

Interstate 10 (I-10) / Highland Springs Ave
Traffic Forecasting and Operational Analysis – Preliminary Scoping Materials
Urban Crossroads, Inc.
(June 10, 2020)

A preliminary Traffic Forecasting and Operational Analysis (TFOA) has been prepared by Urban Crossroads, Inc to support the design team review of alternatives for the I-10/Highland Springs Ave Improvement project. The TFOA utilizes available 2018 and 2019 peak period traffic counts to estimate 2020 baseline conditions.

The attached Exhibits 1 and 2 show the TFOA study area and 2020 peak hour volume estimates at intersection analysis locations for the Alternative 1 (existing/no build) scenario. The I-10/Highland Springs Ave interchange is affected by the configuration of at-grade intersections, peak hour intersections delays, queuing in the approach lanes, and off-ramp queuing during weekday peak hours.

Exhibits 3 and 4 illustrate the Alternative 2 (hook ramps) interchange configuration, with 2020 peak hour volumes redistributed to potential new interchange features.

Exhibits 5 and 6 depict the reconfiguration of interchange intersections with 2020 peak hour volumes reassigned to the potential Diverging Diamond Interchange (DDI) features incorporated into Alternatives 3 and 4. For Alternative 4, intersection #3 is approximately 200' north of Marketplace North Driveway.

The draft TFOA focuses on the following scenarios utilizing existing and future peak hour volumes:

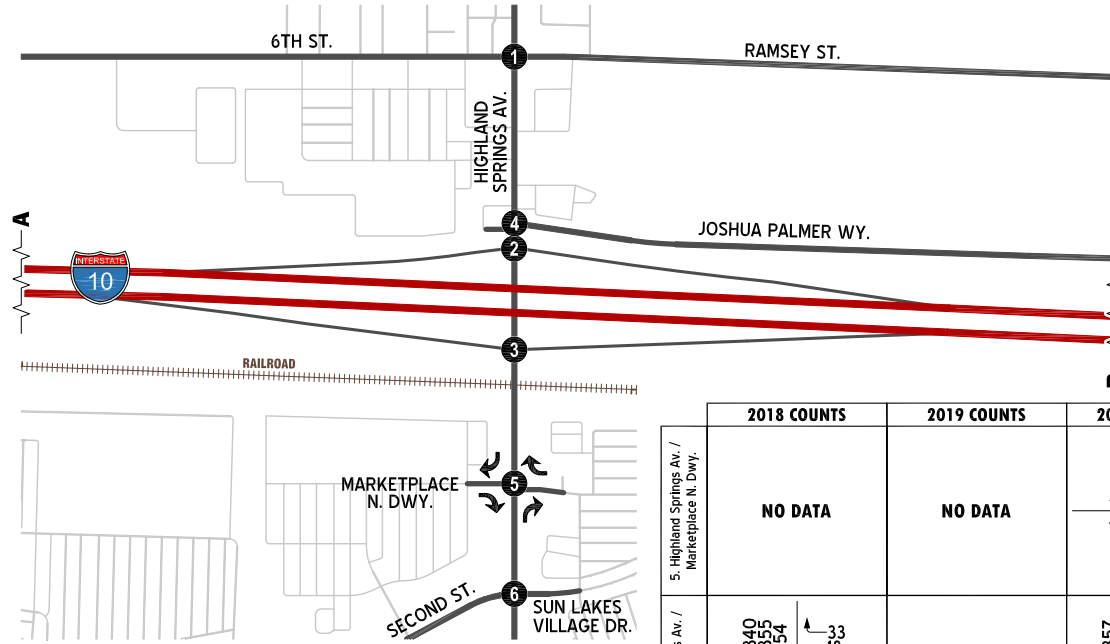
- *Alternative 1 (Existing Lane Geometry) and 2020 AM/PM Traffic Volumes*
- *Alternative 1 (Existing Lane Geometry) and 2040 AM/PM Traffic Volumes*
- *Alternative 1 (Existing Lane Geometry) and Post-2045 AM/PM Traffic Volumes*
- *Alternative 2 (Hook Ramps) Lane Geometry and 2020 AM/PM Traffic Volumes*
- *Alternative 2 (Hook Ramps) Lane Geometry and 2040 AM/PM Traffic Volumes*
- *Alternative 2 (Hook Ramps) Lane Geometry and Post-2045 AM/PM Traffic Volumes*
- *Alternatives 3 and 4 (DDI scenarios) Lane Geometry and 2020 AM/PM Traffic Volumes*
- *Alternatives 3 and 4 (DDI scenarios) Lane Geometry and 2040 AM/PM Traffic Volumes*
- *Alternatives 3 and 4 (DDI scenarios) Lane Geometry and Post-2045 AM/PM Traffic Volumes*

FORECASTING AND OPERATIONAL ANALYSIS METHODOLOGIES

Traffic projections for Horizon Year conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between 2020 conditions and Horizon Year 2040 conditions. Post-2045 traffic forecasts are also provided in order to account for further growth between Horizon Year 2040 and buildout of General and Specific Plans in the vicinity.

EXHIBIT 1: 2020 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 1 (EXISTING CONFIGURATION)

	2018 COUNTS	2019 COUNTS	2020 ESTIMATES																																				
1. Highland Springs Av. / 6th St. - Ramsey St.	<table border="1"> <tr><td>70</td><td>147</td></tr> <tr><td>520</td><td>121</td></tr> <tr><td>100</td><td>64</td></tr> <tr><td>178</td><td>102</td></tr> <tr><td>174</td><td>407</td></tr> <tr><td>138</td><td>138</td></tr> </table>	70	147	520	121	100	64	178	102	174	407	138	138	<table border="1"> <tr><td>82</td><td>47</td></tr> <tr><td>639</td><td>149</td></tr> <tr><td>97</td><td>197</td></tr> <tr><td>112</td><td>109</td></tr> <tr><td>215</td><td>435</td></tr> <tr><td>139</td><td>139</td></tr> </table>	82	47	639	149	97	197	112	109	215	435	139	139	<table border="1"> <tr><td>84</td><td>50</td></tr> <tr><td>941</td><td>151</td></tr> <tr><td>110</td><td>199</td></tr> <tr><td>114</td><td>111</td></tr> <tr><td>217</td><td>437</td></tr> <tr><td>159</td><td>159</td></tr> </table>	84	50	941	151	110	199	114	111	217	437	159	159
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217	437																																						
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4. Highland Springs Av. / Joshua Palmer Wy.	<table border="1"> <tr><td>805</td><td>50</td></tr> <tr><td>16</td><td>50</td></tr> <tr><td>724</td><td>28</td></tr> </table>	805	50	16	50	724	28	NO DATA	<table border="1"> <tr><td>1012</td><td>51</td></tr> <tr><td>16</td><td>51</td></tr> <tr><td>800</td><td>29</td></tr> </table>	1012	51	16	51	800	29																								
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2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr><td>270</td><td>55</td></tr> <tr><td>585</td><td>76</td></tr> <tr><td>261</td><td>617</td></tr> </table>	270	55	585	76	261	617	<table border="1"> <tr><td>326</td><td>143</td></tr> <tr><td>733</td><td>203</td></tr> <tr><td>274</td><td>653</td></tr> </table>	326	143	733	203	274	653	<table border="1"> <tr><td>338</td><td>145</td></tr> <tr><td>735</td><td>205</td></tr> <tr><td>276</td><td>684</td></tr> </table>	338	145	735	205	276	684																		
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LEGEND:
 ① = INTERSECTION ID
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	2018 COUNTS	2019 COUNTS	2020 ESTIMATES																								
5. Highland Springs Av. / Market Place N. Dwy.	NO DATA	NO DATA	<table border="1"> <tr><td>141</td><td>18</td></tr> <tr><td>1002</td><td>18</td></tr> <tr><td>10</td><td>10</td></tr> <tr><td>1008</td><td>10</td></tr> </table>	141	18	1002	18	10	10	1008	10																
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6. Highland Springs Av. / Second St.	<table border="1"> <tr><td>340</td><td>154</td></tr> <tr><td>355</td><td>154</td></tr> <tr><td>154</td><td>154</td></tr> <tr><td>306</td><td>40</td></tr> <tr><td>280</td><td>488</td></tr> <tr><td>14</td><td>14</td></tr> </table>	340	154	355	154	154	154	306	40	280	488	14	14	NO DATA	<table border="1"> <tr><td>357</td><td>46</td></tr> <tr><td>489</td><td>20</td></tr> <tr><td>167</td><td>16</td></tr> <tr><td>322</td><td>43</td></tr> <tr><td>31</td><td>650</td></tr> <tr><td>16</td><td>16</td></tr> </table>	357	46	489	20	167	16	322	43	31	650	16	16
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PENNSYLVANIA AV./I-10 INTERCHANGE AREA

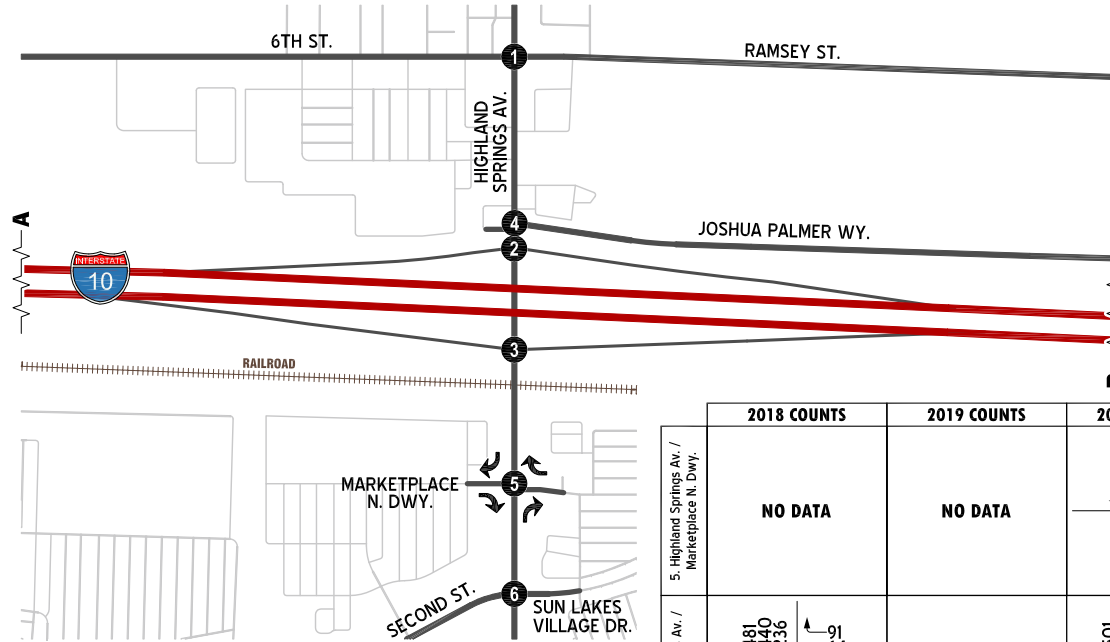
	2018 COUNTS	2019 COUNTS	2020 ESTIMATES												
7. Pennsylvania Av. / I-10 WB Off-Ramp	<table border="1"> <tr><td>293</td><td>333</td></tr> <tr><td>159</td><td>433</td></tr> </table>	293	333	159	433	NO DATA	<table border="1"> <tr><td>388</td><td>174</td></tr> <tr><td>231</td><td>125</td></tr> </table>	388	174	231	125				
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159	433														
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8. Pennsylvania Av. / I-10 EB On-Ramp	<table border="1"> <tr><td>180</td><td>231</td></tr> <tr><td>156</td><td>254</td></tr> <tr><td>159</td><td>231</td></tr> <tr><td>249</td><td>254</td></tr> </table>	180	231	156	254	159	231	249	254	NO DATA	<table border="1"> <tr><td>298</td><td>231</td></tr> <tr><td>215</td><td>254</td></tr> </table>	298	231	215	254
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SUNSET AV./I-10 INTERCHANGE AREA

	2010 COUNTS	2018 & 2019 COUNTS	2020 ESTIMATES														
9. Sunset Av. / I-10 WB Ramps	<table border="1"> <tr><td>168</td><td>197</td></tr> <tr><td>177</td><td>197</td></tr> <tr><td>40</td><td>184</td></tr> </table>	168	197	177	197	40	184	NO DATA	<table border="1"> <tr><td>199</td><td>16</td></tr> <tr><td>234</td><td>16</td></tr> <tr><td>66</td><td>214</td></tr> <tr><td>214</td><td>14</td></tr> </table>	199	16	234	16	66	214	214	14
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10. Sunset Av. / I-10 EB Ramps	<table border="1"> <tr><td>66</td><td>118</td></tr> <tr><td>144</td><td>80</td></tr> <tr><td>30</td><td>6</td></tr> </table>	66	118	144	80	30	6	NO DATA	<table border="1"> <tr><td>72</td><td>171</td></tr> <tr><td>173</td><td>107</td></tr> <tr><td>57</td><td>14</td></tr> </table>	72	171	173	107	57	14		
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EXHIBIT 2: 2020 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 1 (EXISTING CONFIGURATION)

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2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr><td>318</td><td>286</td></tr> <tr><td>681</td><td>552</td></tr> <tr><td>323</td><td>956</td></tr> </table>	318	286	681	552	323	956	<table border="1"> <tr><td>292</td><td>292</td></tr> <tr><td>796</td><td>323</td></tr> <tr><td>319</td><td>933</td></tr> </table>	292	292	796	323	319	933	<table border="1"> <tr><td>334</td><td>294</td></tr> <tr><td>798</td><td>359</td></tr> <tr><td>329</td><td>1003</td></tr> </table>	334	294	798	359	329	1003						
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PENNSYLVANIA AV./I-10 INTERCHANGE AREA

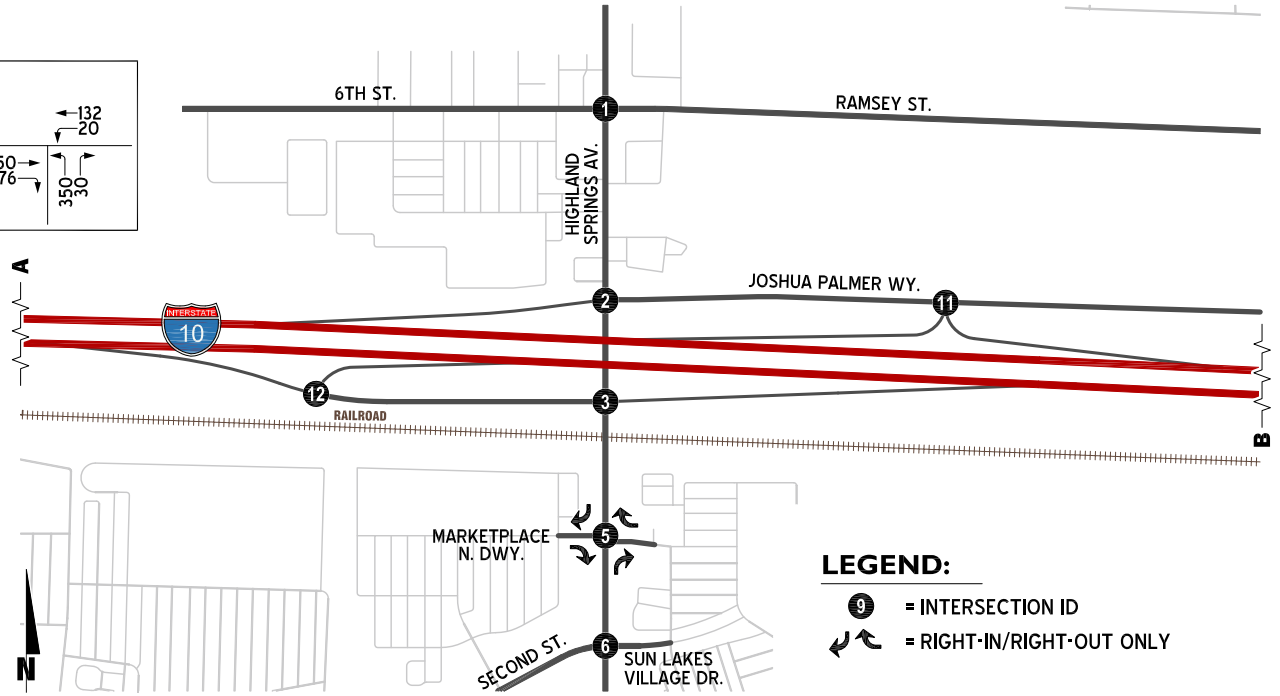
	2018 COUNTS	2019 COUNTS	2020 ESTIMATES										
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SUNSET AV./I-10 INTERCHANGE AREA

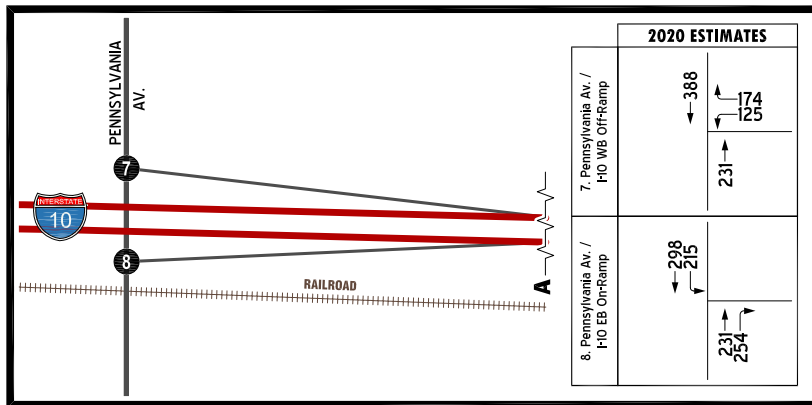
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102	113																
222	92																
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133	136																
271	5																
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25	25																

EXHIBIT 3: 2020 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 2 (HOOK RAMPS)

		2020 ESTIMATES	
12. I-10 EB Ramps / Frontage Rd.	700 →	← 198	
6. Highland Springs Av. / Second St.		322 51 43 650 16	357 489 167 4 606
5. Highland Springs Av. / Marketplace N. Dwy.		10 1008 10	141 1002 18
3. Highland Springs Av. / I-10 EB Ramps		299 40	198 742 661 365
2. Highland Springs Av. / I-10 WB Ramps		315 707 21 655 305	84 641 110 151 99
I. Highland Springs Av. / 6th St. - Ramsey St.		114 176 217 117 437 159	151 50 199
II. I-10 WB Ramps / Joshua Palmer Wy.		150 276 350 30	332 20



PENNSYLVANIA AV./I-10 INTERCHANGE AREA

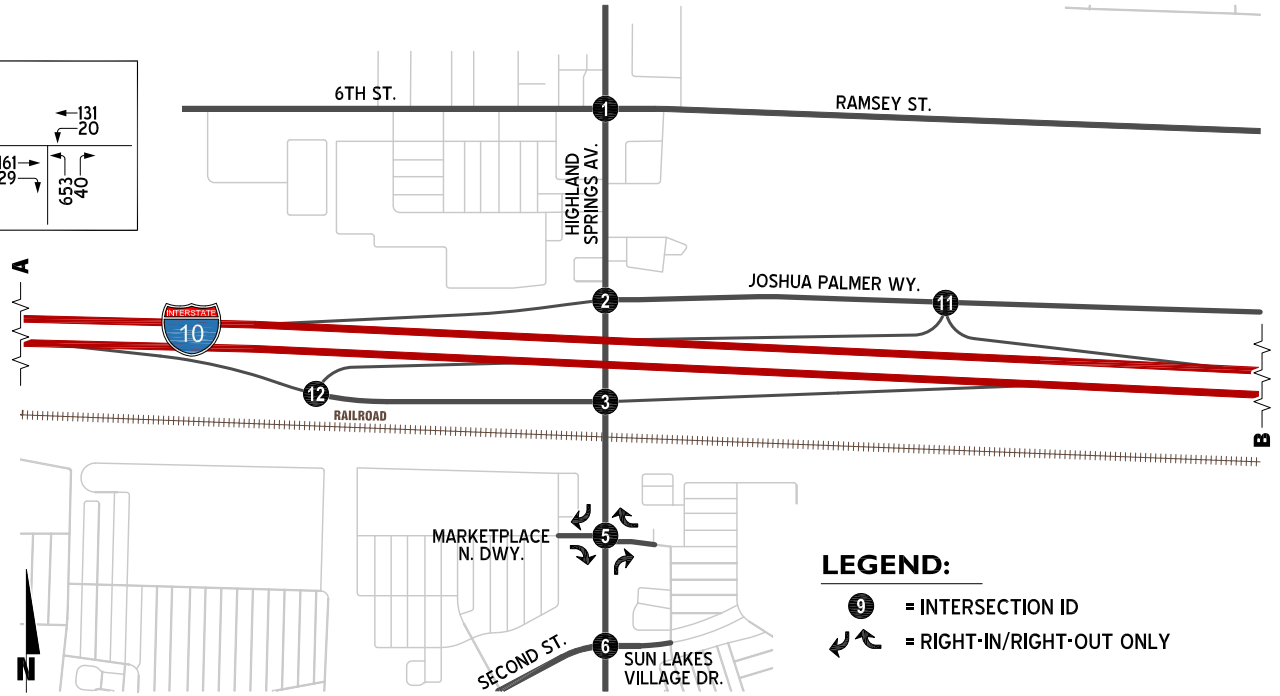


SUNSET AV./I-10 INTERCHANGE AREA

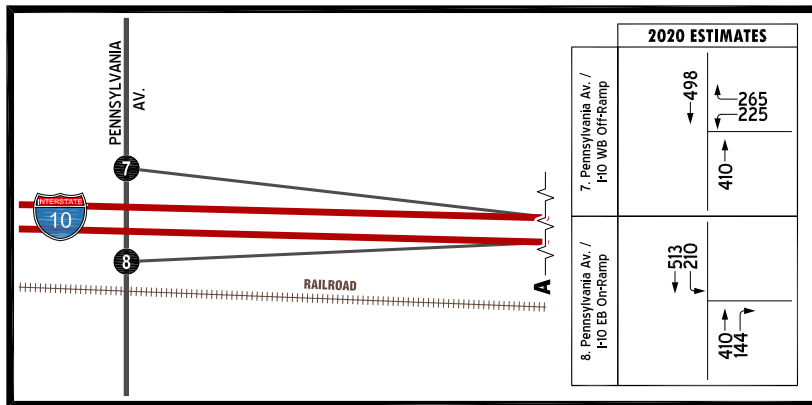


EXHIBIT 4: 2020 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 2 (HOOK RAMPS)

		2020 ESTIMATES																						
12. I-10 EB Ramps / Frontage Rd.	914 →	152 ←																						
6. Highland Springs Av. / Second St.	<table border="1"> <tr><td>501</td><td>579</td><td>251</td></tr> <tr><td>650</td><td>579</td><td>251</td></tr> <tr><td>101</td><td>630</td><td>228</td></tr> </table>	501	579	251	650	579	251	101	630	228	<table border="1"> <tr><td>47</td><td>67</td><td>103</td></tr> <tr><td>47</td><td>67</td><td>103</td></tr> <tr><td>47</td><td>67</td><td>103</td></tr> </table>	47	67	103	47	67	103	47	67	103				
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389	524																							
943	477																							
2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr><td>306</td><td>773</td><td>17</td></tr> <tr><td>320</td><td>209</td><td>647</td></tr> <tr><td>209</td><td>647</td><td>202</td></tr> </table>	306	773	17	320	209	647	209	647	202	<table border="1"> <tr><td>294</td><td>384</td></tr> <tr><td>294</td><td>384</td></tr> <tr><td>294</td><td>384</td></tr> </table>	294	384	294	384	294	384	<table border="1"> <tr><td>161</td><td>329</td></tr> <tr><td>653</td><td>40</td></tr> <tr><td>231</td><td>20</td></tr> </table>	161	329	653	40	231	20
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294	384																							
161	329																							
653	40																							
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1. Highland Springs Av. / 6th St. - Ramsey St.	<table border="1"> <tr><td>105</td><td>502</td><td>120</td></tr> <tr><td>320</td><td>209</td><td>647</td></tr> <tr><td>209</td><td>647</td><td>202</td></tr> </table>	105	502	120	320	209	647	209	647	202	<table border="1"> <tr><td>97</td><td>294</td><td>298</td></tr> <tr><td>97</td><td>294</td><td>298</td></tr> <tr><td>97</td><td>294</td><td>298</td></tr> </table>	97	294	298	97	294	298	97	294	298				
105	502	120																						
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PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

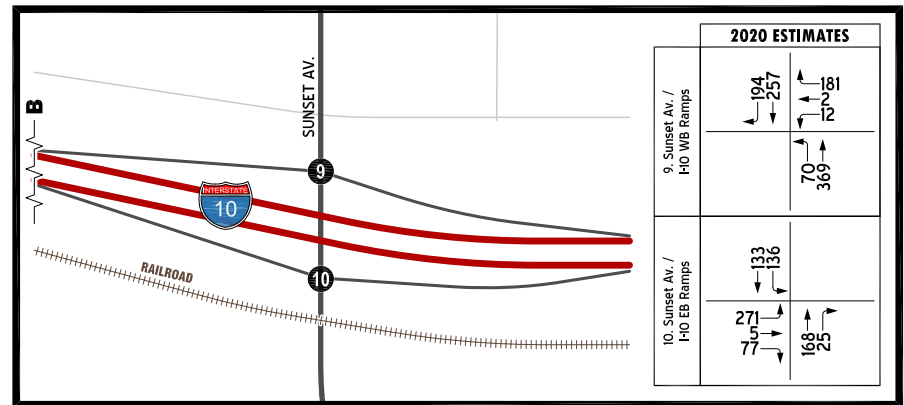
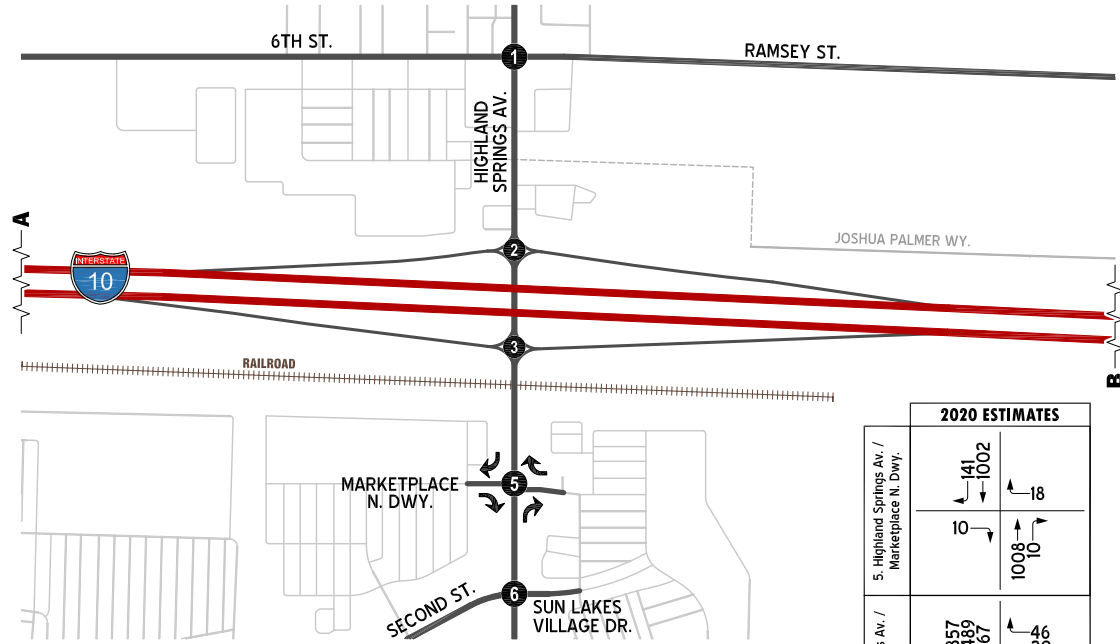


EXHIBIT 5: 2020 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVES 3 & 4 (DIVERGING DIAMOND INTERCHANGE)

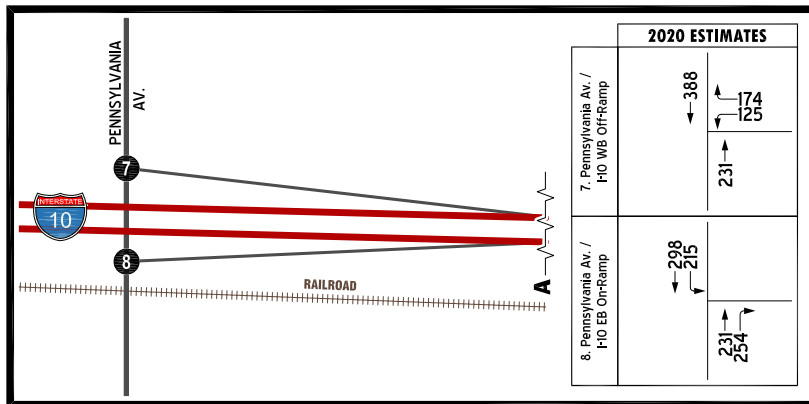
		2020 ESTIMATES	
1. Highland Springs Av. / 6th St. - Ramsey St.		84 641 110	95 150 9
2. Highland Springs Av. / I-10 WB Ramps		338 735	145 205
3. Highland Springs Av. / I-10 EB Ramps		276 684	276 684
ALTERNATIVE 3		742 198	742 198
ALTERNATIVE 4		742 198	742 198



LEGEND:
 ⑨ = INTERSECTION ID
 = RIGHT-IN/RIGHT-OUT ONLY

		2020 ESTIMATES	
5. Highland Springs Av. / Marketplace N. Dwy.		141 1002	18
6. Highland Springs Av. / Second St.		357 289 167	46 20 16

PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

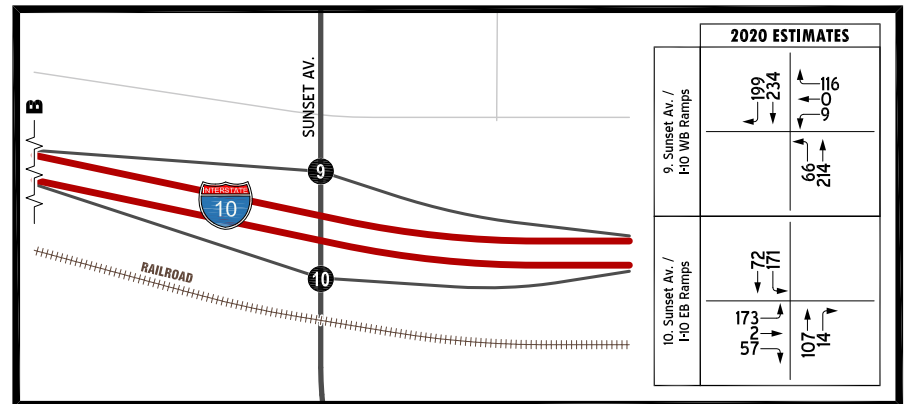
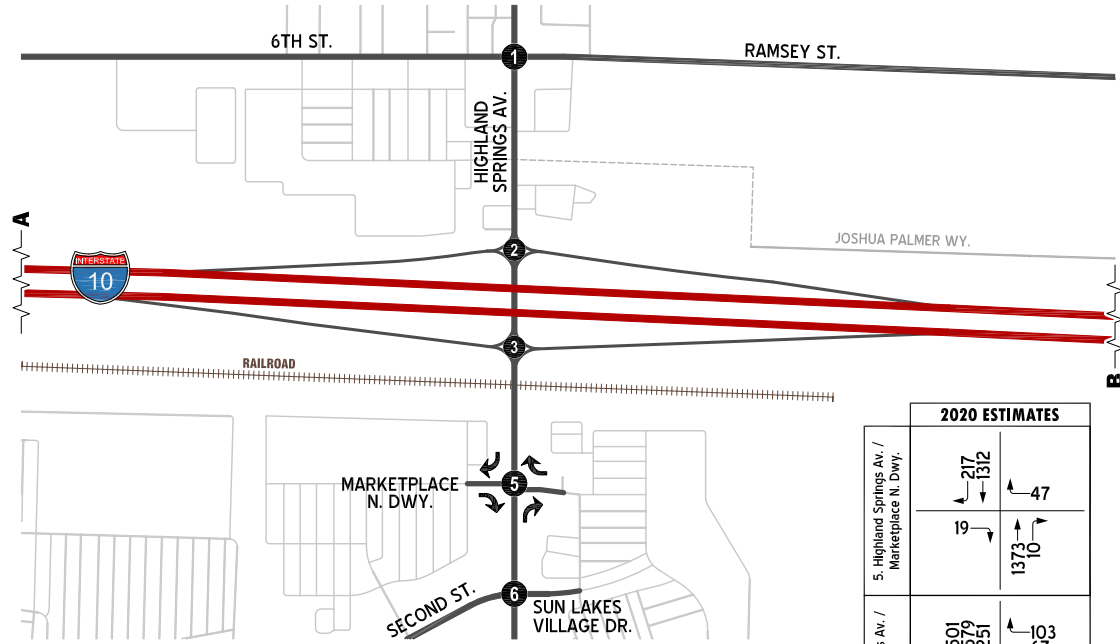


EXHIBIT 6: 2020 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVES 3 & 4 (DIVERGING DIAMOND INTERCHANGE)

		2020 ESTIMATES	
1. Highland Springs Av. / 6th St. - Ramsey St.		105 502 120	97 294 298
2. Highland Springs Av. / I-10 WB Ramps		334 798	294 359
3. Highland Springs Av. / I-10 EB Ramps		329 1003	329 1003
4. Highland Springs Av. / I-10 EB Ramps		389 524	389 524
5. Highland Springs Av. / I-10 EB Ramps		1005 152	1005 152
6. Highland Springs Av. / I-10 EB Ramps		943 477	943 477

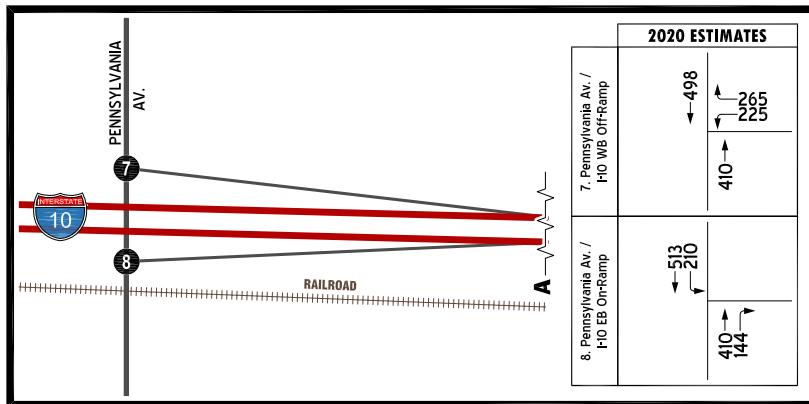


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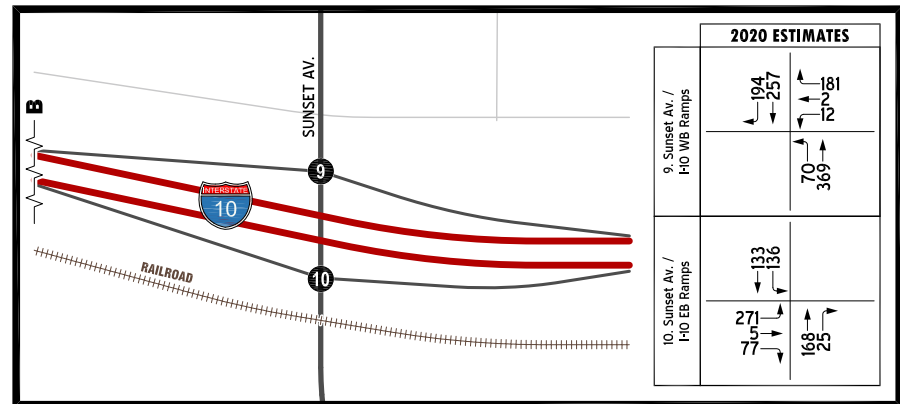
- ⑨ = INTERSECTION ID
- ↔ = RIGHT-IN/RIGHT-OUT ONLY

		2020 ESTIMATES	
5. Highland Springs Av. / Marketplace N. Dwy.		217 1312	47
6. Highland Springs Av. / Second St.		501 579 251	103 67 47
		65 62 35	101 630 28

PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA



In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year peak hour forecasts were refined using the model derived long-range forecasts along with existing peak hour traffic count data available at each analysis location.

A linear programming algorithm (from NCHRP Report 255) is used to calculate individual turning movements which match the known directional roadway segment forecast volumes derived from RivTAM. This program computes a likely set of intersection turning movements from intersection approach volumes and the initial turning proportions from each approach leg.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. However, review of the initial model growth indicated negative values for several study area intersections. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either the 2020 volume estimates or available interim year traffic conditions were not permitted as part of this analysis. Instead, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year and Post-2045 forecasts.

The future Horizon Year and Post-2045 peak hour turning movements were then reviewed by Urban Crossroads for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two freeway ramp locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

For Post-2045 conditions, the Horizon Year 2040 traffic volumes and the following sources have been utilized:

- Traffic Impact Analysis Butterfield Specific Plan (12/2010). Prepared by LSA.
- City of Banning Traffic Circulation (06/2011). General Plan Volumes prepared by LSA.
- Rancho San Geronimo Specific Plan Traffic Impact Analysis (4/2016).
Prepared by Kunzman Associates, Inc.
- City of Beaumont General Plan Traffic Study (12/2004). Prepared by Urban Crossroads, Inc.
- Final TIA Beaumont General Plan Update and Downtown Specific Plan (12/2019).
Prepared by Fehr & Peers.

Traffic operations of roadway facilities are described with the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS "A", representing completely free-flow conditions, to LOS "F", representing breakdown in flow resulting in stop-and-go conditions. LOS "E" represents operations at or near capacity, an unstable level, where vehicles are operating with the minimum spacing for maintaining uniform flow.

LOS delay ranges are summarized in Table A.1. Highway Capacity Manual 6th Edition (HCM 6) methodologies are applied to determine average delay values based upon existing, opening year, and design year peak hour traffic volumes.

TABLE A.1: HCM INTERSECTION DELAY LEVEL OF SERVICE RANGES

Level of Service (LOS)	Average Vehicle Delay Signalized	Average Vehicle Delay Unsignalized
A	0 - 10.00 seconds	0 - 10.00 seconds
B	10.01 - 20.00 seconds	10.01 - 15.00 seconds
C	20.01 - 35.00 seconds	15.01 - 25.00 seconds
D	35.01 - 55.00 seconds	25.01 - 35.00 seconds
E	55.01 - 80.00 seconds	35.01 - 50.00 seconds
F	Above 80.00 seconds	Above 50.00 seconds

Unsignalized intersections are evaluated using the methodology described in Chapter 20 of the HCM 6. The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table A.2). Note that for locations with volume in excess of capacity, overflow conditions lead to LOS “F” operations.

TABLE A.2: UNSIGNALIZED INTERSECTION DESCRIPTION OF LOS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane.

PEAK HOUR INTERSECTION OPERATIONS ANALYSIS

The traffic modeling and signal timing optimization software package Synchro plus SimTraffic (Version 10.1 Build 2 Revision 20 (10.1.2.20)) is utilized for analysis of vehicle delays and queues.

Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the Chapter 19 of the HCM 6 and the unsignalized intersection capacity analysis as specified in Chapter 20 of the HCM 6.

2040 Volumes

The attached Exhibits 7 and 8 show the 2040 peak hour volume estimates at intersection analysis locations for the Alternative 1 (existing/no build) scenario.

Exhibits 9 and 10 illustrate the Alternative 2 (hook ramps) interchange configuration, with 2040 peak hour volumes redistributed to potential new interchange features.

Exhibits 11 and 12 depict the reconfiguration of interchange intersections with 2040 peak hour volumes reassigned to the potential Diverging Diamond Interchange (DDI) features incorporated into Alternatives 3 and 4.

Post 2045 Volumes

The attached Exhibits 13 and 14 show the Post-2045 peak hour volume estimates at intersection analysis locations for the Alternative 1 (existing/no build) scenario.

Exhibits 15 and 16 illustrate the Alternative 2 (hook ramps) interchange configuration, with Post-2045 peak hour volumes redistributed to potential new interchange features.

Exhibits 17 and 18 depict the reconfiguration of interchange intersections with Post-2045 peak hour volumes reassigned to the potential Diverging Diamond Interchange (DDI) features incorporated into Alternatives 3 and 4.

Peak Hour Delays

Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length in Synchro.

The level of service (LOS) and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

Years 2020, 2040, and Post-2045 intersection delay results are summarized in the attached Tables 1 through 3. These tables show LOS results at each study area intersection for Alternatives 1 through 4. Traffic operations calculation worksheets for Alternative 1 (existing/no build) are included in Attachment 1.

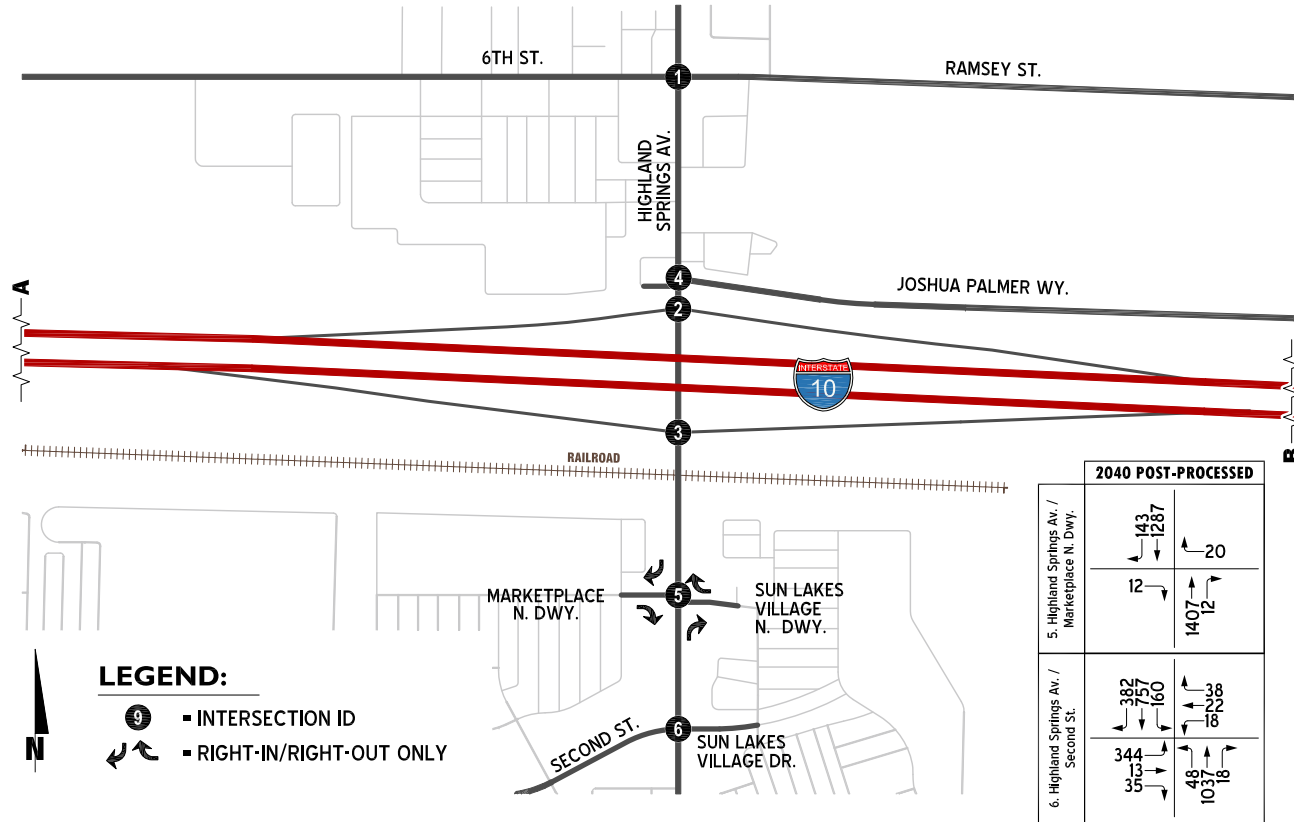
Traffic operations calculation worksheets for Alternative 2 (hook ramps) are provided in Attachment 2. Traffic operations calculation worksheets for Alternatives 3 and 4 (DDI scenarios) are included in Attachment 3.

QUEUING ANALYSIS

Traffic signal progression analysis has been conducted for 2020, 2040, and Post-2045 conditions with each Alternative, to evaluate vehicular queuing by considering the signal timing and

EXHIBIT 7: 2040 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 1 (EXISTING CONFIGURATION)

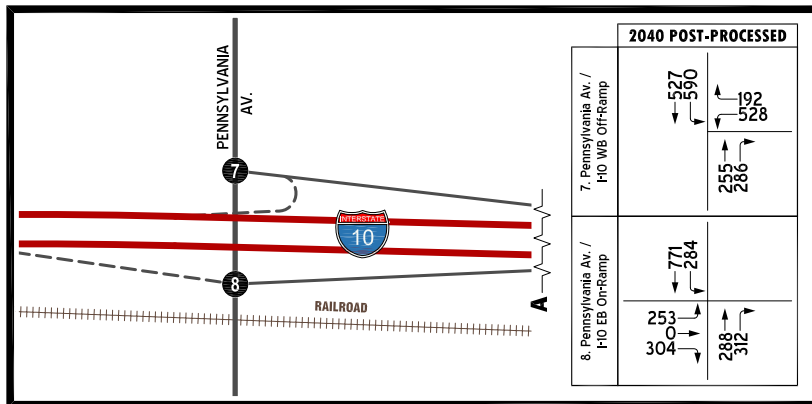
2040 POST-PROCESSED																									
1. Highland Springs Av. / 6th St. - Ramsey St.	<table border="1"> <tr> <td>← 224</td> <td>→ 992</td> <td>← 226</td> <td>→ 992</td> </tr> <tr> <td>← 181</td> <td>→ 181</td> <td>← 181</td> <td>→ 181</td> </tr> <tr> <td>← 230</td> <td>→ 230</td> <td>← 230</td> <td>→ 230</td> </tr> <tr> <td>← 236</td> <td>→ 236</td> <td>← 236</td> <td>→ 236</td> </tr> <tr> <td>← 134</td> <td>→ 755</td> <td>← 134</td> <td>→ 755</td> </tr> <tr> <td>← 175</td> <td>→ 175</td> <td>← 175</td> <td>→ 175</td> </tr> </table>	← 224	→ 992	← 226	→ 992	← 181	→ 181	← 181	→ 181	← 230	→ 230	← 230	→ 230	← 236	→ 236	← 236	→ 236	← 134	→ 755	← 134	→ 755	← 175	→ 175	← 175	→ 175
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← 181	→ 181	← 181	→ 181																						
← 230	→ 230	← 230	→ 230																						
← 236	→ 236	← 236	→ 236																						
← 134	→ 755	← 134	→ 755																						
← 175	→ 175	← 175	→ 175																						
4. Highland Springs Av. / Joshua Palmer Wy.	<table border="1"> <tr> <td>← 1382</td> <td>→ 18</td> <td>← 55</td> <td>→ 55</td> </tr> <tr> <td>← 1126</td> <td>→ 31</td> <td>← 1126</td> <td>→ 31</td> </tr> </table>	← 1382	→ 18	← 55	→ 55	← 1126	→ 31	← 1126	→ 31																
← 1382	→ 18	← 55	→ 55																						
← 1126	→ 31	← 1126	→ 31																						
2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr> <td>← 475</td> <td>→ 183</td> <td>← 183</td> <td>→ 313</td> </tr> <tr> <td>← 972</td> <td>→ 369</td> <td>← 972</td> <td>→ 974</td> </tr> </table>	← 475	→ 183	← 183	→ 313	← 972	→ 369	← 972	→ 974																
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3. Highland Springs Av. / I-10 EB Ramps	<table border="1"> <tr> <td>← 988</td> <td>→ 297</td> <td>← 354</td> <td>→ 442</td> </tr> <tr> <td>← 989</td> <td>→ 438</td> <td>← 989</td> <td>→ 438</td> </tr> </table>	← 988	→ 297	← 354	→ 442	← 989	→ 438	← 989	→ 438																
← 988	→ 297	← 354	→ 442																						
← 989	→ 438	← 989	→ 438																						



2040 POST-PROCESSED													
5. Highland Springs Av. / Marketplace N. Dwy.	<table border="1"> <tr> <td>← 143</td> <td>→ 1287</td> <td>← 20</td> <td>→ 1407</td> </tr> <tr> <td>← 12</td> <td>→ 12</td> <td>← 1407</td> <td>→ 12</td> </tr> </table>	← 143	→ 1287	← 20	→ 1407	← 12	→ 12	← 1407	→ 12				
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6. Highland Springs Av. / Second St.	<table border="1"> <tr> <td>← 382</td> <td>→ 160</td> <td>← 344</td> <td>→ 350</td> </tr> <tr> <td>← 757</td> <td>→ 160</td> <td>← 48</td> <td>→ 1037</td> </tr> <tr> <td>← 160</td> <td>→ 160</td> <td>← 1037</td> <td>→ 16</td> </tr> </table>	← 382	→ 160	← 344	→ 350	← 757	→ 160	← 48	→ 1037	← 160	→ 160	← 1037	→ 16
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- LEGEND:**
- ⑨ - INTERSECTION ID
 - ↔ - RIGHT-IN/RIGHT-OUT ONLY

PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

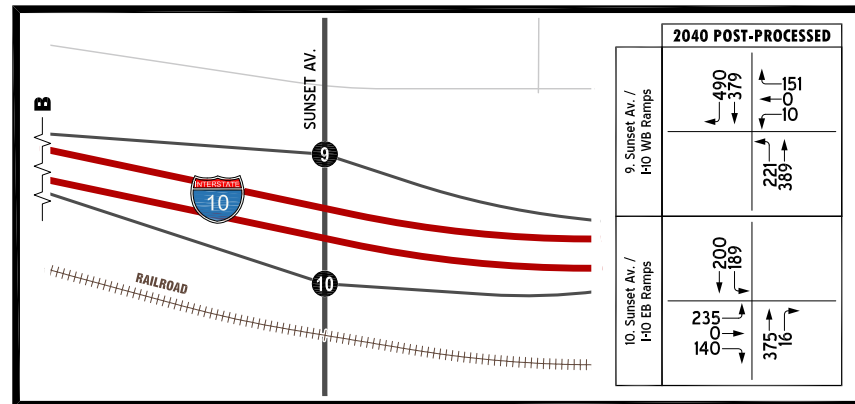
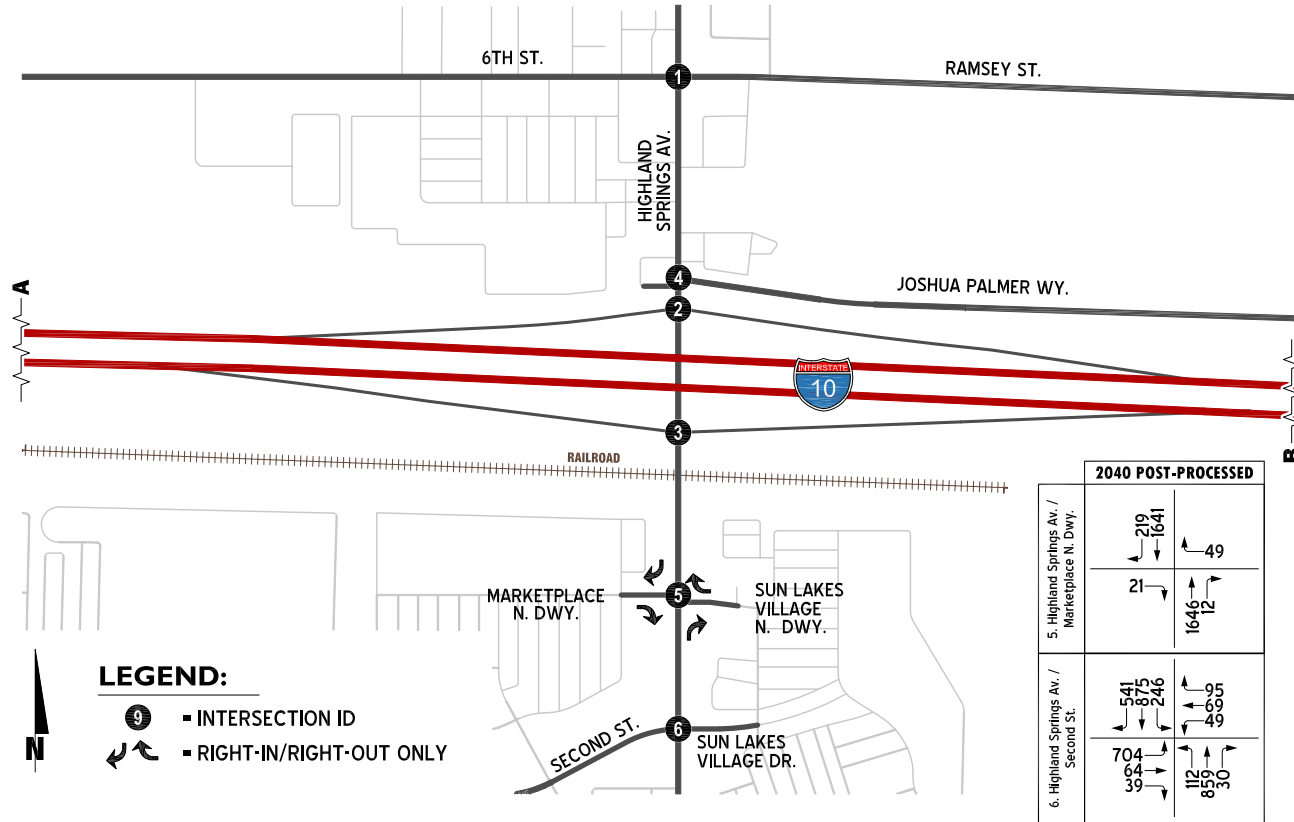


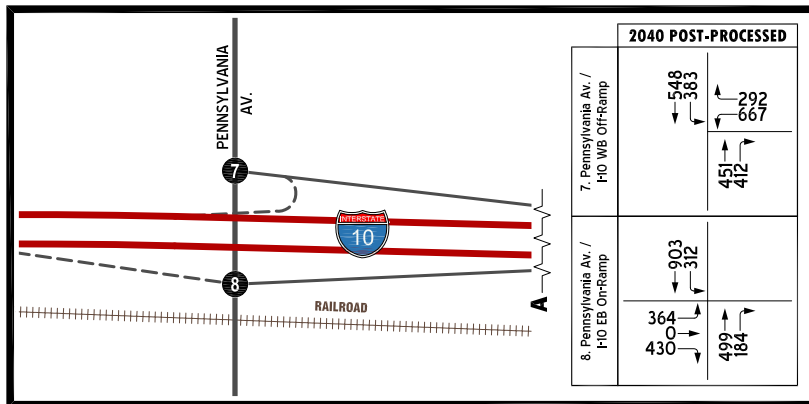
EXHIBIT 8: 2040 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 1 (EXISTING CONFIGURATION)

2040 POST-PROCESSED													
1. Highland Springs Av. / 6th St. - Ramsey St.	<table border="1"> <tr> <td>189</td> <td>864</td> <td>132</td> <td>166</td> </tr> <tr> <td>292</td> <td>406</td> <td>240</td> <td>828</td> </tr> <tr> <td>230</td> <td>1069</td> <td>223</td> <td>328</td> </tr> </table>	189	864	132	166	292	406	240	828	230	1069	223	328
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292	406	240	828										
230	1069	223	328										
4. Highland Springs Av. / Joshua Palmer Wy.	<table border="1"> <tr> <td>1470</td> <td>13</td> <td>56</td> <td></td> </tr> <tr> <td>1654</td> <td>47</td> <td></td> <td></td> </tr> </table>	1470	13	56		1654	47						
1470	13	56											
1654	47												
2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr> <td>437</td> <td>1100</td> <td>382</td> <td></td> </tr> <tr> <td>350</td> <td>1319</td> <td>397</td> <td></td> </tr> </table>	437	1100	382		350	1319	397					
437	1100	382											
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3. Highland Springs Av. / I-10 EB Ramps	<table border="1"> <tr> <td>1283</td> <td>214</td> <td></td> <td></td> </tr> <tr> <td>499</td> <td>1170</td> <td>525</td> <td></td> </tr> </table>	1283	214			499	1170	525					
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499	1170	525											



2040 POST-PROCESSED													
5. Highland Springs Av. / Marketplace N. Dwy.	<table border="1"> <tr> <td>219</td> <td>1641</td> <td>49</td> <td></td> </tr> <tr> <td>21</td> <td>1646</td> <td>12</td> <td></td> </tr> </table>	219	1641	49		21	1646	12					
219	1641	49											
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6. Highland Springs Av. / Second St.	<table border="1"> <tr> <td>541</td> <td>875</td> <td>246</td> <td>605</td> </tr> <tr> <td>704</td> <td>364</td> <td>112</td> <td>859</td> </tr> <tr> <td>30</td> <td>30</td> <td>30</td> <td>30</td> </tr> </table>	541	875	246	605	704	364	112	859	30	30	30	30
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PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

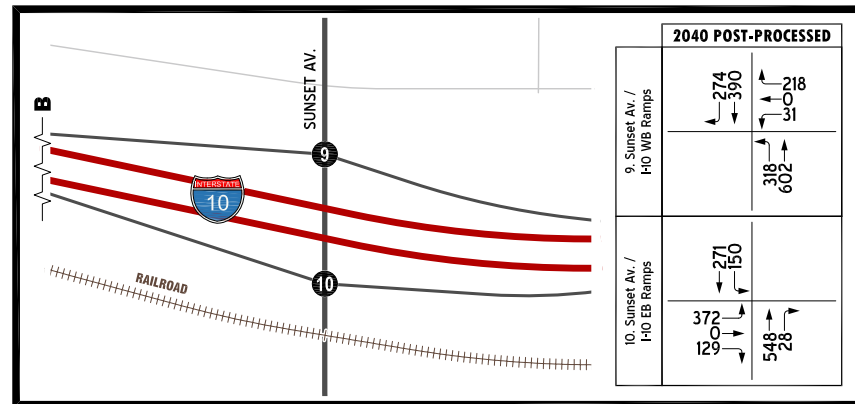
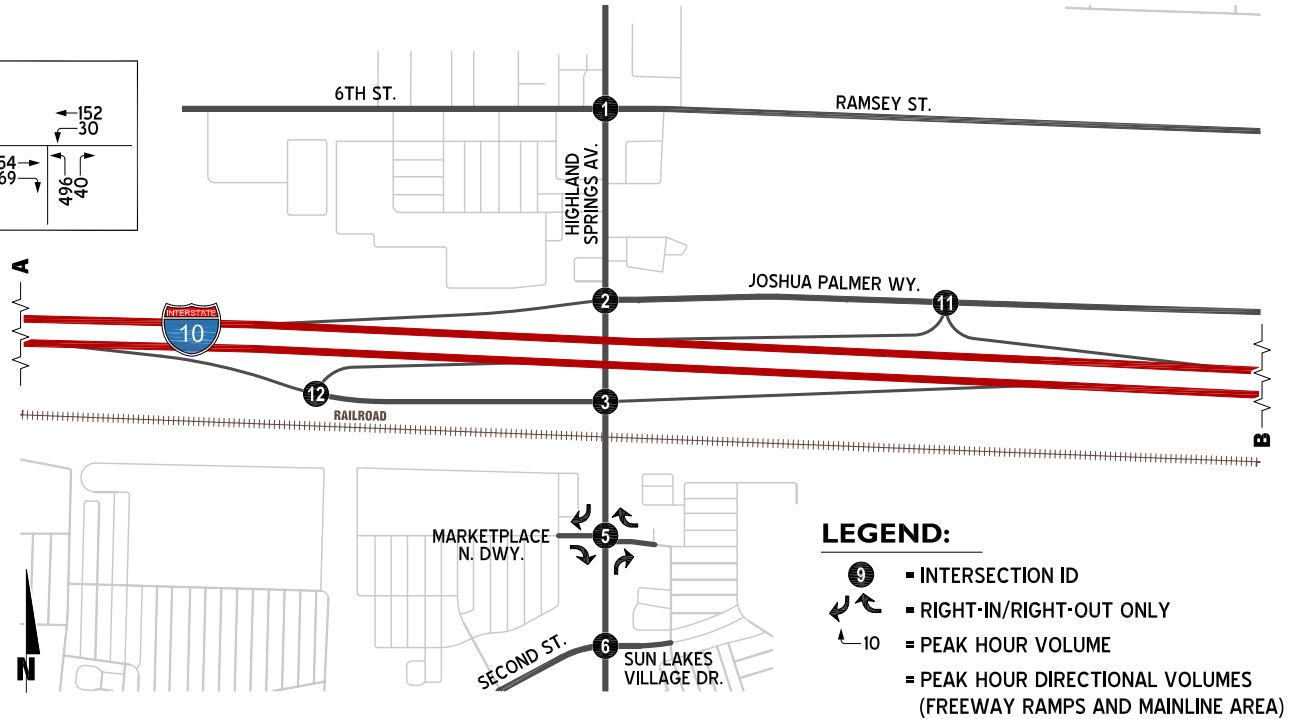
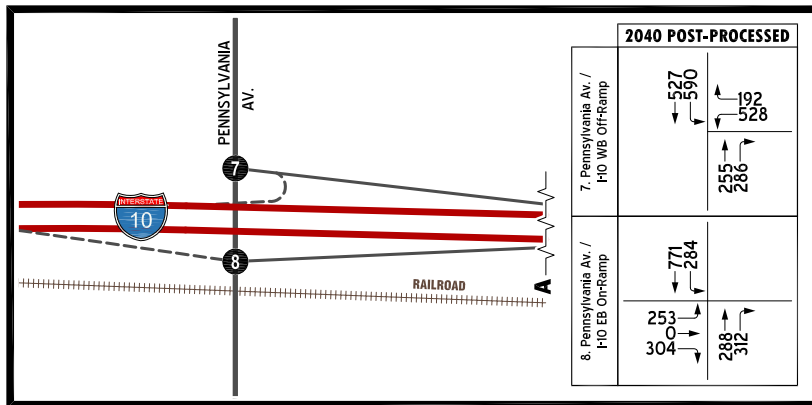


EXHIBIT 9: 2040 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 2 (HOOK RAMPS)

		2040 POST-PROCESSED																	
12. I-10 EB Ramps / Frontage Rd.	797 →	← 297																	
1. Highland Springs Av. / 6th St. - Ramsay St.			<table border="1"> <tr> <td>← 224</td> <td>← 265</td> </tr> <tr> <td>← 992</td> <td>← 292</td> </tr> <tr> <td>← 181</td> <td>← 192</td> </tr> <tr> <td>← 208</td> <td>← 208</td> </tr> <tr> <td>← 236</td> <td>← 236</td> </tr> <tr> <td>← 39</td> <td>← 39</td> </tr> <tr> <td>← 134</td> <td>← 175</td> </tr> <tr> <td>← 755</td> <td>← 755</td> </tr> </table>	← 224	← 265	← 992	← 292	← 181	← 192	← 208	← 208	← 236	← 236	← 39	← 39	← 134	← 175	← 755	← 755
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5. Highland Springs Av. / Marketplace N. Dwy.			<table border="1"> <tr> <td>← 143</td> <td>← 20</td> </tr> <tr> <td>← 1287</td> <td>← 12</td> </tr> <tr> <td>← 12</td> <td>← 1407</td> </tr> <tr> <td>← 1407</td> <td>← 12</td> </tr> </table>	← 143	← 20	← 1287	← 12	← 12	← 1407	← 1407	← 12								
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6. Highland Springs Av. / Second St.			<table border="1"> <tr> <td>← 382</td> <td>← 628</td> </tr> <tr> <td>← 757</td> <td>← 628</td> </tr> <tr> <td>← 160</td> <td>← 160</td> </tr> <tr> <td>← 344</td> <td>← 1037</td> </tr> <tr> <td>← 570</td> <td>← 18</td> </tr> <tr> <td>← 48</td> <td>← 18</td> </tr> </table>	← 382	← 628	← 757	← 628	← 160	← 160	← 344	← 1037	← 570	← 18	← 48	← 18				
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← 570	← 18																		
← 48	← 18																		
II. I-10 WB Ramps / Joshua Palmer Wy.			<table border="1"> <tr> <td>← 154</td> <td>← 352</td> </tr> <tr> <td>← 369</td> <td>← 30</td> </tr> <tr> <td>← 496</td> <td>← 40</td> </tr> </table>	← 154	← 352	← 369	← 30	← 496	← 40										
← 154	← 352																		
← 369	← 30																		
← 496	← 40																		



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

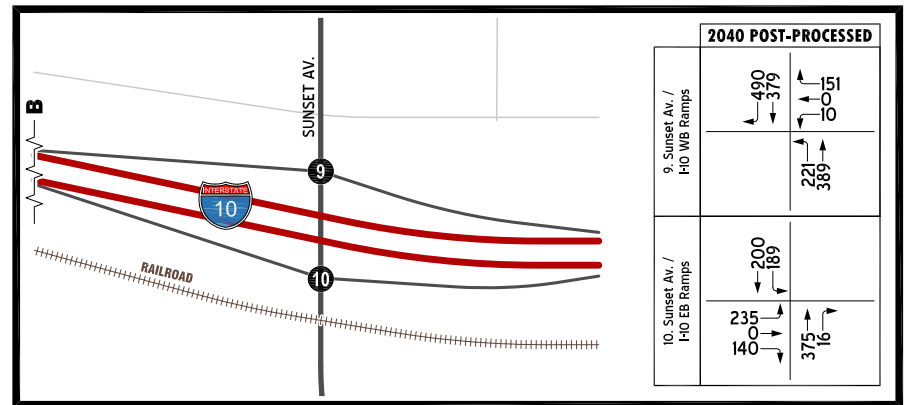
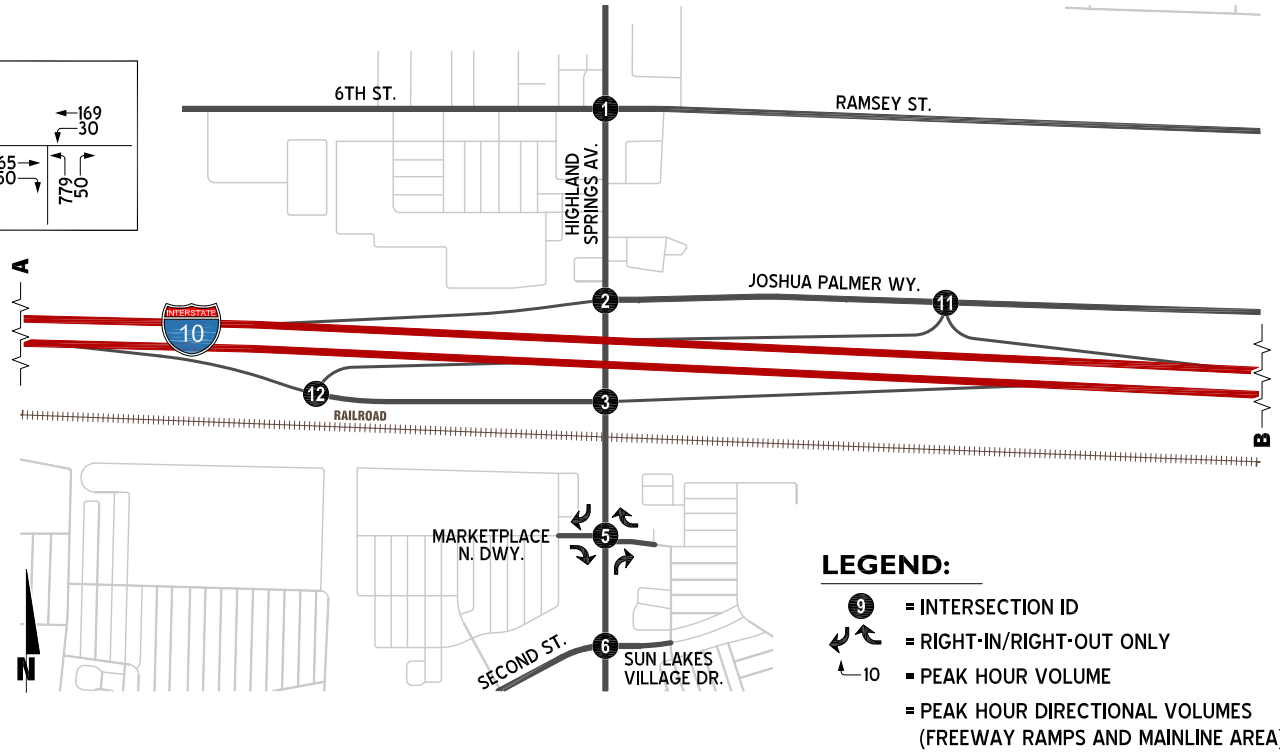
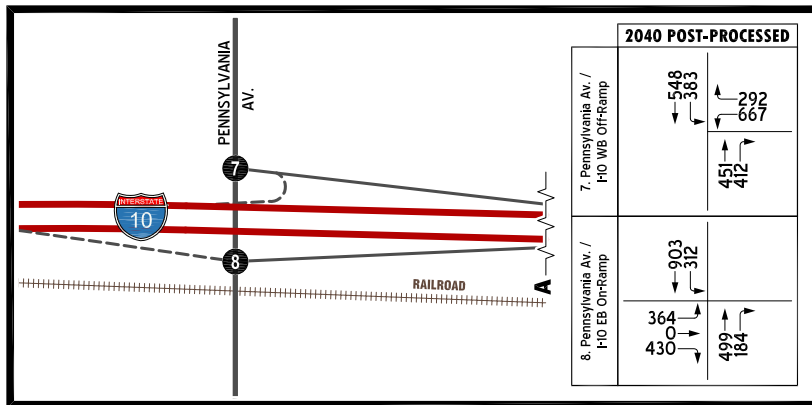


EXHIBIT 10: 2040 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 2 (HOOK RAMPS)

		2040 POST-PROCESSED													
12. I-10 EB Ramps / Frontage Rd.	1077 →	← 214													
1. Highland Springs Av. / 6th St. - Ramsey St.			<table border="1"> <tr> <td>← 189</td> <td>← 864</td> <td>← 166</td> </tr> <tr> <td>← 292</td> <td>← 132</td> <td>← 328</td> </tr> <tr> <td>← 240</td> <td>← 230</td> <td>← 328</td> </tr> <tr> <td>← 1069</td> <td>← 223</td> <td></td> </tr> </table>	← 189	← 864	← 166	← 292	← 132	← 328	← 240	← 230	← 328	← 1069	← 223	
← 189	← 864	← 166													
← 292	← 132	← 328													
← 240	← 230	← 328													
← 1069	← 223														
2. Highland Springs Av. / I-10 WB Ramps			<table border="1"> <tr> <td>← 409</td> <td>← 18</td> <td>← 482</td> </tr> <tr> <td>← 1071</td> <td>← 406</td> <td>← 26</td> </tr> <tr> <td>← 1272</td> <td>← 397</td> <td></td> </tr> </table>	← 409	← 18	← 482	← 1071	← 406	← 26	← 1272	← 397				
← 409	← 18	← 482													
← 1071	← 406	← 26													
← 1272	← 397														
II. I-10 WB Ramps / Joshua Palmer Wy.			<table border="1"> <tr> <td>← 165</td> <td>← 350</td> <td>← 369</td> </tr> <tr> <td>← 779</td> <td>← 50</td> <td></td> </tr> </table>	← 165	← 350	← 369	← 779	← 50							
← 165	← 350	← 369													
← 779	← 50														
3. Highland Springs Av. / I-10 EB Ramps			<table border="1"> <tr> <td>← 214</td> <td>← 1283</td> <td></td> </tr> <tr> <td>← 499</td> <td>← 577</td> <td>← 1170</td> </tr> <tr> <td>← 525</td> <td></td> <td></td> </tr> </table>	← 214	← 1283		← 499	← 577	← 1170	← 525					
← 214	← 1283														
← 499	← 577	← 1170													
← 525															
5. Highland Springs Av. / Marketplace N. Dwy.			<table border="1"> <tr> <td>← 219</td> <td>← 1641</td> <td>← 49</td> </tr> <tr> <td>← 21</td> <td>← 1646</td> <td>← 12</td> </tr> </table>	← 219	← 1641	← 49	← 21	← 1646	← 12						
← 219	← 1641	← 49													
← 21	← 1646	← 12													
6. Highland Springs Av. / Second St.			<table border="1"> <tr> <td>← 541</td> <td>← 875</td> <td>← 246</td> </tr> <tr> <td>← 704</td> <td>← 64</td> <td>← 39</td> </tr> <tr> <td>← 112</td> <td>← 859</td> <td>← 30</td> </tr> </table>	← 541	← 875	← 246	← 704	← 64	← 39	← 112	← 859	← 30			
← 541	← 875	← 246													
← 704	← 64	← 39													
← 112	← 859	← 30													



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

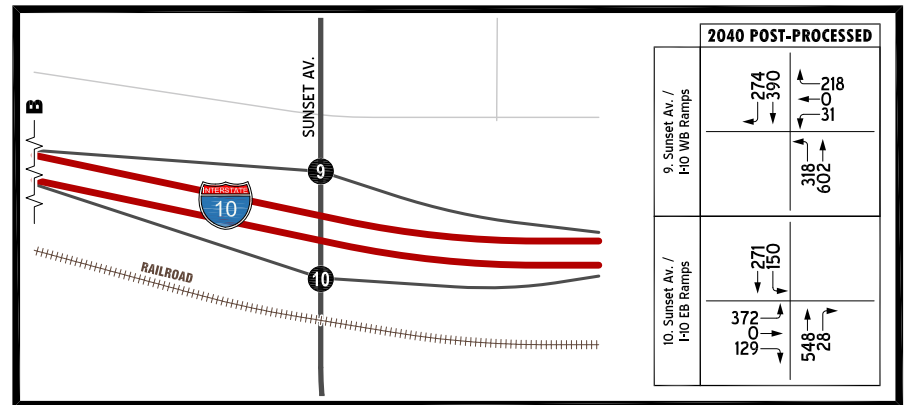
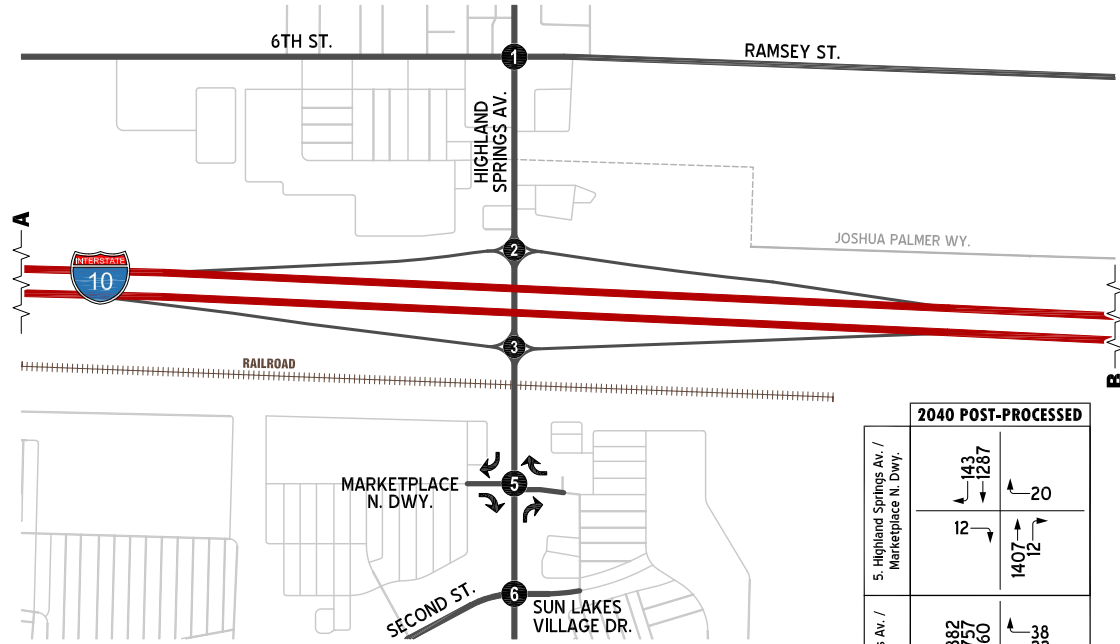


EXHIBIT 11: 2040 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVES 3 & 4 (DIVERGING DIAMOND INTERCHANGE)

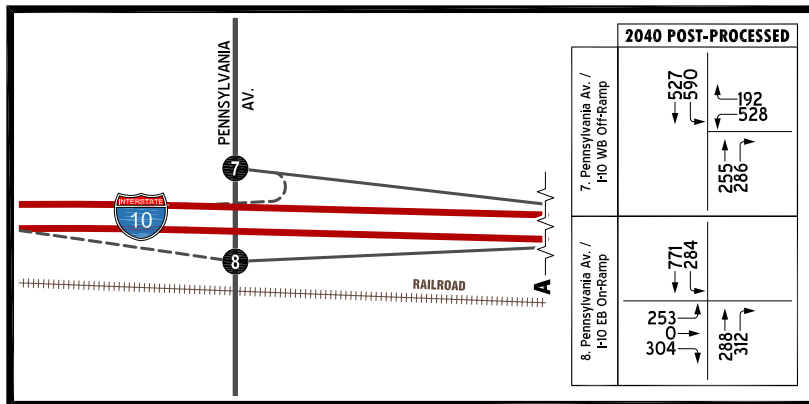
		2040 POST-PROCESSED	
1. Highland Springs Av. / 6th St. - Ramsey St.		224 662 181	205 292 219
2. Highland Springs Av. / I-10 WB Ramps		475 972	183 313
3. Highland Springs Av. / I-10 EB Ramps		354 442	988 297
ALTERNATIVE 3		ALTERNATIVE 4	
2. Highland Springs Av. / I-10 WB Ramps		369 974	183 313
3. Highland Springs Av. / I-10 EB Ramps		354 442	988 297
ALTERNATIVE 3		ALTERNATIVE 4	
2. Highland Springs Av. / I-10 WB Ramps		369 974	183 313
3. Highland Springs Av. / I-10 EB Ramps		354 442	988 297



LEGEND:
 ① = INTERSECTION ID
 = RIGHT-IN/RIGHT-OUT ONLY

		2040 POST-PROCESSED	
5. Highland Springs Av. / Marketplace N. Dwy.		143 1287	20
6. Highland Springs Av. / Second St.		382 757 160	988 238 18

PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

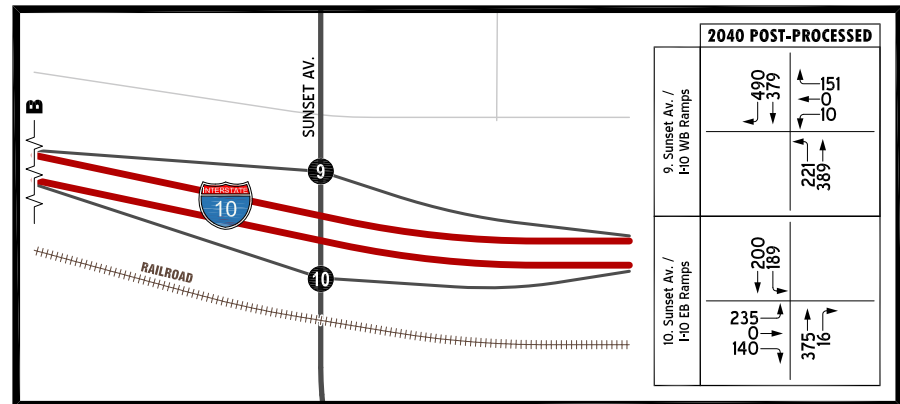
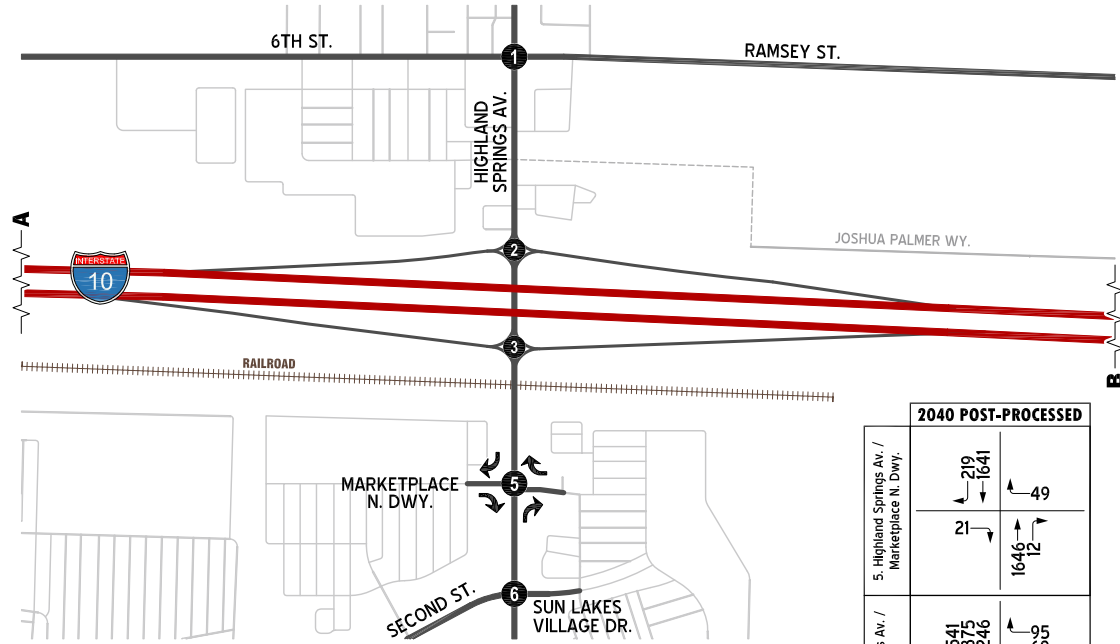


EXHIBIT 12: 2040 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVES 3 & 4 (DIVERGING DIAMOND INTERCHANGE)

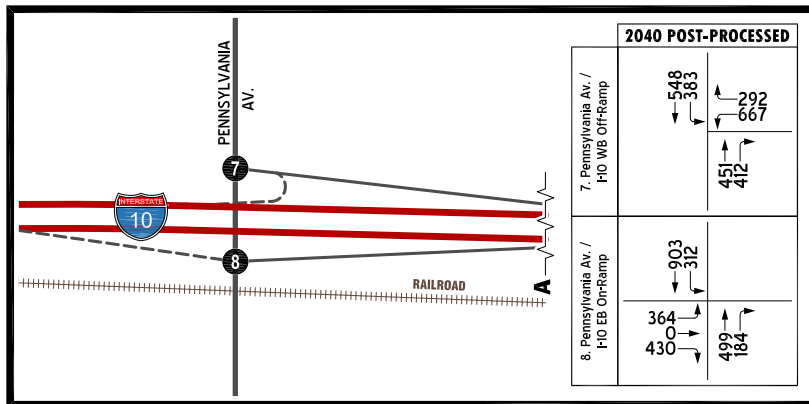
2040 POST-PROCESSED														
1. Highland Springs Av. / 6th St. - Ramsey St.	<table border="1"> <tr> <td>← 189</td> <td>→ 864</td> </tr> <tr> <td>← 166</td> <td>→ 328</td> </tr> <tr> <td>← 292</td> <td>→ 240</td> </tr> <tr> <td>← 240</td> <td>→ 240</td> </tr> <tr> <td>← 230</td> <td>→ 1069</td> </tr> <tr> <td>← 223</td> <td>→ 223</td> </tr> </table>	← 189	→ 864	← 166	→ 328	← 292	→ 240	← 240	→ 240	← 230	→ 1069	← 223	→ 223	
← 189	→ 864													
← 166	→ 328													
← 292	→ 240													
← 240	→ 240													
← 230	→ 1069													
← 223	→ 223													
2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr> <td>← 437</td> <td>→ 1100</td> </tr> <tr> <td>← 382</td> <td>→ 397</td> </tr> <tr> <td>← 350</td> <td>→ 1319</td> </tr> </table>	← 437	→ 1100	← 382	→ 397	← 350	→ 1319	<table border="1"> <tr> <td>← 437</td> <td>→ 1100</td> </tr> <tr> <td>← 382</td> <td>→ 397</td> </tr> <tr> <td>← 350</td> <td>→ 1319</td> </tr> </table>	← 437	→ 1100	← 382	→ 397	← 350	→ 1319
← 437	→ 1100													
← 382	→ 397													
← 350	→ 1319													
← 437	→ 1100													
← 382	→ 397													
← 350	→ 1319													
3. Highland Springs Av. / I-10 EB Ramps	<table border="1"> <tr> <td>← 499</td> <td>→ 1283</td> </tr> <tr> <td>← 577</td> <td>→ 214</td> </tr> <tr> <td>← 1170</td> <td>→ 525</td> </tr> </table>	← 499	→ 1283	← 577	→ 214	← 1170	→ 525	<table border="1"> <tr> <td>← 499</td> <td>→ 1283</td> </tr> <tr> <td>← 577</td> <td>→ 214</td> </tr> <tr> <td>← 1170</td> <td>→ 525</td> </tr> </table>	← 499	→ 1283	← 577	→ 214	← 1170	→ 525
← 499	→ 1283													
← 577	→ 214													
← 1170	→ 525													
← 499	→ 1283													
← 577	→ 214													
← 1170	→ 525													



LEGEND:
 ⑨ = INTERSECTION ID
 = RIGHT-IN/RIGHT-OUT ONLY

2040 POST-PROCESSED														
5. Highland Springs Av. / Marketplace N. Dwy.	<table border="1"> <tr> <td>← 219</td> <td>→ 1041</td> </tr> <tr> <td>← 49</td> <td>→ 21</td> </tr> <tr> <td>← 1646</td> <td>→ 12</td> </tr> </table>	← 219	→ 1041	← 49	→ 21	← 1646	→ 12							
← 219	→ 1041													
← 49	→ 21													
← 1646	→ 12													
6. Highland Springs Av. / Second St.	<table border="1"> <tr> <td>← 541</td> <td>→ 875</td> </tr> <tr> <td>← 246</td> <td>→ 49</td> </tr> <tr> <td>← 695</td> <td>→ 49</td> </tr> <tr> <td>← 704</td> <td>→ 39</td> </tr> <tr> <td>← 112</td> <td>→ 839</td> </tr> <tr> <td>← 30</td> <td>→ 30</td> </tr> </table>	← 541	→ 875	← 246	→ 49	← 695	→ 49	← 704	→ 39	← 112	→ 839	← 30	→ 30	
← 541	→ 875													
← 246	→ 49													
← 695	→ 49													
← 704	→ 39													
← 112	→ 839													
← 30	→ 30													

PENNSYLVANIA AV./I-10 INTERCHANGE AREA

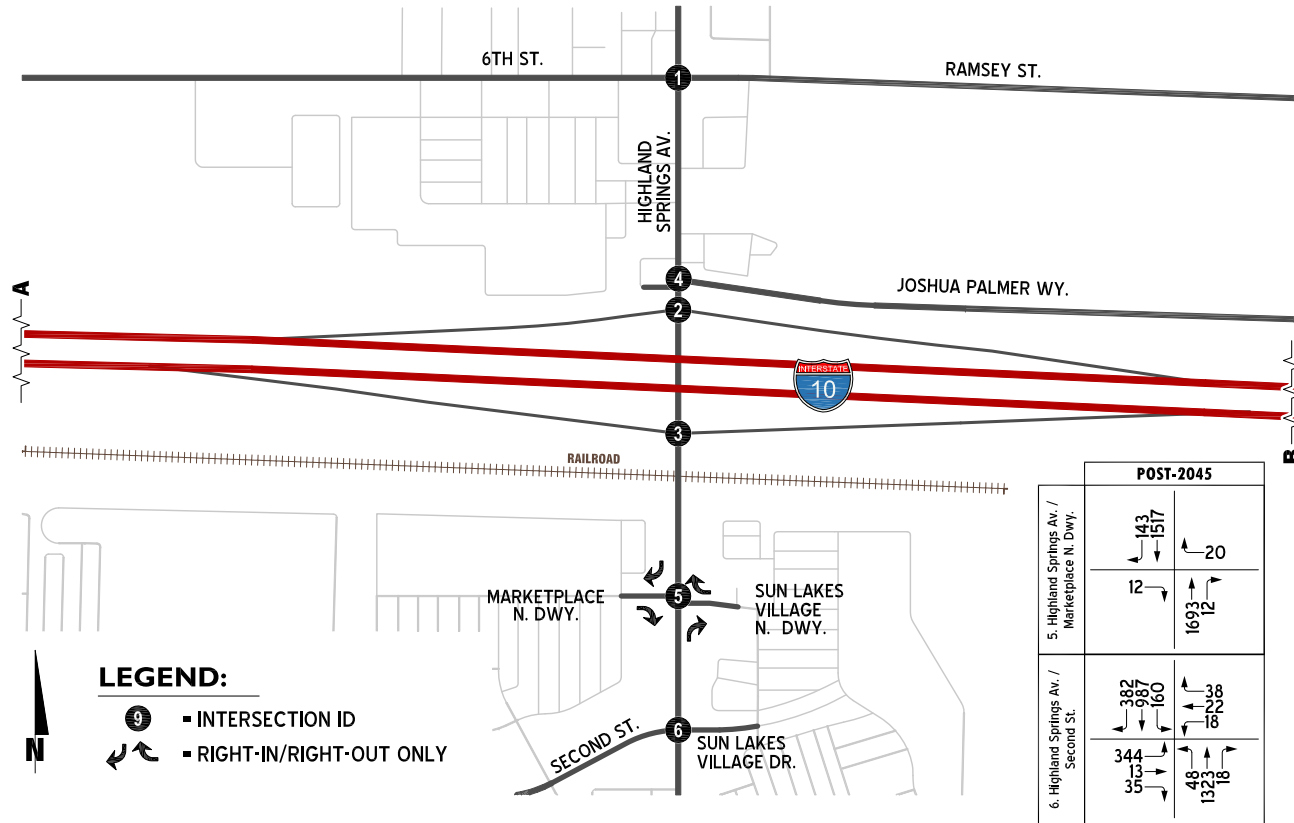


SUNSET AV./I-10 INTERCHANGE AREA



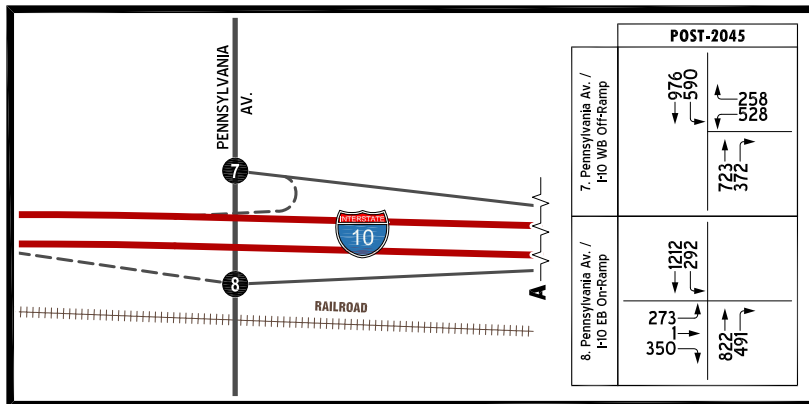
EXHIBIT 13: POST-2045 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 1 (EXISTING CONFIGURATION)

POST-2045																
1. Highland Springs Av. / 6th St. - Ramsey St.	<table border="1"> <tr> <td>← 260</td> <td>← 1816</td> <td>← 6193</td> </tr> <tr> <td>← 272</td> <td>← 272</td> <td>← 4288</td> </tr> <tr> <td>← 240</td> <td>← 729</td> <td>← 6193</td> </tr> <tr> <td>← 306</td> <td>← 306</td> <td>← 4288</td> </tr> <tr> <td>← 277</td> <td>← 1129</td> <td>← 461</td> </tr> </table>	← 260	← 1816	← 6193	← 272	← 272	← 4288	← 240	← 729	← 6193	← 306	← 306	← 4288	← 277	← 1129	← 461
← 260	← 1816	← 6193														
← 272	← 272	← 4288														
← 240	← 729	← 6193														
← 306	← 306	← 4288														
← 277	← 1129	← 461														
4. Highland Springs Av. / Joshua Palmer Wy.	<table border="1"> <tr> <td>← 2485</td> <td>← 18</td> <td>← 55</td> </tr> <tr> <td>← 18</td> <td>← 1833</td> <td>← 31</td> </tr> </table>	← 2485	← 18	← 55	← 18	← 1833	← 31									
← 2485	← 18	← 55														
← 18	← 1833	← 31														
2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr> <td>← 1150</td> <td>← 461</td> </tr> <tr> <td>← 1400</td> <td>← 389</td> </tr> <tr> <td>← 583</td> <td>← 1403</td> </tr> </table>	← 1150	← 461	← 1400	← 389	← 583	← 1403									
← 1150	← 461															
← 1400	← 389															
← 583	← 1403															
3. Highland Springs Av. / I-10 EB Ramps	<table border="1"> <tr> <td>← 1218</td> <td>← 571</td> </tr> <tr> <td>← 775</td> <td>← 502</td> </tr> <tr> <td>← 44</td> <td>← 1211</td> </tr> </table>	← 1218	← 571	← 775	← 502	← 44	← 1211									
← 1218	← 571															
← 775	← 502															
← 44	← 1211															



POST-2045													
5. Highland Springs Av. / Marketplace N. Dwy.	<table border="1"> <tr> <td>← 143</td> <td>← 1517</td> <td>← 20</td> </tr> <tr> <td>← 12</td> <td>← 1693</td> <td>← 12</td> </tr> </table>	← 143	← 1517	← 20	← 12	← 1693	← 12						
← 143	← 1517	← 20											
← 12	← 1693	← 12											
6. Highland Springs Av. / Second St.	<table border="1"> <tr> <td>← 382</td> <td>← 987</td> <td>← 160</td> </tr> <tr> <td>← 344</td> <td>← 1323</td> <td>← 18</td> </tr> <tr> <td>← 35</td> <td>← 48</td> <td>← 1323</td> </tr> <tr> <td>← 502</td> <td>← 18</td> <td>← 1323</td> </tr> </table>	← 382	← 987	← 160	← 344	← 1323	← 18	← 35	← 48	← 1323	← 502	← 18	← 1323
← 382	← 987	← 160											
← 344	← 1323	← 18											
← 35	← 48	← 1323											
← 502	← 18	← 1323											

PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

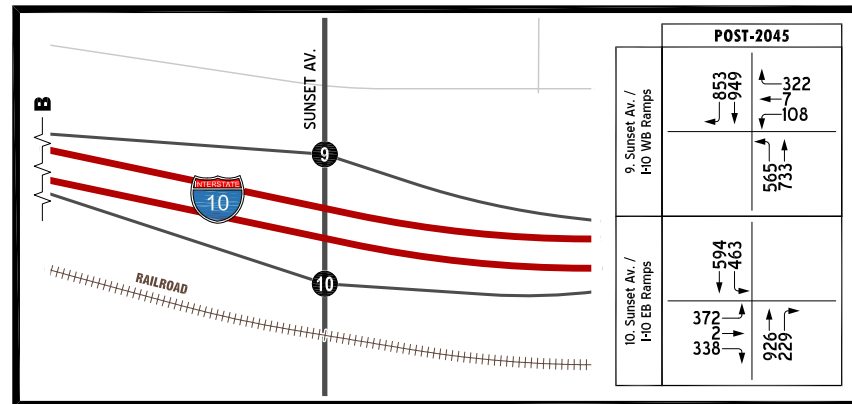
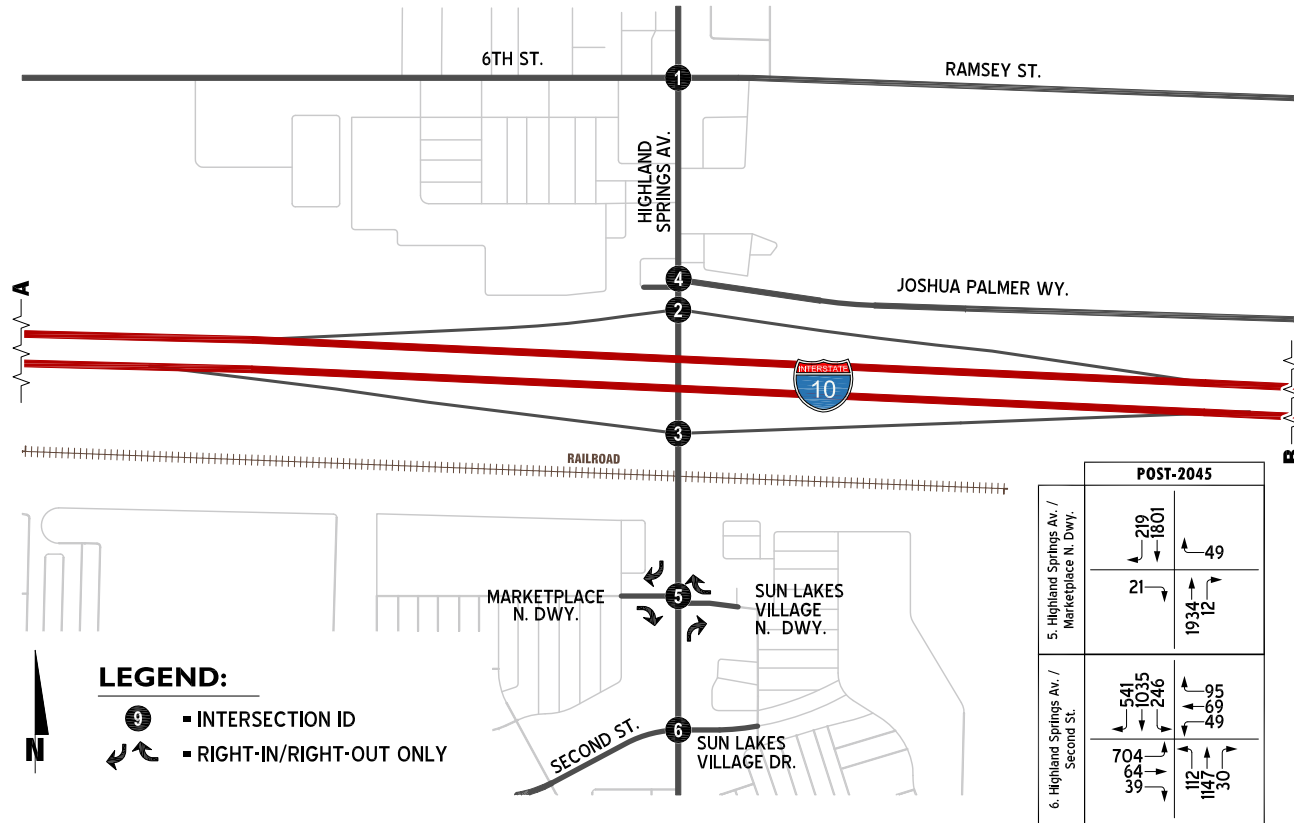


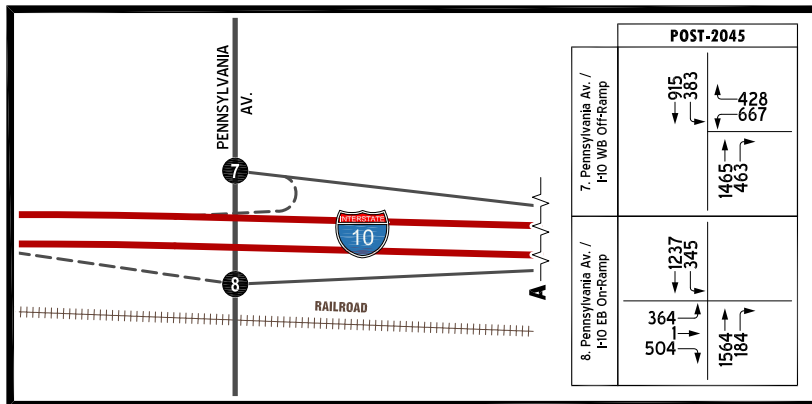
EXHIBIT 14: POST-2045 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 1 (EXISTING CONFIGURATION)

POST-2045																	
1. Highland Springs Av. / 6th St. - Ramsey St.	<table border="1"> <tr> <td>← 189</td> <td>→ 277</td> </tr> <tr> <td>← 1369</td> <td>→ 1120</td> </tr> <tr> <td>← 309</td> <td>→ 577</td> </tr> <tr> <td>← 450</td> <td>→ 1120</td> </tr> <tr> <td>← 370</td> <td>→ 577</td> </tr> <tr> <td>← 394</td> <td>→ 577</td> </tr> <tr> <td>← 512</td> <td>→ 1684</td> </tr> <tr> <td>← 1684</td> <td>→ 596</td> </tr> </table>	← 189	→ 277	← 1369	→ 1120	← 309	→ 577	← 450	→ 1120	← 370	→ 577	← 394	→ 577	← 512	→ 1684	← 1684	→ 596
← 189	→ 277																
← 1369	→ 1120																
← 309	→ 577																
← 450	→ 1120																
← 370	→ 577																
← 394	→ 577																
← 512	→ 1684																
← 1684	→ 596																
4. Highland Springs Av. / Joshua Palmer Wy.	<table border="1"> <tr> <td>← 2107</td> <td>→ 57</td> </tr> <tr> <td>← 13</td> <td>→ 57</td> </tr> <tr> <td>← 2649</td> <td>→ 47</td> </tr> </table>	← 2107	→ 57	← 13	→ 57	← 2649	→ 47										
← 2107	→ 57																
← 13	→ 57																
← 2649	→ 47																
2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr> <td>← 721</td> <td>→ 758</td> </tr> <tr> <td>← 1453</td> <td>→ 556</td> </tr> <tr> <td>← 350</td> <td>→ 1938</td> </tr> </table>	← 721	→ 758	← 1453	→ 556	← 350	→ 1938										
← 721	→ 758																
← 1453	→ 556																
← 350	→ 1938																
3. Highland Springs Av. / I-10 EB Ramps	<table border="1"> <tr> <td>← 1443</td> <td>→ 566</td> </tr> <tr> <td>← 839</td> <td>→ 577</td> </tr> <tr> <td>← 14</td> <td>→ 577</td> </tr> <tr> <td>← 1449</td> <td>→ 534</td> </tr> </table>	← 1443	→ 566	← 839	→ 577	← 14	→ 577	← 1449	→ 534								
← 1443	→ 566																
← 839	→ 577																
← 14	→ 577																
← 1449	→ 534																



POST-2045													
5. Highland Springs Av. / Marketplace N. Dwy.	<table border="1"> <tr> <td>← 219</td> <td>→ 49</td> </tr> <tr> <td>← 1801</td> <td>→ 12</td> </tr> <tr> <td>← 21</td> <td>→ 1934</td> </tr> </table>	← 219	→ 49	← 1801	→ 12	← 21	→ 1934						
← 219	→ 49												
← 1801	→ 12												
← 21	→ 1934												
6. Highland Springs Av. / Second St.	<table border="1"> <tr> <td>← 541</td> <td>→ 665</td> </tr> <tr> <td>← 1035</td> <td>→ 665</td> </tr> <tr> <td>← 246</td> <td>→ 665</td> </tr> <tr> <td>← 704</td> <td>→ 112</td> </tr> <tr> <td>← 64</td> <td>→ 1147</td> </tr> <tr> <td>← 30</td> <td>→ 30</td> </tr> </table>	← 541	→ 665	← 1035	→ 665	← 246	→ 665	← 704	→ 112	← 64	→ 1147	← 30	→ 30
← 541	→ 665												
← 1035	→ 665												
← 246	→ 665												
← 704	→ 112												
← 64	→ 1147												
← 30	→ 30												

PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

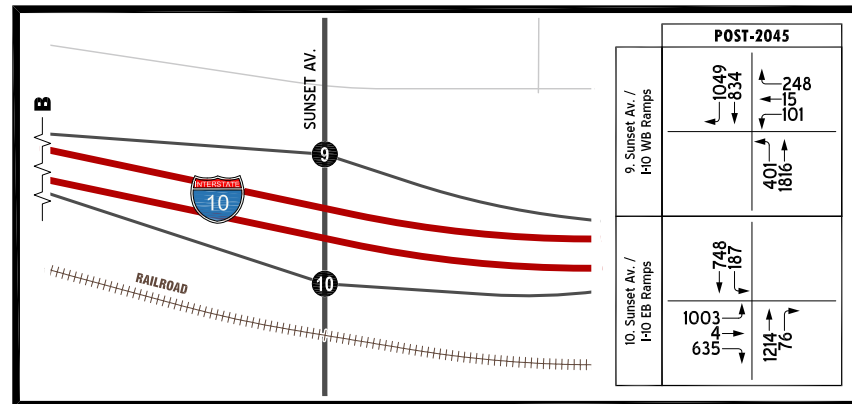
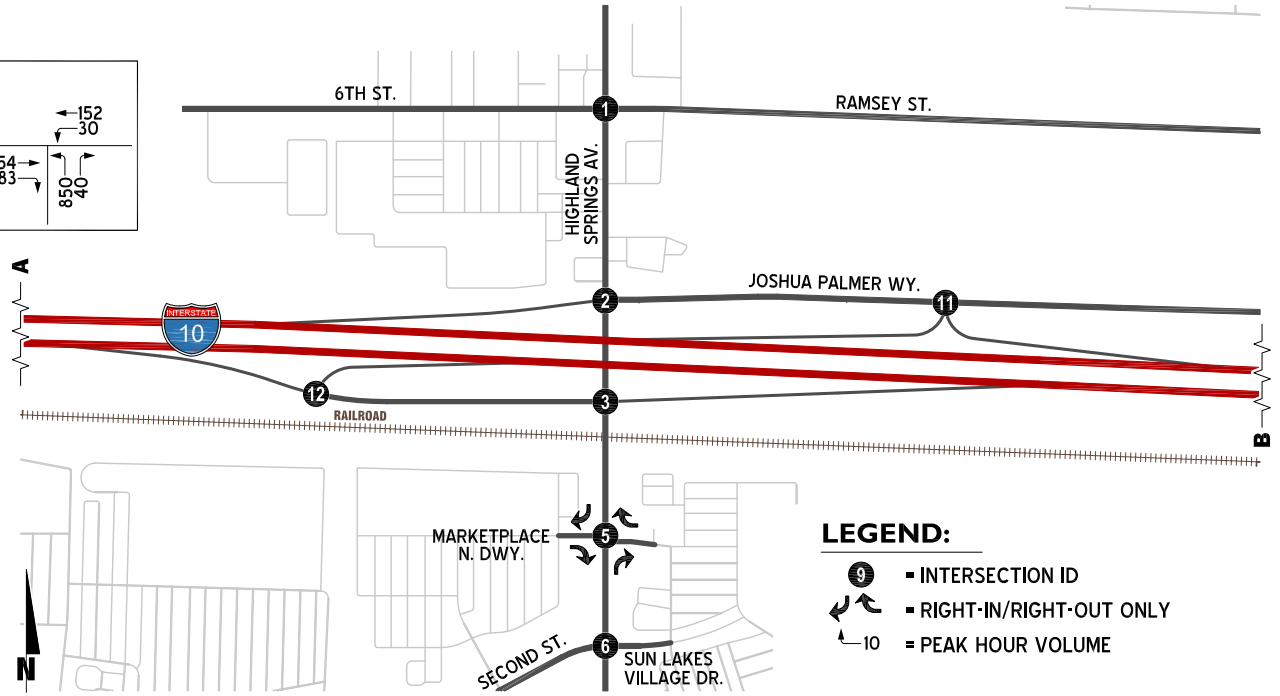
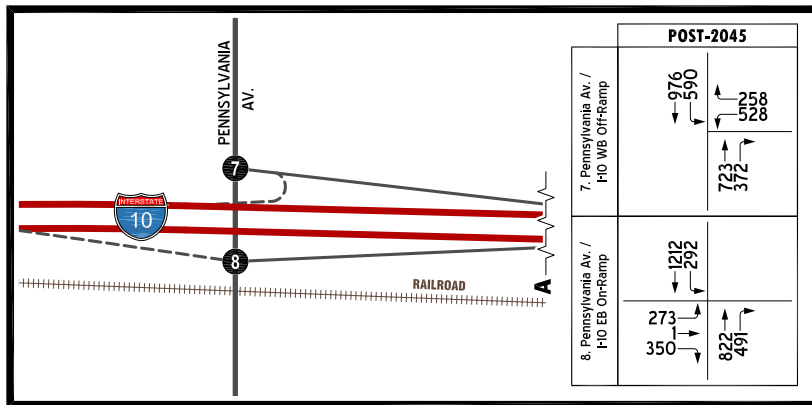


EXHIBIT 15: POST-2045 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 2 (HOOK RAMPS)

		POST-2045	
12. I-10 EB Ramps / Frontage Rd.	1. Highland Springs Av. / 6th St. - Ramsey St.		
	2. Highland Springs Av. / I-10 WB Ramps		
	3. Highland Springs Av. / I-10 EB Ramps		
	5. Highland Springs Av. / Marketplace N. Dwy.		
	6. Highland Springs Av. / Second St.		
		11. I-10 WB Ramps / Joshua Palmer Wy.	



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

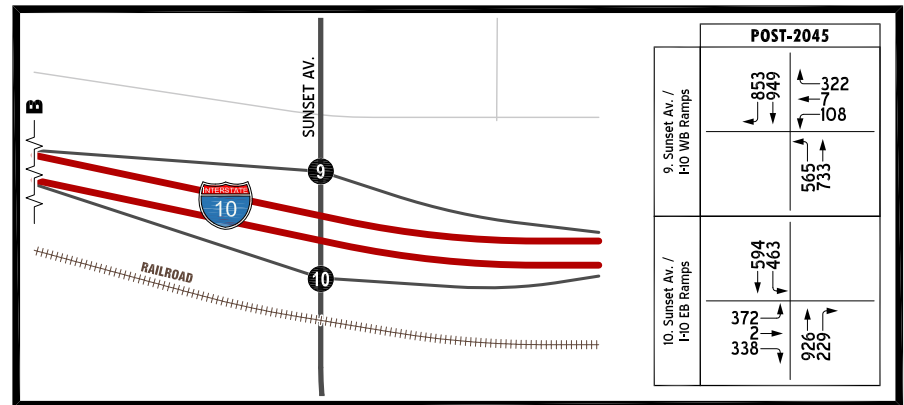
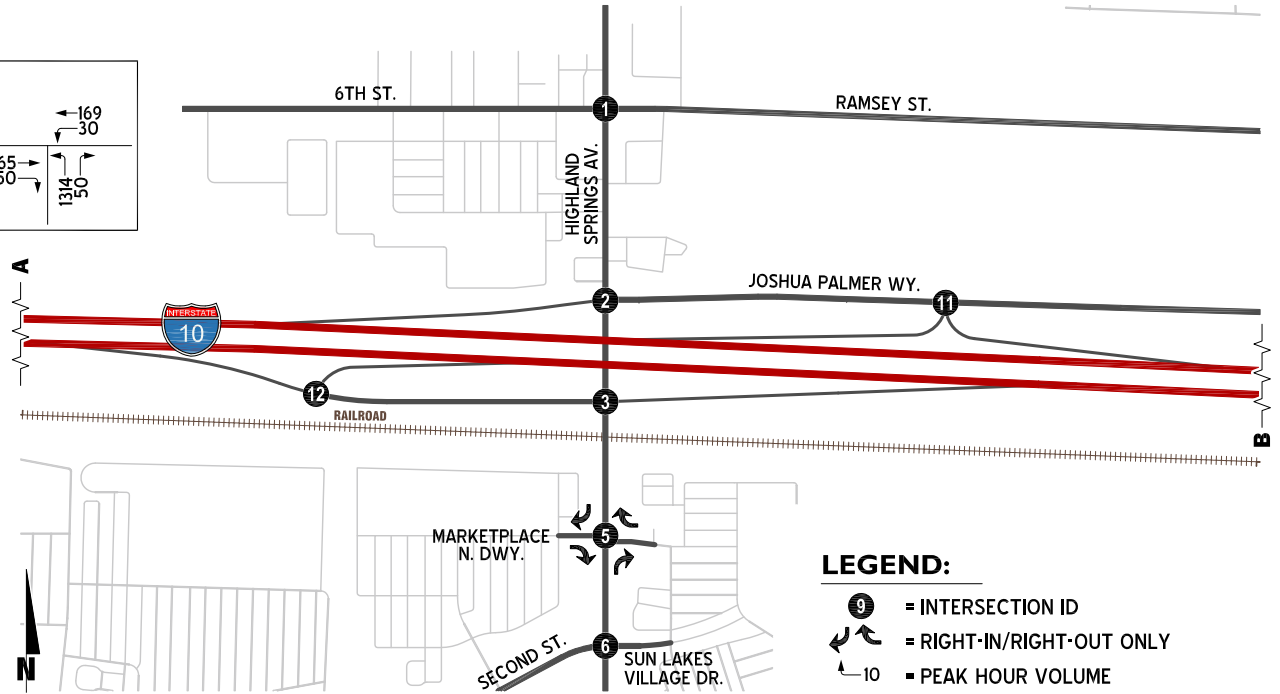
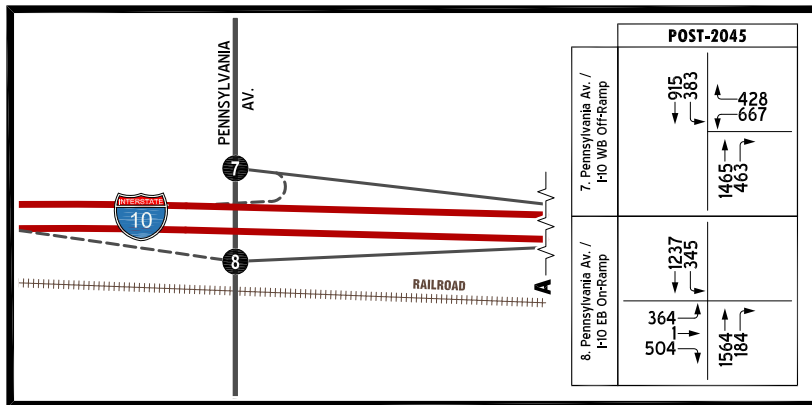


EXHIBIT 16: POST-2045 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVE 2 (HOOK RAMPS)

12. I-10 EB Ramps / Frontage Rd.	1430 →	← 566	POST-2045																
			1. Highland Springs Av. / 6th St. - Ramsey St.	<table border="1"> <tr> <td>← 189</td> <td>← 1369</td> <td>← 277</td> </tr> <tr> <td>← 1120</td> <td>← 577</td> <td></td> </tr> <tr> <td>← 450</td> <td></td> <td></td> </tr> <tr> <td>← 394</td> <td></td> <td></td> </tr> <tr> <td>← 512</td> <td>← 1684</td> <td>← 596</td> </tr> </table>	← 189	← 1369	← 277	← 1120	← 577		← 450			← 394			← 512	← 1684	← 596
			← 189	← 1369	← 277														
			← 1120	← 577															
			← 450																
			← 394																
← 512	← 1684	← 596																	
2. Highland Springs Av. / I-10 WB Ramps	<table border="1"> <tr> <td>← 693</td> <td>← 1424</td> <td>← 758</td> </tr> <tr> <td>← 18</td> <td></td> <td>← 585</td> </tr> <tr> <td>← 189</td> <td>← 397</td> <td></td> </tr> </table>	← 693	← 1424	← 758	← 18		← 585	← 189	← 397										
← 693	← 1424	← 758																	
← 18		← 585																	
← 189	← 397																		
3. Highland Springs Av. / I-10 EB Ramps	<table border="1"> <tr> <td>← 566</td> <td>← 1443</td> <td></td> </tr> <tr> <td>← 839</td> <td>← 14</td> <td></td> </tr> <tr> <td>← 577</td> <td>← 1449</td> <td>← 534</td> </tr> </table>	← 566	← 1443		← 839	← 14		← 577	← 1449	← 534									
← 566	← 1443																		
← 839	← 14																		
← 577	← 1449	← 534																	
5. Highland Springs Av. / Marketplace N. Dwy.	<table border="1"> <tr> <td>← 219</td> <td>← 1801</td> <td>← 49</td> </tr> <tr> <td>← 21</td> <td></td> <td></td> </tr> <tr> <td>← 1934</td> <td>← 12</td> <td></td> </tr> </table>	← 219	← 1801	← 49	← 21			← 1934	← 12										
← 219	← 1801	← 49																	
← 21																			
← 1934	← 12																		
6. Highland Springs Av. / Second St.	<table border="1"> <tr> <td>← 541</td> <td>← 1035</td> <td>← 400</td> </tr> <tr> <td>← 246</td> <td>← 400</td> <td>← 305</td> </tr> <tr> <td>← 704</td> <td>← 112</td> <td>← 147</td> </tr> <tr> <td>← 39</td> <td>← 30</td> <td></td> </tr> </table>	← 541	← 1035	← 400	← 246	← 400	← 305	← 704	← 112	← 147	← 39	← 30							
← 541	← 1035	← 400																	
← 246	← 400	← 305																	
← 704	← 112	← 147																	
← 39	← 30																		
II. I-10 WB Ramps / Joshua Palmer Wy.	<table border="1"> <tr> <td>← 165</td> <td>← 369</td> <td></td> </tr> <tr> <td>← 350</td> <td>← 30</td> <td></td> </tr> <tr> <td>← 1314</td> <td>← 50</td> <td></td> </tr> </table>	← 165	← 369		← 350	← 30		← 1314	← 50										
← 165	← 369																		
← 350	← 30																		
← 1314	← 50																		



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

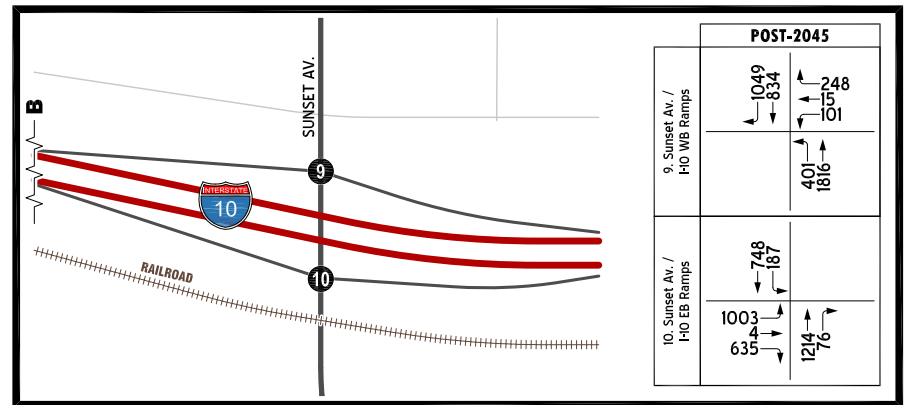
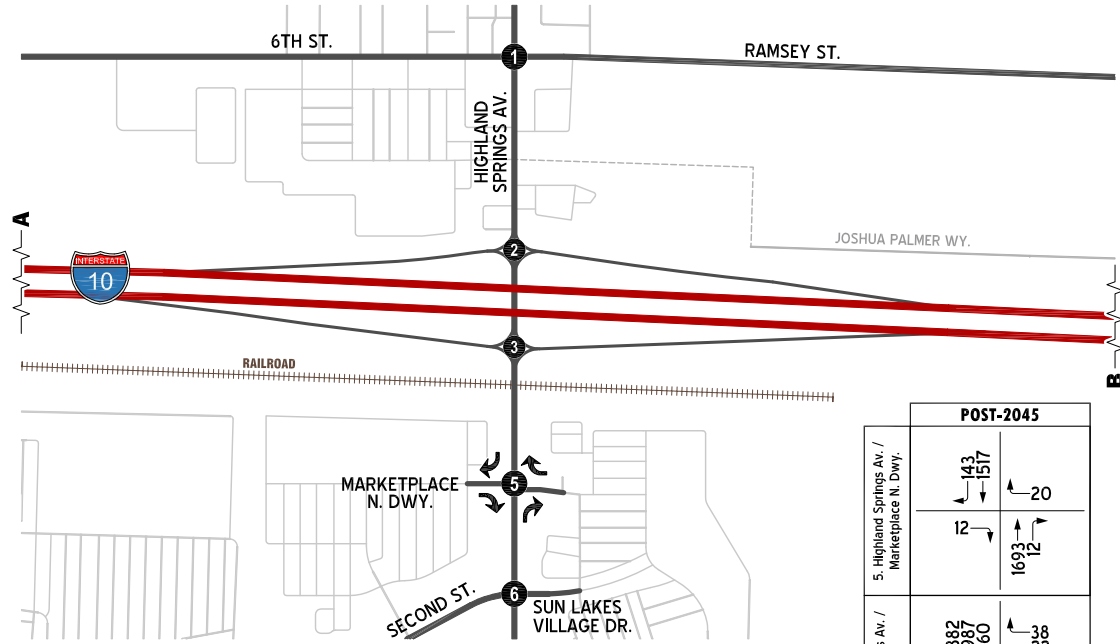


EXHIBIT 17: POST-2045 AM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVES 3 & 4 (DIVERGING DIAMOND INTERCHANGE)

		POST-2045	
1. Highland Springs Av. / 6th St. - Ramsey St.		260 1816 272	193 153 428
2. Highland Springs Av. / I-10 WB Ramps		240 729 306	277 1129 461
3. Highland Springs Av. / I-10 EB Ramps		775 442	1218 571
ALTERNATIVE 3	ALTERNATIVE 4	583 1403	583 1403
		461 389	461 389
		1211 502	1218 571

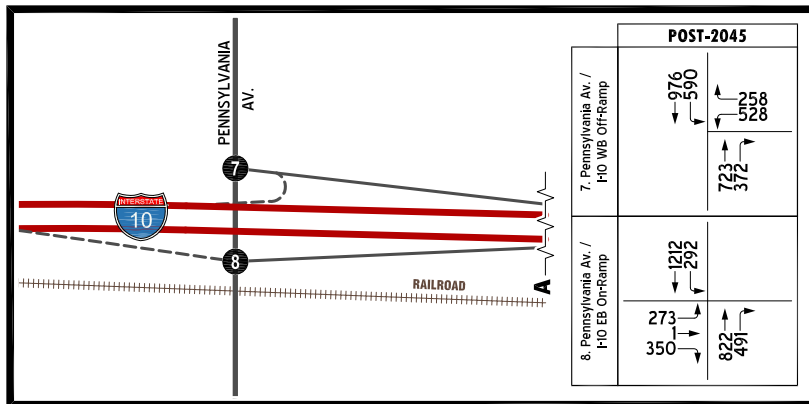


LEGEND:

- ⑨ = INTERSECTION ID
- ↔ = RIGHT-IN/RIGHT-OUT ONLY

		POST-2045	
5. Highland Springs Av. / Marketplace N. Dwy.		143 1517	20
6. Highland Springs Av. / Second St.		382 687 160	182 238
		344 35	48 1323 18

PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

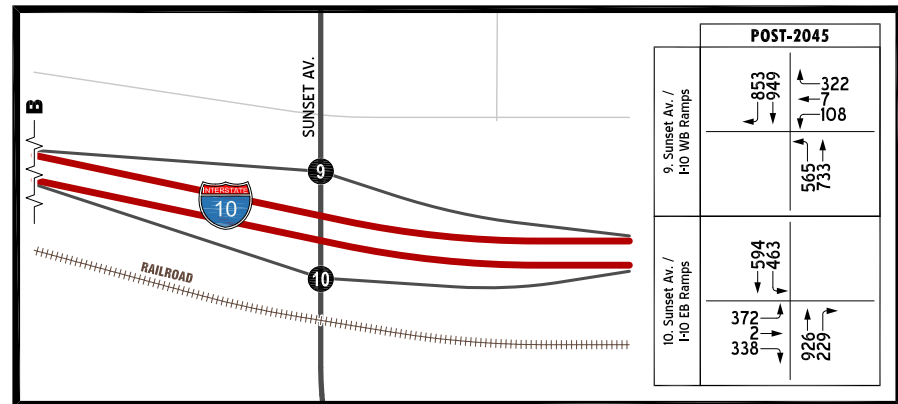
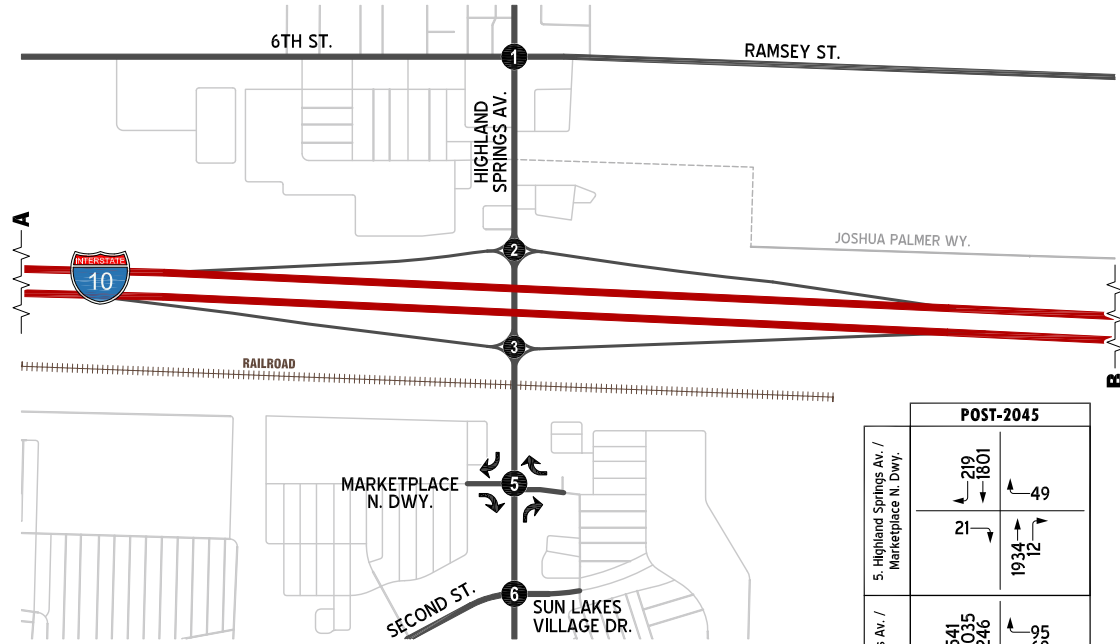


EXHIBIT 18: POST-2045 PM PEAK HOUR INTERSECTION VOLUMES, ALTERNATIVES 3 & 4 (DIVERGING DIAMOND INTERCHANGE)

		POST-2045	
1. Highland Springs Av. / 6th St. - Ramsey St.		189 1369 309 450 878 394	277 1120 577 512 1684 596
2. Highland Springs Av. / I-10 WB Ramps	ALTERNATIVE 3	721 1453 758 556 350 1938	721 1453 758 556 350 1938
	ALTERNATIVE 4	721 1453 758 556 350 1938	721 1453 758 556 350 1938
3. Highland Springs Av. / I-10 EB Ramps	ALTERNATIVE 3	839 577 1443 566 1449 534	839 577 1443 566 1449 534
	ALTERNATIVE 4	839 577 1443 566 1449 534	839 577 1443 566 1449 534

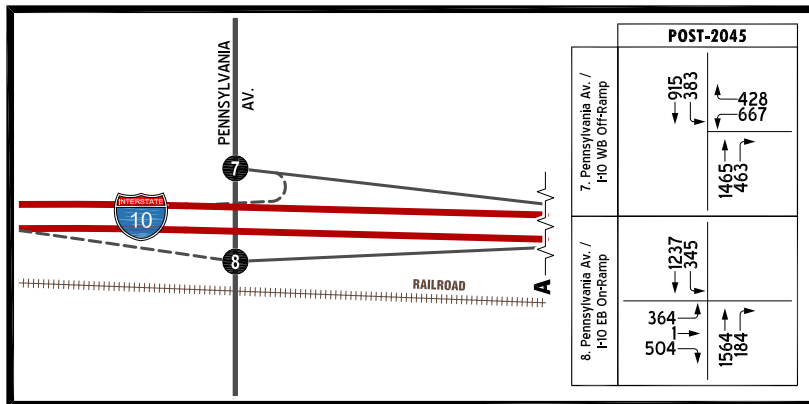


LEGEND:

- ⑨ = INTERSECTION ID
- ↔ = RIGHT-IN/RIGHT-OUT ONLY

		POST-2045	
5. Highland Springs Av. / Marketplace N. Dwy.		219 1801 49	21 1934 12
6. Highland Springs Av. / Second St.		541 1035 246 704 64 39	5 49 95 112 1147 30

PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

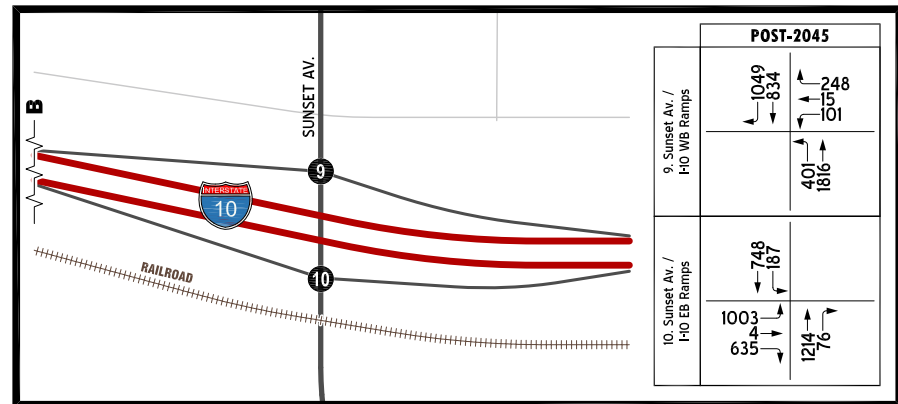


TABLE 1: INTERSECTION ANALYSIS FOR 2020 CONDITIONS

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (Secs)		Level of Service ²	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
1	Highland Springs Av. / 6th St.-Ramsey St.	TS	1	2	1	1	2	1	1	2	1	1	2	d	26.3	35.0	C	C
2	Highland Springs Av. / I-10 WB Ramps																	
	- Alternative 1 (Existing Configuration)	TS	1	2	0	0	2	1	0	0	0	0.5	0.5	1	20.8	29.7	C	C
	- Alternative 2 (Hook Ramps)	TS	0	2	0	1	2	1	0	0	0	1.5	0.5	1	10.3	13.0	B	B
	- Alternatives 3 & 4 (Diverging Diamond)	TS	0	<u>2</u>	0	0	<u>2</u>	1>>	0	0	0	0	0	0	12.6	13.8	B	B
	▪ I-10 WB Off-Ramp (Right Turns)	CFR	0	<u>2</u>	0	0	<u>2</u>	0	0	0	0	0	1>>	0.0	0.0	A	A	
	▪ I-10 WB Off-Ramp (Left Turns) ⁴	CSS	0	<u>2</u>	0	0	<u>2</u>	0	0	0	1	0	0	10.0	13.1	A	B	
3	Highland Springs Av. / I-10 EB Ramps																	
	- Alternative 1 (Existing Configuration)	TS	0	2	1	1	2	0	0.5	0.5	1	0	0	0	21.8	22.7	C	C
	- Alternative 2 (Hook Ramps)	TS	0	2	1	0	2	0	0.5	0.5	1	0	0	0	13.7	15.4	B	B
	- Alternatives 3 & 4 (Diverging Diamond)	TS	0	<u>2</u>	1>>	0	<u>2</u>	0	0	0	0	0	0	0	9.8	14.3	A	B
	▪ I-10 EB Off-Ramp (Right Turns)	CFR	0	<u>2</u>	0	0	<u>2</u>	0	0	0	1>>	0	0	0.0	0.0	A	A	
	▪ I-10 EB Off-Ramp (Left Turns) ⁴	CSS	0	<u>2</u>	0	0	<u>2</u>	0	1	0	0	0	0	13.4	29.5	B	D	
4	Highland Springs Av. / Joshua Palmer Wy.																	
	- Existing Lane Configuration	TS	0	2	0	1	2	0	0	1!	0	0	1!	0	7.5	6.2	A	A
	- Alternative Lane Configurations		N/A												-	-	-	-
5	Highland Springs Av. / Marketplace N. Dwy.	CSS	0	3	0	0	3	d	0	0	1	0	0	1	14.0	18.6	B	C
6	Highland Springs Av. / Second St.	TS	1	3	0	1	3	d	2	1!	0	1	1	0	17.8	39.0	B	D
7	Pennsylvania Av. / I-10 WB Off-Ramp	CSS	0	1	0	0	1	0	0	0	0	0	1!	0	18.9	>80	C	F
8	Pennsylvania Av. / I-10 EB On-Ramp	CSS	0	1	0	0.5	0.5	0	0	0	0	0	0	0	9.5	9.8	A	A
9	Sunset Av. / I-10 WB Ramps	TS	1	2	0	0	2	0	0	0	0	0	1!	0	18.7	19.0	B	B
10	Sunset Av. / I-10 EB Ramps	TS	0	2	0	1	2	0	0	1!	0	0	0	0	43.7	36.2	D	D
11	I-10 WB Ramps / Joshua Palmer Wy.																	
	- Alternative 2 Interchange Configuration	TS	1	0	1	0	0	0	0	1	1	1	1	0	11.5	23.0	B	C
12	I-10 EB Ramps / Frontage Rd.																	
	- Alternative 2 Interchange Configuration	UNC	0	0	0	0	0	0	0	1	0	0	0	1	0.0	0.0	A	A

¹ When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; 0.5 = Shared Lane; 1! = Shared Left/Through/Right Lane; d = Defacto Right Turn Lane; >> = Free-Right Turn Lane; **1** = Improvement

² Per the Highway Capacity Manual 6th Edition (HCM6), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. Delay and level of service is calculated using Synchro 10.1 analysis software.

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

³ TS = Traffic Signal; CSS = Cross-street Stop; UNC = Uncontrolled; CFR = Channelized Free Right

⁴ Delay is calculated using SimTraffic software.

TABLE 2: INTERSECTION ANALYSIS FOR 2040 CONDITIONS

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (Secs)		Level of Service ²	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
1	Highland Springs Av. / 6th St.-Ramsey St.	TS	1	2	1	1	2	1	1	2	1	1	2	d	35.0	54.6	C	D
2	Highland Springs Av. / I-10 WB Ramps																	
	- Alternative 1 (Existing Configuration)	TS	1	2	0	0	2	1	0	0	0	0.5	0.5	1	40.5	43.4	D	D
	- Alternative 2 (Hook Ramps)	TS	0	2	0	1	2	1	0	0	0	1.5	0.5	1	11.1	17.9	B	B
	- Alternatives 3 & 4 (Diverging Diamond)	TS	0	<u>2</u>	0	0	<u>2</u>	1>>	0	0	0	0	0	0	15.7	23.4	B	C
	▪ I-10 WB Off-Ramp (Right Turns)	CFR	0	<u>2</u>	0	0	<u>2</u>	0	0	0	0	0	1>>	0.0	0.0	A	A	
	▪ I-10 WB Off-Ramp (Left Turns) ⁴	CSS	0	<u>2</u>	0	0	<u>2</u>	0	0	0	1	0	0	12.9	16.5	B	C	
3	Highland Springs Av. / I-10 EB Ramps																	
	- Alternative 1 (Existing Configuration)	TS	0	2	1	1	2	0	0.5	0.5	1	0	0	0	41.2	30.8	D	C
	- Alternative 2 (Hook Ramps)	TS	0	2	1	0	2	0	0.5	0.5	1	0	0	0	13.8	18.2	B	B
	- Alternatives 3 & 4 (Diverging Diamond)	TS	0	<u>2</u>	1>>	0	<u>2</u>	0	0	0	0	0	0	0	14.6	23.4	B	C
	▪ I-10 EB Off-Ramp (Right Turns)	CFR	0	<u>2</u>	0	0	<u>2</u>	0	0	1>>	0	0	0	0.0	0.0	A	A	
	▪ I-10 EB Off-Ramp (Left Turns) ⁴	CSS	0	<u>2</u>	0	0	<u>2</u>	0	1	0	0	0	0	25.8	49.5	D	E	
4	Highland Springs Av. / Joshua Palmer Wy.																	
	- Existing Lane Configuration	TS	0	2	0	1	2	0	0	1!	0	0	1!	0	8.9	6.6	A	A
	- Alternative Lane Configurations		N/A												-	-	-	-
5	Highland Springs Av. / Marketplace N. Dwy.	CSS	0	3	0	0	3	d	0	0	1	0	0	1	17.7	22.9	C	C
6	Highland Springs Av. / Second St.																	
6	Highland Springs Av. / Second St.	TS	1	3	0	1	3	d	2	1!	0	1	1	0	18.6	42.3	B	D
7	Pennsylvania Av. / I-10 WB Off-Ramp																	
	- With Reconfigured Interchange	TS	0	1	1	1	1	0	0	0	0	1	0	1	50.7	52.9	D	D
8	Pennsylvania Av. / I-10 EB On-Ramp																	
	- With Reconfigured Interchange	TS	0	1	0	1	1	0	1	0	1	0	0	0	35.6	42.6	D	D
9	Sunset Av. / I-10 WB Ramps	TS	1	2	0	0	2	0	0	0	0	0	1!	0	22.3	26.0	C	C
10	Sunset Av. / I-10 EB Ramps	TS	0	2	0	1	2	0	0	1!	0	0	0	0	47.1	38.0	D	D
11	I-10 WB Ramps / Joshua Palmer Wy.																	
	- Alternative 2 Interchange Configuration	TS	1	0	1	0	0	0	0	1	1	1	1	0	13.5	33.6	B	C
12	I-10 EB Ramps / Frontage Rd.																	
	- Alternative 2 Interchange Configuration	UNC	0	0	0	0	0	0	0	1	0	0	0	1	0.0	0.0	A	A

¹ When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; 0.5 = Shared Lane; 1! = Shared Left/Through/Right Lane; d = Defacto Right Turn Lane; >> = Free-Right Turn Lane; **1** = Improvement

² Per the Highway Capacity Manual 6th Edition (HCM6), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. Delay and level of service is calculated using Synchro 10.1 analysis software.

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

³ TS = Traffic Signal; CSS = Cross-street Stop; UNC = Uncontrolled; CFR = Channelized Free Right

⁴ Delay is calculated using SimTraffic software.

TABLE 3: INTERSECTION ANALYSIS FOR POST-2045 CONDITIONS

(1 of 2)

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (Secs)		Level of Service ²	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
1	Highland Springs Av. / 6th St.-Ramsey St.																	
	- Without Improvements	TS	1	2	1	1	2	1	1	2	1	1	2	d	187.8	216.2	F	F
	- With Improvements	TS	<u>2</u>	<u>3</u>	<u>1></u>	<u>2</u>	<u>3</u>	1	<u>2</u>	<u>3</u>	0	<u>2</u>	<u>3</u>	0	50.0	54.4	D	D
2	Highland Springs Av. / I-10 WB Ramps																	
	- Alternative 1 (Existing Configuration)	TS	1	2	0	0	2	1	0	0	0	0.5	0.5	1	133.3	86.5	F	F
	- With Improvements	TS	<u>2</u>	<u>3</u>	0	0	2	1	0	0	0	<u>2</u>	0	<u>2</u>	48.3	17.2	D	B
	- Alternative 2 (Hook Ramps)	TS	0	2	0	1	2	1	0	0	0	<u>1.5</u>	<u>0.5</u>	<u>1</u>	58.9	85.4	E	F
	- With Additional Improvements	TS	0	<u>3</u>	0	1	2	1	0	0	0	<u>1.5</u>	<u>0.5</u>	<u>1</u>	54.4	41.1	D	D
	- Alternatives 3 & 4 (Diverging Diamond)	TS	0	<u>2</u>	0	0	<u>2</u>	<u>1>></u>	0	0	0	0	0	0	28.0	102.1	C	F
	- With Additional Improvements	TS	0	<u>3</u>	0	0	<u>2</u>	<u>1>></u>	0	0	0	0	0	0	21.4	27.0	C	C
	▪ I-10 WB Off-Ramp (Right Turns)	CFR	0	<u>2</u>	0	0	<u>2</u>	0	0	0	0	0	0	<u>1>></u>	0.0	0.0	A	A
- With Additional Improvements	CFR	0	<u>3</u>	0	0	<u>2</u>	0	0	0	0	0	0	<u>1>></u>	0.0	0.0	A	A	
▪ I-10 WB Off-Ramp (Left Turns) ⁴	CSS	0	<u>2</u>	0	0	<u>2</u>	0	0	0	0	<u>1>></u>	0	0	13.9	75.2	B	F	
- With Additional Improvements ⁴	UNC	0	<u>3</u>	0	0	<u>2</u>	0	0	0	0	<u>1>></u>	0	0	1.0	1.7	A	A	
3	Highland Springs Av. / I-10 EB Ramps																	
	- Alternative 1 (Existing Configuration)	TS	0	2	1	1	2	0	0.5	0.5	1	0	0	0	86.9	110.9	F	F
	- With Improvements	TS	0	<u>3</u>	1	<u>2</u>	2	0	<u>1</u>	1!	1	0	0	0	28.8	30.3	C	C
	- Alternative 2 (Hook Ramps)	TS	0	2	1	0	2	0	0.5	0.5	1	0	0	0	31.5	39.4	C	D
	- Alternatives 3 & 4 (Diverging Diamond)	TS	0	<u>2</u>	<u>1>></u>	0	<u>2</u>	0	0	0	0	0	0	0	14.2	32.3	B	C
	▪ I-10 EB Off-Ramp (Right Turns)	CFR	0	<u>2</u>	0	0	<u>2</u>	0	0	0	<u>1>></u>	0	0	0	0.0	0.0	A	A
	▪ I-10 EB Off-Ramp (Left Turns) ⁴	CSS	0	<u>2</u>	0	0	<u>2</u>	0	<u>1</u>	0	0	0	0	0	34.3	206.2	D	F
- With Additional Improvements ⁴	UNC	0	<u>2</u>	0	0	<u>2</u>	0	<u>1>></u>	0	0	0	0	0	19.8	22.3	C	C	
4	Highland Springs Av. / Joshua Palmer Wy.																	
	- Existing Lane Configuration	TS	0	2	0	1	2	0	0	1!	0	0	1!	0	31.5	39.1	C	D
	- With City of Banning GPBO Improvements	TS	0	<u>3</u>	0	1	2	0	0	1!	0	0	1!	0	30.1	10.6	C	B
	- Alternative Lane Configurations		N/A												-	-	-	-
5	Highland Springs Av. / Marketplace N. Dwy.	CSS	0	3	0	0	3	d	0	0	1	0	0	1	21.3	24.8	C	C
6	Highland Springs Av. / Second St.	TS	1	3	0	1	3	d	2	1!	0	1	1	0	19.5	43.9	B	D
7	Pennsylvania Av. / I-10 WB Off-Ramp																	
	- With Reconfigured Interchange	TS	0	1	<u>1</u>	<u>1</u>	1	0	0	0	0	<u>1</u>	0	1	90.4	192.4	F	F
	- With Additional Interchange Improvements	TS	0	<u>2</u>	<u>1</u>	<u>1</u>	1	0	0	0	0	<u>1</u>	1!	<u>1</u>	37.6	33.2	D	C
8	Pennsylvania Av. / I-10 EB On-Ramp																	
	- With Reconfigured Interchange	TS	0	1	0	<u>1</u>	1	0	<u>1</u>	0	<u>1</u>	0	0	0	166.4	221.6	F	F
	- With Additional Interchange Improvements	TS	0	<u>2</u>	<u>1</u>	<u>1</u>	<u>2</u>	0	<u>1</u>	<u>1!</u>	<u>1</u>	0	0	0	22.5	46.6	C	D
9	Sunset Av. / I-10 WB Ramps																	
	- Without Improvements	TS	1	2	0	0	2	0	0	0	0	0	1!	0	134.9	86.3	F	F
	- With Improvements	TS	1	2	0	0	2	<u>1>></u>	0	0	0	0	1!	0	52.5	24.0	D	C

TABLE 3: INTERSECTION ANALYSIS FOR POST-2045 CONDITIONS

(2 of 2)

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (Secs)		Level of Service ²	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
10	Sunset Av. / I-10 EB Ramps																	
	- Without Improvements	TS	0	2	0	1	2	0	0	1!	0	0	0	0	98.6	303.9	F	F
	- With Improvements	TS	0	2	0	1	2	0	<u>1</u>	1!	<u>1</u>	0	0	0	39.4	50.9	D	D
11	I-10 WB Ramps / Joshua Palmer Wy.																	
	- Alternative 2 Interchange Configuration	TS	<u>1</u>	0	<u>1</u>	0	0	0	0	1	<u>1</u>	<u>1</u>	1	0	73.6	88.3	E	F
	- With Additional Improvements	TS	<u>1</u>	<u>1!</u>	0	0	0	0	0	1	<u>1</u>	<u>1</u>	1	0	19.1	22.4	B	C
12	I-10 EB Ramps / Frontage Rd.																	
	- Alternative 2 Interchange Configuration	UNC	0	0	0	0	0	0	0	<u>1</u>	0	0	0	<u>1</u>	0.0	0.0	A	A

¹ When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; 0.5 = Shared Lane; 1! = Shared Left/Through/Right Lane; d = Defacto Right Turn Lane; >> = Free Turn Lane; 1 = Improvement

² Per the Highway Capacity Manual 6th Edition (HCM6), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. Delay and level of service is calculated using Synchro 10.1 analysis software.

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

³ TS = Traffic Signal; CSS = Cross-street Stop; UNC = Uncontrolled; CFR = Channelized Free Right

⁴ Delay is calculated using SimTraffic software.

physical spacing of intersections. Tables 4 through 6 summarize the results of the queuing analysis for 2020, 2040, and Post-2045 conditions, respectively.

Table 4 summarizes the longest 95th percentile queue length at each location under 2020 peak hour conditions for Alternatives 1 through 4.

Table 5 summarizes the 95th percentile queue length at each location under 2040 peak hour conditions for Alternatives 1 through 4.

Table 6 summarizes the 95th percentile queue length at each location under Post-2045 peak hour conditions for Alternatives 1 through 4.

HCM and SimTraffic queuing analysis calculation worksheets are included in Attachments 1 to 3.

Based upon both 2020, 2040, and Post-2045 peak hour volumes, Tables 4, 5, and 6 indicate that peak hour left turn queues exceed the storage lengths provided on Highland Springs Avenue between the I-10 ramp intersections for Alternative 1 (existing/no build) conditions. This queue length issue illuminates the existing traffic operational issues at the interchange.

TRAFFIC CONTROLS AND INTERSECTION LANE GEOMETRY

Alternative 1

The attached Exhibit 19 shows the intersection traffic control and approach lanes for Alternative 1 (existing/no build).

Exhibit 20 shows the potential additional intersection improvements needed for Post-2045 conditions for Alternative 1 (existing/no build).

Alternative 2

Exhibit 21 illustrates the Alternative 2 (hook ramps) intersection traffic controls and approach lanes. The alignment of Joshua Palmer Way is proposed to be modified and connect directly opposite the existing westbound on-ramp. This is an important feature because it consolidates/corrects the awkward existing off-set intersection at Joshua Palmer/Highland Springs. The existing WB off-ramp is relocated easterly and intersects Joshua Palmer in a hook ramp configuration. In addition, a new westbound on-ramp is provided from Joshua Palmer Way east of Highland Spring Avenue. The eastbound off-ramp is also reconfigured to provide a new EB on-ramp access west of Highland Springs Avenue.

Exhibit 22 shows potential additional intersection improvements needed for Post-2045 conditions for Alternative 2 (hook ramps).

Alternatives 3 and 4

Exhibit 23 depicts the intersection traffic controls and approach lanes with the potential Diverging Diamond Interchange (DDI) features incorporated into Alternatives 3 and 4. The DDI is an alternative which significantly reduces the number of vehicle-to-vehicle conflict points compared to a conventional diamond interchange.

TABLE 4: QUEUING ANALYSIS SUMMARY FOR 2020 CONDITIONS

ID	Intersection	Turning Movement Lane	Storage Length Provided ² (feet)	95th Percentile Queue Length ¹ Per Lane (feet)	
				AM	PM
ALTERNATIVE 1 (EXISTING CONFIGURATION)					
2	Highland Springs Av. / I-10 WB Ramps	NBL	125	225	220
		WBL/T	500	455	>500
		WBR	350	400	512
3	Highland Springs Av. / I-10 EB Ramps	NBR	440	150	179
		SBL	125	212	187
		EBL/T	500	273	336
		EBR	640	204	304
ALTERNATIVE 2 (HOOK RAMPS)					
2	Highland Springs Av. / I-10 WB Ramps - Joshua Palmer Wy.	SBL	125	35	43
		SBR	150	102	91
		WBL	300	167	128
		WBR	300	211	229
3	Highland Springs Av. / I-10 EB Ramps	NBR	440	136	187
		EBL/T	500	346	417
		EBR	500	289	314
11	I-10 WB Ramps / Joshua Palmer Wy.	NBL	300	106	102
		NBR	300	38	34
		EBR	150	68	97
		WBL	150	34	45
ALTERNATIVE 3 (DIVERGING DIAMOND INTERCHANGE)					
2	Highland Springs Av. / I-10 WB Ramps	NBT	300	127	111
		SBT	300	66	46
		WBL	500	100	117
3	Highland Springs Av. / I-10 EB Ramps	NBT	480	140	198
		SBT	300	160	166
		EBL	500	119	120
ALTERNATIVE 4 (MODIFIED DIVERGING DIAMOND INTERCHANGE)					
2	Highland Springs Av. / I-10 WB Ramps	NBT	525	124	127
		SBT	300	46	46
		WBL	500	110	129
3	Highland Springs Av. / I-10 EB Ramps	NBT	280	189	191
		SBT	525	200	249
		EBL	500	126	121

¹ Queue length calculated using SimTraffic.

BOLD = 95th percentile exceeds available storage length.

² 100 = Existing; **100** = Proposed length of storage

TABLE 5: QUEUING ANALYSIS SUMMARY FOR 2040 CONDITIONS

ID	Intersection	Turning Movement Lane	Storage Length Provided ² (feet)	95th Percentile Queue Length ¹ Per Lane (feet)	
				AM	PM
ALTERNATIVE 1 (EXISTING CONFIGURATION)					
2	Highland Springs Av. / I-10 WB Ramps	NBL	125	202	237
		WBL/T	500	>500	>500
		WBR	350	>500	491
3	Highland Springs Av. / I-10 EB Ramps	NBR	440	460	458
		SBL	125	193	159
		EBL/T	500	338	>500
		EBR	640	217	337
ALTERNATIVE 2 (HOOK RAMPS)					
2	Highland Springs Av. / I-10 WB Ramps - Joshua Palmer Wy.	SBL	125	58	85
		SBR	150	133	144
		WBL	300	165	273
		WBR	300	176	318 ³
3	Highland Springs Av. / I-10 EB Ramps	NBR	440	273	286
		EBL/T	500	406	>500
		EBR	500	299	285
11	I-10 WB Ramps / Joshua Palmer Wy.	NBL	300	103	114
		NBR	300	38	31
		EBR	150	117	104
		WBL	150	58	57
ALTERNATIVE 3 (DIVERGING DIAMOND INTERCHANGE)					
2	Highland Springs Av. / I-10 WB Ramps	NBT	300	130	135
		SBT	300	46	49
		WBL	500	133	250
3	Highland Springs Av. / I-10 EB Ramps	NBT	480	193	184
		SBT	300	169	183
		EBL	500	206	432
ALTERNATIVE 4 (MODIFIED DIVERGING DIAMOND INTERCHANGE)					
2	Highland Springs Av. / I-10 WB Ramps	NBT	525	186	212
		SBT	300	49	62
		WBL	500	131	173
3	Highland Springs Av. / I-10 EB Ramps	NBT	280	205	179
		SBT	525	220	225
		EBL	500	311	400

¹ Queue length calculated using SimTraffic.

BOLD = 95th percentile exceeds available storage length.

² 100 = Existing; **100** = Proposed length of storage

³ Excess in queue can be accommodated within transition lane.

TABLE 6: QUEUING ANALYSIS SUMMARY FOR POST-2045 CONDITIONS

ID	Intersection	Turning Movement Lane	Storage Length Provided ² (feet)	95th Percentile Queue Length ¹ Per Lane (feet)	
				AM	PM
ALTERNATIVE 1 (EXISTING CONFIGURATION)					
2	Highland Springs Av. / I-10 WB Ramps	NBL	125	169	209
		WBL	500	176	>500
		WBR	350	438	478
3	Highland Springs Av. / I-10 EB Ramps	NBR	440	318	375
		SBL	125	194	188
		EBL	500	375	400
		EBR	640	322	362
ALTERNATIVE 2 (HOOK RAMPS)					
2	Highland Springs Av. / I-10 WB Ramps - Joshua Palmer Wy.	SBL	125	30	55
		SBR	150	134	130
		WBL	300	309 ³	252
		WBR	300	337 ³	272
3	Highland Springs Av. / I-10 EB Ramps	NBR	440	437	145
		EBL/T	500	>500	>500
		EBR	500	349	270
11	I-10 WB Ramps / Joshua Palmer Wy.	NBL	300	82	114
		NBL/R	300	127	31
		EBR	150	108	104
		WBL	150	56	57
ALTERNATIVE 3 (DIVERGING DIAMOND INTERCHANGE)					
2	Highland Springs Av. / I-10 WB Ramps	NBT	300	98	103
		SBT	300	65	64
		WBL	500	21	149
3	Highland Springs Av. / I-10 EB Ramps	NBT	480	184	180
		SBT	300	180	143
		EBL	500	177	175
ALTERNATIVE 4 (MODIFIED DIVERGING DIAMOND INTERCHANGE)					
2	Highland Springs Av. / I-10 WB Ramps	NBT	525	115	115
		SBT	300	51	74
		WBL	500	10	238
3	Highland Springs Av. / I-10 EB Ramps	NBT	280	191	181
		SBT	525	109	229
		EBL	500	279	184

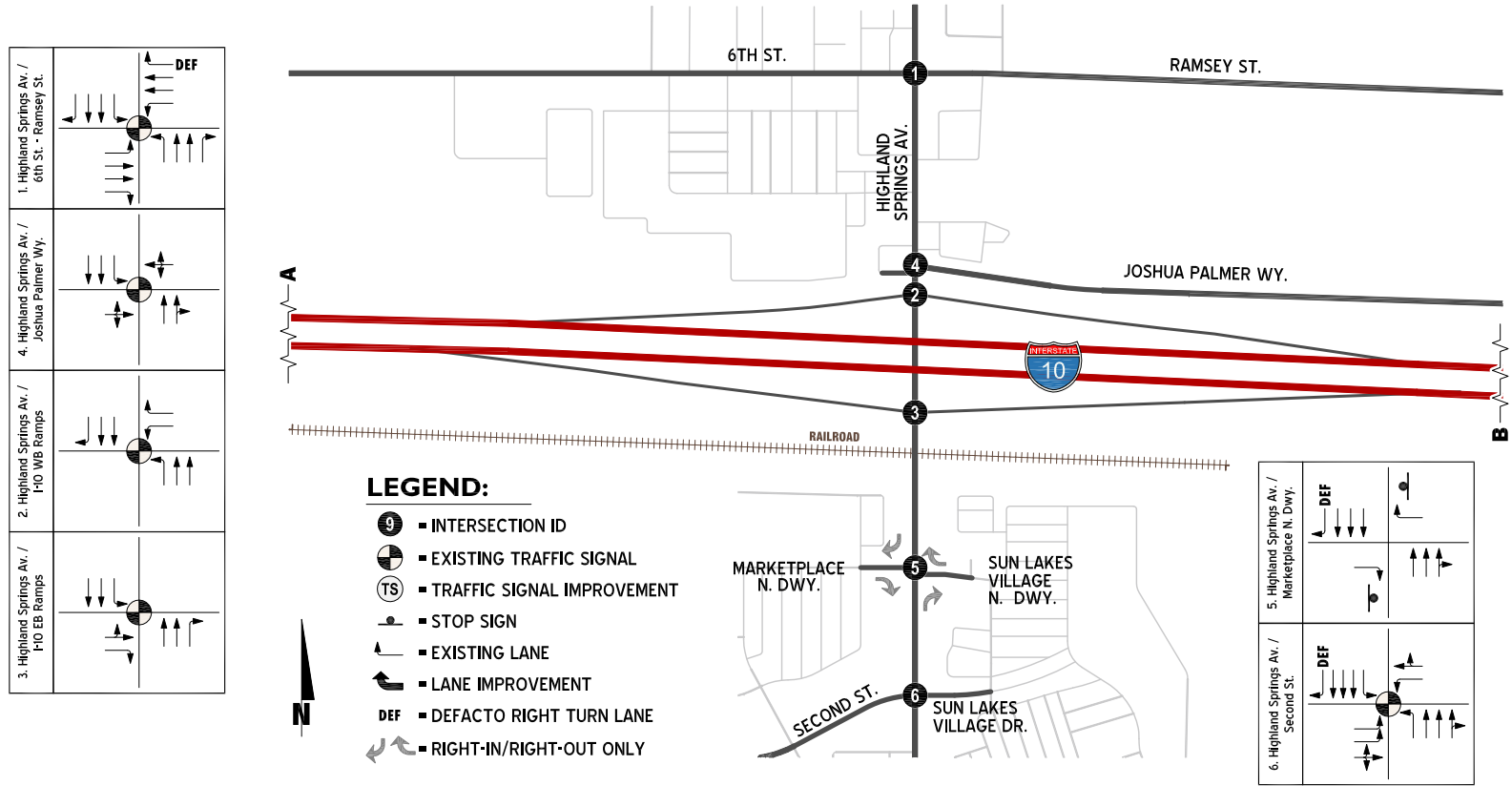
¹ Queue length calculated using SimTraffic.

BOLD = 95th percentile exceeds available storage length.

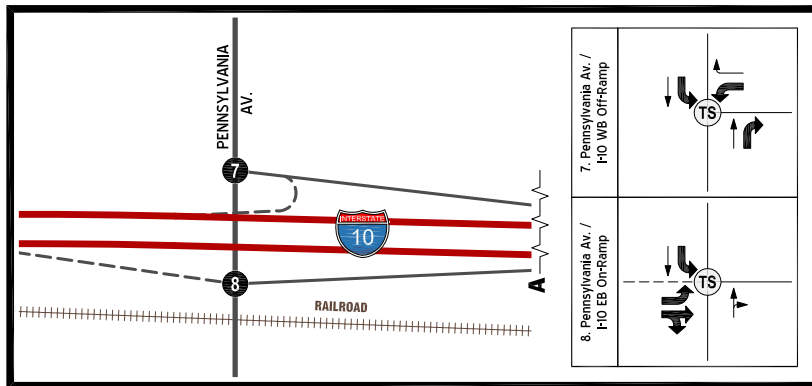
² 100 = Existing; **100** = Proposed length of storage

³ Excess in queue can be accommodated within transition lane.

EXHIBIT 19: ALTERNATIVE 1 (EXISTING CONFIGURATION) INTERSECTION TRAFFIC CONTROLS AND APPROACH LANES



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

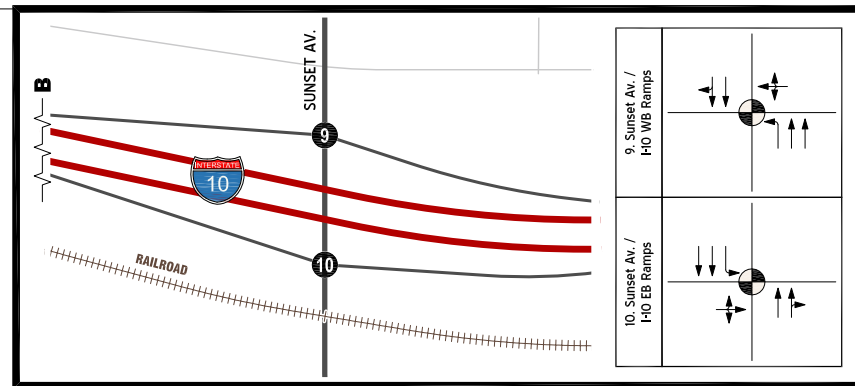
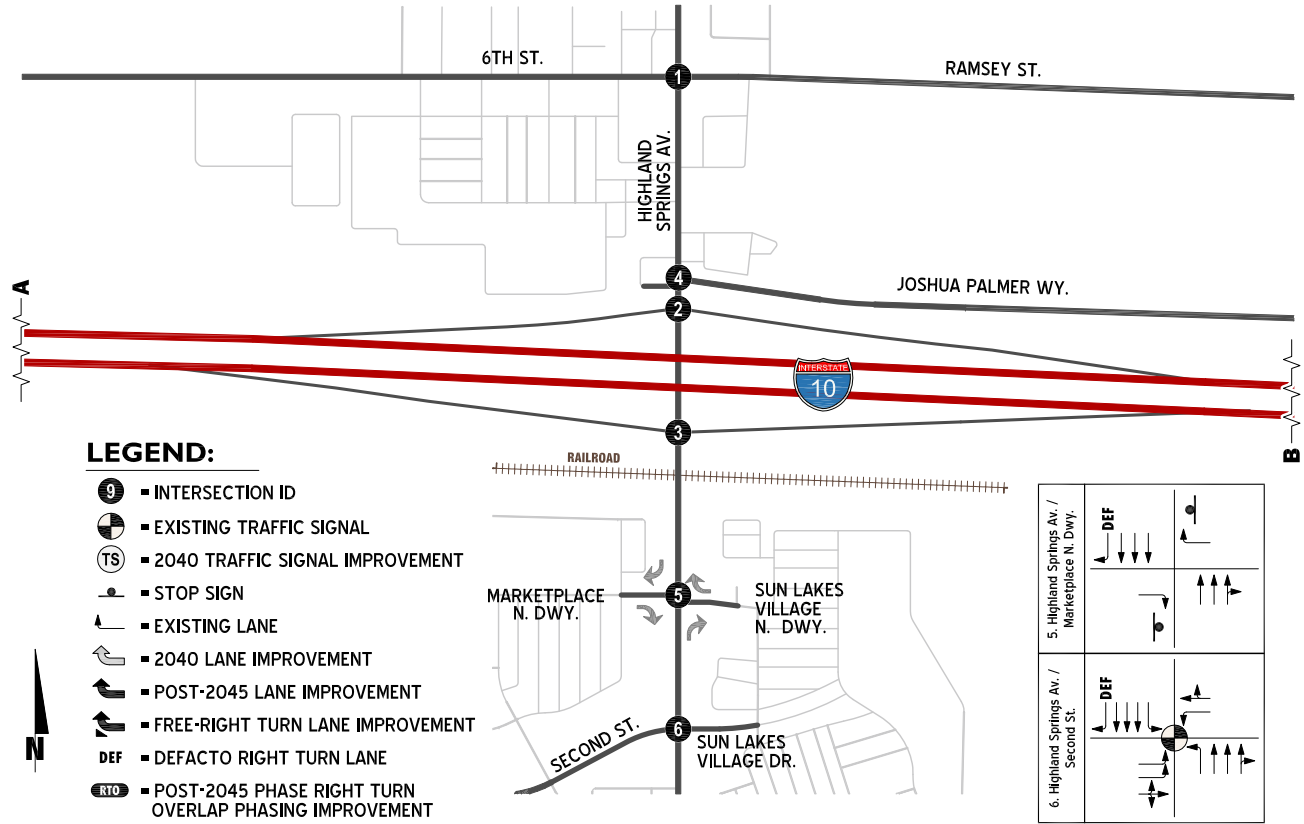
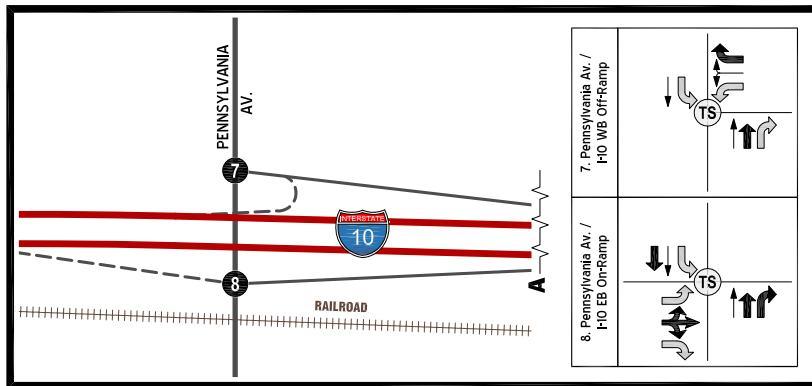


EXHIBIT 20: ADDITIONAL IMPROVEMENTS NEEDED FOR POST-2045 ALTERNATIVE 1 (EXISTING CONFIGURATION) CONDITIONS

1. Highland Springs Av. / 6th St. - Ramsey St.	
4. Highland Springs Av. / Joshua Palmer Wy.	
2. Highland Springs Av. / I-10 WB Ramps	
3. Highland Springs Av. / I-10 EB Ramps	



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

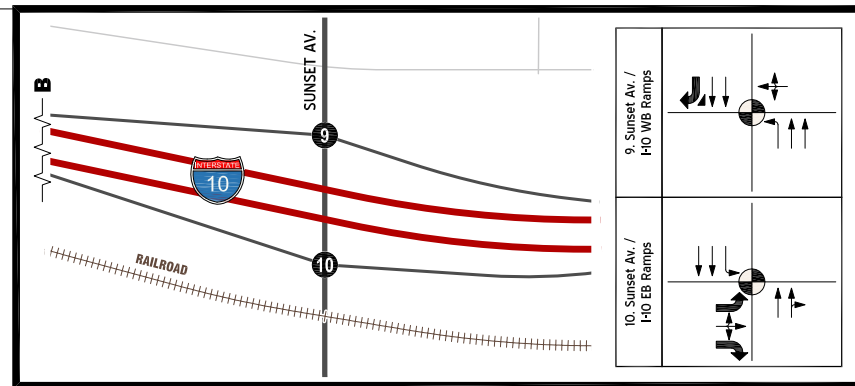
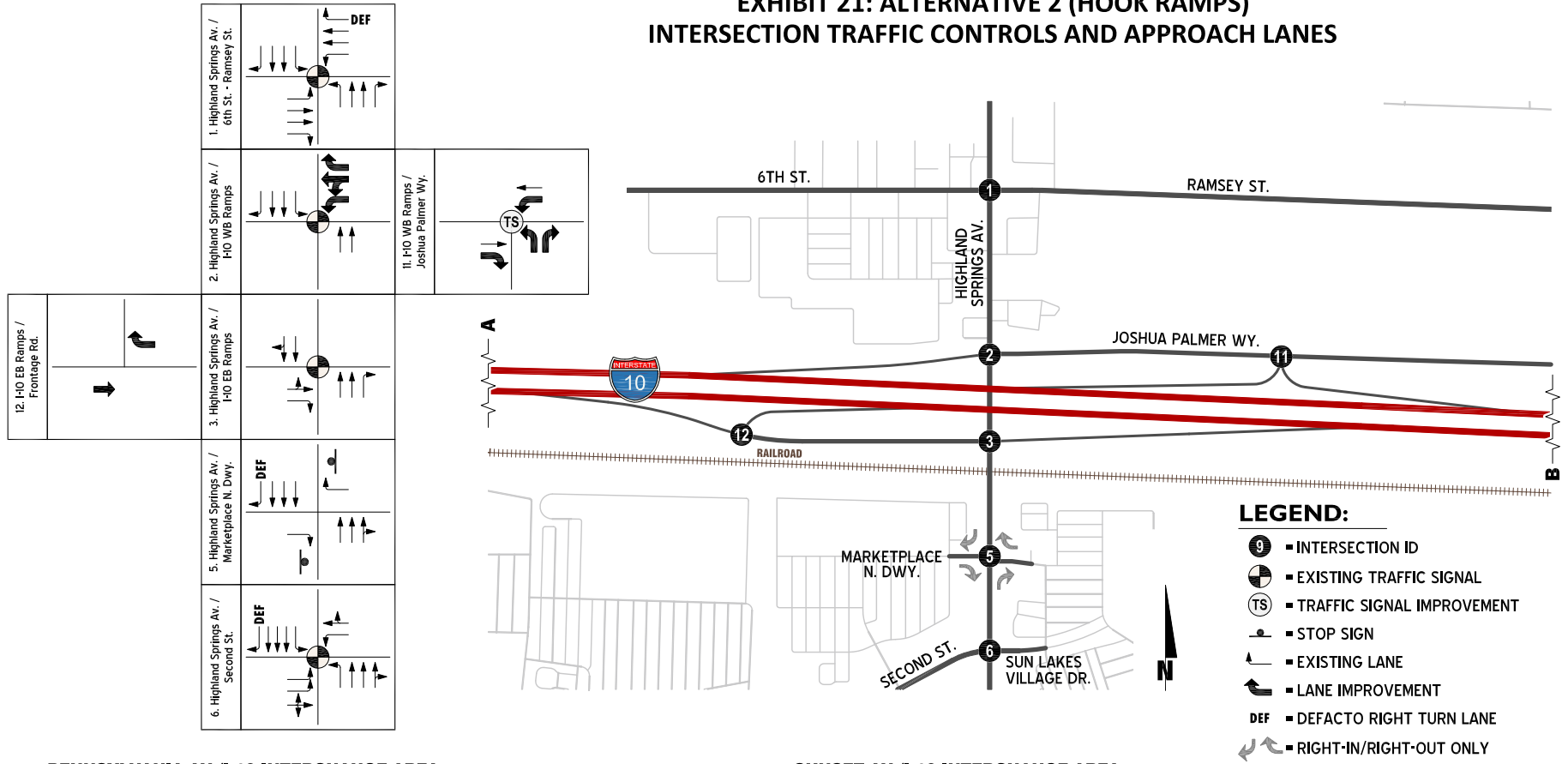
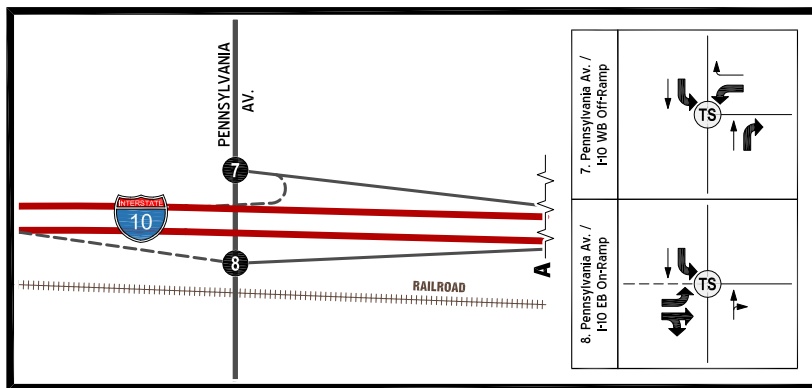


EXHIBIT 21: ALTERNATIVE 2 (HOOK RAMPS) INTERSECTION TRAFFIC CONTROLS AND APPROACH LANES



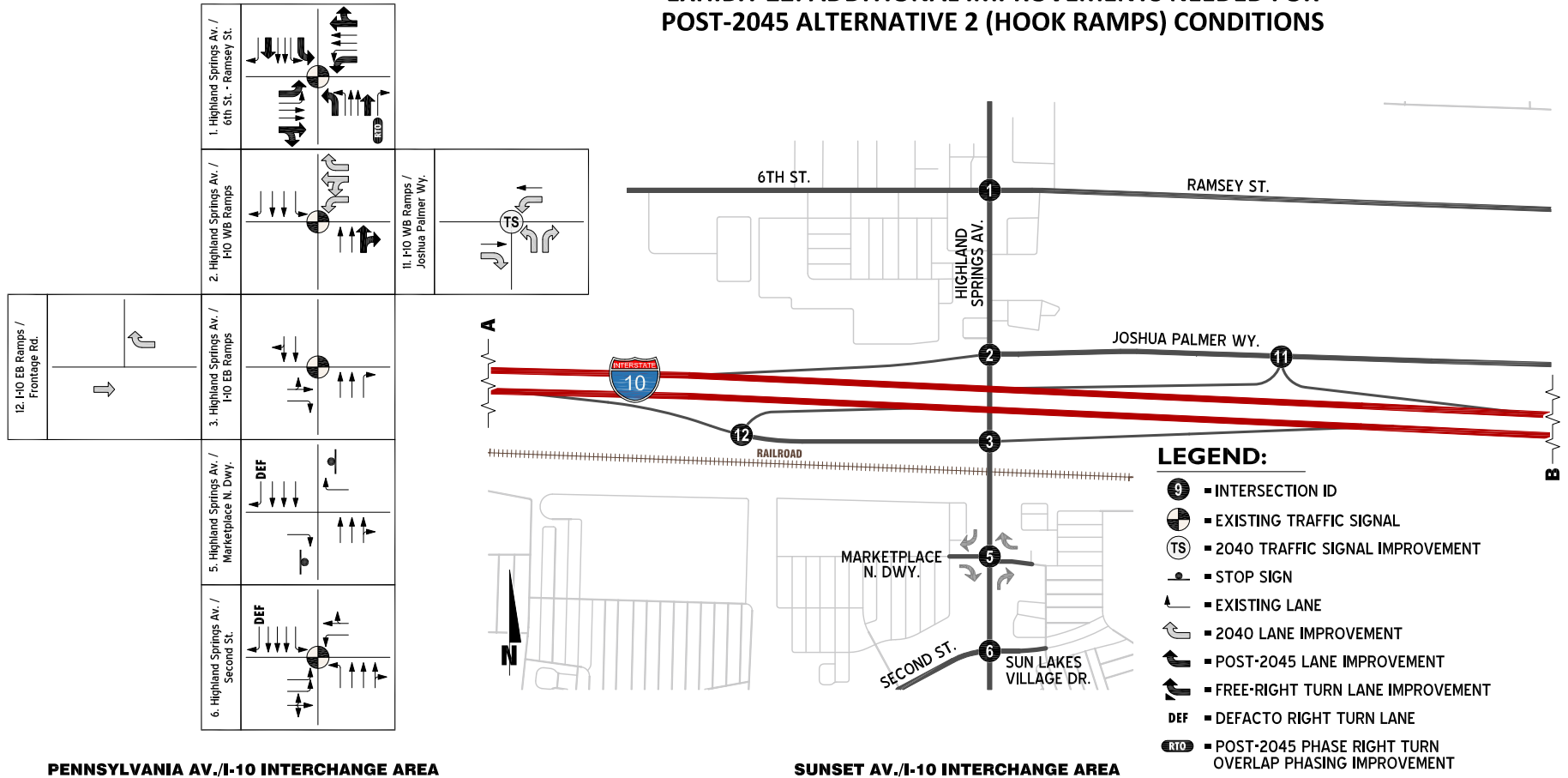
PENNSYLVANIA AV./I-10 INTERCHANGE AREA



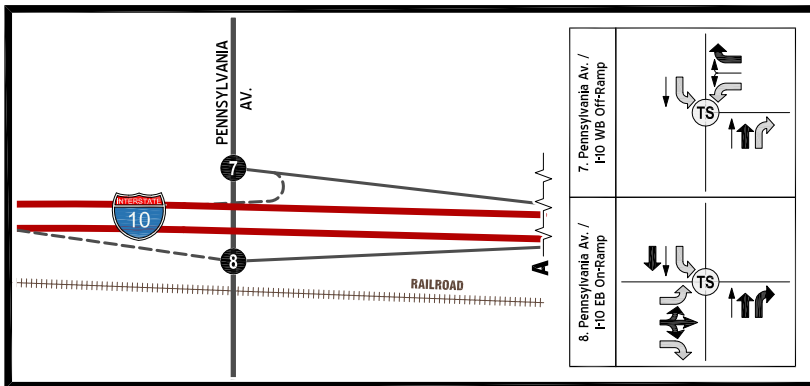
SUNSET AV./I-10 INTERCHANGE AREA



EXHIBIT 22: ADDITIONAL IMPROVEMENTS NEEDED FOR POST-2045 ALTERNATIVE 2 (HOOK RAMPS) CONDITIONS



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

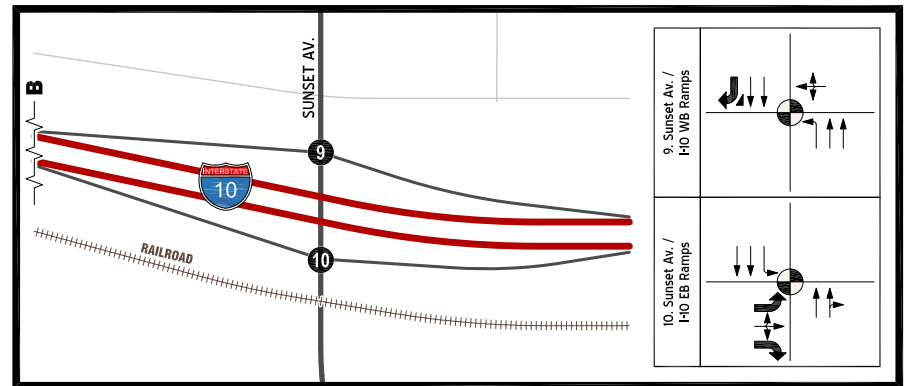
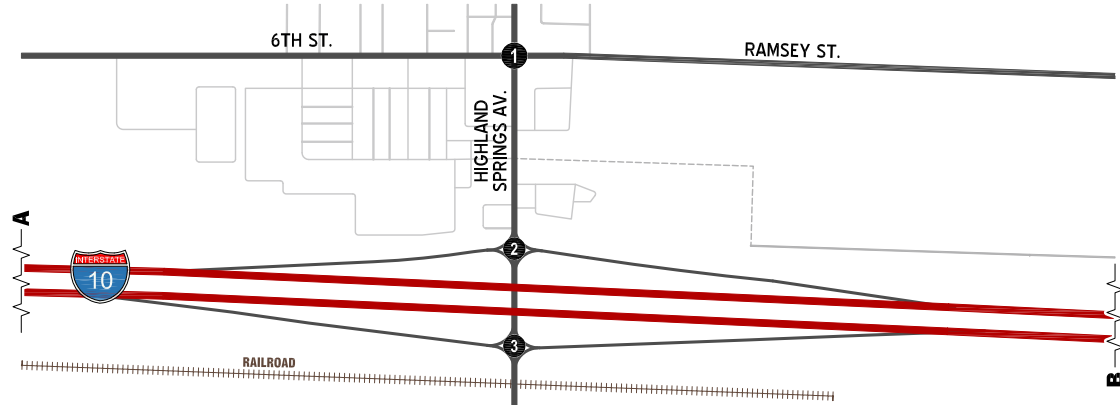
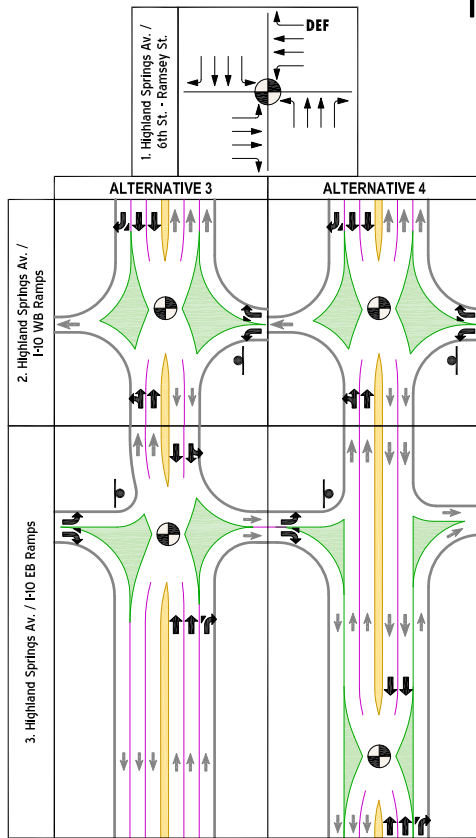
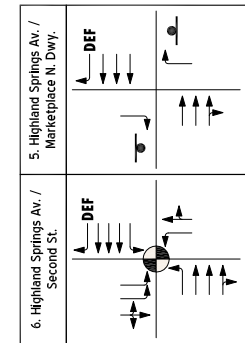


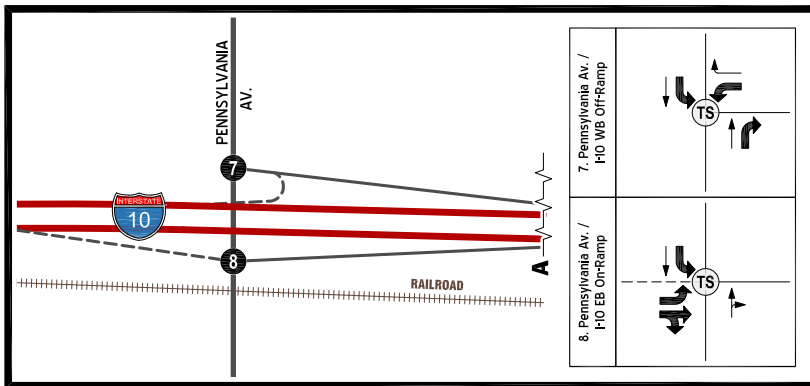
EXHIBIT 23: ALTERNATIVES 3 & 4 (DIVERGING DIAMOND INTERCHANGE) INTERSECTION TRAFFIC CONTROLS AND APPROACH LANES



- LEGEND:**
- ⑨ = INTERSECTION ID
 - ⊙ = EXISTING TRAFFIC SIGNAL
 - ⊙(TS) = TRAFFIC SIGNAL IMPROVEMENT
 - ⊙ = STOP SIGN
 - ↔ = EXISTING LANE
 - ↔ = LANE IMPROVEMENT
 - ↔ = FREE-RIGHT TURN LANE IMPROVEMENT
 - DEF = DEFACTO RIGHT TURN LANE
 - ↔ = RIGHT-IN/RIGHT-OUT ONLY



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA

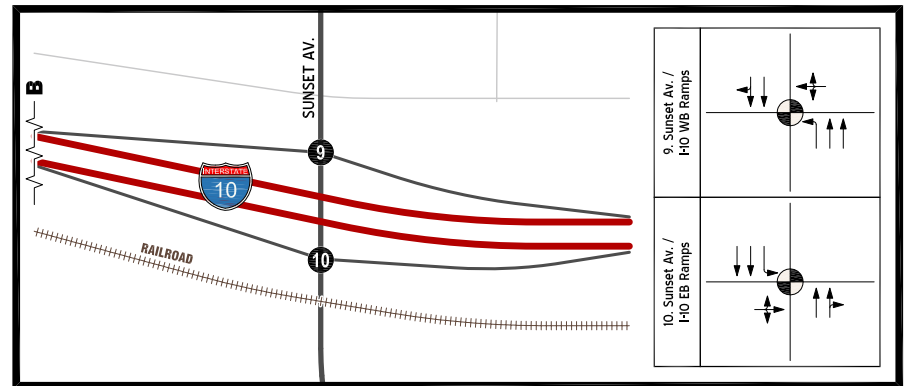


Exhibit 24 shows the potential additional intersection improvements needed for Post-2045 conditions for Alternatives 3 and 4 (DDI).

The primary difference between a DDI and a conventional diamond interchange is the design of directional crossovers on either side of the interchange. This eliminates the need for left turning vehicles to cross the paths of approaching through vehicles.

By shifting cross street traffic to the left side of the street between the signalized crossover intersections, vehicles on the crossroad making a left turn on to or off of ramps do not conflict with vehicles approaching from other directions.

The DDI design has been shown to reduce the severity of conflicts, as conflicts between left-turning movements and the opposing through movement are eliminated. The remaining conflicts are reduced to merge conflicts for turning movements, and the reduced speed crossover conflict of the two through movements.

The difference between Alternative 3 and Alternative 4 involves the location of the southerly crossover intersection (intersection #3). In Alternative 3, this crossover intersection occurs north of the railroad. The crossover intersection occurs south of the railroad in Alternative 4.

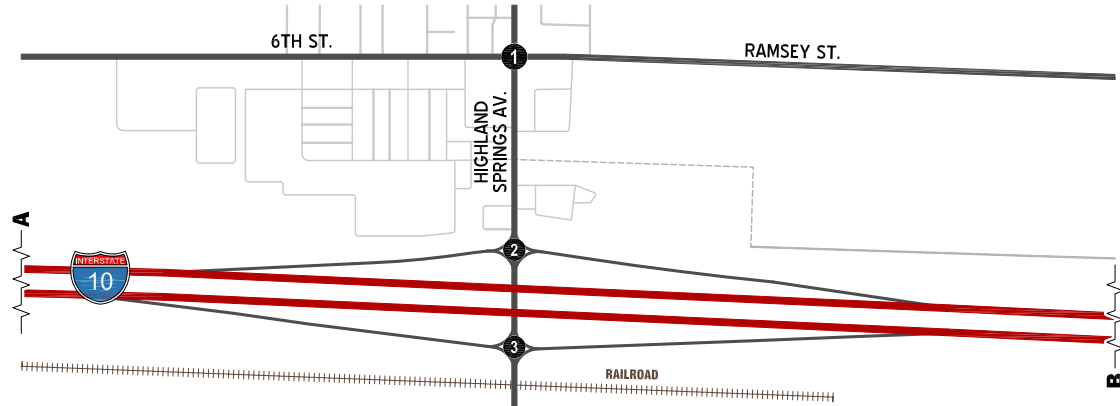
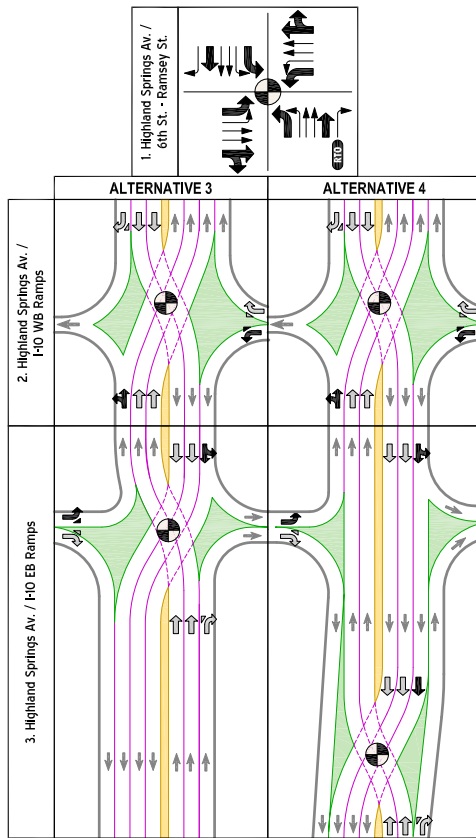
NEXT STEPS

This draft TFOA presents the methodology and initial findings of the operational analysis, for review by RCTC, Caltrans and adjacent Cities. Electronic data will be provided as needed. Urban Crossroads, Inc will respond to comments and revise the analysis, as necessary.

It is anticipated that this technical information will eventually be folded into the Traffic Engineering Performance Assessment (TEPA) to be prepared for the project. The intent of the TEPA is to identify existing and future operational deficiencies and recommend alternatives to improve overall traffic conditions, including pedestrian and bicycle accommodations.

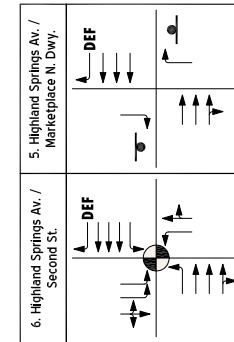
At this time, the improvements under consideration are designed to reduce vehicle delays and queuing in the interchange area, as opposed to the inducement of new travel activities. As such, the project alternatives are not anticipated to increase the amount of existing or future vehicle miles travelled (VMT) in the study area.

EXHIBIT 24: ADDITIONAL IMPROVEMENTS NEEDED FOR POST-2045 ALTERNATIVES 3 & 4 (DIVERGING DIAMOND INTERCHANGE) CONDITIONS

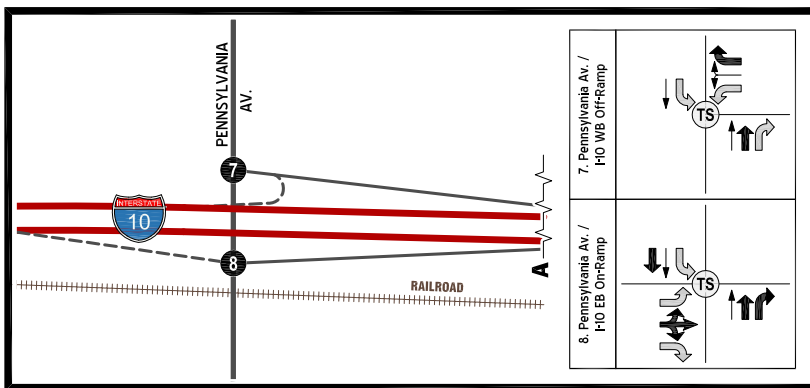


LEGEND:

- ⑨ = INTERSECTION ID
- ⊙ = EXISTING TRAFFIC SIGNAL
- Ⓣ = 2040 TRAFFIC SIGNAL IMPROVEMENT
- ⊥ = STOP SIGN
- ↔ = EXISTING LANE
- ↔ = 2040 LANE IMPROVEMENT
- ↔ = POST-2045 LANE IMPROVEMENT
- ↔ = FREE-RIGHT TURN LANE IMPROVEMENT
- DEF = DEFACTO RIGHT TURN LANE
- RTO = POST-2045 PHASE RIGHT TURN OVERLAP PHASING IMPROVEMENT



PENNSYLVANIA AV./I-10 INTERCHANGE AREA



SUNSET AV./I-10 INTERCHANGE AREA



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