Exhibit A

The Quarry: Legal Description

All that certain real property situate within a portion of Section 9, Township 20 North, Range 20 East, Mount Diablo Meridian, County of Washoe, State of Nevada, described as follows:

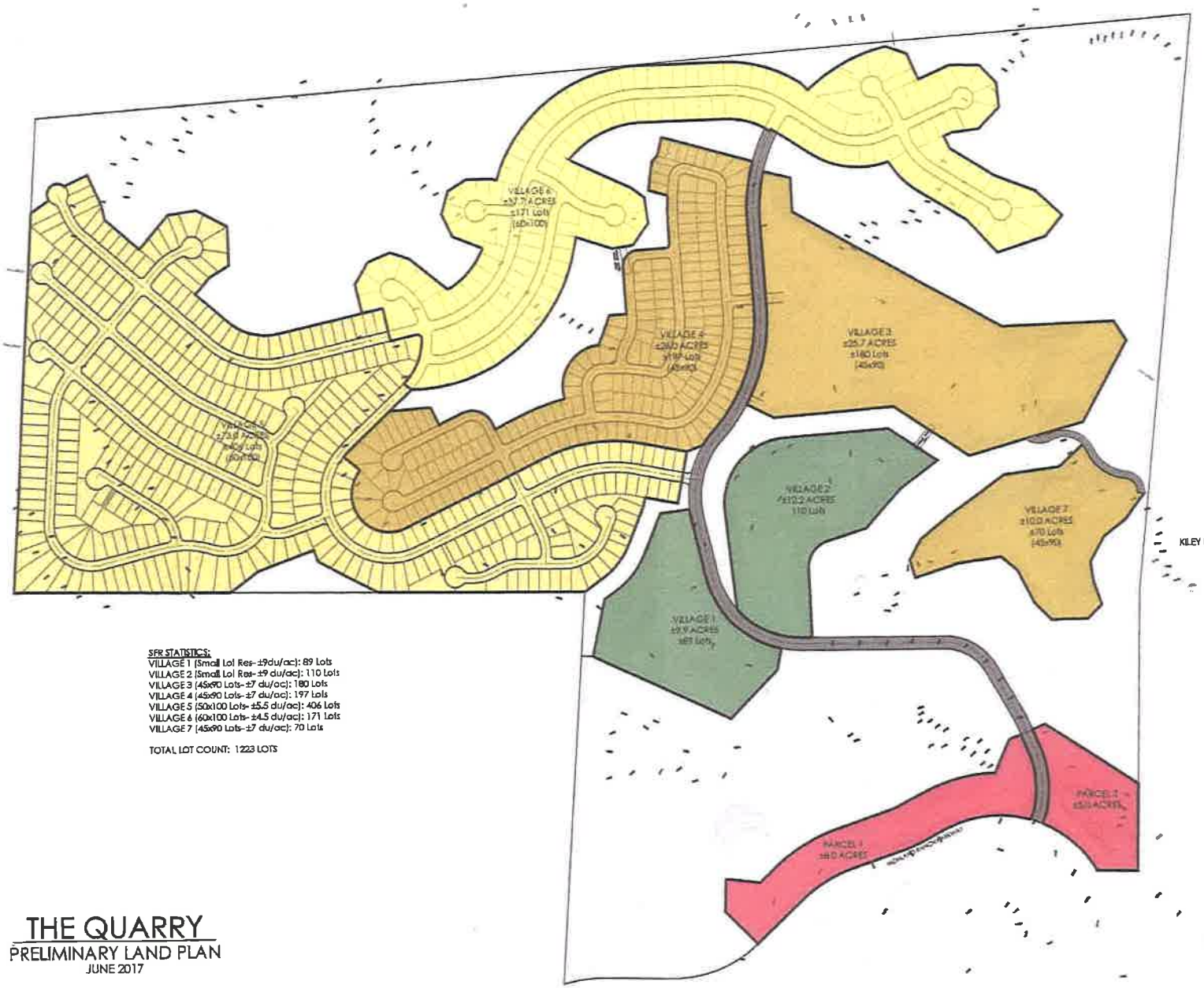
Parcel 2 as shown on the Record of Survey to support a Boundary Line Adjustment (RS3818) filed within the Official Records of Washoe County, Nevada on June 30, 2000 as File No. 2460839 and being more particularly described as follows:

Beginning at the Northeast corner of Section 9;
South 05°43'28" West, 2702.52 feet to the East one- quarter (E ¼) corner of Section 9; Continuing along the Easterly line of Section 9, South 00°57'17" West, 1318.51 feet to the Northerly line of the Southeast one-quarter (SE ¼) of Section 9; Thence along the Northerly line of the Southeast one-quarter (SE ¼) of Section 9, North 89°02'15" West, 189.31 feet to the Northerly right-of-way of Highland Ranch Parkway; Leaving the Northerly line of the Southeast one-quarter (SE ¼) of Section 9, along the Northerly right-of-way of Highland Ranch Parkway, along the arc of a non-tangent curve to the left, from a tangent which bears North 29°56'39"West, having a length of 815.03 feet and a radius of 530.00 feet, through a central angle of 88°06'31"; Continuing along the Northerly right-of-way of Highland Ranch Parkway, South 61°56'50" West, 126.45 feet; Continuing along the Northerly right-of-way of Highland Ranch Parkway, along the arc of a curve to the right, having a length of 90.68 feet and a radius of 570.00 feet, through a central angle of 09°06'56"; Continuing along the Northerly right-of-way of Highland Ranch Parkway, South 71°03'46" West, 254.89 feet; Continuing along the Northerly right-of-way of Highland Ranch Parkway, along the arc of a curve to the left, having a length of 279.50 feet and a radius of 630.00 feet, through a central angle of 25°25'09"; Continuing along the Northerly right-of-way of Highland Ranch Parkway, South 45°38'37" West, 300.00 feet; Continuing along the Northerly right-of-way of Highland Ranch Parkway, along the arc of a curve to the right, having a length of 453.78 feet and a radius of 570.00 feet, through a central angle of 45°36'50"; Continuing along the Northerly right-of-way of Highland Ranch Parkway, North 88°44'33" West, 300.00 feet; Continuing along the Northerly right-of-way of Highland Ranch Parkway, along the arc of a curve to the left, having a length of 204.69 feet and a radius of 630.00 feet, through a central angle of 18°36'55", to the North-South centerline of Section 9; Leaving the Northerly right-of-way of Highland Ranch Parkway, along the North-South centerline of Section 9, North 03°39'56" East, 1859.59 feet to the center of Section 9; Thence along the East-West centerline of Section 9, North 89°25'32" West, 2683.82 feet to the West one-quarter (1/4) of Section 9; Thence along the West line of Section 9, North 03°18'58" East, 2211.00 feet to the Northwest corner of Section 9; Thence along the North line of Section 9, North 85°28'37" East, 2721.15 feet to the North one-quarter (N ¼) corner of Section 9; Continuing along the North line of Section 9, North 85°29'07" East, 2720.96 feet to the Northeast corner of Section 9 and the Point of Beginning.

Containing 386.87 acres, more or less.

11/23/16

APN: **083-011-15**



SFR STATISTICS:
VILLAGE 1 (Small Lot Res- ±9du/ac): 89 Lots
VILLAGE 2 (Small Lot Res- ±9 du/ac): 110 Lots
VILLAGE 3 (45x90 Lots- ±7 du/ac): 180 Lots
VILLAGE 4 (45x90 Lots- ±7 du/ac): 197 Lots
VILLAGE 5 (50x100 Lots- ±5.5 du/ac): 406 Lots
VILLAGE 6 (60x100 Lots- ±4.5 du/ac): 171 Lots
VILLAGE 7 (45x90 Lots- ±7 du/ac): 70 Lots

TOTAL LOT COUNT: 1223 LOTS

THE QUARRY
PRELIMINARY LAND PLAN
JUNE 2017

CHRISTY CORPORATION

EKAY | ECONOMIC CONSULTANTS

June 13, 2018

Mr. Blake Smith
S3 Development Company, LLC
1 East Liberty Street
Suite 444
Reno, NV 89501

Re: Update of Fiscal Impact Analysis of Proposed Quarry Development

Dear Mr. Smith:

Per your request, I updated the fiscal impact analysis of The Quarry project originally conducted in December 2017. It is my understanding the project is proposed to widen a portion of a street included in the December analysis as a 2-lane street, to a 4-lane street. This update includes the addition of 2-lanes to a 3,500 linear foot portion of the street, for a total of 84,000 square feet of additional streets constructed by the Developer and dedicated to the City of Sparks for maintenance.

This update impacts both the General and Road Funds. In the General Fund, road square feet are used to estimate costs associated with Community Services expenditures in the Public Safety and Public Works functions. The Road Fund provides road repair and maintenance services for all City of Sparks streets and will also be impacted by the increase in the size of project streets. Costs for both Funds will increase with the addition of 84,000 square feet of streets to the 1.01 million square feet already considered in the December 2017 report. No other changes to the December 2017 report are considered.

Table 1 below shows the estimated impacts of The Quarry project on the City of Sparks General Fund from the original December 2017 report and the June 2018 update. The table shows General Fund surplus, over the 20-year analysis period, is expected to decrease from $14.3 million in the original report to $14.1 million in the June 2018 given the additional 84,000 square feet of streets.

550 West Plumb Lane, Suite B459
Reno, NV 89509
(775) 232-7203
www.ekayconsultants.com

Table 1. Comparison of General Fund Impacts

December 2017 Report					June 2018 Update				
Year	Total Project Revenue	Total Project Costs	Annual Revenue Surplus	Cumulative Revenue Surplus	Year	Total Project Revenue	Total Project Costs	Annual Revenue Surplus	Cumulative Revenue Surplus
2018	$ 54,948	$ -	$ 54,948	$ 54,948	2018	$ 54,948	$ -	$ 54,948	$ 54,948
2019	214,704	127,082	87,622	142,570	2019	214,704	131,793	82,911	137,859
2020	657,964	471,101	186,863	329,433	2020	657,964	475,953	182,011	319,870
2021	1,116,366	770,640	345,726	675,159	2021	1,116,366	775,638	340,728	660,599
2022	1,599,636	1,080,582	519,054	1,194,213	2022	1,599,636	1,085,729	513,907	1,174,505
2023	2,069,269	1,428,133	641,136	1,835,349	2023	2,069,269	1,433,435	635,834	1,810,339
2024	2,432,609	1,714,223	718,386	2,553,735	2024	2,432,609	1,719,684	712,925	2,523,264
2025	2,505,588	1,764,183	741,404	3,295,139	2025	2,505,588	1,769,808	735,780	3,259,044
2026	2,580,755	1,815,642	765,114	4,060,253	2026	2,580,755	1,821,435	759,320	4,018,364
2027	2,658,178	1,868,644	789,534	4,849,787	2027	2,658,178	1,874,611	783,567	4,801,931
2028	2,737,923	1,923,236	814,687	5,664,474	2028	2,737,923	1,929,383	808,541	5,610,471
2029	2,820,061	1,979,466	840,595	6,505,069	2029	2,820,061	1,985,797	834,264	6,444,735
2030	2,904,663	2,037,383	867,279	7,372,348	2030	2,904,663	2,043,904	860,759	7,305,494
2031	2,991,803	2,097,038	894,765	8,267,113	2031	2,991,803	2,103,754	888,048	8,193,542
2032	3,081,557	2,158,482	923,075	9,190,188	2032	3,081,557	2,165,400	916,157	9,109,699
2033	3,174,003	2,221,770	952,234	10,142,422	2033	3,174,003	2,228,895	945,109	10,054,808
2034	3,269,224	2,286,956	982,268	11,124,690	2034	3,269,224	2,294,295	974,929	11,029,737
2035	3,367,300	2,354,097	1,013,203	12,137,893	2035	3,367,300	2,361,657	1,005,644	12,035,381
2036	3,468,319	2,423,253	1,045,066	13,182,959	2036	3,468,319	2,431,039	1,037,280	13,072,661
2037	3,572,369	2,494,484	1,077,885	14,260,844	2037	3,572,369	2,502,503	1,069,865	14,142,526
Total	**$ 47,277,239**	**$ 33,016,396**	**$ 14,260,844**		**Total**	**$ 47,277,239**	**$ 33,134,713**	**$ 14,142,526**	

Table 2. Comparison of Road Fund Impacts

December 2017 Report					June 2018 Update				
Year	Total Project Revenue	Total Project Costs	Annual Revenue Surplus	Cumulative Revenue Surplus	Year	Total Project Revenue	Total Project Costs	Annual Revenue Surplus	Cumulative Revenue Surplus
2018	$ -	$ -	$ -	$ -	2018	$ -	$ -	$ -	$ -
2019	-	522	(522)	(522)	2019	-	784	(784)	(784)
2020	31,718	819,813	(788,094)	(788,616)	2020	31,718	888,285	(856,567)	(857,351)
2021	65,076	820,247	(755,171)	(1,543,787)	2021	65,076	888,737	(823,661)	(1,681,012)
2022	98,507	821,873	(723,366)	(2,267,154)	2022	98,507	890,382	(791,875)	(2,472,887)
2023	137,239	824,087	(686,848)	(2,954,002)	2023	137,239	892,614	(755,375)	(3,228,261)
2024	176,048	825,709	(649,661)	(3,603,663)	2024	176,048	894,255	(718,207)	(3,946,468)
2025	181,329	825,862	(644,533)	(4,248,196)	2025	181,329	894,428	(713,098)	(4,659,567)
2026	186,769	826,019	(639,250)	(4,887,446)	2026	186,769	894,604	(707,834)	(5,367,401)
2027	192,372	826,179	(633,806)	(5,521,252)	2027	192,372	894,783	(702,411)	(6,069,812)
2028	198,143	826,341	(628,198)	(6,149,450)	2028	198,143	894,967	(696,823)	(6,766,635)
2029	204,088	826,507	(622,420)	(6,771,870)	2029	204,088	895,154	(691,066)	(7,457,701)
2030	210,210	826,677	(616,466)	(7,388,336)	2030	210,210	895,344	(685,134)	(8,142,835)
2031	216,517	826,850	(610,333)	(7,998,669)	2031	216,517	895,539	(679,022)	(8,821,857)
2032	223,012	827,026	(604,014)	(8,602,683)	2032	223,012	895,737	(672,725)	(9,494,582)
2033	229,703	827,206	(597,503)	(9,200,185)	2033	229,703	895,939	(666,237)	(10,160,819)
2034	236,594	827,389	(590,795)	(9,790,981)	2034	236,594	896,146	(659,552)	(10,820,371)
2035	243,691	827,576	(583,884)	(10,374,865)	2035	243,691	896,356	(652,665)	(11,473,036)
2036	251,002	827,767	(576,764)	(10,951,630)	2036	251,002	896,571	(645,569)	(12,118,605)
2037	258,532	827,961	(569,429)	(11,521,059)	2037	258,532	896,790	(638,258)	(12,756,862)
Total	**$ 3,340,551**	**$ 14,861,610**	**$ (11,521,059)**		**Total**	**$ 3,340,551**	**$ 16,097,414**	**$ (12,756,862)**	

Table 2 shows the comparison of the impacts of The Quarry on the City's Road Fund over the 20-year analysis period. The December 2017 report found a deficit for the Road Fund of $11.5 million over the 20-year analysis period. Adding the 84,000 square feet of streets (June 2018 update) increases the deficit for the Fund to $12.8 million.

This analysis shows that The Quarry project is still expected to have a **positive fiscal impact** on the City of Sparks, as the projected General Fund surplus is expected to exceed the estimated deficit in the Road Fund, even with the addition of 84,000 square feet of streets. This includes a $965,000 contingency amount for the City's General Fund, which is not an actual cost for the City.

Updated Appendices 1-9 of the fiscal impact analysis are attached. Of these only Appendix 6 and 9 were updated from the December 2017 report. No methodology or other inputs (other than increase in project streets) changes were made in the June 2018 update. Please see the December 2017 report for methodology, assumptions, and other information.

Please contact me with any questions or concerns.

Sincerely,

Eugenia Larmore

Eugenia Larmore, PhD, MBA, CMA, CVA, MAFF

APPENDIX 1
BUILDOUT ASSUMPTIONS

YEAR	USE TYPE	SQUARE FEET BUILT	# OF UNITS BUILT	ADDED LAND VALUE	ADDED IMPROVEMENTS VALUE	CONSTRUCTION MATERIALS COST
2018	Village 1	-	-	$ 2,018,250	$ -	$ -
	Village 2	-	-	2,466,750	-	-
	Village 3	-	-	-	-	-
	Village 4	-	-	3,950,100	-	-
	Village 5	-	-	5,535,000	-	-
	Village 6	-	-	-	-	-
	Village 7	-	-	-	-	-
	Gen. Commercial	-	-	1,271,044	-	-
	Open Space	-	-	1,081,066	-	-
Subtotal		**-**	**-**	**16,322,211**	**-**	**-**
2019	Village 1	85,500	45	1,973,400	9,418,500	4,709,250
	Village 2	110,000	55	2,466,750	11,511,500	5,755,750
	Village 3	-	-	-	-	-
	Village 4	151,800	66	3,950,100	18,433,800	9,216,900
	Village 5	205,000	82	5,467,500	25,830,000	12,915,000
	Village 6	-	-	-	-	-
	Village 7	-	-	-	-	-
	Gen. Commercial	87,120	-	794,403	10,756,687	5,378,344
	Open Space	-	-	-	-	-
Subtotal		**639,420**	**248**	**14,652,153**	**75,950,487**	**37,975,244**
2020	Village 1	83,600	44	-	9,209,200	4,604,600
	Village 2	110,000	55	-	11,511,500	5,755,750
	Village 3	-	-	-	-	-
	Village 4	151,800	66	3,890,250	18,433,800	9,216,900
	Village 5	202,500	81	5,467,500	25,515,000	12,757,500
	Village 6	-	-	6,437,100	-	-
	Village 7	-	-	-	-	-
	Gen. Commercial	54,450	-	-	6,722,930	3,361,465
	Open Space	-	-	-	-	-
Subtotal		**602,350**	**246**	**15,794,850**	**71,392,430**	**35,696,215**
2021	Village 1	-	-	-	-	-
	Village 2	-	-	-	-	-
	Village 3	-	-	5,386,500	-	-
	Village 4	149,500	65	-	18,154,500	9,077,250
	Village 5	202,500	81	5,467,500	25,515,000	12,757,500
	Village 6	232,200	86	6,362,250	30,039,800	15,019,900
	Village 7	-	-	-	-	-
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**584,200**	**232**	**17,216,250**	**73,709,300**	**36,854,650**
2022	Village 1	-	-	-	-	-
	Village 2	-	-	-	-	-
	Village 3	207,000	90	5,386,500	25,137,000	12,568,500
	Village 4	-	-	-	-	-
	Village 5	202,500	81	5,467,500	25,515,000	12,757,500
	Village 6	229,500	85	-	29,690,500	14,845,250
	Village 7	-	-	6,037,500	-	-
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**639,000**	**256**	**16,891,500**	**80,342,500**	**40,171,250**
2023	Village 1	-	-	-	-	-
	Village 2	-	-	-	-	-
	Village 3	207,000	90	-	25,137,000	12,568,500
	Village 4	-	-	-	-	-
	Village 5	202,500	81	-	25,515,000	12,757,500
	Village 6	-	-	-	-	-
	Village 7	203,000	70	-	28,175,000	14,087,500
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**612,500**	**241**	**-**	**78,827,000**	**39,413,500**

APPENDIX 1
BUILDOUT ASSUMPTIONS

YEAR	USE TYPE	SQUARE FEET BUILT	# OF UNITS BUILT	ADDED LAND VALUE	ADDED IMPROVEMENTS VALUE	CONSTRUCTION MATERIALS COST
TOTAL		**3,077,470**	**1,223**	**$ 80,876,963**	**$ 380,221,717**	**$ 190,110,858**

APPENDIX 1, ASSUMPTIONS:

1. The following land and building costs represent the Developer's best estimate in 2017. Analysis adds land value in the year before construction and improvement value in the year of construction.

a) Residential:

	# of Acres	# of Units	Total Square Feet	Projected Sales Price/Unit	Land Value/ Unit	Improv. Value/ Unit
Village 1	9.90	89	169,100	$ 299,000	$ 44,850	$ 209,300
Village 2	12.20	110	220,000	299,000	44,850	209,300
Village 3	25.70	180	414,000	399,000	59,850	279,300
Village 4	28.00	197	453,100	399,000	59,850	279,300
Village 5	73.00	406	1,015,000	450,000	67,500	315,000
Village 6	37.70	171	461,700	499,000	74,850	349,300
Village 7	10.00	70	203,000	575,000	86,250	402,500
	196.50	**1,223**	**2,935,900**			

Source: Number of acres, units, square footage, and projected sales price from Developer. Land and improvement value based on values for homes sold at similar prices in City of Sparks in 2016 and 2017. Source: Washoe County Assessor's website.

b) Commercial:

	# of Acres	Total Square Feet	Improvements Cost/Sq. Ft.	Land Value/ Acre
General Comm.	13.0	141,570	$ 123.5	$ 158,881

Source: Number of acres and square footage from Developer. Land and improvement value from comparable uses (LU400) around the project. Source: Washoe County Assessor's website.

c) Open Space:

Open Space, estimated at **177.4** acres is expected to be valued using value per acre of **$ 6,095** for similar uses (LU 100) surrounding the project. Source: Washoe County Assessor's Office.

Existing value of the project cannot be used as it is valued as a quarry.

2. Construction Materials Cost is estimated at **50%** of Building Cost. Source: Discussions with contractors.

APPENDIX 2
CITY OF SPARKS
ESTIMATED NUMBER OF RESIDENTS AND EMPLOYEES

YEAR	USE TYPE	# OF UNITS BUILT	CUMUL. # OF OCCUPIED UNITS	SQUARE FEET CONSTRUCTED	CUMUL. NO. OF RESIDENTS	CUMUL. NO. OF EMPLOYEES	% OF SPARKS POPULATION
2018	Village 1	-	-	-	-	-	0.00%
	Village 2	-	-	-	-	-	0.00%
	Village 3	-	-	-	-	-	0.00%
	Village 4	-	-	-	-	-	0.00%
	Village 5	-	-	-	-	-	0.00%
	Village 6	-	-	-	-	-	0.00%
	Village 7	-	-	-	-	-	0.00%
	Gen. Commercial	-	-	-			0.00%
	Open Space	-	-	-	-	-	0.00%
Subtotal		**-**	**-**	**-**	**-**	**-**	**0.00%**
2019	Village 1	45	-	85,500	-	-	0.00%
	Village 2	55	-	110,000	-	-	0.00%
	Village 3	-	-	-	-	-	0.00%
	Village 4	66	-	151,800	-	-	0.00%
	Village 5	82	-	205,000	-	-	0.00%
	Village 6	-	-	-	-	-	0.00%
	Village 7	-	-	-	-	-	0.00%
	Gen. Commercial	-	-	87,120	-	104	0.00%
	Open Space	-	-	-	-	-	0.00%
Subtotal		**248**	**-**	**639,420**	**-**	**104**	**0.00%**
2020	Village 1	44	43	83,600	121	-	0.13%
	Village 2	55	53	110,000	148	-	0.16%
	Village 3	-	-	-	-	-	0.00%
	Village 4	66	64	151,800	178	-	0.19%
	Village 5	81	79	202,500	221	-	0.24%
	Village 6	-	-	-	-	-	0.00%
	Village 7	-	-	-	-	-	0.00%
	Gen. Commercial	-	-	54,450	-	169	0.00%
	Open Space	-	-	-	-	-	0.00%
Subtotal		**246**	**239**	**602,350**	**668**	**169**	**0.71%**
2021	Village 1	-	86	-	240	-	0.26%
	Village 2	-	106	-	296	-	0.32%
	Village 3	-	-	-	-	-	0.00%
	Village 4	65	127	149,500	355	-	0.38%
	Village 5	81	157	202,500	439	-	0.47%
	Village 6	86	-	232,200	-	-	0.00%
	Village 7	-	-	-	-	-	0.00%
	Gen. Commercial	-	-	-	-	169	0.00%
	Open Space	-	-	-	-	-	0.00%
Subtotal		**232**	**477**	**584,200**	**1,330**	**169**	**1.42%**
2022	Village 1	-	86	-	240	-	0.26%
	Village 2	-	106	-	296	-	0.32%
	Village 3	90	-	207,000	-	-	0.00%
	Village 4	-	190	-	530	-	0.57%
	Village 5	81	235	202,500	657	-	0.70%
	Village 6	85	83	229,500	232	-	0.25%
	Village 7	-	-	-	-	-	0.00%
	Gen. Commercial	-	-	-	-	169	0.00%
	Open Space	-	-	-	-	-	0.00%
Subtotal		**256**	**701**	**639,000**	**1,955**	**169**	**2.09%**
2023	Village 1	-	86	-	240	-	0.26%
	Village 2	-	106	-	296	-	0.32%
	Village 3	90	87	207,000	242	-	0.26%
	Village 4	-	190	-	530	-	0.57%
	Village 5	81	314	202,500	875	-	0.94%
	Village 6	-	165	-	460	-	0.49%
	Village 7	70	-	203,000	-	-	0.00%
	Gen. Commercial	-	-	-	-	169	0.00%
	Open Space	-	-	-	-	-	0.00%
Subtotal		**241**	**948**	**612,500**	**2,644**	**169**	**2.83%**

APPENDIX 2
CITY OF SPARKS
ESTIMATED NUMBER OF RESIDENTS AND EMPLOYEES

2024	Village 1	-	86	-	240	-	0.26%
	Village 2	-	106	-	296	-	0.32%
	Village 3	-	174	-	485	-	0.52%
	Village 4	-	190	-	530	-	0.57%
	Village 5	-	392	-	1,093	-	1.17%
	Village 6	-	165	-	460	-	0.49%
	Village 7	-	68	-	188	-	0.20%
	Gen. Commercial	-	-	-	-	169	0.00%
	Open Space	-	-	-	-	-	0.00%
Subtotal		**-**	**1,180**	**-**	**3,293**	**169**	**3.52%**
TOTAL		**1,223**		**3,077,470**			

APPENDIX 2, ASSUMPTIONS:

1. Number of residential units and square feet of buildings from Appendix 1.
2. Occupied single-family units are estimated using a vacancy rate of 3.5% to account for household movement and other timing issues. Households are assumed to be occupied a year after construction. Source: Center for Regional Studies, University of Nevada, Reno, based on data from the American Community Survey.
3. Residents are estimated using a ratio of **2.79** residents per occupied household/unit for owner-occupied units
   Source: "Average Household Size of Occupied Units by Tenure." 2016 American Community Survey 1-Year Estimates, US Census Bureau. Data for Sparks, Nevada.
4. Employee estimates from the Center for Regional Studies, UNR (CRS). Employees added in the year of construction.

Use Type	Project Square Feet	Sq.Ft./Employee	Employee Estimate
Gen Commercial	141,570	837	169

5. Impacts: Analysis estimates costs and revenues associated with the development using estimated number of new development residents only. The analysis assumes employees of the development will be existing residents of the region, residents of other regions, or residents of the development.
6. City of Sparks FY 2016-17 population is estimated at **93,581** Source: City of Sparks Budget, FY 2017-18. This is used to estimate the percent of existing population generated by the project.

APPENDIX 3
CITY OF SPARKS
ESTIMATED REAL PROPERTY TAX REVENUE

YEAR	USE TYPE	ADDED TAX. LAND VALUE ($)	ADDED TAX. IMPROVEMENT VALUE ($)	CUMULATIVE TOTAL TAX. VALUE ($)	CUMULATIVE ASSESSED VALUE ($)	GENERAL FUND REVENUE	AB 104 REVENUE
2018	Village 1	$ 2,018,250	$ -	$ 2,018,250	$ 706,388	$ 6,780	$ 14
	Village 2	2,466,750	-	2,466,750	863,363	8,287	18
	Village 3	-	-	-	-	-	-
	Village 4	3,950,100	-	3,950,100	1,382,535	13,270	28
	Village 5	5,535,000	-	5,535,000	1,937,250	18,594	39
	Village 6	-	-	-	-	-	-
	Village 7	-	-	-	-	-	-
	Gen. Commercial	1,271,044	-	1,271,044	444,866	4,270	9
	Open Space	1,081,066	-	1,081,066	378,373	3,632	8
Subtotal		**16,322,211**	**-**	**16,322,211**	**5,712,774**	**54,831**	**116**
2019	Village 1	1,973,400	9,418,500	4,052,198	1,418,269	13,613	29
	Village 2	2,466,750	11,511,500	5,007,503	1,752,626	16,822	36
	Village 3	-	-	-	-	-	-
	Village 4	3,950,100	18,433,800	8,018,703	2,806,546	26,937	57
	Village 5	5,467,500	25,830,000	11,168,550	3,908,993	37,519	80
	Village 6	-	-	-	-	-	-
	Village 7	-	-	-	-	-	-
	Gen. Commercial	794,403	10,756,687	2,103,578	736,252	7,067	15
	Open Space	-	-	1,113,498	389,724	3,741	8
Subtotal		**14,652,153**	**75,950,487**	**31,464,030**	**11,012,410**	**105,697**	**224**
2020	Village 1	-	9,209,200	13,874,818	4,856,186	46,610	99
	Village 2	-	11,511,500	17,014,573	5,955,100	57,157	121
	Village 3	-	-	-	-	-	-
	Village 4	3,890,250	18,433,800	31,136,328	10,897,715	104,596	222
	Village 5	5,467,500	25,515,000	43,576,007	15,251,602	146,385	311
	Village 6	6,437,100	-	6,437,100	2,252,985	21,624	46
	Village 7	-	-	-	-	-	-
	Gen. Commercial	-	6,722,930	13,246,074	4,636,126	44,498	94
	Open Space	-	-	1,146,903	401,416	3,853	8
Subtotal		**15,794,850**	**71,392,430**	**126,431,802**	**44,251,131**	**424,722**	**902**
2021	Village 1	-	-	23,776,539	8,321,789	79,873	170
	Village 2	-	-	29,381,855	10,283,649	98,702	210
	Village 3	5,386,500	-	5,386,500	1,885,275	18,095	38
	Village 4	-	18,154,500	51,057,232	17,870,031	171,517	364
	Village 5	5,467,500	25,515,000	76,631,237	26,820,933	257,427	546
	Village 6	6,362,250	30,039,800	12,992,463	4,547,362	43,646	93
	Village 7	-	-	-	-	-	-
	Gen. Commercial	-	-	20,568,073	7,198,826	69,094	147
	Open Space	-	-	1,181,310	413,459	3,968	8
Subtotal		**17,216,250**	**73,709,300**	**220,975,209**	**77,341,323**	**742,322**	**1,576**
2022	Village 1	-	-	24,489,835	8,571,442	82,269	175
	Village 2	-	-	30,263,310	10,592,159	101,664	216
	Village 3	5,386,500	25,137,000	10,934,595	3,827,108	36,733	78
	Village 4	-	-	71,288,084	24,950,829	239,478	508
	Village 5	5,467,500	25,515,000	110,678,124	38,737,343	371,801	789
	Village 6	-	29,690,500	44,323,231	15,513,131	148,895	316
	Village 7	6,037,500	-	6,037,500	2,113,125	20,282	43
	Gen. Commercial	-	-	21,185,116	7,414,790	71,167	151
	Open Space	-	-	1,216,750	425,862	4,087	9
Subtotal		**16,891,500**	**80,342,500**	**320,416,544**	**112,145,790**	**1,076,375**	**2,285**
2023	Village 1	-	-	25,224,530	8,828,586	84,737	180
	Village 2	-	-	31,171,210	10,909,923	104,713	222
	Village 3	-	25,137,000	37,153,743	13,003,810	124,811	265
	Village 4	-	-	73,426,726	25,699,354	246,662	524
	Village 5	-	25,515,000	140,278,918	49,097,621	471,239	1,000
	Village 6	-	-	76,234,143	26,681,950	256,093	544
	Village 7	-	28,175,000	6,218,625	2,176,519	20,890	44
	Gen. Commercial	-	-	21,820,669	7,637,234	73,302	156
	Open Space	-	-	1,253,252	438,638	4,210	9
Subtotal		**-**	**78,827,000**	**412,781,816**	**144,473,635**	**1,386,658**	**2,943**

APPENDIX 3
CITY OF SPARKS
ESTIMATED REAL PROPERTY TAX REVENUE

YEAR	USE TYPE	ADDED TAX. LAND VALUE ($)	ADDED TAX. IMPROVEMENT VALUE ($)	CUMULATIVE TOTAL TAX. VALUE ($)	CUMULATIVE ASSESSED VALUE ($)	GENERAL FUND REVENUE	AB 104 REVENUE
2024	Village 1	-	-	25,981,266	9,093,443	87,279	185
	Village 2	-	-	32,106,346	11,237,221	107,855	229
	Village 3	-	-	64,159,465	22,455,813	215,531	458
	Village 4	-	-	75,629,528	26,470,335	254,062	539
	Village 5	-	-	170,767,735	59,768,707	573,660	1,218
	Village 6	-	-	78,521,167	27,482,408	263,776	560
	Village 7	-	-	35,425,434	12,398,902	119,005	253
	Gen. Commercial	-	-	22,475,289	7,866,351	75,501	160
	Open Space	-	-	1,290,850	451,797	4,336	9
Subtotal		**-**	**-**	**506,357,080**	**177,224,978**	**1,701,005**	**3,611**
2025	Village 1	-	-	26,760,704	9,366,246	89,897	191
	Village 2	-	-	33,069,536	11,574,338	111,090	236
	Village 3	-	-	66,084,249	23,129,487	221,997	471
	Village 4	-	-	77,898,414	27,264,445	261,684	555
	Village 5	-	-	175,890,767	61,561,768	590,870	1,254
	Village 6	-	-	80,876,802	28,306,881	271,689	577
	Village 7	-	-	36,488,197	12,770,869	122,575	260
	Gen. Commercial	-	-	23,149,548	8,102,342	77,766	165
	Open Space	-	-	1,329,575	465,351	4,466	9
Subtotal		**-**	**-**	**521,547,792**	**182,541,727**	**1,752,035**	**3,719**
2026	Village 1	-	-	27,563,525	9,647,234	92,594	197
	Village 2	-	-	34,061,622	11,921,568	114,423	243
	Village 3	-	-	68,066,777	23,823,372	228,657	485
	Village 4	-	-	80,235,366	28,082,378	269,535	572
	Village 5	-	-	181,167,490	63,408,622	608,596	1,292
	Village 6	-	-	83,303,106	29,156,087	279,840	594
	Village 7	-	-	37,582,843	13,153,995	126,252	268
	Gen. Commercial	-	-	23,844,034	8,345,412	80,099	170
	Open Space	-	-	1,369,462	479,312	4,600	10
Subtotal		**-**	**-**	**537,194,226**	**188,017,979**	**1,804,597**	**3,831**
2027	Village 1	-	-	28,390,431	9,936,651	95,372	202
	Village 2	-	-	35,083,471	12,279,215	117,856	250
	Village 3	-	-	70,108,780	24,538,073	235,516	500
	Village 4	-	-	82,642,427	28,924,850	277,621	589
	Village 5	-	-	186,602,515	65,310,880	626,854	1,331
	Village 6	-	-	85,802,199	30,030,770	288,235	612
	Village 7	-	-	38,710,328	13,548,615	130,040	276
	Gen. Commercial	-	-	24,559,355	8,595,774	82,502	175
	Open Space	-	-	1,410,546	493,691	4,738	10
Subtotal		**-**	**-**	**553,310,053**	**193,658,519**	**1,858,734**	**3,946**
2028	Village 1	-	-	29,242,144	10,234,750	98,233	209
	Village 2	-	-	36,135,975	12,647,591	121,392	258
	Village 3	-	-	72,212,043	25,274,215	242,582	515
	Village 4	-	-	85,121,700	29,792,595	285,949	607
	Village 5	-	-	192,200,590	67,270,207	645,659	1,371
	Village 6	-	-	88,376,265	30,931,693	296,882	630
	Village 7	-	-	39,871,638	13,955,073	133,941	284
	Gen. Commercial	-	-	25,296,136	8,853,648	84,977	180
	Open Space	-	-	1,452,863	508,502	4,881	10
Subtotal		**-**	**-**	**569,909,355**	**199,468,274**	**1,914,496**	**4,064**
2029	Village 1	-	-	30,119,408	10,541,793	101,180	215
	Village 2	-	-	37,220,055	13,027,019	125,033	265
	Village 3	-	-	74,378,405	26,032,442	249,859	530
	Village 4	-	-	87,675,351	30,686,373	294,528	625
	Village 5	-	-	197,966,608	69,288,313	665,029	1,412
	Village 6	-	-	91,027,553	31,859,644	305,789	649
	Village 7	-	-	41,067,787	14,373,725	137,959	293
	Gen. Commercial	-	-	26,055,020	9,119,257	87,527	186
	Open Space	-	-	1,496,448	523,757	5,027	11
Subtotal		**-**	**-**	**587,006,635**	**205,452,322**	**1,971,931**	**4,186**

APPENDIX 3
CITY OF SPARKS
ESTIMATED REAL PROPERTY TAX REVENUE

YEAR	USE TYPE	ADDED TAX. LAND VALUE ($)	ADDED TAX. IMPROVEMENT VALUE ($)	CUMULATIVE TOTAL TAX. VALUE ($)	CUMULATIVE ASSESSED VALUE ($)	GENERAL FUND REVENUE	AB 104 REVENUE
2030	Village 1	-	-	31,022,990	10,858,047	104,216	221
	Village 2	-	-	38,336,656	13,417,830	128,784	273
	Village 3	-	-	76,609,757	26,813,415	257,355	546
	Village 4	-	-	90,305,612	31,606,964	303,364	644
	Village 5	-	-	203,905,606	71,366,962	684,980	1,454
	Village 6	-	-	93,758,380	32,815,433	314,963	669
	Village 7	-	-	42,299,821	14,804,937	142,098	302
	Gen. Commercial	-	-	26,836,671	9,392,835	90,152	191
	Open Space	-	-	1,541,342	539,470	5,178	11
Subtotal		**-**	**-**	**604,616,834**	**211,615,892**	**2,031,089**	**4,311**
2031	Village 1	-	-	31,953,680	11,183,788	107,342	228
	Village 2	-	-	39,486,756	13,820,365	132,648	282
	Village 3	-	-	78,908,049	27,617,817	265,076	563
	Village 4	-	-	93,014,780	32,555,173	312,465	663
	Village 5	-	-	210,022,774	73,507,971	705,530	1,498
	Village 6	-	-	96,571,131	33,799,896	324,411	689
	Village 7	-	-	43,568,815	15,249,085	146,361	311
	Gen. Commercial	-	-	27,641,771	9,674,620	92,857	197
	Open Space	-	-	1,587,582	555,654	5,333	11
Subtotal		**-**	**-**	**622,755,339**	**217,964,369**	**2,092,022**	**4,441**
2032	Village 1	-	-	32,912,291	11,519,302	110,562	235
	Village 2	-	-	40,671,359	14,234,975	136,627	290
	Village 3	-	-	81,275,291	28,446,352	273,028	580
	Village 4	-	-	95,805,224	33,531,828	321,838	683
	Village 5	-	-	216,323,458	75,713,210	726,695	1,543
	Village 6	-	-	99,468,265	34,813,893	334,144	709
	Village 7	-	-	44,875,880	15,706,558	150,752	320
	Gen. Commercial	-	-	28,471,024	9,964,858	95,643	203
	Open Space	-	-	1,635,210	572,323	5,493	12
Subtotal		**-**	**-**	**641,438,000**	**224,503,300**	**2,154,783**	**4,574**
2033	Village 1	-	-	33,899,659	11,864,881	113,879	242
	Village 2	-	-	41,891,499	14,662,025	140,726	299
	Village 3	-	-	83,713,550	29,299,742	281,219	597
	Village 4	-	-	98,679,380	34,537,783	331,494	704
	Village 5	-	-	222,813,161	77,984,606	748,496	1,589
	Village 6	-	-	102,452,313	35,858,310	344,168	731
	Village 7	-	-	46,222,156	16,177,755	155,274	330
	Gen. Commercial	-	-	29,325,155	10,263,804	98,512	209
	Open Space	-	-	1,684,266	589,493	5,658	12
Subtotal		**-**	**-**	**660,681,140**	**231,238,399**	**2,219,426**	**4,711**
2034	Village 1	-	-	34,916,649	12,220,827	117,295	249
	Village 2	-	-	43,148,244	15,101,885	144,948	308
	Village 3	-	-	86,224,956	30,178,735	289,655	615
	Village 4	-	-	101,639,762	35,573,917	341,438	725
	Village 5	-	-	229,497,556	80,324,145	770,951	1,637
	Village 6	-	-	105,525,883	36,934,059	354,493	752
	Village 7	-	-	47,608,821	16,663,087	159,932	339
	Gen. Commercial	-	-	30,204,909	10,571,718	101,467	215
	Open Space	-	-	1,734,794	607,178	5,828	12
Subtotal		**-**	**-**	**680,501,574**	**238,175,551**	**2,286,009**	**4,853**
2035	Village 1	-	-	35,964,149	12,587,452	120,814	256
	Village 2	-	-	44,442,692	15,554,942	149,296	317
	Village 3	-	-	88,811,705	31,084,097	298,345	633
	Village 4	-	-	104,688,955	36,641,134	351,682	747
	Village 5	-	-	236,382,483	82,733,869	794,080	1,686
	Village 6	-	-	108,691,659	38,042,081	365,128	775
	Village 7	-	-	49,037,085	17,162,980	164,730	350
	Gen. Commercial	-	-	31,111,056	10,888,870	104,511	222
	Open Space	-	-	1,786,838	625,393	6,003	13
Subtotal		**-**	**-**	**700,916,621**	**245,320,817**	**2,354,589**	**4,998**

APPENDIX 3
CITY OF SPARKS
ESTIMATED REAL PROPERTY TAX REVENUE

YEAR	USE TYPE	ADDED TAX. LAND VALUE ($)	ADDED TAX. IMPROVEMENT VALUE ($)	CUMULATIVE TOTAL TAX. VALUE ($)	CUMULATIVE ASSESSED VALUE ($)	GENERAL FUND REVENUE	AB 104 REVENUE
2036	Village 1	-	-	37,043,073	12,965,076	124,439	264
	Village 2	-	-	45,775,972	16,021,590	153,775	326
	Village 3	-	-	91,476,056	32,016,620	307,296	652
	Village 4	-	-	107,829,623	37,740,368	362,232	769
	Village 5	-	-	243,473,957	85,215,885	817,902	1,736
	Village 6	-	-	111,952,409	39,183,343	376,082	798
	Village 7	-	-	50,508,198	17,677,869	169,672	360
	Gen. Commercial	-	-	32,044,388	11,215,536	107,647	229
	Open Space	-	-	1,840,443	644,155	6,183	13
Subtotal		**-**	**-**	**721,944,120**	**252,680,442**	**2,425,227**	**5,148**
2037	Village 1	-	-	38,154,365	13,354,028	128,172	272
	Village 2	-	-	47,149,252	16,502,238	158,388	336
	Village 3	-	-	94,220,338	32,977,118	316,514	672
	Village 4	-	-	111,064,512	38,872,579	373,099	792
	Village 5	-	-	250,778,176	87,772,362	842,439	1,788
	Village 6	-	-	115,310,981	40,358,843	387,364	822
	Village 7	-	-	52,023,444	18,208,205	174,762	371
	Gen. Commercial	-	-	33,005,720	11,552,002	110,876	235
	Open Space	-	-	1,895,656	663,480	6,368	14
Subtotal		**-**	**-**	**743,602,443**	**260,260,855**	**2,497,984**	**5,302**
TOTAL		**$ 80,876,963**	**$ 380,221,717**			**$ 32,854,535**	**$ 69,741**

APPENDIX 3, ASSUMPTIONS:

1. As the project is not currently located in the City of Sparks, all property tax revenue generated by the project will be net new to the City.
2. Taxable value of land and improvements is estimated in Appendix 1.
3. Land and improvement taxable values are inflated by **3.0%** annually, the maximum allowed increase for owner-occupied properties. This may be conservative for commercial uses in the project, which can increase up to 8% per year.
4. Property tax calculation: Taxable Value X 35% = Assessed Value; Assessed Value/100 X Tax Rate = Property Tax Revenue.
   Analysis assumes improvements will generate property tax revenue in the year after improvements are made to account for work-in-progress.
   Land values will generate property tax in the year as developed.
5. City of Sparks General Fund operating tax rate is assumed to remain constant at FY 2017-18 rate of **$ 0.9598** per $100 of value.
   Source: City of Sparks Budget, FY 2017-18.
6. City of Sparks is expected to receive **7.49%** of property tax revenue generated by the AB 104 property tax rate of **$ 0.0272** Source: Nevada Department of Taxation. "Local Gov't Tax Act Distribution." Three-year average FY 2014-15, FY 2015-16, and 2016-17.

APPENDIX 4
CITY OF SPARKS
ESTIMATED SALES TAX REVENUE

YEAR	USE TYPE	CONSTR. MATERIALS COST	HOUSEHOLD EXPENDITURES	TOTAL TAXABLE SALES	CCRT SALES TAX REVENUE	AB 104 SALES TAX REVENUE
2018	Village 1	$ -	$ -	$ -	$ -	$ -
	Village 2	-	-	-	-	-
	Village 3	-	-	-	-	-
	Village 4	-	-	-	-	-
	Village 5	-	-	-	-	-
	Village 6	-	-	-	-	-
	Village 7	-	-	-	-	-
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**-**	**-**	**-**	**-**
2019	Village 1	4,709,250	-	4,709,250	12,624	866
	Village 2	5,755,750	-	5,755,750	15,429	1,059
	Village 3	-	-	-	-	-
	Village 4	9,216,900	-	9,216,900	24,707	1,696
	Village 5	12,915,000	-	12,915,000	34,620	2,376
	Village 6	-	-	-	-	-
	Village 7	-	-	-	-	-
	Gen. Commercial	5,378,344	-	5,378,344	14,417	990
	Open Space	-	-	-	-	-
Subtotal		**37,975,244**	**-**	**37,975,244**	**101,796**	**6,987**
2020	Village 1	4,604,600	801,371	5,405,971	14,491	995
	Village 2	5,755,750	979,454	6,735,204	18,054	1,239
	Village 3	-	-	-	-	-
	Village 4	9,216,900	1,330,032	10,546,932	28,272	1,940
	Village 5	12,757,500	1,844,332	14,601,832	39,141	2,686
	Village 6	-	-	-	-	-
	Village 7	-	-	-	-	-
	Gen. Commercial	3,361,465	-	3,361,465	9,011	618
	Open Space	-	-	-	-	-
Subtotal		**35,696,215**	**4,955,188**	**40,651,403**	**108,970**	**7,479**
2021	Village 1	-	1,632,482	1,632,482	4,376	300
	Village 2	-	2,017,674	2,017,674	5,409	371
	Village 3	-	-	-	-	-
	Village 4	9,077,250	2,739,865	11,817,115	31,677	2,174
	Village 5	12,757,500	3,776,157	16,533,657	44,320	3,042
	Village 6	15,019,900	-	15,019,900	40,262	2,763
	Village 7	-	-	-	-	-
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**36,854,650**	**10,166,178**	**47,020,828**	**126,043**	**8,651**
2022	Village 1	-	1,681,456	1,681,456	4,507	309
	Village 2	-	2,078,205	2,078,205	5,571	382
	Village 3	12,568,500	-	12,568,500	33,691	2,312
	Village 4	-	4,211,712	4,211,712	11,290	775
	Village 5	12,757,500	5,822,231	18,579,731	49,805	3,418
	Village 6	14,845,250	2,257,208	17,102,458	45,845	3,147
	Village 7	-	-	-	-	-
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**40,171,250**	**16,050,813**	**56,222,063**	**150,708**	**10,344**
2023	Village 1	-	1,731,900	1,731,900	4,643	319
	Village 2	-	2,140,551	2,140,551	5,738	394
	Village 3	12,568,500	1,981,857	14,550,357	39,003	2,677
	Village 4	-	4,338,064	4,338,064	11,629	798
	Village 5	12,757,500	7,987,672	20,745,172	55,609	3,817
	Village 6	-	4,622,815	4,622,815	12,392	851
	Village 7	14,087,500	-	14,087,500	37,763	2,592
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**39,413,500**	**22,802,858**	**62,216,358**	**166,776**	**11,447**

APPENDIX 4
CITY OF SPARKS
ESTIMATED SALES TAX REVENUE

YEAR	USE TYPE	CONSTR. MATERIALS COST	HOUSEHOLD EXPENDITURES	TOTAL TAXABLE SALES	CCRT SALES TAX REVENUE	AB 104 SALES TAX REVENUE
2024	Village 1	-	1,783,857	1,783,857	4,782	328
	Village 2	-	2,204,767	2,204,767	5,910	406
	Village 3	-	4,082,625	4,082,625	10,944	751
	Village 4	-	4,468,206	4,468,206	11,977	822
	Village 5	-	10,277,799	10,277,799	27,551	1,891
	Village 6	-	4,761,500	4,761,500	12,764	876
	Village 7	-	2,006,944	2,006,944	5,380	369
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**29,585,697**	**29,585,697**	**79,307**	**5,443**
2025	Village 1	-	1,837,373	1,837,373	4,925	338
	Village 2	-	2,270,910	2,270,910	6,087	418
	Village 3	-	4,205,103	4,205,103	11,272	774
	Village 4	-	4,602,252	4,602,252	12,337	847
	Village 5	-	10,586,133	10,586,133	28,377	1,948
	Village 6	-	4,904,344	4,904,344	13,147	902
	Village 7	-	2,067,153	2,067,153	5,541	380
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**30,473,268**	**30,473,268**	**81,686**	**5,607**
2026	Village 1	-	1,892,494	1,892,494	5,073	348
	Village 2	-	2,339,038	2,339,038	6,270	430
	Village 3	-	4,331,256	4,331,256	11,610	797
	Village 4	-	4,740,320	4,740,320	12,707	872
	Village 5	-	10,903,716	10,903,716	29,228	2,006
	Village 6	-	5,051,475	5,051,475	13,541	929
	Village 7	-	2,129,167	2,129,167	5,707	392
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**31,387,466**	**31,387,466**	**84,137**	**5,775**
2027	Village 1	-	1,949,269	1,949,269	5,225	359
	Village 2	-	2,409,209	2,409,209	6,458	443
	Village 3	-	4,461,194	4,461,194	11,959	821
	Village 4	-	4,882,529	4,882,529	13,088	898
	Village 5	-	11,230,828	11,230,828	30,105	2,066
	Village 6	-	5,203,019	5,203,019	13,947	957
	Village 7	-	2,193,042	2,193,042	5,879	403
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**32,329,090**	**32,329,090**	**86,661**	**5,948**
2028	Village 1	-	2,007,747	2,007,747	5,382	369
	Village 2	-	2,481,485	2,481,485	6,652	457
	Village 3	-	4,595,030	4,595,030	12,317	845
	Village 4	-	5,029,005	5,029,005	13,481	925
	Village 5	-	11,567,753	11,567,753	31,008	2,128
	Village 6	-	5,359,110	5,359,110	14,366	986
	Village 7	-	2,258,833	2,258,833	6,055	416
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**33,298,963**	**33,298,963**	**89,261**	**6,126**
2029	Village 1	-	2,067,979	2,067,979	5,543	380
	Village 2	-	2,555,930	2,555,930	6,851	470
	Village 3	-	4,732,881	4,732,881	12,687	871
	Village 4	-	5,179,875	5,179,875	13,885	953
	Village 5	-	11,914,785	11,914,785	31,939	2,192
	Village 6	-	5,519,883	5,519,883	14,797	1,016
	Village 7	-	2,326,598	2,326,598	6,237	428
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**34,297,932**	**34,297,932**	**91,939**	**6,310**

APPENDIX 4
CITY OF SPARKS
ESTIMATED SALES TAX REVENUE

YEAR	USE TYPE	CONSTR. MATERIALS COST	HOUSEHOLD EXPENDITURES	TOTAL TAXABLE SALES	CCRT SALES TAX REVENUE	AB 104 SALES TAX REVENUE
2030	Village 1	-	2,130,019	2,130,019	5,710	392
	Village 2	-	2,632,607	2,632,607	7,057	484
	Village 3	-	4,874,867	4,874,867	13,068	897
	Village 4	-	5,335,271	5,335,271	14,302	982
	Village 5	-	12,272,229	12,272,229	32,897	2,258
	Village 6	-	5,685,479	5,685,479	15,240	1,046
	Village 7	-	2,396,396	2,396,396	6,424	441
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**35,326,870**	**35,326,870**	**94,697**	**6,499**
2031	Village 1	-	2,193,919	2,193,919	5,881	404
	Village 2	-	2,711,586	2,711,586	7,269	499
	Village 3	-	5,021,113	5,021,113	13,460	924
	Village 4	-	5,495,330	5,495,330	14,731	1,011
	Village 5	-	12,640,396	12,640,396	33,884	2,326
	Village 6	-	5,856,044	5,856,044	15,698	1,077
	Village 7	-	2,468,288	2,468,288	6,616	454
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**36,386,676**	**36,386,676**	**97,538**	**6,694**
2032	Village 1	-	2,259,737	2,259,737	6,057	416
	Village 2	-	2,792,933	2,792,933	7,487	514
	Village 3	-	5,171,747	5,171,747	13,863	952
	Village 4	-	5,660,189	5,660,189	15,173	1,041
	Village 5	-	13,019,608	13,019,608	34,900	2,395
	Village 6	-	6,031,725	6,031,725	16,169	1,110
	Village 7	-	2,542,337	2,542,337	6,815	468
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**37,478,276**	**37,478,276**	**100,464**	**6,895**
2033	Village 1	-	2,327,529	2,327,529	6,239	428
	Village 2	-	2,876,721	2,876,721	7,711	529
	Village 3	-	5,326,899	5,326,899	14,279	980
	Village 4	-	5,829,995	5,829,995	15,628	1,073
	Village 5	-	13,410,196	13,410,196	35,947	2,467
	Village 6	-	6,212,677	6,212,677	16,654	1,143
	Village 7	-	2,618,607	2,618,607	7,019	482
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**38,602,624**	**38,602,624**	**103,478**	**7,102**
2034	Village 1	-	2,397,355	2,397,355	6,426	441
	Village 2	-	2,963,023	2,963,023	7,943	545
	Village 3	-	5,486,706	5,486,706	14,708	1,009
	Village 4	-	6,004,895	6,004,895	16,097	1,105
	Village 5	-	13,812,502	13,812,502	37,026	2,541
	Village 6	-	6,399,057	6,399,057	17,153	1,177
	Village 7	-	2,697,165	2,697,165	7,230	496
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**39,760,703**	**39,760,703**	**106,582**	**7,315**
2035	Village 1	-	2,469,276	2,469,276	6,619	454
	Village 2	-	3,051,914	3,051,914	8,181	561
	Village 3	-	5,651,307	5,651,307	15,149	1,040
	Village 4	-	6,185,042	6,185,042	16,580	1,138
	Village 5	-	14,226,877	14,226,877	38,136	2,617
	Village 6	-	6,591,029	6,591,029	17,668	1,213
	Village 7	-	2,778,080	2,778,080	7,447	511
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**40,953,524**	**40,953,524**	**109,779**	**7,535**

APPENDIX 4
CITY OF SPARKS
ESTIMATED SALES TAX REVENUE

YEAR	USE TYPE	CONSTR. MATERIALS COST	HOUSEHOLD EXPENDITURES	TOTAL TAXABLE SALES	CCRT SALES TAX REVENUE	AB 104 SALES TAX REVENUE
2036	Village 1	-	2,543,354	2,543,354	6,818	468
	Village 2	-	3,143,471	3,143,471	8,426	578
	Village 3	-	5,820,846	5,820,846	15,603	1,071
	Village 4	-	6,370,593	6,370,593	17,077	1,172
	Village 5	-	14,653,683	14,653,683	39,280	2,696
	Village 6	-	6,788,760	6,788,760	18,198	1,249
	Village 7	-	2,861,423	2,861,423	7,670	526
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**42,182,130**	**42,182,130**	**113,073**	**7,761**
2037	Village 1	-	2,619,654	2,619,654	7,022	482
	Village 2	-	3,237,775	3,237,775	8,679	596
	Village 3	-	5,995,472	5,995,472	16,071	1,103
	Village 4	-	6,561,711	6,561,711	17,589	1,207
	Village 5	-	15,093,294	15,093,294	40,459	2,777
	Village 6	-	6,992,423	6,992,423	18,744	1,286
	Village 7	-	2,947,265	2,947,265	7,900	542
	Gen. Commercial	-	-	-	-	-
	Open Space	-	-	-	-	-
Subtotal		**-**	**43,447,594**	**43,447,594**	**116,465**	**7,994**
TOTAL		**$ 190,110,858**	**$ 559,485,851**	**$ 749,596,709**	**$ 2,009,359**	**$ 137,912**

APPENDIX 4, ASSUMPTIONS:

1. Construction Materials Cost is estimated in Appendix 1.
2. Household Taxable Sales-estimated based on the number of occupied households, estimated household income, and expenditure information. Household incomes and percent of income spent on taxable items are estimated as follows, based on projected sales price for each village shown in Appendix 1:

	Household Income	% Spent on Taxable Items
Village 1	$ 61,316	27.5%
Village 2	$ 61,316	27.5%
Village 3	$ 79,390	24.1%
Village 4	$ 79,390	24.1%
Village 5	$ 88,608	24.1%
Village 6	$ 97,465	24.1%
Village 7	$ 111,201	21.7%

Affordability calculator created by EEC and Center for Regional Studies, UNR. Percent of household income spent on taxable items from Consumer Expenditure Survey, 2016, Bureau of Labor Statistics, data by corresponding household income range. Estimates are inflated 3% annually.

3. Relevant tax rates for the City of Sparks are as follows:
   0.500% Basic City County Relief Tax (BCCRT)
   1.750% Supplemental City County Relief Tax (SCCRT)
   0.250% Fair Share (AB 104)

   Distribution of BCCRT and SCCRT sales tax revenue to the City of Sparks is calculated **12.13%** of all Washoe County CCRT revenue.
   Source: Distribution based on average percentage share of Washoe County C-Tax distribution from FY 2014-15 to FY 2016-17. Data from Nevada Department of Taxation. "Consolidated Tax Distribution: Revenue Summary by County."
   Distribution of AB 104 sales tax revenue to the City of Sparks is calculated at **7.49%** of all Washoe County AB 104 revenue.
   Source: Distribution based on average percentage share of Washoe County AB104 distribution from FY 2014-15 to FY 2016-17. Data from Nevada Department of Taxation. "Local Government Tax Act Distribution."
4. A State administrative fee of **1.75%** of all sales tax revenue is subtracted for State uses. Source: AB 552.

APPENDIX 5
CITY OF SPARKS
ESTIMATED PERMIT AND IMPACT FEE REVENUE

YEAR	USE TYPE	ESTIMATED BUILDING VALUATION	PRINCIPAL AMOUNT	BUILDING PERMIT REVENUE	PLAN REVIEW REVENUE	CURRENT PLANNING REVENUE	FIRE INSPEC./ PLAN REVIEW REVENUE	REGIONAL ROAD REVENUE	SEWER CONNECT. REVENUE	RESIDENTIAL PARK TAX REVENUE	IMPACT FEE SERVICE AREA #1 SANITARY SEWER	FLOOD CONTROL	REGIONAL PARKS/REC	FIRE STATION	TOTAL
2018	Village 1	$ -	$ 72,262	$ 69,083	$ 28,905	$ 6,300	$ 31,795	$ 176,488	$ 264,388	$ 45,000	$ 13,365	$ 26,685	$ 35,010	$ 15,300	$ 90,360
	Village 2	-	88,321	84,435	35,328	7,700	38,861	215,708	323,140	55,000	16,335	32,615	42,790	18,700	110,440
	Village 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 4	-	131,857	126,055	52,743	9,240	58,017	258,849	387,768	66,000	19,602	39,138	51,348	22,440	132,528
	Village 5	-	180,216	172,286	72,086	11,480	79,295	321,601	481,773	82,000	24,354	48,626	63,796	27,880	164,656
	Village 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gen. Commercial	-	41,221	39,407	30,915	21,146	18,137	610,816	-	-	24,306	46,783	-	29,621	100,711
	Open Space	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal		**-**	**513,876**	**491,265**	**219,978**	**55,866**	**226,105**	**1,583,462**	**1,457,069**	**248,000**	**97,962**	**193,847**	**192,944**	**113,941**	**598,695**
2019	Village 1	9,418,500	70,657	67,548	28,263	6,160	31,089	172,566	258,512	44,000	13,068	26,092	34,232	14,960	88,352
	Village 2	11,511,500	88,321	84,435	35,328	7,700	38,861	215,708	323,140	55,000	16,335	32,615	42,790	18,700	110,440
	Village 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 4	18,433,800	131,857	126,055	52,743	9,240	58,017	258,849	387,768	66,000	19,602	39,138	51,348	22,440	132,528
	Village 5	25,830,000	178,018	170,185	71,207	11,340	78,328	317,679	475,898	81,000	24,057	48,033	63,018	27,540	162,648
	Village 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gen. Commercial	10,756,687	26,497	25,332	19,873	13,593	11,659	381,760	-	-	15,192	29,240	-	18,513	62,944
	Open Space	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal		**75,950,487**	**495,349**	**473,554**	**207,414**	**48,033**	**217,954**	**1,346,562**	**1,445,319**	**246,000**	**88,254**	**175,118**	**191,388**	**102,153**	**556,912**
2020	Village 1	9,209,200	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 2	11,511,500	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 4	18,433,800	129,859	124,145	51,944	9,100	57,138	254,927	381,893	65,000	19,305	38,545	50,570	22,100	130,520
	Village 5	25,515,000	178,018	170,185	71,207	11,340	78,328	317,679	475,898	81,000	24,057	48,033	63,018	27,540	162,648
	Village 6	-	205,525	196,482	82,210	12,040	90,431	337,289	505,274	86,000	25,542	50,998	66,908	29,240	172,688
	Village 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gen. Commercial	6,722,930	-	-	-	-	-	-	-	-	-	-	-	-	-
	Open Space	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal		**71,392,430**	**513,402**	**490,812**	**205,361**	**32,480**	**225,897**	**909,895**	**1,363,065**	**232,000**	**68,904**	**137,576**	**180,496**	**78,880**	**465,856**
2021	Village 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 3	-	179,805	171,893	71,922	12,600	79,114	352,976	528,775	90,000	26,730	53,370	70,020	30,600	180,720
	Village 4	18,154,500	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 5	25,515,000	178,018	170,185	71,207	11,340	78,328	317,679	475,898	81,000	24,057	48,033	63,018	27,540	162,648
	Village 6	30,039,800	203,136	194,198	81,254	11,900	89,380	333,367	499,399	85,000	25,245	50,405	66,130	28,900	170,680
	Village 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gen. Commercial	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Open Space	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal		**73,709,300**	**560,958**	**536,276**	**224,383**	**35,840**	**246,822**	**1,004,022**	**1,504,072**	**256,000**	**76,032**	**151,808**	**199,168**	**87,040**	**514,048**

APPENDIX 5
CITY OF SPARKS
ESTIMATED PERMIT AND IMPACT FEE REVENUE

YEAR	USE TYPE	ESTIMATED BUILDING VALUATION	PRINCIPAL AMOUNT	BUILDING PERMIT REVENUE	PLAN REVIEW REVENUE	CURRENT PLANNING REVENUE	FIRE INSPEC./ PLAN REVIEW REVENUE	REGIONAL ROAD REVENUE	SEWER CONNECT. REVENUE	RESIDENTIAL PARK TAX REVENUE	IMPACT FEE SERVICE AREA #1 SANITARY SEWER	FLOOD CONTROL	REGIONAL PARKS/REC	FIRE STATION	TOTAL
2022	Village 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 3	25,137,000	179,805	171,893	71,922	12,600	79,114	352,976	528,775	90,000	26,730	53,370	70,020	30,600	180,720
	Village 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 5	25,515,000	178,018	170,185	71,207	11,340	78,328	317,679	475,898	81,000	24,057	48,033	63,018	27,540	162,648
	Village 6	29,690,500	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 7	-	188,143	179,864	75,257	9,800	82,783	274,537	411,270	70,000	20,790	41,510	54,460	23,800	140,560
	Gen. Commercial	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Open Space	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal		**80,342,500**	**545,965**	**521,942**	**218,386**	**33,740**	**240,225**	**945,192**	**1,415,942**	**241,000**	**71,577**	**142,913**	**187,498**	**81,940**	**483,928**
2023	Village 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 3	25,137,000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 5	25,515,000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Village 7	28,175,000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gen. Commercial	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Open Space	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal		**78,827,000**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
TOTAL		**$ 380,221,717**	**$ 2,629,550**	**$ 2,513,850**	**$ 1,075,521**	**$ 205,959**	**$ 1,157,002**	**$ 5,789,133**	**$ 7,185,467**	**$ 1,223,000**	**$ 402,729**	**$ 801,262**	**$ 951,494**	**$ 463,954**	**$ 2,619,439**

APPENDIX 5, ASSUMPTIONS:

1. Building valuation is estimated in Appendix 1. It should be noted that permit fees associated with some residential uses are likely underestimated as construction values provided by the Client and used to estimate permit revenues for the projec are lower than those provided by the 2012 International Building Code.
2. Principal amount for the calculation of building permit and plan check fee revenue is estimated at follows, principal amount and resulting fees are estimated in the year prior to construction:
   $ 993.75 for the first $100,000.01 of Building Permit Valuation, plus **$ 5.60** for each additional $1,000 thereafter through a value of $500,000.
   $ 5,608.75 for the first $1,000,000.01 of Building Permit Valuation, plus **$ 3.65** for each additional $1,000 thereafter.
   Source: "City of Sparks Permit Fees." Revised October 9, 2017. As the number of commercial buildings is unknown, analysis conservatively assumes one building permit per year.
3. Building Permit fee revenue is estimated at **95.60%** of principal amount.
   Building Plan Review fee revenue is estimated at **75.00%** of principal amount, except for single family repeats, which are estimated at **40.00%** of the principal amount.
   Current Planning Plan Review fee revenue is estimated at **51.30%** of the principal amount, except for single family repeats, which are estimated a **$ 140.00** per building.
   Fire Prevention Inspection fee revenue is estimated at **22.00%** of the principal amount.
   Fire Prevention Plan review fee revenue is estimated at **22.00%** of the principal amount.
   Analysis conservatively assumes all single family homes are repeat units. Source: "City of Sparks Permit Fees." Revised October 9, 2017. Revenue for mechanical, plumbing, and electrical permit fees is not estimated as the construction detai required for these estimates are unknown.
4. Regional Road Impact fee (RRIF) revenue is estimated at:
   Single Family **$ 3,921.96** per dwelling unit.
   Commercial **$ 7,011.20** per 1,000 square feet of gross floor area.
   Source: "Regional Road Impact Fee (RRIF)." Regional Transportation Commission. 5th Edition, March 20, 2017. Data for North Service Area.
5. Sewer Connection fee revenue is estimated at **$ 5,875.28** per residential unit. Source: "City of Sparks Permit Fees." Revised October 9, 2017. Connection fees for commercial uses are not estimated as fixture information is not available.

APPENDIX 5
CITY OF SPARKS
ESTIMATED PERMIT AND IMPACT FEE REVENUE

YEAR	USE TYPE	ESTIMATED BUILDING VALUATION	PRINCIPAL AMOUNT	BUILDING PERMIT REVENUE	PLAN REVIEW REVENUE	CURRENT PLANNING REVENUE	FIRE INSPEC./ PLAN REVIEW REVENUE	REGIONAL ROAD REVENUE	SEWER CONNECT. REVENUE	RESIDENTIAL PARK TAX REVENUE	IMPACT FEE SERVICE AREA #1 SANITARY SEWER	FLOOD CONTROL	REGIONAL PARKS/REC	FIRE STATION	TOTAL

6. Residential construction tax for neighborhood parks revenue is estimated at the lesser of 1% of building permit valuation or $1,000 per residential unit. Given an estimated Added Improvements Value shown in Appendix 1, 1% of building per valuation will result in the following values per unit:

Village 1	$ 2,093
Village 2	$ 2,093
Village 3	$ 2,793
Village 4	$ 2,793
Village 5	$ 3,150
Village 6	$ 3,493
Village 7	$ 4,025

The alternative of $1,000 per unit is the lesser of the two options and is used in this calculation of residential tax revenue. Source: Sparks Municipal Code 15.12.0040.

7. The Project is located adjacent to the Impact Fees Service Area Number 1. Should the rpoject be added to the Area, the following fees will apply to the project:

	Unit of Measure	Sanitary Sewer	Flood Control	Regional Parks/Rec	Fire Station
Single Family	Dwelling	$ 297.00	$ 593.00	$ 778.00	$ 340.00
Commercial	1,000 Sq.Ft.	$ 279.00	$ 537.00	$ -	$ 340.00

Source: "City of Sparks Permit Fees." Revised October 9, 2017.

APPENDIX 6
CITY OF SPARKS
COMPARISON OF ESTIMATED REVENUE TO ESTIMATED COSTS

	Base Year FY 16-17	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	1ST 10-YEAR SUBTOTAL
GENERAL FUND												
REVENUE												
Taxes												
Ad Valorem[1]	Appendix 3	$ 54,831	$ 105,697	$ 424,722	$ 742,322	$ 1,076,375	$ 1,386,658	$ 1,701,005	$ 1,752,035	$ 1,804,597	$ 1,858,734	**$ 10,906,978**
Subtotal		**$ 54,831**	**$ 105,697**	**$ 424,722**	**$ 742,322**	**$ 1,076,375**	**$ 1,386,658**	**$ 1,701,005**	**$ 1,752,035**	**$ 1,804,597**	**$ 1,858,734**	**$ 10,906,978**
Licenses and Permits												
Business Licenses[3]	$ 5,878,303	$ -	$ -	$ 45,831	$ 94,031	$ 142,337	$ 198,304	$ 254,380	$ 262,011	$ 269,872	$ 277,968	**$ 1,544,734**
Liquor Licenses[3]	252,674	-	-	1,970	4,042	6,118	8,524	10,934	11,262	11,600	11,948	**66,399**
City Gaming Licenses[2]	554,193	-	-	-	-	-	-	-	-	-	-	**-**
Franchise Fees[3]	4,416,852	-	-	34,437	70,653	106,950	149,002	191,137	196,871	202,777	208,860	**1,160,685**
Nonbusiness Licenses and Permits[5]	53,249	-	-	415	852	1,289	1,796	2,304	2,373	2,445	2,518	**13,993**
Subtotal	**$ 11,155,271**	**$ -**	**$ -**	**$ 82,653**	**$ 169,578**	**$ 256,695**	**$ 357,626**	**$ 458,755**	**$ 472,518**	**$ 486,693**	**$ 501,294**	**$ 2,785,811**
Intergovernmental Revenue												
Consolidated Tax-CCRT Revenue[4]	Appendix 4	$ -	$ 101,796	$ 108,970	$ 126,043	$ 150,708	$ 166,776	$ 79,307	$ 81,686	$ 84,137	$ 86,661	**$ 986,084**
Consolidated Tax-Other Revenue[5]	$ 3,643,715	-	-	28,409	58,286	88,229	122,920	157,679	162,410	167,282	172,301	**957,516**
State Distributive Fund-Sales Tax[4]	Appendix 4	-	6,987	7,479	8,651	10,344	11,447	5,443	5,607	5,775	5,948	**67,680**
State Distributive Fund-Other[6]	Appendix 3	116	224	902	1,576	2,285	2,943	3,611	3,719	3,831	3,946	**23,152**
County Gaming Licenses[2]	389,292	-	-	-	-	-	-	-	-	-	-	**-**
Other Intergovernmental Revenue[7]	551,354	-	-	-	-	-	-	-	-	-	-	**-**
Subtotal		**$ 116**	**$ 109,007**	**$ 145,759**	**$ 194,556**	**$ 251,566**	**$ 304,087**	**$ 246,040**	**$ 253,422**	**$ 261,024**	**$ 268,855**	**$ 2,034,432**
Charges for Services												
Building and Zoning Fees[7]	$ 27,305	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**
Other[8]	2,646,746	-	-	-	-	-	-	-	-	-	-	**-**
Subtotal	**$ 2,674,051**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Fines and Forfeits												
Fines[3]	$ 619,500	$ -	$ -	$ 4,830	$ 9,910	$ 15,001	$ 20,899	$ 26,808	$ 27,613	$ 28,441	$ 29,294	**$ 162,796**
Miscellaneous												
Miscellaneous[7]	$ 153,669	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**
REVENUE TOTAL		**$ 54,948**	**$ 214,704**	**$ 657,964**	**$ 1,116,366**	**$ 1,599,636**	**$ 2,069,269**	**$ 2,432,609**	**$ 2,505,588**	**$ 2,580,755**	**$ 2,658,178**	**$ 15,890,017**

APPENDIX 6
CITY OF SPARKS
COMPARISON OF ESTIMATED REVENUE TO ESTIMATED COSTS

EXPENDITURES	Base Year FY 16-17	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	1ST 10-YEAR SUBTOTAL
General Government												
Legislative[9]	$ 438,791	$ -	$ 919	$ 3,320	$ 5,410	$ 7,573	$ 9,999	$ 11,996	$ 12,345	$ 12,705	$ 13,076	**$ 77,344**
Mayor[9]	109,556	-	230	829	1,351	1,891	2,496	2,995	3,082	3,172	3,265	**19,311**
Management Services[9]	5,966,619	-	12,501	45,145	73,570	102,982	135,962	163,113	167,868	172,765	177,808	**1,051,714**
Legal[9]	1,617,935	-	3,390	12,242	19,950	27,925	36,868	44,231	45,520	46,848	48,215	**285,187**
Financial Services[9]	3,044,757	-	6,379	23,037	37,543	52,552	69,381	83,237	85,663	88,162	90,735	**536,688**
Community Services[9]	1,032,879	-	2,164	7,815	12,736	17,827	23,536	28,237	29,060	29,907	30,780	**182,062**
General Government Total	**$ 12,210,537**	**$ -**	**$ 25,582**	**$ 92,387**	**$ 150,559**	**$ 210,751**	**$ 278,244**	**$ 333,808**	**$ 343,537**	**$ 353,559**	**$ 363,881**	**$ 2,152,307**
Judicial												
Judicial[10]	$ 2,123,457	$ -	$ -	$ 16,556	$ 33,967	$ 51,417	$ 71,634	$ 91,891	$ 94,648	$ 97,487	$ 100,412	**$ 558,014**
Judicial Total		**$ -**	**$ -**	**$ 16,556**	**$ 33,967**	**$ 51,417**	**$ 71,634**	**$ 91,891**	**$ 94,648**	**$ 97,487**	**$ 100,412**	**$ 558,014**
Public Safety												
Police												
Police[11]	Appendix 7	$ -	$ 4,825	$ 179,654	$ 320,617	$ 461,896	$ 625,547	$ 789,526	$ 812,079	$ 835,308	$ 859,234	**$ 4,888,686**
Fire												
Fire[12]	Appendix 8	$ -	$ 49,622	$ 100,199	$ 148,226	$ 203,841	$ 259,571	$ 267,359	$ 275,379	$ 283,641	$ 292,150	**$ 1,879,988**
Community Services												
Community Services[13]	$ 1,277,098	$ -	$ 21,931	$ 22,589	$ 23,267	$ 23,965	$ 24,683	$ 25,424	$ 26,187	$ 26,972	$ 27,781	**$ 222,799**
Public Safety Total		**$ -**	**$ 76,378**	**$ 302,442**	**$ 492,109**	**$ 689,701**	**$ 909,802**	**$ 1,082,309**	**$ 1,113,645**	**$ 1,145,921**	**$ 1,179,165**	**$ 6,991,473**
Public Works												
Community Services[14]	$ 1,480,919	$ -	$ 25,431	$ 26,194	$ 26,980	$ 27,789	$ 28,623	$ 29,482	$ 30,366	$ 31,277	$ 32,215	**$ 258,357**
Public Works Total		**$ -**	**$ 25,431**	**$ 26,194**	**$ 26,980**	**$ 27,789**	**$ 28,623**	**$ 29,482**	**$ 30,366**	**$ 31,277**	**$ 32,215**	**$ 258,357**
Culture and Recreation												
Community Services[10]	$ 2,883,027	$ -	$ -	$ 22,478	$ 46,118	$ 69,810	$ 97,258	$ 124,761	$ 128,504	$ 132,359	$ 136,330	**$ 757,618**
Culture and Recreation Total		**$ -**	**$ -**	**$ 22,478**	**$ 46,118**	**$ 69,810**	**$ 97,258**	**$ 124,761**	**$ 128,504**	**$ 132,359**	**$ 136,330**	**$ 757,618**

APPENDIX 6
CITY OF SPARKS
COMPARISON OF ESTIMATED REVENUE TO ESTIMATED COSTS

	Base Year FY 16-17	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	1ST 10-YEAR SUBTOTAL
Community Support												
Management Services[9]	$ 268,707	$ -	$ 563	$ 2,033	$ 3,313	$ 4,638	$ 6,123	$ 7,346	$ 7,560	$ 7,780	$ 8,008	**$ 47,364**
Community Support Total		**$ -**	**$ 563**	**$ 2,033**	**$ 3,313**	**$ 4,638**	**$ 6,123**	**$ 7,346**	**$ 7,560**	**$ 7,780**	**$ 8,008**	**$ 47,364**
EXPENDITURES SUBTOTAL		**$ -**	**$ 127,954**	**$ 462,090**	**$ 753,046**	**$ 1,054,106**	**$ 1,391,685**	**$ 1,669,597**	**$ 1,718,260**	**$ 1,768,384**	**$ 1,820,011**	**$ 10,765,132**
CONTINGENCY	**3%**	**$ -**	**$ 3,839**	**$ 13,863**	**$ 22,591**	**$ 31,623**	**$ 41,751**	**$ 50,088**	**$ 51,548**	**$ 53,052**	**$ 54,600**	**$ 322,954**
EXPENDITURES TOTAL		**$ -**	**$ 131,793**	**$ 475,953**	**$ 775,638**	**$ 1,085,729**	**$ 1,433,435**	**$ 1,719,684**	**$ 1,769,808**	**$ 1,821,435**	**$ 1,874,611**	**$ 11,088,086**
GENERAL FUND SURPLUS/(DEFICIT)		**$ 54,948**	**$ 82,911**	**$ 182,011**	**$ 340,728**	**$ 513,907**	**$ 635,834**	**$ 712,925**	**$ 735,780**	**$ 759,320**	**$ 783,567**	**$ 4,801,931**
ROAD FUND												
REVENUE												
Licenses and Permits												
Licenses and Permits[3,15]	$ 1,609,563	$ -	$ -	$ 12,549	$ 25,747	$ 38,974	$ 54,298	$ 69,653	$ 71,742	$ 73,895	$ 76,112	**$ 422,970**
Subtotal		**$ -**	**$ -**	**$ 12,549**	**$ 25,747**	**$ 38,974**	**$ 54,298**	**$ 69,653**	**$ 71,742**	**$ 73,895**	**$ 76,112**	**$ 422,970**
Intergovernmental Revenues												
County Gasoline Tax[3]	$ 665,250	$ -	$ -	$ 5,187	$ 10,642	$ 16,108	$ 22,442	$ 28,788	$ 29,652	$ 30,541	$ 31,458	**$ 174,818**
State Gasoline Tax[3]	1,793,365	-	-	13,982	28,687	43,425	60,499	77,607	79,935	82,333	84,803	**471,271**
Subtotal	**2,458,615**	**$ -**	**$ -**	**$ 19,169**	**$ 39,329**	**$ 59,533**	**$ 82,941**	**$ 106,395**	**$ 109,587**	**$ 112,875**	**$ 116,261**	**$ 646,089**
Miscellaneous												
Interest Earned[7]	$ 5,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**
Subtotal		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
REVENUE TOTAL		**$ -**	**$ -**	**$ 31,718**	**$ 65,076**	**$ 98,507**	**$ 137,239**	**$ 176,048**	**$ 181,329**	**$ 186,769**	**$ 192,372**	**$ 1,069,059**
EXPENDITURES												
Public Works[16]	Appendix 9	$ -	$ 784	$ 888,285	$ 888,737	$ 890,382	$ 892,614	$ 894,255	$ 894,428	$ 894,604	$ 894,783	**$ 7,138,871**
EXPENDITURES SUBTOTAL		**$ -**	**$ 784**	**$ 888,285**	**$ 888,737**	**$ 890,382**	**$ 892,614**	**$ 894,255**	**$ 894,428**	**$ 894,604**	**$ 894,783**	**$ 7,138,871**
CONTINGENCY	**0%**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
EXPENDITURES TOTAL		**$ -**	**$ 784**	**$ 888,285**	**$ 888,737**	**$ 890,382**	**$ 892,614**	**$ 894,255**	**$ 894,428**	**$ 894,604**	**$ 894,783**	**$ 7,138,871**
ROAD FUND SURPLUS/(DEFICIT)		**$ -**	**$ (784)**	**$ (856,567)**	**$ (823,661)**	**$ (791,875)**	**$ (755,375)**	**$ (718,207)**	**$ (713,098)**	**$ (707,834)**	**$ (702,411)**	**$ (6,069,812)**

APPENDIX 6
CITY OF SPARKS
COMPARISON OF ESTIMATED REVENUE TO ESTIMATED COSTS

	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	10-YEAR SUBTOTAL	20-YEAR TOTAL
GENERAL FUND												
REVENUE												
Taxes												
Ad Valorem[1]	$1,914,496	$ 1,971,931	$2,031,089	$ 2,092,022	$ 2,154,783	$2,219,426	$ 2,286,009	$2,354,589	$ 2,425,227	$ 2,497,984	**$21,947,557**	**$ 32,854,535**
Subtotal	**$1,914,496**	**$ 1,971,931**	**$2,031,089**	**$ 2,092,022**	**$ 2,154,783**	**$2,219,426**	**$ 2,286,009**	**$2,354,589**	**$ 2,425,227**	**$ 2,497,984**	**$21,947,557**	**$ 32,854,535**
Licenses and Permits												
Business Licenses[3]	$ 286,307	$ 294,896	$ 303,743	$ 312,855	$ 322,241	$ 331,908	$ 341,865	$ 352,121	$ 362,685	$ 373,565	**$ 3,282,187**	**$ 4,826,921**
Liquor Licenses[3]	12,307	12,676	13,056	13,448	13,851	14,267	14,695	15,136	15,590	16,057	**141,082**	**207,481**
City Gaming Licenses[2]	-	-	-	-	-	-	-	-	-	-	-	-
Franchise Fees[3]	215,126	221,580	228,227	235,074	242,126	249,390	256,872	264,578	272,515	280,690	**2,466,177**	**3,626,862**
Nonbusiness Licenses and Permits[3]	2,594	2,671	2,751	2,834	2,919	3,007	3,097	3,190	3,285	3,384	**29,732**	**43,725**
Subtotal	**$ 516,333**	**$ 531,823**	**$ 547,778**	**$ 564,211**	**$ 581,137**	**$ 598,571**	**$ 616,528**	**$ 635,024**	**$ 654,075**	**$ 673,697**	**$ 5,919,178**	**$ 8,704,989**
Intergovernmental Revenue												
Consolidated Tax-CCRT Revenue[4]	$ 89,261	$ 91,939	$ 94,697	$ 97,538	$ 100,464	$ 103,478	$ 106,582	$ 109,779	$ 113,073	$ 116,465	**$ 1,023,275**	**$ 2,009,359**
Consolidated Tax-Other Revenue[5]	177,470	182,794	188,278	193,926	199,744	205,736	211,908	218,265	224,813	231,558	**2,034,491**	**2,992,007**
State Distributive Fund-Sales Tax[4]	6,126	6,310	6,499	6,694	6,895	7,102	7,315	7,535	7,761	7,994	**70,232**	**137,912**
State Distributive Fund-Other[6]	4,064	4,186	4,311	4,441	4,574	4,711	4,853	4,998	5,148	5,302	**46,588**	**69,741**
County Gaming Licenses[2]	-	-	-	-	-	-	-	-	-	-	-	-
Other Intergovernmental Revenue[7]	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	**$ 276,921**	**$ 285,228**	**$ 293,785**	**$ 302,599**	**$ 311,677**	**$ 321,027**	**$ 330,658**	**$ 340,578**	**$ 350,795**	**$ 361,319**	**$ 3,174,586**	**$ 5,209,018**
Charges for Services												
Building and Zoning Fees[7]	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**	**$ -**
Other[8]	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Fines and Forfeits												
Fines[3]	$ 30,173	$ 31,078	$ 32,011	$ 32,971	$ 33,960	$ 34,979	$ 36,028	$ 37,109	$ 38,222	$ 39,369	**$ 345,902**	**$ 508,697**
Miscellaneous												
Miscellaneous[7]	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**	**$ -**
REVENUE TOTAL	**$2,737,923**	**$ 2,820,061**	**$2,904,663**	**$ 2,991,803**	**$ 3,081,557**	**$3,174,003**	**$ 3,269,224**	**$3,367,300**	**$ 3,468,319**	**$ 3,572,369**	**$31,387,222**	**$ 47,277,239**

APPENDIX 6
CITY OF SPARKS
COMPARISON OF ESTIMATED REVENUE TO ESTIMATED COSTS

	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	10-YEAR SUBTOTAL	20-YEAR TOTAL
EXPENDITURES												
General Government												
Legislative[9]	$ 13,458	$ 13,852	$ 14,257	$ 14,675	$ 15,105	$ 15,547	$ 16,004	$ 16,474	$ 16,958	$ 17,456	**$ 153,785**	**$ 231,129**
Mayor[9]	3,360	3,458	3,560	3,664	3,771	3,882	3,996	4,113	4,234	4,358	**38,396**	**57,707**
Management Services[9]	183,004	188,354	193,866	199,543	205,390	211,413	217,616	224,005	230,586	237,365	**2,091,141**	**3,142,855**
Legal[9]	49,624	51,075	52,570	54,109	55,694	57,328	59,010	60,742	62,527	64,365	**567,043**	**852,231**
Financial Services[9]	93,386	96,117	98,930	101,826	104,810	107,883	111,049	114,309	117,668	121,127	**1,067,106**	**1,603,794**
Community Services[9]	31,680	32,606	33,560	34,543	35,555	36,598	37,671	38,777	39,917	41,090	**361,997**	**544,058**
General Government Total	**$ 374,512**	**$ 385,463**	**$ 396,742**	**$ 408,359**	**$ 420,325**	**$ 432,650**	**$ 445,345**	**$ 458,421**	**$ 471,889**	**$ 485,761**	**$ 4,279,467**	**$ 6,431,774**
Judicial												
Judicial[10]	$ 103,424	$ 106,527	$ 109,723	$ 113,015	$ 116,405	$ 119,897	$ 123,494	$ 127,199	$ 131,015	$ 134,945	**$ 1,185,645**	**$ 1,743,659**
Judicial Total	**$ 103,424**	**$ 106,527**	**$ 109,723**	**$ 113,015**	**$ 116,405**	**$ 119,897**	**$ 123,494**	**$ 127,199**	**$ 131,015**	**$ 134,945**	**$ 1,185,645**	**$ 1,743,659**
Public Safety												
Police												
Police[11]	$ 883,878	$ 909,261	$ 935,406	$ 962,334	$ 990,071	$1,018,640	$ 1,048,066	$1,078,375	$ 1,109,593	$ 1,141,747	**$10,077,372**	**$ 14,966,058**
Fire												
Fire[12]	$ 300,914	$ 309,942	$ 319,240	$ 328,817	$ 338,682	$ 348,842	$ 359,308	$ 370,087	$ 381,189	$ 392,625	**$ 3,449,647**	**$ 5,329,635**
Community Services												
Community Services[13]	$ 28,615	$ 29,473	$ 30,358	$ 31,268	$ 32,206	$ 33,173	$ 34,168	$ 35,193	$ 36,249	$ 37,336	**$ 328,038**	**$ 550,837**
Public Safety Total	**$1,213,407**	**$ 1,248,676**	**$1,285,003**	**$ 1,322,420**	**$ 1,360,959**	**$1,400,655**	**$ 1,441,541**	**$1,483,654**	**$ 1,527,031**	**$ 1,571,709**	**$13,855,057**	**$ 20,846,529**
Public Works												
Community Services[14]	$ 33,182	$ 34,177	$ 35,203	$ 36,259	$ 37,346	$ 38,467	$ 39,621	$ 40,809	$ 42,034	$ 43,295	**$ 380,392**	**$ 638,749**
Public Works Total	**$ 33,182**	**$ 34,177**	**$ 35,203**	**$ 36,259**	**$ 37,346**	**$ 38,467**	**$ 39,621**	**$ 40,809**	**$ 42,034**	**$ 43,295**	**$ 380,392**	**$ 638,749**
Culture and Recreation												
Community Services[10]	$ 140,420	$ 144,632	$ 148,971	$ 153,441	$ 158,044	$ 162,785	$ 167,669	$ 172,699	$ 177,880	$ 183,216	**$ 1,609,756**	**$ 2,367,374**
Culture and Recreation Total	**$ 140,420**	**$ 144,632**	**$ 148,971**	**$ 153,441**	**$ 158,044**	**$ 162,785**	**$ 167,669**	**$ 172,699**	**$ 177,880**	**$ 183,216**	**$ 1,609,756**	**$ 2,367,374**

APPENDIX 6
CITY OF SPARKS
COMPARISON OF ESTIMATED REVENUE TO ESTIMATED COSTS

	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	10-YEAR SUBTOTAL	20-YEAR TOTAL
Community Support												
Management Services[9]	$ 8,242	$ 8,483	$ 8,731	$ 8,986	$ 9,250	$ 9,521	$ 9,800	$ 10,088	$ 10,384	$ 10,690	**$ 94,175**	**$ 141,539**
Community Support Total	**$ 8,242**	**$ 8,483**	**$ 8,731**	**$ 8,986**	**$ 9,250**	**$ 9,521**	**$ 9,800**	**$ 10,088**	**$ 10,384**	**$ 10,690**	**$ 94,175**	**$ 141,539**
EXPENDITURES SUBTOTAL	**$1,873,187**	**$ 1,927,958**	**$1,984,373**	**$ 2,042,480**	**$ 2,102,330**	**$2,163,976**	**$ 2,227,471**	**$2,292,870**	**$ 2,360,232**	**$ 2,429,615**	**$21,404,492**	**$ 32,169,625**
CONTINGENCY	**$ 56,196**	**$ 57,839**	**$ 59,531**	**$ 61,274**	**$ 63,070**	**$ 64,919**	**$ 66,824**	**$ 68,786**	**$ 70,807**	**$ 72,888**	**$ 642,135**	**$ 965,089**
EXPENDITURES TOTAL	**$1,929,383**	**$ 1,985,797**	**$2,043,904**	**$ 2,103,754**	**$ 2,165,400**	**$2,228,895**	**$ 2,294,295**	**$2,361,657**	**$ 2,431,039**	**$ 2,502,503**	**$22,046,627**	**$ 33,134,713**
GENERAL FUND SURPLUS/(DEFICIT	**$ 808,541**	**$ 834,264**	**$ 860,759**	**$ 888,048**	**$ 916,157**	**$ 945,109**	**$ 974,929**	**$1,005,644**	**$ 1,037,280**	**$ 1,069,865**	**$ 9,340,595**	**$ 14,142,526**
ROAD FUND												
REVENUE												
Licenses and Permits												
Licenses and Permits[3,15]	$ 78,395	$ 80,747	$ 83,169	$ 85,664	$ 88,234	$ 90,881	$ 93,608	$ 96,416	$ 99,308	$ 102,288	**$ 898,710**	**$ 1,321,680**
Subtotal	**$ 78,395**	**$ 80,747**	**$ 83,169**	**$ 85,664**	**$ 88,234**	**$ 90,881**	**$ 93,608**	**$ 96,416**	**$ 99,308**	**$ 102,288**	**$ 898,710**	**$ 1,321,680**
Intergovernmental Revenues												
County Gasoline Tax[3]	$ 32,401	$ 33,374	$ 34,375	$ 35,406	$ 36,468	$ 37,562	$ 38,689	$ 39,850	$ 41,045	$ 42,277	**$ 371,446**	**$ 546,265**
State Gasoline Tax[3]	87,347	89,968	92,667	95,447	98,310	101,259	104,297	107,426	110,649	113,968	**1,001,337**	**1,472,607**
Subtotal	**$ 119,749**	**$ 123,341**	**$ 127,041**	**$ 130,852**	**$ 134,778**	**$ 138,821**	**$ 142,986**	**$ 147,276**	**$ 151,694**	**$ 156,245**	**$ 1,372,783**	**$ 2,018,872**
Miscellaneous												
Interest Earned[7]	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**	**$ -**
Subtotal	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
REVENUE TOTAL	**$ 198,143**	**$ 204,088**	**$ 210,210**	**$ 216,517**	**$ 223,012**	**$ 229,703**	**$ 236,594**	**$ 243,691**	**$ 251,002**	**$ 258,532**	**$ 2,271,493**	**$ 3,340,551**
EXPENDITURES												
Public Works[16]	$ 894,967	$ 895,154	$ 895,344	$ 895,539	$ 895,737	$ 895,939	$ 896,146	$ 896,356	$ 896,571	$ 896,790	**$ 8,958,543**	**$ 16,097,414**
EXPENDITURES SUBTOTAL	**$ 894,967**	**$ 895,154**	**$ 895,344**	**$ 895,539**	**$ 895,737**	**$ 895,939**	**$ 896,146**	**$ 896,356**	**$ 896,571**	**$ 896,790**	**$ 8,958,543**	**$ 16,097,414**
CONTINGENCY	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
EXPENDITURES TOTAL	**$ 894,967**	**$ 895,154**	**$ 895,344**	**$ 895,539**	**$ 895,737**	**$ 895,939**	**$ 896,146**	**$ 896,356**	**$ 896,571**	**$ 896,790**	**$ 8,958,543**	**$ 16,097,414**
ROAD FUND SURPLUS/(DEFICIT)	**$ (696,823)**	**$ (691,065)**	**$ (685,133)**	**$ (679,022)**	**$ (672,724)**	**$ (666,236)**	**$ (659,552)**	**$ (652,664)**	**$ (645,568)**	**$ (638,258)**	**$ (6,687,050)**	**$ (12,756,862)**

APPENDIX 6
CITY OF SPARKS
COMPARISON OF ESTIMATED REVENUE TO ESTIMATED COSTS

APPENDIX 6, ASSUMPTIONS:

Unless otherwise indicated, the analysis uses Estimated Current Year Ending 6/30/2017 (Fiscal Year 2016-2017) revenue and expenditure data from the City of Sparks Budget, FY 2017-18.

1 See Appendix 3 for calculations.

2 The analysis is conservative in not estimating the increase in some Sparks business-related revenues resulting from new residents of the development, though this increase is expected to occur.

3 ACM: Revenues are calculated based on estimated FY 2016-17 City of Sparks estimated per capita revenues inflated **3%** annually and applied to the estimated annual population of the Project. Per capita revenue is calculated by dividing FY 2016-17 revenue for each source by City of Sparks FY 2016-17 population of **93,581** Source: City of Sparks Budget FY 2017-18.

4 See Appendix 4 for calculations.

5 In addition to CCRT revenue, Consolidated tax for the City includes revenue from Real Property Transfer Tax, GST (MVPT), Cigarette and Liquor taxes. A per capita methodology as explained in footnote 3 is applied to estimate this revenue. Total Washoe County revenues from liquor, cigarette and GST (analysis conservatively does not include RPTT as it is not a recurring revenue) sources totaled **$ 30,048,968** in FY 2016-2017. City of Sparks is estimated to receive **12.13%** of all County C-tax revenue. As a result, the City's portion of GST revenue is estimated at **$ 3,643,715** and the ACM is applied to this amount.
Source: Nevada Department of Taxation. "Consolidated Tax Distribution." City of Sparks portion of C-tax revenue is based on a three-year average data for FY 2014-15 to FY 2016-17.

6 In addition to sales tax revenue, AB 104 revenue for the City includes revenue from property, gaming, and RPTT taxes and interest. Analysis is conservative in not estimating gaming, RPTT, and interest revenue. Property tax revenue is estimated in Appendix 3.

7 Though the project may generate revenue for the City from these sources, the amount is difficult to estimate and/or expected to be minimal.

8 Charges for services for the City include inter-department and inter-fund transfers, which, though impacted, may be difficult to estimate. Some charges for services revenue, such as false alarms may be generated by the project, but again are difficult to estimate.

9 Administrative service (indirect) costs assumed to be impacted by the project are calculated at **25.7%** of direct service costs.
Source: Average percent indirect costs of direct costs for FY 2016-17. Source: City of Sparks Budget, FY 2017-18.

10 ACM: Expenditures are calculated based on estimated FY 2016-17 City of Sparks budget per capita costs inflated **3%** annually and applied to estimated annual population of the Project. Per capita costs are calculated by dividing FY 2016-17 costs for each source by City of Sparks FY 2016-17 population of **93,581** Source: City of Sparks Budget FY 2017-18.

11 See Appendix 7 for calculations and assumptions.

12 See Appendix 8 for calculations and assumptions.

13 Expenditures for the Public Safety source include traffic signals, signs and other public safety items. Costs associated with these services are estimated by dividing total expenditures for this source of **$ 1,277,098** by the total square feet of City of Sparks streets of **67,541,767** and applying to the number of square feet added by the development of **1,093,280** inflated 3% annually. Source: Expenditures from City of Sparks budget FY 2017-18, City of Sparks streets inventory from City of Sparks Community Services Department.

14 Expenditures for the Public Works source include Public Works administrative and facility maintenance costs. Costs associated with these services are estimated by dividing total expenditures for this source of **$ 1,480,919** by the total square feet of City of Sparks streets of **67,541,767** and applying to the number of square feet added by the development of **1,093,280** inflated 3% annually. Source: Expenditures from City of Sparks budget FY 2017-18, City of Sparks streets inventory from City of Sparks Community Services Department.

15 Analysis uses FY 2017-18 amount (instead of FY 2016-17) as it includes the shift of franchise revenues from the Road Fund to the Park & Recreation Project Fund.

16 See Appendix 9 for calculation and assumptions.

APPENDIX 7
CITY OF SPARKS
POLICE DEPARTMENT COST PROJECTIONS

YEAR	CUMUL. NEW RESIDENTIAL POPULATION	OFFICERS REQUIRED RESIDENTIAL	OFFICERS REQUIRED COMMERCIAL	OFFICERS REQUIRED TOTAL	CIVILIANS REQUIRED	SALARY/ BENEFITS	SERVICES/ SUPPLIES	ANNUALIZED VEHICLE COSTS	TOTAL COST
2018	-	-	-	-	-	$ -	$ -	$ -	$ -
2019	-	-	0.04	0.04	0.01	4,662	163	-	4,825
2020	668	1.00	0.06	1.06	0.35	137,076	4,804	37,775	179,654
2021	1,330	2.00	0.06	2.06	0.69	273,265	9,577	37,775	320,617
2022	1,955	2.93	0.06	2.99	1.00	409,761	14,360	37,775	461,896
2023	2,644	3.97	0.06	4.03	1.34	567,871	19,901	37,775	625,547
2024	3,293	4.94	0.06	5.00	1.67	726,298	25,454	37,775	789,526
2025	3,293	4.94	0.06	5.00	1.67	748,087	26,217	37,775	812,079
2026	3,293	4.94	0.06	5.00	1.67	770,530	27,004	37,775	835,308
2027	3,293	4.94	0.06	5.00	1.67	793,646	27,814	37,775	859,234
2028	3,293	4.94	0.06	5.00	1.67	817,455	28,648	37,775	883,878
2029	3,293	4.94	0.06	5.00	1.67	841,979	29,508	37,775	909,261
2030	3,293	4.94	0.06	5.00	1.67	867,238	30,393	37,775	935,406
2031	3,293	4.94	0.06	5.00	1.67	893,255	31,305	37,775	962,334
2032	3,293	4.94	0.06	5.00	1.67	920,053	32,244	37,775	990,071
2033	3,293	4.94	0.06	5.00	1.67	947,654	33,211	37,775	1,018,640
2034	3,293	4.94	0.06	5.00	1.67	976,084	34,208	37,775	1,048,066
2035	3,293	4.94	0.06	5.00	1.67	1,005,367	35,234	37,775	1,078,375
2036	3,293	4.94	0.06	5.00	1.67	1,035,528	36,291	37,775	1,109,593
2037	3,293	4.94	0.06	5.00	1.67	1,066,593	37,380	37,775	1,141,747
TOTAL						**$ 13,802,400**	**$ 483,715**	**$ 679,942**	**$ 14,966,058**

APPENDIX 7, ASSUMPTIONS:

1. Population estimates are shown in Appendix 2 of the report.
2. For the residential portion of the analysis, uniformed officer positions are estimated at **1.5** positions per 1,000 population.
   For non-uniformed positions, a ratio of **0.5** positions for every three uniformed positions, is used. Source: City of Sparks Police Department.
3. For General Commercial use, the analysis estimates the number of calls for service generated by the project by using average data for similar projects:

	Annual CFS	Building Sq.Ft.	CFS/Sq.Ft. (000s)	Project Sq.Ft.	Project CFS
Home Depot	52	102,489	0.51		
Costco	102	148,346	0.69		
Kohl's	92	87,888	1.05		
Average			**0.75**	**141,570**	**105.79**

Source: CFS from City of Sparks Police Department. Comparable project square footage from Washoe County Assessor.
However, many visitors to the commercial portion of the project will be existing residents of the project, calls for service for these residents are estimated above, or existing City of Sparks residents, already generating calls for service for the City. Only non-Sparks residents coming to the project will generate new calls for service for the City.
The analysis conservatively assumes 50% of the above General Commercial calls for service will be net new calls for service for the City.
According to a calculation of the number of calls for service handled annually by a police officer, based on the number of hours worked, break time, vacation time, and other components, an officer is estimated to handle an average of 875 calls for service per year. This results in an estimated **0.06** officer positions for the commercial portion of the project.
Source: City of Sparks Police Department and data from City of Reno Police Department for similar studies.

APPENDIX 7
CITY OF SPARKS
POLICE DEPARTMENT COST PROJECTIONS

4. The following City of Sparks salary information is used to estimate operating costs, inflated **3%** annually.

	Salary Range		
FY 2017-18	**Low**	**High**	**Average**
Police Officer	$ 51,730	$ 67,371	$ 59,550
Sergeant	73,112	87,734	80,423
Crime Analyst	55,245	70,512	62,878
Records Technician	45,510	57,990	51,750
Police Office Assistant	34,070	43,368	38,719
GT/IT Support Specialist	44,866	57,179	51,022
Dispatcher	43,368	55,245	49,306
Weighted Average Officers	**$ 54,402**	**$ 69,917**	**$ 62,160**
Weighted Average Civilians	**$ 40,351**	**$ 51,396**	**$ 45,873**

Source: "Online Jobs Page." City of Sparks Human Resources.

5. Benefits costs are calculated at **57.1%** of salaries.
   Services/Supplies costs calculated at **3.5%** of salaries and benefits.
   Source: Three-year average FY 2015-16 through FY 2017-18 from City of Sparks Budget FY 2017-18.
6. One police vehicle is added for every 3 uniformed positions. The 2017 cost of a fully-equipped vehicle is **$70,000** inflated 3% annually. Life of vehicle is 5 years and the analysis includes vehicle replacement costs with no salvage value. Source: City of Sparks Police Department.

APPENDIX 8
CITY OF SPARKS
FIRE DEPARTMENT COST PROJECTIONS

YEAR	CUMUL. # OF UNITS	RESIDENTIAL CFS*	COMMERCIAL CFS	TOTAL CFS*	ESTIMATED COST/CFS	TOTAL EXPENSES
2018	0	0.00	0.00	0.00	$ 1,473	$ -
2019	248	29.89	2.81	32.70	1,518	49,622
2020	494	59.54	4.56	64.10	1,563	100,199
2021	726	87.51	4.56	92.07	1,610	148,226
2022	982	118.36	4.56	122.92	1,658	203,841
2023	1,223	147.41	4.56	151.97	1,708	259,571
2024	1,223	147.41	4.56	151.97	1,759	267,359
2025	1,223	147.41	4.56	151.97	1,812	275,379
2026	1,223	147.41	4.56	151.97	1,866	283,641
2027	1,223	147.41	4.56	151.97	1,922	292,150
2028	1,223	147.41	4.56	151.97	1,980	300,914
2029	1,223	147.41	4.56	151.97	2,039	309,942
2030	1,223	147.41	4.56	151.97	2,101	319,240
2031	1,223	147.41	4.56	151.97	2,164	328,817
2032	1,223	147.41	4.56	151.97	2,229	338,682
2033	1,223	147.41	4.56	151.97	2,295	348,842
2034	1,223	147.41	4.56	151.97	2,364	359,308
2035	1,223	147.41	4.56	151.97	2,435	370,087
2036	1,223	147.41	4.56	151.97	2,508	381,189
2037	1,223	147.41	4.56	151.97	2,584	392,625
TOTAL						**$ 5,329,635**

*CFS-calls for service.

APPENDIX 8, ASSUMPTIONS:

1. Number of residential units from Appendix 1. Analysis includes all units, not just occupied units, for Fire Department impacts.
2. Residential calls for service are estimated using average cfs per unit data for single-family residential properties between FY 2011-12 and FY 2015-16, estimated at **0.12** cfs. Source: City of Sparks Fire Department and Washoe County Assessor's Office parcel data for number of single-family units.
3. Calls for service for the General Commercial portion are estimated using cfs data for comparable projects:

	Annual CFS	Building Sq.Ft.	CFS/Sq.Ft. (000s)	Project Sq.Ft.	Project CFS
Costco	10	148,346	0.07		
Kohl's	5.4	87,888	0.06		
Average			**0.06**	**141,570**	**9.12**

Source: City of Sparks Fire Department. Data is a five year average of calls for service for FY 2011-12 to FY 2015-16.
However, many visitors to the commercial portion of the project will be existing residents of the project, calls for service for these residents are estimated above, or existingCity of Sparks residents, already generating calls for service for the City. Only non-Sparks residents coming to the project will generate new calls for service for the City. The analysis conservatively assumes 50% of the above General Commercial calls for service will be net new calls for service for the City.

4. Costs to provide services to the development are estimated at **$ 1,430.44** per call for service. This is estimated using total fire expenditures between FY 2011-12 and FY 2015-16 divided by total calls for service during this period. This includes costs for Administration, Emergency Services, and Training and Safety. Estimated costs are inflated 3% annually.

APPENDIX 9
CITY OF SPARKS
STREET MAINTENANCE COST PROJECTIONS

			MAINTENANCE					REPAIR				
YEAR	ADDED SQUARE FEET	ADDED LINEAR FEET	SEWER CLEANING COST	CATCH BASIN COST	STREET SWEEP COST	STREET STRIPING COST	TOTAL COST	SLURRY/ CRACK SEAL COST	3 INCH OVERLAY COST	ROAD REHAB COST	TOTAL ANNUALIZED COST	TOTAL MAINT. COST
2018	-	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2019	358,780	10,470	-	-	784	-	784	-	-	-	-	784
2020	-	-	1,307	14	800	545	2,665	-	-	-	885,620	888,285
2021	174,080	5,120	1,333	14	1,214	556	3,117	-	-	-	885,620	888,737
2022	270,912	7,968	2,025	21	1,872	844	4,762	-	-	-	885,620	890,382
2023	289,508	7,782	3,121	33	2,540	1,300	6,994	-	-	-	885,620	892,614
2024	-	-	4,235	44	2,591	1,765	8,635	149,496	-	-	885,620	894,255
2025	-	-	4,320	45	2,643	1,800	8,808	-	-	-	885,620	894,428
2026	-	-	4,406	46	2,696	1,836	8,984	75,466	-	-	885,620	894,604
2027	-	-	4,495	47	2,749	1,873	9,164	119,793	-	-	885,620	894,783
2028	-	-	4,584	48	2,804	1,910	9,347	130,576	-	-	885,620	894,967
2029	-	-	4,676	49	2,861	1,948	9,534	-	1,782,607	-	885,620	895,154
2030	-	-	4,770	50	2,918	1,987	9,724	-	-	-	885,620	895,344
2031	-	-	4,865	51	2,976	2,027	9,919	-	899,863	-	885,620	895,539
2032	-	-	4,962	52	3,036	2,068	10,117	-	1,428,421	-	885,620	895,737
2033	-	-	5,062	53	3,096	2,109	10,320	-	1,557,000	-	885,620	895,939
2034	-	-	5,163	54	3,158	2,151	10,526	182,235	-	-	885,620	896,146
2035	-	-	5,266	55	3,221	2,194	10,737	-	-	-	885,620	896,356
2036	-	-	5,371	56	3,286	2,238	10,951	91,993	-	-	885,620	896,571
2037	-	-	5,479	57	3,352	2,283	11,170	146,027	-	11,148,918	885,620	896,790
TOTAL	**1,093,280**	**31,340**	**$ 75,441**	**$ 787**	**$ 48,597**	**$ 31,434**	**$ 156,258**	**$ 895,587**	**$ 5,667,891**	**$ 11,148,918**	**$ 15,941,156**	**$ 16,097,414**

APPENDIX 9, ASSUMPTIONS:

1. The development is projected to construct approximately **31,340** linear feet or **1,093,280** square feet of streets to be dedicated to the City for maintenance in the year shown above.

APPENDIX 9
CITY OF SPARKS
STREET MAINTENANCE COST PROJECTIONS

2. The following street maintenance costs are used to estimate the impact of the development's streets on the City:

Item	Frequency	Cost		
Slurry/Crack Seal	Year 5 and 15	$0.37	per square foot	
3 Inch Overlay	10 years	$4.00	per square foot	
Road Rehabilitation	20 years	$7.00	per square foot	
Sewer Cleaning	1.5 years	$0.18	per linear foot	Note: 2/3 of the cost is added annually
Catch Basin Cleaning	1.75 years	$11.56	per mile	Note: 3/5 of the cost is added annually
Street Sweeping	30 days	$32.30	per mile	Note: cost is multiplied by 12 annually
Striping	1 year	$0.05	per linear foot	

Costs are inflated 2% annually. Source: City of Sparks Community Services Department. Estimated repair (extraordinary maintenance) costs are annualized by taking the total estimated costs over the 20-year period and dividing by 20 years.

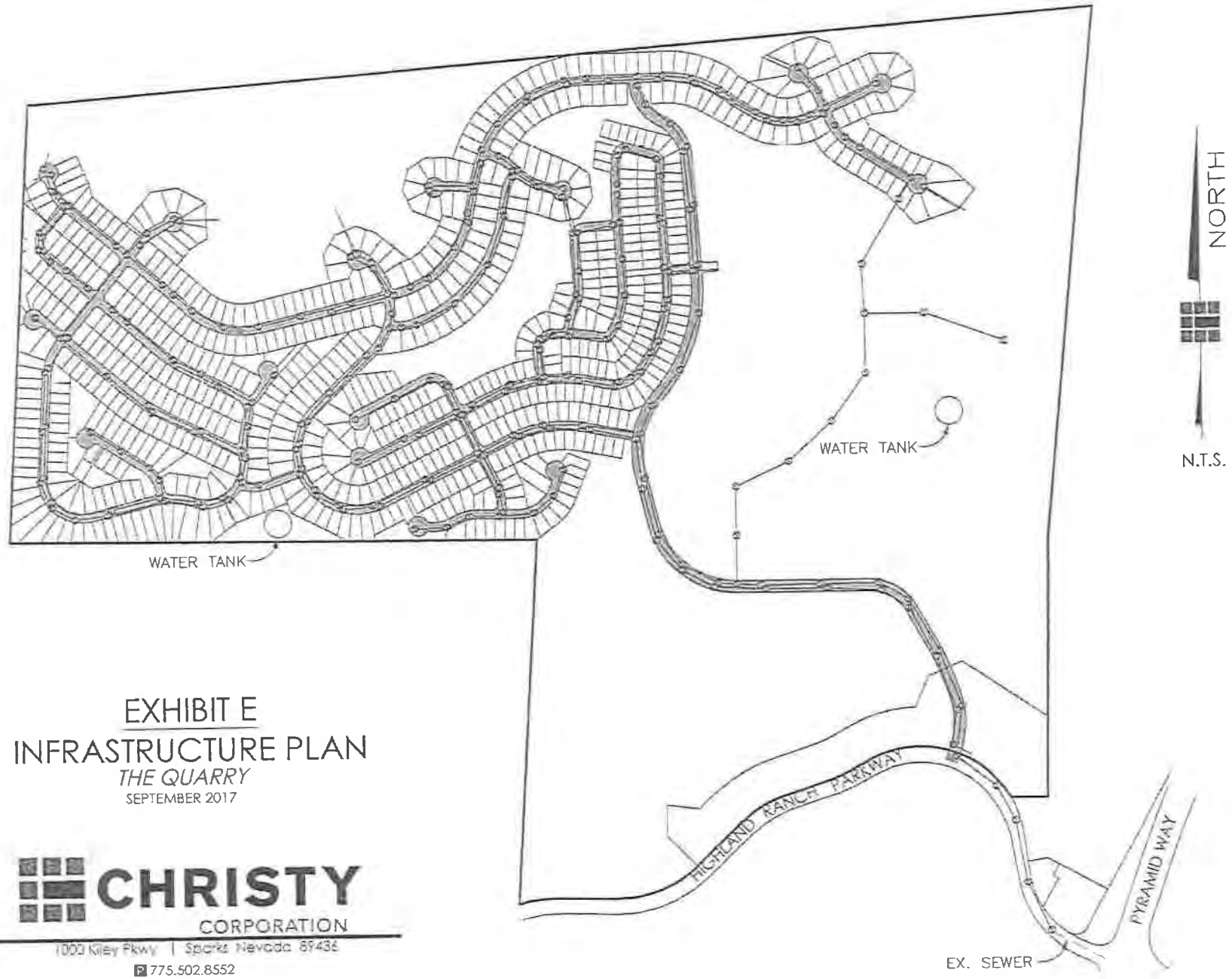


EXHIBIT E
INFRASTRUCTURE PLAN

THE QUARRY

SEPTEMBER 2017

CHRISTY CORPORATION
1000 Kiley Pkwy | Sparks Nevada 89436
P 775.502.8552

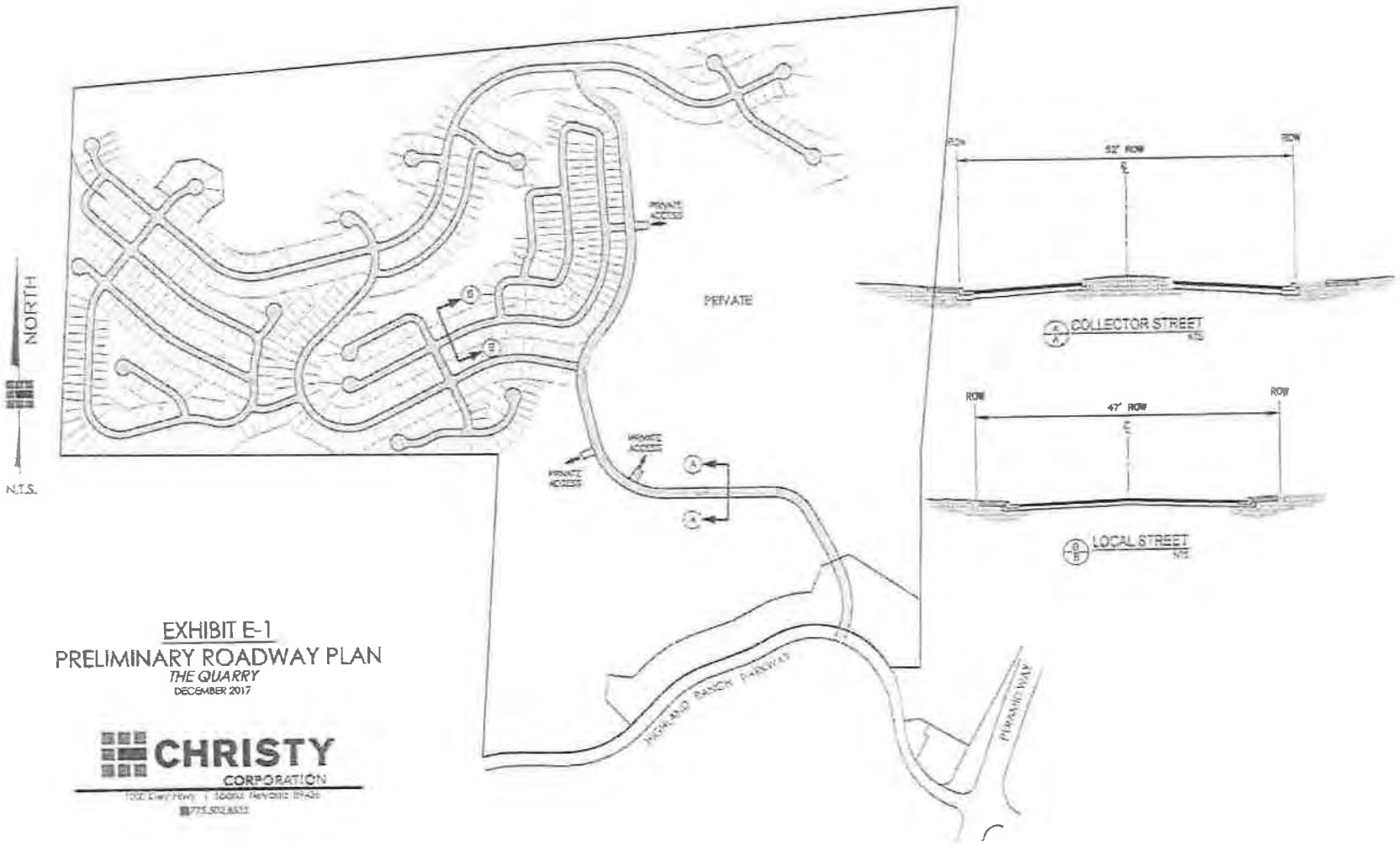


EXHIBIT E-1

PRELIMINARY ROADWAY PLAN

THE QUARRY

DECEMBER 2017

CHRISTY CORPORATION

1000 Kiley Pkwy | Sparks, Nevada 89436

775.972.8533

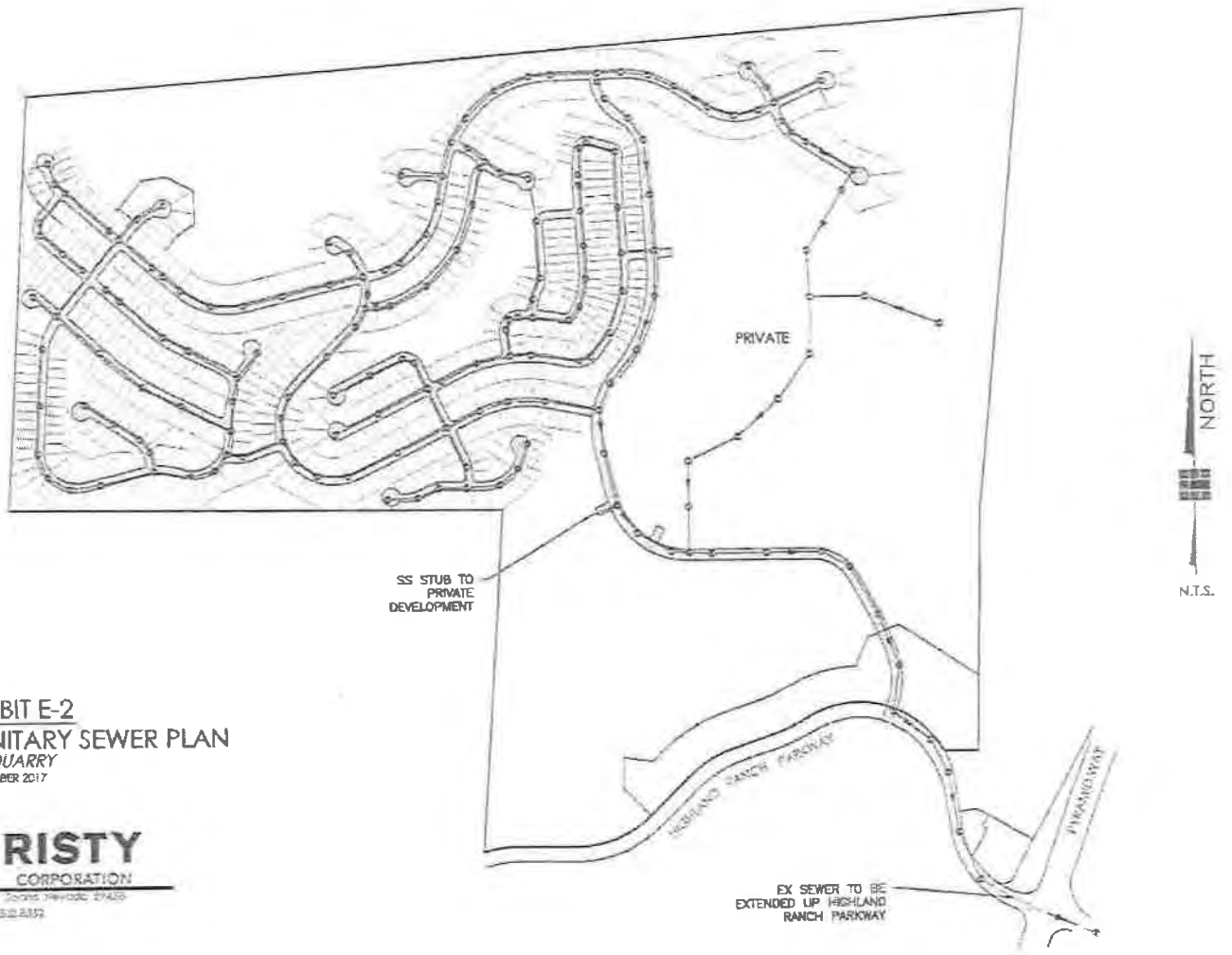


EXHIBIT E-2

PRELIMINARY SANITARY SEWER PLAN

THE QUARRY

DECEMBER 2017

CHRISTY CORPORATION

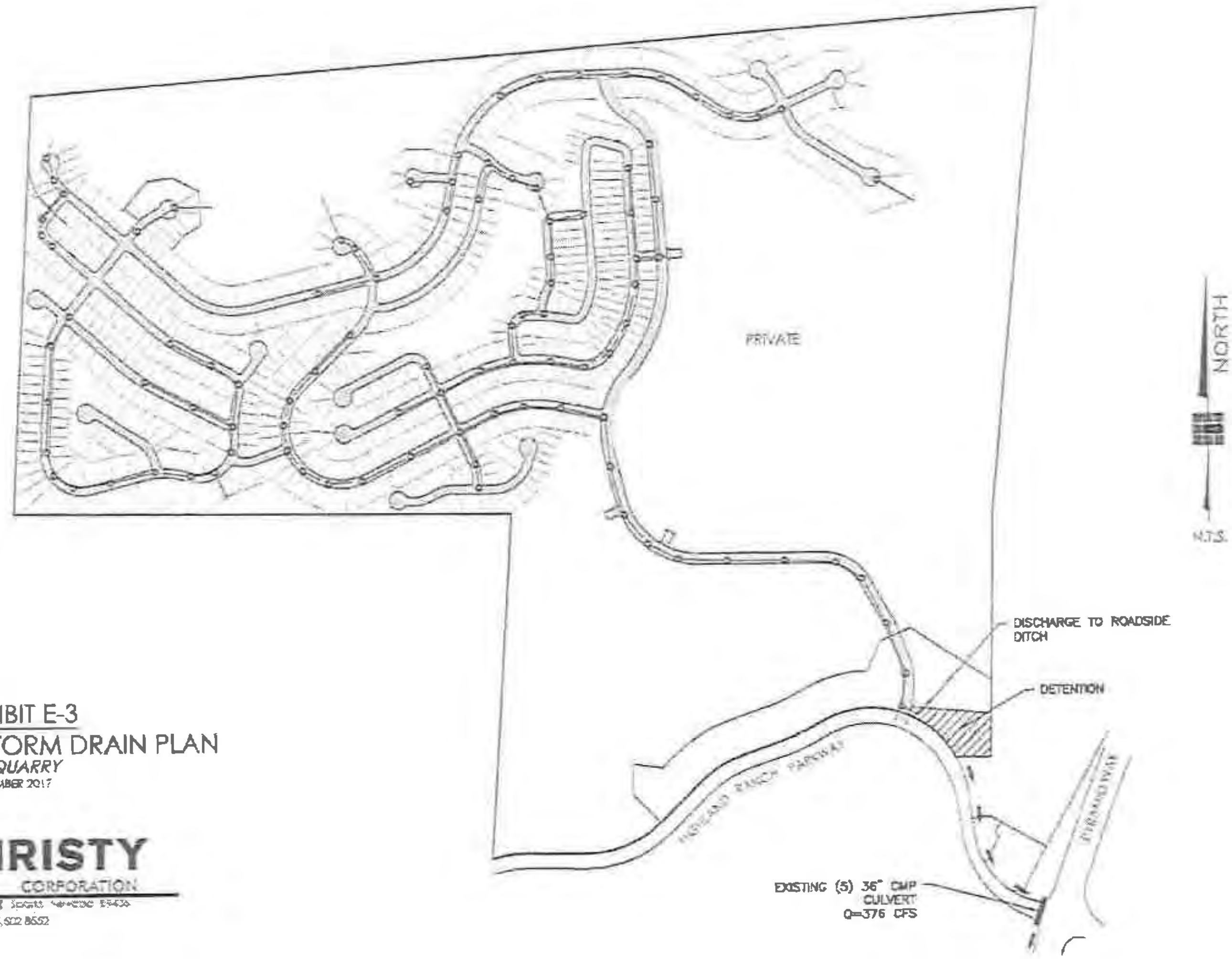
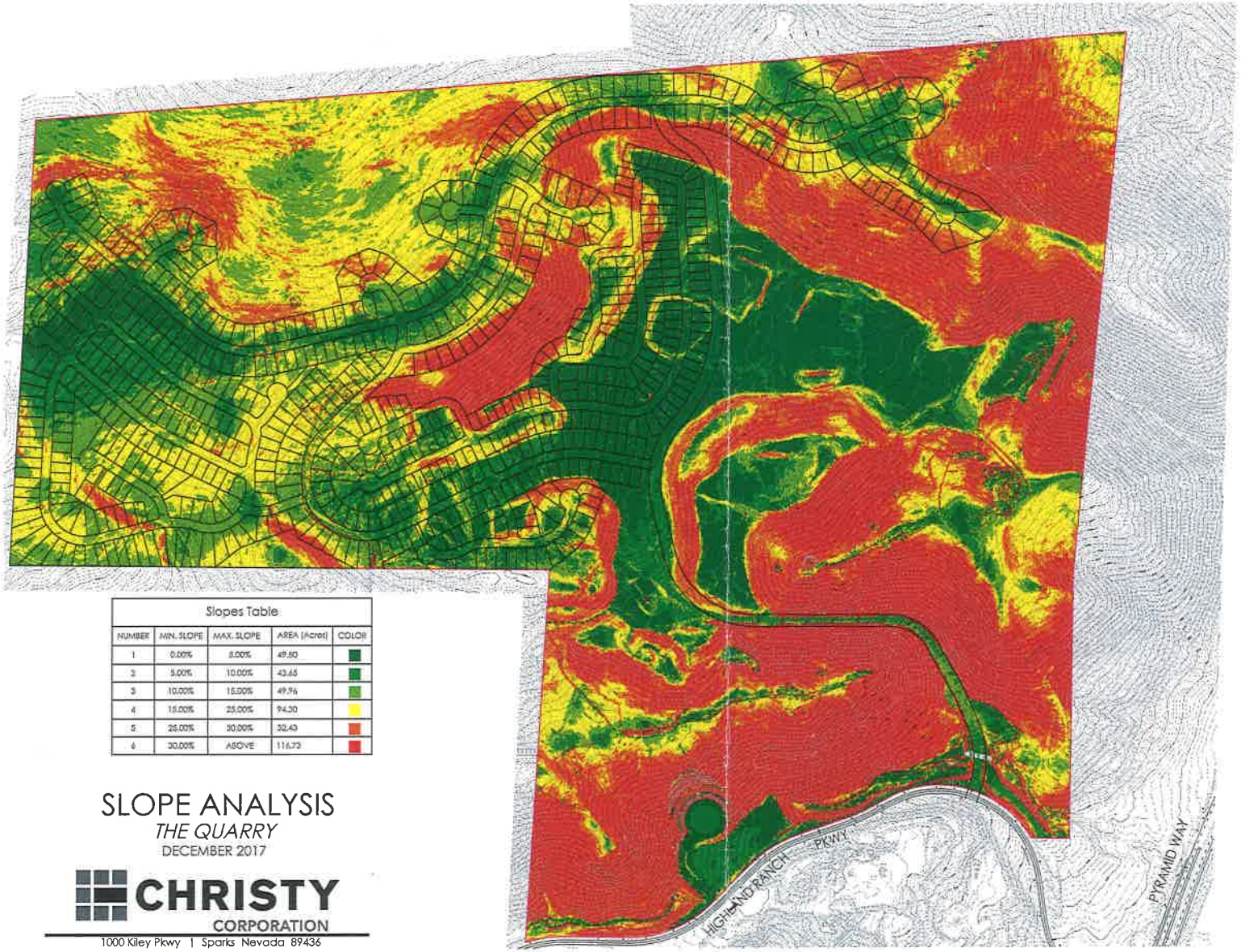


EXHIBIT E-3
PRELIMINARY STORM DRAIN PLAN
THE QUARRY
DECEMBER 2017

CHRISTY
CORPORATION



Slopes Table				
NUMBER	MIN. SLOPE	MAX. SLOPE	AREA (Acres)	COLOR
1	0.00%	5.00%	49.80	
2	5.00%	10.00%	43.65	
3	10.00%	15.00%	49.96	
4	15.00%	25.00%	94.30	
5	25.00%	30.00%	32.43	
6	30.00%	ABOVE	116.73	

SLOPE ANALYSIS

THE QUARRY

DECEMBER 2017

CHRISTY CORPORATION
1000 Kiley Pkwy | Sparks Nevada 89436
P 775.502.8552 christynv.com

NORTH

SCALE: 1"=500'

Jon E.

SOLAEGUI
ENGINEERS

March 12, 2018

RECEIVED-CITY OF SPARKS
MAR 12 2018
COMMUNITY SERVICES
ADMINISTRATION

Karen Melby, AICP
City of Sparks
Community Services Planning Division
431 Prater Way
Sparks, Nevada 89431

RE: The Quarry (NDOT Pre-Permit No. 207543-18)

Dear Karen:

This letter addendum is in response to comments submitted to you by the Nevada Department of Transportation in a letter dated February 22, 2018 regarding the above captioned traffic study. A copy of the letter is attached. The comments generally focus on 1) determining the dwelling unit threshold that would maintain LOS E operation at the Pyramid Highway/Sparks Boulevard/ Highland Ranch Parkway intersection without capacity improvements and 2) providing intersection capacity improvement recommendations necessary to maintain LOS E operation for buildout of the full 1,800 single family dwelling units proposed for the development.

In response to comment 1, a total of 650 dwelling units can be constructed while maintaining LOS E operation at the Pyramid Highway/Sparks Boulevard/Highland Ranch Parkway intersection. The AM and PM peak hour capacity analysis worksheets are attached.

In response to comment 2, the improvements discussed in the original traffic study will provide LOS E or better operation at the Pyramid Highway/Sparks Boulevard/Highland Ranch Parkway intersection with the construction of 1,800 dwelling units. These improvements include dual left turn lanes, two through lanes, and one free right turn lane at the east and west approaches and dual left turn lanes at the south approach. The AM and PM peak hour capacity analysis worksheets are attached.

We trust that this information will meet your requirements. Please call if you have any questions or comments.

Very truly yours,
SOLAEGUI ENGINEERS, LTD

Paul W. Solaegui

PAUL W. SOLAEGUI
CIVIL
No. 7163
REGISTERED PROFESSIONAL ENGINEER

3-12-18
EXP 6-30-18

Enclosures
Letters/Sparks/The Quarry Addendum

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

District II
310 Galletti Way
Sparks, Nevada 89431
(775) 834-8300 FAX (775) 834-8319

February 22, 2018

BRIAN SANDOVAL
Governor

RUDY MALFABON, P.E., *Director*

City of Sparks
Department of Planning/Comm. Devlop.
1675 E Prater Way #107
Sparks, NV 89434

DA18-0001/AX16-0003/
MPA17-00005/RZ17-0006
Jackling Aggregates, LLC/QK, LLC
The Quarry Development

Attention: Ms. Karen Melby, Planner

Dear Ms. Melby:

The Nevada Department of Transportation (NDOT), District II has reviewed the following administrative review requests:

(1) *DA17-0001 – A request for a Development Agreement between the City of Sparks and Jackling Aggregates, LLC and QK, LLC; and*

(2) *AX16-0003 – A request for voluntary annexation into the City of Sparks. Upon annexation the parcel shall convert from Washoe County Designation GR (General Rural) to City of Sparks A40 (Agriculture); and*

(3) *MPA 17-0005 – A request to change the land use designations from Open Space (OS), Commercial (C) and Employment Center (EC) to Intermediate Density Residential (1DR) and Commercial (C); and*

(4) *RZ17-0006 – A request to rezone the site from A40 (Agriculture) to SR 6 (Single Family Residential – 6,000 square feet lots) and C2 (General Commercial) zoning.*

The Quarry Development traffic impact study was provided by the applicant to support the proposed requests. The Quarry Development is proposed to be annexed into the City of Sparks. The project is located northwest of Highland Ranch Parkway and Pyramid Highway (State Route 445) intersection.

- The project is proposed to contain 1,223 single-family detached homes and a 13-acre mini storage facility. The Kiley Ranch land use assumptions consist of two convenience stores with gas pumps, three fast-food restaurants totaling 10,500 square feet, 30,000 square feet of retail buildings and two automotive service buildings totaling 16,000 square feet, a 4-bay car wash and 8 acres of additional mini-storage.

- The Quarry land use will generate approximately 10,974 daily trips, 900 a.m. and 1,046 p.m. peak hour trips. Based on the land use assumptions used in the study, the Kiley Ranch development will generate 15,936 daily trips, 1,003 a.m. and 1,092 p.m. peak hour trips.

- NDOT officially report Annual Average Daily Traffic (AADT) just north of Highland Ranch Parkway is 36,000 vehicles per day.
- The City's adopted level of service (LOS) standard for Pyramid Highway is a LOS E (arterial with moderate access control).
- NDOT reviewed the traffic impact study submitted on October 10, 2017. A technical review was completed on October 16, 2017 addressing concerns with the technical analyses and the project regional impacts.

NDOT District II has the following comments, specifically for the MPA 17-000- map amendment request:

1. The Quarry Development is classified as a project of regional significance as defined by NRS 278.026 5. (d)(6) and should be evaluated to determine if the project impacts any current programmed significant projects.
2. Based on the submitted traffic impact study, NDOT is requesting an addendum. The study revision should include proposed project phasing and its direct traffic impact to the level of service (LOS) at the intersection of Pyramid Highway and Highland Ranch Parkway.
   - On page 17 through 20 of the traffic study, the LOS for the intersection degrades from an existing LOS D to a LOS F (existing plus project). No traffic failure threshold is presented in the report.
   - The addendum should denote the threshold (number of units) that may trigger the LOS F condition to the intersection.
   - For the intersection, please provide recommendations for capacity improvement necessary to maintain LOS E.
3. The Quarry Development constitutes a new community development not previously account in the RTC Long Range Transportation Plan. The project should provide short term intersection improvements that will mitigate its traffic impact at the Pyramid Highway and Highland Ranch Parkway intersection.
   - NDOT does not have any capacity projects anticipated at this location in the near future. Additionally, the RTC Washoe Long Range Transportation Plan does not appear to have any programmed improvement for this intersection until the year 2027+.
   - The project should provide the necessary 10-year improvements that will maintain LOS E for the intersection.

Other comments specific to the future development/ permitting process:

4. An occupancy permit is required for facilities within the NDOT Right-of-Way. Please see the *Terms and Conditions Relating to Right of Way Occupancy Permits* booklet available online at nevadadot.com. Contact the Permit Office at (775) 834-8330 for more information regarding an occupancy permit.
5. The applicant is encouraged to coordinate with the NDOT District Permit Office early for any required standards occupancy permit. NDOT's permit processing time may vary based on project complexity; however, the processing time is approximately 45 working days. This does not include any revision time needed to make necessary changes in the design.

- An effective strategy to minimize delay is taking advantage of the District Permit Office's pre-permit process. Preliminary plans and associated engineering documents may be submitted in advance for NDOT review and comment. This service does not require a processing fee. Please contact the Permit Coordinator, Paula Diem, at (775) 834-8330 for any questions or comments regarding the pre-permit process.

6. For any non-permanent activities or temporary traffic control such as placement of cones, static signs, and portable electronic signs within NDOT right-of-way will require a temporary permit. Please submit temporary permit applications at least 4 weeks prior to the scheduled activity or work. Contact the Permit Office, (775) 834-8300 for more information.

7. The state defers to municipal government for land use development decisions. Public involvement for project related improvements within the NDOT right-of-way should be considered during the municipal land use development public involvement process. Significant public improvements within the NDOT right-of-way developed after the municipal land use development public involvement process may require additional public involvement. It is the responsibility of the permit applicant to perform such additional public involvement. We would encourage such public involvement to be part of a municipal land use development process.

Thank you for the opportunity to review this community development proposal. NDOT reserves the right to incorporate further changes and/or comments as the design review advances. I look forward to working with you and your team, and completing a successful project. If you have any further questions or comments, please contact the Senior Traffic Engineer, Richard Oujevolk, at (775)834-8300.

Sincerely,

DocuSigned by:
32CC95D129D1479...

02/23/2018

Thor A. Dyson, PE

District Engineer

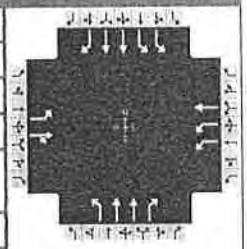
TAD:rmo

cc: Jae Pullen, Engineering Services
Richard Oujevolk, Traffic Office
Paula Diem, Permit Office
NDOT Planning
NDOT Engineering
NDOT Traffic Ops
RTC Washoe
Karen Melby, City of Sparks
File

DS DS

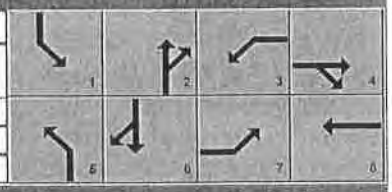
HCS7 : ɲalized Intersection Results Su ˙ nary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Mar 8, 2018	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project (650 Lots)	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp17aw650.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	273	280	251	23	178		160	514	18	470	1284	443

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



Green	14.0	3.0	50.0	5.0	11.0	17.0
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	1.0	0.0	1.0	1.0	0.0	1.0

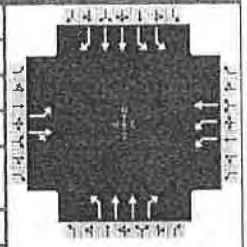
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	21.0	33.0	10.0	22.0	19.0	55.0	22.0	58.0
Change Period, (*Y+R c*), s	0.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	21.8	30.0	2.8	13.9	13.5		19.0	
Green Extension Time (g_e), s	0.0	0.0	0.0	0.7	0.0	0.0	0.4	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		0.94	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	297	550		25	193		174	559	20	511	1396	373
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1712		1730	1870		1781	1781	1556	1730	1781	1538
Queue Service Time (g_s), s	19.8	28.0		0.8	11.9		11.5	13.0	0.9	17.0	43.2	21.4
Cycle Queue Clearance Time (g_c), s	19.8	28.0		0.8	11.9		11.5	13.0	0.9	17.0	43.2	21.4
Green Ratio (*g/C*)	0.18	0.23		0.04	0.14		0.12	0.42	0.42	0.18	0.44	0.44
Capacity (*c*), veh/h	312	399		144	265		208	1484	648	634	1573	679
Volume-to-Capacity Ratio (*X*)	0.952	1.377		0.173	0.730		0.837	0.377	0.030	0.806	0.887	0.549
Back of Queue (*Q*), ft/ln (95 th percentile)	447.8	1234.9		16.5	255.7		263.3	229.3	14.7	306.6	647.7	314
Back of Queue (*Q*), veh/ln (95 th percentile)	17.6	48.6		0.7	10.1		10.4	9.0	0.6	12.1	25.5	12.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	49.0	46.0		55.5	49.3		51.9	24.2	20.7	47.0	30.8	24.7
Incremental Delay (d_2), s/veh	37.9	184.8		0.2	8.6		23.5	0.7	0.1	7.0	7.8	3.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	86.9	230.8		55.7	57.9		75.4	24.9	20.8	53.9	38.6	27.9
Level of Service (LOS)	F	F		E	E		E	C	C	D	D	C
Approach Delay, s/veh / LOS	180.4	F		57.7	E		36.5	D		40.3	D	
Intersection Delay, s/veh / LOS	69.5						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.45	B	2.75	C	2.35	B	1.95	B
Bicycle LOS Score / LOS	1.88	B	0.76	A	1.11	A	2.37	B

HCS7 Signalized Intersection Results Summary

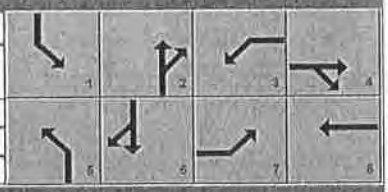
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Mar 8, 2018	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project (650 Lots)	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp17pw650.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	356	299	210	32	345		366	1325	20	252	667	221

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.0	10.0		46.0	6.0	15.0	21.0					
Yellow	4.0	0.0		4.0	4.0	0.0	4.0					
Red	1.0	0.0		1.0	1.0	0.0	1.0					



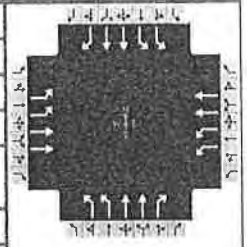
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	26.0	41.0	11.0	26.0	27.0	61.0	17.0	51.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	0.0	5.0	5.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	28.0	38.0	3.3	23.0	29.0		12.1	
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	387	499		35	375		398	1440	22	274	725	197
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1745		1730	1870		1781	1781	1557	1730	1781	1534
Queue Service Time (g_s), s	26.0	36.0		1.3	21.0		27.0	50.2	1.0	10.1	21.5	12.4
Cycle Queue Clearance Time (g_c), s	26.0	36.0		1.3	21.0		27.0	50.2	1.0	10.1	21.5	12.4
Green Ratio (*g/C*)	0.20	0.28		0.05	0.16		0.21	0.43	0.43	0.09	0.35	0.35
Capacity (*c*), veh/h	356	483		160	302		370	1534	671	319	1260	543
Volume-to-Capacity Ratio (*X*)	1.086	1.032		0.218	1.241		1.075	0.939	0.032	0.858	0.575	0.362
Back of Queue (Q), ft/ln (95 th percentile)	684.2	770.1		25.1	793.8		675.9	772.9	17.4	224.7	357.3	207.7
Back of Queue (Q), veh/ln (95 th percentile)	26.9	30.3		1.0	31.3		26.6	30.4	0.7	8.8	14.1	8.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	52.0	47.0		59.7	54.5		51.5	35.4	21.4	58.2	34.1	31.1
Incremental Delay (d_2), s/veh	72.7	49.5		0.3	133.5		68.3	12.4	0.1	19.3	1.9	1.9
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	124.7	96.5		60.0	188.0		119.8	47.8	21.4	77.5	36.0	33.0
Level of Service (LOS)	F	F		E	F		F	D	C	E	D	C
Approach Delay, s/veh / LOS	108.8	F		177.1	F		62.9	E		45.0	D	
Intersection Delay, s/veh / LOS	78.1						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.45	B	2.66	C	2.85	C	2.00	B
Bicycle LOS Score / LOS	1.95	B	0.45	A	2.02	B	1.47	A

HCS7 (nalized Intersection Results Su nary

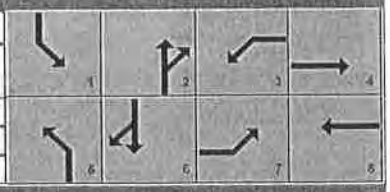
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Mar 8, 2018	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project (1800 Lots)	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name			
Project Description	w/Improvements				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	364	431		23	229		251	514	18	470	1284	474

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

Green	16.0	3.0		47.0	10.0	5.0	19.0					
Yellow	4.0	0.0		4.0	4.0	0.0	4.0					
Red	1.0	0.0		1.0	1.0	0.0	1.0					



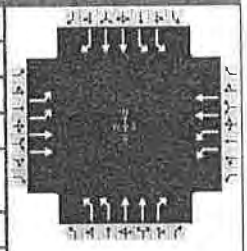
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	20.0	29.0	15.0	24.0	21.0	52.0	24.0	55.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.0	3.0	3.0	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	14.9	16.5	2.8	9.6	10.9		18.6	
Green Extension Time (g_e), s	0.5	1.2	0.0	1.3	0.3	0.0	0.6	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	0.21	0.08	0.00	0.03	0.10		0.17	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4		3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	396	468		25	249		273	559	20	511	1396	407
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1730	1781		1730	1781		1730	1781	1556	1730	1781	1556
Queue Service Time (g_s), s	12.9	14.5		0.8	7.6		8.9	13.6	0.9	16.6	45.1	24.8
Cycle Queue Clearance Time (g_c), s	12.9	14.5		0.8	7.6		8.9	13.6	0.9	16.6	45.1	24.8
Green Ratio (*g/C*)	0.17	0.20		0.08	0.16		0.13	0.39	0.39	0.20	0.42	0.42
Capacity (*c*), veh/h	577	712		288	564		461	1395	609	692	1484	648
Volume-to-Capacity Ratio (*X*)	0.686	0.658		0.087	0.441		0.592	0.401	0.032	0.738	0.941	0.627
Back of Queue (*Q*), ft/ln (95 th percentile)	245.4	272.2		15.6	150.4		172.5	239.4	15.5	292.6	705.2	363.6
Back of Queue (*Q*), veh/ln (95 th percentile)	9.7	10.7		0.6	5.9		6.8	9.4	0.6	11.5	27.8	14.3
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	47.0	44.2		50.8	45.7		48.9	26.3	22.5	45.1	33.6	27.6
Incremental Delay (d_2), s/veh	2.8	1.8		0.0	0.2		1.4	0.9	0.1	3.7	12.9	4.5
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	49.9	46.0		50.8	45.9		50.3	27.2	22.6	48.7	46.5	32.2
Level of Service (LOS)	D	D		D	D		D	C	C	D	D	C
Approach Delay, s/veh / LOS	47.8	D		46.4	D		34.5	C		44.5	D	
Intersection Delay, s/veh / LOS	43.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.60	C	2.74	C	2.51	C	2.47	B
Bicycle LOS Score / LOS	1.18	A	0.67	A	1.19	A	2.40	B

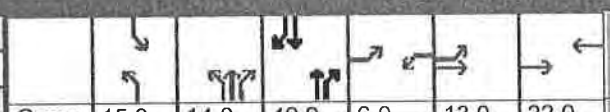
HCS7 ' nalized Intersection Results Su' ' ary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Mar 8, 2018	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project (1800 Lots)	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name			
Project Description	w/Improvements				

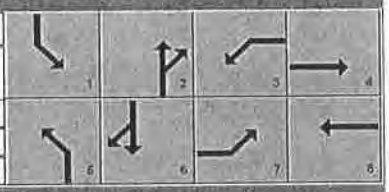


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	404	378		32	479		607	1325	20	252	667	302

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	15.0	14.0	40.0	6.0	13.0	22.0	
Yellow	4.0	0.0	4.0	4.0	0.0	4.0	
Red	1.0	0.0	1.0	1.0	0.0	1.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	24.0	40.0	11.0	27.0	34.0	59.0	20.0	45.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	0.0	5.0	5.0	5.0
Max Allow Headway (MAH), s	3.1	3.0	3.0	3.0	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	17.4	14.4	3.3	20.5	24.6		11.9	
Green Extension Time (g_e), s	0.7	2.1	0.0	0.5	1.2	0.0	0.2	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	0.08	0.00	1.00	1.00	0.02		0.83	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4		3	8		5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	439	411		35	521		660	1440	22	274	725	263
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1781		1730	1781		1730	1781	1556	1730	1781	1553
Queue Service Time (g_s), s	15.4	12.4		1.3	18.5		22.6	51.6	1.1	9.9	23.0	18.4
Cycle Queue Clearance Time (g_c), s	15.4	12.4		1.3	18.5		22.6	51.6	1.1	9.9	23.0	18.4
Green Ratio (g/C)	0.18	0.27		0.05	0.17		0.26	0.42	0.42	0.12	0.31	0.31
Capacity (c), veh/h	639	959		160	603		905	1479	646	399	1096	478
Volume-to-Capacity Ratio (X)	0.688	0.429		0.218	0.864		0.729	0.974	0.034	0.686	0.662	0.551
Back of Queue (Q), ft/ln (95 th percentile)	282.9	234.6		25.1	355.2		371.6	823.8	18	198.3	386.5	296.3
Back of Queue (Q), veh/ln (95 th percentile)	11.1	9.2		1.0	14.0		14.6	32.4	0.7	7.8	15.2	11.7
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	49.5	39.2		59.7	52.5		43.8	37.3	22.5	55.2	39.1	37.5
Incremental Delay (d_2), s/veh	2.6	0.1		0.3	11.9		2.6	17.9	0.1	4.1	3.1	4.5
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	52.1	39.4		60.0	64.4		46.4	55.2	22.6	59.3	42.3	42.0
Level of Service (LOS)	D	D		E	E		D	E	C	E	D	D
Approach Delay, s/veh / LOS	45.9	D		64.2	E		52.1	D		45.9	D	
Intersection Delay, s/veh / LOS	50.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.59	C	2.69	C	3.00	C	2.48	B
Bicycle LOS Score / LOS	1.17	A	0.59	A	2.24	B	1.53	B

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THE QUARRY

TRAFFIC STUDY

SEPTEMBER, 2017

Prepared by:
Solaegui Engineers, Ltd.
715 H Street
Sparks, Nevada 89431
(775) 358-1004

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LIST OF FIGURES

THE QUARRY

TRAFFIC STUDY

EXECUTIVE SUMMARY

The Quarry will be located in the City of Sparks, Nevada. The project site is located north of Highland Ranch Parkway and west of Pyramid Highway. This study also includes analysis of Kiley Ranch land uses located west of Pyramid Highway between Highland Ranch Parkway and Lazy 5 Parkway. The purpose of this study is to address the project's impact upon the adjacent street network. The Highland Ranch Parkway/Pyramid Highway, Highland Ranch Parkway/Project Access, and Highland Ranch Parkway/Frontage Road intersections have been identified for AM and PM peak hour capacity analysis for the existing, existing plus project, existing plus project plus Kiley Ranch, 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch scenarios. The Pyramid Highway intersections with Los Altos Parkway and Lazy 5 Parkway have been identified for trip distribution and assignment analysis only. Pyramid Highway and Highland Ranch Parkway in the vicinity of the site have been identifies for roadway capacity analysis for the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch scenarios.

The Quarry will include the construction of 1,223 single family detached homes and a 13 acre mini-storage facility. The Kiley Ranch land uses will consist of two convenience stores with gas pumps for a total of 8,000 square feet, three fast food restaurants with drive-through lanes totaling 10,500 square feet, two sit-down restaurants totaling 10,000 square feet, 30,000 square feet of retail buildings, two automotive service buildings totaling 16,000 square feet, a car wash with 4 bays, and an 8 acre mini-storage facility. The Quarry is anticipated to generate 10,974 average weekday trips with 900 trips occurring during the AM peak hour and 1,046 trips occurring during the PM peak hour. Kiley Ranch is anticipated to generate 15,936 average weekday trips with 1,003 trips occurring during the AM peak hour and 1,092 trips occurring during the PM peak hour.

Traffic generated by The Quarry will have some impact the adjacent street network. The following recommendations are made to mitigate project traffic impacts.

It is recommended that any required signing, striping or traffic control improvements comply with City of Sparks and Nevada Department of Transportation requirements.

It is recommended that Highland Ranch Parkway be widened to four lanes from Pyramid Highway to the Project Access.

It is recommended that the Pyramid Highway/Highland Ranch Parkway/Sparks Boulevard intersection be improved to include dual left turn lanes, two through lanes, and one right turn lane at the east and west approaches and dual left turn lanes at the south approach. The dual left turn pocket at the west approach should contain 545 feet of storage/deceleration length and the dual left turn pocket at the south approach should contain 740 feet of storage/deceleration length.

It is recommended that the Highland Ranch Parkway/Project Access intersection be improved as three-leg traffic signal controlled intersection with one left turn lane and one through lane at the west approach, one through lane and one right turn lane at the east approach, and dual left turn lanes and one right turn lane at the north approach. The left turn pocket at the west approach should contain 370 feet of storage/deceleration length and the dual left turn pocket at the north approach should contain 365 feet of storage/deceleration length.

INTRODUCTION

STUDY AREA

The Quarry will be located in the City of Sparks, Nevada. The project site is located north of Highland Ranch Parkway and west of Pyramid Highway. Figure 1 shows the location of the project site. This study also includes analysis of Kiley Ranch land uses located west of Pyramid Highway between Highland Ranch Parkway and Lazy 5 Parkway. The purpose of this study is to address the project's impact upon the adjacent street network. The Highland Ranch Parkway/Pyramid Highway, Highland Ranch Parkway/Project Access, and Highland Ranch Parkway/Frontage Road intersections have been identified for AM and PM peak hour capacity analysis for the existing, existing plus project, existing plus project plus Kiley Ranch, 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch scenarios. The Pyramid Highway intersections with Los Altos Parkway and Lazy 5 Parkway have been identified for trip distribution and assignment analysis only. Pyramid Highway and Highland Ranch Parkway in the vicinity of the site have been identified for roadway capacity analysis for the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch scenarios.

EXISTING AND PROPOSED LAND USES

The project site encompasses an old gravel pit and undeveloped land. Adjacent properties generally include undeveloped land with some scattered dwelling units to the north and west. The Quarry will include the construction of 1,223 single family homes and a 13 acre mini-storage facility. The Kiley Ranch land uses will consist of two convenience stores with gas pumps totaling 8,000 square feet, three fast food restaurants with drive-through lanes totaling 10,500 square feet, two sit-down restaurants totaling 10,000 square feet, 30,000 square feet of retail buildings, two automotive service buildings totaling 16,000 square feet, a 4-bay car wash, and an 8 acre mini-storage facility.

EXISTING AND PROPOSED ROADWAYS AND INTERSECTIONS

Pyramid Highway is a four-lane roadway with two through lanes in each direction in the vicinity of the site. The speed limit is posted for 55 miles per hour in the vicinity of the site. Roadway improvements include bicycle lanes, striped edge lines, and paved shoulders on both sides of the roadway. A striped centerline exists south of Highland Ranch Parkway and a raised center median exists north of Highland Ranch Parkway.

Highland Ranch Parkway is a two-lane roadway with one through lane in each direction west of Pyramid Highway. The speed limit is posted for 45 miles per hour with a 35 mile per hour advisory speed limit near the project site. Roadway improvements include striped edge and center lines and paved and graded shoulders.

Sparks Boulevard is a four-lane roadway with two through lanes in each direction east of Pyramid Highway. The speed limit is posted for 40 miles per hour. Roadway improvements include curb, gutter, sidewalk, and bike lanes on both sides of the street and a raised center median with left turn pockets at major intersections.

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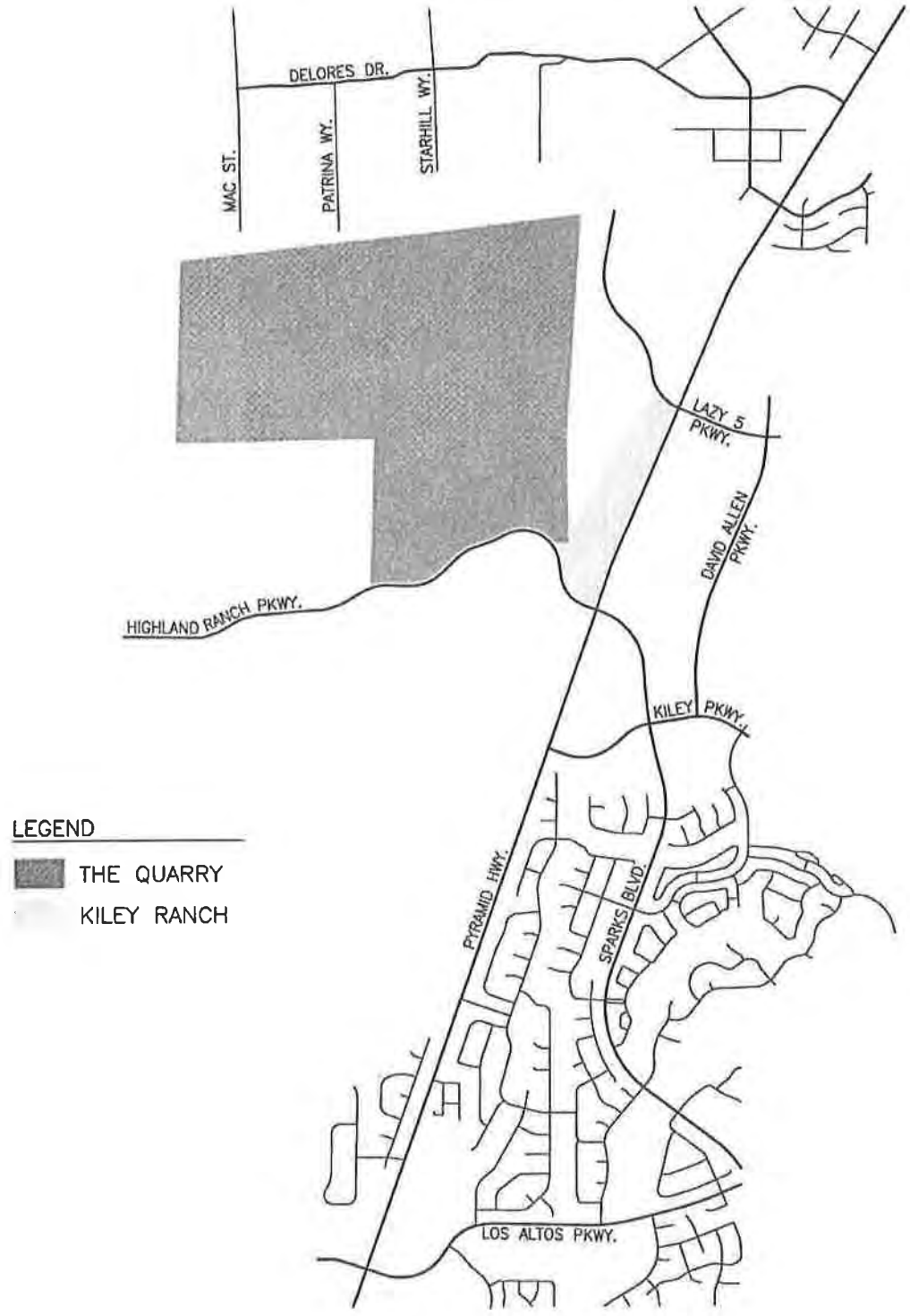

THE QUARRY

VICINITY MAP
FIGURE 1

The Pyramid Highway/Highland Ranch Parkway/Sparks Boulevard intersection is a signalized four-leg intersection with protected phasing for all left turn movements. The north approach contains dual left turn lanes, two through lanes, and one right turn lane. The south approach contains one left turn lane, two through lanes, and one right turn lane. The east approach contains dual left turn lanes, one through lane, and one free right turn lane with a northbound acceleration lane. The west approach contains one left turn lane and one shared through-right turn lane with a southbound acceleration lane. Pedestrian crosswalks exist at all approaches.

The Highland Ranch Parkway/Project Access intersection is an unsignalized three-leg intersection with stop control at the north approach. The intersection contains one shared left turn-through lane at the west approach, one shared through-right turn lane at the east approach, and one shared left turn-right turn lane at the north approach. The north approach served a gravel pit but is now gated.

The Highland Ranch Parkway/Frontage Road intersection does not currently exist but is anticipated to be a typical three-leg intersection with full turning movements allowed. The Highland Ranch Parkway/Frontage Road intersection will provide access to Kiley Ranch.

TRIP GENERATION

In order to assess the magnitude of traffic impacts of the proposed project on the key intersections, trip generation rates and peak hours had to be determined. Trip generation rates were obtained from the Ninth Edition of *ITE Trip Generation* (2012). Trip generation was calculated for the peak hours occurring between 7:00 and 9:00 AM and 4:00 and 6:00 PM which correspond to the peak hours of adjacent street traffic. The Quarry will include the construction of 1,223 single family homes and 13 acres of mini-storage. ITE Land Uses 151: Mini-Warehouse and 210: Single Family Detached Housing was used to calculate trips generated by The Quarry. Table 1 shows a summary of the average daily traffic (ADT) volumes and peak hour volumes generated by The Quarry.

TABLE 1
THE QUARRY TRIP GENERATION

LAND USE	ADT	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single Family (1,223 DU)	10,513	217	649	866	630	370	1,000
Mini-Warehouse (13 AC)	461	15	19	34	23	23	46
Total	10,974	232	668	900	653	393	1,046

Kiley Ranch will consist of two convenience stores with gas pumps for a total of 8,000 square feet, three fast food restaurants with drive-through lanes totaling 10,500 square feet, two sit-down restaurants totaling 10,000 square feet, 30,000 square feet of retail buildings, two automotive service buildings totaling 16,000 square feet, a car wash with 4 bays, and an 8 acre mini-storage facility. ITE Land Uses 151: Mini-Warehouse, 820: Shopping Center, 843: Automobile Parts Sales, 848: Tire Store, 853: Convenience Market with Gasoline Pumps, 932: High-Turnover (Sit-Down) Restaurant, 934: Fast Food Restaurant with Drive-Thru, and 947: Self-Service Car Wash were used to calculate trips generated by Kiley Ranch.

Table 2 shows a summary of the average daily traffic (ADT) volumes and AM and PM peak hour traffic volumes generated by Kiley Ranch.

TABLE 2
KILEY RANCH TRIP GENERATION

LAND USE	ADT	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Convenience Market w/Gas (8,000 SF)	6,765	164	163	327	204	203	407
Fast Food w/Drive-Thru (10,500 SF)	5,209	243	234	477	178	165	343
Sit-Down Restaurant (10,000 SF)	1,272	59	49	108	59	40	99
Shopping Center (30,000 SF)	1,281	18	11	29	53	58	111
Auto Parts Sales (8,000 SF)	495	9	9	18	24	24	48
Tire Store (8,000 SF)	199	14	9	23	14	19	33
Car Wash (4 Bays)	432	0	0	0	11	11	22
Mini-Storage (8 AC)	283	9	12	21	15	14	29
Total	15,936	516	487	1,003	558	534	1,092

TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of project trips to the key intersections was estimated based on existing and future peak hour traffic patterns and the locations of attractions and productions in the area. Separate trip distribution schemes were developed for The Quarry and Kiley Ranch. The trip generation volumes were subsequently assigned to the key intersections based on the trip distribution. Figure 2 shows the trip distribution and assignment for The Quarry. Figure 3 shows the trip distribution and assignment for Kiley Ranch. Access to Kiley Ranch will be provided from Highland Ranch Parkway and Lazy 5 Parkway via the Frontage Road and from Pyramid Highway via two right-in/right-out only driveways.

EXISTING AND PROJECTED TRAFFIC VOLUMES

Figure 4 shows the existing traffic volumes at the key intersections during the AM and PM peak hours. The existing traffic volumes were obtained from weekday counts conducted in September of 2017. Figure 5 shows the existing plus project traffic volumes during the AM and PM peak hours. Figure 6 shows the existing plus project plus Kiley Ranch traffic volumes at the key intersections. Figure 7 shows the 2035 base traffic volumes. The 2035 base average daily traffic volumes were obtained directly from RTC's traffic forecasting model and the peak hour volumes were then estimated based on the average daily traffic volumes. Peak hour factors and directional splits obtained from actual hourly traffic data on Pyramid Highway, Sparks Boulevard, and Highland Ranch Parkway were applied to the average daily traffic volumes in order to obtain peak hour directional link volumes at each leg of the intersection. Peak hour intersection turning movements were then estimated based on manually balancing entering and departing volumes at the intersection. Figure 8 shows the 2035 base plus project traffic volumes at the key intersections during the AM and PM peak hours. Figure 9 shows the 2035 base plus project plus Kiley Ranch traffic volumes at the key intersections during the AM and PM peak hours.

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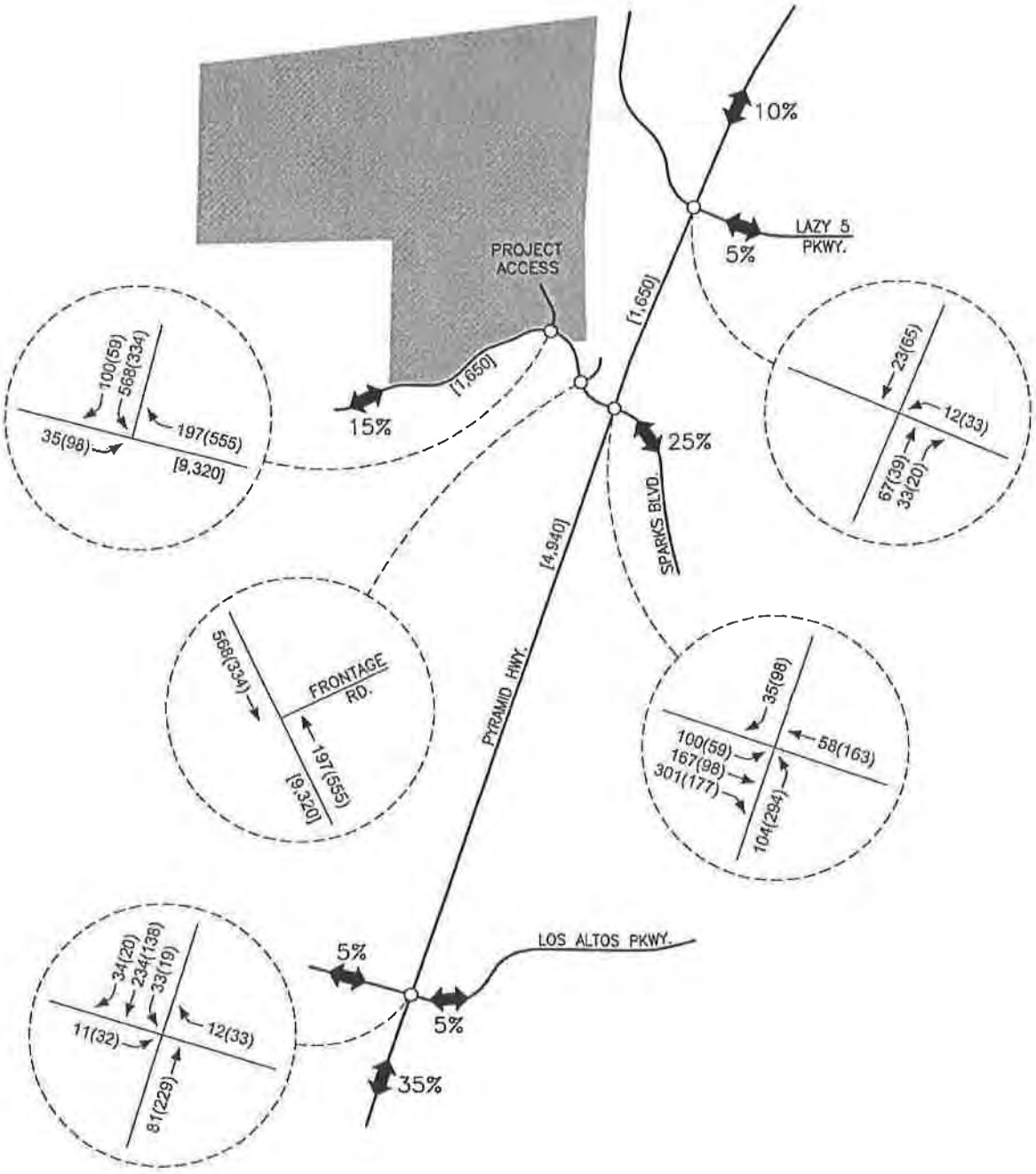
LEGEND
– AM PEAK HOUR
(–) PM PEAK HOUR
[–] AVERAGE DAILY TRAFFIC



THE QUARRY

THE QUARRY TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 2

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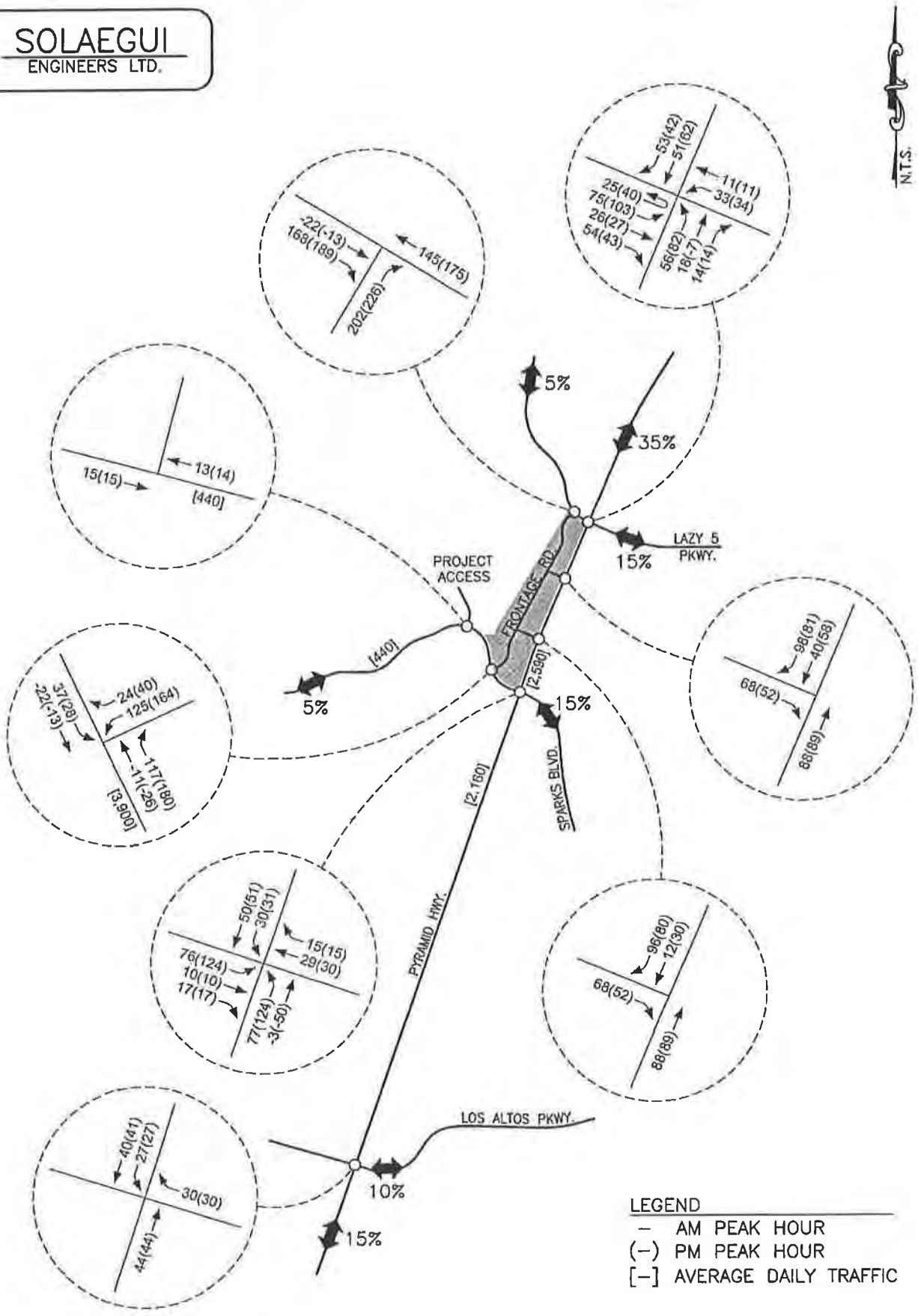

THE QUARRY

KILEY RANCH TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 3

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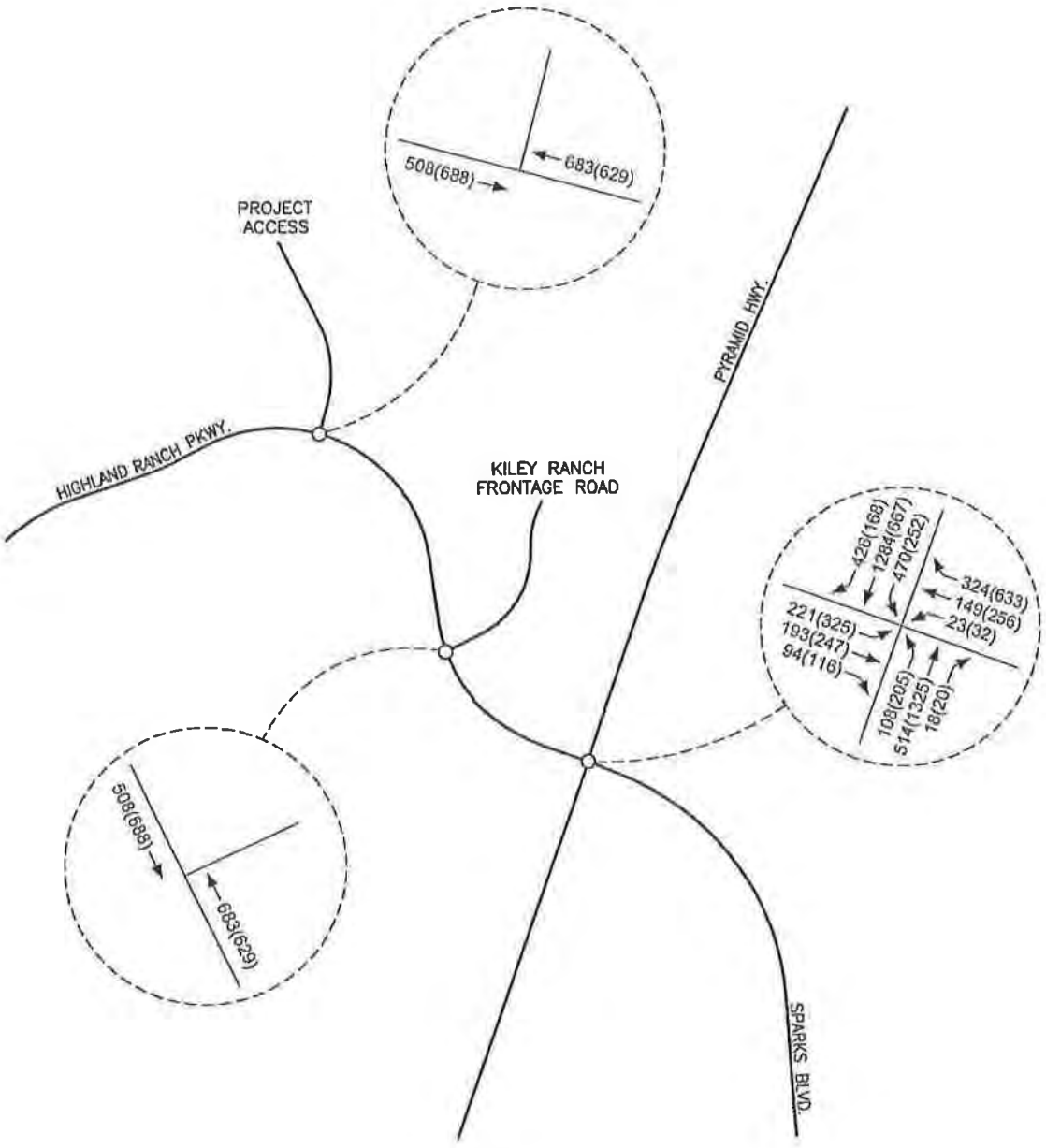
N.T.S.

LEGEND
– AM PEAK HOUR
(–) PM PEAK HOUR



THE QUARRY

EXISTING TRAFFIC VOLUMES
FIGURE 4

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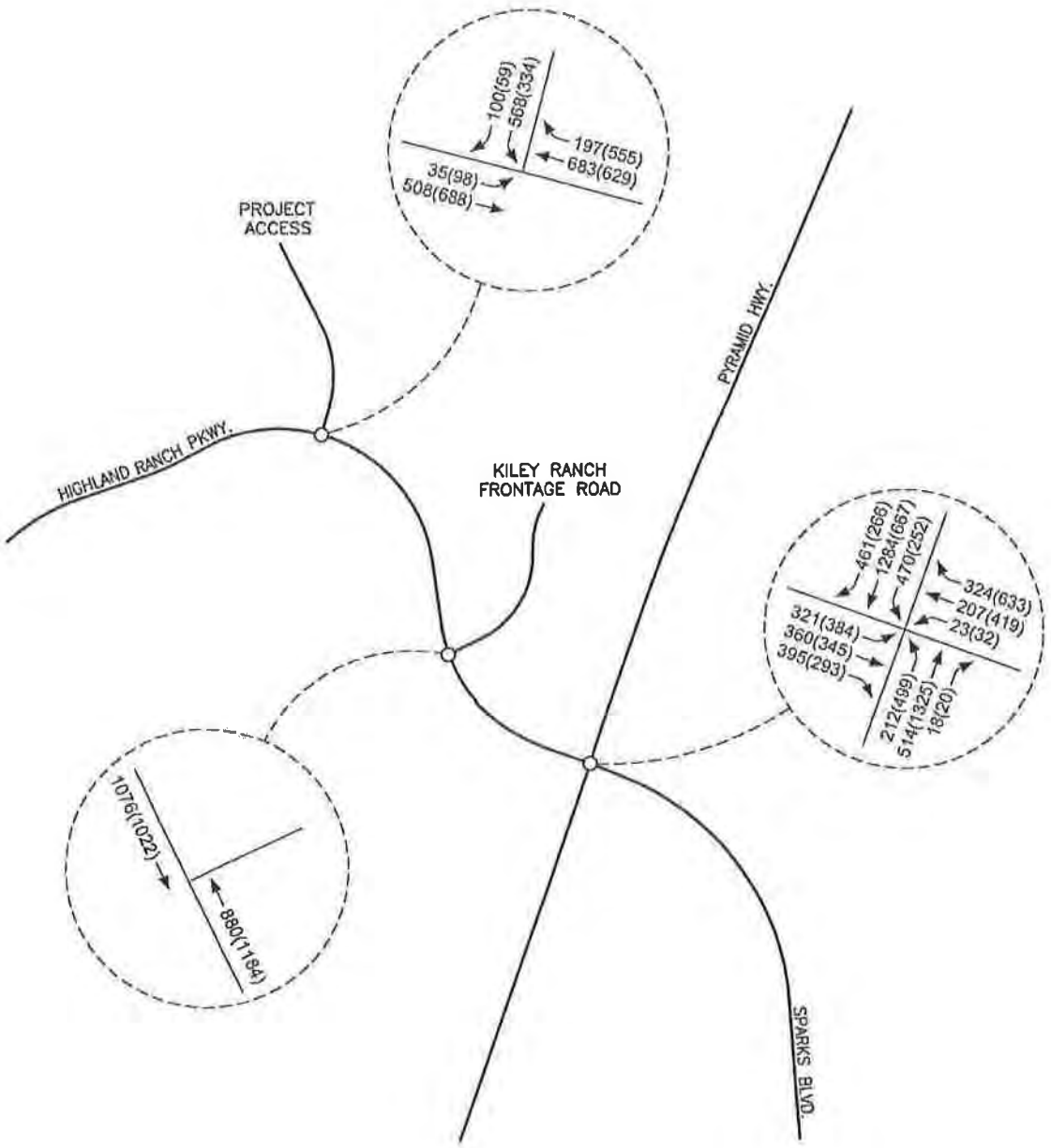
N.T.S.

LEGEND
– AM PEAK HOUR
(–) PM PEAK HOUR



THE QUARRY

EXISTING + PROJECT TRAFFIC VOLUMES
FIGURE 5

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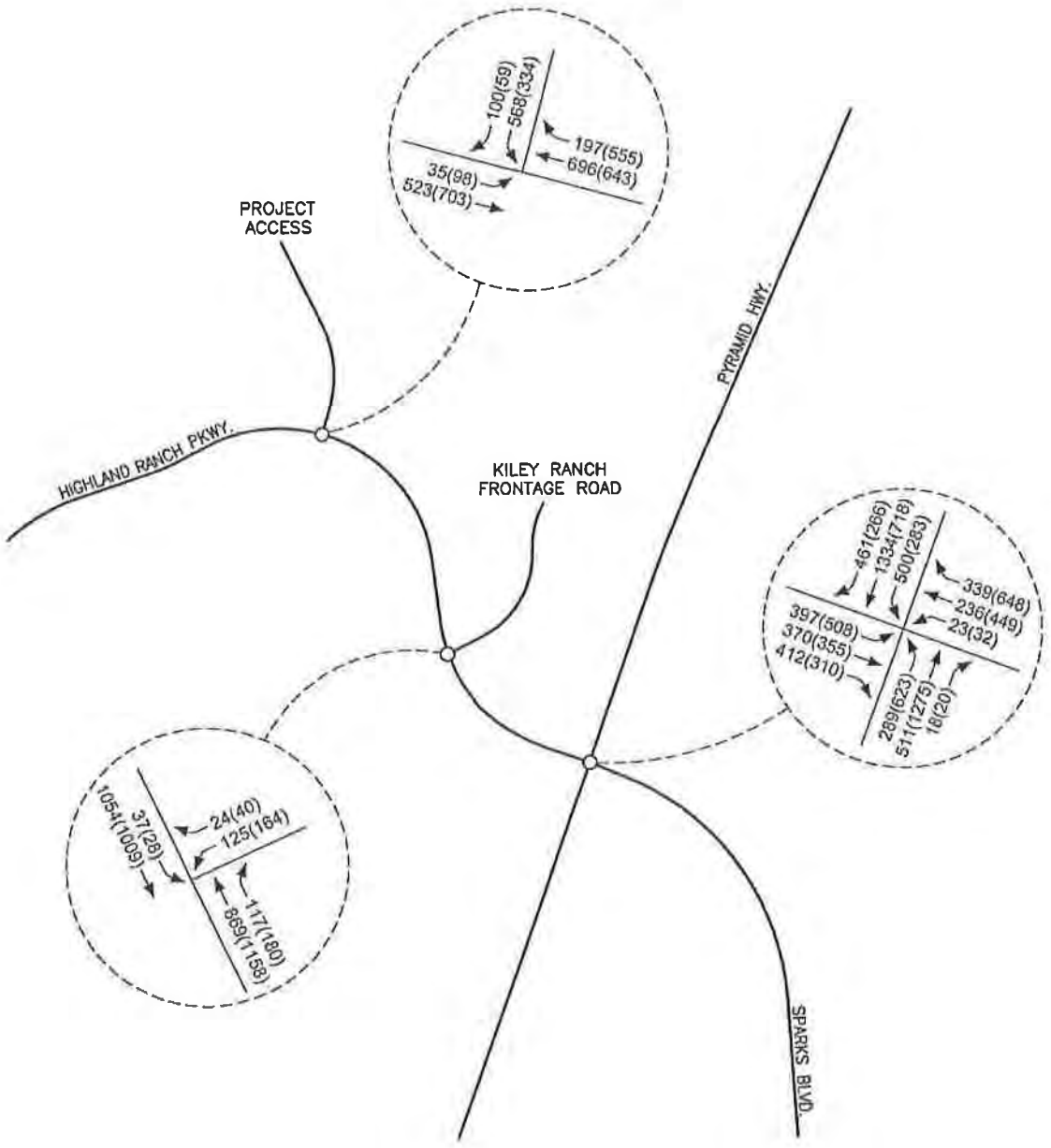
N.T.S.

LEGEND
– AM PEAK HOUR
(–) PM PEAK HOUR



THE QUARRY

EXISTING + PROJECT + KILEY RANCH TRAFFIC VOLUMES
FIGURE 6

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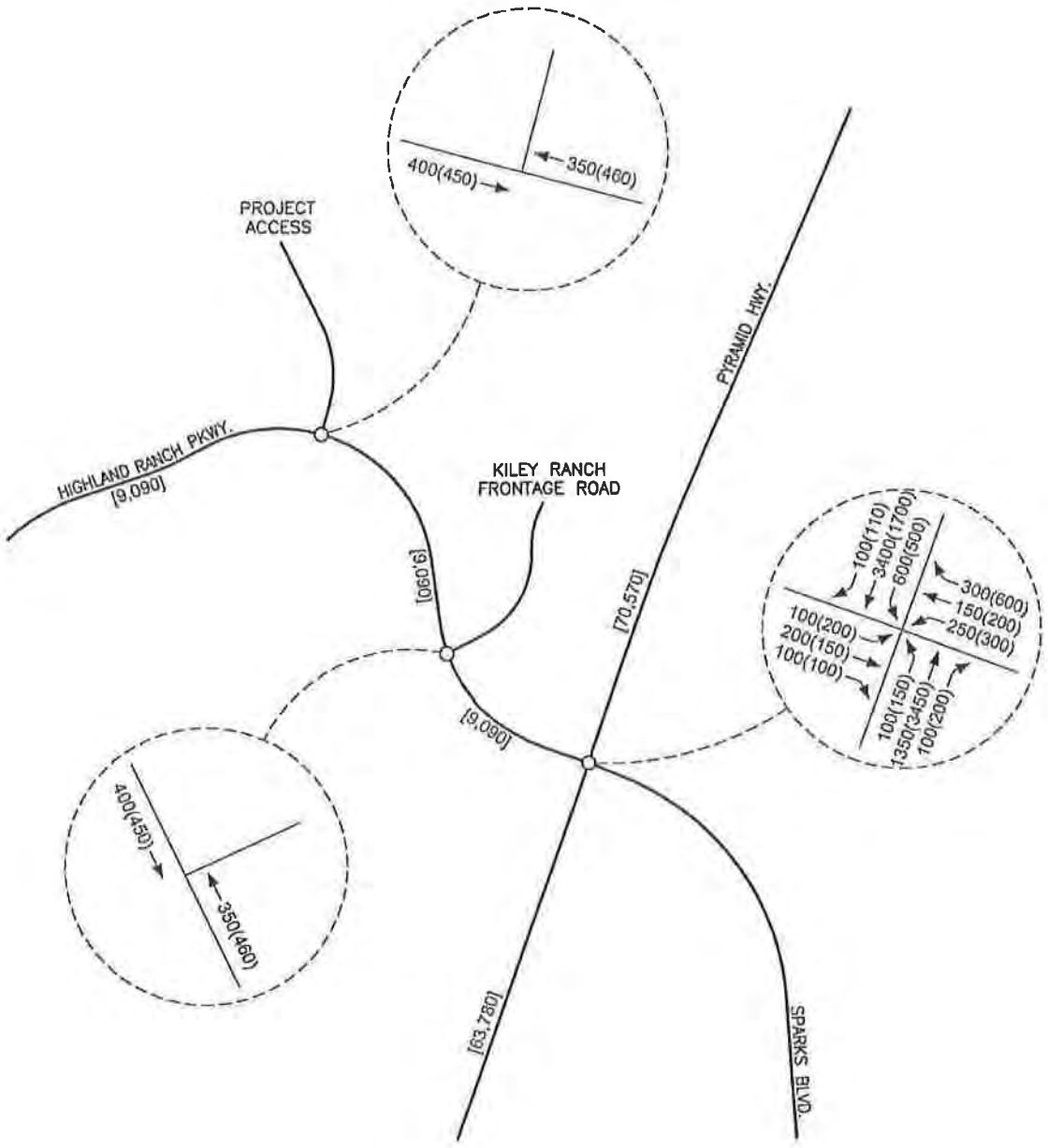
N.T.S.

LEGEND
– AM PEAK HOUR
(–) PM PEAK HOUR
[–] AVERAGE DAILY TRAFFIC



THE QUARRY

2035 BASE TRAFFIC VOLUMES
FIGURE 7

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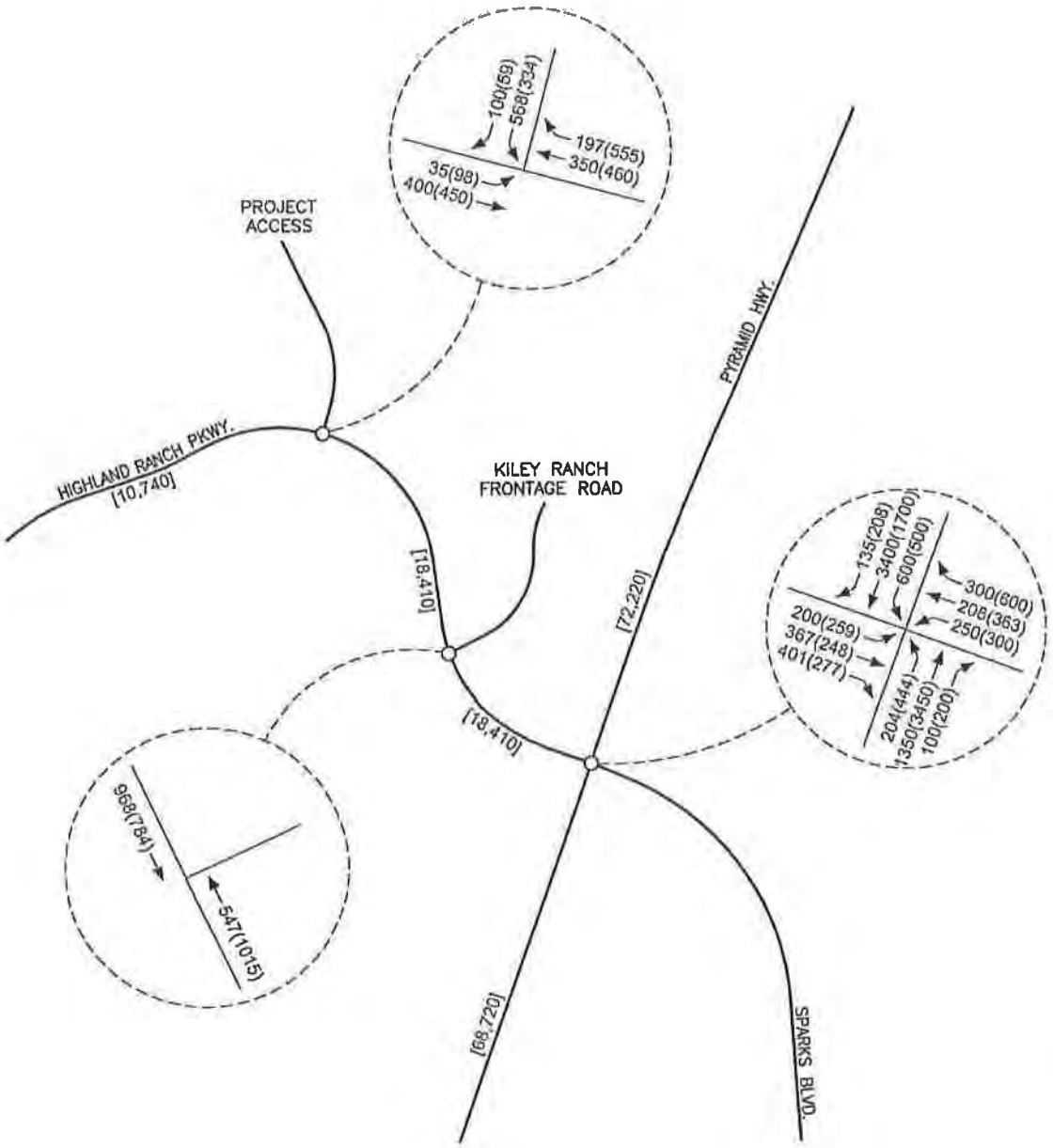
N.T.S.

LEGEND
- – AM PEAK HOUR
- (–) PM PEAK HOUR
- [–] AVERAGE DAILY TRAFFIC



THE QUARRY

2035 BASE + PROJECT TRAFFIC VOLUMES
FIGURE 8

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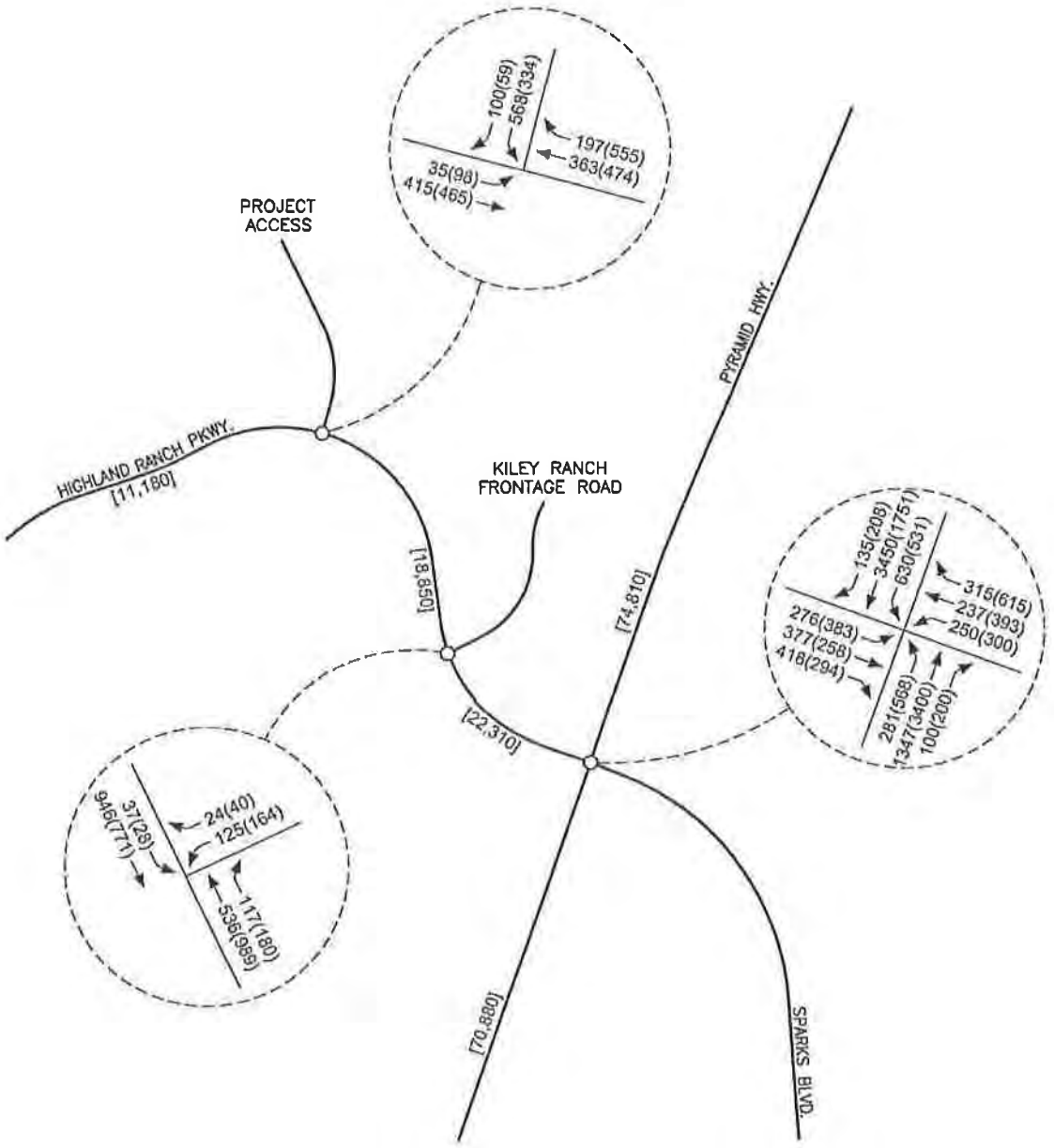
N.T.S.

LEGEND
-- AM PEAK HOUR
(–) PM PEAK HOUR
[–] AVERAGE DAILY TRAFFIC



THE QUARRY

2035 BASE + PROJECT + KILEY RANCH VOLUMES
FIGURE 9

ROADWAY CAPACITY ANALYSIS

Pyramid Highway and Highland Ranch Parkway in the vicinity of the site were identified for roadway capacity analysis. Roadway capacity is based on average daily level of service thresholds established by the Regional Transportation Commission. The 2040 Regional Transportation Plan indicates that LOS standards used for assessing the need for street and highway improvements at a planning level are LOS D for all regional roadway facilities projected to carry less than 27,000 ADT and LOS E for all regional roadway facilities projected to carry 27,000 or more ADT. The LOS standard is LOS D for Highland Ranch Parkway and LOS E for Pyramid Highway based on the 2035 base traffic volumes. The 2040 Regional Transportation Plan indicates that Pyramid Highway is classified as an arterial with high access control and Highland Ranch Parkway is classified as an arterial with moderate access control. Table 3 shows the average daily level of service thresholds for high and moderate access control arterials.

TABLE 3
LEVEL OF SERVICE CRITERIA FOR ROADWAY SEGMENTS

FACILITY/LANES	AVERAGE DAILY TRAFFIC VOLUME			
	LOS C	LOS D	LOS E	LOS F
Arterial with High Access Control				
4 Lanes	≤36,100	36,101-38,400	38,401-40,600	>40,600
6 Lanes	≤54,700	54,701-57,600	57,601-60,900	>60,900
8 Lanes	≤73,200	73,201-76,800	76,801-81,300	>81,300
Arterial with Moderate Access Control				
2 Lanes	≤14,800	14,801-17,500	17,501-18,600	>18,600
4 Lanes	≤32,200	32,201-35,200	35,201-36,900	>36,900
6 Lanes	≤49,600	49,601-52,900	52,901-55,400	>55,400

Pyramid Highway and Highland Ranch Parkway were subsequently reviewed for capacity based on the 2035 average daily traffic volumes presented on Figures 7-9 and the level of service thresholds presented above. Table 4 shows a summary of the roadway segment level of service results for the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch traffic volumes.

TABLE 4
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS

ROADWAY SEGMENT	2035 BASE		2035 BASE + PROJECT		2035 BASE + PROJECT + KILEY	
	ADT	LOS	ADT	LOS	ADT	LOS
Pyramid Highway north of Highland Ranch						
4-Lane High Access Control Arterial (Existing)	70,570	F	72,220	F	74,810	F
6-Lane High Access Control Arterial	70,570	F	72,220	F	74,810	F
8-Lane High Access Control Arterial (Needed)	70,570	C	72,220	C	74,810	D

TABLE 4 (CONTINUED)
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS

ROADWAY SEGMENT	2035 BASE		2035 BASE + PROJECT		2035 BASE + PROJECT + KILEY	
	ADT	LOS	ADT	LOS	ADT	LOS
Pyramid Highway south of Highland Ranch						
4-Lane High Access Control Arterial (Existing)	63,780	F	68,720	F	70,880	F
6-Lane High Access Control Arterial	63,780	F	68,720	F	70,880	F
8-Lane High Access Control Arterial (Needed)	63,780	C	68,720	C	70,800	C
Highland Ranch between Pyramid and Frontage Road						
2-Lane Moderate Access Control Arterial (Existing)	9,090	C	18,410	E	22,310	F
4-Lane Moderate Access Control Arterial (Needed)			18,410	C	22,310	C
Highland Ranch between Frontage Road & Project Access						
2-Lane Moderate Access Control Arterial (Existing)	9,090	C	18,410	E	18,850	F
4-Lane Moderate Access Control Arterial (Needed)			18,410	C	18,850	C
Highland Ranch west of Project Access						
2-Lane Moderate Access Control Arterial (Existing)	9,090	C	10,740	C	11,180	C

As shown in Table 4, the existing four-lane segment of Pyramid Highway north and south of Highland Ranch Parkway operates at LOS F for the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch traffic volumes. This roadway segment will need to be widened to eight lanes in order to maintain policy LOS E or better operation based on the high access control arterial level of service thresholds. However, RTC's 2040 Regional Transportation Plan indicates that the US-395 Connector is planned to be constructed to Pyramid Highway in the 2027-2040 timeframe. The Pyramid Highway/US-395 Connection Project indicates that a six-lane "high speed" high access control arterial is the preferred alternative for the Pyramid Highway/US-395 Connector north and south of Sparks Boulevard. Capacity thresholds for a high speed high access control arterial are not available but it is anticipated that the proposed six-lane section for this new roadway will provide LOS E or better operation for the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch scenarios.

The existing two-lane segment of Highland Ranch Parkway from Pyramid Highway to the Project Access operates at LOS C for the 2035 base traffic volumes, LOS E for the 2035 base plus project traffic volumes, and LOS F for the 2035 base plus project plus Kiley Ranch traffic volumes and the existing two-lane segment west of the Project Access operates at LOS C for the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch traffic volumes. This segment of Highland Ranch Parkway will therefore need to be widened to four lanes in order to maintain policy LOS D or better operation for the 2035 base plus project and 2035 base plus project plus Kiley Ranch scenarios. No capacity improvements are planned for Highland Ranch Parkway in RTC's 2040 Regional Transportation Plan. It is recommended that Highland Ranch Parkway be widened to four lanes from Pyramid Highway to the Project Access in order to serve project traffic volumes.

INTERSECTION CAPACITY ANALYSIS

The key intersections were analyzed for capacity based on procedures presented in the *Highway Capacity Manual (6th Edition)*, prepared by the Transportation Research Board, for unsignalized and signalized intersections using the latest version of the Highway Capacity Software.

The result of capacity analysis is a level of service (LOS) rating for each signalized intersection, roundabout, all-way stop controlled intersection, or minor movement at a two-way stop controlled intersection. Level of service is a qualitative measure of traffic operating conditions where a letter grade "A" through "F", corresponding to progressively worsening traffic operation, is assigned to the intersection or minor movement.

The *Highway Capacity Manual* defines level of service for two-way stop controlled intersections in terms of computed or measured control delay for each minor movement. Level of service is not defined for the two-way stop controlled intersection as a whole but is assigned to all-way stop controlled intersections and roundabouts. The level of service criteria for unsignalized intersections is shown in Table 5.

TABLE 5
LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	DELAY RANGE (SEC/VEH)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Level of service for signalized intersections is stated in terms of the average control delay per vehicle for a peak 15 minute analysis period. The level of service criteria for signalized intersections is shown in Table 6.

TABLE 6
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SEC)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Table 7 shows a summary of the level of service and delay results for the existing, existing plus project, existing plus project plus Kiley Ranch, 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch scenarios. The capacity worksheets are included in the Appendix.

TABLE 7
INTERSECTION LEVEL OF SERVICE AND DELAY RESULTS

	EXISTING		EXISTING + PROJECT		EXISTING + PROJECT + KILEY		2035 BASE		2035 BASE + PROJECT		2035 BASE + PROJECT + KILEY	
INTERSECTION	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Pyramid/Highland Ranch												
Signal w/Exist. Lanes	D40	D54	F136	F137	F165	F189	F193	F327	F321	F359	F349	F376
Signal w/Added Lanes	N/A	N/A	D43	D49	D46	D50	C34	D52	D38	E58	D42	E66
Interchange w/Signal												
NB Ramps	N/A	N/A	N/A	N/A	N/A	N/A	B16	C21	B17	C22.0	B17	C24
SB Ramps	N/A	N/A	N/A	N/A	N/A	N/A	C23	B19	C23	B19	C23	B20
Highland Ranch/Access												
Signal	N/A	N/A	C23	B19	C24	B20	N/A	N/A	B18	B19	B18	B19
Highland Ranch/Frontage												
Stop at North Leg	N/A	N/A	N/A	N/A	B11	B13	N/A	N/A	N/A	N/A	A9	B12
EB Left	N/A	N/A	N/A	N/A	F353	F999	N/A	N/A	N/A	N/A	F61	F392
SB Left	N/A	N/A	N/A	N/A	B12	B14	N/A	N/A	N/A	N/A	B10	B13
SB Right												

Pyramid Highway/Highland Ranch Parkway/Sparks Boulevard Intersection

The Pyramid Highway/Highland Ranch Parkway/Sparks Boulevard intersection was initially analyzed as a signalized four-leg intersection with the existing approach lanes for all scenarios. The intersection currently operates at LOS D with a delay of 40 seconds per vehicle during the AM peak hour and 54 seconds per vehicle during the PM peak hour. For the existing plus project traffic volumes the intersection operates at LOS F with a delay of 136 seconds per vehicle during the AM peak hour and 137 seconds per vehicle during the PM peak hour. For the existing plus project plus Kiley Ranch traffic volumes the intersection operates at LOS F with a delay of 165 seconds per vehicle during the AM peak hour and 189 seconds per vehicle during the PM peak hour. The intersection will continue to operate at LOS F with high delays for the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch traffic volumes.

The signalized Pyramid Highway/Highland Ranch Parkway/Sparks Boulevard intersection was subsequently re-analyzed for capacity with additional approach lanes. For the existing plus project and existing plus project plus Kiley Ranch traffic volumes the intersection operates at LOS D during the AM and PM peak hours with dual left turn lanes, two through lanes, and one free right turn lane at the east and west approaches and dual left turn lanes at the south approach. For the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch traffic volumes the intersection operates at LOS E or better during the AM and PM peak hours with dual left turn lanes, four through lanes, and one right turn lane at the north and south approaches and dual left turn lanes, two through lanes, and one free right turn lane at the east and west approaches.

Four through lanes at the north and south Pyramid Highway approaches is consistent with the roadway capacity results that require an eight-lane high access control arterial for all 2035 scenarios. However, as previously discussed, the Pyramid Highway/US-395 Connection Project indicates that a six-lane "high speed" high access control arterial is the preferred alternative for the Pyramid Highway/US-395 Connector north and south of Sparks Boulevard. The Pyramid Highway/US-395 Connection Project and RTC's 2040 Regional Transportation Plan also indicate that a grade-separated interchange is planned for construction at the Pyramid Highway/Highland Ranch Parkway/Sparks Boulevard intersection in the 2027-2040 timeframe. The Pyramid Highway/ Highland Ranch Parkway/Sparks Boulevard intersection therefore re-analyzed for capacity as two separate signalized ramp intersections. The northbound and southbound ramp intersections operate at LOS C or better during the AM and PM peak hours for the 2035 base, 2035 base plus project, and 2035 base plus project plus Kiley Ranch scenarios. The northbound ramp intersection was analyzed with dual left turn lanes and two through lanes at the west approach, two through lanes and one right turn lane the east approach, and dual left turn lanes and one right turn lane at the south approach. The southbound ramp intersection was analyzed with dual left turn lanes and two through lanes at the east approach, two through lanes and one right turn lane the west approach, and dual left turn lanes and one right turn lane at the north approach.

Storage and deceleration requirements were reviewed for the needed dual left turn lanes at the west and south approaches based on the existing plus project plus Kiley Ranch traffic volumes. 325 feet of storage length is required for each left turn lane at the west approach and 375 feet is required for each left turn lane at the south approach based on the Poisson method for signalized intersections with a 95th percentile confidence level and 130 second cycle length. For desirable conditions 220 feet of deceleration length is needed for the left turn pocket at the west approach based on the 45 mile per hour speed limit on Highland Ranch Parkway and 365 feet of deceleration length is needed for the left turn pocket at the south approach based on the 55 mile per hour speed limit on Pyramid Highway.

It is recommended that the Pyramid Highway/Highland Ranch Parkway/Sparks Boulevard intersection be improved to include dual left turn lanes, two through lanes, and one right turn lane at the east and west approaches and dual left turn lanes at the south approach in order to serve project buildout traffic volumes. The dual left turn pocket at the west approach should contain 545 feet of storage/deceleration length and the dual left turn pocket at the south approach should contain 740 feet of storage/deceleration length.

Highland Ranch Parkway/Project Access Intersection

The Highland Ranch Parkway/Project Access intersection was analyzed as a signalized three-leg intersection for the existing plus project, existing plus project plus Kiley Ranch, 2035 base plus project, and 2035 base plus project plus Kiley Ranch scenarios. The intersection meets traffic signal warrant 3 per the latest edition of the *Manual on Uniform Traffic Control Devices* (MUTCD). For the existing plus project traffic volumes the intersection operates at LOS C during the AM peak hour and LOS B during the AM Peak hour. For the existing plus project plus Kiley Ranch traffic volumes the intersection continues to operate at LOS C during the AM peak hour and LOS B during the AM peak hour with slight increases in delay.

For the 2035 base plus project traffic volumes the intersection operates at LOS B during the AM and PM peak hours. For the 2035 base plus project plus Kiley Ranch traffic volumes the intersection continues to operate at LOS B during the AM and PM peak hours. The intersection was analyzed with one left turn lane and one through lane at the west approach, one through lane and one right turn lane at the east approach, and dual left turn lanes and one right turn lane at the north approach for all scenarios.

Traffic signal spacing requirements were reviewed for the Highland Ranch Parkway/Project Access intersection. RTC's access management standards indicate that traffic signals on arterials with moderate access control (Highland Ranch Parkway) shall be spaced a minimum of 1,590 feet apart. The centerline spacing on Highland Ranch Parkway between Pyramid Highway and the Project Access is ±1,500 which very nearly meets the signal spacing standard.

Storage and deceleration requirements were reviewed for the needed left turn lanes at the west and north approaches. Approximately 150 feet of storage length is required for the left turn lane at the west approach and 250 feet is required for each left turn lane at the north approach based on the Poisson method for signalized intersections with a 95th percentile confidence level and 90 second cycle length. For desirable conditions 220 feet of deceleration length is needed for the left turn pocket at the west approach based on the 45 mile per hour speed limit on Highland Ranch Parkway and 115 feet of deceleration length is needed for the left turn pocket at the north approach based on an assumed speed limit of 35 miles per hour.

It is recommended that the Highland Ranch Parkway/Project Access intersection be improved as three-leg traffic signal controlled intersection with one left turn lane and one through lane at the west approach, one through lane and one right turn lane at the east approach, and dual left turn lanes and one right turn lane at the north approach. The left turn pocket at the west approach should contain 370 feet of storage/deceleration length and the dual left turn pocket at the north approach should contain 365 feet of storage/deceleration length.

Highland Ranch Parkway/Frontage Road Intersection

The Highland Ranch Parkway/Frontage Road intersection was analyzed as an unsignalized three-leg intersection with stop sign control at the north approach for the existing plus project plus Kiley Ranch and 2035 base plus project plus Kiley Ranch scenarios. For the existing plus project plus Kiley Ranch traffic volumes the southbound left turn movement operates at LOS F during the AM and PM peak hours. For the 2035 base plus project plus Kiley Ranch traffic volumes the southbound left turn movement continues to operate at LOS F during the AM and PM peak hours. The intersection was analyzed with one left turn lane and two through lane at the west approach, two through lanes and one right turn lane at the east approach, and one left turn lane and one right turn lane at the north approach for all scenarios. Traffic signal warrant and signal spacing requirements were subsequently reviewed at the intersection. Peak hour traffic signal warrant 3 per the latest edition of the *Manual on Uniform Traffic Control Devices* (MUTCD) is met at the intersection for the existing plus project plus Kiley Ranch traffic volumes. However, the intersection does not meet RTC's 1,590 feet signal spacing requirement. The left turn movements at the intersection may ultimately need to be restricted.

RECOMMENDATIONS

Traffic generated by The Quarry will have some impact the adjacent street network. The following recommendations are made to mitigate project traffic impacts.

It is recommended that any required signing, striping or traffic control improvements comply with City of Sparks and Nevada Department of Transportation requirements.

It is recommended that Highland Ranch Parkway be widened to four lanes from Pyramid Highway to the Project Access.

It is recommended that the Pyramid Highway/Highland Ranch Parkway/Sparks Boulevard intersection be improved to include dual left turn lanes, two through lanes, and one right turn lane at the east and west approaches and dual left turn lanes at the south approach. The dual left turn pocket at the west approach should contain 545 feet of storage/deceleration length and the dual left turn pocket at the south approach should contain 740 feet of storage/deceleration length.

It is recommended that the Highland Ranch Parkway/Project Access intersection be improved as three-leg traffic signal controlled intersection with one left turn lane and one through lane at the west approach, one through lane and one right turn lane at the east approach, and dual left turn lanes and one right turn lane at the north approach. The left turn pocket at the west approach should contain 370 feet of storage/deceleration length and the dual left turn pocket at the north approach should contain 365 feet of storage/deceleration length.

APPENDIX

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/13/2017
Analysis Date: 9/13/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
210	SFHOUSE 1	5257	5256	10513	217	649	866	630	370	1000
	1223 Dwelling Units									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/14/2017
Analysis Date: 9/14/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
151	MWAREHOUSE 1	231	230	461	15	19	34	23	23	46
	13 Acres									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

TRIP GENERATION 2014, TRAFFICWARE, LLC

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/19/2017
Analysis Date: 9/19/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
853	CONVMARKETGAS 1	3383	3382	6765	164	163	327	204	203	407
	8 Gross Floor Area 1000 SF									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	103	103	206	135	134	269
Volume Added to Adjacent Streets		0	0	0	-103	-103	-206	-135	-134	-269

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/19/2017
Analysis Date: 9/19/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
934	FASTFOODDT 1	2605	2604	5209	243	234	477	178	165	343
	10.5 Gross Floor Area 1000 SF									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	119	115	234	89	82	171
Volume Added to Adjacent Streets		0	0	0	-119	-115	-234	-89	-82	-171

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/19/2017
Analysis Date: 9/19/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
932	RESTAURANTHT 1	636	636	1272	59	49	108	59	40	99
	10 Gross Floor Area 1000 SF									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/19/2017
Analysis Date: 9/19/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
820	CENTERSHOPPING 1	641	640	1281	18	11	29	53	58	111
	30 Gross Leasable Area 1000 SF									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/19/2017
Analysis Date: 9/19/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
843	SALESAUTOPARTS 1	248	247	495	9	9	18	24	24	48
	8 Gross Floor Area 1000 SF									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/19/2017
Analysis Date: 9/19/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
848	STORETIRE 1	100	99	199	14	9	23	14	19	33
	8 Gross Floor Area 1000 SF									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/19/2017
Analysis Date: 9/19/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
947	CARWASH 1	216	216	432				11	11	22
	4 Wash Stalls									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - Alternative 1

Project: New Project
Alternative: Alternative 1

Open Date: 9/19/2017
Analysis Date: 9/19/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
151	MWAREHOUSE 1	142	141	283	9	12	21	15	14	29
	8 Acres									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

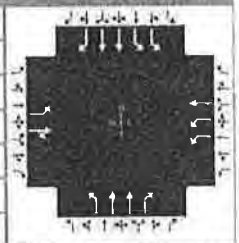
Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp17ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	221	193	94	23	149		108	514	18	470	1284	426

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

Green	14.0	3.0	50.0	5.0	11.0	17.0						
Yellow	4.0	0.0	4.0	4.0	0.0	4.0						
Red	1.0	0.0	1.0	1.0	0.0	1.0						

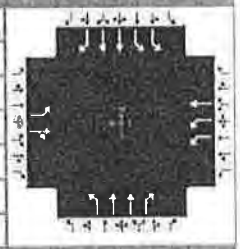
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	21.0	33.0	10.0	22.0	19.0	55.0	22.0	58.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	17.4	19.6	2.8	11.8	9.5		19.0	
Green Extension Time (g_e), s	0.2	0.6	0.0	0.5	0.1	0.0	0.4	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	0.66	0.03	1.00	0.23	0.12		0.94	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	240	285		25	162		117	559	20	511	1396	354
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1773		1730	1870		1781	1781	1556	1730	1781	1538
Queue Service Time (g_s), s	15.4	17.6		0.8	9.8		7.5	13.0	0.9	17.0	43.2	20.1
Cycle Queue Clearance Time (g_c), s	15.4	17.6		0.8	9.8		7.5	13.0	0.9	17.0	43.2	20.1
Green Ratio (*g/C*)	0.18	0.23		0.04	0.14		0.12	0.42	0.42	0.18	0.44	0.44
Capacity (*c*), veh/h	312	414		144	265		208	1484	648	634	1573	679
Volume-to-Capacity Ratio (*X*)	0.771	0.688		0.173	0.611		0.565	0.377	0.030	0.806	0.887	0.522
Back of Queue (*Q*), ft/ln (95 th percentile)	309.5	323.2		16.5	208.3		151.8	229.3	14.7	306.6	647.7	296.7
Back of Queue (*Q*), veh/ln (95 th percentile)	12.2	12.7		0.7	8.2		6.0	9.0	0.6	12.1	25.5	11.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	47.2	42.0		55.5	48.4		50.1	24.2	20.7	47.0	30.8	24.3
Incremental Delay (d_2), s/veh	10.2	4.0		0.2	3.0		2.2	0.7	0.1	7.0	7.8	2.9
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	57.4	46.0		55.7	51.4		52.3	24.9	20.8	53.9	38.6	27.2
Level of Service (LOS)	E	D		E	D		D	C	C	D	D	C
Approach Delay, s/veh / LOS	51.2	D		52.0	D		29.5	C		40.3	D	
Intersection Delay, s/veh / LOS	40.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.2	C	2.9	C	2.3	B
Bicycle LOS Score / LOS	1.4	A	0.7	A	1.1	A	2.4	B

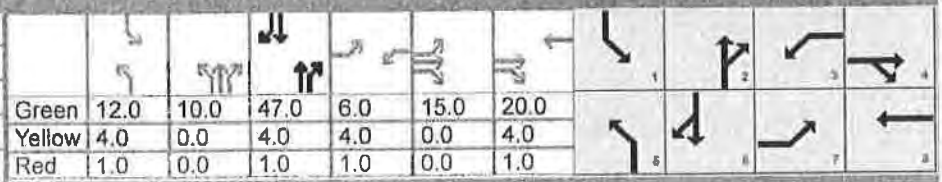
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp17px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	325	247	116	32	256		205	1325	20	252	667	168

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	12.0	10.0		47.0	6.0	15.0	20.0					
Yellow	4.0	0.0		4.0	4.0	0.0	4.0					
Red	1.0	0.0		1.0	1.0	0.0	1.0					

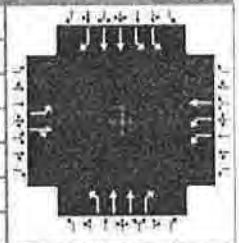
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	26.0	40.0	11.0	25.0	27.0	62.0	17.0	52.0
Change Period, (*Y+R c*), s	0.0	5.0	5.0	5.0	0.0	5.0	5.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.0	3.0	3.0	2.9	0.0	2.9	0.0
Queue Clearance Time (*g s*), s	27.7	26.8	3.3	21.2	16.7		12.1	
Green Extension Time (*g e*), s	0.0	0.9	0.0	0.0	0.3	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	0.07	1.00	1.00	0.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	353	367		35	278		223	1440	22	274	725	139
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1772		1730	1870		1781	1781	1557	1730	1781	1535
Queue Service Time (*g s*), s	25.7	24.8		1.3	19.2		14.7	49.6	1.0	10.1	21.2	8.3
Cycle Queue Clearance Time (*g c*), s	25.7	24.8		1.3	19.2		14.7	49.6	1.0	10.1	21.2	8.3
Green Ratio (*g/C*)	0.20	0.27		0.05	0.15		0.21	0.44	0.44	0.09	0.36	0.36
Capacity (*c*), veh/h	356	477		160	288		370	1561	683	319	1287	555
Volume-to-Capacity Ratio (*X*)	0.992	0.770		0.218	0.967		0.602	0.922	0.032	0.858	0.563	0.251
Back of Queue (*Q*), ft/ln (95 th percentile)	567.9	439.5		25.1	458.9		269.9	752	17.2	224.7	352.9	140.9
Back of Queue (*Q*), veh/ln (95 th percentile)	22.4	17.3		1.0	18.1		10.6	29.6	0.7	8.8	13.9	5.5
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh	51.9	43.8		59.7	54.7		46.6	34.4	20.8	58.2	33.3	29.1
Incremental Delay (*d 2*), s/veh	45.3	6.8		0.3	43.7		2.0	10.5	0.1	19.3	1.8	1.1
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	97.1	50.6		60.0	98.4		48.6	44.9	20.9	77.5	35.1	30.2
Level of Service (LOS)	F	D		E	F		D	D	C	E	D	C
Approach Delay, s/veh / LOS	73.4	E		94.1	F		45.1	D		44.7	D	
Intersection Delay, s/veh / LOS	54.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	3.4	C	2.3	B
Bicycle LOS Score / LOS	1.7	B	0.3	A	1.9	B	1.4	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp17aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	321	360	395	23	207		212	514	18	470	1284	461

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

Green	14.0	3.0	50.0	5.0	11.0	17.0	
Yellow	4.0	0.0	4.0	4.0	0.0	4.0	
Red	1.0	0.0	1.0	1.0	0.0	1.0	

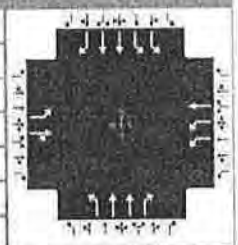
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	21.0	33.0	10.0	22.0	19.0	55.0	22.0	58.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.2	3.0	3.2	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	23.0	30.0	2.8	16.1	16.0		19.0	
Green Extension Time (g_e), s	0.0	0.0	0.0	0.3	0.0	0.0	0.4	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		0.94	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	349	793		25	225		230	559	20	511	1396	392
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1692		1730	1870		1781	1781	1556	1730	1781	1538
Queue Service Time (g_s), s	21.0	28.0		0.8	14.1		14.0	13.0	0.9	17.0	43.2	22.9
Cycle Queue Clearance Time (g_c), s	21.0	28.0		0.8	14.1		14.0	13.0	0.9	17.0	43.2	22.9
Green Ratio (*g/C*)	0.18	0.23		0.04	0.14		0.12	0.42	0.42	0.18	0.44	0.44
Capacity (*c*), veh/h	312	395		144	265		208	1484	648	634	1573	679
Volume-to-Capacity Ratio (*X*)	1.119	2.010		0.173	0.849		1.109	0.377	0.030	0.806	0.887	0.578
Back of Queue (*Q*), ft/ln (95 th percentile)	630.4	2486.8		16.5	319.4		450.5	229.3	14.7	306.6	647.7	333
Back of Queue (*Q*), veh/ln (95 th percentile)	24.8	97.9		0.7	12.6		17.7	9.0	0.6	12.1	25.5	13.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	49.5	46.0		55.5	50.2		53.0	24.2	20.7	47.0	30.8	25.1
Incremental Delay (d_2), s/veh	87.1	463.2		0.2	21.1		94.6	0.7	0.1	7.0	7.8	3.6
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	136.6	509.2		55.7	71.3		147.6	24.9	20.8	53.9	38.6	28.7
Level of Service (LOS)	F	F		E	E		F	C	C	D	D	C
Approach Delay, s/veh / LOS	395.4	F		69.8	E		59.8	E		40.3	D	
Intersection Delay, s/veh / LOS	135.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.2	C	2.9	C	2.3	B
Bicycle LOS Score / LOS	2.4	B	0.8	A	1.2	A	2.4	B

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp17pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	384	345	293	32	419		499	1325	20	252	667	266

Signal Information													
Cycle, s	130.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	12.0	10.0	47.0	6.0	15.0	20.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0			
				Red	1.0	0.0	1.0	1.0	0.0	1.0			

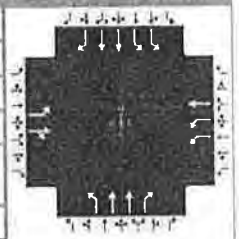
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	26.0	40.0	11.0	25.0	27.0	62.0	17.0	52.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	0.0	5.0	5.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	28.0	37.0	3.3	22.0	29.0		12.1	
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	417	666		35	455		542	1440	22	274	725	246
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1716		1730	1870		1781	1781	1557	1730	1781	1535
Queue Service Time (g_s), s	26.0	35.0		1.3	20.0		27.0	49.6	1.0	10.1	21.2	15.8
Cycle Queue Clearance Time (g_c), s	26.0	35.0		1.3	20.0		27.0	49.6	1.0	10.1	21.2	15.8
Green Ratio (*g/C*)	0.20	0.27		0.05	0.15		0.21	0.44	0.44	0.09	0.36	0.36
Capacity (*c*), veh/h	356	462		160	288		370	1561	683	319	1287	555
Volume-to-Capacity Ratio (*X*)	1.172	1.442		0.218	1.583		1.466	0.922	0.032	0.858	0.563	0.443
Back of Queue (*Q*), ft/ln (95 th percentile)	808.1	1603.7		25.1	1231.3		1335.2	752	17.2	224.7	352.9	253.1
Back of Queue (*Q*), veh/ln (95 th percentile)	31.8	63.1		1.0	48.5		52.6	29.6	0.7	8.8	13.9	10.0
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	52.0	47.5		59.7	55.0		51.5	34.4	20.8	58.2	33.3	31.5
Incremental Delay (d_2), s/veh	103.1	211.0		0.3	278.3		224.1	10.5	0.1	19.3	1.8	2.6
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	155.1	258.5		60.0	333.3		275.6	44.9	20.9	77.5	35.1	34.1
Level of Service (LOS)	F	F		E	F		F	D	C	E	D	C
Approach Delay, s/veh / LOS	218.7	F		313.9	F		107.1	F		44.2	D	
Intersection Delay, s/veh / LOS	137.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	3.4	C	2.3	B
Bicycle LOS Score / LOS	2.3	B	0.6	A	2.1	B	1.5	B

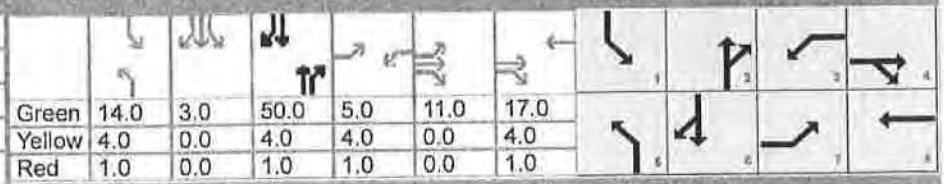
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Ex. + Project + Kiley	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp17awo.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	397	370	412	23	236		289	511	18	500	1334	461

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



	EB			WB			NB			SB		
Green	14.0	3.0		50.0	5.0	11.0	17.0					
Yellow	4.0	0.0		4.0	4.0	0.0	4.0					
Red	1.0	0.0		1.0	1.0	0.0	1.0					

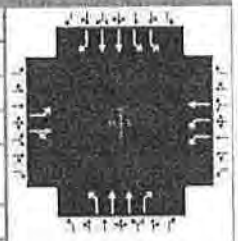
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	21.0	33.0	10.0	22.0	19.0	55.0	22.0	58.0
Change Period, (Y+R c), s	0.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0
Max Allow Headway (MAH), s	3.1	3.2	3.0	3.2	2.9	0.0	2.9	0.0
Queue Clearance Time (g s), s	23.0	30.0	2.8	18.4	16.0		20.3	
Green Extension Time (g e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	432	823		25	257		314	555	20	543	1450	392
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1691		1730	1870		1781	1781	1556	1730	1781	1538
Queue Service Time (g s), s	21.0	28.0		0.8	16.4		14.0	12.9	0.9	18.3	46.0	22.9
Cycle Queue Clearance Time (g c), s	21.0	28.0		0.8	16.4		14.0	12.9	0.9	18.3	46.0	22.9
Green Ratio (g/C)	0.18	0.23		0.04	0.14		0.12	0.42	0.42	0.18	0.44	0.44
Capacity (c), veh/h	312	395		144	265		208	1484	648	634	1573	679
Volume-to-Capacity Ratio (X)	1.384	2.086		0.173	0.968		1.512	0.374	0.030	0.857	0.922	0.578
Back of Queue (Q), ft/ln (95 th percentile)	1000.9	2636.4		16.5	412.5		824.2	227.7	14.7	334.9	697.9	333
Back of Queue (Q), veh/ln (95 th percentile)	39.4	103.8		0.7	16.2		32.4	9.0	0.6	13.2	27.5	13.1
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d 1), s/veh	49.5	46.0		55.5	51.2		53.0	24.2	20.7	47.5	31.6	25.1
Incremental Delay (d 2), s/veh	191.7	497.2		0.2	46.1		253.5	0.7	0.1	10.7	10.4	3.6
Initial Queue Delay (d 3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	241.2	543.2		55.7	97.3		306.5	24.9	20.8	58.2	42.0	28.7
Level of Service (LOS)	F	F		E	F		F	C	C	E	D	C
Approach Delay, s/veh / LOS	439.3	F		93.6	F		124.3	F		43.5	D	
Intersection Delay, s/veh / LOS	164.5						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.2	C	2.9	C	2.3	B
Bicycle LOS Score / LOS	2.6	C	0.9	A	1.2	A	2.5	B

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Ex. + Project + Kiley	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp17pwo.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	508	355	310	32	449		623	1275	20	283	718	266

Signal Information										
Cycle, s	130.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	12.0	10.0	47.0	6.0	15.0	20.0
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0

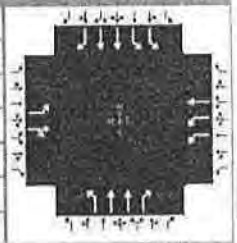
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	26.0	40.0	11.0	25.0	27.0	62.0	17.0	52.0
Change Period, (Y+R c), s	0.0	5.0	5.0	5.0	0.0	5.0	5.0	5.0
Max Allow Headway (MAH), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g s), s	28.0	37.0	3.3	22.0	29.0		13.5	
Green Extension Time (g e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	552	696		35	488		677	1386	22	308	780	246
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1713		1730	1870		1781	1781	1557	1730	1781	1535
Queue Service Time (g s), s	26.0	35.0		1.3	20.0		27.0	46.5	1.0	11.5	23.3	15.8
Cycle Queue Clearance Time (g c), s	26.0	35.0		1.3	20.0		27.0	46.5	1.0	11.5	23.3	15.8
Green Ratio (g/C)	0.20	0.27		0.05	0.15		0.21	0.44	0.44	0.09	0.36	0.36
Capacity (c), veh/h	356	461		160	288		370	1561	683	319	1287	555
Volume-to-Capacity Ratio (X)	1.550	1.508		0.218	1.696		1.830	0.888	0.032	0.963	0.606	0.443
Back of Queue (Q), ft/ln (95 th percentile)	1453.1	1756.2		25.1	1392		2013.6	698.7	17.2	276	382.1	253.1
Back of Queue (Q), veh/ln (95 th percentile)	57.2	69.1		1.0	54.8		79.3	27.5	0.7	10.9	15.0	10.0
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d 1), s/veh	52.0	47.5		59.7	55.0		51.5	33.6	20.8	58.8	33.9	31.5
Incremental Delay (d 2), s/veh	261.0	239.7		0.3	327.8		384.1	7.9	0.1	40.2	2.1	2.6
Initial Queue Delay (d 3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	313.0	287.2		60.0	382.8		435.6	41.4	20.9	99.0	36.1	34.1
Level of Service (LOS)	F	F		E	F		F	D	C	F	D	C
Approach Delay, s/veh / LOS	298.6	F		361.3	F		169.3	F		50.2	D	
Intersection Delay, s/veh / LOS	189.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	3.4	C	2.3	B
Bicycle LOS Score / LOS	2.5	C	0.6	A	2.2	B	1.6	B

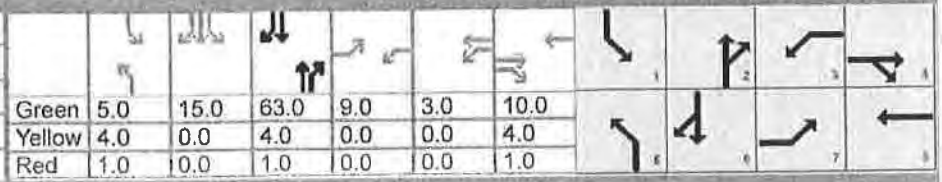
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp35ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	100	200	100	250	150		100	1350	100	600	3400	100

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



Green	5.0	15.0	63.0	9.0	3.0	10.0	
Yellow	4.0	0.0	4.0	0.0	0.0	4.0	
Red	1.0	0.0	1.0	0.0	0.0	1.0	

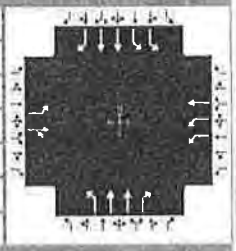
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	9.0	15.0	12.0	18.0	10.0	68.0	25.0	83.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	9.0	12.0	9.0	11.9	7.0		23.2	
Green Extension Time (g_e), s	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	105	289		263	158		105	1421	105	632	3579	79
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1759		1730	1870		1781	1781	1558	1730	1781	1543
Queue Service Time (g_s), s	7.0	10.0		7.0	9.9		5.0	37.8	4.1	21.2	78.0	2.3
Cycle Queue Clearance Time (g_c), s	7.0	10.0		7.0	9.9		5.0	37.8	4.1	21.2	78.0	2.3
Green Ratio (*g/C*)	0.08	0.08		0.06	0.11		0.04	0.52	0.52	0.21	0.65	0.65
Capacity (*c*), veh/h	134	147		202	203		74	1870	818	721	2315	1003
Volume-to-Capacity Ratio (*X*)	0.788	1.975		1.304	0.779		1.418	0.760	0.129	0.876	1.546	0.079
Back of Queue (*Q*), ft/ln (95 th percentile)	183	940.6		334.3	234.4		323.5	534.5	64.3	378.9	4134.4	31
Back of Queue (*Q*), veh/ln (95 th percentile)	7.2	37.0		13.2	9.2		12.7	21.0	2.5	14.9	162.8	1.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	54.6	55.0		56.5	52.1		57.5	22.5	14.5	46.0	21.0	7.7
Incremental Delay (d_2), s/veh	24.3	462.3		168.0	16.0		250.1	3.0	0.3	11.4	247.9	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	78.9	517.3		224.5	68.1		307.6	25.5	14.8	57.4	268.9	7.9
Level of Service (LOS)	E	F		F	E		F	C	B	E	F	A
Approach Delay, s/veh / LOS	400.4	F		165.9	F		43.0	D		233.0	F	
Intersection Delay, s/veh / LOS	192.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	2.9	C	2.3	B
Bicycle LOS Score / LOS	1.1	A	1.1	A	1.8	B	4.0	D

HCS7 Signalized Intersection Results Summary

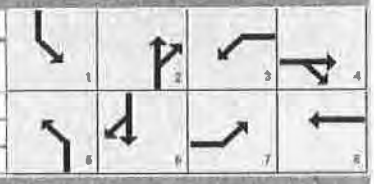
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp35px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	200	150	100	300	200		150	3450	200	500	1700	110

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

	EB			WB			NB			SB		
Green	12.0	10.0		54.0	22.0	1.0	16.0					
Yellow	4.0	0.0		4.0	0.0	0.0	4.0					
Red	1.0	0.0		1.0	0.0	0.0	1.0					



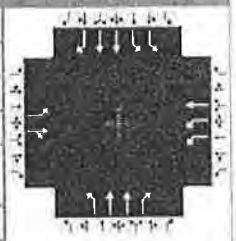
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	22.0	21.0	23.0	22.0	27.0	69.0	17.0	59.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	0.0	5.0	5.0	5.0
Max Allow Headway (MAH), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	16.5	18.0	13.3	16.3	12.0		14.0	
Green Extension Time (g_e), s	0.2	0.0	0.3	0.1	0.2	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	0.10	1.00	0.19	1.00	0.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	211	237		316	211		158	3632	211	526	1789	89
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1743		1730	1870		1781	1781	1558	1730	1781	1537
Queue Service Time (g_s), s	14.5	16.0		11.3	14.3		10.0	64.0	10.3	12.0	54.0	4.7
Cycle Queue Clearance Time (g_c), s	14.5	16.0		11.3	14.3		10.0	64.0	10.3	12.0	54.0	4.7
Green Ratio (g/C)	0.17	0.12		0.14	0.13		0.21	0.49	0.49	0.09	0.42	0.42
Capacity (c), veh/h	301	214		479	245		370	1753	767	319	1479	638
Volume-to-Capacity Ratio (X)	0.698	1.104		0.659	0.861		0.427	2.071	0.275	1.648	1.210	0.140
Back of Queue (Q), ft/ln (95 th percentile)	285	484.1		218.8	329.4		195.4	5829.9	168	757.9	1533.8	78
Back of Queue (Q), veh/ln (95 th percentile)	11.2	19.1		8.6	13.0		7.7	229.5	6.6	29.8	60.4	3.1
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	50.9	57.0		53.1	55.3		44.8	33.0	19.4	59.0	38.0	23.6
Incremental Delay (d_2), s/veh	5.9	92.2		2.7	24.4		0.3	484.1	0.9	305.4	100.9	0.5
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	56.8	149.2		55.8	79.7		45.1	517.1	20.3	364.4	138.9	24.0
Level of Service (LOS)	E	F		E	E		D	F	C	F	F	C
Approach Delay, s/veh / LOS	105.7	F		65.3	E		472.3	F		184.0	F	
Intersection Delay, s/veh / LOS	327.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	3.4	C	2.3	B
Bicycle LOS Score / LOS	1.2	A	0.7	A	3.8	D	2.5	B

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp35aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	200	367	401	250	208		204	1350	100	600	3400	135

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

	EB			WB			NB							
										1	2	3	4	
Green	6.0	15.0		55.0	6.0	4.0	14.0							
Yellow	4.0	0.0		4.0	4.0	0.0	4.0							
Red	1.0	0.0		1.0	1.0	0.0	1.0			8	5	7		

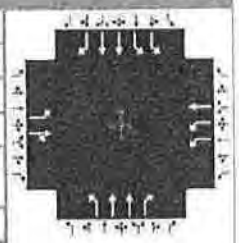
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	15.0	23.0	11.0	19.0	11.0	60.0	26.0	75.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.2	3.0	3.2	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	16.1	20.0	8.0	16.0	8.0		23.0	
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		0.96	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	211	782		263	219		215	1421	105	632	3579	116
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1687		1730	1870		1781	1781	1557	1730	1781	1542
Queue Service Time (g_s), s	14.1	18.0		6.0	14.0		6.0	43.2	4.7	21.0	70.0	4.1
Cycle Queue Clearance Time (g_c), s	14.1	18.0		6.0	14.0		6.0	43.2	4.7	21.0	70.0	4.1
Green Ratio (*g/C*)	0.12	0.15		0.05	0.12		0.05	0.46	0.46	0.22	0.58	0.58
Capacity (*c*), veh/h	223	253		173	218		89	1632	714	750	2077	899
Volume-to-Capacity Ratio (*X*)	0.945	3.091		1.521	1.003		2.411	0.871	0.147	0.843	1.723	0.129
Back of Queue (*Q*), ft/ln (95 th percentile)	353	2920.4		385.3	390.6		782.3	637.2	76.4	366.1	4786.8	59.8
Back of Queue (*Q*), veh/ln (95 th percentile)	13.9	115.0		15.2	15.4		30.8	25.1	3.0	14.4	188.5	2.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	52.1	51.0		57.0	53.0		57.0	29.3	18.9	45.0	25.0	11.3
Incremental Delay (d_2), s/veh	44.7	951.5		261.9	61.8		667.8	6.7	0.4	8.2	327.3	0.3
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	96.8	1002.5		318.9	114.8		724.8	36.0	19.3	53.2	352.3	11.6
Level of Service (LOS)	F	F		F	F		F	D	B	D	F	B
Approach Delay, s/veh / LOS	810.4	F		226.2	F		119.9	F		299.5	F	
Intersection Delay, s/veh / LOS	320.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	2.9	C	2.3	B
Bicycle LOS Score / LOS	2.1	B	1.2	A	1.9	B	4.1	D

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp35pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	259	248	277	300	363		444	3450	200	500	1700	208

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.0	10.0		54.0	22.0	1.0	16.0					
Yellow	4.0	0.0		4.0	0.0	0.0	4.0					
Red	1.0	0.0		1.0	0.0	0.0	1.0					

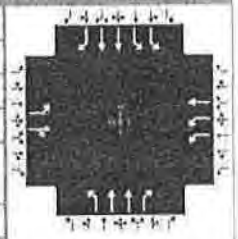
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	22.0	21.0	23.0	22.0	27.0	69.0	17.0	59.0
Change Period, ($Y+R_c$), s	0.0	5.0	5.0	5.0	0.0	5.0	5.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g_s), s	21.5	18.0	13.3	19.0	29.0		14.0	
Green Extension Time (g_e), s	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	0.19	1.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	273	526		316	382		467	3632	211	526	1789	193
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1684		1730	1870		1781	1781	1558	1730	1781	1537
Queue Service Time (g_s), s	19.5	16.0		11.3	17.0		27.0	64.0	10.3	12.0	54.0	10.9
Cycle Queue Clearance Time (g_c), s	19.5	16.0		11.3	17.0		27.0	64.0	10.3	12.0	54.0	10.9
Green Ratio (*g/C*)	0.17	0.12		0.14	0.13		0.21	0.49	0.49	0.09	0.42	0.42
Capacity (*c*), veh/h	301	207		479	245		370	1753	767	319	1479	638
Volume-to-Capacity Ratio (*X*)	0.904	2.540		0.659	1.562		1.263	2.071	0.275	1.648	1.210	0.302
Back of Queue (*Q*), ft/ln (95 th percentile)	417.7	1881		218.8	1037.4		972.1	5829.9	168	757.9	1533.8	182.1
Back of Queue (*Q*), veh/ln (95 th percentile)	16.4	74.1		8.6	40.8		38.3	229.5	6.6	29.8	60.4	7.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	53.0	57.0		53.1	56.5		51.5	33.0	19.4	59.0	38.0	25.4
Incremental Delay (d_2), s/veh	28.1	706.9		2.7	272.0		138.5	484.1	0.9	305.4	100.9	1.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	81.1	763.9		55.8	328.5		190.0	517.1	20.3	364.4	138.9	26.6
Level of Service (LOS)	F	F		E	F		F	F	C	F	F	C
Approach Delay, s/veh / LOS	530.9	F		205.1	F		457.4	F		177.6	F	
Intersection Delay, s/veh / LOS	358.9						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	3.4	C	2.3	B
Bicycle LOS Score / LOS	1.8	B	0.9	A	4.0	D	2.6	C

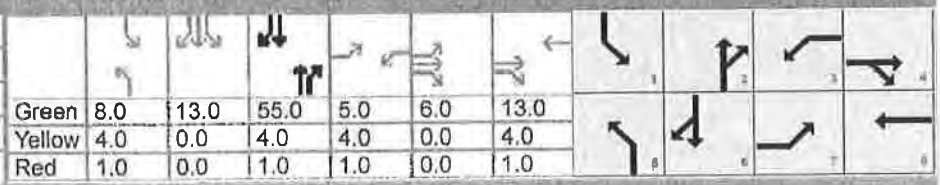
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project + Kiley	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp35awo.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	276	377	418	250	237		281	1347	100	630	3450	135

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



Green	8.0	13.0	55.0	5.0	6.0	13.0
Yellow	4.0	0.0	4.0	4.0	0.0	4.0
Red	1.0	0.0	1.0	1.0	0.0	1.0

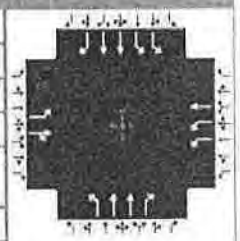
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	16.0	24.0	10.0	18.0	13.0	60.0	26.0	73.0
Change Period, (*Y+R c*), s	0.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0
Max Allow Headway (*MAH*), s	3.1	3.2	3.0	3.2	2.9	0.0	2.9	0.0
Queue Clearance Time (*g s*), s	18.0	21.0	7.0	15.0	10.0		24.3	
Green Extension Time (*g e*), s	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	1.00	1.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	291	811		263	249		296	1418	105	663	3632	116
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1686		1730	1870		1781	1781	1557	1730	1781	1541
Queue Service Time (*g s*), s	16.0	19.0		5.0	13.0		8.0	43.0	4.7	22.3	68.0	4.2
Cycle Queue Clearance Time (*g c*), s	16.0	19.0		5.0	13.0		8.0	43.0	4.7	22.3	68.0	4.2
Green Ratio (*g/C*)	0.13	0.16		0.04	0.11		0.07	0.46	0.46	0.22	0.57	0.57
Capacity (*c*), veh/h	238	267		144	203		119	1632	714	750	2018	873
Volume-to-Capacity Ratio (*X*)	1.223	3.036		1.826	1.231		2.491	0.869	0.147	0.885	1.800	0.133
Back of Queue (Q), ft/ln (95 th percentile)	616.1	3013.1		437.6	546.8		1059.9	634.3	76.4	394.9	5086.2	63.2
Back of Queue (Q), veh/ln (95 th percentile)	24.3	118.6		17.2	21.5		41.7	25.0	3.0	15.5	200.2	2.5
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh	52.0	50.5		57.5	53.5		56.0	29.3	18.9	45.5	26.0	12.2
Incremental Delay (*d 2*), s/veh	132.0	926.2		397.4	139.4		695.3	6.6	0.4	11.8	361.8	0.3
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	184.0	976.7		454.9	192.9		751.3	35.8	19.3	57.4	387.8	12.5
Level of Service (LOS)	F	F		F	F		F	D	B	E	F	B
Approach Delay, s/veh / LOS	767.6	F		327.4	F		151.2	F		328.3	F	
Intersection Delay, s/veh / LOS	348.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	2.9	C	2.3	B
Bicycle LOS Score / LOS	2.3	B	1.2	A	2.0	B	4.1	D

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project + Kiley	Analysis Period	1> 7:00
Intersection	Pyramid & Sparks	File Name	PySp35pwo.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	383	258	294	300	393		568	3400	200	531	1751	208

Signal Information					EB			WB			NB			SB		
Cycle, s	130.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	12.0	10.0		54.0	22.0	1.0	16.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0		4.0	0.0	0.0	4.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0		1.0	0.0	0.0	1.0					

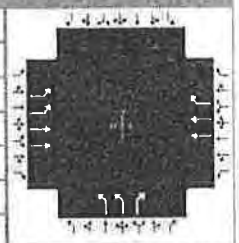
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	2.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	22.0	21.0	23.0	22.0	27.0	69.0	17.0	59.0
Change Period, (Y+R c), s	0.0	5.0	5.0	5.0	0.0	5.0	5.0	5.0
Max Allow Headway (MAH), s	3.1	3.1	3.0	3.1	2.9	0.0	2.9	0.0
Queue Clearance Time (g s), s	24.0	18.0	13.3	19.0	29.0		14.0	
Green Extension Time (g e), s	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	1.00	0.19	1.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8		5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	403	555		316	414		598	3579	211	559	1843	193
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1682		1730	1870		1781	1781	1558	1730	1781	1537
Queue Service Time (g s), s	22.0	16.0		11.3	17.0		27.0	64.0	10.3	12.0	54.0	10.9
Cycle Queue Clearance Time (g c), s	22.0	16.0		11.3	17.0		27.0	64.0	10.3	12.0	54.0	10.9
Green Ratio (g/C)	0.17	0.12		0.14	0.13		0.21	0.49	0.49	0.09	0.42	0.42
Capacity (c), veh/h	301	207		479	245		370	1753	767	319	1479	638
Volume-to-Capacity Ratio (X)	1.337	2.680		0.659	1.691		1.616	2.041	0.275	1.750	1.246	0.302
Back of Queue (Q), ft/ln (95 th percentile)	933.4	2015.8		218.8	1191.4		1613.3	5687.7	168	837.4	1666.5	182.1
Back of Queue (Q), veh/ln (95 th percentile)	36.7	79.4		8.6	46.9		63.5	223.9	6.6	33.0	65.6	7.2
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d 1), s/veh	54.0	57.0		53.1	56.5		51.5	33.0	19.4	59.0	38.0	25.4
Incremental Delay (d 2), s/veh	172.6	769.8		2.7	328.2		289.5	470.6	0.9	350.4	116.6	1.2
Initial Queue Delay (d 3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	226.6	826.8		55.8	384.7		341.0	503.6	20.3	409.4	154.6	26.6
Level of Service (LOS)	F	F		E	F		F	F	C	F	F	C
Approach Delay, s/veh / LOS	574.2	F		242.3	F		458.3	F		199.9	F	
Intersection Delay, s/veh / LOS	375.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.1	C	3.4	C	2.3	B
Bicycle LOS Score / LOS	2.1	B	1.0	A	4.1	D	2.6	C

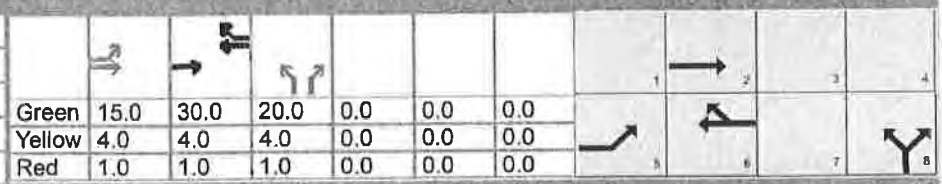
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks NB Ramp	File Name	NB35ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	100	800			400	300	100		100			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	15.0	30.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

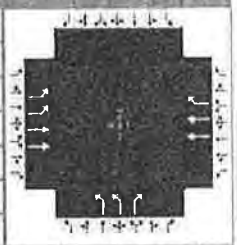
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	20.0	55.0		35.0		25.0		
Change Period, (*Y+R c*), s	5.0	5.0		5.0		5.0		
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.2		
Queue Clearance Time (*g s*), s	4.0					6.3		
Green Extension Time (*g e*), s	0.1	0.0		0.0		0.4		
Phase Call Probability	1.00					1.00		
Max Out Probability	0.00					0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3		18			
Adjusted Flow Rate (*v*), veh/h	105	842			421	316	105		105			
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1730	1781			1781	1585	1730		1585			
Queue Service Time (*g s*), s	2.0	9.3			6.7	12.4	1.9		4.3			
Cycle Queue Clearance Time (*g c*), s	2.0	9.3			6.7	12.4	1.9		4.3			
Green Ratio (*g/C*)	0.19	0.62			0.38	0.38	0.25		0.25			
Capacity (*c*), veh/h	649	2226			1335	594	865		396			
Volume-to-Capacity Ratio (*X*)	0.162	0.378			0.315	0.531	0.122		0.266			
Back of Queue (*Q*), ft/ln (95 th percentile)	37.2	138.5			122.9	213.3	33.7		70.4			
Back of Queue (*Q*), veh/ln (95 th percentile)	1.5	5.5			4.8	8.4	1.3		2.8			
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00	0.00		0.00			
Uniform Delay (*d 1*), s/veh	27.2	7.4			17.7	19.5	23.2		24.1			
Incremental Delay (*d 2*), s/veh	0.0	0.5			0.6	3.4	0.0		0.1			
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0	0.0		0.0			
Control Delay (*d*), s/veh	27.3	7.9			18.3	22.9	23.2		24.2			
Level of Service (LOS)	C	A			B	C	C		C			
Approach Delay, s/veh / LOS	10.0	B		20.3	C		23.7	C		0.0		
Intersection Delay, s/veh / LOS	15.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.9	B	2.4	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.3	A	1.1	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks NB Ramp	File Name	NB35px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	200	650			500	600	150		200			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	30.0	20.0	0.0	0.0	0.0	1	2	3	4
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8
Red	1.0	1.0	1.0	0.0	0.0	0.0				

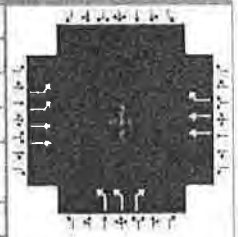
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	20.0	55.0		35.0		25.0		
Change Period, (Y+R c), s	5.0	5.0		5.0		5.0		
Max Allow Headway (MAH), s	3.1	0.0		0.0		3.3		
Queue Clearance Time (g s), s	6.2					11.2		
Green Extension Time (g e), s	0.3	0.0		0.0		0.6		
Phase Call Probability	1.00					1.00		
Max Out Probability	0.00					0.02		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3		18			
Adjusted Flow Rate (v), veh/h	211	684			526	500	158		211			
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1781			1781	1585	1730		1585			
Queue Service Time (g s), s	4.2	7.1			8.7	23.0	2.9		9.2			
Cycle Queue Clearance Time (g c), s	4.2	7.1			8.7	23.0	2.9		9.2			
Green Ratio (g/C)	0.19	0.62			0.38	0.38	0.25		0.25			
Capacity (c), veh/h	649	2226			1335	594	865		396			
Volume-to-Capacity Ratio (X)	0.325	0.307			0.394	0.841	0.183		0.531			
Back of Queue (Q), ft/ln (95 th percentile)	76.9	105.9			159.5	388.6	51.4		153.8			
Back of Queue (Q), veh/ln (95 th percentile)	3.0	4.2			6.3	15.3	2.0		6.1			
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00	0.00	0.00		0.00			
Uniform Delay (d 1), s/veh	28.1	7.0			18.3	22.8	23.6		25.9			
Incremental Delay (d 2), s/veh	0.1	0.4			0.9	13.5	0.0		0.7			
Initial Queue Delay (d 3), s/veh	0.0	0.0			0.0	0.0	0.0		0.0			
Control Delay (d), s/veh	28.2	7.3			19.2	36.3	23.6		26.7			
Level of Service (LOS)	C	A			B	D	C		C			
Approach Delay, s/veh / LOS	12.2	B		27.5	C		25.4	C		0.0		
Intersection Delay, s/veh / LOS	21.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.9	B	2.4	B	3.0	C	3.0	C
Bicycle LOS Score / LOS	1.2	A	1.3	A		F		

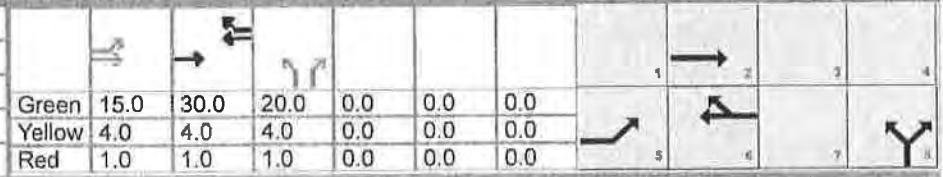
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks NB Ramp	File Name	NB35aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	200	967			458	300	204		100			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	15.0	30.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

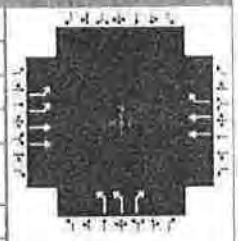
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	20.0	55.0		35.0		25.0		
Change Period, (*Y+R c*), s	5.0	5.0		5.0		5.0		
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.2		
Queue Clearance Time (*g s*), s	6.2					6.3		
Green Extension Time (*g e*), s	0.3	0.0		0.0		0.6		
Phase Call Probability	1.00					1.00		
Max Out Probability	0.00					0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3		18			
Adjusted Flow Rate (*v*), veh/h	211	1018			482	316	215		105			
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1730	1781			1781	1585	1730		1585			
Queue Service Time (*g s*), s	4.2	12.0			7.8	12.4	4.0		4.3			
Cycle Queue Clearance Time (*g c*), s	4.2	12.0			7.8	12.4	4.0		4.3			
Green Ratio (*g/C*)	0.19	0.62			0.38	0.38	0.25		0.25			
Capacity (*c*), veh/h	649	2226			1335	594	865		396			
Volume-to-Capacity Ratio (*X*)	0.325	0.457			0.361	0.531	0.248		0.266			
Back of Queue (*Q*), ft/ln (95 th percentile)	76.9	179.6			143.6	213.3	71.2		70.4			
Back of Queue (*Q*), veh/ln (95 th percentile)	3.0	7.1			5.7	8.4	2.8		2.8			
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00	0.00		0.00			
Uniform Delay (*d 1*), s/veh	28.1	7.9			18.1	19.5	24.0		24.1			
Incremental Delay (*d 2*), s/veh	0.1	0.7			0.8	3.4	0.1		0.1			
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0	0.0		0.0			
Control Delay (*d*), s/veh	28.2	8.6			18.8	22.9	24.0		24.2			
Level of Service (LOS)	C	A			B	C	C		C			
Approach Delay, s/veh / LOS	11.9	B		20.4	C		24.1	C		0.0		
Intersection Delay, s/veh / LOS	16.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.9	B	2.4	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.5	B	1.1	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks NB Ramp	File Name	NB35pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	259	748			663	600	444		200			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4	
Green	15.0	30.0	20.0	0.0	0.0	0.0	5	6	7	8	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0					
Red	1.0	1.0	1.0	0.0	0.0	0.0					

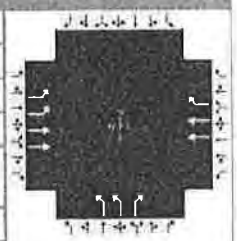
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	20.0	55.0		35.0		25.0		
Change Period, (Y+R c), s	5.0	5.0		5.0		5.0		
Max Allow Headway (MAH), s	3.1	0.0		0.0		3.2		
Queue Clearance Time (g s), s	7.6					11.4		
Green Extension Time (g e), s	0.4	0.0		0.0		1.2		
Phase Call Probability	1.00					1.00		
Max Out Probability	0.01					0.06		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3		18			
Adjusted Flow Rate (v), veh/h	273	787			698	500	467		211			
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1781			1781	1585	1730		1585			
Queue Service Time (g s), s	5.6	8.5			12.2	23.0	9.4		9.2			
Cycle Queue Clearance Time (g c), s	5.6	8.5			12.2	23.0	9.4		9.2			
Green Ratio (g/C)	0.19	0.62			0.38	0.38	0.25		0.25			
Capacity (c), veh/h	649	2226			1335	594	865		396			
Volume-to-Capacity Ratio (X)	0.420	0.354			0.523	0.841	0.540		0.531			
Back of Queue (Q), ft/ln (95 th percentile)	101.8	126.7			218.2	388.6	169.5		153.8			
Back of Queue (Q), veh/ln (95 th percentile)	4.0	5.0			8.6	15.3	6.7		6.1			
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00	0.00	0.00		0.00			
Uniform Delay (d 1), s/veh	28.7	7.2			19.4	22.8	26.0		25.9			
Incremental Delay (d 2), s/veh	0.2	0.4			1.5	13.5	0.4		0.7			
Initial Queue Delay (d 3), s/veh	0.0	0.0			0.0	0.0	0.0		0.0			
Control Delay (d), s/veh	28.8	7.7			20.9	36.3	26.4		26.7			
Level of Service (LOS)	C	A			C	D	C		C			
Approach Delay, s/veh / LOS	13.1	B		27.3	C		26.5	C		0.0		
Intersection Delay, s/veh / LOS	22.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.9	B	2.4	B	3.0	C	3.0	C
Bicycle LOS Score / LOS	1.4	A	1.5	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project + Kiley	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks NB Ramp	File Name	NB35aww.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	276	1007			487	315	281		100			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4	
Green	15.0	30.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8		
Red	1.0	1.0	1.0	0.0	0.0	0.0						

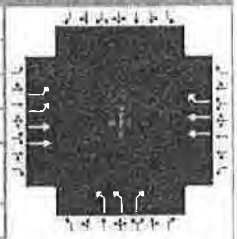
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	20.0	55.0		35.0		25.0		
Change Period, ($Y+R_c$), s	5.0	5.0		5.0		5.0		
Max Allow Headway (MAH), s	3.1	0.0		0.0		3.2		
Queue Clearance Time (g_s), s	8.0					7.6		
Green Extension Time (g_e), s	0.4	0.0		0.0		0.8		
Phase Call Probability	1.00					1.00		
Max Out Probability	0.02					0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3		18			
Adjusted Flow Rate (v), veh/h	291	1060			513	332	296		105			
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1781			1781	1585	1730		1585			
Queue Service Time (g_s), s	6.0	12.7			8.4	13.2	5.6		4.3			
Cycle Queue Clearance Time (g_c), s	6.0	12.7			8.4	13.2	5.6		4.3			
Green Ratio (g/C)	0.19	0.62			0.38	0.38	0.25		0.25			
Capacity (c), veh/h	649	2226			1335	594	865		396			
Volume-to-Capacity Ratio (X)	0.448	0.476			0.384	0.558	0.342		0.266			
Back of Queue (Q), ft/ln (95 th percentile)	109	190.1			154.6	224.7	100.6		70.4			
Back of Queue (Q), veh/ln (95 th percentile)	4.3	7.5			6.1	8.8	4.0		2.8			
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00	0.00	0.00		0.00			
Uniform Delay (d_1), s/veh	28.8	8.0			18.3	19.8	24.6		24.1			
Incremental Delay (d_2), s/veh	0.2	0.7			0.8	3.7	0.1		0.1			
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0	0.0		0.0			
Control Delay (d), s/veh	29.0	8.7			19.1	23.5	24.7		24.2			
Level of Service (LOS)	C	A			B	C	C		C			
Approach Delay, s/veh / LOS	13.1	B		20.8	C		24.6	C		0.0		
Intersection Delay, s/veh / LOS	17.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.9	B	2.4	B	2.9	C	3.0	C
Bicycle LOS Score / LOS	1.6	B	1.2	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project + Kiley	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks NB Ramp	File Name	NB35pww.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	383	789			693	615	568		200			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	30.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

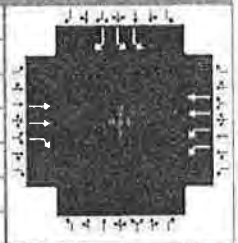
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	20.0	55.0		35.0		25.0		
Change Period, (*Y+R c*), s	5.0	5.0		5.0		5.0		
Max Allow Headway (*MAH*), s	3.1	0.0		0.0		3.2		
Queue Clearance Time (*g s*), s	10.6					14.5		
Green Extension Time (*g e*), s	0.5	0.0		0.0		1.2		
Phase Call Probability	1.00					1.00		
Max Out Probability	0.36					0.37		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3		18			
Adjusted Flow Rate (*v*), veh/h	403	831			729	516	598		211			
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1730	1781			1781	1585	1730		1585			
Queue Service Time (*g s*), s	8.6	9.1			12.9	24.1	12.5		9.2			
Cycle Queue Clearance Time (*g c*), s	8.6	9.1			12.9	24.1	12.5		9.2			
Green Ratio (*g/C*)	0.19	0.62			0.38	0.38	0.25		0.25			
Capacity (*c*), veh/h	649	2226			1335	594	865		396			
Volume-to-Capacity Ratio (*X*)	0.622	0.373			0.546	0.868	0.691		0.531			
Back of Queue (*Q*), ft/ln (95 th percentile)	161.3	136			228.2	412.3	224.6		153.8			
Back of Queue (*Q*), veh/ln (95 th percentile)	6.4	5.4			9.0	16.2	8.8		6.1			
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00	0.00		0.00			
Uniform Delay (*d 1*), s/veh	29.9	7.3			19.7	23.2	27.2		25.9			
Incremental Delay (*d 2*), s/veh	1.4	0.5			1.6	15.7	2.0		0.7			
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0	0.0		0.0			
Control Delay (*d*), s/veh	31.3	7.8			21.3	38.9	29.2		26.7			
Level of Service (LOS)	C	A			C	D	C		C			
Approach Delay, s/veh / LOS	15.5	B		28.6	C		28.5	C		0.0		
Intersection Delay, s/veh / LOS	23.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.9	B	2.4	B	3.0	C	3.0	C
Bicycle LOS Score / LOS	1.5	B	1.5	B		F		

HCS7 Signalized Intersection Results Summary

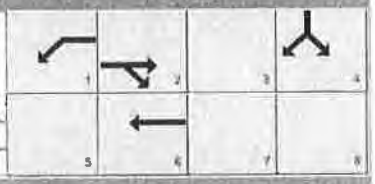
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks SB Ramp	File Name	SB35ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		300	100	250	250					600		100

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	30.0	20.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	



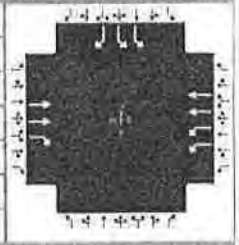
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		35.0	20.0	55.0				25.0
Change Period, ($Y+R_c$), s		5.0	5.0	5.0				5.0
Max Allow Headway (MAH), s		0.0	3.1	0.0				3.2
Queue Clearance Time (g_s), s			7.4					15.4
Green Extension Time (g_e), s		0.0	0.4	0.0				1.0
Phase Call Probability			1.00					1.00
Max Out Probability			0.01					0.50

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7		14
Adjusted Flow Rate (v), veh/h		316	105	263	263					632		105
Adjusted Saturation Flow Rate (s), veh/h/ln		1781	1585	1730	1781					1730		1585
Queue Service Time (g_s), s		4.9	3.6	5.4	2.4					13.4		4.3
Cycle Queue Clearance Time (g_c), s		4.9	3.6	5.4	2.4					13.4		4.3
Green Ratio (g/C)		0.38	0.38	0.19	0.62					0.25		0.25
Capacity (c), veh/h		1335	594	649	2226					865		396
Volume-to-Capacity Ratio (X)		0.236	0.177	0.406	0.118					0.730		0.266
Back of Queue (Q), ft/ln (95 th percentile)		88.8	60.4	97.9	35.5					239.5		70.4
Back of Queue (Q), veh/ln (95 th percentile)		3.5	2.4	3.9	1.4					9.4		2.8
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.00	0.00					0.00		0.00
Uniform Delay (d_1), s/veh		17.1	16.7	28.6	6.1					27.5		24.1
Incremental Delay (d_2), s/veh		0.4	0.7	0.2	0.1					2.8		0.1
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0					0.0		0.0
Control Delay (d), s/veh		17.6	17.4	28.7	6.2					30.3		24.2
Level of Service (LOS)		B	B	C	A					C		C
Approach Delay, s/veh / LOS	17.5	B		17.5	B		0.0			29.4	C	
Intersection Delay, s/veh / LOS	22.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	3.0	C	2.9	C
Bicycle LOS Score / LOS	0.8	A	0.9	A				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks SB Ramp	File Name	SB35px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		350	100	300	350					500		110

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	20.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

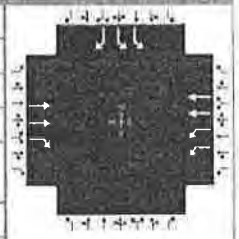
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		25.0	20.0	45.0				25.0
Change Period, (*Y+R c*), s		5.0	5.0	5.0				5.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0				3.2
Queue Clearance Time (*g s*), s			7.5					11.0
Green Extension Time (*g e*), s		0.0	0.5	0.0				1.2
Phase Call Probability			1.00					1.00
Max Out Probability			0.02					0.04

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7		14
Adjusted Flow Rate (*v*), veh/h		368	105	316	368					526		116
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1781	1585	1730	1781					1730		1585
Queue Service Time (*g s*), s		5.8	3.6	5.5	3.5					9.0		3.9
Cycle Queue Clearance Time (*g c*), s		5.8	3.6	5.5	3.5					9.0		3.9
Green Ratio (*g/C*)		0.29	0.29	0.21	0.57					0.29		0.29
Capacity (*c*), veh/h		1017	453	741	2035					988		453
Volume-to-Capacity Ratio (*X*)		0.362	0.232	0.426	0.181					0.533		0.256
Back of Queue (Q), ft/ln (95 th percentile)		107.5	62.4	97.3	51.4					154.6		62.1
Back of Queue (Q), veh/ln (95 th percentile)		4.2	2.5	3.8	2.0					6.1		2.4
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00					0.00		0.00
Uniform Delay (*d 1*), s/veh		19.9	19.1	23.8	7.2					21.1		19.3
Incremental Delay (*d 2*), s/veh		1.0	1.2	0.1	0.2					0.3		0.1
Initial Queue Delay (*d 3*), s/veh		0.0	0.0	0.0	0.0					0.0		0.0
Control Delay (*d*), s/veh		20.9	20.3	23.9	7.4					21.4		19.4
Level of Service (LOS)		C	C	C	A					C		B
Approach Delay, s/veh / LOS	20.8	C		15.0	B		0.0			21.0	C	
Intersection Delay, s/veh / LOS	18.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	3.0	C	2.9	C
Bicycle LOS Score / LOS	0.9	A	1.1	A				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks SB Ramp	File Name	SB35aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		567	401	250	412					600		135

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4
Green	15.0	30.0	20.0	0.0	0.0	0.0					
Yellow	4.0	4.0	4.0	0.0	0.0	0.0					
Red	1.0	1.0	1.0	0.0	0.0	0.0	5	6	7	8	

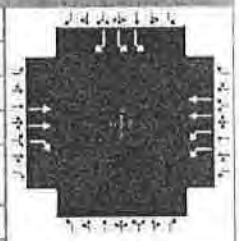
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		35.0	20.0	55.0				25.0
Change Period, (Y+R c), s		5.0	5.0	5.0				5.0
Max Allow Headway (MAH), s		0.0	3.1	0.0				3.2
Queue Clearance Time (g s), s			7.4					15.4
Green Extension Time (g e), s		0.0	0.4	0.0				1.0
Phase Call Probability			1.00					1.00
Max Out Probability			0.01					0.52

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7		14
Adjusted Flow Rate (v), veh/h		597	422	263	434					632		142
Adjusted Saturation Flow Rate (s), veh/h/ln		1781	1585	1730	1781					1730		1585
Queue Service Time (g s), s		10.1	18.1	5.4	4.2					13.4		5.9
Cycle Queue Clearance Time (g c), s		10.1	18.1	5.4	4.2					13.4		5.9
Green Ratio (g/C)		0.38	0.38	0.19	0.62					0.25		0.25
Capacity (c), veh/h		1335	594	649	2226					865		396
Volume-to-Capacity Ratio (X)		0.447	0.710	0.406	0.195					0.730		0.359
Back of Queue (Q), ft/ln (95 th percentile)		185.8	299.7	97.9	61.7					239.5		97.8
Back of Queue (Q), veh/ln (95 th percentile)		7.3	11.8	3.9	2.4					9.4		3.8
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.00	0.00					0.00		0.00
Uniform Delay (d 1), s/veh		18.8	21.3	28.6	6.4					27.5		24.7
Incremental Delay (d 2), s/veh		1.1	7.0	0.2	0.2					2.8		0.2
Initial Queue Delay (d 3), s/veh		0.0	0.0	0.0	0.0					0.0		0.0
Control Delay (d), s/veh		19.9	28.3	28.7	6.6					30.3		24.9
Level of Service (LOS)		B	C	C	A					C		C
Approach Delay, s/veh / LOS	23.4	C		15.0	B		0.0			29.3	C	
Intersection Delay, s/veh / LOS	22.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	3.0	C	2.9	C
Bicycle LOS Score / LOS	1.3	A	1.1	A				F

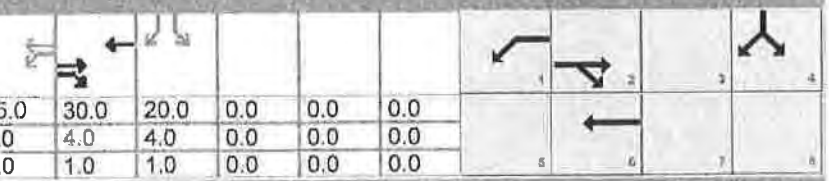
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks SB Ramp	File Name	SB35pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		507	277	300	807					500		208

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	15.0	30.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

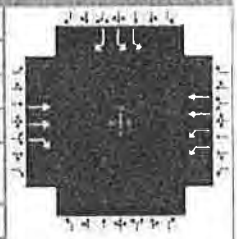
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		35.0	20.0	55.0				25.0
Change Period, ($Y+R_c$), s		5.0	5.0	5.0				5.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0				3.2
Queue Clearance Time (g_s), s			8.5					12.8
Green Extension Time (g_e), s		0.0	0.4	0.0				1.3
Phase Call Probability			1.00					1.00
Max Out Probability			0.05					0.15

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7		14
Adjusted Flow Rate (*v*), veh/h		534	292	316	849					526		219
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1781	1585	1730	1781					1730		1585
Queue Service Time (g_s), s		8.8	11.3	6.5	9.4					10.8		9.6
Cycle Queue Clearance Time (g_c), s		8.8	11.3	6.5	9.4					10.8		9.6
Green Ratio (*g/C*)		0.38	0.38	0.19	0.62					0.25		0.25
Capacity (*c*), veh/h		1335	594	649	2226					865		396
Volume-to-Capacity Ratio (*X*)		0.400	0.491	0.487	0.382					0.609		0.553
Back of Queue (*Q*), ft/ln (95 th percentile)		162.1	196.4	119.6	139.7					196		162.4
Back of Queue (Q), veh/ln (95 th percentile)		6.4	7.7	4.7	5.5					7.7		6.4
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00					0.00		0.00
Uniform Delay (d_1), s/veh		18.4	19.1	29.1	7.4					26.5		26.1
Incremental Delay (d_2), s/veh		0.9	2.9	0.2	0.5					0.9		1.0
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0					0.0		0.0
Control Delay (*d*), s/veh		19.3	22.0	29.3	7.9					27.4		27.1
Level of Service (LOS)		B	C	C	A					C		C
Approach Delay, s/veh / LOS	20.2	C		13.7	B		0.0			27.3	C	
Intersection Delay, s/veh / LOS	19.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	3.0	C	2.9	C
Bicycle LOS Score / LOS	1.2	A	1.4	A				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	AM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project + Kiley	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks SB Ramp	File Name	SB35aww.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		653	418	250	518					630		135

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

	EB			WB			NB			SB		
Green	15.0	30.0		20.0	0.0		0.0	0.0		0.0	0.0	
Yellow	4.0	4.0		4.0	0.0		0.0	0.0		0.0	0.0	
Red	1.0	1.0		1.0	0.0		0.0	0.0		0.0	0.0	

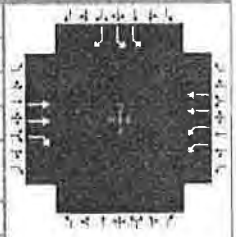
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		35.0	20.0	55.0				25.0
Change Period, (*Y+R c*), s		5.0	5.0	5.0				5.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0				3.2
Queue Clearance Time (*g s*), s			7.4					16.2
Green Extension Time (*g e*), s		0.0	0.4	0.0				0.9
Phase Call Probability			1.00					1.00
Max Out Probability			0.01					0.76

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7		14
Adjusted Flow Rate (*v*), veh/h		687	440	263	545					663		142
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1781	1585	1730	1781					1730		1585
Queue Service Time (*g s*), s		12.0	19.2	5.4	5.4					14.2		5.9
Cycle Queue Clearance Time (*g c*), s		12.0	19.2	5.4	5.4					14.2		5.9
Green Ratio (*g/C*)		0.38	0.38	0.19	0.62					0.25		0.25
Capacity (*c*), veh/h		1335	594	649	2226					865		396
Volume-to-Capacity Ratio (*X*)		0.515	0.740	0.406	0.245					0.767		0.359
Back of Queue (*Q*), ft/ln (95 th percentile)		214.8	317.6	97.9	80.2					254.7		97.8
Back of Queue (*Q*), veh/ln (95 th percentile)		8.5	12.5	3.9	3.2					10.0		3.8
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00					0.00		0.00
Uniform Delay (*d 1*), s/veh		19.4	21.6	28.6	6.6					27.8		24.7
Incremental Delay (*d 2*), s/veh		1.4	8.1	0.2	0.3					3.8		0.2
Initial Queue Delay (*d 3*), s/veh		0.0	0.0	0.0	0.0					0.0		0.0
Control Delay (*d*), s/veh		20.8	29.7	28.7	6.9					31.6		24.9
Level of Service (LOS)		C	C	C	A					C		C
Approach Delay, s/veh / LOS	24.3	C		14.0	B		0.0			30.4	C	
Intersection Delay, s/veh / LOS	23.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	3.0	C	2.9	C
Bicycle LOS Score / LOS	1.4	A	1.2	A				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 18, 2017	Area Type	Other
Jurisdiction	City of Sparks	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2035 Base + Project + Kiley	Analysis Period	1> 7:00
Intersection	Pyramid/Sparks SB Ramp	File Name	SB35pww.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		641	294	300	961					531		208

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	30.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

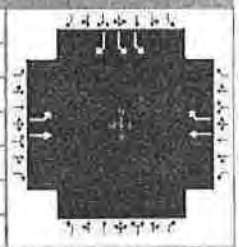
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		35.0	20.0	55.0				25.0
Change Period, ($Y+R_c$), s		5.0	5.0	5.0				5.0
Max Allow Headway (MAH), s		0.0	3.1	0.0				3.2
Queue Clearance Time (g_s), s			8.5					13.6
Green Extension Time (g_e), s		0.0	0.4	0.0				1.3
Phase Call Probability			1.00					1.00
Max Out Probability			0.05					0.23

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7		14
Adjusted Flow Rate (v), veh/h		675	309	316	1012					559		219
Adjusted Saturation Flow Rate (s), veh/h/ln		1781	1585	1730	1781					1730		1585
Queue Service Time (g_s), s		11.7	12.1	6.5	11.9					11.6		9.6
Cycle Queue Clearance Time (g_c), s		11.7	12.1	6.5	11.9					11.6		9.6
Green Ratio (g/C)		0.38	0.38	0.19	0.62					0.25		0.25
Capacity (c), veh/h		1335	594	649	2226					865		396
Volume-to-Capacity Ratio (X)		0.505	0.521	0.487	0.454					0.646		0.553
Back of Queue (Q), ft/ln (95 th percentile)		210.9	208.9	119.6	177.8					208.9		162.4
Back of Queue (Q), veh/ln (95 th percentile)		8.3	8.2	4.7	7.0					8.2		6.4
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.00	0.00					0.00		0.00
Uniform Delay (d_1), s/veh		19.3	19.4	29.1	7.9					26.8		26.1
Incremental Delay (d_2), s/veh		1.4	3.2	0.2	0.7					1.3		1.0
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0					0.0		0.0
Control Delay (d), s/veh		20.6	22.7	29.3	8.5					28.2		27.1
Level of Service (LOS)		C	C	C	A					C		C
Approach Delay, s/veh / LOS	21.3	C		13.5	B		0.0			27.9	C	
Intersection Delay, s/veh / LOS	19.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	3.0	C	2.9	C
Bicycle LOS Score / LOS	1.3	A	1.6	B				F

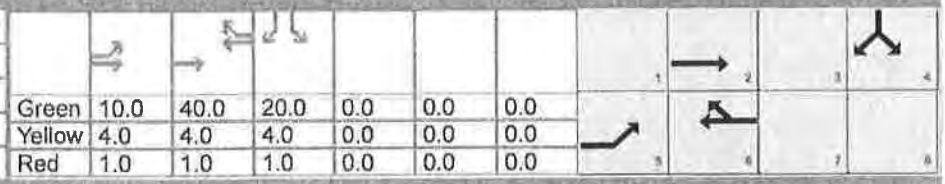
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Highland Ranch & Access	File Name	HrPa17aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	35	508			683	197				568		100

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	40.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

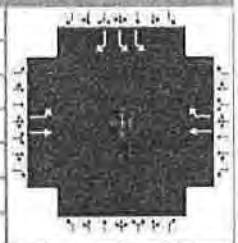
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	2.0	4.0		7.3				9.0
Phase Duration, s	15.0	60.0		45.0				25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1				3.2
Queue Clearance Time (g_s), s	3.6	14.6		31.6				16.1
Green Extension Time (g_e), s	0.0	3.2		2.5				0.8
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.00	0.01		0.32				0.70

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	38	552			742	171				617		109
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870			1870	1585				1730		1585
Queue Service Time (g_s), s	1.6	12.6			29.6	5.4				14.1		4.8
Cycle Queue Clearance Time (g_c), s	1.6	12.6			29.6	5.4				14.1		4.8
Green Ratio (*g/C*)	0.12	0.65			0.47	0.47				0.24		0.24
Capacity (*c*), veh/h	210	1210			880	746				814		373
Volume-to-Capacity Ratio (*X*)	0.182	0.456			0.843	0.229				0.759		0.291
Back of Queue (*Q*), ft/ln (95 th percentile)	31.9	189.5			489.4	82.5				255.4		80.4
Back of Queue (*Q*), veh/ln (95 th percentile)	1.3	7.6			19.3	3.2				10.1		3.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00				0.00		0.00
Uniform Delay (d_1), s/veh	33.8	7.5			19.8	13.3				30.3		26.7
Incremental Delay (d_2), s/veh	0.2	0.1			7.1	0.1				3.7		0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	34.0	7.6			26.9	13.4				34.0		26.8
Level of Service (LOS)	C	A			C	B				C		C
Approach Delay, s/veh / LOS	9.3	A		24.4	C		0.0			32.9	C	
Intersection Delay, s/veh / LOS	23.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.4	B	2.8	C	2.3	B
Bicycle LOS Score / LOS	1.5	A	2.0	B				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Highland Ranch & Access	File Name	HrPa17pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	98	688			629	555				334		59

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Green	10.0	40.0	20.0	0.0	0.0	0.0		
Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Red	1.0	1.0	1.0	0.0	0.0	0.0		

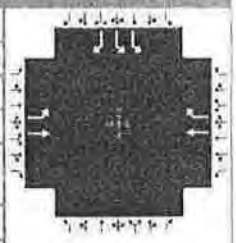
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	2.0	4.0		7.3				9.0
Phase Duration, s	15.0	60.0		45.0				25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1				3.2
Queue Clearance Time (g_s), s	6.8	22.0		27.9				9.6
Green Extension Time (g_e), s	0.0	4.6		4.0				0.8
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.87	0.13		0.29				0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	107	748			684	495				363		64
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870			1870	1585				1730		1585
Queue Service Time (g_s), s	4.8	20.0			25.9	20.4				7.6		2.7
Cycle Queue Clearance Time (g_c), s	4.8	20.0			25.9	20.4				7.6		2.7
Green Ratio (*g/C*)	0.12	0.65			0.47	0.47				0.24		0.24
Capacity (*c*), veh/h	210	1210			880	746				814		373
Volume-to-Capacity Ratio (*X*)	0.508	0.618			0.777	0.663				0.446		0.172
Back of Queue (*Q*), ft/ln (95 th percentile)	94	280.1			420.4	291.8				139.3		46
Back of Queue (*Q*), veh/ln (95 th percentile)	3.7	11.0			16.6	11.5				5.5		1.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00				0.00		0.00
Uniform Delay (d_1), s/veh	35.2	8.8			18.8	17.3				27.8		25.9
Incremental Delay (d_2), s/veh	0.8	0.7			4.0	1.8				0.1		0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	36.0	9.5			22.8	19.1				27.9		26.0
Level of Service (LOS)	D	A			C	B				C		C
Approach Delay, s/veh / LOS	12.8	B		21.3	C		0.0			27.6	C	
Intersection Delay, s/veh / LOS	19.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.4	B	2.9	C	2.3	B
Bicycle LOS Score / LOS	1.9	B	2.4	B				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project + Kiley	Analysis Period	1> 7:00
Intersection	Highland Ranch & Access	File Name	HrPa17awo.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	35	523			696	197				568		100

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	40.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

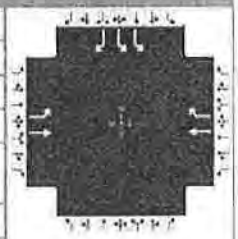
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	2.0	4.0		7.3				9.0
Phase Duration, s	15.0	60.0		45.0				25.0
Change Period, (*Y+R c*), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1				3.2
Queue Clearance Time (*g s*), s	3.6	15.1		32.6				16.1
Green Extension Time (*g e*), s	0.0	3.3		2.4				0.8
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.00	0.01		0.40				0.70

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	38	568			757	171				617		109
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870			1870	1585				1730		1585
Queue Service Time (*g s*), s	1.6	13.1			30.6	5.4				14.1		4.8
Cycle Queue Clearance Time (*g c*), s	1.6	13.1			30.6	5.4				14.1		4.8
Green Ratio (*g/C*)	0.12	0.65			0.47	0.47				0.24		0.24
Capacity (*c*), veh/h	210	1210			880	746				814		373
Volume-to-Capacity Ratio (*X*)	0.182	0.470			0.860	0.229				0.759		0.291
Back of Queue (*Q*), ft/ln (95 th percentile)	31.9	196.1			509.1	82.5				255.4		80.4
Back of Queue (*Q*), veh/ln (95 th percentile)	1.3	7.7			20.0	3.2				10.1		3.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00				0.00		0.00
Uniform Delay (*d 1*), s/veh	33.8	7.6			20.0	13.3				30.3		26.7
Incremental Delay (*d 2*), s/veh	0.2	0.1			8.2	0.1				3.7		0.2
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	34.0	7.7			28.2	13.4				34.0		26.8
Level of Service (LOS)	C	A			C	B				C		C
Approach Delay, s/veh / LOS	9.4	A		25.5	C		0.0			32.9	C	
Intersection Delay, s/veh / LOS	23.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.4	B	2.8	C	2.3	B
Bicycle LOS Score / LOS	1.5	A	2.0	B				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction	NDOT	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project + Kiley	Analysis Period	1> 7:00
Intersection	Highland Ranch & Access	File Name	HrPa17pwo.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	98	703			643	555				334		59

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4	
Green	10.0	40.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8		
Red	1.0	1.0	1.0	0.0	0.0	0.0						

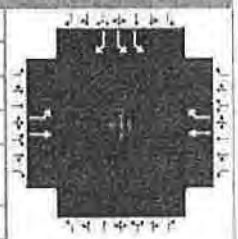
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	2.0	4.0		7.3				9.0
Phase Duration, s	15.0	60.0		45.0				25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1				3.2
Queue Clearance Time (g_s), s	6.8	22.7		28.8				9.6
Green Extension Time (g_e), s	0.0	4.6		4.0				0.8
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.87	0.15		0.34				0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	107	764			699	495				363		64
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870			1870	1585				1730		1585
Queue Service Time (g_s), s	4.8	20.7			26.8	20.4				7.6		2.7
Cycle Queue Clearance Time (g_c), s	4.8	20.7			26.8	20.4				7.6		2.7
Green Ratio (*g/C*)	0.12	0.65			0.47	0.47				0.24		0.24
Capacity (*c*), veh/h	210	1210			880	746				814		373
Volume-to-Capacity Ratio (*X*)	0.508	0.631			0.794	0.663				0.446		0.172
Back of Queue (*Q*), ft/ln (95 th percentile)	94	289.5			436.7	291.8				139.3		46
Back of Queue (*Q*), veh/ln (95 th percentile)	3.7	11.4			17.2	11.5				5.5		1.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00				0.00		0.00
Uniform Delay (d_1), s/veh	35.2	9.0			19.0	17.3				27.8		25.9
Incremental Delay (d_2), s/veh	0.8	0.8			4.7	1.8				0.1		0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	36.0	9.8			23.7	19.1				27.9		26.0
Level of Service (LOS)	D	A			C	B				C		C
Approach Delay, s/veh / LOS	13.0		B	21.8		C	0.0			27.6		C
Intersection Delay, s/veh / LOS	19.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.4	B	2.9	C	2.3	B
Bicycle LOS Score / LOS	1.9	B	2.5	B				F

HCS7 Signalized Intersection Results Summary

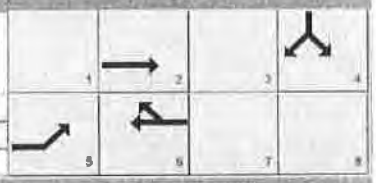
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2035 Base + Project	Analysis Period	1> 7:00
Intersection	Highland Ranch & Access	File Name	HrPa35aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	35	400			350	197				568		100

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	25.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						



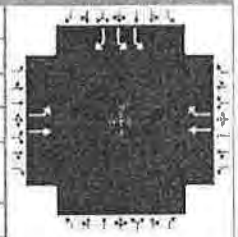
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	2.0	4.0		7.3				9.0
Phase Duration, s	15.0	45.0		30.0				25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1				3.2
Queue Clearance Time (g_s), s	3.3	11.1		13.5				12.9
Green Extension Time (g_e), s	0.0	1.8		1.7				1.2
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.00	0.02		0.05				0.14

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	38	435			380	171				617		109
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870			1870	1585				1730		1585
Queue Service Time (g_s), s	1.3	9.1			11.5	5.4				10.9		3.7
Cycle Queue Clearance Time (g_c), s	1.3	9.1			11.5	5.4				10.9		3.7
Green Ratio (*g/C*)	0.14	0.57			0.36	0.36				0.29		0.29
Capacity (*c*), veh/h	254	1069			668	566				988		453
Volume-to-Capacity Ratio (*X*)	0.150	0.407			0.570	0.301				0.625		0.240
Back of Queue (*Q*), ft/ln (95 th percentile)	24.4	137.1			206.8	82.7				190.9		58
Back of Queue (*Q*), veh/ln (95 th percentile)	1.0	5.4			8.1	3.3				7.5		2.3
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00				0.00		0.00
Uniform Delay (d_1), s/veh	26.3	8.4			18.2	16.2				21.7		19.2
Incremental Delay (d_2), s/veh	0.1	0.1			0.7	0.1				0.9		0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	26.4	8.5			18.9	16.3				22.7		19.3
Level of Service (LOS)	C	A			B	B				C		B
Approach Delay, s/veh / LOS	9.9	A		18.1	B		0.0			22.2	C	
Intersection Delay, s/veh / LOS	17.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.4	B	2.8	C	2.3	B
Bicycle LOS Score / LOS	1.3	A	1.4	A				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2035 Base + Project	Analysis Period	1> 7:00
Intersection	Highland Ranch & Access	File Name	HrPa35pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	98	450			460	555				334		59

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	25.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

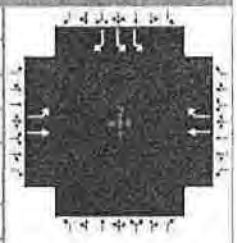
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	2.0	4.0		7.3				9.0
Phase Duration, s	15.0	45.0		30.0				25.0
Change Period, (*Y+R c*), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1				3.2
Queue Clearance Time (*g s*), s	5.8	12.6		18.4				7.9
Green Extension Time (*g e*), s	0.1	2.6		2.0				0.8
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.25	0.11		0.44				0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	107	489			500	386				363		64
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870			1870	1585				1730		1585
Queue Service Time (*g s*), s	3.8	10.6			16.4	14.5				5.9		2.1
Cycle Queue Clearance Time (*g c*), s	3.8	10.6			16.4	14.5				5.9		2.1
Green Ratio (*g/C*)	0.14	0.57			0.36	0.36				0.29		0.29
Capacity (*c*), veh/h	254	1069			668	566				988		453
Volume-to-Capacity Ratio (*X*)	0.419	0.458			0.749	0.682				0.367		0.142
Back of Queue (*Q*), ft/ln (95 th percentile)	71.5	160			293.8	227.6				100.4		33.2
Back of Queue (*Q*), veh/ln (95 th percentile)	2.8	6.3			11.6	9.0				4.0		1.3
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00				0.00		0.00
Uniform Delay (*d 1*), s/veh	27.3	8.7			19.7	19.1				20.0		18.6
Incremental Delay (*d 2*), s/veh	0.4	0.1			4.2	2.8				0.1		0.1
Initial Queue Delay (*d 3*), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	27.8	8.8			23.9	21.9				20.0		18.7
Level of Service (LOS)	C	A			C	C				C		B
Approach Delay, s/veh / LOS	12.2	B		23.0	C		0.0			19.8	B	
Intersection Delay, s/veh / LOS	18.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.4	B	3.0	C	2.3	B
Bicycle LOS Score / LOS	1.5	A	1.9	B				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2035 Base + Project + Kiley	Analysis Period	1> 7:00
Intersection	Highland Ranch & Access	File Name	HrPa35awo.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	35	415			363	197				568		100

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	25.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

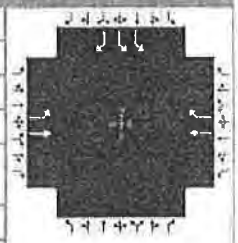
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	2.0	4.0		7.3				9.0
Phase Duration, s	15.0	45.0		30.0				25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	3.1		3.1				3.2
Queue Clearance Time (g_s), s	3.3	11.5		14.0				12.9
Green Extension Time (g_e), s	0.0	1.8		1.7				1.2
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.00	0.03		0.07				0.14

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	38	451			395	171				617		109
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870			1870	1585				1730		1585
Queue Service Time (g_s), s	1.3	9.5			12.0	5.4				10.9		3.7
Cycle Queue Clearance Time (g_c), s	1.3	9.5			12.0	5.4				10.9		3.7
Green Ratio (*g/C*)	0.14	0.57			0.36	0.36				0.29		0.29
Capacity (*c*), veh/h	254	1069			668	566				988		453
Volume-to-Capacity Ratio (*X*)	0.150	0.422			0.591	0.301				0.625		0.240
Back of Queue (*Q*), ft/ln (95 th percentile)	24.4	144			215.6	82.7				190.9		58
Back of Queue (*Q*), veh/ln (95 th percentile)	1.0	5.7			8.5	3.3				7.5		2.3
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00			0.00	0.00				0.00		0.00
Uniform Delay (d_1), s/veh	26.3	8.5			18.3	16.2				21.7		19.2
Incremental Delay (d_2), s/veh	0.1	0.1			1.0	0.1				0.9		0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	26.4	8.6			19.3	16.3				22.7		19.3
Level of Service (LOS)	C	A			B	B				C		B
Approach Delay, s/veh / LOS	10.0	A		18.4	B		0.0			22.2	C	
Intersection Delay, s/veh / LOS	17.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.4	B	2.8	C	2.3	B
Bicycle LOS Score / LOS	1.3	A	1.4	A				F

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.25
Analyst	MSH	Analysis Date	Sep 13, 2017	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2035 Base + Project + Other	Analysis Period	1> 7:00
Intersection	Highland Ranch & Access	File Name	HrPa35pwo.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	98	465			474	555				334		59

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	25.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	2.0	4.0		7.3				9.0
Phase Duration, s	15.0	45.0		30.0				25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0				5.0
Max Allow Headway (MAH), s	3.1	3.1		3.1				3.2
Queue Clearance Time (g_s), s	5.8	13.1		19.1				7.9
Green Extension Time (g_e), s	0.1	2.7		1.9				0.8
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.25	0.14		0.53				0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (v), veh/h	107	505			515	386				363		64
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1870			1870	1585				1730		1585
Queue Service Time (g_s), s	3.8	11.1			17.1	14.5				5.9		2.1
Cycle Queue Clearance Time (g_c), s	3.8	11.1			17.1	14.5				5.9		2.1
Green Ratio (g/C)	0.14	0.57			0.36	0.36				0.29		0.29
Capacity (c), veh/h	254	1069			668	566				988		453
Volume-to-Capacity Ratio (X)	0.419	0.473			0.771	0.682				0.367		0.142
Back of Queue (Q), ft/ln (95 th percentile)	71.5	167.3			307.9	227.6				100.4		33.2
Back of Queue (Q), veh/ln (95 th percentile)	2.8	6.6			12.1	9.0				4.0		1.3
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00	0.00				0.00		0.00
Uniform Delay (d_1), s/veh	27.3	8.8			20.0	19.1				20.0		18.6
Incremental Delay (d_2), s/veh	0.4	0.1			5.0	2.8				0.1		0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (d), s/veh	27.8	8.9			25.0	21.9				20.0		18.7
Level of Service (LOS)	C	A			C	C				C		B
Approach Delay, s/veh / LOS	12.2	B		23.7	C		0.0			19.8	B	
Intersection Delay, s/veh / LOS	19.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.4	B	3.0	C	2.3	B
Bicycle LOS Score / LOS	1.5	A	2.0	B				F

HCS7 Two-Way Stop-Control Report

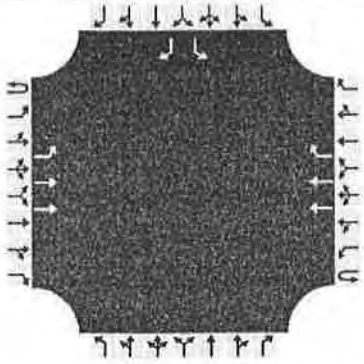
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	9/15/2017
Analysis Year	2017
Time Analyzed	AM Ex. + Project + Other
Intersection Orientation	East-West
Project Description	

Site Information

Intersection	Highland Ranch & Frontage
Jurisdiction	City of Sparks
East/West Street	Highland Ranch Parkway
North/South Street	Frontage Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume, V (veh/h)		37	1054				869	117						125		24
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		40												136		26
Capacity, c (veh/h)		646												91		538
v/c Ratio		0.06												1.49		0.05
95% Queue Length, Q_{95} (veh)		0.2												10.5		0.2
Control Delay (s/veh)		10.9												352.5		12.0
Level of Service, LOS		B												F		B
Approach Delay (s/veh)		0.4												297.8		
Approach LOS														F		

HCS7 Two-Way Stop-Control Report

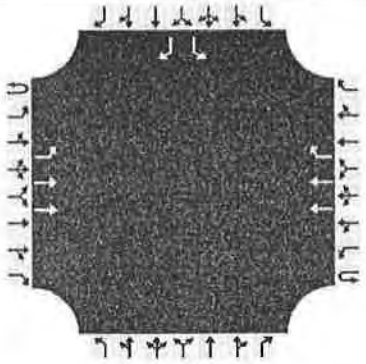
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	9/15/2017
Analysis Year	2017
Time Analyzed	PM Ex. + Project + Other
Intersection Orientation	East-West
Project Description	

Site Information

Intersection	Highland Ranch & Frontage
Jurisdiction	City of Sparks
East/West Street	Highland Ranch Parkway
North/South Street	Frontage Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume, V (veh/h)		28	1009				1158	180						164		40
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

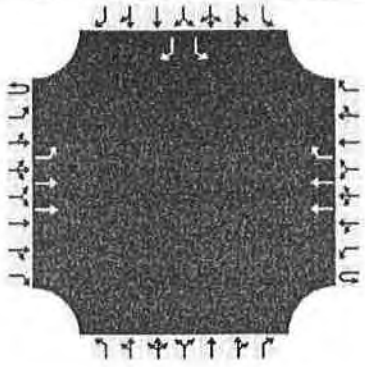
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		30												178		43
Capacity, c (veh/h)		461												60		424
v/c Ratio		0.07												2.97		0.10
95% Queue Length, Q_{95} (veh)		0.2												18.4		0.3
Control Delay (s/veh)		13.4												1036.1		14.4
Level of Service, LOS		B												F		B
Approach Delay (s/veh)		0.4												837.3		
Approach LOS														F		

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Highland Ranch & Frontage
Agency/Co.	Solaegui Engineers	Jurisdiction	City of Sparks
Date Performed	9/15/2017	East/West Street	Highland Ranch Parkway
Analysis Year	2035	North/South Street	Frontage Road
Time Analyzed	AM Base + Project + Other	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume, V (veh/h)		37	946				536	117						125		24
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

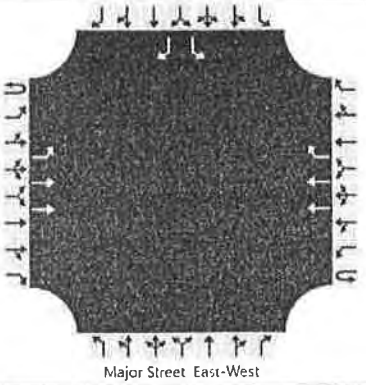
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		39												132		25
Capacity, c (veh/h)		903												186		715
v/c Ratio		0.04												0.71		0.03
95% Queue Length, Q_{95} (veh)		0.1												4.4		0.1
Control Delay (s/veh)		9.2												61.2		10.2
Level of Service, LOS		A												F		B
Approach Delay (s/veh)		0.3												53.0		
Approach LOS														F		

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Highland Ranch & Frontage
Agency/Co.	Solaegui Engineers	Jurisdiction	City of Sparks
Date Performed	9/15/2017	East/West Street	Highland Ranch Parkway
Analysis Year	2035	North/South Street	Frontage Road
Time Analyzed	PM Base + Project + Other	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume, V (veh/h)		28	771				989	180						164		40
Percent Heavy Vehicles (%)		2												2		2
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		29												173		42
Capacity, c (veh/h)		562												106		501
v/c Ratio		0.05												1.63		0.08
95% Queue Length, Q_{95} (veh)		0.2												13.2		0.3
Control Delay (s/veh)		11.7												392.3		12.8
Level of Service, LOS		B												F		B
Approach Delay (s/veh)		0.4												318.2		
Approach LOS														F		