

Attachment A
Initial Alternatives Screening Memo

TECHNICAL MEMORANDUM

March 2, 2026

Project# 30764

To: Brock Dille, PE (Idaho Transportation Department)

From: Tristan Gallagher, EIT, Matthew Hagen, EIT, Chenming Zhang, Liz Kaniecki, PE, Mark Heisinger, PE, and Andy Daleiden, PE

RE: Initial Alternatives Selection Memo (Final)

This memorandum summarizes the results of the initial alternatives screening for Blue Lakes and Pole Line Project (herein referred to as "the project") and presents recommendations for alternatives to carry into the Tier 1 alternatives analysis.

INTRODUCTION

The purpose of this project is to identify improvements for the Blue Lakes Boulevard and Pole Line Road intersection to improve safety and reduce traffic congestion. The improvements are to be implemented in the short-, medium-, or long-term. Figure 1 outlines the tiered evaluation process for the project. This process began with the data collection and evaluation of existing and future year 2050 no-build conditions, which is summarized in Technical Memorandum #1 – Existing and Future No-Build Conditions (Reference 1). The project team identified and screened 20 initial alternatives. The screening process included a critical-movement evaluation of traffic operations during the future year 2050 no-build scenario PM peak hour and a qualitative evaluation to additional criteria. Up to 10 of these initial alternatives will advance to the Tier 1 analysis, which will include a detailed evaluation of the impacts at adjacent intersections, planning level cost estimates, and a refined look at right-of-way (ROW) impacts.

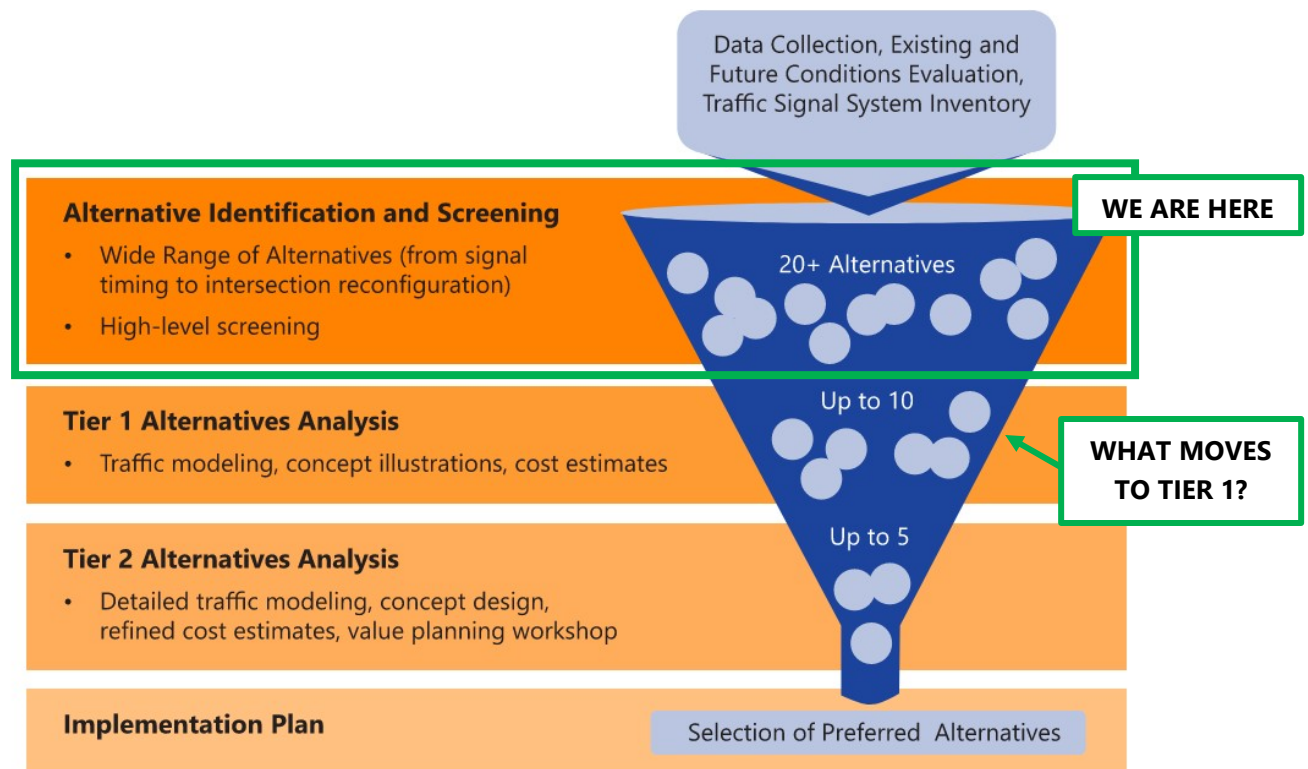


Figure 1. Tiered Evaluation Process

INITIAL ALTERNATIVES SCREENING PROCESS

The initial alternative screening process includes a high-level quantitative evaluation of the traffic operations (volume-to-capacity, delay) at the Blue Lakes Boulevard and Pole Line Road intersection. The process also included a qualitative assessment of additional evaluation criteria, including safety, bicycle/pedestrian, freight, driver familiarity, aesthetics, economic opportunity, impacts to local system, cost, ROW impacts, and constructability. This qualitative assessment focused on the identification of fatal flaws that would prohibit an alternative from further consideration. The evaluation criteria considered in this process were identified based on discussions with the Technical and Project Advisory Groups.

The initial alternatives focused on addressing the critical movements at the Blue Lakes Boulevard and Pole Line Road intersection. These movements include the northbound through, eastbound left, southbound right, and southbound through movements (highlighted in by the green boxes in Figure 2).

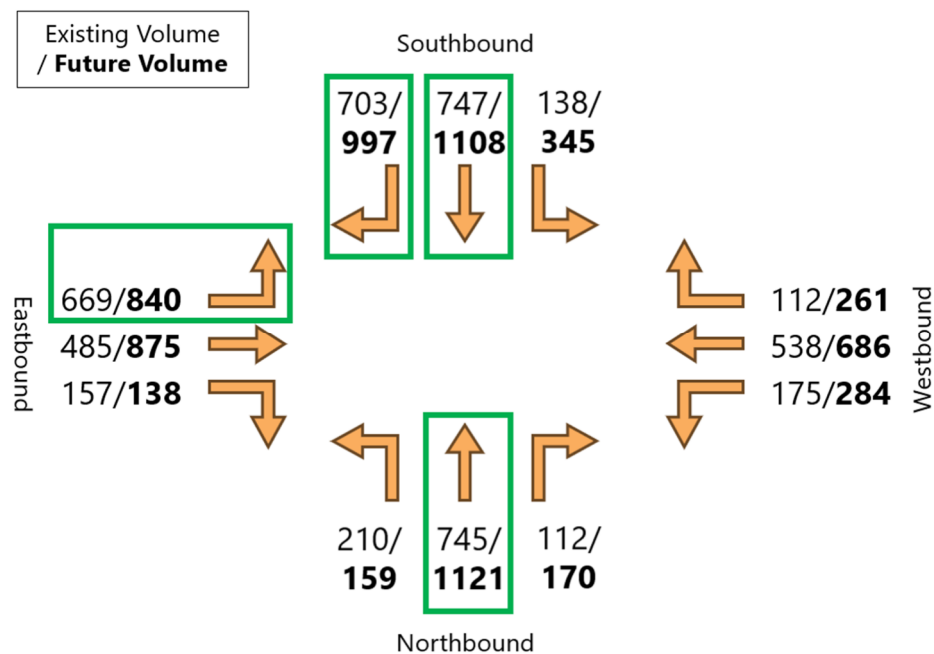


Figure 2. Turning Movement Volumes at Blue Lakes Boulevard/ Pole Line Road Intersection (Weekday PM Peak Hour)

The initial alternatives were categorized into three categories:

- **Conventional Improvements** – These alternatives may improve intersection capacity through signal re-timing and phase modifications, additional turn lanes, and roadway widening.
- **Grade-Separation** – These alternatives may improve intersection capacity by removing movements or phases from the main intersection via grade-separated infrastructure.
- **High-Capacity Intersections and System Routing** – These alternatives may improve intersection capacity by removing movements and/or signal phases from the main intersection through vehicle routing on adjacent roadways or incorporating at-grade, geometric changes to the intersection.

Figures 3 and 4 provide an overview of all the alternatives evaluated in their respective categories. These alternatives were evaluated using future year 2050 weekday PM peak hour traffic volumes and modeled in Synchro 12, and in Sidra for roundabout configurations. Merging maneuvers were also evaluated at a high level using HCS 7 where applicable. The initial results of the analysis were presented to the Technical Advisory Group (TAG) in January 2026 and to the Project Advisory Group (PAG) in February 2026 to gather input that will inform the recommended alternatives to move forward into Tier 1.

RESULTS AND RECOMMENDATION

Table 1 below summarizes the initial alternatives evaluated, initial order of magnitude for cost, benefits and challenges, and highlights which alternatives are recommended to move to the Tier 1 analysis based on fatal flaws and feedback from the TAG and PAG. The recommendations incorporate feedback received. Attachment A provides more detailed information and visuals for each initial alternative that was evaluated.

Table 1. Alternatives Summary Table

Alternative	Cost	Benefits	Challenges	Consultant Recommend Moving to Tier 1	TAG Recommend Moving to Tier 1	PAG Recommend Moving to Tier 1
No-Build Alternatives						
NB: No-Build with Signal Timing Improvements	\$	■ No significant changes to roadway and signal systems.	■ Potential traffic signal equipment limitations	Yes. <i>(For comparison to the other alternatives.)</i>	Yes. <i>(For comparison to the other alternatives.)</i>	Yes. <i>(For comparison to the other alternatives.)</i>
Conventional Intersection Alternatives						
C1: Widen Blue Lakes Boulevard + Signalized Dual Southbound Right-Turns.	\$\$	■ Improves intersection delay by 30-40%. ■ Improves intersection capacity by 20-30%. ■ No significant changes to roadway and signal systems.	■ Northbound lane merge occurs before Perrine Bridge. ■ Requires additional ROW.	Yes	Yes	Yes
C2: Widen Pole Line Road + Dual Southbound Left Turn Lanes.	\$\$	■ Improves intersection delay by 30-40%. ■ Improves intersection capacity by 10-20%. ■ No significant changes to roadway and signal systems.	■ Operates over capacity. ■ Requires additional ROW.	No	No	No
C3: Additional Lanes on Each Approach (3 Through Lanes, Dual Left-Turn Lanes, and Dedicated Right-Turn Lanes)	\$\$\$	■ Improves intersection delay by 40-50%. ■ Improves intersection capacity by 10-20%.	■ Operates over capacity. ■ Under-utilized NBT lane without bridge widening. ■ NBT lane merges before Perrine Bridge. ■ Requires additional ROW.	No	No	No
C4: Triple Eastbound Left-Turns + 3 Northbound Through Lanes + Signalized Dual Southbound Right-Turns.	\$\$	■ Improves intersection delay by 30-40%. ■ Improves intersection capacity by 20-30% (including significant improvement for EBL).	■ Under-utilized NBT lane without bridge widening. ■ Under-utilized eastbound left lane without bridge widening. ■ NBT lane merges before Perrine Bridge. ■ Requires additional ROW.	Yes	Yes	Yes
C5: Triple Eastbound Left-Turn Lanes + Dual Southbound Right-Turn Lanes + Widen Blue Lakes Boulevard to 3-Lanes.	\$\$	■ Improves intersection delay by 30-40%. ■ Improves intersection capacity by 30-40% (including significant improvement for EBL).	■ Under-utilized NBT lane without bridge widening ■ NBT lane merges before the Perrine Bridge. ■ Under-utilized EBL Lane without bridge widening. ■ Requires additional ROW.	Yes	Yes	Yes
Roundabout						
R1: Multilane Roundabout (2-3 Circulatory Lanes).	\$\$	■ Improves safety.	■ Worsens intersection capacity by more than 40%. ■ Worsens intersection delay by more than 50%.	No	No	No

Alternative	Cost	Benefits	Challenges	Consultant Recommend Moving to Tier 1	TAG Recommend Moving to Tier 1	PAG Recommend Moving to Tier 1
High-Capacity Intersections						
HC1: Full Displaced Left-Turn (All Approaches).	\$\$\$	■ Improves intersection delay by 60-70%. ■ Improves intersection capacity by 40-50% (including significant improvement for EBL). ■ Reduces conflict points.	■ Requires extensive access control. ■ Requires clear signage and potentially overhead signage. ■ Driver unfamiliarity.	No	Yes	No
HC2A: Partial Displaced Left-Turn (EB and WB Approaches).	\$\$	■ Improves intersection delay by 40-50%. ■ Improves intersection capacity by 30-40% (including significant improvement for EBL). ■ Reduces conflict points.	■ Requires extensive access control. ■ Requires clear signage and potentially overhead signage. ■ Driver unfamiliarity.	No	Yes	Yes
HC2B: Displaced Left-Turn (Partial – EB Direction Only, WBL Movement Removed).	\$\$	■ Improves intersection delay by 40-50%. ■ Improves intersection capacity by 30-40% (including significant improvement for EBL). ■ Reduces conflict points.	■ Requires extensive access control. ■ Requires clear signage and potentially overhead signage. ■ Driver unfamiliarity.	Yes	No	Yes
HC3: Median U-Turn (Partial – Only NBL & SBL).	\$\$	■ Improves intersection delay by 40-50%. ■ Improves intersection capacity by 20-30%. ■ Reduces conflict points.	■ Freight traffic maneuverability concerns. ■ Requires extensive access control. ■ Requires clear signage and potentially overhead signage. ■ Requires additional ROW for U-turn maneuver. ■ Driver unfamiliarity.	Yes	No	No
HC4: Median U-Turn (Partial – Only NBL & SBL) + Widen Blue Lakes Boulevard.	\$\$	■ Improves intersection delay by 40-50%. ■ Improves intersection capacity by 30-40% (including significant improvement for EBL). ■ Reduces conflict points.	■ Freight traffic maneuverability concerns. ■ Requires extensive access control. ■ Requires clear signage and potentially overhead signage. ■ Requires additional ROW for U-turn maneuver. ■ Driver unfamiliarity.	No	No	No
HC5A: Quadrant Intersections (Partial – NBL & SBL Only, via College Rd).	\$\$	■ Improves intersection delay by 50-60%. ■ Improves intersection capacity by 20-30% (including significant improvement for EBL). ■ Reduces conflict points.	■ Significant increase in delay and decrease in capacity at adjacent signals. ■ Requires additional ROW.	No	No	No
HC5B: Quadrant Intersections (Partial – NBL & SBL Only, via Cheney Dr).	\$\$	■ Improves intersection delay by 50-60%. ■ Improves intersection capacity by 20-30% (including significant improvement for EBL). ■ Reduces conflict points.	■ Significant increase in delay and decrease in capacity at adjacent signals. ■ Significant traffic and ROW impacts to local roads.	Yes	No	No
HC6: Quadrant Intersections (Full).	\$\$	■ Improves intersection delay by 80-90%. ■ Improves intersection capacity by 30-40%. ■ Reduces conflict points.	■ Significant increase in delay and decrease in capacity at adjacent signals.	No	No	No

Alternative	Cost	Benefits	Challenges	Consultant Recommend Moving to Tier 1	TAG Recommend Moving to Tier 1	PAG Recommend Moving to Tier 1
			■ Routing heavy vehicle traffic along Fillmore Street is infeasible. ■ Requires additional ROW.			
HC7: Jughandles.	\$\$\$\$	■ Improves intersection delay by 40-50%. ■ Improves intersection capacity by 10-20%. ■ Reduces conflict points.	■ Significant impacts to properties in northeast and southwest quadrants. ■ Driver unfamiliarity.	No	No	No
HC8: Jughandles + Widen Blue Lakes Boulevard.	\$\$\$\$	■ Improves intersection delay by 60-70%. ■ Improves intersection capacity by 20-30% (including significant improvement for EBL). ■ Reduces conflict points.	■ Significant impacts to properties in northeast and southwest quadrants. ■ Driver unfamiliarity. ■ Under-utilized NBT lane without bridge widening. ■ NBT lane merges before Perrine Bridge.	No	No	No
Grade Separated Alternatives						
GR1: Single-Point Interchange (NB & SB Runs Free).	\$\$\$\$\$	■ Improves intersection delay by 50-60%. ■ Improves intersection capacity by 10-20% (including significant improvement for EBL). ■ Wide turns allow for easy freight maneuverability. ■ Reduces conflict points. ■ NBT & SBT free running movement	■ Requires extensive access control. ■ Requires additional ROW. ■ Driver unfamiliarity in the context of the adjacent signalized intersections and arterial roadways.	Yes	Yes	Yes
GR2: EB Left-Turn Flyover Ramp.	\$\$\$\$	■ Improves intersection delay by 50-60%. ■ Improves intersection capacity by 10-20% (including significant improvement for EBL). ■ Reduces conflict points. ■ EBL free running movement	■ Requires extensive access control. ■ Significant impacts to adjacent properties. ■ EBL merges with NBT traffic downstream. ■ Ramps present challenge for heavy vehicles, particularly in icy conditions. ■ Driver unfamiliarity in the context of the adjacent signalized intersections and arterial roadways.	No	Yes	No
GR3: EB Left-Turn Flyover Ramp + WBL Movement Removal.	\$\$\$\$	■ Improves intersection delay by 50-60%. ■ Improves intersection capacity by 20-30% (including significant improvement for EBL). ■ Reduces conflict points. ■ EBL free running movement	■ Requires extensive access control. ■ Significant impacts to mall. Redevelopment required. ■ EBL merges with NBT traffic downstream. ■ Ramps present challenge for heavy vehicles, particularly in icy conditions. ■ Driver unfamiliarity in the context of the adjacent signalized intersections and arterial roadways.	Yes	No	Yes

Alternative	Cost	Benefits	Challenges	Consultant Recommend Moving to Tier 1	TAG Recommend Moving to Tier 1	PAG Recommend Moving to Tier 1
GR4: Echelon Interchange.	\$\$\$\$\$	■ Improves intersection delay by 80-90%. ■ Improves intersection capacity by 30-40% (including significant improvement for EBL). ■ Reduces conflict points.	■ Requires extensive access control/removal. ■ Significant impacts to mall. Redevelopment required. ■ Driver unfamiliarity with limited constructed examples.	No	Yes	No
GR5: Center-Turn Overpass.	\$\$\$\$\$	■ Improves intersection delay by 80-90%. ■ Improves intersection capacity by 30-40% (including significant improvement for EBL). ■ Reduces conflict points.	■ Requires extensive access control/removal. ■ Significant impacts to mall. Redevelopment required. ■ Driver unfamiliarity with limited constructed examples.	No	Yes	Yes

SUMMARY

This initial evaluation included a high-level analysis of 20 initial alternatives focused on improving traffic operations at the Blue Lakes Boulevard and Pole Line Road intersection and the critical movements: eastbound left, northbound through, southbound through, and southbound right.

The project team presented the screening criteria, these initial alternatives, initial findings, and recommendations to the Technical and Project Advisory Groups in January and February 2026 to gather input. Based on the input received from these groups, the following alternatives will move forward into the Tier 1 evaluation:

1. NB – No-Build with Signal Timing Improvements
2. C1 – Widen Blue Lakes Boulevard + Signalize Dual Southbound Right Turn Lanes
3. C4 – Triple Eastbound Left-Turns + 3 Northbound Through Lanes + Signalized Dual Southbound Right-Turns
4. C5 – Triple Eastbound Left-Turn Lanes + Dual Southbound Right-Turn Lanes + Widen Blue Lakes Boulevard
5. HC2A – Partial Displaced Left-Turn (Eastbound and Westbound Approaches)
 - a. Project team to evaluate options to remove or modify westbound left-turn from intersection
6. GR1 – Single-Point Interchange (Northbound & Southbound Runs Free)
7. GR2 – Eastbound Left-Turn Flyover Ramp
 - a. Project team to evaluate options to remove or modify the westbound left-turn from intersection
8. GR5 – Center-Turn Overpass

The results of this analysis will be summarized in Technical Memorandum #2 – Tier 1 Alternatives Evaluation.

REFERENCES

1. Kittelson & Associates, Inc. *Technical Memorandum #1 – Existing and Future No-Build Conditions*. December 2025.

ATTACHMENTS

Attachment A – Initial Alternatives Figure Package

Attachment A
Initial Alternatives Figure Package

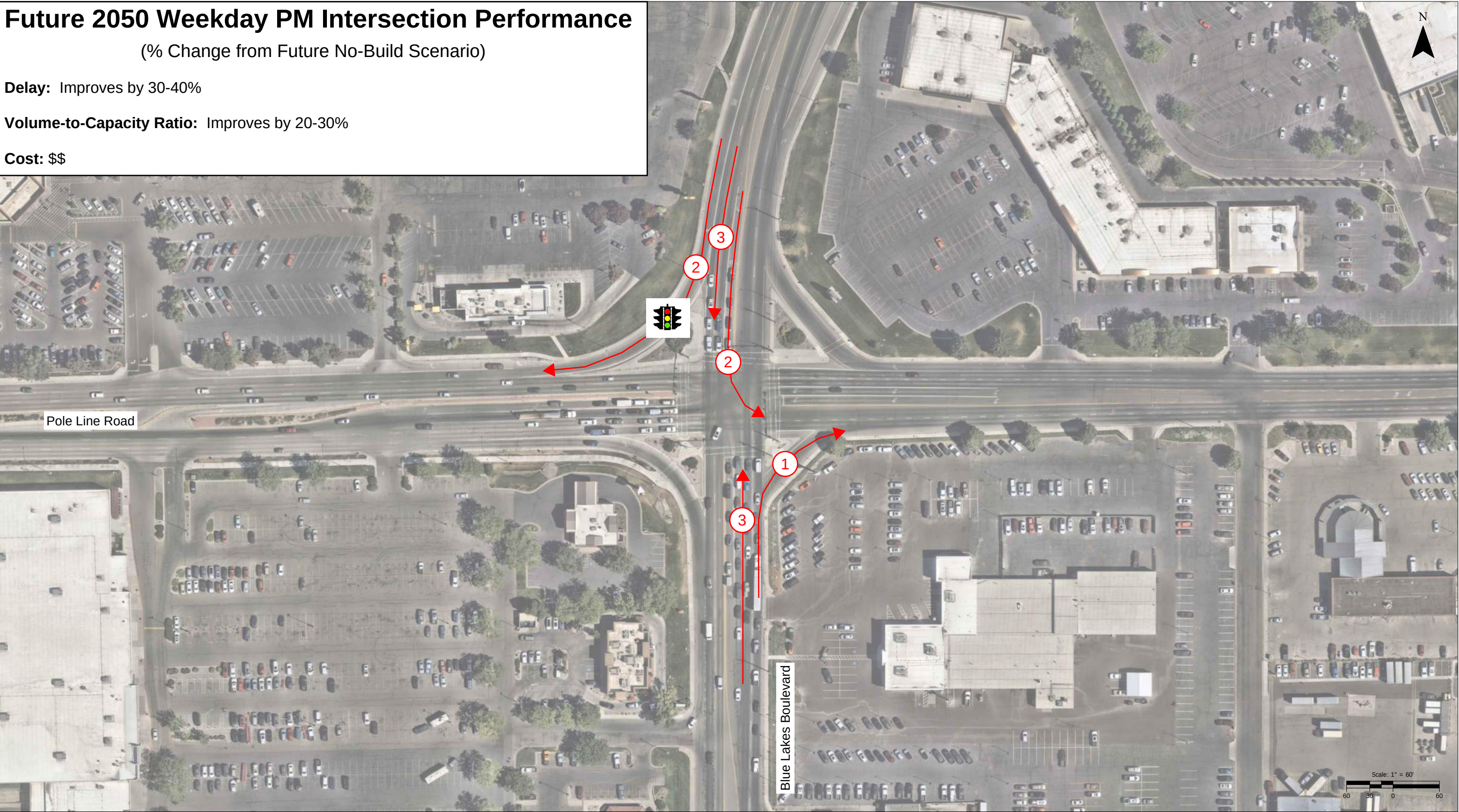
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 30-40%

Volume-to-Capacity Ratio: Improves by 20-30%

Cost: \$\$



Total Number Lanes

Signalize

Initial Alternatives

Widen Blue Lakes Boulevard + Signalized Dual Southbound Right-Turns

Twin Falls, Idaho

Figure C1

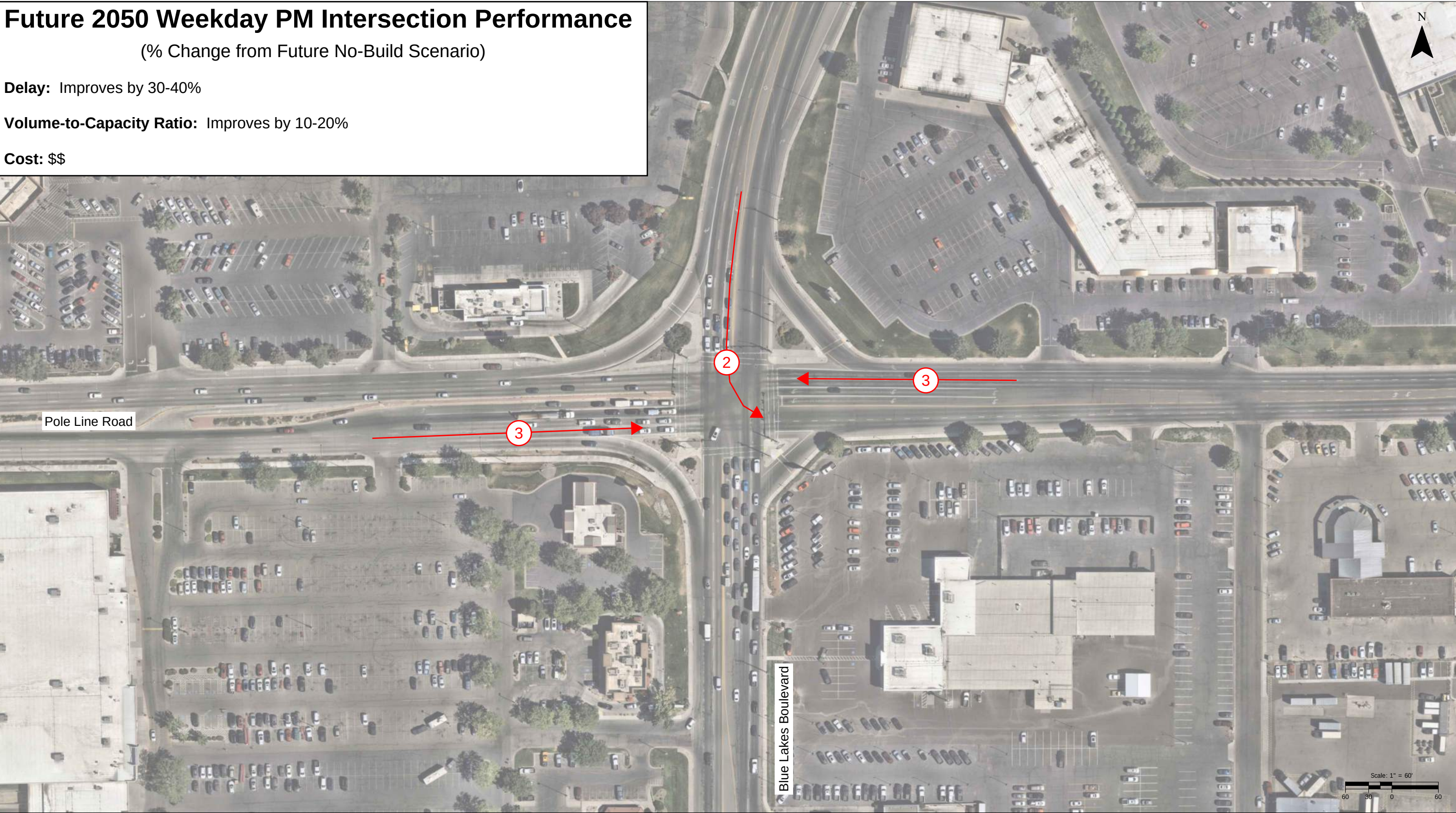
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 30-40%

Volume-to-Capacity Ratio: Improves by 10-20%

Cost: \$\$



#

Total Number Lanes

Initial Alternatives

Widen Pole Line Road + Dual Southbound Left Turn Lanes

Twin Falls, Idaho

Figure

C2

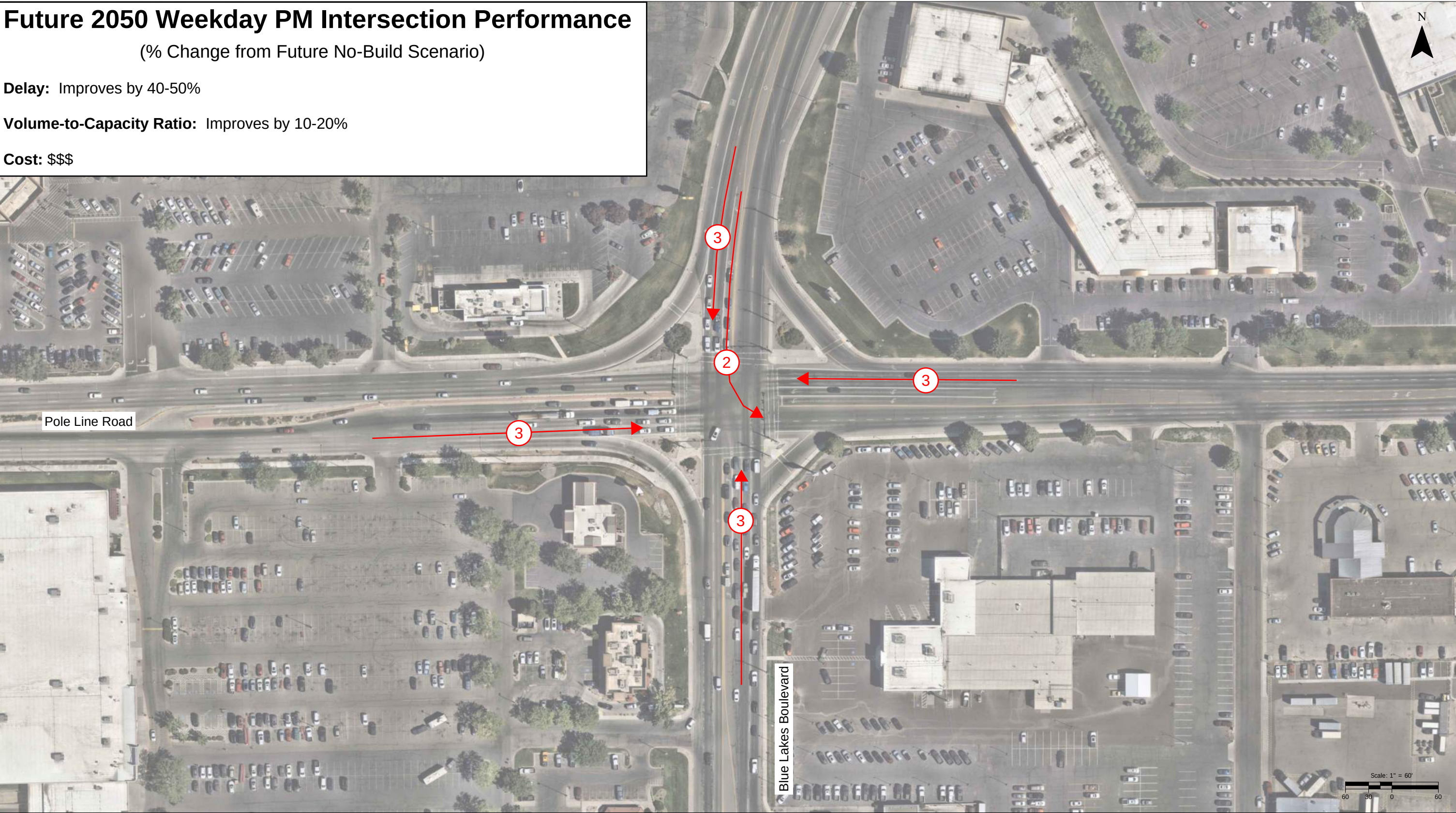
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 40-50%

Volume-to-Capacity Ratio: Improves by 10-20%

Cost: \$\$\$



Total Number Lanes

Initial Alternatives

Additional Lanes on Each Approach

Twin Falls, Idaho

Figure C3

H:\30764 - Blue Lakes_Pole Line Int Analysis\Task 4 - Existing and Future No Build Conditions\VFSSM model\Blue Lakes Expanded Image\BL-OVERALL-IMAGE.dwg Jan 08, 2026 - 3:13pm - kanecki Layout Tab: Template (2)

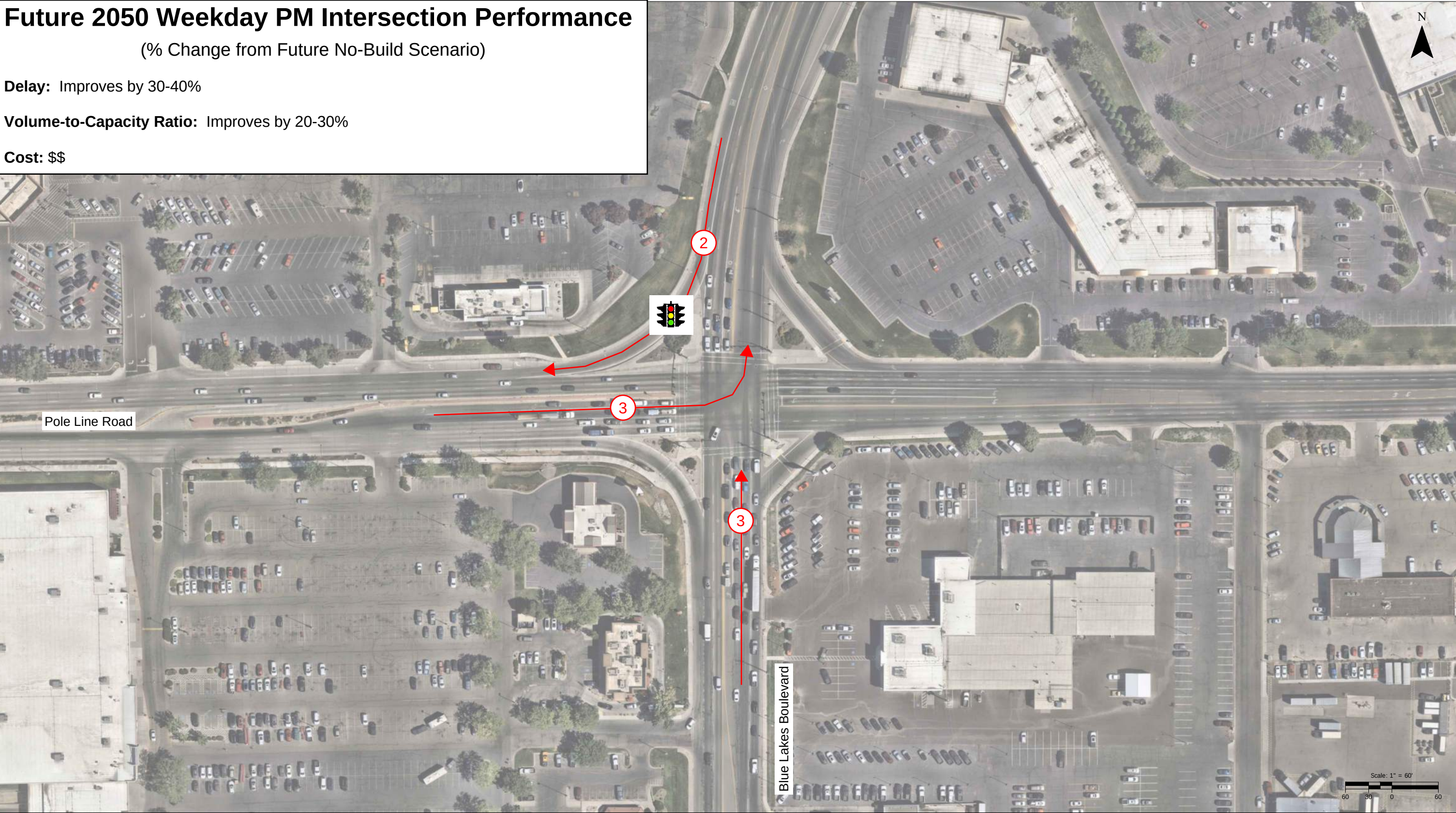
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 30-40%

Volume-to-Capacity Ratio: Improves by 20-30%

Cost: \$\$



Total Number Lanes

Signalize

Initial Alternatives

Triples Eastbound Left-Turns + 3 Northbound Lanes + Signalized Dual Southbound Right-Turns

Twin Falls, Idaho

Figure C4

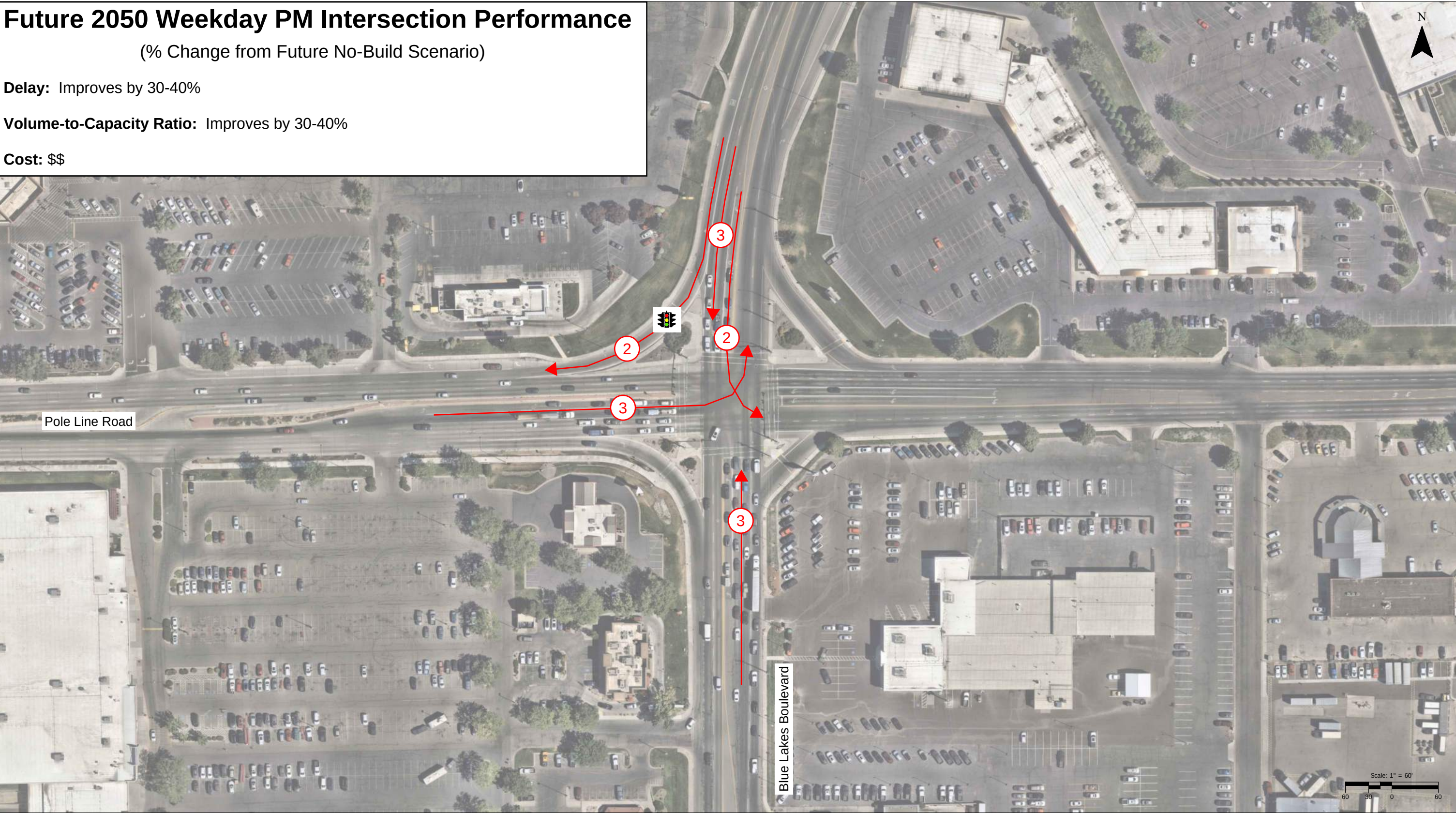
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 30-40%

Volume-to-Capacity Ratio: Improves by 30-40%

Cost: \$\$



Total Number Lanes

Signalize

Initial Alternatives

Triple Eastbound Left-Turn Lanes + Dual Southbound Right-Turn Lanes + Widen Blue Lakes Boulevard to 3-Lanes

Twin Falls, Idaho

Figure C5

H:\30764 - Blue Lakes_Pole Line Int Analysis\Task 4 - Existing and Future No Build Conditions\VISSIM model\Blue Lakes Expanded Image\BL-OVERALL-IMAGE.dwg Jan 08, 2026 - 3:13pm - Ikaniecki Layout Tab: Template (2)

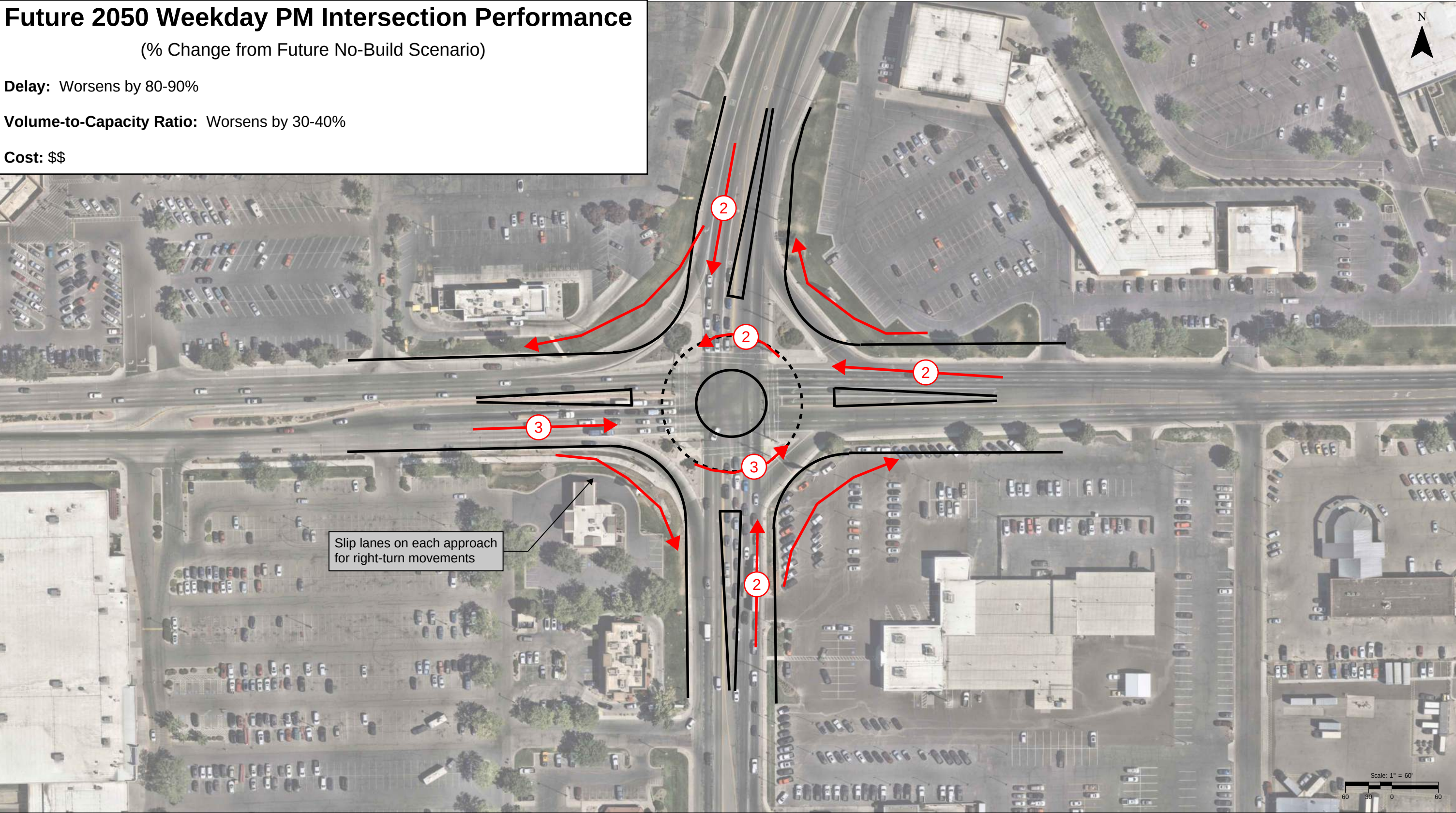
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Worsens by 80-90%

Volume-to-Capacity Ratio: Worsens by 30-40%

Cost: \$\$



Total Number Lanes

Initial Alternatives
Multilane Roundabout (2-3 Circulatory Lanes)
Twin Falls, Idaho

Figure
R1

H:\30764 - Blue Lakes_Pole Line Int Analysis\Task 4 - Existing and Future No Build Conditions\VISSIM model\Blue Lakes Expanded Image\BL-OVERALL-IMAGE.dwg Jan 08, 2026 - 3:13pm - Ikaniecki Layout Tab: Template (2)

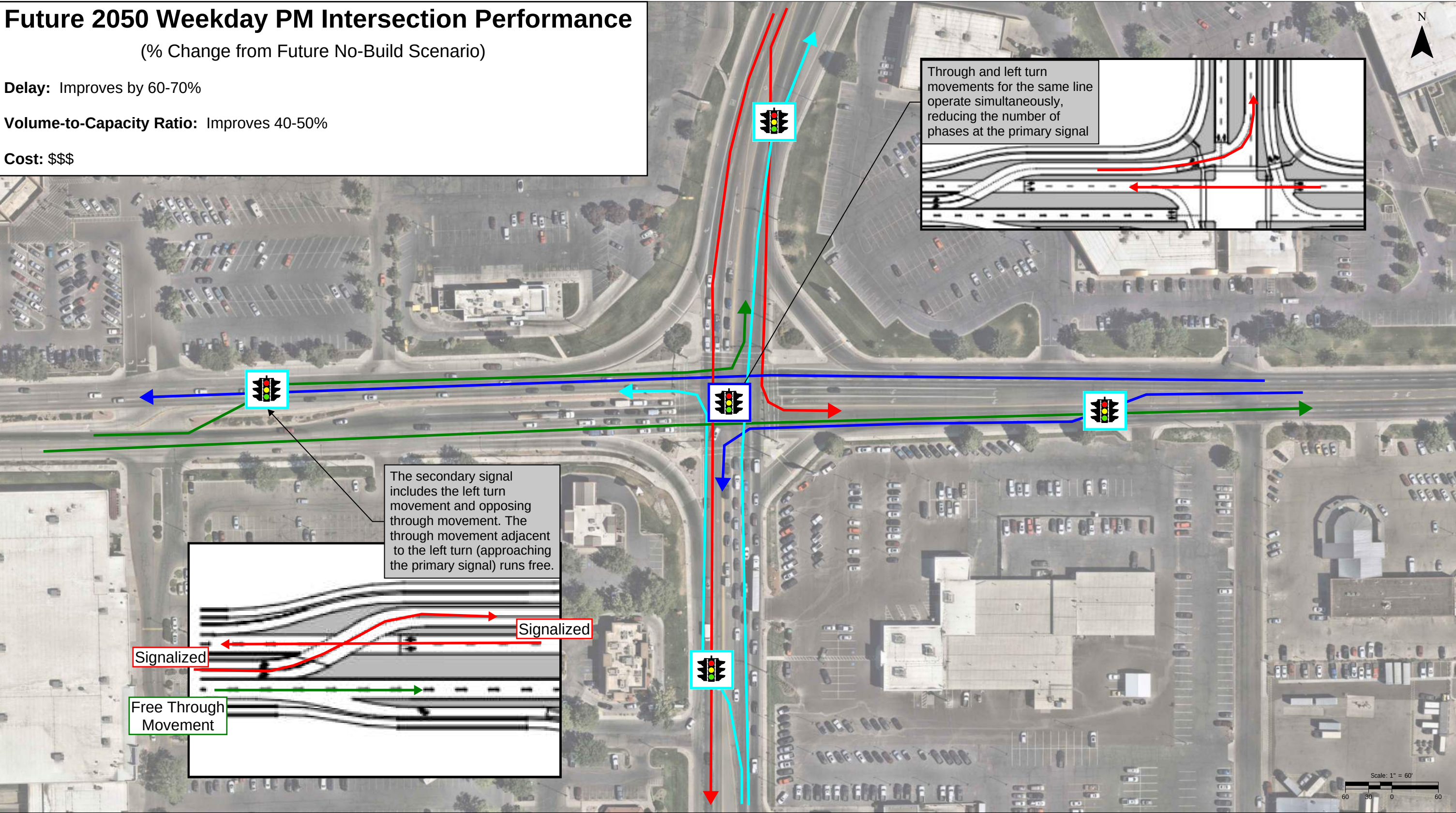
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 60-70%

Volume-to-Capacity Ratio: Improves 40-50%

Cost: \$\$\$



 New Signal  Modified Existing Signal

Initial Alternatives
Displaced Left-Turn (Full)
Twin Falls, Idaho

Figure
HC1

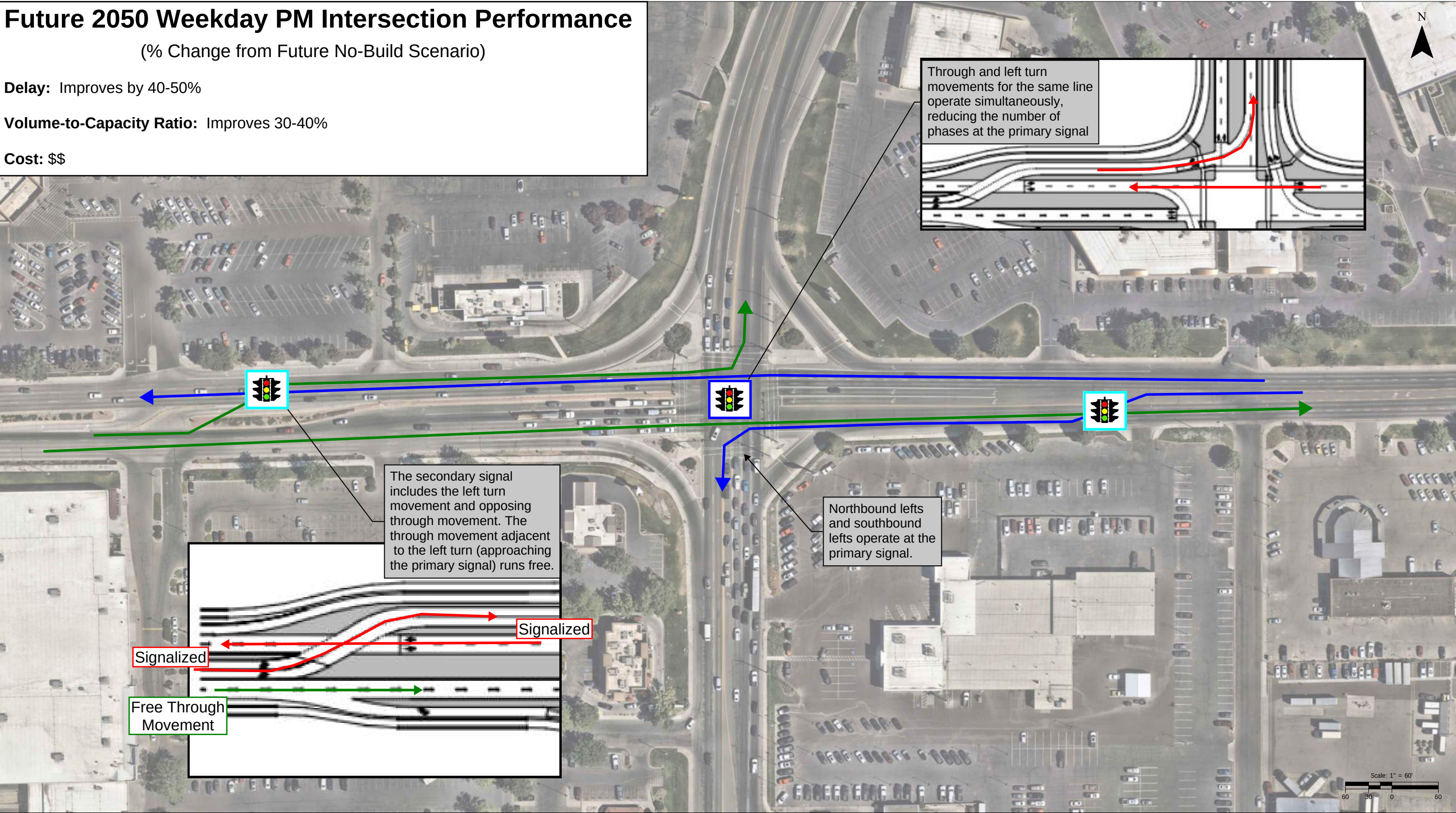
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 40-50%

Volume-to-Capacity Ratio: Improves 30-40%

Cost: \$\$



 New Signal  Modified Existing Signal

Initial Alternatives
Displaced Left-Turn (Partial - EB & WB Directions Only)
Twin Falls, Idaho

Figure
HC2A

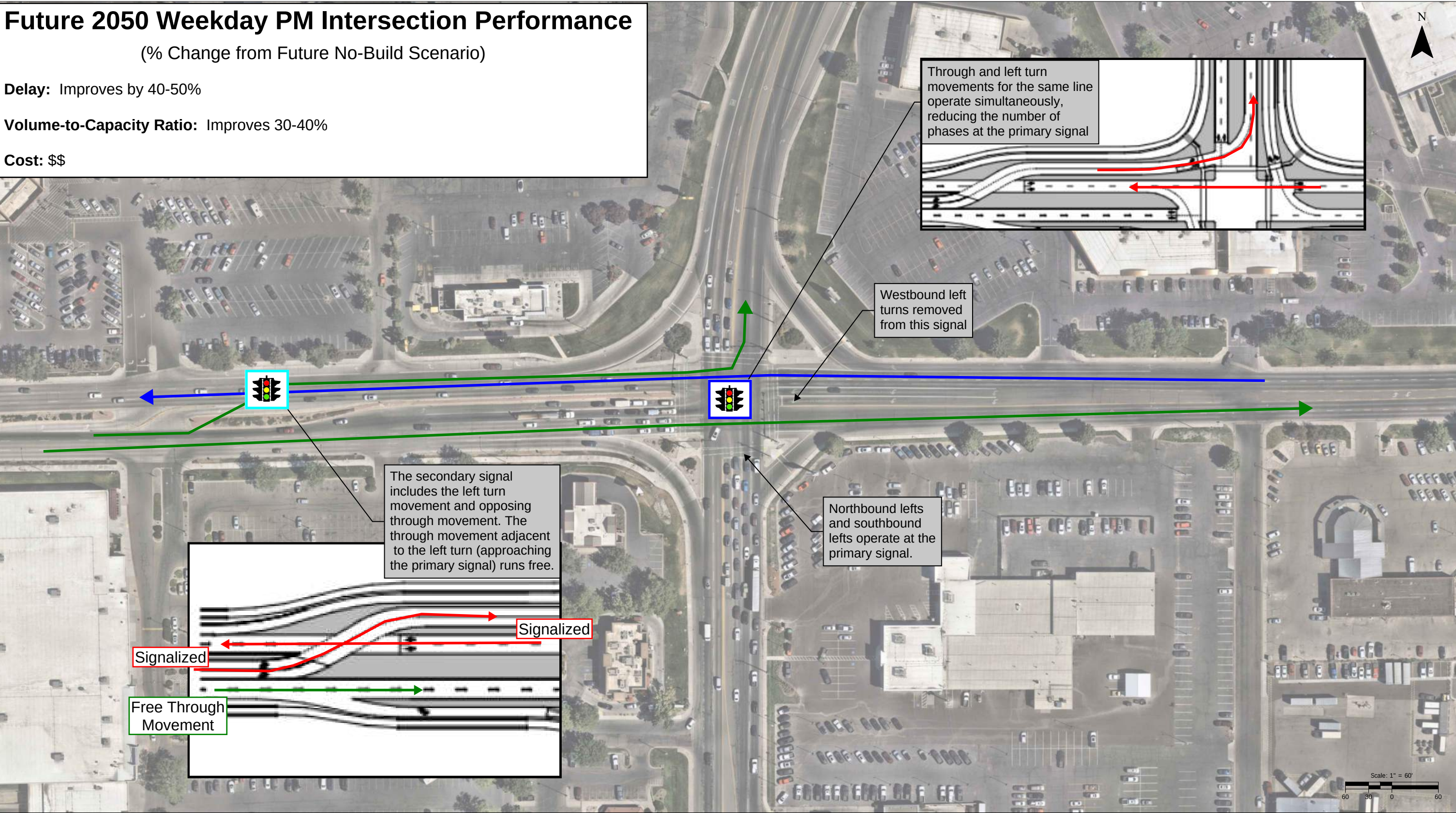
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 40-50%

Volume-to-Capacity Ratio: Improves 30-40%

Cost: \$\$



New Signal



Modified Existing Signal

Initial Alternatives
Displaced Left-Turn (Partial - EB Direction Only, Westbound Left Movement Removed)
Twin Falls, Idaho

Figure
HC2B

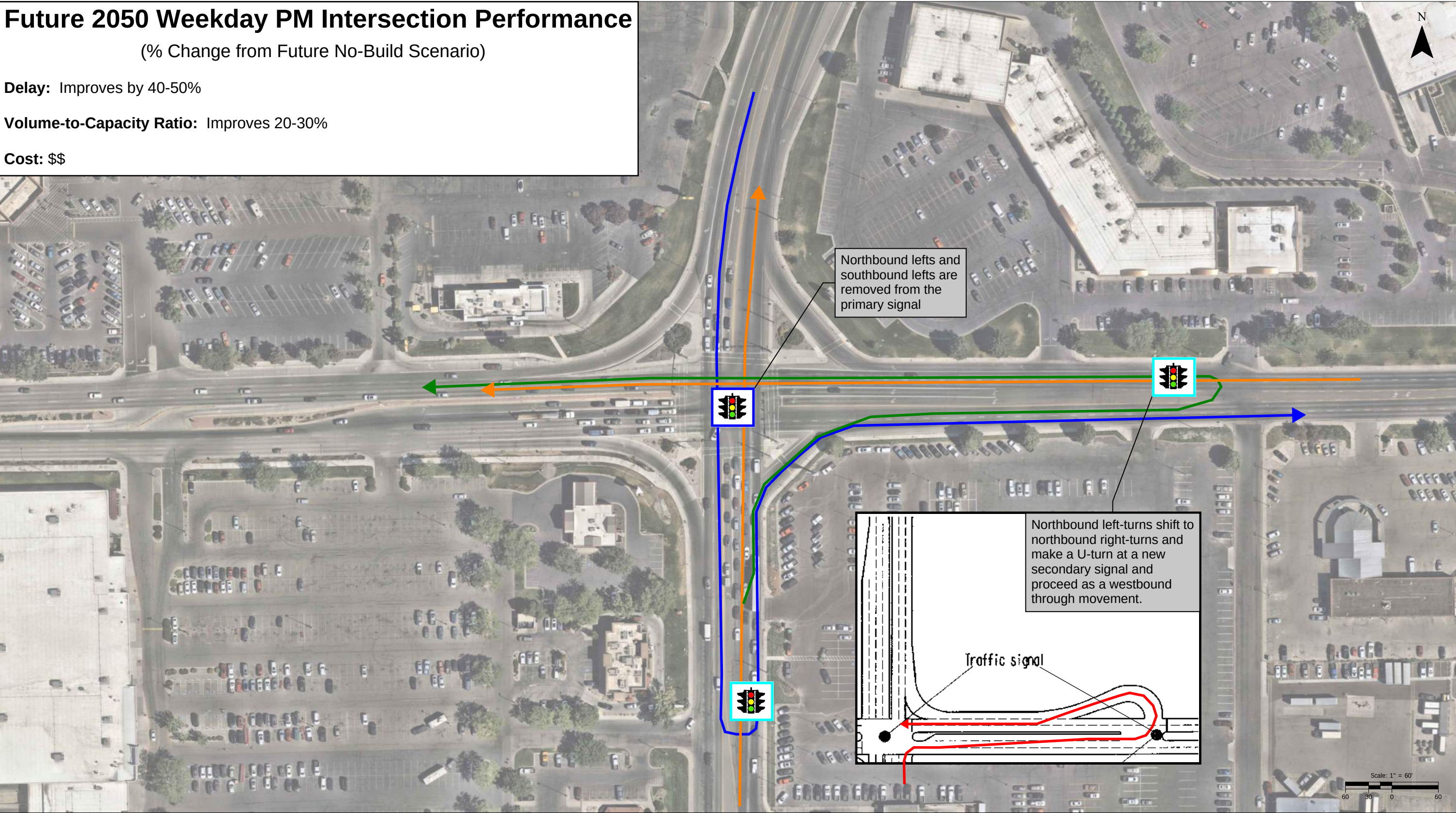
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 40-50%

Volume-to-Capacity Ratio: Improves 20-30%

Cost: \$\$



Initial Alternatives

Median U-Turn (Partial - Only NBL & SBL)

Twin Falls, Idaho

Figure HC3

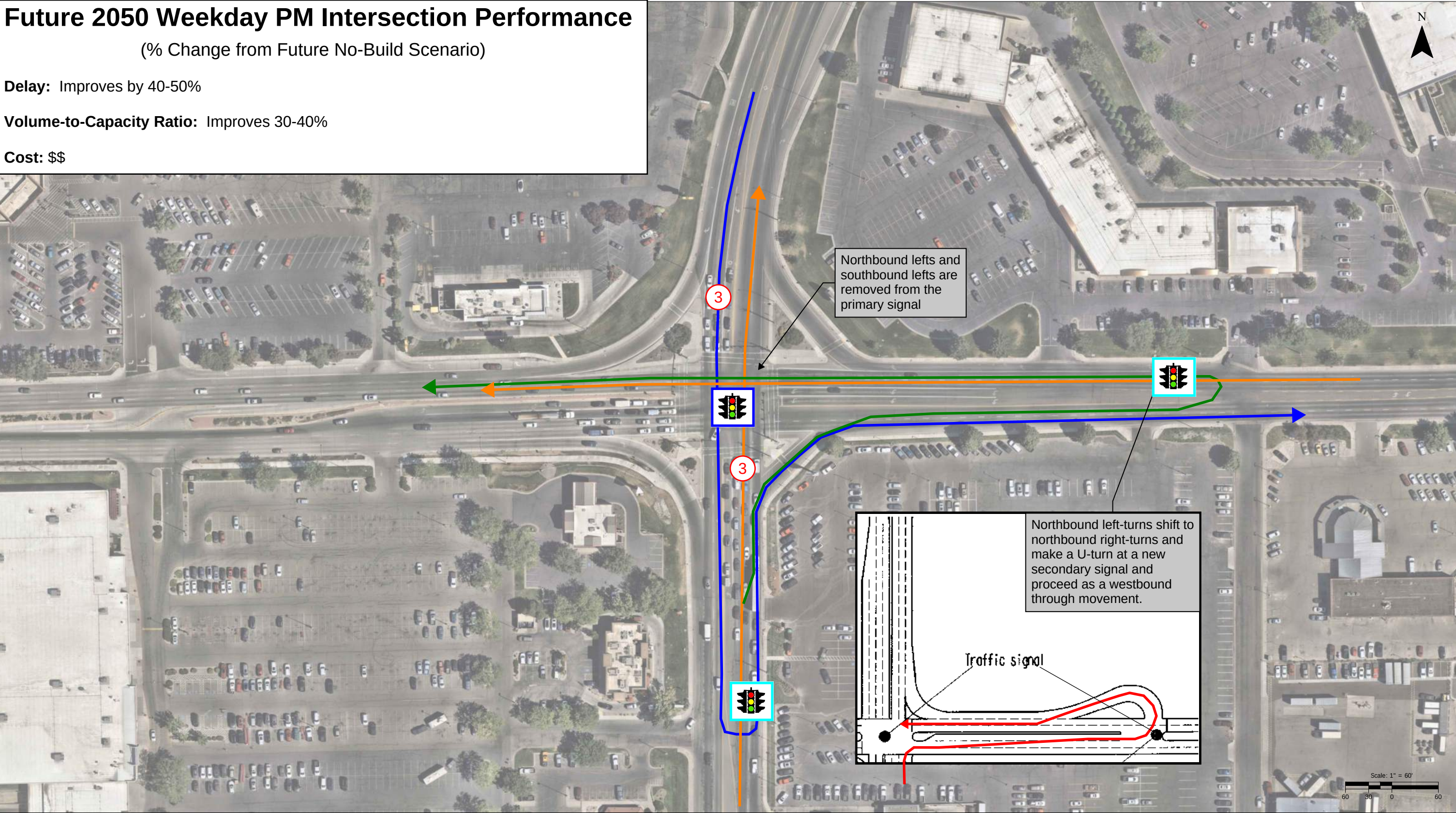
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 40-50%

Volume-to-Capacity Ratio: Improves 30-40%

Cost: \$\$



Total Number Lanes

New Signal

Modified Existing Signal

Initial Alternatives

Median U-Turn (Partial - Only NBL & SBL) + Widen Blue Lakes Boulevard

Twin Falls, Idaho

Figure

HC4

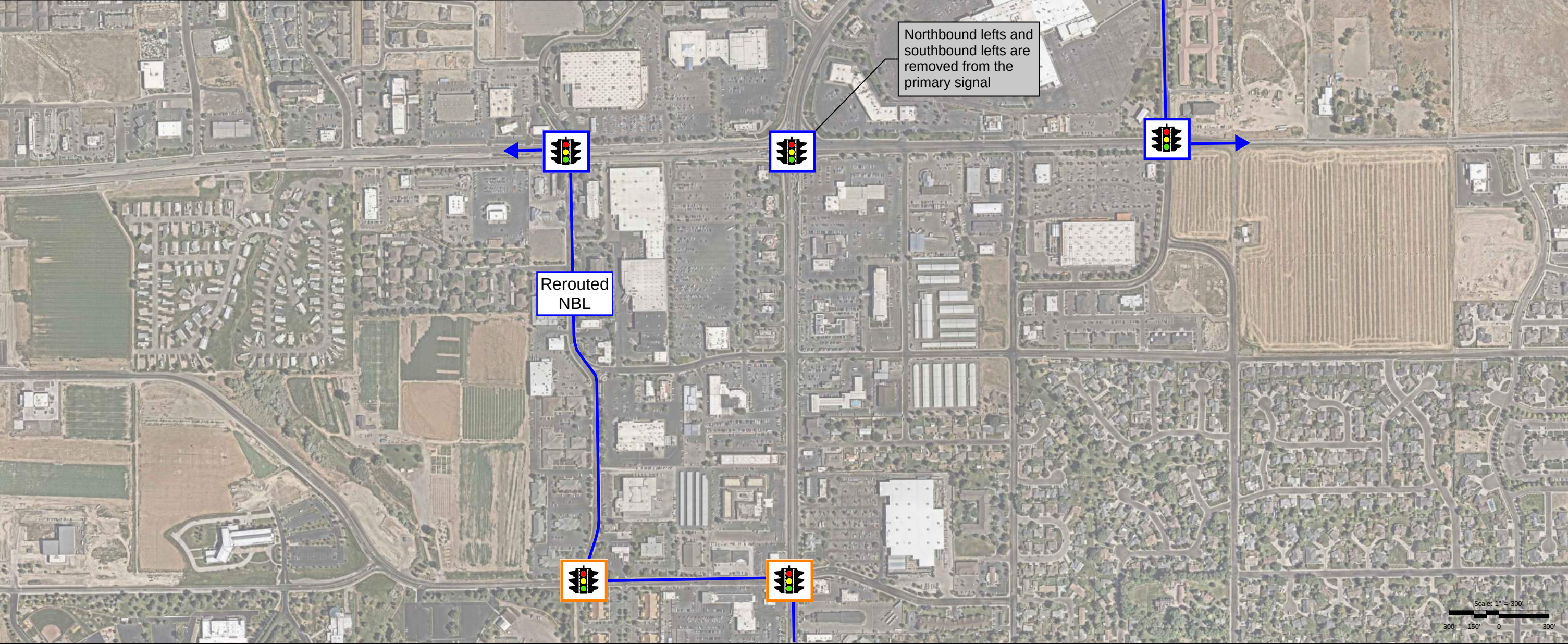
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 50-60% at Blue Lakes - Pole Line intersection (significant increase in delay at adjacent traffic signals)

Volume-to-Capacity Ratio: Improves 20-30% at Blue Lakes - Pole Line intersection (adjacent traffic signals over-capacity)

Cost: \$\$



- New Signal
- Modified Existing Signal
- Existing Signal (Volume Adjustments Only)

Initial Alternatives
Quadrant Intersections (Partial - NBL & SBL Only)
Twin Falls, Idaho

Figure
HC5A

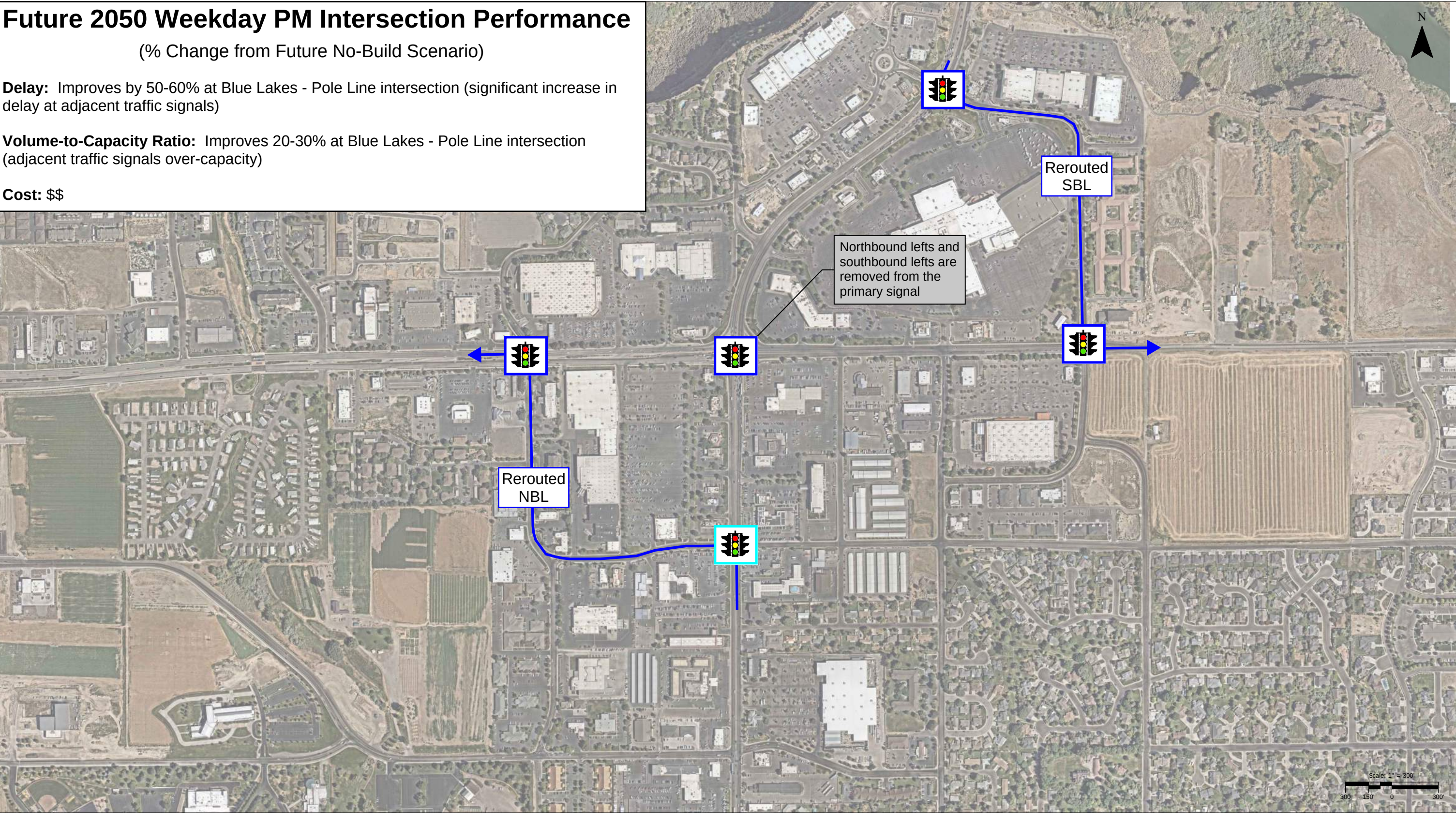
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 50-60% at Blue Lakes - Pole Line intersection (significant increase in delay at adjacent traffic signals)

Volume-to-Capacity Ratio: Improves 20-30% at Blue Lakes - Pole Line intersection (adjacent traffic signals over-capacity)

Cost: \$\$



 New Signal

 Modified Existing Signal

Initial Alternatives

Quadrant Intersections (Partial - NBL & SBL Only)

Twin Falls, Idaho

Figure

HC5B

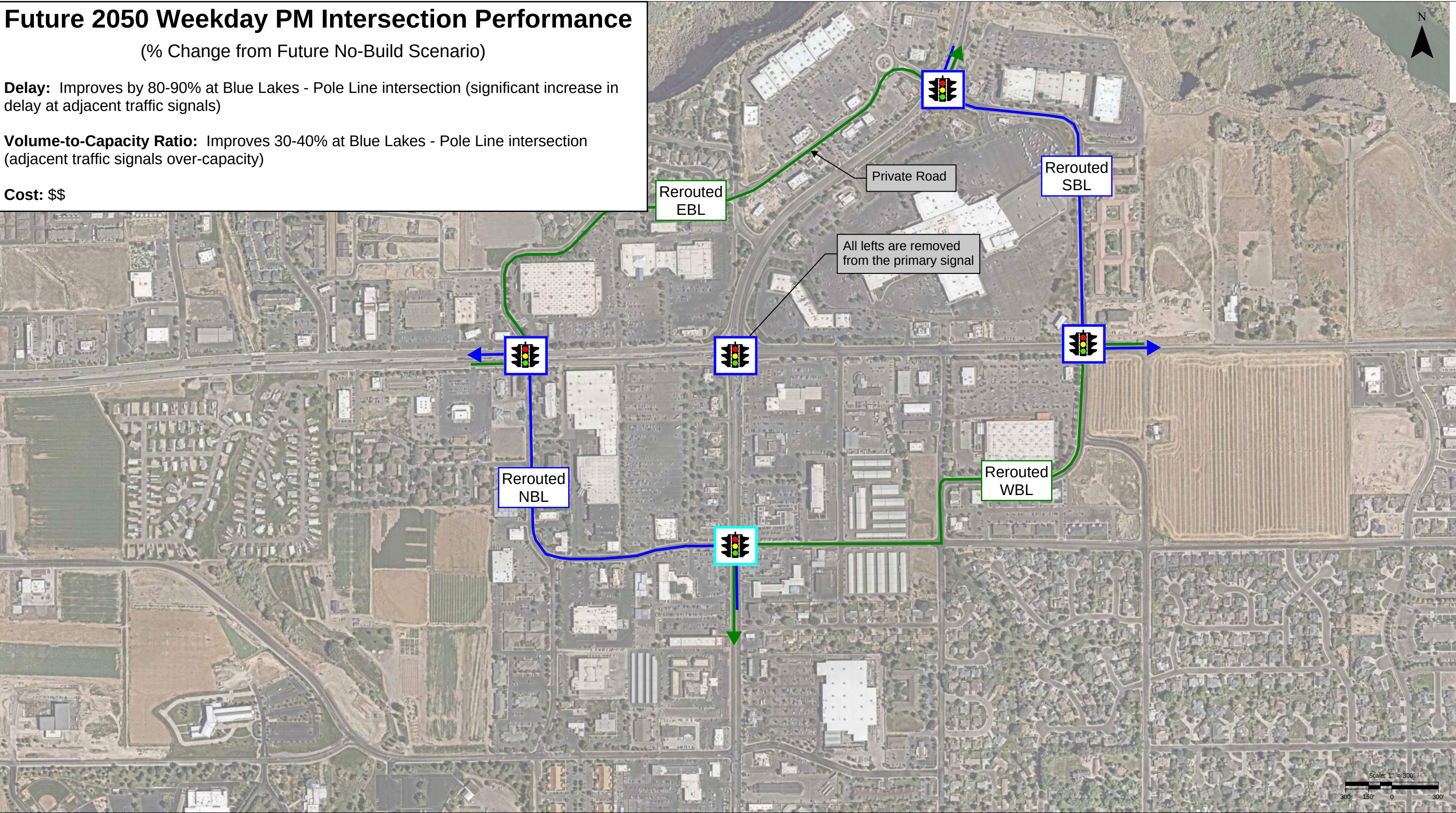
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 80-90% at Blue Lakes - Pole Line intersection (significant increase in delay at adjacent traffic signals)

Volume-to-Capacity Ratio: Improves 30-40% at Blue Lakes - Pole Line intersection (adjacent traffic signals over-capacity)

Cost: \$\$



 New Signal

 Modified Existing Signal

Initial Alternatives

Quadrant Intersections (Full)

Twin Falls, Idaho

Figure HC6

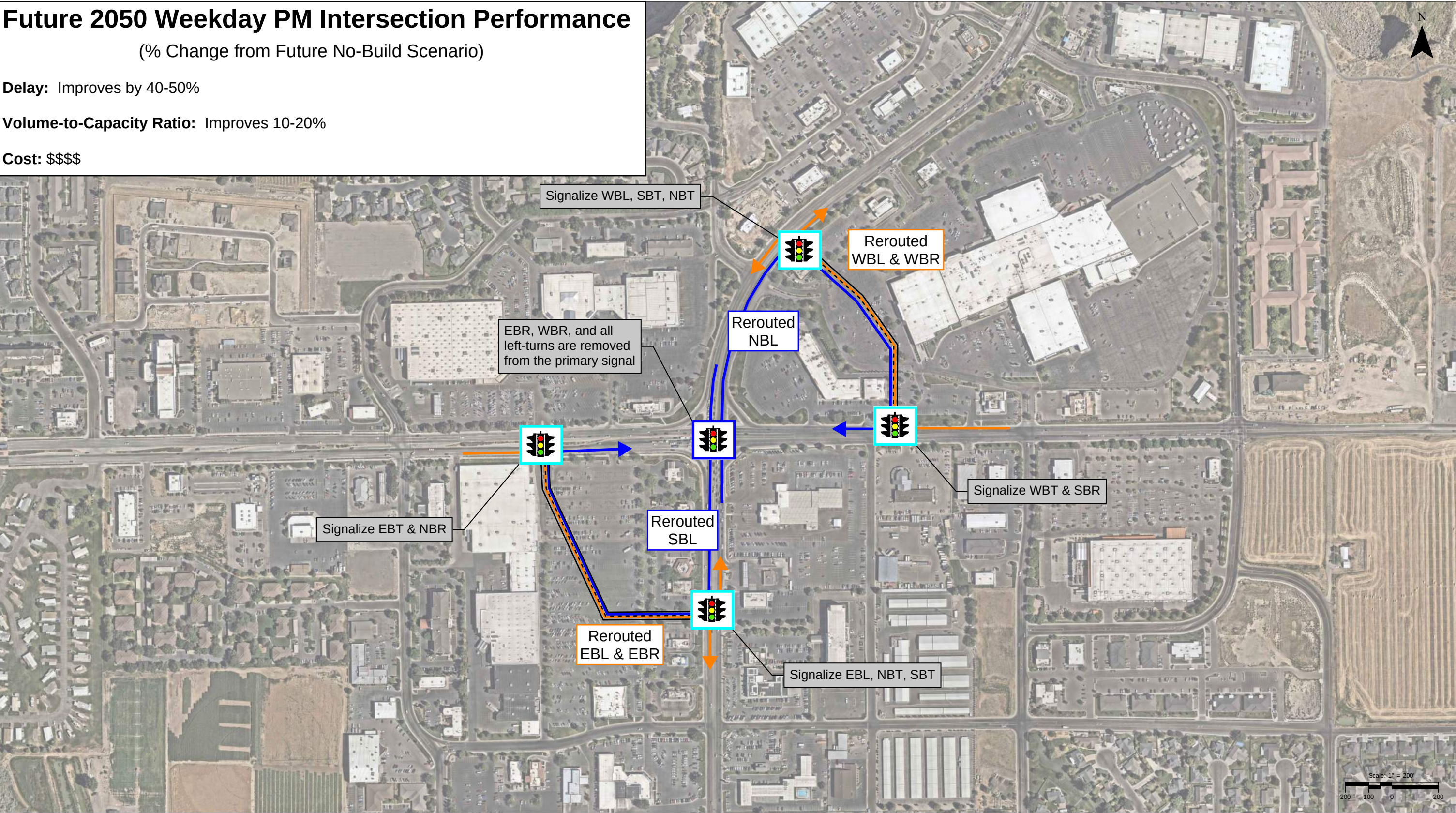
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 40-50%

Volume-to-Capacity Ratio: Improves 10-20%

Cost: \$\$\$\$



New Signal

Modified Existing Signal

New Road Connection

Initial Alternatives

Jughandles

Twin Falls, Idaho

Figure HC7

H:\30764 - Blue Lakes_Pole Line Int Analysis\Task 4 - Existing and Future No-Build Conditions\VISSIM model\Blue Lakes Expanded Image\BL-OVERALL-IMAGE.dwg Jan 08, 2026 - 3:13pm - kkaniecki Layout Tab: Template

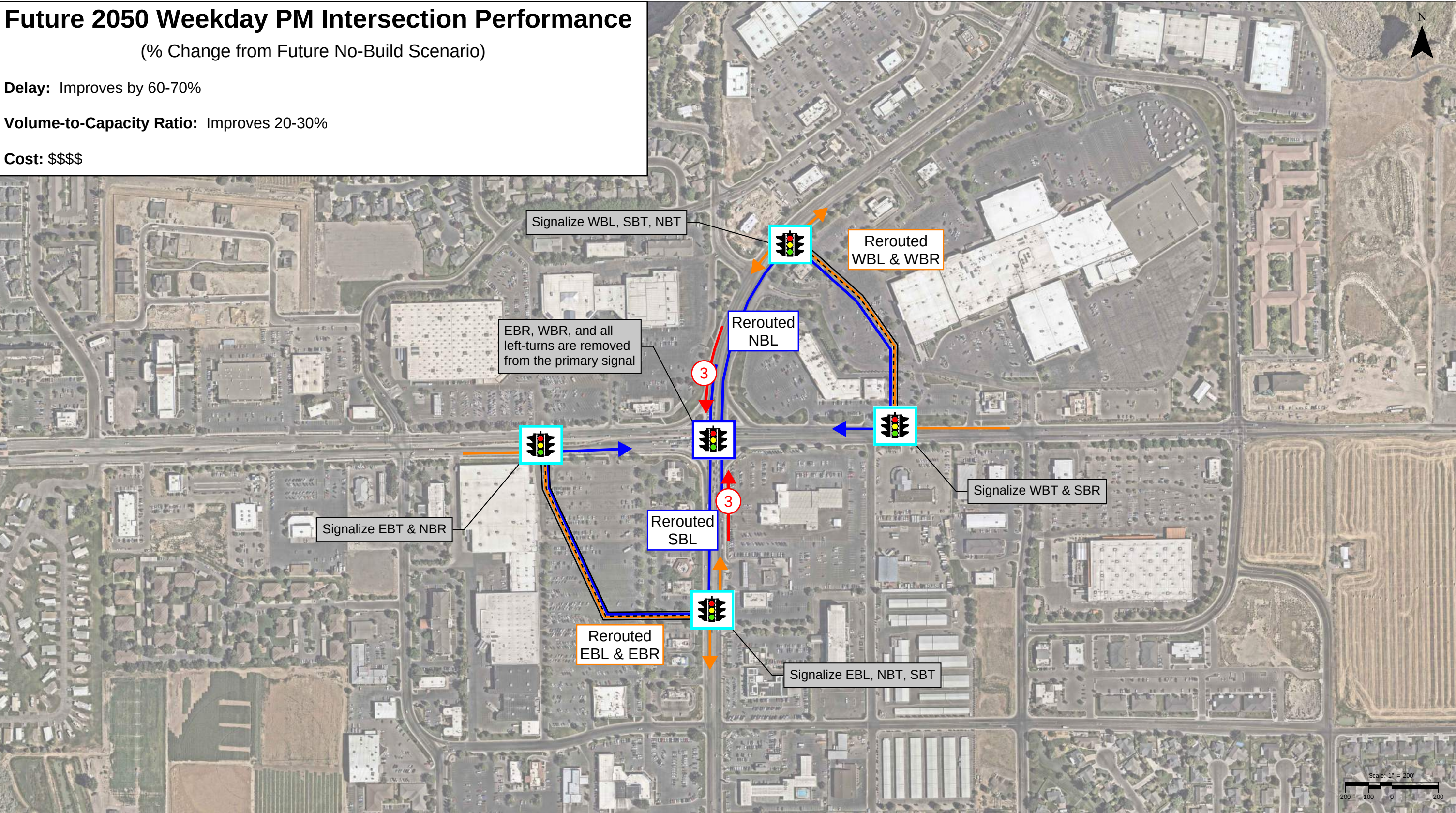
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 60-70%

Volume-to-Capacity Ratio: Improves 20-30%

Cost: \$\$\$\$



Total Number Lanes

New Signal

Modified Existing Signal

New Road Connection

Initial Alternatives

Jughandles + Widen Blue Lakes Boulevard

Twin Falls, Idaho

Figure HC8

H:\30764 - Blue Lakes_Pole Line Int Analysis\Task 4 - Existing and Future No-Build Conditions\VISSIM model\Blue Lakes Expanded Image\BL-OVERALL-IMAGE.dwg Jan 08, 2026 - 3:13pm - kkannecki Layout Tab: Template

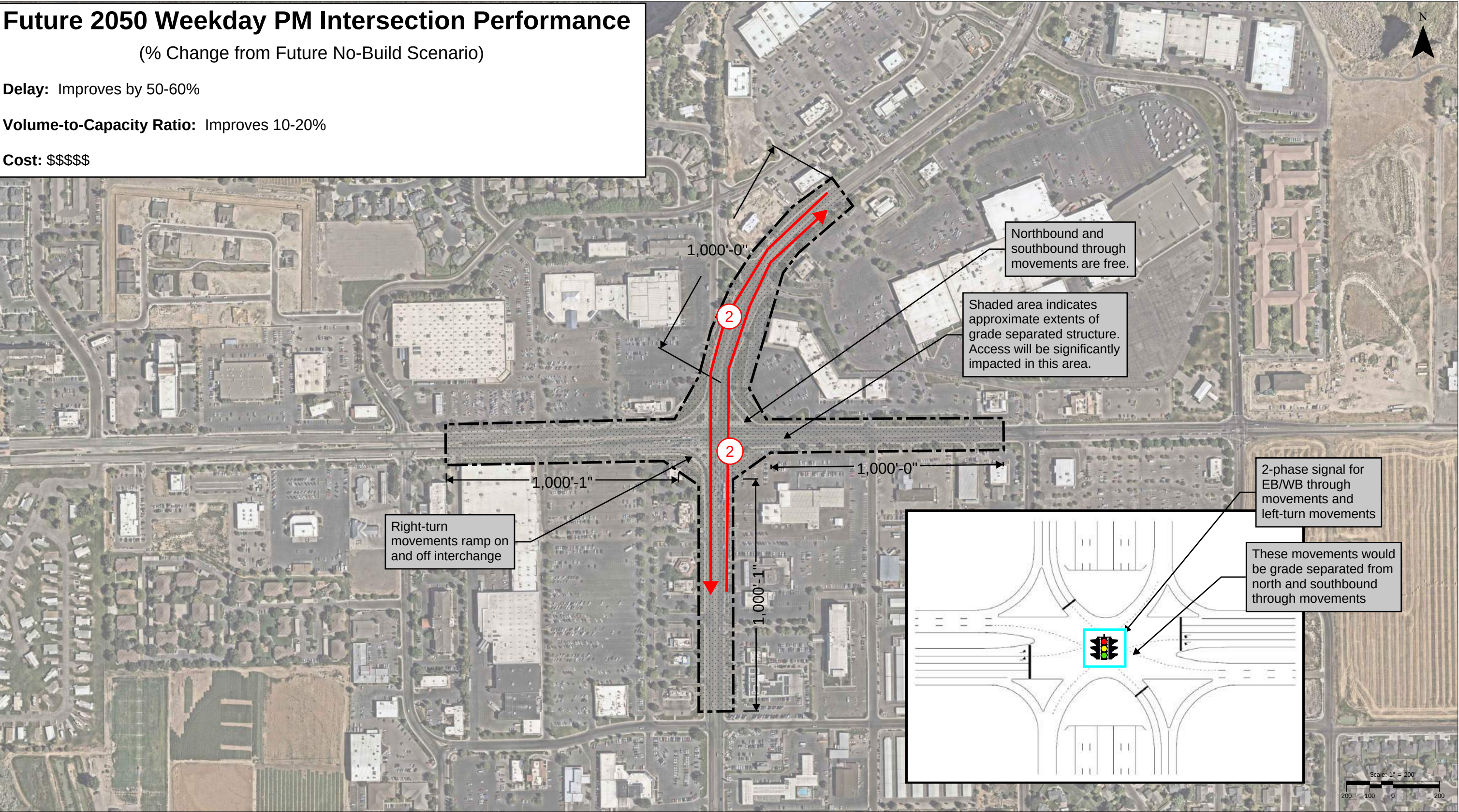
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 50-60%

Volume-to-Capacity Ratio: Improves 10-20%

Cost: \$\$\$\$\$



Total Number Lanes

New Signal

Initial Alternatives

Single-Point Interchange (Northbound & Southbound Free Movements)

Twin Falls, Idaho

Figure

GR1

Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 30-40%

Volume-to-Capacity Ratio: Improves by 10-20%

Cost: \$\$\$\$



 Modified Existing Signal

 New Road Connection

Initial Alternatives

Eastbound Left-Turn Flyover Ramp

Twin Falls, Idaho

Figure GR2

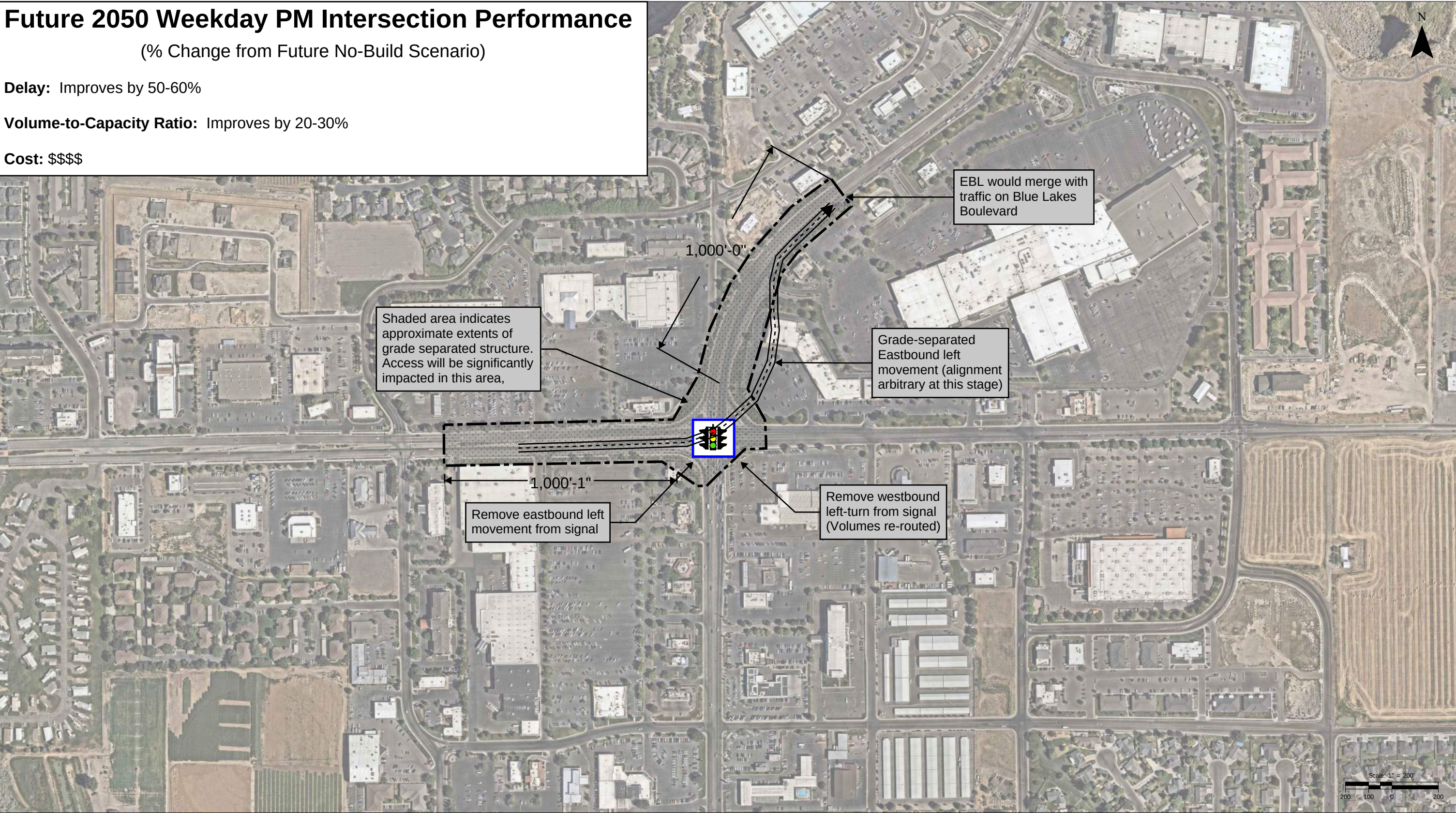
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 50-60%

Volume-to-Capacity Ratio: Improves by 20-30%

Cost: \$\$\$\$



 Modified Existing Signal

 New Road Connection

Initial Alternatives

Eastbound Left-Turn Flyover Ramp + Westbound Left-Turn Removal

Twin Falls, Idaho

Figure

GR3

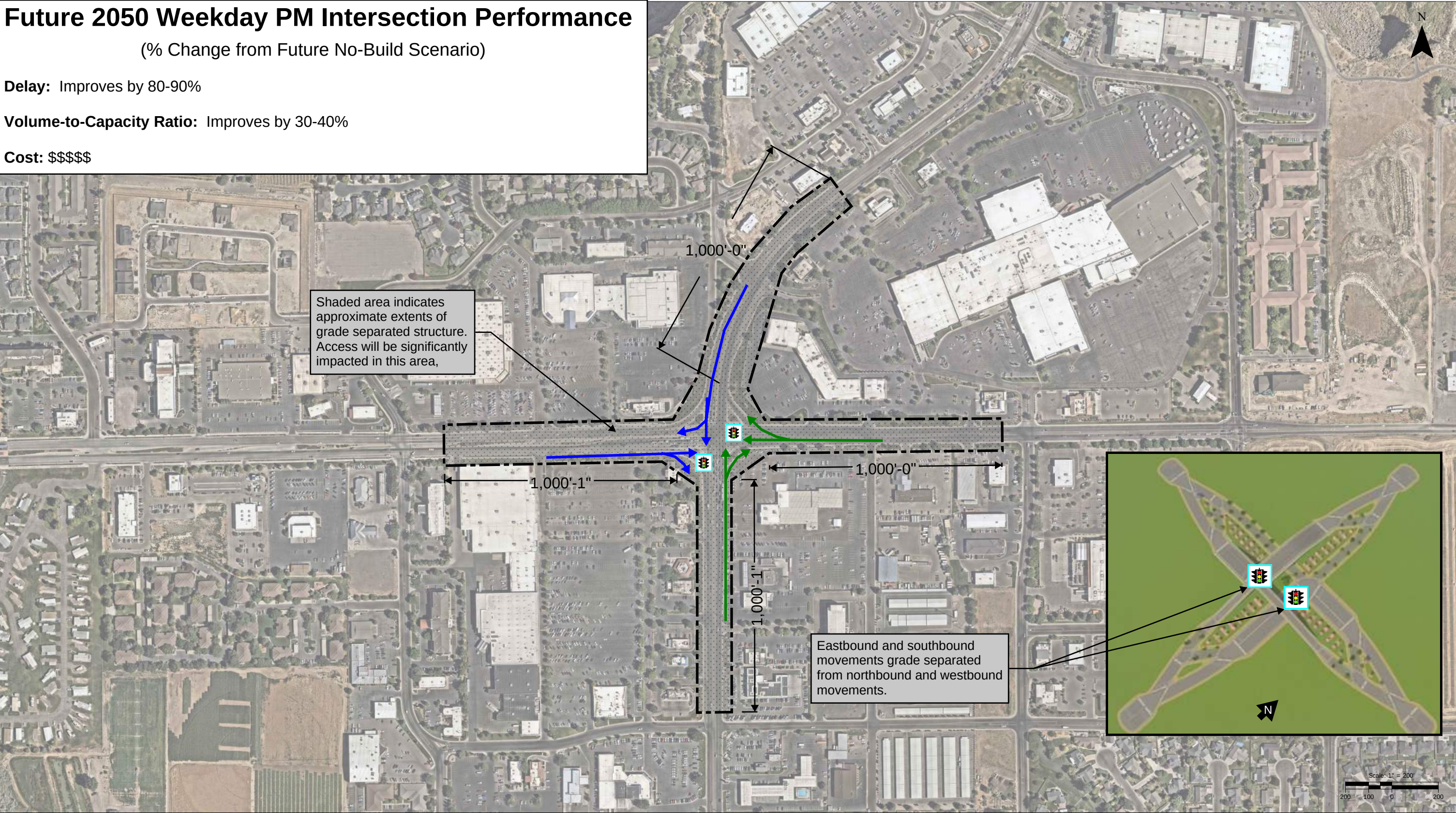
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 80-90%

Volume-to-Capacity Ratio: Improves by 30-40%

Cost: \$\$\$\$\$



 New Signal

Initial Alternatives

Echelon Interchange

Twin Falls, Idaho

Figure GR4

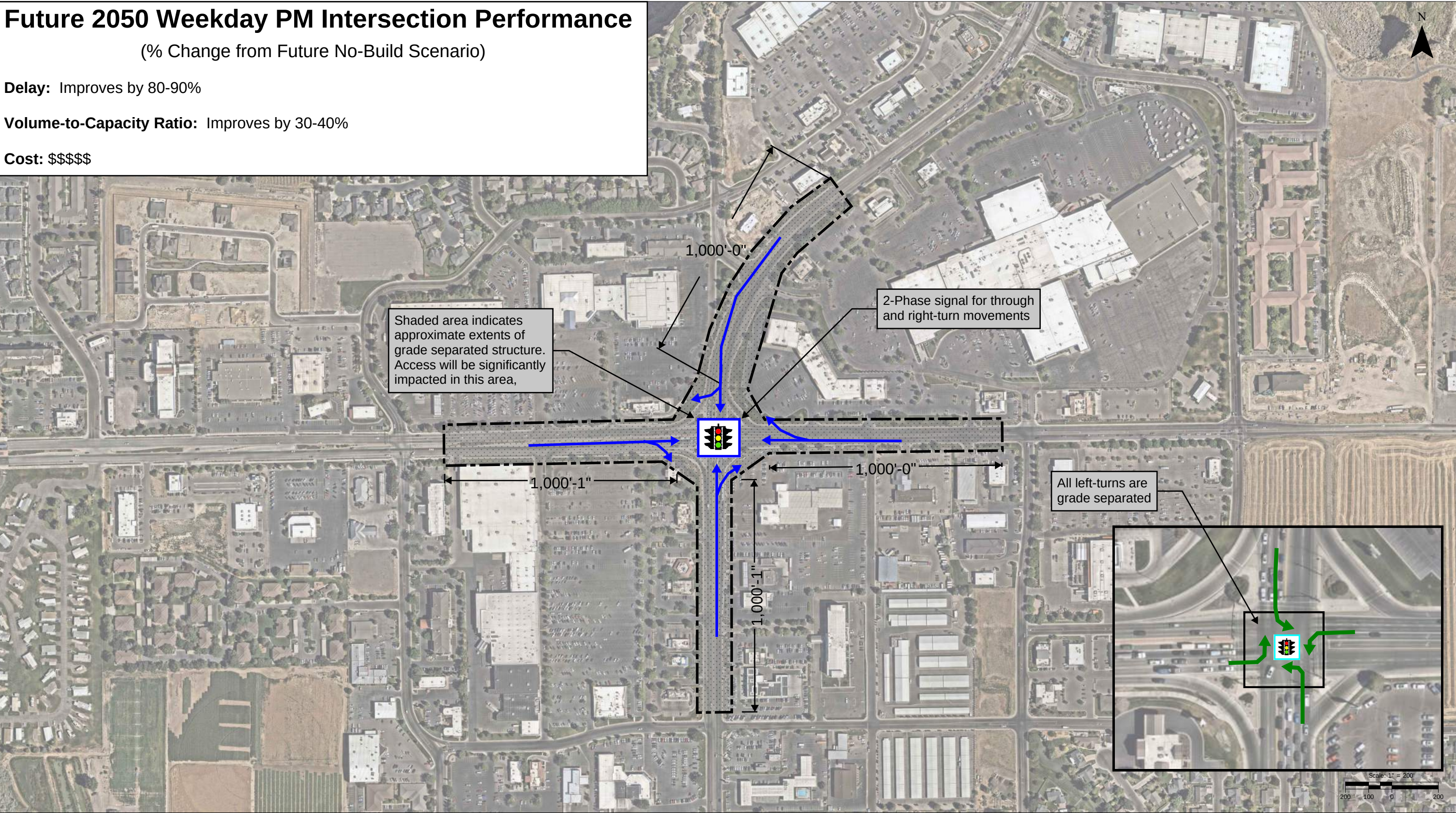
Future 2050 Weekday PM Intersection Performance

(% Change from Future No-Build Scenario)

Delay: Improves by 80-90%

Volume-to-Capacity Ratio: Improves by 30-40%

Cost: \$\$\$\$\$



 New Signal

 Modified Existing Signal

Initial Alternatives

Center-Turn Overpass

Twin Falls, Idaho

Figure GR5

Attachment B
Tier 1 Alternative Synchro
Operational Worksheet Reports

Queues

Future Year 2050 Weekday PM Peak Hour

6: Blue Lakes Blvd & Pole Line Rd

03/24/2026

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	903	885	148	305	700	606	171	1528	478	1159	1072
v/c Ratio	1.47	0.95	0.27	1.10	0.98	1.23	0.85	1.39	1.73	0.83	0.72
Control Delay (s/veh)	257.8	65.1	8.2	125.2	92.6	149.7	105.8	213.1	373.3	24.6	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	257.8	65.1	8.2	125.2	92.6	149.7	105.8	213.1	373.3	24.6	12.8
Queue Length 50th (ft)	~740	553	46	~254	396	~622	111	~1072	~796	556	488
Queue Length 95th (ft)	#874	#688	m54	m#365	#525	#737	m123	m#1189	m#973	540	400
Internal Link Dist (ft)	1276				570				1181		
Turn Bay Length (ft)	370			260			175			175	
Base Capacity (vph)	613	928	554	277	713	493	206	1097	277	1392	1490
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.47	0.95	0.27	1.10	0.98	1.23	0.83	1.39	1.73	0.83	0.72

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.

HCM Signalized Intersection Capacity Analysis

6: Blue Lakes Blvd & Pole Line Rd

Future Year 2050 Weekday PM Peak Hour

03/24/2026

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	840	823	138	284	651	564	159	1251	170	445	1078	997
Future Volume (vph)	840	823	138	284	651	564	159	1251	170	445	1078	997
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7		5.7	5.7	4.0
Lane Util. Factor	*0.93	*0.88	1.00	*0.71	*0.96	1.00	*0.81	*1.00		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3138	3278	1615	2563	3648	1493	2924	3689		1626	3505	1490
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3138	3278	1615	2563	3648	1493	2924	3689		1626	3505	1490
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	903	885	148	305	700	606	171	1345	183	478	1159	1072
RTOR Reduction (vph)	0	0	97	0	0	202	0	7	0	0	0	0
Lane Group Flow (vph)	903	885	51	305	700	404	171	1521	0	478	1159	1072
Confl. Peds. (#/hr)	1					1	13					13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4						Free
Actuated Green, G (s)	31.3	45.3	45.3	17.3	31.3	31.3	11.0	47.3		27.3	63.6	160.0
Effective Green, g (s)	31.3	45.3	45.3	17.3	31.3	31.3	11.0	47.3		27.3	63.6	160.0
Actuated g/C Ratio	0.20	0.28	0.28	0.11	0.20	0.20	0.07	0.30		0.17	0.40	1.00
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7		5.7	5.7	
Vehicle Extension (s)	1.5	1.8	1.8	1.8	1.5	1.5	1.8	1.5		1.8	1.5	
Lane Grp Cap (vph)	613	928	457	277	713	292	201	1090		277	1393	1490
v/s Ratio Prot	c0.29	0.27		0.12	0.19		0.06	c0.41		c0.29	0.33	
v/s Ratio Perm			0.03			c0.27						0.72
v/c Ratio	1.47	0.95	0.11	1.10	0.98	1.38	0.85	1.40		1.73	0.83	0.72
Uniform Delay, d1	64.4	56.3	42.5	71.4	64.1	64.4	73.7	56.4		66.4	43.4	0.0
Progression Factor	0.85	0.86	0.88	0.69	1.05	1.12	1.17	0.73		0.99	0.47	1.00
Incremental Delay, d2	219.4	15.4	0.0	79.2	26.0	189.6	16.6	181.1		336.7	4.1	2.1
Delay (s)	274.2	64.1	37.4	128.5	93.1	261.8	102.5	222.2		402.4	24.3	2.1
Level of Service	F	E	D	F	F	F	F	F		F	C	A
Approach Delay (s/veh)		160.1			163.3			210.1			82.2	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			144.9									
HCM 2000 Volume to Capacity ratio			1.47									
Actuated Cycle Length (s)			160.0						22.8			
Intersection Capacity Utilization			125.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary 6: Blue Lakes Blvd & Pole Line Rd

Future Year 2050 Weekday PM Peak Hour
03/24/2026

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	840	823	138	284	651	564	159	1251	170	445	1078	997
Future Volume (veh/h)	840	823	138	284	651	564	159	1251	170	445	1078	997
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1796	1870	1900	1900	1900	1781	1900	1885	1885	1737	1856	1781
Adj Flow Rate, veh/h	903	885	0	305	700	0	171	1345	0	478	1159	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	7	2	0	0	0	8	0	1	1	11	3	8
Cap, veh/h	622	932		278	714		207	1115		282	1395	
Arrive On Green	0.06	0.09	0.00	0.11	0.20	0.00	0.02	0.10	0.00	0.17	0.40	0.00
Sat Flow, veh/h	3182	3292	1610	2570	3648	1510	2931	3770	0	1654	3526	1510
Grp Volume(v), veh/h	903	885	0	305	700	0	171	1345	0	478	1159	0
Grp Sat Flow(s),veh/h/ln	1591	1646	1610	1285	1824	1510	1466	1885	0	1654	1763	1510
Q Serve(g_s), s	31.3	42.8	0.0	17.3	30.6	0.0	9.3	47.3	0.0	27.3	47.4	0.0
Cycle Q Clear(g_c), s	31.3	42.8	0.0	17.3	30.6	0.0	9.3	47.3	0.0	27.3	47.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	622	932		278	714		207	1115		282	1395	
V/C Ratio(X)	1.45	0.95		1.10	0.98		0.83	1.21		1.69	0.83	
Avail Cap(c_a), veh/h	622	932		278	714		207	1115		282	1395	
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.62	0.62	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	74.8	71.4	0.0	71.3	64.1	0.0	77.2	72.2	0.0	66.4	43.5	0.0
Incr Delay (d2), s/veh	208.4	13.0	0.0	82.7	28.8	0.0	22.0	101.6	0.0	326.9	5.9	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	31.5	20.7	0.0	8.9	17.0	0.0	4.3	39.9	0.0	37.1	21.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	283.3	84.4	0.0	154.1	92.8	0.0	99.2	173.8	0.0	393.3	49.4	0.0
LnGrp LOS	F	F		F	F		F	F		F	D	
Approach Vol, veh/h	1788			1005			1516			1637		
Approach Delay, s/veh	184.8			111.4			165.4			149.8		
Approach LOS	F			F			F			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	69.0	37.0	37.0	33.0	53.0	23.0	51.0				
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7				
Max Green Setting (Gmax), s	11.3	63.3	31.3	31.3	27.3	47.3	17.3	45.3				
Max Q Clear Time (g_c+l1), s	11.3	49.4	33.3	32.6	29.3	49.3	19.3	44.8				
Green Ext Time (p_c), s	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.2				

Intersection Summary

HCM 7th Control Delay, s/veh 157.8
HCM 7th LOS F

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	903	885	148	305	700	606	171	1345	183	478	1159	1072
v/c Ratio	1.39	0.74	0.21	0.84	0.76	1.22	0.77	1.16	0.34	1.32	0.84	0.41
Control Delay (s/veh)	224.4	42.8	10.9	98.2	84.5	166.6	68.3	138.4	24.0	192.8	41.6	0.2
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 (s/veh)	224.4	42.8	10.9	98.2	84.5	166.6	68.3	138.4	24.0	192.8	41.6	0.2
Queue Length 50th (ft)	~728	297	2	161	358	~640	87	~641	60	~332	489	0
Queue Length 95th (ft)	#895	486	m71	m178	m379	m#718	m100	#752	m94	m#327	m468	m0
Internal Link Dist (ft)	1276				570				1181			
Turn Bay Length (ft)	370			260			175			300		
Base Capacity (vph)	648	1191	704	380	921	495	231	1164	531	363	1378	2622
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	1.39	0.74	0.21	0.80	0.76	1.22	0.74	1.16	0.34	1.32	0.84	0.41

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.

HCM Signalized Intersection Capacity Analysis
6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	840	823	138	284	651	564	159	1251	170	445	1078	997
Future Volume (vph)	840	823	138	284	651	564	159	1251	170	445	1078	997
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	4.0
Lane Util. Factor	*0.84	*0.84	1.00	*0.97	*0.95	1.00	*0.97	*0.83	1.00	0.97	*0.83	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	2834	3129	1615	3502	3610	1493	3502	4684	1580	3155	4593	2622
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	2834	3129	1615	3502	3610	1493	3502	4684	1580	3155	4593	2622
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	903	885	148	305	700	606	171	1345	183	478	1159	1072
RTOR Reduction (vph)	0	0	89	0	0	115	0	0	137	0	0	0
Lane Group Flow (vph)	903	885	59	305	700	491	171	1345	46	478	1159	1072
Confl. Peds. (#/hr)	1						1	13				13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			Free
Actuated Green, G (s)	34.3	57.1	57.1	15.5	38.3	38.3	9.6	37.3	37.3	17.3	45.0	150.0
Effective Green, g (s)	34.3	57.1	57.1	15.5	38.3	38.3	9.6	37.3	37.3	17.3	45.0	150.0
Actuated g/C Ratio	0.23	0.38	0.38	0.10	0.26	0.26	0.06	0.25	0.25	0.12	0.30	1.00
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.5	1.8	1.8	1.8	1.5	1.5	1.8	1.5	1.5	1.8	1.5	
Lane Grp Cap (vph)	648	1191	614	361	921	381	224	1164	392	363	1377	2622
v/s Ratio Prot	c0.32	0.28		0.09	0.19		0.05	c0.29		c0.15	0.25	
v/s Ratio Perm			0.04			c0.33			0.03			0.41
v/c Ratio	1.39	0.74	0.10	0.84	0.76	1.29	0.76	1.16	0.12	1.32	0.84	0.41
Uniform Delay, d1	57.9	40.1	29.9	66.1	51.6	55.9	69.1	56.4	43.6	66.4	49.2	0.0
Progression Factor	0.95	0.98	2.11	1.26	1.54	1.75	0.80	1.32	4.07	0.79	0.78	1.00
Incremental Delay, d2	184.0	1.6	0.0	11.8	2.4	143.9	7.6	75.9	0.3	151.4	2.2	0.2
Delay (s)	238.9	40.8	63.1	94.9	82.1	241.7	62.6	150.4	178.0	204.1	40.5	0.2
Level of Service	F	D	E	F	F	F	E	F	F	F	D	A
Approach Delay (s/veh)		134.9			144.6			144.5			53.4	
Approach LOS		F			F			F			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			111.2									
HCM 2000 Volume to Capacity ratio			1.28									
Actuated Cycle Length (s)			150.0						22.8			
Intersection Capacity Utilization			98.1%									
ICU Level of Service									F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary
6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	840	823	138	284	651	564	159	1251	170	445	1078	997
Future Volume (veh/h)	840	823	138	284	651	564	159	1251	170	445	1078	997
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1796	1870	1900	1900	1900	1781	1900	1885	1885	1737	1856	1781
Adj Flow Rate, veh/h	903	885	148	305	700	606	171	1345	183	478	1159	591
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	7	2	0	0	0	8	0	1	1	11	3	8
Cap, veh/h	657	1208	618	350	922	385	217	1167	386	370	1396	792
Arrive On Green	0.23	0.38	0.38	0.10	0.26	0.26	0.02	0.08	0.08	0.12	0.30	0.30
Sat Flow, veh/h	2874	3142	1609	3510	3610	1508	3510	4694	1552	3209	4620	2623
Grp Volume(v), veh/h	903	885	148	305	700	606	171	1345	183	478	1159	591
Grp Sat Flow(s),veh/h/ln	1437	1571	1609	1755	1805	1508	1755	1565	1552	1605	1540	1311
Q Serve(g_s), s	34.3	36.2	9.4	12.9	26.9	28.5	7.3	37.3	16.9	17.3	35.1	17.2
Cycle Q Clear(g_c), s	34.3	36.2	9.4	12.9	26.9	28.5	7.3	37.3	16.9	17.3	35.1	17.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	657	1208	618	350	922	385	217	1167	386	370	1396	792
V/C Ratio(X)	1.37	0.73	0.24	0.87	0.76	1.57	0.79	1.15	0.47	1.29	0.83	0.75
Avail Cap(c_a), veh/h	657	1208	618	381	922	385	232	1167	386	370	1396	792
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.8	39.6	31.3	66.6	51.6	30.8	72.5	68.8	59.5	66.3	48.8	15.0
Incr Delay (d2), s/veh	174.4	1.3	0.0	17.1	3.3	270.5	13.9	78.7	4.1	150.0	4.1	3.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.3	14.1	3.7	6.6	12.5	39.2	3.8	24.3	7.5	14.8	13.9	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	232.3	40.9	31.3	83.7	54.9	301.3	86.3	147.5	63.6	216.3	52.9	18.4
LnGrp LOS	F	D	C	F	D	F	F	F	E	F	D	B
Approach Vol, veh/h	1936				1611				1699			
Approach Delay, s/veh	129.4				153.1				132.3			
Approach LOS	F				F				F			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	51.0	40.0	44.0	23.0	43.0	20.6	63.4				
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7				
Max Green Setting (Gmax), s	9.9	44.7	34.3	38.3	17.3	37.3	16.3	56.3				
Max Q Clear Time (g_c+I1), s	9.3	37.1	36.3	30.5	19.3	39.3	14.9	38.2				
Green Ext Time (p_c), s	0.0	3.6	0.0	2.3	0.0	0.0	0.1	3.8				

Intersection Summary

HCM 7th Control Delay, s/veh	120.1
HCM 7th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

Queues

Future Year 2050 Weekday PM Peak Hour

6: Blue Lakes Blvd & Pole Line Rd

04/09/2026

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	903	885	148	305	700	606	171	1345	183	478	1159	1072
v/c Ratio	1.10	0.69	0.22	0.84	0.76	1.18	0.90	1.13	0.34	1.18	1.00	0.74
Control Delay (s/veh)	113.8	52.5	15.4	104.9	66.5	134.6	101.6	121.5	11.9	147.4	55.2	12.2
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 (s/veh)	113.8	52.5	15.4	104.9	66.5	134.6	101.6	121.5	11.9	147.4	55.2	12.2
Queue Length 50th (ft)	~435	370	22	160	290	~608	82	~617	41	~309	~644	307
Queue Length 95th (ft)	m#497	m487	m60	m#220	398	#842	#158	#729	95	m#368	m#760	m457
Internal Link Dist (ft)	1276				570				1181			
Turn Bay Length (ft)	370		370	260		390	175		175	175		300
Base Capacity (vph)	822	1276	674	380	921	515	189	1195	541	405	1156	1449
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	1.10	0.69	0.22	0.80	0.76	1.18	0.90	1.13	0.34	1.18	1.00	0.74

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.

HCM Signalized Intersection Capacity Analysis 6: Blue Lakes Blvd & Pole Line Rd

Future Year 2050 Weekday PM Peak Hour
04/09/2026

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	840	823	138	284	651	564	159	1251	170	445	1078	997
Future Volume (vph)	840	823	138	284	651	564	159	1251	170	445	1078	997
Ideal Flow (vphpl)	1850	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	*0.80	0.95	1.00	0.97	0.95	1.00	0.97	*0.83	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3942	3539	1615	3502	3610	1493	3502	4684	1580	3155	3505	2603
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3942	3539	1615	3502	3610	1493	3502	4684	1580	3155	3505	2603
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	903	885	148	305	700	606	171	1345	183	478	1159	1072
RTOR Reduction (vph)	0	0	92	0	0	134	0	0	136	0	0	48
Lane Group Flow (vph)	903	885	56	305	700	472	171	1345	47	478	1159	1024
Confl. Peds. (#/hr)	1						1	13				13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	8		7	4		1	6		5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	31.3	54.1	54.1	15.5	38.3	38.3	8.1	38.3	38.3	19.3	49.5	80.8
Effective Green, g (s)	31.3	54.1	54.1	15.5	38.3	38.3	8.1	38.3	38.3	19.3	49.5	80.8
Actuated g/C Ratio	0.21	0.36	0.36	0.10	0.26	0.26	0.05	0.26	0.26	0.13	0.33	0.54
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.5	1.8	1.8	1.8	1.5	1.5	1.8	1.5	1.5	1.8	1.5	1.5
Lane Grp Cap (vph)	822	1276	582	361	921	381	189	1195	403	405	1156	1402
v/s Ratio Prot	c0.23	0.25		0.09	0.19		0.05	c0.29		c0.15	0.33	0.15
v/s Ratio Perm			0.03			c0.32			0.03			0.24
v/c Ratio	1.10	0.69	0.10	0.84	0.76	1.24	0.90	1.13	0.12	1.18	1.00	0.73
Uniform Delay, d1	59.4	40.9	31.8	66.1	51.6	55.9	70.6	55.9	42.9	65.4	50.2	26.3
Progression Factor	1.13	1.23	2.87	1.33	1.18	1.21	0.92	1.14	1.91	0.92	0.66	0.66
Incremental Delay, d2	53.8	0.6	0.0	13.5	2.8	125.0	32.2	65.4	0.4	96.5	21.6	1.1
Delay (s)	120.8	51.0	91.3	101.1	64.0	192.7	97.5	129.3	82.4	156.9	54.6	18.4
Level of Service	F	D	F	F	E	F	F	F	F	F	D	B
Approach Delay (s/veh)		86.6			119.4			121.0			58.3	
Approach LOS		F			F			F			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			91.0									
HCM 2000 Volume to Capacity ratio			1.16									
Actuated Cycle Length (s)			150.0						22.8			
Intersection Capacity Utilization			90.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary

6: Blue Lakes Blvd & Pole Line Rd

Future Year 2050 Weekday PM Peak Hour
04/09/2026

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	840	823	138	284	651	564	159	1251	170	445	1078	997
Future Volume (veh/h)	840	823	138	284	651	564	159	1251	170	445	1078	997
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1749	1870	1900	1900	1900	1781	1900	1885	1885	1737	1856	1781
Adj Flow Rate, veh/h	903	885	148	305	700	606	171	1345	183	478	1159	591
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	7	2	0	0	0	8	0	1	1	11	3	8
Cap, veh/h	834	1295	586	350	922	385	190	1199	397	413	1163	1421
Arrive On Green	0.14	0.24	0.24	0.10	0.26	0.26	0.05	0.26	0.26	0.13	0.33	0.33
Sat Flow, veh/h	3998	3554	1609	3510	3610	1508	3510	4694	1553	3209	3526	2626
Grp Volume(v), veh/h	903	885	148	305	700	606	171	1345	183	478	1159	591
Grp Sat Flow(s),veh/h/ln	1333	1777	1609	1755	1805	1508	1755	1565	1553	1605	1763	1313
Q Serve(g_s), s	31.3	33.9	11.1	12.9	26.9	27.8	7.3	38.3	14.9	19.3	49.2	4.0
Cycle Q Clear(g_c), s	31.3	33.9	11.1	12.9	26.9	27.8	7.3	38.3	14.9	19.3	49.2	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	834	1295	586	350	922	385	190	1199	397	413	1163	1421
V/C Ratio(X)	1.08	0.68	0.25	0.87	0.76	1.57	0.90	1.12	0.46	1.16	1.00	0.42
Avail Cap(c_a), veh/h	834	1295	586	381	922	385	190	1199	397	413	1163	1421
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.29	0.29	0.29	1.00	1.00	1.00	0.69	0.69	0.69	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.5	48.8	40.2	66.6	51.6	29.4	70.6	55.8	47.1	65.3	50.2	9.1
Incr Delay (d2), s/veh	44.0	0.4	0.0	17.1	3.3	270.5	29.6	63.3	2.7	94.9	25.4	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.3	15.7	4.6	6.6	12.5	39.0	4.0	22.0	6.1	13.3	25.5	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	108.6	49.2	40.3	83.7	54.9	299.9	100.2	119.1	49.8	160.2	75.6	9.2
LnGrp LOS	F	D	D	F	D	F	F	F	D	F	E	A
Approach Vol, veh/h	1936			1611			1699			2228		
Approach Delay, s/veh	76.2			152.5			109.7			76.1		
Approach LOS	E			F			F			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.8	55.2	37.0	44.0	25.0	44.0	20.6	60.4				
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7				
Max Green Setting (Gmax), s	8.1	49.5	31.3	38.3	19.3	38.3	16.3	53.3				
Max Q Clear Time (g_c+I1), s	9.3	51.2	33.3	29.8	21.3	40.3	14.9	35.9				
Green Ext Time (p_c), s	0.0	0.0	0.0	2.4	0.0	0.0	0.1	3.7				

Intersection Summary

HCM 7th Control Delay, s/veh 100.2
HCM 7th LOS F

Notes

User approved pedestrian interval to be less than phase max green.
User approved changes to right turn type.

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	903	885	148	305	700	606	171	1345	183	478	1159	1072
v/c Ratio	1.10	0.69	0.22	0.84	0.76	1.18	0.68	1.13	0.34	1.18	0.74	0.76
Control Delay (s/veh)	116.6	56.3	16.2	104.9	66.5	134.6	61.6	127.2	23.7	146.2	29.1	14.7
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 (s/veh)	116.6	56.3	16.2	104.9	66.5	134.6	61.6	127.2	23.7	146.2	29.1	14.7
Queue Length 50th (ft)	~435	412	26	160	290	~608	86	~628	60	~309	355	328
Queue Length 95th (ft)	m#489	m506	m61	m#220	398	#842	m99	#738	m94	m#321	m350	m411
Internal Link Dist (ft)	1276				570				1181			
Turn Bay Length (ft)	800		370		260		390		175		175	
Base Capacity (vph)	822	1276	677	380	921	515	287	1195	541	405	1569	1404
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	1.10	0.69	0.22	0.80	0.76	1.18	0.60	1.13	0.34	1.18	0.74	0.76

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.

HCM Signalized Intersection Capacity Analysis
6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	840	823	138	284	651	564	159	1251	170	445	1078	997
Future Volume (vph)	840	823	138	284	651	564	159	1251	170	445	1078	997
Ideal Flow (vphpl)	1850	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	*0.80	0.95	1.00	0.97	0.95	1.00	0.97	*0.83	1.00	0.97	0.91	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3942	3539	1615	3502	3610	1493	3502	4684	1580	3155	5036	2604
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3942	3539	1615	3502	3610	1493	3502	4684	1580	3155	5036	2604
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	903	885	148	305	700	606	171	1345	183	478	1159	1072
RTOR Reduction (vph)	0	0	95	0	0	134	0	0	136	0	0	49
Lane Group Flow (vph)	903	885	53	305	700	472	171	1345	47	478	1159	1023
Confl. Peds. (#/hr)	1						1	13				13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	8		7	4		1	6		5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	31.3	54.1	54.1	15.5	38.3	38.3	10.8	38.3	38.3	19.3	46.8	78.1
Effective Green, g (s)	31.3	54.1	54.1	15.5	38.3	38.3	10.8	38.3	38.3	19.3	46.8	78.1
Actuated g/C Ratio	0.21	0.36	0.36	0.10	0.26	0.26	0.07	0.26	0.26	0.13	0.31	0.52
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	1.5	1.8	1.8	1.8	1.5	1.5	1.8	1.5	1.5	1.8	1.5	1.5
Lane Grp Cap (vph)	822	1276	582	361	921	381	252	1195	403	405	1571	1355
v/s Ratio Prot	c0.23	0.25		0.09	0.19		0.05	c0.29		c0.15	0.23	0.16
v/s Ratio Perm			0.03			c0.32			0.03			0.24
v/c Ratio	1.10	0.69	0.09	0.84	0.76	1.24	0.68	1.13	0.12	1.18	0.74	0.75
Uniform Delay, d1	59.4	40.9	31.7	66.1	51.6	55.9	67.9	55.9	42.9	65.4	46.1	28.4
Progression Factor	1.20	1.33	3.37	1.33	1.18	1.21	0.79	1.33	4.10	0.96	0.59	0.78
Incremental Delay, d2	53.3	0.6	0.0	13.5	2.8	125.0	3.2	63.3	0.3	93.8	0.8	1.1
Delay (s)	124.5	54.8	106.8	101.1	64.0	192.7	57.0	137.3	176.1	156.4	28.0	23.3
Level of Service	F	D	F	F	E	F	E	F	F	F	C	C
Approach Delay (s/veh)		91.3			119.4			133.4			48.8	
Approach LOS		F			F			F			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			91.5									F
HCM 2000 Volume to Capacity ratio			1.16									
Actuated Cycle Length (s)			150.0						22.8			
Intersection Capacity Utilization			90.5%									E
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary
6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	840	823	138	284	651	564	159	1251	170	445	1078	997
Future Volume (veh/h)	840	823	138	284	651	564	159	1251	170	445	1078	997
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1749	1870	1900	1900	1900	1781	1900	1885	1885	1737	1856	1781
Adj Flow Rate, veh/h	903	885	148	305	700	606	171	1345	183	478	1159	1072
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	7	2	0	0	0	8	0	1	1	11	3	8
Cap, veh/h	834	1295	586	350	922	385	219	1199	397	413	1630	1399
Arrive On Green	0.14	0.24	0.24	0.10	0.26	0.26	0.02	0.08	0.08	0.13	0.32	0.32
Sat Flow, veh/h	3998	3554	1609	3510	3610	1508	3510	4694	1553	3209	5066	2625
Grp Volume(v), veh/h	903	885	148	305	700	606	171	1345	183	478	1159	1072
Grp Sat Flow(s),veh/h/ln	1333	1777	1609	1755	1805	1508	1755	1565	1553	1605	1689	1312
Q Serve(g_s), s	31.3	33.9	11.1	12.9	26.9	27.8	7.3	38.3	16.8	19.3	30.2	10.4
Cycle Q Clear(g_c), s	31.3	33.9	11.1	12.9	26.9	27.8	7.3	38.3	16.8	19.3	30.2	10.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	834	1295	586	350	922	385	219	1199	397	413	1630	1399
V/C Ratio(X)	1.08	0.68	0.25	0.87	0.76	1.57	0.78	1.12	0.46	1.16	0.71	0.77
Avail Cap(c_a), veh/h	834	1295	586	381	922	385	288	1199	397	413	1630	1399
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.25	0.25	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.5	48.8	40.2	66.6	51.6	29.4	72.4	68.7	58.9	65.3	44.7	12.1
Incr Delay (d2), s/veh	43.2	0.3	0.0	17.1	3.3	270.5	7.0	66.4	3.8	94.9	1.3	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.2	15.7	4.6	6.6	12.5	39.0	3.6	23.6	7.5	13.3	12.8	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	107.7	49.2	40.3	83.7	54.9	299.9	79.4	135.1	62.7	160.2	46.0	14.4
LnGrp LOS	F	D	D	F	D	F	E	F	E	F	D	B
Approach Vol, veh/h	1936				1611				1699			
Approach Delay, s/veh	75.8				152.5				121.7			
Approach LOS	E				F				F			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	54.0	37.0	44.0	25.0	44.0	20.6	60.4				
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7				
Max Green Setting (Gmax), s	12.3	45.3	31.3	38.3	19.3	38.3	16.3	53.3				
Max Q Clear Time (g_c+I1), s	9.3	32.2	33.3	29.8	21.3	40.3	14.9	35.9				
Green Ext Time (p_c), s	0.1	5.8	0.0	2.4	0.0	0.0	0.1	3.7				

Intersection Summary

HCM 7th Control Delay, s/veh 93.6
HCM 7th LOS F

Notes

User approved pedestrian interval to be less than phase max green.

Queues

Future Year 2050 Weekday PM Peak Hour

6: Blue Lakes Blvd & Pole Line Rd

04/20/2026

	→	↘	←	↖	↙	↑	↗	↓
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	885	148	700	606	171	1345	478	1159
v/c Ratio	0.81	0.25	0.63	1.02	0.73	0.86	1.48	0.75
Control Delay (s/veh)	38.5	5.4	23.4	58.2	58.1	14.2	257.0	9.4
Queue Delay	0.0	0.0	0.3	27.9	0.0	48.5	0.0	1.1
Total Delay (s/veh)	38.5	5.4	23.6	86.1	58.1	62.7	257.0	10.4
Queue Length 50th (ft)	276	0	90	~158	73	123	~245	78
Queue Length 95th (ft)	354	43	147	#335	m72	m121	m#223	m74
Internal Link Dist (ft)	535		326			482		331
Turn Bay Length (ft)				390	175		175	
Base Capacity (vph)	1097	602	1119	592	233	1564	324	1538
Starvation Cap Reductn	0	0	81	66	0	29	0	172
Spillback Cap Reductn	0	0	0	29	0	604	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.25	0.67	1.15	0.73	1.40	1.48	0.85

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.

HCM Signalized Intersection Capacity Analysis

6: Blue Lakes Blvd & Pole Line Rd

Future Year 2050 Weekday PM Peak Hour

04/20/2026

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑	↑↑	↑↑		↑↑	↑↑	
Traffic Volume (vph)	0	823	138	0	651	564	159	1251	0	445	1078	0
Future Volume (vph)	0	823	138	0	651	564	159	1251	0	445	1078	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7	5.7		5.7	5.7	5.7	5.7		5.7	5.7	
Lane Util. Factor		0.95	1.00		0.95	1.00	*0.81	*1.00		0.97	0.95	
Frpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3539	1615		3610	1494	2924	3762		3155	3505	
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3539	1615		3610	1494	2924	3762		3155	3505	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	885	148	0	700	606	171	1345	0	478	1159	0
RTOR Reduction (vph)	0	0	102	0	0	129	0	0	0	0	0	0
Lane Group Flow (vph)	0	885	46	0	700	477	171	1345	0	478	1159	0
Confl. Peds. (#/hr)	1					1	13					13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type		NA	Perm		NA	Perm	Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases			8			4						
Actuated Green, G (s)		31.0	31.0		31.0	31.0	8.0	41.6		10.3	43.9	
Effective Green, g (s)		31.0	31.0		31.0	31.0	8.0	41.6		10.3	43.9	
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.08	0.42		0.10	0.44	
Clearance Time (s)		5.7	5.7		5.7	5.7	5.7	5.7		5.7	5.7	
Vehicle Extension (s)		1.8	1.8		1.5	1.5	1.8	1.5		1.8	1.5	
Lane Grp Cap (vph)		1097	500		1119	463	233	1564		324	1538	
v/s Ratio Prot		0.25			0.19		0.06	c0.36		c0.15	0.33	
v/s Ratio Perm			0.03			c0.32						
v/c Ratio		0.81	0.09		0.63	1.03	0.73	0.86		1.48	0.75	
Uniform Delay, d1		31.7	24.5		29.5	34.5	45.0	26.6		44.9	23.5	
Progression Factor		1.00	1.00		0.71	0.63	1.24	0.49		1.39	0.38	
Incremental Delay, d2		4.1	0.0		0.7	46.3	1.0	0.6		215.4	0.3	
Delay (s)		35.9	24.5		21.6	68.2	56.8	13.7		277.6	9.2	
Level of Service		D	C		C	E	E	B		F	A	
Approach Delay (s/veh)		34.3			43.2			18.5			87.6	
Approach LOS		C			D			B			F	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			47.9									
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			100.0							17.1		
Intersection Capacity Utilization			84.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
61: Pole Line Rd

Future Year 2050 Weekday PM Peak Hour
04/20/2026



Lane Group	EBL	EBT	WBT	SBR
Lane Group Flow (vph)	903	1033	700	1072
v/c Ratio	0.38	0.20	1.05	0.70
Control Delay (s/veh)	6.7	0.1	87.2	1.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.7	0.1	87.2	1.5
Queue Length 50th (ft)	95	0	~257	0
Queue Length 95th (ft)	204	0	113	m0
Internal Link Dist (ft)		661	535	
Turn Bay Length (ft)	370			
Base Capacity (vph)	2374	5085	1101	1522
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.38	0.20	0.64	0.70

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis 61: Pole Line Rd

Future Year 2050 Weekday PM Peak Hour
04/20/2026

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	840	961	651	0	0	997
Future Volume (vph)	840	961	651	0	0	997
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.5			4.5
Lane Util. Factor	0.97	0.91	0.95			1.00
Frt	1.00	1.00	1.00			0.87
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3273	5085	3610			1522
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3273	5085	3610			1522
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	903	1033	700	0	0	1072
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	903	1033	700	0	0	1072
Heavy Vehicles (%)	7%	2%	0%	8%	0%	8%
Turn Type	Prot	NA	NA			pm+ov
Protected Phases	7	Free	8			7
Permitted Phases						8
Actuated Green, G (s)	72.5	100.0	18.5			91.0
Effective Green, g (s)	72.5	100.0	18.5			91.0
Actuated g/C Ratio	0.73	1.00	0.19			0.91
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2372	5085	667			1522
v/s Ratio Prot	0.28	0.20	c0.19			c0.51
v/s Ratio Perm						0.19
v/c Ratio	0.38	0.20	1.05			0.70
Uniform Delay, d1	5.2	0.0	40.8			1.1
Progression Factor	1.00	1.00	1.10			1.00
Incremental Delay, d2	0.1	0.1	44.2			0.5
Delay (s)	5.3	0.1	89.0			1.7
Level of Service	A	A	F			A
Approach Delay (s/veh)		2.5	89.0		1.7	
Approach LOS		A	F		A	
Intersection Summary						
HCM 2000 Control Delay (s/veh)			18.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.81			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			87.2%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Queues
62: Blue Lakes Blvd

Future Year 2050 Weekday PM Peak Hour
04/20/2026



Lane Group	EBL	NBT	SBT	SBR
Lane Group Flow (vph)	903	1952	1638	1072
v/c Ratio	0.89	1.31	1.07	0.93
Control Delay (s/veh)	49.6	166.3	71.0	21.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	49.6	166.3	71.0	21.0
Queue Length 50th (ft)	341	~840	~624	118
Queue Length 95th (ft)	#432	m#927	#764	#607
Internal Link Dist (ft)	820	331	190	
Turn Bay Length (ft)				
Base Capacity (vph)	1014	1486	1538	1148
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.89	1.31	1.07	0.93

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.

HCM Signalized Intersection Capacity Analysis 62: Blue Lakes Blvd

Future Year 2050 Weekday PM Peak Hour
04/20/2026

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	RL			RL	RL	RL
Traffic Volume (vph)	840	0	0	1815	1523	997
Future Volume (vph)	840	0	0	1815	1523	997
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7			5.7	5.7	5.7
Lane Util. Factor	0.97			0.95	0.95	1.00
Flt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	3273			3574	3505	1495
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	3273			3574	3505	1495
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	903	0	0	1952	1638	1072
RTOR Reduction (vph)	0	0	0	0	0	493
Lane Group Flow (vph)	903	0	0	1952	1638	579
Heavy Vehicles (%)	7%	0%	0%	1%	3%	8%
Turn Type	Prot			NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases						2
Actuated Green, G (s)	31.0			41.6	43.9	43.9
Effective Green, g (s)	31.0			41.6	43.9	43.9
Actuated g/C Ratio	0.31			0.42	0.44	0.44
Clearance Time (s)	5.7			5.7	5.7	5.7
Vehicle Extension (s)	1.5			1.5	1.5	1.5
Lane Grp Cap (vph)	1014			1486	1538	656
v/s Ratio Prot	c0.28			c0.55	0.47	
v/s Ratio Perm						0.39
v/c Ratio	0.89			1.31	1.07	0.88
Uniform Delay, d1	32.9			29.2	28.1	25.7
Progression Factor	1.15			0.72	1.00	1.00
Incremental Delay, d2	9.2			143.1	42.5	15.9
Delay (s)	47.1			164.3	70.5	41.6
Level of Service	D			F	E	D
Approach Delay (s/veh)	47.1			164.3	59.1	
Approach LOS	D			F	E	
Intersection Summary						
HCM 2000 Control Delay (s/veh)			94.0		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			0.99			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	17.1
Intersection Capacity Utilization			83.6%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Queues
63: Pole Line Rd

Future Year 2050 Weekday PM Peak Hour
04/20/2026

	→	↙	←	↘
Lane Group	EBT	WBL	WBT	NBR
Lane Group Flow (vph)	885	305	1306	183
v/c Ratio	0.47	0.62	0.68	0.25
Control Delay (s/veh)	5.2	21.4	18.6	1.2
Queue Delay	0.2	0.0	0.0	0.0
Total Delay (s/veh)	5.4	21.4	18.6	1.2
Queue Length 50th (ft)	14	65	300	0
Queue Length 95th (ft)	m0	87	285	7
Internal Link Dist (ft)	326		373	
Turn Bay Length (ft)		200		
Base Capacity (vph)	2318	603	2364	730
Starvation Cap Reductn	606	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.52	0.51	0.55	0.25
Intersection Summary				
m Volume for 95th percentile queue is metered by upstream signal.				

HCM Signalized Intersection Capacity Analysis 63: Pole Line Rd

Future Year 2050 Weekday PM Peak Hour
04/20/2026

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘↙	↑↑		↗
Traffic Volume (vph)	823	0	284	1215	0	170
Future Volume (vph)	823	0	284	1215	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5		4.5
Lane Util. Factor	0.95		0.97	0.95		1.00
Frt	1.00		1.00	1.00		0.87
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	3539		3502	3610		1627
Flt Permitted	1.00		0.25	1.00		1.00
Satd. Flow (perm)	3539		921	3610		1627
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	885	0	305	1306	0	183
RTOR Reduction (vph)	0	0	0	0	0	114
Lane Group Flow (vph)	885	0	305	1306	0	69
Heavy Vehicles (%)	2%	0%	0%	0%	0%	1%
Turn Type	NA		Perm	NA		Perm
Protected Phases	4			8		
Permitted Phases			8			2
Actuated Green, G (s)	53.2		53.2	53.2		37.8
Effective Green, g (s)	53.2		53.2	53.2		37.8
Actuated g/C Ratio	0.53		0.53	0.53		0.38
Clearance Time (s)	4.5		4.5	4.5		4.5
Vehicle Extension (s)	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	1882		489	1920		615
v/s Ratio Prot	0.25			c0.36		
v/s Ratio Perm			0.33			c0.04
v/c Ratio	0.47		0.62	0.68		0.11
Uniform Delay, d1	14.6		16.4	17.2		20.2
Progression Factor	0.37		1.00	1.00		0.09
Incremental Delay, d2	0.0		2.5	1.0		0.4
Delay (s)	5.4		18.9	18.2		2.2
Level of Service	A		B	B		A
Approach Delay (s/veh)	5.4			18.3	2.2	
Approach LOS	A			B	A	
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			40.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Queues
64: Blue Lakes Blvd

Future Year 2050 Weekday PM Peak Hour
04/20/2026

				
Lane Group	WBL	NBT	NBR	SBT
Lane Group Flow (vph)	305	1516	183	1308
v/c Ratio	0.28	1.02	0.25	0.59
Control Delay (s/veh)	31.8	58.4	9.9	15.4
Queue Delay	0.0	3.6	0.0	0.0
Total Delay (s/veh)	31.8	62.1	9.9	15.4
Queue Length 50th (ft)	61	~525	33	97
Queue Length 95th (ft)	106	#684	78	119
Internal Link Dist (ft)	654	618		482
Turn Bay Length (ft)			150	
Base Capacity (vph)	1085	1486	723	2210
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	16	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.28	1.03	0.25	0.59
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.				

HCM Signalized Intersection Capacity Analysis 64: Blue Lakes Blvd

Future Year 2050 Weekday PM Peak Hour
04/20/2026

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 			  
Traffic Volume (vph)	284	0	1410	170	0	1216
Future Volume (vph)	284	0	1410	170	0	1216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7		5.7	5.7		5.7
Lane Util. Factor	0.97		0.95	1.00		0.91
Flt	1.00		1.00	0.85		1.00
Flt Protected	0.95		1.00	1.00		1.00
Satd. Flow (prot)	3502		3574	1599		5036
Flt Permitted	0.95		1.00	1.00		1.00
Satd. Flow (perm)	3502		3574	1599		5036
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	305	0	1516	183	0	1308
RTOR Reduction (vph)	0	0	0	58	0	0
Lane Group Flow (vph)	305	0	1516	125	0	1308
Heavy Vehicles (%)	0%	8%	1%	1%	11%	3%
Turn Type	Prot		NA	Perm		NA
Protected Phases	8		6			2
Permitted Phases				6		
Actuated Green, G (s)	31.0		41.6	41.6		43.9
Effective Green, g (s)	31.0		41.6	41.6		43.9
Actuated g/C Ratio	0.31		0.42	0.42		0.44
Clearance Time (s)	5.7		5.7	5.7		5.7
Vehicle Extension (s)	1.8		1.5	1.5		1.5
Lane Grp Cap (vph)	1085		1486	665		2210
v/s Ratio Prot	c0.09		c0.42			0.26
v/s Ratio Perm				0.08		
v/c Ratio	0.28		1.02	0.19		0.59
Uniform Delay, d1	26.1		29.2	18.5		21.3
Progression Factor	1.19		1.00	1.00		0.68
Incremental Delay, d2	0.0		28.6	0.6		0.8
Delay (s)	31.0		57.8	19.1		15.2
Level of Service	C		E	B		B
Approach Delay (s/veh)	31.0		53.6			15.2
Approach LOS	C		D			B
Intersection Summary						
HCM 2000 Control Delay (s/veh)			36.4		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	17.1
Intersection Capacity Utilization			56.6%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Queues

30764 - Blue Lakes / Pole Line Int Analysis

6: Blue Lakes Blvd & Pole Line Rd

Year 2050

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR
Lane Group Flow (vph)	1043	889	272	314	703	668	308	235	490	990
v/c Ratio	0.86	0.58	0.30	0.75	0.78	0.85	0.54	0.47	0.79	0.84
Control Delay (s/veh)	39.0	22.9	3.4	53.4	42.8	19.1	40.7	8.0	49.3	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	39.0	22.9	3.4	53.4	42.8	19.1	40.7	8.0	49.3	30.3
Queue Length 50th (ft)	351	234	0	138	220	67	111	0	171	272
Queue Length 95th (ft)	#590	382	51	216	313	#302	171	63	245	#501
Internal Link Dist (ft)	1276				570					
Turn Bay Length (ft)	370			260		390		175		350
Base Capacity (vph)	1214	1559	911	584	1125	841	960	676	1036	1174
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	0.86	0.57	0.30	0.54	0.62	0.79	0.32	0.35	0.47	0.84

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	970	827	253	292	654	621	286	0	219	456	0	921
Future Volume (vph)	970	827	253	292	654	621	286	0	219	456	0	921
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7		5.7	5.7		5.7
Lane Util. Factor	*0.93	*0.88	1.00	*0.71	*0.96	1.00	*0.81		*1.00	0.97		0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.99	1.00		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00		0.85	1.00		0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00
Satd. Flow (prot)	3138	3278	1615	2563	3648	1494	2924		1580	3155		2632
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00
Satd. Flow (perm)	3138	3278	1615	2563	3648	1494	2924		1580	3155		2632
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1043	889	272	314	703	668	308	0	235	490	0	990
RTOR Reduction (vph)	0	0	144	0	0	414	0	0	189	0	0	155
Lane Group Flow (vph)	1043	889	128	314	703	254	308	0	46	490	0	835
Confl. Peds. (#/hr)	1					1	13					13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot		Perm	Prot		Over
Protected Phases	3	8		7	4		2			2		3
Permitted Phases			8			4			2			
Actuated Green, G (s)	39.3	47.8	47.8	16.5	25.0	25.0	19.9		19.9	19.9		39.3
Effective Green, g (s)	39.3	47.8	47.8	16.5	25.0	25.0	19.9		19.9	19.9		39.3
Actuated g/C Ratio	0.39	0.47	0.47	0.16	0.25	0.25	0.20		0.20	0.20		0.39
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7		5.7	5.7		5.7
Vehicle Extension (s)	1.5	1.8	1.8	1.8	1.5	1.5	1.5		1.5	1.5		1.5
Lane Grp Cap (vph)	1217	1546	762	417	900	368	574		310	619		1021
v/s Ratio Prot	c0.33	0.27		0.12	c0.19		0.11			c0.16		0.32
v/s Ratio Perm			0.08			0.17			0.03			
v/c Ratio	0.86	0.58	0.17	0.75	0.78	0.69	0.54		0.15	0.79		0.82
Uniform Delay, d1	28.4	19.4	15.3	40.5	35.6	34.6	36.6		33.7	38.7		27.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	7.9	0.3	0.0	6.7	4.1	4.3	0.5		0.1	6.4		7.3
Delay (s)	36.3	19.7	15.4	47.2	39.7	38.9	37.0		33.8	45.1		35.1
Level of Service	D	B	B	D	D	D	D		C	D		D
Approach Delay (s/veh)		27.0			40.8			35.6			38.4	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			34.6									
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			101.3						17.1			
Intersection Capacity Utilization			75.7%									
Analysis Period (min)			15									
c Critical Lane Group												

										
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	885	148	700	614	171	1292	235	490	1151	1072
v/c Ratio	0.90	0.26	0.64	0.92	0.77	0.82	0.33	0.91	0.64	0.77
Control Delay (s/veh)	65.6	13.1	50.7	45.9	94.9	47.3	20.5	85.9	30.8	33.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	65.6	13.1	50.7	45.9	94.9	47.3	20.5	85.9	30.8	33.4
Queue Length 50th (ft)	508	29	327	374	109	620	98	281	476	507
Queue Length 95th (ft)	587	84	383	#619	#174	740	178	#376	575	644
Internal Link Dist (ft)	1276		570			1181			608	
Turn Bay Length (ft)				390	175		200	175		350
Base Capacity (vph)	1085	607	1208	702	236	1579	719	575	1807	1385
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	0.82	0.24	0.58	0.87	0.72	0.82	0.33	0.85	0.64	0.77

Intersection Summary

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

Queue shown is maximum after two cycles.

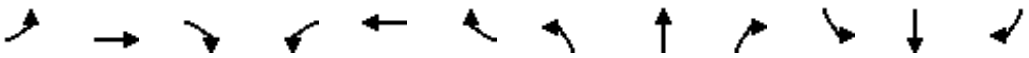
HCM Signalized Intersection Capacity Analysis 6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	823	138	0	651	571	159	1202	219	456	1070	997
Future Volume (vph)	0	823	138	0	651	571	159	1202	219	456	1070	997
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7	5.7		5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor		*0.88	1.00		*0.96	1.00	*0.81	*1.00	*1.00	0.97	0.95	0.88
Frpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3278	1615		3648	1493	2924	3762	1580	3155	3505	2582
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3278	1615		3648	1493	2924	3762	1580	3155	3505	2582
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	885	148	0	700	614	171	1292	235	490	1151	1072
RTOR Reduction (vph)	0	0	76	0	0	217	0	0	56	0	0	54
Lane Group Flow (vph)	0	885	72	0	700	397	171	1292	179	490	1151	1018
Confl. Peds. (#/hr)	1					1	13					13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type		NA	Perm		NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)		48.3	48.3		48.3	48.3	12.1	67.1	67.1	27.5	82.5	82.5
Effective Green, g (s)		48.3	48.3		48.3	48.3	12.1	67.1	67.1	27.5	82.5	82.5
Actuated g/C Ratio		0.30	0.30		0.30	0.30	0.08	0.42	0.42	0.17	0.52	0.52
Clearance Time (s)		5.7	5.7		5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)		1.8	1.8		1.5	1.5	1.8	1.5	1.5	1.8	1.5	1.5
Lane Grp Cap (vph)		989	487		1101	450	221	1577	662	542	1807	1331
v/s Ratio Prot		c0.27			0.19		0.06	c0.34		c0.16	0.33	
v/s Ratio Perm			0.04			0.27			0.11			0.39
v/c Ratio		0.89	0.15		0.64	0.88	0.77	0.82	0.27	0.90	0.64	0.76
Uniform Delay, d1		53.4	40.8		48.3	53.1	72.6	41.1	30.4	65.0	27.9	31.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		10.2	0.1		0.9	17.6	14.2	4.9	1.0	18.1	1.7	4.2
Delay (s)		63.6	40.9		49.1	70.7	86.8	46.0	31.4	83.0	29.7	35.2
Level of Service		E	D		D	E	F	D	C	F	C	D
Approach Delay (s/veh)		60.4			59.2			48.1			41.5	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			49.5		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)					17.1		
Intersection Capacity Utilization			83.2%		ICU Level of Service					E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary 6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

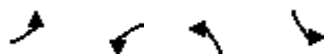
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	823	138	0	651	571	159	1202	219	456	1070	997
Future Volume (veh/h)	0	823	138	0	651	571	159	1202	219	456	1070	997
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1900	0	1900	1781	1900	1885	1885	1737	1856	1781
Adj Flow Rate, veh/h	0	885	148	0	700	614	171	1292	235	490	1151	1072
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	0	0	0	8	0	1	1	11	3	8
Cap, veh/h	0	1090	533	0	1208	500	206	1496	620	530	1733	1296
Arrive On Green	0.00	0.33	0.33	0.00	0.33	0.33	0.07	0.40	0.40	0.17	0.49	0.49
Sat Flow, veh/h	0	3516	1610	0	3724	1508	2931	3770	1562	3209	3526	2636
Grp Volume(v), veh/h	0	885	148	0	700	614	171	1292	235	490	1151	1072
Grp Sat Flow(s),veh/h/ln	0	1646	1610	0	1824	1508	1466	1885	1562	1605	1763	1318
Q Serve(g_s), s	0.0	39.3	10.8	0.0	25.4	53.0	9.2	50.3	17.1	24.1	39.4	55.8
Cycle Q Clear(g_c), s	0.0	39.3	10.8	0.0	25.4	53.0	9.2	50.3	17.1	24.1	39.4	55.8
Prop In Lane	0.00		1.00	0.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	0	1090	533	0	1208	500	206	1496	620	530	1733	1296
V/C Ratio(X)	0.00	0.81	0.28	0.00	0.58	1.23	0.83	0.86	0.38	0.93	0.66	0.83
Avail Cap(c_a), veh/h	0	1090	533	0	1208	500	233	1496	620	584	1733	1296
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.51	0.51	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	48.9	39.4	0.0	44.3	53.5	73.4	44.3	34.3	65.8	30.7	34.9
Incr Delay (d2), s/veh	0.0	2.3	0.1	0.0	0.5	119.7	17.7	6.8	1.8	19.0	2.0	6.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	16.5	11.0	0.0	11.6	53.6	4.0	24.7	6.9	11.2	17.1	18.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	51.2	39.5	0.0	44.7	173.2	91.2	51.1	36.0	84.8	32.7	41.0
LnGrp LOS		D	D		D	F	F	D	D	F	C	D
Approach Vol, veh/h		1033			1314			1698			2713	
Approach Delay, s/veh		49.6			104.7			53.1			45.4	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.9	84.4		58.7	32.1	69.2		58.7				
Change Period (Y+Rc), s	5.7	5.7		5.7	5.7	5.7		5.7				
Max Green Setting (Gmax), s	12.7	77.2		53.0	29.1	60.8		53.0				
Max Q Clear Time (g_c+I1), s	11.2	57.8		55.0	26.1	52.3		41.3				
Green Ext Time (p_c), s	0.0	6.8		0.0	0.3	3.7		3.2				

Intersection Summary

HCM 7th Control Delay, s/veh 59.5
HCM 7th LOS E

Notes

User approved pedestrian interval to be less than phase max green.
User approved changes to right turn type.



Lane Group	EBL	WBL	NBL	SBL
Lane Group Flow (vph)	1043	314	308	490
v/c Ratio	0.78	0.22	0.34	0.59
Control Delay (s/veh)	13.8	7.1	12.5	15.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	13.8	7.1	12.5	15.5
Queue Length 50th (ft)	87	18	24	46
Queue Length 95th (ft)	143	35	52	91
Internal Link Dist (ft)				
Turn Bay Length (ft)	370	260	175	175
Base Capacity (vph)	1725	1846	1039	936
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.60	0.17	0.30	0.52
Intersection Summary				

HCM Signalized Intersection Capacity Analysis 6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	970	0	0	292	0	0	286	0	0	456	0	0
Future Volume (vph)	970	0	0	292	0	0	286	0	0	456	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7			5.7			5.7			5.7		
Lane Util. Factor	0.97			0.97			0.97			0.97		
Frpb, ped/bikes	1.00			1.00			1.00			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			1.00			1.00			1.00		
Flt Protected	0.95			0.95			0.95			0.95		
Satd. Flow (prot)	3273			3502			3502			3155		
Flt Permitted	0.95			0.95			0.95			0.95		
Satd. Flow (perm)	3273			3502			3502			3155		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1043	0	0	314	0	0	308	0	0	490	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1043	0	0	314	0	0	308	0	0	490	0	0
Confl. Peds. (#/hr)	1						1	13				13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3			7			1			5		
Permitted Phases												
Actuated Green, G (s)	14.4			14.4			9.3			9.3		
Effective Green, g (s)	14.4			14.4			9.3			9.3		
Actuated g/C Ratio	0.41			0.41			0.26			0.26		
Clearance Time (s)	5.7			5.7			5.7			5.7		
Vehicle Extension (s)	1.5			1.8			1.8			1.8		
Lane Grp Cap (vph)	1342			1436			927			835		
v/s Ratio Prot	c0.32			0.09			0.09			c0.16		
v/s Ratio Perm												
v/c Ratio	0.78			0.22			0.33			0.59		
Uniform Delay, d1	9.0			6.7			10.4			11.2		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	2.6			0.0			0.1			0.7		
Delay (s)	11.6			6.7			10.5			11.9		
Level of Service	B			A			B			B		
Approach Delay (s/veh)		11.6			6.7			10.5			11.9	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			10.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			35.1				Sum of lost time (s)			11.4		
Intersection Capacity Utilization			50.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary
6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Traffic Volume (veh/h)	970	0	0	292	0	0	286	0	0	456	0	0								
Future Volume (veh/h)	970	0	0	292	0	0	286	0	0	456	0	0								
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0								
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00								
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
Work Zone On Approach	No			No			No			No										
Adj Sat Flow, veh/h/ln	1796	0	0	1900	0	0	1900	0	0	1737	0	0								
Adj Flow Rate, veh/h	1043	0	0	314	0	0	308	0	0	490	0	0								
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93								
Percent Heavy Veh, %	7	0	0	0	0	0	0	0	0	11	0	0								
Cap, veh/h	1271	0	0	893	0	0	893	0	0	805	0	0								
Arrive On Green	0.38	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00								
Sat Flow, veh/h	3319	1043		3510	314		3510	308		3209	490									
Grp Volume(v), veh/h	1043	9.7		314	9.7		308	9.7		490	10.7									
Grp Sat Flow(s),veh/h/ln	1659	A		1755	A		1755	A		1605	B									
Q Serve(g_s), s	8.9			2.3			2.3			4.2										
Cycle Q Clear(g_c), s	8.9			2.3			2.3			4.2										
Prop In Lane	1.00			1.00			1.00			1.00										
Lane Grp Cap(c), veh/h	1271			893			893			805										
V/C Ratio(X)	0.82			0.35			0.34			0.61										
Avail Cap(c_a), veh/h	1931			2043			1150			1051										
HCM Platoon Ratio	1.00			1.00			1.00			1.00										
Upstream Filter(I)	1.00			1.00			1.00			1.00										
Uniform Delay (d), s/veh	8.7			9.6			9.6			10.4										
Incr Delay (d2), s/veh	1.0			0.1			0.1			0.3										
Initial Q Delay(d3), s/veh	0.0			0.0			0.0			0.0										
%ile BackOfQ(50%),veh/ln	1.9			0.6			0.6			1.0										
Unsig. Movement Delay, s/veh																				
LnGrp Delay(d), s/veh	9.7			9.7			9.7			10.7										
LnGrp LOS	A			A			A			B										
Approach Vol, veh/h																				
Approach Delay, s/veh																				
Approach LOS																				
Timer - Assigned Phs	1		3		5		7													
Phs Duration (G+Y+Rc), s	13.7		17.7		13.6		13.7													
Change Period (Y+Rc), s	5.7		5.7		5.7		5.7													
Max Green Setting (Gmax), s	10.3		18.3		10.3		18.3													
Max Q Clear Time (g_c+I1), s	4.3		10.9		6.2		4.3													
Green Ext Time (p_c), s	0.3		1.2		0.4		0.4													
Intersection Summary																				
HCM 7th Control Delay, s/veh				9.9																
HCM 7th LOS				A																
Notes																				
User approved pedestrian interval to be less than phase max green.																				

								
Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	889	272	703	668	952	235	1070	990
v/c Ratio	0.53	0.35	0.41	0.91	0.72	0.37	0.83	0.38
Control Delay (s/veh)	15.7	12.8	14.2	37.3	23.1	13.0	27.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	15.7	12.8	14.2	37.3	23.1	13.0	27.1	0.4
Queue Length 50th (ft)	144	63	104	265	192	51	232	0
Queue Length 95th (ft)	230	133	170	#569	255	103	307	0
Internal Link Dist (ft)	1276		570		1181		608	
Turn Bay Length (ft)				390		200		350
Base Capacity (vph)	1725	806	1760	755	1682	782	1650	2622
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	0.52	0.34	0.40	0.88	0.57	0.30	0.65	0.38

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis 6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑		↑↑	↑		↑↑	↑↑
Traffic Volume (vph)	0	827	253	0	654	621	0	885	219	0	995	921
Future Volume (vph)	0	827	253	0	654	621	0	885	219	0	995	921
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7	5.7		5.7	5.7		5.7	5.7		5.7	4.0
Lane Util. Factor		0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.88
Frpb, ped/bikes		1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		3539	1615		3610	1494		3574	1580		3505	2622
Flt Permitted		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		3539	1615		3610	1494		3574	1580		3505	2622
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	889	272	0	703	668	0	952	235	0	1070	990
RTOR Reduction (vph)	0	0	20	0	0	28	0	0	45	0	0	0
Lane Group Flow (vph)	0	889	252	0	703	640	0	952	190	0	1070	990
Confl. Peds. (#/hr)	1					1	13					13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type		NA	Perm		NA	Perm		NA	Perm		NA	Free
Protected Phases		8			4			6			2	
Permitted Phases			8			4			6			Free
Actuated Green, G (s)		34.1	34.1		34.1	34.1		26.6	26.6		26.6	72.1
Effective Green, g (s)		34.1	34.1		34.1	34.1		26.6	26.6		26.6	72.1
Actuated g/C Ratio		0.47	0.47		0.47	0.47		0.37	0.37		0.37	1.00
Clearance Time (s)		5.7	5.7		5.7	5.7		5.7	5.7		5.7	
Vehicle Extension (s)		1.8	1.8		1.5	1.5		1.5	1.5		1.5	
Lane Grp Cap (vph)		1673	763		1707	706		1318	582		1293	2622
v/s Ratio Prot		0.25			0.19			0.27			c0.31	
v/s Ratio Perm			0.16			c0.43			0.12			0.38
v/c Ratio		0.53	0.33		0.41	0.91		0.72	0.33		0.83	0.38
Uniform Delay, d1		13.4	11.9		12.4	17.5		19.6	16.3		20.7	0.0
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	0.1		0.1	15.0		1.7	0.1		4.3	0.4
Delay (s)		13.5	12.0		12.5	32.5		21.3	16.4		24.9	0.4
Level of Service		B	B		B	C		C	B		C	A
Approach Delay (s/veh)		13.2			22.2			20.3			13.2	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			16.8									
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			72.1						11.4			
Intersection Capacity Utilization			72.5%						C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary
6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑		↑↑	↑		↑↑	↑↑
Traffic Volume (veh/h)	0	827	253	0	654	621	0	885	219	0	995	921
Future Volume (veh/h)	0	827	253	0	654	621	0	885	219	0	995	921
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1900	0	1900	1781	0	1885	1885	0	1856	1781
Adj Flow Rate, veh/h	0	889	272	0	703	668	0	952	235	0	1070	990
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	0	0	0	8	0	1	1	0	3	8
Cap, veh/h	0	1577	714	0	1602	669	0	1474	649	0	1450	1083
Arrive On Green	0.00	0.44	0.44	0.00	0.44	0.44	0.00	0.41	0.41	0.00	0.41	0.41
Sat Flow, veh/h	0	3647	1610	0	3705	1509	0	3676	1578	0	3618	2632
Grp Volume(v), veh/h	0	889	272	0	703	668	0	952	235	0	1070	990
Grp Sat Flow(s),veh/h/ln	0	1777	1610	0	1805	1509	0	1791	1578	0	1763	1316
Q Serve(g_s), s	0.0	14.6	8.9	0.0	10.6	34.8	0.0	16.8	8.1	0.0	20.2	27.9
Cycle Q Clear(g_c), s	0.0	14.6	8.9	0.0	10.6	34.8	0.0	16.8	8.1	0.0	20.2	27.9
Prop In Lane	0.00		1.00	0.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	0	1577	714	0	1602	669	0	1474	649	0	1450	1083
V/C Ratio(X)	0.00	0.56	0.38	0.00	0.44	1.00	0.00	0.65	0.36	0.00	0.74	0.91
Avail Cap(c_a), veh/h	0	1577	714	0	1602	669	0	1535	676	0	1510	1128
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	16.2	14.6	0.0	15.1	21.8	0.0	18.6	16.0	0.0	19.6	21.8
Incr Delay (d2), s/veh	0.0	0.3	0.1	0.0	0.1	34.2	0.0	0.7	0.1	0.0	1.6	10.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.4	3.0	0.0	4.0	17.2	0.0	6.5	2.7	0.0	7.8	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	16.5	14.8	0.0	15.2	56.1	0.0	19.2	16.1	0.0	21.2	32.6
LnGrp LOS		B	B		B	E		B	B		C	C
Approach Vol, veh/h		1161			1371			1187			2060	
Approach Delay, s/veh		16.1			35.1			18.6			26.7	
Approach LOS		B			D			B			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		38.1		40.6		38.1		40.6				
Change Period (Y+Rc), s		5.7		5.7		5.7		5.7				
Max Green Setting (Gmax), s		33.7		34.9		33.7		34.9				
Max Q Clear Time (g_c+l1), s		29.9		36.8		18.8		16.6				
Green Ext Time (p_c), s		2.3		0.0		3.4		4.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			24.9									
HCM 7th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												

Queues

30764 - Blue Lakes / Pole Line Int Analysis

6: Blue Lakes Blvd & Pole Line Rd

Year 2050

											
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	885	148	314	700	614	171	1292	235	490	1151	1072
v/c Ratio	1.05	0.29	1.06	0.47	0.79	0.80	1.02	0.38	1.06	0.80	0.92
Control Delay (s/veh)	99.8	10.3	133.2	35.7	30.7	98.3	81.9	18.4	122.5	46.9	50.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	99.8	10.3	133.2	35.7	30.7	98.3	81.9	18.4	122.5	46.9	50.3
Queue Length 50th (ft)	~577	10	~252	277	357	110	~719	76	~314	571	561
Queue Length 95th (ft)	#727	70	#393	335	552	#177	#853	155	#445	667	#735
Internal Link Dist (ft)	1276			570			1181			608	
Turn Bay Length (ft)			260		390	175		175	175		350
Base Capacity (vph)	846	517	297	1495	773	226	1267	621	461	1435	1165
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.29	1.06	0.47	0.79	0.76	1.02	0.38	1.06	0.80	0.92

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.

HCM Signalized Intersection Capacity Analysis

6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	0	823	138	292	651	571	159	1202	219	456	1070	997
Future Volume (vph)	0	823	138	292	651	571	159	1202	219	456	1070	997
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor		*0.88	1.00	*0.71	*0.96	1.00	*0.81	*1.00	*1.00	0.97	0.95	0.88
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3278	1615	2563	3648	1493	2924	3762	1580	3155	3505	2582
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3278	1615	2563	3648	1493	2924	3762	1580	3155	3505	2582
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	885	148	314	700	614	171	1292	235	490	1151	1072
RTOR Reduction (vph)	0	0	100	0	0	162	0	0	90	0	0	107
Lane Group Flow (vph)	0	885	48	314	700	452	171	1292	145	490	1151	965
Confl. Peds. (#/hr)	1						1	13				13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type		NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)		41.3	41.3	18.6	65.6	65.6	11.8	53.9	53.9	23.4	65.5	65.5
Effective Green, g (s)		41.3	41.3	18.6	65.6	65.6	11.8	53.9	53.9	23.4	65.5	65.5
Actuated g/C Ratio		0.26	0.26	0.12	0.41	0.41	0.07	0.34	0.34	0.15	0.41	0.41
Clearance Time (s)		5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)		1.8	1.8	1.8	1.5	1.5	1.8	1.5	1.5	1.8	1.5	1.5
Lane Grp Cap (vph)		846	416	297	1495	612	215	1267	532	461	1434	1057
v/s Ratio Prot		c0.27		c0.12	0.19		0.06	c0.34		c0.16	0.33	
v/s Ratio Perm			0.03			0.30			0.09			0.37
v/c Ratio		1.05	0.12	1.06	0.47	0.74	0.80	1.02	0.27	1.06	0.80	0.91
Uniform Delay, d1		59.4	45.4	70.7	34.5	40.0	72.9	53.0	38.7	68.3	41.6	44.5
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		43.7	0.0	68.1	0.1	4.0	17.0	30.4	1.3	59.6	4.8	13.3
Delay (s)		103.0	45.4	138.8	34.5	44.0	89.9	83.4	40.0	127.9	46.4	57.8
Level of Service		F	D	F	C	D	F	F	D	F	D	E
Approach Delay (s/veh)		94.8			58.2			78.1			65.6	
Approach LOS		F			E			E			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			71.2									
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			160.0							22.8		
Intersection Capacity Utilization			96.3%							F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 7th Signalized Intersection Summary 6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	0	823	138	292	651	571	159	1202	219	456	1070	997
Future Volume (veh/h)	0	823	138	292	651	571	159	1202	219	456	1070	997
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1900	1900	1900	1781	1900	1885	1885	1737	1856	1781
Adj Flow Rate, veh/h	0	885	148	314	700	614	171	1292	235	490	1151	1072
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	0	0	0	8	0	1	1	11	3	8
Cap, veh/h	0	850	416	299	1496	619	206	1270	525	469	1456	1087
Arrive On Green	0.00	0.26	0.26	0.12	0.41	0.41	0.07	0.34	0.34	0.15	0.41	0.41
Sat Flow, veh/h	0	3516	1610	2570	3648	1509	2931	3770	1559	3209	3526	2632
Grp Volume(v), veh/h	0	885	148	314	700	614	171	1292	235	490	1151	1072
Grp Sat Flow(s),veh/h/ln	0	1646	1610	1285	1824	1509	1466	1885	1559	1605	1763	1316
Q Serve(g_s), s	0.0	41.3	12.0	18.6	22.4	64.8	9.2	53.9	18.8	23.4	45.5	64.6
Cycle Q Clear(g_c), s	0.0	41.3	12.0	18.6	22.4	64.8	9.2	53.9	18.8	23.4	45.5	64.6
Prop In Lane	0.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	0	850	416	299	1496	619	206	1270	525	469	1456	1087
V/C Ratio(X)	0.00	1.04	0.36	1.05	0.47	0.99	0.83	1.02	0.45	1.04	0.79	0.99
Avail Cap(c_a), veh/h	0	850	416	299	1496	619	227	1270	525	469	1456	1087
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.51	0.51	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	59.3	48.5	70.7	34.5	47.0	73.4	53.0	41.4	68.3	40.9	46.5
Incr Delay (d2), s/veh	0.0	33.7	0.1	66.1	0.1	34.2	18.7	29.6	2.7	53.5	4.5	24.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	21.1	11.5	8.9	10.0	49.2	4.0	30.5	17.8	13.1	20.5	24.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	93.1	48.6	136.8	34.5	81.2	92.2	82.7	44.2	121.8	45.4	70.8
LnGrp LOS		F	D	F	C	F	F	F	D	F	D	E
Approach Vol, veh/h		1033			1628			1698			2713	
Approach Delay, s/veh		86.7			71.9			78.3			69.2	
Approach LOS		F			E			E			E	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.9	71.8		71.3	29.1	59.6	24.3	47.0				
Change Period (Y+Rc), s	5.7	5.7		5.7	5.7	5.7	5.7	5.7				
Max Green Setting (Gmax), s	12.4	64.9		65.6	23.4	53.9	18.6	41.3				
Max Q Clear Time (g_c+I1), s	11.2	66.6		66.8	25.4	55.9	20.6	43.3				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 7th Control Delay, s/veh 74.6
HCM 7th LOS E

Notes

User approved pedestrian interval to be less than phase max green.
User approved changes to right turn type.

	→	↘	←	↖	↙	↑	↗	↘	↓
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	885	148	853	606	171	1345	183	478	1159
v/c Ratio	0.81	0.25	0.76	1.02	0.73	0.86	0.26	1.48	0.75
Control Delay (s/veh)	38.5	5.4	36.5	68.3	64.3	33.5	10.5	257.0	9.4
Queue Delay	0.0	0.0	0.0	14.7	0.0	48.0	0.0	0.0	1.1
Total Delay (s/veh)	38.5	5.4	36.5	83.0	64.3	81.5	10.5	257.0	10.4
Queue Length 50th (ft)	276	0	257	~345	67	384	35	~245	78
Queue Length 95th (ft)	354	43	330	#574	#125	476	82	m#223	m74
Internal Link Dist (ft)	535		570			1181			331
Turn Bay Length (ft)				390	175		175	175	
Base Capacity (vph)	1097	602	1119	592	233	1564	711	324	1538
Starvation Cap Reductn	0	0	0	0	0	0	0	0	172
Spillback Cap Reductn	0	0	0	24	0	506	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.25	0.76	1.07	0.73	1.27	0.26	1.48	0.85

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.

HCM Signalized Intersection Capacity Analysis
6: Blue Lakes Blvd & Pole Line Rd

30764 - Blue Lakes / Pole Line Int Analysis
Year 2050

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	
Traffic Volume (vph)	0	823	138	0	793	564	159	1251	170	445	1078	0
Future Volume (vph)	0	823	138	0	793	564	159	1251	170	445	1078	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7	5.7		5.7	5.7	5.7	5.7	5.7	5.7	5.7	
Lane Util. Factor		0.95	1.00		0.95	1.00	*0.81	*1.00	*1.00	0.97	0.95	
Frpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3539	1615		3610	1494	2924	3762	1580	3155	3505	
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		3539	1615		3610	1494	2924	3762	1580	3155	3505	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	885	148	0	853	606	171	1345	183	478	1159	0
RTOR Reduction (vph)	0	0	102	0	0	129	0	0	54	0	0	0
Lane Group Flow (vph)	0	885	46	0	853	477	171	1345	129	478	1159	0
Confl. Peds. (#/hr)	1					1	13					13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	7%	2%	0%	0%	0%	8%	0%	1%	1%	11%	3%	8%
Turn Type		NA	Perm		NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases			8			4			6			
Actuated Green, G (s)		31.0	31.0		31.0	31.0	8.0	41.6	41.6	10.3	43.9	
Effective Green, g (s)		31.0	31.0		31.0	31.0	8.0	41.6	41.6	10.3	43.9	
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.08	0.42	0.42	0.10	0.44	
Clearance Time (s)		5.7	5.7		5.7	5.7	5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)		1.8	1.8		1.5	1.5	1.8	1.5	1.5	1.8	1.5	
Lane Grp Cap (vph)		1097	500		1119	463	233	1564	657	324	1538	
v/s Ratio Prot		0.25			0.24		0.06	c0.36		c0.15	0.33	
v/s Ratio Perm			0.03			c0.32			0.08			
v/c Ratio		0.81	0.09		0.76	1.03	0.73	0.86	0.20	1.48	0.75	
Uniform Delay, d1		31.7	24.5		31.2	34.5	45.0	26.6	18.6	44.9	23.5	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.39	0.38	
Incremental Delay, d2		4.1	0.0		2.8	49.8	9.8	6.4	0.7	215.4	0.3	
Delay (s)		35.9	24.5		34.0	84.3	54.8	33.0	19.2	277.6	9.2	
Level of Service		D	C		C	F	D	C	B	F	A	
Approach Delay (s/veh)		34.3			54.9			33.7			87.6	
Approach LOS		C			D			C			F	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			54.2				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			17.1		
Intersection Capacity Utilization			84.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												



Lane Group	EBL	EBT	WBT	SBR
Lane Group Flow (vph)	903	1033	1005	1072
v/c Ratio	0.44	0.20	0.99	0.70
Control Delay (s/veh)	11.3	0.1	61.6	1.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	11.3	0.1	61.6	1.5
Queue Length 50th (ft)	138	0	~248	0
Queue Length 95th (ft)	247	0	164	m0
Internal Link Dist (ft)		661	535	
Turn Bay Length (ft)	370			
Base Capacity (vph)	2056	5085	1360	1522
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.20	0.74	0.70

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	840	961	935	0	0	997
Future Volume (vph)	840	961	935	0	0	997
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.5			4.5
Lane Util. Factor	0.97	0.91	0.95			1.00
Frt	1.00	1.00	1.00			0.87
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3273	5085	3610			1522
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3273	5085	3610			1522
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	903	1033	1005	0	0	1072
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	903	1033	1005	0	0	1072
Heavy Vehicles (%)	7%	2%	0%	8%	0%	8%
Turn Type	Prot	NA	NA			pm+ov
Protected Phases	7	Free	8			7
Permitted Phases						8
Actuated Green, G (s)	62.8	100.0	28.2			91.0
Effective Green, g (s)	62.8	100.0	28.2			91.0
Actuated g/C Ratio	0.63	1.00	0.28			0.91
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	2055	5085	1018			1522
v/s Ratio Prot	0.28	0.20	c0.28			c0.44
v/s Ratio Perm						0.26
v/c Ratio	0.44	0.20	0.99			0.70
Uniform Delay, d1	9.6	0.0	35.7			1.1
Progression Factor	1.00	1.00	1.18			1.00
Incremental Delay, d2	0.2	0.1	19.2			0.5
Delay (s)	9.7	0.1	61.4			1.7
Level of Service	A	A	E			A
Approach Delay (s/veh)		4.6	61.4		1.7	
Approach LOS		A	E		A	
Intersection Summary						
HCM 2000 Control Delay (s/veh)			18.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			95.1%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						



Lane Group	EBL	NBT	SBT	SBR
Lane Group Flow (vph)	903	1952	1638	1072
v/c Ratio	0.89	1.31	1.07	0.93
Control Delay (s/veh)	53.1	164.3	71.0	21.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	53.1	164.3	71.0	21.0
Queue Length 50th (ft)	341	~844	~624	118
Queue Length 95th (ft)	#433	m#928	#764	#607
Internal Link Dist (ft)	820	331	190	
Turn Bay Length (ft)				
Base Capacity (vph)	1014	1486	1538	1148
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.89	1.31	1.07	0.93

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.

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	RL			RL	RL	RL
Traffic Volume (vph)	840	0	0	1815	1523	997
Future Volume (vph)	840	0	0	1815	1523	997
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7			5.7	5.7	5.7
Lane Util. Factor	0.97			0.95	0.95	1.00
Flt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	3273			3574	3505	1495
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	3273			3574	3505	1495
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	903	0	0	1952	1638	1072
RTOR Reduction (vph)	0	0	0	0	0	493
Lane Group Flow (vph)	903	0	0	1952	1638	579
Heavy Vehicles (%)	7%	0%	0%	1%	3%	8%
Turn Type	Prot			NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases						2
Actuated Green, G (s)	31.0			41.6	43.9	43.9
Effective Green, g (s)	31.0			41.6	43.9	43.9
Actuated g/C Ratio	0.31			0.42	0.44	0.44
Clearance Time (s)	5.7			5.7	5.7	5.7
Vehicle Extension (s)	1.5			1.5	1.5	1.5
Lane Grp Cap (vph)	1014			1486	1538	656
v/s Ratio Prot	c0.28			c0.55	0.47	
v/s Ratio Perm						0.39
v/c Ratio	0.89			1.31	1.07	0.88
Uniform Delay, d1	32.9			29.2	28.1	25.7
Progression Factor	1.27			0.61	1.00	1.00
Incremental Delay, d2	9.0			143.1	42.5	15.9
Delay (s)	50.8			160.8	70.5	41.6
Level of Service	D			F	E	D
Approach Delay (s/veh)	50.8			160.8	59.1	
Approach LOS	D			F	E	
Intersection Summary						
HCM 2000 Control Delay (s/veh)			93.4		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			0.99			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	17.1
Intersection Capacity Utilization			83.6%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

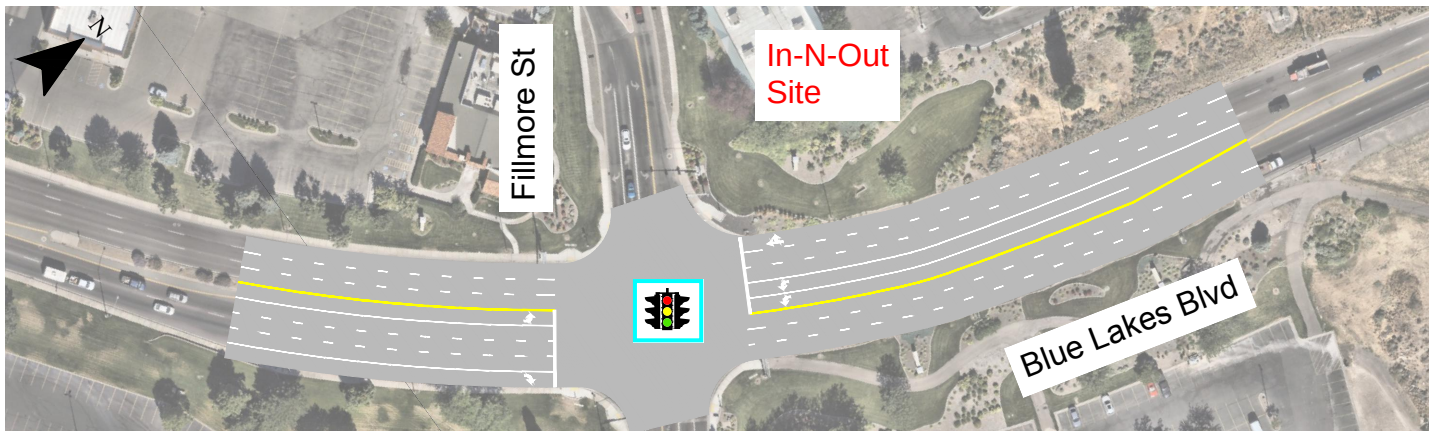
Attachment C
Alternatives Scoring Summary

Evaluation Criteria		Tier 1 Alternatives - Evaluation Scores							
		Alt 1: No Build	Alt 2 (C1): Widen BL & Signalize Dual SBR	Alt 3 (C4): Triple EBL & Signalize Dual SBR	Alt 4 (C5): Triple EBL & Signalize Dual SBR & Widen BL	Alt 5 (HC2): Partial DLT (EB & WB)	Alt 6 (GR1): SPUI	Alt 7 (GR2): EBL Flyover & WBL Removal	Alt 8 (GR5): CTO
Traffic Operations (Future PM Peak Hour)	Level of Service	F	F	F	F	F	C	E	B
	Intersection Delay	157.8	120.1	100.2	93.6	107.4	34.6	59.5	14.6
	Volume to Capacity	1.47	1.28	1.16	1.16	1	0.82	0.86	0.87
	Eastbound Left Queue Length	875	900	500	500	450	600	0	150
	Other Notes or Impacts	N/A	N/A	Rerouting of Volume from Impacted Accesses (-), Likely Increase in Lane Utilization at Fillmore/Pole Line Int (+)	Rerouting of Volume from Impacted Accesses (-), Likely Increase in Lane Utilization at Fillmore/Pole Line Int (+)	Rerouting of Volume from Impacted Accesses (-)	Rerouting of Volume from Impacted Accesses (-)	Rerouting of Volume from Impacted Accesses and Removal of WBL (-)	Rerouting of Volume from Impacted Accesses (-)
	Score	-2	-1	-1	0	1	2	1	2
Safety	Conflicts Points	32	32	32	32	28	24	28	25
	Other Safety Impacts	Retains Free Running Rights (-)	Removes Free Running Rights (+), Additional Through Lanes (Encourages Higher Speeds) (-) and Merging Beyond Intersection (-), Additional SBL (~6% reduction in crashes)	Removes Free Running Rights (+), Third EBL Merging Beyond Intersection (-), Additional SBL (~6% reduction in crashes)	Removes Free Running Rights (+), Triple EBL, Additional Through Lanes (Encourages Higher Speeds) (-) and Merging Beyond Intersection (-), Additional SBL (~6% reduction in crashes)	Displaced Left Turn Intersection (~12% reduction in crashes) (+)	Grade Separation (Encourages Higher Speeds) (-)	Removes Free Running Rights (+), Merging Beyond Intersection (-)	Removes Free Running Rights (+), Grade separated all left-turn movements (+), Merging Beyond Intersection (-)
	Score	-1	0	0	0	1	1	0	0
Ped & Bike	Crossing Length, Stages of Crossing	Max crossing: 97-ft, 3 stage	Max crossing: 97-ft, 3 stage	Max crossing: 109-ft, 3 stage	Max crossing: 109-ft, 3 stage	Slightly shorter due to separation of lanes with medians, 5 stage	Max crossing 30-ft, 4 stage	Shorter due to removed movements, likely median between stages, 3 stages	Shorter due to median under grade-separated structure, 3 stages
	Score	-1	-1	-1	-1	-1	-2	0	0
Familiarity & Ease of Use	Driver Familiarity	Medium/High	High	Medium	Medium	Medium/Low	Medium/Low	Medium/Low	Low
	Score	1	2	0	0	-1	0	-1	-2
Freight	Freight Route Movement/Capacity (EBL + SBR movements)	Existing EBL + SBR freight capacity issues	N/A	Improves EBL movement	Improves EBL movement	Improves EBL movement	Improves EBL movement	Improves EBL movement	Improves EBL Movement
	Score	-1	0	1	1	1	1	1	1
Right of Way	No. of Parcels Impacted	No impacts	>15' - 11 parcels 5-15' - 5 parcels 5' or less - 0 parcels	>15' - 12 parcels 5-15' - 5 parcels 5' or less - 0 parcels	>15' - 12 parcels 5-15' - 5 parcels 5' or less - 0 parcels	>15' - 6 parcels 5-15' - 3 parcels 5' or less - 1 parcels	>15' - 13 parcels 5-15' - 4 parcels 5' or less - 5 parcels	>15' - 8 parcels 5-15' - 3 parcels 5' or less - 5 parcels	>15' - 26 parcels 5-15' - 2 parcels 5' or less - 5 parcels
	Score	2	0	0	0	1	-1	-1	-2
Access Impacts	No. of Access Impacts	No impacts	10-15, none significant	5-15, few significant	15-20, few significant	5-10, some significant	10-15, many significant	5-10, few significant	20-30, many significant
	Score	0	0	-1	-1	-1	-2	-1	-2
Additional Information (Not Part of Scoring)									
Cost Range	Cost Estimate	< \$1M	\$15M - \$30M	\$15M - \$30M	\$15M - \$30M	\$15M - \$50M \$15M - \$30M*	\$50M - \$75M	\$50M - \$75M	>\$100M

* Estimated cost range if only the eastbound left is displaced (i.e., does not displace the westbound left).

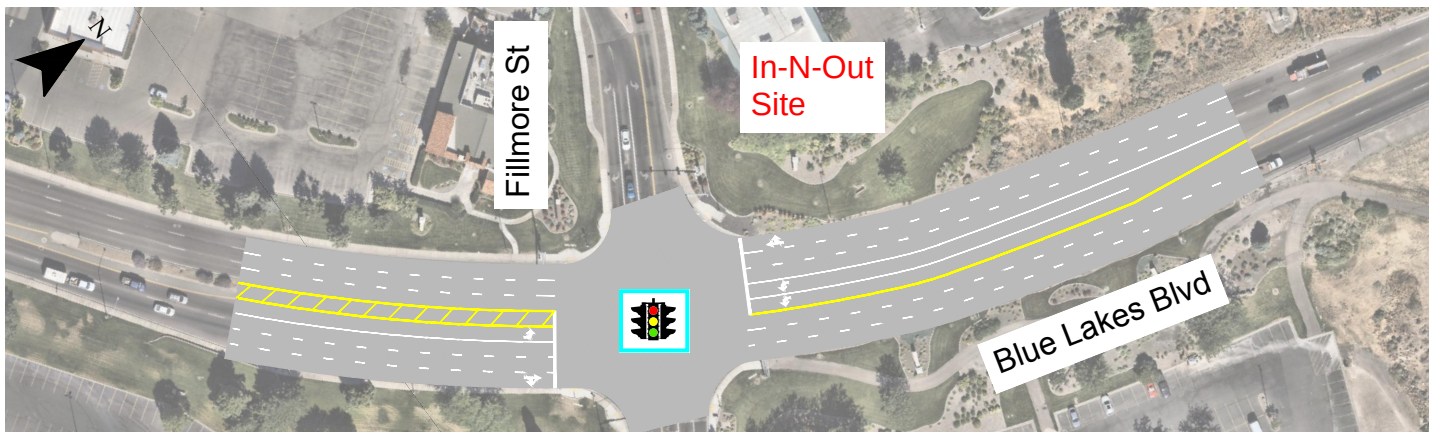
Attachment D
Northbound Lane
Termination Exhibits

Option A



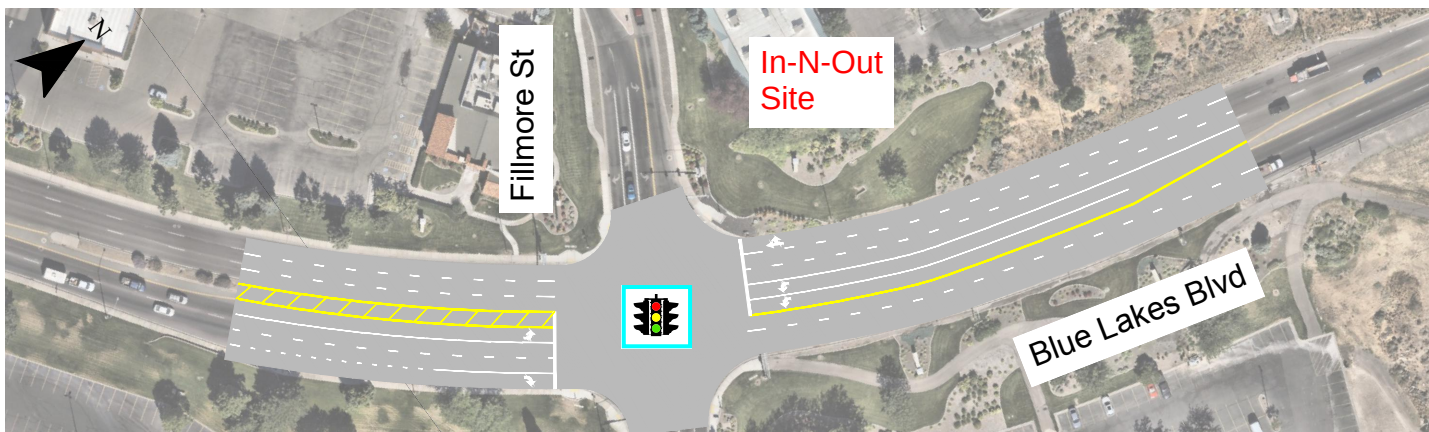
Additional northbound through-lane continues through the Blue Lakes Boulevard/Bridgeview intersection, merges down to two through lanes between Bridgeview Boulevard and the Perrine Bridge.

Option B

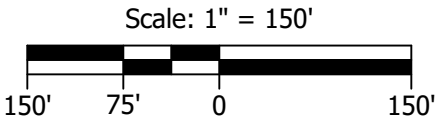


Converting the existing northbound right-turn lane to a shared through-right lane at the Blue Lakes Boulevard/Bridgeview intersection, and then merges down to two through lanes between Bridgeview Boulevard and the Perrine Bridge.

Option C



Maintaining the same lane configuration at the Blue Lakes Boulevard/Bridgeview intersection but the additional northbound through lane results in a trap right turn lane.

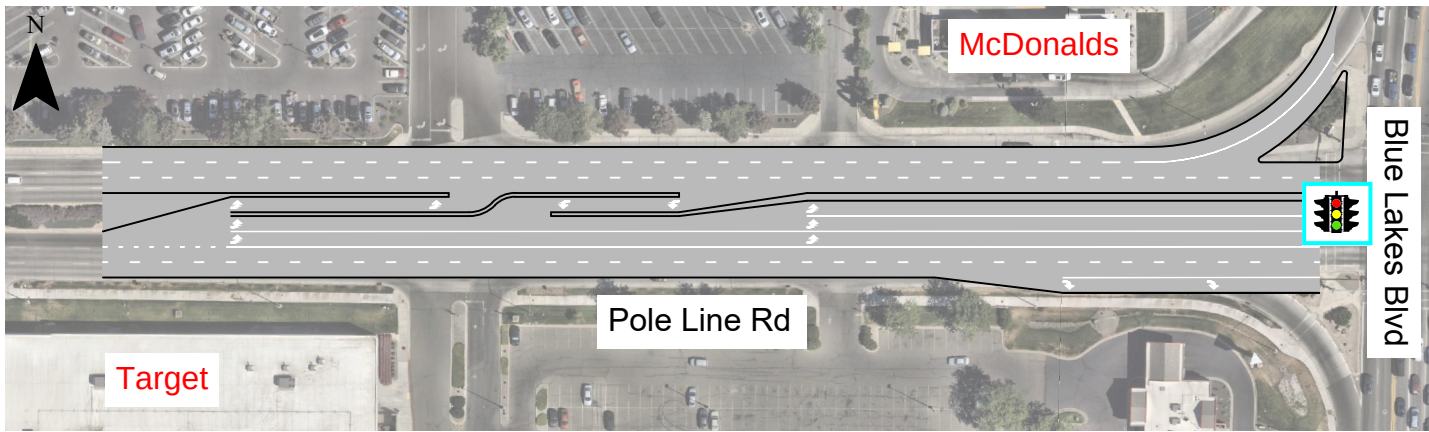


 Modified Signal

Exhibit B
Options to Terminate Third Northbound-Through Lane

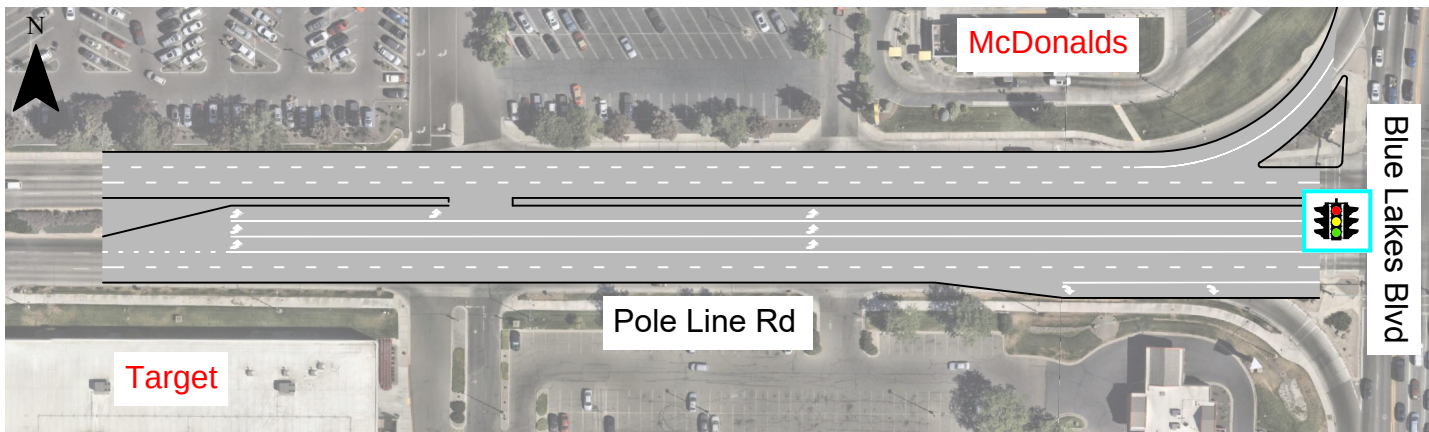
Attachment E
Eastbound Left-Turn
Lane Exhibits

Option A



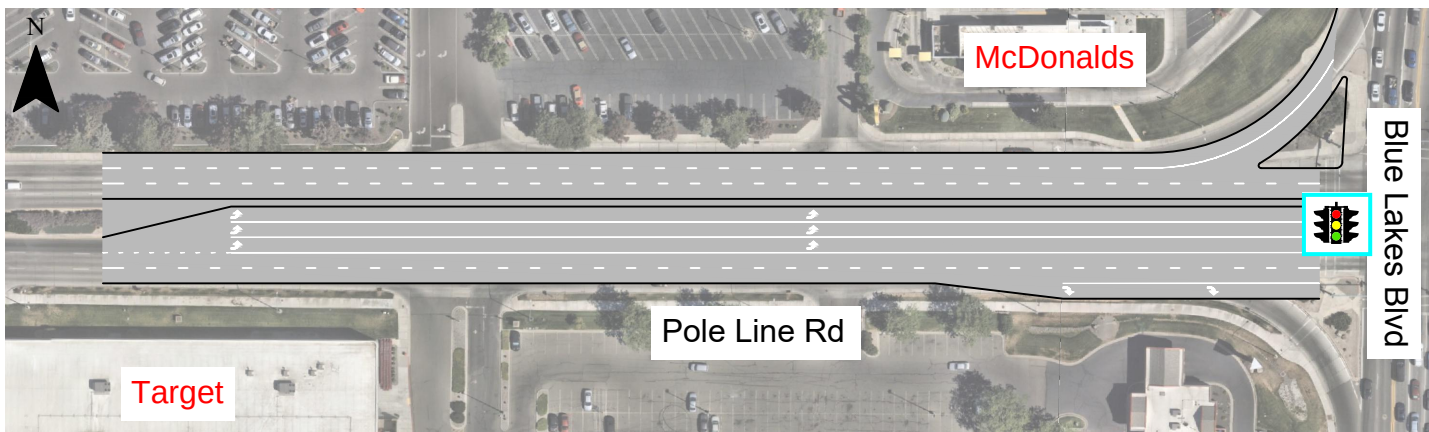
Additional eastbound left-lane at the Blue Lakes Boulevard/Pole Line Road intersection that retains the same access movements (left-ins) to the Target and Costco lots.

Option B

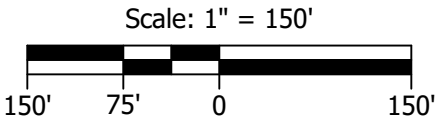


Additional eastbound left-lane at the Blue Lakes Boulevard/Pole Line Road intersection that removes the left-in movement at the Target shopping center lot.

Option C



Additional eastbound left-lane at the Blue Lakes Boulevard/Pole Line Road intersection that removes the left-in movement at the Target shopping center lot and the Costco lot.



Access Configurations Options for Third Eastbound Left-Turn

Exhibit A



DATE: October 31, 2025

TO: District Engineers, Design/Construction Engineers,
All Highway Designers, Design Consultants

David B. Kuisti

FROM: David B. Kuisti, P.E.
Chief Engineer

Monica Crider

Monica Crider, P.E.
State Design Engineer

Dan McElhinney

Dan McElhinney, P.E.
Chief Deputy Director
Chief Operations Officer

Kevin Sablan

Kevin Sablan, P.E.
State Traffic Operations Engineer

RE: Approved State Highway System (SHS) Intersection and Interchange Types for Designers

The best highway designs consider driver expectations for no surprises approaching or using an intersection during the day, night, and winter weather conditions. In recent years, ITD has reviewed unconventional intersection and interchange types in coordination with the Idaho Transportation Board (ITB), Trucking Advisory Council (TAC), and Freight Advisory Committee (FAC). Good examples of innovative interchange design are being built in Idaho on I-90 using an Offset Single Point Urban Interchange and on I-84 with the new divided diamond couplet interchange attached for reference. Since designers must consider highway large truck mobility needs and highway higher traffic peak hour volumes projected for the next twenty years or more, intersection configurations such as roundabouts and displaced left-turn geometry are not acceptable on Idaho state highways as outlined below (Attachment 1). An innovative intersection example is the recently completed two US-20 diverging diamond configurations under the bridges with signalized interchange intersections enhancing mobility and safety (Attachment 2). When intersections are at congestion capacity, widening standard intersections for additional intersection through-put lanes while adding left and right turn lanes will provide an increased capacity by improving intersection mobility accompanied by a traffic signal system (Attachment 3). This practice wisely serves the extensive Idaho infrastructure investment and serves the community by meeting driver expectations, improving safety for all users, and being ready for the highway mobility needs for many decades.

Background

Idaho highways should properly accommodate all road users, meet driver expectations, reduce restrictions, and minimize driver confusion and errors during day, night, and adverse weather conditions. This traffic operational decision memo is to confirm intersection and interchange types approved for selection consideration for the State Highway System (SHS) and to clarify project guidance on the uniform application of these types on Idaho highways for ITD designers and consultants to follow. The following guidance is consistent with prior department issued correspondence regarding ITD intersection selection practices including the February 2023 Chief Operations Officer letter to Districts (Attachment 4) and is further reflected in the August 2023 and February 2024 ITD letters to the City of Ketchum regarding intersection design selections for SH-75 and Serenade Lane (Attachment 5) as well as the guiding February 2023 Joint Resolution between the Idaho Freight Advisory Committee and the Idaho Trucking Advisory Council (Attachment 6).

Department Philosophy and Guidance on Intersection and Interchange Types

ITD is committed to our mission of ensuring safety and mobility for all users and all modes on mainline highways and freeways. To maintain the integrity of the SHS, it is critical that intersections and interchanges meet driver expectations, reduce restrictions for all users, maintain high mobility, and minimize driver confusion and errors during day, night, or adverse weather conditions. As such, ITD guidance states intersection and interchange types must follow standard configurations that are familiar to drivers and should be kept simple and intuitive, avoid confusing lane configurations, reduce restrictions for truck movements, and accommodate higher traffic volumes. Non-standard intersection and interchange types do not meet these design expectations for Idaho on state highways and as such are not acceptable by the department.

ITD **approves** standard intersection and interchange configurations with review on the Idaho SHS including (see attachments 1-4):

- Typical at grade intersections (signalized and non-signalized)
- Green-T intersection for 3-leg road intersections (signalized only)
- Cloverleaf and partial clover leaf interchange (freeway) and Diamond Interchange (freeway)
- Single point urban interchange SPUI (also referred to as urban interchange, single-point interchange and single-point diamond) on the overcrossing and the undercrossing offset SPUI
- Diverging diamond interchange (also referred to as a double crossover diamond interchange)
- Right in/Right out intersection channelization; Left in only mainline channelization; or combined

ITD **does not approve** non-standard intersection configurations on the Idaho SHS including but not limited to (see attachments 4-6):

- Roundabouts, or any similar alternative to a roundabout such as the mini-roundabout or bowtie
- Displaced Left Turn (DLT) intersection lane configuration (often named a continuous flow intersection using three signal locations instead of , splitting/ adding opposite direction traffic)
- Median U-turn or R-Cut (also the Michigan left turn intersection, Median U-turn crossover, boulevard turnaround, Michigan look ThrU-turn intersection, Texas U-Turn or Texas turnaround or similar).

This guidance on approved intersection and interchange designs will be incorporated into the next update of the ITD Roadway Design Manual, expected to be published in early 2026.

Contact: Angie Heuring | Highways Program Project Manager | angie.heuring@itd.idaho.gov

cc: Scott Stokes, Director; Bill Moad, Chair; John Pocock, TAC Chair, Winston Inouye, FAC Chair

Attachments:

- A. Exhibits of I-90 Offset SPUI Interchange and I-84 Divided Diamond Couplet Interchange
1. Highway Review Fact Sheets on Roundabouts and Displaced Left Turns Designs
2. Innovative US 20 At Grade Diverging Diamond Interchange Reconstruction Examples
3. Eagle Road/SH-44 Widening Signalized Intersection Example
4. February 2023 Chief Operations Officer letter to districts
5. February 2024 SH-75 City of Ketchum Letters and Roundabout Fact Sheet
6. February 2023 Joint Resolution by the Trucking Advisory and Freight Advisory Councils



I-90/SH-41 Offset SPUI (Single Point Urban Interchange) - Fall 2025

Project Improvements: The I-90/SH-41 offset SPUI will address safety and capacity concerns by combining the I-90 ramp intersection with SH-41 at a location northwest of the current interchange.

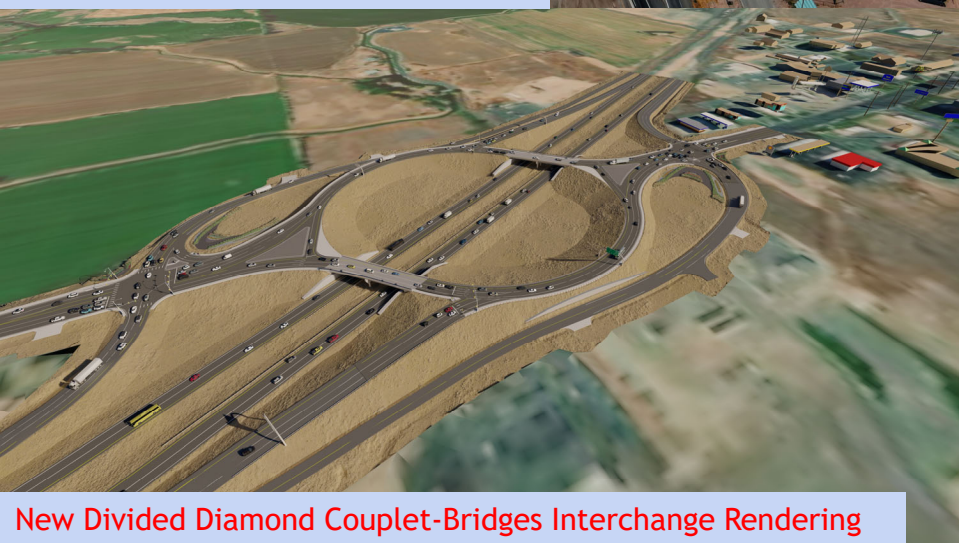
The project will add separated bicycle and pedestrian passages, a vehicular bridge, and a signal to help pedestrians and bicyclists move easier through the interchange and nearby trails.

Your Safety • Your Mobility • Your Economic Opportunity





Current S. Jerome Interchange Work



New Divided Diamond Couplet-Bridges Interchange Rendering

I-84, South Jerome Divided Diamond Couplet-Bridges Interchange - Fall 2026

Project Improvements: This project corrects the overcrossing bridge skew of the South Jerome Interchange by using shorter bridges in the first raised divided diamond couplet-bridges interchange in Idaho. It will improve safety by separating frontage road traffic with on/off-ramp traffic.

Your Safety • Your Mobility • Your Economic Opportunity



Frequently Asked Questions About State Highway Intersections

1. What intersection types are typical in Idaho on state highways?

- Typical three or four legged intersections (signal or stop sign traffic control system)
- Right in/ Right Out Only road connections to State Highways; Left In Only mainline highway channelization
- Green T intersections to provide left turning traffic a merge lane with high volume highway lanes
- Freeway interchanges of various configurations (Diamond, SPUI, Cloverleaf, Diverging)

2. When are traffic signals planned for an intersection and what are the benefits?

- Benefits include: intuitive for drivers, reliable, supports all users, sustainable for decades, prioritizes highest volume legs, and is adaptable during the day or over the year as volumes fluctuate.
- A traffic signal warrant is a study of conditions that an intersection must meet to be eligible for a signal installation.
- Traffic volumes from all directions, during peak traffic volume hours help guide the design.
- Vehicle types such as commercial vehicles along with pedestrian crosswalk accessibility needs are key.
- Physical layout, posted speed limit, and crash experience/history are important.
- Once a warrant is met, the safer intersection is a traffic intersection configuration that drivers expect when they are approaching under all conditions and typical of the highway corridor to help avoid driver confusion leading to congestion or crashes.
- A signalized intersection is designed to safely move all drivers and pedestrians and meets driver expectations.

3. When considering traffic signal operations, how will various traffic volumes be handled?

- On a state highway, traffic volumes can be ten times or more of local roads when considering roundabouts.
- The interruption of continuous traffic is where traffic volumes on a major highway are so heavy that traffic on an intersecting street has excessive delay or conflict in entering with yield or stop sign traffic control.
- Traffic signals allow volumes to be handled easily, avoiding driver confusion, and allow pedestrians to cross the road safely often with pedestrian activated stop signals for crosswalks that inform drivers.
- Off peak hour volumes are not used in intersection type design consideration, all intersections appear to operate well with low volumes and good weather, but the overall design and investment must consider peak hours.
- Signals are operated using camera detection helping adapt when side street traffic is present or if seasonal adjustments are needed which provides public works flexibility that drivers often notice throughout the year.

4. Why we do not use roundabouts on state highways at mainline intersections?

- Better for low traffic volume roads and streets with decorative and landscaping goals and few pedestrians or trucks
- Not ideal for all users unless significant gaps occur and not for highway trucks due to these being yield sign controlled
- Pedestrians can not easily estimate approaching vehicle speeds or which exit and cross walk it may enter
- It is not the low volume times of the evening or weekend, designers must consider the peak hour volumes and how the intersection will operate on a state highway for cars, trucks, bikes, and pedestrians
- Highways have higher average daily vehicles per day and per peak hour particularly in city or resort areas
- These areas often meet the traffic signal warrant study highlighting that a signal is safer and helps mobility
- If signal warrant is met, a signal is the better option for designers and to adapt and serve for decades
- Roundabouts are not configured for future signals, if signals later added indicates roundabout volumes incorrectly used
- Multiple lane highways introduce more conflicts between large and small vehicles, and with pedestrians
- Signals at typical intersections adapt during the day and over time to handle varying volumes and pedestrian needs, roundabouts give equal priority at all times, causing confusion and anxiety for many drivers approaching busy roundabouts.

5. If an intersection is a gateway to a downtown, what features can be considered?

- Lighting
- Decorative poles
- Landscaping on shoulder or median
- Welcome signage or an overhead sign bridge
- Welcome monuments with City messaging on roadside or in median area

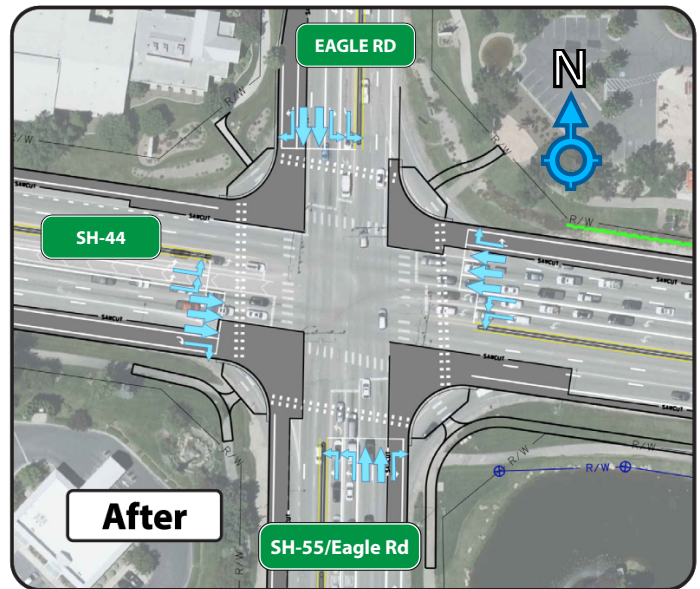
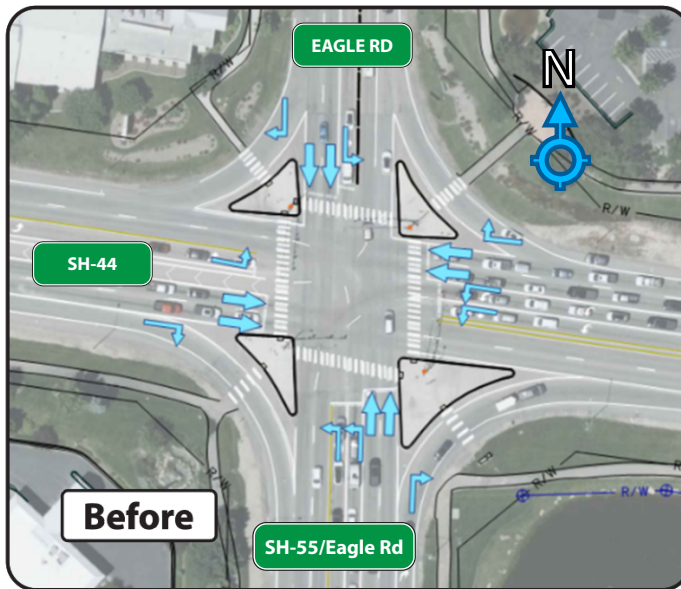
Frequently Asked Questions About State Highway Intersections

6. Why consider all users at state highway intersections?
 - Highway designers are to consider mobility for all users expectations to have the ability to use the intersection regardless of vehicle type, day, night, winter, summer, weather conditions, and avoid surprising conditions during high volume hours and off peak hours
 - Also designers must consider diverse user types using the intersection simultaneously to address issues
 - Failure to address all users' typical needs may result in unsafe movements and potential accidents
7. What is the public outreach process related to highway widening or intersection projects?
 - Public outreach is considered for all projects, especially projects that have significant improvements/impacts
 - Public meetings are intended to share designer concepts and get public perspective from numerous stakeholders
 - Public comments are considered during the year or more of project development environmental studies
 - Designers are to consider traffic conditions and overall improvements based on traffic studies and the site
 - Updates are provided throughout the project development and construction phases with local stakeholders
 - Public comment is requested during the ITD annual State Transportation Improvement Plan development process
8. What are the truck mobility concerns highway designers consider when evaluating traffic volumes and driver safety?
 - ITD should not build truck restrictive highway features and should not add to driver confusion
 - The Idaho Truck Advisory and Freight Advisory Boards have provided guidance and feedback to help.
 - Truck drivers feel roundabouts are dangerous for trucks and adjacent cars or bikes due to poor ability to see all lanes, bikes, and cross walk areas and the design limits requiring truck trailers to use median
 - Requiring a truck to off track trailers tilting onto a curb island or into the next lane is bad left turn design
 - This is not Europe with short trucks; US state highways must accommodate all commercial trucks.
 - Roundabout signage is excessive to address geometry shortfalls and confuses truck drivers and adjacent vehicles too, becoming intersections creating driver and passenger anxiety or to simply avoid
 - Drivers cannot see in mirrors and surroundings views of peds/bikes and cars, creating a zigzag issue for users especially during night driving or bad weather
 - Roundabouts are tough to maneuver, and require driving over curbs tilting trailers or crawling taking 2 lanes instead of one or requiring trucks to driver over the median due to limited diameter or property
 - Often drivers will avoid or go around local road roundabouts limiting mobility and adding time delays.
 - In roundabouts regardless of size, vehicles do not stop by traffic control, which is a pedestrian hazard
 - As vehicles enter a roundabout, they often do not slow for the exit pedestrian area adding risks
 - Roundabouts usually are too small with a raised island statue blocking sight distance safety views across
 - Roundabouts that are an oversized diameter for truck off tracking, even at off ramps, then result in higher speed cars in an all-yield sign area, increasing slower truck driver merge confusion and truck pedestrian/bike conflict risks
 - Some local agencies add excessive signing warning about trucks and warning drivers of poor design
 - It is tough for law enforcement to enforce off tracking or speed or yield infractions in roundabouts
 - If a traffic signal is warranted by study, then a typical signalized intersection design is safer
 - Highway designers are to consider mobility for all users expectations to have the ability to use the intersection regardless of vehicle type, day, night, winter, summer, weather conditions, and avoid surprising conditions during high volume hours and off peak hours
 - Also designers must consider diverse user types using the intersection simultaneously to address issues
 - Failure to address all users' typical needs may result in unsafe movements and potential accidents



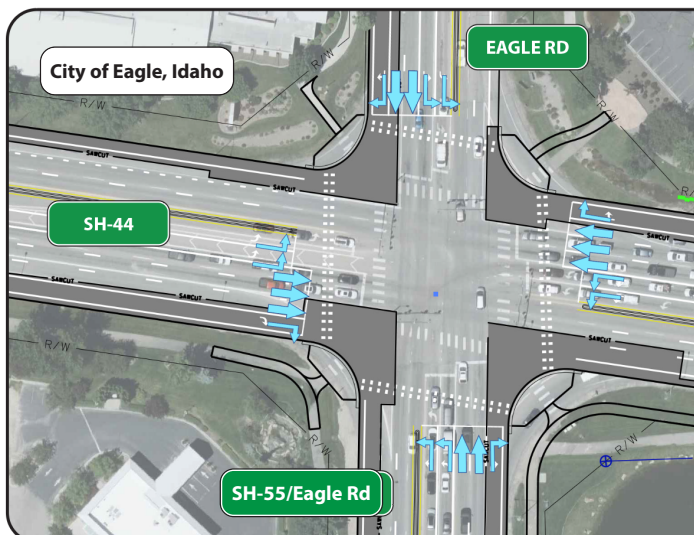
Eagle Road and State Highway 44 Construction Fact Sheet (Summer 2021)

The Idaho Transportation Department (ITD) is building the Eagle Road and State Highway 44 (SH-44) intersection widening in the City of Eagle to increase safety and mobility for all road users. The widened intersection will reduce congestion by adding new left and right turn lanes and a third through lane for improved traffic circulation and eliminate the existing short free running right turns, reducing pedestrian and driver risks significantly. Construction will be complete in October 2021.



New Expanded Intersection – A Lane Reconfiguration Meeting Driver’s Expectations:

The construction project includes adding an auxiliary lane through the intersection in each direction on SH-44. This will be similar to the auxiliary lanes at the high flow intersection of Fairview and Eagle Rd which operates well as a high traffic volume location. ITD will also add new independent right turn lanes on westbound SH-44 and southbound Eagle Rd and the eastbound left and southbound left will be converted into dual left turn movements. Early in construction, the design was updated just for final lanes layout on the same earthwork footprint, reducing contract items and balancing pavement to construct an intersection that supports the Eagle community, increases safety, and improves mobility.

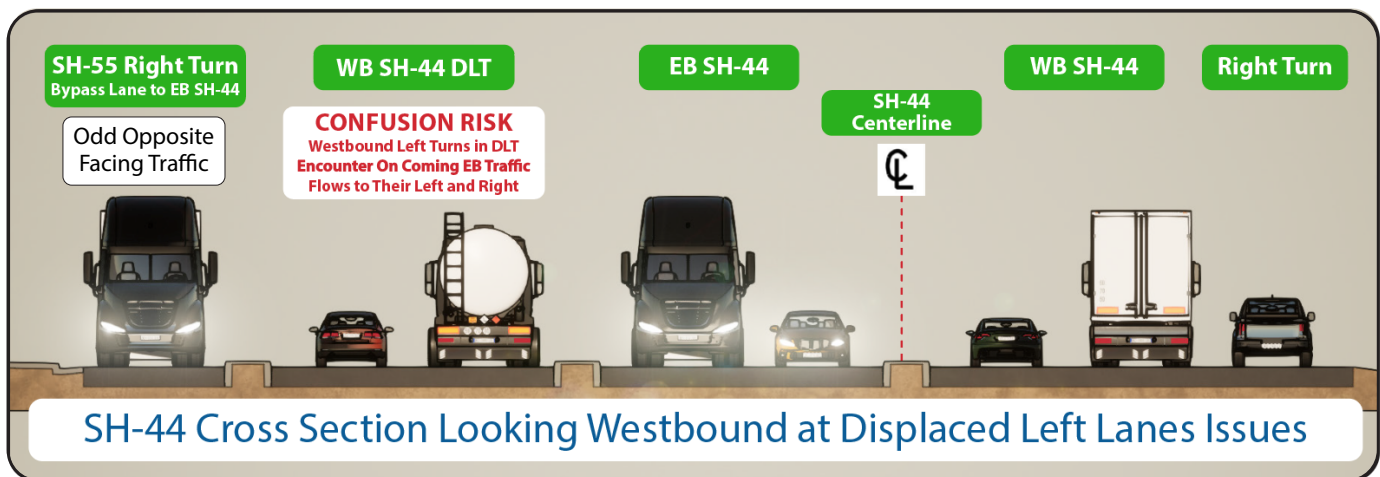
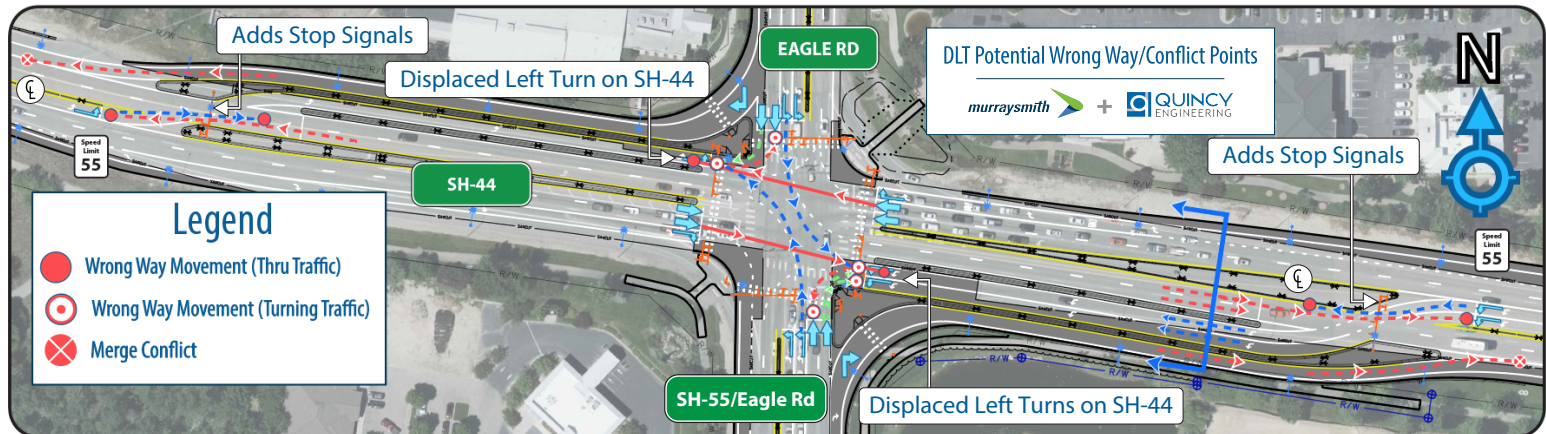


Intersection Widening Key New Lane Reconfiguration Safety Features:

- Adds east-west auxiliary lanes on SH-44, allowing more through traffic on 3 lanes, reducing congestion in the intersection
- Adds second left turn lane for east & southbound traffic for mobility
- Eliminates fast short limited right turns on crosswalks
- Long separate new right turn lanes on SH-44
- Widens SH-55 southbound for easier turns
- Safer for pedestrians & operates without driver confusion
- Benefits trucks and long trailers turning left

Spring 2021: What Was Studied – The Displaced Left Turn Across SH-44 Centerline (“Continuous Flow Intersection”)

ITD's design consultant proposed displacing the SH-44 left turns across centerline originally, but the Spring 2021 ITD study also focused on traffic safety, operations, and driver expectation in all weather conditions that found the displaced left turn (DLT) lanes to be less safe and confusing for users. ITD determined the safety benefits of a typical widened intersection proved to be better suited to meeting driver expectations and needs. A DLT configuration would relocate the left turn lanes to the far-left side of the road, in between opposite facing traffic lanes and adds two signals upstream from the main signalized intersection. Only 25 DLT intersections have been built nationwide and many have since been replaced. A larger, traditional signalized intersection would achieve similar objectives of increasing mobility and relieving congestion with a stronger emphasis on safety for all drivers and pedestrians, without the new wrong way and conflict collision risks of the DLT(CFI).

**Safety/ Mobility Concerns of the DLT Resulting in Lane Reconfiguration for a Widened Standard Intersection:**

1. Less safe for drivers and pedestrians, tougher truck left turns, and adds two signals upstream, stopping SH-44 traffic
2. DLT has wrong way movement risks geometry disorienting drivers with odd opposite facing traffic across SH-44 centerline
3. Potential driver confusion due to unfamiliarity or surprise, especially at night or in bad weather
4. Adds unexpected freeway elements within a suburban context (right turn bypass, huge sign bridges, freeway ramp configuration) in an at-grade intersection concerning Eagle local stakeholders
5. Makes maintenance efforts such as snow removal more difficult
6. Needs excessive traffic signals, sign structures, lighting, striping, signs and beacons to operate and maintain
7. Significant continuous stakeholder outreach and driver education would be required
8. Requires an extra law enforcement program to assist in educating drivers and to enhance compliance
9. Pedestrians may need two-stage crossing, exposing them to additional safety risks and unique opposite facing traffic challenges for visually impaired pedestrians with the DLT intersection and complex signals
10. Freeway style turns add higher speed movements, increasing risks in crosswalk areas and at traffic merge points
11. Highway safety risks override the minimal estimated peak hour delay reduction differences between DLT/CFI and a typical intersection widening lane layout – both provide similar congestion relief
12. Budget - the safer lane reconfiguration design could be included timely in the construction project for within +/- 10% of budget (plus engineering costs) and complete as planned this year teaming with local partners

Rexburg Interchanges

Diverging Diamond Interchange (DDI)

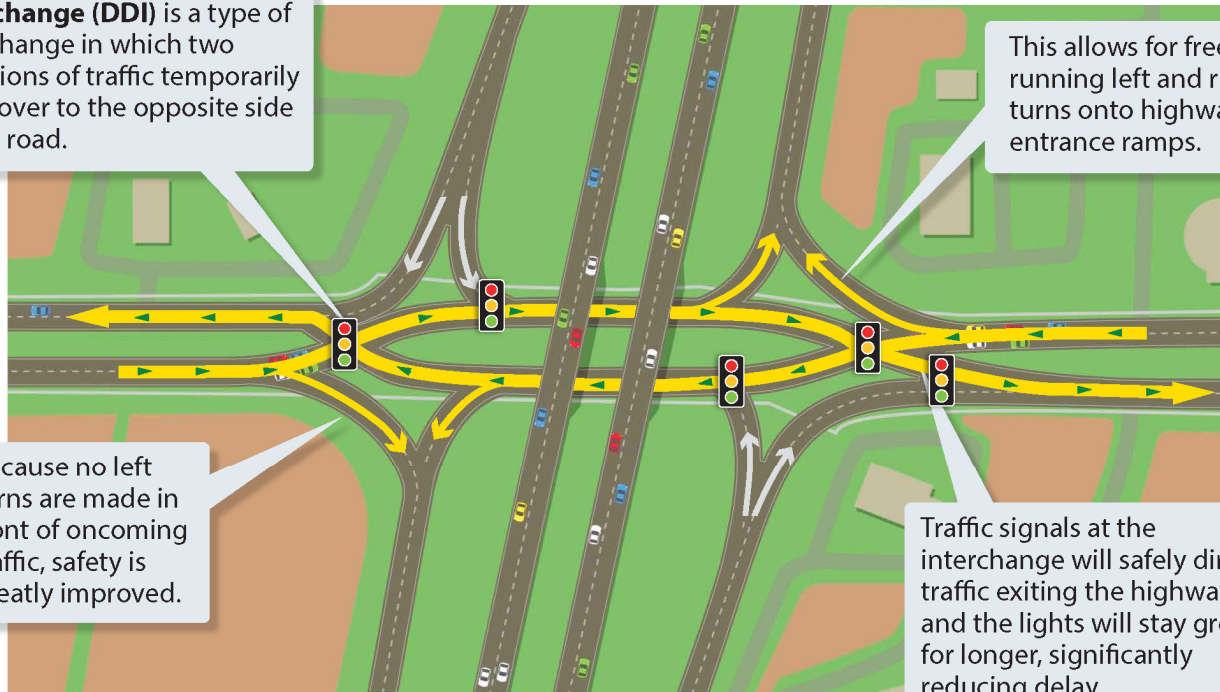


A Diverging Diamond Interchange (DDI) is a type of interchange in which two directions of traffic temporarily cross over to the opposite side of the road.

This allows for free running left and right turns onto highway entrance ramps.

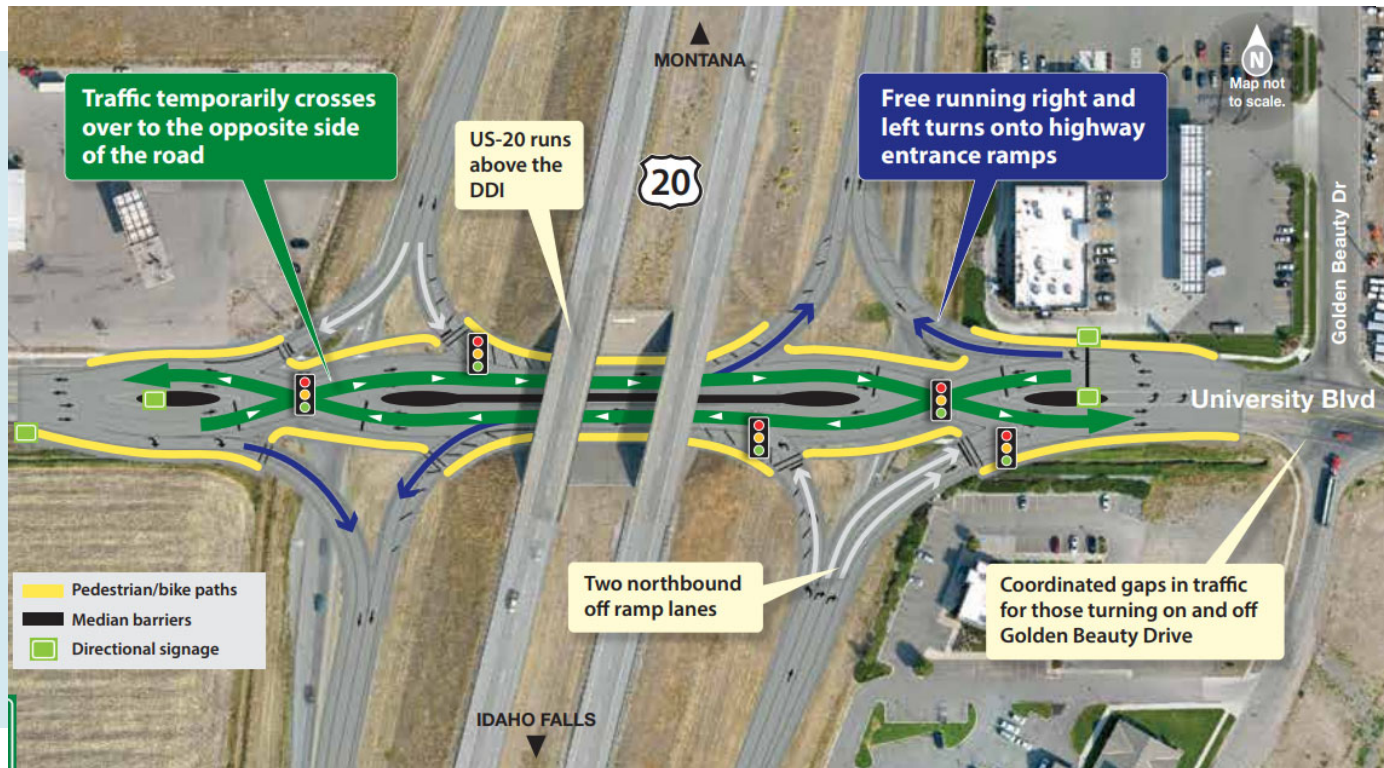
Because no left turns are made in front of oncoming traffic, safety is greatly improved.

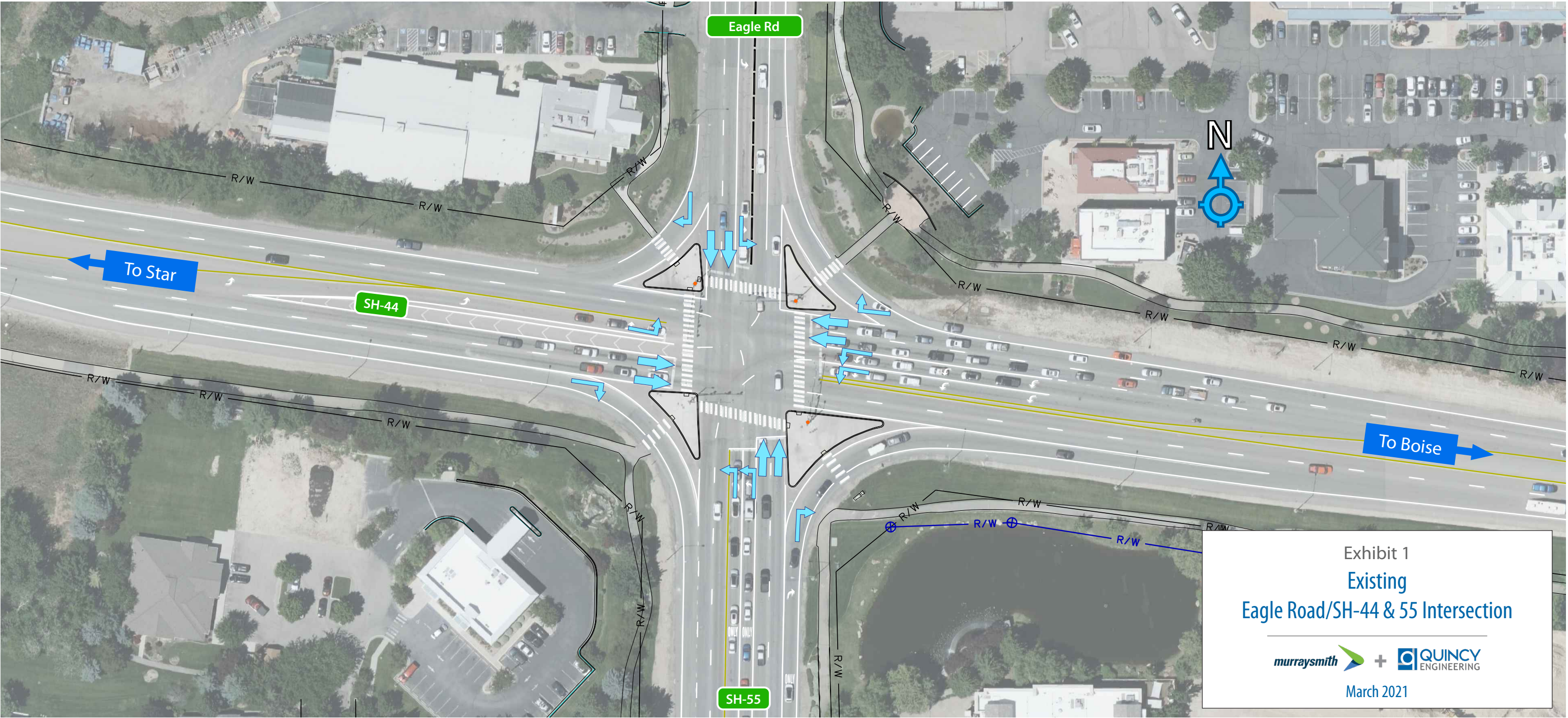
Traffic signals at the interchange will safely direct traffic exiting the highway and the lights will stay green for longer, significantly reducing delay.



Rexburg Interchanges

Exit 332 - Final Design Plan









**Your Safety • Your Mobility
Your Economic Opportunity**

IDAHO TRANSPORTATION DEPARTMENT
P.O. Box 7129 • Boise, ID 83707-1129
(208) 334-8000 • itd.idaho.gov

February 28, 2023

Subject: ITD Intersection Selection Practice for the State Highway System (SHS)

The SHS is the principal routes connecting Idaho communities and supporting intrastate/interstate commerce. ITD is committed to maintaining mobility and safety of the traveling public while meeting the mainline highway driver expectations, avoiding confusing lane configurations, not restricting truck movements, and accommodating higher traffic volumes on the SHS. Accordingly, ITD endeavors to:

- Keep intersections simple and intuitive to meet driver's expectations for reliability and safety on Idaho highways, considering that highway intersections are often handling high traffic volumes and large trucks;
- Minimize driver confusion while traveling during the day, at night or during adverse winter weather;
- Ease driver's ability to navigate the intersection with typical pedestrian crossings or bicycle lanes without lane configuration surprises requiring adding and maintaining excessive custom signing, curbing or paint/markings to direct drivers, bicyclists and pedestrians;
- Build intersections that do not restrict commercial vehicles, and avoid needing two lanes for truck lengths such that trailer tracking shall be accommodated within the truck's lane and enforceable;
- Maintain speed limits through an intersection without adding mainline highway truck off tracking lane conditions, restricting truck mobility and impacting adjacent lanes and vehicle movements;
- Safely accommodate all modes including pedestrians and bicycles with typical crossings or lanes;
- If an intersection meets Traffic Signal Warrants often based on daily traffic volumes, AM and PM peak hour volumes, and pedestrian crossing needs, then install a signal timely;
- Minimize maintenance and operational challenges for all weather conditions; and
- Prioritize state highway vehicle movements, including type of intersection and by coordinated signal timing.

As operational and safety challenges continue to mount on the SHS the exploration of non-standard intersections has become more prevalent. A non-standard intersection is any intersection where one or more conflicting traffic movements is modified to a non-traditional lane configuration resulting in unique traffic control. At grade intersections improvement such as signals, signing, widening and reconfiguration shall strive for standard configurations that are familiar to drivers – prioritizing traffic volume mobility and safety on the state system that also allows intersection capacity benefits for all users. Non-standard intersection types do not meet these design expectations for Idaho on state highways from the highway owner-operator, public safety, mobility, and maintenance perspectives.

As a result, ITD supports the following intersection and interchange configurations with review on the Idaho SHS:

- Typical at grade intersections (signalized and non-signalized)
- Green-T intersection for 3-leg road intersections (signalized and non-signalized)
- Cloverleaf and partial clover leaf interchange (freeway) and Diamond Interchange (freeway)
- Single point urban interchange on overcrossings (also referred to as urban interchange, single-point interchange and single-point diamond)
- Diverging diamond interchange (also referred to as a double crossover diamond)
- Right in/Right out intersection channelization; Left in only mainline channelization; or combined.

As a result, ITD does not support the following intersection designs on mainline for the Idaho SHS:

- Roundabouts, or any similar alternative to a roundabout such as the mini-roundabout or bowtie
- Displaced Left Turn (DLT) intersection lane configuration (often named a continuous flow intersection)
- Median U-turn or R-Cut (also the Michigan left turn intersection, Median U-turn crossover, boulevard turnaround, Michigan look ThrU-turn intersection, Texas U-Turn or Texas turnaround or similar).

Prepared by: Scott Luekenga, scott.luekenga@itd.idaho.gov, WP: 208-334-8057. E-mail scott.luekenga@itd.idaho.gov.



**Your Safety • Your Mobility
Your Economic Opportunity**

IDAHO TRANSPORTATION DEPARTMENT

216 S. Date Street • Shoshone, ID 83352
(208) 886-7800 • itd.idaho.gov

February 23, 2024

Mayor Neil Bradshaw
City of Ketchum
480 East Ave. N.
Ketchum, ID 83340

RE: SH-75 and Serenade Lane Intersection Improvements

Dear Honorable Mayor Bradshaw,

We received your letter dated January 2, 2024 concerning the selected alternative for the SH-75 and Serenade Lane Intersection. As you have discussed with our District Engineer, this intersection is part of a project that has completed the environmental phase and is on track to complete design by October 1 for advertisement and construction to begin next year.

Our team took time to review the summary attached to your letter provided by Jacobs consulting. They may have been working under the assumption that ITD is still considering options at this intersection. In talking with their staff, they had not received our final letter on this subject sent to you dated August 7, 2023. It was agreed, ITD and the project consulting engineers have considered intersection alternatives. In addition, many other factors were considered including highway system context, vehicle and bike/pedestrian crossing needs, various stakeholder input, truck safety, snow maintenance, lane striping needs, driver expectations in all conditions, and traffic operational issues that meet warrants that have led to the decision to install a beneficial traffic signal at this location. Details are outlined in the attached August 7, 2023 letter sent by District Engineer Barrus.

ITD appreciates the opportunity to review alternatives that consider the growing transportation needs and highway traffic volumes on SH-75 supporting the City and the region. ITD's focus will continue to be to enhance the quality of life through transportation for all users of the system.

Sincerely,

Bill Moad
Chairman, Idaho Transportation Board

Attachment

Cc: Idaho Transportation Board Members, Director Stokes, Chief Deputy McElhinney, District 4 Engineer



**Your Safety • Your Mobility
Your Economic Opportunity**

IDAHO TRANSPORTATION DEPARTMENT

P.O. Box 7129 • Boise, ID 83707-1129
(208) 334-8000 • itd.idaho.gov

August 7, 2023

The Honorable Mayor Neil Bradshaw
City of Ketchum
191 5th Street W
Ketchum, ID 83340

Dear Mayor Bradshaw,

Thank you for your participation at the Idaho Transportation Board stakeholder outreach workshop April 19 in Twin Falls and for your earlier April letter to the Board. On behalf of the Chairman and Director, I am sending this response. We agreed to your request to review the intersection type and signal traffic control selected for SH-75 and Serenade Lane improvements. At that meeting a follow up briefing was also arranged with you and Resort Cities Coalition members in Ketchum on May 12 with ITD Chief Deputy Dan McElhinney and myself to further update you and city staff on your questions about SH-75 improvement projects. In addition, there were numerous public meetings since early 2020 in which the SH-75 project team considered options requested by the City during preliminary design which completed in 2022. We thank the City for our partnership on this corridor. This letter is in response to your April and May requests.

As presented at those meetings and in the meeting with you previously at City Hall on March 30, 2022, a new traffic signal is warranted at Serenade Lane and best meets the safety needs of highway traffic and pedestrians when completed and for many decades. The team confirms that a roundabout intersection type was considered but it is yield sign only traffic controlled configuration which does not address needs of all highway users during high traffic peak hour volumes and considering day, night, adverse weather reliability, maintainability and avoiding driver confusion. For instance, there are sight or mobility impaired pedestrian concerns of limited gaps between vehicles to cross because roundabouts do not have stop signs or pedestrian crossing signals, pedestrians have to guess which exit vehicles (often not signaling) may take. In addition, our truck advisory committee confirms the majority of large highway trucks with trailers are not able to avoid tilt or stay within their lane lines, do not adequately see pedestrians or adjacent cars or bicycles in roundabouts. A summary of frequently asked questions is attached for reference.

For background, SH-75 is a two lane highway near the Serenade Lane road connection which is currently a T-intersection with a stop sign on Serenade Lane. Intersection design considers the July 2021 highway average daily traffic over 20,000 vehicles (peak design hourly volume of 1,800) with an estimated 1200 commercial vehicles. The projected average daily traffic in 2041 is anticipated to be at least 33,000 vehicles with 2400 commercial vehicles per day (peak design hourly volume of 3600). These are high peak hour traffic volumes which are factored into the intersection design and also are key reasons for the nearby SH-75 highway widening to four lanes from Elkhorn Road to River Street, planned to begin construction in 2025. Note too, along with too high of traffic volumes at Serenade Lane, more than 90% of the traffic flow is continuing on the highway and less than 10% are on the local street also impacting intersection type. As part of that construction project the signal study at Serenade Lane also uses highway peak hour traffic volumes and as a result meets signal traffic warrants to guide us to install a signal providing the most prudent level of intersection safety for all users similar to the nearby signal project being constructed this summer at the Ohio Gulch Road and SH-75 intersection.

The design ITD is advancing into construction will be to install a traffic signal at the intersection of SH-75 and Serenade Lane, which is consistent with 12 existing signals on this corridor and the new Ohio Gulch Road signal underway to support the community and provide all vehicle types, bike and pedestrian traffic safer crossings while meeting driver expectations in all conditions. ITD is able to accelerate \$7 million to fund the Main Street paving project 2 years early in

Attachment 5: February 2024 SH-75 City of Ketchum Letters and Roundabout Fact Sheet

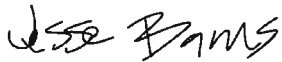
partnership with the City delivering project solutions on SH-75 that addresses ITD roadway needs to remove and replace existing asphalt pavement on Main Street, address traffic operational needs through Ketchum, ADA ramps, and traffic signal upgrades prior to the SH-75 widening project beginning as an adjacent contract scheduling benefit.

In addition, the continued City and ITD regional corridor success from our teamwork as ITD has partnered with Ketchum on several projects and highway work, including results on:

- the transfer of SH75 Spur/Sun Valley Road to the City with Board approval and funding in 2021;
- the installation of a City all stop pedestrian scramble pilot at SH75/Sun Valley Road intersection;
- the installation of a City HAWK pedestrian activated signal pilot at the 4th Street intersection;
- partnering on SH75 Elkhorn Road to River Street project including right of way purchasing and difficult utility relocations (water, sewer, Idaho Power) to widen SH-75 from two currently to four lanes approaching Ketchum.
- the SH-75 North Ketchum project extending into Ketchum and solving for City utility upgrades; and teaming with the City to install pedestrian pathways through encroachment permit from 10th Street to Saddle Road, to help connect into existing City sidewalk and pathway system.

In closing, if the City is still interested in a gateway entrance aesthetics feature the project team has discussed a few options to achieve a gateway vision and the team is here to help. Thank you Mayor and City partners for this opportunity to update you. Please call ITD Chief Deputy Dan McElhinney at 208-871-8534 or myself at 208-870-6330 for additional information.

Sincerely,



Jesse Barrus, P.E.
District 4 Engineer
Idaho Transportation Department

cc: Chairman Moad, Member Kempton, Director Stokes, Dan McElhinney, Resort Cities Coalition members,
Dave Kuisti, Kevin Sablan, Nathan Jerke

Attachments: Frequently Asked Questions about State Highway Intersections
SH-75 Intersection Design Consideration summary
SH-75 Serenade Lane Intersection Public Outreach Exhibit and Draft Design Plan Sheets
April 2023 Correspondence

Frequently Asked Questions About State Highway Intersections

1. What intersection types are typical in Idaho on state highways?

- Typical three or four legged intersections (signal or stop sign traffic control system)
- Right in/ Right Out Only road connections to State Highways; Left In Only mainline highway channelization
- Green T intersections to provide left turning traffic a merge lane with high volume highway lanes
- Freeway interchanges of various configurations (Diamond, SPUI, Cloverleaf, Diverging)

2. When are traffic signals planned for an intersection and what are the benefits?

- Benefits include: intuitive for drivers, reliable, supports all users, sustainable for decades, prioritizes highest volume legs, and is adaptable during the day or over the year as volumes fluctuate.
- A traffic signal warrant is a study of conditions that an intersection must meet to be eligible for a signal installation.
- Traffic volumes from all directions, during peak traffic volume hours help guide the design.
- Vehicle types such as commercial vehicles along with pedestrian crosswalk accessibility needs are key.
- Physical layout, posted speed limit, and crash experience/history are important.
- Once a warrant is met, the safer intersection is a traffic intersection configuration that drivers expect when they are approaching under all conditions and typical of the highway corridor to help avoid driver confusion leading to congestion or crashes.
- A signalized intersection is designed to safely move all drivers and pedestrians and meets driver expectations.

3. When considering traffic signal operations, how will various traffic volumes be handled?

- On a state highway, traffic volumes can be ten times or more of local roads when considering roundabouts.
- The interruption of continuous traffic is where traffic volumes on a major highway are so heavy that traffic on an intersecting street has excessive delay or conflict in entering with yield or stop sign traffic control.
- Traffic signals allow volumes to be handled easily, avoiding driver confusion, and allow pedestrians to cross the road safely often with pedestrian activated stop signals for crosswalks that inform drivers.
- Off peak hour volumes are not used in intersection type design consideration, all intersections appear to operate well with low volumes and good weather, but the overall design and investment must consider peak hours.
- Signals are operated using camera detection helping adapt when side street traffic is present or if seasonal adjustments are needed which provides public works flexibility that drivers often notice throughout the year.

4. Why we do not use roundabouts on state highways at mainline intersections?

- Better for low traffic volume roads and streets with decorative and landscaping goals and few pedestrians or trucks
- Not ideal for all users unless significant gaps occur and not for highway trucks due to these being yield sign controlled
- Pedestrians can not easily estimate approaching vehicle speeds or which exit and cross walk it may enter
- It is not the low volume times of the evening or weekend, designers must consider the peak hour volumes and how the intersection will operate on a state highway for cars, trucks, bikes, and pedestrians
- Highways have higher average daily vehicles per day and per peak hour particularly in city or resort areas
- These areas often meet the traffic signal warrant study highlighting that a signal is safer and helps mobility
- If signal warrant is met, a signal is the better option for designers and to adapt and serve for decades
- Roundabouts are not configured for future signals, if signals later added indicates roundabout volumes incorrectly used
- Multiple lane highways introduce more conflicts between large and small vehicles, and with pedestrians
- Signals at typical intersections adapt during the day and over time to handle varying volumes and pedestrian needs, roundabouts give equal priority at all times, causing confusion and anxiety for many drivers approaching busy roundabouts.

5. If an intersection is a gateway to a downtown, what features can be considered?

- Lighting
- Decorative poles
- Landscaping on shoulder or median
- Welcome signage or an overhead sign bridge
- Welcome monuments with City messaging on roadside or in median area

Frequently Asked Questions About State Highway Intersections

6. Why consider all users at state highway intersections?
 - Highway designers are to consider mobility for all users expectations to have the ability to use the intersection regardless of vehicle type, day, night, winter, summer, weather conditions, and avoid surprising conditions during high volume hours and off peak hours
 - Also designers must consider diverse user types using the intersection simultaneously to address issues
 - Failure to address all users' typical needs may result in unsafe movements and potential accidents
7. What is the public outreach process related to highway widening or intersection projects?
 - Public outreach is considered for all projects, especially projects that have significant improvements/impacts
 - Public meetings are intended to share designer concepts and get public perspective from numerous stakeholders
 - Public comments are considered during the year or more of project development environmental studies
 - Designers are to consider traffic conditions and overall improvements based on traffic studies and the site
 - Updates are provided throughout the project development and construction phases with local stakeholders
 - Public comment is requested during the ITD annual State Transportation Improvement Plan development process
8. What are the truck mobility concerns highway designers consider when evaluating traffic volumes and driver safety?
 - ITD should not build truck restrictive highway features and should not add to driver confusion
 - The Idaho Truck Advisory and Freight Advisory Boards have provided guidance and feedback to help.
 - Truck drivers feel roundabouts are dangerous for trucks and adjacent cars or bikes due to poor ability to see all lanes, bikes, and cross walk areas and the design limits requiring truck trailers to use median
 - Requiring a truck to off track trailers tilting onto a curb island or into the next lane is bad left turn design
 - This is not Europe with short trucks; US state highways must accommodate all commercial trucks.
 - Roundabout signage is excessive to address geometry shortfalls and confuses truck drivers and adjacent vehicles too, becoming intersections creating driver and passenger anxiety or to simply avoid
 - Drivers cannot see in mirrors and surroundings views of peds/bikes and cars, creating a zigzag issue for users especially during night driving or bad weather
 - Roundabouts are tough to maneuver, and require driving over curbs tilting trailers or crawling taking 2 lanes instead of one or requiring trucks to driver over the median due to limited diameter or property
 - Often drivers will avoid or go around local road roundabouts limiting mobility and adding time delays.
 - In roundabouts regardless of size, vehicles do not stop by traffic control, which is a pedestrian hazard
 - As vehicles enter a roundabout, they often do not slow for the exit pedestrian area adding risks
 - Roundabouts usually are too small with a raised island statue blocking sight distance safety views across
 - Roundabouts that are an oversized diameter for truck off tracking, even at off ramps, then result in higher speed cars in an all-yield sign area, increasing slower truck driver merge confusion and truck pedestrian/bike conflict risks
 - Some local agencies add excessive signing warning about trucks and warning drivers of poor design
 - It is tough for law enforcement to enforce off tracking or speed or yield infractions in roundabouts
 - If a traffic signal is warranted by study, then a typical signalized intersection design is safer
 - Highway designers are to consider mobility for all users expectations to have the ability to use the intersection regardless of vehicle type, day, night, winter, summer, weather conditions, and avoid surprising conditions during high volume hours and off peak hours
 - Also designers must consider diverse user types using the intersection simultaneously to address issues
 - Failure to address all users' typical needs may result in unsafe movements and potential accidents

SH-75 and Serenade Lane intersection design considerations (updated 7/2023):

On mainline highways and freeways, ITD strives to follow our mission to ensure safety, mobility and economic opportunity for all users and all modes and to maintain the integrity of the state highway system. The state highway system is the principal routes connecting Idaho communities and supporting intrastate/interstate commerce. Given our operational objectives and commitment to reduce restrictions for users, it is critical to maintain high mobility and to ensure prioritized vehicle movements on the state highways to meet driver expectations. ITD endeavors to keep intersections simple and intuitive for each user of the system. It is important to minimize driver confusion and errors that may occur during the day, night or adverse weather conditions thus increasing drivers' ability to navigate an intersection with minimal need for additional advance signing, curbing, lights, or paint/markings.

At-grade intersection improvements such as signals, signing, widening, pedestrian signals, and geometric operational reconfiguration shall strive for standard configurations that are familiar to approaching drivers while also prioritizing mobility on the state system that also allows intersection safety benefits for trucks, cars, bicycles, and pedestrians during peak hour traffic volumes and with 20 year or more growth projections.

A traffic signal provides optimal performance at this location for many reasons including the following:

- SH-75 is being widened beginning by 2026 to four lanes approaching the City of Ketchum due to traffic levels.
- There are high mainline volumes on SH-75 now and in the projected 20 year traffic volumes.
 - In 2019 the Average Annual Daily Traffic (AADT) was 17,400. Forecast AADT for 2041 is over 33,000
 - It reduces delay over 40 seconds signal cycle in 2041 compared to other alternatives managing flow
- This intersection being signalized will be better suited for commercial vehicles providing goods and services to this community and beyond.
 - 2019 Commercial vehicle AADT was 780; With 2041 Commercial vehicle AADT projected at 2,400.
- Bicyclists and pedestrians will have a signalized intersection for access to both sides of the highway system.
- With a signal there will be increased traffic gaps upstream and downstream of this intersection for vehicles safely accessing the highway versus only limited gaps for local road traffic if a roundabout geometry.
- Reduced right of way and minimal environmental permits compared with other alternatives.
- Ease of ongoing summer and winter maintenance and typical operational striping and signing.
- Traffic volumes are not balanced on each of the legs of the intersection, a factor not in favor of a roundabout. During the 8 peak hour volumes, on average 91.5% of the traffic is on SH-75 and 8.5% of the traffic is on Serenade Lane, thus highway mainline traffic would be redirected continuously without need or benefits.
- The intersection currently meets the following traffic signal warrants: Eight-Hour Vehicular Volume, Four-Hour Vehicular Volume, and Peak Hour. If a signal is warranted then installing is best long term dependable solution.

Roundabout geometry without intersection signal traffic control is not viable at this highway location:

- State highways are dedicated for moving all vehicles efficiently and safely. Roundabouts are designed for low volume streets and must slow vehicles down to 15mph or less - with high volumes this would cause significant back-ups at peak times. This would get worse as volumes increased in future years not allowing gaps for pedestrians and with no signals and yield only traffic control on a roundabout to assist.
- In consultation with our freight and trucking advisory committees, they confirm often drivers have a difficult time navigating roundabouts with other vehicles as they are incorrectly expected to "off track" onto a median apron or into the adjacent lane. Additionally they indicated law enforcement expects them to maintain their lane and therefore makes both the driver and the company liable for incidents that may arise. This also makes insurance claims difficult to manage while law enforcement activity of speed and yielding traffic control during high volume times (creating vehicle and trucks with just 1-2 seconds gaps) is not practical in roundabouts.
- Bikes, pedestrians, and especially disabled users have a difficult time navigating roundabouts. Cars do not stop and this makes these users especially vulnerable, guessing what exit a car will take with limited gaps to cross.
- Intersections with unbalanced volumes at each leg give equal priority to each leg. The mainline higher volumes should have longer priority times for efficient operation, which a traffic signal helps control and is adaptable.
- Trucks shall not leave their lane or drag trailers over curbs tipping a trailer and distracting drivers, adjacent vehicles, and pedestrians looking for gaps to cross – if peak hour is 3600 that's one car per second on average.

**Idaho Department of Transportation
Freight Advisory Committee
and
Trucking Advisory Committee**

Joint Resolution - February 28, 2023

WHEREAS, Idaho Code 40-307 allows for the administration of their function, the Board may employ such persons as are deemed necessary.

WHEREAS, Idaho Code 40-314(3) provides authority of Board to exercise powers necessary to implement the provisions of Title 40;

WHEREAS, Idaho Transportation Board Policy 4048 establishes the Freight Advisory Committee (FAC) to serve as a forum for freight stakeholders to advise the Idaho Transportation Board and the Idaho Transportation Department on freight transportation needs, transportation policy, transportation projects and project funding in developing a safe, efficient and connected freight transportation system supporting the economic vitality of Idaho;

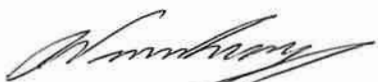
WHEREAS, Idaho Transportation Board Policy 5042 establishes the Trucking Advisory Council (TAC) to advise the Idaho Transportation Board and the Idaho Transportation Department on issues and policies concerning freight transportation, trucking safety, and services in Idaho;

WHEREAS, such advice provided to the Board by the FAC and TAC shall include laws, rules, regulations, policies, and procedures affecting motor carrier operations within the State of Idaho. The FAC and TAC shall provide leadership, recommend law, administrative rule, and/or procedural changes to improve customer service, promote safe freight and trucking practices, identify transportation needs, recommend multi-modal transportation safety improvements, and promote coordinated freight transportation system;

WHEREAS, the State Highway System is the principal routes connecting Idaho's communities, agricultural production, consumer goods production and manufacturing industries with national and global intrastate/interstate commerce;

WHEREAS, the Idaho Transportation Department is committed to maintaining mobility and safety of the traveling public with typical intersection lane configurations for highway intersections. ITD shall not install unique non-traditional street designs such as roundabouts (traffic circles) or displaced left turn (DLT) intersection types in part due to traffic volumes and driver expectations on state highways, and a priority to reduce CMV restrictions or bottlenecks on the State Highway System;

*NOW THEREFORE BE IT RESOLVED, that the Idaho Transportation Department's Freight Advisory Committee and Trucking Advisory Committee jointly endorse the Idaho Transportation Department's memorandum *ITD Intersection Selection Practice for the State Highway System Policy (2/28/2023)*.*



Winston Inouye
Chair
ITD Freight Advisory Committee



John Pocock
Chair
ITD Trucking Advisory Committee

General notes SH-75 widening project intersections:

1. ITD has been working with the City of Ketchum since 2020 and the Resort Cities Coalition for about a year regarding intersection requests and the SH-75 4-lane widening design project through Ketchum.
2. State highway traffic volumes are much higher than local rural roads, and SH-75 is a congested route that warrants widening from two lanes to four lanes, with 13,500 AADT through Ketchum and CAADT of 1200 or 9% trucks. North of Warm Springs Rd on SH-75 drops to 5200 AADT with a CAADT of 410 (about 8% trucks).
3. The Serenade Lane intersection at SH-75 at Ketchum city limits is similar to busy intersections from Hailey to Ketchum that do meet traffic signal warrants and which are currently signalized due to high traffic volumes on SH-75 and pedestrian, bicycle, and turning vehicles safety (see TAC/FAC comments below in 9.).
4. In 2021-2022, the Ohio Gulch Road at SH-75 intersection study near Hailey received strong public support and after various public meetings, with local Representatives and Commissioners attending, received community praise with interim left turn striping in 2022. Then when a traffic signal warrant study was updated by fall 2022 confirming that a new traffic signal would be installed this summer 2023 for SH-75 safety at Ohio Gulch Road, just a few miles from Ketchum, the community expressed gratitude for addressing all users' needs including pedestrian push button signal time and left turning residential and truck traffic in a timely manner.
5. For Serenade Lane at SH-75, the City of Ketchum requested the District 4 team consider a roundabout. ITD invested design and environmental resources to consider options, but the traffic signal warrant clarified for the project team a typical signal configuration provides the best immediate and long-term benefits for all users at the T-intersection - including pedestrian, bicycle and commercial vehicle traffic during day, night, and for all weather driver scenarios. RAs also are difficult for peds/bike to determine when a vehicle is exiting to before they cross.
6. Operating an intersection for highway traffic (maybe 40+ years) must consider peak hour volumes, operational issues, maintainability, meeting driver expectations and all weather day and night considerations as key factors.
7. Numerous public meetings shared study progress since 2020 during the project delivery phase.
8. On March 30, 2022, DE Barrus and COO McElhinney met in Ketchum with the Mayor and team. The widening to four lanes and the traffic volumes benefit most from a signal. The Mayor expressed some support and thanks.
9. The findings concerning roundabout style intersections on mainline highways was studied during this time and presented to the **ITD Truck Advisory Committee and Freight Advisory Committee** for review and input. The key concerns during the all members discussion in fall and winter meetings were firm comments:
 - ITD should not build truck restrictive highway features and not add to driver confusion.
 - Truck drivers feel roundabouts are dangerous for trucks and adjacent cars or bikes.
 - Requiring a truck to off track onto a curb or into the next lane is bad left turn design.
 - This is not Europe with short trucks; US state highways must accommodate all commercial trucks.
 - Some local agencies add excessive signing warning about trucks and confusing drivers about poor design.
 - Drivers cannot track in mirrors/views of peds/bikes and cars, creating a zigzag issue for users.
 - Roundabouts are tough to maneuver, and require driving over curbs tilting trailers.
 - Often drivers will avoid or go around local road roundabouts limiting mobility.
 - In roundabouts regardless of size, vehicles do not stop which is a pedestrian hazard.
 - As vehicles enter a roundabout, they often do not slow for the exit pedestrian area.
 - Local roundabouts usually are too small with an island statue blocking views across.
 - Roundabouts with an oversized diameter, even at off ramps, result in high-speed cars in an all-yield sign area, without traffic stop controls, increasing truck driver confusion and pedestrian/bike conflict risks.
 - It is tough for law enforcement to enforce off tracking or speed or yield infractions in roundabouts.
 - All members agreed if a traffic signal warranted, then a typical signal design is safer and best option.
10. In summary, the TAC/FAC reaffirmed the ITD direction on no roundabouts or DLTs on mainline state highways with their signed resolution during their annual joint meeting February 28, 2023 attached for reference.