CITY OF LOGAN
RESOLUTION NO. 15-16

A RESOLUTION RECOMMENDING A PRELIMINARY ALIGNMENT FOR 100 WEST

WHEREAS, a conceptual design evaluation has been completed to connect 100 West from 600 South to Highway 165 ; and

WHEREAS, the 100 West connection is on the Cache Metropolitan Planning Organization's Phase 1 recommendations in the Regional Transportation Plan; and

WHEREAS, the 100 West connection is intended to provide an alternative to Main Street for traffic on the west side of Main.

NOW THEREFORE, BE IT RESOLVED THAT THE LOGAN MUNICIPAL COUNCIL, hereby recommends the City staff proceed with the next phases of the project including an environmental study and design as funding becomes available.

This resolution shall take effect immediately upon its adoption.

PASSED BY THE LOGAN MUNICIPAL COUNCIL THIS 5 DAY OF MAY, 2015

Jeannie F. Simmonds, Council Chairperson

ATTEST:

Teresa Harris, City Recorder

100 WEST; 600 SOUTH TO HIGHWAY 89-91 CORRIDOR STUDY

FEBRUARY 2015

PREPARED FOR:

LOGAN CITY UNITED IN SERVICE

PREPARED BY:

Jones & DeMille Engineering

1-800-748-5275
Project #: 1401-050

RICHFIELD ▪ PRICE ▪ MANTI ▪ ROOSEVELT ▪ AMERICAN FORK ▪ ST. GEORGE

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EXECUTIVE SUMMARY

100 West is currently a two-lane roadway in Logan City that carries approximately 5,000 vehicles a day in the vicinity of 600 South. 100 West is an alternative roadway to Main Street in that it carries northbound and southbound traffic on the west side of Main in lieu of using the congested Main Street corridor. 100 West currently terminates at 600 South and does not continue any farther south until you get to the other side of the Logan River. Logan City has master planned 100 West as a collector roadway to serve the traffic that travels north and south on the west side of Main Street. Due to the fact that 100 West does not continue past 600 South, it does not allow this roadway to function as a viable north/south alternative to Main Street. The operation of this corridor has been studied to determine possible alternatives to provide an efficient north south corridor for Logan City. The alternatives have been compared with respect to travel time, cost, environmental issues, impact to adjacent property owners, and xxx. Each alternative was ranked to assist in determining a preferred alternative. The alternative that goes through the church property was selected as the preferred geometric alternative and the alternative that is east of the church property was selected as the preferred economical alternative.

1. INTRODUCTION

1.1. BACKGROUND

Logan City developed a transportation master plan in 2011 that shows 100 West extending through 600 South and eventually connecting to Main Street. It is listed in the plan as a 5-10 year improvement. Logan City has master planned 100 West as a collector roadway to serve the traffic that travels north and south on the west side of Main Street. 100 West is currently a two-lane roadway that carries approximately 5,000 vehicles a day in the vicinity of 600 South. 100 West currently terminates at 600 South. A church prohibits the extension of this roadway to the south. The 100 West route is planned to serve as an alternative roadway to Main Street thus reducing the northbound and southbound traffic on Main Street. 100 West continues south on the other side of the church and across the Logan River. Due to the fact that it does not continue past 600 South, it does not allow this roadway to function as a viable North-South alternative to Main Street.

1.2. PURPOSE

The purpose of the study is to develop and analyze improvement alternatives to provide an efficient North-South corridor for Logan City at 100 West between 600 South and US-89. The alternatives will connect 100 West together on both sides of the church to provide a continuous route. The alternatives will be compared with respect to travel time, cost, environmental issues, impact to adjacent property owners, and then ranked. Preferred alternatives, based on the above rankings, for the best geometric and economic scenarios will be selected. These alternatives will be recommended to the city to consider in moving forward with its planning and implementation activities.

1.3. STUDY AREA

The 100 West corridor study area is shown in Figure 1. The area extends along 100 West from 500 South down to the intersection with Main Street and includes 300 West from 600 South to Golf Course Road. Included in the study area is the Logan River. The study area also includes the extension of 600 South to US-89/91.

Figure 1 Study Area

1.4. STUDY OBJECTIVES

The objectives of the study include the following:

- Evaluate existing conditions
- Evaluate intersection alternatives and property impacts
- Complete a decision matrix for each alternative
- Conduct a preliminary environmental review
- Recommend a preferred alternative and associated improvements

2. REVIEW EXISTING INFORMATION AND GATHER DATA

The analysis of the existing roadway conditions provides insight into how the existing street network is configured and how well it performs. This information is useful in establishing baseline conditions and documenting deficiencies that should be resolved with a solution. The information that was gathered as part of this study includes:

- Physical Characteristics
- Traffic Volumes
- Level of Service

2.1. PHYSICAL CHARACTERISTICS

The primary intersections that are within the study corridor are described below:

2.1.1. 100 WEST & US-89/91

Both 100 West approaches to the intersection are currently configured with a single left turn pocket and one through/right turn travel lane. Both US-91 approaches to the intersection are currently configured with a single left turn pocket, two through lanes, and a right turn pocket. The intersection is signalized and operates on a 2 phase signal cycle with permissive movements all the way around the intersection. This intersection becomes the termini of the extension of 100 West southward past 600 South. The peak hour for this intersection is between 4:45 PM and 5:45 PM with a peak hour volume of 2,281 vehicles per hour. Turning movement counts were performed for this intersection and are shown in the Appendix. The intersection currently operates at a Level of Service (LOS) of C with the worst delay movement being the westbound through movement at a delay of 23.1 seconds. Intersection analysis output is also included in the Appendix for the study intersections.

2.1.2. 100 WEST & GOLF COURSE ROAD

All approaches to the intersection are currently configured with a single lane in each direction and a wide shoulder that acts as a right turn pocket. The peak hour for this intersection is between 5:00 PM and 6:00 PM with a peak hour volume of 763 vehicles per hour. Turning movement counts were performed for this intersection and are shown in the Appendix. The intersection is unsignalized with stop control for the northbound and southbound directions and currently operates at a LOS of C with the worst delay movement being the westbound left turn movement at a delay of 16.7 seconds. The output is included in the Appendix.

2.1.3. 100 WEST & 600 SOUTH

This intersection is a T-intersection with the southbound approach having a single right and left turn lane. Both the eastbound and westbound approaches are configured with a single lane in each direction

with enough pavement width to accommodate turning vehicles. The peak hour for this intersection is between 4:30 PM and 5:30 PM with a peak hour volume of 293 vehicles per hour. The intersection is stop controlled for the southbound direction. The intersection is unsignalized and operates at a LOS of B with the worst delay movement being the eastbound left turn movement at a delay of 11.3 seconds.

2.1.4. 300 WEST & GOLF COURSE ROAD

This intersection is a T-intersection with the southbound approach having a single right and left turn lane. Both the eastbound and westbound approaches are configured with a single lane in each direction with enough pavement width to accommodate turning vehicles. The peak hour for this intersection is between 5:00 PM and 6:00 PM with a peak hour volume of 682 vehicles per hour. The intersection is stop controlled for the southbound direction. The intersection is unsignalized and operates at a LOS of B with the worst delay movement being the southbound left turn movement at a delay of 14.3 seconds.

2.1.5. 300 WEST & 600 SOUTH

This intersection is a T-intersection with the northbound approach having a single right and left turn lane. Both the eastbound and westbound approaches are configured with a single lane in each direction with enough pavement width to accommodate turning vehicles. The peak hour for this intersection is between 4:30 PM and 5:30 PM with a peak hour volume of 299 vehicles per hour. The intersection is stop controlled for the northbound direction. The intersection is unsignalized and operates at a LOS of A with the worst delay movement being the northbound left turn movement at a delay of 9.9 seconds.

2.1.6. GOLF COURSE ROAD AND US-91

Both the eastbound and westbound approaches to the intersection are right in right out due to the raised median on US-91. Both US-91 approaches to the intersection are currently configured with a single left turn pocket, two through lanes, and a right turn pocket. The intersection is two-way stop controlled intersection. The peak hour for this intersection is between 4:45 PM and 5:45 PM with a peak hour volume of 1,770 vehicles per hour. Turning movement counts were performed for this intersection and are shown in the Appendix. The intersection currently operates at a Level of Service (LOS) of B with the worst delay movement being the eastbound left turn movement at a delay of 13.1 seconds.

2.1.7. 100 WEST & 500 SOUTH

The eastbound and westbound approaches to the intersection are currently configured with a single lane in each direction and a wide shoulder that acts as a right turn pocket. The northbound and southbound approaches to the intersection have a separate left turn pocket and a combined through/right turn lane. The peak hour for this intersection is between 4:30 PM and 5:30 PM with a peak hour volume of 286 vehicles per hour. The intersection is unsignalized with stop control for the eastbound and westbound directions and currently operates at a LOS of B with the worst delay movement being the westbound left turn movement at a delay of 10.3 seconds.

2.2. TRAFFIC VOLUMES

Turning movement volumes were collected for the PM peak hours on April 1, 2014 at the study intersections listed above. These volumes can be seen for each intersection in the Appendix.

2.3. LEVEL OF SERVICE

The methodology outlined in the Highway Capacity Manual (HCM), published by the Transportation Research Board, uses level of service (LOS) to estimate the efficiency of an intersection or street. The LOS for a signalized intersection is determined by the average vehicle delay for all vehicles entering the intersection as measured in seconds per vehicle. The LOS for an unsignalized intersection is determined by the average delay for each unsignalized movement or approach. For the purpose of this study, an uppercase letter designates signalized intersection LOS and a lowercase letter designates unsignalized intersection LOS. Table 1 provides a summary and definition of each LOS designation for signalized and unsignalized intersections.

Table 1: Level of Service Definition

Signalized Intersection		Unsignalized Intersection		
LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	Definition
A	≤ 10.0	a	≤ 10.0	Favorable Progression
B	> 10.0 and ≤ 20.0	b	> 10.0 and ≤ 15.0	Good Progression
C	> 20.0 and ≤ 35.0	c	> 15.0 and ≤ 25.0	Fair Progression
D	> 35.0 and ≤ 55.0	d	> 25.0 and ≤ 35.0	Noticeable Congestion
E	> 55.0 and ≤ 80.0	e	> 35.0 and ≤ 50.0	Limit of Acceptable Delay
F	> 80	f	> 50	Approaching Unacceptable Delay

Source: Highway Capacity Manual, Transportation Research Board 2010

Any intersection with a LOS E-F is considered unacceptable and any possible mitigation to improve that LOS should be considered.

The traffic analysis software SYNCHRO was used to analyze the operations of the study intersections. The existing LOS calculation results at the study intersections are shown in Table 2.

Table 2: Existing Peak Hour Level of Service (LOS/Delay)

Intersection	Existing 2014 PM Peak
100 West & US-91	C (23.1)
100 West & Golf Course Rd.	c (16.7)
100 West & 600 South	b (11.3)
300 West & Golf Course Rd.	b (14.3)
300 West & 600 South	a (9.9)
100 West & 500 South	b (10.3)
Golf Course Rd. & US-89/91	b (13.1)

3. DEVELOP AND EVALUATE POSSIBLE ROAD ALIGNMENTS

3.1. DEVELOPMENT OF ALIGNMENTS

When looking at the alternatives to continue 100 West south of 600 South, it was apparent that there were only four feasible alternatives. An exhibit showing the location of the proposed alternatives in included in Appendix A of this report. An exhibit showing the proposed cross section of 73 feet for 100 West is also included in Appendix A. Three alternatives were developed around the church property and the fourth alternative is the "do nothing" alternative. Each of the three alternatives that abut or include the church property involve the purchase of the Ellis property which is directly south of the Logan River. Each scenario would require approximately the same amount of land to be purchased. The four alternatives are presented and discussed below:

3.1.1. 100 WEST CONNECTION EAST OF CHURCH

This alignment was developed to connect 100 West between 500 South and Golf Course Road. The alignment uses a minimum horizontal curve radii of around 400 feet in order to meet federal, state, and local standards. The alignment completely misses the church parking lot as discussions with the church suggested that if their parking lot was disturbed then it would be necessary to take the whole property. This alignment requires the purchase of the entire parcel on the northeast corner of the intersection and the two parcels south of 600 South and east of the church. This alternative has an additional impact on the Ellis property in that it goes right through and existing metal building and it would have to be rebuilt or compensation given for its value. The dock that exists on the back of this building would also be impacted and the downloading of freight from this dock would have to be relocated to another location on the building. This alignment also crosses the Logan River at the greatest skew and would require the longest structure to span the river.

3.1.2. 100 WEST CONNECTION THROUGH CHURCH

This alignment was developed to connect 100 West between 500 South and Golf Course Road. The alignment includes horizontal curves but they are not minimum radii due to the straight connection between termini. The alignment dissects the church property and would require working with the church in purchasing the entire parcel and compensation for a new building to be constructed elsewhere. No private property owners are affected by this alternative although some right of way may be required along 100 West to accommodate a 73-foot proposed cross section. This alternative has impact on the Ellis property but does not affect the metal building. This alignment also crosses the Logan River at a skew and would require a longer structure to span the river.

3.1.3. 100 WEST CONNECTION WEST OF CHURCH

This alignment was developed to connect 100 West between 500 South and Golf Course Road. The alignment uses a minimum horizontal curve radii of around 400 feet in order to meet federal, state, and local standards. The alignment impacts the west parking lot of the church property and would require working with the church in purchasing an adjacent parcel to provide replacement parking. This alignment requires the purchase of 3 parcels on the northwest corner of the intersection and 3 parcels south of 600 South and west of the church. This alternative has impact on the Ellis property but does not affect the metal building. This alignment crosses the Logan River in the best location and is almost perpendicular to the alignment of the river creating the best possible crossing scenario.

3.1.4. 300 WEST ALTERNATIVE

This alignment is also referred to as the "do nothing" alternative. No improvements will be made and the traffic will use the existing routes to get to the south end of 100 West. No river crossings will have to be considered and no properties will need to be purchased.

3.2. ALIGNMENT DECISION FACTORS

The screening criteria that were used to evaluate the alternatives are: average travel time, traffic flow (LOS), overall cost, environmental impacts, geometry, property impacts, roadway length, resident relocations, and conformance to previous planning. Several other factors were considered as part of this study but were not determined to be differentiators in alternative selection. They include utilities, stacking length, auxiliary lanes, phasing options, UDOT preference, and supplemental funding options. Each of these factors are critical components to be included in the design of the recommended alternative but are not analyzed in this effort.

3.3. DECISION MATRIX

A decision matrix was developed to provide an unbiased selection of a recommended alternative. Each alternative was evaluated for the criteria explained above and a total score was assigned to each

alignment. An explanation of the criteria is presented here to support the numbers presented in the matrix.

The criteria for average travel time for each alignment is the actual time it takes a vehicle to travel between the intersections of 500 South & 100 West and Golf Course Road & 100 West. The travel times that were encountered for the east alignment, west alignment, through the church alignment, and the 300 West alignment are 57.9 seconds, 58.9 seconds, 57.3 seconds, and 106.0 seconds respectively. The 300 West alignment is merely the "do nothing" alternative in that the existing streets that are currently in place are used to get between the starting and ending locations.

The criteria for traffic flow is a measure of the efficiency of getting traffic through the roadway network. The east, west, and through church alignments are relatively the same with a greater score given to the through the church alternative because it is a straight shot between adjacent intersections and allows for free flow.

The criteria for overall cost was determined based on the cost estimates that were prepared for each alternative. The cost estimates are included in Appendix B. The 300 West alternative has no cost implications from an improvement perspective and the through the church alternative has the highest because the church would have to be replaced.

The criteria for environmental impacts looks at both the impacts to the adjacent Logan River and also Air Quality concerns. All the alignments that touch the church property will have an impact on the Logan River because a new bridge will need to be built across the river. The 300 West alignment does not have impact to the Logan River but will require a vehicle to go through several intersections to traverse the study area. This scenario entails more vehicle emissions and a higher impact on air quality than the other alternatives.

The criteria for geometry adjacent to Highway 89 is the need to close the poor sight distance intersection at 600 South & Highway 89. The alternatives that go by the church property will have a lesser impact on this criteria because there will be less inclination to use this intersection if a direct connection is established to Highway 89 to the south. In either scenario that is chosen the 600 South connection to Highway 89 should be considered for closure.

The criteria for impacts on existing property is how the alignments affect existing properties. The first three alternatives affect many properties and are considered a high impact. The 300 West alternative also affects properties because the added traffic puts pressure on residential neighborhoods in terms of safety, noise, and air pollution.

The criteria for length of road segment is based on the distance between the intersections of 500 South & 100 West and Golf Course Road & 100 West. The first three alternatives are relatively the same with the 300 West alternative is quite a bit longer.

The criteria for relocation of residences is based on houses that would have to be purchased and people would have to be relocated. The west of the church alignment impacts the most households and the

east of the church alignment impacts a few. The other two alternatives do not require relocation of residences.

The criteria for conformance to previous planning looks at whether the alternative follows the master plan and planning completed by the CMPO. The planning that has been completed to date suggests a continuous alignment for 100 West and the first three alternatives meet that objective with the 300 West alignment not conforming.

A score of 0 represents high impact, 1 represents medium impact, and 2 represents low impact. The results are presented in Table 3:

Table 3: Alternatives Decision Matrix

Alternatives Decision Matrix					
Decision Factors		East Alignment	West Alignment	Church Alignment	300 West Alignment
1	Average Travel Time	1	1	2	0
2	Traffic Flow	1	1	2	0
3	Overall Cost	1	0	0	2
4	Environmental Impacts	1	1	1	1
5	Geometry Adj. to Hwy 89	2	2	2	1
6	Impacts on Property	1	0	0	1
7	Length of Road Segment	2	2	2	0
8	Relocation of Residences	1	0	2	2
9	Conformance to Planning	2	2	2	0
	Total Score:	**12**	**9**	**13**	**7**

	High Impact = 0 Points
	Medium Impact = 1 Point
	Low Impact = 2 Points

Based on the criteria listed above and the evaluation of that criteria per the scoring methodology explained above, the alternative that goes through the church is the recommended alternative. It should be noted however that projects such as this often times have budgetary constraints. The through the church alignment is most costly due to the purchase and relocation of the church. Considering cost as a significant driving factor in the decision, then the east of the church alternative would be the recommended alternative.

4. DISCUSSIONS OF ROAD ALIGNMENTS WITH PROPERTY OWNERS

4.1. PRIVATE PROPERTY OWNERS

The owners of the property on the northwest corner of the 600 South and 100 West intersection (Mrs. Amanda Sundberg) were approached to discuss the alternatives that were being considered as part of this study. The property had recently been purchased by the Sundbergs and they mentioned that they planned to be there a long time. After visiting with her about the project and the potential alternatives she was not against the idea of giving up some of their property to accommodate the road realignment. Initially, discussions about the need to potentially take the whole parcel were not received well, but after further discussions they were not against the idea of selling. It was explained to her that it would depend upon the alternative that was selected by the city as to the extent of impact to their property.

A meeting was also held with the owners of Ellis Equipment. The alignments were presented to them and a discussion about the continuation of 100 West through their property. The owners felt like the east alignment would work better for them to preserve more property to the west that could be reused for other purposes. If the east alignment is chosen then consideration should be given to replace the building that the alignment cuts through and the loading dock that will be affected by the change. The owners also mentioned there is a one foot strip of property at the south property line near 100 West that is owned by another individual and will have to be cleared to get the roadway through there.

Some of the other property owners on 600 South east of 100 West were contacted about the alternatives. One gentlemen was contacted and he was not against the idea of a 100 West continuation and was also in favor of doing something with the 600 South connection to Highway 89. He didn't like the idea of closing it but possibly looking at a right in right out scenario.

4.2. CHURCH REPRESENTATIVES

A meeting was held with the Stake President, High Councilman, and Facilities Management representative for the LDS church to discuss the condition of the existing building and the plan for its use in the future. It was mentioned that the building was built in the 1960's and it is nearing its design life. It was felt by the group that the building was still in good shape and there was no need to replace it just because it conflicts with a potential roadway alignment. The Stake President and Facilities Management representative decided that they would contact the real estate department for the church and determine their position on the issue. They also discussed alternative locations that a replacement church could be built on and were going to look at those locations to see if any were viable. Since that meeting, church representatives for the real estate department have been in contact and solidified their stance that the church could go if it was paid for by this project. Otherwise it will continue to operate as currently exists and the roadway alignment will have to work around the existing parking lot.

5. SELECT RECOMMENDED ROAD ALIGNMENT

5.1. DECISION MATRIX RECOMMENDATIONS

The recommendations presented in the previous section of this report for the decision matrix suggest the preferred alternative is through the church property. This is also the most expensive alternative as the entire church property and value of the building will need to be purchased. Looking at it from a more frugal perspective the alignment that is east of the church would be the preferred alternative because it impacts the least amount of property owners and is more economically feasible than going through the church. The exhibit of all of the alternatives accurately shows the preferred alternative that goes through the church property. Another exhibit is included in the Appendix for the recommended alternative (east of the church) showing the preferred roadway configuration. Access to the existing homes would have to come from a cul-de-sac that is constructed over the old 100 West roadway and the Hollyhock Lane access would have to be reconnected to the new alignment as shown in the exhibit.

5.2. DISCUSSION ON IMPROVEMENTS

It is recommended that the cross section be 73 feet wide for the proposed 100 West extension. This includes a center turn lane and bicycle lanes and park strips on each side of the roadway. No parking will be allowed on the street for this cross section. With the installation of geometric improvements along the study corridor various intersection improvements will also be needed as outlined below:

5.2.1. 100 WEST & GOLF COURSE ROAD

This intersection is currently stop controlled for the northbound and southbound directions. With the connection of 100 West beyond 600 South the intersection control will need to be changed so that the northbound and southbound directions are continuous and the eastbound and westbound directions are stop controlled. This intersection should be monitored for left and right turn pockets once the connection has been made.

5.2.2. 100 WEST & US-89/91

This intersection currently serves as another connection to US-89/91 from the west side of the study area. Once the connection of 100 West is complete and it becomes a continuous route from 800 North on the north to US-89/91 on the south then more traffic will be using this intersection to get from the north part of town to the south part of town and vice versa. It is recommended that a right turn pocket be added for the eastbound to southbound movement and the westbound to northbound movement. This will eliminate the conflict between through cars and right turning cars and provide for a more efficient intersection. The signal at the intersection could also add a right turn on red arrow to accommodate these movements.

5.2.3. 100 WEST & 600 SOUTH

This intersection will need to be reconfigured due to the relocation of the intersection to the east. The access for the residences that front 100 West just north of the intersection will need to be provided access via a cul-de-sac. The road that provides access to the west will also have to be extended to connect to the realigned 100 West.

5.2.4. 600 SOUTH & US-89/91

It is recommended that this intersection be reviewed in the design phase for potential access restrictions. The sight distance and geometry at this intersection are substandard and pose potential safety concerns. One idea for improvement would be to close the access and provide a removable gate to allow for emergency vehicles. Reducing this intersection to a right-in/right-out may be another possible solution. With the extension of 100 West past 600 South this intersection will become less needed and should be considered for restrictions.

6. COSTS AND SCHEDULE

Cost estimates have been developed for each of the alternatives pursued in the study. In each case the recommended alternative will need to build a bridge over the Logan River. The permitting to do this will need to be taken care of in the design of the bridge. The other factors to be considered in the design of the bridge include designing it for 3 feet of freeboard based on the 100 year storm, only the water line will cross the bridge, sewer and storm drain lines will stop at each side of the bridge, and use of pile driven footings, concrete abutments, and precast concrete beams. The estimates include the assumption that the cross section of the roadway will be 24 inches of granular borrow, 6 inches of untreated base course, and 6 inches of hot mix asphalt. No geogrid will be used in the roadway as the city would like to make it easier to access utility lines in the future.

The next step in this process is to obtain funding to fully design the improvements that have been identified by this study. As soon as funding becomes available then the design phase of the project can begin. The design is anticipated to take about 9 months. The design will include an environmental analysis, design of pavement widening and roadway improvements, right-of-way acquisition, and design of a bridge.

A concept report is typically developed to aid in the design phase of the project. All the information needed for this report is either included in this study or listed below:

- Functional Classification: Major Collector
- Current Roadway Width varies but is planned for 73 feet per the attached cross section
- 100 West Design Speed is 40 mph
- Assume environmental documentation will include 404 permit

APPENDIX A. COST ESTIMATES

JONES & DEMILLE ENGINEERING, INC.
1535 SOUTH 100 WEST
RICHFIELD UT 84701

ENGINEER'S OPINION OF PROBABLE COST

PROJECT: Logan 100 West
Through Church Alternative
OWNER: Logan City

PROJ #: 1401-050
DATE: 2/3/2015
SHEET: 1

BY: C.D.

ITEM #	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	L.S.	$280,000.00	$280,000.00
2	Traffic Control	1	L.S.	$10,000.00	$10,000.00
3	Remove Asphalt Pavement	12,000	S.Y.	$2.50	$30,000.00
4	Remove Concrete Sidewalk	980	S.Y.	$10.00	$9,800.00
5	Remove Curb & Gutter	2,700	L.F.	$8.00	$21,600.00
6	Relocate Power Pole	6	Each	$25,000.00	$150,000.00
7	Landscaping/Tree Removal	1	L.S.	$20,000.00	$20,000.00
8	Untreated Base Course (Plan Quantity)*	1,400	C.Y.	$25.00	$35,000.00
9	Roadway Excavation (Plan Quantity)*	11,000	C.Y.	$8.00	$88,000.00
10	Granular Borrow*	5,500	C.Y.	$20.00	$110,000.00
11	HMA - 3/4" Max*	2,800	Ton	$90.00	$252,000.00
12	Bridge	1	L.S.	$2,200,000.00	$2,200,000.00
13	Curb & Gutter	2,100	L.F.	$18.00	$37,800.00
14	5' Concrete Sidewalk	2,000	S.Y.	$33.00	$66,000.00
15	Utilities	1	L.S.	$80,000.00	$80,000.00
16	Church Purchase	1	L.S.	$4,000,000.00	$4,000,000.00
17	Commercial Property Purchase	2	Acre	$50,000.00	$100,000.00
18	Contingency	1	L.S.	$520,000.00	$520,000.00
*Assumed pavement section of 6" HMA, 6" UTBC, 24" GB					
TOTAL ESTIMATED CONSTRUCTION COST					**$9,010,200.00**
Preconstruction Engineering Services					$628,000.00
Construction Engineering Services					$720,000.00
Administration/Legal					$40,000.00
PROJECT TOTAL					**$10,398,200.00**

JONES & DEMILLE ENGINEERING, INC.
1535 SOUTH 100 WEST
RICHFIELD UT 84701

ENGINEER'S OPINION OF PROBABLE COST

PROJECT: Logan 100 West
East of Church Alternative
OWNER: Logan City

PROJ #: 1401-050
DATE: 1/20/2015
SHEET: 1

BY: C.D.

ITEM #	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	L.S.	$265,000.00	$265,000.00
2	Traffic Control	1	L.S.	$10,000.00	$10,000.00
3	Remove Asphalt Pavement	3,300	S.Y.	$2.50	$8,250.00
4	Remove Concrete Sidewalk	600	S.Y.	$10.00	$6,000.00
5	Remove Curb & Gutter	1,200	L.F.	$8.00	$9,600.00
6	Relocate Power Pole	6	Each	$25,000.00	$150,000.00
7	Landscaping/Tree Removal	1	L.S.	$30,000.00	$30,000.00
8	Untreated Base Course (Plan Quantity)*	1,700	C.Y.	$25.00	$42,500.00
9	Roadway Excavation (Plan Quantity)*	11,000	C.Y.	$8.00	$88,000.00
10	Granular Borrow*	6,800	C.Y.	$20.00	$136,000.00
11	HMA - 3/4" Max*	3,200	Ton	$90.00	$288,000.00
12	Bridge	1	L.S.	$2,500,000.00	$2,500,000.00
13	Curb & Gutter	3,750	L.F.	$18.00	$67,500.00
14	5' Concrete Sidewalk	2,000	S.Y.	$33.00	$66,000.00
15	Utilities	1	L.S.	$80,000.00	$80,000.00
16	Residential Property Purchase (3 Homes)	2.1	Acre	$400,000.00	$840,000.00
17	Commercial Property Purchase (1 Building)	2.7	Acre	$90,000.00	$243,000.00
18	Contingency	1	L.S.	$725,000.00	$725,000.00

*Assumed pavement section of 6" HMA, 6" UTBC, 24" GB

TOTAL ESTIMATED CONSTRUCTION COST	**$5,554,850.00**
Preconstruction Engineering Services	$389,000.00
Construction Engineering Services	$445,000.00
Administration/Legal	$40,000.00
PROJECT TOTAL	**$6,428,850.00**

JONES & DEMILLE ENGINEERING, INC.
1535 SOUTH 100 WEST
RICHFIELD UT 84701

ENGINEER'S OPINION OF PROBABLE COST

PROJECT: Logan 100 West
West of Church Alternative
OWNER: Logan City

PROJ #: 1401-050
DATE: 1/20/2015
SHEET: 1

BY: C.D.

ITEM #	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization	1	L.S.	$290,000.00	$290,000.00
2	Traffic Control	1	L.S.	$10,000.00	$10,000.00
3	Remove Asphalt Pavement	3,300	S.Y.	$2.50	$8,250.00
4	Remove Concrete Sidewalk	600	S.Y.	$10.00	$6,000.00
5	Remove Curb & Gutter	1,200	L.F.	$8.00	$9,600.00
6	Relocate Power Pole	6	Each	$25,000.00	$150,000.00
7	Landscaping/Tree Removal	1	L.S.	$20,000.00	$20,000.00
8	Untreated Base Course (Plan Quantity)*	1,700	C.Y.	$25.00	$42,500.00
9	Roadway Excavation (Plan Quantity)*	11,000	C.Y.	$8.00	$88,000.00
10	Granular Borrow*	6,800	C.Y.	$20.00	$136,000.00
11	HMA - 3/4" Max*	3,200	Ton	$90.00	$288,000.00
12	Bridge	1	L.S.	$2,200,000.00	$2,200,000.00
13	Curb & Gutter	3,750	L.F.	$18.00	$67,500.00
14	5' Concrete Sidewalk	2,000	S.Y.	$33.00	$66,000.00
15	Utilities	1	L.S.	$80,000.00	$80,000.00
16	Residential Property Purchase (9 Homes)	1.9	Acre	$950,000.00	$1,344,000.00
17	Multi-Family Property Purchase	0.6	Acre	$750,000.00	$450,000.00
18	Commercial Property Purchase	1.4	Acre	$50,000.00	$70,000.00
19	Contingency	1	L.S.	$790,000.00	$790,000.00
*Assumed pavement section of 6" HMA, 6" UTBC, 24" GB					
TOTAL ESTIMATED CONSTRUCTION COST					**$6,115,850.00**
Preconstruction Engineering Services					$425,000.00
Construction Engineering Services					$485,000.00
Administration/Legal					$50,000.00
PROJECT TOTAL					**$7,075,850.00**

APPENDIX B. ALIGNMENT & CROSS SECTION

Jones & DeMille Engineering, Inc.
CIVIL ENGINEERING - SURVEYING - TESTING
GIS - ENVIRONMENTAL

LOGAN CITY - 100 WEST
600 S TO HWY 89-91 CONCEPTUAL DESIGN
73' RIGHT-OF-WAY ALTERNATIVES

PROJECT NUMBER 1401-050

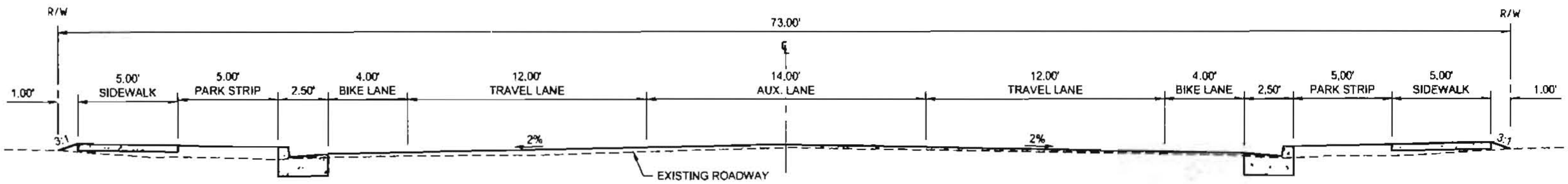
CACHE
COUNTY

SHEET NO. EX-01

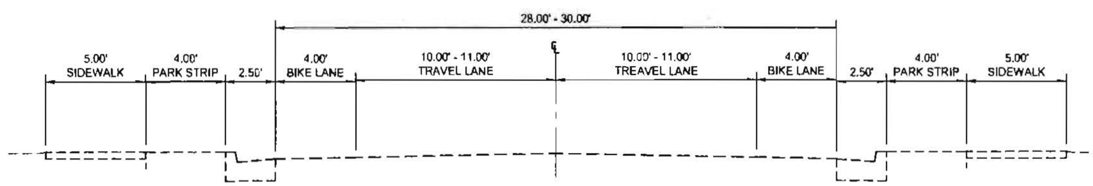
SCALE 1" = 200'

DESIGN JA 14-01 | CHECK BB 14-01

REVISIONS: ORIGINAL SUBMISSION FOR AUTHORIZATION



73' COMMERCIAL TYPICAL SECTION



EXISTING TYPICAL SECTION

SOUTH OF PROJECT

ORIGINAL SUBMISSION FOR AUTHORIZATION

REVISIONS

SCALE 1" = 5'

REVIEW

Jones & DeMille Engineering, Inc.

CIVIL ENGINEERING - SURVEYING - TESTING

GIS - ENVIRONMENTAL

DRAWN JA 14-02

LOGAN CITY - 100 WEST

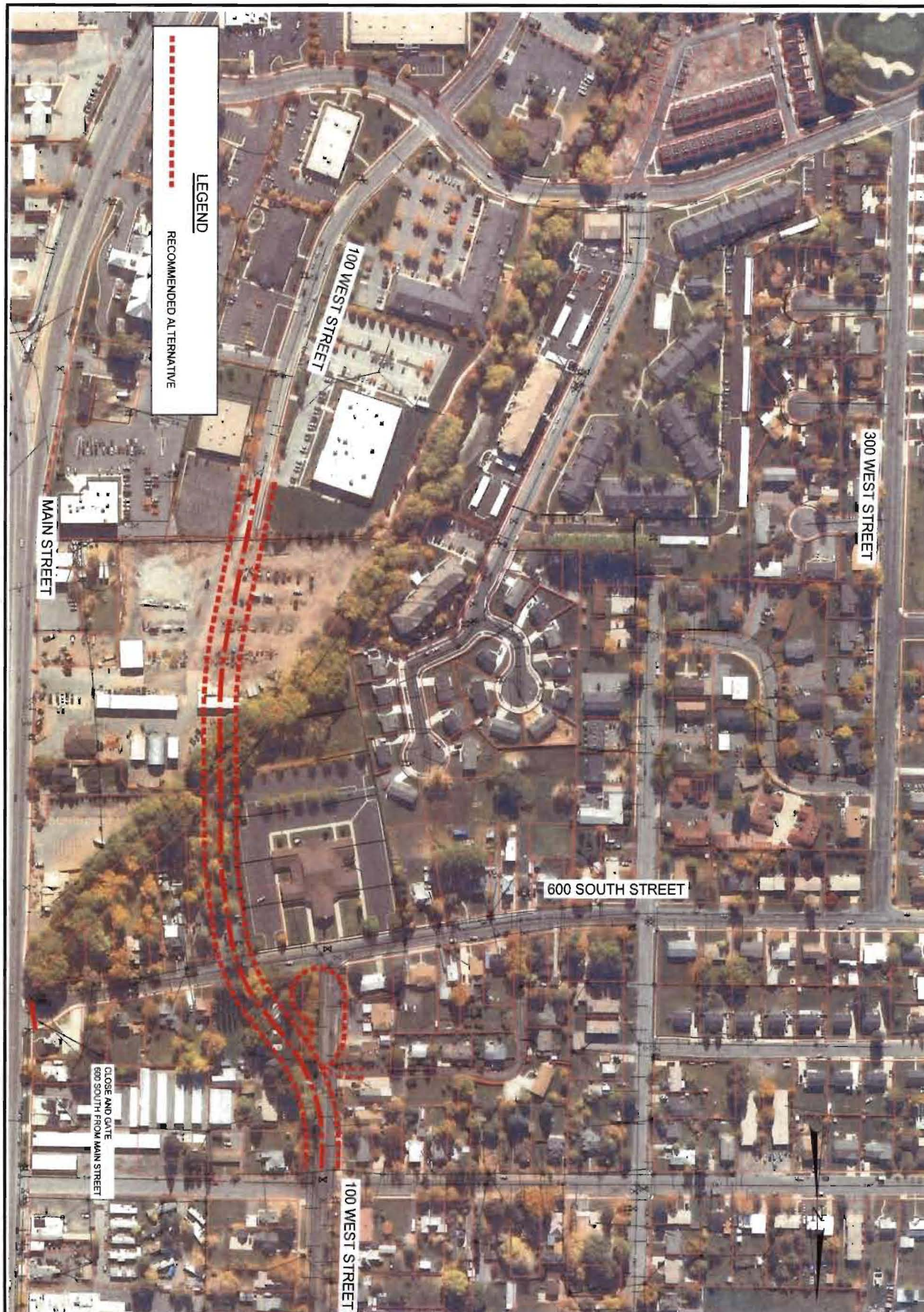
600 S TO HWY 89-91 CONCEPTUAL DESIGN

TYPICAL SECTIONS

PROJECT NUMBER 1401-050

CACHE COUNTY

SHEET NO. TS-01



SHEET NO.	COUNTY			
EX-01	CACHE	LOGAN CITY - 100 WEST		
		600 S TO HWY 89-91 CONCEPTUAL DESIGN		
		73' RIGHT-OF-WAY ALTERNATIVES		
		PROJECT NUMBER	1401-050	

Jones & DeMille Engineering, Inc.
CIVIL ENGINEERING - SURVEYING - TESTING
GIS - ENVIRONMENTAL
1.800.748.5275 www.jonesanddemille.com

APPROVAL RECOMM	DATE	PROJECT DESIGN ENGINEER
APPROVED	DATE	

DESIGN		CHECK		REVIEW
DRAWN	JA 14-01	CHECK	BB 14-01	DATE
QUANT		CHECK		BY

NO.	DATE	DESIGN REV. BY	MAPS CORR. BY	PARCELS AFFECTED	REQUEST BY	REMARKS
		ORIGINAL SUBMISSION FOR AUTHORIZATION				

REVISIONS

SCALE	DWG NAME	DWG CREATED	UPDATED
1" = 200'	[illegible]	2014/02/13	1/8/2015
	SHT SET [illegible]	PEN TBL [illegible]	PLOTTED 1/8/2015

APPENDIX C. TRAFFIC COUNTS & SYNCHRO ANALYSIS

TURNING MOVEMENT COUNT SUMMARY

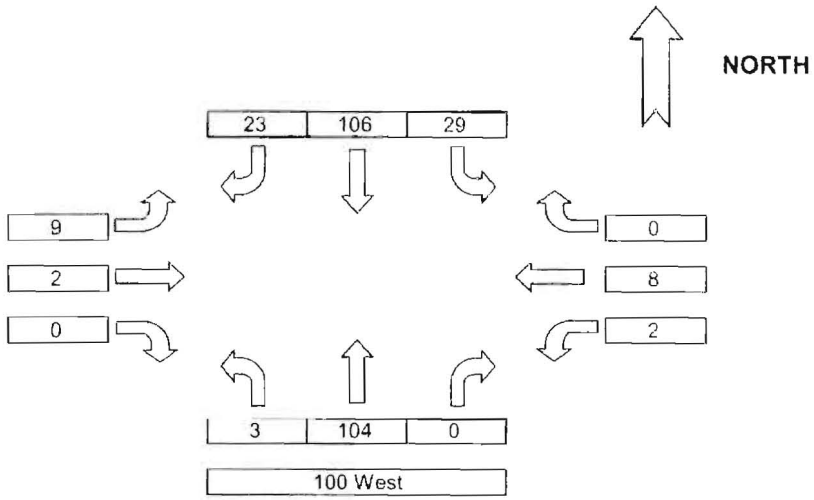
AM PEAK HOUR VOLUMES

INTERSECTION:
N-S STREET: *100 West*
E-W STREET: *500 South*

PROJ. NO.:
COUNT DATE: *1-Apr-14*
NOTES:

COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

PK HR VOLUME:	286
PHF:	0.86
PEAK HOUR:	
FROM:	TO:
4:30 PM	5:30 PM



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	4:15 PM	0	17	0	1	1	0	11	24	5	0	1	0	60
4:15 PM	4:30 PM	0	21	0	1	2	0	9	16	3	1	2	3	57
4:30 PM	4:45 PM	0	29	0	0	0	0	5	23	6	1	2	0	66
4:45 PM	5:00 PM	1	22	0	3	0	0	3	22	3	0	1	0	55
5:00 PM	5:15 PM	2	26	0	4	2	0	9	26	9	1	4	0	83
5:15 PM	5:30 PM	0	27	0	2	0	0	12	35	5	0	1	0	82
5:30 PM	5:45 PM	0	25	0	1	1	0	8	19	3	1	3	0	61
5:45 PM	6:00 PM	0	24	0	2	0	0	5	15	4	0	1	0	51

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	5:00 PM	1	89	0	5	3	0	28	85	17	2	6	2	238
4:15 PM	5:15 PM	3	98	0	8	4	0	26	87	21	3	9	2	261
4:30 PM	5:30 PM	3	104	0	9	2	0	29	106	23	2	8	0	286
4:45 PM	5:45 PM	3	100	0	10	3	0	32	102	20	2	9	0	281
5:00 PM	6:00 PM	2	102	0	9	3	0	34	95	21	2	9	0	277

NOTE PHF IS BASED ON 15 MIN PEAK WITHIN THE PEAK HOUR.

TURNING MOVEMENT COUNT SUMMARY

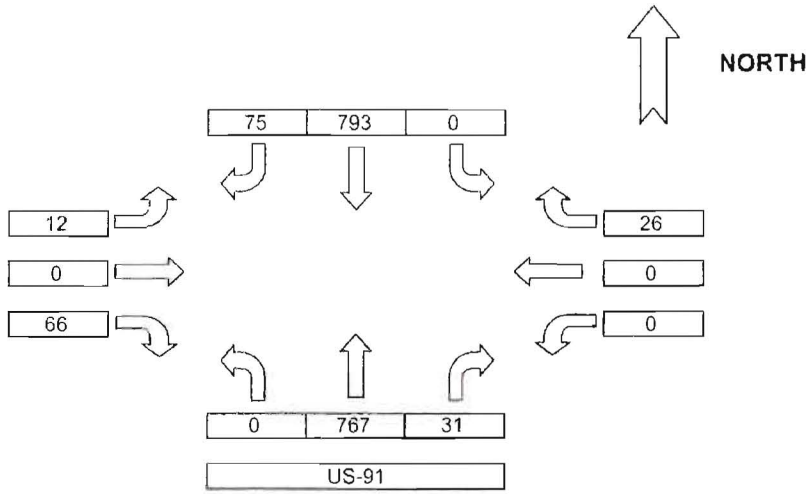
AM PEAK HOUR VOLUMES

INTERSECTION:
N-S STREET: *US-91*
E-W STREET: *Golf Course Road*

PROJ. NO.:
COUNT DATE: *13-Feb-14*
NOTES:

COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

PK HR VOLUME:	1,770
PHF:	0.88
PEAK HOUR:	
FROM:	TO:
4:45 PM	5:45 PM



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	4:15 PM	*0*	*186*	*1*	*3*	*0*	*14*	*0*	*178*	*19*	*0*	*0*	*4*	405
4:15 PM	4:30 PM	*0*	*189*	*1*	*3*	*0*	*14*	*0*	*183*	*15*	*0*	*0*	*6*	411
4:30 PM	4:45 PM	*0*	*148*	*3*	*3*	*0*	*18*	*0*	*163*	*15*	*0*	*0*	*6*	356
4:45 PM	5:00 PM	*0*	*188*	*6*	*3*	*0*	*11*	*0*	*178*	*25*	*0*	*0*	*5*	416
5:00 PM	5:15 PM	*0*	*223*	*10*	*3*	*0*	*25*	*0*	*215*	*20*	*0*	*0*	*9*	505
5:15 PM	5:30 PM	*0*	*164*	*8*	*3*	*0*	*18*	*0*	*208*	*15*	*0*	*0*	*6*	422
5:30 PM	5:45 PM	*0*	*192*	*7*	*3*	*0*	*12*	*0*	*192*	*15*	*0*	*0*	*6*	427
5:45 PM	6:00 PM	*0*	*187*	*8*	*3*	*0*	*21*	*0*	*140*	*21*	*0*	*0*	*7*	387

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	5:00 PM	0	711	11	12	0	57	0	702	74	0	0	21	1,588
4:15 PM	5:15 PM	0	748	20	12	0	68	0	739	75	0	0	26	1,688
4:30 PM	5:30 PM	0	723	27	12	0	72	0	764	75	0	0	26	1,699
4:45 PM	5:45 PM	0	767	31	12	0	66	0	793	75	0	0	26	1,770
5:00 PM	6:00 PM	0	766	33	12	0	76	0	755	71	0	0	28	1,741

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.

TURNING MOVEMENT COUNT SUMMARY

AM PEAK HOUR VOLUMES

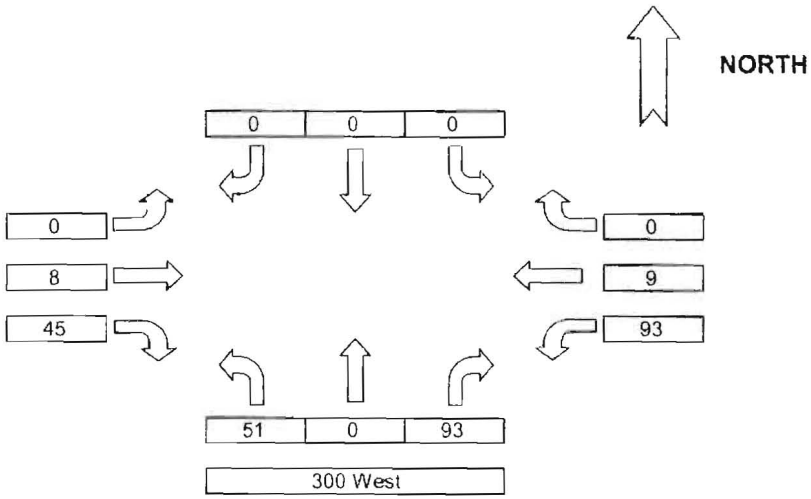
INTERSECTION:
N-S STREET: *300 West*
E-W STREET: *600 South*

PROJ. NO.:
COUNT DATE: *1-Apr-14*
NOTES:

COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

PK HR VOLUME:	299
PHF:	0.81
PEAK HOUR:	
FROM:	TO:
4:30 PM	5:30 PM

600 South



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	4:15 PM	4	0	21	0	4	11	0	0	0	21	3	0	64
4:15 PM	4:30 PM	8	0	23	0	1	8	0	0	0	15	1	0	56
4:30 PM	4:45 PM	11	0	22	0	0	16	0	0	0	19	1	0	69
4:45 PM	5:00 PM	6	0	20	0	3	6	0	0	0	24	3	0	62
5:00 PM	5:15 PM	15	0	22	0	2	10	0	0	0	23	4	0	76
5:15 PM	5:30 PM	19	0	29	0	3	13	0	0	0	27	1	0	92
5:30 PM	5:45 PM	10	0	17	0	3	10	0	0	0	14	4	0	58
5:45 PM	6:00 PM	7	0	22	0	4	11	0	0	0	20	3	0	67

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	5:00 PM	29	0	86	0	8	41	0	0	0	79	8	0	251
4:15 PM	5:15 PM	40	0	87	0	6	40	0	0	0	81	9	0	263
4:30 PM	5:30 PM	51	0	93	0	8	45	0	0	0	93	9	0	299
4:45 PM	5:45 PM	50	0	88	0	11	39	0	0	0	88	12	0	288
5:00 PM	6:00 PM	51	0	90	0	12	44	0	0	0	84	12	0	293

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.

TURNING MOVEMENT COUNT SUMMARY

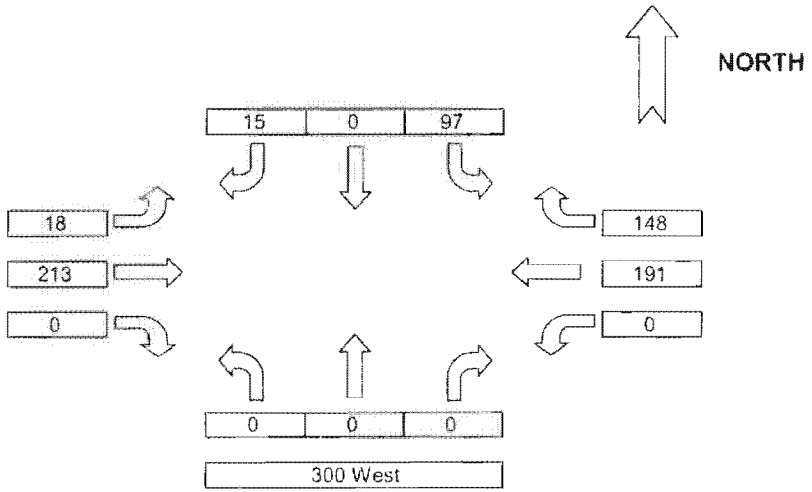
PM PEAK HOUR VOLUMES

INTERSECTION:
N-S STREET: *300 West*
E-W STREET: *Golf Course Road*

PROJ. NO.:
COUNT DATE: *1-Apr-14*
NOTES:

COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

PK HR VOLUME:	682
PHF	0.86
PEAK HOUR:	
FROM:	TO:
5:00 PM	6:00 PM



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	4:15 PM	0	0	0	2	32	0	27	0	7	0	43	24	135
4:15 PM	4:30 PM	0	0	0	3	37	0	16	0	1	0	28	29	114
4:30 PM	4:45 PM	0	0	0	3	52	0	25	0	2	0	38	28	148
4:45 PM	5:00 PM	0	0	0	7	51	0	21	0	1	0	37	22	139
5:00 PM	5:15 PM	0	0	0	6	56	0	23	0	5	0	64	44	198
5:15 PM	5:30 PM	0	0	0	6	60	0	24	0	7	0	56	38	191
5:30 PM	5:45 PM	0	0	0	3	44	0	20	0	3	0	40	24	134
5:45 PM	6:00 PM	0	0	0	3	53	0	30	0	0	0	31	42	159

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	5:00 PM	0	0	0	15	172	0	89	0	11	0	146	103	536
4:15 PM	5:15 PM	0	0	0	19	196	0	85	0	9	0	167	123	599
4:30 PM	5:30 PM	0	0	0	22	219	0	93	0	15	0	195	132	676
4:45 PM	5:45 PM	0	0	0	22	211	0	88	0	16	0	197	128	662
5:00 PM	6:00 PM	0	0	0	18	213	0	97	0	15	0	191	148	682

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.

TURNING MOVEMENT COUNT SUMMARY

AM PEAK HOUR VOLUMES

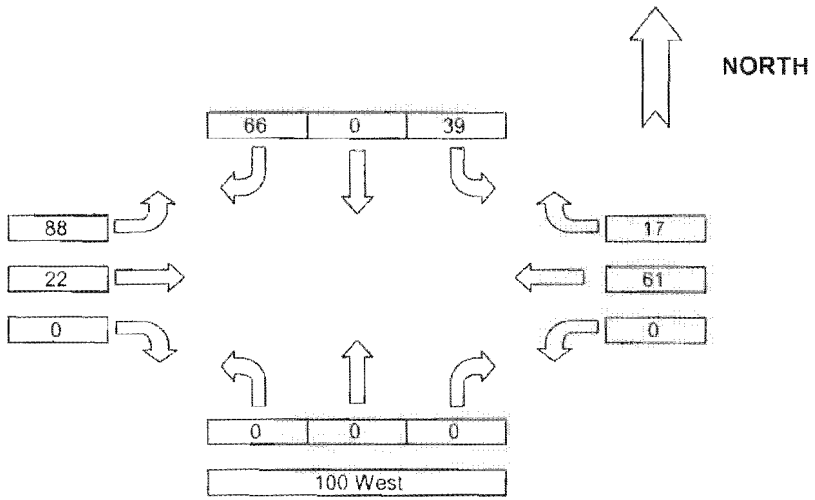
INTERSECTION:
N-S STREET: *100 West*
E-W STREET: *600 South*

PROJ. NO.:
COUNT DATE: *1-Apr-14*
NOTES:

COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

PK HR VOLUME:	293
PHF:	0.89
PEAK HOUR:	
FROM:	TO:
4:30 PM	5:30 PM

600 South



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	4:15 PM	0	0	0	15	6	0	8	0	16	0	14	1	60
4:15 PM	4:30 PM	0	0	0	21	6	0	7	0	19	0	14	5	63
4:30 PM	4:45 PM	0	0	0	23	4	0	10	0	13	0	7	7	64
4:45 PM	5:00 PM	0	0	0	20	6	0	9	0	13	0	19	1	68
5:00 PM	5:15 PM	0	0	0	22	4	0	11	0	17	0	21	4	79
5:15 PM	5:30 PM	0	0	0	23	8	0	9	0	23	0	14	5	82
5:30 PM	5:45 PM	0	0	0	18	4	0	7	0	12	0	9	3	53
5:45 PM	6:00 PM	0	0	0	20	5	0	3	0	11	0	14	2	55

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	5:00 PM	0	0	0	79	22	0	34	0	52	0	54	14	255
4:15 PM	5:15 PM	0	0	0	86	20	0	37	0	53	0	61	17	274
4:30 PM	5:30 PM	0	0	0	88	22	0	39	0	66	0	61	17	293
4:45 PM	5:45 PM	0	0	0	83	22	0	36	0	65	0	63	13	282
5:00 PM	6:00 PM	0	0	0	83	21	0	30	0	63	0	58	14	269

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.

TURNING MOVEMENT COUNT SUMMARY

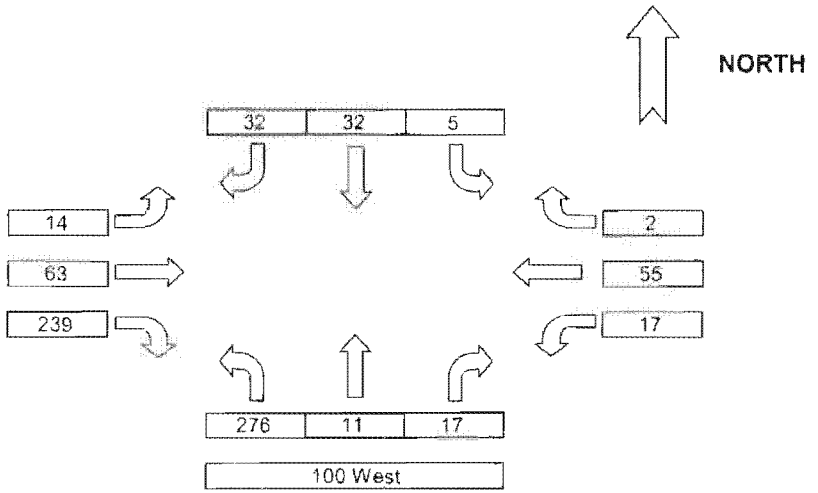
AM PEAK HOUR VOLUMES

INTERSECTION:
N-S STREET: *100 West*
E-W STREET: *Golf Course Road*

PROJ. NO.:
COUNT DATE: *1-Apr-14*
NOTES:

COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

PK HR VOLUME:	763
PHF:	0.87
PEAK HOUR:	
FROM:	TO:
5:00 PM	6:00 PM



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	4:15 PM	52	5	1	1	13	48	0	8	3	2	23	2	158
4:15 PM	4:30 PM	37	5	3	1	10	43	1	7	5	4	4	3	123
4:30 PM	4:45 PM	59	3	5	1	13	65	0	3	4	1	9	1	164
4:45 PM	5:00 PM	44	2	4	2	14	60	1	10	6	2	14	0	159
5:00 PM	5:15 PM	86	3	2	1	12	67	3	11	12	4	16	0	219
5:15 PM	5:30 PM	76	1	4	2	16	67	1	7	5	5	13	1	198
5:30 PM	5:45 PM	54	4	6	5	14	44	1	12	7	3	9	1	160
5:45 PM	6:00 PM	58	3	5	6	21	61	0	2	8	5	17	0	186

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	5:00 PM	192	15	13	5	50	216	2	28	18	9	50	6	604
4:15 PM	5:15 PM	228	13	14	5	49	235	5	31	27	11	43	4	665
4:30 PM	5:30 PM	267	9	15	6	55	259	5	31	27	12	52	2	740
4:45 PM	5:45 PM	262	10	16	10	56	238	6	40	30	14	52	2	736
5:00 PM	6:00 PM	276	11	17	14	63	239	5	32	32	17	55	2	763

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.

TURNING MOVEMENT COUNT SUMMARY

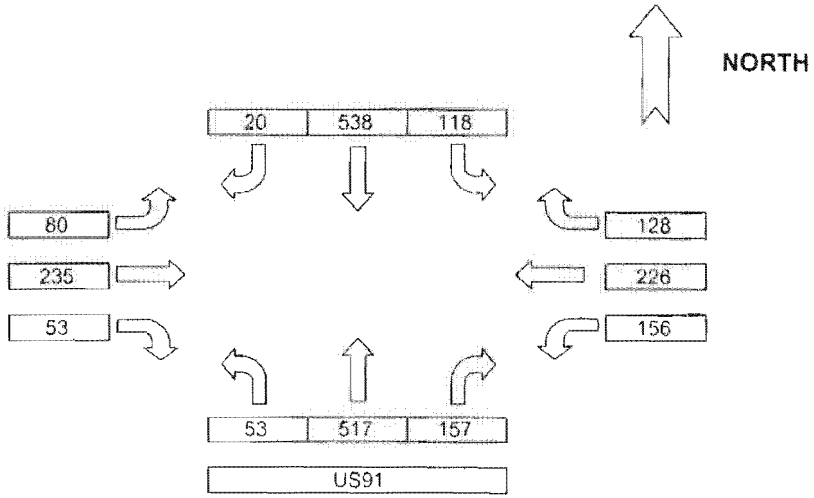
AM PEAK HOUR VOLUMES

INTERSECTION:
N-S STREET: *US91*
E-W STREET: *100 West*

PRO.I NO.:
COUNT DATE: *1-Apr-14*
NOTES:

COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

PK HR VOLUME:	2,281
PHF:	0.90
PEAK HOUR:	
FROM:	TO:
4:45 PM	5:45 PM



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	4:15 PM	13	130	31	14	44	7	26	134	5	31	46	25	506
4:15 PM	4:30 PM	10	120	29	11	50	7	17	131	3	33	35	24	470
4:30 PM	4:45 PM	14	107	34	6	63	7	24	122	2	31	47	20	477
4:45 PM	5:00 PM	14	128	34	22	51	17	16	116	6	41	38	23	506
5:00 PM	5:15 PM	18	149	56	28	62	13	38	141	6	32	62	32	636
5:15 PM	5:30 PM	10	112	36	13	75	15	31	147	4	36	67	37	583
5:30 PM	5:45 PM	11	128	33	17	47	8	33	134	4	47	59	36	556
5:45 PM	6:00 PM	17	135	26	20	56	9	24	105	9	41	40	23	505

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
4:00 PM	5:00 PM	51	485	128	53	208	38	83	503	16	136	166	92	1,959
4:15 PM	5:15 PM	56	504	152	67	226	44	95	510	17	137	182	99	2,089
4:30 PM	5:30 PM	56	496	159	69	251	52	109	526	18	140	214	112	2,202
4:45 PM	5:45 PM	53	517	157	80	235	53	118	538	20	156	226	128	2,281
5:00 PM	6:00 PM	56	524	149	78	240	45	126	527	23	156	228	128	2,280

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	2	0	2	8	0	3	104	0	29	106	23
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	2	0	2	9	0	3	113	0	32	115	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	315	310	128	299	323	113	140			113		
vC1, stage 1 conf vol	191	191		120	120							
vC2, stage 2 conf vol	124	120		179	203							
vCu, unblocked vol	315	310	128	299	323	113	140			113		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	99	100	100			98		
cM capacity (veh/h)	730	675	922	748	672	940	1443			1476		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	11	3	113	32	140
Volume Left	10	2	3	0	32	0
Volume Right	0	0	0	0	0	25
cSH	720	686	1443	1700	1476	1700
Volume to Capacity	0.02	0.02	0.00	0.07	0.02	0.08
Queue Length 95th (ft)	1	1	0	0	2	0
Control Delay (s)	10.1	10.3	7.5	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.1	10.3	0.2		1.4	
Approach LOS	B	B				

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	18.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	8	45	93	9	51	93
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	49	101	10	55	101
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			58		245	33
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			58		245	33
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		92	90
cM capacity (veh/h)			1547		695	1040

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	58	111	157
Volume Left	0	101	55
Volume Right	49	0	101
cSH	1700	1547	884
Volume to Capacity	0.03	0.07	0.18
Queue Length 95th (ft)	0	5	16
Control Delay (s)	0.0	6.9	9.9
Lane LOS		A	A
Approach Delay (s)	0.0	6.9	9.9
Approach LOS			A

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	18	213	191	148	97	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	232	208	161	105	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	368				559	288
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	368				559	288
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				78	98
cM capacity (veh/h)	1190				482	751

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	251	368	122
Volume Left	20	0	105
Volume Right	0	161	16
cSH	1190	1700	507
Volume to Capacity	0.02	0.22	0.24
Queue Length 95th (ft)	1	0	23
Control Delay (s)	0.8	0.0	14.3
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	14.3
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	14	63	239	17	55	2	47	240	17	17	240	47
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	68	260	18	60	2	51	261	18	18	261	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)								1271				
pX, platoon unblocked												
vC, conflicting volume	718	705	286	964	721	270	312			279		
vC1, stage 1 conf vol	323	323		372	372							
vC2, stage 2 conf vol	395	382		592	349							
vCu, unblocked vol	718	705	286	964	721	270	312			279		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	86	65	92	88	100	96			99		
cM capacity (veh/h)	471	501	753	224	488	769	1248			1283		

Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2
Volume Total	343	80	51	279	18	312
Volume Left	15	18	51	0	18	0
Volume Right	260	2	0	18	0	51
cSH	668	387	1248	1700	1283	1700
Volume to Capacity	0.51	0.21	0.04	0.16	0.01	0.18
Queue Length 95th (ft)	74	19	3	0	1	0
Control Delay (s)	16.0	16.7	8.0	0.0	7.8	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.0	16.7	1.2		0.4	
Approach LOS	C	C				

Intersection Summary				
Average Delay	6.8			
Intersection Capacity Utilization	48.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	88	22	0	0	61	17	16	72	20	20	72	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	96	24	0	0	66	18	17	78	22	22	78	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	295	265	87	258	263	89	96			100		
vC1, stage 1 conf vol	130	130		124	124							
vC2, stage 2 conf vol	165	135		134	139							
vCu, unblocked vol	295	265	87	258	263	89	96			100		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	97	100	100	91	98	99			99		
cM capacity (veh/h)	686	700	972	760	702	969	1498			1493		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	120	85	17	100	22	96
Volume Left	96	0	17	0	22	0
Volume Right	0	18	0	22	0	17
cSH	689	747	1498	1700	1493	1700
Volume to Capacity	0.17	0.11	0.01	0.06	0.01	0.06
Queue Length 95th (ft)	16	10	1	0	1	0
Control Delay (s)	11.3	10.4	7.4	0.0	7.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	11.3	10.4	1.1		1.4	
Approach LOS	B	B				

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	12	0	66	0	0	26	0	767	31	0	793	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	0	72	0	0	28	0	834	34	0	862	82
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			4									
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1307	1729	431	1265	1777	417	943			867		
vC1, stage 1 conf vol	862	862		834	834							
vC2, stage 2 conf vol	445	867		431	943							
vCu, unblocked vol	1307	1729	431	1265	1777	417	943			867		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	87	100	100	95	100			100		
cM capacity (veh/h)	281	269	573	285	260	585	723			772		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	85	28	0	417	417	34	0	431	431	82
Volume Left	13	0	0	0	0	0	0	0	0	0
Volume Right	72	28	0	0	0	34	0	0	0	82
cSH	677	585	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.13	0.05	0.00	0.25	0.25	0.02	0.00	0.25	0.25	0.05
Queue Length 95th (ft)	11	4	0	0	0	0	0	0	0	0
Control Delay (s)	13.1	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	B								
Approach Delay (s)	13.1	11.5	0.0				0.0			
Approach LOS	B	B								

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	39.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	235	53	156	226	128	53	517	157	118	538	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1811		1770	1762		1770	3362	1583	1770	3362	1583
Flt Permitted	0.53	1.00		0.95	1.00		0.31	1.00	1.00	0.33	1.00	1.00
Satd. Flow (perm)	994	1811		1770	1762		583	3362	1583	617	3362	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	255	58	170	246	139	58	562	171	128	585	22
RTOR Reduction (vph)	0	14	0	0	34	0	0	0	124	0	0	16
Lane Group Flow (vph)	87	299	0	170	351	0	58	562	47	128	585	6
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Split	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		2	2			4			8	
Permitted Phases	6						4		4	8		8
Actuated Green, G (s)	13.1	13.1		14.1	14.1		14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	13.1	13.1		14.1	14.1		14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.24	0.24		0.26	0.26		0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	240	438		461	459		160	925	435	169	925	435
v/s Ratio Prot		c0.16		0.10	c0.20			0.17			0.17	
v/s Ratio Perm	0.09						0.10		0.03	c0.21		0.00
v/c Ratio	0.36	0.68		0.37	0.76		0.36	0.61	0.11	0.76	0.63	0.01
Uniform Delay, d1	17.0	18.6		16.4	18.5		15.8	17.1	14.6	17.9	17.2	14.3
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	0.9	4.3		0.5	7.4		1.4	1.1	0.1	17.5	1.4	0.0
Delay (s)	18.0	22.9		16.9	25.9		17.2	18.2	14.7	35.4	18.6	14.3
Level of Service	B	C		B	C		B	B	B	D	B	B
Approach Delay (s)		21.9			23.1			17.4			21.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX D. PROPERTY OWNER MINUTES

Property Owner Meetings
Monday, April 14, 2014

Meeting with Ellis Equipment

a. Attendees: Bob, Clair Ellis, Rod, Mark, Tyler, Brian
b. Property Owner prefers the east alignment (red) in order to maximize the remaining parcel left over west of the proposed alignment.
c. Alignment goes through sheds but we will look at possibility of trying to miss them.
d. Asked about 700 South coming through the property from the East of Main Street. UDOT will not allow a light on Main at this location because of proximity to signal to the south.
e. Replace buildings and loading dock seems to be best option if east alignment is chosen.
f. There is a one foot strip of property at south property line by the end of 100 West that may be owned by another individual and will have to be cleared to get roadway through.
g. There is an irrigation canal that runs east and west near the property line with 100 West that will have to be considered during design.
h. Design is 2 years out and construction will not be for at least 3 years depending on funding.
i. The property owners were promised sewer 30 years ago and never got it. They need to show the city the agreements stating this and Mark will take care of it.

25 West 600 South,Tyler Thayn 435-764-4020

a. Doesn't like the idea of closing 600 South off at Main because it will affect his business.
b. He is ok with right in right out for that intersection instead of closing it.
c. He plans to expand business and possibly buy the adjacent parcel for his entire business.
d. He doesn't want his opinion to be the deciding factor of what happens here.

President Lynn Hobbs, Brother Weeks, Brother Payne, Royce Yorgason

a. Prefers east alignment but after discussion they are open to any option.
b. Pedestrian access from south and west is important. Would like to see pedestrian access for homes on the culdesac west of the church.
c. If the yellow alignment is chosen that goes through the church, then additional property can be bought west of the church and the church could move over to those new parcels.
d. There is a possible 8 lot subdivision west of church that needs to be checked on to see where it is at in the process.
e. Church Real Estate Department needs to make the final determination on whether the church can be torn down and rebuilt or avoided.
f. 3 school districts intersect at this intersection, making it a mess for pedestrian and bus traffic. This will have to factor into the design and overall plan for the intersection.
g. Church representatives were good with looking at relocating the church as an option.
h. The lion house on the northeast corner of the intersection is the old Doctor Hale home. They are restoring to original configuration.

i. Church may consider 2 other properties within the stake for the new church location. President Hobbs and Royce went to take a look at them after the meeting.

Property Owner on NE Corner of intersection (Lion house)

a. Property Owner is Amanda Sundberg 435-764-2234
b. Ok with yellow or red alignments.
c. Wants to save house and would like to see the alignments shifted away from her house. She can live with any yard reductions or tree loss that may be necessary to accommodate the east alignment.