Hollywood Boulevard & US-280 Pedestrian and Intersection Improvements APPLE Study



Executive Summary

Study Initiation

The study was initiated by the City of Homewood with the aid of the City of Mountain Brook through the Advanced Planning, Programming, and Logical Engineering (APPLE) program developed by the Regional Planning Commission of Greater Birmingham (RPCGB). The City requested professional planning assistance in evaluating the feasibility of improvements for pedestrians, bicyclists, and motorized vehicles along Hollywood Boulevard between Malaga Avenue and Mountain Brook Village.

Study Area

The study segment of Hollywood Boulevard begins in the City of Homewood, travels through the City of Birmingham, and ends in the City of Mountain Brook. The bridge over US-280, including the US-280 on-ramp and off-ramp intersections, is located in the City of Birmingham. Homewood city limits begin west of the US-280 on-ramp, and Mountain Brook city limits begin at the driveway for Shades Valley Presbyterian Church.

Purpose for the Study

This study was undertaken to assess the feasibility of improving accommodations for pedestrians and bicyclists along Hollywood Boulevard between Malaga Avenue and Mountain Brook Village. In addition, the study examines traffic operations for motorized vehicles. The purpose of this study is to evaluate improvement alternatives and through the development of this report provide stakeholders with information for their use in identifying a preferred alternative. This document summarizes:

- existing conditions,
- the process used to identify potential alternatives for improvement,
- the resulting alternatives that were developed from that process,
- an evaluation of potential positive and negative impacts to the area and adjacent properties that may be associated with each potential improvement,
- funding options,
- stakeholder input, and
- identification of a preferred build option.

Intersection Improvement Options

Although the main focus of this study is to identify pedestrian and bicycle improvement alternatives, a review of the vehicular traffic operations was also conducted. Knowing how the roadway is functioning from a motor vehicle perspective provides a complete picture of how pedestrians and cyclists are impacted by the existing traffic volumes and how the area will be affected with future traffic volumes. Two intersection improvement options were analyzed. The first option included widening the existing bridge for the addition of a westbound left turn lane at the intersection of Hollywood Boulevard and the US-280 eastbound on-ramp. This first improvement option also includes a signal at the Hollywood Boulevard and the US-280 westbound off-ramp. The second option (Option 2) includes the installation of a roundabout at the intersection of Hollywood Boulevard and the US-280 eastbound on-ramp and at the intersection of Hollywood Boulevard and the US-280 westbound off-ramp.

Improvement options 1 and 2 both improve the traffic operations for the area; however, the queue length associated with the westbound left turn movement onto the US-280 eastbound on-ramp is much longer for option 2 than it is with option 1. Both options would require bridge widening. Installation of two roundabouts would cause greater impact to the surrounding properties since the footprint of those features would stretch farther onto private property. The estimated cost for implementing the roundabouts described in Option 2 is \$3.78 Million (excluding right-of-way acquisition) which is over a million dollars more than the cost estimated for the Option 1 improvements. For these reasons, intersection improvement option 1 was assumed to be the most likely option for implementation and was thus carried forward for evaluation with pedestrian improvements.

Pedestrian Improvement Alternatives

By Alabama state law motor vehicles are required to share the roadway with bicycles. The improvement alternatives evaluated for this study include the accommodation of pedestrians and assumes cyclists will use the roadway for their transportation needs.

Four pedestrian improvement alternatives were evaluated during this study:

- **No Build:** The No Build Alternative assumes that no pedestrian accommodations are constructed within the study corridor. The No Build Alternative also assumes pedestrians will use the Zoo Connector Trail that is currently under design and is scheduled to let for construction in September of 2018.
- Alternative A: Pedestrian Bridge and Sidewalk. Alternative A includes installing a 10 foot wide pedestrian bridge located north of Hollywood Boulevard connecting to Union Hill Drive on the west and the parking lot located just to the east of the existing bridge. Alternative A also includes the installation of a 6 foot wide sidewalk along the north side of Hollywood Boulevard west of the existing bridge in order to provide a pedestrian accommodation connecting to the existing sidewalk at Malaga Avenue. Alternative A does not include the installation of a westbound left turn lane since that would necessitate a wider roadway bridge; however, the installation of a signal at the Hollywood Boulevard and US-280 westbound off-ramp is included.

- Alternative B: Bridge Widening and Sidewalk along the North Side of the Corridor. Alternative B includes installing the intersection improvements (westbound left turn lane at the intersection of Hollywood Boulevard and the US-280 eastbound on-ramp and a traffic signal at the intersection of Hollywood Boulevard and the US-280 westbound off-ramp) as well as a 6 foot sidewalk with a 2 foot offset from the travel way along the north side of Hollywood Boulevard that would connect existing sidewalk at Malaga Avenue to the existing sidewalk located in front of Shades Valley Presbyterian Church.
- Alternative C: Bridge Widening and Sidewalk along the South Side of the Corridor. Alternative C includes installing the intersection improvements (westbound left turn lane at the intersection of Hollywood Boulevard and the US-280 eastbound on-ramp and a traffic signal at the intersection of Hollywood Boulevard and the US-280 westbound off-ramp) as well as a 6 foot sidewalk with a 2 foot offset from the travel way along the south side of Hollywood Boulevard that would connect existing sidewalk at Malaga Avenue to the existing sidewalk located in front of Shades Valley Presbyterian Church.
- Alternative D: Pedestrian Bridge Over US-280. Alternative D includes installing a 10 foot wide pedestrian bridge that would be separate from the existing roadway bridge over US-280. The pedestrian bridge would be located north of Hollywood Boulevard connecting to Union Hill Drive on the west and the parking lot located just to the east of the existing bridge. Alternative D does not include any additional sidewalk or roadway improvements.

Stakeholder Involvement

The improvement alternatives were presented during the City Council's Planning and Development Meeting on January 29, 2018. It was during this meeting that the City Council requested that an alternative with only a pedestrian bridge (Alternative D) be evaluated. A follow-up meeting to discuss Alternative D was held on February 15, 2018 and attended by representatives from the City and RPCGB. In addition to these two meetings, a kickoff meeting was held on June 9, 2017 and a progress meeting to discuss the existing condtions analysis was held on October 25, 2017. Representatives from the City of Homewood and RPCGB were present at these meetings.

Preferred Alternative

Stakeholders chose Alternative D: Pedestrian Bridge over US-280 as their preferred alternative since it provided their immediate desire of addressing the lack of pedestrian accommodation across US-280 and is the most financially feasible alternative. To design and construct the bridge, stakeholders chose not to seek federal funds but elected to seek a funding partnership between the cities of Homewood, Mountain Brook, and Birmingham as well as ALDOT. For the purposes of this study, the approximate total cost for Alternative D has been estimated at \$1,165,000.

Next Steps

If not using federal funding, the City may choose to request 50% (a typical percentage associated with a state contribution) of state funding while partnering with the cities of Mountain Brook and Birmingham to share the remaining costs. Since multiple city jurisdictions are involved, an agreement between all cities would have to be established. This agreement should document the rights and responsibilities of each entity and provide the lead project sponsor the right to perform work within the other entity's jurisdiction. Not using federal funding should allow the timing, scheduling, and implementation of the installation to be at the City's discretion; however, partnering with ALDOT could impact the timing and scheduling depending on the requirements associated with their contribution.

If the City chooses to move forward with implementing any of the improvement alternatives and would like to pursue Federal CMAQ or TAP funding, the next step would be to request inclusion of a project in RPCGB's Transportation Improvement Plan (TIP). If Federal funds are secured for the project, an environmental document will need to be prepared. The environmental document must include technical studies and public involvement outreach necessary to comply with procedures of the National Environmental Policy Act (NEPA). Once the environmental study has been completed, the design would be undertaken, and construction would follow. If it is determined that additional right-of-way is required, acquisition would be conducted prior to construction.

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1 Introduction

This study was initiated by the City of Homewood with the aid of the City of Mountain Brook through the Advanced Planning, Programming, and Logical Engineering (APPLE) program developed by the Regional Planning Commission of Greater Birmingham (RPCGB). The City requested professional planning assistance in evaluating the feasibility of improvements for pedestrians, bicyclists, and motorized vehicles along Hollywood Boulevard between Malaga Avenue and Mountain Brook Village. A map showing the study area is shown in Figure 1.

1.1 Purpose of the Study

This study was undertaken to assess the feasibility of improving accommodations for pedestrians and bicyclists along Hollywood Boulevard between Malaga Avenue and Mountain Brook Village. In addition, the study examines traffic operations for motorized vehicles. The purpose of this study is to evaluate improvement alternatives and through the development of this report provide stakeholders with information for their use in identifying a preferred alternative. This document summarizes:

- existing conditions,
- the process used to identify potential alternatives for improvement,
- the resulting alternatives that were developed from that process,
- an evaluation of potential positive and negative impacts to the area and adjacent properties that may be associated with each potential improvement,
- funding options,
- stakeholder input, and
- identification of a preferred build option.

If the City chooses to move forward with a federally funded improvement project for the area, a more detailed Environmental Planning Study would be required.

1.2 Study Approach

The study involves a two-stage process. The first stage included an evaluation of the existing conditions and constraints, and the second stage included an evaluation of future conditions and potential improvement alternatives.

Existing traffic data was collected and a capacity analysis of the existing conditions was prepared. A base map was prepared using aerial images and available GIS data. All information was compiled and evaluated to define the needs of the corridor and identify constraints and opportunities for improvement. A field review was performed as part of stage one. This field review consisted of observing peak hour traffic patterns and investigating what impacts various improvement options would have to the study area.

For stage two, an evaluation of future conditions was conducted and alternatives were developed. Future traffic volumes were projected and analyzed with the existing roadway conditions. Pedestrian improvement alternatives were also analyzed and evaluated relative to their ability to address the purpose and need for the potential project.



Figure 1: Study Area Location Map

2 Base Conditions

2.1 Description of the Study Area

The study segment of Hollywood Boulevard, as shown in Figure 1, begins in the City of Homewood, travels through the City of Birmingham, and ends in the City of Mountain Brook. The bridge over US-280, including the on-ramp and off-ramp intersections, is located in the City of Birmingham. Homewood city limits begin west of the eastbound US-280 on-ramp, and Mountain Brook city limits begin at the intersection with Shades Valley Presbyterian Church driveway.

The land use adjacent to Hollywood Boulevard is predominantly residential; however, other land uses are present. An Express Oil Change shop and "The Hollywood" shopping center are located adjacent to and directly across from the US-280 off-ramp. Additionally, access to Union Hill Cemetery and Shades Valley Presbyterian Church are located along the study segment. The eastern terminus of the study segment is located in Mountain Brook Village which houses shops and restaurants.

An established residential neighborhood is located west of the study area. It generates numerous commuter trips during AM and PM peak hours. In addition, the study segment feeds into Mountain Brook Village resulting in high traffic volumes during the midafternoon peak period.

2.2 Geometrics

Hollywood Boulevard is a two-lane roadway and is classified as a minor arterial. It begins in the City of Homewood, travels through the City of Birmingham and ends in the City of Mountain Brook. The study segment has a 20 MPH speed limit and includes a bridge over US-280 with an eastbound on-ramp and a westbound off-ramp, both of which are stop-controlled intersections. There is no left turn lane on Hollywood Boulevard to accommodate left-turning traffic onto the eastbound US-280 on-ramp. A left turn lane is present for Brookhill Condominiums. Figure 2 provides an aerial image of the study area and identifies geometric features and field measurements.

2.3 Field Observations

A field review was performed on Wednesday, July 26, 2017 from 7:45 to 9:30 AM. Queues were observed in the westbound direction due to vehicles turning left onto the US-280 on-ramp.



Malaga Avenue to Union Hill Cemetery

The Hollywood Boulevard segment from Malaga Avenue to the beginning of Union Hill Cemetery has no striping, 24 feet of pavement, and curb and gutter. This section of Hollywood Boulevard is shown in Figure 3.



Figure 3: Hollywood Boulevard segment from Malaga Avenue to beginning of Union Hill Cemetery

At the intersection of Hollywood Boulevard and Malaga Avenue, all four corners have handicap ramps and crosswalks are provided as shown in Figure 4. Sidewalk is present on both sides of Hollywood Boulevard west of the Malaga intersection and along both sides of Malaga Avenue in the north and south directions. Sidewalk wraps around the southeast corner of the intersection; however, it ends abruptly just a short distance east of the intersection and vegetation in this area has overtaken the sidewalk (see Figure 5).

Figure 4: Crosswalks at Intersection of Hollywood Boulevard and Malaga Avenue





Union Hill Cemetery to 100 feet West of US-280 Ramp

From the beginning of the cemetery until 100 feet before the intersection of Hollywood Boulevard and the US-280 on-ramp, the pavement is 24 feet in width with a 4 foot valley gutter located on the south side of the road (eastbound direction) and grassed shoulder on the north side of the roadway. In some areas along this section of Hollywood Boulevard, residents use the area adjacent to the valley gutter for parking. On the Hollywood Boulevard segment adjacent to Union Hill cemetery, it appears that grass has grown over the edge of pavement and reduced the overall pavement width on the north side of the roadway. The cemetery fence in this area is approximately 6.5 feet from the edge of pavement. Pavement markings warning motorists to slow to 20 miles per hour are faded. Figure 6 shows the faded pavement markings and Figure 7 shows the valley gutter and adjacent parking.





100 feet West of US-280 Ramp to Bridge





The Hollywood Boulevard segment from 100 feet before its intersection with the US-280 on-ramp until the beginning of the bridge has 24 feet of pavement, curb and gutter on the north side of the roadway and a 4 foot valley gutter on the south side of the roadway. Figure 8 shows the eastbound view of this segment of Hollywood Boulevard.

Figure 8: Hollywood Boulevard segment – looking east at intersection with US-280 on-ramp



Bridge over US-280

Figure 9 provides a picture of the bridge over US-280. The current bridge rating for this bridge is 86.5. The current Alabama Highway Bridge Replacement and Rehabilitation Program considers a bridge eligible for replacement after its sufficiency rating falls below 80. The bridge deck on Hollywood Boulevard is 28 feet wide with no shoulders. Several pedestrians and bicyclists were observed utilizing Hollywood Boulevard for recreation purposes (see Figures 10 and 11). There are no dedicated facilities for pedestrians and cyclists on the bridge. The bridge rail does include a curb; however, standing on this curb the rail height only reaches knee level, which does not provide a sufficient comfort level for pedestrians.





Figure 10: Bicyclist Activity on Bridge





Intersection of Hollywood Boulevard and US-280 Off-Ramp

According to the American Association of State and Highway Transportation Officials' A *Policy on Geometric Design of Highways and Streets*, 11th Edition, minimum intersection sight distances for Hollywood Boulevard with a speed limit 20 MPH should be 225 feet for left turns from the minor road and 195 feet for right turns from the minor road. Intersection sight distance for vehicles in the northbound direction at the intersection of Hollywood Boulevard and US-280 off-ramp is approximately 375 feet for vehicles turning left and 300 feet for vehicles turning right. Sight distance can be completely blocked for vehicles turning right at Hollywood Boulevard when there is activity at Express Oil Change. Pavement conditions on the off-ramp are poor (see Figure 12) and pavement markings are faded (see Figure 13). If vehicles go southbound (wrong way), Wrong Way signs are placed 216 feet from the stop line; wrong way vehicles would be almost at US-280 before encountering the Wrong Way warning signs (see Figure 14).





Figure 13: Off-ramp faded pavement markings

Figure 14: Off-ramp Wrong Way signs



There is evidence of ponding water at this intersection. Figure 15 shows two inlets. The inlet top shown in the background of the picture is broken and the inlet shown in the foreground is missing a top and appears to be completely blocked. The presence of silt and grass indicates water is ponding in this area creating a risk for hydroplaning. In addition, the outlet ditch located along the west side of the US-280 off-ramp appears to be experiencing ponding water and as shown in Figure 16, the outlet pipe is approximately 80 percent blocked.





Bridge to Mountain Brook Village

Just after the bridge, the pavement width is approximately 35 feet wide including two 12 foot travel-lanes and one 11 foot eastbound left-turn lane into Brookhill Condominiums and a neighborhood. Figure 17 shows the beginning of the turn lane. The neighborhood is separated from Hollywood Boulevard via fence made up of brick columns and wooden fence posts. In some areas the brick columns are only 2 feet from the edge of pavement (see Figure 18).

Angled parking for Shades Valley Presbyterian Church exists on the south side of Hollywood Boulevard (see Figure 19). This parking area is approximately 250 feet long, accommodates roughly 14 parking spaces, and a driveway for the church. Sidewalk begins on the south side of these parking spaces and continues into Mountain Brook Village.

The typical section of Hollywood Boulevard east of the Brookhill Condominiums entrance includes two 12 foot wide travel lanes and an 11 foot wide two-way left-turn lane. Ninety degree parking also exists on the north side of the roadway as well as sidewalk. This typical section continues into Mountain Brook Village (see Figure 20).

Figure 17: Beginning of Left-turn Lane into Brookhill Condominiums







Figure 19: Angled Parking for Shades Valley Presbyterian Church



Figure 20: Looking east approaching Mountain Brook Village



Hollywood Boulevard APPLE Project Existing Conditions Report City of Homewood, Alabama

2.4 Existing Traffic Operations Evaluation

There is limited area where pedestrians and bicyclists can be accommodated within the current right-of-way. The interaction between vehicular traffic, pedestrians, and bicyclists plays an important role in the level of security all users experience. Due to the right-of-way constraints along the Hollywood Boulevard corridor, examining the vehicular traffic operations aids in understanding how pedestrian and bicyclist facilities could function within the study corridor.

2.4.1 Traffic Counts

The RPCGB provided 24-hour turning movement counts by vehicle type, including pedestrians and bicycles at the following locations:

- Hollywood Boulevard intersection
 with US-280 on-ramp
- Hollywood Boulevard intersection
 with US-280 off-ramp

Counts were performed on April 6th through April 8th (Thursday through Saturday) and on Wednesday, May 10, 2017. The US-280 off ramp location was not counted on April 8th.

A review of the count data identified three peak periods of travel time: 7:45-8:45AM, 12:45-1:45PM, and 4:00-5:00PM. Figure 20 summarizes the existing traffic counts for the highest one-hour in each of the morning, mid-day, and afternoon peak periods.

2.4.2 Existing Capacity Analysis *Existing Intersection LOS Analysis*

Sain conducted a capacity analysis for vehicular traffic at both intersections using PTV's Vistro 5 software. Traffic capacities are expressed as levels of service (LOS) ranging from "A" (free-flow conditions) to "F" (very congested conditions). Generally, LOS "C" is desirable, while LOS "D" is considered acceptable during peak hours of traffic flow. A detailed description of each LOS designation is included in Appendix A. Table 1 summarizes the existing LOS for the morning, mid-day, and afternoon peak hours based



Figure 21: Existing Peak Hour Volumes (2017)

on intersection approach. The capacity analysis results for the existing conditions are included in Appendix B.

The LOS A seen for the eastbound movement on Hollywood Boulevard can be attributed to the fact that this movement is not hindered by any traffic control like a stop sign or signal, the movement is considered free-flow. For the westbound movement on Hollywood Boulevard during the mid-day peak, the overall approach has a LOS F. This can be attributed to long queue lengths that stretch through the adjacent intersection with the US-280 Off-Ramp. During the mid-day peak it is estimated that the queue length is approximately 603 feet.

			2017			
Intersection		Approach	AM Peak	Mid-Day Peak	PM Peak	
			7:45-8:45	12:45-1:45	4:00-5:00	
	SB	Union Hill Drive	F	F	F	
at US-280 On-Pamp	EB	Hollywood Boulevard	А	А	А	
	WB	Hollywood Boulevard	А	F	А	
	NB	US-280 Off-Ramp	D	E	D	
Hollywood Boulevard	SB	Driveway	С	D	В	
at US-280 Off-Ramp	EB	Hollywood Boulevard	A	A	A	
	WB	Hollywood Boulevard	А	A	A	

Table 1: Existing Conditions Level of Service

Figures 22, 23, and 24 illustrate the LOS and queue lengths (highlighted in blue) for the existing morning, mid-day, and afternoon peak periods. The longest queue lengths are experienced during the mid-day peak period. The red highlight area on figure 23 indicates that the queue length stretches beyond the Hollywood Boulevard and the US-280 Off-Ramp intersection.

2.4.3 Traffic Signal Warrant Analysis

A traffic signal warrant analysis was performed for the Hollywood Boulevard/US-280 eastbound on-ramp intersection and for the Hollywood Boulevard/US-280 westbound off-ramp using the existing turning movement volumes (discussed in Section 2.4.1). Part 4 of the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) provides instruction on when a traffic signal should be installed. Included in this instruction are criteria for various traffic signal analyses or warrants. Of the nine warrants provided by the MUTCD, only one warrant (Warrant 1) applies to the Hollywood Boulevard/US-280 ramps intersections. The traffic signal warrant analysis shows that existing traffic volumes warrant a signal at the Hollywood Boulevard and US-280 westbound off-ramp intersection but not at the US-280 eastbound on-ramp intersection. The signal warrant evaluation reports are supplied in Appendix C.



Figure 22: Existing Conditions LOS and Queue Lengths – AM Peak

Montevallo Rd 38 280 PEPERE (C. E EP LEGEND **Control Delay** LOS (s/veh) ≤10 Α В >10-20 С >20-35 D >35-55 280 >55-80 Ε 38 >80 F Queue Length 95th Percentile Queue

Figure 23: Existing Conditions LOS and Queue Lengths – Mid-Afternoon Peak





2.4.4 Bicycle and Pedestrian Accommodations

The land use along the corridor is predominantly residential and commercial. Shades Valley Presbyterian Church, "The Hollywood" shopping center, Union Hill private cemetery, and Mountain Brook Village are potential pedestrian and bicycle trip generators located within or adjacent to the study area.

Pedestrian accommodations exist at and beyond the west end termini of the study area at Malaga Avenue and include sidewalk on both sides of Malaga Avenue and Hollywood Boulevard. Handicap ramps and crosswalks are also located at the Malaga Avenue intersection. On the east side of the study area, sidewalk begins on the south side of Hollywood Boulevard at Shades Valley Presbyterian Church and continues to Mountain Brook Village. Sidewalk begins on the north side of Hollywood Boulevard at the driveway to the Brookhill Condominiums. This section of sidewalk also continues to Mountain Brook Village.

By law, cyclists are allowed to use roadway travel lanes. On the studied section of Hollywood Boulevard there are no dedicated bike lanes or paved shoulders for cyclists. Even though there is evidence of recreational pedestrian and cyclist activity in the study segment, the majority of people would not feel comfortable walking or travelling by bicycle in this area due to the lack of accommodating facilities.

The traffic counts as discussed in section 2.4.1 included a tally of pedestrian and cyclists using the study corridor. The highest number of pedestrians and cyclists was observed during the Saturday count period and included 78 pedestrians and 4 cyclists during the 2-hour morning peak (7:00 to 9:00 AM). It should be noted that the Birmingham Track Club hosted a social on this same day in Homewood and their 13-mile and 9-mile routes included the study segment of Hollywood Boulevard. Tables 2 and 3 provide a summary of pedestrian and cyclist volumes. The actual peak for pedestrians and cyclists varies slightly from the motorist peak times.

	Count Location				
Time	Hollywood Boulevard at US-280		Hollywood Boulevard at US-280		
Mashday	Un-R	amp	UII-h Dedestriere	amp Billion	
vveeкday	Pedestrians	Bikes	Pedestrians	Bikes	
AM Peak	1	0	0	0	
7:00-5:00					
Mid-Day Peak	1	1	3	2	
11:00-1:00	-	1	5	-	
PM Peak	2	2	2	2	
4:00-6:00	2	2	2	3	

Table 2: Pedestrian and Bicycle Count Summary Weekday

Hollywood Boulevard APPLE Project Existing Conditions Report City of Homewood, Alabama

	Count Location			
Time	Hollywood Boulevard at US-280		Hollywood Boulevard at US-280	
	On-Ramp		Off-Ramp	
Weekend	Pedestrians	Bikes	Pedestrians	Bikes
AM Peak	70	Δ		
7:00-9:00	/8	4	Troffic Data was	not collected at
Mid-Day Peak	6	2	this location during the Weekend.	
11:00-1:00	0	5		
PM Peak	2	0		
4:00-6:00	5	0		

Table 3: Pedestrian and Bicycle Count Summary Weekend

2.4.5 Crash Summary

The information presented in this section is exempt from open records, discovery or admission under Alabama Law and 23 U.S.C. §§ 148(h)(4) and 409). The collection of safety data is encouraged to actively address safety issues on regional, local, and site specific levels. Congress has laws, 23 U.S.C. § 148(h)(4) and 23 U.S.C. § 409 which prohibit the production under open records and the discovery or admission of crash and safety data from being admitted into evidence in a Federal or state court proceeding. This document contains text, charts, tables, graphs, lists, and diagrams for the purpose of identifying and evaluating safety enhancements in this region. These materials are protected under 23 U.S.C. §409 and 23 U.S.C. § 148(h)(4). In addition, the Supreme Court in *Ex parte Alabama Dept. of Trans.*, 757 So. 2d 371 (Ala. 1999) found that these are sensitive materials exempt from the Alabama Open Records Act.

Data for crashes occurring on Hollywood Boulevard between Malaga Avenue and Cahaba Road for a 5-year period (January 2012 to December 2016) was provided by the Regional Planning Commission of Greater Birmingham (RPCGB) and the City of Homewood. A summary of this crash data was prepared solely for the purpose of identifying, evaluating, and planning safety improvements on public roads; and is therefore exempt from open records, discovery, or admission under Alabama law and 23 U.S.C. §§ 148(h)(4), and 409.

There were twenty-five (25) total crashes in the study area during the 5-year period with one (1) incapacitating injury crash, one (1) possible injury crash, and twenty-three (23) property damage only crashes. The low-severity nature of crashes can be attributed to the low speed limit of 20 MPH on Hollywood Boulevard, as well as the crash type. Most of the crashes that occurred were rear-end crashes which typically result in low-severity. Several angle crashes also occurred when vehicles failed to yield right-of-way turning left or leaving a driveway. The primary contributing factors to the crashes included following too close, failure to yield the right-of-way, distracted driving, and misjudgment of stopping distance. No crashes involved pedestrians, bicyclists, or school buses.

Crashes are to some degree random events; therefore, crash frequencies naturally fluctuate over time at a given site. This randomness indicates that short-term crash frequencies alone are not a reliable estimator of long-term crash frequency. The crash fluctuation over time makes it difficult to determine whether changes in the observed crash frequency are due to changes in site conditions or are due to natural fluctuations. When a period with high crash frequency is observed, it is statistically probable that the following period will have low crash frequency. This tendency is known as regression-to-the-mean (RTM). Not accounting for the effects of RTM introduces the potential for "RTM bias" (Refer to the Highway Safety Manual for more information). Figures 25 to 28 provide an overview of crash behavior in the study area. Although these figures may not account for the RTM bias, they can illustrate crash trends and guide further analysis.



Hollywood Boulevard crash fluctuations by year can be seen in Figure 25; crash frequency was higher in 2014, decreasing after that year. Figure 26 shows crash frequency by month during the analysis period; April and June had the most crash occurrences. Crash frequency by day of the week is illustrated in Figure 27 and shows almost half of all crashes (44%) occurring on a Wednesday. Figure 28 summarizes crashes by time of day; crash occurrences are higher during morning and mid-day peaks, potentially related to higher traffic volumes due to commuters that take US-280, as well as traffic attracted by shops and restaurants during lunch time.





2.5 Existing Bridge Condition

Per the American Association of State Highway and Transportation Officials' (AASHTO) Bridge Code, bridges are typically designed with a 75-year design life; however, rehabilitation can be performed to extend that life expectancy.

Federal Highway Administration (FHWA) provides information for all bridge inspections performed in the United States. The Hollywood Boulevard bridge over US-280 was built in 1964 and was last inspected in May, 2014. The bridge inspection provided the following assessment:

- a) Structural Evaluation Rating (SCORE = 6 out of 9): if less than 4, the bridge requires corrective action; if less than 3, the bridge should be replaced.
- b) **Deck Geometry Rating (SCORE = 5 out of 9):** if less than 3, the bridge is still open but requires changes; if less than 2, the bridge has to be closed.
- c) **Sufficiency Rating (SCORE = 86.5 out of 100.0):** to be eligible for the Highway Bridge Replacement and Rehabilitation Program, a bridge must have a sufficiency rating of 80.0 or less.
- d) Inspections: no fracture, underwater, or other special inspections are needed.

The Hollywood Boulevard bridge over US-280 is not eligible for the Highway Bridge Replacement and Rehabilitation Program; however, the bridge inspection recommended "bridge rehabilitation because of general structure deterioration or inadequate strength". Improvement costs, estimated by FHWA in 2016, are as follows:

- Bridge improvement cost: \$1,798,000. Includes only bridge construction costs, excluding roadway, right of way, detour, demolition, preliminary engineering, etc.
- Roadway improvement cost: \$180,000. Includes only roadway construction costs, excluding bridge, right-of-way, detour, extensive roadway realignment costs, preliminary engineering, etc.
- Total project cost: \$1,978,000. Includes all costs normally associated with the proposed bridge improvement project.

Per discussions with the ALDOT Bridge Bureau, the Hollywood Boulevard bridge over US-280 is not scheduled for replacement in the near or foreseeable future.

3 Existing Documents and Adjacent Projects

Several documents were reviewed to evaluate the existing conditions of the study area. This section summarizes the documents that were reviewed.

3.1 Alabama Statewide Bicycle and Pedestrian Plan (2017)

The Alabama Statewide Bicycle and Pedestrian Plan was released in 2017 to establish a vision that supports walking and bicycling as modes of transportation in the state. The plan was developed by the Alabama Department of Transportation (ALDOT) and stakeholders to provide guidelines for safe bicycle and pedestrian facilities. The plan promotes walking and bicycling as safe, comfortable, and convenient modes of transportation in all communities across the state for people of all ages and abilities.

According to the Bicycle Corridor Plan proposed by the Alabama Statewide Bicycle and Pedestrian Plan, the cities of Homewood, Mountain Brook, and Birmingham are located within a priority bicycle corridor area. For roadways with speed limits less than 30 MPH, a shared lane for vehicles and bicycles or a wide outside lane are the most recommended bicycle facilities. Sidewalks on both sides are recommended for pedestrians.

3.2 City of Birmingham Comprehensive Plan (2012)

In 2012, the City of Birmingham released the first comprehensive plan based on a community process since 1961. The plan was a result of the discussions between citizens, business owners, and other stakeholders to transform Birmingham into a city that:

- People choose as a place to live
- Has a connected network of walkable urban places
- Is innovative and prosperous, with a diversified and sustainable economy
- Is the most sustainable, "greenest" city in the South
- Has its success built on local and regional partnerships

Chapter 2 of the comprehensive plan shows a comparison between input from the City of Birmingham versus input from residents when identifying a common set of priority elements that should be a part of the city's 20-year vision and statement of principles. The number one priority for both City and residents is "high quality transportation system of well-maintained streets, complete bicycle and pedestrian networks, and excellent public transportation connecting employment, community, and visitor destinations". It can be noticed in the plan that bicycle and pedestrian facilities are priorities for the City of Birmingham.

3.3 RPCGB Active Transportation Plan (2015)

The study area for this plan included the Birmingham Metropolitan Planning Area, comprising Jefferson and Shelby counties, as well as portions of Blount and St. Clair counties. Active transportation systems are important to a region as they provide mobility, economic development, public health, and sustainability, promoting transportation equity and improving quality of life. The Active Transportation Plan includes several principles that guide its development. Two of the most applicable to the Hollywood Boulevard APPLE study include:

- Provide the region's residents with improved access to transportation infrastructure and services, helping to address daily travel needs and opportunities with minimal cost, time, or physical danger
- Encourage and support opportunities to create livable places, developing communities that afford existing and future residents a chance to enjoy a better quality of life, lead healthy lifestyles, and enjoy opportunities to work, live and play

RPCGB is currently working on an update to their Active Transportation Plan (the B-Active Plan). The B-Active Plan is expected to be adopted in the summer of 2019 along with their Long Range Transportation Plan.

3.4 US-280 Cahaba Road Intersection Improvements (Ongoing)

As part of a feasibility study for the City of Birmingham, City of Mountain Brook, and ALDOT, Sain Associates prepared several alternatives to improve the capacity and operations at the Cahaba Road/Hwy 280/Lane Park Road/Culver Road intersection. The alternative with the most efficient operations includes a large roundabout at the Cahaba Road/Hwy 280/Lane Park Road intersection, a mini-roundabout at Culver Road, and the closure of Canterbury Road westbound approach and signal phase at the Cahaba Road/Montevallo Road intersection. The US-280 Cahaba Road Intersection Improvements may affect Hollywood Boulevard traffic, as the Canterbury Road route to Hollywood Boulevard will be eliminated and traffic operations improve at that intersection.

3.5 Zoo Connector Trail (Ongoing)

The City of Birmingham proposes to construct a sidewalk connector in the vicinity of the Birmingham Zoo in order to improve connectivity for pedestrians between the cities of Birmingham, Homewood, and Mountain Brook. The total length of the proposed sidewalk will be approximately 3,500 linear feet. The proposed connector will begin at the existing pedestrian facilities near the intersection of Hermosa Drive and Poinciana Drive. It will continue beneath US-280 before continuing east along 20th Place Access

Road. The proposed project will terminate at existing pedestrian facilities along Cahaba Road. The design of the Zoo Connector Trail is currently underway

When compared to potential pedestrian facilities at the study segment of Hollywood Boulevard, the Zoo Connector Trail is a safer alternative as it is mostly located on lowtraffic volume roadways and still provides pedestrian connectivity between Homewood, Birmingham, and Mountain Brook.

4 **Environmental Features**

A search of documents, databases, a field review, and compilation of GIS data was performed to analyze existing conditions and identify environmental features. This section further discusses the gathered data.

4.1 Historic Assets

A search of various databases was performed to identify any known historic properties. This section summarizes this research. To verify the historic and/or archeological importance of the area, a full cultural resources report should be prepared should the City opt to utilize federal monies to fund improvement projects within this area. To verify the historic and/or archeological importance of the area, a full cultural resources report should be prepared should the City opt to utilize federal monies to fund improvement projects within this area.

4.1.1 The National Register of Historic Places (NRHP)

A search of the NRHP shows that a portion of the study corridor is located within the Hollywood Historic District. The district was entered in the National Register in May of 2002. The district is roughly bound by Montgomery Parkway (US-31), US-280, and Lakeshore Drive. Figure 29 shows the Hollywood Historic District in red as shown on mapping developed by the NRHP. There are 412 contributing buildings and 1 contributing site. The applicable National Register criteria qualifying a property for listing is that the "property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

The Union Hill Cemetery was established around 1880 prior to the Town of Hollywood; however, in 1926 when the town incorporated the cemetery became a part of the town.

4.1.2 Alabama Register of Landmarks and Heritage (ARLH)

There are no properties within the study area recorded on the Alabama Register of Landmarks and Heritage.

4.1.3 Alabama Historic Cemetery Register

Per the historic marker placed at the entrance of Union Hill Cemetery, the site is listed in the Alabama Historic Cemetery Register. The private cemetery was established in the 1870s; however, there are gravestones located within the cemetery that date as far back as the 1850s. In addition, Union Hill Cemetery serves as the final resting place for many veterans of the Civil War, Spanish-American War, World War I, World War II, and the Korean War.



Figure 29: Hollywood Historic District

4.2 Threatened and Endangered Species

A search using the US Fish and Wildlife Service's IPaC Information for Planning and Consultation database revealed a list of known or expected threatened or endangered species located within the study area. According to this list, there are several species potentially located within the study area which could be impacted by activities in the study area. The full list of species can be found in Appendix D. Based on this information a Threatened and Endangered Species survey would be required should the City opt to utilize federal monies to fund improvement projects within this area.

4.3 Wetlands

Per the National Wetlands Inventory, there are no known wetlands within the study area.

4.4 Prime and Unique Farmlands

A search of the Natural Resources Conservation Service's Web Soil Survey reveals that there are no prime or unique farmlands located within the study area.

4.5 Hazardous Materials Properties

A search of the Alabama Department of Environmental Management's (ADEM) *Cleanup Properties Inventory* database and GIS Inspector tool was performed. Per these sources, there are no known hazardous materials sites located within the study area. Should the County elect to move forward with improvements using Federal or State money, a hazardous materials clearance letter will have to be obtained from ALDOT's Environmental Technical Section (ETS).

4.7 Environmental Justice

Environmental Justice is a component of the National Environmental Policy Act (NEPA) that seeks to ensure that all socio-economic groups share in the benefits and burdens of Federal transportation projects. Two areas of environmental justice that frequently become a concern are areas with a high minority population or areas where the majority of the inhabitants are members of low income households. Table 4 provides a very brief overview of the socioeconomic demographics of the study area as shown in the 2015 American Community Survey (ACS), a statistical survey by the U.S. Census Bureau. When compared to census information for Jefferson County, it can be concluded that there are no concerns related to environmental justice. The minority populations and the percentage of families living below the poverty level in the cities connected by the study segment of Hollywood Boulevard are below those seen for the entire County.

Socioeconomic Overview	City of Homewood	City of Mountain Brook	Jefferson County
Population Total	25,535	20,518	659,026
White	79.2%	96.1%	52.8%
African American	16.1%	1.7%	42.3%
Hispanic	5.3%	1.5%	3.8%
% Families Living Below Poverty Level	9.5%	1.3%	15.0%

Table 4: Socioeconomic Overview

5 Utilities

Utility mapping data was collected and a field review was performed to identify utilities located within the study area. The data collected reveals overhead power, telephone, water, sanitary sewer, and gas exist in the study area. Data also indicates that there are no utilities located on the bridge. At least some utility relocation will be required should the City decide to widen Hollywood Boulevard. Mapping of utilities is provided in Appendix E.

Overhead Power

The location of overhead power lines and power poles was determined from field review and aerial imagery. East and west of the bridge, power poles are located just feet from the south edge of pavement, if not closer. In several locations, power poles are located in the existing sidewalk. Overhead power lines are located primarily on the south side of Hollywood Boulevard.

Telephone

Although mapped data for telephone lines was not available, there is evidence of a telephone line located on the north side of Hollywood Boulevard. Telephone manholes were also noted on the south side of Hollywood Boulevard west of the bridge.

Water

According to GIS data provided by Birmingham Water Works, approximately 320 feet of 2-inch water main exists on the south side of Hollywood Boulevard near Malaga Avenue. Another 2-inch water main is located on the south side of Hollywood Boulevard beginning at the US-280 off-ramp and connects to the water main located in Mountain Brook Village. A third water main is located on the east side of the US-280 off-ramp. This 8-inch main extends to US-280.

Sanitary Sewer

Per archived GIS data provided by Jefferson County, only a small portion of the study area contains sanitary sewer. The data shows an 8" sanitary sewer main that begins at the driveway to Asia Rug Co. Cleaning and Repairing and Relfe-Welden Real Estate and extends approximately 175 feet east before traveling south along the property line between Express Oil Change and Shades Valley Presbyterian Church.

Gas

Alagasco provided non-digitized maps of their facilities within the study area. These maps were digitized and added to the study's GIS database. The data shows an 8-inch gas main throughout the study area. The gas main is located north of Hollywood Boulevard west of the bridge. Just prior to the bridge, the gas main perpendicularly crosses Hollywood Boulevard, travels along the US-280 on-ramp, and then crosses beneath US-280. The gas main then travels back to the north side of Hollywood Boulevard. Traveling east, it appears the gas main is located beneath the pavement of Hollywood Boulevard and connects to the gas main located in Mountain Brook Village. It is unusual for a gas main to be located in the roadway.
6 Future Traffic Operations Evaluation

A capacity analysis was performed for the study area considering 20-year design volumes (2037) and existing geometry.

6.1 Growth Rate

The growth rate used to forecast 20-year (2037) design volumes was 1.0% and traffic volumes were forecasted based on a straight-line trend. The study area is fully stable and developed and the 1.0% growth rate is consistent with the rate used for other planning projects for adjacent areas and intersections.

6.2 Future Intersection Capacity Analysis

A future intersection LOS analysis was conducted for the study area with forecasted 20year design (2037) turning movement counts using PTV's Vistro 5 software. Table 5 summarizes the future LOS for the morning, mid-day, and afternoon peak hours based on intersection approach. Figure 30 summarizes the future traffic volumes for the highest one-hour in each of the morning, mid-day, and afternoon peak periods. Figure 31 illustrates the estimated future (2037) LOS and queue lengths (highlighted in blue) for each alternative during the mid-day peak period, when the greatest capacity issues are observed. The queue length for the left-turn movement onto the US-280 westbound on-ramp is shown in red since it stretches through the adjacent off-ramp intersection. The mid-day, westbound Hollywood Boulevard queue length estimated at approximately 1356 feet which is more than double what is currently experienced.

Interrection	Approach		2037			
Intersection			AM Peak	Mid-Day Peak	PM Peak	
	SB	Union Hill Drive	F	F	F	
at US-280 On-Ramp	EB	Hollywood Boulevard	А	A	А	
	WB	Hollywood Boulevard	А	F	А	
Hollywood Boulevard at US-280 Off-Ramp	NB	US-280 Off-Ramp	F	F	F	
	SB	Driveway	D	E	C	
	EB	Hollywood Boulevard	А	А	А	
	WB	Hollywood Boulevard	Δ	Δ	Δ	



Figure 31: 20-Year (2037) LOS and Queue Lengths – Mid-Day Peak



6.3 **Pedestrian Routes**

Currently, there is a lack of pedestrian connectivity between the cities of Homewood and Mountain Brook. Each city provides pedestrian accommodations within their city limits. Hollywood Boulevard offers the shortest route for those wishing to travel between the two cities. Figure 32 maps this route from Malaga Avenue, a 0.5 mile and 9 minute walk. Figure 33 maps this route from Montgomery Parkway (US-31), an 0.8 mile and 16 minute walk. This route is included since it offers connection between main commercial nodes in the City of Homewood and the City of Mountain Brook.

The proposed Zoo Connector Trail discussed in section 3.6 would offer another option for pedestrians to access Mountain Brook Village; however, the distance and travel time is increased. This potential route is shown in Figures 34 and 35 and a comparison of distance and travel time is provided in Table 6.

Table 6. Fedesilian Robles Sommary							
COMPARISON OF DISTANCE AND TRAVEL TIME FOR PEDESTRIAN ROUTES							
	Start Point						
Route	Malaga A	Avenue	Montgomery Parkway				
	Distance	Time	Distance	Time			
Hollywood Boulevard	0.5 mile	9 min	0.8 mile	16 min			
Zoo Connector Trail	0.9 mile	18 min	1.2 mile	23 min			

Table / Dedeatrian Deutee Summany



Figure 32: Hollywood Boulevard Pedestrian Route from Malaga Avenue



Figure 34: Zoo Connector Trail Pedestrian Route from Malaga Avenue





Figure 35: Zoo Connector Trail Pedestrian Route from Montgomery Parkway

7 Intersection Improvement Options

Although the main focus of this study is to identify pedestrian and bicycle improvement alternatives, a review of the vehicular traffic operations was also conducted. Knowing how the roadway is functioning from a motor vehicle perspective provides a complete picture of how pedestrians and cyclists are impacted by the existing traffic volumes and how the area will be affected with future traffic volumes. Existing traffic operations are discussed in Section 2.4 of this report and Section 6.2 of this report provides an overview of the future traffic operations should no changes to the existing roadway geometry occur. These future traffic volumes were used in the capacity analysis to examine intersection improvement alternatives. The alternatives evaluated included intersection improvements since the operations analysis for future traffic volumes showed the performance of the intersections of Hollywood Boulevard and the US-280 ramps will worsen in future years, specifically during the mid-day peak (12:45 PM to 1:45 PM).

Two intersection improvement options were analyzed, the first option included widening the existing bridge to add a westbound left turn lane at the intersection of Hollywood Boulevard and the US-280 eastbound on-ramp. This first improvement option also includes a signal at the Hollywood Boulevard and the US-280 westbound off-ramp. Table 7 summarizes the future LOS for morning, mid-day, and afternoon peak hours for each intersection approach. Figure 36 displays the future (2037) LOS and queue lengths (highlighted in blue) for the mid-day peak period, when the greatest capacity issues are observed for existing conditions. The cost to implement these improvements is estimated at \$2.81 million. This cost excludes right-of-way acquisition.

As seen in Figure 36, the implementation of the previously described improvements greatly improves the overall traffic operations within the area. The one failing movement is for Union Hill Drive. That poor LOS is attributed to lack of gaps in traffic flow on Hollywood Boulevard for vehicles to exit Union Hill Drive and is consistent with existing conditions. Traffic volumes on Union Hill Drive are low and are not sufficient to warrant installation of a traffic Signal. For the mid-day, westbound Hollywood Boulevard movement the addition of a left-turn lane reduces the queue length to approximately 245 feet, which is 82 percent less than the length estimated for existing conditions with 2037 traffic volumes.

Interception	Approach		2037			
intersection			AM Peak	Mid-Day Peak	PM Peak	
Hollywood Boulevard at US-280 On-Ramp (Unsignalized)	SB	Union Hill Drive	F	F	F	
	EB	Hollywood Boulevard	А	А	А	
	WB	Hollywood Boulevard	А	С	А	
Hollywood Boulevard at US-280 Off-Ramp (Signalized)	NB	US-280 Off-Ramp	В	С	В	
	SB	Driveway	С	D	D	
	EB	Hollywood Boulevard	А	А	А	
	WB	Hollywood Boulevard	А	В	В	

 Table 7: Future Level of Service with Option 1 (Westbound Left Turn Lane and Traffic Signal)

The second option analyzed includes the installation of a roundabout at the intersection of Hollywood Boulevard and the US-280 eastbound on-ramp and at the intersection of Hollywood Boulevard and the US-280 westbound off-ramp. Table 8 summarizes the future LOS for the morning, mid-day, and afternoon peak hours for each intersection approach. Figure 37 displays the estimated future (2037) LOS and queue lengths (highlighted in blue) for the mid-day peak period, when the greatest capacity issues are observed. As seen in Table 8 and Figure 37, the installation of the previously described roundabouts yields good LOS results for all movements. The queue lengths for all approaches are on par with the lengths seen for the first improvement option (Figure 36) except that of the westbound approach at the US-280 eastbound on-ramp. That queue length is roughly 200 feet longer for the roundabout option.



Figure 36: Westbound Left Turn Lane with Signal at US-280 Westbound Off-Ramp LOS for 2037 Traffic Volumes Mid-Day Peak

*Note: the intersection improvements depicted in this figure are for analysis purposes only and do not reflect engineering design.

Interception	Approach		2037			
intersection			AM Peak	Mid-Day Peak	PM Peak	
Hollywood Boulevard at US-280 On-Ramp	SB	Union Hill Drive	В	С	В	
	EB	Hollywood Boulevard	В	С	В	
	WB	Hollywood Boulevard	В	С	В	
Hollywood Boulevard at US-280 Off-Ramp	NB	US-280 Off-Ramp	В	С	В	
	SB	Driveway	В	С	В	
	EB	Hollywood Boulevard	В	С	В	
	WB	Hollywood Boulevard	В	C	В	

Table 8: Future Level of Service with Option 2 (Roundabouts)

Improvement options 1 and 2 both improve the traffic operations for the area; however, the queue length associated with the westbound left turn movement onto the US-280 eastbound on-ramp is much longer for option 2 than it is with option 1. Although, in-depth engineering design was not performed for either option it can be said that both options would require bridge widening. Option 2 would require changes in the horizontal alignment for Hollywood Boulevard so that the roundabout approaches could appropriately connect to the center of the roundabouts. Bridge widening would be required to accommodate these alignment changes.

In addition, installation of two roundabouts would cause greater impact to the surrounding properties since the footprint of those features would stretch farther onto private property. These impacts include considerable impact to the cemetery property as well as impact to residential and commercial properties. Finally, the estimated cost for implementing the roundabouts described in Option 2 is \$3.78 million (excluding right-of-way acquisition) which is over a million dollars more than the cost estimated for the Option 1 improvements. For these reasons, intersection improvement option 1 was assumed to be the most likely option for implementation and was thus carried forward for evaluation with pedestrian improvements.

The capacity analysis results for the intersection improvement options are located in Appendix F.



Figure 37: Roundabouts LOS for 2037 Traffic Volumes Mid-Day Peak

*Note: the roundabouts depicted in this figure are for analysis purposes only and do not reflect the actual size or impact that fully designed roundabouts would entail.

8 Pedestrian Improvement Alternatives

By Alabama state law motor vehicles are required to share the roadway with bicycles. The improvement alternatives evaluated for this study include the accommodation of pedestrians and assumes cyclists will use the roadway for their transportation needs.

Four improvement alternatives were evaluated during this study. The following discusses each alternative including the benefits and challenges of each.

8.1 No Build Alternative

The No Build Alternative assumes that no pedestrian accommodations are constructed within the study corridor. As discussed in Section 3.5, a sidewalk project sponsored by the City of Birmingham, the Zoo Connector Trail is currently under design and is scheduled to let for construction in September of 2018. This sidewalk trail will connect the City of Homewood, beginning at the intersection of Hermosa Drive and Poinciana Drive (approximately 1,380 feet from the western terminus of the study corridor) to the City of Birmingham and the City of Mountain Brook, ending at the intersection of Cahaba Road/Lane Park Road/Culver Road/US-280 ramps (approximately 750 feet from the eastern terminus of the study corridor). Once the Zoo Connector Trail sidewalk is constructed, a complete pedestrian connection between the cities of Homewood, Birmingham, and Mountain Brook will be in place.

To enhance the current conditions along Hollywood Boulevard without a new construction project, the City could consider restriping the existing bridge. As discussed in Section 2 of this report, the existing bridge width is 28 feet with 12-foot travel lanes which allows for a 2-foot shoulder between the edge of the travel lane and the bridge barrier. Restriping the bridge so that the centerline stripe is shifted 2 feet north to create an 11-foot westbound lane and an 11-foot eastbound lane would allow for a 4-foot shoulder on the south side of the bridge. Although this restriping concept does not provide a true pedestrian or bicycle accommodation it would provide a wider shoulder shoulder should be to include this new striping scheme in the next resurfacing project.



1 in = 50 ft

& BUPDBY

Hollywood Boulevard APPLE Project Page 39

8.2 Alternative A: Pedestrian Bridge and Sidewalk

Alternative A includes installing a 10 foot wide pedestrian bridge that would be separate from the existing roadway bridge over US-280. The pedestrian bridge would be located north of Hollywood Boulevard connecting to Union Hill Drive on the west and the parking lot located just to the east of the existing bridge. Alternative A also includes the installation of a 6 foot wide sidewalk along the north side of Hollywood Boulevard west of the existing bridge in order to provide a pedestrian accommodation connecting to the existing sidewalk at Malaga Avenue. Placing the sidewalk along the north side of Hollywood Boulevard keeps pedestrians separated from traffic using the US-280 ramps.

Alternative A does not include the installation of a westbound left turn lane since that would necessitate a wider roadway bridge; however, the installation of a signal at the Hollywood Boulevard and US-280 westbound off-ramp is included. The incorporation of the signal allows pedestrians the use of a crosswalk and pedestrian signal. Alternative A crosses pedestrians across Hollywood Boulevard instead of continuing to the existing sidewalk at Brookhill Road because the brick columns and homes located in the Brookhill development are located very close to the existing roadway. To install sidewalk in this area would cause major impacts to the adjacent properties.

Although the pedestrian bridge could be designed so that cyclists could use it as well, their incorporation back into the roadway network at the bridge end points present a challenge since cyclists are required, by law, to ride in the same direction as vehicular traffic. In order to direct cyclists on the bridge to their appropriate travel lanes would require the cyclists to cross Hollywood Boulevard which creates new conflict points between cyclists and motor vehicles along the roadway.

A concept of Alternative A is shown on Figure 39. The cost to install Alternative A is estimated at \$1.94 million. This is a planning level cost with roadway items and sidewalk estimated based on engineering experience and bid tabulations from recent ALDOT projects. The cost for installing the pedestrian bridge assumes that the bridge would be constructed of a prefabricated steel truss system. A local bridge fabricator was contacted to obtain a cost estimate for the pedestrian bridge¹. Gresham, Smith and Partners provided additional estimated costs for the actual bridge installation. A detailed cost estimate is provided in Appendix G.

¹ Contech Engineered Solutions provided an Engineer's Cost Estimate for producing and installing a painted steel truss bridge and for a weathered steel bridge. The painted option was used for the purposes of this report. Contech is familiar with the area and requirements for pedestrian bridge installation.

Challenges associated with Alternative A include impacts to private property. The concept shown in Figure 39 is drawn using base mapping developed with aerial imagery and available GIS data. Based on this information, a 6 foot sidewalk with a 2 foot offset from the travel way can be installed along the north side of Hollywood Boulevard west of the bridge and stay outside of the existing fence associated with the Union Hill cemetery and a residential property; however, it is likely that the fence and small portions of the cemetery would be impacted during construction. On the east side of the bridge, impacts include the loss of some parking spaces at the commercial development where the pedestrian bridge would connect. From available data, it appears that this parking is located within the current roadway right-of-way. Exact right-of-way limits are not known for the corridor but it can be assumed that right-of-way acquisition will be required to install the improvements included in Alternative A. In addition to the parking spaces, there is potential for impacts to the Express Oil Change sign as well as some landscaping that separates parking for the Express Oil Change from parking for Shades Valley Presbyterian Church.

There are at least 4 overhead power poles located on the north side of Hollywood Boulevard west of the bridge that would have to be relocated in order to install the pedestrian accommodation. Additionally, a gas main is located on the north side of Hollywood Boulevard. The exact location of the main is not known but it is possible that this main may have to be relocated in conjunction with sidewalk installation. As for other utility impacts, there is a water line located on the south side of Hollywood Boulevard in the area of the Express Oil Change. Although it is not likely that sidewalk construction alone would cause conflict with the water line, the installation of closed storm drainage may impact underground utilities in the area as well as in other areas where sidewalk is proposed.

Benefits:

- Provides a transportation connection for pedestrians
- Provides more separation between pedestrians and motor vehicles
- Connects the City of Homewood to the City of Mountain Brook

Challenges:

- Requires pedestrians to cross Hollywood Boulevard at US-280 off-ramp
- Potential impact to Union Hill Cemetery Potential Right-of-Way impact to residential property
- Impacts to commercial parking
 Potential impact to Express Oil Change sign, landscaping, and a few parking spaces
- Utility pole relocations
- Potential impact to gas main and water line
- Does not fully address traffic congestion concerns

Opinion of Probable Cost: \$1.94M





Figure 39: Alternative A: Pedestrian Bridge and Sidewalk Hollywood Boulevard APPLE Project Page 42

8.3 Alternative B: Bridge Widening and Sidewalk along the North Side of the Corridor

Alternative B includes installing the intersection improvements (westbound left turn lane at the intersection of Hollywood Boulevard and the US-280 eastbound on-ramp and a traffic signal at the intersection of Hollywood Boulevard and the US-280 westbound offramp) as well as a sidewalk along the north side of Hollywood Boulevard. Placing the sidewalk along the north side of Hollywood Boulevard keeps pedestrians separated from traffic accessing the US-280 ramps. A concept for Alternative B is shown in Figure 40. The concept shows a widened bridge to accommodate the intersection improvements as well as a 6 foot sidewalk with a 2 foot offset from the travel way that would connect existing sidewalk at Malaga Avenue to the existing sidewalk located in front of Shades Valley Presbyterian Church.

The incorporation of the signal in Alternative B allows pedestrians the use of a crosswalk and pedestrian signal. Like Alternative A, Alternative B crosses pedestrians across Hollywood Boulevard instead of continuing the sidewalk to the existing sidewalk at Brookhill Road because the brick columns and homes located in the Brookhill development are located very close to the existing roadway. To install sidewalk in this area would cause major impacts to the adjacent properties.

The cost to install Alternative B is estimated at \$3.74 million. This is a planning level cost with roadway items and sidewalk estimated based on engineering experience and bid tabulations from recent ALDOT projects. A detailed cost estimate is provided in Appendix G.

Challenges associated with Alternative B are similar to those seen with Alternative A. They include impacts to private, residential property and several parking spaces located at the commercial development just east of the bridge. Like the concept shown in Figure 39, the concept shown in Figure 40 is drawn using base mapping developed with aerial imagery and available GIS data. Based on this information, a 6 foot sidewalk with a 2 foot offset from the travel way can be installed along the north side of Hollywood Boulevard west of the bridge and stay outside of the existing fence associated with the Union Hill cemetery and a residential property; however, it is likely that the fence and small portions of the cemetery would be impacted during construction. On the east side of the bridge, impacts include the loss of some parking spaces at the commercial development where the pedestrian bridge would connect. From available data, it appears that this parking is located within the current roadway right-of-way. Exact right-of-way limits are not known for the corridor but it can be assumed that right-of-way acquisition will be required to install the improvements included in Alternative B. In addition to the parking spaces, there is potential for impacts to the Express Oil Change sign as well as some landscaping that separates parking for the Express Oil Change from parking for Shades Valley Presbyterian Church.

There are at least 4 overhead power poles located on the north side of Hollywood Boulevard west of the bridge that would have to be relocated in order to install the pedestrian accommodation. Additionally, a gas main is located on the north side of Hollywood Boulevard. The exact location of the main is not known but it is possible that this main may have to be relocated in conjunction with sidewalk installation. As for other utility impacts, there is a water line located on the south side of Hollywood Boulevard in the area of the Express Oil Change. Although it is not likely that sidewalk construction alone would cause conflict with the water line, the installation of closed storm drainage may impact underground utilities in the area as well as in other areas where sidewalk is proposed.



8.4 Alternative C: Bridge Widening and Sidewalk along the South Side of the Corridor

Alternative C includes installing the intersection improvements (westbound left turn lane at the intersection of Hollywood Boulevard and the US-280 eastbound on-ramp and a traffic signal at the intersection of Hollywood Boulevard and the US-280 westbound offramp) as well as a sidewalk along the south side of Hollywood Boulevard. A concept for Alternative C is shown in Figure 41. The concept shows a widened bridge to accommodate the intersection improvements as well as a 6 foot sidewalk with a 2 foot offset from the travel way that would connect existing sidewalk at Malaga Avenue to the existing sidewalk located in front of Shades Valley Presbyterian Church.

The cost to install Alternative C is estimated at \$3.59 million. This is a planning level cost with roadway items and sidewalk estimated based on engineering experience and bid tabulations from recent ALDOT projects. A detailed cost estimate is provided in Appendix G.

Challenges associated with Alternative C include impacts to private, residential property and the potential for impact to parking spaces located at the commercial development just east of the bridge. Additionally, a sidewalk on the south side of Hollywood Boulevard creates conflict points between pedestrians and motorists accessing the US-280 ramps; however, the pedestrian and cyclist activity observed during a field visit documented a cyclist and two pedestrians traveling on the south side of Hollywood Boulevard.

Like the concepts shown for Alternatives A and B the concept shown in Figure 41 is drawn using base mapping developed with aerial imagery and available GIS data. Based on this information, potential impacts of installing sidewalk on the south side of Hollywood Boulevard west of the bridge would impact fence lines, private parking areas, and driveway grades. Additionally, there are over ten power poles located on the south side of Hollywood Boulevard. Depending on spacing clearances, these poles could be in conflict with the proposed sidewalk and may have to be relocated in order to accommodate the sidewalk.

On the east side of the bridge, potential impacts include the loss of some parking spaces at the commercial development due to proposed bridge widening. From available data, it appears that this parking is located within the current roadway right-of-way. Exact right-of-way limits are not known for the corridor but it can be assumed that right-of-way acquisition will be required to install the improvements included in Alternative C. In addition to the parking spaces, there is potential for impacts to the Express Oil Change sign as well as some landscaping that separates parking for the Express Oil Change from parking for Shades Valley Presbyterian Church. There are also

a couple power poles that would have to be relocated in order to install the proposed sidewalk. As for other utility impacts, there is a water line located on the south side of Hollywood Boulevard in the area of the Express Oil Change. Although it is not likely that sidewalk construction alone would cause conflict with the water line, the installation of closed storm drainage may impact underground utilities in the area as well as in other areas where sidewalk is proposed.



8.5 Alternative D: Pedestrian Bridge over US-280

Alternative D includes installing a 10 foot wide pedestrian bridge that would be separate from the existing roadway bridge over US-280. The pedestrian bridge would be located north of Hollywood Boulevard connecting to Union Hill Drive on the west and the parking lot located just to the east of the existing bridge. Alternative D does not include any additional sidewalk or roadway improvements. Although the pedestrian bridge could be designed so that cyclists could use it as well, their incorporation back into the roadway network at the bridge end points present a challenge since cyclists are required, by law, to ride in the same direction as vehicular traffic. For cyclists on the bridge to return to their appropriate travel lanes they would have to cross Hollywood Boulevard which creates new conflict points between cyclists and motor vehicles along the roadway.

A concept of Alternative A is shown on Figure 42. The cost to install Alternative D is estimated at \$1.165 million. The cost for installing the pedestrian bridge assumes that the bridge would be constructed of a prefabricated steel truss system. A local bridge fabricator was contacted to obtain a cost estimate for the pedestrian bridge². Gresham, Smith and Partners provided additional estimated costs for the actual bridge installation. A detailed cost estimate is provided in Appendix G.

Challenges associated with Alternative D include impacts to commercial parking. The concept shown in Figure 42 is drawn using base mapping developed with aerial imagery and available GIS data. Based on this information, impacts include the loss of some parking spaces at the commercial development located on the east side of the bridge. From available data, it appears that this parking is located within the current roadway right-of-way. Exact right-of-way limits are not known for the corridor but based on Jefferson County tax mapping it can be assumed that no right-of-way acquisition will be required to install the pedestrian bridge. During the design of the pedestrian bridge, the exact placement should take into consideration any potential widening of the in-place roadway bridge. Placing the pedestrian bridge for the sake of roadway widening.

The biggest challenge associated with Alternative D is the potential for the project to be ineligible for federal funding. The use of federal funds requires that the project design and construction follow the National Environmental Policy Act (NEPA) which is a procedural law that requires that the environmental impacts of a project be assessed

 $^{^2}$ Contech Engineered Solutions provided an Engineer's Cost Estimate for producing and installing a painted steel truss bridge and for a weathered steel bridge. The painted option was used for the purposes of this report. Contech is familiar with the area and requirements for pedestrian bridge installation.

prior to any action being taken. This assessment includes determining logical termini for the project. Whether or not the logical termini of the proposed pedestrian bridge can be justified by connecting a driveway for a business park on the west to restaurants on the east will ultimately be determined by the Federal Highway Administration. Discussions with ALDOT's Environmental Technical Section (ETS) indicate that it is possible that no additional sidewalk would be required to satisfy logical termini but a definitive answer could not be provided at the time this report was prepared. Following the completion of the APPLE study, discussions with FHWA and ETS should be conducted to determine if a pedestrian bridge only project could move forward with federal funds. An alternative strategy would be for local and state governments to fund the project without federal dollars

There is one overhead power pole located on the north side of Hollywood Boulevard west of the bridge that may have to be relocated in order to install the pedestrian bridge; however, it is possible that this pole could be avoided during design. There are no other known utility impacts.

8.6 Cost Comparison

All costs included in this report are planning level costs and assume federal funding will be used to install the improvements. Roadway items including sidewalk were estimated based on engineering experience and bid tabulations from recent ALDOT projects. The cost for installing the pedestrian bridge assumed that the bridge would be constructed of a prefabricated steel truss system. Cost estimates for each alternative include costs for utility relocation and right-of-way acquisition. Table 9 provides a cost comparison chart for each alternative.

Pedestrian Improvement Alternative	Total Project Cost (includes Utility Relocation and Right-of-Way Acquisition)			
Alternative A	\$1,940,000			
Alternative B	\$3,740,000			
Alternative C	\$3,590,000			
Alternative D	\$1,165,000			

Table 9: Alternatives Cost Comparison

Utility costs were based on costs associated with recent projects containing utility relocation. These costs were based on a per pole relocation fee for power poles and a per foot cost for gas and water line relocation. Right-of-way costs were developed with the assumption that an acre of acquired property would cost \$150,000.



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9 Accessibility

Per the Americans with Disabilities Act (ADA), facilities located within the public right-ofway must provide accessibility for all users including those with disabilities. The United States Access Board has developed proposed guidelines for pedestrian facilities in public rights-of-way. These guidelines are more commonly referred to as *Public Rights-Of-Way Accessibility Guidelines* or PROWAG. Per PROWAG, design, construction, and any alteration of pedestrian facilities within public rights-of-way, including local rights-ofway, must be made accessible for pedestrians with disabilities. Although PROWAG has not yet been officially adopted by the United States Department of Justice, it is the standard recognized by ALDOT. Once PROWAG is officially adopted it will be mandatory that the guidelines set forth by the United States Access Board be implemented into projects located within public rights-of-way.

10 Potential Funding Sources

The cost associated with the design and construction of any of the proposed alternatives exceeds the City's current available resources. This section discusses funding sources that are available to aid in design and construction. Federal programs are administered by the Alabama Department of Transportation. Table 10 details funding sources, the category of the source and the associated local match.

Funding Source	Category	Match Type				
Congestion Mitigation and Air Quality	Endoral	80% Federal/ 20% City				
Improvement Program (CMAQ)	rederal	(Design and Construction)				
Transportation Alternatives Program	Federal	80% Federal/ 20% City				
(TAP)	rederal	(Construction Only)				
State / a cal Partnership		50% ALDOT/ 50% City				
sidie/local Farmeiship	LOCAI	(Design and Construction)				

Table 10: Funding Options

Federal Funding

Below is a brief description of available federal funding programs.

 CMAQ and TAP funding programs have been continued through the Fixing America's Surface Transportation Act (FAST Act). The Metropolitan Planning Organization (MPO) receives approximately \$10 Million of CMAQ funds and \$1.2 Million of TAP funds annually. These funds are then distributed amongst various municipalities and ALDOT. The members of the MPO vote to determine which projects receive funding. The CMAQ and TAP funding programs are further discussed below.

The Congestion Mitigation and Air Quality Improvement (CMAQ) 0 Program's goal is to improve air quality. The installation of pedestrian facilities is one way CMAQ achieves this goal. Pedestrian facilities have the potential to reduce vehicle emissions since they encourage walking instead of motor vehicle transportation. CMAQ funding can be used for both design and construction of a project. With CMAQ funding, an 80/20 match is required meaning the Federal government provides 80% of the funding and the City would be responsible for the remaining 20% of funding. Since this report was prepared as part of the APPLE program, it can be used in conjunction with the application and will streamline the City's request for CMAQ funding. The downside to CMAQ funding is the time it adds to the overall project. Additional time is required in order to account for ALDOT and FHWA involvement including additional plan reviews and more stringent design and construction standards. For these reasons, a timeframe for completing a CMAQ pedestrian facility project is estimated at three to five years. Additionally, it will be difficult to secure CMAQ funding since all of the currently available funds managed by the MPO have been programmed through 2023.

http://www.fhwa.dot.gov/environment/air_quality/cmaq/

Projects defined as transportation alternatives are eligible for 0 Transportation Alternatives Program (TAP) funding. More specifically, applicable projects include: construction of facilities for pedestrians; construction of safe routes for non-drivers; community improvement activities; and environmental mitigation activities. TAP applicable projects are funded through a competitive process. Project design is not covered by TAP funds, meaning the City would have to use other funding for engineering services. Like CMAQ funding, an 80/20 match is required with TAP funding. TAP funds cover 80% of the construction cost and the City would be responsible for 20% of the construction cost plus all engineering services for the project. In theory the timeframe for completing a TAP project should be shorter than a CMAQ project since the design is separate from the construction funding; however, three to five years should be assumed since design plans and construction specifications are required to meet ALDOT standards. The application deadline for 2018 funding was Friday, December 15, 2017. The total amount a project sponsor can apply for was increased for the 2018 year from \$500,000 to \$800,000 (\$640,000 Federal and \$160,000 local match). Should the City elect to pursue TAP funding for the 2019 year, they should apply with **RPCGB** and ALDOT.

http://www.fhwa.dot.gov/environment/transportation_alternatives/ https://www.rpcgb.org/transportation-alternatives-program/

State and Local Partnership

The City has the option to enter a partnership to achieve the implementation of any of the improvement alternatives. They City may request that ALDOT provide 50% of the funding for the project. To address the remaining 50%, the City may elect to partner with the neighboring City of Mountain Brook and/or City of Birmingham and request that they provide a portion of the funding for the project. Pursuing this type of funding arrangement would decrease the timeline associated with improvement construction.

11 Stakeholder Involvement

Several stakeholder meetings were conducted during the life of the study. Initially, a kickoff meeting was held at Homewood City Hall on June 9, 2017. The purpose of this meeting was to provide an overview of the APPLE program, discuss the details of the project scope, and determine expectations for the final deliverable. Representatives from the City of Homewood and RPCGB were present at this meeting.

Following the conclusion of the existing conditions analysis, a progress meeting was held with representatives from the City of Homewood and RPCGB. Prior to this October 25, 2017 meeting, the City and RPCGB were provided with an existing conditions summary. During the meeting, potential improvement alternatives were discussed. These improvement alternatives were then analyzed and the outcome of these analyses is included in this report.

The improvement alternatives were presented during the City Council's Planning and Development Meeting on January 29, 2018. It was during this meeting that the City Council requested that an alternative with only a pedestrian bridge (Alternative D) be evaluated. A follow-up meeting to discuss Alternative D was held on February 15, 2018 and attended by representatives from the City and RPCGB.

12 Preferred Alternative

Stakeholders chose Alternative D: Pedestrian Bridge over US-280 as their preferred alternative since it provided their immediate desire of addressing the lack of pedestrian accommodation across US-280 and is the most financially feasible alternative. To design and construct the bridge, stakeholders chose not to seek federal funds but elected to seek a funding partnership between the cities of Homewood, Mountain Brook, and Birmingham as well as ALDOT.

13 Next Steps

If not using federal funding, the City may choose to request 50% (a typical percentage associated with a state contribution) of state funding while partnering with the cities of Mountain Brook and Birmingham to share the remaining costs. Since multiple city jurisdictions are involved, an agreement between all entities would have to be established. This agreement should document the rights and responsibilities of each entity and provide the lead project sponsor the right to perform work within the entity's jurisdiction. Not using federal funding should allow the timing, scheduling, and implementation of the installation to be at the City's discretion; however, partnering with ALDOT could impact the timing and scheduling depending on the requirements associated with their contribution.

If the City chooses to move forward with implementing any of the improvement alternatives and would like to pursue Federal CMAQ or TAP funding, the next step would be to request inclusion of a project in RPCGB's Transportation Improvement Plan (TIP). In 2019, RPCGB will solicit new projects to be included in the next TIP planning cycle. However, projects that utilize the APPLE program provide local governments the opportunity to request funding between TIP cycles. The preparation of this feasibility study can be used in the application for funds from the RPCGB for future improvements. It should be noted that there is currently no available CMAQ funding since all resources have been programmed through 2023.

If Federal funds are secured for the project, an environmental document will need to be prepared. The environmental document must include technical studies and public involvement outreach necessary to comply with procedures of the National Environmental Policy Act (NEPA). Once the environmental study has been completed, the design would be undertaken, and construction would follow. If it is determined that additional right-of-way is required, acquisition would be conducted prior to construction.

List of Appendices

- Appendix A Level of Service Description
- Appendix B Existing Capacity Analysis
- Appendix C Traffic Signal Warrant Analyses
- Appendix D USFWS Species List
- Appendix E Utility Map
- Appendix F Capacity Analysis for Intersection Improvement Options
 - Appendix G Cost Estimates

Appendix A Level of Service Description Level of service criteria for signalized intersections is defined in terms of *delay*. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period.

Level of service A describes operations with very low delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of service B describes operations with delay in the range of > 10 to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of service C describes operations with delay in the range of > 20 to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level of service D describes operations with delay in the range of > 35 to 55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high vehicle/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of service E describes operations with delay in the range of > 55 to 80 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high vehicle/capacity ratios. Individual cycle failures are frequent occurrences.

Level of service F describes operations with delay in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over saturation, i.e., when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of Service Unsignalized Intersections

Level of service criteria for unsignalized intersections is stated in terms of average control delay. Control delay is defined as the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The criteria for each level of service are cited in the table below.

Level of Service	Average Control Delay (seconds/vehicle)
Α	0 - 10
В	> 10 - 15
С	> 15 - 25
D	> 25 - 35
E	> 35 – 50
F	> 50

Appendix B Existing Capacity Analysis

Existing Conditions 2017 AM Peak

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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_AM Peak.vistro Report File: \...\Exiting Conditions_AM Peak.pdf Scenario 1 Existing Conditions_AM peak 1/26/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Thru	0.154	184.6	F
4	US-280 Off-Ramp	Two-way stop	HCM 6th Edition	NB Left	0.618	47.0	E

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.
Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	184.6
Level Of Service:	F
Volume to Capacity (v/c):	0.154

Name	U	nion Hill [Dr	Ho	llywood B	lvd	Ho	llywood B	lvd	US-280 On-Ramp		
Approach	S	Southbound			Northeastbound			ıthwestbo	und	Northwestbound		
Lane Configuration	Y			1				\mathbf{F}				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00			20.00			20.00		30.00			
Grade [%]	0.00			0.00				0.00		0.00		
Crosswalk		No			No			No		No		

Name	U	nion Hill [)r	Ho	llywood B	lvd	Но	llywood B	lvd	US-280 On-Ramp			
Base Volume Input [veh/h]	5	3	7	24	243	183	468	288	19	0	0	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	5	3	7	24	243	183	468	288	19	0	0	0	
Peak Hour Factor	0.7500	0.7500	0.7500	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	1.0000	1.0000	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	2	1	2	7	68	51	131	81	5	0	0	0	
Total Analysis Volume [veh/h]	7	4	9	27	273	206	526	324	21	0	0	0	
Pedestrian Volume [ped/h]	0			0				0		0			

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.23	0.15	0.01	0.02	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	163.06	184.57	50.66	8.03	0.00	0.00	11.42	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	F	A	А	A	В	А	A			
95th-Percentile Queue Length [veh]	1.43	1.43	1.43	2.09	2.09	2.09	9.15	9.15	9.15	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	35.73	35.73	35.73	52.36	52.36	52.36	228.76	228.76	228.76	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		116.78		0.43				6.90		0.00		
Approach LOS	F A A								А			
d_I, Intersection Delay [s/veh]		6.13										
Intersection LOS	F											

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

•	
Delay (sec / veh):	47.0
Level Of Service:	E
Volume to Capacity (v/c):	0.618

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Ho	llywood B	lvd			
Approach	١	Northbound			Northeastbound			ıthwestbo	und	Southeastbound		
Lane Configuration	1			4				F		Ŧ		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00				20.00			20.00		15.00		
Grade [%]	0.00			0.00				0.00		0.00		
Crosswalk		No			No			No		No		

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Но	llywood B	lvd			
Base Volume Input [veh/h]	105	0	140	1	252	0	0	659	0	2	0	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	105	0	140	1	252	0	0	659	0	2	0	2
Peak Hour Factor	0.8200	1.0000	0.8200	0.8900	0.8900	1.0000	1.0000	0.8800	0.8800	0.3300	1.0000	0.3300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	32	0	43	0	71	0	0	187	0	2	0	2
Total Analysis Volume [veh/h]	128	0	171	1	283	0	0	749	0	6	0	6
Pedestrian Volume [ped/h]	0			0				0		0		

Version 5.00-01

Priority Scheme	Stop	Free	Free	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.62	0.00	0.23	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.01
d_M, Delay for Movement [s/veh]	47.00	0.00	11.15	9.19	0.00	0.00	0.00	0.00	0.00	27.98	0.00	14.58
Movement LOS	E		В	A	А			А	А	D		В
95th-Percentile Queue Length [veh]	3.57	0.00	0.87	1.45	1.45	0.00	0.00	0.00	0.00	0.16	0.00	0.16
95th-Percentile Queue Length [ft]	89.20	0.00	21.67	36.26	36.26	0.00	0.00	0.00	0.00	4.05	0.00	4.05
d_A, Approach Delay [s/veh]		26.50			0.03			0.00			21.28	
Approach LOS	D				А			А		С		
d_I, Intersection Delay [s/veh]		6.09										
Intersection LOS		E										

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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_AM Peak.vistro Report File: \...\Exiting Conditions_AM Peak.pdf Scenario 1 Existing Conditions_AM peak 1/26/2018

Turning Movement Volume: Summary

ID	Intersection Name	Southbound			Northeastbound			Sout	Total		
U	Intersection Name	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	5	3	7	24	243	183	468	288	19	1240

ID	Intersection Name	North	bound	Northea	stbound	Southwe	stbound	Southea	Total	
		Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	105	140	1	252	659	0	2	2	1161



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п	Intersection		So	outhbour	nd	Nort	heastbo	ound	Sout	hwestbo	ound	Total
U	Name	volume Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
		Final Base	5	3	7	24	243	183	468	288	19	1240
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
3	US-280 On-	In Process	0	0	0	0	0	0	0	0	0	0
5	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	5	3	7	24	243	183	468	288	19	1240

Turning Movement Volume: Detail

ID	Intersection		North	bound	Northea	stbound	Southwe	estbound	Southea	stbound	Total
U	Name	volume rype	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
		Final Base	105	140	1	252	659	0	2	2	1161
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
4	US-280 Off-	In Process	0	0	0	0	0	0	0	0	0
4	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
		Future Total	105	140	1	252	659	0	2	2	1161



Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Traffic Volume - Base Volume















Existing Conditions 2017 Mid-day Peak

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Thru	0.805	924.0	F
4	US-280 Off-Ramp	Two-way stop	HCM 6th Edition	NB Left	0.829	78.8	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.



Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type: Analysis Method: Analysis Period: Two-way stop HCM 6th Edition 15 minutes Delay (sec / veh):924.0Level Of Service:FVolume to Capacity (v/c):0.805

Name	U	nion Hill E	Dr	Ho	llywood B	lvd	Ho	llywood B	lvd	US-280 On-Ramp		
Approach	S	outhboun	d	No	rtheastbou	und	Sou	uthwestbo	und	Northwestbound		
Lane Configuration		Y Left Three District			+			\mathbf{F}				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		15.00			20.00			20.00			30.00	
Grade [%]	0.00			0.00				0.00		0.00		
Crosswalk		No		No				No		No		

Name	U	nion Hill [)r	Ho	llywood B	lvd	Ho	llywood B	lvd	US-	280 On-R	amp
Base Volume Input [veh/h]	6	5	17	16	345	259	556	383	20	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	5	17	16	345	259	556	383	20	0	0	0
Peak Hour Factor	0.8800	0.8800	0.8800	0.9200	0.9200	0.9200	0.9600	0.9600	0.9600	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	5	4	94	70	145	100	5	0	0	0
Total Analysis Volume [veh/h]	7	6	19	17	375	282	579	399	21	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	



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Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.60	0.81	0.03	0.01	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.00		
d_M, Delay for Movement [s/veh]	750.29	924.04	446.53	8.21	0.00	0.00	15.02	0.00	0.00	0.00	0.00	0.00		
Movement LOS	F	F	F	A	А	A	С	А	A					
95th-Percentile Queue Length [veh]	4.12	4.12	4.12	4.06	4.06	4.06	24.10	24.10	24.10	0.00	0.00	0.00		
95th-Percentile Queue Length [ft]	103.11	103.11	103.11	101.58	101.58	101.58	602.54	602.54	602.54	0.00	0.00	0.00		
d_A, Approach Delay [s/veh]		602.51			0.21			8.70			0.00			
Approach LOS		F			А			F			A			
d_I, Intersection Delay [s/veh]						16	.49							
Intersection LOS						F	=							

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

•	
Delay (sec / veh):	78.8
Level Of Service:	F
Volume to Capacity (v/c):	0.829

Name	US-:	280 Off-R	amp	Ho	llywood B	lvd	Ho	llywood B	lvd				
Approach	N	lorthboun	d	No	rtheastbou	ind	Sou	thwestbo	und	Southeastbound			
Lane Configuration		11			-			F		Ŧ			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			20.00			20.00			15.00		
Grade [%]		0.00			0.00			0.00			0.00		
Crosswalk		No		No				No		No			

Name	US-	280 Off-R	amp	Но	llywood B	lvd	Но	llywood B	lvd			
Base Volume Input [veh/h]	149	0	157	3	271	0	0	762	3	1	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	149	0	157	3	271	0	0	762	3	1	0	0
Peak Hour Factor	0.9600	1.0000	0.9600	0.9400	0.9400	1.0000	1.0000	0.9400	0.9400	0.2500	1.0000	0.2500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	0	41	1	72	0	0	203	1	1	0	0
Total Analysis Volume [veh/h]	155	0	164	3	288	0	0	811	3	4	0	0
Pedestrian Volume [ped/h]		0			0			0			0	

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.83	0.00	0.22	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.00		
d_M, Delay for Movement [s/veh]	78.76	0.00	11.13	9.44	0.00	0.00	0.00	0.00	0.00	30.31	0.00	15.20		
Movement LOS	F		В	A	А			А	А	D		С		
95th-Percentile Queue Length [veh]	5.88	0.00	0.83	1.63	1.63	0.00	0.00	0.00	0.00	0.08	0.00	0.08		
95th-Percentile Queue Length [ft]	146.98	0.00	20.72	40.79	40.79	0.00	0.00	0.00	0.00	2.10	0.00	2.10		
d_A, Approach Delay [s/veh]		43.99			0.10			0.00			30.31			
Approach LOS		Е			А			А			D			
d_I, Intersection Delay [s/veh]						9.9	93							
Intersection LOS						F	=				30.31 D			

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Vistro File: \...\Existing Conditions_Mid Peak.vistro Report File: \...\Exiting Conditions_Mid Peak.pdf Scenario 1 Existing Conditions_Mid Peak 1/26/2018

Turning Movement Volume: Summary

ID	Intersection Name	Southbound			Northeastbound			Southwestbound			Total
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	6	5	17	16	345	259	556	383	20	1607

ID	Intersection Name	Northbound		Northea	stbound	Southwe	estbound	Southea	Total	
		Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	149	157	3	271	762	3	1	0	1346



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Hollywood Boulevard Traffic Study

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Scenario 1 Existing Conditions_Mid Peak 1/26/2018

Л	Intersection		Southbound			Northeastbound			Southwestbound			Total
U	Name	volume rype	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
2 US-280 On-	Final Base	6	5	17	16	345	259	556	383	20	1607	
	Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	
	US-280 On-	In Process	0	0	0	0	0	0	0	0	0	0
5	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	6	5	17	16	345	259	556	383	20	1607

Turning Movement Volume: Detail

ID	Intersection		Northbound		Northeastbound		Southwe	estbound	Southea	Total	
U	Name	volume rype	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
		Final Base	149	157	3	271	762	3	1	0	1346
	US-280 Off-	Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0
4	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
		Future Total	149	157	3	271	762	3	1	0	1346



Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







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Hollywood Boulevard Traffic Study

Traffic Volume - Base Volume







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Scenario 1: 1 Existing Conditions_Mid Peak

Existing Conditions 2017 PM Peak

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Vistro File: \...\Existing Conditions_PM Peak.vistro Report File: \...\Exiting Conditions_PM Peak.pdf Scenario 1 Existing Conditions_PM Peak 1/26/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Thru	0.187	94.0	F
4	US-280 Off-Ramp	Two-way stop	HCM 6th Edition	NB Left	0.654	48.3	E

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	94.0
Level Of Service:	F
Volume to Capacity (v/c):	0.187

Name	U	nion Hill [Dr	Но	llywood B	lvd	Но	llywood B	lvd	US-2	US-280 On-Ram Northwestbound Left Thru F 12.00 12.00 1 0 0 100.00 100.00 10	
Approach	S	outhboun	d	No	rtheastbou	und	Sou	Ithwestbo	und	Nor	thwestbo	und
Lane Configuration		Y			+			\mathbf{F}				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		15.00			20.00			20.00			30.00	
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk		No			No			No		No		

Name	U	nion Hill [Dr	Ho	llywood B	lvd	Ho	llywood B	lvd	US-	280 On-R	amp
Base Volume Input [veh/h]	3	5	10	4	309	200	348	342	7	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	5	10	4	309	200	348	342	7	0	0	0
Peak Hour Factor	0.5600	0.5600	0.5600	0.8900	0.8900	0.8900	0.9300	0.9300	0.9300	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	2	4	1	87	56	94	92	2	0	0	0
Total Analysis Volume [veh/h]	5	9	18	4	347	225	374	368	8	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.09	0.19	0.03	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	85.25	93.98	24.71	8.05	0.00	0.00	10.73	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	С	A	А	A	В	А	A			
95th-Percentile Queue Length [veh]	1.17	1.17	1.17	2.75	2.75	2.75	7.28	7.28	7.28	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	29.15	29.15	29.15	68.74	68.74	68.74	182.04	82.04 182.04 182.04		0.00	0.00	0.00
d_A, Approach Delay [s/veh]		53.65		0.06				5.35		0.00		
Approach LOS		F		A				А		А		
d_I, Intersection Delay [s/veh]	4.24											
Intersection LOS						F	=					

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

•	
Delay (sec / veh):	48.3
Level Of Service:	E
Volume to Capacity (v/c):	0.654

Name	US-	280 Off-R	amp	Но	llywood B	lvd	Но	llywood B	lvd				
Approach	М	Northbound			Northeastbound			ıthwestbo	und	Southeastbound			
Lane Configuration		1			4			F		Ť			
Turning Movement	Left Thru Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			20.00		20.00			15.00			
Grade [%]	0.00			0.00			0.00			0.00			
Crosswalk		No			No			No			No		

Name	US-	280 Off-R	amp	Но	llywood B	lvd	Но	llywood B	lvd			
Base Volume Input [veh/h]	129	0	171	0	303	0	0	592	4	1	0	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	129	0	171	0	303	0	0	592	4	1	0	8
Peak Hour Factor	0.9100	1.0000	0.9100	0.8900	0.8900	1.0000	1.0000	0.9000	0.9000	0.8300	1.0000	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	0	47	0	85	0	0	164	1	0	0	2
Total Analysis Volume [veh/h]	142	0	188	0	340	0	0	658	4	1	0	10
Pedestrian Volume [ped/h]	0		0			0			0			

Version 5.00-01

Priority Scheme	Stop	Free	Free	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.65	0.00	0.27	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.02
d_M, Delay for Movement [s/veh]	48.34	0.00	11.99	8.89	0.00	0.00	0.00	0.00	0.00	27.41	0.00	13.03
Movement LOS	E		В	A	А			А	А	D		В
95th-Percentile Queue Length [veh]	3.98	0.00	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09
95th-Percentile Queue Length [ft]	99.57	0.00	26.96	0.00	0.00	0.00	0.00	0.00	0.00	2.14	0.00	2.14
d_A, Approach Delay [s/veh]		27.63		0.00				0.00		14.34		
Approach LOS		D		A			A			В		
d_I, Intersection Delay [s/veh]	6.91											
Intersection LOS	E											

Version 5.00-01

Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_PM Peak.vistro Report File: \...\Exiting Conditions_PM Peak.pdf Scenario 1 Existing Conditions_PM Peak 1/26/2018

Turning Movement Volume: Summary

ID	Intersection Name	Southbound			Northeastbound			Sout	ound	Total	
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	3	5	10	4	309	200	348	342	7	1228

ID	Intersection Name	Northbound		Northea	stbound	Southwe	estbound	Southea	Total	
		Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	129	171	0	303	592	4	1	8	1208

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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_PM Peak.vistro Report File: \...\Exiting Conditions_PM Peak.pdf Scenario 1 Existing Conditions_PM Peak 1/26/2018

П	Intersection Volume Type		Southbound			Northeastbound			Sout	Total		
U	Name	volume rype	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
	Final Base	3	5	10	4	309	200	348	342	7	1228	
	Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	
3	US-280 On-	In Process	0	0	0	0	0	0	0	0	0	0
5	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	3	5	10	4	309	200	348	342	7	1228

Turning Movement Volume: Detail

ID Intersection		North	bound	Northeastbound		Southwe	estbound	Southea	Total		
U	Name	volume rype	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
		Final Base	129	171	0	303	592	4	1	8	1208
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
4	US-280 Off-	In Process	0	0	0	0	0	0	0	0	0
4	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
		Future Total	129	171	0	303	592	4	1	8	1208



Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Traffic Volume - Base Volume














Existing Conditions 2037 AM Peak

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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_AM Peak_2037.vistro Report File: \...\Exiting Conditions_AM Peak_2037.pdf

Scenario 1 Existing Conditions_AM peak_2037 1/26/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Thru	0.777	1,134.2	F
4	US-280 Off-Ramp	Two-way stop	HCM 6th Edition	NB Left	1.033	142.7	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type: Analysis Method: Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	1,134.2
Level Of Service:	F
Volume to Capacity (v/c):	0.777

Name	U	Inion Hill [Dr	Ho	Hollywood Blvd			llywood B	lvd	US-280 On-Ramp		
Approach	S	Southboun	ıd	No	Northeastbound			uthwestbo	und	Northwestbound		
Lane Configuration		Y		+				\mathbf{F}				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00				20.00			20.00		30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk		No			No			No		No		

Name	U	nion Hill [Dr	Ho	llywood B	lvd	Ho	llywood B	lvd	US-	280 On-R	amp
Base Volume Input [veh/h]	6	4	8	29	292	220	562	346	23	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	4	8	29	292	220	562	346	23	0	0	0
Peak Hour Factor	0.7500	0.7500	0.7500	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	3	8	82	62	158	97	6	0	0	0
Total Analysis Volume [veh/h]	8	5	11	33	328	247	631	389	26	0	0	0
Pedestrian Volume [ped/h]		0		0				0		0		

Version 5.00-01

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.80	0.78	0.02	0.03	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	935.16	1134.23	580.16	8.24	0.00	0.00	14.59	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	F	A	А	A	В	A	А			
95th-Percentile Queue Length [veh]	3.61	3.61	3.61	3.25	3.25	3.25	23.02	23.02	23.02	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	90.29	90.29	90.29	81.15	81.15	81.15	575.45	575.45	575.45	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		813.92			0.45			8.80		0.00		
Approach LOS		F			А			F			А	
d_I, Intersection Delay [s/veh]		17.29										
Intersection LOS		F										



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	142.7
Level Of Service:	F
Volume to Capacity (v/c):	1.033

Name	US-	280 Off-R	amp	Ho	Hollywood Blvd			llywood B	lvd			
Approach	М	lorthboun	d	Northeastbound			Sou	ıthwestbo	und	Southeastbound		
Lane Configuration		1		Ħ				F		Ť		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			20.00			20.00		15.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk		No			No			No		No		

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Ho	llywood B	lvd			
Base Volume Input [veh/h]	126	0	168	1	302	0	0	791	0	2	0	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	126	0	168	1	302	0	0	791	0	2	0	2
Peak Hour Factor	0.8200	1.0000	0.8200	0.8900	0.8900	1.0000	1.0000	0.8800	0.8800	0.3300	1.0000	0.3300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	0	51	0	85	0	0	225	0	2	0	2
Total Analysis Volume [veh/h]	154	0	205	1	339	0	0	899	0	6	0	6
Pedestrian Volume [ped/h]		0			0			0		0		

Version 5.00-01

Priority Scheme	Stop	Free	Free	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	1.03	0.00	0.29	0.00	0.00	0.00	0.00	0.01	0.00	0.06	0.00	0.02	
d_M, Delay for Movement [s/veh]	142.74	0.00	12.21	9.77	0.00	0.00	0.00	0.00	0.00	40.22	0.00	17.41	
Movement LOS	F		В	A	А			А	А	Е		С	
95th-Percentile Queue Length [veh]	7.91	0.00	1.21	2.35	2.35	0.00	0.00	0.00	0.00	0.24	0.00	0.24	
95th-Percentile Queue Length [ft]	197.80	0.00	30.27	58.71	58.71	0.00	0.00	0.00	0.00	5.88	0.00	5.88	
d_A, Approach Delay [s/veh]		68.20		0.03				0.00		28.81			
Approach LOS		F			A A						D		
d_I, Intersection Delay [s/veh]				15.43									
Intersection LOS					F								



Version 5.00-01

Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_AM Peak_2037.vistro Report File: \...\Exiting Conditions_AM Peak_2037.pdf Scenario 1 Existing Conditions_AM peak_2037 1/26/2018

Turning Movement Volume: Summary

ID	Intersection Name	Sc	outhbour	nd	Nor	heastbo	ound	Sout	ound	Total	
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	6	4	8	29	292	220	562	346	23	1490

ID	Intersection Name	North	Northbound		stbound	Southwe	estbound	Southea	Total	
	Intersection Name	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	126	168	1	302	791	0	2	2	1392



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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_AM Peak_2037.vistro Report File: \...\Exiting Conditions_AM Peak_2037.pdf Scenario 1 Existing Conditions_AM peak_2037 1/26/2018

П	Intersection		Sc	outhbou	nd	Nor	heastbo	ound	Sout	hwestbo	ound	Total
U	Name	volume Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
		Final Base	6	4	8	29	292	220	562	346	23	1490
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
2	US-280 On-	In Process	0	0	0	0	0	0	0	0	0	0
5	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	6	4	8	29	292	220	562	346	23	1490

Turning Movement Volume: Detail

ID	Intersection		North	bound	Northea	stbound	Southwe	estbound	Southea	stbound	Total
U.	Name	volume rype	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
		Final Base	126	168	1	302	791	0	2	2	1392
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
4	US-280 Off-	In Process	0	0	0	0	0	0	0	0	0
4	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
		Future Total	126	168	1	302	791	0	2	2	1392



Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Traffic Volume - Base Volume













Existing Conditions 2037 Mid-day Peak

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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_Mid Peak_2037.vistro Report File: \...\Exiting Conditions_Mid Peak_2037.pdf

Scenario 1 1/26/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Right	0.040	10,000.0	F
4	US-280 Off-Ramp	Two-way stop	HCM 6th Edition	NB Left	1.415	287.5	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type: Analysis Method: Analysis Period:

Two-way stop HCM 6th Edition 15 minutes Delay (sec / veh):10,000.0Level Of Service:FVolume to Capacity (v/c):0.040

Name	U	Inion Hill [Dr	Ho	llywood B	lvd	Ho	llywood B	lvd	US-280 On-Ramp		
Approach	S	Southboun	ıd	No	Northeastbound			uthwestbo	und	Northwestbound		
Lane Configuration		Y			1			\mathbf{F}				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0 0 0		0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		15.00			20.00			20.00		30.00		
Grade [%]	0.00				0.00			0.00		0.00		
Crosswalk		No			No			No		No		

Name	U	nion Hill [)r	Ho	llywood B	lvd	Ho	llywood B	lvd	US-	280 On-R	amp
Base Volume Input [veh/h]	7	6	20	19	414	311	667	460	24	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	6	20	19	414	311	667	460	24	0	0	0
Peak Hour Factor	0.8800	0.8800	0.8800	0.9200	0.9200	0.9200	0.9600	0.9600	0.9600	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	2	6	5	113	85	174	120	6	0	0	0
Total Analysis Volume [veh/h]	8	7	23	21	450	338	695	479	25	0	0	0
Pedestrian Volume [ped/h]	0			0				0		0		

Version 5.00-01

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.00	0.00	0.04	0.02	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.00	
d_M, Delay for Movement [s/veh]	10000.0	10000.0	10000.0	8.46	0.00	0.00	27.10	0.00	0.00	0.00	0.00	0.00	
Movement LOS	F	F	F	A	А	Α	D	А	A				
95th-Percentile Queue Length [veh]	6.83	6.83	6.83	7.74	7.74	7.74	54.23	54.23	54.23	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	170.87	170.87	170.87	193.56	193.56	193.56	1355.77	1355.77	1355.77	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]		10000.00			0.22			15.71					
Approach LOS		F			А			F			А		
d_I, Intersection Delay [s/veh]		195.02											
Intersection LOS	F												



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	287.5
Level Of Service:	F
Volume to Capacity (v/c):	1.415

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Ho	llywood B	lvd				
Approach	М	lorthboun	d	No	rtheastbou	und	Sou	ıthwestbo	und	Southeastbound			
Lane Configuration		1			-			F		Ť			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00 12.00 12.00		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			20.00			20.00		15.00			
Grade [%]	0.00			0.00				0.00		0.00			
Crosswalk		No			No			No			No		

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Ho	llywood B	lvd			
Base Volume Input [veh/h]	179	0	188	4	325	0	0	914	4	1	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	179	0	188	4	325	0	0	914	4	1	0	0
Peak Hour Factor	0.9600	1.0000	0.9600	0.9400	0.9400	1.0000	1.0000	0.9400	0.9400	0.2500	1.0000	0.2500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	0	49	1	86	0	0	243	1	1	0	0
Total Analysis Volume [veh/h]	186	0	196	4	346	0	0	972	4	4	0	0
Pedestrian Volume [ped/h]		0			0			0		0		

Version 5.00-01

Priority Scheme	Stop	Free	Free	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	1.42	0.00	0.28	0.01	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.00
d_M, Delay for Movement [s/veh]	287.50	0.00	12.17	10.12	0.00	0.00	0.00	0.00	0.00	44.78	0.00	18.46
Movement LOS	F	F B		В	А			А	А	Е		С
95th-Percentile Queue Length [veh]	12.43	0.00	1.15	2.77	2.77	0.00	0.00	0.00	0.00	0.13	0.00	0.13
95th-Percentile Queue Length [ft]	310.76	0.00	28.81	69.27	69.27	0.00	0.00	0.00	0.00	3.28	0.00	3.28
d_A, Approach Delay [s/veh]		146.23		0.12				0.00		44.78		
Approach LOS		F			А			А			Е	
d_I, Intersection Delay [s/veh]		32.76										
Intersection LOS	F											



Scenario 1

1/26/2018

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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_Mid Peak_2037.vistro Report File: \...\Exiting Conditions_Mid Peak_2037.pdf

Turning Movement Volume: Summary

П	Intersection Name	Southbound			Nort	heastbo	ound	Sout	ound	Total	
ID	Intersection Name	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	7	6	20	19	414	311	667	460	24	1928

ID	Intersection Name	Northbound		Northea	stbound	Southwe	estbound	Southea	Total	
		Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	179	188	4	325	914	4	1	0	1615



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Hollywood Boulevard Traffic Study

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Intersection			Sc	outhbou	nd	Nort	heastbo	ound	Sout	ound	Total	
U	Name	volume rype	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
		Final Base	7	6	20	19	414	311	667	460	24	1928
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
3	US-280 On-	In Process	0	0	0	0	0	0	0	0	0	0
5	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	7	6	20	19	414	311	667	460	24	1928

Turning Movement Volume: Detail

ID Intersection		North	bound	Northea	stbound	Southwe	estbound	Southea	stbound	Total	
U.	Name	volume rype	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
		Final Base	179	188	4	325	914	4	1	0	1615
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
4	US-280 Off-	In Process	0	0	0	0	0	0	0	0	0
4	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
		Future Total	179	188	4	325	914	4	1	0	1615

Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Traffic Volume - Base Volume















Existing Conditions 2037 PM Peak

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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_PM Peak_2037.vistro Report File: \...\Exiting Conditions_PM Peak_2037.pdf

Scenario 1 Existing Conditions_PM Peak_2037 1/26/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Thru	0.582	360.0	F
4	US-280 Off-Ramp	Two-way stop	HCM 6th Edition	NB Left	1.085	154.7	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Two-way stop HCM 6th Edition 15 minutes Delay (sec / veh):360.0Level Of Service:FVolume to Capacity (v/c):0.582

Name	U	Inion Hill [Dr	Ho	llywood B	lvd	Ho	llywood B	lvd	US-280 On-Ramp		
Approach	S	Southboun	ıd	No	rtheastbo	und	Sou	uthwestbo	und	Northwestbound		
Lane Configuration		Y			+			Ŧ				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		15.00			20.00			20.00		30.00		
Grade [%]	0.00			0.00				0.00		0.00		
Crosswalk	No			No				No		No		

Name	U	nion Hill [)r	Ho	llywood B	lvd	Но	llywood B	lvd	US-	280 On-R	amp
Base Volume Input [veh/h]	4	6	12	5	371	240	418	410	8	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	6	12	5	371	240	418	410	8	0	0	0
Peak Hour Factor	0.5600	0.5600	0.5600	0.8900	0.8900	0.8900	0.9300	0.9300	0.9300	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	3	5	1	104	67	112	110	2	0	0	0
Total Analysis Volume [veh/h]	7	11	21	6	417	270	449	441	9	0	0	0
Pedestrian Volume [ped/h]		0		0				0		0		

Version 5.00-01

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.29	0.58	0.03	0.01	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	318.66	318.66 360.00 175.50			0.00	0.00	12.80	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F F F			А	A	В	A	A			
95th-Percentile Queue Length [veh]	3.58	3.58 3.58 3.58			4.58	4.58	17.87	17.87	17.87	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	89.48	89.48	89.48	114.47	114.47	114.47	446.85	446.85	446.85	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		253.23		0.07				6.39		0.00		
Approach LOS		F		A				А		A		
d_I, Intersection Delay [s/veh]	9.61											
Intersection LOS	F											



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	154.7
Level Of Service:	F
Volume to Capacity (v/c):	1.085

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Но	llywood B	lvd			
Approach	1	Northbound			Northeastbound			uthwestbo	und	Southeastbound		
Lane Configuration		1			4			F		Т		
Turning Movement	Left Thru Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			20.00			20.00		15.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk		No			No			No		No		

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Ho	llywood B	lvd			
Base Volume Input [veh/h]	155	0	205	0	364	0	0	710	5	1	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	0	205	0	364	0	0	710	5	1	0	10
Peak Hour Factor	0.9100	1.0000	0.9100	0.8900	0.8900	1.0000	1.0000	0.9000	0.9000	0.8300	1.0000	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	0	56	0	102	0	0	197	1	0	0	3
Total Analysis Volume [veh/h]	170 0 225		0	409	0	0	789	6	1	0	12	
Pedestrian Volume [ped/h]			0				0		0			

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	1.08	0.00	0.35	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.03
d_M, Delay for Movement [s/veh]	154.73	0.00	13.59	9.36	0.00	0.00	0.00	0.00	0.00	39.74	0.00	14.72
Movement LOS	F		В	A	А			А	А	Е		В
95th-Percentile Queue Length [veh]	8.86	0.00	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13
95th-Percentile Queue Length [ft]	221.50	0.00	39.25	0.00	0.00	0.00	0.00	0.00	0.00	3.14	0.00	3.14
d_A, Approach Delay [s/veh]		74.33		0.00				0.00		16.65		
Approach LOS		F			A			А		С		
d_I, Intersection Delay [s/veh]		18.35										
Intersection LOS	F											



Version 5.00-01

Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_PM Peak_2037.vistro Report File: \...\Exiting Conditions_PM Peak_2037.pdf Scenario 1 Existing Conditions_PM Peak_2037 1/26/2018

Turning Movement Volume: Summary

ID	Intersection Name	Southbound			Northeastbound			Sout	ound	Total	
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	4	6	12	5	371	240	418	410	8	1474

ID	Intersection Name	Northbound		Northea	stbound	Southwe	estbound	Southea	Total	
		Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	155	205	0	364	710	5	1	10	1450



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Hollywood Boulevard Traffic Study

Vistro File: \...\Existing Conditions_PM Peak_2037.vistro Report File: \...\Exiting Conditions_PM Peak_2037.pdf Scenario 1 Existing Conditions_PM Peak_2037 1/26/2018

П	Intersection Volume Type		Southbound			Northeastbound			Sout	Total		
U	Name	volume Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3 US-280 On- Ramp	Final Base	4	6	12	5	371	240	418	410	8	1474	
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
	US-280 On-	In Process	0	0	0	0	0	0	0	0	0	0
	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	4	6	12	5	371	240	418	410	8	1474

Turning Movement Volume: Detail

Intersection Volume 1			Northbound		Northeastbound		Southwe	estbound	Southea	Total	
U	Name	volume rype	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
		Final Base	155	205	0	364	710	5	1	10	1450
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
4	US-280 Off-	In Process	0	0	0	0	0	0	0	0	0
4	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
		Future Total	155	205	0	364	710	5	1	10	1450



Version 5.00-01 Study Intersections






Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Hollywood Boulevard Traffic Study

Traffic Volume - Base Volume







Version 5.00-01 Traffic Conditions







Appendix C Traffic Signal Warrant Analyses

TRAFFIC SIG City/Town: Homewood County: Jefferson Division: Traffic Data Date: Division:	NAL WARRANT SUN Analysis Performed By: Date Analysis Performed: Project Number if Applicable: Weather Conditions:	IMARY David Coggin 1/8/2018 170022 Clear
Major Route: Hollywood Blvd Minor Route: Union Hill Dr SB	Appr. Lanes: 1 Appr. Lanes: 2	Critical Approach Speed (mph): 25
Warrant #1: Eight-Hour Vehicular Volum 1A - Minimum Vehicular Volume: 1B - Interruption of Continuous Traffic: <i>Any Remedial Measures</i>	80% Satisfied Yes X No Yes X No Tried and their Outcome.	SATISFIED Yes X No 100% Satisfied Yes X No Yes X No
<u>Warrant #2: Four-Hour Vehicular Volume</u> <u>Warrant #3: Peak Hour</u> <u>The Unusual Case(s) that Ju</u>	2 estifies the use of this Warrant.	Yes XNo
Warrant #4: Pedestrian Volume Warrant #5: School Crossing Any Remedial Measures Implemented	d to improve the Safety of the .	Yes XNo Yes XNo Students.
Warrant #6: Coordinated Signal System Warrant #7: Crash Experience Other Alternatives that h	ave failed to reduce crashes.	Yes XNo
<u>Warrant #8: Roadway Network</u> <u>Warrant #9: Intersection Near a Grade Cr</u>	rossing	Yes XNo
CONCLUSIONS Remarks:	Warrants Satisfied	

			TF	RAFF	IC SI	GNA	LW	ARRA	ANTS	5					
City/Town: Homewood						Anal	vsis Per	vsis Performed By: David Coggin							
C C	County:	unty: Jefferson				Date Analysis Performed:					1/8/2018				
						Project Number if Applicable:				170022					
Data						ی ۱۸	loothor (Conditio							
Data					_	V		Jonullio	····ə.	Clear					
Major	Route:	Holly	wood Bl	lvd		A	ppr. Lan	ies: <mark>1</mark>	C	Critical A	pproacl	ach Speed (mph): 25			
Minor	Route:	Union		A	ppr. Lan	ies: 2									
Volume Level Criteria 1. Is the critical speed of major street traffic > 70 km/h (40 mph) ?															
1. 1	is the critical s	peed of majo	or street	tranic >	70 km/r	n (40 m 	pn)?					Ye	s X		
2. I	is the intersec	tion in a built	t-up area	a or isola	ated con	nmunity	of <10,0	000 pop	ulation?)		Ye	s X	No	
lf Q	If Question 1 or 2 above is answered "Yes", then use "70%" volume level												100%		
														-	
Wan	rrant 1 is satisfie	ed if Condition	A or Con	dition B i	is "100%'	" satisfie	d.			Satisf	ied:	Ye	s <u>X</u>	No	
Wan	rant is also sati	sfied if both Co	ondition A	A and Co	ndition B	are "809	%" satisfie	ed, given							
auec	quale mais or o	liner remealari	measures	s nave be	en mea.										
Ade	equate trial(s) of other re	medial r	measur	es tried	:						Ye	s X	No	
	<u>List</u>	Remedial M	easures	Tried (F	Required	d for 809	% Comb	ination o	of A & E	<u>3)</u>		-			
	Condition	A Minimu						D Int			Contin	- 			
	Condition	<u>A - Minimu</u>	ım Vehi	icular \	Volume	e & Co	ndition	B - Int	errupti	ion of (Contin	uous T	raffic		
	Condition	<u>A - Minimu</u>	ım Vehi	icular \	Volume	e & Co	ndition	<u>B - Int</u>	errupti 100%	ion of (Satisfic	Contin ed:	- <mark>uous T</mark> ∐Ye:	s X	No	
	<u>Condition</u>	<u>A - Minimu</u>	um Vehi (Used	icular \ if neithe	Volume er Cond	e & Col	ndition or B is	<u>B - Int</u> satisfie	errupti 100% d) 80%	ion of (Satisfic Satisfic	Contin ed: ed:	- <u>uous T</u> Ye: Ye:	s X]No]No	
[Condition	A - Minimu	um Vehi (Used	icular V	Volume er Cond	e & Con	ndition or B is	B - Int satisfie	errupti 100% d) 80%	ion of (Satisfic Satisfic	Contin ed: ed: pest Ho	uous T	s X]No]No	
	Condition	<u>A - Minimu</u> in veh/hr)	USED	icular V if neithe	Volume er Cond	e & Con lition A	ndition or B is	B - Int	errupti 100% d) 80% Eiç	ion of (Satisfie Satisfie	Contin ed: ed: nest Ho	uous T Ye: Ye: urs	s X s X]No]No	
	Condition (volumes Approac	<u>A - Minimu</u> in veh/hr) h Lanes	IM Vehi (Used Minin	icular V if neithe mum Re	Volume er Cond equirem 2 or 1	e & Con lition A nents more	ndition or B is	B - Internet of the second sec	errupti 100% d) 80% Eig	ion of (Satisfic Satisfic ght High	Contin ed: ed: nest Ho	uous T Ye: Ye: vurs	raffic s X s X]No]No	
	Condition (volumes Approac	A - Minimu in veh/hr) h Lanes ∋ Level	(Used) (Used) Minin 100%	icular \ if neithe mum Re 1 70%	Volume er Cond equirem 2 or 1 100%	e & Con lition A ments more 70%	ndition or B is	B - Intersection	errupti 100% d) 80% Eiç	ion of (Satisfie Satisfie	Contin ed: ed: nest Ho	uous T Ye Ye urs	raffic s X s X]No]No ^{Mb} O	
	Condition (volumes Approac Volume Both App	A - Minimu in veh/hr) h Lanes > Level roaches	(Used) (Used) Minin 100%	icular V if neitho mum Ro 1 70%	Volume er Cond equirem 2 or 1 100%	ents 70%	or B is	B - International Sector	errupti 100% d) 80% Eiç	Satisfie Satisfie Sht High	Contin ed: ed: nest Ho	uous T Ye: Ve: urs 566	s X s X s X]No]No W Q	
- 1A 0%	Condition (volumes Approac Volume Both App on Majo	A - Minimu in veh/hr) h Lanes > Level rroaches r Street	Used (Used) Minin 100%	icular V if neithe mum Re 1 70% 350	Volume er Cond equirem 2 or 1 100% 600	e & Con lition A nents more 70% 420	ndition or B is	B - Int satisfie	errupti 100% d) 80% Eig &	ion of (Satisfic Satisfic ght High	Contin ed: ed: mest Ho	uous T Ye: Ye: urs 566	s X s X s 556]No]No v 2 555	
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<u>NOTE:</u> The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal



Based on MUTCD 2009 Page 2 of 7

TRAFFIC SIGCity/Town:HomewoodCounty:JeffersonDivision:TrafficData Date:	NAL WARRANT SUN Analysis Performed By: Date Analysis Performed: Project Number if Applicable: Weather Conditions:	MARY David Coggin 1/15/2018 170022 Clear
Major Route:Hollywood BoulevardMinor Route:Union Hill Dr	Appr. Lanes: 1 Appr. Lanes: 1	Critical Approach Speed (mph): 25
Warrant #1: Eight-Hour Vehicular Volum 1A - Minimum Vehicular Volume: 1B - Interruption of Continuous Traffic: <i>Any Remedial Measure</i>	ne 80% Satisfied Yes X No Yes X No s Tried and their Outcome.	SATISFIED Yes XNo 100% Satisfied Yes XNo Yes XNo
Warrant #2: Four-Hour Vehicular Volum	<u>e</u>	Yes XNo
Warrant #3: Peak Hour The Unusual Case(s) that Ju Warrant #4: Pedestrian Volume Warrant #5: School Crossing	ustifies the use of this Warrant.	Yes XNO
Any Remedial Measures Implemente	ed to improve the Safety of the s	Students.
Warrant #7: Crash Experience Other Alternatives that h	have failed to reduce crashes.	Yes XNO
Warrant #8: Roadway Network		Yes XNo
Warrant #9: Intersection Near a Grade C	rossing	Yes XNo
CONCLUSIONS Remarks:	Warrants Satisfied	

Citv	City/Town: Homewood					Anal	vsis Per	formed	Bv:	David Coggin				
(County:	Jefferson				Date A	nalvsis	Perform			1/1	5/2018		
, 1					Traffie Dreiget Number if Applicable					1/13/2018				
Det		ITan	Project Number if Applicable:						1/0022					
Dat	a Date:				/eather 0	Jonaitio	ons:	Clear						
Major	[·] Route:	Hollywoo	od Boul	evard		A	ppr. Lan	es: <mark>1</mark>	C	ritical A	pproach	n Speed	l (mph):	25
Minor	Minor Route: Union Hill Dr						ppr. Lan	es: <mark>1</mark>						
Volumo 1.	<mark>e Level C</mark> Is the crit	Criteria ical speed of maio	or street	traffic >	70 km/ł	ר (40 m	oh) ?					∏Ye:	s 🗴	No
2	Is the inte	ersection in a built	-up area	or isola	ated con	nmunitv	of <10.0	000 non	ulation?			Ye	s 🔽	No
lf O)uestion 1	l or 2 above is an	swered "	'Yes" th	en lise	"70%" v	volume le						~ <u> </u>]100%
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WAR	RANT	1 - EIGHT-H		/EHIC	ULAF	R VOL	UME.							
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ade	quate trial	s of other remedial i	measures	s nave be	en tried.									
Ade	equate tr	rial(s) of other re	medial r	neasur	es tried	:						Ye	s X	No
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<u>NOTE:</u> The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal



TRAFFIC SIGN	AL WARRANT SUM	/IMARY
City/Town: Mountain Brook	Analysis Performed By:	David Coggin
County: Jefferson	Date Analysis Performed:	1/8/2018
Division:	Project Number if Applicable:	170022
Data Date:	Weather Conditions:	Clear
Mallana ad Blad		
Major Route: Hollywood Blvd	Appr. Lanes: 1	Critical Approach Speed (mph): 25
Minor Route: 03-200 WB OII Rainp	Appr. Lanes: 2	
		SATISFIED
Werner t #1 Field Herry Weltersler Welter		
Warrant #1: Eight-Hour Vehicular Volume		Yes No
	80% Satisfied	100% Satisfied
1A - Minimum Vehicular Volume:	X Yes No	X Yes No
1B - Interruption of Continuous Traffic:	X Yes No	X Yes No
Any Remedial Measures T	ried and their Outcome.	
<u>Warrant #2: Four-Hour Vehicular Volume</u>		X Yes No
<u>Warrant #3: Peak Hour</u>		Yes X No
The Unusual Case(s) that Just	ifies the use of this Warrant.	
Warrant #4: Pedestrian Volume		Yes X No
Warrant #5: School Crossing		Yes X No
Any Remedial Measures Implemented t	to improve the Safety of the S	Students.
	v	
<u>Warrant #6: Coordinated Signal System</u>		Yes X No
Warrant #7: Crash Experience		Yes X No
Other Alternatives that have	e failed to reduce crashes.	
warrant #8: Koadway Network		Yes X No
Warrant #0. Intersection Near a Grade Cro	ssing	
warrant $\#9$: intersection itear a Oracle Cro	<u>551119</u>	
CONCLUSIONS	Warrants Satisfied	
Remarks:		

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c i i j	County: Jefferson					Date A	nalveie l	Perform		1/8/2018				
	vision					Date Analysis Performed:				1/8/2018				
D		ision:				Dject NL	Imper if A	Арриса		170022				
Data	ita Date:						/eather (Conditio	ns:	Clear				
Major	Major Route: Hollywood Blvd						ppr. Lan	es: <mark>1</mark>	C	ritical A	ical Approach Speed (mph): 25			
Minor Route: US-280 WB Off Ramp Appr. Lanes: 2														
Volume	e Level Cr	<mark>riteria</mark> cal speed of mair	or street	traffic >	70 km/ł	a (40 mi	nh) 2						• v	
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lf Qi	uestion 1	or 2 above is and	swered "	Yes", th	en use	"70%" v	olume le	evel				709	% X	100%
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Wan	rant is also	satisfied if both Co	ondition A	and Co	ndition B	are "809	%" satisfie	ed, given		Gatio	icu.		J	
adeo	quate trials	of other remedial i	measures	s nave be	en tried.									_
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Appendix D USFWS Species List **IPaC**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location



Local office

Alabama Ecological Services Field Office

\$ (251) 441-5181 (251) 441-6222

1208 B Main Street Daphne, AL 36526-4419

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and projectspecific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing sultation the following:

- 1. Draw the project location and click CONTINUE.
- 2. Click DEFINE PROJECT.
- 3. Log in (if directed to do so).
- 4. Provide a name and description for your project.
- 5. Click REQUEST SPECIES LIST.

Listed species¹ are managed by the <u>Ecological Services Program</u> of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Gray Bat Myotis grisescens No critical habitat has been designated for this species. <u>https://ecos.fws.gov/ecp/species/6329</u>	Endangered
Indiana Bat Myotis sodalis There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. <u>https://ecos.fws.gov/ecp/species/5949</u>	Endangered
Northern Long-eared Bat Myotis septentrionalis No critical habitat has been designated for this species. <u>https://ecos.fws.gov/ecp/species/9045</u>	Threatened

Clams

NAME	STATUS
Alabama Moccasinshell Medionidus acutissimus There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. <u>https://ecos.fws.gov/ecp/species/7287</u>	Threatened
Finelined Pocketbook Lampsilis altilis There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. <u>https://ecos.fws.gov/ecp/species/1393</u>	Threatened
Orangenacre Mucket Lampsilis perovalis There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. <u>https://ecos.fws.gov/ecp/species/1980</u>	Threatened

Ovate Clubshell Pleurobema perovatum There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. <u>https://ecos.fws.gov/ecp/species/5430</u>	Endangered
Southern Clubshell Pleurobema decisum There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. <u>https://ecos.fws.gov/ecp/species/6113</u>	Endangered
Triangular Kidneyshell Ptychobranchus greenii There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/4396	Endangered
Upland Combshell Epioblasma metastriata There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. <u>https://ecos.fws.gov/ecp/species/317</u>	Endangered
Flowering Plants	STATUS
Georgia Rockcress Arabis georgiana There is a final <u>critical habitat</u> designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/4535	Threatened
Tennessee Yellow-eyed Grass Xyr s tennesseensis No critical habitat has been designated <i>fo</i> r this species. https://ecos.fws.gov/ecp/species/6010	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service³. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

- 1. The <u>Migratory Birds Treaty Act</u> of 1918.
- 2. The <u>Bald and Golden Eagle Protection Act</u> of 1940.
- 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern <u>http://www.fws.gov/birds/management/managed-species/</u> <u>birds-of-conservation-concern.php</u>
- Conservation measures for birds <u>http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/</u> conservation-measures.php
- Year-round bird occurrence data <u>http://www.birdscanada.org/birdmon/default/datasummaries.jsp</u>

The migratory birds species listed below are species of particular conservation concern (e.g. <u>Birds of Conservation Concern</u>) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special

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attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the <u>AKN Histogram Tools</u> and <u>Other Bird Data Resources</u>. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
American Bittern Botaurus lentiginosus https://ecos.fws.gov/ecp/species/6582	Wintering
Bachman's Sparrow Aimophila aestivalis https://ecos.fws.gov/ecp/species/6177	Year-round
Bald Eagle Haliaeetus leucocephalus https://ecos.fws.gov/ecp/species/1626	Year-round
Brown-headed Nuthatch Sitta pusilla	Year-round
Chuck-will's-widow Caprimulgus carolinensis	Breeding
Dickcissel Spiza americana	Breeding
Fox Sparrow Passerella iliaca	Wintering
Kentucky Warbler Oporornis formosus	Breeding
Le Conte's Sparrow Ammodramus leconteii	Wintering
Least Bittern Ixobrychus exilis	Breeding
Loggerhead Shrike Lanius ludovicianus https://ecos.fws.gov/ecp/species/8833	Year-round
Louisiana Waterthrush Parkesia motacilla	Breeding
Mississippi Kite Ictinia mississippiensis	Breeding
Prairie Warbler Dendroica discolor	Breeding
Prothonotary Warbler Protonotaria citrea	Breeding
Red-headed Woodpecker Melanerpes erythrocephalus	Year-round
Rusty Blackbird Euphagus carolinus	Wintering
Short-eared Owl Asio flammeus https://ecos.fws.gov/ecp/species/9295	Wintering
Swainson's Warbler Limnothlypis swainsonii	Breeding
Wood Thrush Hylocichla mustelina	Breeding
Worm Eating Warbler Helmitheros vermivorum	Breeding

What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?

Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions,

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if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

Atlantic Seabirds:

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOAANCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the <u>Northeast Ocean Data Portal</u>. The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOAANCCOS models: the models were developed as part of the NOAANCCOS project: <u>Integrative Statistical Modeling and Predictive Mapping of Marine</u> <u>Bird Distributions and Abundance on the Atlantic Outer Continental Shelf</u>. The models resulting from this project are being used in a number of decisionsupport/mapping products in order to help guide decision-making on activities off the Atlantic Coast with the goal of reducing impacts to migratory birds. One such product is the <u>Northeast Ocean Data Portal</u>, which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?

Landbirds:

The <u>Avian Knowledge Network (AKN)</u> provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest, survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the <u>Migratory Bird Programs AKN Histogram Tools</u> webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Icwa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North, Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to excand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

Atlantic Seabirds:

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the <u>Northeast Ocean Data Portal</u>. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAANCCOS <u>Integrative Statistical Modeling</u> and <u>Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project</u> webpage.

Facilities

Wildlife refuges

Any activity proposed on <u>National Wildlife Refuge</u> lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to <u>NWI wetlands</u> and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

8/29/2017

IPaC: Explore Location

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities nvolving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix E Utility Map



Appendix F

Capacity Analysis for Intersection Improvement Options

Westbound Left-Turn Lane and Signal Installation at US-280 Off-ramp

2037 AM Peak

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Hollywood Boulevard Traffic Study

Vistro File: \...\LTL and Signal_Mid Peak_2037.vistro Report File: \...\LTL and Signal_Mid Peak 2037.pdf

Scenario 1 LTL_Mid Peak_2037 1/26/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Thru	2.111	2,655.6	F
4	US-280 Off-Ramp	Signalized	HCM 6th Edition	SEB Left	0.648	16.2	В

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	2,655.6
Level Of Service:	F
Volume to Capacity (v/c):	2.111

Name	Union Hill Dr			Hollywood Blvd			Но	llywood B	lvd	US-280 On-Ramp			
Approach	Southbound			Nor	Northeastbound			Southwestbound			Northwestbound		
Lane Configuration	Y			1				-1 F					
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00 12.00 12.00		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00		
No. of Lanes in Pocket	0	0	0	0 0 0		1	0	0	0	0	0		
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	15.00				20.00			20.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00			
Crosswalk		No			No			No		No			

Name	U	nion Hill [)r	Hollywood Blvd			Ho	llywood B	lvd	US-280 On-Ramp			
Base Volume Input [veh/h]	7	6	20	19	414	311	667	460	24	0	0	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	7	6	20	19	414	311	667	460	24	0	0	0	
Peak Hour Factor	0.8800	0.8800	0.8800	0.9200	0.9200	0.9200	0.9600	0.9600	0.9600	1.0000	1.0000	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	2	2	6	5	113	85	174	120	6	0	0	0	
Total Analysis Volume [veh/h]	8	7	23	21	450	338	695	479	25	0	0	0	
Pedestrian Volume [ped/h]		0		0			0			0			

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	1.51	2.11	0.04	0.02	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	2250.60	2655.59	1575.98	8.46	0.00	0.00	27.10	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	F	A	А	A	D	А	A			
95th-Percentile Queue Length [veh]	5.88	5.88	5.88	7.74	7.74	7.74	9.73	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	146.95	146.95	146.95	193.56	193.56	193.56	243.22	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		1916.88			0.22			15.71		0.00		
Approach LOS		F			А			С			А	
d_I, Intersection Delay [s/veh]		44.89										
Intersection LOS						F	=					

Hollywood Boulevard Traffic Study

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period: Signalized HCM 6th Edition 15 minutes Delay (sec / veh):16.2Level Of Service:BVolume to Capacity (v/c):0.648

Name	US-280 Off-Ramp			Hollywood Blvd			Но	llywood B	lvd				
Approach	Northbound			No	Northeastbound			Southwestbound			Southeastbound		
Lane Configuration	1ĺ			4				F		T			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			20.00			20.00			15.00		
Grade [%]	0.00				0.00		0.00			0.00			
Curb Present	No				No			No			No		
Crosswalk		No			No		No			No			

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Но	llywood B	lvd			
Base Volume Input [veh/h]	179	0	188	4	325	0	0	914	4	1	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	179	0	188	4	325	0	0	914	4	1	0	0
Peak Hour Factor	0.9600	1.0000	0.9600	0.9400	0.9400	1.0000	1.0000	0.9400	0.9400	0.2500	1.0000	0.2500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	0	49	1	86	0	0	243	1	1	0	0
Total Analysis Volume [veh/h]	186	0	196	4	346	0	0	972	4	4	0	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossin	9	0			0			0			0	
v_di, Inbound Pedestrian Volume crossing	n	0			0			0			0	
v_co, Outbound Pedestrian Volume crossing	¢.	0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing r	ni	0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

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Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split
Signal group	4	0	0	0	2	0	0	2	0	3	0	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	5	0	0	0	20	0	0	20	0	5	0	0
Maximum Green [s]	22	0	0	0	50	0	0	50	0	10	0	0
Amber [s]	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
Rest In Walk	No				No			No		No		
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall	No				No			No		No		
Maximum Recall	No				Yes			Yes		No		
Pedestrian Recall	No				No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	50.0	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0	20.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

L	R	С	С	С
75	75	75	75	75
4.00	4.00	4.00	4.00	4.00
0.00	0.00	2.00	0.00	0.00
2.00	2.00	2.00	2.00	2.00
12	12	50	50	0
0.16	0.16	0.67	0.67	0.01
0.10	0.12	0.19	0.52	0.00
1781	1589	1856	1869	1781
290	259	1292	1252	11
29.20	29.83	5.01	8.52	36.93
0.11	0.11	0.50	0.50	0.11
1.00	1.00	1.00	1.00	1.00
2.36	4.48	0.52	4.85	17.35
0.00	0.00	0.00	0.00	0.00
1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00
0.64	0.76	0.27	0.78	0.35
31.55	34.31	5.52	13.37	54.28
С	С	A	В	D
No	Yes	No	Yes	Yes
	L 75 4.00 0.00 2.00 12 0.16 0.10 1781 290 29.20 0.11 1.00 2.36 0.00 1.00 1.00 1.00 1.00 2.36 0.00	L R 75 75 4.00 4.00 0.00 0.00 2.00 2.00 12 12 0.16 0.16 0.10 0.12 1781 1589 290 259 29.20 29.83 0.11 0.11 1.00 1.00 2.36 4.48 0.00 0.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	L R C 75 75 75 4.00 4.00 4.00 0.00 0.00 2.00 2.00 2.00 2.00 12 12 50 0.16 0.16 0.67 0.10 0.12 0.19 1781 1589 1856 290 259 1292 29.20 29.83 5.01 0.11 0.11 0.50 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.64	L R C C 75 75 75 75 4.00 4.00 4.00 4.00 0.00 0.00 2.00 0.00 2.00 2.00 2.00 2.00 12 12 50 50 0.16 0.16 0.67 0.67 0.10 0.12 0.19 0.52 1781 1589 1856 1869 290 259 1292 1252 29.20 29.83 5.01 8.52 0.11 0.11 0.50 0.50 1.00 1.00 1.00 1.00 2.36 4.48 0.52 4.85 0.00 0.00 0.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.64

Lane Group LOS	С	С	A	В	D
Critical Lane Group	No	Yes	No	Yes	Yes
50th-Percentile Queue Length [veh]	3.19	3.56	2.07	10.64	0.13
50th-Percentile Queue Length [ft]	79.83	88.88	51.81	266.02	3.22
95th-Percentile Queue Length [veh]	5.75	6.40	3.73	15.99	0.23
95th-Percentile Queue Length [ft]	143.69	159.99	93.26	399.76	5.79

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d_M, Delay for Movement [s/veh]	31.55 0.00 34.31		5.52	5.52	0.00	0.00	13.37	13.37	54.28	0.00	54.28	
Movement LOS	С		С	А	А			В	В	D		D
d_A, Approach Delay [s/veh]	32.97				5.52		13.37			54.28		
Approach LOS	С			А			В			D		
d_I, Intersection Delay [s/veh]						16	.23					
Intersection LOS		В										
Intersection V/C		0.648										

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	n 0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h] 0	1111	1111	0
d_b, Bicycle Delay [s]	45.00	8.89	8.89	45.00
I_b,int, Bicycle LOS Score for Intersection	4.132	2.137	3.170	4.139
Bicycle LOS	D	В	С	D

Ring 1 2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SG 2 545	SG: 3 146	6G:4-25s
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Hollywood Boulevard Traffic Study

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Turning Movement Volume: Summary

ID	Intersection Name	Southbound			Northeastbound			Southwestbound			Total
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	7	6	20	19	414	311	667	460	24	1928

ID	Intersection Name	Northbound		Northea	stbound	Southwe	estbound	Southeastbound		Total
		Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	179	188	4	325	914	4	1	0	1615



Hollywood Boulevard Traffic Study

Vistro File: \...\LTL and Signal_Mid Peak_2037.vistro Report File: \...\LTL and Signal_Mid Peak 2037.pdf Scenario 1 LTL_Mid Peak_2037 1/26/2018

Intersection		Southbound			Northeastbound			Southwestbound			Total	
U	Name	volume rype	Left	Thru	Right	Left	Thru	Right	Left Thru Right 667 460 24 1.00 1.00 1.00 0 0 0 0 0 0	Volume		
	Final Base	7	6	20	19	414	311	667	460	24	1928	
	Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	
3	US-280 On-	In Process	0	0	0	0	0	0	0	0	0	0
5	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	7	6	20	19	414	311	667	460	24	1928

Turning Movement Volume: Detail

ID Intersect Name 4 US-280 (Ramp	Intersection	Volume Type	Northbound		Northeastbound		Southwe	estbound	Southea	stbound	Total
	Name		Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
		Final Base	179	188	4	325	914	4	1	0	1615
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
4	US-280 Off-	In Process	0	0	0	0	0	0	0	0	0
4	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
	-	Future Total	179	188	4	325	914	4	1	0	1615



Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control






Version 5.00-01

Hollywood Boulevard Traffic Study

Traffic Volume - Base Volume















Westbound Left-Turn Lane and Signal Installation at US-280 Off-ramp

2037 Mid-day Peak

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Hollywood Boulevard Traffic Study

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Scenario 1 LTL_Mid Peak_2037 1/26/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Thru	2.111	2,655.6	F
4	US-280 Off-Ramp	Signalized	HCM 6th Edition	SEB Left	0.648	16.2	В

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	2,655.6
Level Of Service:	F
Volume to Capacity (v/c):	2.111

Name	U	nion Hill D)r	Но	Hollywood Blvd			llywood B	lvd	US-280 On-Ramp		
Approach	Southbound			Nor	Northeastbound			uthwestbo	und	Northwestbound		
Lane Configuration		Y			+			-1 F				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0 0 0		1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00				20.00			20.00		30.00		
Grade [%]	0.00				0.00			0.00		0.00		
Crosswalk		No			No			No		No		

Name	U	nion Hill [)r	Ho	Hollywood Blvd			llywood B	lvd	US-280 On-Ramp			
Base Volume Input [veh/h]	7	6	20	19	414	311	667	460	24	0	0	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	7	6	20	19	414	311	667	460	24	0	0	0	
Peak Hour Factor	0.8800	0.8800	0.8800	0.9200	0.9200	0.9200	0.9600	0.9600	0.9600	1.0000	1.0000	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	2	2	6	5	113	85	174	120	6	0	0	0	
Total Analysis Volume [veh/h]	8	7	23	21	450	338	695	479	25	0	0	0	
Pedestrian Volume [ped/h]		0			0			0		0			

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	1.51	2.11	0.04	0.02	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	2250.60	2655.59	1575.98	8.46	0.00	0.00	27.10	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	F	A	А	A	D	А	A			
95th-Percentile Queue Length [veh]	5.88	5.88	5.88	7.74	7.74	7.74	9.73	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	146.95	146.95	146.95	193.56	193.56	193.56	243.22	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		1916.88			0.22			15.71		0.00		
Approach LOS		F			А			С			А	
d_I, Intersection Delay [s/veh]	44.89											
Intersection LOS		F										

Hollywood Boulevard Traffic Study

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period: Signalized HCM 6th Edition 15 minutes Delay (sec / veh):16.2Level Of Service:BVolume to Capacity (v/c):0.648

Name	US-:	280 Off-R	amp	Ho	Hollywood Blvd			llywood B	lvd				
Approach	м	lorthboun	d	No	Northeastbound			thwestbo	und	Southeastbound			
Lane Configuration		1		H				F		Ŧ			
Turning Movement	Left Thru Right			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00 100.00 100.00			100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			20.00			20.00		15.00			
Grade [%]		0.00			0.00			0.00		0.00			
Curb Present		No			No			No		No			
Crosswalk		No			No			No		No			

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Но	llywood B	lvd			
Base Volume Input [veh/h]	179	0	188	4	325	0	0	914	4	1	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	179	0	188	4	325	0	0	914	4	1	0	0
Peak Hour Factor	0.9600	1.0000	0.9600	0.9400	0.9400	1.0000	1.0000	0.9400	0.9400	0.2500	1.0000	0.2500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	0	49	1	86	0	0	243	1	1	0	0
Total Analysis Volume [veh/h]	186	0	196	4	346	0	0	972	4	4	0	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossin	9	0			0			0			0	
v_di, Inbound Pedestrian Volume crossing	ng m O				0			0			0	
v_co, Outbound Pedestrian Volume crossing	¢.	0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing r	ni	i 0			0		0			0		
v_ab, Corner Pedestrian Volume [ped/h]		0			0		0			0		
Bicycle Volume [bicycles/h]		0			0			0			0	

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Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split
Signal group	4	0	0	0	2	0	0	2	0	3	0	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	5	0	0	0	20	0	0	20	0	5	0	0
Maximum Green [s]	22	0	0	0	50	0	0	50	0	10	0	0
Amber [s]	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
Rest In Walk	No				No			No		No		
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall	No				No			No		No		
Maximum Recall	No				Yes			Yes		No		
Pedestrian Recall	No				No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	50.0	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0	20.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

L	R	С	С	С
75	75	75	75	75
4.00	4.00	4.00	4.00	4.00
0.00	0.00	2.00	0.00	0.00
2.00	2.00	2.00	2.00	2.00
12	12	50	50	0
0.16	0.16	0.67	0.67	0.01
0.10	0.12	0.19	0.52	0.00
1781	1589	1856	1869	1781
290	259	1292	1252	11
29.20	29.83	5.01	8.52	36.93
0.11	0.11	0.50	0.50	0.11
1.00	1.00	1.00	1.00	1.00
2.36	4.48	0.52	4.85	17.35
0.00	0.00	0.00	0.00	0.00
1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00
0.64	0.76	0.27	0.78	0.35
31.55	34.31	5.52	13.37	54.28
С	С	A	В	D
No	Yes	No	Yes	Yes
	L 75 4.00 0.00 2.00 12 0.16 0.10 1781 290 29.20 0.11 1.00 2.36 0.00 1.00 1.00 1.00 1.00 2.36 0.00	L R 75 75 4.00 4.00 0.00 0.00 2.00 2.00 12 12 0.16 0.16 0.10 0.12 1781 1589 290 259 29.20 29.83 0.11 0.11 1.00 1.00 2.36 4.48 0.00 0.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	L R C 75 75 75 4.00 4.00 4.00 0.00 0.00 2.00 2.00 2.00 2.00 12 12 50 0.16 0.16 0.67 0.10 0.12 0.19 1781 1589 1856 290 259 1292 29.20 29.83 5.01 0.11 0.11 0.50 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.64	L R C C 75 75 75 75 4.00 4.00 4.00 4.00 0.00 0.00 2.00 0.00 2.00 2.00 2.00 2.00 12 12 50 50 0.16 0.16 0.67 0.67 0.10 0.12 0.19 0.52 1781 1589 1856 1869 290 259 1292 1252 29.20 29.83 5.01 8.52 0.11 0.11 0.50 0.50 1.00 1.00 1.00 1.00 2.36 4.48 0.52 4.85 0.00 0.00 0.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.64

Lane Group LOS	С	С	A	В	D
Critical Lane Group	No	Yes	No	Yes	Yes
50th-Percentile Queue Length [veh]	3.19	3.56	2.07	10.64	0.13
50th-Percentile Queue Length [ft]	79.83	88.88	51.81	266.02	3.22
95th-Percentile Queue Length [veh]	5.75	6.40	3.73	15.99	0.23
95th-Percentile Queue Length [ft]	143.69	159.99	93.26	399.76	5.79

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d_M, Delay for Movement [s/veh]	31.55 0.00 34.31			5.52	5.52	0.00	0.00	13.37	13.37	54.28	0.00	54.28
Movement LOS	С	сс			A A			В	В	D		D
d_A, Approach Delay [s/veh]	32.97				5.52			13.37		54.28		
Approach LOS		С			А			В			D	
d_I, Intersection Delay [s/veh]						16	.23					
Intersection LOS						E	3					
Intersection V/C				0.648								

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	n 0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h] 0	1111	1111	0
d_b, Bicycle Delay [s]	45.00	8.89	8.89	45.00
I_b,int, Bicycle LOS Score for Intersection	4.132	2.137	3.170	4.139
Bicycle LOS	D	В	С	D

Ring 1 2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SG 2 545	SG: 3 146	6G:4-25s
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Hollywood Boulevard Traffic Study

Vistro File: \...\LTL and Signal_Mid Peak_2037.vistro Report File: \...\LTL and Signal_Mid Peak 2037.pdf Scenario 1 LTL_Mid Peak_2037 1/26/2018

Turning Movement Volume: Summary

ID	Intersection Name	Southbound			Northeastbound			Sout	ound	Total	
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	7	6	20	19	414	311	667	460	24	1928

ID	Intersection Name	Northbound		Northea	stbound	Southwe	estbound	Southea	Total	
	Intersection Name	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	179	188	4	325	914	4	1	0	1615



Hollywood Boulevard Traffic Study

Vistro File: \...\LTL and Signal_Mid Peak_2037.vistro Report File: \...\LTL and Signal_Mid Peak 2037.pdf Scenario 1 LTL_Mid Peak_2037 1/26/2018

П	Intersection		So	outhbou	nd	Nort	heastbo	ound	Sout	hwestbo	ound	Total
U	ID Intersection Name 3 US-280 On- Ramp	volume rype	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
		Final Base	7	6	20	19	414	311	667	460	24	1928
	2 US-280 On-	Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
3		In Process	0	0	0	0	0	0	0	0	0	0
5	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	7	6	20	19	414	311	667	460	24	1928

Turning Movement Volume: Detail

ID Intersection Name 4 US-280 Off- Ramp		Northbound		Northea	stbound	Southwe	estbound	Southea	stbound	Total	
	volume rype	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume	
		Final Base	179	188	4	325	914	4	1	0	1615
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
4	US-280 Off-	In Process	0	0	0	0	0	0	0	0	0
4	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
		Future Total	179	188	4	325	914	4	1	0	1615



Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Hollywood Boulevard Traffic Study

Traffic Volume - Base Volume















Westbound Left-Turn Lane and Signal Installation at US-280 Off-ramp

2037 PM Peak

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Hollywood Boulevard Impact Study

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Scenario 1 LTL_PM Peak_2037 1/26/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Two-way stop	HCM 6th Edition	SB Thru	0.391	207.4	F
4	US-280 Off-Ramp	Signalized	HCM 6th Edition	SEB Right	0.575	12.2	В

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Hollywood Boulevard Impact Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Two-way stop HCM 6th Edition 15 minutes

Delay (sec / veh):	207.4
Level Of Service:	F
Volume to Capacity (v/c):	0.391

Name	Union Hill Dr			Ho	Hollywood Blvd			llywood B	lvd	US-280 On-Ramp		
Approach	S	Southbound			Northeastbound			Ithwestbo	und	Northwestbound		
Lane Configuration		ү 🕇 ч										
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00 12.00 12.00		12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		15.00			20.00			20.00		30.00		
Grade [%]	0.00			0.00				0.00		0.00		
Crosswalk	No			No				No		No		

Name	U	Union Hill Dr			Hollywood Blvd			llywood B	lvd	US-280 On-Ramp			
Base Volume Input [veh/h]	4	6	12	5	371	240	418	410	8	0	0	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	4	6	12	5	371	240	418	410	8	0	0	0	
Peak Hour Factor	0.5600	0.5600	0.5600	0.8900	0.8900	0.8900	0.9300	0.9300	0.9300	1.0000	1.0000	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	2	3	5	1	104	67	112	110	2	0	0	0	
Total Analysis Volume [veh/h]	7	11	21	6	417	270	449	441	9	0	0	0	
Pedestrian Volume [ped/h]	0			0			0			0			

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.22	0.39	0.03	0.01	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	193.89	207.38	85.43	8.26	0.00	0.00	12.80	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	F	A	А	A	В	А	А			
95th-Percentile Queue Length [veh]	2.72	2.72	2.72	4.58	4.58	4.58	2.80	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	67.99	67.99	67.99	114.47	114.47	114.47	70.11	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		139.29			0.07			6.39		0.00		
Approach LOS		F			А			А			А	
d_I, Intersection Delay [s/veh]		6.88										
Intersection LOS		F										

Hollywood Boulevard Impact Study

Intersection Level Of Service Report Intersection 4: US-280 Off-Ramp

Control Type: Analysis Method: Analysis Period: Signalized HCM 6th Edition 15 minutes Delay (sec / veh):12.2Level Of Service:BVolume to Capacity (v/c):0.575

Name	US-280 Off-Ramp			Ho	Hollywood Blvd			llywood B	lvd				
Approach	М	Northbound			Northeastbound			uthwestbo	und	Southeastbound			
Lane Configuration	1ĺ				4			F		Ť			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00 20.00 20.00			15.00								
Grade [%]	0.00			0.00			0.00			0.00			
Curb Present	No			No			No			No			
Crosswalk		No			No			No			No		

Name	US-	US-280 Off-Ramp		Ho	llywood B	lvd	Но	llywood B	lvd			
Base Volume Input [veh/h]	155	0	205	0	364	0	0	710	5	1	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	0	205	0	364	0	0	710	5	1	0	10
Peak Hour Factor	0.9100	1.0000	0.9100	0.8900	0.8900	1.0000	1.0000	0.9000	0.9000	0.8300	1.0000	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	0	56	0	102	0	0	197	1	0	0	3
Total Analysis Volume [veh/h]	170	0	225	0	409	0	0	789	6	1	0	12
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossin	9	0			0			0			0	
v_di, Inbound Pedestrian Volume crossing	n	0			0			0			0	
v_co, Outbound Pedestrian Volume crossing	9	0			0			0			0	
v_ci, Inbound Pedestrian Volume crossing r	ni	0			0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

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Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Control Type	Split	Permiss	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split
Signal group	4	0	0	0	2	0	0	2	0	3	0	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	5	0	0	0	20	0	0	20	0	5	0	0
Maximum Green [s]	22	0	0	0	50	0	0	50	0	10	0	0
Amber [s]	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
Rest In Walk	No				No			No		No		
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall	No				Yes			Yes		No		
Maximum Recall	No				No			No		No		
Pedestrian Recall	No				No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	50.0	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0	20.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group	L	R	С	С	С
C, Cycle Length [s]	49	49	49	49	49
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	26	26	1
g / C, Green / Cycle	0.20	0.20	0.54	0.54	0.02
(v / s)_i Volume / Saturation Flow Rate	0.10	0.14	0.22	0.43	0.01
s, saturation flow rate [veh/h]	1781	1589	1870	1867	1603
c, Capacity [veh/h]	360	321	1075	1000	27
d1, Uniform Delay [s]	17.19	18.12	6.75	9.18	23.81
k, delay calibration	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.96	2.77	0.22	1.48	12.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00
X, volume / capacity	0.47	0.70	0.38	0.80	0.48
d, Delay for Lane Group [s/veh]	18.15	20.88	6.97	10.66	36.65
Lane Group LOS	В	С	A	В	D
Critical Lane Group	No	Yes	No	Yes	Yes

Lane Group LOS	В	С	A	В	D
Critical Lane Group	No	Yes	No	Yes	Yes
50th-Percentile Queue Length [veh]	1.58	2.32	2.09	5.76	0.24
50th-Percentile Queue Length [ft]	39.62	58.08	52.18	143.91	6.04
95th-Percentile Queue Length [veh]	2.85	4.18	3.76	9.69	0.43
95th-Percentile Queue Length [ft]	71.32	104.55	93.93	242.28	10.86



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d_M, Delay for Movement [s/veh]	18.15	0.00	20.88	6.97	6.97	0.00	0.00	10.66	10.66	36.65	0.00	36.65
Movement LOS	В		С	А	А			В	В	D		D
d_A, Approach Delay [s/veh]	19.71				6.97		10.66			36.65		
Approach LOS	В			А			В					
d_I, Intersection Delay [s/veh]					12.15							
Intersection LOS						E	3					
Intersection V/C	0.575											

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	n 0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	e 2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h] 0	1111	1111	0
d_b, Bicycle Delay [s]	45.00	8.89	8.89	45.00
I_b,int, Bicycle LOS Score for Intersection	4.132	2.234	2.871	4.154
Bicycle LOS	D	В	С	D

Ring 1 2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4 -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SG 2 545	SG: 3 146	6G:4-25s
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Hollywood Boulevard Impact Study

Vistro File: \...\LTL and Signal_PM Peak_2037.vistro Report File: \...\LTL and Signal_PM Peak 2037.pdf Scenario 1 LTL_PM Peak_2037 1/26/2018

Turning Movement Volume: Summary

ID	Intersection Name	Southbound			Northeastbound			Southwestbound			Total
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	4	6	12	5	371	240	418	410	8	1474

ID Intersection Nam	Intersection Name	Northbound		Northeastbound		Southwestbound		Southeastbound		Total
	Intersection Name	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	155	205	0	364	710	5	1	10	1450



Hollywood Boulevard Impact Study

Vistro File: \...\LTL and Signal_PM Peak_2037.vistro Report File: \...\LTL and Signal_PM Peak 2037.pdf Scenario 1 LTL_PM Peak_2037 1/26/2018

ID Intersection		Southbound			Northeastbound			Southwestbound			Total	
U	Name	volume rype	Left	Thru	Right	Left	Thru	Right	Left	Thru	Nund Right 8 1.00 0 0 0 0 8	Volume
	Final Base	4	6	12	5	371	240	418	410	8	1474	
	Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	
3	US-280 On-	In Process	0	0	0	0	0	0	0	0	0	0
5	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	4	6	12	5	371	240	418	410	8	1474

Turning Movement Volume: Detail

ID	Intersection		North	bound	Northeastbound		Southwestbound		Southea	stbound	Total
ID Intersection Name US-280 Off-	volume rype	Left	Right	Left	Thru	Thru	Right	Left	Right	Volume	
		Final Base	155	205	0	364	710	5	1	10	1450
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
4	US-280 Off-	In Process	0	0	0	0	0	0	0	0	0
4 Ramp	Ramp	Net New Trips	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0
		Future Total	155	205	0	364	710	5	1	10	1450

Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Hollywood Boulevard Impact Study

Traffic Volume - Base Volume







Version 5.00-01 Traffic Conditions







Roundabouts 2037 AM Peak

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Hollywood Boulevard Traffic Study

Vistro File: P:\...\Roundabout AM Peak 2037.vistro Report File: P:\...\Roundabouts_AM Peak_2037.pdf Scenario 1 Roundabouts_AM Peak_2037 8/16/2017

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Roundabout	HCM 6th Edition	SWB Left		14.8	В
4	US-280 Off-Ramp	Roundabout	HCM 6th Edition	SWB Thru		12.4	В

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Roundabout HCM 6th Edition 15 minutes Delay (sec / veh): 14.8 Level Of Service: B

Name	Union Hill Dr			Hollywood Blvd			Hollywood Blvd			US-280 On-Ramp		
Approach	Southbound			Eastbound			Southwestbound			Northwestbound		
Lane Configuration	ł			۲			۲					
Turning Movement	Left2	Left	Right	Left	Thru	Right	Left	Thru	Right	Left	Right	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	15.00			20.00			20.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Name	Union Hill Dr			Hollywood Blvd			Hollywood Blvd			US-280 On-Ramp		
Base Volume Input [veh/h]	6	4	8	29	292	220	562	346	23	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	4	8	29	292	220	562	346	23	0	0	0
Peak Hour Factor	0.7500	0.7500	0.7500	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	3	8	82	62	158	97	6	0	0	0
Total Analysis Volume [veh/h]	8	5	11	33	328	247	631	389	26	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
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Number of Conflicting Circulating Lanes		1			1			1					
Circulating Flow Rate [veh/h]	1040			657				34					
Exiting Flow Rate [veh/h]		397			649			34			343		
Demand Flow Rate [veh/h]	6	4	8	29	292	220	562	346	23	0	0	0	
Adjusted Demand Flow Rate [veh/h]	8	5	11	33	328	247	631	389	26	0	0	0	

Overwrite Calculated Critical Headway	No	No	No	No	
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	
Overwrite Calculated Follow-Up Time	No	No	No	No	
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	
A (intercept)	1380.00	1380.00	1380.00	1380.00	
B (coefficient)	0.00102	0.00102	0.00102	0.00102	
HV Adjustment Factor	0.98	0.98	0.98	0.98	
Entry Flow Rate [veh/h]	25	369	0	1067	
Capacity of Entry and Bypass Lanes [veh/h] 478	707	713	1334	
Pedestrian Impedance	1.00	1.00	1.00	1.00	
Capacity per Entry Lane [veh/h]	469	693	699	1308	
X, volume / capacity	0.05	0.52	0.35	0.80	

Lane LOS	А	В	А	С	
95th-Percentile Queue Length [veh]	0.16	3.05	1.60	9.34	
95th-Percentile Queue Length [ft]	4.04	76.13	39.94	233.49	
Approach Delay [s/veh]	8.36	11.87		16.68	0.00
Approach LOS	A	E	3	С	A
Intersection Delay [s/veh]			14	.82	-
Intersection LOS			E	3	



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 4: US-280 Off-Ramp

Control Type:
Analysis Method:
Analysis Period:

Roundabout HCM 6th Edition 15 minutes Delay (sec / veh):12.4Level Of Service:B

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Но	llywood B	lvd			
Approach	И	Northbound			Northeastbound			uthwestbo	und	Southeastbound		
Lane Configuration		Y			4			F		T		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			20.00			20.00		15.00		
Grade [%]		0.00			0.00		0.00			0.00		
Crosswalk		No		No				No		No		

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Но	llywood B	lvd			
Base Volume Input [veh/h]	126	0	168	1	302	0	0	791	0	2	0	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	126	0	168	1	302	0	0	791	0	2	0	2
Peak Hour Factor	0.8200	1.0000	0.8200	0.8900	0.8900	1.0000	1.0000	0.8800	0.8800	0.3300	1.0000	0.3300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	0	51	0	85	0	0	225	0	2	0	2
Total Analysis Volume [veh/h]	154	0	205	1	339	0	0	899	0	6	0	6
Pedestrian Volume [ped/h]		0			0			0			0	

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Number of Conflicting Circulating Lanes	1			1				1				
Circulating Flow Rate [veh/h]		353		6				158				
Exiting Flow Rate [veh/h]	352			0			1			1074		
Demand Flow Rate [veh/h]	126	126 0 168			302	0	0	791	0	2	0	2
Adjusted Demand Flow Rate [veh/h]	154	0	205	1	339	0	0	899	0	6	0	6

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	367	347	917	13
Capacity of Entry and Bypass Lanes [veh/h	963	1372	1175	462
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	944	1345	1152	453
X, volume / capacity	0.38	0.25	0.78	0.03

Lane LOS	А	A	С	А
95th-Percentile Queue Length [veh]	1.80	1.01	8.43	0.08
95th-Percentile Queue Length [ft]	44.93	25.18	210.77	2.04
Approach Delay [s/veh]	8.04	4.85	17.13	8.31
Approach LOS	А	A	С	А
Intersection Delay [s/veh]		12	.44	
Intersection LOS		E	3	

Hollywood Boulevard Traffic Study

Vistro File: P:\...\Roundabout_AM Peak_2037.vistro Report File: P:\...\Roundabouts_AM Peak_2037.pdf Scenario 1 Roundabouts_AM Peak_2037 8/16/2017

Turning Movement Volume: Summary

ID Intersection Name	Intersection Name	Southbound			Eastbound			Southwestbound			Total
	2	Left	Right	Left	Thru	Right	Left	Thru	Right	Volume	
3	US-280 On-Ramp	6	4	8	29	292	220	562	346	23	1490

	Intersection Name	Northbound			Northea	stbound	Southwe	estbound	Southea	Total	
U	Intersection Name	Left	Thru	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	126	0	168	1	302	791	0	2	2	1392

Version 5.00-01

Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Traffic Volume - Base Volume







Version 5.00-01 Traffic Conditions







Scenario 1: 1 Roundabouts_AM Peak_2037

Roundabouts 2037 Mid-day Peak

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Roundabout	HCM 6th Edition	SWB Left		22.7	С
4	US-280 Off-Ramp	Roundabout	HCM 6th Edition	SWB Thru		17.4	С

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Roundabout HCM 6th Edition 15 minutes Delay (sec / veh):22.7Level Of Service:C

Name	U	Inion Hill [Dr	Ho	llywood B	lvd	Но	llywood B	lvd	US-	280 On-R	amp	
Approach	s	Southboun	ıd		Eastbound	t	Sou	Southwestbound			Northwestbound		
Lane Configuration		۲			۲			ч					
Turning Movement	Left2	Left	Right	Left	Thru	Right	Left	Thru	Right	Left	Right	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		15.00			20.00			20.00		30.00			
Grade [%]		0.00			0.00			0.00		0.00			
Crosswalk		No			No		No			No			

Name	U	nion Hill E)r	Ho	llywood B	lvd	Но	llywood B	lvd	US-:	280 On-R	amp	
Base Volume Input [veh/h]	7	6	20	19	414	311	667	460	24	0	0	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	7	6	20	19	414	311	667	460	24	0	0	0	
Peak Hour Factor	0.8800	0.8800	0.8800	0.9200	0.9200	0.9200	0.9600	0.9600	0.9600	1.0000	1.0000	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	2	2	6	5	113	85	174	120	6	0	0	0	
Total Analysis Volume [veh/h]	8	7	23	21	450	338	695	479	25	0	0	0	
Pedestrian Volume [ped/h]		0			0		0				0		

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Number of Conflicting Circulating Lanes	1				1			1			1		
Circulating Flow Rate [veh/h]	1197				724			21		489			
Exiting Flow Rate [veh/h]		489			716			21		467			
Demand Flow Rate [veh/h]	7	6	20	19	414	311	667	667 460 24		0	0	0	
Adjusted Demand Flow Rate [veh/h]	8	7	23	21	450	338	695	479	25	0	0	0	

Overwrite Calculated Critical Headway	No	No	No	No	
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	
Overwrite Calculated Follow-Up Time	No	No	No	No	
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	
A (intercept)	1380.00	1380.00	1380.00	1380.00	
B (coefficient)	0.00102	0.00102	0.00102	0.00102	
HV Adjustment Factor	0.98	0.98	0.98	0.98	
Entry Flow Rate [veh/h]	39	481	0	1223	
Capacity of Entry and Bypass Lanes [veh/h	407	660	665	1351	
Pedestrian Impedance	1.00	1.00	1.00	1.00	
Capacity per Entry Lane [veh/h]	399	647	652	1324	
X, volume / capacity	0.10	0.73	0.52	0.91	

Lane LOS	В	С	В	D					
95th-Percentile Queue Length [veh]	0.31	6.27 3.00		14.80					
95th-Percentile Queue Length [ft]	7.84	156.66	75.05	369.94					
Approach Delay [s/veh]	10.45	19.	02	25.52	0.00				
Approach LOS	В	()	D	А				
Intersection Delay [s/veh]	22.67								
Intersection LOS	С								



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 4: US-280 Off-Ramp

Control Type:	
Analysis Method:	
Analysis Period:	

Name

Approach

Lane Configuration

Roundabout HCM 6th Edition 15 minutes Delay (sec / veh): 17.4 Level Of Service: C

US-280 Off-Ramp
Hollywood Blvd
Hollywood Blvd

Northbound
Northeastbound
Southwestbound
Southeastbound

Image: Constraint of the state of the

										•		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			20.00			20.00		15.00		
Grade [%]		0.00			0.00			0.00		0.00		
Crosswalk		No			No			No			No	

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Ho	llywood B	lvd				
Base Volume Input [veh/h]	179	0	188	4	325	0	0	914	4	1	0	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	179	0	188	4	325	0	0	914	4	1	0	0	
Peak Hour Factor	0.9600	1.0000	0.9600	0.9400	0.9400	1.0000	1.0000	0.9400	0.9400	0.2500	1.0000	0.2500	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	47	0	49	1	86	0	0	243	1	1	0	0	
Total Analysis Volume [veh/h]	186	0	196	4	346	0	0	972	4	4	0	0	
Pedestrian Volume [ped/h]		0			0			0			0		

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Number of Conflicting Circulating Lanes	1			1		1							
Circulating Flow Rate [veh/h]	361				4			194			1181		
Exiting Flow Rate [veh/h]		357			0			4		1181			
Demand Flow Rate [veh/h]	179	179 0 188		4	325	0	0	914	4	1	0	0	
Adjusted Demand Flow Rate [veh/h]	186	0	196	4	346	0	0	972	4	4	0	0	

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	390	357	996	5
Capacity of Entry and Bypass Lanes [veh/h	955	1375	1133	414
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	937	1348	1111	406
X, volume / capacity	0.41	0.26	0.88	0.01

Lane LOS	А	A	D	А					
95th-Percentile Queue Length [veh]	2.01	1.04	12.50	0.03					
95th-Percentile Queue Length [ft]	50.25	26.10	312.47	0.75					
Approach Delay [s/veh]	8.51	4.91	25.41	9.01					
Approach LOS	А	A	D	А					
Intersection Delay [s/veh]	17.41								
Intersection LOS	С								

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Hollywood Boulevard Traffic Study

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Turning Movement Volume: Summary

П	Interportion Name	Southbound			Eastbound			Southwestbound			Total
U	Intersection Name	2	Left	Right	Left	Thru	Right	Left	Thru	Right	Volume
3	US-280 On-Ramp	7	6	20	19	414	311	667	460	24	1928

П	Intersection Name	Northbound		Northeastbound		Southwestbound		Southeastbound		Total	
U	Intersection Name	Left	Thru	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	179	0	188	4	325	914	4	1	0	1615



Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Hollywood Boulevard Traffic Study

Traffic Volume - Base Volume





Version 5.00-01 Traffic Conditions







Scenario 1: 1 Roundabouts_Mid Peak_2037

Roundabouts 2037 PM Peak

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	US-280 On-Ramp	Roundabout	HCM 6th Edition	EB Thru		10.6	В
4	US-280 Off-Ramp	Roundabout	HCM 6th Edition	SWB Thru		10.5	В

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 3: US-280 On-Ramp

Control Type:
Analysis Method:
Analysis Period:

Roundabout HCM 6th Edition 15 minutes

Delay (sec / veh): Level Of Service: 10.6 В

Name	Union Hill Dr			Hollywood Blvd			Hollywood Blvd			US-280 On-Ramp			
Approach	S	Southbound			Eastbound			Southwestbound			Northwestbound		
Lane Configuration	ት				۲			ъ					
Turning Movement	Left2	Left	Right	Left	Thru	Right	Left	Thru	Right	Left	Right	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		15.00			20.00		20.00			30.00			
Grade [%]	0.00		0.00			0.00			0.00				
Crosswalk	No			No			No			No			

Name	U	nion Hill D)r	Ho	llywood B	lvd	Но	llywood B	lvd	US-	280 On-R	amp
Base Volume Input [veh/h]	4	6	12	5	371	240	418	410	8	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	6	12	5	371	240	418	410	8	0	0	0
Peak Hour Factor	0.5600	0.5600	0.5600	0.8900	0.8900	0.8900	0.9300	0.9300	0.9300	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	3	5	1	104	67	112	110	2	0	0	0
Total Analysis Volume [veh/h]	7	11	21	6	417	270	449	441	9	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	



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Number of Conflicting Circulating Lanes	1				1			1		1		
Circulating Flow Rate [veh/h]	908				476			6			439	
Exiting Flow Rate [veh/h]		450		469			6			432		
Demand Flow Rate [veh/h]	4	6	12	5	371	240	418	410	8	0	0	0
Adjusted Demand Flow Rate [veh/h]	7	11	21	6	417	270	449	441	9	0	0	0

Overwrite Calculated Critical Headway	No	No	No	No	
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	
Overwrite Calculated Follow-Up Time	No	No	No	No	
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	
A (intercept)	1380.00	1380.00	1380.00	1380.00	
B (coefficient)	0.00102	0.00102	0.00102	0.00102	
HV Adjustment Factor	0.98	0.98	0.98	0.98	
Entry Flow Rate [veh/h]	40	432	0	917	
Capacity of Entry and Bypass Lanes [veh/h] 547	849	856	1372	
Pedestrian Impedance	1.00	1.00	1.00	1.00	
Capacity per Entry Lane [veh/h]	536	833	839	1345	
X, volume / capacity	0.07	0.51	0.32	0.67	

Lane LOS	А	В	А	В				
95th-Percentile Queue Length [veh]	0.23	2.93	1.40	5.51				
95th-Percentile Queue Length [ft]	5.86	73.31	34.94	137.72				
Approach Delay [s/veh]	7.61	9.9	96	11.24	0.00			
Approach LOS	A	A	٩	В	А			
Intersection Delay [s/veh]	10.61							
Intersection LOS	B							



Hollywood Boulevard Traffic Study

Intersection Level Of Service Report

Intersection 4: US-280 Off-Ramp

Control Type:
Analysis Method:
Analysis Period:

Roundabout HCM 6th Edition 15 minutes

Delay (sec / veh): Level Of Service: 10.5 В

Name	US-	US-280 Off-Ramp			llywood B	lvd	Hollywood Blvd					
Approach	м	Northbound			rtheastbou	und	Southwestbound			Southeastbound		
Lane Configuration		Y			-		F			Ť		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			20.00		20.00			15.00		
Grade [%]		0.00			0.00		0.00			0.00		
Crosswalk		No			No		No			No		

Name	US-	280 Off-R	amp	Ho	llywood B	lvd	Но	llywood B	lvd			
Base Volume Input [veh/h]	155	0	205	0	364	0	0	710	5	1	0	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	0	205	0	364	0	0	710	5	1	0	10
Peak Hour Factor	0.9100	1.0000	0.9100	0.8900	0.8900	1.0000	1.0000	0.9000	0.9000	0.8300	1.0000	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	0	56	0	102	0	0	197	1	0	0	3
Total Analysis Volume [veh/h]	170	0	225	0	409	0	0	789	6	1	0	12
Pedestrian Volume [ped/h]		0		0			0			0		

Version 5.00-01

Number of Conflicting Circulating Lanes	1			1		1						
Circulating Flow Rate [veh/h]	418				1		173			978		
Exiting Flow Rate [veh/h]		418			0		0			978		
Demand Flow Rate [veh/h]	155	0	205	0	364	0	0	710	5	1	0	10
Adjusted Demand Flow Rate [veh/h]	170	0	225	0	409	0	0	789	6	1	0	12

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	403	418	811	14
Capacity of Entry and Bypass Lanes [veh/h	901	1379	1157	509
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	884	1352	1134	499
X, volume / capacity	0.45	0.30	0.70	0.03

Lane LOS	А	A	В	A					
95th-Percentile Queue Length [veh]	2.34	1.29	6.15	0.08					
95th-Percentile Queue Length [ft]	58.45	32.19	153.75	2.00					
Approach Delay [s/veh]	9.57	5.33	13.76	7.54					
Approach LOS	A	A	В	A					
Intersection Delay [s/veh]	10.55								
Intersection LOS	В								



Version 5.00-01

Hollywood Boulevard Traffic Study

Vistro File: P:\...\Roundabout_PM Peak_2037.vistro Report File: P:\...\Roundabouts_PM Peak_2037.pdf Scenario 1 Roundabouts_PM Peak_2037 8/16/2017

Turning Movement Volume: Summary

ID Intersection Name	Intersection Name	Southbound			Eastbound			Southwestbound			Total
	2	Left	Right	Left	Thru	Right	Left	Thru	Right	Volume	
3	US-280 On-Ramp	4	6	12	5	371	240	418	410	8	1474

ID Intersection	Intersection Name	Namo			Northeastbound		Southwestbound		Southeastbound		Total
	Intersection Name	Left	ft Thru	Right	Left	Thru	Thru	Right	Left	Right	Volume
4	US-280 Off-Ramp	155	0	205	0	364	710	5	1	10	1450



Version 5.00-01 Study Intersections





Version 5.00-01

Lane Configuration and Traffic Control







Version 5.00-01

Hollywood Boulevard Traffic Study

Traffic Volume - Base Volume







Version 5.00-01 Traffic Conditions







Scenario 1: 1 Roundabouts_PM Peak_2037

Appendix G Cost Estimates

	Hollywood Boulevard APPLE	
	Cost Summary	
Motor Vehicle Improvements	Deschuser Tetel	¢0,000,000,00
	Roadway Total:	\$2,080,000.00
	CE&I and Indirect Costs (25%):	\$520,000.00
	Preliminary Engineering (10%):	\$208,000.00
Alternative A - Pedestrian Bridge and	d Sidewalk	\$2,808,000.00
Alternative A - Tedesthan bhuge an	NW/ Sidewalk	\$230,000,00
	NF Sidewalk	\$130,000,00
	Pedestrian Bridge	\$860,000,00
	Traffic Signal	\$170,000,00
	Construction Total	\$1,390,000.00
	CE&I and Indirect Costs (25%):	\$347,500.00
	Preliminary Engineering (10%):	\$139,000.00
	ROW Acquisition:	\$58,000.00
	Grand Total:	\$1,940,000.00
Alternative B - Bridge Widening and	Sidewalk along the North Side of the Corr	idor
	NW Sidewalk	\$230,000.00
	NE Sidewalk	\$130,000.00
	Additional Bridge Widening	\$285,000.00
	Roadway Total	\$2,080,000.00
	Construction Total	\$2,725,000.00
	CE&I and Indirect Costs (25%):	\$681,250.00
	Preliminary Engineering (10%):	\$272,500.00
	ROW Acquisition:	\$58,000.00
	Grand Total:	\$3,740,000.00
Alternative C - Bridge Widening and	Sidewalk along the South Side of the Cor	ridor
	SW Sidewalk	\$170,000.00
	SE Sidewalk	\$70,000.00
	Additional Bridge Widening	\$285,000.00
	Roadway Total	\$2,080,000.00
	Construction Total	\$2,605,000.00
	CE&I and Indirect Costs (25%):	\$651,250.00
	Preliminary Engineering (10%):	\$260,500.00
	ROW Acquisition:	\$65,000.00
	Grand Total:	\$3,590,000.00
Alternative D - Pedestrian Bridge		* ****
	Pedestrian Bridge Construction Total:	\$860,000.00
	CE&I and Indirect Costs (25%):	\$215,000.00
	Preliminary Engineering (10%):	\$90,000.00
	ROW Acquisition:	\$0.00 \$1.165.000.00
	Grand Total.	\$1,105,000.00
NOTE: ENGINEER'S OPINION O ENGINEER'S EXPERIENCES AND INDUSTRY. ENGINEER DOES NOT (F PROBABLE CONSTRUCTION COST PRO QUALIFICATION AND REPRESENTS ENGI SUARANTEE THAT PROPOSALS, BIDS, OR ENGINEER'S OPINION OF PROBABLE COS	VIDED IS MADE ON THE BASIS OF NEER'S BEST JUDGMENT WITH THE ACTUAL COST WILL NOT VARY FROM ST.
l di		
Legend:		
iviotor venicle improvements	The sidewalk section on the method	section improvements
NW Sidewalk		or nonywood Boulevard West of US-
	ZOU The eidewalk continues the month of the	of Hollywood Deviewerd
	The sidewark section on the north side	or nonywood Boulevard east of US-
INE SIGEWAIK	200 and crossing to the south side of H	onywood Boulevard east of the US-
	Zou un ramp The sidewalk section on the south side	of Hollywood Boulevard wast of US
SW Sidewalk		or nonywood boulevald west of US-

The sidewalk section on the south side of Hollywood Boulevard east of US-SE Sidewalk 280

Pedestrian Bridge

Separate bridge for pedestrian use only Bridge widening (not included in Motor Vehicle Improvements) required to install sidewalk Construction Engineering & Inspection Additional Bridge Widening CE&I

OPINION OF PROBABLE COST - Motor Vehicle Improvements

Prepared: January 9, 2018

Prepared by: Sain Associates, Inc.

Project: Hollywood Boulevard APPLE Study County: Jefferson

Motor Vehicle Improvements- Includes bridge and roadway widening for left turn lane onto the US-280 onramp, and a signal at the US-280 off-ramp.

Item Description	Unit	Quantity	Unit Price	Amount
Clearing & Grubbing (\$4000/Acre)	LS	1	\$8,000.00	\$8,000.00
Unclassified Excavation	Су	900	\$15.00	\$13,500.00
Borrow Excavation	Су	1500	\$20.00	\$30,000.00
Removing Curb & Gutter	LF	900	\$10.00	\$9,000.00
Removing Inlets	Ea	2	\$750.00	\$1,500.00
Removing Pipe	LF	100	\$12.00	\$1,200.00
Structure Excavation	Су	50	\$24.00	\$1,200.00
Foundation Backfill	Су	25	\$75.00	\$1,875.00
Planing Existing Pavement	Sy	1400	\$5.00	\$7,000.00
Leveling	Ton	50	\$120.00	\$6,000.00
Asphalt Base (4")	Ton	20	\$100.00	\$2,000.00
Binder (6")	Ton	30	\$100.00	\$3,000.00
Surface (2.5")	Ton	200	\$100.00	\$20,000.00
Tack Coat	Gal	160	\$5.00	\$800.00
Bridge Wideneing	LS	1	\$525,000.00	\$525,000.00
Bridge Rehab	LS	1	\$400,000.00	\$400,000.00
Curb & Gutter	LF	450	\$15.00	\$6,750.00
Storm Inlets	Ea	2	\$3,500.00	\$7,000.00
24" Roadway Pipe	LF	100	\$65.00	\$6,500.00
Steel Beam Guardrail	LF	200	\$35.00	\$7,000.00
Guardail End Anchors	EA	8	\$3,500.00	\$28,000.00
Topsoil	CY	110	\$25.00	\$2,750.00
Seeding	Ac	2	\$1,000.00	\$2,000.00
Mowing	Ac	2	\$100.00	\$200.00
Solid Sodding	SY	330	\$8.00	\$2,640.00
Mulching	Ac	2	\$1,000.00	\$2,000.00
Striping - Solid, Broken, Dotted	LF	4000	\$1.00	\$4,000.00
Striping - Markings & Legends	Sf	500	\$7.00	\$3,500.00
Signs	Sf	500	\$20.00	\$10,000.00
Sign Post	LF	1500	\$10.00	\$15,000.00
Silt Fence - install & remove	LF	1500	\$8.00	\$12,000.00
Erosion Control - other	LS	1	\$50,000.00	\$50,000.00
Traffic Control	LS	1	\$50,000.00	\$50,000.00
Traffic Signal (1 Signal)	LS	1	\$150,000.00	\$150,000.00
Contingency (20%)	LS	1	\$277,883.00	\$277,883.00
Mobilization (9.7% of Overall Cost)	LS	1	\$134,773.26	\$134,773.26
Engineering Controls(1.3% of Overall Cost)	LS	1	\$18,062.40	\$18,062.40
Utility Relocations	LS	1	\$250,000.00	\$250,000.00
Subtot	\$2,070,133.65			
	\$2,080,000.00			
		CE&I and Indire	ect Costs (25%):	\$520,000.00
	\$208,000.00			
			Grand Total:	\$2,808,000.00

Notes:

1. ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

2. UTILITY COST ARE ASSUMED BASED ON KNOWN EXISTING UTILITIES. UTILITIES HAVE NOT BEEN FIELD LOCATED AND RELOCATION COSTS HAVE NOT BEEN VARIFIED.

OPINION OF PROBABLE COST - Motor Vehicle Improvements Prepared: January 29, 2018 Prepared by: Sain Associates, Inc. Project: Hollywood Boulevard APPLE Study County: Jefferson

Item Description	Unit	Quantity	Unit Price	Amount
Clearing & Grubbing (\$4000/Acre)	LS	1	\$16,000.00	\$16,000.00
Unclassified Excavation	Су	6300	\$15.00	\$94,500.00
Borrow Excavation	Су	6300	\$20.00	\$126,000.00
Removing Curb & Gutter	LF	900	\$10.00	\$9,000.00
Removing Inlets	Ea	2	\$750.00	\$1,500.00
Removing Pipe	LF	100	\$12.00	\$1,200.00
Structure Excavation	Су	250	\$24.00	\$6,000.00
Foundation Backfill	Cy	125	\$75.00	\$9,375.00
Planing Existing Pavement	Sy	6500	\$5.00	\$32,500.00
Leveling	Ton	500	\$120.00	\$60,000.00
Asphalt Base (4")	Ton	475	\$100.00	\$47,500.00
Binder (6")	Ton	700	\$100.00	\$70,000.00
Surface (2.5")	Ton	900	\$100.00	\$90,000.00
Tack Coat	Gal	1280	\$5.00	\$6,400.00
Bridge Wideneing	LS	1	\$525,000.00	\$525,000.00
Bridge Rehab	LS	1	\$400,000.00	\$400,000.00
Slope Paving	CY	375	\$400.00	\$150,000.00
Curb & Gutter	LF	2250	\$15.00	\$33,750.00
Storm Inlets	Ea	10	\$3,500.00	\$35,000.00
24" Roadway Pipe	LF	500	\$65.00	\$32,500.00
Steel Beam Guardrail	LF	200	\$35.00	\$7,000.00
Guardail End Anchors	EA	8	\$3,500.00	\$28,000.00
Topsoil	CY	220	\$25.00	\$5,500.00
Seeding	Ac	4	\$1,000.00	\$4,000.00
Mowing	Ac	4	\$100.00	\$400.00
Solid Sodding	SY	660	\$8.00	\$5,280.00
Mulching	Ac	4	\$1,000.00	\$4,000.00
Striping - Solid, Broken, Dotted	LF	4000	\$1.00	\$4,000.00
Striping - Markings & Legends	Sf	500	\$7.00	\$3,500.00
Signs	Sf	500	\$20.00	\$10,000.00
Sign Post	LF	1500	\$10.00	\$15,000.00
Silt Fence - install & remove	LF	1500	\$8.00	\$12,000.00
Erosion Control - other	LS	1	\$50,000.00	\$50,000.00
Traffic Control	LS	1	\$50,000.00	\$50,000.00
Contingency (20%)	LS	1	\$388,981.00	\$388,981.00
Mobilization (9.7% of Overall Cost)	LS	1	\$188,655.79	\$188,655.79
Engineering Controls(1.3% of Overall Cost)	LS	1	\$25,283.77	\$25,283.77
Utility Relocations	LS	1	\$250.000.00	\$250.000.00
Subto	tal		+===,=====	\$2 797 825 55
				φ2,101,020.00
		Co	onstruction Total:	\$2,800,000.00
		CE&I and Indire	ect Costs (25%):	\$700,000.00
		Preliminary En	gineering (10%):	\$280,000.00
	\$3 780 000 00			

Motor Vehicle Improvements- Includes bridge and roadway widening for Roundabout Series

Notes:

1. ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

2. UTILITY COST ARE ASSUMED BASED ON KNOWN EXISTING UTILITIES. UTILITIES HAVE NOT BEEN FIELD LOCATED AND RELOCATION COSTS HAVE NOT BEEN VARIFIED.

3. IMPROVEMENTS DO NOT INCLUDE ROW ACQUISITION, BUT RIGHT OF WAY COULD BE REQUIRED.
OPINION OF PROBABLE COST - NW Sidewalk

Prepared: January 9, 2018 Prepared by: Sain Associates, Inc.

Project: Hollywood Boulevard APPLE Study

County: Jefferson

The sidewalk section on the north side of Hollywood Boulevard west of US-280

Item Description	Unit	Quantity	Unit Price	Amount	
Clearing & Grubbing (\$4000/Acre)	LS	1	\$4,000.00	\$4,000.00	
Unclassified Excavation	Су	450	\$15.00	\$6,750.00	
Borrow Excavation	Су	180	\$20.00	\$3,600.00	
Concrete Sidewalk	SY	560	\$70.00	\$39,200.00	
Concrete Driveway	SY	70	\$75.00	\$5,250.00	
Curb & Gutter	LF	320	\$15.00	\$4,800.00	
Topsoil	CY	70	\$25.00	\$1,750.00	
Solid Sodding	SY	200	\$8.00	\$1,600.00	
Sign Relocate	EA	4	\$100.00	\$400.00	
Silt Fence - install & remove	LF	900	\$8.00	\$7,200.00	
Erosion Control - other	LS	1	\$10,000.00	\$10,000.00	
Traffic Control	LS	1	\$10,000.00	\$10,000.00	
Contingency (20%)	LS	1	\$18,910.00	\$18,910.00	
Mobilization (9.7% of Overall Cost)	LS	1	\$9,171.35	\$9,171.35	
Engineering Controls(1.3% of Overall Cost)	LS	1	\$1,229.15	\$1,229.15	
Utility Relocations - Power	LS	1	\$15,000.00	\$15,000.00	
Utility Relocations - Gas	LS	1	\$84,000.00	\$84,000.00	
Subtotal				\$222,860.50	
	\$230,000.00				
CE&I and Indirect Costs (25%):				\$57,500.00	
Preliminary Engineering (10%):				\$23,000.00	
ROW Acquisition:				\$58,000.00	
Grand Total:				\$310,500.00	

Notes:

1. ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

OPINION OF PROBABLE COST - SW Sidewalk

Prepared: January 9, 2018 Prepared by: Sain Associates, Inc.

Project: Hollywood Boulevard APPLE Study

County: Jefferson

The sidewalk section on the south side of Hollywood Boulevard west of US-280

Item Description	Unit	Quantity	Unit Price	Amount	
Clearing & Grubbing (\$4000/Acre)	LS	1	\$4,000.00	\$4,000.00	
Unclassified Excavation	Су	420	\$15.00	\$6,300.00	
Borrow Excavation	Су	170	\$20.00	\$3,400.00	
Slope Paving	Су	6	\$400.00	\$2,400.00	
Concrete Sidewalk	SY	370	\$70.00	\$25,900.00	
Concrete Driveway	SY	300	\$75.00	\$22,500.00	
Topsoil	CY	70	\$25.00	\$1,750.00	
Solid Sodding	SY	200	\$8.00	\$1,600.00	
Striping - Markings & Legends	Sf	400	\$7.00	\$2,800.00	
Sign Relocate	EA	1	\$100.00	\$100.00	
Silt Fence - install & remove	LF	825	\$8.00	\$6,600.00	
Erosion Control - other	LS	1	\$10,000.00	\$10,000.00	
Traffic Control	LS	1	\$10,000.00	\$10,000.00	
Contingency (20%)	LS	1	\$19,470.00	\$19,470.00	
Mobilization (9.7% of Overall Cost)	LS	1	\$9,442.95	\$9,442.95	
Engineering Controls(1.3% of Overall Cost)	LS	1	\$1,265.55	\$1,265.55	
Utility Relocations - Power	LS	1	\$40,000.00	\$40,000.00	
Subto	\$167,528.50				
Construction Total:				\$170,000.00	
CE&I and Indirect Costs (25%):				\$42,500.00	
Preliminary Engineering (10%):				\$17,000.00	
ROW Acquisition:				\$65,000.00	
Grand Total:				\$229,500.00	

Notes:

1. ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

OPINION OF PROBABLE COST - NE Sidewalk

Prepared: January 9, 2018

Prepared by: Sain Associates, Inc.

Project: Hollywood Boulevard APPLE Study

County: Jefferson

The sidewalk section on the north side of Hollywood Boulevard east of US-280 and crossing to the south side of Hollywood Boulevard east of the US-280 off-ramp

Item Description	Unit	Quantity	Unit Price	Amount
Clearing & Grubbing (\$4000/Acre)	LS	1	\$4,000.00	\$4,000.00
Unclassified Excavation	Су	95	\$15.00	\$1,425.00
Borrow Excavation	Су	40	\$20.00	\$800.00
Concrete Sidewalk	SY	150	\$70.00	\$10,500.00
Topsoil	CY	6	\$25.00	\$150.00
Solid Sodding	SY	50	\$8.00	\$400.00
Striping - Markings & Legends	Sf	1250	\$7.00	\$8,750.00
Sign Relocate	EA	1	\$100.00	\$100.00
Silt Fence - install & remove	LF	190	\$8.00	\$1,520.00
Erosion Control - other	LS	1	\$10,000.00	\$10,000.00
Traffic Control	LS	1	\$10,000.00	\$10,000.00
Contingency (20%)	LS	1	\$9,529.00	\$9,529.00
Mobilization (9.7% of Overall Cost)	LS	1	\$4,621.57	\$4,621.57
Engineering Controls(1.3% of Overall Cost)	LS	1	\$619.39	\$619.39
Utility Relocations - Power & Water	LS	1	\$40,000.00	\$40,000.00
Utility Relocations - Gas	LS	1	\$23,000.00	\$23,000.00
Subto	\$125,414.95			
	\$130,000.00			
CE&I and Indirect Costs (25%):				\$32,500.00
Preliminary Engineering (10%):				\$13,000.00
Grand Total:				\$175,500.00

Notes:

1. ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

OPINION OF PROBABLE COST - SE Sidewalk Prepared: January 9, 2018 Prepared by: Sain Associates, Inc. Project: Hollywood Boulevard APPLE Study County: Jefferson

The sidewalk section on the south side of Hollywood Boulevard east of the US-280 off-ramp

Item Description	Unit	Quantity	Unit Price	Amount
Clearing & Grubbing (\$4000/Acre)	LS	1	\$4,000.00	\$4,000.00
Unclassified Excavation	Су	125	\$15.00	\$1,875.00
Borrow Excavation	Су	50	\$20.00	\$1,000.00
Concrete Sidewalk	SY	165	\$70.00	\$11,550.00
Topsoil	CY	7	\$25.00	\$175.00
Solid Sodding	SY	60	\$8.00	\$480.00
Striping - Markings & Legends	Sf	825	\$7.00	\$5,775.00
Sign Relocate	EA	1	\$100.00	\$100.00
Silt Fence - install & remove	LF	245	\$8.00	\$1,960.00
Erosion Control - other	LS	1	\$10,000.00	\$10,000.00
Traffic Control	LS	1	\$10,000.00	\$10,000.00
Contingency (20%)	LS	1	\$9,383.00	\$9,383.00
Mobilization (9.7% of Overall Cost)	LS	1	\$4,550.76	\$4,550.76
Engineering Controls(1.3% of Overall Cost)	LS	1	\$609.90	\$609.90
Utility Relocations - Power & Water	LS	1	\$5,000.00	\$5,000.00
Subtot	\$66,458.65			
	\$70,000.00			
	\$17,500.00			
Preliminary Engineering (10%):				\$7,000.00
Grand Total:				\$94,500.00

Notes:

1. ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

OPINION OF PROBABLE COST - Pedestrian Bridge

Prepared: July 12, 2018

Prepared by: Sain Associates, Inc.

Project: Hollywood Boulevard APPLE Study

County: Jefferson

Pedestrian Bridge Only

Item Description	Unit	Quantity	Unit Price	Amount
Pedestrian Bridge (Steel Truss)	LS	1	\$314,569.00	\$314,569.00
Installation (Contractor Estimate)	LS	1	\$457,125.00	\$457,125.00
Sidewalk Tie	LS	1	\$5,000.00	\$5,000.00
Contingency (10%)	LS	1	\$77,669.40	\$77,669.40
Subtotal				\$854,363.40
	\$860,000.00 \$215,000.00 \$90,000.00 \$1,165,000.00			

Notes:

1. ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

2. UTILITY COST ARE ASSUMED BASED ON KNOWN EXISTING UTILITIES. UTILITIES HAVE NOT BEEN FIELD LOCATED AND RELOCATION COSTS HAVE NOT BEEN VARIFIED.

3. TYPICALLY AN ALDOT PERMIT SET OF PLANS DOES NOT INCLUDE CE&I AND INDIRECT COSTS; HOWEVER, SINCE ALDOT FUNDING IS BEING SOUGHT THEY MAY BE REQUIRE IT BE INCLUDED. ALSO, CONSIDERING THE PEDESTRIAN BRIDGE IS CROSSING US-280 THEY MAY REQUIRE IT BE INCLUDED WHETHER THEY PROVIDE FUNDING OR NOT. THEREFORE, THIS COST HAS BEEN INCLUDED IN THIS ESTIMATE.

4. THE PRELIMINARY ENGINEERING PERCENTAGE INCLUDES THE COST TO SURVEY THE PROJECT AREA, PRODUCE ALDOT PERMIT PLANS, PERFORM GEOTECHNICAL ENGINEERING, AND DESIGN OF STRUCTURAL COMPONENTS NOT INCLUDED IN THE BRIDGE COST (ABUTMENTS, COLUMNS, AND PEIRS)



MEMORANDUM

TO: Mike Kaczorowski, RPCGB

FROM: Tony Montanaro, P.E.

DATE: 06/18/18

SUBJECT: Cost Estimate for Alternative D, Pedestrian Bridge Option, of the Hollywood APPLE Study

The cost estimate to fabricate and construct the Pedestrian Bridge is **\$1,165,000**. Please see attached for cost detail.

- The cost estimate includes a 10% contingency, CE&I and Indirect Costs at 25%, and preliminary engineering cost of 10%.
- Gresham, Smith, and Partners was contracted to provide a more accurate representation of additional cost surrounding the prefabricated bridge. Their scope included conceptually looking at the required substructure of the bridge, along with additional construction items such as lighting and architectural details.
- Ground run survey was conducted to assist Gresham, Smith, and Partners in confirming and estimating bridge span and height requirements.
- Contech was contacted to adjust their cost if need be. Due to rising steel prices, the cost of their prefabricated bridge unit has increased. Included in this estimate is the cost for the 8' Wide Painted Continental Capstone. If desired, it is estimated it will save about \$40K to select the unpainted weathering steel option for the bridge.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

cc. Jennifer Andress, Homewood City Council

OPINION OF PROBABLE COST - Pedestrian Bridge

Prepared: June 18, 2018 Prepared by: Sain Associates, Inc. Project: Hollywood Boulevard APPLE Study County: Jefferson

Pedestrian Bridge Only

Item Description	Unit	Quantity	Unit Price	Amount	
Prefabricated Pedestrian Bridge (Steel Truss)	LS	1	\$314,569.00	\$314,569.00	
Bridge Items From GS&P					
Crane Rental, Bridge Install	LS	1	\$175,000.00	\$175,000.00	
Abutments	EA	2	\$12,000.00	\$24,000.00	
Bents	EA	2	\$51,000.00	\$102,000.00	
Bridge Deck	CY	35	\$975.00	\$34,125.00	
Lighting	LS	1	\$35,000.00	\$35,000.00	
Earthwork/Site Prep	LS	1	\$10,000.00	\$10,000.00	
Traffic Control	LS	1	\$10,000.00	\$10,000.00	
Architectural Details (15%)	LS	1	\$67,000.00	\$67,000.00	
Sidewalk Tie					
8' Concrete Sidewalk	LF	20	\$200.00	\$4,000.00	
Earthwork/Site Prep	LS	1	\$1,000.00	\$1,000.00	
Contingency (10%)	LS	1	\$77,669.40	\$77,669.40	
Subtotal	\$854,363.40				
		Co	nstruction Total:	\$860,000.00	
CE&I and Indirect Costs (25%):				\$215,000.00	
Preliminary Engineering (10%):				\$90,000.00	
		-	Grand Total:	\$1,165,000.00	

Notes:

1. ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITH THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

2. TYPICALLY AN ALDOT PERMIT SET OF PLANS DOES NOT INCLUDE CE&I AND INDIRECT COSTS; HOWEVER, SINCE ALDOT FUNDING IS BEING SOUGHT THEY MAY BE REQUIRE IT BE INCLUDED. ALSO, CONSIDERING THE PEDESTRIAN BRIDGE IS CROSSING US-280 THEY MAY REQUIRE IT BE INCLUDED WHETHER THEY PROVIDE FUNDING OR NOT. THEREFORE, THIS COST HAS BEEN INCLUDED IN THIS ESTIMATE.

3. THE PRELIMINARY ENGINEERING PERCENTAGE INCLUDES THE COST TO SURVEY THE PROJECT AREA, PRODUCE ALDOT PERMIT PLANS, PERFORM GEOTECHNICAL ENGINEERING, AND DESIGN OF STRUCTURAL COMPONENTS NOT INCLUDED IN THE BRIDGE COST (ABUTMENTS, COLUMNS, AND PEIRS)

4. UTILITY RELOCATION COSTS ARE NOT INLCUDED. BASED ON SURVEY INFORMATION AND CONCEPTUAL LAYOUT, IT IS NOT ANTICIPATED THAT THERE WILL BE ANY UTILITY RELOCATIONS. THE PRESENCE OF BELOW GROUND UTILITIES WAS NOT INDICATED BY SURVEY INFORMATION, HOWEVER, THIS IS NOT A GUARANTEE OF NO CONFLICT.



6/14/2018

Subject: Highway 280 Pedestrian Overpass, Birmingham, AL , (CONTECH Project #485673)

The following is a Continental Pedestrian Bridge System ENGINEER'S COST ESTIMATE for the subject project. This ESTIMATE is intended for preliminary estimating purposes only and should <u>not</u> be interpreted as a final QUOTATION. The information presented is based on the most current data made available to CONTECH.

CONTECH will fabricate and deliver the following described Continental Pedestrian Bridge components and appurtenances:

DESCRIPTION OF SUPPLIED MATERIALS:

230 Total feet of bridge consisting of the spans below: Quantity of (1) 130' x 8' and quantity of (2) 50' x 8' Continental Capstone Truss / 50' span member sizes and truss height match the 130' span 3-Coat Paint Finish 6" Concrete Deck (Galv. Form Deck) 2" vinyl coated chain link fence 8' straight from top of deck on both sides of the truss Painted Piperail provided Steel toe plate provided AASHTO LRFD Pedestrian Guide Specifications Uniform Live Load of 90 psf (LRFD) Vehicular Live Load of 8000 lbs Delivered in 2 sections

ESTIMATE: \$314,569 Delivered (F.O.B.)

Estimated Heaviest Crane Pick 130' bridge: 54,200 lbs

These costs do not include the foundation, or installation costs. As part of the construction process, the contractor is to perform the items listed below in accordance with the installation drawings:

- Excavate and/or construction for the structure & foundations
- Provide and install anchor bolts
- Unload and set structure utilizing crane
- Touch-Up paint work
- Third-party testing
- Materials and work for reinforced concrete deck slab

Please contact me should you have any questions or need additional information. Thank you for your interest in the Continental Pedestrian Bridge System.

Respectfully,

Tod Green (205) 306-3277

CUNTECH







