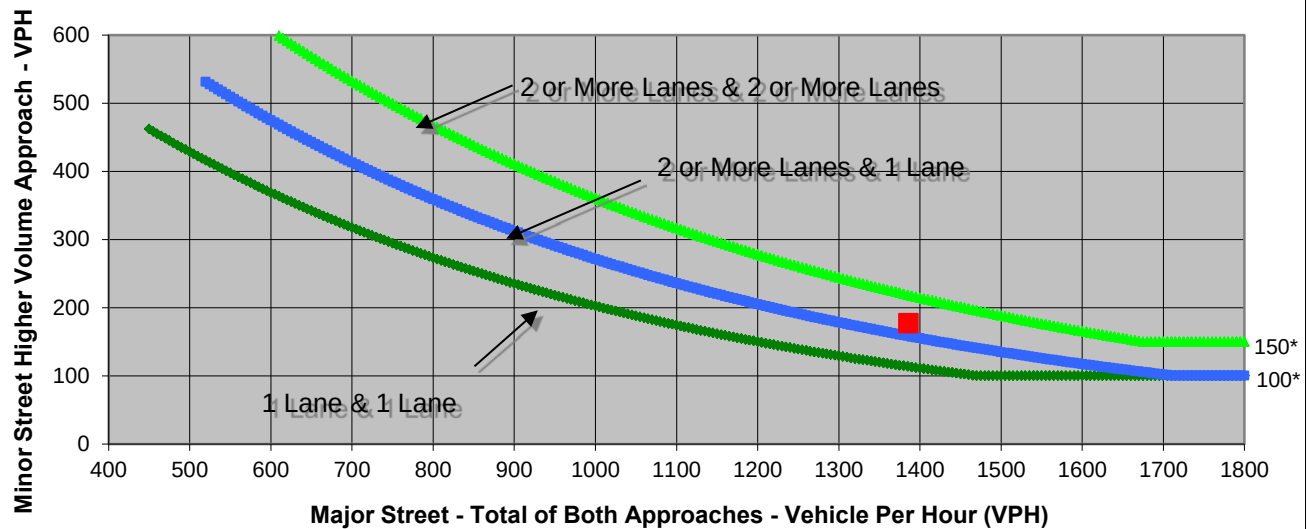
Turn Movement Volumes

	NB	SB	EB	WB
Left	32	2	76	18
Through	0	4	600	642
Right	13	171	40	10
Total	45	177	716	670

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,386	177	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
 Minor Street 24th Street

Project Gateway Park Connection
 Scenario Existing Conditions
 Peak Hour PM

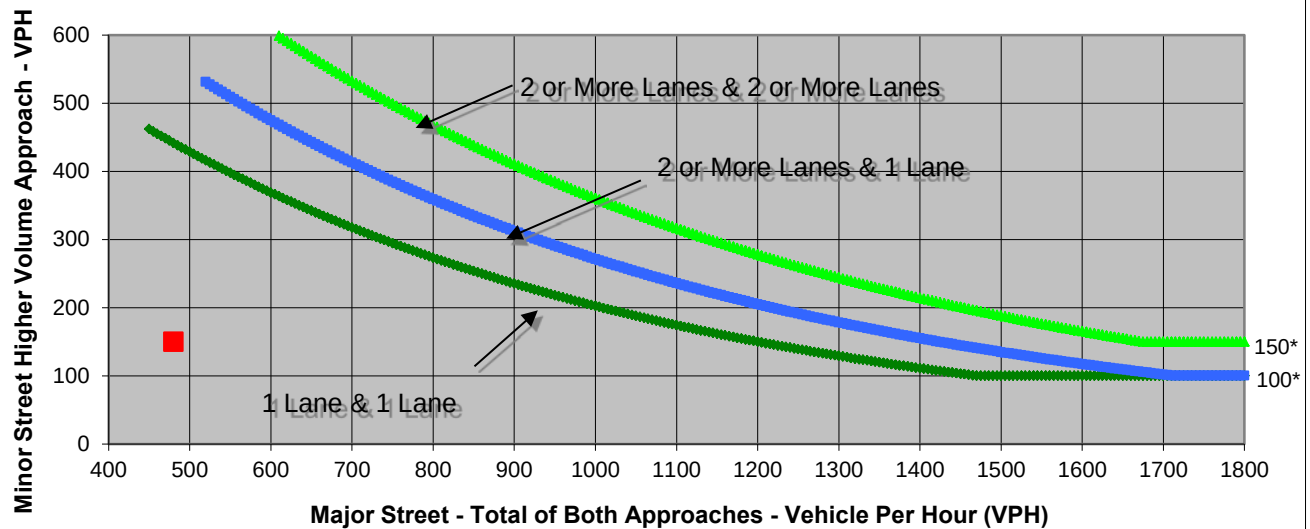
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	150	0
Through	0	480	0	0
Right	0	0	0	0
Total	0	480	150	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	480	150	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
 Minor Street 20th Street

Project Gateway Park Connection
 Scenario Existing Conditions
 Peak Hour PM

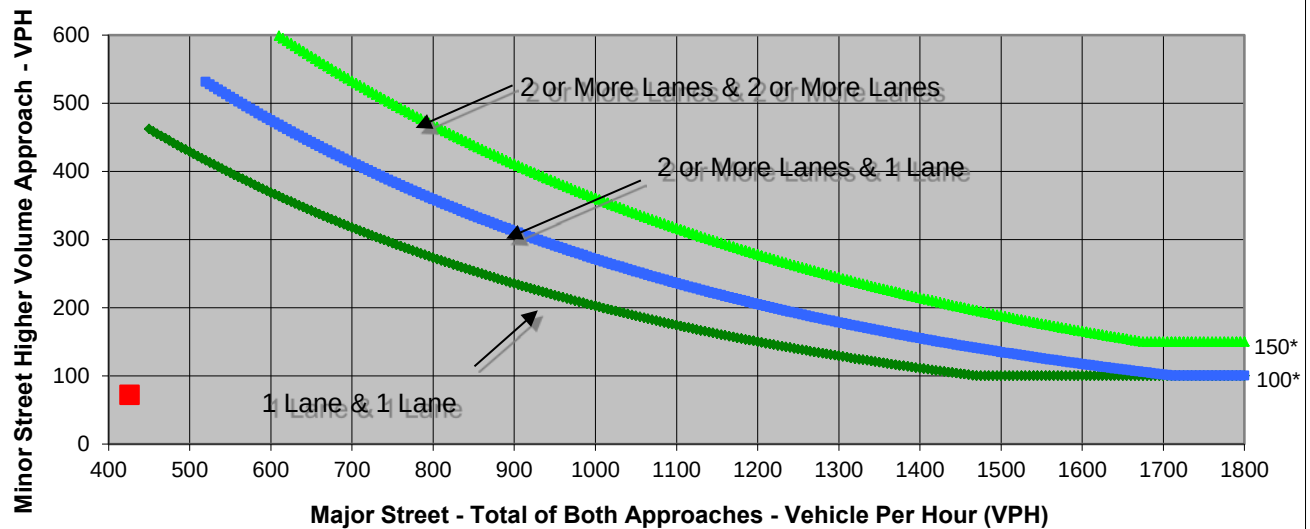
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	6	0	4
Through	0	418	65	1
Right	0	2	7	0
Total	0	426	72	5

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	426	72	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Scenario Existing Conditions
Peak Hour PM

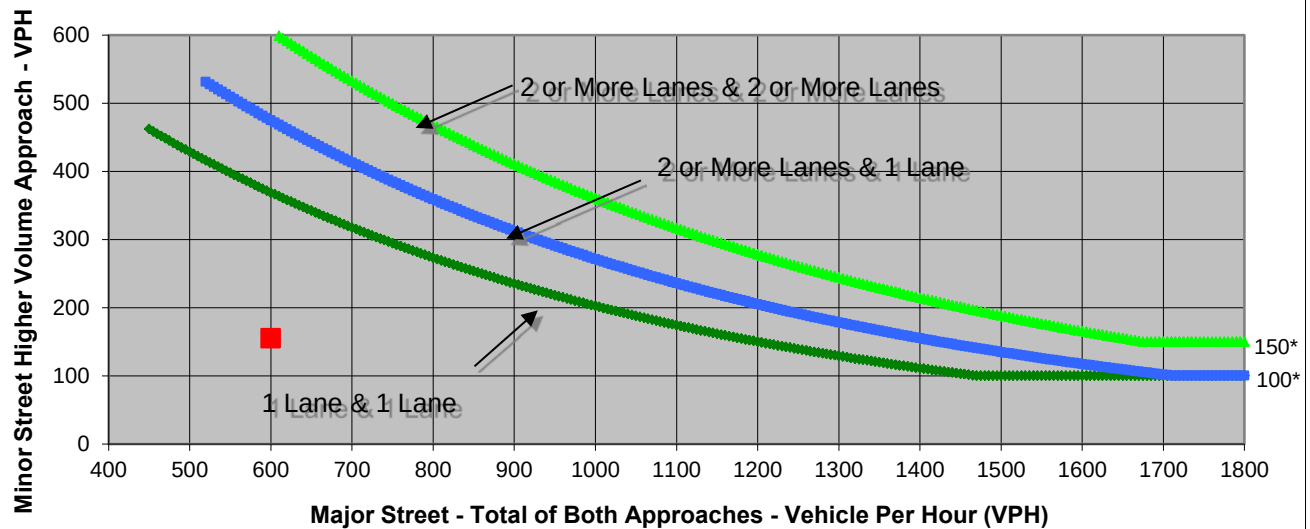
Turn Movement Volumes

	NB	SB	EB	WB
Left	4	0	0	0
Through	596	0	0	146
Right	0	0	0	9
Total	600	0	0	155

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street Mandela Parkway	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	600	155	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Northbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Existing Conditions**
 Peak Hour **PM**

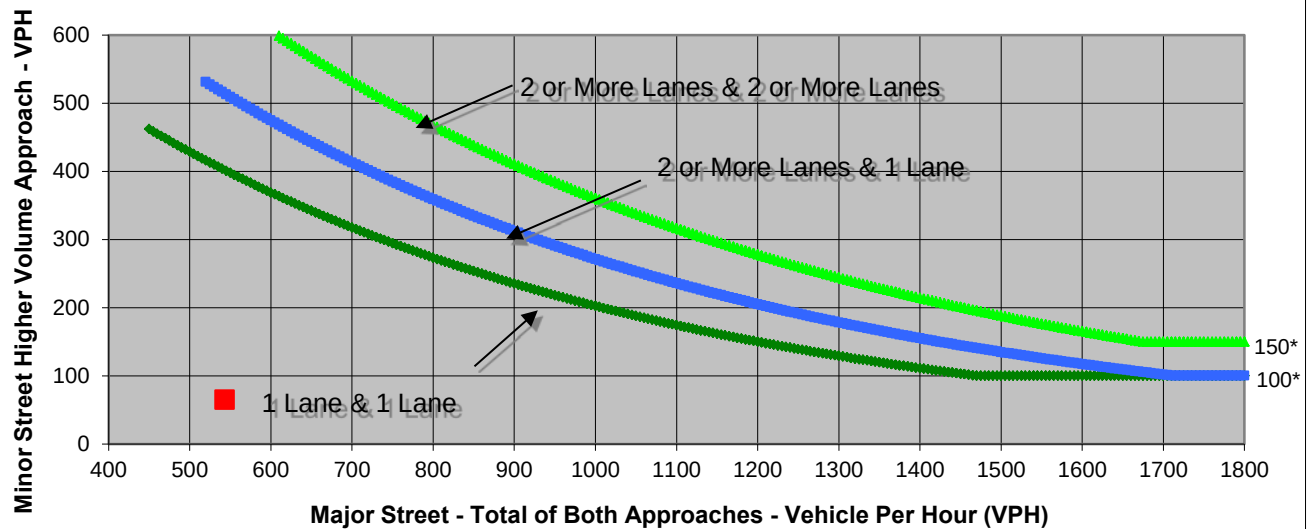
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	65	0
Through	536	0	0	1
Right	2	0	0	4
Total	543	0	65	5

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	543	65	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street W. Grand Ave
Minor Street Campbell St.

Project Gateway Park Connection
Scenario Existing Conditions
Peak Hour SAT

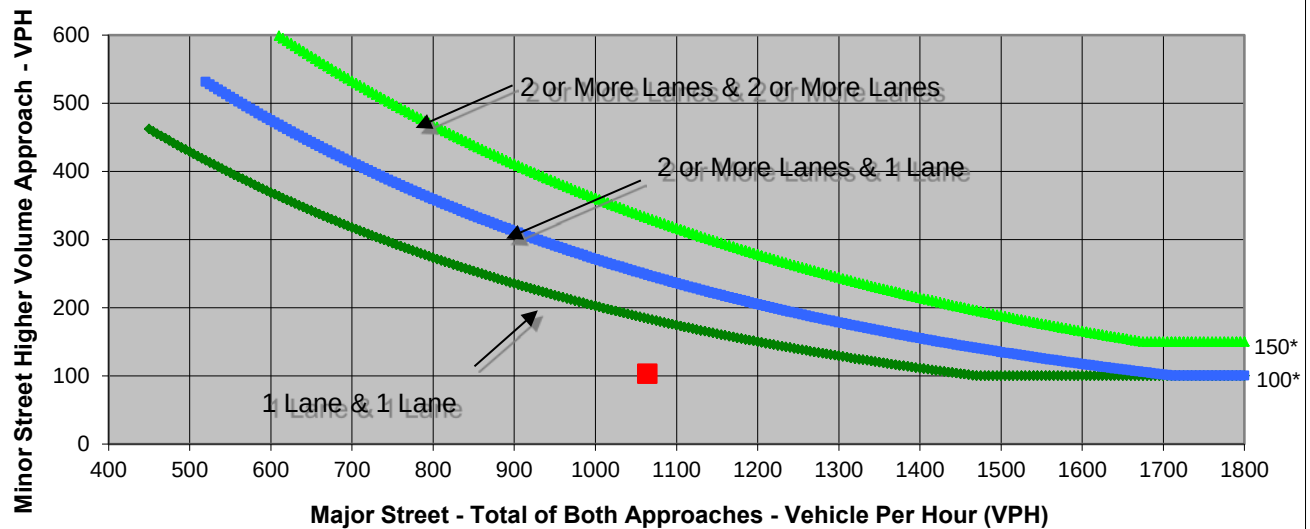
Turn Movement Volumes

	NB	SB	EB	WB
Left	43	3	23	18
Through	4	10	361	624
Right	23	90	33	5
Total	70	103	417	647

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	1,064	103	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Southbound**
 Minor Street **24th Street**

Project **Gateway Park Connection**
 Scenario **Existing Conditions**
 Peak Hour **SAT**

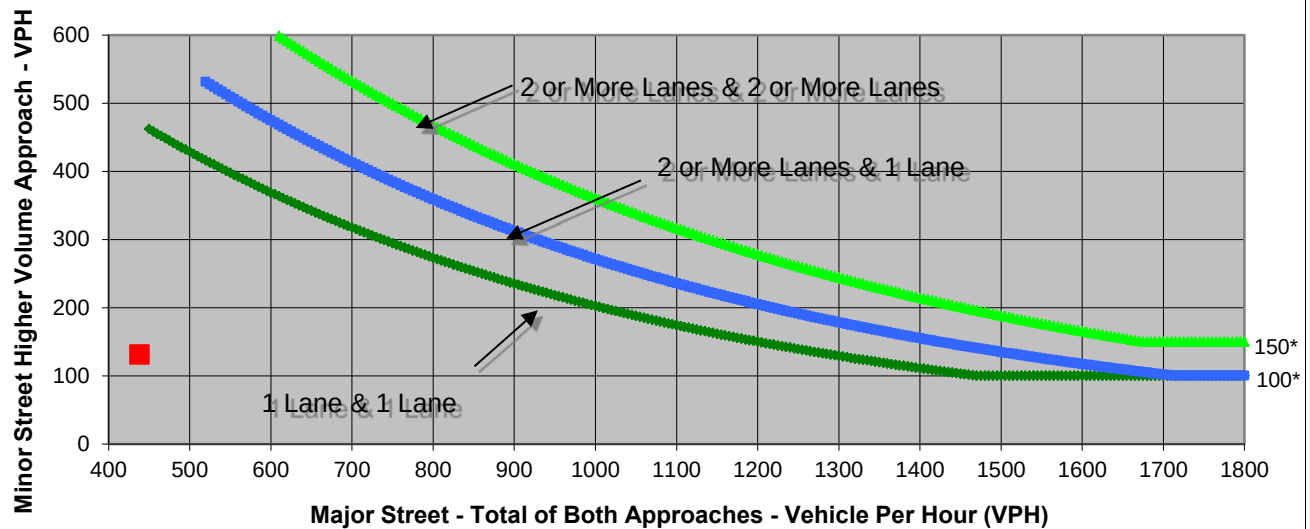
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	131	0
Through	0	438	0	0
Right	0	0	0	0
Total	0	438	131	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	438	131	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Existing Conditions
Peak Hour PM

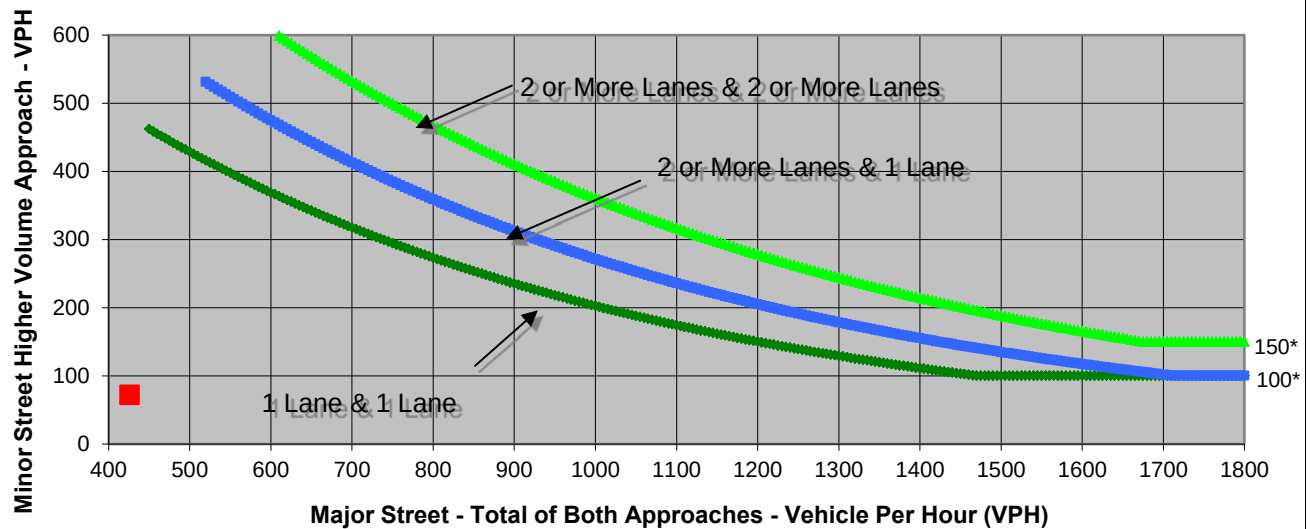
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	6	0	4
Through	0	418	65	1
Right	0	2	7	0
Total	0	426	72	5

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	426	72	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Scenario Existing Conditions
Peak Hour SAT

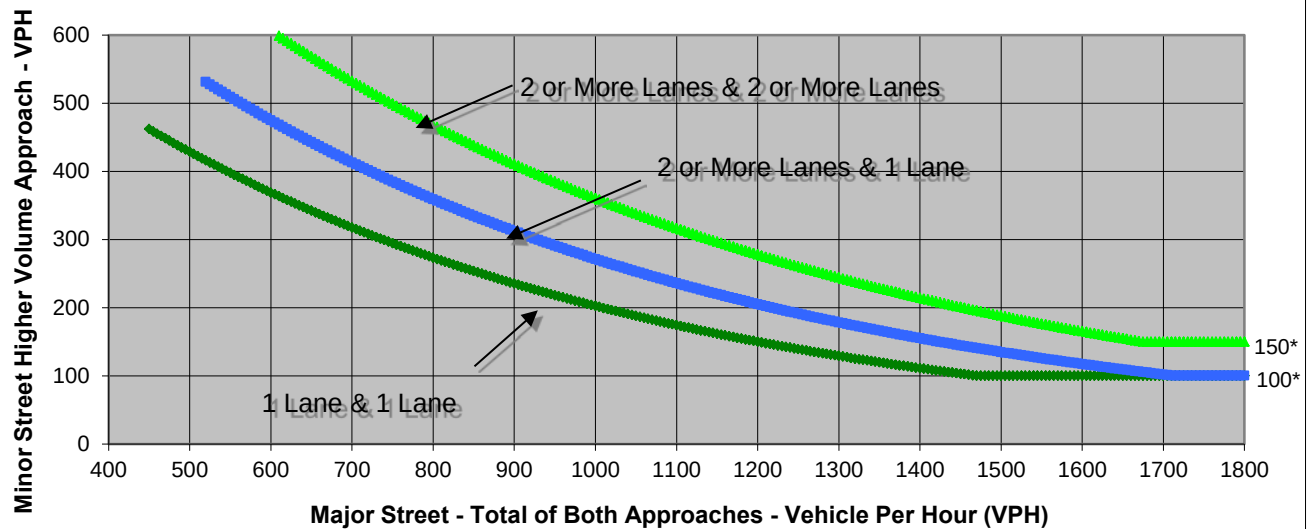
Turn Movement Volumes

	NB	SB	EB	WB
Left	3	0	0	0
Through	331	0	0	128
Right	0	0	0	7
Total	334	0	0	135

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street Mandela Parkway	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	334	135	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Northbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Existing Conditions**
 Peak Hour **SAT**

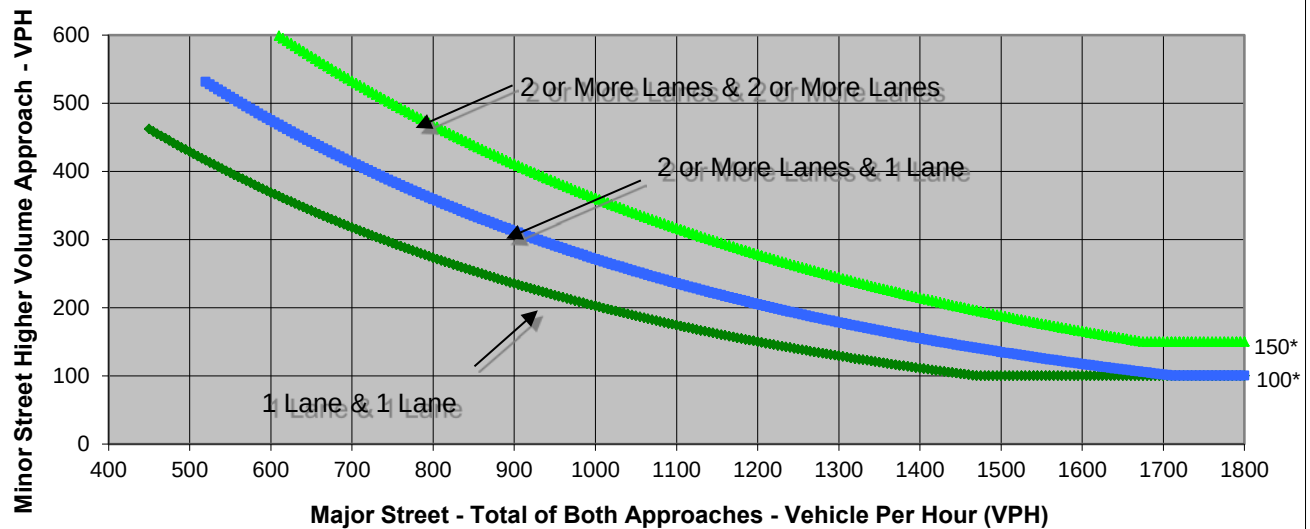
Turn Movement Volumes

	NB	SB	EB	WB
Left	3	0	58	0
Through	266	0	1	1
Right	21	0	0	9
Total	290	0	59	10

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	290	59	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street W. Grand Ave

Minor Street Campbell St.

Project Gateway Park Connection

Existing Plus

Scenario Connection Conditions

Peak Hour PM

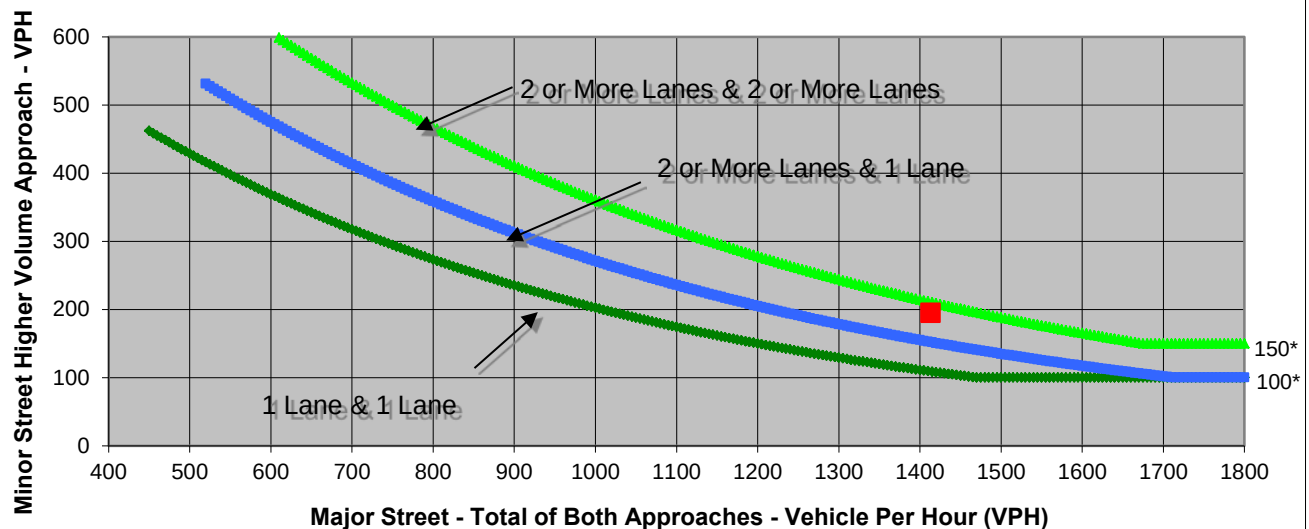
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	2	83	0
Through	0	0	640	660
Right	0	193	0	30
Total	0	195	723	690

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	W. Grand Ave	Campbell St.	
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,413	195	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound
 Minor Street 24th Street

Project Gateway Park Connection
 Existing Plus
 Scenario Connection Conditions
 Peak Hour PM

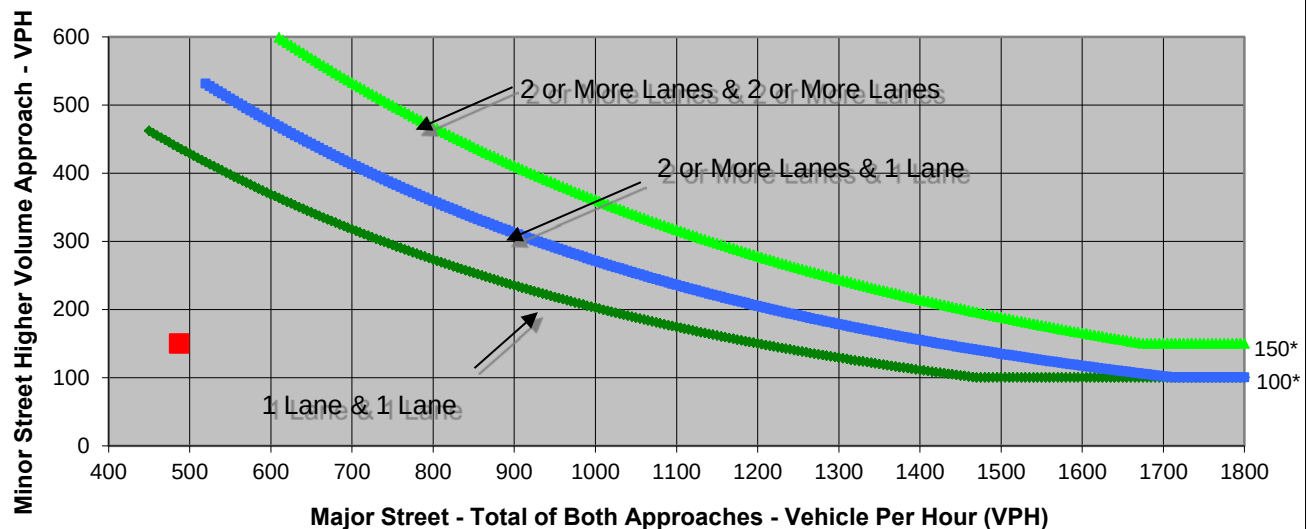
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	150	0
Through	0	487	0	0
Right	0	0	0	0
Total	0	487	150	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	487	150	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Existing Plus Connection Conditions
Peak Hour PM

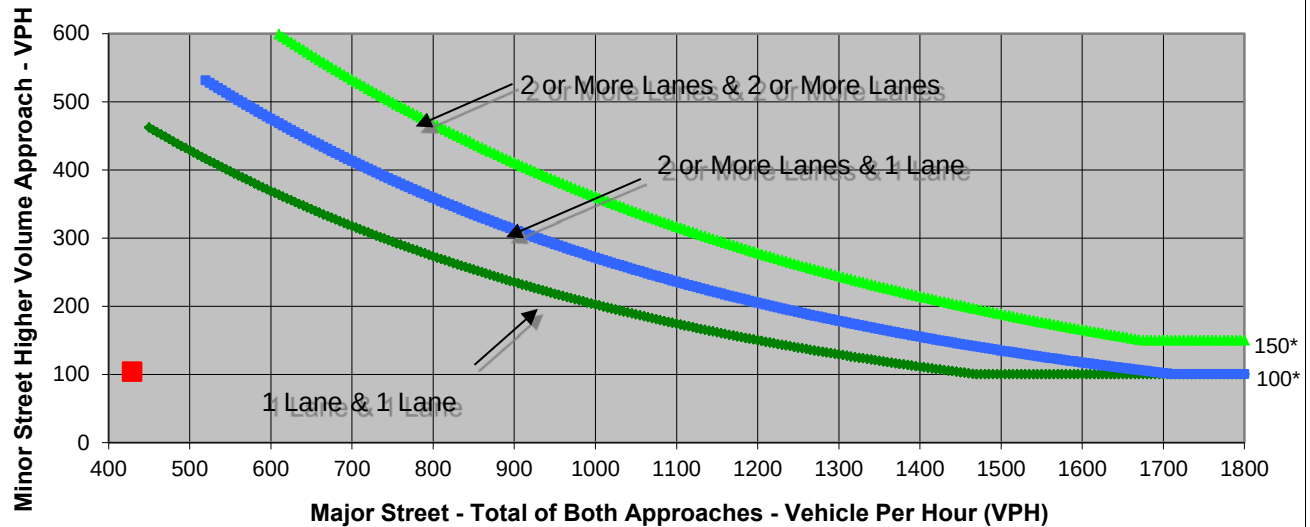
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	6	0	4
Through	0	421	97	1
Right	0	2	7	0
Total	0	429	104	5

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	429	104	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Existing Plus Connection
Scenario Conditions
Peak Hour PM

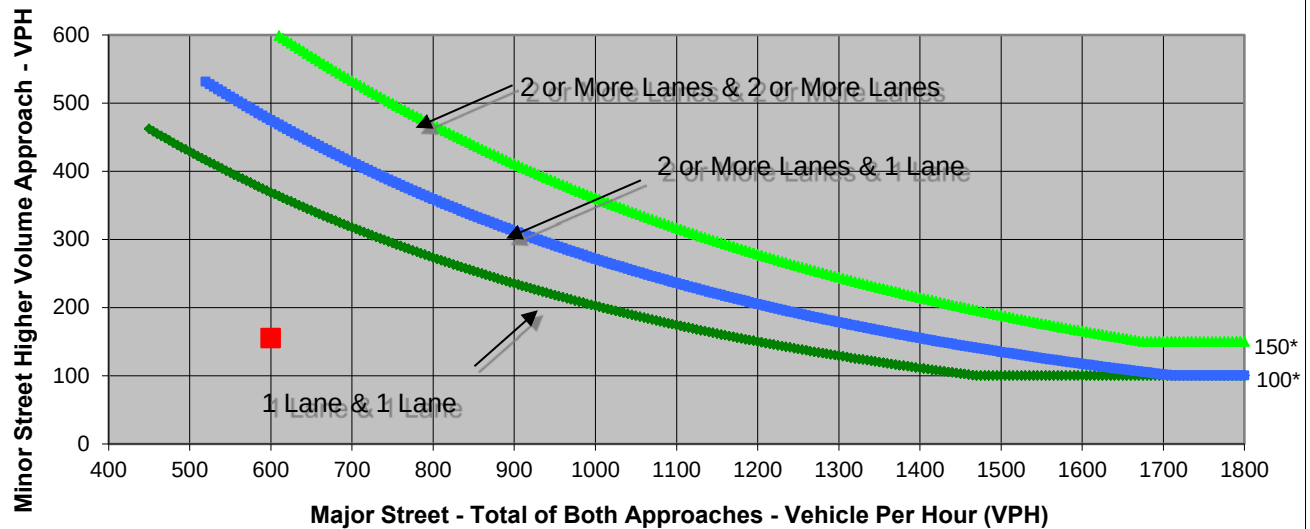
Turn Movement Volumes

	NB	SB	EB	WB
Left	4	0	0	0
Through	596	0	0	146
Right	0	0	0	9
Total	600	0	0	155

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	600	155	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Existing Plus Connection
Scenario Conditions
Peak Hour PM

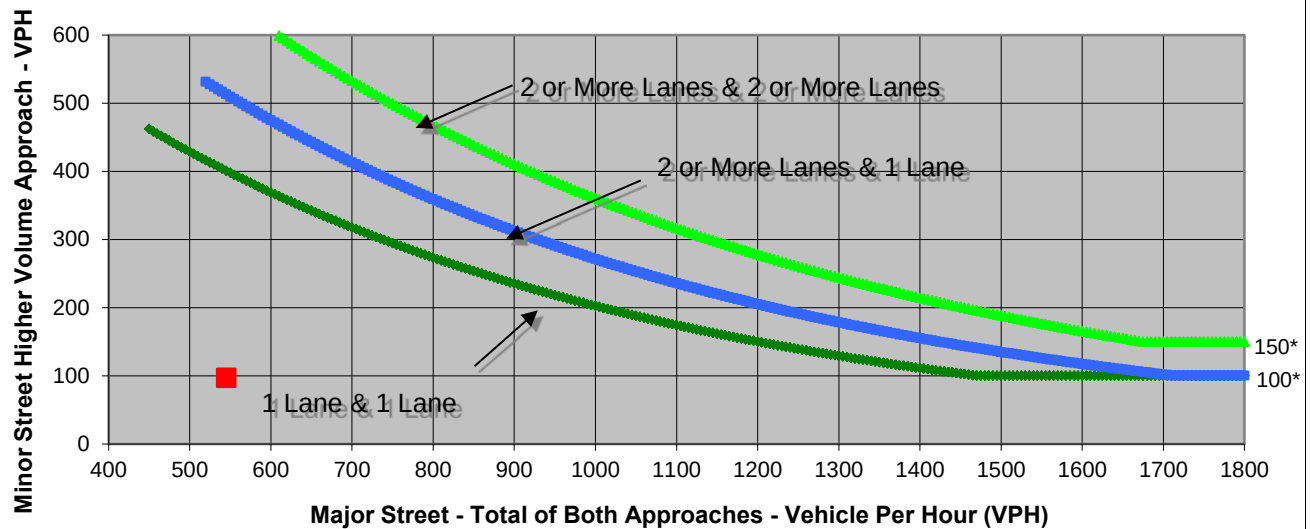
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	97	0
Through	538	0	0	1
Right	2	0	0	4
Total	545	0	97	5

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	545	97	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street W. Grand Ave

Minor Street Campbell St.

Project Gateway Park Connection

Existing Plus

Scenario Connection Conditions

Peak Hour SAT

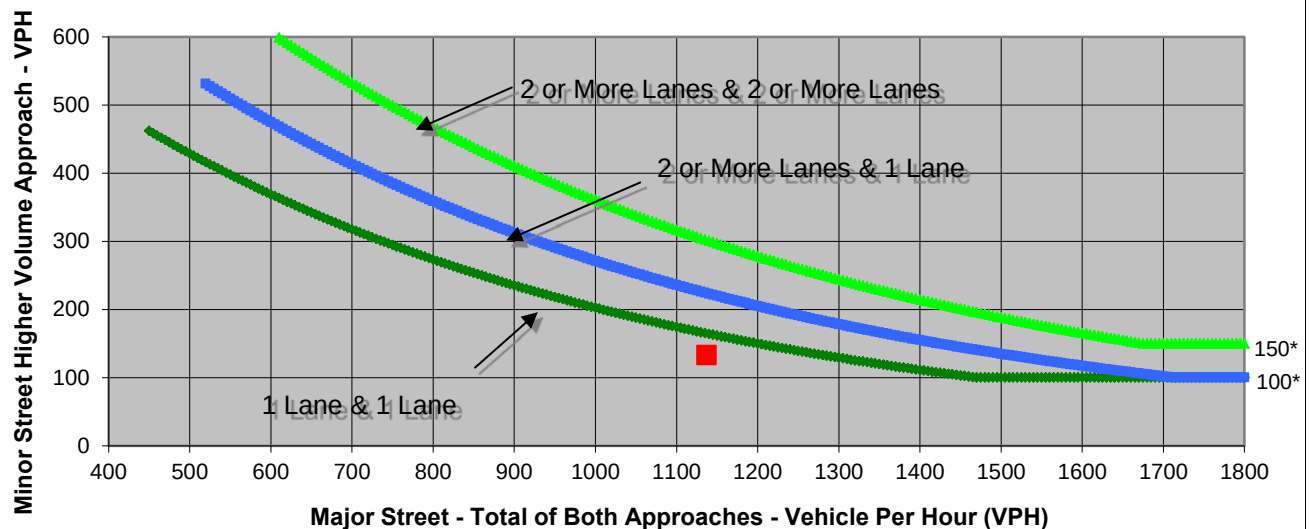
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	3	45	0
Through	0	0	394	650
Right	0	130	0	48
Total	0	133	439	698

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	W. Grand Ave	Campbell St.	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	1,137	133	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound

Minor Street 24th Street

Project Gateway Park Connection

Existing Plus

Scenario Connection Conditions

Peak Hour SAT

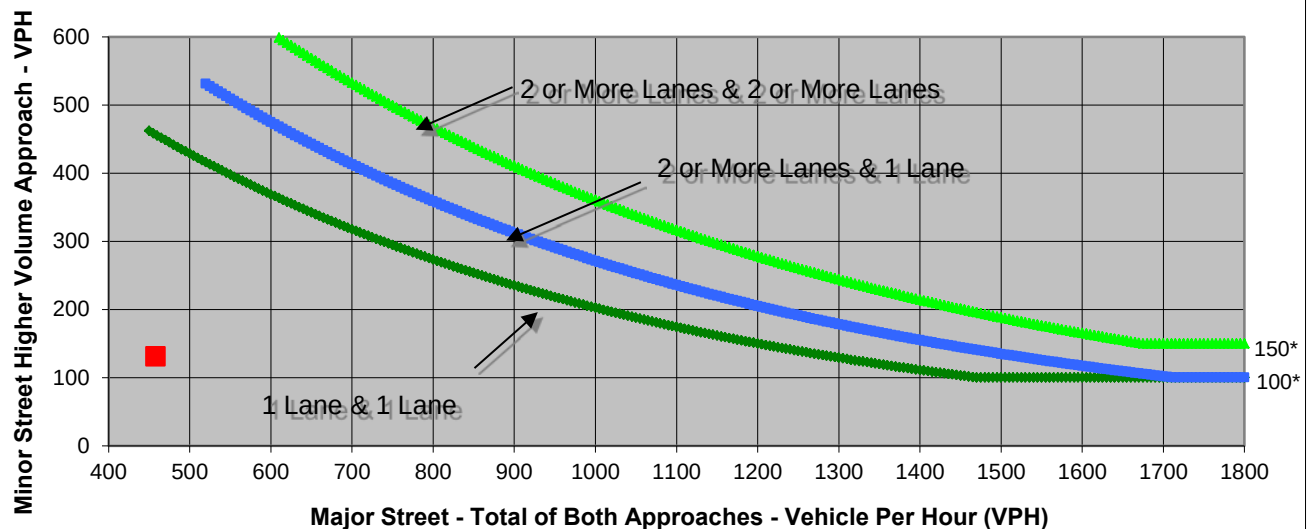
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	131	0
Through	0	458	0	0
Right	0	0	0	0
Total	0	458	131	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	458	131	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Existing Plus Connection
Peak Hour SAT

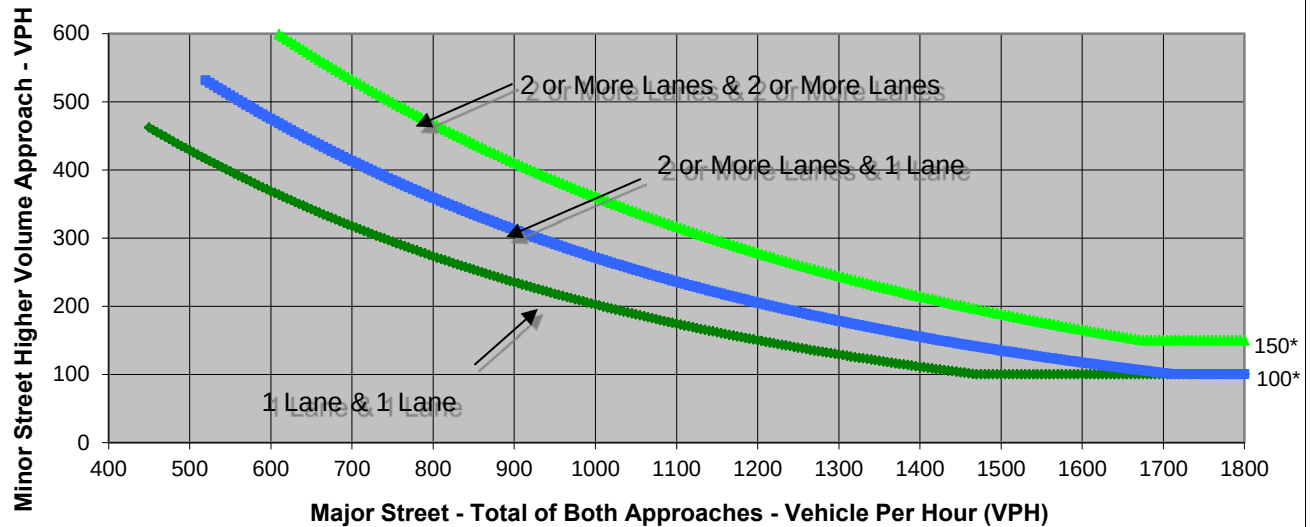
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	25	58	5
Through	0	344	53	0
Right	0	19	14	9
Total	0	388	125	14

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	388	125	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Existing Plus Connection
Scenario Conditions
Peak Hour SAT

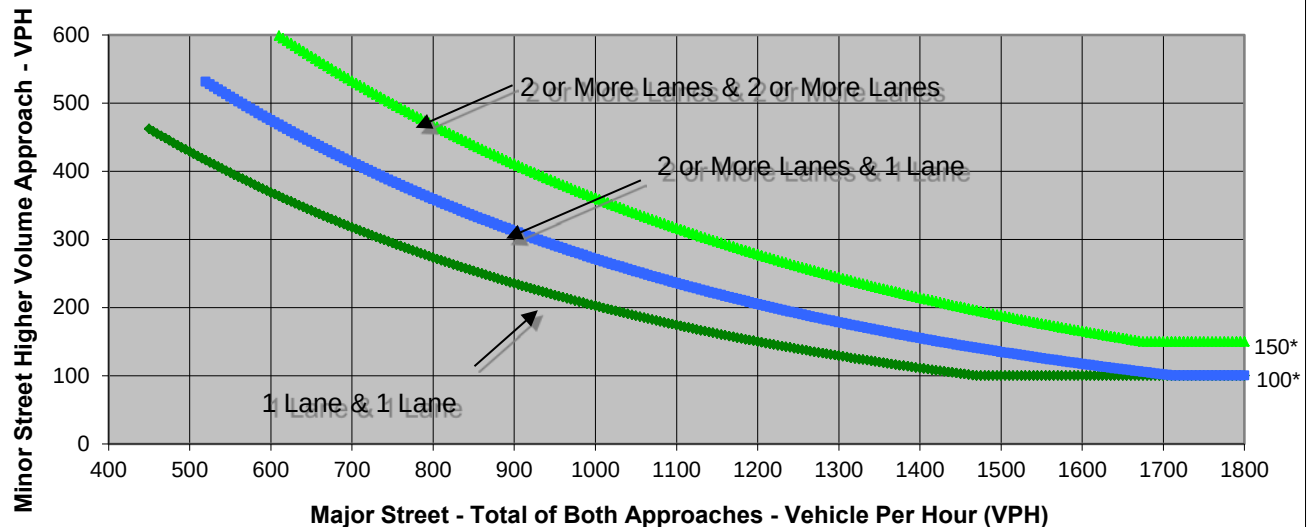
Turn Movement Volumes

	NB	SB	EB	WB
Left	3	0	0	0
Through	332	0	0	128
Right	0	0	0	7
Total	335	0	0	135

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	335	135	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Existing Plus Connection
Scenario Conditions
Peak Hour SAT

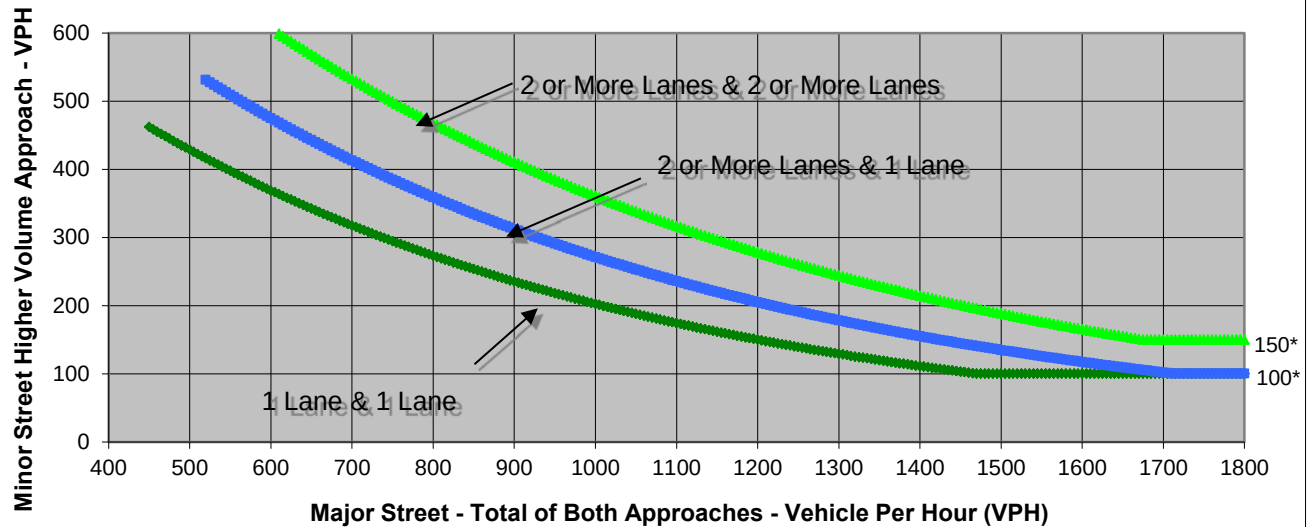
Turn Movement Volumes

	NB	SB	EB	WB
Left	3	0	52	0
Through	272	0	59	1
Right	21	0	0	0
Total	296	0	111	1

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	296	111	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **W. Grand Ave**
 Minor Street **Campbell St.**

Project **Gateway Park Connection**
 Scenario **Near-Term Conditions**
 Peak Hour **PM**

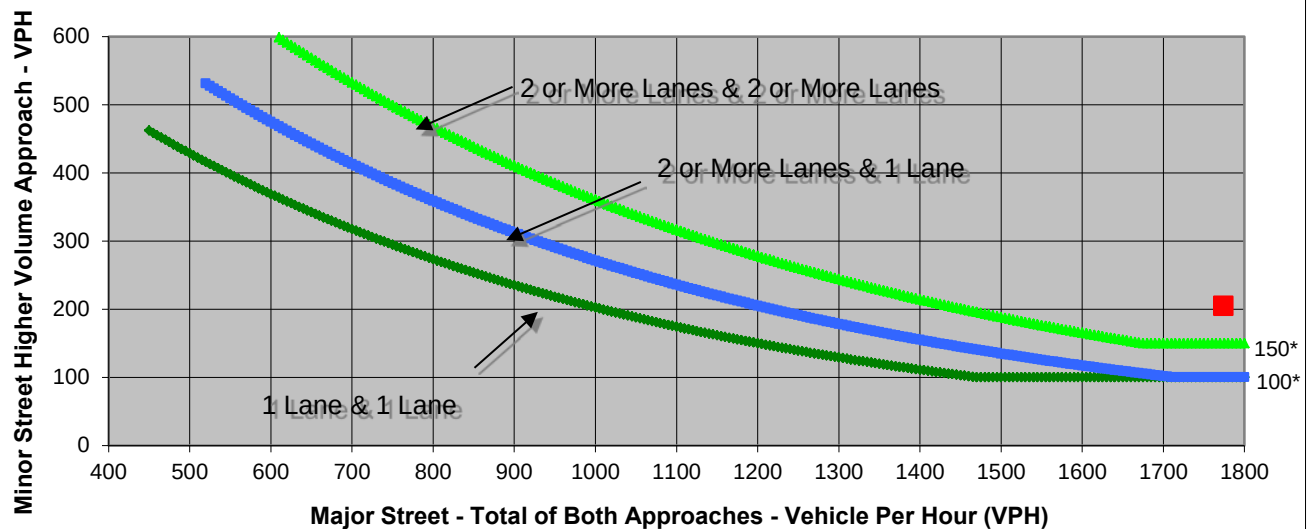
Turn Movement Volumes

	NB	SB	EB	WB
Left	41	3	97	23
Through	0	5	768	822
Right	17	197	51	13
Total	58	205	916	858

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	W. Grand Ave	Campbell St.	
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,774	205	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **24th Street**

Project **Gateway Park Connection**
 Scenario **Near-Term Conditions**
 Peak Hour **PM**

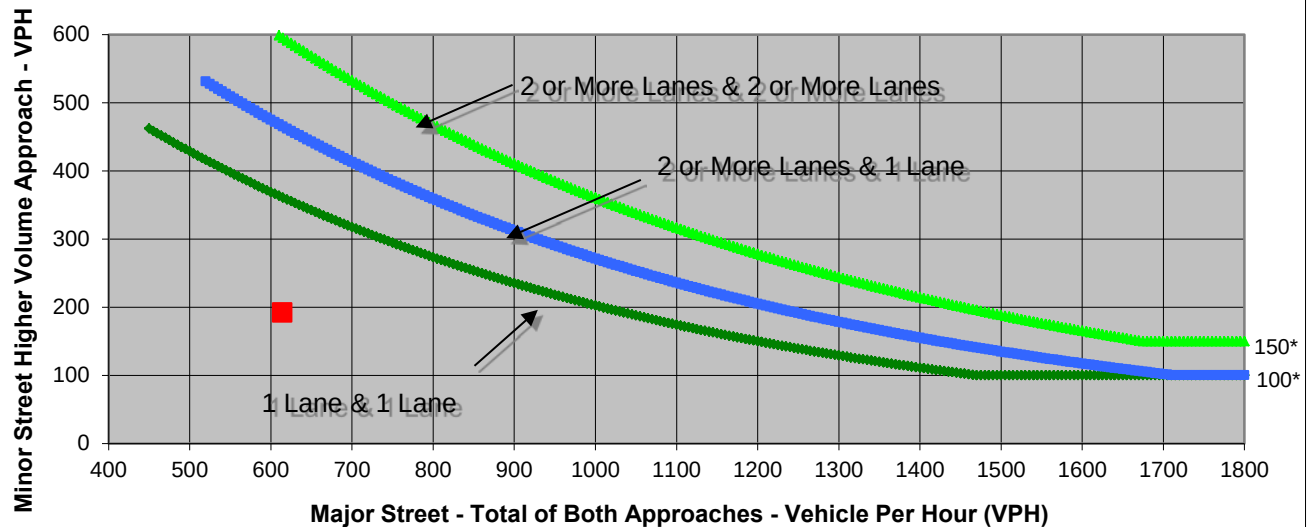
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	192	0
Through	0	614	0	0
Right	0	0	0	0
Total	0	614	192	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	614	192	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Near-Term Conditions
Peak Hour PM

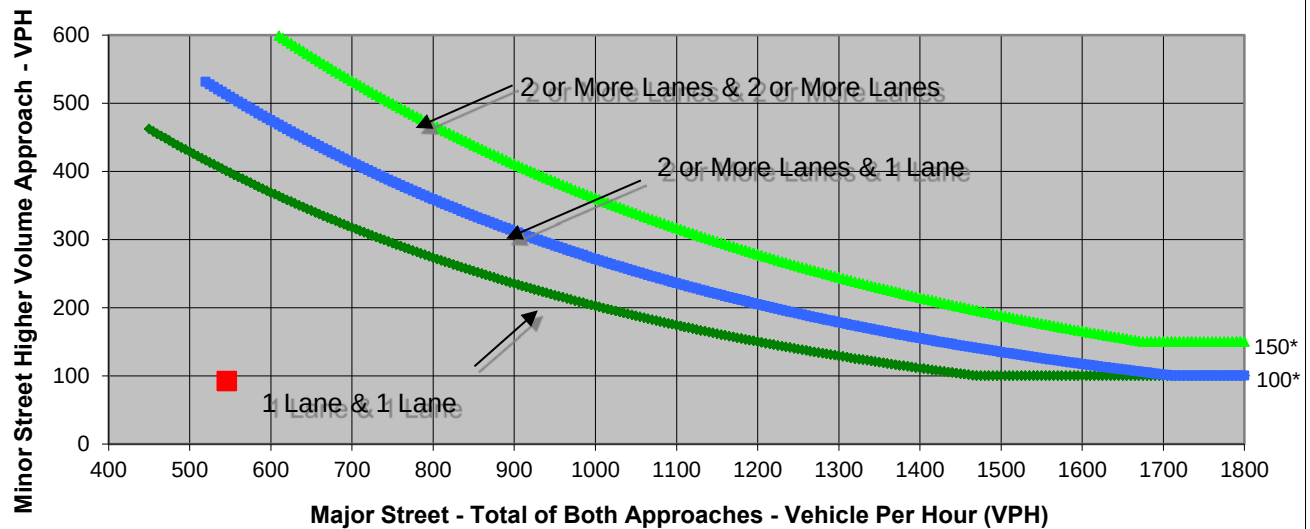
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	8	0	5
Through	0	535	83	1
Right	0	3	9	0
Total	0	546	92	6

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	546	92	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway**
Minor Street **24th Street**

Project **Gateway Park Connection**
Scenario **Near-Term Conditions**
Peak Hour **PM**

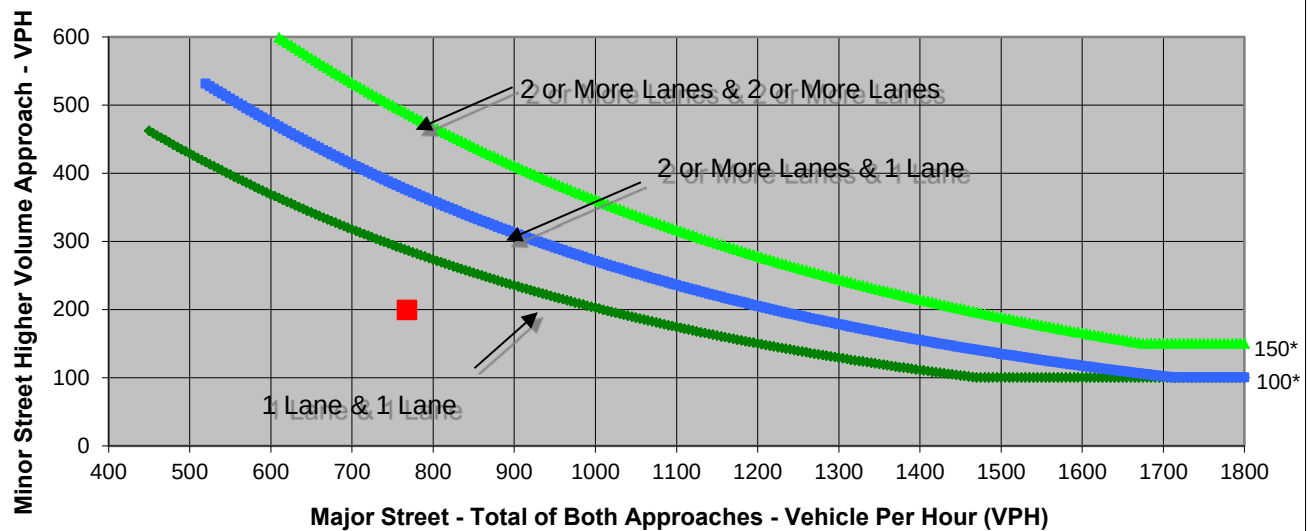
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	0	0
Through	763	0	0	187
Right	0	0	0	12
Total	768	0	0	199

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	768	199	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Northbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Near-Term Conditions**
 Peak Hour **PM**

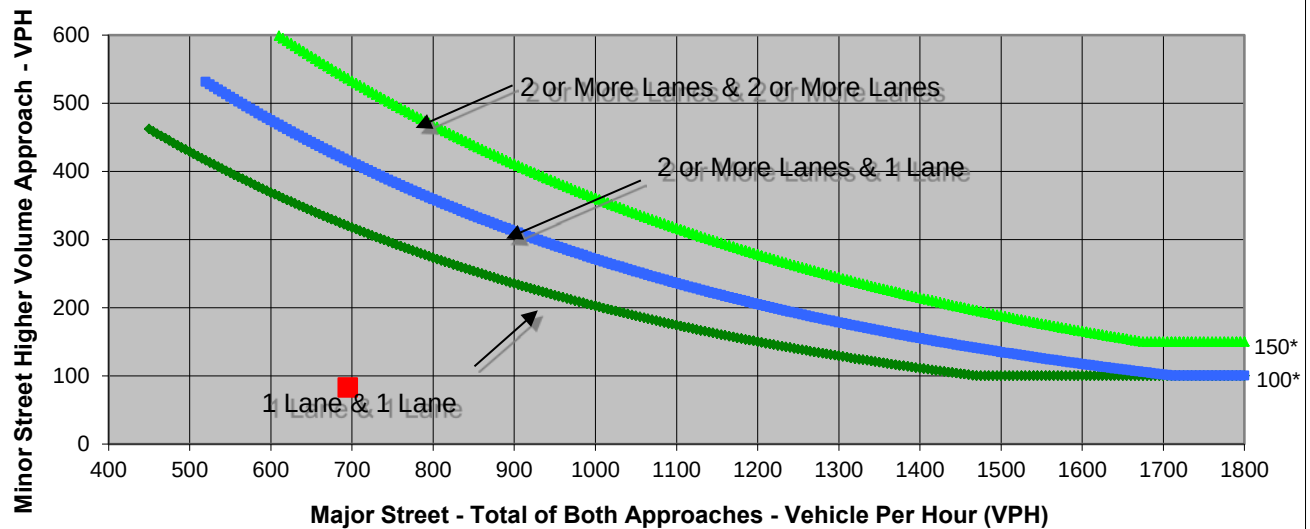
Turn Movement Volumes

	NB	SB	EB	WB
Left	6	0	83	0
Through	686	0	0	1
Right	3	0	0	5
Total	695	0	83	6

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	695	83	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **W. Grand Ave**
 Minor Street **Campbell St.**

Project **Gateway Park Connection**
 Scenario **Near-Term Conditions**
 Peak Hour **SAT**

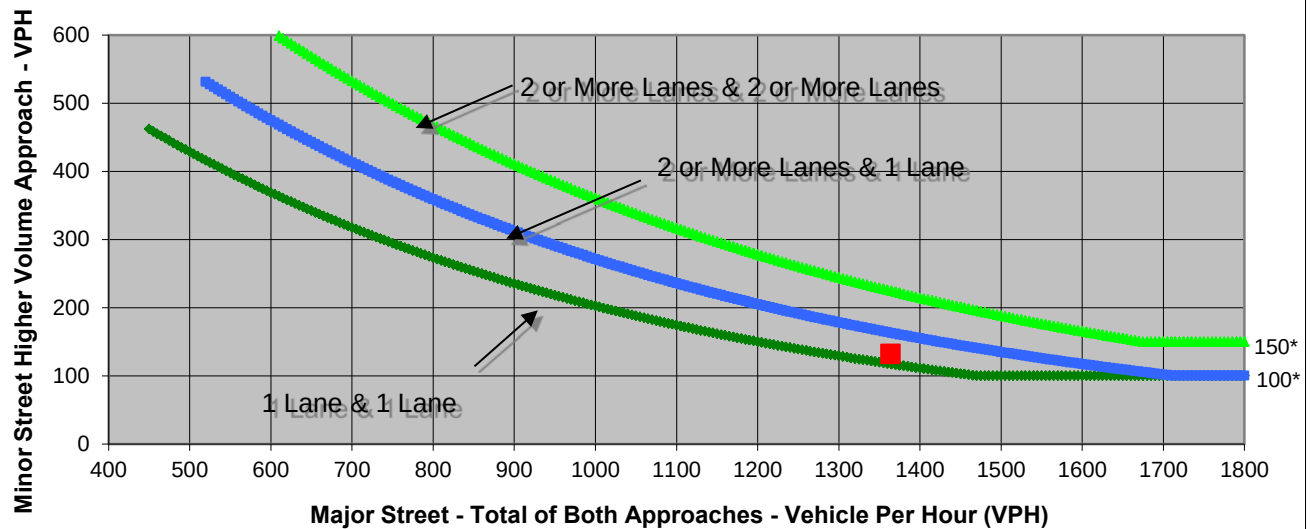
Turn Movement Volumes

	NB	SB	EB	WB
Left	55	4	32	23
Through	5	13	462	799
Right	29	115	42	6
Total	89	132	536	828

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	1,364	132	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Southbound**
 Minor Street **24th Street**

Project **Gateway Park Connection**
 Scenario **Near-Term Conditions**
 Peak Hour **SAT**

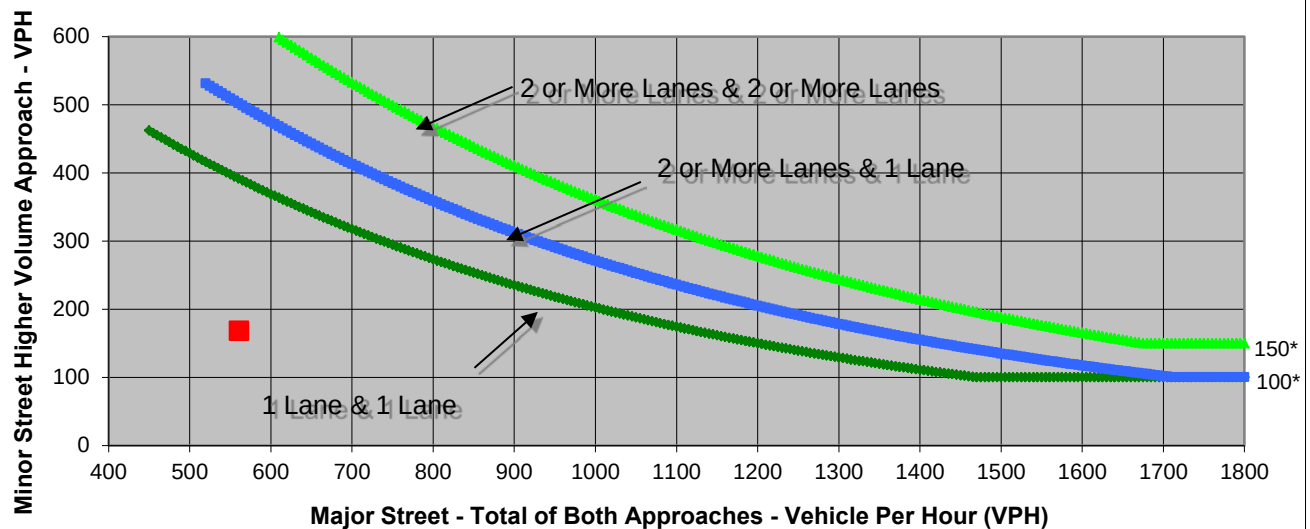
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	168	0
Through	0	561	0	0
Right	0	0	0	0
Total	0	561	168	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	561	168	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Near-Term Conditions**
 Peak Hour **SAT**

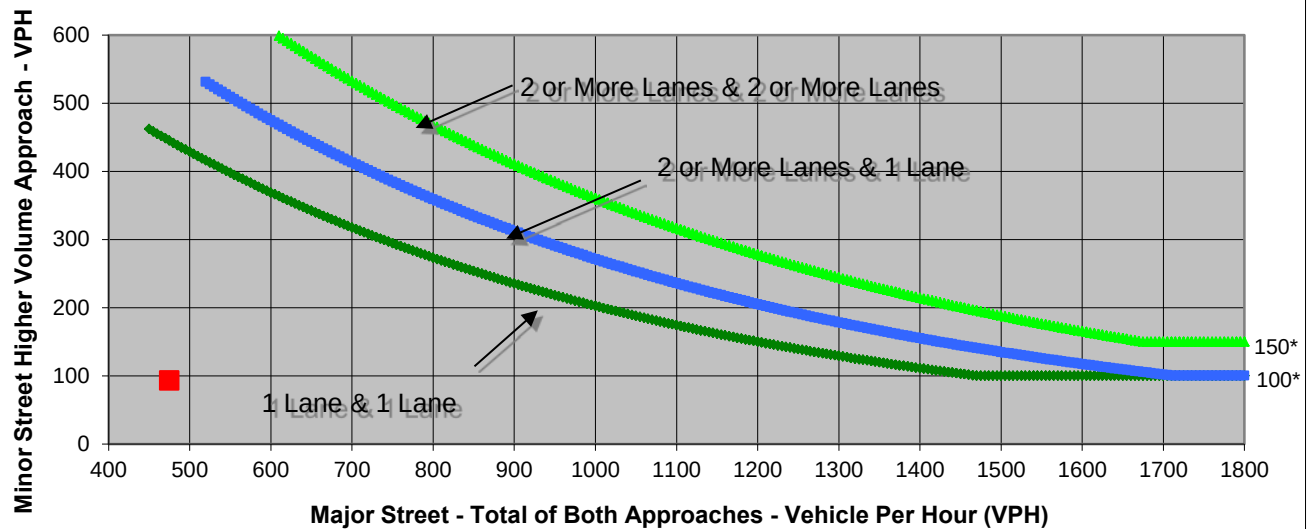
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	32	74	6
Through	0	430	1	0
Right	0	13	18	12
Total	0	475	93	18

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	475	93	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway**
Minor Street **24th Street**

Project **Gateway Park Connection**
Scenario **Near-Term Conditions**
Peak Hour **SAT**

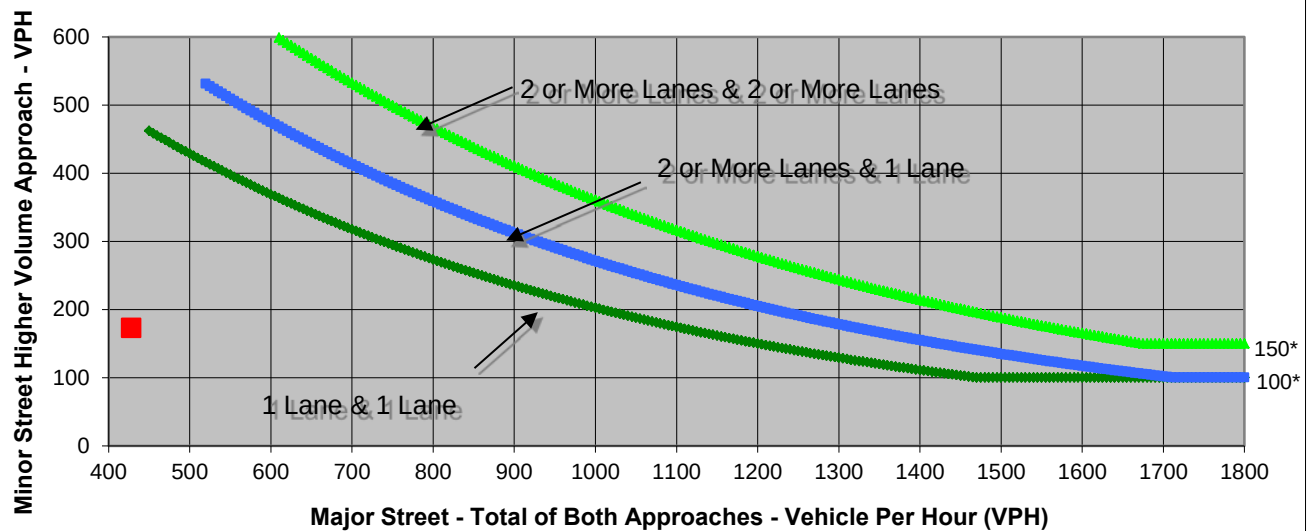
Turn Movement Volumes

	NB	SB	EB	WB
Left	4	0	0	0
Through	424	0	0	164
Right	0	0	0	9
Total	428	0	0	173

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	428	173	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Northbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Near-Term Conditions**
 Peak Hour **SAT**

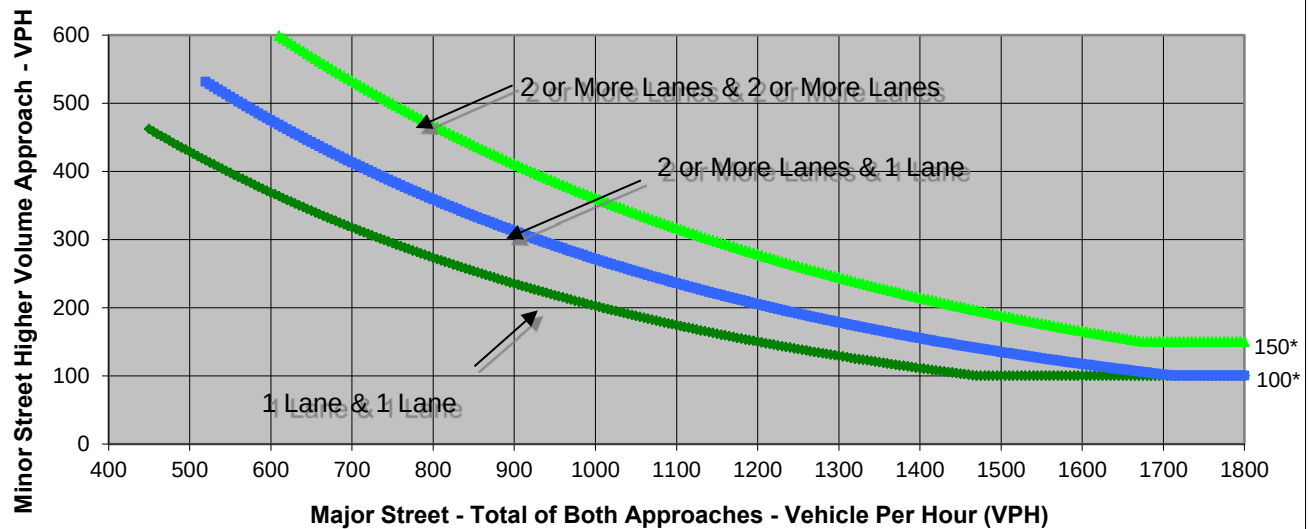
Turn Movement Volumes

	NB	SB	EB	WB
Left	4	0	76	0
Through	340	0	0	1
Right	27	0	0	0
Total	371	0	76	1

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	371	76	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **W. Grand Ave**
Minor Street **Campbell St.**

Project **Gateway Park Connection**
Near-Term with
Scenario **Connection Conditions**
Peak Hour **PM**

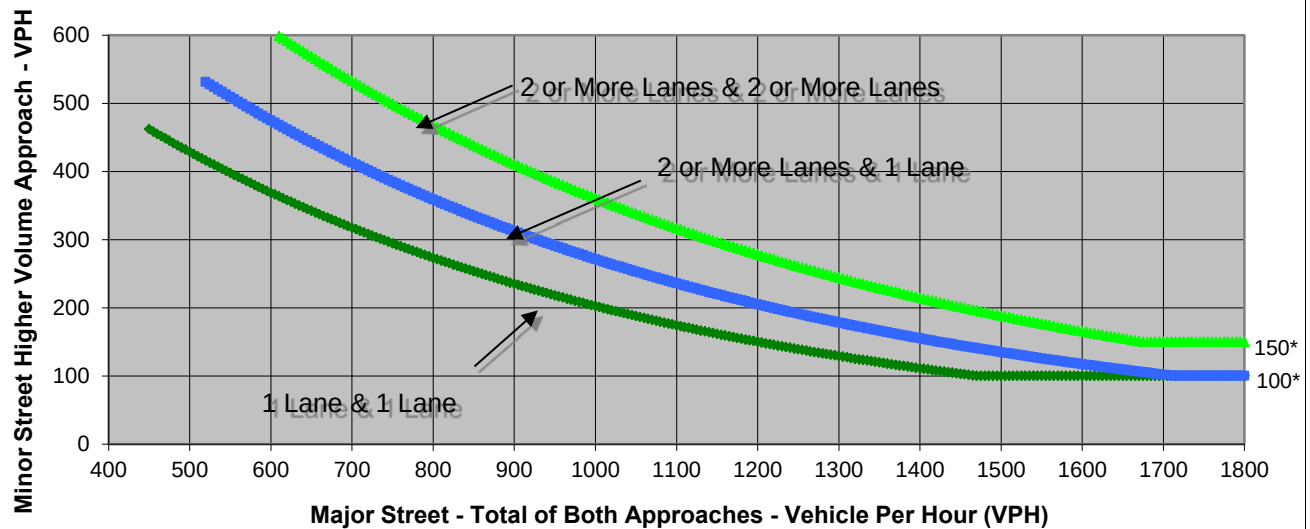
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	3	104	0
Through	0	0	819	845
Right	0	203	0	36
Total	0	206	923	881

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,804	206	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 24th Street

Project Gateway Park Connection
Near-Term with
Scenario Connection Conditions
Peak Hour PM

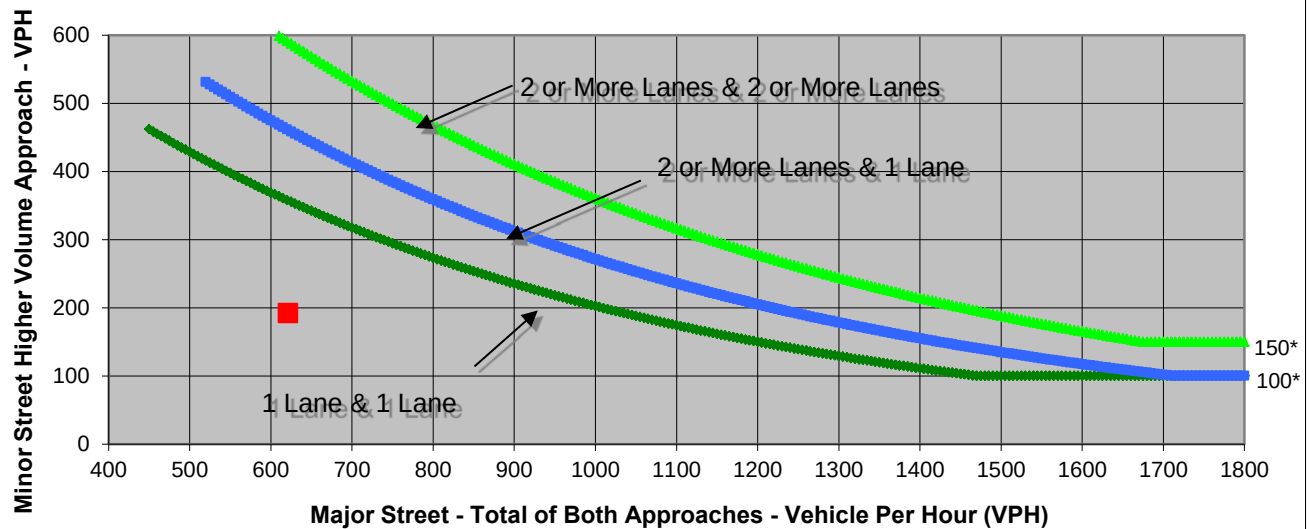
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	192	0
Through	0	621	0	0
Right	0	0	0	0
Total	0	621	192	0

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	621	192	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Near-Term with
Scenario Connection Conditions
Peak Hour PM

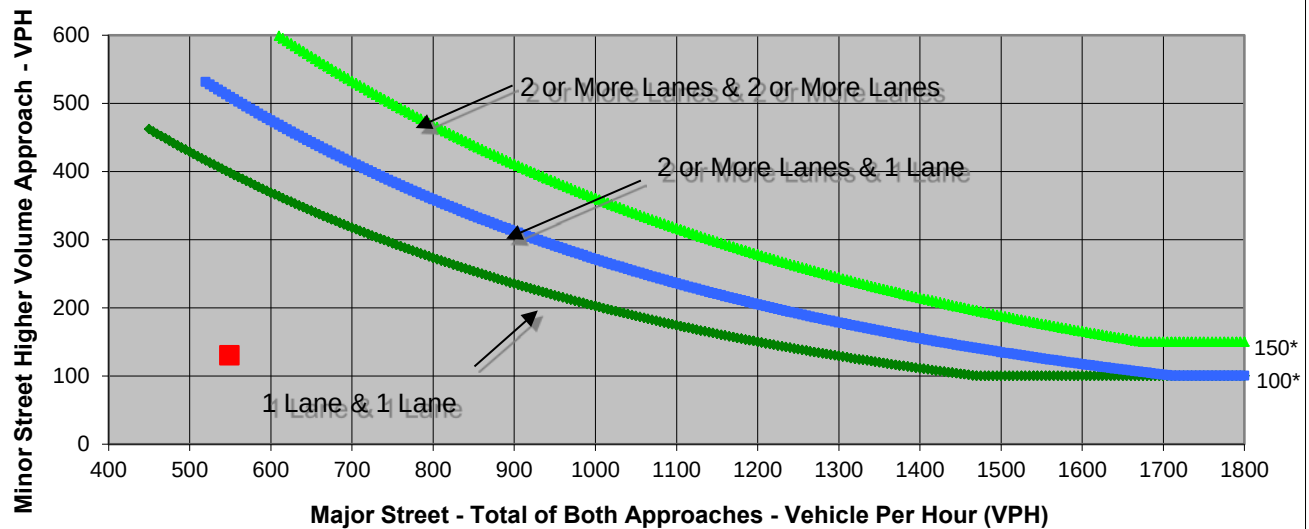
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	8	38	5
Through	0	538	83	1
Right	0	3	9	0
Total	0	549	130	6

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	549	130	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Near-Term with
Scenario Connection Conditions
Peak Hour PM

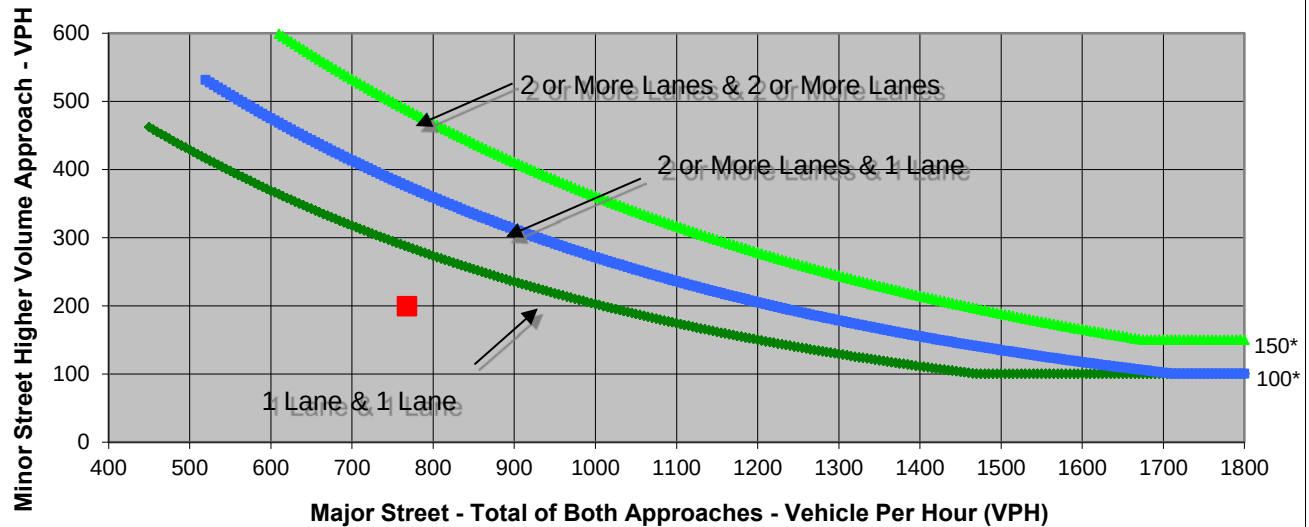
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	0	0
Through	763	0	0	187
Right	0	0	0	12
Total	768	0	0	199

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	768	199	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Near-Term with
Scenario Connection Conditions
Peak Hour PM

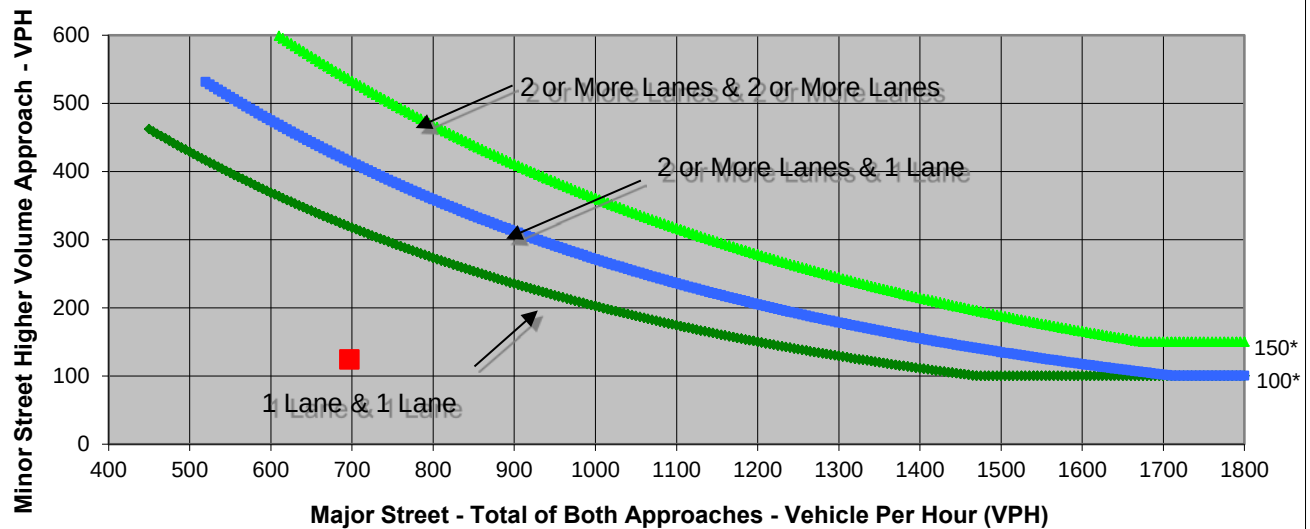
Turn Movement Volumes

	NB	SB	EB	WB
Left	6	0	124	0
Through	688	0	0	1
Right	3	0	0	5
Total	697	0	124	6

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	697	124	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **W. Grand Ave**
Minor Street **Campbell St.**

Project **Gateway Park Connection**
Near-Term with
Scenario **Connection Conditions**
Peak Hour **SAT**

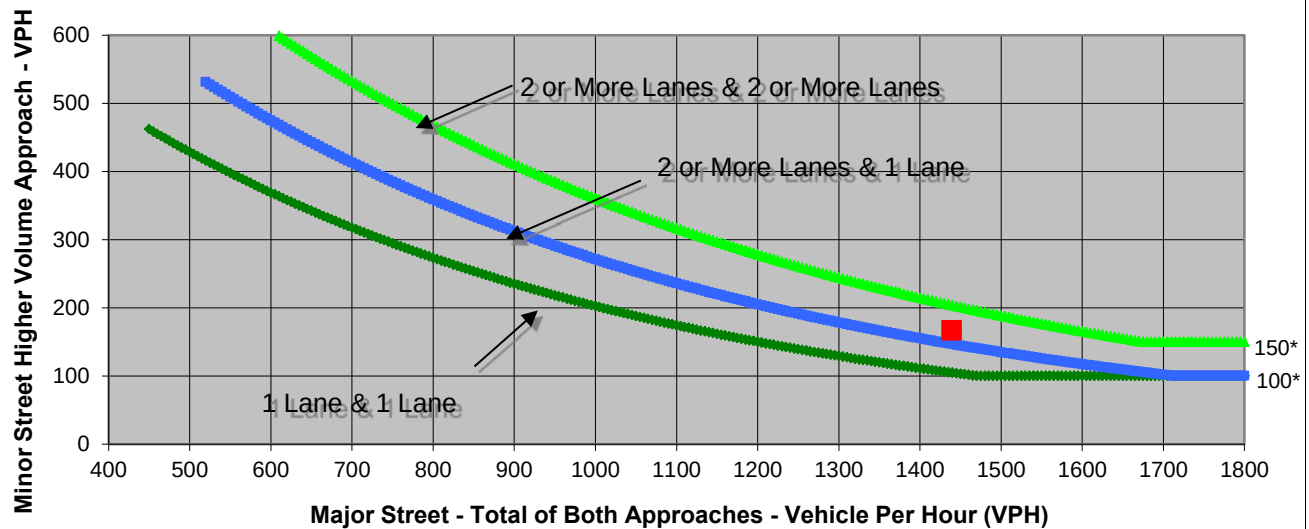
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	4	54	0
Through	0	0	504	829
Right	0	163	0	52
Total	0	167	558	881

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,439	167	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 24th Street

Project Gateway Park Connection
Near-Term with
Scenario Connection Conditions
Peak Hour SAT

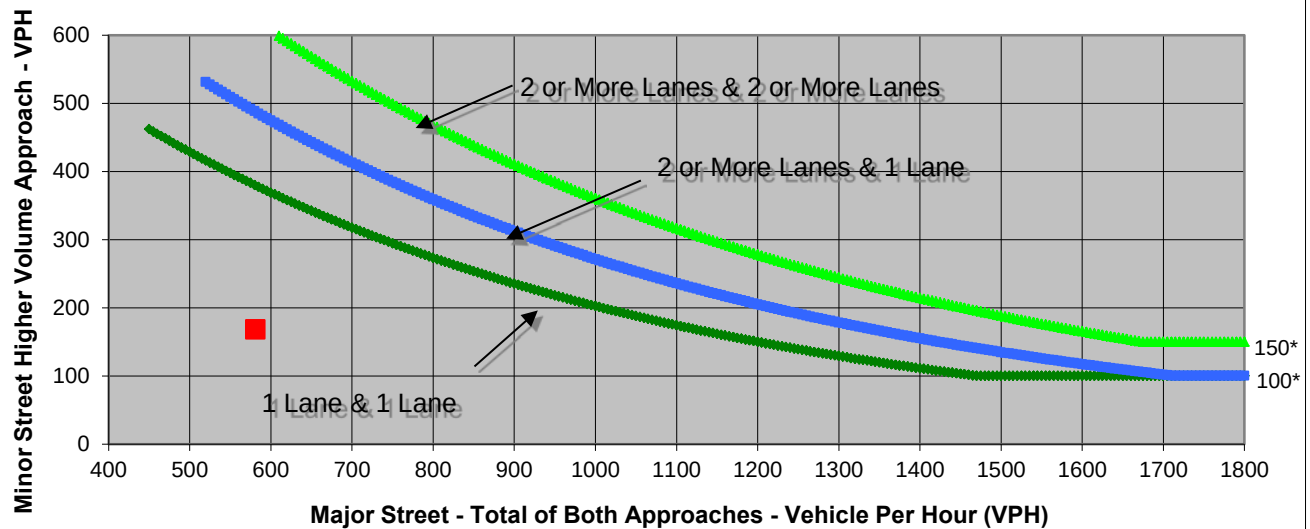
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	168	0
Through	0	581	0	0
Right	0	0	0	0
Total	0	581	168	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Southbound	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	581	168	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Near-Term with
Scenario Connection Conditions
Peak Hour SAT

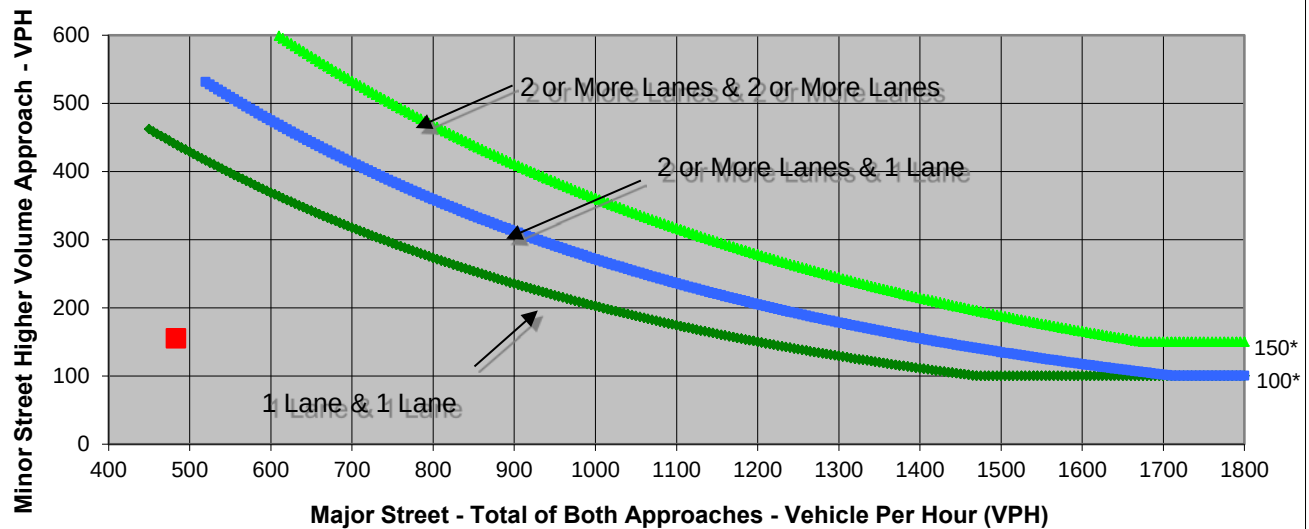
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	32	74	6
Through	0	438	63	0
Right	0	13	18	12
Total	0	483	155	18

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	483	155	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Near-Term with
Scenario Connection Conditions
Peak Hour SAT

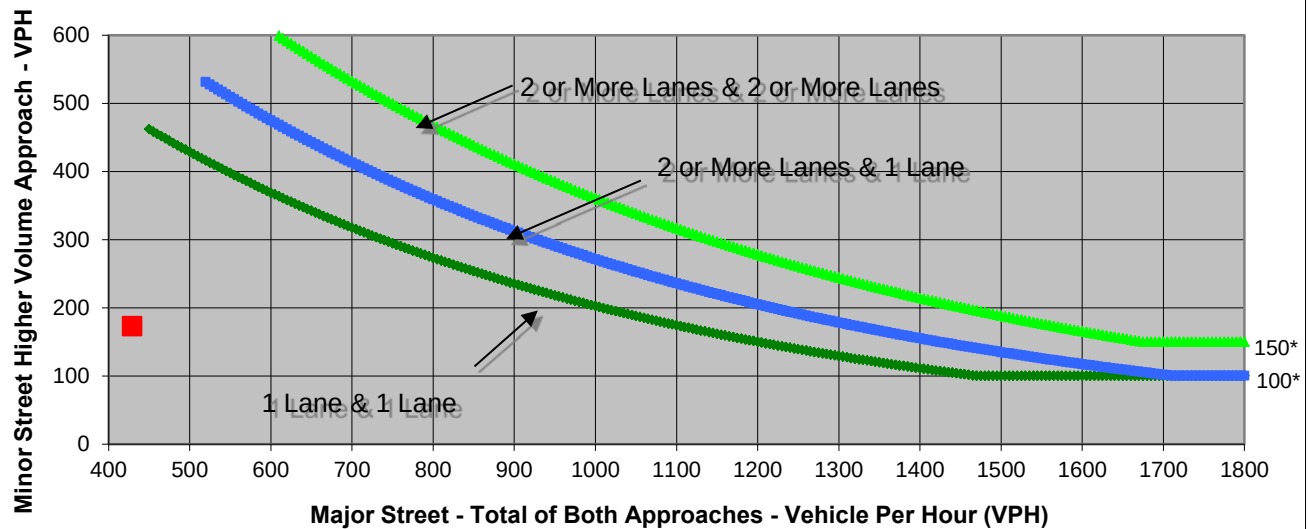
Turn Movement Volumes

	NB	SB	EB	WB
Left	4	0	0	0
Through	425	0	0	164
Right	0	0	0	9
Total	429	0	0	173

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	429	173	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Near-Term with
Scenario Connection Conditions
Peak Hour SAT

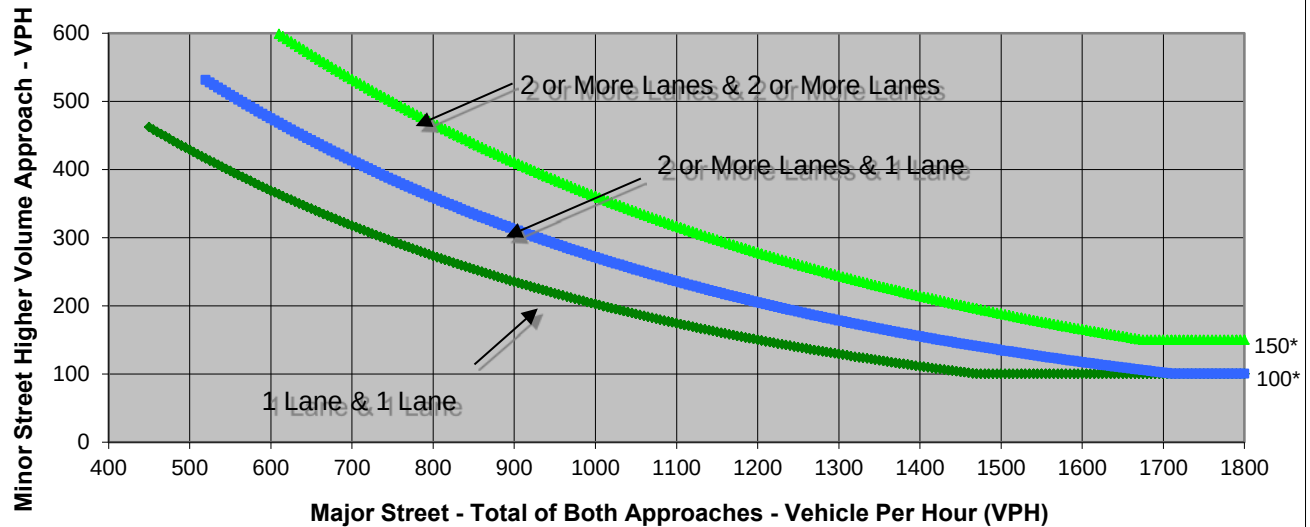
Turn Movement Volumes

	NB	SB	EB	WB
Left	4	0	62	0
Through	346	0	72	1
Right	27	0	0	0
Total	377	0	134	1

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	377	134	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street W. Grand Ave
Minor Street Campbell St.

Project Gateway Park Connection
Near-Term with Connection and
Scenario Park Conditions
Peak Hour PM

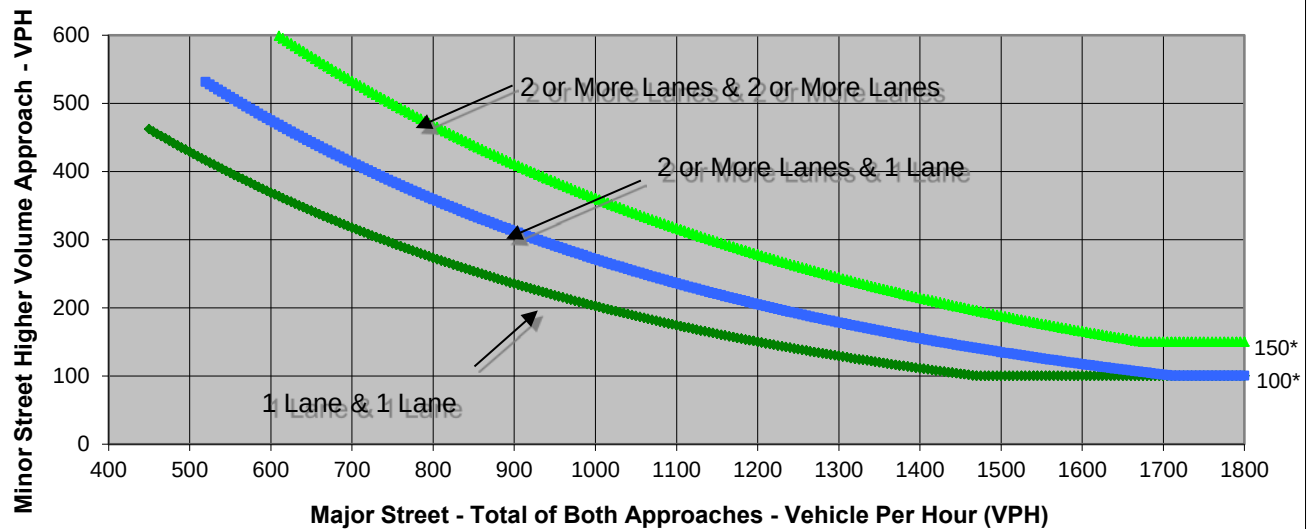
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	3	104	0
Through	0	0	859	902
Right	0	203	0	36
Total	0	206	963	938

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,901	206	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 24th Street

Project Gateway Park Connection
Near-Term with Connection and
Scenario Park Conditions
Peak Hour PM

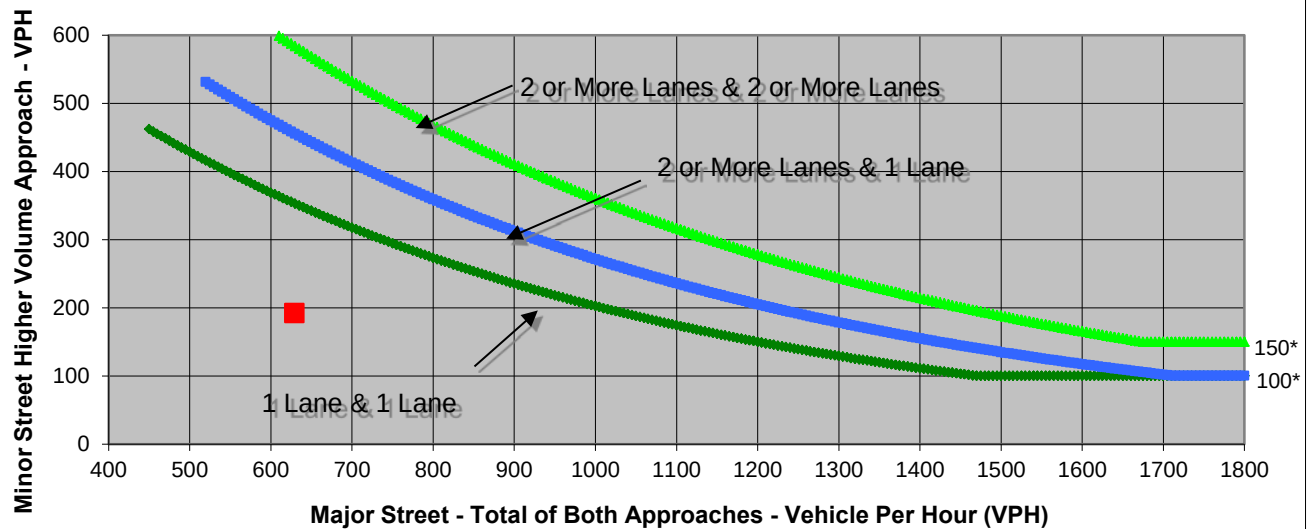
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	192	0
Through	0	629	0	0
Right	0	0	0	0
Total	0	629	192	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	629	192	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Southbound**
Minor Street **20th Street**

Project **Gateway Park Connection**
Near-Term with Connection and
Park Conditions
Scenario **Park Conditions**
Peak Hour **PM**

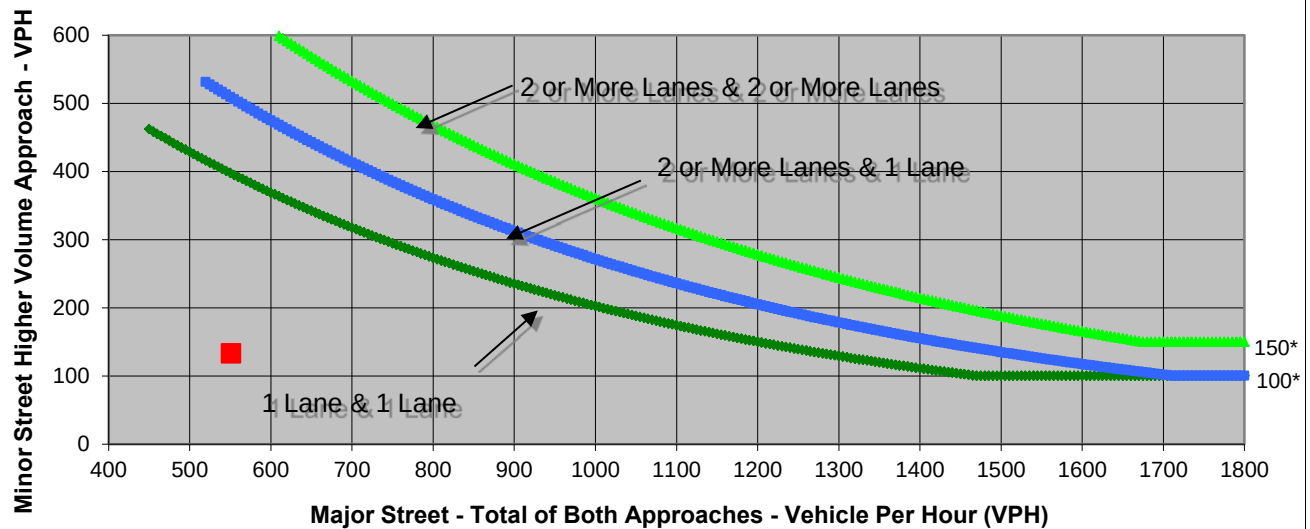
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	8	38	5
Through	0	540	86	1
Right	0	3	9	0
Total	0	551	133	6

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Southbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	551	133	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Northbound
Minor Street 24th Street

Project Gateway Park Connection
Near-Term with Connection and
Scenario Park Conditions
Peak Hour PM

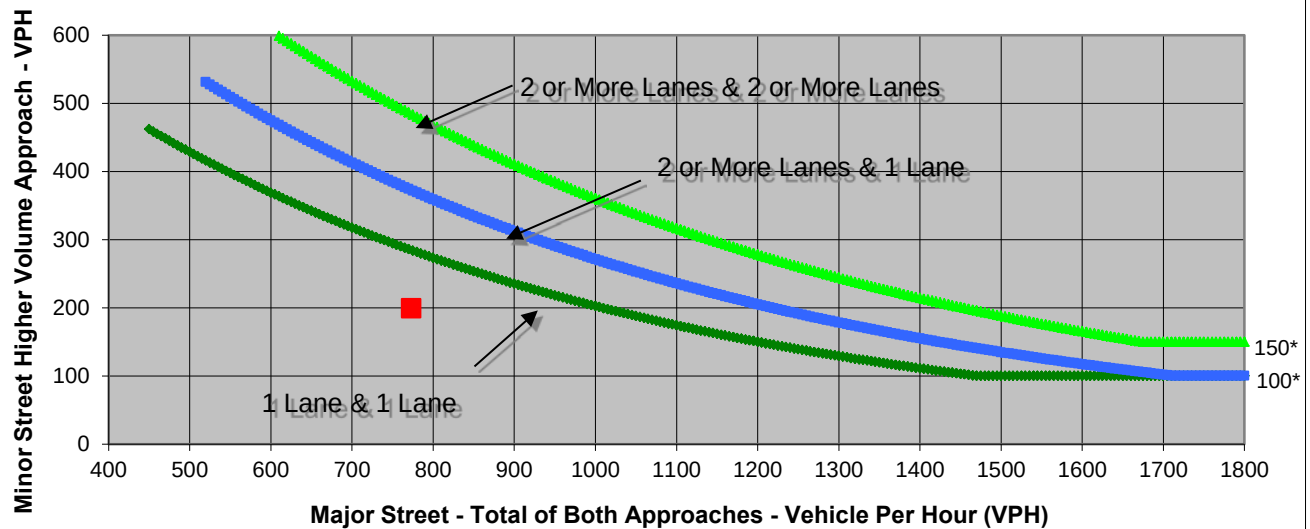
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	0	0
Through	768	0	0	187
Right	0	0	0	12
Total	773	0	0	199

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	773	199	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Northbound**
Minor Street **20th Street**

Project **Gateway Park Connection**
Near-Term with Connection and
Park Conditions
Scenario **Park Conditions**
Peak Hour **PM**

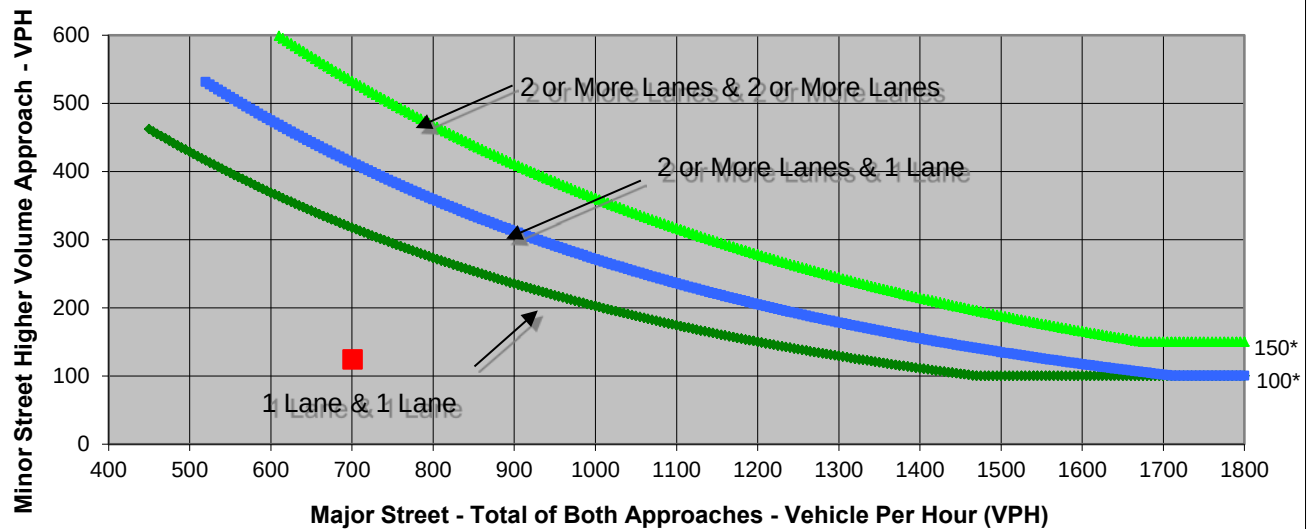
Turn Movement Volumes

	NB	SB	EB	WB
Left	6	0	124	0
Through	692	0	0	1
Right	3	0	0	5
Total	701	0	124	6

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	701	124	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street W. Grand Ave
Minor Street Campbell St.

Project Gateway Park Connection
Near-Term with Connection and
Scenario Park Conditions
Peak Hour SAT

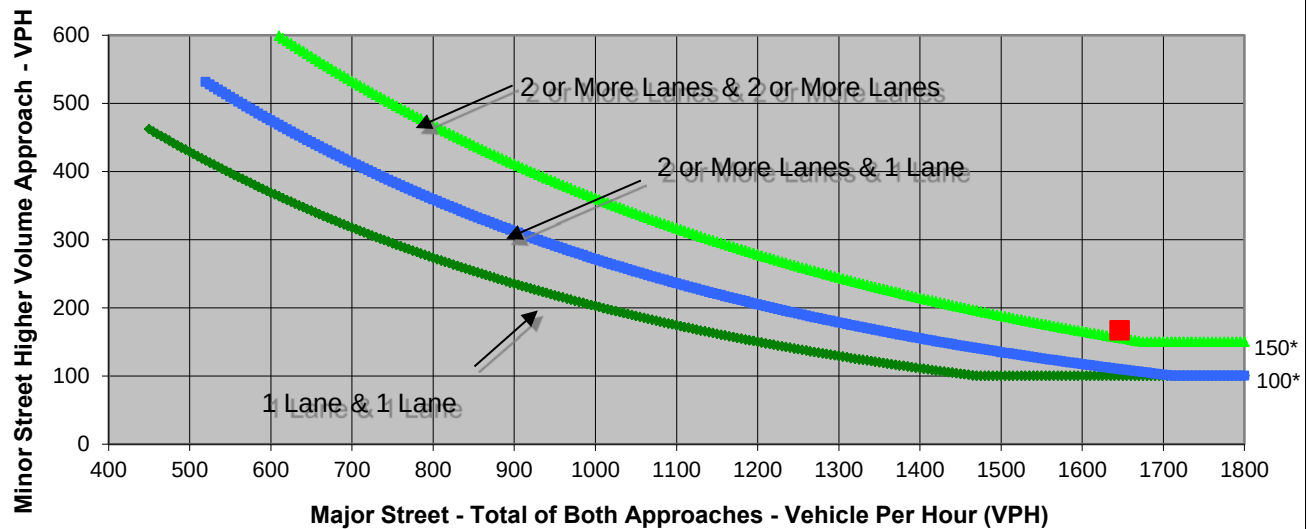
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	4	54	0
Through	0	0	608	932
Right	0	163	0	52
Total	0	167	662	984

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,646	167	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 24th Street

Project Gateway Park Connection
Near-Term with Connection and
Scenario Park Conditions
Peak Hour SAT

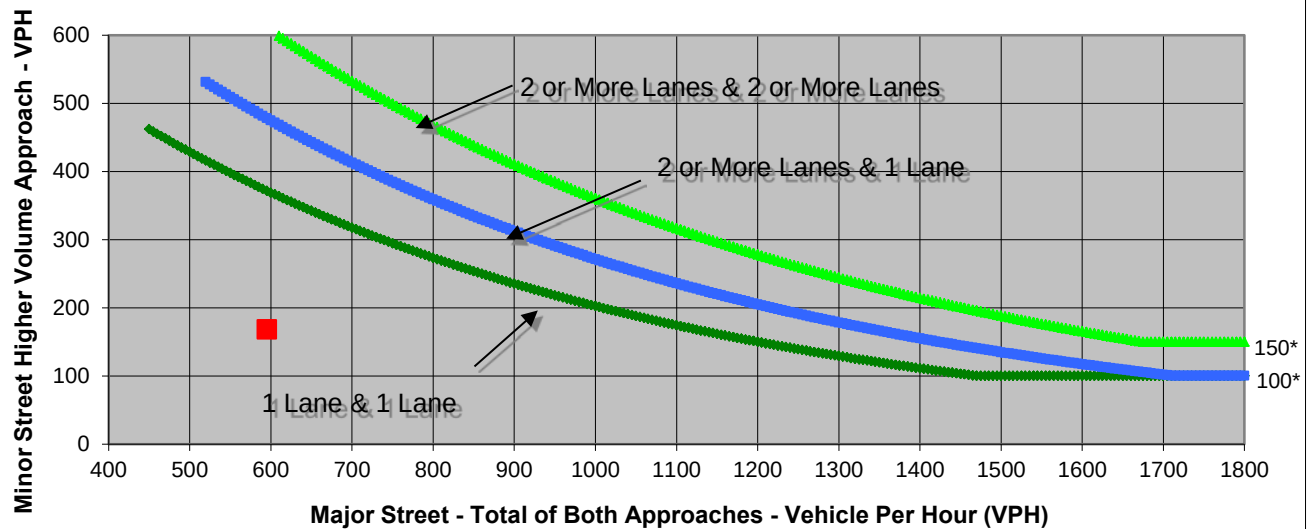
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	168	0
Through	0	595	0	0
Right	0	0	0	0
Total	0	595	168	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Southbound	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	595	168	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Southbound**
Minor Street **20th Street**

Project **Gateway Park Connection**
Near-Term with Connection and
Park Conditions
Scenario **Park Conditions**
Peak Hour **SAT**

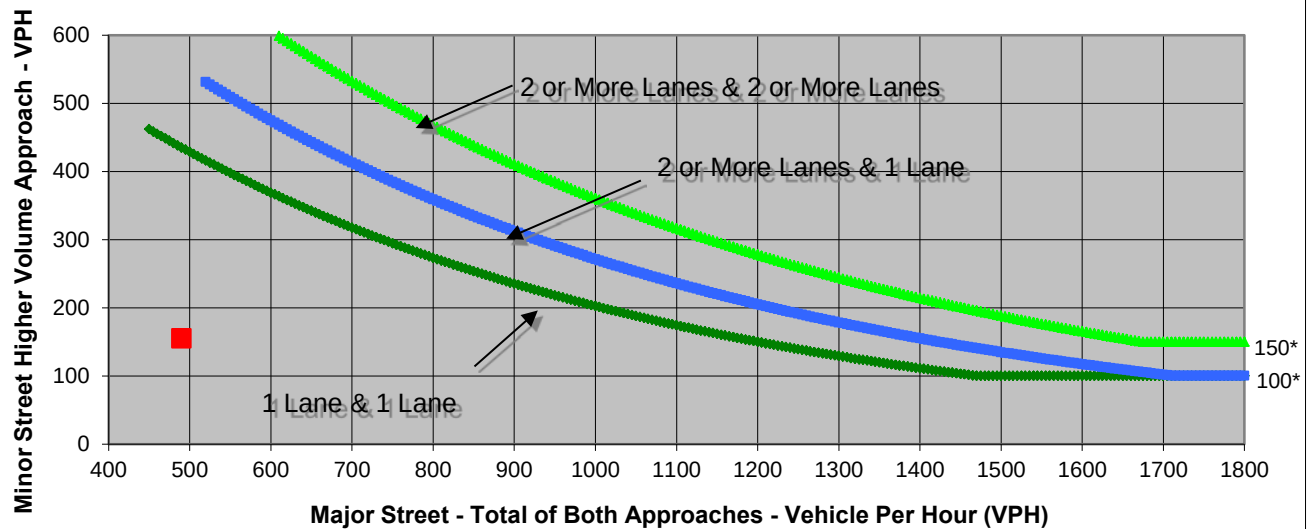
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	32	74	6
Through	0	445	63	0
Right	0	13	18	12
Total	0	490	155	18

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Southbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	490	155	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Northbound
Minor Street 24th Street

Project Gateway Park Connection
Near-Term with Connection and
Scenario Park Conditions
Peak Hour SAT

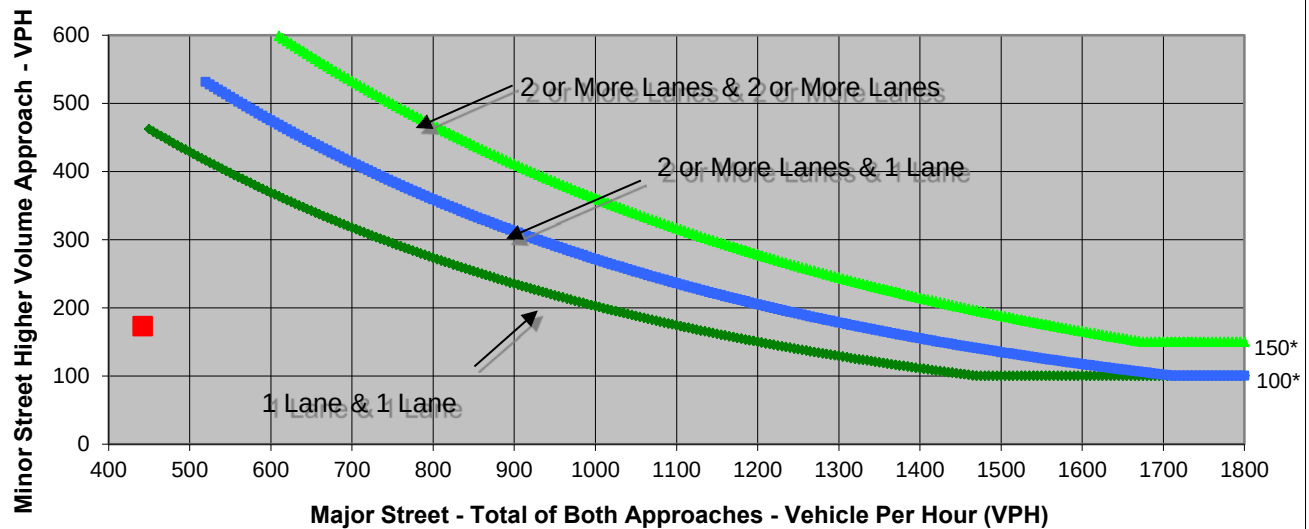
Turn Movement Volumes

	NB	SB	EB	WB
Left	4	0	0	0
Through	438	0	0	164
Right	0	0	0	9
Total	442	0	0	173

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	442	173	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Northbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Near-Term with Connection and Park Conditions**
 Peak Hour **SAT**

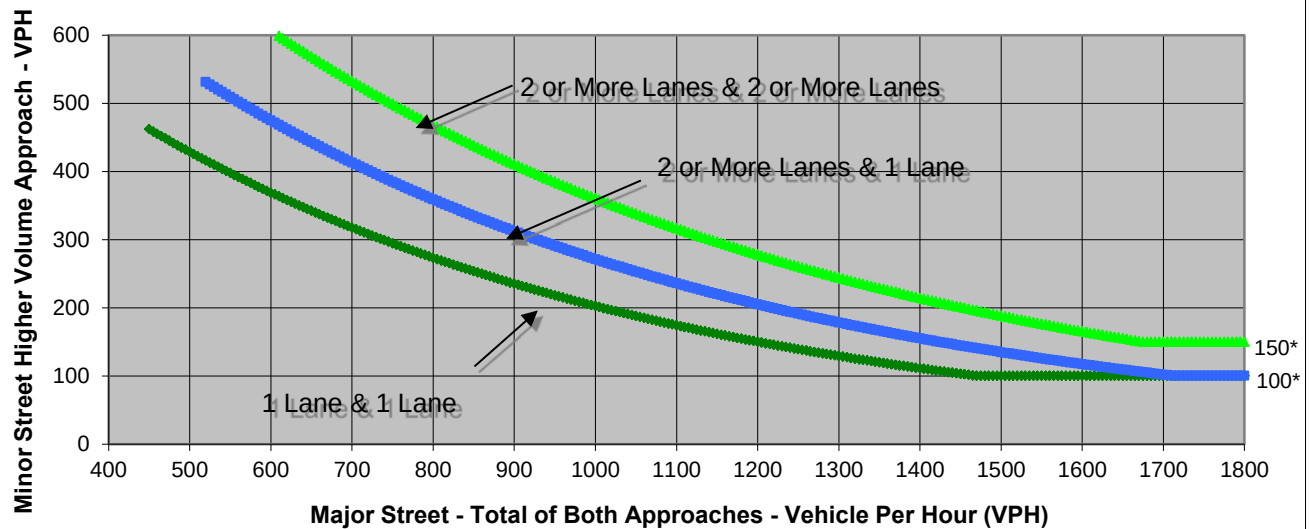
Turn Movement Volumes

	NB	SB	EB	WB
Left	4	0	62	0
Through	354	0	76	1
Right	27	0	0	0
Total	385	0	138	1

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	385	138	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **W. Grand Ave**
 Minor Street **Campbell St.**

Project **Gateway Park Connection**
 Scenario **Cumulative Conditions**
 Peak Hour **PM**

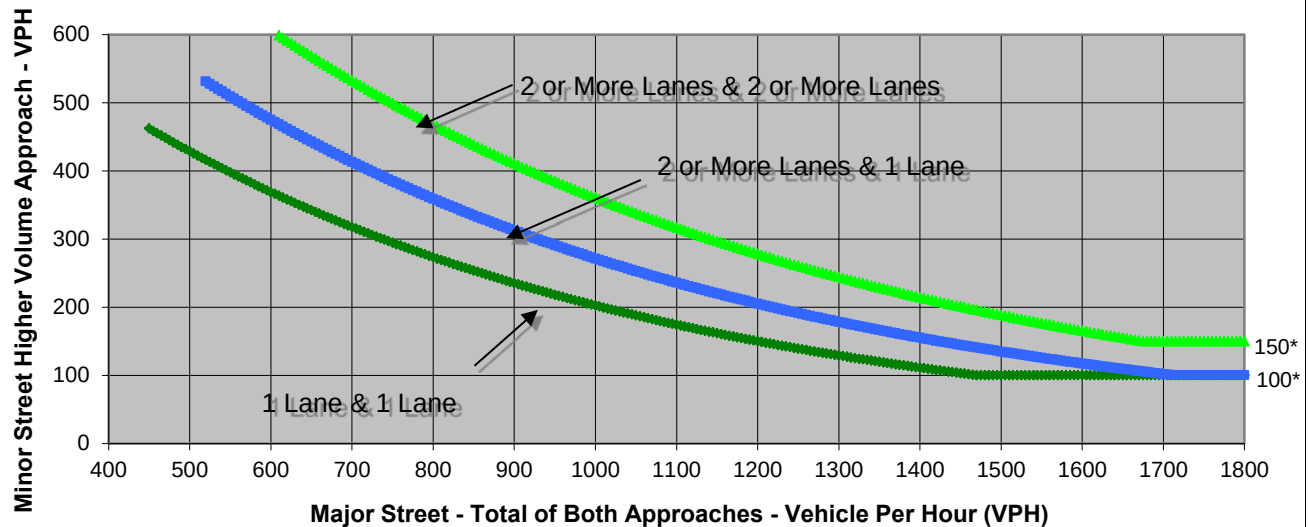
Turn Movement Volumes

	NB	SB	EB	WB
Left	54	3	128	30
Through	0	7	1,008	1,079
Right	22	232	67	17
Total	76	242	1,203	1,126

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	W. Grand Ave	Campbell St.	
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	2,329	242	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **24th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative Conditions**
 Peak Hour **PM**

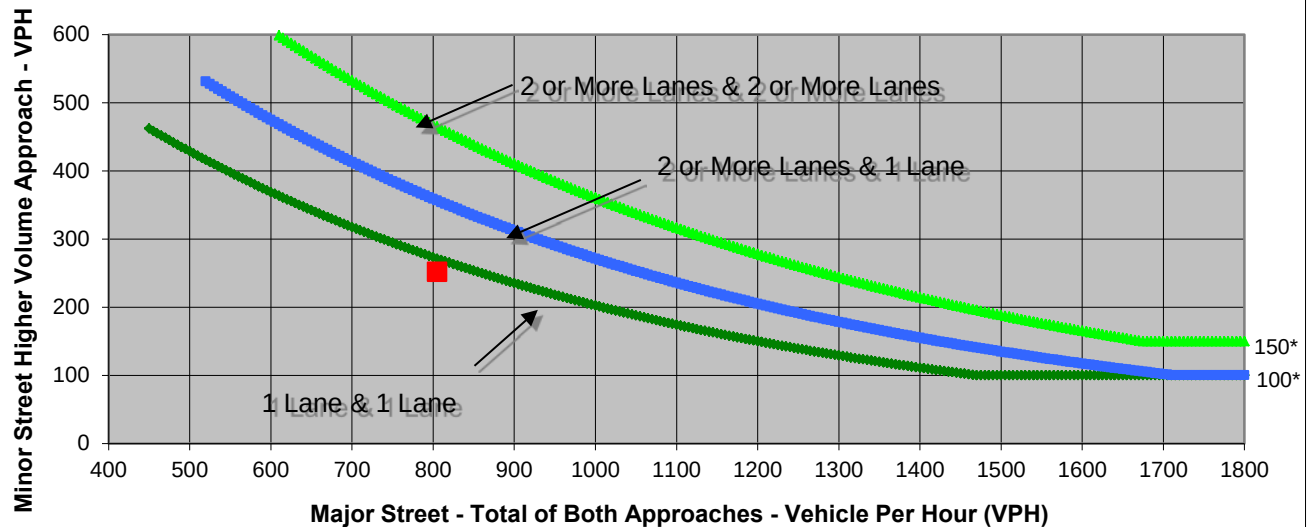
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	252	0
Through	0	805	0	0
Right	0	0	0	0
Total	0	805	252	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	805	252	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative Conditions**
 Peak Hour **PM**

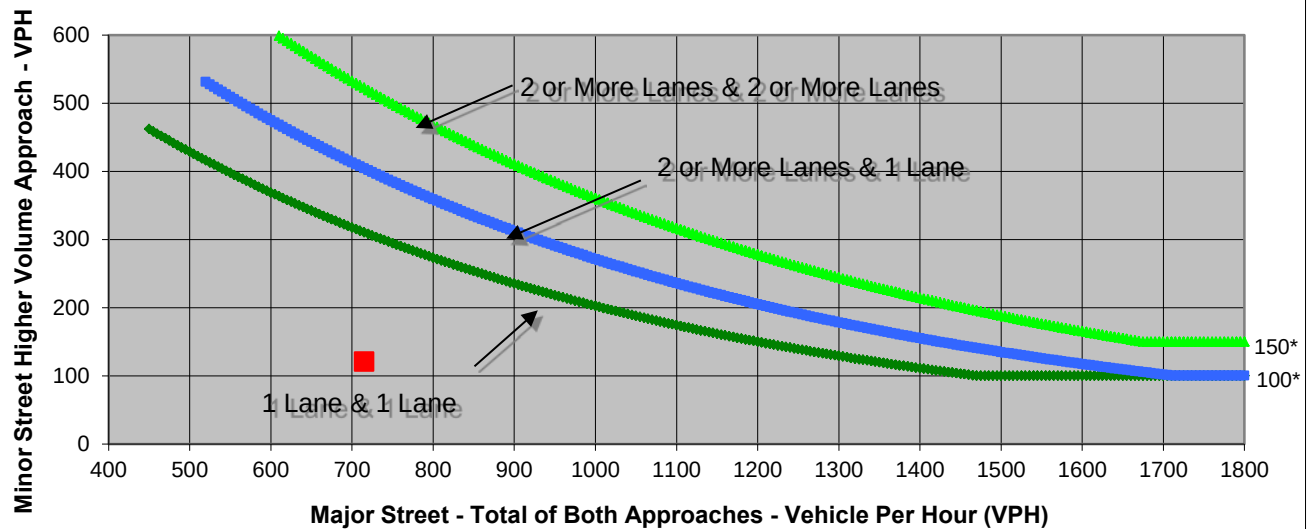
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	10	0	7
Through	0	702	109	2
Right	0	3	12	0
Total	0	715	121	9

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	715	121	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway**
Minor Street **24th Street**

Project **Gateway Park Connection**
Scenario **Cumulative Conditions**
Peak Hour **PM**

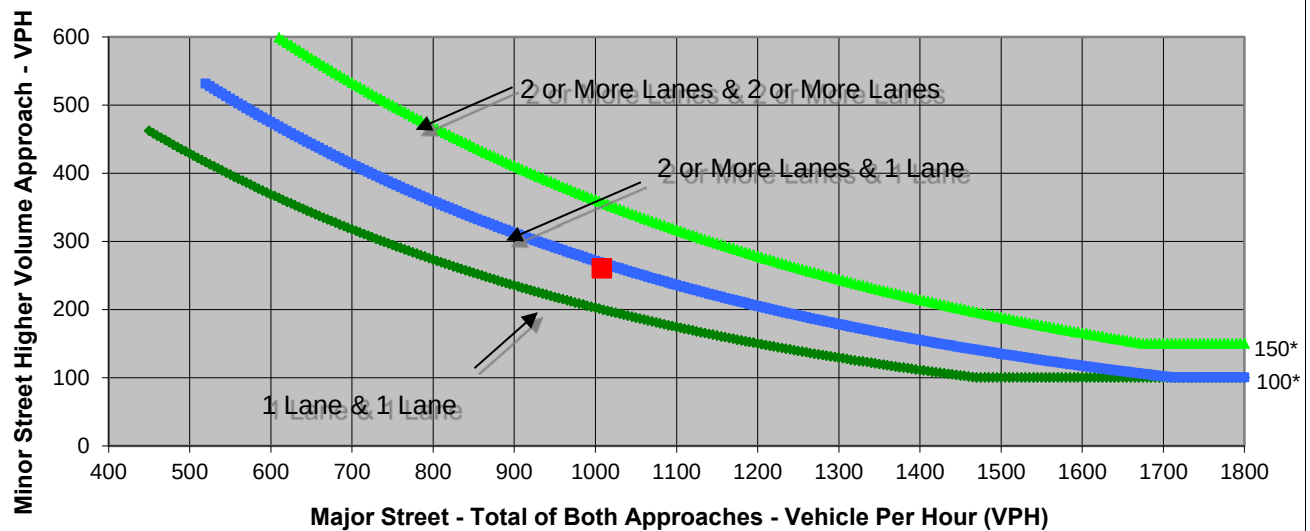
Turn Movement Volumes

	NB	SB	EB	WB
Left	7	0	0	0
Through	1,001	0	0	245
Right	0	0	0	15
Total	1,008	0	0	260

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	1,008	260	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Cumulative Conditions
Peak Hour PM

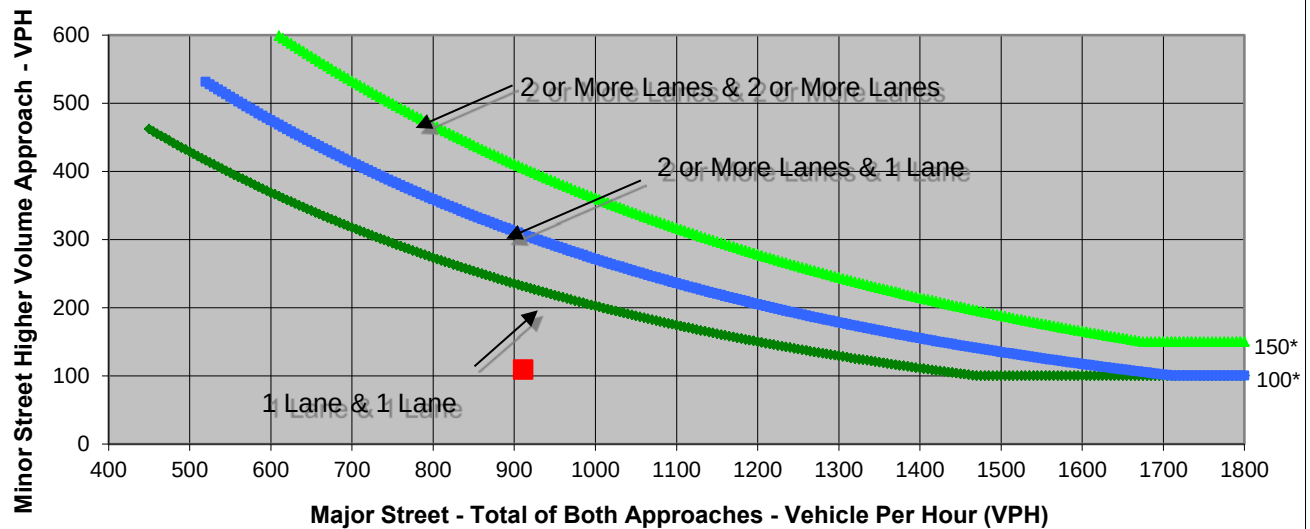
Turn Movement Volumes

	NB	SB	EB	WB
Left	8	0	109	0
Through	900	0	0	2
Right	3	0	0	7
Total	911	0	109	9

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	911	109	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **W. Grand Ave**
 Minor Street **Campbell St.**

Project **Gateway Park Connection**
 Scenario **Cumulative Conditions**
 Peak Hour **SAT**

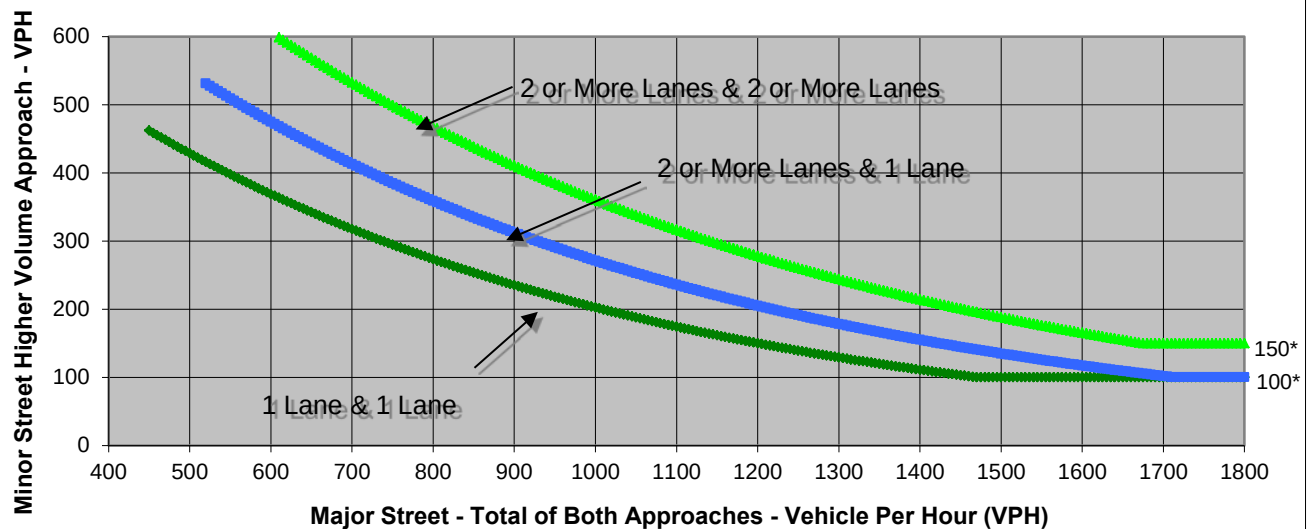
Turn Movement Volumes

	NB	SB	EB	WB
Left	72	5	55	30
Through	7	17	606	1,048
Right	39	151	55	8
Total	118	173	716	1,086

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	W. Grand Ave	Campbell St.	
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,802	173	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **24th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative Conditions**
 Peak Hour **SAT**

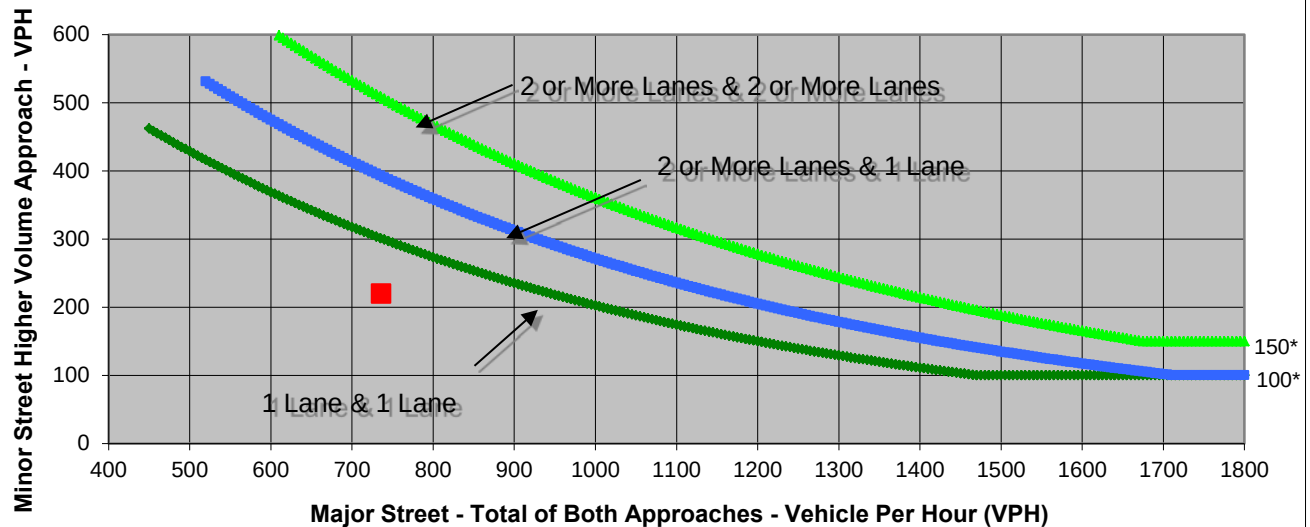
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	220	0
Through	0	736	0	0
Right	0	0	0	0
Total	0	736	220	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	736	220	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative Conditions**
 Peak Hour **SAT**

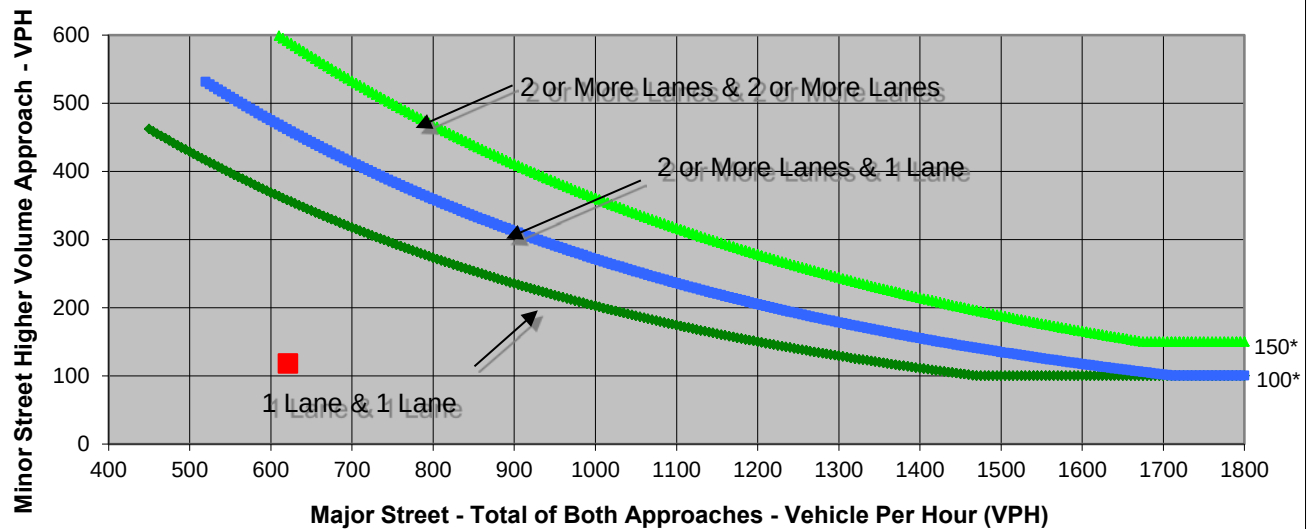
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	42	92	0
Through	0	562	2	99
Right	0	17	24	0
Total	0	621	118	99

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	621	118	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway**
Minor Street **24th Street**

Project **Gateway Park Connection**
Scenario **Cumulative Conditions**
Peak Hour **SAT**

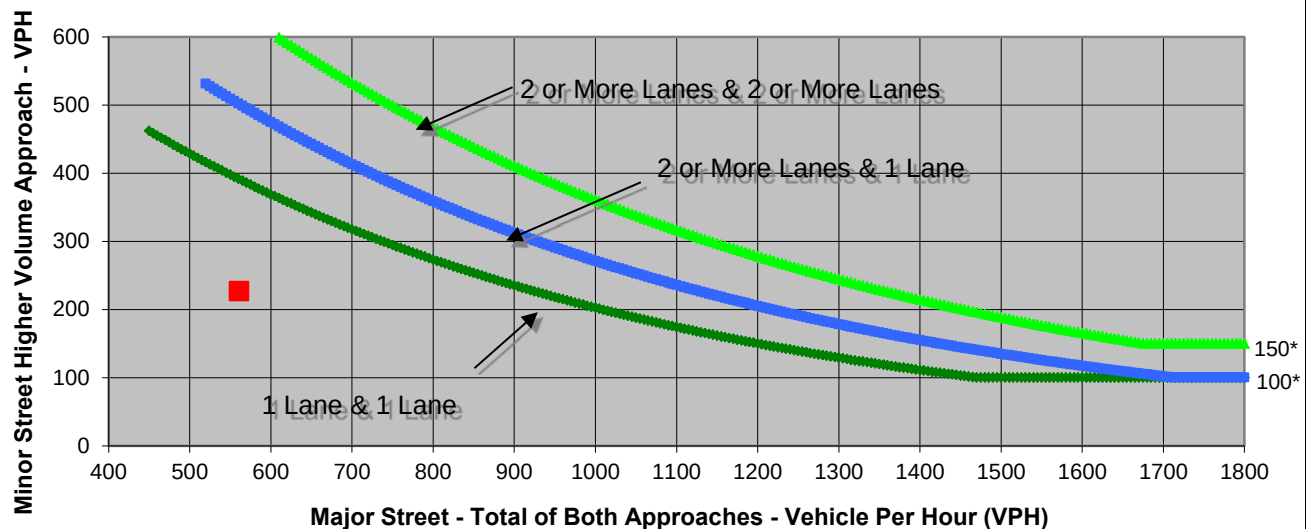
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	0	0
Through	556	0	0	215
Right	0	0	0	12
Total	561	0	0	227

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	561	227	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **Mandela Parkway Northbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative Conditions**
 Peak Hour **SAT**

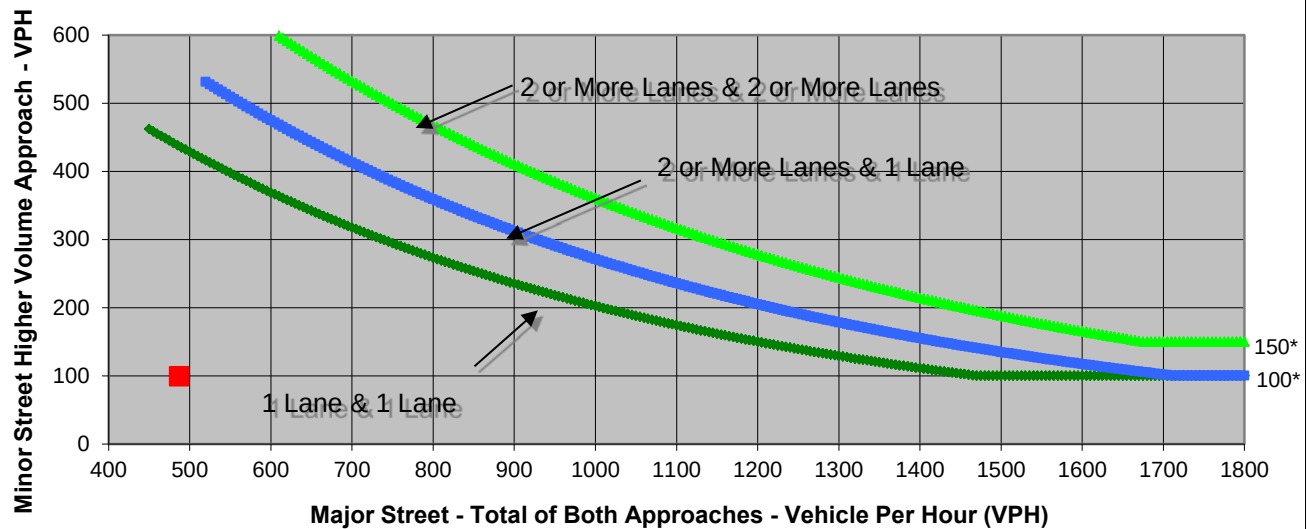
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	0	0
Through	447	0	99	2
Right	35	0	0	0
Total	487	0	99	2

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	487	99	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **W. Grand Ave**
Minor Street **Campbell St.**

Project **Gateway Park Connection**
Scenario **Cumulative with Park Conditions**
Peak Hour **PM**

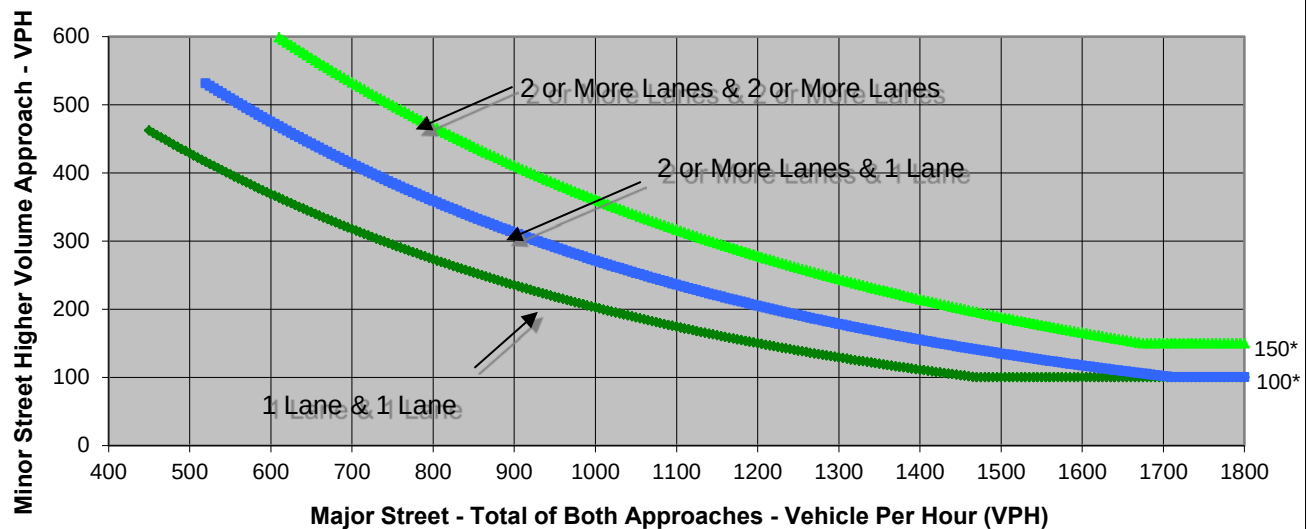
Turn Movement Volumes

	NB	SB	EB	WB
Left	54	3	128	30
Through	0	7	1,048	1,136
Right	22	232	67	17
Total	76	242	1,243	1,183

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	W. Grand Ave	Campbell St.	
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	2,426	242	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **24th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative with Park Conditions**
 Peak Hour **PM**

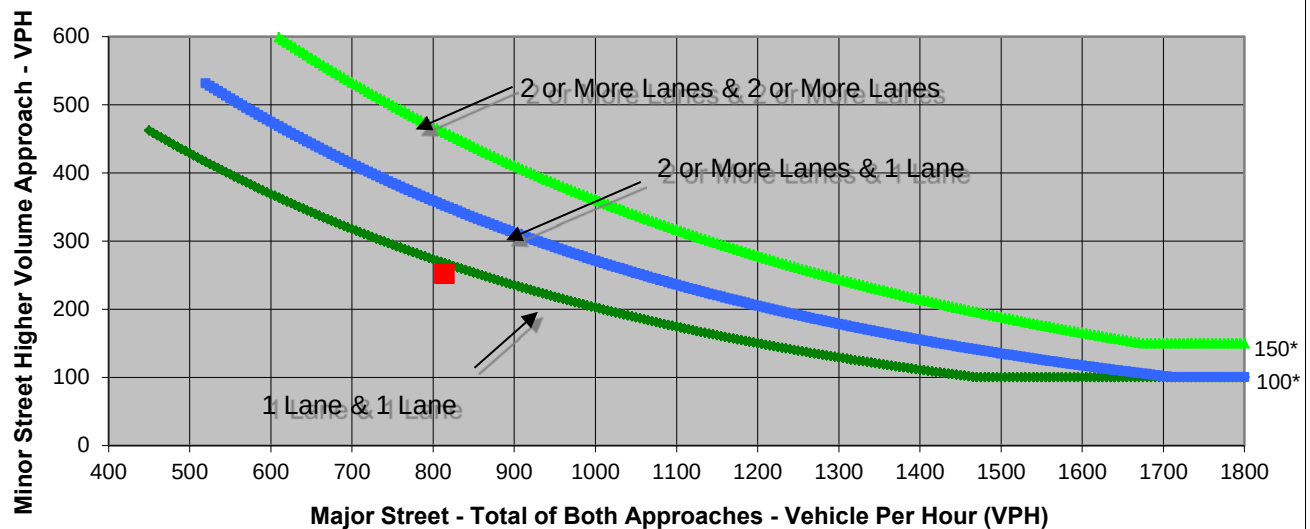
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	252	0
Through	0	814	0	0
Right	0	0	0	0
Total	0	814	252	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	814	252	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative with Park Conditions**
 Peak Hour **PM**

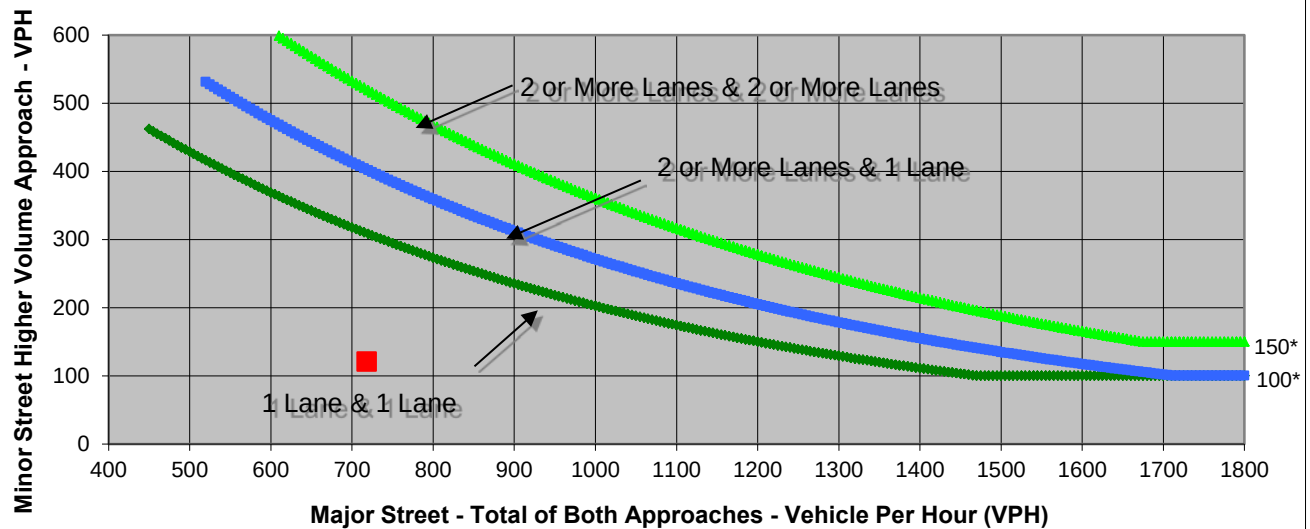
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	10	0	7
Through	0	705	109	2
Right	0	3	12	0
Total	0	718	121	9

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	718	121	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Scenario Cumulative with Park Conditions
Peak Hour PM

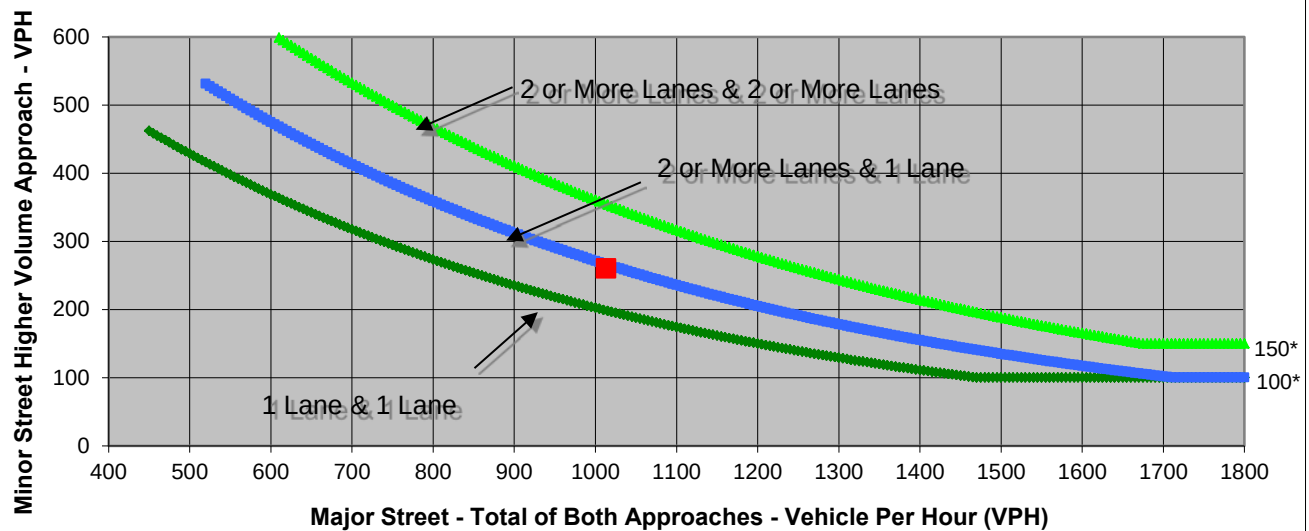
Turn Movement Volumes

	NB	SB	EB	WB
Left	7	0	0	0
Through	1,006	0	0	245
Right	0	0	0	15
Total	1,013	0	0	260

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	1,013	260	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Cumulative Conditions
Peak Hour PM

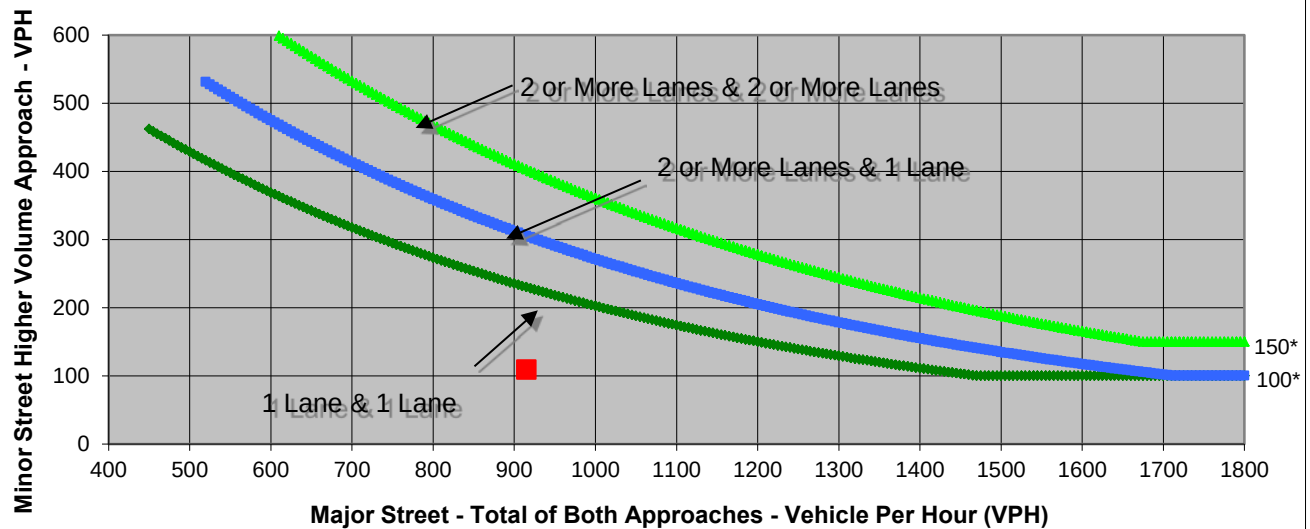
Turn Movement Volumes

	NB	SB	EB	WB
Left	8	0	109	0
Through	904	0	0	2
Right	3	0	0	7
Total	915	0	109	9

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	915	109	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street **W. Grand Ave**
 Minor Street **Campbell St.**

Project **Gateway Park Connection**
 Scenario **Cumulative with Park Conditions**
 Peak Hour **SAT**

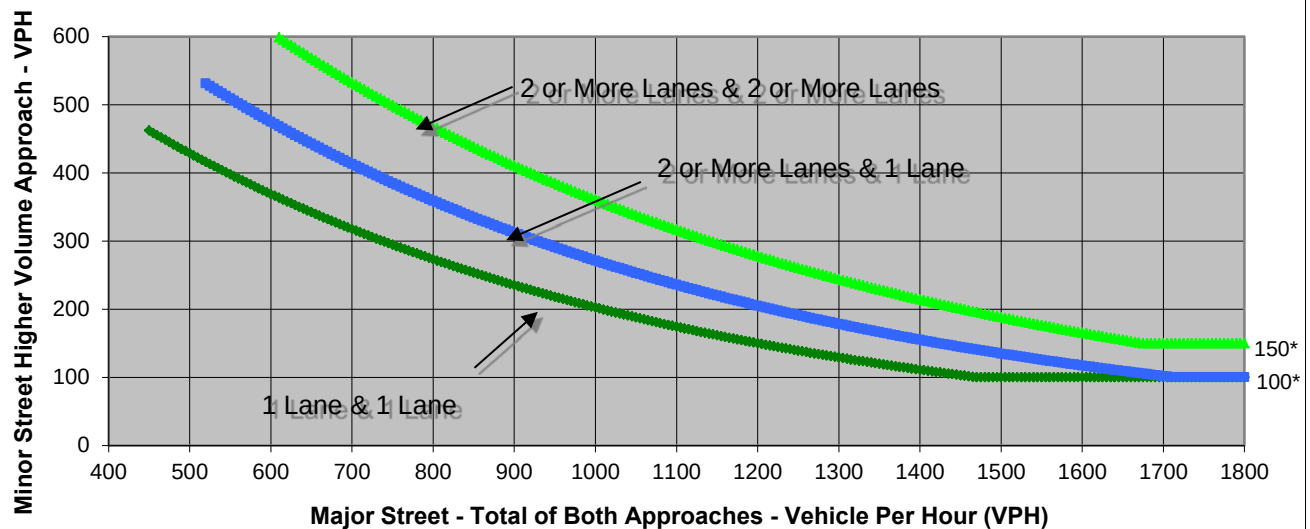
Turn Movement Volumes

	NB	SB	EB	WB
Left	72	5	55	30
Through	7	17	710	1,151
Right	39	151	55	8
Total	118	173	820	1,189

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	W. Grand Ave	Campbell St.	
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	2,009	173	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **24th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative with Park Conditions**
 Peak Hour **SAT**

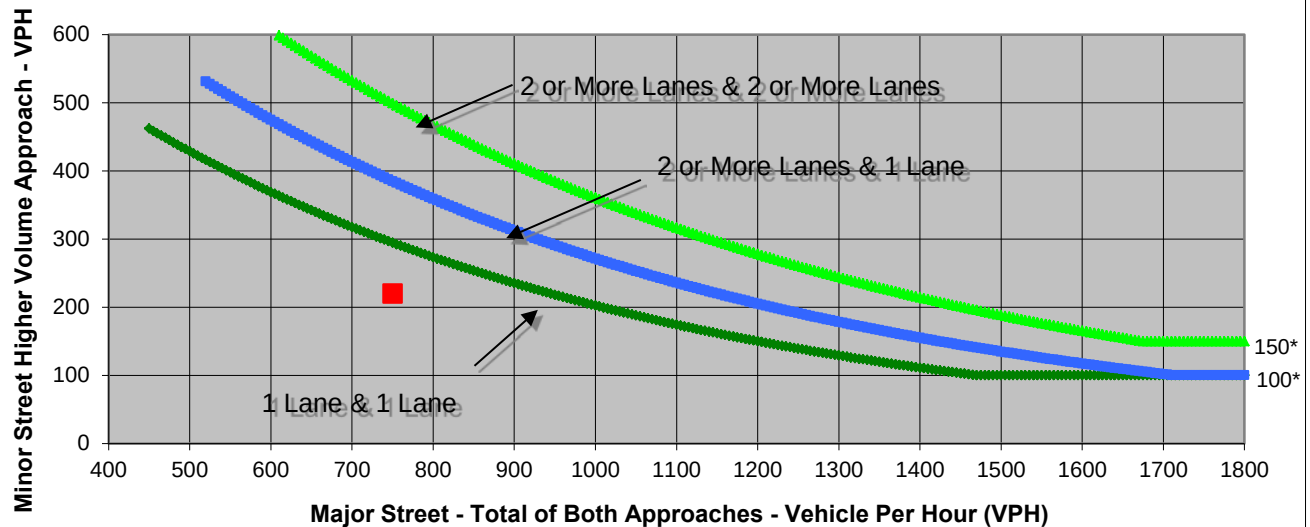
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	220	0
Through	0	750	0	0
Right	0	0	0	0
Total	0	750	220	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	750	220	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Southbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative with Park Conditions**
 Peak Hour **SAT**

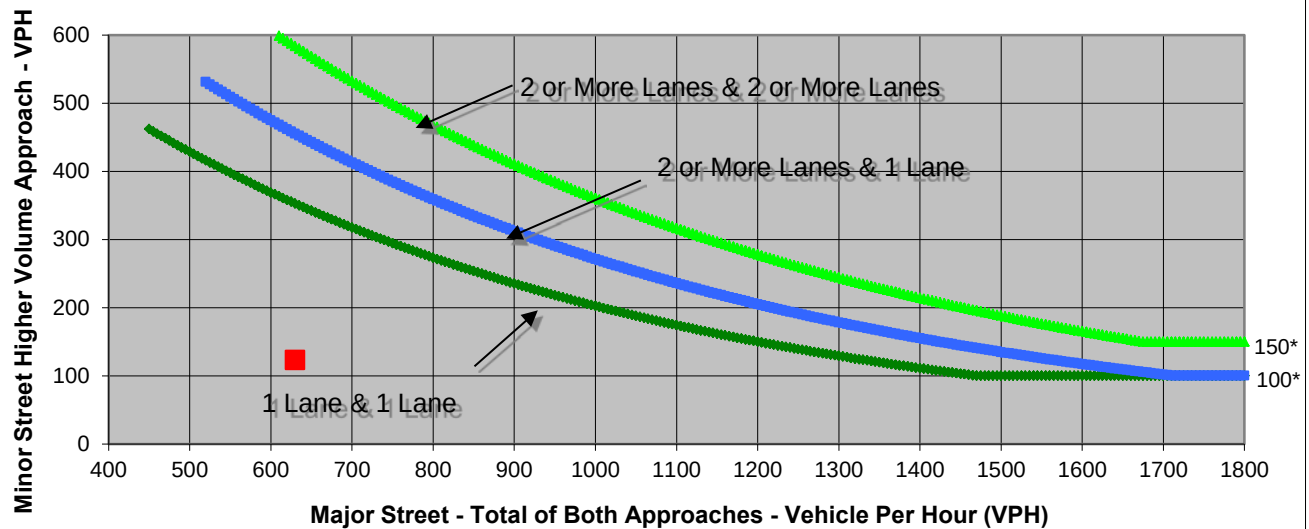
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	42	97	8
Through	0	571	2	0
Right	0	17	24	15
Total	0	630	123	23

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	630	123	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Scenario Cumulative with Park Conditions
Peak Hour SAT

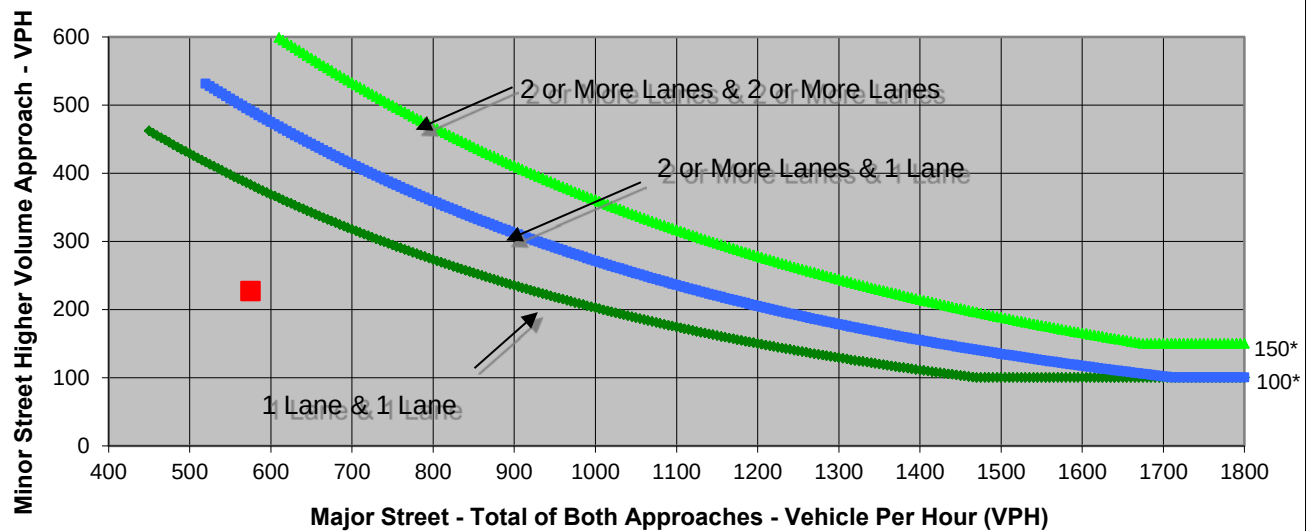
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	0	0
Through	570	0	0	215
Right	0	0	0	12
Total	575	0	0	227

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	575	227	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street **Mandela Parkway Northbound**
 Minor Street **20th Street**

Project **Gateway Park Connection**
 Scenario **Cumulative Conditions**
 Peak Hour **SAT**

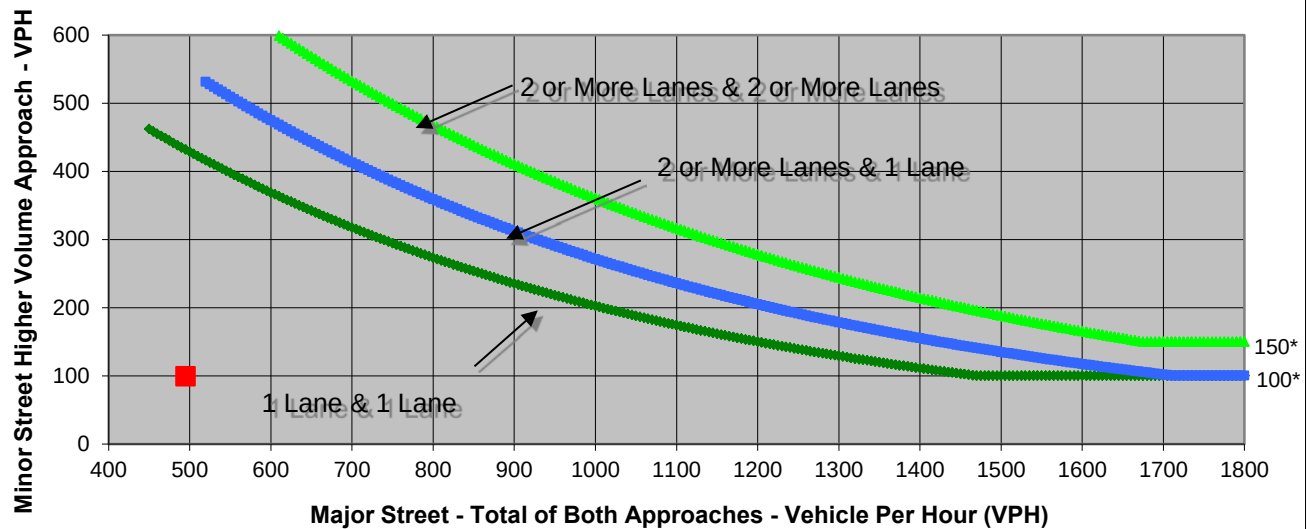
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	99	0
Through	455	0	0	2
Right	35	0	0	0
Total	495	0	99	2

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	495	99	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street W. Grand Ave
Minor Street Campbell St.

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour PM

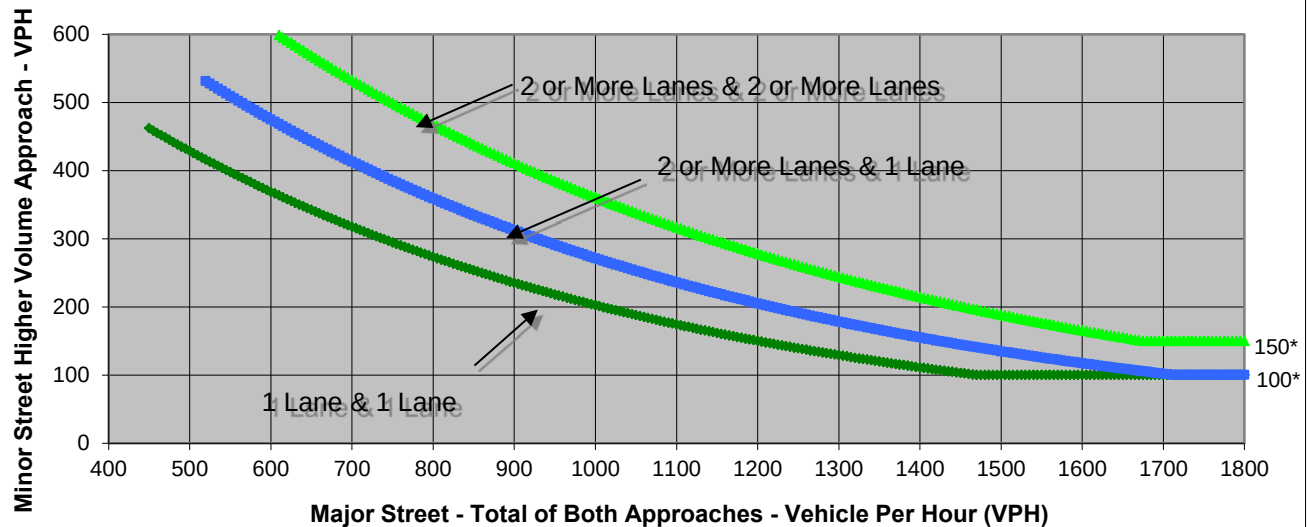
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	3	135	0
Through	0	0	1,075	1,108
Right	0	265	0	43
Total	0	268	1,210	1,151

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	2,361	268	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 24th Street

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour PM

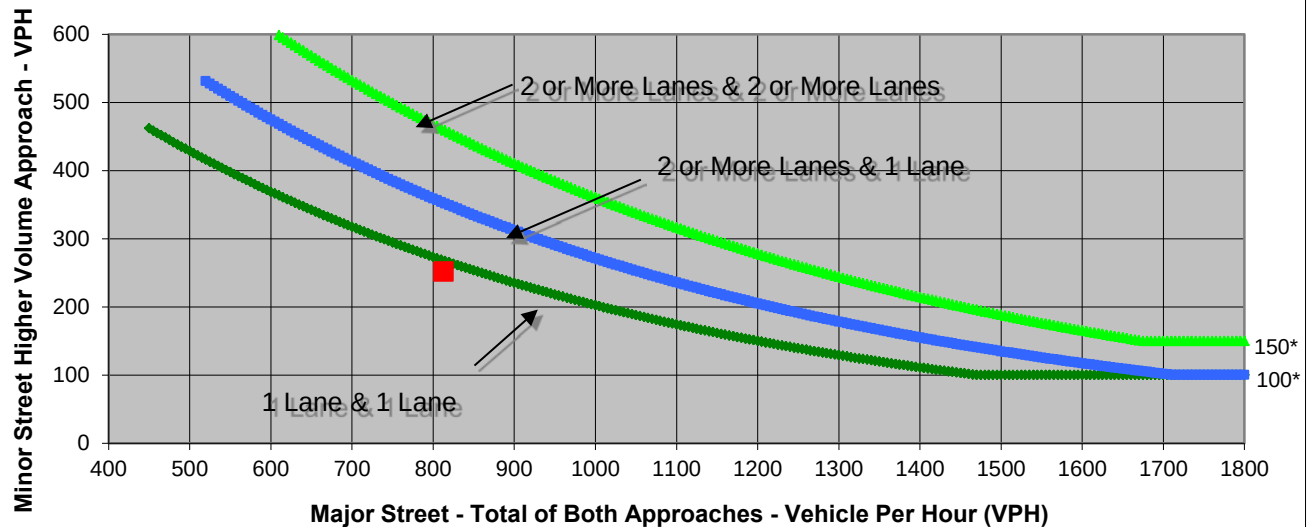
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	252	0
Through	0	813	0	0
Right	0	0	0	0
Total	0	813	252	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	813	252	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour PM

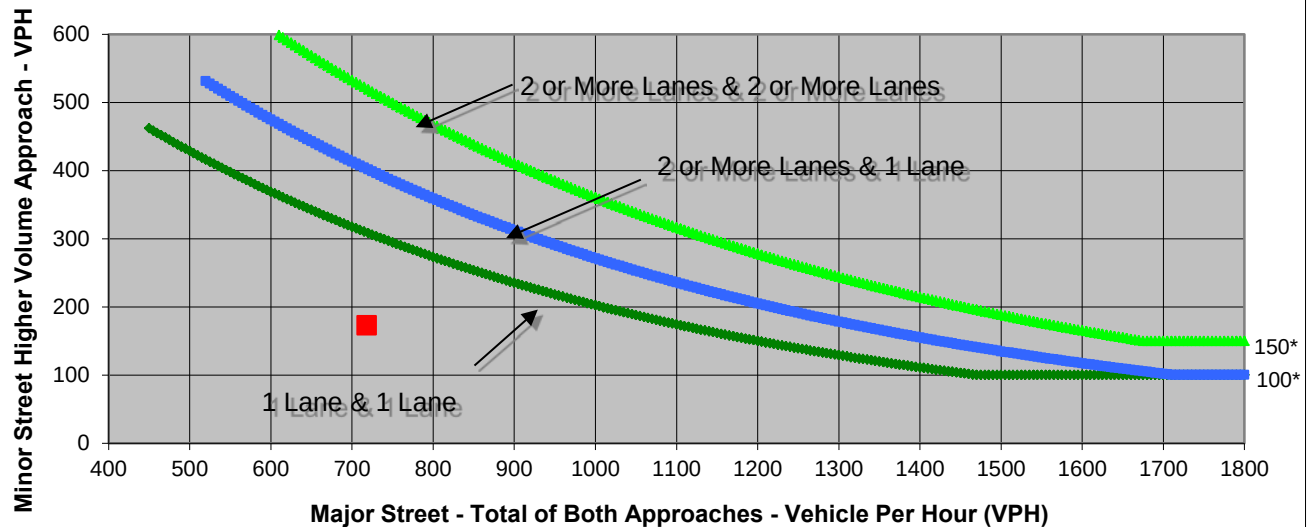
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	10	0	7
Through	0	705	161	2
Right	0	3	12	0
Total	0	718	173	9

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	718	173	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour PM

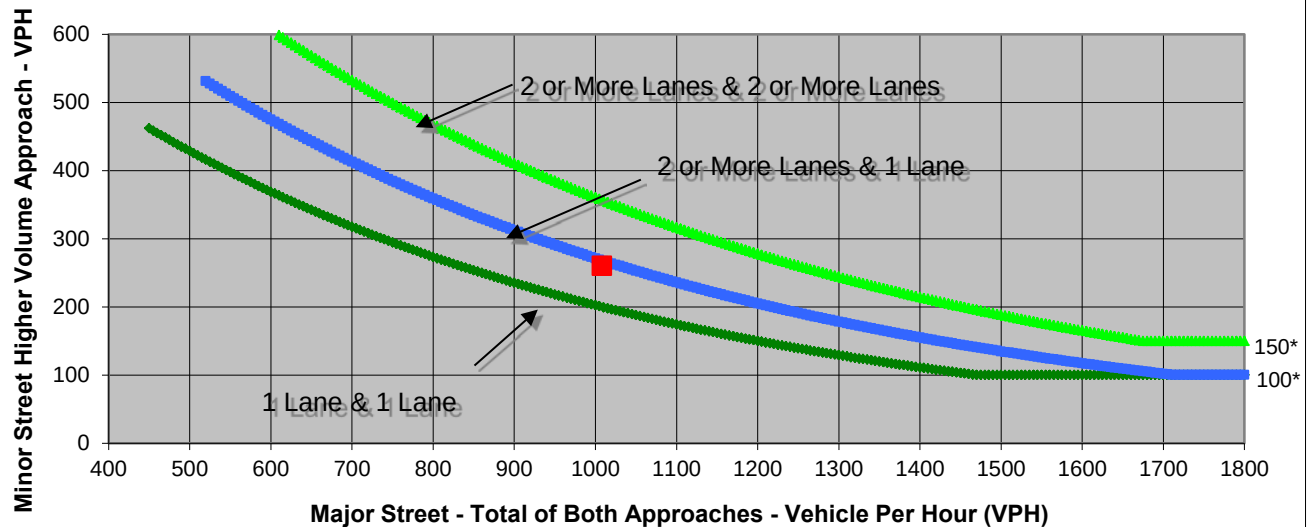
Turn Movement Volumes

	NB	SB	EB	WB
Left	7	0	0	0
Through	1,001	0	0	245
Right	0	0	0	15
Total	1,008	0	0	260

Major Street Direction

<u>x</u>	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	1,008	260	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour PM

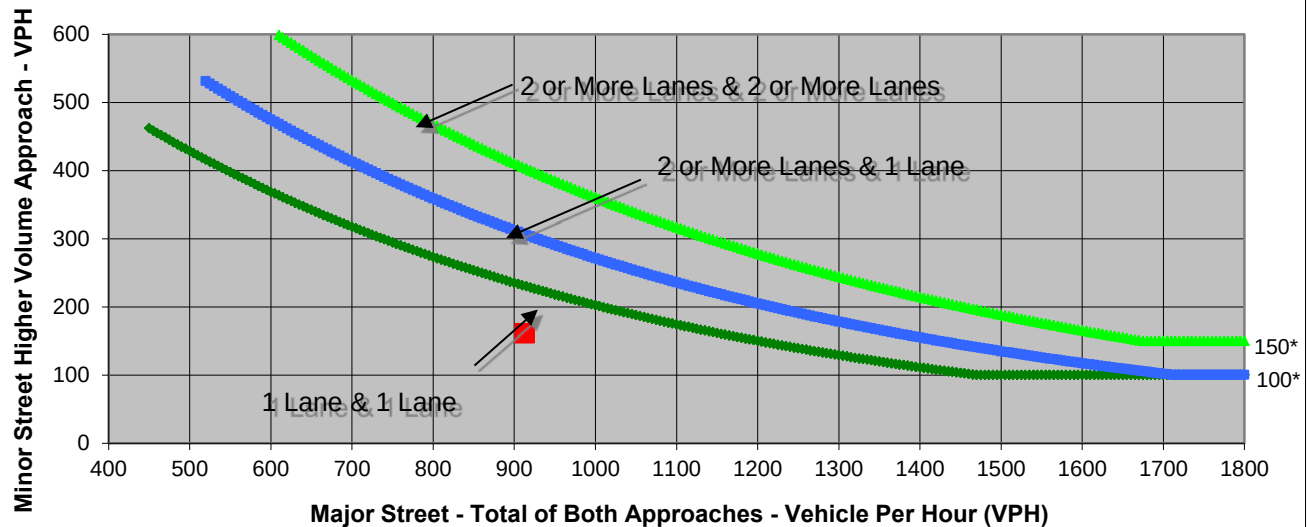
Turn Movement Volumes

	NB	SB	EB	WB
Left	8	0	161	0
Through	902	0	0	2
Right	3	0	0	7
Total	913	0	161	9

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	913	161	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street W. Grand Ave
Minor Street Campbell St.

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour SAT

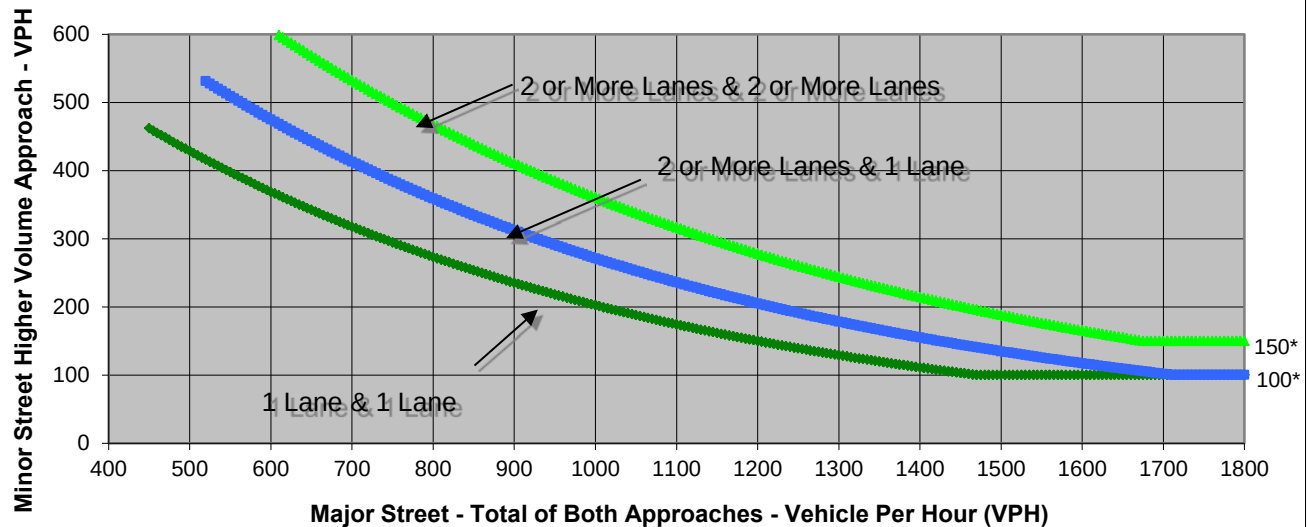
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	5	77	0
Through	0	0	661	1,089
Right	0	205	0	57
Total	0	210	738	1,146

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	1,884	210	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 24th Street

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour SAT

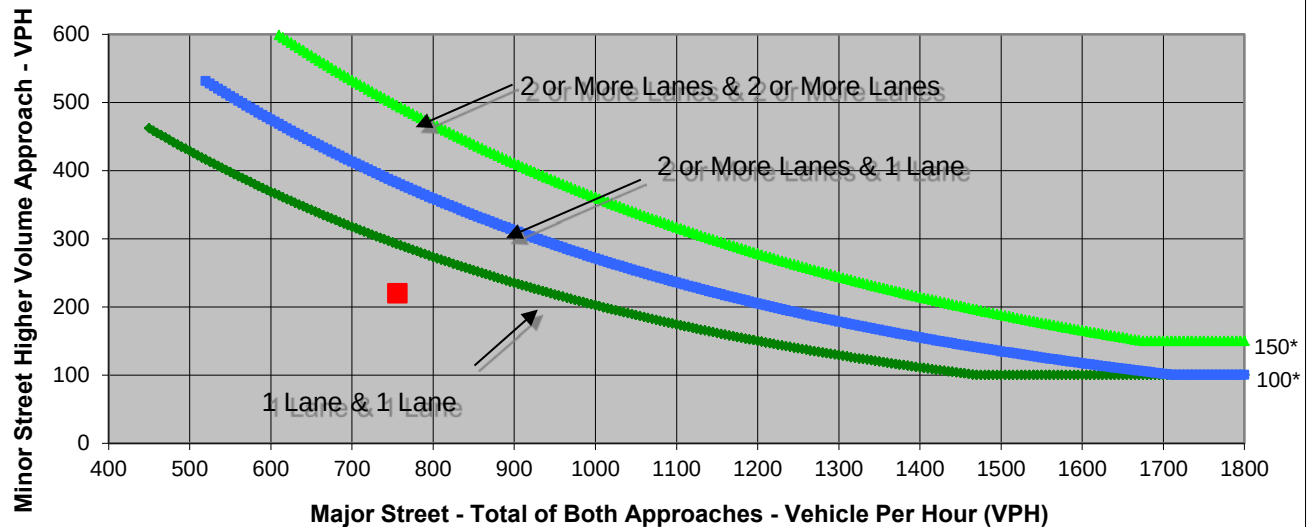
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	220	0
Through	0	756	0	0
Right	0	0	0	0
Total	0	756	220	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	756	220	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour SAT

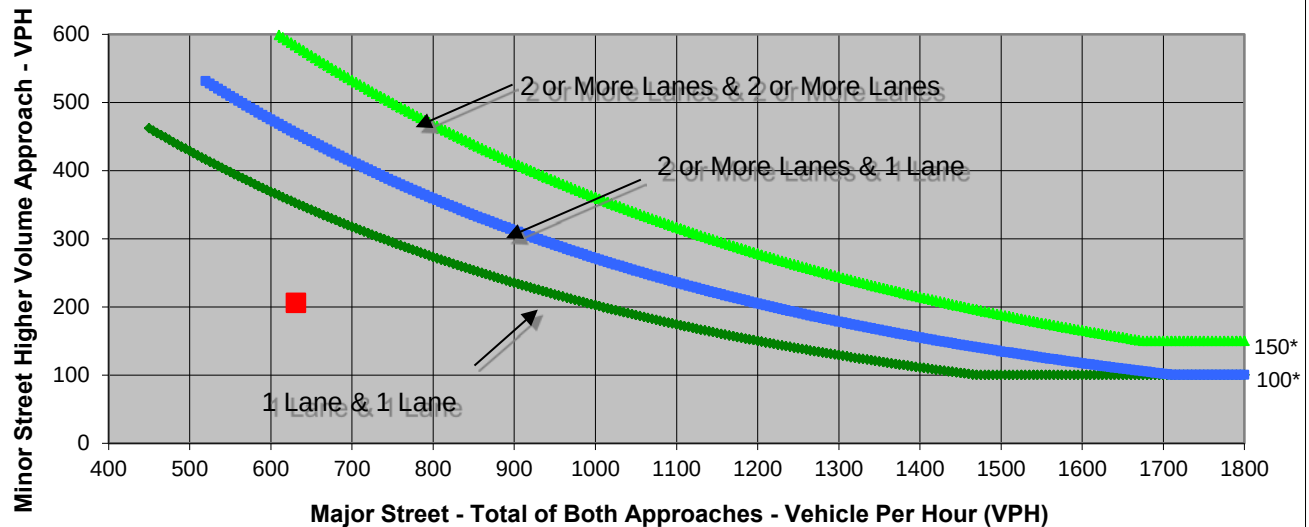
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	17	0	8
Through	0	572	182	0
Right	0	42	24	0
Total	0	631	206	8

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	631	206	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour SAT

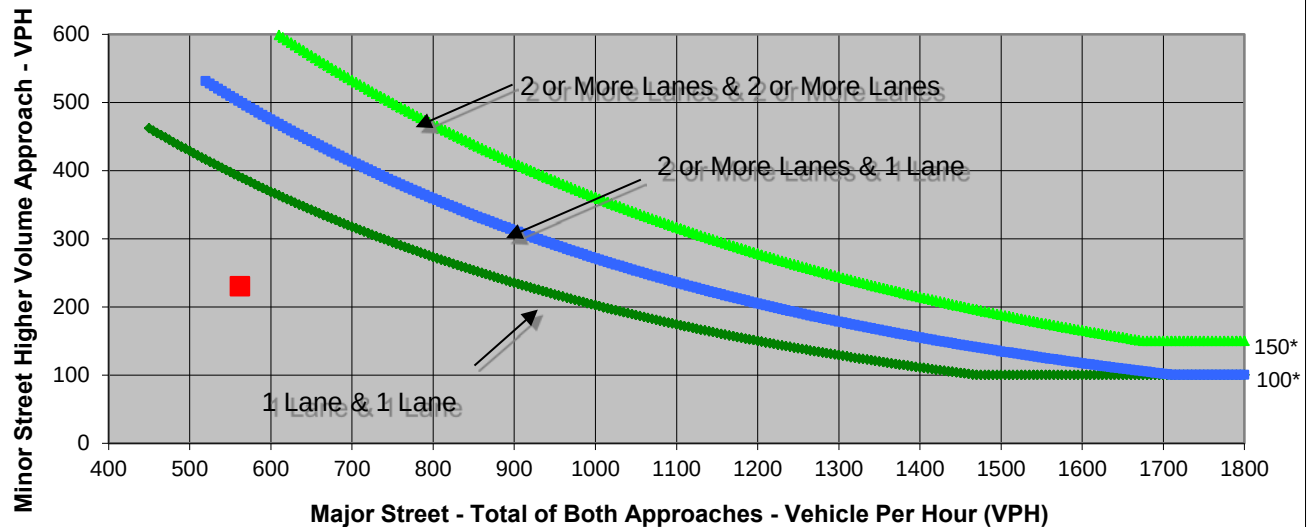
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	0	0
Through	557	0	0	215
Right	0	0	0	15
Total	562	0	0	230

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street Mandela Parkway	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	562	230	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Cumulative with Connection
Scenario Conditions
Peak Hour SAT

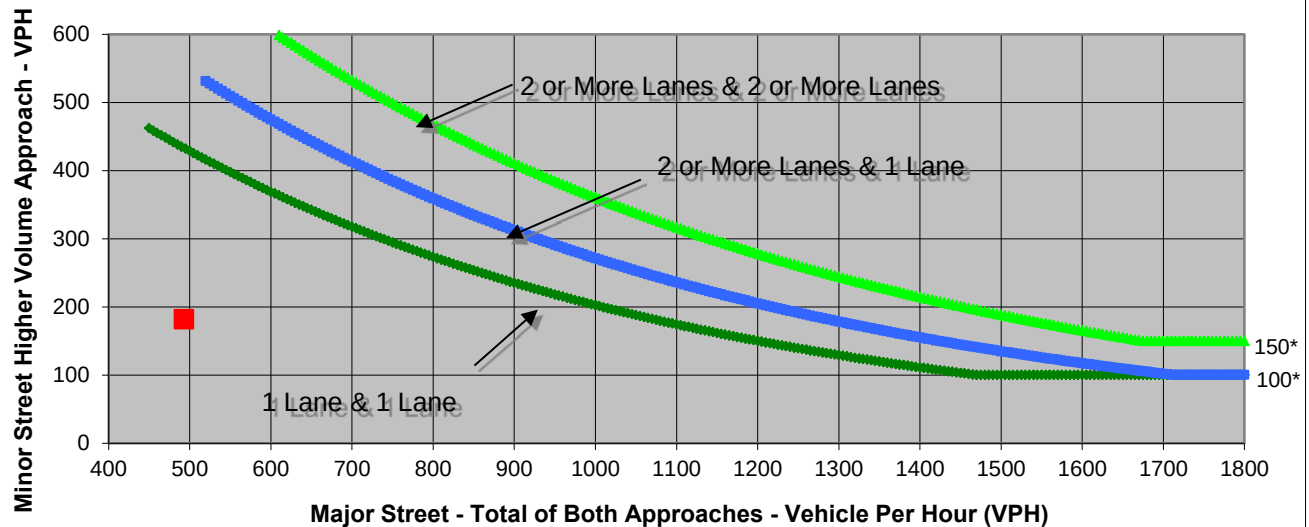
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	182	0
Through	453	0	0	2
Right	35	0	0	0
Total	493	0	182	2

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	493	182	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street W. Grand Ave
Minor Street Campbell St.

Project Gateway Park Connection
Scenario Cumulative with Connection & Park Conditions
Peak Hour PM

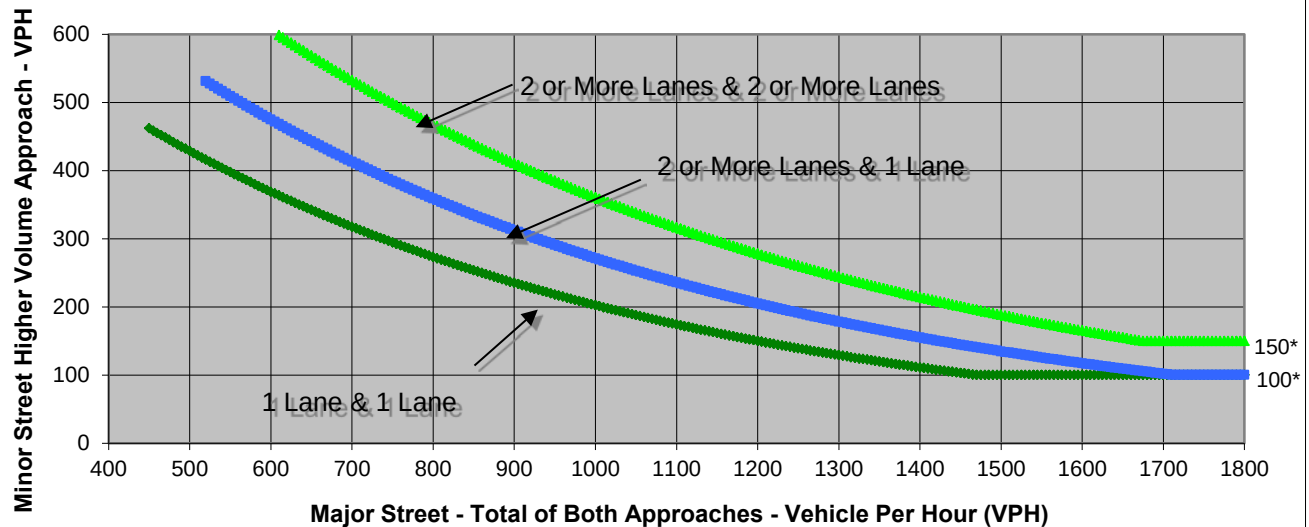
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	3	135	0
Through	0	0	1,115	1,165
Right	0	265	0	43
Total	0	268	1,250	1,208

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	2,458	268	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 24th Street

Project Gateway Park Connection
Scenario Cumulative with Connection and Park Conditions
Peak Hour PM

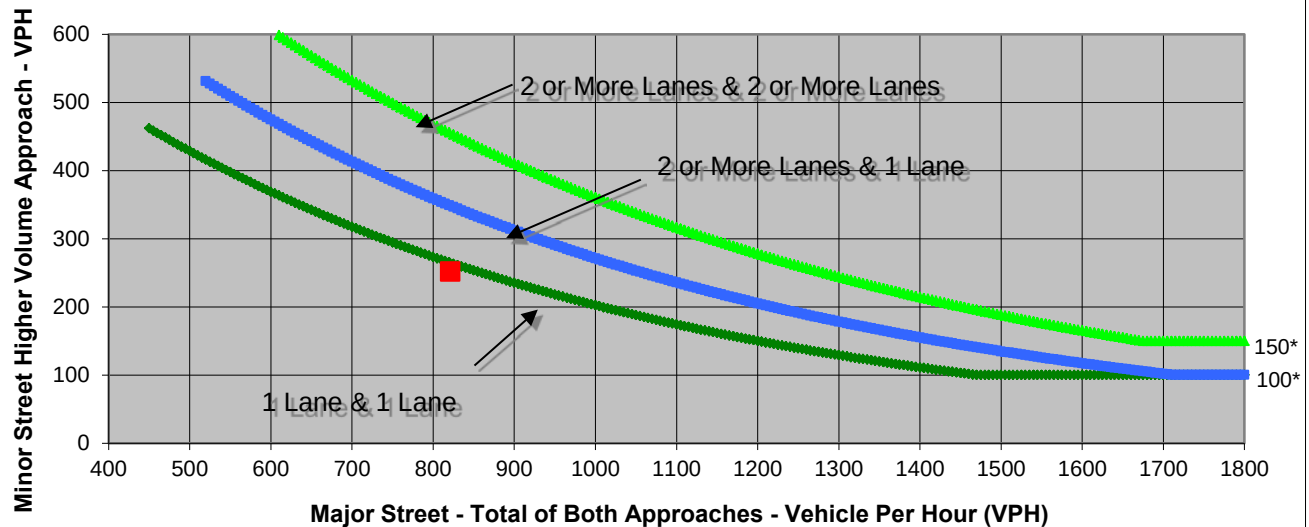
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	252	0
Through	0	821	0	0
Right	0	0	0	0
Total	0	821	252	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	821	252	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Cumulative with Connection and Park Conditions
Peak Hour PM

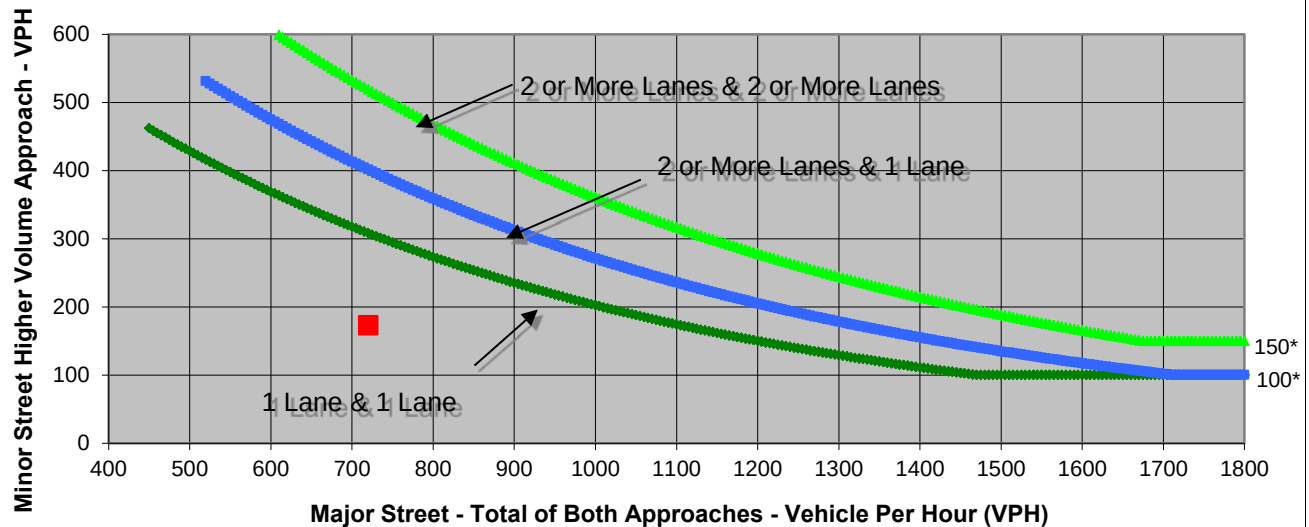
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	10	0	7
Through	0	707	161	2
Right	0	3	12	0
Total	0	720	173	9

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	720	173	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Scenario Cumulative with Connection and Park Conditions
Peak Hour PM

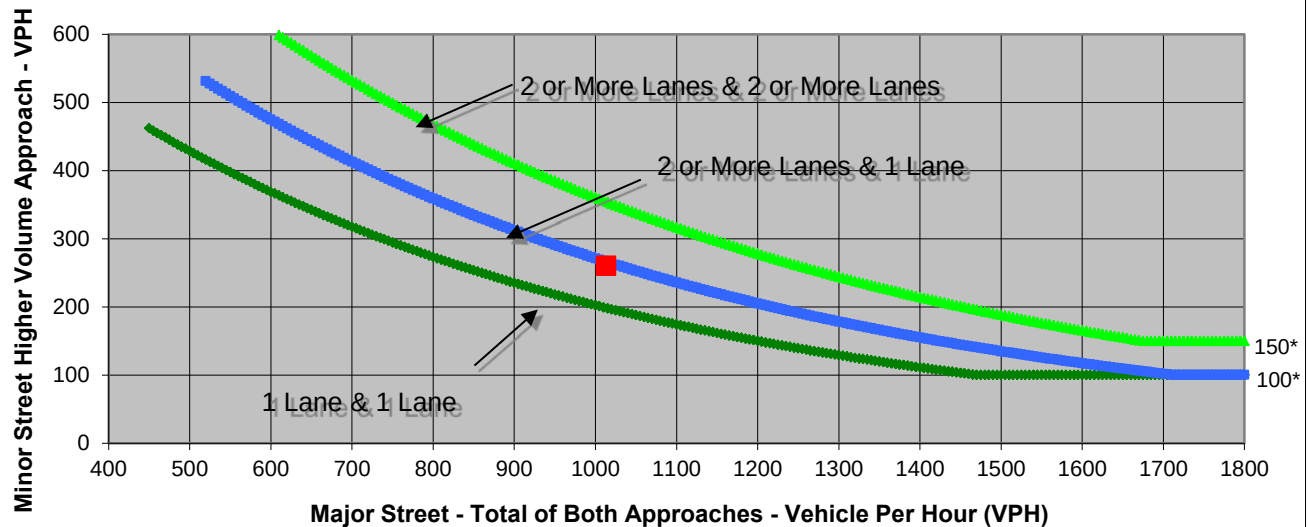
Turn Movement Volumes

	NB	SB	EB	WB
Left	7	0	0	0
Through	1,006	0	0	245
Right	0	0	0	15
Total	1,013	0	0	260

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	1,013	260	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Cumulative with Connection and Park Conditions
Peak Hour PM

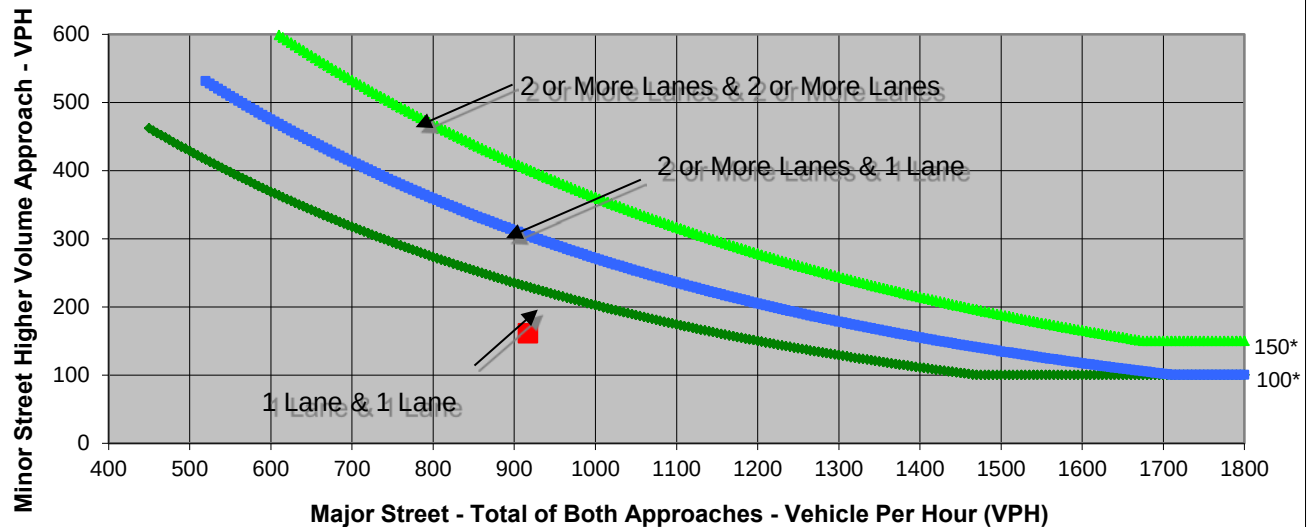
Turn Movement Volumes

	NB	SB	EB	WB
Left	8	0	161	0
Through	906	0	0	2
Right	3	0	0	7
Total	917	0	161	9

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street Mandela Parkway Northbound	Minor Street 20th Street	Warrant Met
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	917	161	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street W. Grand Ave
Minor Street Campbell St.

Project Gateway Park Connection
Scenario Cumulative with Connection & Park Conditions
Peak Hour SAT

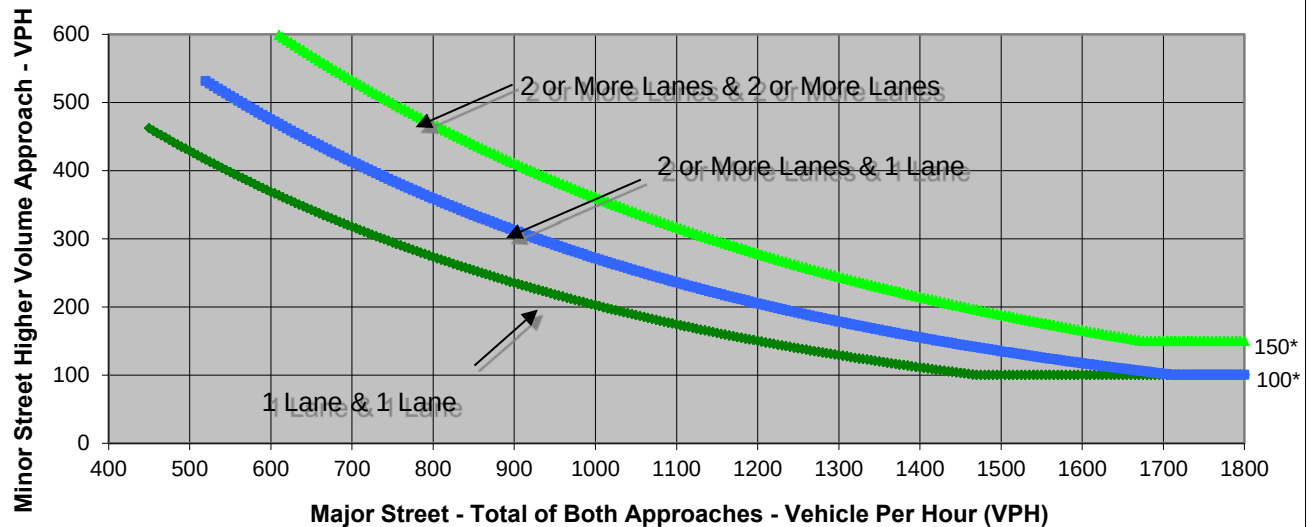
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	5	77	0
Through	0	0	765	1,192
Right	0	205	0	57
Total	0	210	842	1,249

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street W. Grand Ave	Minor Street Campbell St.	Warrant Met
Number of Approach Lanes	2	1	<u>YES</u>
Traffic Volume (VPH) *	2,091	210	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Southbound
Minor Street 24th Street

Project Gateway Park Connection
Scenario Cumulative with Connection and Park Conditions
Peak Hour SAT

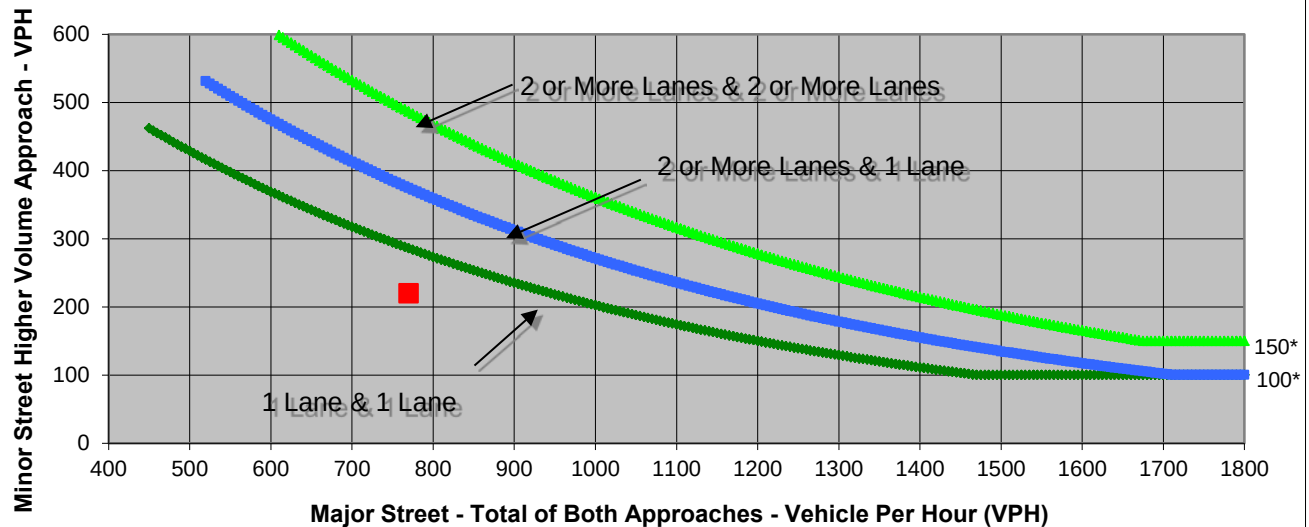
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	220	0
Through	0	770	0	0
Right	0	0	0	0
Total	0	770	220	0

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	24th Street	
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	770	220	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway Southbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Cumulative with Connection and Park Conditions
Peak Hour SAT

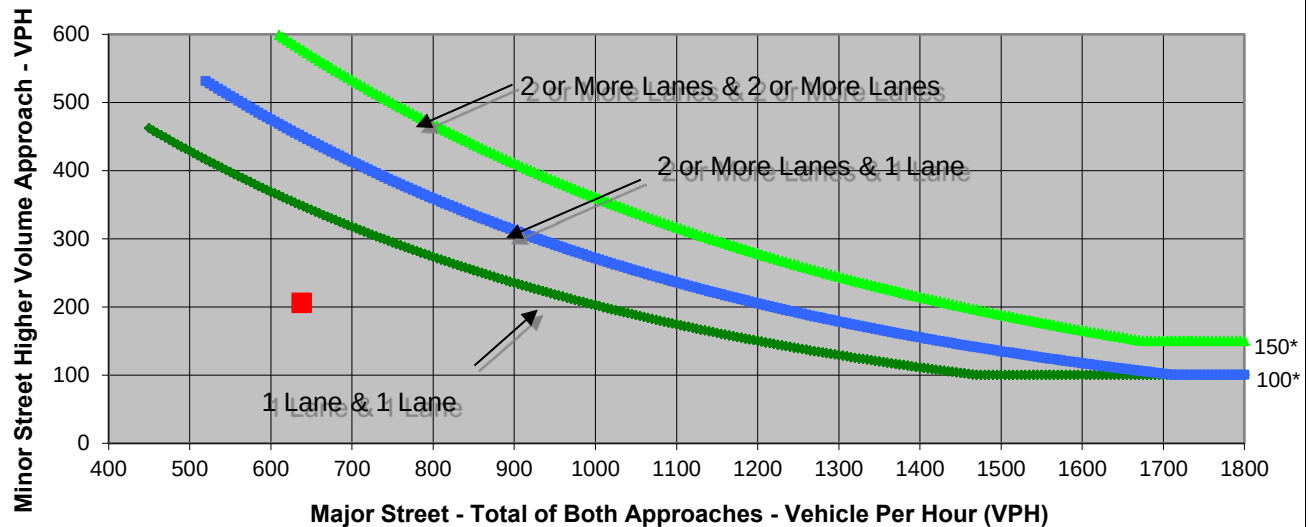
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	42	0	8
Through	0	579	182	0
Right	0	17	24	0
Total	0	638	206	8

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Southbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	638	206	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

Major Street Mandela Parkway
Minor Street 24th Street

Project Gateway Park Connection
Scenario Cumulative with Connection and Park Conditions
Peak Hour SAT

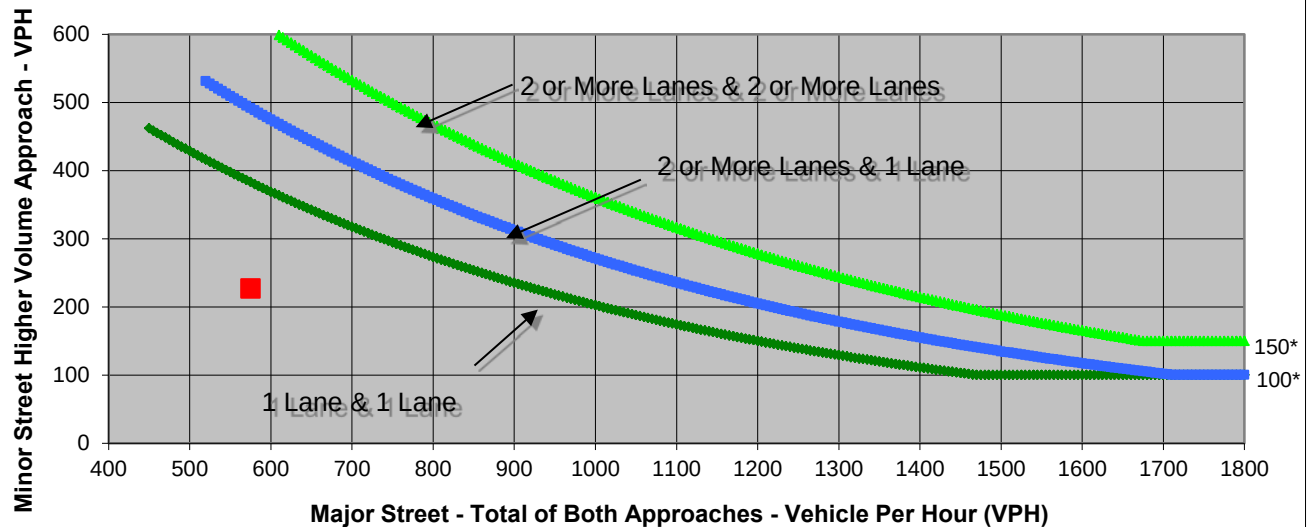
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	0	0
Through	570	0	0	215
Right	0	0	0	12
Total	575	0	0	227

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street Mandela Parkway	Minor Street 24th Street	Warrant Met
Number of Approach Lanes	2	2	<u>NO</u>
Traffic Volume (VPH) *	575	227	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street Mandela Parkway Northbound
Minor Street 20th Street

Project Gateway Park Connection
Scenario Cumulative with Connection and Park Conditions
Peak Hour SAT

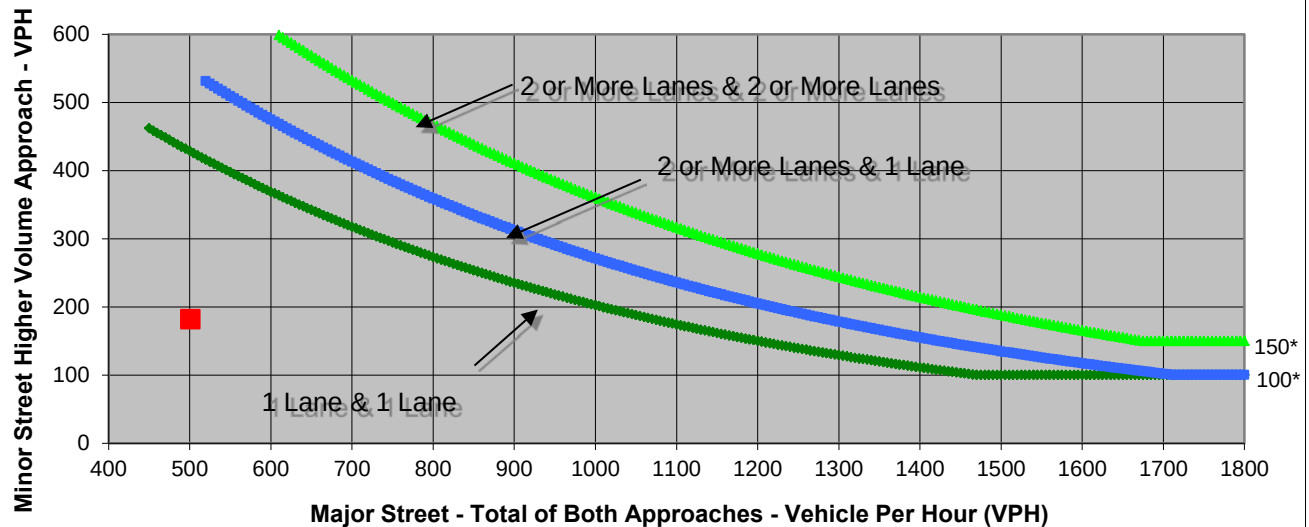
Turn Movement Volumes

	NB	SB	EB	WB
Left	5	0	182	0
Through	461	0	0	2
Right	35	0	0	0
Total	501	0	182	2

Major Street Direction

x	North/South
	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2012

	Major Street	Minor Street	Warrant Met
	Mandela Parkway Northbound	20th Street	
Number of Approach Lanes	2	1	<u>NO</u>
Traffic Volume (VPH) *	501	182	
* Note: Traffic Volume for Major Street is Total Volume of Both Approaches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			

APPENDIX D: BICYCLE AND PEDESTRIAN FORECASTING METHOD



MEMORANDUM

Date: November 28, 2011

To: Blake Clark, PE and Francis Lo, PE; T.Y. Lin International

From: Brooke DuBose & Matt Goyne; Fehr & Peers

Subject: *SFOBB West Span Bicycle/Pedestrian/Maintenance Path PSR Project – Forecasting and Traffic Analysis Methodology*

SF10-0477

This memorandum presents our proposed methodology for conducting pedestrian and bicycle forecasts and a traffic analysis for the San Francisco-Oakland Bay Bridge West Span Bicycle/Pedestrian/ Maintenance (BPM) Path.

The methodology for conducting pedestrian and bicycle forecasts for the BPM was previously documented in the memorandum *SFOBB West Span Bicycle/Pedestrian/Maintenance Path PSR Project – Forecasting Methodology*, dated April 12, 2010. **Attachment A** includes Fehr & Peers' responses to comments received from Caltrans. In addition, **Attachment A** includes responses to comments received from Caltrans regarding the October 31, 2011 "Forecasting and Traffic Analysis Methodology" memorandum.

This traffic analysis will include weekday AM and PM and weekend mid-day peak hour intersection analysis at up to five intersections for existing and future conditions. Forecasted traffic to the project staging area will be added to existing and future no project conditions intersection traffic volumes to determine the project's effects.

BICYCLE AND PEDESTRIAN TRAVEL DEMAND FORECASTING

Per our previous conversations, we understand that the team does not expect pedestrian and bicycle forecasts of the facility to substantially affect the proposed width of the path on the bridge. However, forecasts will be used to determine the scope and project elements for vertical circulation. Overall, we expect the product of this effort to be order-of-magnitude bicycle and pedestrian usage forecasts for the subject facility, for purposes of sizing and locating vertical circulation elements.

Bicycle and pedestrian demand forecasts will rely on existing data at other facilities and minimal collection of new data. Other bridges in the Bay Area allow bicycles and pedestrians (Antioch, Carquinez, Dumbarton, and Golden Gate). However, the only one of those bridges that experiences commuter, recreational, and tourism-related usage at relatively high levels is the Golden Gate Bridge. Although we do not expect that tourism-related use for the west span of the Bay Bridge will be as high as the Golden Gate Bridge, we do anticipate that pedestrian and

bicycle volumes near the San Francisco anchorage of the Bay Bridge will experience similar demand. Recreational use for the west span will likely be less on the Bay Bridge compared to the Golden Gate Bridge, while commuter use may be significant in the long-term once the proposed Treasure Island development and the eastern span of the Bay Bridge are complete.

To obtain an order-of-magnitude estimate of bicycle and pedestrian usage on the Bay Bridge, we will:

- A. Collect bicycle and pedestrian counts from the "Bicycle Safety Study for the Golden Gate Bridge" report prepared by Alta Planning + Design (April 15, 2011).
- B. Coordinate with Caltrans to obtain bicycle and pedestrian counts from other bridges in the Bay Area
- C. Coordinate with AC Transit, BART, and Caltrans to obtain data on the use of bicycles on transit and bicycle shuttle service for transbay trips (if available)
- D. Review forecasted bicycle demand prepared as a part of plans for proposed development on Treasure Island and in SoMa as well as the proposed expansion of ferry service by the Water Transit Authority (WTA).
- E. Compare the data and determine an approximate forecast the Bay Bridge usage, likely within the range between the Golden Gate Bridge observations and counts provided by Caltrans from other sites.

A detailed approach for each task is described below.

Task A. Collect Data at the Golden Gate Bridge

Bicycle and pedestrian counts were collected in August 2010 as a part of the "Bicycle Safety Study for the Golden Gate Bridge" report prepared by Alta Planning + Design (April 15, 2011). These counts identify the weekday and weekend peak hours for pedestrian and bicycle use on the Golden Gate Bridge. These peak hour counts will be used for forecasting the pedestrian and bicycle volumes on the BPM Path. No new pedestrian and bicycle counts will be collected at the Golden Gate Bridge as a part of this study.

Task B. Collect Data from Caltrans

Fehr & Peers will review data collected by Caltrans for bicycle and pedestrian volumes on the other bridges in the Bay Area. It is our understanding that Caltrans has recent data from the Dumbarton Bridge that will assist in our forecasting for the Bay Bridge. We will evaluate Caltrans data and assume all trips are primarily recreational or commuter-related.

Task C. Collect Data from AC Transit, BART, and Caltrans for Transbay Bicycle Service

To evaluate existing transbay bicycle usage, we will collect available data from AC Transit for bus-mounted and under carriage bicycle racks as well as data from Caltrans on the use of transbay bicycle shuttles. We will review existing shuttle schedules and policies for bicycles on buses to assess the current capacity and operations of transbay service. In addition, we will collect available data regarding transbay peak hour bicycle demand on BART. This demand

estimate will include order of magnitude bicycle latent demand, and will be likely be much lower than the bicycle forecasts proposed in Task E.

Task D. Review Plans for Forecasted Future Transbay Bicycle Demand

Fehr & Peers will review plans prepared for proposed developments on Treasure Island and in SoMa (if available) and document bicycle forecast demand for transbay crossings presented in those plans. We will also review WTA plans for projected bicycle demand on future ferry service. We do not propose to do additional analysis regarding ferries or the proposed developments. As noted in Task C, the projected future bicycle demand included in these studies is likely to be much lower than the bicycle forecasts proposed in Task E.

Task E. Compare Data and Forecast Bay Bridge Use

We will compile the data collected on the Golden Gate Bridge, Dumbarton Bridge, and other bridges for which data is available from Caltrans and create a matrix to compare the results based on total volumes, type of use, adjacent land use and population density. We will incorporate relevant data from our work on the Treasure Island Redevelopment project to assist with our analysis.

Given the unique characteristics of the Golden Gate Bridge (GGB) and Bay Bridge (BB) compared to other bridges in the area, we will forecast the combined pedestrian and bicycle volumes on the Bay Bridge with the following approach:

- Volumes near the San Francisco anchorage of BB will be 90-100% of GGB volumes
- Volumes between 500-1000 feet (distance to be determined based on qualitative assessment conducted in Task A) of San Francisco end of BB will be 80-90% of GGB volumes
- Volumes near the Yerba Buena anchorage of BB will be between 60-80% of GGB volumes.

We will review these percentages with the project development team to ensure consensus in our approach. These percentages assume that bicycles on the west span of the Bay Bridge are likely to continue across the bridge to Yerba Buena while many pedestrians will only travel part of the way across before returning to San Francisco, similar to the existing patterns at the Golden Gate Bridge. The forecasts will be critical to appropriately size the proposed connections at each end of the bridge which include ramps to the Rincon Hill area, a path to the Transbay Terminal in San Francisco, as well as the elevators/stairs at Pier W-1 at the Embarcadero.

There will also be a qualitative discussion of the potential for modal shift for transbay travel.

We recognize that this is a relatively simplistic approach; however, based on the unique nature of the project, the variable nature of some of the forecasting assumptions, and the limited effects the forecasting may have on the design of the path width in general, we believe that this is an appropriate level of study for the current phase of project development. As the project is further developed and as it enters the environmental review and project approval phase, additional work may be required.

The forecasted volumes will provide a conservative assessment of the volumes at the landing areas to the bridge. They will not be used as a part of the purpose or need statement for the project.

VEHICULAR TRAFFIC ANALYSIS

Fehr & Peers proposes to study vehicle traffic at the following five intersections, as shown on **Figure 1**:

- Harrison Street / The Embarcadero
- Harrison Street / Spear Street
- Harrison Street / Fremont Street
- Folsom Street / Fremont Street
- Folsom Street / 1st Street

Vehicular access routes to and from the elevator staging area include Harrison Street, Folsom Street, Fremont Street, 1st Street, Bryant Street, and The Embarcadero. The above study intersections were chosen as they represent key gateways into the adjacent Rincon Hill neighborhood and will likely serve the highest amount of project-generated vehicle traffic on critical movements. The above intersections will be analyzed under existing, existing plus project, and cumulative plus project conditions to determine the potential effects of the proposed BPM. In addition, a qualitative discussion regarding the pedestrian and bicycle conditions at these intersections and on adjacent study area roadways will be included for existing and plus project conditions.

Task A. Existing Conditions

Fehr & Peers will collect existing weekday AM and PM peak period (7 to 9 AM and 4 to 6 PM) and Saturday peak period (1 to 3 PM) intersection vehicle turning movement volumes at the five study intersections. During the vehicle counts, we will also collect pedestrian and bicycle counts at the study intersections. We will use these volumes to evaluate existing peak hour intersection vehicle levels of service. We will also qualitatively describe existing pedestrian, bicycle, and transit circulation and amenities in the area. This will include observing and identifying existing amenities the intersection of Spear Street and The Embarcadero, which currently has low levels of pedestrian and bicycle activity but would likely be an important connection to the BPM in the future.

Task B. Forecast Vehicular Traffic Generation

As previously discussed, we will use the Golden Gate Bridge as a proxy for roughly approximating the potential usage of Bay Bridge bicycle and pedestrian facilities, as both bridges are likely to offer scenic views that attract relatively high levels of tourism, in addition to commuter traffic. Fehr & Peers will collect peak period vehicular traffic counts at the parking facilities adjacent to each end of the Golden Gate Bridge as shown in **Table 1**.

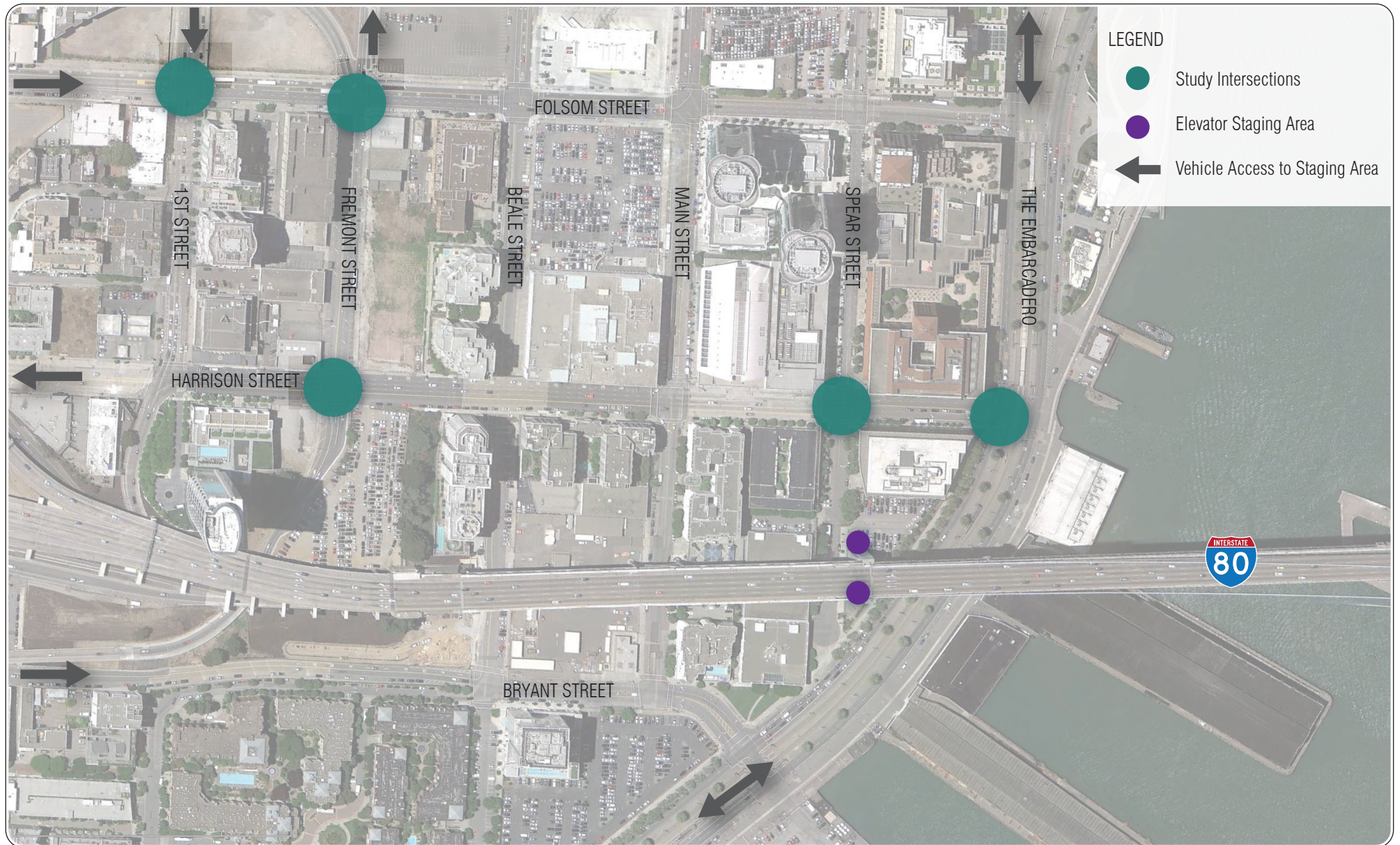


TABLE 1 GOLDEN GATE BRIDGE TRAFFIC COUNTS			
Location	Weekday AM Peak Period (7 to 9 AM)	Weekday PM Peak Period (4 to 6 PM)	Weekend Mid-Day (1 to 3PM)
South End of Golden Gate Bridge	New Counts	2010 Counts ¹	2010 Counts ¹
North End of Golden Gate Bridge	New Counts	New Counts	New Counts
Notes:			
1. Existing weekday PM and weekend mid-day peak period traffic counts were collected at the southern parking lot for the <i>Doyle Drive Replacement Project Merchant Road & Toll Plaza East Study</i> (January 2011, ARUP) in August 2010.			
Source: Fehr & Peers, October 2011			

We recognize that some of the vehicular traffic using the Golden Gate Bridge parking areas is generated simply by the scenic views from the parking lot itself, making a direct comparison between parking areas adjacent to the Golden Gate Bridge and those proposed for staging at the Bay Bridge difficult. We will conduct site observations during the weekend mid-day peak period (the busiest time period) to determine the percent of vehicles that park in the parking lots and then walk or bicycle on the bridge. This portion of the vehicular traffic generated at the Golden Gate Bridge lots will be assumed to be the vehicular demand associated with the Bridge's bicycle and pedestrian facilities. We will make a similar assumption for the proposed Bay Bridge facility to determine weekday AM and PM peak hour and Saturday peak hour vehicle traffic generation, although we propose to work with T.Y. Lin and Caltrans to determine whether some adjustments may be warranted. We recognize that availability of convenient parking at the Bay Bridge and the Golden Gate Bridge may not be similar, but for conservative measure the parking supply at the Bay Bridge will not limit the trip generation to the site.

Task C. Vehicular Trip Distribution and Assignment

Based on the results of Tasks A and B and the proposed staging area layout, we will determine the directions of approach and departure for new vehicle traffic, specifically the changes to individual intersection turning movement volumes during the evaluation periods (weekday AM and PM peak hours, and Saturday peak hour).

Task D. Existing Plus Project Conditions

We will add the forecasted net increase in peak hour vehicle traffic to the existing conditions traffic volumes to forecast "existing plus project" intersection traffic volumes. We will calculate intersection vehicle levels of service for the weekday AM and PM peak hours and Saturday peak hour. We will assume that the near-term proposed bicycle infrastructure is in place as proposed in the San Francisco Bike Plan (2009). This includes Class II bicycle lanes on Fremont Street and on Beale Street south of Folsom Street. If the additional vehicle traffic (and modified roadway network) results in unacceptable traffic conditions, based on the City of San Francisco criteria for identifying traffic impacts, we will identify appropriate improvements, if feasible and consistent with the City's "transit first" policies. It should be noted that the traffic analysis and improvement recommendations are not intended for use in environmental clearance for the

proposed project, but are rather for preliminary planning purposes. Future environmental analysis, if required, may require substantially more analysis than included in this scope.

Task E. Future Conditions

A number of studies have been conducted in the area, including the Transit Center District Plan, have projected future conditions (year 2030) vehicle traffic volumes. We will use growth factors developed from these studies to forecast future conditions intersection vehicle traffic volumes for the weekday AM and PM peak hours. Saturday peak hour vehicle traffic forecasts will be determined by applying the existing ratio of Saturday peak hour vehicle traffic to weekday PM peak hour vehicle traffic to future weekday PM peak hour forecasts. Note that some intersections in this study may not have been previously analyzed, so this task may involve applying growth factors developed at other downtown intersections to the study intersections for this analysis. This is an adequate approach for this planning-level study; however, more detailed forecasts may be necessary later in the PSR process and future environmental analysis.

We will conduct future conditions intersection vehicle level of service analysis at the five study intersections and identify future operating conditions. We will recommend improvements to address long-term deficiencies, if any.

