APPENDIX F

CHOLLAS TRIANGLE
MARKET ANALYSIS

MR+E

Draft

Chollas Triangle Market Analysis

Prepared for
Civitas
City of San Diego

Prepared by
MR+E

10/14/11
R. 11/22/11

3308 Helms
Culver City CA 90232
www.mrpluse.com

Section I Introduction and Executive Summary

Introduction

This report provides an overview of the market conditions affecting the development opportunities for the Chollas Triangle community master plan. The goal of this analysis is to provide data and input to the physical and community planning process in order to identify program elements and development opportunities within the plan area.

Existing Conditions

The communities that surround the Chollas Triangle make up a significant base of spending and economic activity. In many respects the Mid-city portion of the City of San Diego can be thought of as a medium-size city that is primarily residential in character with commercial activity located along transportation corridors. The Chollas Triangle site represents an opportunity to provide a town center or point of focus for this community which despite its relative modest means, when compared to the County as a whole, still represents a significant consumer base that has economic needs that can be met within the community

The median value owner occupied dwelling units in 2010 within the Plan area was just over $211,000. This was significantly lower than the County average of about $342,000 or the City average of approximately $353,000. Because of this the Plan area represents a reserve of attainably priced housing within the broader San Diego region. Prices began to accelerate faster than the State average beginning in late 2001. This was sustained until the beginnings of the financial crisis in 2008 when median sales prices declined faster in the region than for California as a whole. As of 2011, the median sales price for a house in the community was just over $233,000. This compares to the statewide median of just under $252,000 and the County median of approximately $368,000.

Presently there is a significant concentration of very low income population within the Plan area occurring at nearly double the rate of the County as a whole. In the most recent recession, lower income communities have been hit especially hard. As a result, economic development efforts geared towards local employment and new business formation in the community will be especially helpful.

The San Diego Market

Like the rest of the nation the real estate market in San Diego has suffered tremendously since the onset of the 2008 credit crisis. Unemployment, declining residential values and declining household incomes have reduced consumer demand for a broad variety of goods and services. This has translated into negative absorption across all major land-use types in the market. That being said, San Diego has several structural advantages that buffer the local economy from many of the worst effects of the national conditions.

Therefore, the region is currently experiencing negative absorption and rental rates that are below replacement costs for most asset classes. In these circumstances only built to suit pre-lease projects that are narrowly focused to the demands of an end-user are likely to be built in this environment. In the short term the San Diego market is unlikely to produce significant new development pressures for new construction until existing inventory is absorbed and high levels of unemployment begin to abate.

At present the total San Diego market is experiencing the following vacancy rates:

- Office—17.4%
- Retail—8.2%
- Multiunit housing—4.9%
- Industrial—9.8%

Existing inventory will need to be cleared from the market and rental rates will need to begin to exceed replacement costs before significant new levels of development are likely to occur in the market. The demand for multiunit housing is likely to emerge earlier than the other asset classes as San Diego's economy stabilizes and returns to historically realized rates of growth.

The Chollas Triangle Market

The Chollas Triangle market area, like the rest of San Diego, is currently experiencing market conditions that are not conducive to new development. In almost every instance the capitalized value of current income streams and comparable sales prices for existing property are below replacement cost new development. While the immediate market conditions are soft, the location of the Chollas Triangle in the midst of a dense and dynamic community, along with the size of the site, is consistent with a town center development strategy.

The first segment of the real estate market that is likely to be viable on the Chollas Triangle site will be multi-family residential. As capital markets began to stabilize and new household formation continued regionally, based on improving economy development opportunities for market rate, multiunit rental apartments will become viable at the

Chollas Triangle site. Demand for this type of development may begin to emerge over the next 18 to 24 months depending on macro-economic conditions such as credit markets, regional unemployment rates and competitive developments elsewhere in the area.

Program Recommendations

Either as a leading investment or concurrent, with the first phase of development, it will be necessary to improve Chollas Creek and Chollas Pkwy. turning them into a community amenity. With this accomplished the Chollas Triangle site, particularly along its southern and eastern margins, becomes particularly attractive for residential development. In contrast the North and West side of the site currently fronts two of the most significant arteries in Mid-City San Diego and serves as logical sites for retail and consumer oriented commercial developments. Once the landscape improvements are made to the creek and Parkway the latent value of Chollas Triangle's strategic location can be unlocked.

In terms of program recommendations, it is clear that the regional economy of San Diego will need to improve with decreasing rates of unemployment and increasing household incomes before new development pressure comes to bear on this site. That being said the near and intermediate term demand is beginning to develop for multifamily residential development in the Mid-City portion of San Diego. Once issues of access to capital and development finance are addressed and the economy begins to stabilize it is likely that this sector of the real estate economy will be the first to rebound.

Similarly the retail landscape has been significantly challenged by the financial crisis that began in 2008. As the industry begins to stabilize along with incomes in the market it is likely to anticipate that University Avenue will continue to develop as a commercial retail corridor. Chollas Triangle offers a site to combine these market tendencies into a synergistic mixed-use town center development with likely following attributes:

- 250 to 500 residential units capable of being both owner and renter occupied
- Community scale retail development with one or more mid box anchors totaling between 100,000 and 130,000 sq. ft.
- Ancillary office space, including live work and store front office opportunities ranging between 10,000 and 25,000 sq. ft. of total on-site commercial office use.

Section II Existing Conditions

Introduction

This section provides an overview of the existing economic and social conditions within the Chollas Triangle area. The data in this section is based on a combination of demographic and economic data sources. The principal resource used in preparing this quantitative overview was provided from the US Census. Two data sets were used. The first was the recently released 2010 census which included basic information about population and households but lacked details about social and economic characteristics. The second source, also from the US Census, is the American Community Survey (ACS) which represents a rolling four-year survey sample that covers dates from 2005 to 2009. Data from the ACS will be adjusted to conform to the 100% counts of the 2010 census in this review.

In terms of the geographic area being analyzed this section proceeds on the basis of analysis of the three areas of geography.

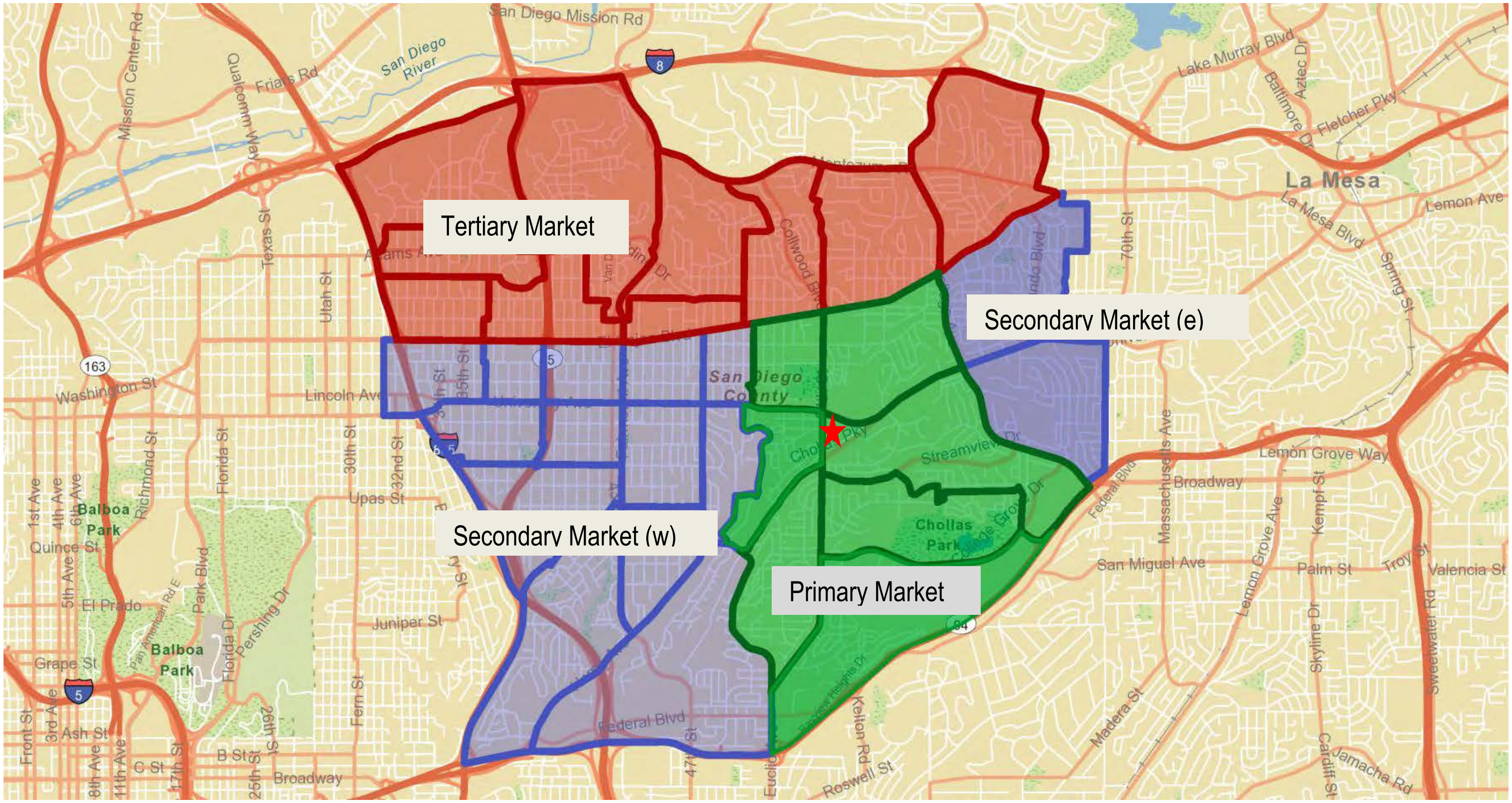
1) ***Plan area***-- This consists of the census tracts that include the Chollas Triangle and the first ring of census tracts that are adjacent to the site. This covers an area roughly from El Cajon Blvd. in the north to SR-94 in the south, Gayle Street on the east and Euclid Avenue on the west.
2) ***Secondary market area***-- This is made up of a set of census tracts located to both the east and west of the plan area. The secondary market area's boundaries on the west side run from a northern boundary along El Cajon Blvd., west along I-805, south along SR- 94 and east along Euclid Ave. The eastern section of the secondary market covers an area from Gayle Street on the west to the city boundary with La Mesa in the east and the area south of El Cajon Blvd.
3) ***Tertiary market area***-- This market area covers the area north of El Cajon Blvd., south of I-8 and Montezuma Blvd.

A map of these three areas as shown in figure II-1. The market area includes portions of City Heights, Eastern Area, Normal Heights and Kensington Talmagde. However, the study area is not coterminous with any of the existing plan areas of the City of San Diego.

Where ever possible, data for the Plan area will be compared to values for the County as a whole. The objective is to provide a relative measure of the proportional representation of any given variable within the plan area. This information is presented either as a percentage share of the total County amount or as an index comparing the proportion of variables within the plan area to its representation on the County wide level. For each variable, an index level above 100% represents a relative overrepresentation of the characteristic within the Plan area when compared to San Diego County. An index level below 100% represents a relative underrepresentation of the characteristic in

Figure I-1

Market Areas



the Plan area when compared to the County. Note that these indices are not additive and they are intended to represent proportional shares rather than an absolute measure of the amount of any particular characteristic.

Population and Households

Table II-1 shows the basic characteristics for population, households and age for the Chollas Triangle area. The Plan area itself is home to a population of approximately 36,000 people in 11,400 households. This represents 1.2% of the total population of San Diego County. The surrounding market area includes an additional 85,000 people in just over 25,000 households. The combined populations of the two areas would be equivalent to a medium-sized California city population of over 121,000.

In terms of age distribution, the population within the Plan area is considerably younger than the population in the County as a whole. The Plan area has a median age of 28.3 years compared to 34.6 for San Diego County. Consistent with this, populations under age 34 are significantly overrepresented in the plan area when compared to San Diego County with 10% of the total Plan area population made up of children under five years old, 10% aged 20-24 and 10% aged 25-29. The presence of children in the Plan area is reflected in the average household size of 3.14 persons per household which is 13% larger than the County average of 2.77 persons per household.

If the Plan area and Secondary market were its own city, it would be larger than Carlsbad, El Cajon or Vista. In this respect, the total market area represents a significant population base with Chollas Triangle at the center of a sizable community in its own right.

Income

Data for income distribution by household is presented in table II-2. The median household income within the Plan area is significantly lower than the median household income for both San Diego City and the County as a whole. Plan area households show median income of just under $38,000 compared to approximately $60,000 in the City and County. Median household incomes within the Plan area are the lowest of any of the areas of geography analyzed as part of this report. Consistent with this, nearly 23% of total households within the plan area report incomes less than $20,000 per year.

There is a significant concentration of very low income population within the Plan area occurring at nearly double the rate of the County as a whole. In the most recent recession, lower income communities have been hit especially hard. As a result, economic development efforts geared towards local employment and new business formation in the community will be especially helpful.

Table II-1
Population and Household 2010
Chollas Plan Area

	Plan Area	Secondary Market Area	Tertiary Market	San Diego City	San Diego County	Index Plan Area Compared To County
Summary						
Total Population	36,201	84,859	44,374	1,324,681	3,120,279	1.2%
Total Households	11,483	25,416	18,487	484,263	1,088,562	1.1%
Average Household Size	3.14	2.95	2.23	2.62	2.77	113.4%
Family Households	7,722	17,502	8,642	289,303	724,981	1.1%
Population by Age						
Population 0-4	3,682	9,221	3,639	90,397	221,845	
Population 5-9	3,170	7,672	2,840	83,991	209,316	
Population 10-14	2,460	5,961	2,751	76,221	195,078	
Population 15-19	2,730	7,600	3,106	96,161	224,861	
Population 20-24	3,646	9,313	4,038	120,285	258,856	
Population 25-29	3,620	8,807	4,127	115,837	246,575	
Population 30-34	3,126	6,543	3,106	103,687	221,556	
Population 35-39	2,387	5,512	3,151	95,284	211,759	
Population 40-44	2,047	5,081	3,017	91,624	211,269	
Population 45-49	1,939	4,763	3,195	93,682	224,698	
Population 50-54	1,805	3,972	2,724	86,367	211,893	
Population 55-59	1,396	3,204	2,219	71,632	179,361	
Population 60-64	1,125	2,428	1,785	58,056	145,725	
Population 65-69	848	1,538	1,172	40,055	101,888	
Population 70-74	654	1,092	879	30,657	77,126	
Population 75-79	570	787	841	26,150	66,045	
Population 80-84	488	656	760	21,857	54,821	
Population 85+	508	709	1,024	22,738	57,607	
Median Age	28.3	29.70	31.5	33.8	34.6	81.8%
Percentage						
Population 0-4	10.2%	10.9%	8.2%	6.8%	7.1%	143.1%
Population 5-9	8.8%	9.0%	6.4%	6.3%	6.7%	130.5%
Population 10-14	6.8%	7.0%	6.2%	5.8%	6.3%	108.7%
Population 15-19	7.5%	9.0%	7.0%	7.3%	7.2%	104.6%
Population 20-24	10.1%	11.0%	9.1%	9.1%	8.3%	121.4%
Population 25-29	10.0%	10.4%	9.3%	8.7%	7.9%	126.5%
Population 30-34	8.6%	7.7%	7.0%	7.8%	7.1%	121.6%
Population 35-39	6.6%	6.5%	7.1%	7.2%	6.8%	97.2%
Population 40-44	5.7%	6.0%	6.8%	6.9%	6.8%	83.5%
Population 45-49	5.4%	5.6%	7.2%	7.1%	7.2%	74.4%
Population 50-54	5.0%	4.7%	6.1%	6.5%	6.8%	73.4%
Population 55-59	3.9%	3.8%	5.0%	5.4%	5.7%	67.1%
Population 60-64	3.1%	2.9%	4.0%	4.4%	4.7%	66.5%
Population 65-69	2.3%	1.8%	2.6%	3.0%	3.3%	71.7%
Population 70-74	1.8%	1.3%	2.0%	2.3%	2.5%	73.1%
Population 75-79	1.6%	0.9%	1.9%	2.0%	2.1%	74.4%
Population 80-84	1.3%	0.8%	1.7%	1.6%	1.8%	76.7%
Population 85+	1.4%	0.8%	2.3%	1.7%	1.8%	76.0%

Source: ESRI, US Census and MR+E

Table II-2
Income 2010
Chollas Plan Area

	Plan Area	Secondary Market Area	Tertiary Market	San Diego City	San Diego County	Index Plan Area Compared To County
Summary						
Total Population	36,201	84,859	44,374	1,324,681	3,120,279	1.2%
Total Households	11,483	25,416	18,487	484,263	1,088,562	1.1%
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Family Households	7,722	17,502	8,642	289,303	724,981	1.1%
Household Income						
HHs w/Inc <$1,0000	1,141	3,092	18,487	29,869	55,973	2.04%
HHs w/Inc $10,000-14,999	748	2,133	1,532	18,234	36,462	2.05%
HHs w/Inc $1,5000-19,999	1,016	2,652	1,301	23,000	47,984	2.12%
HHs w/Inc $20,000-24,999	779	1,901	1,274	18,555	39,730	1.96%
HHs w/Inc $25,000-29,999	796	1,775	880	22,166	48,958	1.63%
HHs w/Inc $30,000-34,999	758	1,436	868	18,383	41,579	1.82%
HHs w/Inc $35,000-39,999	814	1,684	1,052	24,620	56,130	1.45%
HHs w/Inc $40,000-44,999	610	1,396	869	25,322	58,084	1.05%
HHs w/Inc $45,000-49,999	586	1,261	885	20,465	47,110	1.24%
HHs w/Inc $50,000-59,999	1,121	2,470	592	45,270	104,343	1.07%
HHs w/Inc $60,000-74,999	1,320	2,340	1,797	56,805	134,094	0.98%
HHs w/Inc $75,000-99,999	898	1,795	1,619	70,528	164,004	0.55%
HHs w/Inc $100,000-12,4999	427	672	2,364	37,860	89,534	0.48%
w/Inc $125,000-149,999	196	324	1,252	28,648	65,374	0.30%
HHs w/Inc $150,000-199,999	115	219	771	22,397	50,627	0.23%
HHs w/Inc $200,000-249,999	102	165	629	10,682	24,098	0.42%
HHs w/Inc $250,000-499,999	49	84	401	9,335	20,021	0.24%
HHs w/Inc $500,000+	7	17	401	2,123	4,444	0.16%
Median HH Income	37,929	40,584	49,913	59,025	60,699	62.49%
Average HH Income	48,259.0	48,927	65,103	77,395	78,340	61.60%
Aggregate HH Income	554,162,638	1,114,137,322	1,203,559,161	37,479,488,346	85,277,390,088	0.65%
Median Value Owner Occupied DU	211,374	232,366	545,185	353,681	342,408	61.73%
Percentage						
HHs w/Inc <$1,0000	9.9%	12.2%	100.0%	6.2%	5.1%	193.2%
HHs w/Inc $10,000-14,999	6.5%	8.4%	8.3%	3.8%	3.3%	194.5%
HHs w/Inc $1,5000-19,999	8.8%	10.4%	7.0%	4.7%	4.4%	200.7%
HHs w/Inc $20,000-24,999	6.8%	7.5%	6.9%	3.8%	3.6%	185.9%
HHs w/Inc $25,000-29,999	6.9%	7.0%	4.8%	4.6%	4.5%	154.1%
HHs w/Inc $30,000-34,999	6.6%	5.6%	4.7%	3.8%	3.8%	172.8%
HHs w/Inc $35,000-39,999	7.1%	6.6%	5.7%	5.1%	5.2%	137.5%
HHs w/Inc $40,000-44,999	5.3%	5.5%	4.7%	5.2%	5.3%	99.6%
HHs w/Inc $45,000-49,999	5.1%	5.0%	4.8%	4.2%	4.3%	117.9%
HHs w/Inc $50,000-59,999	9.8%	9.7%	3.2%	9.3%	9.6%	101.8%
HHs w/Inc $60,000-74,999	11.5%	9.2%	9.7%	11.7%	12.3%	93.3%
HHs w/Inc $75,000-99,999	7.8%	7.1%	8.8%	14.6%	15.1%	51.9%
HHs w/Inc $100,000-12,4999	3.7%	2.6%	12.8%	7.8%	8.2%	45.2%
w/Inc $125,000-149,999	1.7%	1.3%	6.8%	5.9%	6.0%	28.4%
HHs w/Inc $150,000-199,999	1.0%	0.9%	4.2%	4.6%	4.7%	21.5%
HHs w/Inc $200,000-249,999	0.9%	0.6%	3.4%	2.2%	2.2%	40.1%
HHs w/Inc $250,000-499,999	0.4%	0.3%	2.2%	1.9%	1.8%	23.2%
HHs w/Inc $500,000+	0.1%	0.1%	2.2%	0.4%	0.4%	14.9%

Source: ESRI, US Census and MR+E

Housing

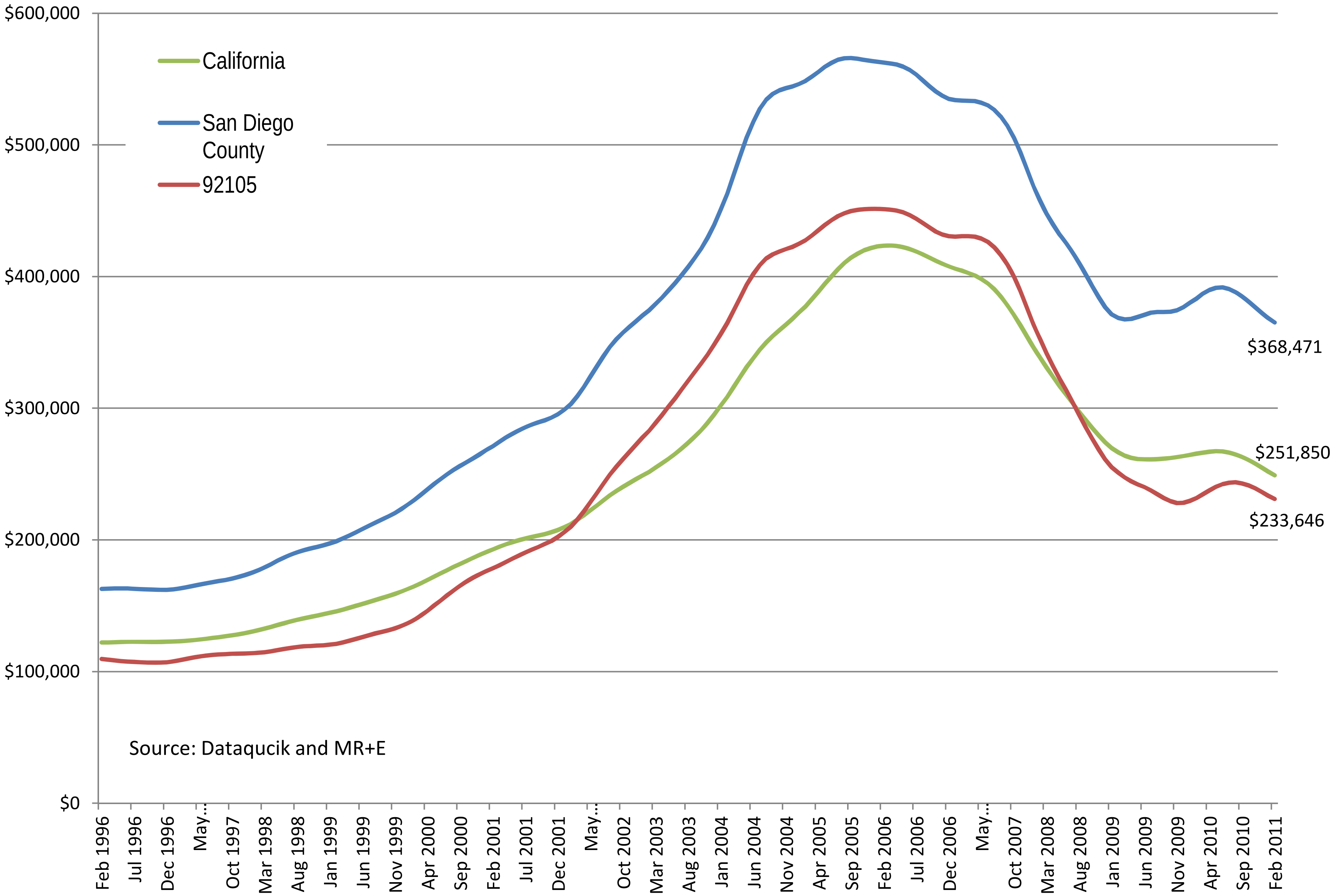
There are 11,483 households in the Plan area representing a little over 1% of the County total. 38% of dwelling units in the Plan area are owner occupied compared to 51% for the County as a whole. Generally speaking rates of homeownership are lowest along the main commercial thoroughfares of El Cajon and University Avenues, with higher rates of homeownership occurring along the north and south margins. The median year of construction for dwelling units within the Plan area was 1971 with only 4% of the total housing stock built since the year 2000. This represents a stable and mature housing market that is largely built out with only limited infill and redevelopment opportunities for new housing construction.

The median value owner occupying dwelling units in 2010 within the Plan area was just over $211,000. This was significantly lower than the County average of about $342,000 or the City average of approximately $353,000. Because of this the Plan area represents a reserve of attainably priced housing within the broader San Diego region. The relative affordability of the region is illustrated on figure II-2. This charts the median sales price for single-family homes in San Diego County California in zip code 92105 which covers the Plan area and portions of the Secondary market area. This data covers from the beginning of 1996 to the present. Over this time, sales prices in the Mid-City area have co-varied with San Diego County as a whole. Prices began to accelerate faster than the State average beginning in late 2001. This was sustained until the beginnings of the financial crisis in 2008 when median sales prices declined faster in the region than for California as a whole. As of 2011, median sales price for a house in zip code 92105 was just over $233,000. This compares to a statewide median of just under $252,000 and a County median of approximately $368,000.

The plan area represents a stock of attainably priced housing and as such plays an important role in the overall housing economy of San Diego. These home values are consistent with the demographic and income profile of the community, which indicates that housing in the plan area is likely occupied by first-time homeowners.

Figure II-2

Medain Sales Price, Single Famly Homes



Source: Dataqucik and MR+E

Consumer Expenditures

Despite the relatively low median household income, the population within the plan area is responsible for a significant amount of consumer spending. Capturing this potential market, along with the spending located in the Secondary and Tertiary markets, will play an important role in developing a land use program for the Chollas Triangle and determining a comprehensive economic development strategy. At present, Plan area households spend over $191 million per year on consumer goods and services including $24 million for general merchandise, $27 million for food outside the home and $14 million for apparel. Estimates of household expenditures by category are shown on table II-3.

Summary and Implications

The communities that surround the Chollas Triangle make up a significant base of spending and economic activity. In many respects the Mid-city portion of the City of San Diego can be thought of as a medium-size city that is primarily residential in character with commercial activity located along transportation corridors. The Chollas Triangle site represents an opportunity to provide a town center or focus for this community which despite its relative modest means when compared to the County as a whole still represents a significant consumer base that has economic needs that can be met within the community. These needs include opportunities for capturing a greater percentage of the community's retail expenditures, increasing employment density to capture a larger proportion of the local labor force and attainability priced housing opportunities in particular newer construction. All of which can be physically accommodated on the Chollas Triangle site.

Table II-2
Household Expenditures
Chollas Plan Area

	Plan Area	Secondary Market Area	Tertiary Market	San Diego City	San Diego County	Index Plan Area Compared To County
Summary						
Total Population	36,201	84,859	44,374	1,324,681	3,120,279	1.2%
Total Households	11,483	25,416	18,478	484,263	1,088,562	1.1%
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Family Households	7,722	17,502	8,642	289,303	724,981	1.1%
Expenditures by Category						
Apparel Stores	$ 14,234,581	$ 29,365,928	$ 28,554,233	$ 942,664,346	$ 2,110,701,794	0.67%
Auto Dealers & Auto Suppliers	35,512,211	71,112,763	69,747,090	2,324,080,651	5,297,333,216	0.67%
Building Materials & Farm Implements	2,441,276	4,617,371	4,455,918	179,527,916	428,906,794	0.57%
Drug Stores	3,952,370	7,553,531	7,744,776	268,265,116	636,361,230	0.62%
Eating & Drinking Places	27,039,178	55,515,623	53,717,954	1,768,153,182	3,979,597,674	0.68%
Food Stores	37,795,335	78,506,018	73,383,625	2,422,635,499	5,468,962,495	0.69%
General Merchandise	24,600,984	48,943,499	49,683,619	1,631,303,282	3,694,575,815	0.67%
Home Furnishings & Appliances	6,949,682	13,751,142	13,772,654	486,492,428	1,113,994,245	0.62%
Packaged Liquor Stores	8,629,327	17,571,737	17,574,878	563,782,342	1,258,175,264	0.69%
Service Station	30,495,792	61,261,755	60,085,466	1,958,157,986	4,472,809,130	0.68%
Total	191,650,736	388,199,367	378,720,213	12,545,062,748	28,461,417,657	0.67%
Expenditures Per Household						
Apparel Stores	1,240	1,155	1,545	1,947	1,939	63.9%
Auto Dealers & Auto Suppliers	3,093	2,798	3,775	4,799	4,866	63.6%
Building Materials & Farm Implements	213	182	241	371	394	54.0%
Drug Stores	344	297	419	554	585	58.9%
Eating & Drinking Places	2,355	2,184	2,907	3,651	3,656	64.4%
Food Stores	3,291	3,089	3,971	5,003	5,024	65.5%
General Merchandise	2,142	1,926	2,689	3,369	3,394	63.1%
Home Furnishings & Appliances	605	541	745	1,005	1,023	59.1%
Packaged Liquor Stores	751	691	951	1,164	1,156	65.0%
Service Station	2,656	2,410	3,252	4,044	4,109	64.6%
Total	16,690	15,274	20,496	25,905	26,146	63.8%

Source: ESRI, US Census and MR+E

Section III the San Diego Market

Introduction

This section will provide an overview analysis of the commercial real estate market in San Diego with the goal of contextualizing demand for future development at the Chollas Triangle site. This will include an overview of the broader economic conditions in the County as well as a description of the real estate market in the County by specific sector. Including:

- Office
- Retail
- Multifamily housing
- Industrial

The San Diego Economy

Like the rest of the State of California, San Diego has suffered significant contractions across a broad variety of economic sectors in the wake of the 2008 credit crisis. Presently the County reports an unemployment rate of over 10%, which represents an historic high that has not been experienced since the end of the Cold War and reduction of Naval expenditures in the early 1990s. Despite this set of reversals there are positive trends in San Diego, the unemployment rate is approximately 2% lower than the statewide rate and the local economy is sufficiently diversified to allow for long-term resilience positioning itself for growth over the long run as the national economy and financial markets began to stabilize and improve. That being said unemployment rates are likely to remain high for the intermediate future at least through 2012. High unemployment rates exacerbate feelings of uncertainty and economic insecurity which inhibits investment in long-term asset classes such as real estate. At the same time median housing values are declining countywide which further limits consumer confidence and provides a lower rate of return for investment in real estate.

Consumer expenditures remain the most important single sector driving growth in the San Diego economy however demand for business investment in equipment and technology products from the US to the rest of the world represent an opportunity for long-term growth in the region. Federal expenditures, and particularly via the Department of Defense, have long played an important role in San Diego's economy however this is likely to be curtailed in the intermediate future as the United States begins to draw down from the wars in Iraq and Afghanistan.

Federal government stimulus spending that was designed to combat the recession peaked in 2010 and will continue to decline unless Congress initiates a new round of spending. This is placed extreme pressure on state and local government spending which is led to further cycles of disinvestment in the region.

As the California economy begins to recover several industries that San Diego is particularly well positioned for will move to the forefront of demand for new investments. These include:

- International tourism
- Technology and biotechnology
- Higher education

Sectors that are anticipated to continue to contract in the intermediate future include:

- Residential construction
- Defense / aerospace
- Consumer services

As the employment balance begins to change in San Diego the demand for commercial real estate and the housing needs of the regional labor force will need to adjust to accommodate a changed economic environment.

Office

At present San Diego's market wide vacancy rate stands at 17.4%. The central business district in downtown San Diego, which is historically performed better than the market as a whole, currently has a vacancy rate of 18.5%. On a regional perspective the tightest markets are currently in La Jolla which reports a 7.9% vacancy rate ranging to a high of 41.4% in Scripps Ranch. While these vacancy rates are historically quite high the picture has been improving in the County due to moderate but steady recovery of employment. In 2010-2011 the region added 6300 jobs in the professional and business services sector which is a key contributor to office occupancy. This resulted in positive absorption of over 340,000 sq. ft. which has been the strongest positive absorption that has occurred since 2008.

Tenants leading this expansion include:

- UCSD extension
- Autoanything
- Nokia
- QUALCOMM

Asking rents range from an average of $2.53 per square foot for class A space to $1.98 per square foot on average for class B space on the countywide basis. Within the downtown area class a rents on average are currently set at

$2.42 with an average asking rents of $2.07 for class B space. Each of these average spreads is below replacement cost indicating that for the foreseeable future any new construction that would take place would need to be owner occupied built to suit office development tied to the needs of a particular tenant. At present the lowest asking rent for class A space in the County is in Oceanside at $1.80 and the highest asking rent for class A space is $3.75 in the Torrey Pines district. In terms of class B space, prices range from the high of $2.56 in the North Beach cities area to a low of $1.48 in Oceanside.

Asking rents have seen a slow but noticeable decline since 2008 and the forecast is for this to continuing to the intermediate future as long as the unemployment rate remains high in the County. Class A properties will be in the greatest demand as the market begins to recover which will eventually spread to secondary markets and class B&C assets. New speculative construction is unlikely. Any new office development will require significant tenant commitments in order to be built. This leads to a circumstance where new development will not be a factor in shaping market fundamentals for the foreseeable future.

Over the long run it is expected that Mission Valley, UTC downtown and Delmar will be among the first markets to show signs of improvement due to the quality of their available office stock. At present there are a wide variety of tenant incentives coupled with the established demographics of the County that continue to make these submarkets particularly competitive. Areas dominated by class B and C office space are likely to see much lower rates of recovery that will be experienced in the premier submarkets of the County.

Retail

With consumer confidence at near historic lows and high unemployment across most sectors, San Diego has experienced a contraction in asking rent and an increase in net negative absorption. From the beginning of the economic crisis in 2008 to 2010 San Diego experienced a total of 1.2 million sq. ft. of net negative absorption. Unemployment, which is a key factor in depressing consumer confidence, must improve significantly in the local area for retail values to return to historically experienced levels. Sectors that are anticipated to drive absorption in the intermediate future include big-box and many box category killers along with grocery stores and staple item retailers. Trailing segments will include high-end and specialty retailers, especially those dependent on tourism. This is a reflection of the ongoing contraction in household incomes and a reduction in the aggregate wealth of households both nationally and within the region.

Retailers with plans to expand in the San Diego market include:

- Costco
- Fresh and easy
- Big lots
- Ross dress for less
- Walgreens

Due to a lack of available financing for speculative projects only prerelease developments are likely to occur in the foreseeable future. Because retail development typically follows new housing construction with a one year time lag the region is unlikely to experience significant demand for net new retail growth until the housing market recovers.

Direct retail vacancies in San Diego are estimated at 8.2% through midyear 2011 which represents nearly 2% increase in total retail vacancies compared to the year before. The majority of this negative absorption has been experienced at community retail centers which shed over 76,000 sq. ft. of in the second quarter of 2011.

Interestingly, areas that had been fast-growing in the earlier part of the decade are now leading in terms of negative absorption and increasing vacancy rates. For example in 2011 San Marcos has had a net negative absorption of over 63,600 sq. ft. Temecula has experienced the loss of over 52,400 sq. ft. In terms of overall market vacancy rates the softest markets for retail space are presently being experienced in Miramar with a vacancy rate of 38.1% followed by Murrietta with a 21% vacancy rate and Temecula with a vacancy rate of 17%.

In terms of the average asking rates in the market are presently at $1.73 per square foot, which represents a decline of 23% lower than the previous quarter and 28% lower than the rental rates in 2010. The submarkets with the highest rates were Delmar / Solana Beach / Rancho Santa Fe area at $3.89 followed by La Jolla at $3.00. Ramona and Lemon Grove reported the lowest level rates at $1.19 and $1.25 each.

In terms of submarkets only six of the 33 markets tracked achieved positive net absorption in the second quarter of 2011. These included Oceanside, Claremont, and San Marcos. Markets with the largest negative growth were Temecula, Miramar and Carmel Mountain Ranch.

In positive news within the retail sector, 2011 has seen new construction activity return for the first time in over a year. Two significant projects are currently underway. The first is the Mercado Del Barrio a 100,000 sq. ft. center in the downtown Hillcrest Old town submarket and the other is the City Heights Center. 20,000 sq. ft. center in the mid-city district.

Multifamily Housing

Historically San Diego has been one of the nation's leading rental markets. The presence of a transient population made up of members of the military, contractors and students at area universities created a strong base of demand for multifamily housing. In addition San Diego is also a significant market for vacation rentals which also supports the multi-unit housing market.

However like all sectors of the real estate economy multifamily housing development has slowed in San Diego due to tight capital markets and an aversion to finance speculative development without preleasing commitments, which is typical of multifamily housing. As a result there have not been any significant deliveries of multifamily projects in the County in the past year.

At the same time vacancy rates are currently at 4.9% countywide which makes San Diego one of the most robust rental markets in the country. As result the market for existing multifamily housing has stabilized with the market experiencing cap rate compression in class A and class B assets. Currently average Rates for apartments in San Diego arranging from 5.9% to 5.6% for class A properties this is a reduction from cap rates over 6.5% that were achieved in 2010 and 2009.

Demand for multifamily housing in San Diego is ultimately tied to new household formation. The components of this growth include: natural growth of the existing population, domestic in-migration and international immigration. Household formation stemming from natural growth has slowed in recent years as young people delay household formation due to economic stress and high rates of unemployment. Domestic and international immigration are driven largely by climate opportunities and as a result this segment of demand has slowed well below traditional levels. In the long run the market for multifamily housing in San Diego can be dissipated to improve as the economy recovers and unemployment rates begin to decline. At the same time the traumatic effects of the 2008 credit crisis and the effects of unsustainable run ups in owner occupied housing is likely to produce a transformed mortgage market in the future. This should produce new structural conditions that are supportive of both rental properties and multifamily projects in the market. The demand for multiunit housing is likely to emerge earlier than the other asset classes as the economy of San Diego stabilizes and returns to historically realized rates of growth.

Industrial

The Chollas Triangle site is not particularly conducive to large-scale industrial use due to the site location and its accessibility to major transportation structure. Additionally, industrial uses tend to be strongly agglomerative and unless adjacent supportive industrial development can be induced to the area, it is unlikely to be a major component of any land use plan. That being said the site has some advantages in that it is a large assembled parcel that is serviced by urban infrastructure and as a result may be of interest to a specific build to suit user.

In general, San Diego has experienced flat to declining asking rental rates for all classes of industrial space from 2007 to the present. Market wide vacancy rate is 9.8% which is essentially unchanged from 2009 levels. New absorption has occurred in the Miramar and Otay Mesa submarkets. This growth has been driven by defense aerospace and support services related to the Navy and Marine activities, and an increase in cross-border traffic which has been experienced through 2009/10 in the Otay Mesa market.

Summary and Implications

Like the rest of the nation the real estate market in San Diego has suffered tremendously since the onset of the 2008 credit crisis. Unemployment, declining residential values and declining household incomes have reduced consumer demand for a broad variety of goods and services. This has translated into negative absorption across all major land-use types in the market. That being said San Diego has several structural advantages that buffer the local economy from many of the worst effects of the national conditions. These include a diversified employment base, the presence of the military and associated defense aerospace contracting, and a well-developed technology and biotechnology sector. The long-term prognosis for the San Diego economy is positive. The underlying strengths of the region continue to support development and investment in the context of a soft national economy.

That being said the region is currently experiencing negative absorption and rental rates that are below replacement cost for most asset classes. In these circumstances only build to suit pre-lease projects that are narrowly focused to the demands of an end-user are likely to be built in this environment.   In the short term the San Diego market is unlikely to produce significant new development pressures for new construction until existing inventory is absorbed and high levels of unemployment begin to abate.

Section IV The Chollas Triangle Market

Introduction

This section will provide an overview of market conditions in the area of the broader Chollas Triangle plan area. As the previous section described the real estate market throughout San Diego is experiencing an extended contraction. In general almost all asset classes are leasing at market rates significantly below replacement cost, which implies the need for additional market demand and absorption before any new real estate development can be expected to occur. Over the short term (from the present to the next 12 to 18 months) economic conditions are unlikely to change in the material manner that will generate demand for significant new development projects either in the broader San Diego market or within the plan area.

However at the same time it is important to recognize that demand will eventually recover and that the Chollas Triangle's site offers opportunities within the logic of the distribution of urban land uses within San Diego that can effectively be the site of redevelopment and new investment. In order for this to occur, changes in the public realm, including improvements to parks and open space, pedestrian amenities, site improvements and improve transit assess ability, will need to be put in place in order to create conditions where the Chollas Triangle can capitalize on improved economic conditions over time.

This section will provide an overview of the existing market conditions in the area around the Chollas Triangle and will describe the circumstances under which new investment might be drawn into the plan area. The sectors of the real estate economy examined include:

- Multifamily residential
- Retail
- Office

Development opportunities each segment will be considered in the analysis that follows.

Multifamily residential

Multifamily residential has the greatest potential for near and midterm development opportunities at the Chollas Triangle site. In general the multifamily market in San Diego is beginning to stabilize and the Mid-City district is anticipated to continue to be a location for absorbing new households as the city's economy continues to grow. Historically this area has been able to accommodate a wide variety of new households stemming from international migration and the proximity to educational institutions. Ranging from K-12 to San Diego State University this provides a foundation of durable demand.

At the same time the site has the opportunity to become amenitized by improvements to the creek and creation of public open space connected to the regional trail network, pedestrian linkages and improved transit service. These factors combined with the existing residential characteristics of the surrounding neighborhoods imply long-term and durable opportunities for multifamily residential development.

Table IV-1 shows apartment median rents and vacancy rates for all of San Diego County and the Mid-City market East of I-15. After experiencing significant declines from 2006 to 2009 both the Mid-City market and the County market are beginning to stabilize and return to median rents approaching prerecession levels. The Mid-City market currently has a 4.6 % vacancy rate compared to countywide average of 3.9%, rents in the Mid-City area average $1,055 compared to $1,183 for the County as a whole.

Table VI--2 shows the range of median asking rents in the County compared to the Mid-City market per square foot and per unit by unit type. Rents range from $716 for studio apartment in the Mid-City market to $1,500 for three-bedroom units. This compares to countywide average of $957 for studio apartment and $1,910 for three-bedroom units. On a per square foot basis prices range $1.55 to $1.22 in the Mid-City market as compared to $2.07 to $1.53 for the County. At present these rates are below replacement cost for new construction. However, with oncoming demand and compression in cap rates that are being experienced market wide, upward pressure is likely to continue on both rental rates and price per square foot. This should result in developer interest in providing new inventory to the market, particularly as current vacancy rates sink to below 4%.

The age of the units and the relationship to rent is shown on table IV-3. In general there is little to no vacancy in the newer units and significantly less inventory as well with no new capacity added after 2009 in the market. Rent premiums are achieved on newer properties which should support development as existing capacity is absorbed.

Comparable data for multi-family residential sales is provided on table IV-4. This covers sales that occurred in 2010 and 2011 in the primary and secondary market areas.

Table IV-1

Apartment

Median Rents and Vacancy Rate

	E of I-15	SD Cty	E of I-15	SD Cty
2011	$1,055	$1,183	4.6%	3.9%
2010	$1,013	$1,159	5.5%	4.9%
2009	$972	$1,136	7.9%	6.2%
2008	$1,011	$1,216	6.8%	5.7%
2007	$1,052	$1,276	5.9%	4.9%
2006	$1,091	$1,340	5.9%	4.8%

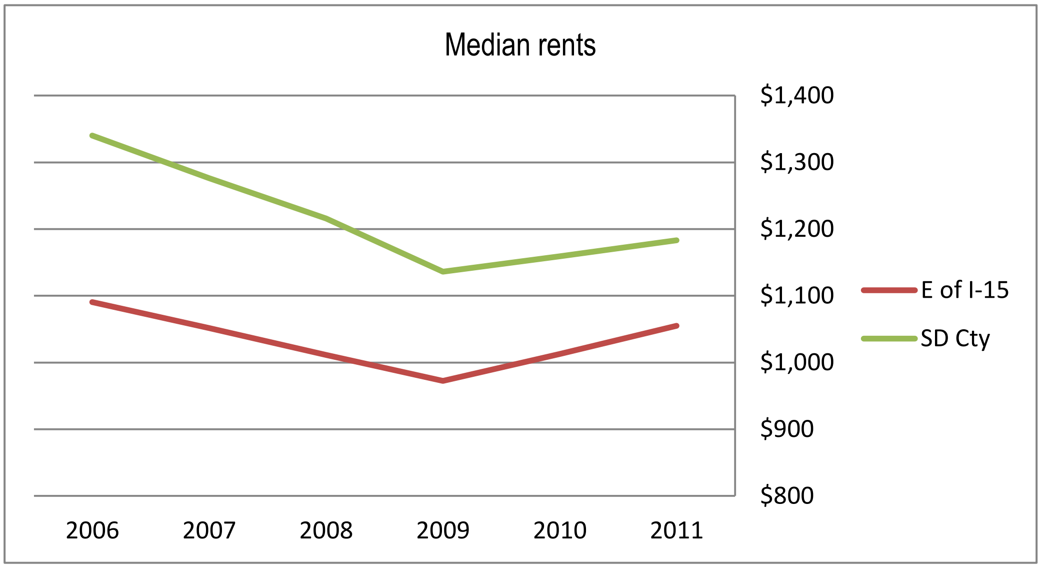

Table IV-2

Apartment
Asking rents

	Per Unit		Per Sq. Ft.		Ave Size (sq. ft)	
	E of I-15	SD County	E of I-15	SD County	E of I-15	SD County
Studio	$716	$957	$1.55	$2.07	461	475
1 BR	$876	$1,157	$1.32	$1.69	663	680
2 BR	$1,144	$1,453	$1.22	$1.50	937	955
3 BR	$1,500	$1,910	$1.22	$1.53	1,233	1,330

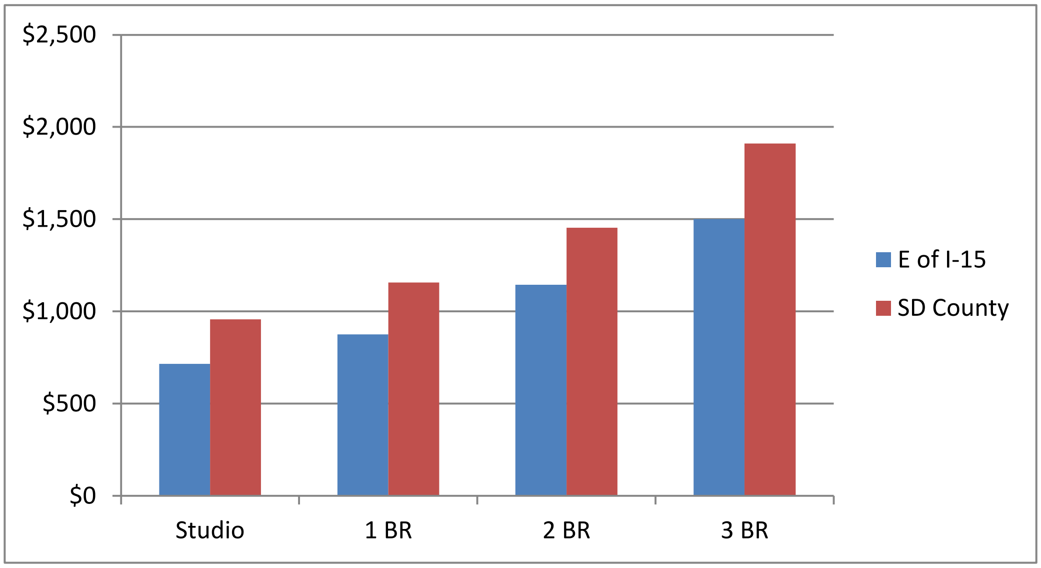

Table IV-3

Apartment Rents and Vacancy

San Diego, East of I-15

Year Built	Rent	Vacancy
Before 1970	$1,041	6.10%
1970-1979	$870	2.30%
1980-1989	$1,105	2.90%
1990-1999	$979	0.0%
2000-2009	$1,469	0.0%
After 2009	n/a	n/a
Total	$1,055	4.50%

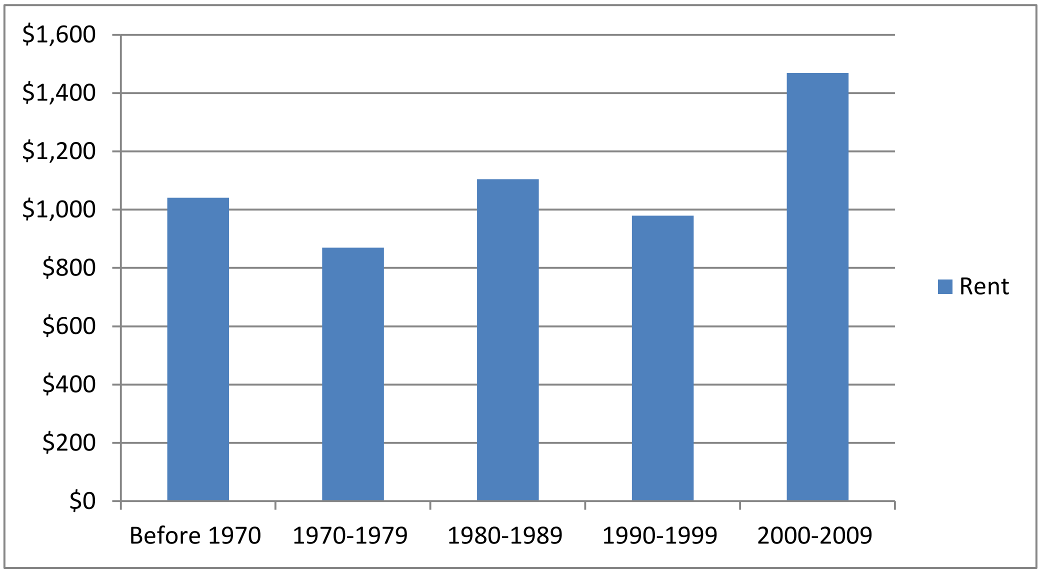

Table IV-4

Comparable Multi Family Residential Sales

5372-78 Wightman St - San Diego, CA
Property Type: Multifamily
Garden/Low-Rise
No. Units: 4
Building Size: 2,968 SF
Sale Date: 1/5/2009
Sale Price: $402,000.00
Price/Unit: $100,500.00

5366 Lea St - San Diego, CA
Duplex/Triplex/Fourplex
No. Units: 2
Building Size: 1,184 SF
Sale Date: 10/30/2009
Sale Price: $108,000.00
Price/Unit: $54,000.00

3911 58Th St - San Diego, CA
Duplex/Triplex/Fourplex
No. Units: 2
Building Size: 2,121 SF
Sale Date: 2/5/2010
Sale Price: $258,000.00
Price/Unit: $129,000.00

5704 E University Ave - San Diego, CA
Garden/Low-Rise
No. Units: 56
Building Size: 43,063 SF
Year Built: 1965
Sale Date: 12/21/2009
Sale Price: $950,000.00
Price/Unit: $16,964.29

University Terrace - 5722 University Ave, San Diego, CA
Garden/Low-Rise
No. Units: 56
Building Size: 40,700 SF
Year Built: 1965
Sale Date: 12/31/2009
Sale Price: $4,500,000.00
Price/Unit: $80,357.14

5977 Streamview Dr - San Diego, CA
Garden/Low-Rise
No. Units: 4
Building Size: 3,818 SF
Sale Date: 12/18/2008
Sale Price: $396,000.00
Price/Unit: $99,000.00

4140, 4150 & 4155 Bonillo Dr - 4140 Bonillo Dr, San Diego, CA
Garden/Low-Rise
No. Units: 122
Building Size: 76,400 SF
Year Built: 1959
Sale Date: 5/15/2009
Sale Price: $11,577,000.00
Price/Unit: $94,893.44

3565-3567 College Ave - San Diego, CA
Garden/Low-Rise
No. Units: 4
Building Size: 2,760 SF
Sale Date: 3/17/2009
Sale Price: $473,500.00
Price/Unit: $118,375.00

3508 College Ave - San Diego, CA
Garden/Low-Rise
No. Units: 10
Building Size: 6,956 SF
Year Built: 1956
Sale Date: 12/3/2009
Sale Price: $850,000.00
Price/Unit: $85,000.00

6115 Carling Way - San Diego, CA
Duplex/Triplex/Fourplex
No. Units: 2
Building Size: 3,295 SF
Sale Date: 7/21/2010
Sale Price: $385,000.00
Price/Unit: $192,500.00

4435-4439 College Ave - San Diego, CA
Garden/Low-Rise
No. Units: 4
Building Size: 2,704 SF
Sale Date: 7/8/2009
Sale Price: $530,000.00
Price/Unit: $132,500.00

6036 Estelle Street, #1/2/3/4 - 6036 Estelle St, San Diego, CA
Duplex/Triplex/Fourplex
No. Units: 4
Building Size: 3,057 SF
Year Built: 1942
Sale Date: 6/10/2009
Sale Price: $710,000.00
Price/Unit: $177,500.00

6175-6177 Acorn St - San Diego, CA
Garden/Low-Rise
No. Units: 2
Building Size: 1,547 SF
Sale Date: 2/8/2010
Sale Price: $320,000.00
Price/Unit: $160,000.00

6280 Acorn St - San Diego, CA
Garden/Low-Rise
No. Units: 32
Building Size: 20,568 SF
Year Built: 1959
Sale Date: 4/23/2010
Sale Price: $2,250,000.00
Price/Unit: $70,312.50

4539-4541 54Th St - San Diego, CA
Duplex/Triplex/Fourplex
No. Units: 2
Building Size: 1,624 SF
Sale Date: 10/2/2009
Sale Price: $340,000.00
Price/Unit: $170,000.00

4784-4786 College Ave - San Diego, CA
Duplex/Triplex/Fourplex
No. Units: 2
Building Size: 1,848 SF
Sale Date: 6/16/2010
Sale Price: $305,000.00
Price/Unit: $152,500.00

4474-4478 52Nd St - San Diego, CA
Garden/Low-Rise
No. Units: 3
Building Size: 1,872 SF
Sale Date: 7/14/2010
Sale Price: $332,000.00
Price/Unit: $110,666.67

4435-4437 52Nd St - 4435 52Nd St, San Diego, CA
Garden/Low-Rise
No. Units: 7
Building Size: 5,259 SF
Year Built: 2000
Sale Date: 7/19/2010
Sale Price: $830,000.00
Price/Unit: $118,571.43

4366 51St St - San Diego, CA
Garden/Low-Rise
No. Units: 9
Building Size: 4,425 SF
Sale Date: 7/12/2010
Sale Price: $710,000.00
Price/Unit: $78,888.89

4274-4282 51St St - San Diego, CA
Garden/Low-Rise
No. Units: 6
Building Size: 2,736 SF
Sale Date: 5/28/2010
Sale Price: $325,000.00
Price/Unit: $54,166.67

4846-4848 Art St - San Diego, CA
Garden/Low-Rise
No. Units: 2
Building Size: 2,262 SF
Sale Date: 3/30/2010
Sale Price: $400,000.00
Price/Unit: $200,000.00

5032-5036 Trojan Ave - San Diego, CA
Duplex/Triplex/Fourplex
No. Units: 2
Building Size: 1,020 SF
Sale Date: 5/29/2009
Sale Price: $170,000.00
Price/Unit: $85,000.00

4511 Altadena Ave - San Diego, CA
Garden/Low-Rise
No. Units: 2
Building Size: 1,043 SF
Sale Date: 7/22/2010
Sale Price: $370,000.00
Price/Unit: $185,000.00

4593 Altadena Ave - San Diego, CA
Garden/Low-Rise
No. Units: 3
Building Size: 2,065 SF
Sale Date: 12/28/2009
Sale Price: $400,000.00
Price/Unit: $133,333.33

Sales price range from a high of $200,000 per unit on a two unit garden low rise project to a low of $16,900 per 56 unit complex, built in 1965 located on University Avenue. This continues to remain below replacement cost for new development.

In general, demand will focus on rental units in the initial years. The first phase residential project that should be developed on the site would be approximately a 250 unit rental development. Ideally the project should be able to support market rents given improvements to the site area and the creation of the park along the Creek. The first project should ideally include at least 80% market rate rental units. Later phases may allow for owner occupied sale units on-site however the market support is not sufficient at this time. Based on review of existing sales prices for condo projects in the surrounding area, a target sales price between $200,000 and $250,000 per dwelling unit is likely to be an achievable price point in the market area. However it is important to note that this valuation can change considerably depending on future market conditions that cannot be reliably identified at this time.

In terms of the mix of units the demographics of the community suggest relatively strong demand for two bedroom units with the following recommended mix of unit types in the first phase focused on rental units:

• Studio	30%
• One bedroom	20%
• Two-bedroom	40%
• Live work / Other specialized	10%

If the program is oriented more towards condominium sales, which are not likely to be supported in the initial years, the unit mix will require larger units. In particular the condominium / townhouse community at Parc 54 offers a good model of the type of units that would be in demand in a for sale market. Under these conditions the unit mix would be more oriented towards two and three bedroom units. As a planning factor the average unit size would be approximately 1,200 sq. ft. net living area with individual units ranging from 900 sq. ft. one bedroom units to 1,400 sq. ft. three bedroom units.

Note that these specific market conditions at the time of development are likely to lead to modification of these distributions. However, the current characteristics of the community market demand suggest that the successful development within the project area should be focused on accommodating family households in larger units.

Future phases and owner-occupied residential development can be anticipated to have a different distribution of unit types reflecting market demand when the development occurs on site. However, generally speaking, owner-occupied two and three bedroom units are more in demand than smaller products.

Retail

The Chollas Triangle site is already a significant retail location in Mid-City. University Avenue serves as one of the major commercial corridors through Central San Diego. The University Sq., Plaza to the East of the Chollas Triangle site along with the Kmart that is presently located there serves to reinforce the retail nature of this portion of the corridor. As the demographic analysis in the previous sections discussed, while the immediate market area is characterized by low and moderate income households there is sufficient density to support retail activity in the area of along University Avenue and El Cajon Blvd.

Unemployment and declining personal incomes have significantly impacted the retail market in San Diego as it has throughout the United States. In particular, lower to moderate income households have seen greater pressure on their discretionary spending in recent years. This is led to a weakening of demand for retail spaces. In addition the market challenges are further compounded by the loss of several major national retail chains to bankruptcy since the beginning of the recession. Over time retail demand will equilibrate as households began to stabilize their internal balance sheets and the economy begins to grow again. At the same time the nature of the markets in or around the Chollas Triangle site suggests that community oriented retail, focused on providing goods and services that meet the daily needs of nearby residents, is most likely to be successful on the site.

In general, the Mid-City market East of I-15 has lagged in terms of development and rental rates the countywide averages. Table VI-5 shows trends in median rents and vacancy rates for the Mid-City East market compared to the County as a whole. At present the Mid-City East market is experiencing a vacancy rate above 10.4% compared to the County's rate of just over 8.6%. Median rents are below the countywide average at $22.50 per square foot. Rents have stabilized somewhat since the decline that was experienced post 2007, and is now experiencing rental rates above pre-recessionary levels. This performance has been achieved at the expense of occupancy which continues to be at a high enough level that existing inventory will need to be absorbed prior to any new significant retail development in the Mid-City East market.

Demand for new retail space on this site is unlikely to materialize until vacancy rates market wide begin to return to pre-recessionary levels. The timing on this is dependent upon stabilization of the unemployment rate and growth in personal incomes within the market area. The first opportunities that are likely to emerge will be retail outlets that are able to access the diverse population of the community. One example of this is the current subdivision of the K-Mart by the Northgate González Market This is an example of niche retail opportunity that can come about when the specific needs of the local community are taken into consideration as part of an overall marketing plan. That being said, demand for net new retail development within the plan area is likely to emerge over the next 3 to 5 years.

Table IV-5

Retail

Median Rents and Vacancy Rate

	East	SD Cty	East	SD Cty
2011	$22.5	$26.4	10.4%	8.6%
2010	$20.7	$26.1	10.0%	8.4%
2009	$19.3	$24.6	9.8%	8.0%
2008	$19.6	$26.5	8.0%	6.1%
2007	$20.4	$28.1	5.9%	4.1%
2006	$21.2	$29.5	5.8%	3.8%

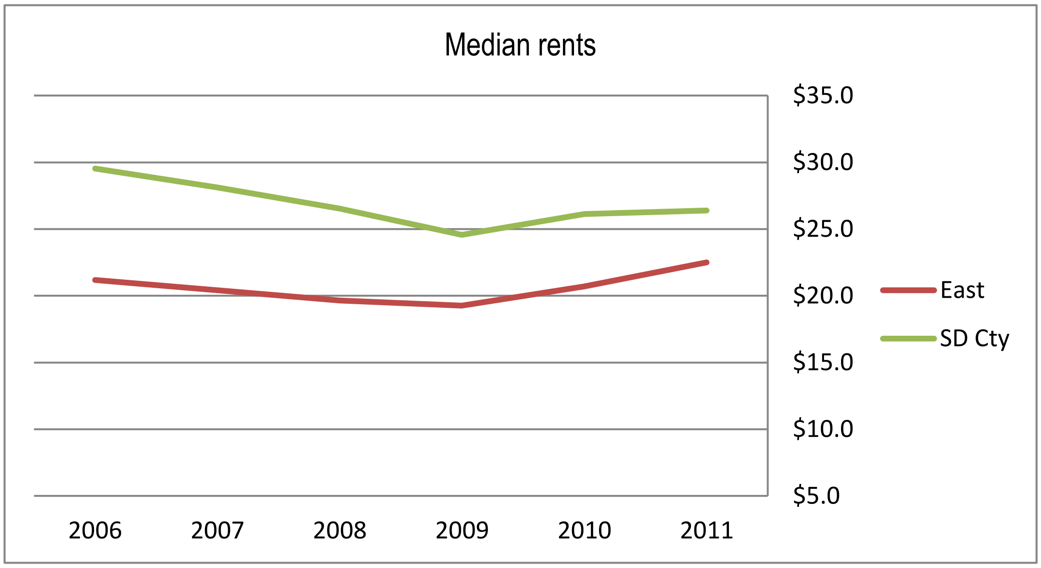

Table IV-6

Selected Retail Sales Comparables

El Cajon Blvd. 6548-Freestanding Restaurant/Retail - 6548-6550 El Cajon Blvd, San Diego, CA
Property Type: Retail
Restaurant
Building Size:
Sale Date: 11/12/2010
Sale Price: $225,000.00

7-Eleven - 6571 El Cajon Blvd, San Diego, CA
Property Type: Retail
Free Standing Bldg
Building Size: 3,130 SF
Year Built: 1981
Sale Date: 11/10/2010
Sale Price: $1,090,000.00
Price/SF $ 348.24

6375 El Cajon Blvd - San Diego, CA
Property Type: Retail
Neighborhood Center
Building Size: 9,042 SF
Sale Date: 5/3/2011
Sale Price: $1,730,000.00
Price/SF $ 191.33

4175 Bonillo Dr - San Diego, CA
Property Type: Retail
Retail (Other)
Building Size: 4,562 SF
Sale Date: 2/10/2011
Sale Price: $435,000.00
Price/SF $ 95.35

6035 University Ave - San Diego, CA
Property Type: Retail
Retail (Other)
Building Size: 11,786 SF
Sale Date: 5/3/2011
Sale Price: $1,000,000.00
Price/SF $ 84.85

3505 Fairmount Ave - San Diego, CA
Property Type: Retail
Retail (Other)
Building Size: 1,104 SF
Sale Date: 5/19/2011
Sale Price: $156,000.00
Price/SF $ 141.30

Rite Aid - 1735 Euclid Ave, San Diego, CA
Property Type: Retail
Free Standing Bldg
Building Size: 17,500 SF
Year Built: 1960
Sale Date: 6/28/2011
Sale Price: $1,284,500.00
Price/SF $ 73.40

Federal Blvd. Owner | User Bldg. - 5160 Federal Blvd., San Diego, CA
Property Type: Retail
Free Standing Bldg
Building Size: 21,652 SF
Year Built: 1955
Sale Date: 7/8/2011
Sale Price: $2,000,000.00
Price/SF $ 92.37

Selected Retail Center Comparables

University Square Plaza
5900 University
Neighborhood Center
Current Asking Rent (Non anchor) $35.00
Current Asking Rent (Anchor) $22.80
Current Vacancy Rate 2.2%
Distance from Subject (miles) .05
Property Size (SF) 205,000
Remodel 2008
Anchor/Major Tenants:
Food 4 Less,53,000 SF
Marshall's, 99 Cent Only, Wells Fargo, T Mobile, Panda Express, Carl's Jr., Game Stop, Starbucks, and Subway

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Campus Plaza
6155 El Cajon Blvd
Community Center
Current Asking Rent (Non anchor) $34.50
Current Asking Rent (Anchor) $24.08
Current Vacancy Rate 3.1%
Distance from Subject (miles) 1.24
Property Size (SF) 111,577
Year Built 1983
Anchor/Major Tenants Unknown Anchor 11,613 SF
Vons S 40,822 SF
Wells Fargo Bank 43,142 SF

City Heights Plaza
4149 University Ave
Neighborhood Center
Current Asking Rent (Non anchor) $28.77
Current Asking Rent (Anchor) N/A
Current Vacancy Rate 0.0%
Distance from Subject (miles) 1.52
Property Size (SF) 40,000
Year Built 1985
Anchor/Major Tenants Hoa Hing Market S

Burger King Plaza
4124 University Ave
Neighborhood Center
Current Asking Rent (Non anchor) $21.61
Current Asking Rent (Anchor) N/A
Current Vacancy Rate 0.0%
Distance from Subject (miles) 1.56
Property Size (SF) 13,100
Year Built 1986
Anchor/Major Tenants Burger King O 3,200 SF
Cafe Dore
Laundry Land
Pizzamania

Aragon Plaza
6506 El Cajon Blvd
Neighborhood Center
Current Asking Rent (Non anchor) $17.49
Current Asking Rent (Anchor) N/A
Current Vacancy Rate 0.0%
Distance from Subject (miles) 1.71
Property Size (SF) 27,000
Year Built 1975
Anchor/Major Tenants Coin Laundry
House of Treasure
Starlight Dance

Gateway Plaza
6929 Federal Blvd
Neighborhood Center
Current Asking Rent (Non anchor) $16.01
Current Asking Rent (Anchor) N/A
Current Vacancy Rate 0.0%
Distance from Subject (miles) 1.86
Property Size (SF) 15,169
Year Built 1970
Anchor/Major Tenants Att Wireless O 1,200 SF
Cleaners
Cold Stone Creamery
El Potosino
Frazee Paint

Lemon Grove Square
7117 Broadway
Neighborhood Center
Current Asking Rent (Nonanchor) $23.73
Current Asking Rent (Anchor) $11.64
Current Vacancy Rate 4.5%
Distance from Subject (miles) 2.07
Property Size (SF) 93,000
Year Built 1977
Anchor/Major Tenants Jackson Hewitt
Payless Shoe Source
Smart & Final S 14,500 SF
Water 4 U

College Plaza
7151 El Cajon Blvd
Neighborhood Center
Current Asking Rent (Nonanchor) $11.88
Current Asking Rent (Anchor) N/A
Current Vacancy Rate 0.0%
Distance from Subject (miles) 2.49
Property Size (SF) 19,000
Year Built 1979
Anchor/Major Tenants Quilted Rose
Rosies Cupboard 8,000 SF
Stamp Addict

Mission Square Shopping Center
6171 Mission Gorge Rd
Neighborhood Center
Current Asking Rent (Non anchor) $25.96
Current Asking Rent (Anchor) N/A
Current Vacancy Rate 9.2%
Distance from Subject (miles) 2.83
Property Size (SF) 24,000
Year Built 1978
Anchor/Major Tenants Chrispractos
Insurance Office
Smart Mart Wireless
Soup Plantation
Taekwardo Academy
Subway

Trolley Stop
6171 Imperial Ave
Neighborhood Center
Current Asking Rent (Non anchor) $14.90
Current Asking Rent (Anchor) $11.17
Current Vacancy Rate 0.0%
Distance from Subject (miles) 2.85
Property Size (SF) 16,250
Year Built 1975
Anchor/Major Tenants Food Bargain Market S 14,000 SF
Unknown 1,600 SF

La Mesa Springs
1984 La Mesa Blvd
Community Center
Current Asking Rent (Non anchor) $24.00
Current Asking Rent (Anchor) $13.56
Current Vacancy Rate 1.5%
Distance from Subject (miles) 2.90
Property Size (SF) 165,000
Year Built 1977
Anchor/Major Tenants Cable Video
Coast Savings
Cucamaya Bank
Gemco
Soup Exchange
Vons 46,000 SF

Office

Generally speaking, office development occurs in concentrations and at locations that are highly central to a region. The typical example is a downtown central business district but also at suburban notes where major transportation systems come together. For the most part office development opportunities along regional corridors and in suburban centers are typically constrained. This path dependency is apparent in the Mid-City and East portions of the San Diego market where in general the overall inventory of available office space is a smaller community serving or tied to a specific institution such as medical office or administrative offices for schools and universities, as well as smaller scale professional services such as attorneys, accountants, tax preparation, property management and the like.

Table IV-6 provides comparable data on office vacancy rates in the Mid-City East market compared to San Diego County as a whole. At present the market is experiencing of 11.6% vacancy rate with median rents of $19.50. This compares to a 9.7% vacancy rate in the County as a whole and with median rates of $24.20. Rents have stabilized in the Mid-City East market and are back to prerecession levels however this has come at the expense of occupancy which is consistently higher than the countywide average. In terms of the age of the office stock available in the market, older often owner occupied office space, built before 1970, has the lowest vacancy rate. These projects tend to be smaller scale and are located at positions of the greatest visibility and accessibility in the region. Buildings built in the 1990s also experience a relatively low vacancy rate, one that is below the countywide average. However, rents in 2011 were at $15.94 considerably lower than the countywide median. Due to the high rate owner occupancy and the prevalence of build to suit office space there have not been a significant number of transactions in recent years. However the capitalized values of these rental rates are not sufficient to stimulate new speculative investment at this time.

Demand for office space in the Chollas Triangle region will closely be tied to improvements in the regional unemployment situation and will be driven by community demands, absent the identification of a key build to suit tenant. That being said, a town center development along the lines of what is being conceived of for the Chollas Triangle is an especially attractive smaller scale office that can occupied upper floors of commercial retail buildings and other interstitial space within a town center development. Another important segment for office type space in the project area are live work residential units that can accommodate professional services and limited kinds of production as home occupations and as business locations tied to the occupation of the resident. Small-scale entrepreneurial activity is likely to continue to be an important feature of the economy of the Mid-City area and as a result demand this kind of hybrid office space is much more likely to materialize in the intermediate future as economic conditions improve. Physical planning for the site should consider the inclusion of hybrid live workspace

Table IV-7

Office

Median Rents and Vacancy Rate

	East	SD Cty	East	SD Cty
2011	$19.5	$24.2	11.6%	9.7%
2010	$17.58	$23.7	11.8%	9.5%
2009	$17.2	$22.3	12.3%	9.6%
2008	$17.9	$24.1	10.2%	9.0%
2007	$19.0	$25.5	9.8%	7.4%
2006	$19.7	$26.8	9.8%	7.2%

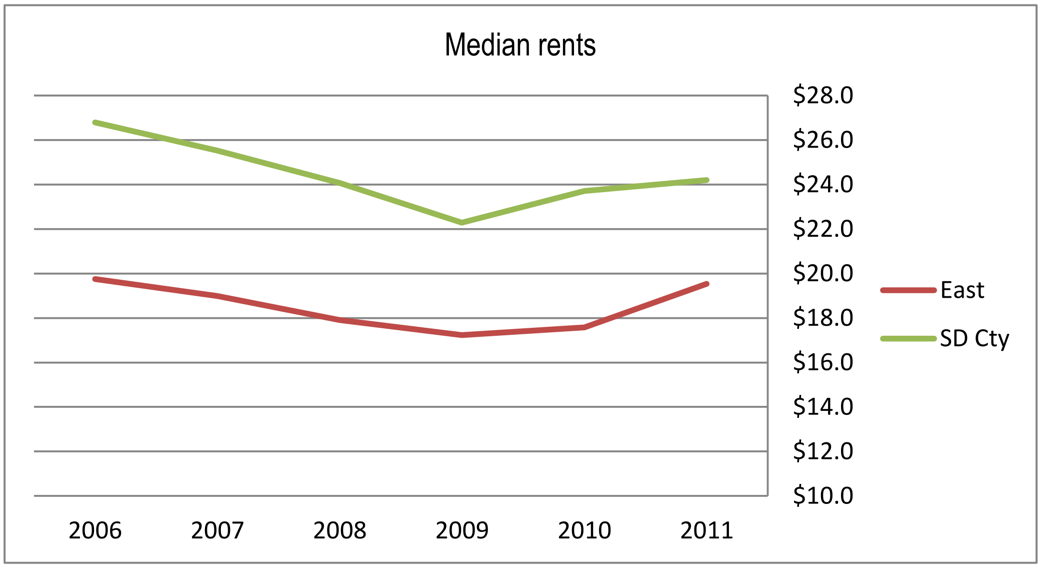
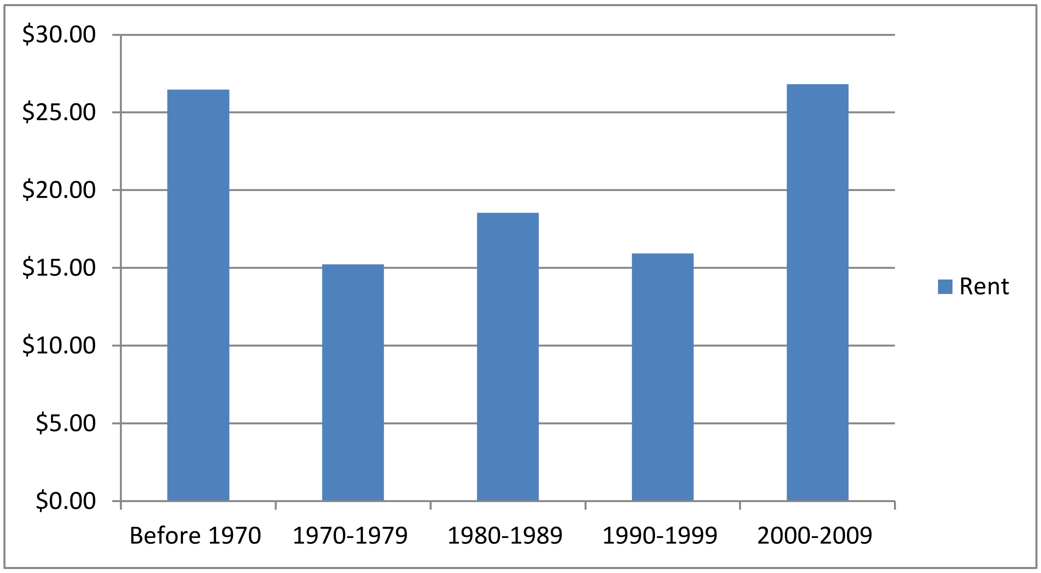


Table IV-8

Ofice Rents and Vacancy

San Diego, East Market

Year Built	Rent	Vacancy
Before 1970	$26.48	4.70%
1970-1979	$15.23	16.20%
1980-1989	$18.55	15.60%
1990-1999	$15.94	5.4%
2000-2009	$26.83	14.4%
After 2009	n/a	n/a
Total	$19.53	11.60%



and the use of secondary commercial space for employment generating uses as a method for absorbing the potential emerging demand for office space in the market.

Industrial

Recent industrial comparable sales are displayed on table IV-7. In general, sales prices have been between $120 $200 per square foot. This is a relatively robust rate for industrial buildings however most of these properties are quite small averaging under 5,000 sq. ft. Larger assets such as a 42,000 square-foot industrial building on Federal Boulevard sold for $24.38 per square foot. The wide range of comparable sales and the limited inventory of available industrial buildings suggests low to very low demand for industrial space in the area immediately surrounding the Chollas Triangle site.

For the most part the community is a mature built out area that is primarily focused on residential neighborhoods with commercial corridors. Opportunities to cite industrial space that will not generate land-use conflicts are limited due to the existing development patterns in this part of the city. For the most part economic development efforts for industrial development have been focused in the Chula Vista / Otay Mesa markets and to a lesser degree in the North County. Demand for hybrid flex industrial research production space has historically been experienced in the La Jolla / UTC markets as well as Miramar. That being said if a build to suit user is seeking an assembled developable parcel within a mature residential area the Chollas Triangle site may offer some advantages. However, most of these uses are not compatible with a town center type development strategy and while the market may develop for these uses within the plan, their presence will need to be closely calibrated with longer-term strategic objectives and higher value-added uses within the site.

Nonprofit and institutional

One of the distinguishing features of the land use surrounding the C triangle site is a strong presence of the nonprofit institutional uses. Crawford high school, is located immediately to the north of the project site and is assessable by footpath from University Avenue. Horace Mann middle school is also nearby, as are three public elementary schools and a variety of private pre-K -12 schools. The presence of schools in the neighborhood helps bring vitality as each serves as a node of daily activity.

Nearby recreational institutional uses include the facilities at Collina del Sol park, the Collina park golf course and swim center. These uses also create activity nearby however unlike the schools this tends to occur on the weekends and holidays.

In terms of healthcare, Promise Hospital-- a 100 bed for-profit acute care facility, is located directly north of the Chollas Triangle along University Avenue. The hospital's capacity is split between acute general medical care and inpatient psychiatric services. Another major, community health and social service provider is the Teen Challenge center located at 5450 Lea Street. Teen Challenge is a residential drug and alcohol treatment facility.

The presence of educational institutional uses in the area are a good and necessary fit with community needs. These types of uses would be able to contribute to the overall development pattern of the site as tenants and assessory uses. In general extra market support (subsidies) would be required to bring nonprofit and community institutions onto the site, and over time land costs may make their presence infeasible. However this category should be accommodated within any recommended development plans, such that existing institutions can continue to function on the site and that expansion or addition of new programs not be precluded by any land use strategy adopted.

Summary and Implications

The Chollas Triangle market area, like the rest of San Diego, is currently experiencing market conditions that are not conducive to new development. This is particularly true for projects and land uses that do not have pre-leasing in place or secured credit tenants. In almost every instance the capitalized value of current income streams and comparable sales prices for existing property are below replacement cost new development.

While the immediate market conditions are soft, the location of the Chollas Triangle in the midst of a dense and dynamic community, along with the size of the site, is consistent with a town center development strategy. This implies a mix of residential and commercial land uses that will create a central focus for the Mid-City district of San Diego and allow for a leveraging of the development pattern in the area to move from a corridor based pattern to a more concentrated nodal core.

The first segment of the real estate market that is likely to be viable on the Chollas Triangle site will be multi-family residential. As capital markets began to stabilize and new household formation continues regionally, based on improving economy development opportunities for market rate multiunit rental apartments will become viable at the Chollas Triangle site. Demand for this type of development may begin to emerge over the next 18 to 24 months depending on macro-economic conditions such as credit markets, regional unemployment rates and competitive development elsewhere in the area.

Any long-term development strategy for the Chollas Triangle site ideally should reflect the sites potential within the context of the urban geography of San Diego rather than being responsive to immediate market conditions which are currently under performing historic rates. Looking beyond a 2 to 5 year time horizon is likely to anticipated development pressure returning to the broader San Diego market as the economy improves. The Chollas Triangle site would then be able to support a mix of residential development in the first phase followed by community level retail development on the site. Specific recommendations for program elements and quantities are outlined in the section that follows.

Table IV-8
Industrial Comparable Sales

City Heights Industrial - 3877 42Nd St., San Diego, CA
Property Type: Industrial
Warehouse
Building Size: 6,000 SF
Sale Date: 9/30/2006
Sale Price: $735,000.00
Price/SF $ 122.50

American Legion - 4061 Fairmont Ave, San Diego, CA
Property Type: Industrial
Warehouse
Building Size: 7,344 SF
Year Built: 1930
Sale Date: 1/31/2007
Sale Price: $2,350,000.00
Price/SF $ 319.99

4715 Polk Ave - San Diego, CA
Property Type: Industrial
Manufacturing
Building Size: 800 SF
Sale Date: 9/24/2009
Sale Price: $185,000.00
Price/SF $ 231.25

4604 University Ave - San Diego, CA
Property Type: Retail
Free Standing Bldg
Building Size: 6,438 SF
Year Built: 1956
Sale Date: 1/25/2006
Sale Price: $1,300,000.00
Price/SF $ 201.93

El Cajon Blvd. 5315 - 5315 El Cajon Blvd., San Diego, CA
Property Type: Office
Office-Warehouse
Building Size: 5,700 SF
Year Built: 1952
Sale Date: 4/30/2007
Sale Price: $1,000,000.00
Price/SF $ 175.44

4792 Dwight St - San Diego, CA
Property Type: Industrial
Manufacturing
Building Size: 760 SF
Year Built: 1940
Sale Date: 6/22/2009
Sale Price: $145,500.00
Price/SF $ 191.45

Federal Blvd. Owner | User Bldg. - 5160 Federal Blvd., San Diego, CA
Property Type: Retail
Free Standing Bldg
Building Size: 21,652 SF
Year Built: 1955
Sale Date: 7/8/2011
Sale Price: $2,000,000.00
Price/SF $ 92.37

6975 North Ave - Lemon Grove, CA
Property Type: Industrial
Manufacturing
Building Size:
Sale Date: 11/6/2002
Sale Price: $730,000.00
Price/SF $ Na

4149 Cartagena Rd - San Diego, CA
Property Type: Industrial
Warehouse
Building Size: 11,500 SF
Year Built: 1988
Sale Date: 4/11/2005
Sale Price: $1,050,000.00
Price/SF $ 91.30

4567 Federal Blvd - San Diego, CA
Property Type: Industrial
Manufacturing
Building Size: 42,253 SF
Year Built: 1969
Sale Date: 12/13/2004
Sale Price: $1,030,000.00
Price/SF $ 24.38

4567 Federal Blvd - San Diego, CA
Property Type: Industrial
Manufacturing
Building Size: 38,780 SF
Year Built: 1969
Sale Date: 7/29/2003
Sale Price: $2,800,000.00
Price/SF $ 72.20

47Th Street - 1645 47Th St, San Diego, CA
Property Type: Industrial
Manufacturing
Building Size: 2,800 SF
Year Built: 1968
Sale Date: 7/14/2009
Sale Price: $320,000.00
Price/SF $ 114.29

Industrial Development Site - 1740 47Th Street, San Diego, CA
Property Type: Land
Industrial (land)
Lot Size: 4.56 Acres
Sale Date: 11/30/2007
Sale Price: $3,300,000.00
Price/Acre: $ 723,684.22

1740 47Th St - San Diego, CA
Property Type: Industrial
Manufacturing
Building Size: 12,500 SF
Sale Date: 11/15/2007
Sale Price: $3,300,000.00
Price/SF $ 264.00

Fed Ex Bldg/Federal Express Buildign - 1650 47Th St, San Diego, CA
Property Type: Industrial
Warehouse
Building Size: 76,822 SF
Year Built: 1988
Sale Date: 10/3/2005
Sale Price: $11,600,000.00
Price/SF $ 151.00

Section V Program and Development Strategy

Introduction

This section will provide recommendations on development volumes and a strategy for transforming the Chollas Triangle site from its present condition to a functioning town center for Mid-City San Diego. It is important to recognize that we are currently in a difficult development market as was described in the sections covering both the broader San Diego and local Mid-City neighborhoods. The current lack of demand is driven by a broad variety of macro-economic conditions ranging from the ability of development to access capital from banks and other traditional funding sources as well as high rates of unemployment and declining household incomes.

Over the long run the local and national economy can be anticipated to improve. This strategy looks to the broader opportunities available at Chollas Triangle from the perspective of its potential role in the urban hierarchy and structure of San Diego. As the market stands today, even with significant off pro forma assistance, there is only marginal demand for new development on-site. That is not to say that there is no economic value to the land. The fact the Northgate González Market is moving on to the site in a space being provided by a sublease from K-mart is evidence of the viability of University Ave. as a commercial corridor even in difficult economic circumstances.

In terms of market interest, the following sectors are likely to begin to see interest in the following order:

1. Multi-family residential
2. Retail
3. Office / Industrial

This section will provide program recommendations for each of these components along with requirements for the development of amenities, such as the renovation of Chollas Creek and supportive public spaces that will be necessary to catalyze development on site.

Residential

The first segment of the Mid-City market area that is likely to experience new capital investment will be multifamily residential development. Already rental rates in the area are beginning to approach replacement cost as more householders moved from ownership to rental across the region. Likewise recent sales prices for existing projects, in particular smaller projects, are beginning to approach replacement cost based on a narrowing capitalization rate and stabilized cash flows from decreased vacancies. This indicates the possibility of new demand emerging.

The biggest impediment to development of new residential development in the area is access to capital. Traditional funding sources, in particular banks, have become increasingly reluctant to finance any kind of real estate development other than pre-lease build to suit projects. In theory, investors should be able to take advantage of historically low interest rates in order to fund development. However, the balance sheet position of many of the nation's largest banks is not conducive to lending for these types of developments. As the financial crisis abates capital should flow back into the real estate development sector.

The other principal impediment for residential development in the Mid-City area is a lack of suitable development sites and the accessibility of available sites to community amenities. The Chollas Triangle site, offers an opportunity to deliver to the market a strategically located assembled site with good transit access, access to neighboring schools and retail opportunities along University Avenue. In that respect the Chollas Triangle site is a desirable residential location. However, in order for residential development to proceed at the site improvements to Chollas Parkway and to Chollas Creek, it will need to be undertaken either concurrently with a first phase of residential development or as a leading investment that creates on site amenities to stimulate interest in development.

The Chollas Triangle site once amenitized with Park infrastructure along its south end would be an ideal site for market rate housing. A mix of affordable units and units of varying sizes and price points of entry may be necessary to assist absorption particularly in the initial years. But on the whole the Chollas Triangle is likely to be a site that can support market rate housing over the long term.

Any development plan will require a diverse mix of unit types in order to be successful. Particularly advantageous unit configurations in the community include; two-bedroom apartments live –work units, and townhome type attached products. Generally speaking, the best location for housing will have access to park improvements along the south and east margins of the site. Ideally the residential component could be developed out in more than one phase. Each with approximately 200 to 250 dwelling units in each phase depending on the physical configuration of the units in order to yield a total of 250 to 500 DUs on-site likely built in two phases.

Retail

University Avenue represents a significant retail corridor in Mid-City San Diego. Chollas Triangle's location is a proven retail site given the long-term durability of the Sears and Kmart uses that have been present. Continued retail investment is exhibited by the recent sublease by González Northgate market at the Kmart building. The Shell gas station on the corner of University and 54 is one of the highest visibility sites in Mid-City. The half-acre parcel is currently for sale with the listed price of $2 million. Whether or not that prices achieved or not remains to be seen however it reinforces the long-term viability of the Chollas Triangle site as a part of the University Avenue retail corridor.

With household incomes continuing to contract in San Diego and with depressed levels of retail sales continuing in light of the current economic downturn, new retail development is unlikely to occur until general economic conditions begin to improve. At the same time several important potential credit tenants and anchors have either disappeared from the market or are not in the position to expand. That being said the structural logic of the Chollas Triangle site as a community oriented retail location is supported by the aggregate income of the community that surrounds it, population density, synergies with neighboring retail projects and finally visibility and access along University Avenue. Retailers who are able to serve the diverse community population are also likely to be able to take advantage of the Chollas Triangle site.

The most likely successful retail program for the Chollas Triangle site would be a community oriented retail project of between 100,000 and 130,000 sq. ft. of total retail development facing the North and West sides of the site and for the portions of the plan area North of University Ave. This would represent net new space in the market. A community retail center would include typical tenants such as groceries, drugstores, personal services, food and beverage and general merchandise sales occurring at in-line stores. Presently the drug store category is under represented in the area and as a result this type of tenant may emerge as a leading contender as a credit tenant for the first retail project on the site.

Office / Industrial

The best opportunity for office or industrial use of the Chollas Triangle site would only come about if the site met the criteria of a single use build to suit tenant. Generally speaking, industrial uses on the site would be incompatible with neighboring land uses. And on the whole the site is not particularly attractive for most industrial users due to issues of site assess ability and access. Modern industrial users require easy 24-hour access for 40 foot trailers which is incompatible with residential land uses. In addition the grade changes in topography on the site are less suitable for industrial land uses than other locations within the San Diego market. In general the site would be competing with long-standing economic development efforts and incentives to induce industrial development in other parts of the city such as at Otay Mesa and the area around Miramar. Additionally industrial land uses occupying sectors in the San Diego economy are continuing to experience relatively high rates of unemployment with a result increase in vacancy rates market wide. All of these are strong contra indications that work against the development of industrial land uses on the site

Office uses have a tendency of being strongly agglomerative. What this means in practice is that it is very difficult to create new office employment centers without creating a significant critical mass. Sometimes this occurs as a result of changes to the transportation system such as opportunities brought about by transit oriented development or by the movement of a single large employer to a build to suit location that attracts additional co tenancies. For the foreseeable future the basic conditions at Chollas Triangle are not highly amenable to large-scale office development. Employment on-site is most likely to be generated from retail sales and services that can take place in commercial spaces within the project in the form as of right uses. An additional generator of on-site employment would be live work type residential units. These can play an important role in providing an identifiable niche for the residential development within the project and will help support the mixed-use and balanced nature of the overall development plan on site. Smaller scale community oriented office uses, including those that house businesses that cater to the ethnic and cultural diversity of the area may be attracted to the site.

Summary and Implications

The Chollas Triangle site represents an ideal location for a town center development strategy. The site fits well into the overall logic of the city of San Diego's economic geography and has the potential to be adjacent to a significant amenity in the form of the improved Chollas Creek. That being said in order for the project to move forward there are a number of critical factors that need to be addressed, as well as changes in the physical condition of the site and the status of the San Diego regional economy.

Either as a leading investment or concurrent with the first phase of development, it will be necessary to improve Chollas Creek and Chollas Pkwy. and turn them into a community amenity. With this accomplished the Chollas Triangle site, particularly along its southern and eastern margins, becomes particularly attractive for residential development. In contrast, the North and West side of the site currently front two of the most significant arteries in Mid-City San Diego and serve as logical sites for retail and consumer oriented commercial development. Once the landscape improvements are made to the Creek and Parkway the latent value of the Chollas Triangle's strategic location can be unlocked.

Improvements to the site and the creation of the creek and park amenity will be required in order to attract quality residential development to the Chollas Triangle site. As multifamily residential is likely to be the first segment of the market that will generate new development demand, the investments in the public realm for the creation of parking open space will need to occur in the initial years if a residential first development strategy is feasible.

Existing fiscal circumstances may preclude major public investments for the creek and related site amenities. In this case a development strategy that focuses on University Avenue may be necessary. In the intermediate term retail demand is likely to emerge as the economy improves and consumer discretionary spending begins to grow. If a credit tenant can be attracted to the site, it is possible to move forward with a retail first strategy that will require significantly lower amounts of public investments on the site. This approach could take advantage of the grade changes on the site to buffer first phase commercial development from a future residential buildout on the south and eastern portions of the site. Is important recognize that retail demand is likely to emerge more slowly than the demand for multifamily residential.

In terms of program recommendations, it is clear that the regional economy of San Diego will need to improve with decreasing rates of unemployment and increasing household incomes before new development pressure comes to bear on this site. That being said, the near and intermediate term demand is beginning to develop for multifamily residential development in the Mid-City portion of the city of San Diego. Once issues of access to capital and development finance are addressed and the economy begins to stabilize it is likely that this sector of the real estate economy will be the first to rebound.

Similarly the retail landscape has been significantly challenged by the financial crisis that began in 2008. As the industry begins to stabilize along with incomes in the market it is possible to anticipate that University Avenue will continue to develop as a commercial retail corridor. The Chollas Triangle offers a site to combine these market tendencies into a synergistic mixed-use town center development with the following attributes:

- 250 to 500 residential units capable of being both owner and renter occupied
    - For a rental project in the first phase, the following recommended mix of unit types is likely to be supported:

Studio	30%
One bedroom	20%
Two-bedroom	40%
Live work / Other specialized	10%

    - In a for sale development the unit mix would be more oriented towards two and three bedroom units. As a planning factor the average unit size would be approximately 1,200 sq. ft. net living area with individual units ranging from 900 sq. ft. one bedroom units to 1,400 sq. ft. three bedroom units.
- A community scale retail development with one or more mid box anchors totaling between 100,000 and 130,000 sq. ft. This represents net new space to the market
- Ancillary office space including live work and store front office opportunities ranging between 10,000 and 25,000 sq. ft. of total on-site commercial office use.

APPENDIX G

NOISE CALCULATIONS

Existing Without Project

	DAYTIME			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS						
Vehicles per hour	448	9	5	4	0	0
Speed in MPH	45	45	45	45	45	45
Left angle	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90
NOISE CALCULATIONS						
Reference levels	69.3	77.6	82.1	69.3	77.6	82.1
ADJUSTMENTS						
Flow	19.7	2.8	-0.2	-0.3	-17.2	-20.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0
Barrier	0	0	0	0	0	0
Grade	0	0	0	0	0	0
Constant	-25	-25	-25	-25	-25	-25
LEQ	63.9	55.4	56.9	43.9	35.4	36.9

DAY LEQ **65.2**

	ROADWAY	Chollas Parkway
5	SEGMENT	54th Street to University Aver
	ADT	4616
	SPEED	45
	DISTANCE	50
	% A	97.0%
	% MT	2.0%
	% HT	1.0%
	LEFT	-90
	RIGHT	90
	DAY LEQ	65
	% Peak of ADT	10.00%
	Day hour	462
	Absorbtive?	no
	Use hour?	Yes
	GRADE dB	0

Existing Without Project

	DAYTIME			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS						
Vehicles per hour	2243	46	23	22	0	0
Speed in MPH	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90
NOISE CALCULATIONS						
Reference levels	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS						
Flow	27.2	10.3	7.3	7.2	-9.7	-12.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0
Barrier	0	0	0	0	0	0
Grade	0	0	0	0	0	0
Constant	-25	-25	-25	-25	-25	-25
LEQ	69.5	61.6	63.4	49.5	41.6	43.4
	DAY LEQ	**71.0**				

	ROADWAY	University Avenue
5	SEGMENT	54th to 58th Streets
	ADT	23125
	SPEED	40
	DISTANCE	50
	% A	97.0%
	% MT	2.0%
	% HT	1.0%
	LEFT	-90
	RIGHT	90
	DAY LEQ	71
	% Peak of ADT	10.00%
	Day hour	2313
	Absorbtive?	no
	Use hour?	Yes
	GRADE dB	0

Existing Without Project

	DAYTIME			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS						
Vehicles per hour	1687	35	17	17	0	0
Speed in MPH	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90
NOISE CALCULATIONS						
Reference levels	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS						
Flow	26.5	9.7	6.7	6.5	-10.3	-13.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0
Barrier	0	0	0	0	0	0
Grade	0	0	0	0	0	0
Constant	-25	-25	-25	-25	-25	-25
LEQ	66.6	59.4	61.6	46.6	39.4	41.6

DAY LEQ **68.4**

ROADWAY	54th Street
SEGMENT	University Avenue to Chollas
ADT	17387
SPEED	35
DISTANCE	50
% A	97.0%
% MT	2.0%
% HT	1.0%
LEFT	-90
RIGHT	90
DAY LEQ	68
% Peak of ADT	10.00%
Day hour	1739
Absorbtive?	no
Use hour?	Yes
GRADE dB	0

APPENDIX H

PALEONTOLOGICAL RESOURCE ASSESSMENT

PALEONTOLOGICAL RESOURCE ASSESSMENT
CHOLLAS TRIANGLE MASTER PLAN
CITY OF SAN DIEGO
SAN DIEGO COUNTY, CALIFORNIA

Prepared under contract to:

AECOM
1420 Kettner Boulevard, Suite 500
San Diego, CA 92101

Prepared by:

DEPARTMENT OF PALEOSERVICES
SAN DIEGO NATURAL HISTORY MUSEUM
P.O. Box 121390
San Diego, CA 92112

Thomas A. Deméré, Ph.D., Director
Sarah A. Siren, M.S., Paleontological Field Manager

26 February 2013

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PALEONTOLOGICAL RESOURCE ASSESSMENT
CHOLLAS TRIANGLE MASTER PLAN
CITY OF SAN DIEGO
SAN DIEGO COUNTY, CALIFORNIA

INTRODUCTION

Project Location

The Chollas Triangle Master Plan Amendment project area is located in the Eastern Area of the Mid-City Communities planning area within the City of San Diego (Figure 1). The 36 acres project area is surrounded by multi-family residential and institutional uses to the north, including a hospital, middle school, and high school; multi-family residential and a commercial shopping center to the east, multi-family residential and a retail shopping center to the west, and single-family residential to the south. The project area is bounded by 54th Street to the west, University Avenue to the north, and Chollas creek to the south and east (Figure 2).

Project Description

The proposed project is designed to amend the Mid-City Communities Plan to provide new land use designations and zoning, an enhanced open space network, and a realigned circulation system that support a mass transit-oriented community. This amendment would include map and text changes to the Mid-City Communities Plan to encourage a vibrant, mixed-use neighborhood village with increased park and open space areas. The amendment would revise the Eastern Area Community Plan Map and redesignate approximately 12.5 acres of Commercial Mixed Use and approximately 3.4 acres of Industrial to Neighborhood Village which would be consistent with Table LU-4 of the General Plan. The Neighborhood Village land use designation would allow for the development of multi-family housing in a mixed-use setting and convenience shopping and services. The amendment would also revise the Future Recommended Street Network to vacate the approximately 11.4 acre Chollas Parkway and designate approximately 5.4 acres as population-based park land, with the remaining land being designated as open space. The proposed project would add a two lane collector at the location of Lea Street, extending north to intersect with University Avenue. The proposed project would also include a rezone of the current CC-5-3 and IL-3-1 zones to zones consistent with the new land use designations as recommended in the General Plan. The proposed project zones would include CC-3-5 with the adoption of the Community Plan Implementation Overlay Zone (CPIOZ) to limit the total square footage of non-residential development to no more than 130,000 square feet (ft) of commercial; and OP-2-1 consistent with the Park land use designation.

At build out the project area could contain approximately 486 dwelling units of multi-family housing, and approximately 130,000 square ft of non-residential development that could include a mixture of retail, office, and other commercial uses.

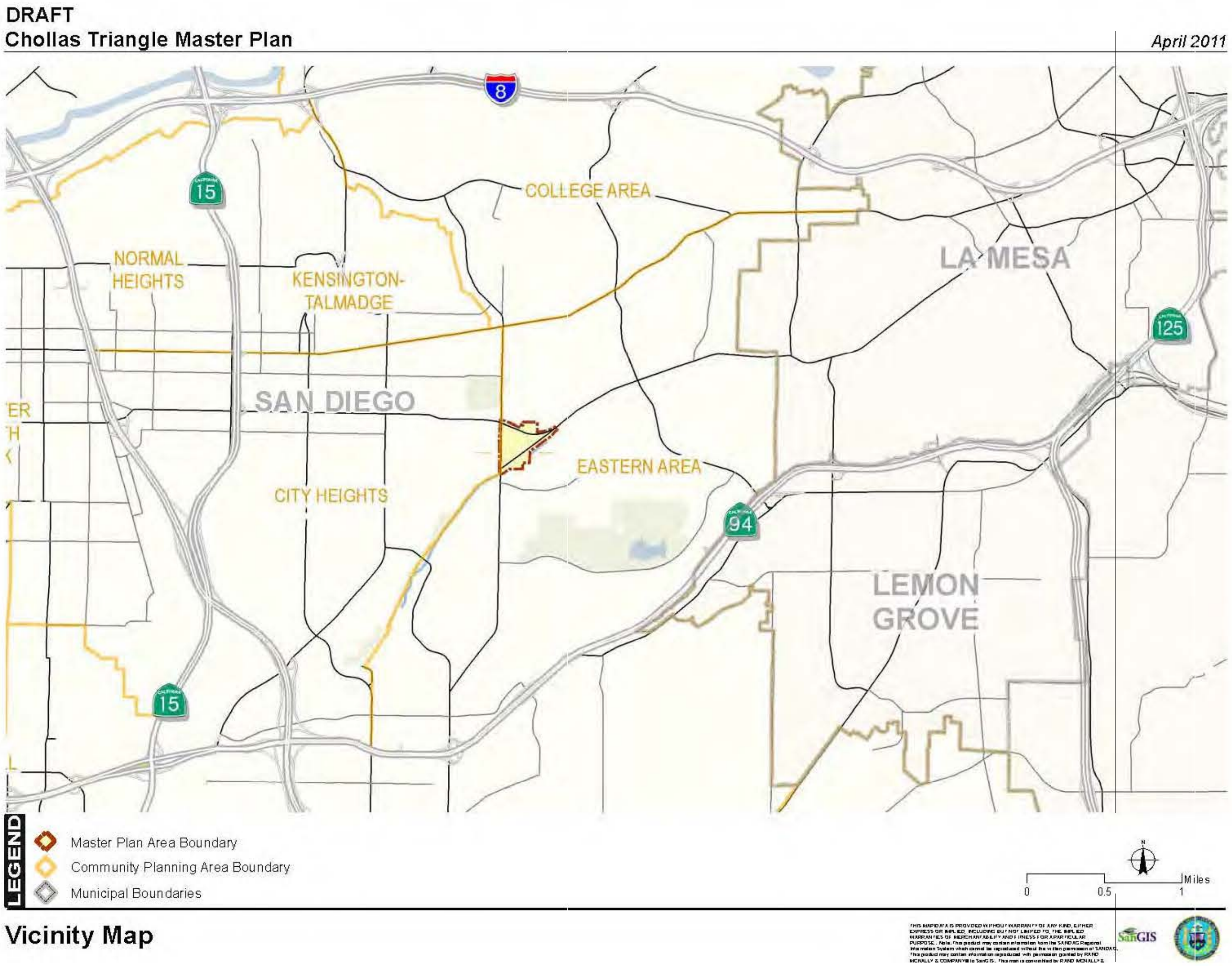

Figure 1. Index map of western San Diego County showing the general location of the Chollas Triangle Master Plan project site (courtesy of SanGIS, 2011).

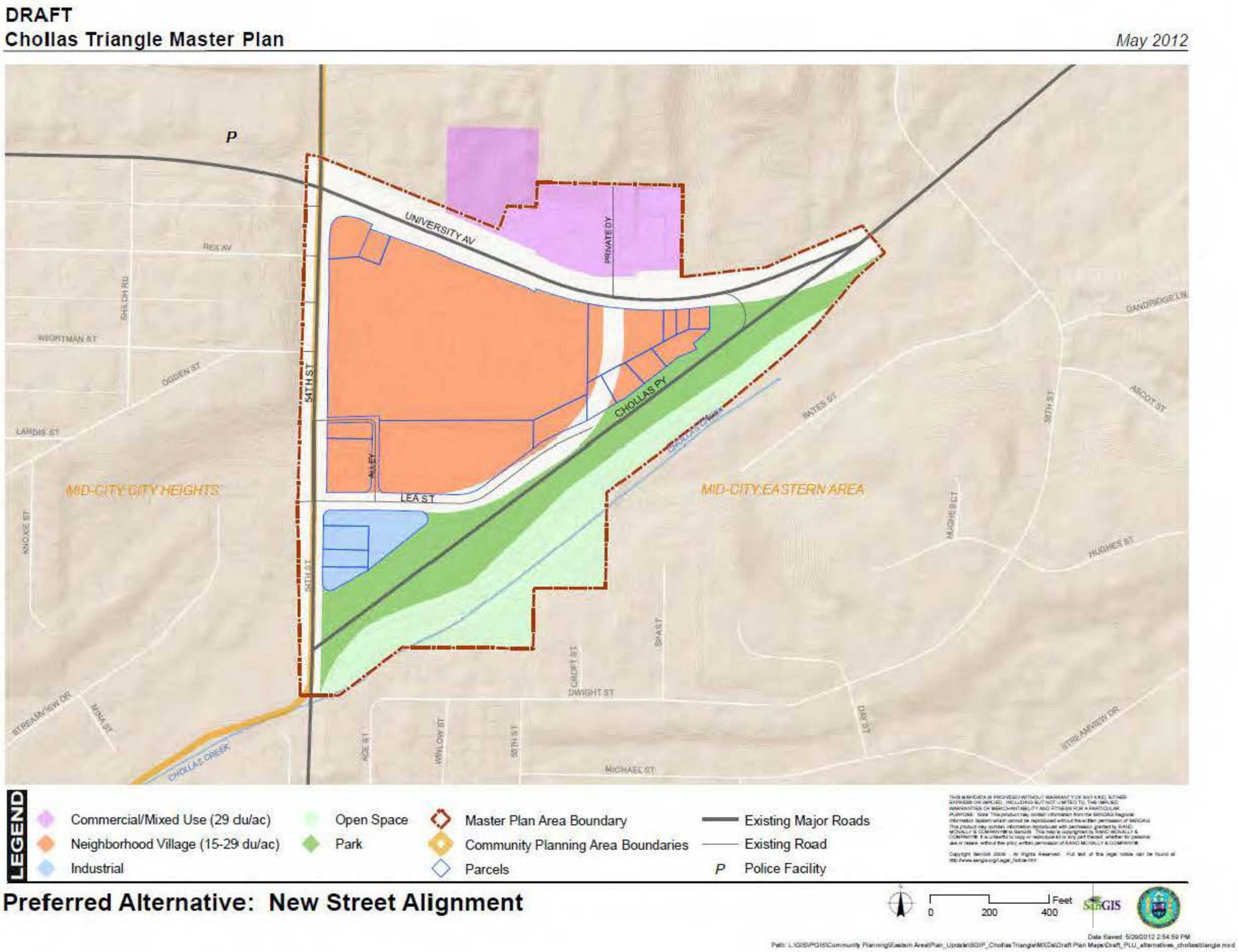

Figure 2. Location map for the Chollas Triangle Master Plan project site, including project alternatives, in the City of San Diego, California (courtesy of SanGIS, 2011).

Project Objectives

The Mid-City Communities Plan Amendment would result in revised community plan policies that would allow mass transit-oriented development and create an active neighborhood village with an integrated mixture of residential, commercial and civic uses adjacent to Chollas Creek. Each element of the community plan would be amended to incorporate revised figures and recommendations that help implement the goals and objectives of the project.

The Natural and Cultural Resources Element would be amended to include goals and recommendations that address the increased park and open space system adjacent to Chollas Creek. Recommendations would address uses allowed adjacent to, and within, the open space network.

The Urban Design Element would add and amend recommendations that guide the bulk and scale of development within the project area. Recommendations addressing building heights and setbacks along University Avenue would be revised to encourage medium-density mixed-use development.

The Land Use Element would be amended to discuss the addition of General Plan land use designations that would encourage the project area to develop as a mixed-use neighborhood village. The Land Use and Economic Development Elements would be amended to remove most of the industrial land uses from the project area and discuss the types of economic activities to be encouraged and allowed on site. The Public Facilities and Services Element revisions would address the additional park space within the community planning area as well as the impacts to utilities, specifically the San Diego Gas and Electric (SDG&E) substation located within the project area. The Transportation Element would be amended to reflect a revised street and bicycle network as well as improvements to the pedestrian network.

The Community Plan Implementation Overlay Zone (CPIOZ) 'Type A' would provide supplemental development regulations that are tailored to the specific site. The intent of the regulations is to ensure that future development proposals are reviewed for consistency with the use and development criteria that have been adopted for the site as part of the community plan amendment process. The CPIOZ "Type A" is ministerial (Process One) and no discretionary permit would be required if proposed development complies with the development standards or criteria.

San Diego Natural History Museum Scope of Work

This technical report provides an assessment of issues related to paleontological resources within the project site. The purpose of this report is to assist in planning and design efforts for the purposed project as related to paleontological resource issues. Specifically, this report is intended to summarize existing paleontological resource data in the project site and vicinity; assess potential impacts to paleontological resources from construction of the project; and identify mitigation measures to avoid or reduce project-related impacts wherever feasible. Additional discussion of report methodology is provided below. This report was prepared by Sarah A. Siren and Thomas A. Deméré of the Department of PaleoServices, San Diego Natural History Museum (SDNHM), San Diego, California.

Paleontological Resources

As defined here, paleontological resources (i.e., fossils) are the buried remains and/or traces of prehistoric organisms (i.e., animals, plants, and microbes). Body fossils such as bones, teeth, shells, leaves, and wood, as well as trace fossils such as tracks, trails, burrows, and footprints, are found in the geological deposits (formations) within which they were originally buried. The primary factor determining whether an object is a fossil or not, isn't how the organic remain or trace is preserved (e.g., "petrified"), but rather how old is the organic remain or trace. Although typically it is assumed that fossils must be older than ~10,000 years (i.e., the generally accepted end of the last glacial period of the Pleistocene Epoch), organic remains of early Holocene age can also be considered to represent fossils because they are part of the record of past life.

Fossils are considered important scientific and educational resources because they serve as direct and indirect evidence of prehistoric life and are used to understand the history of life on Earth, the nature of past environments and climates, the membership and structure of ancient ecosystems, and the pattern and process of organic evolution and extinction. In addition, fossils are considered to be non-renewable resources because typically the organisms they represent no longer exist. Thus, once destroyed, a particular fossil can never be replaced. And finally, for the purposes of this report, paleontological resources can be thought of as including not only the actual fossil remains and traces, but also the fossil collecting localities and the geological formations containing those localities.

METHODOLOGY

A review was conducted of relevant published and unpublished geologic reports (Kennedy and Tan, 1977; 2008; Walsh, 1996), unpublished paleontological reports (Deméré and Walsh, 1993), and museum paleontological locality data (SDNHM, Department of Paleontology; see attached Records Search in the Appendix). This approach was followed in recognition of the direct relationship between paleontological resources and the geologic formations within which they are entombed. Knowing the geology of a particular area and the fossil productivity of formations that occur in that area, it is possible to predict where fossils will, or will not, be encountered.

A pedestrian survey of the project area and immediately surrounding areas was conducted on February 13, 2013 by SDNHM personnel to field check the results of the literature and record searches and to determine the paleontological resource sensitivity of the geologic units that will be affected by the proposed improvements.

EXISTING CONDITIONS

PHYSICAL GEOLOGICAL SETTING

The Coastal Plain region of San Diego County is underlain by a layer cake sequence of marine and non-marine sedimentary rock units that record portions of the last 140 million years of earth history (Deméré and Walsh, 1993). Over this period of time, the relationship of land and sea has drastically fluctuated, such that today, there are ancient marine rocks preserved up to elevations of 900 feet above sea level and ancient river deposits as high as 1,200 feet. Faulting related to the local La Nacion and Rose Canyon fault zones (Artim and Pinckney, 1973; Kennedy, 1975) has broken up this sedimentary sequence into a number of distinct fault blocks in the southwestern part of the county. In the National City/Chula Vista area, the La Nacion Fault Zone has had a major impact on the surface distribution of sedimentary rock units (Kennedy and Tan, 1977). West of the fault zone, there are extensive exposures of Pleistocene-age deposits mapped primarily as the Bay Point Formation. Whereas, east of the fault zone, there are exposures of the Eocene-age Mission Valley Formation and the Oligocene-age Otay Formation. Within the fault zone itself, exposures predominantly consist of sandstones of the Pliocene-age San Diego Formation.

The geology of the project area, as described in the site-specific geotechnical report by Ninyo & Moore (2011) and depicted on the published geologic maps of Kennedy and Tan (1977, 2008), is dominated by artificial fill and Quaternary alluvium to varying depths. These relatively youthful deposits overlie older geologic deposits mapped as the Eocene-age Mission Valley Formation. The Mission Valley Formation, in turn, is locally overlain by the Eocene-age Pomerado Conglomerate, which itself is overlain by marine sandstones of the Pliocene-age San Diego Formation. The western boundary of the project site is coincident with 54th Street, which actually is aligned along the main trace of the La Nacion Fault in this area of San Diego (Kennedy and Tan, 1977). The majority of movement along this fault has been vertical, such that strata found at higher topographic levels to the east have been down-dropped to the west where they now occur at lower topographic levels.

RESULTS OF THE PALEONTOLOGICAL RECORDS SEARCH

A search of the paleontological records housed at the SDNHM Department of Paleontology revealed a single documented fossil collecting site located within the boundaries of the Chollas Triangle Master Plan project site. This collecting site was discovered in an existing cut slope located north of University Avenue. Strata exposed in this cut slope are assigned to the Mission Valley Formation and consist of a basal unit of light gray, cross-bedded sandstones, overlain by a 4.5 foot thick, fossil-bearing bed composed of light gray sandstone that grades upwards into a green and brown sandy mudstone. This sandy mudstone stratum is overlain by 30 feet of light gray, medium-grained, generally massive sandstone with occasional green and rust-colored siltstone interbeds. The fossils recovered from this locality were described by Walsh (1996) and formerly named the Cloud 9 Fauna after the name of a business formerly located at the discovery site. A more complete discussion of these fossils is provided below.

RESULTS OF THE PEDESTRIAN SURVEY

The pedestrian survey of the project site confirmed the geologic mapping of Kennedy and Tan (2008) and the findings of Ninyo & Moore (2011) as relates to the occurrence of paleontologically sensitive geologic rock units. Good exposures of the Eocene-age Mission Valley Formation were seen in the northern portion of the project site, while younger Quaternary alluvial deposits were observed in the south-central portion of the project site. These observations are discussed more fully below (Figure 3).

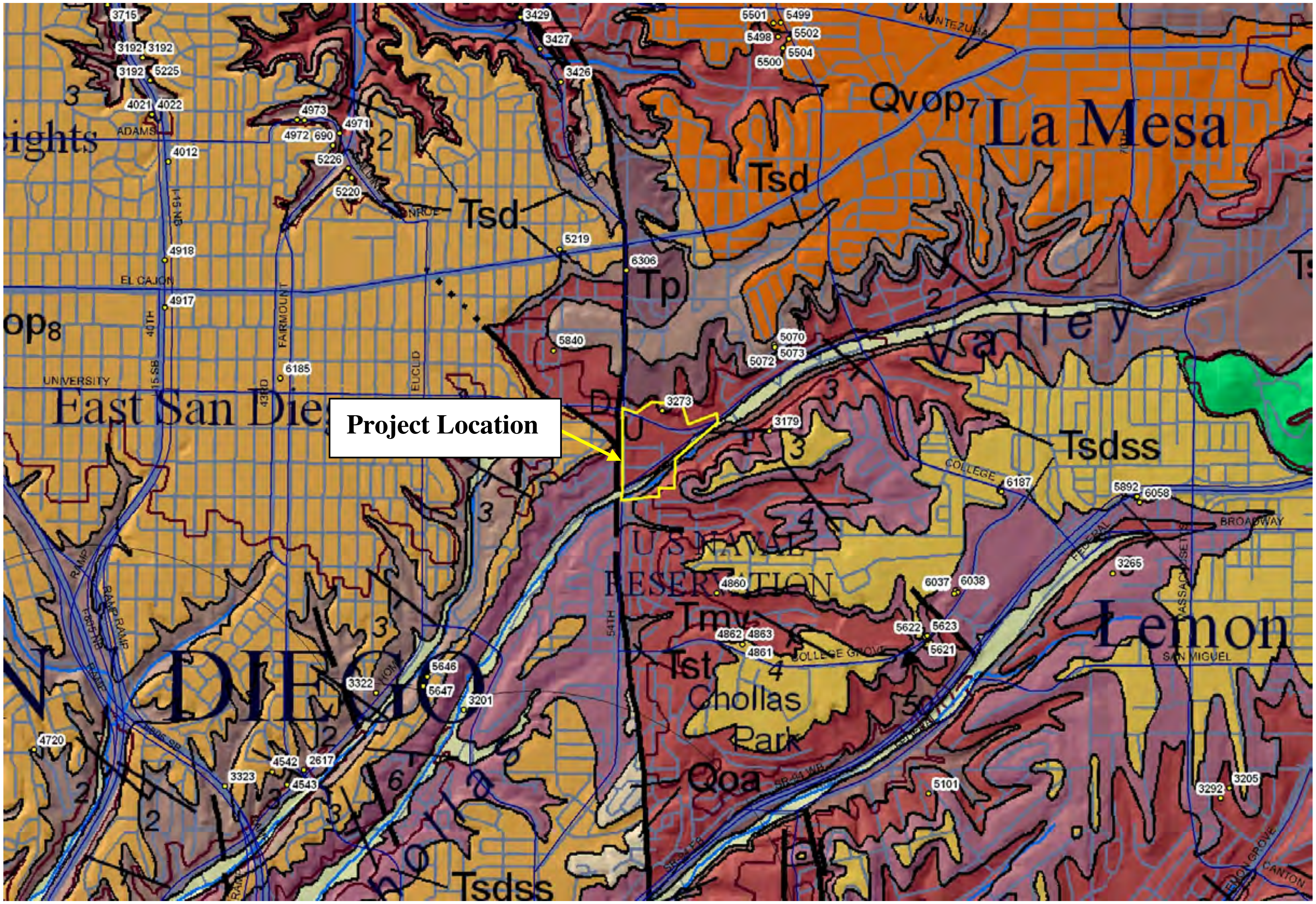

Figure 3. Geology of the project site and vicinity as mapped by Kennedy and Tan (2008), City of San Diego, San Diego County, California. Colors represent the areal distribution of mapped geologic rock units: Quaternary older alluvium (Qoa), Quaternary very old paralic deposits (Qvop), San Diego Formation (Tsd, Tsdss), Pomerado Conglomerate (Tp), Mission Valley Formation (Tmv), and Stadium Conglomerate (Tst). The North-South solid black line crossing the map shows the main trace of the La Nacion Fault Zone. The white tags with four-digit numbers represent previously recorded fossil collecting localities.

PALEONTOLOGICAL RESOURCE ASSESSMENT

The following section provides a general overview of the types of geologic deposits located within the project area and their paleontological resource sensitivity.

Artificial Fill Materials

Introduction: The site-specific geotechnical report (Ninyo & Moore, 2011) reported that modern artificial fill materials cover large areas of the project site. These fill materials presumably were derived from earlier construction activities and were placed in such a way as to provide topographically high areas for current and future development.

Paleontology: No fossils of paleontological interest are located in artificial fill materials. Any contained organic remains have lost their original stratigraphic/geologic context due to the disturbed nature of the artificial fill materials.

Site Specific Assessment: Artificial fill materials are assigned a zero paleontological resource sensitivity due to the loss of the stratigraphic/geologic context of any contained organic remains (e.g., fossils).

Quaternary Alluvium (Qya)

Introduction: Holocene- and late Pleistocene-age alluvial deposits "have been mapped as underlying the Chollas Creek drainage along the southern edge of the site, adjacent to Chollas Parkway" (Ninyo & Moore, 2011). Site-specific geotechnical investigations indicate that these alluvial deposits consist of "poorly sorted, poorly consolidated, permeable alluvial deposits of sand, silt, or clay. Scattered layers of gravel and cobbles are also likely to be present within the alluvium" (Ninyo & Moore, 2011).

Paleontology: Fossils are generally unknown from the younger alluvial deposits in the Coastal Plain of San Diego County. The Holocene age of these deposits indicates they are too young to contain true fossil remains or traces. Consequently, they do not represent significant paleontological resources.

Site Specific Assessment: Quaternary alluvial deposits occur within the modern drainages associated with Chollas Creek along the southern boundary of the project site. Based on its post-Pleistocene age, younger alluvium is assigned a low paleontological resource sensitivity.

Mission Valley Formation (Tmv)

Introduction: Eocene-age sedimentary rocks of the Mission Valley Formation underlie the majority of the project site (Kennedy and Tan, 2008; Ninyo & Moore, 2011). Good exposures of this rock unit occur in the northern portion of the project site north of University Avenue, while vegetation covered exposures occur in the southern portion of the site south of Chollas Parkway. In other areas of the project site the Mission Valley Formation is covered by Quaternary alluvium and artifical fill materials.

The Mission Valley Formation in its type area in nearby Mission Valley consists of light gray, fine-grained marine sandstones (Kennedy and Moore, 1971). In the eastern and southern portions of its area of outcrop, the formation largely consists of light gray, medium-grained, fluvial sandstones and green and brown non-marine mudstones. The formation reaches its maximum known thickness of approximately 200 feet in Mission Valley and is approximately 45 feet thick in the northeastern part of Tierrasanta, approximately 60 feet thick at Scripps Ranch, and from there it steadily thins to the east. The Mission Valley Formation is overlain by the Pomerado Conglomerate north of La Mesa and by the Sweetwater Formation south of SR-94. It is noteworthy that although Kennedy and Tan (2008) mapped the Pomerado Conglomerate in the northernmost portion of the project site, the project-specific geotechnical report (Ninyo & Moore, 2011) did not recognize these strata. To be consistent the present report follows this usage.

Paleontology: Fossil mammals locally occur in strata of the Mission Valley Formation as exposed in the eastern part of the City of San Diego (e.g., the College area, San Carlos, Fletcher Hills, and East San Diego) (Lillegraven and Wilson, 1975; Golz and Lillegraven, 1977; Walsh, 1987, 1996). One particularly rich fossil collecting locality (SDNHM Locality 3273) occurs within the project site and has yielded well-preserved remains of Eocene-age land mammals, including opossums (e.g., *Peratherium* sp. cf. *P. innominatum*, and *Peradectes californicus*), insectivores (e.g., *Apatemys* sp., *Batodonoides powayensis*, *Centetodon* sp., *Proterixoides davisi*, and *Sespedectes singularis*), rodents (e.g., *Simimys* sp., *Pareumys* sp., *Eohaplomys* sp., cf. *Leptotomus* sp., *Microparamys woodi*, and *Sciuravus powayensis*), primates (e.g., *Ourayia* sp., *Dyseolemur* sp. cf. *D. pacificus,* and *Uintasorex* sp.), and artiodactyls (e.g., *Protoreodon* sp. and *Protylopus* sp.). Other fossils collected from this locality include remains of bony and cartilaginous fish, tryonichid (soft-shell) turtle, tortoise, crocodile, snake (including boa material), lizard, and other squamate reptiles.

Historically, the marine strata of the Mission Valley Formation have produced generally well-preserved remains of marine microfossils (e.g., foraminifers), macroinvertebrates (e.g., clams, snails, crustaceans, and sea urchins), and vertebrates (e.g., sharks, rays, and bony fish) (Givens and Kennedy, 1979; Roeder, 1991). Non-marine strata of the Mission Valley Formation have produced well-preserved examples of petrified wood and fairly large and diverse assemblages of fossil land mammals including opossums, insectivores, bats, primates, rodents, artiodactyls, and perissodactyls (Walsh, 1996). The co-occurrence in the Mission Valley Formation of land mammal assemblages with assemblages of marine microfossils, mollusks, and vertebrates is extremely important as it allows for the direct correlation of terrestrial and marine faunal time scales. The Mission Valley Formation represents one of the few instances in North America where such direct correlations are possible (Walsh, 1996).

Site Specific Assessment: During the pedestrian survey, good exposures of the Mission Valley Formation were observed in the existing cut slope behind the building located at 5538 University Avenue, in the northern portion of the project site (Figures 4 and 5). This cut slope exposes approximately 41 feet of light gray, poorly sorted, fine to coarse grained sandstone capped by at least 6.5 feet of iron-oxide stained conglomerate (Figure 6).

Because there is an existing paleontological collecting locality within the project boundaries, and following the paleontological guidelines developed by the City of San Diego, the Mission Valley Formation is assigned a high paleontological resource sensitivity rating. Given the mapped geology and the existing paleontological locality, there is potential for continued fossil remains to be encountered during grading of the project site. Both the marine and nonmarine strata of the Mission Valley Formation are assigned a high paleontological resource sensitivity because of their potential to contribute information important to our understanding and interpretation of the paleontological record of the City of San Diego.

Figure 4. Outcrop of Mission Valley Formation located in an existing cut slope on the north side of University Avenue, east of the intersection with 54th Street, behind an occupational services business at 5538 University Avenue.

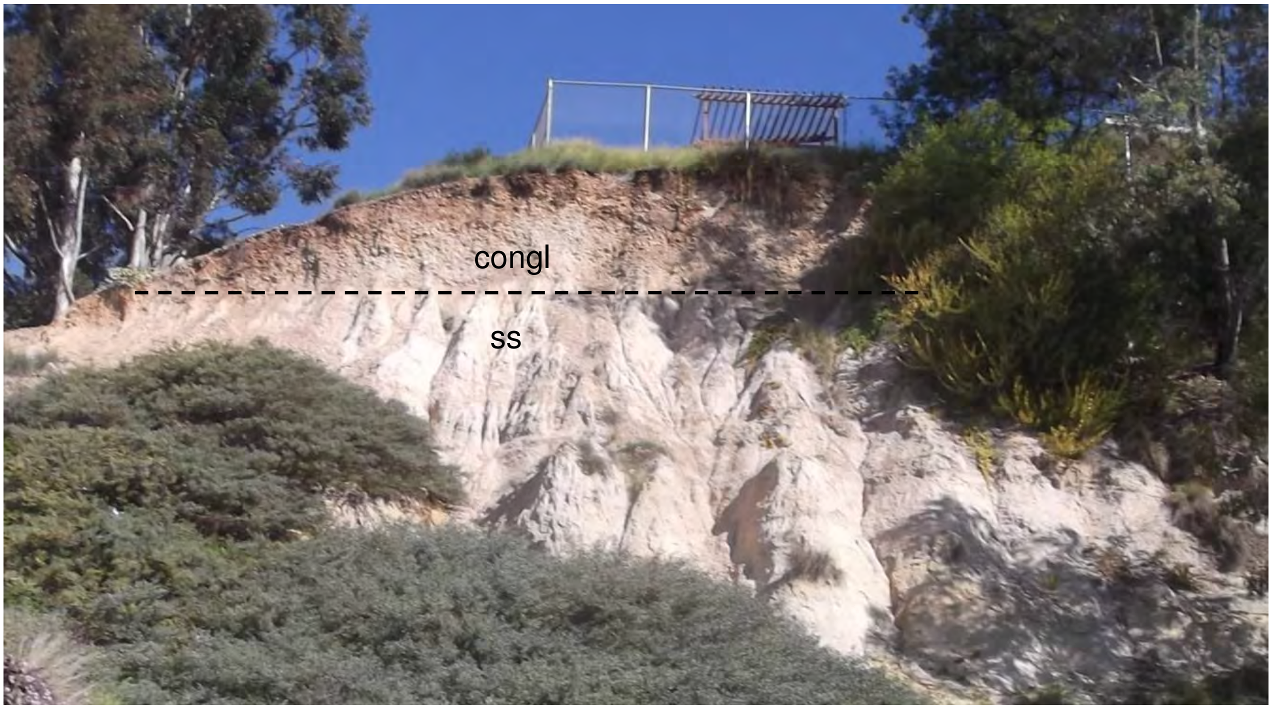

Figure 5. Upper portion of the Eocene stratigraphic section exposed at 5538 University Avenue. The section consists of light gray sandstone strata (ss) overlain by a reddish conglomeratic layer (congl).

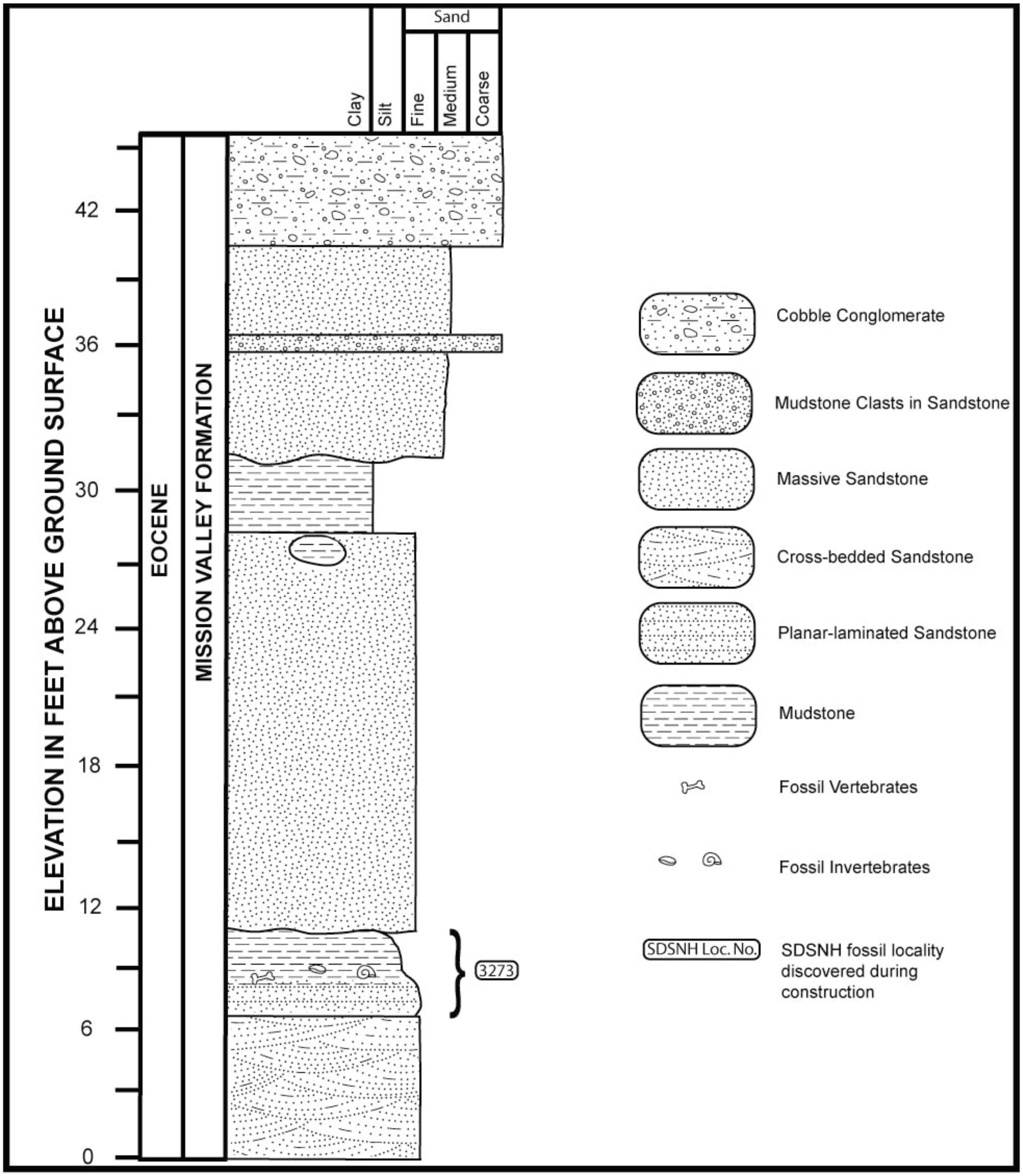

Figure 6. Modified from Walsh (1987). Composite stratigraphy at SDSNH Locality 3273, detailing strata observed within the outcrop located on the north side of the road at 5538 University Avenue.

IMPACT ANALYSIS

INTRODUCTION

Direct impacts to paleontological resources occur when earthwork activities, such as mass grading operations, cut into the geological deposits (formations) within which fossils are buried. These direct impacts are in the form of physical destruction of fossil remains. Since fossils are the remains of prehistoric animal and plant life they are considered to be nonrenewable. Such impacts can be significant and, under CEQA guidelines, require mitigation.

Impacts to paleontological resources are typically rated from high to zero depending upon the resource sensitivity of impacted formations.

High significance

Impacts to high sensitivity formations (Mission Valley Formation).

Moderate significance

Impacts to moderate sensitivity formations (none within the project site).

Low significance

Impacts to low sensitivity formations (Quaternary Alluvium).

Zero significance

Impacts to formations with no fossil potential (artificial fill).

SITE SPECIFIC IMPACTS

Preliminary plans for the Chollas Triangle Master Plan project site designate areas for development and open space. Any excavations into the potentially fossil-bearing strata of the Mission Valley Formation should be mitigated. These potential negative impacts to paleontological resources can be reduced to below the level of significance through implementation of a paleontological mitigation plan as outlined below.

MITIGATION MEASURES

1. A qualified paleontologist should attend the pre-construction meeting to consult with the grading and excavation contractors concerning excavation schedules, paleontological field techniques, and safety issues. (A qualified paleontologist is defined as an individual with a MS or Ph.D. in paleontology or geology that is familiar with paleontological procedures and techniques, who is knowledgeable in the geology and paleontology of San Diego County, and who has worked as a paleontological mitigation project supervisor in the county for at least one year.)
2. A paleontological monitor should be on-site on a full-time basis during the original cutting of previously undisturbed deposits of high paleontological resource potential (Mission Valley Formation) to inspect exposures for contained fossils. (A paleontological monitor is defined as an individual who has experience in the collection and salvage of fossil materials. The paleontological monitor should work under the direction of a qualified paleontologist.)

3. When fossils are discovered, the paleontologist (or paleontological monitor) should recover them. In most cases this fossil salvage can be completed in a short period of time. However, some fossil specimens (such as a complete large mammal skeleton) may require an extended salvage period. In these instances the paleontologist (or paleontological monitor) should be allowed to temporarily direct, divert, or halt grading to allow recovery of fossil remains in a timely manner. Because of the potential for the recovering of small fossil remains, such as isolated mammal teeth, it may be necessary to set up a screen-washing operation on the site.
4. Fossil remains collected during monitoring and salvage should be cleaned, repaired, sorted, and cataloged as part of the mitigation program.
5. Prepared fossils, along with copies of all pertinent field notes, photos, and maps, should be deposited (as a donation) in a scientific institution with permanent paleontological collections such as the San Diego Natural History Museum. Donation of the fossils should be accompanied by financial support for initial specimen storage.
6. A final summary report should be completed that outlines the results of the mitigation program. This report should include discussions of the methods used, stratigraphic section(s) exposed, fossils collected, and significance of recovered fossils.

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<u>APPENDIX</u>: SDSNH Locality Data

DATE 02/05/13
TIME 01:57:20

SAN DIEGO NATURAL HISTORY MUSEUM
DEPARTMENT OF PALEONTOLOGY
LOCALITY CARD

LOCALITY #- 3273

LOCALITY # 3273
LOCALITY NAME Cloud 9 Bar
FIELD NUMBER

LOCATION
COUNTRY U.S.A.
STATE CA
COUNTY San Diego
CITY San Diego

SECT	TWNSP	DIREC	RANGE	DIR
27	16	S	2	W

LOCATION IN SECTION

ELEVATION 330 FT

LATITUDE 32°44'56"N VARIANCE
LONGITUDE 117° 4'34"W

UTM 11 492870 3623248 VARIANCE

MAP NAME National City, CA
MAP SCALE 1:24000 DATUM NAD1927
MAP SOURCE USGS 1967/1975

STRATIGRAPHIC POSITION
GROUP Poway Group
FORMATION Mission Valley Formation
MEMBER
INFORMAL NAME

ERA Cenozoic
SYSTEM Paleogene
SER/EPOCH middle Eocene
AGE/STAGE
NALMA late Uintan
ZONE NAME

LITHOLOGY
sdst
DEPOSITIONAL ENVIRONMENT
CITATION
Kennedy, M.P. & G.L. Moore, 1971, AAPG Bull., 55:709-722.
DONATED BY
0

FIELD NOTES
COLLECTOR
Stephen L. Walsh and Mark A. Roeder 13 Jan 1986
COMPILED BY
S.L. Walsh 15 Jul 1986

PHOTOS ACCESS NO.

ENTERED BY
H.P. Don Vito 18 May 1995

LOCALITY DESCRIPTION

Vertebrate fossils including crocodile, boa, and various mammals from a bed about 3-4 meters above lot level exposed in a large south-facing aritficial cut in white sandstones. Locality is approximately 40 meters due north of the Cloud Nine Bar at 5506 University Avenue, and approximately 265 meters due east of the intersection of University and 54th Street. The fossiliferous bed is about 1 meter thick; it's base is green muddy sandstone that is graduational with the underlying white medium-grained sandstone. This part of the bed grades upward to greenish sandy mudstone, and finally brownish, very slightly sandy, conchoidally fracturing mudstone. This bed is erosionally overlain by more white sandstone. The bed extends laterally from its pinchout about 25 meters east of the main quarry site to at least 40 meters north, into the hill. Most of this fossiliferous bed is now covered by artificial fill, but the easternmost few meters can still be seen. Roughly 8300 lbs. of bulk matrix was taken from this bed by Walsh and Roeder. Most fossils were concentrated in the lower 2/3 of the bed. The collections of bulk matrix can be assigned to two field numbers. "SLW-1/13/86" is the field nubmer of the 2705 kg of matrix collected by Walsh and Mark Roeder on 1/13/86 and 1/14/86, from the "main quarry." This sample included all lithological of the graded fossiliferous bed. "SLW-1/18/86" is the field number assigned to the 1205 kg of the matrix taken purely from the lower 2/3 of the fossiliferous bed, located about 10 meters laterally to the east o the "main quarry," on 1/18, 1/19 and 1/25, 1986.

"SLW-1/13/86" contains batches 1-27, each batch being 100 kg except for Batch 27 which was 105 kg. SLW-1/18/86 contains Batches 28-39. Batch 30 was 105 kg. Total mass of matrix washed was 3910 kg.

Formation: Mission Valley Formation of Kennedy and Moore (1971). Section: Sec. 27 (projected), T16S, R2W

Lat. and Long.: 32 degrees 44' 55.1" +/- .5" N lat.; 117 degrees 04' 33.6" +/- .5" W Long.

Elevation: approx. 330'

Collected: Stephen L. Walsh and Mark A. Roeder, Jan 13-14, 1986 and Jan 18, 19, 25, 1986.

Citation con't: Walsh, S.L., 1995, "Middle Eocene Mammal Faunas of San Diego County, California" in The Terrestrial Eocene-Oligocene Transition in North America. Cambridge University Press.

DONATED: Stephen L. Walsh, 3 Feb 1989.

LOCALITY 3273

SAN DIEGO NATURAL HISTORY MUSEUM
DEPARTMENT OF PALEONTOLOGY
LOCALITY 3273 CLOUD 9

LOCALITY NUMBERS	SPECIES
3273	
3	Mollusca
12	Gastropoda
1	Pelecypoda
2	Chordata
1	Chondrichthyes
247	Mammalia
1	*Apatemys* sp.
1	*Protoreodon* sp.
1	cf. *Protoreodon* sp.
1	*Protylopus* sp.
1	Carnivora
13	*Uintasorex* sp.
1	cf. *Uintasorex* sp.
10	Insectivora
19	*Proterixoides davisi* Stock, 1935
6	cf. *Proterixoides* sp.
374	*Sespedectes singularis* Stock, 1935
2	*Batodonoides powayensis* Novacek, 1976
13	cf. *Batodonoides* sp.
4	*Centetodon* sp.
1	cf. *Centetodon* sp.
45	*Peradectes californicus* (Stock, 1936)
37	cf. *Peradectes* sp.
5	*Peratherium* sp. cf. P. *innominatum* Simpson, 1928
23	Didelphidae/Geolabididae
4	*Dyseolemur* sp. cf. D. *pacificus* Stock, 1934
2	*Ourayia* sp. cf. O. *uintensis* (Osborn, 1895)
6	Rodentia
874	*Simimys* sp.
4	cf. *Simimys* sp.
16	*Pareumys* sp.
2	*Eohaplomys* sp.
3	cf. *Leptotomus* sp.
41	*Microparamys woodi* Kelly and Whistler, 1994
8	*Sciuravus powayensis* Wilson, 1940
60	Osteichthyes
1	Osteichthyes?
1	Testudinidae
1	Trionychidae
3	Testudinidae
54	Crocodylia
10	Crocodylia?
30	Squamata
140	Serpentes
7	Boidae

APPENDIX I

WATER SUPPLY
ASSESSMENT AND ADDENDUM

2014000383

THE CITY OF SAN DIEGO

MEMORANDUM

DATE: May 28, 2014

TO: Kerry Santoro, Assistant Deputy Director, Development Services Department

FROM: Seevani Bista, Senior Water Resources Specialist, Public Utilities Department

SUBJECT: Water Supply Assessment Report (WSA) for the Chollas Triangle Community Plan Amendment and Rezone Project

---

In response to your request, please find attached WSA for the Chollas Triangle Community Plan Amendment and Rezone Project approved by Deputy Director of the Long-Range Planning and Water Resources Division, Public Utilities.

The Public Utilities Department (Department) prepared this WSA to assess whether sufficient water supplies are or will be available to meet the projected water demands of the project. The findings verify that there is sufficient water supply to serve existing demands, projected demands of the project, and future water demands within the Department's service area in normal and dry year forecasts during a 20-year projection.

Should there be any comments on the WSA at the conclusion of the public review process for the Chollas Triangle EIR, please forward your comments for our review. Please provide us a copy of the EIR after the City Council approval.

If you have any questions, please call me at (619) 533-4222.

Seevani Bista

SB/tm

Attachment: Water Supply Assessment Report

cc: Ray Palmucci, Deputy City Attorney, Office of the City Attorney
Marsi A. Steirer, Deputy Director, Public Utilities Department
George Adrian, P.E., Principal Water Resources Specialist, Public Utilities Department
Anna McPherson, Senior Planner, Development Services Department
Michael Prinz, Associate Planner, Planning, Neighborhoods & Economic Development Department
Anas Kaziha, Junior Engineer-Civil, Public Utilities Department
RMS 6.8.4

City of San Diego
PUBLIC UTILITIES
Water & Wastewater

WATER SUPPLY ASSESSMENT REPORT

Chollas Triangle Community Plan Amendment and Rezone Project

Prepared by:

City of San Diego Public Utilities Department

Reviewed by:

Marsi ASteirer May 28, 2014

Marsi A. Steirer, Deputy Director **Date**
Long-Range Planning & Water Resources Division

Prepared: May 2014

City of San Diego Public Utilities Department
Water Supply Assessment Report

Chollas Triangle Community Plan Amendment and Rezone Project

Table of Contents

Section 1 - Purpose

On January 1, 2002, Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221) took effect. The intent of SB 610 and SB 221 was to improve the link between information on water supply availability and certain land-use decisions made by cities and counties. Under SB 610 (codified in the Water Code beginning at Section 10910), a water supply assessment (WSA) must be furnished to cities and counties for inclusion in any environmental documentation of projects (defined in the Water Code) that propose to construct 500 or more residential units, or that will use an amount of water equivalent to what would be used by 500 residential units, and are subject to the California Environmental Quality Act (CEQA). Under SB 221, approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply or water supply verification (WSV).

Not every project that is subject to the requirements of SB 610 is also subject to the mandatory water verification of SB 221 (e.g., if subdivision map approval is not required). Conversely, not every project that is subject to the requirements of SB 221 must also obtain a SB 610 water supply assessment.

A foundational document for compliance for both SB 610 and SB 221 is the Urban Water Management Plan (UWMP) of the relevant water agency. Both of these statutes repeatedly identify the UWMP as a planning document that can be used by a water supplier to meet the standards set forth in both statutes. Thorough and complete UWMPs will allow water suppliers to use UWMPs as a foundation to fulfill the specific requirements of the two statutes. Cities, counties, water districts, property owners and developers utilize this document when planning for and proposing new projects. It is crucial that cities, counties and water suppliers work closely when developing and updating these planning documents. The City of San Diego's 2010 UWMP, which is used as the basis for this Report (WSA), was adopted by the San Diego City Council in June 2011.

The City of San Diego (City) Development Services Department (DSD) requested that Public Utilities Department (Department) prepare this WSA as part of the environmental review for the Chollas Triangle Community Plan Amendment and Rezone Project (Project). A more detailed description of the Project is provided in Section 2 of this WSA. This WSA evaluates water supplies that are or will be available during normal, single-dry year, and multiple-dry water years during a 20-year projection to meet the projected demands of the Project, in addition to existing and planned future water demands of the Department. This WSA provides an assessment of the availability of sufficient water supplies for the Project only, and does not constitute approval of the Project.

This WSA also includes identification of existing water supply entitlements, water rights, water service contracts, or agreements relevant to the identified water supply for the Project and quantities of water received in prior years pursuant to those entitlements, rights, contracts and agreements.

This Report has been prepared in compliance with the requirements under SB 610 by the Department in consultation with DSD, the San Diego County Water Authority (Water Authority) and the Metropolitan Water District of Southern California (MWD).

Section 2 - Project Description

The project is an amendment to the General Plan and Mid-City Communities Plan – eastern area to redesignate approximately 12.5 acres of commercial mixed use, and approximately 3.4 acres of industrial to neighborhood village in an approximately 36 acre area between University Avenue to the north, Chollas Creek and Chollas Parkway to the south and east, and 54th Street to the west. The neighborhood village land use designation would allow for the development of multi-family housing in a mixed-use setting along with convenience shopping and services. The amendment would also revise the Future Recommended Street Network to vacate the approximately 11.4 acre Chollas Parkway and designate approximately 5.4 acres as population-based park land, with the remaining land being designated as open space. The proposed project would also include a rezone of the current commercial community (CC)-5-3 and industrial-light (IL)-3-1 zones to zones consistent with the new land use designations as recommended in the General Plan.

The project site is the existing Chollas Triangle Community that presently consists of a San Diego Gas & Electric (SDGE) substation, three (3) single-family homes south of Lea Street, a gas station, 21 multi-family housing units, a Teen Challenging Center with a group quarters facility that consists of 50 beds, a 60,000 square-foot K-mart, a 40,000 square-foot grocery store, and a commercial use facility. In addition, the project boundary also includes several existing buildings; Alvarado Parkway Institute (behavior health system), a veterinary hospital, a massage facility, recycling center and six (6) multi-family units that were not included in the original community plan. This redevelopment project is proposed to enhance the quality of the existing Chollas Triangle Community by adding and revising the following mixed-uses at build-out:

- 486 multi-family dwelling units
- 130,000 square feet of non-residential developments (mixture of retail, office and other commercial uses)
- 5.4 acres as population-based park land that serves the population of the community

The project site and project zoning map is shown in Figure 2-1 and Figure 2-2.

FIGURE 2-1
VICINITY MAP OF THE PROJECT

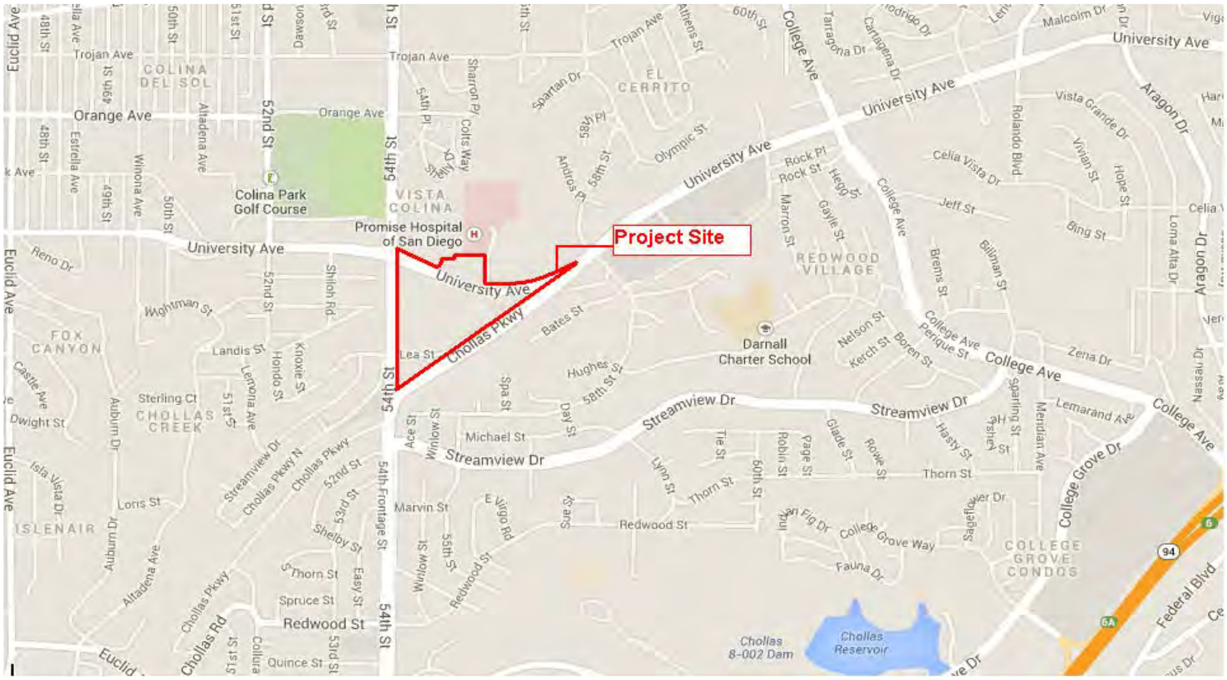
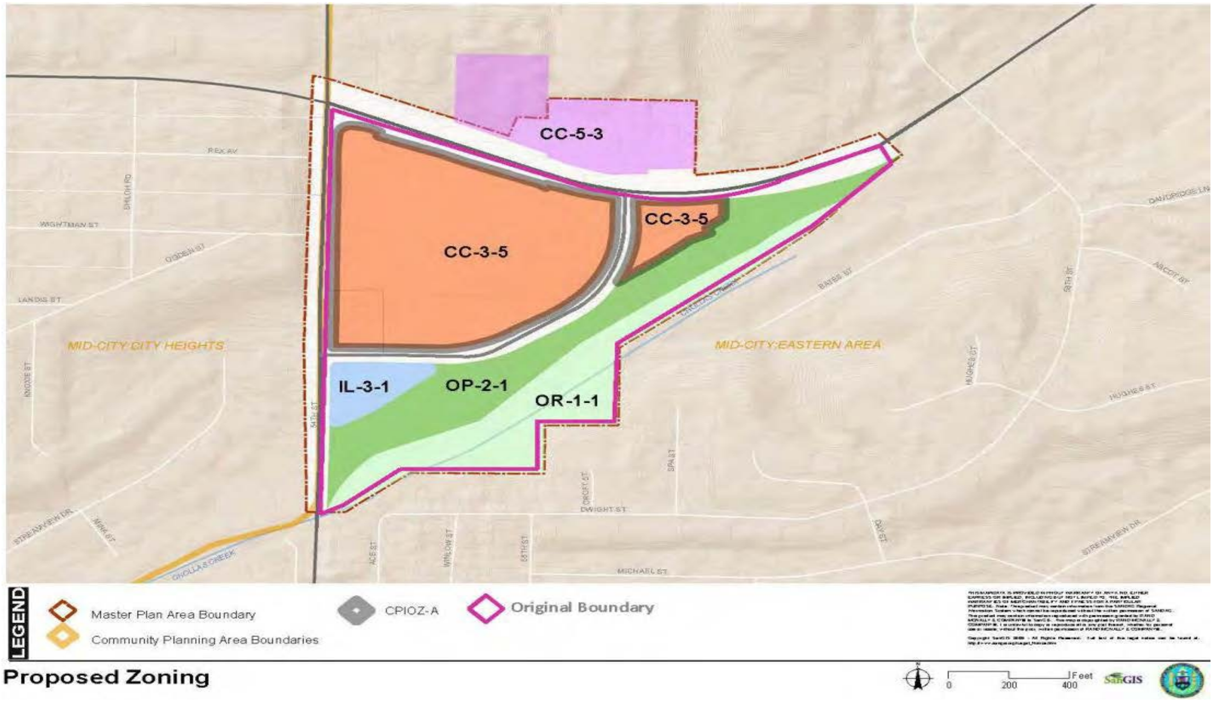


FIGURE 2-2
ZONING MAP OF THE PROJECT



The project proposes the following developments:

Residential

The proposed residential development plan consists of 486 multi-family units within the community, and an additional three (3) single-family homes at build-out.

Commercial

The proposed project will potentially produce 130,000 square foot of existing and new non-residential commercial area at build-out. The additional commercial use could include a mixture of retail, office spaces, and other commercial uses.

Landscape and Recreation

The amendment would also revise the Future Recommended Street Network to vacate the approximately 11.4 acre Chollas Parkway designating approximately 5.4 acres as population-based park land, with the remaining land being designated as open space. The landscaped areas will be kept indigenous to the San Diego River region. Low water use plants will be used in the landscaping around the project site.

A comparison of the proposed and existing development within the proposed project boundary is tabulated below in Table 2-1.

TABLE 2-1

PROPOSED AND EXISTING DEVELOPMENT

Chollas Triangle Area of Change - Land Use Information				
	Existing		Proposed	
Area (in acres)	**Designation**	**Zone**	**Designation**	**Zone**
12.5	Commercial Mixed-Use	CC-5-3	Neighborhood Village	CC-3-5
3.4	Industrial	IL-3-1	Neighborhood Village	CC-3-5
5.4	Industrial	IL-3-1	Park	OP-2-1
5.6	Industrial		Open Space	OR-1-1

Chollas Triangle Dwelling Unit Information		
	Existing	**Proposed**
Single-Family	3	3
Multi-Family	21	486
Teenage Challenge Center	26,000 square feet	-
Commercial	152,000 square feet	130,000 square feet

Section 3 - Findings

Water Assessment

Project: This Report identifies that the water demand projections for the Project, are included in the regional water resource planning documents of MWD, Water Authority, and a portion contained in the City's 2010 UWMP. Current and future water supplies, as well as actions necessary to develop the future water supplies, have been identified. This Report demonstrates that there will be sufficient water supplies available during normal, single-dry year, and multiple-dry water years during a 20-year projection to meet the unanticipated projected demands of the Project. This is done by utilizing the demand increment associated with the accelerated forecasted growth in the Water Authority's 2010 UWMP as described below, and in the City's 2010 UWMP.

The Water Authority's 2010 UWMP provides for a comprehensive planning analysis at a regional level, and includes water use associated with accelerated forecasted residential development as part of its municipal and industrial sector demand projections. These housing units were identified by the San Diego Association of Government (SANDAG) land use plan in the course of its regional housing needs assessment, but are not yet included in existing general land use plans of local jurisdictions. The demand associated with accelerated forecasted residential development is intended to account for SANDAG's land-use development currently projected to occur between 2035 and 2050, but has the likely potential to occur on an accelerated schedule. SANDAG estimates that this accelerated forecasted residential development could occur within the planning horizon (2010 to 2035) of the 2010 UWMP. These units are not yet included in local jurisdictions' general plans, so their projected demands are incorporated at a regional level. When necessary, this additional demand increment, termed Accelerated Forecasted Growth, can be used by member agencies to meet the demands of development projects not identified in the general land use plans.

As demonstrated in Table 3-1 of this Report, prepared by the Department in compliance with the requirements of SB 610 using the City's and Water Authority's 2010 UWMP based upon SANDAG Series 12 Forecast land use, there is sufficient water planned to supply the Project's estimated annual average usage. The projected water demands of the Project are 111,816 gallons per day or 125.23 acre feet per year (AFY). In the City's 2010 UWMP, the planned water demands of this project site are 98,728 gallons per day or 110.58 AFY. The remaining portion of the estimated 13,088 gallons per day or 14.7 AFY is accounted for through the Accelerated Forecasted Growth demand increment of the Water Authority's 2010 UWMP. As documented in the Water Authority's 2010 UWMP, the Water Authority is planning to meet future and existing demands which include the demand increment associated with the accelerated forecasted growth. The Water Authority is assisting its member agencies in tracking the certified Environmental Impact Reports (EIRs) provided by the agencies that include water supply assessments that utilize the accelerated forecasted growth demand increment, to demonstrate adequate supplies for the development. In addition, the next update of the demand forecast for the Water Authority's 2015 UWMP will be based on SANDAG's most recently updated forecast, which will include the Project.

Existing and Future Developments Planned to occur by 2035: The City's 2010 UWMP demonstrates there will be sufficient water supplies available to meet demands for existing and planned future developments that are projected to occur by 2035. Based on a normal water supply year, the estimated water supply projected in five-year increments for a 20-year projection will meet the City's projected water demand of 240,472 acre-feet[A] (AF) in 2015 to 298,860 AF in 2035 (**Table 6-5**) for these developments. Similarly, based on a single-dry year forecast (**Table 6-7**), the estimated water supply will meet the projected water demand of 318,586 AF (2035). Based on a multiple-dry year, third year supply (**Table 6-8**), the estimated water supply will meet the projected demands of 281,466 AF (2015); 303,004 AF (2020); 322,166 AF (2025); 334,720 AF (2030); and 346,823 AF (2035).

Therefore, based on the findings from the City's 2010 UWMP and the Water Authority's 2010 UWMP, this project will result in no unanticipated demands.

TABLE 3-1
WATER DEMAND ANALYSIS

<table>
<tr><th colspan="5">Planned Water Demands for the Project Site included in the 2010 UWMP</th></tr>
<tr><th rowspan="2">Category</th><th rowspan="2" colspan="2">Quantity</th><th colspan="2">Estimated Potable Water Use in</th></tr>
<tr><th>Gallons per Day (GPD)</th><th>Acre-Feet per Year (AFY)</th></tr>
<tr><td>2035</td><td colspan="2"></td><td></td><td></td></tr>
<tr><td>Employees[1]</td><td colspan="2">478</td><td>28,680</td><td>32.12</td></tr>
<tr><td>Multi-family Units[2]</td><td colspan="2">398</td><td>70,048</td><td>78.45</td></tr>
<tr><td colspan="3">Total</td><td>98,728</td><td>110.58</td></tr>
<tr><th colspan="5">Projected Water Demands for Chollas Triangle</th></tr>
<tr><td></td><td>Square-Feet</td><td>employee/Units</td><td>GPD</td><td>AFY</td></tr>
<tr><td>Commercial Development[1,4]</td><td>130,000</td><td>260</td><td>15,600</td><td>17.47</td></tr>
<tr><td>Multi-family Units[2]</td><td colspan="2">486</td><td>85,536</td><td>95.80</td></tr>
<tr><td>Landscaping[5]</td><td>235,224</td><td></td><td>10,680</td><td>11.96</td></tr>
<tr><td colspan="3">Total</td><td>111,816</td><td>125.23</td></tr>
<tr><th colspan="3">Net Water Demands</th><th colspan="2">Acre-Feet per Year (AFY)</th></tr>
<tr><td colspan="3">Projected</td><td colspan="2">125.2</td></tr>
<tr><td colspan="3">City of San Diego 2010 UWMP - Planned</td><td colspan="2">110.6</td></tr>
<tr><td colspan="3">Planned from Water Authority's Accelerated Forecasted Growth[6]</td><td colspan="2">14.7</td></tr>
<tr><td colspan="3">Unanticipated Demand</td><td colspan="2">0</td></tr>
</table>

Table 3-1 Notes:

1. The utilization of 60 gallons per person per day is the City's acceptable standard for employment water use (Includes nominal landscaping water demand).
2. 80 gallons per person per day is the City's acceptable standard for multi-family water consumption (includes landscaping water demands). The person per household (residential) is 2.2 based on City wide average.
3. Includes existing developments that were not included in the original community plan. Data for the existing developments is estimated based on commercial and residential footprint.
4. Number of retail employees estimated at 500 square-feet per employee (City data).
5. Landscaping water demands are based on City's on-line landscaping watering calculator (http://apps.sandiego.gov/landcalc/start.do).

[A] An acre-foot of water equals 325,851 gallons, which is enough water for two average families of four for one year.

Conclusion

In summary, these findings substantiate that there is sufficient water supply planned to serve this Project's future water demands within the Department service area in normal, single-dry year, and multiple-dry water year forecasts.

Therefore, this Report concludes that the projected level of water use for this Project is within the regional water resource planning documents of the City, the Water Authority and MWD. Current and future water supplies, as well as the actions necessary to develop these supplies, have been identified in the water resources planning documents of the Department, the Water Authority, and MWD to serve the projected demands of the Project, in addition to existing and planned future water demands of the Department.

Section 4 - City of San Diego Public Utilities Department

The City of San Diego (City) purchased its initial water system in 1901 from the privately owned San Diego Water & Telephone Company. Since then, continual expansion of the water system has been required to meet the demands of the growing population of the City. To meet the demand, the Public Utility Department (Department) purchased a number of reservoirs between 1913 and 1935 to supplement local water supplies. Despite low annual precipitation for the area (approximately 10 inches per year), these reservoirs supplied the City's growing demands until 1940.

The need to import water emerged with the increased demand generated by the presence of the United States Navy prior to and during World War II, and the ensuing population growth. As a result, the Department and other local retail water distributors formed the Water Authority in 1944 for the purpose of purchasing Colorado River water from MWD. The Department and other local retail water distributors began receiving imported water from the Colorado River in 1947.

Today, the Department treats and delivers more than 200,000 AFY of water to more than 1.3 million residents. The water system extends over 404 square miles, including 342 square miles in the City. The Department potable water system serves the City and certain surrounding areas, including both retail and wholesale customers. The Project is located within the Department service area.

In addition to delivering potable water, the City has a recycled water program. Its objectives are to optimize the use of local water supplies, lessen reliance on imported water and free up capacity in the potable system. Recycled water provides the City a dependable, year-round, locally produced and controlled water resource.

4.1 Overview of Potable System Facilities

The water system consists of nine raw water storage facilities with over 408,000 AF of storage capacity, three water treatment plants, 28 treated water storage facilities, and more than 3,212 miles of transmission and distribution lines.

The Department maintains and operates nine local surface raw water storage facilities, which are connected directly or indirectly to the City's water treatment operations. The Lower Otay, Barrett, and Morena Reservoirs (135,349 AF total capacity) service the Otay Water Treatment Plant in south San Diego; the El Capitan, San Vicente, Sutherland, and Lake Murray Reservoirs (236,311 AF total capacity) service the Alvarado Water Treatment Plant in central San Diego; and the Miramar Reservoir (6,682 AF total capacity) services the Miramar Water Treatment Plant in north San Diego. Lake Hodges Reservoir has a total capacity of 30,251 AF and is connected to Olivenhain Reservoir, which is owned by Water Authority. Olivenhain Reservoir is connected to the Water Authority's second aqueduct. Through this connection, Hodges water can be delivered to all City treatment plants. The City has the ability to access 50 percent of the local water available in Hodges Reservoir via the Water Authority's delivery system.

The Department maintains and operates three water treatment plants with a combined total rated capacity of 378.4 million gallons per day (MGD). The Miramar Water Treatment Plant (Miramar WTP), originally constructed in 1962, has a rated capacity of 144 MGD with the ability to increase to 215 MGD after the replacement of the two old clearwells in 2016. The Miramar WTP generally serves the City's geographical area north of the San Diego River (north San Diego). The Alvarado Water Treatment Plant (Alvarado WTP), operational since 1951, had an initial capacity rating of 120 MGD. Several hydraulic improvements and upgrades were completed in 2011 which increased the capacity of the plant to 200 MGD. The California Department of Public Health (CDPH) has approved this rating for the Alvarado WTP. The Alvarado WTP generally serves the geographical area from National City to the San Diego River (central San Diego). The Otay Water Treatment Plant (Otay WTP) was constructed in 1940, and has a current rated capacity of 34.4 MGD, which meets current and short-term forecasted demands. The Otay WTP has hydraulic capacity to increase to 40 MGD in the future. In order to do so, approval from CDPH is required, based upon a future high filtration rate study. The Otay WTP generally serves the geographical area bordering Mexico (south San Diego) and parts of the southeastern portion of central San Diego. All upgrade work was completed in 2012 including the construction of a third flocculation and sedimentation basin, filter piping and media improvements.

The Department maintains and operates 28 treated water storage facilities including steel tanks, standpipes, concrete tanks and rectangular concrete reservoirs, with capacities varying from less than one to 35 million gallons.

The water system consists of more than 3,212 miles of pipelines, including transmission lines up to 84 inches in diameter and distribution lines as small as four inches in diameter. Transmission lines are pipelines 16 inches and larger in diameter that convey raw water to the water treatment plants and convey treated water from the water treatment plants to the treated water storage facilities. Distribution lines are pipelines 16 inches and smaller in diameters that directly service the retail users connected to a meter. In addition, the Department maintains and operates 49 water pump stations that deliver treated water from the water treatment plants to approximately 279,557 metered service connections in 128 different pressure zones. The Department also maintains several emergency connections to and from neighboring water agencies, including the Santa Fe Irrigation District (Miramar WTP), the City of Poway (Miramar WTP), Olivenhain Municipal Water District (Miramar WTP), the Cal-American Water Company (Alvarado and Otay WTP's), Sweetwater Authority (Otay WTP), and the Otay Water District (Otay WTP).

4.2 Overview of Recycled System Facilities

The City's recycled water system consists primarily of two water reclamation plants with a combined total wastewater treatment capacity of 45 million gallons per day (MGD), three recycled water storage facilities with over a million gallons (12 MG) of storage capacity, and more than 93 miles of transmission and distribution lines.

Located in the Miramar area, the North City Water Reclamation (NCWRP) treats an average of 16.5 MGD of wastewater, although the plant has an ultimate treatment capability of 30 MGD. In CY 2013, 7.0 MGD of the wastewater flows were treated to a tertiary level and 7.1 MGD was beneficially reused. The Department maintains and operates the Northern Service Area distribution system which consists of 91 miles of recycled water pipeline, two reservoirs, two pump stations, with service to 574 meters.

Located at the end of Dairymart Road, near the International Border with Mexico, the South Bay Water Reclamation Plant (SBWRP) treats an average of eight (8) MGD of wastewater, although the Plant has a treatment capability of 15 MGD. In CY 2013, an average of 3.9 MGD of the tertiary treated wastewater flows were beneficially reused. The Public Utilities Department maintains and operates the Southern Service Area distribution system which consists of three (3) miles recycled water pipeline, one storage tank, one pump station and seven (7) meters.

Section 5 - Existing and Projected Supplies

The Public Utilities Department (Department) relies on imported water as its major water supply source, and is a Water Authority member agency. The Water Authority is a member agency of MWD. The statutory relationships between the Water Authority and its member agencies, and MWD and its member agencies, respectively, establish the scope of the Department's entitlements to water from these two agencies. Due to the Department's reliance on these two agencies, this Report relies and includes information on the existing and projected supplies, supply programs, and related projects of the Water Authority and MWD.

The City of San Diego (City) relies on the long-term water resources planning documents of the Water Authority and MWD to support the work on this Report. These documents are available at the following websites and contacts:

San Diego County Water Authority

http://www.sdcwa.org/2010-urban-water-management-plan

Dana Friehauf, Principal Water Resources Specialist (858) 522-6749

Metropolitan Water District of Southern California

http://www.mwdh2o.com/mwdh2o/pages/yourwater/ywater01.html#RUWMP

MWD staff, (213) 217-6000

The Water Authority and MWD are actively pursuing programs and projects to diversify their water supply resources. A description of these efforts as well as the challenges facing the Water Authority and MWD can be found in the San Diego County Water Authority Official Statement, dated February 13, 2013, relating to Water Revenue Refunding Bonds 2013A, and MWD's Official Statement, dated March 13, 2014, relating to Water Revenue Refunding Bonds, 2014 Series A. These Official Statements are available at the following websites[1]:

http://www.sdcwa.org/sites/default/files/files/finance-investor/2013Bond.pdf

http://mwdh2o.com/mwdh2o/pages/finance/PDFs/2014-Ser.A-B-FOS.pdf

A brief overview of MWD and the Water Authority, including the Department relationship to these agencies, is included below.

A description of local surface and local recycled water supplies available to the Department can be found in Section 5.4 of this Report.

[A] This information is current at the time this document was prepared.

5.1 Metropolitan Water District of Southern California

MWD was created in 1928, under authority of the Metropolitan Water District Act (California Statutes 1927, Chapter 429, as reenacted in 1969 as Chapter 209, as amended) (the "MWD Act"). MWD's primary purpose is to provide a supplemental supply of wholesale water for domestic and municipal uses to its constituent agencies. The MWD service area comprises approximately 5,200 square miles and includes portions of the six counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura. There are 26 member agencies of MWD, consisting of 14 cities, 11 municipal water districts and the Water Authority. A Board of Directors, currently numbering 37 members, governs MWD. Each constituent agency has at least one representative on the MWD Board. Representation and voting rights are based upon the assessed valuation of property within each constituent agency. The Water Authority has four members on the MWD Board and about 18 percent of the weighted vote. The total population of the MWD service area is currently estimated at approximately 19 million.

MWD's existing water supplies have been historically sufficient to meet demands within its service area during years of normal precipitation. Although MWD plans and manages reserve supplies to account for normal occurrences of drought conditions, regulatory restrictions, including but not limited to restrictions under the Federal and California Endangered Species Acts, have placed limitations on MWD's ability to provide water to its member agencies. In the future, population growth, regulatory restrictions, increased competition for low-cost water supplies, and other factors such as climate change could impact MWD's ability to supply its member agencies even in normal years.

MWD Water Supply

MWD's two major sources of water are from the Colorado River and the State Water Project (SWP).

Colorado River Water: The Colorado River was MWD's original source of water after its establishment in 1928. The Colorado River Aqueduct, which is owned and operated by MWD, is 242 miles long, starting at Lake Havasu and terminating at Lake Mathews in Riverside County. Under applicable laws, agreements and treaties governing the use of water from the Colorado River, California is entitled to 4.4 million acre-feet of Colorado River water annually, plus one-half of any surpluses that may be available for use collectively in Arizona, California and Nevada as declared on an annual basis by the United States Secretary of the Interior. Under the priority system that governs the distribution of Colorado River water made available to California, MWD holds the fourth priority right of 550,000 acre-feet per year and a fifth priority right of 662,000 acre-feet per year. MWD's fourth priority right is within California's basic annual apportionment of 4.4 million acre-feet; however, the fifth priority right is outside of this entitlement and therefore is not considered a firm supply of water. MWD also retains a "call" on 100,000 acre-feet per year on water transferred to the Coachella Valley Water District and the Desert Water Agency, if needed, so long as they pay for the financial obligations associated with the water during the call period.

Several fish species and other wildlife species either directly or indirectly have the potential to affect Colorado River operations, thus changing the amount of water deliveries to the Colorado River Aqueduct. A number of species that are on either "endangered" or "threatened" lists under the federal and/or California endangered species acts ("ESAs") are present in the area of the Lower Colorado River. MWD and other stakeholder agencies have developed a multi-species conservation program that allows MWD to obtain federal and state permits for any incidental take of protected species resulting from current and future water and power operations of its Colorado River facilities and to minimize any uncertainty from additional listings of endangered species.

<u>State Water Project:</u> The SWP is owned by the State of California and operated by the State Department of Water Resources (DWR). The SWP transports Feather River water stored in and released from Oroville Dam and unregulated flows diverted directly from the San Francisco Bay/Sacramento-San Joaquin Delta Estuary ("Bay-Delta") south via the California Aqueduct to four delivery points near the northern and eastern boundaries of MWD. The total length of the California Aqueduct is 444 miles. MWD is one of 29 agencies that have long-term contracts for water service from DWR, and is the largest agency in terms of the number of people it serves, the share of SWP water to which it is entitled, and the total amount of annual payments made to DWR. MWD's contract with DWR provides for the ultimate delivery of 1,911,400 acre-feet per year (46 percent of the total SWP entitlement). The SWP was originally intended to meet demands of 4.2 million acre-feet per year. Initial SWP facilities were completed in the early 1970s, and it was envisioned that additional facilities would be constructed as contractor demands increased. Several factors, including public opposition, increased costs, and increased non-SWP demands for limited water supplies, combined to delay the construction of additional facilities.

The quantity of SWP water available for delivery each year is controlled by hydrology, environmental and operational considerations. In addition to its importance to urban and agricultural water users, the Bay-Delta is of critical ecological importance. The Bay-Delta is the largest estuary on the west coast of the United States and provides habitat for more than 750 plant and animal species. One-hundred-fifty years of human activity have contributed to the destruction of habitat, the decline of several estuarine and anadromous fish species, and the deterioration of water quality. These activities include increasing water demands from urban and agricultural uses, the dredging and filling of tidal marshes, the construction of levees, urban runoff, agricultural drainage, runoff from abandoned mines, and the introduction of non-native species, thus affecting the supply and reliability of this source.

DWR has altered the operations of the SWP to accommodate species of fish listed under the ESAs. These changes in project operations have adversely affected SWP deliveries. The impact on total SWP operations attributable to the Delta smelt and salmon species biological opinions combined is estimated to be one million acre-feet in an average year, reducing SWP deliveries from approximately 3.3 million acre-feet to approximately 2.3 million acre-feet for the year under average hydrology, and are estimated to range from 0.3 million acre-feet during critically dry years to 1.3 million acre-feet in above normal water years. SWP deliveries to contractors for calendar years 2008 through 2012 were reduced by a total of approximately 2.3 million acre-feet as a result of pumping restrictions. Pumping restrictions impacting the SWP allocation for 2013 have reduced exports by approximately 596,000 acre-feet through calendar year 2013.[B]

5.2 San Diego County Water Authority

The Water Authority's service area lies within the foothill and coastal areas of the westerly third of San Diego County, encompassing 952,208 acres (1,488 square miles). When the Water Authority was established in 1944, its service area consisted of 94,707 acres. Growth has primarily resulted from the addition and annexation of service areas by member agencies. The City, with 210,726 acres, has the largest service area within the Water Authority's total service area. Of the total population of San Diego County, 97 percent live within the Water Authority's service area. The City represents approximately 43 percent of the total population of the Water Authority's service area.

The Water Authority's service area is a semi-arid region where the natural occurrence of water from rainfall and groundwater provides a firm water supply for only a small portion of the water demands of the current population. Since 1990, the Water Authority has provided an average of 85 percent of the water supply within its service area. As a wholesaling entity, the Water Authority has no retail customers, and only serves its member agencies.

The Water Authority's mission is to provide its service area a safe and reliable water supply. Historically, the principal source of supply for the Water Authority's service area has been water purchased by the Water Authority from MWD for sale to the Water Authority's member agencies. However, drought conditions and population growth in the Water Authority's service area have highlighted the need for diversification of the Water Authority's water supplies. Therefore, consistent with its mission statement, the Water Authority has actively pursued a strategy of supply diversification that includes the acquisition and importation of additional water supplies, the development of additional local water supply projects and augmentation of its water supply via local and regional water storage capacity. Water supplies utilized within the Water Authority service area originate from two sources: (1) water imported by the Water Authority and (2) local supplies (such as local runoff, groundwater, recycled water, and prospectively seawater desalination). Since 1990, local supplies have grown to constitute 15 percent of the Water Authority's water supply, and the Water Authority has implemented programs and supported new technologies in order to assist its member agencies in increasing this percentage. Although MWD remains the Water Authority's largest source of imported water, recent years have also seen the diversification of the Water Authority's sources of imported water through core and spot water transfers with other agencies.

In late November 2012, the Water Authority's Board of Directors approved a 30-year Water Purchase Agreement with Poseidon Resources, a private investor-owned company, to purchase water from the proposed Carlsbad Desalination Plant, which is a fully-permitted ocean desalination plant and conveyance pipeline. The plant will produce 50 million gallons a day starting in 2016. By 2020, it will generate enough water to meet seven (7) percent of the region's

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[B] http://mwdh2o.com/mwdh2o/pages/finance/PDFs/2014-Ser.A-B-FOS.pdf current demands[C]. January 8, 2014 represented the first anniversary of construction putting the project a little more than 25 percent complete.

The Quantification Settlement Agreement (QSA) for the Colorado River was completed in October 2003. This historic agreement was enacted to help settle disputes regarding the persistent over-drafting of the state's 4.4 million acre-foot basic annual apportionment of Colorado River water. The agreement includes a long-term transfer of conserved water from the Imperial Irrigation District to the Water Authority. The QSA also commits the state to a restoration path for the environmentally sensitive Salton Sea and provides full mitigation for these water supply programs. Specific programs under the QSA that directly benefit the Water Authority include the San Diego County Water Authority-Imperial Irrigation District water transfer agreement, which currently transfers 100,000 acre-feet of high priority Colorado River water to the Water Authority and will provide up to 200,000 acre-feet of water a year through water conservation measures in Imperial Valley in 2021. The QSA also allows for the transfer of water conserved from the concrete lining of portions of the previously earthen All-American and Coachella Canals from the Imperial Irrigation District. The canal lining projects reduce the loss of water that occurs through seepage. MWD assigned to the Water Authority its right to develop approximately 77,700 acre-feet of conserved Colorado River water annually.

The QSA intended to assure the San Diego region a minimum of 75 years of stable Colorado River water supplies. On November 5, 2003, the Imperial Irrigation District (IID) filed a validation action in Imperial County Superior Court, seeking a judicial determination that 13 agreements associated with the IID/SDCWA water transfer and the QSA are valid, legal and binding. Other lawsuits also were filed contemporaneously challenging the execution, approval and implementation of the QSA on various grounds. All of the QSA cases were coordinated in the Sacramento Superior Court. A final judgment invalidating 11 of the 13 agreements in Phase 1 of the trial was entered on February 11, 2010, and subsequently appealed. On December 7, 2011 the Court of Appeal issued its opinion reversing the judgment and remanding to the trial court for further proceedings. The appellate Court decision resolved many issues in the case, including the validity and constitutionality of the QSA. Trial on compliance with the California Environmental Quality Act was held in November 2012. On June 4, 2013, the court validated the 2003 QSA and related 12 agreements regarding transfers and exchanges of Colorado River water between southern California water agencies. The IID, Coachella Valley Water District, MWD, and SDCWA all sought validation of the agreements from the court under California Water Code section 22762 and California Code of Civil Procedure section 860 et seq., quantifying the amount of Colorado River water each agency may divert and subsequently transfer. The court found the agreements to be valid and adopted in compliance with the requirements of the Brown Act and the California Environmental Quality Act (CEQA). The ruling represents the latest chapter in the longstanding dispute regarding the diversion and use of California's apportionment of the Colorado River under state and federal law.

[C] http://www.sdcwa.org/issue-desal

http://carlsbaddesal.com/

The Water Authority has encouraged the development of additional local water supply projects such as water recycling and groundwater projects through the award of Local Water Supply Development ("LWSD") incentives of up to $200 per acre-foot for recycled water and groundwater produced and beneficially reused within the Water Authority's service area. The purpose of the Water Authority's LWSD program is to promote the development of cost-effective water recycling and groundwater projects that prevent or reduce a demand for imported water and improve regional water supply reliability. The LWSD Program reimburses member agencies for all, or a portion of the difference between the actual per acre-foot cost of producing recycled water, and the revenue generated by the LWSD participant through the sale of that acre-foot of recycled water (not to exceed $200 per acre-foot). In February 2008, the program was expanded to include funding for local brackish and seawater desalination projects.

5.3 2009 Comprehensive Water Package

On November 4, 2009, the California State Legislature passed a comprehensive package of water legislation (the "2009 State Water Legislation") that included five bills (four of which were subsequently signed by Governor Schwarzenegger) addressing California's statewide water situation, with particular emphasis on the Bay-Delta. The 2009 State Water Legislation included, among other things, a 20 percent water conservation mandate for most localities in the State by 2020, new regulations regarding voluntary monitoring of groundwater levels by localities, and an $11.1 billion State general obligation bond measure. The water bond measure was originally certified to be on the State's 2010 ballot. The ballot has already been delayed twice, in 2010 and in 2012. However, the date of the ballot measure has since been pushed to November 2014. The 2009 State Water Legislation also created two new governmental agencies – the Delta Stewardship Council and the Sacramento-San Joaquin Delta Conservancy. The Delta Stewardship Council is charged with developing and implementing a Delta Plan, which would include the Bay Delta Conservation Plan, upon meeting certain conditions. The Sacramento-San Joaquin Delta Conservancy will implement ecosystem restoration activities in the Bay-Delta. In addition, the 2009 State Water Legislation included legislation addressing unauthorized Bay-Delta water diversions. At this time, it is not known what effect the 2009 State Water Legislation will have on future water supplies.

As of March 2014, several bills have been introduced aiming to reduce the amount of the original water bond measure, to amounts ranging between six and ten billion dollars. It is expected that one final bill will ultimately be selected and certified for the late 2014 ballot.

5.4 Public Utilities Department

The Department currently purchases approximately 85 to 90 percent of its water from the Water Authority, which supplies the water (raw and treated) through two aqueducts consisting of five pipelines. While the Department imports a majority of its water, it uses three local supply sources to meet or offset potable demands: local surface water, conservation, and recycled water.

The availability of sufficient imported and regional water supplies to serve existing and planned uses within the Department service area is demonstrated in the prior discussion on the water supply reliability of MWD and the Water Authority. The City has been receiving water from the Water Authority since 1947, and during the last 20 years purchased between 100,000 and 228,000

AFY. For Calendar Year 2013 water purchases totaled approximately 185,466 AF. Depending upon demands, growth and the success of local water supply initiatives, this could remain somewhat constant or increase up to a projected maximum of 298,860 AFY in 2035 during normal years. For the purpose of this analysis the maximum is used.

5.4.1 Demonstrating the Availability of Sufficient Supplies

Imported Supplies

Section 5, subdivision 11 of the County Water Authority Act states that the Water Authority "as far as practicable, shall provide each of its member agencies with adequate supplies of water to meet their expanding and increasing needs." Depending on local weather and supply conditions, the Water Authority provides between 75 to 95 percent of the total supplies used by its 24-member agencies. As mentioned in Section 4, the Public Utilities Department and other local retail water distributors formed the Water Authority in 1944 for the purpose of purchasing Colorado River water from the MWD.

Local Surface Water Supplies

The Department maintains and operates nine local surface raw water storage reservoirs which are connected directly or indirectly to water treatment operations. In the San Diego region approximately 13 percent of local precipitation produces surface run-off to streams that supply Department reservoirs. Approximately half of this run-off is used for the municipal water supply, while the remainder evaporates during reservoir storage. In very wet years, the run-off remainder may spill over the reservoir dams and return to the Pacific Ocean. Average rainfall produces less than half of the average run-off in San Diego. The local climate requires about average rainfall to saturate the soils sufficiently for significant surface run-off to occur. Therefore, most of the run-off to reservoirs is produced in years with much greater than average rainfall. Some flooding may occur even during average or below average rainfall years if the annual rainfall is concentrated in a few intense storms.

The use of local water is affected by availability and water resource management policies. The Department's policy is to use local water first to reduce imported water purchases and costs. The Department also operates emergency and seasonal storage programs in conjunction with its policy.

The purpose of emergency storage is to increase the reliability of the imported water aqueduct system. This is accomplished by maintaining an accessible amount of stored water that could provide an uninterrupted supply of water to the City's water treatment facilities should an interruption to the supply of imported water occur. The management of reservoirs is guided by Council Policy 400-04, which outlines the City's Emergency Water Storage Program. The policy mandates that the Department store sufficient water in active, available storage to meet six-tenths of the normal annual (7.2 months) City water demand requirements (conservation is not included). Active, available storage is that portion of the water that is above the lowest usable outlet of each reservoir.

The monthly emergency storage requirement changes from month-to-month, and is based on the upcoming seven months water demand. This results in a seasonally fluctuating emergency storage requirement, generally peaking in May and reaching its minimum in October. This seasonally fluctuating requirement makes a portion of the required emergency storage capacity available for impounding or seasonal storage.

The purpose of seasonal storage is to increase imported water supply. This is done by storing surplus imported water in the wet winter season for use during the dry summer season. This may also be accomplished by increased use of imported water in lieu of local water in the winter when local water may be saved in reservoirs or groundwater basins for summer use. In addition to increased water yield, this type of seasonal operation also reduces summer peaking on the imported water delivery system.

Conservation

The Department's Water Conservation Program is effective in promoting permanent water savings. Established by the City Council in 1985, the Water Conservation Program accounts for more than 35,650 acre-feet of potable water savings per year. This savings has been achieved by creating a water conservation ethic, adopting programs, policies and ordinances designed to promote water conservation practices, and implementing comprehensive public information and education campaigns.

The City offers a broad range of conservation methods to help meet the needs of our residential and commercial water customers. These include, but are not limited to, the following:

- Rebate programs for high efficiency toilets, washing machines and commercial water saving devices
- Rebates for replacing turf with sustainable landscapes and micro-irrigation systems
- Residential interior/exterior and commercial landscape survey programs
- Public education and outreach

Research conducted by the City, the Water Authority, and the Water Research Foundation has shown that more than half of residential water-use is outdoors. Therefore, the City has added outdoor conservation programs to focus on water efficient landscaping and irrigation management, which provide the best opportunity to achieve significant water savings.

Tools and services available for customers include:

- Commercial and Residential Water-Use Survey Programs — account for all water-use, determine leaks, and check irrigation systems for proper function and uniform coverage. Residential surveys average 15 percent water savings, while commercial surveys, depending on type of facility, can achieve 15 percent to 25 percent water savings. The current focus is on multi-family surveys.

- Nationally recognized Landscape Watering Calculator — an on-line tool that creates watering schedules based on landscaping features, soil type, and weather data. The Calculator is very popular [http://apps.sandiego.gov/landcalc/start.do] and those who have used it are impressed with its ease of use. MWD has adopted this tool and it is available throughout Southern California.

- Water Resources Landscape Database — another tool used to create water budgets and manage irrigation using aerial photographs, GIS maps, weather data, etc. This service has generated significant water savings in City parks, freeway landscapes, schools, and homeowner associations.

- New programs in place include incentives to install water efficient irrigation equipment and evapo-transpiration controllers (smart irrigation clocks that use weather data to set watering schedules); as well as incentives to replace turf with sustainable landscapes.

- The Water Conservation Section teamed up with the Transportation & Storm Water Department to include rain barrels as an item that can receive a rebate through the “Outdoor Water Conservation Rebate Program.” Rain barrels are used to collect rainwater from hard surfaces such as household rooftops. When citizens install a rain barrel at their home, they are helping to maintain a healthy urban watershed by reducing the demand on the potable water system, while also reducing the amount of wet weather runoff that is collected and sent into the public storm water system.

- ‘San Diego Municipal Code (SDMC) 67.06 Water Submeters’ was adopted in April 2010, to encourage water conservation in multi-family residential and mixed-use buildings by requiring the use of water submeters for each individual residential unit. Billing individual residential units based on the actual amount of water consumed in the unit creates a financial incentive for residents of multi-family residential units to conserve water.

Planning efforts to increase water conservation is an ongoing process. The aforementioned water conservation programs undergo periodic reevaluation to ensure the realization of forecasted savings. Additionally, changes in water conservation technologies may require reassessment of long-range plans. The Department continues to work with proven water conservation programs, while including irrigation management programs to maximize water savings; regularly examines new technologies and annually checks progress towards conservation goals; and, continues to work collaboratively with MWD and the Water Authority to formulate new conservation initiatives. The City’s water conservation report, prepared annually, is available at http://www.sandiego.gov/water/pdf/waterreuse/2013/fy13annualwater130101.pdf. The report provides an ongoing assessment and status update, redirecting or enhancing efforts as needed. The programs outlined in the document undergo periodic reevaluation to ensure the realization of forecasted savings.

Drought Management

On January 17, 2014, California Governor Jerry Brown declared a drought in California. On February 11, 2014, the Metropolitan Water District of Southern California’s Board of Directors declared a Water Supply Alert throughout its 5,200-square-mile service area as part of a set of comprehensive actions to address the state’s unprecedented dry conditions. Additionally, on February 13, 2014, the San Diego County Water Authority’s Board of Directors unanimously called upon the region’s residents, businesses and institutions to increase water conservation efforts in response to severe drought conditions across California. The Board also approved notifying the Water Authority's 24-member agencies, including the City of San Diego, which the region is at Level 1 Drought Watch of the Model Drought Response Ordinance.

The City has an extensive list of permanent water use restrictions that are outlined in San Diego Municipal Code Section §67.3803. These restrictions were updated several times during the last California drought. They are in effect every day in San Diego and include the following limitations:

a) no runoff/excessive irrigation;
b) repair leaks upon discovery or within seventy-two hours of notification;
c) no watering of paved areas;
d) no overfilling swimming pools and spas;
e) no non- recirculating decorative water fountains;
f) car washing only in a commercial car wash or using a hose with shutoff nozzle or a bucket;
g) new buildings must recycle cooling system water and car wash water;
h) restaurants will only serve and refill water upon request;
i) hotel guests must have the option of not laundering towels and linens daily;
j) no watering after 10 am and before 4 pm (winter)/before 6 pm (summer);

San Diego's permanent water use restrictions are typically similar to the restrictions many local water agencies implement when they invoke their Level 1 water restrictions.

The City's "Drought Response Level 1 – Drought Watch Condition" is typically invoked when the City Council finds a reasonable probability, that there will be a supply shortage and that a consumer demand reduction of up to ten percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. The Level 1 Drought Watch Condition adds additional voluntary water conservation measures that are added to the City's existing permanent water restrictions outlined in SDMC §67.3803. These voluntary measures include:

1) landscape irrigation limited to assigned three days per week
2) when watering without an irrigation system a shut-off nozzle or garden hose sprinkler system on a timer is required
3) washing vehicles limited to the same schedule as irrigation (except for: boats which may be washed after use; vehicles with health/safety issues; at a commercial carwash that recycles water)
4) use recycled or non-potable water for construction purposes
5) fire hydrants for firefighting only
6) construction operations can use water only as required by regulatory agencies
7) irrigation is not permitted during rain event

The San Diego City Council invoked a "Drought Response Level 1 – Drought Watch Condition" on May 20, 2014, that will go into effect on July 1, 2014.

Recycled Water Supplies

In CY 2013, the beneficial reuse of the recycled water was 12,205 AF: 7,877 AF from the NCWRP and 4,328 AF from the SBWRP. Although landscape irrigation continues to be the leading use of the recycled water, the customer base has become more varied over the years with an increase in the number of industrial and dual plumbed meter connections.

Proactive marketing activities targeting existing irrigation customers, to encourage them to convert their cooling systems to recycled water, coupled with outreach efforts to connect new customers have been successful, as recycled water meter connections have increased over 41 percent since 2007. As of December 2013, the City provides recycled water service to 576 retail meters and 4-5 wholesale meter connections, including the City of Poway, Olivenhain Municipal Water District (3 connections) and Otay Water District. The 2013 top ten retail customers included the City of San Diego Park & Recreation Department, Miramar Marine Corps Air Station Miramar, Black Mountain Ranch and Santa Luz HOA, Caltrans, El Camino Memorial Park, U.S. International Boundary & Water Commission, The Irvine Company, Qualcomm, Village Nurseries (Miramar Nursery) and the City of San Diego's Miramar Landfill.

In CY 2013, financial incentives from the sale of recycled water resulted in nearly $2.85 million in savings towards imported water purchases. The financial incentives are a result of local water resources development agreements with Metropolitan Water District and the San Diego County Water Authority.

The Department, in cooperation with the Park & Recreation Department, has aggressively pursued the retrofitting of City parkland, street landscaping and open space to use recycled water for irrigation; sites fronting recycled water distribution pipelines were targeted. In 2007 only 23 recycled water meters were serving City sites; that number has since grown to 84 meter connections. The Departments are currently working on retrofitting four additional parks/open spaces. The irrigation retrofits are funded in part by Federal and State grants.

Public Utilities Department's Capital Improvement Program

The Department reevaluates water projects contained in the Capital Improvements Program (CIP) and the timing thereof periodically. Changes to the CIP are made to reflect changing priorities within the water system and occur as a result of project scope changes, date revisions, project sequencing, and operational considerations. The Department expended approximately $840 million from July 1, 2003 through June 30, 2013 on CIP projects. Improvements included projects to upgrade and expand water treatment plants, rehabilitate raw and treated water storage facilities, construct major transmission pipelines, replace and/or upgrade existing pump stations, replace cast iron water mains citywide, expand the recycled water system, and other new supply initiatives. In November 2013, the City Council adopted water rate increases of 7.25 percent beginning on January 1, 2014 and 7.5 percent beginning on January 1, 2015. These rate increases provided needed revenue to continue funding the upgrade and expansion of the water system through the CIP in order to ensure a reliable water supply for all City residents and meet CDPH mandates. For fiscal years ending June 30, 2009 through June 30, 2012, the Department expended approximately $408 million on such improvements.

In 2009, the Department initiated a facilities master plan to identify long-term facility needs. With the completion of the water master plan in 2011, over 80 projects were identified through the master planning effort for CIP implementation of fiscal years 2012-2032. Project scopes were developed from facility condition assessments and system evaluations. The prioritization of CIP projects are based on the adopted City Council Policy 800-14 (CP 800-14) as well as inputs from Independent Rates Oversight Committee members and operational staff. The list of prioritized projects will be the basis for 2012-2032 CIP program.

Summary of Supplies

Historic imported water deliveries from the Water Authority to the Public Utilities Department and local surface water, conservation savings and recycled water deliveries are shown in **Table 5-1.**

Table 5-1
Historic Imported, Local and Recycled Water Demands*
Public Utilities Department (Source: 2010 UWMP)

Fiscal Year	Imported Water (acre-feet)	Local Surface Water (acre-feet)	Conservation[1] (acre-feet)	Recycled Water (acre-feet)	Total[2] (acre-feet)
1990	233,158	22,500	-	-	255,658
1995	162,404	59,024	8,914	-	230,342
2000	207,874	39,098	17,410	3,250	267,632
2005	204,144	26,584	29,410	4,294	264,432
2010	188,337	13,117	34,317	12,173	247,944

Table 5-1 Notes:

[1] Conserved water results in savings and is not a direct supply.
[2] Total includes water supplied and conserved.
*Includes retail and wholesale demands

5.4.2 Plans for Acquiring Additional Supplies

Future Supplies

In 2002, the City of San Diego City Council adopted the Long-Range Water Resources Plan (Long-Range Plan) 2002-2030. This plan provides a decision-making framework for evaluating water supply options. The Long-Range Plan identifies water conservation, water recycling, groundwater desalination, groundwater storage, ocean desalination, marine transport, water transfers, and imported supply from the Water Authority and MWD as potential near-term and long-term supplies. The Long-Range Plan concluded that no single supply source would be sufficient to meet the City’s future water demands, but a portfolio of supply options would reduce the dependence upon imported water over time.

The Department completed the City Council approved 2012 Long-Range Water Resources Plan (2012 LRWRP) on December 10, 2013. The 2012 LRWRP is a high level strategy document that evaluates water supply and demand-side objectives against multiple planning objectives. The 2012 LRWRP was an open participatory – stakeholder driven process that evaluated over 20 water supply options such as water conservation, recycled water, groundwater storage, brackish groundwater desalination, rainwater harvesting, graywater and potable reuse. The plan takes a long-range viewpoint through the year 2035 in addressing risk and the uncertainty of future water supply conditions. It is a plan that sets the tone or direction of where the City places its efforts in developing local water supplies.

Conservation and water recycling programs have been implemented and are under investigation for ways to be expanded or increased. The Department is also investigating the development of groundwater and potable reuse.

Conservation

Like many agencies in California, the City is committed to reducing its per capita water consumption by at least 20 percent by the year 2020. Aside from the existing programs listed in Section 5.4.1 of this report, the City is also evaluating the following programs to help reduce overall water consumption:

- Water budget based billing for irrigation only customers - An effort is currently underway to evaluate billing irrigation customers based on their ability to meet property specific water use budgets, and implement a tier rate structure that encourages usage within water budgets.

- Conservation-oriented rate structures - The new rate structure, which took effect in January 2014, adds a new tier that recognizes water conservation efforts, and increases the rates for higher tiers to discourage high volume usage.

- Automated Meter Interface - The City is starting to install smart water meters in monthly billed accounts. These meters allow remote access to consumption patterns via a web portal, and give water customers data that they can monitor and use to manage better their water consumption.

Recycled Water

Recycled Water Study:

The Recycled Water Study was presented to and unanimously accepted by the City Council on July 17, 2012, following a three-year effort that included extensive stakeholder involvement. The Study can be located at the following link:

http://www.sandiego.gov/water/pdf/waterreuse/2012/recycledfinaldraft120510.pdf.

During the 2008 to 2010 Point Loma Wastewater Treatment Plant (Point Loma) permit modification process, San Diego Coastkeeper and the San Diego Chapter of the Surfrider Foundation entered into a Cooperative agreement with the City to conduct the Recycled Water Study (Study). In accordance with the agreement, the San Diego Coastkeeper and the San Diego Chapter of the Surfrider Foundation did not oppose the United States Environmental Protection Agency's (USEPA) decision to grant the permit modification. The City Council authorized the execution of the Cooperative Agreement on February 18, 2009. The modified Permit allows Point Loma to continue operating as a chemically enhanced primary treatment facility (CEPT) for five years until July 31, 2015 when the permit must be renewed rather than upgrading the treatment system to meet secondary standards as required in the federal Clean Water Act. The Study concluded meeting all terms of the Agreement with Coastkeeper and Surfrider.

The Recycled Water Study identified five (5) Reuse Alternatives. Non-Potable Reuse, Indirect Potable Reuse, and wastewater off-load to the Point Loma are the common components of each of the five alternatives. All reuse alternatives presented in the study achieve the study goals, provide a bold vision for the future water reuse in the Metro Service Area, and provides potential savings to ratepayers. For additional details on the Reuse Alternatives, please see the Recycled Water Study Report Dated July 2012 in the above link.

Potable Reuse:

Potable Reuse is an approach the City is considering for maximizing the use of recycled water. Recycled water that is used for non-drinking uses like irrigation and industrial processes, would undergo advanced water purification (AWP) to render it safe for reuse as a drinking water supply. The AWP process uses multiple treatment barriers to remove contaminants from the water and prevent them from re-entering the water supply. It begins with membrane filtration, followed by reverse osmosis, and ends with advanced oxidation. The result is purified water that meets all drinking water standards and is similar in quality to distilled water.

There are two major types: Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). With IPR, the purified water is sent to an environmental buffer; for the City's IPR concept, San Vicente Reservoir would be the environmental buffer. The water in San Vicente is treated at a drinking water treatment plant before it is distributed for drinking purposes. Direct potable reuse differs in that there is no environmental buffer. The California Department of Public health is mandated to determine the feasibility of establishing DPR regulations. Industry experts expect that DPR regulatory criteria to include the use of additional treatment or engineered storage barriers to compensate for the absence of an environmental buffer. The City monitoring the development of DPR regulations and how they might influence the viability of potable reuse implementation.

Water Purification Demonstration Project:

In order to assess the feasibility of indirect potable reuse with reservoir augmentation (IPR/RA), the City initiated a Water Purification Demonstration Project (Demonstration Project). The Demonstration Project evaluated the feasibility of using advanced water purification (AWP) technology to produce water that can be sent to San Vicente Reservoir, subsequently treated, and later be distributed as potable water.

As part of the Demonstration Project, the City tested and operated a one-million gallon per day demonstration-scale AWP Facility from June 2011 to August 2012. The purified water was routinely tested to determine the effectiveness of the treatment equipment and operating data was gathered to develop a cost estimate for full-scale facilities. A study of San Vicente Reservoir was also conducted to establish residence time and short circuiting conditions of the purified water in the reservoir. An extensive public outreach and education program was implemented to educate the public about the potential benefits and implications of an IPR/RA project. The City also coordinated with the State's regulatory agencies to help define the requirements for an IPR/RA project. The Final Project reports have been completed and are available at the following link: www.purewatersd.org/projectreports . The Demonstration Project reports were presented to full City Council on April 23, 2013. The City Council adopted the Demonstration Project Reports and directed staff to determine a preferred implementation plan and schedule that considers potable reuse options for maximizing local water supply and reduced flows to the Point Loma Wastewater Treatment Plant. This follow on effort, now known as the Pure Water San Diego Program, is described in more detail below.

Pure Water San Diego Program:

The Department's Pure Water San Diego Program (Program) is a 20-year program ending in year 2035. The program will create a safe and reliable local water supply through potable reuse, while reducing the Point Loma Wastewater Treatment Plant's ocean discharges and accomplishing secondary equivalency.

Department staff have initiated technical studies to refine system-wide reuse concepts development in the Recycled Water Study (July 2012), are developing a cost-sharing framework, serving on an advisory group to an Expert Panel on Direct Potable Reuse (DPR) and Recycled Water, and are continuing tours of the Advanced Water Purification Facility, speakers bureau presentations and community events participation.

In addition to the above, Department staff is engaged in the preparation of the National Pollution Discharge Elimination Permit (modified permit) for Point Loma which expires July 31, 2015. The draft modified permit application will be brought forward for City Council consideration in fall 2014. Staff is also developing a regulatory and legislative strategy related to Point Loma that will require City Council input and involvement.

The Department is working on implementing the various facets of the Pure Water San Diego Program. Implementation strategy tasks include facility siting studies, engaging key regulatory agencies to develop a modified NPDES permit renewal application which secures long-term compliance with discharge standards at Point Loma through potable reuse and secondary equivalency, and establishing a financing plan and cost-sharing principles with other public agencies that use the City's wastewater system.

This comprehensive effort will provide a secure and reliable long-term local water supply for San Diego while resolving the decade's long issues associated with Point Loma.

Groundwater

There are several groundwater basins in the San Diego region that the City has rights, concerns jurisdiction or otherwise an interest in developing for municipal supply or other beneficial use. These basins are:

- San Pasqual Basin
- Mission Valley Basin
- El Monte/Santee Basin
- Tijuana Basin
- San Diego Formation

The groundwater quality from these basins is predominantly brackish. Improved technologies provide consideration of affordable water sources, such as brackish groundwater, that were not available a few decades ago. This source is a viable alternative and is part of the City's planning efforts. Local water supply projects, particularly groundwater exploration, benefit City rate payers, offer drought protection, and are locally controlled. The City is presently pursuing groundwater feasibility projects in Mission Valley Basin, El Monte/Santee Basin, and the San Diego Formation.

The City is the Monitoring Entity for the San Pasqual Basin as identified under the California Statewide Groundwater Elevation Monitoring (CASGEM) program. Working cooperatively with the California Department of Water Resources (DWR), the City established a network of monitoring wells to regularly and systematically track seasonal and long-term trends in groundwater elevations for this alluvial groundwater basin. Included in this monitoring network are three multi-level monitoring wells in San Pasqual installed by the United States Geological Survey under a cooperative hydrogeological agreement with the City. Participation in the statewide CASGEM program allows basin groundwater data to be maintained and readily available through DWR's public data base.

A Salinity and Nutrient Management Plan (SNMP) is being developed for the San Pasqual Basin to identify excessive salt and nutrient loading for protection of groundwater quality for agriculture, potable water supply and other beneficial groundwater uses. In compliance with the adopted State Water Resources Control Board's (State Board) Recycled Water Policy 2009 to complete SNMPs by May 30, 2014, the City is facilitating a stakeholder driven basin-wide approach to complete this effort. The SNMP incorporates framework components from the SNMP guidelines *(Salinity/Nutrient Management Planning in the San Diego Region (9), Welch 2010)* adopted by the State Board.

The San Diego City Council adopted the San Pasqual Groundwater Management Plan (GMP) in 2007. Several management actions outlined in the GMP are currently being implemented and will continue in the future. For the next several years, basin activities such as surface water and groundwater monitoring programs, water quality testing, basin water budget, and basin capacity studies will be the focus for understanding, protecting and evaluating the long-term sustainable use of the San Pasqual Basin as a water supply source.

The City has been investigating Mission Valley Aquifer. Mission Valley is a narrow, east-west trending valley carved out by the San Diego River as it drains westward from Mission Gorge to the Pacific Ocean. The most conductive portion of the aquifer lies within the extent of an historical well field where the City has retained ownership of the property and where a substantial portion is overlain by Qualcomm Stadium and its parking lot. Part of the history is the establishment of the City's pueblo water right, a prior and paramount right to all of the water of the San Diego River (surface and underground). A fuel tank farm was built in Mission Valley at the mouth of Murphy Canyon in 1963 know as Mission Valley Terminal (MVT). Underground fuel contamination was suspected to being in 1986. From 1986 to 1991 approximately 200,000 gallons of gasoline leaked from the tank farm known as the Mission Valley Terminal located upstream of Qualcomm Stadium. Although remediation of the Mission Valley Aquifer has been ongoing for a period of time, the City is waiting for remediation to be complete before resuming its plans for development of the aquifer for municipal supply.

The City desires to use the San Diego Formation for groundwater municipal supply and seeks to manage the safe yield of the aquifer system in a prudent and efficient manner. The City has been engaged in investigating to gain a better understanding of the San Diego Formation Basin for many years. The City will be able to better characterize the water quality and quantity in the groundwater basin through monitoring wells installed in 2007, 2008, 2011 and 2012. In addition, the City has been working with the United States Geological Survey to develop an integrated and comprehensive understanding of the geology and hydrology of the San Diego Formation, and to use this understanding to evaluate a sustainable, long-term environmental sound use of the formation for municipal supply.

The City has been producing groundwater from the Santee – El Monte basin from two municipal supply wells. One well is located just downstream of the San Vicente Reservoir and the other is located just downstream of the El Capitan Reservoir. The City is evaluating the expansion of its groundwater production facilities at each location to maximize yield. The City's existing San Vicente Production well was constructed in 2004 and pumps a maximum of 600 gallons per minute. The well conveys groundwater directly to the City's existing raw water line from the reservoir and ultimately to the City's Alvarado Treatment Plant. The well located just downstream of the El Capitan reservoir. This well is installed in a granitic rock formation and extracts water from a fractured rock system at an average yield of 50 gallons per minute. This well also conveys groundwater to a raw water pipeline coming from the dam to supply the Alvarado Treatment Plant.

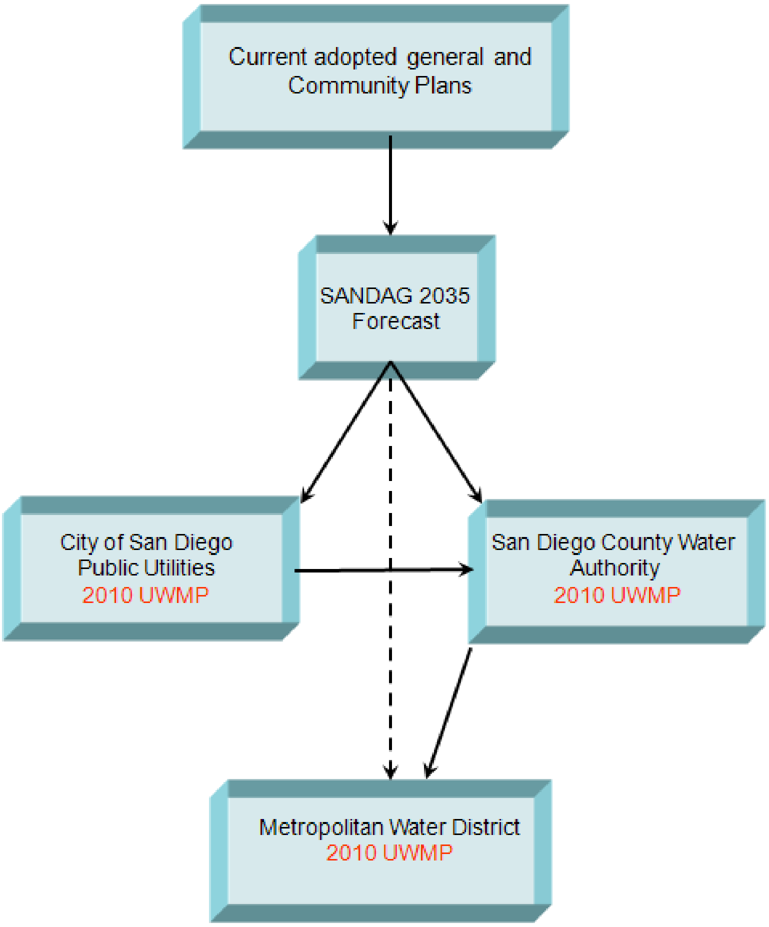
Section 6 - Projected Demands

Approximately every three years the Public Utilities Department (Department) calculates projected water demands within its service area for planning purposes. A computer model is used (IWR-MAIN) to break down water-use by major water-use sectors: Commercial, Industrial, Residential and Public uses. Using past water-use data from the Department and demographic data provided by SANDAG land use, the model is able to correlate the data to determine sector water demands. Using this correlated data, future demographic data is used to project water demands. The model also accounts for water conservation, weather and water rate changes.

In addition to the Department, the Water Authority and MWD use regional growth forecasts to calculate projected water demands within their respective service areas. This provides for consistency between the retail and wholesale agencies projected water demands, thereby ensuring that adequate supplies are being planned for the Department's existing and future water users. The SANDAG forecasts are based on adopted community plan land use, but not citywide zoning. SANDAG forecasts the number of residents, dwelling units, and employees in an area, but not square footage, hotel rooms, or visitors (non-residents or non-employees). For urban areas the smallest forecast geography is typically at the block level, but for suburban and less developed areas the forecast geography can be larger. SANDAG typically updates the regional growth forecast every three to four years. The Public Utilities Department water demand projections, based on the SANDAG Series 12 Forecast land use, are incorporated in the City's 2010 UWMP. These projections are then forwarded to the Water Authority for use in the preparation of their UWMP, which is further incorporated into MWD's UWMP to calculate the ultimate water demands of the region (see **Figure 6-1**).

The Department updates its UWMP every five years. The 2010 UWMP, originally scheduled for completion in December 2010, was completed and adopted in June 2011. The time extension granted for the completion of the 2010 UWMP was due to the new SBX7-7 reporting requirement that needed to be incorporated into the 2010 UWMP. SBX7-7, which is part of the 2009 Water Legislation, requires urban water agencies to reduce statewide per capita water consumption 20 percent by 2020.

FIGURE 6-1
WATER DEMAND PROJECTIONS



The demands from the 2010 UWMP are used throughout this Report. The historical and projected water demands for a normal year are shown in **Table 6-1**.

As part of the requirements for complying with SB 610, **Table 6-7** and **Table 6-8** show the single-dry year and consecutive multiple-dry year demands. All tables in this section are based on data from the 2010 UWMP.

TABLE 6-1
PAST, CURRENT, AND PROJECTED WATER DELIVERIES
(AFY)

Water Use Sector	2005				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single-family	217,983	77,864	0	0	77,864
Multi-family	28,443	39,220	0	0	39,220
Commercial	14,468	33,099	0	0	33,099
Industrial	253	4,276	0	0	4,276
Institutional/Governmental	2,341	16,842	0	0	16,842
Landscape Irrigation	7,245	27,877	0	0	27,877
Total	270,733	199,178	0	0	199,178

Source: City of San Diego Public Utilities Report U02-P10715.

Water Use Sector	2010				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single-family	220,862	62,367	0	0	62,367
Multi-family	28,361	36,324	0	0	36,324
Commercial	14,542	27,244	0	0	27,244
Industrial	186	2,325	0	0	2,325
Institutional/Governmental	2,321	13,774	0	0	13,774
Landscape Irrigation	7,327	20,257	0	0	20,257
Total	273,599	162,291	0	0	162,291

Source: City of San Diego Public Utilities Report U02-P100715.

Table 6-1, Continued

Water Use Sector	2015				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single-family	231,346	75,922	0	0	75,922
Multi-family	32,082	47,266	0	0	47,266
Commercial	14,376	31,617	0	0	31,617
Industrial	186	2,071	0	0	2,071
Institutional/Governmental	2,302	13,359	0	0	13,359
Landscape Irrigation	7,583	25,452	0	0	25,452
Total	287,587	195,688	0	0	195,688

Water Use Sector	2020				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single-family	236,639	79,992	0	0	79,992
Multi-family	37,330	56,700	0	0	56,700
Commercial	14,783	33,541	0	0	33,541
Industrial	186	2157	0	0	2157
Institutional/Governmental	2,302	13,772	0	0	13,772
Landscape Irrigation	7,869	27,247	0	0	27,247
Total	298,582	213,409	0	0	213,409

Water Use Sector	2025		2030		2035	
	Metered		Metered		Metered	
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)
Single-family	241,491	83,370	244,138	85,633	245,682	86,471
Multi-family	42,662	66,070	47,910	75,328	52,420	82,781
Commercial	14,681	34,012	14,100	33,116	13,853	32,740
Industrial	176	2,077	166	1,995	166	1,967
Institutional/Governmental	2,247	13,639	2,172	13,399	2,154	13,329
Landscape irrigation	8,192	28,893	8,162	29,301	8,543	30,698
Total	308,505	228,061	315,534	238,772	321,337	247,986

Table 6-2 summarizes the current and planned water sources the City is relying on to meet future demands.

TABLE 6-2
PLANNED WATER SUPPLY SOURCES
(AFY)

Water Supply Sources	Wholesaler Supplied Volume (yes/no)	2015	2020	2025	2030	2035
San Diego County Water Authority	**Yes**	**201,719**	**221,458**	**237,622**	**249,728**	**260,107**
Supplier produced surface water [(a)]		**29,000**	**29,000**	**29,000**	**29,000**	**29,000**
Supplier produced groundwater		**500**	**500**	**500**	**500**	**500**
Transfers In		**0**	**0**	**0**	**0**	**0**
Exchanges In		**0**	**0**	**0**	**0**	**0**
Recycled Water [(b)]		**9,253**	**9,253**	**9,253**	**9,253**	**9,253**
Desalinated Water		**0**	**0**	**0**	**0**	**0**
Other		**0**	**0**	**0**	**0**	**0**
Total		**240,472**	**260,211**	**276,375**	**288,481**	**298,860**

Notes:

(a) Local surface water estimates provided by City, 2011.

(b) Recycled water excludes recycled water sold to other agencies and is from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.

6.1 Water Sales to other Agencies

Potable Water

The City, through past agreements, sells treated water to the California American Water Company (Cal-Am) which provides water service to the cities of Coronado and Imperial Beach, and Naval Air Station North Island. The population of Naval Station North Island is located within the City of Coronado, whereas the other military bases that the City serves are within the City. The City also sells untreated water to Santa Fe Irrigation District and San Dieguito Water District. **Table 6-3** presents the water sales to other agencies.

Per the agreement between the City and Cal-Am, only local surface water is sold to Cal-Am to provide water to supply Cal-Am customers. A portion of City residents in the South Bay area are also served by Cal-Am and can be served by imported water as well. Per the agreement between the City and the City of Del Mar, the City takes deliveries of water, which the City of Del Mar purchases from the Water Authority, through the Second Aqueduct Connection at Miramar. This water is then treated at the City's Miramar WTP and transported to the City of Del Mar through several interconnections.

The City has agreements to provide surplus treated water to Otay Water District and untreated exchange water to Ramona Municipal Water District. These water deliveries occur infrequently and for short periods of time, and are therefore not shown in **Table 6-3**.

TABLE 6-3
SALES TO OTHER AGENCIES-POTABLE
(AFY)

Water Distributed	2005	2010	2015	2020	2025	2030	2035
California American Water Company	13,311	11,462	13,153	13,395	13,452	13,757	13,988
Santa Fe Irrigation District and San Dieguito Water District [(a)]	2,012	7,227	7,596	7,983	8,391	8,819	9,268
City of Del Mar [(b)]	1,324	1,058	1,112	1,168	1,228	1,290	1,356
Naval Air Station North Island	1,204	1,568	1,568	1,568	1,568	1,568	1,568
Total	14,515	13,030	14,721	14,963	15,020	15,325	15,556

Notes:

[(a)] Through a joint agreement, the City supplies raw water from local surface water supplies to Santa Fe Irrigation District/San Dieguito Water District, and treated water to the other agencies. This water supply is not included in total since the supply is not included in the local surface water supply.

[(b)] City of Del Mar not included in total as the City is treating water for Del Mar that is provided by Water Authority.

Recycled and Non-Revenue Water

The City has three separate agreements to sell recycled water. Olivenhain Municipal Water District and the City of Poway are provided recycled water from the City's North City Water Reclamation Plant while Otay Water District receives recycled water from the City's South Bay Water Reclamation Plant.

Non-Revenue Water (NRW) is water that is unaccounted for or unbilled water consumption. Unaccounted for water can be attributed to unauthorized consumption, meter inaccuracies, data errors, leakage on mains, leakage and overflow at storage and leakage at service connections. Using metered demand and total City delivered values, NRW was computed as 8.2 percent in 2012. Water use for firefighting, line flushing and other authorized, but unbilled use is classified in the computation of NRW as unbilled consumption.

City staff deemed it reasonable to assume this percent system loss could be maintained in future years given the City's aggressive program of leak detection and repair. The City is going forward with an automated meter reading system that could improve billing accuracy, better quantify real versus apparent losses and identify customer leaks. Thus, NRW is held constant in the projections at 9.0 percent for forecast years. **Table 6-4** represents the City's additional water uses (recycled water) and NRW.

TABLE 6-4
ADDITIONAL WATER USES AND LOSSES
(AFY)

Water Use	2005	2010	2015	2020	2025	2030	2035
Recycled water	4,294	7,656	9,253	9,253	9,253	9,253	9,253
Non-revenue water	10,404	21,909	20,810	22,586	24,041	25,131	26,065
Total	14,698	29,565	30,063	31,839	33,294	34,384	35,318

Notes:

1. *Source for recycled water: 2005 from Table 2-8 of the City's 2005 Urban Water Management Plan. 2010 from NCWRP and SBWRP beneficial reuse summary tables with wholesale deliveries excluded provided by the City on March 2, 2011. 2015 and later from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.*
2. *Recycled water is City use only and excludes recycled water sold to other agencies.*
3. *Source for non-revenue water: For 2005, Table 2-8 of the City's 2005 Urban Water Management Plan with 4.3% assumption. For 2010 to 2035, City of San Diego Public Utilities, Update of Long-Term Water Demand Forecast, Table 6-5, Water Demand Forecast with Normal Weather, June 2010.*

Table 6-5 is a summary of and displays City's past water use from 2005 and 2010 with projected water use shown for 2015 thru 2035.

TABLE 6-5
TOTAL WATER-USE
(AFY)

Water Distributed	Total Water Use (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Total Water Deliveries (Table 6-1)	199,178	162,291	195,688	213,409	228,061	238,772	247,986
Sales to Other Water Agencies (Table 6-3)	14,515	13,030	14,721	14,963	15,020	15,325	15,556
Additional Water Uses and Losses (Table 6-4)	14,698	29,565	30,063	31,839	33,294	34,384	35,318
Total	228,391	204,886	240,472	260,211	276,375	288,481	298,860

The analysis in **Table 6-6** below compares the projected normal water supply and customer demands from 2010 to 2035, in five-year increments.

TABLE 6-6
PROJECTED NORMAL SUPPLY AND DEMAND COMPARISON

(AFY)

	2015	2020	2025	2030	2035
Supply totals	240,472	260,211	276,375	288,481	298,860
Demand totals	240,472	260,211	276,375	288,481	298,860
Difference (supply minus demand)	0	0	0	0	0

6.2 Projected Single-dry Year Water Supply and Demand

Table 6-7 provides a comparison of a single-dry year water supply with projected total water use over the next 25 years, in five-year increments. The City's demands in single-dry years are projected to be higher similar in proportion to the increase in regional water demands projected in the Water Authority's 2010 UWMP. An increase in use for landscape irrigation accounts for most of the increase in demands. It is assumed that recycled water demands would not increase in single-dry years. The wholesale water supplies from the Water Authority are assumed to increase to meet the difference between the City's increased water demands and reduced local water supplies.

TABLE 6-7
PROJECTED SINGLE-DRY YEAR SUPPLY AND DEMAND COMPARISON

(AFY)

	2015	2020	2025	2030	2035
Supply totals	255,040	276,526	293,895	307,230	318,586
Demand totals	255,040	276,526	293,895	307,230	318,586
Difference (supply minus demand)	0	0	0	0	0

6.3 Projected Multiple-dry Year Water Supply and Demand

Table 6-8 compares the total water supply available in multiple-dry water years with projected total water use over the next 25 years. The City's demands in multiple-dry years are projected to be higher similar in proportion to the increase in regional water demands projected in Water Authority's 2010 UWMP. It is assumed that recycled water demands would not increase in multiple-dry years. The wholesale water supplies from Water Authority are assumed to increase to meet the difference between the City's increased water demands and reduced local water supplies. Multiple-dry year scenarios represent hot, dry weather periods which may generate urban water demands that are greater than normal.

No extraordinary conservation measures are reflected in the demand projections. The recycled water supplies are assumed to experience no reduction in a dry year.

TABLE 6-8
PROJECTED SUPPLY AND DEMAND COMPARISON DURING MULTIPLE DRY YEAR PERIOD ENDING IN 2035

(AFY)

		Supply and Demand Comparison – Multiple-dry Year Events				
		2015	2020	2025	2030	2035
Multiple-dry year First year supply	Supply totals	257,587	278,451	296,319	309,230	320,382
	Demand totals	257,587	278,451	296,319	309,230	320,382
	Difference	0	0	0	0	0
Multiple-dry year Second year supply	Supply totals	267,323	288,723	306,726	320,467	332,038
	Demand totals	267,323	288,723	306,726	320,467	332,038
	Difference	0	0	0	0	0
Multiple-dry year Third year supply	Supply totals	281,466	303,004	322,166	334,720	346,823
	Demand totals	281,466	303,004	322,166	334,720	346,823
	Difference	0	0	0	0	0

Section 7 - Conclusion - Availability of Sufficient Supplies

The Project is consistent with water demand assumptions in the regional water resource planning documents of the City, the Water Authority and MWD. The Public Utilities Department receives the majority of its water supply from MWD through the Water Authority. In addition, MWD and the Water Authority have developed water supply plans to improve reliability and reduce dependence upon existing imported supplies. MWD's Regional Urban Water Management Plan and Integrated Resources Plan, the Water Authority's 2010 UWMP and annual water supply report include projects that meet long-term supply needs through securing water from the State Water Project, Colorado River, local water supply development and recycled water.

The forecasted normal year water demands compared with projected supplies for the Public Utilities Department are shown in **Table 7-1**. This demonstrates that with existing supplies and implementation of the projects discussed in the three agencies' planning documents there will be adequate water supplies to serve all anticipated growth (existing and future planned uses) and development.

TABLE 7-1
PROJECTED SUPPLY AND DEMAND COMPARISON – NORMAL YEAR
(AFY)

	2015	2020	2025	2030	2035
Supply totals	240,472	260,211	276,375	288,481	298,860
Demand totals	240,472	260,211	276,375	288,481	298,860
Difference (supply minus demand)	0	0	0	0	0

Table 7-2 provides a comparison of a single-dry year water supply with projected total water use over the next 25 years, in five-year increments.

TABLE 7-2
PROJECTED SINGLE-DRY YEAR SUPPLY AND DEMAND COMPARISON
(AFY)

	2015	2020	2025	2030	2035
Supply totals	255,040	276,526	293,895	307,230	318,586
Demand totals	255,040	276,526	293,895	307,230	318,586
Difference (supply minus demand)	0	0	0	0	0

The multiple-dry year scenarios, within a 20-year projection, are shown in **Table 7-3**. This demonstrates that supplies will be adequate to meet all anticipated growth (existing and future planned uses) and development in multiple-dry year periods.

TABLE 7-3
PROJECTED SUPPLY AND DEMAND COMPARISON DURING MULTIPLE DRY YEAR PERIOD ENDING IN 2035

(AFY)

		Supply and Demand Comparison – Multiple-dry Year Events				
		2015	2020	2025	2030	2035
Multiple-dry year First year supply	Supply totals	257,587	278,451	296,319	309,230	320,382
	Demand totals	257,587	278,451	296,319	309,230	320,382
	Difference	0	0	0	0	0
Multiple-dry year Second year supply	Supply totals	267,323	288,723	306,726	320,467	332,038
	Demand totals	267,323	288,723	306,726	320,467	332,038
	Difference	0	0	0	0	0
Multiple-dry year Third year supply	Supply totals	281,466	303,004	322,166	334,720	346,823
	Demand totals	281,466	303,004	322,166	334,720	346,823
	Difference	0	0	0	0	0

This Report demonstrates that there are sufficient water supplies over a 20-year planning horizon to meet the projected demands of the Project as well as the existing and other planned development projects within the Public Utilities Department service area in normal, dry year, and multiple-dry year forecasts. This Project is proposing water demands which are included in the regional water resource planning documents of the City, the Water Authority, and MWD.

Source Documents

California Department of Water Resources (DWR), Progress on Incorporating Climate Change into Management of California's Water Resources, July 2006 Report
California Climate Change Center, 2006 Biennial Report: Our Changing Climate: Assessing the Risks to California, 2006
California Department of Water Resources Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001, March 2011
DSD Memorandum - Request for assessment and project description, February 2013
MWD 2010 Regional Urban Water Management Plan
MWD Report on Metropolitan's Water Supplies, A Blueprint for Water Reliability, March 2003
MWD Integrated Resources Plan Update, Oct 2010
Public Utilities Department 2010 Urban Water Management Plan
Public Utilities Department Annual 2012 Water Conservation Report
Public Utilities Department Recycled Water Study July 2012
Public Utilities Department Recycled Water Master Plan August 2011
Public Utilities Department Water Purification Demonstration Project Report
Water Authority 2010 Urban Water Management Plan
Water Authority Regional Water Facilities Master Plan, 2003
Water Department Long-Range Water Resources Plan (2002-2030), December 2002
Water Department The City of San Diego Subordinated Water Revenue Bonds, Series 2002, October 2002

Water Authority's approval email following a request from City of San Diego Public Utilities Department staff for the use of the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with this project.

From: Weinberg, Ken [mailto:KWeinberg@sdcwa.org]
Sent: Monday, May 19, 2014 3:50 PM
To: Steirer, Marsi
Cc: Friehauf, Dana; Bombardier, Tim; Adrian, George
Subject: FW: WSA-Chollas Community Plan Ammendment
Importance: High

Dear Marsi,

Thank you for your email regarding the Chollas Triangle Community Plan Amendment and Rezone project. The following is the Water Authority's response to your request to use the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with the proposed project.

The purpose of the AFG component of the demand forecast is to estimate, on a regional basis, additional demand associated with proposed projects not yet included in local jurisdictions' general plans and to plan for sufficient regional supplies to reliably meet the water demand of those projects. The Chollas Triangle Community Plan Amendment and Rezone project identified in your e-mail, meets the criteria for the AFG component of the Water Authority's 2010 UWMP and we are planning to have water supplies to reliably meet the demand associated with the project. Our accounting of the AFG demand component will be adjusted to reflect the additional demand associated with the proposed project.

Please let me know if you have any questions or want to discuss further.

Ken

Ken Weinberg
Director of Water Resources

From: Steirer, Marsi [mailto:MSteirer@sandiego.gov]
Sent: Monday, April 14, 2014 10:02 AM
To: Weinberg, Ken
Cc: Friehauf, Dana; Bombardier, Tim; Adrian, George; Bista, Seevani; Kaziha, Anas; Steirer, Marsi
Subject: WSA-Chollas Community Plan Ammendment

Dear Ken,

The City of San Diego is preparing a water supply assessment for the Chollas Triangle Community Plan Amendment and Rezone project, in accordance with the requirements of SB 610. The project is an amendment to the General Plan and Mid-City Communities Plan – Eastern Area to redesignate approximately 12.5 acres of Commercial Mixed Use and approximately 3.4 acres of Industrial to Neighborhood Village in an approximately 36 acre area between University Avenue to the north, Chollas Creek and Chollas Parkway to the south and east, and 54th street to the west. The Neighborhood Village land use designation would allow for the development of multi-family housing in a mixed-use setting and convenience shopping at build-out as listed below:

- 486 multi-family dwelling units,
- 130,000 square feet of non-residential developments,
- 5.4 acres as population-based park land

As some of the proposed development for this project was not accounted for in the SANDAG Series 12 forecast, the water demand associated with the unaccounted growth was also not included in the City's 2010 Urban Water Management Plan. The unaccounted water demand associated with this project is **14.7 acre-feet per year** as seen in the table below:

Portion of Chollas Triangle Project Not Accounted for in the SANDAG's Series 12 Forecast

	Water Demands (Acre Feet per Year)		
Project	**Planned**	**Projected**	**Delta**
Chollas Triangle Development Project	110.58 AFY	125.23 AFY	- 14.7
Total			**- 14.7**

The City is requesting the use of the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with this project, similar to the other projects requested.

Attached are a vicinity map for the project and a spreadsheet showing the total AFG that the City has requested to date.

Your assistance with this request will be greatly appreciated.

Thank you,

Marsi

THE CITY OF SAN DIEGO

M E M O R A N D U M

DATE: March 23, 2015

TO: Anna L. McPherson, Senior Planner, Development Services Department

FROM: Marsi A. Steirer, Deputy Director, Long-Range Planning and Water Resources Division

SUBJECT: Addendum to Approved Chollas Triangle Amendment's Water Supply Assessment Report for Inclusion of Additional Information on Accelerated Forecasted Growth

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The City of San Diego (City) Development Services Department (DSD), as a lead agency, requested the Public Utilities Department (Department) prepare a Water Supply Assessment (WSA) for Chollas Triangle Community Plan Amendment and Rezone project as part of the environmental review. The Department completed, approved and submitted the WSA to DSD on May 28, 2014. The project's WSA report was prepared in compliance with the requirements of Senate Bill (SB) 610 as codified in Water Code Section 10912(a) using the City's and San Diego County Water Authority's (Water Authority) 2010 Urban Water Management Plans (UWMP).

The water demands for the project (14.7 acre-feet per year) are accounted for in the Water Authority's 2010 UWMP under the Accelerated Forecasted Growth (AFG) demand increment. An approval letter from the Water Authority granting the AFG demand for the project is shown in Attachment A. The Water Authority's accounting of the AFG demands is adjusted to reflect the additional water demands associated with each member agency AFG request after the Department approves the WSA. All requests to date that have been received and granted by the Water Authority are shown in Attachment B.

Should you have any questions, please feel free to contact George Adrian at gadrian@sandiego.gov, 619-533-4680 or Seevani Bista at sbista@sandiego.gov, 619-533-4222.

Marsi Steirer

Marsi A. Steirer
Deputy Director

Sb/sb

Attachments: A- Approval Email from Water Authority
B - Water Authority's Accelerated Forecasted Growth Demands that have been Received and Granted

ATTACHMENT A

Approval Email from Water Authority

From: Weinberg, Ken [mailto:KWeinberg@sdcwa.org]
Sent: Monday, May 19, 2014 3:50 PM
To: Steirer, Marsi
Cc: Friehauf, Dana; Bombardier, Tim; Adrian, George
Subject: FW: WSA-Chollas Community Plan Ammendment
Importance: High

Dear Marsi,

Thank you for your email regarding the Chollas Triangle Community Plan Amendment and Rezone project. The following is the Water Authority's response to your request to use the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with the proposed project.

The purpose of the AFG component of the demand forecast is to estimate, on a regional basis, additional demand associated with proposed projects not yet included in local jurisdictions' general plans and to plan for sufficient regional supplies to reliably meet the water demand of those projects. The Chollas Triangle Community Plan Amendment and Rezone project identified in your e-mail, meets the criteria for the AFG component of the Water Authority's 2010 UWMP and we are planning to have water supplies to reliably meet the demand associated with the project. Our accounting of the AFG demand component will be adjusted to reflect the additional demand associated with the proposed project.

Please let me know if you have any questions or want to discuss further.

Ken

Ken Weinberg
Director of Water Resources

From: Steirer, Marsi [mailto:MSteirer@sandiego.gov]
Sent: Monday, April 14, 2014 10:02 AM
To: Weinberg, Ken
Cc: Friehauf, Dana; Bombardier, Tim; Adrian, George; Bista, Seevani; Kaziha, Anas; Steirer, Marsi
Subject: WSA-Chollas Community Plan Ammendment

Dear Ken,

The City of San Diego is preparing a water supply assessment for the Chollas Triangle Community Plan Amendment and Rezone project, in accordance with the requirements of SB 610. The project is an amendment to the General Plan and Mid-City Communities Plan – Eastern Area to redesignate approximately 12.5 acres of

Commercial Mixed Use and approximately 3.4 acres of Industrial to Neighborhood Village in an approximately 36 acre area between University Avenue to the north, Chollas Creek and Chollas Parkway to the south and east, and 54th street to the west. The Neighborhood Village land use designation would allow for the development of multi-family housing in a mixed-use setting and convenience shopping at build-out as listed below:

- 486 multi-family dwelling units,
- 130,000 square feet of non-residential developments,
- 5.4 acres as population-based park land

As some of the proposed development for this project was not accounted for in the SANDAG Series 12 forecast, the water demand associated with the unaccounted growth was also not included in the City's 2010 Urban Water Management Plan. The unaccounted water demand associated with this project is **14.7 acre-feet per year** as seen in the table below:

Portion of Chollas Triangle Project Not Accounted for in the SANDAG's Series 12 Forecast			
	Water Demands (Acre Feet per Year)		
Project	Planned	Projected	Delta
Chollas Triangle Development Project	110.58 AFY	125.23 AFY	- 14.7
Total			- 14.7

The City is requesting the use of the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with this project, similar to the other projects requested.

Attached are a vicinity map for the project and a spreadsheet showing the total AFG that the City has requested to date.

Your assistance with this request will be greatly appreciated.

Thank you,

Marsi

ATTACHMENT B

Water Authority's Accelerated Forecasted Growth Demands that have been Received and Granted

2010 UWMP Accelerated Forecast Growth

				Running Total (AF)	Date Certified EIR Received
Response Date	**Agency**	**Project**	**Estimated (AF)**		
8/24/2011	City of San Diego	San Diego Corporate Center	147		
8/24/2011	City of San Diego	Metropolitan Airpark/Brown Field	38		
8/24/2011	City of San Diego	Barrio Logan Community Plan	272		
8/24/2011	City of San Diego	Otay Mesa Community Plan	170		
8/24/2011	City of San Diego	15th and Island	85		4/24/12 (Approved by CC)
9/26/2011	City of San Diego	Convention Center Expansion	**109**	**821**	9/19/12 (Approved by Port District)
1/31/2012	City of San Diego	WaterMark	**9**	**830**	
4/11/2012	City of San Diego	11th & Broadway Mixed-Use Project	**29**	**859**	12/4/12 (Phase 1 approved) Phase 2
2/13/2013	City of San Diego	Liberty Station East Hotel	**94**	**953**	6/4/13 (Approved by CC)
4/2/2013	City of San Diego	Cisterra Tower Development	**63**	**1,016**	
4/2/2013	City of San Diego	Kaiser Permanente Hospital	**227**	**1,243**	
5/29/2013	Otay Water District	Otay Ranch Planning Area 12	**127**	**1,370**	
7/9/2013	Otay Water District	Villages 3, 8east, and 10	**41**	**1,411**	
8/13/2013	Otay Water District	Village 2 (SPA Amendment)	**529**	**1,940**	
2/28/2013	City of San Diego	Chollas Triangle Development	**14.7**	**1,955**	
6/5/2014	City of San Diego	Glen at Scripps Ranch	**88**	**2,043**	
10/1/2014	City of San Diego	Encanto Community Plan Update	**1460**	**3,503**	
10/6/2014	City of San Diego	Ballpark Village Parcel C Reisdences	**170**	**3,673**	
12/8/2014	City of San Diego	Merge 56 Development	**72**	**3,745**	
			Running Total	**3,745**	
		Total City Usage	**3,048**		

Note: Data as of March 20, 2015

APPENDIX J

CHOLLAS VALLEY TRUNK SEWER MODELING STUDY

SMP

2010000278

CITY OF SAN DIEGO
MEMORANDUM

DATE: March 18, 2010

TO: Distribution

FROM: Carlos Bravo via Huy T. Nguyen, MWWD, Engineering and Program Management Division

SUBJECT: Chollas Valley Trunk Sewer (Trunk Sewer #20) Modeling Study

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OBJECTIVE

Chollas Valley Trunk Sewer Modeling Study was performed to assess the capacity of the trunk sewer and its ability to serve the future developments within the tributary area. This report provides an overview of the current state of this trunk sewer, documents the results of the capacity analysis, and recommends future actions. The findings presented here will assist in developing alternatives to resolve any capacity, surcharge, and other condition problems related to this trunk sewer.

STUDY SCOPE

The improvement alternatives discussed in this study were developed based on capacity requirements only. Other factors relevant to the selection of the recommended alternative, such as facility condition, improvements constructability and associated cost and environmental impacts will be considered in the planning report.

METHODOLOGY

The dynamic modeling program, InfoWorks Version 7.02, and City's ArcGIS/ArcHMF were used for this study. The flows for the existing (using 2009 as the baseline year) and the 2030 scenarios were computed based on population and employment data developed in SanDAG 2030 Series 10, population and employment projections.

Dry Weather Model Calibration

The dry weather flow (DWF) data analysis and model calibrations were based on permanent ADS meters SD22, LM1A and LM7 located at manholes I21S517, L18S237 and L18S653, respectively. The January 2009 dry weather flows were used as a baseline for the calibration. The Unit Generation Rates (UGR) of 60 gallons/capita/day for residential and 20 gallons/capita/day for employment were applied to the SANDAG Series 10 population and employment data used in this model. The typical dry weather day for Chollas Valley Trunk Sewer has an average flow of 3.3 mgd with a peak flow of 4.9 mgd.

Wet Weather Model Calibration

The WWPF was based on SD22, LM1A and LM7 flow meters. Peak RDI/I was added to the Peak DWF to represent a 10 year return flow. The Peaking Factors for La Mesa's flows were estimated to be 3.1 & 2.9 for LM1A and LM7, respectively. Data was not available for the 10-year return event (February 1998 event) for the SD22 meter (City's flow), so it is essential to evaluate the 10-year equivalent wet weather scaling factor of its neighbor trunk sewers including LM1A and LM7 which captured flow data during the 1998 El Nino rainy Events. It was concluded that a peaking factor of 1.7 is reasonable for SD22 which was applied on City-only flow.

DESIGN CRITERIA

The following criteria have been developed and used in accordance with the City of San Diego Metropolitan Wastewater Department Sewer Design Guide to classify trunk sewer criticality. Criticality is based on the maximum depth of flow (d) and the pipe diameter (D) ratio (d/D), and it is expressed as a percentage. The following criteria were used to assess the capacity of Chollas Valley Trunk Sewer.

For **existing** sewer pipes less than 18 inches in diameter:

- d/D exceeds 50% will be classified as **Critical**.
- d/D between 40% and 50% will be classified as **Semi-critical**.
- d/D less than 40% will be classified as **Non-critical**.

For **existing** sewer pipes greater than or equal to 18 inches in diameter:

- d/D exceeds 75% will be classified as **Critical**.
- d/D between 50% and 75% will be classified as **Semi-critical**.
- d/D less than 50% will be classified as **Non-critical**.

For all **new** sewer pipes:

- For 15-inch or smaller in diameter, d/D not to exceed 50% for the projected peak wet weather flow at the buildout condition.

- For 18-inch or larger in diameter, d/D not to exceed 75% for the projected peak wet weather flow at the buildout condition.
- Minimum allowable velocity of 2 fps or 1 percent slopes for the projected peak dry weather flow.

The observed maximum depth of flow during the latest one-week monitoring period (January 2009) was 47% of the 26-inch pipe diameter at the ADS monitoring manhole at I21S517. The modeled depth of flow at this manhole was 45% of pipe diameter. This is considered excellent agreement. See Exhibit A in the Appendix for more details.

According to the above criteria, this trunk sewer would be classified as "**Non-critical**"

BACKGROUND

The Chollas Valley Trunk Sewer runs from east to west, along Chollas Parkway. It begins at the boundary of San Diego and La Mesa at the intersection of Chollas Valley & Federal Boulevard and ends at the intersection of University Avenue & 68th Street. The Chollas Valley Trunk Sewer was built in the 1950's and is approximately 7.5 miles long, compromised of 15-inch and 18-inch VC pipes.

Between 1999 and 2005, the Chollas Valley Trunk Sewer was upgraded by constructing a new parallel system which consisted of 24-inch and 27-inch PVC pipes. Many portions of the original Chollas Valley TS were rehabilitated which resulted in a decrease in diameter of the pipes (14-inch and 17-inch pipes). The new parallel sewer line was renamed as New Chollas Valley Trunk Sewer, TS119 (See Location Map).

Chollas Valley Trunk Sewer serves 60% of City flow and 40% of La Mesa flow

Based on WWC 2006 data this trunk sewer has been classified as **semi-critical** in the 2009 Capacity Report (page 3).

Condition Assessment

CCTV information shows that none of the segments was inspected because of the recent placement of the TS.

Study Area

The service area of Chollas Valley Trunk Sewer is approximately 2,348 acres of which 79% is residential, and 21% is commercial properties. SANDAG 2030 Series 10 population and employment projections anticipate growth in the tributary basin. The total 2010 population (resident and employment) is estimated to be 61,642 and is projected to increase to 71,505 at buildout which is equivalent to a 9,863 increase in population.

New Development Projects

Five development projects were identified in this study area. Only one out of the five requires Community Plan Amendment and was incorporated in this modeling study. Others do not create much flow impact to the Chollas Valley Trunk Sewer.

SEWER MODEL UPDATES AND ASSUMPTIONS

Chollas Valley Trunk Sewer Alignment

The alignment portion through Chollas Valley was validated in this model based on as-built Drawings 14085-D, 24481-D, 228473-D, 24874, 29351-D and 30553-D

HYDRAULIC ANALYSIS

According to the hydraulic modeling results for dry weather flow As-built conditions, Chollas Valley TS has adequate capacity through the year 2030. The maximum d/Ds are generally under 50%, (See Exhibit A).

Most of Chollas Valley Trunk Sewer segments have cleansing velocities ranging from 2 fps to 7 fps with the exception to a few segments of original Chollas Valley Trunk Sewer due most sewage flows now being diverted to the new parallel line. The velocities of these segments (between manhole 132 to manhole 212 on field book pages K20S and J20S) range from nearly zero fps to 0.32 fps. Reducing the pipe size would not greatly increase the cleansing velocity due to minimal flow (The comparison can be made by using 2010 DWF scenarios from Exhibits A & D). Diverting some flows from the New Chollas Valley Trunk Sewer to this original Chollas Valley Trunk Sewer to improve cleansing velocity is not feasible due to a higher invert elevation.

The wet weather modeling results indicate that Chollas Valley Trunk Sewer generally has adequate capacity through the year 2030 with the maximum d/D of 80% excepts one surcharged segment on south University Avenue between College Avenue and Cartagena Drive with the d/D is at approximately 180% under build-out (2030) condition, the backup water also affects two other segments; however, a spill would not occur since the HGL is 13 feet below the rim elevation (See Exhibit B). This surcharge is caused by a La Mesa’s 21-inch diversion line at the upstream of Chollas Valley Trunk Sewer (See Figure B). There is no surcharge under 2010 wet weather scenario.

Alternative “A” is a solution addressing the surcharged segment during wet weather conditions as described above. This alternative involves the flow control at La Mesa’s diversion line by constructing a weir on the diversion side to force the flow goes straight through to the New Chollas Valley trunk line which would relieve the capacity in the original Chollas Valley Trunk Sewer (See Exhibit C).

CONCLUSIONS AND RECOMMENDATIONS

Based on the above analyses, no capacity improvements on Chollas Valley Trunk Sewer are required at this time. However, it is recommended to work with City of La Mesa to control its flow being diverted into the Chollas Valley TS that would cause the surcharge in the future scenario as described in the Hydraulic Analysis Section, Alternative "A" (See Exhibit C).

Carlos Bravo

CB: cb

Attachments: Exhibits.

Distribution:
Bobbi Salvini, MS 922
Cha Moua, MS 902
Isam Hireish, MS 902
Tung Phung

Exhibit A

AS-BUILT CONDITION OF CHOLLAS VALLEY TS

Dry Weather Flow

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2010 DWF AS-BUILT

▨ Chollas Valley TS - TS 020

□ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5200562	L18S653.1	L18S658	372.50	370.10	382.50	0.013	24	181	4.23	5.25	21.9	370.54	370.81	11.96	1.39	16.84	8.3
5214242	L18S658.1	L18S652	370.10	365.40	376.00	0.013	24	375	4.26	5.22	21.8	365.84	366.12	10.16	1.39	16.36	8.5
5200560	L18S652.1	L18S651	365.40	356.70	365.10	0.013	24	679	4.07	5.39	22.5	357.15	357.41	7.95	1.39	16.56	8.4
5200549	L18S651.1	L18S650	356.70	354.75	369.50	0.008	24	250	4.02	5.44	22.7	355.20	355.46	14.30	1.39	12.91	10.8
5200546	L18S650.1	L18S649	354.75	351.05	369.80	0.008	24	481	4.06	5.45	22.7	351.50	351.76	18.30	1.41	12.83	11.0
5200544	L18S649.1	L18S648	351.05	346.25	363.50	0.008	24	630	3.57	5.97	24.9	346.75	346.95	16.75	1.41	12.76	11.0
5200542	L18S648.1	L18S647	346.25	342.65	358.75	0.007	24	533	3.97	5.96	24.8	343.15	343.39	15.60	1.56	12.02	13.0
5200540	L18S647.1	L18S646	342.65	334.50	344.90	0.012	24	707	4.39	5.64	23.5	334.97	335.27	9.93	1.59	15.70	10.1
5200538	L18S646.1	L18S645	334.50	321.00	334.25	0.027	24	499	4.19	5.97	24.9	321.50	321.77	12.75	1.65	24.06	6.9
5200536	L18S645.1	L18S644	321.00	318.00	327.00	0.008	24	400	4.19	5.97	24.9	318.50	318.77	8.51	1.65	12.66	13.0
5200534	L18S644.1	L18S643	318.00	317.25	326.40	0.025	24	30	3.54	6.73	28.0	317.81	318.01	8.59	1.65	23.19	7.1
5200415	L18S643.1	L18S642	317.25	316.50	324.80	0.005	24	161	3.54	6.73	28.0	317.06	317.26	7.74	1.65	9.97	16.6
5200412	L18S642.1	L19S434	316.50	312.45	325.90	0.009	24	427	4.60	5.60	23.3	312.92	313.25	12.98	1.66	14.23	11.6
5518532	L19S434.1	K19S556	312.41	308.71	323.50	0.012	24	316	4.63	5.62	23.4	309.18	309.51	14.32	1.68	15.82	10.6
5518531	K19S556.1	K19S555	308.71	303.92	317.00	0.013	24	369	5.12	5.24	21.8	304.36	304.77	12.64	1.68	16.65	10.1
5518530	K19S555.1	K19S554	303.92	292.50	307.00	0.018	24	620	5.17	5.21	21.7	292.93	293.35	14.07	1.68	19.85	8.5
5534194	K19S554.2	K19S583	292.50	287.40	301.50	0.019	24	266	5.41	5.04	21.0	287.82	288.28	13.68	1.68	20.24	8.3
5534192	K19S583.1	K19S582	287.40	286.91	300.50	0.024	24	21	5.18	5.20	21.7	287.34	287.76	13.16	1.68	22.39	7.5
5518529	K19S582.1	K19S552	286.91	278.50	295.00	0.019	24	435	5.05	5.29	22.0	278.94	279.34	16.06	1.68	20.33	8.3
5518521	K19S552.1	K19S577	278.50	264.75	284.50	0.019	24	725	3.24	7.52	31.3	265.38	265.54	19.12	1.75	20.14	8.7
58610	L18S237.1	L18S236	371.28	370.15	389.43	0.007	14	151	3.19	4.64	33.2	370.54	370.70	18.89	0.64	3.00	21.2
58609	L18S236.1	L18S235	370.15	370.05	383.21	0.007	14	15	3.19	4.64	33.1	370.44	370.59	12.77	0.64	2.80	22.8
5039772	L18S235.1	L18S234	370.05	367.17	376.85	0.007	14	388	3.37	4.46	31.8	367.54	367.72	9.31	0.64	2.99	21.3
58607	L18S234.1	L18S232	367.17	356.82	373.98	0.027	14	387	3.95	3.97	28.4	357.15	357.39	16.83	0.64	5.68	11.2
5347920	L18S232.1	L18S662	356.82	354.05	369.90	0.014	14	195	3.47	4.37	31.2	354.41	354.60	15.49	0.64	4.14	15.4
5347931	L18S662.1	L18S665	354.05	353.77	364.80	0.007	15	40	3.32	4.37	29.1	354.13	354.31	10.67	0.64	3.52	18.2
5347922	L18S665.1	L18S664	353.77	353.16	364.50	0.008	15	77	2.58	5.26	35.1	353.60	353.70	10.90	0.64	3.71	17.2
5347927	L18S664.1	L18S663	353.16	351.80	368.10	0.007	15	195	3.64	5.22	34.8	352.24	352.44	15.86	0.89	3.49	25.6
5347926	L18S663.1	L18S174	351.80	350.85	371.11	0.007	15	131	3.64	5.21	34.8	351.28	351.49	19.82	0.89	3.55	25.1
58567	L18S174.1	L18S187	350.85	346.90	363.65	0.012	14	326	4.42	5.01	35.8	347.32	347.62	16.33	0.98	3.83	25.7
58566	L18S187.1	L18S186	346.90	340.73	357.46	0.012	14	494	4.44	5.00	35.7	341.15	341.45	16.31	0.98	3.88	25.3
58811	L18S186.1	L18S583	340.73	335.92	352.69	0.013	14	381	4.23	5.19	37.1	336.35	336.63	16.34	0.98	3.90	25.2
58816	L18S583.1	L18S458	335.92	331.31	348.08	0.013	14	366	4.48	5.30	37.9	331.75	332.06	16.33	1.07	3.90	27.5
58819	L18S458.1	L18S453	331.31	330.96	355.55	0.012	14	30	4.57	5.24	37.4	331.40	331.72	24.15	1.08	3.76	28.7
58821	L18S453.1	L18S445	330.96	326.48	343.12	0.012	14	360	4.64	5.21	37.2	326.91	327.25	16.21	1.09	3.87	28.0
58802	L18S445.1	L18S444	326.48	321.99	337.95	0.013	14	350	4.40	5.44	38.8	322.44	322.74	15.51	1.09	3.94	27.7
58790	L18S444.1	L18S432	321.99	316.50	331.58	0.011	14	487	4.44	5.43	38.8	316.95	317.26	14.63	1.10	3.69	29.8
58785	L18S432.1	L18S431	316.50	313.30	330.75	0.014	14	226	3.53	6.51	46.5	313.84	314.04	16.91	1.10	4.13	26.6
58776	L18S431.1	L18S422	313.30	311.52	324.38	0.007	14	270	3.89	6.51	46.5	312.06	312.30	12.32	1.22	2.82	43.3
58941	L18S422.1	L19S80	311.52	305.74	319.85	0.016	14	359	5.22	5.20	37.2	306.18	306.60	13.67	1.22	4.41	27.7
58902	L19S80.1	L19S78	305.74	305.24	314.97	0.046	17	11	4.92	5.20	30.6	305.67	306.05	9.30	1.30	12.43	10.5

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2010 DWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
58905	L19S78.1	L19S53	305.24	303.81	321.12	0.015	17	97	4.48	5.57	32.7	304.27	304.59	16.85	1.30	7.06	18.4
58903	L19S53.1	K19S77	303.81	301.69	304.89	0.010	17	215	4.49	5.56	32.7	302.15	302.47	2.74	1.30	5.79	22.4
51687	K19S77.1	K19S76	301.69	300.54	321.44	0.020	14	56	5.49	5.25	37.5	300.98	301.45	20.46	1.30	4.96	26.2
51686	K19S76.1	K19S78	300.54	299.93	321.73	0.012	21	50	4.09	5.42	25.8	300.38	300.64	21.35	1.30	11.32	11.5
51684	K19S78.1	K19S69	299.93	295.92	317.72	0.011	21	374	4.52	5.06	24.1	296.34	296.66	21.38	1.30	10.60	12.3
51682	K19S69.1	K19S62	295.92	287.97	309.77	0.014	21	559	4.52	5.06	24.1	288.39	288.71	21.38	1.30	12.21	10.7
51679	K19S62.1	K19S44	287.97	279.96	300.96	0.014	21	563	2.64	7.44	35.4	280.58	280.69	20.38	1.30	12.21	10.7
51664	K19S44.1	K19S43	280.15	278.07	295.24	0.019	14	108	4.93	5.73	40.9	278.55	278.93	16.69	1.31	4.81	27.2
51663	K19S43.1	K19S42	278.07	276.07	288.12	0.013	14	148	5.09	5.59	39.9	276.54	276.94	11.58	1.31	4.03	32.5
51632	K19S42.1	K19S24	276.07	273.10	286.17	0.015	14	203	5.03	5.64	40.3	273.57	273.96	12.60	1.31	4.20	31.1
51631	K19S24.1	K19S21	273.10	266.94	287.50	0.014	14	433	5.15	5.54	39.6	267.40	267.81	20.10	1.31	4.14	31.6
5518522	K19S21.1	K19S551	266.94	265.96	286.00	0.015	14	65	5.15	5.53	39.5	266.42	266.84	19.58	1.31	4.26	30.7
5533985	K19S551.1	K19S577	265.96	264.75	284.50	0.041	24	29	2.41	7.52	31.3	265.38	265.47	19.12	1.31	29.76	4.4
5518525	K19S577.1	K19S548	264.75	261.64	278.50	0.012	24	270	4.97	8.19	34.1	262.32	262.71	16.18	3.02	15.69	19.3
5534001	K19S548.1	K19S579	261.64	260.61	276.00	0.011	24	98	5.89	7.84	32.7	261.26	261.80	14.74	3.40	15.01	22.6
5534003	K19S579.1	K19S580	260.61	260.34	272.00	0.013	24	20	5.63	8.11	33.8	261.02	261.51	10.98	3.40	16.86	20.1
5518515	K19S580.1	K19S581	260.34	259.29	272.00	0.011	24	95	5.56	8.19	34.1	259.97	260.45	12.03	3.40	15.39	22.1
5534005	K19S581.1	K19S547	259.29	255.00	270.00	0.011	24	404	5.56	8.18	34.1	255.68	256.16	14.32	3.40	15.07	22.5
5518511	K19S547.1	K19S545	255.00	250.46	265.00	0.015	24	305	6.31	7.47	31.1	251.08	251.70	13.92	3.40	17.84	19.0
5533989	K19S545.1	K19S578	250.46	237.63	257.00	0.022	24	579	7.20	6.80	28.3	238.20	239.00	18.80	3.41	21.77	15.6
5518505	K19S578.1	K19S544	237.63	235.41	263.83	0.023	24	96	6.46	7.36	30.7	236.02	236.67	27.81	3.41	22.23	15.3
5518502	K19S544.1	K19S543	235.41	233.31	258.46	0.016	24	132	5.66	8.10	33.8	233.99	234.48	24.48	3.41	18.46	18.5
5518501	K19S543.1	K19S542	233.31	232.89	253.05	0.011	24	37	5.47	8.30	34.6	233.58	234.05	19.47	3.41	15.62	21.8
5518490	K19S542.1	K19S541	232.89	229.59	248.52	0.009	24	375	5.48	8.29	34.6	230.28	230.75	18.24	3.41	13.71	24.9
5518488	K19S541.1	K19S540	229.59	226.44	241.75	0.011	24	292	5.60	8.16	34.0	227.12	227.61	14.63	3.41	15.19	22.5
5518487	K19S540.1	K19S539	226.44	221.45	233.00	0.016	24	320	6.37	7.43	31.0	222.07	222.70	10.93	3.41	18.26	18.7
5518486	K19S539.1	K19S538	221.45	218.03	233.90	0.015	24	223	6.02	7.74	32.3	218.68	219.24	15.22	3.41	18.11	18.8
5518485	K19S538.1	K19S537	218.03	217.58	230.50	0.014	24	32	5.51	8.26	34.4	218.27	218.74	12.23	3.41	17.26	19.8
5518484	K19S537.1	K19S536	217.58	215.90	232.00	0.010	24	164	5.86	7.90	32.9	216.56	217.09	15.44	3.41	14.82	23.0
5518483	K19S536.1	K19S535	215.90	215.70	233.50	0.013	24	15	5.66	8.10	33.7	216.37	216.87	17.13	3.41	16.77	20.3
5518482	K19S535.1	K19S534	215.70	212.97	227.44	0.010	24	281	5.15	8.70	36.3	213.69	214.11	13.75	3.41	14.41	23.7
5518479	K19S534.1	K19S533	212.97	212.02	223.75	0.011	24	90	5.90	8.74	36.4	212.75	213.29	11.00	3.95	15.06	26.2
5518446	K19S533.1	K20S788	212.02	210.70	222.03	0.010	24	126	5.94	8.74	36.4	211.43	211.97	10.60	3.97	14.96	26.5
5518445	K20S788.1	K20S787	210.70	209.12	217.28	0.019	24	83	6.58	8.11	33.8	209.80	210.47	7.48	3.97	20.12	19.7
5518444	K20S787.1	K20S786	209.12	202.56	219.00	0.016	24	407	5.97	8.91	37.1	203.30	203.86	15.70	4.10	18.57	22.1
5518443	K20S786.1	K20S785	202.56	200.85	217.50	0.010	24	166	6.16	8.90	37.1	201.59	202.18	15.91	4.10	14.85	27.6
5518442	K20S785.1	K20S784	200.85	196.48	211.00	0.012	24	360	6.31	8.59	35.8	197.20	197.81	13.81	4.10	16.12	25.4
5518441	K20S784.1	K20S783	196.48	193.70	207.50	0.015	24	181	6.93	8.00	33.3	194.37	195.11	13.13	4.10	18.14	22.6
5518440	K20S783.1	J20S645	193.70	185.26	200.00	0.017	24	496	6.95	7.98	33.2	185.92	186.68	14.08	4.10	19.08	21.5
5518430	J20S645.1	J20S644	185.26	184.69	199.00	0.017	24	33	6.85	8.07	33.6	185.36	186.09	13.64	4.10	19.24	21.3
5518429	J20S644.1	J20S643	184.69	184.15	199.50	0.017	24	31	5.99	8.90	37.1	184.89	185.45	14.61	4.10	19.30	21.3

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2010 DWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5518428	J20S643.1	K20S782	184.15	182.79	201.50	0.009	24	147	5.99	8.90	37.1	183.53	184.09	17.97	4.10	14.06	29.2
5518427	K20S782.1	K20S781	182.79	182.41	201.50	0.012	24	33	6.16	8.71	36.3	183.14	183.73	18.36	4.10	15.74	26.1
5518426	K20S781.1	K20S780	182.41	182.09	201.00	0.012	24	27	5.96	8.93	37.2	182.83	183.39	18.17	4.10	15.88	25.8
5518425	K20S780.1	K20S779	182.09	179.94	197.50	0.010	24	210	5.92	8.97	37.4	180.69	181.23	16.81	4.10	14.81	27.7
5518424	K20S779.1	J20S642	179.94	172.94	188.50	0.010	24	695	5.94	8.96	37.3	173.69	174.23	14.81	4.10	14.67	28.0
5518423	J20S642.1	J20S641	172.94	169.28	193.00	0.010	24	361	5.92	8.97	37.4	170.03	170.57	22.97	4.10	14.72	27.9
5518422	J20S641.1	J20S640	169.28	161.28	182.50	0.010	24	795	6.10	8.78	36.6	162.01	162.59	20.49	4.10	14.67	28.0
5518331	J20S640.1	J20S646	161.28	160.76	183.00	0.011	24	47	5.96	8.93	37.2	161.51	162.06	21.49	4.10	15.41	26.6
5518330	J20S646.1	J20S638	160.76	158.62	172.00	0.010	24	209	6.05	8.83	36.8	159.35	159.92	12.65	4.10	14.79	27.7
5518329	J20S638.1	J20S637	158.62	157.78	170.50	0.011	24	79	6.20	8.68	36.2	158.50	159.10	12.00	4.10	15.10	27.1
5518328	J20S637.1	J20S636	157.78	157.42	170.00	0.012	24	31	6.17	8.70	36.3	158.15	158.74	11.85	4.10	15.78	26.0
5518327	J20S636.1	J20S635	157.42	157.00	170.50	0.011	24	37	6.17	8.71	36.3	157.73	158.32	12.77	4.10	15.66	26.2
5518326	J20S635.1	J21S592	157.00	145.59	161.00	0.011	24	998	6.18	8.70	36.2	146.32	146.91	14.69	4.10	15.63	26.2
5518313	J21S592.1	J21S591	145.59	135.38	148.00	0.014	24	727	5.92	8.98	37.4	136.13	136.67	11.87	4.11	17.32	23.7
5518312	J21S591.1	J21S590	135.38	128.17	144.00	0.010	24	716	5.93	8.97	37.4	128.92	129.46	15.08	4.11	14.67	28.0
5518309	J21S590.1	J21S587	128.17	125.75	144.30	0.036	24	67	8.11	7.16	29.8	126.35	127.37	17.95	4.11	27.79	14.8
52180	K20S138.1	K20S117	209.84	203.96	208.96	0.013	17	439	0.00	1.70	10.0	204.10	204.10	4.86	0.00	6.74	0.0
52051	K20S117.1	K20S124	203.96	203.59	216.55	0.006	17	60	0.04	1.75	10.3	203.74	203.74	12.81	0.00	4.57	0.0
52050	K20S124.1	K20S123	203.59	198.75	203.75	0.013	17	378	0.14	1.78	10.5	198.90	198.90	4.85	0.01	6.60	0.1
52053	K20S123.1	K20S161	198.75	195.92	208.17	0.015	17	191	0.23	1.79	10.5	196.07	196.07	12.10	0.01	7.09	0.2
52055	K20S161.1	K20S160	195.92	193.00	203.40	0.011	17	260	0.22	1.83	10.8	193.15	193.15	10.25	0.01	6.18	0.2
52059	K20S160.1	J20S212	193.00	189.91	199.78	0.013	17	239	0.35	1.80	10.6	190.06	190.06	9.72	0.02	6.63	0.3
44920	J20S212.1	J20S213	189.91	188.81	200.21	0.022	17	50	0.28	2.10	12.4	188.98	188.99	11.23	0.02	8.68	0.2
44921	J20S213.1	J20S214	188.81	188.07	201.88	0.007	17	112	1.63	2.21	13.0	188.26	188.30	13.62	0.13	4.73	2.7
44922	J20S214.1	J20S215	188.07	186.63	195.12	0.027	17	53	1.64	2.35	13.8	186.83	186.87	8.29	0.14	9.59	1.5
44924	J20S215.1	J20S217	186.63	182.93	196.05	0.014	17	259	1.58	2.42	14.3	183.13	183.17	12.92	0.14	6.97	2.0
44925	J20S217.1	J20S336	182.93	180.70	187.19	0.012	17	182	1.70	2.40	14.1	180.90	180.94	6.29	0.15	6.45	2.3
45034	J20S336.1	J20S337	180.70	174.81	183.34	0.013	17	447	1.62	2.49	14.6	175.02	175.06	8.32	0.15	6.69	2.2
45033	J20S337.1	J20S338	174.81	169.13	174.13	0.012	17	489	1.83	2.42	14.2	169.33	169.38	4.80	0.16	6.28	2.6
45032	J20S338.1	J20S340	169.13	168.24	176.40	0.015	17	60	1.74	2.50	14.7	168.45	168.50	7.95	0.16	7.11	2.3
44996	J20S340.1	J20S298	168.24	162.62	170.41	0.011	17	494	1.71	2.57	15.1	162.84	162.88	7.57	0.17	6.22	2.7
45001	J20S298.1	J20S299	162.62	160.19	167.00	0.009	17	258	2.22	2.93	17.2	160.43	160.51	6.57	0.26	5.66	4.6
45003	J20S299.1	J20S302	160.19	157.52	161.75	0.011	17	250	2.47	2.75	16.2	157.75	157.84	4.00	0.26	6.02	4.4
45004	J20S302.1	J21S455	157.52	154.47	160.72	0.016	17	193	2.24	2.98	17.5	154.72	154.79	6.00	0.27	7.33	3.7
45423	J21S455.1	J21S456	154.47	152.51	158.41	0.010	17	189	2.35	2.90	17.0	152.75	152.84	5.66	0.27	5.94	4.6
45424	J21S456.1	J21S462	152.51	149.73	159.68	0.012	17	232	2.36	2.89	17.0	149.97	150.06	9.71	0.27	6.38	4.2
45427	J21S462.1	J21S461	149.73	148.18	153.95	0.013	17	118	1.42	4.28	25.2	148.54	148.57	5.41	0.28	6.68	4.2
45428	J21S461.1	J21S460	148.18	146.70	153.71	0.011	17	139	3.65	4.15	24.4	147.05	147.25	6.67	0.70	6.01	11.7
45371	J21S460.1	J21S457	146.70	143.93	150.99	0.012	17	229	3.55	4.23	24.9	144.28	144.48	6.71	0.70	6.41	11.0
45374	J21S457.1	J21S459	143.93	141.02	148.01	0.011	17	262	3.58	4.20	24.7	141.37	141.57	6.64	0.70	6.14	11.4
45373	J21S459.1	J21S468	141.02	135.35	144.32	0.011	17	495	3.99	3.89	22.9	135.68	135.92	8.65	0.70	6.24	11.3

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HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2010 DWF AS-BUILT

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FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
45368	J21S468.1	J21S467	135.35	133.44	144.00	0.016	17	120	4.00	3.89	22.9	133.77	134.01	10.23	0.70	7.34	9.6
5518310	J21S467.1	J21S587	130.98	124.27	144.30	0.090	24	75	0.38	24.92	103.8	126.34	126.35	17.96	0.78	43.73	1.8
5518308	J21S587.1	J21S586	125.75	122.60	148.00	0.036	24	89	6.46	9.45	39.4	123.39	124.04	24.61	4.80	27.55	17.4
5518307	J21S586.1	J21S585	122.60	121.84	144.00	0.012	24	66	6.57	9.34	38.9	122.62	123.29	21.38	4.80	15.72	30.5
5518076	J21S585.1	J21S584	121.84	114.98	132.00	0.012	24	569	5.92	10.09	42.0	115.82	116.37	16.18	4.80	16.05	29.9
5518073	J21S584.1	J21S583	114.98	114.07	148.00	0.007	27	138	5.37	10.24	37.9	114.93	115.37	33.07	4.80	16.27	29.5
5518072	J21S583.1	J21S579	114.07	110.21	131.00	0.006	27	615	5.33	10.32	38.2	111.07	111.51	19.93	4.81	15.86	30.3
5518070	J21S579.1	J21S578	110.21	108.84	120.50	0.006	27	224	5.33	10.31	38.2	109.70	110.14	10.80	4.81	15.67	30.7
5518069	J21S578.1	J21S577	108.84	107.31	119.00	0.006	27	236	5.14	10.60	39.2	108.19	108.60	10.81	4.81	16.12	29.8
5518068	J21S577.1	J21S582	107.31	106.07	118.80	0.006	27	218	5.16	10.59	39.2	106.95	107.37	11.85	4.82	15.10	31.9
5518065	J21S582.1	J21S581	106.07	105.20	117.30	0.006	27	140	5.33	10.35	38.3	106.06	106.50	11.24	4.83	15.76	30.6
5518063	J21S581.1	J21S580	105.20	103.65	112.20	0.006	27	253	5.32	10.35	38.3	104.51	104.95	7.69	4.83	15.66	30.8
5518062	J21S580.1	J21S502	103.65	102.13	111.93	0.006	27	249	5.33	10.34	38.3	102.99	103.43	8.94	4.83	15.65	30.8
45189	J21S502.1	J21S71	102.13	101.33	109.13	0.012	27	69	5.93	9.56	35.4	102.13	102.67	7.01	4.83	21.63	22.3
45190	J21S71.1	J21S504	101.33	99.02	111.02	0.008	27	274	5.94	9.55	35.4	99.82	100.36	11.21	4.83	18.39	26.2
45188	J21S504.1	J21S505	99.02	96.62	108.62	0.011	27	209	6.19	9.26	34.3	97.39	97.99	11.23	4.83	21.45	22.5
45185	J21S505.1	J21S506	96.62	94.65	107.65	0.011	27	176	6.22	9.23	34.2	95.42	96.02	12.23	4.83	21.18	22.8
45141	J21S506.1	J21S508	94.65	90.86	103.86	0.011	27	334	6.21	9.24	34.2	91.63	92.23	12.23	4.82	21.32	22.6
45144	J21S508.1	J21S509	90.86	87.11	100.11	0.011	27	329	6.26	9.22	34.1	87.88	88.49	12.23	4.85	21.35	22.7
45145	J21S509.1	J21S63	87.11	84.72	97.72	0.011	27	208	6.22	9.26	34.3	85.49	86.09	12.23	4.85	21.46	22.6
45182	J21S63.1	I21S242	84.72	78.71	91.71	0.011	27	532	6.14	9.34	34.6	79.49	80.08	12.22	4.85	21.27	22.8
39803	I21S242.1	I21S525	78.71	77.06	90.30	0.010	27	174	6.16	9.34	34.6	77.84	78.43	12.46	4.86	19.51	24.9
5102267	I21S525.1	I22S556	77.06	75.94	89.00	0.018	26	63	4.80	11.46	44.1	76.90	77.25	12.10	4.86	24.13	20.1
5102265	I22S556.1	I22S555	75.94	74.96	86.20	0.005	26	216	4.77	11.55	44.4	75.92	76.28	10.28	4.88	12.19	40.1
6269175	I22S555.1	I21S529	74.96	73.14	83.14	0.004	26	418	4.71	11.67	44.9	74.11	74.46	9.02	4.88	12.01	40.7
5102263	I21S529.1	I21S517	73.14	73.12	83.00	0.004	27	5	4.74	11.40	42.2	74.07	74.42	8.93	4.88	12.66	38.6
5102151	I21S517.1	I21S518	73.12	72.19	86.60	0.004	27	207	4.75	11.38	42.2	73.14	73.49	13.46	4.88	13.43	36.4

TOTAL LENGTH (MILES):	7.46	LENGTH OF PIPE - d/D < 50% (MILES):	7.45	LENGTH OF PIPE - Q/CAP < 50% (MILES):	7.46
LENGTH WEIGHTED Q/CAP:	18.4	LENGTH OF PIPE - d/D 50 - 75% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	0.00
LENGTH WEIGHTED d/D:	30.4	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	0.00
LENGTH WEIGHTED HGL. BELOW RIM (FT):	13.69	LENGTH OF PIPE - d/D > 100% (MILES):	0.01	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.00

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2030 DWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5200562	L18S653.1	L18S658	372.50	370.10	382.50	0.013	24	181	4.54	5.60	23.3	370.57	370.88	11.93	1.63	16.84	9.7
5214242	L18S658.1	L18S652	370.10	365.40	376.00	0.013	24	375	4.57	5.57	23.2	365.86	366.19	10.14	1.63	16.36	10.0
5200560	L18S652.1	L18S651	365.40	356.70	365.10	0.013	24	679	4.24	5.87	24.5	357.19	357.47	7.91	1.63	16.56	9.9
5200549	L18S651.1	L18S650	356.70	354.75	369.50	0.008	24	250	4.17	5.94	24.8	355.25	355.52	14.26	1.63	12.91	12.6
5200546	L18S650.1	L18S649	354.75	351.05	369.80	0.008	24	481	4.22	5.96	24.8	351.55	351.82	18.25	1.66	12.83	12.9
5200544	L18S649.1	L18S648	351.05	346.25	363.50	0.008	24	630	3.72	6.51	27.1	346.79	347.01	16.71	1.66	12.76	13.0
5200542	L18S648.1	L18S647	346.25	342.65	358.75	0.007	24	533	4.15	6.51	27.1	343.19	343.46	15.56	1.85	12.02	15.4
5200540	L18S647.1	L18S646	342.65	334.50	344.90	0.012	24	707	4.62	6.13	25.5	335.01	335.34	9.89	1.89	15.70	12.0
5200538	L18S646.1	L18S645	334.50	321.00	334.25	0.027	24	499	4.38	6.54	27.2	321.55	321.84	12.70	1.96	24.06	8.2
5200536	L18S645.1	L18S644	321.00	318.00	327.00	0.008	24	400	4.39	6.54	27.2	318.54	318.84	8.46	1.96	12.66	15.5
5200534	L18S644.1	L18S643	318.00	317.25	326.40	0.025	24	30	3.78	7.26	30.3	317.86	318.08	8.54	1.96	23.19	8.5
5200415	L18S643.1	L18S642	317.25	316.50	324.80	0.005	24	161	3.79	7.26	30.3	317.10	317.33	7.70	1.96	9.97	19.7
5200412	L18S642.1	L19S434	316.50	312.45	325.90	0.009	24	427	4.78	6.20	25.9	312.97	313.32	12.93	1.99	14.23	14.0
5518532	L19S434.1	K19S556	312.41	308.71	323.50	0.012	24	316	4.90	6.15	25.6	309.22	309.60	14.28	2.01	15.82	12.7
5518531	K19S556.1	K19S555	308.71	303.92	317.00	0.013	24	369	5.53	5.64	23.5	304.39	304.87	12.61	2.01	16.65	12.1
5518530	K19S555.1	K19S554	303.92	292.50	307.00	0.018	24	620	5.60	5.59	23.3	292.97	293.45	14.04	2.01	19.85	10.1
5534194	K19S554.2	K19S583	292.50	287.40	301.50	0.019	24	266	5.93	5.37	22.4	287.85	288.40	13.65	2.01	20.24	9.9
5534192	K19S583.1	K19S582	287.40	286.91	300.50	0.024	24	21	5.62	5.58	23.3	287.37	287.87	13.12	2.01	22.39	9.0
5518529	K19S582.1	K19S552	286.91	278.50	295.00	0.019	24	435	5.44	5.71	23.8	278.98	279.44	16.02	2.01	20.33	9.9
5518521	K19S552.1	K19S577	278.50	264.75	284.50	0.019	24	725	3.39	8.31	34.6	265.44	265.62	19.06	2.10	20.14	10.4
58610	L18S237.1	L18S236	371.28	370.15	389.43	0.007	14	151	3.31	4.91	35.0	370.56	370.73	18.87	0.71	3.00	23.8
58609	L18S236.1	L18S235	370.15	370.05	383.21	0.007	14	15	3.31	4.90	35.0	370.46	370.63	12.75	0.71	2.80	25.5
5039772	L18S235.1	L18S234	370.05	367.17	376.85	0.007	14	388	3.45	4.75	33.9	367.56	367.75	9.29	0.71	2.99	23.8
58607	L18S234.1	L18S232	367.17	356.82	373.98	0.027	14	387	4.16	4.15	29.6	357.17	357.44	16.81	0.71	5.68	12.6
5347920	L18S232.1	L18S662	356.82	354.05	369.90	0.014	14	195	3.58	4.63	33.1	354.43	354.63	15.47	0.71	4.14	17.2
5347931	L18S662.1	L18S665	354.05	353.77	364.80	0.007	15	40	3.43	4.63	30.8	354.16	354.34	10.64	0.71	3.52	20.3
5347922	L18S665.1	L18S664	353.77	353.16	364.50	0.008	15	77	2.71	5.50	36.7	353.62	353.73	10.88	0.71	3.71	19.3
5347927	L18S664.1	L18S663	353.16	351.80	368.10	0.007	15	195	3.81	5.49	36.6	352.26	352.48	15.84	0.99	3.49	28.5
5347926	L18S663.1	L18S174	351.80	350.85	371.11	0.007	15	131	3.82	5.45	36.4	351.30	351.53	19.80	0.99	3.55	28.0
58567	L18S174.1	L18S187	350.85	346.90	363.65	0.012	14	326	4.59	5.33	38.0	347.34	347.67	16.31	1.11	3.83	28.9
58566	L18S187.1	L18S186	346.90	340.73	357.46	0.012	14	494	4.64	5.32	38.0	341.18	341.51	16.29	1.12	3.88	28.8
58811	L18S186.1	L18S583	340.73	335.92	352.69	0.013	14	381	4.36	5.62	40.2	336.39	336.68	16.30	1.12	3.90	28.8
58816	L18S583.1	L18S458	335.92	331.31	348.08	0.013	14	366	4.57	5.77	41.2	331.79	332.11	16.29	1.23	3.90	31.5
58819	L18S458.1	L18S453	331.31	330.96	355.55	0.012	14	30	4.66	5.74	41.0	331.44	331.78	24.11	1.24	3.76	33.0
58821	L18S453.1	L18S445	330.96	326.48	343.12	0.012	14	360	4.76	5.71	40.8	326.96	327.31	16.16	1.26	3.87	32.6
58802	L18S445.1	L18S444	326.48	321.99	337.95	0.013	14	350	4.56	5.95	42.5	322.49	322.81	15.46	1.27	3.94	32.3
58790	L18S444.1	L18S432	321.99	316.50	331.58	0.011	14	487	4.65	5.94	42.4	316.99	317.33	14.59	1.30	3.69	35.2
58785	L18S432.1	L18S431	316.50	313.30	330.75	0.014	14	226	3.70	7.09	50.6	313.89	314.10	16.86	1.30	4.13	31.4
58776	L18S431.1	L18S422	313.30	311.52	324.38	0.007	14	270	4.09	7.08	50.6	312.11	312.37	12.27	1.43	2.82	50.8
58941	L18S422.1	L19S80	311.52	305.74	319.85	0.016	14	359	5.40	5.73	40.9	306.22	306.67	13.63	1.44	4.41	32.6
58902	L19S80.1	L19S78	305.74	305.24	314.97	0.046	17	11	5.11	5.67	33.4	305.71	306.12	9.26	1.52	12.43	12.2

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2030 DWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
58905	L19S78.1	L19S53	305.24	303.81	321.12	0.015	17	97	4.71	6.02	35.4	304.31	304.66	16.81	1.52	7.06	21.5
58903	L19S53.1	K19S77	303.81	301.69	304.89	0.010	17	215	4.72	6.02	35.4	302.19	302.54	2.70	1.52	5.79	26.3
51687	K19S77.1	K19S76	301.69	300.54	321.44	0.020	14	56	5.82	5.65	40.4	301.01	301.54	20.43	1.52	4.96	30.7
51686	K19S76.1	K19S78	300.54	299.93	321.73	0.012	21	50	4.32	5.83	27.8	300.42	300.71	21.31	1.52	11.32	13.4
51684	K19S78.1	K19S69	299.93	295.92	317.72	0.011	21	374	4.77	5.50	26.2	296.38	296.73	21.34	1.54	10.60	14.6
51682	K19S69.1	K19S62	295.92	287.97	309.77	0.014	21	559	4.77	5.50	26.2	288.43	288.78	21.34	1.54	12.21	12.6
51679	K19S62.1	K19S44	287.97	279.96	300.96	0.014	21	563	2.79	8.10	38.6	280.64	280.76	20.33	1.54	12.21	12.6
51664	K19S44.1	K19S43	280.15	278.07	295.24	0.019	14	108	5.33	6.31	45.1	278.60	279.04	16.64	1.61	4.81	33.5
51663	K19S43.1	K19S42	278.07	276.07	288.12	0.013	14	148	5.50	6.16	44.0	276.58	277.05	11.54	1.61	4.03	39.9
51632	K19S42.1	K19S24	276.07	273.10	286.17	0.015	14	203	5.45	6.21	44.3	273.62	274.08	12.55	1.61	4.20	38.3
51631	K19S24.1	K19S21	273.10	266.94	287.50	0.014	14	433	5.55	6.12	43.7	267.45	267.93	20.05	1.61	4.14	38.9
5518522	K19S21.1	K19S551	266.94	265.96	286.00	0.015	14	65	5.56	6.11	43.6	266.47	266.95	19.53	1.61	4.26	37.8
5533985	K19S551.1	K19S577	265.96	264.75	284.50	0.041	24	29	2.59	8.31	34.6	265.44	265.55	19.06	1.61	29.76	5.4
5518525	K19S577.1	K19S548	264.75	261.64	278.50	0.012	24	270	5.37	8.90	37.1	262.38	262.83	16.12	3.66	15.69	23.3
5534001	K19S548.1	K19S579	261.64	260.61	276.00	0.011	24	98	6.04	8.89	37.0	261.35	261.92	14.65	4.13	15.01	27.5
5534003	K19S579.1	K19S580	260.61	260.34	272.00	0.013	24	20	6.13	8.79	36.6	261.07	261.66	10.93	4.13	16.86	24.5
5518515	K19S580.1	K19S581	260.34	259.29	272.00	0.011	24	95	6.05	8.88	37.0	260.03	260.60	11.97	4.13	15.39	26.8
5534005	K19S581.1	K19S547	259.29	255.00	270.00	0.011	24	404	6.05	8.87	37.0	255.74	256.31	14.26	4.13	15.07	27.4
5518511	K19S547.1	K19S545	255.00	250.46	265.00	0.015	24	305	6.66	8.29	34.5	251.15	251.84	13.85	4.14	17.84	23.2
5533989	K19S545.1	K19S578	250.46	237.63	257.00	0.022	24	579	7.82	7.45	31.0	238.25	239.20	18.75	4.20	21.77	19.3
5518505	K19S578.1	K19S544	237.63	235.41	263.83	0.023	24	96	6.81	8.24	34.3	236.10	236.82	27.73	4.20	22.23	18.9
5518502	K19S544.1	K19S543	235.41	233.31	258.46	0.016	24	132	6.17	8.88	37.0	234.05	234.64	24.41	4.21	18.46	22.8
5518501	K19S543.1	K19S542	233.31	232.89	253.05	0.011	24	37	5.90	9.18	38.3	233.66	234.20	19.40	4.21	15.62	27.0
5518490	K19S542.1	K19S541	232.89	229.59	248.52	0.009	24	375	5.90	9.17	38.2	230.35	230.90	18.17	4.21	13.71	30.7
5518488	K19S541.1	K19S540	229.59	226.44	241.75	0.011	24	292	6.12	8.93	37.2	227.18	227.77	14.56	4.21	15.19	27.7
5518487	K19S540.1	K19S539	226.44	221.45	233.00	0.016	24	320	6.76	8.31	34.6	222.14	222.85	10.86	4.21	18.26	23.1
5518486	K19S539.1	K19S538	221.45	218.03	233.90	0.015	24	223	6.51	8.54	35.6	218.74	219.40	15.16	4.21	18.11	23.3
5518485	K19S538.1	K19S537	218.03	217.58	230.50	0.014	24	32	6.01	9.05	37.7	218.33	218.89	12.17	4.21	17.26	24.4
5518484	K19S537.1	K19S536	217.58	215.90	232.00	0.010	24	164	6.01	9.05	37.7	216.65	217.21	15.35	4.21	14.82	28.4
5518483	K19S536.1	K19S535	215.90	215.70	233.50	0.013	24	15	6.14	8.91	37.1	216.44	217.03	17.06	4.21	16.77	25.1
5518482	K19S535.1	K19S534	215.70	212.97	227.44	0.010	24	281	5.52	9.70	40.4	213.78	214.25	13.66	4.21	14.41	29.2
5518479	K19S534.1	K19S533	212.97	212.02	223.75	0.011	24	90	6.17	9.76	40.7	212.83	213.43	10.92	4.79	15.06	31.8
5518446	K19S533.1	K20S788	212.02	210.70	222.03	0.010	24	126	6.21	9.75	40.6	211.51	212.11	10.52	4.81	14.96	32.1
5518445	K20S788.1	K20S787	210.70	209.12	217.28	0.019	24	83	7.17	8.77	36.5	209.85	210.65	7.43	4.81	20.12	23.9
5518444	K20S787.1	K20S786	209.12	202.56	219.00	0.016	24	407	6.22	9.95	41.4	203.39	203.99	15.61	4.95	18.57	26.6
5518443	K20S786.1	K20S785	202.56	200.85	217.50	0.010	24	166	6.23	9.94	41.4	201.68	202.28	15.82	4.95	14.85	33.3
5518442	K20S785.1	K20S784	200.85	196.48	211.00	0.012	24	360	6.63	9.49	39.5	197.27	197.95	13.73	4.95	16.12	30.7
5518441	K20S784.1	K20S783	196.48	193.70	207.50	0.015	24	181	7.49	8.67	36.1	194.42	195.30	13.08	4.95	18.14	27.3
5518440	K20S783.1	J20S645	193.70	185.26	200.00	0.017	24	496	7.51	8.66	36.1	185.98	186.86	14.02	4.95	19.08	26.0
5518430	J20S645.1	J20S644	185.26	184.69	199.00	0.017	24	33	7.32	8.82	36.7	185.43	186.26	13.57	4.95	19.24	25.7
5518429	J20S644.1	J20S643	184.69	184.15	199.50	0.017	24	31	6.20	9.99	41.6	184.98	185.58	14.52	4.95	19.30	25.7

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TRUNK SEWER 20 - CHOLLAS VALLEY
2030 DWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5518428	J20S643.1	K20S782	184.15	182.79	201.50	0.009	24	147	6.20	9.98	41.6	183.62	184.22	17.88	4.95	14.06	35.2
5518427	K20S782.1	K20S781	182.79	182.41	201.50	0.012	24	33	6.42	9.72	40.5	183.22	183.86	18.28	4.95	15.74	31.5
5518426	K20S781.1	K20S780	182.41	182.09	201.00	0.012	24	27	6.21	9.97	41.5	182.92	183.52	18.08	4.95	15.88	31.2
5518425	K20S780.1	K20S779	182.09	179.94	197.50	0.010	24	210	6.18	10.01	41.7	180.78	181.37	16.72	4.95	14.81	33.4
5518424	K20S779.1	J20S642	179.94	172.94	188.50	0.010	24	695	6.19	9.99	41.6	173.77	174.37	14.73	4.95	14.67	33.7
5518423	J20S642.1	J20S641	172.94	169.28	193.00	0.010	24	361	6.18	10.01	41.7	170.12	170.71	22.88	4.95	14.72	33.6
5518422	J20S641.1	J20S640	169.28	161.28	182.50	0.010	24	795	6.35	9.80	40.8	162.10	162.72	20.40	4.95	14.67	33.8
5518331	J20S640.1	J20S646	161.28	160.76	183.00	0.011	24	47	6.21	9.97	41.5	161.59	162.19	21.41	4.95	15.41	32.1
5518330	J20S646.1	J20S638	160.76	158.62	172.00	0.010	24	209	6.31	9.85	41.0	159.44	160.06	12.56	4.95	14.79	33.5
5518329	J20S638.1	J20S637	158.62	157.78	170.50	0.011	24	79	6.49	9.64	40.2	158.58	159.24	11.92	4.95	15.10	32.8
5518328	J20S637.1	J20S636	157.78	157.42	170.00	0.012	24	31	6.46	9.67	40.3	158.23	158.88	11.77	4.95	15.78	31.4
5518327	J20S636.1	J20S635	157.42	157.00	170.50	0.011	24	37	6.46	9.68	40.3	157.81	158.46	12.69	4.95	15.66	31.6
5518326	J20S635.1	J21S592	157.00	145.59	161.00	0.011	24	998	6.46	9.67	40.3	146.40	147.05	14.60	4.95	15.63	31.7
5518313	J21S592.1	J21S591	145.59	135.38	148.00	0.014	24	727	6.18	10.02	41.7	136.22	136.81	11.78	4.96	17.32	28.6
5518312	J21S591.1	J21S590	135.38	128.17	144.00	0.010	24	716	6.19	10.01	41.7	129.00	129.60	15.00	4.96	14.67	33.8
5518309	J21S590.1	J21S587	128.17	125.75	144.30	0.036	24	67	8.63	7.84	32.7	126.41	127.56	17.90	4.96	27.79	17.8
52180	K20S138.1	K20S117	209.84	203.96	208.96	0.013	17	439	0.00	1.70	10.0	204.10	204.10	4.86	0.00	6.74	0.0
52051	K20S117.1	K20S124	203.96	203.59	216.55	0.006	17	60	0.04	1.75	10.3	203.74	203.74	12.81	0.00	4.57	0.0
52050	K20S124.1	K20S123	203.59	198.75	203.75	0.013	17	378	0.14	1.78	10.5	198.90	198.90	4.85	0.01	6.60	0.1
52053	K20S123.1	K20S161	198.75	195.92	208.17	0.015	17	191	0.24	1.79	10.6	196.07	196.07	12.10	0.01	7.09	0.2
52055	K20S161.1	K20S160	195.92	193.00	203.40	0.011	17	260	0.23	1.84	10.8	193.15	193.15	10.25	0.01	6.18	0.2
52059	K20S160.1	J20S212	193.00	189.91	199.78	0.013	17	239	0.37	1.80	10.6	190.06	190.06	9.72	0.02	6.63	0.3
44920	J20S212.1	J20S213	189.91	188.81	200.21	0.022	17	50	0.29	2.15	12.6	188.99	188.99	11.22	0.02	8.68	0.2
44921	J20S213.1	J20S214	188.81	188.07	201.88	0.007	17	112	1.70	2.24	13.2	188.26	188.30	13.62	0.13	4.73	2.8
44922	J20S214.1	J20S215	188.07	186.63	195.12	0.027	17	53	1.71	2.38	14.0	186.83	186.87	8.29	0.15	9.59	1.5
44924	J20S215.1	J20S217	186.63	182.93	196.05	0.014	17	259	1.64	2.45	14.4	183.13	183.18	12.92	0.15	6.97	2.1
44925	J20S217.1	J20S336	182.93	180.70	187.19	0.012	17	182	1.77	2.43	14.3	180.90	180.95	6.29	0.16	6.45	2.5
45034	J20S336.1	J20S337	180.70	174.81	183.34	0.013	17	447	1.68	2.52	14.8	175.02	175.06	8.32	0.16	6.69	2.4
45033	J20S337.1	J20S338	174.81	169.13	174.13	0.012	17	489	1.91	2.45	14.4	169.33	169.39	4.80	0.17	6.28	2.7
45032	J20S338.1	J20S340	169.13	168.24	176.40	0.015	17	60	1.81	2.54	14.9	168.45	168.50	7.95	0.17	7.11	2.4
44996	J20S340.1	J20S298	168.24	162.62	170.41	0.011	17	494	1.74	2.64	15.5	162.84	162.89	7.57	0.18	6.22	2.8
45001	J20S298.1	J20S299	162.62	160.19	167.00	0.009	17	258	2.27	2.99	17.6	160.44	160.52	6.56	0.27	5.66	4.8
45003	J20S299.1	J20S302	160.19	157.52	161.75	0.011	17	250	2.54	2.80	16.5	157.75	157.85	4.00	0.28	6.02	4.6
45004	J20S302.1	J21S455	157.52	154.47	160.72	0.016	17	193	2.30	3.04	17.9	154.72	154.80	6.00	0.28	7.33	3.9
45423	J21S455.1	J21S456	154.47	152.51	158.41	0.010	17	189	2.41	2.96	17.4	152.76	152.85	5.65	0.29	5.94	4.8
45424	J21S456.1	J21S462	152.51	149.73	159.68	0.012	17	232	2.42	2.95	17.4	149.98	150.07	9.70	0.29	6.38	4.5
45427	J21S462.1	J21S461	149.73	148.18	153.95	0.013	17	118	1.44	4.39	25.8	148.55	148.58	5.40	0.30	6.68	4.5
45428	J21S461.1	J21S460	148.18	146.70	153.71	0.011	17	139	3.71	4.26	25.1	147.05	147.27	6.66	0.74	6.01	12.3
45371	J21S460.1	J21S457	146.70	143.93	150.99	0.012	17	229	3.61	4.35	25.6	144.29	144.50	6.70	0.74	6.41	11.6
45374	J21S457.1	J21S459	143.93	141.02	148.01	0.011	17	262	3.64	4.32	25.4	141.38	141.59	6.63	0.74	6.14	12.1
45373	J21S459.1	J21S468	141.02	135.35	144.32	0.011	17	495	4.08	3.99	23.5	135.68	135.94	8.64	0.74	6.24	11.9

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2030 DWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
45368	J21S468.1	J21S467	135.35	133.44	144.00	0.016	17	120	4.08	3.99	23.4	133.77	134.03	10.23	0.74	7.34	10.1
5518310	J21S467.1	J21S587	130.98	124.27	144.30	0.090	24	75	0.39	25.60	106.7	126.40	126.40	17.90	0.82	43.73	1.9
5518308	J21S587.1	J21S586	125.75	122.60	148.00	0.036	24	89	6.84	10.30	42.9	123.46	124.18	24.54	5.69	27.55	20.7
5518307	J21S586.1	J21S585	122.60	121.84	144.00	0.012	24	66	6.91	10.22	42.6	122.69	123.43	21.31	5.69	15.72	36.2
5518076	J21S585.1	J21S584	121.84	114.98	132.00	0.012	24	569	6.12	11.21	46.7	115.91	116.50	16.09	5.69	16.05	35.5
5518073	J21S584.1	J21S583	114.98	114.07	148.00	0.007	27	138	5.55	11.35	42.0	115.02	115.50	32.98	5.69	16.27	35.0
5518072	J21S583.1	J21S579	114.07	110.21	131.00	0.006	27	615	5.53	11.41	42.3	111.16	111.64	19.84	5.70	15.86	36.0
5518070	J21S579.1	J21S578	110.21	108.84	120.50	0.006	27	224	5.53	11.40	42.2	109.79	110.26	10.71	5.71	15.67	36.4
5518069	J21S578.1	J21S577	108.84	107.31	119.00	0.006	27	236	5.41	11.59	42.9	108.28	108.73	10.72	5.71	16.12	35.4
5518068	J21S577.1	J21S582	107.31	106.07	118.80	0.006	27	218	5.43	11.59	42.9	107.04	107.49	11.76	5.72	15.10	37.9
5518065	J21S582.1	J21S581	106.07	105.20	117.30	0.006	27	140	5.53	11.43	42.3	106.15	106.63	11.15	5.72	15.76	36.3
5518063	J21S581.1	J21S580	105.20	103.65	112.20	0.006	27	253	5.53	11.43	42.3	104.60	105.08	7.60	5.72	15.66	36.5
5518062	J21S580.1	J21S502	103.65	102.13	111.93	0.006	27	249	5.53	11.42	42.3	103.08	103.56	8.85	5.72	15.65	36.6
45189	J21S502.1	J21S71	102.13	101.33	109.13	0.012	27	69	6.26	10.42	38.6	102.20	102.81	6.93	5.72	21.63	26.5
45190	J21S71.1	J21S504	101.33	99.02	111.02	0.008	27	274	6.27	10.41	38.5	99.89	100.50	11.13	5.72	18.39	31.1
45188	J21S504.1	J21S505	99.02	96.62	108.62	0.011	27	209	6.68	9.92	36.8	97.45	98.14	11.17	5.72	21.45	26.7
45185	J21S505.1	J21S506	96.62	94.65	107.65	0.011	27	176	6.71	9.89	36.6	95.47	96.17	12.18	5.72	21.18	27.0
45141	J21S506.1	J21S508	94.65	90.86	103.86	0.011	27	334	6.70	9.90	36.7	91.68	92.38	12.18	5.72	21.32	26.8
45144	J21S508.1	J21S509	90.86	87.11	100.11	0.011	27	329	6.75	9.88	36.6	87.93	88.64	12.18	5.75	21.35	26.9
45145	J21S509.1	J21S63	87.11	84.72	97.72	0.011	27	208	6.71	9.92	36.8	85.55	86.25	12.17	5.75	21.46	26.8
45182	J21S63.1	I21S242	84.72	78.71	91.71	0.011	27	532	6.57	10.08	37.3	79.55	80.22	12.16	5.75	21.27	27.0
39803	I21S242.1	I21S525	78.71	77.06	90.30	0.010	27	174	6.59	10.07	37.3	77.90	78.57	12.40	5.76	19.51	29.5
5102267	I21S525.1	I22S556	77.06	75.94	89.00	0.018	26	63	4.94	12.77	49.1	77.01	77.39	11.99	5.76	24.13	23.9
5102265	I22S556.1	I22S555	75.94	74.96	86.20	0.005	26	216	4.92	12.85	49.4	76.03	76.41	10.17	5.78	12.19	47.4
6269175	I22S555.1	I21S529	74.96	73.14	83.14	0.004	26	418	4.98	12.74	49.0	74.20	74.59	8.93	5.78	12.01	48.2
5102263	I21S529.1	I21S517	73.14	73.12	83.00	0.004	27	5	4.99	12.47	46.2	74.16	74.55	8.84	5.78	12.66	45.7
5102151	I21S517.1	I21S518	73.12	72.19	86.60	0.004	27	207	5.01	12.42	46.0	73.23	73.62	13.37	5.78	13.43	43.1

TOTAL LENGTH (MILES):	7.46	LENGTH OF PIPE - d/D < 50% (MILES):	7.36	LENGTH OF PIPE - Q/CAP < 50% (MILES):	7.41
LENGTH WEIGHTED Q/CAP:	21.9	LENGTH OF PIPE - d/D 50 - 75% (MILES):	0.09	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	0.05
LENGTH WEIGHTED d/D:	33.1	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.00	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	0.00
LENGTH WEIGHTED HGL. BELOW RIM (FT):	13.64	LENGTH OF PIPE - d/D > 100% (MILES):	0.01	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.00

Exhibit B

AS-BUILT CONDITION OF CHOLLAS VALLEY TS

Wet Weather Flow

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2010 WWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5200562	L18S653.1	L18S658	372.50	370.10	382.50	0.013	24	181	5.46	6.94	28.9	370.68	371.14	11.82	2.66	16.84	15.8
5214242	L18S658.1	L18S652	370.10	365.40	376.00	0.013	24	375	5.49	6.91	28.8	365.98	366.44	10.02	2.66	16.36	16.2
5200560	L18S652.1	L18S651	365.40	356.70	365.10	0.013	24	679	4.95	7.45	31.0	357.32	357.70	7.78	2.66	16.56	16.0
5200549	L18S651.1	L18S650	356.70	354.75	369.50	0.008	24	250	4.87	7.54	31.4	355.38	355.75	14.12	2.66	12.91	20.6
5200546	L18S650.1	L18S649	354.75	351.05	369.80	0.008	24	481	4.91	7.56	31.5	351.68	352.05	18.12	2.69	12.83	21.0
5200544	L18S649.1	L18S648	351.05	346.25	363.50	0.008	24	630	4.30	8.33	34.7	346.94	347.23	16.56	2.69	12.76	21.0
5200542	L18S648.1	L18S647	346.25	342.65	358.75	0.007	24	533	4.81	8.32	34.7	343.34	343.70	15.41	3.01	12.02	25.0
5200540	L18S647.1	L18S646	342.65	334.50	344.90	0.012	24	707	5.58	7.58	31.6	335.13	335.62	9.77	3.07	15.70	19.6
5200538	L18S646.1	L18S645	334.50	321.00	334.25	0.027	24	499	5.08	8.35	34.8	321.70	322.10	12.55	3.19	24.06	13.3
5200536	L18S645.1	L18S644	321.00	318.00	327.00	0.008	24	400	5.08	8.34	34.8	318.69	319.10	8.31	3.19	12.66	25.2
5200534	L18S644.1	L18S643	318.00	317.25	326.40	0.025	24	30	4.31	9.43	39.3	318.04	318.33	8.36	3.19	23.19	13.8
5200415	L18S643.1	L18S642	317.25	316.50	324.80	0.005	24	161	4.31	9.43	39.3	317.28	317.57	7.52	3.19	9.97	32.0
5200412	L18S642.1	L19S434	316.50	312.45	325.90	0.009	24	427	5.53	7.85	32.7	313.11	313.58	12.79	3.20	14.23	22.4
5518532	L19S434.1	K19S556	312.41	308.71	323.50	0.012	24	316	5.91	7.57	31.5	309.34	309.88	14.16	3.24	15.82	20.5
5518531	K19S556.1	K19S555	308.71	303.92	317.00	0.013	24	369	5.92	7.56	31.5	304.55	305.09	12.45	3.24	16.65	19.5
5518530	K19S555.1	K19S554	303.92	292.50	307.00	0.018	24	620	6.71	6.91	28.8	293.08	293.77	13.93	3.24	19.85	16.3
5534194	K19S554.2	K19S583	292.50	287.40	301.50	0.019	24	266	7.03	6.67	27.8	287.96	288.73	13.54	3.24	20.24	16.0
5534192	K19S583.1	K19S582	287.40	286.91	300.50	0.024	24	21	6.72	6.90	28.7	287.48	288.19	13.01	3.24	22.39	14.5
5518529	K19S582.1	K19S552	286.91	278.50	295.00	0.019	24	435	6.54	7.03	29.3	279.09	279.75	15.91	3.24	20.33	15.9
5518521	K19S552.1	K19S577	278.50	264.75	284.50	0.019	24	725	3.74	10.99	45.8	265.67	265.88	18.83	3.38	20.14	16.8
58610	L18S237.1	L18S236	371.28	370.15	389.43	0.007	14	151	4.28	8.50	60.7	370.86	371.14	18.57	1.87	3.00	62.4
58609	L18S236.1	L18S235	370.15	370.05	383.21	0.007	14	15	4.33	8.41	60.1	370.75	371.04	12.46	1.87	2.80	66.9
5039772	L18S235.1	L18S234	370.05	367.17	376.85	0.007	14	388	4.56	8.05	57.5	367.84	368.16	9.01	1.87	2.99	62.6
58607	L18S234.1	L18S232	367.17	356.82	373.98	0.027	14	387	5.59	6.84	48.8	357.39	357.88	16.59	1.87	5.68	32.9
5347920	L18S232.1	L18S662	356.82	354.05	369.90	0.014	14	195	4.73	7.80	55.7	354.70	355.05	15.20	1.87	4.14	45.2
5347931	L18S662.1	L18S665	354.05	353.77	364.80	0.007	15	40	4.53	7.76	51.7	354.42	354.73	10.38	1.87	3.52	53.3
5347922	L18S665.1	L18S664	353.77	353.16	364.50	0.008	15	77	3.77	9.03	60.2	353.91	354.13	10.59	1.87	3.71	50.5
5347927	L18S664.1	L18S663	353.16	351.80	368.10	0.007	15	195	4.73	8.91	59.4	352.54	352.89	15.56	2.32	3.49	66.5
5347926	L18S663.1	L18S174	351.80	350.85	371.11	0.007	15	131	4.78	8.82	58.8	351.58	351.94	19.52	2.32	3.55	65.3
58567	L18S174.1	L18S187	350.85	346.90	363.65	0.012	14	326	5.74	8.39	59.9	347.60	348.11	16.05	2.48	3.83	64.8
58566	L18S187.1	L18S186	346.90	340.73	357.46	0.012	14	494	5.77	8.35	59.7	341.43	341.94	16.03	2.48	3.88	63.9
58811	L18S186.1	L18S583	340.73	335.92	352.69	0.013	14	381	5.43	8.87	63.3	336.66	337.12	16.03	2.48	3.90	63.6
58816	L18S583.1	L18S458	335.92	331.31	348.08	0.013	14	366	5.56	9.11	65.1	332.07	332.55	16.01	2.64	3.90	67.6
58819	L18S458.1	L18S453	331.31	330.96	355.55	0.012	14	30	5.70	8.97	64.1	331.71	332.21	23.84	2.65	3.76	70.3
58821	L18S453.1	L18S445	330.96	326.48	343.12	0.012	14	360	5.81	8.88	63.4	327.22	327.74	15.90	2.66	3.87	68.6
58802	L18S445.1	L18S444	326.48	321.99	337.95	0.013	14	350	5.52	9.22	65.9	322.76	323.23	15.19	2.66	3.94	67.7
58790	L18S444.1	L18S432	321.99	316.50	331.58	0.011	14	487	5.70	9.01	64.4	317.25	317.76	14.33	2.68	3.69	72.6
58785	L18S432.1	L18S431	316.50	313.30	330.75	0.014	14	226	4.21	13.37	95.5	314.41	314.69	16.34	2.68	4.13	64.7
58776	L18S431.1	L18S422	313.30	311.52	324.38	0.007	14	270	5.20	10.49	74.9	312.39	312.81	11.99	2.89	2.82	102.4
58941	L18S422.1	L19S80	311.52	305.74	319.85	0.016	14	359	6.66	8.42	60.1	306.44	307.13	13.41	2.89	4.41	65.5
58902	L19S80.1	L19S78	305.74	305.24	314.97	0.046	17	11	6.36	8.05	47.4	305.91	306.54	9.06	3.02	12.43	24.3

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2010 WWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
58905	L19S78.1	L19S53	305.24	303.81	321.12	0.015	17	97	5.74	8.73	51.3	304.54	305.05	16.58	3.02	7.06	42.8
58903	L19S53.1	K19S77	303.81	301.69	304.89	0.010	17	215	5.76	8.70	51.2	302.41	302.93	2.47	3.02	5.79	52.1
51687	K19S77.1	K19S76	301.69	300.54	321.44	0.020	14	56	7.36	8.04	57.4	301.21	302.05	20.23	3.02	4.96	60.9
51686	K19S76.1	K19S78	300.54	299.93	321.73	0.012	21	50	5.61	7.94	37.8	300.59	301.08	21.14	3.02	11.32	26.7
51684	K19S78.1	K19S69	299.93	295.92	317.72	0.011	21	374	5.62	7.93	37.8	296.58	297.07	21.14	3.02	10.60	28.5
51682	K19S69.1	K19S62	295.92	287.97	309.77	0.014	21	559	6.12	7.45	35.5	288.59	289.17	21.18	3.02	12.21	24.7
51679	K19S62.1	K19S44	287.97	279.96	300.96	0.014	21	563	3.81	10.66	50.7	280.85	281.07	20.11	3.02	12.21	24.7
51664	K19S44.1	K19S43	280.15	278.07	295.24	0.019	14	108	6.11	9.45	67.5	278.86	279.44	16.38	3.03	4.81	63.0
51663	K19S43.1	K19S42	278.07	276.07	288.12	0.013	14	148	6.25	9.26	66.2	276.84	277.45	11.28	3.03	4.03	75.2
51632	K19S42.1	K19S24	276.07	273.10	286.17	0.015	14	203	6.21	9.32	66.6	273.88	274.48	12.29	3.03	4.20	72.1
51631	K19S24.1	K19S21	273.10	266.94	287.50	0.014	14	433	6.30	9.21	65.8	267.71	268.32	19.79	3.03	4.14	73.2
5518522	K19S21.1	K19S551	266.94	265.96	286.00	0.015	14	65	6.52	8.94	63.8	266.71	267.37	19.29	3.03	4.26	71.1
5533985	K19S551.1	K19S577	265.96	264.75	284.50	0.041	24	29	3.35	10.99	45.8	265.67	265.84	18.84	3.03	29.76	10.2
5518525	K19S577.1	K19S548	264.75	261.64	278.50	0.012	24	270	6.37	11.93	49.7	262.63	263.26	15.87	6.41	15.69	40.9
5534001	K19S548.1	K19S579	261.64	260.61	276.00	0.011	24	98	7.03	11.92	49.7	261.60	262.37	14.40	7.07	15.01	47.1
5534003	K19S579.1	K19S580	260.61	260.34	272.00	0.013	24	20	7.11	11.81	49.2	261.33	262.11	10.68	7.07	16.86	41.9
5518515	K19S580.1	K19S581	260.34	259.29	272.00	0.011	24	95	7.03	11.91	49.6	260.28	261.05	11.72	7.07	15.39	46.0
5534005	K19S581.1	K19S547	259.29	255.00	270.00	0.011	24	404	7.04	11.90	49.6	255.99	256.76	14.01	7.07	15.07	46.9
5518511	K19S547.1	K19S545	255.00	250.46	265.00	0.015	24	305	8.03	10.75	44.8	251.36	252.36	13.64	7.07	17.84	39.6
5533989	K19S545.1	K19S578	250.46	237.63	257.00	0.022	24	579	9.18	9.73	40.6	238.44	239.75	18.56	7.09	21.77	32.5
5518505	K19S578.1	K19S544	237.63	235.41	263.83	0.023	24	96	8.20	10.59	44.1	236.29	237.34	27.54	7.08	22.23	31.9
5518502	K19S544.1	K19S543	235.41	233.31	258.46	0.016	24	132	7.09	11.86	49.4	234.30	235.08	24.16	7.09	18.46	38.4
5518501	K19S543.1	K19S542	233.31	232.89	253.05	0.011	24	37	6.80	12.26	51.1	233.91	234.63	19.14	7.09	15.62	45.4
5518490	K19S542.1	K19S541	232.89	229.59	248.52	0.009	24	375	6.82	12.23	50.9	230.61	231.33	17.91	7.09	13.71	51.7
5518488	K19S541.1	K19S540	229.59	226.44	241.75	0.011	24	292	7.08	11.87	49.5	227.43	228.21	14.32	7.09	15.19	46.7
5518487	K19S540.1	K19S539	226.44	221.45	233.00	0.016	24	320	8.11	10.68	44.5	222.34	223.36	10.66	7.09	18.26	38.8
5518486	K19S539.1	K19S538	221.45	218.03	233.90	0.015	24	223	7.50	11.35	47.3	218.98	219.85	14.92	7.09	18.11	39.1
5518485	K19S538.1	K19S537	218.03	217.58	230.50	0.014	24	32	6.98	12.00	50.0	218.58	219.34	11.92	7.09	17.26	41.1
5518484	K19S537.1	K19S536	217.58	215.90	232.00	0.010	24	164	6.99	11.99	50.0	216.90	217.66	15.10	7.09	14.82	47.8
5518483	K19S536.1	K19S535	215.90	215.70	233.50	0.013	24	15	7.00	11.97	49.9	216.70	217.46	16.80	7.09	16.77	42.3
5518482	K19S535.1	K19S534	215.70	212.97	227.44	0.010	24	281	6.45	12.85	53.6	214.04	214.69	13.40	7.09	14.41	49.2
5518479	K19S534.1	K19S533	212.97	212.02	223.75	0.011	24	90	7.20	12.94	53.9	213.10	213.90	10.65	8.01	15.06	53.2
5518446	K19S533.1	K20S788	212.02	210.70	222.03	0.010	24	126	7.28	12.85	53.5	211.77	212.59	10.26	8.05	14.96	53.8
5518445	K20S788.1	K20S787	210.70	209.12	217.28	0.019	24	83	8.26	11.63	48.5	210.09	211.15	7.19	8.05	20.12	40.0
5518444	K20S787.1	K20S786	209.12	202.56	219.00	0.016	24	407	7.18	13.32	55.5	203.67	204.47	15.33	8.27	18.57	44.6
5518443	K20S786.1	K20S785	202.56	200.85	217.50	0.010	24	166	7.23	13.20	55.0	201.95	202.76	15.55	8.27	14.85	55.7
5518442	K20S785.1	K20S784	200.85	196.48	211.00	0.012	24	360	7.82	12.40	51.7	197.51	198.46	13.49	8.27	16.12	51.3
5518441	K20S784.1	K20S783	196.48	193.70	207.50	0.015	24	181	8.61	11.76	49.0	194.68	195.83	12.82	8.29	18.14	45.7
5518440	K20S783.1	J20S645	193.70	185.26	200.00	0.017	24	496	8.61	11.51	48.0	186.22	187.37	13.78	8.29	19.08	43.4
5518430	J20S645.1	J20S644	185.26	184.69	199.00	0.017	24	33	8.26	11.89	49.5	185.68	186.74	13.32	8.29	19.24	43.1
5518429	J20S644.1	J20S643	184.69	184.15	199.50	0.017	24	31	7.01	13.56	56.5	185.28	186.04	14.22	8.29	19.30	42.9

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TRUNK SEWER 20 - CHOLLAS VALLEY
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FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5518428	J20S643.1	K20S782	184.15	182.79	201.50	0.009	24	147	7.10	13.42	55.9	183.91	184.69	17.59	8.29	14.06	58.9
5518427	K20S782.1	K20S781	182.79	182.41	201.50	0.012	24	33	7.38	13.09	54.5	183.50	184.35	18.00	8.28	15.74	52.6
5518426	K20S781.1	K20S780	182.41	182.09	201.00	0.012	24	27	7.15	13.37	55.7	183.20	184.00	17.80	8.28	15.88	52.2
5518425	K20S780.1	K20S779	182.09	179.94	197.50	0.010	24	210	7.10	13.44	56.0	181.06	181.84	16.44	8.28	14.81	55.9
5518424	K20S779.1	J20S642	179.94	172.94	188.50	0.010	24	695	7.12	13.41	55.9	174.06	174.84	14.44	8.28	14.67	56.4
5518423	J20S642.1	J20S641	172.94	169.28	193.00	0.010	24	361	7.09	13.44	56.0	170.40	171.18	22.60	8.28	14.72	56.2
5518422	J20S641.1	J20S640	169.28	161.28	182.50	0.010	24	795	7.33	13.14	54.8	162.37	163.21	20.13	8.28	14.67	56.5
5518331	J20S640.1	J20S646	161.28	160.76	183.00	0.011	24	47	7.15	13.37	55.7	161.88	162.67	21.12	8.28	15.41	53.7
5518330	J20S646.1	J20S638	160.76	158.62	172.00	0.010	24	209	7.34	13.10	54.6	159.71	160.55	12.29	8.28	14.79	56.0
5518329	J20S638.1	J20S637	158.62	157.78	170.50	0.011	24	79	7.56	12.77	53.2	158.84	159.73	11.66	8.28	15.10	54.8
5518328	J20S637.1	J20S636	157.78	157.42	170.00	0.012	24	31	7.54	12.79	53.3	158.49	159.37	11.51	8.28	15.78	52.5
5518327	J20S636.1	J20S635	157.42	157.00	170.50	0.011	24	37	7.55	12.77	53.2	158.07	158.95	12.43	8.28	15.66	52.9
5518326	J20S635.1	J21S592	157.00	145.59	161.00	0.011	24	998	7.60	12.67	52.8	146.65	147.55	14.35	8.27	15.63	52.9
5518313	J21S592.1	J21S591	145.59	135.38	148.00	0.014	24	727	7.09	13.45	56.0	136.50	137.28	11.50	8.29	17.32	47.8
5518312	J21S591.1	J21S590	135.38	128.17	144.00	0.010	24	716	7.17	13.31	55.5	129.28	130.08	14.72	8.29	14.67	56.5
5518309	J21S590.1	J21S587	128.17	125.75	144.30	0.036	24	67	10.20	10.11	42.1	126.59	128.21	17.71	8.29	27.79	29.8
52180	K20S138.1	K20S117	209.84	203.96	208.96	0.013	17	439	0.00	1.70	10.0	204.10	204.10	4.86	0.00	6.74	0.0
52051	K20S117.1	K20S124	203.96	203.59	216.55	0.006	17	60	0.06	1.78	10.5	203.74	203.74	12.81	0.00	4.57	0.1
52050	K20S124.1	K20S123	203.59	198.75	203.75	0.013	17	378	0.22	1.83	10.8	198.90	198.90	4.85	0.01	6.60	0.2
52053	K20S123.1	K20S161	198.75	195.92	208.17	0.015	17	191	0.37	1.85	10.9	196.07	196.07	12.10	0.02	7.09	0.3
52055	K20S161.1	K20S160	195.92	193.00	203.40	0.011	17	260	0.35	1.91	11.3	193.16	193.16	10.24	0.02	6.18	0.4
52059	K20S160.1	J20S212	193.00	189.91	199.78	0.013	17	239	0.57	1.86	11.0	190.07	190.07	9.71	0.03	6.63	0.5
44920	J20S212.1	J20S213	189.91	188.81	200.21	0.022	17	50	0.36	2.57	15.1	189.02	189.03	11.19	0.03	8.68	0.4
44921	J20S213.1	J20S214	188.81	188.07	201.88	0.007	17	112	2.35	2.57	15.1	188.28	188.37	13.60	0.22	4.73	4.6
44922	J20S214.1	J20S215	188.07	186.63	195.12	0.027	17	53	2.31	2.68	15.8	186.85	186.94	8.27	0.24	9.59	2.5
44924	J20S215.1	J20S217	186.63	182.93	196.05	0.014	17	259	2.16	2.82	16.6	183.16	183.24	12.89	0.24	6.97	3.4
44925	J20S217.1	J20S336	182.93	180.70	187.19	0.012	17	182	2.34	2.78	16.4	180.93	181.02	6.26	0.25	6.45	3.9
45034	J20S336.1	J20S337	180.70	174.81	183.34	0.013	17	447	2.16	2.94	17.3	175.05	175.13	8.29	0.25	6.69	3.8
45033	J20S337.1	J20S338	174.81	169.13	174.13	0.012	17	489	2.51	2.80	16.5	169.36	169.46	4.77	0.28	6.28	4.4
45032	J20S338.1	J20S340	169.13	168.24	176.40	0.015	17	60	2.32	2.97	17.4	168.49	168.57	7.91	0.28	7.11	3.9
44996	J20S340.1	J20S298	168.24	162.62	170.41	0.011	17	494	1.99	3.33	19.6	162.90	162.96	7.51	0.28	6.22	4.5
45001	J20S298.1	J20S299	162.62	160.19	167.00	0.009	17	258	2.84	3.56	20.9	160.49	160.61	6.51	0.44	5.66	7.8
45003	J20S299.1	J20S302	160.19	157.52	161.75	0.011	17	250	3.15	3.35	19.7	157.80	157.95	3.95	0.45	6.02	7.4
45004	J20S302.1	J21S455	157.52	154.47	160.72	0.016	17	193	2.89	3.60	21.2	154.77	154.90	5.95	0.46	7.33	6.2
45423	J21S455.1	J21S456	154.47	152.51	158.41	0.010	17	189	3.01	3.52	20.7	152.80	152.94	5.61	0.46	5.94	7.7
45424	J21S456.1	J21S462	152.51	149.73	159.68	0.012	17	232	3.02	3.52	20.7	150.02	150.17	9.65	0.46	6.38	7.2
45427	J21S462.1	J21S461	149.73	148.18	153.95	0.013	17	118	1.74	5.41	31.8	148.63	148.68	5.32	0.48	6.68	7.2
45428	J21S461.1	J21S460	148.18	146.70	153.71	0.011	17	139	4.48	5.23	30.8	147.14	147.45	6.58	1.19	6.01	19.8
45371	J21S460.1	J21S457	146.70	143.93	150.99	0.012	17	229	4.34	5.35	31.5	144.38	144.67	6.61	1.19	6.41	18.6
45374	J21S457.1	J21S459	143.93	141.02	148.01	0.011	17	262	4.40	5.30	31.2	141.46	141.76	6.55	1.19	6.14	19.4
45373	J21S459.1	J21S468	141.02	135.35	144.32	0.011	17	495	4.40	5.30	31.2	135.79	136.09	8.53	1.19	6.24	19.1

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FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
45368	J21S468.1	J21S467	135.35	133.44	144.00	0.016	17	120	4.89	4.91	28.9	133.85	134.22	10.15	1.19	7.34	16.2
5518310	J21S467.1	J21S587	130.98	124.27	144.30	0.090	24	75	0.63	27.87	116.1	126.59	126.60	17.71	1.32	43.73	3.0
5518308	J21S587.1	J21S586	125.75	122.60	148.00	0.036	24	89	7.74	13.93	58.0	123.76	124.69	24.24	9.46	27.55	34.3
5518307	J21S586.1	J21S585	122.60	121.84	144.00	0.012	24	66	7.83	13.80	57.5	122.99	123.94	21.01	9.46	15.72	60.1
5518076	J21S585.1	J21S584	121.84	114.98	132.00	0.012	24	569	7.00	15.15	63.1	116.24	117.00	15.76	9.45	16.05	58.9
5518073	J21S584.1	J21S583	114.98	114.07	148.00	0.007	27	138	6.28	15.32	56.7	115.35	115.96	32.65	9.45	16.27	58.1
5518072	J21S583.1	J21S579	114.07	110.21	131.00	0.006	27	615	6.25	15.41	57.1	111.49	112.10	19.51	9.47	15.86	59.7
5518070	J21S579.1	J21S578	110.21	108.84	120.50	0.006	27	224	6.31	15.29	56.6	110.11	110.73	10.39	9.47	15.67	60.4
5518069	J21S578.1	J21S577	108.84	107.31	119.00	0.006	27	236	6.13	15.66	58.0	108.61	109.20	10.38	9.46	16.12	58.7
5518068	J21S577.1	J21S582	107.31	106.07	118.80	0.006	27	218	6.20	15.53	57.5	107.36	107.96	11.44	9.49	15.10	62.8
5518065	J21S582.1	J21S581	106.07	105.20	117.30	0.006	27	140	6.25	15.43	57.1	106.49	107.09	10.81	9.49	15.76	60.2
5518063	J21S581.1	J21S580	105.20	103.65	112.20	0.006	27	253	6.25	15.43	57.2	104.94	105.55	7.26	9.49	15.66	60.6
5518062	J21S580.1	J21S502	103.65	102.13	111.93	0.006	27	249	6.32	15.31	56.7	103.41	104.02	8.52	9.49	15.65	60.7
45189	J21S502.1	J21S71	102.13	101.33	109.13	0.012	27	69	7.20	13.78	51.0	102.48	103.28	6.65	9.50	21.63	43.9
45190	J21S71.1	J21S504	101.33	99.02	111.02	0.008	27	274	7.22	13.75	50.9	100.16	100.98	10.86	9.50	18.39	51.7
45188	J21S504.1	J21S505	99.02	96.62	108.62	0.011	27	209	7.66	13.13	48.6	97.71	98.63	10.90	9.50	21.45	44.3
45185	J21S505.1	J21S506	96.62	94.65	107.65	0.011	27	176	7.70	13.08	48.4	95.74	96.66	11.91	9.50	21.18	44.9
45141	J21S506.1	J21S508	94.65	90.86	103.86	0.011	27	334	7.69	13.10	48.5	91.95	92.87	11.91	9.50	21.32	44.6
45144	J21S508.1	J21S509	90.86	87.11	100.11	0.011	27	329	7.74	13.06	48.4	88.20	89.13	11.91	9.53	21.35	44.7
45145	J21S509.1	J21S63	87.11	84.72	97.72	0.011	27	208	7.70	13.12	48.6	85.81	86.73	11.91	9.53	21.46	44.4
45182	J21S63.1	I21S242	84.72	78.71	91.71	0.011	27	532	7.46	13.44	49.8	79.83	80.69	11.88	9.52	21.27	44.8
39803	I21S242.1	I21S525	78.71	77.06	90.30	0.010	27	174	7.48	13.43	49.7	78.18	79.05	12.12	9.54	19.51	48.9
5102267	I21S525.1	I22S556	77.06	75.94	89.00	0.018	26	63	5.53	17.80	68.5	77.43	77.90	11.57	9.54	24.13	39.5
5102265	I22S556.1	I22S555	75.94	74.96	86.20	0.005	26	216	5.52	17.92	68.9	76.45	76.93	9.75	9.58	12.19	78.6
6269175	I22S555.1	I21S529	74.96	73.14	83.14	0.004	26	418	5.60	17.56	67.5	74.60	75.09	8.53	9.58	12.01	79.8
5102263	I21S529.1	I21S517	73.14	73.12	83.00	0.004	27	5	5.60	17.10	63.3	74.54	75.03	8.45	9.58	12.66	75.7
5102151	I21S517.1	I21S518	73.12	72.19	86.60	0.004	27	207	5.98	16.14	59.8	73.54	74.09	13.06	9.58	13.43	71.4

TOTAL LENGTH (MILES):	7.46	LENGTH OF PIPE - d/D < 50% (MILES):	4.08	LENGTH OF PIPE - Q/CAP < 50% (MILES):	4.59
LENGTH WEIGHTED Q/CAP:	38.9	LENGTH OF PIPE - d/D 50 - 75% (MILES):	3.33	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	2.68
LENGTH WEIGHTED d/D:	45.0	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.04	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	0.15
LENGTH WEIGHTED HGL. BELOW RIM (FT):	13.43	LENGTH OF PIPE - d/D > 100% (MILES):	0.01	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.05

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2030 WWF AS-BUILT

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5200562	L18S653.1	L18S658	372.50	370.10	382.50	0.013	24	181	5.70	7.27	30.3	370.70	371.21	11.80	2.96	16.84	17.6
5214242	L18S658.1	L18S652	370.10	365.40	376.00	0.013	24	375	5.74	7.23	30.1	366.00	366.51	10.00	2.96	16.36	18.1
5200560	L18S652.1	L18S651	365.40	356.70	365.10	0.013	24	679	5.04	7.95	33.1	357.36	357.76	7.74	2.96	16.56	17.9
5200549	L18S651.1	L18S650	356.70	354.75	369.50	0.008	24	250	4.95	8.05	33.6	355.42	355.80	14.08	2.96	12.91	22.9
5200546	L18S650.1	L18S649	354.75	351.05	369.80	0.008	24	481	5.01	8.07	33.6	351.72	352.11	18.08	3.01	12.83	23.4
5200544	L18S649.1	L18S648	351.05	346.25	363.50	0.008	24	630	4.49	8.76	36.5	346.98	347.29	16.52	3.00	12.76	23.5
5200542	L18S648.1	L18S647	346.25	342.65	358.75	0.007	24	533	5.07	8.75	36.5	343.38	343.78	15.37	3.39	12.02	28.2
5200540	L18S647.1	L18S646	342.65	334.50	344.90	0.012	24	707	5.77	8.12	33.8	335.18	335.69	9.72	3.49	15.70	22.2
5200538	L18S646.1	L18S645	334.50	321.00	334.25	0.027	24	499	5.37	8.83	36.8	321.74	322.18	12.51	3.63	24.06	15.1
5200536	L18S645.1	L18S644	321.00	318.00	327.00	0.008	24	400	5.37	8.82	36.7	318.73	319.18	8.27	3.63	12.66	28.7
5200534	L18S644.1	L18S643	318.00	317.25	326.40	0.025	24	30	4.45	10.14	42.3	318.10	318.40	8.31	3.63	23.19	15.7
5200415	L18S643.1	L18S642	317.25	316.50	324.80	0.005	24	161	4.47	10.11	42.1	317.34	317.65	7.46	3.63	9.97	36.5
5200412	L18S642.1	L19S434	316.50	312.45	325.90	0.009	24	427	5.78	8.44	35.2	313.15	313.67	12.74	3.68	14.23	25.9
5518532	L19S434.1	K19S556	312.41	308.71	323.50	0.012	24	316	6.13	8.17	34.0	309.39	309.98	14.11	3.74	15.82	23.6
5518531	K19S556.1	K19S555	308.71	303.92	317.00	0.013	24	369	6.14	8.16	34.0	304.60	305.19	12.40	3.74	16.65	22.4
5518530	K19S555.1	K19S554	303.92	292.50	307.00	0.018	24	620	7.08	7.35	30.6	293.11	293.89	13.89	3.74	19.85	18.8
5534194	K19S554.2	K19S583	292.50	287.40	301.50	0.019	24	266	7.52	7.04	29.4	287.99	288.87	13.51	3.73	20.24	18.5
5534192	K19S583.1	K19S582	287.40	286.91	300.50	0.024	24	21	7.11	7.33	30.6	287.52	288.31	12.98	3.73	22.39	16.7
5518529	K19S582.1	K19S552	286.91	278.50	295.00	0.019	24	435	6.83	7.55	31.5	279.13	279.85	15.87	3.73	20.33	18.4
5518521	K19S552.1	K19S577	278.50	264.75	284.50	0.019	24	725	3.78	12.16	50.7	265.76	265.99	18.74	3.90	20.14	19.4
58610	L18S237.1	L18S236	371.28	370.15	389.43	0.007	14	151	4.56	9.67	69.1	370.96	371.28	18.47	2.32	3.00	77.2
58609	L18S236.1	L18S235	370.15	370.05	383.21	0.007	14	15	4.71	9.39	67.1	370.83	371.18	12.38	2.32	2.80	82.9
5039772	L18S235.1	L18S234	370.05	367.17	376.85	0.007	14	388	4.80	9.23	65.9	367.94	368.30	8.91	2.32	2.99	77.5
58607	L18S234.1	L18S232	367.17	356.82	373.98	0.027	14	387	5.87	7.81	55.8	357.47	358.01	16.51	2.32	5.68	40.7
5347920	L18S232.1	L18S662	356.82	354.05	369.90	0.014	14	195	4.91	9.05	64.7	354.80	355.18	15.10	2.32	4.14	56.0
5347931	L18S662.1	L18S665	354.05	353.77	364.80	0.007	15	40	4.66	9.04	60.3	354.52	354.86	10.28	2.32	3.52	65.9
5347922	L18S665.1	L18S664	353.77	353.16	364.50	0.008	15	77	3.97	10.49	69.9	354.03	354.28	10.47	2.32	3.71	62.5
5347927	L18S664.1	L18S663	353.16	351.80	368.10	0.007	15	195	4.87	10.25	68.3	352.66	353.02	15.45	2.80	3.49	80.3
5347926	L18S663.1	L18S174	351.80	350.85	371.11	0.007	15	131	4.97	10.06	67.1	351.69	352.07	19.42	2.80	3.55	78.9
58567	L18S174.1	L18S187	350.85	346.90	363.65	0.012	14	326	5.87	9.77	69.8	347.71	348.25	15.94	3.00	3.83	78.4
58566	L18S187.1	L18S186	346.90	340.73	357.46	0.012	14	494	5.92	9.74	69.6	341.54	342.09	15.92	3.02	3.88	77.8
58811	L18S186.1	L18S583	340.73	335.92	352.69	0.013	14	381	5.60	10.27	73.4	336.77	337.26	15.92	3.03	3.90	77.6
58816	L18S583.1	L18S458	335.92	331.31	348.08	0.013	14	366	5.72	10.59	75.7	332.19	332.70	15.89	3.21	3.90	82.2
58819	L18S458.1	L18S453	331.31	330.96	355.55	0.012	14	30	5.88	10.40	74.3	331.83	332.36	23.72	3.23	3.76	85.9
58821	L18S453.1	L18S445	330.96	326.48	343.12	0.012	14	360	5.96	10.36	74.0	327.34	327.89	15.78	3.27	3.87	84.3
58802	L18S445.1	L18S444	326.48	321.99	337.95	0.013	14	350	5.65	11.17	79.8	322.92	323.42	15.03	3.28	3.94	83.4
58790	L18S444.1	L18S432	321.99	316.50	331.58	0.011	14	487	5.96	13.48	96.3	317.62	318.17	13.96	3.32	3.69	90.0
58785	L18S432.1	L18S431	316.50	313.30	330.75	0.014	14	226	4.55	25.38	181.3	315.42	315.74	15.34	3.32	4.13	80.2
58776	L18S431.1	L18S422	313.30	311.52	324.38	0.007	14	270	5.82	11.54	82.4	312.48	313.01	11.90	3.54	2.82	125.6
58941	L18S422.1	L19S80	311.52	305.74	319.85	0.016	14	359	6.93	9.80	70.0	306.56	307.31	13.29	3.55	4.41	80.4
58902	L19S80.1	L19S78	305.74	305.24	314.97	0.046	17	11	6.74	9.01	53.0	305.99	306.70	8.98	3.69	12.43	29.7

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2030 WWF AS-BUILT

▨ Chollas Valley TS - TS 020

□ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
58905	L19S78.1	L19S53	305.24	303.81	321.12	0.015	17	97	5.94	9.98	58.7	304.64	305.19	16.48	3.69	7.06	52.3
58903	L19S53.1	K19S77	303.81	301.69	304.89	0.010	17	215	6.04	9.84	57.9	302.51	303.08	2.38	3.69	5.79	63.7
51687	K19S77.1	K19S76	301.69	300.54	321.44	0.020	14	56	7.75	9.11	65.1	301.30	302.23	20.14	3.69	4.96	74.5
51686	K19S76.1	K19S78	300.54	299.93	321.73	0.012	21	50	5.87	8.92	42.5	300.67	301.21	21.05	3.69	11.32	32.6
51684	K19S78.1	K19S69	299.93	295.92	317.72	0.011	21	374	5.94	8.91	42.4	296.66	297.21	21.06	3.73	10.60	35.2
51682	K19S69.1	K19S62	295.92	287.97	309.77	0.014	21	559	6.54	8.29	39.5	288.66	289.33	21.11	3.73	12.21	30.5
51679	K19S62.1	K19S44	287.97	279.96	300.96	0.014	21	563	3.88	12.55	59.7	281.01	281.24	19.96	3.73	12.21	30.6
51664	K19S44.1	K19S43	280.15	278.07	295.24	0.019	14	108	6.22	12.17	86.9	279.09	279.69	16.15	3.84	4.81	79.8
51663	K19S43.1	K19S42	278.07	276.07	288.12	0.013	14	148	6.46	11.43	81.7	277.02	277.67	11.10	3.84	4.03	95.3
51632	K19S42.1	K19S24	276.07	273.10	286.17	0.015	14	203	6.37	11.51	82.2	274.06	274.69	12.11	3.84	4.20	91.2
51631	K19S24.1	K19S21	273.10	266.94	287.50	0.014	14	433	6.56	11.29	80.7	267.88	268.55	19.62	3.84	4.14	92.6
5518522	K19S21.1	K19S551	266.94	265.96	286.00	0.015	14	65	6.89	10.73	76.6	266.86	267.59	19.15	3.84	4.26	89.9
5533985	K19S551.1	K19S577	265.96	264.75	284.50	0.041	24	29	3.72	12.16	50.7	265.76	265.98	18.74	3.84	29.76	12.9
5518525	K19S577.1	K19S548	264.75	261.64	278.50	0.012	24	270	6.59	13.52	56.3	262.77	263.44	15.73	7.74	15.69	49.3
5534001	K19S548.1	K19S579	261.64	260.61	276.00	0.011	24	98	7.35	13.37	55.7	261.72	262.56	14.28	8.54	15.01	56.9
5534003	K19S579.1	K19S580	260.61	260.34	272.00	0.013	24	20	7.41	13.34	55.6	261.45	262.31	10.55	8.54	16.86	50.7
5518515	K19S580.1	K19S581	260.34	259.29	272.00	0.011	24	95	7.29	13.49	56.2	260.42	261.24	11.59	8.54	15.39	55.5
5534005	K19S581.1	K19S547	259.29	255.00	270.00	0.011	24	404	7.37	13.34	55.6	256.11	256.96	13.89	8.54	15.07	56.7
5518511	K19S547.1	K19S545	255.00	250.46	265.00	0.015	24	305	8.43	12.01	50.0	251.46	252.57	13.54	8.57	17.84	48.0
5533989	K19S545.1	K19S578	250.46	237.63	257.00	0.022	24	579	9.92	10.68	44.5	238.52	240.05	18.48	8.66	21.77	39.8
5518505	K19S578.1	K19S544	237.63	235.41	263.83	0.023	24	96	8.58	11.94	49.8	236.41	237.55	27.42	8.66	22.23	38.9
5518502	K19S544.1	K19S543	235.41	233.31	258.46	0.016	24	132	7.30	13.62	56.7	234.45	235.27	24.02	8.68	18.46	47.0
5518501	K19S543.1	K19S542	233.31	232.89	253.05	0.011	24	37	7.04	14.03	58.5	234.06	234.83	18.99	8.68	15.62	55.6
5518490	K19S542.1	K19S541	232.89	229.59	248.52	0.009	24	375	7.15	13.85	57.7	230.74	231.54	17.78	8.68	13.71	63.3
5518488	K19S541.1	K19S540	229.59	226.44	241.75	0.011	24	292	7.45	13.40	55.8	227.56	228.42	14.19	8.68	15.19	57.1
5518487	K19S540.1	K19S539	226.44	221.45	233.00	0.016	24	320	8.54	12.02	50.1	222.45	223.58	10.55	8.68	18.26	47.5
5518486	K19S539.1	K19S538	221.45	218.03	233.90	0.015	24	223	7.79	12.94	53.9	219.11	220.05	14.79	8.68	18.11	47.9
5518485	K19S538.1	K19S537	218.03	217.58	230.50	0.014	24	32	7.23	13.73	57.2	218.72	219.54	11.78	8.68	17.26	50.3
5518484	K19S537.1	K19S536	217.58	215.90	232.00	0.010	24	164	7.43	13.44	56.0	217.02	217.88	14.98	8.68	14.82	58.6
5518483	K19S536.1	K19S535	215.90	215.70	233.50	0.013	24	15	7.23	13.73	57.2	216.84	217.65	16.66	8.68	16.77	51.8
5518482	K19S535.1	K19S534	215.70	212.97	227.44	0.010	24	281	6.79	14.50	60.4	214.18	214.89	13.26	8.68	14.41	60.2
5518479	K19S534.1	K19S533	212.97	212.02	223.75	0.011	24	90	7.51	14.55	60.6	213.23	214.11	10.52	9.66	15.06	64.1
5518446	K19S533.1	K20S788	212.02	210.70	222.03	0.010	24	126	7.69	14.29	59.5	211.89	212.81	10.14	9.69	14.96	64.8
5518445	K20S788.1	K20S787	210.70	209.12	217.28	0.019	24	83	8.73	12.92	53.8	210.20	211.38	7.08	9.70	20.12	48.2
5518444	K20S787.1	K20S786	209.12	202.56	219.00	0.016	24	407	7.48	15.04	62.7	203.81	204.68	15.19	9.93	18.57	53.5
5518443	K20S786.1	K20S785	202.56	200.85	217.50	0.010	24	166	7.63	14.73	61.4	202.08	202.98	15.42	9.93	14.85	66.9
5518442	K20S785.1	K20S784	200.85	196.48	211.00	0.012	24	360	8.19	13.84	57.7	197.63	198.67	13.37	9.93	16.12	61.6
5518441	K20S784.1	K20S783	196.48	193.70	207.50	0.015	24	181	8.83	13.04	54.3	194.79	196.00	12.71	9.94	18.14	54.8
5518440	K20S783.1	J20S645	193.70	185.26	200.00	0.017	24	496	8.94	13.00	54.2	186.34	187.59	13.66	9.94	19.08	52.1
5518430	J20S645.1	J20S644	185.26	184.69	199.00	0.017	24	33	8.40	13.66	56.9	185.83	186.93	13.17	9.94	19.24	51.6
5518429	J20S644.1	J20S643	184.69	184.15	199.50	0.017	24	31	7.28	15.41	64.2	185.43	186.26	14.07	9.94	19.30	51.5

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TRUNK SEWER 20 - CHOLLAS VALLEY
2030 WWF AS-BUILT

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☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5518428	J20S643.1	K20S782	184.15	182.79	201.50	0.009	24	147	7.41	15.09	62.9	184.05	184.90	17.45	9.94	14.06	70.7
5518427	K20S782.1	K20S781	182.79	182.41	201.50	0.012	24	33	7.59	14.91	62.1	183.65	184.55	17.85	9.94	15.74	63.1
5518426	K20S781.1	K20S780	182.41	182.09	201.00	0.012	24	27	7.45	15.11	62.9	183.35	184.21	17.65	9.93	15.88	62.6
5518425	K20S780.1	K20S779	182.09	179.94	197.50	0.010	24	210	7.40	15.20	63.3	181.21	182.06	16.29	9.93	14.81	67.1
5518424	K20S779.1	J20S642	179.94	172.94	188.50	0.010	24	695	7.42	15.16	63.2	174.20	175.06	14.30	9.93	14.67	67.7
5518423	J20S642.1	J20S641	172.94	169.28	193.00	0.010	24	361	7.39	15.21	63.4	170.55	171.40	22.45	9.93	14.72	67.5
5518422	J20S641.1	J20S640	169.28	161.28	182.50	0.010	24	795	7.57	14.91	62.1	162.52	163.41	19.98	9.93	14.67	67.7
5518331	J20S640.1	J20S646	161.28	160.76	183.00	0.011	24	47	7.45	15.09	62.9	162.02	162.88	20.98	9.93	15.41	64.4
5518330	J20S646.1	J20S638	160.76	158.62	172.00	0.010	24	209	7.60	14.76	61.5	159.85	160.75	12.15	9.92	14.79	67.1
5518329	J20S638.1	J20S637	158.62	157.78	170.50	0.011	24	79	7.76	14.47	60.3	158.98	159.92	11.51	9.92	15.10	65.7
5518328	J20S637.1	J20S636	157.78	157.42	170.00	0.012	24	31	7.78	14.43	60.1	158.62	159.56	11.38	9.92	15.78	62.8
5518327	J20S636.1	J20S635	157.42	157.00	170.50	0.011	24	37	7.85	14.33	59.7	158.20	159.15	12.30	9.92	15.66	63.3
5518326	J20S635.1	J21S592	157.00	145.59	161.00	0.011	24	998	8.02	14.07	58.6	146.76	147.76	14.24	9.92	15.63	63.5
5518313	J21S592.1	J21S591	145.59	135.38	148.00	0.014	24	727	7.40	15.21	63.4	136.65	137.50	11.35	9.93	17.32	57.4
5518312	J21S591.1	J21S590	135.38	128.17	144.00	0.010	24	716	7.54	14.88	62.0	129.41	130.29	14.59	9.93	14.67	67.7
5518309	J21S590.1	J21S587	128.17	125.75	144.30	0.036	24	67	11.00	10.98	45.7	126.67	128.55	17.64	9.93	27.79	35.7
52180	K20S138.1	K20S117	209.84	203.96	208.96	0.013	17	439	0.00	1.70	10.0	204.10	204.10	4.86	0.00	6.74	0.0
52051	K20S117.1	K20S124	203.96	203.59	216.55	0.006	17	60	0.07	1.79	10.5	203.74	203.74	12.81	0.00	4.57	0.1
52050	K20S124.1	K20S123	203.59	198.75	203.75	0.013	17	378	0.23	1.84	10.8	198.90	198.90	4.85	0.01	6.60	0.2
52053	K20S123.1	K20S161	198.75	195.92	208.17	0.015	17	191	0.39	1.86	10.9	196.07	196.08	12.10	0.02	7.09	0.3
52055	K20S161.1	K20S160	195.92	193.00	203.40	0.011	17	260	0.37	1.92	11.3	193.16	193.16	10.24	0.02	6.18	0.4
52059	K20S160.1	J20S212	193.00	189.91	199.78	0.013	17	239	0.60	1.87	11.0	190.07	190.07	9.71	0.04	6.63	0.6
44920	J20S212.1	J20S213	189.91	188.81	200.21	0.022	17	50	0.37	2.64	15.5	189.03	189.03	11.18	0.04	8.68	0.4
44921	J20S213.1	J20S214	188.81	188.07	201.88	0.007	17	112	2.35	2.63	15.5	188.29	188.38	13.59	0.23	4.73	4.8
44922	J20S214.1	J20S215	188.07	186.63	195.12	0.027	17	53	2.38	2.74	16.1	186.86	186.95	8.26	0.25	9.59	2.6
44924	J20S215.1	J20S217	186.63	182.93	196.05	0.014	17	259	2.22	2.88	16.9	183.17	183.25	12.88	0.25	6.97	3.6
44925	J20S217.1	J20S336	182.93	180.70	187.19	0.012	17	182	2.41	2.84	16.7	180.94	181.03	6.26	0.27	6.45	4.2
45034	J20S336.1	J20S337	180.70	174.81	183.34	0.013	17	447	2.22	3.00	17.7	175.06	175.14	8.28	0.27	6.69	4.0
45033	J20S337.1	J20S338	174.81	169.13	174.13	0.012	17	489	2.58	2.86	16.8	169.37	169.47	4.76	0.29	6.28	4.7
45032	J20S338.1	J20S340	169.13	168.24	176.40	0.015	17	60	2.38	3.03	17.8	168.49	168.58	7.91	0.29	7.11	4.1
44996	J20S340.1	J20S298	168.24	162.62	170.41	0.011	17	494	2.04	3.42	20.1	162.91	162.97	7.50	0.30	6.22	4.8
45001	J20S298.1	J20S299	162.62	160.19	167.00	0.009	17	258	2.93	3.62	21.3	160.49	160.63	6.51	0.47	5.66	8.2
45003	J20S299.1	J20S302	160.19	157.52	161.75	0.011	17	250	3.24	3.41	20.1	157.80	157.97	3.94	0.47	6.02	7.8
45004	J20S302.1	J21S455	157.52	154.47	160.72	0.016	17	193	2.98	3.67	21.6	154.77	154.91	5.94	0.48	7.33	6.6
45423	J21S455.1	J21S456	154.47	152.51	158.41	0.010	17	189	3.10	3.59	21.1	152.81	152.96	5.60	0.49	5.94	8.2
45424	J21S456.1	J21S462	152.51	149.73	159.68	0.012	17	232	3.11	3.58	21.1	150.03	150.18	9.65	0.49	6.38	7.6
45427	J21S462.1	J21S461	149.73	148.18	153.95	0.013	17	118	1.76	5.59	32.9	148.64	148.69	5.31	0.51	6.68	7.6
45428	J21S461.1	J21S460	148.18	146.70	153.71	0.011	17	139	4.54	5.40	31.7	147.15	147.47	6.56	1.26	6.01	21.0
45371	J21S460.1	J21S457	146.70	143.93	150.99	0.012	17	229	4.40	5.52	32.5	144.39	144.69	6.60	1.26	6.41	19.7
45374	J21S457.1	J21S459	143.93	141.02	148.01	0.011	17	262	4.45	5.47	32.2	141.48	141.78	6.53	1.26	6.14	20.5
45373	J21S459.1	J21S468	141.02	135.35	144.32	0.011	17	495	4.45	5.47	32.2	135.81	136.12	8.51	1.26	6.24	20.2

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
2030 WWF AS-BUILT

▨ Chollas Valley TS - TS 020 ☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
45368	J21S468.1	J21S467	135.35	133.44	144.00	0.016	17	120	5.01	5.02	29.5	133.86	134.25	10.14	1.26	7.34	17.2
5518310	J21S467.1	J21S587	130.98	124.27	144.30	0.090	24	75	0.66	28.74	119.7	126.66	126.67	17.64	1.39	43.73	3.2
5518308	J21S587.1	J21S586	125.75	122.60	148.00	0.036	24	89	7.89	15.77	65.7	123.91	124.88	24.09	11.16	27.55	40.5
5518307	J21S586.1	J21S585	122.60	121.84	144.00	0.012	24	66	8.05	15.57	64.9	123.14	124.14	20.86	11.16	15.72	71.0
5518076	J21S585.1	J21S584	121.84	114.98	132.00	0.012	24	569	7.29	17.01	70.9	116.40	117.22	15.60	11.15	16.05	69.5
5518073	J21S584.1	J21S583	114.98	114.07	148.00	0.007	27	138	6.51	17.19	63.7	115.50	116.16	32.49	11.15	16.27	68.6
5518072	J21S583.1	J21S579	114.07	110.21	131.00	0.006	27	615	6.45	17.32	64.1	111.65	112.30	19.35	11.17	15.86	70.4
5518070	J21S579.1	J21S578	110.21	108.84	120.50	0.006	27	224	6.53	17.07	63.2	110.26	110.92	10.24	11.17	15.67	71.3
5518069	J21S578.1	J21S577	108.84	107.31	119.00	0.006	27	236	6.29	17.63	65.3	108.78	109.39	10.22	11.17	16.12	69.3
5518068	J21S577.1	J21S582	107.31	106.07	118.80	0.006	27	218	6.41	17.37	64.3	107.52	108.16	11.28	11.20	15.10	74.1
5518065	J21S582.1	J21S581	106.07	105.20	117.30	0.006	27	140	6.43	17.36	64.3	106.65	107.29	10.65	11.20	15.76	71.1
5518063	J21S581.1	J21S580	105.20	103.65	112.20	0.006	27	253	6.44	17.35	64.3	105.10	105.74	7.10	11.20	15.66	71.5
5518062	J21S580.1	J21S502	103.65	102.13	111.93	0.006	27	249	6.53	17.10	63.3	103.55	104.22	8.37	11.20	15.65	71.6
45189	J21S502.1	J21S71	102.13	101.33	109.13	0.012	27	69	7.33	15.51	57.5	102.62	103.46	6.51	11.20	21.63	51.8
45190	J21S71.1	J21S504	101.33	99.02	111.02	0.008	27	274	7.44	15.34	56.8	100.30	101.16	10.72	11.20	18.39	60.9
45188	J21S504.1	J21S505	99.02	96.62	108.62	0.011	27	209	8.08	14.35	53.1	97.82	98.83	10.80	11.20	21.45	52.2
45185	J21S505.1	J21S506	96.62	94.65	107.65	0.011	27	176	8.13	14.26	52.8	95.84	96.87	11.81	11.19	21.18	52.9
45141	J21S506.1	J21S508	94.65	90.86	103.86	0.011	27	334	8.12	14.28	52.9	92.05	93.07	11.81	11.19	21.32	52.5
45144	J21S508.1	J21S509	90.86	87.11	100.11	0.011	27	329	8.18	14.23	52.7	88.30	89.34	11.82	11.23	21.35	52.6
45145	J21S509.1	J21S63	87.11	84.72	97.72	0.011	27	208	8.12	14.33	53.1	85.92	86.94	11.80	11.23	21.46	52.3
45182	J21S63.1	I21S242	84.72	78.71	91.71	0.011	27	532	7.67	15.05	55.7	79.96	80.88	11.74	11.23	21.27	52.8
39803	I21S242.1	I21S525	78.71	77.06	90.30	0.010	27	174	7.74	14.90	55.2	78.30	79.23	12.00	11.25	19.51	57.6
5102267	I21S525.1	I22S556	77.06	75.94	89.00	0.018	26	63	5.64	20.60	79.2	77.66	78.15	11.34	11.25	24.13	46.6
5102265	I22S556.1	I22S555	75.94	74.96	86.20	0.005	26	216	5.64	20.66	79.5	76.68	77.18	9.52	11.29	12.19	92.6
6269175	I22S555.1	I21S529	74.96	73.14	83.14	0.004	26	418	5.83	19.69	75.7	74.78	75.31	8.36	11.29	12.01	94.0
5102263	I21S529.1	I21S517	73.14	73.12	83.00	0.004	27	5	5.82	19.11	70.8	74.71	75.24	8.29	11.29	12.66	89.2
5102151	I21S517.1	I21S518	73.12	72.19	86.60	0.004	27	207	6.38	17.57	65.1	73.66	74.29	12.95	11.28	13.43	84.0

TOTAL LENGTH (MILES):	7.46	LENGTH OF PIPE - d/D < 50% (MILES):	2.90	LENGTH OF PIPE - Q/CAP < 50% (MILES):	3.52
LENGTH WEIGHTED Q/CAP:	46.5	LENGTH OF PIPE - d/D 50 - 75% (MILES):	3.92	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	2.75
LENGTH WEIGHTED d/D:	51.0	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.59	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	1.15
LENGTH WEIGHTED HGL. BELOW RIM (FT):	13.33	LENGTH OF PIPE - d/D > 100% (MILES):	0.06	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.05

Exhibit C

ALTERNATIVE ‘A’

Weir Proposal at City Of La Mesa

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2030 WWF - ALTERNATIVE 'A'

▒ Chollas Valley TS - TS 020

□ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5200562	L18S653.1	L18S658	372.50	370.10	382.50	0.013	24	181	6.52	8.80	36.7	370.83	371.49	11.67	4.40	16.84	26.1
5214242	L18S658.1	L18S652	370.10	365.40	376.00	0.013	24	375	6.56	8.75	36.5	366.13	366.80	9.87	4.39	16.36	26.8
5200560	L18S652.1	L18S651	365.40	356.70	365.10	0.013	24	679	5.63	9.80	40.9	357.52	358.01	7.58	4.39	16.56	26.5
5200549	L18S651.1	L18S650	356.70	354.75	369.50	0.008	24	250	5.56	9.90	41.3	355.58	356.06	13.93	4.39	12.91	34.0
5200546	L18S650.1	L18S649	354.75	351.05	369.80	0.008	24	481	5.60	9.93	41.4	351.88	352.36	17.92	4.44	12.83	34.6
5200544	L18S649.1	L18S648	351.05	346.25	363.50	0.008	24	630	5.14	10.59	44.1	347.13	347.54	16.37	4.44	12.76	34.8
5200542	L18S648.1	L18S647	346.25	342.65	358.75	0.007	24	533	5.60	10.58	44.1	343.53	344.02	15.22	4.83	12.02	40.2
5200540	L18S647.1	L18S646	342.65	334.50	344.90	0.012	24	707	6.48	9.61	40.0	335.30	335.95	9.60	4.92	15.70	31.3
5200538	L18S646.1	L18S645	334.50	321.00	334.25	0.027	24	499	5.88	10.56	44.0	321.88	322.42	12.37	5.06	24.06	21.1
5200536	L18S645.1	L18S644	321.00	318.00	327.00	0.008	24	400	5.89	10.56	44.0	318.88	319.42	8.12	5.07	12.66	40.0
5200534	L18S644.1	L18S643	318.00	317.25	326.40	0.025	24	30	4.93	12.13	50.5	318.26	318.64	8.14	5.07	23.19	21.8
5200415	L18S643.1	L18S642	317.25	316.50	324.80	0.005	24	161	4.99	12.01	50.0	317.50	317.89	7.30	5.07	9.97	50.8
5200412	L18S642.1	L19S434	316.50	312.45	325.90	0.009	24	427	6.33	10.08	42.0	313.29	313.91	12.61	5.12	14.23	36.0
5518532	L19S434.1	K19S556	312.41	308.71	323.50	0.012	24	316	6.85	9.57	39.9	309.51	310.24	13.99	5.17	15.82	32.7
5518531	K19S556.1	K19S555	308.71	303.92	317.00	0.013	24	369	6.86	9.55	39.8	304.72	305.45	12.28	5.17	16.65	31.0
5518530	K19S555.1	K19S554	303.92	292.50	307.00	0.018	24	620	7.88	8.62	35.9	293.22	294.18	13.78	5.17	19.85	26.0
5534194	K19S554.2	K19S583	292.50	287.40	301.50	0.019	24	266	8.16	8.61	35.9	288.12	289.15	13.38	5.17	20.24	25.5
5534192	K19S583.1	K19S582	287.40	286.91	300.50	0.024	24	21	7.90	8.60	35.9	287.63	288.60	12.87	5.17	22.39	23.1
5518529	K19S582.1	K19S552	286.91	278.50	295.00	0.019	24	435	7.72	8.74	36.4	279.23	280.16	15.77	5.16	20.33	25.4
5518521	K19S552.1	K19S577	278.50	264.75	284.50	0.019	24	725	5.14	12.22	50.9	265.77	266.18	18.73	5.33	20.14	26.5
58610	L18S237.1	L18S236	371.28	370.15	389.43	0.007	14	151	3.55	5.56	39.7	370.61	370.81	18.81	0.91	3.00	30.2
58609	L18S236.1	L18S235	370.15	370.05	383.21	0.007	14	15	3.55	5.56	39.7	370.51	370.71	12.70	0.91	2.80	32.4
5039772	L18S235.1	L18S234	370.05	367.17	376.85	0.007	14	388	3.76	5.31	38.0	367.61	367.83	9.24	0.91	2.99	30.2
58607	L18S234.1	L18S232	367.17	356.82	373.98	0.027	14	387	4.44	4.71	33.6	357.21	357.52	16.77	0.91	5.68	15.9
5347920	L18S232.1	L18S662	356.82	354.05	369.90	0.014	14	195	3.81	5.28	37.7	354.49	354.71	15.41	0.91	4.14	21.9
5347931	L18S662.1	L18S665	354.05	353.77	364.80	0.007	15	40	3.64	5.27	35.1	354.21	354.42	10.59	0.91	3.52	25.8
5347922	L18S665.1	L18S664	353.77	353.16	364.50	0.008	15	77	2.68	6.63	44.2	353.71	353.82	10.79	0.91	3.71	24.4
5347927	L18S664.1	L18S663	353.16	351.80	368.10	0.007	15	195	4.16	6.62	44.2	352.35	352.62	15.75	1.40	3.49	40.2
5347926	L18S663.1	L18S174	351.80	350.85	371.11	0.007	15	131	4.23	6.54	43.6	351.39	351.67	19.71	1.40	3.55	39.5
58567	L18S174.1	L18S187	350.85	346.90	363.65	0.012	14	326	5.09	6.53	46.7	347.44	347.85	16.21	1.61	3.83	42.0
58566	L18S187.1	L18S186	346.90	340.73	357.46	0.012	14	494	5.16	6.53	46.7	341.28	341.69	16.18	1.63	3.88	42.0
58811	L18S186.1	L18S583	340.73	335.92	352.69	0.013	14	381	4.80	6.94	49.5	336.50	336.85	16.19	1.64	3.90	42.0
58816	L18S583.1	L18S458	335.92	331.31	348.08	0.013	14	366	5.20	7.08	50.6	331.90	332.32	16.18	1.82	3.90	46.7
58819	L18S458.1	L18S453	331.31	330.96	355.55	0.012	14	30	5.30	7.05	50.4	331.55	331.99	24.00	1.85	3.76	49.1
58821	L18S453.1	L18S445	330.96	326.48	343.12	0.012	14	360	5.43	7.03	50.2	327.07	327.52	16.05	1.88	3.87	48.6
58802	L18S445.1	L18S444	326.48	321.99	337.95	0.013	14	350	5.12	7.42	53.0	322.61	323.02	15.34	1.90	3.94	48.3
58790	L18S444.1	L18S432	321.99	316.50	331.58	0.011	14	487	5.27	7.39	52.8	317.11	317.55	14.47	1.95	3.69	52.9
58785	L18S432.1	L18S431	316.50	313.30	330.75	0.014	14	226	3.97	9.37	66.9	314.08	314.33	16.67	1.95	4.13	47.2
58776	L18S431.1	L18S422	313.30	311.52	324.38	0.007	14	270	4.59	9.12	65.2	312.28	312.61	12.10	2.19	2.82	77.5
58941	L18S422.1	L19S80	311.52	305.74	319.85	0.016	14	359	6.22	7.11	50.8	306.33	306.94	13.52	2.19	4.41	49.7
58902	L19S80.1	L19S78	305.74	305.24	314.97	0.046	17	11	5.88	7.03	41.4	305.83	306.36	9.14	2.34	12.43	18.8

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2030 WWF - ALTERNATIVE 'A'

▨ Chollas Valley TS - TS 020

☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
58905	L19S78.1	L19S53	305.24	303.81	321.12	0.015	17	97	5.38	7.53	44.3	304.44	304.89	16.68	2.34	7.06	33.1
58903	L19S53.1	K19S77	303.81	301.69	304.89	0.010	17	215	5.38	7.52	44.2	302.32	302.77	2.57	2.34	5.79	40.4
51687	K19S77.1	K19S76	301.69	300.54	321.44	0.020	14	56	6.93	6.87	49.1	301.11	301.86	20.33	2.34	4.96	47.2
51686	K19S76.1	K19S78	300.54	299.93	321.73	0.012	21	50	5.01	7.15	34.0	300.53	300.92	21.20	2.34	11.32	20.7
51684	K19S78.1	K19S69	299.93	295.92	317.72	0.011	21	374	5.10	7.14	34.0	296.51	296.92	21.21	2.38	10.60	22.4
51682	K19S69.1	K19S62	295.92	287.97	309.77	0.014	21	559	5.66	6.62	31.5	288.52	289.02	21.25	2.38	12.21	19.5
51679	K19S62.1	K19S44	287.97	279.96	300.96	0.014	21	563	3.43	9.61	45.8	280.76	280.94	20.20	2.38	12.21	19.5
51664	K19S44.1	K19S43	280.15	278.07	295.24	0.019	14	108	5.91	8.22	58.7	278.76	279.30	16.48	2.49	4.81	51.8
51663	K19S43.1	K19S42	278.07	276.07	288.12	0.013	14	148	6.04	8.08	57.7	276.74	277.31	11.38	2.49	4.03	61.9
51632	K19S42.1	K19S24	276.07	273.10	286.17	0.015	14	203	6.00	8.13	58.1	273.78	274.34	12.39	2.49	4.20	59.3
51631	K19S24.1	K19S21	273.10	266.94	287.50	0.014	14	433	6.09	8.03	57.3	267.61	268.18	19.89	2.49	4.14	60.2
5518522	K19S21.1	K19S551	266.94	265.96	286.00	0.015	14	65	6.20	7.91	56.5	266.62	267.22	19.38	2.49	4.26	58.5
5533985	K19S551.1	K19S577	265.96	264.75	284.50	0.041	24	29	2.43	12.22	50.9	265.77	265.86	18.73	2.49	29.76	8.4
5518525	K19S577.1	K19S548	264.75	261.64	278.50	0.012	24	270	6.59	13.59	56.6	262.77	263.45	15.73	7.80	15.69	49.7
5534001	K19S548.1	K19S579	261.64	260.61	276.00	0.011	24	98	7.37	13.44	56.0	261.73	262.58	14.27	8.63	15.01	57.5
5534003	K19S579.1	K19S580	260.61	260.34	272.00	0.013	24	20	7.40	13.43	56.0	261.46	262.31	10.54	8.62	16.86	51.2
5518515	K19S580.1	K19S581	260.34	259.29	272.00	0.011	24	95	7.29	13.56	56.5	260.42	261.25	11.58	8.62	15.39	56.0
5534005	K19S581.1	K19S547	259.29	255.00	270.00	0.011	24	404	7.39	13.41	55.9	256.12	256.97	13.88	8.62	15.07	57.2
5518511	K19S547.1	K19S545	255.00	250.46	265.00	0.015	24	305	8.47	12.05	50.2	251.46	252.58	13.54	8.64	17.84	48.5
5533989	K19S545.1	K19S578	250.46	237.63	257.00	0.022	24	579	9.94	10.73	44.7	238.53	240.06	18.48	8.74	21.77	40.1
5518505	K19S578.1	K19S544	237.63	235.41	263.83	0.023	24	96	8.62	11.98	49.9	236.41	237.56	27.42	8.73	22.23	39.3
5518502	K19S544.1	K19S543	235.41	233.31	258.46	0.016	24	132	7.33	13.68	57.0	234.45	235.28	24.01	8.76	18.46	47.4
5518501	K19S543.1	K19S542	233.31	232.89	253.05	0.011	24	37	7.06	14.10	58.8	234.07	234.84	18.99	8.76	15.62	56.1
5518490	K19S542.1	K19S541	232.89	229.59	248.52	0.009	24	375	7.18	13.91	58.0	230.75	231.55	17.77	8.76	13.71	63.9
5518488	K19S541.1	K19S540	229.59	226.44	241.75	0.011	24	292	7.47	13.47	56.1	227.56	228.43	14.19	8.76	15.19	57.7
5518487	K19S540.1	K19S539	226.44	221.45	233.00	0.016	24	320	8.57	12.06	50.3	222.46	223.60	10.54	8.76	18.26	48.0
5518486	K19S539.1	K19S538	221.45	218.03	233.90	0.015	24	223	7.79	13.03	54.3	219.12	220.06	14.78	8.76	18.11	48.4
5518485	K19S538.1	K19S537	218.03	217.58	230.50	0.014	24	32	7.26	13.79	57.5	218.73	219.55	11.77	8.76	17.26	50.8
5518484	K19S537.1	K19S536	217.58	215.90	232.00	0.010	24	164	7.44	13.51	56.3	217.02	217.89	14.98	8.76	14.82	59.1
5518483	K19S536.1	K19S535	215.90	215.70	233.50	0.013	24	15	7.26	13.80	57.5	216.85	217.67	16.65	8.76	16.77	52.2
5518482	K19S535.1	K19S534	215.70	212.97	227.44	0.010	24	281	6.78	14.67	61.1	214.19	214.91	13.25	8.76	14.41	60.8
5518479	K19S534.1	K19S533	212.97	212.02	223.75	0.011	24	90	7.51	14.71	61.3	213.25	214.12	10.50	9.76	15.06	64.8
5518446	K19S533.1	K20S788	212.02	210.70	222.03	0.010	24	126	7.69	14.43	60.1	211.90	212.82	10.13	9.80	14.96	65.5
5518445	K20S788.1	K20S787	210.70	209.12	217.28	0.019	24	83	8.73	13.06	54.4	210.21	211.39	7.07	9.80	20.12	48.7
5518444	K20S787.1	K20S786	209.12	202.56	219.00	0.016	24	407	7.49	15.19	63.3	203.82	204.70	15.17	10.04	18.57	54.1
5518443	K20S786.1	K20S785	202.56	200.85	217.50	0.010	24	166	7.63	14.87	62.0	202.09	202.99	15.41	10.03	14.85	67.6
5518442	K20S785.1	K20S784	200.85	196.48	211.00	0.012	24	360	8.22	13.91	58.0	197.64	198.69	13.36	10.03	16.12	62.3
5518441	K20S784.1	K20S783	196.48	193.70	207.50	0.015	24	181	8.83	13.14	54.8	194.80	196.01	12.70	10.04	18.14	55.4
5518440	K20S783.1	J20S645	193.70	185.26	200.00	0.017	24	496	8.94	13.11	54.6	186.35	187.59	13.65	10.04	19.08	52.6
5518430	J20S645.1	J20S644	185.26	184.69	199.00	0.017	24	33	8.39	13.76	57.3	185.84	186.93	13.16	10.04	19.24	52.1
5518429	J20S644.1	J20S643	184.69	184.15	199.50	0.017	24	31	7.27	15.51	64.6	185.44	186.26	14.06	10.03	19.30	52.0

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☐ New Chollas Valley TS - TS 119

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5518428	J20S643.1	K20S782	184.15	182.79	201.50	0.009	24	147	7.41	15.18	63.2	184.05	184.91	17.45	10.03	14.06	71.3
5518427	K20S782.1	K20S781	182.79	182.41	201.50	0.012	24	33	7.59	15.05	62.7	183.67	184.56	17.83	10.03	15.74	63.8
5518426	K20S781.1	K20S780	182.41	182.09	201.00	0.012	24	27	7.45	15.24	63.5	183.36	184.22	17.64	10.03	15.88	63.2
5518425	K20S780.1	K20S779	182.09	179.94	197.50	0.010	24	210	7.40	15.33	63.9	181.22	182.07	16.28	10.03	14.81	67.8
5518424	K20S779.1	J20S642	179.94	172.94	188.50	0.010	24	695	7.42	15.30	63.7	174.21	175.07	14.29	10.04	14.67	68.4
5518423	J20S642.1	J20S641	172.94	169.28	193.00	0.010	24	361	7.39	15.34	63.9	170.56	171.41	22.44	10.04	14.72	68.2
5518422	J20S641.1	J20S640	169.28	161.28	182.50	0.010	24	795	7.56	15.05	62.7	162.53	163.42	19.97	10.02	14.67	68.3
5518331	J20S640.1	J20S646	161.28	160.76	183.00	0.011	24	47	7.45	15.22	63.4	162.03	162.89	20.97	10.02	15.41	65.0
5518330	J20S646.1	J20S638	160.76	158.62	172.00	0.010	24	209	7.60	14.93	62.2	159.86	160.76	12.14	10.02	14.79	67.8
5518329	J20S638.1	J20S637	158.62	157.78	170.50	0.011	24	79	7.76	14.62	60.9	159.00	159.93	11.50	10.02	15.10	66.4
5518328	J20S637.1	J20S636	157.78	157.42	170.00	0.012	24	31	7.78	14.57	60.7	158.64	159.58	11.36	10.02	15.78	63.5
5518327	J20S636.1	J20S635	157.42	157.00	170.50	0.011	24	37	7.86	14.45	60.2	158.21	159.16	12.29	10.02	15.66	64.0
5518326	J20S635.1	J21S592	157.00	145.59	161.00	0.011	24	998	8.03	14.17	59.0	146.77	147.77	14.23	10.02	15.63	64.1
5518313	J21S592.1	J21S591	145.59	135.38	148.00	0.014	24	727	7.39	15.32	63.8	136.66	137.51	11.34	10.02	17.32	57.9
5518312	J21S591.1	J21S590	135.38	128.17	144.00	0.010	24	716	7.54	15.00	62.5	129.42	130.30	14.58	10.03	14.67	68.3
5518309	J21S590.1	J21S587	128.17	125.75	144.30	0.036	24	67	11.00	11.05	46.0	126.67	128.55	17.63	10.03	27.79	36.1
52180	K20S138.1	K20S117	209.84	203.96	208.96	0.013	17	439	0.00	1.70	10.0	204.10	204.10	4.86	0.00	6.74	0.0
52051	K20S117.1	K20S124	203.96	203.59	216.55	0.006	17	60	0.07	1.79	10.5	203.74	203.74	12.81	0.00	4.57	0.1
52050	K20S124.1	K20S123	203.59	198.75	203.75	0.013	17	378	0.23	1.84	10.8	198.90	198.90	4.85	0.01	6.60	0.2
52053	K20S123.1	K20S161	198.75	195.92	208.17	0.015	17	191	0.39	1.86	10.9	196.07	196.08	12.10	0.02	7.09	0.3
52055	K20S161.1	K20S160	195.92	193.00	203.40	0.011	17	260	0.37	1.92	11.3	193.16	193.16	10.24	0.02	6.18	0.4
52059	K20S160.1	J20S212	193.00	189.91	199.78	0.013	17	239	0.60	1.87	11.0	190.07	190.07	9.71	0.04	6.63	0.6
44920	J20S212.1	J20S213	189.91	188.81	200.21	0.022	17	50	0.37	2.64	15.5	189.03	189.03	11.18	0.04	8.68	0.4
44921	J20S213.1	J20S214	188.81	188.07	201.88	0.007	17	112	2.35	2.63	15.5	188.29	188.38	13.59	0.23	4.73	4.8
44922	J20S214.1	J20S215	188.07	186.63	195.12	0.027	17	53	2.38	2.74	16.1	186.86	186.95	8.26	0.25	9.59	2.6
44924	J20S215.1	J20S217	186.63	182.93	196.05	0.014	17	259	2.22	2.88	16.9	183.17	183.25	12.88	0.25	6.97	3.6
44925	J20S217.1	J20S336	182.93	180.70	187.19	0.012	17	182	2.41	2.84	16.7	180.94	181.03	6.26	0.27	6.45	4.2
45034	J20S336.1	J20S337	180.70	174.81	183.34	0.013	17	447	2.22	3.00	17.7	175.06	175.14	8.28	0.27	6.69	4.0
45033	J20S337.1	J20S338	174.81	169.13	174.13	0.012	17	489	2.58	2.86	16.8	169.37	169.47	4.76	0.29	6.28	4.7
45032	J20S338.1	J20S340	169.13	168.24	176.40	0.015	17	60	2.38	3.03	17.8	168.49	168.58	7.91	0.29	7.11	4.1
44996	J20S340.1	J20S298	168.24	162.62	170.41	0.011	17	494	2.04	3.42	20.1	162.91	162.97	7.50	0.30	6.22	4.8
45001	J20S298.1	J20S299	162.62	160.19	167.00	0.009	17	258	2.93	3.62	21.3	160.49	160.63	6.51	0.47	5.66	8.2
45003	J20S299.1	J20S302	160.19	157.52	161.75	0.011	17	250	3.24	3.41	20.1	157.80	157.97	3.94	0.47	6.02	7.8
45004	J20S302.1	J21S455	157.52	154.47	160.72	0.016	17	193	2.98	3.67	21.6	154.77	154.91	5.94	0.48	7.33	6.6
45423	J21S455.1	J21S456	154.47	152.51	158.41	0.010	17	189	3.10	3.59	21.1	152.81	152.96	5.60	0.49	5.94	8.2
45424	J21S456.1	J21S462	152.51	149.73	159.68	0.012	17	232	3.11	3.58	21.1	150.03	150.18	9.65	0.49	6.38	7.6
45427	J21S462.1	J21S461	149.73	148.18	153.95	0.013	17	118	1.76	5.59	32.9	148.64	148.69	5.31	0.51	6.68	7.6
45428	J21S461.1	J21S460	148.18	146.70	153.71	0.011	17	139	4.54	5.40	31.7	147.15	147.47	6.56	1.26	6.01	21.0
45371	J21S460.1	J21S457	146.70	143.93	150.99	0.012	17	229	4.40	5.52	32.5	144.39	144.69	6.60	1.26	6.41	19.7
45374	J21S457.1	J21S459	143.93	141.02	148.01	0.011	17	262	4.45	5.47	32.2	141.48	141.78	6.53	1.26	6.14	20.5
45373	J21S459.1	J21S468	141.02	135.35	144.32	0.011	17	495	4.45	5.47	32.2	135.81	136.12	8.51	1.26	6.24	20.2

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FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
45368	J21S468.1	J21S467	135.35	133.44	144.00	0.016	17	120	5.01	5.02	29.5	133.86	134.25	10.14	1.26	7.34	17.2
5518310	J21S467.1	J21S587	130.98	124.27	144.30	0.090	24	75	0.66	28.81	120.0	126.67	126.68	17.63	1.39	43.73	3.2
5518308	J21S587.1	J21S586	125.75	122.60	148.00	0.036	24	89	7.93	15.84	66.0	123.92	124.89	24.08	11.27	27.55	40.9
5518307	J21S586.1	J21S585	122.60	121.84	144.00	0.012	24	66	8.05	15.66	65.2	123.15	124.15	20.85	11.26	15.72	71.6
5518076	J21S585.1	J21S584	121.84	114.98	132.00	0.012	24	569	7.29	17.14	71.4	116.41	117.24	15.59	11.27	16.05	70.2
5518073	J21S584.1	J21S583	114.98	114.07	148.00	0.007	27	138	6.51	17.31	64.1	115.51	116.17	32.48	11.27	16.27	69.3
5518072	J21S583.1	J21S579	114.07	110.21	131.00	0.006	27	615	6.45	17.43	64.5	111.66	112.31	19.34	11.29	15.86	71.2
5518070	J21S579.1	J21S578	110.21	108.84	120.50	0.006	27	224	6.54	17.20	63.7	110.27	110.94	10.23	11.29	15.67	72.1
5518069	J21S578.1	J21S577	108.84	107.31	119.00	0.006	27	236	6.32	17.71	65.6	108.79	109.41	10.21	11.29	16.12	70.0
5518068	J21S577.1	J21S582	107.31	106.07	118.80	0.006	27	218	6.45	17.43	64.6	107.52	108.17	11.28	11.31	15.10	74.9
5518065	J21S582.1	J21S581	106.07	105.20	117.30	0.006	27	140	6.44	17.45	64.6	106.65	107.30	10.65	11.31	15.76	71.8
5518063	J21S581.1	J21S580	105.20	103.65	112.20	0.006	27	253	6.44	17.44	64.6	105.11	105.75	7.10	11.31	15.66	72.2
5518062	J21S580.1	J21S502	103.65	102.13	111.93	0.006	27	249	6.55	17.18	63.6	103.56	104.23	8.37	11.30	15.65	72.2
45189	J21S502.1	J21S71	102.13	101.33	109.13	0.012	27	69	7.36	15.57	57.7	102.63	103.47	6.50	11.31	21.63	52.3
45190	J21S71.1	J21S504	101.33	99.02	111.02	0.008	27	274	7.47	15.39	57.0	100.30	101.17	10.72	11.30	18.39	61.5
45188	J21S504.1	J21S505	99.02	96.62	108.62	0.011	27	209	8.08	14.47	53.6	97.83	98.84	10.79	11.31	21.45	52.7
45185	J21S505.1	J21S506	96.62	94.65	107.65	0.011	27	176	8.14	14.39	53.3	95.85	96.88	11.80	11.31	21.18	53.4
45141	J21S506.1	J21S508	94.65	90.86	103.86	0.011	27	334	8.12	14.41	53.4	92.06	93.08	11.80	11.31	21.32	53.0
45144	J21S508.1	J21S509	90.86	87.11	100.11	0.011	27	329	8.19	14.35	53.2	88.31	89.35	11.81	11.35	21.35	53.1
45145	J21S509.1	J21S63	87.11	84.72	97.72	0.011	27	208	8.12	14.45	53.5	85.93	86.95	11.79	11.34	21.46	52.9
45182	J21S63.1	I21S242	84.72	78.71	91.71	0.011	27	532	7.67	15.14	56.1	79.97	80.89	11.74	11.33	21.27	53.3
39803	I21S242.1	I21S525	78.71	77.06	90.30	0.010	27	174	7.75	14.98	55.5	78.31	79.24	11.99	11.35	19.51	58.1
5102267	I21S525.1	I22S556	77.06	75.94	89.00	0.018	26	63	5.64	20.70	79.6	77.67	78.16	11.33	11.34	24.13	47.0
5102265	I22S556.1	I22S555	75.94	74.96	86.20	0.005	26	216	5.63	20.76	79.9	76.69	77.18	9.51	11.39	12.19	93.4
6269175	I22S555.1	I21S529	74.96	73.14	83.14	0.004	26	418	5.84	19.85	76.3	74.79	75.32	8.34	11.39	12.01	94.9
5102263	I21S529.1	I21S517	73.14	73.12	83.00	0.004	27	5	5.82	19.26	71.3	74.72	75.25	8.27	11.39	12.66	90.0
5102151	I21S517.1	I21S518	73.12	72.19	86.60	0.004	27	207	6.40	17.66	65.4	73.66	74.30	12.94	11.40	13.43	84.9

TOTAL LENGTH (MILES):	7.46	LENGTH OF PIPE - d/D < 50% (MILES):	3.57	LENGTH OF PIPE - Q/CAP < 50% (MILES):	4.33
LENGTH WEIGHTED Q/CAP:	42.3	LENGTH OF PIPE - d/D 50 - 75% (MILES):	3.75	LENGTH OF PIPE - Q/CAP 50 - 75% (MILES):	2.92
LENGTH WEIGHTED d/D:	47.4	LENGTH OF PIPE - d/D 75 - 100% (MILES):	0.13	LENGTH OF PIPE - Q/CAP 75 - 100% (MILES):	0.21
LENGTH WEIGHTED HGL. BELOW RIM (FT):	13.36	LENGTH OF PIPE - d/D > 100% (MILES):	0.01	LENGTH OF PIPE - Q/CAP > 100% (MILES):	0.00

Exhibit D

8-INCH PIPE REPLACEMENT

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2010 DWF - 8 INCH PIPE REPLACEMENT

▨ Proposed 8-Inch Pipe Replacement

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5200562	L18S653.1	L18S658	372.50	370.10	382.50	0.013	24	181	4.23	5.25	21.9	370.54	370.81	11.96	1.39	16.84	8.3
5214242	L18S658.1	L18S652	370.10	365.40	376.00	0.013	24	375	4.26	5.22	21.8	365.84	366.12	10.16	1.39	16.36	8.5
5200560	L18S652.1	L18S651	365.40	356.70	365.10	0.013	24	679	4.07	5.39	22.5	357.15	357.41	7.95	1.39	16.56	8.4
5200549	L18S651.1	L18S650	356.70	354.75	369.50	0.008	24	250	4.02	5.44	22.7	355.20	355.46	14.30	1.39	12.91	10.8
5200546	L18S650.1	L18S649	354.75	351.05	369.80	0.008	24	481	4.06	5.45	22.7	351.50	351.76	18.30	1.41	12.83	11.0
5200544	L18S649.1	L18S648	351.05	346.25	363.50	0.008	24	630	3.57	5.97	24.9	346.75	346.95	16.75	1.41	12.76	11.0
5200542	L18S648.1	L18S647	346.25	342.65	358.75	0.007	24	533	3.97	5.96	24.8	343.15	343.39	15.60	1.56	12.02	13.0
5200540	L18S647.1	L18S646	342.65	334.50	344.90	0.012	24	707	4.39	5.64	23.5	334.97	335.27	9.93	1.59	15.70	10.1
5200538	L18S646.1	L18S645	334.50	321.00	334.25	0.027	24	499	4.19	5.97	24.9	321.50	321.77	12.75	1.65	24.06	6.9
5200536	L18S645.1	L18S644	321.00	318.00	327.00	0.008	24	400	4.19	5.97	24.9	318.50	318.77	8.51	1.65	12.66	13.0
5200534	L18S644.1	L18S643	318.00	317.25	326.40	0.025	24	30	3.54	6.73	28.0	317.81	318.01	8.59	1.65	23.19	7.1
5200415	L18S643.1	L18S642	317.25	316.50	324.80	0.005	24	161	3.54	6.73	28.0	317.06	317.26	7.74	1.65	9.97	16.6
5200412	L18S642.1	L19S434	316.50	312.45	325.90	0.009	24	427	4.60	5.60	23.3	312.92	313.25	12.98	1.66	14.23	11.6
5518532	L19S434.1	K19S556	312.41	308.71	323.50	0.012	24	316	4.63	5.62	23.4	309.18	309.51	14.32	1.68	15.82	10.6
5518531	K19S556.1	K19S555	308.71	303.92	317.00	0.013	24	369	5.12	5.24	21.8	304.36	304.77	12.64	1.68	16.65	10.1
5518530	K19S555.1	K19S554	303.92	292.50	307.00	0.018	24	620	5.17	5.21	21.7	292.93	293.35	14.07	1.68	19.85	8.5
5534194	K19S554.2	K19S583	292.50	287.40	301.50	0.019	24	266	5.41	5.04	21.0	287.82	288.28	13.68	1.68	20.24	8.3
5534192	K19S583.1	K19S582	287.40	286.91	300.50	0.024	24	21	5.18	5.20	21.7	287.34	287.76	13.16	1.68	22.39	7.5
5518529	K19S582.1	K19S552	286.91	278.50	295.00	0.019	24	435	5.05	5.29	22.0	278.94	279.34	16.06	1.68	20.33	8.3
5518521	K19S552.1	K19S577	278.50	264.75	284.50	0.019	24	725	3.24	7.52	31.3	265.38	265.54	19.12	1.75	20.14	8.7
58610	L18S237.1	L18S236	371.28	370.15	389.43	0.007	14	151	3.19	4.64	33.2	370.54	370.70	18.89	0.64	3.00	21.2
58609	L18S236.1	L18S235	370.15	370.05	383.21	0.007	14	15	3.19	4.64	33.1	370.44	370.59	12.77	0.64	2.80	22.8
5039772	L18S235.1	L18S234	370.05	367.17	376.85	0.007	14	388	3.37	4.46	31.8	367.54	367.72	9.31	0.64	2.99	21.3
58607	L18S234.1	L18S232	367.17	356.82	373.98	0.027	14	387	3.95	3.97	28.4	357.15	357.39	16.83	0.64	5.68	11.2
5347920	L18S232.1	L18S662	356.82	354.05	369.90	0.014	14	195	3.47	4.37	31.2	354.41	354.60	15.49	0.64	4.14	15.4
5347931	L18S662.1	L18S665	354.05	353.77	364.80	0.007	15	40	3.32	4.37	29.1	354.13	354.31	10.67	0.64	3.52	18.2
5347922	L18S665.1	L18S664	353.77	353.16	364.50	0.008	15	77	2.58	5.26	35.1	353.60	353.70	10.90	0.64	3.71	17.2
5347927	L18S664.1	L18S663	353.16	351.80	368.10	0.007	15	195	3.64	5.22	34.8	352.24	352.44	15.86	0.89	3.49	25.6
5347926	L18S663.1	L18S174	351.80	350.85	371.11	0.007	15	131	3.64	5.21	34.8	351.28	351.49	19.82	0.89	3.55	25.1
58567	L18S174.1	L18S187	350.85	346.90	363.65	0.012	14	326	4.42	5.01	35.8	347.32	347.62	16.33	0.98	3.83	25.7
58566	L18S187.1	L18S186	346.90	340.73	357.46	0.012	14	494	4.44	5.00	35.7	341.15	341.45	16.31	0.98	3.88	25.3
58811	L18S186.1	L18S583	340.73	335.92	352.69	0.013	14	381	4.23	5.19	37.1	336.35	336.63	16.34	0.98	3.90	25.2
58816	L18S583.1	L18S458	335.92	331.31	348.08	0.013	14	366	4.48	5.30	37.9	331.75	332.06	16.33	1.07	3.90	27.5
58819	L18S458.1	L18S453	331.31	330.96	355.55	0.012	14	30	4.57	5.24	37.4	331.40	331.72	24.15	1.08	3.76	28.7
58821	L18S453.1	L18S445	330.96	326.48	343.12	0.012	14	360	4.64	5.21	37.2	326.91	327.25	16.21	1.09	3.87	28.0
58802	L18S445.1	L18S444	326.48	321.99	337.95	0.013	14	350	4.40	5.44	38.8	322.44	322.74	15.51	1.09	3.94	27.7
58790	L18S444.1	L18S432	321.99	316.50	331.58	0.011	14	487	4.44	5.43	38.8	316.95	317.26	14.63	1.10	3.69	29.8
58785	L18S432.1	L18S431	316.50	313.30	330.75	0.014	14	226	3.53	6.51	46.5	313.84	314.04	16.91	1.10	4.13	26.6
58776	L18S431.1	L18S422	313.30	311.52	324.38	0.007	14	270	3.89	6.51	46.5	312.06	312.30	12.32	1.22	2.82	43.3
58941	L18S422.1	L19S80	311.52	305.74	319.85	0.016	14	359	5.22	5.20	37.2	306.18	306.60	13.67	1.22	4.41	27.7
58902	L19S80.1	L19S78	305.74	305.24	314.97	0.046	17	11	4.92	5.20	30.6	305.67	306.05	9.30	1.30	12.43	10.5

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2010 DWF - 8 INCH PIPE REPLACEMENT

▨ Proposed 8-Inch Pipe Replacement

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
58905	L19S78.1	L19S53	305.24	303.81	321.12	0.015	17	97	4.48	5.57	32.7	304.27	304.59	16.85	1.30	7.06	18.4
58903	L19S53.1	K19S77	303.81	301.69	304.89	0.010	17	215	4.49	5.56	32.7	302.15	302.47	2.74	1.30	5.79	22.4
51687	K19S77.1	K19S76	301.69	300.54	321.44	0.020	14	56	5.49	5.25	37.5	300.98	301.45	20.46	1.30	4.96	26.2
51686	K19S76.1	K19S78	300.54	299.93	321.73	0.012	21	50	4.09	5.42	25.8	300.38	300.64	21.35	1.30	11.32	11.5
51684	K19S78.1	K19S69	299.93	295.92	317.72	0.011	21	374	4.52	5.06	24.1	296.34	296.66	21.38	1.30	10.60	12.3
51682	K19S69.1	K19S62	295.92	287.97	309.77	0.014	21	559	4.52	5.06	24.1	288.39	288.71	21.38	1.30	12.21	10.7
51679	K19S62.1	K19S44	287.97	279.96	300.96	0.014	21	563	2.64	7.44	35.4	280.58	280.69	20.38	1.30	12.21	10.7
51664	K19S44.1	K19S43	280.15	278.07	295.24	0.019	14	108	4.93	5.73	40.9	278.55	278.93	16.69	1.31	4.81	27.2
51663	K19S43.1	K19S42	278.07	276.07	288.12	0.013	14	148	5.09	5.59	39.9	276.54	276.94	11.58	1.31	4.03	32.5
51632	K19S42.1	K19S24	276.07	273.10	286.17	0.015	14	203	5.03	5.64	40.3	273.57	273.96	12.60	1.31	4.20	31.1
51631	K19S24.1	K19S21	273.10	266.94	287.50	0.014	14	433	5.15	5.54	39.6	267.40	267.81	20.10	1.31	4.14	31.6
5518522	K19S21.1	K19S551	266.94	265.96	286.00	0.015	14	65	5.15	5.53	39.5	266.42	266.84	19.58	1.31	4.26	30.7
5533985	K19S551.1	K19S577	265.96	264.75	284.50	0.041	24	29	2.41	7.52	31.3	265.38	265.47	19.12	1.31	29.76	4.4
5518525	K19S577.1	K19S548	264.75	261.64	278.50	0.012	24	270	4.97	8.19	34.1	262.32	262.71	16.18	3.02	15.69	19.3
5534001	K19S548.1	K19S579	261.64	260.61	276.00	0.011	24	98	5.89	7.84	32.7	261.26	261.80	14.74	3.40	15.01	22.6
5534003	K19S579.1	K19S580	260.61	260.34	272.00	0.013	24	20	5.63	8.11	33.8	261.02	261.51	10.98	3.40	16.86	20.1
5518515	K19S580.1	K19S581	260.34	259.29	272.00	0.011	24	95	5.56	8.19	34.1	259.97	260.45	12.03	3.40	15.39	22.1
5534005	K19S581.1	K19S547	259.29	255.00	270.00	0.011	24	404	5.56	8.18	34.1	255.68	256.16	14.32	3.40	15.07	22.5
5518511	K19S547.1	K19S545	255.00	250.46	265.00	0.015	24	305	6.31	7.47	31.1	251.08	251.70	13.92	3.40	17.84	19.0
5533989	K19S545.1	K19S578	250.46	237.63	257.00	0.022	24	579	7.20	6.80	28.3	238.20	239.00	18.80	3.41	21.77	15.6
5518505	K19S578.1	K19S544	237.63	235.41	263.83	0.023	24	96	6.46	7.36	30.7	236.02	236.67	27.81	3.41	22.23	15.3
5518502	K19S544.1	K19S543	235.41	233.31	258.46	0.016	24	132	5.66	8.10	33.8	233.99	234.48	24.48	3.41	18.46	18.5
5518501	K19S543.1	K19S542	233.31	232.89	253.05	0.011	24	37	5.47	8.30	34.6	233.58	234.05	19.47	3.41	15.62	21.8
5518490	K19S542.1	K19S541	232.89	229.59	248.52	0.009	24	375	5.48	8.29	34.6	230.28	230.75	18.24	3.41	13.71	24.9
5518488	K19S541.1	K19S540	229.59	226.44	241.75	0.011	24	292	5.60	8.16	34.0	227.12	227.61	14.63	3.41	15.19	22.5
5518487	K19S540.1	K19S539	226.44	221.45	233.00	0.016	24	320	6.37	7.43	31.0	222.07	222.70	10.93	3.41	18.26	18.7
5518486	K19S539.1	K19S538	221.45	218.03	233.90	0.015	24	223	6.02	7.74	32.3	218.68	219.24	15.22	3.41	18.11	18.8
5518485	K19S538.1	K19S537	218.03	217.58	230.50	0.014	24	32	5.51	8.26	34.4	218.27	218.74	12.23	3.41	17.26	19.8
5518484	K19S537.1	K19S536	217.58	215.90	232.00	0.010	24	164	5.86	7.90	32.9	216.56	217.09	15.44	3.41	14.82	23.0
5518483	K19S536.1	K19S535	215.90	215.70	233.50	0.013	24	15	5.66	8.10	33.7	216.37	216.87	17.13	3.41	16.77	20.3
5518482	K19S535.1	K19S534	215.70	212.97	227.44	0.010	24	281	5.15	8.70	36.3	213.69	214.11	13.75	3.41	14.41	23.7
5518479	K19S534.1	K19S533	212.97	212.02	223.75	0.011	24	90	5.90	8.74	36.4	212.75	213.29	11.00	3.95	15.06	26.2
5518446	K19S533.1	K20S788	212.02	210.70	222.03	0.010	24	126	5.94	8.74	36.4	211.43	211.97	10.60	3.97	14.96	26.5
5518445	K20S788.1	K20S787	210.70	209.12	217.28	0.019	24	83	6.58	8.11	33.8	209.80	210.47	7.48	3.97	20.12	19.7
5518444	K20S787.1	K20S786	209.12	202.56	219.00	0.016	24	407	5.97	8.91	37.1	203.30	203.86	15.70	4.10	18.57	22.1
5518443	K20S786.1	K20S785	202.56	200.85	217.50	0.010	24	166	6.16	8.90	37.1	201.59	202.18	15.91	4.10	14.85	27.6
5518442	K20S785.1	K20S784	200.85	196.48	211.00	0.012	24	360	6.31	8.59	35.8	197.20	197.81	13.81	4.10	16.12	25.4
5518441	K20S784.1	K20S783	196.48	193.70	207.50	0.015	24	181	6.93	8.00	33.3	194.37	195.11	13.13	4.10	18.14	22.6
5518440	K20S783.1	J20S645	193.70	185.26	200.00	0.017	24	496	6.95	7.98	33.2	185.92	186.68	14.08	4.10	19.08	21.5
5518430	J20S645.1	J20S644	185.26	184.69	199.00	0.017	24	33	6.85	8.07	33.6	185.36	186.09	13.64	4.10	19.24	21.3
5518429	J20S644.1	J20S643	184.69	184.15	199.50	0.017	24	31	5.99	8.90	37.1	184.89	185.45	14.61	4.10	19.30	21.3

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HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2010 DWF - 8 INCH PIPE REPLACEMENT

▨ Proposed 8-Inch Pipe Replacement

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5518428	J20S643.1	K20S782	184.15	182.79	201.50	0.009	24	147	5.99	8.90	37.1	183.53	184.09	17.97	4.10	14.06	29.2
5518427	K20S782.1	K20S781	182.79	182.41	201.50	0.012	24	33	6.16	8.71	36.3	183.14	183.73	18.36	4.10	15.74	26.1
5518426	K20S781.1	K20S780	182.41	182.09	201.00	0.012	24	27	5.96	8.93	37.2	182.83	183.39	18.17	4.10	15.88	25.8
5518425	K20S780.1	K20S779	182.09	179.94	197.50	0.010	24	210	5.92	8.97	37.4	180.69	181.23	16.81	4.10	14.81	27.7
5518424	K20S779.1	J20S642	179.94	172.94	188.50	0.010	24	695	5.94	8.96	37.3	173.69	174.23	14.81	4.10	14.67	28.0
5518423	J20S642.1	J20S641	172.94	169.28	193.00	0.010	24	361	5.92	8.97	37.4	170.03	170.57	22.97	4.10	14.72	27.9
5518422	J20S641.1	J20S640	169.28	161.28	182.50	0.010	24	795	6.10	8.78	36.6	162.01	162.59	20.49	4.10	14.67	28.0
5518331	J20S640.1	J20S646	161.28	160.76	183.00	0.011	24	47	5.96	8.93	37.2	161.51	162.06	21.49	4.10	15.41	26.6
5518330	J20S646.1	J20S638	160.76	158.62	172.00	0.010	24	209	6.05	8.83	36.8	159.35	159.92	12.65	4.10	14.79	27.7
5518329	J20S638.1	J20S637	158.62	157.78	170.50	0.011	24	79	6.20	8.68	36.2	158.50	159.10	12.00	4.10	15.10	27.1
5518328	J20S637.1	J20S636	157.78	157.42	170.00	0.012	24	31	6.17	8.70	36.3	158.15	158.74	11.85	4.10	15.78	26.0
5518327	J20S636.1	J20S635	157.42	157.00	170.50	0.011	24	37	6.17	8.71	36.3	157.73	158.32	12.77	4.10	15.66	26.2
5518326	J20S635.1	J21S592	157.00	145.59	161.00	0.011	24	998	6.18	8.70	36.2	146.32	146.91	14.69	4.10	15.63	26.2
5518313	J21S592.1	J21S591	145.59	135.38	148.00	0.014	24	727	5.92	8.98	37.4	136.13	136.67	11.87	4.11	17.32	23.7
5518312	J21S591.1	J21S590	135.38	128.17	144.00	0.010	24	716	5.93	8.97	37.4	128.92	129.46	15.08	4.11	14.67	28.0
5518309	J21S590.1	J21S587	128.17	125.75	144.30	0.036	24	67	8.11	7.16	29.8	126.35	127.37	17.95	4.11	27.79	14.8
52180	K20S138.1	K20S117	209.84	203.96	208.96	0.013	8	439	0.00	0.86	10.7	204.03	204.03	4.93	0.00	0.90	0.0
52051	K20S117.1	K20S124	203.96	203.59	216.55	0.006	8	60	0.14	0.96	12.0	203.67	203.67	12.88	0.00	0.61	0.3
52050	K20S124.1	K20S123	203.59	198.75	203.75	0.013	8	378	0.45	1.03	12.8	198.84	198.84	4.91	0.01	0.88	0.9
52053	K20S123.1	K20S161	198.75	195.92	208.17	0.015	8	191	0.74	1.05	13.2	196.01	196.01	12.16	0.01	0.95	1.4
52055	K20S161.1	K20S160	195.92	193.00	203.40	0.011	8	260	0.66	1.14	14.2	193.09	193.10	10.31	0.01	0.83	1.6
52059	K20S160.1	J20S212	193.00	189.91	199.78	0.013	8	239	1.12	1.08	13.5	190.00	190.02	9.78	0.02	0.89	2.3
44920	J20S212.1	J20S213	189.91	188.81	200.21	0.022	8	50	0.33	2.56	32.0	189.02	189.02	11.19	0.02	1.16	1.7
44921	J20S213.1	J20S214	188.81	188.07	201.88	0.007	8	112	2.04	2.55	31.9	188.28	188.35	13.60	0.13	0.63	20.0
44922	J20S214.1	J20S215	188.07	186.63	195.12	0.027	8	53	2.70	2.25	28.1	186.82	186.93	8.30	0.14	1.29	10.9
44924	J20S215.1	J20S217	186.63	182.93	196.05	0.014	8	259	2.51	2.37	29.7	183.13	183.23	12.92	0.14	0.93	15.0
44925	J20S217.1	J20S336	182.93	180.70	187.19	0.012	8	182	2.73	2.33	29.2	180.89	181.01	6.30	0.15	0.86	17.3
45034	J20S336.1	J20S337	180.70	174.81	183.34	0.013	8	447	2.46	2.51	31.4	175.02	175.11	8.32	0.15	0.90	16.6
45033	J20S337.1	J20S338	174.81	169.13	174.13	0.012	8	489	2.81	2.51	31.3	169.34	169.46	4.79	0.16	0.84	19.3
45032	J20S338.1	J20S340	169.13	168.24	176.40	0.015	8	60	2.63	2.55	31.8	168.45	168.56	7.95	0.16	0.95	17.0
44996	J20S340.1	J20S298	168.24	162.62	170.41	0.011	8	494	1.85	3.35	41.8	162.90	162.95	7.51	0.16	0.83	19.7
45001	J20S298.1	J20S299	162.62	160.19	167.00	0.009	8	258	2.97	3.27	40.9	160.46	160.60	6.54	0.26	0.76	33.9
45003	J20S299.1	J20S302	160.19	157.52	161.75	0.011	8	250	3.02	3.27	40.9	157.79	157.93	3.96	0.26	0.81	32.4
45004	J20S302.1	J21S455	157.52	154.47	160.72	0.016	8	193	2.99	3.34	41.7	154.75	154.89	5.97	0.27	0.98	27.1
45423	J21S455.1	J21S456	154.47	152.51	158.41	0.010	8	189	3.16	3.34	41.7	152.79	152.94	5.62	0.27	0.80	33.8
45424	J21S456.1	J21S462	152.51	149.73	159.68	0.012	8	232	3.19	3.21	40.1	150.00	150.16	9.68	0.27	0.85	31.5
45427	J21S462.1	J21S461	149.73	148.18	153.95	0.013	8	118	2.32	4.26	53.3	148.53	148.62	5.42	0.28	0.90	31.3
45428	J21S461.1	J21S460	148.18	146.70	153.71	0.011	17	139	3.64	4.13	24.3	147.04	147.25	6.67	0.70	6.01	11.6
45371	J21S460.1	J21S457	146.70	143.93	150.99	0.012	17	229	3.54	4.22	24.8	144.28	144.48	6.71	0.70	6.41	10.9
45374	J21S457.1	J21S459	143.93	141.02	148.01	0.011	17	262	3.58	4.19	24.6	141.37	141.57	6.64	0.70	6.14	11.3
45373	J21S459.1	J21S468	141.02	135.35	144.32	0.011	17	495	3.98	3.88	22.8	135.67	135.92	8.65	0.70	6.24	11.2

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2010 DWF - 8 INCH PIPE REPLACEMENT

▨ Proposed 8-Inch Pipe Replacement

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
45368	J21S468.1	J21S467	135.35	133.44	144.00	0.016	17	120	3.99	3.88	22.8	133.76	134.01	10.23	0.70	7.34	9.5
5518310	J21S467.1	J21S587	130.98	124.27	144.30	0.090	24	75	0.37	24.92	103.8	126.34	126.35	17.96	0.77	43.73	1.8
5518308	J21S587.1	J21S586	125.75	122.60	148.00	0.036	24	89	6.46	9.45	39.4	123.39	124.04	24.61	4.80	27.55	17.4
5518307	J21S586.1	J21S585	122.60	121.84	144.00	0.012	24	66	6.57	9.34	38.9	122.62	123.29	21.38	4.80	15.72	30.5
5518076	J21S585.1	J21S584	121.84	114.98	132.00	0.012	24	569	5.92	10.09	42.1	115.82	116.37	16.18	4.80	16.05	29.9
5518073	J21S584.1	J21S583	114.98	114.07	148.00	0.007	27	138	5.37	10.25	38.0	114.93	115.37	33.07	4.80	16.27	29.5
5518072	J21S583.1	J21S579	114.07	110.21	131.00	0.006	27	615	5.33	10.32	38.2	111.07	111.51	19.93	4.81	15.86	30.3
5518070	J21S579.1	J21S578	110.21	108.84	120.50	0.006	27	224	5.33	10.32	38.2	109.70	110.14	10.80	4.81	15.67	30.7
5518069	J21S578.1	J21S577	108.84	107.31	119.00	0.006	27	236	5.14	10.60	39.3	108.19	108.60	10.81	4.81	16.12	29.8
5518068	J21S577.1	J21S582	107.31	106.07	118.80	0.006	27	218	5.16	10.59	39.2	106.95	107.37	11.85	4.83	15.10	32.0
5518065	J21S582.1	J21S581	106.07	105.20	117.30	0.006	27	140	5.33	10.35	38.3	106.06	106.50	11.24	4.83	15.76	30.6
5518063	J21S581.1	J21S580	105.20	103.65	112.20	0.006	27	253	5.32	10.35	38.3	104.51	104.95	7.69	4.83	15.66	30.8
5518062	J21S580.1	J21S502	103.65	102.13	111.93	0.006	27	249	5.33	10.35	38.3	102.99	103.43	8.94	4.83	15.65	30.8
45189	J21S502.1	J21S71	102.13	101.33	109.13	0.012	27	69	5.93	9.56	35.4	102.13	102.67	7.01	4.83	21.63	22.3
45190	J21S71.1	J21S504	101.33	99.02	111.02	0.008	27	274	5.94	9.55	35.4	99.82	100.36	11.21	4.83	18.39	26.3
45188	J21S504.1	J21S505	99.02	96.62	108.62	0.011	27	209	6.20	9.26	34.3	97.39	97.99	11.23	4.83	21.45	22.5
45185	J21S505.1	J21S506	96.62	94.65	107.65	0.011	27	176	6.22	9.23	34.2	95.42	96.02	12.23	4.83	21.18	22.8
45141	J21S506.1	J21S508	94.65	90.86	103.86	0.011	27	334	6.21	9.24	34.2	91.63	92.23	12.23	4.83	21.32	22.6
45144	J21S508.1	J21S509	90.86	87.11	100.11	0.011	27	329	6.26	9.22	34.2	87.88	88.49	12.23	4.85	21.35	22.7
45145	J21S509.1	J21S63	87.11	84.72	97.72	0.011	27	208	6.22	9.26	34.3	85.49	86.09	12.23	4.85	21.46	22.6
45182	J21S63.1	I21S242	84.72	78.71	91.71	0.011	27	532	6.15	9.35	34.6	79.49	80.08	12.22	4.85	21.27	22.8
39803	I21S242.1	I21S525	78.71	77.06	90.30	0.010	27	174	6.16	9.34	34.6	77.84	78.43	12.46	4.86	19.51	24.9
5102267	I21S525.1	I22S556	77.06	75.94	89.00	0.018	26	63	4.80	11.46	44.1	76.90	77.26	12.10	4.86	24.13	20.1
5102265	I22S556.1	I22S555	75.94	74.96	86.20	0.005	26	216	4.77	11.55	44.4	75.92	76.28	10.28	4.88	12.19	40.1
6269175	I22S555.1	I21S529	74.96	73.12	83.14	0.004	26	418	4.71	11.68	44.9	74.09	74.44	9.04	4.89	12.01	40.7
5102263	I21S529.1	I21S517	73.14	73.12	83.00	0.004	27	5	4.74	11.40	42.2	74.07	74.42	8.93	4.89	12.66	38.6
5102151	I21S517.1	I21S518	73.12	72.19	86.60	0.004	27	207	4.75	11.38	42.2	73.14	73.49	13.46	4.89	13.43	36.4

TOTAL LENGTH (MILES): 7.46
LENGTH WEIGHTED Q/CAP: 20.0
LENGTH WEIGHTED d/D: 33.0
LENGTH WEIGHTED HGL. BELOW RIM (FT): 13.65

LENGTH OF PIPE - d/D < 50% (MILES): 7.43
LENGTH OF PIPE - d/D 50 - 75% (MILES): 0.02
LENGTH OF PIPE - d/D 75 - 100% (MILES): 0.00
LENGTH OF PIPE - d/D > 100% (MILES): 0.01

LENGTH OF PIPE - Q/CAP < 50% (MILES): 7.46
LENGTH OF PIPE - Q/CAP 50 - 75% (MILES): 0.00
LENGTH OF PIPE - Q/CAP 75 - 100% (MILES): 0.00
LENGTH OF PIPE - Q/CAP > 100% (MILES): 0.00

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2030 DWF - 8 INCH PIPE REPLACEMENT

▨ Proposed 8-Inch Pipe Replacement

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5200562	L18S653.1	L18S658	372.50	370.10	382.50	0.013	24	181	4.54	5.60	23.3	370.57	370.88	11.93	1.63	16.84	9.7
5214242	L18S658.1	L18S652	370.10	365.40	376.00	0.013	24	375	4.57	5.57	23.2	365.86	366.19	10.14	1.63	16.36	10.0
5200560	L18S652.1	L18S651	365.40	356.70	365.10	0.013	24	679	4.24	5.87	24.5	357.19	357.47	7.91	1.63	16.56	9.9
5200549	L18S651.1	L18S650	356.70	354.75	369.50	0.008	24	250	4.17	5.94	24.8	355.25	355.52	14.26	1.63	12.91	12.6
5200546	L18S650.1	L18S649	354.75	351.05	369.80	0.008	24	481	4.22	5.96	24.8	351.55	351.82	18.25	1.66	12.83	12.9
5200544	L18S649.1	L18S648	351.05	346.25	363.50	0.008	24	630	3.72	6.51	27.1	346.79	347.01	16.71	1.66	12.76	13.0
5200542	L18S648.1	L18S647	346.25	342.65	358.75	0.007	24	533	4.15	6.51	27.1	343.19	343.46	15.56	1.85	12.02	15.4
5200540	L18S647.1	L18S646	342.65	334.50	344.90	0.012	24	707	4.62	6.13	25.5	335.01	335.34	9.89	1.89	15.70	12.0
5200538	L18S646.1	L18S645	334.50	321.00	334.25	0.027	24	499	4.38	6.54	27.2	321.55	321.84	12.70	1.96	24.06	8.2
5200536	L18S645.1	L18S644	321.00	318.00	327.00	0.008	24	400	4.39	6.54	27.2	318.54	318.84	8.46	1.96	12.66	15.5
5200534	L18S644.1	L18S643	318.00	317.25	326.40	0.025	24	30	3.78	7.26	30.3	317.86	318.08	8.54	1.96	23.19	8.5
5200415	L18S643.1	L18S642	317.25	316.50	324.80	0.005	24	161	3.79	7.26	30.3	317.10	317.33	7.70	1.96	9.97	19.7
5200412	L18S642.1	L19S434	316.50	312.45	325.90	0.009	24	427	4.78	6.20	25.9	312.97	313.32	12.93	1.99	14.23	14.0
5518532	L19S434.1	K19S556	312.41	308.71	323.50	0.012	24	316	4.90	6.15	25.6	309.22	309.60	14.28	2.01	15.82	12.7
5518531	K19S556.1	K19S555	308.71	303.92	317.00	0.013	24	369	5.53	5.64	23.5	304.39	304.87	12.61	2.01	16.65	12.1
5518530	K19S555.1	K19S554	303.92	292.50	307.00	0.018	24	620	5.60	5.59	23.3	292.97	293.45	14.04	2.01	19.85	10.1
5534194	K19S554.2	K19S583	292.50	287.40	301.50	0.019	24	266	5.93	5.37	22.4	287.85	288.40	13.65	2.01	20.24	9.9
5534192	K19S583.1	K19S582	287.40	286.91	300.50	0.024	24	21	5.62	5.58	23.3	287.37	287.87	13.12	2.01	22.39	9.0
5518529	K19S582.1	K19S552	286.91	278.50	295.00	0.019	24	435	5.44	5.71	23.8	278.98	279.44	16.02	2.01	20.33	9.9
5518521	K19S552.1	K19S577	278.50	264.75	284.50	0.019	24	725	3.39	8.31	34.6	265.44	265.62	19.06	2.10	20.14	10.4
58610	L18S237.1	L18S236	371.28	370.15	389.43	0.007	14	151	3.31	4.91	35.0	370.56	370.73	18.87	0.71	3.00	23.8
58609	L18S236.1	L18S235	370.15	370.05	383.21	0.007	14	15	3.31	4.90	35.0	370.46	370.63	12.75	0.71	2.80	25.5
5039772	L18S235.1	L18S234	370.05	367.17	376.85	0.007	14	388	3.45	4.75	33.9	367.56	367.75	9.29	0.71	2.99	23.8
58607	L18S234.1	L18S232	367.17	356.82	373.98	0.027	14	387	4.16	4.15	29.6	357.17	357.44	16.81	0.71	5.68	12.6
5347920	L18S232.1	L18S662	356.82	354.05	369.90	0.014	14	195	3.58	4.63	33.1	354.43	354.63	15.47	0.71	4.14	17.2
5347931	L18S662.1	L18S665	354.05	353.77	364.80	0.007	15	40	3.43	4.63	30.8	354.16	354.34	10.64	0.71	3.52	20.3
5347922	L18S665.1	L18S664	353.77	353.16	364.50	0.008	15	77	2.71	5.50	36.7	353.62	353.73	10.88	0.71	3.71	19.3
5347927	L18S664.1	L18S663	353.16	351.80	368.10	0.007	15	195	3.81	5.49	36.6	352.26	352.48	15.84	0.99	3.49	28.5
5347926	L18S663.1	L18S174	351.80	350.85	371.11	0.007	15	131	3.82	5.45	36.4	351.30	351.53	19.80	0.99	3.55	28.0
58567	L18S174.1	L18S187	350.85	346.90	363.65	0.012	14	326	4.59	5.33	38.0	347.34	347.67	16.31	1.11	3.83	28.9
58566	L18S187.1	L18S186	346.90	340.73	357.46	0.012	14	494	4.64	5.32	38.0	341.18	341.51	16.29	1.12	3.88	28.8
58811	L18S186.1	L18S583	340.73	335.92	352.69	0.013	14	381	4.36	5.62	40.2	336.39	336.68	16.30	1.12	3.90	28.8
58816	L18S583.1	L18S458	335.92	331.31	348.08	0.013	14	366	4.57	5.77	41.2	331.79	332.11	16.29	1.23	3.90	31.5
58819	L18S458.1	L18S453	331.31	330.96	355.55	0.012	14	30	4.66	5.74	41.0	331.44	331.78	24.11	1.24	3.76	33.0
58821	L18S453.1	L18S445	330.96	326.48	343.12	0.012	14	360	4.76	5.71	40.8	326.96	327.31	16.16	1.26	3.87	32.6
58802	L18S445.1	L18S444	326.48	321.99	337.95	0.013	14	350	4.56	5.95	42.5	322.49	322.81	15.46	1.27	3.94	32.3
58790	L18S444.1	L18S432	321.99	316.50	331.58	0.011	14	487	4.65	5.94	42.4	316.99	317.33	14.59	1.30	3.69	35.2
58785	L18S432.1	L18S431	316.50	313.30	330.75	0.014	14	226	3.70	7.09	50.6	313.89	314.10	16.86	1.30	4.13	31.4
58776	L18S431.1	L18S422	313.30	311.52	324.38	0.007	14	270	4.09	7.08	50.6	312.11	312.37	12.27	1.43	2.82	50.8
58941	L18S422.1	L19S80	311.52	305.74	319.85	0.016	14	359	5.40	5.73	40.9	306.22	306.67	13.63	1.44	4.41	32.6
58902	L19S80.1	L19S78	305.74	305.24	314.97	0.046	17	11	5.11	5.67	33.4	305.71	306.12	9.26	1.52	12.43	12.2

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2030 DWF - 8 INCH PIPE REPLACEMENT

▨ Proposed 8-Inch Pipe Replacement

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
58905	L19S78.1	L19S53	305.24	303.81	321.12	0.015	17	97	4.71	6.02	35.4	304.31	304.66	16.81	1.52	7.06	21.5
58903	L19S53.1	K19S77	303.81	301.69	304.89	0.010	17	215	4.72	6.02	35.4	302.19	302.54	2.70	1.52	5.79	26.3
51687	K19S77.1	K19S76	301.69	300.54	321.44	0.020	14	56	5.82	5.65	40.4	301.01	301.54	20.43	1.52	4.96	30.7
51686	K19S76.1	K19S78	300.54	299.93	321.73	0.012	21	50	4.32	5.83	27.8	300.42	300.71	21.31	1.52	11.32	13.4
51684	K19S78.1	K19S69	299.93	295.92	317.72	0.011	21	374	4.77	5.50	26.2	296.38	296.73	21.34	1.54	10.60	14.6
51682	K19S69.1	K19S62	295.92	287.97	309.77	0.014	21	559	4.77	5.50	26.2	288.43	288.78	21.34	1.54	12.21	12.6
51679	K19S62.1	K19S44	287.97	279.96	300.96	0.014	21	563	2.79	8.10	38.6	280.64	280.76	20.33	1.54	12.21	12.6
51664	K19S44.1	K19S43	280.15	278.07	295.24	0.019	14	108	5.33	6.31	45.1	278.60	279.04	16.64	1.61	4.81	33.5
51663	K19S43.1	K19S42	278.07	276.07	288.12	0.013	14	148	5.50	6.16	44.0	276.58	277.05	11.54	1.61	4.03	39.9
51632	K19S42.1	K19S24	276.07	273.10	286.17	0.015	14	203	5.45	6.21	44.3	273.62	274.08	12.55	1.61	4.20	38.3
51631	K19S24.1	K19S21	273.10	266.94	287.50	0.014	14	433	5.55	6.12	43.7	267.45	267.93	20.05	1.61	4.14	38.9
5518522	K19S21.1	K19S551	266.94	265.96	286.00	0.015	14	65	5.56	6.11	43.6	266.47	266.95	19.53	1.61	4.26	37.8
5533985	K19S551.1	K19S577	265.96	264.75	284.50	0.041	24	29	2.59	8.31	34.6	265.44	265.55	19.06	1.61	29.76	5.4
5518525	K19S577.1	K19S548	264.75	261.64	278.50	0.012	24	270	5.37	8.90	37.1	262.38	262.83	16.12	3.66	15.69	23.3
5534001	K19S548.1	K19S579	261.64	260.61	276.00	0.011	24	98	6.04	8.89	37.0	261.35	261.92	14.65	4.13	15.01	27.5
5534003	K19S579.1	K19S580	260.61	260.34	272.00	0.013	24	20	6.13	8.79	36.6	261.07	261.66	10.93	4.13	16.86	24.5
5518515	K19S580.1	K19S581	260.34	259.29	272.00	0.011	24	95	6.05	8.88	37.0	260.03	260.60	11.97	4.13	15.39	26.8
5534005	K19S581.1	K19S547	259.29	255.00	270.00	0.011	24	404	6.05	8.87	37.0	255.74	256.31	14.26	4.13	15.07	27.4
5518511	K19S547.1	K19S545	255.00	250.46	265.00	0.015	24	305	6.66	8.29	34.5	251.15	251.84	13.85	4.14	17.84	23.2
5533989	K19S545.1	K19S578	250.46	237.63	257.00	0.022	24	579	7.82	7.45	31.0	238.25	239.20	18.75	4.20	21.77	19.3
5518505	K19S578.1	K19S544	237.63	235.41	263.83	0.023	24	96	6.81	8.24	34.3	236.10	236.82	27.73	4.20	22.23	18.9
5518502	K19S544.1	K19S543	235.41	233.31	258.46	0.016	24	132	6.17	8.88	37.0	234.05	234.64	24.41	4.21	18.46	22.8
5518501	K19S543.1	K19S542	233.31	232.89	253.05	0.011	24	37	5.90	9.18	38.3	233.66	234.20	19.40	4.21	15.62	27.0
5518490	K19S542.1	K19S541	232.89	229.59	248.52	0.009	24	375	5.90	9.17	38.2	230.35	230.90	18.17	4.21	13.71	30.7
5518488	K19S541.1	K19S540	229.59	226.44	241.75	0.011	24	292	6.12	8.93	37.2	227.18	227.77	14.56	4.21	15.19	27.7
5518487	K19S540.1	K19S539	226.44	221.45	233.00	0.016	24	320	6.76	8.31	34.6	222.14	222.85	10.86	4.21	18.26	23.1
5518486	K19S539.1	K19S538	221.45	218.03	233.90	0.015	24	223	6.51	8.54	35.6	218.74	219.40	15.16	4.21	18.11	23.3
5518485	K19S538.1	K19S537	218.03	217.58	230.50	0.014	24	32	6.01	9.05	37.7	218.33	218.89	12.17	4.21	17.26	24.4
5518484	K19S537.1	K19S536	217.58	215.90	232.00	0.010	24	164	6.01	9.05	37.7	216.65	217.21	15.35	4.21	14.82	28.4
5518483	K19S536.1	K19S535	215.90	215.70	233.50	0.013	24	15	6.14	8.91	37.1	216.44	217.03	17.06	4.21	16.77	25.1
5518482	K19S535.1	K19S534	215.70	212.97	227.44	0.010	24	281	5.52	9.70	40.4	213.78	214.25	13.66	4.21	14.41	29.2
5518479	K19S534.1	K19S533	212.97	212.02	223.75	0.011	24	90	6.17	9.76	40.7	212.83	213.43	10.92	4.79	15.06	31.8
5518446	K19S533.1	K20S788	212.02	210.70	222.03	0.010	24	126	6.21	9.75	40.6	211.51	212.11	10.52	4.81	14.96	32.1
5518445	K20S788.1	K20S787	210.70	209.12	217.28	0.019	24	83	7.17	8.77	36.5	209.85	210.65	7.43	4.81	20.12	23.9
5518444	K20S787.1	K20S786	209.12	202.56	219.00	0.016	24	407	6.22	9.95	41.4	203.39	203.99	15.61	4.95	18.57	26.6
5518443	K20S786.1	K20S785	202.56	200.85	217.50	0.010	24	166	6.23	9.94	41.4	201.68	202.28	15.82	4.95	14.85	33.3
5518442	K20S785.1	K20S784	200.85	196.48	211.00	0.012	24	360	6.63	9.49	39.5	197.27	197.95	13.73	4.95	16.12	30.7
5518441	K20S784.1	K20S783	196.48	193.70	207.50	0.015	24	181	7.49	8.67	36.1	194.42	195.30	13.08	4.95	18.14	27.3
5518440	K20S783.1	J20S645	193.70	185.26	200.00	0.017	24	496	7.51	8.66	36.1	185.98	186.86	14.02	4.95	19.08	26.0
5518430	J20S645.1	J20S644	185.26	184.69	199.00	0.017	24	33	7.32	8.82	36.7	185.43	186.26	13.57	4.95	19.24	25.7
5518429	J20S644.1	J20S643	184.69	184.15	199.50	0.017	24	31	6.20	9.99	41.6	184.98	185.58	14.52	4.95	19.30	25.7

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HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2030 DWF - 8 INCH PIPE REPLACEMENT

▨ Proposed 8-Inch Pipe Replacement

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5518428	J20S643.1	K20S782	184.15	182.79	201.50	0.009	24	147	6.20	9.98	41.6	183.62	184.22	17.88	4.95	14.06	35.2
5518427	K20S782.1	K20S781	182.79	182.41	201.50	0.012	24	33	6.42	9.72	40.5	183.22	183.86	18.28	4.95	15.74	31.5
5518426	K20S781.1	K20S780	182.41	182.09	201.00	0.012	24	27	6.21	9.97	41.5	182.92	183.52	18.08	4.95	15.88	31.2
5518425	K20S780.1	K20S779	182.09	179.94	197.50	0.010	24	210	6.18	10.01	41.7	180.78	181.37	16.72	4.95	14.81	33.4
5518424	K20S779.1	J20S642	179.94	172.94	188.50	0.010	24	695	6.19	9.99	41.6	173.77	174.37	14.73	4.95	14.67	33.7
5518423	J20S642.1	J20S641	172.94	169.28	193.00	0.010	24	361	6.18	10.01	41.7	170.12	170.71	22.88	4.95	14.72	33.6
5518422	J20S641.1	J20S640	169.28	161.28	182.50	0.010	24	795	6.35	9.80	40.8	162.10	162.72	20.40	4.95	14.67	33.8
5518331	J20S640.1	J20S646	161.28	160.76	183.00	0.011	24	47	6.21	9.97	41.5	161.59	162.19	21.41	4.95	15.41	32.1
5518330	J20S646.1	J20S638	160.76	158.62	172.00	0.010	24	209	6.31	9.85	41.0	159.44	160.06	12.56	4.95	14.79	33.5
5518329	J20S638.1	J20S637	158.62	157.78	170.50	0.011	24	79	6.49	9.64	40.2	158.58	159.24	11.92	4.95	15.10	32.8
5518328	J20S637.1	J20S636	157.78	157.42	170.00	0.012	24	31	6.46	9.67	40.3	158.23	158.88	11.77	4.95	15.78	31.4
5518327	J20S636.1	J20S635	157.42	157.00	170.50	0.011	24	37	6.46	9.68	40.3	157.81	158.46	12.69	4.95	15.66	31.6
5518326	J20S635.1	J21S592	157.00	145.59	161.00	0.011	24	998	6.46	9.67	40.3	146.40	147.05	14.60	4.95	15.63	31.7
5518313	J21S592.1	J21S591	145.59	135.38	148.00	0.014	24	727	6.18	10.02	41.7	136.22	136.81	11.78	4.96	17.32	28.6
5518312	J21S591.1	J21S590	135.38	128.17	144.00	0.010	24	716	6.19	10.01	41.7	129.00	129.60	15.00	4.96	14.67	33.8
5518309	J21S590.1	J21S587	128.17	125.75	144.30	0.036	24	67	8.63	7.85	32.7	126.41	127.56	17.90	4.96	27.79	17.8
52180	K20S138.1	K20S117	209.84	203.96	208.96	0.013	8	439	0.00	0.86	10.7	204.03	204.03	4.93	0.00	0.90	0.0
52051	K20S117.1	K20S124	203.96	203.59	216.55	0.006	8	60	0.14	0.96	12.1	203.67	203.67	12.88	0.00	0.61	0.4
52050	K20S124.1	K20S123	203.59	198.75	203.75	0.013	8	378	0.47	1.04	13.0	198.84	198.84	4.91	0.01	0.88	0.9
52053	K20S123.1	K20S161	198.75	195.92	208.17	0.015	8	191	0.76	1.06	13.3	196.01	196.02	12.16	0.01	0.95	1.4
52055	K20S161.1	K20S160	195.92	193.00	203.40	0.011	8	260	0.68	1.15	14.4	193.09	193.10	10.30	0.01	0.83	1.6
52059	K20S160.1	J20S212	193.00	189.91	199.78	0.013	8	239	1.17	1.09	13.6	190.00	190.02	9.78	0.02	0.89	2.4
44920	J20S212.1	J20S213	189.91	188.81	200.21	0.022	8	50	0.33	2.65	33.1	189.03	189.03	11.18	0.02	1.16	1.8
44921	J20S213.1	J20S214	188.81	188.07	201.88	0.007	8	112	2.07	2.64	33.0	188.29	188.36	13.59	0.13	0.63	21.2
44922	J20S214.1	J20S215	188.07	186.63	195.12	0.027	8	53	2.78	2.29	28.7	186.82	186.94	8.30	0.15	1.29	11.5
44924	J20S215.1	J20S217	186.63	182.93	196.05	0.014	8	259	2.55	2.44	30.5	183.13	183.23	12.92	0.15	0.93	15.9
44925	J20S217.1	J20S336	182.93	180.70	187.19	0.012	8	182	2.79	2.39	29.9	180.90	181.02	6.29	0.16	0.86	18.3
45034	J20S336.1	J20S337	180.70	174.81	183.34	0.013	8	447	2.49	2.59	32.4	175.03	175.12	8.31	0.16	0.90	17.6
45033	J20S337.1	J20S338	174.81	169.13	174.13	0.012	8	489	2.82	2.59	32.4	169.35	169.47	4.78	0.17	0.84	20.4
45032	J20S338.1	J20S340	169.13	168.24	176.40	0.015	8	60	2.66	2.63	32.9	168.46	168.57	7.94	0.17	0.95	18.0
44996	J20S340.1	J20S298	168.24	162.62	170.41	0.011	8	494	1.89	3.42	42.8	162.91	162.96	7.50	0.17	0.83	20.9
45001	J20S298.1	J20S299	162.62	160.19	167.00	0.009	8	258	3.03	3.36	42.0	160.47	160.61	6.53	0.27	0.76	35.9
45003	J20S299.1	J20S302	160.19	157.52	161.75	0.011	8	250	3.08	3.36	42.0	157.80	157.95	3.95	0.28	0.81	34.3
45004	J20S302.1	J21S455	157.52	154.47	160.72	0.016	8	193	3.07	3.42	42.7	154.75	154.90	5.97	0.28	0.98	28.7
45423	J21S455.1	J21S456	154.47	152.51	158.41	0.010	8	189	3.10	3.41	42.7	152.79	152.94	5.61	0.28	0.80	35.7
45424	J21S456.1	J21S462	152.51	149.73	159.68	0.012	8	232	3.23	3.31	41.4	150.01	150.17	9.67	0.28	0.85	33.3
45427	J21S462.1	J21S461	149.73	148.18	153.95	0.013	8	118	2.37	4.39	54.8	148.54	148.63	5.41	0.30	0.90	33.2
45428	J21S461.1	J21S460	148.18	146.70	153.71	0.011	17	139	3.71	4.25	25.0	147.05	147.27	6.66	0.74	6.01	12.3
45371	J21S460.1	J21S457	146.70	143.93	150.99	0.012	17	229	3.60	4.34	25.5	144.29	144.49	6.70	0.74	6.41	11.5
45374	J21S457.1	J21S459	143.93	141.02	148.01	0.011	17	262	3.64	4.31	25.3	141.38	141.58	6.63	0.74	6.14	12.0
45373	J21S459.1	J21S468	141.02	135.35	144.32	0.011	17	495	4.07	3.98	23.4	135.68	135.94	8.64	0.74	6.24	11.8

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HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 20 - CHOLLAS VALLEY
TS 020 2030 DWF - 8 INCH PIPE REPLACEMENT

▨ Proposed 8-Inch Pipe Replacement

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
45368	J21S468.1	J21S467	135.35	133.44	144.00	0.016	17	120	4.07	3.98	23.4	133.77	134.03	10.23	0.74	7.34	10.1
5518310	J21S467.1	J21S587	130.98	124.27	144.30	0.090	24	75	0.39	25.60	106.7	126.40	126.40	17.90	0.82	43.73	1.9
5518308	J21S587.1	J21S586	125.75	122.60	148.00	0.036	24	89	6.84	10.30	42.9	123.46	124.18	24.54	5.70	27.55	20.7
5518307	J21S586.1	J21S585	122.60	121.84	144.00	0.012	24	66	6.91	10.23	42.6	122.69	123.43	21.31	5.70	15.72	36.2
5518076	J21S585.1	J21S584	121.84	114.98	132.00	0.012	24	569	6.12	11.21	46.7	115.91	116.50	16.09	5.70	16.05	35.5
5518073	J21S584.1	J21S583	114.98	114.07	148.00	0.007	27	138	5.55	11.35	42.0	115.02	115.50	32.98	5.69	16.27	35.0
5518072	J21S583.1	J21S579	114.07	110.21	131.00	0.006	27	615	5.53	11.41	42.3	111.16	111.64	19.84	5.71	15.86	36.0
5518070	J21S579.1	J21S578	110.21	108.84	120.50	0.006	27	224	5.53	11.40	42.2	109.79	110.26	10.71	5.71	15.67	36.4
5518069	J21S578.1	J21S577	108.84	107.31	119.00	0.006	27	236	5.41	11.59	42.9	108.28	108.73	10.72	5.71	16.12	35.4
5518068	J21S577.1	J21S582	107.31	106.07	118.80	0.006	27	218	5.43	11.59	42.9	107.04	107.49	11.76	5.72	15.10	37.9
5518065	J21S582.1	J21S581	106.07	105.20	117.30	0.006	27	140	5.53	11.43	42.3	106.15	106.63	11.15	5.72	15.76	36.3
5518063	J21S581.1	J21S580	105.20	103.65	112.20	0.006	27	253	5.53	11.43	42.3	104.60	105.08	7.60	5.72	15.66	36.6
5518062	J21S580.1	J21S502	103.65	102.13	111.93	0.006	27	249	5.54	11.42	42.3	103.08	103.56	8.85	5.72	15.65	36.6
45189	J21S502.1	J21S71	102.13	101.33	109.13	0.012	27	69	6.26	10.42	38.6	102.20	102.81	6.93	5.73	21.63	26.5
45190	J21S71.1	J21S504	101.33	99.02	111.02	0.008	27	274	6.27	10.41	38.6	99.89	100.50	11.13	5.73	18.39	31.1
45188	J21S504.1	J21S505	99.02	96.62	108.62	0.011	27	209	6.68	9.93	36.8	97.45	98.14	11.17	5.72	21.45	26.7
45185	J21S505.1	J21S506	96.62	94.65	107.65	0.011	27	176	6.71	9.89	36.6	95.47	96.17	12.18	5.72	21.18	27.0
45141	J21S506.1	J21S508	94.65	90.86	103.86	0.011	27	334	6.70	9.91	36.7	91.69	92.38	12.18	5.72	21.32	26.9
45144	J21S508.1	J21S509	90.86	87.11	100.11	0.011	27	329	6.75	9.88	36.6	87.93	88.64	12.18	5.75	21.35	26.9
45145	J21S509.1	J21S63	87.11	84.72	97.72	0.011	27	208	6.71	9.92	36.8	85.55	86.25	12.17	5.75	21.46	26.8
45182	J21S63.1	I21S242	84.72	78.71	91.71	0.011	27	532	6.57	10.08	37.3	79.55	80.22	12.16	5.75	21.27	27.0
39803	I21S242.1	I21S525	78.71	77.06	90.30	0.010	27	174	6.59	10.07	37.3	77.90	78.57	12.40	5.76	19.51	29.5
5102267	I21S525.1	I22S556	77.06	75.94	89.00	0.018	26	63	4.94	12.77	49.1	77.01	77.39	11.99	5.76	24.13	23.9
5102265	I22S556.1	I22S555	75.94	74.96	86.20	0.005	26	216	4.92	12.86	49.4	76.03	76.41	10.17	5.78	12.19	47.5
6269175	I22S555.1	I21S529	74.96	73.12	83.14	0.004	26	418	4.98	12.74	49.0	74.18	74.57	8.95	5.79	12.01	48.2
5102263	I21S529.1	I21S517	73.14	73.12	83.00	0.004	27	5	4.99	12.47	46.2	74.16	74.55	8.84	5.79	12.66	45.7
5102151	I21S517.1	I21S518	73.12	72.19	86.60	0.004	27	207	5.01	12.42	46.0	73.23	73.62	13.37	5.78	13.43	43.1

TOTAL LENGTH (MILES): 7.46
LENGTH WEIGHTED Q/CAP: 23.5
LENGTH WEIGHTED d/D: 35.8
LENGTH WEIGHTED HGL. BELOW RIM (FT): 13.60

LENGTH OF PIPE - d/D < 50% (MILES): 7.33
LENGTH OF PIPE - d/D 50 - 75% (MILES): 0.12
LENGTH OF PIPE - d/D 75 - 100% (MILES): 0.00
LENGTH OF PIPE - d/D > 100% (MILES): 0.01

LENGTH OF PIPE - Q/CAP < 50% (MILES): 7.41
LENGTH OF PIPE - Q/CAP 50 - 75% (MILES): 0.05
LENGTH OF PIPE - Q/CAP 75 - 100% (MILES): 0.00
LENGTH OF PIPE - Q/CAP > 100% (MILES): 0.00

APPENDIX K

TRANSPORTATION
IMPACT STUDY

TRANSPORTATION IMPACT STUDY
CHOLLAS TRIANGLE MASTER PLAN
CITY OF SAN DIEGO, CA

Transportation Strategies for
Sustainability

Prepared for:

City of San Diego
202 C Street
San Diego, CA 92101

Civitas
1200 Bannock Street
Denver, CO 80204

Submitted by:

Fehr & Peers
401 West A Street, Suite 900
San Diego, CA 92101

FEHR PEERS

April 2014

TRANSPORTATION IMPACT STUDY
of
CHOLLAS TRIANGLE MASTER PLAN
City of San Diego, California

April 2014

Prepared for:

Civitas, Inc.
1200 Bannock Street
Denver, CO 80204

Prepared by:

FEHR & PEERS
401 West A Street, Suite 900
San Diego, California 92101
(619) 234-3190

Ref: SD11-0037

Responsible Engineer:

D. Sohrab Rashid

REGISTERED PROFESSIONAL ENGINEER
D. SOHRAB RASHID
No. 1845
Exp.
TRAFFIC
STATE OF CALIFORNIA

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1. EXECUTIVE SUMMARY

This project evaluates the potential traffic and mobility impacts associated with the Chollas Triangle project. The report is formatted as follows:

INTRODUCTION

Chapter 2 provides the project description and a summary of the report's organization. The Chollas Triangle Master Plan report conducts a traffic analysis for a mixed-use project, including residential and retail components, at the southeast corner of University Avenue & 54th Street. The site has several existing uses that would be replaced by the proposed project. This traffic impact study analyzes existing conditions and conducts a segment and intersection impact analysis for the proposed project 2035 horizon year scenario.

EXISTING CONDITIONS

Chapter 3 describes the existing roadway network within the project study area and provides analysis results for existing conditions. Thirteen of the sixteen segments analyzed currently operate at an acceptable level of service (D or better). 14 of the 18 intersections analyzed currently operate at an acceptable level of service (D or better). A description of the existing pedestrian, bicycle, transit, and parking facilities near the project site is also included.

STUDY METHODOLOGY

Chapter 4 describes the methodologies and standards utilized to analyze roadway and intersection operations, and the criteria applied for the determination of significant impacts. The intersection analysis was conducted with the HCM methodology using the Synchro software package.

PROJECT DESCRIPTION AND TRIP GENERATION

Chapter 5 describes the proposed project including project traffic generation, trip distribution pattern, and trip assignment. With credits for existing land uses applied, the project's cumulative trip generation is estimated to be approximately 7,200 daily trips, 490 AM peak hour trips, and 820 PM peak hour trips. Additionally, with credits for existing land uses applied, the project's driveway trip generation is estimated to be approximately 10,060 daily trips, 590 AM peak hour trips, and 1,190 PM peak hour trips.

HORIZON YEAR (2035) CONDITIONS

Chapter 6 describes projected long-term year traffic conditions and the proposed projects traffic impacts. Analysis results are provided for both with and without project conditions. Under horizon year conditions, 13 of 16 analyzed segments and 14 of 18 analyzed intersections are projected to operate at an acceptable level of service (D or better). The project results in two roadway impacts and three intersection impacts.

FINDINGS AND RECOMMENDATIONS

The final chapter outlines the overall study findings and identifies recommended project-related mitigation measures and their effectiveness. An analysis of site access and operating conditions is also included.

2. INTRODUCTION

2.1. STUDY PURPOSE

The purpose of this Transportation Impact Study (TIS) is to identify and document the transportation related impacts associated with the development of the proposed Chollas Triangle Master Plan (proposed project), as well as to recommend mitigation measures for any identified transportation impacts associated with the proposed project. According to City staff, the project does not require a Community Plan Update.

2.2. PROJECT DESCRIPTION

The proposed project is located in the City of San Diego within the Eastern Area neighborhood of the Mid City Community Plan Area. The project area is bound by 54th Street to the west, University Avenue to the north, and Chollas Parkway to the east and south, plus a small area north of University Avenue. **Figure 2-1** displays the regional location of the proposed project and **Figure 2-2** displays the projects proposed zoning.

The project proposes to redevelop the existing Chollas Triangle site, which currently includes a service station, anchor retail, several smaller commercial establishments and the Teen Challenge Center. The project proposes to develop a set of mixed land uses which include approximately 130,000 square feet of neighborhood commercial uses, 486 multi-family dwelling units, and 5.5 acres of passive park uses. The proposed project would continue to take access from both 54th Street and University Avenue, but would consolidate access from a total of 11 driveways to five vehicular access points, one of which currently exists opposite Lea Street on 54th Street. **Figure 2-3** displays the site plan of the proposed project.

The proposed Chollas Triangle Master Plan also contains several roadway network modifications which will be included as project features:

- *Chollas Parkway* - The Chollas Triangle Master Plan proposes the vacation of Chollas Parkway. This would result in the removal of the four-lane Chollas Parkway and elimination of the T-intersections of Chollas Parkway & University Avenue and Chollas Parkway & 54th Street. The vacation of Chollas Parkway will allow for the creation of new open space and local circulation will be facilitated by a new network of on-site streets connecting 54th Street and University Avenue.

- *Chollas Triangle Collector Street* (New Street A) - The proposed two-lane collector street will connect 54th Street and University Avenue and facilitate project access. The project proposes to form a four-legged signalized intersection at the existing Lea Street & 54th Street intersection, which is already signalized. The collector street would curve to the north, forming a proposed signalized, four-legged intersection at University Avenue opposite the existing Promise Hospital Driveway.

- *New Street B* – A new north-south, two-lane collector street will be constructed approximately 500 feet east of 54th Street connecting University Avenue to New Street A. This street is expected to provide on-street parking on both sides and be controlled with stop signs at on-site intersections. The intersection of New Street B and University Avenue is proposed to be a full access intersection and signalized.

- *New Street C* – A new east-west, two-lane collector street will be constructed approximately 540 feet south of University Avenue (at 54th Street) connecting 54th Street with New Street A. This street is expected to provide on-street parking on both sides and be controlled with stop signs at on-site intersections. The intersection of New Street C and 54th Street is proposed to be a full access intersection (except for left-turns out to 54th Street) and controlled by a stop sign on the New Street C approach.

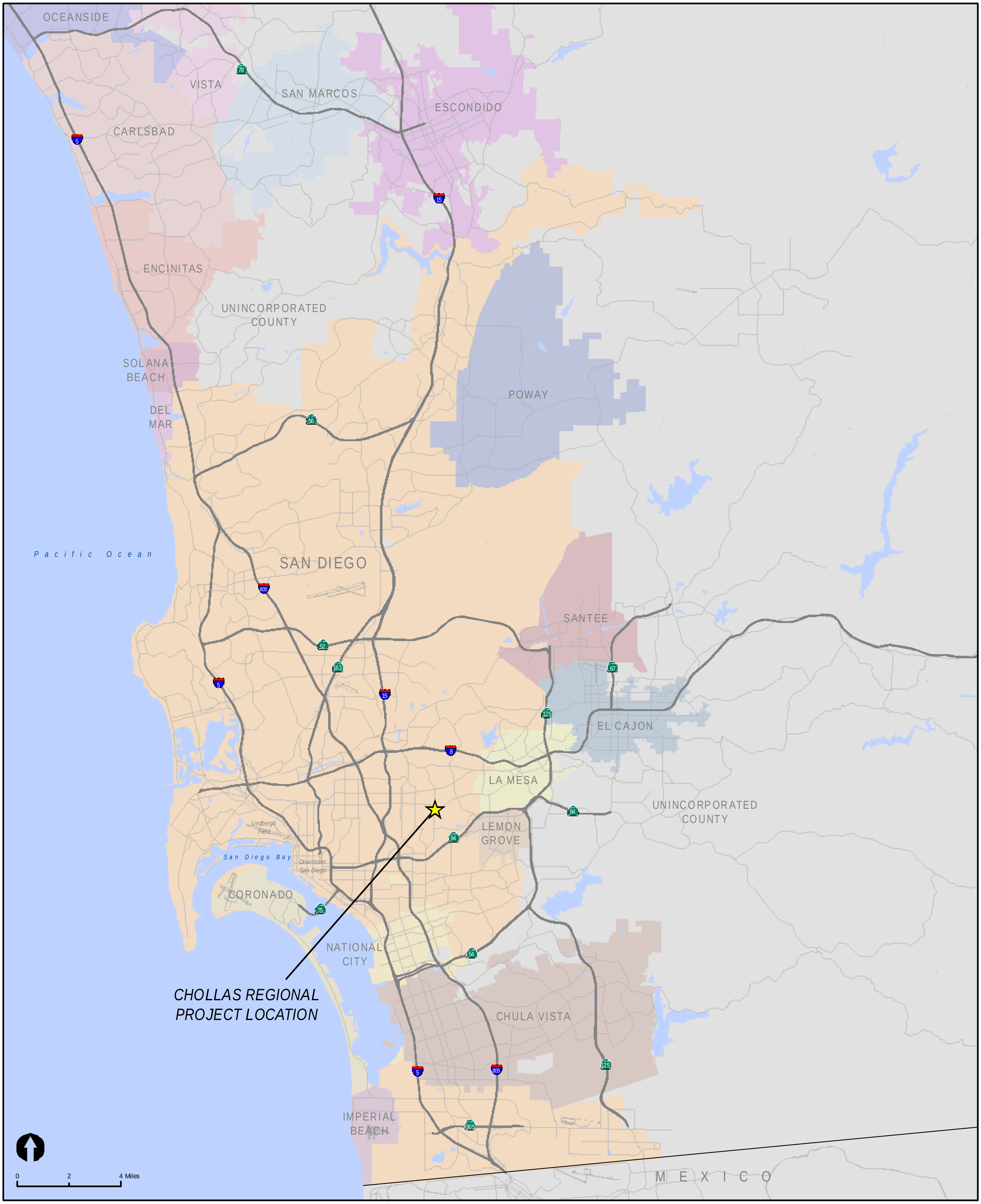


Figure **2**-1: Regional Project Location

Chollas Triangle Master Plan Traffic Impact Study

Date:11/6/2012

Source: SANDAG (2011)

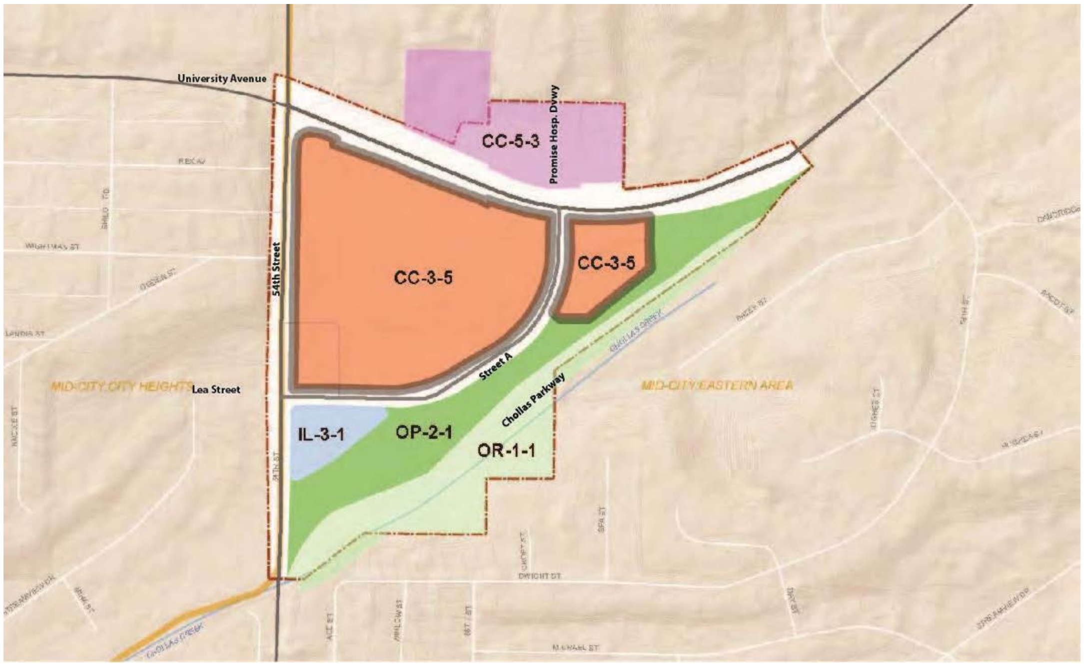


Figure 2-2
Project Zoning

- *New Street D* – A new east-west, two-lane collector street will be constructed approximately 300 feet south of University Avenue (at 54th Street) connecting 54th Street with New Street B. This street is expected to provide on-street parking on both sides and be controlled with stop signs at on-site intersections. The intersection of New Street D and 54th Street is proposed to be a right-turn only intersection and controlled by a stop sign on the New Street D approach.

2.3. REPORT ORGANIZATION

Following this introduction chapter, this report is organized into the following chapters:

Chapter 3: Existing Conditions – This chapter describes the existing roadway network within the project study area and provides analysis results for existing conditions.

Chapter 4: Study Methodology – This chapter describes the methodologies and standards utilized to analyze roadway and intersection operations.

Chapter 5: Project Description and Trip Generation – This chapter describes the proposed project including project traffic generation, trip distribution pattern, and trip assignment.

Chapter 6: Horizon Year (2035) Conditions – This chapter describes projected long-term year traffic conditions. Analysis results are provided for both with and without project conditions.

Chapter 7: Findings and Recommendations – Outlines the overall study findings and identifies recommended project-related mitigation measures.

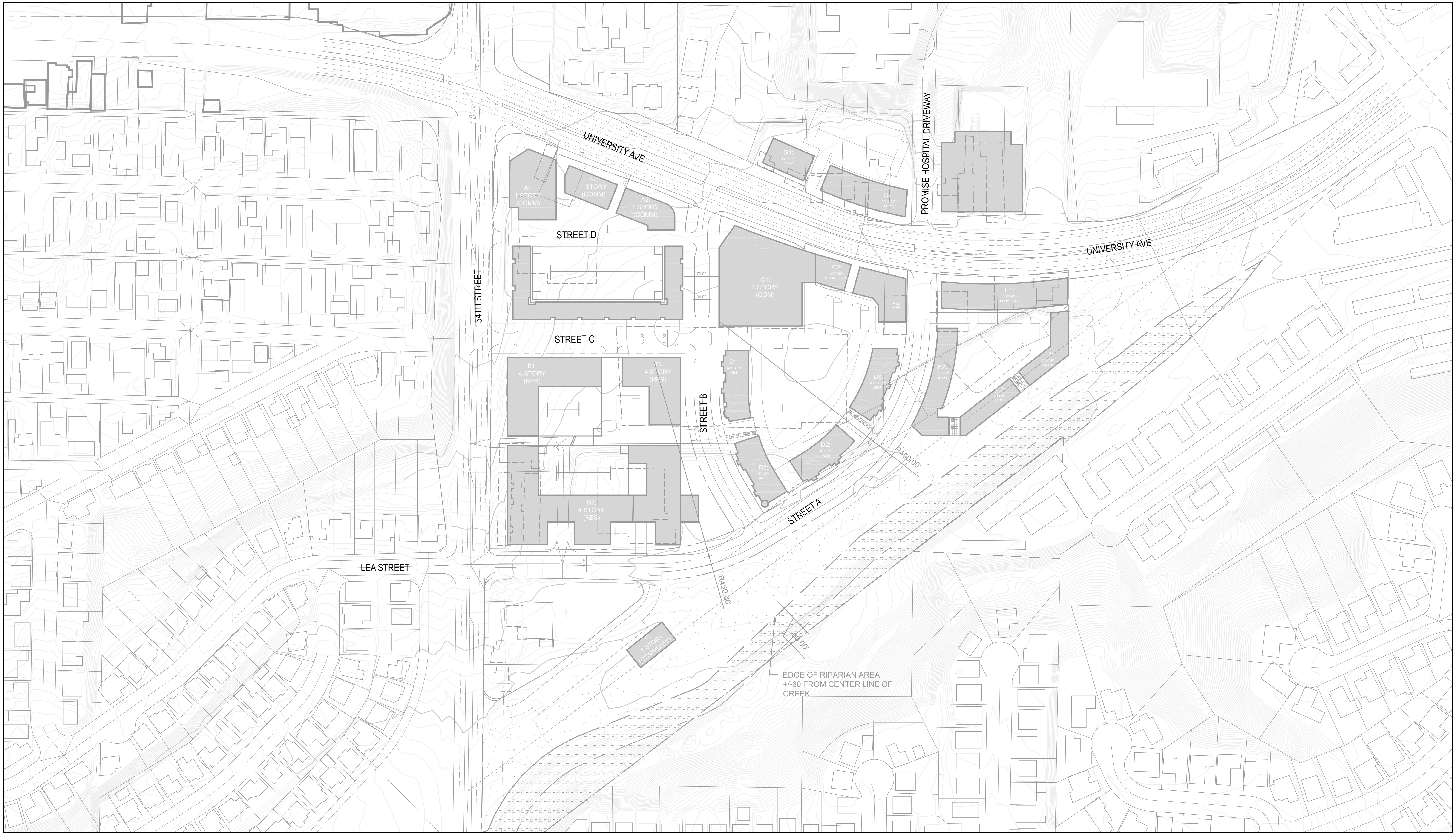


Figure **2-3**: Site Plan and Circulation

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Civitas

3. EXISTING CONDITIONS

This section describes key study area roadway segments and intersections, existing daily roadway and peak hour intersection traffic volume information, and LOS analysis results.

3.1. EXISTING ROADWAY NETWORK AND TRAFFIC VOLUMES

Major roadway facilities within the project study area include the following:

North/South Roadway Facilities

54th Street – spans between Montezuma Road to the north and Euclid Avenue to the south. Within the project study area 54th Street is a four-lane roadway divided by a raised median and has a posted speed limit of 35 mph. 54th Street is currently classified as a Class III Bike Route north of University Avenue, and on-street parking is allowed on both sides of the street along a limited number of segments. 54th Street is classified as a Four-Lane Major Street in the Mid-City Community Plan.

Euclid Avenue – spans between Monroe Avenue to the north and Home Avenue to the south. Within the project study area Euclid Avenue is a two-lane roadway divided by double yellow line and has a posted speed limit of 35 mph. Euclid Avenue currently has Class II Bike Lanes north of Monroe Avenue and allows on-street parking on both sides of the Street north of Thorn Street. Euclid Avenue is classified as a Three-Lane Collector Street in the Mid-City Community Plan; however, a median-turn lane is only provided at select major intersections such as at University Avenue or El Cajon Boulevard.

College Avenue – spans between Navajo Road to the north and Federal Boulevard to the south. Within the project study area College Avenue is a four-lane roadway divided by double yellow line north of University Avenue and has a raised median south of University Avenue. College Avenue currently has a posted speed limit of 35 mph north of University Avenue and 40 mph south of University Avenue. There are no existing bicycle facilities designated on College Avenue. On-street parking is allowed on both sides of the street north of University Avenue. In the Mid-City Community Plan, College Avenue is classified as a Four-Lane Major Street, although the section from El Cajon Boulevard to University Avenue currently operates as a Four-Lane Collector Street by definition. .

Collwood Boulevard – extends between Montezuma Road to the north and 54th Street to the south, where 54th Street is designated as the east and south legs of this latter intersection. Collwood Boulevard is a two-lane roadway with a center two-way left turn lane (TWLTL) along almost its entire length, and includes a posted speed limit of 35 mph. Existing bicycle lanes are provided on almost the entire roadway length except for: 1) a short section between Monroe Avenue and 54th Street, and 2) the northbound approach to the Montezuma Road intersection. On-street parking is allowed on both sides of the street along its entire length. Collwood Boulevard operates as a Two-Lane Collector with a TWLTL but its ultimate classification is a Four-Lane Major in the College Area Community Plan.

East/West Roadway Facilities

Montezuma Road – spans between Fairmount Avenue to the west and El Cajon Boulevard to the east. Within the project study area Montezuma Road is currently a four-lane roadway. Montezuma Road is currently divided by a raised median and has a posted speed limit of 50 mph west of Collwood Boulevard, a posted speed limit of 40 mph between Collwood Boulevard and College Avenue, and a posted speed limit of 35 mph east of College Avenue (plus a 25 mph school zone). Montezuma Road has a designated Class II Bicycle Lane and parking is prohibited on both sides of the street within the project study area. Montezuma Road is classified by the current College Area Community Plan as a Four-Lane Major Street (Access Restricted).

El Cajon Boulevard – spans between Park Boulevard to the west and Spring Street in the City of La Mesa to the east. Within the project study area El Cajon Boulevard is a four-lane roadway. El Cajon Boulevard is currently divided by a raised median near the intersection with 54th Street and double yellow lines as one travels east or west. The posted speed limit is 35 mph (plus a 25 mph school zone). El Cajon Boulevard is not designated to include bicycle facilities and parking is generally allowed on both sides of the street. El Cajon Boulevard is classified by the current Mid-City Community Plan as a Four-Lane Major Street.

University Avenue – spans between Washington Street to the west and La Mesa Boulevard to the east. Within the project study area University Avenue is currently a five-lane roadway (two-lanes WB three-lanes EB) between Chollas Parkway and College Avenue and a four-lane roadway west of Chollas Parkway and east of College Avenue. University Avenue is currently divided by a raised median between College Avenue and Winona Avenue, while other segments in the study area generally include a two-way-left-turn-lane. University Avenue has a posted speed limit of 40 mph. Parking is generally allowed on both sides of University Avenue and it is classified by the current Mid-City Community Plan as a Four or Five-Lane Major Though Street.

Chollas Parkway – spans between 54th Street to the west and University Avenue to the east. Within the project study area Chollas Parkway is currently a four-lane roadway along its entire length. Chollas Parkway is currently divided by a raised median with a posted speed limit of 45 mph, and parking is prohibited on both sides of the street. In the current Mid-City Community Plan, Chollas Parkway is planned to be reduced in width and is designated as a Two-Lane Collector. However, the Community Plan also identifies an alternative where Chollas Parkway would be partly or completely closed and Lea Street would be extended to make an east-west connection.

College Grove Drive – extends between 54th Street on the west and College Avenue on the east. Within the project study area College Grove Drive is a four-lane roadway divided by a raised median except for a painted median located between 55th Street and Chollas Station Road. College Grove Drive currently has a posted speed limit of 40 between 54th Street and Chollas Station Road, 45 mph from Chollas Station Road to College Grove Way, and 35 mph from College Grove Way to College Avenue. Bike lanes are provided along the entire length of the street except between College Grove Way and College Avenue. On-street parking is only allowed on the north side of the street between 55th Street and the entrance to the east parking lot at Chollas Lake. In the Mid-City Community Plan, College Grove Drive is planned to have a reduced width and operate as a Three-Lane Collector Street (i.e., one lane in each direction with a TWLTL), although the street currently operates as a Four-Lane Collector Street by definition. .

Streamview Drive – extends between 54th Street on the west and College Avenue on the east. Within the project study area Streamview Drive is a two-lane roadway divided by a raised median (that varies in width from 24 to 54 feet) or angled parking in the median from east of the Michael-Lynn Street intersection to west of Gayle Street. Streamview Drive currently has a posted speed limit of 25 mph. No separate bike facilities are provided, but MTS bus service operates on this street. In addition to the diagonal parking in some median areas, on-street parking is allowed on the curb on both sides of the street. In the Mid-City Community Plan, Streamview Drive is designated as a Two-Lane Collector.

Figure 3-1 displays the existing roadway and intersection geometry for all key study roadway facilities, as well as the existing Average Daily Traffic (ADT) volumes for the study area roadway segments and AM / PM peak hour traffic volumes for the key study area intersections. Study area roadway segment and intersection counts were conducted in November/December 2011 and May 2012. Count worksheets are provided in **Appendix A**.

3.2. EXISTING TRAFFIC OPERATIONS

LOS analyses of existing conditions were conducted using the methodologies described in Chapter 4.0. Roadway segment and intersection LOS results are discussed separately below.

Roadway Segment Analysis

Table 3.1 displays the LOS analysis results for the key study area roadway segments under existing conditions.

As shown in Table 3.1, all key study area roadway segments are currently operating at LOS D or better based on their existing function with the exception of the following segments:

1. Montezuma Road between Collwood Boulevard and Fairmount Avenue (LOS F)
2. Collwood Boulevard between Montezuma Road and 54th Street (LOS F)

TABLE 3.1
ROADWAY SEGMENT LOS RESULTS- EXISTING CONDITIONS

No.	Street	Segment	Existing Street Classification	Daily Traffic Count	LOS E Threshold	V/C	Existing LOS
1	Montezuma Rd	Fairmount Ave to Collwood Bl	4-Lane Major	**49,575**	**40,000**	**1.239**	**F**
2	Collwood Blvd	Montezuma Rd to 54th St	2-Lane Collector(w TWLTL[1])	**24,178**	**15,000**	**1.612**	**F**
3	54th St	El Cajon Blvd to Trojan Ave	4-Lane Major	22,215	40,000	0.555	C
4		Trojan Ave to University Ave	4-Lane Major	24,842	40,000	0.621	C
5		University Ave to Chollas Pkwy	4-Lane Major	17,387	40,000	0.435	B
6		Streamview Dr to Redwood St	4-Lane Major	19,482	40,000	0.487	B
7		College Grove Dr to Euclid Ave	4-Lane Major	19,142	40,000	0.479	B
8	College Ave	El Cajon Blvd to University Ave	4-Lane Collector	22,604	30,000	0.753	D
9		University Ave to Streamview Dr	4-Lane Major	23,579	40,000	0.589	C
10	University Ave	Euclid Ave to Winona Ave	4-Lane Collector	18,905	30,000	0.630	C
11		52nd St to 54th St	4-Lane Major	27,361	40,000	0.684	C
12		54th St to 58th St	4-Lane Collector	23,126	30,000	0.771	C
13		58th St to College Ave	5-Lane Major	21,675	45,000	0.482	B
14		College Avenue to Rolando Bl	4-Lane Collector (w TWLTL)	17,410	30,000	0.580	C
15		Rolando Bl to Aragon Dr	4-Lane Collector (w TWLTL)	15,689	30,000	0.523	C
16	Chollas Pkwy	54th St to University Ave	4-Lane Collector	4,616	30,000	0.154	A

Source: Fehr & Peers, June 2013

Notes:
1. TWLTL = Two-way left-turn lane in center of roadway.

Bold letters indicate facilities operating at LOS E or worse

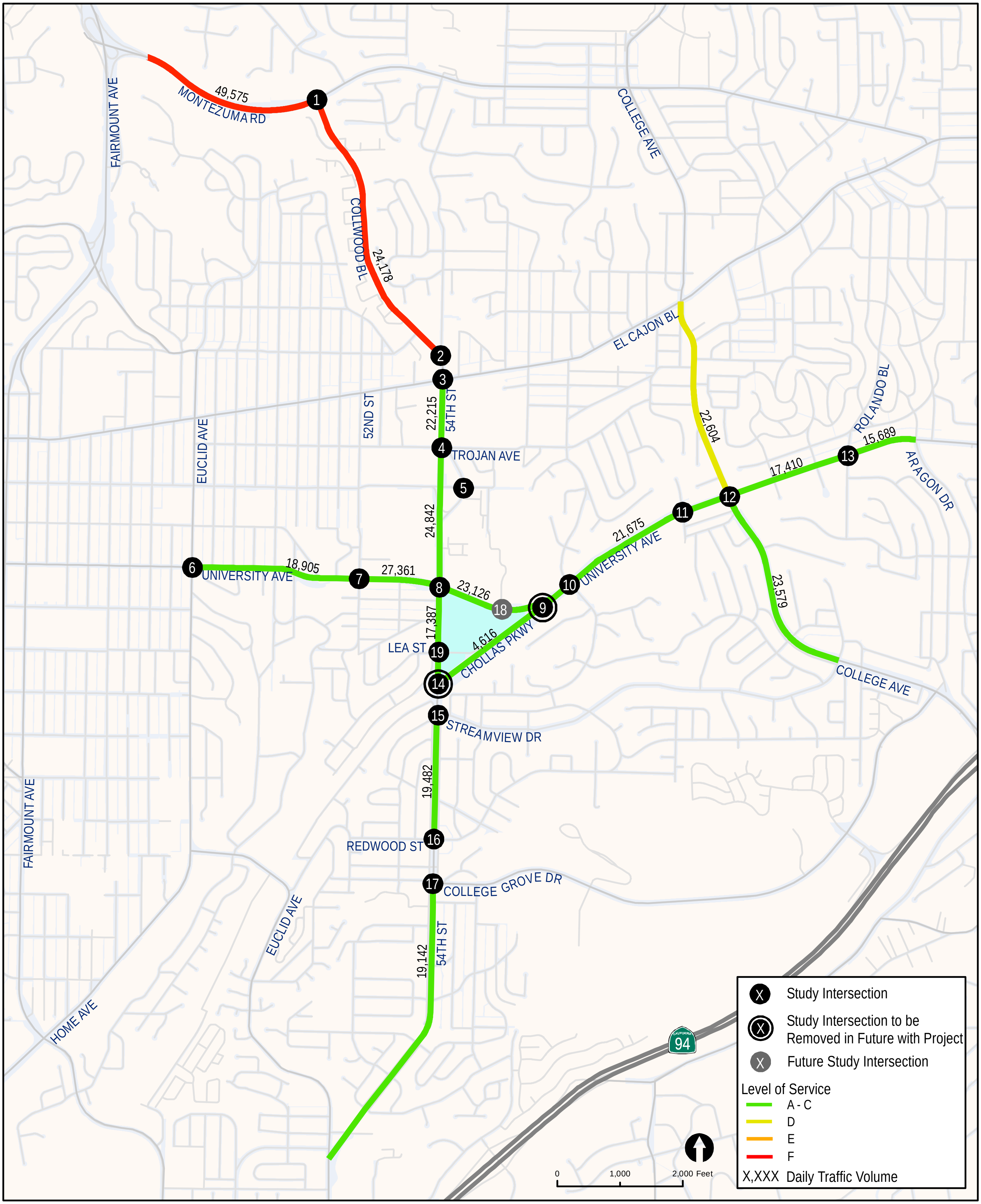
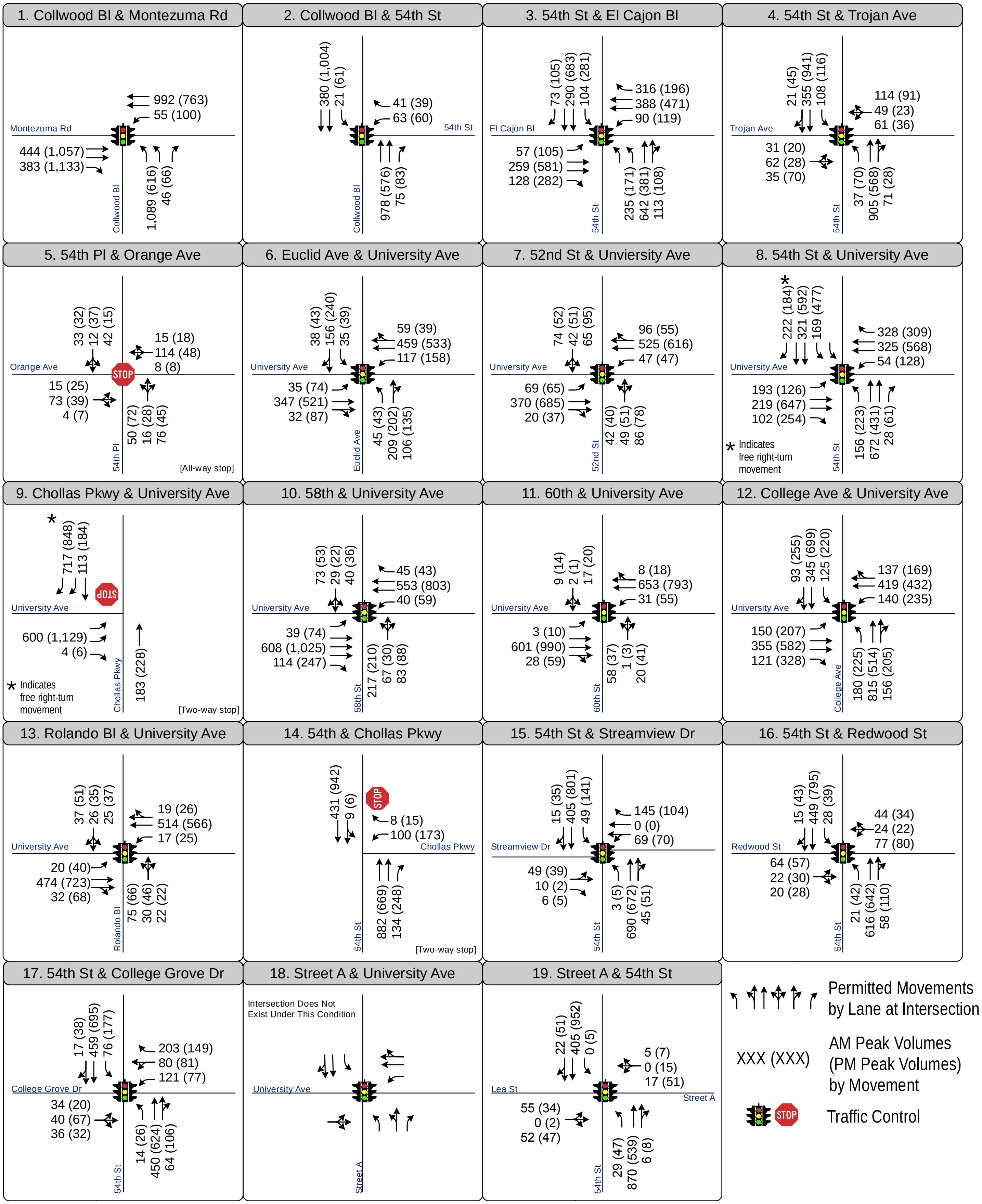


Figure 3-1: Roadway Traffic Volumes - Existing Conditions

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)
Page 1 of 2



Intersection Geometry and Traffic Volumes - Existing Conditions

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)
Page 2 of 2

Intersection Analysis

Table 3.2 displays intersection LOS and average vehicle delay results for the key study area intersections under Existing conditions. All study area intersections are currently signalized unless otherwise noted. LOS calculation worksheets for Existing conditions are provided in **Appendix B**.

TABLE 3.2
PEAK HOUR INTERSECTION LOS RESULTS – EXISITING CONDITIONS

No.	Intersection	AM		PM	
		Delay (sec)	LOS	Delay (sec)	LOS
1	Collwood Boulevard & Montezuma Road	29.4	C	21.5	C
2	Collwood Boulevard & 54th Street	12.4	B	10.7	B
3	54th Street & El Cajon Boulevard	41.4	D	38.8	D
4	54th Street & Trojan Avenue	25.7	C	16.4	B
5	54th Street & Orange Avenue [a]	12.8	B	8.2	A
6	Euclid Avenue & University Avenue	20.5	C	26.5	C
7	52nd Street & University Avenue	21.6	C	23.7	C
8	54th Street & University Avenue	32.1	C	30.4	C
9	Chollas Parkway & University Avenue [b]	28.5	D	**>200**	**F**
10	58th Street & University Avenue	20.6	C	21.5	C
11	60th Street & University Avenue	8.3	A	8.2	A
12	College Avenue & University Avenue	36.2	D	**57.1**	**E**
13	Rolando Boulevard & University Avenue	11.2	B	13.5	B
14	54th Street & Chollas Parkway [b]	**42.9**	**E**	**117.1**	**F**
15	54th Street & Streamview Drive	17.2	B	17.3	B
16	54th Street & Redwood Street	13.4	B	12.1	B
17	54th Street & College Grove Drive	23.8	C	26.4	C
19	54th Street & Lea Street	8.0	A	10.8	B

Source: Fehr & Peers, June 2013

Notes:
[a] Intersection is all-way stop-controlled
[b] Intersection is side-street stop-controlled
Bold letters indicate facilities operating at LOS E or worse

As shown above, all key study area intersections are currently operating at LOS D or better with the exception of the following:

9. Chollas Parkway & University Avenue (LOS F - PM Peak)
12. College Avenue & University Avenue (LOS E - PM Peak)
14. 54th Street & Chollas Parkway (LOS E – AM Peak, LOS F – PM Peak)

3.3. EXISTING PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian facilities include, but are not limited to, sidewalks and paths, striped crosswalks, and pedestrian display heads at signalized intersections. The site frontage includes a concrete sidewalk along the entire length of both sides of 54th Street and on both sides of University Avenue except for a short 280-foot segment on the south side of the street just west of the Chollas Parkway intersection. In addition, no sidewalks are provided on either side of Chollas Parkway immediately adjacent to the site, although an informal walking path is visible on the south side of Chollas Parkway. This path eventually connects to a 400-foot section of sidewalk on University Avenue west of 58th Street. Because of the layout of the University Avenue/Chollas Parkway intersection and the overall lack of sidewalks, no convenient pedestrian crossing point of either street is provided near this intersection. This existing configuration makes pedestrian access to and from University Avenue to the east challenging in that the only controlled crossing point west of 58th Street is at the University Avenue/54th Street intersection approximately 2,200 feet away. This signalized intersection includes pedestrian heads and striped crosswalks.

Beyond the immediate site frontage, a sidewalk is provided on both sides of University Avenue east of 58th Street and on 54th Street north of University Avenue. On 54th Street south of Lea Street to Chollas Parkway, narrow asphalt paths are provided on both sides of the street, but do not appear to meet Americans with Disabilities Act (ADA) requirements. At several points, the available sidewalk width is less than 36 inches wide because of light standards or utility poles.

Observations near the site showed that jaywalking occurs on the east and south legs of the University Avenue/54th Avenue intersection because of the bus transit stops that are located 150 feet to 250 away from the intersection crosswalks. Some patrons of the existing site development do not use the signalized crosswalks and avoid the more circuitous path to get to the stops.

Bicycle facilities include separate paths, lanes, and routes in addition to storage facilities. In the immediate vicinity of the project site, the only bike lanes are provided on 54th Street and are discontinuous in that the lanes do not extend through all intersections (e.g., northbound through the University Avenue intersection) or do not exist (e.g., northbound between Chollas Parkway and Lea Street). Further from the site, bicycle lanes are provided on Collwood Boulevard, Montezuma Road, portions of 54th Street, and most of College Grove Avenue.

3.4. EXISTING TRANSIT SERVICE

The project site is served by three bus routes operated by the Metropolitan Transit System (MTS): Route 7, Route 10 and Route 955. The closest stops are located in both directions on University Avenue east of 54th Street and on southbound 54th Street south of University Avenue. A brief description of each route presented below and detailed schedules with additional route information are provided in **Appendix C.**

> **Route 7**—Route 7 provides east-west service between Downtown and La Mesa by way of University Avenue. The route connects Horton Plaza with City College, Balboa Park, the San Diego Zoo, City Heights Transit Plaza, and the Joan Kroc Center in La Mesa. This route operates seven days a week.
>
> **Route 10**—Route 10 provides east-west, limited stops, service between Old Town and the University Avenue/College Avenue intersection by way of University Avenue. The route terminates at the Old Town Transit Center and connects to Hillcrest, North Park, and City Heights. This route operates seven days a week.
>
> **Route 955**—Route 955 provides north-south service between the 8th Street Trolley station and the SDSU Transit Center. The route connects the 8th Street Trolley station with the Euclid Avenue Trolley station and the SDSU transit center via 43rd Street and 54th Street. This service operates seven days a week.

3.5. EXISTING PARKING SUPPLY

Parking is provided for all uses on the site and is generally segregated by use, except for the two largest uses on the site that share spaces in the largest lot area. While a detailed parking study was not conducted for existing uses, the overall supply is adequate based on anecdotal information and a substantial surplus of parking is typically available.

4. STUDY METHODOLOGY

The traffic analyses prepared for this study were performed in accordance with City of San Diego requirements and the enhanced California Environmental Quality Act (CEQA) project review process. Detailed information on roadway segment, as well as, intersection analysis methodologies, standards, and thresholds are discussed in the following sections.

4.1. ROADWAY SEGMENT LEVEL OF SERVICE STANDARDS AND THRESHOLDS

Roadway segment Level of Service (LOS) standards and thresholds provide the basis for analysis of arterial roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. The City of San Diego's roadway classifications, levels of service, and average daily traffic thresholds for level of service are provided in table two of the city's *Traffic Impact Study Manual* (1998). The roadway segment capacity and LOS standards utilized to analyze roadways evaluated in this report is contained in **Appendix D**.

These standards are generally used as planning guidelines to determine the classification of roadways. The actual capacity of a roadway facility varies according to its physical attributes. Typically, the performance and LOS of a roadway segment is heavily influenced by the ability of its intersections to accommodate peak hour traffic volumes. For the purposes of this traffic analysis, LOS D is considered acceptable for circulation element roadway segments.

4.2. PEAK HOUR INTERSECTION LOS STANDARDS AND THRESHOLDS

This section presents the methodologies used to perform peak hour intersection capacity analysis, including both signalized and unsignalized intersections. The following assumptions were utilized in conducting all intersection LOS analyses according to Highway Capacity Manual methodology:

- *Pedestrian Calls per Hour:* Based on existing pedestrian count data. Where data was not available, 10 calls per hour for each pedestrian movement was assumed.
- *Heavy Vehicle Factor:* A 2% heavy vehicle factor was assumed for all intersections within the study area.
- *Signal Timing:* Based on existing City signal timing plans (as of July 2011)
- *Peak Hour Factor:* Based on existing peak hour count data

Signalized Intersection Analysis

The analysis of signalized intersections utilized the operational analysis procedures as outlined in the *2000 Highway Capacity Manual (HCM), Transportation Research Board Special Report 209*. This method defines LOS in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time. This technique uses 1,900 vehicles per hour per lane (VPHPL) as the maximum saturation volume of an intersection. This saturation volume is adjusted to account for lane width, on-street parking, pedestrians, traffic composition (i.e., percentage trucks) and shared lane movements (i.e. through and right-turn movements originating from the same lane). The LOS criteria used for this technique are described in **Table 4.1**. The computerized analysis of intersection operations was performed utilizing the *SYNCHRO 6.0* traffic analysis software.

TABLE 4.1
SIGNALIZED INTERSECTION LOS CRITERIA

Average Stopped Delay Per Vehicle (seconds)	LOS Characteristics
<10.0	*LOS A* describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
10.1 – 20.0	*LOS B* describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
20.1 – 35.0	*LOS C* describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
35.1 – 55.0	*LOS D* describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
55.1 – 80.0	*LOS E* is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80.0	*LOS F* describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Highway Capacity Manual 2000, TRB Special Report 209

Unsignalized Intersection Analysis

Unsignalized intersections, including two-way and all-way stop controlled intersections, were analyzed using the 2000 Highway Capacity Manual (Section 10) unsignalized intersection analysis methodology. The *SYNCHRO 6.0* Traffic Analysis software supports this methodology and was utilized to produce LOS results. The LOS for a two-way stop controlled (TWSC) intersection is determined by the computed control delay and is defined for each minor movement. **Table 4.2** summarizes the LOS criteria for unsignalized intersections. The City of San Diego considers LOS D or better during the AM and PM peak hours to be acceptable for intersection LOS.

TABLE 4.2
UNSIGNALIZED INTERSECTION LOS CRITERIA

Average Control Delay (sec/veh)	LOS
<u><</u>10	A
>10 and <u><</u>15	B
>15 and <u><</u>25	C
>25 and <u><</u>35	D
>35 and <u><</u>50	E
>50	F

Highway Capacity Manual 2000, TRB Special Report 209

4.3. DETERMINATION OF SIGNIFICANT IMPACTS

The *City of San Diego Significance Determination Thresholds, January 2011* defines project impact thresholds corresponding to the type of facility. These thresholds are generally based upon an acceptable increase in the Volume / Capacity (V/C) ratio for roadway and freeway segments, and upon increases in vehicle delays for intersections and ramps.

In the City of San Diego, LOS D is considered acceptable for roadway and intersection operations. **Table 4.3** summarizes the impact significant thresholds as identified by the City of San Diego beyond which mitigation measures are required.

TABLE 4.3
MEASURE OF SIGNIFICANT PROJECT TRAFFIC IMPACTS

LOS with Project*	Allowable Change Due to Impact**					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec)	Delay (min.)
LOS E (or ramp meter delays above 15 min.)	0.010	1.0	0.02	1.0	2.0	2.0
LOS F (or ramp meter delays above 15 min.)	0.005	0.5	0.01	0.5	1.0	1.0

Source: *City of San Diego, Significance Determination Thresholds, January 2011*

Note 1: The allowable increase in delay at a ramp meter with more than 15 minutes id delay and freeway LOS E is 2 minutes.
Note 2: The allowable increase in delay at a ramp meter with more than 15 minutes id delay and freeway LOS F is 1 minute.

* All LOS measurements are based upon HCM procedures for peak-hour conditions. However, vehicle to capacity (V/C) ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2.1 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

** If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigation (within the Traffic Impact Study report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see above * note), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

Impacts to pedestrians, bicyclists and transit patrons are evaluated differently than for vehicles. In general, multi-modal impacts are identified when implementation of the proposed project would result in one of the following conditions:

- Conflicts with an existing or planned bicycle, pedestrian or transit facility or service, or results in the addition of a substantial number of pedestrians, bicyclists and/or transit patrons that would require modification of existing or planned multi-modal facilities or services.

5. PROJECT DESCRIPTION AND TRIP GENERATION

This section describes the proposed Chollas Triangle Master Plan including the proposed land uses, estimated trip generation, trip distribution, and trip assignment.

5.1. PROJECT DESCRIPTION

The proposed project is located in the City of San Diego in the Eastern Area neighborhood of the Mid-City Community Plan Area. The project area is bound by 54th Street to the west, University Avenue to the north, and Chollas Parkway to the east and south, with a small area north of University Avenue. **Figure 5-1** illustrates the location of the proposed project within the greater study area, as well as the number of travel lanes on each segment and the primary traffic control device (i.e., signal or stop sign(s)) at each location.

The project proposes to redevelop the existing Chollas Triangle site, which currently includes a service station, anchor retail, several smaller commercial establishments and the Teen Challenge Center. The project proposes to develop a set of mixed land uses which include approximately 130,000 square feet of neighborhood commercial uses, 486 multi-family dwelling units, and 5.5 acres of passive park uses. The proposed project would continue to take access via driveways located on 54th Street and University Avenue but will consolidate the number of access points add two new traffic signals on University Avenue. The project site plan was previously provided in **Figure 2-3.**

5.2. PROJECT TRIP GENERATION

Project trip generation estimates were derived utilizing the *City of San Diego Land Development Code – Trip Generation Manual, May 2003*. **Table 5.1** displays the projected cumulative trip generation for the proposed project, which presents the traffic volumes that would be added to the roadway system at the study intersections that are not immediately adjacent to the project site. These trips exclude pass-by trips to the commercial uses, which are those trips that will be made to and from the site by traffic that is already passing by the site.

TABLE 5.1
CUMULATIVE PROJECT TRIP GENERATION

				AM Peak					PM Peak				
Land Use	**Units**	**Trip Rate**	**ADT**	**%**	**Trips**	**Split**	**In**	**Out**	**%**	**Trips**	**Split**	**In**	**Out**
Proposed Project Land Uses													
Multi-Family Residential	486 DU	8/DU	3,888	8	311	2:8	62	249	10	389	7:3	272	117
Neighborhood Commercial	130 KFS	72/KSF	9,360	4	375	6:4	225	150	11	1,030	5:5	515	515
Undeveloped Park	5.5 Acre	5/acre	28	4	2	5:5	1	1	8	2	5:5	1	1
Sub-Total			*13,276*		*688*		*288*	*400*		*1,421*		*788*	*633*
Existing Land Uses to be Removed													
Multi-Family Residential	7 DU	8/DY	56	8	5	2:8	1	4	10	6	7:3	4	2
Other Group Quarters	26 KFS	3/KSF	78	7	5	6:4	3	2	7	5	4:6	2	3
Community Commercial	116 KFS	49/KSF	5,684	3	170	6:4	102	68	10	568	5:5	284	284
Service Station	8 Pump	30/Pump	240	8	20	5:5	10	10	8	20	5:5	10	10
Sub-Total			*6,058*		*200*		*116*	*84*		*599*		*300*	*299*
Net New Project Trips			**7,218**		**488**		**172**	**316**		**822**		**488**	**334**

Source: City of San Diego Land Development Code – Trip Generation Manual, May 2003

As shown, the land uses described above included as part of the proposed project, in combination with the removal of existing uses, are anticipated to generate 7,218 daily vehicle trips, including 488 trips during the AM peak hour (172-in/316-out) and 822 trips during the PM peak hour (488-in/334-out).

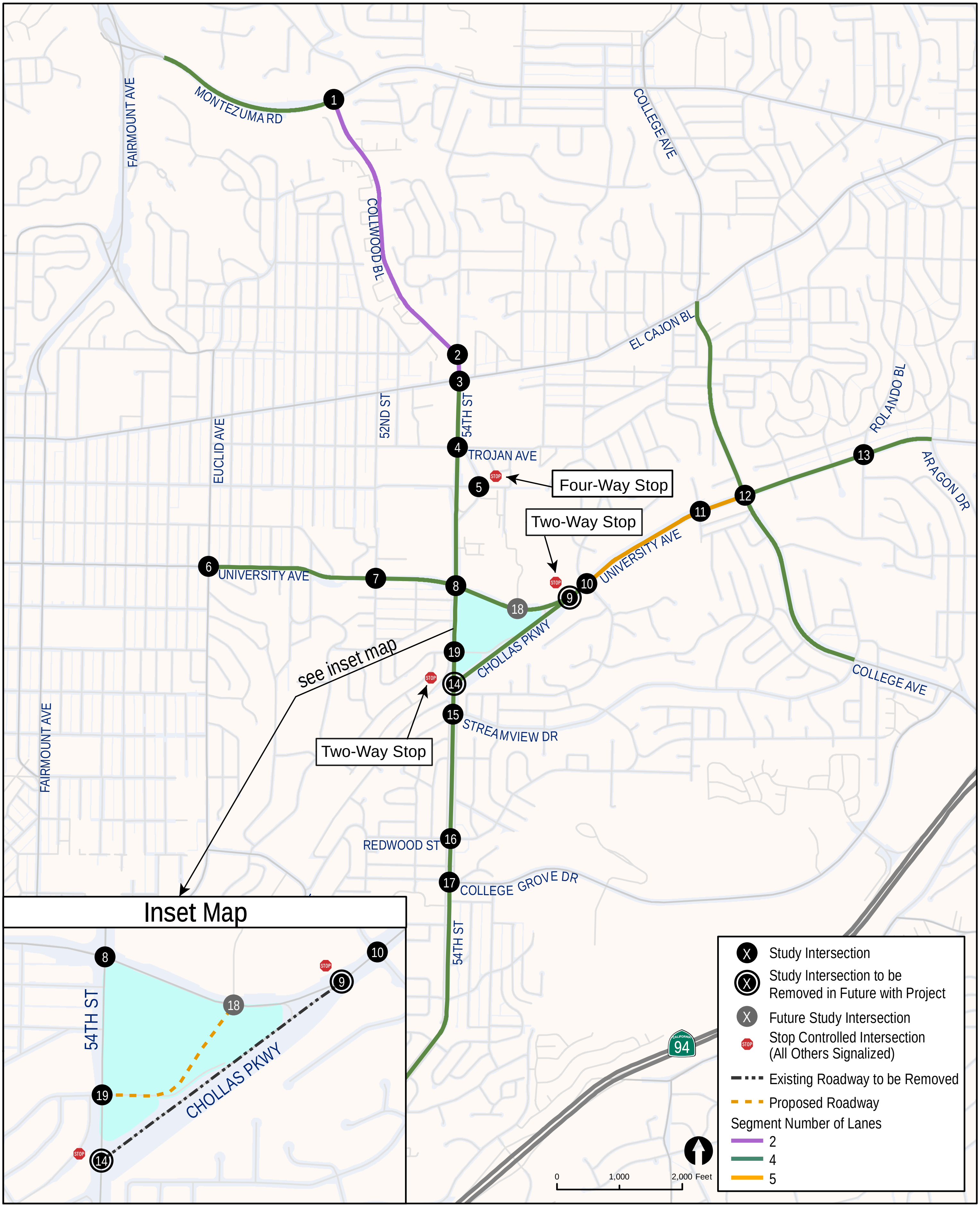


Figure 5-1: Chollas Triangle Study Area and Key Intersections

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)

For the analysis of the site driveways, pass-by trips need to be included in the total project trip generation to ensure that all site-generated traffic is accounted for. The projected driveway trip generation is presented in **Table 5.2** and was used to analyze operations at intersections immediately adjacent to the site.

TABLE 5.2
DRIVEWAY PROJECT TRIP GENERATION

Land Use	Units	Trip Rate	ADT	AM Peak					PM Peak				
				%	Trips	Split	In	Out	%	Trips	Split	In	Out
Proposed Project Land Uses													
Multi-Family Residential	486 DU	8/DU	3,888	8	311	2:8	62	249	10	389	7:3	272	117
Neighborhood Commercial	130 KFS	120/KSF	15,600	4	624	6:4	374	250	11	1,716	5:5	858	858
Undeveloped Park	5.5 Acre	5/acre	28	4	2	5:5	1	1	8	2	5:5	1	1
Sub-Total			*19,516*		*936*		*437*	*499*		*2,107*		*1,131*	*976*
Existing Land Uses to be Removed													
Multi-Family Residential	7 DU	8/DY	56	8	5	2:8	1	4	10	6	7:3	4	2
Other Group Quarters	26 KFS	3/KSF	78	7	5	6:4	3	2	7	5	4:6	2	3
Community Commercial	116 KFS	70/KSF	8,120	3	244	6:4	146	97	10	812	5:5	406	406
Service Station	8 Pump	150/Pump	1,200	8	96	5:5	48	48	8	96	5:5	48	48
Sub-Total			*9,454*		*350*		*198*	*151*		*919*		*460*	*459*
Net New Project Trips			**10,062**		**587**		**239**	**348**		**1,188**		**671**	**517**

5.3. PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Project Trip Distribution

The project trip distribution was developed based upon a SANDAG Series 12 select Zone assignment as well as input from City staff. **Figure 5-2** displays the assumed project trip distribution. Outputs from the select zone assignment are provided in **Appendix E.**

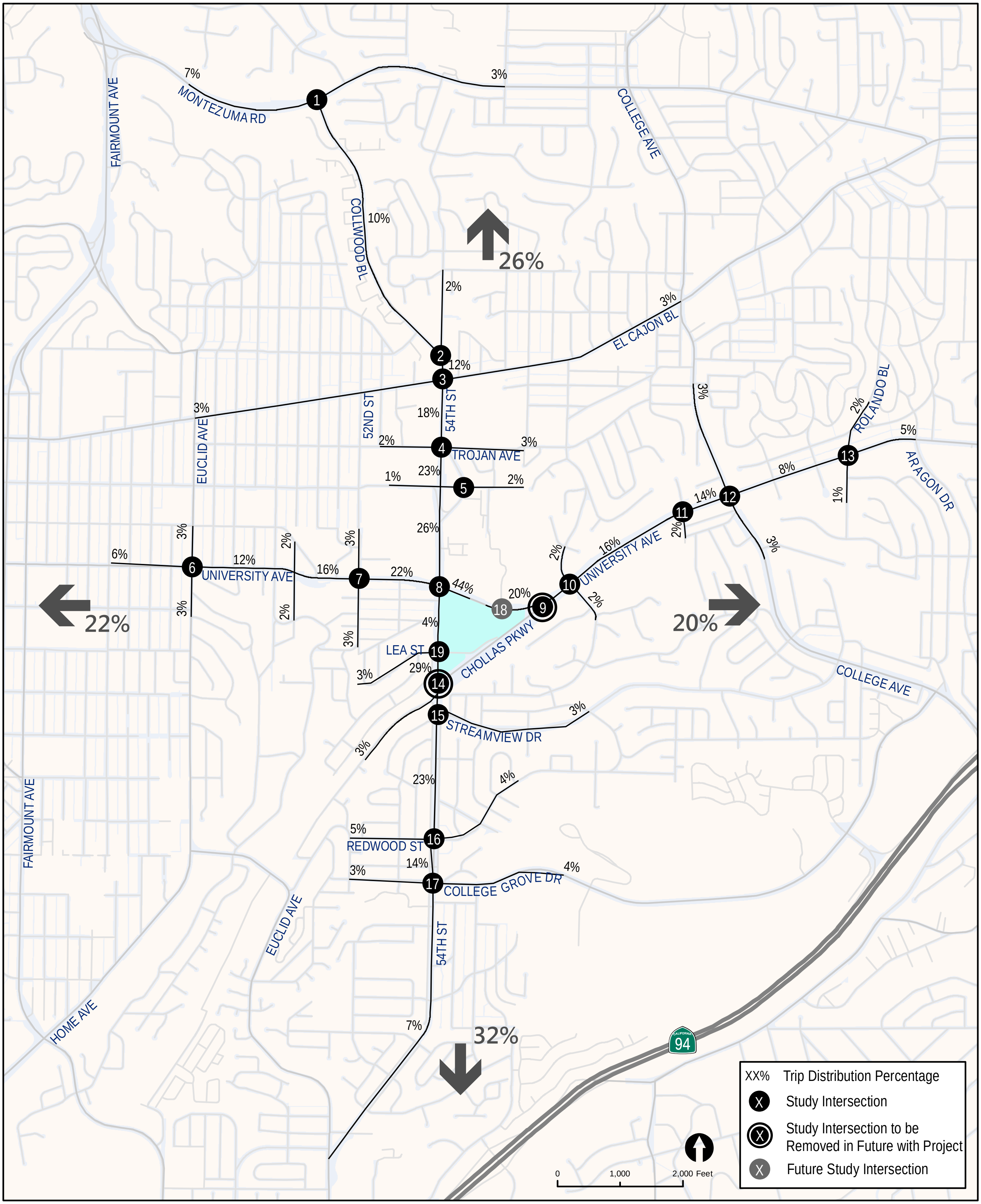


Figure 5-2: Trip Distribution

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012

Source: Fehr & Peers (2011)

FEHR & PEERS

Project Trip Assignment
Based upon the daily and AM/PM peak hour project trip generation along with the assumed trip distribution, project trips were assigned to the adjacent roadway network, as displayed in **Figure 5-3**.

5.4. PROJECT STUDY AREA

The project study area was determined based upon the City of San Diego Traffic Impact Study guidelines as well as the SANTEC/ITE guidelines. Based on the methodologies outlined in these guidelines all intersections and roadway segments in which the proposed project is anticipated to add 50 or more peak hour trips was included as part of this analysis.

The major components of the project include neighborhood-commercial and residential land uses. Based on the nature of the commercial uses and various neighborhood and regional-commercial developments in the area, it is anticipated that the majority of retail project trips will be drawn from the local community. The analyzed land uses would have a limited regional draw and shopping opportunities such as Marketplace at the Grove Shopping Center, Metropolitan Shopping Center, University Square, Boulevard Mart Shopping Center, Campus Plaza Shopping Center, Lemon Grove Plaza Shopping Center, and retail shopping opportunities along University Avenue, El Cajon, and near Fairmount Avenue & Mission Gorge Road highlight the local nature of this commercial center.

The availability of so many shopping destinations indicates there is also a sizeable work-force in the area, and this is only when considering retail shopping opportunities. While there are likely to be residents who are employed in traditional employment centers such as downtown San Diego, there are several other commercial or industrial areas near the project site that are accessible such as Federal Boulevard, Market Street, College Grove Drive, Mission Gorge/Friars Road, San Diego State University, various hospitals, and employment opportunities along University Ave and El Cajon Boulevard. Additionally, during the peak hours the residential trips account for up to about half of the estimated net new trip generation. Based on the diversity of available land uses and composition of the trip generation estimates it is projected that fewer than 20 trips would utilize a freeway ramp in the area.

The following 16 roadway segments were identified for study:

1. Montezuma Road, between Fairmount Avenue & Collwood Boulevard
2. Collwood Boulevard, between Montezuma Road & 54th Street
3. 54th Street, between El Cajon Boulevard & Trojan Avenue
4. 54th Street, between Trojan Avenue & University Avenue
5. 54th Street, between University Avenue & Chollas Parkway
6. 54th Street, between Streamview Drive & Redwood Street
7. 54th Street, between College Grove Drive & Euclid Avenue
8. College Avenue, between El Cajon Boulevard & University Avenue
9. College Avenue, between University Avenue & Streamview Drive
10. University Avenue, between Euclid Avenue & 52nd Street
11. University Avenue, between 52nd Street & 54th Street
12. University Avenue, between 54th Street & 58th Street
13. University Avenue, between 58th Street & 60th Street
14. University Avenue, between College Avenue & Rolando Boulevard
15. University Avenue, between Rolando Boulevard to Aragon Drive
16. Chollas Parkway, between 54th Street & University Avenue

The following 18 key intersections were identified for study:

1. Collwood Boulevard & Montezuma Road
2. Collwood Boulevard & 54th Street
3. 54th Street & El Cajon Boulevard
4. 54th Street & Trojan Avenue
5. 54th Street & Orange Avenue (all-way stop-controlled)
6. Euclid Avenue & University Avenue
7. 52nd Street & University Avenue
8. 54th Street & University Avenue
9. Chollas Parkway & University Avenue (side-street stop-controlled)
10. 58th Street & University Avenue
11. 60th Street & University Avenue
12. College Avenue & University Avenue
13. Rolando Boulevard & University Avenue
14. 54th Street & Chollas Parkway (side-street stop-controlled)
15. 54th Street & Streamview Drive
16. 54th Street & Redwood Street
17. 54th Street & College Grove Drive
18. 54th Street & Lea Street

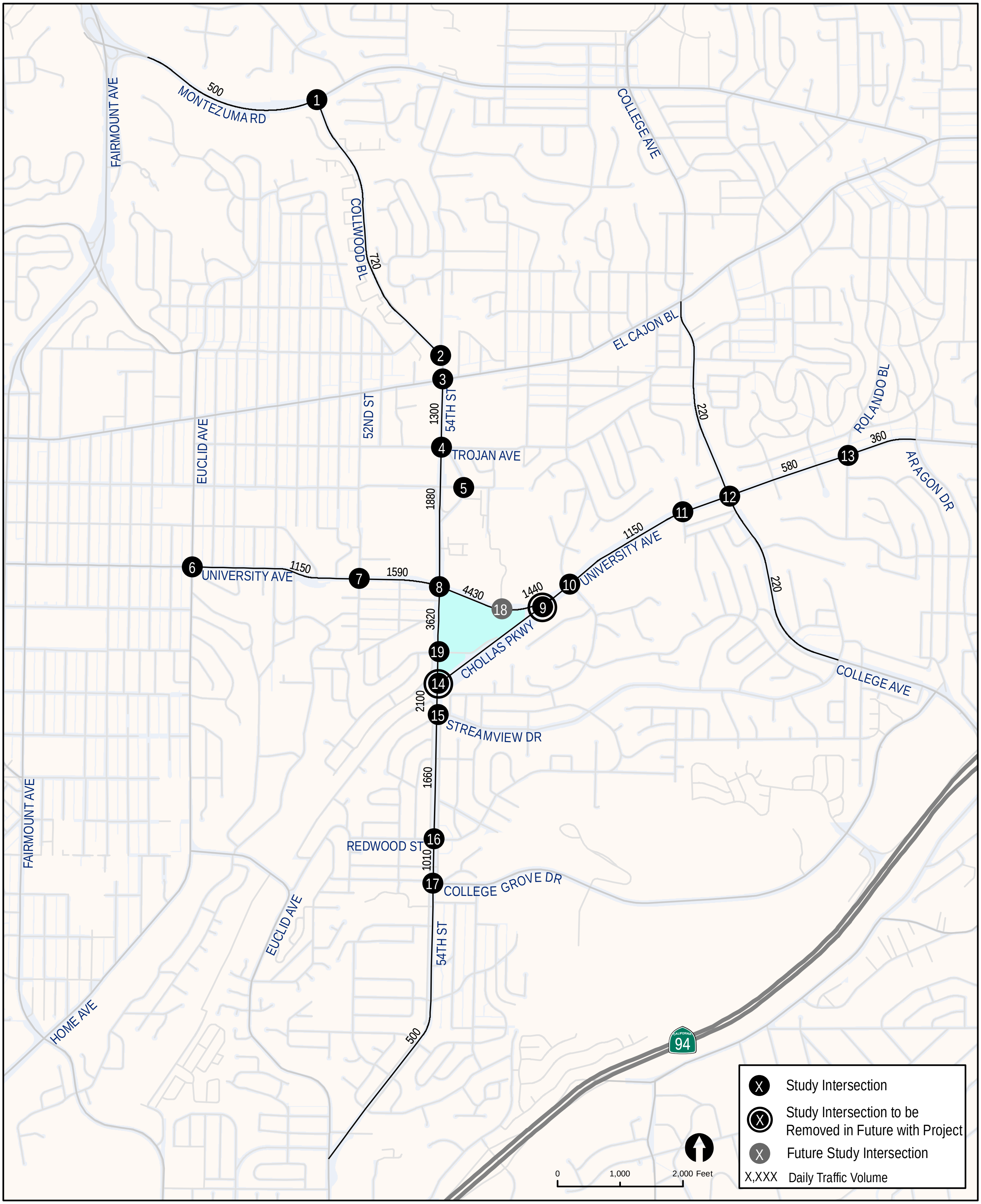
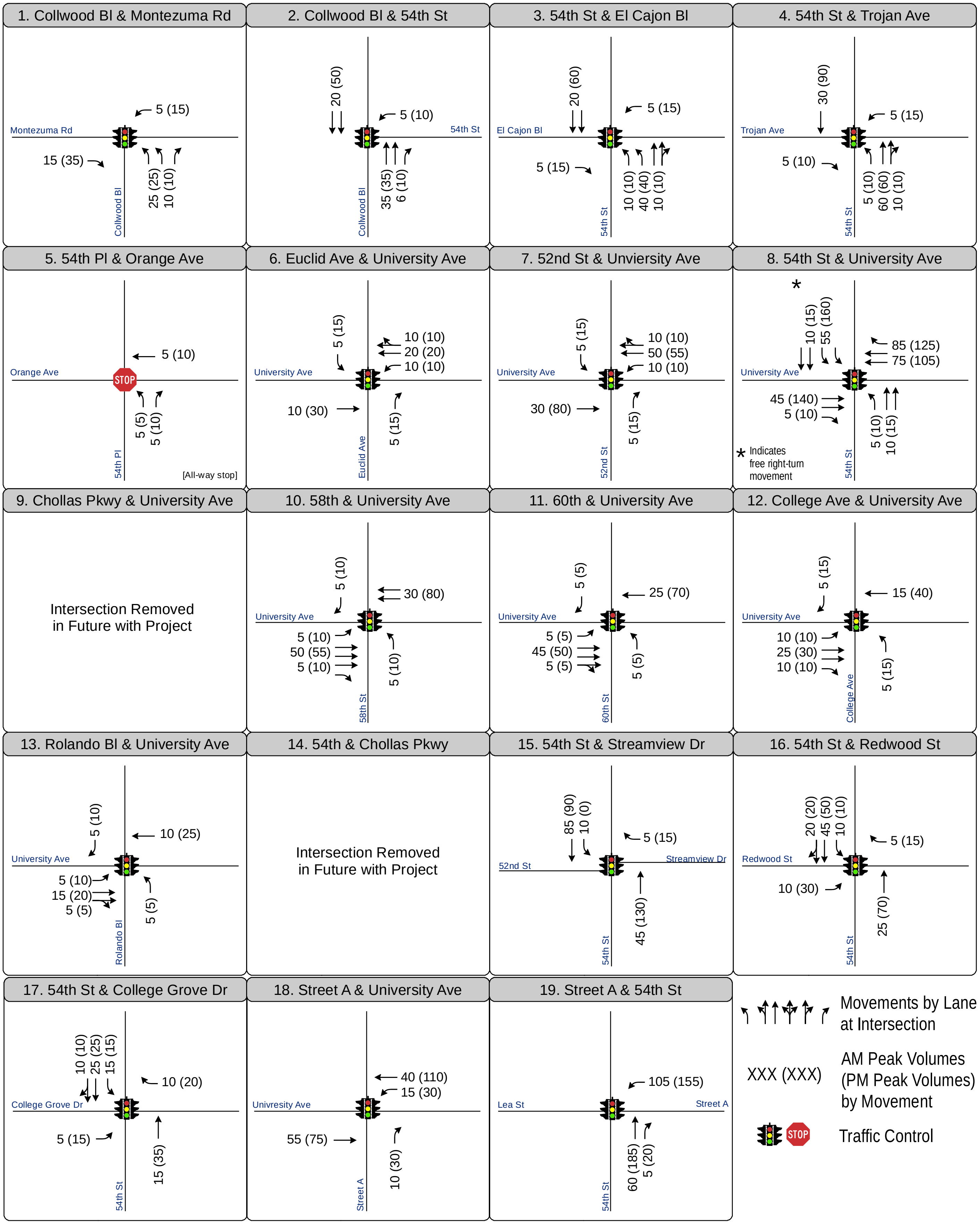


Figure 5-3: Roadway Project Traffic Volume Assignment

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)
Page 1 of 3



Intersection Geometry and Project Traffic Volume Assignment

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)
Page 2 of 3

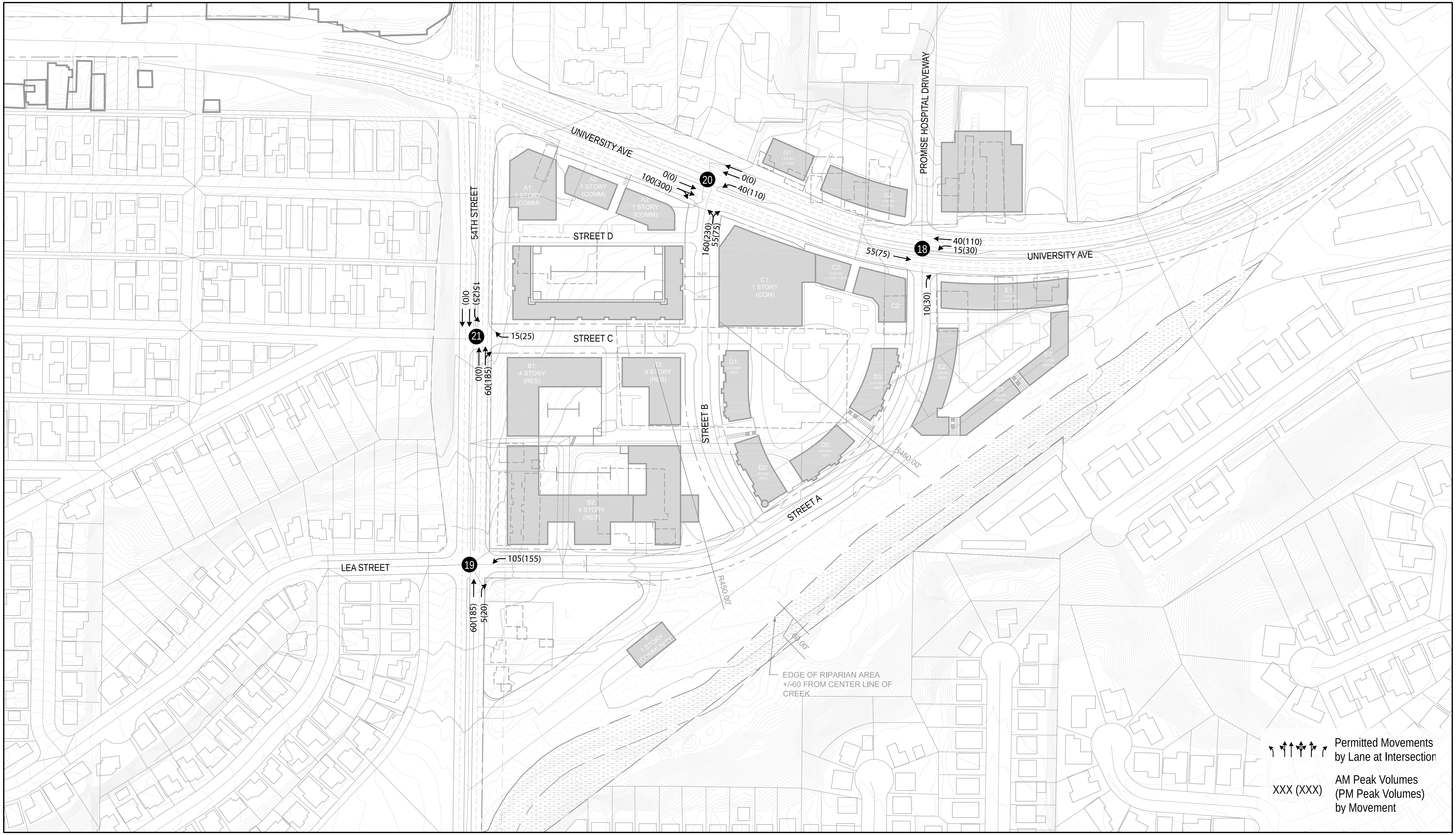


Figure 5-3: Peak Hour at Project Access Point Volume Assignment

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Civitas
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FEHR PEERS

6. HORIZON YEAR (2035) CONDITIONS

This section provides an analysis of Horizon Year traffic conditions both with and without the proposed project.

6.1. HORIZON YEAR ROADWAY NETWORK AND TRAFFIC VOLUMES

It is assumed that no roadway or intersection improvements would be implemented under Horizon Year conditions.

Horizon Year traffic volumes were derived from the SANDAG Series 12 Year 2035 Transportation Forecast and processed consistent with Small Study Area Traffic Modeling Process. An overview and details regarding the steps to complete the modeling process is included in **Appendix E**, along with the tables that were used to develop the future volume forecasts. Prior to completing the model forecasts, a thorough review of model inputs was completed for the base and horizon year scenarios. Horizon Year 2035 peak hour intersection turning movements at these locations were developed by comparing existing and forecasted Year 2035 ADTs as well as peak hour approach and departure volumes, then applying the respective growth factors. Manual adjustments were also made to ensure that traffic volumes among adjacent intersections are reasonably balanced. **Appendix E** includes the tables that were used to develop the future volume forecasts. The model review included the following:

- Circulation network
- Number of lanes on roadways and approach lanes at signalized intersections
- Traffic controls
- Street classification
- Base year traffic volumes
- Roadway speed limits
- Zone connector locations and granularity
- Traffic Analysis Zones
- City approved model land use and trip generation inputs (land use description, unit type, quantity, and City of San Diego trip generation rates)

The model inputs described above were reviewed by the project team and approved by City staff prior to running the final model forecasts used to derive Horizon Year traffic volumes.

Figure 6-1 displays the assumed Horizon Year Base roadway geometry and traffic volumes at key study area roadway segments and intersections.

6.2. HORIZON YEAR BASE TRAFFIC OPERATIONS

LOS analyses under Horizon Year Base (without project) conditions were conducted using the methodologies described in Chapter 4.0. Roadway segment and intersection LOS results are discussed separately below.

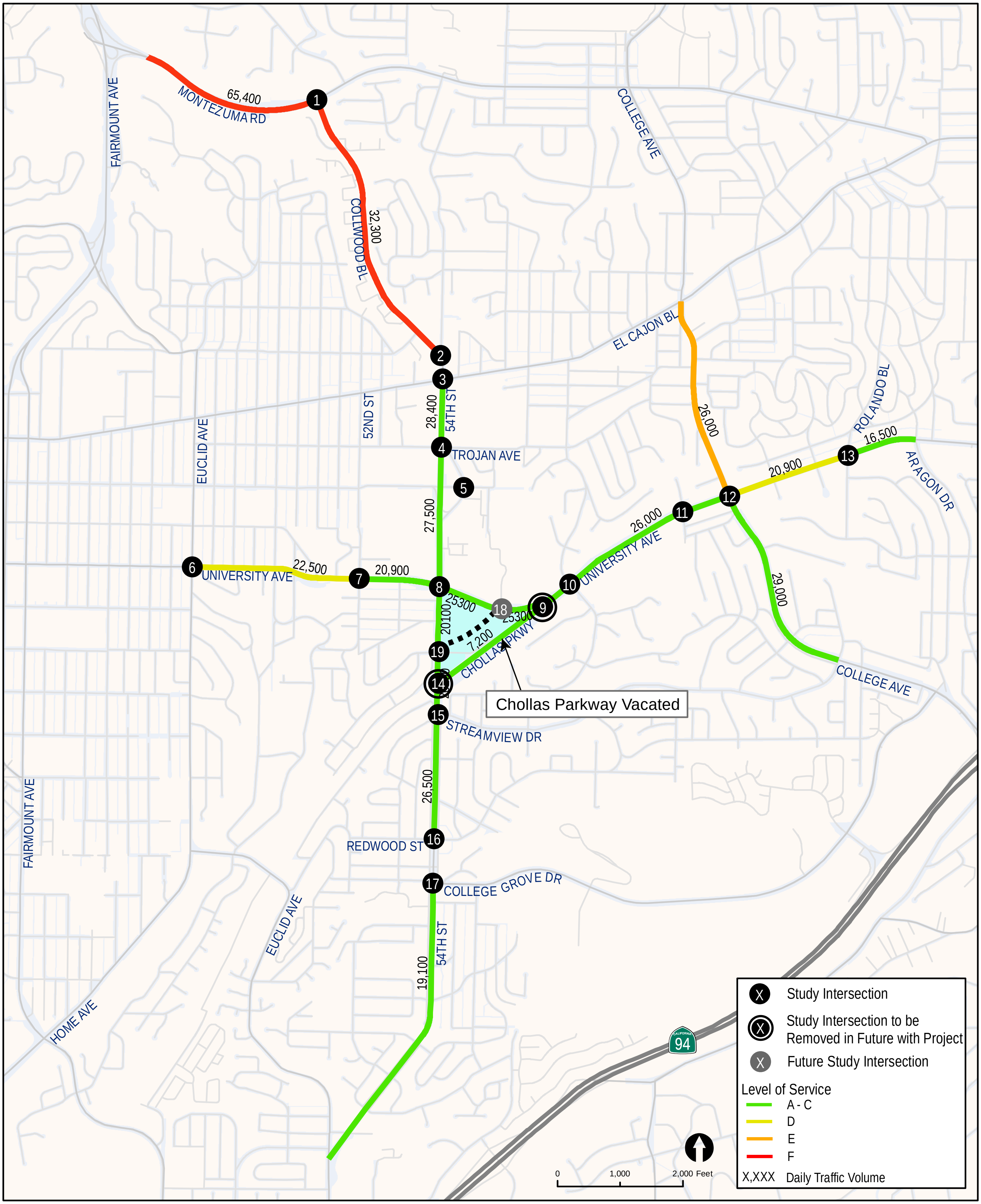

Figure 6-1: Roadway Traffic Volumes - Horizon Year Base Conditions

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)
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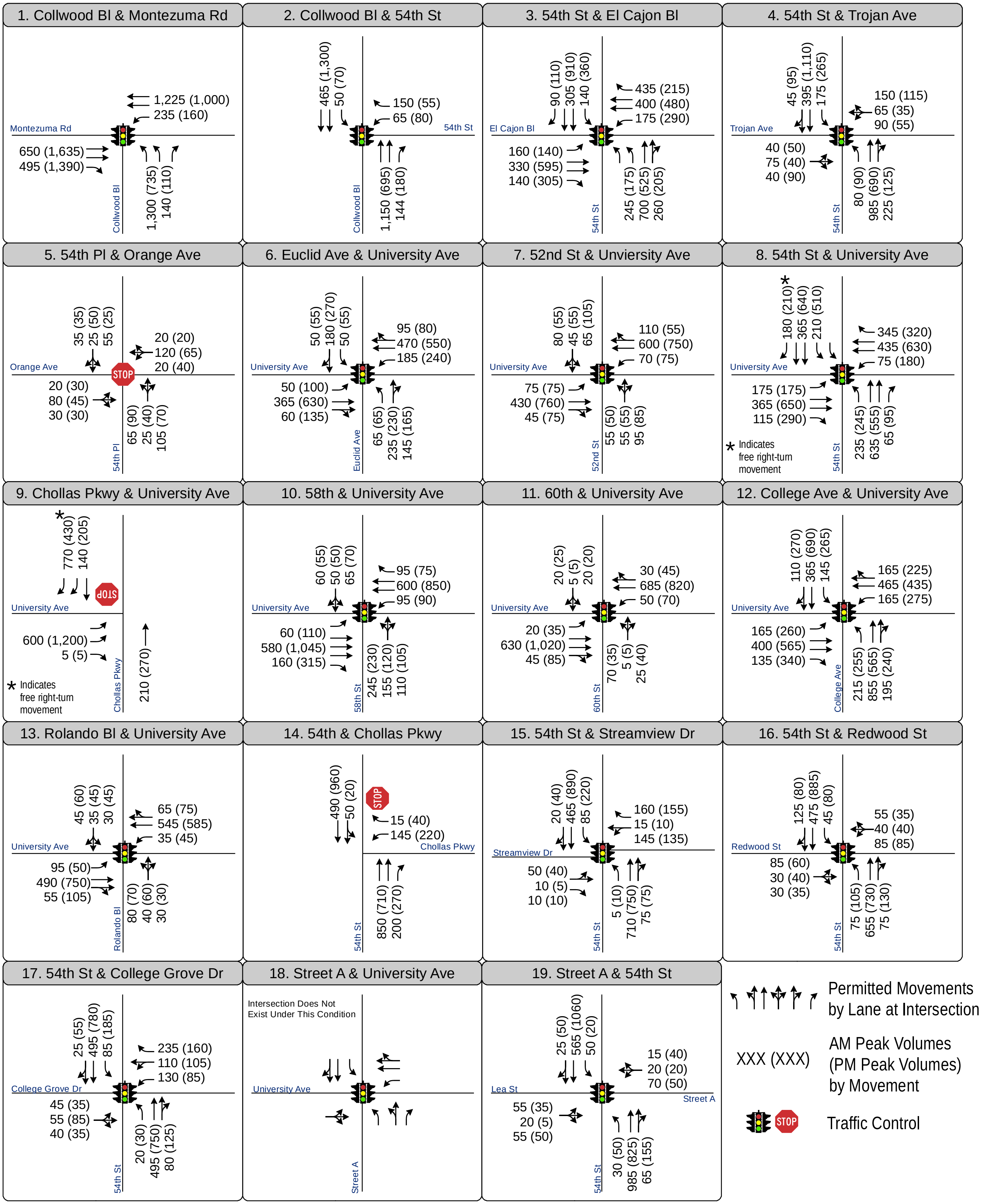


Intersection Geometry and Traffic Volumes - Horizon Year Base Conditions

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)
Page 2 of 2

Roadway Segment Analysis

Table 6.1 displays the LOS analysis results for the key study area roadway segments under Horizon Year Base conditions.

TABLE 6.1
ROADWAY SEGMENT LOS RESULTS – HORIZON YEAR BASE CONDITIONS

No.	Street	Segment	Street Classification	ADT	LOS E Threshold	V/C[1]	LOS
1	Montezuma Rd	Fairmount Ave to Collwood Blvd	4-Lane Major	65,400	40,000	1.635	F
2	Collwood Blvd	Montezuma Rd to 54th St	2-Lane Collector (w TWLTL)[2]	32,300	15,000	2.153	F
3	54th St	El Cajon Blvd to Trojan Ave	4-Lane Major	28,400	40,000	0.710	C
4		Trojan Ave to University Ave	4-Lane Major	27,500	40,000	0.688	C
5		University Ave to Chollas Prkwy	4-Lane Major	20,100	40,000	0.503	B
6		Streamview Dr to Redwood St	4-Lane Major	26,500	40,000	0.663	C
7		College Grove Dr to Euclid Ave	4-Lane Major	19,200	40,000	0.480	B
8	College Ave	El Cajon Blvd to University Ave	4-Lane Collector	26,000	30,000	0.867	E
9		University Ave to Streamview Dr	4-Lane Major	29,000	40,000	0.725	C
10	University Ave	Euclid Ave to Winona Ave	4-Lane Collector	22,500	30,000	0.750	D
11		52nd St to 54th St	4-Lane Major	27,400	40,000	0.685	C
12		54th St to 58th St	4-Lane Collector	25,300	30,000	0.843	E
13		58th St to 60th St	5-Lane Major	26,000	45,000	0.578	C
14		College Avenue to Rolando Blvd	4-Lane Collector (w TWLTL)	20,900	30,000	0.697	D
15		Rolando Bl to Aragon Dr	Collector (4-Lane w TWLTL)	16,500	30,000	0.550	C
16	Chollas Pkwy	54th St to University Ave	4-Lane Collector	7,200	30,000	0.240	A

Source: Fehr & Peers, June 2013

Note:
1. V/C: Volume to capacity ratio
2. TWLTL = Two-Way Left-Turn Lane

Bold letters indicate facilities operating at LOS E or worse

As shown, all study area roadway segments are projected to operate at LOS D or better under Horizon Year Base conditions, with the exception of the following:

1. Montezuma Road between Fairmount Avenue and Collwood Boulevard (LOS F)
2. Collwood Boulevard between Montezuma Road and 54th Street (LOS F)
8. College Avenue between El Cajon Blvd to University Ave (LOS E)

Intersection Analysis

Table 6.2 displays intersection LOS and average vehicle delay results for the key study area intersections under Horizon Year Base conditions. All intersections are assumed to be signalized unless otherwise noted. LOS calculation worksheets for Horizon Year Base Plus Project conditions are provided in **Appendix F**.

TABLE 6.2
PEAK HOUR INTERSECTION LOS RESULTS – HORIZON YEAR BASE CONDITIONS

No.	Intersection	AM		PM	
		Delay (sec)	LOS	Delay (sec)	LOS
1	Collwood Boulevard & Montezuma Road	35.4	D	47.0	D
2	Collwood Boulevard & 54th Street	16.2	B	11.9	B
3	54th Street & El Cajon Boulevard	49.2	D	53.9	D
4	54th Street & Trojan Avenue	33.7	C	27.4	C
5	54th Street & Orange Avenue [a]	24.3	C	9.1	A
6	Euclid Avenue & University Avenue	22.4	C	27.6	C
7	52nd Street & University Avenue	22.6	C	23.5	C
8	54th Street & University Avenue	25.6	C	38.4	D
9	Chollas Parkway & University Avenue [b]	33.5	D	**>200**	**F**
10	58th Street & University Avenue	26.1	C	25.2	C
11	60th Street & University Avenue	9.4	A	10.6	B
12	College Avenue & University Avenue	**63.9**	**E**	**67.6**	**E**
13	Rolando Boulevard & University Avenue	15.2	B	15.8	B
14	54th Street & Chollas Parkway [b]	**60.6**	**F**	**145.7**	**F**
15	54th Street & Streamview Drive	23.5	C	26.6	C
16	54th Street & Redwood Street	18.2	B	14.7	B
17	54th Street & College Grove Drive	25.9	C	29.3	C
19	54th Street & Lea Street	14.7	B	11.9	B

Source: Fehr & Peers, June 2013

Notes:
[a] Intersection is all-way stop-controlled
[b] Intersection is side-street stop-controlled
Bold letters indicate facilities operating at LOS E or worse

As shown, all key study area intersections are projected to operate at LOS D or better under Horizon Year Base conditions, with the exception of the following:

9. Chollas Parkway & University Avenue (LOS F – AM Peak)
12. College Avenue & University Avenue (LOS E – AM & PM Peaks)
14. 54th Street & Chollas Parkway (LOS F – AM & PM Peaks)

6.3. HORIZON YEAR BASE PLUS PROJECT ROADWAY NETWORK AND TRAFFIC VOLUMES

The proposed Chollas Triangle Master Plan contains several roadway network modifications which will be included as project features. The roadway changes assumed under the Horizon Year Base Plus Project conditions are as follows:

- *Chollas Parkway* - The Chollas Triangle Master Plan proposes the vacation of Chollas Parkway. This would result in the removal of the four-lane Chollas Parkway and elimination of the T-intersections of Chollas Parkway & University Avenue and Chollas Parkway & 54th Street. The vacation of Chollas Parkway will allow for the creation of new open space and local circulation will be facilitated by a new network of on-site streets connecting 54th Street and University Avenue.

- *Chollas Triangle Collector Street (New Street A)* - The proposed two-lane collector street will connect 54th Street and University Avenue and facilitate project access. The project proposes to form a four-legged signalized intersection at the existing Lea Street/54th Street intersection, which is already signalized. The collector street would curve to the north, forming a signalized, four-legged intersection at University Avenue opposite the existing Promise Hospital Driveway.

- *New Street B* – A new north-south, two-lane collector street will be constructed approximately 500 feet east of 54th Street connecting University Avenue to New Street A. This street is expected to provide on-street parking on both sides and be controlled with stop signs at on-site intersections. The intersection of New Street B and University Avenue is proposed to be a full access intersection and signalized.

- *New Street C* – A new east-west, two-lane collector street will be constructed approximately 540 feet south of University Avenue (at 54th Street) connecting 54th Street with New Street A. This street is expected to provide on-street parking on both sides and be controlled with stop signs at on-site intersections. The intersection of New Street C and 54th Street is proposed to be a full access intersection (except for left-turns out to 54th Street) and controlled by a stop sign on the New Street C approach.

- *New Street D* – A new east-west, two-lane collector street will be constructed approximately 300 feet south of University Avenue (at 54th Street) connecting 54th Street with New Street B. This street is expected to provide on-street parking on both sides and be controlled with stop signs at on-site intersections. The intersection of New Street D and 54th Street is proposed to be a right-turn only intersection and controlled by a stop sign on the New Street D approach.

Volume Forecasts at New Streets and Intersections

As discussed, Chollas Parkway will be replaced by a new collector street that will result in new intersections at 54th Street & Lea Street and University Avenue & Promise Hospital Driveway. The forecasts for the daily segment volume and peak hour intersection volumes were developed based on three sources of traffic:

1. Existing volumes at the 54th Street & Lea Street, 54th Street & Chollas Parkway and Chollas Parkway & University Avenue intersections:
    a. Turning movement volumes at these intersections were reviewed to gain a better understanding of local travel patterns around the project site and along Chollas Parkway.
    b. Another intersection, 54th Street & University Avenue, was also reviewed due to its importance to serving the project site and capacity to serve additional traffic that would

no longer be able to utilize the former Chollas Parkway alignment as a cut-through route connecting University Avenue and 54th Street.

2. Segment volumes on Chollas Parkway and the new collector street:

    a. Based on the reduction in capacity, from the four lanes provided on Chollas Parkway fronting no active land uses, to the new two-lane collector street with on-street parking and commercial frontages, some of the traffic currently utilizing Chollas Parkway was assumed to be shifted to the University Avenue & 54th Street intersection, rather than the Chollas Parkway alignment previously available as a cut-through route. The reduced speed, curved alignment, and overall reduced capacity on New Street A will keep some drivers on the major streets.

    b. Segment volumes on Chollas Parkway were reviewed and compared to the projected volumes on the new collector street (based on the year 2035 SANDAG transportation forecast) to determine the magnitude of through traffic currently using Chollas Parkway that would redistribute to the 54th Street & University Avenue intersection. Additional information regarding this shift in volumes is provided in **Appendix G.**

2. Project-generated traffic

    a. Traffic generated by the proposed project was assigned to the local street network

    b. Following the addition of the three sources of traffic above, the intersection volumes were reviewed and compared against the existing volumes and volume forecasts for reasonableness

The Horizon Year Base Plus Project traffic volumes were derived by adding the project trip assignment (displayed in Figure 5-3) to the Horizon Year Base volumes (displayed in Figure 6-1).

Figure 6-2 displays the Horizon Year Base Plus Project intersection lane configurations and daily ADT, AM and PM peak hour traffic volumes for the key study area roadway segments and intersections.

6.4. HORIZON YEAR BASE PLUS PROJECT TRAFFIC OPERATIONS

LOS analyses under Horizon Year Base Plus Project conditions were conducted using the methodologies described in Chapter 4.0. Roadway segment and intersection LOS results are discussed separately below.

Roadway Segment Analysis

Table 6.3 displays the LOS analysis results for the key study area roadway segments under Horizon Year Base Plus Project conditions.

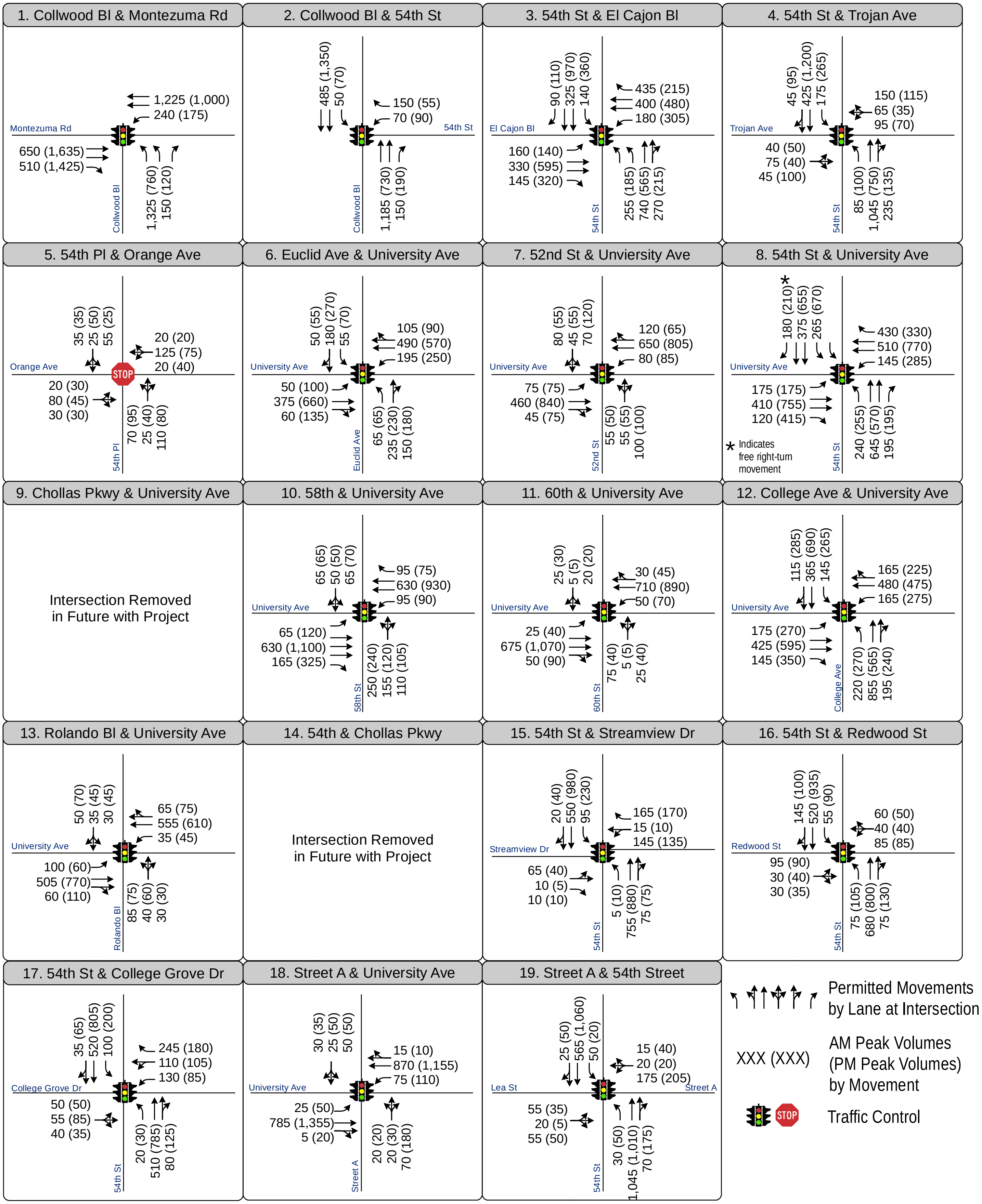
As shown in Table 6.3, all study area roadway segments are projected to operate at LOS D or better under Horizon Year Base Plus Project conditions, with the exception of the following:

1. Montezuma Road between Fairmont Avenue and Collwood Boulevard (LOS F)
2. Collwood Boulevard between Montezuma Road and 54th Street (LOS F)
8. College Avenue between El Cajon Boulevard to University Avenue (LOS E)

Figure 6-2: Roadway Traffic Volumes - Horizon Year Plus Project Conditions

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)
Page 1 of 3



Intersection Geometry and Traffic Volumes - Horizon Year Plus Project Conditions

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Fehr & Peers (2011)
Page 2 of 3

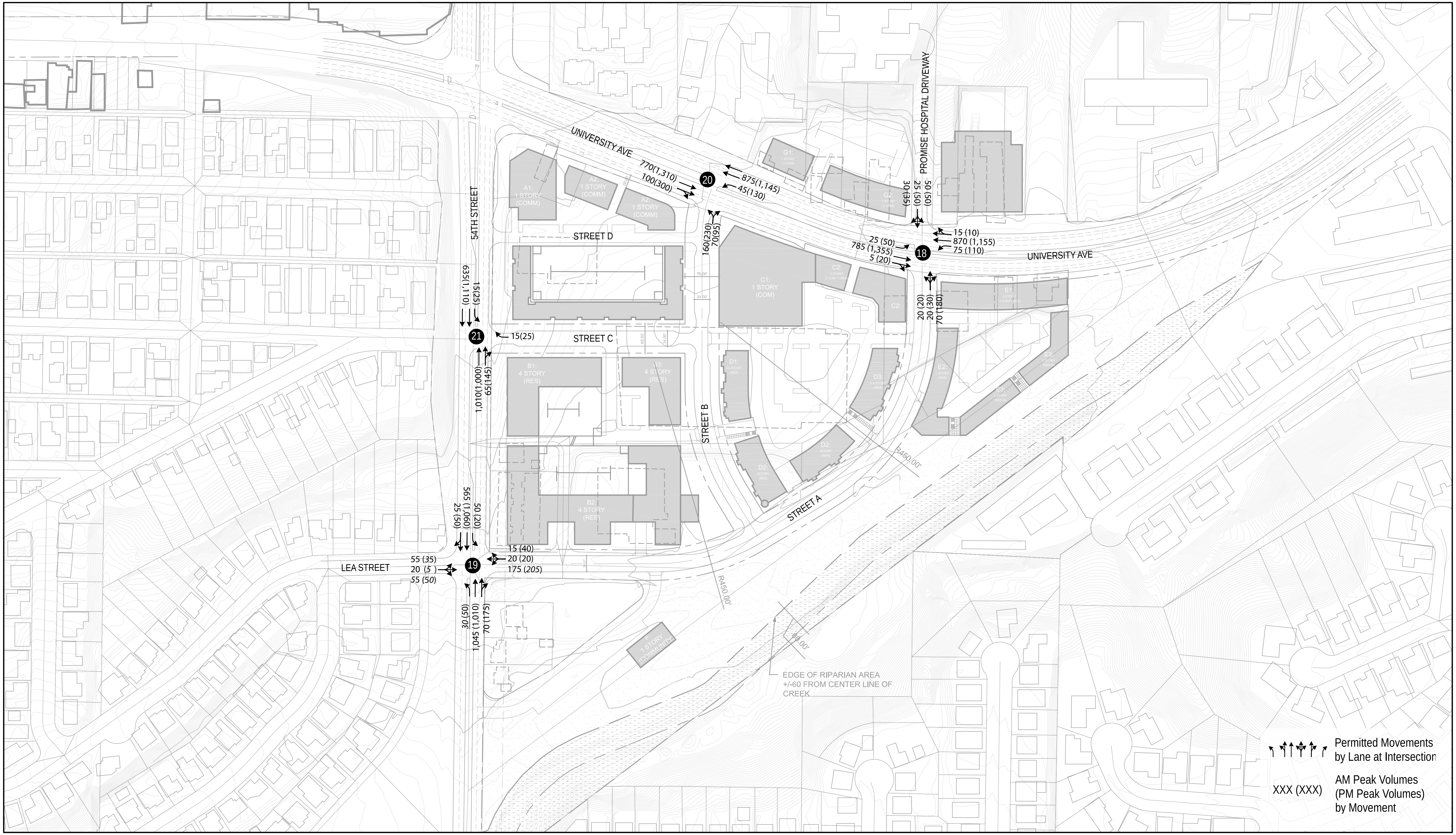


Figure 6-2: Horizon Year Plus Project Estimated Volumes at Access Points

Chollas Triangle Master Plan Traffic Impact Study

Date: 11/6/2012
Source: Civitas
Page 3 of 3

FEHR & PEERS

TABLE 6.3
ROADWAY SEGMENT LOS RESULTS – HORIZON YEAR BASE PLUS PROJECT CONDITIONS

No.	Street	Segment	Street Classification	ADT[1]	LOS E Threshold	W/ Project		Base V/C	Δ[3]	Sig?[4]
						V/C[2]	LOS			
1	**Montezuma Rd**	**Fairmount Ave to Collwood Blvd**	**4-Lane Major**	**65,900**	**40,000**	**1.648**	**F**	**1.635**	**0.013**	**Y**
2	**Collwood Blvd**	**Montezuma Rd to 54th St**	**2-Lane Collector w/ TWLTL[5]**	**33,000**	**15,000**	**2.200**	**F**	**2.153**	**0.047**	**Y**
3	54th St	El Cajon Blvd to Trojan Ave	4-Lane Major	29,700	40,000	0.743	C	0.710	0.033	N
4		Trojan Ave to University Ave	4-Lane Major	29,400	40,000	0.735	C	0.688	0.047	N
5		University Ave to Lea Street	4-Lane Major	24,900	40,000	0.623	C	0.503	0.120	N
6		Streamview Dr to Redwood St	4-Lane Major	28,200	40,000	0.705	C	0.660	0.043	N
7		College Grove Dr to Euclid Ave	4-Lane Major	19,700	40,000	0.490	B	0.493	0.012	N
8	College Ave	El Cajon Blvd to University Ave	4-Lane Collector	**26,200**	**30,000**	**0.873**	**E**	**0.867**	0.006	N
9		University Ave to Streamview Dr	4-Lane Major	29,200	40,000	0.730	C	0.725	0.005	N
10	University Ave	Euclid Ave to Winona Ave	4-Lane Collector	23,700	30,000	0.790	D	0.753	0.037	N
11		52nd St to 54th St	4-Lane Major	29,000	40,000	0.725	D	0.523	0.040	N
12		**54th St to 58th St**	**4-Lane Collector**	**29,730**	**30,000**	**.991**	**E**	**0.843**	**0.148**	**Y**
13		58th St to 60th St	5-Lane Major	27,400	45,000	0.609	C	0.578	0.031	N
14		College Avenue to Rolando Blvd	Collector (4-Lane w TWLTL[5])	21,500	30,000	0.717	D	0.697	0.020	N
15		Rolando Bl to Aragon Dr	Collector (4-Lane w TWLTL[5])	16,900	30,000	0.563	C	0.550	0.013	N
16	Chollas Pkwy	54th St to University Ave	4-Lane Collector	*Removed Under this Scenario*						*N/A*
17	New Road A	54th St to University Ave	2-Lane Collector	5,000	8,000	0.625	C	N/A	N/A	N

Source: Fehr & Peers, June 2013

Note:

1. ADT = Average daily traffic.
2. V/C = Volume-to-capacity ratio.
3. Δ = Change in V/C
4. Sig? = Is impact significant?
5. TWLTL = Two-way left-turn lane.

Bold letters indicate facilities operating at LOS E or worse

Intersection Analysis

Table 6.4 displays intersection LOS and average vehicle delay results for the key study area intersections under Horizon Year Base Plus Project conditions. All intersections are assumed to be signalized unless otherwise noted. LOS calculation worksheets for Horizon Year Base Plus Project conditions are provided in **Appendix H**

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TABLE 6.4
PEAK HOUR INTERSECTION LOS RESULTS – HORIZON YEAR BASE PLUS PROJECT CONDITIONS

No.	Intersection	AM						PM					
		W/ Project		Base		Δ [c]	Sig? [d]	W/ Project		Base		Δ [c]	Sig? [d]
		Delay (sec)	LOS	Delay (sec)	LOS			Delay (sec)	LOS	Delay (sec)	LOS		
1	Collwood Boulevard & Montezuma Road	36.2	D	35.4	D	0.8	N	52.2	D	47.0	D	5.2	N
2	Collwood Boulevard & 54th Street	16.7	B	16.2	B	0.5	N	12.3	B	11.9	B	0.4	N
3	54th Street & El Cajon Boulevard	49.8	D	49.2	D	0.6	N	**57.2**	**E**	53.9	D	**3.3**	**Y**
4	54th Street & Trojan Avenue	38.4	D	33.7	C	4.7	N	29.6	C	27.4	C	2.2	N
5	54th Street & Orange Avenue [a]	28.5	D	24.3	C	4.2	N	9.3	A	9.1	A	0.2	N
6	Euclid Avenue & University Avenue	22.4	C	22.4	C	0.0	N	27.8	C	27.6	C	0.2	N
7	52nd Street & University Avenue	23.5	C	22.6	C	0.9	N	24.2	C	23.5	C	0.7	N
8	54th Street & University Avenue [e]	27.2	C	25.6	C	1.6	N	52.7	D	38.4	D	14.3	N
9	Chollas Parkway & University Avenue [b]	N/A	N/A	33.5	D	N/A	N/A	N/A	N/A	**>200**	**F**	N/A	N/A
10	58th Street & University Avenue	28.8	C	26.1	C	2.7	N	31.3	C	25.2	C	6.1	N
11	60th Street & University Avenue	10.0	B	9.4	A	0.6	N	14.6	B	10.6	B	4.0	N
12	College Avenue & University Avenue	**66.1**	**E**	**63.9**	**E**	**2.2**	**Y**	**72.2**	**E**	**67.6**	**E**	**4.6**	**Y**
13	Rolando Boulevard & University Avenue	15.2	B	15.2	B	0.0	N	16.3	B	15.8	B	0.5	N
14	54th Street & Chollas Parkway [b]	N/A	N/A	**60.6**	**F**	N/A	N/A	N/A	N/A	**145.7**	**F**	N/A	N/A
15	54th Street & Streamview Drive	26.1	B	23.5	C	2.6	N	23.9	C	26.6	C	-2.7	N
16	54th Street & Redwood Street	18.3	B	18.2	B	0.1	N	18.0	B	14.7	B	3.3	N
17	54th Street & College Grove Drive	26.1	C	25.9	C	0.2	N	30.6	C	29.3	C	1.3	N
18	Lea Street & University Avenue [e]	25.1	C	N/A	N/A	N/A	N/A	40.0	D	N/A	N/A	N/A	N/A
19	54th Street & Lea Street [e]	21.2	C	14.7	B	6.5	N	34.6	C	11.9	B	22.7	N
20	University Avenue & Street B	10.3	B	N/A	N/A	N/A	N/A	24.4	C	N/A	N/A	N/A	N/A
21	54th Street & Street C	10.0	B	N/A	N/A	N/A	N/A	9.5	A	N/A	N/A	N/A	N/A

Source: Fehr & Peers, June 2013

Notes:
[a] Intersection is all-way stop-controlled
[b] Intersection is side-street stop-controlled
[c] Δ: Change in average intersection delay between with project and base conditions
[d] Sig?: Significant impact?
[e] Locations analyzed with driveway project trip generation rates
Bold letters indicate facilities operating at LOS E or worse

As shown, all key study area intersections are projected to operate at LOS D or better under Horizon Year Base Plus Project conditions, with the exception of the following:

3. 54th Street & El Cajon Boulevard (LOS E – PM Peak)
12. College Avenue & University Avenue (LOS E – AM Peak, LOS E PM Peak)

6.5. SITE ACCESS

Driveways and internal circulation facilities will be designed to accommodate for passenger cars and provide truck access.

The proposed project would provide access from two full access driveways located on University Avenue plus one full access driveway, one partial access driveway and one right-turn only driveway on 54th Street. Both of the University Avenue intersections (New Streets A and B) and the driveway opposite Lea Street on 54th Street are proposed to be signalized. The two driveways on 54th Street between Lea Street and University Avenue are proposed to operate with side street stop control only. The southbound left-turn into the site at New Street C would be provided by a median opening and the design would preclude left-turns out from this location as shown in the adjacent photo.

Of the four intersections providing access to the site, Intersection 19 (54th St/Lea St) is currently signalized and Intersections 18 and 20 are proposed to provide full access (i.e., to all allow all turning movements). Intersection 18 includes Promise Hospital driveway and provides a secondary connection to 54th Street from University Avenue. Intersection 20 provides access to the center of the site and will help to distribute traffic amongst the site's internal roadways. Signal warrants were evaluated to determine if both of these locations would meet the required minimum volume threshold during the peak hours under Horizon Base Plus Project conditions. The results of this analysis show that signals are warranted at both locations under this scenario, and the worksheets are included in **Appendix M**.

The intersection of Lea Street & University Avenue is projected to operate at LOS E in the AM peak hour under Horizon Year Plus Project conditions. To achieve an acceptable LOS, it is proposed that the east-west configuration be converted to split phasing. **Table 6.5** summarizes the LOS results for this intersection under Horizon Year Base Plus Project conditions plus improvements. With the suggested improvements the LOS improves to B during both peak hours.

TABLE 6.5
SUMMARY OF PEAK HOUR LOS RESULTS – ACCESS POINTS WITH IMPROVEMENTS

#	Intersection	AM		PM	
		Delay (sec)	LOS	Delay (sec)	LOS
19	54th Street & Lea Street-New Street A (Signal)	16.2	B	18.4	B

Source: Fehr & Peers, June 2013

6.6. PEDESTRIAN, BICYCLE, AND TRANSIT IMPACTS

The project is designed as a transit proximate development that includes increased density, quality pedestrian facilities, bicycle parking and other characteristics to reduce the number of single occupant vehicle trips to and from the site. Each non-automobile travel mode is discussed below.

Pedestrian Impacts

Development of the site is expected to include sidewalks along all sections of 54th Street and University Avenue, as well as on all internal streets. With the project, Chollas Parkway will be removed and replaced with active and passive recreation uses along the adjacent creek. This will eliminate two intersections that are difficult for pedestrians to navigate and will provide a multi-use path linking future trail extensions along the Chollas Creek corridor. Lastly, the project proposes two new signalized intersections of internal site streets on University Avenue: 1) opposite the Promise Hospital driveway (Intersection 18), and 2) between 54th Street and the Promise Hospital driveway (Intersection 20). These locations will provide two new opportunities for pedestrians to cross University Avenue and will greatly improve access to the existing bus stops on University Avenue east of 54th Street.

While the project will likely increase the number of people walking in the area, the accompanying pedestrian improvements will greatly enhance facilities and on-site connectivity. The City may want to consider requiring signalization of the new internal street intersection on 54th Street approximately 540 feet south of University Avenue to further enhance pedestrian, bicycle and transit access. This improvement is not required from a vehicle capacity perspective, but would provide a controlled crossing of 54th Street and could help to link the adjacent neighborhood to the west with the project site.

Bicycle Impacts

The City of San Diego Bicycle Master Plan calls for bicycle lanes on both 54th Street and University Avenue, plus the construction of a multi-use path along the general alignment of Chollas Parkway adjacent to the creek. In addition, the North Park-Mid City Regional Bike Corridors project currently in development by SANDAG calls for bicycle lanes on University Avenue from Winona Street to the west to east of 58th Street. As noted under Existing Conditions, bicycle lanes are provided on sections of 54th Street but are not continuous.

The proposed project land uses could be constructed on the site without changing the current bicycle facilities and by itself would not conflict with the planned improvements. However, to accommodate the planned facilities, redevelopment of the site should include sufficient widening on 54th Street to provide continuous Class II bike lanes on 54th Street including through the University Avenue intersection in both directions. This may require modification of the center raised median on 54th Street north of Lea Street to provide adequate width. Similarly, on-street parking should be eliminated or additional width should be provided on University Avenue to accommodate bike lanes in both directions.

The project should include convenient and secure parking to encourage residents, employees and patrons of local businesses to ride to and from the project site. Bike parking should provide both racks at several locations throughout the site for the commercial and park uses, as well as residential bike parking within the units or incorporated into the on-site vehicle parking areas.

Implementation of the proposed project will benefit bicycle travel on both fronting roadways be reducing the number of driveways and the number of potential conflict points for bicyclist and pedestrians. The eight existing curb cuts on University Avenue would be reduced to two, and the three existing driveways/alleys on 54th Street would be reconfigured. With these changes and the additional width to accommodate bike lanes, plus the addition of a multi-use trail along Chollas Creek and on-site bike parking, the proposed project would greatly benefit bicycle travel in the area, and no bicycle impacts are anticipated.

Transit Impacts

The proposed project is expected to increase the number of transit patrons using the existing routes serving the site. Assuming that up to five percent of trips were made by transit, this could result in a total of 70 transit riders during the PM peak hour (the higher of the two peak periods). However, these riders would travel on three routes with 12- to 15-minute headways and would comprise both inbound and outbound trips. Thus, the average number of riders per bus per hour would be four and would not have a substantial impact on transit service.

With development of the site and potential widening to accommodate planned bicycle facilities, it is possible that the existing bus stops adjacent to the project site could be relocated closer to the University Avenue/54th Street intersection. In addition, it may be desirable to include an additional stop adjacent to the site depending on the final site plan design. The project developer should work with MTS to determine the appropriate stop locations and specific street design to enhance bus interaction with general vehicle traffic. Accordingly, no transit impacts are anticipated with implementation of the proposed project.

6.7. IMPACT SIGNIFICANCE AND MITIGATION

Project-related impacts have been identified at three key study roadway segments and three key study intersections under Horizon Year Base Plus Project conditions, as summarized in the following sections, along with identification of mitigation recommendations.

Roadways

Based on the impact significance criteria presented in Chapter 4, under Horizon Year Base Plus Project conditions, the proposed project would have cumulative traffic related impacts on the following three roadway segments:

1. Montezuma Road between Fairmont Avenue and Collwood Boulevard
2. Collwood Boulevard between Montezuma Road and 54th Street
12. University Avenue between 54th Street & 58th Street

To assess if mitigation measures are required for a significantly impacted segment the following three (3) criteria are utilized:

- Determine if segment is constructed to its ultimate classification.
- Determine if the intersections at both ends of the segment operate at an acceptable LOS (with mitigation, if needed).
- Determine if the segment operates at an acceptable LOS utilizing the peak hour arterial analysis methodology outlined in the HCM.

Montezuma Road between Fairmont Avenue and Collwood Boulevard

1. Based on the existing College Area Community Plan Circulation Element, this segment of Montezuma Road is constructed to its ultimate classification as a Four-Lane Major.

2. As noted in Table 6.4, the Collwood Boulevard/Montezuma Road intersection, which is the eastern end of this segment, is projected to operate at LOS D during the PM peak hour. Therefore, no mitigation is required based on the projected operations at this controlling intersection. The westerly intersection of Montezuma Road & Fairmount Avenue is grade separated and would not have an impact on the operations of this segment.

3. The peak hour HCM arterial analysis indicates that this segment is projected to operate at LOS C or better, in both directions, during both the AM and PM peak hours (peak hour arterial analysis worksheets are provided in **Appendix J**).

   This segment is impacted, but mitigation measures are not required based on the three criteria outlined above. This impact would therefore remain significant and unmitigated.

Collwood Boulevard between Montezuma Road and 54th Street

1. As noted in the existing College Area Community Plan, Collwood Boulevard is classified as a Four-Lane Major, but is currently constructed and operated as a Two-Lane Collector. Therefore the proposed project should pay a fair-share contribution to any future capacity-enhancing improvements on this segment of Collwood Boulevard, which would potentially alleviate the cumulative traffic-related impacts associated with the proposed project. It is important to note that without additional right-of-way acquisition or the removal of on-street parking, modification of the

street to include four vehicle lanes could have secondary impacts to bicycle travel by precluding or affecting implementation of the proposed bicycle facilities in the City of San Diego's Bicycle Master Plan by reducing the amount of available right of way for these facilities. The project would be responsible for an eight percent (8%) fair-share contribution toward the segment mitigation of Collwood Boulevard between Montezuma Road and 54th Street. Appendix I contains an explanation of the determination of the project's fair-share contribution for this improvement. Based on this assessment, this impact is considered significant and unmitigated.

***University Avenue between 54th Street* and 58th Street**

1. As noted in the existing Mid City Community Plan, This segment of University Avenue is classified as a Four-Lane Major, but is currently constructed and operated as a Four-Lane Collector due to the lack of a continuous raised median. Based on the proposed site access locations and to accommodate left-turns at future intersections along University Avenue, the proposed project should install a continuous median along this segment along the project frontage. With the median installation, the proposed project would provide future capacity-enhancing improvements on this segment of University Avenue by changing the street classification and increasing the corresponding segment capacity. This would mitigate the cumulative traffic-related impacts associated with the proposed project. It is important to note that without additional right-of-way acquisition or the removal of on-street parking, modification of the street to include a continuous median could have secondary impacts to bicycle travel by precluding or affecting implementation of the proposed bicycle facilities in the City of San Diego's Bicycle Master Plan by reducing the amount of available right of way for these facilities. The project would be responsible for a sixty-seven percent (67%) fair-share contribution toward the segment mitigation. **Appendix I** contains an explanation of the determination of the project's fair-share contribution for this improvement. Based on this assessment, this impact is considered mitigated.

Intersections

Based on the impact significance criteria presented in Section 4.2, under Horizon Year Base Plus Project conditions, the proposed project would have cumulative traffic related impacts at the following two intersections:

3. *54th Street & El Cajon Boulevard* – This cumulative impact is due to a lack of overall capacity at the intersection during the PM peak hour under Horizon Year with Project conditions. The proposed project would contribute a total of 150 additional trips to the intersection during the PM peak hour causing the intersection LOS to degrade from LOS D to E under with project conditions.
12. *College Avenue & University Avenue* - This cumulative impact is due to increased volumes at the intersection during the both the AM & PM peak hours under Horizon Year conditions. The proposed project would contribute a total of 70 and 120 additional trips to the intersection during the peak hours, respectively, causing the intersection operations to degrade (worse LOS E in the AM peak hour, and LOS E to F in the PM peak hour) further under with project conditions.

The following measures would be necessary to mitigate the identified cumulative impacts:

54th Street & El Cajon Boulevard

Restripe the southbound 54th Street approach to remove the existing right-turn lane and include a second southbound left-turn lane. This recommended lane configuration could fit in the existing 42' approach right-of-way by providing two 11' through lanes (consistent with what is currently in place) and two 10' left-turn lanes. However, based on the existing alignment of the receiving lanes the center-median may need to be shifted a few feet to the east. No impact to on-street parking or transit stops would occur with implementation of this improvement. It is important to note that without additional right-of-way acquisition or the removal of on-street parking, modification of the street to accommodate this improvement could have secondary impacts to bicycle travel by precluding or affecting implementation of the proposed bicycle facilities in the City of San Diego's Bicycle Master Plan by reducing the amount of available right of way for these facilities, thereby potentially impacting bicyclist safety at this location. A conceptual diagram of the proposed mitigation is included in **Figure 6-3**. The operational analysis of the recommended improvements show the impact is fully mitigated.

College Avenue & University Avenue

Restripe both the northbound and southbound approaches to include a second left-turn lane. The lane configuration at both approaches will include 18' outside lane (curb lane), 10' inside lane, and dual 10' left turn lanes. However, based on the existing alignment of the receiving lanes the center-median may need to be shifted a few feet to the east for the southbound approach and to the west for the northbound approach. There would be no impact to on-street parking or transit stops due to this recommended improvement. It is important to note that without additional right-of-way acquisition or the removal of on-street parking, modification of the street to accommodate this improvement could have secondary impacts to bicycle travel by precluding or affecting implementation of the proposed bicycle facilities in the City of San Diego's Bicycle Master Plan by reducing the amount of available right of way for these facilities, thereby potentially impacting bicyclist safety at this location. A conceptual diagram of the proposed mitigation is included in **Figure 6-4**. The operational analysis of this improvement shows that the recommended, reduces delay to less than pre-project conditions. Therefore the impact is fully mitigated.

Table 6.6 demonstrates that with implementation of the identified mitigation measures, the impacted intersections would operate at acceptable or at better than pre-development conditions. LOS calculation worksheets for Horizon Year Base Plus Project mitigated conditions are provided in **Appendix K.**

TABLE 6.6
PEAK HOUR INTERSECTION LOS RESULTS – HORIZON YEAR 2030 PLUS PROJECT WITH MITIGATION

No.	Intersection	AM					PM				
		W/ Mitigation		Base		Δ	W/ Mitigation		Base		Δ
		Delay (sec)	LOS	Delay (sec)	LOS		Delay (sec)	LOS	Delay (sec)	LOS	
3	54th Street & El Cajon Boulevard	47.7	D	49.2	D	-1.5	53.3	D	53.9	D	-0.6
12	College Avenue & University Avenue	40.7	D	63.9	E	-23.2	56.5	E	76.1	E	-19.6

Source: Fehr & Peers, June 2013

Notes:
Bold indicates substandard LOS
Δ = Change in intersection delay

As noted above, no bicycle, pedestrian or transit impacts are anticipated provided the project incorporates adequate widening to accommodate planned bicycle facilities and potential transit stop modifications. Thus, multi-modal impacts of the proposed project are expected to be less than significant.

Summary of Operational Improvements

Aside from overall intersection impacts, two intersections were identified that included one or more approaches projected to operate at LOS F under Horizon Plus Project conditions. Per direction from City staff, operational improvements were tested that would reduce delay to pre-project condition levels or better. Operational improvements include the optimization of intersection signal timing splits, offsets, and cycle lengths. The following improvements, which reduced delay to pre-project conditions or better, were applied at the following intersections and the LOS worksheets are available in **Appendix L**. Results of the following operational improvements, which result in no approaches operating at LOS F under Horizon Plus Project conditions, are shown in Table 6.7:

cycle lengths. The following improvements, which reduced delay to pre-project conditions or better, were applied at the following intersections and the LOS worksheets are available in **Appendix L**. Results of the following operational improvements, which result in no approaches operating at LOS F under Horizon Plus Project conditions, are shown in Table 6.7:

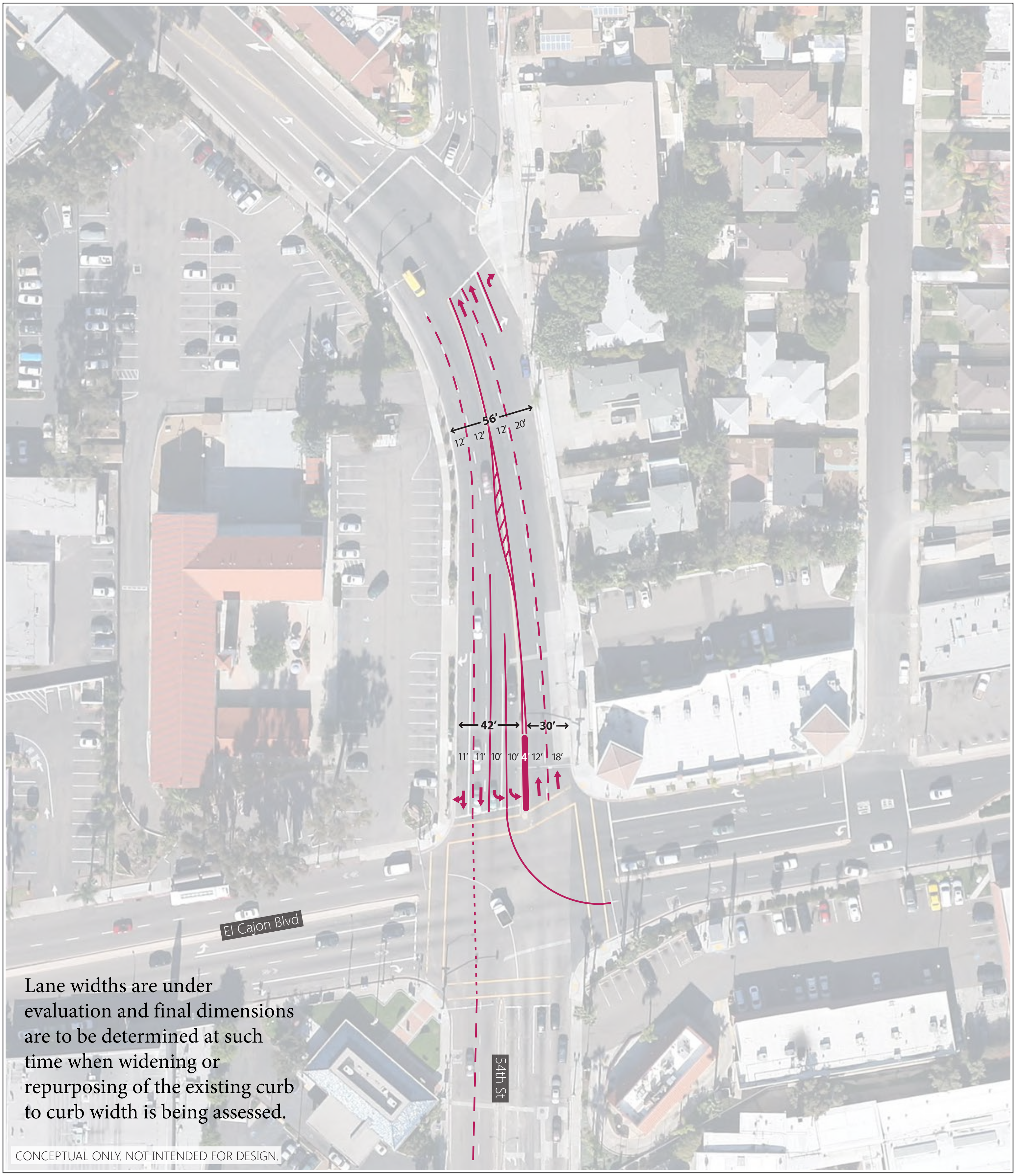
18. University Avenue & Site Driveway/Promise Hospital Driveway: AM peak hour and PM peak hour: optimization of signal timing splits, cycle length, and offsets
19. 54th Street & Lea Street: AM peak hour and PM peak hour: optimization of signal timing splits, cycle length, and offsets

TABLE 6.7
PEAK HOUR INTERSECTION LOS RESULTS – HORIZON YEAR 2030 PLUS PROJECT WITH OPERATIONAL IMPROVEMENTS

No.	Intersection	AM					PM				
		W/ Op Imp		HY w/ Proj		Δ	W/ Op Imp		HY w/ Proj		Δ
		Delay (sec)	LOS	Delay (sec)	LOS		Delay (sec)	LOS	Delay (sec)	LOS	
18	Lea Street & University Avenue [e]	18.6	B	25.1	C	-6.5	33.5	C	40.0	D	-6.5
19	54th Street & Lea Street [e]	15.9	B	21.2	C	-5.3	14.8	B	34.6	**C**	-19.8

Source: Fehr & Peers, June 2013

Notes:
Bold indicates substandard LOS
Δ = Change in intersection delay



Lane widths are under evaluation and final dimensions are to be determined at such time when widening or repurposing of the existing curb to curb width is being assessed.

CONCEPTUAL ONLY. NOT INTENDED FOR DESIGN.

N

Not to Scale

54th STREET & EL CAJON BOULEVARD MITIGATION CONCEPTUAL DIAGRAM

Lane widths are under evaluation and final dimensions are to be determined at such time when widening or repurposing of the existing curb to curb width is being assessed.

CONCEPTUAL ONLY. NOT INTENDED FOR DESIGN.

COLLEGE AVE & UNIVERSITY AVE MITIGATION CONCEPTUAL DIAGRAM

FEHR PEERS

FIGURE 6-4

7. FINDINGS AND RECOMMENDATIONS

This chapter provides a summary of the key findings and study recommendations, including the LOS results for each scenario analyzed. Specific recommendations related to mitigation of proposed project traffic impacts on the roadway network are listed.

7.1. SUMMARY OF TRAFFIC OPERATIONS

Table 7.1 summarizes the roadway segment LOS results for each of the analyzed scenarios.

TABLE 7.1
SUMMARY OF ROADWAY SEGMENT LOS RESULTS

No.	Street	Segment	Existing	Horizon Year Base	Horizon Year Base Plus Project	Significantly Impacted?
1	Montezuma Rd	Fairmount Ave to Collwood Blvd	**F**	**F**	**F**	**Y**
2	Collwood Blvd	Montezuma Rd to 54th St	**F**	**F**	**F**	**Y**
3	54th St	El Cajon Blvd to Trojan Ave	C	C	C	N
4		Trojan Ave to University Ave	C	C	C	N
5		University Ave to Chollas Prkwy	B	B	C	N
6		Streamview Dr to Redwood St	B	C	C	N
7		College Grove Dr to Euclid Ave	B	B	B	N
8	College Ave	El Cajon Blvd to University Ave	D	**E**	**E**	N
9		University Ave to Streamview Dr	C	C	C	N
10	University Ave	Euclid Ave to Winona Ave	C	D	D	N
11		52nd St to 54th St	C	B	D	N
12		54th St to 58th St	**C**	**E**	**E**	**Y**
13		58th St to 60th St	B	C	C	N
14		College Avenue to Rolando Blvd	C	D	D	N
15		Rolando Bl to Aragon Dr	C	C	C	N
16	Chollas Pkwy	54th St to University Ave	B	A	N/A	N
17	New Street A	54th St to University Ave	N/A	N/A	C	N

Source: Fehr & Peers, June 2013

Note:
Bold letters indicate facilities operating at LOS E or F

The following key points summarize the roadway segment analyses:

Existing Conditions – all key study area roadway segments are currently operating at LOS D or better with the exception of the following segments:

1. Montezuma Road between Fairmount Avenue and Collwood Boulevard (LOS F)
2. Collwood Boulevard between Montezuma Road and 54th Street (LOS F)

Horizon Year Base Conditions - all study area roadway segments are projected to operate at LOS D or better under Horizon Year Base conditions, with the exception of the following:

1. Montezuma Road between Fairmont Avenue and Collwood Boulevard (LOS F)
2. Collwood Boulevard between Montezuma Road and 54th Street (LOS F)
8. College Avenue between El Cajon Boulevard and University Avenue (LOS E)
12. University Avenue between 54th Street and 58th Street (LOS E)

Horizon Year Base Plus Project Conditions - all study area roadway segments are projected to operate at LOS D or better under Horizon Year Base Plus Project conditions, with the exception of the following:

1. Montezuma Road between Fairmont Avenue and Collwood Boulevard (LOS F)
2. Collwood Boulevard between Montezuma Road and 54th Street (LOS F)
8. College Avenue between El Cajon Boulevard and University Avenue (LOS E)
12. University Avenue between 54th Street and 58th Street (LOS E)

Table 7.2 summarizes the intersection LOS results for each of the analyzed scenarios.

TABLE 7.2
SUMMARY OF INTERSECTION PEAK HOUR LOS RESULTS

No.	Intersection	Existing		Horizon Year Base		Horizon Year Plus Project		Significantly Impacted?
		AM	PM	AM	PM	AM	PM	
1	Collwood Boulevard & Montezuma Road	C	C	D	D	D	D	N
2	Collwood Boulevard & 54th Street	B	B	B	B	B	B	N
3	54th Street & El Cajon Boulevard	D	D	D	D	D/D*	**E/D***	**Y**
4	54th Street & Trojan Avenue	C	B	C	C	D	C	N
5	54th Street & Orange Avenue [a]	B	A	D	A	D	A	N
6	Euclid Avenue & University Avenue	C	C	C	C	C	C	N
7	52nd Street & University Avenue	C	C	C	C	C	C	N
8	54th Street & University Avenue	C	C	C	D	D	D	N
9	Chollas Parkway & University Avenue [b]	D	**F**	D	**F**	N/A	N/A	N
10	58th Street & University Avenue	C	C	C	C	C	C	N
11	60th Street & University Avenue	A	A	A	B	B	B	N
12	College Avenue & University Avenue	D	**E**	**E**	**E**	**E/D***	**E/E***	**Y**
13	Rolando Boulevard & University Avenue	B	B	B	B	B	B	N
14	54th Street & Chollas Parkway [b]	**E**	**F**	**F**	**F**	N/A	N/A	N
15	54th Street & Streamview Drive	B	B	C	C	C	C	N
16	54th Street & Redwood Street	B	B	B	B	B	B	N
17	54th Street & College Grove Drive	C	C	C	C	C	C	N
18	Lea Street & University Avenue	N/A	N/A	N/A	N/A	C	D	N
19	54th Street & Lea Street	N/A	N/A	N/A	N/A	**E**	C	N
20	University Avenue & Street B	N/A	N/A	N/A	N/A	B	C	N
21	54th Street & Street C	N/A	N/A	N/A	N/A	B	A	N

Source: Fehr & Peers, June 2013

Notes:
[a] Intersection is stop-controlled
[b] Intersection is side-street stop-controlled
Bold letters indicate facilities operating at LOS E or worse
*LOS/LOS indicates Horizon LOS/Horizon LOS with Mitigation

The following key points summarize the intersection analyses:

Existing Conditions – all key study area intersections are currently operating at LOS D or better with the exception of the following:

9. Chollas Parkway & University Avenue (LOS F - PM Peak)
12. College Avenue & University Avenue (LOS E - PM Peak)
14. 54th Street & Chollas Parkway (LOS E – AM Peak, LOS F – PM Peak)

Horizon Year Base Conditions - all key study area intersections are projected to operate at LOS D or better under Horizon Year Base conditions, with the exception of the following:

9. Chollas Parkway & University Avenue (LOS F – AM Peak)
12. College Avenue & University Avenue (LOS E – AM & PM Peaks)
14. 54th Street & Chollas Parkway (LOS F – AM & PM Peaks)

Horizon Year Base Plus Project Conditions - all key study area intersections are projected to operate at LOS D or better under Horizon Year Base Plus Project conditions, with the exception of the following:

3. 54th Street & El Cajon Boulevard (LOS E – PM Peak)
12. College Avenue & University Avenue (LOS E – AM Peak, LOS E PM Peak)

Summary of Impacts and Mitigation Measures

Project-related impacts have been identified at three key study roadway segments and four key study intersections under Horizon Year Base Plus Project conditions, as summarized in the following sections, along with identification of mitigation recommendations.

Roadways

Based on the impact significance criteria presented in Section 4.1, under Horizon Year Base Plus Project conditions, the proposed project would have cumulative traffic related impacts on the following three roadway segments:

Montezuma Road between Fairmont Avenue and Collwood Boulevard

1. Based on the existing College Area Community Plan Circulation Element, this segment of Montezuma Road is constructed to its ultimate classification as a Four-Lane Major.

2. As noted in Table 6.4, the intersection of Collwood Boulevard & Montezuma Road, which binds the northern end of this segment, is projected to operate at LOS D during the PM peak hour. Therefore, no mitigation is required based on the projected operations at this controlling intersection. The westerly intersection of Montezuma Road & Fairmount Avenue is grade separated and would not have an impact on the operations of this segment.

3. The peak hour HCM arterial analysis indicates that this segment is projected to operate at LOS C or better, in both directions, during both the AM and PM peak hours (peak hour arterial analysis worksheets are provided in **Appendix J**)

This segment is impacted, but mitigation measures are not required based on the three criteria outlined above. This impact would therefore remain significant and unmitigated.

Collwood Boulevard between Montezuma Road and 54th Street

1. As noted in the Circulation Element of the existing College Area Community Plan, Collwood Boulevard is classified as a Four-Lane Collector. As noted in Section 6.0 of this report, Collwood Boulevard is currently constructed as a Two-Lane Collector.

Based on the City's criteria, the proposed project should pay a fair-share contribution to any future capacity enhancing improvements on this segment of Collwood Boulevard, which could alleviate the traffic-related impacts associated with the proposed project. An intersection improvement is discussed in the following section; however, the feasibility of the recommended improvement is undetermined. Therefore the impact is significant and unmitigated.

University Avenue between 54th Street and 58th Street

1. As noted in the Circulation Element of the existing Mid City Community Plan, University Avenue is classified as a Four-Lane Major. As noted in Section 6.0 of this report, Collwood Boulevard is currently constructed as a Four-Lane Collector.

Based on the City's criteria, the proposed project should pay a fair-share contribution to any future capacity enhancing improvements on this segment of University Avenue, which could alleviate the traffic-related impacts associated with the proposed project. A segment improvement is discussed in Chapter 6 that could mitigate the significant impact at this location.

Intersections

54th Street & El Cajon Boulevard

Restripe the southbound 54th Street approach to remove the existing right-turn lane and include a second southbound left-turn lane. This recommended lane configuration could fit in the existing 42' approach right-of-way by providing two 11' through lanes (consistent with what is currently in place) and two 10' left-turn lanes. However, based on the existing alignment of the receiving lanes the center-median may need to be sifted a few feet to the east. There would be no impact to on-street parking or transit stops due to this recommended improvement. The impact is fully mitigated.

College Avenue & University Avenue

Restripe both the northbound and southbound approaches to include a second left-turn lane. The lane configuration at both approaches will include 18' outside lane (curb lane), 10' inside lane, and dual 10' left turn lanes. However, based on the existing alignment of the receiving lanes the center-median may need to be shifted a few feet to the east for the southbound approach and to the west for the northbound approach. There would be no impact to on-street parking or transit stops due to this recommended improvement. The impact is fully mitigated.

7.2. ROPOSED PARKING SUPPLY

The final site plan of the project will be designed to City standards with adequate parking supply for typical operations demand per the City of San Diego Municipal Code parking requirements. The current site plan is conceptual only, does not include a detailed parking program, and will be refined once a project developer is selected.

APPENDIX A

TRAFFIC COUNT WORKSHEETS

Prepared by NDS/ATD

VOLUME

Montezuma Rd between Collwood Blvd & Fairmount Ave

Day: Tuesday
Date: 5/24/2011

City: San Diego
Project #: CA11_4148_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	20,546	21,000	41,546

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			81		42		123		12:00			260		273		533	
00:15			54		38		92		12:15			243		243		486	
00:30			46		31		77		12:30			260		283		543	
00:45			49	230	35	146	84	376	12:45			285	1048	285	1084	570	2132
01:00			33		25		58		13:00			292		291		583	
01:15			45		10		55		13:15			272		277		549	
01:30			33		15		48		13:30			290		286		576	
01:45			29	140	12	62	41	202	13:45			319	1173	305	1159	624	2332
02:00			27		16		43		14:00			335		368		703	
02:15			22		9		31		14:15			314		265		579	
02:30			27		15		42		14:30			388		297		685	
02:45			23	99	10	50	33	149	14:45			385	1422	302	1232	687	2654
03:00			13		13		26		15:00			395		344		739	
03:15			14		10		24		15:15			442		387		829	
03:30			17		17		34		15:30			435		425		860	
03:45			13	57	27	67	40	124	15:45			455	1727	311	1467	766	3194
04:00			9		18		27		16:00			428		328		756	
04:15			10		28		38		16:15			524		318		842	
04:30			9		34		43		16:30			449		330		779	
04:45			12	40	48	128	60	168	16:45			465	1866	347	1323	812	3189
05:00			11		72		83		17:00			550		340		890	
05:15			33		86		119		17:15			578		347		925	
05:30			38		167		205		17:30			527		371		898	
05:45			47	129	136	461	183	590	17:45			559	2214	336	1394	895	3608
06:00			64		158		222		18:00			489		309		798	
06:15			91		226		317		18:15			463		272		735	
06:30			107		362		469		18:30			387		299		686	
06:45			154	416	396	1142	550	1558	18:45			317	1656	343	1223	660	2879
07:00			141		471		612		19:00			313		267		580	
07:15			172		530		702		19:15			298		215		513	
07:30			205		565		770		19:30			290		189		479	
07:45			221	739	523	2089	744	2828	19:45			271	1172	197	868	468	2040
08:00			218		414		632		20:00			238		206		444	
08:15			220		399		619		20:15			265		204		469	
08:30			215		456		671		20:30			239		198		437	
08:45			209	862	367	1636	576	2498	20:45			259	1001	220	828	479	1829
09:00			191		327		518		21:00			255		176		431	
09:15			170		325		495		21:15			243		193		436	
09:30			221		332		553		21:30			220		204		424	
09:45			204	786	270	1254	474	2040	21:45			203	921	153	726	356	1647
10:00			185		218		403		22:00			182		118		300	
10:15			213		242		455		22:15			202		106		308	
10:30			209		251		460		22:30			163		94		257	
10:45			219	826	324	1035	543	1861	22:45			160	707	69	387	229	1094
11:00			187		268		455		23:00			120		74		194	
11:15			215		279		494		23:15			120		61		181	
11:30			226		251		477		23:30			85		46		131	
11:45			261	889	227	1025	488	1914	23:45			101	426	33	214	134	640
TOTALS				5213		9095		**14308**	**TOTALS**				15333		11905		**27238**
SPLIT %				36.4%		63.6%		**34.4%**	**SPLIT %**				56.3%		43.7%		**65.6%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	20,546	21,000	41,546

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour			11:45	07:00	**07:15**	**PM Peak Hour**			17:00	15:00	**17:00**
AM Pk Volume			1024	2089	**2848**	**PM Pk Volume**			2214	1467	**3608**
Pk Hr Factor			0.981	0.924	**0.925**	**Pk Hr Factor**			0.958	0.863	**0.975**
7 - 9 Volume	0	0	1601	3725	**5326**	**4 - 6 Volume**	0	0	4080	2717	**6797**
7 - 9 Peak Hour			07:45	07:00	**07:15**	**4 - 6 Peak Hour**			17:00	16:45	**17:00**
7 - 9 Pk Volume	0	0	874	2089	**2848**	**4 - 6 Pk Volume**	0	0	2214	1405	**3608**
Pk Hr Factor	0.000	0.000	0.989	0.924	**0.925**	**Pk Hr Factor**	0.000	0.000	0.958	0.947	**0.975**

Prepared by NDS/ATD

VOLUME

Montezuma Rd between Fairmont Ave & Collwood Blvd

Day: Wednesday
Date: 9/19/2012

City: San Diego
Project #: CA12_4329_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	23,777	25,797	49,574

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			78		41		119		**12:00**			275		391		666	
00:15			52		37		89		**12:15**			298		316		614	
00:30			49		31		80		**12:30**			320		305		625	
00:45			48	227	22	131	70	358	**12:45**			276	1169	311	1323	587	2492
01:00			33		18		51		**13:00**			310		422		732	
01:15			31		12		43		**13:15**			391		325		716	
01:30			29		16		45		**13:30**			369		329		698	
01:45			28	121	15	61	43	182	**13:45**			317	1387	351	1427	668	2814
02:00			24		16		40		**14:00**			315		456		771	
02:15			14		6		20		**14:15**			359		342		701	
02:30			21		18		39		**14:30**			366		340		706	
02:45			14	73	10	50	24	123	**14:45**			392	1432	304	1442	696	2874
03:00			16		14		30		**15:00**			454		377		831	
03:15			8		22		30		**15:15**			532		456		988	
03:30			6		24		30		**15:30**			555		549		1104	
03:45			10	40	15	75	25	115	**15:45**			513	2054	457	1839	970	3893
04:00			9		17		26		**16:00**			517		477		994	
04:15			13		29		42		**16:15**			526		358		884	
04:30			10		45		55		**16:30**			472		445		917	
04:45			18	50	63	154	81	204	**16:45**			612	2127	474	1754	1086	3881
05:00			17		81		98		**17:00**			589		493		1082	
05:15			27		99		126		**17:15**			599		445		1044	
05:30			39		159		198		**17:30**			641		457		1098	
05:45			55	138	193	532	248	670	**17:45**			633	2462	428	1823	1061	4285
06:00			77		211		288		**18:00**			624		423		1047	
06:15			93		257		350		**18:15**			559		411		970	
06:30			132		384		516		**18:30**			462		409		871	
06:45			156	458	471	1323	627	1781	**18:45**			427	2072	498	1741	925	3813
07:00			173		528		701		**19:00**			318		427		745	
07:15			229		607		836		**19:15**			386		271		657	
07:30			321		769		1090		**19:30**			309		232		541	
07:45			314	1037	707	2611	1021	3648	**19:45**			326	1339	199	1129	525	2468
08:00			286		718		1004		**20:00**			265		209		474	
08:15			365		552		917		**20:15**			285		231		516	
08:30			408		521		929		**20:30**			265		171		436	
08:45			303	1362	481	2272	784	3634	**20:45**			237	1052	183	794	420	1846
09:00			244		394		638		**21:00**			217		162		379	
09:15			272		307		579		**21:15**			258		167		425	
09:30			350		306		656		**21:30**			226		215		441	
09:45			271	1137	335	1342	606	2479	**21:45**			198	899	260	804	458	1703
10:00			238		321		559		**22:00**			196		154		350	
10:15			263		290		553		**22:15**			174		101		275	
10:30			256		317		573		**22:30**			158		115		273	
10:45			242	999	302	1230	544	2229	**22:45**			117	645	71	441	188	1086
11:00			238		321		559		**23:00**			115		76		191	
11:15			263		287		550		**23:15**			90		58		148	
11:30			284		294		578		**23:30**			89		53		142	
11:45			327	1112	369	1271	696	2383	**23:45**			91	385	41	228	132	613
TOTALS				6754		11052		**17806**	**TOTALS**				17023		14745		**31768**
SPLIT %				37.9%		62.1%		**35.9%**	**SPLIT %**				53.6%		46.4%		**64.1%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	23,777	25,797	49,574

AM Peak Hour			07:45	07:15	**07:30**	**PM Peak Hour**			17:15	15:15	**16:45**
AM Pk Volume			1373	2801	**4032**	**PM Pk Volume**			2497	1939	**4310**
Pk Hr Factor			0.841	0.911	**0.925**	**Pk Hr Factor**			0.974	0.883	**0.981**
7 - 9 Volume	0	0	2399	4883	**7282**	**4 - 6 Volume**	0	0	4589	3577	**8166**
7 - 9 Peak Hour			07:45	07:15	**07:30**	**4 - 6 Peak Hour**			17:00	16:45	**16:45**
7 - 9 Pk Volume	0	0	1373	2801	**4032**	**4 - 6 Pk Volume**	0	0	2462	1869	**4310**
Pk Hr Factor	0.000	0.000	0.841	0.911	**0.925**	**Pk Hr Factor**	0.000	0.000	0.960	0.948	**0.981**

Prepared by NDS/ATD

VOLUME

Collwood Blvd between Montezuma Rd & 54th St

Day: Tuesday
Date: 5/24/2011

City: San Diego
Project #: CA11_4148_002

DAILY TOTALS	NB	SB	EB	WB	Total
	10,327	11,113	0	0	21,440

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	18		42				60		12:00	121		153				274	
00:15	14		40				54		12:15	158		129				287	
00:30	12		20				32		12:30	135		142				277	
00:45	16	60	24	126			40	186	12:45	136	550	135	559			271	1109
01:00	6		19				25		13:00	122		145				267	
01:15	9		27				36		13:15	133		150				283	
01:30	17		16				33		13:30	150		149				299	
01:45	17	49	21	83			38	132	13:45	153	558	148	592			301	1150
02:00	15		18				33		14:00	176		171				347	
02:15	6		14				20		14:15	169		200				369	
02:30	8		17				25		14:30	145		245				390	
02:45	3	32	12	61			15	93	14:45	184	674	225	841			409	1515
03:00	4		11				15		15:00	168		210				378	
03:15	8		10				18		15:15	152		260				412	
03:30	15		7				22		15:30	178		236				414	
03:45	17	44	6	34			23	78	15:45	130	628	257	963			387	1591
04:00	15		4				19		16:00	143		248				391	
04:15	22		3				25		16:15	129		284				413	
04:30	42		5				47		16:30	165		259				424	
04:45	39	118	7	19			46	137	16:45	161	598	256	1047			417	1645
05:00	42		4				46		17:00	141		262				403	
05:15	71		13				84		17:15	176		305				481	
05:30	129		21				150		17:30	166		277				443	
05:45	100	342	34	72			134	414	17:45	138	621	279	1123			417	1744
06:00	145		40				185		18:00	155		284				439	
06:15	165		58				223		18:15	129		236				365	
06:30	251		68				319		18:30	148		232				380	
06:45	223	784	99	265			322	1049	18:45	116	548	154	906			270	1454
07:00	259		92				351		19:00	113		159				272	
07:15	274		103				377		19:15	85		193				278	
07:30	301		99				400		19:30	108		157				265	
07:45	257	1091	111	405			368	1496	19:45	92	398	161	670			253	1068
08:00	224		116				340		20:00	88		141				229	
08:15	198		111				309		20:15	75		121				196	
08:30	210		102				312		20:30	76		143				219	
08:45	210	842	111	440			321	1282	20:45	74	313	120	525			194	838
09:00	143		109				252		21:00	83		128				211	
09:15	159		89				248		21:15	62		123				185	
09:30	130		123				253		21:30	66		106				172	
09:45	150	582	105	426			255	1008	21:45	59	270	97	454			156	724
10:00	127		125				252		22:00	47		109				156	
10:15	116		98				214		22:15	36		109				145	
10:30	121		100				221		22:30	40		70				110	
10:45	130	494	113	436			243	930	22:45	40	163	74	362			114	525
11:00	126		101				227		23:00	35		62				97	
11:15	105		104				209		23:15	22		61				83	
11:30	124		126				250		23:30	27		53				80	
11:45	113	468	129	460			242	928	23:45	16	100	68	244			84	344
TOTALS		4906		2827				**7733**	**TOTALS**		5421		8286				**13707**
SPLIT %		63.4%		36.6%				**36.1%**	**SPLIT %**		39.5%		60.5%				**63.9%**

DAILY TOTALS	NB	SB	EB	WB	Total
	10,327	11,113	0	0	21,440

AM Peak Hour	07:00	11:45			**07:00**	**PM Peak Hour**	14:45	17:15			**17:15**
AM Pk Volume	1091	553			**1496**	**PM Pk Volume**	682	1145			**1780**
Pk Hr Factor	0.906	0.904			**0.935**	**Pk Hr Factor**	0.927	0.939			**0.925**
7 - 9 Volume	1933	845	0	0	**2778**	**4 - 6 Volume**	1219	2170	0	0	**3389**
7 - 9 Peak Hour	07:00	07:45			**07:00**	**4 - 6 Peak Hour**	16:45	17:00			**16:45**
7 - 9 Pk Volume	1091	440	0	0	**1496**	**4 - 6 Pk Volume**	644	1123	0	0	**1744**
Pk Hr Factor	0.906	0.948	0.000	0.000	**0.935**	**Pk Hr Factor**	0.915	0.920	0.000	0.000	**0.906**

Prepared by NDS/ATD

VOLUME

Collwood Blvd between Montezuma Rd & 54th St

Day: Wednesday
Date: 9/19/2012

City: San Diego
Project #: CA12_4329_002

DAILY TOTALS	NB	SB	EB	WB	Total
	11,189	12,989	0	0	24,178

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	24		62				86		**12:00**	132		195				327	
00:15	24		56				80		**12:15**	118		186				304	
00:30	18		30				48		**12:30**	158		196				354	
00:45	20	86	46	194			66	280	**12:45**	138	546	146	723			284	1269
01:00	7		32				39		**13:00**	165		153				318	
01:15	9		25				34		**13:15**	170		177				347	
01:30	8		28				36		**13:30**	157		160				317	
01:45	8	32	18	103			26	135	**13:45**	153	645	183	673			336	1318
02:00	9		13				22		**14:00**	148		189				337	
02:15	3		15				18		**14:15**	157		201				358	
02:30	9		22				31		**14:30**	150		207				357	
02:45	8	29	16	66			24	95	**14:45**	153	608	252	849			405	1457
03:00	11		11				22		**15:00**	141		251				392	
03:15	11		6				17		**15:15**	174		233				407	
03:30	18		2				20		**15:30**	185		276				461	
03:45	10	50	7	26			17	76	**15:45**	152	652	316	1076			468	1728
04:00	12		6				18		**16:00**	158		296				454	
04:15	27		7				34		**16:15**	135		270				405	
04:30	31		5				36		**16:30**	155		245				400	
04:45	41	111	18	36			59	147	**16:45**	155	603	285	1096			440	1699
05:00	49		15				64		**17:00**	145		264				409	
05:15	72		18				90		**17:15**	161		308				469	
05:30	140		18				158		**17:30**	167		303				470	
05:45	141	402	26	77			167	479	**17:45**	168	641	286	1161			454	1802
06:00	136		38				174		**18:00**	136		331				467	
06:15	181		50				231		**18:15**	151		315				466	
06:30	267		100				367		**18:30**	116		247				363	
06:45	287	871	118	306			405	1177	**18:45**	120	523	263	1156			383	1679
07:00	305		98				403		**19:00**	104		226				330	
07:15	321		126				447		**19:15**	91		233				324	
07:30	319		123				442		**19:30**	90		193				283	
07:45	304	1249	163	510			467	1759	**19:45**	97	382	207	859			304	1241
08:00	295		138				433		**20:00**	77		198				275	
08:15	295		129				424		**20:15**	90		185				275	
08:30	277		154				431		**20:30**	58		144				202	
08:45	255	1122	133	554			388	1676	**20:45**	62	287	147	674			209	961
09:00	173		117				290		**21:00**	74		121				195	
09:15	163		111				274		**21:15**	55		164				219	
09:30	178		133				311		**21:30**	69		146				215	
09:45	170	684	133	494			303	1178	**21:45**	59	257	136	567			195	824
10:00	145		127				272		**22:00**	53		120				173	
10:15	134		138				272		**22:15**	32		95				127	
10:30	169		145				314		**22:30**	51		79				130	
10:45	143	591	131	541			274	1132	**22:45**	37	173	72	366			109	539
11:00	112		132				244		**23:00**	33		80				113	
11:15	152		138				290		**23:15**	27		66				93	
11:30	134		165				299		**23:30**	31		58				89	
11:45	137	535	172	607			309	1142	**23:45**	19	110	71	275			90	385
TOTALS		5762		3514				**9276**	**TOTALS**		5427		9475				**14902**
SPLIT %		62.1%		37.9%				**38.4%**	**SPLIT %**		36.4%		63.6%				**61.6%**

DAILY TOTALS	NB	SB	EB	WB	Total
	11,189	12,989	0	0	24,178

AM Peak Hour	07:00	11:45			**07:15**	**PM Peak Hour**	15:15	17:30			**17:15**
AM Pk Volume	1249	749			**1789**	**PM Pk Volume**	669	1235			**1860**
Pk Hr Factor	0.973	0.955			**0.958**	**Pk Hr Factor**	0.904	0.933			**0.989**
7 - 9 Volume	2371	1064	0	0	**3435**	**4 - 6 Volume**	1244	2257	0	0	**3501**
7 - 9 Peak Hour	07:00	07:45			**07:15**	**4 - 6 Peak Hour**	17:00	17:00			**17:00**
7 - 9 Pk Volume	1249	584	0	0	**1789**	**4 - 6 Pk Volume**	641	1161	0	0	**1802**
Pk Hr Factor	0.973	0.896	0.000	0.000	**0.958**	**Pk Hr Factor**	0.954	0.942	0.000	0.000	**0.959**

Prepared by NDS/ATD

VOLUME

54th St between El Cajon Blvd & Trojan Ave

Day: Tuesday
Date: 5/24/2011

City: San Diego
Project #: CA11_4148_003

DAILY TOTALS	NB	SB	EB	WB	Total
	10,831	11,384	0	0	22,215

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	11		37				48		12:00	140		173				313	
00:15	6		34				40		12:15	172		174				346	
00:30	14		16				30		12:30	164		167				331	
00:45	15	46	22	109			37	155	12:45	162	638	149	663			311	1301
01:00	8		17				25		13:00	179		140				319	
01:15	7		13				20		13:15	162		147				309	
01:30	5		10				15		13:30	155		164				319	
01:45	8	28	19	59			27	87	13:45	166	662	179	630			345	1292
02:00	12		26				38		14:00	183		199				382	
02:15	7		15				22		14:15	208		188				396	
02:30	4		14				18		14:30	168		242				410	
02:45	4	27	12	67			16	94	14:45	201	760	233	862			434	1622
03:00	7		12				19		15:00	190		237				427	
03:15	7		6				13		15:15	168		239				407	
03:30	12		7				19		15:30	199		236				435	
03:45	12	38	7	32			19	70	15:45	137	694	270	982			407	1676
04:00	11		2				13		16:00	150		250				400	
04:15	16		2				18		16:15	143		254				397	
04:30	27		4				31		16:30	186		265				451	
04:45	31	85	10	18			41	103	16:45	165	644	278	1047			443	1691
05:00	32		9				41		17:00	167		276				443	
05:15	61		14				75		17:15	164		279				443	
05:30	96		26				122		17:30	180		278				458	
05:45	90	279	29	78			119	357	17:45	144	655	279	1112			423	1767
06:00	102		44				146		18:00	184		261				445	
06:15	129		61				190		18:15	158		222				380	
06:30	204		72				276		18:30	132		199				331	
06:45	220	655	133	310			353	965	18:45	137	611	189	871			326	1482
07:00	270		145				415		19:00	132		193				325	
07:15	276		109				385		19:15	136		162				298	
07:30	283		106				389		19:30	122		180				302	
07:45	235	1064	121	481			356	1545	19:45	109	499	143	678			252	1177
08:00	222		165				387		20:00	93		129				222	
08:15	186		138				324		20:15	96		115				211	
08:30	169		116				285		20:30	110		125				235	
08:45	173	750	115	534			288	1284	20:45	85	384	132	501			217	885
09:00	148		116				264		21:00	74		94				168	
09:15	165		103				268		21:15	71		108				179	
09:30	143		128				271		21:30	63		92				155	
09:45	141	597	127	474			268	1071	21:45	52	260	94	388			146	648
10:00	142		112				254		22:00	61		69				130	
10:15	125		123				248		22:15	48		76				124	
10:30	162		121				283		22:30	42		64				106	
10:45	166	595	124	480			290	1075	22:45	32	183	64	273			96	456
11:00	159		128				287		23:00	26		64				90	
11:15	130		133				263		23:15	16		43				59	
11:30	167		126				293		23:30	20		42				62	
11:45	141	597	150	537			291	1134	23:45	18	80	49	198			67	278
TOTALS		4761		3179				**7940**	**TOTALS**		6070		8205				**14275**
SPLIT %		60.0%		40.0%				**35.7%**	**SPLIT %**		42.5%		57.5%				**64.3%**

DAILY TOTALS	NB	SB	EB	WB	Total
	10,831	11,384	0	0	22,215

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour	07:00	11:45			**07:00**	**PM Peak Hour**	14:15	17:00			**16:45**
AM Pk Volume	1064	664			**1545**	**PM Pk Volume**	767	1112			**1787**
Pk Hr Factor	0.940	0.954			**0.931**	**Pk Hr Factor**	0.922	0.996			**0.975**
7 - 9 Volume	1814	1015	0	0	**2829**	**4 - 6 Volume**	1299	2159	0	0	**3458**
7 - 9 Peak Hour	07:00	07:45			**07:00**	**4 - 6 Peak Hour**	16:30	17:00			**16:45**
7 - 9 Pk Volume	1064	540	0	0	**1545**	**4 - 6 Pk Volume**	682	1112	0	0	**1787**
Pk Hr Factor	0.940	0.818	0.000	0.000	**0.931**	**Pk Hr Factor**	0.917	0.996	0.000	0.000	**0.975**

Prepared by NDS/ATD

VOLUME

University Ave between 52nd St & Euclid Ave

Day: Tuesday
Date: 5/24/2011

City: San Diego
Project #: CA11_4148_004

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	9,219	9,686	18,905

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			22		28		50		12:00			136		178		314	
00:15			26		15		41		12:15			161		127		288	
00:30			27		18		45		12:30			160		153		313	
00:45			7	82	7	68	14	150	12:45			138	595	182	640	320	1235
01:00			7		16		23		13:00			147		162		309	
01:15			4		9		13		13:15			151		139		290	
01:30			7		7		14		13:30			157		149		306	
01:45			10	28	9	41	19	69	13:45			152	607	140	590	292	1197
02:00			12		6		18		14:00			147		156		303	
02:15			10		8		18		14:15			157		155		312	
02:30			10		15		25		14:30			160		158		318	
02:45			7	39	9	38	16	77	14:45			176	640	164	633	340	1273
03:00			10		9		19		15:00			218		150		368	
03:15			9		7		16		15:15			179		197		376	
03:30			8		3		11		15:30			173		174		347	
03:45			6	33	6	25	12	58	15:45			167	737	187	708	354	1445
04:00			9		8		17		16:00			177		157		334	
04:15			9		10		19		16:15			179		188		367	
04:30			8		10		18		16:30			191		158		349	
04:45			11	37	27	55	38	92	16:45			157	704	172	675	329	1379
05:00			15		15		30		17:00			190		176		366	
05:15			22		20		42		17:15			206		174		380	
05:30			12		35		47		17:30			152		181		333	
05:45			32	81	39	109	71	190	17:45			204	752	154	685	358	1437
06:00			32		51		83		18:00			175		174		349	
06:15			58		67		125		18:15			166		168		334	
06:30			62		82		144		18:30			148		146		294	
06:45			102	254	111	311	213	565	18:45			135	624	158	646	293	1270
07:00			109		132		241		19:00			129		139		268	
07:15			84		167		251		19:15			129		135		264	
07:30			102		132		234		19:30			122		139		261	
07:45			113	408	153	584	266	992	19:45			116	496	153	566	269	1062
08:00			137		137		274		20:00			110		127		237	
08:15			102		155		257		20:15			112		118		230	
08:30			124		150		274		20:30			122		122		244	
08:45			108	471	134	576	242	1047	20:45			118	462	125	492	243	954
09:00			116		119		235		21:00			131		130		261	
09:15			107		100		207		21:15			96		104		200	
09:30			109		130		239		21:30			54		99		153	
09:45			114	446	109	458	223	904	21:45			80	361	70	403	150	764
10:00			114		116		230		22:00			56		57		113	
10:15			133		112		245		22:15			56		47		103	
10:30			156		137		293		22:30			42		53		95	
10:45			131	534	130	495	261	1029	22:45			44	198	37	194	81	392
11:00			113		144		257		23:00			38		29		67	
11:15			121		151		272		23:15			27		37		64	
11:30			137		135		272		23:30			32		21		53	
11:45			140	511	157	587	297	1098	23:45			22	119	20	107	42	226
TOTALS				2924		3347		**6271**	**TOTALS**				6295		6339		**12634**
SPLIT %				46.6%		53.4%		**33.2%**	**SPLIT %**				49.8%		50.2%		**66.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	9,219	9,686	18,905

AM Peak Hour			11:45	11:15	**11:45**	**PM Peak Hour**			17:00	15:15	**15:00**
AM Pk Volume			597	621	**1212**	**PM Pk Volume**			752	715	**1445**
Pk Hr Factor			0.927	0.872	**0.965**	**Pk Hr Factor**			0.913	0.907	**0.961**
7 - 9 Volume	0	0	879	1160	**2039**	**4 - 6 Volume**	0	0	1456	1360	**2816**
7 - 9 Peak Hour			07:45	07:45	**07:45**	**4 - 6 Peak Hour**			17:00	16:45	**17:00**
7 - 9 Pk Volume	0	0	476	595	**1071**	**4 - 6 Pk Volume**	0	0	752	703	**1437**
Pk Hr Factor	0.000	0.000	0.869	0.960	**0.977**	**Pk Hr Factor**	0.000	0.000	0.913	0.971	**0.945**

Prepared by NDS/ATD

VOLUME

54th St between Streamview Dr & Redwood St

Day: Tuesday
Date: 5/24/2011

City: San Diego
Project #: CA11_4148_005

DAILY TOTALS	NB	SB	EB	WB	Total
	9,848	9,634	0	0	19,482

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	12		23				35		12:00	168		136				304	
00:15	17		20				37		12:15	115		136				251	
00:30	18		10				28		12:30	135		139				274	
00:45	8	55	6	59			14	114	12:45	138	556	163	574			301	1130
01:00	13		10				23		13:00	167		143				310	
01:15	10		8				18		13:15	156		166				322	
01:30	12		6				18		13:30	125		133				258	
01:45	14	49	9	33			23	82	13:45	130	578	151	593			281	1171
02:00	6		8				14		14:00	161		157				318	
02:15	7		8				15		14:15	162		188				350	
02:30	12		9				21		14:30	174		192				366	
02:45	7	32	7	32			14	64	14:45	190	687	174	711			364	1398
03:00	8		11				19		15:00	154		206				360	
03:15	5		4				9		15:15	176		169				345	
03:30	8		6				14		15:30	180		198				378	
03:45	7	28	3	24			10	52	15:45	176	686	206	779			382	1465
04:00	6		9				15		16:00	160		206				366	
04:15	7		5				12		16:15	172		201				373	
04:30	12		8				20		16:30	169		194				363	
04:45	11	36	21	43			32	79	16:45	208	709	232	833			440	1542
05:00	17		32				49		17:00	166		212				378	
05:15	33		18				51		17:15	209		198				407	
05:30	31		45				76		17:30	159		198				357	
05:45	46	127	52	147			98	274	17:45	172	706	206	814			378	1520
06:00	47		54				101		18:00	145		202				347	
06:15	82		76				158		18:15	164		180				344	
06:30	124		79				203		18:30	146		178				324	
06:45	173	426	106	315			279	741	18:45	141	596	161	721			302	1317
07:00	175		115				290		19:00	147		129				276	
07:15	184		120				304		19:15	106		170				276	
07:30	184		139				323		19:30	142		152				294	
07:45	181	724	118	492			299	1216	19:45	127	522	125	576			252	1098
08:00	194		117				311		20:00	109		105				214	
08:15	135		138				273		20:15	95		106				201	
08:30	142		132				274		20:30	111		100				211	
08:45	160	631	126	513			286	1144	20:45	112	427	93	404			205	831
09:00	125		105				230		21:00	98		81				179	
09:15	114		98				212		21:15	84		85				169	
09:30	129		113				242		21:30	79		63				142	
09:45	140	508	99	415			239	923	21:45	67	328	71	300			138	628
10:00	136		103				239		22:00	66		54				120	
10:15	120		100				220		22:15	61		47				108	
10:30	119		118				237		22:30	45		55				100	
10:45	139	514	103	424			242	938	22:45	53	225	40	196			93	421
11:00	143		127				270		23:00	30		45				75	
11:15	150		130				280		23:15	46		42				88	
11:30	148		118				266		23:30	29		28				57	
11:45	130	571	116	491			246	1062	23:45	22	127	30	145			52	272
TOTALS		3701		2988				**6689**	**TOTALS**		6147		6646				**12793**
SPLIT %		55.3%		44.7%				**34.3%**	**SPLIT %**		48.0%		52.0%				**65.7%**

DAILY TOTALS	NB	SB	EB	WB	Total
	9,848	9,634	0	0	19,482

AM Peak Hour	07:15	11:45			**07:15**	**PM Peak Hour**	16:30	16:45			**16:30**
AM Pk Volume	743	527			**1237**	**PM Pk Volume**	752	840			**1588**
Pk Hr Factor	0.957	0.948			**0.957**	**Pk Hr Factor**	0.900	0.905			**0.902**
7 - 9 Volume	1355	1005	0	0	**2360**	**4 - 6 Volume**	1415	1647	0	0	**3062**
7 - 9 Peak Hour	07:15	08:00			**07:15**	**4 - 6 Peak Hour**	16:30	16:45			**16:30**
7 - 9 Pk Volume	743	513	0	0	**1237**	**4 - 6 Pk Volume**	752	840	0	0	**1588**
Pk Hr Factor	0.957	0.929	0.000	0.000	**0.957**	**Pk Hr Factor**	0.900	0.905	0.000	0.000	**0.902**

Prepared by NDS/ATD

VOLUME

54th St between College Grove Dr & Euclid Ave

Day: Tuesday
Date: 5/24/2011

City: San Diego
Project #: CA11_4148_006

DAILY TOTALS	NB	SB	EB	WB	Total
	9,249	9,893	0	0	19,142

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	10		19				29		12:00	143		125				268	
00:15	13		18				31		12:15	122		150				272	
00:30	16		10				26		12:30	140		136				276	
00:45	9	48	9	56			18	104	12:45	158	563	156	567			314	1130
01:00	5		8				13		13:00	168		155				323	
01:15	6		8				14		13:15	144		160				304	
01:30	12		7				19		13:30	118		126				244	
01:45	13	36	9	32			22	68	13:45	144	574	144	585			288	1159
02:00	3		12				15		14:00	143		160				303	
02:15	4		8				12		14:15	165		148				313	
02:30	8		10				18		14:30	193		191				384	
02:45	6	21	5	35			11	56	14:45	190	691	206	705			396	1396
03:00	6		6				12		15:00	170		203				373	
03:15	3		5				8		15:15	154		180				334	
03:30	9		7				16		15:30	162		200				362	
03:45	8	26	5	23			13	49	15:45	181	667	199	782			380	1449
04:00	8		9				17		16:00	172		191				363	
04:15	8		6				14		16:15	191		187				378	
04:30	9		20				29		16:30	176		197				373	
04:45	12	37	19	54			31	91	16:45	188	727	206	781			394	1508
05:00	17		45				62		17:00	175		213				388	
05:15	31		31				62		17:15	172		180				352	
05:30	35		63				98		17:30	185		181				366	
05:45	58	141	63	202			121	343	17:45	174	706	197	771			371	1477
06:00	53		71				124		18:00	135		188				323	
06:15	106		104				210		18:15	160		148				308	
06:30	158		106				264		18:30	133		151				284	
06:45	193	510	125	406			318	916	18:45	126	554	154	641			280	1195
07:00	126		116				242		19:00	123		147				270	
07:15	119		140				259		19:15	91		163				254	
07:30	144		154				298		19:30	110		147				257	
07:45	130	519	149	559			279	1078	19:45	123	447	129	586			252	1033
08:00	134		127				261		20:00	82		96				178	
08:15	115		145				260		20:15	114		102				216	
08:30	147		146				293		20:30	82		106				188	
08:45	147	543	157	575			304	1118	20:45	109	387	102	406			211	793
09:00	119		138				257		21:00	82		75				157	
09:15	100		137				237		21:15	74		83				157	
09:30	103		135				238		21:30	78		72				150	
09:45	123	445	131	541			254	986	21:45	67	301	69	299			136	600
10:00	134		111				245		22:00	55		47				102	
10:15	107		107				214		22:15	56		50				106	
10:30	102		116				218		22:30	52		70				122	
10:45	109	452	105	439			214	891	22:45	54	217	41	208			95	425
11:00	123		120				243		23:00	33		36				69	
11:15	131		144				275		23:15	37		43				80	
11:30	134		119				253		23:30	22		28				50	
11:45	134	522	124	507			258	1029	23:45	23	115	26	133			49	248
TOTALS		3300		3429				**6729**	**TOTALS**		5949		6464				**12413**
SPLIT %		49.0%		51.0%				**35.2%**	**SPLIT %**		47.9%		52.1%				**64.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	9,249	9,893	0	0	19,142

AM Peak Hour	06:30	08:15			**08:00**	**PM Peak Hour**	16:15	16:15			**16:15**
AM Pk Volume	596	586			**1118**	**PM Pk Volume**	730	803			**1533**
Pk Hr Factor	0.772	0.933			**0.919**	**Pk Hr Factor**	0.955	0.942			**0.973**
7 - 9 Volume	1062	1134	0	0	**2196**	**4 - 6 Volume**	1433	1552	0	0	**2985**
7 - 9 Peak Hour	08:00	07:30			**08:00**	**4 - 6 Peak Hour**	16:15	16:15			**16:15**
7 - 9 Pk Volume	543	575	0	0	**1118**	**4 - 6 Pk Volume**	730	803	0	0	**1533**
Pk Hr Factor	0.923	0.933	0.000	0.000	**0.919**	**Pk Hr Factor**	0.955	0.942	0.000	0.000	**0.973**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-001

54TH N-O UNIVERSITY

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	20		30					12:00	169		210				
00:15	22		22					12:15	146		263				
00:30	16		29					12:30	138		269				
00:45	11	69	31	112			181	12:45	167	620	257	999			1619
01:00	5		26					13:00	145		266				
01:15	8		22					13:15	163		300				
01:30	9		15					13:30	170		269				
01:45	5	27	10	73			100	13:45	166	644	317	1152			1796
02:00	4		8					14:00	165		294				
02:15	7		8					14:15	192		297				
02:30	8		10					14:30	199		324				
02:45	10	29	11	37			66	14:45	166	722	292	1207			1929
03:00	12		5					15:00	183		303				
03:15	18		4					15:15	199		290				
03:30	22		8					15:30	200		302				
03:45	16	68	4	21			89	15:45	214	796	315	1210			2006
04:00	12		4					16:00	164		288				
04:15	20		6					16:15	195		318				
04:30	18		8					16:30	204		288				
04:45	29	79	9	27			106	16:45	224	787	312	1206			1993
05:00	33		15					17:00	174		316				
05:15	31		22					17:15	193		345				
05:30	68		16					17:30	180		312				
05:45	95	227	26	79			306	17:45	181	728	288	1261			1989
06:00	84		33					18:00	141		251				
06:15	121		35					18:15	143		233				
06:30	144		44					18:30	143		202				
06:45	226	575	77	189			764	18:45	127	554	218	904			1458
07:00	288		126					19:00	155		235				
07:15	326		195					19:15	122		215				
07:30	277		166					19:30	116		200				
07:45	303	1194	138	625			1819	19:45	103	496	184	834			1330
08:00	262		149					20:00	108		121				
08:15	235		133					20:15	79		101				
08:30	233		161					20:30	88		90				
08:45	202	932	151	594			1526	20:45	80	355	88	400			755
09:00	215		125					21:00	77		60				
09:15	211		123					21:15	76		95				
09:30	184		129					21:30	73		101				
09:45	133	743	126	503			1246	21:45	77	303	88	344			647
10:00	121		114					22:00	48		70				
10:15	118		128					22:15	38		92				
10:30	126		145					22:30	41		80				
10:45	135	500	146	533			1033	22:45	40	167	51	293			460
11:00	162		161					23:00	33		66				
11:15	177		162					23:15	30		48				
11:30	184		162					23:30	26		44				
11:45	151	674	169	654			1328	23:45	14	103	35	193			296
Total Vol.		5117		3447			**8564**			6275		10003			**16278**

Daily Totals

NB	SB	EB	WB	**Combined**
11392	13450			**24842**

	AM			**PM**		
Split %	59.8%	40.2%	**34.5%**	38.5%	61.5%	**65.5%**
Peak Hour	07:00	11:45	**07:00**	16:15	16:45	**16:30**
Volume	1194	911	**1819**	797	1285	**2056**
P.H.F.	0.92	0.85	**0.87**	0.95	0.93	**0.96**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-002

54TH S-O UNIVERSITY

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	20		20					12:00	143		115				
00:15	22		19					12:15	115		139				
00:30	19		26					12:30	97		127				
00:45	11	72	20	85			157	12:45	107	462	131	512			974
01:00	10		18					13:00	115		139				
01:15	19		15					13:15	135		115				
01:30	15		26					13:30	104		126				
01:45	12	56	12	71			127	13:45	138	492	129	509			1001
02:00	11		18					14:00	116		130				
02:15	9		10					14:15	138		141				
02:30	5		9					14:30	134		188				
02:45	8	33	5	42			75	14:45	139	527	169	628			1155
03:00	12		8					15:00	157		193				
03:15	8		4					15:15	141		187				
03:30	9		8					15:30	168		197				
03:45	12	41	10	30			71	15:45	164	630	200	777			1407
04:00	18		5					16:00	145		200				
04:15	10		4					16:15	128		209				
04:30	19		8					16:30	131		215				
04:45	22	69	15	32			101	16:45	157	561	211	835			1396
05:00	26		12					17:00	156		209				
05:15	20		15					17:15	146		229				
05:30	33		10					17:30	146		228				
05:45	48	127	22	59			186	17:45	124	572	214	880			1452
06:00	55		26					18:00	132		195				
06:15	68		30					18:15	102		171				
06:30	75		44					18:30	110		184				
06:45	108	306	51	151			457	18:45	125	469	168	718			1187
07:00	121		88					19:00	104		141				
07:15	195		115					19:15	104		131				
07:30	211		121					19:30	92		125				
07:45	249	776	107	431			1207	19:45	76	376	105	502			878
08:00	207		83					20:00	78		110				
08:15	165		84					20:15	59		93				
08:30	174		100					20:30	69		92				
08:45	142	688	108	375			1063	20:45	57	263	86	381			644
09:00	184		97					21:00	67		85				
09:15	129		75					21:15	54		94				
09:30	113		91					21:30	61		86				
09:45	130	556	102	365			921	21:45	61	243	80	345			588
10:00	132		98					22:00	34		47				
10:15	102		84					22:15	35		55				
10:30	100		99					22:30	34		45				
10:45	120	454	114	395			849	22:45	33	136	53	200			336
11:00	125		93					23:00	26		37				
11:15	119		93					23:15	35		43				
11:30	141		105					23:30	16		34				
11:45	105	490	132	423			913	23:45	17	94	34	148			242
Total Vol.		3668		2459			**6127**			4825		6435			**11260**

Daily Totals

NB	SB	EB	WB	**Combined**
8493	8894			**17387**

	AM			PM		
Split %	59.9%	40.1%	**35.2%**	42.9%	57.1%	**64.8%**
Peak Hour	07:15	11:45	**07:15**	15:00	17:00	**16:45**
Volume	862	513	**1288**	630	880	**1482**
P.H.F.	0.87	0.92	**0.90**	0.94	0.96	**0.99**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-003

UNIVERSITY W-O 54TH

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			30		28			12:00			185		329		
00:15			33		20			12:15			186		290		
00:30			26		35			12:30			164		270		
00:45			20	109	44	127	236	12:45			193	728	240	1129	1857
01:00			18		26			13:00			206		243		
01:15			15		18			13:15			171		270		
01:30			11		20			13:30			167		277		
01:45			9	53	16	80	133	13:45			193	737	278	1068	1805
02:00			5		11			14:00			181		285		
02:15			15		8			14:15			177		246		
02:30			10		9			14:30			188		281		
02:45			9	39	15	43	82	14:45			178	724	296	1108	1832
03:00			5		18			15:00			220		288		
03:15			10		9			15:15			244		314		
03:30			15		5			15:30			251		305		
03:45			9	39	4	36	75	15:45			252	967	284	1191	2158
04:00			8		15			16:00			240		333		
04:15			5		22			16:15			232		300		
04:30			12		26			16:30			244		297		
04:45			20	45	18	81	126	16:45			255	971	314	1244	2215
05:00			16		26			17:00			273		313		
05:15			18		35			17:15			275		323		
05:30			22		33			17:30			246		334		
05:45			35	91	51	145	236	17:45			218	1012	295	1265	2277
06:00			35		48			18:00			211		313		
06:15			44		66			18:15			190		252		
06:30			66		95			18:30			178		273		
06:45			95	240	135	344	584	18:45			193	772	233	1071	1843
07:00			168		141			19:00			173		218		
07:15			166		218			19:15			136		196		
07:30			135		226			19:30			150		221		
07:45			148	617	268	853	1470	19:45			131	590	216	851	1441
08:00			165		275			20:00			119		190		
08:15			139		284			20:15			102		192		
08:30			129		262			20:30			99		172		
08:45			158	591	218	1039	1630	20:45			106	426	140	694	1120
09:00			147		212			21:00			88		113		
09:15			154		198			21:15			97		160		
09:30			118		179			21:30			90		115		
09:45			133	552	219	808	1360	21:45			70	345	146	534	879
10:00			131		210			22:00			57		97		
10:15			164		197			22:15			69		92		
10:30			153		213			22:30			59		75		
10:45			145	593	192	812	1405	22:45			47	232	78	342	574
11:00			143		213			23:00			39		64		
11:15			150		232			23:15			32		89		
11:30			183		269			23:30			40		55		
11:45			181	657	254	968	1625	23:45			37	148	42	250	398
Total Vol.				3626		5336	**8962**					7652		10747	**18399**

Daily Totals

NB	SB	EB	WB	**Combined**
		11278	16083	**27361**

	AM			**PM**		
Split %	40.5%	59.5%	**32.8%**	41.6%	58.4%	**67.2%**
Peak Hour	11:30	11:45	**11:30**	16:45	16:45	**16:45**
Volume	735	1143	**1877**	1049	1284	**2333**
P.H.F.	0.99	0.87	**0.91**	0.95	0.96	**0.98**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-004

UNIVERSITY E-O 54TH

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			25		20			12:00			184		209		
00:15			20		18			12:15			171		164		
00:30			18		26			12:30			160		189		
00:45			26	89	22	86	175	12:45			185	700	205	767	1467
01:00			15		18			13:00			179		186		
01:15			10		21			13:15			187		202		
01:30			12		15			13:30			182		209		
01:45			9	46	10	64	110	13:45			186	734	192	789	1523
02:00			11		13			14:00			177		191		
02:15			9		10			14:15			181		183		
02:30			8		19			14:30			190		204		
02:45			7	35	22	64	99	14:45			187	735	201	779	1514
03:00			10		16			15:00			208		215		
03:15			5		11			15:15			214		226		
03:30			9		9			15:30			247		218		
03:45			5	29	5	41	70	15:45			284	953	235	894	1847
04:00			15		7			16:00			262		241		
04:15			10		26			16:15			245		223		
04:30			9		21			16:30			262		237		
04:45			12	46	26	80	126	16:45			284	1053	231	932	1985
05:00			18		28			17:00			292		217		
05:15			22		30			17:15			263		235		
05:30			26		33			17:30			257		196		
05:45			25	91	62	153	244	17:45			236	1048	225	873	1921
06:00			30		77			18:00			236		235		
06:15			35		84			18:15			235		226		
06:30			51		80			18:30			218		205		
06:45			66	182	135	376	558	18:45			204	893	218	884	1777
07:00			98		151			19:00			159		191		
07:15			105		140			19:15			140		162		
07:30			102		162			19:30			153		131		
07:45			121	426	226	679	1105	19:45			149	601	148	632	1233
08:00			135		235			20:00			112		140		
08:15			151		218			20:15			105		128		
08:30			144		177			20:30			115		128		
08:45			135	565	195	825	1390	20:45			104	436	119	515	951
09:00			122		151			21:00			94		81		
09:15			162		142			21:15			94		112		
09:30			142		146			21:30			89		88		
09:45			130	556	135	574	1130	21:45			70	347	92	373	720
10:00			119		156			22:00			80		74		
10:15			141		141			22:15			71		55		
10:30			162		126			22:30			73		61		
10:45			121	543	132	555	1098	22:45			45	269	54	244	513
11:00			135		148			23:00			43		41		
11:15			140		162			23:15			39		57		
11:30			162		170			23:30			42		39		
11:45			144	581	178	658	1239	23:45			34	158	36	173	331
Total Vol.				3189		4155	**7344**					7927		7855	**15782**

Daily Totals

NB	SB	EB	WB	**Combined**
		11116	12010	**23126**

	AM			PM		
Split %	43.4%	56.6%	**31.8%**	50.2%	49.8%	**68.2%**
Peak Hour	11:30	07:45	**07:45**	16:30	15:45	**16:30**
Volume	661	856	**1407**	1101	936	**2021**
P.H.F.	0.90	0.91	**0.95**	0.94	0.97	**0.98**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-005

UNIVERSITY BTN 58TH & UNIVERSITY SQUARE DWY

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			20		28			12:00			209		170		
00:15			17		26			12:15			166		182		
00:30			19		20			12:30			171		173		
00:45			20	76	19	93	169	12:45			173	719	187	712	1431
01:00			16		22			13:00			179		164		
01:15			11		15			13:15			186		180		
01:30			10		18			13:30			186		167		
01:45			15	52	10	65	117	13:45			195	746	168	679	1425
02:00			12		16			14:00			175		189		
02:15			8		20			14:15			164		159		
02:30			9		16			14:30			199		174		
02:45			5	34	11	63	97	14:45			179	717	206	728	1445
03:00			12		9			15:00			182		213		
03:15			10		5			15:15			231		206		
03:30			12		4			15:30			234		181		
03:45			19	53	10	28	81	15:45			240	887	210	810	1697
04:00			10		15			16:00			231		191		
04:15			5		18			16:15			239		200		
04:30			7		20			16:30			238		218		
04:45			9	31	16	69	100	16:45			246	954	211	820	1774
05:00			19		11			17:00			281		197		
05:15			20		9			17:15			253		227		
05:30			16		18			17:30			226		193		
05:45			35	90	22	60	150	17:45			231	991	212	829	1820
06:00			33		35			18:00			215		195		
06:15			48		30			18:15			210		185		
06:30			68		45			18:30			197		183		
06:45			89	238	78	188	426	18:45			198	820	145	708	1528
07:00			97		95			19:00			138		159		
07:15			135		126			19:15			131		149		
07:30			141		154			19:30			165		139		
07:45			162	535	162	537	1072	19:45			144	578	145	592	1170
08:00			145		184			20:00			123		134		
08:15			150		182			20:15			107		114		
08:30			149		132			20:30			121		119		
08:45			165	609	121	619	1228	20:45			93	444	102	469	913
09:00			170		135			21:00			88		91		
09:15			187		141			21:15			103		117		
09:30			132		121			21:30			92		93		
09:45			151	640	134	531	1171	21:45			79	362	96	397	759
10:00			116		126			22:00			70		77		
10:15			147		109			22:15			67		50		
10:30			146		144			22:30			55		50		
10:45			179	588	137	516	1104	22:45			38	230	42	219	449
11:00			156		137			23:00			36		42		
11:15			151		142			23:15			35		42		
11:30			164		155			23:30			28		44		
11:45			181	652	171	605	1257	23:45			40	139	25	153	292
Total Vol.				3598		3374	**6972**					7587		7116	**14703**

Daily Totals

NB	SB	EB	WB	**Combined**
		11185	10490	**21675**

	AM			**PM**		
Split %	51.6%	48.4%	**32.2%**	51.6%	48.4%	**67.8%**
Peak Hour	11:45	11:45	**11:45**	16:30	16:30	**16:30**
Volume	727	696	**1423**	1018	853	**1871**
P.H.F.	0.87	0.96	**0.94**	0.91	0.94	**0.97**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-007

UNIVERSITY BTN COLLEGE & CARTAGENA

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			10		20			12:00			150		130		
00:15			8		18			12:15			122		128		
00:30			9		10			12:30			151		121		
00:45			15	42	9	57	99	12:45			166	589	135	514	1103
01:00			8		5			13:00			146		148		
01:15			9		8			13:15			149		168		
01:30			15		10			13:30			164		166		
01:45			10	42	6	29	71	13:45			151	610	154	636	1246
02:00			18		4			14:00			145		128		
02:15			16		4			14:15			159		130		
02:30			11		5			14:30			159		119		
02:45			15	60	6	19	79	14:45			160	623	151	528	1151
03:00			9		8			15:00			187		140		
03:15			5		6			15:15			212		168		
03:30			4		5			15:30			172		188		
03:45			10	28	8	27	55	15:45			212	783	195	691	1474
04:00			6		10			16:00			213		164		
04:15			8		15			16:15			191		155		
04:30			5		18			16:30			185		141		
04:45			10	29	22	65	94	16:45			253	842	132	592	1434
05:00			15		10			17:00			217		151		
05:15			16		15			17:15			223		142		
05:30			20		20			17:30			205		135		
05:45			15	66	19	64	130	17:45			185	830	142	570	1400
06:00			22		33			18:00			198		150		
06:15			26		38			18:15			184		138		
06:30			54		42			18:30			151		122		
06:45			45	147	77	190	337	18:45			155	688	108	518	1206
07:00			55		84			19:00			139		105		
07:15			68		121			19:15			118		121		
07:30			121		116			19:30			109		126		
07:45			195	439	126	447	886	19:45			104	470	115	467	937
08:00			168		168			20:00			101		90		
08:15			141		149			20:15			87		88		
08:30			135		166			20:30			77		80		
08:45			142	586	148	631	1217	20:45			78	343	75	333	676
09:00			121		156			21:00			69		52		
09:15			108		142			21:15			86		40		
09:30			115		118			21:30			68		35		
09:45			126	470	126	542	1012	21:45			56	279	22	149	428
10:00			113		108			22:00			56		28		
10:15			104		122			22:15			42		41		
10:30			123		104			22:30			35		30		
10:45			110	450	114	448	898	22:45			31	164	20	119	283
11:00			128		127			23:00			30		20		
11:15			130		116			23:15			21		26		
11:30			117		126			23:30			37		27		
11:45			133	508	112	481	989	23:45			21	109	23	96	205
Total Vol.				2867		3000	**5867**					6330		5213	**11543**

Daily Totals

NB	SB	EB	WB	**Combined**
		9197	8213	**17410**

	AM			**PM**		
Split %	48.9%	51.1%	**33.7%**	54.8%	45.2%	**66.3%**
Peak Hour	07:45	08:00	**07:45**	16:45	15:15	**15:15**
Volume	639	631	**1248**	898	715	**1524**
P.H.F.	0.82	0.94	**0.93**	0.89	0.92	**0.94**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-009

UNIVERSITY BTN ROLANDO & ARAGON

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			12		19			12:00			134		105		
00:15			18		18			12:15			135		137		
00:30			20		15			12:30			142		113		
00:45			16	66	11	63	129	12:45			151	562	118	473	1035
01:00			11		8			13:00			124		121		
01:15			9		9			13:15			147		113		
01:30			5		5			13:30			157		119		
01:45			8	33	4	26	59	13:45			148	576	110	463	1039
02:00			8		5			14:00			145		101		
02:15			5		11			14:15			163		112		
02:30			4		2			14:30			155		107		
02:45			6	23	6	24	47	14:45			149	612	125	445	1057
03:00			9		8			15:00			188		140		
03:15			12		9			15:15			185		142		
03:30			20		5			15:30			179		157		
03:45			15	56	4	26	82	15:45			184	736	114	553	1289
04:00			11		5			16:00			224		138		
04:15			15		6			16:15			179		144		
04:30			8		10			16:30			202		149		
04:45			9	43	5	26	69	16:45			190	795	155	586	1381
05:00			12		8			17:00			215		134		
05:15			18		9			17:15			199		134		
05:30			22		15			17:30			188		133		
05:45			26	78	20	52	130	17:45			172	774	142	543	1317
06:00			35		33			18:00			187		116		
06:15			33		48			18:15			154		118		
06:30			42		88			18:30			133		91		
06:45			51	161	70	239	400	18:45			132	606	101	426	1032
07:00			99		92			19:00			111		74		
07:15			104		104			19:15			98		100		
07:30			111		102			19:30			99		77		
07:45			121	435	121	419	854	19:45			94	402	90	341	743
08:00			130		135			20:00			94		68		
08:15			126		141			20:15			71		72		
08:30			162		144			20:30			66		68		
08:45			122	540	119	539	1079	20:45			74	305	64	272	577
09:00			121		105			21:00			60		54		
09:15			108		80			21:15			75		48		
09:30			98		99			21:30			65		39		
09:45			118	445	90	374	819	21:45			44	244	44	185	429
10:00			94		98			22:00			45		41		
10:15			90		104			22:15			31		32		
10:30			104		126			22:30			38		24		
10:45			112	400	105	433	833	22:45			17	131	18	115	246
11:00			115		99			23:00			22		21		
11:15			114		91			23:15			24		22		
11:30			100		117			23:30			24		17		
11:45			118	447	126	433	880	23:45			20	90	13	73	163
Total Vol.				2727		2654	**5381**					5833		4475	**10308**

Daily Totals

NB	SB	EB	WB	**Combined**
		8560	7129	**15689**

	AM			**PM**		
Split %	50.7%	49.3%	**34.3%**	56.6%	43.4%	**65.7%**
Peak Hour	08:00	07:45	**07:45**	16:30	16:00	**16:00**
Volume	540	541	**1080**	806	586	**1381**
P.H.F.	0.83	0.94	**0.88**	0.94	0.95	**0.95**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-010

COLLEGE N-O UNIVERSITY

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	28		30					12:00	175		152				
00:15	20		28					12:15	227		161				
00:30	33		44					12:30	204		161				
00:45	25	106	26	128			234	12:45	202	808	180	654			1462
01:00	19		20					13:00	182		173				
01:15	12		19					13:15	189		150				
01:30	18		20					13:30	194		160				
01:45	20	69	18	77			146	13:45	216	781	134	617			1398
02:00	16		20					14:00	176		186				
02:15	11		16					14:15	185		204				
02:30	9		21					14:30	159		210				
02:45	5	41	15	72			113	14:45	195	715	195	795			1510
03:00	12		5					15:00	210		246				
03:15	9		9					15:15	230		208				
03:30	5		5					15:30	237		201				
03:45	12	38	10	29			67	15:45	220	897	260	915			1812
04:00	8		8					16:00	210		248				
04:15	7		7					16:15	205		247				
04:30	10		6					16:30	194		228				
04:45	8	33	8	29			62	16:45	207	816	198	921			1737
05:00	26		7					17:00	240		208				
05:15	22		20					17:15	224		273				
05:30	28		18					17:30	204		268				
05:45	33	109	22	67			176	17:45	246	914	263	1012			1926
06:00	41		26					18:00	216		222				
06:15	68		35					18:15	199		205				
06:30	66		44					18:30	174		180				
06:45	121	296	60	165			461	18:45	166	755	167	774			1529
07:00	180		77					19:00	174		170				
07:15	215		70					19:15	122		173				
07:30	235		98					19:30	130		120				
07:45	268	898	121	366			1264	19:45	135	561	109	572			1133
08:00	299		135					20:00	124		112				
08:15	289		122					20:15	108		101				
08:30	215		108					20:30	122		93				
08:45	220	1023	90	455			1478	20:45	93	447	92	398			845
09:00	235		116					21:00	110		95				
09:15	223		126					21:15	108		89				
09:30	235		131					21:30	107		104				
09:45	188	881	104	477			1358	21:45	67	392	83	371			763
10:00	150		114					22:00	90		72				
10:15	142		113					22:15	86		86				
10:30	191		107					22:30	61		53				
10:45	214	697	108	442			1139	22:45	55	292	62	273			565
11:00	178		125					23:00	52		51				
11:15	135		177					23:15	0		40				
11:30	133		144					23:30	0		48				
11:45	192	638	124	570			1208	23:45	0	52	27	166			218
Total Vol.		4829		2877			**7706**			7430		7468			**14898**

Daily Totals

NB	SB	EB	WB	Combined
12259	10345			**22604**

	AM			PM		
Split %	62.7%	37.3%	**34.1%**	49.9%	50.1%	**65.9%**
Peak Hour	07:30	11:45	**07:30**	17:00	17:15	**17:00**
Volume	1091	598	**1567**	914	1026	**1926**
P.H.F.	0.91	0.93	**0.90**	0.91	0.94	**0.95**

Prepared by NDS/ATD

VOLUME

College Av between El Cajon Blvd & University Ave

Day: Wednesday
Date: 9/19/2012

City: San Diego
Project #: CA12_4329_003

DAILY TOTALS	NB	SB	EB	WB	Total
	11,900	11,872	0	0	23,772

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	27		33				60		**12:00**	142		184				326	
00:15	25		24				49		**12:15**	161		178				339	
00:30	18		19				37		**12:30**	178		178				356	
00:45	15	85	21	97			36	182	**12:45**	134	615	196	736			330	1351
01:00	20		21				41		**13:00**	172		203				375	
01:15	10		22				32		**13:15**	152		181				333	
01:30	9		11				20		**13:30**	173		171				344	
01:45	14	53	18	72			32	125	**13:45**	183	680	165	720			348	1400
02:00	10		12				22		**14:00**	145		193				338	
02:15	12		6				18		**14:15**	153		189				342	
02:30	8		12				20		**14:30**	154		211				365	
02:45	10	40	6	36			16	76	**14:45**	174	626	180	773			354	1399
03:00	7		6				13		**15:00**	199		224				423	
03:15	5		7				12		**15:15**	240		204				444	
03:30	7		8				15		**15:30**	207		286				493	
03:45	9	28	9	30			18	58	**15:45**	209	855	284	998			493	1853
04:00	6		5				11		**16:00**	157		265				422	
04:15	8		12				20		**16:15**	180		247				427	
04:30	13		15				28		**16:30**	161		256				417	
04:45	26	53	18	50			44	103	**16:45**	204	702	277	1045			481	1747
05:00	26		20				46		**17:00**	192		281				473	
05:15	27		35				62		**17:15**	197		276				473	
05:30	37		35				72		**17:30**	186		258				444	
05:45	46	136	34	124			80	260	**17:45**	205	780	242	1057			447	1837
06:00	44		50				94		**18:00**	180		233				413	
06:15	72		45				117		**18:15**	194		229				423	
06:30	132		78				210		**18:30**	198		202				400	
06:45	188	436	80	253			268	689	**18:45**	173	745	225	889			398	1634
07:00	252		87				339		**19:00**	159		227				386	
07:15	291		113				404		**19:15**	137		182				319	
07:30	318		128				446		**19:30**	129		160				289	
07:45	292	1153	130	458			422	1611	**19:45**	145	570	129	698			274	1268
08:00	240		135				375		**20:00**	127		156				283	
08:15	283		108				391		**20:15**	135		174				309	
08:30	337		135				472		**20:30**	133		154				287	
08:45	233	1093	170	548			403	1641	**20:45**	108	503	127	611			235	1114
09:00	172		150				322		**21:00**	97		120				217	
09:15	155		111				266		**21:15**	122		116				238	
09:30	176		110				286		**21:30**	88		156				244	
09:45	152	655	125	496			277	1151	**21:45**	80	387	134	526			214	913
10:00	143		136				279		**22:00**	87		107				194	
10:15	137		129				266		**22:15**	58		78				136	
10:30	191		108				299		**22:30**	59		55				114	
10:45	165	636	144	517			309	1153	**22:45**	47	251	58	298			105	549
11:00	163		154				317		**23:00**	55		63				118	
11:15	143		171				314		**23:15**	38		44				82	
11:30	173		174				347		**23:30**	39		40				79	
11:45	175	654	153	652			328	1306	**23:45**	32	164	41	188			73	352
TOTALS		5022		3333				**8355**	**TOTALS**		6878		8539				**15417**
SPLIT %		60.1%		39.9%				**35.1%**	**SPLIT %**		44.6%		55.4%				**64.9%**

DAILY TOTALS	NB	SB	EB	WB	Total
	11,900	11,872	0	0	23,772

AM Peak Hour	07:00	11:45			**07:45**	**PM Peak Hour**	15:00	16:45			**16:45**
AM Pk Volume	1153	693			**1660**	**PM Pk Volume**	855	1092			**1871**
Pk Hr Factor	0.906	0.942			**0.879**	**Pk Hr Factor**	0.891	0.972			**0.972**
7 - 9 Volume	2246	1006	0	0	**3252**	**4 - 6 Volume**	1482	2102	0	0	**3584**
7 - 9 Peak Hour	07:00	08:00			**07:45**	**4 - 6 Peak Hour**	17:00	16:45			**16:45**
7 - 9 Pk Volume	1153	548	0	0	**1660**	**4 - 6 Pk Volume**	780	1092	0	0	**1871**
Pk Hr Factor	0.906	0.806	0.000	0.000	**0.879**	**Pk Hr Factor**	0.951	0.972	0.000	0.000	**0.972**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-011

COLLEGE S-O UNIVERSITY

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	28		33					12:00	156		167				
00:15	30		42					12:15	180		208				
00:30	33		29					12:30	185		199				
00:45	26	117	29	133			250	12:45	162	683	221	795			1478
01:00	19		30					13:00	145		194				
01:15	18		20					13:15	169		194				
01:30	20		15					13:30	201		169				
01:45	10	67	18	83			150	13:45	193	708	204	761			1469
02:00	9		22					14:00	153		233				
02:15	5		15					14:15	172		223				
02:30	8		11					14:30	177		245				
02:45	12	34	19	67			101	14:45	186	688	238	939			1627
03:00	15		9					15:00	199		214				
03:15	9		5					15:15	197		226				
03:30	5		8					15:30	214		268				
03:45	8	37	12	34			71	15:45	173	783	279	987			1770
04:00	12		19					16:00	187		254				
04:15	10		18					16:15	199		254				
04:30	9		26					16:30	218		287				
04:45	15	46	16	79			125	16:45	170	774	257	1052			1826
05:00	20		22					17:00	209		270				
05:15	22		32					17:15	240		294				
05:30	19		30					17:30	174		312				
05:45	32	93	42	126			219	17:45	229	852	280	1156			2008
06:00	33		44					18:00	203		277				
06:15	48		60					18:15	190		246				
06:30	68		66					18:30	174		220				
06:45	108	257	78	248			505	18:45	166	733	201	944			1677
07:00	138		99					19:00	144		199				
07:15	168		138					19:15	147		192				
07:30	151		142					19:30	125		154				
07:45	215	672	149	528			1200	19:45	137	553	152	697			1250
08:00	226		177					20:00	129		142				
08:15	208		152					20:15	121		125				
08:30	212		126					20:30	110		110				
08:45	182	828	135	590			1418	20:45	105	465	121	498			963
09:00	192		148					21:00	114		130				
09:15	217		140					21:15	111		103				
09:30	181		133					21:30	97		114				
09:45	142	732	129	550			1282	21:45	89	411	93	440			851
10:00	145		143					22:00	80		86				
10:15	157		151					22:15	56		95				
10:30	186		142					22:30	53		61				
10:45	200	688	141	577			1265	22:45	45	234	56	298			532
11:00	177		174					23:00	28		47				
11:15	141		183					23:15	0		47				
11:30	159		166					23:30	0		45				
11:45	167	644	176	699			1343	23:45	0	28	32	171			199
Total Vol.		4215		3714			**7929**			6912		8738			**15650**

Daily Totals

NB	SB	EB	WB	**Combined**
11127	12452			**23579**

	AM			**PM**		
Split %	53.2%	46.8%	**33.6%**	44.2%	55.8%	**66.4%**
Peak Hour	07:45	11:45	**07:45**	17:00	17:15	**17:15**
Volume	861	750	**1465**	852	1163	**2009**
P.H.F.	0.95	0.90	**0.91**	0.83	0.93	**0.94**

TUESDAY NOVEMBER 30, 2010 CITY: SAN DIEGO PROJECT: CA10-1203-03-012

CHOLLAS S-O UNIVERSITY

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	6		8					12:00	35		30				
00:15	9		9					12:15	32		29				
00:30	10		5					12:30	44		31				
00:45	5	30	8	30			60	12:45	35	146	37	127			273
01:00	9		4					13:00	35		37				
01:15	5		5					13:15	44		40				
01:30	7		1					13:30	44		32				
01:45	9	30	1	11			41	13:45	48	171	25	134			305
02:00	5		2					14:00	38		44				
02:15	5		2					14:15	27		26				
02:30	4		0					14:30	39		27				
02:45	10	24	4	8			32	14:45	41	145	33	130			275
03:00	5		5					15:00	38		34				
03:15	5		1					15:15	50		50				
03:30	6		2					15:30	52		38				
03:45	5	21	4	12			33	15:45	51	191	45	167			358
04:00	12		2					16:00	51		51				
04:15	5		2					16:15	56		45				
04:30	4		1					16:30	49		32				
04:45	5	26	6	11			37	16:45	54	210	31	159			369
05:00	1		2					17:00	67		52				
05:15	5		1					17:15	46		45				
05:30	9		7					17:30	50		34				
05:45	5	20	12	22			42	17:45	54	217	42	173			390
06:00	10		9					18:00	51		46				
06:15	15		5					18:15	47		40				
06:30	18		15					18:30	42		32				
06:45	26	69	20	49			118	18:45	42	182	30	148			330
07:00	22		26					19:00	27		38				
07:15	30		33					19:15	25		28				
07:30	40		35					19:30	38		30				
07:45	44	136	28	122			258	19:45	30	120	25	121			241
08:00	35		29					20:00	26		24				
08:15	42		33					20:15	16		22				
08:30	44		26					20:30	20		26				
08:45	66	187	28	116			303	20:45	25	87	20	92			179
09:00	58		30					21:00	19		21				
09:15	40		26					21:15	19		19				
09:30	35		21					21:30	15		15				
09:45	42	175	23	100			275	21:45	16	69	9	64			133
10:00	35		33					22:00	8		12				
10:15	31		28					22:15	8		11				
10:30	42		20					22:30	9		7				
10:45	29	137	19	100			237	22:45	3	28	1	31			59
11:00	33		16					23:00	8		7				
11:15	30		22					23:15	7		4				
11:30	28		18					23:30	4		8				
11:45	39	130	26	82			212	23:45	10	29	8	27			56
Total Vol.		985		663			**1648**			1595		1373			**2968**

Daily Totals

NB	SB	EB	WB	**Combined**
2580	2036			**4616**

	AM			**PM**		
Split %	59.8%	40.2%	**35.7%**	53.7%	46.3%	**64.3%**
Peak Hour	08:15	07:15	**08:15**	16:15	15:15	**17:00**
Volume	210	125	**327**	226	184	**390**
P.H.F.	0.80	0.89	**0.87**	0.95	0.90	**0.82**

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Collwood Blvd and Montezuma Rd , City of San Diego

Date: 5/24/2011

Day: Tuesday

Project #: CA11_4147_001

Peak Hour Summary

Collwood Blvd

Montezuma Rd

Southbound Approach

	↲	↓	↳	⇧
Lanes	0	0	0	
AM	0	0	0	0
NOON	0	0	0	0
PM	0	0	0	0

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Eastbound Approach

		AM	NOON	PM
⇦		2081	0	1379
↱	0	0	0	0
→	2	444	0	1057
↘	1	383	0	1133
	Lanes	AM	NOON	PM

CONTROL

Signalized

Westbound Approach

	AM	NOON	PM	Lanes
↰	0	0	0	0
←	992	0	763	2
↙	55	0	100	1
⇨	490	0	1123	
	AM	NOON	PM	

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

	⇩	↰	↑	↱
AM	438	1089	0	46
NOON	0	0	0	0
PM	1233	616	0	66
Lanes		1	1	1

Northbound Approach

Total Ins & Outs

North Leg

	⇩	⇧
AM	0	0
NOON	0	0
PM	0	0

West Leg

	AM	NOON	PM
⇦	2081	0	1379
⇨	827	0	2190

East Leg

	AM	NOON	PM
⇦	1047	0	863
⇨	490	0	1123

South Leg

	⇩	⇧
AM	438	1135
NOON	0	0
PM	1233	682

Total Volume Per Leg

	North Leg	West Leg	East Leg	South Leg
AM	0	2908	1537	1573
NOON	0	0	0	0
PM	0	3569	1986	1915

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

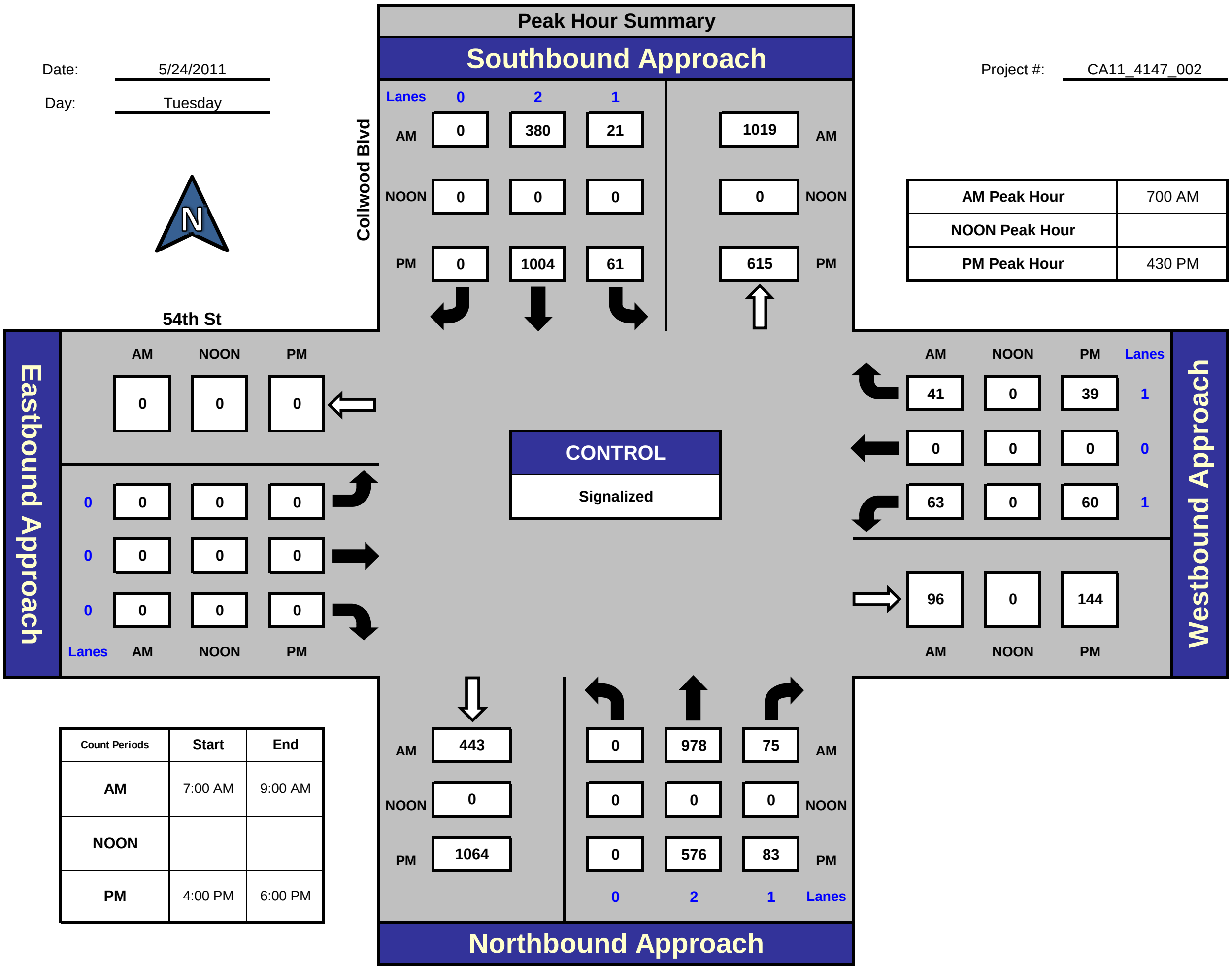
Collwood Blvd and 54th St , City of San Diego

Date: 5/24/2011

Day: Tuesday

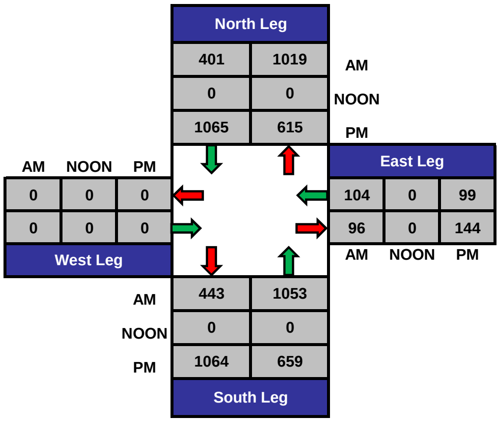
Project #: CA11_4147_002

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	430 PM

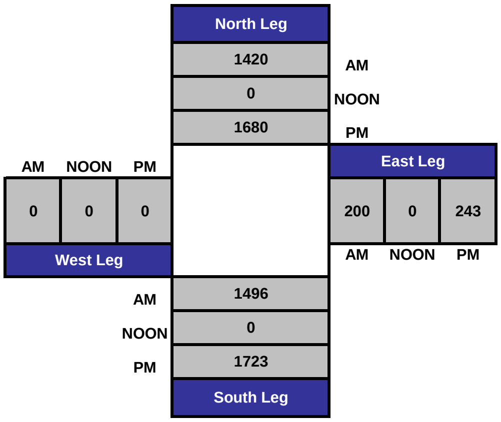


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

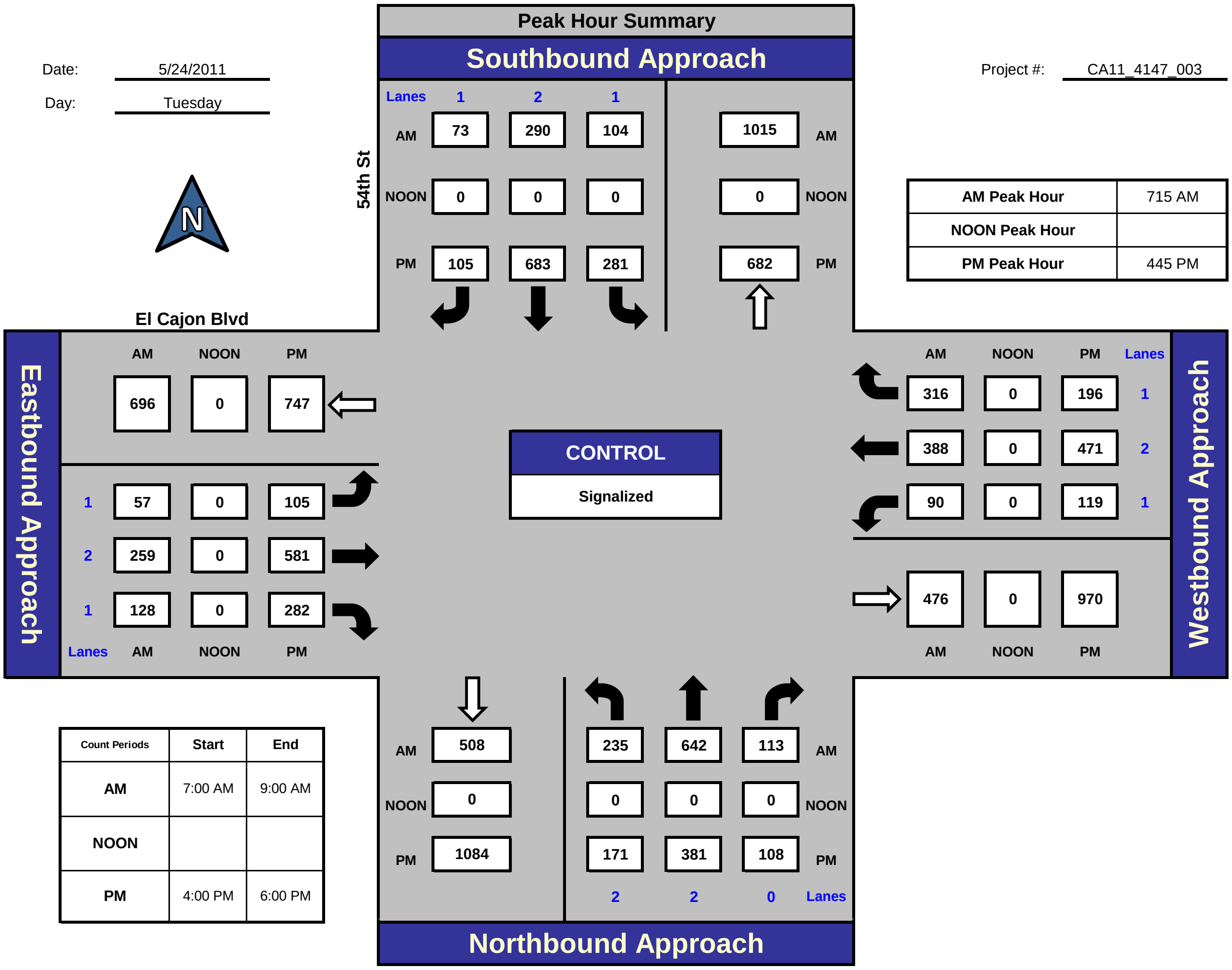
54th St and El Cajon Blvd , City of San Diego

Date: 5/24/2011

Day: Tuesday

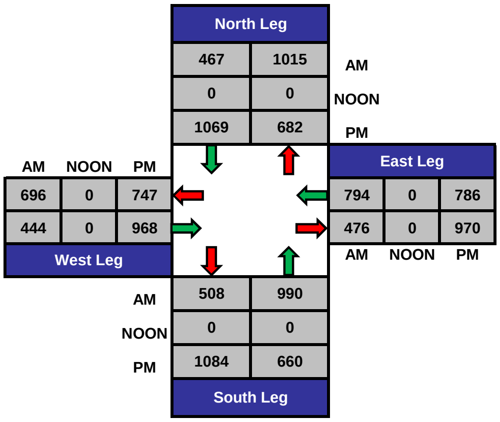
Project #: CA11_4147_003

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM

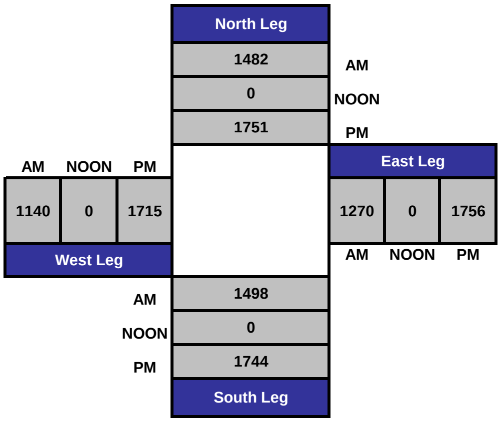


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

54th St and Trojan Ave , City of San Diego

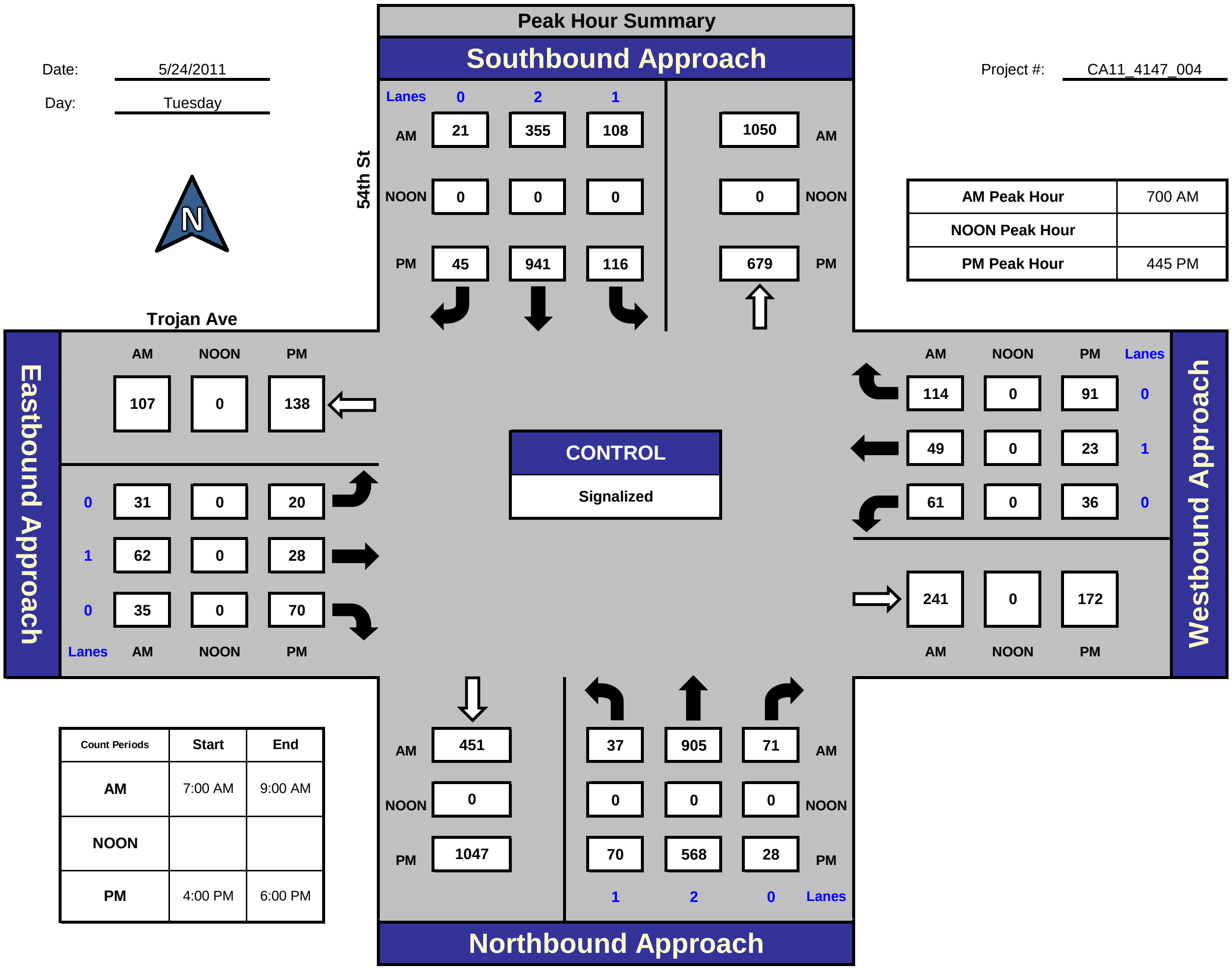
Date: 5/24/2011

Day: Tuesday

Project #: CA11_4147_004

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM



Peak Hour Summary

Southbound Approach

Lanes	0	2	1	
AM	21	355	108	1050
NOON	0	0	0	0
PM	45	941	116	679

Westbound Approach

	AM	NOON	PM	Lanes
	114	0	91	0
	49	0	23	1
	61	0	36	0
	241	0	172	

Eastbound Approach

Lanes	AM	NOON	PM
	107	0	138
0	31	0	20
1	62	0	28
0	35	0	70

CONTROL

Signalized

Northbound Approach

AM	451	37	905	71
NOON	0	0	0	0
PM	1047	70	568	28
Lanes		1	2	0

Total Ins & Outs

North Leg

AM	484	1050
NOON	0	0
PM	1102	679

East Leg

AM	NOON	PM
224	0	150
241	0	172

West Leg

AM	NOON	PM
107	0	138
128	0	118

South Leg

AM	451	1013
NOON	0	0
PM	1047	666

Total Volume Per Leg

North Leg

AM	1534
NOON	0
PM	1781

East Leg

AM	NOON	PM
465	0	322

West Leg

AM	NOON	PM
235	0	256

South Leg

AM	1464
NOON	0
PM	1713

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

54th Place and Orange Ave , City of San Diego

Date: 5/24/2011

Day: Tuesday

Project #: CA11_4147_005

Peak Hour Summary

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	445 PM

54th Place

Orange Ave

Southbound Approach

	↲	↓	↳	⇧
Lanes	0	1	0	
AM	33	12	42	46
NOON	0	0	0	0
PM	32	37	15	71

Eastbound Approach

	AM	NOON	PM
⇦	197	0	152

Lanes		AM	NOON	PM
0	↱	15	0	25
1	→	73	0	39
0	↴	4	0	7

Westbound Approach

	AM	NOON	PM	Lanes
↰	15	0	18	0
←	114	0	48	1
↙	8	0	8	0

	AM	NOON	PM
⇨	191	0	99

CONTROL

4-Way Stop

Northbound Approach

	⇩	↰	↑	↱
AM	24	50	16	76
NOON	0	0	0	0
PM	52	72	28	45
Lanes		0	1	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

AM	87	46
NOON	0	0
PM	84	71

West Leg

AM	NOON	PM
197	0	152
92	0	71

East Leg

AM	NOON	PM
137	0	74
191	0	99

South Leg

AM	24	142
NOON	0	0
PM	52	145

Total Volume Per Leg

	North Leg	West Leg	East Leg	South Leg
AM	133	289	328	166
NOON	0	0	0	0
PM	155	223	173	197

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Euclid Ave and University Ave , City of San Diego

Date: 5/25/2011

Day: Wednesday

Project #: CA11_4147_006

AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach

Euclid Ave

	↲	↓	↳	⇧	
Lanes	0	1	1		
AM	38	156	35	303	AM
NOON	0	0	0	0	NOON
PM	43	240	39	315	PM

University Ave

Eastbound Approach

	AM	NOON	PM	
	542	0	619	⇦
1	35	0	74	↱
2	347	0	521	→
0	32	0	87	↴
Lanes	AM	NOON	PM	

CONTROL

Signalized

Westbound Approach

	AM	NOON	PM	Lanes
↰	59	0	39	0
←	459	0	533	2
↙	117	0	158	1
⇨	488	0	695	
	AM	NOON	PM	

	⇩	↰	↑	↱	
AM	305	45	209	106	AM
NOON	0	0	0	0	NOON
PM	485	43	202	135	PM
		1	1	0	Lanes

Northbound Approach

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

229	303	AM
0	0	NOON
322	315	PM

West Leg

AM	NOON	PM
542	0	619
414	0	682

East Leg

635	0	730
488	0	695
AM	NOON	PM

South Leg

AM	305	360
NOON	0	0
PM	485	380

Total Volume Per Leg

North Leg

532	AM
0	NOON
637	PM

West Leg

AM	NOON	PM
956	0	1301

East Leg

1123	0	1425
AM	NOON	PM

South Leg

AM	665
NOON	0
PM	865

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

52nd St and University Ave , City of San Diego

Date: 5/25/2011

Day: Wednesday

Project #: CA11_4147_007

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

Peak Hour Summary

52nd St

Southbound Approach

Lanes	0	1	0		
AM	74	42	65	214	AM
NOON	0	0	0	0	NOON
PM	52	51	95	171	PM
	↲	↓	↳	⇧	

University Ave

Eastbound Approach

	AM	NOON	PM	
	641	0	708	⇦
1	69	0	65	↱
2	370	0	685	→
0	20	0	37	↴
Lanes	AM	NOON	PM	

CONTROL

Signalized

Westbound Approach

	AM	NOON	PM	Lanes
↰	96	0	55	0
←	525	0	616	2
↙	47	0	47	1
⇨	521	0	858	
	AM	NOON	PM	

Northbound Approach

	⇩	↰	↑	↱	
AM	109	42	49	86	AM
NOON	0	0	0	0	NOON
PM	135	40	51	78	PM
		0	1	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

181	214	AM
0	0	NOON
198	171	PM

West Leg

AM	NOON	PM
641	0	708
459	0	787

East Leg

668	0	718
521	0	858
AM	NOON	PM

South Leg

AM	109	177
NOON	0	0
PM	135	169

Total Volume Per Leg

North Leg

395	AM
0	NOON
369	PM

West Leg

AM	NOON	PM
1100	0	1495

East Leg

1189	0	1576
AM	NOON	PM

South Leg

AM	286
NOON	0
PM	304

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

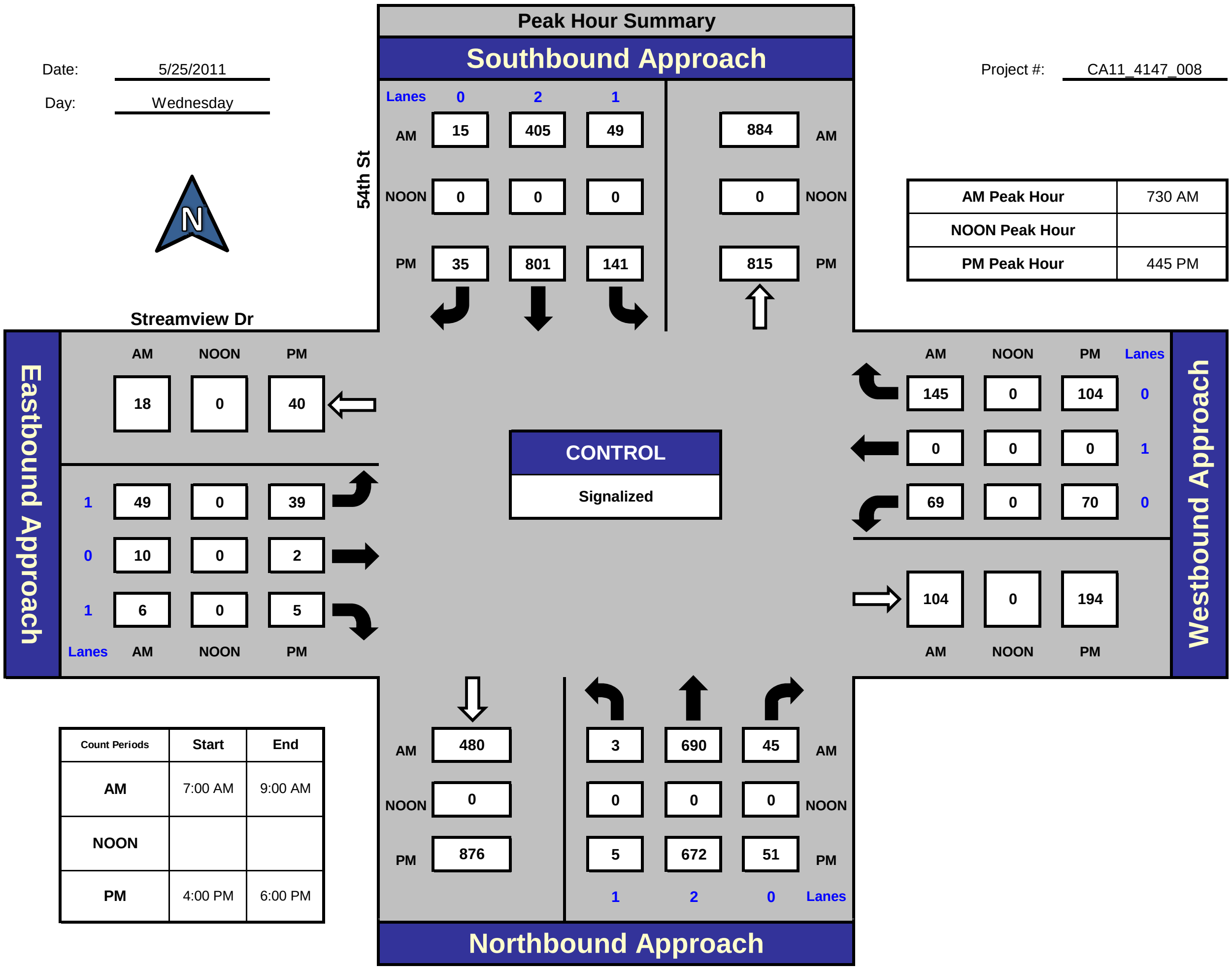
54th St and Streamview Dr , City of San Diego

Date: 5/25/2011

Day: Wednesday

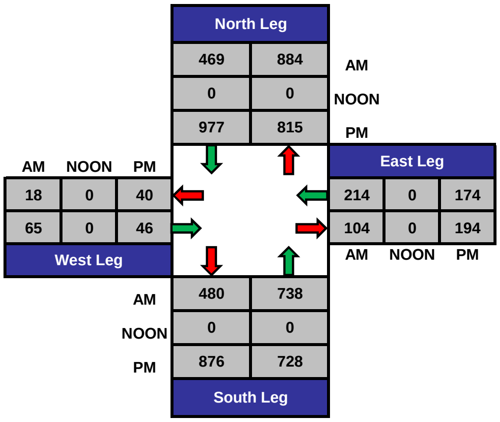
Project #: CA11_4147_008

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

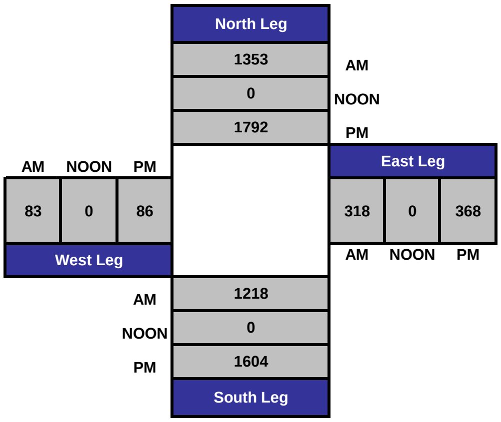


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

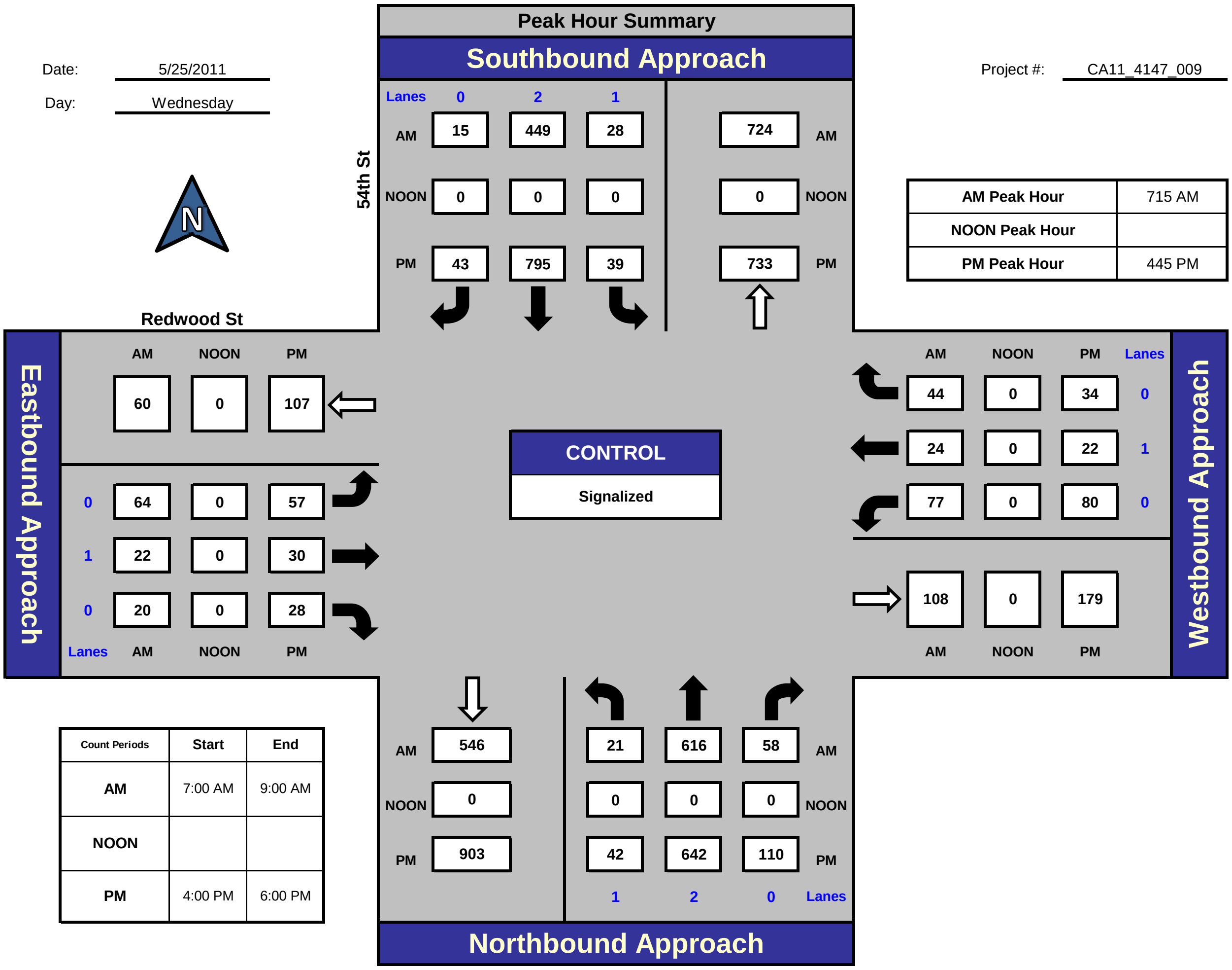
54th St and Redwood St , City of San Diego

Date: 5/25/2011

Day: Wednesday

Project #: CA11_4147_009

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM



Peak Hour Summary

Southbound Approach

Lanes	0	2	1		
AM	15	449	28	724	AM
NOON	0	0	0	0	NOON
PM	43	795	39	733	PM

Eastbound Approach

AM	NOON	PM
60	0	107

Lanes	AM	NOON	PM
0	64	0	57
1	22	0	30
0	20	0	28

CONTROL

Signalized

Westbound Approach

AM	NOON	PM	Lanes
44	0	34	0
24	0	22	1
77	0	80	0

108	0	179
AM	NOON	PM

Northbound Approach

AM	546	21	616	58	AM
NOON	0	0	0	0	NOON
PM	903	42	642	110	PM
		1	2	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

492	724	AM
0	0	NOON
877	733	PM

West Leg

AM	NOON	PM
60	0	107
106	0	115

East Leg

145	0	136
108	0	179
AM	NOON	PM

South Leg

AM	546	695
NOON	0	0
PM	903	794

Total Volume Per Leg

North Leg

1216	AM
0	NOON
1610	PM

West Leg

AM	NOON	PM
166	0	222

East Leg

253	0	315
AM	NOON	PM

South Leg

AM	1241
NOON	0
PM	1697

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

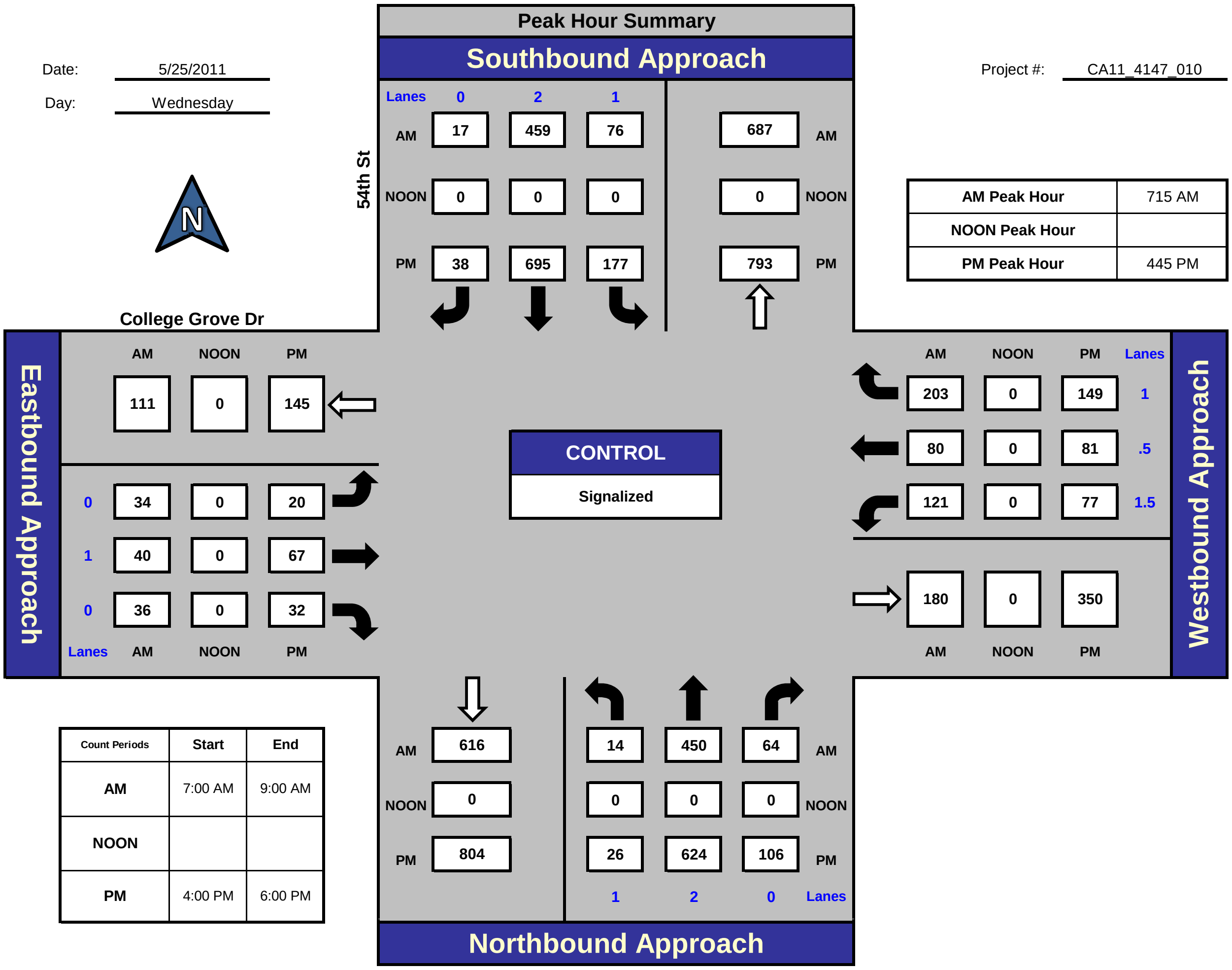
54th St and College Grove Dr , City of San Diego

Date: 5/25/2011

Day: Wednesday

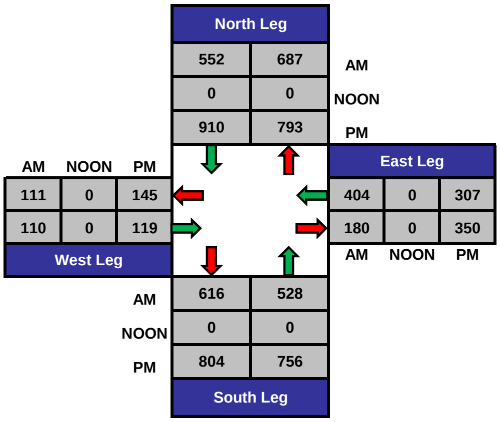
Project #: CA11_4147_010

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM

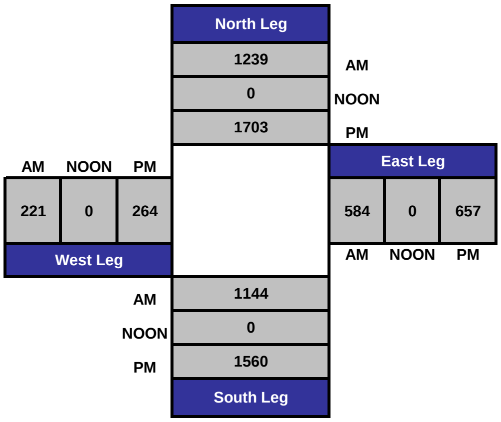


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TRAFFIC DATA SERVICES

DATE:	LOCATION:	SAN DIEGO	PROJECT #:	CA10-1203-03
12/1/10	NORTH & SOUTH:	54TH	LOCATION #:	1
WEDNESDAY	EAST & WEST:	UNIVERSITY	CONTROL:	SIGNAL

NOTES:

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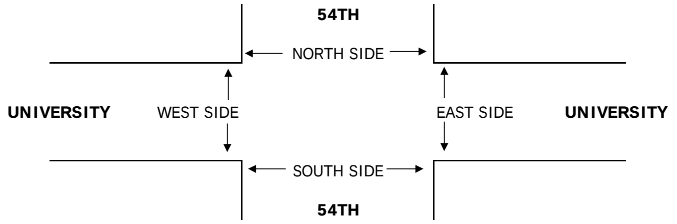
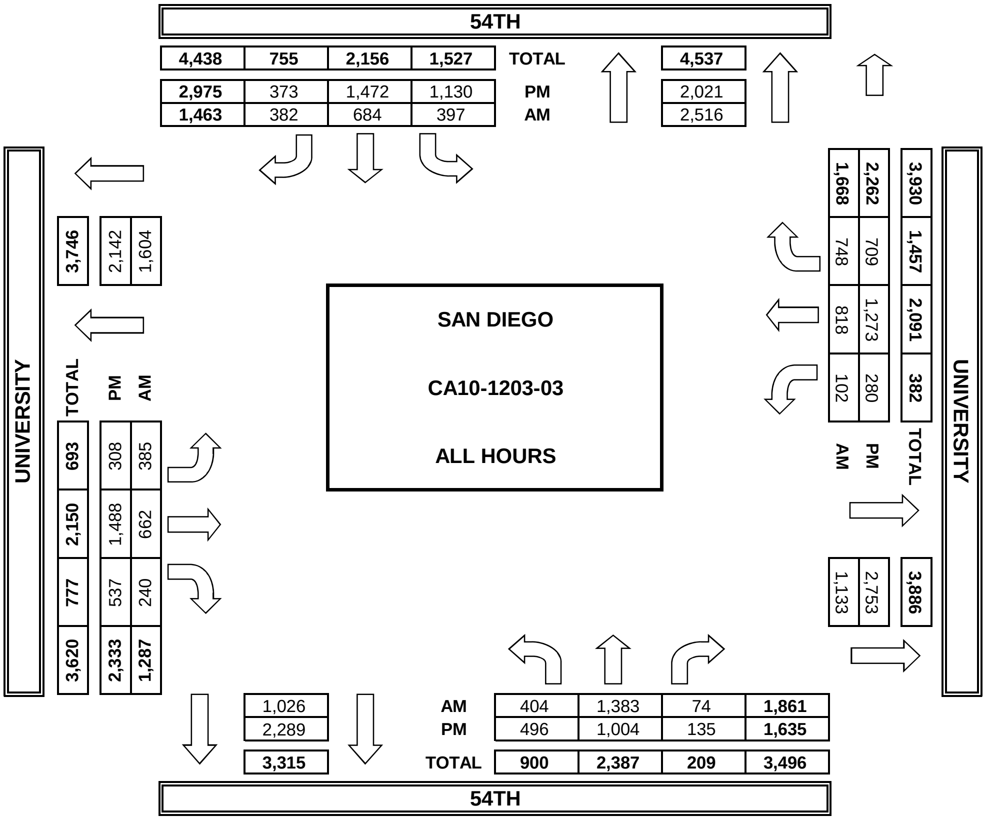
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND				U-TURNS				
		54TH			54TH			UNIVERSITY			UNIVERSITY								
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	1	2	3	1	1	2	1	1	2	1		X	X	X	X	
AM	6:30 AM	25	122	8	23	44	10	34	41	15	8	43	54	427					0
	6:45 AM	18	124	6	23	46	19	42	53	19	8	44	69	471					0
	7:00 AM	24	172	7	36	70	59	78	47	26	16	55	86	676					0
	7:15 AM	29	153	5	38	90	65	39	54	32	12	68	65	650					0
	7:30 AM	42	194	9	55	88	67	48	50	26	15	104	84	782					0
	7:45 AM	61	153	7	40	73	31	28	68	18	11	98	93	681					0
	8:00 AM	35	142	9	48	64	43	29	85	19	7	119	74	674					0
	8:15 AM	50	104	8	42	74	34	28	101	23	11	98	69	642					0
	8:30 AM	62	103	5	40	75	26	27	88	34	6	97	84	647					0
	8:45 AM	58	116	10	52	60	28	32	75	28	8	92	70	629					0
	VOLUMES	404	1,383	74	397	684	382	385	662	240	102	818	748	6,279	0	0	0	0	0
	APPROACH %	22%	74%	4%	27%	47%	26%	30%	51%	19%	6%	49%	45%						
	APP/DEPART	1,861	/	2,516	1,463	/	1,026	1,287	/	1,133	1,668	/	1,604	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	156	672	28	169	321	222	193	219	102	54	325	328	2,789					
	APPROACH %	18%	79%	3%	24%	45%	31%	38%	43%	20%	8%	46%	46%						
	PEAK HR FACTOR		0.873			0.848			0.851			0.871		0.892					
	APP/DEPART	856	/	1,193	712	/	477	514	/	416	707	/	703	0					
PM	3:30 PM	33	72	9	90	118	30	23	126	36	23	110	58	728		4			4
	3:45 PM	40	85	18	95	138	28	28	142	42	20	135	69	840		3			3
	4:00 PM	42	105	11	111	129	35	26	131	48	28	124	63	853		7			7
	4:15 PM	49	126	15	96	148	33	39	155	51	25	121	74	932		10			10
	4:30 PM	49	111	10	63	120	55	31	170	66	47	157	80	959		12			12
	4:45 PM	61	120	18	140	162	48	28	162	68	33	142	72	1,054		18			18
	5:00 PM	58	96	15	141	159	45	29	167	67	26	127	84	1,014		9			9
	5:15 PM	55	104	18	133	151	36	38	148	53	22	142	73	973		8			8
	5:30 PM	54	105	9	129	165	30	36	148	56	30	103	66	931		7			7
	5:45 PM	55	80	12	132	182	33	30	139	50	26	112	70	921		8			8
	VOLUMES	496	1,004	135	1,130	1,472	373	308	1,488	537	280	1,273	709	9,205	0	86	0	0	86
	APPROACH %	30%	61%	8%	38%	49%	13%	13%	64%	23%	12%	56%	31%						
	APP/DEPART	1,635	/	2,021	2,975	/	2,289	2,333	/	2,753	2,262	/	2,142	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	223	431	61	477	592	184	126	647	254	128	568	309	4,000					
	APPROACH %	31%	60%	9%	38%	47%	15%	12%	63%	25%	13%	57%	31%						
	PEAK HR FACTOR		0.898			0.895			0.962			0.885		0.949					
	APP/DEPART	715	/	866	1,253	/	974	1,027	/	1,185	1,005	/	975	0					



		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	6:30 AM	4	9	8	6	27					0	1	2	0	0	3
	6:45 AM	6	11	16	4	37					0	2	2	2	1	7
	7:00 AM	8	15	22	8	53					0	1	3	3	2	9
	7:15 AM	5	11	18	10	44					0	1	1	1	0	3
	7:30 AM	7	16	16	9	48					0	0	1	0	2	3
	7:45 AM	5	15	19	5	44					0	2	2	2	0	6
	8:00 AM	9	12	15	4	40					0	0	0	1	0	1
	8:15 AM	9	9	11	5	34					0	1	2	3	3	9
	8:30 AM	10	8	9	4	31					0	1	0	4	0	5
	8:45 AM	7	4	5	5	21					0	2	1	1	2	6
	TOTAL	70	110	139	60	379	0	0	0	0	0	11	14	17	10	52
PM	3:30 PM	5	7	3	4	19					0	0	4	5	6	15
	3:45 PM	4	8	6	8	26					0	2	2	4	0	8
	4:00 PM	9	9	5	8	31					0	1	0	1	1	3
	4:15 PM	6	15	5	9	35					0	6	1	1	2	10
	4:30 PM	12	18	4	10	44					0	5	2	0	2	9
	4:45 PM	7	5	9	5	26					0	0	2	5	0	7
	5:00 PM	5	7	6	9	27					0	1	4	1	5	11
	5:15 PM	4	12	8	6	30					0	5	1	0	0	6
	5:30 PM	2	13	4	5	24					0	2	5	2	2	11
	5:45 PM	1	9	5	4	19					0	2	0	3	2	7
	TOTAL	55	103	55	68	281	0	0	0	0	0	24	21	22	20	87

PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS



SAN DIEGO

CA10-1203-03

ALL HOURS

54TH (north)

4,438	**755**	**2,156**	**1,527**	**TOTAL**
2,975	373	1,472	1,130	**PM**
1,463	382	684	397	**AM**

TOTAL	**4,537**
PM	2,021
AM	2,516

UNIVERSITY (west)

TOTAL	**PM**	**AM**
3,746	2,142	1,604

TOTAL	**PM**	**AM**
693	308	385
2,150	1,488	662
777	537	240
3,620	**2,333**	**1,287**

UNIVERSITY (east)

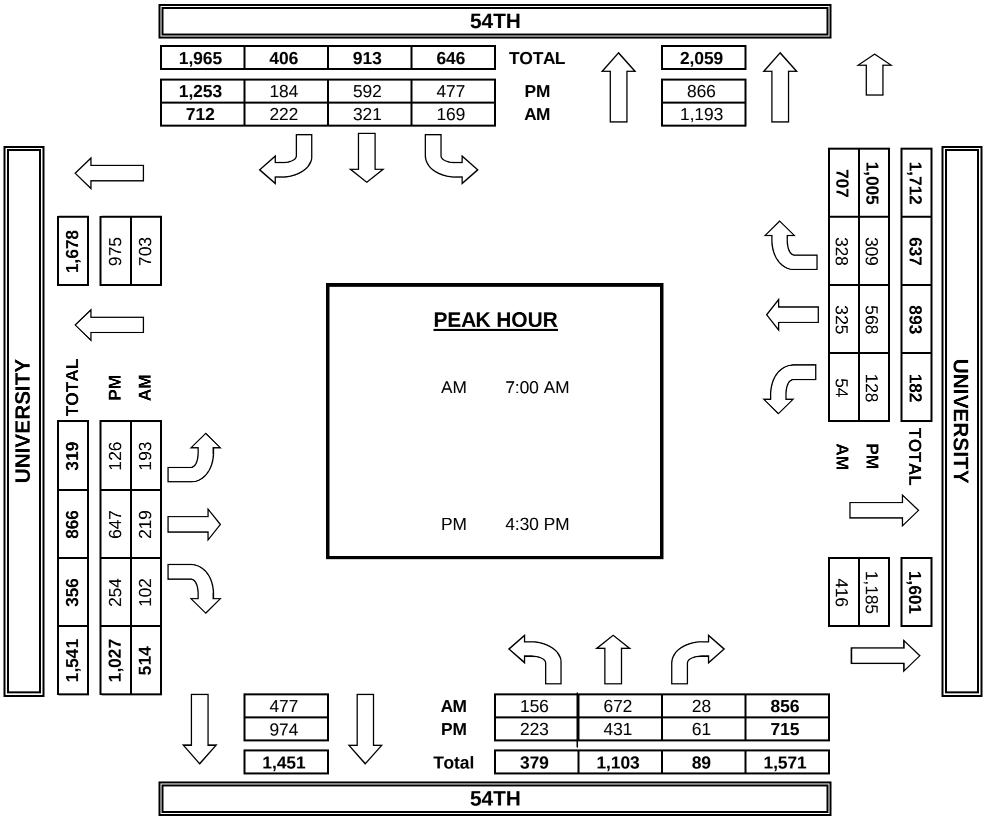
AM	**PM**	**TOTAL**
1,668	**2,262**	**3,930**
748	709	**1,457**
818	1,273	**2,091**
102	280	**382**

AM	**PM**	**TOTAL**
1,133	2,753	**3,886**

54TH (south)

AM	404	1,383	74	**1,861**
PM	496	1,004	135	**1,635**
TOTAL	**900**	**2,387**	**209**	**3,496**

AM	1,026
PM	2,289
TOTAL	**3,315**



PEAK HOUR

AM 7:00 AM

PM 4:30 PM

54TH (north)

1,965	**406**	**913**	**646**	**TOTAL**
1,253	184	592	477	**PM**
712	222	321	169	**AM**

TOTAL	**2,059**
PM	866
AM	1,193

UNIVERSITY (west)

TOTAL	**PM**	**AM**
1,678	975	703

TOTAL	**PM**	**AM**
319	126	193
866	647	219
356	254	102
1,541	**1,027**	**514**

UNIVERSITY (east)

AM	**PM**	**TOTAL**
707	**1,005**	**1,712**
328	309	**637**
325	568	**893**
54	128	**182**

AM	**PM**	**TOTAL**
416	1,185	**1,601**

54TH (south)

AM	156	672	28	**856**
PM	223	431	61	**715**
Total	**379**	**1,103**	**89**	**1,571**

AM	477
PM	974
Total	**1,451**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TRAFFIC DATA SERVICES

DATE:				
12/1/10	LOCATION:	SAN DIEGO	PROJECT #:	CA10-1203-03
WEDNESDAY	NORTH & SOUTH:	CHOLLAS	LOCATION #:	2
	EAST & WEST:	UNIVERSITY	CONTROL:	SIGNAL

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		NORTHBOUND CHOLLAS			SOUTHBOUND CHOLLAS			EASTBOUND UNIVERSITY			WESTBOUND UNIVERSITY			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	X	X	1	X	X	X	X	2	0	1	2	X	
AM	6:30 AM			22					58	0	22	121		223
	6:45 AM			24					67	0	16	134		241
	7:00 AM			24					87	1	27	169		308
	7:15 AM			34					80	2	23	144		283
	7:30 AM			31					105	0	29	180		345
	7:45 AM			36					77	0	25	169		307
	8:00 AM			33					136	1	28	216		414
	8:15 AM			52					143	0	26	186		407
	8:30 AM			45					167	1	32	165		410
	8:45 AM			53					154	2	27	150		386
	VOLUMES	0	0	354	0	0	0	0	1,074	7	255	1,634	0	3,324
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	99%	1%	13%	87%	0%	
	APP/DEPART	354	/	0	0	/	262	1,081	/	1,428	1,889	/	1,634	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	0	0	183	0	0	0	0	600	4	113	717	0	1,617
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	99%	1%	14%	86%	0%	
	PEAK HR FACTOR		0.863			0.000			0.899			0.850		0.976
	APP/DEPART	183	/	0	0	/	117	604	/	783	830	/	717	0
PM	3:30 PM			54					260	0	40	190		544
	3:45 PM			59					261	0	48	221		589
	4:00 PM			59					257	1	43	211		571
	4:15 PM			46					242	2	36	213		539
	4:30 PM			61					264	1	41	211		578
	4:45 PM			56					292	3	40	192		583
	5:00 PM			64					277	0	44	245		630
	5:15 PM			56					273	1	45	223		598
	5:30 PM			52					287	2	55	188		584
	5:45 PM			49					267	0	43	192		551
	VOLUMES	0	0	556	0	0	0	0	2,680	10	435	2,086	0	5,767
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	100%	0%	17%	83%	0%	
	APP/DEPART	556	/	0	0	/	445	2,690	/	3,236	2,521	/	2,086	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	0	0	228	0	0	0	0	1,129	6	184	848	0	2,395
	APPROACH %	0%	0%	100%	0%	0%	0%	0%	99%	1%	18%	82%	0%	
	PEAK HR FACTOR		0.891			0.000			0.962			0.893		0.950
	APP/DEPART	228	/	0	0	/	190	1,135	/	1,357	1,032	/	848	0

U-TURNS				
NB	SB	EB	WB	TTL
X	X	X	X	
				0
				0
				0
				0
				0
				0
				0
				0
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0	0	0	0	0
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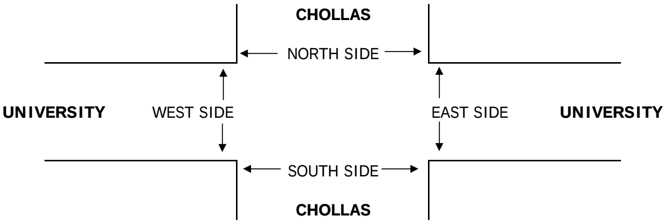
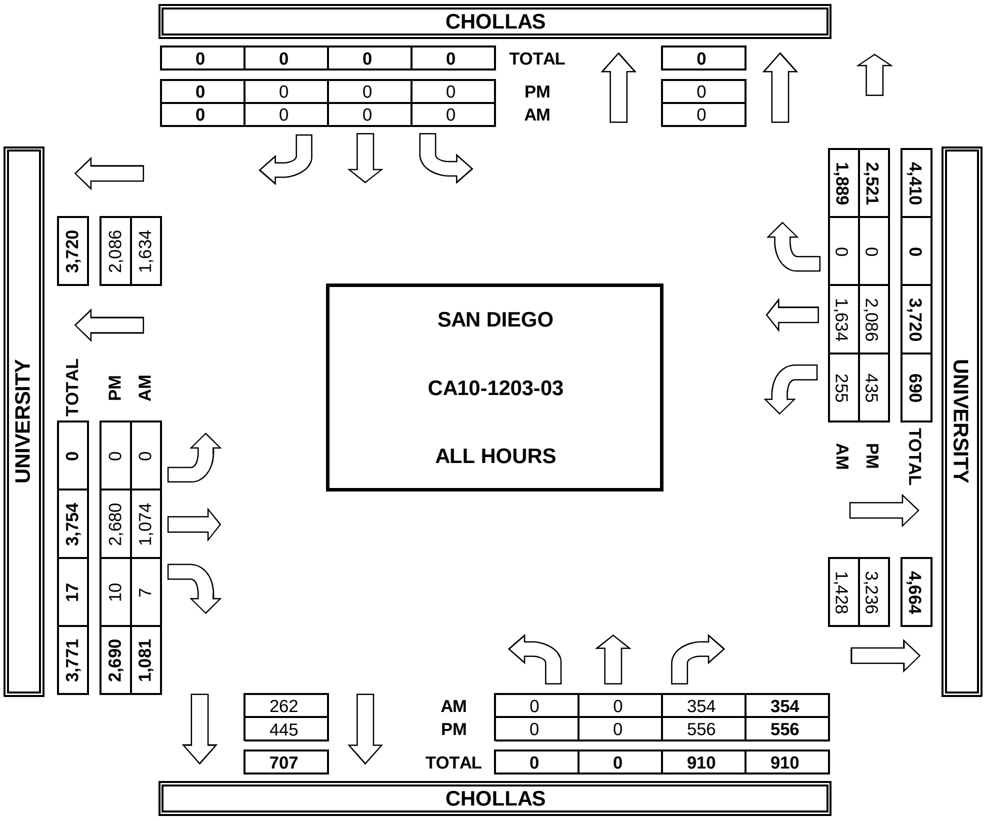
				0
				0
0	0	0	0	0

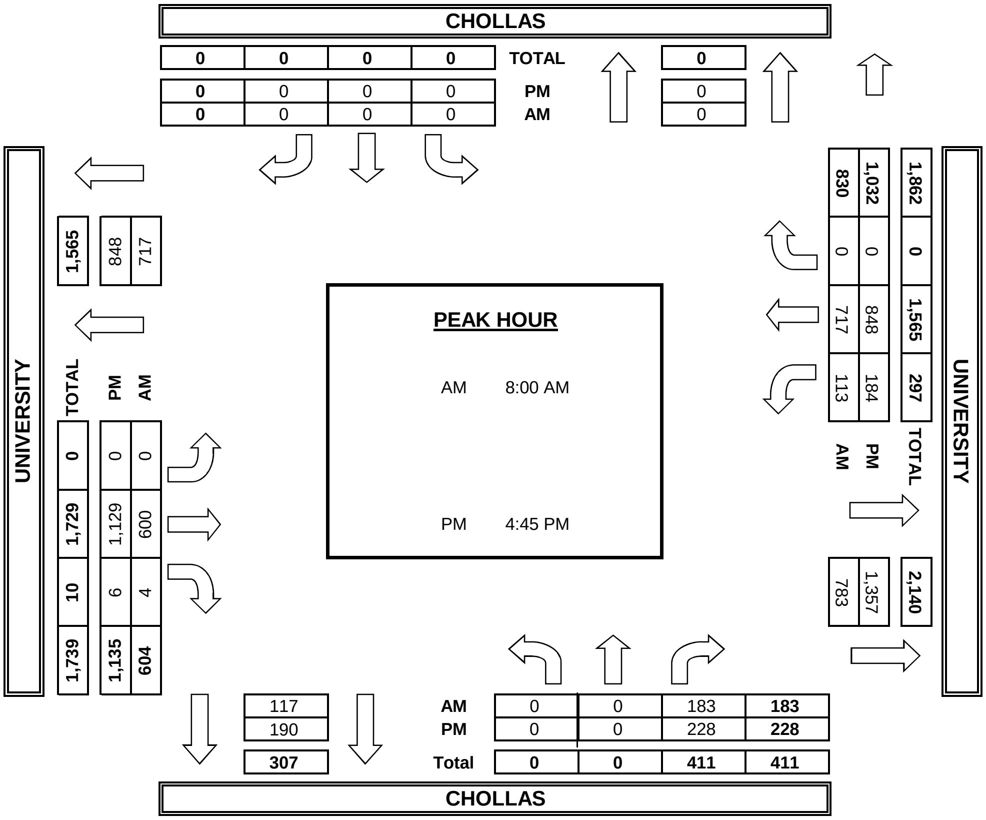


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	6:30 AM	0	0	0	1	1					0	0	2	0	0	2
	6:45 AM	0	0	0	0	0					0	0	1	0	0	1
	7:00 AM	0	0	0	2	2					0	1	0	0	0	1
	7:15 AM	0	2	1	0	3					0	2	2	0	0	4
	7:30 AM	0	3	0	0	3					0	2	0	0	0	2
	7:45 AM	0	4	2	3	9					0	4	2	0	0	6
	8:00 AM	0	1	0	2	3					0	1	3	0	0	4
	8:15 AM	0	3	1	1	5					0	0	1	0	1	2
	8:30 AM	0	5	0	0	5					0	2	1	0	0	3
	8:45 AM	0	3	0	0	3					0	4	0	0	0	4
	TOTAL	0	21	4	9	34	0	0	0	0	0	16	12	0	1	29
PM	3:30 PM	0	1	2	1	4					0	2	2	0	0	4
	3:45 PM	0	3	0	0	3					0	1	1	0	0	2
	4:00 PM	0	7	0	0	7					0	3	4	0	0	7
	4:15 PM	0	8	3	2	13					0	2	5	0	0	7
	4:30 PM	0	14	1	2	17					0	4	3	0	0	7
	4:45 PM	0	5	3	4	12					0	5	0	0	0	5
	5:00 PM	0	7	3	0	10					0	3	3	0	0	6
	5:15 PM	0	5	2	1	8					0	4	4	0	0	8
	5:30 PM	0	3	0	1	4					0	2	3	0	0	5
	5:45 PM	0	2	0	2	4					0	1	1	0	0	2
	TOTAL	0	55	14	13	82	0	0	0	0	0	27	26	0	0	53

PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TRAFFIC DATA SERVICES

DATE:	LOCATION:	SAN DIEGO	PROJECT #:	CA10-1203-03
12/1/10	NORTH & SOUTH:	58TH	LOCATION #:	3
WEDNESDAY	EAST & WEST:	UNIVERSITY	CONTROL:	SIGNAL

NOTES:

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		NORTHBOUND 58TH			SOUTHBOUND 58TH			EASTBOUND UNIVERSITY			WESTBOUND UNIVERSITY			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0	1	0	0	1	0	1	3	1	1	2	1	
AM	6:30 AM	41	18	16	7	8	12	10	56	18	7	77	12	282
	6:45 AM	45	13	28	5	7	13	9	63	13	3	88	18	305
	7:00 AM	60	26	11	11	18	21	18	72	17	5	117	16	392
	7:15 AM	48	12	18	8	7	16	9	108	16	8	99	9	358
	7:30 AM	67	12	24	4	9	16	4	112	23	13	133	7	424
	7:45 AM	47	9	21	12	2	11	8	95	28	12	146	10	401
	8:00 AM	56	12	26	8	5	18	7	123	33	10	162	12	472
	8:15 AM	62	15	21	9	8	20	9	162	26	13	131	16	492
	8:30 AM	51	22	20	12	9	16	12	158	30	10	128	5	473
	8:45 AM	48	18	16	11	7	19	11	165	25	7	132	12	471
	VOLUMES	525	157	201	87	80	162	97	1,114	229	88	1,213	117	4,070
	APPROACH %	59%	18%	23%	26%	24%	49%	7%	77%	16%	6%	86%	8%	
	APP/DEPART	883	/	371	329	/	397	1,440	/	1,402	1,418	/	1,900	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	217	67	83	40	29	73	39	608	114	40	553	45	1,908
	APPROACH %	59%	18%	23%	28%	20%	51%	5%	80%	15%	6%	87%	7%	
	PEAK HR FACTOR		0.936			0.959			0.947			0.867		0.970
	APP/DEPART	367	/	151	142	/	183	761	/	731	638	/	843	0
PM	3:30 PM	30	4	17	10	4	10	15	238	55	13	181	5	582
	3:45 PM	34	5	22	12	3	8	17	246	50	22	217	9	645
	4:00 PM	36	4	23	14	9	12	19	227	57	19	189	6	615
	4:15 PM	55	3	21	6	6	10	23	223	77	18	202	15	659
	4:30 PM	49	7	20	6	4	12	11	261	58	13	200	13	654
	4:45 PM	46	8	29	9	6	13	22	232	71	12	201	7	656
	5:00 PM	60	7	21	10	5	16	19	256	62	14	189	11	670
	5:15 PM	55	8	18	11	7	12	22	276	56	20	213	12	710
	5:30 PM	39	7	12	6	9	15	15	265	60	22	159	10	619
	5:45 PM	40	6	17	12	9	11	12	245	56	18	176	9	611
	VOLUMES	444	59	200	96	62	119	175	2,469	602	171	1,927	97	6,421
	APPROACH %	63%	8%	28%	35%	22%	43%	5%	76%	19%	8%	88%	4%	
	APP/DEPART	703	/	331	277	/	835	3,246	/	2,765	2,195	/	2,490	0
	BEGIN PEAK HR		4:30 PM											
	VOLUMES	210	30	88	36	22	53	74	1,025	247	59	803	43	2,690
	APPROACH %	64%	9%	27%	32%	20%	48%	5%	76%	18%	7%	89%	5%	
	PEAK HR FACTOR		0.932			0.895			0.951			0.923		0.947
	APP/DEPART	328	/	147	111	/	328	1,346	/	1,149	905	/	1,066	0

U-TURNS				
NB	SB	EB	WB	TTL
X	X	X	X	
				0
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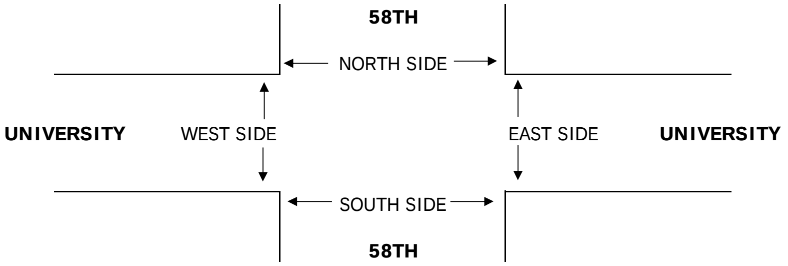
				0
0	0	0	0	0



		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	6:30 AM	1	2	1	2	6					0	0	1	0	0	1
	6:45 AM	0	1	2	2	5					0	0	0	0	0	0
	7:00 AM	1	0	4	2	7					0	0	0	0	0	0
	7:15 AM	2	0	4	2	8					0	1	0	1	1	3
	7:30 AM	1	2	3	3	9					0	2	0	0	0	2
	7:45 AM	4	1	5	4	14					0	0	2	0	0	2
	8:00 AM	1	5	4	3	13					0	2	0	0	0	2
	8:15 AM	5	0	5	1	11					0	1	0	0	1	2
	8:30 AM	2	2	3	1	8					0	3	0	0	0	3
	8:45 AM	2	4	6	2	14					0	2	2	1	0	5
	TOTAL	19	17	37	22	95	0	0	0	0	0	11	5	2	2	20
PM	3:30 PM	6	3	8	2	19					0	0	0	0	0	0
	3:45 PM	2	2	5	1	10					0	1	0	0	1	2
	4:00 PM	5	1	12	3	21					0	1	0	1	0	2
	4:15 PM	7	3	9	1	20					0	0	0	0	0	0
	4:30 PM	7	3	15	4	29					0	0	2	0	2	4
	4:45 PM	4	4	7	3	18					0	0	0	0	0	0
	5:00 PM	4	6	12	2	24					0	2	0	0	1	3
	5:15 PM	2	2	3	1	8					0	0	0	0	0	0
	5:30 PM	2	4	8	4	18					0	2	2	0	0	4
	5:45 PM	5	2	6	3	16					0	1	0	1	2	4
	TOTAL	44	30	85	24	183	0	0	0	0	0	7	4	2	6	19

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TRAFFIC DATA SERVICES

DATE:	LOCATION:	SAN DIEGO	PROJECT #:	CA10-1203-03
12/1/10	NORTH & SOUTH:	60TH	LOCATION #:	5
WEDNESDAY	EAST & WEST:	UNIVERSITY	CONTROL:	SIGNAL

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		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		60TH			60TH			UNIVERSITY			UNIVERSITY			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0	1	0	0	1	0	1	3	0	1	2	0	
AM	6:30 AM	6	1	0	3	2	1	0	79	4	2	72	1	171
	6:45 AM	5	0	1	4	2	1	0	84	3	1	98	1	200
	7:00 AM	1	1	3	6	0	2	1	82	3	3	122	1	225
	7:15 AM	8	0	3	4	0	2	0	110	4	2	109	3	245
	7:30 AM	14	0	8	7	3	3	0	122	3	5	152	1	318
	7:45 AM	13	1	5	7	0	2	2	155	4	18	184	2	393
	8:00 AM	15	0	4	5	1	5	0	121	9	5	178	1	344
	8:15 AM	14	0	2	1	1	0	0	140	10	4	139	3	314
	8:30 AM	16	0	9	4	0	2	1	185	5	4	152	2	380
	8:45 AM	13	0	3	2	0	0	1	147	8	3	138	0	315
	VOLUMES	105	3	38	43	9	18	5	1,225	53	47	1,344	15	2,905
	APPROACH %	72%	2%	26%	61%	13%	26%	0%	95%	4%	3%	96%	1%	
	APP/DEPART	146	/	23	70	/	109	1,283	/	1,306	1,406	/	1,467	0
	BEGIN PEAK HR		7:45 AM											
	VOLUMES	58	1	20	17	2	9	3	601	28	31	653	8	1,431
	APPROACH %	73%	1%	25%	61%	7%	32%	0%	95%	4%	4%	94%	1%	
	PEAK HR FACTOR		0.790			0.636			0.827			0.848		0.910
	APP/DEPART	79	/	12	28	/	61	632	/	638	692	/	720	0
PM	3:30 PM	6	0	10	4	0	2	7	270	14	15	155	4	487
	3:45 PM	10	0	4	4	1	4	3	251	10	11	184	6	488
	4:00 PM	8	1	5	0	0	1	2	224	10	16	219	1	487
	4:15 PM	12	2	12	5	0	4	6	240	10	18	219	5	533
	4:30 PM	11	0	11	6	0	2	3	259	14	5	196	4	511
	4:45 PM	5	0	8	3	1	4	4	231	20	18	187	5	486
	5:00 PM	9	1	10	6	0	4	1	250	14	14	191	4	504
	5:15 PM	9	0	8	2	1	4	2	250	11	8	209	7	511
	5:30 PM	12	0	7	6	1	2	2	251	15	13	184	5	498
	5:45 PM	6	0	5	4	0	0	4	230	11	8	195	4	467
	VOLUMES	88	4	80	40	4	27	34	2,456	129	126	1,939	45	4,972
	APPROACH %	51%	2%	47%	56%	6%	38%	1%	94%	5%	6%	92%	2%	
	APP/DEPART	172	/	83	71	/	259	2,619	/	2,576	2,110	/	2,054	0
	BEGIN PEAK HR		4:15 PM											
	VOLUMES	37	3	41	20	1	14	14	980	58	55	793	18	2,034
	APPROACH %	46%	4%	51%	57%	3%	40%	1%	93%	6%	6%	92%	2%	
	PEAK HR FACTOR		0.779			0.875			0.953			0.895		0.954
	APP/DEPART	81	/	35	35	/	114	1,052	/	1,041	866	/	844	0

U-TURNS				
NB	SB	EB	WB	TTL
X	X	X	X	
				0
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				0
				0
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				0
				0
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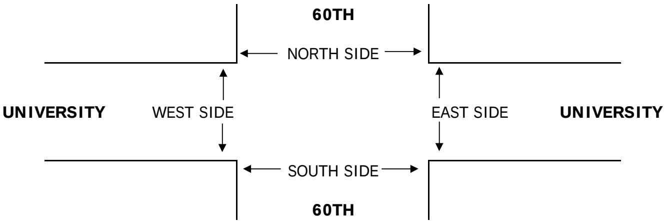
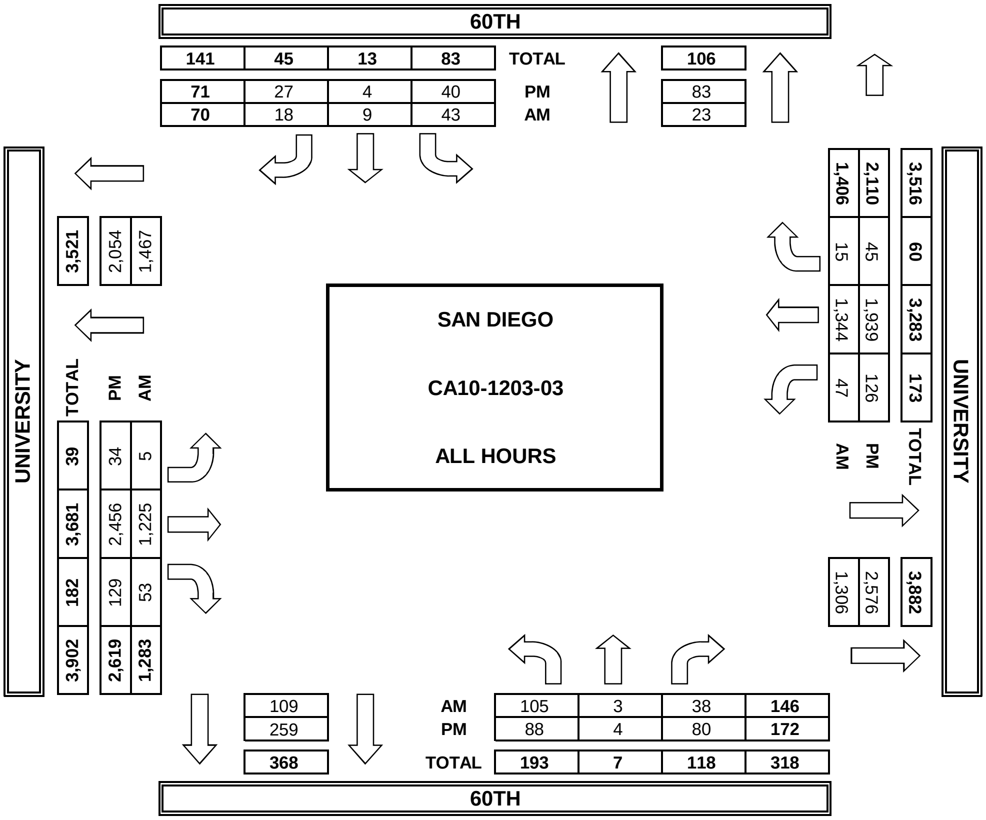
0	0	0	0	0



		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	6:30 AM	0	0	0	0	0					0	0	0	0	0	0
	6:45 AM	0	0	3	0	3					0	1	0	0	0	1
	7:00 AM	0	0	1	0	1					0	1	1	0	0	2
	7:15 AM	0	2	2	0	4					0	2	0	0	0	2
	7:30 AM	2	0	4	2	8					0	0	0	0	0	0
	7:45 AM	0	0	6	2	8					0	1	1	0	0	2
	8:00 AM	0	1	2	2	5					0	3	1	0	1	5
	8:15 AM	1	2	3	0	6					0	1	2	1	0	4
	8:30 AM	0	1	2	0	3					0	0	0	0	0	0
	8:45 AM	1	1	2	0	4					0	1	1	0	0	2
	TOTAL	4	7	25	6	42	0	0	0	0	0	10	6	1	1	18
PM	3:30 PM	1	2	4	4	11					0	0	0	0	0	0
	3:45 PM	1	6	3	1	11					0	0	1	0	1	2
	4:00 PM	0	1	3	3	7					0	0	0	0	0	0
	4:15 PM	1	3	3	1	8					0	2	0	0	0	2
	4:30 PM	0	2	5	1	8					0	2	2	0	0	4
	4:45 PM	0	2	5	1	8					0	1	2	0	0	3
	5:00 PM	0	1	1	1	3					0	2	2	1	0	5
	5:15 PM	1	5	2	0	8					0	1	1	0	0	2
	5:30 PM	0	0	5	1	6					0	0	3	0	0	3
	5:45 PM	0	1	13	1	15					0	0	0	0	0	0
	TOTAL	4	23	44	14	85	0	0	0	0	0	8	11	1	1	21

PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS



SAN DIEGO

CA10-1203-03

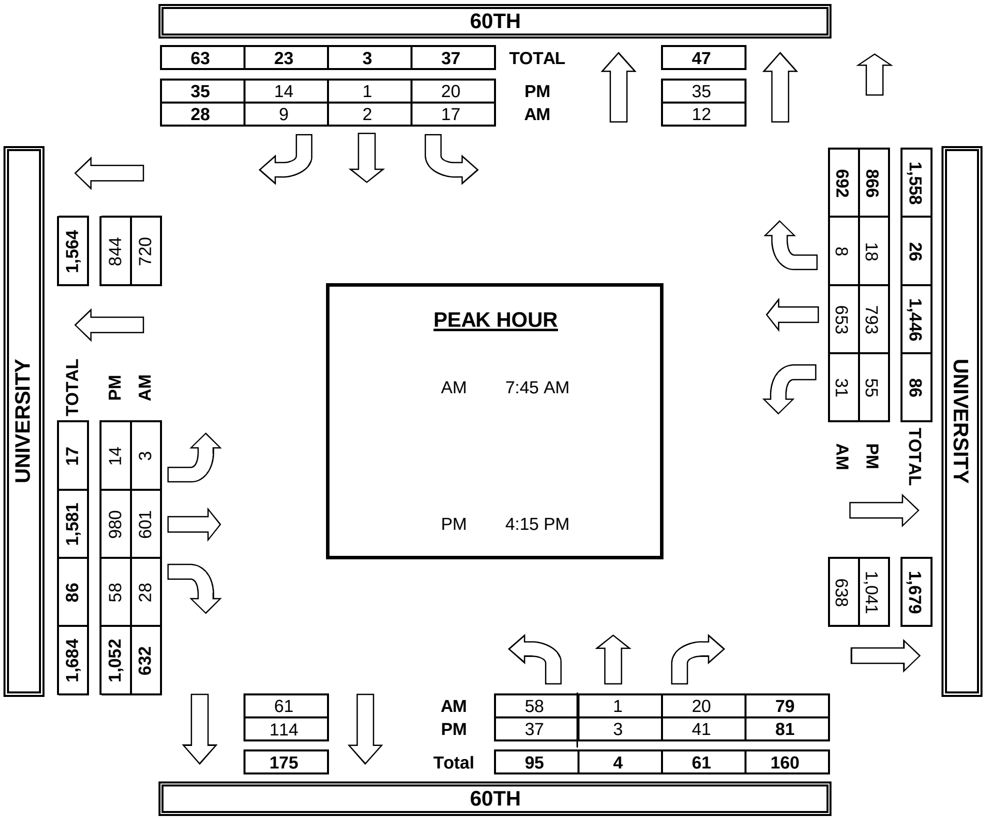
ALL HOURS

TOTAL	141	45	13	83	106
PM	71	27	4	40	83
AM	70	18	9	43	23

AM	1,406	15	1,344	47	1,306
PM	2,110	45	1,939	126	2,576
TOTAL	3,516	60	3,283	173	3,882

TOTAL	3,521	39	3,681	182	3,902
PM	2,054	34	2,456	129	2,619
AM	1,467	5	1,225	53	1,283

AM	109	105	3	38	146
PM	259	88	4	80	172
TOTAL	368	193	7	118	318



PEAK HOUR

AM 7:45 AM

PM 4:15 PM

TOTAL	63	23	3	37	47
PM	35	14	1	20	35
AM	28	9	2	17	12

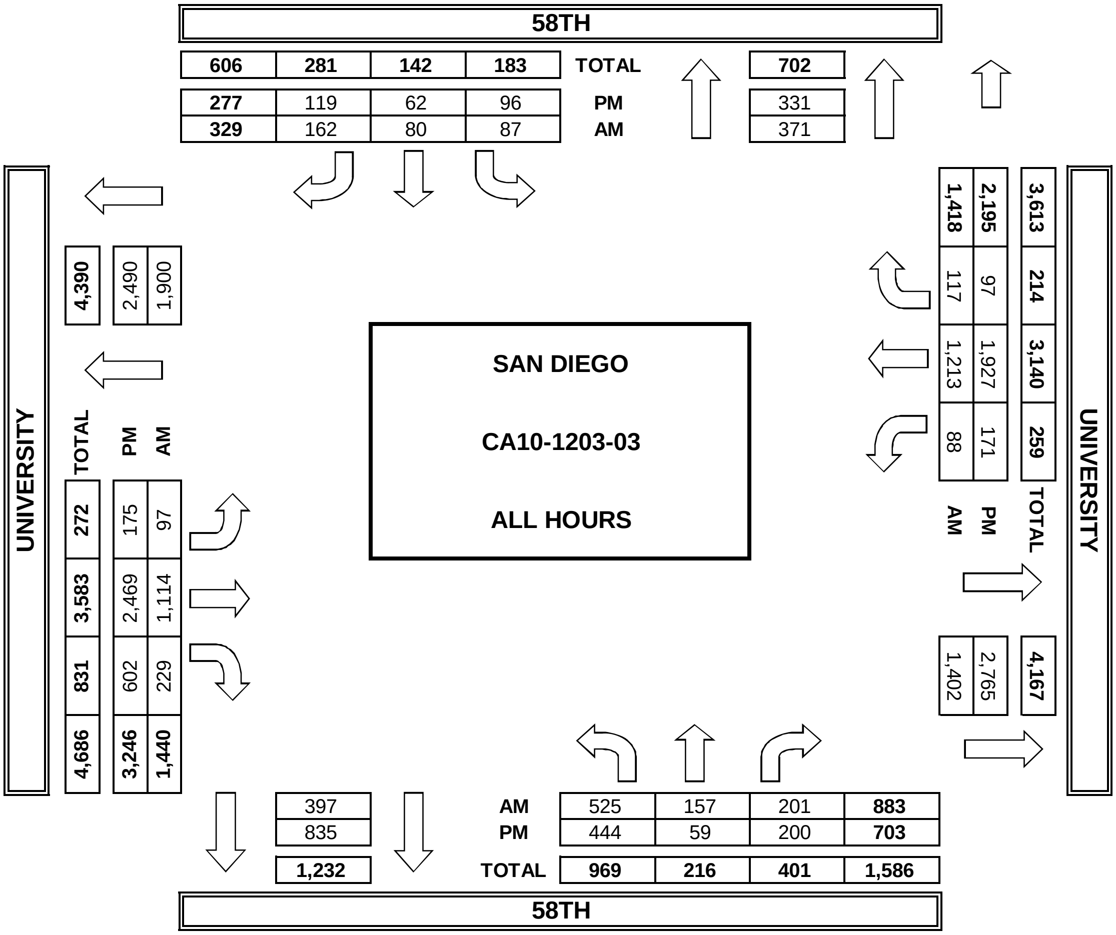
AM	692	8	653	31	638
PM	866	18	793	55	1,041
TOTAL	1,558	26	1,446	86	1,679

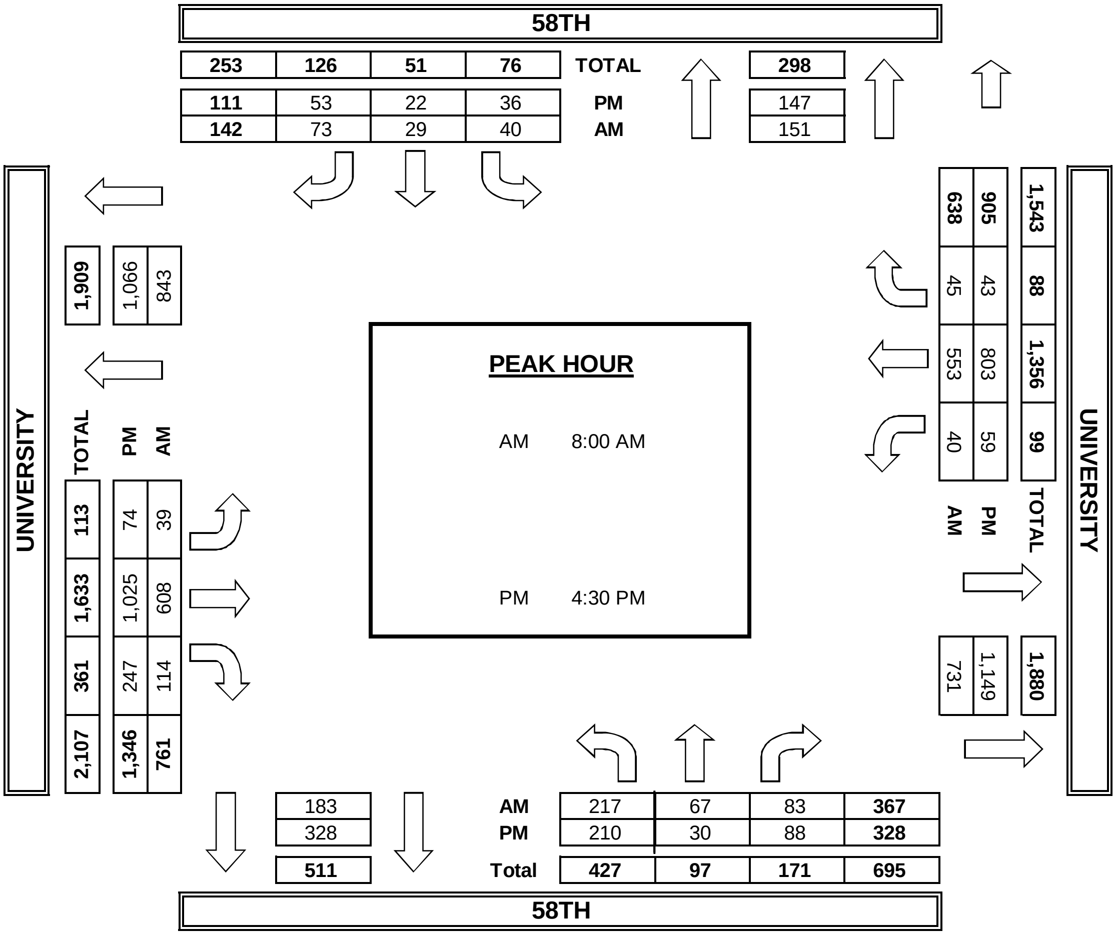
TOTAL	1,564	17	1,581	86	1,684
PM	844	14	980	58	1,052
AM	720	3	601	28	632

AM	61	58	1	20	79
PM	114	37	3	41	81
Total	175	95	4	61	160

PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TRAFFIC DATA SERVICES

DATE:	LOCATION:	SAN DIEGO	PROJECT #:	CA10-1203-03
12/1/10	NORTH & SOUTH:	COLLEGE	LOCATION #:	6
WEDNESDAY	EAST & WEST:	UNIVERSITY	CONTROL:	SIGNAL

NOTES:

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		NORTHBOUND COLLEGE			SOUTHBOUND COLLEGE			EASTBOUND UNIVERSITY			WESTBOUND UNIVERSITY			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	2	0	1	2	0	1	2	1	1	2	0	
AM	6:30 AM	40	95	10	9	46	18	20	32	22	15	35	22	364
	6:45 AM	44	100	12	11	48	16	22	41	25	20	42	28	409
	7:00 AM	59	151	16	11	57	18	26	50	28	14	55	23	508
	7:15 AM	42	169	19	16	91	22	32	62	35	18	56	38	600
	7:30 AM	55	184	19	32	80	36	30	79	34	20	89	45	703
	7:45 AM	51	231	48	28	96	28	40	88	35	23	87	30	785
	8:00 AM	45	172	39	33	79	19	31	84	22	35	97	32	688
	8:15 AM	40	174	31	30	83	21	34	88	32	39	124	37	733
	8:30 AM	44	238	38	34	87	25	45	95	32	43	111	38	830
	8:45 AM	33	197	44	25	73	26	29	82	35	36	72	40	692
	VOLUMES	453	1,711	276	229	740	229	309	701	300	263	768	333	6,312
	APPROACH %	19%	70%	11%	19%	62%	19%	24%	54%	23%	19%	56%	24%	
	APP/DEPART	2,440	/	2,353	1,198	/	1,303	1,310	/	1,206	1,364	/	1,450	0
	BEGIN PEAK HR		7:45 AM											
	VOLUMES	180	815	156	125	345	93	150	355	121	140	419	137	3,036
	APPROACH %	16%	71%	14%	22%	61%	17%	24%	57%	19%	20%	60%	20%	
	PEAK HR FACTOR		0.872			0.926			0.910			0.870		0.914
	APP/DEPART	1,151	/	1,102	563	/	606	626	/	636	696	/	692	0
PM	3:30 PM	35	122	47	44	176	46	54	136	68	46	98	43	915
	3:45 PM	42	120	71	45	173	55	54	132	64	62	112	46	976
	4:00 PM	50	129	49	43	156	53	46	106	78	49	111	36	906
	4:15 PM	61	145	47	38	177	60	47	117	68	42	99	44	945
	4:30 PM	55	131	51	49	138	47	73	123	75	56	77	52	927
	4:45 PM	55	141	58	66	162	70	60	138	74	66	121	56	1,067
	5:00 PM	60	123	44	52	184	65	50	162	91	62	126	44	1,063
	5:15 PM	66	133	54	60	168	64	49	132	72	59	96	42	995
	5:30 PM	44	117	49	42	185	56	48	150	91	48	89	27	946
	5:45 PM	51	121	40	52	161	52	40	123	88	45	90	32	895
	VOLUMES	519	1,282	510	491	1,680	568	521	1,319	769	535	1,019	422	9,635
	APPROACH %	22%	55%	22%	18%	61%	21%	20%	51%	29%	27%	52%	21%	
	APP/DEPART	2,311	/	2,225	2,739	/	2,984	2,609	/	2,320	1,976	/	2,106	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	225	514	205	220	699	255	207	582	328	235	432	169	4,071
	APPROACH %	24%	54%	22%	19%	60%	22%	19%	52%	29%	28%	52%	20%	
	PEAK HR FACTOR		0.929			0.975			0.922			0.860		0.954
	APP/DEPART	944	/	890	1,174	/	1,262	1,117	/	1,007	836	/	912	0

U-TURNS				
NB	SB	EB	WB	TTL
X	X	X	X	
				0
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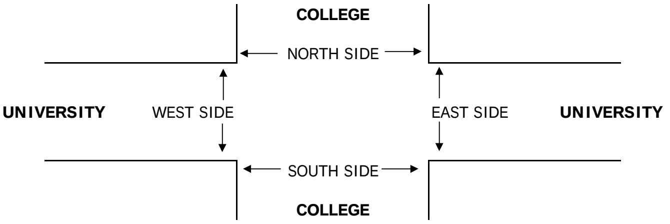
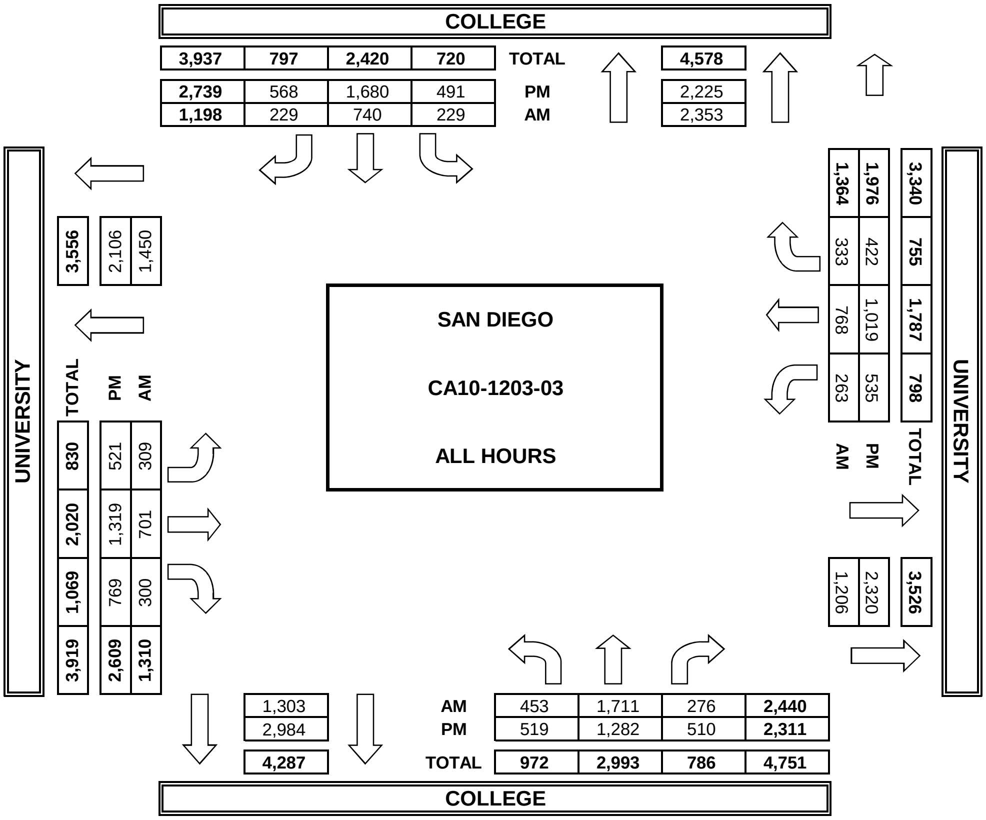
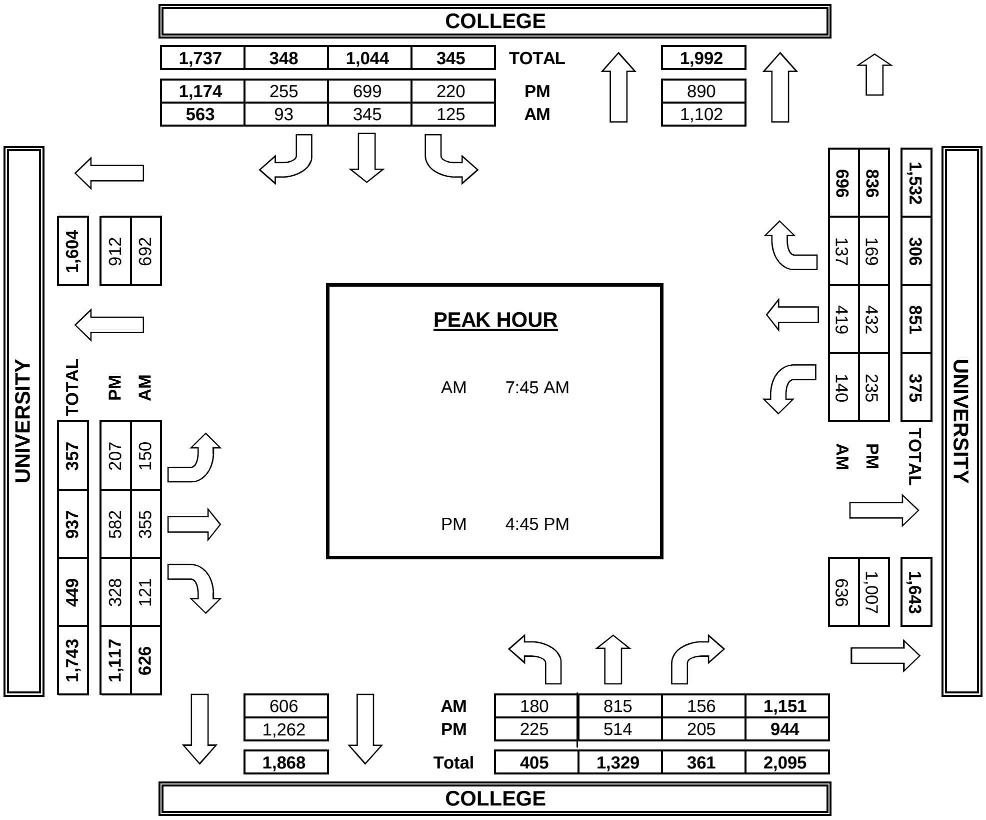


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	6:30 AM	1	1	2	4	8					0	0	0	0	0	0
	6:45 AM	3	2	1	1	7					0	0	0	0	0	0
	7:00 AM	2	1	3	2	8					0	1	1	0	0	2
	7:15 AM	3	5	1	3	12					0	2	0	0	0	2
	7:30 AM	7	6	4	5	22					0	0	0	0	1	1
	7:45 AM	6	7	4	1	18					0	1	3	1	0	5
	8:00 AM	3	8	3	4	18					0	1	2	0	1	4
	8:15 AM	4	5	6	6	21					0	1	2	0	1	4
	8:30 AM	3	2	7	2	14					0	2	1	0	2	5
	8:45 AM	4	10	4	2	20					0	1	1	0	0	2
	TOTAL	36	47	35	30	148	0	0	0	0	0	9	10	1	5	25
PM	3:30 PM	3	9	9	4	25					0	0	0	0	0	0
	3:45 PM	2	8	5	5	20					0	1	1	0	1	3
	4:00 PM	5	12	8	4	29					0	1	0	0	0	1
	4:15 PM	5	15	5	6	31					0	2	2	0	1	5
	4:30 PM	4	10	10	12	36					0	1	0	0	1	2
	4:45 PM	3	9	4	15	31					0	2	2	1	0	5
	5:00 PM	6	18	5	18	47					0	2	1	1	1	5
	5:15 PM	2	11	5	11	29					0	3	2	0	0	5
	5:30 PM	2	9	5	9	25					0	1	1	1	1	4
	5:45 PM	4	10	7	10	31					0	0	0	0	0	0
	TOTAL	36	111	63	94	304	0	0	0	0	0	13	9	3	5	30

PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TRAFFIC DATA SERVICES

DATE:	LOCATION:	SAN DIEGO	PROJECT #:	CA10-1203-03
12/1/10	NORTH & SOUTH:	ROLANDO	LOCATION #:	8
WEDNESDAY	EAST & WEST:	UNIVERSITY	CONTROL:	SIGNAL

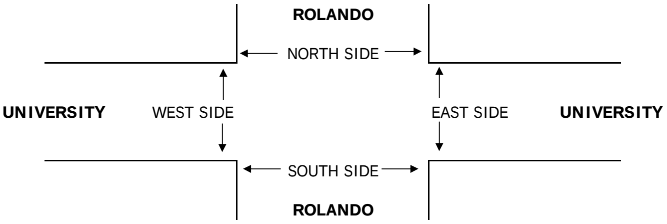
NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

		NORTHBOUND ROLANDO			SOUTHBOUND ROLANDO			EASTBOUND UNIVERSITY			WESTBOUND UNIVERSITY			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0	1	0	0	1	0	1	2	0	1	2	0	
AM	6:30 AM	20	5	2	3	1	5	4	51	4	3	50	3	151
	6:45 AM	21	3	2	4	3	8	2	42	4	2	65	3	159
	7:00 AM	16	3	6	3	1	5	6	75	5	3	73	2	198
	7:15 AM	22	4	1	5	1	4	5	99	5	7	88	0	241
	7:30 AM	20	4	1	5	1	3	6	123	4	5	105	1	278
	7:45 AM	20	4	7	2	6	9	6	127	6	1	132	3	323
	8:00 AM	16	9	3	11	4	10	7	120	4	6	145	5	340
	8:15 AM	17	9	6	2	5	6	4	112	12	5	123	5	306
	8:30 AM	22	8	6	10	11	12	3	115	10	5	114	6	322
	8:45 AM	14	8	6	6	3	12	7	75	13	3	114	11	272
	VOLUMES	188	57	40	51	36	74	50	939	67	40	1,009	39	2,590
	APPROACH %	66%	20%	14%	32%	22%	46%	5%	89%	6%	4%	93%	4%	
	APP/DEPART	285	/	146	161	/	143	1,056	/	1,030	1,088	/	1,271	0
	BEGIN PEAK HR		7:45 AM											
	VOLUMES	75	30	22	25	26	37	20	474	32	17	514	19	1,291
	APPROACH %	59%	24%	17%	28%	30%	42%	4%	90%	6%	3%	93%	3%	
	PEAK HR FACTOR		0.882			0.667			0.946			0.881		0.949
	APP/DEPART	127	/	69	88	/	75	526	/	521	550	/	626	0
PM	3:30 PM	19	3	16	9	6	10	18	172	16	10	167	4	450
	3:45 PM	27	8	7	11	7	9	10	168	19	12	129	4	411
	4:00 PM	16	7	10	9	5	9	12	160	12	4	151	7	402
	4:15 PM	13	12	7	3	17	7	11	151	8	8	149	5	391
	4:30 PM	24	12	6	9	10	7	11	181	12	3	158	9	442
	4:45 PM	15	16	4	11	12	13	9	186	23	8	125	6	428
	5:00 PM	19	10	6	12	7	19	13	168	15	7	162	4	442
	5:15 PM	8	8	6	5	6	12	7	188	18	7	121	7	393
	5:30 PM	11	2	5	8	8	14	10	184	16	7	128	5	398
	5:45 PM	16	7	5	7	7	7	8	179	12	10	125	4	387
	VOLUMES	168	85	72	84	85	107	109	1,737	151	76	1,415	55	4,144
	APPROACH %	52%	26%	22%	30%	31%	39%	5%	87%	8%	5%	92%	4%	
	APP/DEPART	325	/	249	276	/	312	1,997	/	1,893	1,546	/	1,690	0
	BEGIN PEAK HR		4:30 PM											
	VOLUMES	66	46	22	37	35	51	40	723	68	25	566	26	1,705
	APPROACH %	49%	34%	16%	30%	28%	41%	5%	87%	8%	4%	92%	4%	
	PEAK HR FACTOR		0.798			0.809			0.953			0.892		0.964
	APP/DEPART	134	/	112	123	/	128	831	/	782	617	/	683	0

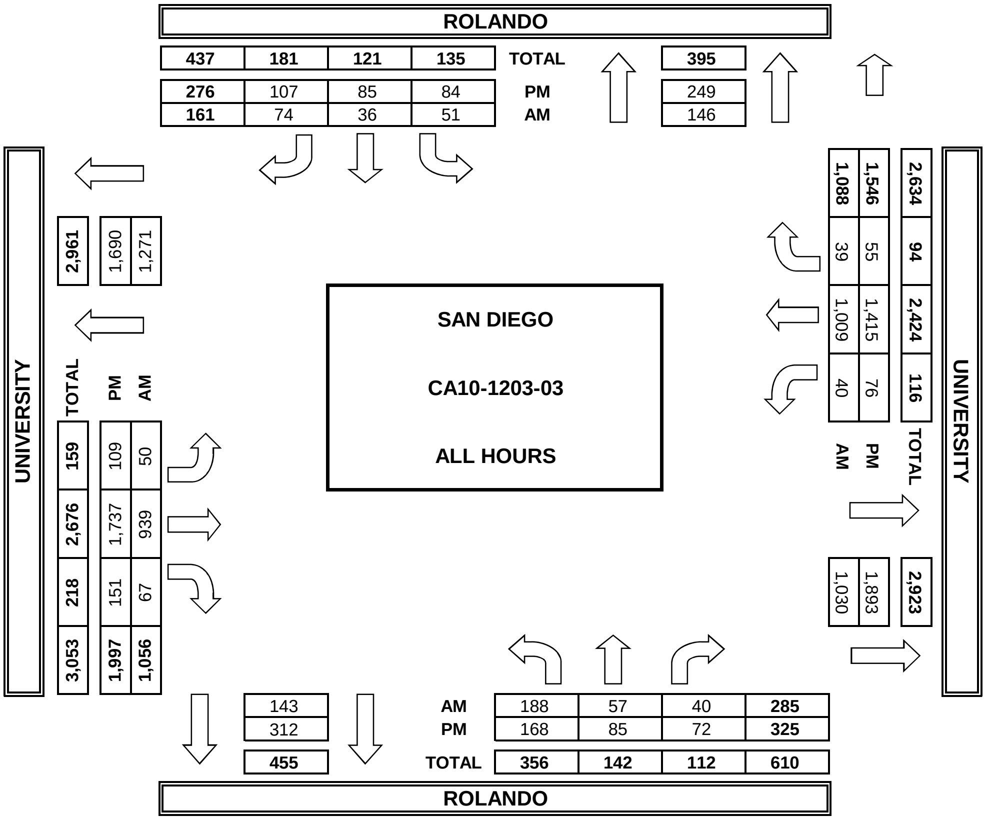
U-TURNS				
NB	SB	EB	WB	TTL
X	X	X	X	
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0



		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	6:30 AM	0	0	1	0	1					0	0	0	0	0	0
	6:45 AM	0	0	0	1	1					0	0	0	0	0	0
	7:00 AM	0	0	0	3	3					0	1	1	0	0	2
	7:15 AM	2	1	0	1	4					0	2	1	0	0	3
	7:30 AM	2	1	2	1	6					0	0	0	0	0	0
	7:45 AM	1	0	2	0	3					0	2	1	0	0	3
	8:00 AM	0	2	6	1	9					0	1	2	0	0	3
	8:15 AM	0	1	8	2	11					0	1	0	0	1	2
	8:30 AM	0	2	4	2	8					0	2	0	1	0	3
	8:45 AM	2	0	6	0	8					0	0	0	0	0	0
	TOTAL	7	7	29	11	54	0	0	0	0	0	9	5	1	1	16
PM	3:30 PM	0	0	2	2	4					0	0	0	0	0	0
	3:45 PM	1	3	8	0	12					0	2	2	0	1	5
	4:00 PM	1	3	4	1	9					0	1	1	0	1	3
	4:15 PM	1	2	3	3	9					0	1	1	0	0	2
	4:30 PM	3	2	2	1	8					0	2	1	0	0	3
	4:45 PM	0	1	3	0	4					0	2	0	1	0	3
	5:00 PM	2	5	2	0	9					0	1	0	1	2	4
	5:15 PM	3	3	7	1	14					0	2	1	1	0	4
	5:30 PM	2	3	8	0	13					0	3	2	2	1	8
	5:45 PM	2	0	2	0	4					0	0	0	1	0	1
	TOTAL	15	22	41	8	86	0	0	0	0	0	14	8	6	5	33

PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS



ROLANDO (north)

437	181	121	135	TOTAL	395
276	107	85	84	PM	249
161	74	36	51	AM	146

UNIVERSITY (east)

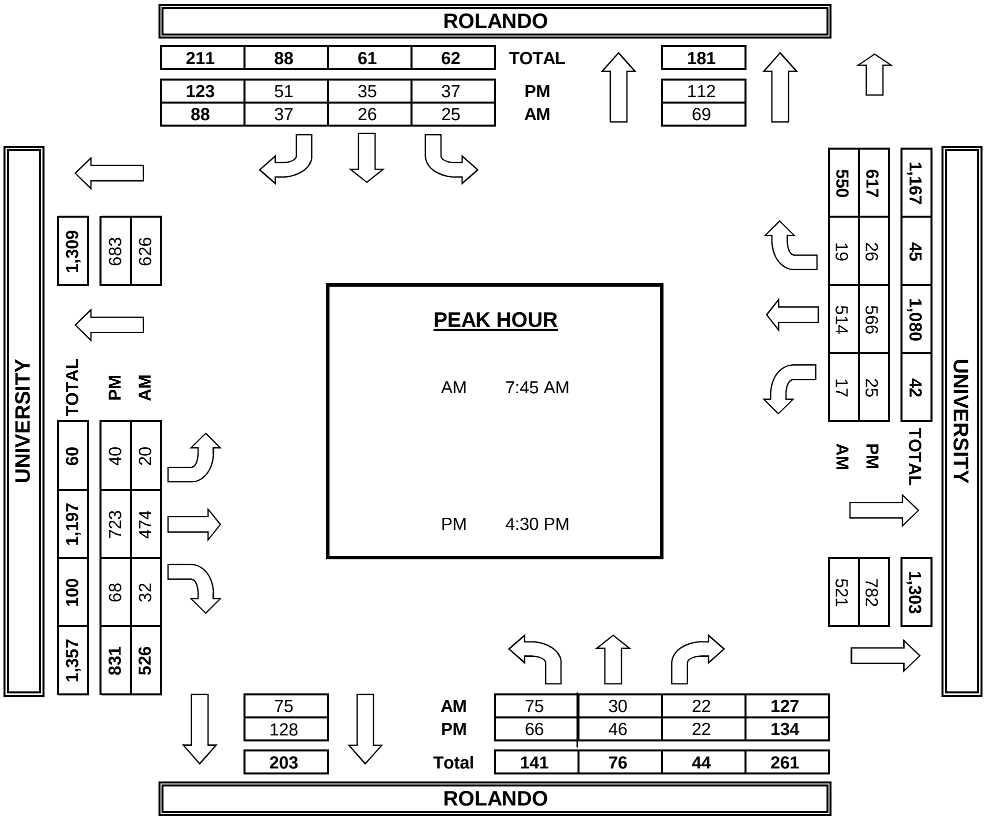
AM	PM	TOTAL
1,088	1,546	2,634
39	55	94
1,009	1,415	2,424
40	76	116
1,030	1,893	2,923

UNIVERSITY (west)

TOTAL	PM	AM
2,961	1,690	1,271
159	109	50
2,676	1,737	939
218	151	67
3,053	1,997	1,056

ROLANDO (south)

143	AM	188	57	40	285
312	PM	168	85	72	325
455	TOTAL	356	142	112	610



AM 7:45 AM

PM 4:30 PM

ROLANDO (north)

211	88	61	62	TOTAL	181
123	51	35	37	PM	112
88	37	26	25	AM	69

UNIVERSITY (east)

AM	PM	TOTAL
550	617	1,167
19	26	45
514	566	1,080
17	25	42
521	782	1,303

UNIVERSITY (west)

TOTAL	PM	AM
1,309	683	626
60	40	20
1,197	723	474
100	68	32
1,357	831	526

ROLANDO (south)

75	AM	75	30	22	127
128	PM	66	46	22	134
203	Total	141	76	44	261

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TRAFFIC DATA SERVICES

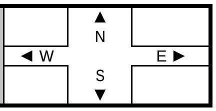
DATE:
12/1/10
WEDNESDAY

LOCATION: SAN DIEGO
NORTH & SOUTH: 54TH
EAST & WEST: CHOLLAS

PROJECT #: CA10-1203-03
LOCATION #: 11
CONTROL: 1-WAY STOP (WB)

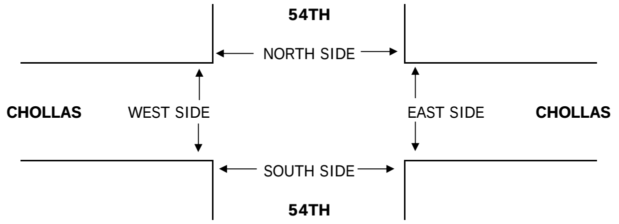
NOTES:

AM
PM
MD
OTHER
OTHER



		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
			54TH			54TH			CHOLLAS			CHOLLAS		
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	X	2	X	0	2	X	X	X	X	1	X	1	
AM	6:30 AM		146	17	0	65					15		0	243
	6:45 AM		164	20	2	70					18		0	274
	7:00 AM		216	27	0	95					17		0	355
	7:15 AM		202	25	1	138					31		0	397
	7:30 AM		258	33	1	107					22		1	422
	7:45 AM		218	38	2	89					29		3	379
	8:00 AM		204	38	5	97					18		4	366
	8:15 AM		168	32	3	104					31		0	338
	8:30 AM		176	47	3	117					29		1	373
	8:45 AM		149	36	2	104					37		1	329
	VOLUMES	0	1,901	313	19	986	0	0	0	0	247	0	10	3,476
	APPROACH %	0%	86%	14%	2%	98%	0%	0%	0%	0%	96%	0%	4%	
	APP/DEPART	2,214	/	1,911	1,005	/	1,233	0	/	332	257	/	0	0
	BEGIN PEAK HR		7:15 AM											
	VOLUMES	0	882	134	9	431	0	0	0	0	100	0	8	1,564
	APPROACH %	0%	87%	13%	2%	98%	0%	0%	0%	0%	93%	0%	7%	
	PEAK HR FACTOR		0.873			0.791			0.000			0.844		0.927
	APP/DEPART	1,016	/	890	440	/	531	0	/	143	108	/	0	0
PM	3:30 PM		131	59	0	182					43		2	417
	3:45 PM		139	66	2	190					36		1	434
	4:00 PM		164	60	3	184					45		3	459
	4:15 PM		183	64	1	230					39		1	518
	4:30 PM		156	47	3	218					33		4	461
	4:45 PM		190	62	2	231					39		5	529
	5:00 PM		150	68	1	235					42		2	498
	5:15 PM		190	60	0	236					48		4	538
	5:30 PM		139	58	3	240					44		4	488
	5:45 PM		153	63	0	245					48		1	510
	VOLUMES	0	1,595	607	15	2,191	0	0	0	0	417	0	27	4,852
	APPROACH %	0%	72%	28%	1%	99%	0%	0%	0%	0%	94%	0%	6%	
	APP/DEPART	2,202	/	1,622	2,206	/	2,608	0	/	622	444	/	0	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	0	669	248	6	942	0	0	0	0	173	0	15	2,053
	APPROACH %	0%	73%	27%	1%	99%	0%	0%	0%	0%	92%	0%	8%	
	PEAK HR FACTOR		0.910			0.975			0.000			0.904		0.954
	APP/DEPART	917	/	684	948	/	1,115	0	/	254	188	/	0	0

U-TURNS				
NB	SB	EB	WB	TTL
X	X	X	X	
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0



		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	6:30 AM	0	0	2		2					0	0	0	1	0	1
	6:45 AM	0	0	4		4					0	0	0	0	0	0
	7:00 AM	0	0	0		0					0	0	0	3	1	4
	7:15 AM	0	0	0		0					0	0	0	0	0	0
	7:30 AM	1	0	2		3					0	0	0	1	3	4
	7:45 AM	0	0	1		1					0	0	0	2	0	2
	8:00 AM	0	0	4		4					0	0	0	0	2	2
	8:15 AM	0	2	0		2					0	0	0	1	1	2
	8:30 AM	2	1	0		3					0	1	0	1	0	2
	8:45 AM	0	0	1		1					0	1	0	1	0	2
	TOTAL	3	3	14	0	20	0	0	0	0	0	2	0	10	7	19
PM	3:30 PM	0	0	2		2					0	0	0	0	1	1
	3:45 PM	0	0	3		3					0	0	0	1	0	1
	4:00 PM	0	0	0		0					0	1	0	0	0	1
	4:15 PM	0	1	1		2					0	1	0	0	0	1
	4:30 PM	2	2	2		6					0	1	1	0	2	4
	4:45 PM	0	0	4		4					0	0	1	1	0	2
	5:00 PM	2	0	2		4					0	2	0	3	1	6
	5:15 PM	1	0	5		6					0	0	1	0	0	1
	5:30 PM	0	1	2		3					0	0	2	2	0	4
	5:45 PM	0	0	0		0					0	0	1	1	0	2
	TOTAL	5	4	21	0	30	0	0	0	0	0	5	6	8	4	23

PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS

54TH

3,211	**0**	**3,177**	**34**	**TOTAL**
2,206	0	2,191	15	**PM**
1,005	0	986	19	**AM**

3,533
1,622
1,911

CHOLLAS

TOTAL	**PM**	**AM**
0	0	0
0	0	0
0	0	0
0	0	0
0	**0**	**0**

TOTAL	**PM**	**AM**
0	0	0

SAN DIEGO

CA10-1203-03

ALL HOURS

CHOLLAS

AM	**PM**	**TOTAL**
257	**444**	**701**
10	27	**37**
0	0	**0**
247	417	**664**

AM	**PM**	**TOTAL**
332	622	**954**

AM	1,233
PM	2,608
TOTAL	**3,841**

AM	0	1,901	313	**2,214**
PM	0	1,595	607	**2,202**
TOTAL	**0**	**3,496**	**920**	**4,416**

54TH

54TH

1,388	**0**	**1,373**	**15**	**TOTAL**
948	0	942	6	**PM**
440	0	431	9	**AM**

1,574
684
890

CHOLLAS

TOTAL	**PM**	**AM**
0	0	0
0	0	0
0	0	0
0	0	0
0	**0**	**0**

TOTAL	**PM**	**AM**
0	0	0

PEAK HOUR

AM 7:15 AM

PM 4:45 PM

CHOLLAS

AM	**PM**	**TOTAL**
108	**188**	**296**
8	15	**23**
0	0	**0**
100	173	**273**

AM	**PM**	**TOTAL**
143	254	**397**

AM	531
PM	1,115
Total	**1,646**

AM	0	882	134	**1,016**
PM	0	669	248	**917**
Total	**0**	**1,551**	**382**	**1,933**

54TH

APPENDIX B

PEAK HOUR INTERSECTION LOS WORKSHEETS
EXISTING CONDITIONS

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Volume (vph)	444	383	55	992	1089	46
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	488	421	60	1090	1197	51
RTOR Reduction (vph)	0	67	0	0	0	31
Lane Group Flow (vph)	488	354	60	1090	1197	20
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	57.1	103.5	7.6	68.7	46.4	46.4
Effective Green, g (s)	59.2	106.0	8.0	71.2	46.8	46.8
Actuated g/C Ratio	0.47	0.84	0.06	0.57	0.37	0.37
Clearance Time (s)	6.1	4.4	4.4	6.5	4.4	4.4
Vehicle Extension (s)	4.3	2.0	2.0	4.8	2.0	2.0
Lane Grp Cap (vph)	1663	1382	112	2000	1275	588
v/s Ratio Prot	0.14	0.10	0.03	c0.31	c0.35	
v/s Ratio Perm		0.13				0.01
v/c Ratio	0.29	0.26	0.54	0.55	0.94	0.03
Uniform Delay, d1	20.5	2.0	57.2	17.2	38.2	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.0	2.5	1.1	12.9	0.0
Delay (s)	21.0	2.1	59.7	18.3	51.1	25.2
Level of Service	C	A	E	B	D	C
Approach Delay (s)	12.2			20.5	50.1	
Approach LOS	B			C	D	

Intersection Summary

HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	126.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	63	41	978	75	21	380
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	66	43	1019	78	22	396
RTOR Reduction (vph)	0	38	0	69	0	0
Lane Group Flow (vph)	66	5	1019	9	22	396
Turn Type		Perm		Over	Prot	
Protected Phases	3		2	3	1	6
Permitted Phases		3				
Actuated Green, G (s)	8.0	8.0	48.1	8.0	1.4	53.5
Effective Green, g (s)	8.0	8.0	48.6	8.0	1.4	54.0
Actuated g/C Ratio	0.11	0.11	0.69	0.11	0.02	0.77
Clearance Time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Vehicle Extension (s)	2.0	2.0	3.7	2.0	2.0	3.7
Lane Grp Cap (vph)	202	181	2457	181	35	2730
v/s Ratio Prot	c0.04		c0.29	0.01	c0.01	0.11
v/s Ratio Perm		0.00				
v/c Ratio	0.33	0.03	0.41	0.05	0.63	0.15
Uniform Delay, d1	28.5	27.5	4.6	27.6	34.0	2.1
Progression Factor	1.00	1.00	2.35	1.63	1.00	1.00
Incremental Delay, d2	0.3	0.0	0.4	0.0	22.7	0.1
Delay (s)	28.9	27.6	11.2	45.0	56.7	2.2
Level of Service	C	C	B	D	E	A
Approach Delay (s)	28.4		13.6			5.0
Approach LOS	C		B			A

Intersection Summary

HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3460		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	3460		1770	3539	1583
Volume (vph)	57	259	128	90	388	316	235	642	113	104	290	73
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	61	276	136	96	413	336	250	683	120	111	309	78
RTOR Reduction (vph)	0	0	78	0	0	183	0	11	0	0	0	57
Lane Group Flow (vph)	61	276	58	96	413	153	250	792	0	111	309	21
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	7.7	60.3	60.3	11.3	62.6	62.6	13.9	38.1		12.6	36.9	36.9
Effective Green, g (s)	8.1	60.2	60.2	11.7	63.8	63.8	14.3	39.1		13.0	37.8	37.8
Actuated g/C Ratio	0.06	0.43	0.43	0.08	0.46	0.46	0.10	0.28		0.09	0.27	0.27
Clearance Time (s)	4.4	3.9	3.9	4.4	5.2	5.2	4.4	5.0		4.4	4.9	4.9
Vehicle Extension (s)	1.5	3.7	3.7	1.5	3.7	3.7	1.5	3.7		1.5	3.7	3.7
Lane Grp Cap (vph)	102	1522	681	148	1613	721	351	966		164	956	427
v/s Ratio Prot	0.03	0.08		c0.05	c0.12		c0.07	c0.23		0.06	0.09	
v/s Ratio Perm			0.04			0.10						0.01
v/c Ratio	0.60	0.18	0.09	0.65	0.26	0.21	0.71	0.82		0.68	0.32	0.05
Uniform Delay, d1	64.4	24.7	23.6	62.2	23.5	23.0	60.9	47.2		61.5	40.9	37.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.91		0.96	1.02	1.07
Incremental Delay, d2	6.1	0.3	0.2	7.1	0.4	0.7	3.0	3.1		8.4	0.2	0.1
Delay (s)	70.5	24.9	23.9	69.3	23.9	23.6	77.3	45.9		67.3	41.8	40.6
Level of Service	E	C	C	E	C	C	E	D		E	D	D
Approach Delay (s)		30.5			28.9			53.4			47.3	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	41.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

4: Trojan Ave & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.96			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1773			1712		1770	3500		1770	3509	
Flt Permitted		0.85			0.87		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1533			1512		1770	3500		1770	3509	
Volume (vph)	31	62	35	61	49	114	37	905	71	108	355	21
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	36	73	41	72	58	134	44	1065	84	127	418	25
RTOR Reduction (vph)	0	28	0	0	77	0	0	8	0	0	4	0
Lane Group Flow (vph)	0	122	0	0	187	0	44	1141	0	127	439	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		15.0			15.0		3.4	23.6		16.8	36.8	
Effective Green, g (s)		15.9			15.9		3.8	24.9		17.2	38.3	
Actuated g/C Ratio		0.23			0.23		0.05	0.36		0.25	0.55	
Clearance Time (s)		4.9			4.9		4.4	5.3		4.4	5.5	
Vehicle Extension (s)		3.0			3.0		2.0	2.1		2.0	2.1	
Lane Grp Cap (vph)		348			343		96	1245		435	1920	
v/s Ratio Prot							c0.02	c0.33		c0.07	0.13	
v/s Ratio Perm		0.08			c0.12							
v/c Ratio		0.35			0.54		0.46	0.92		0.29	0.23	
Uniform Delay, d1		22.7			23.9		32.1	21.6		21.5	8.2	
Progression Factor		1.00			1.00		1.00	1.00		0.89	0.83	
Incremental Delay, d2		0.6			1.8		1.3	12.0		0.1	0.3	
Delay (s)		23.3			25.6		33.4	33.6		19.2	7.1	
Level of Service		C			C		C	C		B	A	
Approach Delay (s)		23.3			25.6			33.6			9.8	
Approach LOS		C			C			C			A	

Intersection Summary

HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	73	4	8	114	15	50	16	76	42	12	33
Peak Hour Factor	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Hourly flow rate (vph)	33	159	9	17	248	33	109	35	165	91	26	72

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	200	298	309	189
Volume Left (vph)	33	17	109	91
Volume Right (vph)	9	33	165	72
Hadj (s)	0.04	-0.02	-0.22	-0.10
Departure Headway (s)	6.0	5.7	5.5	5.9
Degree Utilization, x	0.33	0.47	0.47	0.31
Capacity (veh/h)	540	581	600	545
Control Delay (s)	11.9	13.7	13.4	11.4
Approach Delay (s)	11.9	13.7	13.4	11.4
Approach LOS	B	B	B	B

Intersection Summary			
Delay	12.8		
HCM Level of Service	B		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3495		1770	3479		1770	1769		1770	1808	
Flt Permitted	0.95	1.00		0.95	1.00		0.49	1.00		0.27	1.00	
Satd. Flow (perm)	1770	3495		1770	3479		919	1769		497	1808	
Volume (vph)	35	347	32	117	459	59	45	209	106	35	156	38
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	38	373	34	126	494	63	48	225	114	38	168	41
RTOR Reduction (vph)	0	6	0	0	7	0	0	30	0	0	14	0
Lane Group Flow (vph)	38	401	0	126	550	0	48	309	0	38	195	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.4	40.9		10.6	47.1		20.3	20.3		20.3	20.3	
Effective Green, g (s)	4.8	41.8		11.0	48.0		21.2	21.2		21.2	21.2	
Actuated g/C Ratio	0.06	0.49		0.13	0.56		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.1		2.0	2.3		3.7	3.7		4.2	4.2	
Lane Grp Cap (vph)	99	1699		226	1942		227	436		123	446	
v/s Ratio Prot	0.02	0.11		c0.07	c0.16			c0.17			0.11	
v/s Ratio Perm							0.05			0.08		
v/c Ratio	0.38	0.24		0.56	0.28		0.21	0.71		0.31	0.44	
Uniform Delay, d1	39.2	12.8		35.2	10.0		25.8	29.6		26.4	27.4	
Progression Factor	1.00	1.00		0.77	0.95		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.3		1.6	0.4		0.6	5.5		2.2	1.0	
Delay (s)	40.1	13.2		28.9	9.8		26.3	35.0		28.6	28.4	
Level of Service	D	B		C	A		C	D		C	C	
Approach Delay (s)		15.5			13.4			34.0			28.4	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✣			✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.94			0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.97	
Frt	1.00	0.99		1.00	0.98			0.93			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3485		1770	3406			1594			1610	
Flt Permitted	0.95	1.00		0.95	1.00			0.83			0.67	
Satd. Flow (perm)	1770	3485		1770	3406			1332			1095	
Volume (vph)	69	370	20	47	525	96	42	49	86	65	42	74
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	76	407	22	52	577	105	46	54	95	71	46	81
RTOR Reduction (vph)	0	2	0	0	10	0	0	56	0	0	41	0
Lane Group Flow (vph)	76	427	0	52	672	0	0	139	0	0	157	0
Confl. Peds. (#/hr)	30		48	48		30	78		113	113		78
Confl. Bikes (#/hr)			24			5			2			17
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	7.0	54.1		4.9	52.0			14.1			14.1	
Effective Green, g (s)	7.0	55.0		4.9	52.9			14.1			14.1	
Actuated g/C Ratio	0.08	0.64		0.06	0.62			0.16			0.16	
Clearance Time (s)	4.0	4.9		4.0	4.9			4.0			4.0	
Vehicle Extension (s)	2.0	4.1		2.0	4.1			2.0			2.0	
Lane Grp Cap (vph)	144	2229		101	2095			218			180	
v/s Ratio Prot	c0.04	0.12		0.03	c0.20							
v/s Ratio Perm								0.10			c0.14	
v/c Ratio	0.53	0.19		0.51	0.32			0.64			0.87	
Uniform Delay, d1	37.9	6.4		39.4	7.9			33.6			35.1	
Progression Factor	0.91	1.36		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.6	0.2		1.8	0.4			4.4			33.2	
Delay (s)	35.9	8.9		41.2	8.3			38.0			68.3	
Level of Service	D	A		D	A			D			E	
Approach Delay (s)		12.9			10.7			38.0			68.3	
Approach LOS		B			B			D			E	

Intersection Summary

HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1515	1770	3539	1538	1770	3539	1500	3433	3539	1556
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1515	1770	3539	1538	1770	3539	1500	3433	3539	1556
Volume (vph)	193	219	102	54	325	328	156	672	28	169	321	222
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	199	226	105	56	335	338	161	693	29	174	331	229
RTOR Reduction (vph)	0	0	64	0	0	0	0	0	20	0	0	0
Lane Group Flow (vph)	199	226	41	56	335	338	161	693	9	174	331	229
Confl. Peds. (#/hr)			44			18			54			18
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free			8			Free
Actuated Green, G (s)	9.0	28.9	28.9	2.0	21.9	76.4	5.9	22.5	22.5	4.2	20.8	76.4
Effective Green, g (s)	9.4	29.9	29.9	2.4	22.9	76.4	6.3	23.5	23.5	4.6	21.8	76.4
Actuated g/C Ratio	0.12	0.39	0.39	0.03	0.30	1.00	0.08	0.31	0.31	0.06	0.29	1.00
Clearance Time (s)	4.4	5.0	5.0	4.4	5.0		4.4	5.0	5.0	4.4	5.0	
Vehicle Extension (s)	2.0	3.5	3.5	2.0	3.7		3.0	3.5	3.5	2.0	3.5	
Lane Grp Cap (vph)	218	1385	593	56	1061	1538	146	1089	461	207	1010	1556
v/s Ratio Prot	c0.11	0.06		0.03	c0.09		c0.09	c0.20		0.05	0.09	
v/s Ratio Perm			0.03			c0.22			0.01			0.15
v/c Ratio	0.91	0.16	0.07	1.00	0.32	0.22	1.10	0.64	0.02	0.84	0.33	0.15
Uniform Delay, d1	33.1	15.1	14.5	37.0	20.7	0.0	35.1	22.8	18.4	35.5	21.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.2	0.1	0.1	120.3	0.2	0.3	104.7	1.3	0.0	24.4	0.2	0.2
Delay (s)	70.3	15.2	14.6	157.3	20.9	0.3	139.7	24.1	18.4	59.9	21.7	0.2
Level of Service	E	B	B	F	C	A	F	C	B	E	C	A
Approach Delay (s)		35.8			21.8			45.0			24.1	
Approach LOS		D			C			D			C	

Intersection Summary

HCM Average Control Delay	32.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

9: University Ave & Chollas Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations		↑↑									↑	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	600	0	0	0	0	0	0	0	0	113	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	645	0	0	0	0	0	0	0	0	122	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			645			706	645	323	323	645	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			645			706	645	323	323	645	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	*7.4	3.3
p0 queue free %	100			100			100	100	100	100	55	100
cM capacity (veh/h)	1622			936			210	389	673	607	272	1084

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	323	323	122
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	272
Volume to Capacity	0.19	0.19	0.45
Queue Length 95th (ft)	0	0	54
Control Delay (s)	0.0	0.0	28.5
Lane LOS			D
Approach Delay (s)	0.0		28.5
Approach LOS			D

Intersection Summary

Average Delay	4.5		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

10: University Ave & 58th st

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑	↱		✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.95		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.99	
Satd. Flow (prot)	1770	5085	1545	1770	3539	1505		1738			1687	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.73			0.85	
Satd. Flow (perm)	1770	5085	1545	1770	3539	1505		1301			1455	
Volume (vph)	39	608	114	40	553	45	217	67	83	40	29	73
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	42	654	123	43	595	48	233	72	89	43	31	78
RTOR Reduction (vph)	0	0	0	0	0	26	0	0	0	0	0	0
Lane Group Flow (vph)	42	654	123	43	595	22	0	394	0	0	152	0
Confl. Peds. (#/hr)			8			12	9		17	17		9
Confl. Bikes (#/hr)									2			6
Turn Type	Prot		Free	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			4			4	
Permitted Phases			Free			6	4			4		
Actuated Green, G (s)	4.4	35.1	80.0	4.5	35.4	35.4		26.0			26.0	
Effective Green, g (s)	4.8	36.2	80.0	4.9	36.3	36.3		26.9			26.9	
Actuated g/C Ratio	0.06	0.45	1.00	0.06	0.45	0.45		0.34			0.34	
Clearance Time (s)	4.4	5.1		4.4	4.9	4.9		4.9			4.9	
Vehicle Extension (s)	2.0	3.5		2.0	3.5	3.5		2.0			2.0	
Lane Grp Cap (vph)	106	2301	1545	108	1606	683		437			489	
v/s Ratio Prot	0.02	0.13		c0.02	c0.17							
v/s Ratio Perm			c0.08			0.01		c0.30			0.10	
v/c Ratio	0.40	0.28	0.08	0.40	0.37	0.03		0.90			0.31	
Uniform Delay, d1	36.2	13.8	0.0	36.1	14.3	12.1		25.3			19.7	
Progression Factor	1.00	1.00	1.00	1.27	0.87	0.82		1.00			1.00	
Incremental Delay, d2	0.9	0.3	0.1	0.9	0.7	0.1		21.0			0.1	
Delay (s)	37.1	14.1	0.1	46.7	13.1	10.0		46.3			19.8	
Level of Service	D	B	A	D	B	B		D			B	
Approach Delay (s)		13.2			15.0			46.3			19.8	
Approach LOS		B			B			D			B	

Intersection Summary

HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱			↰↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.97	
Satd. Flow (prot)	1770	5045		1770	3532			1720			1708	
Flt Permitted	0.95	1.00		0.95	1.00			0.76			0.84	
Satd. Flow (perm)	1770	5045		1770	3532			1361			1488	
Volume (vph)	3	601	28	31	653	8	58	1	20	17	2	9
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	3	660	31	34	718	9	64	1	22	19	2	10
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	691	0	34	727	0	0	87	0	0	31	0
Confl. Peds. (#/hr)			4			1	4		13	13		4
Confl. Bikes (#/hr)			1			1			4			5
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	0.8	51.1		3.7	54.2			10.8			10.8	
Effective Green, g (s)	1.2	52.2		4.1	55.1			11.7			11.7	
Actuated g/C Ratio	0.01	0.65		0.05	0.69			0.15			0.15	
Clearance Time (s)	4.4	5.1		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	4.7		2.0	3.9			2.0			2.0	
Lane Grp Cap (vph)	27	3292		91	2433			199			218	
v/s Ratio Prot	0.00	0.14		c0.02	c0.21							
v/s Ratio Perm								c0.06			0.02	
v/c Ratio	0.11	0.21		0.37	0.30			0.44			0.14	
Uniform Delay, d1	38.9	5.6		36.7	4.9			31.1			29.8	
Progression Factor	1.01	1.05		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.7	0.1		0.9	0.3			0.6			0.1	
Delay (s)	40.0	6.0		37.6	5.2			31.7			29.9	
Level of Service	D	A		D	A			C			C	
Approach Delay (s)		6.2			6.6			31.7			29.9	
Approach LOS		A			A			C			C	

Intersection Summary

HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1530	1770	3383		1770	3434		1770	3406	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1530	1770	3383		1770	3434		1770	3406	
Volume (vph)	150	355	121	140	419	137	180	815	156	125	345	93
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	390	133	154	460	151	198	896	171	137	379	102
RTOR Reduction (vph)	0	0	99	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	165	390	34	154	611	0	198	1067	0	137	481	0
Confl. Peds. (#/hr)			22			16			20			13
Confl. Bikes (#/hr)						1			8			5
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	10.7	22.0	22.0	10.2	21.7		13.6	30.6		9.4	25.1	
Effective Green, g (s)	11.1	23.1	23.1	10.6	22.6		14.0	31.8		9.8	27.6	
Actuated g/C Ratio	0.12	0.25	0.25	0.12	0.25		0.15	0.35		0.11	0.30	
Clearance Time (s)	4.4	5.1	5.1	4.4	4.9		4.4	5.2		4.4	6.5	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.7		2.0	3.2		2.0	3.6	
Lane Grp Cap (vph)	215	895	387	205	837		271	1196		190	1030	
v/s Ratio Prot	c0.09	0.11		0.09	c0.18		c0.11	c0.31		0.08	0.14	
v/s Ratio Perm			0.02									
v/c Ratio	0.77	0.44	0.09	0.75	0.73		0.73	0.89		0.72	0.47	
Uniform Delay, d1	38.8	28.6	26.0	39.1	31.5		36.9	28.1		39.4	25.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.7	0.4	0.1	12.8	3.4		8.4	8.8		10.8	0.4	
Delay (s)	52.5	29.1	26.2	51.9	34.9		45.3	36.9		50.2	26.3	
Level of Service	D	C	C	D	C		D	D		D	C	
Approach Delay (s)		34.1			38.3			38.2			31.6	
Approach LOS		C			D			D			C	

Intersection Summary

HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

13: University Ave & Rolando Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	3500		1770	3518			1754			1708	
Flt Permitted	0.95	1.00		0.95	1.00			0.76			0.91	
Satd. Flow (perm)	1770	3500		1770	3518			1373			1572	
Volume (vph)	20	474	32	17	514	19	75	30	22	25	26	37
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	499	34	18	541	20	79	32	23	26	27	39
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	533	0	18	561	0	0	134	0	0	92	0
Confl. Peds. (#/hr)			5			1	5		20	20		5
Confl. Bikes (#/hr)			1			1			3			6
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	2.7	58.5		2.6	58.4			14.7			14.7	
Effective Green, g (s)	3.1	59.4		3.0	59.3			15.6			15.6	
Actuated g/C Ratio	0.03	0.66		0.03	0.66			0.17			0.17	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	3.6		2.0	3.6			2.0			2.0	
Lane Grp Cap (vph)	61	2310		59	2318			238			272	
v/s Ratio Prot	c0.01	0.15		0.01	c0.16							
v/s Ratio Perm								c0.10			0.06	
v/c Ratio	0.34	0.23		0.31	0.24			0.56			0.34	
Uniform Delay, d1	42.5	6.1		42.5	6.2			34.1			32.7	
Progression Factor	1.00	1.00		1.25	0.55			1.00			1.00	
Incremental Delay, d2	1.2	0.2		1.1	0.2			1.8			0.3	
Delay (s)	43.7	6.4		54.2	3.6			35.9			32.9	
Level of Service	D	A		D	A			D			C	
Approach Delay (s)		7.8			5.2			35.9			32.9	
Approach LOS		A			A			D			C	

Intersection Summary

HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱		↰↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	100	8	882	134	9	431
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	104	8	919	140	9	449
Pedestrians	5		3			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			602			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1170	466			924	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1076	293			802	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	45	99			99	
cM capacity (veh/h)	189	628			731	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	104	8	459	459	140	159	299
Volume Left	104	0	0	0	0	9	0
Volume Right	0	8	0	0	140	0	0
cSH	189	628	1700	1700	1700	731	1700
Volume to Capacity	0.55	0.01	0.27	0.27	0.08	0.01	0.18
Queue Length 95th (ft)	73	1	0	0	0	1	0
Control Delay (s)	45.4	10.8	0.0	0.0	0.0	0.7	0.0
Lane LOS	E	B				A	
Approach Delay (s)	42.9		0.0			0.3	
Approach LOS	E						

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1788	1554		1770	1543	1770	3498		1770	3517	
Flt Permitted		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1788	1554		1770	1543	1770	3498		1770	3517	
Volume (vph)	49	10	6	69	0	145	3	690	45	49	405	15
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	56	11	7	78	0	165	3	784	51	56	460	17
RTOR Reduction (vph)	0	0	6	0	0	146	0	3	0	0	2	0
Lane Group Flow (vph)	0	67	1	0	78	19	3	832	0	56	475	0
Confl. Peds. (#/hr)	3		2	2		3	5		11	11		5
Confl. Bikes (#/hr)			2			3			11			5
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)		10.0	10.0		10.2	10.2	1.1	56.9		6.6	62.7	
Effective Green, g (s)		11.9	11.9		12.1	12.1	1.5	59.0		7.0	64.5	
Actuated g/C Ratio		0.11	0.11		0.11	0.11	0.01	0.56		0.07	0.61	
Clearance Time (s)		5.9	5.9		5.9	5.9	4.4	6.1		4.4	5.8	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	2.0	3.3		2.0	3.3	
Lane Grp Cap (vph)		201	174		202	176	25	1947		117	2140	
v/s Ratio Prot		c0.04			c0.04		0.00	c0.24		c0.03	0.14	
v/s Ratio Perm			0.00			0.01						
v/c Ratio		0.33	0.00		0.39	0.11	0.12	0.43		0.48	0.22	
Uniform Delay, d1		43.4	41.8		43.5	42.1	51.6	13.7		47.7	9.4	
Progression Factor		1.00	1.00		1.00	1.00	1.14	0.63		1.00	1.00	
Incremental Delay, d2		1.0	0.0		1.2	0.3	0.8	0.7		1.1	0.2	
Delay (s)		44.4	41.8		44.7	42.4	59.6	9.3		48.9	9.6	
Level of Service		D	D		D	D	E	A		D	A	
Approach Delay (s)		44.1			43.1			9.5			13.8	
Approach LOS		D			D			A			B	

Intersection Summary

HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

16: Redwood St & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.96		1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1762			1741		1770	3493		1770	3523	
Flt Permitted		0.70			0.77		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1264			1380		1770	3493		1770	3523	
Volume (vph)	64	22	20	77	24	44	21	616	58	28	449	15
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	66	23	21	79	25	45	22	635	60	29	463	15
RTOR Reduction (vph)	0	10	0	0	19	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	100	0	0	130	0	22	692	0	29	477	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		14.7			14.7		2.8	72.6		4.3	73.5	
Effective Green, g (s)		15.6			15.6		3.2	73.7		4.7	75.2	
Actuated g/C Ratio		0.15			0.15		0.03	0.70		0.04	0.71	
Clearance Time (s)		4.9			4.9		4.4	5.1		4.4	5.7	
Vehicle Extension (s)		2.0			2.0		2.0	4.7		2.0	4.7	
Lane Grp Cap (vph)		186			203		53	2429		78	2499	
v/s Ratio Prot							0.01	c0.20		c0.02	0.14	
v/s Ratio Perm		0.08			c0.09							
v/c Ratio		0.54			0.64		0.42	0.28		0.37	0.19	
Uniform Delay, d1		41.9			42.6		50.5	6.1		49.2	5.2	
Progression Factor		1.00			1.00		1.11	0.50		1.00	1.16	
Incremental Delay, d2		1.5			5.1		1.8	0.3		1.1	0.2	
Delay (s)		43.3			47.7		57.6	3.3		50.2	6.2	
Level of Service		D			D		E	A		D	A	
Approach Delay (s)		43.3			47.7			5.0			8.7	
Approach LOS		D			D			A			A	

Intersection Summary

HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	⬑	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.96		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.98		0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1753		1681	1750	1583	1770	3473		1770	3521	
Flt Permitted		0.98		0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1753		1681	1750	1583	1770	3473		1770	3521	
Volume (vph)	34	40	36	121	80	203	14	450	64	76	459	17
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	37	43	39	130	86	218	15	484	69	82	494	18
RTOR Reduction (vph)	0	16	0	0	0	187	0	8	0	0	2	0
Lane Group Flow (vph)	0	103	0	105	111	31	15	545	0	82	510	0
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		11.3		13.3	13.3	13.3	2.6	53.0		8.1	58.4	
Effective Green, g (s)		12.2		15.0	15.0	15.0	3.0	54.3		8.5	59.8	
Actuated g/C Ratio		0.12		0.14	0.14	0.14	0.03	0.51		0.08	0.56	
Clearance Time (s)		4.9		5.7	5.7	5.7	4.4	5.3		4.4	5.4	
Vehicle Extension (s)		3.6		2.6	2.6	2.6	2.0	5.0		2.0	4.7	
Lane Grp Cap (vph)		202		238	248	224	50	1779		142	1986	
v/s Ratio Prot		c0.06		0.06	c0.06		0.01	c0.16		c0.05	0.14	
v/s Ratio Perm						0.02						
v/c Ratio		0.51		0.44	0.45	0.14	0.30	0.31		0.58	0.26	
Uniform Delay, d1		44.1		41.7	41.7	39.8	50.5	15.0		47.0	11.8	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.30	0.42	
Incremental Delay, d2		2.6		1.0	1.0	0.2	1.2	0.4		3.5	0.3	
Delay (s)		46.7		42.7	42.7	40.1	51.7	15.4		64.7	5.3	
Level of Service		D		D	D	D	D	B		E	A	
Approach Delay (s)		46.7			41.4			16.4			13.5	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	55	0	52	17	0	5	29	870	6	0	405	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95			0.95	
Frt		0.93			0.97		1.00	1.00			0.99	
Flt Protected		0.97			0.96		0.95	1.00			1.00	
Satd. Flow (prot)		1697			1740		1770	3536			3511	
Flt Permitted		0.83			0.74		0.95	1.00			1.00	
Satd. Flow (perm)		1438			1339		1770	3536			3511	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	59	0	56	18	0	5	31	935	6	0	435	24
RTOR Reduction (vph)	0	39	0	0	4	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	76	0	0	19	0	31	941	0	0	457	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		10.7			10.7		5.0	85.3			75.8	
Effective Green, g (s)		11.2			11.2		5.5	85.8			76.3	
Actuated g/C Ratio		0.11			0.11		0.05	0.82			0.73	
Clearance Time (s)		4.5			4.5		4.5	4.5			4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		153			143		93	2889			2551	
v/s Ratio Prot							0.02	c0.27			0.13	
v/s Ratio Perm		c0.05			0.01							
v/c Ratio		0.49			0.13		0.33	0.33			0.18	
Uniform Delay, d1		44.2			42.5		48.0	2.4			4.5	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		2.5			0.4		2.1	0.3			0.2	
Delay (s)		46.7			42.9		50.1	2.7			4.7	
Level of Service		D			D		D	A			A	
Approach Delay (s)		46.7			42.9			4.2			4.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Volume (vph)	1057	1133	100	763	616	66
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1101	1180	104	795	642	69
RTOR Reduction (vph)	0	86	0	0	0	48
Lane Group Flow (vph)	1101	1094	104	795	642	21
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	66.8	107.1	12.0	82.8	40.3	40.3
Effective Green, g (s)	68.9	109.6	12.4	85.3	40.7	40.7
Actuated g/C Ratio	0.51	0.82	0.09	0.64	0.30	0.30
Clearance Time (s)	6.1	4.4	4.4	6.5	4.4	4.4
Vehicle Extension (s)	4.3	2.0	2.0	4.8	2.0	2.0
Lane Grp Cap (vph)	1820	1342	164	2253	1043	481
v/s Ratio Prot	0.31	c0.25	c0.06	0.22	0.19	
v/s Ratio Perm		0.44				0.01
v/c Ratio	0.60	0.82	0.63	0.35	0.62	0.04
Uniform Delay, d1	23.0	6.7	58.6	11.4	39.9	32.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	3.7	5.8	0.4	0.8	0.0
Delay (s)	24.5	10.4	64.4	11.8	40.7	32.9
Level of Service	C	B	E	B	D	C
Approach Delay (s)	17.2			17.9	40.0	
Approach LOS	B			B	D	

Intersection Summary

HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	60	39	576	83	61	1004
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	42	626	90	66	1091
RTOR Reduction (vph)	0	39	0	83	0	0
Lane Group Flow (vph)	65	3	626	7	66	1091
Turn Type		Perm		Over	Prot	
Protected Phases	3		2	3	1	6
Permitted Phases		3				
Actuated Green, G (s)	9.8	9.8	90.1	9.8	7.6	101.7
Effective Green, g (s)	9.8	9.8	90.6	9.8	7.6	102.2
Actuated g/C Ratio	0.08	0.08	0.75	0.08	0.06	0.85
Clearance Time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Vehicle Extension (s)	2.0	2.0	3.7	2.0	2.0	3.7
Lane Grp Cap (vph)	145	129	2672	129	112	3014
v/s Ratio Prot	c0.04		0.18	0.00	c0.04	c0.31
v/s Ratio Perm		0.00				
v/c Ratio	0.45	0.03	0.23	0.06	0.59	0.36
Uniform Delay, d1	52.5	50.7	4.4	50.8	54.7	1.9
Progression Factor	1.00	1.00	0.47	1.70	1.00	1.00
Incremental Delay, d2	0.8	0.0	0.2	0.1	5.0	0.3
Delay (s)	53.3	50.7	2.2	86.4	59.7	2.2
Level of Service	D	D	A	F	E	A
Approach Delay (s)	52.3		12.8			5.5
Approach LOS	D		B			A

Intersection Summary

HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

3: El Cajon Bl & 54th St
Existing - PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3422		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	3422		1770	3539	1583
Volume (vph)	105	581	282	119	471	196	171	381	108	281	683	105
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	109	605	294	124	491	204	178	397	112	293	711	109
RTOR Reduction (vph)	0	0	177	0	0	126	0	27	0	0	0	76
Lane Group Flow (vph)	109	605	117	124	491	78	178	482	0	293	711	33
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	11.3	44.6	44.6	12.4	44.4	44.4	10.2	21.5		23.8	35.2	35.2
Effective Green, g (s)	11.7	44.5	44.5	12.8	45.6	45.6	10.6	22.5		24.2	36.1	36.1
Actuated g/C Ratio	0.10	0.37	0.37	0.11	0.38	0.38	0.09	0.19		0.20	0.30	0.30
Clearance Time (s)	4.4	3.9	3.9	4.4	5.2	5.2	4.4	5.0		4.4	4.9	4.9
Vehicle Extension (s)	1.5	3.7	3.7	1.5	3.7	3.7	1.5	3.7		1.5	3.7	3.7
Lane Grp Cap (vph)	173	1312	587	189	1345	602	303	642		357	1065	476
v/s Ratio Prot	0.06	c0.17		c0.07	0.14		0.05	c0.14		c0.17	0.20	
v/s Ratio Perm			0.07			0.05						0.02
v/c Ratio	0.63	0.46	0.20	0.66	0.37	0.13	0.59	0.75		0.82	0.67	0.07
Uniform Delay, d1	52.1	28.7	25.6	51.5	26.8	24.3	52.6	46.1		45.8	36.7	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.17	0.98		0.95	0.97	0.95
Incremental Delay, d2	5.4	1.2	0.8	6.1	0.8	0.4	1.8	5.1		12.8	1.6	0.1
Delay (s)	57.5	29.8	26.4	57.6	27.5	24.7	63.2	50.3		56.4	37.3	28.6
Level of Service	E	C	C	E	C	C	E	D		E	D	C
Approach Delay (s)		31.8			31.4			53.6			41.4	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.92			0.92		1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1700			1689		1770	3514		1770	3515	
Flt Permitted		0.85			0.79		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1451			1345		1770	3514		1770	3515	
Volume (vph)	20	28	70	36	23	91	70	568	28	116	941	45
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	30	74	38	24	97	74	604	30	123	1001	48
RTOR Reduction (vph)	0	65	0	0	81	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	60	0	0	78	0	74	633	0	123	1048	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		14.0			14.0		8.3	78.1		13.3	82.9	
Effective Green, g (s)		14.9			14.9		8.7	79.4		13.7	84.4	
Actuated g/C Ratio		0.12			0.12		0.07	0.66		0.11	0.70	
Clearance Time (s)		4.9			4.9		4.4	5.3		4.4	5.5	
Vehicle Extension (s)		3.0			3.0		2.0	2.1		2.0	2.1	
Lane Grp Cap (vph)		180			167		128	2325		202	2472	
v/s Ratio Prot							0.04	0.18		c0.07	c0.30	
v/s Ratio Perm		0.04			c0.06							
v/c Ratio		0.33			0.47		0.58	0.27		0.61	0.42	
Uniform Delay, d1		48.0			48.9		53.9	8.4		50.6	7.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	0.56	
Incremental Delay, d2		1.1			2.1		3.9	0.3		3.1	0.5	
Delay (s)		49.1			51.0		57.8	8.7		53.9	4.7	
Level of Service		D			D		E	A		D	A	
Approach Delay (s)		49.1			51.0			13.8			9.9	
Approach LOS		D			D			B			A	

Intersection Summary

HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	39	7	8	48	18	72	28	45	15	37	32
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	28	44	8	9	55	20	82	32	51	17	42	36

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	81	84	165	95
Volume Left (vph)	28	9	82	17
Volume Right (vph)	8	20	51	36
Hadj (s)	0.05	-0.09	-0.05	-0.16
Departure Headway (s)	4.6	4.5	4.3	4.3
Degree Utilization, x	0.10	0.11	0.20	0.11
Capacity (veh/h)	721	743	791	785
Control Delay (s)	8.2	8.0	8.4	7.9
Approach Delay (s)	8.2	8.0	8.4	7.9
Approach LOS	A	A	A	A

Intersection Summary

Delay	8.2		
HCM Level of Service	A		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3463		1770	3503		1770	1751		1770	1820	
Flt Permitted	0.95	1.00		0.95	1.00		0.30	1.00		0.20	1.00	
Satd. Flow (perm)	1770	3463		1770	3503		564	1751		377	1820	
Volume (vph)	74	521	87	158	533	39	43	202	135	39	240	43
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	79	554	93	168	567	41	46	215	144	41	255	46
RTOR Reduction (vph)	0	10	0	0	4	0	0	33	0	0	9	0
Lane Group Flow (vph)	79	637	0	168	604	0	46	326	0	41	292	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	7.7	48.9		14.0	55.2		22.9	22.9		22.9	22.9	
Effective Green, g (s)	8.1	49.8		14.4	56.1		23.8	23.8		23.8	23.8	
Actuated g/C Ratio	0.08	0.50		0.14	0.56		0.24	0.24		0.24	0.24	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.1		2.0	2.3		3.7	3.7		4.2	4.2	
Lane Grp Cap (vph)	143	1725		255	1965		134	417		90	433	
v/s Ratio Prot	0.04	c0.18		c0.09	0.17			c0.19			0.16	
v/s Ratio Perm							0.08			0.11		
v/c Ratio	0.55	0.37		0.66	0.31		0.34	0.78		0.46	0.67	
Uniform Delay, d1	44.2	15.4		40.5	11.6		31.6	35.7		32.6	34.6	
Progression Factor	1.00	1.00		1.43	0.51		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	0.6		4.5	0.4		1.9	9.6		5.4	4.6	
Delay (s)	46.8	16.1		62.3	6.3		33.5	45.3		38.0	39.2	
Level of Service	D	B		E	A		C	D		D	D	
Approach Delay (s)		19.4			18.4			43.9			39.1	
Approach LOS		B			B			D			D	

Intersection Summary

HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.95			0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.97	
Frt	1.00	0.99		1.00	0.99			0.94			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3471		1770	3446			1619			1652	
Flt Permitted	0.95	1.00		0.95	1.00			0.87			0.64	
Satd. Flow (perm)	1770	3471		1770	3446			1423			1075	
Volume (vph)	65	685	37	47	616	55	40	51	78	95	51	52
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	66	692	37	47	622	56	40	52	79	96	52	53
RTOR Reduction (vph)	0	2	0	0	4	0	0	43	0	0	17	0
Lane Group Flow (vph)	66	727	0	47	674	0	0	128	0	0	184	0
Confl. Peds. (#/hr)	49		72	72		49	86		74	74		86
Confl. Bikes (#/hr)			15			17			7			11
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.5	64.0		5.1	62.6			18.0			18.0	
Effective Green, g (s)	6.5	64.9		5.1	63.5			18.0			18.0	
Actuated g/C Ratio	0.06	0.65		0.05	0.64			0.18			0.18	
Clearance Time (s)	4.0	4.9		4.0	4.9			4.0			4.0	
Vehicle Extension (s)	2.0	4.1		2.0	4.1			2.0			2.0	
Lane Grp Cap (vph)	115	2253		90	2188			256			194	
v/s Ratio Prot	c0.04	c0.21		0.03	0.20							
v/s Ratio Perm								0.09			c0.17	
v/c Ratio	0.57	0.32		0.52	0.31			0.50			0.95	
Uniform Delay, d1	45.4	7.8		46.3	8.3			37.0			40.5	
Progression Factor	1.40	0.49		0.81	1.94			1.00			1.00	
Incremental Delay, d2	4.1	0.4		2.2	0.3			0.6			48.7	
Delay (s)	67.8	4.2		39.9	16.4			37.5			89.2	
Level of Service	E	A		D	B			D			F	
Approach Delay (s)		9.5			17.9			37.5			89.2	
Approach LOS		A			B			D			F	

Intersection Summary

HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	0.94	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1500	1770	3539	1538	1770	3539	1481	3433	3539	1556
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1500	1770	3539	1538	1770	3539	1481	3433	3539	1556
Volume (vph)	126	647	254	128	568	309	223	431	61	477	592	184
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	130	667	262	132	586	319	230	444	63	492	610	190
RTOR Reduction (vph)	0	0	167	0	0	0	0	0	47	0	0	0
Lane Group Flow (vph)	130	667	95	132	586	319	230	444	16	492	610	190
Confl. Peds. (#/hr)			44			18			54			18
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free			8			Free
Actuated Green, G (s)	9.7	30.6	30.6	9.6	30.5	100.0	17.3	23.9	23.9	17.1	23.7	100.0
Effective Green, g (s)	10.1	31.6	31.6	10.0	31.5	100.0	17.7	24.9	24.9	17.5	24.7	100.0
Actuated g/C Ratio	0.10	0.32	0.32	0.10	0.32	1.00	0.18	0.25	0.25	0.18	0.25	1.00
Clearance Time (s)	4.4	5.0	5.0	4.4	5.0		4.4	5.0	5.0	4.4	5.0	
Vehicle Extension (s)	2.0	3.5	3.5	2.0	3.7		3.0	3.5	3.5	2.0	3.5	
Lane Grp Cap (vph)	179	1118	474	177	1115	1538	313	881	369	601	874	1556
v/s Ratio Prot	0.07	c0.19		c0.07	0.17		c0.13	0.13		c0.14	c0.17	
v/s Ratio Perm			0.06			c0.21			0.01			0.12
v/c Ratio	0.73	0.60	0.20	0.75	0.53	0.21	0.73	0.50	0.04	0.82	0.70	0.12
Uniform Delay, d1	43.6	28.8	25.0	43.8	28.1	0.0	38.9	32.2	28.5	39.7	34.3	0.0
Progression Factor	1.10	0.87	0.55	1.01	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5	2.3	0.9	12.6	1.6	0.3	8.6	0.5	0.1	8.1	2.5	0.2
Delay (s)	59.5	27.4	14.7	56.7	25.4	0.3	47.6	32.8	28.6	47.8	36.8	0.2
Level of Service	E	C	B	E	C	A	D	C	C	D	D	A
Approach Delay (s)		28.2			21.6			37.0			35.6	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1129	0	0	0	0	0	0	0	0	184	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	1214	0	0	0	0	0	0	0	0	198	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			1214			1313	1214	607	607	1214	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			1214			1313	1214	607	607	1214	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	*7.4	3.3
p0 queue free %	100			100			0	100	100	100	0	100
cM capacity (veh/h)	1622			570			0	180	439	380	146	1084

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	607	607	198
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	146
Volume to Capacity	0.36	0.36	1.36
Queue Length 95th (ft)	0	0	311
Control Delay (s)	0.0	0.0	256.7
Lane LOS			F
Approach Delay (s)	0.0		256.7
Approach LOS			F

Intersection Summary			
Average Delay	36.0		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑	↱		✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.94		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.96			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.98	
Satd. Flow (prot)	1770	5085	1545	1770	3539	1493		1718			1691	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.73			0.84	
Satd. Flow (perm)	1770	5085	1545	1770	3539	1493		1290			1448	
Volume (vph)	74	1025	247	59	803	43	210	30	88	36	22	53
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	80	1102	266	63	863	46	226	32	95	39	24	57
RTOR Reduction (vph)	0	0	0	0	0	18	0	0	0	0	0	0
Lane Group Flow (vph)	80	1102	266	63	863	28	0	353	0	0	120	0
Confl. Peds. (#/hr)			8			12	9		17	17		9
Confl. Bikes (#/hr)									2			6
Turn Type	Prot		Free	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			4			4	
Permitted Phases			Free			6	4			4		
Actuated Green, G (s)	7.5	47.9	100.0	6.9	47.5	47.5		30.8			30.8	
Effective Green, g (s)	7.9	49.0	100.0	7.3	48.4	48.4		31.7			31.7	
Actuated g/C Ratio	0.08	0.49	1.00	0.07	0.48	0.48		0.32			0.32	
Clearance Time (s)	4.4	5.1		4.4	4.9	4.9		4.9			4.9	
Vehicle Extension (s)	2.0	3.5		2.0	3.5	3.5		2.0			2.0	
Lane Grp Cap (vph)	140	2492	1545	129	1713	723		409			459	
v/s Ratio Prot	c0.05	0.22		0.04	c0.24							
v/s Ratio Perm			c0.17			0.02		c0.27			0.08	
v/c Ratio	0.57	0.44	0.17	0.49	0.50	0.04		0.86			0.26	
Uniform Delay, d1	44.4	16.6	0.0	44.6	17.6	13.6		32.1			25.4	
Progression Factor	1.14	1.04	1.00	1.06	0.89	0.99		1.00			1.00	
Incremental Delay, d2	3.0	0.5	0.2	1.0	1.0	0.1		16.4			0.1	
Delay (s)	53.8	17.7	0.2	48.1	16.8	13.5		48.5			25.5	
Level of Service	D	B	A	D	B	B		D			C	
Approach Delay (s)		16.5			18.6			48.5			25.5	
Approach LOS		B			B			D			C	

Intersection Summary

HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	1.00			0.93			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	5034		1770	3525			1669			1689	
Flt Permitted	0.95	1.00		0.95	1.00			0.85			0.86	
Satd. Flow (perm)	1770	5034		1770	3525			1446			1490	
Volume (vph)	14	980	58	55	793	18	37	3	41	20	1	14
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	15	1077	64	60	871	20	41	3	45	22	1	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	15	1141	0	60	891	0	0	89	0	0	38	0
Confl. Peds. (#/hr)			4			1	4		13	13		4
Confl. Bikes (#/hr)			1			1			4			5
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	65.9		6.8	70.3			12.9			12.9	
Effective Green, g (s)	3.0	67.0		7.2	71.2			13.8			13.8	
Actuated g/C Ratio	0.03	0.67		0.07	0.71			0.14			0.14	
Clearance Time (s)	4.4	5.1		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	4.7		2.0	3.9			2.0			2.0	
Lane Grp Cap (vph)	53	3373		127	2510			200			206	
v/s Ratio Prot	0.01	0.23		c0.03	c0.25							
v/s Ratio Perm								c0.06			0.03	
v/c Ratio	0.28	0.34		0.47	0.35			0.45			0.18	
Uniform Delay, d1	47.4	7.0		44.6	5.5			39.6			38.1	
Progression Factor	1.30	0.18		0.86	1.65			1.00			1.00	
Incremental Delay, d2	1.0	0.3		0.5	0.2			0.6			0.2	
Delay (s)	62.5	1.5		39.0	9.3			40.2			38.3	
Level of Service	E	A		D	A			D			D	
Approach Delay (s)		2.3			11.2			40.2			38.3	
Approach LOS		A			B			D			D	

Intersection Summary

HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

12: University Ave & College ave

Existing - PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1526	1770	3360		1770	3350		1770	3370	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1526	1770	3360		1770	3350		1770	3370	
Volume (vph)	207	582	328	235	432	169	225	514	205	220	699	255
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	227	640	360	258	475	186	247	565	225	242	768	280
RTOR Reduction (vph)	0	0	223	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	227	640	137	258	661	0	247	790	0	242	1048	0
Confl. Peds. (#/hr)			22			16			20			13
Confl. Bikes (#/hr)						1			8			5
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	13.6	24.7	24.7	12.6	23.9		14.9	28.6		15.0	27.4	
Effective Green, g (s)	14.0	25.8	25.8	13.0	24.8		15.3	29.8		15.4	29.9	
Actuated g/C Ratio	0.14	0.26	0.26	0.13	0.25		0.15	0.30		0.15	0.30	
Clearance Time (s)	4.4	5.1	5.1	4.4	4.9		4.4	5.2		4.4	6.5	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.7		2.0	3.2		2.0	3.6	
Lane Grp Cap (vph)	248	913	394	230	833		271	998		273	1008	
v/s Ratio Prot	0.13	0.18		c0.15	c0.20		c0.14	0.24		0.14	c0.31	
v/s Ratio Perm			0.09									
v/c Ratio	0.92	0.70	0.35	1.12	0.79		0.91	0.79		0.89	1.04	
Uniform Delay, d1	42.4	33.6	30.2	43.5	35.2		41.7	32.2		41.4	35.0	
Progression Factor	0.93	0.68	1.32	1.00	1.10		1.00	1.00		1.00	1.00	
Incremental Delay, d2	33.8	2.5	0.7	95.7	5.4		31.8	6.4		26.6	39.2	
Delay (s)	73.1	25.5	40.7	139.2	44.2		73.5	38.7		68.0	74.2	
Level of Service	E	C	D	F	D		E	D		E	E	
Approach Delay (s)		38.7			70.9			47.0			73.1	
Approach LOS		D			E			D			E	

Intersection Summary

HCM Average Control Delay	57.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3486		1770	3513			1765			1708	
Flt Permitted	0.95	1.00		0.95	1.00			0.71			0.86	
Satd. Flow (perm)	1770	3486		1770	3513			1291			1498	
Volume (vph)	40	723	68	25	566	26	66	46	22	37	35	51
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	761	72	26	596	27	69	48	23	39	37	54
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	42	833	0	26	623	0	0	140	0	0	130	0
Confl. Peds. (#/hr)			5			1	5		20	20		5
Confl. Bikes (#/hr)			1			1			3			6
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	4.8	67.3		2.9	65.4			15.6			15.6	
Effective Green, g (s)	5.2	68.2		3.3	66.3			16.5			16.5	
Actuated g/C Ratio	0.05	0.68		0.03	0.66			0.16			0.16	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	3.6		2.0	3.6			2.0			2.0	
Lane Grp Cap (vph)	92	2377		58	2329			213			247	
v/s Ratio Prot	c0.02	c0.24		0.01	0.18							
v/s Ratio Perm								c0.11			0.09	
v/c Ratio	0.46	0.35		0.45	0.27			0.66			0.53	
Uniform Delay, d1	46.0	6.6		47.5	6.9			39.1			38.2	
Progression Factor	0.96	0.88		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.1	0.4		2.0	0.3			5.5			0.9	
Delay (s)	45.1	6.2		49.5	7.2			44.6			39.1	
Level of Service	D	A		D	A			D			D	
Approach Delay (s)		8.1			8.9			44.6			39.1	
Approach LOS		A			A			D			D	

Intersection Summary

HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱		↰↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	100	8	669	248	6	942
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	104	8	697	258	6	981
Pedestrians	5		3			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			602			
pX, platoon unblocked	0.92	0.92			0.92	
vC, conflicting volume	1208	355			702	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1138	210			587	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	41	99			99	
cM capacity (veh/h)	177	727			900	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	104	8	348	348	258	333	654
Volume Left	104	0	0	0	0	6	0
Volume Right	0	8	0	0	258	0	0
cSH	177	727	1700	1700	1700	900	1700
Volume to Capacity	0.59	0.01	0.20	0.20	0.15	0.01	0.38
Queue Length 95th (ft)	80	1	0	0	0	1	0
Control Delay (s)	51.0	10.0	0.0	0.0	0.0	0.2	0.0
Lane LOS	F	B				A	
Approach Delay (s)	48.0		0.0			0.1	
Approach LOS	E						

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1778	1560		1770	1583	1770	3491		1770	3512	
Flt Permitted		0.95	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1778	1560		1770	1583	1770	3491		1770	3512	
Volume (vph)	39	2	5	70	0	104	5	672	51	141	801	35
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	45	2	6	80	0	120	6	772	59	162	921	40
RTOR Reduction (vph)	0	0	5	0	0	107	0	5	0	0	2	0
Lane Group Flow (vph)	0	47	1	0	80	13	6	826	0	162	959	0
Confl. Peds. (#/hr)			2	2			16		16	16		16
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)		8.0	8.0		9.8	9.8	1.2	49.1		16.8	65.0	
Effective Green, g (s)		9.9	9.9		11.7	11.7	1.6	51.2		17.2	66.8	
Actuated g/C Ratio		0.09	0.09		0.11	0.11	0.02	0.48		0.16	0.63	
Clearance Time (s)		5.9	5.9		5.9	5.9	4.4	6.1		4.4	5.8	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	2.0	3.3		2.0	3.3	
Lane Grp Cap (vph)		166	146		195	175	27	1686		287	2213	
v/s Ratio Prot		c0.03			c0.05		0.00	c0.24		c0.09	0.27	
v/s Ratio Perm			0.00			0.01						
v/c Ratio		0.28	0.00		0.41	0.08	0.22	0.49		0.56	0.43	
Uniform Delay, d1		44.7	43.6		43.9	42.3	51.6	18.6		40.9	10.0	
Progression Factor		1.00	1.00		1.00	1.00	1.35	0.58		1.00	1.00	
Incremental Delay, d2		0.9	0.0		1.4	0.2	1.5	1.0		1.5	0.6	
Delay (s)		45.7	43.6		45.3	42.5	71.3	11.7		42.5	10.6	
Level of Service		D	D		D	D	E	B		D	B	
Approach Delay (s)		45.4			43.6			12.1			15.2	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

16: Redwood St & 54th St

Existing - PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.97		1.00	0.98		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1759			1748		1770	3461		1770	3512	
Flt Permitted		0.77			0.72		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1381			1287		1770	3461		1770	3512	
Volume (vph)	57	30	28	80	22	34	42	642	110	39	795	43
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	32	29	84	23	36	44	676	116	41	837	45
RTOR Reduction (vph)	0	14	0	0	14	0	0	6	0	0	2	0
Lane Group Flow (vph)	0	107	0	0	129	0	44	786	0	41	880	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		14.7			14.7		6.2	73.7		3.2	70.1	
Effective Green, g (s)		15.6			15.6		6.6	74.8		3.6	71.8	
Actuated g/C Ratio		0.15			0.15		0.06	0.71		0.03	0.68	
Clearance Time (s)		4.9			4.9		4.4	5.1		4.4	5.7	
Vehicle Extension (s)		2.0			2.0		2.0	4.7		2.0	4.7	
Lane Grp Cap (vph)		203			189		110	2442		60	2379	
v/s Ratio Prot							0.02	c0.23		c0.02	c0.25	
v/s Ratio Perm		0.08			c0.10							
v/c Ratio		0.53			0.68		0.40	0.32		0.68	0.37	
Uniform Delay, d1		41.8			42.8		47.8	5.9		50.6	7.4	
Progression Factor		1.00			1.00		1.14	0.31		1.27	0.62	
Incremental Delay, d2		1.1			7.4		0.8	0.3		21.3	0.4	
Delay (s)		42.9			50.3		55.0	2.2		85.5	5.0	
Level of Service		D			D		E	A		F	A	
Approach Delay (s)		42.9			50.3			4.9			8.5	
Approach LOS		D			D			A			A	

Intersection Summary

HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

17: College Grove Dr & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↰↑	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.96		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1780		1681	1770	1583	1770	3462		1770	3512	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1780		1681	1770	1583	1770	3462		1770	3512	
Volume (vph)	20	67	32	77	81	149	26	624	106	177	695	38
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	71	34	82	86	159	28	664	113	188	739	40
RTOR Reduction (vph)	0	12	0	0	0	138	0	12	0	0	3	0
Lane Group Flow (vph)	0	114	0	82	86	21	28	765	0	188	776	0
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		11.3		12.4	12.4	12.4	4.3	41.0		21.0	57.6	
Effective Green, g (s)		12.2		14.1	14.1	14.1	4.7	42.3		21.4	59.0	
Actuated g/C Ratio		0.12		0.13	0.13	0.13	0.04	0.40		0.20	0.56	
Clearance Time (s)		4.9		5.7	5.7	5.7	4.4	5.3		4.4	5.4	
Vehicle Extension (s)		3.6		2.6	2.6	2.6	2.0	5.0		2.0	4.7	
Lane Grp Cap (vph)		205		224	235	211	78	1382		357	1955	
v/s Ratio Prot		c0.06		c0.05	0.05		0.02	c0.22		c0.11	0.22	
v/s Ratio Perm						0.01						
v/c Ratio		0.55		0.37	0.37	0.10	0.36	0.55		0.53	0.40	
Uniform Delay, d1		44.3		41.9	41.9	40.4	49.2	24.6		37.8	13.4	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.33	0.71	
Incremental Delay, d2		3.6		0.8	0.8	0.2	1.0	1.6		0.6	0.6	
Delay (s)		48.0		42.7	42.6	40.5	50.2	26.2		50.9	10.1	
Level of Service		D		D	D	D	D	C		D	B	
Approach Delay (s)		48.0			41.6			27.0			18.0	
Approach LOS		D			D			C			B	

Intersection Summary

HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Existing PM
19: Lea Drive & 54th St

3/27/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	34	2	47	51	15	7	47	539	8	5	952	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.92			0.99		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1686			1775		1770	3531		1770	3512	
Flt Permitted		0.86			0.69		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1474			1271		1770	3531		1770	3512	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	37	2	51	55	16	8	51	580	9	5	1024	55
RTOR Reduction (vph)	0	46	0	0	4	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	44	0	0	75	0	51	588	0	5	1076	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		10.7			10.7		7.3	79.5		1.3	73.5	
Effective Green, g (s)		11.2			11.2		7.8	80.0		1.8	74.0	
Actuated g/C Ratio		0.11			0.11		0.07	0.76		0.02	0.70	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		157			136		131	2690		30	2475	
v/s Ratio Prot							c0.03	0.17		0.00	c0.31	
v/s Ratio Perm		0.03			c0.06							
v/c Ratio		0.28			0.55		0.39	0.22		0.17	0.43	
Uniform Delay, d1		43.2			44.5		46.3	3.6		50.9	6.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			4.5		1.9	0.2		2.6	0.6	
Delay (s)		44.2			49.0		48.2	3.8		53.5	7.2	
Level of Service		D			D		D	A		D	A	
Approach Delay (s)		44.2			49.0			7.3			7.4	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

MTS BUS ROUTE TABLES

CASH FARES / *Tarifas en efectivo*

Exact fare, please / *Favor de pagar la cantidad exacta*	
Day Pass (Regional) / *Pase diario (Regional)* Compass Card required ($2) / *Se requiere un Compass Card ($2)*	$5.00
One-Way Fare / *Tarifa de una direccíon*	$2.25
Senior (60+)/Disabled/Medicare *Mayores de 60 años/Discapacitados/Medicare*	$1.10*
Children 5 & under / *Niños de 5 años o menos* Up to two children ride free per paying adult / *Máximo dos niños viajan gratis por cada adulto*	FREE / *GRATIS*

MONTHLY PASSES / *Pases mensual*

Adult / *Adulto*	$72.00
Senior (60+)/Disabled/Medicare *Mayores de 60 años/Discapacitados/Medicare*	$18.00*
Youths (18 and under) *Jóvenes (18 años o menos)*	$36.00*

*I.D. required for discount fare or pass.
**Se requiere identificación para tarifas o pases de descuento.*

DAY PASS (REGIONAL) / *Pase diario (Regional)*

All passes are sold on Compass Card, which can be reloaded and reused for up to five years. Compass Cards are available for $2 at select outlets. A $5 Day Pass requires a Compass Card. A paper Day Pass can be purchased on board buses for an additional $2 fee.

Todos los pases se venden en el Compass Card, el cual puede ser recargado y reutilizado por hasta cinco años. Compass Cards están disponibles por $2 en selectas sucursales. Un pase de un día por $5 requiere un Compass Card. Un pase de un día de papel se puede obtener a bordo los autobuses por un costo adicional de $2.

DIRECTORY / *Directorio*

Regional Transit Information *Información de transporte público regional*	511 or/*ó* (619) 233-3004
TTY/TDD (teletype for hearing impaired) *Teletipo para sordos*	(619) 234-5005 or/*ó* (888) 722-4889
InfoExpress (24-hour info via Touch-Tone phone) *Información las 24 horas (via teléfono de teclas)*	(619) 685-4900
Customer Service / Suggestions *Servicio al cliente / Sugerencias*	(619) 557-4555
SafeWatch	(619) 557-4500
The Transit Store / Lost & Found *The Transit Store / Objetos extraviados* Articles found on the bus are turned in at The Transit Store *Artículos encontrados en los autobuses son entregados a The Transit Store*	(619) 234-1060 1st & Broadway Downtown San Diego M–F 9am–5pm
For MTS online trip planning *Planificación de viajes por Internet*	www.sdmts.com

For more information on riding MTS services, pick up a Rider's Guide on a bus or at The Transit Store, or visit **www.sdmts.com**.
*Para obtener más información sobre el uso de los servicios de MTS, recoja un 'Rider's Guide' en un autobús o en The Transit Store, o visita a **www.sdmts.com**.*

Thank you for riding MTS! ***¡Gracias por viajar con MTS!***

Effective JANUARY 26, 2014

7

Downtown – La Mesa

via University Av.

DESTINATIONS

- Balboa Park
- City College
- City Heights Retail Village
- City Heights Transit Plaza
- Joan Kroc Center
- San Diego Zoo

TROLLEY CONNECTIONS

City College
La Mesa Blvd.

MTS Metropolitan Transit System

Alternative formats available upon request. Please call: (619) 557-4555 / *Formato alternativo disponible al preguntar. Favor de llamar: (619) 557-4555*

The schedules and other information shown in this timetable are subject to change. MTS does not assume responsibility for errors in timetables nor for any inconvenience caused by delayed buses.
Los horarios e información que se indican en este itinerario están sujetos a cambios. MTS no asume responsabilidad por errores en los itinerarios, ni por ningún perjuicio que se origine por los autobuses demorados.

A Saturday or Sunday schedule will be operated on the following holidays and observed holidays
Se operará con horario de sábado o domingo durante los siguientes días festivos y feriados observados >>> New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, Christmas

Route 7 – Monday through Friday / *lunes a viernes*

Downtown ➡ North Park ➡ City Heights ➡ La Mesa

Ⓐ Front St. & B St. **DEPART**	Ⓒ Broadway & 3rd Av.	Ⓓ City College Trolley Sta. (11th Av.)	Ⓔ Park Bl. & University	Ⓕ University & 30th St.	Ⓗ University & Fairmount	Ⓘ University & College Av.	Ⓙ University & 69th St.	Ⓚ La Mesa Bl. Trolley **ARRIVE**
4:38a	4:41a	4:46a	4:54a	4:59a	5:08a	5:16a	5:19a	5:26a
5:00	5:04	5:10	5:19	5:24	5:34	5:43	5:46	—
5:20	5:24	5:30	5:39	5:44	5:54	6:03	6:06	6:13
5:35	5:39	5:45	5:54	5:59	6:09	6:18	6:21	—
5:50	5:54	6:00	6:09	6:14	6:24	6:33	6:36	6:43
6:03	6:07	6:13	6:23	6:29	6:39	6:49	6:52	—
6:15	6:19	6:25	6:35	6:41	6:51	7:01	7:04	7:12
6:27	6:31	6:37	6:47	6:53	7:03	7:13	7:16	—
6:37	6:41	6:48	6:59	7:05	7:16	7:27	7:31	7:39
6:48	6:53	7:00	7:11	7:17	7:28	7:39	7:43	—
7:00	7:05	7:12	7:23	7:29	7:40	7:51	7:55	8:03
7:12	7:17	7:24	7:35	7:41	7:52	8:03	8:07	—
7:24	7:29	7:36	7:47	7:53	8:04	8:15	8:19	8:27
7:36	7:41	7:48	7:59	8:05	8:16	8:27	8:31	—
7:48	7:53	8:00	8:11	8:17	8:28	8:39	8:43	8:51
8:00	8:05	8:12	8:23	8:30	8:42	8:53	8:57	—
8:12	8:17	8:24	8:35	8:42	8:54	9:05	9:09	9:18
8:24	8:29	8:36	8:47	8:54	9:06	9:17	9:21	—
8:36	8:41	8:48	8:59	9:06	9:18	9:29	9:33	9:42
8:48	8:53	9:00	9:11	9:18	9:30	9:41	9:45	—
9:00	9:05	9:12	9:23	9:30	9:42	9:53	9:57	10:06
9:12	9:17	9:24	9:35	9:42	9:54	10:05	10:09	—
9:24	9:29	9:36	9:47	9:54	10:06	10:17	10:21	10:30
9:36	9:41	9:48	9:59	10:06	10:18	10:29	10:33	—
9:48	9:53	10:00	10:11	10:18	10:30	10:41	10:45	10:54
10:00	10:05	10:12	10:23	10:30	10:42	10:53	10:57	—
10:12	10:17	10:24	10:35	10:42	10:54	11:05	11:09	11:18
10:24	10:29	10:36	10:47	10:54	11:06	11:17	11:21	—
10:36	10:41	10:48	10:59	11:06	11:18	11:29	11:33	11:42
10:48	10:53	11:00	11:11	11:18	11:30	11:41	11:45	—
11:00	11:05	11:12	11:23	11:30	11:42	11:53	11:57	**12:06p**
11:12	11:17	11:24	11:35	11:42	11:54	**12:05p**	**12:09p**	—
11:24	11:29	11:36	11:47	11:54	**12:06p**	**12:17**	**12:21**	**12:30**
11:36	11:41	11:48	11:59	**12:06p**	**12:18**	**12:29**	**12:33**	—
11:48	11:53	**12:00p**	**12:11p**	**12:18**	**12:30**	**12:41**	**12:45**	**12:54**
12:00p	**12:05p**	**12:12**	**12:23**	**12:30**	**12:42**	**12:53**	**12:57**	—
12:11	**12:16**	**12:23**	**12:35**	**12:42**	**12:56**	**1:08**	**1:12**	**1:22**
12:23	**12:28**	**12:35**	**12:47**	**12:54**	**1:08**	**1:20**	**1:24**	—
12:35	**12:40**	**12:47**	**12:59**	**1:06**	**1:20**	**1:32**	**1:36**	**1:46**
12:47	**12:52**	**12:59**	**1:11**	**1:18**	**1:32**	**1:44**	**1:48**	—
12:59	**1:04**	**1:11**	**1:23**	**1:30**	**1:44**	**1:56**	**2:00**	**2:10**
1:10	**1:16**	**1:23**	**1:35**	**1:42**	**1:57**	**2:09**	**2:13**	—
1:22	**1:28**	**1:35**	**1:47**	**1:54**	**2:09**	**2:21**	**2:25**	**2:35**
1:34	**1:40**	**1:47**	**1:59**	**2:06**	**2:21**	**2:33**	**2:37**	—
1:46	**1:52**	**1:59**	**2:11**	**2:18**	**2:33**	**2:45**	**2:49**	**2:59**
1:58	**2:04**	**2:11**	**2:23**	**2:30**	**2:45**	**2:57**	**3:01**	—
—	—	**R 2:20**	**2:32**	**2:39**	**2:54 B**	—	—	—
2:10	**2:16**	**2:23**	**2:35**	**2:42**	**2:57**	**3:09**	**3:13**	**3:23**
—	—	**R 2:32**	**2:44**	**2:51**	**3:06 B**	—	—	—
2:22	**2:28**	**2:35**	**2:47**	**2:54**	**3:09**	**3:21**	**3:25**	—
—	—	**R 2:44**	**2:56**	**3:03**	**3:18 B**	—	—	—
2:34	**2:40**	**2:47**	**2:59**	**3:06**	**3:21**	**3:33**	**3:37**	**3:47**
2:46	**2:52**	**2:59**	**3:11**	**3:18**	**3:33**	**3:45**	**3:49**	—
2:58	**3:04**	**3:11**	**3:23**	**3:30**	**3:45**	**3:57**	**4:01**	**4:11**
3:10	**3:16**	**3:23**	**3:35**	**3:42**	**3:57**	**4:09**	**4:13**	—
3:16	**3:22**	**3:29**	**3:41**	**3:48**	**4:03 B**	—	—	—
3:22	**3:28**	**3:35**	**3:47**	**3:54**	**4:09**	**4:21**	**4:25**	**4:35**
3:28	**3:34**	**3:41**	**3:53**	**4:00**	**4:15 B**	—	—	—
3:34	**3:40**	**3:47**	**3:59**	**4:06**	**4:21**	**4:33**	**4:37**	—
3:40	**3:46**	**3:53**	**4:05**	**4:12**	**4:27 B**	—	—	—
3:46	**3:52**	**3:59**	**4:11**	**4:18**	**4:33**	**4:45**	**4:49**	**4:59**
3:52	**3:58**	**4:05**	**4:17**	**4:24**	**4:39 B**	—	—	—
3:58	**4:04**	**4:11**	**4:23**	**4:30**	**4:45**	**4:57**	**5:01**	—
4:04	**4:10**	**4:17**	**4:29**	**4:36**	**4:51 B**	—	—	—
4:10	**4:16**	**4:23**	**4:35**	**4:42**	**4:57**	**5:09**	**5:13**	**5:23**
4:16	**4:22**	**4:29**	**4:41**	**4:48**	**5:03 B**	—	—	—
4:22	**4:28**	**4:35**	**4:47**	**4:54**	**5:09**	**5:21**	**5:25**	—
4:28	**4:34**	**4:41**	**4:53**	**5:00**	**5:15 B**	—	—	—
4:34	**4:40**	**4:47**	**4:59**	**5:06**	**5:21**	**5:33**	**5:37**	**5:47**
4:40	**4:46**	**4:53**	**5:05**	**5:12**	**5:27 B**	—	—	—
4:46	**4:52**	**4:59**	**5:11**	**5:18**	**5:33**	**5:45**	**5:49**	—
4:52	**4:58**	**5:05**	**5:17**	**5:24**	**5:39 B**	—	—	—
4:58	**5:04**	**5:11**	**5:23**	**5:30**	**5:45**	**5:57**	**6:01**	**6:11**
5:05	**5:11**	**5:18**	**5:29**	**5:36**	**5:50 B**	—	—	—
5:11	**5:17**	**5:24**	**5:35**	**5:42**	**5:56**	**6:08**	**6:12**	—
5:23	**5:29**	**5:36**	**5:47**	**5:54**	**6:08**	**6:20**	**6:24**	**6:33**
5:35	**5:41**	**5:48**	**5:59**	**6:06**	**6:20**	**6:31**	**6:35**	—
5:47	**5:53**	**6:00**	**6:11**	**6:18**	**6:32**	**6:43**	**6:47**	**6:56**
5:59	**6:05**	**6:12**	**6:23**	**6:30**	**6:44**	**6:55**	**6:59**	—
6:13	**6:19**	**6:26**	**6:37**	**6:43**	**6:56**	**7:06**	**7:10**	**7:18**
6:27	**6:33**	**6:40**	**6:51**	**6:57**	**7:10**	**7:20**	**7:24**	—
6:42	**6:48**	**6:55**	**7:06**	**7:12**	**7:23**	**7:33**	**7:37**	**7:44**
6:58	**7:03**	**7:10**	**7:20**	**7:26**	**7:37**	**7:47**	**7:51**	—
7:14	**7:19**	**7:25**	**7:35**	**7:41**	**7:52**	**8:02**	**8:06**	**8:13**
7:29	**7:34**	**7:40**	**7:50**	**7:56**	**8:07**	**8:17**	**8:21**	—
7:44	**7:49**	**7:55**	**8:05**	**8:11**	**8:22**	**8:32**	**8:36**	**8:43**
7:59	**8:04**	**8:10**	**8:20**	**8:26**	**8:36**	**8:45**	**8:48**	—
8:15	**8:19**	**8:25**	**8:34**	**8:40**	**8:50**	**8:59**	**9:02**	**9:09**
8:30	**8:34**	**8:40**	**8:49**	**8:55**	**9:05**	**9:14**	**9:17**	—
8:45	**8:49**	**8:55**	**9:04**	**9:10**	**9:20**	**9:29**	**9:32**	**9:39**
9:00	**9:04**	**9:10**	**9:19**	**9:25**	**9:35**	**9:44**	**9:47**	—
9:15	**9:19**	**9:25**	**9:34**	**9:40**	**9:50**	**9:59**	**10:02**	**10:09**
9:30	**9:34**	**9:40**	**9:49**	**9:55**	**10:05**	**10:14**	**10:17**	—
9:45	**9:49**	**9:55**	**10:04**	**10:10**	**10:20**	**10:29**	**10:32**	**10:39**
10:00	**10:04**	**10:10**	**10:19**	**10:24**	**10:33**	**10:42**	**10:45**	—
10:17	**10:20**	**10:25**	**10:34**	**10:39**	**10:48**	**10:57**	**11:00**	**11:07**
10:32	**10:35**	**10:40**	**10:49**	**10:54**	**11:03**	**11:12**	**11:15**	—
10:47	**10:50**	**10:55**	**11:04**	**11:09**	**11:18**	**11:27**	**11:30**	**11:37**
11:02	**11:05**	**11:10**	**11:18**	**11:23**	**11:31**	**11:39**	**11:42**	—
11:32	**11:35**	**11:40**	**11:48**	**11:53**	12:01a	12:09a	12:12a	—
12:02a	12:05a	12:10a	12:18a	12:23a	12:31	12:39	—	—
12:32	12:35	12:40	12:48	12:53	1:01	1:09	—	—
1:02	1:05	1:10	1:18	1:23	1:31	1:39	—	—
1:32	1:35	1:40	1:48	1:53	2:01 B	—	—	—

La Mesa ➡ City Heights ➡ North Park ➡ Downtown

Ⓚ La Mesa Bl. Trolley **DEPART**	Ⓙ University & 69th St.	Ⓘ University & College Av.	Ⓗ University & Fairmount	Ⓖ City Heights Transit Plaza @ 15 Fwy.	Ⓕ University & 30th St.	Ⓔ Park Bl. & University	Ⓓ City College Trolley Sta. (Park Bl.)	Ⓒ Broadway & 4th Av.	Ⓑ Broadway & 1st Av. **ARRIVE**
—	—	—	—	4:29a	4:35a	4:39a	4:47a	4:50a	4:53a
—	4:29a	4:32a	4:41a	4:44	4:51	4:56	5:04	5:08	5:11
—	4:44	4:47	4:56	4:59	5:06	5:11	5:19	5:23	5:26
—	4:59	5:02	5:11	5:14	5:21	5:26	5:34	5:38	5:41
—	5:12	5:15	5:24	5:27	5:34	5:39	5:47	5:51	5:54
—	5:24	5:27	5:36	5:39	5:46	5:52	6:00	6:04	6:07
—	5:36	5:39	5:48	5:51	5:58	6:04	6:12	6:16	6:20
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5:47a	5:54	5:57	6:06	6:09	6:16	6:22	6:30	6:34	6:38
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—	6:02	6:06	6:17	6:21	6:29	6:35	6:43	6:47	6:52
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6:07	6:14	6:18	6:29	6:33	6:41	6:47	6:55	6:59	7:04
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11:14	11:23	11:27	11:40	11:45	11:54	**12:01p**	**12:12**	**12:17**	**12:22**
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11:38	11:47	11:51	**12:04p**	**12:09p**	**12:18**	**12:25**	**12:36**	**12:41**	**12:46**
—	11:59	**12:03p**	**12:16**	**12:21**	**12:30**	**12:37**	**12:48**	**12:53**	**12:58**
12:02p	**12:11p**	**12:15**	**12:28**	**12:33**	**12:42**	**12:49**	**1:00**	**1:05**	**1:10**
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7:06	**7:14**	**7:18**	**7:29**	**7:33**	**7:41**	**7:47**	**7:55**	**7:59**	**8:03**
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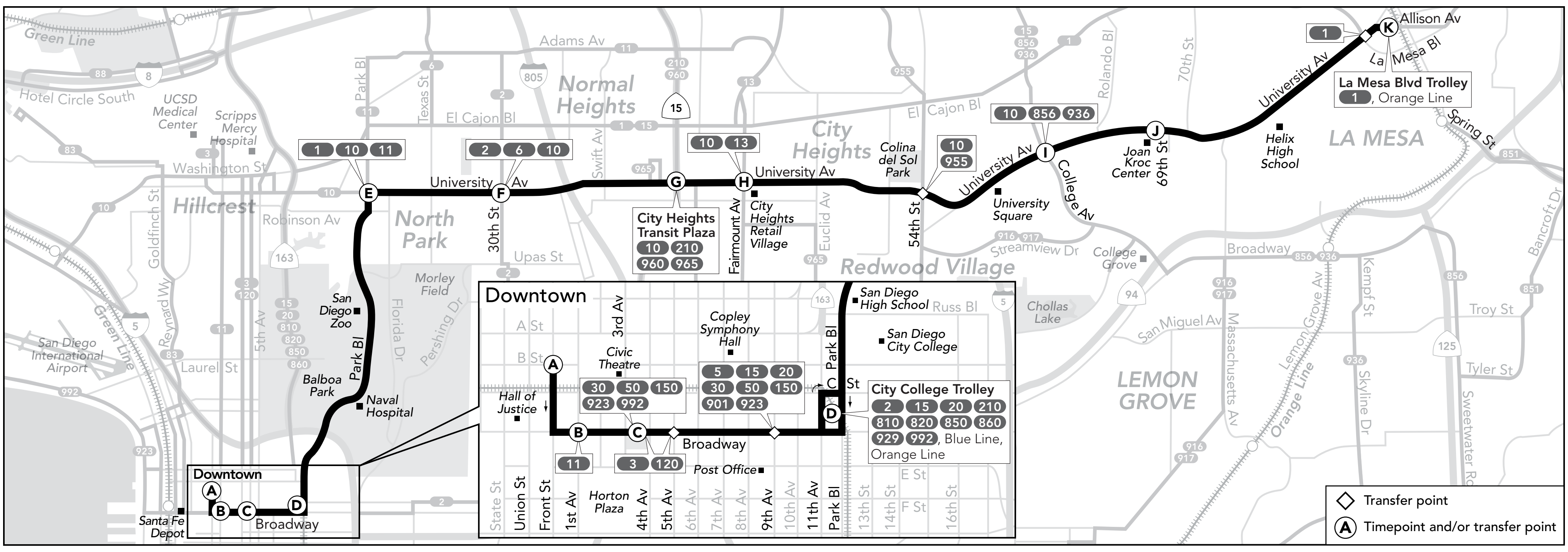
8:40	**8:47**	**8:50**	**9:00**	**9:03**	**9:10**	**9:16**	**9:24**	**9:28**	**9:31**
—	**9:02**	**9:05**	**9:15**	**9:18**	**9:25**	**9:31**	**9:39**	**9:43**	**9:46**
9:10	**9:17**	**9:20**	**9:30**	**9:33**	**9:40**	**9:46**	**9:54**	**9:58**	**10:01**
—	**9:37**	**9:40**	**9:50**	**9:53**	**10:00**	**10:06**	**10:14**	**10:18**	**10:21**
9:55	**10:02**	**10:05**	**10:15**	**10:18**	**10:25**	**10:31**	**10:39**	**10:43**	**10:46**
—	**10:31**	**10:34**	**10:42**	**10:45**	**10:51**	**10:57**	**11:04**	**11:08**	**11:11**
10:54	**11:01**	**11:04**	**11:12**	**11:15**	**11:21**	**11:27**	**11:34**	**11:38**	**11:41**
—	**11:31**	**11:34**	**11:42**	**11:45**	**11:51**	**11:57**	12:04a	12:08a	12:11a
—	12:01a	12:04a	12:12a	12:15a	12:21a	12:27a	12:34	12:38	12:41
—	12:31	12:34	12:42	12:45	12:51	12:57	1:04	1:08	1:11

B = Trip ends 8 minutes later at University Ave. & 54th St. / *Viaje termina 8 minutos después en University Ave. y 54th St.*
R = Trip does not operate during June, July and August school break / *Viaje no opera durante las vacaciones de escuela en junio, julio y agosto*



Route 7 – Saturday / *sábado*

Downtown ➡ North Park ➡ City Heights ➡ La Mesa

Ⓐ Front St. & B St. **DEPART**	Ⓒ Broadway & 3rd Av.	Ⓓ City College Trolley Sta. (11th Av.)	Ⓔ Park Bl. & University	Ⓕ University & 30th St.	Ⓗ University & Fairmount	Ⓘ University & College Av.	Ⓙ University & 69th St.	Ⓚ La Mesa Bl. Trolley **ARRIVE**
5:32a	5:35a	5:40a	5:49a	5:54a	6:04a	6:14a	6:16a	6:23a
6:01	6:04	6:10	6:19	6:24	6:35	6:46	6:48	6:55
6:31	6:34	6:40	6:49	6:54	7:05	7:16	7:18	7:25
6:46	6:49	6:55	7:04	7:09	7:20	7:31	—	—
7:01	7:04	7:10	7:19	7:24	7:35	7:46	7:48	7:55
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7:30	7:34	7:40	7:50	7:55	8:07	8:18	8:21	8:28
7:45	7:49	7:55	8:05	8:10	8:23	8:34	—	—
7:58	8:02	8:08	8:18	8:23	8:36	8:47	8:51	8:58
8:09	8:13	8:19	8:29	8:34	8:47	8:58	—	—
8:20	8:24	8:30	8:40	8:45	8:58	9:09	9:13	9:20
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11:18	11:22	11:30	11:41	11:48	**12:03p**	**12:17**	—	—
11:30	11:34	11:42	11:53	**12:00p**	**12:15**	**12:29**	**12:33**	**12:42**
11:42	11:46	11:54	**12:05p**	**12:12**	**12:27**	**12:41**	—	—
11:54	11:58	**12:06p**	**12:17**	**12:24**	**12:39**	**12:53**	**12:57**	**1:06**
12:06p	**12:10p**	**12:18**	**12:29**	**12:36**	**12:51**	**1:05**	—	—
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8:15	**8:19**	**8:25**	**8:34**	**8:41**	**8:53**	**9:03**	—	—
8:30	**8:34**	**8:40**	**8:49**	**8:56**	**9:08**	**9:18**	—	—
8:45	**8:49**	**8:55**	**9:04**	**9:10**	**9:21**	**9:30**	—	—
9:00	**9:04**	**9:10**	**9:19**	**9:25**	**9:36**	**9:45**	—	—
9:30	**9:34**	**9:40**	**9:49**	**9:55**	**10:06**	**10:15**	—	—
10:00	**10:04**	**10:10**	**10:19**	**10:25**	**10:36**	**10:45**	—	—
10:30	**10:34**	**10:40**	**10:48**	**10:54**	**11:04**	**11:13**	—	—
11:00	**11:04**	**11:10**	**11:18**	**11:24**	**11:34**	**11:43**	—	—
11:31	**11:34**	**11:40**	**11:48**	**11:53**	12:02a	12:11a	—	—
12:01a	12:04a	12:10a	12:18a	12:23a	12:32	12:41	—	—
12:31	12:34	12:40	12:48	12:53	1:02	1:11	—	—
1:01	1:04	1:10	1:18	1:23	1:32 **C**	—	—	—

La Mesa ➡ City Heights ➡ North Park ➡ Downtown

Ⓚ La Mesa Bl. Trolley **DEPART**	Ⓙ University & 69th St.	Ⓘ University & College Av.	Ⓗ University & Fairmount	Ⓖ City Heights Transit Plaza @ 15 Fwy.	Ⓕ University & 30th St.	Ⓔ Park Bl. & University	Ⓓ City College Trolley Sta. (Park Bl.)	Ⓒ Broadway & 4th Av.	Ⓑ Broadway & 1st Av. **ARRIVE**
—	—	4:55a **D**	5:06a	5:08a	5:16a	5:20a	5:29a	5:33a	5:36a
—	—	5:25 **D**	5:36	5:38	5:46	5:50	5:59	6:03	6:06
—	—	5:40 **D**	5:51	5:53	6:01	6:05	6:14	6:18	6:21
—	—	5:54 **D**	6:05	6:08	6:16	6:20	6:29	6:33	6:37
—	—	6:09 **D**	6:20	6:23	6:31	6:35	6:44	6:48	6:52
6:16a	6:23a	6:25	6:35	6:38	6:46	6:50	6:59	7:03	7:07
—	—	6:39 **D**	6:50	6:53	7:01	7:05	7:14	7:18	7:22
6:46	6:53	6:55	7:05	7:08	7:16	7:20	7:29	7:33	7:37
—	—	7:06 **D**	7:18	7:22	7:31	7:36	7:46	7:50	7:54
7:13	7:20	7:23	7:34	7:38	7:47	7:52	8:02	8:06	8:10
—	—	7:37 **D**	7:49	7:53	8:03	8:09	8:20	8:24	8:29
7:42	7:50	7:53	8:04	8:08	8:18	8:24	8:35	8:39	8:44
—	—	8:07 **D**	8:19	8:23	8:33	8:39	8:50	8:54	8:59
8:12	8:20	8:23	8:34	8:38	8:48	8:54	9:05	9:09	9:14
—	—	8:34 **D**	8:48	8:52	9:03	9:09	9:20	9:24	9:29
8:40	8:48	8:51	9:03	9:07	9:18	9:24	9:35	9:39	9:44
—	—	9:02 **D**	9:16	9:20	9:31	9:37	9:48	9:52	9:57
9:06	9:14	9:17	9:29	9:33	9:44	9:50	10:01	10:05	10:10
—	—	9:27 **D**	9:41	9:45	9:56	10:02	10:13	10:17	10:22
9:30	9:38	9:41	9:53	9:57	10:08	10:14	10:25	10:29	10:34
—	—	9:49 **D**	10:05	10:09	10:20	10:27	10:39	10:43	10:48
9:52	10:01	10:04	10:17	10:21	10:32	10:39	10:51	10:55	11:00
—	—	10:13 **D**	10:29	10:33	10:44	10:51	11:03	11:07	11:12
10:16	10:25	10:28	10:41	10:45	10:56	11:03	11:15	11:19	11:24
—	—	10:37 **D**	10:53	10:57	11:08	11:15	11:27	11:31	11:36
10:40	10:49	10:52	11:05	11:09	11:20	11:27	11:39	11:43	11:48
—	—	11:01 **D**	11:17	11:21	11:32	11:39	11:51	11:55	**12:00p**
11:04	11:13	11:16	11:29	11:33	11:44	11:51	**12:03p**	**12:07p**	**12:12**
—	—	11:25 **D**	11:41	11:45	11:56	**12:03p**	**12:16**	**12:20**	**12:25**
11:27	11:36	11:39	11:53	11:57	**12:08p**	**12:15**	**12:28**	**12:32**	**12:37**
—	—	11:49 **D**	**12:05p**	**12:09p**	**12:20**	**12:27**	**12:40**	**12:44**	**12:49**
11:51	**12:00p**	**12:03p**	**12:17**	**12:21**	**12:32**	**12:39**	**12:52**	**12:56**	**1:01**
—	—	**12:13 D**	**12:29**	**12:33**	**12:44**	**12:51**	**1:04**	**1:08**	**1:13**
12:15p	**12:24**	**12:27**	**12:41**	**12:45**	**12:56**	**1:03**	**1:16**	**1:20**	**1:25**
—	—	**12:37 D**	**12:53**	**12:57**	**1:08**	**1:15**	**1:28**	**1:32**	**1:37**
12:39	**12:48**	**12:51**	**1:05**	**1:09**	**1:20**	**1:27**	**1:40**	**1:44**	**1:49**
—	—	**1:01 D**	**1:17**	**1:21**	**1:32**	**1:39**	**1:52**	**1:56**	**2:01**
1:03	**1:12**	**1:15**	**1:29**	**1:33**	**1:44**	**1:51**	**2:04**	**2:08**	**2:13**
—	—	**1:25 D**	**1:41**	**1:45**	**1:56**	**2:03**	**2:16**	**2:20**	**2:25**
1:27	**1:36**	**1:39**	**1:53**	**1:57**	**2:08**	**2:15**	**2:28**	**2:32**	**2:37**
—	—	**1:49 D**	**2:05**	**2:09**	**2:20**	**2:27**	**2:40**	**2:44**	**2:49**
1:51	**2:00**	**2:03**	**2:17**	**2:21**	**2:32**	**2:39**	**2:52**	**2:56**	**3:01**
—	—	**2:13 D**	**2:29**	**2:33**	**2:44**	**2:51**	**3:04**	**3:08**	**3:13**
2:15	**2:24**	**2:27**	**2:41**	**2:45**	**2:56**	**3:03**	**3:16**	**3:20**	**3:25**
—	—	**2:37 D**	**2:53**	**2:57**	**3:08**	**3:15**	**3:28**	**3:32**	**3:37**
2:39	**2:48**	**2:51**	**3:05**	**3:09**	**3:20**	**3:27**	**3:40**	**3:44**	**3:49**
—	—	**3:01 D**	**3:17**	**3:21**	**3:32**	**3:39**	**3:52**	**3:56**	**4:01**
3:03	**3:12**	**3:15**	**3:29**	**3:33**	**3:44**	**3:51**	**4:04**	**4:08**	**4:13**
—	—	**3:25 D**	**3:41**	**3:45**	**3:56**	**4:03**	**4:16**	**4:20**	**4:25**
3:27	**3:36**	**3:39**	**3:53**	**3:57**	**4:08**	**4:15**	**4:28**	**4:32**	**4:37**
—	—	**3:49 D**	**4:05**	**4:09**	**4:20**	**4:27**	**4:40**	**4:44**	**4:49**
3:51	**4:00**	**4:03**	**4:17**	**4:21**	**4:32**	**4:39**	**4:52**	**4:56**	**5:01**
—	—	**4:13 D**	**4:29**	**4:33**	**4:44**	**4:51**	**5:04**	**5:08**	**5:13**
4:15	**4:24**	**4:27**	**4:41**	**4:45**	**4:56**	**5:03**	**5:16**	**5:20**	**5:25**
—	—	**4:37 D**	**4:53**	**4:57**	**5:08**	**5:15**	**5:28**	**5:32**	**5:37**
4:39	**4:48**	**4:51**	**5:05**	**5:09**	**5:20**	**5:27**	**5:40**	**5:44**	**5:49**
—	—	**5:01 D**	**5:17**	**5:21**	**5:32**	**5:39**	**5:52**	**5:56**	**6:01**
5:03	**5:12**	**5:15**	**5:29**	**5:33**	**5:44**	**5:51**	**6:04**	**6:08**	**6:13**
—	—	**5:27 D**	**5:41**	**5:45**	**5:55**	**6:02**	**6:13**	**6:17**	**6:22**
5:29	**5:37**	**5:40**	**5:53**	**5:57**	**6:07**	**6:14**	**6:25**	**6:29**	**6:34**
—	—	**5:51 D**	**6:05**	**6:09**	**6:19**	**6:26**	**6:37**	**6:41**	**6:46**
5:53	**6:01**	**6:04**	**6:17**	**6:21**	**6:31**	**6:38**	**6:49**	**6:53**	**6:58**
—	—	**6:18 D**	**6:32**	**6:36**	**6:46**	**6:53**	**7:04**	**7:08**	**7:13**
6:23	**6:31**	**6:34**	**6:47**	**6:51**	**7:01**	**7:08**	**7:19**	**7:23**	**7:28**
—	—	**6:51 D**	**7:04**	**7:08**	**7:17**	**7:23**	**7:33**	**7:37**	**7:41**
—	—	**7:07 D**	**7:20**	**7:24**	**7:33**	**7:39**	**7:49**	**7:53**	**7:57**
7:12	**7:20**	**7:23**	**7:35**	**7:39**	**7:48**	**7:54**	**8:04**	**8:08**	**8:12**
—	—	**7:39 D**	**7:51**	**7:54**	**8:02**	**8:08**	**8:17**	**8:21**	**8:25**
7:45	**7:52**	**7:55**	**8:06**	**8:09**	**8:17**	**8:23**	**8:32**	**8:36**	**8:40**
—	—	**8:09 D**	**8:21**	**8:24**	**8:32**	**8:38**	**8:47**	**8:51**	**8:55**
8:15	**8:22**	**8:25**	**8:36**	**8:39**	**8:47**	**8:53**	**9:02**	**9:06**	**9:10**
—	—	**8:39 D**	**8:51**	**8:54**	**9:02**	**9:08**	**9:17**	**9:21**	**9:25**
8:52	**8:59**	**9:02**	**9:13**	**9:16**	**9:24**	**9:30**	**9:39**	**9:43**	**9:47**
—	—	**9:31 D**	**9:43**	**9:46**	**9:54**	**10:00**	**10:09**	**10:13**	**10:17**
—	—	**10:01 D**	**10:13**	**10:16**	**10:24**	**10:30**	**10:39**	**10:43**	**10:47**
—	—	**10:33 D**	**10:45**	**10:48**	**10:55**	**11:01**	**11:09**	**11:13**	**11:16**
—	—	**11:03 D**	**11:15**	**11:18**	**11:25**	**11:31**	**11:39**	**11:43**	**11:46**
—	—	**11:36 D**	**11:47**	**11:50**	**11:56**	12:02a	12:09a	12:13a	12:16a
—	—	12:06a **D**	12:17a	12:20a	12:26a	12:32	12:39	12:43	12:46

Route 7 – Sunday / *domingo*

Downtown ➡ North Park ➡ City Heights ➡ La Mesa

Ⓐ Front St. & B St. **DEPART**	Ⓒ Broadway & 3rd Av.	Ⓓ City College Trolley Sta. (11th Av.)	Ⓔ Park Blvd. & University	Ⓕ University & 30th St.	Ⓗ University & Fairmount	Ⓘ University & College Av.	Ⓙ University & 69th St.	Ⓚ La Mesa Bl. Trolley **ARRIVE**
—	—	6:27a	6:36a	6:41a	6:52a	7:03a	7:05a	7:12a
—	—	7:10	7:19	7:24	7:35	7:46	—	—
—	—	7:40	7:50	7:55	8:07	8:18	8:21	8:28
NOTE: On Sunday, use Routes 2 and 992 on Broadway between Front St. and City College Trolley Station ***NOTA:*** *En los domingos, use las rutas 2 y 992 para servicio sobre Broadway entre Front St. y City College Trolley Station*		8:12	8:22	8:27	8:40	8:51	—	—
		8:42	8:52	8:58	9:12	9:24	9:28	9:36
		9:12	9:22	9:28	9:42	9:54	9:58	10:06
		9:27	9:38	9:45	9:59	10:12	—	—
		9:42	9:53	10:00	10:14	10:27	10:31	10:39
		9:57	10:08	10:15	10:29	10:42	—	—
		10:12	10:23	10:30	10:45	10:59	11:03	11:12
		10:27	10:38	10:45	11:00	11:14	—	—
		10:42	10:53	11:00	11:15	11:29	11:33	11:42
		10:54	11:05	11:12	11:27	11:41	—	—
		11:06	11:17	11:24	11:39	11:53	11:57	**12:06p**
		11:18	11:29	11:36	11:51	**12:05p**	—	—
		11:30	11:41	11:48	**12:03p**	**12:17**	**12:21p**	**12:30**
		11:42	11:53	**12:00p**	**12:15**	**12:29**	—	—
		11:54	**12:05p**	**12:12**	**12:27**	**12:41**	**12:45**	**12:54**
		12:06p	**12:17**	**12:24**	**12:39**	**12:53**	—	—
		12:18	**12:29**	**12:36**	**12:51**	**1:05**	**1:09**	**1:18**
		12:30	**12:41**	**12:48**	**1:03**	**1:17**	—	—
		12:42	**12:53**	**1:00**	**1:15**	**1:29**	**1:33**	**1:42**
		12:54	**1:05**	**1:12**	**1:27**	**1:41**	—	—
		1:06	**1:17**	**1:24**	**1:39**	**1:53**	**1:57**	**2:06**
		1:18	**1:29**	**1:36**	**1:51**	**2:05**	—	—
		1:30	**1:41**	**1:48**	**2:03**	**2:17**	**2:21**	**2:30**
		1:42	**1:53**	**2:00**	**2:15**	**2:29**	—	—
		1:54	**2:05**	**2:12**	**2:27**	**2:41**	**2:45**	**2:54**
		2:06	**2:17**	**2:24**	**2:39**	**2:53**	—	—
		2:18	**2:29**	**2:36**	**2:51**	**3:05**	**3:09**	**3:18**
		2:30	**2:41**	**2:48**	**3:03**	**3:17**	—	—
		2:42	**2:53**	**3:00**	**3:15**	**3:29**	**3:33**	**3:42**
		2:54	**3:05**	**3:12**	**3:27**	**3:41**	—	—
		3:06	**3:17**	**3:24**	**3:39**	**3:53**	**3:57**	**4:06**
		3:18	**3:29**	**3:36**	**3:51**	**4:05**	—	—
		3:30	**3:41**	**3:48**	**4:03**	**4:17**	**4:21**	**4:30**
		3:42	**3:53**	**4:00**	**4:15**	**4:29**	—	—
		3:54	**4:05**	**4:12**	**4:26**	**4:39**	**4:43**	**4:51**
		4:06	**4:17**	**4:24**	**4:38**	**4:51**	—	—
		4:18	**4:29**	**4:36**	**4:50**	**5:03**	**5:07**	**5:15**
		4:30	**4:41**	**4:48**	**5:02**	**5:15**	—	—
		4:42	**4:53**	**5:00**	**5:14**	**5:27**	**5:31**	**5:39**
		4:54	**5:05**	**5:12**	**5:26**	**5:39**	—	—
		5:06	**5:17**	**5:24**	**5:37**	**5:49**	**5:52**	**5:59**
		5:18	**5:29**	**5:36**	**5:49**	**6:01**	—	—
		5:30	**5:41**	**5:48**	**6:01**	**6:13**	**6:16**	**6:23**
		5:42	**5:53**	**6:00**	**6:13**	**6:25**	—	—
		5:54	**6:05**	**6:12**	**6:25**	**6:37**	**6:40**	**6:47**
		6:06	**6:17**	**6:24**	**6:37**	**6:49**	—	—
		6:21	**6:32**	**6:39**	**6:52**	**7:04**	**7:07**	**7:14**
		6:42	**6:53**	**7:00**	**7:13**	**7:25**	**7:28**	**7:35**
		7:12	**7:23**	**7:30**	**7:43**	**7:55**	**7:58**	**8:05**
		7:40	**7:49**	**7:56**	**8:08**	**8:19**	—	—
		8:10	**8:19**	**8:26**	**8:38**	**8:49**	—	—
		8:40	**8:49**	**8:56**	**9:08**	**9:18**	—	—
		9:10	**9:19**	**9:25**	**9:36**	**9:45**	—	—
		9:40	**9:49**	**9:55**	**10:06**	**10:15**	—	—
—	—	**10:10**	**10:19**	**10:25**	**10:36**	**10:45**	—	—
—	—	**10:40**	**10:48**	**10:54**	**11:04**	**11:13**	—	—
—	—	**11:10**	**11:18**	**11:24**	**11:34**	**11:43**	—	—

La Mesa ➡ City Heights ➡ North Park ➡ Downtown

Ⓚ La Mesa Bl. Trolley **DEPART**	Ⓙ University & 69th St.	Ⓘ University & College Av.	Ⓗ University & Fairmount	Ⓖ City Heights Transit Plaza @ 15 Fwy.	Ⓕ University & 30th St.	Ⓔ Park Blvd. & University	Ⓓ City College Trolley Sta. (Park Bl.)	Ⓒ Broadway & 4th Av.	Ⓑ Broadway & 1st Av. **ARRIVE**
—	—	5:25a **D**	5:36a	5:38a	5:46a	5:50a	5:59a	—	—
—	—	5:54 **D**	6:05	6:08	6:16	6:20	6:29	—	—
6:16a	6:23a	6:25	6:35	6:38	6:46	6:50	6:59	—	—
—	—	6:49 **D**	7:01	7:05	7:14	7:19	7:29	**NOTE:** On Sunday, use Routes 2 and 992 on Broadway between City College Trolley Station and 1st Av. ***NOTA:*** *En los domingos, use las rutas 2 y 992 para servicio sobre Broadway entre City College Trolley Station y 1st Av.*	
—	—	7:19 **D**	7:31	7:35	7:44	7:49	7:59		
7:38	7:46	7:49	8:00	8:04	8:13	8:18	8:29		
—	—	8:16 **D**	8:28	8:32	8:42	8:48	8:59		
—	—	8:28 **D**	8:42	8:46	8:57	9:03	9:14		
—	—	8:43 **D**	8:57	9:01	9:12	9:18	9:29		
8:49	8:57	9:00	9:12	9:16	9:27	9:33	9:44		
—	—	9:13 **D**	9:27	9:31	9:42	9:48	9:59		
—	—	9:28 **D**	9:42	9:46	9:57	10:03	10:14		
—	—	9:45 **D**	9:59	10:03	10:14	10:20	10:31		
9:50	9:59	10:02	10:15	10:19	10:30	10:37	10:49		
—	—	10:14 **D**	10:30	10:34	10:45	10:52	11:04		
—	—	10:28 **D**	10:44	10:48	10:59	11:06	11:18		
10:32	10:41	10:44	10:57	11:01	11:12	11:19	11:31		
—	—	10:53 **D**	11:09	11:13	11:24	11:31	11:43		
10:56	11:05	11:08	11:21	11:25	11:36	11:43	11:55		
—	—	11:17 **D**	11:33	11:37	11:48	11:55	**12:08p**		
11:19	11:28	11:31	11:45	11:49	**12:00p**	**12:07p**	**12:20**		
—	—	11:41 **D**	11:57	**12:01p**	**12:12**	**12:19**	**12:32**		
11:43	11:52	11:55	**12:09p**	**12:13**	**12:24**	**12:31**	**12:44**		
—	—	**12:05p D**	**12:21**	**12:25**	**12:36**	**12:43**	**12:56**		
12:07p	**12:16p**	**12:19**	**12:33**	**12:37**	**12:48**	**12:55**	**1:08**		
—	—	**12:29 D**	**12:45**	**12:49**	**1:00**	**1:07**	**1:20**		
12:31	**12:40**	**12:43**	**12:57**	**1:01**	**1:12**	**1:19**	**1:32**		
—	—	**12:53 D**	**1:09**	**1:13**	**1:24**	**1:31**	**1:44**		
12:55	**1:04**	**1:07**	**1:21**	**1:25**	**1:36**	**1:43**	**1:56**		
—	—	**1:17 D**	**1:33**	**1:37**	**1:48**	**1:55**	**2:08**		
1:19	**1:28**	**1:31**	**1:45**	**1:49**	**2:00**	**2:07**	**2:20**		
—	—	**1:41 D**	**1:57**	**2:01**	**2:12**	**2:19**	**2:32**		
1:43	**1:52**	**1:55**	**2:09**	**2:13**	**2:24**	**2:31**	**2:44**		
—	—	**2:05 D**	**2:21**	**2:25**	**2:36**	**2:43**	**2:56**		
2:07	**2:16**	**2:19**	**2:33**	**2:37**	**2:48**	**2:55**	**3:08**		
—	—	**2:29 D**	**2:45**	**2:49**	**3:00**	**3:07**	**3:20**		
2:31	**2:40**	**2:43**	**2:57**	**3:01**	**3:12**	**3:19**	**3:32**		
—	—	**2:53 D**	**3:09**	**3:13**	**3:24**	**3:31**	**3:44**		
2:55	**3:04**	**3:07**	**3:21**	**3:25**	**3:36**	**3:43**	**3:56**		
—	—	**3:17 D**	**3:33**	**3:37**	**3:48**	**3:55**	**4:08**		
3:19	**3:28**	**3:31**	**3:45**	**3:49**	**4:00**	**4:07**	**4:20**		
—	—	**3:41 D**	**3:57**	**4:01**	**4:12**	**4:19**	**4:32**		
3:43	**3:52**	**3:55**	**4:09**	**4:13**	**4:24**	**4:31**	**4:44**		
—	—	**4:05 D**	**4:21**	**4:25**	**4:36**	**4:43**	**4:56**		
4:07	**4:16**	**4:19**	**4:33**	**4:37**	**4:48**	**4:55**	**5:08**		
—	—	**4:29 D**	**4:45**	**4:49**	**5:00**	**5:07**	**5:20**		
4:31	**4:40**	**4:43**	**4:57**	**5:01**	**5:12**	**5:19**	**5:32**		
—	—	**4:53 D**	**5:09**	**5:13**	**5:24**	**5:31**	**5:44**		
4:55	**5:04**	**5:07**	**5:21**	**5:25**	**5:36**	**5:43**	**5:56**		
—	—	**5:19 D**	**5:33**	**5:37**	**5:47**	**5:54**	**6:05**		
5:21	**5:29**	**5:32**	**5:45**	**5:49**	**5:59**	**6:06**	**6:17**		
—	—	**5:43 D**	**5:57**	**6:01**	**6:11**	**6:18**	**6:29**		
5:45	**5:53**	**5:56**	**6:09**	**6:13**	**6:23**	**6:30**	**6:41**		
—	—	**6:08 D**	**6:22**	**6:26**	**6:36**	**6:43**	**6:54**		
6:12	**6:20**	**6:23**	**6:36**	**6:40**	**6:50**	**6:57**	**7:08**		
—	—	**6:38 D**	**6:51**	**6:55**	**7:04**	**7:10**	**7:20**		
6:43	**6:51**	**6:54**	**7:06**	**7:10**	**7:19**	**7:25**	**7:35**		
7:05	**7:13**	**7:16**	**7:28**	**7:32**	**7:41**	**7:47**	**7:57**		
7:34	**7:41**	**7:44**	**7:55**	**7:58**	**8:06**	**8:12**	**8:21**		
8:04	**8:11**	**8:14**	**8:25**	**8:28**	**8:36**	**8:42**	**8:51**		
8:34	**8:41**	**8:44**	**8:55**	**8:58**	**9:06**	**9:12**	**9:21**	—	—
—	—	**9:13 D**	**9:25**	**9:28**	**9:36**	**9:42**	**9:51**	—	—
—	—	**9:43 D**	**9:55**	**9:58**	**10:06**	**10:12**	**10:21**	—	—
—	—	**10:13 D**	**10:25**	**10:28**	**10:36**	**10:42**	**10:51**	—	—

C = Trip ends 6 minutes later at University Av. & 54th St. / *Viaje termina 6 minutos después en University Av. y 54th St.*
D = Trip begins on southwest corner of University Av. at College Av. (next to the Everything A Deal store) / *Viaje comienza en la esquina suroeste de University Av. y College Av. (junto a la tienda Everything A Deal)*

CASH FARES / *Tarifas en efectivo*

Exact fare, please / *Favor de pagar la cantidad exacta*	
Day Pass (Regional) / *Pase diario (Regional)*	$5.00
One-Way Fare / *Tarifa de una direccíon*	$2.25
Senior (60+)/Disabled/Medicare *Mayores de 60 años/Discapacitados/Medicare*	$1.10*
Children 5 & under / *Niños de 5 años o menos* Up to two children ride free per paying adult / *Máximo dos niños viajan gratis por cada adulto*	FREE / *GRATIS*

MONTHLY PASSES / *Pases mensual*

Adult / *Adulto*	$72.00
Senior (60+)/Disabled/Medicare *Mayores de 60 años/Discapacitados/Medicare*	$18.00*
Youths (18 and under) *Jóvenes (18 años o menos)*	$36.00*

*I.D. required for discount fare or pass.
**Se requiere identificación para tarifas o pases de descuento.*

DAY PASS (REGIONAL) / *Pase diario (Regional)*

Valid for unlimited travel for one person on Trolley, most MTS buses, NCTD BREEZE and SPRINTER. Valid for a discount on COASTER fares. Not valid on Premium Express, Rural, Access, or special service buses.

Válidos para viajes ilimitados de una sola persona para: el Trolley, la mayoría de los autobuses de MTS, y los servicios del NCTD de BREEZE y SPRINTER. Válidos para acceder a descuentos en el COASTER, pero no para las rutas Premium Express, rurales, Access, ni los servicios especiales.

DIRECTORY / *Directorio*

Regional Transit Information *Información de transporte público regional*	511 or/ó (619) 233-3004
TTY/TDD (teletype for hearing impaired) *Teletipo para sordos*	(619) 234-5005 or/ó (888) 722-4889
InfoExpress (24-hour info via Touch-Tone phone) *Información las 24 horas (via teléfono de teclas)*	(619) 685-4900
Customer Service / Suggestions *Servicio al cliente / Sugerencias*	(619) 557-4555
SafeWatch	(619) 557-4500
The Transit Store / Lost & Found *The Transit Store / Objetos extraviados*	(619) 234-1060
Articles found on the bus are turned in at The Transit Store *Artículos encontrados en los autobuses son entregados a The Transit Store*	1st & Broadway Downtown San Diego M–F 9am–5pm
For MTS online trip planning *Planificación de viajes por Internet*	www.sdmts.com

For more information on riding MTS services, pick up a Rider's Guide on a bus or at The Transit Store, or visit **www.sdmts.com**.
*Para obtener más información sobre el uso de los servicios de MTS, recoja un 'Rider's Guide' en un autobús o en The Transit Store, o visita a **www.sdmts.com**.*

Thank you for riding MTS! *¡Gracias por viajar con MTS!*

Effective JANUARY 27, 2013

10

Old Town – University & College Limited Stops

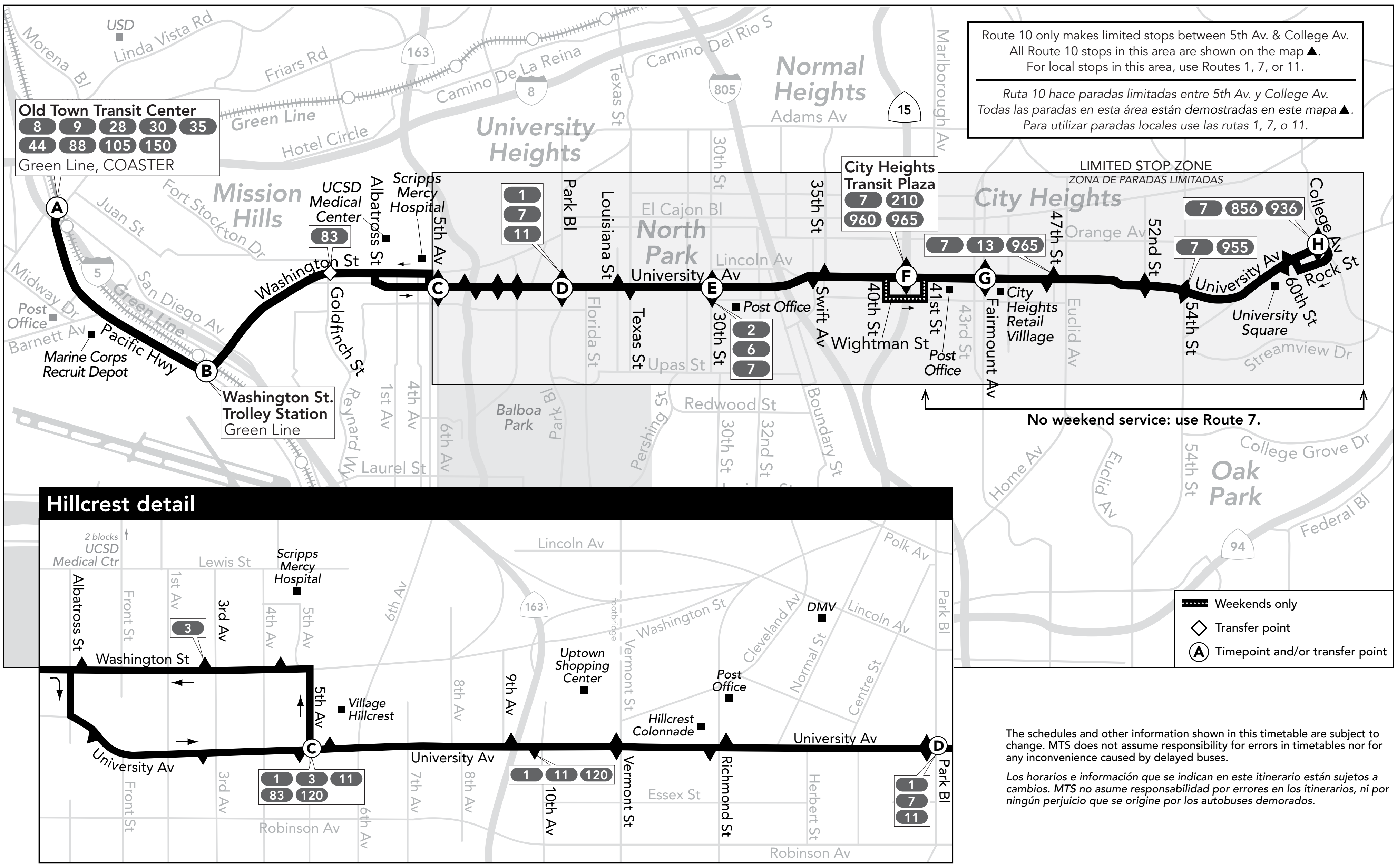
via University Av.

DESTINATIONS
- City Heights Retail Village
- City Heights Transit Plaza
- Hillcrest DMV
- Scripps Mercy Hospital
- Uptown Shopping Center
- Village Hillcrest

TROLLEY CONNECTIONS
Old Town
Washington St.

Metropolitan Transit System

Alternative formats available upon request. Please call: (619) 557-4555 / *Formato alternativo disponible al preguntar. Favor de llamar: (619) 557-4555*



Route 10 only makes limited stops between 5th Av. & College Av.
All Route 10 stops in this area are shown on the map ▲.
For local stops in this area, use Routes 1, 7, or 11.

Ruta 10 hace paradas limitadas entre 5th Av. y College Av.
Todas las paradas en esta área están demostradas en este mapa ▲.
Para utilizar paradas locales use las rutas 1, 7, o 11.

The schedules and other information shown in this timetable are subject to change. MTS does not assume responsibility for errors in timetables nor for any inconvenience caused by delayed buses.

Los horarios e información que se indican en este itinerario están sujetos a cambios. MTS no asume responsabilidad por errores en los itinerarios, ni por ningún perjuicio que se origine por los autobuses demorados.

A Saturday or Sunday schedule will be operated on the following holidays and observed holidays
Se operará con horario de sábado o domingo durante los siguientes días festivos y feriados observados >>> New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, Christmas

Route 10 – Sunday / *domingo*

Old Town ➡ Hillcrest ➡ North Park ➡ City Heights

Ⓐ Old Town Transit Center **DEPART**	Ⓑ Washington St. & Pacific Hwy.	Ⓒ University Av. & 5th Av.	Ⓓ University Av. & Park Bl.	Ⓔ University Av. & 30th St.	Ⓕ City Heights Transit Plaza @ 15-Fwy.	Ⓖ University Av. & Fairmount Av.	Ⓗ University Av. & College Av. **ARRIVE**
6:32a	6:36a	6:43a	6:47a	6:52a	6:59a	—	—
7:32	7:36	7:44	7:49	7:54	8:02	—	—
8:32	8:36	8:44	8:49	8:54	9:02	—	—
9:00	9:04	9:12	9:17	9:22	9:30	—	—
9:28	9:32	9:40	9:45	9:50	9:58	—	—
9:58	10:02	10:10	10:15	10:20	10:28	—	—
10:28	10:32	10:40	10:45	10:50	10:58	—	—
10:58	11:03	11:11	11:18	11:23	11:32	—	—
11:28	11:33	11:41	11:48	11:53	**12:02p**	—	—
11:58	**12:03p**	**12:11p**	**12:18p**	**12:23p**	**12:32**	—	—
12:28p	**12:33**	**12:42**	**12:49**	**12:55**	**1:04**	—	—
12:58	**1:03**	**1:12**	**1:19**	**1:25**	**1:34**	—	—
1:28	**1:33**	**1:42**	**1:49**	**1:55**	**2:04**	—	—
1:58	**2:03**	**2:12**	**2:19**	**2:25**	**2:34**	—	—
2:28	**2:33**	**2:42**	**2:49**	**2:55**	**3:04**	—	—
2:58	**3:03**	**3:12**	**3:19**	**3:25**	**3:34**	—	—
3:28	**3:33**	**3:42**	**3:49**	**3:55**	**4:04**	—	—
3:58	**4:03**	**4:12**	**4:19**	**4:25**	**4:34**	—	—
4:28	**4:33**	**4:42**	**4:49**	**4:55**	**5:04**	—	—
4:58	**5:03**	**5:12**	**5:19**	**5:25**	**5:34**	—	—
5:28	**5:33**	**5:42**	**5:49**	**5:55**	**6:04**	—	—
5:58	**6:03**	**6:11**	**6:18**	**6:23**	**6:31**	—	—
6:28	**6:33**	**6:41**	**6:48**	**6:53**	**7:01**	—	—
6:58	**7:03**	**7:11**	**7:18**	**7:23**	**7:31**	—	—
7:26	**7:31**	**7:39**	**7:46**	**7:51**	**7:59**	—	—
7:56	**8:01**	**8:09**	**8:16**	**8:21**	**8:29**	—	—
8:26	**8:31**	**8:39**	**8:46**	**8:51**	**8:59**	—	—
8:56	**9:00**	**9:08**	**9:14**	**9:19**	**9:26**	—	—
9:56	**10:00**	**10:08**	**10:14**	**10:19**	**10:26**	—	—

LIMITED STOP ZONE / *ZONA DE PARADAS LIMITADAS*

City Heights ➡ North Park ➡ Hillcrest ➡ Old Town

Ⓗ University Av. & College Av. **DEPART**	Ⓖ University Av. & Fairmount Av.	Ⓕ City Heights Transit Plaza @ 15-Fwy.	Ⓔ University Av. & 30th St.	Ⓓ University Av. & Park Bl.	Ⓒ University Av. & 5th Av.	Ⓑ Washington St. & Pacific Hwy.	Ⓐ Old Town Transit Center **ARRIVE**
—	—	5:25a	5:30a	5:33a	5:37a	5:45a	5:50a
—	—	5:55	6:00	6:03	6:07	6:15	6:20
—	—	6:25	6:30	6:33	6:37	6:45	6:50
—	—	6:55	7:00	7:03	7:07	7:15	7:20
—	—	7:25	7:30	7:33	7:37	7:45	7:50
—	—	7:51	7:57	8:01	8:06	8:15	8:20
—	—	8:19	8:25	8:29	8:34	8:43	8:48
—	—	8:49	8:55	8:59	9:04	9:13	9:18
—	—	9:16	9:23	9:28	9:33	9:42	9:48
—	—	9:46	9:53	9:58	10:03	10:12	10:18
—	—	10:16	10:23	10:28	10:33	10:42	10:48
—	—	10:44	10:52	10:57	11:03	11:12	11:18
—	—	11:14	11:22	11:27	11:33	11:42	11:48
—	—	11:44	11:52	11:57	**12:03p**	**12:12p**	**12:18p**
—	—	**12:14p**	**12:22p**	**12:27p**	**12:33**	**12:42**	**12:48**
—	—	**12:44**	**12:52**	**12:57**	**1:03**	**1:12**	**1:18**
—	—	**1:14**	**1:22**	**1:27**	**1:33**	**1:42**	**1:48**
—	—	**1:44**	**1:52**	**1:57**	**2:03**	**2:12**	**2:18**
—	—	**2:14**	**2:22**	**2:27**	**2:33**	**2:42**	**2:48**
—	—	**2:44**	**2:52**	**2:57**	**3:03**	**3:12**	**3:18**
—	—	**3:14**	**3:22**	**3:27**	**3:33**	**3:42**	**3:48**
—	—	**3:44**	**3:52**	**3:57**	**4:03**	**4:12**	**4:18**
—	—	**4:14**	**4:22**	**4:27**	**4:33**	**4:42**	**4:48**
—	—	**4:44**	**4:52**	**4:57**	**5:03**	**5:12**	**5:18**
—	—	**5:14**	**5:22**	**5:27**	**5:33**	**5:42**	**5:48**
—	—	**5:47**	**5:54**	**5:58**	**6:04**	**6:13**	**6:18**
—	—	**6:17**	**6:24**	**6:28**	**6:34**	**6:43**	**6:48**
—	—	**6:45**	**6:52**	**6:56**	**7:02**	**7:11**	**7:16**
—	—	**7:45**	**7:52**	**7:56**	**8:02**	**8:11**	**8:16**

LIMITED STOP ZONE / *ZONA DE PARADAS LIMITADAS*

Route 10 – Monday through Friday / *lunes a viernes*

Old Town ➡ Hillcrest ➡ North Park ➡ City Heights

Ⓐ Old Town Transit Center **DEPART**	Ⓑ Washington St. & Pacific Hwy.	Ⓒ University Av. & 5th Av.	Ⓓ University Av. & Park Bl.	Ⓔ University Av. & 30th St.	Ⓕ City Heights Transit Plaza @ 15-Fwy.	Ⓖ University Av. & Fairmount Av.	Ⓗ University Av. & College Av. **ARRIVE**
5:51a	5:55a	6:02a	6:06a	6:11a	6:16a	6:19a	6:26a
6:06	6:10	6:17	6:21	6:26	6:31	6:34	6:41
6:21	6:25	6:32	6:37	6:42	6:48	6:51	6:59
6:36	6:40	6:47	6:52	6:57	7:03	7:06	7:14
6:51	6:55	7:02	7:07	7:12	7:18	7:21	7:29
7:06	7:10	7:17	7:23	7:28	7:35	7:38	7:46
7:21	7:25	7:32	7:38	7:43	7:51	7:54	8:02
7:36	7:40	7:47	7:53	7:58	8:06	8:09	8:17
7:51	7:55	8:02	8:08	8:13	8:21	8:24	8:32
8:06	8:10	8:18	8:25	8:30	8:38	8:41	8:50
8:21	8:25	8:33	8:40	8:45	8:53	8:56	9:05
8:36	8:40	8:48	8:55	9:00	9:08	9:11	9:20
8:51	8:55	9:03	9:10	9:15	9:23	9:26	9:35
9:06	9:10	9:18	9:25	9:30	9:38	9:41	9:50
9:21	9:25	9:33	9:40	9:45	9:53	9:56	10:05
9:36	9:40	9:48	9:55	10:00	10:08	10:11	10:20
9:51	9:56	10:04	10:11	10:16	10:24	10:28	10:37
10:06	10:11	10:20	10:27	10:32	10:40	10:44	10:53
10:21	10:26	10:35	10:42	10:47	10:55	10:59	11:08
10:36	10:41	10:50	10:57	11:02	11:10	11:14	11:23
10:51	10:56	11:05	11:12	11:17	11:25	11:29	11:38
11:06	11:11	11:20	11:27	11:32	11:40	11:44	11:53
11:21	11:26	11:35	11:42	11:47	11:55	11:59	**12:08p**
11:36	11:41	11:50	11:57	**12:02p**	**12:10p**	**12:14p**	**12:23**
11:51	11:56	**12:05p**	**12:12p**	**12:17**	**12:25**	**12:29**	**12:38**
12:06p	**12:11p**	**12:20**	**12:27**	**12:32**	**12:40**	**12:44**	**12:53**
12:21	**12:26**	**12:35**	**12:42**	**12:47**	**12:55**	**12:59**	**1:08**
12:36	**12:41**	**12:50**	**12:57**	**1:02**	**1:10**	**1:14**	**1:23**
12:51	**12:56**	**1:06**	**1:13**	**1:18**	**1:26**	**1:30**	**1:40**
1:06	**1:11**	**1:21**	**1:29**	**1:34**	**1:42**	**1:46**	**1:56**
1:21	**1:26**	**1:36**	**1:44**	**1:49**	**1:57**	**2:01**	**2:11**
1:36	**1:41**	**1:51**	**1:59**	**2:04**	**2:12**	**2:16**	**2:26**
1:51	**1:56**	**2:06**	**2:14**	**2:19**	**2:27**	**2:31**	**2:41**
2:06	**2:11**	**2:21**	**2:29**	**2:34**	**2:42**	**2:46**	**2:56**
2:21	**2:26**	**2:36**	**2:44**	**2:49**	**2:57**	**3:01**	**3:11**
2:36	**2:41**	**2:51**	**2:59**	**3:04**	**3:12**	**3:16**	**3:26**
2:48	**2:53**	**3:03**	**3:11**	**3:16**	**3:24**	**3:28**	**3:38**
3:00	**3:05**	**3:15**	**3:23**	**3:28**	**3:36**	**3:40**	**3:50**
3:12	**3:17**	**3:27**	**3:35**	**3:40**	**3:48**	**3:52**	**4:02**
3:24	**3:29**	**3:39**	**3:47**	**3:52**	**4:00**	**4:04**	**4:14**
3:36	**3:41**	**3:51**	**3:59**	**4:04**	**4:12**	**4:16**	**4:26**
3:48	**3:53**	**4:03**	**4:11**	**4:16**	**4:24**	**4:28**	**4:38**
4:00	**4:05**	**4:15**	**4:23**	**4:29**	**4:37**	**4:42**	**4:52**
4:12	**4:17**	**4:27**	**4:35**	**4:41**	**4:49**	**4:54**	**5:04**
4:24	**4:29**	**4:39**	**4:47**	**4:53**	**5:01**	**5:06**	**5:16**
4:36	**4:41**	**4:51**	**4:59**	**5:05**	**5:13**	**5:18**	**5:28**
4:48	**4:53**	**5:03**	**5:11**	**5:17**	**5:25**	**5:30**	**5:40**
5:00	**5:05**	**5:15**	**5:23**	**5:29**	**5:37**	**5:42**	**5:52**
5:12	**5:17**	**5:27**	**5:35**	**5:41**	**5:49**	**5:54**	**6:04**
5:24	**5:29**	**5:39**	**5:47**	**5:53**	**6:01**	**6:06**	**6:16**
5:37	**5:42**	**5:52**	**6:00**	**6:06**	**6:14**	**6:19**	**6:29**
5:52	**5:57**	**6:07**	**6:15**	**6:21**	**6:29**	**6:34**	**6:44**
6:07	**6:12**	**6:22**	**6:30**	**6:36**	**6:44**	**6:49**	**6:59**
6:22	**6:27**	**6:37**	**6:45**	**6:50**	**6:58**	**7:03**	**7:12**
6:37	**6:41**	**6:51**	**6:59**	**7:04**	**7:11**	**7:15**	**7:24**
6:52	**6:56**	**7:06**	**7:14**	**7:19**	**7:26**	**7:30**	**7:39**
7:07	**7:11**	**7:21**	**7:29**	**7:34**	**7:41**	**7:45**	**7:54**
7:22	**7:26**	**7:36**	**7:43**	**7:48**	**7:54**	**7:58**	**8:06**
7:37	**7:41**	**7:50**	**7:57**	**8:02**	**8:08**	**8:11**	**8:19**
7:52	**7:56**	**8:05**	**8:12**	**8:17**	**8:23**	**8:26**	**8:34**
8:07	**8:11**	**8:20**	**8:27**	**8:32**	**8:38**	**8:41**	**8:49**
8:22	**8:26**	**8:35**	**8:42**	**8:47**	**8:53**	**8:56**	**9:04**
8:42	**8:46**	**8:55**	**9:02**	**9:07**	**9:13**	**9:16**	**9:24**
9:12	**9:16**	**9:24**	**9:30**	**9:35**	**9:40**	**9:43**	**9:50**
9:42	**9:46**	**9:54**	**10:00**	**10:05**	**10:10**	**10:13**	**10:20**
10:12	**10:16**	**10:23**	**10:28**	**10:32**	**10:37**	**10:40**	**10:47**
10:44	**10:48**	**10:55**	**11:00**	**11:04**	**11:09**	**11:12**	**11:19**
11:14	**11:18**	**11:25**	**11:30**	**11:34**	**11:39**	**11:42**	**11:49**
11:44	**11:48**	**11:55**	12:00a	12:04a	12:09a	12:12a	12:19a

LIMITED STOP ZONE / *ZONA DE PARADAS LIMITADAS*

City Heights ➡ North Park ➡ Hillcrest ➡ Old Town

Ⓗ University Av. & College Av. **DEPART**	Ⓖ University Av. & Fairmount Av.	Ⓕ City Heights Transit Plaza @ 15-Fwy.	Ⓔ University Av. & 30th St.	Ⓓ University Av. & Park Bl.	Ⓒ University Av. & 5th Av.	Ⓑ Washington St. & Pacific Hwy.	Ⓐ Old Town Transit Center **ARRIVE**
4:46a	4:53a	4:56a	5:02a	5:06a	5:11a	5:19a	5:24a
5:16	5:23	5:26	5:32	5:36	5:41	5:49	5:54
5:31	5:38	5:41	5:47	5:51	5:56	6:04	6:09
5:46	5:53	5:56	6:02	6:06	6:11	6:19	6:24
6:00	6:07	6:10	6:16	6:21	6:26	6:34	6:39
6:12	6:19	6:22	6:28	6:33	6:38	6:46	6:51
6:22	6:29	6:32	6:38	6:43	6:48	6:57	7:03
6:32	6:39	6:43	6:50	6:55	7:00	7:09	7:15
6:44	6:51	6:55	7:02	7:07	7:12	7:21	7:27
6:55	7:02	7:06	7:14	7:19	7:24	7:33	7:39
7:06	7:13	7:17	7:25	7:30	7:35	7:45	7:51
7:17	7:25	7:29	7:37	7:42	7:47	7:57	8:03
7:29	7:37	7:41	7:49	7:54	7:59	8:09	8:15
7:41	7:49	7:53	8:01	8:06	8:11	8:21	8:27
7:53	8:01	8:05	8:13	8:18	8:23	8:33	8:39
8:05	8:13	8:17	8:25	8:30	8:35	8:45	8:51
8:17	8:25	8:29	8:37	8:42	8:47	8:57	9:03
8:29	8:37	8:41	8:49	8:54	8:59	9:09	9:15
8:39	8:48	8:52	9:00	9:05	9:10	9:20	9:27
8:51	9:00	9:04	9:12	9:17	9:23	9:33	9:40
9:06	9:15	9:19	9:27	9:32	9:38	9:48	9:55
9:21	9:30	9:34	9:42	9:47	9:53	10:03	10:10
9:36	9:45	9:49	9:57	10:02	10:08	10:18	10:25
9:51	10:00	10:04	10:12	10:17	10:23	10:33	10:40
10:06	10:15	10:19	10:27	10:32	10:38	10:48	10:55
10:21	10:30	10:34	10:42	10:47	10:53	11:03	11:10
10:36	10:45	10:49	10:57	11:02	11:08	11:18	11:25
10:51	11:00	11:04	11:12	11:17	11:23	11:33	11:40
11:06	11:15	11:19	11:27	11:32	11:38	11:48	11:55
11:21	11:30	11:34	11:42	11:47	11:53	**12:03p**	**12:10p**
11:36	11:45	11:49	11:57	**12:02p**	**12:08p**	**12:18**	**12:25**
11:51	**12:00p**	**12:04p**	**12:12p**	**12:17**	**12:23**	**12:33**	**12:40**
12:06p	**12:15**	**12:19**	**12:27**	**12:32**	**12:38**	**12:48**	**12:55**
12:21	**12:30**	**12:34**	**12:42**	**12:47**	**12:53**	**1:03**	**1:10**
12:36	**12:45**	**12:49**	**12:57**	**1:02**	**1:08**	**1:18**	**1:25**
12:51	**1:00**	**1:04**	**1:12**	**1:17**	**1:23**	**1:33**	**1:40**
1:06	**1:15**	**1:19**	**1:27**	**1:32**	**1:38**	**1:48**	**1:55**
1:21	**1:30**	**1:34**	**1:42**	**1:47**	**1:53**	**2:03**	**2:10**
1:34	**1:44**	**1:48**	**1:56**	**2:02**	**2:08**	**2:18**	**2:25**
1:49	**1:59**	**2:03**	**2:11**	**2:17**	**2:23**	**2:33**	**2:40**
2:05	**2:15**	**2:19**	**2:27**	**2:33**	**2:39**	**2:49**	**2:56**
2:20	**2:30**	**2:34**	**2:42**	**2:48**	**2:54**	**3:04**	**3:11**
2:35	**2:45**	**2:49**	**2:57**	**3:03**	**3:09**	**3:19**	**3:26**
2:50	**3:00**	**3:04**	**3:12**	**3:18**	**3:24**	**3:34**	**3:41**
3:05	**3:15**	**3:19**	**3:27**	**3:33**	**3:39**	**3:49**	**3:56**
3:20	**3:30**	**3:34**	**3:42**	**3:48**	**3:54**	**4:04**	**4:11**
3:35	**3:45**	**3:49**	**3:57**	**4:03**	**4:09**	**4:19**	**4:26**
3:48	**3:58**	**4:02**	**4:11**	**4:17**	**4:24**	**4:35**	**4:42**
4:03	**4:13**	**4:17**	**4:26**	**4:32**	**4:39**	**4:50**	**4:57**
4:18	**4:28**	**4:32**	**4:41**	**4:47**	**4:54**	**5:05**	**5:12**
4:33	**4:43**	**4:47**	**4:56**	**5:02**	**5:09**	**5:20**	**5:27**
4:48	**4:58**	**5:02**	**5:11**	**5:17**	**5:24**	**5:35**	**5:42**
5:05	**5:15**	**5:19**	**5:28**	**5:34**	**5:41**	**5:52**	**5:59**
5:20	**5:30**	**5:34**	**5:43**	**5:49**	**5:56**	**6:07**	**6:14**
5:37	**5:47**	**5:50**	**5:58**	**6:04**	**6:11**	**6:21**	**6:28**
5:52	**6:02**	**6:05**	**6:13**	**6:19**	**6:26**	**6:36**	**6:43**
6:07	**6:17**	**6:20**	**6:28**	**6:34**	**6:41**	**6:51**	**6:58**
6:22	**6:32**	**6:35**	**6:43**	**6:49**	**6:56**	**7:06**	**7:13**
6:40	**6:50**	**6:53**	**7:01**	**7:06**	**7:12**	**7:22**	**7:28**
7:09	**7:19**	**7:22**	**7:30**	**7:35**	**7:41**	**7:51**	**7:57**
7:39	**7:49**	**7:52**	**8:00**	**8:05**	**8:11**	**8:21**	**8:27**
8:14	**8:24**	**8:27**	**8:35**	**8:40**	**8:46**	**8:56**	**9:02**
8:48	**8:57**	**9:00**	**9:07**	**9:12**	**9:18**	**9:27**	**9:32**
9:18	**9:27**	**9:30**	**9:37**	**9:42**	**9:48**	**9:57**	**10:02**
9:57	**10:05**	**10:07**	**10:14**	**10:18**	**10:23**	**10:32**	**10:37**
10:27	**10:35**	**10:37**	**10:44**	**10:48**	**10:53**	**11:02**	**11:07**

LIMITED STOP ZONE / *ZONA DE PARADAS LIMITADAS*

Route 10 – Saturday / *sábado*

Old Town ➡ Hillcrest ➡ North Park ➡ City Heights

Ⓐ Old Town Transit Center **DEPART**	Ⓑ Washington St. & Pacific Hwy.	Ⓒ University Av. & 5th Av.	Ⓓ University Av. & Park Bl.	Ⓔ University Av. & 30th St.	Ⓕ City Heights Transit Plaza @ 15-Fwy.	Ⓖ University Av. & Fairmount Av.	Ⓗ University Av. & College Av. **ARRIVE**
5:47a	5:51a	5:58a	6:02a	6:07a	6:14a	—	—
6:17	6:21	6:28	6:32	6:37	6:44	—	—
6:47	6:51	6:58	7:02	7:07	7:14	—	—
7:17	7:21	7:29	7:34	7:39	7:47	—	—
7:47	7:51	7:59	8:04	8:09	8:17	—	—
8:17	8:21	8:29	8:34	8:39	8:47	—	—
8:45	8:49	8:57	9:02	9:07	9:15	—	—
9:08	9:12	9:20	9:25	9:30	9:38	—	—
9:30	9:34	9:42	9:47	9:52	10:00	—	—
9:52	9:56	10:04	10:09	10:14	10:22	—	—
10:13	10:17	10:25	10:30	10:35	10:43	—	—
10:33	10:38	10:46	10:53	10:58	11:07	—	—
10:53	10:58	11:06	11:13	11:18	11:27	—	—
11:13	11:18	11:26	11:33	11:38	11:47	—	—
11:33	11:38	11:46	11:53	11:58	**12:07p**	—	—
11:53	11:58	**12:06p**	**12:13p**	**12:18p**	**12:27**	—	—
12:13p	**12:18p**	**12:26**	**12:33**	**12:38**	**12:47**	—	—
12:33	**12:38**	**12:47**	**12:54**	**1:00**	**1:09**	—	—
12:53	**12:58**	**1:07**	**1:14**	**1:20**	**1:29**	—	—
1:13	**1:18**	**1:27**	**1:34**	**1:40**	**1:49**	—	—
1:33	**1:38**	**1:47**	**1:54**	**2:00**	**2:09**	—	—
1:53	**1:58**	**2:07**	**2:14**	**2:20**	**2:29**	—	—
2:13	**2:18**	**2:27**	**2:34**	**2:40**	**2:49**	—	—
2:33	**2:38**	**2:47**	**2:54**	**3:00**	**3:09**	—	—
2:53	**2:58**	**3:07**	**3:14**	**3:20**	**3:29**	—	—
3:13	**3:18**	**3:27**	**3:34**	**3:40**	**3:49**	—	—
3:33	**3:38**	**3:47**	**3:54**	**4:00**	**4:09**	—	—
3:53	**3:58**	**4:07**	**4:14**	**4:20**	**4:29**	—	—
4:13	**4:18**	**4:27**	**4:34**	**4:40**	**4:49**	—	—
4:33	**4:38**	**4:47**	**4:54**	**5:00**	**5:09**	—	—
4:53	**4:58**	**5:07**	**5:14**	**5:20**	**5:29**	—	—
5:13	**5:18**	**5:27**	**5:34**	**5:40**	**5:49**	—	—
5:33	**5:38**	**5:47**	**5:54**	**6:00**	**6:09**	—	—
5:53	**5:58**	**6:06**	**6:13**	**6:18**	**6:26**	—	—
6:13	**6:18**	**6:26**	**6:33**	**6:38**	**6:46**	—	—
6:37	**6:42**	**6:50**	**6:57**	**7:02**	**7:10**	—	—
7:07	**7:12**	**7:20**	**7:27**	**7:32**	**7:40**	—	—
7:37	**7:42**	**7:50**	**7:57**	**8:02**	**8:10**	—	—
8:10	**8:15**	**8:23**	**8:30**	**8:35**	**8:43**	—	—
8:40	**8:45**	**8:53**	**9:00**	**9:05**	**9:13**	—	—
9:10	**9:14**	**9:22**	**9:28**	**9:33**	**9:40**	—	—
9:40	**9:44**	**9:52**	**9:58**	**10:03**	**10:10**	—	—
10:10	**10:14**	**10:21**	**10:26**	**10:30**	**10:37**	—	—
10:40	**10:44**	**10:51**	**10:56**	**11:00**	**11:07**	—	—
11:12	**11:16**	**11:23**	**11:28**	**11:32**	**11:39**	—	—
11:42	**11:46**	**11:53**	**11:58**	12:02a	12:09a	—	—

LIMITED STOP ZONE / *ZONA DE PARADAS LIMITADAS*

City Heights ➡ North Park ➡ Hillcrest ➡ Old Town

Ⓗ University Av. & College Av. **DEPART**	Ⓖ University Av. & Fairmount Av.	Ⓕ City Heights Transit Plaza @ 15-Fwy.	Ⓔ University Av. & 30th St.	Ⓓ University Av. & Park Bl.	Ⓒ University Av. & 5th Av.	Ⓑ Washington St. & Pacific Hwy.	Ⓐ Old Town Transit Center **ARRIVE**
—	—	5:12a	5:17a	5:20a	5:24a	5:32a	5:37a
—	—	5:42	5:47	5:50	5:54	6:02	6:07
—	—	6:12	6:17	6:20	6:24	6:32	6:37
—	—	6:42	6:47	6:50	6:54	7:02	7:07
—	—	7:12	7:17	7:20	7:24	7:32	7:37
—	—	7:38	7:44	7:48	7:53	8:02	8:07
—	—	8:04	8:10	8:14	8:19	8:28	8:33
—	—	8:28	8:34	8:38	8:43	8:52	8:57
—	—	8:51	8:57	9:01	9:06	9:15	9:20
—	—	9:08	9:15	9:20	9:25	9:34	9:40
—	—	9:28	9:35	9:40	9:45	9:54	10:00
—	—	9:48	9:55	10:00	10:05	10:14	10:20
—	—	10:08	10:15	10:20	10:25	10:34	10:40
—	—	10:28	10:35	10:40	10:45	10:54	11:00
—	—	10:46	10:54	10:59	11:05	11:14	11:20
—	—	11:06	11:14	11:19	11:25	11:34	11:40
—	—	11:26	11:34	11:39	11:45	11:54	**12:00p**
—	—	11:46	11:54	11:59	**12:05p**	**12:14p**	**12:20**
—	—	**12:06p**	**12:14p**	**12:19p**	**12:25**	**12:34**	**12:40**
—	—	**12:26**	**12:34**	**12:39**	**12:45**	**12:54**	**1:00**
—	—	**12:46**	**12:54**	**12:59**	**1:05**	**1:14**	**1:20**
—	—	**1:06**	**1:14**	**1:19**	**1:25**	**1:34**	**1:40**
—	—	**1:26**	**1:34**	**1:39**	**1:45**	**1:54**	**2:00**
—	—	**1:46**	**1:54**	**1:59**	**2:05**	**2:14**	**2:20**
—	—	**2:06**	**2:14**	**2:19**	**2:25**	**2:34**	**2:40**
—	—	**2:26**	**2:34**	**2:39**	**2:45**	**2:54**	**3:00**
—	—	**2:46**	**2:54**	**2:59**	**3:05**	**3:14**	**3:20**
—	—	**3:06**	**3:14**	**3:19**	**3:25**	**3:34**	**3:40**
—	—	**3:26**	**3:34**	**3:39**	**3:45**	**3:54**	**4:00**
—	—	**3:46**	**3:54**	**3:59**	**4:05**	**4:14**	**4:20**
—	—	**4:06**	**4:14**	**4:19**	**4:25**	**4:34**	**4:40**
—	—	**4:26**	**4:34**	**4:39**	**4:45**	**4:54**	**5:00**
—	—	**4:46**	**4:54**	**4:59**	**5:05**	**5:14**	**5:20**
—	—	**5:06**	**5:14**	**5:19**	**5:25**	**5:34**	**5:40**
—	—	**5:23**	**5:31**	**5:36**	**5:42**	**5:51**	**5:57**
—	—	**5:53**	**6:00**	**6:04**	**6:10**	**6:19**	**6:24**
—	—	**6:24**	**6:31**	**6:35**	**6:41**	**6:50**	**6:55**
—	—	**6:54**	**7:01**	**7:05**	**7:11**	**7:20**	**7:25**
—	—	**7:24**	**7:31**	**7:35**	**7:41**	**7:50**	**7:55**
—	—	**7:54**	**8:01**	**8:05**	**8:11**	**8:20**	**8:25**
—	—	**8:24**	**8:31**	**8:35**	**8:41**	**8:50**	**8:55**
—	—	**8:58**	**9:04**	**9:07**	**9:12**	**9:20**	**9:25**
—	—	**9:28**	**9:34**	**9:37**	**9:42**	**9:50**	**9:55**
—	—	**9:58**	**10:04**	**10:07**	**10:12**	**10:20**	**10:25**
—	—	**10:28**	**10:34**	**10:37**	**10:42**	**10:50**	**10:55**

LIMITED STOP ZONE / *ZONA DE PARADAS LIMITADAS*

CASH FARES / *Tarifas en efectivo*

Exact fare, please / *Favor de pagar la cantidad exacta*	
Day Pass (Regional) / *Pase diario (Regional)*	$5.00
One-Way Fare / *Tarifa de una direccíon*	$2.25
Senior (60+)/Disabled/Medicare *Mayores de 60 años/Discapacitados/Medicare*	$1.10*
Children 5 & under / *Niños de 5 años o menos* Up to two children ride free per paying adult / *Máximo dos niños viajan gratis por cada adulto*	FREE / *GRATIS*

MONTHLY PASSES / *Pases mensual*

Adult / *Adulto*	$72.00
Senior (60+)/Disabled/Medicare *Mayores de 60 años/Discapacitados/Medicare*	$18.00*
Youths (18 and under) *Jóvenes (18 años o menos)*	$36.00*

*I.D. required for discount fare or pass.
**Se requiere identificación para tarifas o pases de descuento.*

DAY PASS (REGIONAL) / ***Pase diario (Regional)***

Valid for unlimited travel for one person on Trolley, most MTS buses, NCTD BREEZE and SPRINTER. Valid for a discount on COASTER fares. Not valid on Premium Express, Rural, Access, or special service buses.

Válidos para viajes ilimitados de una sola persona para: el Trolley, la mayoría de los autobuses de MTS, y los servicios del NCTD de BREEZE y SPRINTER. Válidos para acceder a descuentos en el COASTER, pero no para las rutas Premium Express, rurales, Access, ni los servicios especiales.

DIRECTORY / *Directorio*

Regional Transit Information *Información de transporte público regional*	511 or/ó (619) 233-3004
TTY/TDD (teletype for hearing impaired) *Teletipo para sordos*	(619) 234-5005 or/ó (888) 722-4889
InfoExpress (24-hour info via Touch-Tone phone) *Información las 24 horas (via teléfono de teclas)*	(619) 685-4900
Customer Service / Suggestions *Servicio al cliente / Sugerencias*	(619) 557-4555
SafeWatch	(619) 557-4500
Lost & Found *Objetos extraviados*	(619) 427-5660 or/ó (800) 409-3310
The Transit Store	(619) 234-1060 1st & Broadway, Downtown San Diego M–F 9am–5pm
For MTS online trip planning *Planificación de viajes por Internet*	www.sdmts.com

For more information on riding MTS services, pick up a Rider's Guide on a bus or at The Transit Store, or visit **www.sdmts.com**.
Para obtener más información sobre el uso de los servicios de MTS, recoja un 'Rider's Guide' en un autobús o en The Transit Store, o visita a ***www.sdmts.com****.*

Thank you for riding MTS! ***¡Gracias por viajar con MTS!***

Effective JANUARY 27, 2013

955

8th St. Trolley – SDSU

via 43rd St. / Euclid Trolley / 54th St.

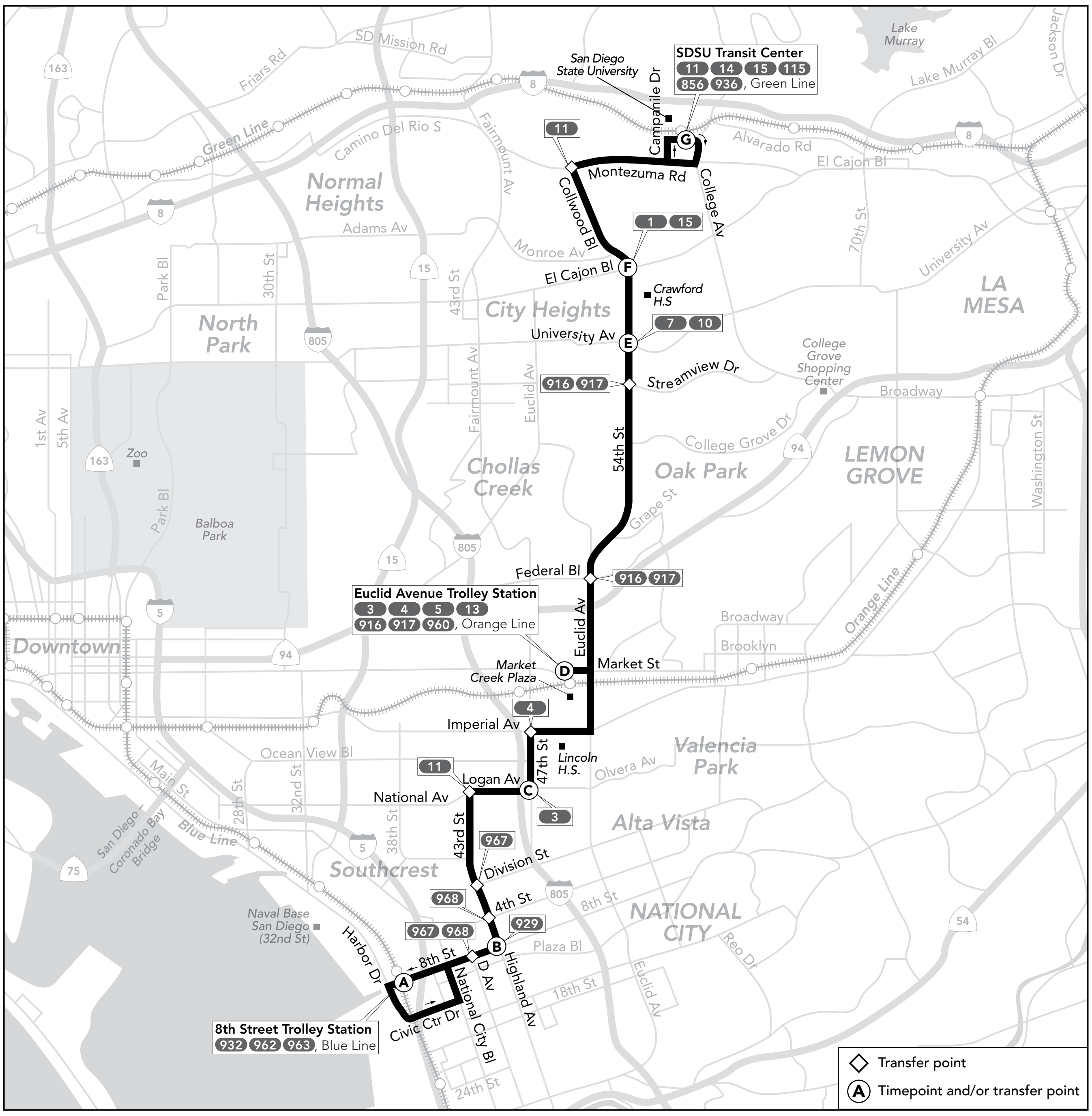
DESTINATIONS

- 54th Street
- Crawford High School
- Euclid Avenue Trolley Station
- Lincoln High School
- Market Creek Plaza
- San Diego State University
- South 43rd Street

TROLLEY CONNECTIONS
8th St.
Euclid Av.
SDSU

MTS Metropolitan Transit System

Alternative formats available upon request. Please call: (619) 557-4555 / ***Formato alternativo disponible al preguntar. Favor de llamar: (619) 557-4555***



The schedules and other information shown in this timetable are subject to change. MTS does not assume responsibility for errors in timetables nor for any inconvenience caused by delayed buses.
Los horarios e información que se indican en este inerario están sujetos a cambios. MTS no asume responsabilidad por errores en los itinerarios, ni por ningún perjuicio que se origine por los autobuses demorados.

Route 955 – Sunday / *domingo*

National City ➡ Oak Park ➡ SDSU

Ⓐ 8th St. Trolley Station **DEPART**	Ⓑ Highland Av. & 8th St.	Ⓒ 47th St. & Logan Av.	Ⓓ Euclid Av. Trolley Station	Ⓔ 54th St. & University Av.	Ⓕ 54th St. & El Cajon Bl.	Ⓖ SDSU Transit Center **ARRIVE**
—	—	—	6:00a	6:09a	6:12a	6:21a
6:34a	6:42a	6:51a	7:00	7:09	7:12	7:21
7:32	7:40	7:50	8:00	8:10	8:14	8:24
8:32	8:40	8:50	9:00	9:10	9:14	9:24
9:32	9:40	9:50	10:00	10:10	10:14	10:24
10:32	10:40	10:50	11:00	11:10	11:14	11:24
11:05	11:14	11:25	11:36	11:47	11:51	**12:02p**
11:35	11:44	11:55	**12:06p**	**12:17p**	**12:21p**	**12:32**
12:05p	**12:14p**	**12:25p**	**12:36**	**12:47**	**12:51**	**1:02**
12:35	**12:44**	**12:55**	**1:06**	**1:17**	**1:21**	**1:32**
1:05	**1:14**	**1:25**	**1:36**	**1:47**	**1:51**	**2:02**
1:35	**1:44**	**1:55**	**2:06**	**2:17**	**2:21**	**2:32**
2:05	**2:14**	**2:25**	**2:36**	**2:47**	**2:51**	**3:02**
2:35	**2:44**	**2:55**	**3:06**	**3:17**	**3:21**	**3:32**
3:05	**3:14**	**3:25**	**3:36**	**3:47**	**3:51**	**4:02**
3:35	**3:44**	**3:55**	**4:06**	**4:17**	**4:21**	**4:32**
4:05	**4:14**	**4:25**	**4:36**	**4:47**	**4:51**	**5:02**
4:35	**4:44**	**4:55**	**5:06**	**5:17**	**5:21**	**5:32**
5:05	**5:14**	**5:25**	**5:36**	**5:47**	**5:51**	**6:02**
5:35	**5:44**	**5:55**	**6:06**	**6:17**	**6:21**	**6:32**
6:13	**6:22**	**6:32**	**6:49 T**	**6:59**	**7:03**	**7:13**
7:13	**7:22**	**7:32**	**7:49 T**	**7:59**	**8:03**	**8:13**
8:14	**8:23**	**8:33**	**8:49 T**	**8:59**	**9:02**	**9:11**

SDSU ➡ Oak Park ➡ National City

Ⓖ SDSU Transit Center **DEPART**	Ⓕ 54th St. & El Cajon Bl.	Ⓔ 54th St. & University Av.	Ⓓ Euclid Av. Trolley Station	Ⓒ Logan Av. & 47th St.	Ⓑ 8th St. & Highland Av.	Ⓐ 8th St. Trolley Station **ARRIVE**
—	—	—	5:58a	6:05a	6:14a	6:19a
6:38a	6:45a	6:47a	6:58	7:05	7:14	7:19
7:34	7:43	7:46	7:58	8:05	8:14	8:19
8:34	8:43	8:46	8:58	9:05	9:14	9:19
9:32	9:41	9:44	9:56	10:04	10:14	10:20
9:58	10:07	10:10	10:22	10:30	10:40	10:46
10:28	10:37	10:40	10:52	11:00	11:10	11:16
10:57	11:06	11:09	11:22	11:31	11:41	11:47
11:27	11:36	11:39	11:52	**12:01p**	**12:11p**	**12:17p**
11:57	**12:06p**	**12:09p**	**12:22p**	**12:31**	**12:41**	**12:47**
12:27p	**12:36**	**12:39**	**12:52**	**1:01**	**1:11**	**1:17**
12:57	**1:06**	**1:09**	**1:22**	**1:31**	**1:41**	**1:47**
1:27	**1:36**	**1:39**	**1:52**	**2:01**	**2:11**	**2:17**
1:57	**2:06**	**2:09**	**2:22**	**2:31**	**2:41**	**2:47**
2:27	**2:36**	**2:39**	**2:52**	**3:01**	**3:11**	**3:17**
2:57	**3:06**	**3:09**	**3:22**	**3:31**	**3:41**	**3:47**
3:27	**3:36**	**3:39**	**3:52**	**4:01**	**4:11**	**4:17**
3:57	**4:06**	**4:09**	**4:22**	**4:31**	**4:41**	**4:47**
4:27	**4:36**	**4:39**	**4:52**	**5:01**	**5:11**	**5:17**
4:57	**5:06**	**5:09**	**5:22**	**5:31**	**5:41**	**5:47**
5:27	**5:36**	**5:39**	**5:52**	**6:01**	**6:11**	**6:17**
6:01	**6:10**	**6:13**	**6:34 T**	**6:43**	**6:53**	**6:59**
6:48	**6:56**	**6:59**	**7:19 T**	**7:26**	**7:35**	**7:41**
7:48	**7:56**	**7:59**	**8:19 T**	**8:26**	**8:35**	**8:41**
8:48	**8:56**	**8:59**	**9:19 T**	**9:26**	**9:35**	**9:41**

T = Trip arrives 8 minutes earlier / *Viaje llega 8 minutos antes*

A Saturday or Sunday schedule will be operated on the following holidays and observed holidays >>> New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, Christmas
Se operará con horario de sábado o domingo durante los siguientes días festivos y feriados observados

Route 955 – Monday through Friday / *lunes a viernes*

National City ➡ Oak Park ➡ SDSU

Ⓐ 8th St. Trolley Station **DEPART**	Ⓑ Highland Av. & 8th St.	Ⓒ 47th St. & Logan Av.	Ⓓ Euclid Av. Trolley Station	Ⓔ 54th St. & University Av.	Ⓕ 54th St. & El Cajon Bl.	Ⓖ SDSU Transit Center **ARRIVE**
4:55a	5:04a	5:13a	5:21a	5:30a	5:33a	5:42a
5:10	5:19	5:28	5:36	5:45	5:48	5:57
5:25	5:34	5:43	5:51	6:00	6:03	6:12
5:39	5:48	5:58	6:06	6:15	6:18	6:27
5:53	6:02	6:12	6:21	6:31	6:35	6:45
6:08	6:17	6:27	6:36	6:46	6:50	7:00
6:20	6:30	6:40	6:51	7:02	7:06	7:17
6:35	6:45	6:55	7:06	7:17	7:21	7:32
6:50	7:00	7:10	7:21	7:32	7:36	7:47
7:05	7:15	7:25	7:36	7:47	7:51	8:02
7:20	7:30	7:40	7:51	8:02	8:06	8:17
7:35	7:45	7:55	8:06	8:17	8:21	8:32
7:50	8:00	8:10	8:21	8:32	8:36	8:47
8:06	8:16	8:26	8:36	8:47	8:51	9:01
8:21	8:31	8:41	8:51	9:02	9:06	9:16
8:36	8:46	8:56	9:06	9:17	9:21	9:31
8:51	9:01	9:11	9:21	9:32	9:36	9:46
9:06	9:16	9:26	9:36	9:47	9:51	10:01
9:21	9:31	9:41	9:51	10:02	10:06	10:16
9:36	9:46	9:56	10:06	10:17	10:21	10:31
9:51	10:01	10:11	10:21	10:32	10:36	10:46
10:06	10:16	10:26	10:36	10:47	10:51	11:01
10:20	10:30	10:41	10:51	11:02	11:06	11:17
10:35	10:45	10:56	11:06	11:17	11:21	11:32
10:50	11:00	11:11	11:21	11:32	11:36	11:47
11:05	11:15	11:26	11:36	11:47	11:51	**12:02p**
11:20	11:30	11:41	11:51	**12:02p**	**12:06p**	**12:17**
11:35	11:45	11:56	**12:06p**	**12:17**	**12:21**	**12:32**
11:50	**12:00p**	**12:11p**	**12:21**	**12:32**	**12:36**	**12:47**
12:05p	**12:15**	**12:26**	**12:36**	**12:47**	**12:51**	**1:02**
12:20	**12:30**	**12:41**	**12:51**	**1:02**	**1:06**	**1:17**
12:35	**12:45**	**12:56**	**1:06**	**1:17**	**1:21**	**1:32**
12:50	**1:00**	**1:11**	**1:21**	**1:32**	**1:36**	**1:47**
1:05	**1:15**	**1:26**	**1:36**	**1:47**	**1:51**	**2:02**
1:20	**1:30**	**1:41**	**1:51**	**2:02**	**2:06**	**2:17**
1:35	**1:45**	**1:56**	**2:06**	**2:17**	**2:21**	**2:32**
1:50	**2:00**	**2:11**	**2:21**	**2:32**	**2:36**	**2:47**
2:05	**2:15**	**2:26**	**2:36**	**2:47**	**2:51**	**3:02**
2:19	**2:29**	**2:40**	**2:51**	**3:03**	**3:07**	**3:18**
2:34	**2:44**	**2:55**	**3:06**	**3:18**	**3:22**	**3:33**
2:49	**2:59**	**3:10**	**3:21**	**3:33**	**3:37**	**3:48**
3:04	**3:14**	**3:25**	**3:36**	**3:48**	**3:52**	**4:03**
3:19	**3:29**	**3:40**	**3:51**	**4:03**	**4:07**	**4:18**
3:34	**3:44**	**3:55**	**4:06**	**4:18**	**4:22**	**4:33**
3:49	**3:59**	**4:10**	**4:21**	**4:33**	**4:37**	**4:48**
4:04	**4:14**	**4:25**	**4:36**	**4:48**	**4:52**	**5:03**
4:19	**4:29**	**4:40**	**4:51**	**5:03**	**5:07**	**5:18**
4:34	**4:44**	**4:55**	**5:06**	**5:18**	**5:22**	**5:33**
4:49	**4:59**	**5:10**	**5:21**	**5:33**	**5:37**	**5:48**
5:04	**5:14**	**5:25**	**5:36**	**5:48**	**5:52**	**6:03**
5:19	**5:29**	**5:40**	**5:51**	**6:03**	**6:07**	**6:18**
5:34	**5:44**	**5:55**	**6:06**	**6:18**	**6:22**	**6:33**
5:55	**6:05**	**6:15**	**6:25**	**6:36**	**6:40**	**6:50**
6:18	**6:28**	**6:38**	**6:48**	**6:59**	**7:03**	**7:12**
6:50	**6:59**	**7:09**	**7:18**	**7:28**	**7:32**	**7:41**
7:20	**7:29**	**7:39**	**7:48**	**7:58**	**8:02**	**8:11**
7:52	**8:01**	**8:11**	**8:19**	**8:29**	**8:32**	**8:41**
8:23	**8:32**	**8:42**	**8:50**	**9:00**	**9:03**	**9:12**
8:53	**9:02**	**9:12**	**9:20**	**9:30**	**9:33**	**9:42**
9:23	**9:32**	**9:42**	**9:50**	**10:00**	**10:03**	**10:12**
9:53	**10:02**	**10:12**	**10:20**	**10:30**	**10:33**	**10:42**

SDSU ➡ Oak Park ➡ National City

Ⓖ SDSU Transit Center **DEPART**	Ⓕ 54th St. & El Cajon Bl.	Ⓔ 54th St. & University Av.	Ⓓ Euclid Av. Trolley Station	Ⓒ Logan Av. & 47th St.	Ⓑ 8th St. & Highland Av.	Ⓐ 8th St. Trolley Station **ARRIVE**
5:04a	5:11a	5:13a	5:24a	5:31a	5:40a	5:45a
5:34	5:41	5:43	5:54	6:01	6:10	6:15
5:48	5:55	5:57	6:09	6:17	6:27	6:32
6:02	6:09	6:12	6:24	6:32	6:42	6:47
6:16	6:24	6:27	6:39	6:47	6:57	7:02
6:31	6:39	6:42	6:54	7:02	7:12	7:17
6:44	6:53	6:56	7:09	7:18	7:28	7:35
6:59	7:08	7:11	7:24	7:33	7:43	7:50
7:14	7:23	7:26	7:39	7:48	7:58	8:05
7:29	7:38	7:41	7:54	8:03	8:13	8:20
7:44	7:53	7:56	8:09	8:18	8:28	8:35
7:59	8:08	8:11	8:24	8:33	8:43	8:50
8:14	8:23	8:26	8:39	8:48	8:58	9:05
8:29	8:38	8:41	8:54	9:03	9:13	9:20
8:44	8:53	8:56	9:09	9:18	9:28	9:35
9:00	9:09	9:12	9:24	9:32	9:42	9:48
9:15	9:24	9:27	9:39	9:47	9:57	10:03
9:30	9:39	9:42	9:54	10:02	10:12	10:18
9:45	9:54	9:57	10:09	10:17	10:27	10:33
10:00	10:09	10:12	10:24	10:32	10:42	10:48
10:15	10:24	10:27	10:39	10:47	10:57	11:03
10:30	10:39	10:42	10:54	11:02	11:12	11:18
10:45	10:54	10:57	11:09	11:17	11:27	11:33
11:00	11:09	11:12	11:24	11:32	11:42	11:48
11:15	11:24	11:27	11:39	11:47	11:57	**12:03p**
11:30	11:39	11:42	11:54	**12:02p**	**12:12p**	**12:18**
11:45	11:54	11:57	**12:09p**	**12:17**	**12:27**	**12:33**
12:00p	**12:09p**	**12:12p**	**12:24**	**12:32**	**12:42**	**12:48**
12:15	**12:24**	**12:27**	**12:39**	**12:47**	**12:57**	**1:03**
12:30	**12:39**	**12:42**	**12:54**	**1:02**	**1:12**	**1:18**
12:45	**12:54**	**12:57**	**1:09**	**1:17**	**1:27**	**1:33**
1:00	**1:09**	**1:12**	**1:24**	**1:32**	**1:42**	**1:48**
1:15	**1:24**	**1:27**	**1:39**	**1:47**	**1:57**	**2:03**
1:30	**1:39**	**1:42**	**1:54**	**2:02**	**2:12**	**2:18**
1:45	**1:54**	**1:57**	**2:09**	**2:17**	**2:27**	**2:33**
1:59	**2:09**	**2:12**	**2:24**	**2:32**	**2:42**	**2:48**
2:13	**2:23**	**2:26**	**2:39**	**2:48**	**2:59**	**3:06**
2:28	**2:38**	**2:41**	**2:54**	**3:03**	**3:14**	**3:21**
2:43	**2:53**	**2:56**	**3:09**	**3:18**	**3:29**	**3:36**
2:58	**3:08**	**3:11**	**3:24**	**3:33**	**3:44**	**3:51**
3:13	**3:23**	**3:26**	**3:39**	**3:48**	**3:59**	**4:06**
3:28	**3:38**	**3:41**	**3:54**	**4:03**	**4:14**	**4:21**
3:43	**3:53**	**3:56**	**4:09**	**4:18**	**4:29**	**4:36**
3:58	**4:08**	**4:11**	**4:24**	**4:33**	**4:44**	**4:51**
4:13	**4:23**	**4:26**	**4:39**	**4:48**	**4:59**	**5:06**
4:28	**4:38**	**4:41**	**4:54**	**5:03**	**5:14**	**5:21**
4:43	**4:53**	**4:56**	**5:09**	**5:18**	**5:29**	**5:36**
4:58	**5:08**	**5:11**	**5:24**	**5:33**	**5:44**	**5:51**
5:13	**5:23**	**5:26**	**5:39**	**5:48**	**5:59**	**6:06**
5:30	**5:39**	**5:42**	**5:54**	**6:02**	**6:12**	**6:18**
5:45	**5:54**	**5:57**	**6:09**	**6:17**	**6:27**	**6:33**
6:00	**6:09**	**6:12**	**6:24**	**6:32**	**6:42**	**6:48**
6:15	**6:24**	**6:27**	**6:39**	**6:47**	**6:57**	**7:03**
6:30	**6:39**	**6:42**	**6:54**	**7:02**	**7:12**	**7:18**
6:45	**6:54**	**6:57**	**7:09**	**7:17**	**7:27**	**7:33**
7:01	**7:10**	**7:13**	**7:25**	**7:33**	**7:43**	**7:49**
7:19	**7:27**	**7:30**	**7:49 T**	**7:56**	**8:05**	**8:11**
7:49	**7:57**	**8:00**	**8:19 T**	**8:26**	**8:35**	**8:41**
8:18	**8:26**	**8:29**	**8:49 T**	**8:56**	**9:05**	**9:11**
8:48	**8:56**	**8:59**	**9:19 T**	**9:26**	**9:35**	**9:41**
9:20	**9:28**	**9:30**	**9:49 T**	**9:56**	**10:05**	**10:10**
9:50	**9:58**	**10:00**	**10:19 T**	**10:26**	**10:35**	**10:40**
10:20	**10:28**	**10:30**	**10:49 T**	**10:56**	**11:05**	**11:10**
10:50	**10:58**	**11:00**	**11:19 T**	**11:26**	**11:35**	**11:40**

Route 955 – Saturday / *sábado*

National City ➡ Oak Park ➡ SDSU

Ⓐ 8th St. Trolley Station **DEPART**	Ⓑ Highland Av. & 8th St.	Ⓒ 47th St. & Logan Av.	Ⓓ Euclid Av. Trolley Station	Ⓔ 54th St. & University Av.	Ⓕ 54th St. & El Cajon Bl.	Ⓖ SDSU Transit Center **ARRIVE**
5:39a	5:47a	5:56a	6:05a	6:14a	6:17a	6:26a
6:09	6:17	6:26	6:35	6:44	6:47	6:56
6:39	6:47	6:56	7:05	7:14	7:17	7:26
7:02	7:10	7:20	7:30	7:40	7:44	7:54
7:32	7:40	7:50	8:00	8:10	8:14	8:24
8:02	8:10	8:20	8:30	8:40	8:44	8:54
8:22	8:30	8:40	8:50	9:00	9:04	9:14
8:42	8:50	9:00	9:10	9:20	9:24	9:34
9:02	9:10	9:20	9:30	9:40	9:44	9:54
9:22	9:30	9:40	9:50	10:00	10:04	10:14
9:42	9:50	10:00	10:10	10:20	10:24	10:34
10:02	10:10	10:20	10:30	10:40	10:44	10:54
10:22	10:30	10:40	10:50	11:00	11:04	11:14
10:39	10:48	10:59	11:10	11:21	11:25	11:36
10:59	11:08	11:19	11:30	11:41	11:45	11:56
AND THEN EVERY 20 MINUTES AT: / *Y LUEGO CADA 20 MINUTOS A LA:*						
:19	:28	:39	:50	:01	:05	:16
:39	:48	:59	:10	:21	:25	:36
:59	:08	:19	:30	:41	:45	:56
UNTIL: / *HASTA:*						
5:19p	**5:28p**	**5:39p**	**5:50p**	**6:01p**	**6:05p**	**6:16p**
5:39	**5:48**	**5:59**	**6:10**	**6:21**	**6:25**	**6:36**
6:05	**6:14**	**6:24**	**6:33**	**6:43**	**6:47**	**6:57**
6:28	**6:37**	**6:47**	**6:56**	**7:06**	**7:10**	**7:20**
6:58	**7:07**	**7:17**	**7:26**	**7:36**	**7:40**	**7:50**
7:28	**7:37**	**7:47**	**7:56**	**8:06**	**8:10**	**8:20**
7:56	**8:05**	**8:15**	**8:23**	**8:33**	**8:36**	**8:45**
8:23	**8:32**	**8:42**	**8:50**	**9:00**	**9:03**	**9:12**
8:53	**9:02**	**9:12**	**9:20**	**9:30**	**9:33**	**9:42**
9:53	**10:02**	**10:12**	**10:20**	**10:30**	**10:33**	**10:42**

SDSU ➡ Oak Park ➡ National City

Ⓖ SDSU Transit Center **DEPART**	Ⓕ 54th St. & El Cajon Bl.	Ⓔ 54th St. & University Av.	Ⓓ Euclid Av. Trolley Station	Ⓒ Logan Av. & 47th St.	Ⓑ 8th St. & Highland Av.	Ⓐ 8th St. Trolley Station **ARRIVE**
5:38a	5:45a	5:47a	5:58a	6:05a	6:14a	6:19a
6:08	6:15	6:17	6:28	6:35	6:44	6:49
6:38	6:45	6:47	6:58	7:05	7:14	7:19
7:04	7:13	7:16	7:28	7:35	7:44	7:49
7:34	7:43	7:46	7:58	8:05	8:14	8:19
8:04	8:13	8:16	8:28	8:35	8:44	8:49
8:41	8:50	8:53	9:05	9:12	9:21	9:26
9:11	9:20	9:23	9:35	9:43	9:53	9:59
9:31	9:40	9:43	9:55	10:03	10:13	10:19
9:51	10:00	10:03	10:15	10:23	10:33	10:39
10:11	10:20	10:23	10:35	10:43	10:53	10:59
10:30	10:39	10:42	10:55	11:04	11:14	11:20
10:50	10:59	11:02	11:15	11:24	11:34	11:40
AND THEN EVERY 20 MINUTES AT: / *Y LUEGO CADA 20 MINUTOS A LA:*						
:10	:19	:22	:35	:44	:54	:00
:30	:39	:42	:55	:04	:14	:20
:50	:59	:02	:15	:24	:34	:40
UNTIL: / *HASTA:*						
5:10p	**5:19p**	**5:22p**	**5:35p**	**5:44p**	**5:54p**	**6:00p**
5:30	**5:39**	**5:42**	**5:55**	**6:04**	**6:14**	**6:20**
5:57	**6:06**	**6:09**	**6:22**	**6:31**	**6:41**	**6:47**
6:18	**6:26**	**6:29**	**6:49 T**	**6:56**	**7:05**	**7:11**
6:48	**6:56**	**6:59**	**7:19 T**	**7:26**	**7:35**	**7:41**
7:18	**7:26**	**7:29**	**7:49 T**	**7:56**	**8:05**	**8:11**
7:48	**7:56**	**7:59**	**8:19 T**	**8:26**	**8:35**	**8:41**
8:18	**8:26**	**8:29**	**8:49 T**	**8:56**	**9:05**	**9:11**
8:48	**8:56**	**8:59**	**9:19 T**	**9:26**	**9:35**	**9:41**
9:20	**9:28**	**9:30**	**9:49 T**	**9:56**	**10:05**	**10:10**
9:50	**9:58**	**10:00**	**10:19 T**	**10:26**	**10:35**	**10:40**
10:50	**10:58**	**11:00**	**11:19 T**	**11:26**	**11:35**	**11:40**

T = Trip arrives 8 minutes earlier / *Viaje llega 8 minutos antes*

APPENDIX D

SAN DIEGO TRAFFIC IMPACT STUDY ADT THRESHOLDS

TABLE 2
Roadway Classifications, Levels of Service (LOS) and Average Daily Traffic (ADT)

			LEVEL OF SERVICE				
STREET CLASSIFICATION	LANES	CROSS SECTIONS	A	B	C	D	E
Freeway	8 lanes		60,000	84,000	120,000	140,000	150,000
Freeway	6 lanes		45,000	63,000	90,000	110,000	120,000
Freeway	4 lanes		30,000	42,000	60,000	70,000	80,000
Expressway	6 lanes	102/122	30,000	42,000	60,000	70,000	80,000
Primary Arterial	6 lanes	102/122	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	102/122	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 lanes	78/98	15,000	21,000	30,000	35,000	40,000
Collector	4 lanes	72/92	10,000	14,000	20,000	25,000	30,000
Collector (no center lane)	4 lanes	64/84	5,000	7,000		13,000	15,000
continuous left-turn lane)	2 lanes	50/70			10,000		
Collector (no fronting property)	2 lanes	40/60	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	50/70	2,500	3,500	5,000	6,500	8,000
Collector (multifamily)	2 lanes	40/60	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 lanes	36/56	—	—	2,200	—	—

LEGEND:

XXX/XXX = Curb to curb width (feet)/right-of-way width (feet): based on the City of San Diego Street Design. Manual

XX/XXX= Approximate recommended ADT based on the City of San Diego Street Design Manual.

NOTES:

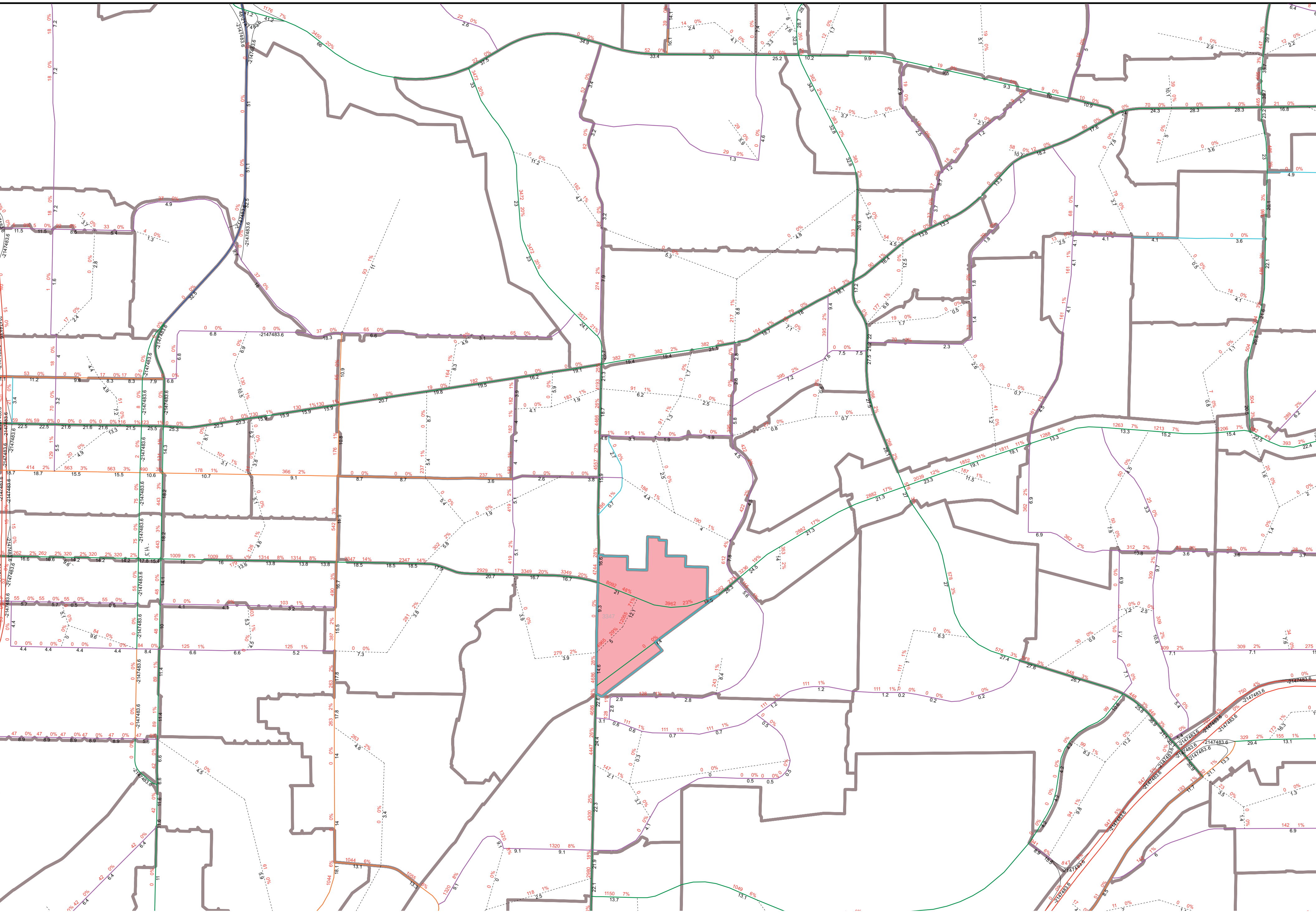
1. The volumes and the average daily level of service listed above are only intended as a general planning guideline.

2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

			LEVEL OF SERVICE				
STREET CLASSIFICATION	LANES	CROSS SECTIONS	A	B	C	D	E
Major Arterial	5 lanes		25,000	30,000	35,000	40,000	45,000

APPENDIX E

SELECT ZONE ASSIGNMENT OUTPUT



Existing Movement Volume

INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	1089		46					444	383	55	992	
2		978	75	21	380					63		41
3	235	642	113	104	290	73	57	259	128	90	388	316
4	37	905	71	108	355	21	31	62	35	61	49	114
5	50	16	76	42	12	33	15	73	4	8	114	15
6	45	209	106	35	156	38	35	347	32	117	459	59
7	42	49	86	65	42	74	69	370	20	47	525	96
8	208	502	29	170	286	134	112	342	94	35	412	320
9					111			523				
10	216	58	88	36	22	53	36	538	117	45	567	43
11	58	1	20	17	2	9	3	601	28	31	653	8
12	180	815	156	125	345	93	150	355	121	140	419	137
13	75	30	22	25	26	37	20	474	32	17	514	19
14		766	155	13	407					107		8
15	3	690	45	49	405	15	49	10	6	69		145
16	21	616	58	28	449	15	64	22	20	77	24	44
17	14	450	64	76	459	17	34	40	36	121	80	203

Derectional volume				Leg Growth				Future Derectional Volume				Future Derectional Volume			
NB	SB	EB	WB	N Leg	S Leg	E Leg	W Leg	NB	SB	EB	WB	NB	SB	EB	WB
1135	0	827	1047	0	1	0	0	1748	0	1100	1393	613	0	273	346
1053	401	0	104	0	0	2	0	1116	453	0	267	63	52	0	163
990	467	444	794	0	0	0	0	1327	495	457	953	337	28	13	159
1013	484	128	224	0	0	0	0	1357	649	146	309	344	165	18	85
142	87	92	137	0	1	0	0	253	95	110	178	111	8	18	41
360	229	414	635	0	0	0	0	457	268	468	794	97	39	54	159
177	181	459	668	0	0	0	0	195	185	514	755	18	4	55	87
739	590	548	767	0	0	0	0	909	844	625	890	170	254	77	123
0	111	523	0	0	0	0	1	0	133	858	0	0	22	335	0
362	111	691	655	0	0	0	0	518	162	829	740	156	51	138	85
79	28	632	692	0	0	0	0	87	31	670	734	8	3	38	42
1151	563	626	696	0	0	0	0	1266	619	689	766	115	56	63	70
127	88	526	550	0	0	0	0	144	114	668	627	17	26	142	77
921	420	0	115	0	0	0	0	939	466	0	115	18	46	0	0
738	469	65	214	0	0	0	0	1063	478	65	231	325	9	0	17
695	492	106	145	0	0	0	0	785	708	153	170	90	216	47	25
528	552	110	404	0	0	0	0	539	624	121	521	11	72	11	117

Movement Growth

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
232	0	232	0	0	0	0	104	223	283	131	0
0	5	522	2	2	0	0	0	0	6	0	13
17	35	157	33	33	1	1	6	16	186	8	17
45	136	160	65	65	22	7	8	7	34	11	34
19	8	31	10	10	1	1	5	24	54	7	3
18	25	43	19	19	7	14	24	26	78	30	42
8	1	10	1	1	2	3	30	20	32	42	5
29	138	34	80	80	43	62	15	24	39	21	100
0	0	0	13	13	21	60	0	191	0	0	0
31	94	19	28	28	10	84	16	75	46	17	52
2	4	2	1	1	1	17	9	17	19	10	19
38	38	38	19	19	19	21	21	21	23	23	23
8	9	3	5	5	13	79	28	26	14	36	43
68	4	0	2	2	171	0	0	0	0	0	0
0	12	56	41	41	0	0	0	0	75	0	1
54	54	15	27	27	129	28	8	6	3	15	15
2	3	12	3	3	16	3	13	0	5	27	37

Future Movement

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1321	0	278	0	0	0	0	548	606	338	1123	0
0	983	597	23	382	0	0	0	0	69	0	54
252	677	270	137	323	74	58	265	144	276	396	333
82	1041	231	173	420	43	38	70	42	95	60	148
69	24	107	52	22	34	16	78	28	62	121	18
63	234	149	54	175	45	49	371	58	195	489	101
50	50	96	66	43	76	72	400	40	79	567	101
237	640	63	250	366	177	174	357	118	74	433	420
0	0	0	0	124	0	0	523	0	0	0	0
247	152	107	64	50	63	120	554	192	91	584	95
60	5	22	18	3	10	20	610	45	50	663	27
218	853	194	144	364	112	171	376	142	163	442	160
83	39	25	30	31	50	99	502	58	31	550	62
0	770	155	15	409	0	0	0	0	107	0	8
3	702	101	90	446	15	49	10	6	144	0	146
75	670	73	55	476	144	92	30	26	80	39	59
16	453	76	79	462	33	37	53	36	126	107	240

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1325	0	280	0	0	0	0	550	610	340	1125	0
0	985	600	25	385	0	0	0	0	70	0	55
255	680	270	140	325	75	60	270	145	280	400	335
85	1045	235	175	425	45	40	75	45	95	65	150
70	25	110	55	25	35	20	80	30	65	125	20
65	235	150	55	180	50	50	375	60	195	490	105
55	55	100	70	45	80	75	400	45	80	570	105
240	640	65	250	370	180	175	360	120	75	435	420
0	0	0	0	125	0	0	525	0	0	0	0
250	155	110	65	50	65	120	555	195	95	585	95
60	5	25	20	5	10	25	610	50	50	665	30
220	855	195	145	365	115	175	380	145	165	445	165
85	40	30	30	35	50	100	505	60	35	555	65
0	775	160	15	410	0	0	0	0	110	0	10
5	705	105	95	450	20	50	10	10	145	0	150
75	670	75	55	480	145	95	30	30	85	40	60
20	455	80	80	465	35	40	55	40	130	110	245

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
0.31	0.29	0.08	0.05	0.02	0.01	0.00	0.00	0.08	0.07	0.02	0.01
0.05	0.05	0.10	0.08	0.00	0.00	0.01	0.00	0.01	0.01	0.03	0.02
0.05	0.05	0.10	0.10	0.00	0.00	0.01	0.01	0.01	0.01	0.03	0.03
0.05	0.05	0.16	0.10	0.00	0.00	0.01	0.01	0.01	0.01	0.04	0.03
0.05	0.05	0.16	0.16	0.00	0.00	0.01	0.01	0.01	0.01	0.04	0.04
0.10	0.10	0.33	0.16	0.01	0.01	0.02	0.01	0.03	0.03	0.08	0.04
0.10	0.10	0.33	0.33	0.01	0.01	0.02	0.02	0.03	0.03	0.08	0.08
0.00	0.05	0.33	0.33	0.00	0.00	0.02	0.02	0.00	0.01	0.08	0.08
0.05	0.00	0.33	0.33	0.00	0.00	0.02	0.02	0.01	0.00	0.08	0.08
0.00	0.05	0.33	0.33	0.00	0.00	0.02	0.02	0.00	0.01	0.08	0.08
0.10	0.00	0.33	0.33	0.01	0.00	0.02	0.02	0.03	0.00	0.08	0.08
0.00	0.05	0.33	0.33	0.00	0.00	0.02	0.02	0.00	0.01	0.08	0.08
0.10	0.10	0.33	0.36	0.01	0.01	0.02	0.02	0.03	0.03	0.08	0.09
0.10	0.10	0.36	0.36	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.00	0.05	0.36	0.30	0.00	0.00	0.02	0.02	0.00	0.01	0.09	0.08
0.05	0.00	0.36	0.36	0.00	0.00	0.02	0.02	0.01	0.00	0.09	0.09
0.00	0.05	0.36	0.16	0.00	0.00	0.02	0.01	0.00	0.01	0.09	0.04
0.15	0.15	0.16	0.09	0.01	0.01	0.01	0.00	0.04	0.04	0.04	0.02
0.05	0.05	0.09	0.09	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02
0.10	0.05	0.09	0.09	0.01	0.00	0.00	0.00	0.03	0.01	0.02	0.02
0.00	0.05	0.09	0.35	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.09
0.05	0.05	0.35	0.35	0.00	0.00	0.02	0.02	0.01	0.01	0.09	0.09
0.10	0.10	0.29	0.35	0.01	0.01	0.01	0.02	0.03	0.03	0.07	0.09
0.05	0.05	0.29	0.18	0.00	0.00	0.01	0.01	0.01	0.01	0.07	0.05
0.05	0.10	0.28	0.29	0.00	0.01	0.01	0.01	0.01	0.03	0.07	0.07
0.05	0.20	0.26	0.28	0.00	0.01	0.01	0.01	0.01	0.05	0.07	0.07
0.05	0.05	0.59	0.00	0.00	0.00	0.03	0.00	0.01	0.01	0.15	0.00
0.10	0.10	0.30	0.59	0.01	0.01	0.02	0.03	0.03	0.03	0.08	0.15
0.10	0.10	0.39	0.11	0.01	0.01	0.02	0.01	0.03	0.03	0.10	0.03
0.10	0.05	0.10	0.39	0.01	0.00	0.01	0.02	0.03	0.01	0.03	0.10
0.31	0.31	0.10	0.05	0.02	0.02	0.01	0.00	0.08	0.08	0.03	0.01
0.05	0.05	0.30	0.05	0.00	0.00	0.02	0.00	0.01	0.01	0.08	0.01
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.05	0.05	0.34	0.34	0.00	0.00	0.02	0.02	0.01	0.01	0.09	0.09
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.15	0.15	0.34	0.34	0.01	0.01	0.02	0.02	0.04	0.04	0.09	0.09
0.05	0.05	0.34	0.34	0.00	0.00	0.02	0.02	0.01	0.01	0.09	0.09
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.05	0.05	0.34	0.34	0.00	0.00	0.02	0.02	0.01	0.01	0.09	0.09
0.37	0.37	0.31	0.23	0.02	0.02	0.02	0.01	0.09	0.09	0.08	0.06
0.05	0.05	0.27	0.31	0.00	0.00	0.01	0.02	0.01	0.01	0.07	0.08
0.10	0.10	0.30	0.27	0.01	0.01	0.02	0.01	0.03	0.03	0.08	0.07
0.05	0.05	0.21	0.30	0.00	0.00	0.01	0.02	0.01	0.01	0.05	0.08
0.10	0.10	0.21	0.21	0.01	0.01	0.01	0.01	0.03	0.03	0.05	0.05
0.15	0.15	0.09	0.21	0.01	0.01	0.00	0.01	0.04	0.04	0.02	0.05
0.05	0.05	0.05	0.09	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02
0.10	0.10	0.17	0.05	0.01	0.01	0.01	0.00	0.03	0.03	0.04	0.01
0.10	0.10	0.26	0.17	0.01	0.01	0.01	0.01	0.03	0.03	0.07	0.04
0.37	0.31	0.10	0.10	0.02	0.02	0.01	0.01	0.09	0.08	0.03	0.03

Existing Movement Volume

INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	111	351	152	155	301	71	117	569	121	79	420	81
2	33	106	117	37	72	23	32	817	36	74	523	21
3	34	4	46	6	7	23	34	831	86	36	604	18
4	59	19	11	40	35	41	32	843	13	16	577	20
5	5	3	6	6	4	20	25	767	37	20	555	21
6	49	135	32	171	136	66	87	640	39	12	490	62
7	7	2	25	23	8	32	22	786	33	21	523	17
8	15		52					760	80	47	591	
9				4		26	31	797			598	11
10	8		14					868	16	30	602	
11				17		44	27	847			591	18
12	12		42					809	36	44	580	
13	9		37	16	1	57	54	796	14	23	557	40
14	107	78	42	32	73	35	13	645	131	32	467	28
15	11		36					708	31	38	554	
16				18		35	38	706			556	17
17	6		54					670	55	11	567	

Derectional volume				Leg Growth				Future Derectional Volume				Future Derectional Volume		
NB	SB	EB	WB	N Leg	S Leg	E Leg	W Leg	NB	SB	EB	WB	NB	SB	EB
614	527	807	580	0	0	0	0	792	690	847	626	178	163	40
256	132	885	618	0	0	0	0	269	139	956	680	13	7	71
84	36	951	658	0	0	0	0	88	38	1046	724	4	2	95
89	116	888	613	0	0	0	0	93	122	977	711	4	6	89
14	30	829	596	0	0	0	0	15	32	962	691	1	2	133
216	373	766	564	0	0	0	0	238	410	889	750	22	37	123
34	63	841	561	0	0	0	0	37	69	1119	746	3	6	278
67	0	840	638	0	0	0	0	70	0	1117	849	3	0	277
0	30	828	609	0	0	0	0	0	32	1101	810	0	2	273
22	0	884	632	0	0	0	0	23	0	1176	841	1	0	292
0	61	874	609	0	0	0	0	0	67	1162	810	0	6	288
54	0	845	624	0	0	0	0	57	0	1124	830	3	0	279
46	74	864	620	0	0	0	0	51	81	1175	825	5	7	311
227	140	789	527	0	0	0	0	250	154	1073	717	23	14	284
47	0	739	592	0	0	0	0	49	0	961	805	2	0	222
0	53	744	573	0	0	0	0	0	56	1012	779	0	3	268
60	0	725	578	0	0	0	0	63	0	841	786	3	0	116

WB
46
62
66
98
95
186
185
211
201
209
201
206
205
190
213
206
208

Movement Growth

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
13	131	22	108	108	12	30	5	27	31	3	34
5	3	7	1	1	3	15	39	15	13	25	13
2	1	2	0	0	1	19	48	19	13	33	13
2	1	4	1	1	2	14	71	14	16	38	16
0	0	0	0	0	1	18	82	18	13	59	13
7	4	20	6	6	11	21	112	21	32	56	32
2	0	2	1	1	4	37	173	37	24	115	24
3	0	3	0	0	0	0	241	21	16	183	0
0	0	0	0	0	1	21	237	0	0	175	15
1	0	1	0	0	0	0	253	22	16	181	0
0	0	0	0	0	5	44	221	0	0	154	30
2	0	2	0	0	0	0	242	21	16	179	0
3	1	3	1	1	5	39	183	39	26	139	26
15	3	15	2	2	9	35	183	35	23	122	23
2	0	2	0	0	0	0	228	17	16	156	0
0	0	0	0	0	2	19	235	0	0	181	14
1	0	5	0	0	0	0	199	11	20	81	0

Future Movement

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
124	482	174	263	409	83	147	574	148	110	423	115
38	109	124	38	73	26	47	856	51	87	548	34
36	5	48	6	7	24	53	879	105	49	637	31
61	20	15	41	36	43	46	914	27	32	615	36
5	3	6	6	4	21	43	849	55	33	614	34
56	139	52	177	142	77	108	752	60	44	546	94
9	2	27	24	9	36	59	959	70	45	638	41
18	0	55	0	0	0	0	1001	101	63	774	0
0	0	0	4	0	27	52	1034	0	0	773	26
9	0	15	0	0	0	0	1121	38	46	783	0
0	0	0	17	0	49	71	1068	0	0	745	48
14	0	44	0	0	0	0	1051	57	60	759	0
12	0	40	17	2	62	93	979	53	49	696	66
122	81	57	34	75	44	48	828	166	55	589	51
13	0	38	0	0	0	0	936	48	54	710	0
0	0	0	18	0	37	57	941	0	0	737	31
7	0	59	0	0	0	0	869	66	31	648	0

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
130	490	180	270	410	90	150	580	150	110	430	120
40	110	130	40	80	30	50	860	60	90	550	40
40	10	50	10	10	30	60	880	110	50	640	40
70	20	20	50	40	50	50	920	30	40	620	40
10	10	10	10	10	30	50	850	60	40	620	40
60	140	60	180	150	80	110	760	60	50	550	100
10	10	30	30	10	40	60	960	70	50	640	50
20	0	60	0	0	0	0	1010	110	70	780	0
0	0	0	10	0	30	60	1040	0	0	780	30
10	0	20	0	0	0	0	1130	40	50	790	0
0	0	0	20	0	50	80	1070	0	0	750	50
20	0	50	0	0	0	0	1060	60	60	760	0
20	0	40	20	10	70	100	980	60	50	700	70
130	90	60	40	80	50	50	830	170	60	590	60
20	0	40	0	0	0	0	940	50	60	710	0
0	0	0	20	0	40	60	950	0	0	740	40
10	0	60	0	0	0	0	870	70	40	650	0

135	0	185	0	0	0	0	580	155
0	115	135	40	85	0	0	0	0
45	15	55	15	15	35	65	880	115
75	25	25	55	45	50	50	920	35
15	15	15	15	15	35	50	850	60
65	145	65	180	155	80	110	760	65
15	15	35	35	15	45	65	960	70
25	5	65	5	5	5	5	1010	115
0	0	0	0	5	0	0	1040	0
15	5	25	5	5	5	5	1130	45
5	5	5	25	5	50	80	1070	5
25	5	55	5	5	5	5	1060	65
25	5	40	25	15	70	105	980	65
0	95	65	40	85	0	0	0	0
20	5	45	5	5	5	5	940	50
5	5	5	25	5	45	65	950	5
15	5	65	5	5	5	5	870	70

115	435	0
90	0	45
55	640	45
45	620	45
45	620	40
55	550	105
55	640	55
75	780	5
0	0	0
55	790	5
5	750	50
65	760	5
50	700	70
65	0	60
65	0	5
5	740	45
45	650	5

Existing Movement Volume

INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	616		66					1057	1133	100	763	
2		576	83	61	1004					60		39
3	171	381	108	281	683	105	105	581	282	119	471	196
4	70	568	28	116	941	45	20	28	70	36	23	91
5	72	28	45	15	37	32	25	39	7	8	48	18
6	43	202	135	39	240	43	74	521	87	158	533	39
7	40	51	78	95	51	52	65	685	37	47	616	55
8	223	431	61	477	592	184	126	647	254	128	568	309
9					170			1106				
10	210	30	88	36	22	53	74	1025	247	59	803	43
11	34	1	37	17	2	14	10	990	59	45	783	20
12	236	528	207	227	652	246	232	555	312	243	420	194
13	66	46	22	37	35	51	40	723	68	25	566	26
14		686	237	6	920					162		15
15	5	672	51	141	801	35	39	2	5	70		104
16	42	642	110	39	795	43	57	30	28	80	22	34
17	26	624	106	177	695	38	20	67	32	77	81	149

Derectional volume				Leg Growth				Future Derectional Volume				Future Derectional Volume			
NB	SB	EB	WB	N Leg	S Leg	E Leg	W Leg	NB	SB	EB	WB	NB	SB	EB	WB
682	0	2190	863	0	1	0	0	1050	0	2913	1148	368	0	723	285
659	1065	0	99	0	0	2	0	699	1203	0	254	40	138	0	155
660	1069	968	786	0	0	0	0	884	1133	997	943	224	64	29	157
666	1102	118	150	0	0	0	0	892	1477	135	207	226	375	17	57
145	84	71	74	0	1	0	0	258	92	85	96	113	8	14	22
380	322	682	730	0	0	0	0	483	377	771	913	103	55	89	183
169	198	787	718	0	0	0	0	186	202	881	811	17	4	94	93
715	1253	1027	1005	0	0	0	0	879	1792	1171	1166	164	539	144	161
0	170	1106	0	0	0	0	1	0	204	1814	0	0	34	708	0
328	111	1346	905	0	0	0	0	469	162	1615	1023	141	51	269	118
72	33	1059	848	0	0	0	0	79	36	1123	899	7	3	64	51
971	1125	1099	857	0	0	0	0	1068	1238	1209	943	97	113	110	86
134	123	831	617	0	0	0	0	151	160	1055	703	17	37	224	86
923	926	0	177	0	0	0	0	941	1028	0	177	18	102	0	0
728	977	46	174	0	0	0	0	1048	997	46	188	320	20	0	14
794	877	115	136	0	0	0	0	897	1263	166	159	103	386	51	23
756	910	119	307	0	0	0	0	771	1028	131	396	15	118	12	89

Movement Growth

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
140	0	140	0	0	0	0	274	591	233	108	0
0	3	327	5	5	0	0	0	0	5	0	12
11	24	104	75	75	3	3	14	34	184	8	17
30	90	105	148	148	49	7	8	7	23	8	23
19	8	32	10	10	1	1	4	19	29	4	2
19	27	45	27	27	10	23	39	44	90	34	48
8	1	9	1	1	2	5	51	35	35	45	5
28	133	33	170	170	92	117	29	45	51	27	130
0	0	0	19	19	32	126	0	404	0	0	0
28	85	17	28	28	10	163	32	147	64	23	71
2	3	2	2	2	1	29	15	29	23	12	23
32	32	32	38	38	38	37	37	37	29	29	29
8	10	3	7	7	17	125	45	41	16	41	48
68	4	0	3	3	376	0	0	0	0	0	0
0	12	56	86	86	0	0	0	0	61	0	1
61	61	17	48	48	229	30	9	6	3	14	14
3	5	18	5	5	27	4	14	0	3	20	28

Future Movement

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
756	0	206	0	0	0	0	1331	1724	333	871	0
0	579	410	66	1009	0	0	0	0	65	0	51
182	405	212	356	758	108	108	595	316	303	479	213
100	658	133	264	1089	94	27	36	77	59	31	114
91	36	77	25	47	33	26	43	26	37	52	20
62	229	180	66	267	53	97	560	131	248	567	87
48	52	87	96	52	54	70	736	72	82	661	60
251	564	94	647	762	276	243	676	299	179	595	439
0	0	0	0	189	0	0	1106	0	0	0	0
238	115	105	64	50	63	237	1057	394	123	826	114
36	4	39	19	4	15	39	1005	88	68	795	43
268	560	239	265	690	284	269	592	349	272	449	223
74	56	25	44	42	68	165	768	109	41	607	74
0	690	237	9	923	0	0	0	0	162	0	15
5	684	107	227	887	35	39	2	5	131	0	105
103	703	127	87	843	272	87	39	34	83	36	48
29	629	124	182	700	65	24	81	32	80	101	177

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
760	0	210	0	0	0	0	1335	1725	335	875	0
0	580	410	70	1010	0	0	0	0	70	0	55
185	405	215	360	760	110	110	595	320	305	480	215
100	660	135	265	1090	95	30	40	80	60	35	115
95	40	80	25	50	35	30	45	30	40	55	20
65	230	180	70	270	55	100	560	135	250	570	90
50	55	90	100	55	55	75	740	75	85	665	65
255	565	95	650	765	280	245	680	300	180	600	440
0	0	0	0	190	0	0	1110	0	0	0	0
240	120	105	65	50	65	240	1060	395	125	830	115
40	5	40	20	5	15	40	1005	90	70	795	45
270	565	240	265	690	285	270	595	350	275	450	225
75	60	30	45	45	70	165	770	110	45	610	75
0	695	240	10	925	0	0	0	0	165	0	20
10	685	110	230	890	40	40	5	10	135	0	105
105	705	130	90	845	275	90	40	35	85	40	50
30	630	125	185	700	65	25	85	35	85	105	180

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
0.31	0.29	0.08	0.05	0.02	0.01	0.00	0.00	0.08	0.07	0.02	0.01
0.05	0.05	0.10	0.08	0.00	0.00	0.01	0.00	0.01	0.01	0.03	0.02
0.05	0.05	0.10	0.10	0.00	0.00	0.01	0.01	0.01	0.01	0.03	0.03
0.05	0.05	0.16	0.10	0.00	0.00	0.01	0.01	0.01	0.01	0.04	0.03
0.05	0.05	0.16	0.16	0.00	0.00	0.01	0.01	0.01	0.01	0.04	0.04
0.10	0.10	0.33	0.16	0.01	0.01	0.02	0.01	0.03	0.03	0.08	0.04
0.10	0.10	0.33	0.33	0.01	0.01	0.02	0.02	0.03	0.03	0.08	0.08
0.00	0.05	0.33	0.33	0.00	0.00	0.02	0.02	0.00	0.01	0.08	0.08
0.05	0.00	0.33	0.33	0.00	0.00	0.02	0.02	0.01	0.00	0.08	0.08
0.00	0.05	0.33	0.33	0.00	0.00	0.02	0.02	0.00	0.01	0.08	0.08
0.10	0.00	0.33	0.33	0.01	0.00	0.02	0.02	0.03	0.00	0.08	0.08
0.00	0.05	0.33	0.33	0.00	0.00	0.02	0.02	0.00	0.01	0.08	0.08
0.10	0.10	0.33	0.36	0.01	0.01	0.02	0.02	0.03	0.03	0.08	0.09
0.10	0.10	0.36	0.36	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.00	0.05	0.36	0.30	0.00	0.00	0.02	0.02	0.00	0.01	0.09	0.08
0.05	0.00	0.36	0.36	0.00	0.00	0.02	0.02	0.01	0.00	0.09	0.09
0.00	0.05	0.36	0.16	0.00	0.00	0.02	0.01	0.00	0.01	0.09	0.04
0.15	0.15	0.16	0.09	0.01	0.01	0.01	0.00	0.04	0.04	0.04	0.02
0.05	0.05	0.09	0.09	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02
0.10	0.05	0.09	0.09	0.01	0.00	0.00	0.00	0.03	0.01	0.02	0.02
0.00	0.05	0.09	0.35	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.09
0.05	0.05	0.35	0.35	0.00	0.00	0.02	0.02	0.01	0.01	0.09	0.09
0.10	0.10	0.29	0.35	0.01	0.01	0.01	0.02	0.03	0.03	0.07	0.09
0.05	0.05	0.29	0.18	0.00	0.00	0.01	0.01	0.01	0.01	0.07	0.05
0.05	0.10	0.28	0.29	0.00	0.01	0.01	0.01	0.01	0.03	0.07	0.07
0.05	0.20	0.26	0.28	0.00	0.01	0.01	0.01	0.01	0.05	0.07	0.07
0.05	0.05	0.59	0.00	0.00	0.00	0.03	0.00	0.01	0.01	0.15	0.00
0.10	0.10	0.30	0.59	0.01	0.01	0.02	0.03	0.03	0.03	0.08	0.15
0.10	0.10	0.39	0.11	0.01	0.01	0.02	0.01	0.03	0.03	0.10	0.03
0.10	0.05	0.10	0.39	0.01	0.00	0.01	0.02	0.03	0.01	0.03	0.10
0.31	0.31	0.10	0.05	0.02	0.02	0.01	0.00	0.08	0.08	0.03	0.01
0.05	0.05	0.30	0.05	0.00	0.00	0.02	0.00	0.01	0.01	0.08	0.01
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.05	0.05	0.34	0.34	0.00	0.00	0.02	0.02	0.01	0.01	0.09	0.09
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.15	0.15	0.34	0.34	0.01	0.01	0.02	0.02	0.04	0.04	0.09	0.09
0.05	0.05	0.34	0.34	0.00	0.00	0.02	0.02	0.01	0.01	0.09	0.09
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.10	0.10	0.34	0.34	0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.09
0.05	0.05	0.34	0.34	0.00	0.00	0.02	0.02	0.01	0.01	0.09	0.09
0.37	0.37	0.31	0.23	0.02	0.02	0.02	0.01	0.09	0.09	0.08	0.06
0.05	0.05	0.27	0.31	0.00	0.00	0.01	0.02	0.01	0.01	0.07	0.08
0.10	0.10	0.30	0.27	0.01	0.01	0.02	0.01	0.03	0.03	0.08	0.07
0.05	0.05	0.21	0.30	0.00	0.00	0.01	0.02	0.01	0.01	0.05	0.08
0.10	0.10	0.21	0.21	0.01	0.01	0.01	0.01	0.03	0.03	0.05	0.05
0.15	0.15	0.09	0.21	0.01	0.01	0.00	0.01	0.04	0.04	0.02	0.05
0.05	0.05	0.05	0.09	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02
0.10	0.10	0.17	0.05	0.01	0.01	0.01	0.00	0.03	0.03	0.04	0.01
0.10	0.10	0.26	0.17	0.01	0.01	0.01	0.01	0.03	0.03	0.07	0.04
0.37	0.31	0.10	0.10	0.02	0.02	0.01	0.01	0.09	0.08	0.03	0.03

Existing Movement Volume

INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	111	351	152	155	301	71	117	569	121	79	420	81
2	33	106	117	37	72	23	32	817	36	74	523	21
3	34	4	46	6	7	23	34	831	86	36	604	18
4	59	19	11	40	35	41	32	843	13	16	577	20
5	5	3	6	6	4	20	25	767	37	20	555	21
6	49	135	32	171	136	66	87	640	39	12	490	62
7	7	2	25	23	8	32	22	786	33	21	523	17
8	15		52					760	80	47	591	
9				4		26	31	797			598	11
10	8		14					868	16	30	602	
11				17		44	27	847			591	18
12	12		42					809	36	44	580	
13	9		37	16	1	57	54	796	14	23	557	40
14	107	78	42	32	73	35	13	645	131	32	467	28
15	11		36					708	31	38	554	
16				18		35	38	706			556	17
17	6		54					670	55	11	567	

Derectional volume				Leg Growth				Future Derectional Volume				Future Derectional Volume			
NB	SB	EB	WB	N Leg	S Leg	E Leg	W Leg	NB	SB	EB	WB	NB	SB	EB	WB
614	527	807	580	0	0	0	0	792	690	847	626	178	163	40	46
256	132	885	618	0	0	0	0	269	139	956	680	13	7	71	62
84	36	951	658	0	0	0	0	88	38	1046	724	4	2	95	66
89	116	888	613	0	0	0	0	93	122	977	711	4	6	89	98
14	30	829	596	0	0	0	0	15	32	962	691	1	2	133	95
216	373	766	564	0	0	0	0	238	410	889	750	22	37	123	186
34	63	841	561	0	0	0	0	37	69	1119	746	3	6	278	185
67	0	840	638	0	0	0	0	70	0	1117	849	3	0	277	211
0	30	828	609	0	0	0	0	0	32	1101	810	0	2	273	201
22	0	884	632	0	0	0	0	23	0	1176	841	1	0	292	209
0	61	874	609	0	0	0	0	0	67	1162	810	0	6	288	201
54	0	845	624	0	0	0	0	57	0	1124	830	3	0	279	206
46	74	864	620	0	0	0	0	51	81	1175	825	5	7	311	205
227	140	789	527	0	0	0	0	250	154	1073	717	23	14	284	190
47	0	739	592	0	0	0	0	49	0	961	805	2	0	222	213
0	53	744	573	0	0	0	0	0	56	1012	779	0	3	268	206
60	0	725	578	0	0	0	0	63	0	841	786	3	0	116	208

Movement Growth

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
13	131	22	108	108	12	30	5	27	31	3	34
5	3	7	1	1	3	15	39	15	13	25	13
2	1	2	0	0	1	19	48	19	13	33	13
2	1	4	1	1	2	14	71	14	16	38	16
0	0	0	0	0	1	18	82	18	13	59	13
7	4	20	6	6	11	21	112	21	32	56	32
2	0	2	1	1	4	37	173	37	24	115	24
3	0	3	0	0	0	0	241	21	16	183	0
0	0	0	0	0	1	21	237	0	0	175	15
1	0	1	0	0	0	0	253	22	16	181	0
0	0	0	0	0	5	44	221	0	0	154	30
2	0	2	0	0	0	0	242	21	16	179	0
3	1	3	1	1	5	39	183	39	26	139	26
15	3	15	2	2	9	35	183	35	23	122	23
2	0	2	0	0	0	0	228	17	16	156	0
0	0	0	0	0	2	19	235	0	0	181	14
1	0	5	0	0	0	0	199	11	20	81	0

Future Movement

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
124	482	174	263	409	83	147	574	148	110	423	115
38	109	124	38	73	26	47	856	51	87	548	34
36	5	48	6	7	24	53	879	105	49	637	31
61	20	15	41	36	43	46	914	27	32	615	36
5	3	6	6	4	21	43	849	55	33	614	34
56	139	52	177	142	77	108	752	60	44	546	94
9	2	27	24	9	36	59	959	70	45	638	41
18	0	55	0	0	0	0	1001	101	63	774	0
0	0	0	4	0	27	52	1034	0	0	773	26
9	0	15	0	0	0	0	1121	38	46	783	0
0	0	0	17	0	49	71	1068	0	0	745	48
14	0	44	0	0	0	0	1051	57	60	759	0
12	0	40	17	2	62	93	979	53	49	696	66
122	81	57	34	75	44	48	828	166	55	589	51
13	0	38	0	0	0	0	936	48	54	710	0
0	0	0	18	0	37	57	941	0	0	737	31
7	0	59	0	0	0	0	869	66	31	648	0

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
130	490	180	270	410	90	150	580	150	110	430	120
40	110	130	40	80	30	50	860	60	90	550	40
40	10	50	10	10	30	60	880	110	50	640	40
70	20	20	50	40	50	50	920	30	40	620	40
10	10	10	10	10	30	50	850	60	40	620	40
60	140	60	180	150	80	110	760	60	50	550	100
10	10	30	30	10	40	60	960	70	50	640	50
20	0	60	0	0	0	0	1010	110	70	780	0
0	0	0	10	0	30	60	1040	0	0	780	30
10	0	20	0	0	0	0	1130	40	50	790	0
0	0	0	20	0	50	80	1070	0	0	750	50
20	0	50	0	0	0	0	1060	60	60	760	0
20	0	40	20	10	70	100	980	60	50	700	70
130	90	60	40	80	50	50	830	170	60	590	60
20	0	40	0	0	0	0	940	50	60	710	0
0	0	0	20	0	40	60	950	0	0	740	40
10	0	60	0	0	0	0	870	70	40	650	0

NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR
135	0	185	0	0	0	0	585	155
0	115	135	45	85	0	0	0	0
45	15	55	15	15	35	65	880	115
75	25	25	55	45	55	50	920	35
15	15	15	15	15	35	50	850	60
65	145	65	180	155	80	110	760	65
15	15	35	35	15	45	65	960	75
25	5	65	5	5	5	5	1010	115
0	0	0	0	5	0	0	1045	0
15	5	25	5	5	5	5	1130	45
5	5	5	25	5	50	80	1070	5
25	5	55	5	5	5	5	1060	65
25	5	40	25	15	75	105	980	65
0	95	65	40	85	0	0	0	0
20	5	45	5	5	5	5	940	50
5	5	5	25	5	45	65	950	5
15	5	65	5	5	5	5	870	70

WBL	WBT	WBR
115	435	0
90	0	45
55	640	45
45	620	45
45	620	40
55	555	100
55	645	55
75	780	5
0	0	0
55	795	5
5	755	50
65	760	5
50	700	75
65	0	60
65	0	5
5	740	45
45	650	5

APPENDIX F

PEAK HOUR INTERSECTION LOS WORKSHEETS
FUTURE YEAR BASE CONDITIONS

2035 Base AM
1: Collwood Bl & Montezuma Rd

11/3/2012

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Volume (vph)	650	495	235	1225	1300	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	714	544	258	1346	1429	154
RTOR Reduction (vph)	0	13	0	0	0	68
Lane Group Flow (vph)	714	531	258	1346	1429	86
Turn Type	NA	pm+ov	Prot	NA	NA	Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	32.4	89.1	22.0	58.4	56.7	56.7
Effective Green, g (s)	34.5	89.9	22.4	60.9	57.1	57.1
Actuated g/C Ratio	0.27	0.71	0.18	0.48	0.45	0.45
Clearance Time (s)	6.1	4.4	4.4	6.5	4.4	4.4
Vehicle Extension (s)	4.3	2.0	2.0	4.8	2.0	2.0
Lane Grp Cap (vph)	969	1129	315	1711	1556	717
v/s Ratio Prot	0.20	0.21	0.15	c0.38	c0.42	
v/s Ratio Perm		0.12				0.05
v/c Ratio	0.74	0.47	0.82	0.79	0.92	0.12
Uniform Delay, d1	41.6	7.8	49.8	27.1	32.3	19.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	0.1	14.5	3.7	8.8	0.0
Delay (s)	46.6	7.9	64.3	30.9	41.1	19.9
Level of Service	D	A	E	C	D	B
Approach Delay (s)	29.9			36.2	39.0	
Approach LOS	C			D	D	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	126.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Volume (vph)	65	150	1150	144	50	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	68	156	1198	150	52	484
RTOR Reduction (vph)	0	135	0	130	0	0
Lane Group Flow (vph)	68	21	1198	20	52	484
Turn Type	NA	Perm	NA	Over	Prot	NA
Protected Phases	3		2	3	1	6
Permitted Phases		3				
Actuated Green, G (s)	9.4	9.4	43.5	9.4	4.6	52.1
Effective Green, g (s)	9.4	9.4	44.0	9.4	4.6	52.6
Actuated g/C Ratio	0.13	0.13	0.63	0.13	0.07	0.75
Clearance Time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Vehicle Extension (s)	2.0	2.0	3.7	2.0	2.0	3.7
Lane Grp Cap (vph)	238	213	2225	213	116	2659
v/s Ratio Prot	c0.04		c0.34	0.01	c0.03	0.14
v/s Ratio Perm		0.01				
v/c Ratio	0.29	0.10	0.54	0.09	0.45	0.18
Uniform Delay, d1	27.3	26.6	7.3	26.6	31.5	2.5
Progression Factor	1.00	1.00	1.73	2.35	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.6	0.0	1.0	0.2
Delay (s)	27.5	26.7	13.2	62.5	32.5	2.7
Level of Service	C	C	B	E	C	A
Approach Delay (s)	26.9		18.7			5.5
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰	↑↑	↱
Volume (vph)	160	330	140	175	400	435	245	700	260	140	305	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3395		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	3395		1770	3539	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	351	149	186	426	463	261	745	277	149	324	96
RTOR Reduction (vph)	0	0	102	0	0	201	0	27	0	0	0	63
Lane Group Flow (vph)	170	351	47	186	426	262	261	995	0	149	324	33
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	16.0	44.5	44.5	16.8	44.0	44.0	14.0	46.2		14.8	47.1	47.1
Effective Green, g (s)	16.4	44.4	44.4	17.2	45.2	45.2	14.4	47.2		15.2	48.0	48.0
Actuated g/C Ratio	0.12	0.32	0.32	0.12	0.32	0.32	0.10	0.34		0.11	0.34	0.34
Clearance Time (s)	4.4	3.9	3.9	4.4	5.2	5.2	4.4	5.0		4.4	4.9	4.9
Vehicle Extension (s)	1.5	3.7	3.7	1.5	3.7	3.7	1.5	3.7		1.5	3.7	3.7
Lane Grp Cap (vph)	207	1122	502	217	1143	511	353	1145		192	1213	543
v/s Ratio Prot	0.10	0.10		c0.11	0.12		0.08	c0.29		c0.08	0.09	
v/s Ratio Perm			0.03			c0.17						0.02
v/c Ratio	0.82	0.31	0.09	0.86	0.37	0.51	0.74	0.87		0.78	0.27	0.06
Uniform Delay, d1	60.4	36.2	33.6	60.2	36.5	38.5	61.0	43.5		60.7	33.3	30.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	0.94	0.88
Incremental Delay, d2	21.3	0.7	0.4	25.9	0.9	3.6	6.8	7.4		16.1	0.1	0.1
Delay (s)	81.7	37.0	34.0	86.1	37.4	42.1	67.8	50.9		75.0	31.4	27.1
Level of Service	F	D	C	F	D	D	E	D		E	C	C
Approach Delay (s)		47.7			47.9			54.3			42.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	49.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	40	75	40	90	65	150	80	985	225	175	395	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.93		1.00	0.97		1.00	0.98	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1775			1714		1770	3440		1770	3485	
Flt Permitted		0.79			0.80		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1418			1390		1770	3440		1770	3485	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	47	88	47	106	76	176	94	1159	265	206	465	53
RTOR Reduction (vph)	0	14	0	0	39	0	0	18	0	0	7	0
Lane Group Flow (vph)	0	168	0	0	319	0	94	1406	0	206	511	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		26.3			26.3		8.1	44.2		14.9	50.8	
Effective Green, g (s)		27.2			27.2		8.5	45.5		15.3	52.3	
Actuated g/C Ratio		0.27			0.27		0.08	0.46		0.15	0.52	
Clearance Time (s)		4.9			4.9		4.4	5.3		4.4	5.5	
Vehicle Extension (s)		3.0			3.0		2.0	2.1		2.0	2.1	
Lane Grp Cap (vph)		386			378		150	1565		271	1823	
v/s Ratio Prot							0.05	c0.41		c0.12	0.15	
v/s Ratio Perm		0.12			c0.23							
v/c Ratio		0.44			0.84		0.63	0.90		0.76	0.28	
Uniform Delay, d1		30.1			34.4		44.2	25.1		40.6	13.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			15.6		5.8	8.6		10.7	0.4	
Delay (s)		30.9			50.0		50.0	33.7		51.3	13.7	
Level of Service		C			D		D	C		D	B	
Approach Delay (s)		30.9			50.0			34.7			24.4	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

5: 54th Pl & Orange Av

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	80	30	20	120	20	65	25	105	55	25	35
Peak Hour Factor	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Hourly flow rate (vph)	43	174	65	43	261	43	141	54	228	120	54	76

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	283	348	424	250
Volume Left (vph)	43	43	141	120
Volume Right (vph)	65	43	228	76
Hadj (s)	-0.07	-0.02	-0.22	-0.05
Departure Headway (s)	7.3	7.1	6.7	7.4
Degree Utilization, x	0.57	0.69	0.79	0.51
Capacity (veh/h)	441	465	507	420
Control Delay (s)	19.6	24.6	30.8	18.0
Approach Delay (s)	19.6	24.6	30.8	18.0
Approach LOS	C	C	D	C

Intersection Summary			
Delay	24.3		
HCM Level of Service	C		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

2035 Base AM
6: Euclid Ave & University Ave

11/3/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	50	365	60	185	470	95	65	235	145	50	180	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3464		1770	3450		1770	1756		1770	1802	
Flt Permitted	0.95	1.00		0.95	1.00		0.47	1.00		0.24	1.00	
Satd. Flow (perm)	1770	3464		1770	3450		875	1756		443	1802	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	54	392	65	199	505	102	70	253	156	54	194	54
RTOR Reduction (vph)	0	13	0	0	13	0	0	34	0	0	16	0
Lane Group Flow (vph)	54	444	0	199	594	0	70	375	0	54	232	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	5.0	32.2		15.1	42.3		24.5	24.5		24.5	24.5	
Effective Green, g (s)	5.4	33.1		15.5	43.2		25.4	25.4		25.4	25.4	
Actuated g/C Ratio	0.06	0.38		0.18	0.50		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.1		2.0	2.3		3.7	3.7		4.2	4.2	
Lane Grp Cap (vph)	111	1333		319	1733		258	519		131	532	
v/s Ratio Prot	0.03	0.13		c0.11	c0.17			c0.21			0.13	
v/s Ratio Perm							0.08			0.12		
v/c Ratio	0.49	0.33		0.62	0.34		0.27	0.72		0.41	0.44	
Uniform Delay, d1	39.0	18.7		32.6	12.9		23.2	27.1		24.3	24.5	
Progression Factor	1.00	1.00		0.76	0.97		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.7		2.6	0.5		0.7	5.2		3.2	0.9	
Delay (s)	40.2	19.3		27.4	13.0		23.9	32.3		27.5	25.4	
Level of Service	D	B		C	B		C	C		C	C	
Approach Delay (s)		21.5			16.6			31.1			25.8	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑↱			↰↑↱	
Volume (vph)	75	430	45	70	600	110	55	55	95	65	45	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.94			0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.98	
Frt	1.00	0.99		1.00	0.98			0.94			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3440		1770	3405			1600			1611	
Flt Permitted	0.95	1.00		0.95	1.00			0.79			0.69	
Satd. Flow (perm)	1770	3440		1770	3405			1283			1125	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	473	49	77	659	121	60	60	104	71	49	88
RTOR Reduction (vph)	0	5	0	0	10	0	0	50	0	0	43	0
Lane Group Flow (vph)	82	517	0	77	770	0	0	174	0	0	165	0
Confl. Peds. (#/hr)	30		48	48		30	78		113	113		78
Confl. Bikes (#/hr)			24			5			2			17
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	7.4	50.4		7.2	50.2			15.5			15.5	
Effective Green, g (s)	7.4	51.3		7.2	51.1			15.5			15.5	
Actuated g/C Ratio	0.09	0.60		0.08	0.59			0.18			0.18	
Clearance Time (s)	4.0	4.9		4.0	4.9			4.0			4.0	
Vehicle Extension (s)	2.0	4.1		2.0	4.1			2.0			2.0	
Lane Grp Cap (vph)	152	2052		148	2023			231			203	
v/s Ratio Prot	c0.05	0.15		0.04	c0.23							
v/s Ratio Perm								0.14			c0.15	
v/c Ratio	0.54	0.25		0.52	0.38			0.75			0.81	
Uniform Delay, d1	37.7	8.2		37.7	9.2			33.4			33.9	
Progression Factor	0.89	1.78		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.7	0.3		1.5	0.5			11.6			20.6	
Delay (s)	35.3	15.0		39.3	9.7			45.1			54.4	
Level of Service	D	B		D	A			D			D	
Approach Delay (s)		17.7			12.4			45.1			54.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2035 Base AM
8: 54th St & University Ave

11/3/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	175	365	115	75	435	345	235	635	65	210	365	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	0.94	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1509	1770	3539	1538	1770	3539	1492	3433	3539	1556
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1509	1770	3539	1538	1770	3539	1492	3433	3539	1556
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	180	376	119	77	448	356	242	655	67	216	376	186
RTOR Reduction (vph)	0	0	79	0	0	0	0	0	43	0	0	0
Lane Group Flow (vph)	180	376	40	77	448	356	242	655	24	216	376	186
Confl. Peds. (#/hr)			44			18			54			18
Turn Type	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Perm	Prot	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free			8			Free
Actuated Green, G (s)	11.3	28.3	28.3	5.0	22.0	86.3	14.6	24.8	24.8	9.4	19.6	86.3
Effective Green, g (s)	11.7	29.3	29.3	5.4	23.0	86.3	15.0	25.8	25.8	9.8	20.6	86.3
Actuated g/C Ratio	0.14	0.34	0.34	0.06	0.27	1.00	0.17	0.30	0.30	0.11	0.24	1.00
Clearance Time (s)	4.4	5.0	5.0	4.4	5.0		4.4	5.0	5.0	4.4	5.0	
Vehicle Extension (s)	2.0	3.5	3.5	2.0	3.7		3.0	3.5	3.5	2.0	3.5	
Lane Grp Cap (vph)	240	1202	512	111	943	1538	308	1058	446	390	845	1556
v/s Ratio Prot	c0.10	0.11		0.04	c0.13		c0.14	c0.19		0.06	0.11	
v/s Ratio Perm			0.03			0.23			0.02			0.12
v/c Ratio	0.75	0.31	0.08	0.69	0.48	0.23	0.79	0.62	0.05	0.55	0.44	0.12
Uniform Delay, d1	35.9	21.1	19.3	39.6	26.6	0.0	34.1	26.0	21.6	36.2	28.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	0.2	0.1	14.1	0.5	0.4	12.4	1.1	0.1	1.0	0.4	0.2
Delay (s)	47.0	21.2	19.4	53.7	27.1	0.4	46.5	27.2	21.6	37.2	28.4	0.2
Level of Service	D	C	B	D	C	A	D	C	C	D	C	A
Approach Delay (s)		27.8			18.6			31.6			24.1	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	86.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

9: Chollas Pkwy & University Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑	
Volume (veh/h)	0	600	0	0	0	0	0	0	0	0	140	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	645	0	0	0	0	0	0	0	0	151	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			645			720	645	323	323	645	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			645			720	645	323	323	645	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	*7.4	3.3
p0 queue free %	100			100			100	100	100	100	45	100
cM capacity (veh/h)	1622			936			177	389	673	607	272	1084

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	323	323	151
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	272
Volume to Capacity	0.19	0.19	0.55
Queue Length 95th (ft)	0	0	77
Control Delay (s)	0.0	0.0	33.5
Lane LOS			D
Approach Delay (s)	0.0		33.5
Approach LOS			D

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

2035 Base AM
10: 58th st & University Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑	↱		✥			✥	
Volume (vph)	60	580	160	95	600	95	245	155	110	65	50	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.95		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.98	
Satd. Flow (prot)	1770	5085	1545	1770	3539	1505		1752			1728	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.75			0.74	
Satd. Flow (perm)	1770	5085	1545	1770	3539	1505		1354			1310	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	65	624	172	102	645	102	263	167	118	70	54	65
RTOR Reduction (vph)	0	0	0	0	0	65	0	0	0	0	0	0
Lane Group Flow (vph)	65	624	172	102	645	37	0	548	0	0	189	0
Confl. Peds. (#/hr)			8			12	9		17	17		9
Confl. Bikes (#/hr)									2			6
Turn Type	Prot	NA	Free	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			4	
Permitted Phases			Free			6	4			4		
Actuated Green, G (s)	6.5	24.2	80.0	7.9	25.8	25.8		33.5			33.5	
Effective Green, g (s)	6.9	25.3	80.0	8.3	26.7	26.7		34.4			34.4	
Actuated g/C Ratio	0.09	0.32	1.00	0.10	0.33	0.33		0.43			0.43	
Clearance Time (s)	4.4	5.1		4.4	4.9	4.9		4.9			4.9	
Vehicle Extension (s)	2.0	3.5		2.0	3.5	3.5		2.0			2.0	
Lane Grp Cap (vph)	153	1608	1545	184	1181	502		582			563	
v/s Ratio Prot	0.04	0.12		c0.06	c0.18							
v/s Ratio Perm			c0.11			0.02		c0.40			0.14	
v/c Ratio	0.42	0.39	0.11	0.55	0.55	0.07		0.94			0.34	
Uniform Delay, d1	34.7	21.3	0.0	34.1	21.7	18.2		21.8			15.2	
Progression Factor	1.00	1.00	1.00	1.23	0.91	0.87		1.00			1.00	
Incremental Delay, d2	0.7	0.7	0.1	2.0	1.8	0.3		23.5			0.1	
Delay (s)	35.4	22.0	0.1	43.8	21.7	16.1		45.3			15.3	
Level of Service	D	C	A	D	C	B		D			B	
Approach Delay (s)		18.7			23.7			45.3			15.3	
Approach LOS		B			C			D			B	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱			✥			✥	
Volume (vph)	20	630	45	50	685	30	70	5	25	20	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1770	5026		1770	3514			1725			1690	
Flt Permitted	0.95	1.00		0.95	1.00			0.79			0.86	
Satd. Flow (perm)	1770	5026		1770	3514			1407			1485	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	692	49	55	753	33	77	5	27	22	5	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	741	0	55	786	0	0	109	0	0	49	0
Confl. Peds. (#/hr)			4			1	4		13	13		4
Confl. Bikes (#/hr)			1			1			4			5
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.0	48.0		4.1	50.3			13.5			13.5	
Effective Green, g (s)	2.4	49.1		4.5	51.2			14.4			14.4	
Actuated g/C Ratio	0.03	0.61		0.06	0.64			0.18			0.18	
Clearance Time (s)	4.4	5.1		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	4.7		2.0	3.9			2.0			2.0	
Lane Grp Cap (vph)	53	3085		100	2249			253			267	
v/s Ratio Prot	0.01	0.15		c0.03	c0.22							
v/s Ratio Perm								c0.08			0.03	
v/c Ratio	0.42	0.24		0.55	0.35			0.43			0.18	
Uniform Delay, d1	38.1	7.0		36.8	6.7			29.2			27.8	
Progression Factor	1.30	0.54		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.9	0.2		3.7	0.4			0.4			0.1	
Delay (s)	51.3	4.0		40.4	7.1			29.6			27.9	
Level of Service	D	A		D	A			C			C	
Approach Delay (s)		5.3			9.3			29.6			27.9	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

12: College ave & University Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	165	400	135	165	465	165	215	855	195	145	365	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1526	1770	3373		1770	3415		1770	3392	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1526	1770	3373		1770	3415		1770	3392	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	440	148	181	511	181	236	940	214	159	401	121
RTOR Reduction (vph)	0	0	109	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	181	440	39	181	692	0	236	1154	0	159	522	0
Confl. Peds. (#/hr)			22			16			20			13
Confl. Bikes (#/hr)						1			8			5
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	15.0	25.8	25.8	15.0	26.0		16.6	28.4		13.3	23.8	
Effective Green, g (s)	15.4	26.9	26.9	15.4	26.9		17.0	29.6		13.7	26.3	
Actuated g/C Ratio	0.15	0.26	0.26	0.15	0.26		0.17	0.29		0.13	0.26	
Clearance Time (s)	4.4	5.1	5.1	4.4	4.9		4.4	5.2		4.4	6.5	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.7		2.0	3.2		2.0	3.6	
Lane Grp Cap (vph)	268	937	404	268	893		296	995		239	878	
v/s Ratio Prot	c0.10	0.12		0.10	c0.21		c0.13	c0.34		0.09	0.15	
v/s Ratio Perm			0.03									
v/c Ratio	0.68	0.47	0.10	0.68	0.77		0.80	1.16		0.67	0.59	
Uniform Delay, d1	40.7	31.4	28.2	40.7	34.5		40.6	36.0		41.8	33.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	0.5	0.1	5.2	4.4		13.0	83.3		5.3	1.2	
Delay (s)	45.9	31.8	28.3	45.9	39.0		53.6	119.3		47.1	34.2	
Level of Service	D	C	C	D	D		D	F		D	C	
Approach Delay (s)		34.5			40.4			108.1			37.2	
Approach LOS		C			D			F			D	

Intersection Summary			
HCM Average Control Delay	63.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	101.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	95	490	55	35	545	65	80	40	30	30	35	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.97			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	3477		1770	3475			1750			1715	
Flt Permitted	0.95	1.00		0.95	1.00			0.75			0.90	
Satd. Flow (perm)	1770	3477		1770	3475			1346			1559	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	516	58	37	574	68	84	42	32	32	37	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	100	574	0	37	642	0	0	158	0	0	116	0
Confl. Peds. (#/hr)			5			1	5		20	20		5
Confl. Bikes (#/hr)			1			1			3			6
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	8.3	54.7		4.5	50.9			16.6			16.6	
Effective Green, g (s)	8.7	55.6		4.9	51.8			17.5			17.5	
Actuated g/C Ratio	0.10	0.62		0.05	0.58			0.19			0.19	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	3.6		2.0	3.6			2.0			2.0	
Lane Grp Cap (vph)	171	2148		96	2000			262			303	
v/s Ratio Prot	c0.06	c0.17		0.02	c0.18							
v/s Ratio Perm								c0.12			0.07	
v/c Ratio	0.58	0.27		0.39	0.32			0.60			0.38	
Uniform Delay, d1	38.9	7.9		41.1	9.9			33.1			31.5	
Progression Factor	1.00	1.00		1.33	0.64			1.00			1.00	
Incremental Delay, d2	3.3	0.3		0.9	0.4			2.7			0.3	
Delay (s)	42.2	8.2		55.7	6.8			35.8			31.8	
Level of Service	D	A		E	A			D			C	
Approach Delay (s)		13.2			9.4			35.8			31.8	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2035 Base AM
14: 54th St & Chollas Pkwy

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱		↰↑
Volume (veh/h)	145	15	850	200	50	490
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	151	16	885	208	52	510
Pedestrians	5		3			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			602			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	1253	450			890	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	992	69			576	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	23	98			94	
cM capacity (veh/h)	197	848			861	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	151	16	443	443	208	222	340
Volume Left	151	0	0	0	0	52	0
Volume Right	0	16	0	0	208	0	0
cSH	197	848	1700	1700	1700	861	1700
Volume to Capacity	0.77	0.02	0.26	0.26	0.12	0.06	0.20
Queue Length 95th (ft)	130	1	0	0	0	5	0
Control Delay (s)	66.0	9.3	0.0	0.0	0.0	2.7	0.0
Lane LOS	F	A				A	
Approach Delay (s)	60.6		0.0			1.1	
Approach LOS	F						

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

15: 54th St & Streamview Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Volume (vph)	50	10	10	145	15	160	5	710	75	85	465	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1788	1554		1782	1551	1770	3474		1770	3513	
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1788	1554		1782	1551	1770	3474		1770	3513	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	57	11	11	165	17	182	6	807	85	97	528	23
RTOR Reduction (vph)	0	0	10	0	0	147	0	7	0	0	2	0
Lane Group Flow (vph)	0	68	1	0	182	35	6	885	0	97	549	0
Confl. Peds. (#/hr)	3		2	2		3	5		11	11		5
Confl. Bikes (#/hr)			2			3			11			5
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)		10.2	10.2		18.2	18.2	1.2	46.1		9.2	54.4	
Effective Green, g (s)		12.1	12.1		20.1	20.1	1.6	48.2		9.6	56.2	
Actuated g/C Ratio		0.11	0.11		0.19	0.19	0.02	0.45		0.09	0.53	
Clearance Time (s)		5.9	5.9		5.9	5.9	4.4	6.1		4.4	5.8	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	2.0	3.3		2.0	3.3	
Lane Grp Cap (vph)		204	177		338	294	27	1580		160	1863	
v/s Ratio Prot		c0.04			c0.10		0.00	c0.25		c0.05	0.16	
v/s Ratio Perm			0.00			0.02						
v/c Ratio		0.33	0.01		0.54	0.12	0.22	0.56		0.61	0.29	
Uniform Delay, d1		43.2	41.6		38.8	35.6	51.6	21.1		46.4	13.9	
Progression Factor		1.00	1.00		1.00	1.00	1.06	0.80		1.00	1.00	
Incremental Delay, d2		1.0	0.0		1.7	0.2	1.5	1.4		4.4	0.4	
Delay (s)		44.2	41.6		40.4	35.8	56.0	18.3		50.8	14.3	
Level of Service		D	D		D	D	E	B		D	B	
Approach Delay (s)		43.8			38.1			18.5			19.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

16: 54th St & Redwood St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	85	30	30	85	40	55	75	655	75	45	475	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.96		1.00	0.98		1.00	0.97	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1759			1744		1770	3485		1770	3429	
Flt Permitted		0.66			0.77		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1194			1372		1770	3485		1770	3429	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	88	31	31	88	41	57	77	675	77	46	490	129
RTOR Reduction (vph)	0	11	0	0	19	0	0	4	0	0	12	0
Lane Group Flow (vph)	0	139	0	0	167	0	77	748	0	46	607	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		17.4			17.4		8.0	67.9		6.3	65.6	
Effective Green, g (s)		18.3			18.3		8.4	69.0		6.7	67.3	
Actuated g/C Ratio		0.17			0.17		0.08	0.65		0.06	0.63	
Clearance Time (s)		4.9			4.9		4.4	5.1		4.4	5.7	
Vehicle Extension (s)		2.0			2.0		2.0	4.7		2.0	4.7	
Lane Grp Cap (vph)		206			237		140	2269		112	2177	
v/s Ratio Prot							c0.04	c0.21		0.03	0.18	
v/s Ratio Perm		0.12			c0.12							
v/c Ratio		0.68			0.70		0.55	0.33		0.41	0.28	
Uniform Delay, d1		41.1			41.3		47.0	8.2		47.8	8.6	
Progression Factor		1.00			1.00		1.06	0.60		1.24	1.13	
Incremental Delay, d2		6.7			7.5		2.5	0.4		0.9	0.3	
Delay (s)		47.8			48.8		52.3	5.3		60.0	10.0	
Level of Service		D			D		D	A		E	B	
Approach Delay (s)		47.8			48.8			9.7			13.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣		↰	⬑	↱	↰	↑↱		↰	↑↱	
Volume (vph)	45	55	40	130	110	235	20	495	80	85	495	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.96		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.98		0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1762		1681	1753	1583	1770	3465		1770	3514	
Flt Permitted		0.98		0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1762		1681	1753	1583	1770	3465		1770	3514	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	48	59	43	140	118	253	22	532	86	91	532	27
RTOR Reduction (vph)	0	13	0	0	0	212	0	10	0	0	2	0
Lane Group Flow (vph)	0	137	0	113	145	41	22	608	0	91	557	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		13.3		15.3	15.3	15.3	2.9	47.4		9.7	54.1	
Effective Green, g (s)		14.2		17.0	17.0	17.0	3.3	48.7		10.1	55.5	
Actuated g/C Ratio		0.13		0.16	0.16	0.16	0.03	0.46		0.10	0.52	
Clearance Time (s)		4.9		5.7	5.7	5.7	4.4	5.3		4.4	5.4	
Vehicle Extension (s)		3.6		2.6	2.6	2.6	2.0	5.0		2.0	4.7	
Lane Grp Cap (vph)		236		270	281	254	55	1592		169	1840	
v/s Ratio Prot		c0.08		0.07	c0.08		0.01	c0.18		c0.05	0.16	
v/s Ratio Perm						0.03						
v/c Ratio		0.58		0.42	0.52	0.16	0.40	0.38		0.54	0.30	
Uniform Delay, d1		43.1		40.1	40.7	38.3	50.4	18.8		45.7	14.3	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.38	0.46	
Incremental Delay, d2		3.9		0.8	1.3	0.2	1.7	0.7		1.6	0.4	
Delay (s)		47.0		40.9	42.0	38.6	52.1	19.5		64.5	7.0	
Level of Service		D		D	D	D	D	B		E	A	
Approach Delay (s)		47.0			40.1			20.6			15.1	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	55	20	55	70	20	15	30	985	65	50	565	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.94			0.98		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1721			1768		1770	3506		1770	3517	
Flt Permitted		0.82			0.63		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1449			1154		1770	3506		1770	3517	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	59	22	59	75	22	16	32	1059	70	54	608	27
RTOR Reduction (vph)	0	28	0	0	6	0	0	3	0	0	2	0
Lane Group Flow (vph)	0	112	0	0	107	0	32	1126	0	54	633	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		13.8			13.8		5.1	70.2		7.5	72.6	
Effective Green, g (s)		14.3			14.3		5.6	70.7		8.0	73.1	
Actuated g/C Ratio		0.14			0.14		0.05	0.67		0.08	0.70	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		197			157		94	2361		135	2449	
v/s Ratio Prot							0.02	c0.32		c0.03	0.18	
v/s Ratio Perm		0.08			c0.09							
v/c Ratio		0.57			0.68		0.34	0.48		0.40	0.26	
Uniform Delay, d1		42.5			43.2		47.9	8.3		46.2	5.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.9			11.5		2.2	0.7		1.9	0.3	
Delay (s)		46.4			54.7		50.1	8.9		48.2	6.2	
Level of Service		D			D		D	A		D	A	
Approach Delay (s)		46.4			54.7			10.1			9.5	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2035 Base PM
1: Collwood Bl & Montezuma Rd

11/3/2012

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Volume (vph)	1635	1390	160	1000	735	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1703	1448	167	1042	766	115
RTOR Reduction (vph)	0	18	0	0	0	80
Lane Group Flow (vph)	1703	1430	167	1042	766	35
Turn Type	NA	pm+ov	Prot	NA	NA	Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	75.5	112.7	12.4	91.9	37.2	37.2
Effective Green, g (s)	77.6	113.5	12.8	94.4	37.6	37.6
Actuated g/C Ratio	0.55	0.81	0.09	0.67	0.27	0.27
Clearance Time (s)	6.1	4.4	4.4	6.5	4.4	4.4
Vehicle Extension (s)	4.3	2.0	2.0	4.8	2.0	2.0
Lane Grp Cap (vph)	1962	1283	162	2386	922	425
v/s Ratio Prot	0.48	c0.30	c0.09	0.29	0.22	
v/s Ratio Perm		0.60				0.02
v/c Ratio	0.87	1.11	1.03	0.44	0.83	0.08
Uniform Delay, d1	26.8	13.2	63.6	10.5	48.2	38.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	62.7	79.1	0.6	6.2	0.0
Delay (s)	32.3	75.9	142.7	11.1	54.4	38.3
Level of Service	C	E	F	B	D	D
Approach Delay (s)	52.4			29.3	52.3	
Approach LOS	D			C	D	

Intersection Summary			
HCM Average Control Delay	47.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Volume (vph)	80	55	695	180	70	1300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	60	755	196	76	1413
RTOR Reduction (vph)	0	54	0	177	0	0
Lane Group Flow (vph)	87	6	755	19	76	1413
Turn Type	NA	Perm	NA	Over	Prot	NA
Protected Phases	3		2	3	1	6
Permitted Phases		3				
Actuated Green, G (s)	11.6	11.6	87.4	11.6	8.5	99.9
Effective Green, g (s)	11.6	11.6	87.9	11.6	8.5	100.4
Actuated g/C Ratio	0.10	0.10	0.73	0.10	0.07	0.84
Clearance Time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Vehicle Extension (s)	2.0	2.0	3.7	2.0	2.0	3.7
Lane Grp Cap (vph)	171	153	2592	153	125	2961
v/s Ratio Prot	c0.05		0.21	0.01	c0.04	c0.40
v/s Ratio Perm		0.00				
v/c Ratio	0.51	0.04	0.29	0.12	0.61	0.48
Uniform Delay, d1	51.5	49.1	5.5	49.6	54.1	2.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.0	0.3	0.1	5.6	0.6
Delay (s)	52.4	49.2	5.7	49.7	59.8	3.2
Level of Service	D	D	A	D	E	A
Approach Delay (s)	51.1		14.8			6.1
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

3: 54th St & El Cajon Bl

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰	↑↑	↱
Volume (vph)	140	595	305	290	480	215	175	525	205	360	910	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3390		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	3390		1770	3539	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	146	620	318	302	500	224	182	547	214	375	948	115
RTOR Reduction (vph)	0	0	199	0	0	160	0	30	0	0	0	60
Lane Group Flow (vph)	146	620	119	302	500	64	182	731	0	375	948	55
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	14.8	30.2	30.2	24.8	38.9	38.9	11.3	33.8		33.5	56.1	56.1
Effective Green, g (s)	15.2	30.1	30.1	25.2	40.1	40.1	11.7	34.8		33.9	57.0	57.0
Actuated g/C Ratio	0.11	0.22	0.22	0.18	0.29	0.29	0.08	0.25		0.24	0.41	0.41
Clearance Time (s)	4.4	3.9	3.9	4.4	5.2	5.2	4.4	5.0		4.4	4.9	4.9
Vehicle Extension (s)	1.5	3.7	3.7	1.5	3.7	3.7	1.5	3.7		1.5	3.7	3.7
Lane Grp Cap (vph)	192	761	340	319	1014	453	287	843		429	1441	645
v/s Ratio Prot	0.08	c0.18		c0.17	0.14		0.05	c0.22		c0.21	0.27	
v/s Ratio Perm			0.08			0.04						0.03
v/c Ratio	0.76	0.81	0.35	0.95	0.49	0.14	0.63	0.87		0.87	0.66	0.09
Uniform Delay, d1	60.6	52.3	46.7	56.7	41.5	37.1	62.1	50.4		51.0	33.6	25.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.7	9.4	2.8	35.8	1.7	0.7	3.3	9.6		17.1	1.2	0.1
Delay (s)	75.3	61.6	49.5	92.6	43.2	37.8	65.4	60.0		68.1	34.8	25.6
Level of Service	E	E	D	F	D	D	E	E		E	C	C
Approach Delay (s)		59.9			56.6			61.0			42.7	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM Average Control Delay	53.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	50	40	90	55	35	115	90	690	125	265	1110	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.92		1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1713			1699		1770	3458		1770	3497	
Flt Permitted		0.71			0.74		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1235			1267		1770	3458		1770	3497	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	43	96	59	37	122	96	734	133	282	1181	101
RTOR Reduction (vph)	0	49	0	0	62	0	0	10	0	0	3	0
Lane Group Flow (vph)	0	143	0	0	156	0	96	857	0	282	1279	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		19.2			19.2		10.9	49.9		36.3	75.1	
Effective Green, g (s)		20.1			20.1		11.3	51.2		36.7	76.6	
Actuated g/C Ratio		0.17			0.17		0.09	0.43		0.31	0.64	
Clearance Time (s)		4.9			4.9		4.4	5.3		4.4	5.5	
Vehicle Extension (s)		3.0			3.0		2.0	2.1		2.0	2.1	
Lane Grp Cap (vph)		207			212		167	1475		541	2232	
v/s Ratio Prot							0.05	0.25		c0.16	c0.37	
v/s Ratio Perm		0.12			c0.12							
v/c Ratio		0.69			0.73		0.57	0.58		0.52	0.57	
Uniform Delay, d1		47.0			47.4		52.0	26.2		34.4	12.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.5			12.3		3.0	1.7		0.4	1.1	
Delay (s)		56.5			59.8		55.0	27.9		34.8	13.5	
Level of Service		E			E		E	C		C	B	
Approach Delay (s)		56.5			59.8			30.6			17.3	
Approach LOS		E			E			C			B	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2035 Base PM
5: 54th Place & Orange St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	45	30	40	65	20	90	40	70	25	50	35
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	34	51	34	45	74	23	102	45	80	28	57	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	119	142	227	125
Volume Left (vph)	34	45	102	28
Volume Right (vph)	34	23	80	40
Hadj (s)	-0.08	0.00	-0.09	-0.11
Departure Headway (s)	4.9	4.9	4.6	4.7
Degree Utilization, x	0.16	0.19	0.29	0.16
Capacity (veh/h)	674	675	734	703
Control Delay (s)	8.8	9.1	9.5	8.7
Approach Delay (s)	8.8	9.1	9.5	8.7
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.1		
HCM Level of Service	A		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	100	630	135	240	550	80	65	230	165	55	270	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3445		1770	3472		1770	1746		1770	1815	
Flt Permitted	0.95	1.00		0.95	1.00		0.31	1.00		0.21	1.00	
Satd. Flow (perm)	1770	3445		1770	3472		584	1746		391	1815	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	106	670	144	255	585	85	69	245	176	59	287	59
RTOR Reduction (vph)	0	16	0	0	8	0	0	32	0	0	9	0
Lane Group Flow (vph)	106	798	0	255	662	0	69	389	0	59	337	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	10.3	36.6		20.6	46.9		28.6	28.6		28.6	28.6	
Effective Green, g (s)	10.7	37.5		21.0	47.8		29.5	29.5		29.5	29.5	
Actuated g/C Ratio	0.11	0.38		0.21	0.48		0.29	0.29		0.29	0.29	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.1		2.0	2.3		3.7	3.7		4.2	4.2	
Lane Grp Cap (vph)	189	1292		372	1660		172	515		115	535	
v/s Ratio Prot	0.06	c0.23		c0.14	0.19			c0.22			0.19	
v/s Ratio Perm							0.12			0.15		
v/c Ratio	0.56	0.62		0.69	0.40		0.40	0.75		0.51	0.63	
Uniform Delay, d1	42.4	25.4		36.5	16.8		28.2	32.0		29.3	30.5	
Progression Factor	1.00	1.00		1.11	0.42		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	2.2		3.9	0.7		1.9	6.5		5.6	2.8	
Delay (s)	44.7	27.6		44.3	7.7		30.1	38.4		34.8	33.3	
Level of Service	D	C		D	A		C	D		C	C	
Approach Delay (s)		29.6			17.8			37.3			33.5	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✣			✣	
Volume (vph)	75	760	75	75	750	55	50	55	85	105	55	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			0.95			0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.97	
Frt	1.00	0.99		1.00	0.99			0.94			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3418		1770	3462			1622			1657	
Flt Permitted	0.95	1.00		0.95	1.00			0.85			0.63	
Satd. Flow (perm)	1770	3418		1770	3462			1392			1074	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	76	768	76	76	758	56	51	56	86	106	56	56
RTOR Reduction (vph)	0	4	0	0	3	0	0	38	0	0	17	0
Lane Group Flow (vph)	76	840	0	76	811	0	0	155	0	0	201	0
Confl. Peds. (#/hr)	49		72	72		49	86		74	74		86
Confl. Bikes (#/hr)			15			17			7			11
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	7.7	59.1		7.7	59.1			20.3			20.3	
Effective Green, g (s)	7.7	60.0		7.7	60.0			20.3			20.3	
Actuated g/C Ratio	0.08	0.60		0.08	0.60			0.20			0.20	
Clearance Time (s)	4.0	4.9		4.0	4.9			4.0			4.0	
Vehicle Extension (s)	2.0	4.1		2.0	4.1			2.0			2.0	
Lane Grp Cap (vph)	136	2051		136	2077			283			218	
v/s Ratio Prot	c0.04	c0.25		0.04	0.23							
v/s Ratio Perm								0.11			c0.19	
v/c Ratio	0.56	0.41		0.56	0.39			0.55			0.92	
Uniform Delay, d1	44.5	10.6		44.5	10.4			35.7			39.1	
Progression Factor	1.30	0.52		0.80	1.78			1.00			1.00	
Incremental Delay, d2	2.3	0.5		2.4	0.5			1.2			39.6	
Delay (s)	60.0	6.0		38.2	19.1			36.9			78.7	
Level of Service	E	A		D	B			D			E	
Approach Delay (s)		10.4			20.7			36.9			78.7	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

8: University Ave & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	175	650	290	180	630	320	245	555	95	510	640	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	0.94	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1500	1770	3539	1538	1770	3539	1481	3433	3539	1556
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1500	1770	3539	1538	1770	3539	1481	3433	3539	1556
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	184	684	305	189	663	337	258	584	100	537	674	221
RTOR Reduction (vph)	0	0	194	0	0	0	0	0	72	0	0	0
Lane Group Flow (vph)	184	684	111	189	663	337	258	584	28	537	674	221
Confl. Peds. (#/hr)			44			18			54			18
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free			8			Free
Actuated Green, G (s)	11.7	28.9	28.9	9.8	27.0	100.0	17.8	26.8	26.8	15.7	24.7	100.0
Effective Green, g (s)	12.1	29.9	29.9	10.2	28.0	100.0	18.2	27.8	27.8	16.1	25.7	100.0
Actuated g/C Ratio	0.12	0.30	0.30	0.10	0.28	1.00	0.18	0.28	0.28	0.16	0.26	1.00
Clearance Time (s)	4.4	5.0	5.0	4.4	5.0		4.4	5.0	5.0	4.4	5.0	
Vehicle Extension (s)	2.0	3.5	3.5	2.0	3.7		3.0	3.5	3.5	2.0	3.5	
Lane Grp Cap (vph)	214	1058	449	181	991	1538	322	984	412	553	910	1556
v/s Ratio Prot	0.10	c0.19		c0.11	0.19		c0.15	0.17		c0.16	c0.19	
v/s Ratio Perm			0.07			c0.22			0.02			0.14
v/c Ratio	0.86	0.65	0.25	1.04	0.67	0.22	0.80	0.59	0.07	0.97	0.74	0.14
Uniform Delay, d1	43.1	30.5	26.5	44.9	31.9	0.0	39.2	31.2	26.6	41.7	34.1	0.0
Progression Factor	1.14	0.74	0.35	1.10	1.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.7	2.9	1.3	73.3	3.0	0.3	13.3	1.0	0.1	30.7	3.4	0.2
Delay (s)	74.8	25.5	10.5	122.5	37.9	0.3	52.5	32.2	26.6	72.5	37.5	0.2
Level of Service	E	C	B	F	D	A	D	C	C	E	D	A
Approach Delay (s)		29.3			40.7			37.2			44.8	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2035 Base PM
9: Chollas Pkwy & University Ave

11/3/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑	
Volume (veh/h)	0	1200	0	0	0	0	0	0	0	0	205	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	1290	0	0	0	0	0	0	0	0	220	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			1290			1401	1290	645	645	1290	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			1290			1401	1290	645	645	1290	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	*7.4	3.3
p0 queue free %	100			100			0	100	100	100	0	100
cM capacity (veh/h)	1622			533			0	162	415	357	133	1084

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	645	645	220
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	133
Volume to Capacity	0.38	0.38	1.66
Queue Length 95th (ft)	0	0	401
Control Delay (s)	0.0	0.0	384.1
Lane LOS			F
Approach Delay (s)	0.0		384.1
Approach LOS			F

Intersection Summary			
Average Delay	56.0		
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value

2035 Base PM
10: University Ave & 58th st

2/19/2014

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑	↱		✥			✥	
Volume (vph)	110	1045	315	90	850	75	230	120	105	70	50	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.94		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.98	
Satd. Flow (prot)	1770	5085	1545	1770	3539	1493		1743			1732	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74			0.73	
Satd. Flow (perm)	1770	5085	1545	1770	3539	1493		1315			1296	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	1100	332	95	895	79	242	126	111	74	53	58
RTOR Reduction (vph)	0	0	0	0	0	30	0	0	0	0	0	0
Lane Group Flow (vph)	116	1100	332	95	895	49	0	479	0	0	185	0
Confl. Peds. (#/hr)			8			12	9		17	17		9
Confl. Bikes (#/hr)									2			6
Turn Type	Prot		Free	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			4			4	
Permitted Phases			Free			6	4			4		
Actuated Green, G (s)	9.3	39.0	100.0	7.1	37.0	37.0		39.5			39.5	
Effective Green, g (s)	9.7	40.1	100.0	7.5	37.9	37.9		40.4			40.4	
Actuated g/C Ratio	0.10	0.40	1.00	0.08	0.38	0.38		0.40			0.40	
Clearance Time (s)	4.4	5.1		4.4	4.9	4.9		4.9			4.9	
Vehicle Extension (s)	2.0	3.5		2.0	3.5	3.5		2.0			2.0	
Lane Grp Cap (vph)	172	2039	1545	133	1341	566		531			524	
v/s Ratio Prot	c0.07	0.22		0.05	c0.25							
v/s Ratio Perm			c0.21			0.03		c0.36			0.14	
v/c Ratio	0.67	0.54	0.21	0.71	0.67	0.09		0.90			0.35	
Uniform Delay, d1	43.6	22.9	0.0	45.2	25.8	19.9		27.9			20.7	
Progression Factor	1.03	0.72	1.00	0.99	0.97	0.93		1.00			1.00	
Incremental Delay, d2	6.6	0.8	0.3	13.5	2.5	0.3		18.1			0.1	
Delay (s)	51.6	17.3	0.3	58.2	27.7	18.9		46.1			20.9	
Level of Service	D	B	A	E	C	B		D			C	
Approach Delay (s)		16.2			29.7			46.1			20.9	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2035 Base PM
11: University Ave & 60th st

2/19/2014

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱			✥			✥	
Volume (vph)	35	1020	85	70	820	45	35	5	40	20	5	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.93			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1770	5016		1770	3508			1674			1678	
Flt Permitted	0.95	1.00		0.95	1.00			0.86			0.88	
Satd. Flow (perm)	1770	5016		1770	3508			1479			1511	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	1074	89	74	863	47	37	5	42	21	5	26
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	37	1163	0	74	910	0	0	84	0	0	52	0
Confl. Peds. (#/hr)			4			1	4		13	13		4
Confl. Bikes (#/hr)			1			1			4			5
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.6	60.0		7.6	63.2			18.0			18.0	
Effective Green, g (s)	5.0	61.1		8.0	64.1			18.9			18.9	
Actuated g/C Ratio	0.05	0.61		0.08	0.64			0.19			0.19	
Clearance Time (s)	4.4	5.1		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	4.7		2.0	3.9			2.0			2.0	
Lane Grp Cap (vph)	89	3065		142	2249			280			286	
v/s Ratio Prot	0.02	0.23		c0.04	c0.26							
v/s Ratio Perm								c0.06			0.03	
v/c Ratio	0.42	0.38		0.52	0.40			0.30			0.18	
Uniform Delay, d1	46.1	9.8		44.2	8.7			34.9			34.1	
Progression Factor	1.21	0.43		1.01	1.12			1.00			1.00	
Incremental Delay, d2	1.0	0.3		0.6	0.2			0.2			0.1	
Delay (s)	56.9	4.5		45.4	10.0			35.1			34.2	
Level of Service	E	A		D	A			D			C	
Approach Delay (s)		6.1			12.6			35.1			34.2	
Approach LOS		A			B			D			C	

Intersection Summary

HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2035 Base PM
12: University Ave & College ave
2/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	260	565	340	275	435	225	255	565	240	265	690	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1526	1770	3323		1770	3341		1770	3362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1526	1770	3323		1770	3341		1770	3362	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	595	358	289	458	237	268	595	253	279	726	284
RTOR Reduction (vph)	0	0	219	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	274	595	139	289	695	0	268	848	0	279	1010	0
Confl. Peds. (#/hr)			22			16			20			13
Confl. Bikes (#/hr)						1			8			5
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	13.7	25.5	25.5	12.6	24.6		14.1	27.9		14.9	27.4	
Effective Green, g (s)	14.1	26.6	26.6	13.0	25.5		14.5	29.1		15.3	29.9	
Actuated g/C Ratio	0.14	0.27	0.27	0.13	0.26		0.14	0.29		0.15	0.30	
Clearance Time (s)	4.4	5.1	5.1	4.4	4.9		4.4	5.2		4.4	6.5	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.7		2.0	3.2		2.0	3.6	
Lane Grp Cap (vph)	250	941	406	230	847		257	972		271	1005	
v/s Ratio Prot	0.15	0.17		c0.16	c0.21		0.15	0.25		c0.16	c0.30	
v/s Ratio Perm			0.09									
v/c Ratio	1.10	0.63	0.34	1.26	0.82		1.04	0.87		1.03	1.00	
Uniform Delay, d1	43.0	32.4	29.6	43.5	35.1		42.8	33.7		42.4	35.0	
Progression Factor	0.96	0.71	1.59	0.96	1.05		1.00	1.00		1.00	1.00	
Incremental Delay, d2	83.9	1.4	0.6	145.4	6.5		67.8	10.7		62.5	29.6	
Delay (s)	125.1	24.4	47.7	187.3	43.3		110.5	44.4		104.9	64.7	
Level of Service	F	C	D	F	D		F	D		F	E	
Approach Delay (s)		53.7			85.6			60.2			73.4	
Approach LOS		D			F			E			E	

Intersection Summary

HCM Average Control Delay	67.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	50	750	105	45	585	75	70	60	30	45	45	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.97			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3464		1770	3470			1763			1714	
Flt Permitted	0.95	1.00		0.95	1.00			0.72			0.84	
Satd. Flow (perm)	1770	3464		1770	3470			1294			1460	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	781	109	47	609	78	73	62	31	47	47	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	52	890	0	47	687	0	0	166	0	0	156	0
Confl. Peds. (#/hr)			5			1	5		20	20		5
Confl. Bikes (#/hr)			1			1			3			6
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	6.5	63.2		5.1	61.8			17.5			17.5	
Effective Green, g (s)	6.9	64.1		5.5	62.7			18.4			18.4	
Actuated g/C Ratio	0.07	0.64		0.06	0.63			0.18			0.18	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	3.6		2.0	3.6			2.0			2.0	
Lane Grp Cap (vph)	122	2220		97	2176			238			269	
v/s Ratio Prot	c0.03	c0.26		0.03	0.20							
v/s Ratio Perm								c0.13			0.11	
v/c Ratio	0.43	0.40		0.48	0.32			0.70			0.58	
Uniform Delay, d1	44.7	8.7		45.9	8.7			38.2			37.3	
Progression Factor	0.93	0.89		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.8	0.5		1.4	0.4			7.0			1.9	
Delay (s)	42.4	8.2		47.3	9.1			45.2			39.2	
Level of Service	D	A		D	A			D			D	
Approach Delay (s)		10.1			11.5			45.2			39.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

14: 54th St & Chollas Pkwy

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱		↰↑
Volume (veh/h)	220	40	710	270	20	960
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	229	42	740	281	21	1000
Pedestrians	5		3			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			602			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	1289	377			745	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1026	0			397	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	96			98	
cM capacity (veh/h)	194	934			999	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	229	42	370	370	281	354	667
Volume Left	229	0	0	0	0	21	0
Volume Right	0	42	0	0	281	0	0
cSH	194	934	1700	1700	1700	999	1700
Volume to Capacity	1.18	0.04	0.22	0.22	0.17	0.02	0.39
Queue Length 95th (ft)	292	3	0	0	0	2	0
Control Delay (s)	170.5	9.0	0.0	0.0	0.0	0.7	0.0
Lane LOS	F	A				A	
Approach Delay (s)	145.7		0.0			0.3	
Approach LOS	F						

Intersection Summary			
Average Delay	17.2		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

15: 54th St & Streamview Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑↱		↰	↑↱	
Volume (vph)	40	5	10	135	10	155	10	750	75	220	890	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1784	1560		1780	1583	1770	3477		1770	3511	
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1784	1560		1780	1583	1770	3477		1770	3511	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	46	6	11	155	11	178	11	862	86	253	1023	46
RTOR Reduction (vph)	0	0	10	0	0	148	0	8	0	0	2	0
Lane Group Flow (vph)	0	52	1	0	166	30	11	940	0	253	1067	0
Confl. Peds. (#/hr)			2	2			16		16	16		16
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)		9.7	9.7		16.0	16.0	1.3	31.9		26.1	57.0	
Effective Green, g (s)		11.6	11.6		17.9	17.9	1.7	34.0		26.5	58.8	
Actuated g/C Ratio		0.11	0.11		0.17	0.17	0.02	0.32		0.25	0.55	
Clearance Time (s)		5.9	5.9		5.9	5.9	4.4	6.1		4.4	5.8	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	2.0	3.3		2.0	3.3	
Lane Grp Cap (vph)		195	171		301	267	28	1115		443	1948	
v/s Ratio Prot		c0.03			c0.09		0.01	c0.27		c0.14	0.30	
v/s Ratio Perm			0.00			0.02						
v/c Ratio		0.27	0.01		0.55	0.11	0.39	0.84		0.57	0.55	
Uniform Delay, d1		43.3	42.1		40.4	37.3	51.6	33.5		34.8	15.1	
Progression Factor		1.00	1.00		1.00	1.00	1.31	0.65		1.00	1.00	
Incremental Delay, d2		0.7	0.0		2.2	0.2	3.1	7.4		1.1	1.1	
Delay (s)		44.0	42.1		42.6	37.5	70.7	29.4		35.9	16.2	
Level of Service		D	D		D	D	E	C		D	B	
Approach Delay (s)		43.7			39.9			29.8			20.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

16: 54th St & Redwood St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	60	40	35	85	40	35	105	730	130	80	885	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.96			0.97		1.00	0.98		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1758			1761		1770	3459		1770	3495	
Flt Permitted		0.76			0.71		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1375			1278		1770	3459		1770	3495	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	42	37	89	42	37	111	768	137	84	932	84
RTOR Reduction (vph)	0	15	0	0	12	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	127	0	0	156	0	111	898	0	84	1012	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		17.0			17.0		11.0	66.2		8.4	63.0	
Effective Green, g (s)		17.9			17.9		11.4	67.3		8.8	64.7	
Actuated g/C Ratio		0.17			0.17		0.11	0.63		0.08	0.61	
Clearance Time (s)		4.9			4.9		4.4	5.1		4.4	5.7	
Vehicle Extension (s)		2.0			2.0		2.0	4.7		2.0	4.7	
Lane Grp Cap (vph)		232			216		190	2196		147	2133	
v/s Ratio Prot							c0.06	c0.26		0.05	c0.29	
v/s Ratio Perm		0.09			c0.12							
v/c Ratio		0.55			0.72		0.58	0.41		0.57	0.47	
Uniform Delay, d1		40.3			41.7		45.0	9.5		46.8	11.3	
Progression Factor		1.00			1.00		1.09	0.39		1.39	0.46	
Incremental Delay, d2		1.4			9.7		2.3	0.4		2.9	0.7	
Delay (s)		41.8			51.4		51.2	4.1		68.0	5.9	
Level of Service		D			D		D	A		E	A	
Approach Delay (s)		41.8			51.4			9.3			10.6	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Volume (vph)	35	85	35	85	105	160	30	750	125	185	780	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.97		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1786		1681	1770	1583	1770	3463		1770	3504	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1786		1681	1770	1583	1770	3463		1770	3504	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	37	90	37	90	112	170	32	798	133	197	830	59
RTOR Reduction (vph)	0	10	0	0	0	145	0	12	0	0	4	0
Lane Group Flow (vph)	0	154	0	90	112	25	32	919	0	197	885	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		12.1		13.8	13.8	13.8	4.5	38.5		21.3	55.2	
Effective Green, g (s)		13.0		15.5	15.5	15.5	4.9	39.8		21.7	56.6	
Actuated g/C Ratio		0.12		0.15	0.15	0.15	0.05	0.38		0.20	0.53	
Clearance Time (s)		4.9		5.7	5.7	5.7	4.4	5.3		4.4	5.4	
Vehicle Extension (s)		3.6		2.6	2.6	2.6	2.0	5.0		2.0	4.7	
Lane Grp Cap (vph)		219		246	259	231	82	1300		362	1871	
v/s Ratio Prot		c0.09		0.05	c0.06		0.02	c0.27		c0.11	0.25	
v/s Ratio Perm						0.02						
v/c Ratio		0.70		0.37	0.43	0.11	0.39	0.71		0.54	0.47	
Uniform Delay, d1		44.7		40.8	41.2	39.3	49.1	28.1		37.7	15.4	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.35	0.73	
Incremental Delay, d2		10.3		0.7	0.9	0.2	1.1	3.3		0.8	0.8	
Delay (s)		54.9		41.5	42.1	39.4	50.2	31.4		51.9	12.0	
Level of Service		D		D	D	D	D	C		D	B	
Approach Delay (s)		54.9			40.8			32.0			19.2	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2035 Base PM
19: Lea Drive & 54th St

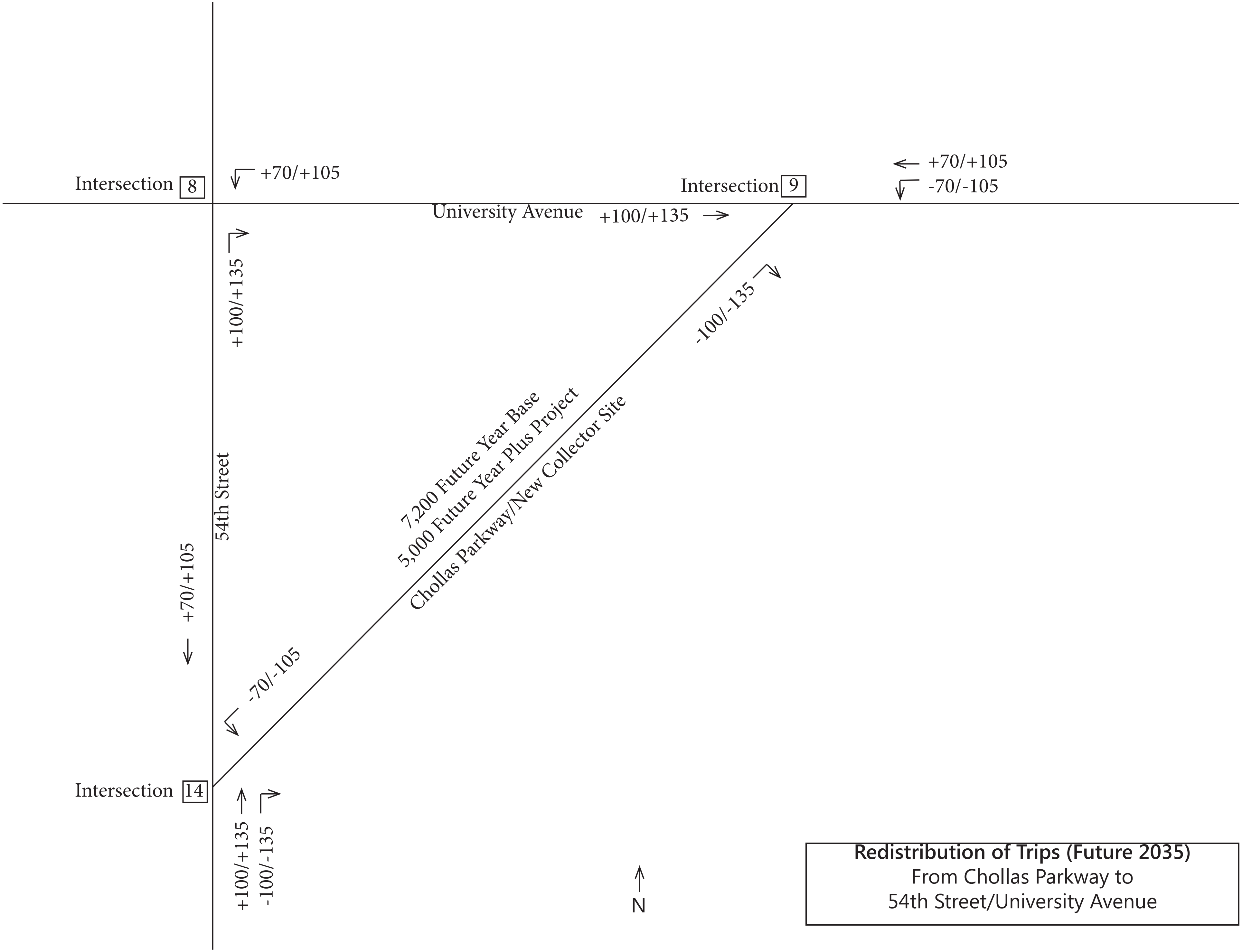
3/27/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	35	5	50	50	20	40	50	825	155	20	1060	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.92			0.95		1.00	0.98		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1690			1733		1770	3455		1770	3515	
Flt Permitted		0.79			0.76		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1365			1353		1770	3455		1770	3515	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	38	5	54	54	22	43	54	887	167	22	1140	54
RTOR Reduction (vph)	0	48	0	0	21	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	49	0	0	98	0	54	1044	0	22	1192	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		12.0			12.0		7.5	76.3		3.2	72.0	
Effective Green, g (s)		12.5			12.5		8.0	76.8		3.7	72.5	
Actuated g/C Ratio		0.12			0.12		0.08	0.73		0.04	0.69	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		163			161		135	2527		62	2427	
v/s Ratio Prot							c0.03	0.30		0.01	c0.34	
v/s Ratio Perm		0.04			c0.07							
v/c Ratio		0.30			0.61		0.40	0.41		0.35	0.49	
Uniform Delay, d1		42.3			43.9		46.2	5.4		49.5	7.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1			6.4		1.9	0.5		3.5	0.7	
Delay (s)		43.3			50.3		48.2	5.9		53.0	8.3	
Level of Service		D			D		D	A		D	A	
Approach Delay (s)		43.3			50.3			8.0			9.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX G

REDISTRIBUTION OF TRIPS FROM CHOLLAS PARKWAY



Redistribution of Trips (Future 2035)
From Chollas Parkway to
54th Street/University Avenue

APPENDIX H

PEAK HOUR INTERSECTION LOS WORKSHEETS
FUTURE YEAR BASE PLUS PROJECT CONDITIONS

2035 with Project AM
1: Collwood Bl & Montezuma Rd

11/3/2012

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Volume (vph)	650	510	240	1225	1325	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	714	560	264	1346	1456	165
RTOR Reduction (vph)	0	12	0	0	0	71
Lane Group Flow (vph)	714	548	264	1346	1456	94
Turn Type	NA	pm+ov	Prot	NA	NA	Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	32.8	90.0	21.1	57.9	57.2	57.2
Effective Green, g (s)	34.9	90.8	21.5	60.4	57.6	57.6
Actuated g/C Ratio	0.28	0.72	0.17	0.48	0.46	0.46
Clearance Time (s)	6.1	4.4	4.4	6.5	4.4	4.4
Vehicle Extension (s)	4.3	2.0	2.0	4.8	2.0	2.0
Lane Grp Cap (vph)	980	1141	302	1696	1569	724
v/s Ratio Prot	0.20	0.22	c0.15	c0.38	c0.42	
v/s Ratio Perm		0.13				0.06
v/c Ratio	0.73	0.48	0.87	0.79	0.93	0.13
Uniform Delay, d1	41.3	7.5	50.9	27.6	32.2	19.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	0.1	22.7	3.9	9.7	0.0
Delay (s)	46.0	7.6	73.6	31.5	42.0	19.8
Level of Service	D	A	E	C	D	B
Approach Delay (s)	29.1			38.4	39.7	
Approach LOS	C			D	D	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	126.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Volume (vph)	70	150	1185	150	50	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	73	156	1234	156	52	505
RTOR Reduction (vph)	0	135	0	135	0	0
Lane Group Flow (vph)	73	21	1234	21	52	505
Turn Type	NA	Perm	NA	Over	Prot	NA
Protected Phases	3		2	3	1	6
Permitted Phases		3				
Actuated Green, G (s)	9.5	9.5	43.4	9.5	4.6	52.0
Effective Green, g (s)	9.5	9.5	43.9	9.5	4.6	52.5
Actuated g/C Ratio	0.14	0.14	0.63	0.14	0.07	0.75
Clearance Time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Vehicle Extension (s)	2.0	2.0	3.7	2.0	2.0	3.7
Lane Grp Cap (vph)	240	215	2219	215	116	2654
v/s Ratio Prot	c0.04		c0.35	0.01	c0.03	0.14
v/s Ratio Perm		0.01				
v/c Ratio	0.30	0.10	0.56	0.10	0.45	0.19
Uniform Delay, d1	27.3	26.5	7.5	26.5	31.5	2.6
Progression Factor	1.00	1.00	1.74	2.47	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.6	0.0	1.0	0.2
Delay (s)	27.5	26.6	13.6	65.5	32.5	2.7
Level of Service	C	C	B	E	C	A
Approach Delay (s)	26.9		19.5			5.5
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰	↑↑	↱
Volume (vph)	160	330	145	180	400	435	255	740	270	140	325	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3397		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	3397		1770	3539	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	351	154	191	426	463	271	787	287	149	346	96
RTOR Reduction (vph)	0	0	107	0	0	201	0	26	0	0	0	62
Lane Group Flow (vph)	170	351	47	191	426	262	271	1048	0	149	346	34
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	16.0	42.4	42.4	17.2	42.3	42.3	14.3	47.9		14.8	48.5	48.5
Effective Green, g (s)	16.4	42.3	42.3	17.6	43.5	43.5	14.7	48.9		15.2	49.4	49.4
Actuated g/C Ratio	0.12	0.30	0.30	0.13	0.31	0.31	0.10	0.35		0.11	0.35	0.35
Clearance Time (s)	4.4	3.9	3.9	4.4	5.2	5.2	4.4	5.0		4.4	4.9	4.9
Vehicle Extension (s)	1.5	3.7	3.7	1.5	3.7	3.7	1.5	3.7		1.5	3.7	3.7
Lane Grp Cap (vph)	207	1069	478	223	1100	492	360	1187		192	1249	559
v/s Ratio Prot	0.10	0.10		c0.11	0.12		0.08	c0.31		c0.08	0.10	
v/s Ratio Perm			0.03			c0.17						0.02
v/c Ratio	0.82	0.33	0.10	0.86	0.39	0.53	0.75	0.88		0.78	0.28	0.06
Uniform Delay, d1	60.4	37.8	35.1	60.0	37.8	39.8	60.9	42.9		60.7	32.5	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	0.95	0.88
Incremental Delay, d2	21.3	0.8	0.4	25.3	1.0	4.1	7.7	8.2		16.1	0.2	0.1
Delay (s)	81.7	38.7	35.5	85.2	38.8	43.9	68.6	51.1		74.9	30.9	26.4
Level of Service	F	D	D	F	D	D	E	D		E	C	C
Approach Delay (s)		48.8			49.2			54.6			41.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	49.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2035 with Project AM
4: 54th St & Trojan Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	40	75	45	95	65	150	85	1045	235	175	425	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.96			0.93		1.00	0.97		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1770			1715		1770	3442		1770	3488	
Flt Permitted		0.80			0.79		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1433			1368		1770	3442		1770	3488	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	47	88	53	112	76	176	100	1229	276	206	500	53
RTOR Reduction (vph)	0	16	0	0	37	0	0	18	0	0	7	0
Lane Group Flow (vph)	0	172	0	0	327	0	100	1487	0	206	546	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		27.0			27.0		8.4	43.5		14.9	49.8	
Effective Green, g (s)		27.9			27.9		8.8	44.8		15.3	51.3	
Actuated g/C Ratio		0.28			0.28		0.09	0.45		0.15	0.51	
Clearance Time (s)		4.9			4.9		4.4	5.3		4.4	5.5	
Vehicle Extension (s)		3.0			3.0		2.0	2.1		2.0	2.1	
Lane Grp Cap (vph)		400			382		156	1542		271	1789	
v/s Ratio Prot							0.06	c0.43		c0.12	0.16	
v/s Ratio Perm		0.12			c0.24							
v/c Ratio		0.43			0.85		0.64	0.96		0.76	0.31	
Uniform Delay, d1		29.5			34.1		44.1	26.8		40.6	14.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7			16.8		6.6	15.8		10.7	0.4	
Delay (s)		30.3			50.9		50.6	42.7		51.3	14.5	
Level of Service		C			D		D	D		D	B	
Approach Delay (s)		30.3			50.9			43.2			24.5	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2035 with Project AM
5: 54th Pl & Orange Av

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	80	30	20	125	20	70	25	110	55	25	35
Peak Hour Factor	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Hourly flow rate (vph)	43	174	65	43	272	43	152	54	239	120	54	76

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	283	359	446	250
Volume Left (vph)	43	43	152	120
Volume Right (vph)	65	43	239	76
Hadj (s)	-0.07	-0.01	-0.22	-0.05
Departure Headway (s)	7.6	7.4	6.9	7.7
Degree Utilization, x	0.60	0.74	0.86	0.53
Capacity (veh/h)	425	457	501	419
Control Delay (s)	21.1	28.2	38.7	19.2
Approach Delay (s)	21.1	28.2	38.7	19.2
Approach LOS	C	D	E	C

Intersection Summary			
Delay	28.5		
HCM Level of Service	D		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

2035 with Project AM
6: Euclid Ave & University Ave

11/3/2012

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	50	375	60	195	490	105	65	235	150	55	180	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3465		1770	3445		1770	1754		1770	1802	
Flt Permitted	0.95	1.00		0.95	1.00		0.47	1.00		0.23	1.00	
Satd. Flow (perm)	1770	3465		1770	3445		878	1754		437	1802	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	54	403	65	210	527	113	70	253	161	59	194	54
RTOR Reduction (vph)	0	13	0	0	15	0	0	35	0	0	15	0
Lane Group Flow (vph)	54	455	0	210	626	0	70	379	0	59	233	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	5.0	31.0		16.1	42.1		24.7	24.7		24.7	24.7	
Effective Green, g (s)	5.4	31.9		16.5	43.0		25.6	25.6		25.6	25.6	
Actuated g/C Ratio	0.06	0.37		0.19	0.50		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.1		2.0	2.3		3.7	3.7		4.2	4.2	
Lane Grp Cap (vph)	111	1285		340	1723		261	522		130	536	
v/s Ratio Prot	0.03	0.13		c0.12	c0.18			c0.22			0.13	
v/s Ratio Perm							0.08			0.13		
v/c Ratio	0.49	0.35		0.62	0.36		0.27	0.73		0.45	0.43	
Uniform Delay, d1	39.0	19.6		31.9	13.1		23.1	27.1		24.5	24.4	
Progression Factor	1.00	1.00		0.74	0.96		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.8		2.2	0.6		0.7	5.2		3.8	0.9	
Delay (s)	40.2	20.4		25.8	13.1		23.7	32.3		28.3	25.2	
Level of Service	D	C		C	B		C	C		C	C	
Approach Delay (s)		22.4			16.2			31.0			25.8	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	75	460	45	80	650	120	55	55	100	70	45	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.94			0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.98	
Frt	1.00	0.99		1.00	0.98			0.94			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3445		1770	3404			1595			1613	
Flt Permitted	0.95	1.00		0.95	1.00			0.80			0.66	
Satd. Flow (perm)	1770	3445		1770	3404			1295			1090	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	505	49	88	714	132	60	60	110	77	49	88
RTOR Reduction (vph)	0	5	0	0	10	0	0	53	0	0	40	0
Lane Group Flow (vph)	82	549	0	88	836	0	0	177	0	0	174	0
Confl. Peds. (#/hr)	30		48	48		30	78		113	113		78
Confl. Bikes (#/hr)			24			5			2			17
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	7.4	49.6		7.6	49.8			15.9			15.9	
Effective Green, g (s)	7.4	50.5		7.6	50.7			15.9			15.9	
Actuated g/C Ratio	0.09	0.59		0.09	0.59			0.18			0.18	
Clearance Time (s)	4.0	4.9		4.0	4.9			4.0			4.0	
Vehicle Extension (s)	2.0	4.1		2.0	4.1			2.0			2.0	
Lane Grp Cap (vph)	152	2023		156	2007			239			202	
v/s Ratio Prot	0.05	0.16		c0.05	c0.25							
v/s Ratio Perm								0.14			c0.16	
v/c Ratio	0.54	0.27		0.56	0.42			0.74			0.86	
Uniform Delay, d1	37.7	8.7		37.6	9.6			33.1			34.0	
Progression Factor	0.89	1.80		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.7	0.3		2.8	0.6			10.3			28.5	
Delay (s)	35.3	16.0		40.4	10.2			43.4			62.5	
Level of Service	D	B		D	B			D			E	
Approach Delay (s)		18.5			13.1			43.4			62.5	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

8: University Ave & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	175	410	120	145	510	430	240	645	195	265	375	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	0.94	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1509	1770	3539	1556	1770	3539	1492	3433	3539	1556
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1509	1770	3539	1556	1770	3539	1492	3433	3539	1556
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	180	423	124	149	526	443	247	665	201	273	387	186
RTOR Reduction (vph)	0	0	87	0	0	0	0	0	128	0	0	0
Lane Group Flow (vph)	180	423	37	149	526	443	247	665	73	273	387	186
Confl. Peds. (#/hr)			44			18			54			18
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free			8			Free
Actuated Green, G (s)	11.5	25.2	25.2	8.6	22.3	86.8	14.1	24.7	24.7	9.5	20.1	86.8
Effective Green, g (s)	11.9	26.2	26.2	9.0	23.3	86.8	14.5	25.7	25.7	9.9	21.1	86.8
Actuated g/C Ratio	0.14	0.30	0.30	0.10	0.27	1.00	0.17	0.30	0.30	0.11	0.24	1.00
Clearance Time (s)	4.4	5.0	5.0	4.4	5.0		4.4	5.0	5.0	4.4	5.0	
Vehicle Extension (s)	2.0	3.5	3.5	2.0	3.7		3.0	3.5	3.5	2.0	3.5	
Lane Grp Cap (vph)	243	1068	455	184	950	1556	296	1048	442	392	860	1556
v/s Ratio Prot	c0.10	0.12		0.08	c0.15		c0.14	c0.19		0.08	0.11	
v/s Ratio Perm			0.02			c0.28			0.05			0.12
v/c Ratio	0.74	0.40	0.08	0.81	0.55	0.28	0.83	0.63	0.16	0.70	0.45	0.12
Uniform Delay, d1	36.0	24.0	21.7	38.1	27.3	0.0	35.0	26.5	22.6	37.0	27.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.1	0.3	0.1	21.3	0.8	0.5	18.0	1.3	0.2	4.3	0.4	0.2
Delay (s)	46.1	24.3	21.8	59.4	28.1	0.5	53.0	27.8	22.8	41.3	28.4	0.2
Level of Service	D	C	C	E	C	A	D	C	C	D	C	A
Approach Delay (s)		29.3			21.3			32.5			26.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	86.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑	↱		✣			✣	
Volume (vph)	65	630	165	95	630	95	250	155	110	65	50	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.95		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.98	
Satd. Flow (prot)	1770	5085	1545	1770	3539	1505		1752			1724	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.75			0.75	
Satd. Flow (perm)	1770	5085	1545	1770	3539	1505		1345			1313	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	70	677	177	102	677	102	269	167	118	70	54	70
RTOR Reduction (vph)	0	0	0	0	0	63	0	0	0	0	0	0
Lane Group Flow (vph)	70	677	177	102	677	39	0	554	0	0	194	0
Confl. Peds. (#/hr)			8			12	9		17	17		9
Confl. Bikes (#/hr)									2			6
Turn Type	Prot	NA	Free	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			4	
Permitted Phases			Free			6	4			4		
Actuated Green, G (s)	6.7	23.9	80.0	7.9	25.3	25.3		33.8			33.8	
Effective Green, g (s)	7.1	25.0	80.0	8.3	26.2	26.2		34.7			34.7	
Actuated g/C Ratio	0.09	0.31	1.00	0.10	0.33	0.33		0.43			0.43	
Clearance Time (s)	4.4	5.1		4.4	4.9	4.9		4.9			4.9	
Vehicle Extension (s)	2.0	3.5		2.0	3.5	3.5		2.0			2.0	
Lane Grp Cap (vph)	157	1589	1545	184	1159	493		583			570	
v/s Ratio Prot	0.04	0.13		c0.06	c0.19							
v/s Ratio Perm			c0.11			0.03		c0.41			0.15	
v/c Ratio	0.45	0.43	0.11	0.55	0.58	0.08		0.95			0.34	
Uniform Delay, d1	34.6	21.8	0.0	34.1	22.4	18.6		21.8			15.0	
Progression Factor	1.25	1.33	1.00	1.21	0.91	0.92		1.00			1.00	
Incremental Delay, d2	0.6	0.7	0.1	2.0	2.1	0.3		25.2			0.1	
Delay (s)	44.0	29.8	0.1	43.2	22.4	17.4		47.1			15.2	
Level of Service	D	C	A	D	C	B		D			B	
Approach Delay (s)		25.2			24.3			47.1			15.2	
Approach LOS		C			C			D			B	

Intersection Summary			
HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱			✥			✥	
Volume (vph)	25	675	50	50	710	30	75	5	25	20	5	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1770	5023		1770	3514			1727			1680	
Flt Permitted	0.95	1.00		0.95	1.00			0.80			0.87	
Satd. Flow (perm)	1770	5023		1770	3514			1428			1499	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	742	55	55	780	33	82	5	27	22	5	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	27	797	0	55	813	0	0	114	0	0	54	0
Confl. Peds. (#/hr)			4			1	4		13	13		4
Confl. Bikes (#/hr)			1			1			4			5
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.1	47.8		4.1	50.0			13.7			13.7	
Effective Green, g (s)	2.5	48.9		4.5	50.9			14.6			14.6	
Actuated g/C Ratio	0.03	0.61		0.06	0.64			0.18			0.18	
Clearance Time (s)	4.4	5.1		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	4.7		2.0	3.9			2.0			2.0	
Lane Grp Cap (vph)	55	3070		100	2236			261			274	
v/s Ratio Prot	0.02	0.16		c0.03	c0.23							
v/s Ratio Perm								c0.08			0.04	
v/c Ratio	0.49	0.26		0.55	0.36			0.44			0.20	
Uniform Delay, d1	38.1	7.2		36.8	6.9			29.0			27.7	
Progression Factor	1.30	0.70		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.5	0.2		3.7	0.5			0.4			0.1	
Delay (s)	51.9	5.3		40.4	7.3			29.5			27.9	
Level of Service	D	A		D	A			C			C	
Approach Delay (s)		6.8			9.4			29.5			27.9	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2035 with Project AM
12: College ave & University Ave

11/3/2012

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	175	425	145	165	480	165	220	855	195	145	365	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1525	1770	3376		1770	3415		1770	3387	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1525	1770	3376		1770	3415		1770	3387	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	192	467	159	181	527	181	242	940	214	159	401	126
RTOR Reduction (vph)	0	0	116	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	192	467	43	181	708	0	242	1154	0	159	527	0
Confl. Peds. (#/hr)			22			16			20			13
Confl. Bikes (#/hr)						1			8			5
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	15.6	26.9	26.9	15.1	26.6		17.0	28.4		13.4	23.5	
Effective Green, g (s)	16.0	28.0	28.0	15.5	27.5		17.4	29.6		13.8	26.0	
Actuated g/C Ratio	0.16	0.27	0.27	0.15	0.27		0.17	0.29		0.13	0.25	
Clearance Time (s)	4.4	5.1	5.1	4.4	4.9		4.4	5.2		4.4	6.5	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.7		2.0	3.2		2.0	3.6	
Lane Grp Cap (vph)	275	963	415	267	902		299	982		237	856	
v/s Ratio Prot	c0.11	0.13		0.10	c0.21		c0.14	c0.34		0.09	0.16	
v/s Ratio Perm			0.03									
v/c Ratio	0.70	0.48	0.10	0.68	0.78		0.81	1.18		0.67	0.62	
Uniform Delay, d1	41.2	31.4	28.1	41.3	35.0		41.2	36.7		42.4	34.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	0.5	0.1	5.3	4.7		14.1	89.6		5.8	1.4	
Delay (s)	47.3	31.9	28.2	46.6	39.7		55.2	126.3		48.1	35.4	
Level of Service	D	C	C	D	D		E	F		D	D	
Approach Delay (s)		34.8			41.1			114.0			38.4	
Approach LOS		C			D			F			D	

Intersection Summary			
HCM Average Control Delay	66.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	102.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	100	505	60	35	555	65	85	40	30	30	35	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.97			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	3474		1770	3476			1751			1708	
Flt Permitted	0.95	1.00		0.95	1.00			0.73			0.90	
Satd. Flow (perm)	1770	3474		1770	3476			1310			1558	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	532	63	37	584	68	89	42	32	32	37	53
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	105	595	0	37	652	0	0	163	0	0	122	0
Confl. Peds. (#/hr)			5			1	5		20	20		5
Confl. Bikes (#/hr)			1			1			3			6
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	8.6	54.4		4.5	50.3			16.9			16.9	
Effective Green, g (s)	9.0	55.3		4.9	51.2			17.8			17.8	
Actuated g/C Ratio	0.10	0.61		0.05	0.57			0.20			0.20	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	3.6		2.0	3.6			2.0			2.0	
Lane Grp Cap (vph)	177	2135		96	1977			259			308	
v/s Ratio Prot	c0.06	0.17		0.02	c0.19							
v/s Ratio Perm								c0.12			0.08	
v/c Ratio	0.59	0.28		0.39	0.33			0.63			0.40	
Uniform Delay, d1	38.7	8.1		41.1	10.3			33.1			31.4	
Progression Factor	1.00	1.00		1.21	0.59			1.00			1.00	
Incremental Delay, d2	3.5	0.3		0.9	0.4			3.4			0.3	
Delay (s)	42.3	8.4		50.8	6.5			36.5			31.7	
Level of Service	D	A		D	A			D			C	
Approach Delay (s)		13.5			8.9			36.5			31.7	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↑↱		↰	↑↱	
Volume (vph)	65	10	10	145	15	165	5	755	75	95	550	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.9	5.9		5.9	5.9	4.4	6.1		4.4	5.8	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1785	1553		1782	1552	1770	3477		1770	3517	
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1785	1553		1782	1552	1770	3477		1770	3517	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	74	11	11	165	17	188	6	858	85	108	625	23
RTOR Reduction (vph)	0	0	10	0	0	151	0	7	0	0	2	0
Lane Group Flow (vph)	0	85	1	0	182	37	6	936	0	108	646	0
Confl. Peds. (#/hr)	3		2	2		3	5		11	11		5
Confl. Bikes (#/hr)			2			3			11			5
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)		10.9	10.9		20.9	20.9	1.2	41.7		10.2	51.0	
Effective Green, g (s)		10.9	10.9		20.9	20.9	1.2	41.7		10.2	51.0	
Actuated g/C Ratio		0.10	0.10		0.20	0.20	0.01	0.39		0.10	0.48	
Clearance Time (s)		5.9	5.9		5.9	5.9	4.4	6.1		4.4	5.8	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	2.0	3.3		2.0	3.3	
Lane Grp Cap (vph)		184	160		351	306	20	1368		170	1692	
v/s Ratio Prot		c0.05			c0.10		0.00	c0.27		c0.06	0.18	
v/s Ratio Perm			0.00			0.02						
v/c Ratio		0.46	0.01		0.52	0.12	0.30	0.68		0.64	0.38	
Uniform Delay, d1		44.8	42.7		38.1	35.0	52.0	26.7		46.1	17.5	
Progression Factor		1.00	1.00		1.00	1.00	1.09	0.85		1.30	0.59	
Incremental Delay, d2		1.8	0.0		1.3	0.2	2.9	2.7		5.3	0.6	
Delay (s)		46.6	42.7		39.3	35.2	59.6	25.4		65.1	10.9	
Level of Service		D	D		D	D	E	C		E	B	
Approach Delay (s)		46.2			37.2			25.7			18.7	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	22.3
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	95	30	30	85	40	60	75	680	75	55	520	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	5.1		4.4	5.7	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.96		1.00	0.99		1.00	0.97	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1760			1741		1770	3486		1770	3423	
Flt Permitted		0.64			0.77		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1158			1379		1770	3486		1770	3423	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	33	33	92	43	65	82	739	82	60	565	158
RTOR Reduction (vph)	0	10	0	0	20	0	0	4	0	0	14	0
Lane Group Flow (vph)	0	159	0	0	180	0	82	817	0	60	709	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.2			18.2		8.2	66.3		7.1	64.6	
Effective Green, g (s)		19.1			19.1		8.6	66.3		7.1	64.6	
Actuated g/C Ratio		0.18			0.18		0.08	0.63		0.07	0.61	
Clearance Time (s)		4.9			4.9		4.4	5.1		4.4	5.7	
Vehicle Extension (s)		2.0			2.0		2.0	4.7		2.0	4.7	
Lane Grp Cap (vph)		209			248		144	2180		119	2086	
v/s Ratio Prot							c0.05	c0.23		0.03	0.21	
v/s Ratio Perm		c0.14			0.13							
v/c Ratio		0.76			0.72		0.57	0.37		0.50	0.34	
Uniform Delay, d1		41.3			41.0		46.9	9.7		47.8	10.2	
Progression Factor		1.00			1.00		1.08	0.60		1.31	0.64	
Incremental Delay, d2		13.7			8.5		2.9	0.5		1.2	0.4	
Delay (s)		54.9			49.5		53.7	6.3		63.9	7.0	
Level of Service		D			D		D	A		E	A	
Approach Delay (s)		54.9			49.5			10.6			11.3	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱		↰	↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Volume (vph)	50	55	40	130	110	245	20	510	80	100	520	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.96		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.98		0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1763		1681	1760	1583	1770	3467		1770	3505	
Flt Permitted		0.98		0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1763		1681	1760	1583	1770	3467		1770	3505	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	54	59	43	140	118	263	22	548	86	108	559	38
RTOR Reduction (vph)	0	12	0	0	0	222	0	10	0	0	3	0
Lane Group Flow (vph)	0	144	0	126	132	41	22	624	0	108	594	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		13.7		14.7	14.7	14.7	2.9	46.5		10.8	54.3	
Effective Green, g (s)		14.6		16.4	16.4	16.4	3.3	47.8		11.2	55.7	
Actuated g/C Ratio		0.14		0.15	0.15	0.15	0.03	0.45		0.11	0.53	
Clearance Time (s)		4.9		5.7	5.7	5.7	4.4	5.3		4.4	5.4	
Vehicle Extension (s)		3.6		2.6	2.6	2.6	2.0	5.0		2.0	4.7	
Lane Grp Cap (vph)		243		260	272	245	55	1563		187	1842	
v/s Ratio Prot		c0.08		0.07	c0.07		0.01	c0.18		c0.06	0.17	
v/s Ratio Perm						0.03						
v/c Ratio		0.59		0.48	0.49	0.17	0.40	0.40		0.58	0.32	
Uniform Delay, d1		42.9		40.9	40.9	38.9	50.4	19.5		45.1	14.4	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.32	0.44	
Incremental Delay, d2		4.1		1.1	1.1	0.3	1.7	0.8		2.6	0.4	
Delay (s)		47.1		42.1	42.0	39.1	52.1	20.2		62.1	6.8	
Level of Service		D		D	D	D	D	C		E	A	
Approach Delay (s)		47.1			40.6			21.3			15.3	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project AM

18: Lea Street & University Ave

1/7/2014

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	25	785	5	75	870	15	20	20	70	50	25	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.0	4.0			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.91			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3536		1770	3530			1689			1750	
Flt Permitted	0.95	1.00		0.95	1.00			0.91			0.44	
Satd. Flow (perm)	1770	3536		1770	3530			1551			783	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	27	844	5	81	935	16	22	22	75	54	27	32
RTOR Reduction (vph)	0	1	0	0	1	0	0	67	0	0	18	0
Lane Group Flow (vph)	27	848	0	81	950	0	0	52	0	0	95	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			3	
Permitted Phases							4			3		
Actuated Green, G (s)	1.6	33.9		7.1	39.4			8.2			12.8	
Effective Green, g (s)	1.6	33.9		7.6	39.9			8.2			12.8	
Actuated g/C Ratio	0.02	0.42		0.09	0.50			0.10			0.16	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	35	1498		168	1760			158			125	
v/s Ratio Prot	0.02	0.24		c0.05	c0.27							
v/s Ratio Perm								c0.03			c0.12	
v/c Ratio	0.77	0.57		0.48	0.54			0.33			0.76	
Uniform Delay, d1	39.0	17.5		34.3	13.8			33.3			32.1	
Progression Factor	1.51	1.51		0.72	1.02			1.00			1.00	
Incremental Delay, d2	62.5	1.4		1.7	0.9			1.2			22.6	
Delay (s)	121.5	27.9		26.5	15.0			34.6			54.7	
Level of Service	F	C		C	B			C			D	
Approach Delay (s)		30.8			15.9			34.6			54.7	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project AM
19: Lea Street & 54th St

3/27/2014

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	55	20	55	175	20	15	30	1045	70	50	565	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.94			0.99		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1721			1771		1770	3506		1770	3517	
Flt Permitted		0.83			0.65		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1459			1195		1770	3506		1770	3517	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	59	22	59	188	22	16	32	1124	75	54	608	27
RTOR Reduction (vph)	0	22	0	0	2	0	0	6	0	0	4	0
Lane Group Flow (vph)	0	118	0	0	224	0	32	1193	0	54	631	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		29.5			29.5		4.3	55.1		6.9	57.7	
Effective Green, g (s)		30.0			30.0		4.8	55.6		7.4	58.2	
Actuated g/C Ratio		0.29			0.29		0.05	0.53		0.07	0.55	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		417			341		81	1857		125	1949	
v/s Ratio Prot							0.02	c0.34		c0.03	c0.18	
v/s Ratio Perm		0.08			c0.19							
v/c Ratio		0.28			0.66		0.40	0.64		0.43	0.32	
Uniform Delay, d1		29.1			33.0		48.7	17.6		46.8	12.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			4.5		3.2	1.7		2.4	0.4	
Delay (s)		29.5			37.5		51.8	19.3		49.2	13.2	
Level of Service		C			D		D	B		D	B	
Approach Delay (s)		29.5			37.5			20.2			16.0	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project AM
20: University Ave & Street B

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰↱	
Volume (vph)	770	100	45	875	160	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.98		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3478		1770	3539	1726	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3478		1770	3539	1726	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	828	108	48	941	172	75
RTOR Reduction (vph)	10	0	0	0	22	0
Lane Group Flow (vph)	926	0	48	941	225	0
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Actuated Green, G (s)	46.1		4.9	55.5	15.5	
Effective Green, g (s)	46.1		4.9	55.5	15.5	
Actuated g/C Ratio	0.58		0.06	0.69	0.19	
Clearance Time (s)	4.5		4.5	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2004		108	2455	334	
v/s Ratio Prot	c0.27		0.03	c0.27	c0.13	
v/s Ratio Perm						
v/c Ratio	0.46		0.44	0.38	0.67	
Uniform Delay, d1	9.8		36.2	5.1	29.9	
Progression Factor	1.00		1.09	0.30	1.00	
Incremental Delay, d2	0.8		2.5	0.4	5.3	
Delay (s)	10.6		42.1	1.9	35.2	
Level of Service	B		D	A	D	
Approach Delay (s)	10.6			3.9	35.2	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

21: 54th St & Street C

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱		↰	↑↑
Volume (veh/h)	0	15	1010	65	15	635
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	16	1086	70	16	683
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			825			841
pX, platoon unblocked	0.70	0.67			0.67	
vC, conflicting volume	1495	578			1156	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	487	0			264	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	352	731			874	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	16	724	432	16	341	341
Volume Left	0	0	0	16	0	0
Volume Right	16	0	70	0	0	0
cSH	731	1700	1700	874	1700	1700
Volume to Capacity	0.02	0.43	0.25	0.02	0.20	0.20
Queue Length 95th (ft)	2	0	0	1	0	0
Control Delay (s)	10.0	0.0	0.0	9.2	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	10.0	0.0		0.2		
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Volume (vph)	1635	1425	175	1000	760	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1703	1484	182	1042	792	125
RTOR Reduction (vph)	0	15	0	0	0	85
Lane Group Flow (vph)	1703	1469	182	1042	792	40
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	75.5	112.7	12.4	91.9	37.2	37.2
Effective Green, g (s)	77.6	113.5	12.8	94.4	37.6	37.6
Actuated g/C Ratio	0.55	0.81	0.09	0.67	0.27	0.27
Clearance Time (s)	6.1	4.4	4.4	6.5	4.4	4.4
Vehicle Extension (s)	4.3	2.0	2.0	4.8	2.0	2.0
Lane Grp Cap (vph)	1962	1283	162	2386	922	425
v/s Ratio Prot	0.48	c0.31	c0.10	0.29	0.23	
v/s Ratio Perm		0.62				0.03
v/c Ratio	0.87	1.15	1.12	0.44	0.86	0.09
Uniform Delay, d1	26.8	13.2	63.6	10.5	48.7	38.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	75.0	107.7	0.6	7.7	0.0
Delay (s)	32.3	88.3	171.3	11.1	56.4	38.5
Level of Service	C	F	F	B	E	D
Approach Delay (s)	58.4			34.9	54.0	
Approach LOS	E			C	D	

Intersection Summary			
HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Volume (vph)	90	55	730	190	70	1350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	60	793	207	76	1467
RTOR Reduction (vph)	0	54	0	186	0	0
Lane Group Flow (vph)	98	6	793	21	76	1467
Turn Type		Perm		Over	Prot	
Protected Phases	3		2	3	1	6
Permitted Phases		3				
Actuated Green, G (s)	12.1	12.1	86.9	12.1	8.5	99.4
Effective Green, g (s)	12.1	12.1	86.9	12.1	8.5	99.4
Actuated g/C Ratio	0.10	0.10	0.72	0.10	0.07	0.83
Clearance Time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Vehicle Extension (s)	2.0	2.0	3.7	2.0	2.0	3.7
Lane Grp Cap (vph)	178	160	2563	160	125	2931
v/s Ratio Prot	c0.06		0.22	0.01	c0.04	c0.41
v/s Ratio Perm		0.00				
v/c Ratio	0.55	0.04	0.31	0.13	0.61	0.50
Uniform Delay, d1	51.4	48.7	5.9	49.2	54.1	3.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.0	0.3	0.1	5.6	0.6
Delay (s)	53.4	48.7	6.2	49.3	59.8	3.6
Level of Service	D	D	A	D	E	A
Approach Delay (s)	51.7		15.1			6.4
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project PM
3: El Cajon Bl & 54th St

2/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰	↑↑	↱
Volume (vph)	140	595	320	305	480	215	185	565	215	360	970	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3393		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	3393		1770	3539	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	146	620	333	318	500	224	193	589	224	375	1010	115
RTOR Reduction (vph)	0	0	191	0	0	160	0	28	0	0	0	57
Lane Group Flow (vph)	146	620	142	318	500	64	193	785	0	375	1010	58
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	14.8	31.8	31.8	23.2	38.9	38.9	11.8	35.2		32.1	55.6	55.6
Effective Green, g (s)	15.2	31.7	31.7	23.6	40.1	40.1	12.2	36.2		32.5	56.5	56.5
Actuated g/C Ratio	0.11	0.23	0.23	0.17	0.29	0.29	0.09	0.26		0.23	0.40	0.40
Clearance Time (s)	4.4	3.9	3.9	4.4	5.2	5.2	4.4	5.0		4.4	4.9	4.9
Vehicle Extension (s)	1.5	3.7	3.7	1.5	3.7	3.7	1.5	3.7		1.5	3.7	3.7
Lane Grp Cap (vph)	192	801	358	298	1014	453	299	877		411	1428	639
v/s Ratio Prot	0.08	c0.18		c0.18	0.14		0.06	c0.23		c0.21	0.29	
v/s Ratio Perm			0.09			0.04						0.04
v/c Ratio	0.76	0.77	0.40	1.07	0.49	0.14	0.65	0.89		0.91	0.71	0.09
Uniform Delay, d1	60.6	50.8	46.0	58.2	41.5	37.1	61.8	50.1		52.4	34.8	25.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.7	7.2	3.3	71.0	1.7	0.7	3.6	11.8		23.8	1.7	0.1
Delay (s)	75.3	58.0	49.3	129.2	43.2	37.8	65.4	61.9		76.2	36.6	25.9
Level of Service	E	E	D	F	D	D	E	E		E	D	C
Approach Delay (s)		57.6			68.3			62.5			45.6	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM Average Control Delay	57.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

4: Trojan Ave & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	50	40	100	70	35	115	100	750	135	265	1200	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.93		1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1708			1704		1770	3458		1770	3500	
Flt Permitted		0.75			0.69		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1306			1197		1770	3458		1770	3500	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	43	106	74	37	122	106	798	144	282	1277	101
RTOR Reduction (vph)	0	53	0	0	53	0	0	11	0	0	3	0
Lane Group Flow (vph)	0	149	0	0	180	0	106	931	0	282	1375	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		21.1			21.1		11.7	48.0		36.3	72.4	
Effective Green, g (s)		22.0			22.0		12.1	49.3		36.7	73.9	
Actuated g/C Ratio		0.18			0.18		0.10	0.41		0.31	0.62	
Clearance Time (s)		4.9			4.9		4.4	5.3		4.4	5.5	
Vehicle Extension (s)		3.0			3.0		2.0	2.1		2.0	2.1	
Lane Grp Cap (vph)		239			219		178	1421		541	2155	
v/s Ratio Prot							c0.06	0.27		0.16	c0.39	
v/s Ratio Perm		0.11			c0.15							
v/c Ratio		0.62			0.82		0.60	0.66		0.52	0.64	
Uniform Delay, d1		45.2			47.1		51.6	28.5		34.4	14.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.0			21.3		3.5	2.4		0.4	1.5	
Delay (s)		50.2			68.4		55.1	30.9		34.8	16.0	
Level of Service		D			E		E	C		C	B	
Approach Delay (s)		50.2			68.4			33.3			19.2	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

5: Orange Av & 54th Pl

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	45	30	40	75	20	95	40	80	25	50	35
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	34	51	34	45	85	23	108	45	91	28	57	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	119	153	244	125
Volume Left (vph)	34	45	108	28
Volume Right (vph)	34	23	91	40
Hadj (s)	-0.08	0.00	-0.10	-0.11
Departure Headway (s)	4.9	5.0	4.7	4.8
Degree Utilization, x	0.16	0.21	0.32	0.17
Capacity (veh/h)	663	665	730	690
Control Delay (s)	8.9	9.3	9.8	8.8
Approach Delay (s)	8.9	9.3	9.8	8.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.3		
HCM Level of Service	A		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

2035 w/ Project PM
6: University Ave & Euclid Ave

2/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Volume (vph)	100	660	135	250	570	90	65	230	180	70	270	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3449		1770	3467		1770	1740		1770	1815	
Flt Permitted	0.95	1.00		0.95	1.00		0.34	1.00		0.22	1.00	
Satd. Flow (perm)	1770	3449		1770	3467		628	1740		401	1815	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	106	702	144	266	606	96	69	245	191	74	287	59
RTOR Reduction (vph)	0	20	0	0	11	0	0	42	0	0	11	0
Lane Group Flow (vph)	106	826	0	266	691	0	69	394	0	74	335	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	8.4	25.1		21.4	38.1		25.3	25.3		25.3	25.3	
Effective Green, g (s)	8.8	26.0		21.8	39.0		26.2	26.2		26.2	26.2	
Actuated g/C Ratio	0.10	0.30		0.25	0.45		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.1		2.0	2.3		3.7	3.7		4.2	4.2	
Lane Grp Cap (vph)	181	1043		449	1572		191	530		122	553	
v/s Ratio Prot	0.06	c0.24		c0.15	0.20			c0.23			0.18	
v/s Ratio Perm							0.11			0.18		
v/c Ratio	0.59	0.79		0.59	0.44		0.36	0.74		0.61	0.61	
Uniform Delay, d1	36.9	27.5		28.2	16.0		23.4	26.9		25.5	25.5	
Progression Factor	1.00	1.00		0.67	1.09		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.1	6.2		1.3	0.8		1.5	5.8		10.0	2.3	
Delay (s)	40.0	33.7		20.2	18.3		24.8	32.7		35.5	27.8	
Level of Service	D	C		C	B		C	C		D	C	
Approach Delay (s)		34.4			18.9			31.6			29.1	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	75	840	75	85	805	65	50	55	100	120	55	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.94			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.96	
Frt	1.00	0.99		1.00	0.99			0.93			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1770	3452		1770	3474			1595			1649	
Flt Permitted	0.95	1.00		0.95	1.00			0.87			0.62	
Satd. Flow (perm)	1770	3452		1770	3474			1402			1054	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	76	848	76	86	813	66	51	56	101	121	56	56
RTOR Reduction (vph)	0	5	0	0	4	0	0	52	0	0	17	0
Lane Group Flow (vph)	76	919	0	86	875	0	0	156	0	0	216	0
Confl. Peds. (#/hr)	30		48	48		30	78		113	113		78
Confl. Bikes (#/hr)			24			5			2			17
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	7.1	46.6		7.6	47.1			18.9			18.9	
Effective Green, g (s)	7.1	47.5		7.6	48.0			18.9			18.9	
Actuated g/C Ratio	0.08	0.55		0.09	0.56			0.22			0.22	
Clearance Time (s)	4.0	4.9		4.0	4.9			4.0			4.0	
Vehicle Extension (s)	2.0	4.1		2.0	4.1			2.0			2.0	
Lane Grp Cap (vph)	146	1907		156	1939			308			232	
v/s Ratio Prot	0.04	c0.27		c0.05	0.25							
v/s Ratio Perm								0.11			c0.20	
v/c Ratio	0.52	0.48		0.55	0.45			0.51			0.93	
Uniform Delay, d1	37.8	11.7		37.6	11.2			29.4			32.9	
Progression Factor	0.71	1.70		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.1	0.6		2.4	0.8			0.5			39.9	
Delay (s)	27.8	20.6		39.9	12.0			29.9			72.8	
Level of Service	C	C		D	B			C			E	
Approach Delay (s)		21.1			14.5			29.9			72.8	
Approach LOS		C			B			C			E	

Intersection Summary

HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project PM
8: University Ave & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	755	415	285	770	400	255	570	195	670	655	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.98	1.00	1.00	0.93	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1491	1770	3539	1556	1770	3539	1468	3433	3539	1556
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1491	1770	3539	1556	1770	3539	1468	3433	3539	1556
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	184	795	437	300	811	421	268	600	205	705	689	221
RTOR Reduction (vph)	0	0	191	0	0	0	0	0	118	0	0	0
Lane Group Flow (vph)	184	795	246	300	811	421	268	600	87	705	689	221
Confl. Peds. (#/hr)			44			18			54			18
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free			8			Free
Actuated Green, G (s)	14.3	30.3	30.3	17.7	33.7	114.8	20.2	27.2	27.2	20.8	27.8	114.8
Effective Green, g (s)	14.7	31.3	31.3	18.1	34.7	114.8	20.6	28.2	28.2	21.2	28.8	114.8
Actuated g/C Ratio	0.13	0.27	0.27	0.16	0.30	1.00	0.18	0.25	0.25	0.18	0.25	1.00
Clearance Time (s)	4.4	5.0	5.0	4.4	5.0		4.4	5.0	5.0	4.4	5.0	
Vehicle Extension (s)	2.0	3.5	3.5	2.0	3.7		3.0	3.5	3.5	2.0	3.5	
Lane Grp Cap (vph)	227	965	407	279	1070	1556	318	869	361	634	888	1556
v/s Ratio Prot	0.10	c0.22		c0.17	0.23		0.15	0.17		c0.21	c0.19	
v/s Ratio Perm			0.16			c0.27			0.06			0.14
v/c Ratio	0.81	0.82	0.60	1.08	0.76	0.27	0.84	0.69	0.24	1.11	0.78	0.14
Uniform Delay, d1	48.7	39.2	36.4	48.3	36.2	0.0	45.5	39.3	34.7	46.8	40.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.4	5.9	2.7	75.3	3.3	0.4	18.0	2.5	0.4	70.5	4.4	0.2
Delay (s)	67.1	45.1	39.0	123.7	39.5	0.4	63.5	41.8	35.1	117.3	44.4	0.2
Level of Service	E	D	D	F	D	A	E	D	D	F	D	A
Approach Delay (s)		46.1			45.3			46.0			70.2	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	52.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	114.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2035 w/ Project PM
10: University Ave & 58th st

2/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑	↱		✥			✥	
Volume (vph)	120	1100	325	90	930	75	240	120	105	70	50	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.94		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.98	
Satd. Flow (prot)	1770	5085	1545	1770	3539	1493		1743			1724	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72			0.74	
Satd. Flow (perm)	1770	5085	1545	1770	3539	1493		1296			1304	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1158	342	95	979	79	253	126	111	74	53	68
RTOR Reduction (vph)	0	0	0	0	0	28	0	0	0	0	0	0
Lane Group Flow (vph)	126	1158	342	95	979	51	0	490	0	0	195	0
Confl. Peds. (#/hr)			8			12	9		17	17		9
Confl. Bikes (#/hr)									2			6
Turn Type	Prot		Free	Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			4			4	
Permitted Phases			Free			6	4			4		
Actuated Green, G (s)	9.4	38.2	100.0	7.0	36.0	36.0		40.4			40.4	
Effective Green, g (s)	9.8	39.3	100.0	7.4	36.9	36.9		41.3			41.3	
Actuated g/C Ratio	0.10	0.39	1.00	0.07	0.37	0.37		0.41			0.41	
Clearance Time (s)	4.4	5.1		4.4	4.9	4.9		4.9			4.9	
Vehicle Extension (s)	2.0	3.5		2.0	3.5	3.5		2.0			2.0	
Lane Grp Cap (vph)	173	1998	1545	131	1306	551		535			539	
v/s Ratio Prot	c0.07	0.23		0.05	c0.28							
v/s Ratio Perm			c0.22			0.03		c0.38			0.15	
v/c Ratio	0.73	0.58	0.22	0.73	0.75	0.09		0.92			0.36	
Uniform Delay, d1	43.8	23.9	0.0	45.3	27.5	20.6		27.7			20.3	
Progression Factor	0.67	1.39	1.00	1.06	0.98	1.10		1.00			1.00	
Incremental Delay, d2	4.2	0.4	0.1	14.9	3.8	0.3		20.1			0.2	
Delay (s)	33.6	33.5	0.1	62.9	30.8	23.0		47.8			20.4	
Level of Service	C	C	A	E	C	C		D			C	
Approach Delay (s)		26.5			32.9			47.8			20.4	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project PM
11: University Ave & 60th st

2/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱			✥			✥	
Volume (vph)	40	1070	90	70	890	45	40	5	40	20	5	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.1		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.94			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1770	5014		1770	3510			1679			1668	
Flt Permitted	0.95	1.00		0.95	1.00			0.84			0.89	
Satd. Flow (perm)	1770	5014		1770	3510			1447			1505	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1126	95	74	937	47	42	5	42	21	5	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	42	1221	0	74	984	0	0	89	0	0	58	0
Confl. Peds. (#/hr)			4			1	4		13	13		4
Confl. Bikes (#/hr)			1			1			4			5
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	4.8	60.1		7.3	62.8			18.2			18.2	
Effective Green, g (s)	4.8	60.1		7.3	62.8			18.2			18.2	
Actuated g/C Ratio	0.05	0.60		0.07	0.63			0.18			0.18	
Clearance Time (s)	4.4	5.1		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	4.7		2.0	3.9			2.0			2.0	
Lane Grp Cap (vph)	85	3013		129	2204			263			274	
v/s Ratio Prot	0.02	0.24		c0.04	c0.28							
v/s Ratio Perm								c0.06			0.04	
v/c Ratio	0.49	0.41		0.57	0.45			0.34			0.21	
Uniform Delay, d1	46.4	10.5		44.8	9.6			35.7			34.8	
Progression Factor	0.96	1.08		0.99	1.17			1.00			1.00	
Incremental Delay, d2	1.5	0.4		1.2	0.2			0.3			0.1	
Delay (s)	45.9	11.8		45.7	11.4			35.9			34.9	
Level of Service	D	B		D	B			D			C	
Approach Delay (s)		12.9			13.8			35.9			34.9	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.3
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	270	595	350	275	475	225	270	565	240	265	690	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1526	1770	3335		1770	3341		1770	3355	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1526	1770	3335		1770	3341		1770	3355	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	626	368	289	500	237	284	595	253	279	726	300
RTOR Reduction (vph)	0	0	217	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	284	626	151	289	737	0	284	848	0	279	1026	0
Confl. Peds. (#/hr)			22			16			20			13
Confl. Bikes (#/hr)						1			8			5
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	13.7	26.0	26.0	12.6	25.1		13.6	27.9		14.4	27.4	
Effective Green, g (s)	14.1	27.1	27.1	13.0	26.0		14.0	29.1		14.8	29.9	
Actuated g/C Ratio	0.14	0.27	0.27	0.13	0.26		0.14	0.29		0.15	0.30	
Clearance Time (s)	4.4	5.1	5.1	4.4	4.9		4.4	5.2		4.4	6.5	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.7		2.0	3.2		2.0	3.6	
Lane Grp Cap (vph)	250	959	414	230	867		248	972		262	1003	
v/s Ratio Prot	0.16	0.18		c0.16	c0.22		c0.16	0.25		0.16	c0.31	
v/s Ratio Perm			0.10									
v/c Ratio	1.14	0.65	0.36	1.26	0.85		1.15	0.87		1.06	1.02	
Uniform Delay, d1	43.0	32.3	29.5	43.5	35.1		43.0	33.7		42.6	35.0	
Progression Factor	1.05	0.74	1.48	0.96	1.05		1.00	1.00		1.00	1.00	
Incremental Delay, d2	97.3	1.6	0.7	145.3	8.1		102.0	10.7		73.8	34.4	
Delay (s)	142.6	25.5	44.3	187.1	45.1		145.0	44.4		116.4	69.4	
Level of Service	F	C	D	F	D		F	D		F	E	
Approach Delay (s)		56.9			85.1			69.6			79.5	
Approach LOS		E			F			E			E	

Intersection Summary			
HCM Average Control Delay	72.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	60	770	110	45	610	75	75	60	30	45	45	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	3462		1770	3473			1763			1705	
Flt Permitted	0.95	1.00		0.95	1.00			0.69			0.85	
Satd. Flow (perm)	1770	3462		1770	3473			1241			1469	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	802	115	47	635	78	78	62	31	47	47	73
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	62	917	0	47	713	0	0	171	0	0	167	0
Confl. Peds. (#/hr)			5			1	5		20	20		5
Confl. Bikes (#/hr)			1			1			3			6
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	7.0	62.8		5.1	60.9			17.9			17.9	
Effective Green, g (s)	7.4	63.7		5.5	61.8			18.8			18.8	
Actuated g/C Ratio	0.07	0.64		0.06	0.62			0.19			0.19	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	3.6		2.0	3.6			2.0			2.0	
Lane Grp Cap (vph)	131	2205		97	2146			233			276	
v/s Ratio Prot	c0.04	c0.26		0.03	0.21							
v/s Ratio Perm								c0.14			0.11	
v/c Ratio	0.47	0.42		0.48	0.33			0.73			0.61	
Uniform Delay, d1	44.4	9.0		45.9	9.2			38.2			37.2	
Progression Factor	0.92	0.86		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.4		1.4	0.4			9.8			2.6	
Delay (s)	41.5	8.0		47.3	9.6			48.1			39.8	
Level of Service	D	A		D	A			D			D	
Approach Delay (s)		10.2			11.9			48.1			39.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project PM
15: Streamview Dr & 54th St

2/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Volume (vph)	40	5	10	135	10	170	10	880	75	230	980	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1784	1554		1780	1550	1770	3485		1770	3515	
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1784	1554		1780	1550	1770	3485		1770	3515	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	46	6	11	155	11	195	11	1011	86	264	1126	46
RTOR Reduction (vph)	0	0	10	0	0	162	0	6	0	0	2	0
Lane Group Flow (vph)	0	52	1	0	166	33	11	1091	0	264	1170	0
Confl. Peds. (#/hr)	3		2	2		3	5		11	11		5
Confl. Bikes (#/hr)			2			3			11			5
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)		9.7	9.7		16.0	16.0	1.3	36.0		22.0	57.0	
Effective Green, g (s)		11.6	11.6		17.9	17.9	1.7	38.1		22.4	58.8	
Actuated g/C Ratio		0.11	0.11		0.17	0.17	0.02	0.36		0.21	0.55	
Clearance Time (s)		5.9	5.9		5.9	5.9	4.4	6.1		4.4	5.8	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	2.0	3.3		2.0	3.3	
Lane Grp Cap (vph)		195	170		301	262	28	1253		374	1950	
v/s Ratio Prot		c0.03			c0.09		0.01	c0.31		c0.15	0.33	
v/s Ratio Perm			0.00			0.02						
v/c Ratio		0.27	0.01		0.55	0.13	0.39	0.87		0.71	0.60	
Uniform Delay, d1		43.3	42.1		40.4	37.4	51.6	31.6		38.7	15.7	
Progression Factor		1.00	1.00		1.00	1.00	1.22	0.58		1.33	0.45	
Incremental Delay, d2		0.7	0.0		2.2	0.2	3.1	7.9		4.2	1.2	
Delay (s)		44.0	42.1		42.6	37.6	66.2	26.2		55.5	8.3	
Level of Service		D	D		D	D	E	C		E	A	
Approach Delay (s)		43.7			39.9			26.6			17.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	90	40	35	85	40	50	105	800	130	90	935	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.96		1.00	0.98		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1761			1748		1770	3465		1770	3488	
Flt Permitted		0.68			0.74		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1235			1324		1770	3465		1770	3488	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	42	37	89	42	53	111	842	137	95	984	105
RTOR Reduction (vph)	0	12	0	0	17	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	162	0	0	167	0	111	972	0	95	1085	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		17.7			17.7		11.0	65.0		8.9	62.3	
Effective Green, g (s)		18.6			18.6		11.4	66.1		9.3	64.0	
Actuated g/C Ratio		0.18			0.18		0.11	0.62		0.09	0.60	
Clearance Time (s)		4.9			4.9		4.4	5.1		4.4	5.7	
Vehicle Extension (s)		2.0			2.0		2.0	4.7		2.0	4.7	
Lane Grp Cap (vph)		217			232		190	2161		155	2106	
v/s Ratio Prot							c0.06	0.28		0.05	c0.31	
v/s Ratio Perm		c0.13			0.13							
v/c Ratio		0.75			0.72		0.58	0.45		0.61	0.52	
Uniform Delay, d1		41.5			41.2		45.0	10.4		46.6	12.1	
Progression Factor		1.00			1.00		1.05	0.48		1.16	0.88	
Incremental Delay, d2		11.6			8.5		2.2	0.5		4.2	0.8	
Delay (s)		53.1			49.8		49.5	5.5		58.5	11.4	
Level of Service		D			D		D	A		E	B	
Approach Delay (s)		53.1			49.8			10.0			15.2	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱		↰	↰↑	↱	↰	↑↱		↰	↑↱	
Volume (vph)	50	85	35	85	105	180	30	785	125	200	805	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.97		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1785		1681	1770	1583	1770	3466		1770	3500	
Flt Permitted		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1785		1681	1770	1583	1770	3466		1770	3500	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	90	37	90	112	191	32	835	133	213	856	69
RTOR Reduction (vph)	0	9	0	0	0	163	0	12	0	0	4	0
Lane Group Flow (vph)	0	171	0	90	112	28	32	956	0	213	921	0
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)		10.9		13.8	13.8	13.8	4.5	37.8		23.2	56.4	
Effective Green, g (s)		11.8		15.5	15.5	15.5	4.9	39.1		23.6	57.8	
Actuated g/C Ratio		0.11		0.15	0.15	0.15	0.05	0.37		0.22	0.55	
Clearance Time (s)		4.9		5.7	5.7	5.7	4.4	5.3		4.4	5.4	
Vehicle Extension (s)		3.6		2.6	2.6	2.6	2.0	5.0		2.0	4.7	
Lane Grp Cap (vph)		199		246	259	231	82	1278		394	1908	
v/s Ratio Prot		c0.10		0.05	c0.06		0.02	c0.28		c0.12	0.26	
v/s Ratio Perm						0.02						
v/c Ratio		0.86		0.37	0.43	0.12	0.39	0.75		0.54	0.48	
Uniform Delay, d1		46.3		40.8	41.2	39.3	49.1	29.2		36.4	14.9	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.37	0.58	
Incremental Delay, d2		29.6		0.7	0.9	0.2	1.1	4.0		0.7	0.8	
Delay (s)		75.8		41.5	42.1	39.5	50.2	33.2		50.6	9.4	
Level of Service		E		D	D	D	D	C		D	A	
Approach Delay (s)		75.8			40.7			33.7			17.1	
Approach LOS		E			D			C			B	

Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

18: Lea Street & University Avenue

1/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✣			✣	
Volume (vph)	50	1355	20	110	1155	10	20	30	180	50	50	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.89			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1770	3531		1770	3535			1659			1765	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.42	
Satd. Flow (perm)	1770	3531		1770	3535			1604			748	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	54	1457	22	118	1242	11	22	32	194	54	54	38
RTOR Reduction (vph)	0	1	0	0	1	0	0	129	0	0	12	0
Lane Group Flow (vph)	54	1478	0	118	1252	0	0	119	0	0	134	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			3	
Permitted Phases							4			3		
Actuated Green, G (s)	4.4	41.7		6.7	44.0			16.1			17.5	
Effective Green, g (s)	4.9	42.2		7.2	44.5			16.6			18.0	
Actuated g/C Ratio	0.05	0.42		0.07	0.44			0.17			0.18	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	86	1490		127	1573			266			134	
v/s Ratio Prot	0.03	c0.42		c0.07	0.35							
v/s Ratio Perm								c0.07			c0.18	
v/c Ratio	0.63	0.99		0.93	0.80			0.45			1.00	
Uniform Delay, d1	46.7	28.7		46.1	23.9			37.6			41.0	
Progression Factor	1.00	0.95		1.02	0.86			1.00			1.00	
Incremental Delay, d2	6.5	14.0		44.1	2.8			5.3			77.2	
Delay (s)	52.9	41.2		91.3	23.4			42.9			118.1	
Level of Service	D	D		F	C			D			F	
Approach Delay (s)		41.6			29.3			42.9			118.1	
Approach LOS		D			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	40.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

19: Lea Drive & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	35	5	50	205	20	40	50	1010	175	20	1060	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.92			0.98		1.00	0.98		1.00	0.99	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1690			1757		1770	3461		1770	3515	
Flt Permitted		0.91			0.68		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1567			1243		1770	3461		1770	3515	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	38	5	54	220	22	43	54	1086	188	22	1140	54
RTOR Reduction (vph)	0	43	0	0	6	0	0	12	0	0	3	0
Lane Group Flow (vph)	0	54	0	0	279	0	54	1262	0	22	1191	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		16.4			16.4		5.9	72.9		2.2	69.2	
Effective Green, g (s)		16.9			16.9		6.4	73.4		2.7	69.7	
Actuated g/C Ratio		0.16			0.16		0.06	0.70		0.03	0.66	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		252			200		108	2419		46	2333	
v/s Ratio Prot							c0.03	c0.36		0.01	0.34	
v/s Ratio Perm		0.03			c0.22							
v/c Ratio		0.22			1.40		0.50	0.52		0.48	0.51	
Uniform Delay, d1		38.3			44.0		47.8	7.5		50.5	9.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			205.5		3.6	0.8		7.6	0.8	
Delay (s)		38.7			249.6		51.4	8.3		58.1	9.8	
Level of Service		D			F		D	A		E	A	
Approach Delay (s)		38.7			249.6			10.0			10.7	
Approach LOS		D			F			B			B	

Intersection Summary			
HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰↱	
Volume (vph)	1310	300	130	1145	230	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.97		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3440		1770	3539	1728	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3440		1770	3539	1728	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1409	323	140	1231	247	102
RTOR Reduction (vph)	19	0	0	0	14	0
Lane Group Flow (vph)	1713	0	140	1231	335	0
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases						
Actuated Green, G (s)	56.8		10.2	71.5	19.5	
Effective Green, g (s)	56.8		10.2	71.5	19.5	
Actuated g/C Ratio	0.57		0.10	0.72	0.20	
Clearance Time (s)	4.5		4.5	4.5	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1953		180	2530	336	
v/s Ratio Prot	c0.50		c0.08	0.35	c0.19	
v/s Ratio Perm						
v/c Ratio	0.88		0.78	0.49	1.00	
Uniform Delay, d1	18.6		43.8	6.2	40.2	
Progression Factor	1.00		1.30	0.12	1.00	
Incremental Delay, d2	5.9		12.8	0.4	47.6	
Delay (s)	24.5		69.8	1.2	87.8	
Level of Service	C		E	A	F	
Approach Delay (s)	24.5			8.2	87.8	
Approach LOS	C			A	F	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

21: 54th St & Street C

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱		↰	↑↑
Volume (veh/h)	0	25	200	145	25	1110
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	27	215	156	27	1194
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			764			811
pX, platoon unblocked	0.84					
vC, conflicting volume	944	185			371	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	546	185			371	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			98	
cM capacity (veh/h)	383	825			1184	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	27	143	228	27	597	597
Volume Left	0	0	0	27	0	0
Volume Right	27	0	156	0	0	0
cSH	825	1700	1700	1184	1700	1700
Volume to Capacity	0.03	0.08	0.13	0.02	0.35	0.35
Queue Length 95th (ft)	3	0	0	2	0	0
Control Delay (s)	9.5	0.0	0.0	8.1	0.0	0.0
Lane LOS	A			A		
Approach Delay (s)	9.5	0.0		0.2		
Approach LOS	A					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX I

FAIR SHARE CONTRIBUTION CALCULATIONS

Intersection Fair-Share Calculation

		AM													PM												
Scenario	Int#	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total
EX	3 - 54th Street & El Cajon Boulevard	235	642	113	104	290	73	57	259	128	90	388	316	2695	171	381	108	281	683	105	105	581	282	119	471	196	3483
Horizon w/o Project	3 - 54th Street & El Cajon Boulevard	245	700	260	140	305	90	160	330	140	175	400	435	3380	175	525	205	360	910	110	140	595	305	290	480	215	4310
Horizon w Project	3 - 54th Street & El Cajon Boulevard	255	740	270	140	325	90	160	330	145	180	400	435	3470	185	565	215	360	970	110	140	595	320	305	480	215	4460

=(4460-4310)/(4460-3483)*100 = 15%

		AM													PM												
Scenario	Int#	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total
EX	12 - College Avenue & University Avenue	180	815	156	125	345	93	150	355	121	140	419	137	3036	236	528	207	227	652	246	232	555	312	243	420	194	4052
Horizon w/o Project	12 - College Avenue & University Avenue	215	855	195	145	365	110	165	400	135	165	465	165	3380	255	565	240	265	690	270	260	565	340	275	435	225	4385
Horizon w Project	12 - College Avenue & University Avenue	220	855	195	145	365	115	175	425	145	165	480	165	3450	270	565	240	265	690	285	270	595	350	275	475	225	4505

=(4505-4385)/(4505-4052)*100= 26%

Segment Fair-Share Calculations

No.	Street	Segment	EX	Horizon W/O Project	Horizon W Project	Fair-share Calculation
2	Collwood Blvd	Montezuma Rd to 54th St	24,178	32,300	33,000	=(33000-32300)/(33000-24178)*100 = 8%
12	University Ave	54th St to 58th St	23,126	25,300	29,730	=(29730-25300)/(29730-23126)*100 = 67%

APPENDIX J

PEAK HOUR ARTERIAL ANALYSIS

Arterial Level of Service: EB Montezuma Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Collwood Bl	II	40	65.0	38.7	103.7	0.72	25.1	C
Total	II		65.0	38.7	103.7	0.72	25.1	C

Arterial Level of Service: WB Montezuma Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Collwood Bl	III	30	64.7	27.6	92.3	0.54	21.0	C
Total	III		64.7	27.6	92.3	0.54	21.0	C

Arterial Level of Service: EB Montezuma Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Collwood Bl	II	40	57.8	45.6	103.4	0.64	22.4	C
Total	II		57.8	45.6	103.4	0.64	22.4	C

Arterial Level of Service: WB Montezuma Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Collwood Bl	III	30	64.7	10.8	75.5	0.54	25.7	B
Total	III		64.7	10.8	75.5	0.54	25.7	B

APPENDIX K

PEAK HOUR INTERSECTION WORKSHEETS – HORIZON YEAR BASE PLUS PROJECT CONDITIONS (MITIGATION)

2035 with Project AM Mitigation
3: 54th St & El Cajon Bl

11/7/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰↰	↑↱	
Volume (vph)	160	330	145	180	400	435	255	740	270	140	325	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3397		3433	3424	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	3397		3433	3424	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	351	154	191	426	463	271	787	287	149	346	96
RTOR Reduction (vph)	0	0	104	0	0	157	0	27	0	0	18	0
Lane Group Flow (vph)	170	351	50	191	426	306	271	1047	0	149	424	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	16.4	45.7	45.7	18.7	46.7	46.7	14.6	48.6		9.3	43.4	
Effective Green, g (s)	16.8	45.6	45.6	19.1	47.9	47.9	15.0	49.6		9.7	44.3	
Actuated g/C Ratio	0.12	0.33	0.33	0.14	0.34	0.34	0.11	0.35		0.07	0.32	
Clearance Time (s)	4.4	3.9	3.9	4.4	5.2	5.2	4.4	5.0		4.4	4.9	
Vehicle Extension (s)	1.5	3.7	3.7	1.5	3.7	3.7	1.5	3.7		1.5	3.7	
Lane Grp Cap (vph)	212	1153	516	241	1211	542	368	1204		238	1083	
v/s Ratio Prot	0.10	0.10		c0.11	0.12		c0.08	c0.31		0.04	0.12	
v/s Ratio Perm			0.03			c0.19						
v/c Ratio	0.80	0.30	0.10	0.79	0.35	0.57	0.74	0.87		0.63	0.39	
Uniform Delay, d1	60.0	35.3	32.9	58.5	34.4	37.6	60.6	42.2		63.4	37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.96	0.95	
Incremental Delay, d2	18.3	0.7	0.4	15.2	0.8	4.2	6.5	7.1		3.6	0.3	
Delay (s)	78.2	36.0	33.2	73.7	35.2	41.8	67.1	49.3		64.6	35.9	
Level of Service	E	D	C	E	D	D	E	D		E	D	
Approach Delay (s)		46.0			44.9			52.9			43.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	47.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰↰	↑↱		↰↰	↑↱	
Volume (vph)	175	425	145	165	480	165	220	855	195	145	365	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1522	1770	3375		3433	3415		3433	3387	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1522	1770	3375		3433	3415		3433	3387	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	192	467	159	181	527	181	242	940	214	159	401	126
RTOR Reduction (vph)	0	0	117	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	192	467	42	181	708	0	242	1154	0	159	527	0
Confl. Peds. (#/hr)			22			16			20			13
Confl. Bikes (#/hr)						1			8			5
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	14.8	28.1	28.1	14.5	28.0		11.7	41.4		7.4	35.8	
Effective Green, g (s)	15.2	29.2	29.2	14.9	28.9		12.1	42.6		7.8	38.3	
Actuated g/C Ratio	0.14	0.26	0.26	0.13	0.26		0.11	0.39		0.07	0.35	
Clearance Time (s)	4.4	5.1	5.1	4.4	4.9		4.4	5.2		4.4	6.5	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.7		2.0	3.2		2.0	3.6	
Lane Grp Cap (vph)	243	935	402	239	883		376	1317		242	1174	
v/s Ratio Prot	c0.11	0.13		0.10	c0.21		c0.07	c0.34		0.05	0.16	
v/s Ratio Perm			0.03									
v/c Ratio	0.79	0.50	0.10	0.76	0.80		0.64	0.88		0.66	0.45	
Uniform Delay, d1	46.1	34.5	30.8	46.1	38.1		47.1	31.5		50.0	27.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.9	0.5	0.1	11.5	5.5		2.8	6.9		4.8	0.3	
Delay (s)	61.0	35.0	30.9	57.5	43.6		50.0	38.4		54.9	28.3	
Level of Service	E	C	C	E	D		D	D		D	C	
Approach Delay (s)		40.3			46.5			40.4			34.4	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰↰	↑↱	
Volume (vph)	140	595	320	305	480	215	185	565	215	360	970	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3393		3433	3485	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	3393		3433	3485	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	633	340	324	511	229	197	601	229	383	1032	117
RTOR Reduction (vph)	0	0	189	0	0	156	0	26	0	0	6	0
Lane Group Flow (vph)	149	633	151	324	511	73	197	804	0	383	1143	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	15.0	32.1	32.1	27.9	43.7	43.7	11.9	42.8		19.5	50.5	
Effective Green, g (s)	15.4	32.0	32.0	28.3	44.9	44.9	12.3	43.8		19.9	51.4	
Actuated g/C Ratio	0.11	0.23	0.23	0.20	0.32	0.32	0.09	0.31		0.14	0.37	
Clearance Time (s)	4.4	3.9	3.9	4.4	5.2	5.2	4.4	5.0		4.4	4.9	
Vehicle Extension (s)	1.5	3.7	3.7	1.5	3.7	3.7	1.5	3.7		1.5	3.7	
Lane Grp Cap (vph)	195	809	362	358	1135	508	302	1062		488	1279	
v/s Ratio Prot	0.08	c0.18		c0.18	0.14		0.06	0.24		c0.11	c0.33	
v/s Ratio Perm			0.10			0.05						
v/c Ratio	0.76	0.78	0.42	0.91	0.45	0.14	0.65	0.76		0.78	0.89	
Uniform Delay, d1	60.5	50.7	46.0	54.5	37.8	33.9	61.8	43.3		58.0	41.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.7	7.4	3.5	24.8	1.3	0.6	3.8	3.3		7.5	8.5	
Delay (s)	75.2	58.2	49.6	79.4	39.0	34.5	65.6	46.6		65.5	50.2	
Level of Service	E	E	D	E	D	C	E	D		E	D	
Approach Delay (s)		57.8			50.3			50.2			54.0	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	53.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

2035 with Project PM Mitigation

12: College ave & University Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰↰	↑↱		↰↰	↑↱	
Volume (vph)	270	595	350	275	475	225	270	565	240	265	690	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1526	1770	3335		3433	3341		3433	3355	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1526	1770	3335		3433	3341		3433	3355	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	297	654	385	302	522	247	297	621	264	291	758	313
RTOR Reduction (vph)	0	0	163	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	297	654	222	302	769	0	297	885	0	291	1071	0
Confl. Peds. (#/hr)			22			16			20			13
Confl. Bikes (#/hr)						1			8			5
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	16.5	26.1	26.1	16.0	25.8		9.3	29.4		9.4	28.2	
Effective Green, g (s)	16.9	27.2	27.2	16.4	26.7		9.7	30.6		9.8	30.7	
Actuated g/C Ratio	0.17	0.27	0.27	0.16	0.27		0.10	0.31		0.10	0.31	
Clearance Time (s)	4.4	5.1	5.1	4.4	4.9		4.4	5.2		4.4	6.5	
Vehicle Extension (s)	2.0	3.7	3.7	2.0	3.7		2.0	3.2		2.0	3.6	
Lane Grp Cap (vph)	299	963	415	290	890		333	1022		336	1030	
v/s Ratio Prot	0.17	0.18		c0.17	c0.23		c0.09	0.26		0.08	c0.32	
v/s Ratio Perm			0.15									
v/c Ratio	0.99	0.68	0.53	1.04	0.86		0.89	0.87		0.87	1.04	
Uniform Delay, d1	41.5	32.5	31.0	41.8	34.9		44.6	32.8		44.5	34.6	
Progression Factor	0.96	0.80	1.12	0.96	1.04		1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.6	1.9	1.5	63.6	8.8		24.0	9.8		19.6	38.9	
Delay (s)	88.5	27.8	36.2	103.7	45.2		68.6	42.6		64.0	73.6	
Level of Service	F	C	D	F	D		E	D		E	E	
Approach Delay (s)		43.7			61.7			49.1			71.5	
Approach LOS		D			E			D			E	

Intersection Summary			
HCM Average Control Delay	56.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

APPPENDIX L

PEAK HOUR INTERSECTION WORKSHEETS –
HORIZON YEAR BASE PLUS PROJECT CONDITIONS (OPERATIONAL)

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	25	780	5	70	860	15	20	20	70	50	25	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.0	4.0			4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.91			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3536		1770	3530			1689			1750	
Flt Permitted	0.95	1.00		0.95	1.00			0.86			0.79	
Satd. Flow (perm)	1770	3536		1770	3530			1465			1413	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	27	839	5	75	925	16	22	22	75	54	27	32
RTOR Reduction (vph)	0	1	0	0	1	0	0	67	0	0	21	0
Lane Group Flow (vph)	27	843	0	75	940	0	0	52	0	0	92	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			4			3	
Permitted Phases							4			3		
Actuated Green, G (s)	3.1	32.9		5.9	35.7			8.2			10.0	
Effective Green, g (s)	3.1	32.9		6.4	36.2			8.2			10.0	
Actuated g/C Ratio	0.04	0.44		0.09	0.48			0.11			0.13	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	73	1551		151	1704			160			188	
v/s Ratio Prot	0.02	c0.24		0.04	c0.27							
v/s Ratio Perm								c0.04			c0.07	
v/c Ratio	0.37	0.54		0.50	0.55			0.33			0.49	
Uniform Delay, d1	35.0	15.5		32.8	13.7			30.8			30.1	
Progression Factor	1.00	1.00		1.00	1.00			0.99			1.00	
Incremental Delay, d2	3.1	1.4		2.6	1.3			1.0			2.0	
Delay (s)	38.1	16.9		35.3	15.0			31.6			32.1	
Level of Service	D	B		D	B			C			C	
Approach Delay (s)		17.6			16.5			31.6			32.1	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project PM Operational Improvements
18: University Ave & Lea Street

6/18/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Volume (vph)	50	1330	20	100	1125	10	20	30	170	50	50	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.90			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1770	3531		1770	3534			1661			1765	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.42	
Satd. Flow (perm)	1770	3531		1770	3534			1599			761	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	54	1430	22	108	1210	11	22	32	183	54	54	38
RTOR Reduction (vph)	0	1	0	0	1	0	0	122	0	0	13	0
Lane Group Flow (vph)	54	1451	0	108	1220	0	0	115	0	0	133	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			4			3	
Permitted Phases							4			3		
Actuated Green, G (s)	4.4	41.7		6.7	44.0			13.1			20.5	
Effective Green, g (s)	4.9	42.2		7.2	44.5			13.6			21.0	
Actuated g/C Ratio	0.05	0.42		0.07	0.44			0.14			0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	87	1490		127	1573			217			160	
v/s Ratio Prot	0.03	c0.41		0.06	c0.35							
v/s Ratio Perm								c0.07			c0.18	
v/c Ratio	0.62	0.97		0.85	0.78			0.53			0.83	
Uniform Delay, d1	46.6	28.4		45.9	23.5			40.2			37.8	
Progression Factor	0.75	0.60		0.67	1.04			1.00			1.00	
Incremental Delay, d2	8.3	13.2		27.0	2.4			9.0			37.5	
Delay (s)	43.3	30.1		57.7	26.8			49.2			75.4	
Level of Service	D	C		E	C			D			E	
Approach Delay (s)		30.6			29.3			49.2			75.4	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project AM Operational Improvements
19: Lea Drive & 54th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	35	5	50	205	20	40	50	1010	175	20	1060	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.92			0.98		1.00	0.98		1.00	0.99	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1690			1757		1770	3461		1770	3515	
Flt Permitted		0.86			0.76		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1474			1391		1770	3461		1770	3515	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	38	5	54	220	22	43	54	1086	188	22	1140	54
RTOR Reduction (vph)	0	40	0	0	11	0	0	20	0	0	5	0
Lane Group Flow (vph)	0	57	0	0	274	0	54	1254	0	22	1189	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		14.8			14.8		2.6	30.9		0.8	29.1	
Effective Green, g (s)		15.3			15.3		3.1	31.4		1.3	29.6	
Actuated g/C Ratio		0.26			0.26		0.05	0.52		0.02	0.49	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		376			355		91	1811		38	1734	
v/s Ratio Prot							c0.03	c0.36		0.01	0.34	
v/s Ratio Perm		0.04			c0.20							
v/c Ratio		0.15			0.77		0.59	0.69		0.58	0.69	
Uniform Delay, d1		17.3			20.7		27.8	10.7		29.1	11.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			10.0		10.0	2.2		19.6	2.2	
Delay (s)		17.5			30.7		37.8	12.9		48.7	13.9	
Level of Service		B			C		D	B		D	B	
Approach Delay (s)		17.5			30.7			13.9			14.5	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2035 w/ Project AM Operational Improvements
19: Lea Street & 54th St

3/27/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	55	20	55	175	20	15	30	1045	70	50	565	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.94			0.99		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1721			1771		1770	3506		1770	3517	
Flt Permitted		0.84			0.69		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1480			1277		1770	3506		1770	3517	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	59	22	59	188	22	16	32	1124	75	54	608	27
RTOR Reduction (vph)	0	45	0	0	5	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	95	0	0	221	0	32	1192	0	54	631	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4								
Actuated Green, G (s)		14.0			14.0		2.0	29.6		2.9	30.5	
Effective Green, g (s)		14.5			14.5		2.5	30.1		3.4	31.0	
Actuated g/C Ratio		0.24			0.24		0.04	0.50		0.06	0.52	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		358			309		74	1759		100	1817	
v/s Ratio Prot							0.02	c0.34		c0.03	0.18	
v/s Ratio Perm		0.06			c0.17							
v/c Ratio		0.27			0.72		0.43	0.68		0.54	0.35	
Uniform Delay, d1		18.4			20.9		28.1	11.3		27.5	8.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			7.7		4.0	2.1		5.8	0.5	
Delay (s)		18.8			28.6		32.1	13.4		33.4	9.1	
Level of Service		B			C		C	B		C	A	
Approach Delay (s)		18.8			28.6			13.9			11.0	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX M

PROJECT DRIVEWAY SIGNAL WARRANT ANALYSIS

FEHR & PEERS

Sheet No	1	of	1	
Project	Chollas Triangle Master Plan			
Scenario	Future with Project (driveway volume			
Peak Hour	AM			

Major Street University Avenue
Minor Street Street A/Promise Hosp Dvwy

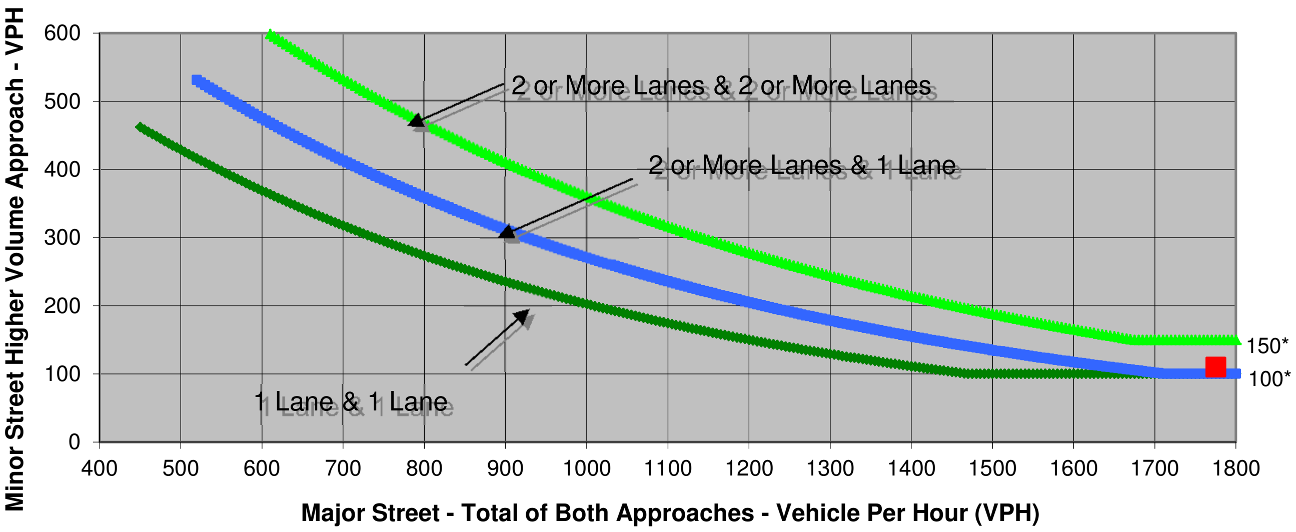
Turn Movement Volumes

	NB	SB	EB	WB
Left	20	50	25	75
Through	20	25	785	870
Right	70	30	5	15
Total	110	105	815	960

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

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

	Major Street University Avenue	Minor Street Street A/Promise Hosp Dvwy	Warrant Met
Number of Approach Lanes	**4**	**1**	**YES**
Traffic Volume (VPH) *	**1,775**	**110**	

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

FEHR PEERS

Sheet No 1 of 1

Major Street University Avenue
Minor Street Street A/Promise Hosp Dvwy

Project Chollas Triangle Master Plan
Scenario Future with Project (driveway volume
Peak Hour PM

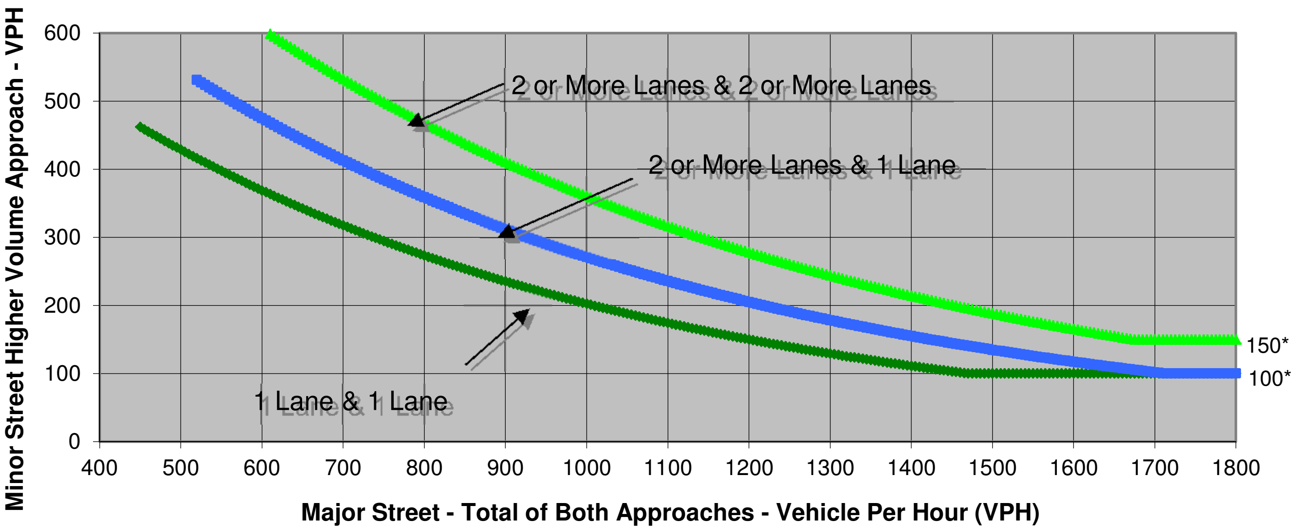
Turn Movement Volumes

	NB	SB	EB	WB
Left	20	50	50	110
Through	30	50	1,355	1,155
Right	180	35	20	10
Total	230	135	1,425	1,275

Major Street Direction

☐ North/South
x East/West

Figure 4C-3. Warrant 3, Peak Hour



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

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

	Major Street University Avenue	**Minor Street** Street A/Promise Hosp Dvwy	**Warrant Met**
Number of Approach Lanes	**4**	**1**	**YES**
Traffic Volume (VPH) *	**2,700**	**230**	

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

FEHR PEERS

Sheet No	1	of	1	

Project: Chollas Triangle Master Plan
Scenario: Future with Project (driveway volume
Peak Hour: AM

Major Street: University Avenue
Minor Street: Internal Roadway Dvwy/Street B

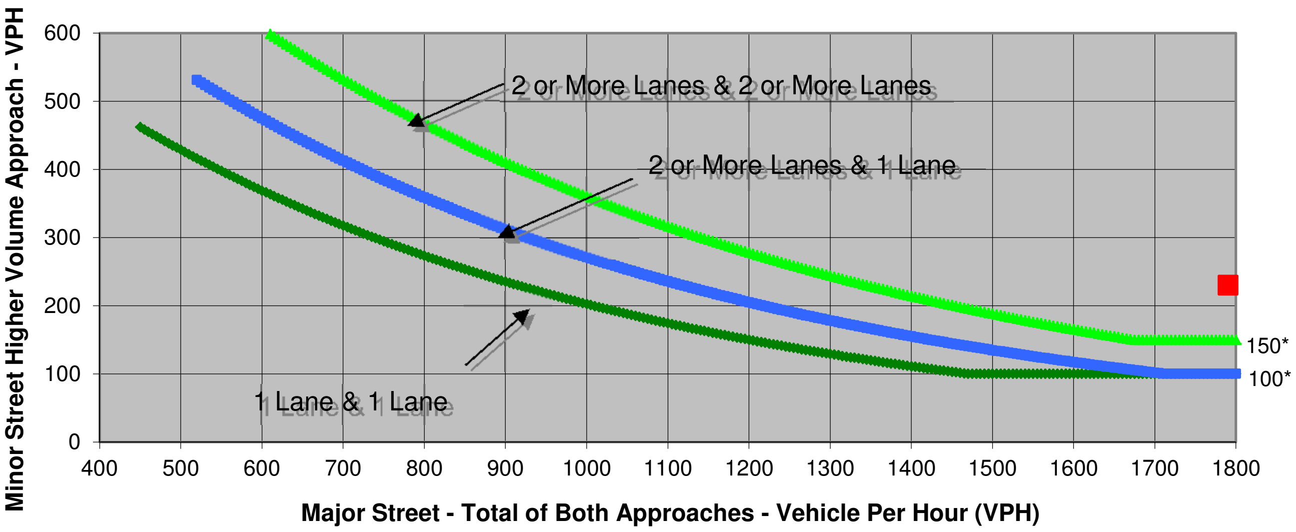
Turn Movement Volumes

	NB	SB	EB	WB
Left	160	0	0	45
Through	0	0	770	875
Right	70	0	100	0
Total	230	0	870	920

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

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

	Major Street University Avenue	Minor Street Internal Roadway Dvwy/Street B	Warrant Met
Number of Approach Lanes	**4**	**1**	**YES**
Traffic Volume (VPH) *	**1,790**	**230**	

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

FEHR PEERS

Sheet No	1	of	1	

Major Street: University Avenue
Minor Street: Internal Roadway Dvwy/Street B

Project: Chollas Triangle Master Plan
Scenario: Future with Project (driveway volume
Peak Hour: PM

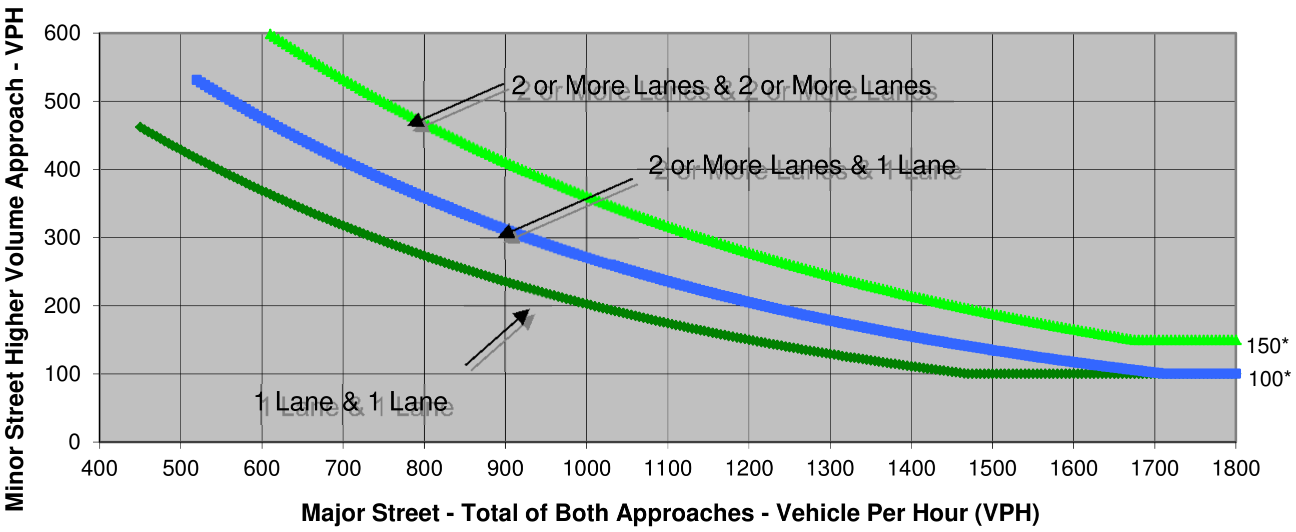
Turn Movement Volumes

	NB	SB	EB	WB
Left	230	0	0	130
Through	0	0	1,310	1,145
Right	95	0	300	0
Total	325	0	1,610	1,275

Major Street Direction

	North/South
x	East/West

Figure 4C-3. Warrant 3, Peak Hour



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

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

	Major Street University Avenue	**Minor Street** Internal Roadway Dvwy/Street B	**Warrant Met**
Number of Approach Lanes	**4**	**1**	**YES**
Traffic Volume (VPH) *	**2,885**	**325**	

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