

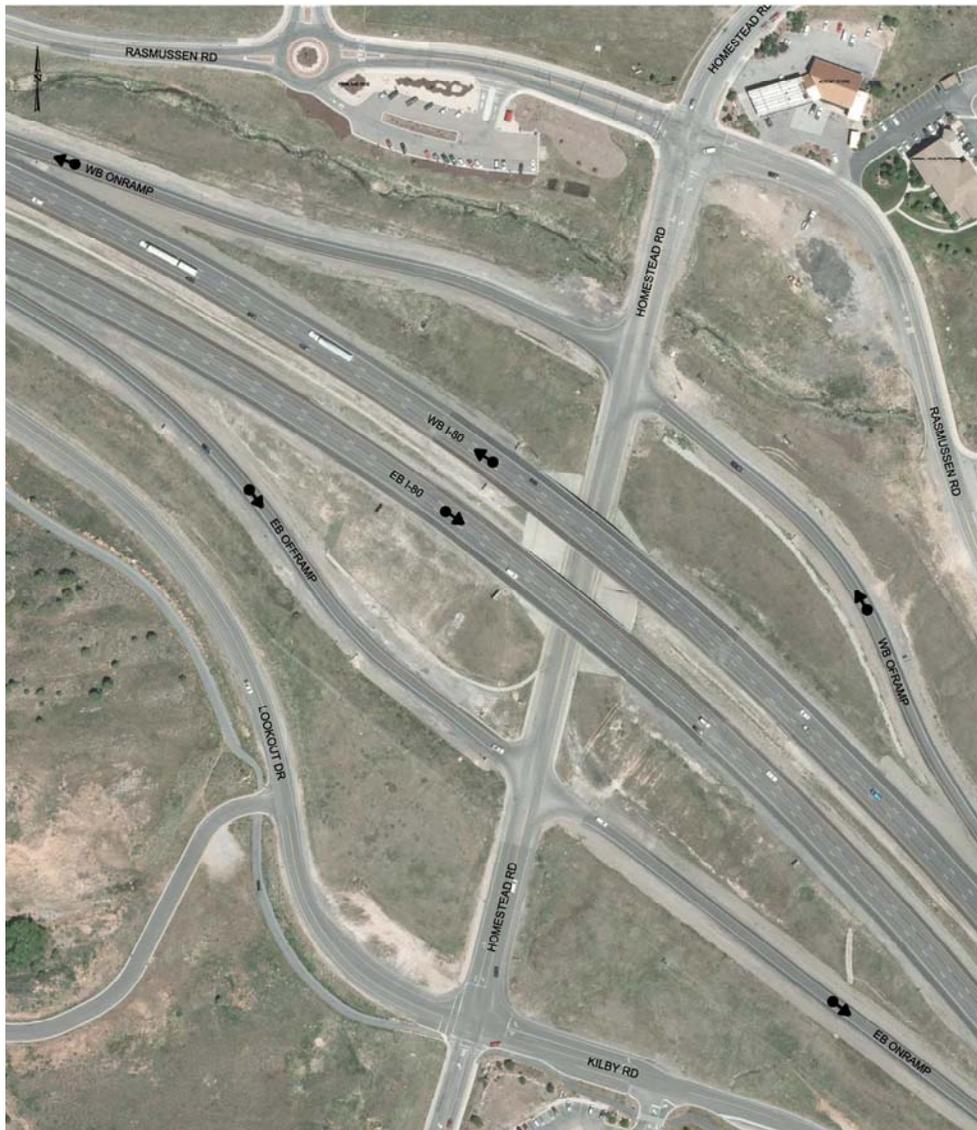
UTAH DEPARTMENT OF TRANSPORTATION
Region 2

Planning Study

I-80 Jeremy Ranch Exit; MP 141

PIN 13255

August 19, 2015



PLANNING STUDY

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PLANNING STUDY

Executive Summary

INTRODUCTION

The I-80 Jeremy Ranch Interchange, located at M.P. 141 along I-80, serves vital community and commercial interests in western Summit County. The purpose of the study is to evaluate intersection design options for the I-80 Interchange and the Jeremy Ranch frontage roads (Homestead, Kilby, and Rasmussen) and recommend solutions, with cost estimates, that provide an acceptable level of service to the year 2040. The study has taken into account a phased approach to construction considering the replacement of I-80 bridge replacement. The study used the available data that has been generated by UDOT and Summit County.

There have been previous studies accomplished for this area including a study in June 2007, a follow up study, dated June 2009, and a recent traffic signal warrant for the ramps. The recommendations of these studies were not mutually supported by UDOT and Summit County due to the concern over the impact to the I-80 highway and the ramps, or the proposed vision for this area. The goal of this study is to identify a solution that will meet the needs of both stakeholders.

IDENTIFIED STUDY SOLUTIONS

At the kickoff meeting with UDOT and Summit County, Stanley Consultants Team (herein called Team) presented nine possible options to the group with a brief discussion of the pros and cons of each option (minutes of meeting dated April 9, 2015). The group also discussed and brainstormed other potential possibilities. The meeting concluded with a decision to proceed with the following options in the sequence listed:

1. Modified U-turn (Option 5). This option allows left turn movements for the I-80 on-ramps.
2. If Option 5 fails then study the Modified U-Turn with no left turn movement for the I-80 on-ramps (Option 6).
3. If Option 6 fails then evaluate the large 6 legged roundabout (Option 8).
4. If Option 8 fails then advance the Single Point Urban Interchange (SPUI) with possibility of roundabouts at the local roads (Option 9).

RESULTS

The following are the results based on the VISSIM modeling analysis for the 2030 and 2040 AM and PM peak hour conditions:

- The modified U-Turn with left turns to the on-ramp (Option 5) produced an acceptable level of service for year 2030, but not for year 2040. The principle mode of failure was the westbound off-ramp backing into I-80 traffic.
- The modified U-Turn with no left turns (Option 6) failed to provide an acceptable level of service in the year 2030. The principle mode of failure was the westbound off-ramp backing into I-80 traffic.
- The large 6 leg roundabout (Option 8) provided an acceptable level of service for the years 2030 and 2040. Option 9 was not evaluated since Option 8 was an acceptable solution.

PLANNING STUDY

Executive Summary

RECOMMENDATIONS

The modified U-turn option (Option 5) provides an acceptable level of service for the year 2030 but does not meet the project objective to provide adequate level of service in 2040. The estimated total cost to construct the modified U-turn option is \$3,785,000. Due to the fact that it is not known when the I-80 bridges will be replaced (the bridges have high sufficiency and the UDOT Structures Division indicated that the bridges may be replaced within the next 10 to 20 years), and the bridges replacements will change the layout of this option, it is not recommended to proceed with this option.

The modified U-Turn with no left turn movements for the I-80 on-ramps (Option 6) failed for the year 2030 and is not recommended.

The recommendation of this study is to construct the large six leg roundabouts (Option 8). This option provides an acceptable level of service for the year 2040 and beyond. The dual lane configuration of the large roundabout makes it possible to integrate the roundabouts with very little modification into a future reconstruction of the interchange as either a SPUI or as the same diamond configuration. The estimated total cost to construct the large six leg roundabout is \$6,733,000. This option provides ample level of service until 2040 and potentially beyond.

Due to potential funding limitations, it may be necessary to construct each roundabout separately with 2 or more projects. This is feasible, though not recommended due to the impact on driver expectations. If it is decided to phase the project, the north roundabout should be constructed first due to the current level of service and traffic congestion that is occurring at the existing interchange. Potential issues which could impact the construction of the recommended option include underground utilities, the stream, the proximity of the Jeremy Ranch elementary school, the park and ride and public opinion. As a result, it is recommended that the work on the documented categorical exclusion (CatEx) document begin as soon as possible to prevent these potential issues from impacting a timely construction.

PLANNING STUDY – Design Data

SECTION 1: General Information

Project Name:	I-80 MP 141 – Jeremy Ranch Exit (Feasibility Study)		
Project Manager:	Steve Quinn	County:	Summit
Pin Number:	13255	Begin Mile Post:	141
Project Number:	S-I80-4(155)141	End Mile Post:	141
Route Number:	I-80	Design Year:	2040
Functional Classification:	Interstate Freeway	Design Speed:	Varies (70/50/40)

Purpose and Need:

This is a feasibility Study. The intent is to develop interchange or intersection options for the I-80 Jeremy Ranch exit and study possible intersection adjustments that will provide adequate capacity for the interchange and side intersections until 2040. This study included a review of the existing studies, development of baseline regional traffic numbers and growth pattern culminating in the development of a comprehensive traffic model for the interchange up to the year 2040.

Major Project Risks for Implementation of Selected Study Option:

*Traffic develops at a rate significantly different than the predicted rate.
 Interchange planned between Jeremy Ranch and Kimball Junction is not built as scheduled.
 Summit County changes projected zoning to increase density.
 There is an existing stream crossing that will be crossed and may impact design.
 Utilities within the ROW are impacted.
 A structure project to replace the interchange bridge is moved forward and the interchange layout is drastically modified may have an impact on the proposed option.
 Some opposition to the Roundabouts by the public or stakeholders.
 Funding for the project is not available.*

Project Estimate and Timeline:

Preferred Alternative Total Project Cost (Current Year):	\$6,401,000	Estimated Construction Duration:	120 days
Preferred Alternative Construction Year Estimate (2016):	\$6,733,000	Recommended Commission Approved Amount:	\$6,733,000

Signature Block:

Project Manager	Date	Region Preconstruction Engineer	Date
Region STIP Workshop Chair	Date	Region Director	Date
Prepared By	Date		

PLANNING STUDY – Design Data

SECTION 2: Detailed Design Information

Roadway / Pavement Summary (Activities 54C, 58C, 76C, Page 2 of 6 of Cost Estimate Sheet)

Prior to this study several studies were conducted analyzing solutions at this interchange. The first, a 2007 study analyzed several options including signalized intersections at the frontage roads and full interchange reconstructions. The recommended solution to this study was providing full signals at each intersection while significantly expanding the intersection footprint to accommodate the additional lanes. Because Summit County does not support signals within their roadways there was a follow up memo in 2009 that suggested that 4 small roundabouts, one at each frontage road and ramp intersection would be a viable solution. UDOT didn't support this option due to the potential impact on the ramps and the I-80. This study was commenced with the goal to evaluate the prior solutions, look at additional solutions and provide a proposed geometric layout, cost estimate and traffic analysis for up to 3 options. In order to minimize the cost of concurrently evaluating three options, it was later decided to sequentially evaluate options selected by the team until an acceptable Level of Service is reached for the year 2040.

In preparation for the kickoff meeting, several new options were prepared including a Modified U-Turn option that integrated moderately sized roundabouts at the frontage roads to act as the U-Turn movement, the same U-Turn option but allowed left turns at the on-ramps (only), a DDI interchange that utilized the existing bridge and a large 6 leg roundabout that combined the ramp and frontage road intersections into a single large roundabout.

At the kickoff meeting, 9 options were presented. Summit County expressed their preference that no signalized intersections be constructed on the frontage roads. In the end, three options were allowed to move forward for analysis in the current study. These were the modified U-Turn option with Left turns (Option 5), the modified U-Turn option without left turns (Option 6) and the large 6 leg roundabout (Option 9). In the event the three selected options failed, the study would evaluate the construction of a single point urban interchange (SPUI). Traffic models were developed for each option. Each of these options results in a roundabout at the frontage road intersections and leaves the existing curb lines under the bridge unchanged which will not modify the existing structure.

The traffic study revealed that the only option that met the required level of service in the design year (2040), with no impact to the I-80 bridge replacement, was the large roundabout.

Since this is a feasibility study, the Team did not spend a lot of time on the design details of the roundabouts. The roundabout design presented in this report may require optimizations and adjustments to radii or angles to meet the required fast path balancing required in the current design publication along with the other evaluation criteria. The designer should evaluate and optimize the roundabout per the TRB publication NCHRP REPORT 672, "Roundabouts: An Informational Guide" (Second Edition) or it's successor to ensure the roundabout meets all the required design elements and each of the design requirements is checked to ensure the roundabout is balanced and discourages drivers from deviating from the designated lanes.

Traffic and Safety Summary (Activity 64C, Page 3 of 6 of Cost Estimate Sheet)

Traffic volumes were obtained from a collection of pedestrian and vehicular counts conducted by UDOT over the past several years. These counts were conducted at various times of day and represented different seasons of the year. The patterns and trends manifested by the counts were examined to develop a set of base year traffic volumes. Key issues for traffic volumes in this area are the influence of school traffic in the AM peak hour and the marginal historical growth in volume over the years.

PLANNING STUDY – Design Data

Using historic counts, regional and statewide travel demand models, existing land use patterns, and local government land use policies, a set of turning movement forecasts for 2040 conditions were developed. These forecasts were significantly lower than forecasts from the previous study completed in 2007. However, the lower forecasts were deemed appropriate by the study Team given the marginal growth experienced in the last nine years and the geographical constraint for new land development in the area. Additionally, the tempered forecasts were further supported by outputs from the regional travel demand models, which were not previously available in 2007.

Since 2007, multiple studies have been conducted for the Jeremy Ranch area with varying types of alternatives analyzed and recommended. To develop a base set of alternatives to evaluate for this effort, the study Team organized an alternatives workshop with both Summit County and UDOT Region 2 staff on April 9, 2015. In the workshop, the Team reviewed previously studied alternatives, as well as new ideas, and selected two options to consider for this study. These options include a "Modified U-Turn" option as well as a "Large Roundabout" option.

The Modified U-Turn option consisted of small roundabouts at either of the frontage road intersections and modified ramp intersections to channel off-ramp vehicles to turn right towards the roundabouts. This design also contained two variations that either allowed or prohibited direct left turns onto I-80 on ramps. During the study process, it was determined that allowing direct left turns to on-ramps produced better traffic results and the prohibiting left turns variation was eliminated. The Large Roundabout design combined the ramp intersections and frontage road intersections on either side of I-80 into single, large roundabouts.

Both of these options were subjected to traffic analysis for 2040 conditions. Traffic analysis was conducted with the VISSIM software package, a state-of-the-practice traffic simulation program. The evaluation of the options was an iterative process. The outputs of the traffic analysis led to refinements in designs which were then resubmitted to the traffic analysis. Additionally, traffic model efforts were submitted to UDOT staff for review. Comments from UDOT staff further refined the models which led to additional modifications to designs. The final outcome of the analysis was the determination that the Modified U-turn option could only provide acceptable Level of Service (LOS) through 2030 and would fail by 2040. In contrast, the final Large Roundabout option was found to operate acceptably through 2040. As such, the Large Roundabout option was identified as the preferred option arising from this process.

Structures Summary (Activity 62C, Page 4 of 6 of Cost Estimate Sheet)

No work on the existing I-15 interchange bridges is anticipated with this work. If funding is available, structures should be consulted and any concrete or minor structural repairs that are necessary should be undertaken during construction of the suggested alternative.

The selected alternative will require the construction of one or more hydraulic structures to allow the existing stream on the north side of the interchange to be carried through. No hydraulic analysis was performed with this planning study, but one should be required to properly size and site the hydraulic structures. It is possible that the flow rates may be small enough that a pipe may be sufficient which would eliminate the need for any structures. For the purposes of this study, it was assumed box culverts would be required to pass the stream.

PLANNING STUDY – Design Data

Environmental Summary (Activity 52C, Page 5 of 6 of Cost Estimate Sheet)

All planned work is anticipated to be within the existing UDOT right-of-way (ROW).

A fully documented categorical exclusion will be required to move this project forward. This effort will include the evaluation of all resource areas of the built and natural environment. The stream on the north side of I-80 will require partial relocation and construction of new crossings. This may require a permit for stream alteration and minor wetland impact. Air quality and noise analysis may be required.

Right of Way Summary (Activity 56C, Page 6 of 6 of Cost Estimate Sheet)

UDOT ROW encompasses the public ROW on each frontage road and everything in between. A simple analysis of the existing ROW was undertaken as part of this study and revealed no impediments to construction. When the project moves forward a more detailed analysis of the existing ROW should be undertaken to ensure there are no utility easements or other restrictions that could require additional mitigation or costs which were not revealed with this study.

No ROW acquisition is anticipated with this study.

Utility and Railroad Summary (Activity 68C, Page 6 of 6 of Cost Estimate Sheet)

No detailed utility information was collected with this study. There are visible power lines and other utilities with markings within the interchange. Due to the residential and developed nature of the area normal urban type utilities are likely to be found within the interchange, frontage roads and cross street. These would include water, sewer, power, communication and gas. There is a high likelihood of multiple communication lines and high pressure gas lines within the I-80 ROW. There is no railroad within the project limits.

A detailed review of the utilities should be undertaken during the environmental process (likely to be a CatEx) to ensure there are no significant utility impacts.

ITS Summary (Activity 66C, Page 3 of 6 of Cost Estimate Sheet)

UDOT Fiber Map shows existing UDOT ATMs lines within the I-80 ROW. No signals will be constructed with this project. During the CatEx, the UDOT TOC and Region Two traffic and safety should be consulted to see if any ITS activities are required.

No ITS activities are anticipated.

Public Involvement Summary (Activity 60C, Page 2 of 6 of Cost Estimate Sheet)

Because this was a planning study, no public involvement was undertaken. UDOT and/or Summit County should present the proposed layout to their constituents for their input on the proposed solution. During the CatEx process, public meetings should be held to get public input on the proposed alternative.

PLANNING STUDY – Design Data

Miscellaneous Summary:

Redesign and reconstruction of the park and ride facility on the north side of I-80 should be considered with this construction project. There are indications that the park and ride is over capacity and too small for the location. In addition, the reconstruction necessary to accommodate the roundabout would be simplified by reconstructing the park and ride at the same time.

A revised potential layout for the park and ride was developed in concept form and included within the layout with this report. Costs for reconstructing the park and ride have not been included in the cost estimate.

APPENDICIES

1. Workshop Meeting #1 Minutes
2. Workshop Meeting #2 Minutes
3. Technical Evaluation Meeting #1 Minutes
4. Technical Evaluation Meeting #2 Minutes
5. Workshop Meeting #3 Minutes
6. Recommended Alternative Plan View
7. Recommended Alternative Plan View with Modified Park and Ride
8. Detailed Cost Estimate
9. Traffic Forecast Assumptions
10. Traffic Analysis Summary
11. QC Form 2040 – UDOT QC
12. Review Form 2040 – UDOT Final Review (Approved), and Approval Email

Workshop Meeting #1
Meeting Date: April 9, 2015
Notes by: Ahmad Jaber

Name	Representing	Email	Phone
Ahmad Jaber	Stanley Consultants	jaberahmad@stanleygroup.com	801-269-3886
Trent Hanson	Stanley Consultants	hansontrent@stanleygroup.com	801-239-8880
Amber Mortensen	UDOT Traffic	akmortensen@utah.gov	801-910-2171
Charles Allen	InterPlan	charles@interplanco.com	801-307-3400
Eric Rasband	UDOT	crasband@utah.gov	801-608-8870
Derrick Radke	Summit County	dradke@summitcounty.org	435-336-3978
Leslie Crawford	Summit County	lcrawford@summitcountu.org	435-336-3120
Steve Quinn	UDOT	squinn@utah.gov	801-503-6451
Todd Richins	UDOT	tlrichins@utah.gov	801-910-2130
Kelly Burns	UDOT	kburns@utah.gov	801-386-6118
Danny Page	UDOT	dpage@utah.gov	801-975-4827
Josh Sletten	UDOT	jsletten@utah.gov	801-965-4879
Steve Poulsen	UDOT	stevepoulsen@utah.gov	801-887-8791

- Steve Quinn, UDOT PM, welcomed everyone to the Workshop and explained the purpose of the meeting. The following are the highlights of the meeting:
- Ahmad introduced the project and give a brief background and intent of the meeting.
- Steve Quinn started a discussion that Todd brought up that this might be a wildlife migratory route. The response is that we do not know if it will be a migratory route, and at this time, we should proceed with the study as planned.
- To begin the discussion of options the timeline for bridge replacement was discussed as this would control options. Many of the bridges along the I-80 corridor have been built replaced or rehabilitated. So, UDOT Structures believe that it is reasonable to replace the bridge within 10-20 years.
- Summit County doesn't want to maintain signals, the county has no signals and would like to have none for the foreseeable future. The county would prefer roundabouts and other free flowing traffic accommodations.
- Ahmad presented nine options with the group. A handout of the list and type of options is attached.
- The committee discussed these options, the cost and Level of Service:
- The difference between option 1 & 2 diamond is the number of through lanes at the intersections. Cost is high because both options require the bridges to be replaced.
- The selected alternate from the previous study was the 4 roundabouts. This option was not acceptable to all.
- The 2009 alternative was the modified U-turn. This option failed due to traffic onto the on- ramps immediately. Low cost option, no need to replace the structure immediately.

- A new option, the modified U-turn with no left turn movement was presented. This option may work from a traffic perspective. Need to educate the public about the option if selected. Low cost option, potential for public opposition.
- A DDI option using the existing structure with the removal of the slope embankment was discussed. Stanley doesn't have the cost, but will be happy to run the numbers if the committee chooses to pursue this option. Due to signing and maintenance issues this option was later dropped.
- A combined (large) roundabout. This is a possible solution and the concept has been used by other states.
- Eric Rasband discussed the J-hooks to connect directly to frontage roads. He showed the example in Bentonville, Arkansas.
- Ahmad brought up that if the bridge replacement will occur by 2030, the traffic projections may be done for that year. Once the bridges on I-80 are replaced there will be many other options to address traffic needs.
- Derrick would like the large roundabout to move forward.
- Summit County likes the modified U-turn option.
- UDOT expressed concerns that roundabouts have an ultimate capacity.

After further discussion of these options the decision was made by the group to analyze the following options:

1. Time frame for the study is 20 years. Structures are comfortable that the bridges on I-80 will be replaced by that time frame and more options will become available. From the discussion it was pointed out that this would make this project an interim project to reduce congestion and compensate for additional growth until the bridges can be replaced.
2. Study Option 5, modified Michigan U-Turn, with allowable left turns for the I-80 on-ramps, will be analyzed first. Even though this option failed in the initial study immediately those traffic projections have not been reached.
3. If Option 5 fails then go to Option 6, Modified Michigan U-Turn with no left turns onto the on-ramps allowed. Potential to phased approach with modified U-turn roundabouts working with a SPUI constructed at a later date with the bridge replacement, group agrees to move it forward. Everything needs to consider pedestrian movements.
4. Option 5 and 6 are considered a single option in this consideration due to the minor difference between them.
5. The second option for the project to consider and advance is the large 6 entrance/2 lane roundabouts which combine interchange ramps and frontage road intersection into a single roundabout. A potential issue with the stream on the east side. Summit County doesn't see this a problem and could use the project to improve the stream quality.
6. Options 9, SPUI with roundabout combination. This option will be analyzed if all alternates above fail but modified to accommodate roundabouts on the frontage roads.
7. Options will consider a phased approach.
8. All options need to look at the trail.

Summit County and UDOT expressed interest in getting the project completed in less than six months. Ahmad believes that a decision on the agreed option could be done within the next couple of months. That will help the County with their next phase, while Stanley's Team is doing the paperwork. Stanley requested access to information and modeling from previous consultants. Information was provided by Eric Rasband.

Stanley also requested information about the future development zonings for the properties adjacent to the County Roads. Leslie will provide the information. The consultants were directed to use the currently permitted zoning and agreed upon number of residences for the travel demand model.

Workshop Meeting #1

											April 9, 2015	
I-80- Jeremy Ranch Workshop #1												
	No Build Alternative	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Comments	
	Existing w. Traffic Signals	Diamond Interchange Signal, Option 1	Diamond Interchange Signal, Option 2	SPUI	Rounadbout one at each Intersection (4 roundabouts total)	Modified Michigan U-Turn	Modified Michigan U-Turn; No left turn onto I-80	DDI	Roundabout combining interestions (2 roundabouts total)	SPUI/Rounabouts Combinations		
Done by Others	Yes	Yes	Yes	Yes	Yes	yes	No	No	No	No		
LOS Results(2030)	F	D	D	D	F	Failure						
Cost (year)	Minimal	\$22 M (2007)	\$21.75 (2007)	\$26.6 (2007)	\$10.3 (2007)	\$1.5 (2009)						
I-80 Bridge Impact	N/A	Replacement	Replacement	Replacement	N/A		Modficiation	Modification	N/A	Modifications	bridges have high SR	
Pedestrian Flow/ Impact												
Project Phasing												
Additional Construction Rework												
Right of Way Impact									Impact			
Impact on Canal									Big Impact			
Environmental Impact									Impact			
Comments	Yr 2020; Overall LOS E, with LOS F (North Intersection) at Rasmussen to Homestaed SB	Year 2030; LOS D (South Intersection) at Kilby EB approach; LOS is C or better for the rest	Year 2030; LOS D (South Intersection) at Kilby EB approach; LOS is C or better for the rest	Year 2030; Los D (North Intersection) at Homestead SB approach, LOS is C or better for the rest	FY2030; LOS F (South Intersection) at Kilby WB; LOS F at West Bound Off-Ramp at Homestead SB; LOS C or better on the rest	Round abouts at the outside are satisfactory; Failure by 2015 AM peak to make left Trun onto I-80 in 2015	Can built pedestrian along exisitng bridge slope protection	Can address Pedestrian		Can address Pedestrian		

WORKSHOP MEETING #2

Date: May 28, 2015 **Place:** Region Two, Canyon 1 Room

Project/Purpose: I-80 Jeremy Ranch Exit,
Workshop 2 **Notes By:** Ahmad Jaber

PERSONS ATTENDING

1. Steve Quinn	9. Amber Mortensen
2. Ahmad Jaber	10. Patrick Cowley
3. Trent Hanson	11. Kelly Burns
4. Charles Allen	12.
5. Eric Rasband	13.
6. Derrick Radke	14.
7. Marjorie Rasmussen	15.
8. Nicholas Clark	16.

ITEMS TO BE DISCUSSED:

1. Welcome and Introduction	7.
2. Workshop Objective	8.
3. Traffic Projections	9.
4. Design Alternatives Analyzed	10.
5. Recommendations	11.
6. Next Step	12.

NOTES:

Steve Quinn, UDOT PM, welcomed everyone and asked them to introduce themselves. He also reminded everyone of the project objectives and gave a brief history of the project.

Ahmad gave a brief background of the first workshop and the nine layout options discussed and the recommendations of the group. Ahmad also talked about the meeting held on May 08, 2015, and attended by Steve, Ahmad, Derrick Radke, Leslie Crawford, Mike Kendell, Eric Rasband, Trent Hanson, and Charles Allen where the traffic projection were discussed and the group agreed with the traffic data projections Charles presented.

Ahmad presented the two layout options that the Stanley's Team analyzed with the "pros and cons" of these options. Based on the preliminary traffic modelling, it appears that both options will give an acceptable level of service by 2040. The group discussed traffic "weaving", signing, and suggested improvements to these layouts. Funding for the options were also discussed. The timing for the bridges replacement was also discussed.

The team agreed on the following:

1. Submit the VISSIM traffic analysis to Eric Rasband and Kelly Burns for their review.
2. Proceed with the development of both options to ensure that both will work. Generate a high level cost estimate for these options.
3. Send the final layout to Eric (this should be done in about two weeks).
4. Steve will schedule a follow up meeting in three weeks.

Technical Evaluation Meeting #1

Date: June 9, 2015 **Place:** TOC Room 230
Project/Purpose: I-80 Jeremy Ranch Exit,
Technical Evaluation **Notes By:** Ahmad Jaber

PERSONS ATTENDING

1. Steve Quinn	9. Grant Farnsworth
2. Ahmad Jaber	10. Brett Hadley
3. Trent Hanson	11.
4. Charles Allen	12.
5. Eric Rasband	13.
6. Kelly Burns	14.
7. Mark Johnson (GoTo Call)	15.
8. Rob Clayton	16.

ITEMS TO BE DISCUSSED:

1. Welcome and Introduction	7.
2. Intent of Meeting	8.
3. Recommendations	9.
4. Next Step	10.
5.	11.
6.	12.

After a brief introduction of those present and the intent of the meeting, the Eric Rasband and Charles Allen updated the team on the results of the meeting they had yesterday (Monday). The group agreed on the following:

InterPlan will run the model based on the meeting with Eric and have the information submitted to Eric and Kelly by the end of the current week. The TOC will review the results and give their feedback by Tuesday of next week. Stanley Consultants will revise the layout as per the new results and forward the same to MTJ for optimizing the geometry. A follow up meeting with the same group is scheduled for Wednesday, June 17th to discuss the geometric layout and recommendations.

Technical Evaluation Meeting #2

Date: June 17, 2015 Place: TOC Room 133
Project/Purpose: I-80 Jeremy Ranch Exit, Technical Evaluation Notes By: Ahmad Jaber

PERSONS ATTENDING

1. Steve Quinn	9.
2. Ahmad Jaber	10.
3. Trent Hanson	11.
4. Charles Allen	12.
5. Kelly Burns	13.
6. Mark Johnson (GoTo Call)	14.
7.	15.
8.	16.

ITEMS TO BE DISCUSSED:

1. Welcome and Introduction	7.
2. Follow up from Last Week	8.
3. Recommendations	9.
4. Next Step	10.
5.	11.
6.	12.

NOTES:

The following is a highlight of the discussion:

- UDOT has used VISSIM on many projects, including roundabouts and would like to use this model or the final analysis and decision making of the roundabouts.
- From a traffic analysis perspective, the large roundabout is a feasible solution. There may be opportunities for scaling the size back, and make geometric improvements
- The small roundabout may be acceptable for the year 2030 with the addition of the hook ramp, from Rassmussen Road east bound to I-80 west bound on-ramp.
- InterPlan will check if the small roundabout is still feasible for the year 2040, with adding other geometric improvements as discussed in the meeting.
- Steve Quinn to share the information with Region Two leadership to make sure they are comfortable with the solutions.
- We will present these solutions at the meeting with Summit County on Monday, January 22nd, 2015.
- We will also present a high level cost estimate to the team for their information. A more detailed estimate will be generated at a later date.
- We will have a pros and cons list to share with the team on Monday

WORKSHOP MEETING #3

Date: June 22, 2015 Place: Region Two
Project/Purpose: I-80 Jeremy Ranch Exit, Workshop 3 Notes By: Ahmad Jaber

PERSONS INVITED (ATTENDING)

1. Steve Quinn (SQ)	9. Amber Mortensen
2. Ahmad Jaber (AJ)	10. Patrick Cowley
3. Trent Hanson	11. Kelly Burns (KB)
4. Charles Allen (CA)	12. Leslie Crawford
5. Eric Rasband	13. Steve Poulsen
6. Derrick Radke (DR)	14. Cheryl Hersh Simmons
7. Marjorie Rasmussen (MCR)	15. Peter Jager (PJ)
8. Nicholas Clark (NNC)	16. Brandon Brady (BB)

ITEMS TO BE DISCUSSED:

1. Welcome and Introduction	7.
2. Update since last Workshop	8.
3. Results of Analysis	9.
4. Alternative Evaluation matrix	10.
5. Recommendations	11.
6. Next Step	12.

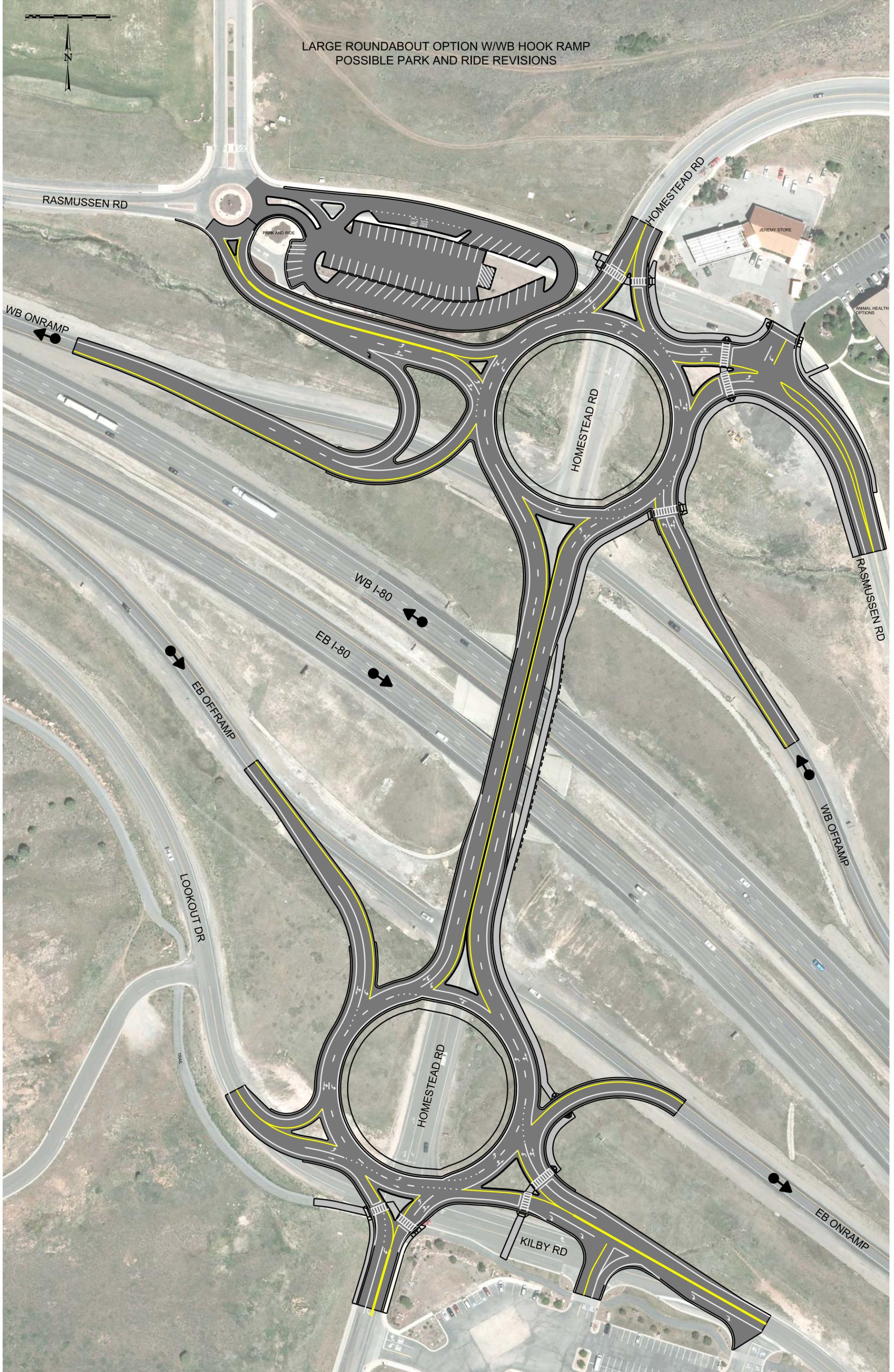
NOTES:

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1. Steve Quinn and Ahmad updated those present on the status of the two final solutions.
 2. Ahmad presented the draft "Pros and Cons" of each option (Evaluation Matrix Attached).
 3. UDOT is planning to present the project to the Utah Transportation Commission for their support.
 4. Stanley Consultants Team will continue with the analysis and optimization of the large roundabout.
 5. Stanley Consultants Team will wait to hear if we should proceed with the optimization of the Modified Michigan U-Turn (small roundabout) until after the Transportation Commission meeting.
 6. No environmental or utility work will be done on this phase of the project.
 7. Summit County would like InterPlan to share the visual analysis of their work.

LARGE ROUNDABOUT OPTION W/WB HOOK RAMP



LARGE ROUNDABOUT OPTION W/WB HOOK RAMP
POSSIBLE PARK AND RIDE REVISIONS



Cost Estimate - Planning Level

PIN: 13321 PROJECT # S-I80-4(155)141 PROJECT NAME: I-80 MP 141 – Jeremy Ranch Exit

Prepared By: Stanley Consultants

Date 8/19/2015

Proposed Project Scope: Roundabouts at Jeremy Ranch Exit - Large Roundabout Option

Approximate Route Reference Mile Post (BEGIN) =	141.500	(END) =	142.280
Project Length =	0.780	miles	4,118 ft
Current FY Year (July-June) =	2015		
Assumed Construction FY Year =	2016		
Construction Items Inflation Factor =	1.06	1 yrs for inflation	
Assumed Yearly Inflation for Engineering Services (PE and CE) (%/yr) =	3.0%		
Assumed Yearly Inflation for Right of Way (%/yr) =	2.0%		
Items not Estimated (% of Construction) =	20.0%		
Preliminary Engineering (% of Construction + Incentives) =	8.0%		
Construction Engineering (% of Construction + Incentives) =	7.5%		

Construction Items	Cost	Remarks
Pulic Information Services	\$8,000	
Roadway and Drainage	\$3,327,968	
Traffic and Safety	\$226,450	
Structures	\$625,000	
Environmental Mitigation	\$51,600	
ITS	\$0	
	Subtotal	
	Items not Estimated (20%)	
	Construction Subtotal	
	\$4,239,018	
	\$847,804	
	\$5,086,822	
P.E. Cost	P.E. Subtotal	8%
	\$408,041	
C.E. Cost	C.E. Subtotal	8%
	\$382,539	
Right of Way	Right of Way Subtotal	\$0
Utilities	Utilities Subtotal	\$10,000
Incentives	Incentives Subtotal	\$13,696
Miscellaneous	Miscellaneous Subtotal	\$0

Cost Estimate (ePM screen 505)	2015	2016
P.E.	\$408,000	\$420,000
Right of Way	\$0	\$0
Utilities	\$10,000	\$11,000
Construction	\$5,087,000	\$5,367,000
C.E.	\$383,000	\$394,000
Incentives	\$14,000	\$15,000
Aesthetics	0.75% \$38,000	\$40,000
Change Order Contingency	9.00% \$461,000	\$486,000
UDOT Oversight	\$0	\$0
Miscellaneous	\$0	\$0
TOTAL	\$6,401,000	\$6,733,000

PROPOSED COMMISSION REQUEST	TOTAL \$6,401,000	TOTAL \$6,733,000
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Project Assumptions/Risks

1 No utility impacts (One power pole move accounted for)	8
2 No right of way required	9
3 No wetland mitigationf for the stream move	10
4 I-80 bridge is sufficient and does not need replacement	11
5 11 Foot lanes underneath the I-80 bridge are required to remain within the existing curb lines	12
6 No significant landscaping, weed and seed is all that is estimated	13
7	14

Roadway and Drainage (Activities 54C, 58C and 76C)

PIN: 13321 PROJECT # S-I80-4(155)141 PROJECT NAME: I-80 MP 141 – Jeremy Ranch Exit

Item #	Item	Quantity	Units	Price	Cost	Remarks
Roadway						
012850010	Mobilization	1	Lump	\$400,000.00	\$400,000.00	Usually 7-10% of construction
015540005	Traffic Control	1	Lump	\$200,000.00	\$200,000.00	Usually 3-5% of construction
01557001*	Maintenance of Traffic	1	Lump	\$50,000.00	\$50,000.00	Usually 1% of construction
015720020	Dust Control and Watering	749	1000 gal	\$35.00	\$26,215.00	
027760030	Concrete Flatwork 4 inch thick	10,333	sq ft	\$4.00	\$41,332.00	
020560015	Granular Borrow (Plan Quantity)	9,852	cu yd	\$25.00	\$246,300.00	
022210020	Remove Box Culvert	1	Each	\$10,000.00	\$10,000.00	
022210165	Remove Asphalt Pavement	20,811	sq yd	\$6.00	\$124,865.47	
022210110	Remove Concrete Sidewalk	333	sq yd	\$12.00	\$4,000.00	
022210125	Remove concrete curb and gutter	4,125	ft	\$5.00	\$20,622.50	
022310010	Clearing and Grubbing	1	Lump	\$25,000.00	\$25,000.00	
023160020	Roadway Excavation (Plan Quantity)	19,741	cu yd	\$12.00	\$236,892.00	
027710025	Concrete Curb and Gutter Type B1	8,249	ft	\$18.00	\$148,482.00	
027710017	Concrete Curb Type B5	2,687	ft	\$10.00	\$26,870.00	
027210020	Untreated Base Course (Plan Quantity)	6,568	cu yd	\$30.00	\$197,040.00	
027350010	Micro-Surfacing	27,334	sq yd	\$3.00	\$82,002.00	
027410060	HMA - 3/4 Inch	9,102	Ton	\$90.00	\$819,180.00	
027480010	Liquid Asphalt MC-70 or MC-250	60	Ton	\$700.00	\$42,000.00	Prime Coat
027480040	Emulsified Asphalt CSS-1	8	Ton	\$700.00	\$5,600.00	Tack Coat
027520020	Portland Cement Concrete Pavement 9 inch Thick	2,223	sq yd	\$40.00	\$88,920.00	
027710025	Concrete Curb and Gutter Type B1	8,249	ft	\$18.00	\$148,482.00	
027760010	Concrete Sidewalk	24,833	sq ft	\$5.00	\$124,165.00	
027710059	Perpendicular/Parallel Pedestrian Access Ramp	14	Each	\$2,500.00	\$35,000.00	
Roadway Subtotal					\$3,102,968	
Drainage						
026101388	24 Inch Irrigation/Storm Drain, Class C, smooth	2,000	ft	\$75.00	\$150,000.00	
026330130	Concrete Drainage Structure 5 ft to 7 ft deep - CB 9	25	Each	\$3,000.00	\$75,000.00	
Drainage Subtotal					\$225,000	
PI						
013150010	Public Information Services	1	Lump	\$8,000.00	\$8,000.00	Usually 0.25% of construction

Traffic, Safety & ITS (Activities 64C and 66C)

PIN: 13321 PROJECT # S-I80-4(155)141 PROJECT NAME: I-80 MP 141 – Jeremy Ranch Exit

Item #	Item	Quantity	Units	Price	Cost	Remarks
Traffic						
027650050	Pavement Marking Paint	214	gal	\$25.00	\$5,350.00	
027680105	Pavement Message (Preformed Thermoplastic)	65	Each	\$200.00	\$13,000.00	
027680110	Pavement Message (Preformed Thermoplastic Stop Line, Crosswalks - 12 inch)	70	Each	\$200.00	\$14,000.00	
028910020	Sign, Type A-1	1,872	sq ft	\$50.00	\$93,600.00	
028910270	Remove Sign Less Than 20 Square Feet	10	Each	\$50.00	\$500.00	
Signals						
02892001D	Traffic Signal System	1	Lump			
Lighting						
16525001D	Highway Lighting System	1	Lump	\$100,000.00	\$100,000.00	15-20 Lights
Traffic and Safety Subtotal					\$226,450	
ITS						
	None Anticipated					
ITS Subtotal					\$0	

Structures (Activity 62C)

PIN: 13321 PROJECT # S-I80-4(155)141 PROJECT NAME: I-80 MP 141 – Jeremy Ranch Exit

Item #	Item	Quantity	Units	Price	Cost	Remarks
Bridges						
Walls						
Sign Structures						
Hydraulics						
	New Box Culvert	1	Lump	\$600,000.00	\$600,000.00	400 ft x \$1,500 per foot
Geotech						
	Geotech Report	1	Lump	\$25,000.00	\$25,000.00	
Structures Subtotal					\$625,000	

Environmental and Landscaping (Activity 52C)

PIN: 13321 PROJECT # S-I80-4(155)141 PROJECT NAME: I-80 MP 141 – Jeremy Ranch Exit

Item #	Item	Quantity	Units	Price	Cost	Remarks
Environmental						
	Stream Channel Realignment	400	ft	\$100.00	\$40,000.00	
Temporary Erosion Control						
	Check Dams	25	Each	\$200.00	\$5,000.00	
Landscaping						
029110010	Wood Fiber Mulch	3	Acre	\$1,200.00	\$3,600.00	
029220030	Broadcast Seed	3	Acre	\$1,000.00	\$3,000.00	
Environmental Mitigation Subtotal					\$51,600	

Utilities, Right of Way, and Incentives (Activities 56C and 68C)

PIN: 13321 PROJECT # S-I80-4(155)141 PROJECT NAME: I-80 MP 141 – Jeremy Ranch Exit

Item #	Item	Quantity	Units	Price	Cost	Remarks
Utilities						
	Relocate Power Line	1	Lump	\$10,000.00	\$10,000.00	At least one power pole
Utilities Subtotal					\$10,000	
Right-of-way						
	Urban/Suburban Residential		sq ft			
	Urban/Suburban Commercial		sq ft			
	non-Urban/Suburban Residential		Each			
	non-Urban/Suburban Commercial		sq ft			
	non-Urban/Suburban Farm		Each			
Right-of-Way Subtotal					\$0	
Incentives						
	00000602* Hot Mix Asphalt (HMA) Incentive	1	Lump	\$11,605.05	\$11,605.05	
	00000605* Bonded Wearing Course Incentive	1	Lump	\$2,091.05	\$2,091.05	
	00000606* Early Completion - Time	0	Cal'd			
	00000607* Lane Rental Incentive	0	Hours			
	00000608* Miscellaneous Incentive	1	Lump			
Incentives Subtotal					\$13,696	

MEMORANDUM

To: Project File

From: Charles Allen, P.E., InterPlan
Kai Tohinaka, InterPlan

Date: April 23, 2015

Subject: Jeremy Ranch Interchange Traffic Forecasting Assumptions

The following documents the guiding principles and assumptions regarding the development of traffic forecasts for the Jeremy Ranch Interchange study.

Traffic projections for the Jeremy Ranch interchange and adjacent frontage road intersections are based on the following inputs:

- Existing traffic volumes and patterns
- Regional and statewide Travel Demand Model (TDM) forecasts
- Historic traffic growth
- Existing land use
- Local government land use policies

The following assumptions and principles were used to guide the development of traffic forecasts:

Greater growth is expected on the north side of the Jeremy Ranch interchange than the south side of the interchange.

Both the Utah Statewide Travel Model (USTM) and the travel model used for the Mountain Accord study exhibit greater traffic volume increases for centroids serving Traffic Analysis Zones (TAZs) representing areas north of the interchange than south of the interchange. Additionally, there appears to be more developable land on the north side than south side. Finally, Summit County's comments at the initial project workshop indicated an expectation for commercial/mixed-use development for vacant land on the northwest quadrant of the interchange whereas the vacant land on the southwest quadrant was expected to develop as residential. Commercial property usually generates more trips per acre than residential property.

School-related traffic will not increase at the same rate as background traffic

School-related traffic volumes (particularly vehicles accessing Jeremy Ranch Elementary School) are considered somewhat fixed and are not expected to grow at the same rate as traffic volumes related to other uses. Some growth may occur as new residences in the area result in increased student enrollment and an accompanying potential increase in faculty and staff. However, this growth will be relatively minor compared to the combined work, shopping, and recreation related trips brought on by these same new households.

Greater growth is expected during the PM peak hour than the AM peak hour.

A significant portion of AM peak hour traffic volumes represent school-related traffic, which, for the reasons stated above, is not expected to grow at the same rate as other types of trips. PM traffic volumes contain very little school-related traffic.

Most traffic volumes are interchange ramp related.

An evaluation of existing traffic patterns shows that, other than school-related traffic volumes in the AM peak hour, "cross-interchange" traffic is minimal. The majority of vehicles at any of the study area intersections came from, or are proceeding to, one of the interchange ramps. Future traffic volumes are expected to follow a similar pattern.

Historic traffic growth has been minimal.

Existing peak hour traffic volumes are nearly the same as, and for particular movements even less than, counts conducted in 2006. Also, a comparison of aerial imagery between 2006 and 2013 indicates little perceptible change in land use for the area.

Growth projections from the 2006 study have not been realized nor appear feasible.

As mentioned above, traffic volumes have experienced little change in the last nine years. It is anticipated that the degree of long-term growth predicted by the 2006 study is not tenable. This may be due to a number of reasons, including changes in development expectations, the impact of The Recession, the fact that in 2006 there were no TDMs available for this area, and that the 2006 study growth projections were based on historical data for an area that was growing rapidly, yet approaching geographical build-out.

Summit County zoning, land use, and development entitlement maps indicate limited opportunity for future development within the travel-shed of the interchange. The Snyderville Basin General Plan describes the Jeremy Ranch/Pinebrook neighborhood as containing "subdivisions that are largely built-out." Additionally, Open Space zoning and undevelopable slopes contribute to a geographical constraint to new development and there do not appear to be major opportunities for redevelopment to bring higher-density land uses into the area.

MEMORANDUM

To: Steve Quinn, UDOT
Ahmad Jaber, Stanley Consultants

From: Charles Allen, InterPlan
Tim Peterson, InterPlan

Date: July 30, 2015

Subject: Jeremy Ranch Interchange Traffic Study Summary

The purpose of this memo is to document the traffic analysis of the preferred design for the Jeremy Ranch Interchange Study. The Utah Department of Transportation (UDOT) joined with Summit County to evaluate interchange and frontage road design options that meet projected traffic needs and local and regional goals. This memo documents the methods and results from evaluating the preferred alternative emerging from this process.

Traffic Volumes and Forecasts

Traffic volumes were obtained from a collection of pedestrian and vehicular counts conducted by UDOT over the past several years. These counts were conducted at various times of day and represent different seasons of the year. InterPlan examined the patterns and trends manifest by the counts to develop a set of base year traffic volumes. Key issues for traffic volumes in this area are the influence of school traffic in the AM peak hour and the marginal historical growth in volume over the years. Table 1 summarizes the sources of counts provided to InterPlan.

Table 1. Summary of Traffic Counts

Count Date	Time Frame	Intersections	Count Type
December 2006	AM & PM Peak Hours	Frontage Roads Interchange Ramps	Vehicular
October 2013	12 Hour	Interchange Ramps	Vehicular Pedestrian
August 2014	12 Hour	Interchange Ramps	Vehicular Pedestrian
November 2014	AM & PM Peak Hours	Frontage Roads	Vehicular Pedestrian
February 2015	President's Day Weekend	Frontage Road Interchange Ramps	Vehicular Pedestrian

Using historic counts, regional and statewide travel demand models, existing land use patterns, and local government land use policies, InterPlan developed a set of turning movement forecasts for 2040 conditions. These forecasts were significantly lower than forecasts from a study completed in 2007. However, the lower forecasts were deemed appropriate by the study team given the marginal growth experienced in the last eight years and the geographical constraint for new land development in the area. Additionally, the tempered forecasts were further supported by outputs from the regional travel demand models, which were not previously available in 2007. Figures 1 and 2 summarize the existing and 2040 AM and PM peak hour turning movement volumes for the area. Further detail regarding traffic forecasts are detailed the *Jeremy Ranch Interchange Traffic Forecasting Assumptions Memo* (April 2015) prepared by InterPlan.

Alternatives Development

Since 2007, multiple studies have been conducted for the Jeremy Ranch area with varying types of alternatives analyzed and recommended. To develop a base set of alternatives to evaluate for this effort, the study team organized an alternatives workshop with both Summit County and UDOT Region 2 staff on April 9, 2015. In the workshop, the team reviewed previously studied alternatives, as well as new ideas, and selected two options to consider for this study. These options include a "Modified U-Turn" design as well as a "Large Roundabout" design.

The Modified U-Turn design consisted of small roundabouts at either of the frontage road intersections and modified ramp intersections to channel off-ramp vehicles to turn right towards the roundabouts. The Large Roundabout design combined the ramp intersections and frontage road intersections on either side of I-80 into single, large roundabouts.

Alternatives Analysis and Results

Both of these alternative designs were subjected to traffic analysis for 2040 conditions. Traffic analysis was conducted with the VISSIM software package, a state-of-the-practice traffic simulation program. The evaluation of the alternatives was an iterative process. The outputs of the traffic analysis led to refinements in alternate designs which were then resubmitted to the traffic analysis. Additionally, traffic model efforts were submitted to UDOT staff for review. Comments from UDOT staff further refined the models which led to additional modifications to alternative designs. The final outcome of the analysis was the determination that the Modified U-turn design could only provide acceptable Level of Service (LOS) through 2030 and would fail by 2040. In contrast, the final Large Roundabout design was found to operate acceptably through 2040. As such, the Large Roundabout design was identified as the preferred alternative arising from this process. Figure 3 summarizes the LOS results for the Large Roundabout design.

Figure 1 AM Existing and 2040 Peak Hour Turning Movement Volumes

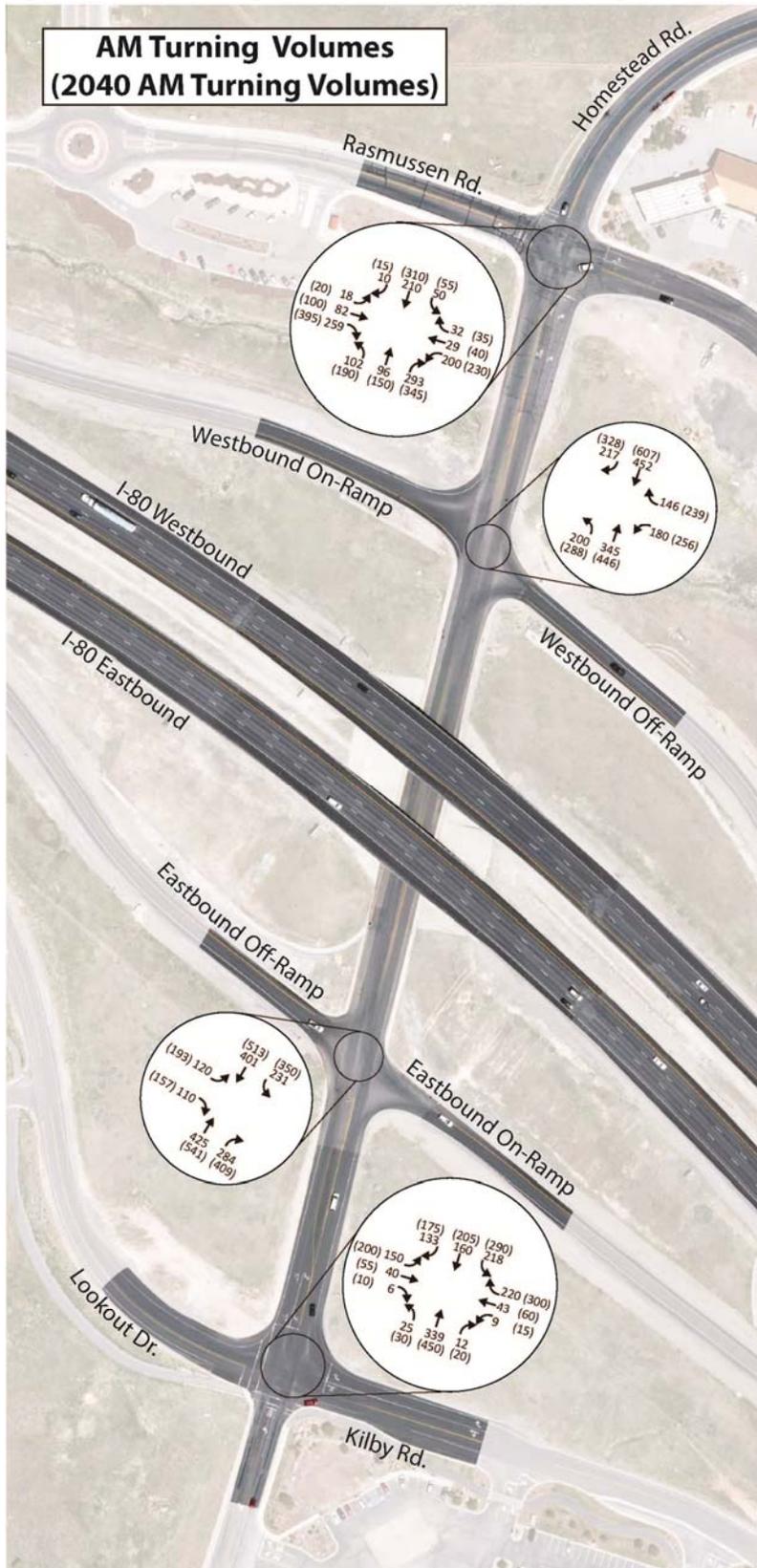


Figure 2 PM Existing and 2040 Peak Hour Turning Movement Volumes

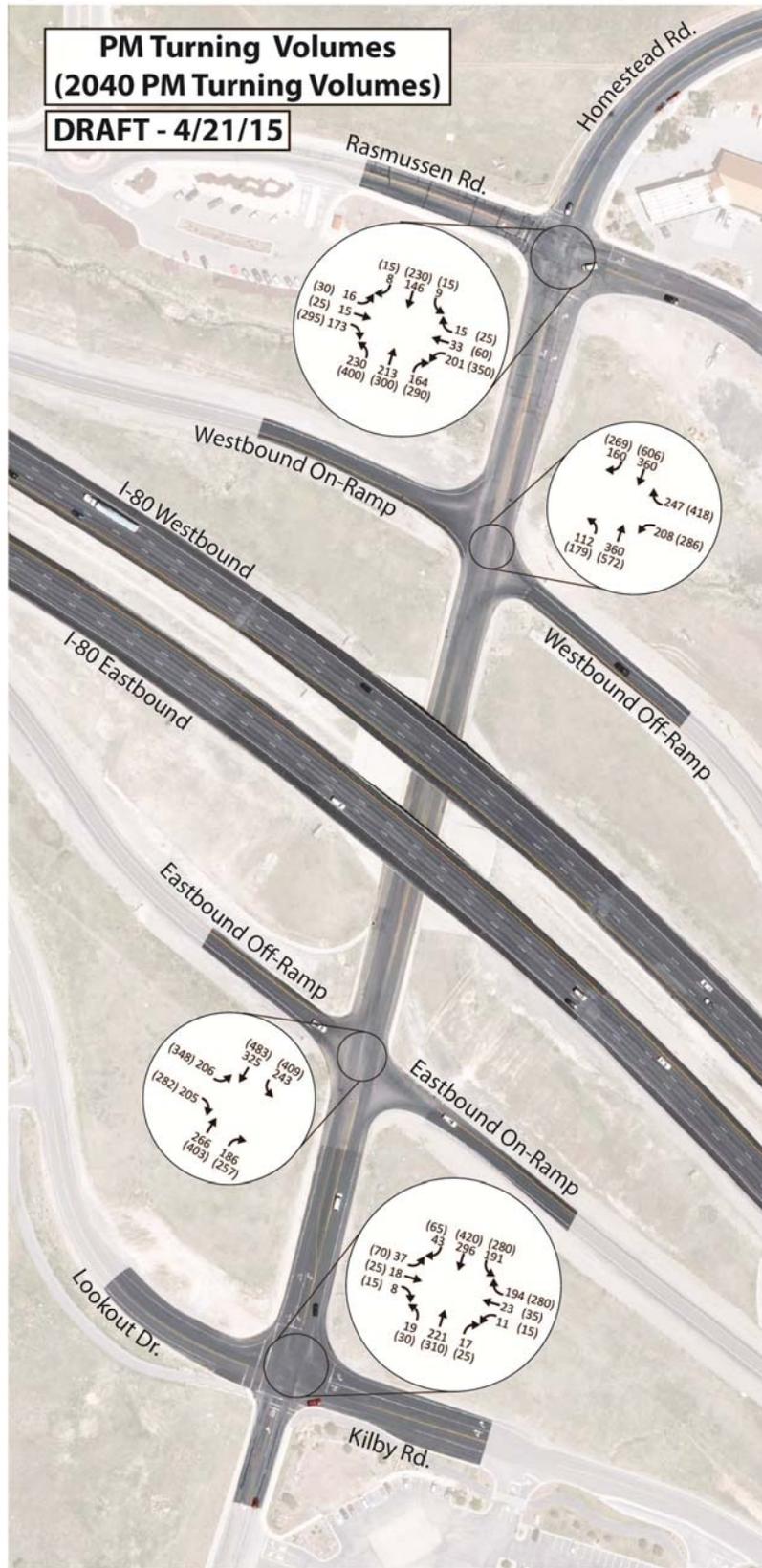
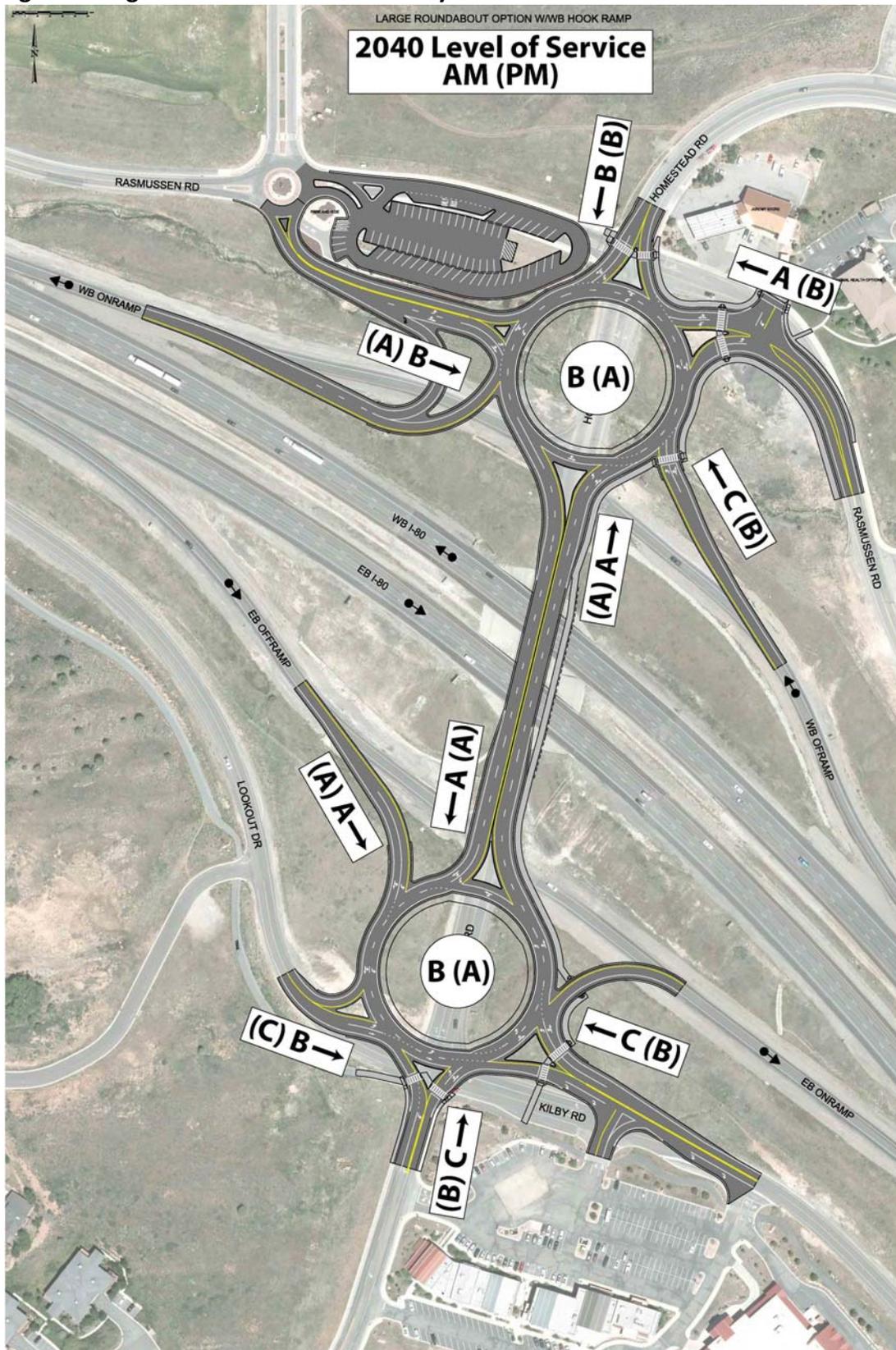


Figure 3 Large Roundabout LOS Summary - 2040 AM & PM Peak Hours



UDOT QC

Project: I-80 Jeremy Ranch Interchange

Firm: InterPlan

Version: 1

NOTE: Often issues identified in the PM model are likely replicated in the AM model and need to be addressed in both.

Additional Comments

Note: If this project goes to design, make sure to have an experienced roundabout designer review your work. Just at first glance, the current design of this roundabout needs improvement to avoid path overlap and excessive speeds on approach. (see Chapter 6 Geometric Design of the FHWA Roundabouts Guide) There may be other improvements that you will want to include once you dig a little deeper. Pedestrian crossings for a dual roundabout can also be a little tricky. However, the way you have modeled it reflects how it should operate if designed correctly so we don't expect these fixes to impact the capacity. **Noted**

Model Scale (V5.4 and earlier)

Checked

Link Layout

Checked

Lane Change and Emergency Stop Distances

Note: Some of the emergency stop distances are set to 500 feet. In this case, it doesn't seem to be causing any issues. But for other projects, be aware that this high a value can sometimes create issues in the model that may not exist in reality. **Noted. In this case, the long emergency stop distances are coded for the I-80 off ramps only to discourage unrealistic, last-minute lane change behavior at the ramp entries to the roundabouts. As you mentioned, this does not appear to create issues.**

Simulation Parameters

Checked

Desired Speed Distributions

Checked

Speed Decision Points

Checked

Reduced Speed Areas

Checked

Priority Rules and Conflict Areas

Checked

Signal Heads

N/A

Signal Detection

N/A

Pedestrian Signal Heads

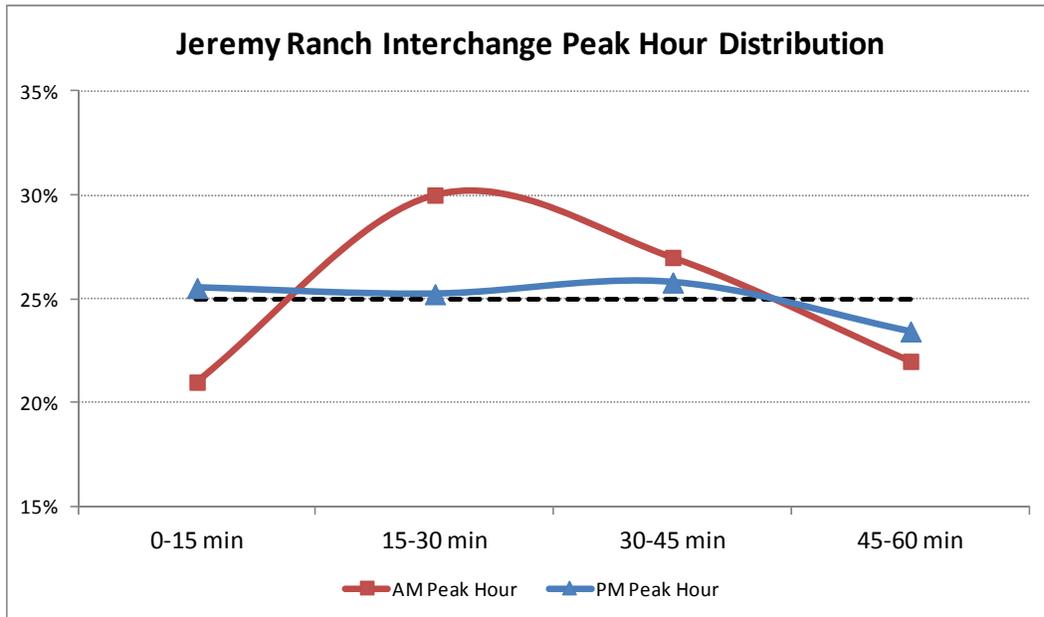
N/A

Signal Timing

N/A

Input Volumes and PHF

Note: The PHF represented in the model is not typical to traffic patterns in general. Verify that your volumes represent projected conditions. **Peak hour distribution is coded according to actual peak hour fluctuation from data collection. The graph below illustrates the interchange peak hour volume distribution from the data collection.**



Pedestrian Volumes

Note: There are zero pedestrian volumes included in this model. Does this accurately represent projected conditions? **Due to unrealistic vehicle behavior created by conflict area at crosswalk links, ped volumes were left out of the model. This is not felt to significantly impact results because pedestrian volumes are extremely low according to UDOT-provided data collection.**

Vehicle Composition

Note: HGV volumes are lower than what we typically see. Does 1% HGV accurately represent projected conditions? **Yes. Very low heavy vehicles volumes are experienced in this area. This is not expected to change significantly for future conditions.**

Vehicle Routing

Checked

Node Start of Delay

Checked

Node Layout

Checked

Data Collection Times

Checked

Driving Behaviors

Checked

Simulation Parameters / Number of Runs

Checked

MOEs

Not Provided

Data Collection Points/Travel Times

N/A

Model Run

Checked

Error Log

Checked

UDOT Final Review - Approved

Project: I-80 Jeremy Ranch Interchange

Firm: InterPlan

Version: 1 (Models dated 07/08/2015)

NOTE: Often issues identified in the PM model are likely replicated in the AM model and need to be addressed in both.

APPROVED

Additional Comments

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Model Scale (V5.4 and earlier)

Checked

Link Layout

Checked

Lane Change and Emergency Stop Distances

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Simulation Parameters

Checked

Desired Speed Distributions

Checked

Speed Decision Points

Checked

Reduced Speed Areas

Checked

Priority Rules and Conflict Areas

Checked

Signal Heads

N/A

Signal Detection

N/A

Pedestrian Signal Heads

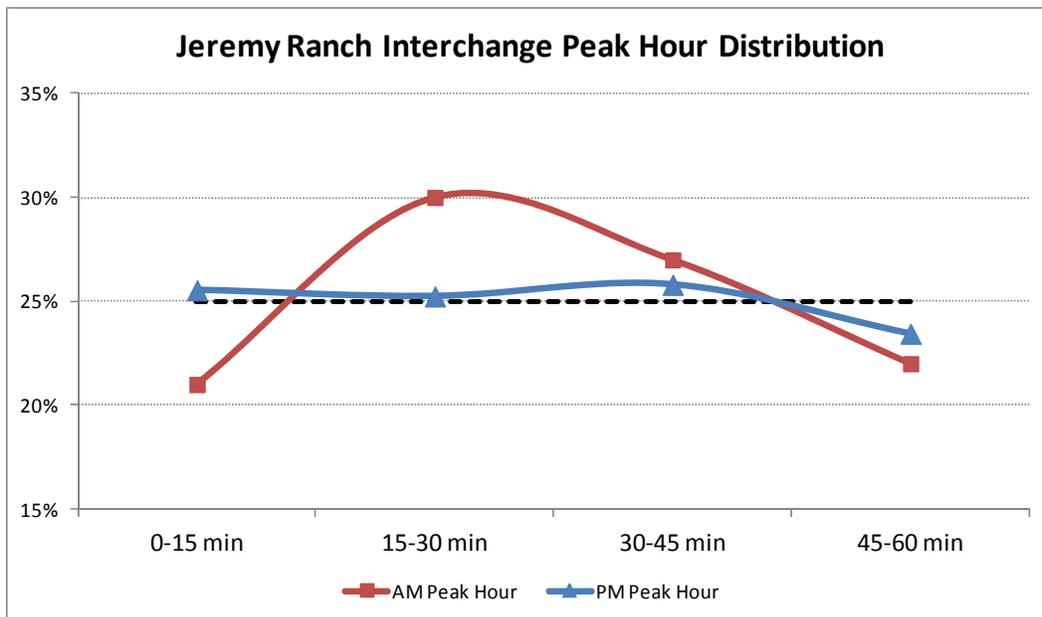
N/A

Signal Timing

N/A

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crosswalk links, ped volumes were left out of the model. This is not felt to significantly impact results because pedestrian volumes are extremely low according to UDOT-provided data collection.

Vehicle Composition

Note: HGV volumes are lower than what we typically see. Does 1% HGV accurately represent projected conditions? **Yes. Very low heavy vehicles volumes are experienced in this area. This is not expected to change significantly for future conditions.**

Vehicle Routing

Checked

Node Start of Delay

Checked

Node Layout

Checked

Data Collection Times

Checked

Driving Behaviors

Checked

Simulation Parameters / Number of Runs

Checked

MOEs

Not Provided

Data Collection Points/Travel Times

N/A

Model Run

Checked

Error Log

Checked

From: Kelly Burns [<mailto:kburns@utah.gov>]
Sent: Monday, July 20, 2015 12:12 PM
To: Charles Allen
Cc: Eric Rasband; Jaber, Ahmad; Steve Quinn; Glenn Blackwelder
Subject: Re: Large Roundabout VISSIM models

Charles,

We have found your responses to our comments to meet our expectations. Attached is our approval of your model for your records.

Kel

On Fri, Jul 17, 2015 at 2:58 PM, Charles Allen <charles@interplanco.com> wrote:

Kelly,

Thank you for your input and your timely response. Attached are my responses to the model review notes. Let me know if you have any questions.

In speaking with Ahmad Jaber, it is certainly our intention to further refine the roundabout layout should it move into a design phase.

Thanks,

Charles Allen, PE

InterPlan Co.

[801-307-3400](tel:801-307-3400)

charles@interplanco.com

www.interplanco.com

From: Kelly Burns [<mailto:kburns@utah.gov>]
Sent: Wednesday, July 15, 2015 12:32 PM
To: Charles Allen
Cc: Eric Rasband; Jaber, Ahmad; Steve Quinn; Glenn Blackwelder
Subject: Re: Large Roundabout VISSIM models

Charles,

We have reviewed your model and have attached the following comments. Typically in our QC process, we like you to either respond or fix (as appropriate) to anything marked as a "note" and fix anything marked as a "fix". Overall, this is clean model with some minor notes.

We had our in-house roundabout expert Glenn Blackwelder take a glance at your geometry as well. If this project goes to design, make sure to have an experienced roundabout designer review your work. Just at first glance, the current design of this roundabout needs improvement to avoid path overlap and excessive speeds on approach. (see Chapter 6 Geometric Design of the FHWA Roundabouts Guide) There may be other improvements that you will want to include once you dig a little deeper. Pedestrian crossings for a dual roundabout can also be a little tricky. However, the way you have modeled it reflects how it should operate if designed correctly so we don't expect these fixes to impact the capacity that you report out of the model.

Steve - If this project goes to design, you may want to consider subing Kittelson to Stanley just as a QC. It would be a good training opportunity for Stanley and Interplan and would ensure a good product. Either way, we are happy to continue providing you support as needed.

Kel