Traffic Impact Study
Solana Torrance
Torrance, California

August 5, 2016

Prepared for

ReyLenn Properties LLC

Prepared by

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ATTESTATION

This report has been prepared by, and under the direction of, the undersigned, a duly Registered Traffic Engineer and Registered Civil Engineer in the State of California. Except as noted, the undersigned attests to the technical information contained herein, and has judged to be acceptable the qualifications of any technical specialists providing engineering data for this report, upon which findings, conclusions, and recommendations are based.

_____ _____

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Date: August 5, 2016

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Solana Torrance
Traffic Impact Study

August 5, 2016

I. EXECUTIVE SUMMARY

This report documents a Traffic Impact Study (TIS) completed for the proposed *Solana Torrance* multi-family residential project (hereinafter referred to as the *Project*), to be located on the southwest corner of Hawthorne Boulevard and Via Valmonte, in the City of Torrance, California. The *Project* is located on a 24.68 vacant parcel. Adjacent land uses include residential to the north and west, residential and light commercial/office to the east, and vacant land/hillside to the south.

Project Description

The proposed *Project* boundary contains 24.68 acres, of which 6.06 acres of disturbed land from a former quarry operation will be developed into a multifamily residential community. The balance of the site (18.62 acres) will be preserved as natural open space. The proposed residential community will consist of 300 multi-family dwelling units, 676 parking spaces in a subterranean parking structure and approximately 10,000 square feet of common amenity space/management offices. Access to the *Project* site is proposed to be provided via one driveway entrance on Hawthorne Boulevard (right-in/right-out only) and one driveway on Via Valmonte (right-in/right-out only).

Traffic Impact Study

The TIS was commissioned by the *Solana Torrance* proponent and developer, **Reylenn Properties, LLC**, Solana Beach, California, and performed by **KHR Associates**, Newport Beach, California. The scope of work for the study was provided by staff with the City of Torrance, Public Works and Community Development Departments. As part of the TIS, new traffic counts were taken at eleven study intersections and two roadway segments. Additionally, the City of Torrance, as well as neighboring cities provided lists of projects for inclusion in the cumulative analysis portion of the TIS.

The TIS focused on: 1) establishing a baseline for traffic conditions at potentially impacted intersections and roadways; 2) determining how much traffic could be generated by the proposed *Solana Torrance* development; 3) determining if the additional traffic would result in impacts at any or all of the study intersections and roadways under various future development scenarios; 4) determining appropriate

mitigation measures should it be found that any or all of the study intersections and roadways are impacted; 5) performing a queue analysis of the eastbound left turn at the Via Valmonte/Hawthorne Boulevard intersection, and 6) evaluating other traffic-related issues, such as parking, transit use, internal traffic controls and potential pedestrian traffic generated by the *Project.*

Study Findings

Based on the analyses presented herein, the following findings were made:

1) New traffic counts were taken in mid-April 2016, and reflect baseline traffic conditions at study intersections and on study roadway segments.

2) By the *Project* target year of 2019, the *Project* is estimated to generate a total of 1,758 average weekday trip ends; and 132 A.M. and 156 P.M. peak hour trips ends, respectively.

3) The potential for "internal capture" of vehicle trips will be present, however, the percentage of such trip reduction is uncertain.

4) While the *Project* will generate some degree of regular transit use, thus potentially reducing private vehicle trips, the percentage of such trip reduction is uncertain.

5) Based on the current site plan for the *Project*, vehicular access will be provided via two future driveways - one driveway along Hawthorne Boulevard and one driveway on Via Valmonte.

6) Both *Project* driveways will be restricted to right-turn-only movements for residents and visitors. Delivery and emergency vehicles will be allowed to turn left into the site at the Via Valmonte entrance.

7) Capital Improvements are slated for the intersections of Hawthorne Boulevard/Pacific Coast Highway and Vista Montana/Pacific Coast Highway that will reduce traffic congestion for each location. These improvements are planned to occur in 2017 and 2018.

Study Conclusions

Based on the above study findings, the following conclusions were made:

1) Since new traffic counts take into consideration current land uses, traffic generated by any previous development on the subject property cannot be deducted from the amount of traffic projected to be generated by the *Project*.

2) The potential use of transit was not taken into consideration in reducing the amount of traffic projected to be generated by the *Project*.

3) Each intersection was analyzed for "Levels of Service" (LOS) using four scenarios: existing 2016 volumes, ambient growth 2019 volumes, *Project* 2019 volumes, and cumulative development 2019 volumes for both the A.M. and P.M. peak hours.

4) Each intersection was analyzed using two methods – Intersection Capacity Utilization (ICU), and Highway Capacity Manual (HCM). Calculation sheets for each intersection/condition are within the Appendix section of this report.

5) Using counts taken in the April 2016, (existing traffic conditions), the ICU LOS at each of the study intersections, during both the A.M. and P.M. peak hours of weekday commute, fall within acceptable limits (i.e., "D" or better) with the exception of the Crenshaw Boulevard/Pacific Coast Highway intersection during the P.M. peak hour of traffic.

6) The addition of ambient growth (i.e., one percent per year for three years) traffic to the 2016 volumes resulted in only slight increases in utilization and ICU intersection LOS for each of the study intersections.

7) In the target year of 2019, with the addition of *Project* traffic, the ICU LOS at each of the study intersections during both the A.M. and P.M. peak hours of traffic increased slightly with no changes to the LOS designations.

8) In the target year 2019, with the addition of cumulative development traffic, the ICU LOS at each of the study intersections during both the A.M. and P.M. peak hours of traffic are projected to stay within acceptable limits, again with the exception of the Crenshaw Boulevard/Pacific Coast Highway intersection which further deteriorates in LOS in both the A.M. and P.M. peak hours.

9) Using the HCM methodology to determine levels of service for the studied intersections revealed similar results in LOS (as the ICU method). Intersection delays increased with each scenario and the Crenshaw Boulevard/Pacific Coast Highway intersection further deteriorated in LOS during both peak hours of traffic. Also, the intersection of Rolling Hills Road/Crenshaw Boulevard decreased in LOS to "E" during the A.M. peak hour under cumulative development conditions.

10) The intersection of Via Valmonte and Palos Verdes North is a "stop-controlled" intersection that had an HCM LOS of "D" in all scenarios primarily due to the significant north-south traffic volumes traveling through that intersection. It is important to note that although this intersection is within proximity to the Project site, only six *Project* trips were distributed through this intersection in the P.M. peak hour due to turn movement restrictions on *Project* traffic.

11) The two roadway segments analyzed – Via Valmonte and Hawthorne Boulevard, adjacent to the *Project* site both currently operate at acceptable levels, and will continue to do so with the addition of ambient growth, *Project* traffic and cumulative development traffic in 2019.

12) The roadway connections and parking provisions depicted on the current site plan for the *Project*, appear to be well situated relative to the surrounding public streets and highways network.

13) A queuing analysis performed for the eastbound approach to the Via Valmonte/Hawthorne Boulevard intersection revealed that the hour long average of vehicles waiting within the left-turn lane during the A.M. peak hour was 2.8 vehicles. The highest number recorded at any given traffic signal cycle was five – nearly double the average. By adding estimated traffic into the eastbound approach to the Via Valmonte/Hawthorne Boulevard intersection, there could be an average of five vehicles and a maximum of 10 vehicles waiting to turn left at any given time during the peak hour. The proposed second left turn lane will increase the total vehicle capacity for left turn movements to approximately 12 vehicles. With the development of the proposed intersection improvements, there should be more than adequate space within the left turn pockets to accommodate existing plus *Project* related vehicles during the highest use time period.

Recommendations

Based on the above study findings and conclusions, the proposed *Project* is not anticipated to result in significantly measurable traffic impacts to any of the study street segments or intersections during the daily or A.M. or P.M. peak hours of weekday commute. Therefore, the following recommendations are made:

1) Construct *Project* driveways allowing right turn movements only from Via Valmonte and Hawthorne Boulevard.

2) Complete the off-site widening and improvements to Via Valmonte and restriping of Hawthorne Boulevard as shown on the *Project* plan.

3) Construct the intersection improvements including an additional left/through lane to the eastbound approach leg of the Via Valmonte/Hawthorne Boulevard, a new crosswalk on Via Valmonte accessible ramps, and traffic signal relocation on Via Valmonte.

4) Restripe the west side of Hawthorne Boulevard for a right turn deceleration lane, adjacent to the site for *Project* related traffic ingress.

5) Provide various traffic controls, including signage, striping, and pavement marking, to provide safe and efficient vehicular, pedestrian, and bicycle movement through and within the *Project* site.

II. INTRODUCTION

Reylenn Properties, LLC (Reylenn), Solana Beach, has proposed a 300-unit multi-family residential development (known as *Solana Torrance*) on a vacant site located on the southwest corner of Hawthorne Boulevard and Via Valmonte, in the *Hillside Residential Neighborhood District* of the City of Torrance, California. As part of its environmental review process, the City determined that a traffic impact study (TIS) was necessary, and that potential impacts associated with the proposed development must be analyzed, and mitigation measures must be identified.

Reylenn was given permission by the City to commission **KHR Associates**, Newport Beach, California, to work with City staff and undertake the TIS. The City specified the requirements of the TIS, and identified intersection and roadway segments of concern. The City also provided a list of other development projects within the general proximity of the proposed development that should be analyzed for potential cumulative traffic impacts. Moreover, future development lists were gathered from neighboring cities in order to fully estimate future traffic increases on study intersections leading up to *Project* buildout in 2019.

Information regarding the proposed *Solana Torrance* development was provided by **Reylenn** and the project architect, Withee Malcolm Architects, Torrance, California. The results of the TIS are presented herein, and the findings, conclusions, and recommendations are solely those of **KHR Associates**, and may not be reflect the opinions of **Reylenn,** the City of Torrance, or any other interested parties.

Project Description

The proposed *Project* boundary contains 24.68 acres of undeveloped land, of which 6.06 acres of disturbed land from a former quarry operation will be developed into a multi-family residential community. The remaining balance of the site (18.62 acres) will be preserved as natural open space. The proposed residential community will consist of 300 multi-family dwelling units, 676 parking spaces in a subterranean parking structure and approximately 10,000 square feet of common amenity space/management offices.

Access to the *Project* site is proposed to be provided via one driveway entrance on Hawthorne Boulevard (right-in/right-out only) and one driveway on Via Valmonte (right-in/right-out only). Service and emergency vehicles will be allowed to enter the driveway on Via Valmonte. According to **Reylenn**, the target year for completion and occupancy of the *Project* is 2019. Figure 1 depicts the most current conceptual site plan for the *Project*.

Figure 1 – Solana Torrance Site Plan

Site Location and Existing Uses

The *Project* site is located on the southwesterly corner of Hawthorne Boulevard and Via Valmonte, within the City of Torrance, California. The *Project* is within the Hillside Overlay Zone, with General Plan Land Use Designations of Low Density Residential (R-LO), and a Zoning designation of A1 – Light Agricultural.

Adjacent land uses include residential uses to the north and west, residential and light commercial/office to the east and vacant/hillside land to the south. Hawthorne Boulevard, running along the east side of the *Project* site, is within the Hawthorne Boulevard Corridor Specific Plan. Figure 2 illustrates the location of the *Project* site within the City of Torrance along with the City's Residential Neighborhood Districts.

Current existing major land uses in close proximity to the *Project* site include the *Torrance Municipal Airport (also known as Zamperini Field),* a general aviation airport owned and operated by the City of Torrance, providing regional aviation access to recreational pilots, businesses, and emergency services flights; and *Del Amo Fashion Center*, a superregional shopping center with approximately three million square feet of retail space. The *Project* site is currently undeveloped land, vacant and unutilized. Figure 3 provides a recent aerial perspective of the configuration and limits of the *Project* site.

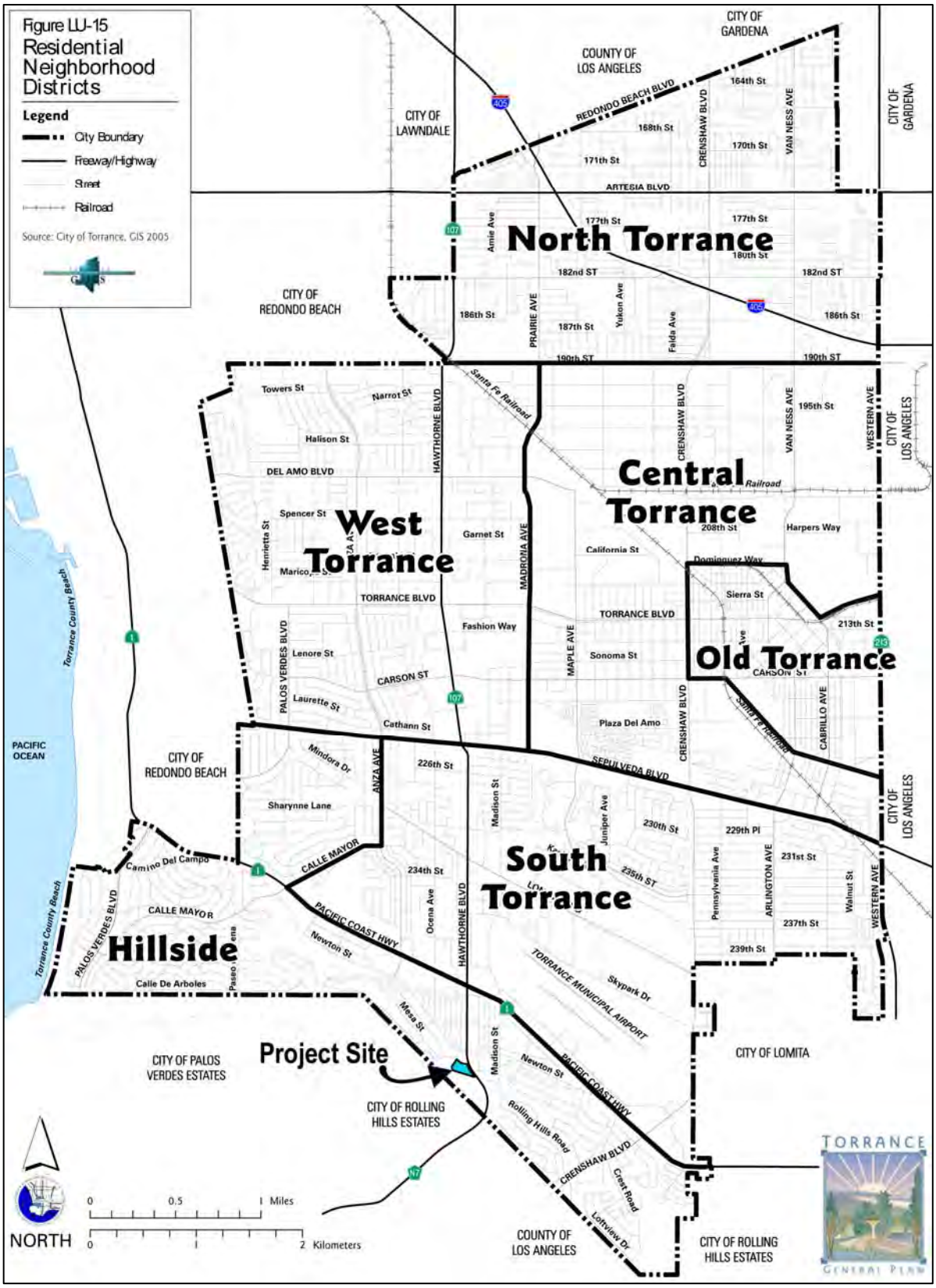


Figure 2 – Project Site Location within the City of Torrance[A]

Figure 3 – Aerial Perspective of Project Site

Traffic Impact Study Area

The TIS area generally consists of the development site and surrounding residential communities and commercial properties. Three major transportation corridors exist within close proximity – Hawthorne Boulevard, Crenshaw Boulevard, and Pacific Coast Highway, which all provide regional access opportunities to either the San Diego Freeway (I-405) or the Harbor Freeway (I-110). Study intersections and arterial roadway segments were identified by the Public Works Department, and are listed in Table I. Figure 4 provides an aerial view of the study roadway segments and intersections within the general study area.

Description of Roadway Segments

The existing regional network of streets and highways servicing the development site include Via Valmonte, Hawthorne Boulevard, Pacific Coast Highway, and Crenshaw Boulevard. Freeways in the Project vicinity include the San Diego (I-405) Freeway and the Harbor (I-110) freeway. The following briefly describes each of these existing roadways, as described within the City's General Plan – Circulation and Infrastructure Element.

[A] Land Use Element, City of Torrance General Plan, City of Torrance, April 2010.

TABLE I - STUDY AREA ROADWAYS & INTERSECTIONS	
ID	**Roadway Segments**
A	Hawthorne Boulevard south of Via Valmonte
B	Via Valmonte west of Hawthorne Boulevard
No.	**Intersection**
1	Hawthorne Boulevard & Pacific Coast Highway
2	Hawthorne Boulevard & 244th Street
3	Hawthorne Boulevard & Newton Street
4	Hawthorne Boulevard & Via Valmonte
5	Hawthorne Boulevard & Rolling Hills Road
6	Rolling Hills Road & Whiffle Tree Lane
7	Rolling Hills Road & Fallenleaf Drive
8	Crenshaw Boulevard & Rolling Hills Road
9	Crenshaw Boulevard & Pacific Coast Highway
10	Anza Avenue/Vista Montana & Pacific Coast Highway
11	Via Valmonte & Palos Verdes Drive North

Figure 4 – Location of Study Roadway Segments & Intersections

Hawthorne Boulevard – Hawthorne Boulevard (SR-107) runs in a primarily north to south direction from Century Boulevard to Palos Verdes Drive, respectively.

Hawthorne Boulevard is classified as a Principal Arterial, and is generally an eight-lane divided roadway with a raised median. Adjacent the project site, Hawthorne Boulevard is six lanes, divided, with an existing half right of way from the centerline to the westerly right of way line of 50 feet along the entire property frontage, and a centerline to westerly face-of-curb dimension of 40 feet. From Interstate 405, Hawthorne Boulevard provides access to the Del Amo Fashion Center as well as residential areas.

Via Valmonte – Via Valmonte is a Collector street providing access to the residential neighborhood adjacent to the development site. Trending in an east to west direction, terminating at Hawthorne Boulevard to the east and Paseo Del Campo to the west, Via Valmonte consists of two lanes, undivided.

Pacific Coast Highway – Pacific Coast Highway (SR-1) is a major state highway running along most of the Pacific coastline of California. Within the City of Torrance, Pacific Coast Highway is designated a Major Arterial, tending in an east-west direction with six lanes, divided.

San Diego (I-405) Freeway – The San Diego (I-405) freeway runs in a northwest-southeast orientation through the City of Torrance. The I-405 freeway was constructed as a bypass of the Santa Ana freeway (I-5), and it continues to serve interstate and regional travel needs to major destinations within the western and southern parts of the greater Los Angeles area. The I-405 freeway features four to five mixed flow lanes and HOV lanes in each direction.

Harbor (I-110) Freeway – The Harbor (I-110) freeway runs in a north-south direction, connecting San Pedro and the Port of Los Angeles with Downtown Los Angeles and Pasadena. The I-110 freeway features at least four mixed flow lanes and HOV lanes in each direction.

Description of Study Intersections

The eleven study intersections are briefly described below, followed by aerial views of each study intersection (see Figures 5 through 15). The current lane configurations of the approach legs to the eleven study intersection are depicted in Figure 16.

1) **Hawthorne Boulevard & Pacific Coast Highway –** This intersection is signalized for eight phases of traffic movement. The northbound approach leg features three through lanes and dual left turn lanes. The southbound approach leg has three through lanes, a separate right turn lane, and dual left turn lanes. The eastbound approach leg has three through lanes and a left turn pocket. The westbound approach leg has three through lanes and a left turn pocket. Crosswalks are marked across all four legs of the intersection.

   The City of Torrance has indicated that this intersection is slated for capital improvements in 2017 to include three through lanes and dual left turn lanes in all directions. The intersection will continue to operate with eight phases.

2) **Hawthorne Boulevard & 244th Street –** This intersection is signalized for six phases of traffic movement. The northbound and southbound approach legs each feature three through lanes and a left turn pocket. The eastbound and westbound approach legs each have one lane for left, through and right turn movements. Crosswalks are marked across all four legs of the intersection.

3) **Hawthorne Boulevard & Newton Street –** The intersection of Hawthorne Boulevard and Newton Street is signalized for six phases of traffic movement. The northbound approach leg features three through lanes and a left turn pocket. The southbound approach leg has three through lanes and a left turn pocket. The eastbound approach leg has one through/right turn lane and a left turn pocket. The westbound approach leg has one through lane, a separate right turn lane, and a left turn pocket. Crosswalks are marked across all four legs of the intersection.

4) **Hawthorne Boulevard & Via Valmonte –** The intersection of Hawthorne Boulevard and Via Valmonte is signalized for six phases of movement. The northbound approach leg features three through lanes, a right turn lane, a left turn pocket, and a raised median island. The southbound approach leg has three through lanes and a left turn pocket, and a raised median island. The eastbound leg has an optional through/right turn/left turn lane. The westbound leg has optional through/left and through/right turn lanes. Crosswalks are marked across the southbound, eastbound and westbound legs.

5) **Hawthorne Boulevard & Rolling Hills Road –** The intersection of Hawthorn Boulevard and Rolling Hills Road is signalized for six phases of traffic movement. The northbound approach leg features two through lanes and a left turn pocket. The southbound approach leg has two through lanes and dual left turn lanes. The eastbound approach leg serves as the driveway for the *Sunrise at Palos Verdes* development. The westbound approach leg has an optional through/right turn lane, a separate right turn lane, and a separate left turn lane. Crosswalks are marked across the northbound, southbound and westbound approach legs.

6) **Rolling Hills Road & Whiffletree Lane –** The intersection of Rolling Hills Road and Whiffletree Lane is signalized for two phases of traffic movement. The northbound and southbound approach legs (Whiffletree Lane) each feature one lane serving all movements. The eastbound and westbound approach legs each have two through lanes with left turn movements yielding to opposing traffic. Crosswalks are marked across all four legs.

7) **Rolling Hill Road & Fallenleaf Drive –** The intersection of Rolling Hills Road and Fallenleaf Drive is signalized for six phases of traffic movement. The eastbound and westbound approach legs (Rolling Hills Road) each feature two through lanes and a left turn pocked. The northbound and southbound legs each have a single through lane serving all movements. Crosswalks are marked across all four legs of the intersection.

8) **Crenshaw Boulevard & Rolling Hills Road –** The intersection of Crenshaw Boulevard and Rolling Hills Road is signalized for eight phases of traffic movement. The eastbound and westbound approach legs (Rolling Hills Road) each feature one through lane, a separate right turn lane, and a left turn pocket. The northbound and southbound approach legs each have three through lanes and a left turn pocket. Crosswalks are marked across all four legs of the intersection.

9) **Crenshaw Boulevard & Pacific Coast Highway –** The intersection of Crenshaw Boulevard and Pacific Coast Highway is signalized for eight phases of traffic movement. The northbound approach leg (Crenshaw Boulevard) has three through lanes, a separate right turn lane, and a left turn pocket. The southbound approach leg has three through lanes and a left turn pocket. The eastbound approach leg (Pacific Coast Highway) has two through lanes and dual left turn lanes. The westbound approach leg features three through lanes and dual left turn lanes. Crosswalks are marked across all four legs of the intersection.

10) **Anza Avenue/Vista Montana & Pacific Coast Highway –** The intersection of Anza Avenue/Vista Montana and Pacific Coast Highway is signalized for six phases of traffic movement. The northbound approach leg features one left turn lane, one left/through lane, and one through/right turn lane. The southbound approach leg has one left turn lane, one left/through lane, one through lane and a separate right turn lane. The eastbound and westbound approach legs each have two through lanes and a left turn pocket. The intersection currently operates with a split phase in the north and south directions. Crosswalks are marked across the northbound, southbound, and eastbound legs of the intersection.

    The City of Torrance has indicated that this intersection is slated for capital improvements in 2018 to include: dual left turn lanes, one through lane and one through/right turn lane in the northbound direction; and dual left turn lanes, two through lanes and a separate right turn lane in the southbound direction. The intersection will operate with eight phases of movement.

11) **Via Valmonte & Palos Verdes Drive North –** The intersection of Via Valmonte and Palos Verdes Drive North is controlled in each direction by stop signs. The northbound approach leg features a through lane and a left turn pocket. The southbound approach leg has one lane serving all movements. The eastbound and westbound approach legs each have one lane serving all movements. The north leg of the intersection is separated by wide parkway that includes a pedestrian path that continues northwest to Via Alameda. Crosswalks are marked across the southbound, eastbound and westbound legs of the intersection.

Figure 5 – Hawthorne Boulevard & Pacific Coast Highway

Figure 6 – Hawthorne Boulevard & 244th Street

Figure 7 – Hawthorne Boulevard & Newton Street

Figure 8 – Hawthorne Boulevard & Via Valmonte

Figure 9 – Hawthorne Boulevard & Rolling Hills Road

Figure 10 – Rolling Hills Road & Whiffletree Lane

Figure 11 – Rolling Hills Road & Fallenleaf Drive

Figure 12 – Crenshaw Boulevard & Rolling Hills Road

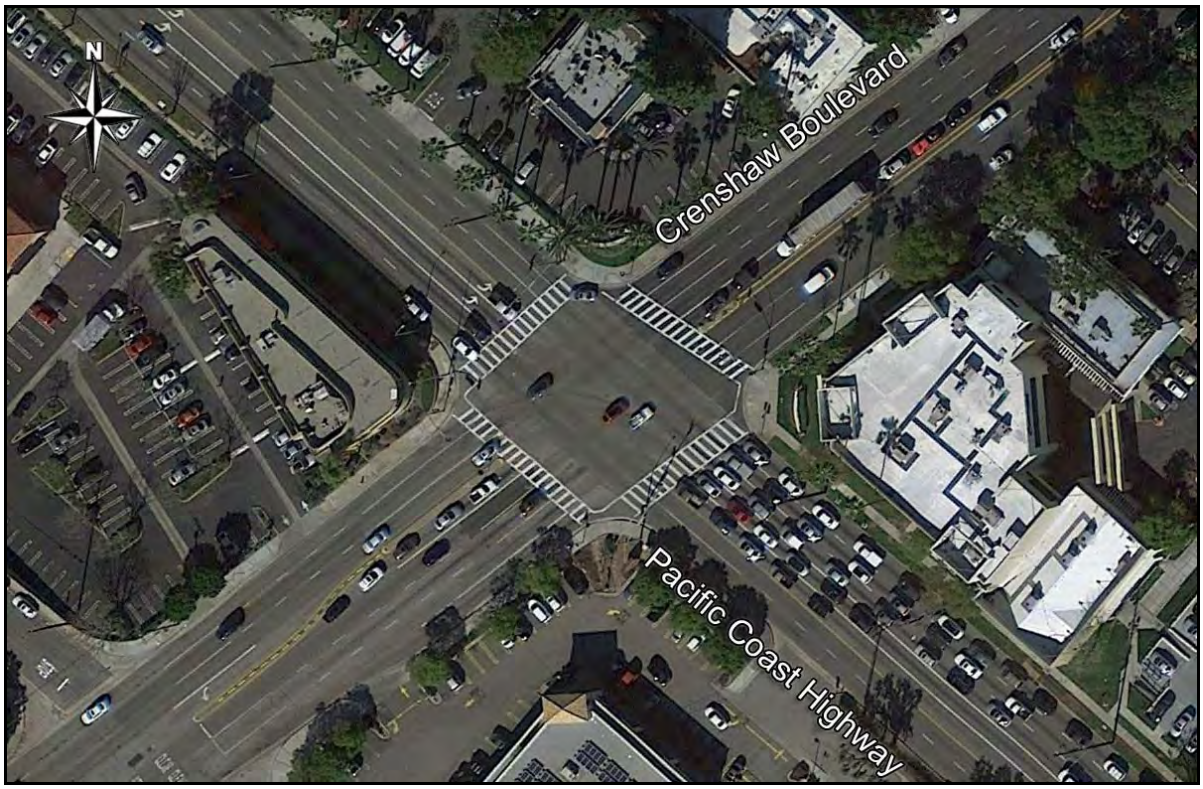


Figure 13 – Crenshaw Boulevard & Pacific Coast Highway

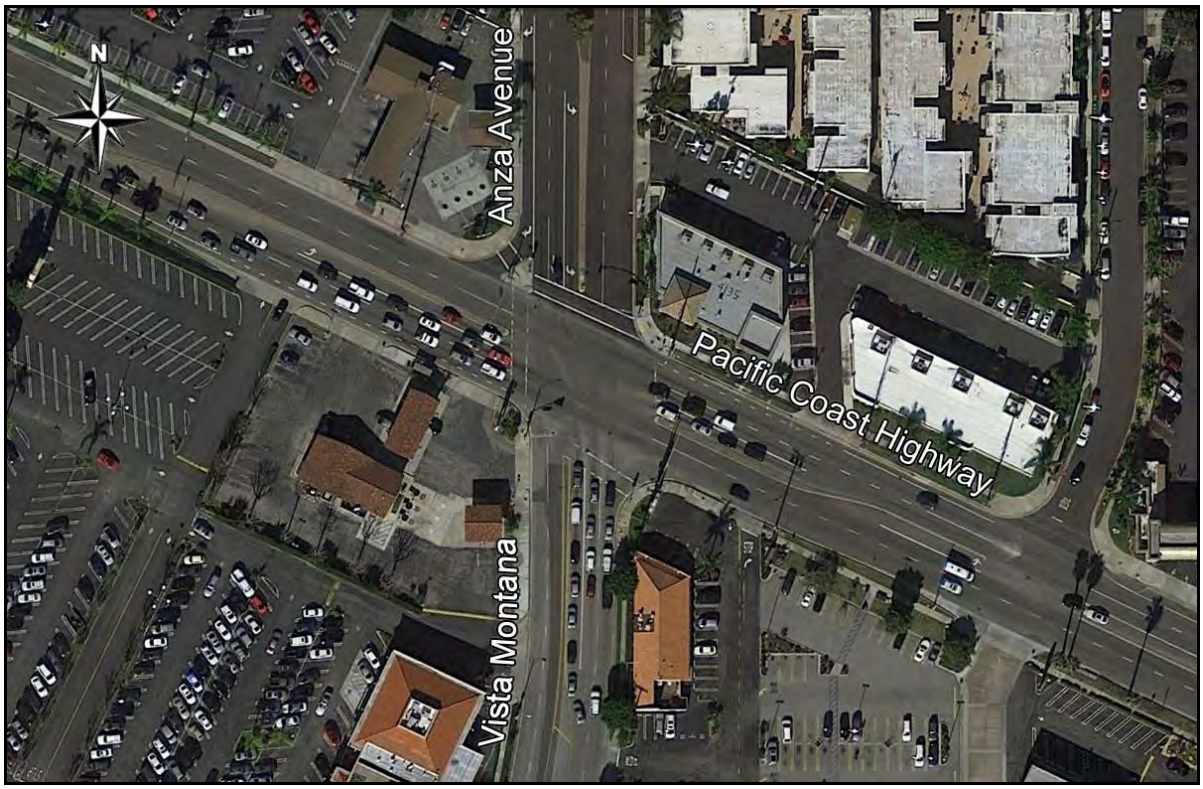


Figure 14 – Anza Avenue/Vista Montana & Pacific Coast Highway

Figure 15 – Via Valmonte & Palos Verde Drive North

III. STUDY TERMINOLOGY

The following are definitions of some of the terminology used throughout this report.

A.M. and P.M. Peak Hours

The *A.M and P.M. peak hours* refer to the morning and late afternoon times of the day during which the greatest number of motor vehicles are carried on a given roadway segment or intersection. Typically, the significant peak hours of traffic on an average weekday occur during the morning commute, between 7:00 and 9:00 A.M., and during the late afternoon commute, between 4:00 and 6:00 P.M. These hours do not necessarily correspond to the peak hour of trip generation, which, for commercial uses, can occur mid-day and on weekends. For the subject study, A.M. and P.M. peak hour turn movement traffic counts were collected in the month of April 2016 for each study intersection on a Wednesday. These intersection turn movement counts were independently collected for **KHR Associates** by National Data & Surveying Services (NDS), Santa Ana, California. The summary intersection traffic count results can be found in the Appendix section of this report.

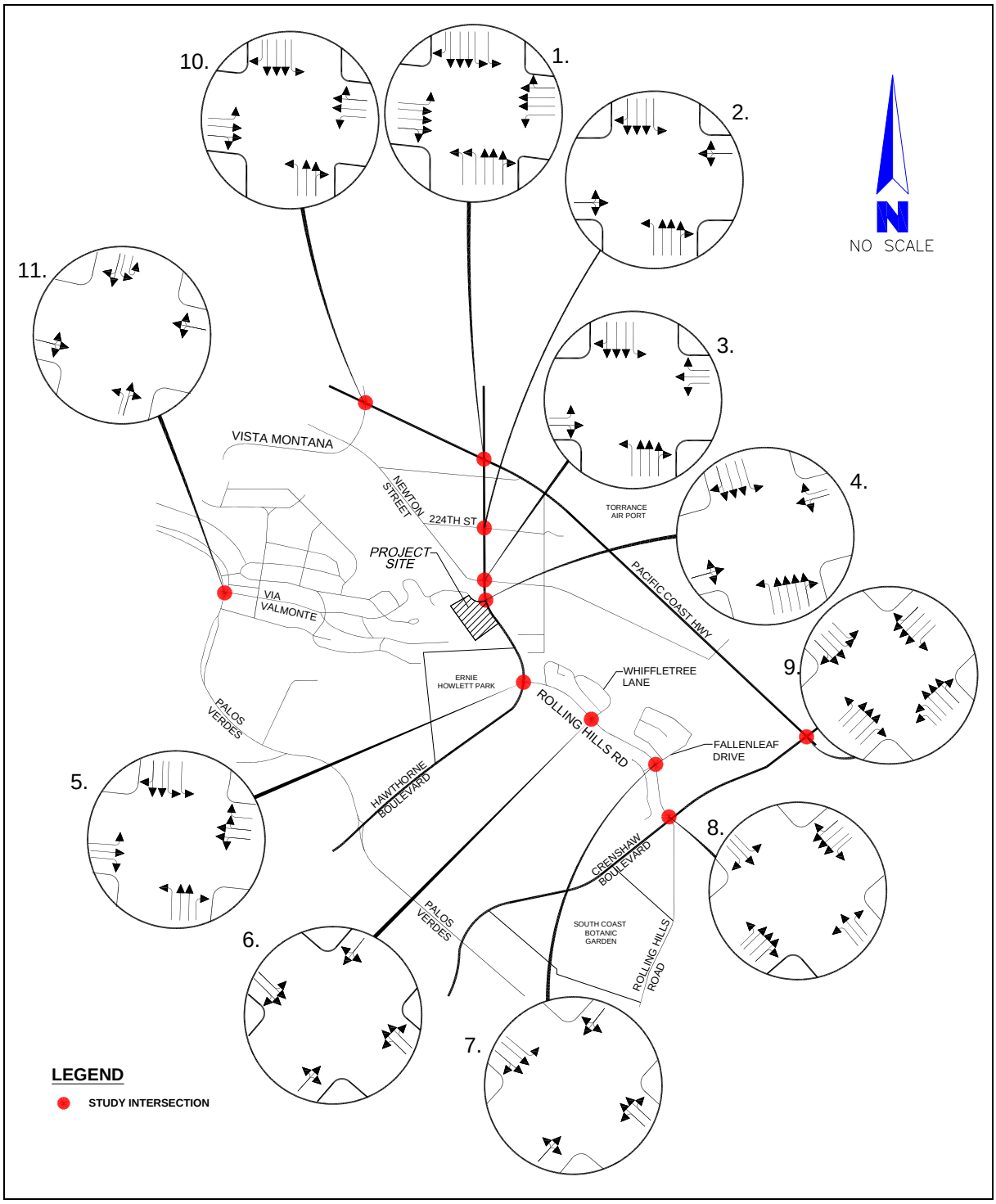


Figure 16 – Intersection Lane Configurations

Average Daily Traffic

The *average daily traffic* (ADT) volume is an estimate of the number of motor vehicles carried on a given roadway segment over a 24-hour period of time. The

estimate of ADT is often based on one or more days of actual traffic counts taken by a mechanical device designed specifically for counting traffic on streets. ADT volumes are typically expressed as the total number of vehicles for both directions of travel, but may be separated by direction when such information is useful, as was done for this traffic analysis. ADT volumes do not typically change in dramatic fashion from month to month or year to year, unless the area in question is undergoing rapid growth and development or seasonal variations are significant. For the subject study, directional roadway segment traffic counts were continuously collected in the month of April 2016 over 24 consecutive hours – on a Wednesday. These daily traffic counts were also independently collected for **KHR Associates** by NDS. The summary ADT count results can be found in the Appendix section of this report.

Capacity

The *capacity* of a roadway segment or intersection is the maximum rate of vehicular traffic flow under prevailing traffic, physical design, and operational conditions. Factors affecting capacity include the type and frequency of traffic controls; the operational characteristics of traffic signals (if present); lane widths; horizontal and vertical grades; horizontal and vertical clearances from obstructions; the amount of truck and/or bus traffic; the availability of on-street parking and the rate of parking turnover; restrictions on mid-property access; and the volume of turn movements at adjacent intersections and driveways. Capacity is most commonly defined for hourly periods of time, and most analyses rely on peak 15-minute count increments to establish capacity values. It is useful to define capacity as the maximum volume of traffic that an intersection may be expected to carry, under the least desirable conditions (e.g., with heavy congestion during the peak hours).

For planning purposes, roadway segments are also assigned “capacities” based on the number of travel lanes; width of the roadway; access restrictions; medians; parkway and intersection design; and adjacent land uses. 24-hour roadway segment capacities are not indicative of the maximum number of vehicles that can be *physically* carried - rather, such capacities suggest the maximum number of vehicles that *should be allowed* under ideal conditions given the characteristics of the roadway and community preferences. These capacity values vary somewhat from jurisdiction to jurisdiction. The City of Torrance uses a per lane capacity of 1,600 vehicles.

Hourly capacities for roadways are typically stated in vehicles per hour per lane (VPHPL). On multi-lane arterials and freeways, unimpeded capacity is 2,000 VPHPL. On two-lane roadways, with directional traffic split 50%/50%, the total capacity for both directions combined is 2,800 vehicles per hour (VPH). Lane capacities on surface streets vary from 1,500 VPH to 1,900 VPH, depending on ambient and operational conditions, including the types of adjacent land uses, number and location of driveways, intersection signal operations, and other factors.

Level of Service

The *level of service* (LOS) of a roadway segment or an intersection is a qualitatively defined measure of prevailing traffic, design, and operational conditions. The LOS, denoted alphabetically from "A" to "F," best to worst, is an evaluation of the degree of congestion, roadway design constraints, delay, accident potential, and driver discomfort experienced during a given period of time - typically during the peak hour or on a daily basis. LOS “D” or better is considered to be a target for intersection operations within the City of Torrance to maintain stable traffic flow, realizing that peak hour congestion may occur at locations with unusual traffic characteristics due to regional traffic flow.[B]

The LOS may be quantitatively calculated by a number of methods that generally compare traffic volumes with the physical and operational capacity of a roadway section or intersection to carry traffic demands placed upon it. For roadway segments and intersections, the volume-to-capacity (V/C) ratio is indicative of LOS. Traffic volumes are measured by conducting actual counts over prescribed periods of time. Capacity figures are established by the governing jurisdiction, and often based on localized conditions. Intersection LOS can also be determined using computer software to account for various influencing factors such as lane configurations, traffic signal timing (for signalized intersections), and vehicle delays.

Table II lists the typical service volumes corresponding to the number of lanes and median type. It should be noted that the LOS for roadway segments are generally used for planning purposes only, and do not indicate true operational LOS.

TABLE II – LEVELS OF SERVICE FOR ROADWAY CLASSIFICATIONS

Traffic Lane Configuration	Levels of Service					
	A	B	C	D	E	F
8 (divided)	45,000	52,500	60,000	67,500	75,000	>75,000
6 (divided)	33,900	39,400	45,000	50,600	56,300	>56,300
4 (divided)	22,500	26,300	30,000	33,800	37,500	>37,500
4 (undivided)	15,000	17,500	20,000	22,500	25,000	>25,000
2 (undivided)	7,500	8,800	10,000	11,300	12,500	>12,500

Various methods of computing intersection LOS are used, including the Intersection Capacity Utilization (ICU) and HCS+ software, based on the 2010 Highway Capacity Manual (HCM).[C] Table III provides City of Torrance LOS definitions for signalized intersections at corresponding volume-to-capacity (V/C) ratios. Table IV provides criteria for signalized and unsignalized intersections, based on HCM methodologies for determining LOS. These LOS are used to approximate true operating conditions, and are calculated for intersections during morning and late afternoon peak hours.

[B] City of Torrance General Plan - Circulation and Infrastructure Element, Adopted April 6, 2010.
[C] HCS+, Release 6.50, McTrans Center, University of Florida, 2010.

TABLE III - SIGNALIZED INTERSECTION LOS & V/C RATIOS

LOS	V/C Ratio	Definitions
A	≤ 0.60	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.
B	> 0.60 ≤ 0.70	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.
C	> 0.70 ≤ 0.80	Good operation. Occasionally backups may develop behind turning vehicles. Most drivers feel somewhat restricted.
D	> 0.80 ≤ 0.90	Fair operation. There are no long-standing traffic queues. This level is typically associated with design practice for peak periods.
E	> 0.90 ≤ 1.00	Poor operation. Some long-standing vehicular queues develop on critical approaches.
F	> 1.00	Forced flow. Represents jammed conditions. Backups from locations downstream or on the cross street may restrict or prevent movements of vehicles out of the intersection approach lanes. Potential for stop-and-go-type traffic flow.

Source: City of Torrance General Plan, Circulation and Infrastructure Element, April 2010

TABLE IV – UNSIGNALIZED & SIGNALIZED INTERSECTION LOS CRITERIA

	Intersection Delay (in Seconds)	
Level of Service	Unsignalized Intersection	Signalized Intersection
A	≤ 10.0	≤ 10.0
B	> 10.0 and ≤ 15.0	> 10.0 and ≤ 20.0
C	> 15.0 and ≤ 25.0	> 20.0 and ≤ 35.0
D	> 25.0 and ≤ 35.0	> 35.0 and ≤ 55.0
E	> 35.0 and ≤ 50.0	> 55.0 and ≤ 80.0
F	> 50.0	> 80.0

Source: Highway Capacity Manual, HCM 2010 & Caltrans Guide for the Preparation of Traffic Impact Studies, 2010.

Significant Transportation Impact

Although the methodologies for calculating LOS are well-established and fairly consistent, determining whether or not a “significant transportation impact” or intersection traffic impact occurs is not as easy to quantify. Local jurisdictions have varying interpretations of what constitutes a significant impact. Some agencies base significant impacts on the number of seconds added to average intersection delay per vehicle or the number of additional vehicles added to a critical intersection turn movement. In most cases, significant transportation impacts are determined on the basis of increase in the volume-to-capacity ratio (see Table V).

TABLE V - SIGNIFICANT TRANSPORTATION IMPACT FOR PROJECT-RELATED INCREASE IN V/C

Level of Service	V/C Ratio	Project-Related Increase in V/C
C	> 0.70 – 0.80	Equal to or greater than 0.05
D	> 0.80 – 0.90	Equal to or greater than 0.03
E, F	> 0.90	Equal to or greater than 0.01

Trip Ends

Traffic generated by different types of development and land use is typically expressed in terms of *trip ends*. A trip end (or trip) is the directional movement of a single motor vehicle either to or from a development site. When a vehicle enters a development site, one trip end is generated. When a vehicle exits a development site, one trip end is generated. Therefore, each vehicle entering and exiting a development site generates two trip ends. For analysis purposes, the number of trip ends generated over a given time period is the total of all vehicles entering plus all vehicles exiting the site during that time period. Trip ends generated to a development site are designated inbound trips and trip ends generated from a development site are designated outbound trips.

Trip Generation

Trip generation refers to the number of trip ends generated by a given development or land use over a specified period of time - usually per day and during morning and late afternoon peak hours of traffic demand. Attempts to quantify the trip making propensities of given land uses and types of development have led to the formulation of trip generation rates. In simplified travel demand forecasting, trip ends are often estimated by applying these empirically-determined trip generation rates. Rates for a variety of land uses, including residential developments, may be found in technical reference documents such as the Institute of Transportation Engineers' (ITE) *Trip Generation* manual.[D] The data found in these documents typically include average weekday and peak hour rates that correspond with the peak periods of commuter traffic. A wide assortment of land uses, including multi-family residential, commercial office, and lodging are covered.

For multi-family residential development, the independent variable is typically the number of dwelling units, and trip generation is stated in terms of trip ends per dwelling unit.

[D] *Trip Generation*, 9th Edition, Volume 3 of 3, Institute of Transportation Engineers

Trip Reduction

The convenient and price-sensitive availability of transit service to and from a given project site can also reduce private vehicle trips. The City provides a municipally operated transit system called the "Torrance Transit" serving the South Bay region of Los Angeles County. In addition, the proliferation of private taxi services such as Uber and Lyft are having an impact on how small groups of people routinely travel to certain destinations and venues. Due to the uncertain benefit of these services, trip reduction estimates were not used to estimate future traffic related impacts.

Trip Distribution/Trip Assignment

In addition to trip generation, travel demand forecasting also includes trip distribution and trip assignment. Trip distribution signifies by general direction (i.e., east, west, north, and south) the percentage of all traffic generated to and from a given project site. Trip assignment identifies the particular routes used by traffic generated to and from a given project site. These steps are often combined for small projects and/or areas of analysis. Trip distribution/trip assignment is used to predict the patterns of traffic generated by a given project site, taking into consideration several factors, including: observations of existing traffic patterns; existing land use and proposed land use; surrounding land uses; volumes of traffic on streets and highways; the traffic carrying capacity of these streets and highways; and site access (e.g., turn movement) restrictions.

Ambient Growth

In order to effectively estimate traffic conditions at the *Project* target year of 2019, an ambient growth factor was included in the evaluations per the recommendation of the City of Torrance. Volumes recorded in 2016 for study roadways and intersections were multiplied by one percent per year for each of the three years leading to 2019 conditions – the estimated date of occupancy for the development.

IV. TRIP GENERATION

Trip generation for the proposed *Project* can be estimated by applying known trip generation rates for the various proposed uses. For urban settings, trip generation is calculated for an average weekday (24-hour period, and for the morning and afternoon peak hours of weekday commute (typically 7:00 to 9:00 A.M. and 4:00 to 6:00 P.M.) on streets serving a given project). For the proposed *Project* residential use, the ITE *Trip Generation* manual provides the following definitions:

Land Use Code 230 – Residential Condominium/Townhouse

Per ITE Land Use Code 230, "residential condominiums/townhouses are defined as ownership units that have at least one other owned unit within the same building structure." Additionally, with respect to analyzing potential traffic impacts associated

with residential condominiums/townhouses, "the peak hour of the generator typically coincides with the peak hour of the adjacent street traffic."[E]

As indicated in Table VI, the proposed *Project* is estimated to generate a total of 1,758 daily trip ends, including 132 trip ends (22 inbound and 110 outbound) and 156 trip ends (105 inbound and 51 outbound), during the A.M. and P.M. peak hours, respectively.

TABLE VI - SUMMARY OF SOLANA TORRANCE TRIP GENERATION

AVERAGE DAILY TRIPS ON A WEEKDAY

Land Use Category (Code)[1]	Size[2]	Trip Rate[3]	Inbound/ Outbound[3]	Inbound Trip Ends[4]	Outbound Trip Ends[4]	Total Trip Ends[4]
Residential Condo/Townhomes (230)	300 DU	5.86/DU	50%/50%	879	879	1,758

WEEKDAY A.M. PEAK HOUR OF ADJACENT STREET TRAFFIC

Land Use Category (Code)[1]	Size[2]	Trip Rate[3]	Inbound/ Outbound[3]	Inbound Trip Ends[4]	Outbound Trip Ends[4]	Total Trip Ends[4]
Residential Condo/Townhomes (230)	300 DU	0.44/DU	17%/83%	22	110	132

WEEKDAY P.M. PEAK HOUR OF ADJACENT STREET TRAFFIC

Land Use Category (Code)[1]	Size[2]	Trip Rate[3]	Inbound/ Outbound[3]	Inbound Trip Ends[4]	Outbound Trip Ends[4]	Total Trip Ends[4]
Residential Condo/Townhomes (230)	300 DU	0.52/DU	67%/33%	105	51	156

Notes:
1 - Land Use Code Per *Trip Generation Manual*, 9th Ed., Institute of Transportation Engineers.
2 - DU = Dwelling Units
3 - Trip Generation Rate & Percentage of Inbound/Outbound Trips Per *Trip Generation Manual*, 9th Ed., Institute of Transportation Engineers
4 - All Trip Ends Rounded to Nearest Whole Unit

V. TRIP DISTRIBUTION/TRIP ASSIGNMENTS

Trip distribution and trip assignments for the proposed *Project* were formulated with input from the City of Torrance Traffic and Transportation Division.

Trip Distribution

Based on known trip making propensities and travel routes taken by those residing, working, and traveling within the regional proximity of the proposed *Project*, trip

[E] *Trip Generation*, Volume 2 of 3, 9th Edition, Institute of Transportation Engineers, 2012

distribution assumptions were formulated. The distribution of inbound and outbound trips generated by the proposed *Project* are depicted in Figure 17. As noted, the majority of trips (70%) are oriented toward the north, where most employment centers, commercial businesses, and schools are located.

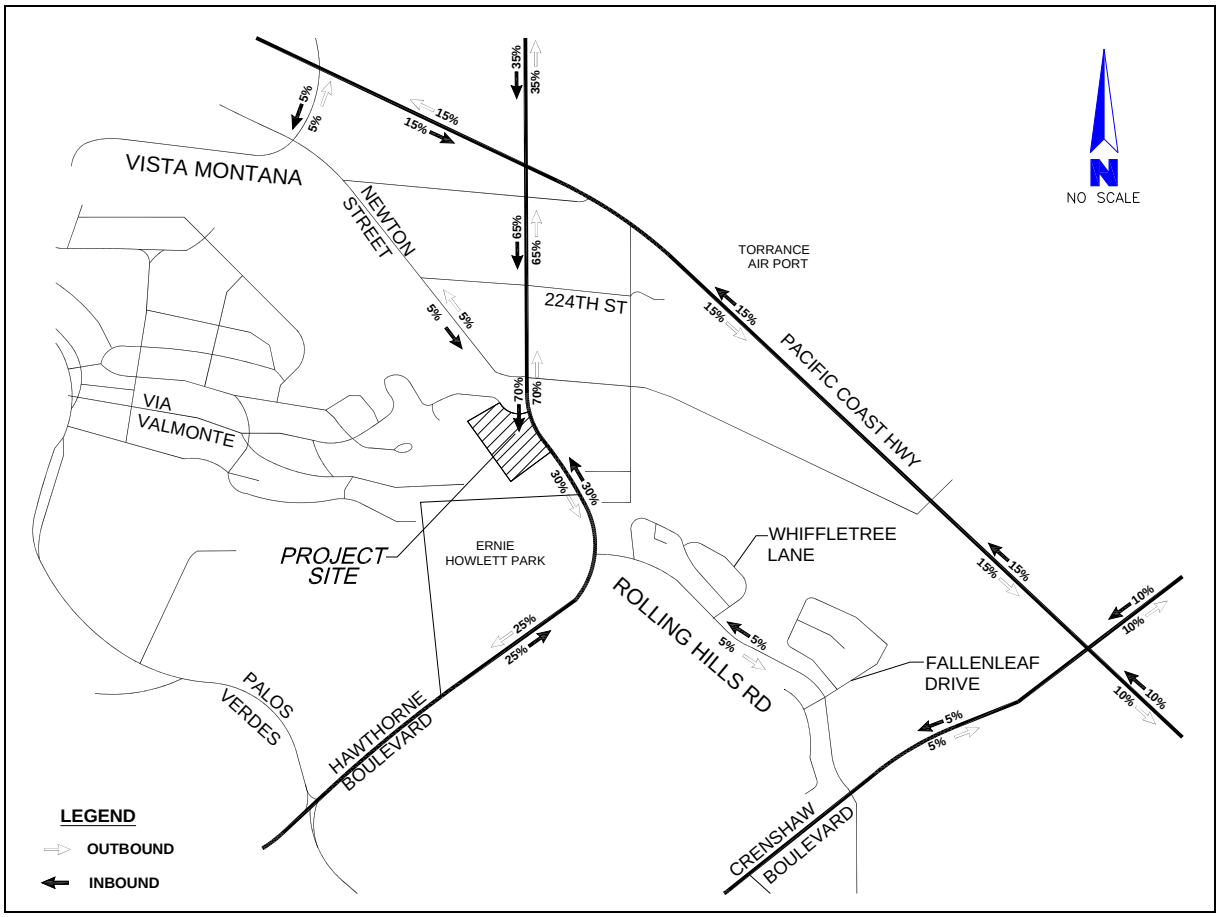


Figure 17 – Trip Distribution Assumptions

Trip Assignments

Based on the trip distribution assumptions illustrated in Figure 17, trip assignments were made. These trip assignments were based on physical and operational constraints affecting roadways and intersections; direction (i.e., inbound or outbound) and time of day (i.e., A.M. or P.M. peak hour) of travel; and traffic control devices that regulate the flow of traffic on the streets and highways network servicing the *Project* site.

Inbound and outbound trips generated by the proposed *Project* during the daily, and A.M. and P.M. peak hours of weekday commute were assigned to various roadway segments and study intersections based on trip distribution percentages in each direction from the *Project* site. These inbound and outbound trip assignments during daily, and A.M. and P.M. peak hours are depicted in Figure 18.

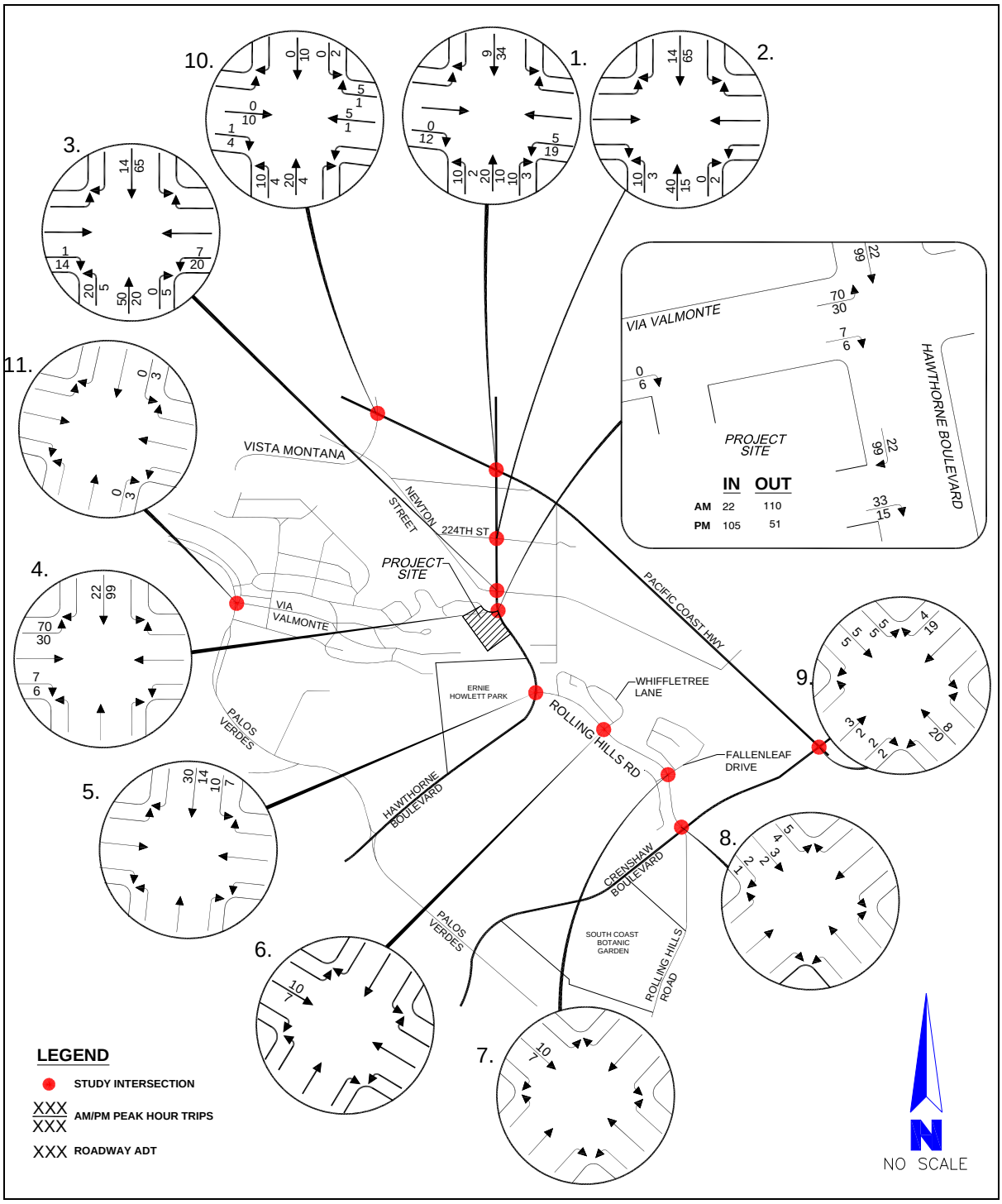


Figure 18 – ADT & Peak Hour "Project-Only" Trip Assignments

Existing Traffic – Year 2016 Conditions

Existing traffic at study roadway segments and intersections were documented by directional 24-hour (i.e., ADT) and peak hour (i.e., A.M. and P.M. peak hours of weekday commute) turn movement counts. The results are illustrated in Figure 19.

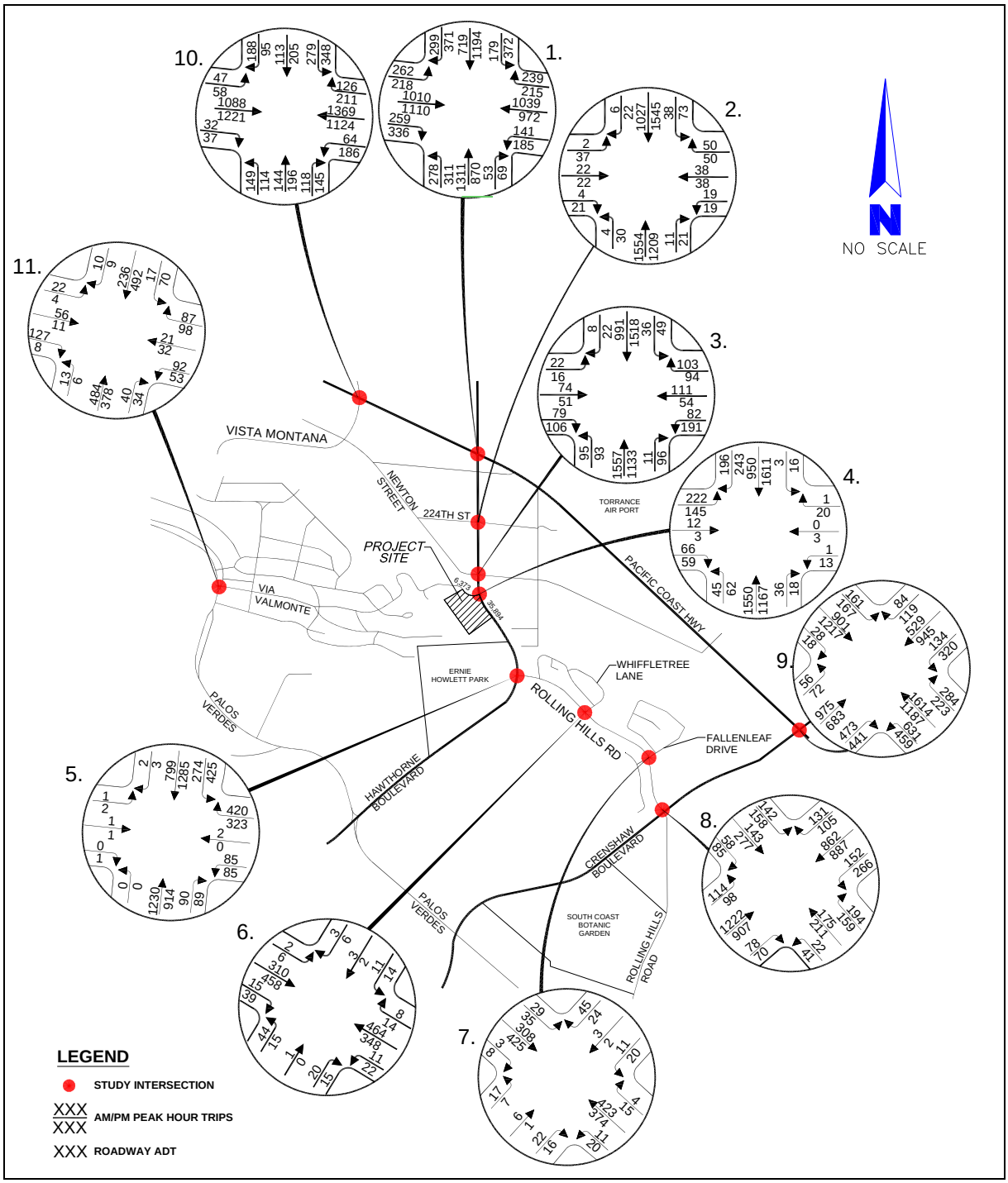


Figure 19 – 2016 Existing ADT & Peak Hour Intersection Traffic Volumes

Existing + Ambient Growth – Year 2019 Conditions

Adding ambient growth traffic (i.e., one percent per year for three years) to existing traffic at study roadway segments and intersections during the A.M. and P.M peak hours of weekday commute are illustrated in Figure 20.

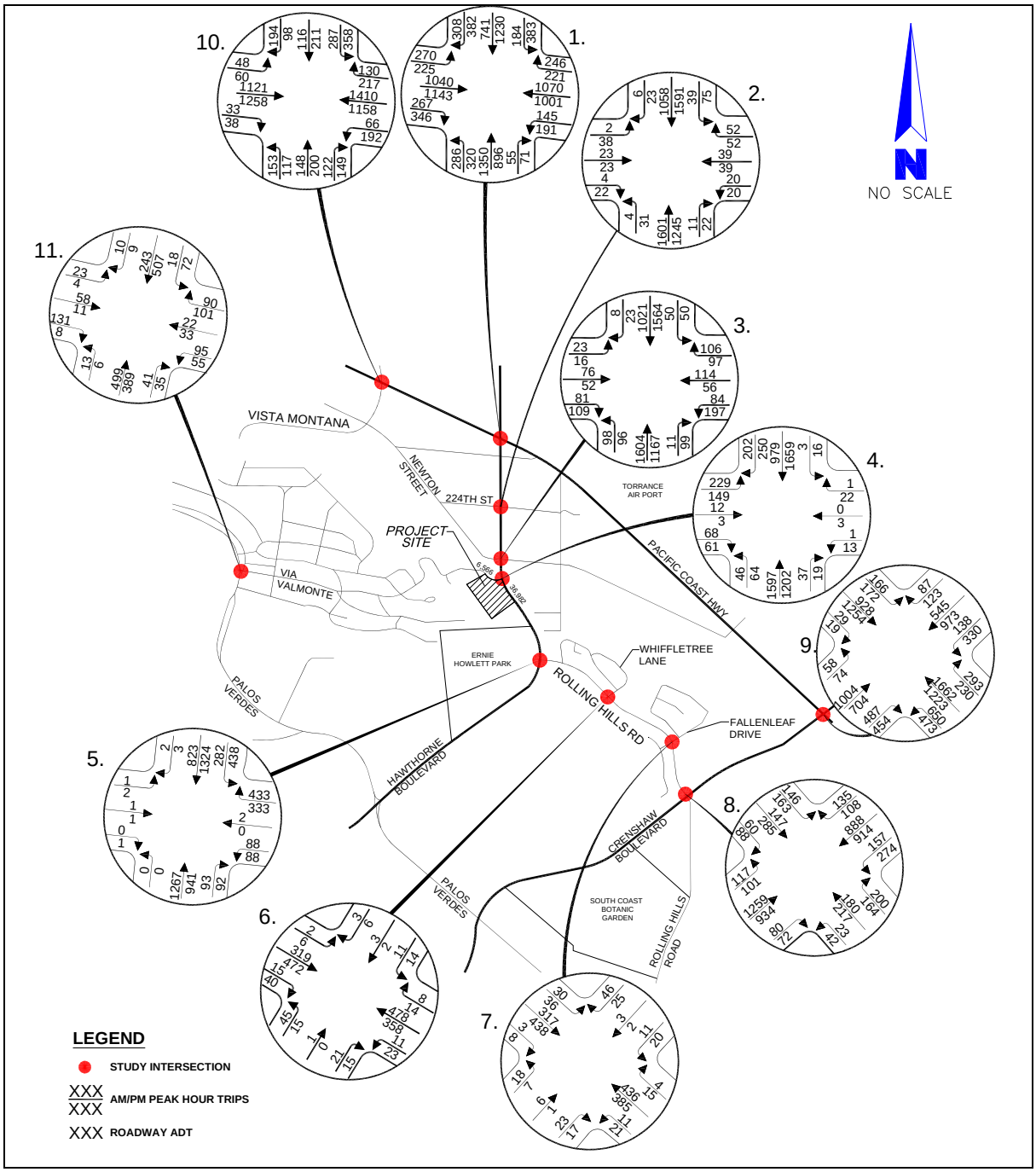


Figure 20 – 2019 Ex.+Ambient Growth ADT & Peak Hour Intersection Traffic Volumes

Ambient+Project Traffic – Year 2019 Conditions

Adding *Project* traffic to the 2019 Ambient Growth condition at study roadway segments and intersections during the A.M. and P.M peak hours of weekday commute are illustrated in Figure 21.

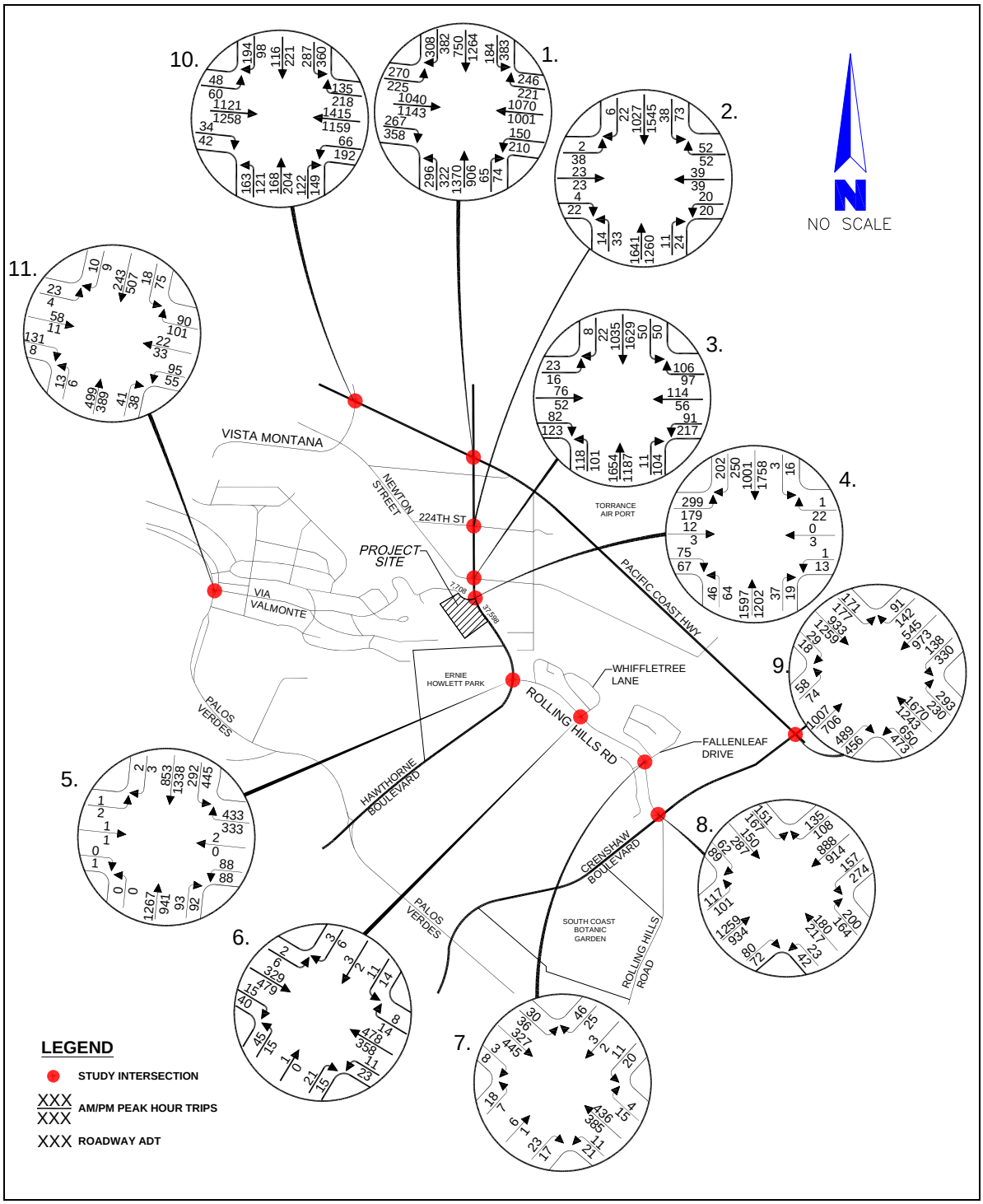


Figure 21 – 2019 Ambient + Project ADT & Peak Hour Intersection Traffic Volumes

Committed and Proposed Developments

There are a number of development projects within the regional area of the *Project* site that are either in the design or advanced planning stages, or under construction that will generate varying amounts of traffic on the regional streets and highways

network. Traffic generated by these development projects need to be taken into account when evaluating the proposed *Project*'s fair share responsibilities for traffic improvements. Although the timing of completion of each development will vary, for this study, a worst-case scenario was used by assuming build-out and occupancy of each development by the year 2019.

Table VII contains a list of committed and proposed projects within the area of the *Project* site, as provided by the Cities of Torrance, Rancho Palos Verdes, Rolling Hills Estates, and Lomita. Note that Palos Verdes Estates did not have any new developments on the horizon other than home improvement projects. Also listed are their respective amounts of traffic estimated to be generated upon completion. The location of each of these projects is identified in Figure 22.

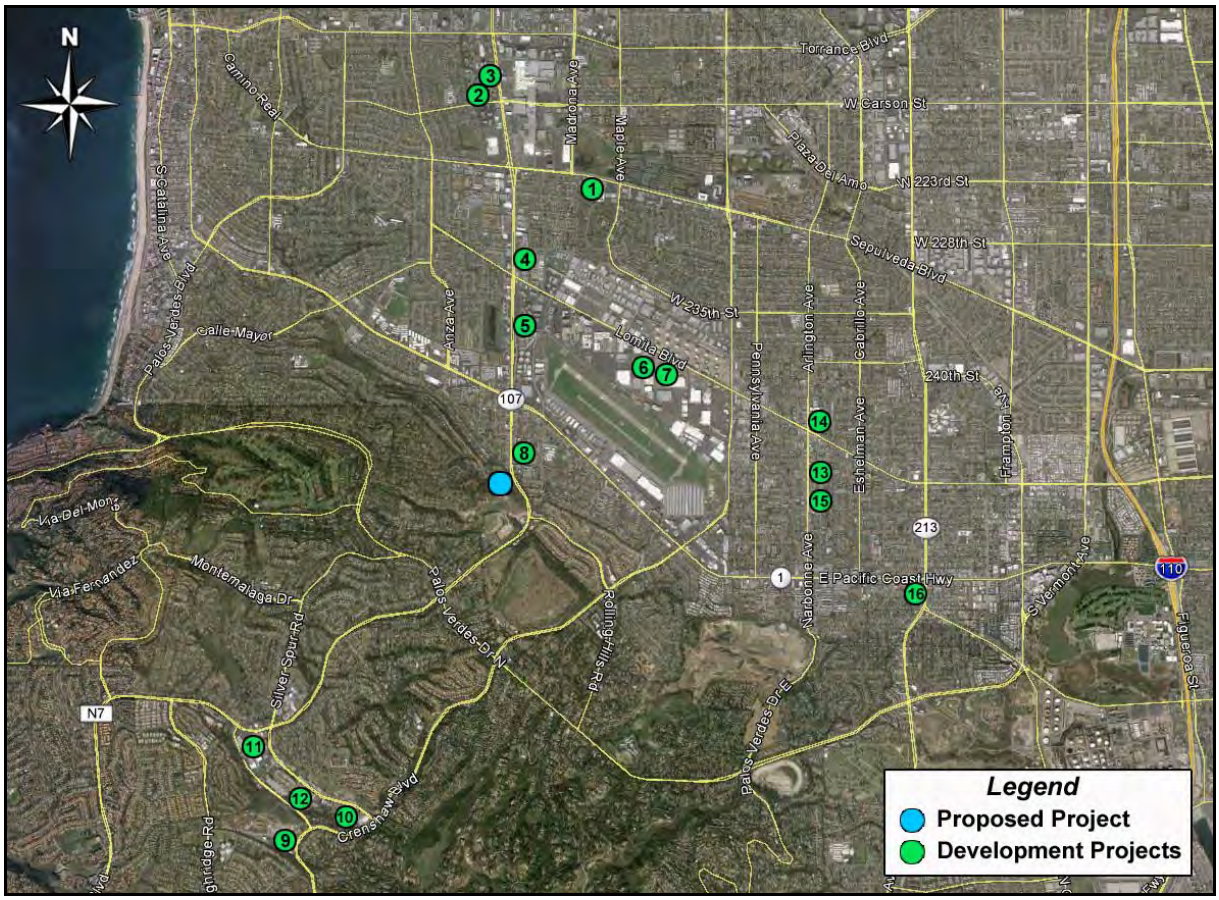


Figure 22 – Location of Committed and Proposed Development Projects

Cumulative Traffic – Year 2019 Conditions

Adding cumulative development traffic to the existing traffic, ambient growth, and project development traffic at study roadway segments and intersections during the A.M. and P.M peak hours of weekday commute are illustrated in Figure 23.

TABLE VII - COMMITTED AND PROPOSED DEVELOPMENT PROJECTS

Land Use	Size	Unit	ADT[2]	AM Peak Hour[2] In	AM Peak Hour[2] Out	AM Peak Hour[2] Total	PM Peak Hour[2] In	PM Peak Hour[2] Out	PM Peak Hour[2] Total
1. 3210 Sepulveda Boulevard, Torrance – Assisted Living									
Trip Generation[1]	130	Beds	356	12	6	18	12	15	27
2. Del Amo Senior Village, Torrance – Independent Living/Assisted Living/Hotel									
Trip Generation[1]	360	DU	1,253	13	16	29	24	16	40
3. 21515 Hawthorne Boulevard, Torrance – Commercial (Health Club & Gym/Restaurant)									
Trip Generation[3]	45,000/12,000	SF	4,238	70	56	126	182	183	365
4. 23104 Hawthorne Boulevard, Torrance – Child Day Care									
Trip Generation[1]	10,023	SF	800	68	60	128	62	70	132
5. 23550 Hawthorne Boulevard, Torrance – Restaurant/Bank									
Trip Generation[1]	1,500/2000	SF	1,387	61	48	109	62	61	123
6. 24000 Garnier Street, Torrance – Medical Office									
Trip Generation[1]	36,866	SF	1,332	72	19	91	37	100	137
7. 2640 Lomita Boulevard, Torrance – Commercial (Costco w/ Car Wash/Gas) Replacing Prev. Costco + Medical Off.									
New Costco[3]	161,500	SF	7,808	147	108	255	368	405	773
Previous Costco[3]	148,000	SF	-6,964	-135	-98	-233	-339	-373	-712
Medical Office[3]	75,000	SF	2,852	142	37	179	63	162	225
8. 24444 Hawthorne Boulevard, Torrance – Office/Residential									
Trip Generation[1]	2,700/8	SF/DU	51	5	5	10	5	6	11
9. 5601 Crestridge Road, Rancho Palos Verdes (Crestridge Senior Condominium Project) – Condominiums									
Trip Generation[3]	60	DU	480	4	29	33	28	16	44
10. 927 Deep Valley Drive, Rolling Hills Estates – Condominiums/Commercial (Replace Medical, Office, Retail Use)									
Trip Generation[3]	75/2,000	DU/SF	-42	-41	27	-14	17	-34	-17
11. Peninsula Center, Rolling Hills Estates – Commercial									
Trip Generation[3]	16,000	SF	2,296	110	86	196	123	96	219
12. 627 Deep Valley Drive, Rolling Hills Estates – Condominiums/Commercial									
Trip Generation[3]	58/5,810	DU/SF	636	-2	15	13	30	21	51
13. 250th & Narbonne, Lomita – Condominiums/Commercial/Industrial									
Trip Generation[3]	20/2,035/4,281	DU/SF	202	6	9	15	12	9	21
14. 24516 Narbonne Avenue, Lomita – Townhomes/Retail									
Trip Generation[3]	22/3,700	DU/SF	128	2	8	10	7	4	11
15. 25114 Narbonne Avenue, Lomita – Townhomes/Retail									
Trip Generation[3]	11/3,500	DU/SF	219	4	6	10	8	7	15
16. 1730-1734 Pacific Coast Highway, Lomita – Commercial/Retail									
Trip Generation[3]	850/180	SF/SF	204	24	24	48	5	4	9
Total Trip Generation			**17,236**	**562**	**461**	**1,023**	**706**	**768**	**1,474**

Notes:
DU: Dwelling Unit; SF: Square Feet; RM: Room
[1] Trip Generation Rate & Percentage of Inbound/Outbound Trips Per *Trip Generation Manual*, 9th Ed., Institute of Transportation Engineers.
[2] All Trip Ends Rounded to Nearest Whole Unit.
[3] Data from Available Traffic Studies.

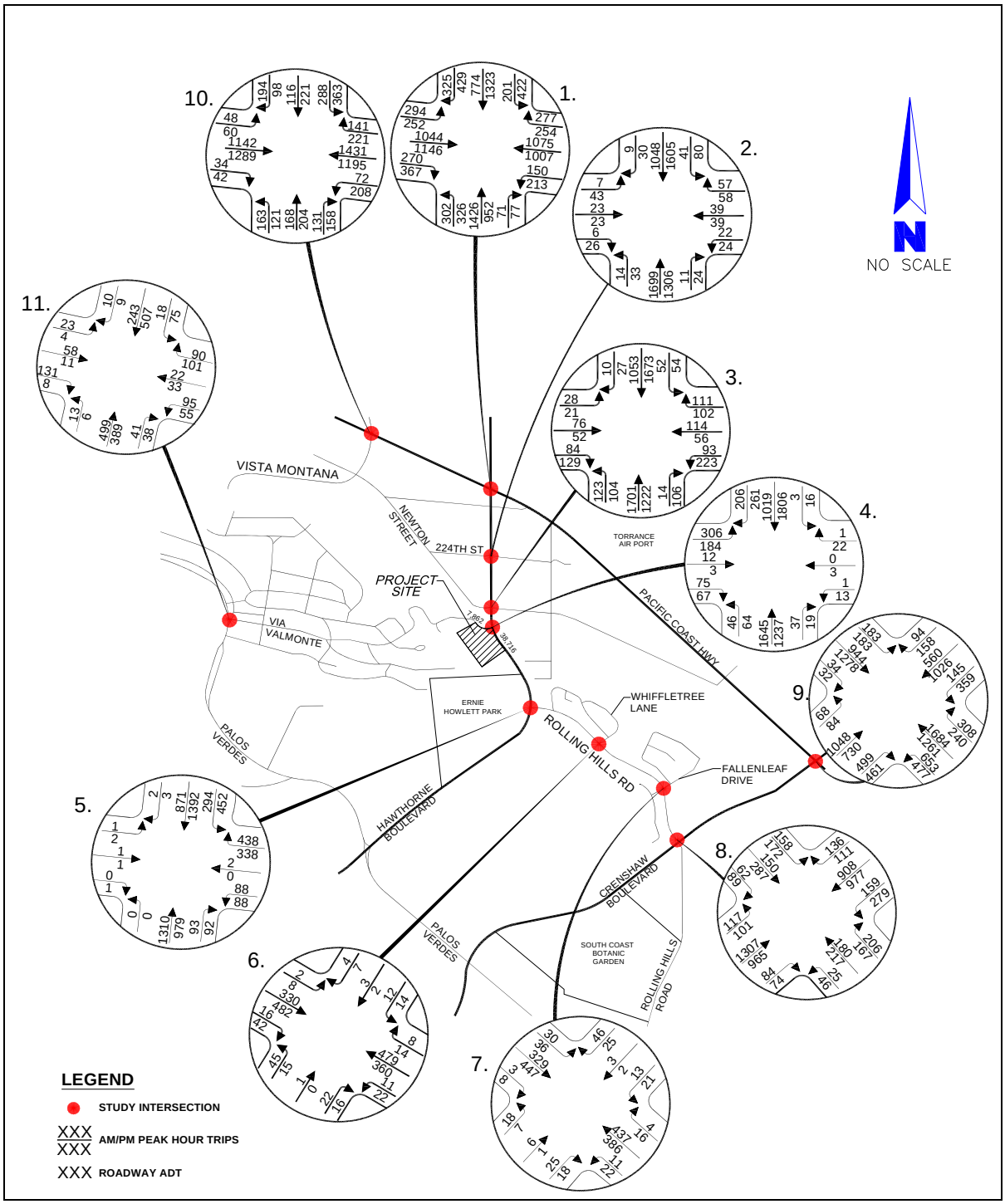


Figure 23 – 2019 Cumulative ADT & Peak Hour Intersection Traffic Volumes

VI. EXISTING & FUTURE LEVELS OF SERVICE

Future traffic conditions resulting from additional development may be predicted by performing a travel demand forecast. Such forecasts vary in magnitude and

complexity, but at minimum include defining the streets and highways network of interest; estimating the amount of traffic generated by a given development or geographic area; determining the area-wide distribution of this traffic; and assigning it to specific portions of the streets and highways network. In order to determine the magnitude and impact of additional traffic generated onto streets surrounding the project site, a travel demand forecast of future traffic conditions was undertaken for the proposed *Project*. Using the 2016 traffic counts and employing trip generation, distribution and assignment of future traffic, as described in Section V, existing and future roadway and intersection levels of service can be determined.

Both the ICU and the HCM methodologies were employed to determine intersection levels of service for all study intersections. For the 2019 Project and Cumulative estimates, Capital Improvements, as described in Section II, slated for the Pacific Coast Highway/Hawthorne Boulevard and Pacific Coast Highway/Vista Montana intersections were included in the analyses. Roadway segments were evaluated based on typical level of service volumes for each roadway designation.

Existing, Ambient Growth, Project, and Cumulative Roadway LOS

Based on a comparison between the ADT count in Appendix A of this report and the City's Circulation Element designations for roadway classifications, the LOS for study roadways for the 2016 existing, and existing plus ambient growth (i.e., one percent per year for three years) volumes were determined for the year 2019. Then, the *Project* traffic and the cumulative development related traffic were added to estimate future LOS under those conditions.

Cumulative impacts refer to the combined effects of traffic generated by individual projects within a defined area of concern. The City's list of committed and proposed projects along with neighboring City projects will generate varying amounts of additional traffic (see Table VII). While the traffic impacts associated with each project may not be individually significant, cumulatively, the traffic impacts can be significant, or have the potential of compounding or increasing the effects of traffic impacts of the proposed *Project* in the target year 2019.

As noted in Table VIII, all study roadway segments currently operate at acceptable levels of service, and should continue to operate at acceptable levels of service through the 2019 estimates. The only change in roadway segment LOS occurs on Via Valmonte directly adjacent to the *Project* site – from "A" to "B" with the addition of *Project* related traffic.

Existing & Existing+Ambient Growth (2019) Intersection LOS – ICU Method

Existing intersection LOS, as calculated using the ICU method, are summarized in Table IX for the eleven intersections studied. Turn movement counts for existing traffic were taken in April 2016. The ambient growth factor (i.e., one percent per year for three years) was then added to the existing volumes to estimate *Project* related

impacts on existing conditions. The ICU calculation forms may be found in the Appendix section of this report. As shown in the Table IX, all intersections operate within acceptable levels of LOS "D" or better under both scenarios with the exception of the Crenshaw Boulevard/Pacific Coast Highway intersection operating at LOS "E" during the P.M. peak hours.

TABLE VIII – 2016 EXISTING; 2019 EXISTING+AMBIENT; 2019 AMBIENT+PROJECT & 2019 CUMULATIVE ROADWAY SEGMENT V/C RATIOS & LEVELS OF SERVICE

Roadway Segment	2016 Existing		2016 Existing+ 2019 Ambient[2]		2019 Ambient+ Project[3]		2019 Cumulative [4]	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Hawthorne Blvd.								
South of Via Valmonte[5]	**35,894**	**B**	**36,982**	**B**	**37,598**	**B**	**38,716**	**B**
Via Valmonte								
West of Hawthorne Blvd.[6]	**6,373**	**A**	**6,566**	**A**	**7,708**	**B**	**7,862**	**B**

[1] Intersection Counts Taken by NDS, April 2016
[2] Annual Growth Rate of 1 Percent Per Year for 3 Years Applied
[3] Project Related Trips Added Per Trip Distribution (65% North, 35% South)
[4] Cumulative Developments – Addl. Volumes Based Upon Diff. Trip Distribution Percentages for Each Region
[5] Classified as Six Lane Divided Roadway with a LOS B Capacity of 39,400
[6] Classified as Two Lane Undivided Roadway with a LOS A Capacity of 7,500

TABLE IX – EXISTING (2016) & EXISTING+AMBIENT (2019) ICU METHOD LOS

	2016 EXISTING[1]				2016 EXISTING+ 2019 AMBIENT[2]			
	A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**
Hawthorne Blvd/Pacific Coast Hwy	0.870	D	0.863	D	0.893	D	0.886	D
Hawthorne Blvd/244th Street	0.512	A	0.520	A	0.524	A	0.532	A
Hawthorne Blvd/Newton Street	0.593	A	0.662	B	0.608	B	0.679	B
Hawthorne Blvd/Via Valmonte	0.572	A	0.628	B	0.586	A	0.643	B
Hawthorne Blvd/Rolling Hills Road	0.653	B	0.601	B	0.669	B	0.616	B
Whiffletree Lane/Rolling Hills Road	0.390	A	0.397	A	0.399	A	0.406	A
Fallenleaf Drive/Rolling Hills Road	0.317	A	0.287	A	0.323	A	0.293	A
Crenshaw Blvd/Rolling Hills Road	0.773	C	0.832	D	0.794	C	0.854	D
Crenshaw Blvd/Pacific Coast Hwy.	0.874	D	0.972	E	0.897	D	0.996	E
Vista Montana/Pacific Coast Hwy.	0.773	C	0.780	C	0.793	C	0.801	D
Palos Verdes Drive/Via Valmonte	0.680	B	0.750	C	0.698	C	0.770	C

[1] Intersection Counts Taken by NDS, April 2016
[2] Annual Growth Rate of 1 Percent per Year for 3 Years

Ambient+Project & Cumulative Intersection LOS – ICU Method

Future 2019 "Ambient+*Project"* and "Cumulative" LOS, as calculated using the ICU method, are summarized in Table X for the eleven intersections studied. These estimates included the capital improvements slated for the Pacific Coast Highway/ Hawthorne Boulevard and Pacific Coast Highway/Vista Montana intersections. As shown in the table, all study intersections are estimated to continue to operate at LOS "D" or better with the addition of *Project* traffic, again with the exception of the exception of the Crenshaw Boulevard/Pacific Coast Highway intersection operating at LOS "E" during the P.M. peak hour. With the Cumulative development traffic added to future 2019 estimates, intersection volumes increased slightly, and the LOS further deteriorated for the Crenshaw Boulevard/Pacific Coast Highway intersection to LOS "E" in the A.M. peak hour and LOS "F" during the P.M. peak hour.

TABLE X – 2019 AMBIENT+PROJECT & 2019 CUMULATIVE TRAFFIC ICU METHOD LOS

	2019 AMBIENT+PROJECT [1]				CUMULATIVE [2]			
	A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**
Hawthorne Blvd/Pacific Coast Hwy	0.750	C	0.768	C	0.776	C	0.783	C
Hawthorne Blvd/244th Street	0.535	A	0.548	A	0.554	A	0.568	A
Hawthorne Blvd/Newton Street	0.622	B	0.709	C	0.635	B	0.725	C
Hawthorne Blvd/Via Valmonte	0.622	B	0.680	B	0.636	B	0.696	B
Hawthorne Blvd/Rolling Hills Road	0.673	B	0.619	B	0.687	B	0.631	B
Whiffletree Lane/Rolling Hills Road	0.401	A	0.407	A	0.409	A	0.410	A
Fallenleaf Drive/Rolling Hills Road	0.323	A	0.293	A	0.326	A	0.294	A
Crenshaw Blvd/Rolling Hills Road	0.796	C	0.856	D	0.813	D	0.870	D
Crenshaw Blvd/Pacific Coast Hwy.	0.899	D	0.997	E	0.918	E	1.034	F
Vista Montana/Pacific Coast Hwy.	0.774	C	0.766	C	0.781	C	0.780	C
Palos Verdes Drive/Via Valmonte	0.699	B	0.771	C	0.700	C	0.773	C

[1] Project Related Trips Per Trip Distribution and Turn Movement Restrictions and Opportunities
[2] Cumulative Developments – Volumes Based Upon Various Trip Distribution Percentages for Each Region

Intersection LOS – HCM Method

"Existing" and "Existing+Ambient" Growth LOS, as calculated using the HCM method, are summarized in Table XI for the eleven intersections studied. The "Ambient+Project" and "Cumulative" scenarios are shown in Table XII. The HCM calculation forms may be found in the Appendix section of this report. As shown in Table XI, all intersections operate within acceptable levels of LOS "D" or better under both scenarios with the exception of the Crenshaw Boulevard/Pacific Coast Highway intersection operating at LOS "E" or worse during the A.M. and P.M. peak hours. Table XII shows the Crenshaw Boulevard/Pacific Coast Highway intersection further deteriorating during both time periods under the "Cumulative" scenario, largely due to

increased project traffic from various projects within the proximity of that intersection. Another intersection in that area – Rolling Hills Road/Crenshaw Boulevard also shows decreased LOS in the A.M. peak hour from cumulative development traffic.

TABLE XI – 2016 EXISTING & 2019 EXISTING+AMBIENT TRAFFIC HCM METHOD LOS

	2016 EXISTING [1]				EXISTING+AMBIENT [2]			
	A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
Intersection	**Delay[3]**	**LOS**	**Delay[3]**	**LOS**	**Delay[3]**	**LOS**	**Delay[3]**	**LOS**
Hawthorne Blvd/Pacific Coast Hwy.	48.5	D	54.6	D	32.0[4]	C	32.1[4]	C
Hawthorne Blvd/244th Street	15.6	B	15.9	B	16.7	B	17.0	B
Hawthorne Blvd/Newton Street	10.1	B	11.6	B	10.3	B	11.8	B
Hawthorne Blvd/Via Valmonte	19.2	B	17.6	B	19.0	B	17.5	B
Hawthorne Blvd/Rolling Hills Road	15.7	B	13.8	B	16.2	B	13.7	B
Whiffletree Lane/Rolling Hills Road	5.2	A	4.2	A	5.2	A	4.2	A
Fallenleaf Drive/Rolling Hills Road	6.1	A	4.8	A	6.1	A	4.9	A
Crenshaw Blvd/Rolling Hills Road	46.4	D	45.2	D	52.9	D	47.4	D
Crenshaw Blvd/Pacific Coast Hwy.	50.4	D	79.2	E	56.5	E	86.8	F
Vista Montana/Pacific Coast Hwy.	38.8	D	44.5	D	33.9[4]	C	36.9[4]	D
Palos Verdes Drive/Via Valmonte	27.8	D	25.3	D	34.4	D	29.7	D

[1] Intersection Counts Taken by NDS, April 2016
[2] Annual Growth Rate of 1 Percent per Year for 3 Years
[3] Worst Case Direction Average Intersection Delay Per Vehicle (In Seconds)
[4] Includes Planned Capital Improvements to that Intersection

TABLE XII – 2019 AMBIENT+PROJECT & 2019 CUMULATIVE TRAFFIC HCM METHOD LOS

	AMBIENT+PROJECT [1]				CUMULATIVE [2]			
	A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
Intersection	**Delay[3]**	**LOS**	**Delay[3]**	**LOS**	**Delay[3]**	**LOS**	**Delay[3]**	**LOS**
Hawthorne Blvd/Pacific Coast Hwy.	32.2[4]	C	34.8[4]	C	33.1[4]	C	36.5[4]	D
Hawthorne Blvd/244th Street	18.1	B	19.5	B	21.4	C	25.2	C
Hawthorne Blvd/Newton Street	10.7	B	12.7	B	10.9	B	13.5	B
Hawthorne Blvd/Via Valmonte	19.1	B	17.7	B	18.9	B	17.9	B
Hawthorne Blvd/Rolling Hills Road	16.1	B	13.6	B	16.6	B	13.5	B
Whiffletree Lane/Rolling Hills Road	5.4	A	4.4	A	5.9	A	4.4	A
Fallenleaf Drive/Rolling Hills Road	6.1	A	4.8	A	6.2	A	4.9	A
Crenshaw Blvd/Rolling Hills Road	53.0	D	47.5	D	69.2	E	50.7	D
Crenshaw Blvd/Pacific Coast Hwy.	57.2	E	87.8	F	63.0	E	95.3	F
Vista Montana/Pacific Coast Hwy.	34.3[4]	C	37.1[4]	D	34.7[4]	C	38.0[4]	D
Palos Verdes Drive/Via Valmonte	34.8	D	30.4	D	34.9	D	30.8	D

[1] Project Related Trips Per Trip Distribution and Turn Movement Restrictions and Opportunities
[2] Cumulative Developments – Volumes Based Upon Various Trip Distribution Percentages for Each Region
[3] Worst Case Direction Average Intersection Delay Per Vehicle (In Seconds)
[4] Includes Planned Capital Improvements to that Intersection

VII. SITE ACCESS, CIRCULATION, & PARKING

Proposed site access, internal circulation, and parking for the proposed *Project* were analyzed by reviewing the *Project* site plan, the proposed off-site improvements, and other constraints and opportunities for access to the site. It is important to note that turn movement restrictions placed upon the proposed *Project* restrict resident and visitor vehicle ingress and egress to right turns only. With these restrictions, internal circulation and off-site improvements for site access were designed accordingly.

Street and Traffic Improvements

Vehicular access to the *Project* site is proposed via one main driveway entrance on Hawthorne Boulevard and one secondary driveway on Via Valmonte. The driveway turn movements at these two locations will be restricted to right turn in and right turn out, with the exception that service and emergency vehicle access will be permitted left turn ingress at the Via Valmonte driveway.

Off-site street improvements include widening of the eastbound Via Valmonte approach leg to Hawthorne Boulevard adjacent to the *Project* site to provide an additional full travel lane to make optional left turn, through movement, and right turns. This improvement will include a new roadway surface; new curb, gutter, sidewalk, and parkway on the south side of Via Valmonte; reconstruction of the asphalt concrete walkway on the north side of Via Valmonte; a new crosswalk across Via Valmonte at Hawthorne Boulevard; and new accessible ramps on the northwest and southwest corners of the intersection. Figure 24 illustrates the proposed improvements to Via Valmonte at Hawthorne Boulevard.

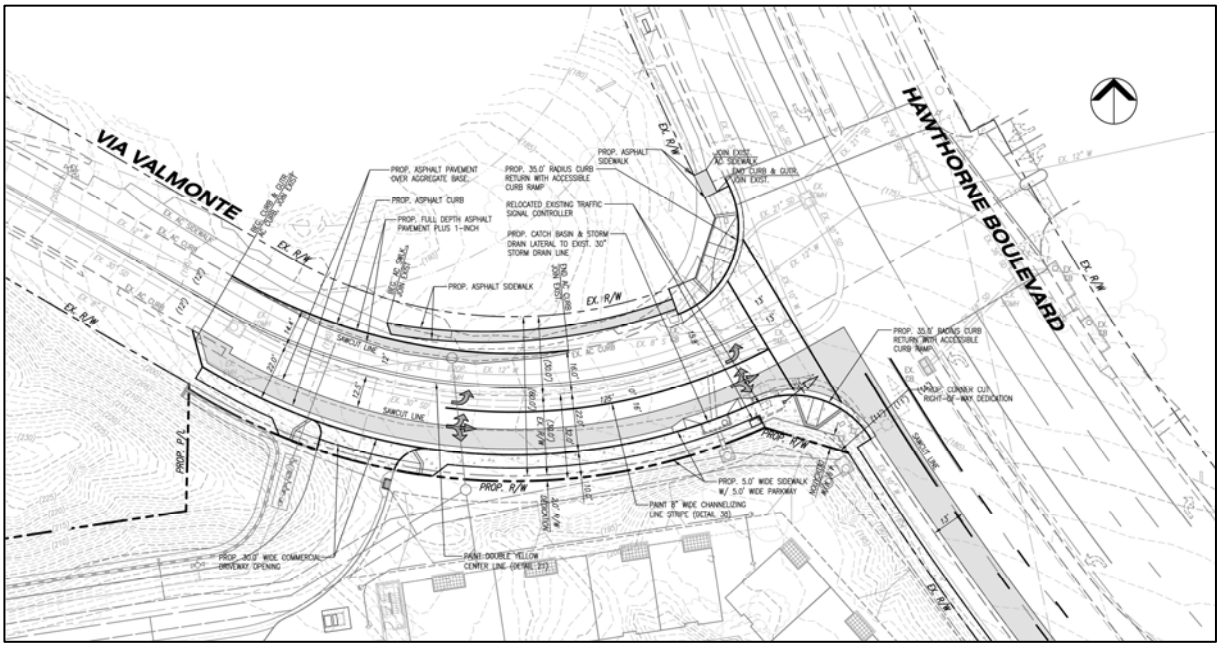


Figure 24 –Via Valmonte Improvements at Hawthorne Boulevard

On Hawthorne Boulevard, street improvements include a new continuous sidewalk and parkway to the new *Project* main entrance driveway, and restriping southbound traffic lanes to create a deceleration/right turn lane leading into the *Project* driveway. Figure 25 illustrates the proposed improvements along Hawthorne Boulevard.

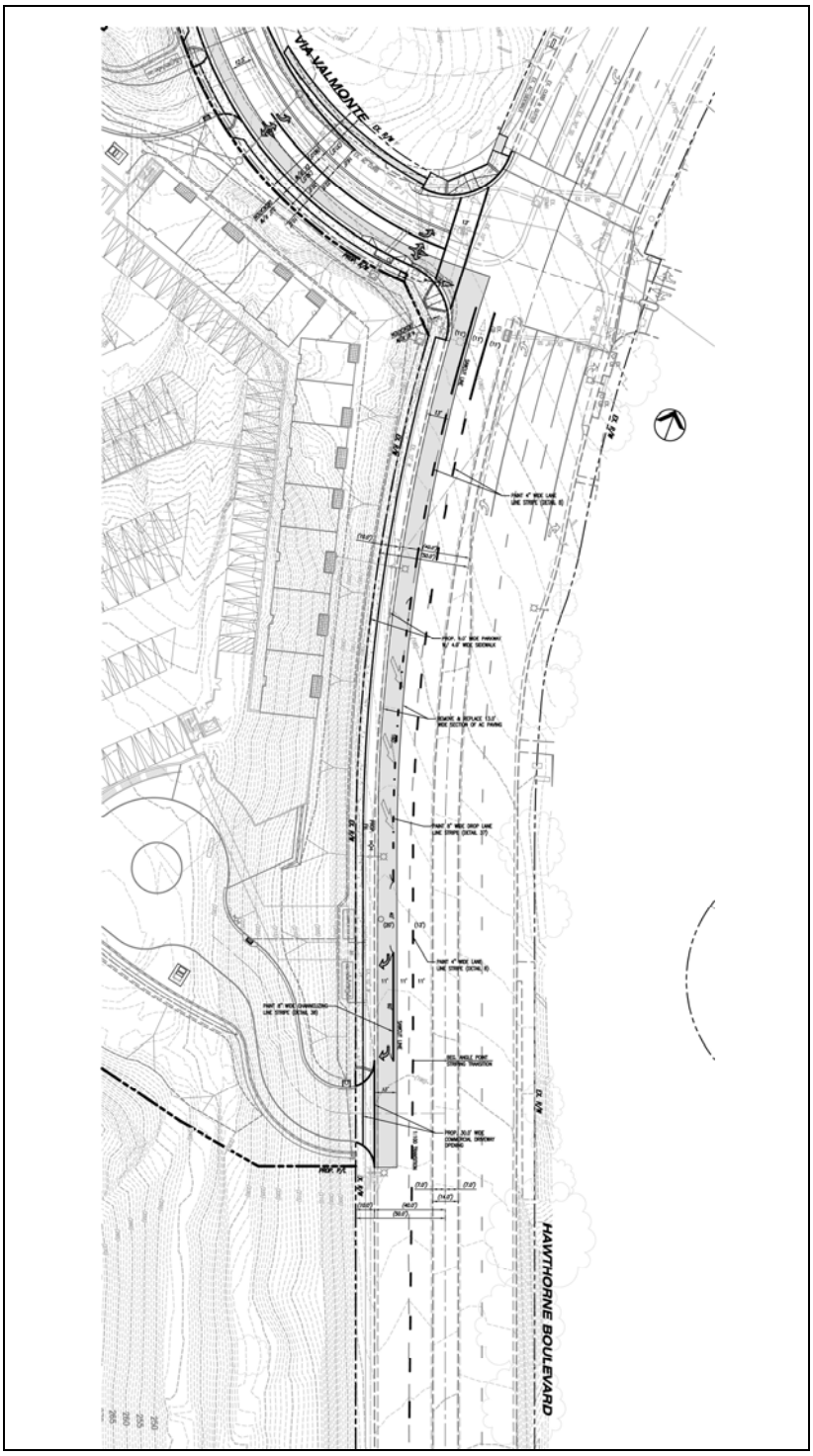


Figure 24 –Hawthorne Boulevard Improvements

Site Access & Internal Circulation

A review of the site plan for the proposed *Project* reveals a simple, yet efficient, circulation system with convenient access to the *Project* via two driveways - one driveway along Hawthorne Boulevard and one driveway on Via Valmonte. Within the property, internal drive aisles lead directly into a subterranean parking structure. Within the parking structure, parking spaces and drive aisles are appropriately sized to accommodate resident and guest parking. Appropriately-sized fire lanes and maintenance roads are also provided on site.

Parking

The proposed *Project* will feature a three level subterranean parking structure located under the residential buildings. Vehicular access to the parking structure will be controlled by signage. Designated guest parking will also be provided. In total, the 300 multi-family dwelling units will be served with 676 parking spaces, for a parking ratio of approximately 2.25 spaces per unit, as required by City code.

Intersection Queuing Analysis

The City of Torrance requested, as part of the TIS, that a queuing analysis be performed for the eastbound approach to the Via Valmonte/Hawthorne Boulevard intersection. The queuing analysis was intended to show the number of vehicles that typically wait for the left turn movement onto northbound Hawthorne Boulevard during the A.M. peak hour. Between 7:00 A.M. and 8:00 A.M, on May 24, 2016, a survey was taken to identify the number of vehicles waiting in the left turn lane at each traffic signal cycle. A total of 112 vehicles turned left at the eastbound approach and there were a total of 40 traffic signal cycles. This results in an hour long average of 2.8 vehicles turning left per cycle. Broken down into 15 minute time intervals, the average vehicle queue is shown in Table XIII.

TABLE XIII – QUEUING SURVEY

Time Period	Average Queue
7:00 – 7:15 A.M.	2.25
7:15 - 7:30 A.M.	2.90
7:30 – 7:45 A.M.	3.20
7:45 – 8:00 A.M.	2.10

[1] Queuing Survey Taken May 24, 2016

As shown in the table, the largest average queue of 3.2 vehicles occurred between 7:30 and 7:45 A.M. It is important to note that the largest number of vehicles observed in the left turn lane at any given time during any cycle was five, which occurred twice during the hour long observation. Five vehicles is nearly twice the hour long average.

In order to estimate the impact of additional *Project* related trips to the left turn queue, the trip generation/distribution during the A.M. peak hour, as shown in Figure 18, was added to the surveyed vehicles. A total of 70 left turning *Project* vehicles leaving the site from the Via Valmonte driveway, added to the surveyed 112 vehicles brought the future total to an estimated 182 vehicles turning left during the A.M. hour with *Project* buildout. Assuming the same number of 40 traffic signal cycles, the average queue for left turn movements is 4.55 (rounded up to 5) vehicles during the A.M. peak hour. To assume a worst case maximum of left-turn movements at any given time, doubling the average (10 vehicles) could potentially occupy the two left turn lanes during the peak use time period.

As described above, the *Project* plan includes constructing a second optional left turn lane for the eastbound approach to the intersection. The anticipated vehicle capacity of both left turn options is 250 feet (125 feet for each lane), which should accommodate approximately 12 vehicles (at 20 feet each). With the development of the proposed intersection improvements, there should be more than adequate space within the left turn pockets to accommodate existing plus *Project* related vehicles during the highest use time period.

Pedestrian Crossings

The City of Torrance requested, as part of the TIS, a review of pedestrian crossings at the intersection of Via Valmonte and Hawthorne Boulevard, to see if re-locating the existing crosswalk across Hawthorne Boulevard on the north leg to the south leg of the intersection would improve the efficiency of left turns from eastbound Via Valmonte onto northbound Hawthorne Boulevard by eliminating the conflict between pedestrian crossings and left turning vehicles. Pedestrian traffic (mostly school kids) is generated from the residential neighborhoods to the west along Via Valmonte. All pedestrians walk along the north side of Via Valmonte on an asphalt walkway. There are no pedestrian walkways along the south side of Via Valmonte.

After a field review of actual pedestrian crossings at the Via Valmonte/Hawthorne Boulevard intersection, it was determined that relocating the crosswalk from the north leg to the south leg would not eliminate conflict with left turning vehicles because the crossing movement would simply be transferred to the west leg, where pedestrians would still impede the eastbound left turns. In fact, overall delay at the intersection would increase substantially by forcing pedestrians to cross both Via Valmonte (from the north side to the south side); then Hawthorne Boulevard to get to the east side of Hawthorne Boulevard; and then cross the *Hillside Village* shopping center driveway, whereas pedestrians currently cross only Hawthorne Boulevard on the north leg.

There are also constructability issues with trying to relocate the crosswalk to the south leg. There are no sidewalks or accessible ramps on the southeast corner of the intersection, and it appears that the corner is actually private property (i.e., part of the Hillside Village shopping center). In addition, the existing raised median would have

to be cut-back in order to properly align a crosswalk once the southwest corner is built out as part of the recommended off-site improvements associated with the proposed *Project*. The median has a storm drain inlet which would then have to be relocated as well.

Finally, it was observed that kids walking to school were better served by simply staying on the west side of Hawthorne Boulevard and crossing at Newton Street, rather than at Via Valmonte.

VIII. STUDY FINDINGS, CONCLUSIONS, & RECOMMENDATIONS

The proposed *Solana Torrance* project will replace a closed quarry operation with 300 new multi-family residences, utilizing only 6.06 acres of previously disturbed land within a 24.68-acre property. The remaining 18.62 acres of land will be preserved as natural open space.

The potential traffic impacts associated with the proposed *Project* were documented and analyzed in this Traffic Impact Study by focusing on two key roadway segments and eleven key intersections, as identified by the City of Torrance. The City also required that cumulative traffic impacts associated with the build-out of other projects be analyzed. The study findings, conclusions, and recommendations are presented as follows:

Study Findings

Based on the documentation and analyses presented herein, the following study findings were made:

1) New traffic counts were taken in mid-April 2016, and reflect baseline traffic conditions at study intersections and on study roadway segments.

2) By the *Project* target year of 2019, the *Project* is estimated to generate a total of 1,758 average weekday trip ends; and 132 A.M. and 156 P.M. peak hour trips ends, respectively.

3) The potential for “internal capture” of vehicle trips will be present, however, the percentage of such trip reduction is uncertain.

4) While the *Project* will generate some degree of regular transit use, thus potentially reducing private vehicle trips, the percentage of such trip reduction is uncertain.

5) Based on the current site plan for the *Project*, vehicular access will be provided via two future driveways - one driveway along Hawthorne Boulevard and one driveway on Via Valmonte.

6) Both *Project* driveways will be restricted to right-turn-only movements for residents and visitors. Delivery and emergency vehicles will be allowed to turn left into the site at the Via Valmonte entrance.

7) Capital Improvements are slated for the intersections of Hawthorne Boulevard/Pacific Coast Highway and Vista Montana/Pacific Coast Highway that will reduce traffic congestion for each location. These improvements are planned to occur in 2017 and 2018.

8) Relocating the existing crosswalk on the north leg of Via Valmonte and Hawthorne Boulevard to the south leg will increase overall delay to traffic.

Study Conclusions

Based on the above study findings, the following study conclusions were reached:

1) Since new traffic counts take into consideration current land uses, traffic generated by any previous development on the subject property cannot be deducted from the amount of traffic projected to be generated by the *Project*.

2) The potential use of transit was not taken into consideration in reducing the amount of traffic projected to be generated by the *Project*.

3) Each intersection was analyzed for "Levels of Service" (LOS) using four scenarios: existing 2016 volumes, ambient growth 2019 volumes, *Project* 2019 volumes, and cumulative development 2019 volumes for both the A.M. and P.M. peak hours.

4) Each intersection was analyzed using two methods – Intersection Capacity Utilization (ICU), and Highway Capacity Manual (HCM). Calculation sheets for each intersection/condition are within the Appendix section of this report.

5) Using counts taken in the April 2016, (existing traffic conditions), the ICU LOS at each of the study intersections, during both the A.M. and P.M. peak hours of weekday commute, fall within acceptable limits (i.e., "D" or better) with the exception of the Crenshaw Boulevard/Pacific Coast Highway intersection during the P.M. peak hour of traffic.

6) The addition of ambient growth (i.e., one percent per year for three years) traffic to the 2016 volumes resulted in only slight increases in utilization and ICU intersection LOS for each of the study intersections.

7) In the target year of 2019, with the addition of *Project* traffic, the ICU LOS at each of the study intersections during both the A.M. and P.M. peak hours of traffic increased slightly with no changes to the LOS designations.

8) In the target year 2019, with the addition of cumulative development traffic, the ICU LOS at each of the study intersections during both the A.M. and P.M. peak hours of traffic are projected to stay within acceptable limits, again with the exception of the Crenshaw Boulevard/Pacific Coast Highway intersection which further deteriorates in LOS in both the A.M. and P.M. peak hours.

9) Using the HCM methodology to determine levels of service for the studied intersections revealed similar results in LOS (as the ICU method). Intersection delays increased with each scenario and the Crenshaw Boulevard/Pacific Coast Highway intersection further deteriorated in LOS during both peak hours of traffic. Also, the intersection of Rolling Hills Road/Crenshaw Boulevard decreased in LOS to "E" during the A.M. peak hour under cumulative development conditions.

10) The intersection of Via Valmonte and Palos Verdes North is a "stop-controlled" intersection that had an HCM LOS of "D" in all scenarios primarily due to the significant north-south traffic volumes traveling through that intersection. It is important to note that although this intersection is within proximity to the Project site, only six *Project* trips were distributed through this intersection in the P.M. peak hour due to turn movement restrictions on *Project* traffic.

11) The two roadway segments analyzed – Via Valmonte and Hawthorne Boulevard, adjacent to the *Project* site both currently operate at acceptable levels, and will continue to do so with the addition of ambient growth, *Project* traffic and cumulative development traffic in 2019.

12) The roadway connections and parking provisions depicted on the current site plan for the *Project*, appear to be well situated relative to the surrounding public streets and highways network.

13) A queuing analysis performed for the eastbound approach to the Via Valmonte/Hawthorne Boulevard intersection revealed that the hour long average of vehicles waiting within the left-turn lane during the A.M. peak hour was 2.8 vehicles. The highest number recorded at any given traffic signal cycle was five – nearly double the average. By adding estimated traffic into the eastbound approach to the Via Valmonte/Hawthorne Boulevard intersection, there could be an average of five vehicles and a maximum of 10 vehicles waiting to turn left at any given time during the peak hour. The proposed second left turn lane will increase the total vehicle capacity for left turn movements to approximately 12 vehicles. With the development of the proposed intersection improvements, there should be more than adequate space within the left turn pockets to accommodate existing plus *Project* related vehicles during the highest use time period.

14) The existing crosswalk at Via Valmonte and Hawthorne Boulevard should remain in place.

Recommendations

Based on the above study findings and conclusions, the proposed *Project* is not anticipated to result in measurably significant traffic impacts to any of the study roadway segments or intersections during the daily or A.M. or P.M. peak hours of weekday commute. With the build-out of other projects in the future, potential traffic impacts were identified. However, the City's planned public improvements at key intersections indicate that future impacts will be offset.

During the course of the TIS, several traffic-related improvements were identified as being desirable to improve traffic flow and traffic safety at the *Project* site. The recommended improvements are as follows:

1) Construct *Project* driveways allowing right turn movements only from Via Valmonte and Hawthorne Boulevard.

2) Complete the off-site widening and improvements to Via Valmonte and restriping of Hawthorne Boulevard as shown on the *Project* plan.

3) Construct the intersection improvements including an additional left/through lane to the eastbound approach leg of the Via Valmonte/Hawthorne Boulevard, a new crosswalk on Via Valmonte accessible ramps, and traffic signal relocation on Via Valmonte.

4) Restripe the west side of Hawthorne Boulevard for a right turn deceleration lane, adjacent to the site for *Project* related traffic ingress.

5) Provide various traffic controls, including signage, striping, and pavement marking, to provide safe and efficient vehicular, pedestrian, and bicycle movement through and within the *Project* site.

IX. REFERENCES

1. City of Torrance General Plan, *Circulation and Infrastructure Element*, April 2010.
2. Institute of Transportation Engineers' (ITE) *Trip Generation* manual, 9TH Ed., 2012.
3. City of Torrance "Citywide Traffic Analysis," June 2008.
4. Caltrans' *Guide for the Preparation of Traffic Impact Studies*, December 2002.
5. Transportation Research Board, *Highway Capacity Manual*, HCM2010, 2010.

APPENDIX SECTION

Appendix A – Existing Roadway ADT and A.M./P.M. Peak Hour Intersection Counts

Prepared by NDS/ATD

VOLUME

Hawthorne Blvd S/O Via Valmonte

Day: Wednesday
Date: 4/13/2016

City: Torrance
Project #: CA16_5230_002

DAILY TOTALS	NB	SB	EB	WB	Total
	18,002	17,892	0	0	35,894

AM Period	NB		SB		EB		WB		TOTAL	
00:00	12		24						36	
00:15	12		29						41	
00:30	7		14						21	
00:45	14	45	15	82					29	127
01:00	13		9						22	
01:15	6		13						19	
01:30	7		11						18	
01:45	5	31	14	47					19	78
02:00	6		8						14	
02:15	9		8						17	
02:30	6		8						14	
02:45	8	29	3	27					11	56
03:00	9		8						17	
03:15	6		10						16	
03:30	12		3						15	
03:45	14	41	9	30					23	71
04:00	16		10						26	
04:15	18		12						30	
04:30	28		13						41	
04:45	35	97	17	52					52	149
05:00	49		20						69	
05:15	67		22						89	
05:30	85		31						116	
05:45	93	294	30	103					123	397
06:00	120		45						165	
06:15	132		73						205	
06:30	157		110						267	
06:45	202	611	123	351					325	962
07:00	285		143						428	
07:15	320		171						491	
07:30	369		294						663	
07:45	427	1401	290	898					717	2299
08:00	391		259						650	
08:15	416		244						660	
08:30	408		219						627	
08:45	392	1607	288	1010					680	2617
09:00	323		201						524	
09:15	328		198						526	
09:30	325		194						519	
09:45	301	1277	191	784					492	2061
10:00	325		186						511	
10:15	290		199						489	
10:30	311		227						538	
10:45	315	1241	229	841					544	2082
11:00	297		210						507	
11:15	261		229						490	
11:30	307		257						564	
11:45	298	1163	267	963					565	2126
TOTALS		7837		5188						13025
SPLIT %		60.2%		39.8%						36.3%

PM Period	NB		SB		EB		WB		TOTAL	
12:00	274		263						537	
12:15	312		246						558	
12:30	288		264						552	
12:45	296	1170	263	1036					559	2206
13:00	282		257						539	
13:15	299		298						597	
13:30	262		267						529	
13:45	264	1107	296	1118					560	2225
14:00	263		318						581	
14:15	266		341						607	
14:30	275		305						580	
14:45	302	1106	333	1297					635	2403
15:00	347		375						722	
15:15	369		380						749	
15:30	345		349						694	
15:45	306	1367	336	1440					642	2807
16:00	332		374						706	
16:15	311		362						673	
16:30	277		374						651	
16:45	324	1244	360	1470					684	2714
17:00	319		399						718	
17:15	359		433						792	
17:30	296		411						707	
17:45	308	1282	409	1652					717	2934
18:00	263		383						646	
18:15	238		378						616	
18:30	229		326						555	
18:45	244	974	345	1432					589	2406
19:00	235		345						580	
19:15	226		297						523	
19:30	191		256						447	
19:45	164	816	244	1142					408	1958
20:00	128		213						341	
20:15	115		226						341	
20:30	120		214						334	
20:45	102	465	213	866					315	1331
21:00	91		186						277	
21:15	83		217						300	
21:30	88		158						246	
21:45	72	334	131	692					203	1026
22:00	49		124						173	
22:15	43		109						152	
22:30	63		82						145	
22:45	41	196	72	387					113	583
23:00	45		67						112	
23:15	18		47						65	
23:30	24		32						56	
23:45	17	104	26	172					43	276
TOTALS		10165		12704						22869
SPLIT %		44.4%		55.6%						63.7%

DAILY TOTALS	NB	SB	EB	WB	Total
	18,002	17,892	0	0	35,894

Prepared by NDS/ATD

VOLUME

Via Valmonte W/O Hawthorne Blvd

Day: Wednesday
Date: 4/13/2016

City: Torrance
Project #: CA16_5230_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	3,097	3,276	6,373

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			1		3		4		12:00			54		64		118	
00:15			5		4		9		12:15			49		51		100	
00:30			1		3		4		12:30			53		55		108	
00:45			0	7	1	11	1	18	12:45			52	208	58	228	110	436
01:00			1		0		1		13:00			34		46		80	
01:15			1		0		1		13:15			49		54		103	
01:30			1		1		2		13:30			56		60		116	
01:45			0	3	2	3	2	6	13:45			57	196	60	220	117	416
02:00			1		1		2		14:00			45		49		94	
02:15			1		1		2		14:15			48		45		93	
02:30			1		1		2		14:30			46		48		94	
02:45			1	4	1	4	2	8	14:45			43	182	67	209	110	391
03:00			2		1		3		15:00			70		52		122	
03:15			2		0		2		15:15			58		45		103	
03:30			1		1		2		15:30			68		65		133	
03:45			0	5	3	5	3	10	15:45			61	257	49	211	110	468
04:00			2		2		4		16:00			67		68		135	
04:15			2		1		3		16:15			59		73		132	
04:30			4		1		5		16:30			61		78		139	
04:45			5	13	3	7	8	20	16:45			48	235	76	295	124	530
05:00			11		3		14		17:00			60		85		145	
05:15			10		2		12		17:15			52		73		125	
05:30			18		1		19		17:30			47		67		114	
05:45			18	57	2	8	20	65	17:45			33	192	80	305	113	497
06:00			13		2		15		18:00			51		70		121	
06:15			14		8		22		18:15			58		73		131	
06:30			20		16		36		18:30			44		47		91	
06:45			42	89	28	54	70	143	18:45			41	194	60	250	101	444
07:00			55		34		89		19:00			36		69		105	
07:15			58		47		105		19:15			23		39		62	
07:30			60		56		116		19:30			25		46		71	
07:45			62	235	69	206	131	441	19:45			19	103	51	205	70	308
08:00			66		50		116		20:00			23		28		51	
08:15			68		53		121		20:15			17		55		72	
08:30			73		55		128		20:30			8		29		37	
08:45			75	282	64	222	139	504	20:45			12	60	25	137	37	197
09:00			73		47		120		21:00			11		32		43	
09:15			49		31		80		21:15			15		37		52	
09:30			61		31		92		21:30			14		18		32	
09:45			65	248	37	146	102	394	21:45			8	48	18	105	26	153
10:00			50		39		89		22:00			9		28		37	
10:15			40		46		86		22:15			11		7		18	
10:30			52		45		97		22:30			4		10		14	
10:45			55	197	53	183	108	380	22:45			12	36	14	59	26	95
11:00			57		39		96		23:00			4		8		12	
11:15			64		42		106		23:15			4		13		17	
11:30			47		47		94		23:30			5		7		12	
11:45			64	232	45	173	109	405	23:45			1	14	2	30	3	44
TOTALS				1372		1022		2394	TOTALS				1725		2254		3979
SPLIT %				57.3%		42.7%		37.6%	SPLIT %				43.4%		56.6%		62.4%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	3,097	3,276	6,373

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Hawthorne Blvd and Pacific Coast Hwy , Torrance

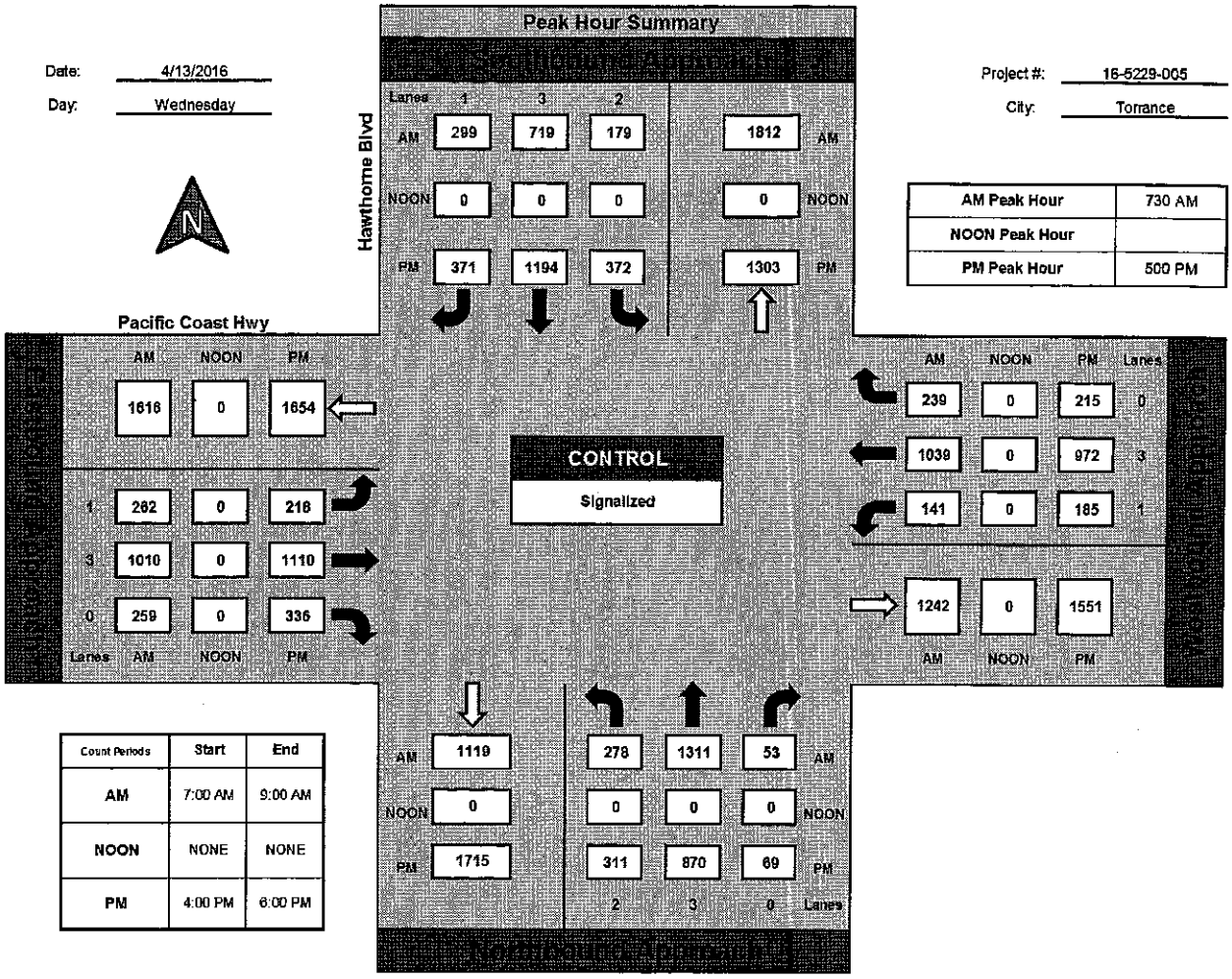
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-005

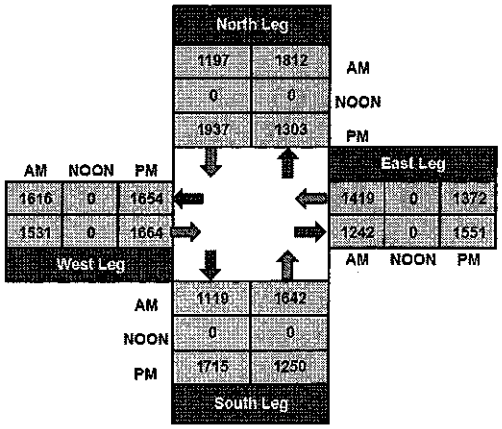
City: Torrance

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	500 PM

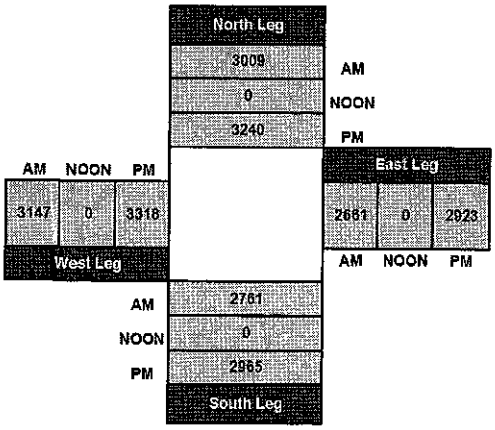


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Hawthorne Blvd and 244th St , Torrance

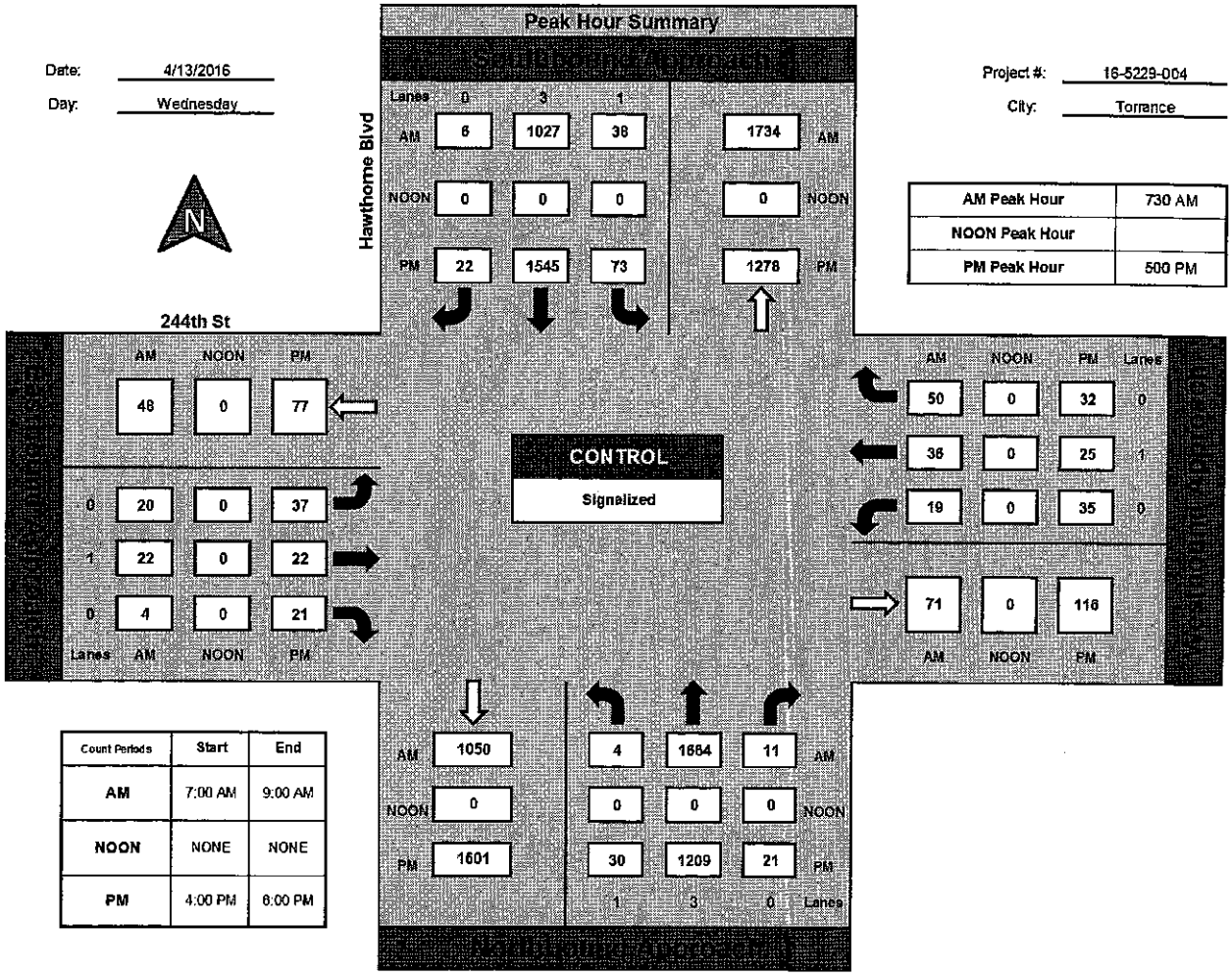
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-004

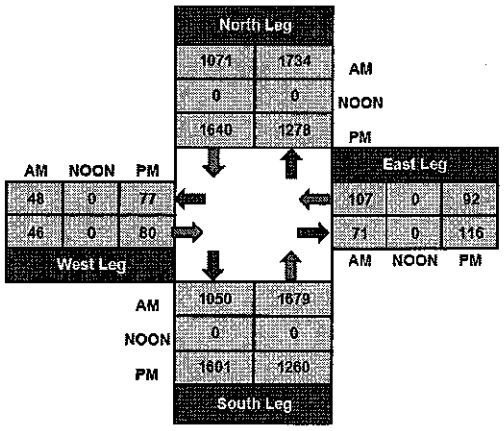
City: Torrance

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	500 PM

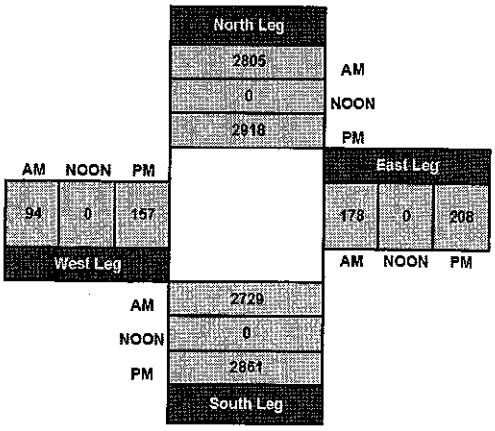


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



2

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Hawthorne Blvd and Newton St , Torrance

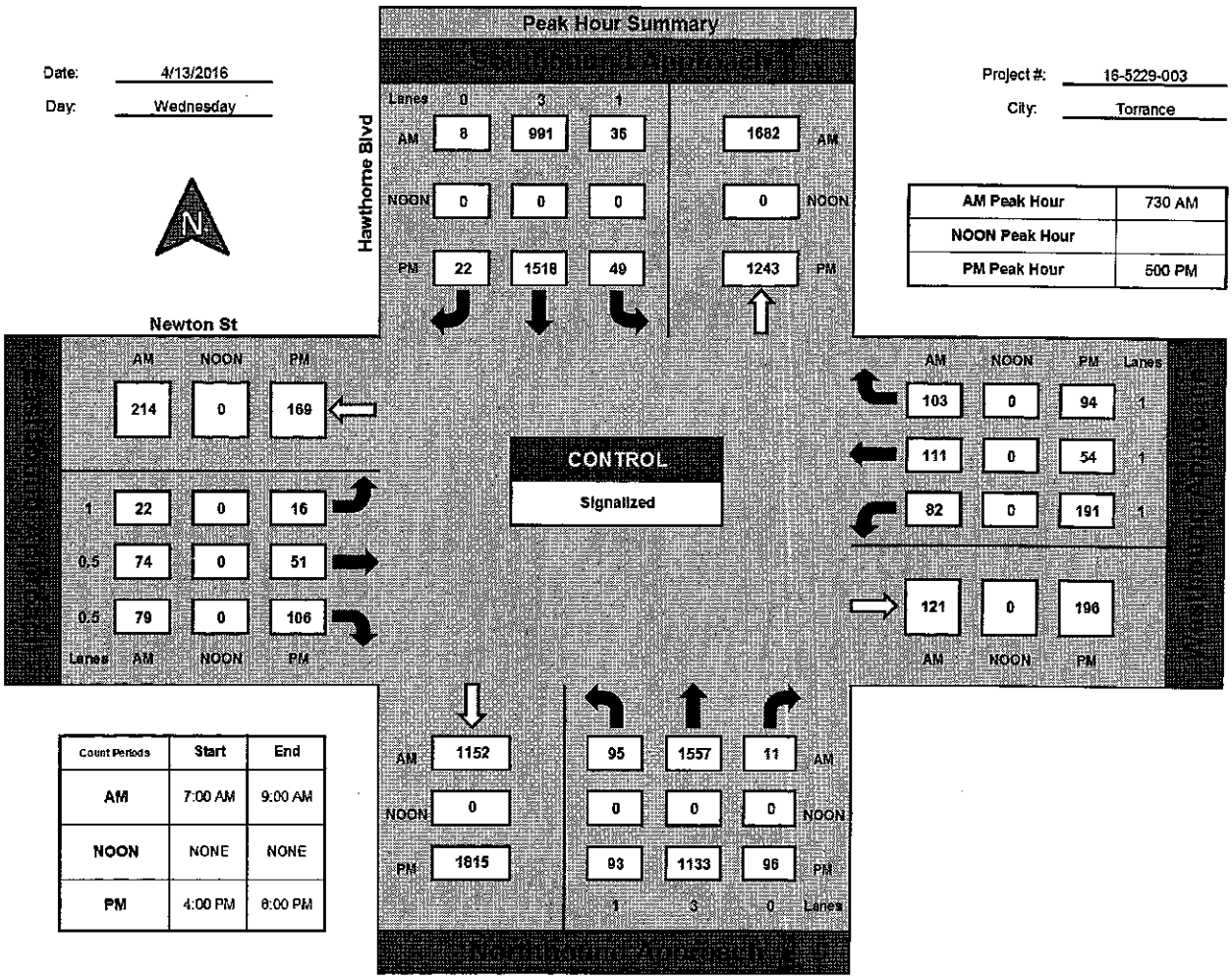
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-003

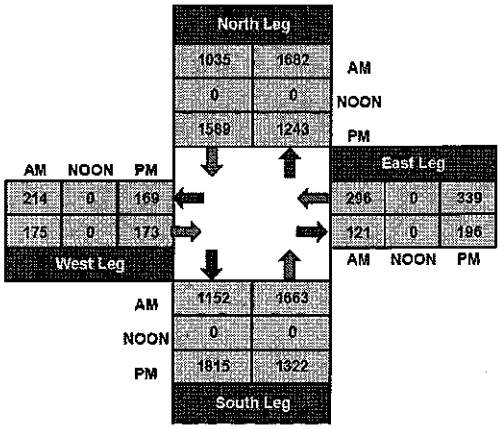
City: Torrance

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	500 PM

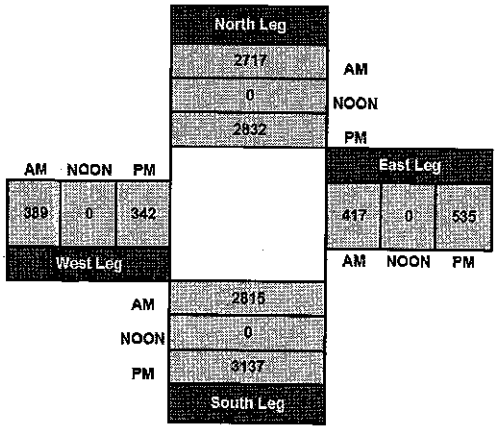


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



3

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Hawthorne Blvd and Via Valmonte , Torrance

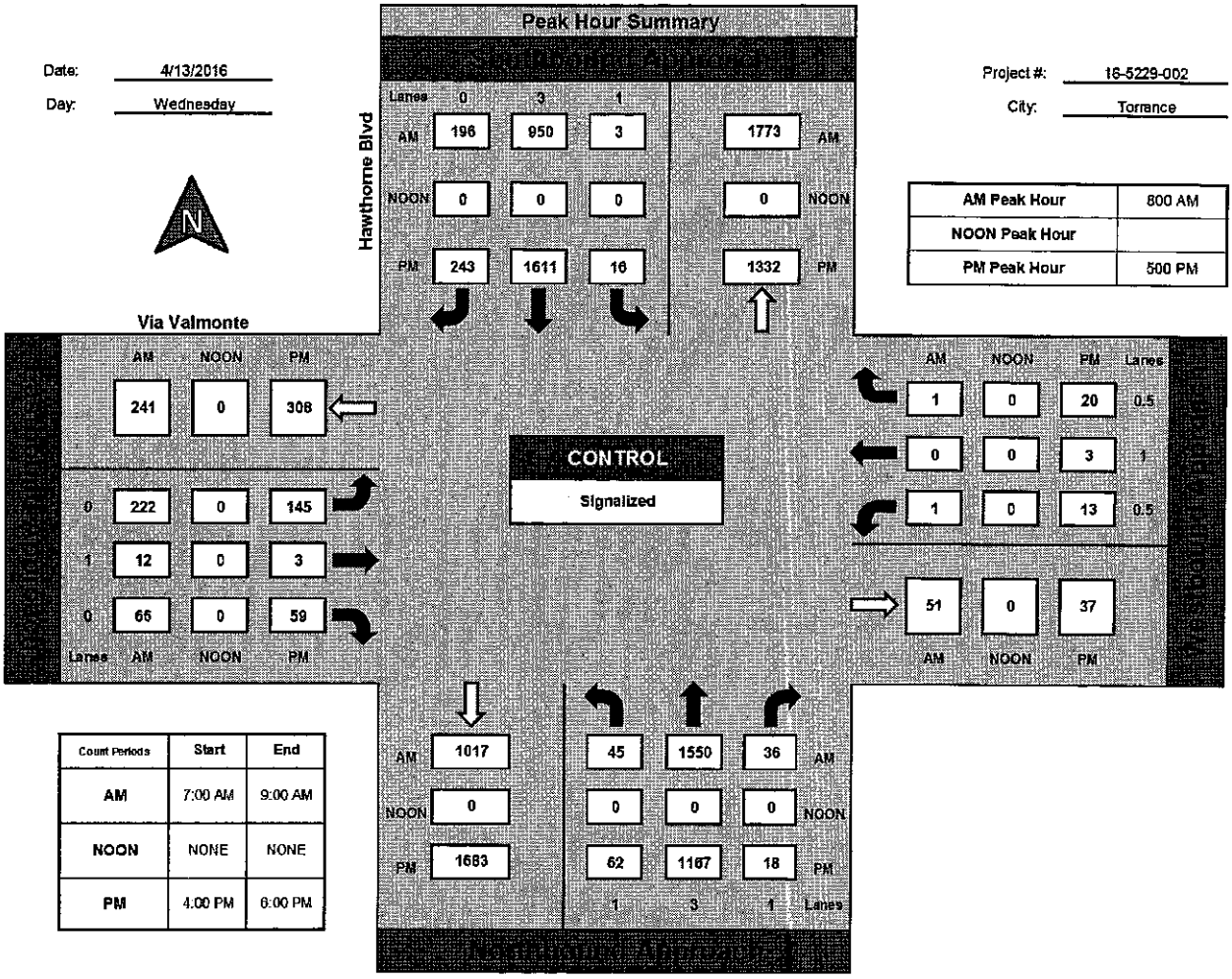
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-002

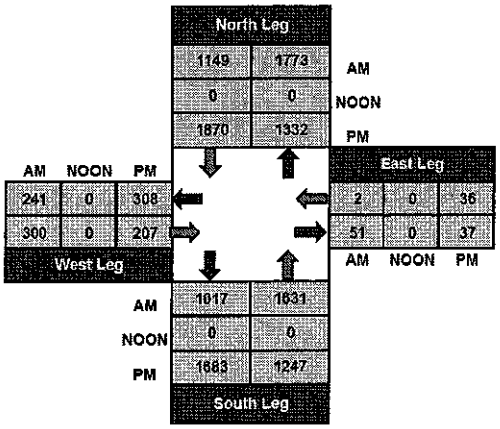
City: Torrance

AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	500 PM

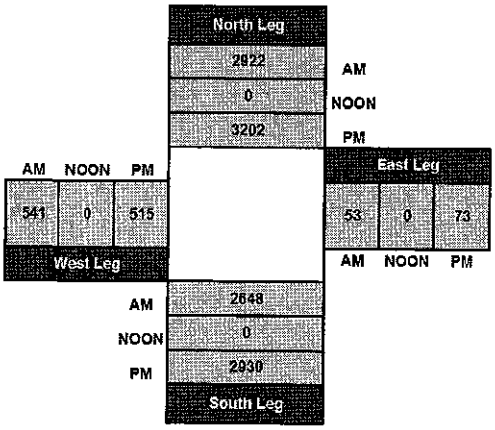


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



4

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Hawthorne Blvd and Rolling Hills Rd , Torrance

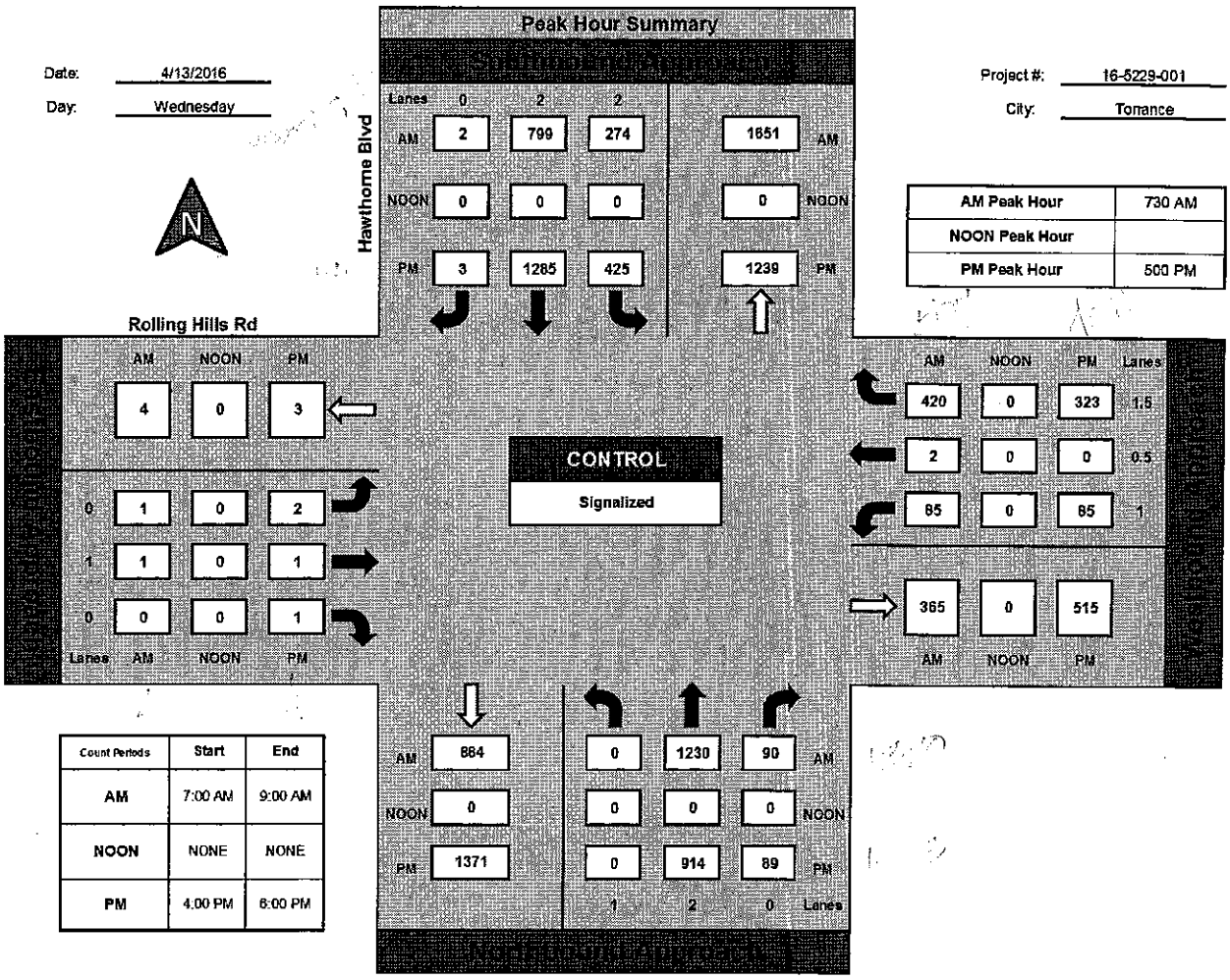
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-001

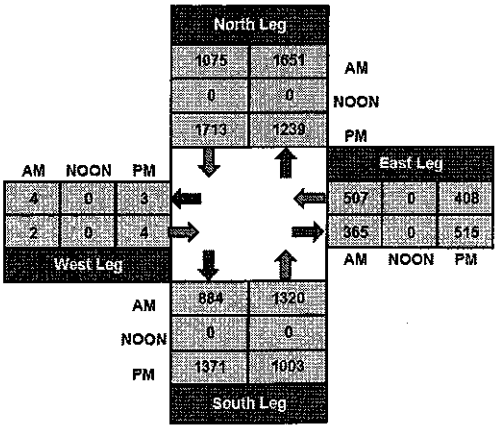
City: Torrance

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	500 PM

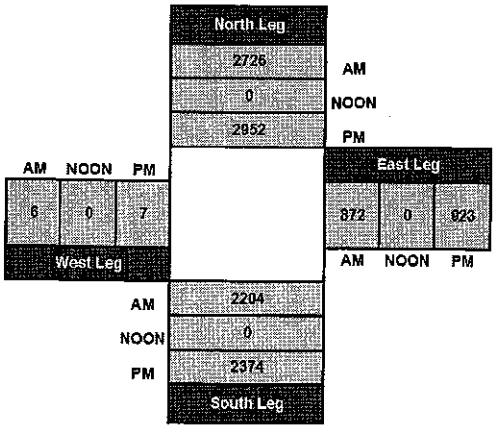


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Whiffle Tree Ln and Rolling Hills Rd , Torrance

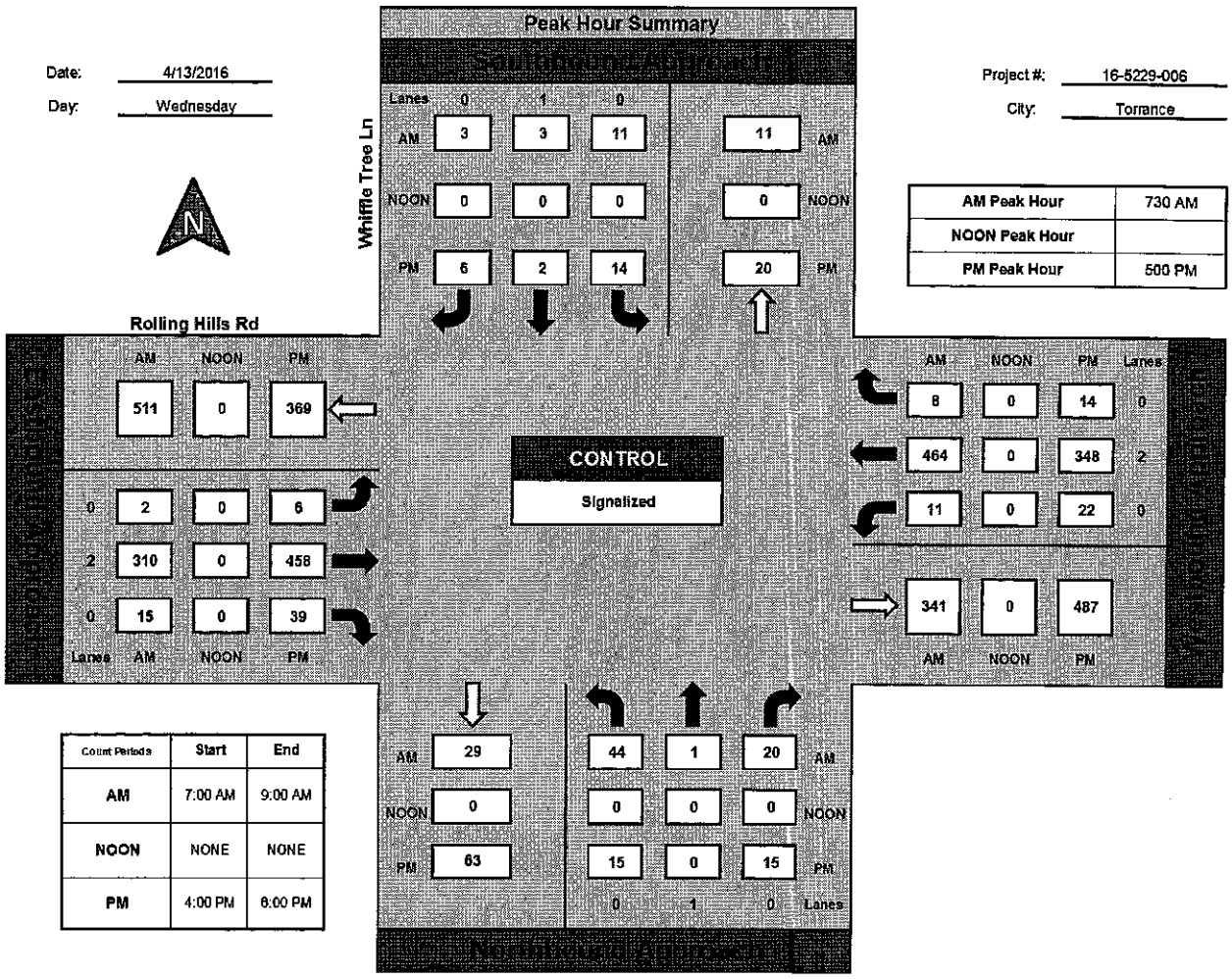
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-006

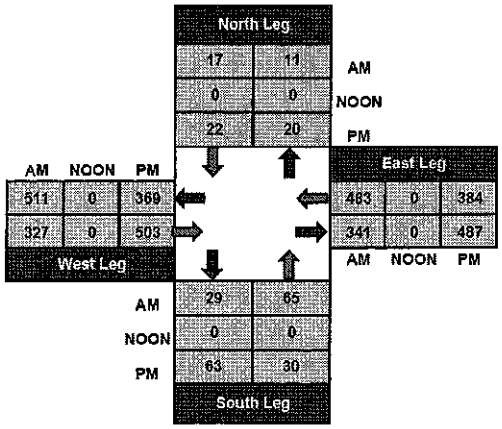
City: Torrance

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	500 PM

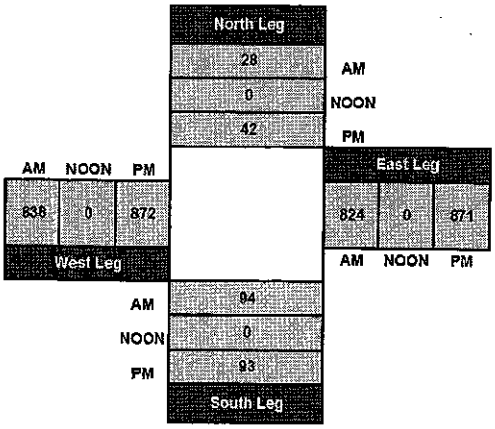


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Ce

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Fallenleaf Dr and Rolling Hills Rd , Torrance

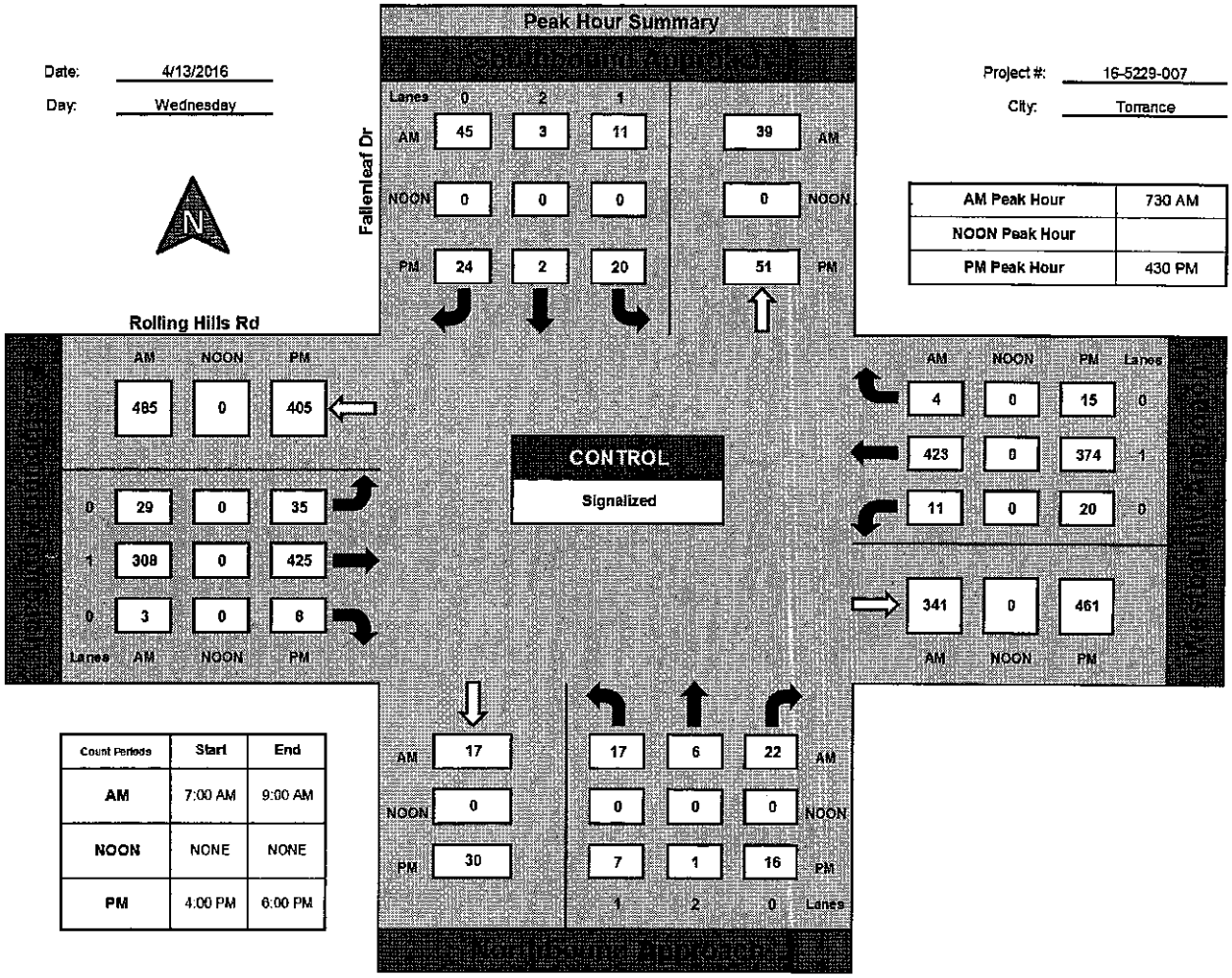
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-007

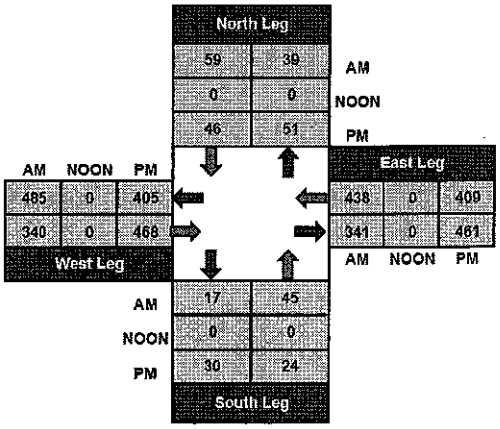
City: Torrance

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

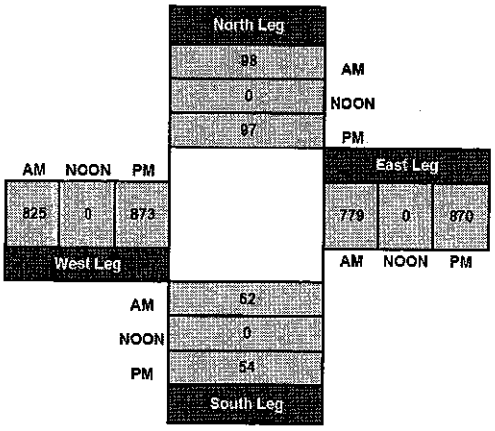


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



4

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Crenshaw Blvd and Rolling Hills Rd , Torrance

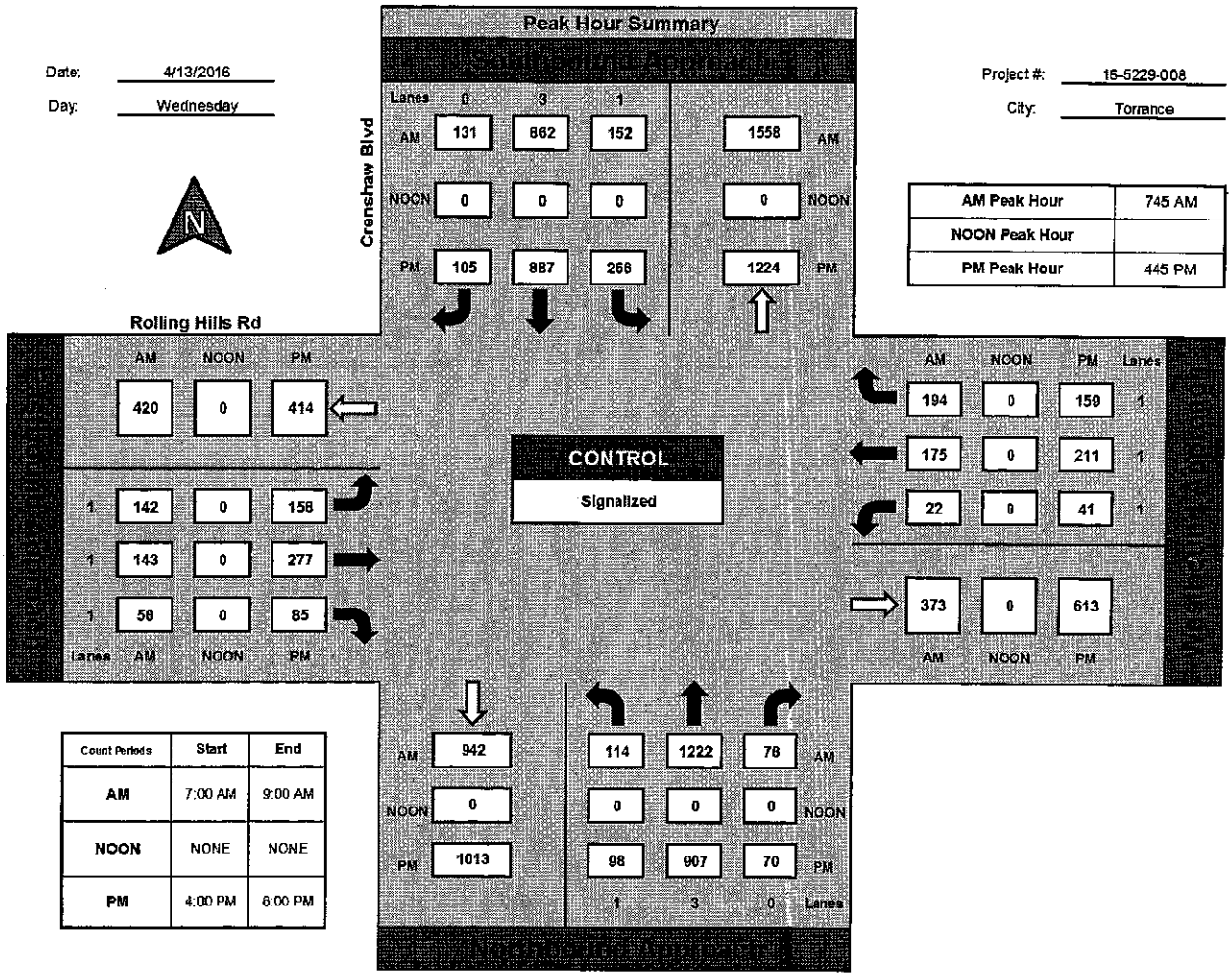
Date: 4/13/2016

Day: Wednesday

Project #: 15-5229-008

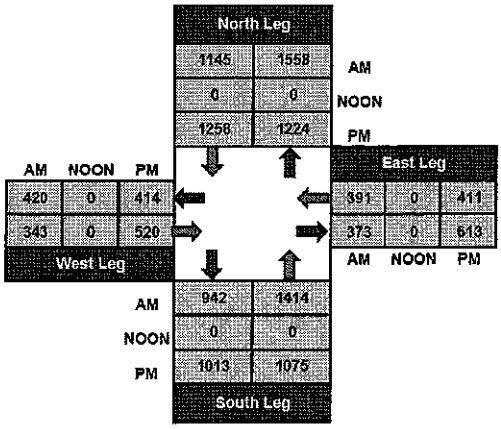
City: Torrance

AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	445 PM

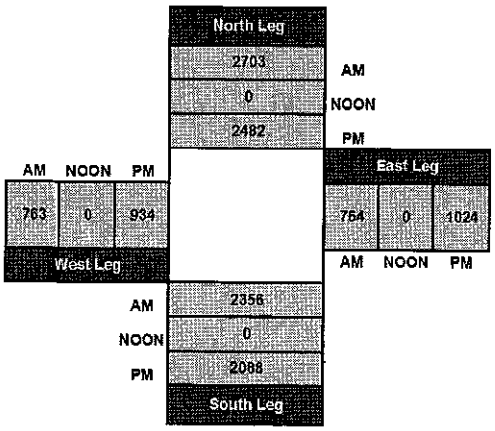


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



8

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Crenshaw Blvd and Pacific Coast Hwy , Torrance

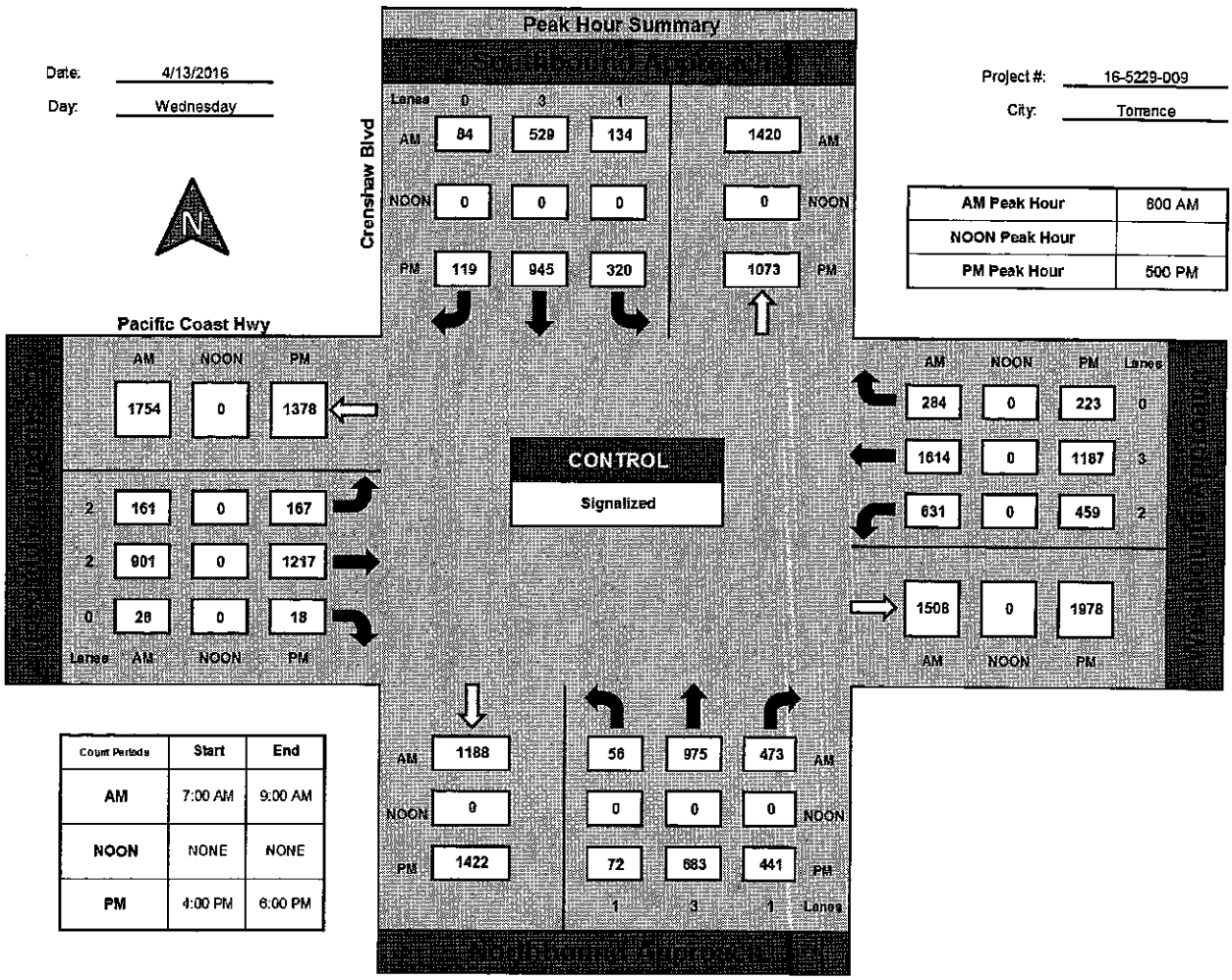
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-009

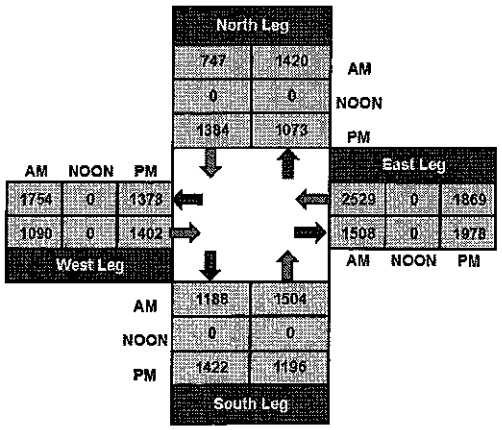
City: Torrance

AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	500 PM

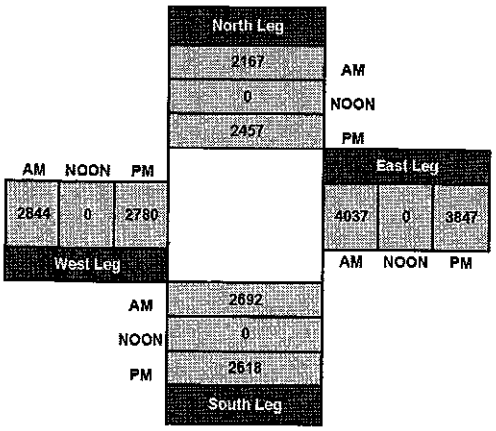


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Anza Ave/Vista Montana and Pacific Coast Hwy , Torrance

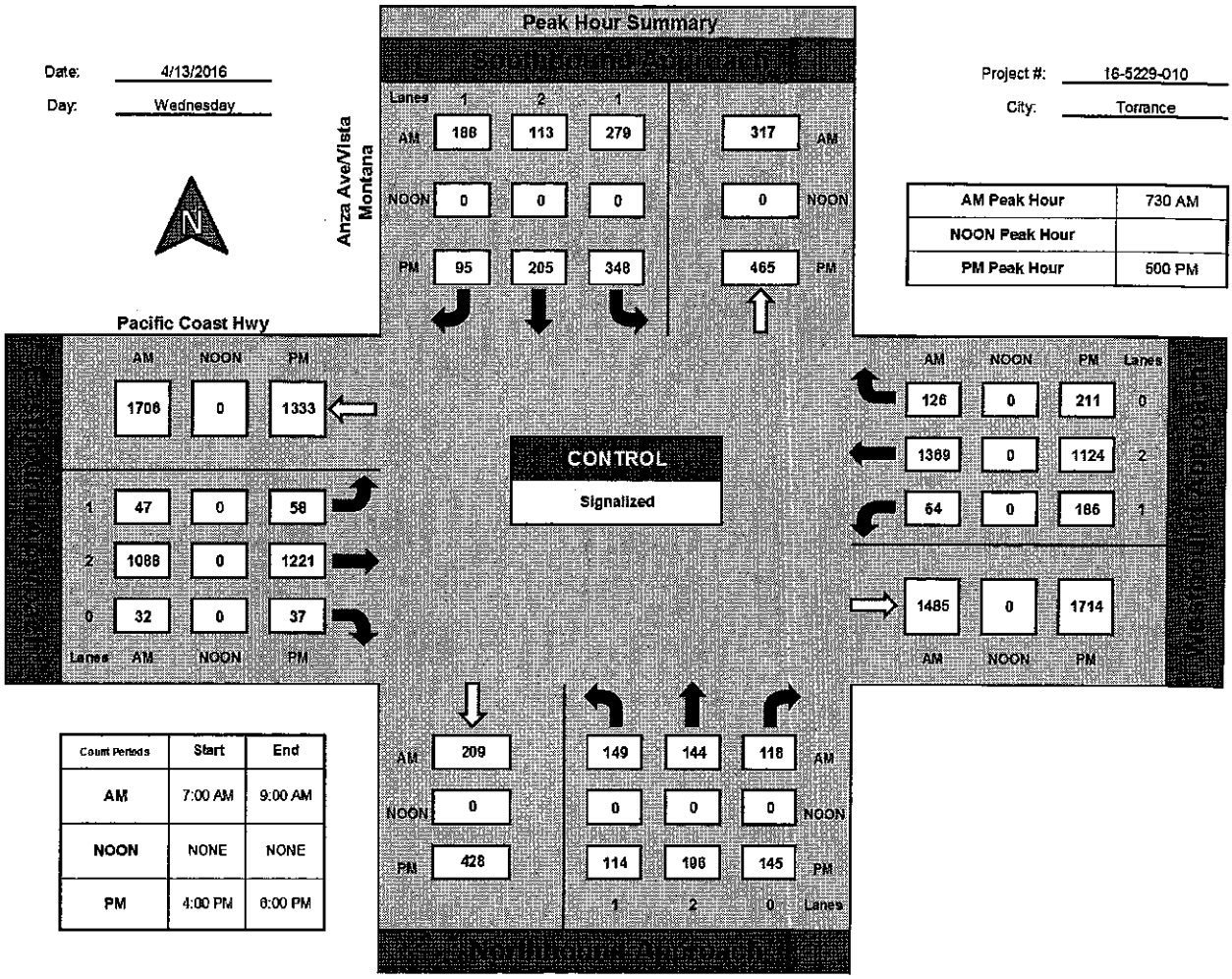
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-010

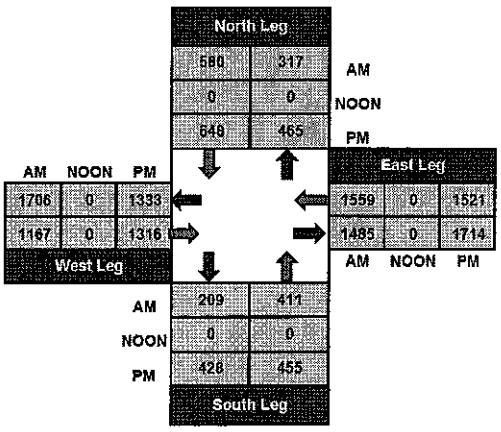
City: Torrance

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	500 PM

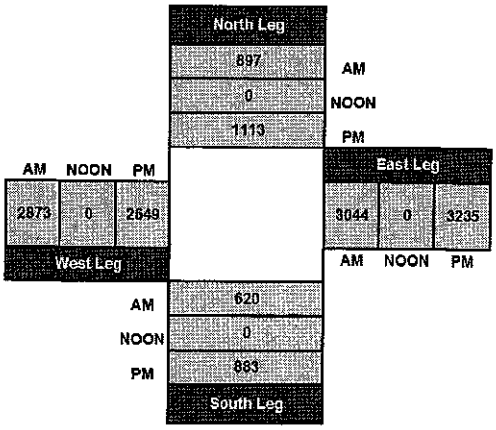


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



10

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Palos Verdes Dr N and Via Valmonte , Torrance

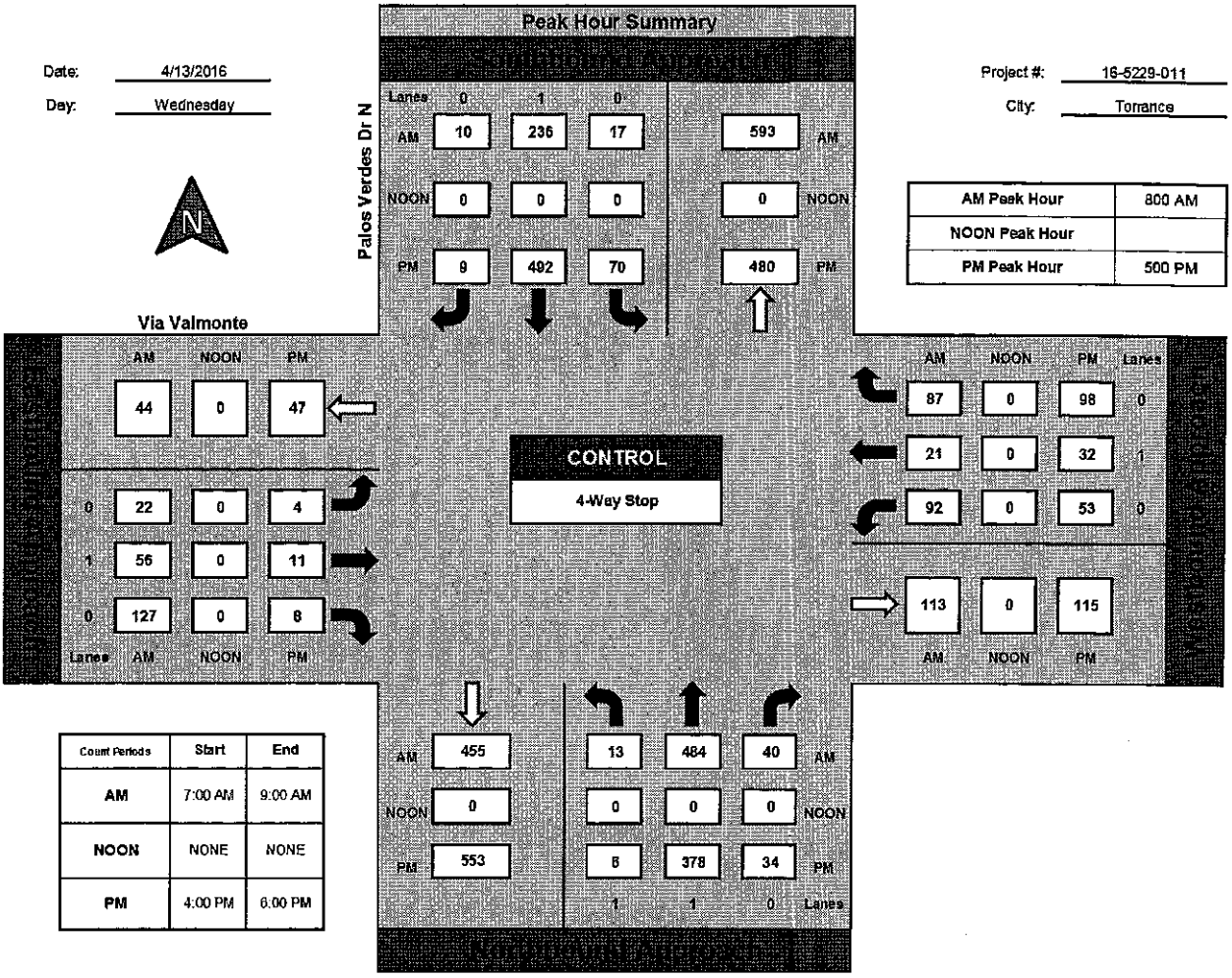
Date: 4/13/2016

Day: Wednesday

Project #: 16-5229-011

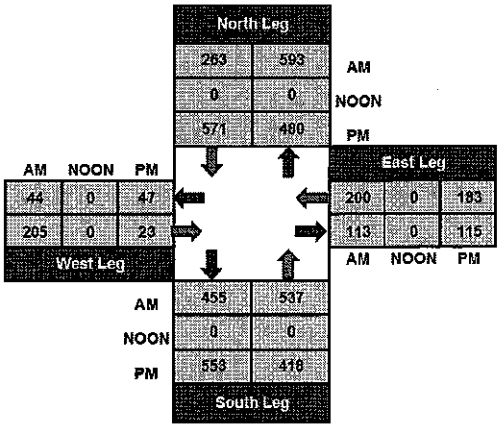
City: Torrance

AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	500 PM

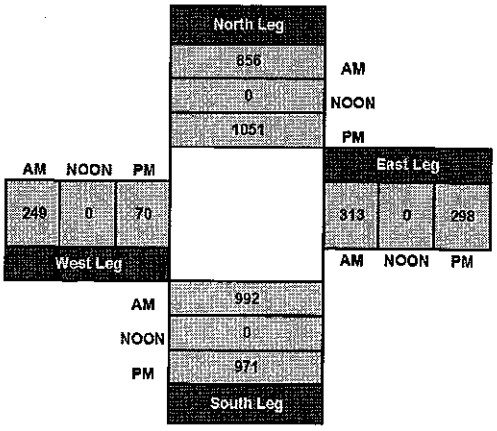


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Appendix B – 2016 Existing & Existing + 2019 Ambient

Level of Service Worksheets

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	2	3200	278	286	0.087	0.090
	Through	3	4800	1364	1405	0.284 *	0.293 *
	Right Turn**	0	0	0	0	-	
Southbound	Left Turn	2	3200	179	184	0.056 *	0.058 *
	Through	3	4800	719	741	0.150	0.154
	Right Turn	1	1600	299	308	0.187	0.193
Eastbound	Left Turn	1	1600	262	270	0.164 *	0.169 *
	Through	3	4800	1269	1307	0.264	0.272
	Right Turn**	0	0	0	0	-	
Westbound	Left Turn	1	1600	141	145	0.088	0.091
	Through	3	4800	1278	1317	0.266 *	0.274 *
	Right Turn**	0	0	0	0	-	
ICU Plus Lost Time Factor of .10						**0.870**	
Existing 2016 Level of Service						**D**	
ICU Plus Lost Time Factor of .10							**0.893**
Ambient 2019 Level of Service							**D**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
1

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	2	3200	311	320	0.097 *	0.100 *
	Through	3	4800	939	967	0.196	0.202
	Right Turn**	0	0	0	0	-	
Southbound	Left Turn	2	3200	372	383	0.116	0.120
	Through	3	4800	1194	1230	0.249 *	0.256 *
	Right Turn	1	1600	371	382	0.232	0.239
Eastbound	Left Turn	1	1600	218	225	0.136	0.140
	Through	3	4800	1446	1490	0.301 *	0.310 *
	Right Turn**	0	0	0	0	-	
Westbound	Left Turn	1	1600	185	191	0.116 *	0.119 *
	Through	3	4800	1187	1223	0.247	0.255
	Right Turn**	0	0	0	0	-	
	ICU Plus Lost Time Factor of .10					**0.863**	
	Existing 2016 Level of Service					**D**	
	ICU Plus Lost Time Factor of .10						**0.886**
	Ambient 2019 Level of Service						**D**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
1

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	244th Street	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	4	4	0.003	0.003
	Through	3	4800	1565	1612	0.326 *	0.336 *
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	38	39	0.024 *	0.024 *
	Through	3	4800	1033	1064	0.215	0.222
	Right Turn**	0	0			-	
Eastbound	Left Turn***	0	0		0	-	-
	Through	1	1600	42	43	0.026 *	0.027 *
	Right Turn	0.5	800	4	4	0.005	0.005
Westbound	Left Turn***	0	0			-	-
	Through	1	1600	57	59	0.036 *	0.037 *
	Right Turn	0.5	800	50	52	0.063	0.064
	ICU Plus Lost Time Factor of .10					**0.512**	
	Existing 2016 Level of Service					**A**	
	ICU Plus Lost Time Factor of .10						**0.524**
	Ambient 2019 Level of Service						**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
2

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	244th Street	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	30	31	0.019 *	0.019 *
	Through	3	4800	1230	1267	0.256	0.264
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	73	75	0.046	0.047
	Through	3	4800	1567	1614	0.326 *	0.336 *
	Right Turn**	0	0			-	
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	59	61	0.037 *	0.038 *
	Right Turn	0.5	800	21	22	0.026	0.027
Westbound	Left Turn***	0	0			-	-
	Through	1	1600	60	62	0.038 *	0.039 *
	Right Turn	0.5	800	32	33	0.040	0.041
	ICU Plus Lost Time Factor of .10					**0.520**	
	Existing 2016 Level of Service					**A**	
	ICU Plus Lost Time Factor of .10						**0.532**
	Ambient 2019 Level of Service						**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
2

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Newton Street	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	95	98	0.059	0.061
	Through	3	4800	1568	1616	0.327 *	0.337 *
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	36	37	0.023 *	0.023 *
	Through	3	4800	999	1029	0.208	0.214
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	22	23	0.014	0.014
	Through	0.5	800	74	76	0.093 *	0.095 *
	Right Turn	0.5	800	79	81	0.099	0.102
Westbound	Left Turn	1	1600	82	84	0.051 *	0.053 *
	Through	1	1600	111	114	0.069	0.071
	Right Turn	1	1600	103	106	0.064	0.066
			ICU Plus Lost Time Factor of .10			**0.593**	
			Existing 2016 Level of Service			**A**	
			ICU Plus Lost Time Factor of .10				**0.608**
			Ambient 2019 Level of Service				**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
3

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Newton Street	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	93	96	0.058 *	0.060 *
	Through	3	4800	1229	1266	0.256	0.264
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	49	50	0.031	0.032
	Through	3	4800	1540	1587	0.321 *	0.331 *
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	16	16	0.010	0.010
	Through	0.5	800	51	53	0.064 *	0.066 *
	Right Turn	0.5	800	106	109	0.133	0.137
Westbound	Left Turn	1	1600	191	197	0.119 *	0.123 *
	Through	1	1600	54	56	0.034	0.035
	Right Turn	1	1600	94	97	0.059	0.061
				ICU Plus Lost Time Factor of .10		**0.662**	
				Existing 2016 Level of Service		**B**	
				ICU Plus Lost Time Factor of .10			**0.679**
				Ambient 2019 Level of Service			**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
3

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	8:00 - 9:00 AM
East-West Street:	Via Valmonte	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	45	46	0.028	0.029
	Through	3	4800	1550	1597	0.323 *	0.333 *
	Right Turn	1	1600	36	37	0.023	0.023
Southbound	Left Turn	1	1600	3	3	0.002 *	0.002 *
	Through	3	4800	1146	1181	0.239	0.246
	Right Turn**	0	0		0	-	
Eastbound	Left Turn***	0	0		0	-	-
	Through	1	1600	234	241	0.146 *	0.151 *
	Right Turn	0.5	800	66	68	0.083	0.085
Westbound	Left Turn***	0	0		0	-	-
	Through	1	1600	1	1	0.001 *	0.001 *
	Right Turn	1	1600	1	1	0.001	0.001
				ICU Plus Lost Time Factor of .10		**0.572**	
				Existing 2016 Level of Service		**A**	
				ICU Plus Lost Time Factor of .10			**0.586**
				Ambient 2019 Level of Service			**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
4

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Via Valmonte	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	62	64	0.039 *	0.040 *
	Through	3	4800	1167	1202	0.243	0.250
	Right Turn	1	1600	18	19	0.011	0.012
Southbound	Left Turn	1	1600	16	16	0.010	0.010
	Through	3	4800	1854	1910	0.386 *	0.398 *
	Right Turn**	0	0		0	-	
Eastbound	Left Turn***	0	0		0	-	-
	Through	1	1600	148	152	0.093 *	0.095 *
	Right Turn	0.5	800	59	61	0.074	0.076
Westbound	Left Turn***	0	0		0	-	-
	Through	1	1600	16	16	0.010 *	0.010 *
	Right Turn	1	1600	20	21	0.013	0.013
	ICU Plus Lost Time Factor of .10					**0.628**	
	Existing 2016 Level of Service					**B**	
	ICU Plus Lost Time Factor of .10						**0.643**
	Ambient 2019 Level of Service						**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
4

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	0	0	0.000	0.000
	Through	2	3200	1320	1360	0.413 *	0.425 *
	Right Turn**	0	0			-	
Southbound	Left Turn	2	3200	274	282	0.086 *	0.088 *
	Through	2	3200	801	825	0.250	0.258
	Right Turn**	0	0			-	
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	2	2	0.001 *	0.001 *
	Right Turn	0.5	800	0	0	0.000	0.000
Westbound	Left Turn	1	1600	85	88	0.053 *	0.055 *
	Through	0.5	800	2	2	0.003	0.003
	Right Turn	1.5	2400	420	433	0.175	0.180
			ICU Plus Lost Time Factor of .10			**0.653**	
			Existing 2016 Level of Service			**B**	
			ICU Plus Lost Time Factor of .10				**0.669**
			Ambient 2019 Level of Service				**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
5

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	0	0	0.000	0.000
	Through	2	3200	1003	1033	0.313 *	0.323 *
	Right Turn**	0	0			-	
Southbound	Left Turn	2	3200	425	438	0.133 *	0.137 *
	Through	2	3200	1288	1327	0.403	0.415
	Right Turn**	0	0			-	
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	3	3	0.002 *	0.002 *
	Right Turn	0.5	800	1	1	0.001	0.001
Westbound	Left Turn	1	1600	85	88	0.053 *	0.055 *
	Through	0.5	800	0	0	0.000	0.000
	Right Turn	1.5	2400	323	333	0.135	0.139
	ICU Plus Lost Time Factor of .10					**0.601**	
	Existing 2016 Level of Service					**B**	
	ICU Plus Lost Time Factor of .10						**0.616**
	Ambient 2019 Level of Service						**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
5

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Whiffletree Lane	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn***	0	0		0	-	-
	Through	1	1600	45	46	0.028 *	0.029 *
	Right Turn	0.5	800	20	21	0.025	0.026
Southbound	Left Turn***	0	0		0	-	
	Through	1	1600	14	14	0.009 *	0.009 *
	Right Turn	0.5	800	3	3	0.004	0.004
Eastbound	Left Turn***	0	0		0	-	-
	Through	2	3200	327	337	0.102 *	0.105 *
	Right Turn**	0	0		0	-	
Westbound	Left Turn***	0	0		0	-	-
	Through	2	3200	483	498	0.151 *	0.156 *
	Right Turn**	0	0		0	-	

ICU Plus Lost Time Factor of .10	**0.390**	
Existing 2016 Level of Service	**A**	
ICU Plus Lost Time Factor of .10		**0.399**
Ambient 2019 Level of Service		**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
6

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Whiffletree Lane	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn***	0	0		0	-	-
	Through	1	1600	15	15	0.009 *	0.010 *
	Right Turn	0.5	800	15	15	0.019	0.019
Southbound	Left Turn***	0	0		0	-	
	Through	1	1600	16	16	0.010 *	0.010 *
	Right Turn	0.5	800	6	6	0.008	0.008
Eastbound	Left Turn***	0	0		0	-	-
	Through	2	3200	503	518	0.157 *	0.162 *
	Right Turn**	0	0		0	-	
Westbound	Left Turn***	0	0		0	-	-
	Through	2	3200	384	396	0.120 *	0.124 *
	Right Turn**	0	0		0	-	
	ICU Plus Lost Time Factor of .10					**0.397**	
	Existing 2016 Level of Service					**A**	
	ICU Plus Lost Time Factor of .10						**0.406**
	Ambient 2019 Level of Service						**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
6

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Fallenleaf Drive	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn***	0	0		0	-	-
	Through	1	1600	45	46	0.028 *	0.029 *
	Right Turn**	0	0		0	-	
Southbound	Left Turn***	0	0		0	-	
	Through	1	1600	59	61	0.037 *	0.038 *
	Right Turn**	0	0		0	-	
Eastbound	Left Turn	1	1600	29	30	0.018 *	0.019 *
	Through	2	3200	311	320	0.097	0.100
	Right Turn**	0	0		0	-	
Westbound	Left Turn	1	1600	11	11	0.007	0.007
	Through	2	3200	427	440	0.133 *	0.137 *
	Right Turn**	0	0		0	-	
	ICU Plus Lost Time Factor of .10					**0.317**	
	Existing 2016 Level of Service					**A**	
	ICU Plus Lost Time Factor of .10						**0.323**
	Ambient 2019 Level of Service						**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
7

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Fallenleaf Drive	**Peak Hour:**	4:30 - 5:30 PM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn***	0	0		0	-	-
	Through	1	1600	24	25	0.015 *	0.015 *
	Right Turn**	0	0		0	-	
Southbound	Left Turn***	0	0		0	-	
	Through	1	1600	46	47	0.029 *	0.030 *
	Right Turn**	0	0		0	-	
Eastbound	Left Turn	1	1600	35	36	0.022 *	0.023 *
	Through	2	3200	433	446	0.135	0.139
	Right Turn**	0	0		0	-	
Westbound	Left Turn	1	1600	20	21	0.013	0.013
	Through	2	3200	389	401	0.122 *	0.125 *
	Right Turn**	0	0		0	-	
	ICU Plus Lost Time Factor of .10					**0.287**	
	Existing 2016 Level of Service					**A**	
	ICU Plus Lost Time Factor of .10						**0.293**
	Ambient 2019 Level of Service						**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
7

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Crenshaw Boulevard	**Peak Hour:**	7:45 - 8:45 AM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	114	117	0.071	0.073
	Through	3	4800	1300	1339	0.271 *	0.279 *
	Right Turn**	0	0		0	-	
Southbound	Left Turn	1	1600	152	157	0.095 *	0.098 *
	Through	3	4800	993	1023	0.207	0.213
	Right Turn**	0	0		0	-	
Eastbound	Left Turn	1	1600	142	146	0.089 *	0.091 *
	Through	1	1600	143	147	0.089	0.092
	Right Turn	1	1600	58	60	0.036	0.037
Westbound	Left Turn	1	1600	22	23	0.014	0.014
	Through	0.5	800	175	180	0.219 *	0.225 *
	Right Turn	1.5	2400	194	200	0.081	0.083
				ICU Plus Lost Time Factor of .10		**0.773**	
				Existing 2016 Level of Service		**C**	
				ICU Plus Lost Time Factor of .10			**0.794**
				Ambient 2019 Level of Service			**C**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
8

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Crenshaw Boulevard	**Peak Hour:**	4:45 - 5:45 PM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	98	101	0.061	0.063
	Through	3	4800	977	1007	0.204 *	0.210 *
	Right Turn**	0	0		0	-	
Southbound	Left Turn	1	1600	266	274	0.166 *	0.171 *
	Through	3	4800	992	1022	0.207	0.213
	Right Turn**	0	0		0	-	
Eastbound	Left Turn	1	1600	158	163	0.099 *	0.102 *
	Through	1	1600	277	285	0.173	0.178
	Right Turn	1	1600	85	88	0.053	0.055
Westbound	Left Turn	1	1600	41	42	0.026	0.026
	Through	0.5	800	211	217	0.264 *	0.272 *
	Right Turn	1.5	2400	159	164	0.066	0.068
	ICU Plus Lost Time Factor of .10					**0.832**	
	Existing 2016 Level of Service					**D**	
	ICU Plus Lost Time Factor of .10						**0.854**
	Ambient 2019 Level of Service						**D**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
8

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Crenshaw Boulevard	**Peak Hour:**	8:00 - 9:00 AM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	56	58	0.035	0.036
	Through	3	4800	975	1004	0.203 *	0.209 *
	Right Turn	1	1600	473	487	0.296	0.305
Southbound	Left Turn	1	1600	134	138	0.084 *	0.086 *
	Through	3	4800	613	632	0.128	0.132
	Right Turn**	0	0		0	-	
Eastbound	Left Turn	2	3200	161	166	0.050	0.052
	Through	2	3200	929	957	0.290 *	0.299 *
	Right Turn**	0	0		0	-	
Westbound	Left Turn	2	3200	631	650	0.197 *	0.203 *
	Through	3	4800	1898	1956	0.395	0.407
	Right Turn**	0	0		0	-	
	ICU Plus Lost Time Factor of .10					**0.874**	
	Existing 2016 Level of Service					**D**	
	ICU Plus Lost Time Factor of .10						**0.897**
	Ambient 2019 Level of Service						**D**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
9

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Crenshaw Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	72	74	0.045	0.046
	Through	3	4800	683	703	0.142 *	0.146 *
	Right Turn	1	1600	441	454	0.276	0.284
Southbound	Left Turn	1	1600	320	329	0.200 *	0.205 *
	Through	3	4800	1064	1096	0.222	0.228
	Right Turn**	0	0		0	-	
Eastbound	Left Turn	2	3200	167	172	0.052	0.054
	Through	2	3200	1235	1272	0.386 *	0.398 *
	Right Turn**	0	0		0	-	
Westbound	Left Turn	2	3200	459	472	0.143 *	0.147 *
	Through	3	4800	1410	1453	0.294	0.303
	Right Turn**	0	0		0	-	
				ICU Plus Lost Time Factor of .10		**0.972**	
				Existing 2016 Level of Service		**E**	
				ICU Plus Lost Time Factor of .10			**0.996**
				Ambient 2019 Level of Service			**E**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
9

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Vista Montana	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1.5	2400	149	154	0.062	0.064
	Through	1.5	2400	144	148	0.060 *	0.062 *
	Right Turn	0.5	800	118	122	0.148	0.152
Southbound	Left Turn	1.5	2400	279	287	0.116 *	0.120 *
	Through	1.5	2400	113	116	0.047	0.049
	Right Turn	1	1600	188	194	0.118	0.121
Eastbound	Left Turn	1	1600	47	48	0.029 *	0.030 *
	Through	2	3200	1120	1154	0.350	0.361
	Right Turn**	0	0			-	
Westbound	Left Turn	1	1600	64	66	0.040	0.041
	Through	2	3200	1495	1540	0.467 *	0.481 *
	Right Turn**	0	0			-	

ICU Plus Lost Time Factor of .10	**0.773**	
Existing 2016 Level of Service	**C**	
ICU Plus Lost Time Factor of .10		**0.793**
Ambient 2019 Level of Service		**C**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
10

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Vista Montana	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1.5	2400	114	117	0.048	0.049
	Through	1.5	2400	196	202	0.082 *	0.084 *
	Right Turn	0.5	800	145	149	0.181	0.187
Southbound	Left Turn	1.5	2400	348	359	0.145 *	0.149 *
	Through	1.5	2400	205	211	0.085	0.088
	Right Turn	1	1600	95	98	0.059	0.061
Eastbound	Left Turn	1	1600	58	60	0.036 *	0.037 *
	Through	2	3200	1258	1296	0.393	0.405
	Right Turn**	0	0			-	
Westbound	Left Turn	1	1600	186	192	0.116	0.120
	Through	2	3200	1335	1375	0.417 *	0.430 *
	Right Turn**	0	0			-	
				ICU Plus Lost Time Factor of .10		**0.780**	
				Existing 2016 Level of Service		**C**	
				ICU Plus Lost Time Factor of .10			**0.801**
				Ambient 2019 Level of Service			**D**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
10

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Palos Verdes Drive	**Peak Hour:**	8:00 - 9:00 AM
East-West Street:	Via Valmonte	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	13	13	0.008	0.008
	Through	1	1600	484	499	0.303 *	0.312 *
	Right Turn	0.5	800	40	41	0.050	0.052
Southbound	Left Turn***	0	0		0	-	
	Through	1	1600	253	261	0.158 *	0.163 *
	Right Turn	0.5	800	10	10	0.013	0.013
Eastbound	Left Turn***	0	0		0	-	-
	Through	1	1600	78	80	0.049 *	0.050 *
	Right Turn	0.5	800	127	131	0.159	0.164
Westbound	Left Turn***	0	0		0	-	-
	Through	1	1600	113	116	0.071 *	0.073 *
	Right Turn	0.5	800	87	90	0.109	0.112
	ICU Plus Lost Time Factor of .10					**0.680**	
	Existing 2016 Level of Service					**B**	
	ICU Plus Lost Time Factor of .10						**0.698**
	Ambient 2019 Level of Service						**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
11

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Existing; Existing Plus Ambient (2019)	**Count Date:**	Wed. April 13, 2016
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Palos Verdes Drive	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Via Valmonte	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Existing (2016)	Existing +Ambient (2019)	Existing (2016)	Existing +Ambient (2019)
Northbound	Left Turn	1	1600	6	6	0.004	0.004
	Through	1	1600	378	389	0.236 *	0.243 *
	Right Turn	0.5	800	34	35	0.043	0.044
Southbound	Left Turn***	0	0		0	-	
	Through	1	1600	562	579	0.351 *	0.362 *
	Right Turn	0.5	800	9	9	0.011	0.012
Eastbound	Left Turn***	0	0		0	-	-
	Through	1	1600	15	15	0.009 *	0.010 *
	Right Turn	0.5	800	8	8	0.010	0.010
Westbound	Left Turn***	0	0		0	-	-
	Through	1	1600	85	88	0.053 *	0.055 *
	Right Turn	0.5	800	98	101	0.123	0.126
				ICU Plus Lost Time Factor of .10		**0.750**	
				Existing 2016 Level of Service		C	
				ICU Plus Lost Time Factor of .10			**0.770**
				Ambient 2019 Level of Service			C

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
11

Appendix C – 2019 Ambient + Project & 2019 Cumulative
Level of Service Worksheets

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	2	3200	296	302	0.093	0.094
	Through	3	4800	1371	1427	0.286 *	0.297 *
	Right Turn	1	1600	65	71	0.041	0.044
Southbound	Left Turn	2	3200	184	201	0.058 *	0.063 *
	Through	3	4800	750	774	0.156	0.161
	Right Turn	1	1600	308	325	0.193	0.203
Eastbound	Left Turn	2	3200	270	294	0.084 *	0.092 *
	Through	3	4800	1041	1045	0.217	0.218
	Right Turn	1	1600	267	270	0.167	0.169
Westbound	Left Turn	2	3200	150	150	0.047	0.047
	Through	3	4800	1070	1075	0.223 *	0.224 *
	Right Turn	1	1600	246	277	0.154	0.173
				ICU Plus Lost Time Factor of .10		**0.750**	
				Level of Service		**C**	
				ICU Plus Lost Time Factor of .10			**0.776**
				Level of Service			**C**

* Denotes Critical Movement

Study Intersection No.

1

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	2	3200	322	326	0.101 *	0.102 *
	Through	3	4800	906	952	0.189	0.198
	Right Turn	1	1600	74	77	0.046	0.048
Southbound	Left Turn	2	3200	383	422	0.120	0.132
	Through	3	4800	1264	1323	0.263 *	0.276 *
	Right Turn	1	1600	382	429	0.239	0.268
Eastbound	Left Turn	2	3200	225	252	0.070	0.079
	Through	3	4800	1144	1147	0.238 *	0.239 *
	Right Turn	1	1600	358	367	0.224	0.229
Westbound	Left Turn	2	3200	210	213	0.066 *	0.067 *
	Through	3	4800	1001	1007	0.209	0.210
	Right Turn	1	1600	222	255	0.139	0.159
ICU Plus Lost Time Factor of .10						**0.768**	
Level of Service						**C**	
ICU Plus Lost Time Factor of .10							**0.783**
Level of Service							**C**

* Denotes Critical Movement

Study Intersection No.
1

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	244th Street	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	14	14	0.009	0.009
	Through	3	4800	1652	1710	0.344 *	0.356 *
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	39	42	0.024 *	0.026 *
	Through	3	4800	1078	1102	0.225	0.230
	Right Turn**	0	0			-	
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	48	53	0.030 *	0.033 *
	Right Turn	0.5	800	4	6	0.005	0.008
Westbound	Left Turn***	0	0			-	-
	Through	1	1600	59	61	0.037 *	0.038 *
	Right Turn	0.5	800	52	52	0.065	0.065
	ICU Plus Lost Time Factor of .10					**0.535**	
	Existing 2016 Level of Service					**A**	
	ICU Plus Lost Time Factor of .10						**0.554**
	Ambient 2019 Level of Service						**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
2

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	244th Street	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	34	34	0.021 *	0.021 *
	Through	3	4800	1283	1329	0.267	0.277
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	75	82	0.047	0.051
	Through	3	4800	1680	1748	0.350 *	0.364 *
	Right Turn**	0	0			-	
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	61	66	0.038 *	0.041 *
	Right Turn	0.5	800	22	26	0.028	0.033
Westbound	Left Turn***	0	0			-	-
	Through	1	1600	62	66	0.039 *	0.041 *
	Right Turn	0.5	800	33	39	0.041	0.049
	ICU Plus Lost Time Factor of .10					**0.548**	
	Existing 2016 Level of Service					**A**	
	ICU Plus Lost Time Factor of .10						**0.568**
	Ambient 2019 Level of Service						**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
2

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Newton Street	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	118	123	0.074	0.077
	Through	3	4800	1665	1715	0.347 *	0.357 *
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	37	39	0.023 *	0.024 *
	Through	3	4800	1043	1063	0.217	0.221
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	23	28	0.014	0.018
	Through	0.5	800	76	76	0.095 *	0.095 *
	Right Turn	0.5	800	82	84	0.103	0.105
Westbound	Left Turn	1	1600	91	93	0.057 *	0.058 *
	Through	1	1600	114	114	0.071	0.071
	Right Turn	1	1600	106	111	0.066	0.069

ICU Plus Lost Time Factor of .10	**0.622**	
Existing 2016 Level of Service	**B**	
ICU Plus Lost Time Factor of .10		**0.635**
Ambient 2019 Level of Service		**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
3

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Newton Street	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	101	104	0.063 *	0.065 *
	Through	3	4800	1291	1328	0.269	0.277
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	50	54	0.031	0.034
	Through	3	4800	1652	1701	0.344 *	0.354 *
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	16	21	0.010	0.013
	Through	0.5	800	53	53	0.066 *	0.066 *
	Right Turn	0.5	800	123	129	0.154	0.161
Westbound	Left Turn	1	1600	217	223	0.136 *	0.139 *
	Through	1	1600	56	56	0.035	0.035
	Right Turn	1	1600	97	102	0.061	0.064
				ICU Plus Lost Time Factor of .10		**0.709**	
				Existing 2016 Level of Service		**C**	
				ICU Plus Lost Time Factor of .10			**0.725**
				Ambient 2019 Level of Service			**C**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
3

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	8:00 - 9:00 AM
East-West Street:	Via Valmonte	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	46	46	0.029	0.029
	Through	3	4800	1597	1645	0.333 *	0.343 *
	Right Turn	1	1600	37	37	0.023	0.023
Southbound	Left Turn	1	1600	3	3	0.002 *	0.002 *
	Through	3	4800	1203	1225	0.251	0.255
	Right Turn**	0	0			-	
Eastbound	Left Turn***	1	1600	299	306	0.187 *	0.191 *
	Through	1	1600	12	12	0.008	0.008
	Right Turn	0.5	800	75	75	0.094	0.094
Westbound	Left Turn***	0	0			-	-
	Through	1	1600	1	1	0.001 *	0.001 *
	Right Turn	1	1600	1	1	0.001	0.001
			ICU Plus Lost Time Factor of .10			**0.622**	
			Existing 2016 Level of Service			**B**	
			ICU Plus Lost Time Factor of .10				**0.636**
			Ambient 2019 Level of Service				**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
4

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Via Valmonte	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	64	64	0.040 *	0.040 *
	Through	3	4800	1202	1237	0.250	0.258
	Right Turn	1	1600	19	19	0.012	0.012
Southbound	Left Turn	1	1600	16	16	0.010	0.010
	Through	3	4800	2009	2068	0.419 *	0.431 *
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	179	184	0.112 *	0.115 *
	Through	1	1600	3	3	0.002	0.002
	Right Turn	0.5	800	67	67	0.084	0.084
Westbound	Left Turn***	0	0			-	-
	Through	1	1600	16	16	0.010 *	0.010 *
	Right Turn	1	1600	21	21	0.013	0.013
				ICU Plus Lost Time Factor of .10		**0.680**	
				Existing 2016 Level of Service		**B**	
				ICU Plus Lost Time Factor of .10			**0.696**
				Ambient 2019 Level of Service			**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
4

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	0	0	0.000	0.000
	Through	2	3200	1360	1403	0.425 *	0.438 *
	Right Turn**	0	0			-	
Southbound	Left Turn	2	3200	292	294	0.091 *	0.092 *
	Through	2	3200	855	873	0.267	0.273
	Right Turn**	0	0			-	
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	2	2	0.001 *	0.001 *
	Right Turn	0.5	800	0	0	0.000	0.000
Westbound	Left Turn	1	1600	88	88	0.055 *	0.055 *
	Through	0.5	800	2	2	0.003	0.003
	Right Turn	1.5	2400	433	438	0.180	0.183
				ICU Plus Lost Time Factor of .10		**0.673**	
				Existing 2016 Level of Service		**B**	
				ICU Plus Lost Time Factor of .10			**0.687**
				Ambient 2019 Level of Service			**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
5

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Hawthorne Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	0	0	0.000	0.000
	Through	2	3200	1034	1064	0.323 *	0.333 *
	Right Turn**	0	0			-	
Southbound	Left Turn	2	3200	445	452	0.139 *	0.141 *
	Through	2	3200	1341	1395	0.419	0.436
	Right Turn**	0	0			-	
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	3	3	0.002 *	0.002 *
	Right Turn	0.5	800	1	1	0.001	0.001
Westbound	Left Turn	1	1600	88	88	0.055 *	0.055 *
	Through	0.5	800	0	0	0.000	0.000
	Right Turn	1.5	2400	333	338	0.139	0.141
	ICU Plus Lost Time Factor of .10					**0.619**	
	Existing 2016 Level of Service					**B**	
	ICU Plus Lost Time Factor of .10						**0.631**
	Ambient 2019 Level of Service						**B**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
5

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Whiffletree Lane	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn***	0	0			-	-
	Through	1	1600	46	46	0.029 *	0.029 *
	Right Turn	0.5	800	21	22	0.026	0.028
Southbound	Left Turn***	0	0			-	
	Through	1	1600	14	25	0.009 *	0.016 *
	Right Turn	0.5	800	3	4	0.004	0.005
Eastbound	Left Turn***	0	0			-	-
	Through	2	3200	331	332	0.108 *	0.109 *
	Right Turn**	0	0	15	16	-	
Westbound	Left Turn***	0	0			-	-
	Through	2	3200	489	490	0.155 *	0.156 *
	Right Turn**	0	0	8	9	-	

ICU Plus Lost Time Factor of .10	**0.401**	
Existing 2016 Level of Service	**A**	
ICU Plus Lost Time Factor of .10		**0.409**
Ambient 2019 Level of Service		**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
6

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Whiffletree Lane	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn***	0	0			-	-
	Through	1	1600	15	15	0.009 *	0.009 *
	Right Turn	0.5	800	15	16	0.019	0.020
Southbound	Left Turn***	0	0			-	
	Through	1	1600	16	16	0.010 *	0.010 *
	Right Turn	0.5	800	6	7	0.008	0.009
Eastbound	Left Turn***	0	0			-	-
	Through	2	3200	485	490	0.164 *	0.166 *
	Right Turn**	0	0	40	42	-	
Westbound	Left Turn***	0	0			-	-
	Through	2	3200	382	384	0.124 *	0.124 *
	Right Turn**	0	0	14	14	-	
				ICU Plus Lost Time Factor of .10		**0.407**	
				Existing 2016 Level of Service		**A**	
				ICU Plus Lost Time Factor of .10			**0.410**
				Ambient 2019 Level of Service			**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
6

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019)	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Fallenleaf Drive	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn***	0	0		0	-	-
	Through	1	1600	47	49	0.029 *	0.031 *
	Right Turn**	0	0			-	
Southbound	Left Turn***	0	0			-	
	Through	1	1600	60	62	0.038 *	0.039 *
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	30	30	0.019 *	0.019 *
	Through	2	3200	330	332	0.103	0.104
	Right Turn**	0	0			-	
Westbound	Left Turn	1	1600	11	11	0.007	0.007
	Through	2	3200	440	441	0.138 *	0.138 *
	Right Turn**	0	0			-	
				ICU Plus Lost Time Factor of .10		**0.323**	
				Existing 2016 Level of Service		**A**	
				ICU Plus Lost Time Factor of .10			**0.326**
				Ambient 2019 Level of Service			**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
7

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Fallenleaf Drive	**Peak Hour:**	4:30 - 5:30 PM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn***	0	0			-	-
	Through	1	1600	24	25	0.015 *	0.016 *
	Right Turn**	0	0			-	
Southbound	Left Turn***	0	0			-	
	Through	1	1600	48	49	0.030 *	0.031 *
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	36	36	0.023 *	0.023 *
	Through	2	3200	453	455	0.142	0.142
	Right Turn**	0	0			-	
Westbound	Left Turn	1	1600	21	22	0.013	0.014
	Through	2	3200	400	402	0.125 *	0.126 *
	Right Turn**	0	0			-	
			ICU Plus Lost Time Factor of .10			**0.293**	
			Existing 2016 Level of Service			**A**	
			ICU Plus Lost Time Factor of .10				**0.294**
			Ambient 2019 Level of Service				**A**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
7

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Crenshaw Boulevard	**Peak Hour:**	7:45 - 8:45 AM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	117	117	0.073	0.073
	Through	3	4800	1339	1391	0.279 *	0.290 *
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	157	159	0.098 *	0.099 *
	Through	3	4800	1023	1044	0.213	0.218
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	151	158	0.094 *	0.099 *
	Through	1	1600	150	150	0.094	0.094
	Right Turn	1	1600	62	62	0.039	0.039
Westbound	Left Turn	1	1600	23	25	0.014	0.016
	Through	0.5	800	180	180	0.225 *	0.225 *
	Right Turn	1.5	2400	200	206	0.083	0.086
	ICU Plus Lost Time Factor of .10					**0.796**	
	Existing 2016 Level of Service					**C**	
	ICU Plus Lost Time Factor of .10						**0.813**
	Ambient 2019 Level of Service						**D**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
8

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Crenshaw Boulevard	**Peak Hour:**	4:45 - 5:45 PM
East-West Street:	Rolling Hills Road	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	101	101	0.063	0.063
	Through	3	4800	1006	1039	0.210 *	0.216 *
	Right Turn**	0	0			-	
Southbound	Left Turn	1	1600	274	279	0.171 *	0.174 *
	Through	3	4800	1022	1088	0.213	0.227
	Right Turn**	0	0			-	
Eastbound	Left Turn	1	1600	167	172	0.104 *	0.108 *
	Through	1	1600	287	287	0.179	0.179
	Right Turn	1	1600	89	89	0.056	0.056
Westbound	Left Turn	1	1600	42	46	0.026	0.029
	Through	0.5	800	217	217	0.271 *	0.271 *
	Right Turn	1.5	2400	164	167	0.068	0.070
				ICU Plus Lost Time Factor of .10		**0.856**	
				Existing 2016 Level of Service		**D**	
				ICU Plus Lost Time Factor of .10			**0.870**
				Ambient 2019 Level of Service			**D**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
8

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Crenshaw Boulevard	**Peak Hour:**	8:00 - 9:00 AM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	58	68	0.036	0.043
	Through	3	4800	1007	1048	0.210 *	0.218 *
	Right Turn	1	1600	489	499	0.306	0.312
Southbound	Left Turn	1	1600	138	145	0.086 *	0.091 *
	Through	3	4800	636	654	0.133	0.136
	Right Turn**	0	0			-	
Eastbound	Left Turn	2	3200	171	183	0.053	0.057
	Through	2	3200	962	978	0.300 *	0.306 *
	Right Turn**	0	0			-	
Westbound	Left Turn	2	3200	650	653	0.203 *	0.204 *
	Through	3	4800	1964	1993	0.409	0.415
	Right Turn**	0	0			-	
				ICU Plus Lost Time Factor of .10		**0.899**	
				Existing 2016 Level of Service		**D**	
				ICU Plus Lost Time Factor of .10			**0.918**
				Ambient 2019 Level of Service			**E**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
9

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Crenshaw Boulevard	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	74	84	0.046	0.053
	Through	3	4800	705	729	0.146 *	0.152 *
	Right Turn	1	1600	456	461	0.285	0.288
Southbound	Left Turn	1	1600	329	358	0.205 *	0.224 *
	Through	3	4800	1116	1185	0.233	0.247
	Right Turn**	0	0			-	
Eastbound	Left Turn	2	3200	177	183	0.055	0.057
	Through	2	3200	1278	1311	0.399 *	0.410 *
	Right Turn**	0	0			-	
Westbound	Left Turn	2	3200	472	476	0.147 *	0.149 *
	Through	3	4800	1473	1501	0.307	0.313
	Right Turn**	0	0			-	

ICU Plus Lost Time Factor of .10	**0.997**	
Existing 2016 Level of Service	**E**	
ICU Plus Lost Time Factor of .10		**1.034**
Ambient 2019 Level of Service		**F**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
9

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Vista Montana	**Peak Hour:**	7:30 - 8:30 AM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	2	3200	164	164	0.051	0.051
	Through	1.5	2400	168	168	0.070 *	0.070 *
	Right Turn	0.5	800	122	131	0.153	0.164
Southbound	Left Turn	2	3200	287	288	0.090 *	0.090 *
	Through	2	3200	116	116	0.036	0.036
	Right Turn	1	1600	194	194	0.121	0.121
Eastbound	Left Turn	1	1600	48	48	0.030 *	0.030 *
	Through	2	3200	1155	1176	0.361	0.368
	Right Turn**	0	0			-	
Westbound	Left Turn	1	1600	66	72	0.041	0.045
	Through	2	3200	1550	1572	0.484 *	0.491 *
	Right Turn**	0	0			-	
				ICU Plus Lost Time Factor of .10		**0.774**	
				Existing 2016 Level of Service		**C**	
				ICU Plus Lost Time Factor of .10			**0.781**
				Ambient 2019 Level of Service			**C**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
10

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Vista Montana	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Pacific Coast Highway	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	2	3200	121	121	0.038	0.038
	Through	1.5	2400	206	206	0.086 *	0.086 *
	Right Turn	0.5	800	149	158	0.186	0.198
Southbound	Left Turn	2	3200	361	364	0.113 *	0.114 *
	Through	2	3200	221	221	0.069	0.069
	Right Turn	1	1600	98	98	0.061	0.061
Eastbound	Left Turn	1	1600	60	60	0.038 *	0.038 *
	Through	2	3200	1310	1341	0.409	0.419
	Right Turn**	0	0			-	
Westbound	Left Turn	1	1600	192	208	0.120	0.130
	Through	2	3200	1377	1416	0.430 *	0.443 *
	Right Turn**	0	0			-	
				ICU Plus Lost Time Factor of .10		**0.766**	
				Existing 2016 Level of Service		**C**	
				ICU Plus Lost Time Factor of .10			**0.780**
				Ambient 2019 Level of Service			**C**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements

Study Intersection No.
10

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Palos Verdes Drive	**Peak Hour:**	8:00 - 9:00 AM
East-West Street:	Via Valmonte	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	13	13	0.008	0.008
	Through	1	1600	499	499	0.312 *	0.312 *
	Right Turn	0.5	800	41	42	0.051	0.053
Southbound	Left Turn***	0	0			-	
	Through	1	1600	261	262	0.163 *	0.164 *
	Right Turn	0.5	800	10	10	0.013	0.013
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	81	82	0.051 *	0.051 *
	Right Turn	0.5	800	131	131	0.164	0.164
Westbound	Left Turn***	0	0			-	-
	Through	1	1600	117	117	0.073 *	0.073 *
	Right Turn	0.5	800	90	90	0.113	0.113
				ICU Plus Lost Time Factor of .10		**0.699**	
				Existing 2016 Level of Service		**B**	
				ICU Plus Lost Time Factor of .10			**0.700**
				Ambient 2019 Level of Service			**C**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

Study Intersection No.
11

KHR ASSOCIATES
INTERSECTION CAPACITY UTILIZATION ANALYSIS

Conditions:	Project Plus Ambient (2019), Cumulative	**Count Date:**	
Location:	City of Torrance, California	**Horizon Date:**	2019
North-South Street:	Palos Verdes Drive	**Peak Hour:**	5:00 - 6:00 PM
East-West Street:	Via Valmonte	**Data Source:**	
Annual Growth Rate:	1.00%	**Input By:**	C. B.

Comments: Capacity Volume of Vehicles Per Hour Per Lane = 1600
Capacity Volume of Vehicles Per Hour For Dual Left-Turn Lanes = 3200
Ambient Traffic Increase Factor per City of Torrance = 1 % Per Year

Direction of Travel	Lane Movement	Number of Lanes	Capacity (Veh/Hr) On Green	Peak Hour Volume		Volume/Capacity Ratio	
				Project (2019)	Cumulative (2019)	Project (2019)	Cumulative (2019)
Northbound	Left Turn	1	1600	6	6	0.004	0.004
	Through	1	1600	389	389	0.243 *	0.243 *
	Right Turn	0.5	800	38	38	0.048	0.048
Southbound	Left Turn***	0	0			-	
	Through	1	1600	582	582	0.364 *	0.364 *
	Right Turn	0.5	800	9	9	0.011	0.011
Eastbound	Left Turn***	0	0			-	-
	Through	1	1600	15	15	0.009 *	0.009 *
	Right Turn	0.5	800	8	8	0.010	0.010
Westbound	Left Turn***	0	0			-	-
	Through	1	1600	88	90	0.055 *	0.056 *
	Right Turn	0.5	800	101	102	0.126	0.128
	ICU Plus Lost Time Factor of .10					**0.771**	
	Existing 2016 Level of Service					**C**	
	ICU Plus Lost Time Factor of .10						**0.773**
	Ambient 2019 Level of Service						**C**

* Denotes Critical Movement
** Right Turn Volumes Added to Through Movements
*** Left Turn Volumes Added to Through Movements

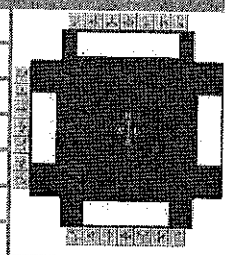
Study Intersection No.
11

Appendix D – Intersection Level of Service Worksheets

Highway Capacity Method

HCS 2010 Signalized Intersection Results Summary

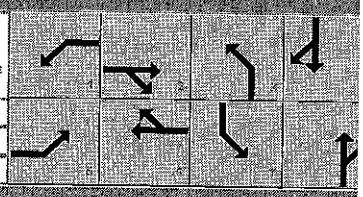
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Hawthorne Boulevard	File Name	1-PCH-Hawthorne Exist AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	262	1269	0	141	1278	0	278	1364	0	179	719	299

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	11.6	1.6	46.0	8.3	3.5	29.1
Yellow	4.0	4.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	4.0	2.0	4.0	2.0	3.0
Phase Duration, s	21.2	55.6	15.6	50.0	15.8	36.5	12.3	33.1
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	19.2		11.6		11.5	30.2	8.1	23.3
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0	0.3	2.3	0.2	3.9
Phase Call Probability	1.00		0.99		1.00	1.00	1.00	1.00
Max Out Probability	1.00		0.04		0.22	0.94	0.00	0.60

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	262	1269	0	141	1278	0	278	1364	0	179	719	299
Adjusted Saturation Flow Rate (s), veh/h/ln	1740	1827	0	1740	1827	0	1723	1863	0	1723	1691	1575
Queue Service Time (g_s), s	17.2	20.6	0.0	9.6	22.5	0.0	9.5	28.2	0.0	6.1	15.0	21.3
Cycle Queue Clearance Time (g_c), s	17.2	20.6	0.0	9.6	22.5	0.0	9.5	28.2	0.0	6.1	15.0	21.3
Green Ratio (g/C)	0.14	0.43		0.10	0.38		0.10	0.27		0.07	0.24	0.24
Capacity (c), veh/h	249	2357		168	2101		338	1515		239	1230	382
Volume-to-Capacity Ratio (X)	1.053	0.538	0.000	0.842	0.608	0.000	0.823	0.900	0.000	0.750	0.585	0.784
Back of Queue (Q), ft/ln (50 th percentile)	497.1	223.9	0	118.5	250.6	0	111.3	349.9	0	68.4	157.5	224.4
Back of Queue (Q), veh/ln (50 th percentile)	19.3	8.7	0.0	4.6	9.7	0.0	4.3	13.6	0.0	2.7	6.1	9.0
Queue Storage Ratio (RQ) (50 th percentile)	1.66	0.75	0.00	0.39	0.84	0.00	0.55	1.72	0.00	0.22	0.52	0.76
Uniform Delay (d_1), s/veh	51.4	25.4		53.3	29.8		53.1	42.2		54.8	40.1	42.5
Incremental Delay (d_2), s/veh	173.7	0.9	0.0	11.2	1.3	0.0	6.6	7.8	0.0	1.8	0.4	9.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	225.1	26.3		64.5	31.1		59.7	50.0		56.6	40.5	51.6
Level of Service (LOS)	F	C		E	C		E	D		E	D	D
Approach Delay, s/veh / LOS	60.3	E		34.4	C		51.6	D		45.7	D	
Intersection Delay, s/veh / LOS	48.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.5	C	3.3	C	3.3	C
Bicycle LOS Score / LOS	1.3	A	1.3	A	1.4	A	1.1	A

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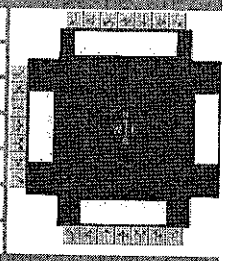
HCS 2010 Signalized Intersection Results Summary

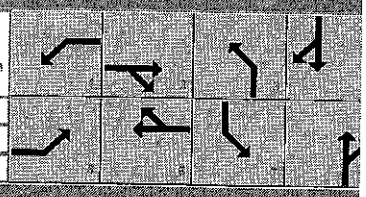
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Hawthorne Boulevard	File Name	1-PCH-Hawthorne Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	218	1446	0	185	1187	0	311	939	0	372	1194	371

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	14.6	1.4	46.0	12.9	2.0	27.1
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	4.0	2.0	4.0	2.0	3.0
Phase Duration, s	20.0	51.4	18.6	50.0	16.9	31.1	18.9	33.1
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	16.9		14.5		12.6	20.8	14.7	30.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.2	3.8	0.1	0.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		0.71	0.68	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	218	1446	0	185	1187	0	311	939	0	372	1194	371
Adjusted Saturation Flow Rate (s), veh/h/ln	1740	1827	0	1740	1827	0	1723	1863	0	1723	1691	1575
Queue Service Time (g_s), s	14.9	26.0	0.0	12.5	20.5	0.0	10.6	18.8	0.0	12.7	28.0	28.0
Cycle Queue Clearance Time (g_c), s	14.9	26.0	0.0	12.5	20.5	0.0	10.6	18.8	0.0	12.7	28.0	28.0
Green Ratio (g/C)	0.52	0.40		0.50	0.38		0.32	0.23		0.12	0.24	0.24
Capacity (c), veh/h	232	2167		211	2100		370	1264		427	1231	382
Volume-to-Capacity Ratio (X)	0.939	0.667	0.000	0.876	0.565	0.000	0.841	0.743	0.000	0.872	0.970	0.97
Back of Queue (Q), ft/ln (50 th percentile)	272.6	288.7	0	187.4	227.3	0	129	222.1	0	164.5	376.2	437.8
Back of Queue (Q), veh/ln (50 th percentile)	10.6	11.2	0.0	7.3	8.8	0.0	5.0	8.6	0.0	6.4	14.6	17.5
Queue Storage Ratio (RQ) (50 th percentile)	0.91	0.96	0.00	0.62	0.76	0.00	0.63	1.09	0.00	0.54	1.23	1.48
Uniform Delay (d_1), s/veh	51.5	29.8		51.8	29.1		52.6	43.2		51.6	45.0	45.0
Incremental Delay (d_2), s/veh	66.1	1.7	0.0	33.0	1.1	0.0	10.1	2.2	0.0	17.3	28.9	65.9
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	117.6	31.5		84.8	30.2		62.7	45.4		69.0	73.9	110.9
Level of Service (LOS)	F	C		F	C		E	D		E	E	F
Approach Delay, s/veh / LOS	42.7	D		37.6	D		49.7	D		80.0	F	
Intersection Delay, s/veh / LOS	54.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.5	C	3.3	C	3.3	C
Bicycle LOS Score / LOS	1.4	A	1.2	A	1.2	A	1.6	A

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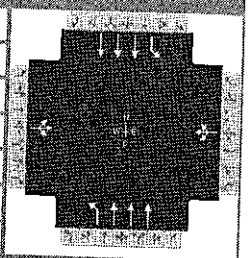
HCS 2010 Signalized Intersection Results Summary

General Information

Agency			
Analyst		Analysis Date	8/4/2016
Jurisdiction		Time Period	
Urban Street	Hawthorne Boulevard	Analysis Year	2016
Intersection	244th Street	File Name	2-Hawthorne-244th Exist AM.xus
Project Description			

Intersection Information	
Duration, h	1.00
Area Type	Other
PHF	1.00
Analysis Period	1> 7:00



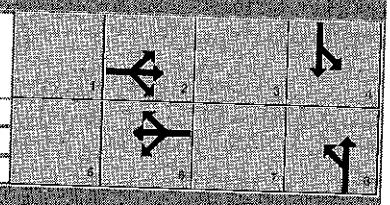
Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	42	4	0	57	50	4	1565		38	1033	

Signal Information

Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	21.0	16.0	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		20.0		20.0
Change Period, ($Y+R_c$), s		9.0		9.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.1		3.1
Queue Clearance Time (g_s), s						14.9		18.0
Green Extension Time (g_e), s		0.0		0.0		0.9		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0			0		4	1565		38	1033	
Adjusted Saturation Flow Rate (s), veh/h/ln		0			0		555	1691		334	1691	
Queue Service Time (g_s), s		0.0			0.0		0.3	12.9		3.1	7.4	
Cycle Queue Clearance Time (g_c), s		0.0			0.0		7.7	12.9		16.0	7.4	
Green Ratio (g/C)							0.36	0.36		0.36	0.36	
Capacity (c), veh/h							266	1804		183	1804	
Volume-to-Capacity Ratio (X)		0.000			0.000		0.015	0.867		0.208	0.573	
Back of Queue (Q), ft/ln (50 th percentile)		0			0		0.7	113.3		9.2	54.5	
Back of Queue (Q), veh/ln (50 th percentile)		0.0			0.0		0.0	4.5		0.4	2.2	
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.01	0.58		0.09	0.28	
Uniform Delay (d_1), s/veh							14.8	13.5		21.6	11.7	
Incremental Delay (d_2), s/veh		0.0			0.0		0.0	4.8		0.2	0.3	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							14.8	18.4		21.8	12.0	
Level of Service (LOS)							B	B		C	B	
Approach Delay, s/veh / LOS	9.8	A		10.6	B		18.3	B		12.4	B	
Intersection Delay, s/veh / LOS	15.6						B					

Multimodal Results

	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.7	A	1.4	A	1.1	A

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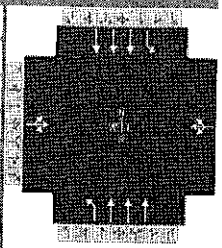
HCS 2010 Signalized Intersection Results Summary

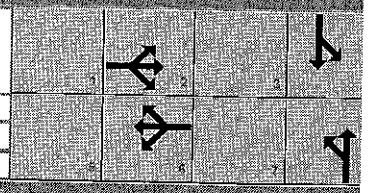
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	244th Street	File Name	2-Hawthorne-244th Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	59	21	0	60	32	30	1230		73	1567	

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	21.0	16.0	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		20.0		20.0
Change Period, ($Y+R_c$), s		9.0		9.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						18.0		18.0
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0			0		30	1230		73	1567	
Adjusted Saturation Flow Rate (s), veh/h/ln		0			0		333	1691		460	1691	
Queue Service Time (g_s), s		0.0			0.0		3.0	9.3		6.7	13.0	
Cycle Queue Clearance Time (g_c), s		0.0			0.0		16.0	9.3		16.0	13.0	
Green Ratio (g/C)							0.36	0.36		0.36	0.36	
Capacity (c), veh/h							183	1804		229	1804	
Volume-to-Capacity Ratio (X)		0.000			0.000		0.164	0.682		0.319	0.869	
Back of Queue (Q), ft/ln (50 th percentile)		0			0		7.2	70.3		16.8	113.7	
Back of Queue (Q), veh/ln (50 th percentile)		0.0			0.0		0.3	2.8		0.7	4.5	
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.07	0.36		0.17	0.58	
Uniform Delay (d_1), s/veh							21.4	12.3		19.3	13.5	
Incremental Delay (d_2), s/veh		0.0			0.0		0.2	0.9		0.3	4.9	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							21.5	13.2		19.6	18.4	
Level of Service (LOS)							C	B		B	B	
Approach Delay, s/veh / LOS	10.2	B		10.3	B		13.4	B		18.5	B	
Intersection Delay, s/veh / LOS	15.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.6	A	1.2	A	1.4	A

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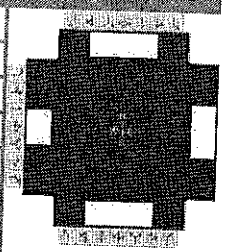
HCS 2010 Signalized Intersection Results Summary

General Information

Agency			
Analyst		Analysis Date	8/4/2016
Jurisdiction		Time Period	
Urban Street	Hawthorne Boulevard	Analysis Year	2016
Intersection	Newton Street	File Name	3-Hawthorne-Newton Exist AM.xus
Project Description			

Intersection Information	
Duration, h	1.00
Area Type	Other
PHF	1.00
Analysis Period	1> 7:00



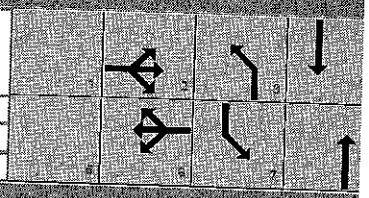
Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	22	74	79	82	111	103	95	1568		36	999	

Signal Information

Cycle, s	41.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.1	2.1	2.0	17.7	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		12.1		12.1	8.0	23.7	6.1	21.7
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s		5.3		7.9	4.1	11.9	2.8	7.9
Green Extension Time (g_e), s		0.5		0.3	0.1	7.8	0.0	8.4
Phase Call Probability		1.00		1.00	0.67	1.00	0.34	1.00
Max Out Probability		0.40		1.00	0.00	0.21	0.00	0.14

Movement Group Results

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	22	153		82	111	103	95	1568		36	999	
Adjusted Saturation Flow Rate (s), veh/h/ln	1302	1738		1254	1900	1610	1810	1691		1810	1691	
Queue Service Time (g_s), s	0.6	3.3		2.6	2.1	2.3	2.1	9.9		0.8	5.9	
Cycle Queue Clearance Time (g_c), s	2.7	3.3		5.9	2.1	2.3	2.1	9.9		0.8	5.9	
Green Ratio (g/C)	0.19	0.19		0.19	0.19	0.19	0.10	0.47		0.05	0.42	
Capacity (c), veh/h	359	336		317	368	312	174	2389		89	2151	
Volume-to-Capacity Ratio (X)	0.061	0.455		0.259	0.302	0.331	0.546	0.656		0.404	0.464	
Back of Queue (Q), ft/ln (50 th percentile)	3.9	27.1		16.1	18.9	17.7	19.7	58.3		8	37.5	
Back of Queue (Q), veh/ln (50 th percentile)	0.2	1.1		0.6	0.8	0.7	0.8	2.3		0.3	1.5	
Queue Storage Ratio (RQ) (50 th percentile)	0.04	0.27		0.16	0.19	0.18	0.20	0.30		0.08	0.19	
Uniform Delay (d_1), s/veh	15.6	14.9		17.5	14.5	14.6	18.1	8.5		19.3	8.7	
Incremental Delay (d_2), s/veh	0.0	0.4		0.2	0.2	0.2	1.0	0.1		1.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	15.7	15.3		17.7	14.6	14.8	19.1	8.6		20.4	8.7	
Level of Service (LOS)	B	B		B	B	B	B	A		C	A	
Approach Delay, s/veh / LOS	15.3	B		15.5	B		9.2	A		9.1	A	
Intersection Delay, s/veh / LOS	10.1						B					

Multimodal Results

	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.4	B	2.2	B
Bicycle LOS Score / LOS	0.8	A	1.0	A	1.4	A	1.1	A

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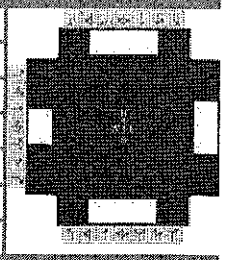
HCS 2010 Signalized Intersection Results Summary

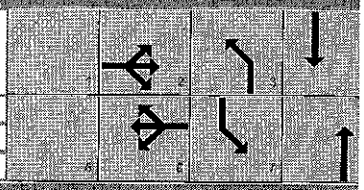
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Newton Street	File Name	3-Hawthorne-Newton Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	16	51	106	191	54	94	93	1229		49	1540	

Signal Information			
Cycle, s	47.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	2.9	1.4	21.6	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		14.0		14.0	8.3	27.0	6.9	25.6
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s		5.9		12.0	4.4	10.0	3.3	13.4
Green Extension Time (g_e), s		0.5		0.0	0.1	8.9	0.0	8.2
Phase Call Probability		1.00		1.00	0.71	1.00	0.48	1.00
Max Out Probability		0.64		1.00	0.00	0.22	0.00	0.30

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	16	157		191	54	94	93	1229		49	1540	
Adjusted Saturation Flow Rate (s), veh/h/ln	1371	1694		1249	1900	1610	1810	1691		1810	1691	
Queue Service Time (g_s), s	0.5	3.9		6.1	1.1	2.3	2.4	8.0		1.3	11.4	
Cycle Queue Clearance Time (g_c), s	1.6	3.9		10.0	1.1	2.3	2.4	8.0		1.3	11.4	
Green Ratio (g/C)	0.21	0.21		0.21	0.21	0.21	0.09	0.48		0.06	0.45	
Capacity (c), veh/h	405	354		310	397	336	161	2438		109	2292	
Volume-to-Capacity Ratio (X)	0.040	0.444		0.616	0.136	0.280	0.577	0.504		0.451	0.672	
Back of Queue (Q), ft/ln (50 th percentile)	3.2	32.9		53.7	10.4	18.9	23.5	51.5		12.7	77.7	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	1.3		2.1	0.4	0.8	0.9	2.1		0.5	3.1	
Queue Storage Ratio (RQ) (50 th percentile)	0.03	0.33		0.54	0.10	0.19	0.23	0.26		0.13	0.39	
Uniform Delay (d_1), s/veh	16.1	16.5		21.4	15.4	15.9	20.9	8.5		21.7	10.3	
Incremental Delay (d_2), s/veh	0.0	0.3		2.7	0.1	0.2	1.2	0.1		1.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	16.1	16.8		24.1	15.5	16.1	22.2	8.6		22.8	10.5	
Level of Service (LOS)	B	B		C	B	B	C	A		C	B	
Approach Delay, s/veh / LOS	16.8	B		20.5	C		9.5	A		10.8	B	
Intersection Delay, s/veh / LOS	11.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.2	B
Bicycle LOS Score / LOS	0.8	A	1.0	A	1.2	A	1.4	A

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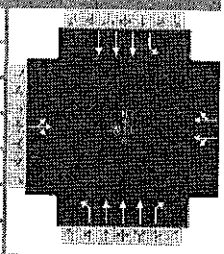
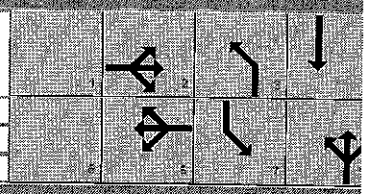
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Via Valmonte	File Name	4-Hawthorne-Via Valmonte Exist AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	234	66	0	1	1	45	1550	36	3	1146	

Signal Information										
Cycle, s	75.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	32.3	0.4	3.3	27.1	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		8.0	1.1	3.0	2.0	4.0
Phase Duration, s		36.3		36.3	7.7	34.4	4.4	31.1
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s					3.1	21.6	2.1	16.0
Green Extension Time (g_e), s		0.0		0.0	0.0	8.7	0.0	9.1
Phase Call Probability					0.61	1.00	0.06	1.00
Max Out Probability					0.00	0.21	0.00	0.17

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h		0		0		1	45	1550	36	3	1146	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0		1610	1810	1691	1610	1810	1691	
Queue Service Time (g_s), s		0.0		0.0		0.0	1.1	19.6	1.0	0.1	14.0	
Cycle Queue Clearance Time (g_c), s		0.0		0.0		0.0	1.1	19.6	1.0	0.1	14.0	
Green Ratio (g/C)						0.43	0.43	0.41	0.41	0.00	0.36	
Capacity (c), veh/h						693	271	2055	652	9	1833	
Volume-to-Capacity Ratio (X)		0.000		0.000		0.001	0.166	0.754	0.055	0.341	0.625	
Back of Queue (Q), ft/ln (50 th percentile)		0		0		0.2	10.4	175.1	8.6	1.8	126.6	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		0.0		0.0	0.4	7.0	0.3	0.1	5.1	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.00		0.01	0.10	0.89	0.04	0.02	0.64	
Uniform Delay (d_1), s/veh						12.2	14.3	19.1	13.6	37.2	19.8	
Incremental Delay (d_2), s/veh		0.0		0.0		0.0	0.1	0.5	0.0	8.4	0.1	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh						12.2	14.4	19.6	13.6	45.6	19.9	
Level of Service (LOS)						B	B	B	B	D	B	
Approach Delay, s/veh / LOS	16.0	B		12.2	B		19.3	B		20.0	B	
Intersection Delay, s/veh / LOS	19.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.2	C	2.3	B	2.6	B
Bicycle LOS Score / LOS	1.0	A	0.5	A	1.4	A	1.1	A

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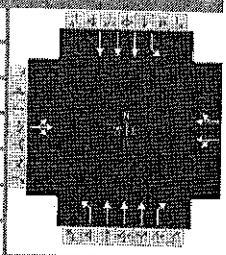
HCS 2010 Signalized Intersection Results Summary

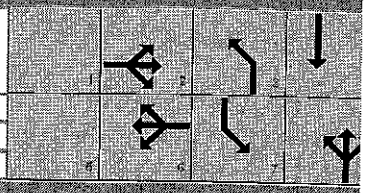
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Via Valmonte	File Name	4-Hawthorne-Via Valmonte Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	148	59	0	16	20	62	1167	18	16	1854	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	25.3	1.7	2.7	33.4	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		8.0	1.1	3.0	2.0	4.0
Phase Duration, s		29.3		29.3	8.4	40.0	5.7	37.4
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s					3.3	13.6	2.7	26.0
Green Extension Time (g_e), s		0.0		0.0	0.1	11.6	0.0	7.4
Phase Call Probability					0.73	1.00	0.28	1.00
Max Out Probability					0.00	0.19	0.00	0.55

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h		0		0		20	62	1167	18	16	1854	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0		1610	1810	1691	1610	1810	1691	
Queue Service Time (g_s), s		0.0		0.0		0.6	1.3	11.6	0.4	0.7	24.0	
Cycle Queue Clearance Time (g_c), s		0.0		0.0		0.6	1.3	11.6	0.4	0.7	24.0	
Green Ratio (g/C)						0.34	0.51	0.48	0.48	0.02	0.44	
Capacity (c), veh/h						543	233	2437	773	41	2257	
Volume-to-Capacity Ratio (X)		0.000		0.000		0.037	0.267	0.479	0.023	0.390	0.821	
Back of Queue (Q), ft/ln (50 th percentile)		0		0		5.9	11.6	97.8	3.5	7.6	215.5	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		0.0		0.2	0.5	3.9	0.1	0.3	8.6	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.00		0.15	0.12	0.50	0.02	0.10	1.09	
Uniform Delay (d_1), s/veh						16.7	14.6	13.2	10.2	36.1	18.2	
Incremental Delay (d_2), s/veh		0.0		0.0		0.1	0.2	0.1	0.0	2.2	1.8	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh						16.8	14.9	13.2	10.3	38.4	20.0	
Level of Service (LOS)						B	B	B	B	D	C	
Approach Delay, s/veh / LOS	20.1	C		16.8	B		13.3	B		20.2	C	
Intersection Delay, s/veh / LOS	17.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	2.3	B	2.5	B
Bicycle LOS Score / LOS	0.8	A	0.5	A	1.2	A	1.5	A

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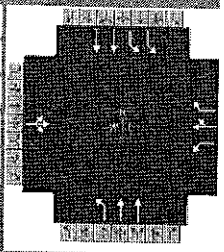
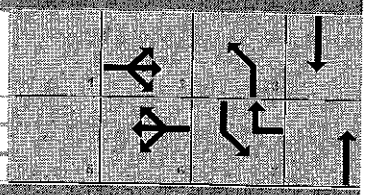
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	5-Hawthorne-Rolling Hills Exist AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	2	0	85	2	420	0	1320		274	801	

Signal Information											
Cycle, s	60.0	Reference Phase	2								
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0	
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		18.2		18.2	0.0	31.0	10.9	41.8
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0		0	0	0	0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0	0	0	0	0		0	0	
Queue Service Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g_c), s		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Green Ratio (g/C)				0.24	0.24	0.35		0.45		0.11	0.63	
Capacity (c), veh/h				458	449	565	3	1593		402	2236	
Volume-to-Capacity Ratio (X)		0.000		0.185	0.004	0.744	0.000	0.828		0.681	0.358	
Back of Queue (Q), ft/ln (50 th percentile)		0		24.6	0.5	144.8	0	169.4		44.4	39.8	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		1.0	0.0	5.8	0.0	6.8		1.8	1.6	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.61	0.01	2.90	0.00	0.86		0.22	0.20	
Uniform Delay (d_1), s/veh				18.6	17.5	17.1	0.0	14.5		25.5	5.3	
Incremental Delay (d_2), s/veh		0.0		0.9	0.0	9.1	0.0	1.8		0.8	0.0	
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				19.5	17.5	26.2	0.0	16.3		26.3	5.3	
Level of Service (LOS)				B	B	C		B		C	A	
Approach Delay, s/veh / LOS	17.5	B		25.0	C		16.3	B		10.7	B	
Intersection Delay, s/veh / LOS	15.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.8	C	2.0	B
Bicycle LOS Score / LOS	0.5	A	1.3	A	1.6	A	1.4	A

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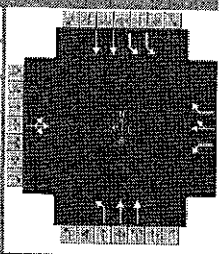
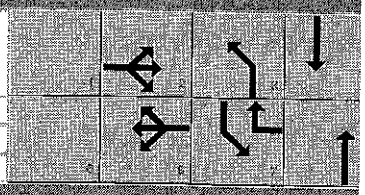
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	5-Hawthorne-Rolling Hills Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	3	1	85	0	323	0	1003		425	1288	

Signal Information												
Cycle, s	60.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		19.5		19.5	0.0	26.9	13.6	40.5
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0		0	0	0	0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0	0	0	0	0		0	0	
Queue Service Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g_c), s		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Green Ratio (g/C)				0.26	0.26	0.42		0.38		0.16	0.61	
Capacity (c), veh/h				489	491	674	3	1353		562	2157	
Volume-to-Capacity Ratio (X)		0.000		0.174	0.000	0.479	0.000	0.741		0.756	0.597	
Back of Queue (Q), ft/ln (50 th percentile)		0		23.6	0	77.9	0	128.3		67.5	87.5	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		0.9	0.0	3.1	0.0	5.1		2.7	3.5	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.59	0.00	1.56	0.00	0.65		0.34	0.44	
Uniform Delay (d_1), s/veh				17.6	0.0	12.7	0.0	16.0		24.1	7.2	
Incremental Delay (d_2), s/veh		0.0		0.8	0.0	2.5	0.0	0.5		0.8	0.1	
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				18.4	0.0	15.1	0.0	16.5		24.9	7.3	
Level of Service (LOS)				B		B		B		C	A	
Approach Delay, s/veh / LOS	16.6	B		15.8	B		16.5	B		11.7	B	
Intersection Delay, s/veh / LOS	13.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.8	C	2.0	B
Bicycle LOS Score / LOS	0.5	A	1.2	A	1.3	A	1.9	A

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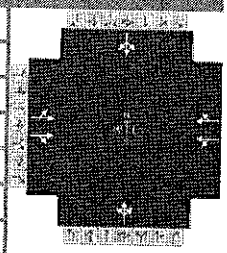
HCS 2010 Signalized Intersection Results Summary

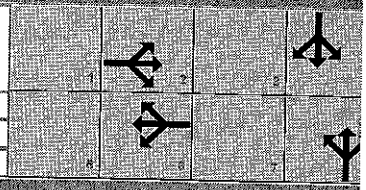
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Whiffletree Lane	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	6-Rolling Hills-Whiffletree Exist AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	327	0	0	483	0	0	45	20	0	14	3

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.5	1.1	3.3	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		12.0
Phase Duration, s		32.5		32.5		7.3		5.1
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.1		3.1
Queue Clearance Time (g_s), s						3.6		2.4
Green Extension Time (g_e), s		0.0		0.0		0.1		0.0
Phase Call Probability						0.56		0.19
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0		0	0		0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		0	0		0		0			0	
Queue Service Time (g_s), s	0.0		0.0	0.0		0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	0.0		0.0	0.0		0.0		0.0			0.0	
Green Ratio (g/C)												
Capacity (c), veh/h												
Volume-to-Capacity Ratio (X)	0.000		0.000	0.000		0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	0		0	0		0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.0		0.0	0.0		0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.00		0.00	0.00		0.00		0.00			0.00	
Uniform Delay (d_1), s/veh												
Incremental Delay (d_2), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (d), s/veh												
Level of Service (LOS)												
Approach Delay, s/veh / LOS	3.4	A		3.6	A		21.1	C		23.4	C	
Intersection Delay, s/veh / LOS	5.2						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.6	A	0.5	A

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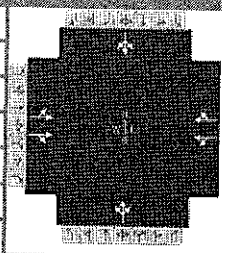
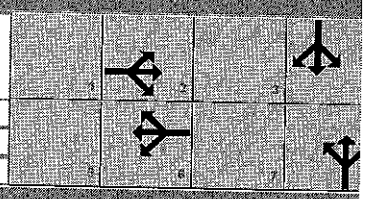
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Whiffletree Lane	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	6-Rolling Hills-Whiffletree Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	503	0	0	384	0	0	15	15	0	16	6

Signal Information												
Cycle, s	45.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	29.7	1.4	1.9	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		12.0
Phase Duration, s		33.7		33.7		5.9		5.4
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.1
Queue Clearance Time (g_s), s						2.8		2.5
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						0.31		0.24
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0		0	0		0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		0	0		0		0			0	
Queue Service Time (g_s), s	0.0		0.0	0.0		0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	0.0		0.0	0.0		0.0		0.0			0.0	
Green Ratio (g/C)												
Capacity (c), veh/h												
Volume-to-Capacity Ratio (X)	0.000		0.000	0.000		0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	0		0	0		0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.0		0.0	0.0		0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.00		0.00	0.00		0.00		0.00			0.00	
Uniform Delay (d_1), s/veh												
Incremental Delay (d_2), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (d), s/veh												
Level of Service (LOS)												
Approach Delay, s/veh / LOS	3.2	A		3.0	A		22.5	C		22.9	C	
Intersection Delay, s/veh / LOS	4.2						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.5	A	0.5	A

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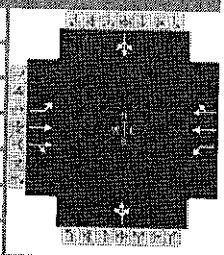
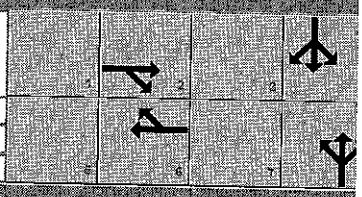
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Fallenleaf Drive	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	7-Rolling Hills-Fallenleaf Exist AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	29	311	0	11	427	0	0	45	0	0	59	0

Signal Information										
Cycle, s	45.0	Reference Phase	2							
Offset, s	0	Reference Point	End							
Uncoordinated	No	Simult. Gap E/W	On	Green	27.3	3.1	2.6	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		12.0		12.0
Phase Duration, s		31.3		31.3		6.6		7.1
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.0		3.0
Queue Clearance Time (g_s), s						3.1		3.4
Green Extension Time (g_e), s		0.0		0.0		0.1		0.1
Phase Call Probability						0.43		0.52
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	29	311	0	11	427	0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	976	1900	0	1085	1900	0		0			0	
Queue Service Time (g_s), s	0.6	1.6	0.0	0.2	2.2	0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	2.9	1.6	0.0	1.8	2.2	0.0		0.0			0.0	
Green Ratio (g/C)	0.61	0.61		0.61	0.61							
Capacity (c), veh/h	703	2304		780	2304							
Volume-to-Capacity Ratio (X)	0.041	0.135	0.000	0.014	0.185	0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	2.4	8.6	0	0.8	12.4	0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	0.3	0.0	0.0	0.5	0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.02	0.04	0.00	0.01	0.06	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	4.6	3.8		4.2	3.9							
Incremental Delay (d_2), s/veh	0.1	0.1	0.0	0.0	0.2	0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	4.7	3.9		4.2	4.1							
Level of Service (LOS)	A	A		A	A							
Approach Delay, s/veh / LOS	4.0	A		4.1	A		21.5	C		21.0	C	
Intersection Delay, s/veh / LOS	6.1						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	0.8	A	0.6	A	0.6	A

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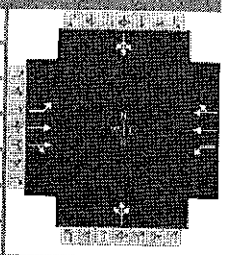
HCS 2010 Signalized Intersection Results Summary

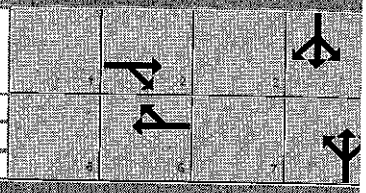
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Fallenleaf Drive	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	7-Rolling Hills-Fallenleaf Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	35	433	0	20	389	0	0	24	0	0	46	0

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.8	2.6	1.6	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		12.0		12.0
Phase Duration, s		32.8		32.8		5.6		6.6
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.0		3.0
Queue Clearance Time (g_s), s						2.6		3.1
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						0.26		0.44
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	35	433	0	20	389	0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1010	1900	0	970	1900	0		0			0	
Queue Service Time (g_s), s	0.6	2.1	0.0	0.4	1.8	0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	2.5	2.1	0.0	2.5	1.8	0.0		0.0			0.0	
Green Ratio (g/C)	0.64	0.64		0.64	0.64							
Capacity (c), veh/h	765	2434		736	2434							
Volume-to-Capacity Ratio (X)	0.046	0.178	0.000	0.027	0.160	0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	2.3	9.8	0	1.3	8.6	0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	0.4	0.0	0.1	0.3	0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.02	0.05	0.00	0.01	0.04	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	3.7	3.3		3.8	3.2							
Incremental Delay (d_2), s/veh	0.1	0.2	0.0	0.1	0.1	0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	3.9	3.4		3.9	3.4							
Level of Service (LOS)	A	A		A	A							
Approach Delay, s/veh / LOS	3.5	A		3.4	A		22.6	C		21.4	C	
Intersection Delay, s/veh / LOS	4.8						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.5	A	0.6	A

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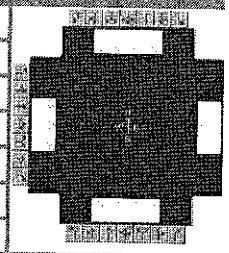
HCS 2010 Signalized Intersection Results Summary

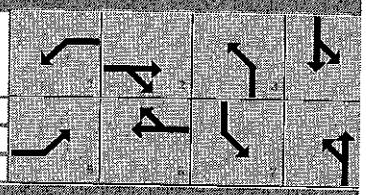
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Rolling Hills Road	File Name	8-Rolling Hills-Crenshaw Exist AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	142	143	58	22	175	194	114	1300		152	993	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.1	4.6	50.4	7.4	2.0	32.5
Yellow	4.0	4.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	4.0	1.1	4.0
Phase Duration, s	15.8	63.0	7.1	54.4	11.4	36.5	13.4	38.5
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	2.9	3.0	2.9
Queue Clearance Time (g_s), s	11.8		3.5		7.5	32.1	9.3	22.8
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.1	0.4	0.1	5.2
Phase Call Probability	0.99		0.52		0.98	1.00	0.99	1.00
Max Out Probability	0.20		0.00		0.00	1.00	0.01	0.28

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	142	143	58	22	175	194	114	1300		152	993	
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1608	1723	1810	1607	1774	1691		1774	1691	
Queue Service Time (g_s), s	9.8	6.7	3.0	1.5	8.9	11.3	5.5	30.1		7.3	20.8	
Cycle Queue Clearance Time (g_c), s	9.8	6.7	3.0	1.5	8.9	11.3	5.5	30.1		7.3	20.8	
Green Ratio (g/C)	0.10	0.49	0.49	0.03	0.42	0.42	0.33	0.27		0.35	0.29	
Capacity (c), veh/h	169	890	791	45	760	674	224	1374		207	1457	
Volume-to-Capacity Ratio (X)	0.841	0.161	0.073	0.491	0.230	0.288	0.508	0.946		0.735	0.682	
Back of Queue (Q), ft/ln (50 th percentile)	129.7	76	27.9	17.9	105.2	116.8	60.2	372.4		81.3	220.1	
Back of Queue (Q), veh/ln (50 th percentile)	5.0	2.9	1.1	0.7	4.0	4.7	2.3	14.3		3.1	8.5	
Queue Storage Ratio (RQ) (50 th percentile)	0.43	0.25	0.10	0.06	0.35	0.40	0.29	1.82		0.26	0.72	
Uniform Delay (d_1), s/veh	55.2	22.8	21.5	58.2	28.3	29.2	30.8	42.9		32.1	37.9	
Incremental Delay (d_2), s/veh	15.4	0.4	0.2	3.1	0.7	1.1	0.7	17.5		1.9	1.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	70.6	23.1	21.7	61.3	29.0	30.2	31.5	60.4		34.1	39.0	
Level of Service (LOS)	E	C	C	E	C	C	C	E		C	D	
Approach Delay, s/veh / LOS	42.5	D		31.4	C		58.1	E		38.3	D	
Intersection Delay, s/veh / LOS	46.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.4	B
Bicycle LOS Score / LOS	1.1	A	1.1	A	1.3	A	1.1	A

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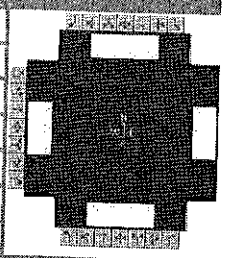
HCS 2010 Signalized Intersection Results Summary

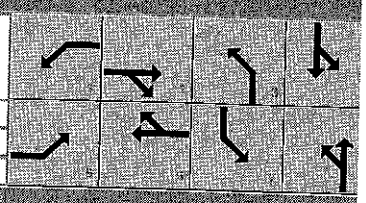
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Rolling Hills Road	File Name	8-Rolling Hills-Crenshaw Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	158	277	85	41	211	159	98	977		266	992	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.5	4.4	49.8	6.9	4.6	25.7
Yellow	4.0	4.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	4.0	1.1	4.0
Phase Duration, s	16.9	62.3	8.5	53.8	10.9	29.7	19.6	38.4
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	2.9	3.0	2.9
Queue Clearance Time (g_s), s	12.9		4.8		7.1	24.5	15.5	22.8
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.1	1.2	0.0	4.5
Phase Call Probability	0.99		0.75		0.96	1.00	1.00	1.00
Max Out Probability	0.38		0.00		0.00	1.00	1.00	0.17

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	158	277	85	41	211	159	98	977		266	992	
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1608	1723	1810	1607	1774	1691		1774	1691	
Queue Service Time (g_s), s	10.9	13.8	4.4	2.8	11.0	9.2	5.1	22.5		13.5	20.8	
Cycle Queue Clearance Time (g_c), s	10.9	13.8	4.4	2.8	11.0	9.2	5.1	22.5		13.5	20.8	
Green Ratio (g/C)	0.49	0.49	0.49	0.42	0.42	0.42	0.27	0.21		0.36	0.29	
Capacity (c), veh/h	185	878	781	64	751	667	217	1087		305	1453	
Volume-to-Capacity Ratio (X)	0.853	0.315	0.109	0.639	0.281	0.238	0.452	0.898		0.871	0.683	
Back of Queue (Q), ft/ln (50 th percentile)	149.8	167.1	42.3	33.4	131.3	93	56.6	264.9		201.5	219.8	
Back of Queue (Q), veh/ln (50 th percentile)	5.8	6.4	1.7	1.3	5.1	3.7	2.2	10.2		7.8	8.5	
Queue Storage Ratio (RQ) (50 th percentile)	0.50	0.56	0.15	0.11	0.44	0.32	0.28	1.29		0.66	0.72	
Uniform Delay (d_1), s/veh	54.8	25.6	22.4	57.7	29.3	28.7	34.7	45.9		32.0	38.0	
Incremental Delay (d_2), s/veh	19.5	0.9	0.3	3.9	0.9	0.8	0.6	10.6		26.0	1.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	74.2	26.5	22.7	61.7	30.3	29.5	35.2	56.5		58.0	39.0	
Level of Service (LOS)	E	C	C	E	C	C	D	E		E	D	
Approach Delay, s/veh / LOS	40.4	D		33.1	C		54.6	D		43.0	D	
Intersection Delay, s/veh / LOS	45.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.5	B	2.4	B
Bicycle LOS Score / LOS	1.3	A	1.2	A	1.1	A	1.2	A

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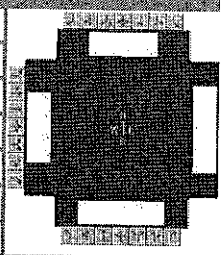
HCS 2010 Signalized Intersection Results Summary

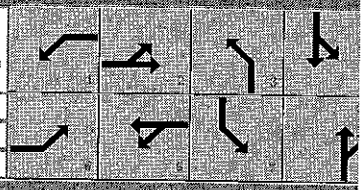
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Crenshaw Boulevard	File Name	9-PCH-Crenshaw Exist AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	161	929		631	1898		56	975	473	134	613	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	5.0	47.1	5.1	3.2	33.7
Yellow	4.0	4.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	1.1	4.0
Phase Duration, s	10.0	51.1	18.9	60.0	9.1	37.7	12.3	40.9
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	5.4		14.6		5.7	35.7	8.3	13.4
Green Extension Time (g_e), s	0.2	0.0	0.3	0.0	0.0	0.0	0.1	5.6
Phase Call Probability	1.00		1.00		0.85	1.00	0.99	1.00
Max Out Probability	0.00		1.00		0.00	1.00	0.00	0.04

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	161	929		631	1898		56	975	473	134	613	
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1723		1673	1643		1774	1691	1608	1774	1691	
Queue Service Time (g_s), s	3.4	29.1		12.6	42.8		3.7	20.5	33.7	6.3	11.4	
Cycle Queue Clearance Time (g_c), s	3.4	29.1		12.6	42.8		3.7	20.5	33.7	6.3	11.4	
Green Ratio (g/C)	0.44	0.39		0.53	0.47		0.26	0.28	0.28	0.36	0.31	
Capacity (c), veh/h	330	1352		711	2302		75	1424	451	245	1561	
Volume-to-Capacity Ratio (X)	0.488	0.687		0.887	0.824		0.747	0.685	1.048	0.546	0.393	
Back of Queue (Q), ft/ln (50 th percentile)	34.1	341.9		162.8	475.8		45.7	217.8	757.8	68.1	118.1	
Back of Queue (Q), veh/ln (50 th percentile)	1.3	13.1		6.3	18.3		1.8	8.4	30.3	2.6	4.5	
Queue Storage Ratio (RQ) (50 th percentile)	0.11	1.14		0.54	1.59		0.22	1.06	3.85	0.22	0.38	
Uniform Delay (d_1), s/veh	27.8	37.7		24.8	36.8		56.8	38.4	43.2	29.2	32.7	
Incremental Delay (d_2), s/veh	0.4	2.9		13.5	3.6		5.6	1.1	139.6	0.7	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	28.3	40.6		38.3	40.4		62.4	39.6	182.7	29.9	32.8	
Level of Service (LOS)	C	D		D	D		E	D	F	C	C	
Approach Delay, s/veh / LOS	38.8	D		39.9	D		85.5	F		32.3	C	
Intersection Delay, s/veh / LOS	50.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	3.1	C	3.3	C
Bicycle LOS Score / LOS	1.4	A	1.9	A	1.3	A	0.9	A

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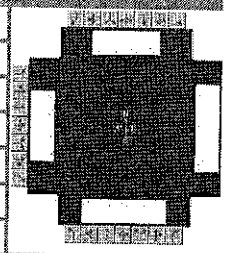
HCS 2010 Signalized Intersection Results Summary

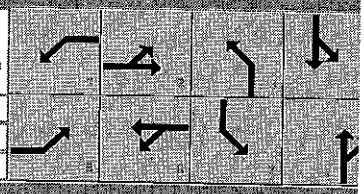
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Crenshaw Boulevard	File Name	9-PCH-Crenshaw Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	167	1235		459	1410		72	683	441	320	1064	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	2.1	49.9	6.2	5.8	26.0
Yellow	4.0	4.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	1.1	4.0
Phase Duration, s	10.0	53.9	16.1	60.0	10.2	30.0	20.0	39.8
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	5.4		11.6		6.8	28.0	18.0	24.4
Green Extension Time (g_e), s	0.2	0.0	0.5	0.0	0.1	0.0	0.0	4.8
Phase Call Probability	1.00		1.00		0.91	1.00	1.00	1.00
Max Out Probability	0.00		0.35		0.00	1.00	1.00	0.30

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	167	1235		459	1410		72	683	441	320	1064	
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1723		1673	1643		1774	1691	1608	1774	1691	
Queue Service Time (g_s), s	3.4	40.9		9.6	29.2		4.8	14.6	26.0	16.0	22.4	
Cycle Queue Clearance Time (g_c), s	3.4	40.9		9.6	29.2		4.8	14.6	26.0	16.0	22.4	
Green Ratio (g/C)	0.47	0.42		0.53	0.47		0.27	0.22	0.22	0.37	0.30	
Capacity (c), veh/h	439	1432		523	2301		92	1099	348	368	1512	
Volume-to-Capacity Ratio (X)	0.380	0.862		0.877	0.613		0.780	0.621	1.266	0.869	0.704	
Back of Queue (Q), ft/ln (50 th percentile)	33.5	497.9		118.8	317.8		58.3	156.4	1465	237.6	236.2	
Back of Queue (Q), veh/ln (50 th percentile)	1.3	19.2		4.6	12.2		2.2	6.0	58.6	9.1	9.1	
Queue Storage Ratio (RQ) (50 th percentile)	0.11	1.66		0.40	1.06		0.28	0.76	7.44	0.77	0.77	
Uniform Delay (d_1), s/veh	21.8	40.1		29.6	32.1		56.2	42.5	47.0	32.1	37.4	
Incremental Delay (d_2), s/veh	0.2	7.6		11.6	1.2		5.5	0.8	502.0	22.5	1.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	22.0	47.7		41.2	33.3		61.7	43.4	549.0	54.7	38.7	
Level of Service (LOS)	C	D		D	C		E	D	F	D	D	
Approach Delay, s/veh / LOS	44.7	D		35.3	D		230.9	F		42.4	D	
Intersection Delay, s/veh / LOS	79.2						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	3.1	C	3.3	C
Bicycle LOS Score / LOS	1.6	A	1.5	A	1.1	A	1.2	A

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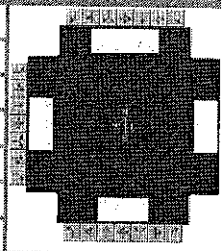
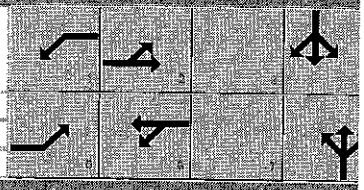
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Vista Montana	File Name	10-PCH-Vista Montana Exist AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	47	1120		64	1495		149	144	118	279	113	188

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		10.0		9.0
Phase Duration, s	8.7	69.0	9.3	69.6		16.5		25.1
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0		4.0		4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0		0.0		0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0		0.0		0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	0.00	0.00	0.00	0.00		0.00		0.00
Max Out Probability	0.00	0.00	0.00	0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.58	0.54		0.59	0.55		0.10	0.10	0.10	0.18	0.18	0.18
Capacity (c), veh/h	176	1867		271	1883		185	195	166	312	656	277
Volume-to-Capacity Ratio (X)	0.266	0.600		0.236	0.794		0.804	0.699	0.758	0.893	0.172	0.68
Back of Queue (Q), ft/ln (50 th percentile)	14.5	361.3		18.3	539.8		115.4	102.6	93	253.8	36.3	132.
Back of Queue (Q), veh/ln (50 th percentile)	0.6	13.9		0.7	20.8		4.4	3.9	3.7	9.8	1.4	5.3
Queue Storage Ratio (RQ) (50 th percentile)	0.05	1.20		0.06	1.80		0.75	0.50	0.47	1.65	0.18	0.67
Uniform Delay (d_1), s/veh	22.3	27.7		15.8	32.1		52.5	51.9	52.3	48.3	42.0	46.3
Incremental Delay (d_2), s/veh	0.3	1.4		0.2	3.6		3.2	1.7	2.7	21.4	0.0	2.4
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	22.6	29.2		16.0	35.7		55.7	53.6	55.0	69.7	42.0	48.7
Level of Service (LOS)	C	C		B	D		E	D	D	E	D	D
Approach Delay, s/veh / LOS	28.9	C		34.9	C		54.8	D		57.5	E	
Intersection Delay, s/veh / LOS	38.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.5	A	1.8	A	0.8	A	1.0	A

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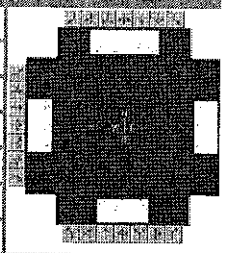
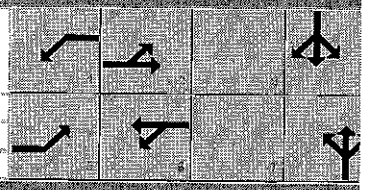
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Vista Montana	File Name	10-PCH-Vista Montana Exist PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	58	1258		186	1335		114	196	145	348	205	95

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		10.0		9.0
Phase Duration, s	9.1	59.3	12.7	62.9		18.6		29.3
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0		4.0		4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0		0.0		0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0		0.0		0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	0.00	0.00	0.00	0.00		0.00		0.00
Max Out Probability	0.00	0.00	0.00	0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.50	0.46		0.55	0.49		0.12	0.12	0.12	0.21	0.21	0.21
Capacity (c), veh/h	183	1589		240	1692		216	227	195	374	785	331
Volume-to-Capacity Ratio (X)	0.318	0.792		0.776	0.789		0.527	0.785	0.834	0.931	0.261	0.28
Back of Queue (Q), ft/ln (50 th percentile)	21	472.4		67.7	493.3		82.5	135.4	121.5	365	64.3	57.9
Back of Queue (Q), veh/ln (50 th percentile)	0.8	18.2		2.6	19.0		3.2	5.2	4.9	14.0	2.5	2.3
Queue Storage Ratio (RQ) (50 th percentile)	0.07	1.57		0.23	1.64		0.54	0.66	0.62	2.38	0.31	0.29
Uniform Delay (d_1), s/veh	23.7	36.3		25.8	34.7		49.4	51.2	51.5	46.5	39.5	39.8
Incremental Delay (d_2), s/veh	0.4	4.3		2.1	3.9		0.7	2.3	3.7	40.3	0.1	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	24.0	40.5		27.8	38.6		50.2	53.5	55.2	86.8	39.6	40.0
Level of Service (LOS)	C	D		C	D		D	D	E	F	D	D
Approach Delay, s/veh / LOS	39.8	D		37.3	D		53.3	D		65.0	E	
Intersection Delay, s/veh / LOS	44.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.6	A	1.7	A	0.9	A	1.0	A

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Phone:
E-Mail:
Fax:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst:
Agency/Co.: KHR Associates
Date Performed: 8/4/2016
Analysis Time Period: 8:00 - 9:00 A.M.
Intersection: Palos Verdes North
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Existing AM Peak Hour
East/West Street: Via Valmonte
North/South Street: Palos Verdes North

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	205	0	0	200	0	13	484	40	0	263	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		L	T	LTR	
PHF	1.00		1.00		1.00	1.00	1.00	
Flow Rate	205		200		13	484	263	
% Heavy Veh	0		0		0	0	0	
No. Lanes	1		1		2		1	
Opposing-Lanes	1		1		1		2	
Conflicting-lanes	2		2		1		1	
Geometry group	2		2		5		4a	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	205		200		13	484	263	
Left-Turn	0		0		13	0	0	
Right-Turn	0		0		0	0	0	
Prop. Left-Turns	0.0		0.0		1.0	0.0	0.0	
Prop. Right-Turns	0.0		0.0		0.0	0.0	0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	
Geometry Group	2		2		5		4a	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.5		0.2	

hRT-adj	-0.6		-0.6		-0.7		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0		0.0		0.5	0.0	0.0	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	205		200		13	484	263	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.18		0.18		0.01	0.43	0.23	
hd, final value	6.91		6.93		6.97	6.46	6.56	
x, final value	0.393		0.385		0.025	0.869	0.479	
Move-up time, m	2.0		2.0		2.3		2.0	
Service Time	4.9		4.9		4.7	4.2	4.6	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	205		200		13	484	263	
Service Time	4.9		4.9		4.7	4.2	4.6	
Utilization, x	0.393		0.385		0.025	0.869	0.479	
Dep. headway, hd	6.91		6.93		6.97	6.46	6.56	
Capacity	526		526		433	556	548	
95% Queue Length	1.9		1.9		0.1	14.3	2.7	
Delay	14.4		14.2		9.9	46.2	15.6	
LOS	B		B		A	E	C	
Approach:								
Delay	14.4		14.2		45.2		15.6	
LOS	B		B		E		C	

Intersection Delay 27.8 Intersection LOS D

Phone:
E-Mail:
Fax:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst:
Agency/Co.: KHR Associates
Date Performed: 8/4/2016
Analysis Time Period: 5:00 - 6:00 P.M.
Intersection: Palos Verdes North
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Existing PM Peak Hour
East/West Street: Via Valmonte
North/South Street: Palos Verdes North

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	23	0	0	183	0	6	378	34	0	571	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		L	T	LTR	
PHF	1.00		1.00		1.00	1.00	1.00	
Flow Rate	23		183		6	378	571	
% Heavy Veh	0		0		0	0	0	
No. Lanes	1		1		2		1	
Opposing-Lanes	1		1		1		2	
Conflicting-lanes	2		2		1		1	
Geometry group	2		2		5		4a	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	23		183		6	378	571	
Left-Turn	0		0		6	0	0	
Right-Turn	0		0		0	0	0	
Prop. Left-Turns	0.0		0.0		1.0	0.0	0.0	
Prop. Right-Turns	0.0		0.0		0.0	0.0	0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	
Geometry Group	2		2		5		4a	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.5		0.2	

hRT-adj	-0.6		-0.6		-0.7		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0		0.0		0.5	0.0	0.0	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	23		183		6	378	571	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.02		0.16		0.01	0.34	0.51	
hd, final value	7.01		6.44		6.41	5.90	5.33	
x, final value	0.045		0.328		0.011	0.620	0.846	
Move-up time, m	2.0		2.0		2.3		2.0	
Service Time	5.0		4.4		4.1	3.6	3.3	

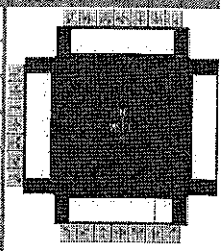
Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	23		183		6	378	571	
Service Time	5.0		4.4		4.1	3.6	3.3	
Utilization, x	0.045		0.328		0.011	0.620	0.846	
Dep. headway, hd	7.01		6.44		6.41	5.90	5.33	
Capacity	575		555		600	610	672	
95% Queue Length	0.1		1.5		0.0	4.7	13.1	
Delay	10.3		12.6		9.2	18.1	35.0+	
LOS	B		B		A	C	E	
Approach:								
Delay	10.3		12.6		18.0		35.0+	
LOS	B		B		C		E	

Intersection Delay 25.3 Intersection LOS D

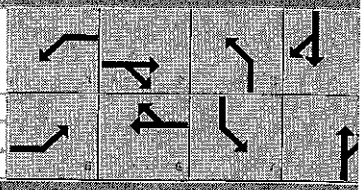
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Hawthorne Boulevard	File Name	1-PCH-Hawthorne Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	270	1040	267	145	1070	246	286	1350	55	184	741	308

Signal Information											
Cycle, s	90.0	Reference Phase	2								
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0	
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	13.6	35.9	9.9	32.2	13.6	33.4	10.9	30.6
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0	0	0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.11	0.35	0.35	0.07	0.31	0.31	0.11	0.33	0.33	0.08	0.30	0.30
Capacity (c), veh/h	357	1745	569	220	1544	503	369	1655	525	263	1499	465
Volume-to-Capacity Ratio (X)	0.757	0.596	0.469	0.659	0.693	0.489	0.776	0.816	0.105	0.700	0.494	0.66
Back of Queue (Q), ft/ln (50 th percentile)	76.4	182	134.5	41	198.6	129	77.8	219.5	19	50.6	106.1	138.
Back of Queue (Q), veh/ln (50 th percentile)	2.9	7.0	5.4	1.6	7.6	5.2	3.0	8.4	0.8	1.9	4.1	5.5
Queue Storage Ratio (RQ) (50 th percentile)	0.25	0.61	0.47	0.14	0.66	0.45	0.38	1.07	0.10	0.16	0.35	0.47
Uniform Delay (d_1), s/veh	40.7	28.7	27.1	42.0	31.6	29.3	39.1	27.8	21.2	40.6	26.2	27.8
Incremental Delay (d_2), s/veh	1.3	1.5	2.8	1.3	2.6	3.4	1.3	2.0	0.0	1.3	0.1	1.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	41.9	30.2	29.9	43.3	34.2	32.7	40.5	29.8	21.2	41.8	26.3	29.0
Level of Service (LOS)	D	C	C	D	C	C	D	C	C	D	C	C
Approach Delay, s/veh / LOS	32.1	C		34.9	C		31.3	C		29.3	C	
Intersection Delay, s/veh / LOS	32.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.5	C	3.5	C	3.5	C	3.5	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	1.4	A	1.2	A

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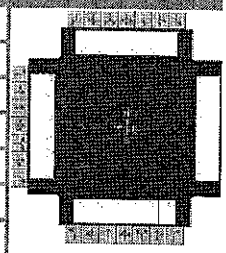
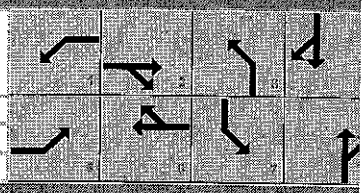
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Hawthorne Boulevard	File Name	1-PCH-Hawthorne Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	225	1143	346	191	1001	221	320	896	71	383	1230	382

Signal Information											
Cycle, s	90.0	Reference Phase	2								
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0	
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	12.2	33.1	11.2	32.1	14.5	29.6	16.1	31.2
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0	0	0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.09	0.32	0.32	0.08	0.31	0.31	0.12	0.28	0.28	0.13	0.30	0.30
Capacity (c), veh/h	307	1608	519	271	1555	502	403	1441	457	464	1532	476
Volume-to-Capacity Ratio (X)	0.732	0.711	0.666	0.705	0.644	0.440	0.794	0.622	0.155	0.825	0.803	0.80
Back of Queue (Q), ft/ln (50 th percentile)	61	180.9	172	51.9	154.3	97.1	87.2	135.2	26.8	109.7	201.5	196.
Back of Queue (Q), veh/ln (50 th percentile)	2.4	7.0	6.9	2.0	6.0	3.9	3.4	5.2	1.1	4.3	7.8	7.9
Queue Storage Ratio (RQ) (50 th percentile)	0.20	0.60	0.59	0.17	0.51	0.33	0.43	0.67	0.14	0.36	0.66	0.67
Uniform Delay (d_1), s/veh	39.8	26.8	26.3	40.4	26.6	24.7	38.7	28.0	24.1	37.9	28.9	28.9
Incremental Delay (d_2), s/veh	1.3	2.7	6.8	1.3	2.1	2.8	2.1	0.3	0.1	5.6	2.1	6.6
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	41.1	29.5	33.1	41.6	28.7	27.5	40.8	28.3	24.2	43.5	31.0	35.5
Level of Service (LOS)	D	C	C	D	C	C	D	C	C	D	C	D
Approach Delay, s/veh / LOS	31.8	C		30.3	C		31.2	C		34.3	C	
Intersection Delay, s/veh / LOS	32.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.5	C	3.5	C	3.5	C	3.5	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	1.2	A	1.6	A

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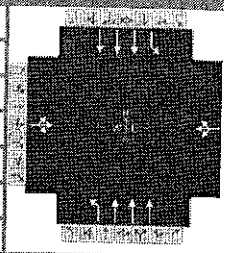
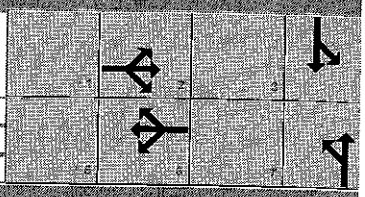
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	244th Street	File Name	2-Hawthorne-244th Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	43	4	0	59	52	4	1612		39	1064	

Signal Information												
Cycle, s	45.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	21.0	16.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		20.0		20.0
Change Period, ($Y+R_c$), s		9.0		9.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						15.5		18.0
Green Extension Time (g_e), s		0.0		0.0		0.4		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0			0		4	1612		39	1064	
Adjusted Saturation Flow Rate (s), veh/h/ln		0			0		539	1691		319	1691	
Queue Service Time (g_s), s		0.0			0.0		0.3	13.5		2.5	7.7	
Cycle Queue Clearance Time (g_c), s		0.0			0.0		8.0	13.5		16.0	7.7	
Green Ratio (g/C)							0.36	0.36		0.36	0.36	
Capacity (c), veh/h							259	1804		178	1804	
Volume-to-Capacity Ratio (X)		0.000			0.000		0.015	0.894		0.219	0.590	
Back of Queue (Q), ft/ln (50 th percentile)		0			0		0.7	124.2		9.4	56.9	
Back of Queue (Q), veh/ln (50 th percentile)		0.0			0.0		0.0	5.0		0.4	2.3	
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.01	0.63		0.09	0.29	
Uniform Delay (d_1), s/veh							15.1	13.7		21.9	11.8	
Incremental Delay (d_2), s/veh		0.0			0.0		0.0	6.5		0.2	0.4	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							15.1	20.2		22.2	12.2	
Level of Service (LOS)							B	C		C	B	
Approach Delay, s/veh / LOS	9.8	A		10.6	B		20.2	C		12.5	B	
Intersection Delay, s/veh / LOS	16.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.7	A	1.4	A	1.1	A

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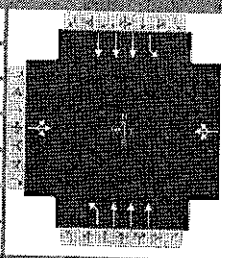
HCS 2010 Signalized Intersection Results Summary

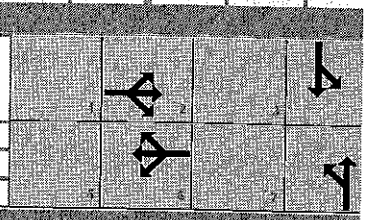
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	244th Street	File Name	2-Hawthorne-244th Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	61	22	0	62	33	31	1267		75	1614	

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	21.0	16.0	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		20.0		20.0
Change Period, ($Y+R_c$), s		9.0		9.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						18.0		18.0
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0			0		31	1267		75	1614	
Adjusted Saturation Flow Rate (s), veh/h/ln		0			0		318	1691		444	1691	
Queue Service Time (g_s), s		0.0			0.0		2.5	9.7		6.3	13.5	
Cycle Queue Clearance Time (g_c), s		0.0			0.0		16.0	9.7		16.0	13.5	
Green Ratio (g/C)							0.36	0.36		0.36	0.36	
Capacity (c), veh/h							177	1804		223	1804	
Volume-to-Capacity Ratio (X)		0.000			0.000		0.175	0.702		0.337	0.895	
Back of Queue (Q), ft/ln (50 th percentile)		0			0		7.5	73.9		17.7	125.1	
Back of Queue (Q), veh/ln (50 th percentile)		0.0			0.0		0.3	3.0		0.7	5.0	
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.07	0.38		0.18	0.64	
Uniform Delay (d_1), s/veh							21.8	12.5		19.8	13.7	
Incremental Delay (d_2), s/veh		0.0			0.0		0.2	1.1		0.3	6.6	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							22.0	13.5		20.2	20.3	
Level of Service (LOS)							C	B		C	C	
Approach Delay, s/veh / LOS	10.2	B		10.4	B		13.7	B		20.3	C	
Intersection Delay, s/veh / LOS	17.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.6	A	1.2	A	1.4	A

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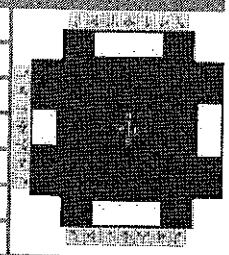
HCS 2010 Signalized Intersection Results Summary

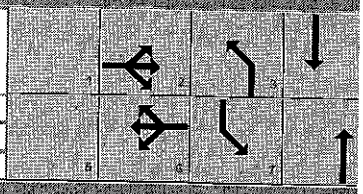
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Newton Street	File Name	3-Hawthorne-Newton Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	23	76	81	84	114	106	98	1616		37	1029	

Signal Information			
Cycle, s	43.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.4	2.2	2.0	18.5	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		12.4		12.4	8.2	24.5	6.2	22.5
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s		5.4		8.2	4.2	12.5	2.9	8.3
Green Extension Time (g_e), s		0.5		0.2	0.1	8.0	0.0	8.7
Phase Call Probability		1.00		1.00	0.69	1.00	0.36	1.00
Max Out Probability		0.46		1.00	0.00	0.25	0.00	0.16

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	23	157		84	114	106	98	1616		37	1029	
Adjusted Saturation Flow Rate (s), veh/h/ln	1299	1739		1249	1900	1610	1810	1691		1810	1691	
Queue Service Time (g_s), s	0.7	3.4		2.7	2.2	2.4	2.2	10.5		0.9	6.3	
Cycle Queue Clearance Time (g_c), s	2.9	3.4		6.2	2.2	2.4	2.2	10.5		0.9	6.3	
Green Ratio (g/C)	0.20	0.20		0.20	0.20	0.20	0.10	0.48		0.05	0.43	
Capacity (c), veh/h	354	339		311	371	314	174	2417		91	2182	
Volume-to-Capacity Ratio (X)	0.065	0.463		0.270	0.307	0.337	0.562	0.668		0.409	0.472	
Back of Queue (Q), ft/ln (50 th percentile)	4.3	29		17.2	20.2	18.9	21.2	63.1		8.5	40.3	
Back of Queue (Q), veh/ln (50 th percentile)	0.2	1.2		0.7	0.8	0.8	0.8	2.5		0.3	1.6	
Queue Storage Ratio (RQ) (50 th percentile)	0.04	0.29		0.17	0.20	0.19	0.21	0.32		0.09	0.20	
Uniform Delay (d_1), s/veh	16.1	15.3		18.1	14.9	14.9	18.6	8.7		19.9	8.8	
Incremental Delay (d_2), s/veh	0.0	0.4		0.2	0.2	0.2	1.1	0.1		1.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	16.1	15.7		18.3	15.0	15.2	19.7	8.8		21.0	8.8	
Level of Service (LOS)	B	B		B	B	B	B	A		C	A	
Approach Delay, s/veh / LOS	15.8	B		16.0	B		9.4	A		9.3	A	
Intersection Delay, s/veh / LOS	10.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.2	B
Bicycle LOS Score / LOS	0.8	A	1.0	A	1.4	A	1.1	A

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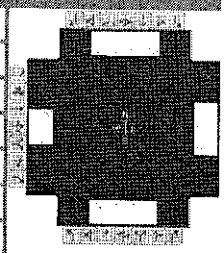
HCS 2010 Signalized Intersection Results Summary

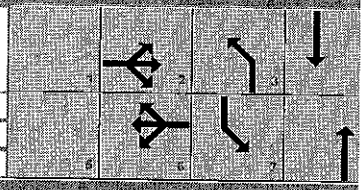
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Newton Street	File Name	3-Hawthorne-Newton Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	16	53	109	197	56	97	96	1266		50	1587	

Signal Information			
Cycle, s	48.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	3.0	1.4	22.3	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		14.0		14.0	8.4	27.7	7.0	26.3
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s		6.1		12.0	4.5	10.3	3.3	14.0
Green Extension Time (g_e), s		0.5		0.0	0.1	9.2	0.0	8.3
Phase Call Probability		1.00		1.00	0.73	1.00	0.49	1.00
Max Out Probability		0.73		1.00	0.00	0.25	0.00	0.34

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	16	162		197	56	97	96	1266		50	1587	
Adjusted Saturation Flow Rate (s), veh/h/ln	1369	1695		1243	1900	1610	1810	1691		1810	1691	
Queue Service Time (g_s), s	0.5	4.1		5.9	1.2	2.5	2.5	8.3		1.3	12.0	
Cycle Queue Clearance Time (g_c), s	1.6	4.1		10.0	1.2	2.5	2.5	8.3		1.3	12.0	
Green Ratio (g/C)	0.21	0.21		0.21	0.21	0.21	0.09	0.49		0.06	0.46	
Capacity (c), veh/h	396	348		299	390	331	162	2474		110	2327	
Volume-to-Capacity Ratio (X)	0.040	0.466		0.660	0.144	0.293	0.592	0.512		0.456	0.682	
Back of Queue (Q), ft/ln (50 th percentile)	3.3	35.2		60.3	11.2	20.1	24.8	54		13.2	82	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	1.4		2.4	0.4	0.8	1.0	2.2		0.5	3.3	
Queue Storage Ratio (RQ) (50 th percentile)	0.03	0.35		0.60	0.11	0.20	0.25	0.27		0.13	0.42	
Uniform Delay (d_1), s/veh	16.5	17.0		22.1	15.8	16.4	21.3	8.5		22.1	10.4	
Incremental Delay (d_2), s/veh	0.0	0.4		4.3	0.1	0.2	1.3	0.1		1.1	0.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	16.5	17.4		26.4	15.9	16.5	22.6	8.6		23.2	10.5	
Level of Service (LOS)	B	B		C	B	B	C	A		C	B	
Approach Delay, s/veh / LOS	17.3	B		22.0	C		9.6	A		10.9	B	
Intersection Delay, s/veh / LOS	11.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.2	B
Bicycle LOS Score / LOS	0.8	A	1.1	A	1.2	A	1.4	A

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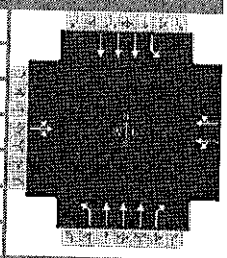
HCS 2010 Signalized Intersection Results Summary

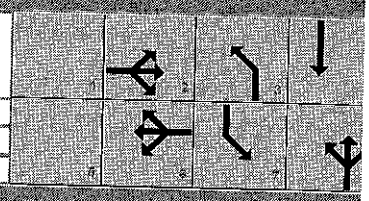
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Via Valmonte	File Name	4-Hawthorne-Via Valmonte Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	241	68	0	1	1	46	1597	37	3	1181	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	31.5	0.4	3.3	27.8	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		8.0	1.1	3.0	2.0	4.0
Phase Duration, s		35.5		35.5	7.7	35.1	4.4	31.8
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s					3.1	22.1	2.1	16.3
Green Extension Time (g_e), s		0.0		0.0	0.0	9.0	0.0	9.5
Phase Call Probability					0.62	1.00	0.06	1.00
Max Out Probability					0.00	0.25	0.00	0.20

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h		0		0		1	46	1597	37	3	1181	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0		1610	1810	1691	1610	1810	1691	
Queue Service Time (g_s), s		0.0		0.0		0.0	1.1	20.1	1.0	0.1	14.3	
Cycle Queue Clearance Time (g_c), s		0.0		0.0		0.0	1.1	20.1	1.0	0.1	14.3	
Green Ratio (g/C)						0.42	0.44	0.42	0.42	0.00	0.37	
Capacity (c), veh/h						676	272	2107	669	9	1882	
Volume-to-Capacity Ratio (X)		0.000		0.000		0.001	0.169	0.758	0.055	0.341	0.628	
Back of Queue (Q), ft/ln (50 th percentile)		0		0		0.2	10.3	179	8.6	1.8	128.8	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		0.0		0.0	0.4	7.2	0.3	0.1	5.2	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.00		0.01	0.10	0.91	0.04	0.02	0.65	
Uniform Delay (d_1), s/veh						12.6	14.0	18.7	13.1	37.2	19.3	
Incremental Delay (d_2), s/veh		0.0		0.0		0.0	0.1	0.5	0.0	8.4	0.1	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh						12.6	14.1	19.3	13.1	45.6	19.5	
Level of Service (LOS)						B	B	B	B	D	B	
Approach Delay, s/veh / LOS	16.8	B		12.6	B		19.0	B		19.5	B	
Intersection Delay, s/veh / LOS	19.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.2	C	2.3	B	2.6	B
Bicycle LOS Score / LOS	1.0	A	0.5	A	1.4	A	1.1	A

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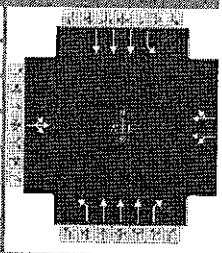
HCS 2010 Signalized Intersection Results Summary

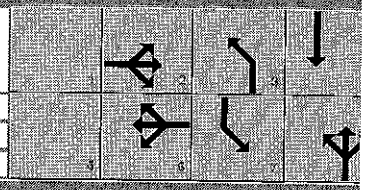
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Via Valmonte	File Name	4-Hawthorne-Via Valmonte Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	152	61	0	16	21	64	1202	19	16	1910	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.6	1.7	2.7	34.0	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		8.0	1.1	3.0	2.0	4.0
Phase Duration, s		28.6		28.6	8.4	40.7	5.7	38.0
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s					3.3	13.9	2.7	26.8
Green Extension Time (g_e), s		0.0		0.0	0.1	12.1	0.0	7.2
Phase Call Probability					0.74	1.00	0.28	1.00
Max Out Probability					0.00	0.22	0.00	0.61

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h		0		0		21	64	1202	19	16	1910	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0		1610	1810	1691	1610	1810	1691	
Queue Service Time (g_s), s		0.0		0.0		0.7	1.3	11.9	0.5	0.7	24.8	
Cycle Queue Clearance Time (g_c), s		0.0		0.0		0.7	1.3	11.9	0.5	0.7	24.8	
Green Ratio (g/C)						0.33	0.52	0.49	0.49	0.02	0.45	
Capacity (c), veh/h						528	232	2483	788	41	2299	
Volume-to-Capacity Ratio (X)		0.000		0.000		0.040	0.276	0.484	0.024	0.390	0.831	
Back of Queue (Q), ft/ln (50 th percentile)		0		0		6.3	11.7	99.4	3.7	7.6	222.8	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		0.0		0.3	0.5	4.0	0.1	0.3	8.9	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.00		0.16	0.12	0.50	0.02	0.10	1.13	
Uniform Delay (d_1), s/veh						17.2	14.8	12.8	9.9	36.1	18.0	
Incremental Delay (d_2), s/veh		0.0		0.0		0.1	0.2	0.1	0.0	2.2	2.1	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh						17.3	15.1	12.9	9.9	38.4	20.1	
Level of Service (LOS)						B	B	B	A	D	C	
Approach Delay, s/veh / LOS	20.9	C		17.2	B		12.9	B		20.2	C	
Intersection Delay, s/veh / LOS	17.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	2.2	B	2.5	B
Bicycle LOS Score / LOS	0.8	A	0.5	A	1.2	A	1.5	A

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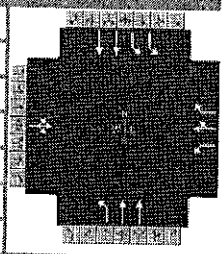
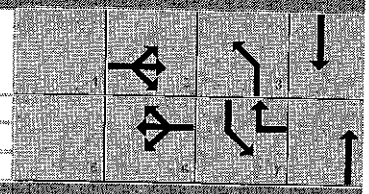
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	5-Hawthorne-Rolling Hills Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	2	0	88	2	433	0	1360		282	825	

Signal Information												
Cycle, s	60.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		17.4		17.4	0.0	31.6	11.0	42.6
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0		0	0	0	0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0	0	0	0	0		0	0	
Queue Service Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g_c), s		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Green Ratio (g/C)				0.22	0.22	0.34		0.46		0.12	0.64	
Capacity (c), veh/h				440	424	548	3	1631		411	2282	
Volume-to-Capacity Ratio (X)		0.000		0.200	0.005	0.790	0.000	0.834		0.686	0.361	
Back of Queue (Q), ft/ln (50 th percentile)		0		26.2	0.6	162.3	0	174.5		45.5	38.1	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		1.0	0.0	6.5	0.0	7.0		1.8	1.5	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.66	0.01	3.25	0.00	0.89		0.23	0.19	
Uniform Delay (d_1), s/veh				19.3	18.1	17.9	0.0	14.2		25.4	5.0	
Incremental Delay (d_2), s/veh		0.0		1.0	0.0	12.0	0.0	2.0		0.8	0.0	
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				20.4	18.1	29.9	0.0	16.2		26.2	5.0	
Level of Service (LOS)				C	B	C		B		C	A	
Approach Delay, s/veh / LOS	18.1	B		28.2	C		16.2	B		10.4	B	
Intersection Delay, s/veh / LOS	16.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.8	C	2.0	B
Bicycle LOS Score / LOS	0.5	A	1.4	A	1.6	A	1.4	A

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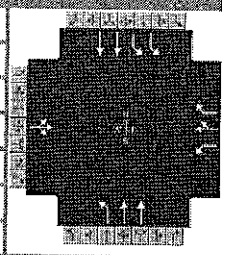
HCS 2010 Signalized Intersection Results Summary

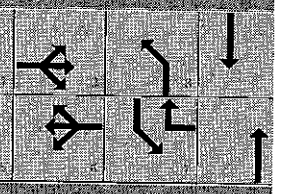
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	5-Hawthorne-Rolling Hills Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	3	1	88	0	333	0	1033		438	1327	

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	0.0	0.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		18.8		18.8	0.0	27.4	13.8	41.2
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0		0	0	0	0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0	0	0	0	0		0	0	
Queue Service Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g_c), s		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Green Ratio (g/C)				0.25	0.25	0.41		0.39		0.16	0.62	
Capacity (c), veh/h				470	467	659	3	1385		575	2202	
Volume-to-Capacity Ratio (X)		0.000		0.187	0.000	0.505	0.000	0.746		0.762	0.603	
Back of Queue (Q), ft/ln (50 th percentile)		0		25.1	0	83.3	0	131.3		69.3	86	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		1.0	0.0	3.3	0.0	5.3		2.8	3.4	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.63	0.00	1.67	0.00	0.67		0.35	0.44	
Uniform Delay (d_1), s/veh				18.3	0.0	13.2	0.0	15.7		24.0	6.9	
Incremental Delay (d_2), s/veh		0.0		0.9	0.0	2.8	0.0	0.6		0.8	0.1	
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				19.1	0.0	16.0	0.0	16.3		24.8	7.0	
Level of Service (LOS)				B		B		B		C	A	
Approach Delay, s/veh / LOS	17.1	B		16.6	B		16.3	B		11.4	B	
Intersection Delay, s/veh / LOS	13.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.8	C	2.0	B
Bicycle LOS Score / LOS	0.5	A	1.2	A	1.3	A	1.9	A

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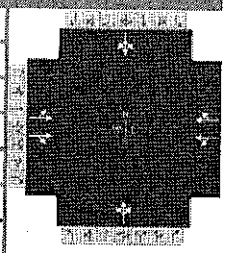
HCS 2010 Signalized Intersection Results Summary

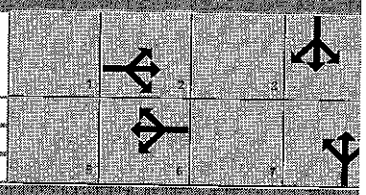
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Whiffletree Lane	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	6-Rolling Hills-Whiffletree Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	337	0	0	498	0	0	46	21	0	14	3

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.4	1.1	3.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		12.0
Phase Duration, s		32.4		32.4		7.4		5.1
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.1		3.1
Queue Clearance Time (g_s), s						3.6		2.4
Green Extension Time (g_e), s		0.0		0.0		0.1		0.0
Phase Call Probability						0.57		0.19
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0		0	0		0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		0	0		0		0			0	
Queue Service Time (g_s), s	0.0		0.0	0.0		0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	0.0		0.0	0.0		0.0		0.0			0.0	
Green Ratio (g/C)												
Capacity (c), veh/h												
Volume-to-Capacity Ratio (X)	0.000		0.000	0.000		0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	0		0	0		0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.0		0.0	0.0		0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.00		0.00	0.00		0.00		0.00			0.00	
Uniform Delay (d_1), s/veh												
Incremental Delay (d_2), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (d), s/veh												
Level of Service (LOS)												
Approach Delay, s/veh / LOS	3.5	A		3.7	A		21.1	C		23.4	C	
Intersection Delay, s/veh / LOS	5.2						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.6	A	0.5	A

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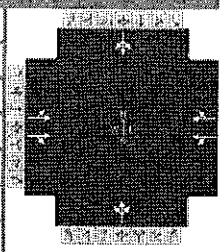
HCS 2010 Signalized Intersection Results Summary

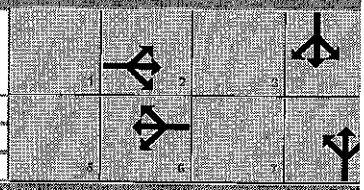
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Whiffletree Lane	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	6-Rolling Hills-Whiffletree Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	518	0	0	396	0	0	15	15	0	16	6

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	29.7	1.4	1.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		12.0
Phase Duration, s		33.7		33.7		5.9		5.4
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.1
Queue Clearance Time (g_s), s						2.8		2.5
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						0.31		0.24
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0		0	0		0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		0	0		0		0			0	
Queue Service Time (g_s), s	0.0		0.0	0.0		0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	0.0		0.0	0.0		0.0		0.0			0.0	
Green Ratio (g/C)												
Capacity (c), veh/h												
Volume-to-Capacity Ratio (X)	0.000		0.000	0.000		0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	0		0	0		0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.0		0.0	0.0		0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.00		0.00	0.00		0.00		0.00			0.00	
Uniform Delay (d_1), s/veh												
Incremental Delay (d_2), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (d), s/veh												
Level of Service (LOS)												
Approach Delay, s/veh / LOS	3.2	A		3.0	A		22.5	C		22.9	C	
Intersection Delay, s/veh / LOS	4.2						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.5	A	0.5	A

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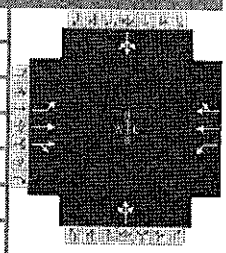
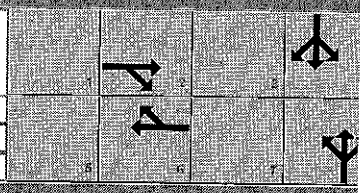
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Fallenleaf Drive	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	7-Rolling Hills-Fallenleaf Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	30	320	0	11	440	0	0	46	0	0	61	0

Signal Information												
Cycle, s	45.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	27.2	3.2	2.6	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		12.0		12.0
Phase Duration, s		31.2		31.2		6.6		7.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.0		3.0
Queue Clearance Time (g_s), s						3.1		3.4
Green Extension Time (g_e), s		0.0		0.0		0.1		0.1
Phase Call Probability						0.44		0.53
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	30	320	0	11	440	0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	964	1900	0	1076	1900	0		0			0	
Queue Service Time (g_s), s	0.6	1.6	0.0	0.2	2.3	0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	3.0	1.6	0.0	1.9	2.3	0.0		0.0			0.0	
Green Ratio (g/C)	0.60	0.60		0.60	0.60							
Capacity (c), veh/h	692	2295		770	2295							
Volume-to-Capacity Ratio (X)	0.043	0.139	0.000	0.014	0.192	0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	2.5	9.1	0	0.8	12.9	0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	0.4	0.0	0.0	0.5	0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.02	0.05	0.00	0.01	0.06	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	4.7	3.9		4.3	4.0							
Incremental Delay (d_2), s/veh	0.1	0.1	0.0	0.0	0.2	0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	4.8	4.0		4.3	4.2							
Level of Service (LOS)	A	A		A	A							
Approach Delay, s/veh / LOS	4.1	A		4.2	A		21.4	C		21.0	C	
Intersection Delay, s/veh / LOS	6.1						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.6	A	0.6	A

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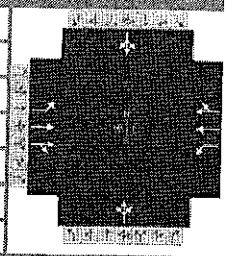
HCS 2010 Signalized Intersection Results Summary

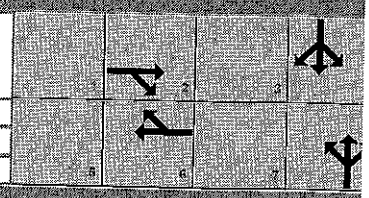
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Fallenleaf Drive	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	7-Rolling Hills-Fallenleaf Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	36	446	0	21	401	0	0	25	0	0	47	0

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.7	2.7	1.6	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		12.0		12.0
Phase Duration, s		32.7		32.7		5.6		6.7
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.0		3.0
Queue Clearance Time (g_s), s						2.6		3.1
Green Extension Time (g_e), s		0.0		0.0		0.0		0.1
Phase Call Probability						0.27		0.44
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	36	446	0	21	401	0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	999	1900	0	959	1900	0		0			0	
Queue Service Time (g_s), s	0.7	2.2	0.0	0.4	1.9	0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	2.6	2.2	0.0	2.6	1.9	0.0		0.0			0.0	
Green Ratio (g/C)	0.64	0.64		0.64	0.64							
Capacity (c), veh/h	755	2425		726	2425							
Volume-to-Capacity Ratio (X)	0.048	0.184	0.000	0.029	0.165	0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	2.5	10.2	0	1.5	9.2	0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	0.4	0.0	0.1	0.4	0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.02	0.05	0.00	0.01	0.05	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	3.8	3.3		3.9	3.3							
Incremental Delay (d_2), s/veh	0.1	0.2	0.0	0.1	0.1	0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	3.9	3.5		3.9	3.4							
Level of Service (LOS)	A	A		A	A							
Approach Delay, s/veh / LOS	3.5	A		3.5	A		22.5	C		21.4	C	
Intersection Delay, s/veh / LOS	4.9						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.5	A	0.6	A

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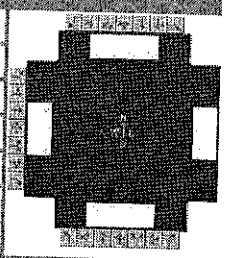
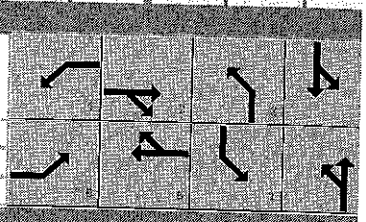
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Rolling Hills Road	File Name	8-Rolling Hills-Crenshaw Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	146	147	60	23	180	200	117	1339		157	1023	

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	4.0	1.1	4.0
Phase Duration, s	16.0	62.8	7.2	54.0	11.6	36.3	13.6	38.4
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	0	0	0	0	0	0	0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0	0	0	0		0	0	
Queue Service Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Green Ratio (g/C)	0.10	0.49	0.49	0.03	0.42	0.42	0.33	0.27		0.35	0.29	
Capacity (c), veh/h	173	887	788	46	754	669	221	1367		206	1454	
Volume-to-Capacity Ratio (X)	0.844	0.166	0.076	0.498	0.239	0.299	0.529	0.979		0.764	0.704	
Back of Queue (Q), ft/ln (50 th percentile)	135.8	78.6	29	18.7	109.1	121.6	61.9	433.7		86.2	229.3	
Back of Queue (Q), veh/ln (50 th percentile)	5.2	3.0	1.2	0.7	4.2	4.9	2.4	16.7		3.3	8.8	
Queue Storage Ratio (RQ) (50 th percentile)	0.45	0.26	0.10	0.06	0.36	0.42	0.30	2.12		0.28	0.75	
Uniform Delay (d_1), s/veh	55.1	22.9	21.6	58.1	28.6	29.5	31.1	43.5		32.2	38.3	
Incremental Delay (d_2), s/veh	17.4	0.4	0.2	3.1	0.7	1.1	0.7	32.2		3.5	1.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	72.5	23.3	21.8	61.2	29.4	30.7	31.8	75.7		35.7	39.6	
Level of Service (LOS)	E	C	C	E	C	C	C	E		D	D	
Approach Delay, s/veh / LOS	43.4	D		31.8	C		72.2	E		39.1	D	
Intersection Delay, s/veh / LOS	52.9						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.4	B
Bicycle LOS Score / LOS	1.1	A	1.2	A	1.3	A	1.1	A

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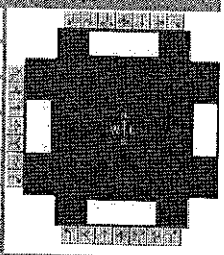
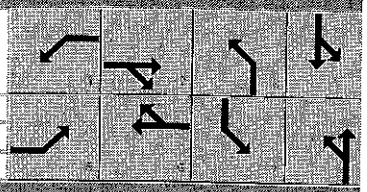
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Rolling Hills Road	File Name	8-Rolling Hills-Crenshaw Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	163	285	88	42	217	164	101	1007		274	1022	

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.2	61.7	8.5	53.0	11.1	29.8	19.9	38.7
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	0	0	0	0	0	0	0	0		0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0	0	0	0		0	0	
Queue Service Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Cycle Queue Clearance Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Green Ratio (g/C)	0.11	0.48	0.48	0.04	0.41	0.41	0.27	0.22		0.36	0.29	
Capacity (c), veh/h	190	870	773	65	739	656	216	1092		307	1466	
Volume-to-Capacity Ratio (X)	0.857	0.327	0.114	0.647	0.294	0.250	0.468	0.922		0.892	0.697	
Back of Queue (Q), ft/ln (50 th percentile)	159.7	174.1	44.2	34.2	137	97.3	58.3	284.9		221.1	228	
Back of Queue (Q), veh/ln (50 th percentile)	6.1	6.7	1.8	1.3	5.3	3.9	2.2	11.0		8.5	8.8	
Queue Storage Ratio (RQ) (50 th percentile)	0.53	0.58	0.15	0.11	0.46	0.34	0.28	1.39		0.72	0.74	
Uniform Delay (d_1), s/veh	54.7	26.0	22.7	57.7	30.0	29.3	34.6	46.1		31.8	38.0	
Incremental Delay (d_2), s/veh	23.3	1.0	0.3	4.0	1.0	0.9	0.6	14.8		32.9	1.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	78.0	27.0	23.0	61.8	31.0	30.2	35.2	60.9		64.7	39.2	
Level of Service (LOS)	E	C	C	E	C	C	D	E		E	D	
Approach Delay, s/veh / LOS	41.9	D		33.8	C		58.5	E		44.6	D	
Intersection Delay, s/veh / LOS	47.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.5	B	2.4	B
Bicycle LOS Score / LOS	1.4	A	1.2	A	1.1	A	1.2	A

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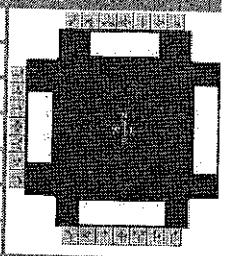
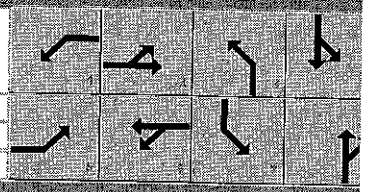
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Crenshaw Boulevard	File Name	9-PCH-Crenshaw Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	166	957		650	1956		58	1004	487	138	632	

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	1.1	4.0
Phase Duration, s	10.0	50.7	19.3	60.0	9.1	37.5	12.5	40.9
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	
Queue Service Time (g_s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Cycle Queue Clearance Time (g_c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Green Ratio (g/C)	0.44	0.39		0.53	0.47		0.04	0.28	0.28	0.36	0.31	
Capacity (c), veh/h	321	1341		703	2302		76	1416	449	242	1558	
Volume-to-Capacity Ratio (X)	0.517	0.714		0.925	0.850		0.764	0.709	1.085	0.570	0.406	
Back of Queue (Q), ft/ln (50 th percentile)	35.5	357.1		190	498.8		47.5	227.3	922.5	70.3	122.6	
Back of Queue (Q), veh/ln (50 th percentile)	1.4	13.7		7.3	19.2		1.8	8.7	36.9	2.7	4.7	
Queue Storage Ratio (RQ) (50 th percentile)	0.12	1.19		0.63	1.66		0.23	1.11	4.69	0.23	0.40	
Uniform Delay (d_1), s/veh	28.5	38.4		25.4	37.4		56.8	38.9	43.3	29.4	32.9	
Incremental Delay (d_2), s/veh	0.5	3.3		22.0	4.4		6.1	1.4	193.8	0.8	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	29.0	41.7		47.4	41.7		62.9	40.3	237.1	30.2	33.0	
Level of Service (LOS)	C	D		D	D		E	D	F	C	C	
Approach Delay, s/veh / LOS	39.8	D		43.1	D		103.0	F		32.5	C	
Intersection Delay, s/veh / LOS	56.5						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	3.1	C	3.3	C
Bicycle LOS Score / LOS	1.4	A	1.9	A	1.3	A	0.9	A

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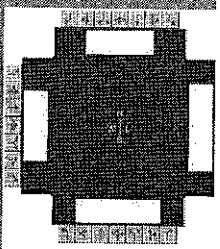
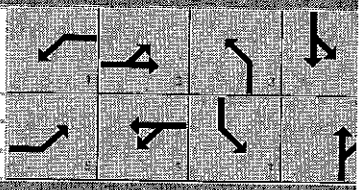
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Crenshaw Boulevard	File Name	9-PCH-Crenshaw Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	172	1272		472	1453		74	703	454	329	1096	

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	1.1	4.0
Phase Duration, s	10.0	52.6	17.4	60.0	10.4	30.0	20.0	39.6
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	
Queue Service Time (g_s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Cycle Queue Clearance Time (g_c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Green Ratio (g/C)	0.46	0.41		0.53	0.47		0.05	0.22	0.22	0.37	0.30	
Capacity (c), veh/h	427	1396		533	2301		95	1099	348	364	1505	
Volume-to-Capacity Ratio (X)	0.403	0.911		0.886	0.631		0.782	0.639	1.303	0.904	0.728	
Back of Queue (Q), ft/ln (50 th percentile)	35.3	543.5		141.8	330.2		59.9	161.8	1622.5	269.3	246.9	
Back of Queue (Q), veh/ln (50 th percentile)	1.4	20.9		5.5	12.7		2.3	6.2	64.9	10.4	9.5	
Queue Storage Ratio (RQ) (50 th percentile)	0.12	1.81		0.47	1.10		0.29	0.79	8.24	0.88	0.80	
Uniform Delay (d_1), s/veh	22.6	41.7		33.3	32.5		56.1	42.7	47.0	33.0	37.9	
Incremental Delay (d_2), s/veh	0.2	12.3		14.5	1.3		5.4	1.0	567.0	32.5	1.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	22.8	54.0		47.8	33.8		61.5	43.7	614.0	65.5	39.5	
Level of Service (LOS)	C	D		D	C		E	D	F	E	D	
Approach Delay, s/veh / LOS	50.3	D		37.2	D		255.1	F		45.5	D	
Intersection Delay, s/veh / LOS	86.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	3.1	C	3.3	C
Bicycle LOS Score / LOS	1.7	A	1.5	A	1.2	A	1.3	A

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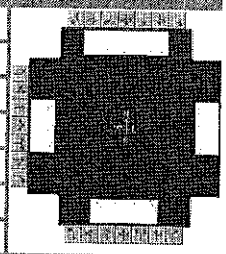
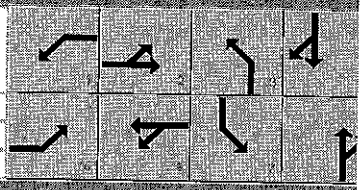
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Vista Montana	File Name	10-PCH-Vista Montana Amb AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	48	1154		66	1540		154	148	122	287	116	194

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	4.0	2.0	3.0
Phase Duration, s	8.8	77.7	9.3	78.3	11.4	16.9	16.1	21.5
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.65	0.61		0.66	0.62		0.06	0.11	0.11	0.10	0.15	0.15
Capacity (c), veh/h	203	2116		306	2132		213	200	170	347	518	229
Volume-to-Capacity Ratio (X)	0.236	0.545		0.216	0.722		0.724	0.702	0.760	0.828	0.224	0.84
Back of Queue (Q), ft/ln (50 th percentile)	14.2	342		14.4	508.1		59.4	105.7	95.6	116.9	38.9	143.
Back of Queue (Q), veh/ln (50 th percentile)	0.5	13.2		0.6	19.5		2.3	4.1	3.8	4.5	1.5	5.7
Queue Storage Ratio (RQ) (50 th percentile)	0.09	1.14		0.12	2.03		0.39	0.52	0.49	0.76	0.21	0.73
Uniform Delay (d_1), s/veh	18.2	22.7		12.0	26.6		55.3	51.7	52.1	52.9	45.2	49.9
Incremental Delay (d_2), s/veh	0.2	1.0		0.1	2.2		1.8	1.7	2.7	7.6	0.1	3.4
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	18.4	23.7		12.1	28.8		57.1	53.4	54.7	60.5	45.3	53.3
Level of Service (LOS)	B	C		B	C		E	D	D	E	D	D
Approach Delay, s/veh / LOS	23.5	C		28.1	C		55.1	E		55.2	E	
Intersection Delay, s/veh / LOS	33.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.5	A	1.8	A	0.8	A	1.0	A

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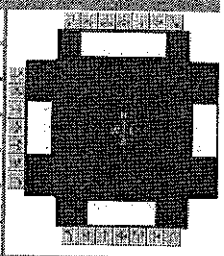
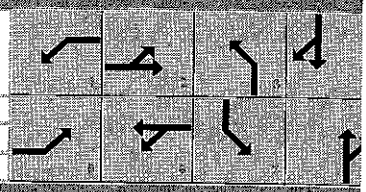
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Vista Montana	File Name	10-PCH-Vista Montana Amb PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	60	1296		192	1375		117	202	149	359	211	98

Signal Information											
Cycle, s	120.0	Reference Phase	2								
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0	
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	4.0	2.0	3.0
Phase Duration, s	9.2	70.3	11.8	73.0	10.0	19.4	18.5	27.8
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.60	0.55		0.62	0.57		0.05	0.13	0.13	0.12	0.20	0.20
Capacity (c), veh/h	220	1905		270	1981		173	239	205	415	703	312
Volume-to-Capacity Ratio (X)	0.273	0.680		0.712	0.694		0.677	0.770	0.816	0.865	0.300	0.31
Back of Queue (Q), ft/ln (50 th percentile)	16.6	433.7		73.1	458.3		45.3	138.6	123.7	157.6	67.7	61
Back of Queue (Q), veh/ln (50 th percentile)	0.6	16.7		2.8	17.6		1.7	5.3	4.9	6.1	2.6	2.4
Queue Storage Ratio (RQ) (50 th percentile)	0.11	1.45		0.61	1.83		0.29	0.68	0.63	1.03	0.37	0.31
Uniform Delay (d_1), s/veh	18.2	29.0		21.8	28.1		56.0	50.6	50.9	51.8	41.0	41.1
Incremental Delay (d_2), s/veh	0.2	2.0		1.3	2.1		1.7	2.0	3.1	15.7	0.1	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	18.4	31.0		23.1	30.2		57.8	52.6	54.0	67.5	41.1	41.3
Level of Service (LOS)	B	C		C	C		E	D	D	E	D	D
Approach Delay, s/veh / LOS	30.4	C		29.3	C		54.4	D		55.3	E	
Intersection Delay, s/veh / LOS	36.9						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.6	A	1.8	A	0.9	A	1.0	A

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Phone:
E-Mail:
Fax:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst:
Agency/Co.: KHR Associates
Date Performed: 8/4/2016
Analysis Time Period: 8:00 - 9:00 A.M.
Intersection: Palos Verdes North
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Ambient AM Peak Hour
East/West Street: Via Valmonte
North/South Street: Palos Verdes North

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	211	0	0	206	0	13	499	41	0	271	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		L	T	LTR	
PHF	1.00		1.00		1.00	1.00	1.00	
Flow Rate	211		206		13	499	271	
% Heavy Veh	0		0		0	0	0	
No. Lanes	1		1		2		1	
Opposing-Lanes	1		1		1		2	
Conflicting-lanes	2		2		1		1	
Geometry group	2		2		5		4a	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	211		206		13	499	271	
Left-Turn	0		0		13	0	0	
Right-Turn	0		0		0	0	0	
Prop. Left-Turns	0.0		0.0		1.0	0.0	0.0	
Prop. Right-Turns	0.0		0.0		0.0	0.0	0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	
Geometry Group	2		2		5		4a	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.5		0.2	

hRT-adj	-0.6		-0.6		-0.7		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0		0.0		0.5	0.0	0.0	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	211		206		13	499	271	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.19		0.18		0.01	0.44	0.24	
hd, final value	7.08		7.10		7.09	6.58	6.72	
x, final value	0.415		0.406		0.026	0.913	0.506	
Move-up time, m	2.0		2.0		2.3		2.0	
Service Time	5.1		5.1		4.8	4.3	4.7	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	211		206		13	499	271	
Service Time	5.1		5.1		4.8	4.3	4.7	
Utilization, x	0.415		0.406		0.026	0.913	0.506	
Dep. headway, hd	7.08		7.10		7.09	6.58	6.72	
Capacity	502		502		433	548	531	
95% Queue Length	2.1		2.0		0.1	17.9	3.0	
Delay	15.1		14.9		10.0-	61.0	16.6	
LOS	C		B		A	F	C	
Approach:								
Delay	15.1		14.9		59.7		16.6	
LOS	C		B		F		C	

Intersection Delay 34.4 Intersection LOS D

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst:
Agency/Co.: KHR Associates
Date Performed: 8/4/2016
Analysis Time Period: 5:00 - 6:00 P.M.
Intersection: Palos Verdes North
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Ambient PM Peak Hour
East/West Street: Via Valmonte
North/South Street: Palos Verdes North

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	23	0	0	189	0	6	389	35	0	588	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		L	T	LTR	
PHF	1.00		1.00		1.00	1.00	1.00	
Flow Rate	23		189		6	389	588	
% Heavy Veh	0		0		0	0	0	
No. Lanes	1		1		2		1	
Opposing-Lanes	1		1		1		2	
Conflicting-lanes	2		2		1		1	
Geometry group	2		2		5		4a	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	23		189		6	389	588	
Left-Turn	0		0		6	0	0	
Right-Turn	0		0		0	0	0	
Prop. Left-Turns	0.0		0.0		1.0	0.0	0.0	
Prop. Right-Turns	0.0		0.0		0.0	0.0	0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	
Geometry Group	2		2		5		4a	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.5		0.2	

hRT-adj	-0.6		-0.6		-0.7		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0		0.0		0.5	0.0	0.0	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	23		189		6	389	588	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.02		0.17		0.01	0.35	0.52	
hd, final value	7.16		6.54		6.48	5.98	5.40	
x, final value	0.046		0.343		0.011	0.646	0.881	
Move-up time, m	2.0		2.0		2.3		2.0	
Service Time	5.2		4.5		4.2	3.7	3.4	

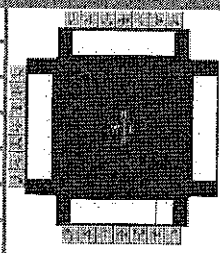
Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	23		189		6	389	588	
Service Time	5.2		4.5		4.2	3.7	3.4	
Utilization, x	0.046		0.343		0.011	0.646	0.881	
Dep. headway, hd	7.16		6.54		6.48	5.98	5.40	
Capacity	460		556		600	598	668	
95% Queue Length	0.1		1.6		0.0	5.2	15.9	
Delay	10.5		12.9		9.3	19.4	42.9	
LOS	B		B		A	C	E	
Approach:								
Delay	10.5		12.9		19.2		42.9	
LOS	B		B		C		E	

Intersection Delay 29.7 Intersection LOS D

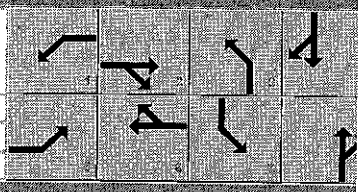
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Hawthorne Boulevard	File Name	1-PCH-Hawthorne Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	270	1041	267	150	1070	246	296	1371	65	184	750	308

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	13.6	35.4	10.1	31.9	13.9	33.7	10.9	30.7
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0	0	0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.11	0.35	0.35	0.07	0.31	0.31	0.11	0.33	0.33	0.08	0.30	0.30
Capacity (c), veh/h	356	1718	534	226	1526	473	379	1674	520	263	1503	466
Volume-to-Capacity Ratio (X)	0.757	0.606	0.500	0.664	0.701	0.520	0.781	0.819	0.125	0.700	0.499	0.66
Back of Queue (Q), ft/ln (50 th percentile)	76.4	183.4	143.9	42.4	199.5	137.4	80.5	223.3	23.4	50.6	107.4	143.
Back of Queue (Q), veh/ln (50 th percentile)	2.9	7.1	5.5	1.6	7.7	5.3	3.1	8.6	0.9	1.9	4.1	5.5
Queue Storage Ratio (RQ) (50 th percentile)	0.25	0.61	0.48	0.14	0.67	0.46	0.39	1.09	0.11	0.16	0.35	0.47
Uniform Delay (d_1), s/veh	40.7	29.0	27.7	42.0	31.9	29.8	39.0	27.7	21.1	40.6	26.2	27.7
Incremental Delay (d_2), s/veh	1.3	1.6	3.4	1.3	2.8	4.1	1.4	2.1	0.0	1.3	0.1	1.3
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	41.9	30.6	31.1	43.2	34.6	33.9	40.4	29.8	21.1	41.8	26.2	29.0
Level of Service (LOS)	D	C	C	D	C	C	D	C	C	D	C	C
Approach Delay, s/veh / LOS	32.6	C		35.4	D		31.3	C		29.2	C	
Intersection Delay, s/veh / LOS	32.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.5	C	3.5	C	3.5	C	3.5	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	1.4	A	1.2	A

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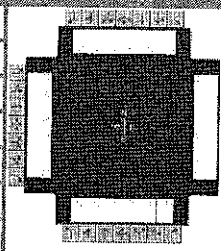
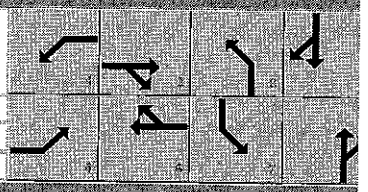
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 5:00
Intersection	Hawthorne Boulevard	File Name	1-PCH-Hawthorne Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	225	1144	358	210	1001	222	322	906	74	383	1264	382

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	12.3	31.9	11.9	31.5	14.6	30.1	16.1	31.6
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max Out Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0	0	0	0	0	0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.09	0.31	0.31	0.09	0.31	0.31	0.12	0.29	0.29	0.13	0.31	0.31
Capacity (c), veh/h	308	1531	475	292	1507	467	405	1470	457	464	1558	483
Volume-to-Capacity Ratio (X)	0.730	0.747	0.753	0.719	0.664	0.475	0.795	0.616	0.162	0.825	0.811	0.79
Back of Queue (Q), ft/ln (50 th percentile)	63.6	217.4	231.2	59.4	184.5	121.2	88.6	136.7	28.8	110.6	209.6	201.
Back of Queue (Q), veh/ln (50 th percentile)	2.4	8.4	8.9	2.3	7.1	4.7	3.4	5.3	1.1	4.3	8.1	7.8
Queue Storage Ratio (RQ) (50 th percentile)	0.21	0.72	0.77	0.20	0.61	0.40	0.43	0.67	0.14	0.36	0.68	0.66
Uniform Delay (d_1), s/veh	41.1	32.4	32.4	41.3	31.6	29.5	38.7	27.6	23.8	37.9	28.8	28.5
Incremental Delay (d_2), s/veh	1.3	3.5	11.3	1.3	2.4	3.5	2.2	0.3	0.1	5.6	2.3	6.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	42.4	35.8	43.7	42.6	33.9	32.9	40.9	27.9	23.9	43.5	31.1	34.6
Level of Service (LOS)	D	D	D	D	C	C	D	C	C	D	C	C
Approach Delay, s/veh / LOS	38.3	D		35.0	D		30.9	C		34.1	C	
Intersection Delay, s/veh / LOS	34.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.5	C	3.5	C	3.5	C	3.5	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	1.2	A	1.6	A

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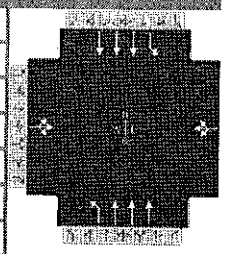
HCS 2010 Signalized Intersection Results Summary

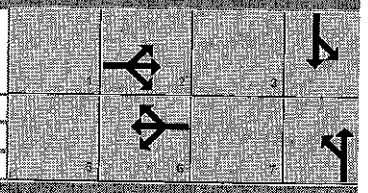
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	244th Street	File Name	2-Hawthorne-244th Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	48	4	0	59	52	14	1652		39	1078	

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	21.0	16.0	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		20.0		20.0
Change Period, ($Y+R_c$), s		9.0		9.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						16.0		18.0
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0			0		14	1652		39	1078	
Adjusted Saturation Flow Rate (s), veh/h/ln		0			0		532	1691		307	1691	
Queue Service Time (g_s), s		0.0			0.0		1.0	14.0		2.0	7.8	
Cycle Queue Clearance Time (g_c), s		0.0			0.0		8.8	14.0		16.0	7.8	
Green Ratio (g/C)							0.36	0.36		0.36	0.36	
Capacity (c), veh/h							257	1804		174	1804	
Volume-to-Capacity Ratio (X)		0.000			0.000		0.055	0.916		0.225	0.598	
Back of Queue (Q), ft/ln (50 th percentile)		0			0		2.6	136.7		9.4	58	
Back of Queue (Q), veh/ln (50 th percentile)		0.0			0.0		0.1	5.5		0.4	2.3	
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.03	0.69		0.09	0.29	
Uniform Delay (d_1), s/veh							15.5	13.9		22.1	11.9	
Incremental Delay (d_2), s/veh		0.0			0.0		0.0	8.7		0.2	0.4	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							15.5	22.5		22.4	12.2	
Level of Service (LOS)							B	C		C	B	
Approach Delay, s/veh / LOS	9.8	A		10.6	B		22.5	C		12.6	B	
Intersection Delay, s/veh / LOS	18.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.7	A	1.4	A	1.1	A

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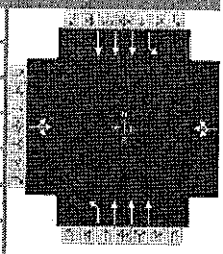
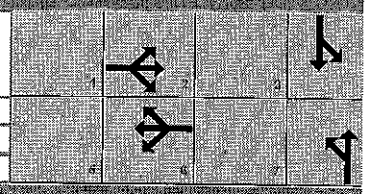
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	244th Street	File Name	2-Hawthorne-244th Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	61	22	0	62	33	34	1283		75	1680	

Signal Information										
Cycle, s	45.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	21.0	16.0	0.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		20.0		20.0
Change Period, ($Y+R_c$), s		9.0		9.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.3		3.3
Queue Clearance Time (g_s), s						18.0		18.0
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0			0		34	1283		75	1680	
Adjusted Saturation Flow Rate (s), veh/h/ln		0			0		299	1691		438	1691	
Queue Service Time (g_s), s		0.0			0.0		1.6	9.8		6.2	14.4	
Cycle Queue Clearance Time (g_c), s		0.0			0.0		16.0	9.8		16.0	14.4	
Green Ratio (g/C)							0.36	0.36		0.36	0.36	
Capacity (c), veh/h							171	1804		220	1804	
Volume-to-Capacity Ratio (X)		0.000			0.000		0.199	0.711		0.341	0.931	
Back of Queue (Q), ft/ln (50 th percentile)		0			0		8.2	75.5		17.9	148.7	
Back of Queue (Q), veh/ln (50 th percentile)		0.0			0.0		0.3	3.0		0.7	5.9	
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.08	0.38		0.18	0.76	
Uniform Delay (d_1), s/veh							22.2	12.5		20.0	14.0	
Incremental Delay (d_2), s/veh		0.0			0.0		0.2	1.1		0.3	10.8	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							22.4	13.7		20.4	24.8	
Level of Service (LOS)							C	B		C	C	
Approach Delay, s/veh / LOS	10.2	B		10.4	B		13.9	B		24.6	C	
Intersection Delay, s/veh / LOS	19.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.6	A	1.2	A	1.5	A

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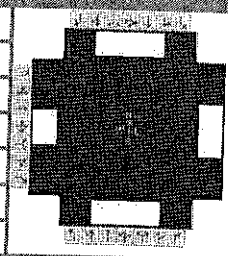
HCS 2010 Signalized Intersection Results Summary

General Information

Agency			
Analyst		Analysis Date	8/4/2016
Jurisdiction		Time Period	
Urban Street	Hawthorne Boulevard	Analysis Year	2016
Intersection	Newton Street	File Name	3-Hawthorne-Newton Proj AM.xus
Project Description			

Intersection Information

Duration, h	1.00
Area Type	Other
PHF	1.00
Analysis Period	1> 7:00



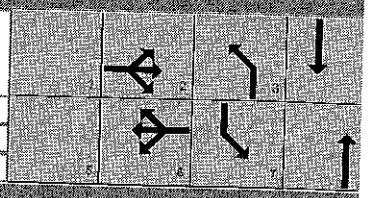
Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	23	76	82	91	114	106	118	1665		37	1043	

Signal Information

Cycle, s	44.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.8	2.2	2.4	18.9	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		12.8		12.8	8.6	25.3	6.2	22.9
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s		5.6		8.6	4.8	13.2	2.9	8.6
Green Extension Time (g_e), s		0.5		0.2	0.2	8.1	0.0	9.0
Phase Call Probability		1.00		1.00	0.77	1.00	0.37	1.00
Max Out Probability		0.49		1.00	0.00	0.28	0.00	0.18

Movement Group Results

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	23	158		91	114	106	118	1665		37	1043	
Adjusted Saturation Flow Rate (s), veh/h/ln	1299	1738		1248	1900	1610	1810	1691		1810	1691	
Queue Service Time (g_s), s	0.7	3.6		3.1	2.3	2.5	2.8	11.2		0.9	6.6	
Cycle Queue Clearance Time (g_c), s	2.9	3.6		6.6	2.3	2.5	2.8	11.2		0.9	6.6	
Green Ratio (g/C)	0.20	0.20		0.20	0.20	0.20	0.10	0.48		0.05	0.43	
Capacity (c), veh/h	354	345		310	377	320	188	2441		90	2166	
Volume-to-Capacity Ratio (X)	0.065	0.458		0.293	0.302	0.332	0.627	0.682		0.411	0.482	
Back of Queue (Q), ft/ln (50 th percentile)	4.4	30.3		19.4	20.9	19.6	26.7	68.9		8.8	43.8	
Back of Queue (Q), veh/ln (50 th percentile)	0.2	1.2		0.8	0.8	0.8	1.1	2.8		0.4	1.8	
Queue Storage Ratio (RQ) (50 th percentile)	0.04	0.30		0.19	0.21	0.20	0.27	0.35		0.09	0.22	
Uniform Delay (d_1), s/veh	16.4	15.7		18.6	15.1	15.2	19.0	8.9		20.4	9.2	
Incremental Delay (d_2), s/veh	0.0	0.4		0.2	0.2	0.2	1.3	0.1		1.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	16.4	16.0		18.8	15.3	15.5	20.3	9.0		21.6	9.2	
Level of Service (LOS)	B	B		B	B	B	C	A		C	A	
Approach Delay, s/veh / LOS	16.1	B		16.4	B		9.8	A		9.7	A	
Intersection Delay, s/veh / LOS	10.7						B					

Multimodal Results

	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.2	B
Bicycle LOS Score / LOS	0.8	A	1.0	A	1.5	A	1.1	A

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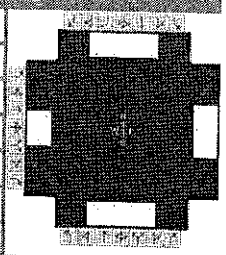
HCS 2010 Signalized Intersection Results Summary

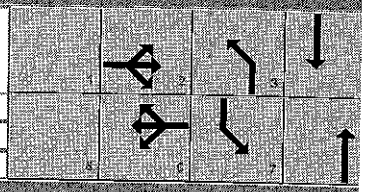
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Newton Street	File Name	3-Hawthorne-Newton Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	16	53	123	217	56	97	101	1291		50	1652	

Signal Information			
Cycle, s	49.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	3.0	1.5	23.2	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		14.0		14.0	8.5	28.7	7.0	27.2
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s		6.6		12.0	4.7	10.5	3.3	14.8
Green Extension Time (g_e), s		0.5		0.0	0.1	9.6	0.0	8.4
Phase Call Probability		1.00		1.00	0.75	1.00	0.50	1.00
Max Out Probability		0.98		1.00	0.00	0.28	0.00	0.39

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	16	176		217	56	97	101	1291		50	1652	
Adjusted Saturation Flow Rate (s), veh/h/ln	1369	1688		1228	1900	1610	1810	1691		1810	1691	
Queue Service Time (g_s), s	0.5	4.6		5.4	1.2	2.5	2.7	8.5		1.3	12.8	
Cycle Queue Clearance Time (g_c), s	1.7	4.6		10.0	1.2	2.5	2.7	8.5		1.3	12.8	
Green Ratio (g/C)	0.20	0.20		0.20	0.20	0.20	0.09	0.50		0.06	0.47	
Capacity (c), veh/h	387	339		277	382	324	164	2523		109	2368	
Volume-to-Capacity Ratio (X)	0.041	0.519		0.782	0.147	0.300	0.615	0.512		0.459	0.698	
Back of Queue (Q), ft/ln (50 th percentile)	3.4	40.5		84.1	11.6	20.8	26.9	55.6		13.6	88.7	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	1.6		3.4	0.5	0.8	1.1	2.2		0.5	3.5	
Queue Storage Ratio (RQ) (50 th percentile)	0.03	0.41		0.84	0.12	0.21	0.27	0.28		0.14	0.45	
Uniform Delay (d_1), s/veh	17.0	17.7		23.2	16.3	16.9	21.8	8.4		22.6	10.5	
Incremental Delay (d_2), s/veh	0.0	0.7		13.5	0.1	0.2	1.4	0.1		1.1	0.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	17.1	18.4		36.8	16.4	17.1	23.2	8.5		23.7	10.8	
Level of Service (LOS)	B	B		D	B	B	C	A		C	B	
Approach Delay, s/veh / LOS	18.3	B		28.5	C		9.6	A		11.1	B	
Intersection Delay, s/veh / LOS	12.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.2	B
Bicycle LOS Score / LOS	0.8	A	1.1	A	1.3	A	1.4	A

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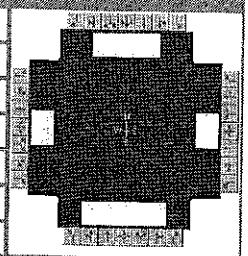
HCS 2010 Signalized Intersection Results Summary

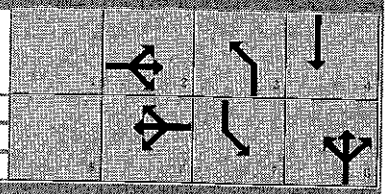
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Via Valmonte	File Name	4-Hawthorne-Via Valmonte Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	311	75	0	1	1	46	1597	37	3	1203	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	31.4	0.4	3.3	27.9	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		8.0	1.1	3.0	2.0	4.0
Phase Duration, s		35.4		35.4	7.7	35.2	4.4	31.9
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s					3.1	22.1	2.1	16.6
Green Extension Time (g_e), s		0.0		0.0	0.0	9.1	0.0	9.5
Phase Call Probability					0.62	1.00	0.06	1.00
Max Out Probability					0.00	0.25	0.00	0.21

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	0	386		0		1	46	1597	37	3	1203	
Adjusted Saturation Flow Rate (s), veh/h/ln	1437	1836		0		1610	1810	1691	1610	1810	1691	
Queue Service Time (g_s), s	0.0	11.6		0.0		0.0	1.1	20.1	1.0	0.1	14.6	
Cycle Queue Clearance Time (g_c), s	0.0	11.6		0.0		0.0	1.1	20.1	1.0	0.1	14.6	
Green Ratio (g/C)	0.42	0.42				0.42	0.44	0.42	0.42	0.00	0.37	
Capacity (c), veh/h	96	769				675	269	2112	670	9	1886	
Volume-to-Capacity Ratio (X)	0.000	0.502		0.000		0.001	0.171	0.756	0.055	0.341	0.638	
Back of Queue (Q), ft/ln (50 th percentile)	0	122.5		0		0.2	10.3	178.2	8.6	1.8	131.7	
Back of Queue (Q), veh/ln (50 th percentile)	0.0	4.9		0.0		0.0	0.4	7.1	0.3	0.1	5.3	
Queue Storage Ratio (RQ) (50 th percentile)	0.00	1.22		0.00		0.01	0.10	0.91	0.04	0.02	0.67	
Uniform Delay (d_1), s/veh	0.0	16.0				12.7	14.0	18.7	13.1	37.2	19.4	
Incremental Delay (d_2), s/veh	0.0	2.4		0.0		0.0	0.1	0.5	0.0	8.4	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	0.0	18.4				12.7	14.1	19.2	13.1	45.6	19.5	
Level of Service (LOS)		B				B	B	B	B	D	B	
Approach Delay, s/veh / LOS	18.4	B		12.7	B		18.9	B		19.6	B	
Intersection Delay, s/veh / LOS	19.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.2	C	2.3	B	2.7	B
Bicycle LOS Score / LOS	1.1	A	0.5	A	1.4	A	1.2	A

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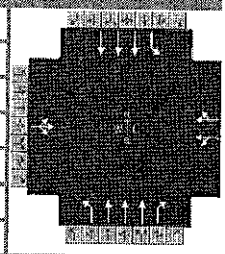
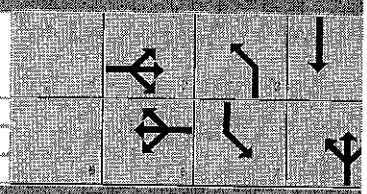
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Via Valmonte	File Name	4-Hawthorne-Via Valmonte Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	182	67	0	16	21	64	1202	19	16	2009	

Signal Information												
Cycle, s	75.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		8.0	1.1	3.0	2.0	4.0
Phase Duration, s		27.7		27.7	8.4	41.6	5.7	38.9
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g_s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g_e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h		0		0		0	0	0	0	0	0	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0		0	0	0	0	0	0	
Queue Service Time (g_s), s		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Cycle Queue Clearance Time (g_c), s		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Green Ratio (g/C)						0.32	0.53	0.50	0.50	0.02	0.47	
Capacity (c), veh/h						508	228	2546	808	41	2362	
Volume-to-Capacity Ratio (X)		0.000		0.000		0.041	0.281	0.472	0.024	0.390	0.850	
Back of Queue (Q), ft/ln (50 th percentile)		0		0		6.5	11.2	95.7	3.5	7.6	236.7	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		0.0		0.3	0.4	3.8	0.1	0.3	9.5	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.00		0.16	0.11	0.49	0.02	0.10	1.20	
Uniform Delay (d_1), s/veh						17.8	15.2	12.2	9.4	36.1	17.7	
Incremental Delay (d_2), s/veh		0.0		0.0		0.2	0.2	0.1	0.0	2.2	2.6	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh						18.0	15.5	12.2	9.4	38.4	20.4	
Level of Service (LOS)						B	B	B	A	D	C	
Approach Delay, s/veh / LOS	22.8	C		17.9	B		12.4	B		20.5	C	
Intersection Delay, s/veh / LOS	17.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	2.2	B	2.5	B
Bicycle LOS Score / LOS	0.9	A	0.5	A	1.2	A	1.6	A

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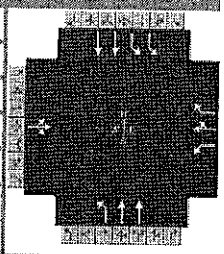
HCS 2010 Signalized Intersection Results Summary

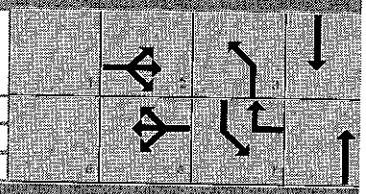
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	5-Hawthorne-Rolling Hills Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	2	0	88	2	433	0	1360		292	855	

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	13.2	0.0	7.2	27.6	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		17.2		17.2	0.0	31.6	11.2	42.8
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	3.0	3.1	3.0
Queue Clearance Time (g_s), s						22.1	6.8	8.7
Green Extension Time (g_e), s		0.0		0.0	0.0	5.5	0.5	7.3
Phase Call Probability						1.00	0.99	1.00
Max Out Probability						0.28	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0		88	2	433	0	1360		292	855	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		1437	1900	1610	1810	1773		1757	1773	
Queue Service Time (g_s), s		0.0		3.1	0.0	13.2	0.0	20.1		4.8	6.7	
Cycle Queue Clearance Time (g_c), s		0.0		3.1	0.0	13.2	0.0	20.1		4.8	6.7	
Green Ratio (g/C)				0.22	0.22	0.34		0.46		0.12	0.65	
Capacity (c), veh/h				434	417	547	3	1633		422	2295	
Volume-to-Capacity Ratio (X)		0.000		0.203	0.005	0.792	0.000	0.833		0.692	0.373	
Back of Queue (Q), ft/ln (50 th percentile)		0		26.4	0.6	162.7	0	173.6		47.1	39.2	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		1.1	0.0	6.5	0.0	6.9		1.9	1.6	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.66	0.01	3.25	0.00	0.88		0.24	0.20	
Uniform Delay (d_1), s/veh				19.5	18.3	17.9	0.0	14.2		25.3	4.9	
Incremental Delay (d_2), s/veh		0.0		1.1	0.0	12.1	0.0	2.1		0.8	0.0	
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				20.6	18.3	30.0	0.0	16.2		26.1	5.0	
Level of Service (LOS)				C	B	C		B		C	A	
Approach Delay, s/veh / LOS	18.3	B		28.4	C		16.2	B		10.3	B	
Intersection Delay, s/veh / LOS	16.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.8	C	2.0	B
Bicycle LOS Score / LOS	0.5	A	1.4	A	1.6	A	1.4	A

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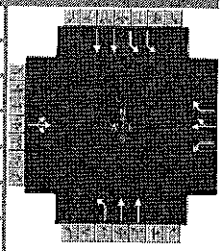
HCS 2010 Signalized Intersection Results Summary

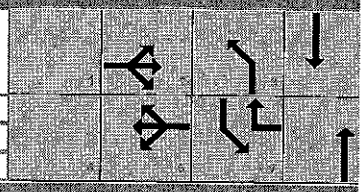
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	5-Hawthorne-Rolling Hills Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	3	1	88	0	333	0	1034		445	1341	

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	14.6	0.0	9.9	23.5	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		18.6		18.6	0.0	27.5	13.9	41.4
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	3.0	3.1	3.0
Queue Clearance Time (g_s), s						17.0	9.3	15.7
Green Extension Time (g_e), s		0.0		0.0	0.0	6.4	0.7	8.0
Phase Call Probability						1.00	1.00	1.00
Max Out Probability						0.25	0.07	0.04

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0		88	0	333	0	1034		445	1341	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		1435	1900	1610	1810	1773		1757	1773	
Queue Service Time (g_s), s		0.0		3.0	0.0	9.2	0.0	15.0		7.3	13.7	
Cycle Queue Clearance Time (g_c), s		0.0		3.1	0.0	9.2	0.0	15.0		7.3	13.7	
Green Ratio (g/C)				0.24	0.24	0.41		0.39		0.17	0.62	
Capacity (c), veh/h				467	462	658	3	1387		582	2211	
Volume-to-Capacity Ratio (X)		0.000		0.189	0.000	0.506	0.000	0.745		0.764	0.607	
Back of Queue (Q), ft/ln (50 th percentile)		0		25.3	0	83.4	0	131.5		70.4	86	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		1.0	0.0	3.3	0.0	5.3		2.8	3.4	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.63	0.00	1.67	0.00	0.67		0.35	0.44	
Uniform Delay (d_1), s/veh				18.4	0.0	13.2	0.0	15.7		23.9	6.8	
Incremental Delay (d_2), s/veh		0.0		0.9	0.0	2.8	0.0	0.6		0.8	0.1	
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				19.3	0.0	16.0	0.0	16.3		24.7	6.9	
Level of Service (LOS)				B		B		B		C	A	
Approach Delay, s/veh / LOS	17.3	B		16.7	B		16.3	B		11.4	B	
Intersection Delay, s/veh / LOS	13.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.8	C	2.0	B
Bicycle LOS Score / LOS	0.5	A	1.2	A	1.3	A	2.0	A

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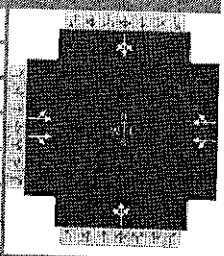
HCS 2010 Signalized Intersection Results Summary

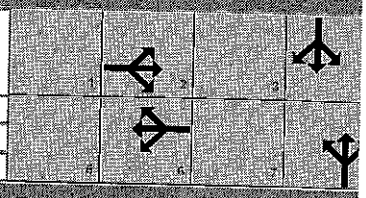
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Whiffletree Lane	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	6-Rolling Hills-Whiffletree Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	331	15	0	489	8	0	46	21	0	14	3

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.4	1.1	3.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		12.0
Phase Duration, s		32.4		32.4		7.4		5.1
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.1		3.1
Queue Clearance Time (g_s), s						3.6		2.4
Green Extension Time (g_e), s		0.0		0.0		0.1		0.0
Phase Call Probability						0.57		0.19
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0		172	0		248		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		1871	0		1889		0			0	
Queue Service Time (g_s), s	0.0		1.7	0.0		2.5		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	0.0		1.7	0.0		2.5		0.0			0.0	
Green Ratio (g/C)			0.63			0.63						
Capacity (c), veh/h			1183			1194						
Volume-to-Capacity Ratio (X)	0.000		0.146	0.000		0.208		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	0		9.2	0		14		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.0		0.4	0.0		0.6		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.00		0.05	0.00		0.07		0.00			0.00	
Uniform Delay (d_1), s/veh			3.4			3.5						
Incremental Delay (d_2), s/veh	0.0		0.3	0.0		0.4		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (d), s/veh			3.6			3.9						
Level of Service (LOS)			A			A						
Approach Delay, s/veh / LOS	3.6	A		3.9	A		21.1	C		23.4	C	
Intersection Delay, s/veh / LOS	5.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.6	A	0.5	A

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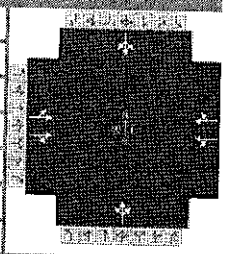
HCS 2010 Signalized Intersection Results Summary

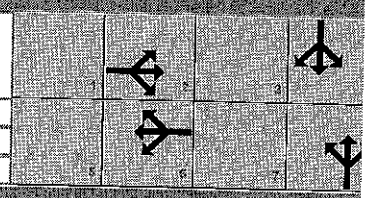
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Whiffletree Lane	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	6-Rolling Hills-Whiffletree Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	485	40	0	382	14	0	15	15	0	16	6

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	29.7	1.4	1.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		12.0
Phase Duration, s		33.7		33.7		5.9		5.4
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.1
Queue Clearance Time (g_s), s						2.8		2.5
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						0.31		0.24
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0		260	0		197		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		1849	0		1876		0			0	
Queue Service Time (g_s), s	0.0		2.5	0.0		1.8		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	0.0		2.5	0.0		1.8		0.0			0.0	
Green Ratio (g/C)			0.66			0.66						
Capacity (c), veh/h			1219			1237						
Volume-to-Capacity Ratio (X)	0.000		0.213	0.000		0.159		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	0		12	0		8.7		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.0		0.5	0.0		0.3		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.00		0.06	0.00		0.04		0.00			0.00	
Uniform Delay (d_1), s/veh			3.0			2.9						
Incremental Delay (d_2), s/veh	0.0		0.4	0.0		0.3		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (d), s/veh			3.4			3.2						
Level of Service (LOS)			A			A						
Approach Delay, s/veh / LOS	3.4	A		3.2	A		22.5	C		22.9	C	
Intersection Delay, s/veh / LOS	4.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.5	A	0.5	A

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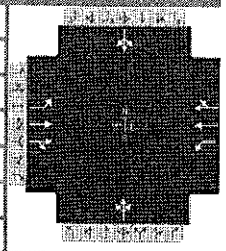
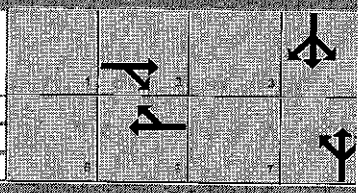
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Fallenleaf Drive	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	7-Rolling Hills-Fallenleaf Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	30	330	0	11	440	0	0	47	0	0	60	0

Signal Information										
Cycle, s	45.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	27.2	3.2	2.7	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		12.0		12.0
Phase Duration, s		31.2		31.2		6.7		7.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.0		3.0
Queue Clearance Time (g_s), s						3.1		3.4
Green Extension Time (g_e), s		0.0		0.0		0.1		0.1
Phase Call Probability						0.44		0.53
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	30	330	0	11	440	0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	964	1900	0	1067	1900	0		0			0	
Queue Service Time (g_s), s	0.6	1.7	0.0	0.2	2.3	0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	3.0	1.7	0.0	1.9	2.3	0.0		0.0			0.0	
Green Ratio (g/C)	0.60	0.60		0.60	0.60							
Capacity (c), veh/h	692	2294		763	2294							
Volume-to-Capacity Ratio (X)	0.043	0.144	0.000	0.014	0.192	0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	2.5	9.4	0	0.8	12.9	0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	0.4	0.0	0.0	0.5	0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.02	0.05	0.00	0.01	0.06	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	4.7	3.9		4.3	4.0							
Incremental Delay (d_2), s/veh	0.1	0.1	0.0	0.0	0.2	0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	4.8	4.0		4.3	4.2							
Level of Service (LOS)	A	A		A	A							
Approach Delay, s/veh / LOS	4.1	A		4.2	A		21.4	C		21.0	C	
Intersection Delay, s/veh / LOS	6.1						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.6	A	0.6	A

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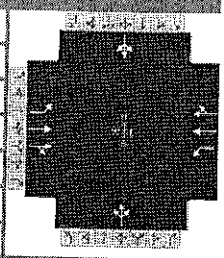
HCS 2010 Signalized Intersection Results Summary

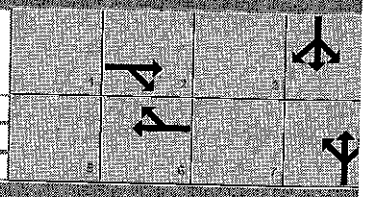
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Fallenleaf Drive	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	7-Rolling Hills-Fallenleaf Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	36	453	0	21	400	0	0	24	0	0	48	0

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.7	2.7	1.6	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		12.0		12.0
Phase Duration, s		32.7		32.7		5.6		6.7
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.0		3.0
Queue Clearance Time (g_s), s						2.6		3.1
Green Extension Time (g_e), s		0.0		0.0		0.0		0.1
Phase Call Probability						0.26		0.45
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	36	453	0	21	400	0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1000	1900	0	953	1900	0		0			0	
Queue Service Time (g_s), s	0.7	2.2	0.0	0.4	1.9	0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	2.6	2.2	0.0	2.6	1.9	0.0		0.0			0.0	
Green Ratio (g/C)	0.64	0.64		0.64	0.64							
Capacity (c), veh/h	756	2427		721	2427							
Volume-to-Capacity Ratio (X)	0.048	0.187	0.000	0.029	0.165	0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	2.4	10.4	0	1.5	9.2	0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	0.4	0.0	0.1	0.4	0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.02	0.05	0.00	0.01	0.05	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	3.8	3.3		3.9	3.3							
Incremental Delay (d_2), s/veh	0.1	0.2	0.0	0.1	0.1	0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	3.9	3.5		4.0	3.4							
Level of Service (LOS)	A	A		A	A							
Approach Delay, s/veh / LOS	3.5	A		3.5	A		22.6	C		21.4	C	
Intersection Delay, s/veh / LOS	4.8						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.5	A	0.6	A

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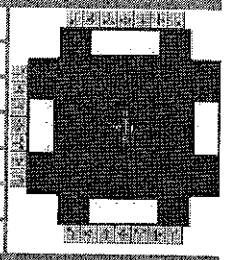
HCS 2010 Signalized Intersection Results Summary

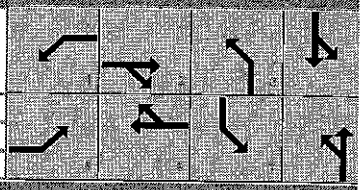
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Rolling Hills Road	File Name	8-Rolling Hills-Crenshaw Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	151	150	62	23	180	200	117	1339		157	1023	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.2	5.2	49.6	7.6	2.0	32.3
Yellow	4.0	4.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	4.0	1.1	4.0
Phase Duration, s	16.4	62.8	7.2	53.6	11.6	36.3	13.6	38.4
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	2.9	3.0	2.9
Queue Clearance Time (g_s), s	12.4		3.6		7.7	33.4	9.6	23.6
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.1	0.0	0.1	5.2
Phase Call Probability	0.99		0.54		0.98	1.00	0.99	1.00
Max Out Probability	0.49		0.00		0.00	1.00	0.02	0.34

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	151	150	62	23	180	200	117	1339		157	1023	
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1608	1723	1810	1607	1774	1691		1774	1691	
Queue Service Time (g_s), s	10.4	7.1	3.2	1.6	9.3	11.8	5.7	31.4		7.6	21.6	
Cycle Queue Clearance Time (g_c), s	10.4	7.1	3.2	1.6	9.3	11.8	5.7	31.4		7.6	21.6	
Green Ratio (g/C)	0.10	0.49	0.49	0.03	0.41	0.41	0.33	0.27		0.35	0.29	
Capacity (c), veh/h	178	887	788	46	748	664	221	1367		206	1454	
Volume-to-Capacity Ratio (X)	0.848	0.169	0.079	0.498	0.241	0.301	0.529	0.979		0.764	0.704	
Back of Queue (Q), ft/ln (50 th percentile)	143	80.3	29.9	18.7	109.4	121.9	61.9	433.7		86.2	229.3	
Back of Queue (Q), veh/ln (50 th percentile)	5.5	3.1	1.2	0.7	4.2	4.9	2.4	16.7		3.3	8.8	
Queue Storage Ratio (RQ) (50 th percentile)	0.48	0.27	0.10	0.06	0.36	0.42	0.30	2.12		0.28	0.75	
Uniform Delay (d_1), s/veh	54.9	23.0	21.7	58.1	28.8	29.8	31.1	43.5		32.2	38.3	
Incremental Delay (d_2), s/veh	19.4	0.4	0.2	3.1	0.8	1.2	0.7	32.2		3.5	1.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	74.3	23.4	21.9	61.2	29.6	30.9	31.8	75.7		35.7	39.6	
Level of Service (LOS)	E	C	C	E	C	C	C	E		D	D	
Approach Delay, s/veh / LOS	44.3	D		32.1	C		72.2	E		39.1	D	
Intersection Delay, s/veh / LOS	53.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.4	B
Bicycle LOS Score / LOS	1.1	A	1.2	A	1.3	A	1.1	A

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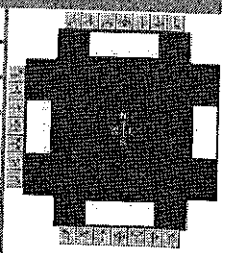
HCS 2010 Signalized Intersection Results Summary

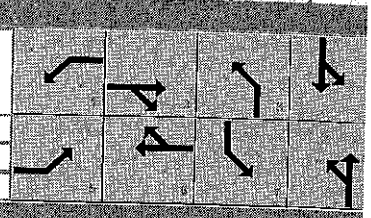
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Rolling Hills Road	File Name	8-Rolling Hills-Crenshaw Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	167	287	89	42	217	164	101	1007		274	1022	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.5	5.0	48.7	7.1	4.8	25.8
Yellow	4.0	4.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.5	61.7	8.5	52.7	11.1	29.8	19.9	38.7
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	2.9	3.0	2.9
Queue Clearance Time (g_s), s	13.5		4.9		7.3	25.3	15.9	23.5
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.1	0.5	0.0	4.5
Phase Call Probability	1.00		0.75		0.97	1.00	1.00	1.00
Max Out Probability	1.00		0.00		0.00	1.00	1.00	0.22

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	167	287	89	42	217	164	101	1007		274	1022	
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1608	1723	1810	1607	1774	1691		1774	1691	
Queue Service Time (g_s), s	11.5	14.5	4.7	2.9	11.4	9.6	5.3	23.3		13.9	21.5	
Cycle Queue Clearance Time (g_c), s	11.5	14.5	4.7	2.9	11.4	9.6	5.3	23.3		13.9	21.5	
Green Ratio (g/C)	0.11	0.48	0.48	0.04	0.41	0.41	0.27	0.22		0.36	0.29	
Capacity (c), veh/h	194	870	773	65	735	652	216	1092		307	1466	
Volume-to-Capacity Ratio (X)	0.860	0.330	0.115	0.647	0.295	0.251	0.468	0.922		0.892	0.697	
Back of Queue (Q), ft/ln (50 th percentile)	165.8	175.5	44.7	34.2	137.4	97.5	58.3	284.9		221.1	228	
Back of Queue (Q), veh/ln (50 th percentile)	6.4	6.8	1.8	1.3	5.3	3.9	2.2	11.0		8.5	8.8	
Queue Storage Ratio (RQ) (50 th percentile)	0.55	0.59	0.15	0.11	0.46	0.34	0.28	1.39		0.72	0.74	
Uniform Delay (d_1), s/veh	54.6	26.1	22.7	57.7	30.2	29.5	34.6	46.1		31.8	38.0	
Incremental Delay (d_2), s/veh	24.9	1.0	0.3	4.0	1.0	0.9	0.6	14.8		32.9	1.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	79.4	27.1	23.1	61.8	31.2	30.4	35.2	60.9		64.7	39.2	
Level of Service (LOS)	E	C	C	E	C	C	D	E		E	D	
Approach Delay, s/veh / LOS	42.5	D		33.9	C		58.5	E		44.6	D	
Intersection Delay, s/veh / LOS	47.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.5	B	2.4	B
Bicycle LOS Score / LOS	1.4	A	1.2	A	1.1	A	1.2	A

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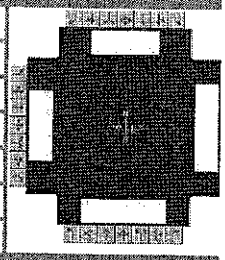
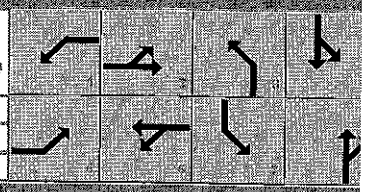
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Crenshaw Boulevard	File Name	9-PCH-Crenshaw Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	171	962		650	1964		58	1007	489	138	636	

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	6.0	5.4	46.6	5.1	3.4	33.5		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	4.0	0.0	4.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	1.1	4.0
Phase Duration, s	10.0	50.6	19.4	60.0	9.1	37.5	12.5	40.9
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	5.6		15.3		5.9	35.5	8.5	13.9
Green Extension Time (g_e), s	0.2	0.0	0.2	0.0	0.0	0.0	0.1	5.9
Phase Call Probability	1.00		1.00		0.86	1.00	0.99	1.00
Max Out Probability	0.00		1.00		0.00	1.00	0.00	0.05

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	171	962		650	1964		58	1007	489	138	636	
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1723		1673	1643		1774	1691	1608	1774	1691	
Queue Service Time (g_s), s	3.6	30.5		13.3	44.8		3.9	21.4	33.5	6.5	11.9	
Cycle Queue Clearance Time (g_c), s	3.6	30.5		13.3	44.8		3.9	21.4	33.5	6.5	11.9	
Green Ratio (g/C)	0.44	0.39		0.53	0.47		0.04	0.28	0.28	0.36	0.31	
Capacity (c), veh/h	320	1338		702	2302		76	1416	449	241	1558	
Volume-to-Capacity Ratio (X)	0.534	0.719		0.926	0.853		0.764	0.711	1.090	0.572	0.408	
Back of Queue (Q), ft/ln (50 th percentile)	36.7	359.5		192.6	502		47.5	228	943.7	70.3	123.3	
Back of Queue (Q), veh/ln (50 th percentile)	1.4	13.8		7.4	19.3		1.8	8.8	37.7	2.7	4.7	
Queue Storage Ratio (RQ) (50 th percentile)	0.12	1.20		0.64	1.67		0.23	1.11	4.79	0.23	0.40	
Uniform Delay (d_1), s/veh	28.6	38.5		25.8	37.5		56.8	38.9	43.3	29.4	32.9	
Incremental Delay (d_2), s/veh	0.5	3.4		22.5	4.5		6.1	1.5	200.6	0.8	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	29.1	41.9		48.3	41.9		62.9	40.4	243.9	30.2	33.0	
Level of Service (LOS)	C	D		D	D		E	D	F	C	C	
Approach Delay, s/veh / LOS	40.0	D		43.5	D		105.2	F		32.5	C	
Intersection Delay, s/veh / LOS	57.2						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	3.1	C	3.3	C
Bicycle LOS Score / LOS	1.4	A	1.9	A	1.3	A	0.9	A

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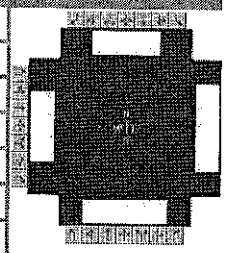
HCS 2010 Signalized Intersection Results Summary

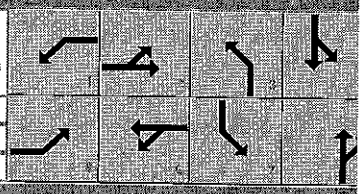
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Crenshaw Boulevard	File Name	9-PCH-Crenshaw Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	177	1278		472	1473		74	705	456	329	1096	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	3.5	48.5	6.4	5.6	26.0
Yellow	4.0	4.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	1.1	4.0
Phase Duration, s	10.0	52.5	17.5	60.0	10.4	30.0	20.0	39.6
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	5.7		13.1		6.9	28.0	18.0	25.3
Green Extension Time (g_e), s	0.3	0.0	0.4	0.0	0.1	0.0	0.0	4.7
Phase Call Probability	1.00		1.00		0.92	1.00	1.00	1.00
Max Out Probability	0.00		1.00		0.00	1.00	1.00	0.37

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	177	1278		472	1473		74	705	456	329	1096	
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1723		1673	1643		1774	1691	1608	1774	1691	
Queue Service Time (g_s), s	3.7	43.2		11.1	30.8		4.9	15.2	26.0	16.0	23.3	
Cycle Queue Clearance Time (g_c), s	3.7	43.2		11.1	30.8		4.9	15.2	26.0	16.0	23.3	
Green Ratio (g/C)	0.45	0.40		0.53	0.47		0.05	0.22	0.22	0.37	0.30	
Capacity (c), veh/h	421	1393		533	2301		95	1099	348	363	1505	
Volume-to-Capacity Ratio (X)	0.420	0.917		0.886	0.640		0.782	0.641	1.309	0.906	0.728	
Back of Queue (Q), ft/ln (50 th percentile)	36.5	551.3		143.7	335.8		59.9	162.5	1646.8	270.2	246.9	
Back of Queue (Q), veh/ln (50 th percentile)	1.4	21.2		5.5	12.9		2.3	6.3	65.9	10.4	9.5	
Queue Storage Ratio (RQ) (50 th percentile)	0.12	1.84		0.48	1.12		0.29	0.79	8.37	0.88	0.80	
Uniform Delay (d_1), s/veh	22.9	41.9		33.7	32.7		56.1	42.8	47.0	33.0	37.9	
Incremental Delay (d_2), s/veh	0.2	13.1		14.7	1.4		5.4	1.0	577.1	32.9	1.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	23.1	55.0		48.4	34.0		61.5	43.8	624.1	65.9	39.5	
Level of Service (LOS)	C	E		D	C		E	D	F	E	D	
Approach Delay, s/veh / LOS	51.1	D		37.5	D		259.1	F		45.6	D	
Intersection Delay, s/veh / LOS	87.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	3.1	C	3.3	C
Bicycle LOS Score / LOS	1.7	A	1.6	A	1.2	A	1.3	A

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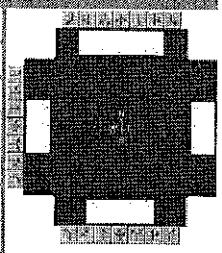
HCS 2010 Signalized Intersection Results Summary

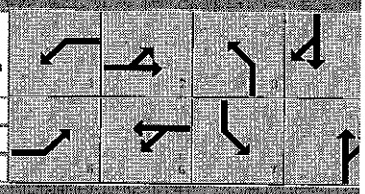
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Vista Montana	File Name	10-PCH-Vista Montana Proj AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	48	1155		66	1550		164	168	122	287	116	194

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.8	0.5	73.3	7.8	0.3	13.3
Yellow	4.0	0.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	4.0	2.0	3.0
Phase Duration, s	8.8	77.3	9.3	77.9	11.8	17.3	16.1	21.6
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.1	3.0	3.1
Queue Clearance Time (g_s), s	3.2		3.6		7.6	12.1	11.8	16.5
Green Extension Time (g_e), s	0.1	0.0	0.1	0.0	0.2	1.1	0.3	1.1
Phase Call Probability	0.80		0.89		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.31	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	48	1155		66	1550		164	151	139	287	116	194
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723		1723	1723		1723	1863	1605	1723	1773	1569
Queue Service Time (g_s), s	1.2	30.7		1.6	45.5		5.6	9.4	10.1	9.8	3.5	14.5
Cycle Queue Clearance Time (g_c), s	1.2	30.7		1.6	45.5		5.6	9.4	10.1	9.8	3.5	14.5
Green Ratio (g/C)	0.65	0.61		0.66	0.62		0.06	0.11	0.11	0.10	0.15	0.15
Capacity (c), veh/h	200	2105		304	2121		223	206	177	347	519	230
Volume-to-Capacity Ratio (X)	0.240	0.549		0.217	0.731		0.735	0.732	0.785	0.828	0.223	0.84
Back of Queue (Q), ft/ln (50 th percentile)	14.4	344.1		14.6	515.3		63.2	113.9	103.2	116.9	38.9	143.
Back of Queue (Q), veh/ln (50 th percentile)	0.6	13.2		0.6	19.8		2.4	4.4	4.1	4.5	1.5	5.7
Queue Storage Ratio (RQ) (50 th percentile)	0.10	1.15		0.12	2.06		0.41	0.56	0.52	0.76	0.21	0.73
Uniform Delay (d_1), s/veh	18.6	22.9		12.2	27.0		55.1	51.6	52.0	52.9	45.2	49.9
Incremental Delay (d_2), s/veh	0.2	1.0		0.1	2.3		1.8	1.9	2.9	7.6	0.1	3.4
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	18.8	24.0		12.3	29.3		56.9	53.5	54.9	60.5	45.3	53.3
Level of Service (LOS)	B	C		B	C		E	D	D	E	D	D
Approach Delay, s/veh / LOS	23.8	C		28.6	C		55.2	E		55.2	E	
Intersection Delay, s/veh / LOS	34.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.5	A	1.8	A	0.9	A	1.0	A

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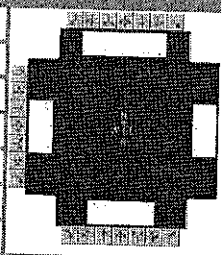
HCS 2010 Signalized Intersection Results Summary

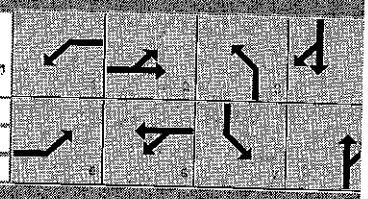
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Vista Montana	File Name	10-PCH-Vista Montana Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	60	1310		192	1377		121	206	149	361	221	98

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	5.2	2.7	66.1	6.2	4.3	15.5
Yellow	4.0	0.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	4.0	2.0	3.0
Phase Duration, s	9.2	70.1	11.9	72.8	10.2	19.5	18.5	27.8
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.1	3.0	3.1
Queue Clearance Time (g_s), s	3.8		7.6		6.1	14.3	14.3	8.4
Green Extension Time (g_e), s	0.1	0.0	0.3	0.0	0.1	1.2	0.2	1.3
Phase Call Probability	0.86		1.00		0.98	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	60	1310		192	1377		121	186	169	361	221	98
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723		1723	1723		1723	1863	1605	1723	1773	1571
Queue Service Time (g_s), s	1.8	38.7		5.6	40.4		4.1	11.6	12.3	12.3	6.4	6.4
Cycle Queue Clearance Time (g_c), s	1.8	38.7		5.6	40.4		4.1	11.6	12.3	12.3	6.4	6.4
Green Ratio (g/C)	0.59	0.55		0.62	0.57		0.05	0.13	0.13	0.12	0.20	0.20
Capacity (c), veh/h	218	1898		266	1975		177	241	207	417	705	312
Volume-to-Capacity Ratio (X)	0.275	0.690		0.722	0.697		0.682	0.771	0.817	0.866	0.314	0.31
Back of Queue (Q), ft/ln (50 th percentile)	16.7	441.4		75.8	460.4		46.8	139.8	125	158.7	71.1	60.9
Back of Queue (Q), veh/ln (50 th percentile)	0.6	17.0		2.9	17.7		1.8	5.4	5.0	6.1	2.7	2.4
Queue Storage Ratio (RQ) (50 th percentile)	0.11	1.47		0.63	1.84		0.30	0.68	0.63	1.03	0.39	0.31
Uniform Delay (d_1), s/veh	18.3	29.3		22.2	28.3		55.9	50.5	50.9	51.8	41.1	41.1
Incremental Delay (d_2), s/veh	0.3	2.1		1.4	2.1		1.7	2.0	3.1	15.9	0.1	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	18.6	31.4		23.6	30.4		57.7	52.5	53.9	67.7	41.2	41.3
Level of Service (LOS)	B	C		C	C		E	D	D	E	D	D
Approach Delay, s/veh / LOS	30.8	C		29.6	C		54.3	D		55.3	E	
Intersection Delay, s/veh / LOS	37.1						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.6	A	1.8	A	0.9	A	1.0	A

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Phone:
E-Mail:
Fax:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst:
Agency/Co.: KHR Associates
Date Performed: 8/4/2016
Analysis Time Period: 8:00 - 9:00 A.M.
Intersection: Palos Verdes North
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Project AM Peak Hour
East/West Street: Via Valmonte
North/South Street: Palos Verdes North

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	212	0	0	207	0	13	499	41	0	271	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		L	T	LTR	
PHF	1.00		1.00		1.00	1.00	1.00	
Flow Rate	212		207		13	499	271	
% Heavy Veh	0		0		0	0	0	
No. Lanes	1		1		2		1	
Opposing-Lanes	1		1		1		2	
Conflicting-lanes	2		2		1		1	
Geometry group	2		2		5		4a	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	212		207		13	499	271	
Left-Turn	0		0		13	0	0	
Right-Turn	0		0		0	0	0	
Prop. Left-Turns	0.0		0.0		1.0	0.0	0.0	
Prop. Right-Turns	0.0		0.0		0.0	0.0	0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	
Geometry Group	2		2		5		4a	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.5		0.2	

hRT-adj	-0.6		-0.6		-0.7		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0		0.0		0.5	0.0	0.0	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	212		207		13	499	271	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.19		0.18		0.01	0.44	0.24	
hd, final value	7.09		7.11		7.11	6.60	6.74	
x, final value	0.418		0.409		0.026	0.914	0.507	
Move-up time, m	2.0		2.0		2.3		2.0	
Service Time	5.1		5.1		4.8	4.3	4.7	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	212		207		13	499	271	
Service Time	5.1		5.1		4.8	4.3	4.7	
Utilization, x	0.418		0.409		0.026	0.914	0.507	
Dep. headway, hd	7.09		7.11		7.11	6.60	6.74	
Capacity	505		505		433	548	531	
95% Queue Length	2.1		2.0		0.1	18.1	3.0	
Delay	15.2		15.0+		10.0-	61.8	16.6	
LOS	C		C		A	F	C	
Approach:								
Delay	15.2		15.0+		60.4		16.6	
LOS	C		C		F		C	

Intersection Delay 34.8 Intersection LOS D

Phone:
E-Mail:
Fax:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst:
Agency/Co.: KHR Associates
Date Performed: 8/4/2016
Analysis Time Period: 5:00 - 6:00 P.M.
Intersection: Palos Verdes North
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Project PM Peak Hour
East/West Street: Via Valmonte
North/South Street: Palos Verdes North

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	23	0	0	189	0	6	389	38	0	591	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		L	T	LTR	
PHF	1.00		1.00		1.00	1.00	1.00	
Flow Rate	23		189		6	389	591	
% Heavy Veh	0		0		0	0	0	
No. Lanes	1		1		2		1	
Opposing-Lanes	1		1		1		2	
Conflicting-lanes	2		2		1		1	
Geometry group	2		2		5		4a	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	23		189		6	389	591	
Left-Turn	0		0		6	0	0	
Right-Turn	0		0		0	0	0	
Prop. Left-Turns	0.0		0.0		1.0	0.0	0.0	
Prop. Right-Turns	0.0		0.0		0.0	0.0	0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	
Geometry Group	2		2		5		4a	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.5		0.2	

hRT-adj	-0.6		-0.6		-0.7		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0		0.0		0.5	0.0	0.0	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	23		189		6	389	591	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.02		0.17		0.01	0.35	0.53	
hd, final value	7.17		6.55		6.49	5.98	5.40	
x, final value	0.046		0.344		0.011	0.646	0.886	
Move-up time, m	2.0		2.0		2.3		2.0	
Service Time	5.2		4.5		4.2	3.7	3.4	

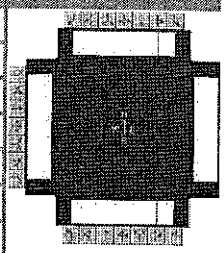
Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	23		189		6	389	591	
Service Time	5.2		4.5		4.2	3.7	3.4	
Utilization, x	0.046		0.344		0.011	0.646	0.886	
Dep. headway, hd	7.17		6.55		6.49	5.98	5.40	
Capacity	460		556		600	598	664	
95% Queue Length	0.1		1.6		0.0	5.2	16.3	
Delay	10.5		13.0		9.3	19.4	44.2	
LOS	B		B		A	C	E	
Approach:								
Delay	10.5		13.0		19.3		44.2	
LOS	B		B		C		E	

Intersection Delay 30.4 Intersection LOS D

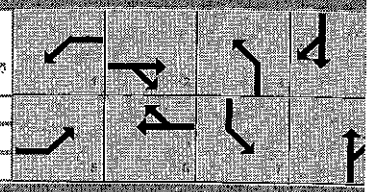
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Hawthorne Boulevard	File Name	1-PCH-Hawthorne Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	294	1045	270	150	1075	277	302	1427	71	201	774	325

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	6.1	0.2	26.0	7.3	2.7	27.7		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	4.0	0.0	4.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	14.2	34.2	10.1	30.0	14.1	34.4	11.3	31.7
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	9.8		6.0		9.7	25.3	7.1	18.2
Green Extension Time (g_e), s	0.5	0.0	0.2	0.0	0.4	5.1	0.3	6.4
Phase Call Probability	1.00		0.98		1.00	1.00	0.99	1.00
Max Out Probability	0.00		0.00		0.04	0.51	0.00	0.32

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	294	1045	270	150	1075	277	302	1427	71	201	774	325
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1643	1531	1673	1643	1529	1723	1691	1577	1723	1691	1574
Queue Service Time (g_s), s	7.8	17.3	14.0	4.0	18.5	15.0	7.7	23.3	2.8	5.1	11.2	16.2
Cycle Queue Clearance Time (g_c), s	7.8	17.3	14.0	4.0	18.5	15.0	7.7	23.3	2.8	5.1	11.2	16.2
Green Ratio (g/C)	0.11	0.34	0.34	0.07	0.29	0.29	0.11	0.34	0.34	0.08	0.31	0.31
Capacity (c), veh/h	381	1652	513	225	1423	441	385	1716	533	281	1563	485
Volume-to-Capacity Ratio (X)	0.772	0.633	0.526	0.665	0.755	0.628	0.785	0.832	0.133	0.715	0.495	0.67
Back of Queue (Q), ft/ln (50 th percentile)	83.3	187.2	149.3	42.4	207.5	167.6	82.1	234.3	25.2	55.2	109	152.
Back of Queue (Q), veh/ln (50 th percentile)	3.2	7.2	5.7	1.6	8.0	6.4	3.2	9.0	1.0	2.1	4.2	5.9
Queue Storage Ratio (RQ) (50 th percentile)	0.28	0.62	0.50	0.14	0.69	0.56	0.40	1.14	0.12	0.18	0.35	0.50
Uniform Delay (d_1), s/veh	40.4	29.9	28.7	42.0	33.3	31.9	38.9	27.4	20.6	40.3	25.4	27.2
Incremental Delay (d_2), s/veh	1.3	1.9	3.9	1.3	3.9	6.8	1.4	2.6	0.0	1.3	0.1	1.7
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	41.7	31.8	32.5	43.2	37.2	38.7	40.3	30.0	20.7	41.6	25.5	28.9
Level of Service (LOS)	D	C	C	D	D	D	D	C	C	D	C	C
Approach Delay, s/veh / LOS	33.7	C		38.1	D		31.4	C		28.8	C	
Intersection Delay, s/veh / LOS	33.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.5	C	3.5	C	3.5	C	3.5	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	1.5	A	1.2	A

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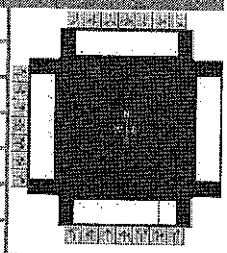
HCS 2010 Signalized Intersection Results Summary

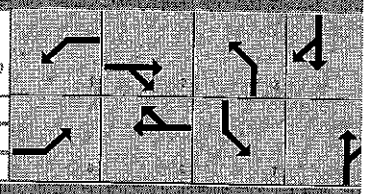
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 5:00
Intersection	Hawthorne Boulevard	File Name	1-PCH-Hawthorne Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	252	1147	367	213	1007	255	326	952	77	422	1323	429

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.9	1.1	25.3	10.7	2.4	26.6
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Phase Duration, s	13.0	30.4	11.9	29.3	14.7	30.6	17.1	33.0
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	8.7		7.6		10.3	16.6	12.7	24.8
Green Extension Time (g_e), s	0.4	0.0	0.3	0.0	0.4	6.4	0.4	4.2
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.08	0.43	0.82	0.73

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	252	1147	367	213	1007	255	326	952	77	422	1323	429
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1643	1530	1673	1643	1529	1723	1691	1577	1723	1691	1574
Queue Service Time (g_s), s	6.7	19.9	20.7	5.6	17.3	13.7	8.3	14.6	3.3	10.7	21.5	22.8
Cycle Queue Clearance Time (g_c), s	6.7	19.9	20.7	5.6	17.3	13.7	8.3	14.6	3.3	10.7	21.5	22.8
Green Ratio (g/C)	0.10	0.29	0.29	0.09	0.28	0.28	0.12	0.30	0.30	0.15	0.32	0.32
Capacity (c), veh/h	336	1444	448	294	1383	429	409	1501	467	502	1638	508
Volume-to-Capacity Ratio (X)	0.751	0.795	0.819	0.724	0.728	0.595	0.798	0.634	0.165	0.841	0.808	0.84
Back of Queue (Q), ft/ln (50 th percentile)	71.3	225.5	257.3	60.2	192.9	151.9	90	144.3	29.7	125.6	217.1	245.
Back of Queue (Q), veh/ln (50 th percentile)	2.7	8.7	9.9	2.3	7.4	5.8	3.5	5.6	1.1	4.8	8.3	9.5
Queue Storage Ratio (RQ) (50 th percentile)	0.24	0.75	0.86	0.20	0.64	0.51	0.44	0.70	0.14	0.41	0.71	0.80
Uniform Delay (d_1), s/veh	40.9	33.6	33.9	41.3	33.4	31.9	38.6	27.5	23.5	37.4	27.9	28.4
Incremental Delay (d_2), s/veh	1.3	4.8	17.2	1.3	3.5	6.1	2.4	0.5	0.1	7.9	2.5	11.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	42.2	38.4	51.2	42.6	36.8	38.0	41.0	28.0	23.5	45.4	30.4	39.5
Level of Service (LOS)	D	D	D	D	D	D	D	C	C	D	C	D
Approach Delay, s/veh / LOS	41.6	D		37.9	D		30.8	C		35.1	D	
Intersection Delay, s/veh / LOS	36.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.5	C	3.5	C	3.5	C	3.5	C
Bicycle LOS Score / LOS	1.5	A	1.3	A	1.2	A	1.7	A

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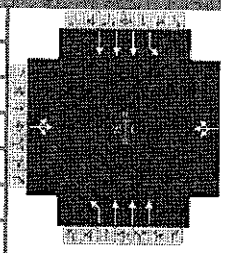
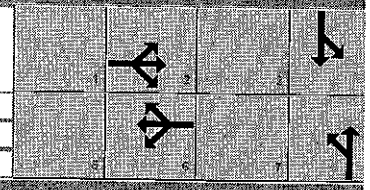
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	244th Street	File Name	2-Hawthorne-244th Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	53	6	0	61	52	14	1710		42	1102	

Signal Information												
Cycle, s	45.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	21.0	16.0	0.0	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		20.0		20.0
Change Period, ($Y+R_c$), s		9.0		9.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						16.7		18.0
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0			0		14	1710		42	1102	
Adjusted Saturation Flow Rate (s), veh/h/ln		0			0		520	1691		290	1691	
Queue Service Time (g_s), s		0.0			0.0		1.0	14.7		1.3	8.0	
Cycle Queue Clearance Time (g_c), s		0.0			0.0		9.1	14.7		16.0	8.0	
Green Ratio (g/C)							0.36	0.36		0.36	0.36	
Capacity (c), veh/h							252	1804		168	1804	
Volume-to-Capacity Ratio (X)		0.000			0.000		0.056	0.948		0.250	0.611	
Back of Queue (Q), ft/ln (50 th percentile)		0			0		2.6	165.5		10.2	59.8	
Back of Queue (Q), veh/ln (50 th percentile)		0.0			0.0		0.1	6.6		0.4	2.4	
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.03	0.84		0.10	0.30	
Uniform Delay (d_1), s/veh							15.7	14.1		22.4	11.9	
Incremental Delay (d_2), s/veh		0.0			0.0		0.0	14.2		0.3	0.4	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							15.7	28.3		22.7	12.4	
Level of Service (LOS)							B	C		C	B	
Approach Delay, s/veh / LOS	9.9	A		10.6	B		28.2	C		12.8	B	
Intersection Delay, s/veh / LOS	21.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.7	A	1.4	A	1.1	A

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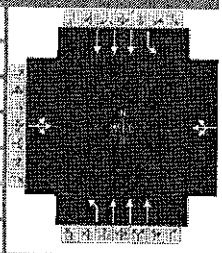
HCS 2010 Signalized Intersection Results Summary

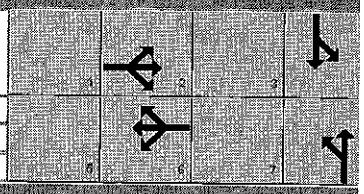
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	244th Street	File Name	2-Hawthorne-244th Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	66	26	0	66	39	34	1329		82	1748	

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	21.0	16.0	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		25.0		25.0		20.0		20.0
Change Period, ($Y+R_c$), s		9.0		9.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.3		3.3
Queue Clearance Time (g_s), s						18.0		18.0
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						1.00		1.00
Max Out Probability						1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0			0		34	1329		82	1748	
Adjusted Saturation Flow Rate (s), veh/h/ln		0			0		280	1691		419	1691	
Queue Service Time (g_s), s		0.0			0.0		0.8	10.3		5.7	15.2	
Cycle Queue Clearance Time (g_c), s		0.0			0.0		16.0	10.3		16.0	15.2	
Green Ratio (g/C)							0.36	0.36		0.36	0.36	
Capacity (c), veh/h							165	1804		213	1804	
Volume-to-Capacity Ratio (X)		0.000			0.000		0.206	0.737		0.385	0.969	
Back of Queue (Q), ft/ln (50 th percentile)		0			0		8.2	80.1		19.8	198.3	
Back of Queue (Q), veh/ln (50 th percentile)		0.0			0.0		0.3	3.2		0.8	7.9	
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.08	0.41		0.20	1.01	
Uniform Delay (d_1), s/veh							22.4	12.7		20.7	14.3	
Incremental Delay (d_2), s/veh		0.0			0.0		0.2	1.4		0.4	21.2	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh							22.7	14.1		21.1	35.5	
Level of Service (LOS)							C	B		C	D	
Approach Delay, s/veh / LOS	10.3	B		10.5	B		14.3	B		34.8	C	
Intersection Delay, s/veh / LOS	25.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.2	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.7	A	1.2	A	1.5	A

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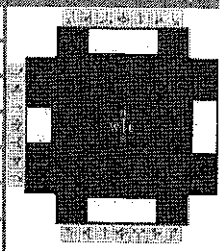
HCS 2010 Signalized Intersection Results Summary

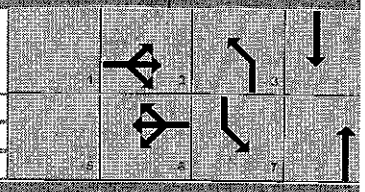
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Newton Street	File Name	3-Hawthorne-Newton Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	28	76	84	93	114	111	123	1715		39	1063	

Signal Information			
Cycle, s	45.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.1	2.3	2.4	19.7	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		13.1		13.1	8.7	26.1	6.3	23.7
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s		5.7		8.9	5.0	14.0	3.0	8.8
Green Extension Time (g_e), s		0.5		0.2	0.2	8.1	0.0	9.3
Phase Call Probability		1.00		1.00	0.79	1.00	0.39	1.00
Max Out Probability		0.55		1.00	0.00	0.32	0.00	0.21

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	28	160		93	114	111	123	1715		39	1063	
Adjusted Saturation Flow Rate (s), veh/h/ln	1299	1736		1246	1900	1610	1810	1691		1810	1691	
Queue Service Time (g_s), s	0.9	3.7		3.2	2.3	2.7	3.0	12.0		1.0	6.8	
Cycle Queue Clearance Time (g_c), s	3.2	3.7		6.9	2.3	2.7	3.0	12.0		1.0	6.8	
Green Ratio (g/C)	0.20	0.20		0.20	0.20	0.20	0.10	0.49		0.05	0.43	
Capacity (c), veh/h	351	346		306	379	321	188	2465		93	2198	
Volume-to-Capacity Ratio (X)	0.080	0.462		0.304	0.301	0.346	0.653	0.696		0.418	0.484	
Back of Queue (Q), ft/ln (50 th percentile)	5.6	31.8		20.7	21.7	21.4	29	74.4		9.6	45.8	
Back of Queue (Q), veh/ln (50 th percentile)	0.2	1.3		0.8	0.9	0.9	1.2	3.0		0.4	1.8	
Queue Storage Ratio (RQ) (50 th percentile)	0.06	0.32		0.21	0.22	0.21	0.29	0.38		0.10	0.23	
Uniform Delay (d_1), s/veh	16.9	16.1		19.1	15.5	15.7	19.6	9.1		20.9	9.3	
Incremental Delay (d_2), s/veh	0.0	0.4		0.2	0.2	0.2	1.4	0.2		1.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	16.9	16.4		19.3	15.7	15.9	21.1	9.3		22.1	9.3	
Level of Service (LOS)	B	B		B	B	B	C	A		C	A	
Approach Delay, s/veh / LOS	16.5	B		16.8	B		10.1	B		9.8	A	
Intersection Delay, s/veh / LOS	10.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.2	B
Bicycle LOS Score / LOS	0.8	A	1.0	A	1.5	A	1.1	A

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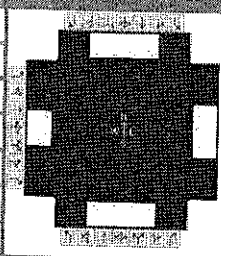
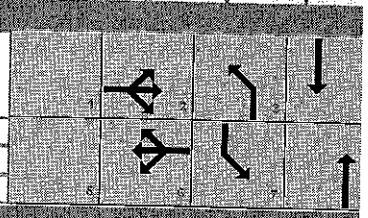
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Newton Street	File Name	3-Hawthorne-Newton Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	21	53	129	223	56	102	104	1328		54	1701	

Signal Information					EB		WB			
Cycle, s	50.5	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	10.0	3.2	1.4	23.9	0.0	0.0
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		14.0		14.0	8.6	29.3	7.2	27.9
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s		6.9		12.0	4.8	10.9	3.5	15.4
Green Extension Time (g_e), s		0.5		0.0	0.1	9.8	0.1	8.5
Phase Call Probability		1.00		1.00	0.77	1.00	0.53	1.00
Max Out Probability		1.00		1.00	0.00	0.32	0.00	0.44

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	21	182		223	56	102	104	1328		54	1701	
Adjusted Saturation Flow Rate (s), veh/h/ln	1369	1685		1221	1900	1610	1810	1691		1810	1691	
Queue Service Time (g_s), s	0.7	4.9		5.1	1.2	2.7	2.8	8.9		1.5	13.4	
Cycle Queue Clearance Time (g_c), s	1.9	4.9		10.0	1.2	2.7	2.8	8.9		1.5	13.4	
Green Ratio (g/C)	0.20	0.20		0.20	0.20	0.20	0.09	0.50		0.06	0.47	
Capacity (c), veh/h	380	334		266	376	319	165	2543		114	2401	
Volume-to-Capacity Ratio (X)	0.055	0.545		0.840	0.149	0.320	0.630	0.522		0.472	0.709	
Back of Queue (Q), ft/ln (50 th percentile)	4.6	44		103.6	11.9	22.6	28.3	58.5		14.9	93.8	
Back of Queue (Q), veh/ln (50 th percentile)	0.2	1.8		4.1	0.5	0.9	1.1	2.3		0.6	3.8	
Queue Storage Ratio (RQ) (50 th percentile)	0.05	0.44		1.04	0.12	0.23	0.28	0.30		0.15	0.48	
Uniform Delay (d_1), s/veh	17.5	18.2		23.8	16.7	17.3	22.1	8.5		22.8	10.5	
Incremental Delay (d_2), s/veh	0.0	1.1		23.1	0.1	0.2	1.5	0.1		1.1	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	17.5	19.3		47.0	16.8	17.6	23.6	8.6		24.0	10.9	
Level of Service (LOS)	B	B		D	B	B	C	A		C	B	
Approach Delay, s/veh / LOS	19.1	B		34.7	C		9.7	A		11.3	B	
Intersection Delay, s/veh / LOS	13.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.2	B
Bicycle LOS Score / LOS	0.8	A	1.1	A	1.3	A	1.5	A

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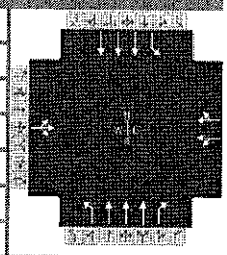
HCS 2010 Signalized Intersection Results Summary

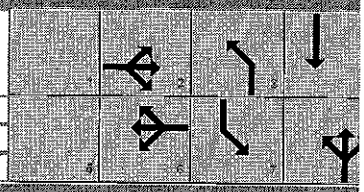
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Via Valmonte	File Name	4-Hawthorne-Via Valmonte Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	318	75	0	1	1	46	1645	37	3	1225	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	30.7	0.4	3.3	28.6	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		8.0	1.1	3.0	2.0	4.0
Phase Duration, s		34.7		34.7	7.7	35.9	4.4	32.6
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s					3.1	22.7	2.1	16.8
Green Extension Time (g_e), s		0.0		0.0	0.0	9.3	0.0	9.8
Phase Call Probability					0.62	1.00	0.06	1.00
Max Out Probability					0.00	0.29	0.00	0.23

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h		0		0		1	46	1645	37	3	1225	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0		1610	1810	1691	1610	1810	1691	
Queue Service Time (g_s), s		0.0		0.0		0.0	1.1	20.7	1.0	0.1	14.8	
Cycle Queue Clearance Time (g_c), s		0.0		0.0		0.0	1.1	20.7	1.0	0.1	14.8	
Green Ratio (g/C)						0.41	0.45	0.43	0.43	0.00	0.38	
Capacity (c), veh/h						659	271	2161	686	9	1935	
Volume-to-Capacity Ratio (X)		0.000		0.000		0.002	0.170	0.761	0.054	0.341	0.633	
Back of Queue (Q), ft/ln (50 th percentile)		0		0		0.2	10	182.8	8.4	1.8	132.2	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		0.0		0.0	0.4	7.3	0.3	0.1	5.3	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.00		0.01	0.10	0.93	0.04	0.02	0.67	
Uniform Delay (d_1), s/veh						13.1	13.6	18.3	12.7	37.2	18.9	
Incremental Delay (d_2), s/veh		0.0		0.0		0.0	0.1	0.6	0.0	8.4	0.1	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh						13.1	13.7	18.9	12.7	45.6	19.0	
Level of Service (LOS)						B	B	B	B	D	B	
Approach Delay, s/veh / LOS	19.3	B		13.1	B		18.6	B		19.1	B	
Intersection Delay, s/veh / LOS	18.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.2	C	2.3	B	2.6	B
Bicycle LOS Score / LOS	1.1	A	0.5	A	1.4	A	1.2	A

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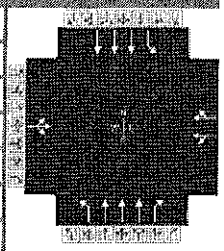
HCS 2010 Signalized Intersection Results Summary

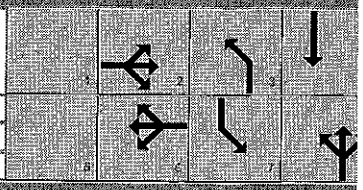
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Via Valmonte	File Name	4-Hawthorne-Via Valmonte Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	187	67	0	16	21	64	1237	19	16	2068	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	23.1	1.7	2.7	35.5	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		8.0	1.1	3.0	2.0	4.0
Phase Duration, s		27.1		27.1	8.4	42.2	5.7	39.5
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s					3.3	13.9	2.7	29.2
Green Extension Time (g_e), s		0.0		0.0	0.1	13.3	0.0	6.3
Phase Call Probability					0.74	1.00	0.28	1.00
Max Out Probability					0.00	0.28	0.00	0.75

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h		0		0		21	64	1237	19	16	2068	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		0		1610	1810	1691	1610	1810	1691	
Queue Service Time (g_s), s		0.0		0.0		0.7	1.3	11.9	0.4	0.7	27.2	
Cycle Queue Clearance Time (g_c), s		0.0		0.0		0.7	1.3	11.9	0.4	0.7	27.2	
Green Ratio (g/C)						0.31	0.54	0.51	0.51	0.02	0.47	
Capacity (c), veh/h						496	225	2583	820	41	2399	
Volume-to-Capacity Ratio (X)		0.000		0.000		0.042	0.284	0.479	0.023	0.390	0.862	
Back of Queue (Q), ft/ln (50 th percentile)		0		0		6.6	11.2	97.4	3.5	7.6	246.2	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		0.0		0.3	0.4	3.9	0.1	0.3	9.8	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.00		0.16	0.11	0.49	0.02	0.10	1.25	
Uniform Delay (d_1), s/veh						18.2	15.5	12.0	9.1	36.1	17.6	
Incremental Delay (d_2), s/veh		0.0		0.0		0.2	0.3	0.1	0.0	2.2	3.0	
Initial Queue Delay (d_3), s/veh		0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh						18.3	15.7	12.0	9.2	38.4	20.6	
Level of Service (LOS)						B	B	B	A	D	C	
Approach Delay, s/veh / LOS	23.5	C		18.3	B		12.1	B		20.8	C	
Intersection Delay, s/veh / LOS	17.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	2.2	B	2.5	B
Bicycle LOS Score / LOS	0.9	A	0.5	A	1.2	A	1.6	A

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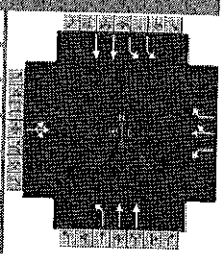
HCS 2010 Signalized Intersection Results Summary

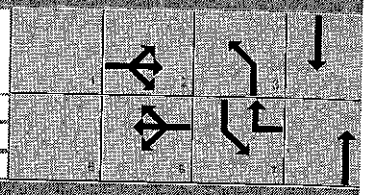
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	5-Hawthorne-Rolling Hills Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	2	0	88	2	438	0	1403		294	873	

Signal Information			
Cycle, s	60.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.5	0.0	7.2	28.3	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		16.5		16.5	0.0	32.3	11.2	43.5
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	3.0	3.1	3.0
Queue Clearance Time (g_s), s						22.8	6.8	8.7
Green Extension Time (g_e), s		0.0		0.0	0.0	5.5	0.5	7.7
Phase Call Probability						1.00	0.99	1.00
Max Out Probability						0.32	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0		88	2	438	0	1403		294	873	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		1437	1900	1610	1810	1773		1757	1773	
Queue Service Time (g_s), s		0.0		3.1	0.1	12.5	0.0	20.8		4.8	6.7	
Cycle Queue Clearance Time (g_c), s		0.0		3.2	0.1	12.5	0.0	20.8		4.8	6.7	
Green Ratio (g/C)				0.21	0.21	0.33		0.47		0.12	0.66	
Capacity (c), veh/h				418	395	529	3	1671		424	2336	
Volume-to-Capacity Ratio (X)		0.000		0.211	0.005	0.827	0.000	0.839		0.693	0.374	
Back of Queue (Q), ft/ln (50 th percentile)		0		27	0.6	178.4	0	179.1		47.4	37.6	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		1.1	0.0	7.1	0.0	7.2		1.9	1.5	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.67	0.01	3.57	0.00	0.91		0.24	0.19	
Uniform Delay (d_1), s/veh				20.1	18.8	18.6	0.0	13.9		25.3	4.6	
Incremental Delay (d_2), s/veh		0.0		1.1	0.0	15.5	0.0	2.3		0.8	0.0	
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				21.2	18.9	34.1	0.0	16.2		26.1	4.7	
Level of Service (LOS)				C	B	C		B		C	A	
Approach Delay, s/veh / LOS	18.9	B		31.9	C		16.2	B		10.1	B	
Intersection Delay, s/veh / LOS	16.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.8	C	2.0	B
Bicycle LOS Score / LOS	0.5	A	1.4	A	1.6	A	1.5	A

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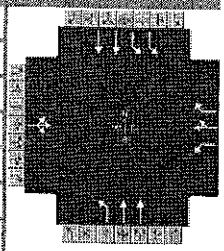
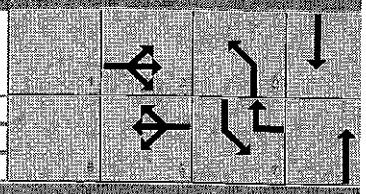
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Hawthorne Boulevard	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	5-Hawthorne-Rolling Hills Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	3	1	88	0	338	0	1064		452	1395	

Signal Information											
Cycle, s	60.0	Reference Phase	2								
Offset, s	0	Reference Point	End	Green	13.9	0.0	10.1	24.0	0.0	0.0	
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		5.0	2.0	4.0	2.0	4.0
Phase Duration, s		17.9		17.9	0.0	28.0	14.1	42.1
Change Period, ($Y+R_c$), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	3.0	3.1	3.0
Queue Clearance Time (g_s), s						17.4	9.4	16.2
Green Extension Time (g_e), s		0.0		0.0	0.0	6.6	0.7	8.4
Phase Call Probability						1.00	1.00	1.00
Max Out Probability						0.29	0.08	0.06

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h		0		88	0	338	0	1064		452	1395	
Adjusted Saturation Flow Rate (s), veh/h/ln		0		1435	1900	1610	1810	1773		1757	1773	
Queue Service Time (g_s), s		0.0		3.0	0.0	9.6	0.0	15.4		7.4	14.2	
Cycle Queue Clearance Time (g_c), s		0.0		3.1	0.0	9.6	0.0	15.4		7.4	14.2	
Green Ratio (g/C)				0.23	0.23	0.40		0.40		0.17	0.63	
Capacity (c), veh/h				450	440	643	3	1421		589	2252	
Volume-to-Capacity Ratio (X)		0.000		0.196	0.000	0.526	0.000	0.749		0.767	0.620	
Back of Queue (Q), ft/ln (50 th percentile)		0		25.8	0	87.3	0	134.5		71.5	87.3	
Back of Queue (Q), veh/ln (50 th percentile)		0.0		1.0	0.0	3.5	0.0	5.4		2.9	3.5	
Queue Storage Ratio (RQ) (50 th percentile)		0.00		0.64	0.00	1.75	0.00	0.68		0.36	0.44	
Uniform Delay (d_1), s/veh				18.9	0.0	13.7	0.0	15.4		23.9	6.6	
Incremental Delay (d_2), s/veh		0.0		1.0	0.0	3.1	0.0	0.7		0.8	0.1	
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				19.9	0.0	16.8	0.0	16.1		24.7	6.7	
Level of Service (LOS)				B		B		B		C	A	
Approach Delay, s/veh / LOS	17.8	B		17.4	B		16.1	B		11.1	B	
Intersection Delay, s/veh / LOS	13.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	2.8	C	2.0	B
Bicycle LOS Score / LOS	0.5	A	1.2	A	1.4	A	2.0	B

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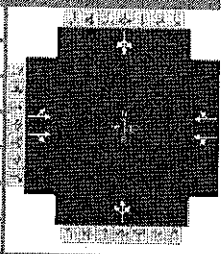
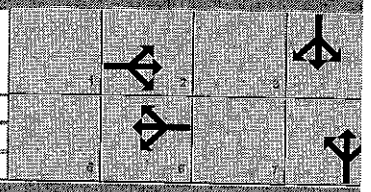
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Whiffletree Lane	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	6-Rolling Hills-Whiffletree Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	332	16	0	490	9	0	46	22	0	25	4

Signal Information												
Cycle, s	45.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	27.7	1.8	3.4	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		12.0
Phase Duration, s		31.7		31.7		7.4		5.8
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.1		3.1
Queue Clearance Time (g_s), s						3.7		2.7
Green Extension Time (g_e), s		0.0		0.0		0.1		0.0
Phase Call Probability						0.57		0.30
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0		173	0		249		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		1869	0		1888		0			0	
Queue Service Time (g_s), s	0.0		1.8	0.0		2.6		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	0.0		1.8	0.0		2.6		0.0			0.0	
Green Ratio (g/C)			0.62			0.62						
Capacity (c), veh/h			1152			1164						
Volume-to-Capacity Ratio (X)	0.000		0.150	0.000		0.214		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	0		10.3	0		15.5		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.0		0.4	0.0		0.6		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.00		0.05	0.00		0.08		0.00			0.00	
Uniform Delay (d_1), s/veh			3.6			3.8						
Incremental Delay (d_2), s/veh	0.0		0.3	0.0		0.4		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (d), s/veh			3.9			4.2						
Level of Service (LOS)			A			A						
Approach Delay, s/veh / LOS	3.9	A		4.2	A		21.1	C		22.3	C	
Intersection Delay, s/veh / LOS	5.9						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.6	A	0.5	A

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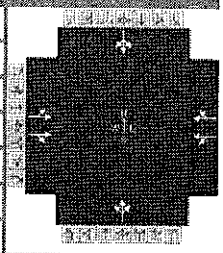
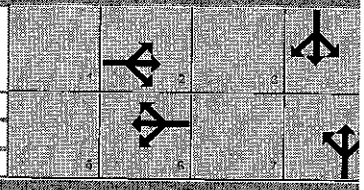
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Whiffletree Lane	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	6-Rolling Hills-Whiffletree Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	0	490	42	0	384	14	0	15	16	0	16	7

Signal Information										
Cycle, s	45.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	29.6	1.5	1.9	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		12.0		12.0
Phase Duration, s		33.6		33.6		5.9		5.5
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.2		3.1
Queue Clearance Time (g_s), s						2.8		2.6
Green Extension Time (g_e), s		0.0		0.0		0.0		0.0
Phase Call Probability						0.32		0.25
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	0		263	0		198		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	0		1847	0		1876		0			0	
Queue Service Time (g_s), s	0.0		2.6	0.0		1.8		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	0.0		2.6	0.0		1.8		0.0			0.0	
Green Ratio (g/C)			0.66			0.66						
Capacity (c), veh/h			1214			1233						
Volume-to-Capacity Ratio (X)	0.000		0.217	0.000		0.161		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	0		12.6	0		9		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.0		0.5	0.0		0.4		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.00		0.06	0.00		0.04		0.00			0.00	
Uniform Delay (d_1), s/veh			3.1			3.0						
Incremental Delay (d_2), s/veh	0.0		0.4	0.0		0.3		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (d), s/veh			3.5			3.2						
Level of Service (LOS)			A			A						
Approach Delay, s/veh / LOS	3.5	A		3.2	A		22.4	C		22.9	C	
Intersection Delay, s/veh / LOS	4.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.7	B	2.7	B
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.5	A	0.5	A

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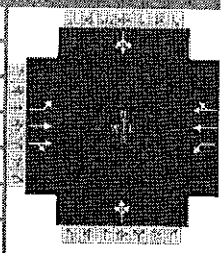
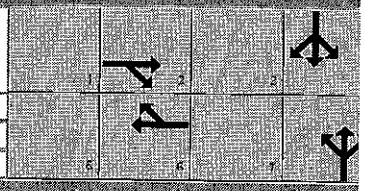
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Fallenleaf Drive	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	7-Rolling Hills-Fallenleaf Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	30	332	0	11	441	0	0	49	0	0	62	0

Signal Information												
Cycle, s	45.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	27.0	3.2	2.7	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		12.0		12.0
Phase Duration, s		31.0		31.0		6.7		7.2
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.0		3.0
Queue Clearance Time (g_s), s						3.1		3.4
Green Extension Time (g_e), s		0.0		0.0		0.1		0.1
Phase Call Probability						0.46		0.54
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	30	332	0	11	441	0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	963	1900	0	1065	1900	0		0			0	
Queue Service Time (g_s), s	0.7	1.7	0.0	0.2	2.4	0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	3.0	1.7	0.0	1.9	2.4	0.0		0.0			0.0	
Green Ratio (g/C)	0.60	0.60		0.60	0.60							
Capacity (c), veh/h	687	2281		758	2281							
Volume-to-Capacity Ratio (X)	0.044	0.146	0.000	0.015	0.193	0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	2.5	9.6	0	0.8	13.1	0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	0.4	0.0	0.0	0.5	0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.03	0.05	0.00	0.01	0.07	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	4.8	3.9		4.4	4.1							
Incremental Delay (d_2), s/veh	0.1	0.1	0.0	0.0	0.2	0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	4.9	4.1		4.4	4.3							
Level of Service (LOS)	A	A		A	A							
Approach Delay, s/veh / LOS	4.1	A		4.3	A		21.3	C		21.0	C	
Intersection Delay, s/veh / LOS	6.2						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.6	A	0.6	A

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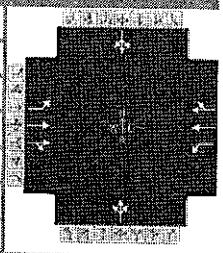
HCS 2010 Signalized Intersection Results Summary

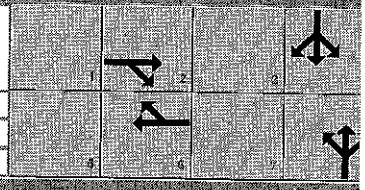
General Information				Intersection Information	
Agency				Duration, h	1.00
Analyst		Analysis Date	8/4/2016	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	Fallenleaf Drive	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Rolling Hills Road	File Name	7-Rolling Hills-Fallenleaf Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	36	455	0	22	402	0	0	25	0	0	49	0

Signal Information			
Cycle, s	45.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.6	2.7	1.6	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		12.0		12.0
Phase Duration, s		32.6		32.6		5.6		6.7
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (MAH), s		0.0		0.0		3.0		3.0
Queue Clearance Time (g_s), s						2.6		3.1
Green Extension Time (g_e), s		0.0		0.0		0.0		0.1
Phase Call Probability						0.27		0.46
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	36	455	0	22	402	0		0			0	
Adjusted Saturation Flow Rate (s), veh/h/ln	998	1900	0	951	1900	0		0			0	
Queue Service Time (g_s), s	0.7	2.2	0.0	0.4	1.9	0.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	2.6	2.2	0.0	2.7	1.9	0.0		0.0			0.0	
Green Ratio (g/C)	0.64	0.64		0.64	0.64							
Capacity (c), veh/h	752	2418		718	2418							
Volume-to-Capacity Ratio (X)	0.048	0.188	0.000	0.031	0.166	0.000		0.000			0.000	
Back of Queue (Q), ft/ln (50 th percentile)	2.5	10.8	0	1.6	9.3	0		0			0	
Back of Queue (Q), veh/ln (50 th percentile)	0.1	0.4	0.0	0.1	0.4	0.0		0.0			0.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.02	0.05	0.00	0.02	0.05	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	3.9	3.4		3.9	3.3							
Incremental Delay (d_2), s/veh	0.1	0.2	0.0	0.1	0.1	0.0		0.0			0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	4.0	3.6		4.0	3.5							
Level of Service (LOS)	A	A		A	A							
Approach Delay, s/veh / LOS	3.6	A		3.5	A		22.5	C		21.3	C	
Intersection Delay, s/veh / LOS	4.9						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	2.0	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	0.8	A	0.5	A	0.6	A

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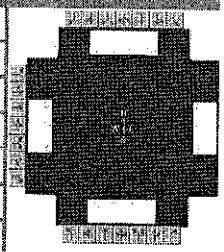
HCS 2010 Signalized Intersection Results Summary

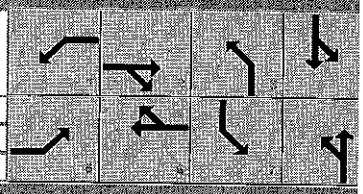
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Rolling Hills Road	File Name	8-Rolling Hills-Crenshaw Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	158	150	62	25	180	206	117	1391		159	1044	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.4	5.5	49.1	7.6	2.1	32.2
Yellow	4.0	4.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	4.0	1.1	4.0
Phase Duration, s	16.9	62.6	7.4	53.1	11.6	36.2	13.7	38.4
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	2.9	3.0	2.9
Queue Clearance Time (g_s), s	12.9		3.7		7.7	34.2	9.7	24.2
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.1	0.0	0.1	5.2
Phase Call Probability	0.99		0.57		0.98	1.00	1.00	1.00
Max Out Probability	0.87		0.00		0.00	1.00	0.02	0.39

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	158	150	62	25	180	206	117	1391		159	1044	
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1608	1723	1810	1607	1774	1691		1774	1691	
Queue Service Time (g_s), s	10.9	7.1	3.2	1.7	9.3	12.2	5.7	32.2		7.7	22.2	
Cycle Queue Clearance Time (g_c), s	10.9	7.1	3.2	1.7	9.3	12.2	5.7	32.2		7.7	22.2	
Green Ratio (g/C)	0.11	0.49	0.49	0.03	0.41	0.41	0.33	0.27		0.35	0.29	
Capacity (c), veh/h	185	884	786	49	741	658	218	1363		204	1454	
Volume-to-Capacity Ratio (X)	0.854	0.170	0.079	0.513	0.243	0.313	0.537	1.021		0.779	0.718	
Back of Queue (Q), ft/ln (50 th percentile)	153.4	80.5	30	20.3	110.1	126.9	62	569.4		88.5	235.5	
Back of Queue (Q), veh/ln (50 th percentile)	5.9	3.1	1.2	0.8	4.2	5.1	2.4	21.9		3.4	9.1	
Queue Storage Ratio (RQ) (50 th percentile)	0.51	0.27	0.10	0.07	0.37	0.44	0.30	2.78		0.29	0.77	
Uniform Delay (d_1), s/veh	54.8	23.1	21.8	58.1	29.1	30.2	31.3	43.9		32.1	38.5	
Incremental Delay (d_2), s/veh	22.2	0.4	0.2	3.1	0.8	1.2	0.8	71.1		4.5	1.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	76.9	23.5	22.0	61.2	29.9	31.5	32.0	115.0		36.6	40.0	
Level of Service (LOS)	E	C	C	E	C	C	C	F		D	D	
Approach Delay, s/veh / LOS	46.1	D		32.6	C		108.6	F		39.5	D	
Intersection Delay, s/veh / LOS	69.2						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.4	B	2.4	B
Bicycle LOS Score / LOS	1.1	A	1.2	A	1.3	A	1.1	A

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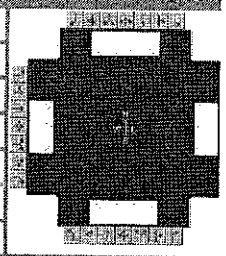
HCS 2010 Signalized Intersection Results Summary

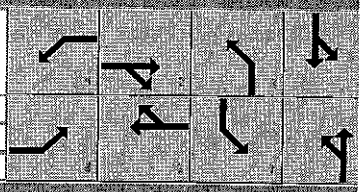
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Rolling Hills Road	File Name	8-Rolling Hills-Crenshaw Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	172	287	89	46	217	167	101	1039		279	1088	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.7	5.2	48.1	7.1	4.9	26.0
Yellow	4.0	4.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	4.0	1.1	4.0
Phase Duration, s	17.9	61.3	8.7	52.1	11.1	30.0	20.0	38.9
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	2.9	3.0	2.9
Queue Clearance Time (g_s), s	13.8		5.2		7.2	26.2	16.2	25.2
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.1	0.0	0.0	4.3
Phase Call Probability	1.00		0.78		0.97	1.00	1.00	1.00
Max Out Probability	1.00		0.00		0.00	1.00	1.00	0.33

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8		7	4	
Adjusted Flow Rate (v), veh/h	172	287	89	46	217	167	101	1039		279	1088	
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1608	1723	1810	1607	1774	1691		1774	1691	
Queue Service Time (g_s), s	11.8	14.5	4.7	3.2	11.5	9.8	5.2	24.2		14.2	23.2	
Cycle Queue Clearance Time (g_c), s	11.8	14.5	4.7	3.2	11.5	9.8	5.2	24.2		14.2	23.2	
Green Ratio (g/C)	0.12	0.48	0.48	0.04	0.40	0.40	0.28	0.22		0.37	0.29	
Capacity (c), veh/h	199	864	768	68	726	645	206	1099		305	1477	
Volume-to-Capacity Ratio (X)	0.864	0.332	0.116	0.681	0.299	0.259	0.489	0.945		0.916	0.737	
Back of Queue (Q), ft/ln (50 th percentile)	175	176.4	44.9	37.7	138.2	100.3	58.3	310.7		244.1	247.2	
Back of Queue (Q), veh/ln (50 th percentile)	6.7	6.8	1.8	1.4	5.3	4.0	2.2	12.0		9.4	9.5	
Queue Storage Ratio (RQ) (50 th percentile)	0.58	0.59	0.16	0.13	0.46	0.35	0.28	1.52		0.79	0.80	
Uniform Delay (d_1), s/veh	54.5	26.3	23.0	57.7	30.5	29.9	34.8	46.3		31.8	38.4	
Incremental Delay (d_2), s/veh	27.8	1.0	0.3	4.5	1.1	1.0	0.7	20.9		42.5	1.8	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	82.3	27.4	23.3	62.2	31.6	30.9	35.4	67.2		74.3	40.1	
Level of Service (LOS)	F	C	C	E	C	C	D	E		E	D	
Approach Delay, s/veh / LOS	43.9	D		34.6	C		64.4	E		47.1	D	
Intersection Delay, s/veh / LOS	50.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.3	C	2.5	B	2.4	B
Bicycle LOS Score / LOS	1.4	A	1.2	A	1.1	A	1.2	A

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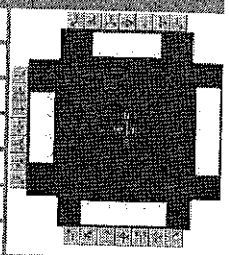
HCS 2010 Signalized Intersection Results Summary

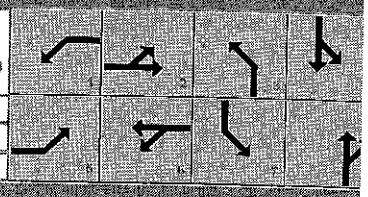
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Crenshaw Boulevard	File Name	9-PCH-Crenshaw Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	183	978		653	1993		68	1048	499	145	654	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.2	5.7	46.1	5.9	3.0	33.1
Yellow	4.0	4.0	4.0	4.0	0.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	1.1	4.0
Phase Duration, s	10.2	50.1	19.9	59.9	9.9	37.1	12.9	40.1
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	5.9		15.8		6.5	35.1	8.9	14.4
Green Extension Time (g_e), s	0.3	0.0	0.0	0.0	0.0	0.0	0.1	6.1
Phase Call Probability	1.00		1.00		0.90	1.00	0.99	1.00
Max Out Probability	0.00		1.00		0.00	1.00	0.01	0.07

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	183	978		653	1993		68	1048	499	145	654	
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1723		1673	1643		1774	1691	1608	1774	1691	
Queue Service Time (g_s), s	3.9	31.2		13.8	45.8		4.5	22.6	33.1	6.9	12.4	
Cycle Queue Clearance Time (g_c), s	3.9	31.2		13.8	45.8		4.5	22.6	33.1	6.9	12.4	
Green Ratio (g/C)	0.44	0.38		0.53	0.47		0.05	0.28	0.28	0.36	0.30	
Capacity (c), veh/h	320	1326		701	2295		87	1398	443	238	1525	
Volume-to-Capacity Ratio (X)	0.572	0.738		0.931	0.868		0.778	0.749	1.126	0.609	0.429	
Back of Queue (Q), ft/ln (50 th percentile)	39.7	369.6		206.2	515.8		55.3	242.6	1109.4	74.7	128.7	
Back of Queue (Q), veh/ln (50 th percentile)	1.5	14.2		7.9	19.8		2.1	9.3	44.4	2.9	5.0	
Queue Storage Ratio (RQ) (50 th percentile)	0.13	1.23		0.69	1.72		0.27	1.18	5.64	0.24	0.42	
Uniform Delay (d_1), s/veh	29.0	39.1		27.2	37.9		56.4	39.7	43.5	30.1	33.7	
Incremental Delay (d_2), s/veh	0.6	3.8		24.9	5.1		5.7	2.1	258.0	0.9	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	29.6	42.8		52.1	43.0		62.1	41.7	301.5	31.1	33.8	
Level of Service (LOS)	C	D		D	D		E	D	F	C	C	
Approach Delay, s/veh / LOS	40.7	D		45.2	D		122.9	F		33.3	C	
Intersection Delay, s/veh / LOS	63.0						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	3.1	C	3.3	C
Bicycle LOS Score / LOS	1.4	A	1.9	A	1.4	A	0.9	A

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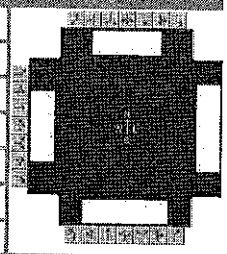
HCS 2010 Signalized Intersection Results Summary

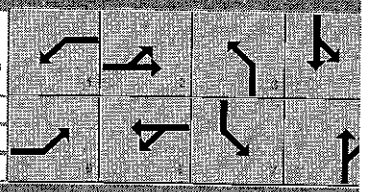
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Crenshaw Boulevard	File Name	9-PCH-Crenshaw Cumu PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	183	1311		476	1501		84	729	461	358	1185	

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.1	4.1	47.8	7.2	4.8	26.0
Yellow	4.0	4.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	1.1	4.0
Phase Duration, s	10.1	51.8	18.2	59.9	11.2	30.0	20.0	38.8
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0
Queue Clearance Time (g_s), s	5.8		13.8		7.6	28.0	18.0	28.0
Green Extension Time (g_e), s	0.3	0.0	0.3	0.0	0.1	0.0	0.0	3.8
Phase Call Probability	1.00		1.00		0.94	1.00	1.00	1.00
Max Out Probability	0.00		1.00		0.00	1.00	1.00	0.62

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	183	1311		476	1501		84	729	461	358	1185	
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1723		1673	1643		1774	1691	1608	1774	1691	
Queue Service Time (g_s), s	3.8	44.9		11.8	31.6		5.6	15.8	26.0	16.0	26.0	
Cycle Queue Clearance Time (g_c), s	3.8	44.9		11.8	31.6		5.6	15.8	26.0	16.0	26.0	
Green Ratio (g/C)	0.45	0.40		0.53	0.47		0.06	0.22	0.22	0.37	0.29	
Capacity (c), veh/h	415	1374		534	2298		106	1099	348	358	1471	
Volume-to-Capacity Ratio (X)	0.441	0.954		0.891	0.653		0.789	0.663	1.323	0.999	0.805	
Back of Queue (Q), ft/ln (50 th percentile)	38.3	612.2		217.6	344.4		67.5	169.6	1707.7	448.8	280.7	
Back of Queue (Q), veh/ln (50 th percentile)	1.5	23.5		8.4	13.2		2.6	6.5	68.3	17.3	10.8	
Queue Storage Ratio (RQ) (50 th percentile)	0.13	2.04		0.73	1.15		0.33	0.83	8.68	1.46	0.91	
Uniform Delay (d_1), s/veh	23.4	43.0		36.0	33.0		55.7	43.0	47.0	35.3	39.5	
Incremental Delay (d_2), s/veh	0.3	21.7		16.6	1.5		5.0	1.2	602.3	94.5	3.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	23.7	64.7		52.6	34.4		60.7	44.2	649.3	129.9	42.7	
Level of Service (LOS)	C	E		D	C		E	D	F	F	D	
Approach Delay, s/veh / LOS	59.6	E		38.8	D		264.2	F		62.9	E	
Intersection Delay, s/veh / LOS	95.3						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.3	C	3.1	C	3.3	C
Bicycle LOS Score / LOS	1.7	A	1.6	A	1.2	A	1.3	A

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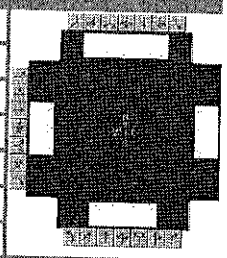
HCS 2010 Signalized Intersection Results Summary

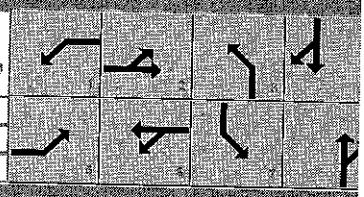
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Vista Montana	File Name	10-PCH-Vista Montana Cumu AM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	48	1176		72	1572		164	168	131	288	116	194

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.8	0.7	72.8	7.8	0.3	13.6
Yellow	4.0	0.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	4.0	2.0	3.0
Phase Duration, s	8.8	76.8	9.5	77.5	11.8	17.6	16.1	21.9
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.1	3.0	3.1
Queue Clearance Time (g_s), s	3.2		3.8		7.6	12.5	11.8	16.4
Green Extension Time (g_e), s	0.1	0.0	0.1	0.0	0.2	1.1	0.3	1.1
Phase Call Probability	0.80		0.91		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.32	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	48	1176		72	1572		164	156	143	288	116	194
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723		1723	1723		1723	1863	1596	1723	1773	1569
Queue Service Time (g_s), s	1.2	31.6		1.8	46.6		5.6	9.7	10.5	9.8	3.5	14.4
Cycle Queue Clearance Time (g_c), s	1.2	31.6		1.8	46.6		5.6	9.7	10.5	9.8	3.5	14.4
Green Ratio (g/C)	0.65	0.61		0.65	0.61		0.06	0.11	0.11	0.10	0.15	0.15
Capacity (c), veh/h	194	2091		297	2110		223	211	181	348	531	235
Volume-to-Capacity Ratio (X)	0.247	0.562		0.243	0.745		0.735	0.737	0.791	0.829	0.219	0.82
Back of Queue (Q), ft/ln (50 th percentile)	15	354.3		16.2	529.4		63.2	117.6	106	117.4	38.8	141.
Back of Queue (Q), veh/ln (50 th percentile)	0.6	13.6		0.6	20.4		2.4	4.5	4.2	4.5	1.5	5.7
Queue Storage Ratio (RQ) (50 th percentile)	0.10	1.18		0.13	2.12		0.41	0.57	0.54	0.76	0.21	0.72
Uniform Delay (d_1), s/veh	19.3	23.4		12.7	27.5		55.1	51.5	51.8	52.9	44.9	49.5
Incremental Delay (d_2), s/veh	0.2	1.1		0.2	2.5		1.8	1.9	3.0	7.7	0.1	2.9
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	19.5	24.6		12.9	30.0		56.9	53.4	54.8	60.6	44.9	52.4
Level of Service (LOS)	B	C		B	C		E	D	D	E	D	D
Approach Delay, s/veh / LOS	24.4	C		29.3	C		55.1	E		54.9	D	
Intersection Delay, s/veh / LOS	34.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.5	A	1.8	A	0.9	A	1.0	A

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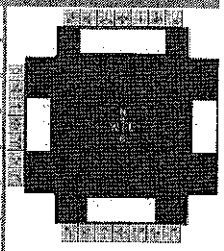
HCS 2010 Signalized Intersection Results Summary

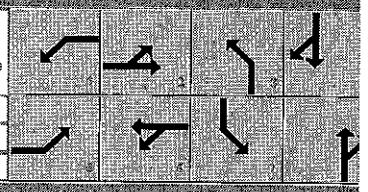
General Information				Intersection Information	
Agency	KHR Associates			Duration, h	1.00
Analyst		Analysis Date	8/1/2016	Area Type	Other
Jurisdiction	Torrance California	Time Period		PHF	1.00
Urban Street	Pacific Coast Highway	Analysis Year	2016	Analysis Period	1> 7:30
Intersection	Vista Montana	File Name	10-PCH-Vista Montana Proj PM.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	60	1341		208	1416		121	206	158	364	221	98

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	5.2	3.2	65.1	6.2	4.4	15.9
Yellow	4.0	0.0	4.0	4.0	4.0	4.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	2.0	4.0	2.0	3.0
Phase Duration, s	9.2	69.1	12.4	72.3	10.2	19.9	18.6	28.3
Change Period, ($Y+R_c$), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.0	0.0	3.0	0.0	3.0	3.1	3.0	3.1
Queue Clearance Time (g_s), s	3.8		8.1		6.1	14.7	14.5	8.4
Green Extension Time (g_e), s	0.1	0.0	0.3	0.0	0.1	1.2	0.2	1.3
Phase Call Probability	0.86		1.00		0.98	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.01	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2		1	6		3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	60	1341		208	1416		121	191	173	364	221	98
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723		1723	1723		1723	1863	1597	1723	1773	1572
Queue Service Time (g_s), s	1.8	40.3		6.1	42.1		4.1	11.9	12.7	12.5	6.4	6.4
Cycle Queue Clearance Time (g_c), s	1.8	40.3		6.1	42.1		4.1	11.9	12.7	12.5	6.4	6.4
Green Ratio (g/C)	0.59	0.54		0.62	0.57		0.05	0.13	0.13	0.12	0.20	0.20
Capacity (c), veh/h	208	1870		262	1962		177	246	211	419	718	318
Volume-to-Capacity Ratio (X)	0.288	0.717		0.793	0.722		0.682	0.775	0.821	0.868	0.308	0.308
Back of Queue (Q), ft/ln (50 th percentile)	17.2	461.3		86.5	481.1		46.8	143.8	127.9	160.7	70.8	60.6
Back of Queue (Q), veh/ln (50 th percentile)	0.7	17.7		3.3	18.5		1.8	5.5	5.1	6.2	2.7	2.4
Queue Storage Ratio (RQ) (50 th percentile)	0.11	1.54		0.72	1.92		0.30	0.70	0.65	1.05	0.38	0.31
Uniform Delay (d_1), s/veh	19.3	30.4		23.8	29.1		55.9	50.3	50.7	51.7	40.7	40.7
Incremental Delay (d_2), s/veh	0.3	2.4		2.1	2.4		1.7	2.0	3.1	16.3	0.1	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	19.6	32.8		25.9	31.5		57.7	52.4	53.8	68.0	40.8	40.9
Level of Service (LOS)	B	C		C	C		E	D	D	E	D	D
Approach Delay, s/veh / LOS	32.2	C		30.8	C		54.2	D		55.3	E	
Intersection Delay, s/veh / LOS	38.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.6	A	1.8	A	0.9	A	1.1	A

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Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst:
Agency/Co.: KHR Associates
Date Performed: 8/4/2016
Analysis Time Period: 8:00 - 9:00 A.M.
Intersection: Palos Verdes North
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Cumulative AM Peak Hour
East/West Street: Via Valmonte
North/South Street: Palos Verdes North

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	212	0	0	207	0	13	499	42	0	272	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		L	T	LTR	
PHF	1.00		1.00		1.00	1.00	1.00	
Flow Rate	212		207		13	499	272	
% Heavy Veh	0		0		0	0	0	
No. Lanes	1		1		2		1	
Opposing-Lanes	1		1		1		2	
Conflicting-lanes	2		2		1		1	
Geometry group	2		2		5		4a	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	212		207		13	499	272	
Left-Turn	0		0		13	0	0	
Right-Turn	0		0		0	0	0	
Prop. Left-Turns	0.0		0.0		1.0	0.0	0.0	
Prop. Right-Turns	0.0		0.0		0.0	0.0	0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	
Geometry Group	2		2		5		4a	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.5		0.2	

hRT-adj	-0.6		-0.6		-0.7		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0		0.0		0.5	0.0	0.0	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	212		207		13	499	272	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.19		0.18		0.01	0.44	0.24	
hd, final value	7.10		7.12		7.11	6.60	6.74	
x, final value	0.418		0.409		0.026	0.915	0.509	
Move-up time, m	2.0		2.0		2.3		2.0	
Service Time	5.1		5.1		4.8	4.3	4.7	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	212		207		13	499	272	
Service Time	5.1		5.1		4.8	4.3	4.7	
Utilization, x	0.418		0.409		0.026	0.915	0.509	
Dep. headway, hd	7.10		7.12		7.11	6.60	6.74	
Capacity	505		505		433	548	533	
95% Queue Length	2.1		2.0		0.1	18.1	3.0	
Delay	15.2		15.0+		10.0-	62.0	16.7	
LOS	C		C		A	F	C	
Approach:								
Delay	15.2		15.0+		60.7		16.7	
LOS	C		C		F		C	

Intersection Delay 34.9 Intersection LOS D

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst:
Agency/Co.: KHR Associates
Date Performed: 8/4/2016
Analysis Time Period: 5:00 - 6:00 P.M.
Intersection: Palos Verdes North
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: Cumulative PM Peak Hour
East/West Street: Via Valmonte
North/South Street: Palos Verdes North

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	23	0	0	192	0	6	389	38	0	591	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		L	T	LTR	
PHF	1.00		1.00		1.00	1.00	1.00	
Flow Rate	23		192		6	389	591	
% Heavy Veh	0		0		0	0	0	
No. Lanes	1		1		2		1	
Opposing-Lanes	1		1		1		2	
Conflicting-lanes	2		2		1		1	
Geometry group	2		2		5		4a	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	23		192		6	389	591	
Left-Turn	0		0		6	0	0	
Right-Turn	0		0		0	0	0	
Prop. Left-Turns	0.0		0.0		1.0	0.0	0.0	
Prop. Right-Turns	0.0		0.0		0.0	0.0	0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0	0.0	0.0	
Geometry Group	2		2		5		4a	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2		0.5		0.2	

hRT-adj	-0.6		-0.6		-0.7		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.0		0.0		0.5	0.0	0.0	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	23		192		6	389	591	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.02		0.17		0.01	0.35	0.53	
hd, final value	7.19		6.55		6.51	6.00	5.41	
x, final value	0.046		0.350		0.011	0.648	0.889	
Move-up time, m	2.0		2.0		2.3		2.0	
Service Time	5.2		4.6		4.2	3.7	3.4	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	23		192		6	389	591	
Service Time	5.2		4.6		4.2	3.7	3.4	
Utilization, x	0.046		0.350		0.011	0.648	0.889	
Dep. headway, hd	7.19		6.55		6.51	6.00	5.41	
Capacity	460		549		600	598	664	
95% Queue Length	0.1		1.6		0.0	5.3	16.6	
Delay	10.5		13.1		9.3	19.6	45.0	
LOS	B		B		A	C	E	
Approach:								
Delay	10.5		13.1		19.4		45.0	
LOS	B		B		C		E	

Intersection Delay 30.8 Intersection LOS D