

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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

**FILE** P.I. # 0010941

**OFFICE** Design Policy & Support

Fulton County

GDOT District 7 - Metro Atlanta

**DATE** 10/29/2014

SR 154/SR 166 @ CR 472/Niskey Lake Road

**FROM**  Brent Story, State Design Policy Engineer

**TO** SEE DISTRIBUTION

**SUBJECT** APPROVED CONCEPT REPORT

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

Attachment

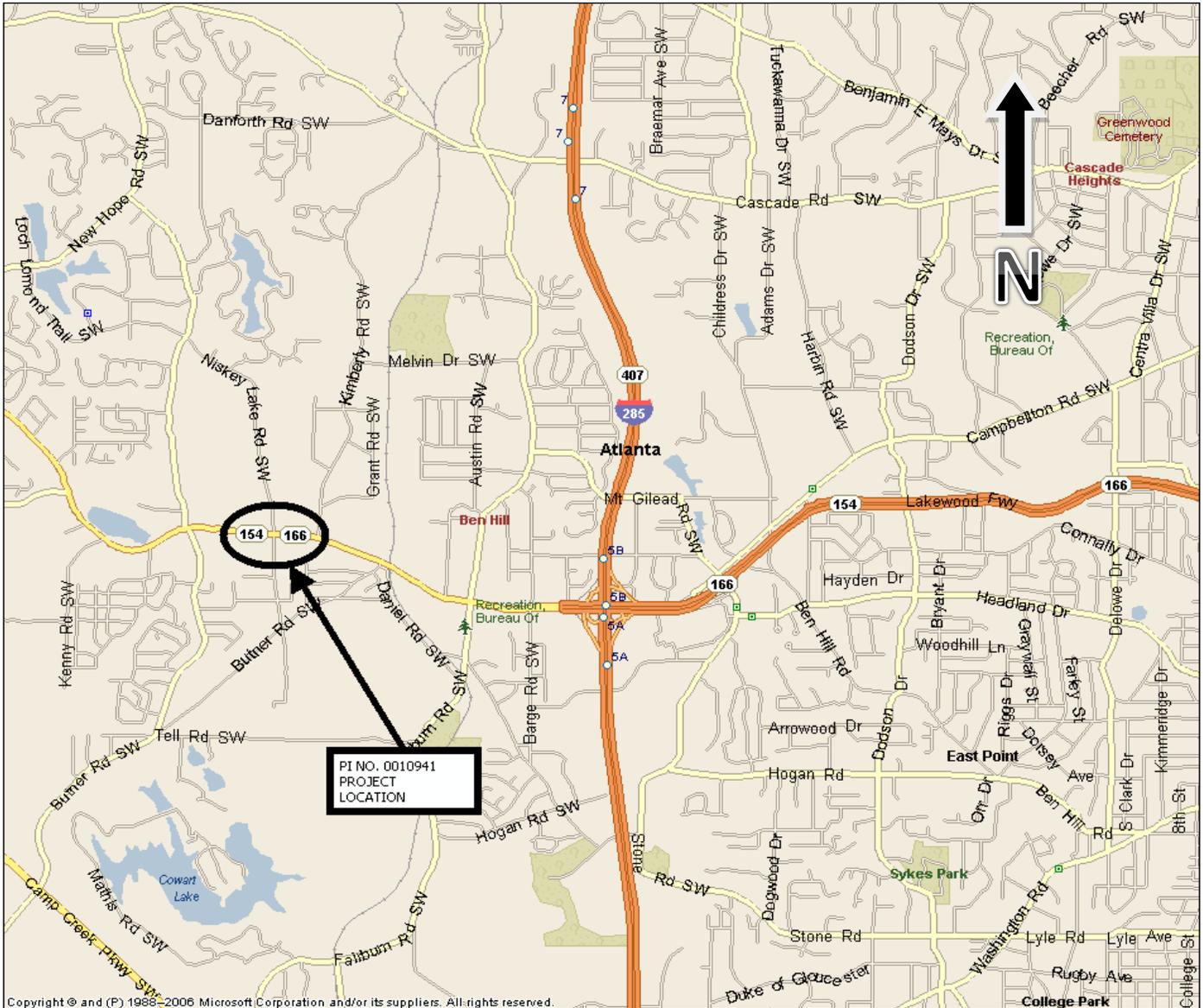
**DISTRIBUTION:**

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Richard Cobb, Statewide Location Bureau  
Andy Casey, State Roadway Design Engineer  
Attn: Mac Cranford, Design Group Manager  
Rachel Brown, District Engineer  
Scott Lee, District Preconstruction Engineer  
Patrick Allen, District Utilities Engineer  
Peter Emmanuel, Project Manager  
BOARD MEMBER - 5th Congressional District



County: Fulton

### PROJECT LOCATION



**SR 154/166 Campbellton Rd at CR 472/Niskey Lake Rd  
Intersection Improvement  
PI No. 0010941  
Fulton County**

## PLANNING & BACKGROUND DATA

### Project Justification Statement:

State Route (SR) 154/SR 166/Campbellton Road at Niskey Lake Road in Fulton County was identified for intersection improvements. The proposed project is part of the GDOT Operational Improvement Lump Sum Program from the Office of Traffic Operations. This proposed project was presented to and approved by the Operational Improvement Committee as a QUICK project.

SR 154/SR 166 is an urban minor arterial that connects downtown Atlanta to the residential communities in the western suburban and rural areas. At the intersection, SR 154/166 is a 40 mph east-west two lane, two-way undivided roadway with no turn lanes. Niskey Lake Road is a 35 mph urban local road that serves the residential areas north and south of SR 166 and SR 154. At the intersection, Niskey Lake Rd is a north-south two lane, two-way undivided roadway with no turn lanes. The intersection is currently signalized with no protected phases. The project limits should not extend more than 1000 feet from the center of the intersection for all of the approaches.

District 7 Traffic Operations staff provided a summary of a capacity analysis capturing the intersection operations. Field observation and analysis showed an unacceptable intersection performance at LOS F for the 2011 existing and 2031 future year with the existing configuration. There are also extensive queues that form eastbound and westbound along SR 166/154 during the peak hour periods due to high volumes of commuter traffic and the lack of turn lanes for left turning vehicles. The project proposes minor improvements to install turn lanes on the main street approaches to improve capacity and operation through this routine bottleneck. The improved operational function at this intersection will relieve the traffic congestion during the peak hour periods.

The project lies within the boundaries of the Atlanta Regional Commission (ARC), Atlanta's Metropolitan Planning Organization (MPO). As an operational improvement project, this project is categorized under the "operational improvement lump sum category" in the MPO's RTP or TIP.

### Description of the proposed project:

This project proposes to improve the operational efficiency of the intersection, by widening symmetrically to add left turn lanes on SR 154/166. The turn bays will be 250' long with 100' entry tapers. The existing traffic signal will be upgraded to accommodate the new lane configuration.

**Federal Oversight:**     Exempt     State Funded     Other

**MPO:** Atlanta Regional Commission (ARC)

MPO Project ID: N/A

**Regional Commission:** Atlanta Regional Commission

RC Project ID: N/A

**Congressional District(s):** 5

**Projected Traffic:** AADT

Current Year (2013): 18,340 Open Year (2015): 18,523 Design Year (2025): 19,450

Traffic Projections Performed by: District 7 Traffic Operations

**Functional Classification (Mainline):** Urban Minor Arterial Street

**Is this a 3R (Resurfacing, Restoration, & Rehabilitation) Project?**  No  Yes

**Will Context Sensitive Solutions procedures be utilized?**  No  Yes

**DESIGN AND STRUCTURAL DATA - Design Features: SR 154/166/Campbellton Rd**

Feature	Existing	Standard*	Proposed
<b>Typical Section</b>			
- Number of Lanes	2	2	2-3
- Lane Width(s)	12'	12'	12'
- Outside Shoulder Width & Type	Varies	8' Rural	8'Rural
- Outside Shoulder Slope	Varies	6%	6%
- Auxiliary Lanes	N/A	12'	12'
Posted Speed	40 MPH		40 MPH
Design Speed	45 MPH	45 MPH	45 MPH
Min Horizontal Curve Radius	N/A	N/A	N/A
Max. Superelevation Rate	2%	6%	2%
Max. Grade	2%	7%	2%
Access Control	Permit	Permit	Permit
Right-of-Way Width	50'	N/A	70'
Maximum Grade – Crossroad	4%	7%	4%
Design Vehicle	N/A	WB-40	WB-40

\*According to current GDOT design policy if applicable

**Major Structures:** N/A

**Major Interchanges/Intersections:** SR 154/166/Campbellton Rd@ Niskey Lake Rd

**Utility Involvements:**

- Atlanta Gas Light
- BellSouth Telecommunications
- City of Atlanta Watershed Management & Sewer
- Comcast of Georgia
- Fulton County
- Georgia Power

County: Fulton

Lighting required:  No  Yes

Public Interest Determination Policy and Procedure recommended (Utilities)?  No  Yes

SUE Required:  No  Yes

Railroad Involvement: N/A

**Complete Streets - Bicycle, Pedestrian, and/or Transit Warrants:**

Warrants met:  None  Bicycle  Pedestrian  Transit

Right-of-Way (ROW): Existing width: 50ft Proposed width: 70ft

Required Right-of-Way anticipated:  No  Yes  Undetermined  
Easements anticipated:  None  Temporary  Permanent  Utility  Other

Anticipated number of impacted parcels:	16
Displacements anticipated:	Total: 0
	Businesses: 0
	Residences: 0
	Other: 0

Transportation Management Plan [TMP] Required:  No  Yes  
If Yes: Project classified as:  Non-Significant  Significant  
TMP Components Anticipated:  TTC/SP150  TO  PI

Design Exceptions to FHWA/AASHTO controlling criteria anticipated: None

Design Variances to GDOT Standard Criteria anticipated: None

**ENVIRONMENTAL DATA**

**Anticipated Environmental Document:**

GEPA:  NEPA:  CE  PCE

**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

MS4 Compliance – Is the project located in an MS4 area?  No  Yes

**Environmental Permits/Variances/Commitments/Coordination anticipated:** NPDES Permit for over 1 acre of disturbance

**NEPA/GEPA:** A Categorical Exclusion (CE) is anticipated

**Ecology:** To Be Determined – No adverse impacts anticipated.

**History:** To Be Determined – No adverse impacts anticipated.

**Archeology:** To Be Determined – No adverse impacts anticipated.

**Air & Noise:** To Be Determined – No adverse impacts anticipated.

**Public Involvement:** None

**PROJECT RESPONSIBILITIES**

**Project Activities:**

<b>Project Activity</b>	<b>Party Responsible for Performing Task(s)</b>
Concept Development	<i>GDOT</i>
Design	<i>GDOT</i>
Right-of-Way Acquisition	<i>GDOT</i>
Utility Relocation	<i>Utility Companies</i>
Letting to Contract	<i>GDOT</i>
Construction Supervision	<i>GDOT</i>
Providing Material Pits	<i>Contractor</i>
Providing Detours	<i>None</i>
Environmental Studies, Documents, and Permits	<i>GDOT</i>
Environmental Mitigation	<i>GDOT</i>
Construction Inspection & Materials Testing	<i>GDOT</i>

**Other projects in the area:** None

**Other coordination to date:** None

**Project Cost Estimate and Funding Responsibilities:**

	<b>Breakdown of PE</b>	<b>ROW</b>	<b>Reimbursable Utility</b>	<b>CST*</b>	<b>Environmental Mitigation</b>	<b>Total Cost</b>
By Whom	GDOT	GDOT	N/A	GDOT	N/A	
\$ Amount	\$400,000.00	\$542,000.00	\$0.00	\$635,124.73	N/A	\$1,577,124.73
Date of Estimate	6/5/2012	8/22/2013	9/27/2013	9/29/2014	N/A	

\*CST Cost includes: Construction, Engineering and Inspection, and Liquid AC Cost Adjustment.

**ALTERNATIVES**

<b>Preferred Alternative: <i>Left Turn Lanes</i></b>			
<b>Estimated Property Impacts:</b>	<b>16</b>	<b>Estimated Total Cost:</b>	<b>\$1,577,124.73</b>
<b>Estimated ROW Cost:</b>	<b>\$542,000.00</b>	<b>Estimated CST Time:</b>	<b>12 months</b>
<b>Rationale: <i>The adding of turning lanes will improve the operational efficiency of the intersection.</i></b>			

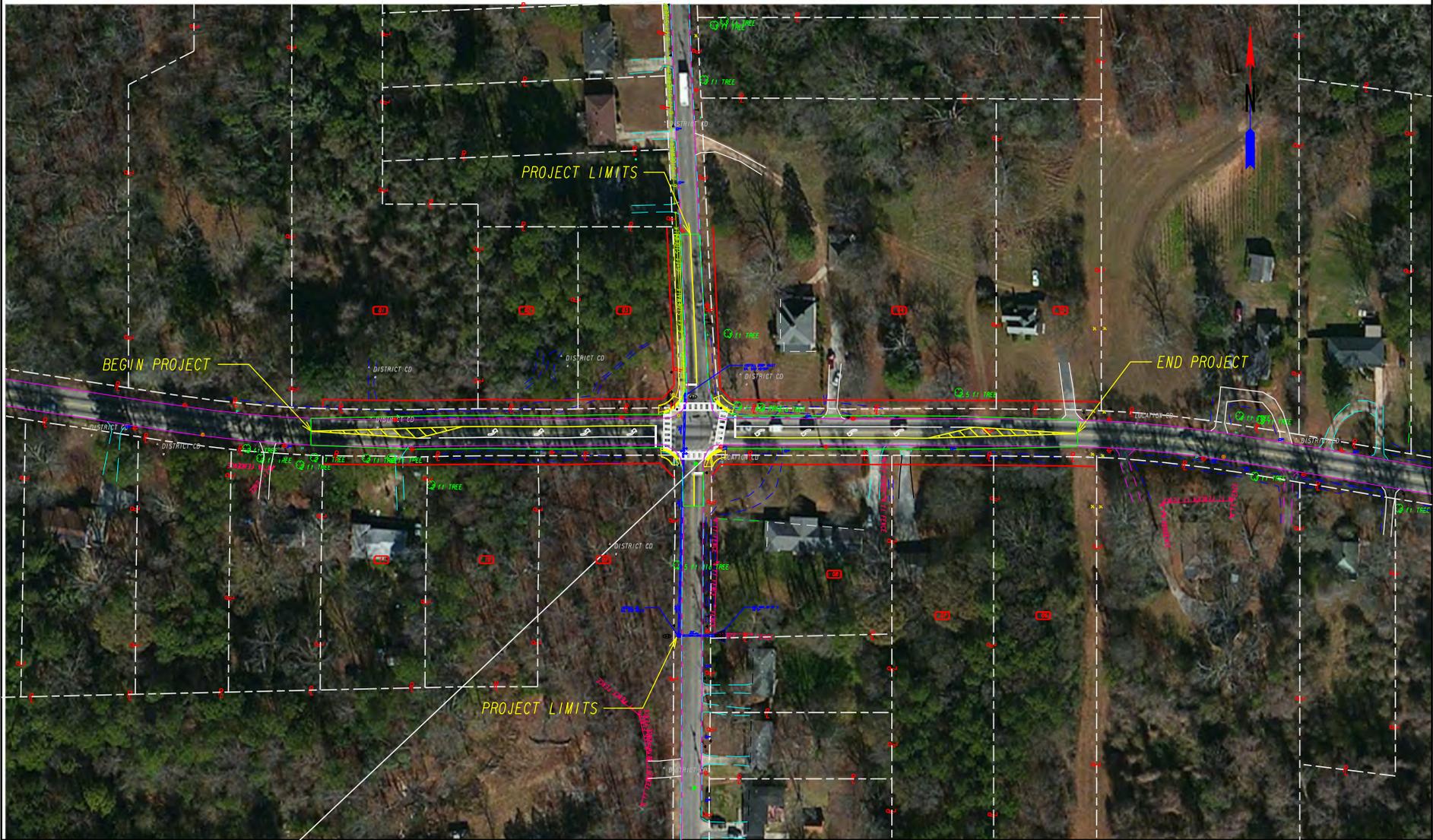
<b>No-Build Alternative: <i>No Build</i></b>			
<b>Estimated Property Impacts:</b>	<b>0</b>	<b>Estimated Total Cost:</b>	<b>\$0</b>
<b>Estimated ROW Cost:</b>	<b>\$0</b>	<b>Estimated CST Time:</b>	<b>0</b>
<b>Rationale: <i>The No-Build alternative is not recommended for this project. The No-Build alternative will not improve the operation of the intersection and will continue to cause long queue lengths.</i></b>			

<b>Alternative 1: <i>Single Lane Roundabout</i></b>			
<b>Estimated Property Impacts:</b>	<b>15</b>	<b>Estimated Total Cost:</b>	<b>\$2,520,000.00</b>
<b>Estimated ROW Cost:</b>	<b>\$1,200,000.00</b>	<b>Estimated CST Time:</b>	<b>12 months</b>
<b>Rationale: <i>The traffic volume was at the upper threshold for a single lane roundabout and the potential cost of right of way required to do the right of way exceeds the budget of the project. Also, given that this quick operational improvement project, the project manager wants to proceed forward with the turn lane option, since it works just as well as single lane roundabout.</i></b>			

**Comments/additional information:** N/A

**Attachments:**

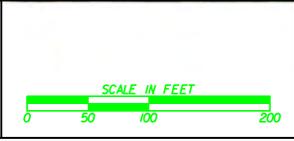
1. Concept Layout
2. Typical Sections
3. Cost Estimates
4. Crash Summary
5. Peak Hour Traffic Volumes
6. TE Study
7. HSM Analysis
8. GDOT Roundabout Analysis Spreadsheet



PROPERTY AND EXISTING R/W LINE  
 REQUIRED R/W LINE  
 CONSTRUCTION LIMITS  
 EASEMENT FOR CONSTR  
 & MAINTENANCE OF SLOPES  
 EASEMENT FOR CONSTR OF SLOPES  
 EASEMENT FOR CONSTR OF DRIVES

-e- BEGIN LIMIT OF ACCESS.....BLA  
 -e- END LIMIT OF ACCESS.....ELA  
 -e- LIMIT OF ACCESS  
 -e- REQ'D R/W & LIMIT OF ACCESS

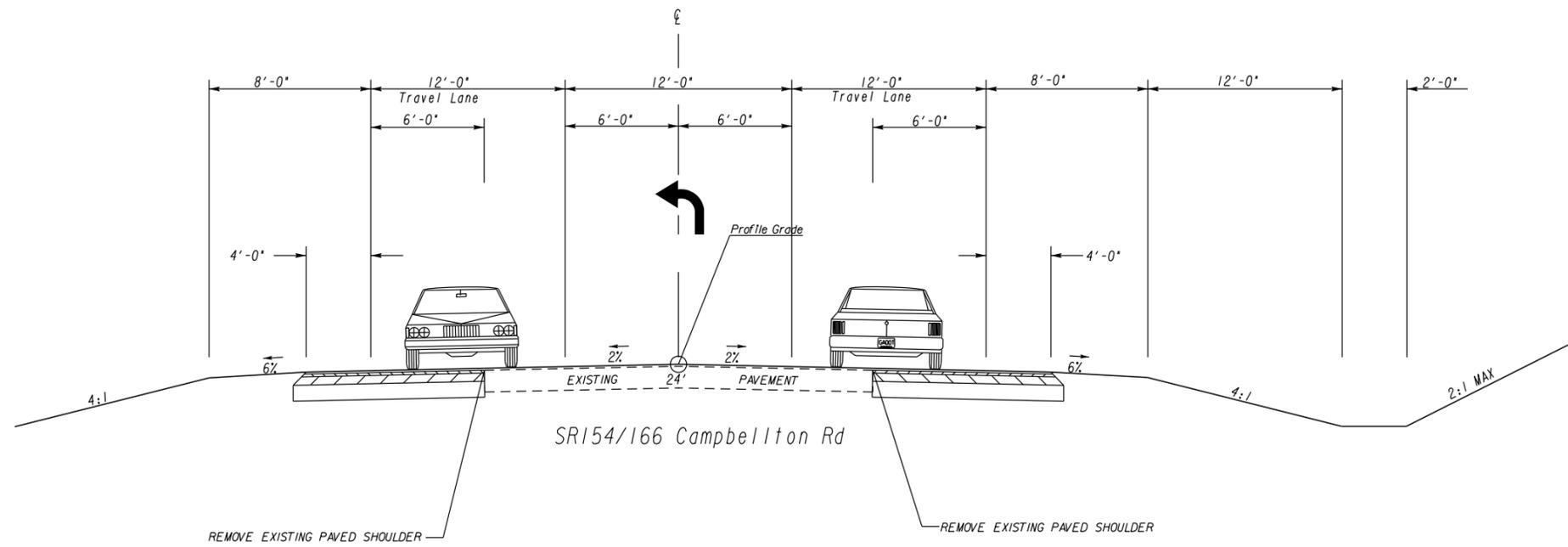
**GEORGIA**  
 DEPARTMENT  
 OF  
 TRANSPORTATION



REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE: DISTRICT 7 ROAD DESIGN  
**MAINLINE PLAN**  
 SR 154/166/CAMPBELLTON RD  
 AT CR 472/NISKEY LAKE RD

DRAWING No. **13-001**



**GEORGIA**  
DEPARTMENT  
OF  
TRANSPORTATION

NOT TO SCALE

REVISION DATES	

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: DISTRICT 7 ROAD DESIGN  
**TYPICAL SECTIONS**  
SR 154/166/CAMPBELLTON RD  
AT CR 472/NISKEY LAKE RD

DRAWING No.  
**05-001**

# DETAILED COST ESTIMATE



**Job: 0010941\_CK DRFT**

JOB NUMBER 0010941\_CK DRFT

FED/STATE PROJECT NUMBER

SPEC YEAR: 01

DESCRIPTION: SR 154/166 @ CR 472/NISKEY LAKE RD

ITEMS FOR JOB 0010941\_CK DRFT

**0010 - ROADWAY**

ine Num	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0025	150-1000	1.000	LS	\$75,000.00	TRAFFIC CONTROL - PI NO. 0010941	\$75,000.00
0030	210-0100	1.000	LS	\$75,000.00	GRADING COMPLETE - PI NO. 0010941	\$75,000.00
0035	310-1101	842.000	TN	\$26.24	GR AGGR BASE CRS, INCL MATL	\$22,090.98
0038	318-3000	100.000	TN	\$23.26	AGGR SURF CRS	\$2,326.35
0245	402-1812	100.000	TN	\$94.09	RECYL AC LEVELING, INC BM&HL	\$9,409.10
0039	402-3121	600.000	TN	\$81.45	RECYL AC 25MM SP, GP1/2, BM&HL	\$48,871.72
0040	402-3130	350.000	TN	\$110.74	RECYL AC 12.5MM SP, GP2, BM&HL	\$38,758.64
0045	402-3190	400.000	TN	\$86.93	RECYL AC 19 MM SP, GP 1 OR 2 , INC BM&HL	\$34,773.43
0050	413-1000	660.000	GL	\$4.09	BITUM TACK COAT	\$2,700.37
0059	432-5010	3683.000	SY	\$4.27	MILL ASPH CONC PVMT, VARB DEPTH	\$15,733.70
0070	441-0016	8.000	SY	\$44.17	DRIVEWAY CONCRETE, 6 IN TK	\$353.40
0065	441-0104	67.000	SY	\$50.54	CONC SIDEWALK, 4 IN	\$3,386.23
0069	441-0108	20.000	SY	\$64.10	CONC SIDEWALK, 8 IN	\$1,281.93
0075	441-5002	400.000	LF	\$14.25	CONC HEADER CURB, 6", TP 2	\$5,700.46
0080	446-1100	1200.000	LF	\$6.10	PVMT REF FAB STRIPS, TP2, 18 INCH WIDTH	\$7,321.42
0085	500-9999	100.000	CY	\$183.94	CL B CONC, BASE OR PVMT WIDEN	\$18,393.59
0240	611-8055	3.000	EA	\$1,600.00	ADJUST MINOR STRUCT TO GRADE	\$4,800.00
0095	634-1200	12.000	EA	\$118.97	RIGHT OF WAY MARKERS	\$1,427.59
0230	643-8200	1060.000	LF	\$1.29	BARRIER FENCE (ORANGE), 4 FT	\$1,365.11
<b>SUBTOTAL FOR ROADWAY:</b>						<b>\$368,694.02</b>

**0020 - EROSION**

ine Num	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0155	163-0232	2.000	AC	\$103.50	TEMPORARY GRASSING	\$207.01
0160	163-0240	15.000	TN	\$313.43	MULCH	\$4,701.40
0195	163-0550	1.000	EA	\$140.51	CONS & REM INLET SEDIMENT TRAP	\$140.51
0165	165-0030	1125.000	LF	\$0.79	MAINT OF TEMP SILT FENCE, TP C	\$888.76
0225	165-0101	12.000	EA	\$658.87	MAINT OF CONST EXIT	\$7,906.50
0200	165-0105	1.000	EA	\$62.70	MAINT OF INLET SEDIMENT TRAP	\$62.70
0170	171-0030	2250.000	LF	\$2.92	TEMPORARY SILT FENCE, TYPE C	\$6,576.80
0175	603-2180	47.000	SY	\$38.48	STN DUMPED RIP RAP, TP 3, 12"	\$1,808.63
0180	700-6910	3.000	AC	\$901.36	PERMANENT GRASSING	\$2,704.07
0185	700-7000	9.000	TN	\$92.97	AGRICULTURAL LIME	\$836.71
0235	700-8000	9.000	TN	\$613.19	FERTILIZER MIXED GRADE	\$5,518.75
0190	700-8100	450.000	LB	\$2.53	FERTILIZER NITROGEN CONTENT	\$1,137.56
<b>SUBTOTAL FOR EROSION:</b>						<b>\$32,489.40</b>

**0030 - DRAINAGE**

ine Num	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0210	550-1180	150.000	LF	\$42.98	STM DR PIPE 18", H 1-10	\$6,446.49
0215	550-2180	50.000	LF	\$35.33	SIDE DR PIPE 18", H 1-10	\$1,766.46
0090	550-4118	1.000	EA	\$505.73	FLARED END SECT 18 IN, SIDE DR	\$505.73
0219	668-2100	1.000	EA	\$2,167.93	DROP INLET, GP 1	\$2,167.93
0255	668-2110	24.000	LF	\$176.16	DROP INLET, GP 1, ADDL DEPTH	\$4,227.76
<b>SUBTOTAL FOR DRAINAGE:</b>						<b>\$15,114.37</b>

# DETAILED COST ESTIMATE



**Job: 0010941\_CK DRFT**

**0050 - SIGNING & MARKING**

Line Numb	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0100	636-1020	100.000	SF	\$14.70	HWY SGN,TP1MAT,REFL SH TP3	\$1,469.89
0105	636-2070	195.000	LF	\$8.20	GALV STEEL POSTS, TP 7	\$1,599.19
0250	639-5000	4.000	EA	\$6,417.04	PRESTRESSED CONC STR POLE, TP- IV	\$25,668.17
0110	647-1000	1.000	LS	\$75,000.00	TRAF SIGNAL INSTALLATION NO - 1	\$75,000.00
0115	653-0120	8.000	EA	\$77.46	THERM PVMT MARK, ARROW, TP 2	\$619.71
0120	653-1501	4140.000	LF	\$0.55	THERMO SOLID TRAF ST 5 IN, WHI	\$2,290.58
0125	653-1704	75.000	LF	\$6.44	THERM SOLID TRAF STRIPE,24",WH	\$482.81
0130	653-1804	620.000	LF	\$2.24	THERM SOLID TRAF STRIPE, 8",WH	\$1,389.76
0135	653-2502	1.000	LM	\$1,509.16	THERMO SOLID TRAF ST, 5 IN YE	\$1,509.16
0140	653-6006	202.000	SY	\$3.94	THERM TRAF STRIPING, YELLOW	\$795.13
0145	654-1001	150.000	EA	\$3.84	RAISED PVMT MARKERS TP 1	\$576.57
0150	654-1003	75.000	EA	\$3.91	RAISED PVMT MARKERS TP 3	\$293.07
<b>SUBTOTAL FOR SIGNING &amp; MARKING:</b>						<b>\$111,694.04</b>

**TOTALS FOR JOB 0010941\_CK DRFT**

<b>ITEMS COST:</b>	<b>\$527,991.83</b>
<b>COST GROUP COST:</b>	<b>\$0.00</b>
<b>ESTIMATED COST:</b>	<b>\$527,991.83</b>
<b>CONTINGENCY PERCENT:</b>	<b>0.10</b>
<b>ENGINEERING AND INSPECTION:</b>	<b>0.05</b>
<b>ESTIMATED COST WITH CONTINGENCY AND E&amp;I:</b>	<b>\$607,190.60</b>

PROJ. NO. [REDACTED]  
P.I. NO. 0010941  
DATE 9/29/2014

CALL NO.

INDEX (TYPE)	DATE	INDEX
REG. UNLEADED	Sep-14	\$ 3.335
DIESEL		\$ 3.765
LIQUID AC		\$ 618.00

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)				<b>26883</b>	\$	<b>26,883.00</b>
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	988.80		
Monthly Asphalt Cement Price month project let (APL)			\$	618.00		
Total Monthly Tonnage of asphalt cement (TMT)				72.5		

ASPHALT	Tons	%AC	AC ton
Leveling	100	5.0%	5
12.5 OGFC		5.0%	0
12.5 mm	350	5.0%	17.5
9.5 mm SP		5.0%	0
25 mm SP	600	5.0%	30
19 mm SP	400	5.0%	20
	<b>1450</b>		<b>72.5</b>

**BITUMINOUS TACK COAT**

Price Adjustment (PA)			\$	<b>1,051.13</b>	\$	<b>1,051.13</b>
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	988.80		
Monthly Asphalt Cement Price month project let (APL)			\$	618.00		
Total Monthly Tonnage of asphalt cement (TMT)				2.834766609		

Bitum Tack	Gals	gals/ton	tons
	660	232.8234	2.83476661

**BITUMINOUS TACK COAT (surface treatment)**

Price Adjustment (PA)				<b>0</b>	\$	<b>-</b>
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	988.80		
Monthly Asphalt Cement Price month project let (APL)			\$	618.00		
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** \$ **27,934.13**

GEORGIA DEPARTMENT OF TRANSPORTATION  
PRELIMINARY ROW COST ESTIMATE SUMMARY

Date: 8/22/2013 Project: 0010941  
 Revised: County: Fulton  
 PI: 0010941

Description: SR 154 /166@CR 472/Niskey Lake Rd  
 Project Termini: SR 154 /166@CR 472/Niskey Lake Rd

Existing ROW: Varies  
 Required ROW: Varies  
 Parcels: 16

Land and Improvements \_\_\_\_\_ \$216,825.00

Proximity Damage	\$0.00
Consequential Damage	\$0.00
Cost to Cures	\$0.00
Trade Fixtures	\$0.00
Improvements	\$75,000.00

Valuation Services \_\_\_\_\_ \$20,000.00

Legal Services \_\_\_\_\_ \$123,300.00

Relocation \_\_\_\_\_ \$32,000.00

Demolition \_\_\_\_\_ \$0.00

Administrative \_\_\_\_\_ \$149,500.00

TOTAL ESTIMATED COSTS \_\_\_\_\_ \$541,625.00

**TOTAL ESTIMATED COSTS (ROUNDED) \_\_\_\_\_ \$542,000.00**

Preparation Credits	Hours	Signature

Prepared By: Dashone Alexander CG#: 286999 08/22/2013(E)  
 Approved By: Dashone Alexander CG#: 286999 08/22/2013(E)

**NOTE: No Market Appreciation is included in this Preliminary Cost Estimate**



### Crash Summary for SR 154/166 Campbellton Rd @ CR 472/Niskey Lake Rd

AccidentNo	AccidentNumber	Date	Time	County	Route	Milelog	IntersectingRoute	Injuries	Fatalities	MannerOfCollision	LocationOfImpact	FirstHarmfulEvent	Light	Surface	DirVeh1	DirVeh2	MnvrVeh1	MnvrVeh2	MicrofilmNo	LatDecimal	LongDecimal	
2280975	2280975	1/29/2010	7:20 PM	FULTON	CAMPBELLTON RD SW	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Wet	East	East	Straight	Straight	A0190140	33.695625	-84.527854	
3463091	3463091	3/3/2010	6:40 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Dry	Southeast	Southeast	Straight	Stopped	A0900434	33.695568	-84.527728	
3485777	3485777	4/18/2010	2:00 AM	FULTON	NISKEY LAKE RD	0	CAMPBELLTON RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Dry	East	East	Straight	Straight	A1350467	33.695568	-84.527728	
3514542	3514542	5/15/2010	2:17 PM	FULTON	CAMPBELLTON RD SW	0	NISKEY LAKE RD	1	0	Not A Collision with Motor Vehicle	On Shoulder	Utility Pole	Daylight	Dry	Southeast		Straight		A1730185	33.748313	-84.39111	
3540349	3540349	7/31/2010	2:50 PM	FULTON	CAMPBELLTON RD SW	0	NISKEY LAKE ROAD SW	5	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	Southeast	Southeast	Straight	Straight	A2640266	33.69556	-84.527853	
3699281	3699281	8/17/2010	7:09 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	1	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	East	East	Straight	Straight	A3330414	33.695568	-84.527728	
3556292	3556292	9/1/2010	6:30 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	East	East	Straight	Straight	A2880283	33.695568	-84.527728	
3727706	3727706	10/26/2010	8:50 AM	FULTON	NISKEY LAKE RD SW	0	CAMPBELLTON RD	1	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	East	East	Straight	Stopped	A3520229	33.748313	-84.39111	
3734602	3734602	11/25/2010	6:18 PM	FULTON	NISKEY LAKE RD	0	CAMPBELLTON RD	0	0	Rear End		Motor Vehicle In Motion	Dusk	Dry	None	West		Stopped	A3720365	33.748313	-84.39111	
3655776	3655776	3/4/2011	12:08 PM	FULTON	CAMPBELLTON RD SW	0	NISKEY LAKE RD	1	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	West	West	Straight	Straight	80760512	33.695625	-84.527854	
3882475	3882475	9/15/2011	5:50 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	1	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	West	West	Straight	Straight	82760096	33.695572	-84.52784	
3911082	3911082	10/19/2011	4:54 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	West	West	Stopped	Stopped	83060677	33.695572	-84.52784	
3935075	3935075	10/31/2011	6:10 AM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Head On	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Dry	East		Straight		83330783	33.695572	-84.52784	
3966506	3966506	12/29/2011	7:39 PM	FULTON	NISKEY LAKE RD	0	CAMPBELLTON RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Dry	East	East	Straight	Stopped	C0060917	33.695572	-84.52784	
4022015	4022015	2/12/2012	7:52 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Dry	West	East	Straight	Stopped	C0600651	33.695573	-84.52784	
4047343	4047343	3/9/2012	11:20 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	1	0	Rear End	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Dry	West	West	Straight	Straight	C0891017	33.69557	-84.52784	
4077029	4077029	4/13/2012	4:30 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	1	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	East	East	Straight	Straight	C1181327	33.69557	-84.52784	
4093445	4093445	4/18/2012	8:15 AM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway		Daylight	Dry	East	None	Straight	Stopped	C1291309	33.694641	-84.526947	
4107410	4107410	4/30/2012	9:17 AM	FULTON	NISKEY LAKE RD	0	CAMPBELLTON RD	0	0	Sideswipe-Opposite Direction	On Roadway	Motor Vehicle In Motion	Daylight	Dry	North	South	Straight	Straight	C1291435	33.697502	-84.526787	
4200136	4200136	9/11/2012	2:20 PM	FULTON	NISKEY LAKE RD SW	0	CAMPBELLTON RD	4	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	West	West	Straight	Straight		33.695571	-84.527838	
4284245	4284245	11/17/2012	3:40 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Angle	Off Roadway	Motor Vehicle In Motion	Daylight	Dry	West		Straight			-1	-1	
4298672	4298672	12/12/2012	8:40 AM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	1	0	Not A Collision with Motor Vehicle	On Roadway	Pedestrian	Daylight	Dry	East		Straight			33.695573	-84.52784	
4302500	4302500	12/18/2012	10:00 AM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	West	West	Straight	Straight		33.695573	-84.52784	
4315350	4315350	12/24/2012	8:15 AM	FULTON	NISKEY LAKE RD SW	0	CAMPBELLTON RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Dry	West	South	Straight	Straight		-1	-1	
4370493	4370493	2/28/2013	8:45 AM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	2	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	East	East	Straight	Stopped		33.695573	-84.52784	
4395835	4395835	3/23/2013	6:00 PM	FULTON	CAMPBELLTON RD SW	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	South	South	Straight	Stopped		-1	-1	
4397795	4397795	3/27/2013	5:51 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	East	East	Straight	Straight		33.695573	-84.52784	
4424110	4424110	4/18/2013	4:14 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	East	East	Straight	Straight		33.695573	-84.52784	
4437298	4437298	5/7/2013	4:30 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	East	East	Straight	Stopped		33.695573	-84.52784	
4521791	4521791	7/22/2013	2:00 PM	FULTON	CAMPBELLTON RD SW	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion	Daylight	Dry	West	West	Straight	Straight		-1	-1	
4523797	4523797	7/23/2013	8:33 AM	FULTON	CAMPBELLTON RD SW	0	NISKEY LAKE RD	0	0	Rear End		Motor Vehicle In Motion	Daylight	Dry							-1	-1
4621706	4621706	10/20/2013	8:54 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	0	0	Rear End	On Roadway	Motor Vehicle In Motion - In Other Roadway	Dark-Not Lighted	Dry	East	None	Straight			33.695583	-84.527858	
4627920	4627920	10/25/2013	2:56 PM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	2	0	Angle	On Roadway	Motor Vehicle In Motion	Daylight	Dry	North	West	Turning Left	Straight		33.695583	-84.527858	
4690547	4690547	12/27/2013	1:51 AM	FULTON	CAMPBELLTON RD	0	NISKEY LAKE RD	1	0	Head On	On Roadway	Motor Vehicle In Motion	Dark-Lighted	Dry	East	West	Straight	Straight		-1	-1	

# Georgia Department of Transportation

5025 New Peachtree Road  
Chamblee, Georgia 30341  
SR 166 @ Boat Rock Rd

Default Comments  
Change These in The Preferences Window  
Select File/Preference in the Main Scree  
Then Click the Comments Tab

File Name : Niskey Lake Rd @ SR 166  
Site Code : 00000000  
Start Date : 12/16/2010  
Page No : 1

Groups Printed- Unshifted - Bank 1

Start Time	NISKEY LAKE RD From North					SR 166 From East					NISKEY LAKE RD From South					SR 166 From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:15 AM	0	0	2	0	2	1	34	1	0	36	0	0	0	0	0	0	64	0	0	64	102
06:30 AM	0	0	5	0	5	1	30	0	0	31	1	0	1	0	2	1	90	0	0	91	129
06:45 AM	0	0	3	0	3	2	29	0	0	31	2	0	1	0	3	2	102	0	0	104	141
<b>Total</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>10</b>	<b>4</b>	<b>93</b>	<b>1</b>	<b>0</b>	<b>98</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>5</b>	<b>3</b>	<b>256</b>	<b>0</b>	<b>0</b>	<b>259</b>	<b>372</b>
07:00 AM	0	0	5	0	5	4	41	0	0	45	1	0	0	0	1	0	125	0	0	125	176
07:15 AM	0	0	7	0	7	3	37	0	0	40	2	0	1	0	3	0	129	0	0	129	179
07:30 AM	0	1	14	0	15	7	45	0	0	52	0	2	1	0	3	0	183	0	0	183	253
07:45 AM	1	1	18	0	20	12	64	0	0	76	5	1	1	1	8	2	161	1	0	164	268
<b>Total</b>	<b>1</b>	<b>2</b>	<b>44</b>	<b>0</b>	<b>47</b>	<b>26</b>	<b>187</b>	<b>0</b>	<b>0</b>	<b>213</b>	<b>8</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>15</b>	<b>2</b>	<b>598</b>	<b>1</b>	<b>0</b>	<b>601</b>	<b>876</b>
08:00 AM	2	0	24	0	26	18	53	1	0	72	1	4	1	0	6	0	184	2	0	186	290
08:15 AM	1	1	26	0	28	40	54	1	0	95	3	6	2	0	11	1	175	4	0	180	314
08:30 AM	4	2	49	0	55	57	66	2	0	125	4	4	1	0	9	0	158	1	0	159	348
08:45 AM	5	1	56	0	62	50	72	1	0	123	2	3	0	1	6	1	176	2	0	179	370
<b>Total</b>	<b>12</b>	<b>4</b>	<b>155</b>	<b>0</b>	<b>171</b>	<b>165</b>	<b>245</b>	<b>5</b>	<b>0</b>	<b>415</b>	<b>10</b>	<b>17</b>	<b>4</b>	<b>1</b>	<b>32</b>	<b>2</b>	<b>693</b>	<b>9</b>	<b>0</b>	<b>704</b>	<b>1322</b>
09:00 AM	3	1	27	0	31	17	59	2	0	78	7	4	0	1	12	0	158	1	0	159	280
Grand Total	16	7	236	0	259	212	584	8	0	804	28	24	9	3	64	7	1705	11	0	1723	2850
Apprch %	6.2	2.7	91.1	0		26.4	72.6	1	0		43.8	37.5	14.1	4.7		0.4	99	0.6	0		
Total %	0.6	0.2	8.3	0	9.1	7.4	20.5	0.3	0	28.2	1	0.8	0.3	0.1	2.2	0.2	59.8	0.4	0	60.5	
Unshifted	16	7	236	0	259	212	584	8	0	804	28	24	9	3	64	7	1705	11	0	1723	2850
% Unshifted	100	100	100	0	100	100	100	100	0	100	100	100	100	100	100	100	100	100	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

# Georgia Department of Transportation

5025 New Peachtree Road  
Chamblee, Georgia 30341  
SR 166 @ Boat Rock Rd

File Name : Niskey Lake Rd @ SR 166

Site Code : 00000000

Start Date : 12/16/2010

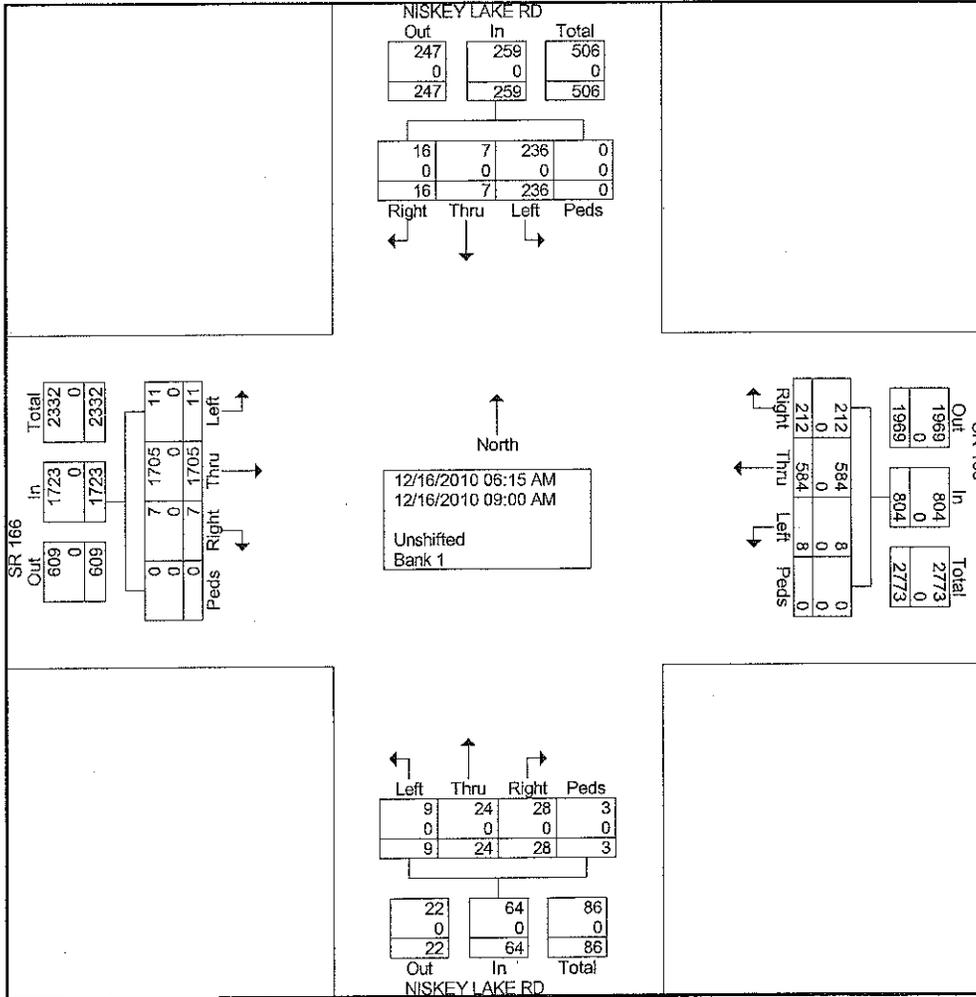
Page No : 2

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## TRAFFIC ENGINEERING REPORT

State Route 154/166/Campbellton Road

@ Nisky Lake Rd

(SR 154 MP 23.17)

*Revised(1) – 9/16/13*

*Revised(2) – 06/06/14*

*Revised (3) – 09/22/14*

### REASON FOR INVESTIGATION:

Citizen Complaints

### TOPOGRAPHY:

SR 154/166 is classified as an urban minor arterial with relatively flat terrain. Data obtained from the Department Road Information System indicated that the 2012 ADT was 18,340 vehicles. SR 154/166 is a two-lane undivided highway with a typical 2 foot paved shoulder that ties into existing grade, with no dedicated turning lanes. This intersection is 100% located in Fulton County.

Nisky Lake is an urban local street with flat terrain. The ADT for Niskey Lake Rd is estimated to be 1900 vehicles in 2010. There is 60 ft of right of way.

### VEHICLE SPEEDS:

The posted speed limit on SR 154/166 is 40 MPH.

The posted speed limit on Niskey Lake Rd is 35 MPH.

### PEDESTRIAN MOVEMENTS:

There were no pedestrians visible during the traffic counts or during any of the other site visits.

### EXISTING TRAFFIC CONTROL:

This intersection is currently operated by a Stop and Go signal.

### FUTURE PROJECTS:

There are no long-range or current projects in the area of focus at the present time.

### SIGHT DISTANCE:

Intersection sight distance is adequate according to the AASHTO standards. The results are summarized in the table below.

Intersecting Road	Arterial Speed (mph)	Existing SDL (ft.)	Required SDL (ft.)	Existing SDR (ft.)	Required SDR (ft.)
Nisky Lake Road	40	610	445	500	445

**CRASH HISTORY:**

In 2006, there were 9 crashes at this intersection, 3 of which were correctable. In 2007 there were 5 crashes at this intersection, 1 of which were correctable.

**ROUNDAABOUT ANALYSIS:**

A roundabout analysis was conducted for the intersection. The analysis considered SR 154/166 and Niskey Lake as a conceptual single-lane roundabout. The analysis projects a LOS of A for the side street and a LOS A and C for the mainline (2011). The existing intersection operates at LOS C for the side street and LOS F and C for the mainline.

The chart below shows the capacity analysis (2011) for a proposed **ROUNDAABOUT**

Approach --->	SR 166 WB	SR 166 EB	Niskey Lake NB	Niskey Lake SB
2011 LOS	A	C	A	A
2011 v/c ratio	0.43	0.84	0.08	0.23
2011 95 <sup>th</sup> queue	59 ft	299 ft	6 ft	22 ft
2031 LOS	B	F	B	A
2031 v/c ratio	0.64	1.36	0.38	0.13
2031 95 <sup>th</sup> queue	131 ft	2966 ft	11 ft	42 ft

The next chart shows the capacity analysis for the **PROPOSED SIGNALIZED INTERSECTION** (with left turn lane on SR 154/166).

Approach --->	SR 166 WB	SR 166 EB	Niskey Lake SB	Niskey Lake NB
2011 LOS	B	B	E	E
v/c ratio	0.40	.64	.22	0.64
95 <sup>th</sup> queue	317 ft	771 ft	48 ft	283 ft
2031 LOS	B	D	E	E
2031 v/c ratio	0.59	0.95	1.01	0.32
2031 95 <sup>th</sup> queue	598 ft	1909 ft	419 ft	68 ft

The next chart shows the capacity analysis for the **EXISTING** signalized intersection.

Approach --->	SR 166 WB	SR 166 EB	Niskey Lake SB	Niskey Lake NB
2010 LOS	F	C	C	B
v/c ratio	1.09	0.67	0.05	0.30
95 <sup>th</sup> queue	3150 ft	580 ft	170 ft	35 ft

**SIGNAL WARRANT ANALYSIS:**

This intersection is already signalized.

**CONCLUSIONS:**

The intersection of SR 166/Campbellton Rd and Niskey Lake Rd was studied for potential improvements. Two options were studied and the results were compared; a single-lane roundabout and a traffic signal with the addition of left turn lanes. It was field observed that the queues regularly stacked up to block upstream and downstream driveways, preventing existing subdivisions from entering or exiting SR 166. The lack of turn lanes at this intersection contribute to the long queue lengths and congestion.

The Level of Service (LOS) was used to compare the roundabout and the traffic signal for this intersection. The tables below display the LOS for each of the four intersection approaches as well as the overall LOS for the intersection. The intersection was also analyzed in the current year (2011) and the design year (2031). The LOS for the intersection for the current year (2011) was found to be C for both the roundabout and the traffic signal. While the overall intersection LOS was the same, the controlling approach (SR 166 EB) performs better with the traffic signal than the roundabout, LOS D and LOS F, respectively. The LOS for the intersection for the design year (2031) was found to be a LOS F for the roundabout and a LOS C for the signalized intersection. In addition to providing better LOS, the traffic signal will also minimize the geometric footprint of the intersection, which would prove beneficial if there are funding constraints.

The concise LOS results from the analysis on page two are included below for quick reference:

**PROPOSED ROUNDABOUT**

Approach ---->	SR 166 WB	SR 166 EB	Niskey Lake NB	Niskey Lake SB
2011 LOS	A	C	A	A
2031 LOS	B	F	B	A

**2011 LOS OVERALL = C**

**2031 LOS OVERALL = F**

**PROPOSED SIGNALIZED INTERSECTION** (with left turn lane on SR 154/166)

Approach ---->	SR 166 WB	SR 166 EB	Niskey Lake SB	Niskey Lake NB
2011 LOS	B	B	E	E
2031 LOS	B	D	E	E

**2011 LOS OVERALL = C**

**2031 LOS OVERALL = C**

**RECOMMENDATIONS:**

Option 1: An alternate recommendation is the installation of a left turn lane (300ft min.) at each approach of SR 154/166.

Option 2: It is recommended that a project be programmed to install a single lane roundabout at this location.

RECOMMENDED BY: Neil Lally DATE: 9/22/14  
District Traffic Engineer

RECOMMENDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
State Traffic Engineer

RECOMMENDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
Director of Operations

cc: file

# INTERSECTION SUMMARY

Site: SR 166 @ Niskey lake  
Proposed

SR 166/Fairburn Rd @ Niskey Lake Rd  
Roundabout

2011

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1436 veh/h	1723 pers/h
Percent Heavy Vehicles	3.0 %	
Degree of Saturation	0.838	
Practical Spare Capacity	1.4 %	
Effective Intersection Capacity	1713 veh/h	
Control Delay (Total)	6.70 veh-h/h	8.04 pers-h/h
Control Delay (Average)	16.8 sec	16.8 sec
Control Delay (Worst Lane)	24.7 sec	
Control Delay (Worst Movement)	24.7 sec	24.7 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	LOS C	
95% Back of Queue - Vehicles (Worst Lane)	11.7 veh	
95% Back of Queue - Distance (Worst Lane)	298.9 ft	
Total Effective Stops	976 veh/h	1172 pers/h
Effective Stop Rate	0.68 per veh	0.68 per pers
Proportion Queued	0.59	0.59
Performance Index	33.3	33.3
Travel Distance (Total)	528.3 veh-mi/h	633.9 pers-mi/h
Travel Distance (Average)	1942 ft	1942 ft
Travel Time (Total)	23.6 veh-h/h	28.3 pers-h/h
Travel Time (Average)	59.2 sec	59.2 sec
Travel Speed	22.4 mph	22.4 mph
Cost (Total)	433.46 \$/h	433.46 \$/h
Fuel Consumption (Total)	27.2 gal/h	
Carbon Dioxide (Total)	257.3 kg/h	
Hydrocarbons (Total)	0.423 kg/h	
Carbon Monoxide (Total)	18.08 kg/h	
NOx (Total)	0.561 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	689,217 veh/y	827,061 pers/y
Delay	3,217 veh-h/y	3,860 pers-h/y
Effective Stops	468,634 veh/y	562,361 pers/y
Travel Distance	253,560 veh-mi/y	304,272 pers-mi/y
Travel Time	11,338 veh-h/y	13,605 pers-h/y
Cost	208,062 \$/y	208,062 \$/y
Fuel Consumption	13,033 gal/y	
Carbon Dioxide	123,482 kg/y	
Hydrocarbons	203 kg/y	
Carbon Monoxide	8,680 kg/y	
NOx	269 kg/y	



# MOVEMENT SUMMARY

Site: SR 166 @ Niskey lake  
Proposed

SR 166/Fairburn Rd @ Niskey Lake Rd  
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Niskey Lake Rd											
3	L	4	3.0	0.080	9.7	LOS A	0.2	6.3	0.64	0.97	23.9
8	T	18	3.0	0.080	9.7	LOS A	0.2	6.3	0.64	0.75	25.6
18	R	11	3.0	0.080	9.7	LOS A	0.2	6.3	0.64	0.80	25.4
Approach		34	3.0	0.080	9.7	LOS A	0.2	6.3	0.64	0.80	25.3
East: SR 166/Fairburn Rd											
1	L	5	3.0	0.425	8.0	LOS A	2.3	59.2	0.18	0.85	24.3
6	T	266	3.0	0.425	8.0	LOS A	2.3	59.2	0.18	0.34	26.7
16	R	179	3.0	0.425	8.0	LOS A	2.3	59.2	0.18	0.45	26.2
Approach		451	3.0	0.425	8.0	LOS A	2.3	59.2	0.18	0.39	26.5
North: Niskey Lake Rd											
7	L	168	3.0	0.225	6.7	LOS A	0.9	22.1	0.42	0.74	24.7
4	T	4	3.0	0.225	6.7	LOS A	0.9	22.1	0.42	0.50	26.9
14	R	13	3.0	0.225	6.7	LOS A	0.9	22.1	0.42	0.57	26.5
Approach		186	3.0	0.225	6.7	LOS A	0.9	22.1	0.42	0.73	24.8
West: SR 166/Fairburn Rd											
5	L	10	3.0	0.838	24.7	LOS C	11.7	298.9	0.86	0.92	19.3
2	T	753	3.0	0.838	24.7	LOS C	11.7	298.9	0.86	0.83	19.9
12	R	2	3.0	0.838	24.7	LOS C	11.7	298.9	0.86	0.85	19.8
Approach		765	3.0	0.838	24.7	LOS C	11.7	298.9	0.86	0.83	19.9
All Vehicles		1436	3.0	0.838	16.8	LOS C	11.7	298.9	0.59	0.68	22.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

Processed: Friday, June 06, 2014 2:24:18 PM

SIDRA INTERSECTION 5.1.8.2059

Project: X:\Chris Woods\Operations\SR 166\SR 166 @ Niskey Lake\SR 166 @ Niskey Lake(2).sip

8001140, GEORGIA DEPARTMENT OF TRANSPORTATION, FLOATING

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**SIDRA**  
**INTERSECTION**

# LANE SUMMARY

Site: SR 166 @ Niskey lake  
Proposed

SR 166/Fairburn Rd @ Niskey Lake Rd  
Roundabout

Lane Use and Performance																
	Demand Flows						Deg. Satn	Lane Util	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Lane Length	SL Type	Cap. Adj.	Prob. Block
	L	T	R	Total	HV %	Cap. veh/h										
	veh/h	veh/h	veh/h	veh/h	%	veh/h	v/c	%	sec		veh	ft	ft		%	%
<b>South: Niskey Lake Rd</b>																
Lane 1	4	18	11	34	3.0	420	P	100	9.7	LOS A	0.2	6.3	1600	-	0.0	0.0
Approach	4	18	11	34	3.0		0.080		9.7	LOS A	0.2	6.3				
<b>East: SR 166/Fairburn Rd</b>																
Lane 1	5	266	179	451	3.0	1061	P	100	8.0	LOS A	2.3	59.2	1600	-	0.0	0.0
Approach	5	266	179	451	3.0		0.425		8.0	LOS A	2.3	59.2				
<b>North: Niskey Lake Rd</b>																
Lane 1	168	4	13	186	3.0	826	P	100	6.7	LOS A	0.9	22.1	1600	-	0.0	0.0
Approach	168	4	13	186	3.0		0.225		6.7	LOS A	0.9	22.1				
<b>West: SR 166/Fairburn Rd</b>																
Lane 1	10	753	2	765	3.0	913	P	100	24.7	LOS C	11.7	298.9	1600	-	0.0	0.0
Approach	10	753	2	765	3.0		0.838		24.7	LOS C	11.7	298.9				
Intersection				1436	3.0		0.838		16.8	LOS C	11.7	298.9				

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

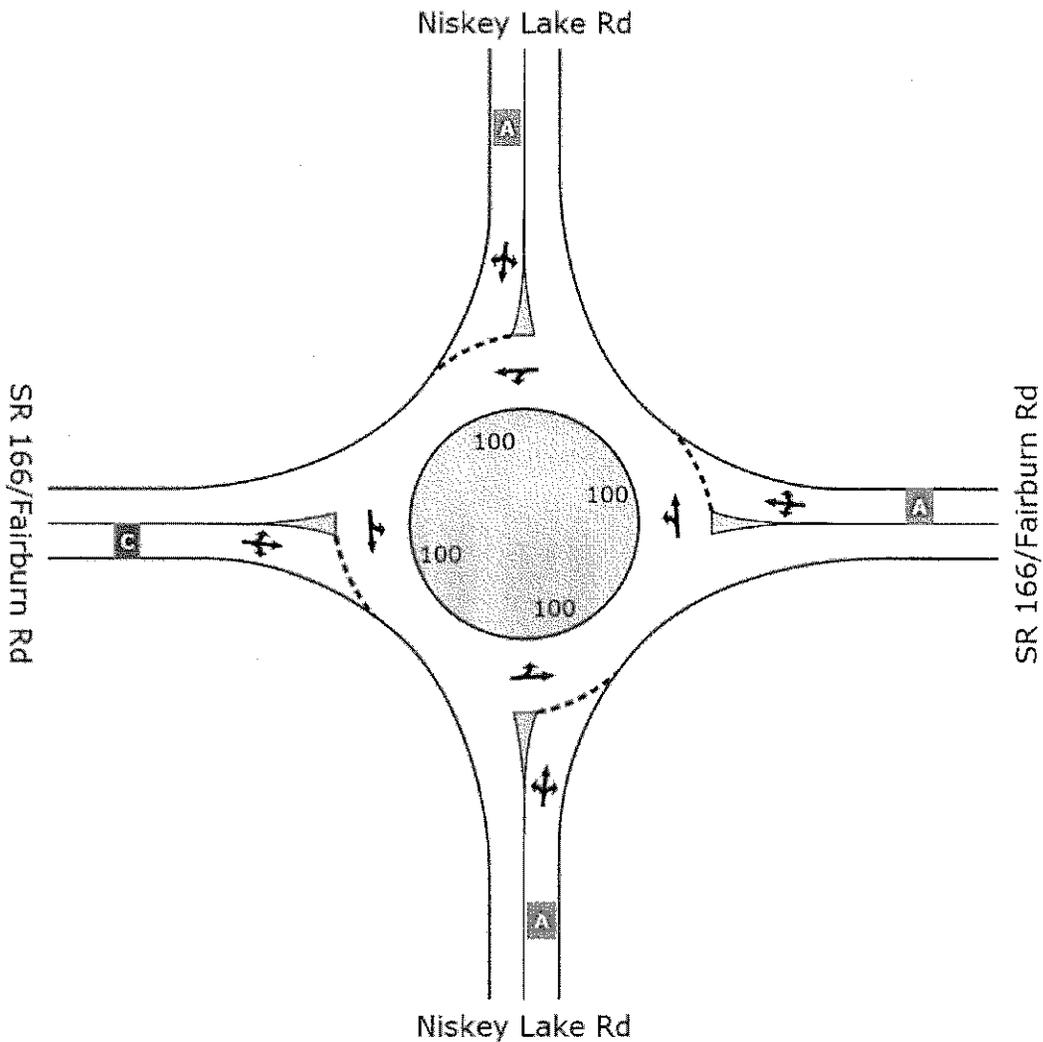
Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

# LEVEL OF SERVICE SUMMARY

Site: SR 166 @ Niskey lake  
Proposed

SR 166/Fairburn Rd @ Niskey Lake Rd  
Roundabout



	South	East	North	West	Intersection
LOS	A	A	A	C	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

# INTERSECTION SUMMARY

Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)

2011

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1436 veh/h	1723 pers/h
Percent Heavy Vehicles	3.0 %	
Degree of Saturation	0.638	
Practical Spare Capacity	41.1 %	
Effective Intersection Capacity	2251 veh/h	
Control Delay (Total)	8.47 veh-h/h	10.17 pers-h/h
Control Delay (Average)	21.2 sec	21.2 sec
Control Delay (Worst Lane)	64.3 sec	
Control Delay (Worst Movement)	64.3 sec	64.3 sec
Geometric Delay (Average)	2.1 sec	
Stop-Line Delay (Average)	21.2 sec	
Intersection Level of Service (LOS)	LOS C	
95% Back of Queue - Vehicles (Worst Lane)	30.1 veh	
95% Back of Queue - Distance (Worst Lane)	771.4 ft	
Total Effective Stops	949 veh/h	1139 pers/h
Effective Stop Rate	0.66 per veh	0.66 per pers
Proportion Queued	0.68	0.68
Performance Index	62.8	62.8
Travel Distance (Total)	518.8 veh-mi/h	622.6 pers-mi/h
Travel Distance (Average)	1908 ft	1908 ft
Travel Time (Total)	24.8 veh-h/h	29.7 pers-h/h
Travel Time (Average)	62.1 sec	62.1 sec
Travel Speed	21.0 mph	21.0 mph
Cost (Total)	437.30 \$/h	437.30 \$/h
Fuel Consumption (Total)	26.6 gal/h	
Carbon Dioxide (Total)	251.8 kg/h	
Hydrocarbons (Total)	0.413 kg/h	
Carbon Monoxide (Total)	16.53 kg/h	
NOx (Total)	0.526 kg/h	

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.  
HCM Delay Model used. Geometric Delay not included.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	689,217 veh/y	827,061 pers/y
Delay	4,067 veh-h/y	4,880 pers-h/y
Effective Stops	455,443 veh/y	546,532 pers/y
Travel Distance	249,038 veh-mi/y	298,846 pers-mi/y
Travel Time	11,884 veh-h/y	14,260 pers-h/y
Cost	209,903 \$/y	209,903 \$/y
Fuel Consumption	12,756 gal/y	
Carbon Dioxide	120,859 kg/y	
Hydrocarbons	198 kg/y	
Carbon Monoxide	7,936 kg/y	
NOx	253 kg/y	

# MOVEMENT SUMMARY

Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop Queued	Effective Stop Rate per veh	Average Speed mph	
South: Niskey Lake Rd												
3	L	4	3.0	0.222	64.3	LOS E	1.9	47.8	1.00	0.80	12.2	
8	T	18	3.0	0.222	64.3	LOS E	1.9	47.8	1.00	0.80	12.2	
18	R	11	3.0	0.222	64.3	LOS E	1.9	47.8	1.00	0.80	12.2	
Approach		34	3.0	0.222	64.3	LOS E	1.9	47.8	1.00	0.80	12.2	
East: SR 166/Fairburn Rd												
1	L	5	3.0	0.018	23.7	LOS C	0.2	5.2	0.65	0.68	19.0	
6	T	266	3.0	0.395	10.2	LOS B	12.4	316.6	0.53	0.48	26.0	
16	R	179	3.0	0.395	10.2	LOS B	12.4	316.6	0.53	0.87	24.2	
Approach		451	3.0	0.395	10.3	LOS B	12.4	316.6	0.53	0.63	25.1	
North: Niskey Lake Rd												
7	L	168	3.0	0.636	57.5	LOS E	11.0	282.5	0.99	0.82	12.8	
4	T	4	3.0	0.636	57.5	LOS E	11.0	282.5	0.99	0.81	12.8	
14	R	13	3.0	0.636	57.5	LOS E	11.0	282.5	0.99	0.82	12.8	
Approach		186	3.0	0.636	57.5	LOS E	11.0	282.5	0.99	0.82	12.8	
West: SR 166/Fairburn Rd												
5	L	10	3.0	0.019	14.7	LOS B	0.3	7.5	0.51	0.69	21.9	
2	T	753	3.0	0.638	17.0	LOS B	30.1	771.4	0.68	0.63	23.0	
12	R	2	3.0	0.638	17.0	LOS B	30.1	771.4	0.68	0.96	22.0	
Approach		765	3.0	0.638	17.0	LOS B	30.1	771.4	0.68	0.63	23.0	
All Vehicles		1436	3.0	0.638	21.2	LOS C	30.1	771.4	0.68	0.66	21.0	

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

# LANE SUMMARY

Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)

Lane Use and Performance																
	Demand Flows				HV %	Cap veh/h	Deg Satn v/c	Lane Util %	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance ft	Lane Length ft	SL Type	Cap Adj %	Prob Block %
	L veh/h	T veh/h	R veh/h	Total veh/h												
<b>South: Niskey Lake Rd</b>																
Lane 1	4	18	11	34	3.0	152	0.222	100	64.3	LOS E	1.9	47.8	1600	-	0.0	0.0
Approach	4	18	11	34	3.0		0.222		64.3	LOS E	1.9	47.8				
<b>East: SR 166/Fairburn Rd</b>																
Lane 1	5	0	0	5	3.0	294	0.018	100	23.7	LOS C	0.2	5.2	300	-	0.0	0.0
Lane 2	0	266	179	446	3.0	1129	0.395	100	10.2	LOS B	12.4	316.6	1600	-	0.0	0.0
Approach	5	266	179	451	3.0		0.395		10.3	LOS B	12.4	316.6				
<b>North: Niskey Lake Rd</b>																
Lane 1	168	4	13	186	3.0	292	0.636	100	57.5	LOS E	11.0	282.5	1600	-	0.0	0.0
Approach	168	4	13	186	3.0		0.636		57.5	LOS E	11.0	282.5				
<b>West: SR 166/Fairburn Rd</b>																
Lane 1	10	0	0	10	3.0	503	0.019	100	14.7	LOS B	0.3	7.5	300	-	0.0	0.0
Lane 2	0	753	2	755	3.0	1184	0.638	100	17.0	LOS B	30.1	771.4	1600	-	0.0	0.0
Approach	10	753	2	765	3.0		0.638		17.0	LOS B	30.1	771.4				
Intersection				1436	3.0		0.638		21.2	LOS C	30.1	771.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

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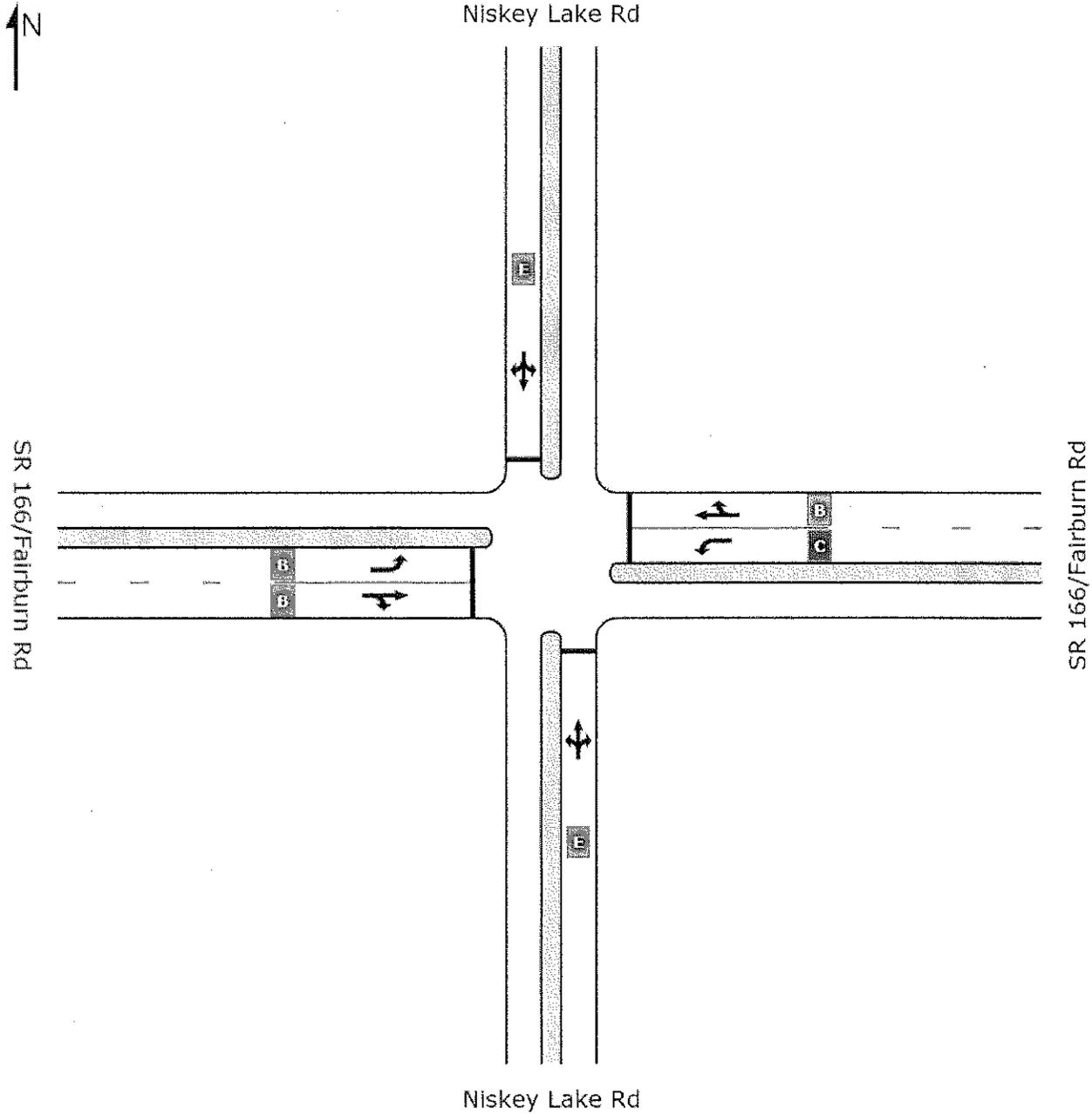
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**INTERSECTION**

# LEVEL OF SERVICE SUMMARY

Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)



	South	East	North	West	Intersection
LOS	E	B	E	B	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

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# PHASING SUMMARY

Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)

Phase times specified by the user

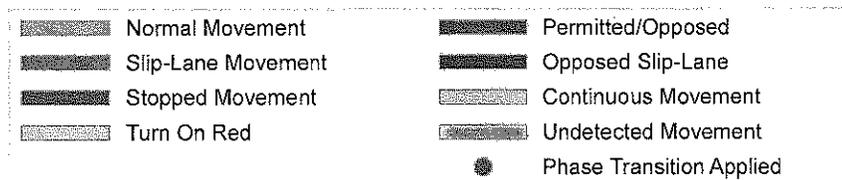
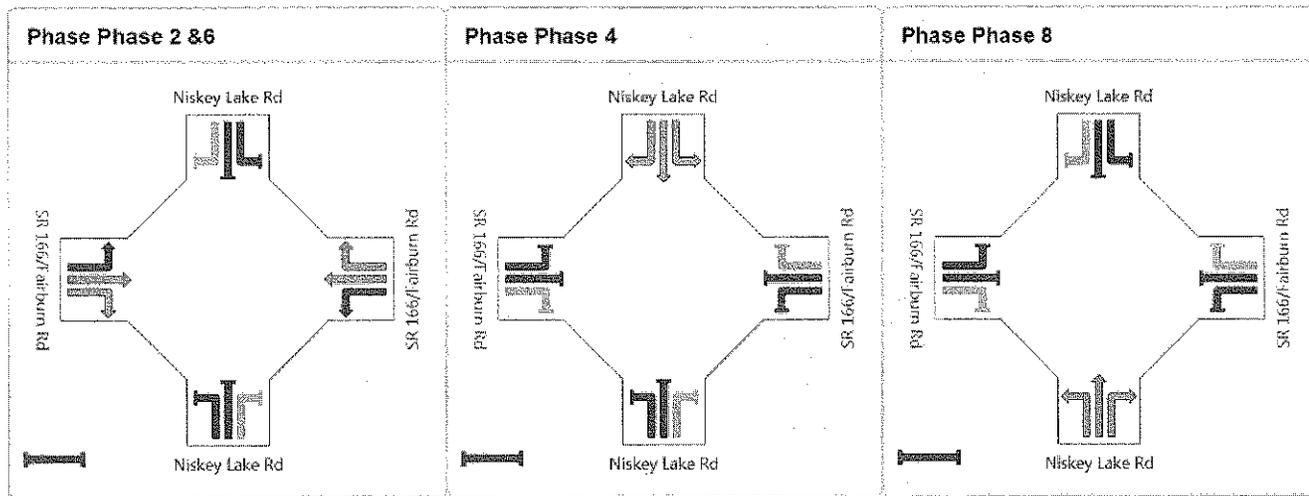
Sequence: Opposed Turns

Input Sequence: Phase 2 &6, Phase 4, Phase 8

Output Sequence: Phase 2 &6, Phase 4, Phase 8

## Phase Timing Results

Phase	Phase 2 &6	Phase 4	Phase 8
Green Time (sec)	74	19	9
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	80	25	15
Phase Split	67 %	21 %	13 %



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INTERSECTION

# INTERSECTION SUMMARY

Site: SR 166 @ Niskey lake  
Proposed

SR 166/Fairburn Rd @ Niskey Lake Rd  
Roundabout

2031

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	2126 veh/h	2551 pers/h
Percent Heavy Vehicles	3.0 %	
Degree of Saturation	1.356	
Practical Spare Capacity	-37.3 %	
Effective Intersection Capacity	1568 veh/h	
Control Delay (Total)	61.41 veh-h/h	73.69 pers-h/h
Control Delay (Average)	104.0 sec	104.0 sec
Control Delay (Worst Lane)	184.6 sec	
Control Delay (Worst Movement)	184.6 sec	184.6 sec
Geometric Delay (Average)	4.6 sec	
Stop-Line Delay (Average)	104.0 sec	
Intersection Level of Service (LOS)	LOS F	
95% Back of Queue - Vehicles (Worst Lane)	115.9 veh	
95% Back of Queue - Distance (Worst Lane)	2966.8 ft	
Total Effective Stops	5100 veh/h	6120 pers/h
Effective Stop Rate	2.40 per veh	2.40 per pers
Proportion Queued	0.72	0.72
Performance Index	161.6	161.6
Travel Distance (Total)	782.1 veh-mi/h	938.6 pers-mi/h
Travel Distance (Average)	1942 ft	1942 ft
Travel Time (Total)	86.5 veh-h/h	103.7 pers-h/h
Travel Time (Average)	146.4 sec	146.4 sec
Travel Speed	9.0 mph	9.0 mph
Cost (Total)	1401.16 \$/h	1401.16 \$/h
Fuel Consumption (Total)	67.4 gal/h	
Carbon Dioxide (Total)	638.4 kg/h	
Hydrocarbons (Total)	1.211 kg/h	
Carbon Monoxide (Total)	44.10 kg/h	
NOx (Total)	1.238 kg/h	

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,020,522 veh/y	1,224,626 pers/y
Delay	29,477 veh-h/y	35,373 pers-h/y
Effective Stops	2,448,004 veh/y	2,937,605 pers/y
Travel Distance	375,429 veh-mi/y	450,515 pers-mi/y
Travel Time	41,500 veh-h/y	49,800 pers-h/y
Cost	672,557 \$/y	672,557 \$/y
Fuel Consumption	32,340 gal/y	
Carbon Dioxide	306,417 kg/y	
Hydrocarbons	581 kg/y	
Carbon Monoxide	21,169 kg/y	
NOx	594 kg/y	

# MOVEMENT SUMMARY

Site: SR 166 @ Niskey lake  
Proposed

SR 166/Fairburn Rd @ Niskey Lake Rd  
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop Queued	Effective Stop Rate per veh	Average Speed mph
South: Niskey Lake Rd											
3	L	5	3.0	0.133	12.2	LOS B	0.4	10.5	0.70	0.98	23.0
8	T	27	3.0	0.133	12.2	LOS B	0.4	10.5	0.70	0.80	24.4
18	R	15	3.0	0.133	12.2	LOS B	0.4	10.5	0.70	0.84	24.2
Approach		48	3.0	0.133	12.2	LOS B	0.4	10.5	0.70	0.83	24.2
East: SR 166/Fairburn Rd											
1	L	8	3.0	0.638	12.5	LOS B	5.1	130.8	0.31	0.80	22.6
6	T	396	3.0	0.638	12.5	LOS B	5.1	130.8	0.31	0.37	24.5
16	R	266	3.0	0.638	12.5	LOS B	5.1	130.8	0.31	0.46	24.1
Approach		670	3.0	0.638	12.5	LOS B	5.1	130.8	0.31	0.41	24.3
North: Niskey Lake Rd											
7	L	250	3.0	0.380	9.9	LOSA	1.6	41.5	0.56	0.86	23.4
4	T	5	3.0	0.380	9.9	LOSA	1.6	41.5	0.56	0.68	25.1
14	R	18	3.0	0.380	9.9	LOSA	1.6	41.5	0.56	0.73	24.8
Approach		274	3.0	0.380	9.9	LOSA	1.6	41.5	0.56	0.85	23.5
West: SR 166/Fairburn Rd											
5	L	14	3.0	1.356	184.6	LOS F	115.9	2966.8	1.00	4.01	6.1
2	T	1118	3.0	1.356	184.6	LOS F	115.9	2966.8	1.00	4.01	5.8
12	R	2	3.0	1.356	184.6	LOS F	115.9	2966.8	1.00	4.01	5.8
Approach		1135	3.0	1.356	184.6	LOS F	115.9	2966.8	1.00	4.01	5.8
All Vehicles		2126	3.0	1.356	104.0	LOS F	115.9	2966.8	0.72	2.40	9.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

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**INTERSECTION**

# LANE SUMMARY

Site: SR 166 @ Niskey lake  
Proposed

SR 166/Fairburn Rd @ Niskey Lake Rd  
Roundabout

Lane Use and Performance																
	Demand Flows			Total	HV %	Cap	Deg Satn	Lane Util	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Lane Length	SL Type	Cap Adj %	Prob Block %
	L	T	R													
<b>South: Niskey Lake Rd</b>																
Lane 1	5	27	15	48	3.0	359	0.133	100	12.2	LOS B	0.4	10.5	1600	-	0.0	0.0
Approach	5	27	15	48	3.0		0.133		12.2	LOS B	0.4	10.5				
<b>East: SR 166/Fairburn Rd</b>																
Lane 1	8	396	266	670	3.0	1050	0.638	100	12.5	LOS B	5.1	130.8	1600	-	0.0	0.0
Approach	8	396	266	670	3.0		0.638		12.5	LOS B	5.1	130.8				
<b>North: Niskey Lake Rd</b>																
Lane 1	250	5	18	274	3.0	720	0.380	100	9.9	LOS A	1.6	41.5	1600	-	0.0	0.0
Approach	250	5	18	274	3.0		0.380		9.9	LOS A	1.6	41.5				
<b>West: SR 166/Fairburn Rd</b>																
Lane 1	14	1118	2	1135	3.0	837	1.356	100	184.6	LOS F	115.9	2966.8	1600	-	0.0	28.2
Approach	14	1118	2	1135	3.0		1.356		184.6	LOS F	115.9	2966.8				
Intersection				2126	3.0		1.356		104.0	LOS F	115.9	2966.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

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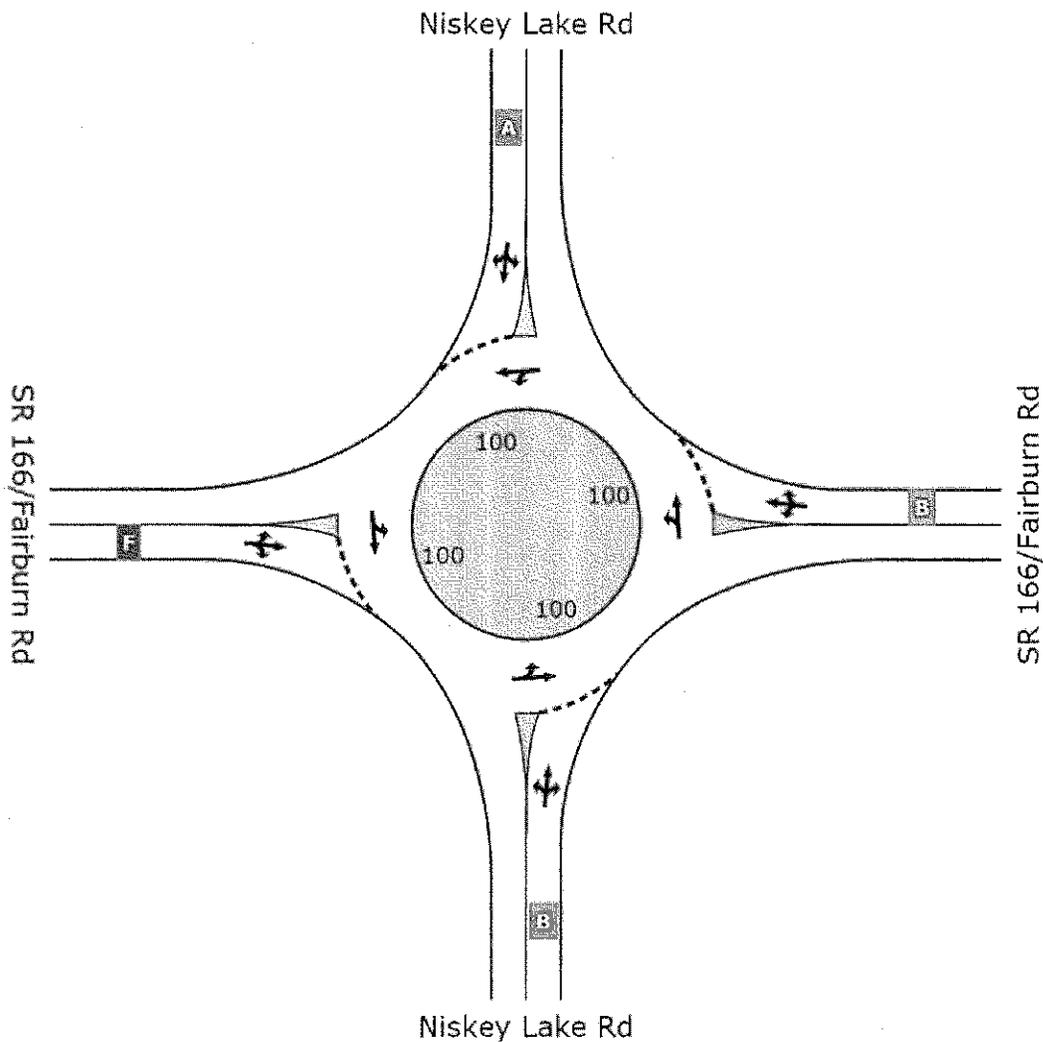
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# LEVEL OF SERVICE SUMMARY

Site: SR 166 @ Niskey lake  
Proposed

SR 166/Fairburn Rd @ Niskey Lake Rd  
Roundabout



	South	East	North	West	Intersection
LOS	B	B	A	F	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

Project: X:\Chris Woods\Operations\SR 166\SR 166 @ Nisky Lake\SR 166 @ Nisky Lake(2031).sip  
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SIDRA  
INTERSECTION

# INTERSECTION SUMMARY

Site: SR 166 @ Niskey Lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)

2031

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	2125 veh/h	2550 pers/h
Percent Heavy Vehicles	3.0 %	
Degree of Saturation	1.007	
Practical Spare Capacity	-10.6 %	
Effective Intersection Capacity	2110 veh/h	
Control Delay (Total)	19.59 veh-h/h	23.51 pers-h/h
Control Delay (Average)	33.2 sec	33.2 sec
Control Delay (Worst Lane)	71.8 sec	
Control Delay (Worst Movement)	71.8 sec	71.8 sec
Geometric Delay (Average)	2.1 sec	
Stop-Line Delay (Average)	33.2 sec	
Intersection Level of Service (LOS)	LOS C	
95% Back of Queue - Vehicles (Worst Lane)	74.6 veh	
95% Back of Queue - Distance (Worst Lane)	1908.5 ft	
Total Effective Stops	1997 veh/h	2396 pers/h
Effective Stop Rate	0.94 per veh	0.94 per pers
Proportion Queued	0.88	0.88
Performance Index	124.8	124.8
Travel Distance (Total)	767.8 veh-mi/h	921.4 pers-mi/h
Travel Distance (Average)	1908 ft	1908 ft
Travel Time (Total)	44.0 veh-h/h	52.9 pers-h/h
Travel Time (Average)	74.6 sec	74.6 sec
Travel Speed	17.4 mph	17.4 mph
Cost (Total)	764.66 \$/h	764.66 \$/h
Fuel Consumption (Total)	45.0 gal/h	
Carbon Dioxide (Total)	426.2 kg/h	
Hydrocarbons (Total)	0.730 kg/h	
Carbon Monoxide (Total)	30.22 kg/h	
NOx (Total)	0.910 kg/h	

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

HCM Delay Model used. Geometric Delay not included.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,020,000 veh/y	1,224,000 pers/y
Delay	9,404 veh-h/y	11,285 pers-h/y
Effective Stops	958,396 veh/y	1,150,075 pers/y
Travel Distance	368,561 veh-mi/y	442,273 pers-mi/y
Travel Time	21,143 veh-h/y	25,372 pers-h/y
Cost	367,038 \$/y	367,038 \$/y
Fuel Consumption	21,593 gal/y	
Carbon Dioxide	204,591 kg/y	
Hydrocarbons	350 kg/y	
Carbon Monoxide	14,504 kg/y	
NOx	437 kg/y	

# MOVEMENT SUMMARY

Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph	
<b>South: Niskey Lake Rd</b>												
3	L	5	3.0	0.315	71.8	LOS E	2.7	68.1	1.00	0.81	11.4	
8	T	27	3.0	0.315	71.8	LOS E	2.7	68.1	1.00	0.81	11.4	
18	R	15	3.0	0.315	71.8	LOS E	2.7	68.1	1.00	0.81	11.4	
Approach		48	3.0	0.315	71.8	LOS E	2.7	68.1	1.00	0.81	11.4	
<b>East: SR 166/Fairburn Rd</b>												
1	L	8	3.0	0.087	52.7	LOS D	0.4	10.8	0.95	0.68	13.3	
6	T	396	3.0	0.586	14.1	LOS B	23.4	598.1	0.64	0.59	23.9	
16	R	266	3.0	0.586	14.1	LOS B	23.4	598.1	0.64	0.89	22.7	
Approach		670	3.0	0.586	14.5	LOS B	23.4	598.1	0.64	0.71	23.2	
<b>North: Niskey Lake Rd</b>												
7	L	250	3.0	1.007	56.9	LOS F	16.4	419.1	1.00	1.02	12.9	
4	T	4	3.0	1.007	56.9	LOS F	16.4	419.1	1.00	1.02	12.9	
14	R	18	3.0	0.999	56.9	LOS E	16.4	419.1	1.00	1.02	12.8	
Approach		273	3.0	1.007	56.9	LOS E	16.4	419.1	1.00	1.02	12.9	
<b>West: SR 166/Fairburn Rd</b>												
5	L	14	3.0	0.041	21.0	LOS C	0.5	12.9	0.62	0.70	19.8	
2	T	1118	3.0	0.946	37.1	LOS D	74.6	1908.5	1.00	1.07	16.8	
12	R	2	3.0	0.946	37.1	LOS D	74.6	1908.5	1.00	1.07	16.7	
Approach		1135	3.0	0.946	36.9	LOS D	74.6	1908.5	1.00	1.06	16.8	
All Vehicles		2125	3.0	1.007	33.2	LOS C	74.6	1908.5	0.88	0.94	17.4	

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

# LANE SUMMARY

Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)

Lane Use and Performance																
	Demand Flows				HV %	Cap. veh/h	Deg. Satn v/c	Lane Util %	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block %
	L veh/h	T veh/h	R veh/h	Total veh/h												
<b>South: Niskey Lake Rd</b>																
Lane 1	5	27	15	48	3.0	152	0.315	100	71.8	LOS E	2.7	68.1	1600	-	0.0	0.0
Approach	5	27	15	48	3.0		0.315		71.8	LOS E	2.7	68.1				
<b>East: SR 166/Fairburn Rd</b>																
Lane 1	8	0	0	8	3.0	88	0.087	100	52.7	LOS D	0.4	10.8	300	-	0.0	0.0
Lane 2	0	396	266	662	3.0	1129	0.586	100	14.1	LOS B	23.4	598.1	1600	-	0.0	0.0
Approach	8	396	266	670	3.0		0.586		14.5	LOS B	23.4	598.1				
<b>North: Niskey Lake Rd</b>																
Lane 1	250	4	18	273	3.0	271	1.007	100	56.9	LOS F	16.4	419.1	1600	-	0.0	0.0
Approach	250	4	18	273	3.0		1.007		56.9	LOS E	16.4	419.1				
<b>West: SR 166/Fairburn Rd</b>																
Lane 1	14	0	0	14	3.0	349	0.041	100	21.0	LOS C	0.5	12.9	300	-	0.0	0.0
Lane 2	0	1118	2	1121	3.0	1185	0.946	100	37.1	LOS D	74.6	1908.5	1600	-	0.0	21.0
Approach	14	1118	2	1135	3.0		0.946		36.9	LOS D	74.6	1908.5				
Intersection				2125	3.0		1.007		33.2	LOS C	74.6	1908.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

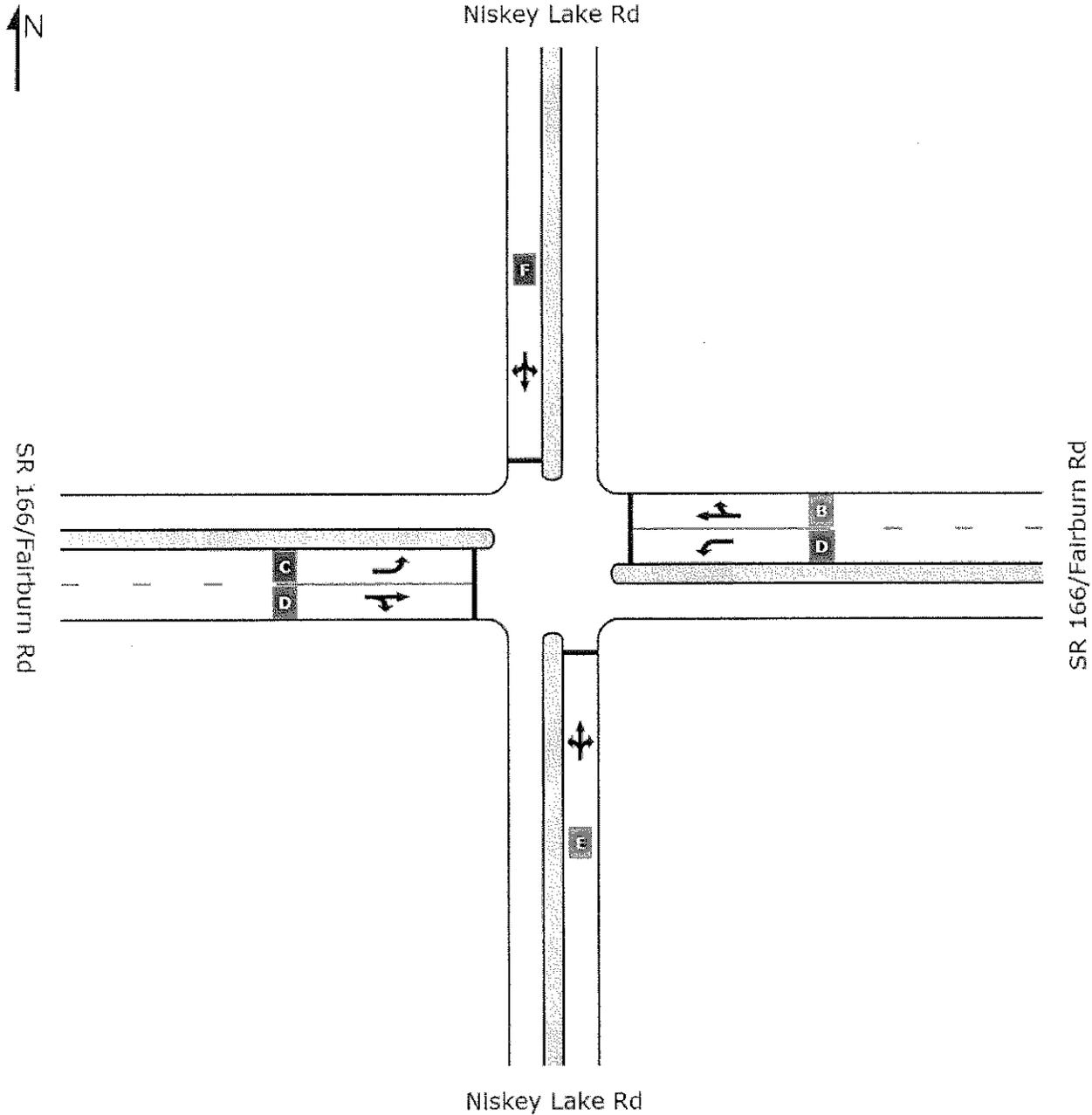
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

# LEVEL OF SERVICE SUMMARY

Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)



	South	East	North	West	Intersection
LOS	E	B	E	D	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.



# PHASING SUMMARY

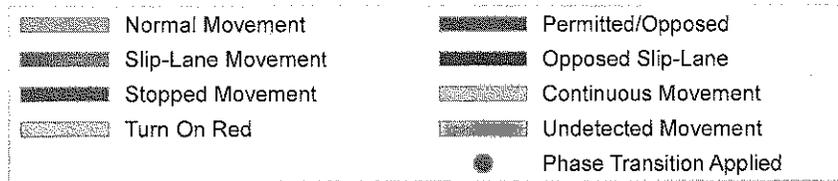
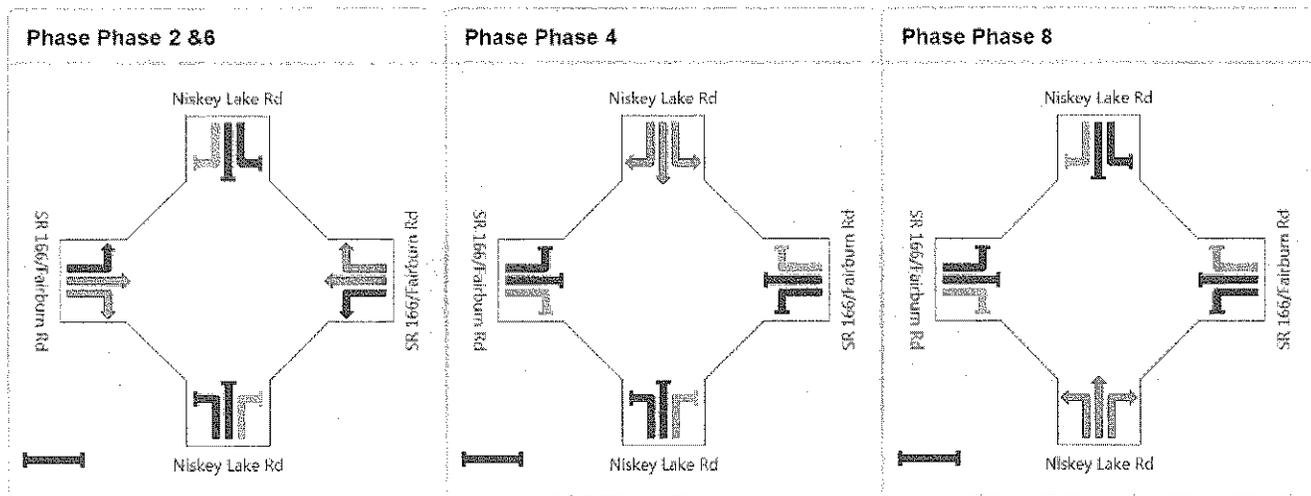
Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)

Phase times specified by the user  
Sequence: Opposed Turns  
Input Sequence: Phase 2 &6, Phase 4, Phase 8  
Output Sequence: Phase 2 &6, Phase 4, Phase 8

## Phase Timing Results

Phase	Phase 2 &6	Phase 4	Phase 8
Green Time (sec)	74	19	9
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	80	25	15
Phase Split	67 %	21 %	13 %



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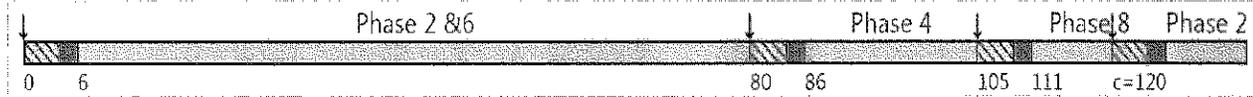
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# MOVEMENT TIMING

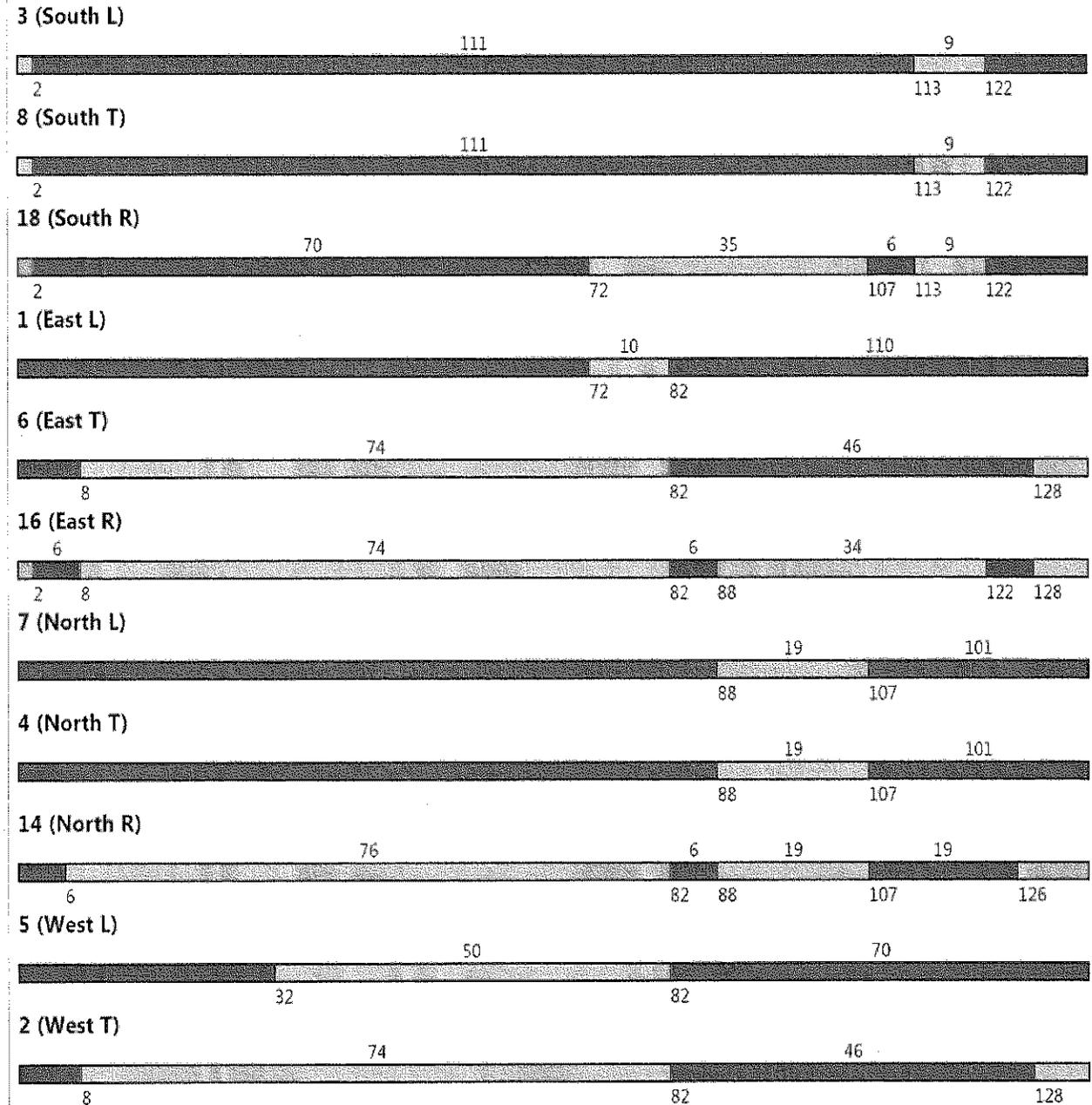
Site: SR 166 @ Niskey lake  
Proposed - Conversion

SR 166/Fairburn Rd @ Niskey Lake Rd  
Signals - Pretimed Cycle Time = 120 seconds (User-Given Phase Times)  
Phase times specified by the user  
Sequence: Opposed Turns  
Input Sequence: Phase 2 &6, Phase 4, Phase 8  
Output Sequence: Phase 2 &6, Phase 4, Phase 8

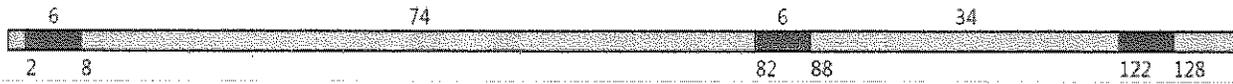
## DISPLAYED SIGNAL TIMING - PHASES



## EFFECTIVE SIGNAL TIMING - MOVEMENTS



12 (West R)



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INTERSECTION

**HIGHWAY SAFETY MANUAL (HSM) ANALYSIS for CONCEPT REPORTS**

This Concept Report for PI No. 0010941 includes an HSM predicted average crash frequency analysis for the design year ADT using the Manual’s Predictive Method. The HSM uses AADT with the Predictive Method while this analysis uses ADT since AADT is typically not available for GDOT projects. The Predictive Method analysis is based on Safety Performance Functions (SPF) for individual roadway segments and intersections that provide the crash frequency. The HSM often provides information on crash frequency distribution by collision type and severity. Crash severities include Fatality, Incapacitating Injury, Non-Incapacitating Injury, Possible Injury and Property Damage Only. Some SPFs include HSM Crash Modification Factors (CMF) that adjust the SPF crash frequency to account for difference between HSM base conditions that the function is based on and project specific conditions such as geometric design features. The HSM includes local calibration factors to further refine predicted average crash frequency. These local calibration factors have not yet been developed for GDOT.

**Project Roadway Segment and Intersection Types analyzed**

Roadway Segment				Intersection	
ID #	Type	Sta. Begin	Sta. End	ID #	Type
n/a	n/a	n/a	n/a	1	4 Leg Signalized-Urban/Suburban Arterial

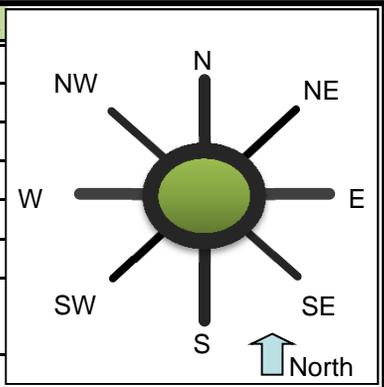
The total predicted average of yearly crashes per the Highway safety Manual method for the proposed intersection is 3.5 crashes per year. The base model has a total prediction average of 3.8 yearly crashes. The prediction is 8% less than the base condition due to the addition of left turn lanes.

**HSM Predictive Method for Urban/Suburban Arterial Roadway Intersections – Fatal & Injury Crashes**

		Urban Intersection Base Crash Frequency – Excluding Vehicle and Pedestrian/Bicycle (fatal & injury crashes/year)	Left Turn Lanes	Unsignalized – $CMF_{2i} = 1.00$ Signalized Permissive Left Turn	Right Turn Lanes	Unsignalized – $CMF_{4i} = 1.00$ Signalized Right Turn On Red	Lighting	Red Light Cameras	Urban Intersection Adjusted Crash frequency – Excluding Vehicle and Pedestrian/Bicycle (fatal & injury crashes/year)	Vehicle-Pedestrian (fatal & injury crashes/year)	Vehicle-Bike (fatal & injury crashes/year)	Total Predicted Average Crash Frequency for Roadway Intersections (fatal & injury crashes/year)
Intersection ID #	Analysis Condition	$N_{spf\ int}$	$CMF_{1i}$	$CMF_{2i}$	$CMF_{3i}$	$CMF_{4i}$	$CMF_{5i}$	$CMF_{6i}$	$N_{bi}$	$N_{pedi}$	$N_{bikei}$	$N_{predicted\ int}$
Total	Base	3.729	1.00	1.00	1.00	1.00	1.00	1.00	3.729	0.016	0.056	3.8
	Proposed	3.777	1.00	1.00	1.00	1.00	0.91	1.00	3.440	0.033	0.052	3.5

**General & Site Information** v2.1

Analyst:	Chartrae Kent
Agency/Co:	District 7 Road Design
Date:	9/29/2014
Project or PI#:	0010941
Year, Peak Hour:	
County/District:	Fulton/District 7
Intersection Name:	SR 154/166 @ Niskey Lake Rd



**Volumes** Entry Legs (FROM)

		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
<b>Exit Legs (TO)</b>	N (1), vph	0		165		17		9	
	NE (2), vph								
	E (3), vph	155		0		10		693	
	SE (4), vph								
	S (5), vph	4		245		0		2	
	SW (6), vph								
	W (7), vph	12		5		4		0	
	NW (8), vph								
Output	Total Vehicles	171	0	415	0	31	0	704	0

**Volume Characteristics**

	N	NE	E	SE	S	SW	W	NW
% Cars	95%	100%	95%	100%	95%	100%	95%	100%
% Heavy Vehicles	5%	0%	5%	0%	5%	0%	5%	0%
% Bicycle	0%	0%	0%	0%	0%	0%	0%	0%
# of Pedestrians (ped/hr)	1	0	1	0	1	0	1	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
F <sub>HV</sub>	0.952	1.000	0.952	1.000	0.952	1.000	0.952	1.000
F <sub>ped</sub>	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

**Entry/Conflicting Flows**

	N	NE	E	SE	S	SW	W	NW
Flow to Leg #								
N (1), pcu/h	0	0	188	0	19	0	10	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	177	0	0	0	11	0	791	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	5	0	280	0	0	0	2	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	14	0	6	0	5	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	195	0	474	0	35	0	803	0
Conflicting flow, pcu/h	290	0	34	0	978	0	461	0

**Roundabout Type** Standard Single Lane or Urban Compact

Enter type here...	Standard Single Lane
--------------------	----------------------

**Results: Approach Measures of Effectiveness**

HCM 2010 Model (build)	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	805	NA	1040	NA	405	NA	679	NA
Entry Flow Rates, vph	186	NA	451	NA	34	NA	765	NA
<b>V/C ratio</b>	<b>0.23</b>		<b>0.43</b>		<b>0.08</b>		<b>1.13</b>	
<b>Control Delay, s/veh</b>	<b>7</b>		<b>8</b>		<b>10</b>		<b>98</b>	
LOS	A		A		B		F	
<b>95th % Queue (ft)</b>	<b>23</b>		<b>59</b>		<b>7</b>		<b>609</b>	
Calibrated Model (future)	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	1007	NA	1235	NA	581	NA	878	NA
Entry Flow Rates, vph	186	NA	451	NA	34	NA	765	NA
<b>V/C ratio</b>	<b>0.19</b>		<b>0.38</b>		<b>0.06</b>		<b>0.92</b>	
<b>Control Delay, sec/pcu</b>	<b>5</b>		<b>7</b>		<b>7</b>		<b>35</b>	
LOS	A		A		A		D	
<b>95th % Queue (ft)</b>	<b>19</b>		<b>48</b>		<b>5</b>		<b>350</b>	

Notes:

v2.1

Unit Legend:

vph = vehicles per hour  
PHF = peak hour factor  
F<sub>HV</sub> = heavy vehicle factor  
pcu = passenger car unit

**Bypass Lane Merge Point Analysis (if applicable)**

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
<b>Does the bypass have a dedicated receiving lane?</b>						
<b>Volumes</b>						
Right Turn Volume removed from Entry Leg						
<b>Volume Characteristics (for entry leg)</b>						
PHF						
F <sub>HV</sub>						
F <sub>ped</sub>						
<b>NOTE: Volume Characteristics for Exit Leg are already taken into account</b>						
<b>Entry/Conflicting Flows</b>						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
<b>Bypass Lane Results (HCM 2010 Model)</b>						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
<b>V/C ratio</b>						
<b>Control Delay, s/veh</b>						
LOS						
<b>95th % Queue (ft)</b>						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						