WALL CONSULTANT GROUP
2139 South 1260 West, Salt Lake City, UT 84119-1464

TECHNICAL MEMORANDUM

Date: Wednesday, February 7, 2024

To: Nate Nelson, PE, City of West Jordan

From: Jeremy Searle, P.E., PTOE, Scott Johnson, P.E., PTOE, Shawn Seager, AICP

Subject: **WEST JORDAN – 9000 SOUTH CORRIDOR NO-BUILD ANALYSIS**

Executive Summary

As a follow up to the previously completed 9000 South Corridor Study, West Jordan City requested that WCG analyze additional scenarios where the connection of 9000 South at New Bingham Highway is not completed. WCG analyzed future conditions to determine the impacts of not making this connection, as well as mitigation measures that may be required for intersections in the study area to operate at acceptable levels of service (LOS) during the morning and evening peak hours.

WCG found that not completing the planned connection of 9000 South at New Bingham Highway will result in increased traffic volumes on numerous other roads in the area, particularly on 6400 West. 6400 West and New Bingham Highway would need to be widened significantly to mitigate the anticipated delays and queueing that will occur. Furthermore, failing to complete the planned connection will result in an incomplete roadway grid network. An incomplete grid network will result in increased travel times, reduced mobility, decreased safety for pedestrians and motorists, and less desirable transit routes.

Based on the analysis described below, WCG recommends that the 9000 South connection at New Bingham Highway be completed as planned to maintain east/west mobility in the region and to contribute to a safe and efficient regional roadway grid network.

Background

9000 South (SR-209) is a major east/west corridor in the Salt Lake Valley, extending from Little Cottonwood Canyon on the east to New Bingham Highway (SR-209) on the west. (SR-209 continues southwest along New Bingham Highway through Copperton Metro Township.)

Long-range transportation plans produced by West Jordan City and the Wasatch Front Regional Council (WFRC) over the past several decades have indicated that 9000 South would extend westward as the city grew. Right of way was preserved as land developed and segments of the roadway were built and connected over time. 9000 South was connected to New Bingham Highway with the construction of the Mountain View Corridor (MVC) in the early 2010s and the segment of 9000 South between New Bingham Highway and 6400 West was constructed starting in 2005.

As the land west of 6400 West is now being developed, 9000 South will continue to be extended from 6400 West to Bacchus Highway (SR-111) and plans are being made to complete the connection of 9000 South at New Bingham Highway.

9000 South Corridor Study

To complete the planned connection of 9000 South, a new intersection would need to be constructed to accommodate New Bingham Highway and maintain the connection between New Bingham Highway and 9000 South. In 2023 WCG completed the 9000 South Corridor Study to determine the appropriate alignment and control for this new intersection. Another purpose of the study was to verify that the planned five-lane cross section on 9000 South west of the new intersection would accommodate the projected demand.

Alignment Alternatives

As part of the corridor study, two alignments for the new intersection were considered. The first was to realign New Bingham Highway to connect with Duck Ridge Way. The second was to realign New Bingham Highway to connect with Ron Wood Park Road via the north leg of New Bingham Highway. These alignment alternatives are shown in Figure 1. As shown in Figure 1, the Ron Wood Park Road alignment would require more right of way acquisition than the Duck Ridge Way alignment. The Duck Ridge Way alignment is approximately 500 feet farther from Mountain View Corridor (MVC) than the Ron Wood Park Road alignment.

While either alignment would meet UDOT access management intersection spacing standards, the decision was made to realign New Bingham Highway with Duck Ridge Way to maximize the spacing of the future intersection from MVC and to minimize the amount of right of way that would need to be acquired. Development is currently taking place on the south parcel, further limiting opportunities to acquire additional ROW.

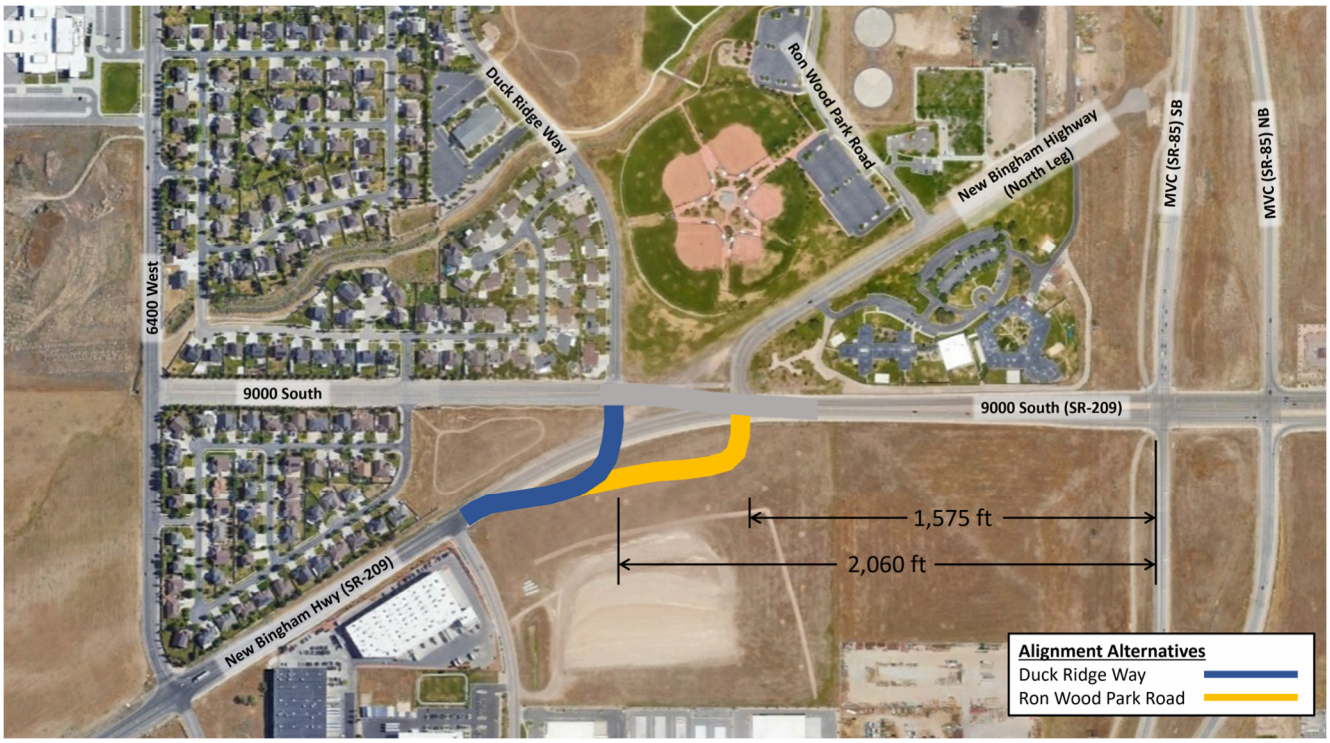


Figure 1: 9000 South Corridor Study Alignment Alternatives

Intersection Control

Two intersection control alternatives were analyzed, an intersection controlled by a traffic signal and a roundabout. While roundabouts generally require more right of way at the intersection, they are generally safer and can more easily accommodate skewed approaches. A roundabout could also be configured to incorporate the north leg of New Bingham Highway. The analyses showed that a roundabout would not have the capacity to accommodate the projected traffic demand at the intersection. It was determined that the intersection should be controlled by a traffic signal.

It was also determined that a five-lane cross section on 9000 South (west of the new intersection) would accommodate the projected demand.

No-Build Analysis

As a follow up to the 9000 South Corridor Study, West Jordan City staff requested that an additional scenario be analyzed assuming that the connection of 9000 South was not completed, and that 9000 South continue to curve to the southwest becoming New Bingham Highway. These additional analyses will include traffic microsimulation of key intersections along the 9000 South corridor during the morning and evening peak hours, as well as an analysis of average daily traffic (ADT) volumes on collector and arterial roads in the area surrounding the 9000 South corridor.

Study Area

The study area (see Figure 2) for this analysis is the 9000 South alignment in the southwest corner of the City between Bacchus Highway and MVC, as well as the 6400 West / New Bingham Highway intersection. Land uses in the study area have historically been agricultural. In the last 20 years the land adjacent to the MVC corridor has become more industrial in nature, with some residential redevelopment along 6400 West. Development plans west of 6400 West consist of a variety of residential land uses. Some commercial and industrial land uses are also anticipated.

Figure 2: 9000 South Corridor Study No-Build Analysis Study Area

Future Growth

The Jones Ranch development will be located north of 9000 South and extend west from 6400 West to approximately the western city limits. This development will consist of residential development of various densities as well as a commercial node at the future intersection of Bacchus Highway and 9000 South.

It is anticipated that the land located south of 9000 South will be developed in the near future with a mix of residential and industrial. No proposal for redevelopment has been submitted to the city at this time and anticipated land uses for this area are based on preliminary conversations.

In addition to these two developments in the immediate vicinity of the study area, it is anticipated that the area at large will continue to develop resulting in increased traffic demand in the study area and throughout the region.

Long-Range Plans

The extension of 9000 South to Bacchus Highway (SR-111) has been included in various long-range transportation plans for more than two decades. As shown in the timeline in Figure 3, the extension of 9000 South west to Bacchus Highway was first included in the West Jordan Transportation Master Plan (TMP) in 1998, and in the WFRC Regional Transportation Plan (RTP) in 2007.

The WFRC RTP: 2023-2050 was recently adopted and identifies the construction of 9000 South between Bacchus Highway and New Bingham Highway as a Phase 1 (2023-2032) project. This project was also included in the previous (2019) RTP as well as the 2015, 2011, and 2007 plans.

According to the RTP, Bacchus Highway is planned to be widened from a two-lane cross section to a five-lane cross section as a Phase 1 project, and 9000 South east of New Bingham Highway is planned to be widened to a seven-lane cross section as a Phase 2 (2033-2042) project.

9000 South between Bacchus Highway and New Bingham Highway is also identified by the RTP as a location where new bike lanes are to be added, and a shared-use path is planned to be added to Bacchus Highway from 5400 South to Old Bingham Highway. These are both planned as Phase 1 projects.

The currently adopted 2014 West Jordan TMP identifies 9000 South as a "UDOT Arterial (4/5 Lanes)" between Bacchus Highway and New Bingham Highway in the future (2040) roadway network. East of New Bingham Highway 9000 South is identified as a "UDOT Arterial (6/7 Lanes)." (The TMP recommends that "the remainder" of 9000 South be considered for a transfer of jurisdiction from the City to UDOT, thus its designation as a UDOT Arterial.)

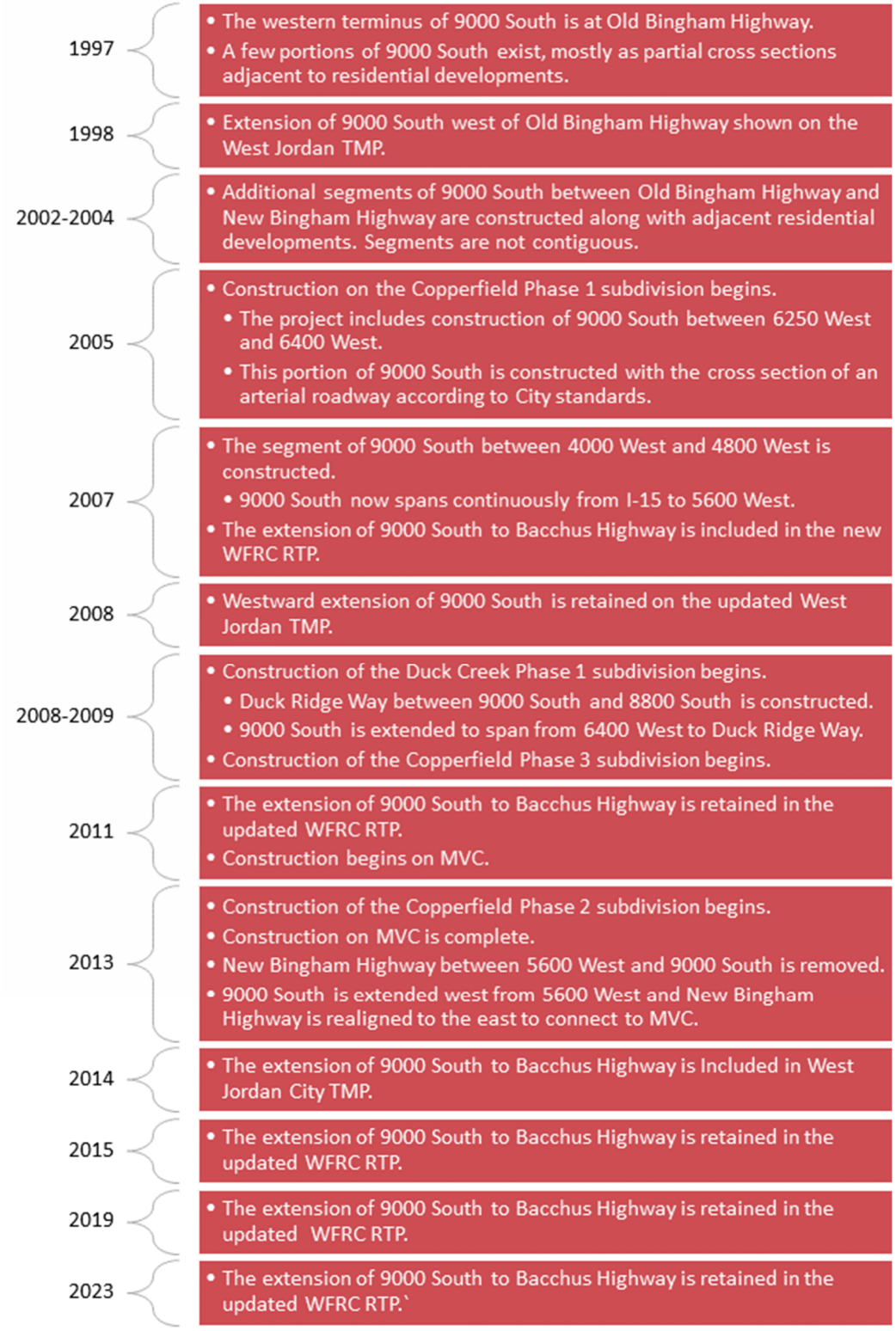


Figure 3: Timeline of 9000 South planning and construction.

Methodology

The study area for the no-build traffic microsimulation analysis consists of the following intersections:

- Bacchus Highway / 9000 South
- 6700 West / 9000 South
- 6400 West / 9000 South
- 6400 West / New Bingham Highway
- New Bingham Highway (North Leg) / 9000 South

The 6400 West / New Bingham Highway intersection was added to the study intersections from the original corridor study since much of the east/west traffic on 9000 South would likely reroute through this intersection if the planned connection was not completed.

The study area for the ADT analysis consists of arterial and collector roads ranging from 7800 South to Old Bingham Highway between Bacchus Highway and 5600 West.

As in the original corridor study the Wasatch Front Travel Demand Model (TDM) was used to forecast future 2050 ADTs for the roadways in the study area as well as peak hour turning movement volumes for each of the study intersections.

The calibrated Vissim models used in the original corridor study were used to create future 2050 no-build models to analyze operations at each of the study intersections. The same Highway Capacity Manual (HCM) 7th Edition, 2022 methodology used in the original corridor study to determine level of service (LOS) was used in this study as well. Outputs from the Vissim models were used to calculate the projected LOS and 95th percentile queues at each study intersection, as well as average travel times in either direction on 9000 South.

Assumptions

The three mile stretch of 9000 South between New Bingham Highway and Bangerter Highway is planned to be widened to seven lanes (three travel lanes in each direction) prior to 2050, while only operational improvements are planned for New Bingham Highway. For these no-build analyses some assumptions had to be made as to how this seven-lane cross section on 9000 South would transition into the existing three-lane cross section on New Bingham Highway.

It was assumed that the outermost westbound lane coming from the 9000 South / Mountain View Corridor (MVC) interchange would become a trap right-turn lane at New Bingham Highway as happens currently in the exiting five-lane cross section. The remaining two westbound lanes would continue through the 6400 West / New Bingham Highway intersection before reducing to one westbound lane. It was also assumed that the eastbound roadway would widen from one to two lanes beginning at the Prosperity

Road / New Bingham Highway intersection, as is currently the case, then widen to three eastbound lanes at the 9000 South / MVC interchange.

UDOT has recently determined that a traffic signal is warranted at the 6400 West / New Bingham Highway intersection. Therefore, it was assumed that a traffic signal had been installed at that intersection.

Analysis

The following sections summarize the analyses and results of the no-build condition.

ADT Analysis

The Wasatch Front TDM was used to forecast future 2050 average daily traffic (ADT) volume in the study area with the assumption that the planned 9000 South connection was not completed. The projected ADTs from this scenario were compared to the projected ADTs from the build scenario (assuming that the planned connection was completed), and the differences are shown in Figure 4. As expected, the ADT on 9000 South between Bacchus Highway and MVC is anticipated to drop significantly, as this becomes a less desirable east/west route in the area. Also as expected, the ADT on 6400 West between 9000 South and New Bingham Highway and on New Bingham Highway between 6400 West and 9000 South (shown in red in Figure 4) are expected to increase by approximately 8,000 as east/west traffic on 9000 South reroutes because the 9000 South connection was not completed.

As a result of 9000 South becoming a less desirable route, traffic is anticipated to use other routes to access or cross over MVC. The nearest MVC access points to 9000 South are at 7800 South and Old Bingham Highway which are anticipated to experience a 3,000 and 1,000 increase in ADT, respectively. 8200 South and 8600 South, roads which cross over MVC are anticipated to experience an increase of approximately 2,000 ADT and 3,000, respectively. Segments of Bacchus Highway, 6700 West, 6400 West, Prosperity Road, and 5600 West are also anticipated to experience increases in 1,000 to 2,000 ADT. These changes in ADT are summarized in Table 1.

Table 1: Future 2050 No-Build Change in ADT

Street Name	Change in ADT*
7800 South	+3,000
8200 South	+2,000
8600 South	+3,000
Old Bingham Highway	+1,000
6700 West	+2,000
6400 West	+2,000
5600 West	+2,000

*Compared to the Build Scenario where the 90000 South connection is completed.

WCG, January 2024

Functional Classification Impacts

9000 South has been planned to be a significant east/west arterial route in the region with right of way preserved for construction or expansion to a five- or seven-lane arterial road. By not completing the 9000 South connection, traffic will divert onto other roads which have been planned to be three-lane collector roads (except for 7800 South, which is planned to be a five-lane arterial road). Adding traffic to these collector roads may require adding additional capacity, as these roads were not planned to accommodate such volumes. Adding capacity to these three-lane collector roads may require one or more of the following actions:

- Removal of or encroachment on bicycle and pedestrian facilities
- Eliminating two-way left-turn lanes or other auxiliary lanes
- Partial taking of residential properties adjacent to the road
- Additional east/west delay in the region during morning and evening peak traffic periods (morning and evening commutes)

School Impacts

Diverting traffic onto these roads will also result in increased traffic volumes on the roads directly adjacent to or in the vicinity of the following schools where kindergarten through twelfth grade students attend on a traditional school calendar:

- Antelope Canyon Elementary School
- Oakcrest Elementary School
- Fox Hollow Elementary School
- Ascent Academy of West Jordan
- Sunset Ridge Middle School

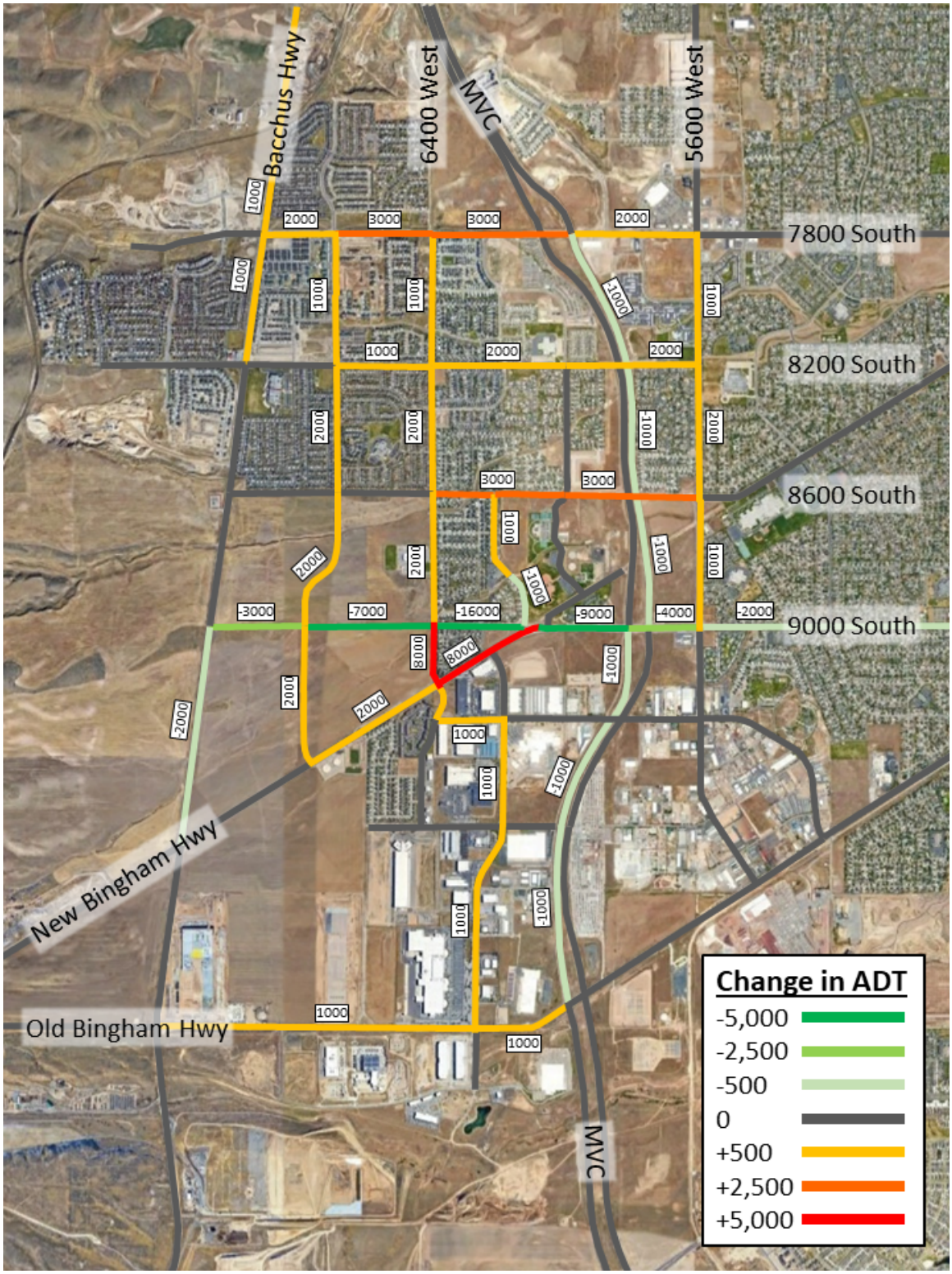


Figure 4: Changes in ADT between build and no-build scenarios.

Microsimulation Analysis

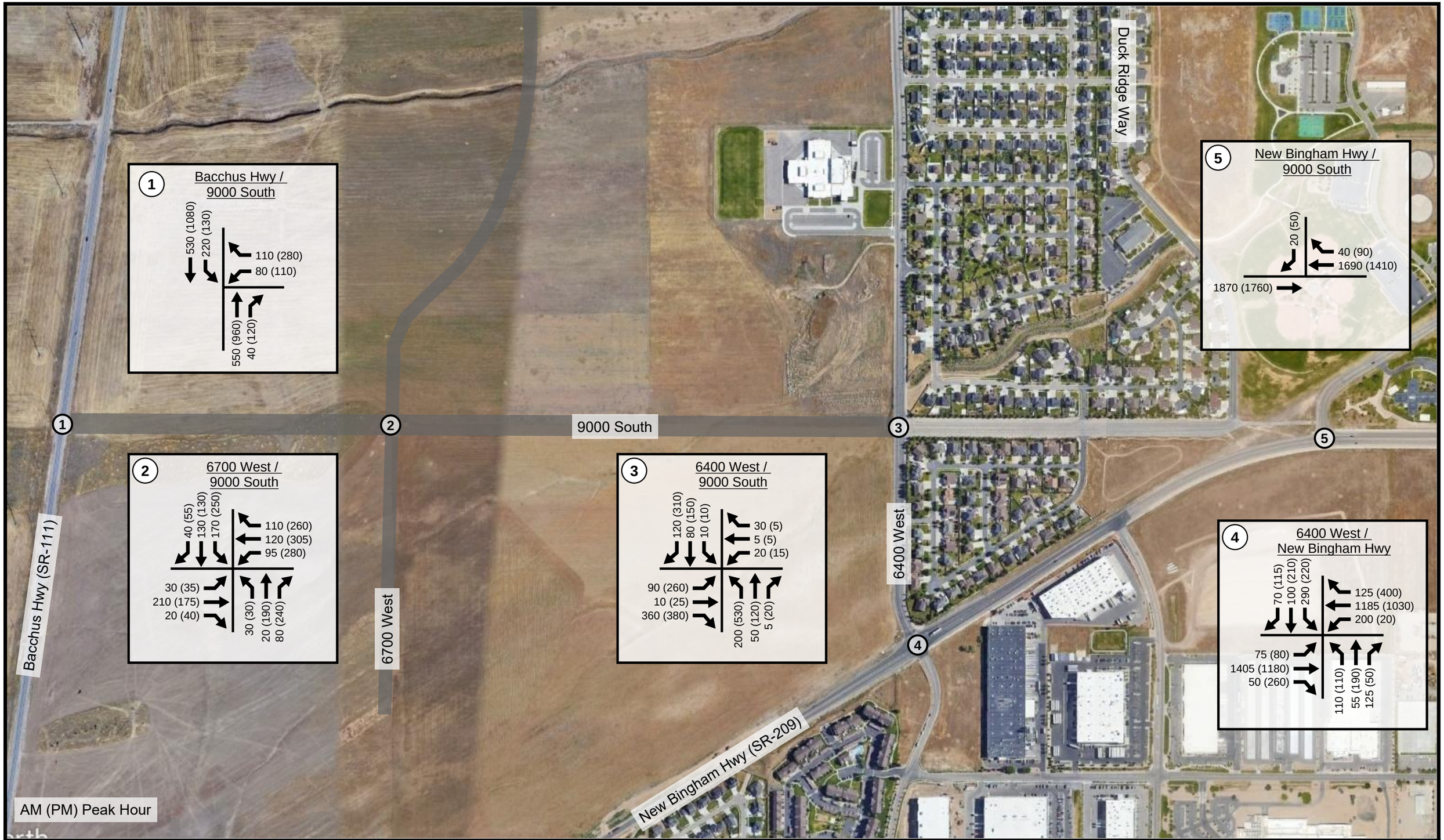
WCG used Vissim, an industry standard microsimulation software, to analyze future 2050 no-build conditions at each of the study intersections during the morning and evening peak hours, including LOS, queueing, and travel time. The Wasatch Front TDM was used to forecast peak hour turning movement volumes. These volumes are shown in Figure 5.

The results of the microsimulation analysis were used to calculate the LOS at each study intersection, which is shown in Table 2. As shown in Table 2, the 6400 West / New Bingham Highway intersection is anticipated to operate at LOS F during the morning peak hour and LOS E during the evening peak hour. The New Bingham Highway / 9000 South intersection is anticipated to operate at LOS E during the morning peak hour and the 6400 West / 9000 South intersection is anticipated to operate at LOS E during the evening peak hour. All other study intersections are anticipated to operate at LOS D or better during the peak hours.

The 95th percentile queue lengths were calculated for each study intersection and are shown in Table 3. The 95th percentile queues along the 6400 West corridor during the morning peak hour are illustrated in Figure 6, and the 95th percentile queues during the evening peak hour are illustrated in Figure 7. As shown in Table 3 and in Figure 6, the 95th percentile queues on the east- and westbound approaches to the 6400 West / New Bingham Highway intersection are anticipated to extend for several hundred feet during the morning peak hour.

As shown in Table 3 and in Figure 7, the 95th percentile queues on the south- and eastbound approaches to the 6400 West / New Bingham Highway intersection are anticipated to extend for several hundred feet during the evening peak hour. The queues on the southbound approach are anticipated to extend through the 6400 West / 9000 South intersection nearly reaching the south access to Antelope Canyon Elementary School. The 95th percentile queues on the northbound approach to the 6400 West / 9000 South intersection are anticipated to extend almost all the way to New Bingham Highway.

The queues on 6400 West in the morning and evening peak hours are anticipated to extend past and block the 9075 South / 6400 West intersection, which is one of two accesses to the Copperfield Phase 1 residential subdivision. During the evening peak hour, queues on 6400 West and anticipated to extend past the 8865 South / 6400 West intersection, which provides access to the Copperfield Phase 2, Copperfield Phase 3, and other residential subdivisions.



Future (2050) No-Build Peak Hour Volumes

West Jordan 9000 South Corridor No-Build Analysis

WALL CONSULTANT GROUP
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Phone: 801-449-1173

DATE: 11/15/2023
PROJECT: 22-253
Figure 5

As shown in Table 3 and in Figure 7, the 95th percentile queues on the eastbound approach to the 6400 West / New Bingham Highway intersection are anticipated to extend for several thousand feet during the morning and evening peak hour due to demand on this approach far exceeding the available capacity. Queues on the westbound approach are anticipated to extend for more than 2,000 feet during the morning peak hour and for more than 700 feet during the evening peak hour. The queues on the southbound approach are anticipated to extend past 9075 South in both the morning and evening peak hours, interfering with operations at one of two accesses to this residential neighborhood, and past 9000 South during the evening peak hour, interfering with operations at that intersection.

Not completing the planned 9000 South connection will result in significant delays and queueing on New Bingham Highway, 6400 West, and surrounding streets.

Table 2: Future 2050 No-Build LOS Results

Intersection	Condition	Overall Int.	Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Bacchus Hwy (SR-111) / 9000 South	AM	LOS B / 15.6	-	-	-	15.7	-	5.2	-	22.0	0.8	17.3	11.8	-
			-			LOS A / 9.5			LOS C / 20.5			LOS B / 13.4		
	PM	LOS C / 20.3	-	-	-	19.1	-	17.6	-	27.9	1.3	24.9	17.6	-
			-			LOS B / 14.2			LOS C / 24.9			LOS B / 18.3		
6700 West / 9000 South	AM	LOS C / 24.5	6.7	12.4	5.4	5.6	9.5	1.6	50.4	57.8	5.5	51.2	55.3	34.6
			LOS B / 11.1			LOS A / 6.0			LOS C / 24.3			LOS D / 50.8		
	PM	LOS D / 35.5	11.5	15.1	7.5	7.6	13.9	2.9	41.0	59.9	6.9	>80.0	72.8	59.2
			LOS B / 13.3			LOS A / 8.6			LOS C / 30.8			LOS F / >80.0		
6400 West / 9000 South	AM	LOS C / 20.8	8.4	13.2	5.5	20.3	24.9	9.7	26.6	44.2	11.2	59.9	57.3	35.5
			LOS A / 6.2			LOS B / 14.7			LOS C / 30.1			LOS D / 44.6		
	PM	LOS E / 55.1	26.0	44.6	57.7	51.4	28.3	14.4	51.6	46.6	38.8	74.1	>80.0	71.0
			LOS D / 44.9			LOS D / 39.3			LOS D / 50.3			LOS E / 76.4		
6400 West / New Bingham Hwy (SR-209)	AM	LOS F / >80.0	>80.0	>80.0	>80.0	>80.0	62.3	38.5	>80.0	59.1	20.2	>80.0	>80.0	70.4
			LOS F / >80.0			LOS E / 79.3			LOS E / 57.1			LOS F / >80.0		
	PM	LOS E / 78.2	68.8	72.9	45.7	36.7	33.3	19.8	>80.0	77.8	42.5	>80.0	>80.0	>80.0
			LOS E / 68.1			LOS C / 29.7			LOS F / >80.0			LOS F / >80.0		
New Bingham Hwy / 9000 South (SR-209)	AM	LOS E / 37.2	-	-	-	-	-	40.0	-	-	-	-	-	31.1
			-			LOS E / 40.0			-			LOS D / 31.1		
	PM	LOS C / 24.2	-	-	-	-	-	29.6	-	-	-	-	-	14.6
			-			LOS D / 29.6			-			LOS B / 14.6		
WCG, December 2023														

Table 3: Future 2050 No-Build 95th Percentile Queues

Intersection	Condition	Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Bacchus Hwy (SR-111) /	AM	-	-	-	50	-	55	-	220	-	175	175	-
9000 South	PM	-	-	-	65	-	160	-	415	-	275	370	-
6700 West /	AM	25	105	-	40	55	-	60	40	-	220	225	-
9000 South	PM	45	85	-	100	95	-	65	90	-	630	610	-
6400 West /	AM	70	150	-	25	20	-	190	105	-	20	245	-
9000 South	PM	520	530	-	25	20	-	840	685	-	735	900	-
6400 West /	AM	80	5645	40	2545	2095	40	220	155	70	645	580	-
New Bingham Hwy (SR-209)	PM	80	5630	5605	45	735	765	630	630	40	1620	160	-
WCG, December 2023													

Figure 6: 95th percentile queues along 6400 West during the morning peak hour with no-build conditions.

Figure 7: 95th percentile queues along 6400 West during the evening peak hour with no-build conditions.

Mitigated Scenario Analysis

WCG conducted additional analyses to determine what measures might be needed to mitigate the anticipated poor LOS and excessive queueing at the 6400 West / 9000 South and 6400 West / New Bingham Highway intersections. A mitigated scenario was analyzed which assumed that the following improvements had been implemented:

- New Bingham Highway Widened to Five Lanes
- Dual Left-Turn Lanes on the Southbound Approach to the 6400 West / New Bingham Highway intersection.

The LOS for each study intersection was calculated and is shown in Table 4. As shown in Table 4, all study intersections are anticipated to operate at acceptable levels of service. Despite the acceptable intersection LOSs, significant delay is anticipated on the southbound approach to the 6400 West / 9000 South intersection, and on the east- and westbound approaches to the 6400 West / New Bingham Highway intersection.

Table 4: Future 2050 No-Build Mitigated LOS Results

Intersection	Condition	Overall Int.	Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Bacchus Hwy (SR-111) / 9000 South	AM	LOS B / 16.2	-	-	-	21.0	-	9.7	-	21.9	0.8	17.5	11.8	-
			-			LOS B / 14.4			LOS C / 20.4			LOS B / 13.5		
	PM	LOS C / 20.3	-	-	-	19.3	-	12.4	-	27.9	1.3	24.5	17.6	-
			-			LOS B / 14.3			LOS C / 24.9			LOS B / 18.3		
6700 West / 9000 South	AM	LOS C / 32.9	10.7	12.6	5.0	52.5	42.5	9.9	50.4	57.4	5.1	51.2	55.3	34.5
			LOS B / 11.8			LOS C / 34.7			LOS C / 24.0			LOS D / 50.8		
	PM	LOS C / 34.4	11.8	15.5	8.0	7.3	14.9	2.7	40.4	59.6	6.9	>80.0	68.4	55.0
			LOS B / 13.7			LOS A / 8.6			LOS C / 30.7			LOS F / >80.0		
6400 West / 9000 South	AM	LOS C / 29.8	7.9	17.4	24.5	25.6	24.6	9.7	26.4	42.1	12.1	60.6	67.3	42.0
			LOS C / 21.4			LOS B / 16.4			LOS C / 29.2			LOS D / 52.2		
	PM	LOS D / 41.9	25.2	24.1	11.5	32.3	28.0	14.4	55.7	47.0	43.5	64.0	69.9	56.7
			LOS B / 17.2			LOS C / 27.7			LOS D / 53.7			LOS E / 60.9		
6400 West / New Bingham Hwy (SR-209)	AM	LOS D / 53.2	26.7	33.5	29.4	61.8	22.2	12.5	>80.0	63.8	15.4	>80.0	>80.0	75.4
			LOS C / 33.1			LOS C / 26.6			LOS E / 65.7			LOS F / >80.0		
	PM	LOS D / 45.0	24.6	22.4	19.1	31.0	34.2	20.3	>80.0	75.4	30.4	>80.0	>80.0	>80.0
			LOS C / 21.9			LOS C / 30.5			LOS F / >80.0			LOS F / >80.0		
New Bingham Hwy / 9000 South (SR-209)	AM	LOS D / 28.9	-	-	-	-	-	34.1	-	-	-	-	-	18.1
			-			LOS E / 34.1			-			LOS C / 18.1		
	PM	LOS C / 22.4	-	-	-	-	-	27.0	-	-	-	-	-	14.1
			-			LOS D / 27.0			-			LOS B / 14.1		
WCG, December 2023														

The 95th percentile queue lengths were calculated for each study intersection in the mitigated scenario and are shown in Table 5 and illustrated in Figure 8 and Figure 9. As shown in Table 5 and in Figure 8, the 95th percentile queue on the south-, east-, and westbound approaches to the 6400 West / New Bingham Highway intersection are anticipated to extend for several hundred feet during the morning peak hour. The queues on the southbound approach will extend past and interfere with operations at the 9075 South / 6400 West intersection.

As shown in Table 5 and in Figure 9, the 95th percentile queues on the north- and southbound approaches to the 6400 West / 9000 South intersection and on all approaches to the 6400 West / New Bingham Highway intersection are anticipated to extend for several hundred feet during the evening peak hour. Queues are anticipated to extend past and interfere with operations at the 8865 South / 6400 West and 9075 South / 6400 West intersections.

Widening New Bingham Highway adding dual left-turn lanes at southbound 6400 West will help to mitigate excessive delays, but queuing and delay will continue to be an issue.

Table 5: Future 2050 No-Build Mitigated 95th Percentile Queues

Intersection	Condition	Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Bacchus Hwy (SR-111) / 9000 South	AM	-	-	-	65	-	110	-	220	-	180	175	-
	PM	-	-	-	65	-	165	-	415	-	270	370	-
6700 West / 9000 South	AM	40	105	-	190	75	-	60	40	-	220	225	-
	PM	40	85	-	90	100	-	65	90	-	610	580	-
6400 West / 9000 South	AM	65	435	-	25	20	-	245	105	-	20	295	-
	PM	210	270	-	25	20	-	820	405	-	305	780	-
6400 West / New Bingham Hwy (SR-209)	AM	80	845	845	330	720	65	285	240	60	1525	1530	-
	PM	90	665	665	40	710	760	610	610	45	400	405	-
WCG, December 2023													

Figure 8: 95th percentile queues along 6400 West during the morning peak hour with no-build mitigated conditions.

Figure 9: 95th percentile queues along 6400 West during the evening peak hour with no-build mitigated conditions.

While the proposed mitigation measures are anticipated to result in acceptable LOSs in the study area, the anticipated queueing is still anticipated to be excessive. A second mitigated scenario was analyzed to determine what mitigation measure might be needed to mitigate the anticipated excessive queues. It was assumed that the following mitigation measures had been implemented:

- Expand 6400 West to a five-lane cross section between 9000 South and New Bingham Highway.
- Expand New Bingham Highway to a seven-lane cross section east of 6400 West
- Install triple left-turn lanes on the southbound approach to the 6400 West / New Bingham Highway intersection.
- Install dual right-turn lanes on the westbound approach to the 6400 West / New Bingham Highway intersection.

The LOS for each study intersection was calculated and is shown in Table 6. As shown in Table 6, all study intersections are anticipated to operate at the same or similar levels of service as in the first mitigated scenario. Significant delay is still anticipated on some movements at the 6400 West / 9000 South intersection, particularly on the north- and southbound approaches.

Table 6: Future 2050 No-Build Mitigated 2 LOS Results

Intersection	Condition	Overall Int.	Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Bacchus Hwy (SR-111) / 9000 South	AM	LOS B / 16.2	-	-	-	21.0	-	9.6	-	21.9	0.8	17.6	11.8	-
			-			LOS B / 14.3			LOS C / 20.4			LOS B / 13.5		
	PM	LOS C / 20.4	-	-	-	19.0	-	12.2	-	28.0	1.3	24.5	17.6	-
			-			LOS B / 14.1			LOS C / 25.0			LOS B / 18.3		
6700 West / 9000 South	AM	LOS C / 32.9	10.6	12.7	5.0	53.0	41.5	9.7	50.4	57.8	5.1	51.2	55.3	34.5
			LOS B / 11.8			LOS C / 34.5			LOS C / 24.1			LOS D / 50.8		
	PM	LOS C / 34.7	11.8	15.3	7.9	8.0	14.6	2.8	40.9	59.2	6.8	>80.0	70.6	57.3
			LOS B / 13.6			LOS A / 9.0			LOS C / 30.4			LOS F / >80.0		
6400 West / 9000 South	AM	LOS C / 21.0	7.5	13.1	4.9	20.1	24.3	9.8	26.8	42.1	4.6	60.5	59.2	38.2
			LOS A / 5.5			LOS B / 14.6			LOS C / 29.3			LOS D / 47.0		
	PM	LOS D / 44.5	25.2	23.1	11.1	31.9	28.1	14.9	58.3	56.2	18.5	67.7	76.3	63.1
			LOS B / 17.0			LOS C / 27.7			LOS E / 56.6			LOS E / 67.2		
6400 West / New Bingham Hwy (SR-209)	AM	LOS D / 37.6	26.9	32.9	29.1	66.2	22.1	9.9	>80.0	64.9	10.3	79.4	71.0	44.9
			LOS C / 32.5			LOS C / 26.9			LOS E / 63.5			LOS E / 72.5		
	PM	LOS D / 39.0	22.1	21.8	18.8	32.6	28.5	9.7	>80.0	68.1	24.3	75.8	>80.0	>80.0
			LOS C / 21.3			LOS C / 23.6			LOS F / >80.0			LOS F / >80.0		
New Bingham Hwy / 9000 South (SR-209)	AM	LOS D / 25.5	-	-	-	-	-	33.2	-	-	-	-	-	8.9
			-			LOS D / 33.2			-			LOS A / 8.9		
	PM	LOS C / 19.5	-	-	-	-	-	26.4	-	-	-	-	-	7.4
			-			LOS D / 26.4			-			LOS A / 7.4		
WCG, December 2023														

The 95th percentile queue lengths were calculated for each study intersection and are shown in Table 7 and illustrated in Figure 10 and Figure 11. As shown in Table 7 and Figure 10, the 95th percentile queues on the east- and westbound approaches to the 6400 West / New Bingham Highway intersection are anticipated to extend for several hundred feet in the morning peak hour.

As shown in Table 7 and Figure 11, the 95th percentile queues on the north-, east-, and westbound approaches to the 6400 West / New Bingham Highway intersection are anticipated to extend for several hundred feet in the evening peak hour. The 95th percentile queues on the north- and southbound approaches to the 6400 West / 9000 South intersection are also anticipated to extend for several hundred feet. These queues are anticipated to extend past and interfere with operations at the 8865 South / 6400 West and 9075 South / 6400 West intersections.

Widening New Bingham Highway and 6400 West, as well as adding triple left-turn lanes at southbound 6400 West will mitigate the anticipated queueing and delay but will come with significant impacts to property owners and residents.

While the queues on the east- and westbound approaches to the 6400 West / New Bingham Highway intersection are anticipated to extend for several hundred feet in either mitigated scenario, these queues are not anticipated to interfere with operations at

upstream intersections or accesses. The queues on north- and southbound 6400 West would be much more impactful to residents of the adjacent neighborhoods as access to those neighborhoods would be impeded during peak hours. It is also likely that the anticipated conditions will incentivize some drivers to use local roads through residential areas to bypass the anticipated queueing and delay.

Table 7: Future 2050 No-Build Mitigated 2 95th Percentile Queues

Intersection	Condition	Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Bacchus Hwy (SR-111) / 9000 South	AM	-	-	-	65	-	100	-	220	-	180	175	-
	PM	-	-	-	65	-	160	-	415	-	270	370	-
6700 West / 9000 South	AM	40	105	-	190	70	-	60	40	-	220	225	-
	PM	45	85	-	100	95	-	65	90	-	650	610	-
6400 West / 9000 South	AM	60	145	-	35	20	-	240	105	15	25	265	-
	PM	215	275	-	25	20	-	650	365	35	175	790	-
6400 West / New Bingham Hwy (SR-209)	AM	80	845	845	365	590	40	285	195	70	250	220	-
	PM	85	620	620	50	590	565	610	605	40	320	340	-
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Figure 10: 95th percentile queues along 6400 West during the morning peak hour with additional mitigation measures.

Figure 11: 95th percentile queues along 6400 West during the evening peak hour with additional mitigation measures.

The improvements assumed in the first mitigated scenario would require wider roadway cross sections on the intersection approaches to the 6400 West / New Bingham Highway intersection and on New Bingham Highway east of 6400 West; these improvements could largely be accomplished within the existing right-of-way, with little or no impact on adjacent properties. The improvements assumed in the second mitigated scenario would likely have a much greater impact on adjacent properties.

It is likely that extending the five-lane cross section on 6400 West north of 9000 South and extending the seven-lane cross section on New Bingham Highway west of 6400 West would mitigate the anticipated queueing issues by adding more vehicle capacity to the intersections as well as more queue storage space. Not only would this expansion impact more properties adjacent to the roadways, but it is also possible that extending the widened cross sections would not actually mitigate the queueing issues but move them to a point farther downstream and outside of the study area where the roadway transitions to a narrower cross section.

Travel Time Analysis

The results of the microsimulation analysis were used to calculate the average travel time on the 9000 South corridor. Travel times and travel distances for the 2050 No-Build and 2050 No-Build Mitigated scenarios were compared to the 2050 Build scenario. The analyzed travel routes for these scenarios are shown in Figure 12. As shown in Figure

12, the no-build condition results in eastbound vehicles on 9000 South turning right onto 6400 West and then turning left to continue east on New Bingham Highway and 9000 South. Conversely, westbound vehicles on 9000 South continue onto New Bingham Highway to turn right onto 6400 West then turn left to continue west on 9000 South. The route in the no-build conditions is almost one-quarter mile longer than in the build condition.

Travel times for each scenario were compared and are summarized in Table 8. As shown in Table 8, the average travel time through the 9000 South corridor is anticipated to be higher in both directions during the morning and evening peak hours in the no-build condition than if the 9000 South connection were completed. In the first mitigated scenario, travel times are anticipated to be approximately one to four minutes longer than in the build condition. In the second mitigated scenario the increase in travel time is anticipated to be less than one minute.

Figure 12: Routes used in 9000 South travel time analysis.

Table 8: 9000 South Travel Time Analysis

Travel Direction	Condition	Change in Travel Time (min)*		
		2050 No-Build	2050 No-Build Mitigated	2050 No-Build Mitigated 2
Eastbound	AM	+0.8	+3.7	+0.4
	PM	+3.7	+1.2	+0.5
Westbound	AM	+1.2	+0.7	+0.5
	PM	+0.8	+0.9	+0.7

*Compared to the Build Scenario where the 90000 South connection is completed.
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Additional Considerations

In addition to the previously discussed analyses, the following should also be considered:

East/West Travel in the Salt Lake Valley

One issue that has been identified by stakeholders in the Salt Lake Valley, particularly the southwest quadrant of the valley, is the lack of east/west travel corridors. This part of the Valley has multiple high-capacity options for north/south travel, including I-15, Bangerter Highway, MVC, and Bacchus Highway. East/west travel options are limited to arterial surface streets, many of which do not connect the west side of the valley directly to I-15. 7000 South spans the entire city and connects to I-15 but does not connect to MVC or Bacchus Highway and is interrupted by the South Valley Regional Airport. 7800 South spans the entire city but does not directly connect to I-15. **9000 South is the only east/west route in West Jordan that will span the entire city and connects to I-15**. Not completing the planned 9000 South connection would result in decreased east/west mobility in an area where east/west mobility is already a concern.

Roadway Grid System

Studies have shown that roadway grid systems are beneficial to communities in multiple ways. Established grid systems disperse traffic by providing multiple routes to drivers' destinations. Grid systems typically result in fewer and less severe crashes, and result in reduced response times for emergency vehicles. The improved connectivity provided by a grid system is good for job growth, property values, and market accessibility, resulting in increased economic vitality. Not completing the planned 9000 South connection would significantly impair the roadway grid system in this part of the valley, and result in a loss of these potential benefits.

Alternative Transportation Impacts

By not completing the planned 9000 South connection, 9000 South will be a non-continuous east/west corridor in the southwest Salt Lake Valley. This will result in 9000 South being a less desirable route for future transit lines. Not completing the 9000 South connection will also result in New Bingham Highway and 6400 West (and possible others)

needing to be widened more than is currently planned for. In addition to the previously discussed property impacts of these wider cross sections, this will also create additional hazards for pedestrians and other non-motorized users. Wider streets result in increased exposure of pedestrians to vehicles with longer crossing times and distances. This is especially impactful to children and persons with disabilities. By completing the currently planned projects including the 9000 South connection, no additional road widening is expected within the study area.

Conclusions and Recommendations

WCG has analyzed the future 2050 no-build scenario for the 9000 South Corridor Study, which assumes that the planned connection of 9000 South at Duck Ridge Way is not completed, and that 9000 South continue to curve to the southwest becoming New Bingham Highway. Based on this analysis WCG makes the following conclusions and recommendations:

- It is anticipated that traffic will divert from 9000 South to other roadways.
    - It is anticipated that the ADTs on the following east/west routes will increase by 1,000 to 3,000 vehicles:
        - 7800 South
        - 8200 South
        - 8600 South
        - Old Bingham Highway
    - It is anticipated that the ADTs on the following north/south routes will increase by 1,000 to 3,000 vehicles:
        - Bacchus Highway
        - 6700 West
        - 6400 West
        - 5600 West
        - Prosperity Road
    - The ADTs on the north and east legs of the 6400 West / New Bingham Highway intersection are anticipated to increase by approximately 8,000 vehicles.
    - The roadways adjacent to or near the following schools will experience an increase in ADT:
        - Antelope Canyon Elementary School
        - Oakcrest Elementary School
        - Fox Hollow Elementary School
        - Ascent Academy of West Jordan
        - Sunset Ridge Middle School
- It is anticipated that the following intersections will operate at poor levels of service during the morning or evening peak hours:
    - 6400 West / New Bingham Highway
    - 6400 West / 9000 South

- Significant queueing is anticipated on New Bingham Highway and 6400 West at the 6400 West / New Bingham Highway intersection.
- It is anticipated that the following mitigation measures, at a minimum, will be necessary to mitigate the poor levels of service:
  - Widen New Bingham Highway to five lanes.
  - Reconstruct the southbound approach to the 6400 West / New Bingham Highway intersection to include dual left-turn lanes.
- It is anticipated that the following mitigation measures, at a minimum, will be necessary to mitigate queueing to a more manageable level:
  - Widen 6400 west to five lanes between 9000 South and New Bingham Highway.
  - Widen New Bingham Highway east of 6400 West to seven lanes.
  - Construct triple left-turn lanes on the southbound approach to the 6400 West / New Bingham Highway intersection.
- It is anticipated that east/west travel times on 9000 South will increase by anywhere between one and four minutes during peak hours.

In addition to the previous impacts associated with the no-build scenario, failing to construct the 9000 South connection will result in an incomplete regional roadway grid network, and interrupt an important east/west corridor in West Jordan City. Roadway grid networks have been shown to increase mobility and access in a region, as well as safety. Well-developed grid networks disperse traffic, rather than concentrate it onto a single roadway. They improve access for all road users and make mass transit more accessible. Without the proposed 9000 South connection, travelers and residents in this area are likely to experience an increase in:

- Travel Time
- Vehicle Miles Traveled (VMT)
- Vehicle Emissions
- Cut-through Traffic in Residential Neighborhoods

The pros and cons of the no-build scenario (not completing the planned 9000 South connection) are summarized in Table 9.

Based on these findings, WCG recommends that the 9000 South connection at New Bingham Highway be completed as planned to maintain east/west mobility in the region and to contribute to a safe and efficient regional roadway grid network.

Table 9: Pros and Cons of the No-Build Scenario

Not Completing the Planned 9000 South Connection	
Pros:	**Cons:**
✓ No increase in traffic volumes on 9000 South between 6400 West and Duck Ridge Way ✓ Less road/traffic noise for residents in the Copperfield and Duck Creek subdivisions ✓ Maintained neighborhood cohesion and connectivity between the Copperfield and Duck Creek subdivisions	✖ Increased traffic volumes on almost all roadways between 7800 South and Old Bingham Highway ✖ Increased congestion and queueing along the 6400 West corridor ✖ Wider roadway cross sections on 6400 West, New Bingham Highway, and possibly other roadways ✖ Increased traffic on roadways adjacent to or near five schools ✖ Incomplete regional roadway grid network ✖ Increased travel times ✖ Increased cut through traffic on neighborhood streets ✖ Interrupted 9000 South corridor ✖ Decreased mobility and access ✖ Decreased safety for pedestrians and vehicles ✖ Less desirable transit routes