

S.R. 92 Access & Circulation Study

January 2022



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S.R. 92 Access & Circulation Study

prepared by
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January 6, 2022



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1 SUMMARY OF FINDINGS

The Utah Department of Transportation, Mountainland Association of Governments, and the cities of Lehi, Highland, and Alpine joined commissioned a study to evaluate traffic operations and connectivity for the eastern portion of State Route 92 (Timpanogos Highway). The study considered major intersection from Lehi Center Street to Canyon Road. Several off-corridor locations were evaluated where existing streets could be extended or connected to improve the overall street network connectivity in the area. The *Utah Street Connectivity Guide* describes how good street connectivity provides benefits to mobility, transportation choices, emergency services, safety, and the economy.

Three specific locations were evaluated for increased street connectivity. From a traffic volume perspective, they generally reduced projected future volumes on S.R. 92 by a few percentage points and would result in slightly better operational performance on the corridor. However, even with relatively minor traffic performance benefits, the connections should still be seriously considered due to the other benefits that good street connectivity can provide.

Currently, traffic on the S.R. 92 generally operates well with minor exceptions at 5300 West (S.R. 74) and Canyon Road. A traffic signal at Canyon Road will fix the issues there and should be able to accommodate future demand as well. A recent study found that a signal is warranted at Canyon Road. By 2050 the major intersections from Highland Boulevard to North County Boulevard are all projected to operate at LOS E or F if no modifications are made. Three travel lanes in each direction will be needed on S.R. 92 from the Commuter Lanes on the west through the 5300 West intersection on the east to meet the anticipated traffic demands. The geometric intersection improvements identified for each intersection are:

- **Highland Boulevard** – Dual westbound left turn lanes, which would require some widening on the south side of the intersection to accommodate two receiving lanes.
- **6000 West** – Three eastbound and westbound through lanes and exclusive northbound and southbound right turn lanes. The analysis shows that exclusive right turn lanes would not be needed to achieve LOS D, but they would be valuable for safety and driver comfort and should still be considered.
- **6400 West** – Three eastbound and westbound through lanes.
- **5300 West (S.R. 74)** – Three eastbound and westbound through lanes and dual eastbound left turn lanes or two northbound and southbound through lanes and dual eastbound left turn lanes.
- **4800 West/North County Boulevard (S.R. 129)** – Two northbound and southbound through lanes.

A need was also identified for widening one the main access roads to Alpine. 4800 West/Canyon Crest Road was selected as the preferred roadway due to slightly higher future volumes and better regional connectivity since it connects to North County Boulevard, which provides good access to I-15.

Concept designs and cost estimates were prepared for improvement options selected by the study team for the 6000 West, 5300 West, and the 4800 West/Canyon Crest Road widening, which includes improvements to the S.R. 92 intersection. A phasing analysis was not completed, but since the 5300 West intersection already operates at LOS E, it would be the location with the highest priority. The concept design for 5300 West is quite robust with additional through lanes on all four legs and dual eastbound left turn lanes. Those improvements could also be phased which would lower the initial cost but would result in additional projects at that same intersection in the future when more improvements are needed.

2 INTRODUCTION

In collaboration with Utah Department of Transportation (UDOT), Mountainland Association of Governments (MAG), Lehi City, Highland City, and Alpine City, an access and circulation study was conducted for the eastern portion of S.R. 92 (Timpanogos Highway). The study primarily considered major intersections from Lehi Center Street to Canyon Road. Several roadway connectivity options were evaluated to understand how they would affect traffic patterns and support the roadway grid network. Concept designs and cost estimates were prepared for roadway widening projects at three separate intersections. **Figure 1** shows the study area.

3 ANALYSIS METHODOLOGY

The analyses performed for this study used the jointly owned and maintained Wasatch Front Regional Council (WFRC)/Mountainland Associated of Governments (MAG) travel demand model and the Synchro traffic operations analysis software. This section describes how each of these tools were used.

3.1 Travel Demand Modeling

The WFRC/MAG travel demand model (TDM) is a tool used to predict future travel and traffic volumes for the Wasatch Front area. WFRC and MAG are the Metropolitan Planning Organizations for the Wasatch Front and are responsible for coordinating transportation planning in the region. MAG is responsible for Utah County and WFRC for Weber, Davis, and Salt Lake Counties. Version 8.3.1 of the travel demand model was used for this study.

The travel demand model has two primary inputs: land use data and transportation system data. The land use data consists of residential and employment data for the entire region. This data is prepared in geographic blocks called Traffic Analysis Zones (TAZs). The travel model inputs are prepared for a base year, which in this case was 2019, and for a future year, which in this case was 2050. These projections are used by the MPOs to develop the Regional Transportation Plan (RTP), which is the plan for the development of the future transportation system. The RTP includes a list of projects that are planned to meet future transportation needs over a 20+ year horizon. The future land use projections for the study area were reviewed with representatives from each city to ensure that the RTP projections still conformed with city plans. **Appendix A** contains figures showing the assumed study area population and employment growth.

Using the land use and transportation system inputs, the travel model predicts how many trips will be generated in the region, where those trips are going, the mode by which they will be made, and the transportation facilities that will be used to get there.

MODEL CALIBRATION

A segment-by-segment comparison was made between model volumes and observed traffic volumes. Daily volume data was obtained from UDOT for the study area, including published *Traffic on Utah Highways* volumes and volumes from UDOT's Automated Traffic Signal Performances Measures (ATSPM) system. A review of the initial base year travel demand model results showed that the model was low on most roads in the study area, including S.R. 92, 5300 West (S.R. 74), North County Boulevard (S.R. 129), and Canyon Road. Testing showed that free-flow speed adjustments were not sufficient to bring the model volumes up to the observed target volumes. Therefore, adjustments were made to the trip generation rates in the study area to increase the number of vehicles on the roadway network and bring the model volumes closer to their target values.

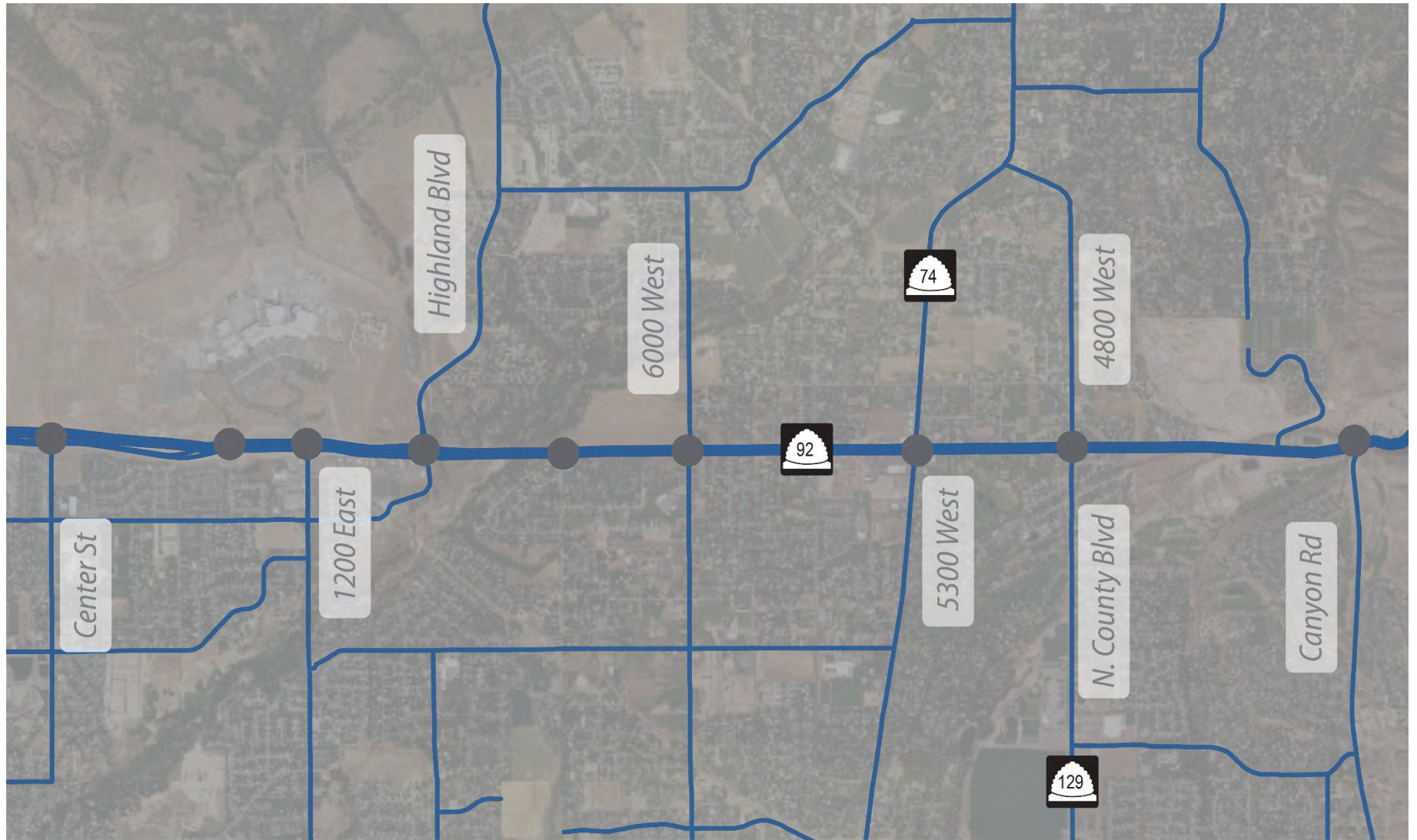


Figure 1: Study Area

3.2 Traffic Operations Analysis

The Synchro software was used to evaluate traffic operations. Synchro is a deterministic signal timing and traffic analysis tool that was selected for this study because it allows for the evaluation of individual intersections based on *Highway Capacity Manual* (HCM) guidelines.

Existing Traffic Volumes

To prepare the Synchro model, initial existing traffic volumes were collected on Tuesday, August 4, 2020. Due on construction on the east end of the corridor, supplemental traffic volumes were collected where the construction had taken place on Tuesday, September 1, 2020. Intersection turning movement counts were collected between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM at:

- Timpanogos Highway (S.R. 92) & Lehi Center Street
- Timpanogos Highway (S.R. 92) & Micron Delivery Access
- Timpanogos Highway (S.R. 92) & 1200 East
- Timpanogos Highway (S.R. 92) & Highland Boulevard
- Timpanogos Highway (S.R. 92) & 6400 West
- Timpanogos Highway (S.R. 92) & 6000 West
- Timpanogos Highway (S.R. 92) & Alpine Highway (S.R. 74)
- Timpanogos Highway (S.R. 92) & North County Boulevard (S.R. 129)
- Timpanogos Highway (S.R. 92) & Canyon Road
- Timpanogos Highway Commuter Lane (S.R. 92) & Center Street Offramps
- Timpanogos Highway Commuter Lane (S.R. 92) & WB Highland Drive Onramp
- Timpanogos Highway Commuter Lane (S.R. 92) & 1200 East Ramps

Generally, the peak hours were determined to be from 7:15 AM to 8:15 AM for the AM peak and 5:00 PM to 6:00 PM for the PM peak. Due to the coronavirus pandemic, 2020 traffic volumes were lower than normal conditions, particularly during the peak hours. ATSPM data was used to compare 2019 traffic volumes to 2020 from which volume adjustment factors were developed for the S.R. 92 corridor. The AM peak hour volumes were increased by an average of 27% and the PM peak hour volumes by an average of 12%. The adjusted volumes were then balanced along the corridor to ensure that the volume leaving one intersection was the same as the volume arriving at the next intersection. **Appendix B** contains a figure showing the adjusted and balance estimated 2020 peak hour intersection volumes.

Existing Signal Timing

Existing traffic signal timing data were obtained from the UDOT Traffic Operations Center and entered into the Synchro models. The intersections were modeled based on existing conditions, including the number of lanes, exclusive turn lanes, storage lengths and movement volumes. The study area was modeled as a network; however, the analysis was completed for each intersection independently.

Future Traffic Volumes

Estimated AM and PM peak hour volumes were developed for 2050 using principles described in the National Highway Cooperative Research Program (NCHRP) Report 255 document. The 2050 peak hour intersection volumes were developed from the existing adjusted and balanced peak hour traffic volumes. The WFRC/MAG travel demand model was run for the base year (2019) and for the future year (2050) and the difference between these models was used to estimate the traffic increase for the inbound and outbound direction for each intersection leg. The turning movement volumes were then balanced to ensure the correct number of inbound and outbound vehicles on each leg of the intersection. The 2050 future volumes are found in **Appendix B**.



3.3 Measures of Effectiveness

Measures of Effectiveness (MOE) are used to evaluate the analysis objectives and compare the results of the various concepts. They quantify the results of the analysis and is often expressed as levels on how well the concept will perform.

For each Synchro analysis, the intersection results were calculated by Synchro following the procedures and equations described in the 2010 HCM. Two key measures of effectiveness were extracted from the Synchro models. The first was average delay per vehicle for the overall intersection and for each turning movement, which was used to determine level of service (LOS), as described in the HCM. LOS describes the operating performance of an intersection or roadway, is measured quantitatively, and is reported on a scale from A to F, with A representing the best performance and F the worst. For signalized intersections, the overall intersection LOS is most commonly reported, while for unsignalized intersections, LOS is most commonly reported based for the approach with the highest delay. **Table 1** provides a brief explanation for each LOS and the associated average delay per vehicle for unsignalized and signalized intersections.

Table 1. Intersection Level of Service Criteria

LOS	Description	2050 PM Peak Hour	
		Unsignalized	Signalized
A	Free Flow Operations / Insignificant Delay	0 ≤ 10	0 ≤ 10
B	Smooth Operations / Short Delays	>10.0 and ≤ 15.0	> 10 and ≤ 20
C	Stable Operations / Acceptable Delays	>15.0 and ≤ 25.0	> 20 and ≤ 35
D	Approaching Unstable Operations / Tolerable Delays	>25.0 and ≤ 35.0	> 35 and ≤ 55
E	Unstable Operations / Significant Delays Begin	>35.0 and ≤ 50.0	> 55 and ≤ 80
F	Very Poor Operations / Excessive Delays Occur	> 50.0	> 80

Source: *Highway Capacity Manual 2010*, Transportation Research Board National Research Council, Washington D.C

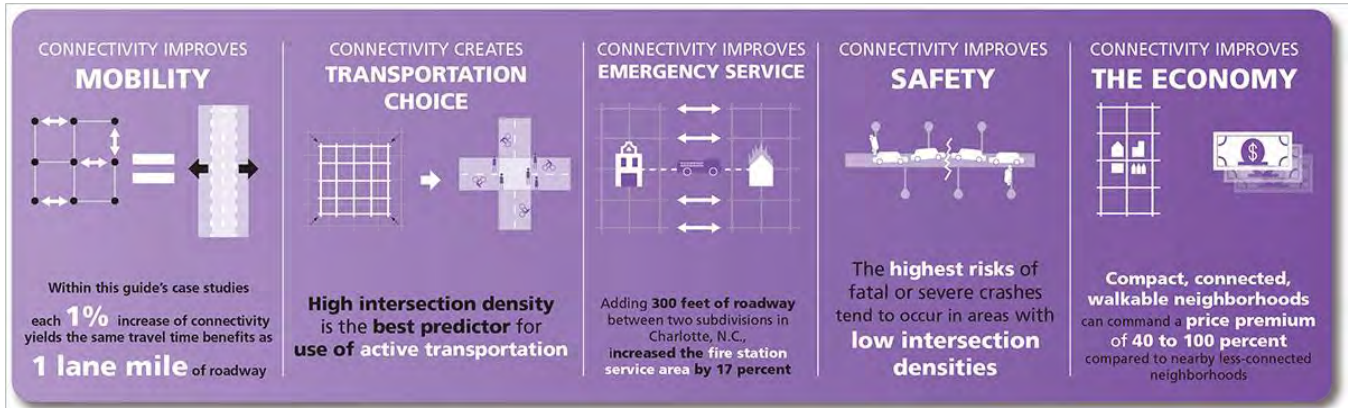
The second key measure of effectiveness extracted from Synchro was the estimated 95th percentile queue length for each turning movement at the study intersections. This represents the vehicle queue length that would only be exceeded five percent of the time during the analysis period. It helps identify issues such as queuing between intersections and queues that exceed their available storage.

4 STREET CONNECTIVITY

The 2019-2050 MAG RTP identifies roadway connectivity and building out the grid network as essential for accommodating long-term travel in the region. Several locations in the study area but on the S.R. 92 corridor were identified where roads could be built to increase connectivity. This section briefly describes the benefits of connectivity and describes the identified locations within the study area.

4.1 Connectivity Benefits

In 2017, the major transportation agencies on the Wasatch Front published the *Utah Street Connectivity Guide*. This document makes the case for connectivity, provides tools for connectivity, and provides a design guide and case studies. The guide clearly illustrates that street connectivity is an important principle that can provide numerous benefits to a community. **Figure 2** is an infographic from the guide that summarizes the benefits of street connectivity.



Source: *Utah Street Connectivity Guide*, March 2017, page 4

Figure 2: Street Connectivity Benefits

As shown in the figure, good street connectivity provides benefits to mobility, transportation choices, emergency services, safety, and the economy. A subsequent UDOT research project performed by the University of Utah states that, "improving street connectivity at a neighborhood level could be considered as a viable community development strategy to mitigate congestion on major arteries without compromising road safety."¹

¹ Street Network Connectivity, Traffic Congestion, and Traffic Safety, Utah Department of Transportation, September 2020

4.2 Study Area Connectivity Options

Three study area connectivity options were identified and analyzed. The three options include connections at 11800 North near the Micron facility, 5710 West in Highland, and High Bench Road in Alpine. The general location of the three potential connections is shown in **Figure 3**.

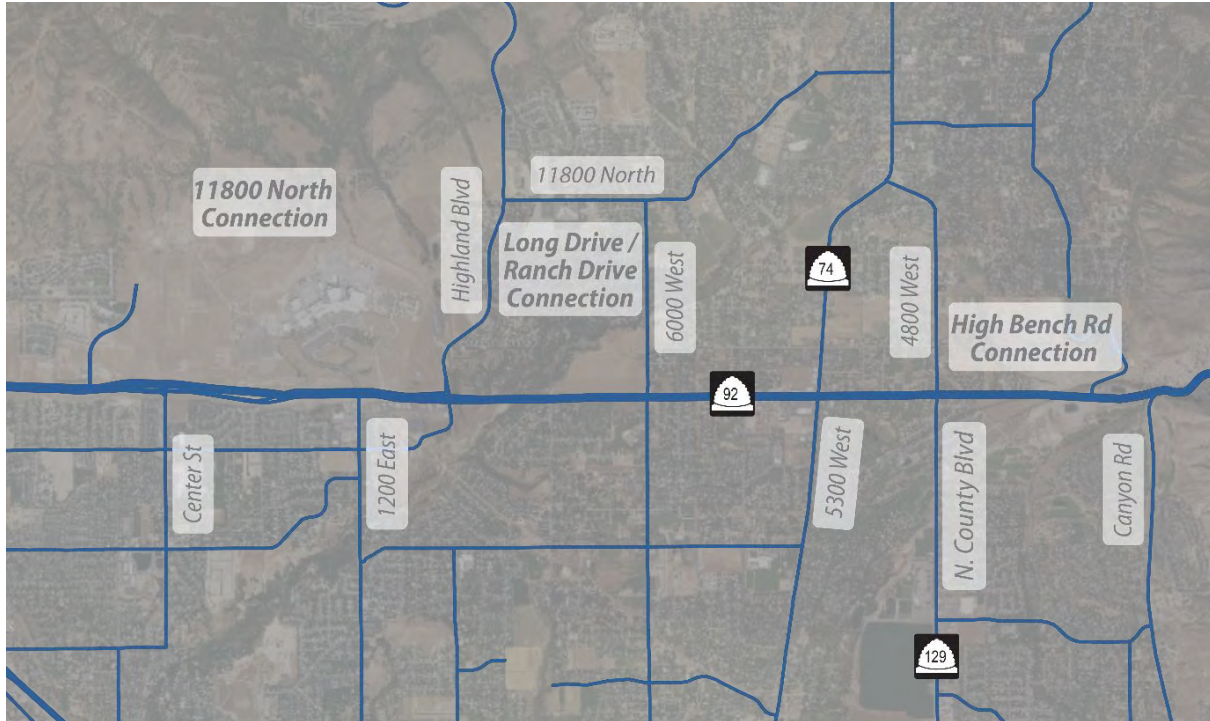


Figure 3: Potential Connection Locations

4.2.1 11800 North

The 11800 North connection would extend the existing Highland 11800 North collector road to the west into Lehi up and around the Micron facility before connecting to Lehi 500 West. The existing 11800 North is a two-lane road with a posted speed limit of 35 mph. Looping the connection north of the Micron facility would likely require the road to briefly leave Lehi City and enter Draper City, which may complicate the funding and construction of the connection. **Figure 4** conceptually illustrates the 11800 North connection.

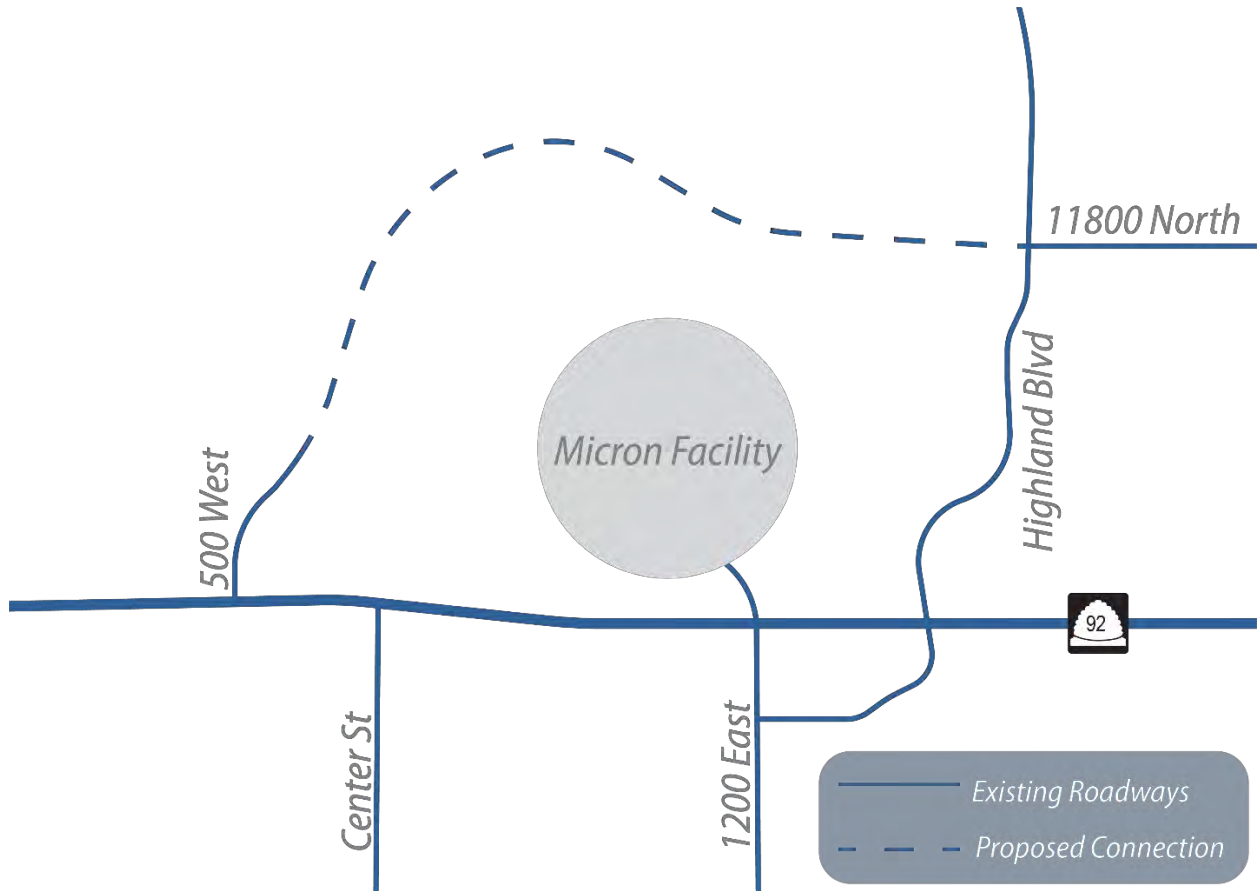


Figure 4: 11800 North Connection

4.2.2 Long Drive & Ranch Drive

The Long Drive and Ranch Drive connections are the extensions of two separate, intersecting roads. The Long Drive connection would extend that road west approximately a half-mile to connect to 6000 West. Penn Brooke Lane would also be extended south to connect to Long Drive. The existing Long Drive is a local road with a 25-mph speed limit. The Ranch Drive connection would extend that road to the east approximately a third of a mile to S.R. 74 (5300 West). **Figure 5** conceptually illustrates the Long Drive and Ranch Drive connections.

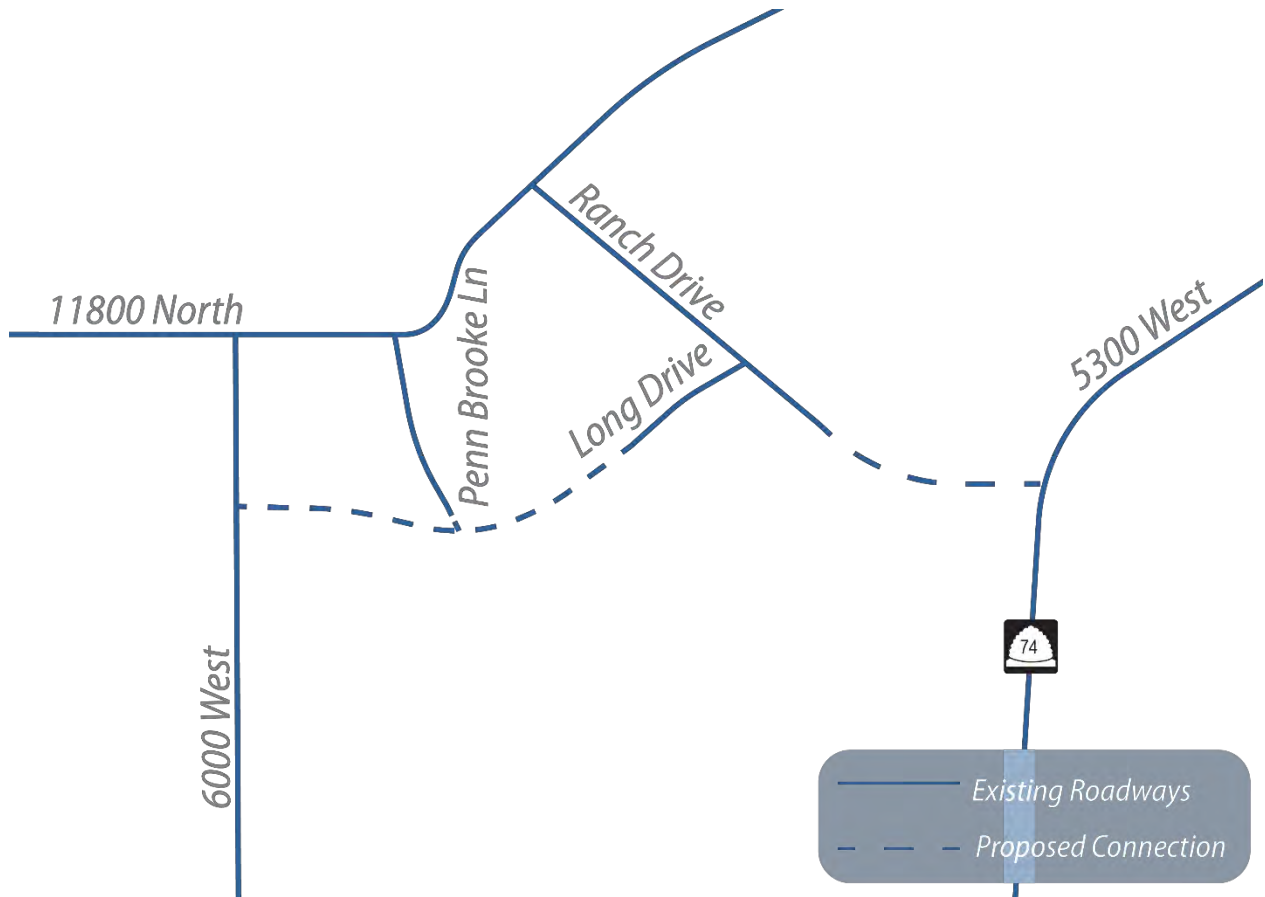


Figure 5: Long Drive / Ranch Drive Connections

4.2.3 High Bench Road

The High Bench Road connection would extend the existing High Bench Road in Alpine south to S.R. 92 in Highland. High Bench Road in Alpine lines up with Park Drive in Highland with a 650-foot gap between the two roads; however, the cities' preference is to have the connection cut through the existing gravel pit for a more direct connection to S.R. 92. This would require the closure of the gravel pit before the connection could be built, so it could be a long time until then. Another issue with this connection is the difference in elevation between S.R. 92 and High Bench Road. According to Google Earth, there is a difference of approximately 125 feet in elevation in the 0.5-mile connection, which would result in a fairly steep road in places. **Figure 6** conceptually illustrates the High Bench Road connection.

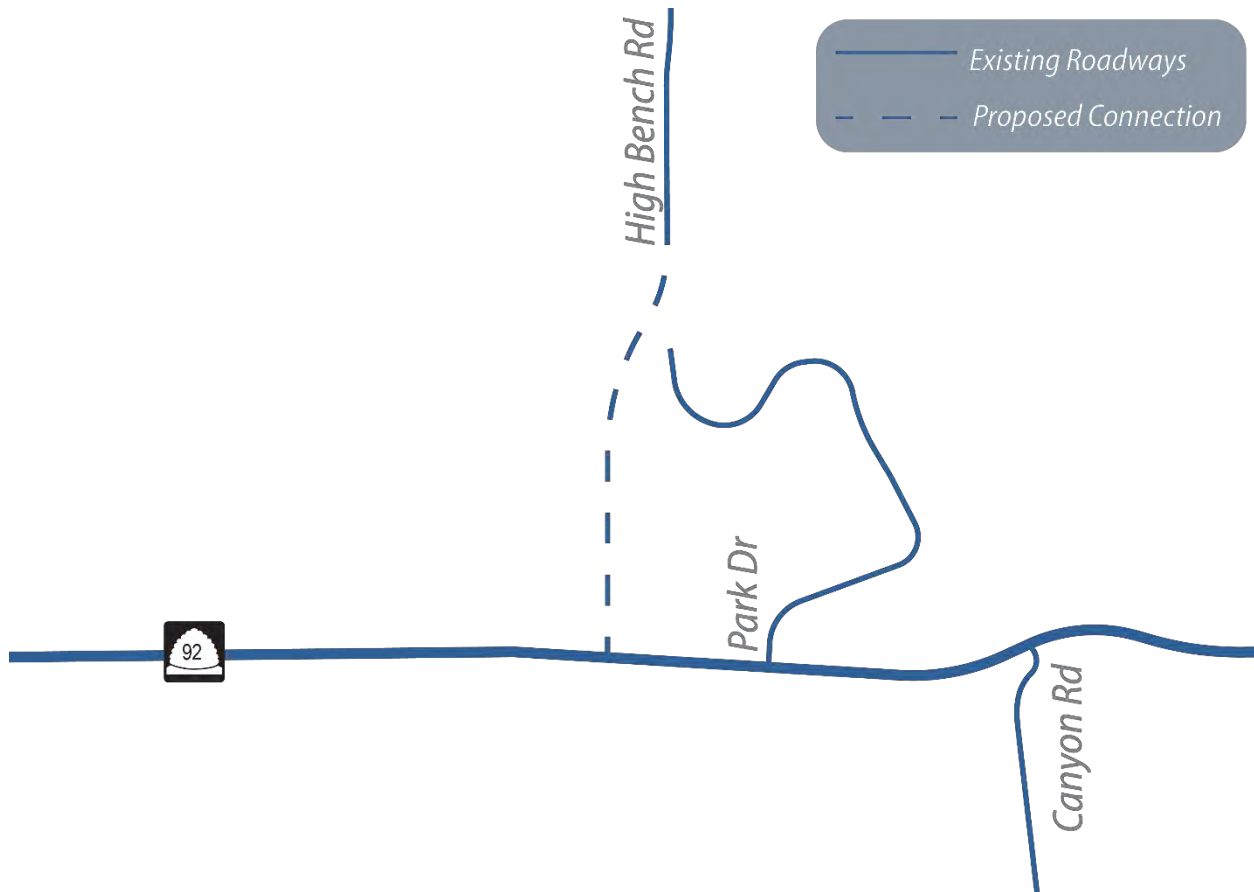


Figure 6: High Bench Road Connection

4.3 Study Area Connectivity Analysis

The MAG travel model was run for 2050 conditions with and without the three study area connections to understand the effect they would have on traffic patterns in the study area. The largest shift in traffic volumes would occur on the east side of the study area where several thousand vehicles per day would be diverted from 4800 West to High Bench Road, and similarly from North County Boulevard to Canyon Road.

S.R. 92 intersection traffic volumes were projected with and without the proposed connections. **Table 2** compares the projected 2050 PM peak hour total study area intersection volumes with and without the roadway connections. **Appendix B** contains a figure comparing the S.R. 92 intersection volumes between the two scenarios.

Table 2. S.R. 92 Intersection Volumes With and Without Connections

Intersection	2050 PM Peak Hour		% Change
	Without Connections	With Connections	
Timpanogos Highway (S.R. 92) & Center Street	3,480	3,370	-3.3
Timpanogos Highway (S.R. 92) & Micron Delivery Access	2,790	2,720	-2.5
Timpanogos Highway (S.R. 92) & 1200 West	5,230	5,170	-1.1
Timpanogos Highway (S.R. 92) & Highland Blvd	5,430	5,420	-0.2
Timpanogos Highway (S.R. 92) & 6400 West	5,300	5,320	0.4
Timpanogos Highway (S.R. 92) & 6000 West	5,890	5,630	-4.4
Timpanogos Highway (S.R. 92) & Alpine Highway (S.R. 74)	5,560	5,470	-1.6
Timpanogos Highway (S.R. 92) & N. County Blvd (S.R. 129)	4,770	4,690	-1.7
Timpanogos Highway (S.R. 92) & Canyon Rd	1,590	1,650	3.8

With the addition of the new connections, there would generally be a small decrease in traffic at S.R. 92 intersections in the study area. 6000 West would see the largest drop in traffic when the connections are added with volume reduction of 4.4 percent. The largest volume increase would be at Canyon Road at 3.8 percent, which would be due to traffic shifting from North County Boulevard.

A traffic analysis for the S.R. 92 study area intersections was performed for both sets of volumes, which revealed only minor differences in the intersection performance between the scenarios. While the traffic operations benefit associated with the potential connectors is projected to be somewhat limited, that does not mean that the connections should be removed from consideration. As discussed previously, there are other benefits associated with increased connectivity that are independent of traffic performance, including increased transportation choices, emergency response benefits, increased safety, and benefits to the economy. As such, the study area connectors should still be considered as part of a resilient transportation system.

5 S.R. 92 INTERSECTION ANALYSIS

The study intersections on S.R. 92 were analyzed to understand their traffic performance under existing conditions and future 2050 conditions without any modifications. For intersections that are expected to operate poorly in the future, various intersection modifications were analyzed for their ability to improve traffic performance.

5.1 Existing Conditions

The estimated delay and LOS for all the study intersections are shown below in **Table 3**. Detailed LOS results can be found in **Appendix C**.

Table 3. Existing Intersection Level of Service / Delay Results

Location	2020 AM Peak Hour		2020 PM Peak Hour	
	Worst Approach ²	AM LOS / Delay ¹	Worst Approach ²	PM LOS / Delay ¹
S.R. 92 & Center Street	-	B / 18	-	B / 19
S.R. 92 & Micron Delivery Entrance	SB	C / 22	SB	C / 18
S.R. 92 & 1200 East	-	C / 23	-	C / 26
S.R. 92 & Highland Boulevard	-	B / 14	-	C / 24
S.R. 92 & 6400 West	-	A / 6	-	B / 11
S.R. 92 & 6000 West	-	C / 33	-	D / 49
S.R. 92 & 5600 West	NB	F / >100	NB	F / >100
S.R. 92 & 5300 West (S.R. 74)	-	D / 40	-	E / 65
S.R. 92 & North County Boulevard (S.R. 129)	-	D / 41	-	D / 36
S.R. 92 & Canyon Road	NB	D / 25	NB	F / >100

1. Average delay reported in seconds/vehicle
 2. Worst approach delay is reported for unsignalized intersections
 NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

During the AM peak hour, all the signalized intersections operate at LOS D or better; however, there are individual movements at LOS E and F. During the PM peak hour, the signalized intersections except for 5300 West operate at LOS D or better. The intersection 5300 West operates at LOS E with 65 seconds of delay per vehicle and half of the turning movements at LOS E or F. The unsignalized intersections at 5600 West and Canyon Road operate at LOS F with over 100 seconds of delay per vehicle for vehicles on the northbound approach. Traffic signal warrant studies have recently been performed for each of those intersections. The Canyon Road intersection met the warrant criteria while the 5600 West intersection did not. Although the delay is high at 5600 West, the volumes on 5600 West are low, so the overall impact of the high delay is quite low.

5.2 Future 2050 Conditions

This section reports the intersection delay and LOS for each of the intersections within the study area for the future 2050 conditions. By 2050, AM peak hour volumes for the S.R. 92 study area intersections are anticipated to increase by 30-35 percent compared to existing and the PM peak hour volumes by 24-29 percent. Detailed volume information can be found in **Appendix B**.

The No Build results are reported for each intersection followed by the results of the various improvement scenarios that were considered. Generally speaking, the S.R. 92 corridor volumes are projected to increase enough that widening to three travel lanes in each direction would be required for the corridor to operate at an acceptable LOS. Certain intersections also include other improvements such as dual left turn lanes. Intersections that are not reported in this section but are within the study area are not anticipated to need additional intersection improvements beyond their existing configuration. This is based on the assumption that Canyon Road would be signalized. All the results presented in this section assume that the study area connections

described in Section 4 are implemented. Detailed analysis results for analyses presented in the following sections can be found in **Appendix C**.

5.2.1 Highland Boulevard

The Highland Boulevard intersection LOS for the PM peak hour for the 2050 with connections scenario is shown in **Figure 7**. Without any intersection improvements, Highland Boulevard is expected to perform at LOS E with 74 seconds of delay per vehicle. By adding dual westbound left-turn lanes and protected/permissive phasing to the northbound and southbound approaches, the intersection is expected to perform at LOS D with 55 seconds of delay per vehicle.

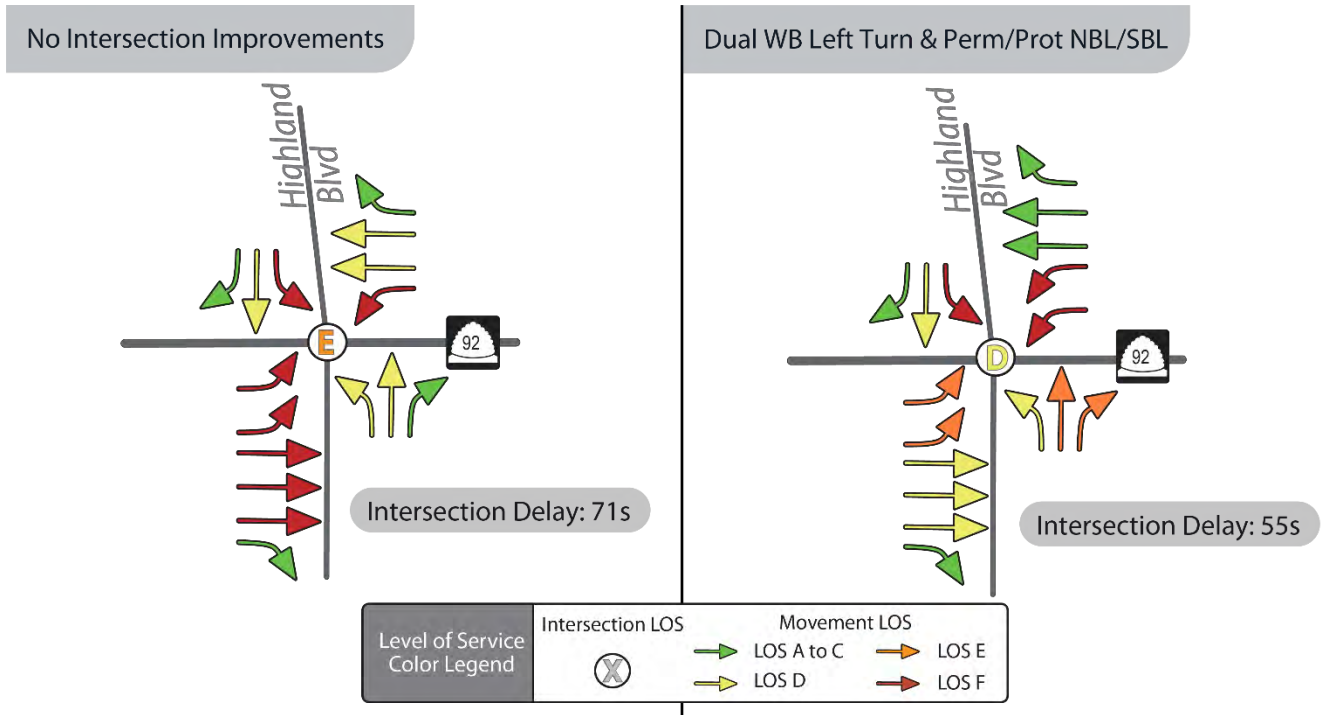


Figure 7: Highland Boulevard Intersection LOS

5.2.2 6000 West

The 6000 West intersection LOS for the PM peak hour for the 2050 with connections scenario is shown in **Figure 8**. Without any intersection improvements, 6000 West is expected to perform at LOS F with over 100 seconds of delay per vehicle. By adding a third eastbound and westbound through lane and right turn pockets to the northbound and southbound approaches, the intersection is expected to perform at LOS D with 49 seconds of delay per vehicle. The analysis shows that exclusive right turn lanes would not be needed to achieve LOS D, but they would be valuable for safety and driver comfort. Adding dual left turn lanes without three through lanes on S.R. 92 would be expected to operate at LOS E.

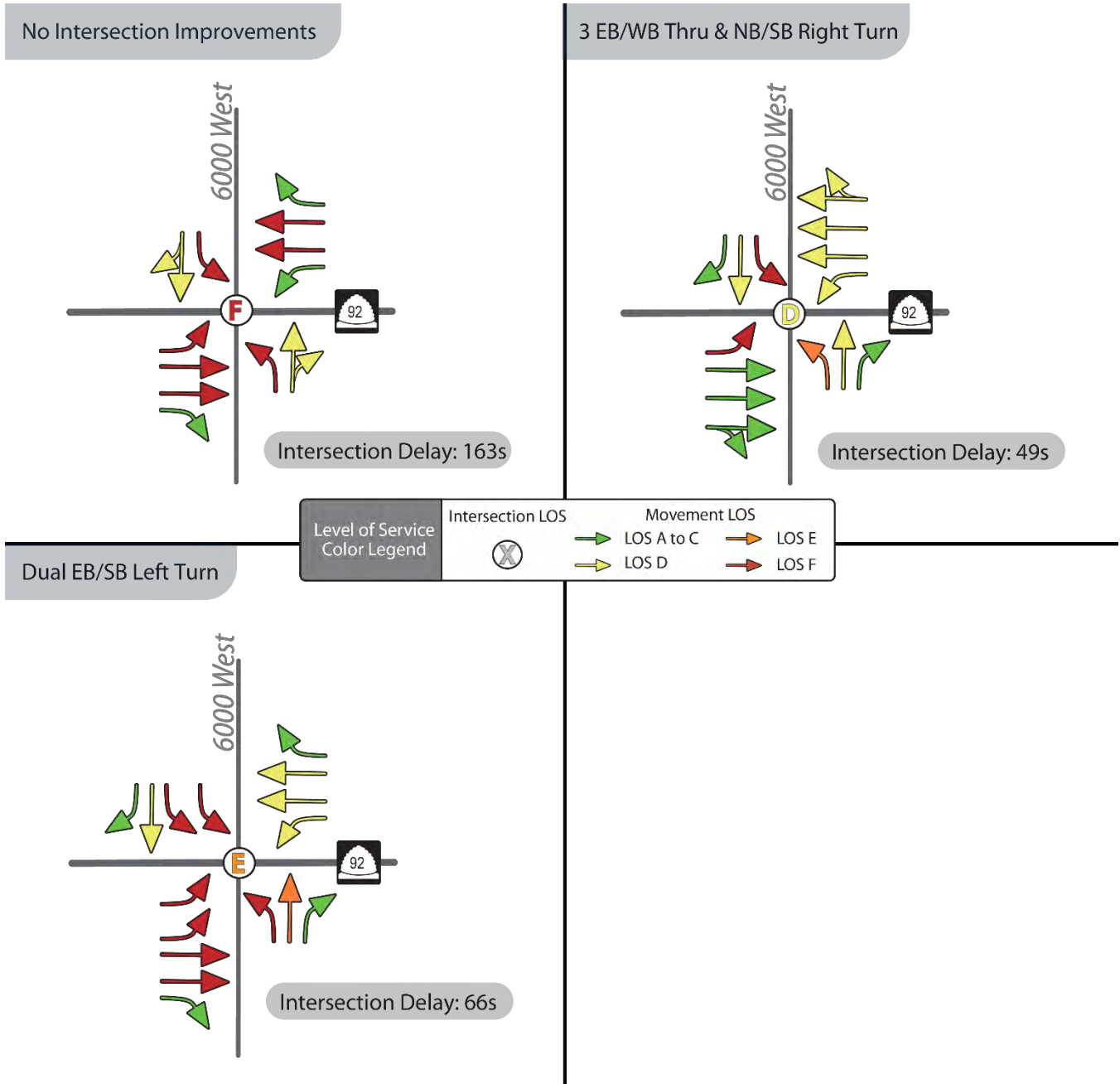


Figure 8: 6000 West Intersection LOS

5.2.3 6400 West

The 6400 West intersection LOS for the PM peak hour for the 2050 with connections scenario is shown in **Figure 9**. Without any intersection improvements, 6400 West is expected to perform at LOS E with over 63 seconds of delay per vehicle. By adding a third eastbound and westbound through lane, the intersection is expected to perform at LOS D with 37 seconds of delay per vehicle.

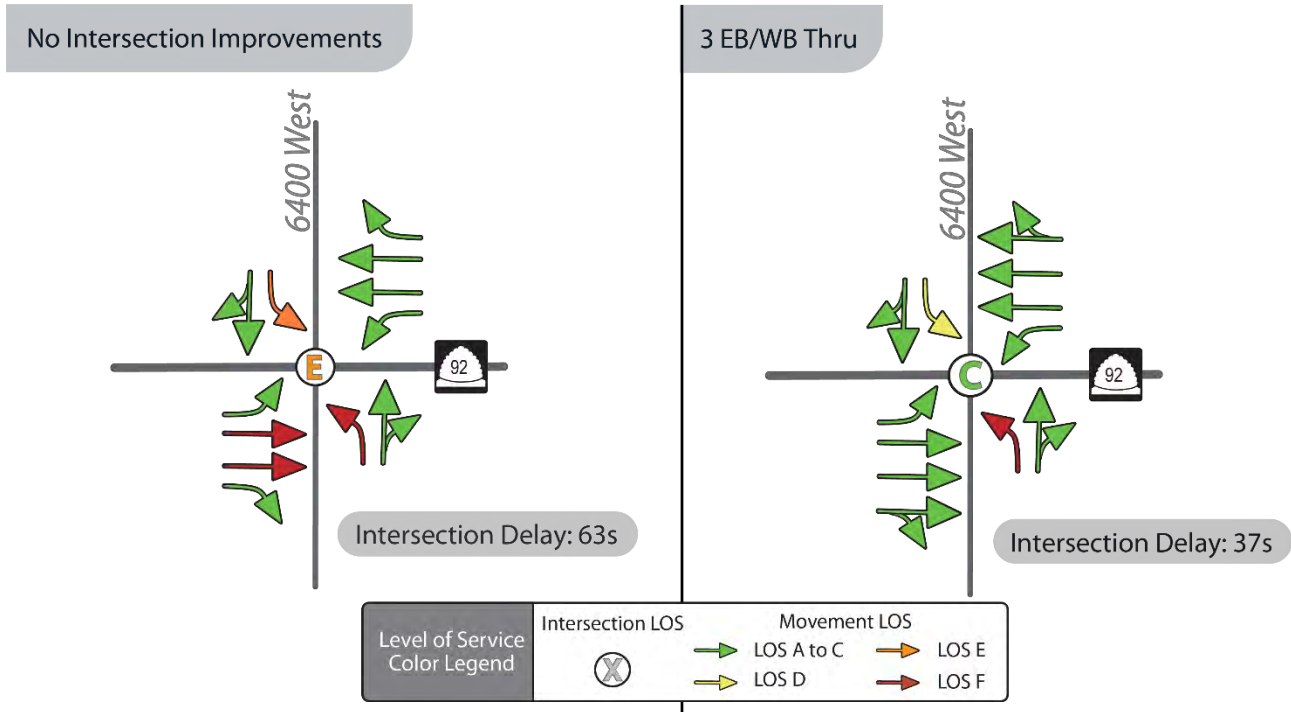


Figure 9: 6400 West Intersection LOS

5.2.4 5300 West (S.R. 74)

The 5300 West (S.R. 74) intersection LOS for the PM peak hour for the 2050 with connections scenario is shown in **Figure 10**. Without any intersection improvements, 5300 West is expected to perform at LOS F with 72 seconds of delay per vehicle. By adding a third eastbound and westbound through lane and a dual eastbound left-turn, the intersection is expected to perform at LOS E with 56 seconds of delay per vehicle. Another option that would be expected to operate at LOS D is adding a second northbound and southbound through lane and a dual eastbound left-turn. Without the extra through lane on either leg, the intersection would still perform at LOS E with 80 seconds of delay per vehicle. A scenario with dual eastbound left-turn lanes, three eastbound and westbound through lanes, and two northbound and southbound through lanes was also analyzed which performs the best with 42 seconds of delay per vehicle.

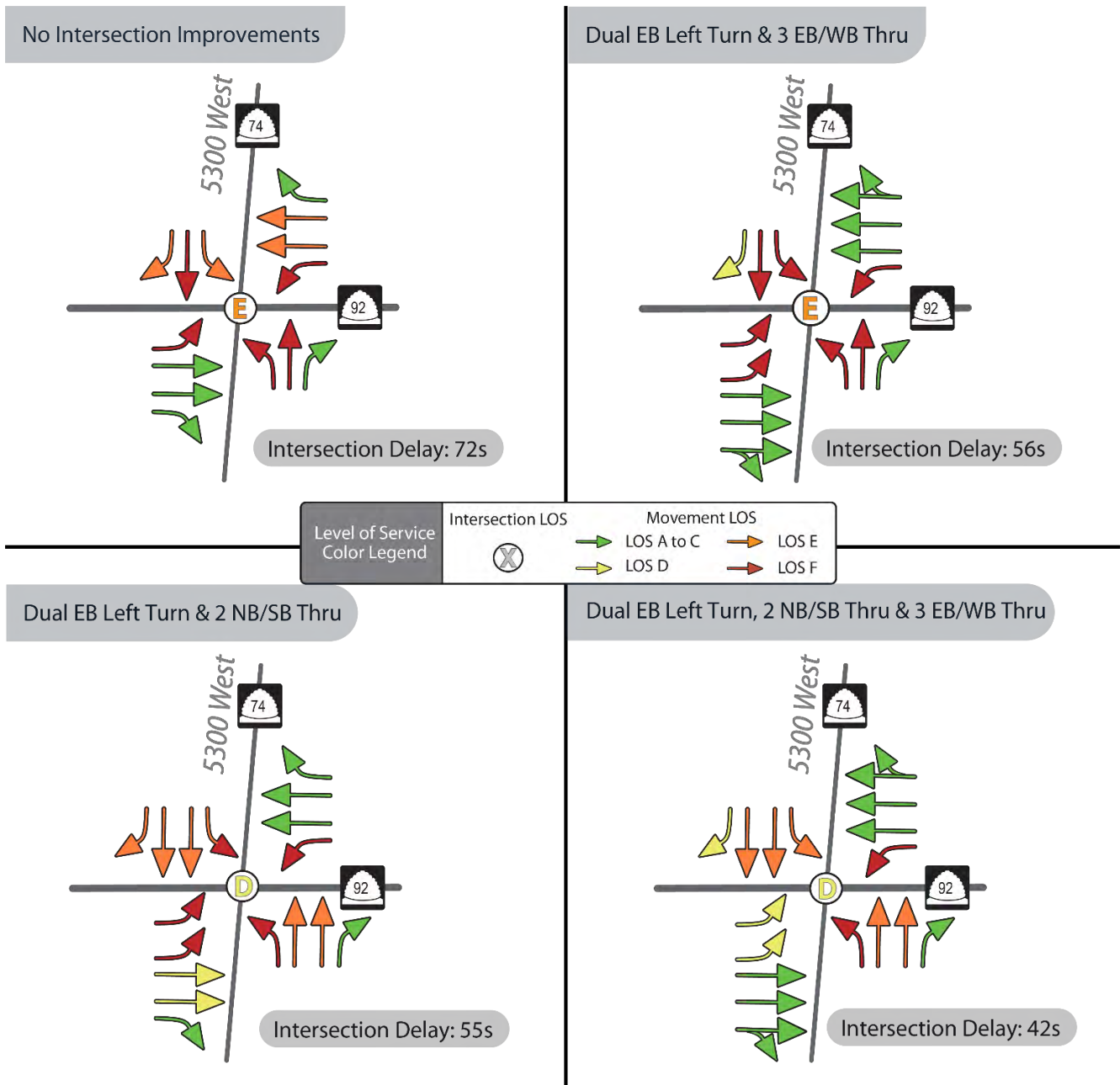


Figure 10: 5300 West (S.R. 74) Intersection LOS

5.2.5 North County Boulevard (S.R. 129)

The North County Boulevard (S.R. 129) intersection LOS for the PM peak hour for the 2050 with connections scenario is shown in **Figure 11**. Without any intersection improvements, 6000 West is expected to perform at LOS E with 68 seconds of delay per vehicle. By adding a second northbound and southbound through lane, the intersection is expected to perform at LOS D with 36 seconds of delay per vehicle. Another viable solution is to have dual southbound left turn lanes. Under this improvement, the intersection is expected to perform at LOS D with 44 seconds of delay per vehicle.

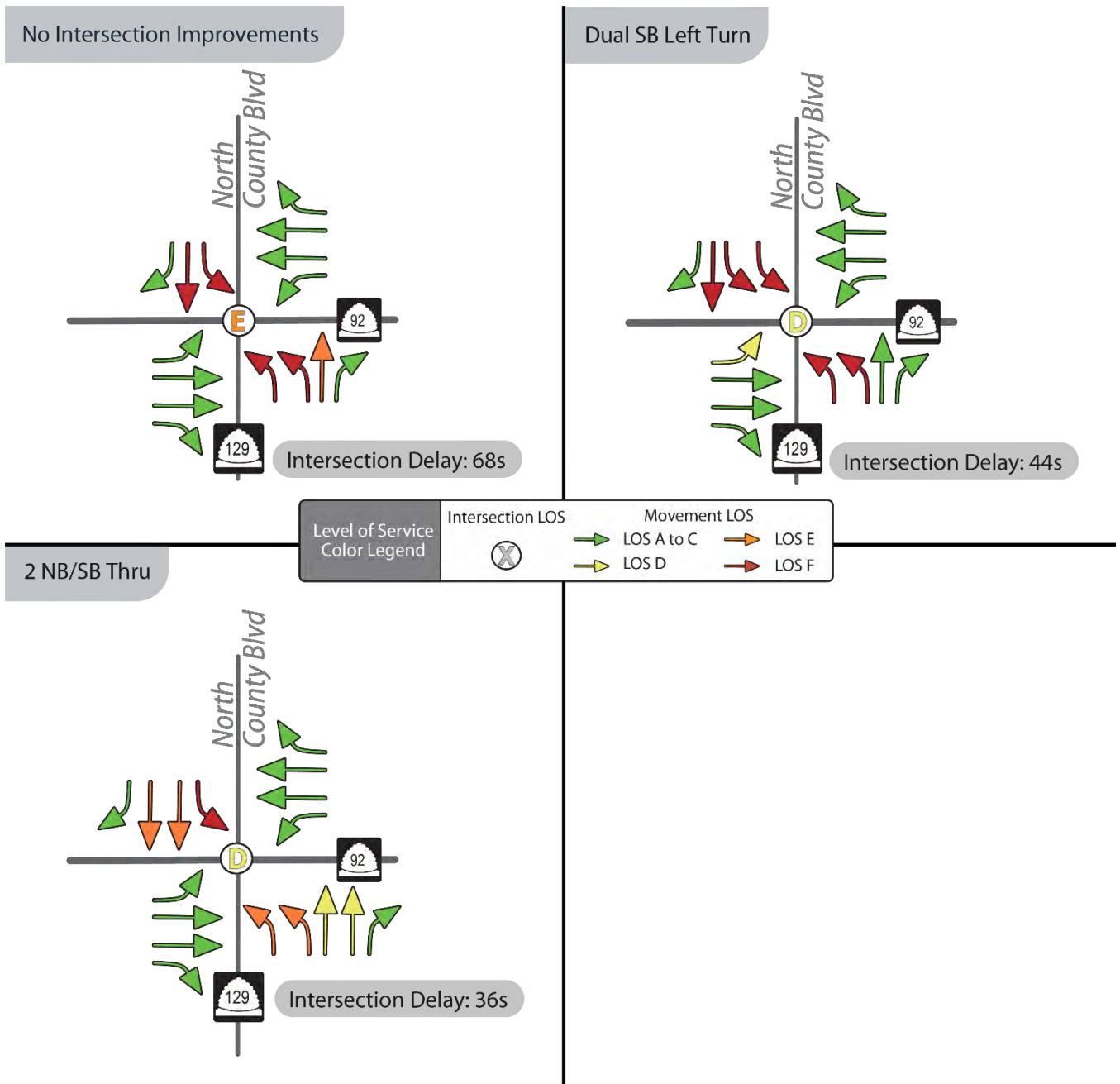


Figure 11: North County Boulevard (S.R. 129) Intersection LOS

6 ROADWAY WIDENING ANALYSIS

The travel modeling showed that there will be sufficient demand to for a four-lane road between Alpine and S.R. 92. A roadway widening analysis was completed to understand which roadways would benefit from widening to increase access and circulation within the study area. The widening analysis consisted of comparing existing and future roadway volumes. Both 5300 West (S.R. 74) and 4800 West/Canyon Crest Road were considered. Both roads are projected to have similar volumes widening either one could be justified. However, the study team didn't think it would be prudent to widen both roads, so 4800 West/Canyon Crest Road was chosen as the best candidate for widening as it had slightly higher future demand and connected directly to North County Boulevard (S.R. 129) which is a regional facility that provides good access to I-15.

7 CONCEPT DESIGNS

Concepts designs and cost estimates were prepared for intersection improvements at two of the study intersections and for the 4800 West/Canyon Crest Road widening. The two intersections selected by the study team were 6000 West and 5300 West (S.R. 74). The 4800 West/Canyon Crest Road widening included improvements to the S.R. 92 & North County Boulevard (S.R. 129) intersection. Plan sheets and a typical section for the widening concept design can be found in **Appendix D**. Detailed cost estimates for the three concept designs can be found in **Appendix E**.

7.1 6000 West

The concept design for 6000 West with three through lanes in each direction is shown in **Figure 12**. As shown, the concept assumes shared through-right turn lanes on S.R. 92. These improvements are estimated to cost approximately \$6.2 million in 2021 dollars and \$7.3 million in 2025 dollars.



Figure 12: 6000 West Intersection Concept Design

7.2 5300 West (S.R. 74)

For 5300 West (S.R. 74), the study team chose to have a concept design prepared for an option with three east-west through lanes, two north-south through lanes, and dual left-turn lanes on S.R. 92. This option combines two options that were evaluated and would be expected to perform better than either option by themselves. The concept design for this new option is shown in **Figure 13**. These improvements are estimated to cost approximately \$11.4 million in 2021 dollars and \$13.4 million in 2025 dollars.



Figure 13: 5300 West (S.R. 74) Intersection Concept Design

7.3 4800 West/Canyon Crest Road

As mentioned, concept designs for the widening of 4800 West/Canyon Crest Road can be found in **Appendix D**. The concept design for S.R. 92 & North County Boulevard (S.R. 129) intersection is shown in **Figure 14**. The concept includes two northbound and southbound through lanes.

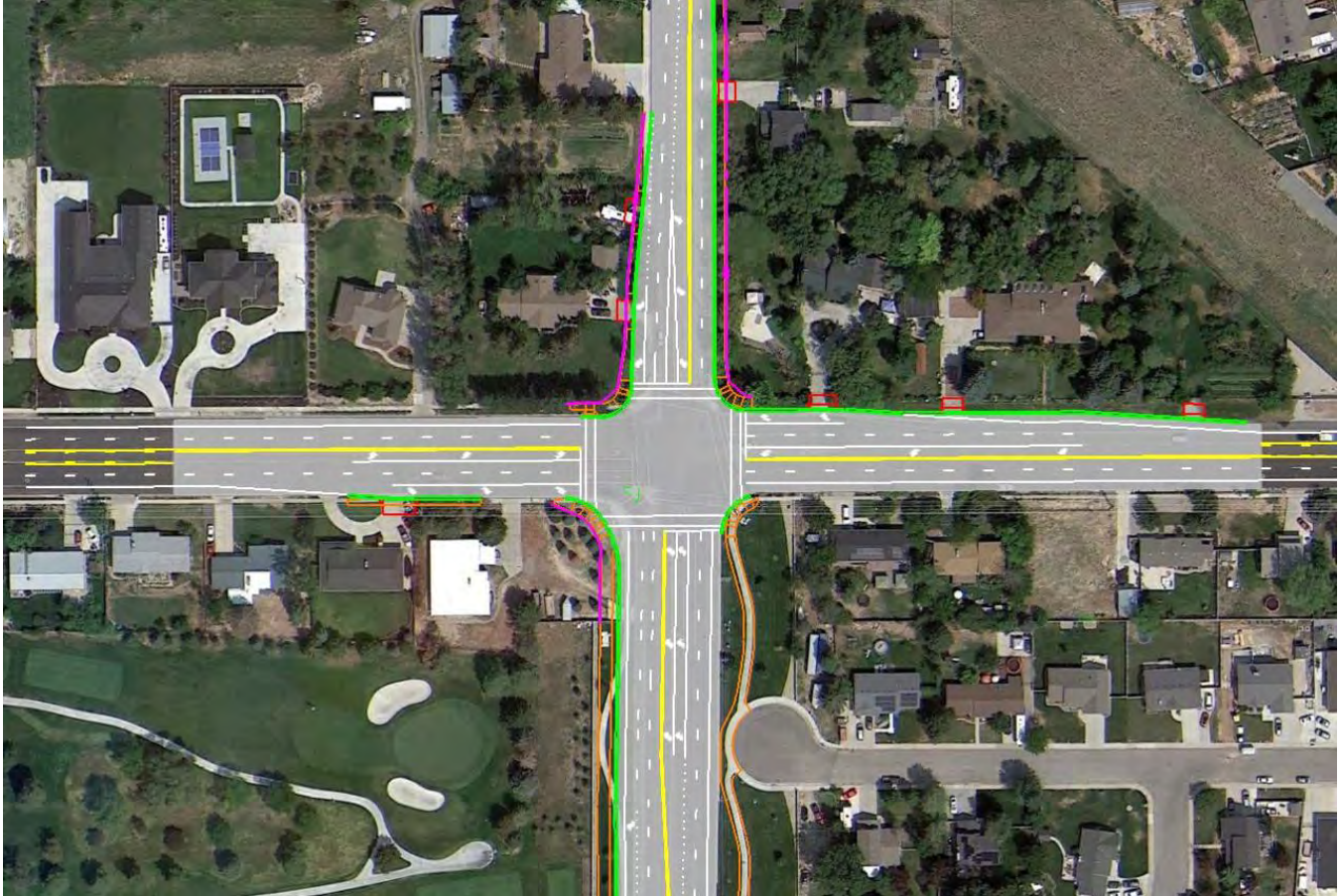


Figure 14: North County Boulevard (S.R. 129) Intersection Concept Design

Due to the size of the corridor and the cost to build the whole thing at once, the corridor was divided into three phases so that the widening could occur incrementally in a more financially feasible manner. The three phases and their estimated costs are shown in **Table 4**.

Table 4. 4800 West/Canyon Crest Road Phase Limits and Cost Estimates

Phase	Limits	Cost (2021 dollars)	Cost (2025 dollars)
1	Country Club Drive to Healey Boulevard	\$7,605,000	\$8,944,000
2	Healey Boulevard to Ridge Drive	\$3,622,000	\$4,259,000
3	Ridge Drive to Main Street	\$2,753,000	\$3,236,000

8 CONCLUSIONS

Per the *Utah Street Connectivity Guide* good street connectivity provides benefits to mobility, transportation choices, emergency services, safety, and the economy. Four potential connection options were identified to increase the street connectivity in Lehi, Highland and Alpine. The four connections at 11800 North, Long Drive,

////////////////////////////////////
Ranch Drive, and High Bench Road would generally result in a minor decrease to future traffic volumes on S.R. 92 throughout the study area and a corresponding decrease in intersection delay. Even though the delay reduction would be relatively minor, the connections should still be seriously considered due to the other benefits that good street connectivity can provide.

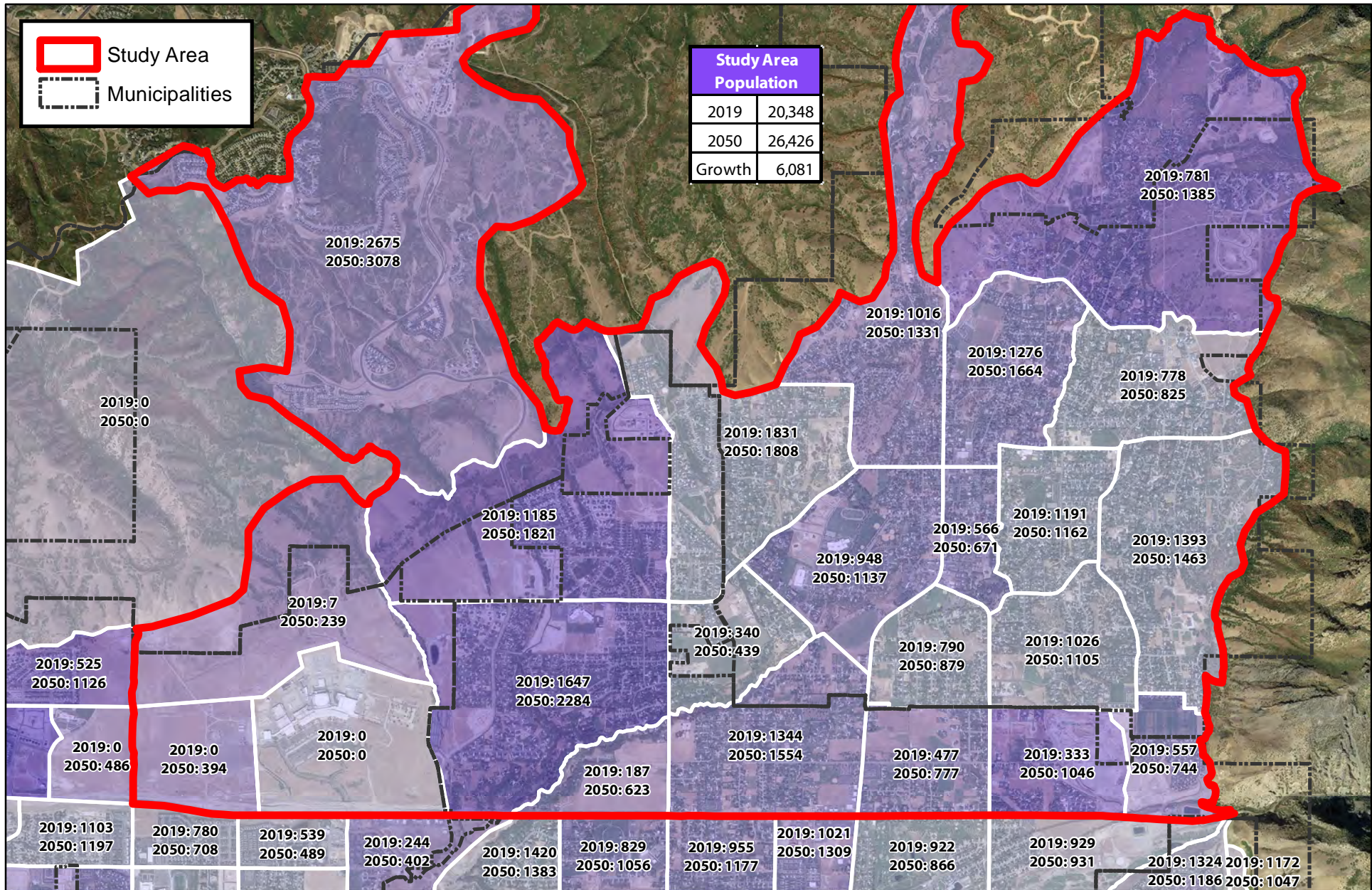
Specific S.R. 92 intersection analyses were performed for 2050 future conditions with connections. Generally, the improvements required for the intersections to operate at acceptable LOS is widening S.R. 92 to three through lanes in the eastbound and westbound directions from the Express Lanes on the west through the 5300 West intersection on the east. Some intersections would also require additional left turn lanes or exclusive right turn lanes. With these improvements, each intersection would operate at LOS D or better within the study area. Because the 5300 West intersection currently operates at LOS E, it would have the highest priority for improvement. The improvements there could be phased, which would reduce the initial cost but would require additional work at the same location in the future. Concept designs and cost estimates for intersection improvements at 6000 West and 5300 West were prepared.

The study also determined there will be a need to widen one of the two primary road into Alpine (5300 West or 4800 West/Canyon Crest Road). The study team determined that the widening should be done on 4800 West/Canyon Crest Road due to slightly higher future volume projections and better regional connectivity. To make funding more manageable, the widening was divided into three phases. Concept designs and cost estimates were prepared for each phase of the widening.



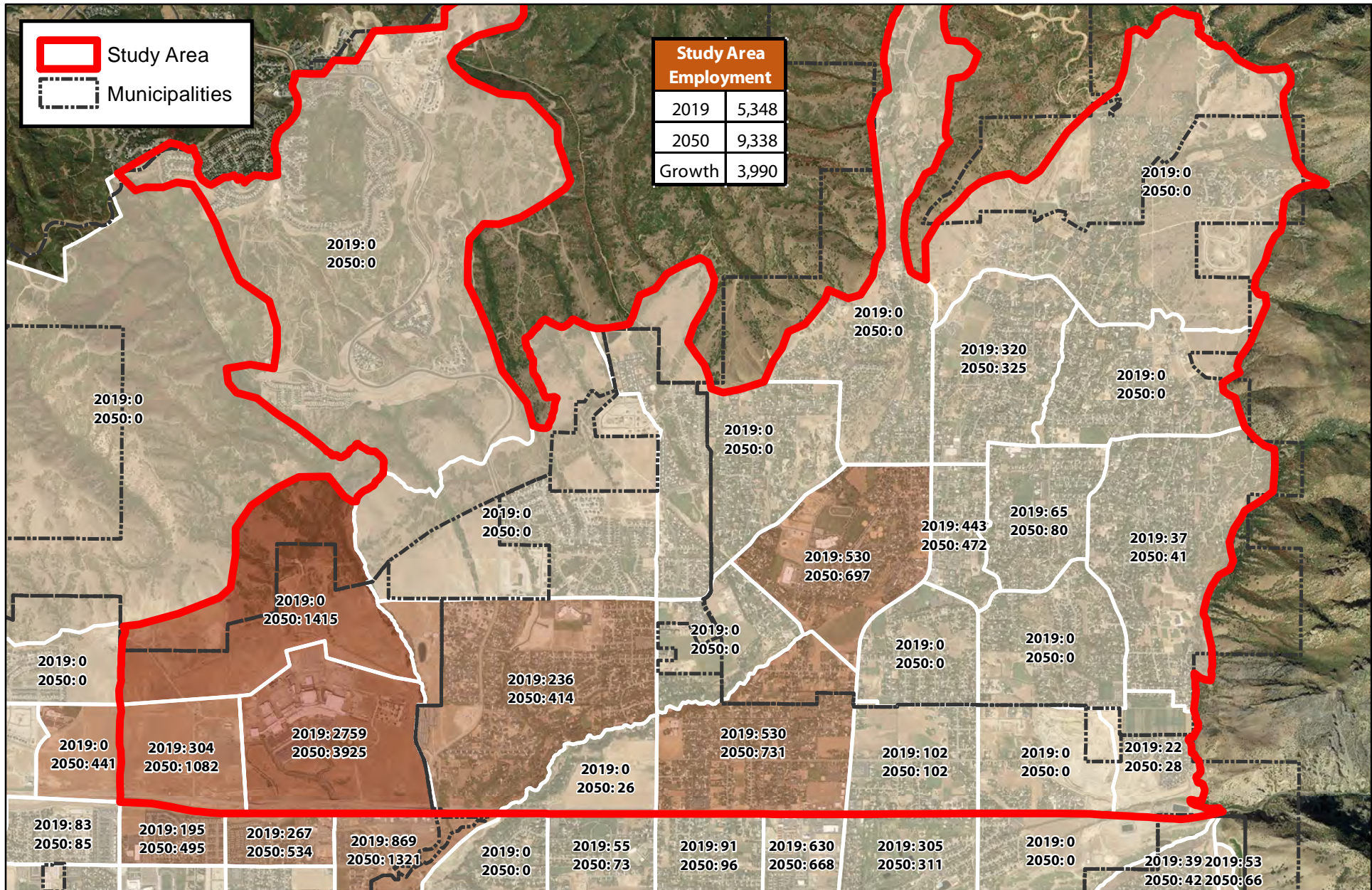
Appendix A
Population and Employment Growth





Total Population Growth 2019-2050

SR-92 North Regional Traffic Study



Total Employment Growth 2019-2050

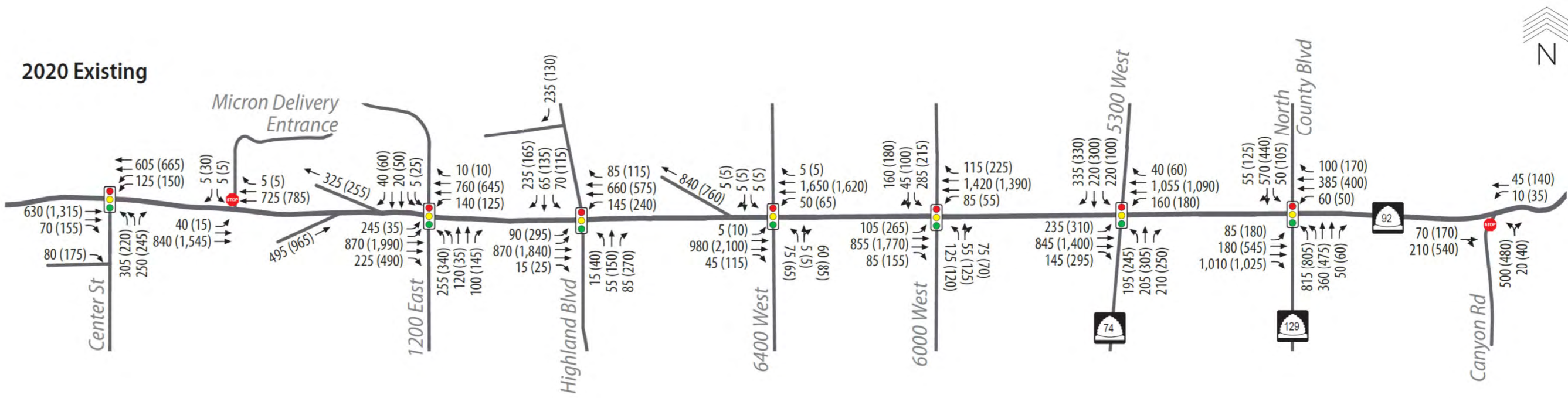
SR-92 North Regional Traffic Study



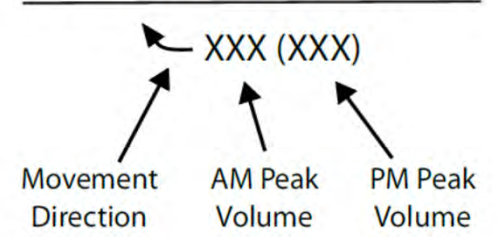
Appendix B
Traffic Volumes



2020 Existing



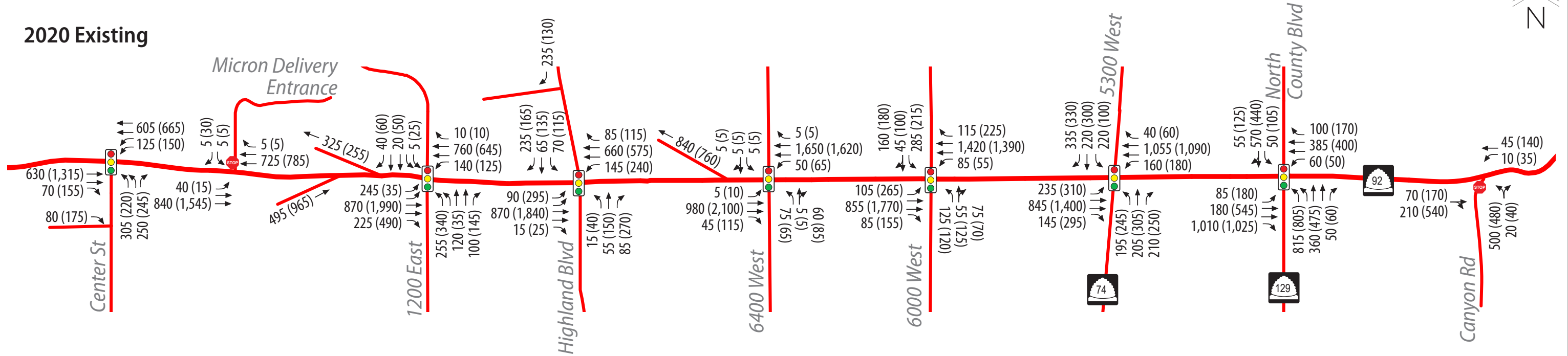
Volume Legend



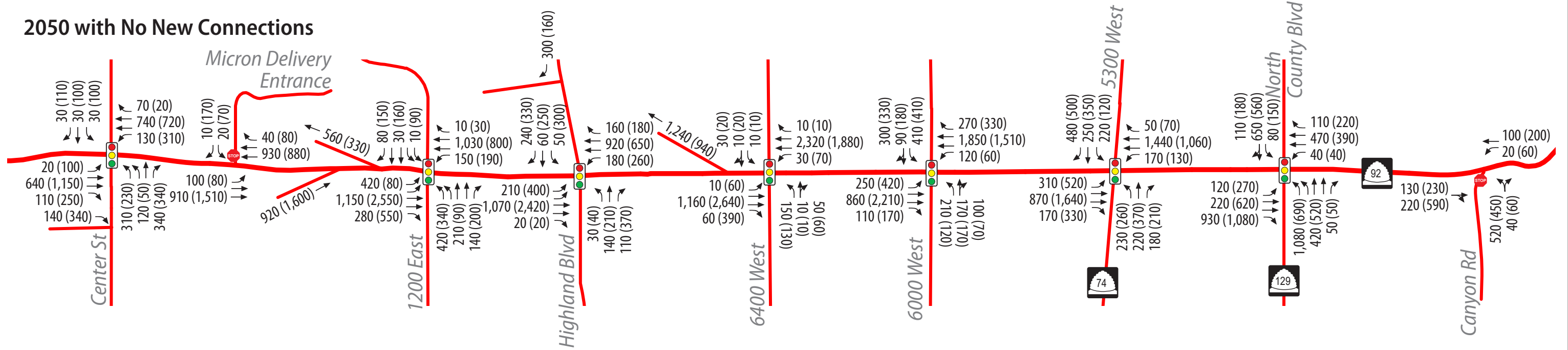
Weekday Peak Hour Volumes

SR-92 North Regional Traffic Study

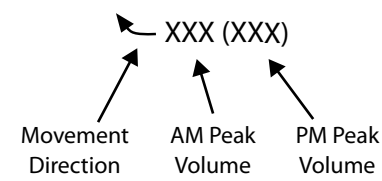
2020 Existing



2050 with No New Connections



Volume Legend



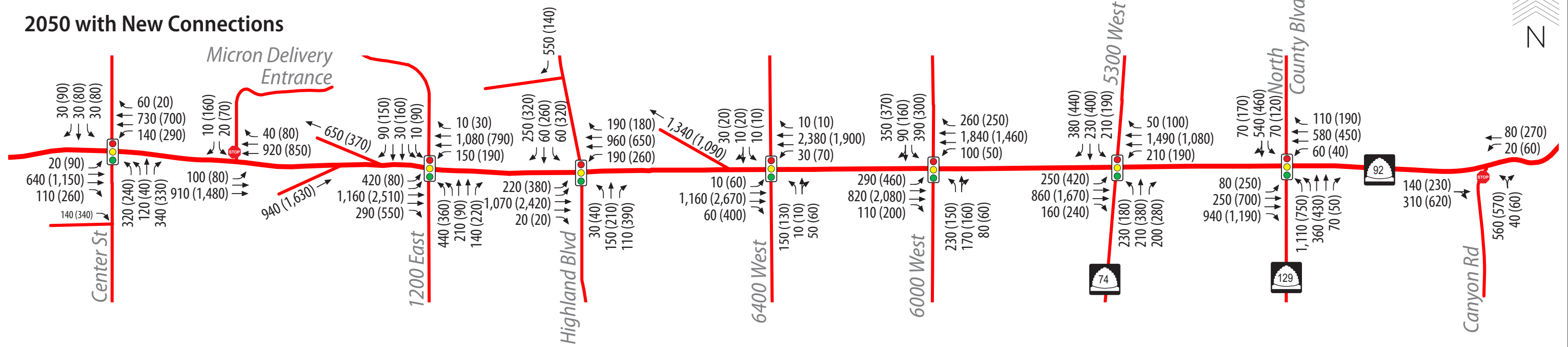
2020 Existing volumes based on 2020 traffic counts adjusted to reflect pre-pandemic conditions

Weekday Peak Hour Volumes

SR-92 North Regional Traffic Study

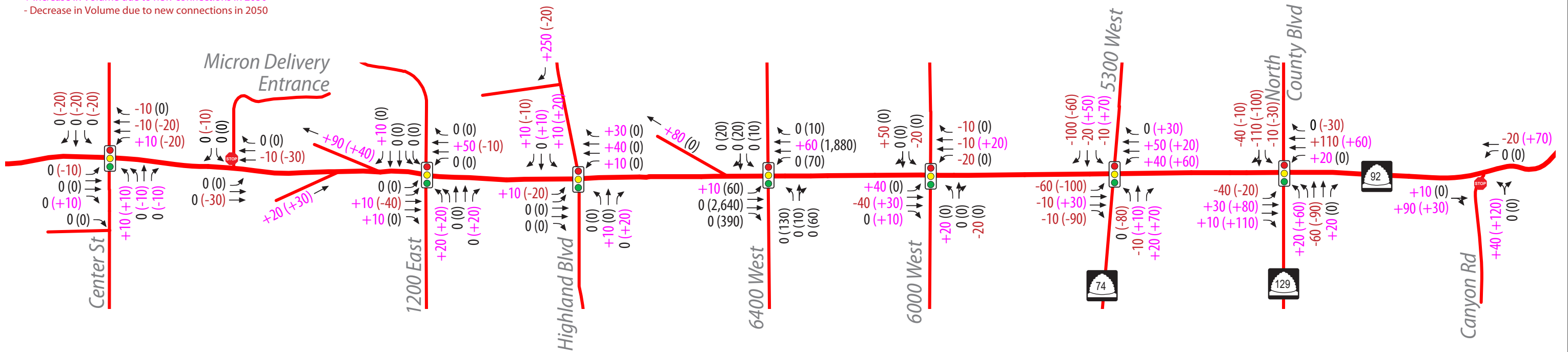
DRAFT

2050 with New Connections

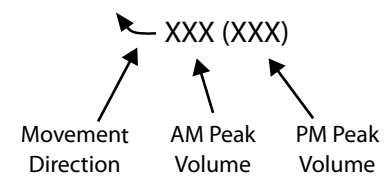


Change in Volumes Due to New Connections

+ Increase in Volume due to new connections in 2050
 - Decrease in Volume due to new connections in 2050



Volume Legend



Weekday Peak Hour Volumes

SR-92 North Regional Traffic Study

DRAFT



Appendix C
Intersection LOS Results



Timings

101: Center Street & SR-92

04/15/2021

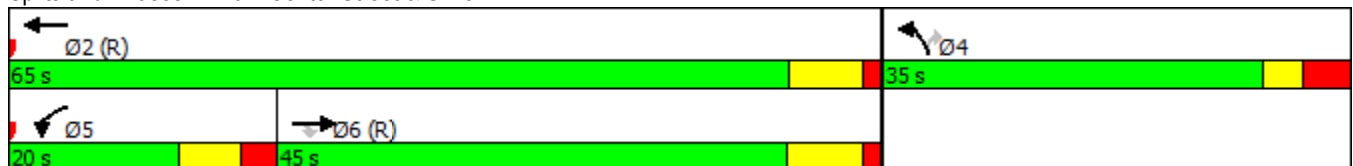


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↔	↑↑	↔	↑
Traffic Volume (vph)	630	70	125	605	305	250
Future Volume (vph)	630	70	125	605	305	250
Satd. Flow (prot)	3539	1583	3433	3539	3433	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3539	1583	3433	3539	3433	1583
Satd. Flow (RTOR)		76				272
Lane Group Flow (vph)	685	76	136	658	332	272
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6				4
Total Split (s)	45.0	45.0	20.0	65.0	35.0	35.0
Total Lost Time (s)	7.1	7.1	7.4	7.0	6.7	6.7
Act Effct Green (s)	58.7	58.7	7.3	73.5	12.8	12.8
Actuated g/C Ratio	0.59	0.59	0.07	0.74	0.13	0.13
v/c Ratio	0.33	0.08	0.55	0.25	0.75	0.62
Control Delay	11.8	3.0	39.4	6.2	53.0	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	3.0	39.4	6.2	53.0	11.4
LOS	B	A	D	A	D	B
Approach Delay	11.0			11.9	34.3	
Approach LOS	B			B	C	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 43 (43%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 17.8
 Intersection LOS: B
 Intersection Capacity Utilization 47.9%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 101: Center Street & SR-92



Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑	↗	↘	↗
Traffic Vol, veh/h	40	840	725	5	5	5
Future Vol, veh/h	40	840	725	5	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	100	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	913	788	5	5	5

Major/Minor

	Major1	Major2	Minor2
Conflicting Flow All	788	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	-
Pot Cap-1 Maneuver	827	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	827	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach

	EB	WB	SB
HCM Control Delay, s	0.4	0	21.6
HCM LOS			C

Minor Lane/Major Mvmt

	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	827	-	-	-	138	605
HCM Lane V/C Ratio	0.053	-	-	-	0.039	0.009
HCM Control Delay (s)	9.6	-	-	-	32.2	11
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0

Timings

103: 1200 East & SR-92

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑	↗	↖↖	↑↑	↗	↖↖	↑↑	↗
Traffic Volume (vph)	245	870	225	140	760	10	255	120	100	5	20	40
Future Volume (vph)	245	870	225	140	760	10	255	120	100	5	20	40
Satd. Flow (prot)	3433	5085	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			243			238			313			311
Lane Group Flow (vph)	266	946	245	152	826	11	277	130	109	5	22	43
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5 15	2		7	4		3	8	
Permitted Phases			6			2			4			8
Total Split (s)	23.0	25.0	25.0		32.0	32.0	25.0	30.0	30.0	15.0	20.0	20.0
Total Lost Time (s)	7.7	6.5	6.5		6.6	6.6	6.2	6.1	6.1	6.4	7.1	7.1
Act Effct Green (s)	10.8	38.1	38.1	16.6	47.9	47.9	11.1	18.6	18.6	5.0	5.0	5.0
Actuated g/C Ratio	0.11	0.38	0.38	0.17	0.48	0.48	0.11	0.19	0.19	0.05	0.05	0.05
v/c Ratio	0.72	0.49	0.33	0.52	0.49	0.01	0.73	0.20	0.20	0.03	0.12	0.11
Control Delay	51.9	21.8	3.6	32.7	11.6	0.0	53.9	34.4	0.8	45.6	47.1	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	21.8	3.6	32.7	11.6	0.0	53.9	34.4	0.8	45.6	47.1	0.6
LOS	D	C	A	C	B	A	D	C	A	D	D	A
Approach Delay		24.2			14.8			37.8			18.4	
Approach LOS		C			B			D			B	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 48 (48%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 23.3

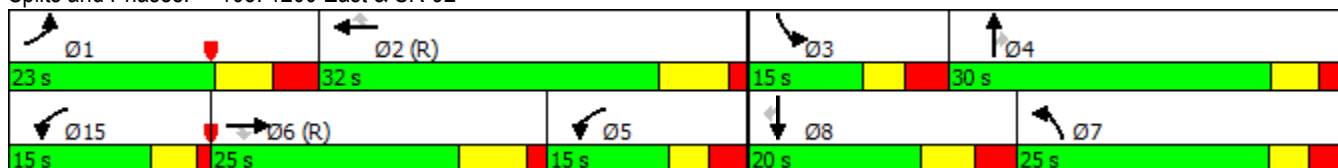
Intersection LOS: C

Intersection Capacity Utilization 58.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 103: 1200 East & SR-92



Timings

103: 1200 East & SR-92

04/15/2021

Lane Group	Ø5	Ø15
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	5	15
Permitted Phases		
Total Split (s)	15.0	15.0
Total Lost Time (s)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Timings

104: Highland Drive & SR-92

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗↗	↖	↖	↗↗	↖	↖	↗	↖	↖	↗	↖
Traffic Volume (vph)	90	870	15	145	660	85	15	55	85	75	65	235
Future Volume (vph)	90	870	15	145	660	85	15	55	85	75	65	235
Satd. Flow (prot)	3433	5085	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.278			0.711			0.718		
Satd. Flow (perm)	3433	5085	1583	518	3539	1583	1324	1863	1583	1337	1863	1583
Satd. Flow (RTOR)			130			121			197			255
Lane Group Flow (vph)	98	946	16	158	717	92	16	60	92	82	71	255
Turn Type	Prot	NA	Perm	D,P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4				8
Permitted Phases			6	6		2	4		4	8		8
Total Split (s)	20.0	50.0	50.0	15.0	45.0	45.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Lost Time (s)	6.5	7.3	7.3	6.1	7.3	7.3	7.6	7.6	7.6	7.6	7.6	7.6
Act Effct Green (s)	7.1	60.0	60.0	70.1	63.7	63.7	10.1	10.1	10.1	10.1	10.1	10.1
Actuated g/C Ratio	0.07	0.60	0.60	0.70	0.64	0.64	0.10	0.10	0.10	0.10	0.10	0.10
v/c Ratio	0.40	0.31	0.02	0.33	0.32	0.09	0.12	0.32	0.27	0.61	0.38	0.66
Control Delay	65.3	2.0	0.0	11.4	15.3	4.9	40.3	44.5	2.0	60.9	46.2	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	2.0	0.0	11.4	15.3	4.9	40.3	44.5	2.0	60.9	46.2	13.7
LOS	E	A	A	B	B	A	D	D	A	E	D	B
Approach Delay		7.8			13.7			20.8			28.9	
Approach LOS		A			B			C			C	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 91 (91%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 14.2

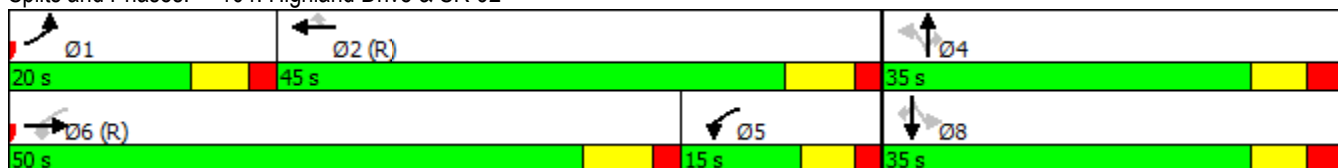
Intersection LOS: B

Intersection Capacity Utilization 55.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 104: Highland Drive & SR-92



Timings

105: 6400 West & SR-92

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	5	980	45	50	1650	5	75	5	60	5	5	5
Future Volume (vph)	5	980	45	50	1650	5	75	5	60	5	5	5
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1604	0	1770	1723	0
Flt Permitted	0.111			0.238			0.751			0.711		
Satd. Flow (perm)	207	3539	1583	443	3539	1583	1399	1604	0	1324	1723	0
Satd. Flow (RTOR)			104			49		65			5	
Lane Group Flow (vph)	5	1065	49	54	1793	5	82	70	0	5	10	0
Turn Type	Perm	NA	Perm	D,P+P	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			4				8
Permitted Phases	6		6	6		2	4			8		
Total Split (s)	51.0	51.0	51.0	15.0	66.0	66.0	34.0	34.0		34.0	34.0	
Total Lost Time (s)	7.0	7.0	7.0	5.0	7.0	7.0	7.5	7.5		7.5	7.5	
Act Effct Green (s)	71.3	71.3	71.3	76.2	79.6	79.6	9.8	9.8		9.8	9.8	
Actuated g/C Ratio	0.71	0.71	0.71	0.76	0.80	0.80	0.10	0.10		0.10	0.10	
v/c Ratio	0.03	0.42	0.04	0.13	0.64	0.00	0.60	0.33		0.04	0.06	
Control Delay	1.4	3.0	0.1	2.9	5.6	0.0	60.5	15.6		38.8	29.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	1.4	3.0	0.1	2.9	5.6	0.0	60.5	15.6		38.8	29.8	
LOS	A	A	A	A	A	A	E	B		D	C	
Approach Delay		2.8			5.5			39.8			32.8	
Approach LOS		A			A			D			C	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 97 (97%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 6.4

Intersection LOS: A

Intersection Capacity Utilization 68.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 105: 6400 West & SR-92



Timings

106: 6000 West & SR-92

04/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	855	85	85	1420	115	125	55	75	285	45	160
Future Volume (vph)	105	855	85	85	1420	115	125	55	75	285	45	160
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1701	0	1770	1645	0
Flt Permitted	0.085			0.230			0.545			0.666		
Satd. Flow (perm)	158	3539	1583	428	3539	1583	1015	1701	0	1241	1645	0
Satd. Flow (RTOR)			115			115		66			172	
Lane Group Flow (vph)	114	929	92	92	1543	125	136	142	0	310	223	0
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4				8
Permitted Phases	2		6	6		2	4			8		
Total Split (s)	15.0	52.0	52.0	15.0	52.0	52.0	33.0	33.0		33.0	33.0	
Total Lost Time (s)	5.8	6.9	6.9	6.0	6.9	6.9	7.5	7.5		7.5	7.5	
Act Effct Green (s)	55.4	49.8	49.8	56.2	47.2	47.2	25.5	25.5		25.5	25.5	
Actuated g/C Ratio	0.55	0.50	0.50	0.56	0.47	0.47	0.26	0.26		0.26	0.26	
v/c Ratio	0.57	0.53	0.11	0.28	0.92	0.15	0.53	0.29		0.98	0.41	
Control Delay	22.4	29.0	7.3	10.5	35.8	4.2	40.7	18.3		84.9	10.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	22.4	29.0	7.3	10.5	35.8	4.2	40.7	18.3		84.9	10.9	
LOS	C	C	A	B	D	A	D	B		F	B	
Approach Delay		26.6			32.2			29.3			54.0	
Approach LOS		C			C			C			D	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 81 (81%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 33.4

Intersection LOS: C

Intersection Capacity Utilization 91.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 106: 6000 West & SR-92



Intersection												
Int Delay, s/veh	10.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑		↘	↑	↗	↘	↑	↗
Traffic Vol, veh/h	5	1185	25	25	1555	5	35	0	35	5	0	30
Future Vol, veh/h	5	1185	25	25	1555	5	35	0	35	5	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	275	170	-	-	100	-	100	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1288	27	27	1690	5	38	0	38	5	0	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1696	0	0	1288	0	0	2198	3049	644	2402	3046	848
Stage 1	-	-	-	-	-	-	1299	1299	-	1747	1747	-
Stage 2	-	-	-	-	-	-	899	1750	-	655	1299	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	372	-	-	534	-	-	~ 25	12	416	17	12	305
Stage 1	-	-	-	-	-	-	171	230	-	89	138	-
Stage 2	-	-	-	-	-	-	300	138	-	421	230	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	372	-	-	534	-	-	~ 21	11	416	15	11	305
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 21	11	-	15	11	-
Stage 1	-	-	-	-	-	-	169	227	-	88	131	-
Stage 2	-	-	-	-	-	-	254	131	-	377	227	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			\$ 394.8			65		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	21	-	416	372	-	-	534	-	-	15	-	305
HCM Lane V/C Ratio	1.812	-	0.091	0.015	-	-	0.051	-	-	0.362	-	0.107
HCM Control Delay (s)	\$ 775.1	0	14.5	14.8	-	-	12.1	-	-	\$ 345.9	0	18.2
HCM Lane LOS	F	A	B	B	-	-	B	-	-	F	A	C
HCM 95th %tile Q(veh)	5	-	0.3	0	-	-	0.2	-	-	1	-	0.4

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Timings

108: 5300 West (SR-74) & SR-92

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	235	845	145	160	1055	40	195	205	210	220	220	335
Future Volume (vph)	235	845	145	160	1055	40	195	205	210	220	220	335
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.080			0.213			0.341			0.368		
Satd. Flow (perm)	149	3539	1583	397	3539	1583	635	1863	1583	685	1863	1583
Satd. Flow (RTOR)			130			123			228			278
Lane Group Flow (vph)	255	918	158	174	1147	43	212	223	228	239	239	364
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Total Split (s)	25.0	65.0	65.0	25.0	65.0	65.0	25.0	30.0	30.0	25.0	30.0	30.0
Total Lost Time (s)	5.9	7.2	7.2	6.3	7.2	7.2	6.0	7.0	7.0	6.1	7.0	7.0
Act Effct Green (s)	67.1	49.9	49.9	56.7	44.9	44.9	35.2	19.0	19.0	35.7	19.3	19.3
Actuated g/C Ratio	0.55	0.41	0.41	0.46	0.37	0.37	0.29	0.15	0.15	0.29	0.16	0.16
v/c Ratio	0.86	0.64	0.22	0.57	0.89	0.07	0.66	0.78	0.52	0.71	0.82	0.75
Control Delay	60.4	31.8	7.1	22.7	46.3	0.2	43.2	71.6	11.1	46.3	74.9	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	31.8	7.1	22.7	46.3	0.2	43.2	71.6	11.1	46.3	74.9	24.8
LOS	E	C	A	C	D	A	D	E	B	D	E	C
Approach Delay		34.4			41.9			41.7			45.1	
Approach LOS		C			D			D			D	

Intersection Summary

Cycle Length: 145

Actuated Cycle Length: 122.8

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 40.1

Intersection LOS: D

Intersection Capacity Utilization 87.0%

ICU Level of Service E

Analysis Period (min) 15

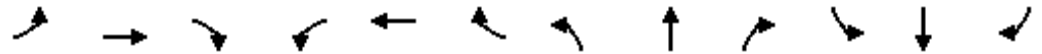
Splits and Phases: 108: 5300 West (SR-74) & SR-92



Timings

109: 4800 West & SR-92

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	85	180	1010	60	385	100	815	360	50	50	570	55
Future Volume (vph)	85	180	1010	60	385	100	815	360	50	50	570	55
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.415			0.629			0.950			0.950		
Satd. Flow (perm)	773	3539	1583	1172	3539	1583	3433	1863	1583	1770	1863	1583
Satd. Flow (RTOR)			606			127			80			131
Lane Group Flow (vph)	92	196	1098	65	418	109	886	391	54	54	620	60
Turn Type	Perm	NA	Free	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		6			2		7	4		3		8
Permitted Phases	6		Free	2		2			4			8
Total Split (s)	40.0	40.0		40.0	40.0	40.0	40.0	35.0	35.0	20.0	45.0	45.0
Total Lost Time (s)	7.0	7.0		6.8	6.8	6.8	5.8	6.3	6.3	5.2	6.6	6.6
Act Effct Green (s)	33.0	33.0	124.0	33.2	33.2	33.2	33.2	67.4	67.4	7.2	38.4	38.4
Actuated g/C Ratio	0.27	0.27	1.00	0.27	0.27	0.27	0.27	0.54	0.54	0.06	0.31	0.31
v/c Ratio	0.45	0.21	0.69	0.21	0.44	0.21	0.97	0.39	0.06	0.53	1.07	0.10
Control Delay	46.6	36.3	2.5	37.9	39.7	5.1	67.4	18.7	1.6	75.0	100.3	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	36.3	2.5	37.9	39.7	5.1	67.4	18.7	1.6	75.0	100.3	0.4
LOS	D	D	A	D	D	A	E	B	A	E	F	A
Approach Delay		10.2			33.1			50.4			90.3	
Approach LOS		B			C			D			F	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 124

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 41.3

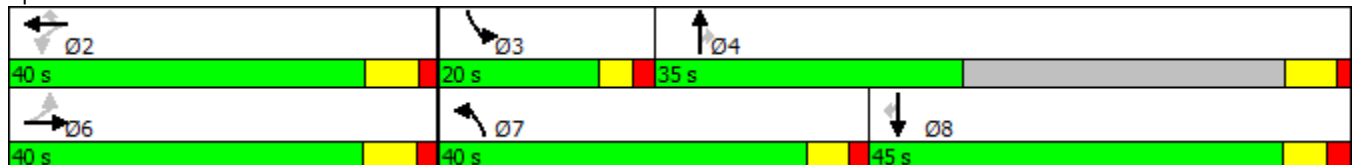
Intersection LOS: D

Intersection Capacity Utilization 94.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 109: 4800 West & SR-92



Intersection						
Int Delay, s/veh	15.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	70	210	10	45	500	20
Future Vol, veh/h	70	210	10	45	500	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	228	11	49	543	22

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	304	0	261	190
Stage 1	-	-	-	-	190	-
Stage 2	-	-	-	-	71	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1257	-	728	852
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	952	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1257	-	722	852
Mov Cap-2 Maneuver	-	-	-	-	722	-
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	944	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	25.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	726	-	-	1257	-
HCM Lane V/C Ratio	0.779	-	-	0.009	-
HCM Control Delay (s)	25.1	-	-	7.9	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	7.6	-	-	0	-

Timings

101: Center Street & SR-92

04/15/2021

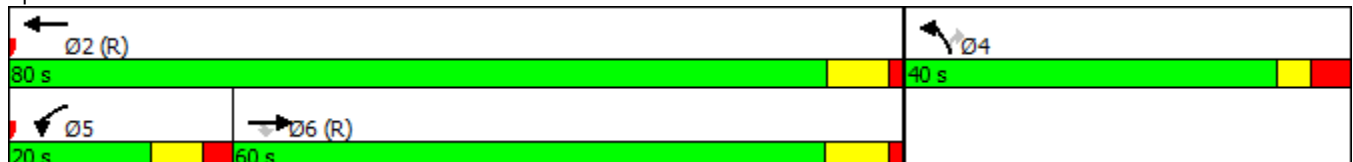


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↔	↑↑	↔	↑
Traffic Volume (vph)	1315	155	150	665	220	245
Future Volume (vph)	1315	155	150	665	220	245
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6				4
Detector Phase	6	6	5	2	4	4
Switch Phase						
Minimum Initial (s)	15.0	15.0	5.0	15.0	5.0	5.0
Minimum Split (s)	22.1	22.1	12.4	22.0	11.7	11.7
Total Split (s)	60.0	60.0	20.0	80.0	40.0	40.0
Total Split (%)	50.0%	50.0%	16.7%	66.7%	33.3%	33.3%
Yellow Time (s)	5.6	5.6	4.7	5.5	3.0	3.0
All-Red Time (s)	1.5	1.5	2.7	1.5	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.4	7.0	6.7	6.7
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	78.0	78.0	8.9	94.4	11.9	11.9
Actuated g/C Ratio	0.65	0.65	0.07	0.79	0.10	0.10
v/c Ratio	0.62	0.15	0.64	0.26	0.70	0.75
Control Delay	14.7	1.9	86.1	1.0	63.3	24.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	1.9	86.1	1.0	63.3	24.9
LOS	B	A	F	A	E	C
Approach Delay	13.4			16.7	43.1	
Approach LOS	B			B	D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 100 (83%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 19.4
 Intersection LOS: B
 Intersection Capacity Utilization 64.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 101: Center Street & SR-92



Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑	↗	↘	↗
Traffic Vol, veh/h	15	1545	785	5	5	30
Future Vol, veh/h	15	1545	785	5	5	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	100	90	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	1679	853	5	5	33

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	853	0	-	0	1725 427
Stage 1	-	-	-	-	853 -
Stage 2	-	-	-	-	872 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	782	-	-	-	80 576
Stage 1	-	-	-	-	378 -
Stage 2	-	-	-	-	369 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	782	-	-	-	78 576
Mov Cap-2 Maneuver	-	-	-	-	78 -
Stage 1	-	-	-	-	378 -
Stage 2	-	-	-	-	361 -

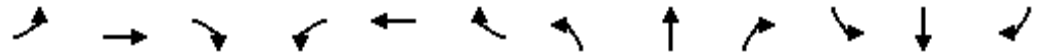
Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	17.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	782	-	-	-	78	576
HCM Lane V/C Ratio	0.021	-	-	-	0.07	0.057
HCM Control Delay (s)	9.7	-	-	-	54.6	11.6
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.2

Timings

103: 1200 East & SR-92

04/15/2021

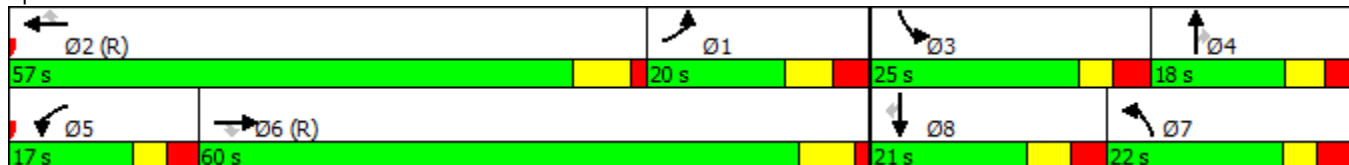


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗↗	↘	↖	↗↗	↘	↖↖	↗↗	↘	↖↖	↗↗	↘
Traffic Volume (vph)	35	1990	490	125	645	10	340	35	145	25	50	60
Future Volume (vph)	35	1990	490	125	645	10	340	35	145	25	50	60
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.7	44.5	44.5	10.9	40.6	40.6	11.2	11.1	11.1	11.4	12.1	12.1
Total Split (s)	20.0	60.0	60.0	17.0	57.0	57.0	22.0	18.0	18.0	25.0	21.0	21.0
Total Split (%)	16.7%	50.0%	50.0%	14.2%	47.5%	47.5%	18.3%	15.0%	15.0%	20.8%	17.5%	17.5%
Yellow Time (s)	4.3	5.0	5.0	3.0	5.1	5.1	3.0	3.6	3.6	3.0	4.0	4.0
All-Red Time (s)	3.4	1.5	1.5	2.9	1.5	1.5	3.2	2.5	2.5	3.4	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.7	6.5	6.5	5.9	6.6	6.6	6.2	6.1	6.1	6.4	7.1	7.1
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	9.4	62.5	62.5	12.4	68.7	68.7	16.3	19.7	19.7	5.1	5.6	5.6
Actuated g/C Ratio	0.08	0.52	0.52	0.10	0.57	0.57	0.14	0.16	0.16	0.04	0.05	0.05
v/c Ratio	0.14	0.82	0.56	0.75	0.35	0.01	0.80	0.07	0.36	0.19	0.33	0.23
Control Delay	47.1	26.4	9.2	70.3	12.7	0.0	63.1	41.5	3.5	58.5	60.5	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	26.4	9.2	70.3	12.7	0.0	63.1	41.5	3.5	58.5	60.5	2.0
LOS	D	C	A	E	B	A	E	D	A	E	E	A
Approach Delay		23.4			21.8			45.0			34.1	
Approach LOS		C			C			D			C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 58 (48%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 26.3
 Intersection LOS: C
 Intersection Capacity Utilization 77.2%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 103: 1200 East & SR-92



Timings

104: Highland Drive & SR-92

04/15/2021

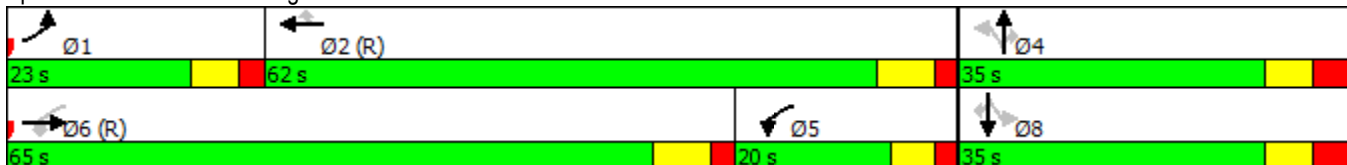


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕	↕↕↕	↕	↕	↕↕	↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	295	1840	25	240	575	115	40	150	270	115	135	165
Future Volume (vph)	295	1840	25	240	575	115	40	150	270	115	135	165
Turn Type	Prot	NA	Perm	D,P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6	6		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.5	29.3	29.3	11.1	22.3	22.3	43.6	43.6	43.6	12.6	12.6	12.6
Total Split (s)	23.0	65.0	65.0	20.0	62.0	62.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	19.2%	54.2%	54.2%	16.7%	51.7%	51.7%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	4.3	5.2	5.2	4.0	5.2	5.2	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.2	2.1	2.1	2.1	2.1	2.1	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.3	7.3	6.1	7.3	7.3	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	15.0	68.2	68.2	83.3	66.7	66.7	16.9	16.9	16.9	16.9	16.9	16.9
Actuated g/C Ratio	0.12	0.57	0.57	0.69	0.56	0.56	0.14	0.14	0.14	0.14	0.14	0.14
v/c Ratio	0.75	0.69	0.03	0.97	0.32	0.13	0.27	0.62	0.71	0.87	0.56	0.48
Control Delay	74.8	2.7	0.0	82.6	20.2	7.4	47.6	57.8	22.9	95.8	55.0	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.8	2.7	0.0	82.6	20.2	7.4	47.6	57.8	22.9	95.8	55.0	10.2
LOS	E	A	A	F	C	A	D	E	C	F	E	B
Approach Delay		12.6			34.7			36.4			48.5	
Approach LOS		B			C			D			D	

Intersection Summary

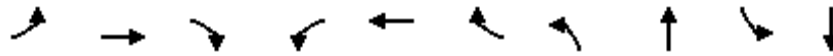
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 107 (89%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 86.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 104: Highland Drive & SR-92



Timings
105: 6400 West & SR-92

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗↗	↖	↖	↗↗	↖	↖	↗	↖	↗
Traffic Volume (vph)	10	2100	115	65	1620	5	65	5	5	5
Future Volume (vph)	10	2100	115	65	1620	5	65	5	5	5
Turn Type	Perm	NA	Perm	D,P+P	NA	Perm	Perm	NA	Perm	NA
Protected Phases		6		5	2			4		8
Permitted Phases	6		6	6		2	4		8	
Detector Phase	6	6	6	5	2	2	4	4	8	8
Switch Phase										
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	10.0	22.0	22.0	31.5	31.5	33.5	33.5
Total Split (s)	70.0	70.0	70.0	15.0	85.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	58.3%	58.3%	58.3%	12.5%	70.8%	70.8%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.5	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	5.0	7.0	7.0	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	86.5	86.5	86.5	93.5	95.5	95.5	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.72	0.72	0.72	0.78	0.80	0.80	0.08	0.08	0.08	0.08
v/c Ratio	0.07	0.89	0.11	0.47	0.63	0.00	0.61	0.45	0.05	0.07
Control Delay	2.1	15.3	0.3	32.2	1.9	0.0	74.2	17.8	48.8	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.1	15.3	0.3	32.2	1.9	0.0	74.2	17.8	48.8	36.3
LOS	A	B	A	C	A	A	E	B	D	D
Approach Delay		14.4			3.0			41.6		40.5
Approach LOS		B			A			D		D

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 10.8
 Intersection Capacity Utilization 80.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 105: 6400 West & SR-92



Timings
106: 6000 West & SR-92

04/15/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	265	1770	155	55	1390	225	120	125	215	100
Future Volume (vph)	265	1770	155	55	1390	225	120	125	215	100
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA	Perm	NA
Protected Phases	1	6		5	2			4		8
Permitted Phases	2		6	6		2	4		8	
Detector Phase	1	6	6	5	2	2	4	4	8	8
Switch Phase										
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.8	22.9	22.9	11.0	22.9	22.9	32.5	32.5	32.5	32.5
Total Split (s)	15.0	67.0	67.0	15.0	67.0	67.0	38.0	38.0	38.0	38.0
Total Split (%)	12.5%	55.8%	55.8%	12.5%	55.8%	55.8%	31.7%	31.7%	31.7%	31.7%
Yellow Time (s)	4.3	5.4	5.4	4.5	5.4	5.4	5.6	5.6	5.6	5.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	6.9	6.9	6.0	6.9	6.9	7.5	7.5	7.5	7.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	71.5	66.4	66.4	72.3	60.1	60.1	29.4	29.4	29.4	29.4
Actuated g/C Ratio	0.60	0.55	0.55	0.60	0.50	0.50	0.24	0.24	0.24	0.24
v/c Ratio	1.34	0.98	0.18	0.40	0.85	0.29	0.79	0.47	0.97	0.65
Control Delay	195.3	44.5	8.4	18.4	32.0	8.8	75.2	38.1	96.3	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	195.3	44.5	8.4	18.4	32.0	8.8	75.2	38.1	96.3	37.9
LOS	F	D	A	B	C	A	E	D	F	D
Approach Delay		60.2			28.4			52.2		63.3
Approach LOS		E			C			D		E

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 84 (70%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.34
 Intersection Signal Delay: 48.6
 Intersection LOS: D
 Intersection Capacity Utilization 99.3%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 106: 6000 West & SR-92



Intersection												
Int Delay, s/veh	31.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑		↘	↑	↗	↘	↑	↗
Traffic Vol, veh/h	30	1955	70	25	1625	15	25	0	45	5	0	20
Future Vol, veh/h	30	1955	70	25	1625	15	25	0	45	5	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	275	170	-	-	100	-	100	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	2125	76	27	1766	16	27	0	49	5	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1783	0	0	2125	0	0	3128	4027	1063	2957	4019	891
Stage 1	-	-	-	-	-	-	2190	2190	-	1829	1829	-
Stage 2	-	-	-	-	-	-	938	1837	-	1128	2190	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	344	-	-	253	-	-	~ 5	3	219	6	3	285
Stage 1	-	-	-	-	-	-	46	82	-	79	126	-
Stage 2	-	-	-	-	-	-	284	125	-	218	82	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	344	-	-	253	-	-	~ 4	2	219	~ 4	2	285
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 4	2	-	~ 4	2	-
Stage 1	-	-	-	-	-	-	42	74	-	71	113	-
Stage 2	-	-	-	-	-	-	234	112	-	153	74	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	\$ 1559	\$ 361.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	4	-	219	344	-	-	253	-	-	4	-	285
HCM Lane V/C Ratio	6.793	-	0.223	0.095	-	-	0.107	-	-	1.359	-	0.076
HCM Control Delay (s)	\$ 4318.2	0	26.1	16.6	-	-	20.9	-	-	\$ 1731.9	0	18.7
HCM Lane LOS	F	A	D	C	-	-	C	-	-	F	A	C
HCM 95th %tile Q(veh)	5	-	0.8	0.3	-	-	0.4	-	-	1.5	-	0.2

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Timings

108: 5300 West (SR-74) & SR-92

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗	↘	↘	↗	↘	↘	↗	↘	↘	↗	↘
Traffic Volume (vph)	310	1400	295	180	1090	60	245	305	250	100	300	330
Future Volume (vph)	310	1400	295	180	1090	60	245	305	250	100	300	330
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.9	27.2	27.2	11.3	31.2	31.2	11.0	30.0	30.0	11.1	33.0	33.0
Total Split (s)	33.0	55.0	55.0	15.0	37.0	37.0	17.0	38.0	38.0	12.0	34.0	34.0
Total Split (%)	27.3%	45.5%	45.5%	12.4%	30.6%	30.6%	14.0%	31.4%	31.4%	9.9%	28.1%	28.1%
Yellow Time (s)	3.8	4.9	4.9	4.0	4.9	4.9	4.0	4.9	4.9	4.0	4.9	4.9
All-Red Time (s)	2.1	2.3	2.3	2.3	2.3	2.3	2.0	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	7.2	7.2	6.3	7.2	7.2	6.0	7.0	7.0	6.1	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	64.9	48.2	48.2	51.1	38.9	38.9	41.0	29.0	29.0	30.8	24.0	24.0
Actuated g/C Ratio	0.54	0.40	0.40	0.42	0.32	0.32	0.34	0.24	0.24	0.25	0.20	0.20
v/c Ratio	0.92	1.08	0.43	0.86	1.04	0.10	1.08	0.75	0.50	0.49	0.89	0.62
Control Delay	63.1	83.9	12.4	64.8	79.2	0.3	112.9	53.3	12.9	36.6	72.3	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.1	83.9	12.4	64.8	79.2	0.3	112.9	53.3	12.9	36.6	72.3	10.5
LOS	E	F	B	E	E	A	F	D	B	D	E	B
Approach Delay		70.1			73.7			58.9			39.5	
Approach LOS		E			E			E			D	

Intersection Summary

Cycle Length: 121

Actuated Cycle Length: 121

Offset: 16 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 64.7

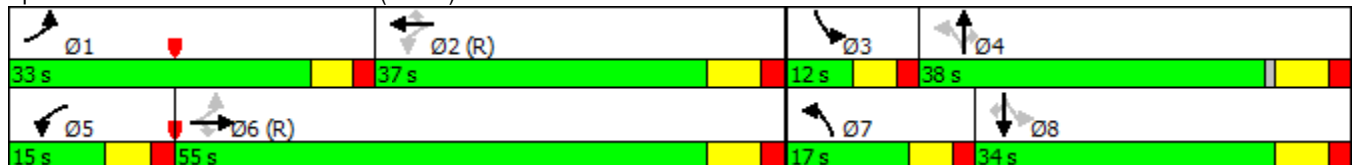
Intersection LOS: E

Intersection Capacity Utilization 100.1%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 108: 5300 West (SR-74) & SR-92



Timings

109: 4800 West & SR-92

04/15/2021

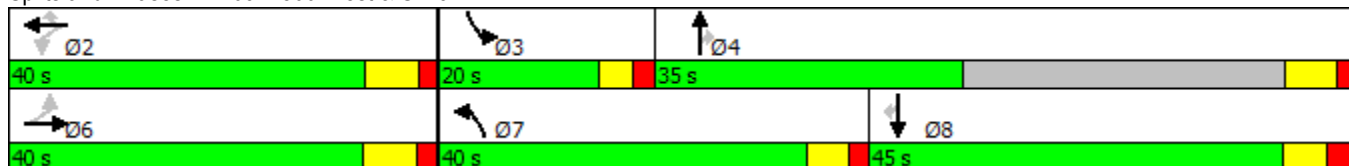


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	180	545	1025	50	400	170	805	475	60	105	440	125
Future Volume (vph)	180	545	1025	50	400	170	805	475	60	105	440	125
Turn Type	Perm	NA	Free	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		6			2		7	4		3	8	
Permitted Phases	6		Free	2		2			4			8
Detector Phase	6	6		2	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	25.0	25.0		24.8	24.8	24.8	10.8	24.3	24.3	10.2	24.6	24.6
Total Split (s)	40.0	40.0		40.0	40.0	40.0	40.0	35.0	35.0	20.0	45.0	45.0
Total Split (%)	32.0%	32.0%		32.0%	32.0%	32.0%	32.0%	28.0%	28.0%	16.0%	36.0%	36.0%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.8	4.8	3.2	4.1	4.1
All-Red Time (s)	2.0	2.0		1.8	1.8	1.8	1.8	1.5	1.5	2.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		6.8	6.8	6.8	5.8	6.3	6.3	5.2	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	33.2	33.2	118.3	33.4	33.4	33.4	31.7	56.0	56.0	10.5	33.8	33.8
Actuated g/C Ratio	0.28	0.28	1.00	0.28	0.28	0.28	0.27	0.47	0.47	0.09	0.29	0.29
v/c Ratio	0.90	0.60	0.70	0.36	0.43	0.32	0.95	0.59	0.08	0.73	0.90	0.25
Control Delay	84.3	41.0	2.6	45.2	37.7	6.6	62.9	26.2	2.9	79.6	61.8	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.3	41.0	2.6	45.2	37.7	6.6	62.9	26.2	2.9	79.6	61.8	7.1
LOS	F	D	A	D	D	A	E	C	A	E	E	A
Approach Delay		23.0			29.8			47.2			54.4	
Approach LOS		C			C			D			D	

Intersection Summary

Cycle Length: 125
 Actuated Cycle Length: 118.3
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 36.2
 Intersection LOS: D
 Intersection Capacity Utilization 91.4%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 109: 4800 West & SR-92



Intersection						
Int Delay, s/veh	87.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↑	↔	
Traffic Vol, veh/h	170	540	35	140	480	40
Future Vol, veh/h	170	540	35	140	480	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	185	587	38	152	522	43

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	772	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.218	-
Pot Cap-1 Maneuver	-	-	843	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	843	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-






























Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	236.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	394	-	-	843	-
HCM Lane V/C Ratio	1.435	-	-	0.045	-
HCM Control Delay (s)	236.2	-	-	9.5	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	28.8	-	-	0.1	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
104: Highland Drive & SR-92

04/19/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			 						 	
Traffic Volume (vph)	400	2420	20	260	650	180	40	210	370	300	250	330
Future Volume (vph)	400	2420	20	260	650	180	40	210	370	300	250	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	435		450	260		280	100		170	280		180
Storage Lanes	2		1	1		1	1		1	1		1
Taper Length (ft)	280			125			80			100		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.058			0.437			0.505		
Satd. Flow (perm)	3433	5085	1583	108	3539	1583	814	1863	1583	941	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			87			196			220			359
Link Speed (mph)		50			50			25				25
Link Distance (ft)		1343			952			1887				477
Travel Time (s)		18.3			13.0			51.5				13.0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	435	2630	22	283	707	196	43	228	402	326	272	359
Shared Lane Traffic (%)												
Lane Group Flow (vph)	435	2630	22	283	707	196	43	228	402	326	272	359
Turn Type	Prot	NA	Perm	D,P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4				8
Permitted Phases			6	6		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.5	29.3	29.3	11.1	22.3	22.3	43.6	43.6	43.6	12.6	12.6	12.6
Total Split (s)	35.0	76.0	76.0	23.0	64.0	64.0	51.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	23.3%	50.7%	50.7%	15.3%	42.7%	42.7%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%
Yellow Time (s)	4.3	5.2	5.2	4.0	5.2	5.2	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	2.2	2.1	2.1	2.1	2.1	2.1	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.3	7.3	6.1	7.3	7.3	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	23.1	68.7	68.7	86.8	62.1	62.1	43.4	43.4	43.4	43.4	43.4	43.4

Lanes, Volumes, Timings
104: Highland Drive & SR-92

04/19/2021

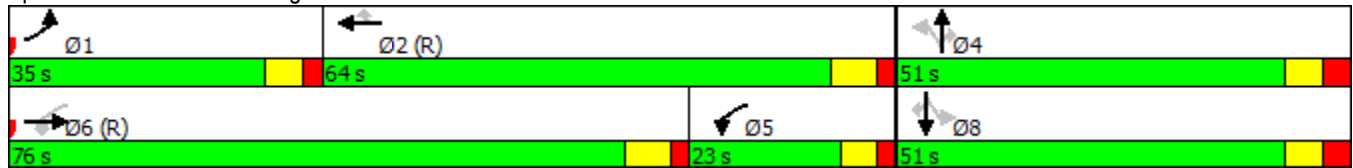


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.15	0.46	0.46	0.58	0.41	0.41	0.29	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.82	1.13	0.03	1.14	0.48	0.25	0.18	0.42	0.65	1.20	0.50	0.50
Control Delay	83.1	84.1	0.0	141.2	39.0	10.4	42.7	46.1	26.0	164.4	48.3	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.1	84.1	0.0	141.2	39.0	10.4	42.7	46.1	26.0	164.4	48.3	6.4
LOS	F	F	A	F	D	B	D	D	C	F	D	A
Approach Delay	83.4			58.7			33.9			72.1		
Approach LOS	F			E			C			E		

Intersection Summary


































Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	80.6 (54%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green
Natural Cycle:	125
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.20
Intersection Signal Delay:	70.9
Intersection LOS:	E
Intersection Capacity Utilization	112.7%
ICU Level of Service	H
Analysis Period (min)	15

Splits and Phases: 104: Highland Drive & SR-92



Lanes, Volumes, Timings
104: Highland Drive & SR-92

04/26/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	 					 	 	 
Traffic Volume (vph)	380	2420	20	260	650	180	40	210	390	320	260	320
Future Volume (vph)	380	2420	20	260	650	180	40	210	390	320	260	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	435		450	260		280	100		170	280		180
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	280			125			80			100		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.950			0.578			0.369		
Satd. Flow (perm)	3433	5085	1583	3433	3539	1583	1077	1863	1583	687	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			119			196			164			348
Link Speed (mph)		50			50			25				25
Link Distance (ft)		1343			952			1887				477
Travel Time (s)		18.3			13.0			51.5				13.0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	413	2630	22	283	707	196	43	228	424	348	283	348
Shared Lane Traffic (%)												
Lane Group Flow (vph)	413	2630	22	283	707	196	43	228	424	348	283	348
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2			4		3	8	
Permitted Phases			6			2	4		4	8		8
Detector Phase	1	6	6	5	2	2	4	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.5	29.3	29.3	11.1	22.3	22.3	43.6	43.6	43.6	9.5	12.6	12.6
Total Split (s)	32.0	75.0	75.0	17.0	60.0	60.0	46.0	46.0	46.0	12.0	58.0	58.0
Total Split (%)	21.3%	50.0%	50.0%	11.3%	40.0%	40.0%	30.7%	30.7%	30.7%	8.0%	38.7%	38.7%
Yellow Time (s)	4.3	5.2	5.2	4.0	5.2	5.2	4.2	4.2	4.2	3.5	4.2	4.2
All-Red Time (s)	2.2	2.1	2.1	2.1	2.1	2.1	3.4	3.4	3.4	1.0	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	7.3	7.3	6.1	7.3	7.3	7.6	7.6	7.6	4.5	7.6	7.6
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	21.7	75.3	75.3	10.9	64.1	64.1	30.8	30.8	30.8	45.9	42.8	42.8

Lanes, Volumes, Timings
 104: Highland Drive & SR-92

04/26/2021

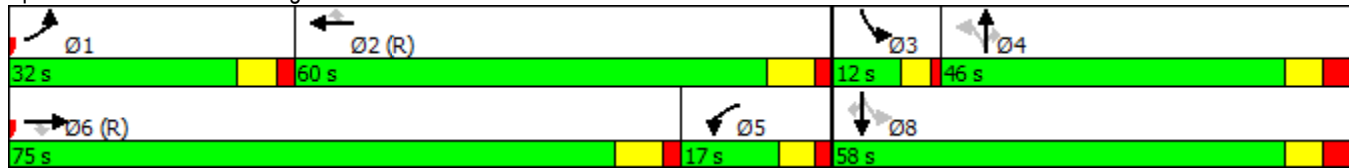


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.14	0.50	0.50	0.07	0.43	0.43	0.21	0.21	0.21	0.31	0.29	0.29
v/c Ratio	0.83	1.03	0.03	1.14	0.47	0.25	0.20	0.60	0.93	1.32	0.53	0.50
Control Delay	69.3	37.1	0.0	143.0	24.9	6.8	48.3	59.5	63.2	205.7	48.0	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	37.1	0.0	143.0	24.9	6.8	48.3	59.5	63.2	205.7	48.0	5.9
LOS	E	D	A	F	C	A	D	E	E	F	D	A
Approach Delay	41.2			50.1			61.1			89.1		
Approach LOS	D			D			E			F		

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	110 (73%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle:	145
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.32
Intersection Signal Delay:	53.2
Intersection LOS:	D
Intersection Capacity Utilization	104.8%
ICU Level of Service	G
Analysis Period (min)	15

Splits and Phases: 104: Highland Drive & SR-92



Queues

104: Highland Drive & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	413	2630	22	283	707	196	43	228	424	348	283	348
v/c Ratio	0.83	1.03	0.03	1.14	0.47	0.25	0.20	0.60	0.93	1.32	0.53	0.50
Control Delay	69.3	37.1	0.0	143.0	24.9	6.8	48.3	59.5	63.2	205.7	48.0	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	37.1	0.0	143.0	24.9	6.8	48.3	59.5	63.2	205.7	48.0	5.9
Queue Length 50th (ft)	188	~1032	0	~160	188	26	35	201	265	~381	230	0
Queue Length 95th (ft)	m188	m#1148	m0	#260	316	67	69	278	#401	#572	307	71
Internal Link Dist (ft)		1263			872			1807			397	
Turn Bay Length (ft)	435		450	260		280	100		170	280		180
Base Capacity (vph)	583	2554	854	249	1512	789	275	476	527	264	625	762
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	1.03	0.03	1.14	0.47	0.25	0.16	0.48	0.80	1.32	0.45	0.46

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings
106: 6000 West & SR-92

04/19/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	420	2120	170	60	1510	330	120	170	70	410	180	330
Future Volume (vph)	420	2120	170	60	1510	330	120	170	70	410	180	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		175	275		150	125		0	150		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	50			75			75			50		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.956				0.903
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1781	0	1770	1682	0
Flt Permitted	0.075			0.058			0.163			0.503		
Satd. Flow (perm)	140	3539	1583	108	3539	1583	304	1781	0	937	1682	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			76			119		15				69
Link Speed (mph)		50			50			30				35
Link Distance (ft)		2677			2693			1450				1432
Travel Time (s)		36.5			36.7			33.0				27.9
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	457	2304	185	65	1641	359	130	185	76	446	196	359
Shared Lane Traffic (%)												
Lane Group Flow (vph)	457	2304	185	65	1641	359	130	261	0	446	555	0
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4				8
Permitted Phases	2		6	6		2	4			8		
Detector Phase	1	6	6	5	2	2	4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.8	22.9	22.9	11.0	22.9	22.9	32.5	32.5		32.5	32.5	
Total Split (s)	28.0	73.0	73.0	15.0	60.0	60.0	62.0	62.0		62.0	62.0	
Total Split (%)	18.7%	48.7%	48.7%	10.0%	40.0%	40.0%	41.3%	41.3%		41.3%	41.3%	
Yellow Time (s)	4.3	5.4	5.4	4.5	5.4	5.4	5.6	5.6		5.6	5.6	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.8	6.9	6.9	6.0	6.9	6.9	7.5	7.5		7.5	7.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effect Green (s)	76.4	70.4	70.4	77.2	53.1	53.1	54.5	54.5		54.5	54.5	

Lanes, Volumes, Timings
106: 6000 West & SR-92

04/19/2021



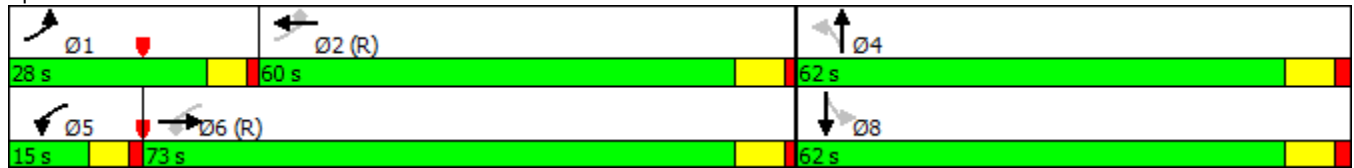
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.51	0.47	0.47	0.51	0.35	0.35	0.36	0.36		0.36	0.36	
v/c Ratio	1.46	1.39	0.24	0.49	1.31	0.56	1.18	0.40		1.31	0.85	
Control Delay	252.7	208.0	21.6	35.0	173.8	20.7	184.6	35.6		198.3	51.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	252.7	208.0	21.6	35.0	173.8	20.7	184.6	35.6		198.3	51.6	
LOS	F	F	C	C	F	C	F	D		F	D	
Approach Delay		203.2			142.8			85.1			117.0	
Approach LOS		F			F			F			F	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.46
 Intersection Signal Delay: 163.0
 Intersection Capacity Utilization 124.5%
 Analysis Period (min) 15

Intersection LOS: F
 ICU Level of Service H

Splits and Phases: 106: 6000 West & SR-92



Lanes, Volumes, Timings
106: 6000 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	460	2080	200	50	1460	250	150	160	60	300	160	370
Future Volume (vph)	460	2080	200	50	1460	250	150	160	60	300	160	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		175	275		150	125		150	150		150
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	50			75			75			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.978				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5019	0	1770	4973	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.045			0.561			0.561		
Satd. Flow (perm)	1770	5019	0	84	4973	0	1045	1863	1583	1045	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			26				114			388
Link Speed (mph)		50			50			30				35
Link Distance (ft)		2677			2693			1450				1432
Travel Time (s)		36.5			36.7			33.0				27.9
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	500	2261	217	54	1587	272	163	174	65	326	174	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	500	2478	0	54	1859	0	163	174	65	326	174	402
Turn Type	Prot	NA		D,P+P	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4				8
Permitted Phases				6			4		4	8		8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.8	22.9		11.0	22.9		32.5	32.5	32.5	43.5	43.5	43.5
Total Split (s)	43.0	92.0		15.0	64.0		43.0	43.0	43.0	43.0	43.0	43.0
Total Split (%)	28.7%	61.3%		10.0%	42.7%		28.7%	28.7%	28.7%	28.7%	28.7%	28.7%
Yellow Time (s)	4.3	5.4		4.5	5.4		5.6	5.6	5.6	5.6	5.6	5.6
All-Red Time (s)	1.5	1.5		1.5	1.5		1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	6.9		6.0	6.9		7.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Act Effect Green (s)	37.2	90.1		96.2	57.1		35.5	35.5	35.5	35.5	35.5	35.5

Lanes, Volumes, Timings
106: 6000 West & SR-92

04/26/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.25	0.60		0.64	0.38		0.24	0.24	0.24	0.24	0.24	0.24
v/c Ratio	1.14	0.82		0.44	0.97		0.66	0.40	0.14	1.32	0.40	0.60
Control Delay	138.5	19.6		37.8	40.3		66.1	51.4	0.9	213.1	51.4	9.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	138.5	19.6		37.8	40.3		66.1	51.4	0.9	213.1	51.4	9.2
LOS	F	B		D	D		E	D	A	F	D	A
Approach Delay		39.5			40.2			49.2			91.1	
Approach LOS		D			D			D			F	

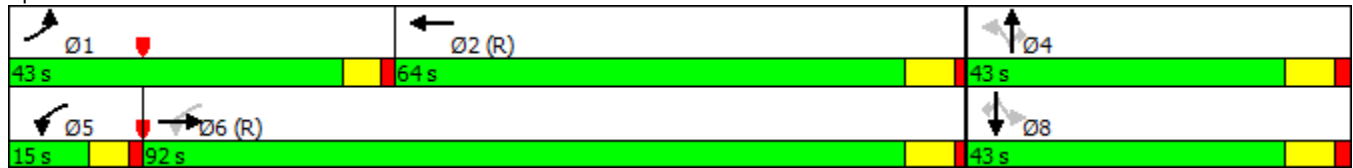
Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 5 (3%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.32
 Intersection Signal Delay: 47.9
 Intersection Capacity Utilization 107.4%
 Analysis Period (min) 15

Intersection LOS: D

ICU Level of Service G

Splits and Phases: 106: 6000 West & SR-92



Queues

106: 6000 West & SR-92

04/26/2021



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	500	2478	54	1859	163	174	65	326	174	402
v/c Ratio	1.14	0.82	0.44	0.97	0.66	0.40	0.14	1.32	0.40	0.60
Control Delay	138.5	19.6	37.8	40.3	66.1	51.4	0.9	213.1	51.4	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	138.5	19.6	37.8	40.3	66.1	51.4	0.9	213.1	51.4	9.2
Queue Length 50th (ft)	~567	324	22	669	146	145	0	~410	145	11
Queue Length 95th (ft)	m#629	m418	m63	#775	233	220	2	#611	220	109
Internal Link Dist (ft)		2597		2613		1370			1352	
Turn Bay Length (ft)	300		275		125		150	150		150
Base Capacity (vph)	438	3022	156	1909	247	440	461	247	440	670
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.82	0.35	0.97	0.66	0.40	0.14	1.32	0.40	0.60

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings
106: 6000 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗↗	↑↑	↖	↖	↑↑	↖	↖	↑	↖	↗↗	↑	↖
Traffic Volume (vph)	460	2080	200	50	1460	250	150	160	60	300	160	370
Future Volume (vph)	460	2080	200	50	1460	250	150	160	60	300	160	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		175	275		150	125		150	150		150
Storage Lanes	2		1	1		1	1		1	2		1
Taper Length (ft)	50			75			75			50		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.950			0.047			0.647			0.950		
Satd. Flow (perm)	3433	3539	1583	88	3539	1583	1205	1863	1583	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			151			147			210
Link Speed (mph)		50			50			30				35
Link Distance (ft)		2677			2693			1450				1432
Travel Time (s)		36.5			36.7			33.0				27.9
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	500	2261	217	54	1587	272	163	174	65	326	174	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	500	2261	217	54	1587	272	163	174	65	326	174	402
Turn Type	Prot	NA	Perm	D,P+P	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2			4		3	8	
Permitted Phases			6	6		2	4		4			8
Detector Phase	1	6	6	5	2	2	4	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.8	22.9	22.9	11.0	22.9	22.9	32.5	32.5	32.5	9.5	43.5	43.5
Total Split (s)	27.0	85.0	85.0	15.0	73.0	73.0	33.0	33.0	33.0	17.0	50.0	50.0
Total Split (%)	18.0%	56.7%	56.7%	10.0%	48.7%	48.7%	22.0%	22.0%	22.0%	11.3%	33.3%	33.3%
Yellow Time (s)	4.3	5.4	5.4	4.5	5.4	5.4	5.6	5.6	5.6	3.5	5.6	5.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.9	1.9	1.9	1.0	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	6.9	6.9	6.0	6.9	6.9	7.5	7.5	7.5	4.5	7.5	7.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	23.5	85.8	85.8	92.0	66.6	66.6	22.7	22.7	22.7	12.5	39.7	39.7

Lanes, Volumes, Timings
106: 6000 West & SR-92

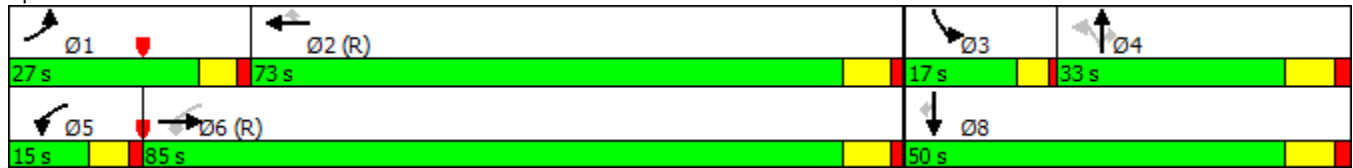
04/26/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.16	0.57	0.57	0.61	0.44	0.44	0.15	0.15	0.15	0.08	0.26	0.26
v/c Ratio	0.93	1.12	0.23	0.44	1.01	0.35	0.90	0.62	0.18	1.14	0.35	0.70
Control Delay	83.7	83.1	13.1	39.0	44.8	6.6	106.0	69.1	1.1	155.2	46.3	29.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.7	83.1	13.1	39.0	44.8	6.6	106.0	69.1	1.1	155.2	46.3	29.7
LOS	F	F	B	D	D	A	F	E	A	F	D	C
Approach Delay	78.1			39.2			73.0			78.3		
Approach LOS	E			D			E			E		

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 5 (3%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.14
 Intersection Signal Delay: 65.8 Intersection LOS: E
 Intersection Capacity Utilization 101.6% ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 106: 6000 West & SR-92



Queues

106: 6000 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	500	2261	217	54	1587	272	163	174	65	326	174	402
v/c Ratio	0.93	1.12	0.23	0.44	1.01	0.35	0.90	0.62	0.18	1.14	0.35	0.70
Control Delay	83.7	83.1	13.1	39.0	44.8	6.6	106.0	69.1	1.1	155.2	46.3	29.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.7	83.1	13.1	39.0	44.8	6.6	106.0	69.1	1.1	155.2	46.3	29.7
Queue Length 50th (ft)	~275	~1381	58	25	~857	35	155	158	0	~191	135	170
Queue Length 95th (ft)	m#299	m#1505	m80	m66	#974	67	#277	240	0	#294	206	297
Internal Link Dist (ft)		2597			2613			1370			1352	
Turn Bay Length (ft)	300		175	275		150	125		150	150		150
Base Capacity (vph)	537	2025	952	155	1572	787	204	316	391	286	527	599
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	1.12	0.23	0.35	1.01	0.35	0.80	0.55	0.17	1.14	0.33	0.67

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings
105: 6400 West & SR-92

04/19/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	2640	390	70	1880	10	130	10	60	10	20	20
Future Volume (vph)	60	2640	390	70	1880	10	130	10	60	10	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	150		150	100		0	125		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	50			50			50			50		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.872				0.925
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1624	0	1770	1723	0
Flt Permitted	0.070			0.038			0.728			0.708		
Satd. Flow (perm)	130	3539	1583	71	3539	1583	1356	1624	0	1319	1723	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			202			33		65			22	
Link Speed (mph)		50			50			35			15	
Link Distance (ft)		1837			2677			1555			1208	
Travel Time (s)		25.1			36.5			30.3			54.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	65	2870	424	76	2043	11	141	11	65	11	22	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	2870	424	76	2043	11	141	76	0	11	44	0
Turn Type	Perm	NA	Perm	D,P+P	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			4				8
Permitted Phases	6		6	6		2	4			8		
Detector Phase	6	6	6	5	2	2	4	4		8	8	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0	24.0	10.0	22.0	22.0	31.5	31.5		33.5	33.5	
Total Split (s)	102.0	102.0	102.0	15.0	117.0	117.0	33.0	33.0		33.0	33.0	
Total Split (%)	68.0%	68.0%	68.0%	10.0%	78.0%	78.0%	22.0%	22.0%		22.0%	22.0%	
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.5	3.5		3.5	3.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	5.0	7.0	7.0	7.5	7.5		7.5	7.5	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effect Green (s)	104.6	104.6	104.6	113.5	116.5	116.5	19.0	19.0		19.0	19.0	

Lanes, Volumes, Timings
105: 6400 West & SR-92

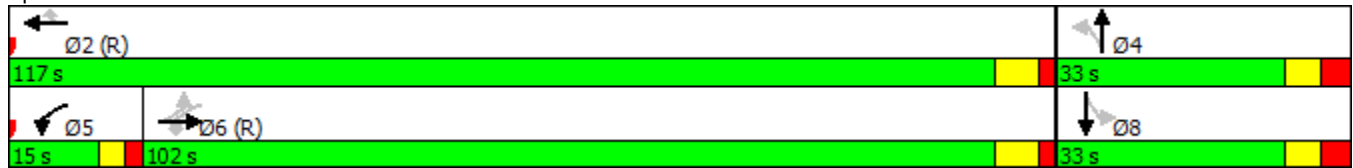
04/19/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.70	0.70	0.70	0.76	0.78	0.78	0.13	0.13		0.13	0.13	
v/c Ratio	0.72	1.16	0.36	0.58	0.74	0.01	0.82	0.29		0.07	0.19	
Control Delay	31.0	101.1	2.7	28.2	24.7	1.8	97.5	18.6		55.2	34.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	31.0	101.1	2.7	28.2	24.7	1.8	97.5	18.6		55.2	34.2	
LOS	C	F	A	C	C	A	F	B		E	C	
Approach Delay		87.3			24.7			69.9			38.4	
Approach LOS		F			C			E			D	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 125 (83%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.16
 Intersection Signal Delay: 63.1
 Intersection LOS: E
 Intersection Capacity Utilization 98.9%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 105: 6400 West & SR-92



Lanes, Volumes, Timings
105: 6400 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖↖		↖	↖↖↖		↖	↖		↖	↖	
Traffic Volume (vph)	60	2670	400	70	1900	10	130	10	60	10	20	20
Future Volume (vph)	60	2670	400	70	1900	10	130	10	60	10	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	150		150	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	50			50			50			50		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.980			0.999			0.872				0.925
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4984	0	1770	5080	0	1770	1624	0	1770	1723	0
Flt Permitted	0.082			0.038			0.728			0.708		
Satd. Flow (perm)	153	4984	0	71	5080	0	1356	1624	0	1319	1723	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			1			65			21	
Link Speed (mph)		50			50			35			15	
Link Distance (ft)		1837			2677			1555			1208	
Travel Time (s)		25.1			36.5			30.3			54.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	65	2902	435	76	2065	11	141	11	65	11	22	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	3337	0	76	2076	0	141	76	0	11	44	0
Turn Type	Perm	NA		D,P+P	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6			6			4			8		
Detector Phase	6	6		5	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	15.0	15.0		5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		10.0	22.0		35.5	35.5		35.5	35.5	
Total Split (s)	99.0	99.0		15.0	114.0		36.0	36.0		36.0	36.0	
Total Split (%)	66.0%	66.0%		10.0%	76.0%		24.0%	24.0%		24.0%	24.0%	
Yellow Time (s)	5.0	5.0		3.0	5.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		3.5	3.5		3.5	3.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		5.0	7.0		7.5	7.5		7.5	7.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Act Effect Green (s)	104.0	104.0		113.1	116.1		19.4	19.4		19.4	19.4	

Lanes, Volumes, Timings
105: 6400 West & SR-92

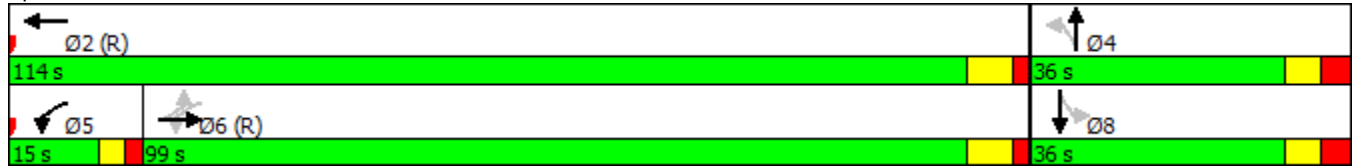
04/26/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.69	0.69		0.75	0.77		0.13	0.13		0.13	0.13	
v/c Ratio	0.62	0.96		0.57	0.53		0.81	0.29		0.06	0.18	
Control Delay	20.0	23.1		28.3	17.7		94.0	18.2		54.3	34.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.0	23.1		28.3	17.7		94.0	18.2		54.3	34.7	
LOS	B	C		C	B		F	B		D	C	
Approach Delay		23.1			18.1			67.4			38.6	
Approach LOS		C			B			E			D	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	135 (90%), Referenced to phase 2:WBT and 6:EBWB, Start of 1st Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	23.0
Intersection LOS:	C
Intersection Capacity Utilization	86.5%
ICU Level of Service	E
Analysis Period (min)	15

Splits and Phases: 105: 6400 West & SR-92



Queues

105: 6400 West & SR-92

04/26/2021



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	65	3337	76	2076	141	76	11	44
v/c Ratio	0.62	0.96	0.57	0.53	0.81	0.29	0.06	0.18
Control Delay	20.0	23.1	28.3	17.7	94.0	18.2	54.3	34.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	23.1	28.3	17.7	94.0	18.2	54.3	34.7
Queue Length 50th (ft)	15	1254	50	466	136	10	10	20
Queue Length 95th (ft)	m37	m#1249	m63	m525	204	56	28	56
Internal Link Dist (ft)		1757		2597		1475		1128
Turn Bay Length (ft)	150		150		100		125	
Base Capacity (vph)	105	3466	170	3933	257	361	250	344
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.96	0.45	0.53	0.55	0.21	0.04	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings
108: 5300 West (SR-74) & SR-92

04/19/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	520	1640	330	130	1060	70	260	370	210	120	350	500
Future Volume (vph)	520	1640	330	130	1060	70	260	370	210	120	350	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		215	150		250	175		180	275		175
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	60			65			50			75		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.074			0.084			0.129			0.154		
Satd. Flow (perm)	138	3539	1583	156	3539	1583	240	1863	1583	287	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			176			162			164			332
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		2055			3245			1172			1187	
Travel Time (s)		31.1			49.2			17.8			18.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	565	1783	359	141	1152	76	283	402	228	130	380	543
Shared Lane Traffic (%)												
Lane Group Flow (vph)	565	1783	359	141	1152	76	283	402	228	130	380	543
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.9	27.2	27.2	11.3	31.2	31.2	11.0	30.0	30.0	11.1	33.0	33.0
Total Split (s)	42.0	82.0	82.0	15.0	55.0	55.0	20.0	38.0	38.0	15.0	33.0	33.0
Total Split (%)	28.0%	54.7%	54.7%	10.0%	36.7%	36.7%	13.3%	25.3%	25.3%	10.0%	22.0%	22.0%
Yellow Time (s)	3.8	4.9	4.9	4.0	4.9	4.9	4.0	4.9	4.9	4.0	4.9	4.9
All-Red Time (s)	2.1	2.3	2.3	2.3	2.3	2.3	2.0	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	7.2	7.2	6.3	7.2	7.2	6.0	7.0	7.0	6.1	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effect Green (s)	91.1	74.8	74.8	57.4	47.8	47.8	46.0	31.0	31.0	35.8	26.0	26.0

Lanes, Volumes, Timings
 108: 5300 West (SR-74) & SR-92

04/19/2021



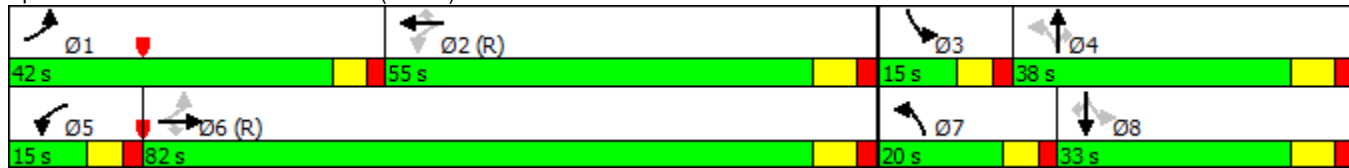
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.61	0.50	0.50	0.38	0.32	0.32	0.31	0.21	0.21	0.24	0.17	0.17
v/c Ratio	1.19	1.01	0.41	0.92	1.02	0.12	1.31	1.04	0.50	0.83	1.18	0.99
Control Delay	127.6	34.5	1.8	81.8	69.3	1.7	203.5	114.1	19.7	79.9	160.3	59.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	127.6	34.5	1.8	81.8	69.3	1.7	203.5	114.1	19.7	79.9	160.3	59.8
LOS	F	C	A	F	E	A	F	F	B	E	F	E
Approach Delay	49.6			66.8			118.2			98.6		
Approach LOS	D			E			F			F		

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 82 (55%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.31
 Intersection Signal Delay: 72.4
 Intersection Capacity Utilization 112.7%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service H

Splits and Phases: 108: 5300 West (SR-74) & SR-92



Lanes, Volumes, Timings
108: 5300 West (SR-74) & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	420	1670	240	190	1080	100	180	380	280	190	400	440
Future Volume (vph)	420	1670	240	190	1080	100	180	380	280	190	400	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		215	150		250	175		180	275		175
Storage Lanes	2		0	1		0	1		1	1		1
Taper Length (ft)	60			65			50			75		
Lane Util. Factor	0.97	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.981			0.987				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	4989	0	1770	5019	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.950			0.950			0.118			0.114		
Satd. Flow (perm)	3433	4989	0	1770	5019	0	220	1863	1583	212	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			11				187			275
Link Speed (mph)		45			45			45				45
Link Distance (ft)		2055			3245			1172				1187
Travel Time (s)		31.1			49.2			17.8				18.0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	457	1815	261	207	1174	109	196	413	304	207	435	478
Shared Lane Traffic (%)												
Lane Group Flow (vph)	457	2076	0	207	1283	0	196	413	304	207	435	478
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							4		4	8		8
Detector Phase	1	6		5	2		7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.9	34.2		11.3	34.2		11.0	31.0	31.0	11.1	37.0	37.0
Total Split (s)	32.0	71.0		20.0	59.0		17.0	41.0	41.0	18.0	42.0	42.0
Total Split (%)	21.3%	47.3%		13.3%	39.3%		11.3%	27.3%	27.3%	12.0%	28.0%	28.0%
Yellow Time (s)	3.8	4.9		4.0	4.9		4.0	4.9	4.9	4.0	4.9	4.9
All-Red Time (s)	2.1	2.3		2.3	2.3		2.0	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	7.2		6.3	7.2		6.0	7.0	7.0	6.1	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Act Effect Green (s)	23.2	63.8		13.7	54.7		46.0	34.0	34.0	47.8	35.0	35.0

Lanes, Volumes, Timings
 108: 5300 West (SR-74) & SR-92

04/26/2021

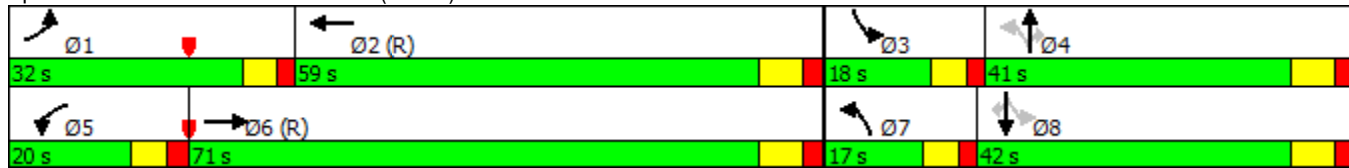


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.15	0.43		0.09	0.36		0.31	0.23	0.23	0.32	0.23	0.23
v/c Ratio	0.86	0.97		1.29	0.70		1.08	0.98	0.60	1.08	1.00	0.82
Control Delay	87.4	32.9		213.7	21.3		127.4	95.8	24.9	126.3	100.3	35.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	32.9		213.7	21.3		127.4	95.8	24.9	126.3	100.3	35.5
LOS	F	C		F	C		F	F	C	F	F	D
Approach Delay		42.7			48.0			79.0			77.4	
Approach LOS		D			D			E			E	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	90 (60%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle:	135
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.29
Intersection Signal Delay:	55.9
Intersection LOS:	E
Intersection Capacity Utilization	101.2%
ICU Level of Service	G
Analysis Period (min)	15

Splits and Phases: 108: 5300 West (SR-74) & SR-92



Queues

108: 5300 West (SR-74) & SR-92

04/26/2021



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	457	2076	207	1283	196	413	304	207	435	478
v/c Ratio	0.86	0.97	1.29	0.70	1.08	0.98	0.60	1.08	1.00	0.82
Control Delay	87.4	32.9	213.7	21.3	127.4	95.8	24.9	126.3	100.3	35.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	32.9	213.7	21.3	127.4	95.8	24.9	126.3	100.3	35.5
Queue Length 50th (ft)	244	270	~259	204	~160	405	101	~173	~430	204
Queue Length 95th (ft)	303	#822	m#339	m239	#329	#624	209	#346	#661	#387
Internal Link Dist (ft)		1975		3165		1092			1107	
Turn Bay Length (ft)	250		150		175		180	275		175
Base Capacity (vph)	597	2134	161	1835	181	422	503	191	434	580
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.97	1.29	0.70	1.08	0.98	0.60	1.08	1.00	0.82

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings
108: 5300 West (SR-74) & SR-92

04/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗	↘	↖	↗↗	↘	↖	↗↗	↘	↖	↗↗	↘
Traffic Volume (vph)	420	1670	240	190	1080	100	180	380	280	190	400	440
Future Volume (vph)	420	1670	240	190	1080	100	180	380	280	190	400	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		215	150		250	175		180	275		175
Storage Lanes	2		1	1		1	1		1	1		1
Taper Length (ft)	60			65			50			75		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.287			0.313		
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	535	3539	1583	583	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124			162			181			255
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		2055			3245			1172			1187	
Travel Time (s)		31.1			49.2			17.8			18.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	457	1815	261	207	1174	109	196	413	304	207	435	478
Shared Lane Traffic (%)												
Lane Group Flow (vph)	457	1815	261	207	1174	109	196	413	304	207	435	478
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.9	34.2	34.2	11.3	34.2	34.2	11.0	31.0	31.0	11.1	37.0	37.0
Total Split (s)	31.0	81.0	81.0	20.0	70.0	70.0	15.0	34.0	34.0	15.0	34.0	34.0
Total Split (%)	20.7%	54.0%	54.0%	13.3%	46.7%	46.7%	10.0%	22.7%	22.7%	10.0%	22.7%	22.7%
Yellow Time (s)	3.8	4.9	4.9	4.0	4.9	4.9	4.0	4.9	4.9	4.0	4.9	4.9
All-Red Time (s)	2.1	2.3	2.3	2.3	2.3	2.3	2.0	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	7.2	7.2	6.3	7.2	7.2	6.0	7.0	7.0	6.1	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	22.9	73.8	73.8	14.7	66.0	66.0	36.0	26.0	26.0	35.8	26.0	26.0

Lanes, Volumes, Timings
 108: 5300 West (SR-74) & SR-92

04/28/2021

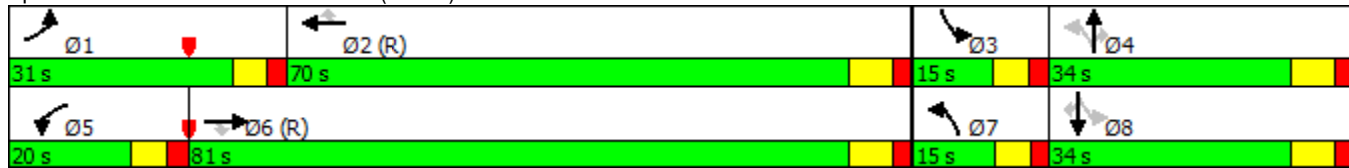


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.15	0.49	0.49	0.10	0.44	0.44	0.24	0.17	0.17	0.24	0.17	0.17
v/c Ratio	0.87	1.04	0.31	1.20	0.75	0.14	0.97	0.67	0.72	0.99	0.71	0.99
Control Delay	81.1	51.5	9.4	179.6	18.7	1.7	103.7	63.9	33.3	108.4	65.3	65.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.1	51.5	9.4	179.6	18.7	1.7	103.7	63.9	33.3	108.4	65.3	65.6
LOS	F	D	A	F	B	A	F	E	C	F	E	E
Approach Delay	52.5			39.8			62.2			73.4		
Approach LOS	D			D			E			E		

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	83 (55%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle:	145
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.20
Intersection Signal Delay:	54.7
Intersection LOS:	D
Intersection Capacity Utilization:	99.9%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 108: 5300 West (SR-74) & SR-92



Queues

108: 5300 West (SR-74) & SR-92

04/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	457	1815	261	207	1174	109	196	413	304	207	435	478
v/c Ratio	0.87	1.04	0.31	1.20	0.75	0.14	0.97	0.67	0.72	0.99	0.71	0.99
Control Delay	81.1	51.5	9.4	179.6	18.7	1.7	103.7	63.9	33.3	108.4	65.3	65.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.1	51.5	9.4	179.6	18.7	1.7	103.7	63.9	33.3	108.4	65.3	65.6
Queue Length 50th (ft)	238	~1024	51	~261	257	5	155	200	114	165	212	244
Queue Length 95th (ft)	303	#1166	m116	m#339	m281	m9	#252	260	229	#336	274	#479
Internal Link Dist (ft)		1975			3165			1092			1107	
Turn Bay Length (ft)	250		215	150		250	175		180	275		175
Base Capacity (vph)	574	1741	841	173	1556	786	202	637	433	209	637	494
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	1.04	0.31	1.20	0.75	0.14	0.97	0.65	0.70	0.99	0.68	0.97

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings
108: 5300 West (SR-74) & SR-92

11/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↔		↔	↕↕↔		↔	↕↕	↔	↔	↕↕	↔
Traffic Volume (vph)	420	1670	240	190	1080	100	180	380	280	190	400	440
Future Volume (vph)	420	1670	240	190	1080	100	180	380	280	190	400	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		215	150		250	175		180	275		175
Storage Lanes	2		0	1		0	1		1	1		1
Taper Length (ft)	60			65			50			75		
Lane Util. Factor	0.97	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt		0.981			0.987				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	4989	0	1770	5019	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.065			0.379			0.245		
Satd. Flow (perm)	3433	4989	0	121	5019	0	706	3539	1583	456	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			12				225			305
Link Speed (mph)		45			45			45				45
Link Distance (ft)		2055			3245			1172				1187
Travel Time (s)		31.1			49.2			17.8				18.0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	457	1815	261	207	1174	109	196	413	304	207	435	478
Shared Lane Traffic (%)												
Lane Group Flow (vph)	457	2076	0	207	1283	0	196	413	304	207	435	478
Turn Type	Prot	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases				2			4		4	8		8
Detector Phase	1	6		5	2		7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.9	27.2		11.3	31.2		11.0	30.0	30.0	11.1	33.0	33.0
Total Split (s)	35.0	76.0		23.0	64.0		15.0	31.0	31.0	20.0	36.0	36.0
Total Split (%)	23.3%	50.7%		15.3%	42.7%		10.0%	20.7%	20.7%	13.3%	24.0%	24.0%
Yellow Time (s)	3.8	4.9		4.0	4.9		4.0	4.9	4.9	4.0	4.9	4.9
All-Red Time (s)	2.1	2.3		2.3	2.3		2.0	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	7.2		6.3	7.2		6.0	7.0	7.0	6.1	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max		None	Max	Max	None	Max	Max
Act Effect Green (s)	23.9	70.4		78.0	62.0		34.2	24.2	24.2	43.6	29.0	29.0

Lanes, Volumes, Timings
 108: 5300 West (SR-74) & SR-92

11/15/2021

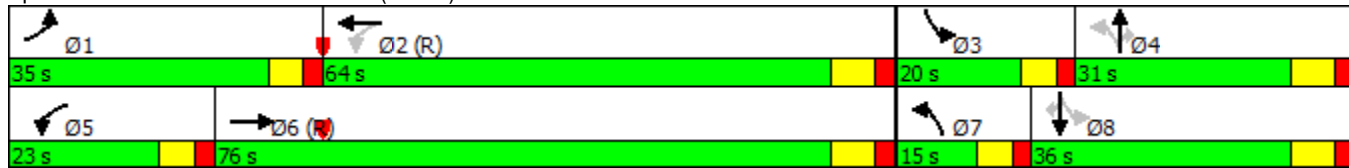


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.16	0.47		0.52	0.41		0.23	0.16	0.16	0.29	0.19	0.19
v/c Ratio	0.84	0.88		0.91	0.62		0.88	0.72	0.68	0.82	0.64	0.87
Control Delay	52.0	29.2		91.6	33.3		81.8	67.9	24.8	68.9	60.5	37.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	29.2		91.6	33.3		81.8	67.9	24.8	68.9	60.5	37.5
LOS	D	C		F	C		F	E	C	E	E	D
Approach Delay		33.3			41.4			56.5			52.2	
Approach LOS		C			D			E			D	

Intersection Summary

























Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	110 (73%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	42.3
Intersection LOS:	D
Intersection Capacity Utilization	91.3%
ICU Level of Service	F
Analysis Period (min)	15

Splits and Phases: 108: 5300 West (SR-74) & SR-92



Lanes, Volumes, Timings
109: 4800 West & SR-92

04/19/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	620	1080	40	390	220	690	520	50	150	560	180
Future Volume (vph)	270	620	1080	40	390	220	690	520	50	150	560	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		250	150		130	250		275	150		530
Storage Lanes	1		1	1		2	1		1	1		1
Taper Length (ft)	75			75			75			30		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.464			0.311			0.950			0.950		
Satd. Flow (perm)	864	3539	1583	579	3539	1583	3433	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			690			239			67			196
Link Speed (mph)		45			45			45				35
Link Distance (ft)		3245			900			1430				1106
Travel Time (s)		49.2			13.6			21.7				21.5
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	293	674	1174	43	424	239	750	565	54	163	609	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	674	1174	43	424	239	750	565	54	163	609	196
Turn Type	Perm	NA	Free	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		6			2		7	4		3		8
Permitted Phases	6		Free	2		2			4			8
Detector Phase	6	6		2	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	25.0	25.0		24.8	24.8	24.8	10.8	24.3	24.3	10.2	24.6	24.6
Total Split (s)	72.0	72.0		72.0	72.0	72.0	31.0	58.0	58.0	20.0	47.0	47.0
Total Split (%)	48.0%	48.0%		48.0%	48.0%	48.0%	20.7%	38.7%	38.7%	13.3%	31.3%	31.3%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.8	4.8	3.2	4.1	4.1
All-Red Time (s)	2.0	2.0		1.8	1.8	1.8	1.8	1.5	1.5	2.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		6.8	6.8	6.8	5.8	6.3	6.3	5.2	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	65.0	65.0	150.0	65.2	65.2	65.2	25.2	52.0	52.0	14.5	40.4	40.4

Lanes, Volumes, Timings
109: 4800 West & SR-92

04/19/2021

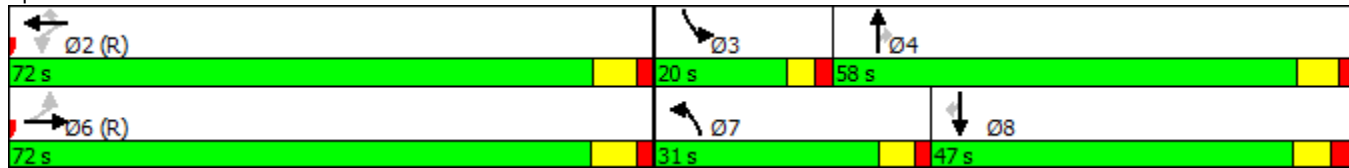


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.43	0.43	1.00	0.43	0.43	0.43	0.17	0.35	0.35	0.10	0.27	0.27
v/c Ratio	0.78	0.44	0.74	0.17	0.28	0.29	1.30	0.88	0.09	0.95	1.22	0.34
Control Delay	25.8	16.3	13.5	33.2	33.3	10.0	195.8	61.9	5.0	123.6	159.9	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.8	16.3	13.5	33.2	33.3	10.0	195.8	61.9	5.0	123.6	159.9	7.0
LOS	C	B	B	C	C	A	F	E	A	F	F	A
Approach Delay		16.1			25.4			133.0			122.8	
Approach LOS		B			C			F			F	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	130 (87%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle:	120
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.30
Intersection Signal Delay:	68.2
Intersection LOS:	E
Intersection Capacity Utilization	96.7%
ICU Level of Service	F
Analysis Period (min)	15

Splits and Phases: 109: 4800 West & SR-92



Lanes, Volumes, Timings
109: 4800 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	700	1190	40	450	190	750	430	50	120	460	170
Future Volume (vph)	250	700	1190	40	450	190	750	430	50	120	460	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		250	150		500	250		275	150		530
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (ft)	75			75			75			30		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1863	1583	3433	1863	1583
Flt Permitted	0.399			0.234			0.950			0.950		
Satd. Flow (perm)	743	3539	1583	436	3539	1583	3433	1863	1583	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			709			207			67			132
Link Speed (mph)		45			45			45				35
Link Distance (ft)		3245			900			1430				1106
Travel Time (s)		49.2			13.6			21.7				21.5
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	272	761	1293	43	489	207	815	467	54	130	500	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	272	761	1293	43	489	207	815	467	54	130	500	185
Turn Type	Perm	NA	Free	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		6			2		7	4		3		8
Permitted Phases	6		Free	2		2			4			8
Detector Phase	6	6		2	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	38.0	38.0		33.8	33.8	33.8	10.8	33.3	33.3	10.2	33.6	33.6
Total Split (s)	63.0	63.0		63.0	63.0	63.0	41.0	71.0	71.0	16.0	46.0	46.0
Total Split (%)	42.0%	42.0%		42.0%	42.0%	42.0%	27.3%	47.3%	47.3%	10.7%	30.7%	30.7%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.8	4.8	3.2	4.1	4.1
All-Red Time (s)	2.0	2.0		1.8	1.8	1.8	1.8	1.5	1.5	2.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		6.8	6.8	6.8	5.8	6.3	6.3	5.2	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	56.0	56.0	150.0	56.2	56.2	56.2	35.2	67.0	67.0	8.5	39.4	39.4

Lanes, Volumes, Timings
109: 4800 West & SR-92

04/26/2021

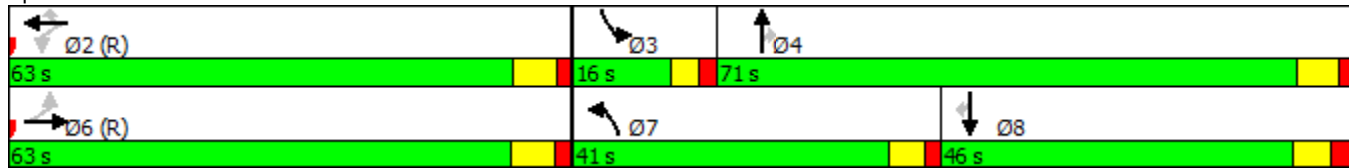


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.37	0.37	1.00	0.37	0.37	0.37	0.23	0.45	0.45	0.06	0.26	0.26
v/c Ratio	0.98	0.58	0.82	0.26	0.37	0.29	1.01	0.56	0.07	0.67	1.02	0.36
Control Delay	53.8	17.2	21.6	31.9	28.5	7.3	90.9	34.3	3.7	85.8	100.0	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	17.2	21.6	31.9	28.5	7.3	90.9	34.3	3.7	85.8	100.0	16.0
LOS	D	B	C	C	C	A	F	C	A	F	F	B
Approach Delay	23.9			22.8			67.6			78.7		
Approach LOS	C			C			E			E		

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle:	105
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	43.5
Intersection LOS:	D
Intersection Capacity Utilization:	95.1%
ICU Level of Service:	F
Analysis Period (min):	15

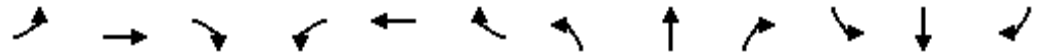
Splits and Phases: 109: 4800 West & SR-92



Queues

109: 4800 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	272	761	1293	43	489	207	815	467	54	130	500	185
v/c Ratio	0.98	0.58	0.82	0.26	0.37	0.29	1.01	0.56	0.07	0.67	1.02	0.36
Control Delay	53.8	17.2	21.6	31.9	28.5	7.3	90.9	34.3	3.7	85.8	100.0	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	17.2	21.6	31.9	28.5	7.3	90.9	34.3	3.7	85.8	100.0	16.0
Queue Length 50th (ft)	250	181	1212	26	156	43	~422	334	0	65	~518	40
Queue Length 95th (ft)	m#307	m193	m1265	60	208	71	#562	460	20	101	#745	110
Internal Link Dist (ft)		3165			820			1350			1026	
Turn Bay Length (ft)	150		250	150		500	250		275	150		530
Base Capacity (vph)	277	1321	1583	163	1325	722	805	831	743	247	489	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.58	0.82	0.26	0.37	0.29	1.01	0.56	0.07	0.53	1.02	0.36

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings
109: 4800 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	700	1190	40	450	190	750	430	50	120	460	170
Future Volume (vph)	250	700	1190	40	450	190	750	430	50	120	460	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		250	150		500	250		275	150		530
Storage Lanes	1		0	1		1	2		1	1		1
Taper Length (ft)	75			75			75			30		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.425			0.275			0.950			0.950		
Satd. Flow (perm)	792	3539	1583	512	3539	1583	3433	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			792			207			67			160
Link Speed (mph)		45			45			45				35
Link Distance (ft)		3245			900			1430				1106
Travel Time (s)		49.2			13.6			21.7				21.5
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	272	761	1293	43	489	207	815	467	54	130	500	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	272	761	1293	43	489	207	815	467	54	130	500	185
Turn Type	Perm	NA	Free	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		6			2		7	4		3		8
Permitted Phases	6		Free	2		2			4			8
Detector Phase	6	6		2	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	38.0	38.0		33.8	33.8	33.8	10.8	33.3	33.3	10.2	33.6	33.6
Total Split (s)	70.0	70.0		70.0	70.0	70.0	46.0	55.0	55.0	25.0	34.0	34.0
Total Split (%)	46.7%	46.7%		46.7%	46.7%	46.7%	30.7%	36.7%	36.7%	16.7%	22.7%	22.7%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	4.0	4.8	4.8	3.2	4.1	4.1
All-Red Time (s)	2.0	2.0		1.8	1.8	1.8	1.8	1.5	1.5	2.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		6.8	6.8	6.8	5.8	6.3	6.3	5.2	6.6	6.6
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	67.8	67.8	150.0	68.0	68.0	68.0	37.7	49.7	49.7	14.0	25.2	25.2

Lanes, Volumes, Timings
109: 4800 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.45	0.45	1.00	0.45	0.45	0.45	0.25	0.33	0.33	0.09	0.17	0.17
v/c Ratio	0.76	0.48	0.82	0.19	0.31	0.25	0.95	0.40	0.09	0.79	0.84	0.46
Control Delay	22.5	14.1	17.0	23.3	21.7	6.7	74.9	39.7	5.3	96.7	74.0	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	14.1	17.0	23.3	21.7	6.7	74.9	39.7	5.3	96.7	74.0	15.1
LOS	C	B	B	C	C	A	E	D	A	F	E	B
Approach Delay	16.7			17.6			59.8			64.2		
Approach LOS	B			B			E			E		

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 35.3

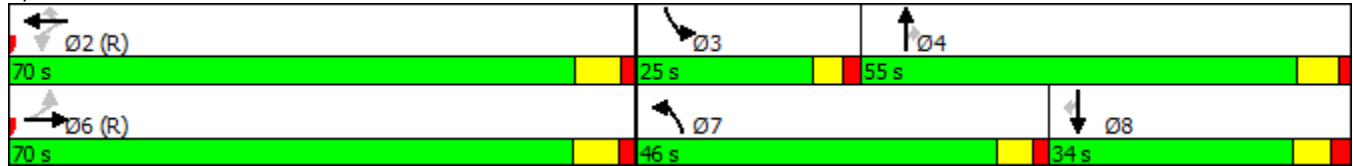
Intersection LOS: D

Intersection Capacity Utilization 83.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 109: 4800 West & SR-92



Queues

109: 4800 West & SR-92

04/26/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	272	761	1293	43	489	207	815	467	54	130	500	185
v/c Ratio	0.76	0.48	0.82	0.19	0.31	0.25	0.95	0.40	0.09	0.79	0.84	0.46
Control Delay	22.5	14.1	17.0	23.3	21.7	6.7	74.9	39.7	5.3	96.7	74.0	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	14.1	17.0	23.3	21.7	6.7	74.9	39.7	5.3	96.7	74.0	15.1
Queue Length 50th (ft)	193	180	1148	24	148	43	400	178	0	127	249	21
Queue Length 95th (ft)	m186	m175	m935	49	180	71	#503	240	24	194	315	95
Internal Link Dist (ft)		3165			820			1350			1026	
Turn Bay Length (ft)	150		250	150		500	250		275	150		530
Base Capacity (vph)	357	1598	1583	231	1603	830	920	1190	577	233	646	419
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.48	0.82	0.19	0.31	0.25	0.89	0.39	0.09	0.56	0.77	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

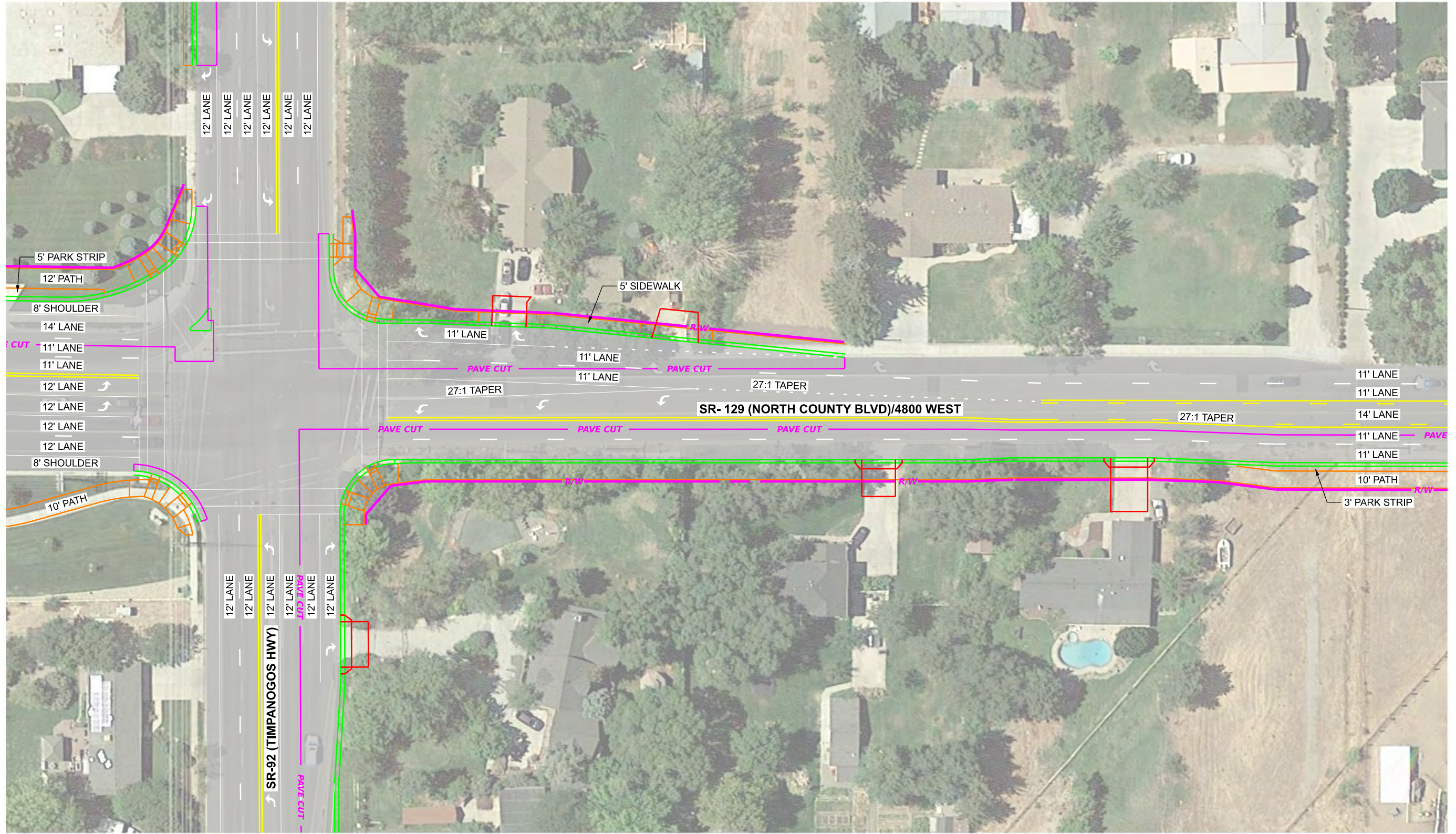


Appendix D
4800 West/Canyon Crest Road Concept Design



1/7/2022 28-045_RD-03.dwg

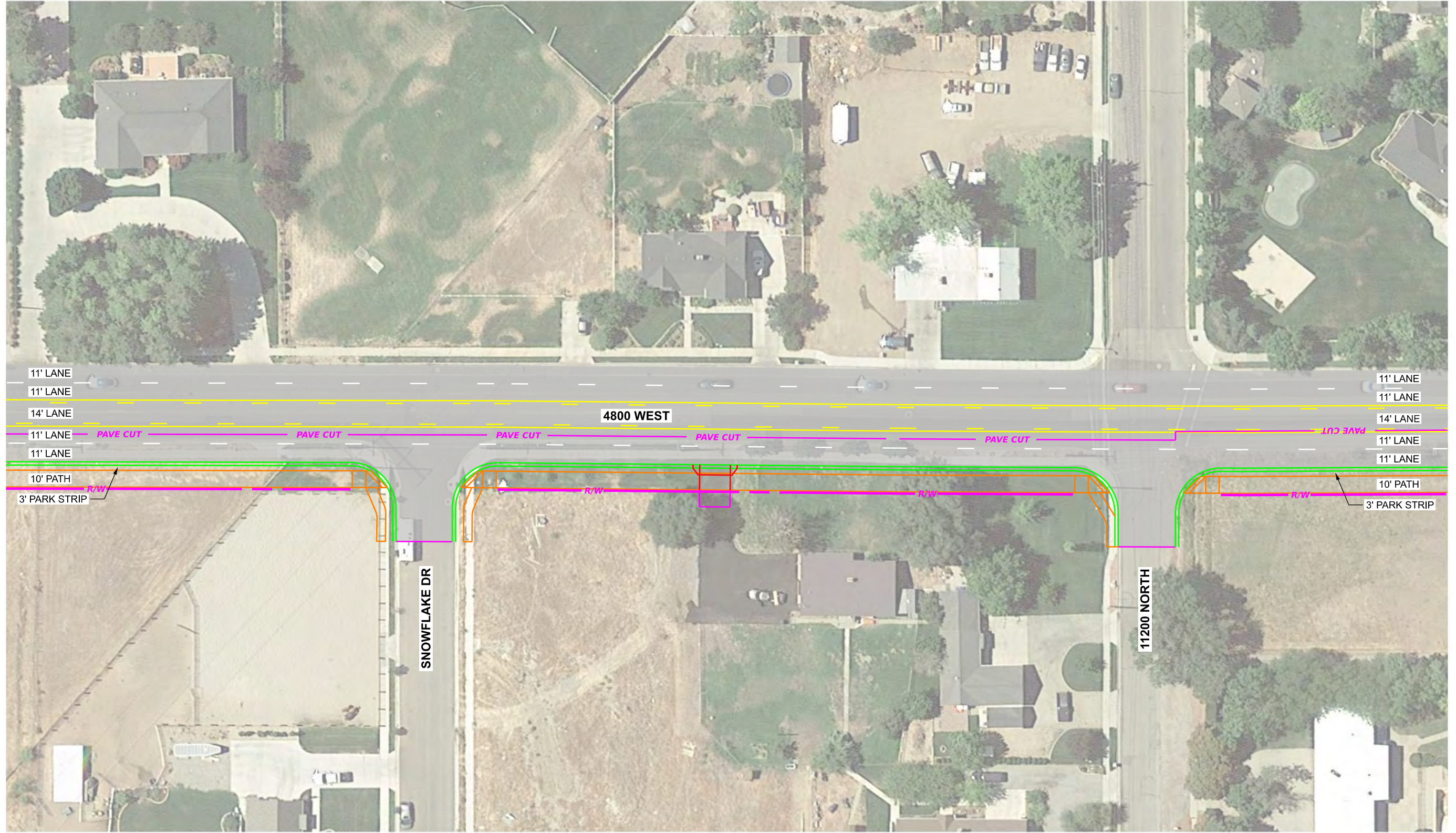
PRELIMINARY
NOT FOR CONSTRUCTION
1/7/2022



PROJECT		SR-92 ACCESS AND CIRCULATION STUDY	
PROJECT NUMBER	S-0092(39)1	PIN	16992
ROADWAY - PHASE 1		APPROVED	
UTAH DEPARTMENT OF TRANSPORTATION		AVENUE CONSULTANTS	
DRAWN BY		DATE	
OC CHECKED BY		DATE	
PROFESSIONAL ENGINEER		DATE	
NO.		DATE	
APPROVED BY		DATE	
REVISIONS		REMARKS	

1/7/2022 20-045_RD-04.dgn

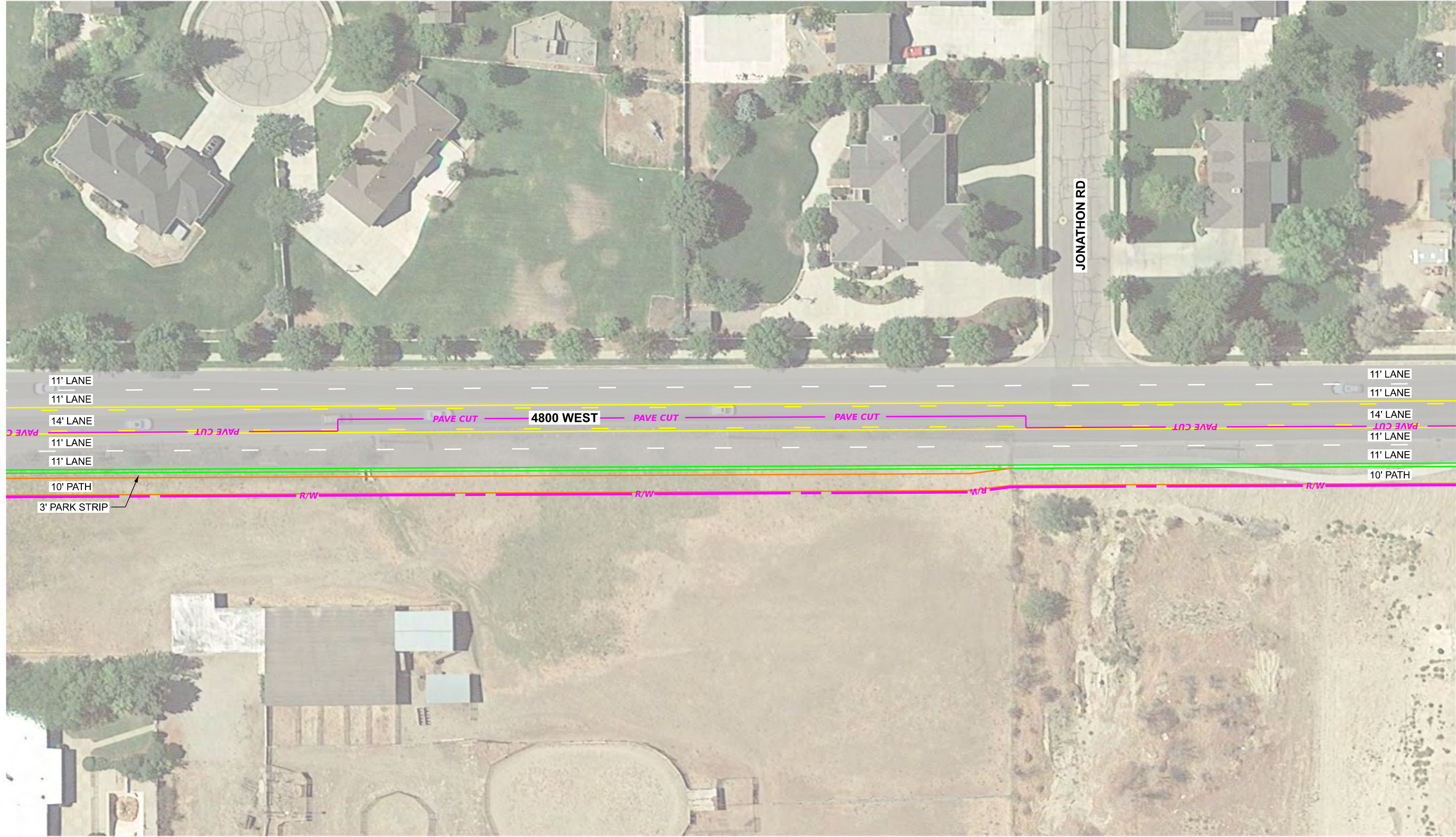
PRELIMINARY
NOT FOR CONSTRUCTION
1/7/2022



PROJECT		SR-92 ACCESS AND CIRCULATION STUDY		APPROVED	
PROJECT NUMBER		S-0092(39)1		PIN 16992	
SHEET NO.		RD-04		ROADWAY - PHASE 1	
UTAH DEPARTMENT OF TRANSPORTATION			AVENUE CONSULTANTS		
DRAWN BY			DATE		
OC CHECKED BY			APPROVED BY		
PROFESSIONAL ENGINEER			NO. DATE		
REVISIONS			REMARKS		

1/7/2022 28-045_RD-05.dgn

PRELIMINARY
NOT FOR CONSTRUCTION
1/7/2022

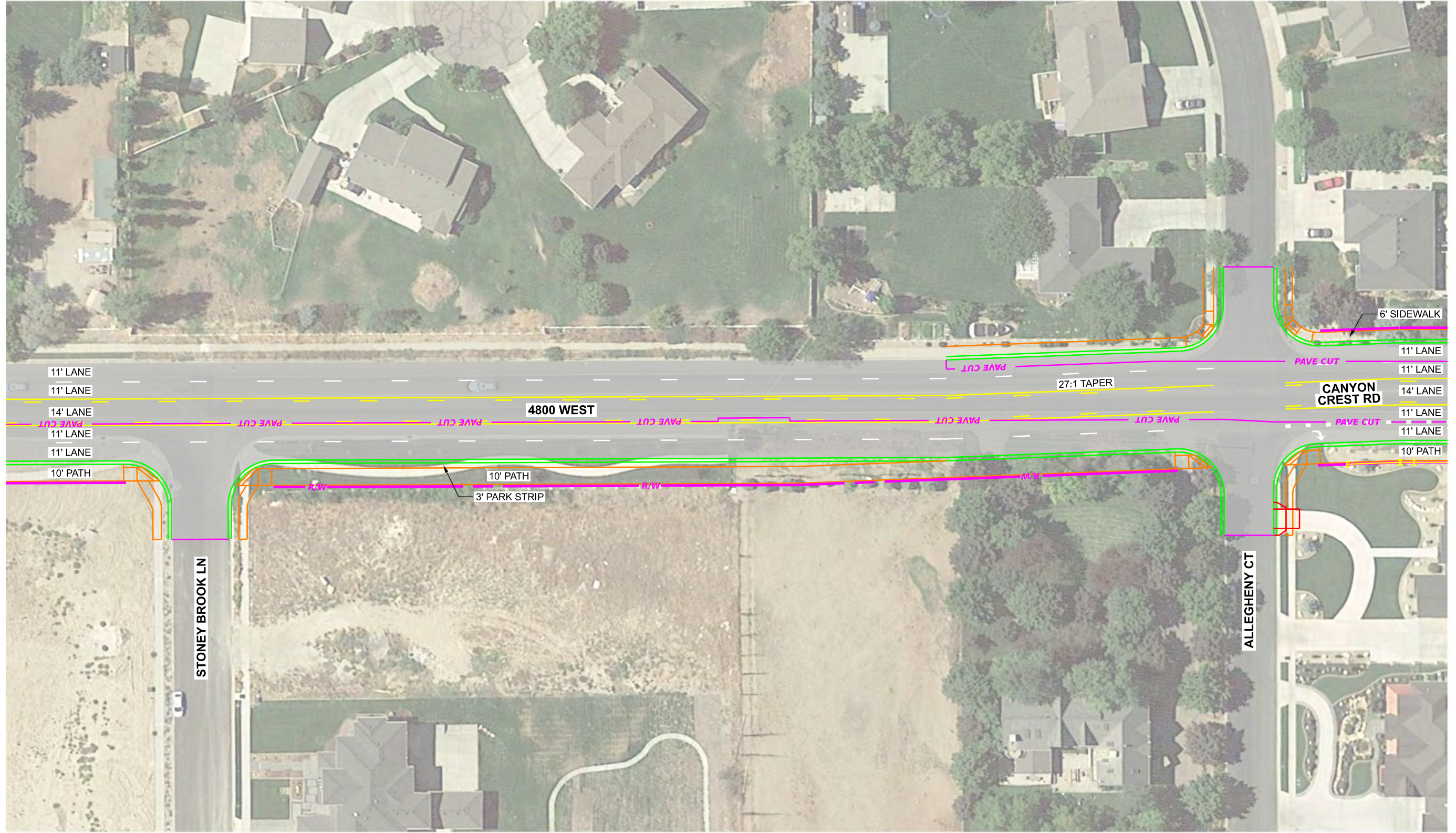


PROJECT		SR-92 ACCESS AND CIRCULATION STUDY	
PROJECT NUMBER	S-0092(39)1	PIN	16992
ROADWAY - PHASE 1		APPROVED	
UTAH DEPARTMENT OF TRANSPORTATION		AVENUE CONSULTANTS	
PROFESSIONAL ENGINEER		DATE	
DRAWN BY		OC	CHECKED BY
NO.		DATE	APPROVED BY
REVISIONS		REMARKS	

SHEET NO. RD-05

1/7/2022 28-045_RD-06.dgn

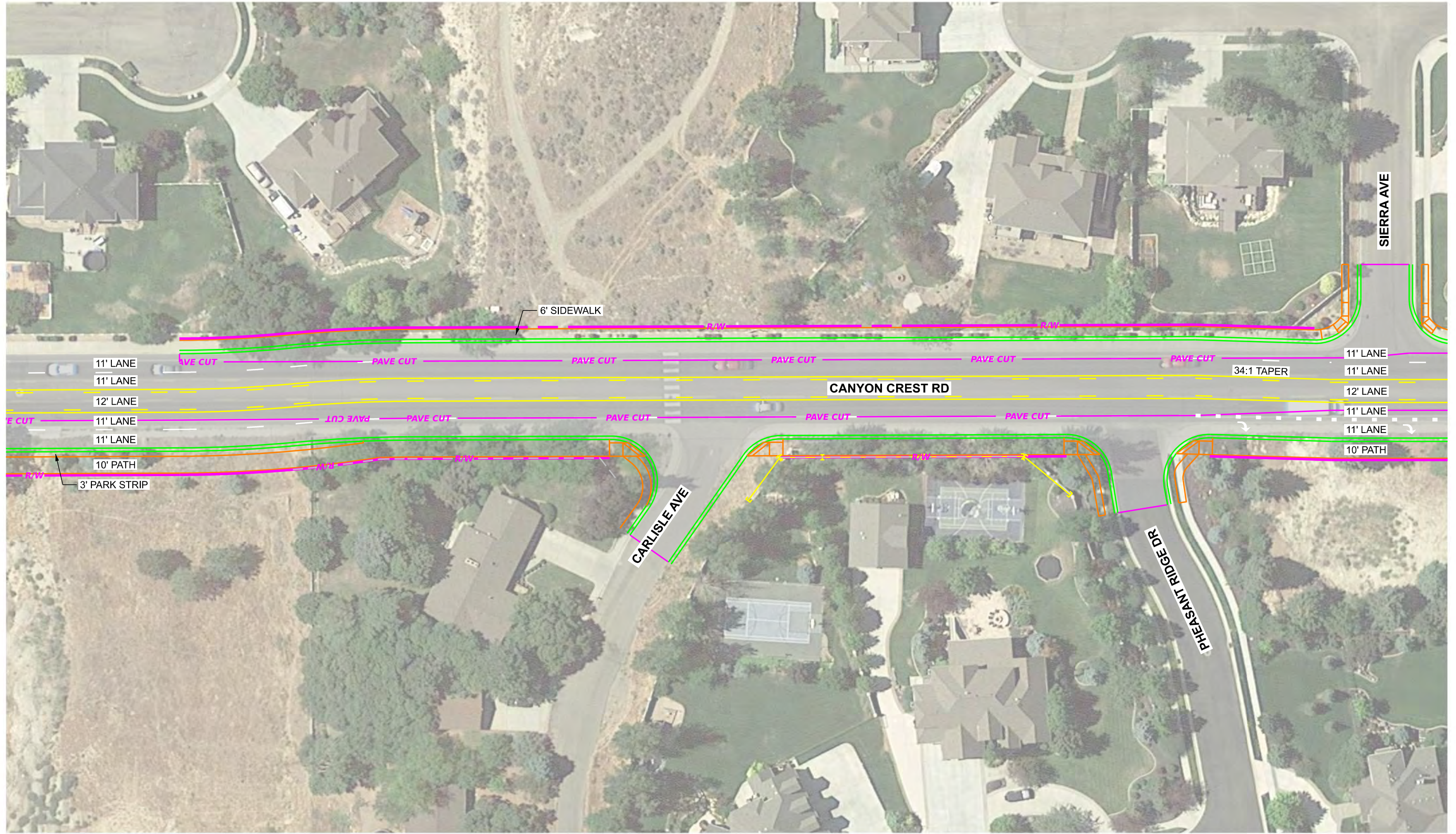
PRELIMINARY
NOT FOR CONSTRUCTION
1/7/2022



PROJECT		SR-92 ACCESS AND CIRCULATION STUDY	
PROJECT NUMBER	S-0092(39)1	PIN	16992
ROADWAY - PHASE 1		APPROVED	
UTAH DEPARTMENT OF TRANSPORTATION		AVENUE CONSULTANTS	
PROFESSIONAL ENGINEER		DATE	
DRAWN BY		OC	CHECKED BY
NO.		DATE	APPROVED BY
REVISIONS		REMARKS	

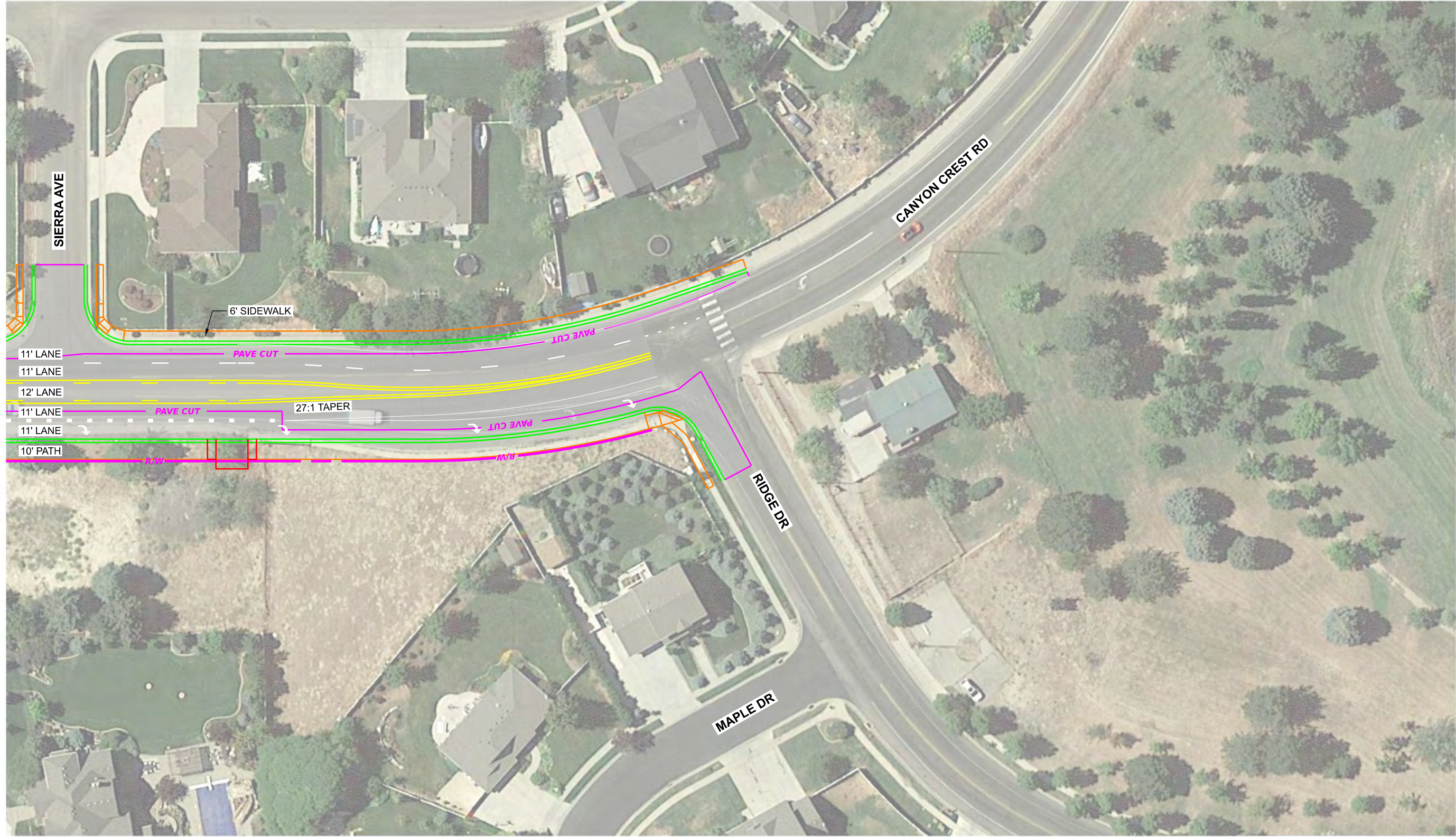
1/7/2022 28-045_RD-06.dgn

PRELIMINARY
NOT FOR CONSTRUCTION
1/7/2022



PROJECT		SR-92 ACCESS AND CIRCULATION STUDY	
PROJECT NUMBER	S-0092(39)1	PIN	16992
APPROVED		DATE	
UTAH DEPARTMENT OF TRANSPORTATION		AVENUE CONSULTANTS	
DRAWN BY		CHECKED BY	
DATE		DATE	
PROFESSIONAL ENGINEER		APPROVED BY	
REVISIONS		REMARKS	
NO.		DATE	
APPROVED		DATE	
SHEET NO.		RD-08	

1/7/2022 20-045_RD-05 - Phase 2.dgn



PRELIMINARY
NOT FOR CONSTRUCTION
 1/7/2022

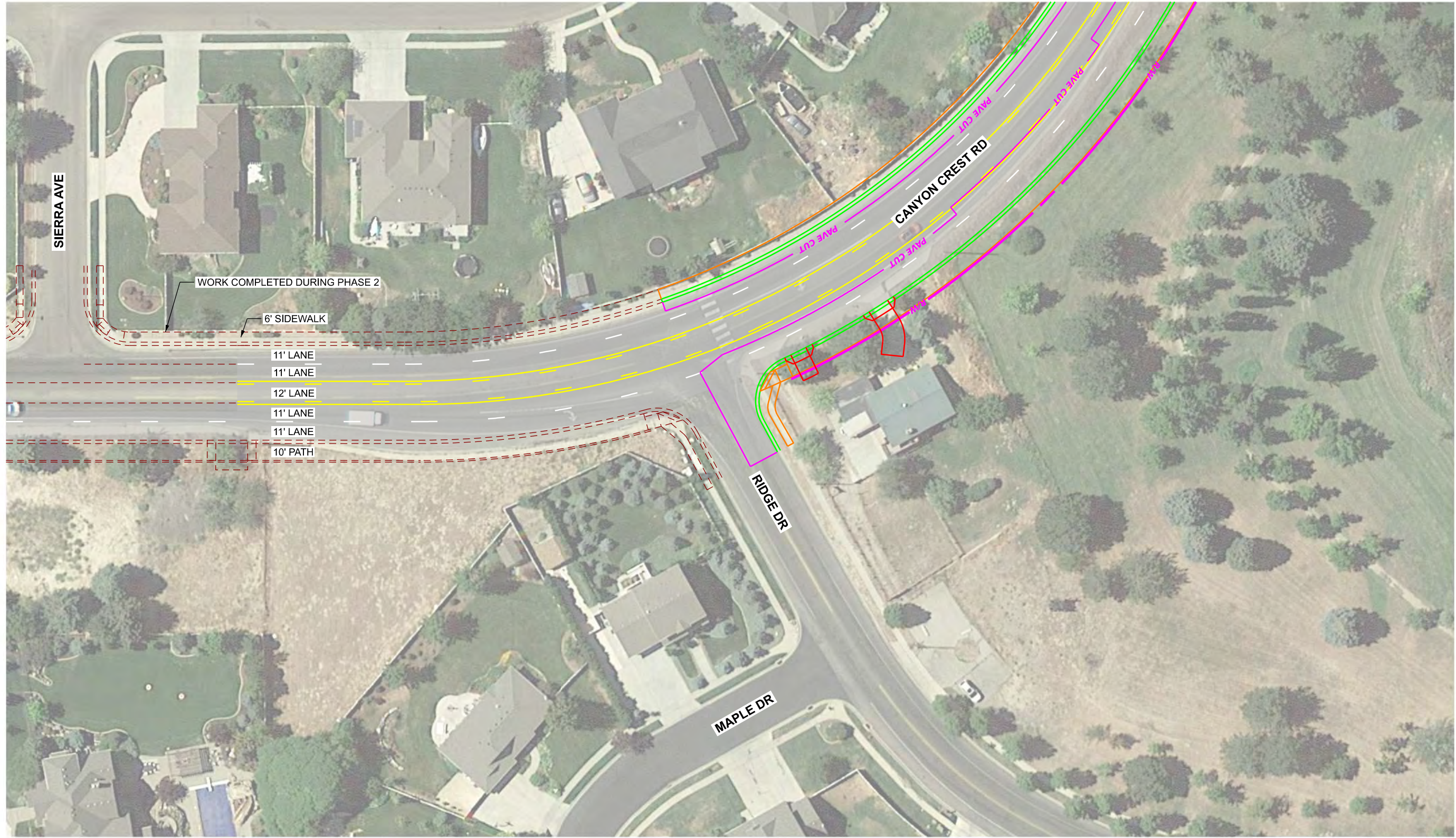
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PROJECT NUMBER	S-0092(39)1	PIN	16992
APPROVED		PROFESSIONAL ENGINEER	
DATE		DATE	
DRAWN BY		CHECKED BY	
OC		APPROVED BY	
NO.		DATE	
REVISIONS		REMARKS	

UTAH DEPARTMENT OF TRANSPORTATION
 AVENUE CONSULTANTS

PROJECT: SR-92 ACCESS AND CIRCULATION STUDY
 PROJECT NUMBER: S-0092(39)1
 PIN: 16992
 ROADWAY - PHASE 2

1/7/2022 20-045_RD-05 - Phase 3.dgn

PRELIMINARY
NOT FOR CONSTRUCTION
1/7/2022



PROJECT		SR-92 ACCESS AND CIRCULATION STUDY		APPROVED		UTAH DEPARTMENT OF TRANSPORTATION		REVISIONS	
PROJECT NUMBER		S-0092(39)1		PIN 16992		AVENUE CONSULTANTS		NO. DATE APPROVED BY	
SHEET NO.		RD-09		PROFESSIONAL ENGINEER		DATE		REMARKS	
DRAWN BY		OC		CHECKED BY		DATE		APPROVED BY	



Appendix E
Cost Estimates



**PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 6000 West
Cost Estimate - Concept Level**

Prepared By: David Webb

Date 4/26/2021

Proposed Project Scope: Improve signal LOS by adding a third EB/WB lane and adding NB/SB right turn pockets.

Approximate Route Reference Mile Post (BEGIN) =	(END) =
Project Length = 0.000 miles	ft
Current FY Year (July-June) = 2021	
Assumed Construction FY Year = 2025	
Construction Items Inflation Factor = 1.18	4 yrs for inflation
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) = 3.25%	
Assumed Yearly Inflation for Right of Way (%/yr) = 4.0%	
Items not Estimated (% of Construction) = 30.0%	
Preliminary Engineering (% of Construction + Incentives) = 12.0%	
Construction Engineering (% of Construction + Incentives) = 10.0%	

Construction Items	Cost	Remarks
Public Information Services	\$10,000	
Roadway and Drainage	\$2,557,782	
Traffic and Safety	\$513,082	
Structures	\$0	
Environmental Mitigation	\$20,000	
ITS	\$0	
	Subtotal	\$3,100,864
	Items not Estimated (30%)	\$930,259
	Construction Subtotal	\$4,031,123
P.E. Cost	P.E. Subtotal	\$493,455 12%
C.E. Cost	C.E. Subtotal	\$411,212 10%
Right of Way	Right of Way Subtotal	\$694,943
Utilities	Utilities Subtotal	\$96,000
Incentives	Incentives Subtotal	\$81,000
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2021	2025
P.E.	\$493,000	\$560,000
Right of Way	\$695,000	\$813,000
Utilities	\$96,000	\$114,000
Construction	\$4,031,000	\$4,775,000
C.E.	\$411,000	\$467,000
Incentives	\$81,000	\$96,000
Aesthetics	0.75% \$30,000	\$36,000
Change Order Contingency	9.00% \$365,000	\$432,000
UDOT Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$6,202,000	\$7,293,000

PROPOSED COMMISSION REQUEST	TOTAL \$6,202,000	TOTAL \$7,293,000
------------------------------------	--------------------------	--------------------------

Project Assumptions/Risks

1 Pavement design: 8" HMA, 6" UTBC, 12" GB	8
2	9
3	10
4	11
5	12
6	13
7	14

Roadway and Drainage

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 6000 West

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
015017010	Mobilization	1	lump	\$282,000.00	\$282,000.00	Usually 7-10% of construction
015547005	Traffic Control	1	lump	\$121,000.00	\$121,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	lump	\$40,000.00	\$40,000.00	Usually 1% of construction
020567015	Granular Borrow (Plan Quantity)	4,913	cubic yard	\$40.00	\$196,520.00	
022217125	Remove Concrete Curb and Gutter	7,232	foot	\$5.00	\$36,159.03	
022217115	Remove Concrete Driveway	458	square yard	\$15.00	\$6,872.69	
022217110	Remove Concrete Sidewalk	3,818	square yard	\$10.00	\$38,180.85	
	Remove Sound Wall	338	foot	\$50.00	\$16,901.25	
	Remove Fence	162	foot	\$5.00	\$808.93	
022317010	Clearing and Grubbing	1	lump	\$50,000.00	\$50,000.00	
023167020	Roadway Excavation (Plan Quantity)	10,675	cubic yard	\$25.00	\$266,875.00	
027217020	Untreated Base Course (Plan Quantity)	2,488	cubic yard	\$55.00	\$136,840.00	
027357010	Micro-Surfacing	42,800	square yard	\$3.00	\$128,400.00	
027417050	HMA - 1/2 Inch	6,765	ton	\$85.00	\$575,025.00	
027487040	Emulsified Asphalt CSS-1	13	ton	\$800.00	\$10,400.00	Tack Coat
027767025	Concrete Curb and Gutter Type B1	7,116	foot	\$25.00	\$177,904.10	
027767038	Concrete Driveway Flared, 6 inch Thick	5,755	square foot	\$10.00	\$57,545.97	
027767010	Concrete Sidewalk	29,154	square foot	\$5.50	\$160,348.89	
027717059	Perpendicular/Parallel Pedestrian Access Ramp	17	each	\$3,000.00	\$51,000.00	
Roadway Subtotal					\$2,352,782	
Drainage						
026107386	Drainage Pipe - 18 inch, Smooth, Leak-Resistant	300	foot	\$150.00	\$45,000.00	
026337130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	25	each	\$4,000.00	\$100,000.00	
	Drainage (1.5% of Construction)	1	lump	\$60,000.00	\$60,000.00	
Drainage Subtotal					\$205,000	
PI						
015407010	Public Information Services	1	lump	\$10,000.00	\$10,000	Usually 0.25% of construction

Traffic, Safety & ITS

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 6000 West

Item #	Item	Quantity	Units	Price	Cost	Remarks
Traffic						
027657050	Pavement Marking Paint	288	gallon	\$1,000.00	\$288,000.00	
027687105	Pavement Message (Preformed Thermoplastic)	26	each	\$200.00	\$5,200.00	
027687115	Pavement Message (Preformed Thermoplastic Stop Line, Crosswalks - 12 inch)	823	foot	\$12.00	\$9,881.87	
	Signs (0.25% of Construction)	1	Lump	\$10,000.00	\$10,000.00	
Signals						
02892701D	Traffic Signal System	1	lump	\$200,000.00	\$200,000.00	
Lighting						
Traffic and Safety Subtotal					\$513,082	
ITS						
	ATMS (0% of Construction)	1	Lump	\$0.00	\$0.00	
ITS Subtotal					\$0	

Environmental and Landscaping

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 6000 West

Item #	Item	Quantity	Units	Price	Cost	Remarks
Environmental						
Temporary Erosion Control						
Landscaping						
	Erosion Control and Landscaping (0.5% of Construction	1	Lump	\$20,000.00	\$20,000.00	
Environmental Mitigation Subtotal					\$20,000	

Utilities, Right of Way, and Incentives

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 6000 West

Item #	Item	Quantity	Units	Price	Cost	Remarks
Utilities						
	Reconstruct Irrigation Box	3	Each	\$5,000.00	\$15,000.00	
	Utility (2% of Construction)	1	Lump	\$81,000.00	\$81,000.00	
Utilities Subtotal					\$96,000	
Right-of-way						
	Urban/Suburban Residential	23,648	sq ft	\$20.00	\$472,952.74	
	Cost to Cure (Stone Wall)	2,704	sq ft	\$80.00	\$216,320.00	
	Cost to Cure (Ornamental Fence)	162	ft	\$35.00	\$5,670.00	
Right-of-Way Subtotal					\$694,943	
Incentives						
	Incentive (2% of Construction)	1	Lump	\$81,000.00	\$81,000.00	
Incentives Subtotal					\$81,000	

**PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 5300 West
Cost Estimate - Concept Level**

Prepared By: Heather Hamilton

Date 4/26/2021

Proposed Project Scope: Improve signal LOS by adding additional thru lanes in all directions and making the EB left turn a dual left turn.

Approximate Route Reference Mile Post (BEGIN) =	(END) =
Project Length = 0.000	miles ft
Current FY Year (July-June) = 2021	
Assumed Construction FY Year = 2025	
Construction Items Inflation Factor = 1.18	4 yrs for inflation
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) = 3.25%	
Assumed Yearly Inflation for Right of Way (%/yr) = 4.0%	
Items not Estimated (% of Construction) = 30.0%	
Preliminary Engineering (% of Construction + Incentives) = 12.0%	
Construction Engineering (% of Construction + Incentives) = 10.0%	

Construction Items	Cost	Remarks
Public Information Services	\$11,000	
Roadway and Drainage	\$3,726,672	
Traffic and Safety	\$334,340	
Structures	\$0	
Environmental Mitigation	\$27,000	
ITS	\$0	
	Subtotal	\$4,099,012
	Items not Estimated (30%)	\$1,229,704
	Construction Subtotal	\$5,328,716
P.E. Cost	P.E. Subtotal	\$652,286 12%
C.E. Cost	C.E. Subtotal	\$543,572 10%
Right of Way	Right of Way Subtotal	\$3,663,720
Utilities	Utilities Subtotal	\$543,000
Incentives	Incentives Subtotal	\$107,000
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2021	2025
P.E.	\$652,000	\$741,000
Right of Way	\$3,664,000	\$4,286,000
Utilities	\$543,000	\$643,000
Construction	\$5,329,000	\$6,312,000
C.E.	\$544,000	\$618,000
Incentives	\$107,000	\$127,000
Aesthetics	0.75% \$40,000	\$47,000
Change Order Contingency	9.00% \$483,000	\$572,000
UDOT Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$11,362,000	\$13,346,000

PROPOSED COMMISSION REQUEST	TOTAL #####	TOTAL \$13,346,000
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Project Assumptions/Risks

1 Pavement design: 8" HMA, 6" UTBC, 12" GB	8
2	9
3	10
4	11
5	12
6	13
7	14

Roadway and Drainage

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 5300 West

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
015017010	Mobilization	1	lump	\$373,000.00	\$373,000.00	Usually 7-10% of construction
015547005	Traffic Control	1	lump	\$160,000.00	\$160,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	lump	\$53,000.00	\$53,000.00	Usually 1% of construction
020567015	Granular Borrow (Plan Quantity)	7,299	cubic yard	\$40.00	\$291,960.00	
022217110	Remove Concrete Sidewalk	4,486	square yard	\$10.00	\$44,858.93	
022217120	Remove Concrete Curb	1,921	foot	\$5.00	\$9,603.40	
022217125	Remove Concrete Curb and Gutter	10,220	foot	\$5.00	\$51,101.39	
022217115	Remove Concrete Driveway	1,416	square yard	\$15.00	\$21,246.93	
022317010	Clearing and Grubbing	1	lump	\$50,000.00	\$50,000.00	
023167020	Roadway Excavation (Plan Quantity)	15,813	cubic yard	\$25.00	\$395,325.00	
027217020	Untreated Base Course (Plan Quantity)	3,650	cubic yard	\$55.00	\$200,750.00	
027357010	Micro-Surfacing	75,569	square yard	\$3.00	\$226,707.00	
027417050	HMA - 1/2 Inch	10,050	ton	\$85.00	\$854,250.00	
027487040	Emulsified Asphalt CSS-1	20	ton	\$800.00	\$16,000.00	Tack Coat
027717059	Perpendicular/Parallel Pedestrian Access Ramp	41	each	\$3,000.00	\$123,000.00	
027767018	Concrete Curb Type M2	4,785	foot	\$25.00	\$119,614.40	
027767025	Concrete Curb and Gutter Type B1	9,764	foot	\$25.00	\$244,100.10	
027767010	Concrete Sidewalk	40,272	square foot	\$5.50	\$221,495.98	
027767038	Concrete Driveway Flared, 6 inch Thick	7,174	square foot	\$10.00	\$71,737.48	
Roadway Subtotal					\$3,527,751	
Drainage						
026107386	Drainage Pipe - 18 inch, Smooth, Leak-Resistant	233	foot	\$150.00	\$34,920.90	
026337130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	21	each	\$4,000.00	\$84,000.00	
	Drainage (1.5% of Construction)	1	lump	\$80,000.00	\$80,000.00	
Drainage Subtotal					\$198,921	
PI						
015407010	Public Information Services	1	lump	\$11,000.00	\$11,000	Usually 0.25% of construction

Traffic, Safety & ITS

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 5300 West

Item #	Item	Quantity	Units	Price	Cost	Remarks
Traffic						
027657050	Pavement Marking Paint	422	gallon	\$100.00	\$42,200.00	
027687105	Pavement Message (Preformed Thermoplastic)	79	each	\$200.00	\$15,800.00	
027687115	Pavement Message (Preformed Thermoplastic Stop Line, Crosswalks - 12 inch)	1,278	foot	\$12.00	\$15,340.18	
	Signs (0.25% of Construction)	1	Lump	\$11,000.00	\$11,000.00	
Signals						
02892701D	Traffic Signal System	1	lump	\$250,000.00	\$250,000.00	
Lighting						
Traffic and Safety Subtotal					\$334,340	
ITS						
ITS Subtotal					\$0	

Environmental and Landscaping

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 5300 West

Item #	Item	Quantity	Units	Price	Cost	Remarks
Environmental						
Temporary Erosion Control						
Landscaping						
	Erosion Control and Landscaping (0.5% of Construction	1	Lump	\$27,000.00	\$27,000.00	
Environmental Mitigation Subtotal					\$27,000	

Utilities, Right of Way, and Incentives

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
SR-92 & 5300 West

Item #	Item	Quantity	Units	Price	Cost	Remarks
Utilities						
	Relocate Power Pole (Transmission)	6	Lump	\$50,000.00	\$300,000.00	
	Relocate Power Pole (Distribution)	3	Lump	\$10,000.00	\$30,000.00	
	Utility (4% of Construction)	1	Lump	\$213,000.00	\$213,000.00	
Utilities Subtotal					\$543,000	
Right-of-way						
	Urban/Suburban Residential	44,772	sq ft	\$20.00	\$895,446.64	
	Urban/Suburban Commercial	55,365	sq ft	\$50.00	\$2,768,273.55	
Right-of-Way Subtotal					\$3,663,720	
Incentives						
	Incentive (2% of Construction)	1	Lump	\$107,000.00	\$107,000.00	
Incentives Subtotal					\$107,000	

**PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 1)
Cost Estimate - Concept Level**

Prepared By: David Webb

Date 10/15/2021

Proposed Project Scope: Widen Canyon Crest to a 5-lane section from SR-92 to Main Street.

Approximate Route Reference Mile Post (BEGIN) =	n/a	(END) =	n/a
Project Length =	1.207	miles	6,373 ft
Current FY Year (July-June) =	2021		
Assumed Construction FY Year =	2025		
Construction Items Inflation Factor =	1.18	4 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.25%		
Assumed Yearly Inflation for Right of Way (%/yr) =	4.0%		
Items not Estimated (% of Construction) =	30.0%		
Preliminary Engineering (% of Construction + Incentives) =	14.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Public Information Services	\$10,000	
Roadway and Drainage	\$2,902,111	
Traffic and Safety	\$79,678	
Structures	\$0	
Environmental Mitigation	\$59,000	
ITS	\$0	
	Subtotal	\$3,050,789
	Items not Estimated (30%)	\$915,237
	Construction Subtotal	\$3,966,026
P.E. Cost	P.E. Subtotal	\$566,304 14%
C.E. Cost	C.E. Subtotal	\$404,503 10%
Right of Way	Right of Way Subtotal	\$1,166,747
Utilities	Utilities Subtotal	\$1,032,100
Incentives	Incentives Subtotal	\$79,000
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2021	2025
P.E.	\$566,000	\$643,000
Right of Way	\$1,167,000	\$1,365,000
Utilities	\$1,032,000	\$1,222,000
Construction	\$3,966,000	\$4,698,000
C.E.	\$405,000	\$460,000
Incentives	\$79,000	\$94,000
Aesthetics	0.75% \$30,000	\$36,000
Change Order Contingency	9.00% \$360,000	\$426,000
UDOT Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$7,605,000	\$8,944,000

PROPOSED COMMISSION REQUEST	TOTAL	\$7,605,000	TOTAL	\$8,944,000
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Project Assumptions/Risks

1 Pavement design: 8" HMA, 6" UTBC, 12" GB	8
2 Roadway excavation includes asphalt removal	9
3 Typical Section: (2)11-ft lanes, 14-ft TWLT lane, (2)11-ft lanes, no shoulder, 2-ft Curb and Gutter, 3-ft parkstrip, 10-ft path	10
4 3-ft parkstrip removed as needed to reduce ROW impacts	11
5 Most widening completed to east maintaing existing edge of pavement on the west	12
6	13
7	14

Roadway and Drainage

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 1)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
015017010	Mobilization	1	lump	\$278,000.00	\$278,000.00	Usually 5-7% of construction
015547005	Traffic Control	1	lump	\$79,000.00	\$79,000.00	Usually 1-2% of construction
01557001*	Maintenance of Traffic	1	lump	\$40,000.00	\$40,000.00	Usually 1% of construction
020567015	Granular Borrow (Plan Quantity)	4,667	cubic yard	\$40.00	\$186,680.00	
022217125	Remove Concrete Curb and Gutter	5,845	foot	\$5.00	\$29,226.94	
022217110	Remove Concrete Sidewalk	3,837	square yard	\$10.00	\$38,366.26	
022217110	Remove Concrete Driveway	544	square yard	\$15.00	\$8,160.63	
022217080	Remove Fence	1,422	foot	\$5.00	\$7,111.54	Vinyl, wood, or chain link
	Remove Retaining Wall		foot	\$15.00		
	Remove Privacy Wall	544	foot	\$12.50	\$6,801.94	
022317010	Clearing and Grubbing	1	lump	\$235,000.00	\$235,000.00	Includes approximately: 45 trees < 4" 31 trees 4" to 12" 16 trees > 12"
023167020	Roadway Excavation (Plan Quantity)	10,110	cubic yard	\$25.00	\$252,750.00	
027217020	Untreated Base Course (Plan Quantity)	2,334	cubic yard	\$55.00	\$128,370.00	
027357010	Micro-Surfacing	44,305	square yard	\$3.00	\$132,915.00	
027417050	HMA - 1/2 Inch	6,511	ton	\$85.00	\$553,435.00	
027487040	Emulsified Asphalt CSS-1	13	ton	\$800.00	\$10,400.00	Tack Coat
	Concrete Curb and Gutter APWA Type E	6,505	ft	\$25.00	\$162,615.53	
027767010	Concrete Sidewalk	58,606	square foot	\$5.50	\$322,330.99	
027767022P	Concrete Driveway	3,986	square foot	\$7.00	\$27,898.50	
027717059	Perpendicular/Parallel Pedestrian Access Ramp	30	each	\$3,000.00	\$90,000.00	
	Fence	1,322	ft	\$30.00	\$39,657.78	Vinyl, wood, or chain link
	Fence - Privacy	507	ft	\$350.00	\$177,339.05	
Roadway Subtotal					\$2,806,059	
Drainage						
026107386	Drainage Pipe-18 inch smooth leak resistant	150	ft	\$120.00	\$18,051.60	
018927010	Reconstruct Catch Basin	15	each	\$2,500.00	\$37,500.00	
	Concrete drainage structure	9	each	\$4,500.00	\$40,500.00	
Drainage Subtotal					\$96,052	
PI						
015407010	Public Information Services	1	lump	\$10,000.00	\$10,000	Usually 0.25% of construction

Traffic, Safety & ITS

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 1)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Traffic						
027657050	Pavement Marking Paint	254	gallon	\$40.00	\$10,160.00	
027687105	Pavement Message (Preformed Thermoplastic)	118	each	\$250.00	\$29,518.33	
	Signs Lump Sum	1	Lump	\$40,000.00	\$40,000.00	1% of Construction
Traffic and Safety Subtotal					\$79,678	
ITS Subtotal						
					\$0	

Environmental and Landscaping

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 1)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Temporary Erosion Control & Landscaping						
	Erosion Control and Landscaping	1	Lump	\$59,000.00	\$59,000.00	1.5% of Construction
Environmental Mitigation Subtotal					\$59,000	

Utilities, Right of Way, and Incentives

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 1)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Utilities						
	Relocate Power Pole (Metal)	2	Each	\$200,000.00	\$400,000.00	
	Relocate Power Pole (Wood)	10	Each	\$15,000.00	\$150,000.00	
	Undergrounding Power lines	2,176	ft	\$80.00	\$174,080.00	4 lines to move underground
	Undergrounding Power lines	1,154	ft	\$130.00	\$150,020.00	7 lines to move underground
	Utility (2% of Construction)	1	Lump	\$79,000.00	\$79,000.00	
Utilities Subtotal					\$1,032,100	
Right-of-way						
	Urban/Suburban Residential	46,670	sq ft	\$25.00	\$1,166,746.50	
Right-of-Way Subtotal					\$1,166,747	
Incentives						
	Incentive	1	Lump	\$79,000.00	\$79,000.00	2% of Construction
Incentives Subtotal					\$79,000	

**PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 2)
Cost Estimate - Concept Level**

Prepared By: David Webb

Date 10/15/2021

Proposed Project Scope: Widen Canyon Crest to a 5-lane section from SR-92 to Main Street.

Approximate Route Reference Mile Post (BEGIN) =	n/a	(END) =	n/a
Project Length =	1.207	miles	6,373 ft
Current FY Year (July-June) =	2021		
Assumed Construction FY Year =	2025		
Construction Items Inflation Factor =	1.18	4 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.25%		
Assumed Yearly Inflation for Right of Way (%/yr) =	4.0%		
Items not Estimated (% of Construction) =	30.0%		
Preliminary Engineering (% of Construction + Incentives) =	14.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Public Information Services	\$5,000	
Roadway and Drainage	\$1,288,312	
Traffic and Safety	\$24,040	
Structures	\$295,460	
Environmental Mitigation	\$32,000	
ITS	\$0	
	Subtotal	\$1,644,812
	Items not Estimated (30%)	\$493,444
	Construction Subtotal	\$2,138,256
P.E. Cost	P.E. Subtotal	\$305,376 14%
C.E. Cost	C.E. Subtotal	\$218,126 10%
Right of Way	Right of Way Subtotal	\$519,374
Utilities	Utilities Subtotal	\$188,640
Incentives	Incentives Subtotal	\$43,000
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2021	2025
P.E.	\$305,000	\$347,000
Right of Way	\$519,000	\$608,000
Utilities	\$189,000	\$224,000
Construction	\$2,138,000	\$2,532,000
C.E.	\$218,000	\$248,000
Incentives	\$43,000	\$51,000
Aesthetics	0.75% \$16,000	\$19,000
Change Order Contingency	9.00% \$194,000	\$230,000
UDOT Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$3,622,000	\$4,259,000

PROPOSED COMMISSION REQUEST	TOTAL	\$3,622,000	TOTAL	\$4,259,000
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Project Assumptions/Risks

1 Pavement design: 8" HMA, 6" UTBC, 12" GB	8	_____
2 Roadway excavation includes asphalt removal	9	_____
3 Typical Section: (2)11-ft lanes, 12-ft TWLT lane, (2)11-ft lanes, no shoulder, 2-ft Curb and Gutter, 3-ft parkstrip, 10-ft path	10	_____
4 3-ft parkstrip removed as needed to reduce ROW impacts	11	_____
5 Most widening completed to east/north maintaing existing edge of pavement on the west/south	12	_____
6	13	_____
7	14	_____

Roadway and Drainage

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 2)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
015017010	Mobilization	1	lump	\$150,000.00	\$150,000.00	Usually 5-7% of construction
015547005	Traffic Control	1	lump	\$43,000.00	\$43,000.00	Usually 1-2% of construction
01557001*	Maintenance of Traffic	1	lump	\$21,000.00	\$21,000.00	Usually 1% of construction
020567015	Granular Borrow (Plan Quantity)	1,480	cubic yard	\$45.00	\$66,600.00	
022217125	Remove Concrete Curb and Gutter	3,014	foot	\$5.00	\$15,072.40	
022217110	Remove Concrete Sidewalk	1,669	square yard	\$10.00	\$16,686.05	
022217110	Remove Concrete Driveway	185	square yard	\$15.00	\$2,773.09	
022217080	Remove Fence	563	foot	\$5.00	\$2,815.00	Vinyl, wood, or chain link
	Remove Retaining Wall	342	foot	\$15.00	\$5,135.91	
	Remove Privacy Wall	418	foot	\$12.50	\$5,225.00	
022317010	Clearing and Grubbing	1	lump	\$205,000.00	\$205,000.00	Includes approximately: 28 trees < 4" 31 trees 4" to 12" 16 trees > 12"
023167020	Roadway Excavation (Plan Quantity)	3,207	cubic yard	\$30.00	\$96,210.00	
027217020	Untreated Base Course (Plan Quantity)	740	cubic yard	\$60.00	\$44,400.00	
027357010	Micro-Surfacing	12,724	square yard	\$3.00	\$38,172.00	
027417050	HMA - 1/2 Inch	2,038	ton	\$90.00	\$183,420.00	
027487040	Emulsified Asphalt CSS-1	4	ton	\$800.00	\$3,200.00	Tack Coat
	Concrete Curb and Gutter APWA Type E	3,002	ft	\$25.00	\$75,041.45	
027767010	Concrete Sidewalk	20,958	square foot	\$5.50	\$115,269.05	
027767022P	Concrete Driveway	749	square foot	\$7.00	\$5,242.34	
027717059	Perpendicular/Parallel Pedestrian Access Ramp	8	each	\$3,000.00	\$24,000.00	
	Fence	625	ft	\$30.00	\$18,750.00	Vinyl, wood, or chain link
	Fence - Privacy	418	ft	\$350.00	\$146,300.00	
Roadway Subtotal					\$1,283,312	
Drainage						
018927010	Reconstruct Catch Basin	2	each	\$2,500.00	\$5,000.00	
Drainage Subtotal					\$5,000	
PI						
015407010	Public Information Services	1	lump	\$5,000.00	\$5,000	Usually 0.25% of construction

Traffic, Safety & ITS

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 2)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Traffic						
027657050	Pavement Marking Paint	76	gallon	\$40.00	\$3,040.00	
	Signs Lump Sum	1	Lump	\$21,000.00	\$21,000.00	1% of Construction
Traffic and Safety Subtotal					\$24,040	
ITS Subtotal						
					\$0	

Structures

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 2)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Walls						
	Retaining Wall	1,676	sq ft	\$85.00	\$142,460.00	Assumed 419x4 (wall area)
	Retaining Wall	1,800	sq ft	\$85.00	\$153,000.00	Assumed 200x9 (wall area)
Structures Subtotal					\$295,460	

Environmental and Landscaping

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 2)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Temporary Erosion Control & Landscaping						
	Erosion Control and Landscaping	1	Lump	\$32,000.00	\$32,000.00	1.5% of Construction
Environmental Mitigation Subtotal					\$32,000	

Utilities, Right of Way, and Incentives

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 2)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Utilities						
	Relocate Power Pole (Distribution)	4	Each	\$15,000.00	\$60,000.00	
	Undergrounding Power Lines	1,066	ft	\$40.00	\$42,640.00	2 lines to move underground
	Utility (2 % of Construction)	1	Lump	\$43,000.00	\$43,000.00	
Utilities Subtotal					\$188,640	
Right-of-way						
	Urban/Suburban Residential	20,775	sq ft	\$25.00	\$519,374.08	
Right-of-Way Subtotal					\$519,374	
Incentives						
	Incentive	1	Lump	\$43,000.00	\$43,000.00	2% of Construction
Incentives Subtotal					\$43,000	

**PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 3)
Cost Estimate - Concept Level**

Prepared By: David Webb

Date 10/15/2021

Proposed Project Scope: Widen Canyon Crest to a 5-lane section from SR-92 to Main Street.

Approximate Route Reference Mile Post (BEGIN) =	n/a	(END) =	n/a
Project Length =	1.207	miles	6,373 ft
Current FY Year (July-June) =	2021		
Assumed Construction FY Year =	2025		
Construction Items Inflation Factor =	1.18	4 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.25%		
Assumed Yearly Inflation for Right of Way (%/yr) =	4.0%		
Items not Estimated (% of Construction) =	30.0%		
Preliminary Engineering (% of Construction + Incentives) =	14.0%		
Construction Engineering (% of Construction + Incentives) =	10.0%		

Construction Items	Cost	Remarks
Public Information Services	\$4,000	
Roadway and Drainage	\$1,238,323	
Traffic and Safety	\$27,120	
Structures	\$0	
Environmental Mitigation	\$25,000	
ITS	\$0	
	Subtotal	\$1,294,443
	Items not Estimated (30%)	\$388,333
	Construction Subtotal	\$1,682,776
P.E. Cost	P.E. Subtotal	\$240,349 14%
C.E. Cost	C.E. Subtotal	\$171,678 10%
Right of Way	Right of Way Subtotal	\$329,988
Utilities	Utilities Subtotal	\$128,000
Incentives	Incentives Subtotal	\$34,000
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2021	2025
P.E.	\$240,000	\$273,000
Right of Way	\$330,000	\$386,000
Utilities	\$128,000	\$152,000
Construction	\$1,683,000	\$1,994,000
C.E.	\$172,000	\$195,000
Incentives	\$34,000	\$40,000
Aesthetics	0.75% \$13,000	\$15,000
Change Order Contingency	9.00% \$153,000	\$181,000
UDOT Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$2,753,000	\$3,236,000

PROPOSED COMMISSION REQUEST	TOTAL	\$2,753,000	TOTAL	\$3,236,000
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Project Assumptions/Risks

1 Pavement design: 8" HMA, 6" UTBC, 12" GB	8
2 Roadway excavation includes asphalt removal	9
3 Typical Section: (2)11-ft lanes, 12-ft TWLT lane, (2)11-ft lanes, no shoulder, 2-ft Curb and Gutter, 10-ft path	10
4 Most widening completed to east maintaing existing edge of pavement on the west	11
5	12
6	13
7	14

Roadway and Drainage

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 3)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
015017010	Mobilization	1	lump	\$118,000.00	\$118,000.00	Usually 5-7% of construction
015547005	Traffic Control	1	lump	\$34,000.00	\$34,000.00	Usually 1-2% of construction
01557001*	Maintenance of Traffic	1	lump	\$17,000.00	\$17,000.00	Usually 1% of construction
020567015	Granular Borrow (Plan Quantity)	1,970	cubic yard	\$45.00	\$88,650.00	
022217125	Remove Concrete Curb and Gutter	3,582	foot	\$5.00	\$17,908.00	
022217110	Remove Concrete Sidewalk	1,302	square yard	\$10.00	\$13,015.21	
022217140	Remove Raised Island	523	square yard	\$10.00	\$5,232.56	
	Remove Brick Wall	292	foot	\$20.00	\$5,840.00	
022217110	Remove Concrete Driveway	353	square yard	\$15.00	\$5,298.53	
	Remove Privacy Wall	140	foot	\$12.50	\$1,750.00	
022317010	Clearing and Grubbing	1	lump	\$110,000.00	\$110,000.00	Includes approximately: 8 trees < 4" 39 trees 4" to 12" 4 trees > 12"
023167020	Roadway Excavation (Plan Quantity)	4,267	cubic yard	\$30.00	\$128,010.00	
027217020	Untreated Base Course (Plan Quantity)	985	cubic yard	\$60.00	\$59,100.00	
027357010	Micro-Surfacing	14,610	square yard	\$3.00	\$43,830.00	
027417050	HMA - 1/2 Inch	2,712	ton	\$90.00	\$244,080.00	
027487040	Emulsified Asphalt CSS-1	6	ton	\$800.00	\$4,800.00	Tack Coat
	Concrete Curb APWA Type R	161	ft	\$15.00	\$2,415.00	
	Concrete Curb APWA Type S	395	ft	\$15.00	\$5,925.00	
	Concrete Curb and Gutter APWA Type E	3,162	ft	\$25.00	\$79,059.08	
027767060	Concrete Flatwork, 8 inch thick	3,706	square foot	\$7.00	\$25,942.26	
027767010	Concrete Sidewalk	18,513	square foot	\$5.50	\$101,818.75	
027767022P	Concrete Driveway	1,894	square foot	\$7.00	\$13,256.45	
027717059	Perpendicular/Parallel Pedestrian Access Ramp	9	each	\$3,000.00	\$27,000.00	
027717086	Detectable Warning Surface	4	each	\$1,000.00	\$4,000.00	
027767100	Plowable End Section	8	each	\$600.00	\$4,800.00	
	Chain link fence - 12 ft	127	ft	\$30.00	\$3,810.00	Vinyl, wood, or chain link
	Chain link fence - 4 ft	216	ft	\$15.00	\$3,240.00	
	Landscape Wall	163	ft	\$20.00	\$3,267.26	
	Fence - Privacy	132	ft	\$350.00	\$46,095.00	
Roadway Subtotal					\$1,217,143	
Drainage						
026107386	Drainage Pipe-18 inch smooth leak resistant	39	ft	\$120.00	\$4,680.00	
018927010	Reconstruct Catch Basin	3	each	\$2,500.00	\$7,500.00	
	Concrete drainage structure	2	each	\$4,500.00	\$9,000.00	
Drainage Subtotal					\$21,180	
PI						
015407010	Public Information Services	1	lump	\$4,000.00	\$4,000	Usually 0.25% of construction

Traffic, Safety & ITS

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 3)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Traffic						
027657050	Pavement Marking Paint	68	gallon	\$40.00	\$2,720.00	
027687105	Pavement Message (Preformed Thermoplastic)	37	each	\$200.00	\$7,400.00	
	Signs Lump Sum	1	Lump	\$17,000.00	\$17,000.00	1% of Construction
Traffic and Safety Subtotal					\$27,120	
ITS Subtotal						
					\$0	

Environmental and Landscaping

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 3)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Temporary Erosion Control & Landscaping						
	Erosion Control and Landscaping	1	Lump	\$25,000.00	\$25,000.00	1.5% of Construction
Environmental Mitigation Subtotal					\$25,000	

Utilities, Right of Way, and Incentives

PIN: 16992 PROJECT # S-0092(39)1 PROJECT NAME: SR-92 North Regional Traffic Study
Canyon Crest; SR-92 to Main Street (phase 3)

Item #	Item	Quantity	Units	Price	Cost	Remarks
Utilities						
	Relocate Power Pole (Distribution)	4	Each	\$15,000.00	\$60,000.00	
	Utility (2% of Construction)	1	Lump	\$34,000.00	\$34,000.00	
Utilities Subtotal					\$128,000	
Right-of-way						
	Urban/Suburban Commercial	3,261	sq ft	\$25.00	\$81,519.50	
	Urban/Suburban Residential	9,939	sq ft	\$25.00	\$248,468.75	
Right-of-Way Subtotal					\$329,988	
Incentives						
	Incentive	1	Lump	\$34,000.00	\$34,000.00	2% of Construction
Incentives Subtotal					\$34,000	