

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

**OFFICE OF DESIGN POLICY & SUPPORT
INTERDEPARTMENTAL CORRESPONDENCE**

FILE P.I. # 0006932 **OFFICE** Design Policy & Support
CSSTP-0006-00(932)
Rockdale County
GDOT District 7 - Metro Atlanta **DATE** 12/10/2014
CR 57/Klondike Road @ CR 62/
McDaniel Mill Road

FROM  *for* Brent Story, State Design Policy Engineer

TO SEE DISTRIBUTION

SUBJECT APPROVED REVISED CONCEPT REPORT

Attached is the approved Revised Concept Report for the above subject project.

Attachment

DISTRIBUTION:

Glenn Bowman, Director of Engineering
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Patrick Allen, District Utilities Engineer
Roxanne Harris, Project Manager
BOARD MEMBER - 4th Congressional District

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
REVISED PROJECT CONCEPT REPORT**

Project Type:	<u>Intersection Improvement</u>	P.I. Number:	<u>0006932</u>
GDOT District:	<u>District 7</u>	County:	<u>Rockdale</u>
Federal Route Number:	<u>N/A</u>	State Route Number:	<u>N/A</u>
Project Number:	<u>STP-0006-00(932)</u>		

The approved concept design for this project proposed the conversion of the existing five-legged intersection of Klondike Road @ McDaniel Road/Hurst Road to a four-legged intersection by relocating the Hurst Road approach 400' west along Klondike Road, which in turn created two additional three-legged intersections. The approved concept also improved the existing intersection (skew) angle from 45 degrees to 61 degrees. This was done by reconstructing the Klondike Road west approach with a new horizontal curve, but with a design speed below the existing posted speed of 45 MPH. Reconstructing this curve would have required the lowering of the posted speed limit of Klondike Road to 40 MPH or approving a design exception for this horizontal curve. A Design Exception was subsequently not approved, and a speed study was conducted that showed the average running speed higher than the existing posted speed limit. Flattening the Klondike Road curve to meet the 45 MPH design speed would have resulted in an intersection skew angle below 60 degrees, which would have also required a Design Exception be approved for the skew angle. For these reasons, the concept design for this project has been revisited.

The resulting changes to the concept design are substantial. Hurst Road now remains on its present alignment to the existing intersection with McDaniel Mill Road, instead of being dead-ended west of the existing intersection, with a new connector road constructed to Klondike Road. McDaniel Mill continues to remain on its present alignment throughout the project area. The revised concept relocates Klondike Road from its present alignment for an approximate distance of 2100 feet (0.4 miles). Relocated Klondike Road intersects McDaniel Mill Road approximately 570 feet south of the existing intersection. Relocated Klondike Road includes three horizontal curves.

The existing intersection would remain as four-legged with McDaniel Mill Road serving as the north and south approaches, Hurst Road serving as the west approach, and a dead-end stub of existing Klondike Road serving as the east approach. This section of Klondike Road would remain to serve the New Hope Church and several residential properties. Based on projected traffic demand, this intersection can be converted to side-street stop control, with Klondike Road having the right-of-way. However, a sharp vertical crest immediately north of the intersection on McDaniel Mill Road limits intersection sight distance for side street traffic. For this reason, this project will lower the McDaniel Mill Road profile for a distance of 300 feet north of the existing intersection.

The proposed intersection of McDaniel Mill Road @ Relocated Klondike Road is proposed to be constructed as a single-lane roundabout. The Roundabout Concept Review document, prepared by MTJ Engineering, describes the proposed roundabout in detail and is included as one of the Attachments.

PLANNING, APPROVED CONCEPT, & BACKGROUND DATA

Project Justification Statement: Project STP-0006-00(932) will improve the operation of the existing five-legged intersection of Klondike Road @ McDaniel Mill Road / Hurst Road by removing one of the intersection legs, the Klondike Road through traffic by relocating Klondike Road, and improving the intersection sight distance of the existing intersection location.

This will be done by constructing a new four-legged roundabout intersection for Klondike Road @ Relocated Klondike Road that is ADA compliant and with a better intersection (skew) angle with McDaniel Mill Road (approximately 80 degrees) than the angle between the existing Klondike Road west approach at the existing intersection(45 degrees).

This project is included as part of the RTP developed by the Atlanta Regional Commission (Project RO-237). This project is part of the 2003 Conyers/Rockdale County Comprehensive Transportation Plan.

McDaniel Mill Road is a two-lane north-south facility that connects the I-20 frontage road in the north to Smyrna Road in the south. Klondike Road is a two-lane east-west facility that connects Conyers via the I-20/West Avenue Interchange with DeKalb County. Hurst Road is a two-lane east-west facility that begins at its intersection with McDaniel Mill Road and Klondike Road and continues west into DeKalb County, ultimately connecting with Turner Hill Road.

The existing intersection is five-legged with five-way stop sign control. The existing geometry is deficient with a 45 degree intersection (skew) angle between Klondike Road and McDaniel Mill Road, with both McDaniel Mill and Klondike Roads continuing through the intersection on curved alignments. Due to the combined effects of the existing curvature of Klondike Road through the intersection and the flat skew angle, the interior area of the intersection for vehicles following Klondike Road is up to 150 feet long. There is no channelization or pavement marking provided to aid motorists traveling the intersection in any direction. The presence of the fifth leg compounds driver confusion and increases the accident potential, especially considering the existing geometric layout.

The surrounding area is currently rural but has begun to transition to urban/suburban land uses due to a large subdivision partially constructed along Klondike Road southwest of the intersection and a fire station that has recently been constructed along Hurst Road west of the intersection. As this area grows in population and traffic, this intersection will experience increasing traffic and potential for accidents.

There is one historic resource located in the project area, the New Hope Church. It is located in the southeast quadrant of the existing Klondike Road/McDaniel Mill Road/Hurst Road intersection. The church is likely eligible due to its similarity to nearby buildings within the nearby Arabia Mountain Historic District and its association with the quarrying industry in the area.

Description of the approved concept: The project is located approximately one mile west of the City Limits of Conyers, Georgia. The logic for establishing approved concept termini was due to the improvement of the vertical and horizontal alignments and appropriate tie-in locations. The concept proposed to satisfy the Need and Purpose by increasing the intersection angle from 45 to 61 degrees, reducing the five-legged intersection to four legs, and improving horizontal and vertical alignments through the intersection. Hurst Road was proposed to be “dead-ended” west of the existing intersection, with a new connector road constructed between Hurst Road and Klondike

Road immediately east of Castle Point subdivision. Two new 3-legged intersections would have been constructed along Hurst Road and along Klondike Road approximately 400 feet southwest of the existing intersection. The existing stub of Hurst Road was to be maintained in order to provide access to a recently-constructed fire station located 400 feet west of the existing intersection.

The proposed improvements to Klondike Road @ McDaniel Mill Road would have occurred at the existing intersection location. The intersection skew would have been improved from a 45 degree angle to a 61 degree angle. However, in the process of improving the intersection angle, the radius of the existing horizontal curve on the west Klondike Road approach would have had to be reduced to accommodate a 40 MPH design speed in order to remove the existing horizontal curve from within the intersection. The posted speed of Klondike Road is 45 MPH.

Updated Accident Data: Updated accident data was collected using the Georgia DOT accident reporting system between 2008 and 2013. A total of 20 accidents were recorded in the overall vicinity of the existing intersection. Of these, 12 took place outside the project limits and/or were single-vehicle collisions with deer. This leaves 8 accidents over a six-year period that may be related to the existing intersection configuration. Of these 8 accidents, none had fatalities, and only one had injuries.

The Table below summarizes the accident rate for the immediate intersection vicinity and compares it with the statewide average rate for the functional classification for each of the intersection legs. As can be seen from the summary, the calculated accident rates are below the statewide averages for each functional classification.

**Accident Rate Summary (Per 100,000,000 Vehicle Miles Traveled) –
 Klondike Road / McDaniel Mill Road / Hurst Road**

Year	Number of Accidents	Computed Accident Rate	Statewide Average Rate (Minor Arterial, non NHS Urban)	Statewide Average Rate (Collector, Urban)
2008	2	328	469	443
2009	1	164	463	431
2010	1	164	Not Available	Not Available
2011	0	0	Not Available	Not Available
2012	2	328	Not Available	Not Available
2013	2	328	Not Available	Not Available
Average	8	216	-	-

The following Table identifies the individual crash type for each accident that is included in the above table. As can be seen from the accident types shown in that table, the majority of accidents were rear end accidents, with the remainder being either right-angle or sideswipe.

Although there is not enough accident data in the GDOT database to make definitive conclusions as to accident cause and other details, it is likely that the existing five-way stop control contributed to the number of rear-end collisions by forcing all vehicles to stop. Conversion of the multi-way stop to side street stop control at the existing intersection and construction of a roundabout at the proposed intersection would tend to reduce the potential for rear-end collisions by reducing the number of approach vehicles that stop before proceeding through the intersection.

**Summary of Crashes
 Intersection of Klondike Road at McDaniel Mill Road and Hurst Road**

2008							
Intersection	Total Crashes	Crash Type				Injury Tot.	Fatality
		Sideswipe	Rear End	Angle	Other		
Klondike/McDaniel	2	2	1	1	0	0/2	0
2009							
Intersection	Total Crashes	Crash Type				Injury Tot.	Fatality
		Sideswipe	Rear End	Angle	Tot.		
Klondike/McDaniel	1	0	1	0	0	0/1	0
2010							
Intersection	Total Crashes	Crash Type				Injury Tot.	Fatality
		Sideswipe	Rear End	Angle	Tot.		
Klondike/McDaniel	1	0	1	0	0	1/1	0
2011							
Intersection	Total Crashes	Crash Type				Injury Tot.	Fatality
		Sideswipe	Rear End	Angle	Tot.		
Klondike/McDaniel	0	0	0	0	0	0/0	0
2012							
Intersection	Total Crashes	Crash Type				Injury Tot.	Fatality
		Sideswipe	Rear End	Angle	Tot.		
Klondike/McDaniel	2	1	1	0	0	0/2	0
2013							
Intersection	Total Crashes	Crash Type				Injury Tot.	Fatality
		Sideswipe	Rear End	Angle	Tot.		
Klondike/McDaniel	2	0	1	1	0	0/2	0

Build Alternatives Considered: There are several constraints located in the immediate vicinity of the existing intersection that have complicated the development of cost-effective design concept alternatives that would meet the purpose and need for this project. The most critical constraints are listed below:

- Five approach legs meet at the existing intersection. The very flat existing intersection angle and long horizontal curve on Klondike Road through the intersection preclude realigning the Klondike Road intersection legs, while still meeting AASHTO requirements for horizontal curvature of the approach roadways and/or the intersection skew angle.
- The Historic Resource Boundary for New Hope Church is located within 20 feet of the existing edge of pavement in southeast quadrant of existing intersection.
- A large existing AT&T substation is located in northeast quadrant of existing intersection within 35 feet of existing edge of pavement.
- Existing single family residential properties are located on either side of McDaniel Mill Road north of the intersection are within 70 feet of existing roadway. A large parsonage home for the church (4-side brick) is on the west side of McDaniel Mill Road closest to the intersection.

- A Rockdale County fire station was constructed in the 2008-2009 time period on north side of Hurst Road, located 400' west of existing intersection.
- Southwest of the existing intersection, Klondike Road nearly parallels McDaniel Mill Road, which precludes meeting posted speed design on Klondike Road without realigning the roadway further to the west.

Prior to the development of the original approved concept and prior to the development of the revised concept design, numerous alternatives and variations were considered. Alternatives to the original approved concept consisted of roundabout and conventional intersections at or near the existing intersection site that would relocate McDaniel Mill Road either through the parsonage home on the north side of the intersection or within the historic resource boundary on the south side of the intersection.

Alternatives were not selected due to severe right-of-way impacts and/or environmental impacts. Also, there would still have been the need for a design exception for Klondike Road and/or the skew angle for the conventional intersection alternatives (that was ultimately rejected for the original concept alternative).

The development of the revised concept alternative narrowed down to three general alternatives. Two of these three alternatives relocated at least one of the Klondike Road legs from the existing intersection, in order to minimize or eliminate the previously described issues and constraints at the existing intersection location.

Like the original approved concept, the first alternative would eliminate the Hurst Road approach from the existing intersection and retain its overall intersection layout. This alternative would flatten the Klondike Road approach curves west of the intersection in order to meet the posted speed limit and without the need for a design exception. In order to do this, the southwest project limits would need to be extended a minimum of 500' as reverse curvature would be required to tie into the existing roadway. The primary impacts for this realignment would have been to the detention pond that serves the Castle Point subdivision, as this realignment would "clip" the northwest corner of the pond, filling in much of it, and still come within 200' of a subdivision street and take the back of at least two single family home lots. Flattening the alignment to move further from the pond would extend the project limits even further south while moving deeper into the Castle Point subdivision.

The feasibility of relocating the west leg of Klondike Road to tie into Hurst Road was investigated as a separate alternative. A roundabout intersection between Klondike Road and Hurst Road was considered approximately 400' to 500' west of the existing intersection. A roundabout would allow the Klondike Road traffic (the major movement) to continue through the new intersection without having to stop, while still allowing Klondike Road to "tee" into Hurst Road. Unfortunately the footprint of this intersection would be in front of the fire station and force the relocation of the Hurst Road approaches as well as Klondike Road in order to stay off of the fire station property. Also, the fire station is not laid out to provide direct truck access to a roundabout intersection in that general vicinity.

An additional alternative had been developed that would relocate Klondike Road on both sides of McDaniel Mill Road, effectively moving the Klondike Road intersection 500' south. Klondike Road would curve to the east, southwest of the existing intersection, then intersecting McDaniel Mill Road at a 70 degree angle. East of McDaniel Mill Road, relocated Klondike Road would curve northeast and then east, in order to tie into the existing roadway approximately 950' east of the existing intersection. Although this alternative provides for a longer relocation of Klondike Road than other alternatives considered, it has several key advantages, listed below.

- Limited construction needed at existing intersection. Most of the work would be the removal of the existing Klondike Road southwest approach. Existing intersection remains as 4-legged with much lower approach volumes, with McDaniel Mill Road intersecting Hurst Road (west approach) and existing Klondike Road stub (east approach). The long horizontal curve on Klondike Road through the intersection is approach removed as well.
- No known historic impacts, as Klondike Road realignment stays considerably south of church property and historic boundary.
- Fewer utility impacts than previous approved concept, as existing AT&T substation is left intact.
- Klondike Road relocation is primarily within undeveloped property. No relocations would be needed.
- This alternative maintains continuity of Klondike Road throughout project area, with only a single 4-legged intersection with McDaniel Mill Road within the project limits. Initial concept development assumed conventional intersection between Relocated Klondike Road and McDaniel Mill Road.
- This alternative would provide shorter and more direct access for fire trucks to McDaniel Mill Road compared to the original approved concept, and similar access to Klondike Road, when compared to the original approved concept.

Informal meetings between the County and Georgia DOT District 7 showed support for above described alternative. It did the best job of meeting project need and purpose while avoiding constraints and issues that have affected other alternatives. Qk4 proceeded to develop an updated concept alternative and update to the concept report.

Initial updated traffic forecasts and traffic analysis of proposed intersection show that only one volume-based signal warrant would be satisfied by the design year of 2036. Based on current volume trends, this intersection would not need to be signalized for many years. Recommended traffic control for this intersection in the opening year would be for McDaniel Mill Road to have the right-of-way with Klondike Road having side street stop sign traffic control.

Klondike Road is classified as an urban minor arterial east of McDaniel Mill Road and is a longer facility than McDaniel Mill Road. It connects Conyers with Dekalb County. For these reasons, Rockdale County desires that Klondike Road traffic not have to stop at this intersection when traffic volumes are not heavy. Constructing this intersection as a roundabout would allow all traffic to enter the intersection under yield control and with reduced delay.

Also, the Traffic Analysis Memorandum (Attachment 7) showed this intersection at Level of Service “A” in the design year as a roundabout, with Level of Service “D” as a conventional intersection with two-way stop control and Level of Service “C” with all-way stop control. The traffic analysis shows that this intersection as a roundabout has higher reserve capacity than as a conventional intersection. This reserve capacity would be most critical if traffic growth increases faster than what is incorporated in the approved volume projections and/or in the time period beyond the design year, where the presence of a roundabout would preclude the need for signalization of this intersection for the foreseeable future.

Following completion of the Traffic Analysis Memorandum, Rockdale County authorized preparation of a Roundabout Concept Review, which was prepared by MTJ Engineering (Attachment 9). The roundabout concept layout was further refined and its recommendations have been incorporated in the recommended concept layout for this project (Attachment 4). That document included a brief discussion of the the possibility of a five-legged roundabout at the existing intersection location, but the construction of a large intersection at that location would breach the historic impact boundary, previously described, notwithstanding other property and utility impacts.

PDP Classification: Major Minor

Federal Oversight: Full Oversight Exempt State Funded Other

Projected Traffic as shown in the approved Concept Report: **AADT**

Klondike Road

Open Year (2009): 3800

Design Year (2029): 7500

McDaniel Mill Road

Open Year (2009): 4750

Design Year (2029): 9300

Hurst Road

Open Year (2009): 1200

Design Year (2029): 2350

Updated Traffic: **AADT**

Klondike Road

Open Year (2016): 3820

Design Year (2036): 5400

McDaniel Mill Road

Open Year (2016): 5960

Design Year (2036): 8420

Hurst Road

Open Year (2016): 1300

Design Year (2036): 1820

Functional Classification (Mainline): McDaniel Mill Road – Urban Collector Street
Klondike Road east of McDaniel Mill / Hurst Rd W –
Urban Minor Arterial
Klondike Road west of McDaniel Mill – Urban Local Road

VE Study anticipated: No Yes Completed – Date:

Pavement Type(Existing) Hot Mix Asphalt Portland Cement Concrete
Pavement Type(Proposed)* Hot Mix Asphalt Portland Cement Concrete

*Approved pavement design of previous concept is Asphalt. Pavement design will be revisited, but existing roadway section and new alignment likely to stay asphalt due to low overall volumes and truck traffic.

PROPOSED REVISIONS

Approved Features:	Proposed Features:
<p>Klondike Road <u>Project Termini:</u> Begin – Approx. 1000’ southwest of existing intersection; End – Approx. 750’ east of existing intersection <u>Alignment:</u> Adjust intersection angle from 45 to 61 degrees <u>Right-of-Way:</u> 9 parcels affected</p> <p>McDaniel Mill Road <u>Project Termini:</u> Begin – Approx. 650’ south of existing intersection; End – Approx. 600’ northeast of existing intersection <u>Right-of-Way:</u> 8 parcels affected</p> <p>Hurst Road <u>Project Termini:</u> Begin – Approx. 730’ west of existing intersection; End – Approx. 760’ southwest of existing intersection <u>Alignment:</u> New connector road to intersect with Klondike Road approximately 760’ southwest of existing intersection.</p>	<p>Relocated Klondike Road <u>Project Termini:</u> Begin – Approx. 1300’ southwest of existing intersection; End – Approx. 1200’ east of existing intersection <u>Alignment:</u> Relocate to intersect McDaniel Mill Road 500’ south of existing intersection as a roundabout <u>Right-of-Way:</u> 5 parcels affected</p> <p>McDaniel Mill Road <u>Project Termini:</u> Begin – Approx. 1150’ south of existing intersection; End – Approx. 320’ northeast of existing intersection <u>Right-of-Way:</u> 6 parcels affected</p> <p>Hurst Road <u>Project Termini:</u> Begin – Approx. 120’ west of existing intersection; End – existing intersection <u>Alignment:</u> Maintain existing alignment</p> <p>Existing Klondike Road <u>Project Termini:</u> Obliterate west of existing intersection, maintain 700’ east of intersection to provide access to existing properties.</p>
<p>Reason(s) for change: During the initial alternatives analysis phase for this project, a roundabout configuration was found to be the best option in terms of capacity analysis and traffic flow but could not be constructed without encroaching on a historic resource, while a “conventional” intersection could be constructed without these impacts. For that reason, a conventional intersection was selected as the preferred alternative for the original concept design.</p> <p>The revised concept design meets the project purpose and need without the need for a Design Exception for the intersection angle or the need of a Design Exception for the horizontal curve on Klondike Road with reduced radius that would not meet design speed of the posted speed limit. This revised concept also avoids a large telephone over-ground utility facility located in the northeast quadrant of the existing intersection that would have required relocation under the previously approved concept. The revised concept also allows construction of a roundabout at the relocated intersection since there is no longer encroachment to the historic resource.</p>	

ENVIRONMENTAL

Project Air Quality:

Is the project located in a PM 2.5 Non-attainment area? No Yes
 Is the project located in an Ozone Non-attainment area? No Yes
 Is a Carbon Monoxide hotspot analysis required? No Yes

Project does not include capacity improvement. No changes to through lane capacity are proposed.
 The project does not contain a traffic signal or include design year traffic that exceeds 10,000 ADT.

Potential environmental impacts of proposed revision: No changes are anticipated.
Have proposed revisions been reviewed by environmental staff? No Yes

Environmental responsibilities (Studies/Documents/Permits): GT Hill (consultant)

Environmental impacts by section

NEPA: Environmental document will need to be reevaluated due to proposed concept changes

Ecology: Georgia Aster Survey Completed in 11/2012. No other ecology surveys are anticipated to be needed.

Archeology: No archeological impacts anticipated at this time pending updated survey

History: No additional historic impacts anticipated at this time pending updated survey

Air & Noise: Additional modeling not required

Public Involvement: No public outreach not required as result of revision.

PROJECT COST & ADDITIONAL INFORMATION

Updated Cost Estimate		Date of Estimate
Base Construction Cost:	\$1,720,009	10/30/2014
Engineering and Inspection:	\$86,000	10/30/2014
Liquid AC Adjustment:	\$158,334	2/25/2014
<u>Total Construction Cost:</u>	\$1,964,343	
Right-of-Way:	\$1,220,000	10/23/2014
Utilities (reimbursable costs):	\$647,000	9/30/2014
Environmental Mitigation:	None Expected	
TOTAL PROJECT COST:	\$3,831,343	

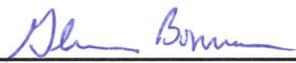
Recommendation: Recommend that the proposed revision to the concept be approved for implementation.

Comments:

Attachments:

1. Location map
2. Cost Estimate
3. Typical Sections
4. Concept Plan
5. Updated Design Traffic Approval Letter
6. Traffic Diagrams
7. Traffic Analysis Memorandum with Attachments (Includes Capacity Analysis and Signal Warrant Studies)
8. Street Lighting Commitment Letter
9. Roundabout Concept Review prepared by MTJ Engineering, dated 1/28/14
10. Project Schedule
11. Benefit/Cost Analysis
12. Completed Fuel/Asphalt adjustment form

APPROVALS

Concur: 
Director of Engineering

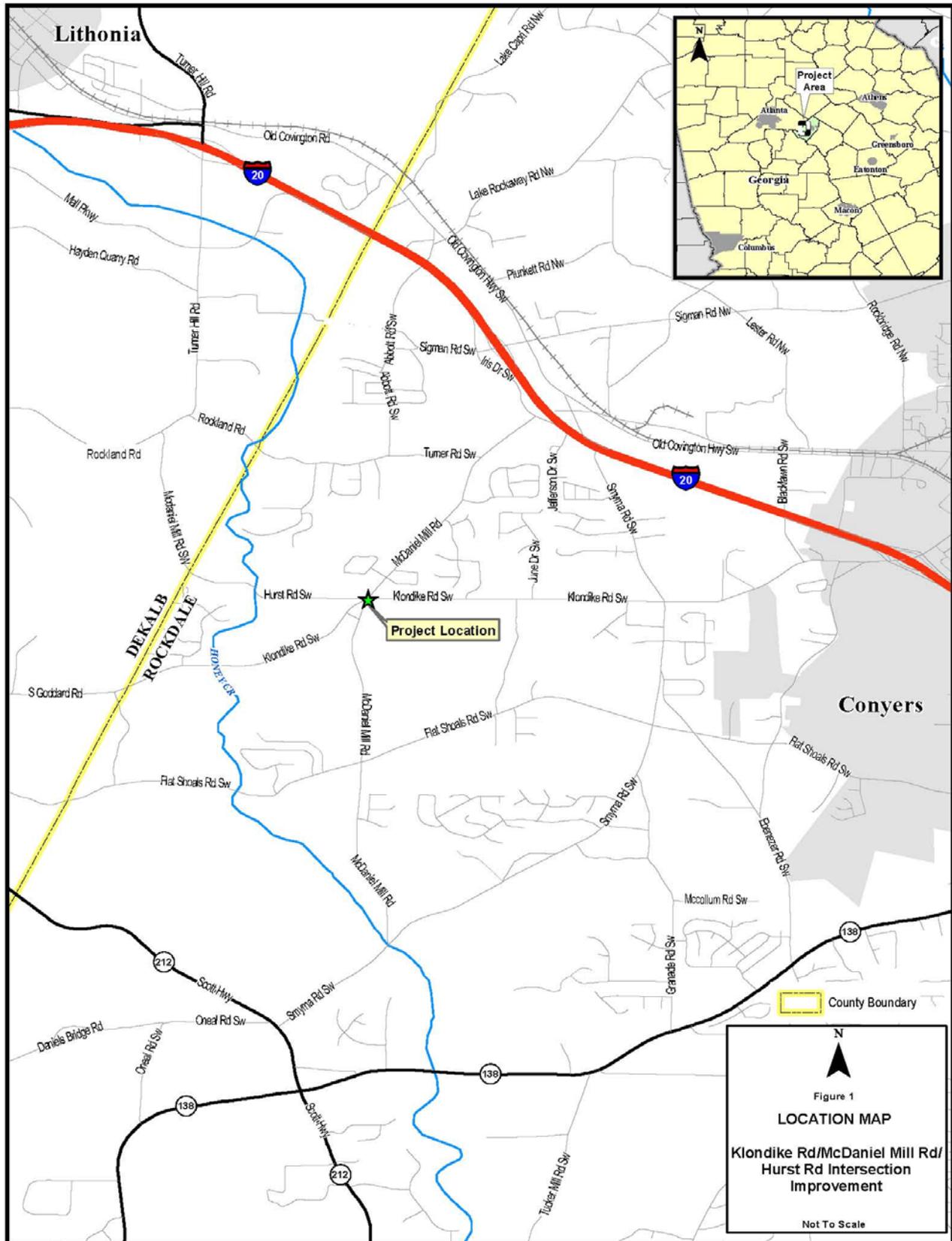
Approve: 
Chief Engineer

11/26/14
Date

Project Number: STP-0006-00(932)

P. I. Number: 0006932

County: Rockdale



JOB NUMBER : 0006932YR2014 SPEC YEAR: 01
DESCRIPTION: KLONDIKE @ MCDANIEL MILL - PI#0006932/ROCKDALE COUNTY

ITEMS FOR JOB 0006932YR2014

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
0005	150-1000		LS	TRAFFIC CONTROL - CSSTP-0006-00(932)	1.000	100000.00	100000.00
0015	210-0100		LS	GRADING COMPLETE - CSSTP-0006-00(932)	1.000	250000.00	250000.00
0025	163-0300		EA	CONSTRUCTION EXIT	3.000	888.68	2666.05
0030	163-0503		EA	CONSTR AND REMOVE SILT CONTROL GATE, TP 3	5.000	389.43	1947.19
0035	163-0550		EA	CONS & REM INLET SEDIMENT TRAP	10.000	132.80	1328.04
0040	165-0010		LF	MAINT OF TEMP SILT FENCE, TP A	7100.000	0.49	3530.69
0045	165-0087		EA	MAINT OF SILT CONTROL GATE, TP 3	5.000	110.76	553.80
0050	165-0101		EA	MAINT OF CONST EXIT	5.000	464.77	2323.89
0055	165-0105		EA	MAINT OF INLET SEDIMENT TRAP	10.000	42.44	424.49
0060	167-1000		EA	WATER QUALITY MONITORING AND SAMPLING	1.000	460.67	460.67
0065	167-1500		MO	WATER QUALITY INSPECTIONS	15.000	317.89	4768.43
0070	171-0010		LF	TEMPORARY SILT FENCE, TYPE A	7290.000	1.47	10733.80
0075	603-2024		SY	STN DUMPED RIP RAP, TP 1, 24"	1480.000	37.88	56070.95
0080	603-7000		SY	PLASTIC FILTER FABRIC	1480.000	3.46	5131.93
0085	310-5120		SY	GR AGGR BS CRS 12IN INCL MATL	13756.000	18.88	259749.73
0090	402-1812		TN	RECYL AC LEVELLING, INC BM&HL	150.000	79.71	11957.78
0095	402-3121		TN	RECYL AC 25MM SP, GP1/2, BM&HL	5870.000	58.84	345424.44
0100	402-3130		TN	RECYL AC 12.5MM SP, GP2, BM&HL	920.000	71.68	65949.30
0105	402-3190		TN	RECYL AC 19 MM SP, GP 1 OR 2 , INC BM&HL	1470.000	65.56	96373.79
0110	413-1000		GL	BITUM TACK COAT	2000.000	2.69	5397.48
0114	432-5010		SY	MILL ASPH CONC PVMT, VARB DEPTH	150.000	9.37	1405.57
0115	441-0018		SY	DRIVEWAY CONCRETE, 8 IN TK	320.000	40.08	12825.91
0120	441-0104		SY	CONC SIDEWALK, 4 IN	710.000	30.03	21324.85
0125	441-0754		SY	CONC MEDIAN, 7 1/2 IN	1025.000	46.67	47842.45
0129	441-4030		SY	CONC VALLEY GUTTER, 8 IN	80.000	48.86	3909.02
0130	900-0039		SF	BRICK PAVERS	2770.000	12.04	33366.40
0135	441-6222		LF	CONC CURB & GUTTER/ 8"X30"TP2	1300.000	15.50	20158.54
0144	441-5025		LF	CONC HEADER CURB, 4", TP 9	340.000	16.00	5440.00
0145	550-1181		LF	STM DR PIPE 18", H 10-15	480.000	30.35	14570.26
0150	550-1240		LF	STM DR PIPE 24", H 1-10	60.000	42.17	2530.41
0155	550-1300		LF	STM DR PIPE 30", H 1-10	310.000	47.98	14876.42
0165	550-3618		EA	SAFETY END SECTION 18", SD, 6:1	2.000	578.28	1156.58
0175	550-4218		EA	FLARED END SECT 18 IN, ST DR	2.000	401.54	803.10
0180	550-4230		EA	FLARED END SECT 30 IN, ST DR	1.000	779.79	779.80
0190	668-1100		EA	CATCH BASIN, GP 1	2.000	1987.17	3974.35
0200	668-2100		EA	DROP INLET, GP 1	2.000	1660.40	3320.80
0205	668-4300		EA	STORM SEW MANHOLE, TP 1	1.000	1834.05	1834.05
0210	636-1020		SF	Hwy SGN, TP, MAT, REFL SH TP3	120.000	14.82	1779.03
0215	636-2070		LF	GALV STEEL POSTS, TP 7	210.000	8.35	1754.46
0219	653-0130		EA	THERM PVMT MARK, ARROW, TP 3	4.000	91.46	365.85
0220	653-1501		LF	THERMO SOLID TRAF ST 5 IN, WHI	8000.000	0.36	2917.20
0221	682-9030		LS	LIGHTING SYSTEM	1.000	100000.00	100000.00

JOB ESTIMATE REPORT

ITEM TOTAL	INFLATED ITEM TOTAL							
0230	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	9020.000	0.36			3282.20
0235	653-1704	LF	THERM SOLID TRAF STRIPE, 24", WH	50.000	3.91			195.91
0238	653-1804	LF	THERM SOLID TRAF STRIPE, 8", WH	720.000	1.85			1334.64
0239	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	140.000	0.39			55.19
0249	652-9002	SY	TRAFFIC STRIPE, YELLOW	450.000	1.94			875.60
0250	654-1001	EA	RAISED PVMT MARKERS TP 1	200.000	3.52			705.65
0255	654-1003	EA	RAISED PVMT MARKERS TP 3	80.000	4.00			320.06
0260	163-0232	AC	TEMPORARY GRASSING	5.000	364.16			1820.83
0265	163-0240	TN	MULCH	130.000	197.89			25726.04
0270	700-6910	AC	PERMANENT GRASSING	6.000	734.14			4404.87
0275	700-7000	TN	AGRICULTURAL LIME	10.000	68.17			681.71
0285	700-8000	TN	FERTILIZER MIXED GRADE	5.000	359.10			1795.51
0290	700-8100	LB	FERTILIZER NITROGEN CONTENT	460.000	1.56			718.75
ITEM TOTAL								
INFLATED ITEM TOTAL								
TOTALS FOR JOB 0006932YR2014								
ESTIMATED COST:								
CONTINGENCY PERCENT (10.0) :								
ESTIMATED TOTAL:								
\$1,563,644.46								
\$156,364.45								
\$1,720,008.91								

GEORGIA DEPARTMENT OF TRANSPORTATION
LOCAL ACQUISITION - DETAILED ROW COST ESTIMATE SUMMARY

Date (MM/YYYY): October-14 Project: Klondike Rd @ McDaniel Mill Rd
 Revised: County: Rockdale
 PI: 6932

Description:

Parcels: 6 R/W Plan Date:

FOR FUNDING ONLY

CONTRACT

Land and Improvements _____ \$1,093,187.19

Relocation _____ \$0.00

Demolition _____ \$0.00

SUB TOTAL (Reimbursable) _____ \$1,093,187.19

Valuation Services (Non-reimbursable) _____ \$15,000.00

Legal Services (Non-reimbursable) _____ \$41,550.00

SUB TOTAL (Non-reimbursable) _____ \$56,550.00

IN-HOUSE

Sponsor In-house _____ \$50,500.00

Agency Oversight In-house _____ \$11,500.00

TOTAL ESTIMATED COSTS _____ \$1,211,737.19

TOTAL ESTIMATED COSTS (ROUNDED) _____ \$1,220,000.00

Preparation Credits	Hours	Signature

Dashone Alexander *CG#: 286999 10/23/2014^(E)

Dashone Alexander *CG#: 286999 10/23/2014^(E)

*CG required only if used for Negotiations

Attachment(s): **Project Location Map; Subject/Comp Location Map; Comparable Sales Data**

Dyer, Jeff

From: Dyer, Jeff
Sent: Wednesday, October 29, 2014 3:22 PM
To: Dyer, Jeff
Subject: FW: 0006932-Cost Estimate Updates

The updated approved utility cost for this project adds in the \$500,000 to the \$147,000 in the previous estimate, resulting in a total estimated utility cost of \$647,000.

From: Woodard, Wade [mailto:wwoodard@dot.ga.gov]
Sent: Tuesday, September 30, 2014 5:11 PM
To: Dyer, Jeff; Harris, Roxanne E
Cc: Brian Frix
Subject: RE: 0006932-Cost Estimate Updates

Yes, I agree with cost estimate that Jeff submitted. Please add in the \$500,000 for the AT&T RTU site for reimbursable cost.

Thanks

Wade Woodard
Georgia Department Of Transportation
District Seven Metro Utilities Engineer
Serving : DeKalb & Rockdale Counties
Phone: 770-986-1117
Fax: 770-986-1411
wwoodard@dot.ga.gov

From: Dyer, Jeff [mailto:jdyer@qk4.com]
Sent: Wednesday, September 24, 2014 3:41 PM
To: Harris, Roxanne E
Cc: Woodard, Wade; Brian Frix
Subject: FW: 0006932-Cost Estimate Updates

Roxanne:

After discussion with Wade Woodard, we will add in \$500,000 for the AT&T RTU site which is located at the NE quadrant of the existing intersection of McDaniel Mill Road @ Klondike Road/Hurst Road. It is our intent to avoid impacts to that site which would mean that that all or most of that cost would not be needed in the end for this project, but for the sake of the concept cost estimate, we will include it at this time.

Also, Mr. Woodard is ok with our two estimates already included for Snapping Shoals and Rockdale County Water Resources, since they were provided by the Utility Companies and were received in the last several months.

Thanks,
Jeff Dyer

From: Dyer, Jeff
Sent: Monday, September 22, 2014 10:45 AM
To: 'Harris, Roxanne E'
Cc: Brian Frix
Subject: RE: 0006932-Cost Estimate Updates

Snapping Shoals - \$22,000
Rockdale Co. Water Resources - \$125,000

From: Harris, Roxanne E [<mailto:RHarris@dot.ga.gov>]
Sent: Monday, September 22, 2014 10:36 AM
To: Dyer, Jeff
Subject: RE: 0006932-Cost Estimate Updates

Thanks. Please send the detailed information regarding the reimbursable costs (i.e. cost per utility company).

Regards,

Roxanne

Roxanne Harris
Project Manager
Georgia Department of Transportation
Office of Program Delivery
600 West Peachtree Street, 25th Floor
Atlanta, GA 30308
Office: (404) 347-0607
Cell: (404) 807-7456
Fax: (404) 631-1588
E-mail: rharris@dot.ga.gov

From: Dyer, Jeff [<mailto:jdyer@gk4.com>]
Sent: Monday, September 22, 2014 10:25 AM
To: Harris, Roxanne E
Subject: RE: 0006932-Cost Estimate Updates

Our last estimate was a total of \$147,000 for reimbursable utilities.

From: Harris, Roxanne E [<mailto:RHarris@dot.ga.gov>]
Sent: Monday, September 22, 2014 10:23 AM
To: Dyer, Jeff
Subject: RE: 0006932-Cost Estimate Updates

Hello Jeff,

Last question, I promise. Will there be any reimbursable utility costs?

Regards,

Roxanne

Roxanne Harris
Project Manager
Georgia Department of Transportation
Office of Program Delivery

600 West Peachtree Street, 25th Floor
Atlanta, GA 30308
Office: (404) 347-0607
Cell: (404) 807-7456
Fax: (404) 631-1588
E-mail: rharris@dot.ga.gov

From: Dyer, Jeff [<mailto:jdyer@qk4.com>]
Sent: Monday, September 22, 2014 10:17 AM
To: Harris, Roxanne E
Subject: RE: 0006932-Cost Estimate Updates

10-4

From: Harris, Roxanne E [<mailto:RHarris@dot.ga.gov>]
Sent: Monday, September 22, 2014 10:16 AM
To: Dyer, Jeff
Subject: RE: 0006932-Cost Estimate Updates

Thanks Jeff. This is the information that I need. I will add the contingency percentage, but wanted to make sure that you hadn't added one already. If you had, I would need to know the percentage that you used in order to be consistent.

Regards,

Roxanne

Roxanne Harris
Project Manager
Georgia Department of Transportation
Office of Program Delivery
600 West Peachtree Street, 25th Floor
Atlanta, GA 30308
Office: (404) 347-0607
Cell: (404) 807-7456
Fax: (404) 631-1588
E-mail: rharris@dot.ga.gov

From: Dyer, Jeff [<mailto:jdyer@qk4.com>]
Sent: Monday, September 22, 2014 10:14 AM
To: Harris, Roxanne E
Subject: RE: 0006932-Cost Estimate Updates

Roxanne:

There was a liquid AC adjustment. The total adjustment amount is \$158,344. As far as a percentage referred to below, I assume you mean a contingency. In the last submission of the concept report, there was no contingency percentage added. One of the comments from the submission was to add one, which will be added in the resubmission. If you need it now, I would suggest adding a contingency percentage to the construction cost estimate I sent this morning.

JD

From: Harris, Roxanne E [<mailto:RHarris@dot.ga.gov>]
Sent: Monday, September 22, 2014 9:57 AM

To: Dyer, Jeff
Subject: RE: 0006932-Cost Estimate Updates
Importance: High

Thanks Jeff. Are there any liquid AC adjustments? If so please send. Also, what percentage did you use for the base estimate?

Regards,

Roxanne

Roxanne Harris
Project Manager
Georgia Department of Transportation
Office of Program Delivery
600 West Peachtree Street, 25th Floor
Atlanta, GA 30308
Office: (404) 347-0607
Cell: (404) 807-7456
Fax: (404) 631-1588
E-mail: rharris@dot.ga.gov

From: Dyer, Jeff [<mailto:jdye@gk4.com>]
Sent: Monday, September 22, 2014 8:10 AM
To: Harris, Roxanne E
Subject: RE: 0006932-Cost Estimate Updates

Latest construction cost is \$1,463,644, which is dated 2/25/14.

Latest ROW cost is \$925,000, which is dated 2/28/14. The ROW cost went up drastically due to the fact that the revised concept is mostly on new alignment. The 2009 estimate would be based on the original concept. These are the same cost estimates that are included the last concept report submission.

From: Harris, Roxanne E [<mailto:RHarris@dot.ga.gov>]
Sent: Friday, September 19, 2014 3:15 PM
To: Dyer, Jeff
Subject: 0006932-Cost Estimate Updates

Hello Jeff,

I know that you are currently out of town, but upon your return can you please provide the most recent cost estimate information? I have listed the information that I currently have (along with the dates the information was provided).

	Cost Estimate Amounts	Date
ROW	\$150,000.00	
Construction	\$1,894,506.00	12/11/2009

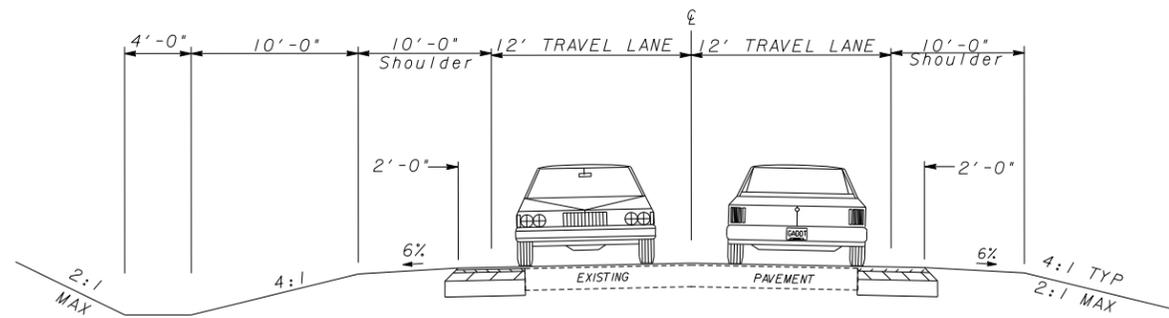
Regards,

Roxanne

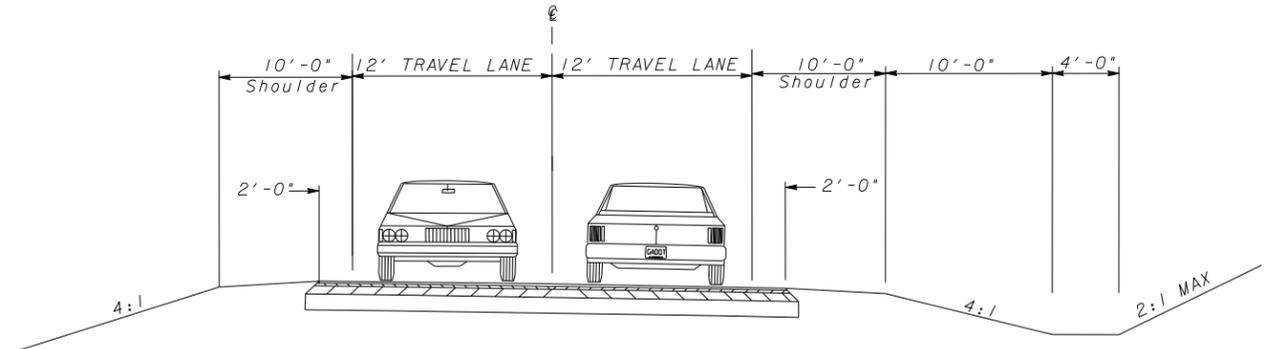
Roxanne Harris
Project Manager
Georgia Department of Transportation
Office of Program Delivery
600 West Peachtree Street, 25th Floor
Atlanta, GA 30308
Office: (404) 347-0607
Cell: (404) 807-7456
Fax: (404) 631-1588
E-mail: rharris@dot.ga.gov

Georgia DOT partners with Georgia Commute Options to promote commute alternatives in metro Atlanta. Get more by driving less. Save money, reduce stress and have time to work, rest or relax while someone else drives. Find out more at 1-877-9GA-OPTIONS (1-877-942-6784) or visit us at <http://www.dot.ga.gov>; follow us on <http://www.facebook.com/GeorgiaCommuteOptions>, or <http://www.facebook.com/GeorgiaDOT> and <http://twitter.com/gadepoftrans>

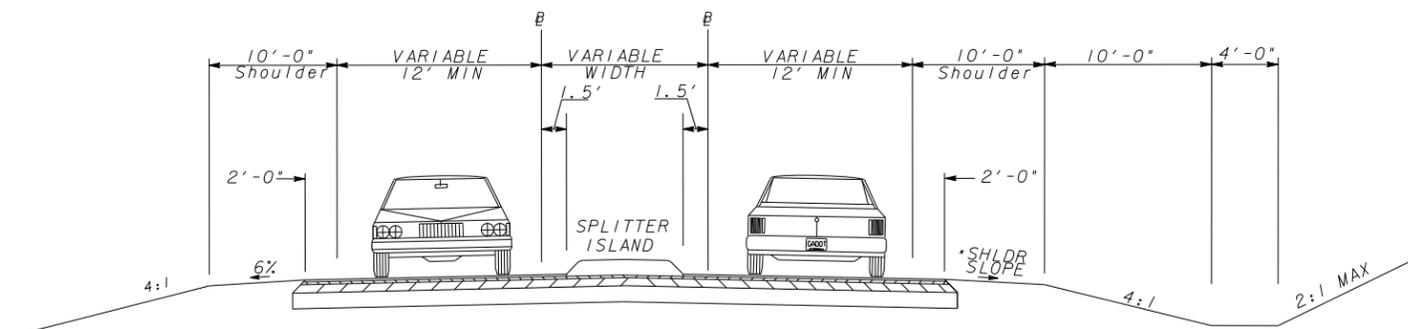
DGN



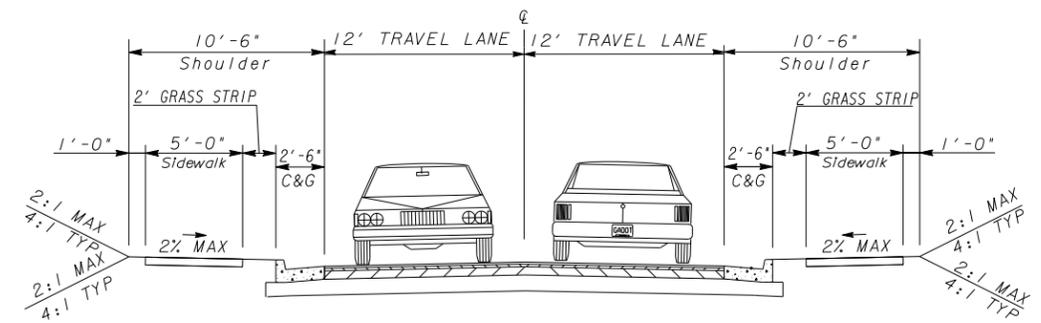
TYPICAL ROADWAY SECTION
 KLONDIKE RD
 MCDANIEL MILL ROAD
 OVERLAY SECTION / NO SUPERELEVATION



TYPICAL ROADWAY SECTION
 RELOC. KLONDIKE ROAD
 SUPERELEVATED SECTIONS, NO SPLITTER ISLANDS



TYPICAL ROADWAY SECTION
 MC DANIEL MILL RD / RELOC. KLONDIKE ROAD
 SECTIONS WITH SPLITTER ISLANDS
 APPROACHING ROUNDABOUT



TYPICAL ROADWAY SECTION
 MCDANIEL MILL ROAD
 URBAN SECTION NORTH OF HURST RD

ROCKDALE COUNTY, GA PI*0006932

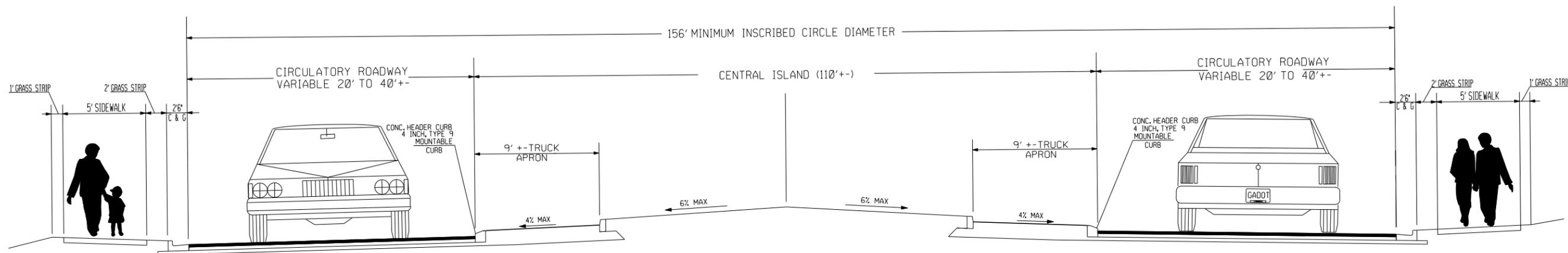
ROCKDALE COUNTY
 DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

KLONDIKE RD/MCDANIEL MILL RD/
 HURST RD INTERSECTION IMPROVEMENTS



• Engineering
 • Planning
 3189 Holcomb Bridge Road
 Suite 405
 Norcross, Georgia 30071
 (404) 829-5900



TYPICAL ROADWAY SECTION
 MC DANIEL MILL RD / RELOC. KLONDIKE ROAD
 ROUNDABOUT

NOTE:
 REFER TO GADOT CONSTRUCTION DETAIL NUMBER RA-2
 FOR MORE DETAIL ON ROUNDABOUT
 TYPICAL SECTION

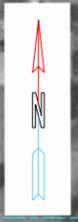
ROCKDALE COUNTY, GA PI*0006932

ROCKDALE COUNTY
 DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

KLONDIKE RD/MCDANIEL MILL RD/
 HURST RD INTERSECTION IMPROVEMENTS





LOWER PROFILE TO IMPROVE INTERSECTION SITE DISTANCE

TWO-WAY STOP CONTROL INTERSECTION

EXIST. UTILITY FACILITY TO REMAIN

OBLITERATE EXIST ROADWAY

OLD KLONDIKE RD

HURST RD

OBLITERATE EXIST ROADWAY

MC DANIEL MILL RD

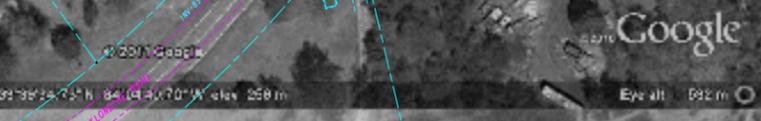
RELOC. KLONDIKE RD

RELOC. KLONDIKE RD

PROPOSED SINGLE-LANE ROUNDABOUT

MC DANIEL MILL RD

PI#0006932
KLONDIKE RD @ MC DANIEL MILL RD
UPDATED CONCEPT PLAN
2/24/14



Department of Transportation State of Georgia

INTERDEPARTMENT CORRESPONDENCE

FILE CSSTP-0006-00(932), Rockdale County **OFFICE** Planning
P.I. # 0006932
DATE October 1, 2013

FROM Cynthia L. VanDyke, State Transportation Planning Administrator

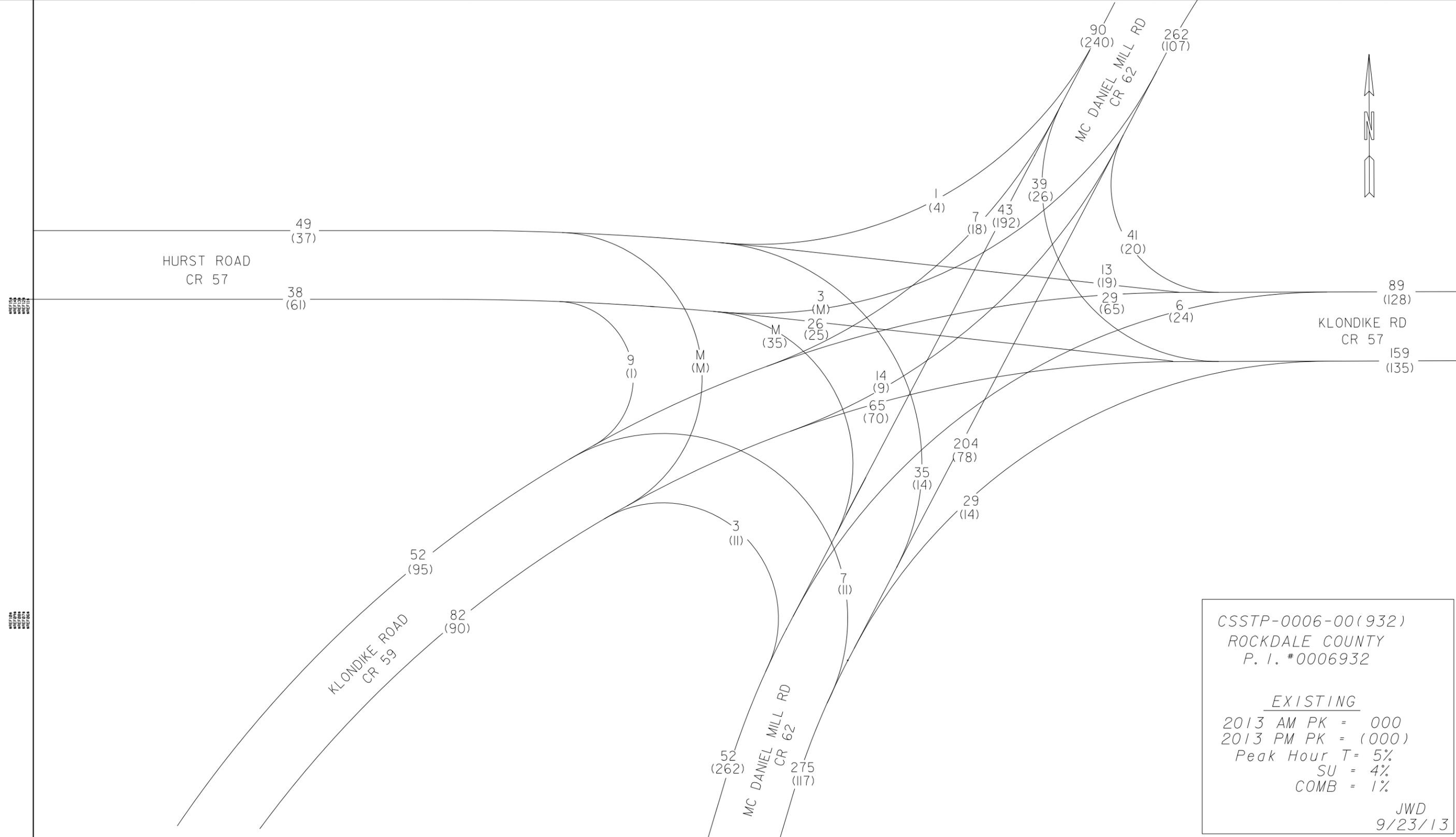
TO Genetha Rice-Singleton, State Program Delivery Design Engineer
Attention: Derrick Brown

SUBJECT **Reviewed** Design Traffic for *CR 57/Klondike Road @ CR 62/McDaniel Mill Road /Hurst Road.*

As per your request, we reviewed the consultant's Design Traffic for the above project.

The Design Traffic is approved based on the information furnished. Any questions concerning this review should be addressed to Ms. Leslie R. Woods at e-mail lwoods2@dot.ga.gov or phone (404) 631-1773.

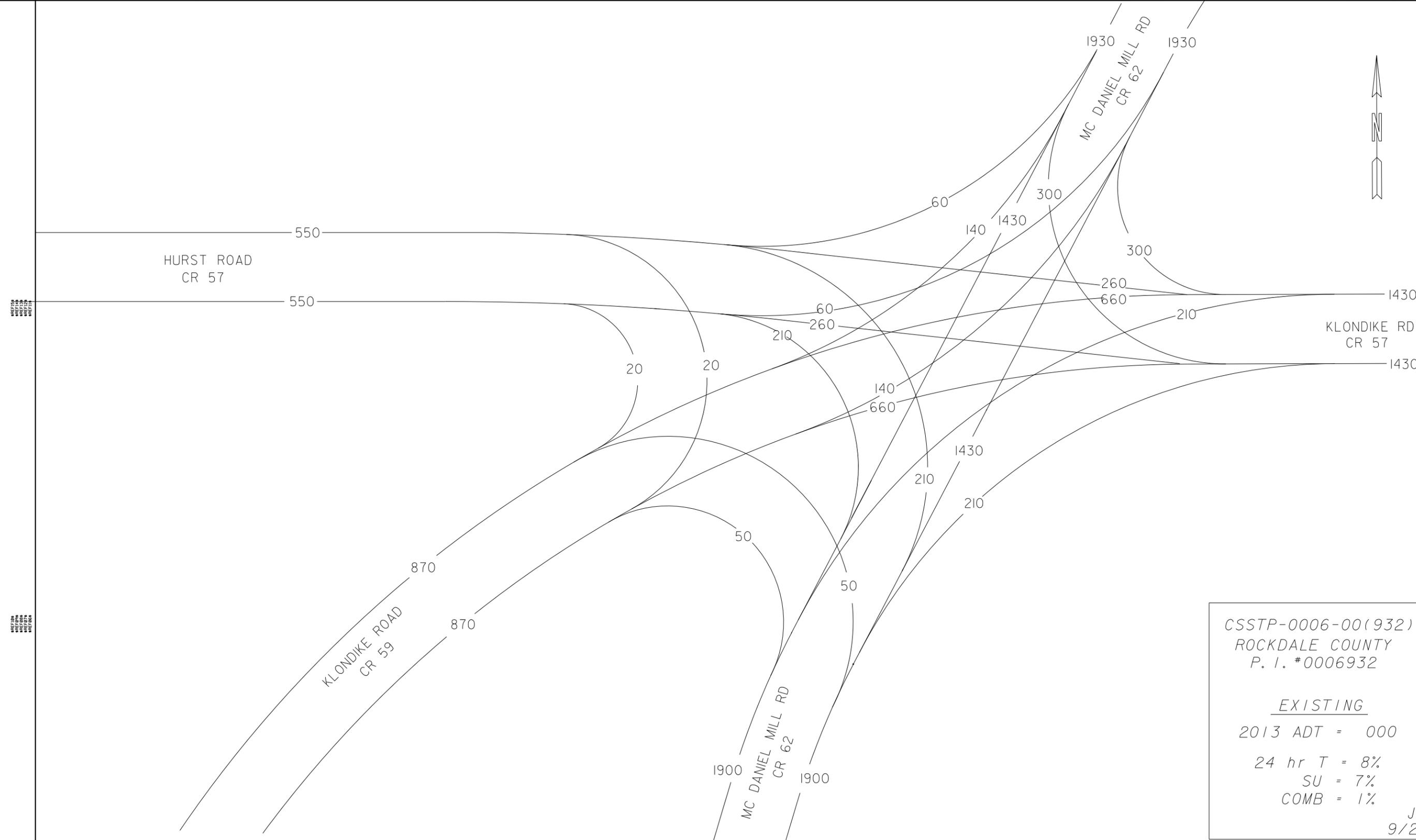
CLV/LRW



CSSTP-0006-00(932)
 ROCKDALE COUNTY
 P. I. #0006932

EXISTING
 2013 AM PK = 000
 2013 PM PK = (000)
 Peak Hour T= 5%
 SU = 4%
 COMB = 1%

JWD
 9/23/13



CSSTP-0006-00(932)
 ROCKDALE COUNTY
 P. I. #0006932

EXISTING

2013 ADT = 000

24 hr T = 8%

SU = 7%

COMB = 1%

JWD
9/23/13

3/1/2007

GPLN

• Engineering
 • Architecture
 • Planning
 • Construction Management

3189 Holcomb Bridge Road
 Suite 455
 Norcross, Georgia 30071
 (404) 329-5900

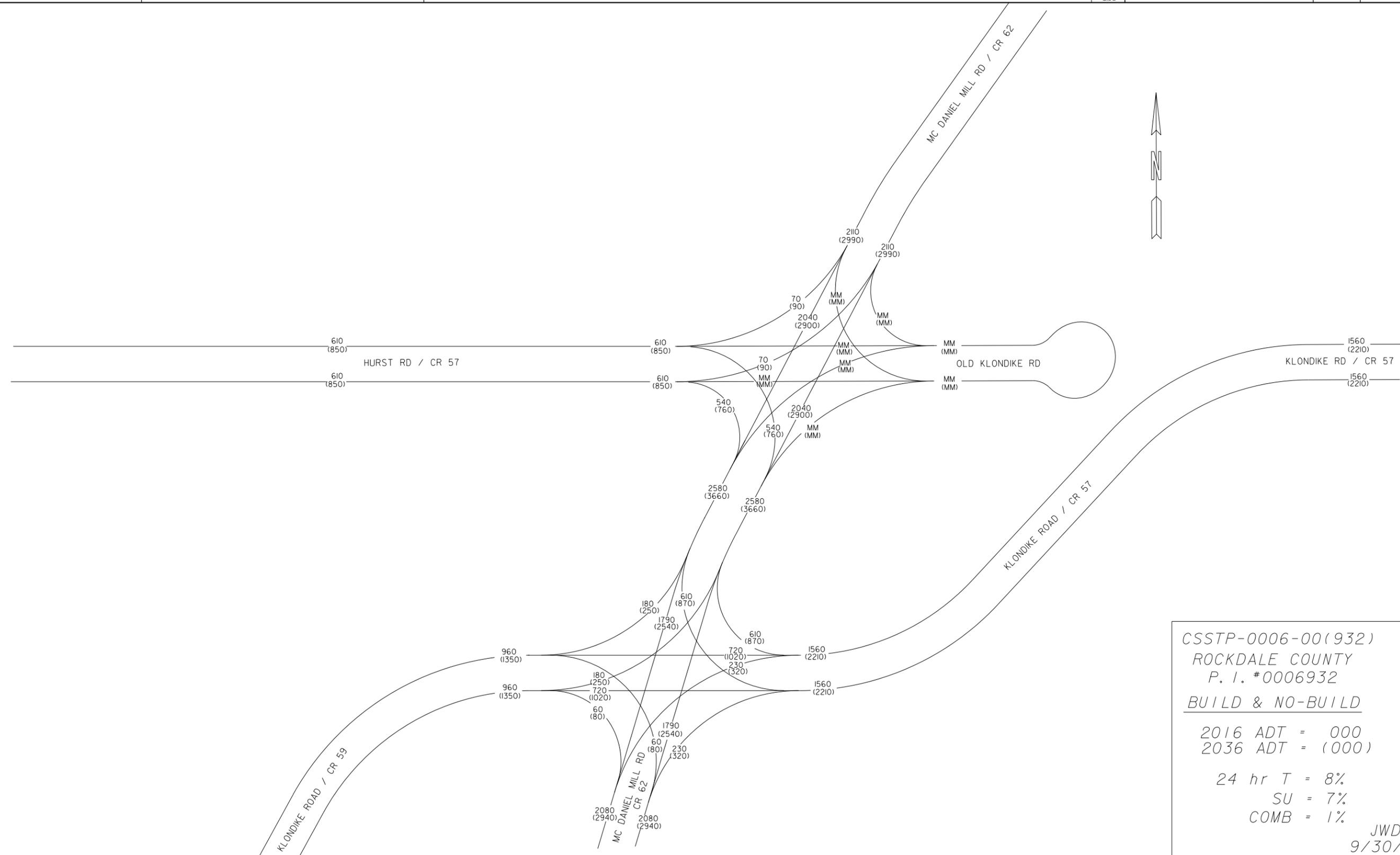
DATE	REVISION

DATE	REVISION

ROCKDALE COUNTY
 DEPARTMENT OF PUBLIC
 SERVICES & ENGINEERING

TRAFFIC DIAGRAM
 CR 57, CR 59 / KLONDIKE RD
 CR 62 / MCDANIEL MILL RD
 CR 57 / HURST RD
 INTERSECTION IMPROVEMENTS

DRAWING No.
10-02



CSSTP-0006-00(932)
 ROCKDALE COUNTY
 P. I. #0006932
BUILD & NO-BUILD
 2016 ADT = 000
 2036 ADT = (000)
 24 hr T = 8%
 SU = 7%
 COMB = 1%

JWD
9/30/13

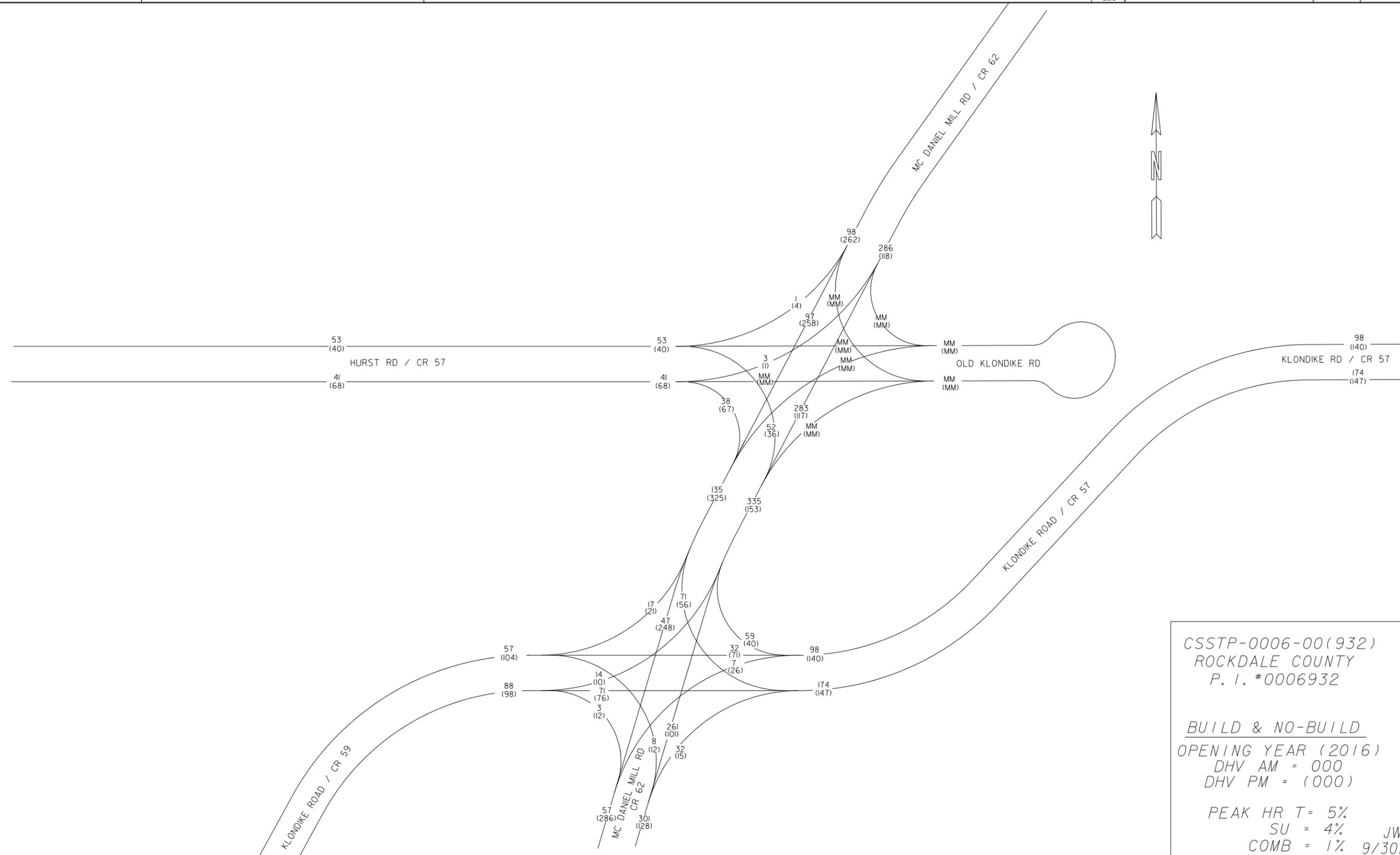
DATE	REVISION

ROCKDALE COUNTY
 DEPARTMENT OF TRANSPORTATION

TRAFFIC DIAGRAM
 CR 57, CR 59 / KLONDIKE RD
 CR 62 / MCDANIEL MILL RD
 CR 57 / HURST RD
 INTERSECTION IMPROVEMENTS

DRAWING No.
10-03





CSSTP-0006-00(932)
 ROCKDALE COUNTY
 P. I. #0006932

BUILD & NO-BUILD
 OPENING YEAR (2016)
 DHV AM = 000
 DHV PM = (000)

PEAK HR T = 5%
 SU = 4% JWD
 COMB = 1% 9/30/13

3/11/2007
 GPLM
 \$PRF\$
 \$DGN\$



DATE	REVISION

ROCKDALE COUNTY
 DEPARTMENT OF TRANSPORTATION

TRAFFIC DIAGRAM
 CR 57, CR 59 / KLONDIKE RD
 CR 62 / MCDANIEL MILL RD
 CR 57 / HURST RD
 INTERSECTION IMPROVEMENTS

DRAWING No.
10-04



Architecture

Engineering

Construction

MEMORANDUM

TO: Miguel Valentin
FROM: Jeff Dyer
SUBJECT: Updated Build and Design Year Traffic Estimates / Level of Service Summary
DATE: 9/30/13
PROJECT: PI#0006932 - Klondike Road @ McDaniel Mill Road / Hurst Road

Reasons for Update

The original traffic projections for this project were developed in 2006 for an assumed opening year of 2009. The concept layout itself has also been revised since then. The previous concept retained the intersection of Klondike Road @ McDaniel Mill Road at its original location while removing the Hurst Road approach. A connector roadway to Klondike Road west of the intersection would have been constructed for Hurst Road traffic.

The revised concept will keep Hurst Road at its present location, forming a four-legged intersection at McDaniel Mill Road. Klondike Road will be relocated for an approximate distance of 2000' and will intersect McDaniel Mill Road approximately 500' south of the existing intersection. Based on the revised concept layout, the existing southwest approach of Klondike Road will be removed from the original intersection and the east approach cut off for through traffic and dead-ended, drastically reducing the side street volumes at the original intersection. Based on the revised schedule, this project is projected to open to traffic by the year 2016, with the design year being 20 years later in the year 2036.

Updated Build and Design Year Peak hour Traffic Projections

The assumed opening year for this project is 2016. In order to arrive at projected traffic volumes for the "opening" year, three years of compounded traffic growth have been added to the 2013 turning movement volumes. This background growth includes traffic expected to be generated by nearby subdivisions that may be constructed in the area as well as increases in through traffic.

For the purposes of this study, the original 2006 turning movements have been replaced with updated 2013 peak hour turning movement volumes and 24-hour approach volumes. In addition, the existing (2013) traffic volumes have been increased by 9.27% to account for three years of compounded traffic growth of 3% per year. The 2016 volume projections consist of the existing traffic volumes plus the traffic attributed to the 9.27% background growth.



Architecture

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MEMORANDUM

For the purpose of this study, 2016 opening year traffic volumes have been increased by 41.47% to account for 2036 (design year) traffic projections. This assumes that growth in the area continues, resulting in a 2% compounded annual increase for the first ten years, and 1.5% compounded annual growth for the final ten years. These account for the likelihood that the traffic growth rate will be higher in the early years, when more land is still undeveloped, and growth percentages will tend to taper off as years go by and there is less land available for new development.

Appendix A contains the 2016 a.m. and p.m. peak hour traffic projections for the separated intersections of McDaniel Mill Road @ Hurst Road / Old Klondike Road and McDaniel Mill Road @ Relocated Klondike Road. Appendix B contains the 2036 a.m. and p.m. peak hour traffic projections for the same two intersections.

Derivation of Truck Percentages

The truck percentages are assumed to be unchanged from the 2013 vehicular classification counts. Each intersection approach has been counted for 24-hours. As part of these counts, vehicular classifications were recorded. Buses, 2-Axle 6-Tire, 3-Axle Single and 4-Axle Single are counted as Single Unit (S.U.) trucks. All vehicles classified as double or larger are counted as combination trucks. Based on the total approach volumes, the total truck percentage (T) was found to be 8%, with 7% of that being S.U. trucks, and the remaining 1% being Combinations. Based on the types of land uses being constructed in this area (residential), truck percentages are not likely to increase over the next 20-years, in fact they may actually decrease as the area becomes more residential and less agricultural. However, it will be assumed that the truck percentage will remain unchanged. The peak hour truck percentage was found to be 5%.



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MEMORANDUM

Signal Warrant Analyses

Signal warrants were evaluated for the original project at the original intersection. It had been found that even with the original (higher) forecasted volumes, a signal was only warranted a minimum of five years after the projected opening year.

The updated concept divides the original five-legged intersection into two separate intersections approximately 500' apart. Hurst Road will remain a minor approach at the original intersection, but with volumes too low to consider a signal based on volume warrants. Klondike Road will be relocated to the new intersection. There may be a possibility that at some point a signal would be warranted at the new intersection.

Based on revised growth forecasts, it is not likely that a signal would be warranted (if at all) until at or near the design year. A signal warrant analysis has been done for the design year in order to verify that assumption.

The location and circumstances for this intersection would meet criteria for the 70% tables, since the posted speeds are currently 45 MPH on the intersection legs, which is greater than 40 MPH, and the overall community is over 10,000 in population, when considering the population of Rockdale County as a whole, even though the immediate vicinity of the intersection is currently lightly developed. The 70% tables are used as a basis for the analysis.

Single lanes are assumed for all approaches, and no approach volume deductions are made for right-turns. This is justified by the absence of right-turn lanes anticipated to be provided on any of the approaches. Provision of right-turn lanes would make the meeting of signal warrants less likely. Based on higher volumes than Klondike Road, McDaniel Mill Road is considered the major street for the purposes of warrant analysis.

Table 2 summarizes the warrant analysis for 2016 and 2036 using the 70% tables for the three volume-based warrants. As can be seen in the table, no volume-based warrants are satisfied for 2016. Warrant 2 (four-hour vehicular volume) is satisfied for 2036, but neither of the other two volume warrants is satisfied. The results of this analysis show that a signal should not be included as part of the construction plan development, but a signal may be warranted at some point at or near the design year if a conventional intersection is constructed.



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MEMORANDUM

Table 2: Signal Warrant Summary – McDaniel Mill Road @ Relocated Klondike Road – 70% Tables

Volume-Based Warrant	Opening (2016)	Design (2036)
1 - 8-Hour Vehicular Volume	Not Satisfied	Not Satisfied
2 - 4-Hour Vehicular Volume	Not Satisfied	Satisfied
3 - Peak Hour	Not Satisfied	Not Satisfied

4-Way Stop Warrant Analyses

The existing traffic control at the Klondike Road / McDaniel Mill Road / Hurst Road intersection is a multi-way stop. Based on updated approach volumes with Klondike Road removed, side street stop control for the Hurst Road / Old Klondike Road approaches would be the most feasible traffic control for the original intersection, due to the low side street volumes. Field observations reveal that sight distance is limited on the north approach due to a short vertical curve located immediately north of the intersection. An intersection sight distance review of intersection shows it to be inadequate for Hurst Road approach traffic looking north on McDaniel Mill Road for gaps in traffic. For this reason, the profile of McDaniel Road is recommended to be lowered as part of this project in order to provide adequate intersection sight distance, and so the existing multi-way stop control can be removed from this intersection.

With higher volumes at the relocated intersection, a 4-way stop may be a viable traffic control at that intersection. Volume warrants for 4-way stop control, similar to traffic signal warrants, are included in Chapter 2B - Regulatory Signs. Table 3 summarizes the 4-way stop control warrants for existing traffic (2012), opening year (2016) and the design year (2036). The 70% volume thresholds would apply for the reasons discussed in the previous section. But both the 70% and 100% thresholds have been evaluated.

For the warrant to be satisfied, 8 hours of volumes must exceed 300 vehicles per hour for the major street and 200 vehicles for the minor street, assuming the 100% threshold. Using the 70% threshold, the volumes are 210 vehicles per hour and 140 vehicles per hour, respectively. Table 3 summarizes results of the warrant analysis.



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MEMORANDUM

Table 3: Four-Way Stop Warrant Summary – McDaniel Mill Road @ Relocated Klondike Road

Warrant	Existing (2012)	Opening (2016)	Design (2036)
8-hour Volumes Warrant – 100%	Not Satisfied	Not Satisfied	Not Satisfied
8-hour Volumes Warrant – 70%	Not Satisfied	Not Satisfied	Satisfied

As can be seen on Table 3, the volume warrant for a 4-way stop is not satisfied for the opening year of 2016, although it is satisfied for 7 of the 8 required hours and comes very close for the potential 8th hour, which implies that this warrant would be satisfied within a relatively short time after the opening year, assuming actual traffic growth approximates the assumptions made in this memorandum. The 4-way stop warrant is satisfied for the design year of 2036 using the 70% thresholds. Appendix C contains the worksheets for both the signal and 4-way stop warrant studies.

Potential for Roundabout at McDaniel Mill @ Relocated Klondike Road

A single-lane roundabout may be feasible at this intersection. Based on the relatively balanced approach volumes and the meeting of a warrant for a multi-way stop by the design year and the warrant nearly being met for the opening year, the potential for a roundabout at McDaniel Mill Road @ Relocated Klondike Road should be examined. The intersection site is currently undeveloped and the center of the roundabout intersection would be located at least 200 feet south of the property line for the historic resource within the project area (church property in southeast quadrant of the existing intersection). The intersection angle is initially proposed to be a minimum of 70 degrees, pending further refinement. These are factors that make it likely that a roundabout could be constructed at this intersection. For this reason, roundabout analysis will be included in the following level of service analysis tables for this intersection.

Level of Service Analysis (2016)

Level of service analysis using the 2016 opening year volumes has been performed using *Highway Capacity Manual* (HCM) methodologies. More specifically at McDaniel Mill Road @ Hurst Road, methodology for both unsignalized 2-way stop control and 4-way stop control has been used. For McDaniel Mill Road @ Relocated Klondike Road, 2-way stop control, 4-way stop control, and roundabout methodologies have been evaluated. Level of service has been estimated at both intersections assuming no additional turn lanes. 2-way stop control has been assumed with McDaniel Mill Road having the right-of-way at both intersections, since it has the higher traffic volumes.



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MEMORANDUM

Table 4: Intersection Level of Service Summary, 2016 Volumes

Intersection Name	Time Period	Worst Approach (2-way)	Level of Service	Approach Delay (2-Way.) / Intersection Delay (4-Way) Seconds
McDaniel Mill Road @ Hurst Road (2-Way)	a.m. peak	WB	B	12.0
McDaniel Mill Road @ Hurst Road (2-Way)	p.m. peak	WB	B	11.6
McDaniel Mill Road @ Hurst Road (4-Way)	a.m. peak	-	A	9.14
McDaniel Mill Road @ Hurst Road (4-Way)	p.m. peak	-	A	8.65
McDaniel Mill Rd @ Reloc. Klondike Rd (2-Way)	a.m. peak	EB	C	15.5
McDaniel Mill Rd @ Reloc. Klondike Rd (2-Way)	p.m. peak	EB	C	15.2
McDaniel Mill Rd @ Reloc. Klondike Rd (4-Way)	a.m. peak	-	A	9.60
McDaniel Mill Rd @ Reloc. Klondike Rd (4-Way)	p.m. peak	-	B	10.27
McDaniel Mill Rd @ Reloc. Klondike Rd (Roundabout)	a.m. peak	-	A	6.59
McDaniel Mill Rd @ Reloc. Klondike Rd (Roundabout)	p.m. peak	-	A	6.71

Table 4 shows that both intersections would operate a level of service “C” or better. McDaniel Mill Road @ Relocated Klondike Road would operate with side street stop control at level of service “C” for the worst approach, although with an overall level of service “A” or “B”, using 4-way stop control, and level of service “A” using a roundabout. Appendix D contains the level of service/capacity printouts that the table entries are based on.

Level of Service Analysis (2036)

Level of service has also been estimated for the 2036 design year volume projections. These are summarized in Table 5. The same traffic control assumptions have been used for 2036 as for 2016. Appendix E contains the level of service/capacity printouts that the table entries are based on.



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Table 5: Intersection Level of Service Summary, 2036 Volumes

Intersection Name	Time Period	Worst Approach (2-way)	Level of Service	Approach Delay (2-Way.) / Intersection Delay (4-Way) Seconds
McDaniel Mill Road @ Hurst Road (2-Way)	a.m. peak	WB	B	14.4
McDaniel Mill Road @ Hurst Road (2-Way)	p.m. peak	WB	B	13.8
McDaniel Mill Road @ Hurst Road (4-Way)	a.m. peak	-	B	11.26
McDaniel Mill Road @ Hurst Road (4-Way)	p.m. peak	-	B	10.07
McDaniel Mill Rd @ Reloc. Klondike Rd (2-Way)	a.m. peak	EB	C	24.8
McDaniel Mill Rd @ Reloc. Klondike Rd (2-Way)	p.m. peak	WB	D	27.3
McDaniel Mill Rd @ Reloc. Klondike Rd (4-Way)	a.m. peak	-	B	12.62
McDaniel Mill Rd @ Reloc. Klondike Rd (4-Way)	p.m. peak	-	C	15.02
McDaniel Mill Rd @ Reloc. Klondike Rd (Roundabout)	a.m. peak	-	A	9.20
McDaniel Mill Rd @ Reloc. Klondike Rd (Roundabout)	p.m. peak	-	A	9.24

Table 5 shows level of service “C” or better on the worst approach for both intersections, except for 2-way stop control at McDaniel Mill Road @ Relocated Klondike Road in the p.m. peak hour. At that intersection, level of service for the westbound approach is “D” for the p.m. peak hour and “C” for the eastbound approach for the p.m. peak hour, although not shown in Table 5. A roundabout at McDaniel Mill Road @ Relocated Klondike Road would provide level of service “A” for both peak hours. A roundabout would provide the best level of service (“A”) of the three traffic control scenarios evaluated at this intersection.



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Conclusions

Based on the assumptions used to arrive at opening year (2016) and design year (2036) volume projections, the intersection of Relocated Klondike Road and McDaniel Mill Road would not warrant signalization until at or near the design year of 2036, and even then, only a single warrant would be met. The level of service analysis shows that McDaniel Mill Road @ Relocated Klondike Road would operate at level of service "C" or better even without signalization.

Based on level of service analysis, both four-way stop control and two-way stop control would operate adequately at this intersection in the opening year of 2016. If the actual traffic volumes end up matching the assumed volume projections, this intersection would have moderate delays for the Relocated Klondike Road (side street) approaches, assuming two-way stop control by the year 2036. If the actual traffic volumes end up exceeding the volume projections, the delays for side street traffic (Klondike Road) under two-way stop control could become excessive.

Based on projected traffic volumes and level of service analysis, McDaniel Mill Road @ Relocated Klondike Road could operate as an unsignalized intersection with level of service "D" or better, whether constructed as a roundabout or conventional intersection. However, a roundabout would provide the overall best level of service at this intersection ("A") and at least should be developed as concept alternative, in order to further evaluate its feasibility. Also, a roundabout would provide the most reserve capacity for this intersection and not require further improvement; if or when actual future volumes exceed the volume projections in the future.

Based on the revised concept layout, the existing southwest approach of Klondike Road will be removed and the east approach cut off for through traffic, drastically reducing the side street volumes. Based on traffic volumes and level of service analysis, the existing intersection of McDaniel Mill Road @ Hurst Road/Old Klondike Road could operate with side street stop sign control for the Hurst Road / Old Klondike Road approaches for both the opening year and design year. However existing restricted intersection sight distance on McDaniel Mill Road north of the intersection would preclude operating this intersection with two-way stop control, unless the profile of McDaniel Mill Road north of the intersection were lowered to eliminate the sight distance issue. Existing sight distance considerations would keep multi-way stop control in place at this intersection.

This project (PI#0006932) proposes the lowering of the McDaniel Mill Road profile north of Hurst Road to provide adequate sight distance for vehicles approaching the intersection from Hurst Road. Presuming this improvement is included as part of this project, this intersection would operate adequately with 2-way stop control.



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List of Appendices

Appendix A – 2016 Peak Hour Traffic Projections

Appendix B – 2036 Peak Hour Traffic Projections

Appendix C – Signal Warrant Analysis / 4-Way Stop Warrant Analysis Worksheets

Appendix D – 2016 Level of Service Printouts

Appendix E – 2036 Level of Service Printouts

Appendix A

2016 Peak Hour Traffic Projections

Intersection Turning Movements

Project: Klondike @ McDaniel Mill Rd

Scenario: 2016 a.m. peak, proposed roadway network

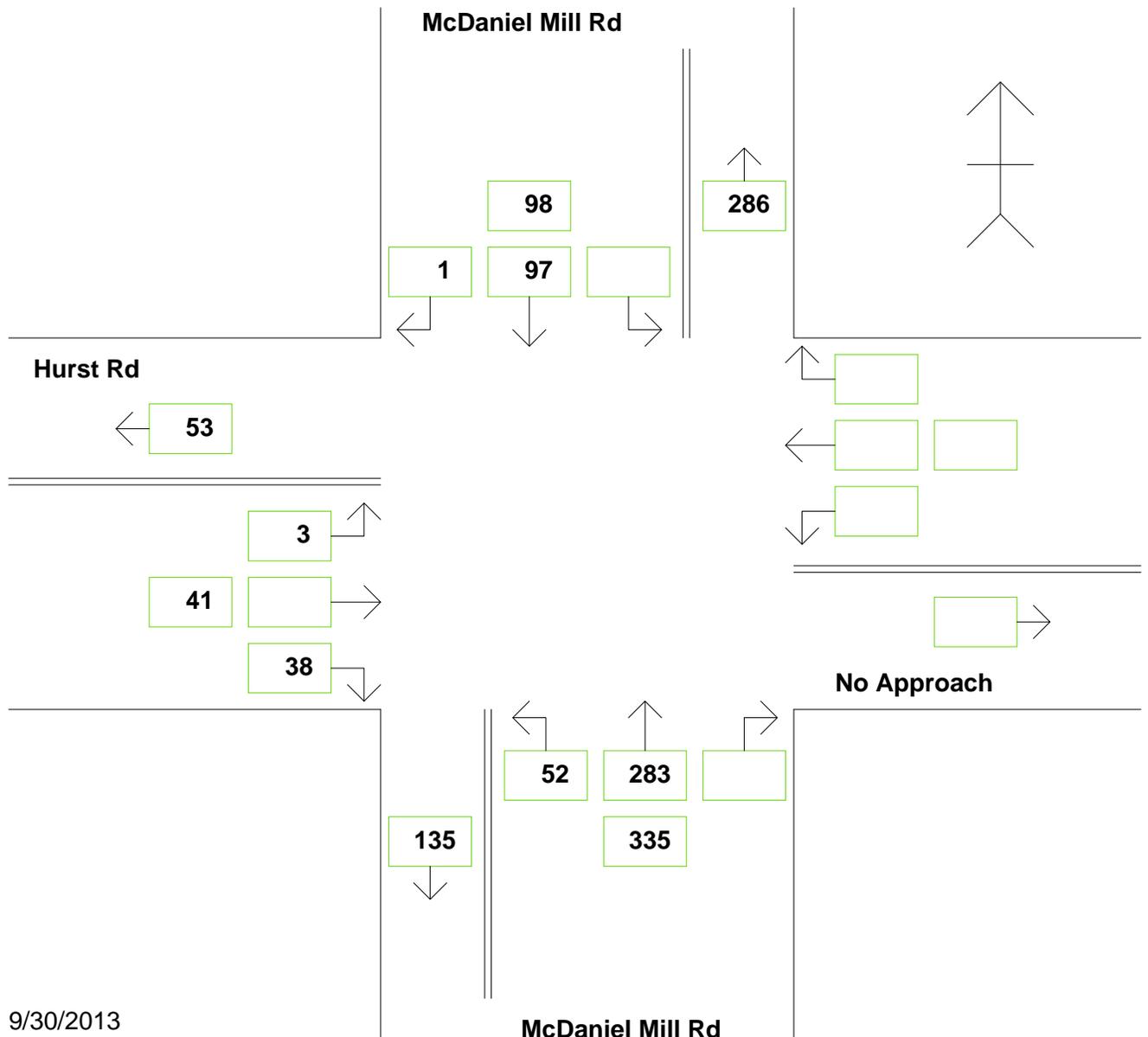
Time Period: a.m. peak

Intersection Name: McDaniel Mill Road @ Hurst Road

Intersection ID: 1

Type: Future
Displayed: Volumes

Next Node North: X 4
Next Node East: 0
Next Node South: 2
Next Node West: X 1



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Intersection Turning Movements

Project: Klondike @ McDaniel Mill Rd

Scenario: 2016 a.m. peak, proposed roadway network

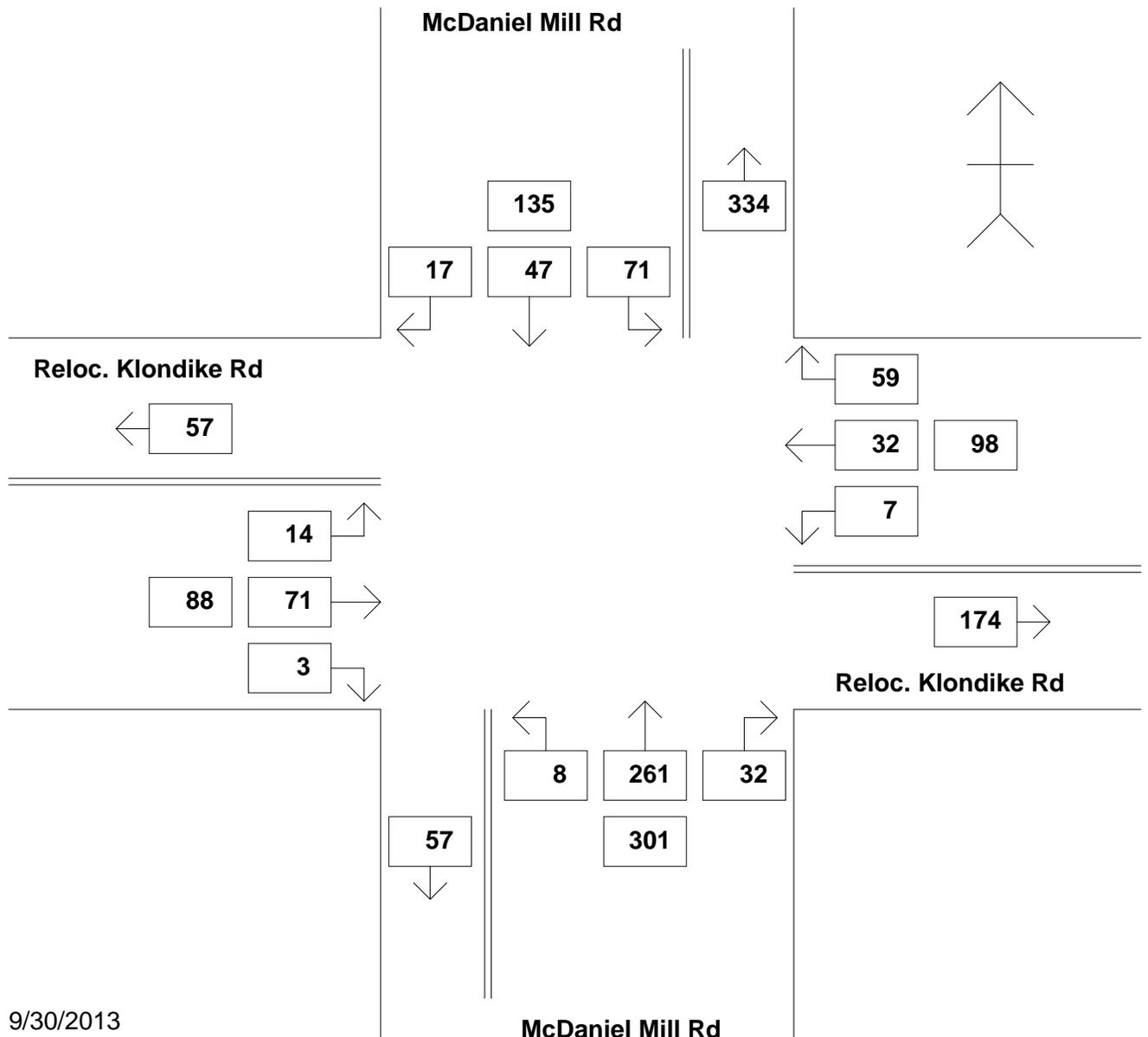
Time Period: a.m. peak

Intersection Name: McDaniel Mill Road @ Klondike Road

Intersection ID: 2

Type: Future
Displayed: Volumes

Next Node North: 1
Next Node East: X 5
Next Node South: X 3
Next Node West: 3



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Intersection Turning Movements

Project: Klondike @ McDaniel Mill Rd

Scenario: 2016 p.m. peak, proposed roadway network

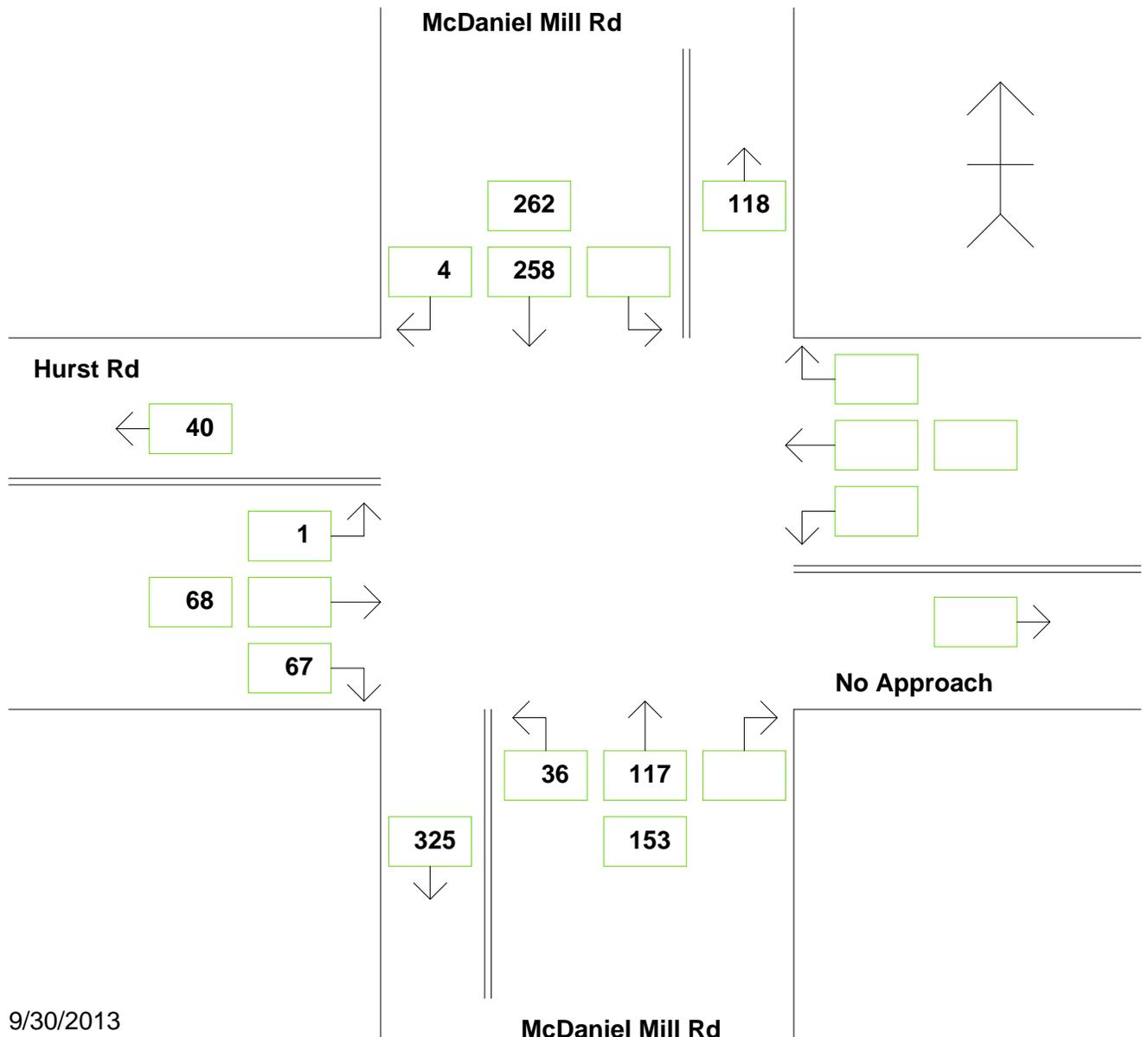
Time Period: p.m. peak

Intersection Name: McDaniel Mill Road @ Hurst Road

Intersection ID: 1

Type: Future
Displayed: Volumes

Next Node North: X 4
Next Node East: 0
Next Node South: 2
Next Node West: X 1



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Intersection Turning Movements

Project: Klondike @ McDaniel Mill Rd

Scenario: 2016 p.m. peak, proposed roadway network

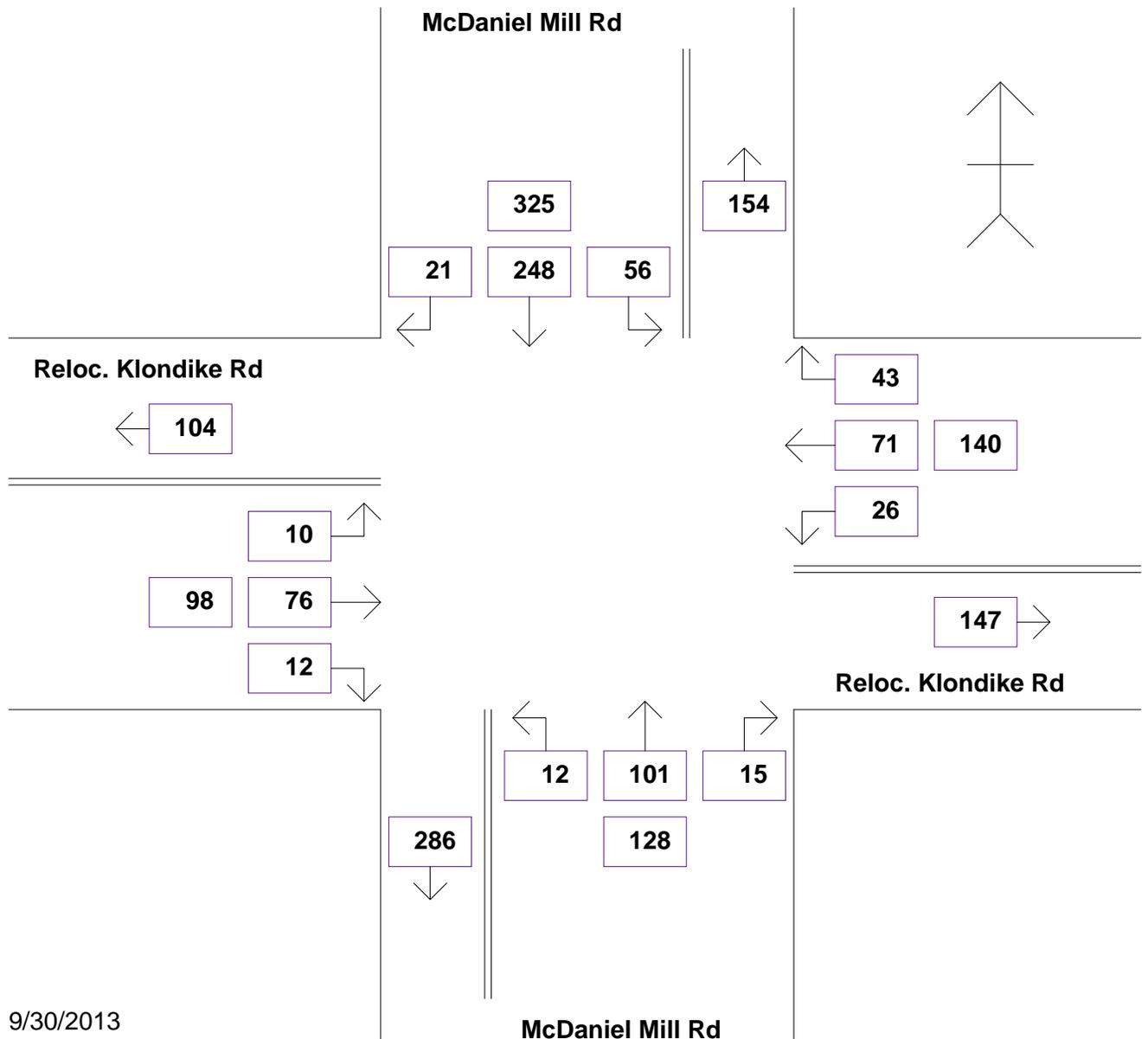
Time Period: p.m. peak

Intersection Name: McDaniel Mill Road @ Klondike Road

Intersection ID: 2

Type: Future
Displayed: Volumes

Next Node North: 1
Next Node East: X 5
Next Node South: X 3
Next Node West: 3



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Appendix B

2036 Peak Hour Traffic Projections

Intersection Turning Movements

Project: Klondike @ McDaniel Mill Rd

Scenario: 2036 a.m. peak, proposed roadway network

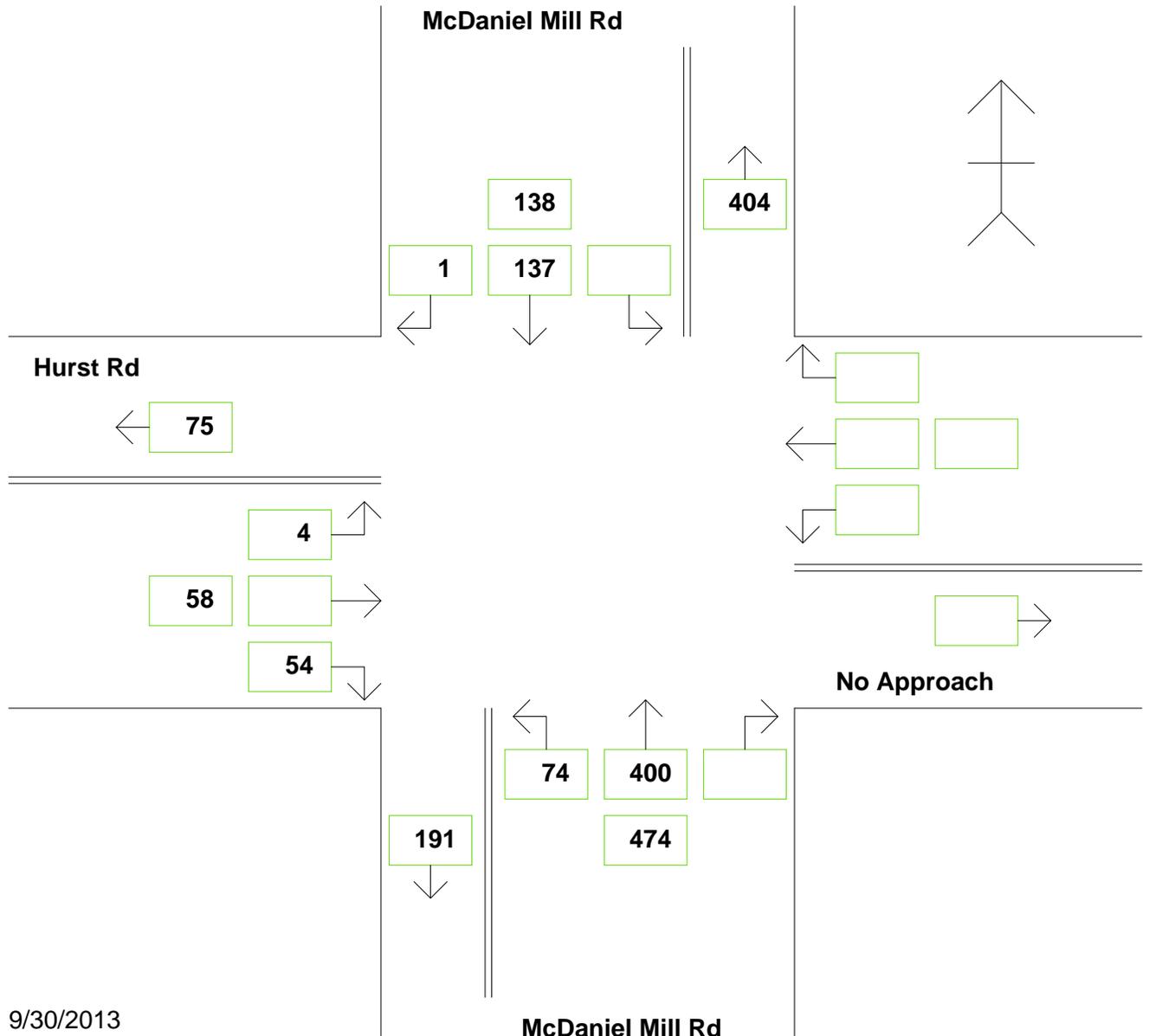
Time Period: a.m. peak

Intersection Name: McDaniel Mill Road @ Hurst Road

Intersection ID: 1

Type: Future
Displayed: Volumes

Next Node North: X 4
Next Node East: 0
Next Node South: 2
Next Node West: X 1



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Intersection Turning Movements

Project: Klondike @ McDaniel Mill Rd

Scenario: 2036 a.m. peak, proposed roadway network

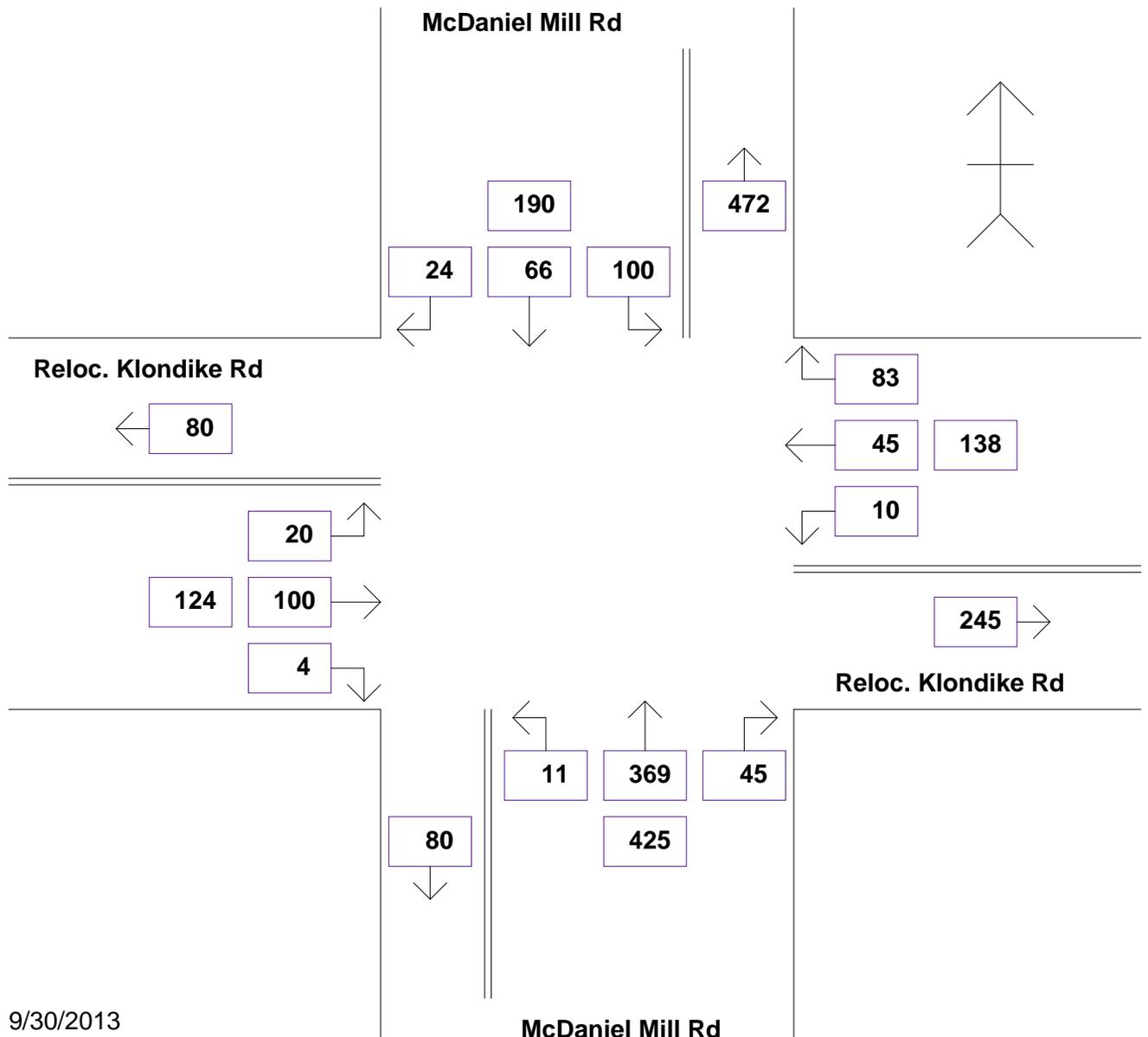
Time Period: a.m. peak

Intersection Name: McDaniel Mill Road @ Klondike Road

Intersection ID: 2

Type: Future
Displayed: Volumes

Next Node North: 1
Next Node East: X 5
Next Node South: X 3
Next Node West: 3



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Intersection Turning Movements

Project: Klondike @ McDaniel Mill Rd

Scenario: 2036 p.m. peak, proposed roadway network

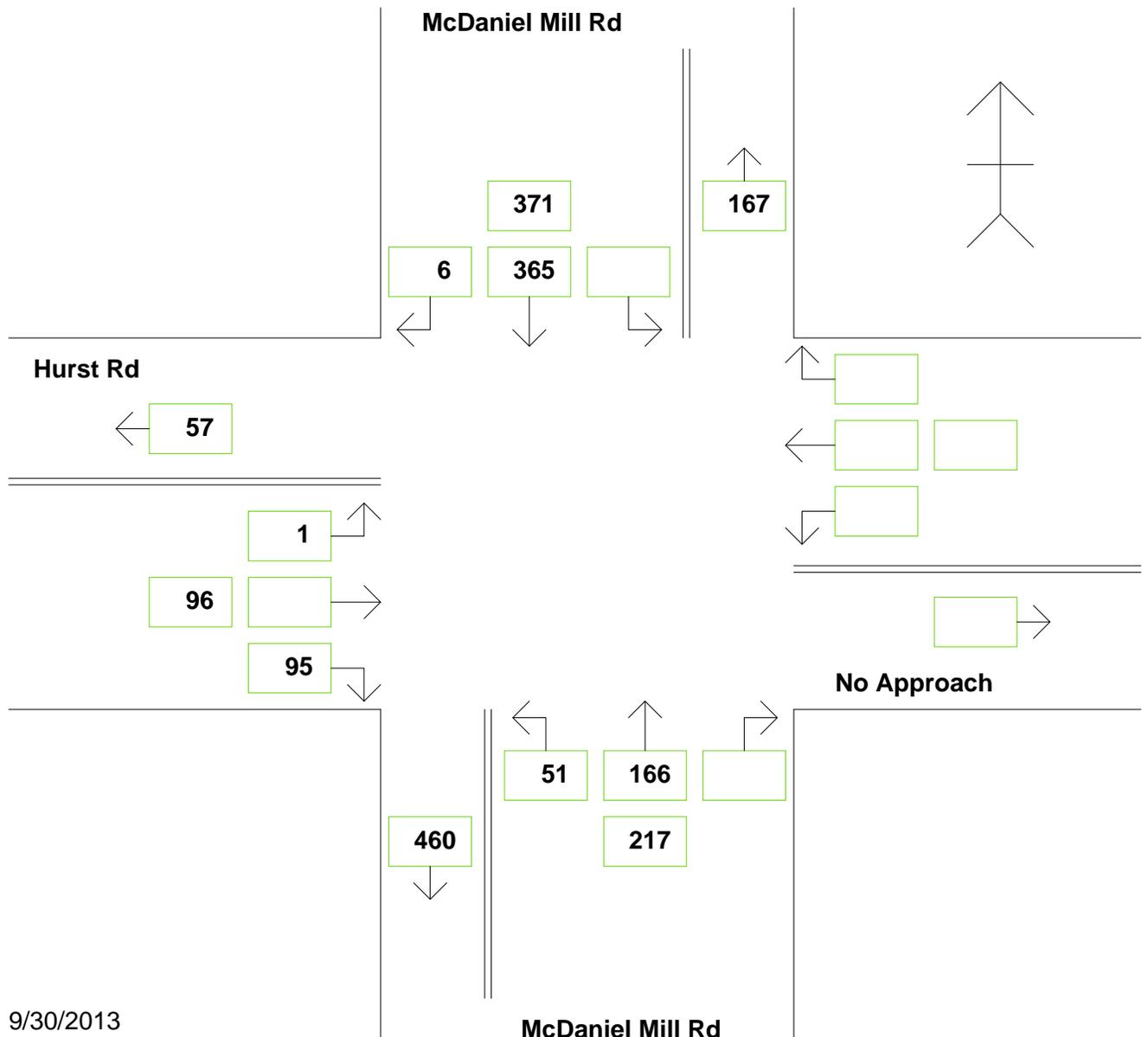
Time Period: p.m. peak

Intersection Name: McDaniel Mill Road @ Hurst Road

Intersection ID: 1

Type: Future
Displayed: Volumes

Next Node North: X 4
Next Node East: 0
Next Node South: 2
Next Node West: X 1



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Intersection Turning Movements

Project: Klondike @ McDaniel Mill Rd

Scenario: 2036 p.m. peak, proposed roadway network

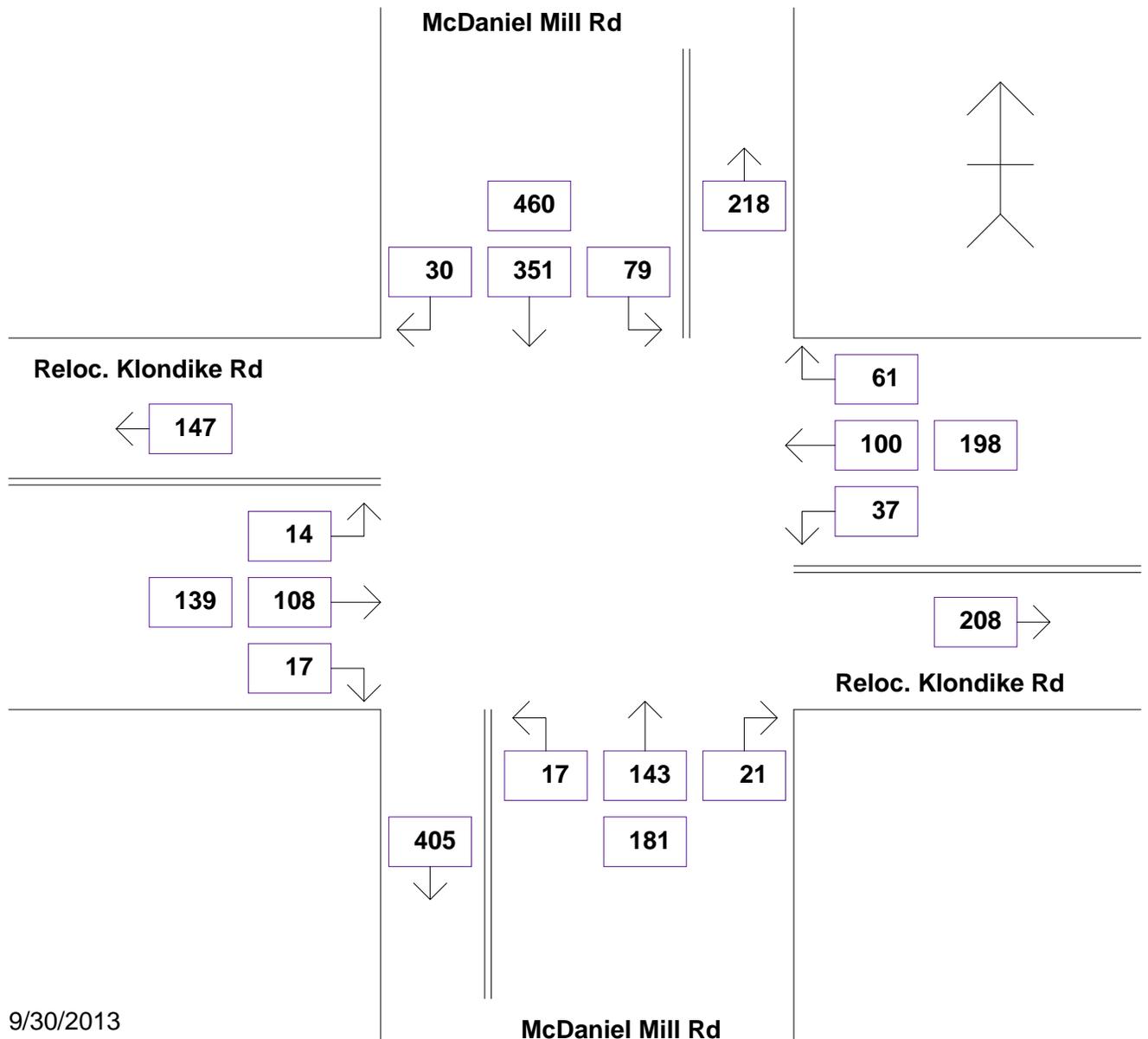
Time Period: p.m. peak

Intersection Name: McDaniel Mill Road @ Klondike Road

Intersection ID: 2

Type: Future
Displayed: Volumes

Next Node North: 1
Next Node East: X 5
Next Node South: X 3
Next Node West: 3



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Appendix C

Signal Warrant Analysis / 4-Way Stop Warrant Analysis Worksheets

Appendix D

2016 Level of Service Printouts

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JWD			Intersection	McDaniel Mill Rd @ Hurst Rd		
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA		
Date Performed	10/1/2013			Analysis Year	2016		
Analysis Time Period	a.m. peak						
Project Description <i>Klondike @ McDaniel Mill Rd Revised Concept 2-way stop</i>							
East/West Street: <i>Hurst Road</i>				North/South Street: <i>McDaniel Mill Rd</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	52	283	1	1	97	1	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	52	283	1	1	97	1	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	3	1	38	1	1	1	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	3	1	38	1	1	1	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (veh/h)	52	1		3			42
C (m) (veh/h)	1476	1261		515			864
v/c	0.04	0.00		0.01			0.05
95% queue length	0.11	0.00		0.02			0.15
Control Delay (s/veh)	7.5	7.9		12.0			9.4
LOS	A	A		B			A
Approach Delay (s/veh)	--	--		12.0			9.4
Approach LOS	--	--		B			A

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JWD			Intersection	McDaniel Mill Rd @ Hurst Rd		
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA		
Date Performed	10/1/2013			Analysis Year	2016		
Analysis Time Period	p.m. peak						
Project Description <i>Klondike @ McDaniel Mill Rd Revised Concept 2-way stop</i>							
East/West Street: <i>Hurst Road</i>				North/South Street: <i>McDaniel Mill Rd</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	36	117	1	1	258	4	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	36	117	1	1	258	4	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	1	1	67	1	1	1	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	1	1	67	1	1	1	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (veh/h)	36	1		3			69
C (m) (veh/h)	1285	1452		550			759
v/c	0.03	0.00		0.01			0.09
95% queue length	0.09	0.00		0.02			0.30
Control Delay (s/veh)	7.9	7.5		11.6			10.2
LOS	A	A		B			B
Approach Delay (s/veh)	--	--		11.6			10.2
Approach LOS	--	--		B			B

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	JWD				Intersection	McDaniel Mill Rd @ Hurst Rd			
Agency/Co.	Qk4				Jurisdiction	Rockdale County, GA			
Date Performed	10/1/2013				Analysis Year	2016			
Analysis Time Period	a.m. peak								
Project ID Klondike @ McDaniel Mill Rd Revised Concept - 4-way stop									
East/West Street: Hurst Road					North/South Street: McDaniel Mill Rd				
Volume Adjustments and Site Characteristics									
Approach	Eastbound				Westbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	3	1	38	1	1	1			
%Thrus Left Lane									
Approach	Northbound				Southbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	52	283	1	1	97	1			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	42		3		336		99		
% Heavy Vehicles	0		0		0		0		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.1		0.3		0.2		0.0		
Prop. Right-Turns	0.9		0.3		0.0		0.0		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	-0.5		-0.1		0.0		-0.0		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.04		0.00		0.30		0.09		
hd, final value (s)	4.32		4.77		4.14		4.33		
x, final value	0.05		0.00		0.39		0.12		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	2.3		2.8		2.1		2.3		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	292		253		586		349		
Delay (s/veh)	7.55		7.79		9.71		7.91		
LOS	A		A		A		A		
Approach: Delay (s/veh)	7.55		7.79		9.71		7.91		
LOS	A		A		A		A		
Intersection Delay (s/veh)	9.14								
Intersection LOS	A								

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	JWD				Intersection	McDaniel Mill Rd @ Hurst Rd			
Agency/Co.	Qk4				Jurisdiction	Rockdale County, GA			
Date Performed	10/1/2013				Analysis Year	2016			
Analysis Time Period	p.m. peak								
Project ID Klondike @ McDaniel Mill Rd Revised Concept - 4-way stop									
East/West Street: Hurst Road					North/South Street: McDaniel Mill Rd				
Volume Adjustments and Site Characteristics									
Approach	Eastbound				Westbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	1	1	67	1	1	1			
%Thrus Left Lane									
Approach	Northbound				Southbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	36	117	1	1	258	4			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	69		3		154		263		
% Heavy Vehicles	0		0		0		0		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.0		0.3		0.2		0.0		
Prop. Right-Turns	1.0		0.3		0.0		0.0		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	-0.6		-0.1		0.0		-0.0		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.06		0.00		0.14		0.23		
hd, final value (s)	4.24		4.78		4.37		4.22		
x, final value	0.08		0.00		0.19		0.31		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	2.2		2.8		2.4		2.2		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	319		253		404		513		
Delay (s/veh)	7.62		7.80		8.38		9.09		
LOS	A		A		A		A		
Approach: Delay (s/veh)	7.62		7.80		8.38		9.09		
LOS	A		A		A		A		
Intersection Delay (s/veh)	8.65								
Intersection LOS	A								

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JWD			Intersection	McDaniel Mill Rd @ Klondike Rd		
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA		
Date Performed	10/1/2013			Analysis Year	2016		
Analysis Time Period	a.m. peak						
Project Description <i>Klondike @ McDaniel Mill Rd Revised Concept</i>							
East/West Street: <i>Relocated Klondike Road</i>				North/South Street: <i>McDaniel Mill Rd</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	8	261	32	71	47	17	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	8	261	32	71	47	17	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	14	71	3	7	32	59	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	14	71	3	7	32	59	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (veh/h)	8	71		98			88
C (m) (veh/h)	1519	1252		578			431
v/c	0.01	0.06		0.17			0.20
95% queue length	0.02	0.18		0.61			0.76
Control Delay (s/veh)	7.4	8.0		12.5			15.5
LOS	A	A		B			C
Approach Delay (s/veh)	--	--		12.5			15.5
Approach LOS	--	--		B			C

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JWD			Intersection	McDaniel Mill Rd @ Klondike Rd		
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA		
Date Performed	10/1/2013			Analysis Year	2016		
Analysis Time Period	p.m. peak						
Project Description <i>Klondike @ McDaniel Mill Rd Revised Concept</i>							
East/West Street: <i>Relocated Klondike Road</i>				North/South Street: <i>McDaniel Mill Rd</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	12	101	15	56	248	21	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	12	101	15	56	248	21	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	10	76	12	26	71	40	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	10	76	12	26	71	40	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (veh/h)	12	56		137			98
C (m) (veh/h)	1277	1454		494			449
v/c	0.01	0.04		0.28			0.22
95% queue length	0.03	0.12		1.12			0.82
Control Delay (s/veh)	7.8	7.6		15.1			15.2
LOS	A	A		C			C
Approach Delay (s/veh)	--	--		15.1			15.2
Approach LOS	--	--		C			C

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	JWD				Intersection	McDaniel Mill Rd @ Klondike Rd			
Agency/Co.	Qk4				Jurisdiction	Rockdale County, GA			
Date Performed	10/1/2013				Analysis Year	2016			
Analysis Time Period	a.m. peak								
Project ID Klondike Rd @ McDaniel Mill Rd - Updated Concept - 4way stop									
East/West Street: Reloc. Klondike Rd					North/South Street: McDaniel Mill Rd				
Volume Adjustments and Site Characteristics									
Approach	Eastbound				Westbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	14	71	3	7	32	59			
%Thrus Left Lane									
Approach	Northbound				Southbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	8	261	32	71	47	17			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	88		98		301		135		
% Heavy Vehicles	5		5		5		5		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.2		0.1		0.0		0.5		
Prop. Right-Turns	0.0		0.6		0.1		0.1		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	0.1		-0.3		0.0		0.1		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.08		0.09		0.27		0.12		
hd, final value (s)	5.20		4.83		4.59		4.87		
x, final value	0.13		0.13		0.38		0.18		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	3.2		2.8		2.6		2.9		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	338		348		551		385		
Delay (s/veh)	8.96		8.56		10.42		8.96		
LOS	A		A		B		A		
Approach: Delay (s/veh)	8.96		8.56		10.42		8.96		
LOS	A		A		B		A		
Intersection Delay (s/veh)	9.60								
Intersection LOS	A								

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	JWD				Intersection	McDaniel Mill Rd @ Klondike Rd			
Agency/Co.	Qk4				Jurisdiction	Rockdale County, GA			
Date Performed	10/1/2013				Analysis Year	2016			
Analysis Time Period	p.m. peak								
Project ID Klondike Rd @ McDaniel Mill Rd - Updated Concept - 4way stop									
East/West Street: Reloc. Klondike Rd					North/South Street: McDaniel Mill Rd				
Volume Adjustments and Site Characteristics									
Approach	Eastbound				Westbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	10	76	12	26	71	40			
%Thrus Left Lane									
Approach	Northbound				Southbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	12	101	15	56	248	21			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	98		137		128		325		
% Heavy Vehicles	5		5		5		5		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.1		0.2		0.1		0.2		
Prop. Right-Turns	0.1		0.3		0.1		0.1		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	0.0		-0.1		0.0		0.1		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.09		0.12		0.11		0.29		
hd, final value (s)	5.30		5.15		5.01		4.80		
x, final value	0.14		0.20		0.18		0.43		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	3.3		3.1		3.0		2.8		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	348		387		378		575		
Delay (s/veh)	9.19		9.40		9.09		11.42		
LOS	A		A		A		B		
Approach: Delay (s/veh)	9.19		9.40		9.09		11.42		
LOS	A		A		A		B		
Intersection Delay (s/veh)	10.27								
Intersection LOS	B								

ROUNDBABOUT REPORT																	
General Information									Site Information								
Analyst	JWD								Intersection	Reloc. Klondike @ McDaniel							
Agency or Co.	Qk4								E/W Street Name	Relocated Klondike Road							
Date Performed	10/1/2013								N/S Street Name								
Time Period	a.m. peak								Analysis Year	2016							
Peak Hour Factor	0.92								Project ID	Roundabout Alternative, 2016 volumes projections							
Project Description:																	
Volume Adjustment and Site Characteristics																	
	EB				WB				NB				SB				
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U	
Number of Lanes (N)	0	1	0		0	1	0		0	1	0		0	1	0		
Lane Assignment	LTR				LTR				LTR				LTR				
Right-Turn Bypass	None				None				None				None				
Conflicting Lanes	1				1				1				1				
Volume (V), veh/h	14	71	3	0	7	32	59	0	8	261	32	0	71	47	17	0	
Heavy Veh. Adj. (f_{HV}), %	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
Pedestrians Crossing	0				0				0				0				
Critical and Follow-Up Headway Adjustment																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Critical Headway (sec)	5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		
Follow-Up Headway (sec)	3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		
Flow Computations																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Circulating Flow (V_c), pc/h	143				323				178				54				
Exiting Flow (V_{ex}), pc/h	199				65				381				65				
Entry Flow (V_e), pc/h	100				112				344				154				
Entry Volume veh/h	95				107				328				147				
Capacity and v/c Ratios																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Capacity (c_{PCE}), pc/h	980				818				946				1071				
Capacity (c), veh/h	933				779				901				1020				
v/c Ratio (X)	0.10				0.14				0.36				0.14				
Delay and Level of Service																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Lane Control Delay (d), s/veh	4.8				6.0				8.1				4.8				
Lane LOS	A				A				A				A				
Lane 95% Queue	0.3				0.5				1.7				0.5				

Approach Delay, s/veh	4.81	6.04	8.08	4.84
Approach LOS, s/veh	A	A	A	A
Intersection Delay, s/veh	6.59			
Intersection LOS	A			

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ROUNDBOUT REPORT																	
General Information									Site Information								
Analyst	JWD								Intersection	Reloc. Klondike @ McDaniel							
Agency or Co.	Qk4								E/W Street Name	Relocated Klondike Road							
Date Performed	10/1/2013								N/S Street Name	McDaniel Mill Road							
Time Period	p.m. peak								Analysis Year	2016							
Peak Hour Factor	0.92								Project ID	Roundabout Alternative, 2016 volumes projections							
Project Description:																	
Volume Adjustment and Site Characteristics																	
	EB				WB				NB				SB				
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U	
Number of Lanes (N)	0	1	0		0	1	0		0	1	0		0	1	0		
Lane Assignment	LTR				LTR				LTR				LTR				
Right-Turn Bypass	None				None				None				None				
Conflicting Lanes	1				1				1				1				
Volume (V), veh/h	10	76	12	0	26	71	40	0	12	101	15	0	56	248	21	0	
Heavy Veh. Adj. (f_{HV}), %	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
Pedestrians Crossing	0				0				0				0				
Critical and Follow-Up Headway Adjustment																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Critical Headway (sec)	5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		
Follow-Up Headway (sec)	3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		
Flow Computations																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Circulating Flow (V_c), pc/h	377				140				162				125				
Exiting Flow (V_{ex}), pc/h	168				119				172				326				
Entry Flow (V_e), pc/h		112				156				146				371			
Entry Volume veh/h		107				149				139				353			
Capacity and v/c Ratios																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Capacity (c_{PCE}), pc/h		775				982				961				998			
Capacity (c), veh/h		738				935				915				950			
v/c Ratio (X)		0.14				0.16				0.15				0.37			
Delay and Level of Service																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Lane Control Delay (d), s/veh		6.4				5.4				5.4				7.9			
Lane LOS		A				A				A				A			
Lane 95% Queue		0.5				0.6				0.5				1.7			

Approach Delay, s/veh	6.42	5.37	5.40	7.88
Approach LOS, s/veh	A	A	A	A
Intersection Delay, s/veh	6.71			
Intersection LOS	A			

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Appendix E

2036 Level of Service Printouts

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JWD			Intersection	McDaniel Mill Rd @ Hurst Rd		
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA		
Date Performed	10/1/2013			Analysis Year	2036		
Analysis Time Period	a.m. peak						
Project Description <i>Klondike @ McDaniel Mill Rd Revised Concept 2-way stop</i>							
East/West Street: <i>Hurst Road</i>				North/South Street: <i>McDaniel Mill Rd</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	74	400	1	1	137	1	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	74	400	1	1	137	1	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	4	1	54	1	1	1	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	4	1	54	1	1	1	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (veh/h)	74	1		3			59
C (m) (veh/h)	1427	1142		385			789
v/c	0.05	0.00		0.01			0.07
95% queue length	0.16	0.00		0.02			0.24
Control Delay (s/veh)	7.7	8.2		14.4			9.9
LOS	A	A		B			A
Approach Delay (s/veh)	--	--		14.4			9.9
Approach LOS	--	--		B			A

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JWD			Intersection	McDaniel Mill Rd @ Hurst Rd		
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA		
Date Performed	10/1/2013			Analysis Year	2036		
Analysis Time Period	p.m. peak						
Project Description <i>Klondike @ McDaniel Mill Rd Revised Concept 2-way stop</i>							
East/West Street: <i>Hurst Road</i>				North/South Street: <i>McDaniel Mill Rd</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	51	166	1	1	365	6	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	51	166	1	1	365	6	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	1	1	95	1	1	1	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	1	1	95	1	1	1	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (veh/h)	51	1		3			97
C (m) (veh/h)	1171	1393		414			660
v/c	0.04	0.00		0.01			0.15
95% queue length	0.14	0.00		0.02			0.51
Control Delay (s/veh)	8.2	7.6		13.8			11.4
LOS	A	A		B			B
Approach Delay (s/veh)	--	--		13.8			11.4
Approach LOS	--	--		B			B

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	JWD				Intersection	McDaniel Mill Rd @ Hurst Rd			
Agency/Co.	Qk4				Jurisdiction	Rockdale County, GA			
Date Performed	10/1/2013				Analysis Year	2036			
Analysis Time Period	a.m. peak								
Project ID Klondike @ McDaniel Mill Rd Revised Concept - 4-way stop									
East/West Street: Hurst Road					North/South Street: McDaniel Mill Rd				
Volume Adjustments and Site Characteristics									
Approach	Eastbound				Westbound				
Movement	L	T	R	L	T	R	L	T	
Volume (veh/h)	4	1	54	1	1	1			
%Thrus Left Lane									
Approach	Northbound				Southbound				
Movement	L	T	R	L	T	R	L	T	
Volume (veh/h)	74	400	1	1	137	1			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	59		3		475		139		
% Heavy Vehicles	0		0		0		0		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.1		0.3		0.2		0.0		
Prop. Right-Turns	0.9		0.3		0.0		0.0		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	-0.5		-0.1		0.0		-0.0		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.05		0.00		0.42		0.12		
hd, final value (s)	4.72		5.22		4.24		4.54		
x, final value	0.08		0.00		0.56		0.18		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	2.7		3.2		2.2		2.5		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	309		253		725		389		
Delay (s/veh)	8.12		8.24		12.48		8.50		
LOS	A		A		B		A		
Approach: Delay (s/veh)	8.12		8.24		12.48		8.50		
LOS	A		A		B		A		
Intersection Delay (s/veh)	11.26								
Intersection LOS	B								

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	JWD				Intersection	McDaniel Mill Rd @ Hurst Rd			
Agency/Co.	Qk4				Jurisdiction	Rockdale County, GA			
Date Performed	10/1/2013				Analysis Year	2036			
Analysis Time Period	p.m. peak								
Project ID Klondike @ McDaniel Mill Rd Revised Concept - 4-way stop									
East/West Street: Hurst Road					North/South Street: McDaniel Mill Rd				
Volume Adjustments and Site Characteristics									
Approach	Eastbound				Westbound				
Movement	L	T	R	L	T	R	L	T	
Volume (veh/h)	1	1	95	1	1	1			
%Thrus Left Lane									
Approach	Northbound				Southbound				
Movement	L	T	R	L	T	R	L	T	
Volume (veh/h)	51	166	1	1	365	6			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	97		3		218		372		
% Heavy Vehicles	0		0		0		0		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.0		0.3		0.2		0.0		
Prop. Right-Turns	1.0		0.3		0.0		0.0		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	-0.6		-0.1		0.0		-0.0		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.09		0.00		0.19		0.33		
hd, final value (s)	4.65		5.26		4.59		4.39		
x, final value	0.13		0.00		0.28		0.45		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	2.6		3.3		2.6		2.4		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	347		253		468		622		
Delay (s/veh)	8.31		8.28		9.36		10.97		
LOS	A		A		A		B		
Approach: Delay (s/veh)	8.31		8.28		9.36		10.97		
LOS	A		A		A		B		
Intersection Delay (s/veh)	10.07								
Intersection LOS	B								

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JWD			Intersection	McDaniel Mill Rd @ Klondike Rd		
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA		
Date Performed	10/1/2013			Analysis Year	2036		
Analysis Time Period	a.m. peak						
Project Description <i>Klondike @ McDaniel Mill Rd Revised Concept</i>							
East/West Street: <i>Relocated Klondike Road</i>				North/South Street: <i>McDaniel Mill Rd</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	11	371	45	100	67	24	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	11	371	45	100	67	24	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	20	100	4	10	45	83	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	20	100	4	10	45	83	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (veh/h)	11	100		138			124
C (m) (veh/h)	1485	1127		441			304
v/c	0.01	0.09		0.31			0.41
95% queue length	0.02	0.29		1.32			1.91
Control Delay (s/veh)	7.4	8.5		16.8			24.8
LOS	A	A		C			C
Approach Delay (s/veh)	--	--		16.8			24.8
Approach LOS	--	--		C			C

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	JWD			Intersection	McDaniel Mill Rd @ Klondike Rd		
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA		
Date Performed	10/1/2013			Analysis Year	2036		
Analysis Time Period	p.m. peak						
Project Description <i>Klondike @ McDaniel Mill Rd Revised Concept</i>							
East/West Street: <i>Relocated Klondike Road</i>				North/South Street: <i>McDaniel Mill Rd</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	17	142	21	79	351	30	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	17	142	21	79	351	30	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	14	108	17	37	100	61	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	14	108	17	37	100	61	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0				0
Lanes	0	1	0	0	1		0
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (veh/h)	17	79		198			139
C (m) (veh/h)	1161	1398		354			320
v/c	0.01	0.06		0.56			0.43
95% queue length	0.04	0.18		3.26			2.11
Control Delay (s/veh)	8.1	7.7		27.3			24.6
LOS	A	A		D			C
Approach Delay (s/veh)	--	--		27.3			24.6
Approach LOS	--	--		D			C

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	JWD				Intersection	McDaniel Mill Rd @ Klondike Rd			
Agency/Co.	Qk4				Jurisdiction	Rockdale County, GA			
Date Performed	10/1/2013				Analysis Year	2036			
Analysis Time Period	a.m. peak								
Project ID Klondike Rd @ McDaniel Mill Rd - Updated Concept - 4way stop									
East/West Street: Reloc. Klondike Rd					North/South Street: McDaniel Mill Rd				
Volume Adjustments and Site Characteristics									
Approach	Eastbound				Westbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	20	100	4	10	45	83			
%Thrus Left Lane									
Approach	Northbound				Southbound				
Movement	L	T	R	L	T	R	L	R	
Volume (veh/h)	11	371	45	100	67	24			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	124		138		427		191		
% Heavy Vehicles	5		5		5		5		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.2		0.1		0.0		0.5		
Prop. Right-Turns	0.0		0.6		0.1		0.1		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
hadj, computed	0.1		-0.3		0.0		0.1		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.11		0.12		0.38		0.17		
hd, final value (s)	5.89		5.51		5.00		5.41		
x, final value	0.20		0.21		0.59		0.29		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	3.9		3.5		3.0		3.4		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	374		388		677		441		
Delay (s/veh)	10.38		9.98		15.03		10.58		
LOS	B		A		C		B		
Approach: Delay (s/veh)	10.38		9.98		15.03		10.58		
LOS	B		A		C		B		
Intersection Delay (s/veh)	12.62								
Intersection LOS	B								

ALL-WAY STOP CONTROL ANALYSIS								
General Information				Site Information				
Analyst	JWD			Intersection	McDaniel Mill Rd @ Klondike Rd			
Agency/Co.	Qk4			Jurisdiction	Rockdale County, GA			
Date Performed	10/1/2013			Analysis Year	2036			
Analysis Time Period	p.m. peak							
Project ID Klondike Rd @ McDaniel Mill Rd - Updated Concept - 4way stop								
East/West Street: Reloc. Klondike Rd				North/South Street: McDaniel Mill Rd				
Volume Adjustments and Site Characteristics								
Approach	Eastbound				Westbound			
Movement	L	T	R	L	T	R		
Volume (veh/h)	14	108	17	37	100	61		
%Thrus Left Lane								
Approach	Northbound				Southbound			
Movement	L	T	R	L	T	R		
Volume (veh/h)	17	142	21	79	351	30		
%Thrus Left Lane								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	1.00		1.00		1.00		1.00	
Flow Rate (veh/h)	139		198		180		460	
% Heavy Vehicles	5		5		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							
Saturation Headway Adjustment Worksheet								
Prop. Left-Turns	0.1		0.2		0.1		0.2	
Prop. Right-Turns	0.1		0.3		0.1		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		-0.1		0.0		0.1	
Departure Headway and Service Time								
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.12		0.18		0.16		0.41	
hd, final value (s)	6.16		5.94		5.77		5.35	
x, final value	0.24		0.33		0.29		0.68	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t _s (s)	4.2		3.9		3.8		3.4	
Capacity and Level of Service								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	389		448		430		653	
Delay (s/veh)	11.07		11.79		11.08		19.14	
LOS	B		B		B		C	
Approach: Delay (s/veh)	11.07		11.79		11.08		19.14	
LOS	B		B		B		C	
Intersection Delay (s/veh)	15.02							
Intersection LOS	C							

ROUNDBOUT REPORT																	
General Information								Site Information									
Analyst	JWD							Intersection	Reloc. Klondike @ McDaniel								
Agency or Co.	Qk4							E/W Street Name	Relocated Klondike Road								
Date Performed	10/1/2013							N/S Street Name	McDaniel Mill Road								
Time Period	a.m. peak							Analysis Year	2036								
Peak Hour Factor	0.92							Project ID	Roundabout Alternative, 2036 volumes projections								
Project Description:																	
Volume Adjustment and Site Characteristics																	
	EB				WB				NB				SB				
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U	
Number of Lanes (N)	0	1	0		0	1	0		0	1	0		0	1	0		
Lane Assignment	LTR				LTR				LTR				LTR				
Right-Turn Bypass	None				None				None				None				
Conflicting Lanes	1				1				1				1				
Volume (V), veh/h	20	100	4	0	10	45	83	0	11	371	45	0	100	67	24	0	
Heavy Veh. Adj. (f_{HV}), %	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
Pedestrians Crossing	0				0				0				0				
Critical and Follow-Up Headway Adjustment																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Critical Headway (sec)	5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		
Follow-Up Headway (sec)	3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		
Flow Computations																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Circulating Flow (V_c), pc/h	201				459				251				75				
Exiting Flow (V_{ex}), pc/h	280				91				541				92				
Entry Flow (V_e), pc/h		142				158				487				218			
Entry Volume veh/h		135				150				464				208			
Capacity and v/c Ratios																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Capacity (c_{PCE}), pc/h		923				714				879				1048			
Capacity (c), veh/h		879				680				837				998			
v/c Ratio (X)		0.15				0.22				0.55				0.21			
Delay and Level of Service																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Lane Control Delay (d), s/veh		5.6				7.9				12.3				5.6			
Lane LOS		A				A				B				A			
Lane 95% Queue		0.5				0.8				3.5				0.8			

Approach Delay, s/veh	5.61	7.90	12.28	5.59
Approach LOS, s/veh	A	A	B	A
Intersection Delay, s/veh	9.20			
Intersection LOS	A			

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ROUNDBOUT REPORT																	
General Information								Site Information									
Analyst	JWD							Intersection	Reloc. Klondike @ McDaniel								
Agency or Co.	Qk4							E/W Street Name	Relocated Klondike Road								
Date Performed	10/1/2013							N/S Street Name	McDaniel Mill Road								
Time Period	p.m. peak							Analysis Year	2036								
Peak Hour Factor	0.92							Project ID	Roundabout Alternative, 2036 volumes projections								
Project Description:																	
Volume Adjustment and Site Characteristics																	
	EB				WB				NB				SB				
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U	
Number of Lanes (N)	0	1	0		0	1	0		0	1	0		0	1	0		
Lane Assignment	LTR				LTR				LTR				LTR				
Right-Turn Bypass	None				None				None				None				
Conflicting Lanes	1				1				1				1				
Volume (V), veh/h	14	108	17	0	37	100	61	0	17	142	21	0	79	351	30	0	
Heavy Veh. Adj. (f _{HV}), %	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
Pedestrians Crossing	0				0				0				0				
Critical and Follow-Up Headway Adjustment																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Critical Headway (sec)	5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		
Follow-Up Headway (sec)	3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		
Flow Computations																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Circulating Flow (V _c), pc/h	533				197				229				175				
Exiting Flow (V _{ex}), pc/h	237				168				248				462				
Entry Flow (V _e), pc/h		159				226				205				525			
Entry Volume veh/h		151				215				195				500			
Capacity and v/c Ratios																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Capacity (c _{PCE}), pc/h		663				928				898				948			
Capacity (c), veh/h		632				883				856				903			
v/c Ratio (X)		0.24				0.24				0.23				0.55			
Delay and Level of Service																	
	EB				WB				NB				SB				
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		
Lane Control Delay (d), s/veh		8.7				6.6				6.6				11.6			
Lane LOS		A				A				A				B			
Lane 95% Queue		0.9				1.0				0.9				3.5			

Approach Delay, s/veh	8.68	6.60	6.58	11.59
Approach LOS, s/veh	A	A	A	B
Intersection Delay, s/veh	9.24			
Intersection LOS	A			

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DEPARTMENT OF FINANCE
ROSELYN MILLER, DIRECTOR
TELEPHONE: 770-278-7555
FACSIMILE: 770- 929-4039

Contract Transmittal

To: ~~Krystal Stovall Dixon, GDOT~~ *Roxanne Harris*
From: Connie Rivers, Rockdale County Contract Specialist
Date: October 20, 2014
Re: Contract #2014-136

Please find enclosed a fully executed agreement as referenced above.

If you have any questions regarding this contract please contact Connie Rivers at 770-278-7554 or via email at Connie.Rivers@rockdalecounty.org.

Thank you for doing business with Rockdale County Government.

Sincerely,

Connie Rivers

Contract Specialist
Rockdale County Government
Department of Finance
Direct: (770) 278-7554
Email: Connie.Rivers@rockdalecounty.org

RECEIVED

OCT 22 2014

Office of Program Delivery

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INDICATION OF ROUNDABOUT SUPPORT

Georgia Department of Transportation
Office of Design Policy & Support
One Georgia Center - 26th Floor
600 West Peachtree Street, NW
Atlanta, Georgia 30308
ATTN: Scott MacLean, Lead Design Engineer

Location

Rockdale County supports the consideration of a roundabout at the location specified below.

Description: CR 57/Klondike Rd @ CR 62/McDaniel Mill Rd/Hurst Rd

State/County Route Numbers: (see above)

Project: CSSTP-0006-00(932) Rockdale County P.I. No. 0006932

Associated Conditions

The undersigned agrees to participate in the following maintenance of the intersection in the event that the roundabout is selected as the preferred concept alternative:

- The full and entire cost to energize the lighting system installed and to provide for the operation/maintenance thereof.

We agree to participate in a formal *Local Government Lighting Project Agreement* during the preliminary design phase. This indication of support is submitted and all the conditions are hereby agreed to. The undersigned are duly authorized to execute this agreement.

This 16th day of October, 2014

Attest:

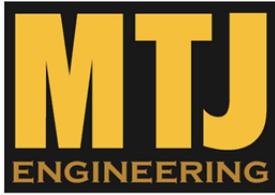
[Signature]
County Clerk

By: [Signature]

Title: Chairman & CEO

Approved as to form

[Signature]
M. Qader A. Balg, County Attorney



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Madison, WI 53705
Office: 608.238.5000
Fax: 866.846.5552
www.mtjengineering.com

Technical Memorandum

TO: JEFF DYER PROJECT MANAGER, QK4 INC
FROM: MARK T. JOHNSON, P.E., MTJ ENGINEERING, LLC
SUBJECT: ROUNDABOUT CONCEPT REVIEW OF:
Klondike Road @ McDaniel Mill Road / Hurst Road, Rockdale County- PI#0006932
DATE: 1/27/2014
CC:

Introduction:

While under contract with Rockdale County as a sub-consultant to QK4 we've reviewed the following studies and plans previously prepared by QK4 for the intersection of Klondike Road @ McDaniel Mill Road / Hurst Road located in the county Rockdale, GA PI#0006932:

- 2007 Concept Report (CR) with supporting traffic analysis and plan development documentation
- 9/30/13 Traffic Analysis Memo Report
- 5/17/13 Roundabout Concept
- "Revised Project Concept Report" (un-dated) received 8/14/13

Based on this review we offer the following very brief summaries of these previous plans and studies as it relates to the development of a roundabout for this intersection.

2007 Concept Report (CR) Review and Project Understanding:

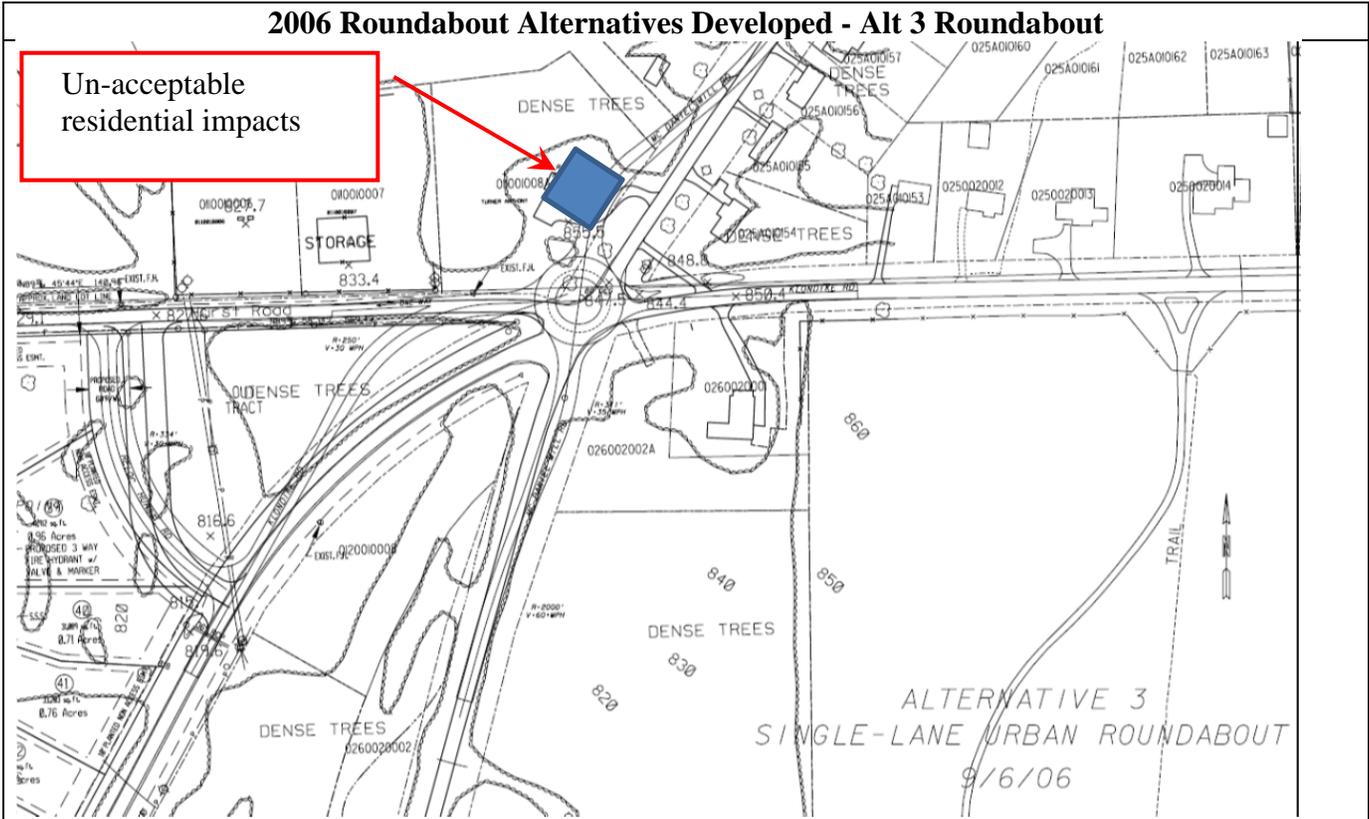
The 2007 CR established that the existing 5 legged skewed intersection is problematic both operationally and identified existing and future safety concerns. A number of intersection re-alignment alternative were evaluated including conventional and roundabout intersection alternatives.

As part of this effort two roundabout alternatives were developed at the existing intersection location but were rejected due to un-acceptable residential, utility and or historic properties impacts associated with placing a roundabout in this location and these concept layouts are shown below.

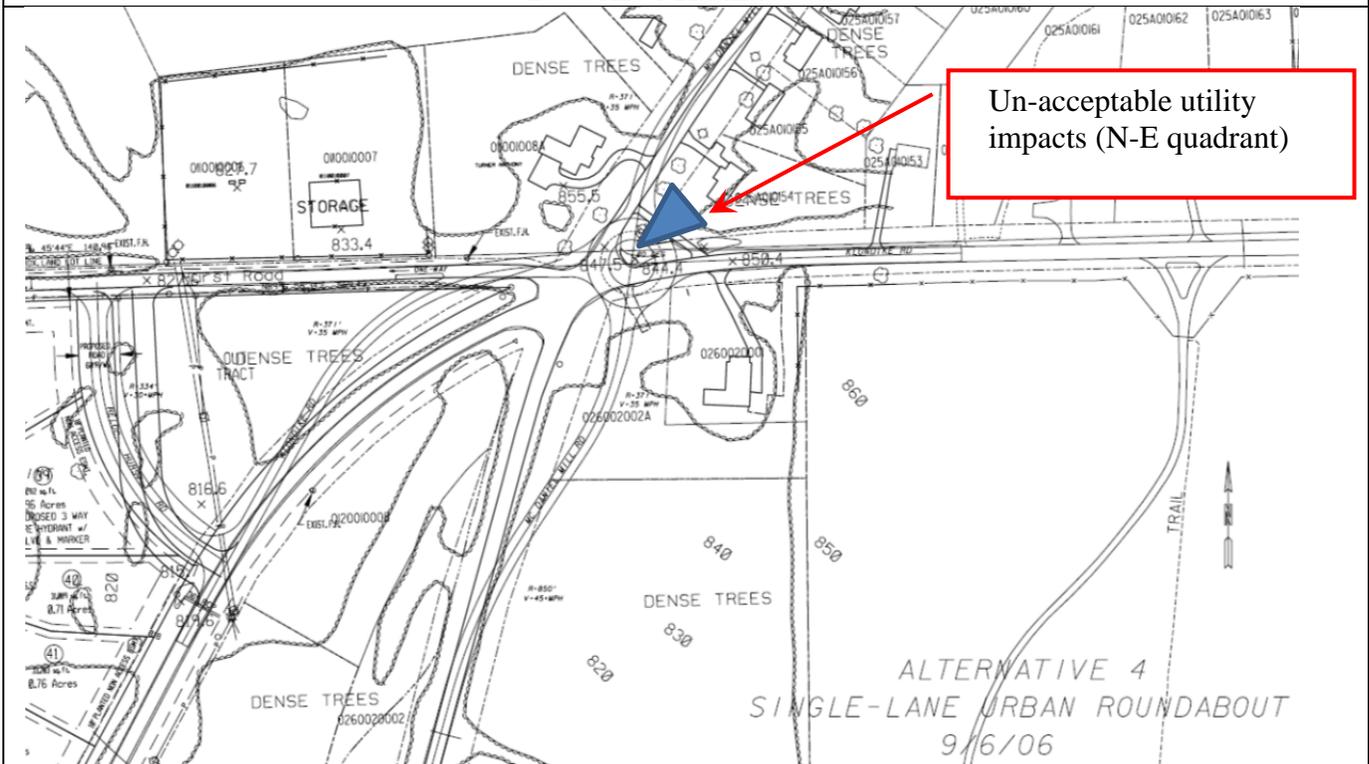
An alignment with a conventional intersection was identified in the 2007 CR as the preferred improvement at that time. However the preferred alternative required a design exception for the horizontal curvature of the re-aligned west leg of Klondike Drive that wasn't approved and subsequently the project did not move forward as proposed.



2006 Roundabout Alternatives Developed - Alt 3 Roundabout

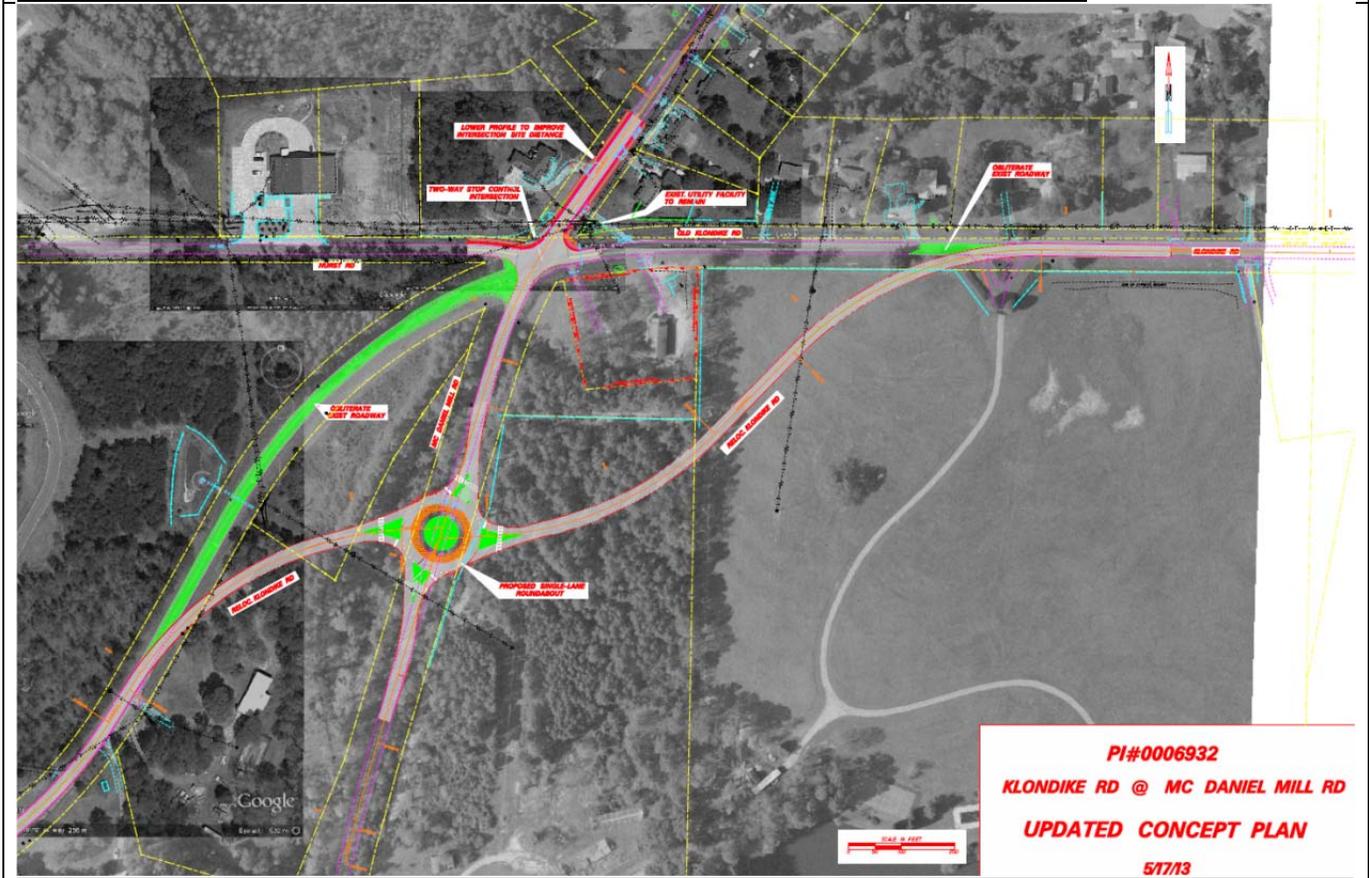


2006 Alt 4 Roundabout



The current Draft CR prepared by QK4 includes a revised roundabout layout and design based upon a re-located Klondike Drive alignment and this is shown below.

Concept Plan by QK4 May 2013 – Relocated Klondike Drive with Roundabout



Summary from the QK4:

Safety- The original 2007 CR indicates 1 intersection related crash had occurred in the 3 years analyzed.

Cost - The 2013 Amended CR estimated construction costs of the re-aligned roadways and proposed roundabout intersection are shown below:

Cost Estimate:		
Base Construction Cost:	\$1,521,103	3/22/2013
Engineering and Inspection:		
Liquid AC Adjustment:		
Total Construction Cost:		
Right-of-Way:	\$980,000	3/22/2013

Total Cost Estimate = 2.5M

Review of Traffic Analysis Memo report dated 9/30/13:

The Traffic Memo prepared by QK4 identifies opening year as 2016 and design year 2036. The Traffic memo found that with the re-aligned Klondike Road and proposed new layout maintaining the west leg of Hurst at the current location that the side street volumes are substantially reduced. A summary of the other key findings excerpted from the QK4 updated Traffic Memo dated 9/30/13 are shown below in the text box:

Proposed Relocated Klondike Road and McDaniel Mill Road Intersection:

- Does not meet warrants for signalization until at or near the design year of 2036, and one warrant is met.
- Both a four-way stop control and two-way stop control would operate adequately at this intersection in the opening year of 2016.
- The re-aligned 4 legged intersection meets 8-hour All-Way Volumes Warrants for the 70% threshold on 2036 flows.
- LOS D or better assuming two-way stop control by the year 2036.
- LOS C or better as an all-way stop 2036.
- LOS A as a roundabout 2036.
 - Roundabout would provide the most reserve capacity for this intersection and not require further improvement; if future volumes exceed the 2036 volume projections.

McDaniel Mill Road @ Hurst Road/Old Klondike Road:

- Side street stop sign control for the Hurst Road / Old Klondike Road approaches for both 2016 and 2036 operate acceptably.
- However existing restricted intersection sight distance on McDaniel Mill Road north of the intersection would preclude operating this intersection with two-way stop control, unless the profile of McDaniel Mill Road north of the intersection were lowered to eliminate the sight distance issue.
- Existing sight distance considerations would keep multi-way stop control in place at this intersection.

This project proposes the lowering of the McDaniel Mill Road profile north of Hurst Road to provide adequate sight distance for vehicles approaching the intersection from Hurst Road. Presuming this improvement is included as part of this project, this intersection would operate adequately with 2-way stop control.

Geometric Design

As part of our review for this project we have reviewed the proposed (May 2013) concept roundabout layout developed by QK4 and have developed geometric modifications to improve the skew angle, and ensure optimal safety and overall operations and safety are achieved. To include meeting Fast Path criteria, approach sight distance and minimum centerline radii for the design speed of 45 mph and Large Truck Movements are accommodated (WB-67)

High Speed Approaches:

The minimum splitter island lengths for this roadway have been calculated based on AASHTO Comfortable Deceleration Distance for an approach speed and a presumed entering speed of the roundabout.

The posted speed limit is 45 mph for all legs of the intersection. The splitter islands have been extended to account for the approach roadway speeds and to provide channelization consistent with high speed approach design criteria. Posted speeds are 45 mph, and GDOT typically applies a design speed to match posted speeds. However, it is anticipated that prevailing speeds may exceed 45 mph. Therefore a “design speed” = 50mph with the prevailing and conservative entering speed of 20 mph has been applied to determine the desired length of splitter islands based on standard de-acceleration rates and is calculated to be 200’. The proposed MTJ re-design provides:

- 235’ of splitter island length for north and south-bound approaches and
- 475’ of splitter island length for the east and west approaches.
 - The lengthened channelization (splitter islands) for east and west approaches account for the necessary tighter curvature of these approaches and is intended to assist in inducing slower speeds on these approaches to optimize safety.

Please see the MTJ re-design below that utilizes re-alignment of McDaniel Mill Road to assist in achieving an improved intersection angle between each of the four legs (closer to 90 degrees).

- Alt A utilizes a tighter 400’ center line radii along re-located Klondike Drive and more relaxed center line radii along McDaniels Road

Please see the revised 160’ ICD MTJ corrective re-design plan sheets attached to include:

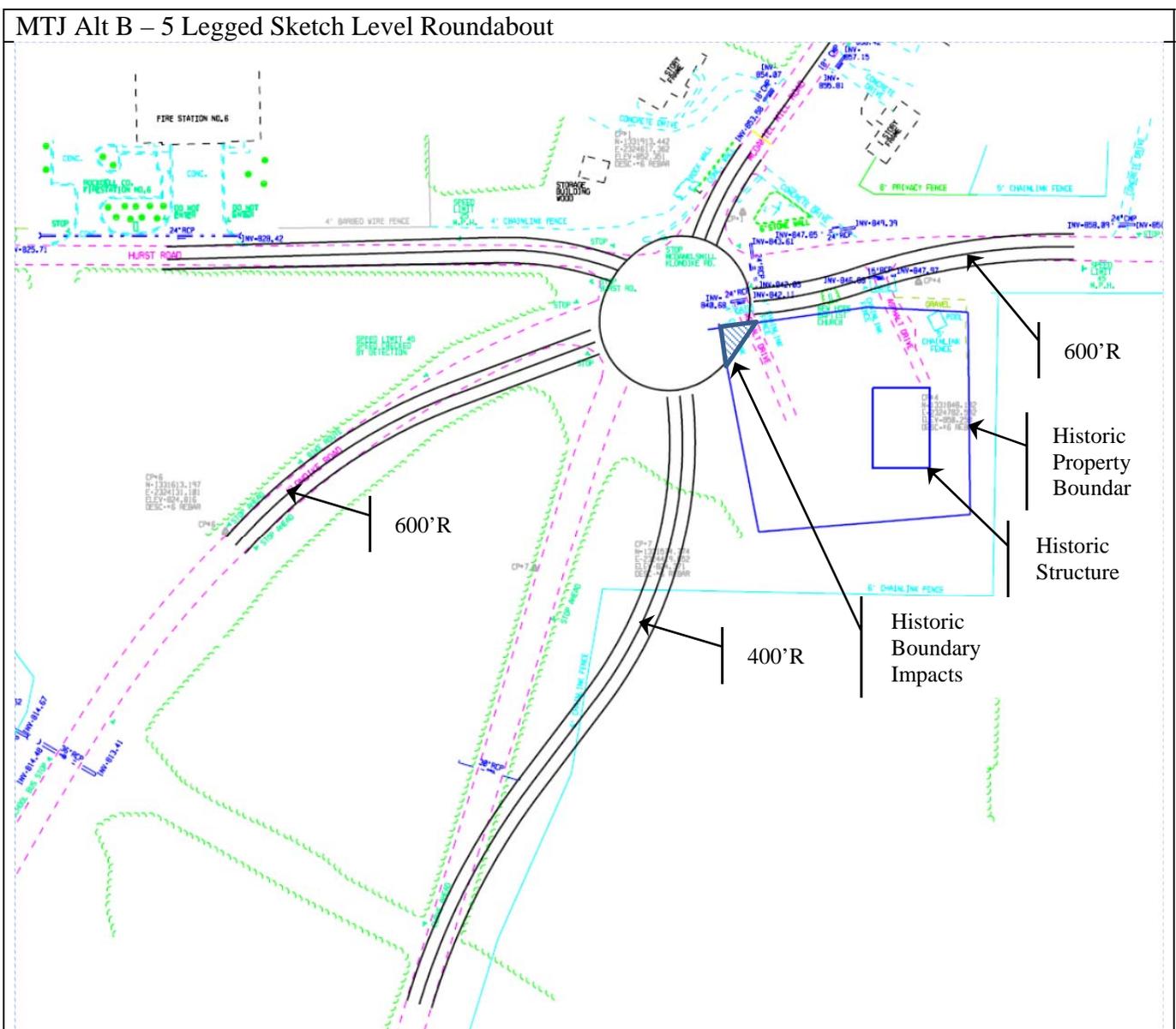
- Fast Path Constructs
- WB 67 Truck Templates

In addition we’ve developed an alternative sketch layout that provides a 5 legged roundabout concept at the existing intersection and this is shown below.

The 5 legged roundabout sketch alternative avoids the utility impacts in the north-east quadrant, and the residential impacts in the north-west quadrant, but to avoid these impacts it will impact the historic property in the south-east quadrant.

Potential benefits of this concept include costs savings from reduced roadway and land acquisition costs associated with precluding the need to re-align Klondike Road. Additionally, processing all the side streets at the roundabout may be considered safer condition than leaving Hurst as a side street stop controlled intersection as is the case with the re-aligned Klondike roadway.

However it's noted that acquiring land from a historic property would likely require some level of 4f process to. And the analysis would seem to be focused on if there are other "viable" alternatives (ie the re-aligned Klondike Road).



SUMMARY

Traffic Analysis:

Realigned Klondike Road Intersection:

- Meets All-Way Stop Warrants for the 70% thresholds on 2036 traffic.

Hurst Road intersection with McDaniels:

- Two-way stop control is maintained only if the profile of the north leg of McDaniels is modified to remove the identified vertical sight distance deficiency.

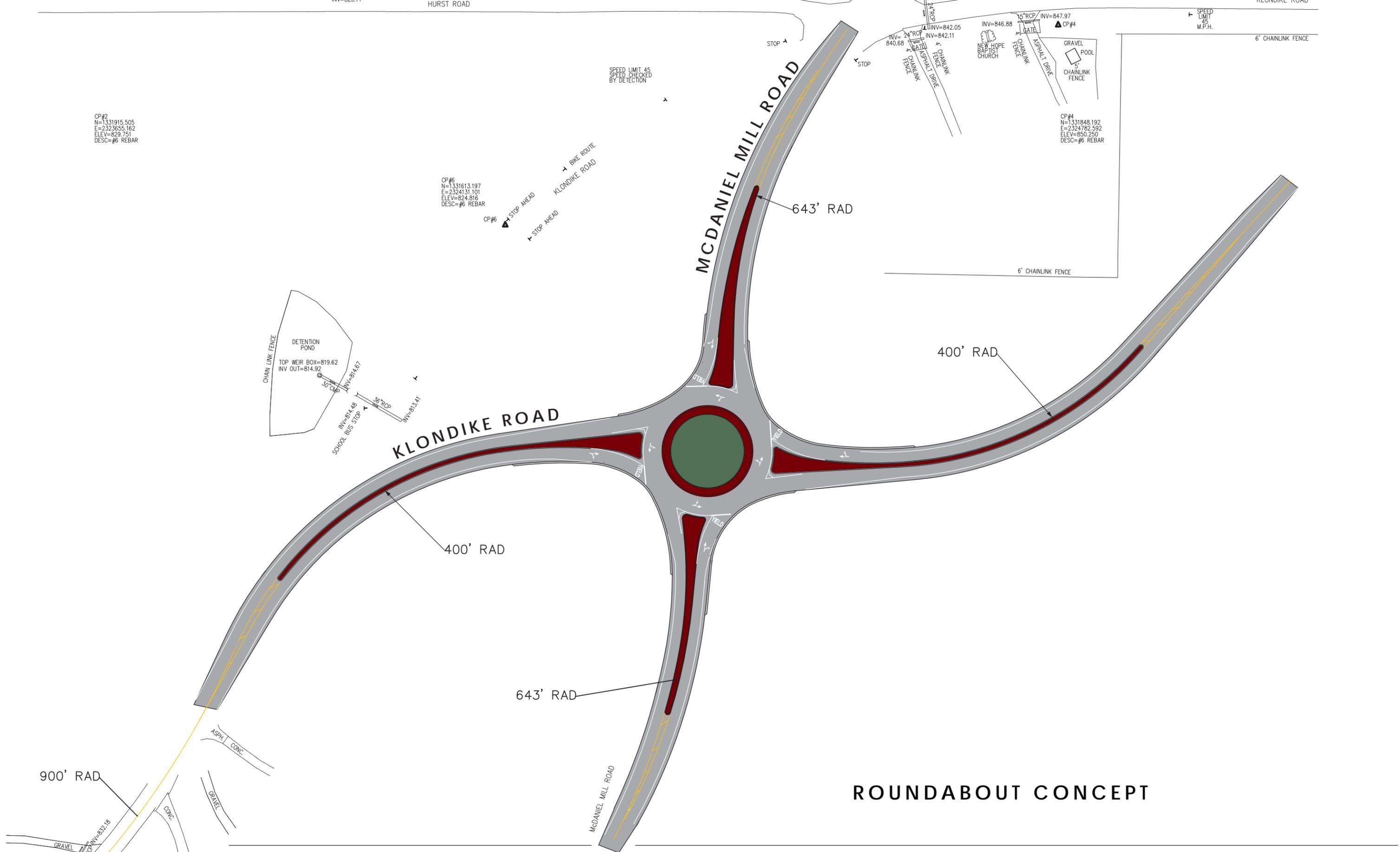
Realigned Klondike Road and 4 Legged Roundabout Intersection:

Our review of the proposed (May 2013) concept roundabout layout identified the following recommended modifications:

- Approach roadway alignment changes to both McDaniel and Klondike Road to improve the skew angle between each of the four legs to achieve close to 90 degrees.
- MTJ corrective re-designed roundabout that meets horizontal roundabout design criteria based on GDOT and NCHRP 672 criteria and principles for safety, operations, and truck movements utilizing a WB-67 design vehicle.
 - It is noted that this horizontal design will readily accept the addition of pedestrian crossings at the appropriate locations if it's determined they are to be installed.

Alternative 5 Legged Roundabout at Existing Intersection Location (no re-aligned Klondike Drive):

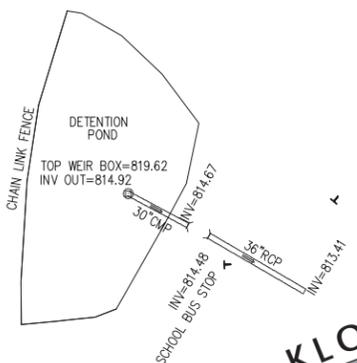
Our review developed a 5 Leg sketch level concept roundabout located at the existing intersection. Benefits of this layout include reduced construction and ROW acquisition costs, and potential safety benefits from processing all side street traffic at the roundabout. However, if the re-located Klondike Drive alignment is determined to be “viable” from a 4f perspective then this alternative may not be allowed due to the impact to the historic property boundary.



CP#2
 N=1331915.505
 E=2323655.162
 ELEV=829.751
 DESC=#6 REBAR

CP#5
 N=1331613.197
 E=2324131.101
 ELEV=824.816
 DESC=#6 REBAR

CP#4
 N=1331848.192
 E=2324782.592
 ELEV=850.250
 DESC=#6 REBAR

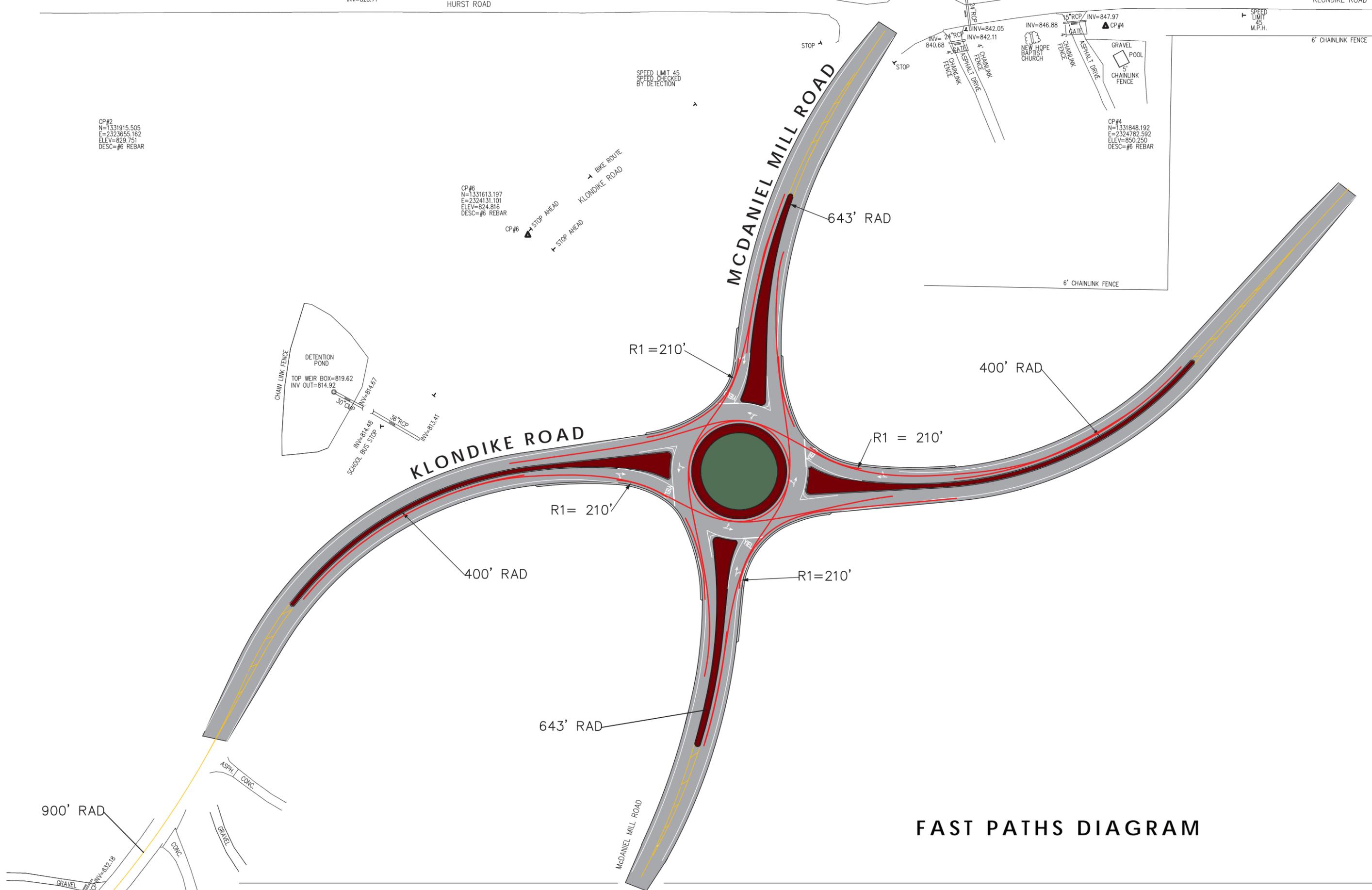


ROUNDABOUT CONCEPT

Klondike Road @ McDaniel Mill Road / Hurst Road
 Rockdale County-Georgia PI#0006932

SCALE 1" = 100'
 10.21.2013

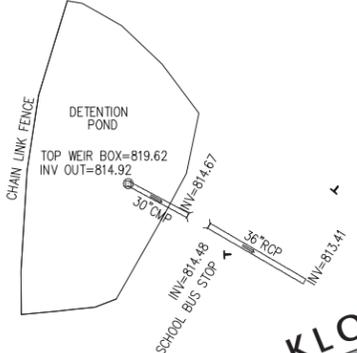
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 E=2324131.101
 ELEV=824.816
 DESC=#6 REBAR

CP#4
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 E=2324782.592
 ELEV=850.250
 DESC=#6 REBAR

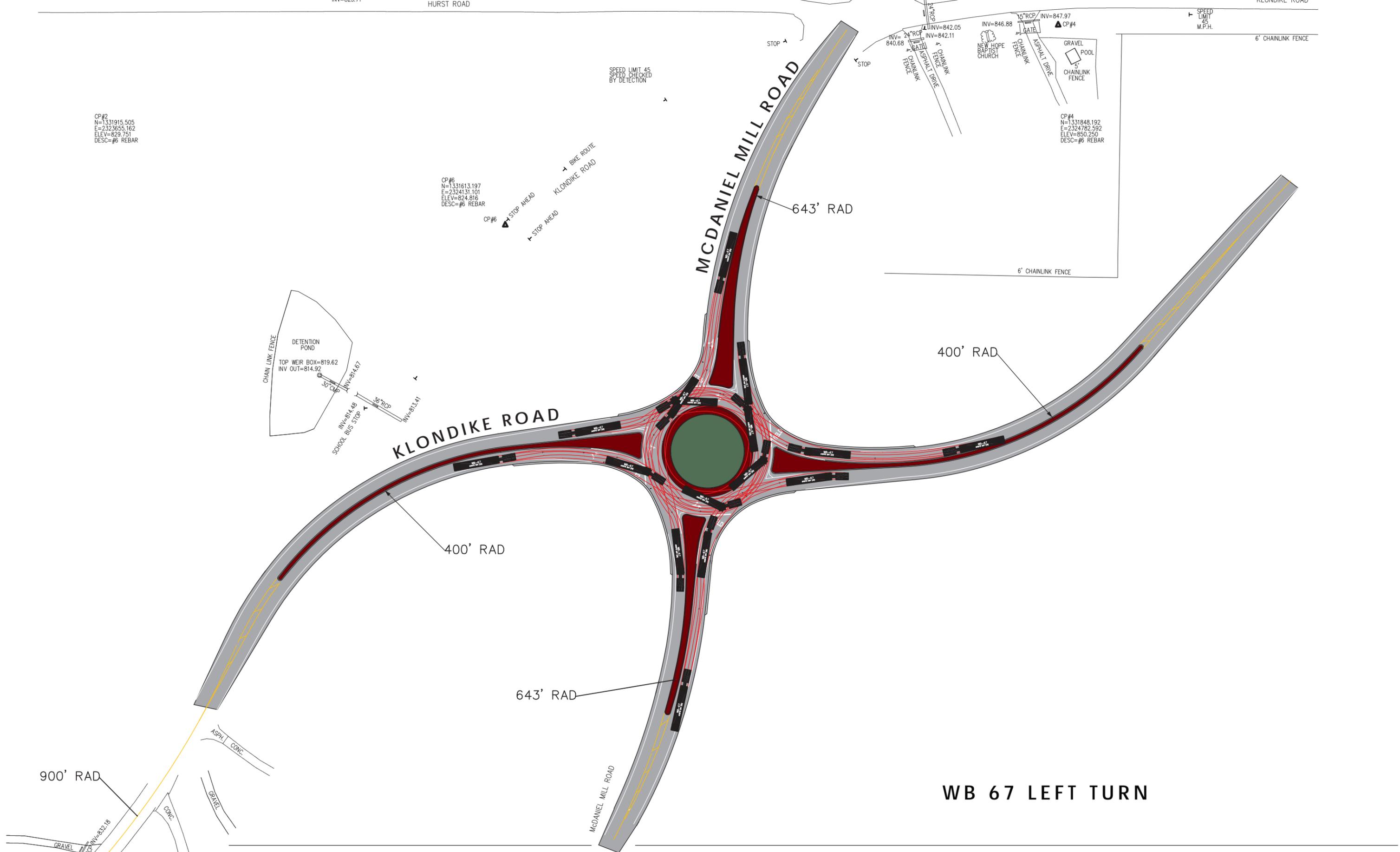


FAST PATHS DIAGRAM

Klondike Road @ McDaniel Mill Road / Hurst Road
 Rockdale County-Georgia PI#0006932

SCALE 1" = 100'
 10.21.2013

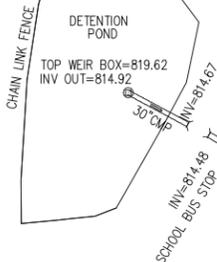
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 ELEV=824.816
 DESC=#6 REBAR

CP#4
 N=1331848.192
 E=2324782.592
 ELEV=850.250
 DESC=#6 REBAR

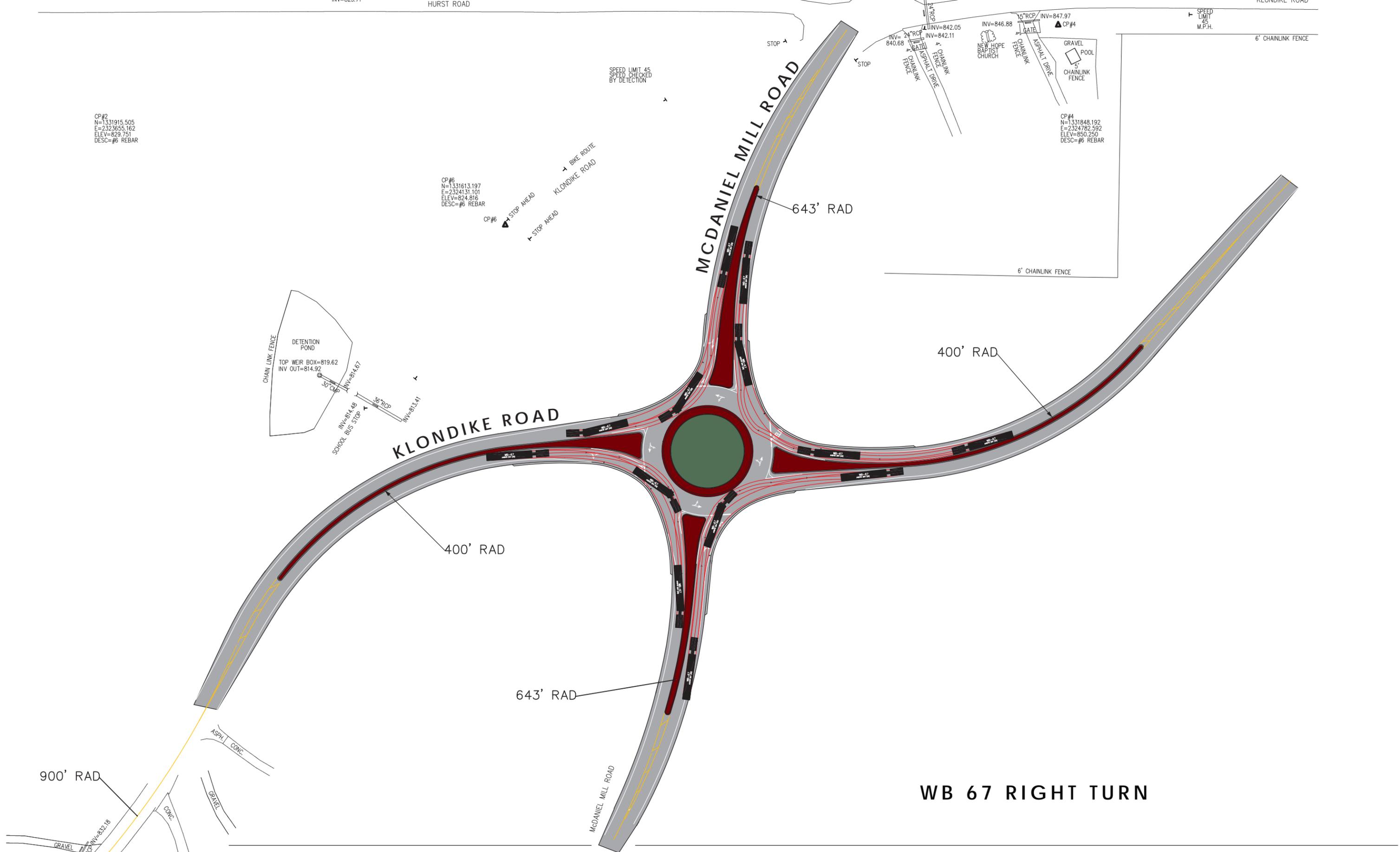


WB 67 LEFT TURN

Klondike Road @ McDaniel Mill Road / Hurst Road
 Rockdale County-Georgia PI#0006932

SCALE 1" = 100'
 10.21.2013

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 MADISON, WI 53705
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CP#2
 N=1331915.505
 E=2323655.162
 ELEV=829.751
 DESC=#6 REBAR

CP#5
 N=1331613.197
 E=2324131.101
 ELEV=824.816
 DESC=#6 REBAR

CP#4
 N=1331848.192
 E=2324782.592
 ELEV=850.250
 DESC=#6 REBAR

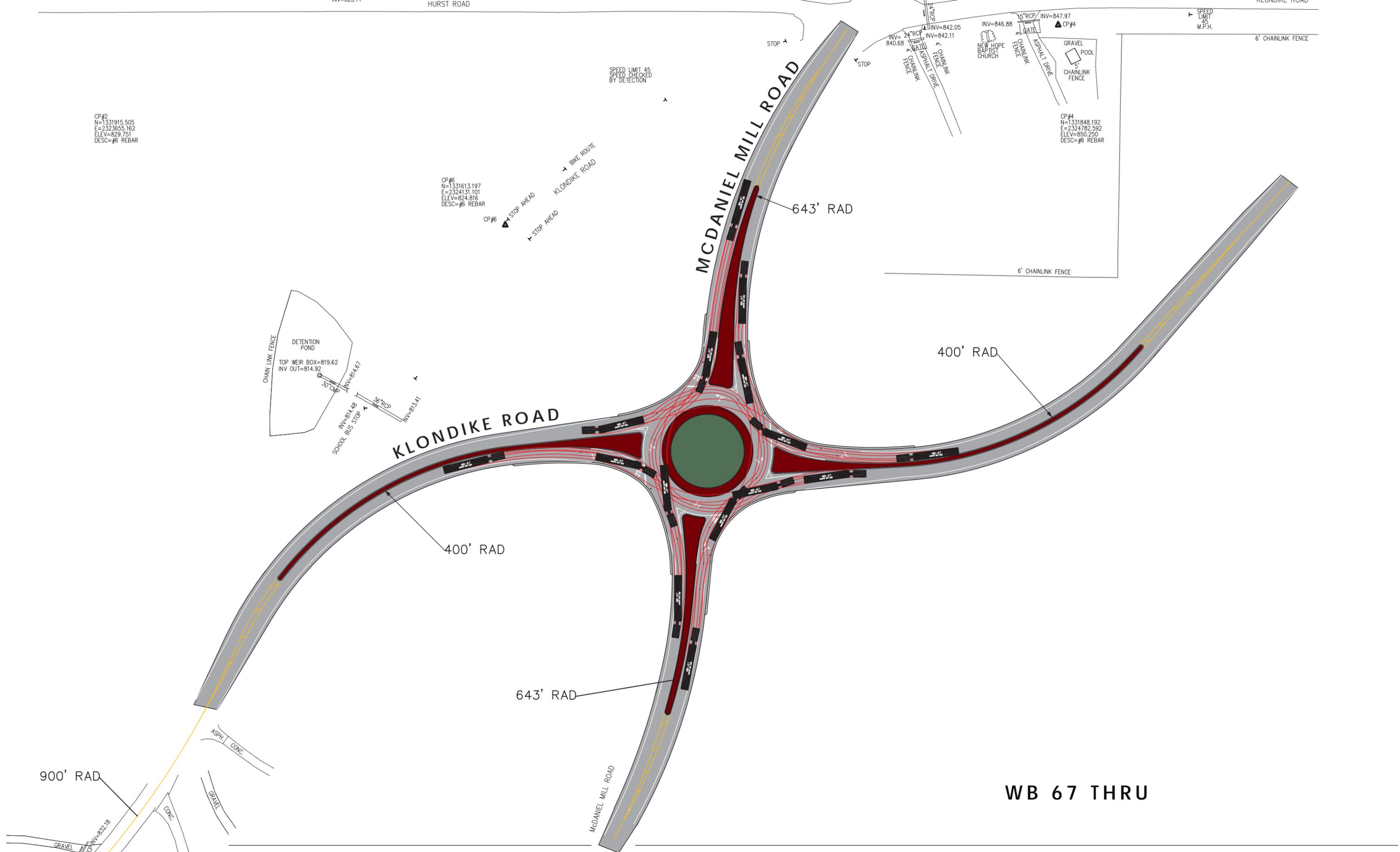
DETENTION POND
 TOP WEIR BOX=819.62
 INV OUT=814.92

WB 67 RIGHT TURN

Klondike Road @ McDaniel Mill Road / Hurst Road
 Rockdale County-Georgia PI#0006932

SCALE 1" = 100'
 10.21.2013

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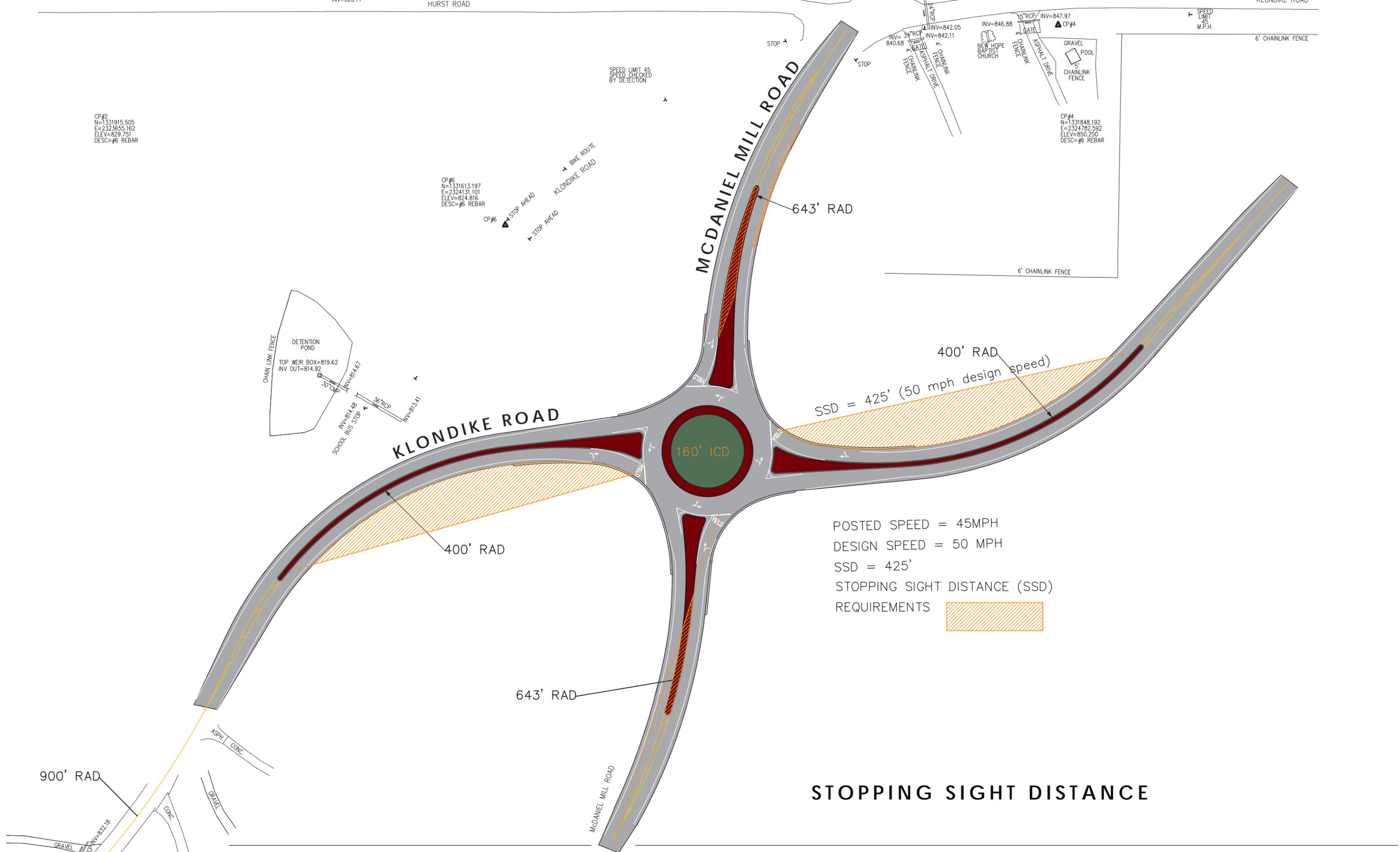


Klondike Road @ McDaniel Mill Road / Hurst Road
 Rockdale County-Georgia PI#0006932

WB 67 THRU

SCALE 1" = 100'
 10.21.2013

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 FX | 866.846.5552
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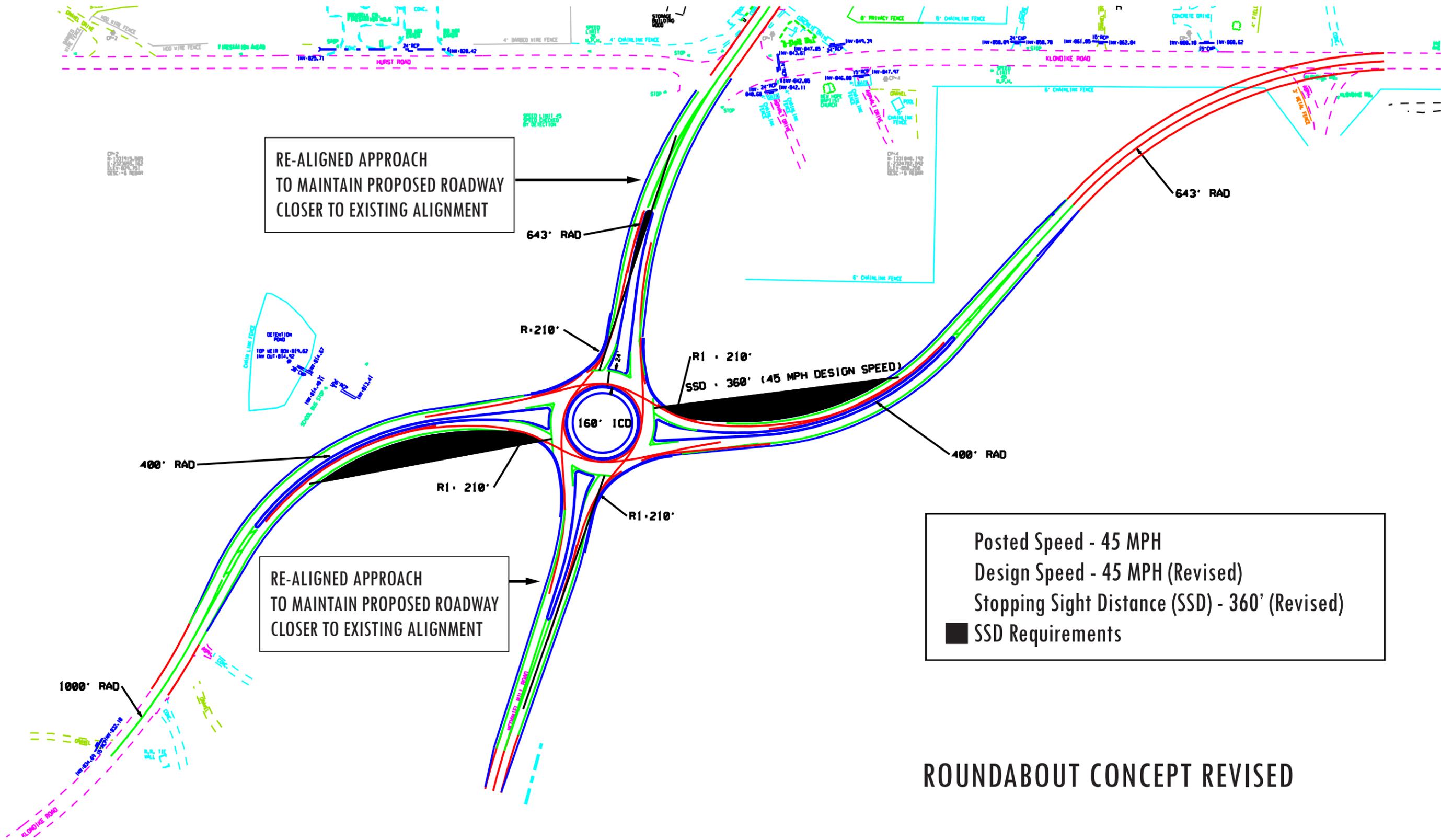
POSTED SPEED = 45MPH
 DESIGN SPEED = 50 MPH
 SSD = 425'
 STOPPING SIGHT DISTANCE (SSD)
 REQUIREMENTS

STOPPING SIGHT DISTANCE

Klondike Road @ McDaniel Mill Road / Hurst Road
 Rockdale County-Georgia PI#0006932

SCALE 1" = 100'
 10.21.2013

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Posted Speed - 45 MPH
 Design Speed - 45 MPH (Revised)
 Stopping Sight Distance (SSD) - 360' (Revised)
 ■ SSD Requirements

ROUNDBOUT CONCEPT REVISED



**Benefit Cost Analysis Work Sheet
CONGESTION Projects**

CSSTP-0006-00(932)

0006932

Rockdale

Klondike Road @ McDaniel Mill / Hurst Road Intersection Improvement

Congestion Benefit = Tb + CMb + Fb

Person Time Savings Benefit (Tb)

*Db (hrs)	0.04
ADT	8,420
Tb (\$s)	\$11,577,500.00

Commercial or Truck Time Savings Benefit (CMb)

Db (hrs)	0.04
% Truck Traffic	0.06
ADT	8,420
CMb	\$3,670,278.00

Fuel Savings Benefit (Fb)

ADT	8,420
Fb (\$s)	\$4,034,583.33

Total Congestion Benefit	\$19,282,361.33
Total Project Cost	\$3,831,343.00
B/C Ratio	5.03

PROJ. NO.	CSSTP-0006-00(932)	CALL NO.
P.I. NO.	0006932	
DATE	10/30/2014	

INDEX (TYPE)	DATE	INDEX
REG. UNLEADED	Oct-14	\$ 3.312
DIESEL		\$ 3.718
LIQUID AC		\$ 615.00

Link to Fuel and AC Index:
<http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx>

LIQUID AC ADJUSTMENTS

PA=[((APM-APL)/APL)]xTMTxAPL

Asphalt

Price Adjustment (PA)				155164.5	\$	155,164.50
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	984.00		
Monthly Asphalt Cement Price month project let (APL)			\$	615.00		
Total Monthly Tonnage of asphalt cement (TMT)				420.5		

ASPHALT	Tons	%AC	AC ton
Leveling	150	5.0%	7.5
12.5 OGFC		5.0%	0
12.5 mm	920	5.0%	46
9.5 mm SP		5.0%	0
25 mm SP	5870	5.0%	293.5
19 mm SP	1470	5.0%	73.5
	8410		420.5

BITUMINOUS TACK COAT

Price Adjustment (PA)				\$ 3,169.78	\$	3,169.78
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	984.00		
Monthly Asphalt Cement Price month project let (APL)			\$	615.00		
Total Monthly Tonnage of asphalt cement (TMT)				8.590201844		

Bitum Tack

Gals	gals/ton	tons
2000	232.8234	8.59020184

BITUMINOUS TACK COAT (surface treatment)

Price Adjustment (PA)				0	\$	-
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	984.00		
Monthly Asphalt Cement Price month project let (APL)			\$	615.00		
Total Monthly Tonnage of asphalt cement (TMT)				0		

Bitum Tack	SY	Gals/SY	Gals	gals/ton	tons
Single Surf. Trmt.		0.20	0	232.8234	0
Double Surf.Trmt.		0.44	0	232.8234	0
Triple Surf. Trmt		0.71	0	232.8234	0
					0

TOTAL LIQUID AC ADJUSTMENT **\$ 158,334.28**