Georgia Department of Transportation

Interoffice Memo
Office of Design Policy & Support

DATE: 7/10/2020*

FILE: P.I.# 0007836, CSSTP-0007-00(836)
Bartow and Cherokee Counties / GDOT District 6 - Cartersville
SR 20 Widening FM I-75/Bartow to I-575/Cherokee

FROM: Dave Peters for R. Christopher Rudd, PE, State Design Policy Engineer

TO: SEE DISTRIBUTION

SUBJECT: APPROVED CONCEPT REPORT

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

Attachment

Distribution:
- Hiral Patel, Director of Engineering
- Joe Carpenter, Director of P3
- Albert Shelby, Director of Program Delivery
- Carol Comer, Director, Division of Intermodal
- Darryl VanMeter, Assistant Director of P3/State Innovative Delivery Administrator
- Kim Nesbitt, Program Delivery Administrator
- Bobby Hilliard, Program Control Administrator
- Radney Simpson, Assistant State Transportation Planning Administrator
- Eric Duff, State Environmental Administrator
- Bill DuVall, State Bridge Engineer
- Andrew Heath, State Traffic Engineer
- Angela Robinson, Financial Management Administrator
- Erik Rohde, State Project Review Engineer
- Monica Flournoy, State Materials Engineer
- Patrick Allen, State Utilities Engineer
- Eric Conklin, State Transportation Data Administrator
  Attn: Systems & Classification Branch
- Benny Walden, Statewide Location Bureau Chief
- Ed David Adams, State Safety Program Manager
- Grant Waldrop, District Engineer
- David Acree, District Preconstruction Engineer
- Jun Birnkammer, District Utilities Manager
- Theo Igbalajobi, Project Manager
- BOARD MEMBER - 11th Congressional District

* Note added to page 24 on August 25, 2020

Project Concept Report

Project Type:	Widening	P.I. Number:	0007836
GDOT District:	6	County:	Bartow, Cherokee
Federal Route Number:	N/A	State Route Number:	20
Project Number:	CSSTP-0007-00(836)		

WIDENING AND RECONSTRUCTION OF SR 20 FROM I-75 IN BARTOW COUNTY TO I-575 IN CHEROKEE COUNTY

Submitted for approval: * Concept Report updated 6/22/20

Keith Kunst, PE ARCADIS US, Inc	3/6/2020 Date
Kimberley W. Nesbitt State Program Delivery Administrator – Kimberly Nesbitt	3/17/2020 Date
KEBD GDOT Project Manager – Theo Igbalajobi	3-10-20 Date

Recommendation for approval: * Recommendations are on file ~OB

* Eric Duff State Environmental Administrator	* 3/19/2020 Date
for * Chris Raymond State Traffic Engineer	* 5/15/2020 Date
* Erik Rohde Project Review Engineer	* 5/5/2020 Date
for * Marcela Coll State Utilities Engineer	* 5/11/2020 Date
* Grant Waldrop District Engineer	* 5/14/2020 Date
* Bill DuVall State Bridge Engineer	* 3/25/2020 Date

☒ MPO Area: This project is consistent with the MPO adopted Regional Transportation Plan (RTP)/Long Range Transportation Plan (LRTP).

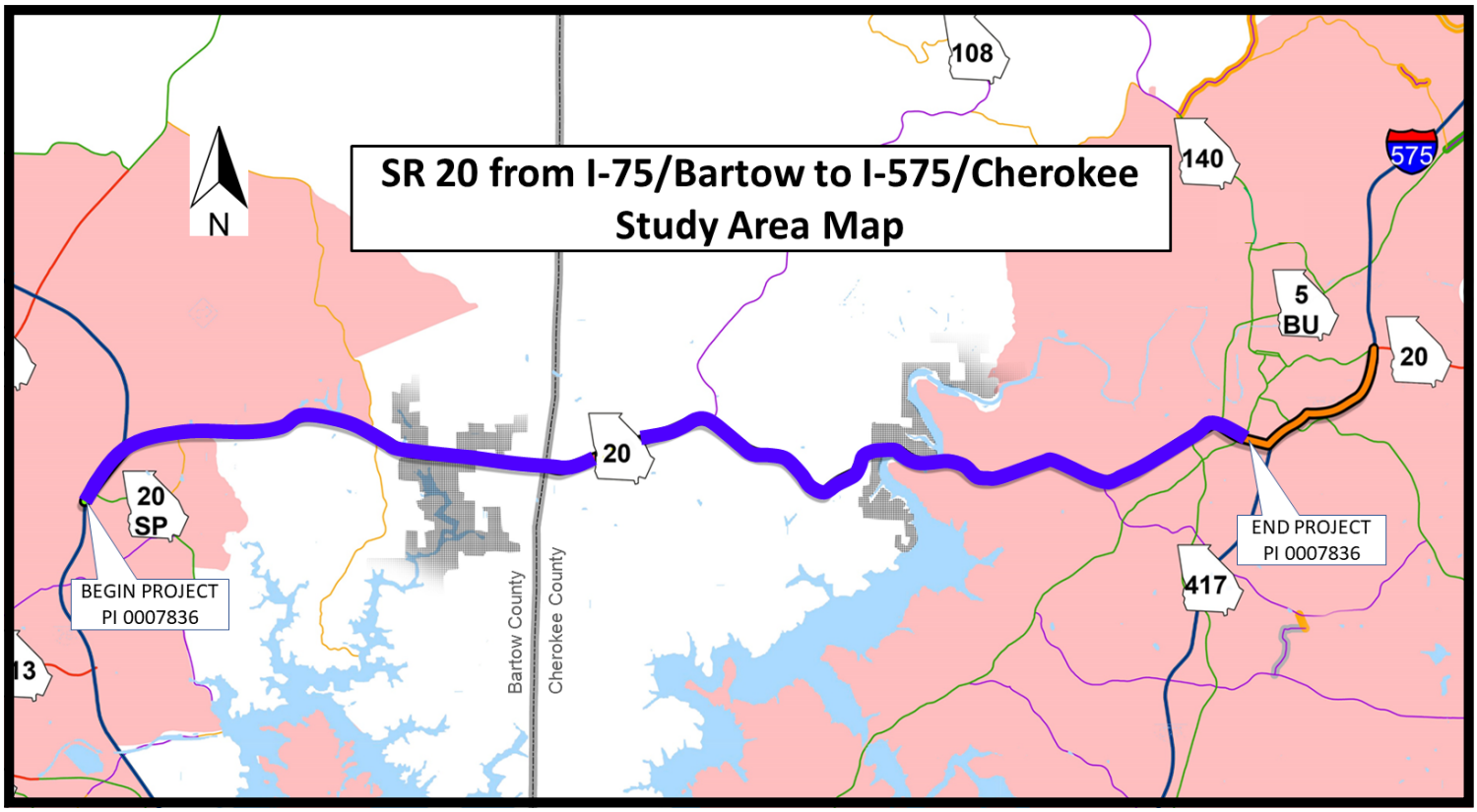
☐ Rural Area: This project is consistent with the goals outlined in the Statewide Transportation Plan (SWTP) and/or is included in the State Transportation Improvement Program (STIP).

Charles Robinson for State Transportation Planning Administrator	3-31-20 Date

* Recommendations also received from the following:

Office of Intermodal: Alan Hood 3/30/2020

PROJECT LOCATION MAP



PLANNING AND BACKGROUND

Prepared By: GDOT, Office of Planning, updated by Arcadis ~OB 05/2020 **Date:** *3/12/2012*

Project Justification Statement: The SR 20 corridor serves daily commuters living in the residential areas along the route as well as some commercial through-traffic. There is a traffic pattern outward from the center of the corridor in the AM peak hours and inward during the PM peak hours due to the interstates around the corridor. Commuters living in the area have limited alternate routes to access the I-75 and I-575 corridors as well as the metropolitan Atlanta area. The closest adjacent east-west route to the north is SR 140, which intersects SR 20 near the I-575 interchange and intersects I-75 fifteen miles north of the SR 20 interchange with I-75. Additionally, the SR 20 corridor runs along the north side of the Allatoona Lake, which leaves few options for east-west routes on the southern side of SR 20. Bells Ferry Road and Kellogg Creek Road provide access to SR 92, which is the closest adjacent east-west route on the southern side of SR 20.

When traveling west to east, the current (2014) Average Annual Daily Traffic (AADT) along SR 20, from I-75 to Hickory Flat Hwy/Marietta Hwy steadily decreases until the Fincher Road/Upper Sweetwater Trail intersection and then steadily increases until the Hickory Flat Hwy/Marietta Hwy intersection. In Bartow County, from I-75 to the Cherokee County line, the AADT on SR 20 ranges between 9,000 and 22,000 (level of service, LOS, “B” to LOS “C”). In Cherokee County, from the county line, to Hickory Flat Hwy/Marietta Hwy the AADT increases from 9,000 to 24,000 (LOS “B” to LOS “C”).

The projected no-build design year 2046 AADT along SR 20 From I-75 to the Cherokee County line ranges between 13,000 and 30,000 (LOS “B” to LOS “E”). In Cherokee County, from the county line, to Hickory Flat Hwy/Marietta Hwy the AADT increases from 13,000 to 33,000 (LOS “B” to LOS “D”). Under build conditions, the design year 2046 AADT over the length of the corridor is projected to range between 14,000 and 34,000 (LOS “A” to LOS “B”).

The Office of Planning recommends the western project limit for this project begins just east of I-75, and ties into the existing four lane facility. The eastern terminus for this project is proposed to terminate at the intersection of Hickory Flat Hwy/Marietta Hwy/I-575 and tie into the existing multilane configuration.

The crash rates for the section of SR 20 in Bartow County (just east of I-75 to the county line) were mostly below the statewide average, for a similar functional classification of road for 2014-2018 with the exception of the section from the Wilderness Camp Road/Bells Ferry Road intersection to the county line, which exceeded the average rate for both total and injury crashes. The section of SR 20 in Cherokee County (County line to Hickory Flat Hwy/Marietta Hwy intersection) had sections with crash rates above the statewide average for total, injury, and fatal crashes for 2014-2018. The sections between the Clearwater Trail/Rhine Road intersection to the Fields Landing Drive intersection had crash rates that exceeded for total, injury, and fatal crashes. The section from the Riverbend Way/Pope Circle intersection to the River Green Avenue/Butterworth Road intersection exceeded statewide rates for total and injury crashes and the sections between the Teasley Middle School intersection and the Herndon Lane intersection also had crashes that exceeded statewide rates for total and injury crashes.

Currently, the Statewide Transportation Plan defines congestion as LOS D to LOS F with a LOS E sometimes used to define congestion in large urban areas. The goal of this project is to alleviate future congestion along SR 20 between Interstates 75 and 575 and reduce crash frequency along the corridor.

Existing conditions:

The project begins east of the intersection of SR20 @ I-75 in Bartow County and ends at the overpass of SR5/Marietta Hwy west of I-575 in Cherokee County. The existing road width has a four-lane layout at the interstate systems and a two-lane layout at Lake Allatoona. A large portion of the existing rural 12-foot, two lane highway has turning and passing lanes that have been added to the original corridor footprint from new construction projects for safety improvements. Existing shoulders are both paved and grass with numerous locations containing steep slope drop offs due to terrain. Existing guardrail and fill walls along the corridor remain or have been updated or added in some locations due to the aforementioned safety improvement projects.

Currently, SR 20 is an east/west rural principal arterial with limited major route connectivity. The roadway consists of rolling terrain throughout most of the corridor with more mountainous terrain around Lake Allatoona and the Upper Etowah River. Several locations of SR 20 cross over the US Army Corps of Engineers Lake Allatoona controlled areas. There is a very low-density residential population within Bartow County and shortly after Lake Allatoona the population becomes denser with the gradual increase of subdivisions, schools, and businesses within Cherokee County. Land uses range from commercial, industrial, farmland, and residential. Some of the developments along the corridor include residential streets and neighborhoods, the Vulcan Quarry, the Georgia National Cemetery, Knox Elementary School, River Greene Academy, and Teasley Middle School.

There are three existing bridges and several culverts from the tributaries feeding Lake Allatoona and the Upper Etowah River. SR 20 @ Stamp Creek (Structure ID 015-5125-0) is 217-ft long by 43.30-ft wide and SR 20 @ Boston Creek (Structure ID 015-5126-0) is 257-ft long by 43.30-ft wide. Both of these bridges are pre-stressed concrete structures reconstructed in 2007 to accommodate future widening and structural deficiencies. SR 20 @ Etowah River (Structure ID 057-0010-0) is 362-ft long by 23.80-ft wide and was constructed in 1950, resulting in low operating ratings.

There are numerous intersections along the corridor that do not meet current design standards. Several of the major intersections have extreme angles or steep horizontal/vertical curves that limit the visibility of the drivers. Some of these locations have higher than average accident rates.

Major intersections along the corridor include SR 294, Bells Ferry Road/Wilderness Camp Road, Fincher Road/SR 108, Fields Landing Drive, River Green Avenue/Butterworth Road, Marietta Highway/SR 140, and Hickory Flat Highway/SR 140. The results of the crash severity analysis show that when accidents occur along this corridor, they tend to be particularly severe accidents. In addition to causing property damage, injuries, and loss of life, accidents along the corridor also contribute non-recurring congestion which can add to the congestion already present during the peak hours. The results of the crash analysis show that improvements to access control and horizontal/vertical curvature have the potential to reduce the number and severity of crashes occurring along the corridor.

There is visual evidence of rock in the vicinity around Lake Allatoona and between Stamp and Boston Creeks. Geotechnical analysis during Preliminary Plans phase will determine if blasting will be required.

There are currently no known maintenance issues within the corridor.

Other projects in the area:

- PI 621350-, SR 20 from I-75 to SR 61/US 411 Partial Relocation, Under Construction
- PI S015066, Dual left turn lanes southbound at SR 20 at Herndon Road, Under Construction, this project is adding raised median within the project, after the project is complete, will have to evaluate if this can be salvaged within PI 0007836.
- PI 0003681, SR 20 from SR 369/Cherokee to SR 371/Forsyth, Engineering Phase
- PI 0006039, Bell Ferry Rd from North of Sixes Rd to SR 20/Knox Hwy, Engineering Scheduled for 2051
- PI M005373, Bridge Preservation at 4 state route locations in Cherokee & Gilmer Counties (SR 140 over Etowah River), Current Status Unknown

MPO: Atlanta Regional Commission, Cartersville-Bartow MPO **TIP #:** ARC: CH-020A2, CBMPO: CB-507

Congressional District(s): *11*

Federal Oversight: ☐ **PoDI** ☒ **Exempt** ☐ **State Funded** ☐ **Other**

Projected Traffic: 24 HR T: 15 % Current Year (2014): 23,600
Open Year (2026): 27,400 Design Year (2046): 33,600
Traffic Projections Performed by: Arcadis US, Inc.

Date approved by the GDOT Office of Planning: *1/23/2020*

AASHTO Functional Classification (Mainline): *Principal Arterial*
AASHTO Context Classification (Mainline): Rural
AASHTO Project Type (Mainline): Reconstruction
Is the project located on an NHS roadway? ☐ No ☒ Yes

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

Warrants met: ☐ None ☐ Bicycle ☒ Pedestrian ☒ Transit

1. Pedestrian Warrant #1 – 2 schools located at eastern end of corridor and commercial areas located at western and eastern ends of corridor.
2. Transit Warrant #1 – Cherokee Areas Transit System (CATS), route overlaps project corridor between intersection with Marietta Hwy and SR 140/Hickory Flat Hwy.

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

Pavement Evaluation and Recommendations

Initial Pavement Evaluation Summary Report Required? ☐ No ☒ Yes - Only for areas where existing pavement is to be retained.

Feasible Pavement Alternatives: ☐ HMA ☐ PCC ☒ HMA & PCC

Is the project located on a Special Roadway or Network? ☐ No ☒ Yes *Oversize Truck Route*

Is the project located on or intersect an RTOP corridor? ☒ No ☐ Yes

Is Federal Aviation Administration coordination anticipated? ☒ No ☐ Yes

DESIGN AND STRUCTURAL

Description of the proposed project: The project is in Bartow and Cherokee Counties, Georgia on SR 20 beginning from SR 20 and I-75 in Bartow County to approximately SR 20 and I-575 in Cherokee County. This 17-mile project will widen the critical East-West Corridor linking Cartersville and I-75 to Canton from two to four lanes with a median. Major structures include widening of existing bridges over Stamp and Boston Creeks and replacement of Knox Bridge over Lake Allatoona/Etowah River.

Context Sensitive Solutions

Issues of Concern:

1. Corridor passes through USACE property at two segments.
2. Two Revolutionary War era cemetery plots located directly north and south of the existing roadway at the western edge of the Allatoona WMA

Context Sensitive Solutions Proposed:

1. Narrow median from 32-ft depressed to 24-ft raised.
2. Narrow median from 24-ft raised to 12-ft raised in vicinity of cemeteries.

Major Structures:

Structure	Existing	Proposed
Bridge (015-5125-0) SR 20 over Stamp Creek	Two 12-ft lanes, 10-ft outside shoulders, 43.3-ft roadway width,46.9-ft deck width, 217-ft length	Widen existing 217-ft long bridge to the north for a total width of 81.25-ft. Typical section includes 4 – 12-ft lanes, 10-ft outside shoulder EB and 8-ft outside shoulder WB, with 4-ft inside shoulders and a 4-ft raised median.
Bridge (015-5126-0) SR 20 over Boston Creek	Two 12-ft lanes, 10-ft outside shoulders, 43.3-ft roadway width,46.9-ft deck width, 257-ft length	Retain existing bridge to carry EB traffic and construct new parallel bridge 257-ft long and 39.25-ft wide to carry WB traffic, consisting of 2 – 12-ft lanes, 8-ft outside shoulder and 4-ft inside shoulder.
Bridge (057-0010-0) SR 20 over Lake Allatoona/Etowah River	Two 12-ft lanes, no shoulders, 23.8-ft roadway width, 29.6-ft deck width, 362-ft length	New 850-ft long x 91.25-ft wide bridge on an offset alignment to the north of the existing bridge. Bridge typical section includes 4 – 12-ft lanes, 8-ft outside shoulders, 4-ft inside shoulders and a 16-ft raised median.
Bridge (057-0071-0) Marietta Street over SR 20/Hickory Flat Hwy	Two 12-ft lanes, 8-ft outside shoulders, 4-ft sidewalks, 40-ft roadway width, 50.4-ft deck width, 19.0-ft minimum vertical clearance over SR 20	No changes proposed
Culvert SR 20 over Rowland Spring Creek	Double barrel culvert, unknown exact dimensions, approx. 11-ft W x8-ft H	Extend existing double barrel culvert to proposed wall, by approx. 5-ft
Culvert (015-0134-0) SR 20 over Carter Creek	Double 9-ft W x8-ft H box culvert, 100-ft long	Extend existing Double 9-ft W x8-ft H by approx. 95-ft
Culvert (015-0028-0) SR 20 over McKaskey Creek	Double 10-ft W x7-ft H box culvert, 94-ft long	Replace with new 10-ft W x7-ft H box culvert, 160-ft long
Wall	STA 27+82 to 31+05 RT, 323-ft long	Existing wall to remain
Wall	STA 92+47 to 96+95 LT, 448-ft long	Replace with new wall, 250-ft long, max. height 15-ft
Wall	STA 103+27 to 111+45 LT, 818-ft long	Replace with new wall, 500-ft long, max. height 25-ft
Wall	STA 124+31 to 126+62 LT, 231-ft long, Dam located in this area.	Existing wall to remain
Wall	STA 128+80 to 134+37 RT, 557-ft long	Replace with new wall, 350-ft long, max. height 25-ft
Wall	N/A	STA 156+00 to 159+00 RT, 300-ft long, max. height 10-ft
Wall	N/A	STA 167+00 to 172+50 RT, 550-ft long, max. height 15-ft
Wall	STA 177+20 to 179+60 LT, 240-ft long	Existing wall to remain
Wall	STA 188+59 to 192+44 RT, 385-ft long	Existing wall to be removed, replaced with embankment
Wall	STA 191+59 to 199+59 LT, 800-ft long	Existing wall to remain

Structure	Existing	Proposed
Wall	STA 198+10 to 205+56 RT, 746-ft long	Replace with new wall, 600-ft long, max. height 15-ft
Wall	N/A	STA 211+00 to 212+50 RT, 150-ft long, max. height 6-ft
Wall	STA 224+04 to 233+04 RT, 900-ft long	Existing wall to remain
Wall	N/A	STA 242+00 to 247+50 RT, 550-ft long, max. height 3-ft
Wall	N/A	STA 256+00 to 262+00 LT, 600-ft long, max. height 20-ft
Wall	N/A	STA 283+00 to 284+00 RT, 100-ft long, max. height 15-ft
Wall	N/A	STA 296+00 to 299+00 RT, 300-ft long, max. height 25-ft
Wall	N/A	STA 311+50 to 313+50 RT, 200-ft long, max. height 15-ft
Wall	N/A	STA 363+50 to 364+50 RT, 350-ft long, max. height 15-ft
Wall	STA 449+00 to 453+00 RT, 400-ft long	Existing wall to be removed, replaced with embankment
Wall	N/A	STA 600+50 to 602+50 RT, 200-ft long, max. height 35-ft
Wall	N/A	STA 616+00 to 637+00 RT. 2100-ft long, max. height 6-ft
Wall	N/A	STA 655+50 to 662+50 RT, 700-ft long, max. height 25-ft

Accelerated Bridge Construction (ABC) techniques anticipated: ☒ No ☐ Yes

Mainline Design Features:

SR 20 (Typical Sections 1-4)	**Functional Classification:** *Principal Arterial*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
- Number of Lanes	2-4		4
- **Lane Width(s) (-ft)**	**12-ft**	**11-12-ft**	**11-12-ft**
- **Median Width (-ft) & Type**	**Varies, depressed and flush**	**20-24-ft raised. 32-44-ft depressed**	**20-ft raised. 12-24-ft raised. 32-ft depressed**
- **Shoulder Width (-ft) (Outside)**	**Varies**	**10-ft overall 6.5-ft paved**	**10-ft overall 6.5-ft paved**
- **Border Area Width (-ft)**	**Varies**	**10-16-ft**	**12-ft**
- **Cross Slope (%)**	**2%**	**2%**	**2%**
- **Outside Shoulder Slope (%)**	**Varies**	**6% rural 2% urban**	**6% rural 2% urban**
- **Inside Shoulder Width (-ft)**	**N/A**	**N/A 45 mph raised median. 2-ft 55 mph raised median. 6-ft overall (2-ft paved) depressed median**	**N/A 45 mph raised median. 2-ft 55 mph raised median. 6-ft overall (2-ft paved) depressed median**
- **Sidewalks (-ft)**	**N/A**	**5-ft**	**5-ft**
- Auxiliary Lanes (#lanes/-ft width)	1 passing/12-ft		N/A
- **Bike Accommodations**	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	35-55 mph		45-55 mph
Design Speed (mph)	**35-65 mph**	45-55 mph	45-55 mph
Minimum Horizontal Curve Radius (-ft)	**955-ft**	**643-ft 45 mph 1060-ft 55 mph**	**1470-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**5.6%**
Maximum Grade (%)	**~7.0%**	**6%**	**6.8%**
Access Control	By Permit	By Permit	By Permit
Design Vehicle	N/A		WB-67
Check Vehicle	N/A		OSOW
Pavement Type	HMA		HMA or PCC

**According to current GDOT Design Policy if applicable*

Sideroad Design Features:

Simpson Circle, Woodall Rd, Rhine Rd, Misty Way and Ridgemont Rd Design Features: (Typical Section 5)	**Functional Classification:** *Local Road and Street*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
- Number of Lanes	1-2 Varies	2	2
- Lane Width(s) (-ft)	**10-12-ft**	**11-12-ft**	**12-ft**
- Median Width (-ft) & Type	**N/A**	**N/A**	**N/A**
- Shoulder Width (-ft) (Outside)	**0-6-ft Varies**	**2-ft Paved 6-ft Overall**	**2-ft Paved 6-ft Overall**
- Border Area Width (-ft)	**N/A**	**N/A**	**N/A**
- Cross Slope (%)	**2%**	**2%**	**2%**
- Outside Shoulder Slope (%)	**Varies**	**6%**	**6%**
- Sidewalks (-ft)	**N/A**	**N/A**	**N/A**
- Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
- Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	25-30 mph		30 mph
Design Speed (mph)	**N/A**	**30 mph**	**30 mph**
Minimum Horizontal Curve Radius (-ft)	**120-ft**	**231-ft**	**518-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**6%**
Maximum Grade (%)	**11%**	**14%**	**13%**
Access Control	**N/A**	**N/A**	**N/A**
Design Vehicle	N/A		S-BUS36
Check Vehicle	N/A		SU-40
Pavement Type	HMA		HMA or PCC

**According to current GDOT Design Policy if applicable*

Dean Rd, Ranger Rd, Vulcan Quarry Rd, JR Rd, Roberson Rd, Holly Dr, Timberlake Cove, Commerce Row, Chandler Lane, Hawks Farm Rd, Brooke Rd, Deer Run Dr, Rose Brooke Cir, Clearwater Trail, Mt Olive Church Lane, Sutallee Woods Trail, Peachtree Dr, Highland View Pass, Upper Sweetwater Trail, Ficklen Church Way, Willie West Rd, Knox Campground Trail, Fields Chapel Rd, Scott Hudgens Dr and Fields Landing Dr Design Features: (Typical Section 6)	**Functional Classification:** *Local Road and Street*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
Number of Lanes	1-2 Varies		2
Lane Width(s) (-ft)	**11-12-ft Varies**	**11-12-ft**	**12-ft**
Median Width (-ft) & Type	**N/A**	**N/A**	**N/A**
Shoulder Width (-ft) (Outside)	**0-6-ft Varies**	**2-ft Paved 6-ft Overall**	**2-ft Paved 6-ft Overall**
Border Area Width (-ft)	**N/A**	**N/A**	**N/A**
Cross Slope (%)	**2%**	**2%**	**2%**
Outside Shoulder Slope	**Varies**	**6%**	**6%**
Inside Shoulder Width (-ft)	**N/A**	**N/A**	**N/A**
Sidewalks (-ft)	**0-5-ft Varies**	**N/A**	**N/A**
Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	20-35 mph Varies		25 mph*
Design Speed (mph)	**N/A**	**25 mph**	**25 mph**
Minimum Horizontal Curve Radius (-ft)	**50-ft**	**144-ft**	**144-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**6%**
Maximum Grade (%)	**17%**	**15%**	**14%**
Access Control	**N/A**	**N/A**	**N/A**
Design Vehicle	N/A		S-BUS36
Check Vehicle	N/A		SU-40
Pavement Type	HMA		HMA or PCC

~OB

*According to current GDOT Design Policy if applicable

~OB

*** Note: A speed study will be submitted for review and approval to determine if a posted speed should be lowered prior to Preliminary Design.**

Rowland Springs Rd, Wilderness Camp Rd Design Features: (Typical Section 7)	**Functional Classification:** *Major Collector* **&** **Minor Collector**		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
Number of Lanes	2		2
Lane Width(s) (-ft)	**11-12-ft Varies**	**11-12-ft**	**12-ft**
Median Width (-ft) & Type	**N/A**	**N/A**	**N/A**
Shoulder Width (-ft) (Outside)	**N/A**	**4-ft Paved 6-ft Overall**	**4-ft Paved 6-ft Overall**
Border Area Width (-ft)	**N/A**	**N/A**	**N/A**
Cross Slope (%)	**2%**	**2%**	**2%**
Outside Shoulder Slope (%)	**N/A**	**6%**	**6%**
Inside Shoulder Width (-ft)	**N/A**	**N/A**	**N/A**
Sidewalks (-ft)	**N/A**	**N/A**	**N/A**
Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	25 mph		25 mph
Design Speed (mph)	**N/A**	**25 mph**	**25 mph**
Minimum Horizontal Curve Radius (-ft)	**325-ft**	**144-ft**	**325-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**6%**
Maximum Grade (%)	**5%**	**11%**	**6%**
Access Control	**N/A**	**N/A**	**N/A**
Design Vehicle	N/A		SU-30
Check Vehicle	N/A		S-BUS36
Pavement Type	HMA		HMA or PCC

**According to current GDOT Design Policy if applicable*

Bells Ferry Rd Design Features: (Typical Section 8)	**Functional Classification:** *Major Collector*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
Number of Lanes	2		2
Lane Width(s) (-ft)	**11-ft**	**11-12-ft**	**12-ft**
Median Width (-ft) & Type	**N/A**	**N/A**	**N/A**
Shoulder Width (-ft) (Outside)	**N/A**	**4-ft Paved 6-ft Overall**	**4-ft Paved 6-ft Overall**
Border Area Width (-ft)	**N/A**	**N/A**	**N/A**
Cross Slope (%)	**2%**	**2%**	**2%**
Outside Shoulder Slope (%)	**N/A**	**6%**	**6%**
Inside Shoulder Width (-ft)	**N/A**	**N/A**	**N/A**
Sidewalks (-ft)	**N/A**	**N/A**	**N/A**
Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	35 mph		35 mph
Design Speed (mph)	**N/A**	**35 mph**	**35 mph**
Minimum Horizontal Curve Radius (-ft)	**220-ft**	**340-ft**	**340-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**6%**
Maximum Grade (%)	**5%**	**10%**	**6%**
Access Control	**N/A**	**N/A**	**N/A**
Design Vehicle	N/A		SU-30
Check Vehicle	N/A		S-BUS36
Pavement Type	HMA		HMA or PCC

**According to current GDOT Design Policy if applicable*

SR 108/Fincher Rd Design Features: (Typical Section 9)	**Functional Classification:** *Major Collector*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
Lane Width(s) (-ft)	2		2
Median Width (-ft) & Type	**11-ft**	**11-12-ft**	**12-ft**
Shoulder Width (-ft) (Outside)	**N/A**	**4-ft Paved 8-ft Overall**	**4-ft Paved 10-ft Overall**
Border Area Width (-ft)	**N/A**	**N/A**	**N/A**
Lane Width(s) (-ft)	**N/A**	**N/A**	**N/A**
Cross Slope (%)	**2%**	**2%**	**2%**
Outside Shoulder Slope (%)	**N/A**	**6%**	**6%**
Inside Shoulder Width (-ft)	**N/A**	**N/A**	**N/A**
Sidewalks (-ft)	**N/A**	**N/A**	**N/A**
Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	55 mph		55 mph
Design Speed (mph)	**N/A**	**55 mph**	**55 mph**
Minimum Horizontal Curve Radius (-ft)	**973-ft**	**960-ft**	**973-ft**
Maximum Superelevation Rate (%)	**8%****	**8%****	**8%****
Maximum Grade (%)	**4%**	**9%**	**4%**
Access Control	**By Permit**	**By Permit**	**By Permit**
Design Vehicle	N/A		SU-30
Check Vehicle	N/A		S-BUS36
Pavement Type	HMA		HMA or PCC

**According to current GDOT Design Policy if applicable*

Butterworth Rd Design Features: (Typical Section 10)	**Functional Classification:** *Major Collector*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
Number of Lanes	2		2
Lane Width(s) (-ft)	**12-ft**	**11-12-ft**	**12-ft**
Median Width (-ft) & Type	**N/A**	**N/A**	**N/A**
Shoulder Width (-ft) (Outside)	**N/A**	**4-ft Paved 6-ft Overall**	**4-ft Paved 6-ft Overall**
Border Area Width (-ft)	**N/A**	**N/A**	**N/A**
Cross Slope (%)	**2%**	**2%**	**2%**
Outside Shoulder Slope (%)	**N/A**	**6%**	**6%**
Inside Shoulder Width (-ft)	**N/A**	**N/A**	**N/A**
Sidewalks (-ft)	**N/A**	**N/A**	**N/A**
Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	35 mph		35 mph
Design Speed (mph)	**N/A**	**35 mph**	**35 mph**
Minimum Horizontal Curve Radius (-ft)	**610-ft**	**340-ft**	**610-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**6%**
Maximum Grade (%)	**6%**	**10%**	**8%**
Access Control	**N/A**	**N/A**	**N/A**
Design Vehicle	N/A		SU-30
Check Vehicle	N/A		S-BUS36
Pavement Type	HMA		HMA or PCC

**According to current GDOT Design Policy if applicable*

Marietta Hwy Design Features: (Typical Section 11)	**Functional Classification:** *Minor Arterial*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
Number of Lanes	4		4
Lane Width(s) (-ft)	**12-ft**	**11-12-ft**	**12-ft**
Median Width (-ft) & Type	**N/A**	**20-ft Raised**	**20-ft Raised**
Shoulder Width (-ft) (Outside)	**N/A**	**N/A**	**N/A**
Border Area Width (-ft)	**N/A**	**10-16-ft**	**12-ft**
Cross Slope (%)	**2%**	**2%**	**2%**
Outside Shoulder Slope (%)	**N/A**	**N/A**	**N/A**
Inside Shoulder Width (-ft)	**N/A**	**N/A**	**N/A**
Sidewalks (-ft)	**N/A**	**5-ft**	**5-ft**
Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	45 mph		45 mph
Design Speed (mph)	**N/A**	**45 mph**	**45 mph**
Minimum Horizontal Curve Radius (-ft)	**725-ft**	**643-ft**	**725-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**6%**
Maximum Grade (%)	**7%**	**9%**	**7%**
Access Control	**By Permit**	**By Permit**	**By Permit**
Design Vehicle	N/A		WB-67
Check Vehicle	N/A		OSOW
Pavement Type	HMA		HMA or PCC

**According to current GDOT Design Policy if applicable*

SR 5 Spur/ SR 140/SR 20/Hickory Flat Hwy: (Typical Section 12)	**Functional Classification:** *Principal Arterial*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
Number of Lanes	2-3 varies		4
Lane Width(s) (-ft)	**12-ft**	**11-12-ft**	**12-ft**
Median Width (-ft) & Type	**N/A**	**24-ft Raised**	**24-ft Raised**
Shoulder Width (-ft) (Outside)	**10-ft**	**6.5-ft Paved 10-ft Overall**	**6.5-ft Paved 10-ft Overall**
Border Area Width (-ft)	**N/A**	**N/A**	**N/A**
Cross Slope (%)	**2%**	**2%**	**2%**
Outside Shoulder Slope (%)	**N/A**	**6%**	**6%**
Inside Shoulder Width (-ft)	**N/A**	**2-ft**	**2-ft**
Sidewalks (-ft)	**N/A**	**N/A**	**N/A**
Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	55 mph		55 mph
Design Speed (mph)	**N/A**	**55 mph**	**55 mph**
Minimum Horizontal Curve Radius (-ft)	**1390-ft**	**1060-ft**	**1390-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**6%**
Maximum Grade (%)	**6%**	**6%**	**6%**
Access Control	**Limited Access**	**Limited Access**	**Limited Access**
Design Vehicle	N/A		WB-67
Check Vehicle	N/A		OSOW
Pavement Type	HMA		HMA or PCC

**According to current GDOT Design Policy if applicable*

Copper Hills Dr, Fieldstone Dr, Legend Creek Dr, Riverbend Way, Pope Circle and River Green Ave Design Features: (Typical Section 13)	**Functional Classification:** *Local Road and Street*		
Feature	**Existing**	***Policy**	**Proposed**
Typical Section:			
Number of Lanes	2	2	2
Lane Width(s) (-ft)	**12-ft**	**11-12-ft**	**12-ft**
Median Width (-ft) & Type	**N/A**	**N/A**	**N/A**
Shoulder Width (-ft) (Outside)	**N/A**	**N/A**	**N/A**
Border Area Width (-ft)	**N/A**	**10-16-ft**	**10-12-ft**
Cross Slope (%)	**2%**	**2%**	**2%**
Outside Shoulder Slope (%)	**N/A**	**N/A**	**N/A**
Inside Shoulder Width (-ft)	**N/A**	**N/A**	**N/A**
Sidewalks (-ft)	**N/A**	**5-ft**	**5-ft**
Auxiliary Lanes (#lanes/-ft width)	N/A		N/A
Bike Accommodations	**N/A**	**N/A**	**N/A**
Posted Speed (mph)	20-35 mph Varies		25 mph *
Design Speed (mph)	**N/A**	**25 mph**	**25 mph**
Minimum Horizontal Curve Radius (-ft)	**50-ft**	**144-ft**	**144-ft**
Maximum Superelevation Rate (%)	**N/A**	**6%**	**6%**
Maximum Grade (%)	**17%**	**15%**	**14%**
Access Control	**N/A**	**N/A**	**N/A**
Design Vehicle	N/A		S-BUS36
Check Vehicle	N/A		SU-40
Pavement Type	HMA		HMA or PCC

~OB

**According to current GDOT Design Policy if applicable*

~OB

*** Note: A speed study will be submitted for review and approval to determine if a posted speed should be lowered prior to Preliminary Design.**

Design Exceptions/Design Variances to FHWA or GDOT Controlling Criteria anticipated:

FHWA or GDOT Controlling Criteria	No	Undetermined	Yes	DE or DV	Approval Date (if applicable)
1. Design Speed	☒	☐	☐		
2. Design Loading Structural Capacity	☒	☐	☐		
3. Stopping Sight Distance	☒	☐	☐		
4. Horizontal Curve Radius	☒	☐	☐		
5. Maximum Grade	☐	☐	☒	DE	11/13/2019
6. Vertical Clearance	☒	☐	☐		
7. Superelevation Rate	☒	☐	☐		
8. Lane Width	☒	☐	☐		
9. Cross Slope	☒	☐	☐		
10. Shoulder Width	☒	☐	☐		

1. Maximum existing grade of SR 20 between Roberson Road and Timberlake Cove is 6.8%.

Design Variances to GDOT Standard Criteria anticipated:

GDOT Standard Criteria	No	Undetermined	Yes	Approval Date (if applicable)
1. Access Control	☒	☐	☐	
2. Shoulder Width	☒	☐	☐	
3. Intersection Sight Distance	☒	☐	☐	
4. Intersection Skew Angle	☒	☐	☐	
5. Tangent Lengths on Reverse Curves	☒	☐	☐	
6. Lateral Offset to Obstruction	☒	☐	☐	
7. Rumble Strips	☒	☐	☐	
8. Safety Edge	☒	☐	☐	
9. Median Usage	☐	☐	☒	09/17/2019
10. Roundabout Illumination Levels	☒	☐	☐	
11. Complete Streets Warrants	☒	☐	☐	
12. ADA Requirements in PROWAG	☒	☐	☐	
13. GDOT Construction Standards	☒	☐	☐	
14. GDOT Drainage Manual	☒	☐	☐	

1- The Approved Design Variance is for SR 20 between Bells Ferry Road/Wilderness Camp Rd to reduce median width from 24-ft to 12-ft

VE Study anticipated: ☐ No ☒ Yes ☒ Completed: *9/18/2018*

Lighting Required: ☐ No ☒ Yes - Roundabout

NOTE: Local Letters of Support have been requested. *~OB*

Off-site Detours Anticipated: ☐ No ☒ Undetermined ☐ Yes

If yes: Roadway type to be closed: ☐ Local Road ☐ State Route

Detour Route selected: ☐ Local Road ☐ State Route

District Concurrence w/Detour Route: ☐ No/Pending ☐ Received *Date*

Transportation Management Plan [TMP] Required: ☐ No ☒ Yes

If Yes: Project classified as: ☒ Non-Significant ☐ Significant

TMP Components Anticipated: ☒ TTC ☐ TO ☐ PI

INTERCHANGES AND INTERSECTIONS

Interchanges/Major Intersections: Major Intersections include SR 20 at I-75, SR 20 at SR 294, SR 20 at Bells Ferry Road/Wilderness Camp Road , SR 20 at Fincher Road/Highway 108, SR 20 at Fields Landing Drive, SR 20 at River Green Avenue/Butterworth Road, SR 20 at Marietta Highway/Highway 140, SR 20 at Hickory Flat Highway/Highway 140.

Intersection Control Evaluation (ICE) Required: ☐ No ☒ Yes

Roundabout Concept Validation Required: ☐ No ☒ Yes ☐ Completed *Date*

UTILITY AND PROPERTY

Railroad Involvement: N/A

Utility Involvements:

Owner	Type
Amicalolca EMC	Electric
AT&T	Telecommunications
Atlanta Gas Light	Gas
City of Cartersville - Gas	Gas
Cherokee County Water and Sewer Authority	Water and Sewer
Bartow County Water	Water
Comcast	Telecommunications
Dalton Utilities - Transmission	Electric
Georgia Power – Distribution	Electric
Georgia Power - Transmission	Electric
Sunesys	Telecommunications
Windstream Communications	Telecommunications

SUE Required: ☐ No ☒ Yes ☐ Undetermined

Public Interest Determination Policy and Procedure recommended: ☐ No ☒ Yes
* Noted: Consideration ~OB

Right-of-Way (ROW): Existing width: 80-200ft. Proposed width: 150-450ft.

Required Right-of-Way anticipated: ☐ None ☒ Yes ☐ Undetermined
Easements anticipated: ☐ None ☒ Temporary ☒ Permanent * ☐ Utility ☐ Other
** Permanent easements include the right to place utilities.*

Anticipated total number of impacted parcels:		200
Displacements anticipated:	Businesses:	7
	Residences:	22
	Other:	
Total Displacements:		29

Location and Design approval: ☐ Not Required ☒ Required

Impacts to USACE property anticipated: ☐ No ☒ Yes ☐ Undetermined

ENVIRONMENTAL & PERMITS

Anticipated Environmental Document: *NEPA ~ EA-FONSI*

Level of Environmental Analysis:

☐ The environmental considerations noted below are based on preliminary desktop or screening level environmental analysis and are subject to revision after the completion of resource identification, delineation, and agency concurrence.

☒ The environmental considerations noted below are based on the completion of resource identification, delineation, and agency concurrence.

GDOT MS4 Permit Compliance – Is the project located in a GDOT MS4 area? ☐ No ☒ Yes
If yes, is the GDOT MS4 Permit anticipated to apply to all or part of this project? ☐ No ☒ Yes

A portion of the project is located within an MS4 area. The total length of project located in the MS4 area is approximately 7.7 miles.

Is Non-MS4 water quality mitigation anticipated? ☒ No ☐ Yes

Environmental Permits/Variances/Commitments/Coordination anticipated:

Permit/Variance/Commitment/ Coordination Anticipated	No	Yes	Remarks
1. U.S. Coast Guard Permit	☒	☐	
2. Forest Service/NPS	☒	☐	
3. CWA Section 404 Permit	☐	☒	Individual Permit anticipated.
4. Tennessee Valley Authority Permit	☒	☐	
5. USACE Real Estate Outgrant	☐	☒	Permanent Easement required
6. Buffer Variance	☐	☒	
7. Coastal Zone Management Coordination	☒	☐	
8. NPDES	☐	☒	
9. FEMA	☐	☒	
10. Cemetery Permit	☒	☐	Unmarked cemetery exists in close proximity to SR 20, but design has been modified to try to avoid impacting it.
11. Other Permits	☒	☐	
12. Other Commitments	☐	☒	
13. Other Coordination	☐	☒	

Coordination with the U.S. Army Corps of Engineers (USACE) under Section 4(f) is also needed due to impacts to the Allatoona Wildlife management Area (WMA) as well as the Day Use Area (boat ramp) west of Knox Bridge.

Is a PAR required? ☐ No ☒ Yes ☒ Completed *2/7/2020*

Environmental Comments and Information:

NEPA/GEPA: NEPA document level is anticipated to be an Environmental Assessment (EA)/Finding of No Significant Impact (FONSI). The project will use part of the Allatoona WMA, which is owned by the USACE and leased to the Georgia Department of Natural Resources (DNR) for wildlife and recreation purposes. The project would also affect a USACE Day Use Area near Lake Allatoona.

Ecology: Field surveys for ecological resources have been conducted. An Ecology Resources Survey Report has been completed and approved for the project, and an Ecology Resources Assessment of Effects will be required. Field surveys located 54 intermittent streams, 34 perennial streams, 15 open waters, 66 wetlands, and four ephemeral channels in the project area. All jurisdictional streams (intermittent and perennial) and open waters are considered buffered state waters.

Seasonal surveys for protected species have been completed. Three protected plant species—pink ladyslipper, Cumberland rose-gentian, and Georgia aster—were found along the corridor. Presence of federally protected Indiana, northern long eared, and gray bats within the project area is assumed and further acoustic surveys and mist netting are not required. In addition, there are documented occurrences of the Etowah darter, amber darter, Cherokee darter, rock darter, Coosa chub, frecklebelly madtom, freckled darter, Etowah crayfish, and protected lined chub in or near project area waters. Therefore, GDOT Special Provision 107.23H will be required during project implementation, which would contain appropriate measures to protect the species and suitable habitat during construction.

History: A survey for historic resource has been completed for this project, and a Historic Resources Survey Report (HRSR) prepared. The survey identified 14 historic resources eligible for listing on the National Register of Historic Places (NRHP) along the proposed project corridor. The State Historic Preservation Office (SHPO) concurred with these findings on August 31, 2017. The proposed project would likely affect several of these resources; however, it is not known if these effects would be considered adverse. A cultural resources Assessment of Effects (AOE) report will be required for review and concurrence by the SHPO.

Archaeology: Field surveys for archaeological resources and cemeteries have been completed, and a Phase 1 Archaeological Resources Survey Report is in preparation, which will require concurrence by the SHPO. Several sites and cemeteries were identified within the project study area. There are two cemetery sites within close proximity of the project corridor. Project design in this area has already been modified to minimize impacts to these sites. Impacts to cemeteries and archaeological sites will be discussed in the Cultural Resources AOE to be prepared for this project.

Air Quality:

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

This concept conforms with the Atlanta Regional Commission's Transportation Improvement Program. ARC's Fact Sheet for this project states "This project widens this critical East-West Corridor linking Cartersville and I-75 to Canton from 2 to 4 lanes". ARC's network schematics for this corridor show two thru-lanes in each direction for this corridor from I-75 to I-575. Network Year is 2030.

Noise Effects: The proposed project is a Type I Project under FHWA's Highway Traffic Noise Policy and Guidance (revised January 2011). Therefore, a noise impact assessment with abatement (barrier) analysis will be completed for this project. This assessment will model existing and anticipated future Build condition noise levels along the corridor and determine whether abatement for any noise impacts would be considered reasonable and feasible.

Public Involvement: Public information open houses (PIOHs), including one virtual PIOH and up to two traditional open houses, are planned for the project, but have not yet been scheduled. Since an EA is anticipated for this project, a Public Hearing Open House (PHOH) will also be required. Additional public outreach may be required for impacts to recreational facilities at or uses in the Allatoona WMA.

Stakeholder interviews were held in September and October 2014 with the City of Canton, City of Cartersville, Cherokee County (Chairman, Public Works, County Manager), Bartow County (Commissioner, County Administrator), Cherokee County Schools Superintendent and Planning/Forecasting Coordinator, Bartow County

Schools Director of Transportation, Cartersville-Bartow Chamber of Commerce, and Cherokee Chamber of Commerce. Major topics discussed in these interviews included safety issues and concerns along the corridor and predicted future residential and commercial growth of the corridor.

Major stakeholders: Major stakeholders include the City of Canton, City of Cartersville, Cherokee and Bartow counties, USACE, USFWS, Georgia DNR, homeowners' associations, schools, and the traveling public

CONSTRUCTION

Issues potentially affecting constructability/construction schedule:

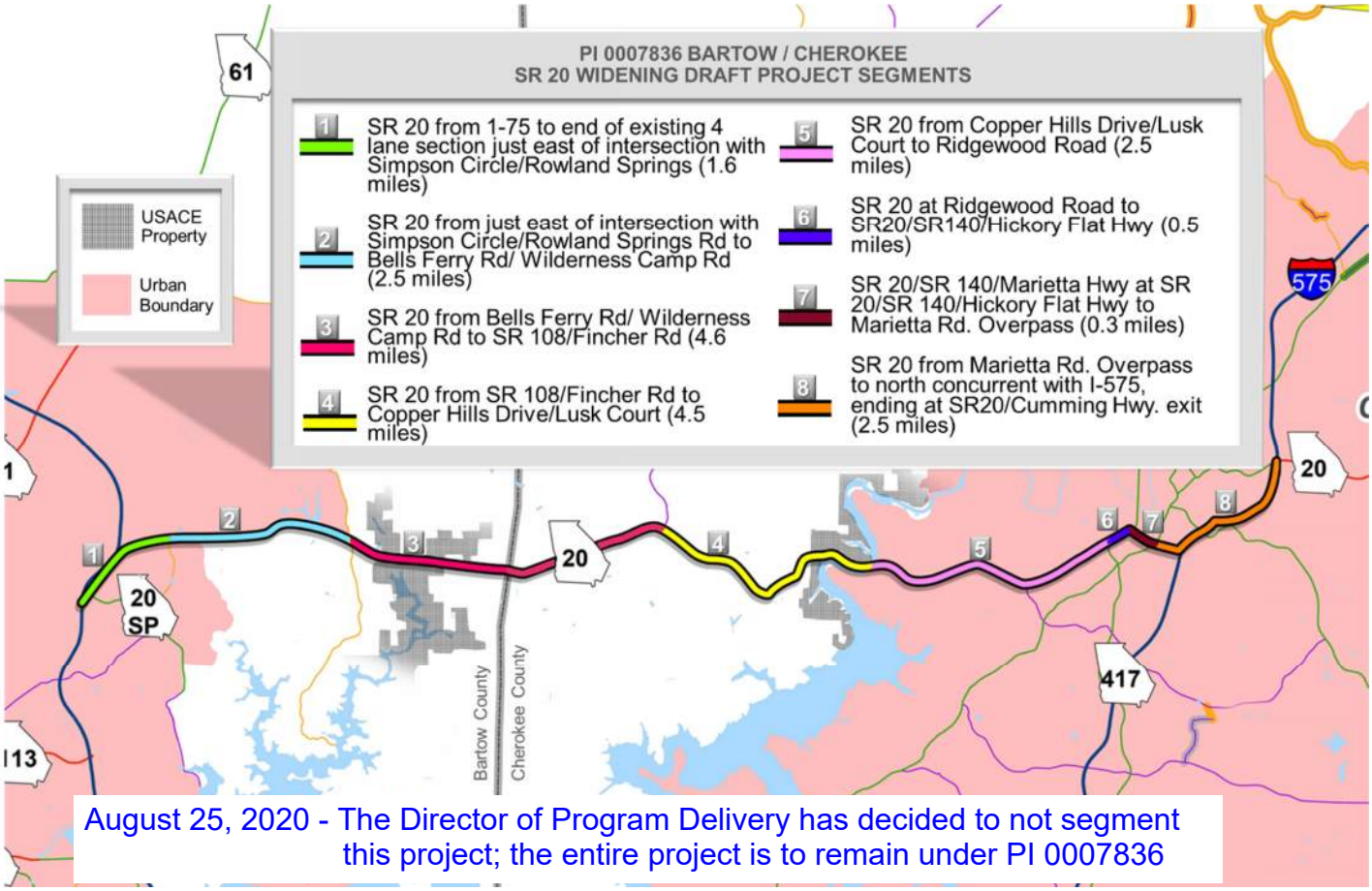
1. There is visual evidence of rock along existing cuts. This may require blasting in order to widen the roadway. Traffic may have to be detoured during this activity. Geotechnical survey will determine the precise locations. Potential locations include:
    a. North side of SR 20 at Lake Allatoona, both western and eastern shores
    b. North side of SR 20 between Stamp and Boston Creeks.
2. Project should be spilt into 8 segments. Full corridor will not be bid in one letting. Based on factors such as ADHS criteria, geometry, staging, constructability, environmental documentation & logical termini, potential dividing points between segments are identified in the following table:

Segment No.	Begin/End	Description	Approximate Length (Miles)	Project Cost Estimate
1	I-75 to Dean Road/Simpson Circle	Existing roadway in this segment consists of 4 lanes with both depressed and flush medians. Existing roadway transitions from 4-lane with flush median to 4-lane with no median at the Segment 1 & 2 dividing point	0.7	$4.1M
2	Dean Road/Simpson Circle to Bells Ferry/Wilderness Camp Road	Existing roadway is 2-4 lanes and no median. Urban Area Boundary is at the Segment 2 & 3 dividing point.	3.2	$23.0M
3	Bells Ferry/Wilderness Camp Road to SR 108/Fincher Road/Upper Sweetwater Trail	Bells Ferry/Wilderness Camp Road to SR 108/Fincher Road/Upper Sweetwater Trail – Existing roadway is 2-3 lanes. Roadway passes through the USACE Allatoona WMA with two bridge crossings.	4.6	$36.9M
4	SR 108/Fincher Road/Upper Sweetwater Trail to Copper Hills Drive/Lusk Court	Existing roadway is 2-3 lanes. Roadway passes through USACE Allatoona WMA and contains mountainous terrain and a bridge crossing over Lake Allatoona. Urban Area Boundary is located at Lake Allatoona.	4.6	$51.2M
5	Copper Hills Drive/Lusk Court to Ridgewood Road	Existing roadway is 2-3 lanes.	2.5	$17.5M
6	Ridgewood Road to SR 140/Hickory Flat Hwy	Existing roadway is 6 lanes with a flush median.	0.5	$4.5M
7	SR 140/Hickory Flat Hwy to Marietta Road Overpass	Add a second lane to SR 140 eastbound towards I-575.	0.4	$1.9M

8	Marietta Road Overpass & Concurrent with I-575 to SR 20/Cumming Hwy exit	No construction activities proposed	2.5	$0

Early Completion Incentives recommended for consideration: ☒ No ☐ Yes

PROPOSED SEGMENTING MAP



August 25, 2020 - The Director of Program Delivery has decided to not segment this project; the entire project is to remain under PI 0007836

COORDINATION, ACTIVITIES, RESPONSIBILITIES, AND COSTS

Initial Concept Team Meeting: Held April 27, 2017, meeting minutes attached

Concept Team Meeting: Held on December 17, 2019, District 6 Office, Magnolia Conference Room, meeting minutes attached

Other coordination to date: Meeting with USACE held on July 13, 2017, meeting minutes attached. USACE coordination with ARPA activities for Archaeology Special Studies.

Project Activity	Party Responsible for Performing Task(s)
Concept Development	Arcadis US, Inc.
Design	Arcadis US, Inc.
Right-of-Way Acquisition	GDOT District 6 Right of Way Office
Utility Coordination (Preconstruction)	District 6 Utilities Office

Utility Relocation (Construction)	Utility Owner/Contractor
Letting to Contract	GDOT Construction Bidding Administration
Construction Supervision	GDOT District 6 Construction Office
Providing Material Pits	Contractor
Providing Detours	Contractor
Project Activity	**Party Responsible for Performing Task(s)**
Environmental Studies, Documents, & Permits	Arcadis US, Inc.
Environmental Mitigation	GDOT Environmental Compliance Office
Construction Inspection & Materials Testing	GDOT District 6 District 6 Construction

Project Cost Estimate Summary and Funding Responsibilities:

	PE Activities		ROW	Reimbursable Utilities	CST*	Total Cost
	PE Funding	Section 404 Mitigation				
Programmed Cost:	$13,577,056		$55,120,000	$6,935,000	$180,661,288	$259,293,344
Funded By:	GDOT	TBD	GDOT	GDOT	GDOT	
Estimated Amount:	$15,000,000	$3,142,580	$59,765,000**	$6,935,000	$182,304,951	$267,147,531
Date of Estimate:	12/17/2013	1/10/2020	04/04/2018	02/15/2019	**04/30/2020**	
Cost Difference:	$1,422,944		$4,645,000	$0	$1,643,663	$7,854,187

~ OB

*CST Cost includes: Construction, Engineering and Inspection, Contingencies and Liquid AC Cost Adjustment
** Estimated ROW cost by Designer.

ALTERNATIVES DISCUSSION

Alternative selection:

Preferred Alternative: Combination of widening to the north, south and symmetrically. Combination of raised 20-ft & 24-ft median and 32-ft depressed median. Segment near Lake Allatoona with 6 existing reverse curves will be straightened into two curves.

Estimated Property Impacts:	209 AC/200 Parcels	**Estimated Total Cost:**	$ 267,147,531
* **Estimated ROW Cost:**	$ 59,765,000	**Estimated CST Time:**	3 years

~ OB

Rationale: Due to the mountainous terrain, widening exclusively to the north or south of the existing roadway would not be practical. Corridor was analyzed to determine the most efficient side to widen in each tangent segment of the corridor. Based on the results of the results of the analysis, this alternative has the lowest overall cost. Factors used to determine which side to widen: right-of-way acquisition area, displacements, earthwork volume, environmental resource impacts, utility pole impacts and staging considerations. In the PAR, alternatives were considered in the segment of the corridor on the western shore of Lake Allatoona. This area has six reverse curves and the geometry is to be corrected.

- PAR Alternative A (part of the Preferred Alternative): Mostly follow existing alignment, but cuts straight across existing reverse curves. This addressed the geometric deficiency of six reverse curves and struck a balance with costs.
- PAR Alternative B: New alignment north of existing alignment - $2.7 million more than Alternative A, primarily due to more earthwork. Does not include additional ROW costs associated with new alignment.

- PAR Alternative C: Follow existing alignment as closely as possible - $0.6 million less than Alternative A. This alternative did not address the geometric deficiencies for six reverse curves and was eliminated.

* Estimated ROW cost by Designer.

No-Build Alternative: No widening			
Estimated Property Impacts:	0 AC	**Estimated Total Cost:**	$0
Estimated ROW Cost:	$0	**Estimated CST Time:**	N/A
Rationale: Does not meet Project Justification Statement			

Alternative 2: Widen roadway exclusively to the north of the existing roadway – 44-ft depressed median			
Estimated Property Impacts:	295 AC/329 Parcels	**Estimated Total Cost:**	$302 million
Estimated ROW Cost*:	$84 million	**Estimated CST Time:**	3 years
Rationale: More ROW will need to be acquired, 1.41 million CY of additional unclassified earthwork. Widening exclusively to the north will prevent flexibility needed to selectively avoid parcels/displacements and to correct geometric deficiencies and in turn accommodate maintenance of traffic during construction. An existing dam located near JR Road on the north side of corridor would be impacted. A 44-ft wide median used for the entire corridor would prevent using context sensitive design in avoid impacts to USACE property.			

* Estimated ROW cost by Designer.

Alternative 3: Widen roadway exclusively to the south of the existing roadway – 44-ft depressed median			
Estimated Property Impacts:	280 AC/348 Parcels	**Estimated Total Cost:**	$298 million
Estimated ROW Cost*:	$80 million	**Estimated CST Time:**	3 years
Rationale: More ROW will need to be acquired,1.46 million CY of additional unclassified earthwork. Widening exclusively to the south will prevent flexibility needed to selectively avoid parcels/displacements and to correct geometric deficiencies and in turn accommodate maintenance of traffic during construction. Lake Allatoona is located on the south side and parallel to the corridor, which prevents widening to that side. A 44-ft wide median used for the entire corridor would prevent using context sensitive design in avoid impacts to USACE property.			

* Estimated ROW cost by Designer.

Alternative 4: Widen roadway exclusively to the north of the existing roadway – 24-ft raised median			
Estimated Property Impacts:	228 AC/314 Parcels	**Estimated Total Cost:**	$275 million
Estimated ROW Cost*:	$65 million	**Estimated CST Time:**	3 years
Rationale: More ROW will need to be acquired, 0.3 million CY of additional unclassified earthwork. Widening exclusively to the north will prevent flexibility needed to selectively avoid parcels/displacements and to correct geometric deficiencies and in turn accommodate maintenance of traffic during construction. An existing dam located near JR Road on the north side of corridor would be impacted.			

* Estimated ROW cost by Designer.

Alternative 5: Widen roadway exclusively to the south of the existing roadway – 24-ft raised median			
Estimated Property Impacts:	221 AC/306 Parcels	**Estimated Total Cost:**	$273 million
Estimated ROW Cost*:	$63 million	**Estimated CST Time:**	3 years
Rationale: More ROW will need to be acquired, 0.4 million CY of additional unclassified earthwork. Widening exclusively to the south will prevent flexibility needed to selectively avoid parcels/displacements and to correct geometric deficiencies and in turn accommodate maintenance of traffic during construction. Lake Allatoona is located on the south side and parallel to the corridor, which prevents widening to that side.			

* Estimated ROW cost by Designer.

Comments: Estimated Total Costs exclude the ROW costs. Estimated Total Costs for Alternatives 2 thru 5 is based on the additional earthwork required compared to the Preferred Alternative at $7.25/CY (Oct'17-Sep'19 Average GDOT unit price for unclassified excavation line item). Estimated ROW cost by designer for alternatives 2 thru 5 is based on unit cost of $285,646/AC, which was calculated from the Preliminary ROW Cost Summary of the Preferred Alternative dated April 4, 2018.

LIST OF ATTACHMENTS/SUPPORTING DATA

1. Concept Layout
2. Typical sections
3. Detailed Cost Estimates:
    a. Construction including Engineering and Inspection and Contingencies
    b. Revisions to Programmed Costs forms, & Liquid AC Cost Adjustment forms
    c. Right-of-Way
    d. Section 404 Mitigation Cost Estimate
    e. Utilities
4. Concept Utility Report
5. Crash summaries
6. Design Traffic diagrams
7. Capacity analysis summary
8. Summary of Signal Warrant Analysis
9. ICE Report(s)
    a. Stage 1 Screening Decision Record
    b. Concurrence Memo
    c. Stage 2 Alternative Selection Decision Record
    d. Approved Waiver Requests
10. Roundabout Data
    a. Concept validation – Geometric & Performance checks (Fastest Paths, Design & OSOW vehicle swept paths, Sight distance checks.
11. S I & A Report(s)
12. MS4 Concept Report Summary
13. Conforming plan's network schematics showing thru lanes.
14. Minutes of Concept meetings
15. PAR Report Summary
16. Stakeholder Interviews/Meeting Summaries
17. Other items Referred to in Report
    a. VE Study Implementation Letter
    b. No known maintenance issues

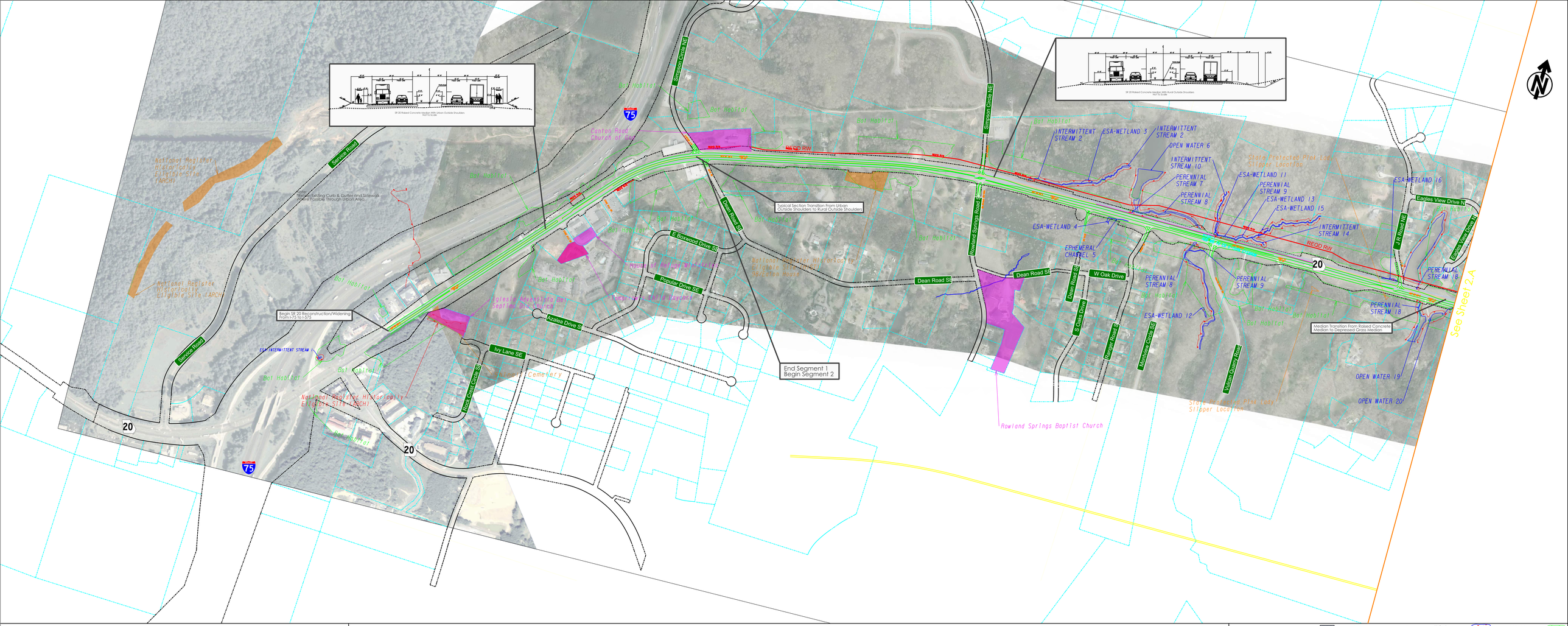
d. Approved Design Exceptions and Variances

APPROVALS

Concur:	Director of Engineering	7/2/2020 Date
Approve:	Chief Engineer	7/10/2020 Date

Digitally signed by Margaret B. Pirkle
DN: cn=Margaret B. Pirkle, o=Georgia Department of Transportation, ou=Chief Engineer, email=mpirkle@dot.ga.gov, c=US
Date: 2020.07.10 18:40:48 -04'00'

Concept Layout



GDOT Georgia Department of Transportation

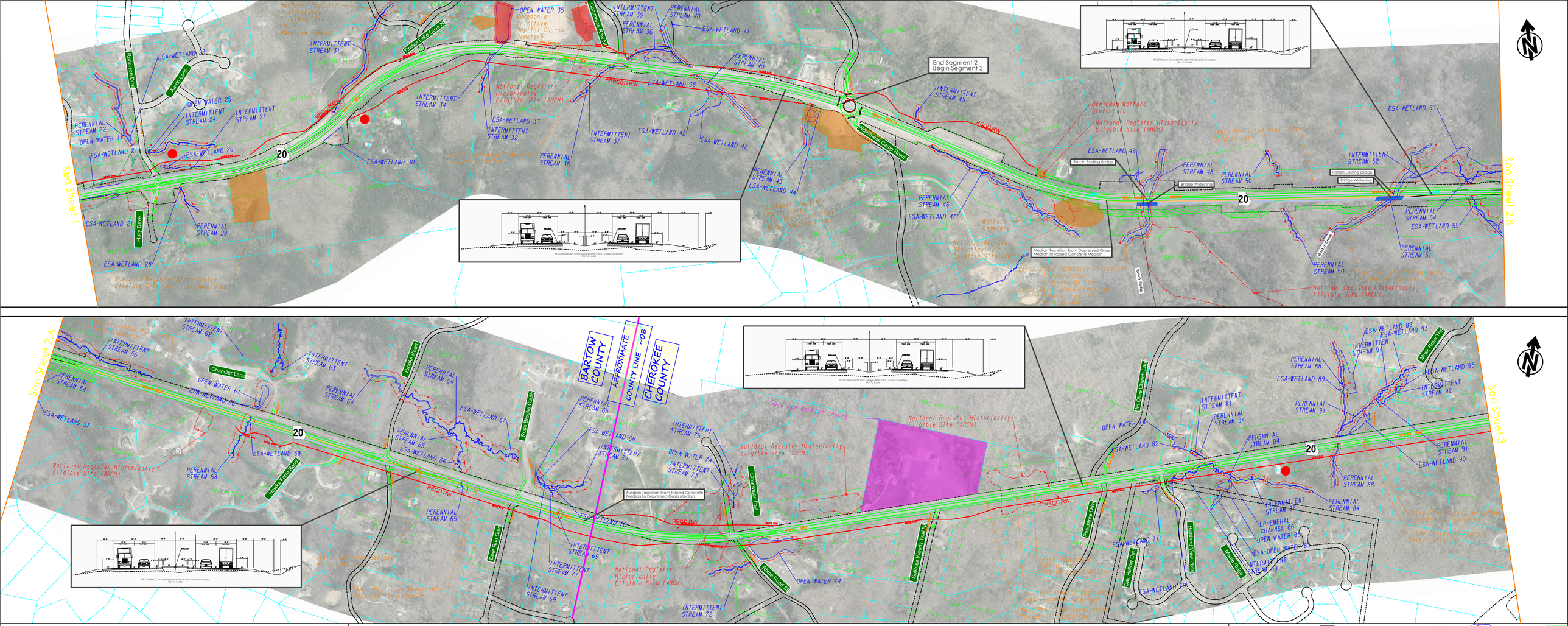
SR 20 Reconstruction/Widening from I-75 to I-575 (PI 0007836) - Concept Layout

LEGEND:

Scale In Feet: 0 100 200 400

Lanes With Depressed Grass Median
Lanes With Concrete Raised Median
Retaining Wall
GIS Property Lines
Cut Line
Fill Line
Proposed ROW
Proposed Permanent Easement
Existing Permanent Easement (Corps, Property)
Wetland
Stream
Open Water
Historical Resource
Community Facilities
Bat Habitats
State/Federally Protected Species
Environmental Justice (EJ) Community Boundary
Potential Displacement

Sheet 1



GDOT Georgia Department of Transportation

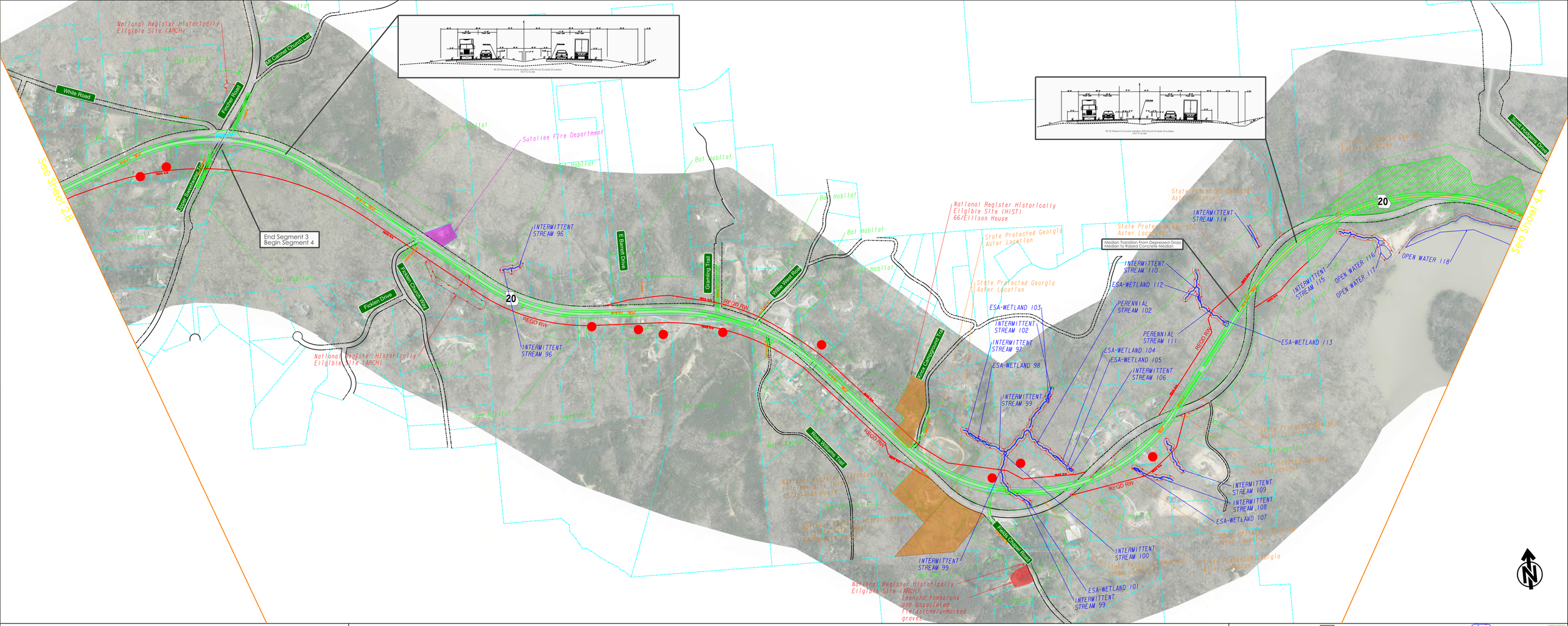
SR 20 Reconstruction/Widening from I-75 to I-575 (PI 0007836) - Concept Layout

LEGEND:

Scale 1:2400

Lanes With Depressed Grass Median
Lanes With Concrete Raised Median
Retaining Wall
GA Property Lines
Cut Line
Fill Line
Proposed ROW
Proposed Permanent Easement
Existing Permanent Easement (CDRs, Property)
Wetland
Stream
Open Water
Historical Resource
Community Facilities
Bat Habitats
States/Federally Protected Species
Environmental Justice (EJ) Community Boundary
Potential Displacement

Sheet 2 of 3



GDOT Georgia Department of Transportation

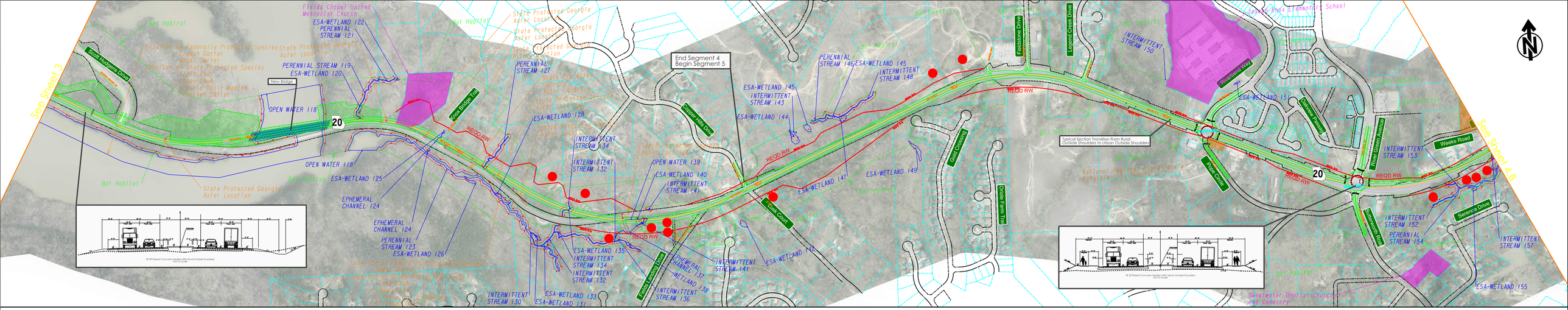
SR 20 Reconstruction/Widening from I-75 to I-575 (PI 0007836) - Concept Layout

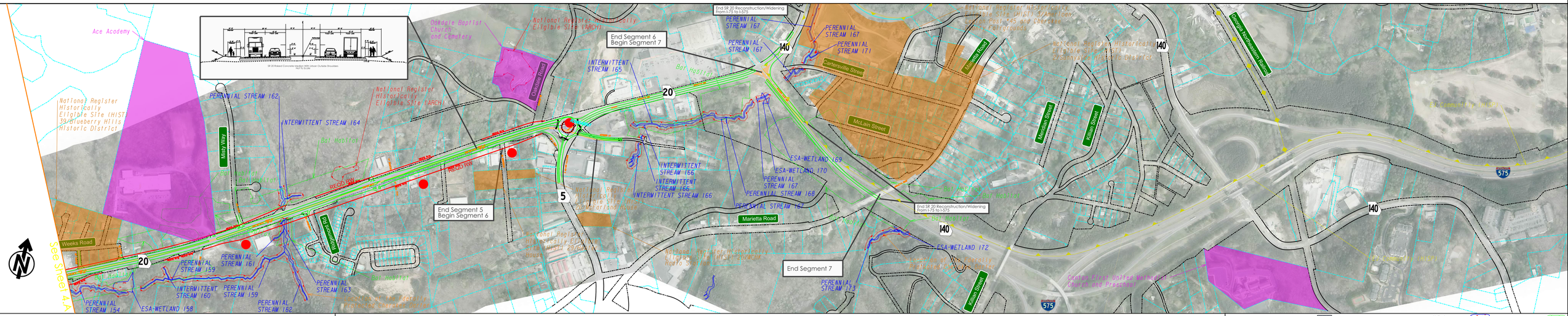
LEGEND:

Scale In Feet: 0 100 200 400

- Lanes With Depressed Grass Median
- Lanes With Concrete Raised Median
- Retaining Wall
- GA Property Lines
- Cut Line
- Fill Line
- Proposed ROW
- Proposed Permanent Easement
- Existing Permanent Easement (CONS. Property)
- Wetland
- Stream
- Open Water
- Historical Resource
- Community Facilities
- Bat Habitats
- State/Federally Protected Species
- Environmental Justice (EJ) Community Boundary
- Potential Displacement

Sheet 3 of 3





GDOT Georgia Department of Transportation

SR 20 Reconstruction/Widening from I-75 to I-575 (PI 0007836) - Concept Layout

LEGEND:

Scale 1:1 Feet
200 0 200 400

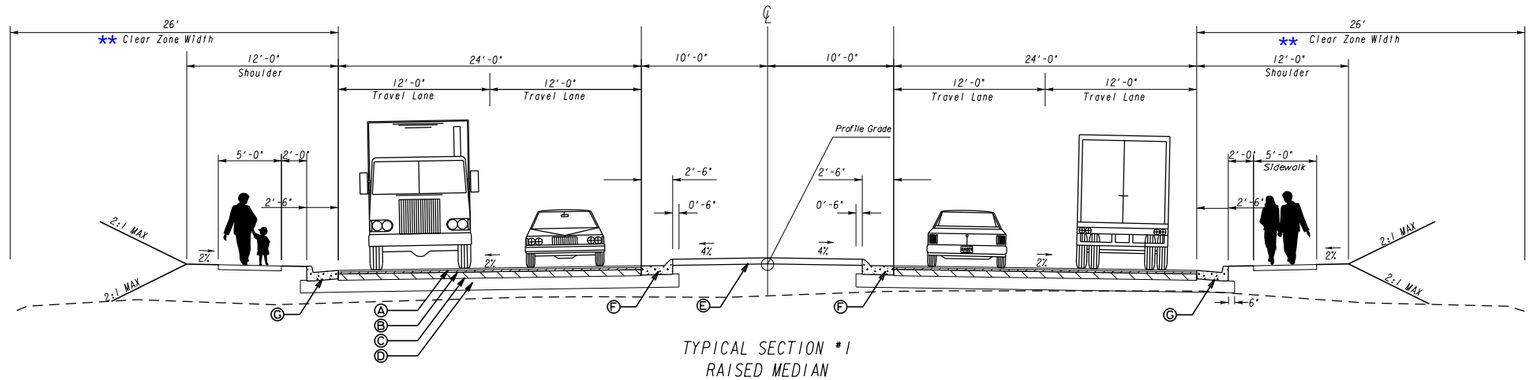
Lanes With Depressed Grass Median
Lanes With Concrete Raised Median
Retaining Wall
GA Property Lines
Cut Line
Fill Line
Proposed ROW
Proposed Permanent Easement
Existing Permanent Easement (Corps, Property)
Wetland
Stream
Open Water
Historical Resource
Community Facilities
Bat Habitats
State/Federally Protected Species
Environmental Justice (EJ) Community Boundary
Potential Displacement

Sheet 4 of 4

Typical Sections

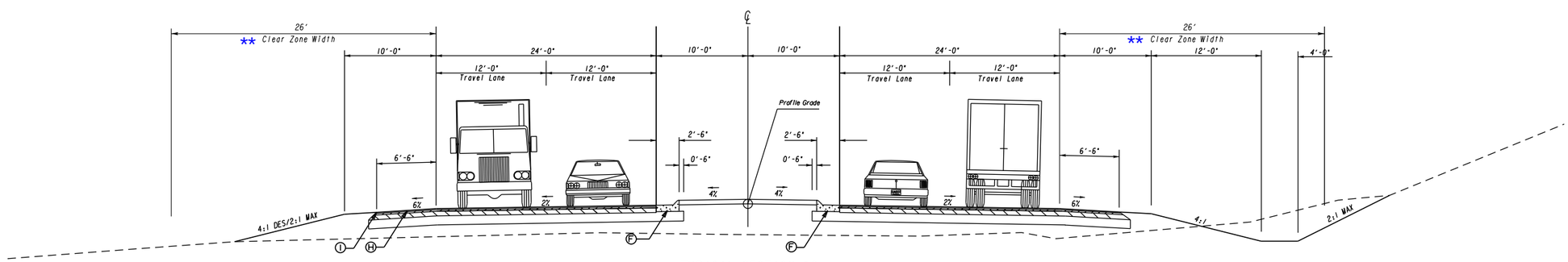
**** NOTE:** *~OB*

Clear Zone widths for all Typical Sections will be verified and revised as necessary per updated traffic volumes according to the proposed design speeds and roadway functional classifications during Preliminary Design.



TYPICAL SECTION #1
RAISED MEDIAN
URBAN SECTION
SR 20
Beginning to Simpson Cir/Dean Rd
West of Fieldstone Dr to Marietta Hwy
45 MPH D.S.

(A) 1.5" 12.5MM ASPHALTIC CONCRETE SUPERPAVE (165#/SY)
(B) 2" 19MM ASPHALTIC CONCRETE SUPERPAVE (220#/SY)
(C) 8" 25MM ASPHALTIC CONCRETE SUPERPAVE (880#/SY)
(D) 12" G.A.B.
(E) 6" RAISED CONCRETE MEDIAN
(F) 8X24" GDOT TYPE 7 CURB & GUTTER
(G) 8X24" GDOT TYPE 2 CURB & GUTTER
(H) RUMBLE STRIP PAVEMENT EDGE TREATMENT
(I) PAVEMENT EDGE TREATMENT



TYPICAL SECTION #2
RAISED MEDIAN
SR 20
Simpson Cir/Dean Rd to Roberson DR/Holly Dr
45 MPH D.S.

ARCADIS Design & Consultancy for natural and built assets

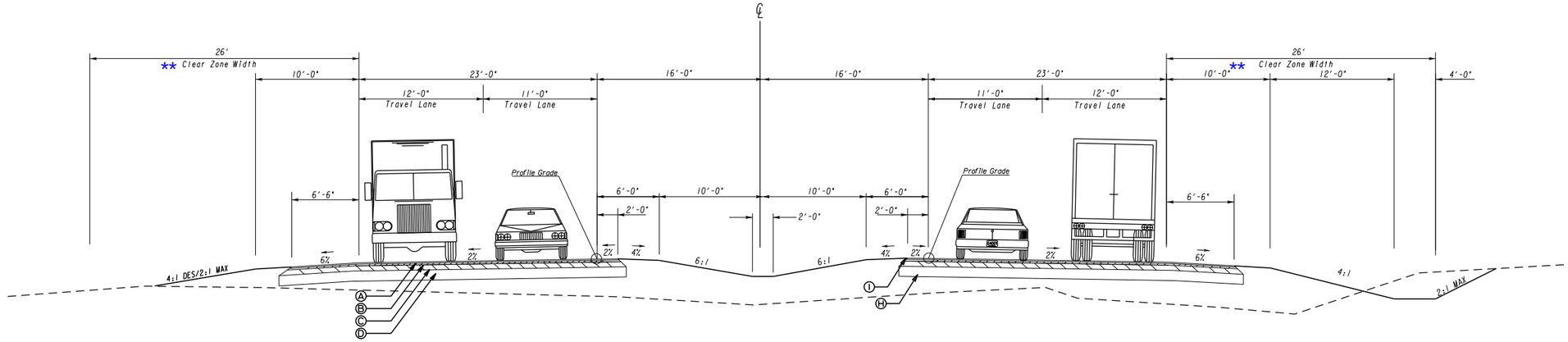
NOT FOR CONSTRUCTION

REVISION DATES

TYPICAL SECTIONS
CONCEPT TYPICAL SECTIONS
SR 20 FROM I-75 TO I-575

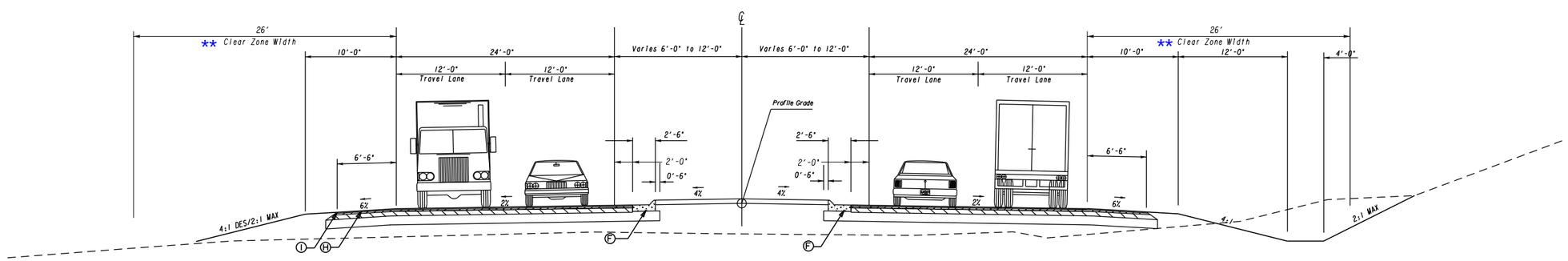
CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No. 05-001



TYPICAL SECTION #3
DEPRESSED MEDIAN
SR 20
Roberson Dr/Holly Dr to Bells Ferry/Wilderness Camp Rd
Clearwater Tr/Rhine Rd to Allatoona WMA boundry
55 MPH D.S.

(A) 1.5" 12.5MM ASPHALTIC CONCRETE SUPERPAVE (165#/SY)
(B) 2" 19MM ASPHALTIC CONCRETE SUPERPAVE (220#/SY)
(C) 8" 25MM ASPHALTIC CONCRETE SUPERPAVE (880#/SY)
(D) 12" G.A.B.
(E) 6" RAISED CONCRETE MEDIAN
(F) 8X24" GDOT TYPE 7 CURB & GUTTER
(G) 8X24" GDOT TYPE 2 CURB & GUTTER
(H) RUMBLE STRIP PAVEMENT EDGE TREATMENT
(I) PAVEMENT EDGE TREATMENT



TYPICAL SECTION #4
RAISED MEDIAN
SR 20
Bells Ferry/Wilderness Camp Rd to Clearwater Tr/Rhine Rd
Allatoona WMA boundry to West of Fieldstone Dr
55 MPH D.S.

ARCADIS C Design & Consultancy for natural and built assets

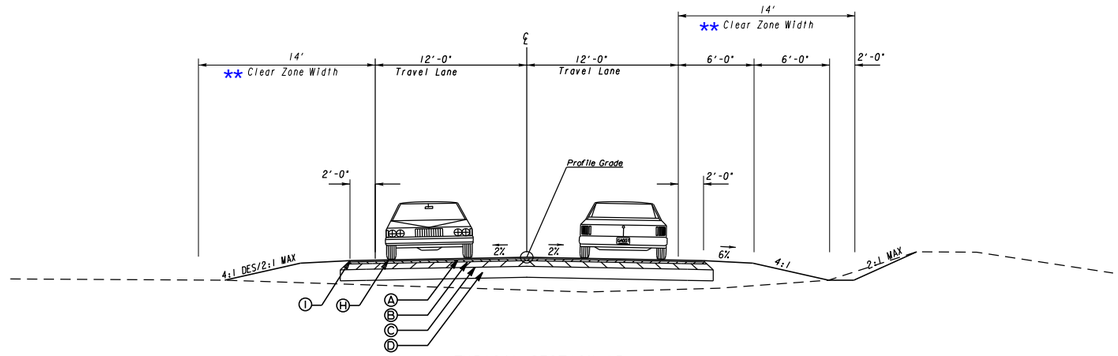
NOT FOR CONSTRUCTION

REVISION DATES

TYPICAL SECTIONS
VE STUDY LAYOUT
SR 20 FROM I-75 TO I-575

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

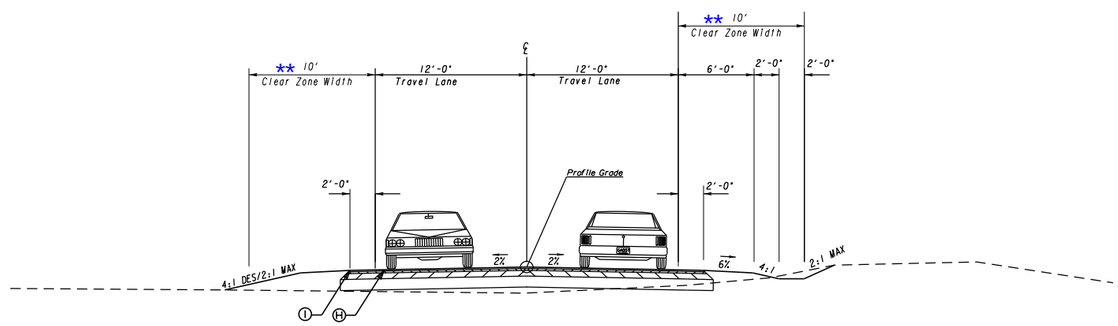
DRAWING No.
05-002



TYPICAL SECTION #5

30 MPH D.S.

(A) 1.5" 12.5MM ASPHALTIC CONCRETE SUPERPAVE (165#/SY)
(B) 2" 19MM ASPHALTIC CONCRETE SUPERPAVE (220#/SY)
(C) 8" 25MM ASPHALTIC CONCRETE SUPERPAVE (880#/SY)
(D) 12" G.A.B.
(E) 6" RAISED CONCRETE MEDIAN
(F) 8X24" GDOT TYPE 7 CURB & GUTTER
(G) 8X24" GDOT TYPE 2 CURB & GUTTER
(H) RUMBLE STRIP PAVEMENT EDGE TREATMENT
(I) PAVEMENT EDGE TREATMENT



TYPICAL SECTION #6

25 MPH D.S.

ARCADIS Design & Consultancy for natural and built assets

NOT FOR CONSTRUCTION

REVISION DATES		

TYPICAL SECTIONS

CONCEPT TYPICAL SECTIONS

CHECKED:		DATE:		DRAWING No.
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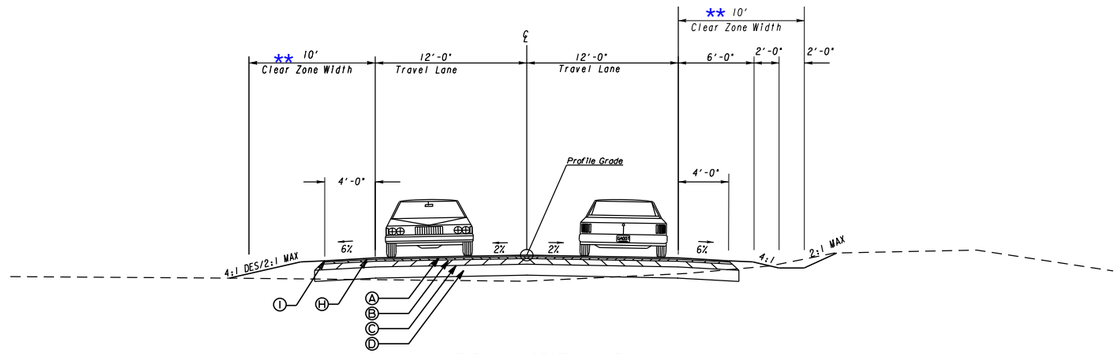
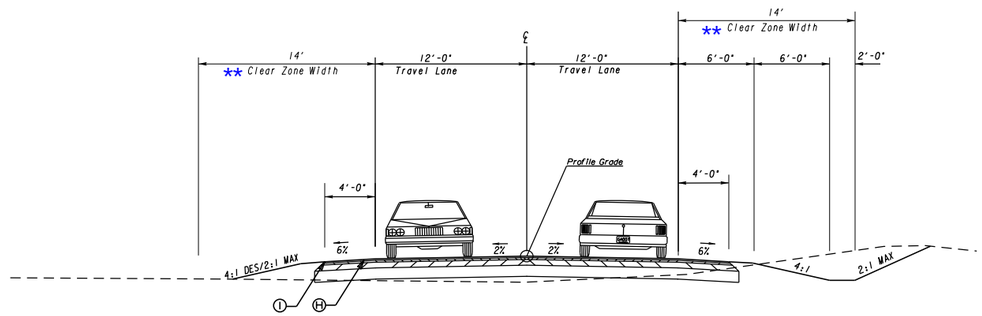
CORRECTED:		DATE:		
VERIFIED:		DATE:		



TYPICAL SECTION #7

25 MPH D.S.

(A) 1.5" 12.5MM ASPHALTIC CONCRETE SUPERPAVE (165#/SY)
(B) 2" 19MM ASPHALTIC CONCRETE SUPERPAVE (220#/SY)
(C) 8" 25MM ASPHALTIC CONCRETE SUPERPAVE (880#/SY)
(D) 12" G.A.B.
(E) 6" RAISED CONCRETE MEDIAN
(F) 8X24" GDOT TYPE 7 CURB & GUTTER
(G) 8X24" GDOT TYPE 2 CURB & GUTTER
(H) RUMBLE STRIP PAVEMENT EDGE TREATMENT
(I) PAVEMENT EDGE TREATMENT



TYPICAL SECTION #8

35 MPH D.S.

ARCADIS Design & Consultancy for natural and built assets

NOT FOR CONSTRUCTION

REVISION DATES		

TYPICAL SECTIONS

CONCEPT TYPICAL SECTIONS

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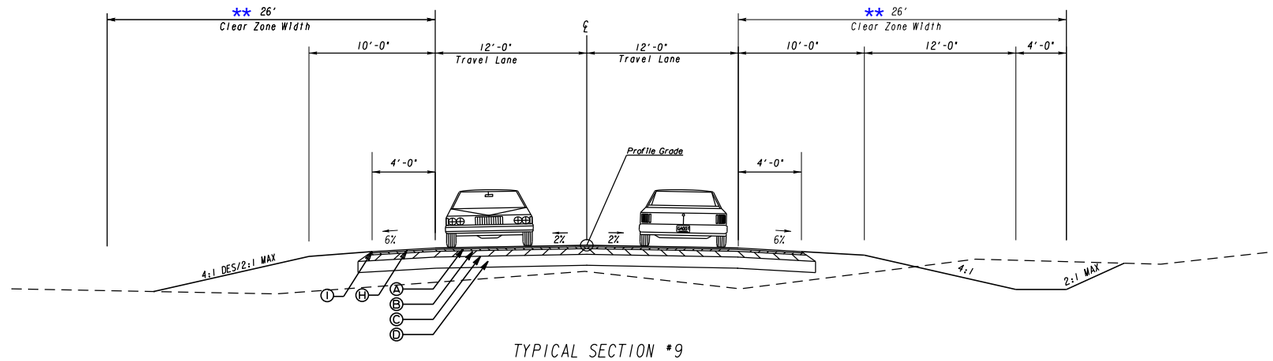
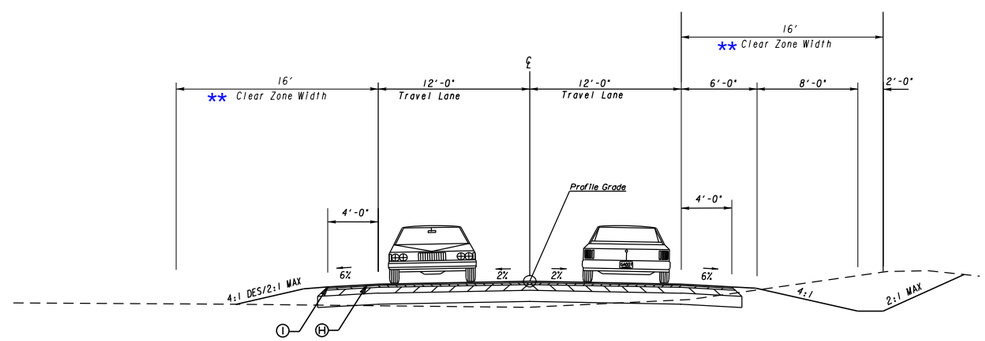
BACKCHECKED:		DATE:		05-004
CORRECTED:		DATE:		
VERIFIED:		DATE:		



TYPICAL SECTION #9
SR 108/Fincher Rd
55 MPH D.S.

(A) 1.5" 12.5MM ASPHALTIC CONCRETE SUPERPAVE (165#/SY)
(B) 2" 19MM ASPHALTIC CONCRETE SUPERPAVE (220#/SY)
(C) 8" 25MM ASPHALTIC CONCRETE SUPERPAVE (880#/SY)
(D) 12" G.A.B.
(E) 6" RAISED CONCRETE MEDIAN
(F) 8X24" GDOT TYPE 7 CURB & GUTTER
(G) 8X24" GDOT TYPE 2 CURB & GUTTER
(H) RUMBLE STRIP PAVEMENT EDGE TREATMENT
(I) PAVEMENT EDGE TREATMENT



TYPICAL SECTION #10
Butterworth Rd
35 MPH D.S.

ARCADIS Design & Consultancy for natural and built assets

NOT FOR CONSTRUCTION

REVISION DATES

TYPICAL SECTIONS
CONCEPT TYPICAL SECTIONS

CHECKED:		DATE:	
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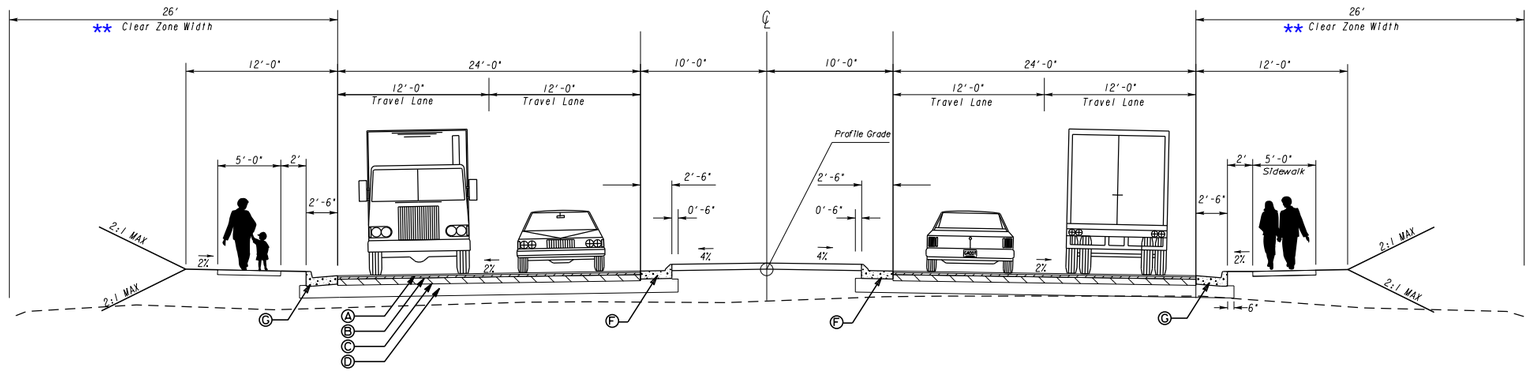
VERIFIED:		DATE:	

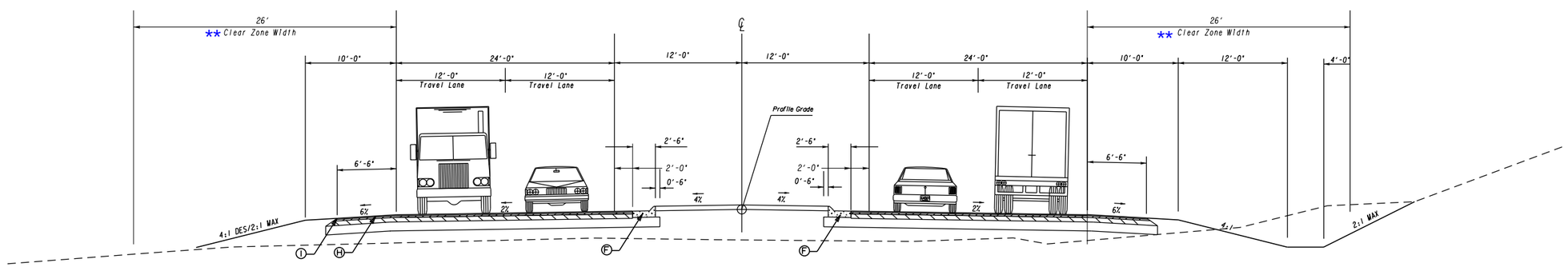
DRAWING No.
05-005



TYPICAL SECTION #11

45 MPH D.S.

(A) 1.5" 12.5MM ASPHALTIC CONCRETE SUPERPAVE (165#/SY)
(B) 2" 19MM ASPHALTIC CONCRETE SUPERPAVE (220#/SY)
(C) 8" 25MM ASPHALTIC CONCRETE SUPERPAVE (880#/SY)
(D) 12" G.A.B.
(E) 6" RAISED CONCRETE MEDIAN
(F) 8X24" GDOT TYPE 7 CURB & GUTTER
(G) 8X24" GDOT TYPE 2 CURB & GUTTER
(H) RUMBLE STRIP PAVEMENT EDGE TREATMENT
(I) PAVEMENT EDGE TREATMENT



TYPICAL SECTION #12
RAISED MEDIAN-RURAL SHOULDERS
SR 20
SR 5 Spur/SR 140/SR 20/Hicory Flat Hwy
55 MPH D.S.

ARCADIS Design & Consultancy for natural and built assets

NOT FOR CONSTRUCTION

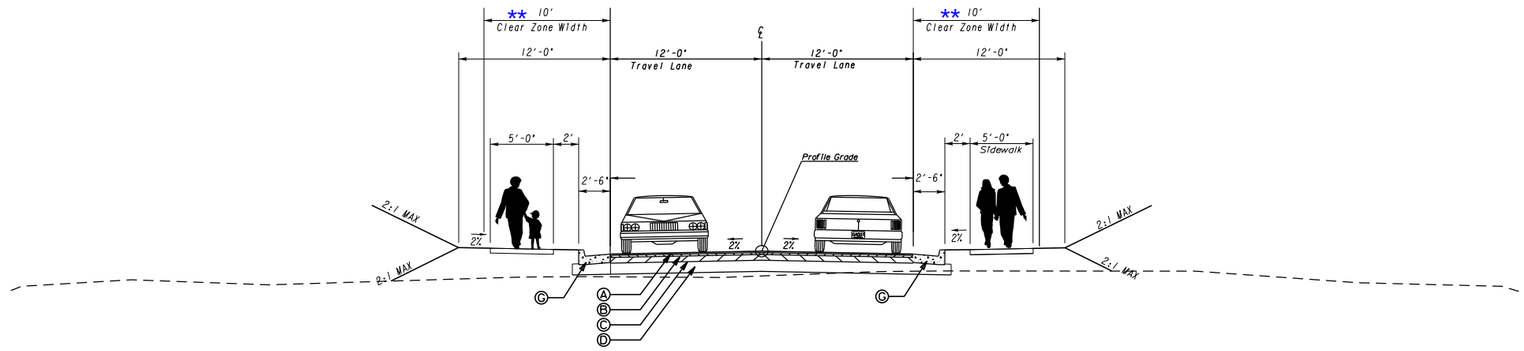
REVISION DATES

TYPICAL SECTIONS

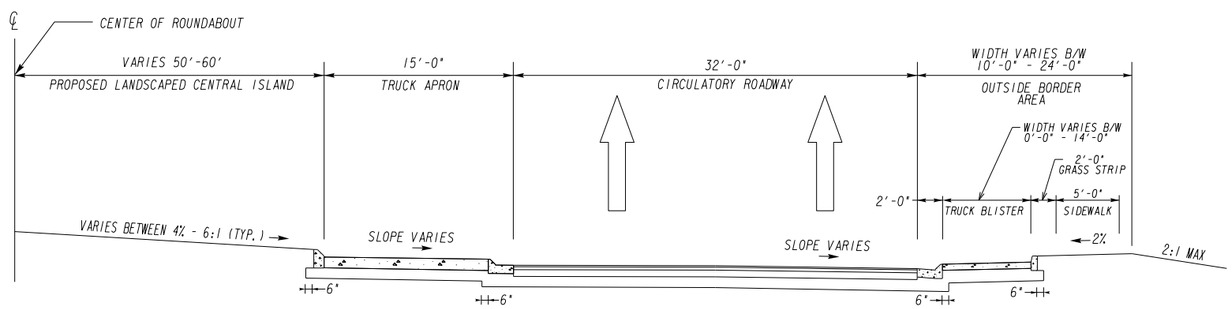
CONCEPT TYPICAL SECTIONS

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No. 05-006



TYPICAL SECTION #13
Copper Hills Dr, Fieldstone Dr, Legend Creek Dr, Riverbend Way, Pope Circle, River Green Ave



ROUNDABOUT TYPICAL

(A) 1.5" 12.5MM ASPHALTIC CONCRETE SUPERPAVE (165#/SY)
(B) 2" 19MM ASPHALTIC CONCRETE SUPERPAVE (220#/SY)
(C) 8" 25MM ASPHALTIC CONCRETE SUPERPAVE (880#/SY)
(D) 12" G.A.B.
(E) 6" RAISED CONCRETE MEDIAN
(F) 8X24" GDOT TYPE 7 CURB & GUTTER
(G) 8X24" GDOT TYPE 2 CURB & GUTTER
(H) RUMBLE STRIP PAVEMENT EDGE TREATMENT
(I) PAVEMENT EDGE TREATMENT

ARCADIS Design & Consultancy for natural and built assets

NOT FOR CONSTRUCTION

REVISION DATES

TYPICAL SECTIONS
CONCEPT TYPICAL SECTIONS

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-007

Cost Estimates

Georgia Department of Transportation

Interoffice Memo

FILE

PI NUMBER	0007836	PROJECT DESCRIPTION	SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE
OFFICE	Program Delivery		
DATE	Thursday, April 30, 2020		

From: Kimberly Nesbitt, State Program Delivery Administrator

To: Erik Rohde, P.E., State Project Review Engineer
via email Mailbox: CostEstimatesandUpdates@dot.ga.gov

Subject: **REVISIONS TO PROGRAMMED COSTS**

Project Manager:	Theophilus Niyi Igbalajobi
Management Let Date:	Long Range
Management Right of Way Date:	Long Range

Cost Estimate Review Iteration

Date of Submittal #1	**7/26/2019**
Date of Submittal #2	**3/6/2020**
Date of Submittal #3	

Summary of Programmed Costs and Proposed Revised Costs:

Estimate Type	Cost Estimate Amounts (T-Pro Without Inflation)	Last Estimate Date	Revised Cost Estimate
CONSTRUCTION	$180,661,288.36	11/07/2017	$182,304,951.06
RIGHT OF WAY	$55,120,000.00	11/07/2017	$59,765,000.00
UTILITIES	$6,935,000.00	11/07/2017	$6,935,000.00

Explanation for Cost Change and Contingency Justification:

The revised cost is based on Concept Report comments recived, the concept layout and the cost is adjusted to the latest CES cost history. Contigency of 20% is chosen based on the GDOT risk memo for Reconstruction/Rehabilitation Added Capacity project.

Attachments:

1. Validation of final QC-QA
2.Cost Estimate Worksheet
3.Detailed CES report dated 04/29/2020
4.ROW Estimate dated 04/04/2018
5.Utility Cost Estimate dated 02/15/2019

Georgia Department of Transportation

Interoffice Memo

Design Phase Leader Validation of Final QC/QA for Construction Cost Estimate Used In This Revision to Programmed Costs:

Consultant Company or GDOT Design Office:	Arcadis U.S., Inc.
Printed Name:	Robert Askew
Title:	Project Manager
Signature:	
Date:	4/30/2020

FOR PROJECTS WITH A LOCAL SPONSOR	
If the project has a local sponsor, the project manager should ensure that the local authority completes the following validation indicating that it has reviewed the construction cost estimate and whether it is in concurrence with the construction costs presented.	
Please select the appropriate validation below upon review of the cost estimate: ☐ I acknowledge that I have reviewed the project construction cost estimate and concur with the costs presented. ☐ I acknowledge that I have reviewed the project construction cost estimate but do not concur with the costs presented.	
Please provide an explanation for non-concurrence.	
Local Authority Name and Title:	
Local Authority Signature:	
Date:	

Georgia Department of Transportation

Interoffice Memo

Cost Estimate Worksheet:

CONSTRUCTION COST ESTIMATE (Required base estimate entered from CES and should not include E&I). →	**A**	$ 138,964,322.09
ENGINEERING AND INSPECTION (The default E&I percentage is 5.0%, but may be adjusted per project scope.) →	**D**	$ 6,948,216.10

Construction Cost	E&I Percentage	E&I Cost
B	C	D = B x C
$ 138,964,322.09	5%	$ 6,948,216.10

CONTINGENCY (Refer to the Risk and Contingencies Table included in GDOT Policy 3A-9 Cost Estimating Purpose) →	**I**	$ 29,182,507.64

Construction Cost	E&I Cost	Construction + E&I	Contingency Percentage	Contingency Cost
E	F	G = E + F	H	I = G x H
$ 138,964,322.09	$ 6,948,216.10	$ 145,912,538.19	20%	$ 29,182,507.64

ASPHALT FUEL PRICE ADJUSTMENT (Leave blank if not applicable) →	**Q**	$ 7,209,905.23

Date	Apr 2020
Regular Unleaded	$1.816/ GAL
Diesel	$2.623/ GAL
Liquid AC	$475.00/ TON

Current Asphalt Fuel Index Prices can be found at the link below:

http://www.dot.ga.gov/PS/Materials/AsphaltFuelIndex

	Description	Tons	Percentage of Asphaltic Concrete	Tons of Asphaltic Concrete	Total Monthly Tonnage of Asphalt Cement (TMT)	Monthly Asphalt Cement Price month project let (APL)	Max. Cap	Monthly Asphalt Cement Price month placed (APM)	Price Adjustment (PA)
Liquid AC									
		J	K	L = J x K	M = Sum of Columns L, T & W	N	O	P = (N x O)+N	Q = [((P - N) / N)] x M x N
	Leveling				25297.91 TN	$475.00/ TON	60%	$ 760.00	$ 7,209,905.23
	Patching								
	9.5 mm SP								
	12.5 OGFC								
	12.5 PEM								
	12.5 mm SP	59135.00 TN	5.00%	2956.75 TN					
	19 mm SP	118265.00 TN	5.00%	5913.25 TN					
	25 mm SP	315365.00 TN	5.00%	15768.25 TN					
Bituminous Tack Coat		Tack Coat	GL/TN	Tons					
	Description	R	S	T = R/S					
	Tack Coat	153585.00 GL	232.8234 GL/TN	659.66 TN					
Bituminous Tack Coat (Surface Treatment)		SY	GL/SY	TN					
	Description	U	V	W = (U x V) / (232.8234 GL/TN)					
	Single Surface Treatment		0.20 Gl/SY						
	Double Surface Treatment		0.44 Gl/SY						
	Triple Surface Treatment		0.71 Gl/SY						

CONSTRUCTION TOTAL COST →	**X = A+D+I+Q**	$ 182,304,951.06
RIGHT OF WAY COST →	**Y**	$ 59,765,000.00
UTILITIES COST (Provided by Utility Office) →	**Z = Sum of Reimbursable Costs**	$ 6,935,000.00

Utility Owner	Reimbursable Cost	Utility Owner	Reimbursable Cost
City of Cartersville - Gas	$ 375,000.00		
Georgia Power - Distribution	$ 6,160,000.00		
Georgia Power - Transmission	$ 400,000.00		

JOB ESTIMATE REPORT

JOB NUMBER : 0007836- SEG 1 SPEC YEAR: 13
DESCRIPTION: SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE- SEGMENT 1

ITEMS FOR JOB 0007836- SEG 1

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
0005	150-1000		LS	TRAFFIC CONTROL - PI 0007836- SEGMENT 1- 0.7MILES	1.000	197925.00	197925.00
0006	153-1300		EA	FIELD ENGINEERS OFFICE TP 3	1.000	60000.00	60000.00
0008	156-0100		LS	GPS DATA COLLECTION & SUBMITTAL	1.000	7500.00	7500.00
0009	158-1000		HR	TRAINING HOURS	1000.000	0.80	800.00
0010	201-1500		LS	CLEARING & GRUBBING - PI 0007836- SEGMENT 1- 0.7MILES	1.000	131950.00	131950.00
0015	205-0001		CY	UNCLASS EXCAV	29735.000	7.25	215578.75
0020	207-0203		CY	FOUND BKFILL MATL, TP II	220.000	64.75	14246.18
0025	310-1101		TN	GR AGGR BASE CRS, INCL MATL	18590.000	29.91	556124.87
0030	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	10550.000	80.96	854232.55
0035	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	1980.000	101.73	201444.35
0040	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	3960.000	89.72	355323.12
0044	413-0750		GL	TACK COAT	5140.000	3.25	16705.00
0045	456-2015		GLM	INDENT. RUMB. STRIPS - GRND-IN-PL (SKIP)	1.500	2094.34	3141.52
0050	441-0104		SY	CONC SIDEWALK, 4 IN	4100.000	35.04	143703.44
0055	441-0204		SY	PLAIN CONC DITCH PAVING, 4 IN	220.000	46.72	10278.76
0059	441-0748		SY	CONC MEDIAN, 6 IN	5000.000	49.75	248770.60
0060	441-6222		LF	CONC CURB & GUTTER/ 8X30TP2	7275.000	16.67	121296.58
0065	441-6740		LF	CONC CURB & GUTTER/ 8X30 TP7	6955.000	18.18	126464.85
0074	500-3002		CY	CL AA CONCRETE	44.000	781.58	34389.54
0075	500-3800		CY	CL A CONC, INCL REINF STEEL	88.000	1117.27	98320.02
0080	511-1000		LB	BAR REINF STEEL	3519.000	1.33	4683.12
0100	550-1180		LF	STM DR PIPE 18,H 1-10	308.000	58.07	17887.04
0105	550-1240		LF	STM DR PIPE 24,H 1-10	308.000	64.49	19865.77
0110	550-1300		LF	STM DR PIPE 30,H 1-10	163.000	84.50	13774.31
0115	550-1360		LF	STM DR PIPE 36,H 1-10	163.000	82.89	13512.30
0120	550-1480		LF	STM DR PIPE 48,H 1-10	123.000	145.07	17844.52
0125	550-4218		EA	FLARED END SECT 18 IN, ST DR	4.000	778.42	3113.72
0130	550-4224		EA	FLARED END SECT 24 IN, ST DR	4.000	887.64	3550.57
0135	550-4230		EA	FLARED END SECT 30 IN, ST DR	3.000	1096.90	3290.71
0140	550-4236		EA	FLARED END SECT 36 IN, ST DR	2.000	1424.01	2848.02
0145	603-2024		SY	STN DUMPED RIP RAP, TP 1, 24	66.000	68.39	4514.37
0150	603-2182		SY	STN DUMPED RIP RAP, TP 3, 24	66.000	60.99	4025.36
0155	603-7000		SY	PLASTIC FILTER FABRIC	132.000	5.35	707.48
0160	620-0100		LF	TEMP BARRIER, METHOD NO. 1	264.000	32.03	8458.11
0165	621-4070		LF	CONCRETE SIDE BARRIER, TY 7C	132.000	220.06	29047.92
0170	621-4085		LF	CONCRETE SIDE BARRIER, TP 7W	66.000	150.00	9900.00
0200	634-1200		EA	RIGHT OF WAY MARKERS	15.000	167.91	2518.75
0205	641-1100		LF	GUARDRAIL, TP T	22.000	103.54	2278.04
0210	641-1200		LF	GUARDRAIL, TP W	225.000	27.92	6283.29
0215	641-5001		EA	GUARDRAIL ANCHORAGE, TP 1	7.000	1524.03	10668.24

JOB ESTIMATE REPORT

0220	641-5015	EACH	GUARDRL ANCHOR, TP 12A, 31 IN, TANG, E/A	7.000	3250.00	22750.00
0225	643-8200	LF	BARRIER FENCE (ORANGE), 4 FT	352.000	2.34	825.60
0240	636-1033	SF	HWY SIGNS, TP1MAT,REFL SH TP 9	260.000	17.66	4593.45
0245	636-1041	SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	75.000	24.34	1825.91
0250	636-2070	LF	GALV STEEL POSTS, TP 7	616.000	9.02	5557.52
0260	639-2002	LF	STEEL WIRE STRAND CABLE, 3/8	88.000	6.94	611.09
0265	639-4003	EA	STRAIN POLE, TP III	2.000	8500.00	17000.00
0289	653-0110	EA	THERM PVMT MARK, ARROW, TP 1	5.000	125.00	625.00
0290	653-0120	EA	THERM PVMT MARK, ARROW, TP 2	101.000	87.03	8790.87
0295	653-0130	EA	THERM PVMT MARK, ARROW, TP 3	101.000	158.42	16001.19
0300	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	9676.000	0.67	6558.78
0305	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	9676.000	0.63	6129.07
0310	653-1704	LF	THERM SOLID TRAF STRIPE,24,WH	79.000	7.43	587.50
0315	653-1804	LF	THERM SOLID TRAF STRIPE, 8,WH	967.000	2.65	2566.36
0320	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	9676.000	0.45	4432.09
0325	653-3502	GLF	THERMO SKIP TRAF ST, 5 IN, YEL	396.000	0.48	192.36
0330	653-6004	SY	THERM TRAF STRIPING, WHITE	2507.000	4.54	11392.66
0335	653-6006	SY	THERM TRAF STRIPING, YELLOW	251.000	5.49	1379.18
0340	654-1001	EA	RAISED PVMT MARKERS TP 1	50.000	5.91	295.91
0345	654-1003	EA	RAISED PVMT MARKERS TP 3	605.000	4.70	2846.19
0350	654-1010	EA	RAISED PVMT MARKERS TP 10	40.000	51.35	2054.09
0353	668-1100	EA	CATCH BASIN, GP 1	5.000	3240.41	16202.08
0354	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	5.000	267.26	1336.32
0355	668-2100	EA	DROP INLET, GP 1	5.000	2693.42	13467.12
0360	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	5.000	302.98	1514.93
0365	668-4300	EA	STORM SEW MANHOLE, TP 1	4.000	2695.72	10782.89
0370	668-4311	LF	ST SEW MANHOLE,TP 1,A DEP,CL 1	4.000	355.49	1421.96
0375	668-4400	EA	STORM SEW MANHOLE, TP 2	3.000	4024.84	12074.52
0380	668-4412	LF	ST SEW MANHOLE,TP 2,A DEP,CL 2	2.000	374.33	748.66
0385	163-0300	EA	CONSTRUCTION EXIT	6.000	2330.30	13981.83
0389	163-0520	LF	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	202.000	19.12	3862.83
0390	163-0527	EA	CNST/REM RIP RAP CKDM,STN P RIPRAP/SN BG	220.000	514.54	113200.09
0395	163-0528	LF	CONSTR AND REM FAB CK DAM -TP C SLT FN	1671.000	14.74	24644.36
0400	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	968.000	5.08	4917.70
0405	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	22.000	210.87	4639.23
0410	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	1100.000	0.57	634.84
0415	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	2200.000	0.68	1498.05
0420	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	1056.000	5.81	6136.44
0424	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	968.000	2.17	2108.54
0425	165-0101	EA	MAINT OF CONST EXIT	6.000	773.01	4638.10
0430	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	22.000	85.48	1880.58
0435	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	2200.000	2.69	5925.52
0440	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	4398.000	3.77	16600.43
0444	700-6001	LS	GRASSING - COMPLETE	1.000	50000.00	50000.00
0449	169-0005	EA	BIORETENTION BASIN, NO. - 2	1.000	15825.00	15825.00
0454	169-0005	EA	BIORETENTION BASIN, NO. - 4	1.000	21150.00	21150.00
0459	169-0005	EA	BIORETENTION BASIN, NO. - 5	1.000	16250.00	16250.00

JOB ESTIMATE REPORT

ITEM TOTAL	4059423.57
INFLATED ITEM TOTAL	4059423.57

TOTALS FOR JOB 0007836- SEG 1

ESTIMATED COST:	4059423.61
CONTINGENCY PERCENT (0.0):	0.00
ESTIMATED TOTAL:	4059423.61

JOB ESTIMATE REPORT

JOB NUMBER : 0007836- SEG 2 SPEC YEAR: 13
DESCRIPTION: SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE- SEGMENT 2

ITEMS FOR JOB 0007836- SEG 2

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
0450	150-1000		LS	TRAFFIC CONTROL - PI 0007836- SEGMENT 2- 3.2 MILES	1.000	862850.00	862850.00
0452	153-1300		EA	FIELD ENGINEERS OFFICE TP 3	1.000	85637.00	85637.01
0458	156-0100		LS	GPS DATA COLLECTION & SUBMITTAL	1.000	25000.00	25000.00
0459	158-1000		HR	TRAINING HOURS	4000.000	0.80	3200.00
0460	201-1500		LS	CLEARING & GRUBBING - PI 0007836- SEGMENT 2- 3.2 MILES	1.000	575250.00	575250.00
0465	205-0001		CY	UNCLASS EXCAV	423163.200	7.25	3067933.20
0470	207-0203		CY	FOUND BKFILL MATL, TP II	959.000	59.20	56776.05
0475	310-1101		TN	GR AGGR BASE CRS, INCL MATL	102450.000	25.52	2615498.30
0479	318-3000		TN	AGGR SURF CRS	5360.000	30.04	161042.81
0480	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	65365.000	78.00	5098470.00
0485	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	11260.000	88.00	990880.00
0490	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	24510.000	83.00	2034330.00
0494	402-4510		TN	RECYL AC 12.5 MM SP,GP2ONLY,INC P-MBM&HL	1000.000	117.55	117551.11
0495	413-0750		GL	TACK COAT	31850.000	3.25	103512.50
0500	456-2015		GLM	INDENT. RUMB. STRIPS - GRND-IN-PL (SKIP)	7.000	1459.28	10215.03
0504	439-0022		SY	PLN PC CONC PVMT CL3 10 THK	650.000	123.96	80578.10
0510	441-0204		SY	PLAIN CONC DITCH PAVING, 4 IN	959.000	40.84	39169.49
0511	441-0748		SY	CONC MEDIAN, 6 IN	24000.000	41.63	999210.24
0514	441-5008		LF	CONC HEADER CURB, 6 IN, TP 7	375.000	19.18	7193.02
0520	441-6740		LF	CONC CURB & GUTTER/ 8X30 TP7	29785.000	16.40	488572.59
0524	500-3002		CY	CL AA CONCRETE	192.000	781.58	150063.44
0525	500-3800		CY	CL A CONC, INCL REINF STEEL	384.000	1073.49	412223.39
0530	511-1000		LB	BAR REINF STEEL	15340.000	1.16	17843.64
0550	550-1180		LF	STM DR PIPE 18,H 1-10	1342.000	49.49	66420.10
0555	550-1240		LF	STM DR PIPE 24,H 1-10	1342.000	55.45	74419.05
0560	550-1300		LF	STM DR PIPE 30,H 1-10	709.000	74.08	52526.36
0565	550-1360		LF	STM DR PIPE 36,H 1-10	709.000	76.42	54185.05
0570	550-1480		LF	STM DR PIPE 48,H 1-10	537.000	145.07	77906.55
0575	550-4218		EA	FLARED END SECT 18 IN, ST DR	7.000	771.74	5402.20
0580	550-4224		EA	FLARED END SECT 24 IN, ST DR	7.000	880.86	6166.03
0585	550-4230		EA	FLARED END SECT 30 IN, ST DR	5.000	1094.99	5474.97
0590	550-4236		EA	FLARED END SECT 36 IN, ST DR	3.000	1424.01	4272.03
0595	603-2024		SY	STN DUMPED RIP RAP, TP 1, 24	288.000	63.32	18236.23
0600	603-2182		SY	STN DUMPED RIP RAP, TP 3, 24	288.000	55.73	16050.94
0605	603-7000		SY	PLASTIC FILTER FABRIC	575.000	4.98	2868.43
0610	620-0100		LF	TEMP BARRIER, METHOD NO. 1	1150.000	37.19	42774.27
0615	621-4070		LF	CONCRETE SIDE BARRIER, TY 7C	575.000	220.00	126500.00
0620	621-4085		LF	CONCRETE SIDE BARRIER, TP 7W	288.000	150.00	43200.00
0625	627-1000		SF	MSE WALL FACE, 0 - 10 FT HT, WALL NO -	2620.000	52.86	138515.76

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			PI 0007836- SEGMENT 2- 3.2 MILES			
0630	627-1010	SF	MSE WALL FACE, 10 - 20 FT HT, WALL NO - PI 0007836- SEGMENT 2- 3.2 MILES	14100.000	63.18	890963.49
0635	627-1020	SF	MSE WALL FACE, 20 - 30 FT HT, WALL NO - PI 0007836- SEGMENT 2- 3.2 MILES	14250.000	73.48	1047205.71
0640	627-1100	LF	COPING A, WALL NO - PI 0007836- SEGMENT 2- 3.2 MILES	2700.000	91.68	247537.92
0645	632-0003	EA	CHANGEABLE MESS SIGN,PORT,TP 3	1.000	10827.76	10827.77
0650	634-1200	EA	RIGHT OF WAY MARKERS	72.000	157.86	11366.14
0655	641-1100	LF	GUARDRAIL, TP T	96.000	87.74	8423.94
0660	641-1200	LF	GUARDRAIL, TP W	978.000	25.60	25041.22
0665	641-5001	EA	GUARDRAIL ANCHORAGE, TP 1	11.000	1524.03	16764.38
0670	641-5015	EACH	GUARDRL ANCHOR, TP 12A, 31 IN, TANG, E/A	11.000	3250.00	35750.00
0675	643-8200	LF	BARRIER FENCE (ORANGE), 4 FT	1534.000	1.90	2923.56
0690	636-1033	SF	HWY SIGNS, TP1MAT,REFL SH TP 9	1132.000	16.00	18114.65
0695	636-1041	SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	326.000	24.34	7936.64
0700	636-2070	LF	GALV STEEL POSTS, TP 7	2684.000	7.78	20893.81
0710	639-2002	LF	STEEL WIRE STRAND CABLE, 3/8	383.000	5.11	1959.79
0715	639-4003	EA	STRAIN POLE, TP III	4.000	8500.00	34000.00
0739	653-0110	EA	THERM PVMT MARK, ARROW, TP 1	8.000	125.00	1000.00
0740	653-0120	EA	THERM PVMT MARK, ARROW, TP 2	154.000	85.00	13091.31
0745	653-0130	EA	THERM PVMT MARK, ARROW, TP 3	154.000	158.42	24397.85
0750	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	42183.000	0.47	20066.45
0755	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	42183.000	0.51	21577.87
0760	653-1704	LF	THERM SOLID TRAF STRIPE,24,WH	345.000	6.82	2356.19
0765	653-1804	LF	THERM SOLID TRAF STRIPE, 8,WH	4218.000	2.56	10839.12
0770	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	42183.000	0.40	16989.20
0775	653-3502	GLF	THERMO SKIP TRAF ST, 5 IN, YEL	1726.000	0.45	783.48
0780	653-6004	SY	THERM TRAF STRIPING, WHITE	10929.000	4.14	45329.01
0785	653-6006	SY	THERM TRAF STRIPING, YELLOW	1093.000	5.12	5605.98
0790	654-1001	EA	RAISED PVMT MARKERS TP 1	400.000	5.23	2095.16
0795	654-1003	EA	RAISED PVMT MARKERS TP 3	300.000	4.79	1438.75
0800	654-1010	EA	RAISED PVMT MARKERS TP 10	69.000	49.68	3428.02
0808	668-1100	EA	CATCH BASIN, GP 1	4.000	3240.41	12961.66
0809	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	10.000	267.26	2672.64
0810	668-2100	EA	DROP INLET, GP 1	10.000	2748.87	27488.74
0815	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	28.000	239.44	6704.53
0820	668-4300	EA	STORM SEW MANHOLE, TP 1	6.000	2592.57	15555.45
0825	668-4311	LF	ST SEW MANHOLE,TP 1,A DEP,CL 1	15.000	330.84	4962.70
0830	668-4400	EA	STORM SEW MANHOLE, TP 2	3.000	4024.84	12074.52
0835	668-4412	LF	ST SEW MANHOLE,TP 2,A DEP,CL 2	8.000	374.33	2994.64
0845	163-0300	EA	CONSTRUCTION EXIT	10.000	2284.97	22849.80
0850	163-0520	LF	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	882.000	19.12	16866.41
0855	163-0527	EA	CNST/REM RIP RAP CKDM,STN P RIPRAP/SN BG	959.000	495.11	474819.01
0860	163-0528	LF	CONSTR AND REM FAB CK DAM -TP C SLT FN	7286.000	12.57	91590.99
0865	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	4218.000	4.21	17795.49
0870	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	35.000	204.22	7147.85
0875	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	4794.000	0.45	2191.10
0880	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	9587.000	0.49	4784.20

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0885	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	4602.000	4.01	18498.43
0889	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	4128.000	1.68	6970.09
0890	165-0101	EA	MAINT OF CONST EXIT	10.000	765.47	7654.71
0895	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	35.000	83.89	2936.47
0900	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	9587.000	2.40	23099.97
0905	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	19174.000	3.44	65978.50
0910	700-6001	LS	GRASSING - COMPLETE	1.000	400000.00	400000.00
0915	681-4303	EA	LT STD, 30' MH, 12' ARM	16.000	4500.00	72000.00
0920	681-6290	EA	LUMINAIRE, TP 3, LED	16.000	575.00	9200.00
0925	682-1404	LF	CABLE, TP XHHW, AWG NO 10	4000.000	0.92	3697.72
0930	682-6233	LF	CONDUIT, NONMETL, TP 3, 2 IN	1500.000	6.50	9750.00
0935	682-8500	EA	ELEC PWR SVC ASSBLY (AERIAL SERV POINT)	1.000	8500.00	8500.00
0940	682-9020	EA	ELEC JCT BOX	5.000	750.00	3750.00
0945	682-9950	LF	DIRECTIONAL BORE - 3 IN	750.000	15.00	11250.00
0950	169-0005	EA	BIORETENTION BASIN, NO. - 6A	1.000	13100.00	13100.00
0955	169-0005	EA	BIORETENTION BASIN, NO. - 6B	1.000	10800.00	10800.00
0960	169-0005	EA	BIORETENTION BASIN, NO. - 6C	1.000	13950.00	13950.00
0965	169-0005	EA	BIORETENTION BASIN, NO. - 6D	1.000	12850.00	12850.00
0970	169-0005	EA	BIORETENTION BASIN, NO. - 7	1.000	36000.00	36000.00
0975	169-0005	EA	BIORETENTION BASIN, NO. - 8	1.000	18900.00	18900.00
0980	169-0005	EA	BIORETENTION BASIN, NO. - 9A	1.000	30000.00	30000.00
0985	169-0005	EA	BIORETENTION BASIN, NO. - 9C	1.000	42600.00	42600.00
0990	169-0005	EA	BIORETENTION BASIN, NO. - 10A	1.000	40250.00	40250.00
0995	169-0005	EA	BIORETENTION BASIN, NO. - 12	1.000	43000.00	43000.00
1000	169-0005	EA	BIORETENTION BASIN, NO. - 13A	1.000	16550.00	16550.00

ITEM TOTAL	22931370.91
INFLATED ITEM TOTAL	22931370.92

TOTALS FOR JOB 0007836- SEG 2

ESTIMATED COST:	22931370.92
CONTINGENCY PERCENT (0.0):	0.00
ESTIMATED TOTAL:	22931370.92

JOB ESTIMATE REPORT

JOB NUMBER : 0007836- SEG 3 SPEC YEAR: 13
DESCRIPTION: SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE- SEGMENT 3

ITEMS FOR JOB 0007836- SEG 3

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
0920	150-1000		LS	TRAFFIC CONTROL - PI 0007836- SEGMENT 3- 4.6 MILES	1.000	1267737.00	1267737.00
0927	153-1300		EA	FIELD ENGINEERS OFFICE TP 3	1.000	100000.00	100000.00
0928	156-0100		LS	GPS DATA COLLECTION & SUBMITTAL	1.000	25000.00	25000.00
0929	158-1000		HR	TRAINING HOURS	6500.000	0.80	5200.00
0930	201-1500		LS	CLEARING & GRUBBING - PI 0007836- SEGMENT 3- 4.6 MILES	1.000	845158.00	845158.00
0935	205-0001		CY	UNCLASS EXCAV	1008894.000	7.25	7314481.50
0940	207-0203		CY	FOUND BKFILL MATL, TP II	1409.000	57.83	81486.23
0945	310-1101		TN	GR AGGR BASE CRS, INCL MATL	140860.000	24.78	3491291.16
0949	318-3000		TN	AGGR SURF CRS	5475.000	30.00	164263.74
0950	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	91365.000	78.00	7126470.00
0955	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	16130.000	88.00	1419440.00
0960	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	34265.000	83.00	2843995.00
0964	402-4510		TN	RECYL AC 12.5 MM SP,GP2ONLY,INC P-MBM&HL	1000.000	117.55	117551.11
0965	413-0750		GL	TACK COAT	44500.000	3.25	144625.00
0970	456-2015		GLM	INDENT. RUMB. STRIPS - GRND-IN-PL (SKIP)	9.580	801.23	7675.79
0974	433-1200		SY	REF CONC APPR SL/I SLOPED EDGE	805.000	186.80	150376.39
0975	439-0022		SY	PLN PC CONC PVMT CL3 10 THK	650.000	123.96	80578.10
0980	441-0204		SY	PLAIN CONC DITCH PAVING, 4 IN	1409.000	39.43	55562.48
0985	441-0748		SY	CONC MEDIAN, 6 IN	20170.000	42.46	856501.91
0989	441-5008		LF	CONC HEADER CURB, 6 IN, TP 7	375.000	19.18	7193.02
0990	441-6740		LF	CONC CURB & GUTTER/ 8X30 TP7	31850.000	16.32	519971.00
0994	500-3002		CY	CL AA CONCRETE	282.000	781.58	220405.68
0995	500-3800		CY	CL A CONC, INCL REINF STEEL	564.000	1062.36	599172.03
1000	511-1000		LB	BAR REINF STEEL	22538.000	1.12	25310.40
1003	540-1202		LS	REM OF PARTS OF EX BR, BR NO - BR 015-5125-0	1.000	60000.00	60000.00
1004	540-1202		LS	REM OF PARTS OF EX BR, BR NO - BR 015-5126-0	1.000	70000.00	70000.00
1005	543-9000		LS	CONSTR OF BRIDGE COMPLETE - BR 015-5125-0	1.000	2800000.00	2800000.00
1010	543-9000		LS	CONSTR OF BRIDGE COMPLETE - BR 015-5126-0	1.000	1675000.00	1675000.00
1020	550-1180		LF	STM DR PIPE 18,H 1-10	1972.000	47.46	93604.10
1025	550-1240		LF	STM DR PIPE 24,H 1-10	1972.000	53.30	105118.17
1030	550-1300		LF	STM DR PIPE 30,H 1-10	1042.000	71.57	74581.33
1035	550-1360		LF	STM DR PIPE 36,H 1-10	1042.000	74.81	77956.65
1040	550-1480		LF	STM DR PIPE 48,H 1-10	789.000	145.07	114466.05
1045	550-4218		EA	FLARED END SECT 18 IN, ST DR	6.000	773.57	4641.48
1050	550-4224		EA	FLARED END SECT 24 IN, ST DR	6.000	882.72	5296.35

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1055	550-4230	EA	FLARED END SECT 30 IN, ST DR	5.000	1094.99	5474.97
1060	550-4236	EA	FLARED END SECT 36 IN, ST DR	3.000	1424.01	4272.03
1065	603-2024	SY	STN DUMPED RIP RAP, TP 1, 24	423.000	62.05	26250.61
1070	603-2182	SY	STN DUMPED RIP RAP, TP 3, 24	423.000	54.43	23026.75
1075	603-7000	SY	PLASTIC FILTER FABRIC	845.000	4.89	4136.96
1080	620-0100	LF	TEMP BARRIER, METHOD NO. 1	1690.000	35.28	59630.67
1084	620-0200	LF	TEMP BARRIER, METHOD NO. 2	750.000	65.37	49033.43
1085	621-4070	LF	CONCRETE SIDE BARRIER, TY 7C	845.000	220.00	185900.00
1090	621-4085	LF	CONCRETE SIDE BARRIER, TP 7W	423.000	150.00	63450.00
1095	627-1000	SF	MSE WALL FACE, 0 - 10 FT HT, WALL NO - PI 0007836- SEGMENT 3- 4.6 MILES	1110.000	53.93	59869.91
1100	627-1010	SF	MSE WALL FACE, 10 - 20 FT HT, WALL NO - PI 0007836- SEGMENT 3- 4.6 MILES	14575.000	63.00	918236.51
1105	627-1020	SF	MSE WALL FACE, 20 - 30 FT HT, WALL NO - PI 0007836- SEGMENT 3- 4.6 MILES	5025.000	82.47	414417.73
1110	627-1100	LF	COPING A, WALL NO - PI 0007836- SEGMENT 3- 4.6 MILES	2100.000	93.24	195817.06
1115	632-0003	EA	CHANGEABLE MESS SIGN,PORT,TP 3	1.000	10827.76	10827.77
1120	634-1200	EA	RIGHT OF WAY MARKERS	64.000	158.59	10150.18
1125	641-1100	LF	GUARDRAIL, TP T	141.000	84.03	11849.62
1130	641-1200	LF	GUARDRAIL, TP W	1437.000	25.02	35966.96
1135	641-5001	EA	GUARDRAIL ANCHORAGE, TP 1	10.000	1524.03	15240.34
1140	641-5015	EACH	GUARDRL ANCHOR, TP 12A, 31 IN, TANG, E/A	10.000	3250.00	32500.00
1145	643-8200	LF	BARRIER FENCE (ORANGE), 4 FT	2254.000	1.80	4068.88
1160	636-1033	SF	HWY SIGNS, TP1MAT,REFL SH TP 9	1663.000	15.59	25932.07
1165	636-1041	SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	479.000	24.34	11661.50
1170	636-2070	LF	GALV STEEL POSTS, TP 7	3944.000	7.49	29540.56
1180	639-2002	LF	STEEL WIRE STRAND CABLE, 3/8	563.000	4.72	2659.39
1185	639-4003	EA	STRAIN POLE, TP III	4.000	8500.00	34000.00
1209	653-0110	EA	THERM PVMT MARK, ARROW, TP 1	7.000	125.00	875.00
1210	653-0120	EA	THERM PVMT MARK, ARROW, TP 2	151.000	85.10	12850.42
1215	653-0130	EA	THERM PVMT MARK, ARROW, TP 3	151.000	158.42	23922.57
1220	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	6178.000	0.75	4664.88
1225	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	6178.000	0.67	4176.64
1230	653-1704	LF	THERM SOLID TRAF STRIPE,24,WH	508.000	6.67	3392.69
1235	653-1804	LF	THERM SOLID TRAF STRIPE, 8,WH	6198.000	2.54	15793.56
1240	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	61978.000	0.38	24136.09
1245	653-3502	GLF	THERMO SKIP TRAF ST, 5 IN, YEL	2535.000	0.44	1130.53
1250	653-6004	SY	THERM TRAF STRIPING, WHITE	16058.000	4.04	65030.56
1255	653-6006	SY	THERM TRAF STRIPING, YELLOW	1606.000	5.03	8090.06
1260	654-1001	EA	RAISED PVMT MARKERS TP 1	400.000	5.23	2095.16
1265	654-1003	EA	RAISED PVMT MARKERS TP 3	300.000	4.79	1438.75
1270	654-1010	EA	RAISED PVMT MARKERS TP 10	60.000	50.10	3006.27
1275	657-1085	LF	PRF PL SD PVT MKG,8,B/W,TP PB	1000.000	7.86	7863.46
1276	657-3085	GLF	PRF PL SK PVMT MKG,8,B/W,TPPB	1000.000	4.43	4439.01
1277	657-6085	LF	PRF PL SD PVMT MKG,8,B/Y,TPPB	1000.000	7.74	7749.56
1278	668-1100	EA	CATCH BASIN, GP 1	6.000	3240.41	19442.49
1279	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	20.000	267.26	5345.28
1280	668-2100	EA	DROP INLET, GP 1	9.000	2748.87	24739.86
1284	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	36.000	231.36	8329.18
1285	668-4300	EA	STORM SEW MANHOLE, TP 1	6.000	2592.57	15555.45
1290	668-4311	LF	ST SEW MANHOLE,TP 1,A DEP,CL 1	23.000	323.24	7434.72
1295	668-4400	EA	STORM SEW MANHOLE, TP 2	3.000	4024.84	12074.52

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1300	668-4412	LF	ST SEW MANHOLE,TP 2,A DEP,CL 2	11.000	374.33	4117.63
1310	163-0300	EA	CONSTRUCTION EXIT	9.000	2284.97	20564.82
1315	163-0520	LF	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	1296.000	19.12	24783.29
1320	163-0527	EA	CNST/REM RIP RAP CKDM,STN P RIPRAP/SN BG	1409.000	490.16	690641.19
1325	163-0528	LF	CONSTR AND REM FAB CK DAM -TP C SLT FN	10705.000	12.05	129069.33
1330	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	6198.000	4.01	24909.08
1335	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	33.000	205.05	6766.82
1340	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	7043.000	0.43	3028.70
1345	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	14086.000	0.46	6480.83
1350	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	6762.000	3.34	22610.78
1354	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	6198.000	1.57	9744.37
1355	165-0101	EA	MAINT OF CONST EXIT	9.000	767.02	6903.19
1360	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	33.000	84.09	2775.23
1365	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	14086.000	2.34	32966.31
1370	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	28172.000	3.35	94625.80
1375	700-6001	LS	GRASSING - COMPLETE	1.000	575000.00	575000.00
1380	681-4303	EA	LT STD, 30' MH, 12' ARM	16.000	4500.00	72000.00
1385	681-6290	EA	LUMINAIRE, TP 3, LED	16.000	575.00	9200.00
1390	682-1404	LF	CABLE, TP XHHW, AWG NO 10	4000.000	0.92	3697.72
1395	682-6233	LF	CONDUIT, NONMETL, TP 3, 2 IN	1500.000	6.50	9750.00
1400	682-8500	EA	ELEC PWR SVC ASSBLY (AERIAL SERV POINT)	1.000	8500.00	8500.00
1405	682-9020	EA	ELEC JCT BOX	5.000	750.00	3750.00
1410	682-9950	LF	DIRECTIONAL BORE - 3 IN	750.000	15.00	11250.00
1415	169-0005	EA	BIORETENTION BASIN, NO. - 16B	1.000	14900.00	14900.00
1420	169-0005	EA	BIORETENTION BASIN, NO. - 16C	1.000	13200.00	13200.00

ITEM TOTAL 36868835.39
INFLATED ITEM TOTAL 36868835.39

TOTALS FOR JOB 0007836- SEG 3

ESTIMATED COST: 36868835.37
CONTINGENCY PERCENT (0.0): 0.00
ESTIMATED TOTAL: 36868835.37

NOTE: The item totals include all alternate items. The estimated totals include only the low cost alternate items.

JOB ESTIMATE REPORT

JOB NUMBER : 0007836- SEG 4 SPEC YEAR: 13
DESCRIPTION: SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE- SEGMENT 4

ITEMS FOR JOB 0007836- SEG 4

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
1385	150-1000		LS	TRAFFIC CONTROL - PI 0007836- SEGMENT 4- 4.6 MILES	1.000	1247040.00	1247040.00
1392	153-1300		EA	FIELD ENGINEERS OFFICE TP 3	1.000	120000.00	120000.00
1393	156-0100		LS	GPS DATA COLLECTION & SUBMITTAL	1.000	30000.00	30000.00
1394	158-1000		HR	TRAINING HOURS	8500.000	0.80	6800.00
1395	201-1500		LS	CLEARING & GRUBBING - PI 0007836- SEGMENT 4- 4.6 MILES	1.000	831360.00	831360.00
1400	205-0001		CY	UNCLASS EXCAV	1991077.000	7.25	14435308.25
1405	207-0203		CY	FOUND BKFILL MATL, TP II	1386.000	57.89	80236.44
1410	310-1101		TN	GR AGGR BASE CRS, INCL MATL	127600.000	25.01	3191813.20
1414	318-3000		TN	AGGR SURF CRS	4665.000	30.32	141474.43
1415	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	84115.000	78.00	6560970.00
1420	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	15775.000	88.00	1388200.00
1425	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	31550.000	83.00	2618650.00
1430	413-0750		GL	TACK COAT	41000.000	3.25	133250.00
1435	456-2015		GLM	INDENT. RUMB. STRIPS - GRND-IN-PL (SKIP)	9.430	810.39	7642.02
1444	433-1200		SY	REF CONC APPR SL/I SLOPED EDGE	610.000	194.06	118377.08
1445	441-0204		SY	PLAIN CONC DITCH PAVING, 4 IN	1386.000	39.49	54737.70
1449	441-0748		SY	CONC MEDIAN, 6 IN	20475.000	42.39	867972.31
1455	441-6740		LF	CONC CURB & GUTTER/ 8X30 TP7	21600.000	16.78	362467.22
1459	500-3002		CY	CL AA CONCRETE	277.000	781.58	216497.77
1460	500-3800		CY	CL A CONC, INCL REINF STEEL	554.000	1062.87	588834.11
1465	511-1000		LB	BAR REINF STEEL	22170.000	1.12	24934.60
1479	540-1102		LS	REM OF EX BR, BR NO - BR 057-0010-0	1.000	385000.00	385000.00
1480	543-9000		LS	CONSTR OF BRIDGE COMPLETE - BR 057-0010-0	1.000	12500000.00	12500000.00
1485	550-1180		LF	STM DR PIPE 18,H 1-10	1940.000	47.55	92248.98
1490	550-1240		LF	STM DR PIPE 24,H 1-10	1940.000	53.39	103586.24
1495	550-1300		LF	STM DR PIPE 30,H 1-10	1025.000	71.68	73472.66
1500	550-1360		LF	STM DR PIPE 36,H 1-10	1025.000	74.88	76754.59
1505	550-1480		LF	STM DR PIPE 48,H 1-10	776.000	145.07	112580.05
1510	550-4218		EA	FLARED END SECT 18 IN, ST DR	9.000	768.75	6918.84
1515	550-4224		EA	FLARED END SECT 24 IN, ST DR	9.000	877.83	7900.51
1520	550-4230		EA	FLARED END SECT 30 IN, ST DR	7.000	1093.73	7656.17
1525	550-4236		EA	FLARED END SECT 36 IN, ST DR	5.000	1424.01	7120.05
1530	603-2024		SY	STN DUMPED RIP RAP, TP 1, 24	416.000	62.11	25838.78
1535	603-2182		SY	STN DUMPED RIP RAP, TP 3, 24	416.000	54.49	22668.82
1540	603-7000		SY	PLASTIC FILTER FABRIC	832.000	4.89	4076.39
1545	620-0100		LF	TEMP BARRIER, METHOD NO. 1	1663.000	35.36	58807.59
1550	621-4070		LF	CONCRETE SIDE BARRIER, TY 7C	832.000	220.00	183040.00
1555	621-4085		LF	CONCRETE SIDE BARRIER, TP 7W	416.000	150.00	62400.00
1560	627-1000		SF	MSE WALL FACE, 0 - 10 FT HT, WALL NO -	8450.000	51.44	434719.12

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			PI 0007836- SEGMENT 4- 4.6 MILES			
1564	627-1010	SF	MSE WALL FACE, 10 - 20 FT HT, WALL NO - PI 0007836- SEGMENT 4- 4.6 MILES	3400.000	71.81	244176.00
1565	627-1020	SF	MSE WALL FACE, 20 - 30 FT HT, WALL NO - PI 0007836- SEGMENT 4- 4.6 MILES	13000.000	74.23	965099.20
1570	627-1100	LF	COPING A, WALL NO - PI 0007836- SEGMENT 4- 4.6 MILES	3000.000	91.03	273096.69
1575	632-0003	EA	CHANGEABLE MESS SIGN,PORT,TP 3	2.000	10827.76	21655.54
1580	634-1200	EA	RIGHT OF WAY MARKERS	95.000	156.14	14834.25
1585	641-1100	LF	GUARDRAIL, TP T	138.000	84.24	11625.56
1590	641-1200	LF	GUARDRAIL, TP W	1413.000	25.05	35401.46
1595	641-5001	EA	GUARDRAIL ANCHORAGE, TP 1	16.000	1524.03	24384.55
1600	641-5015	EACH	GUARDRL ANCHOR, TP 12A, 31 IN, TANG, E/A	16.000	3250.00	52000.00
1605	643-8200	LF	BARRIER FENCE (ORANGE), 4 FT	2217.000	1.80	4011.44
1620	636-1033	SF	HWY SIGNS, TP1MAT,REFL SH TP 9	1635.000	15.61	25524.61
1625	636-1041	SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	472.000	24.34	11491.08
1630	636-2070	LF	GALV STEEL POSTS, TP 7	3880.000	7.50	29108.89
1640	639-2002	LF	STEEL WIRE STRAND CABLE, 3/8	554.000	4.73	2625.65
1645	639-4003	EA	STRAIN POLE, TP III	4.000	8500.00	34000.00
1669	653-0110	EA	THERM PVMT MARK, ARROW, TP 1	11.000	125.00	1375.00
1670	653-0120	EA	THERM PVMT MARK, ARROW, TP 2	226.000	83.20	18804.09
1675	653-0130	EA	THERM PVMT MARK, ARROW, TP 3	226.000	158.42	35804.64
1680	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	60966.000	0.43	26543.38
1685	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	60966.000	0.48	29562.41
1690	653-1704	LF	THERM SOLID TRAF STRIPE,24,WH	499.000	6.68	3336.03
1695	653-1804	LF	THERM SOLID TRAF STRIPE, 8,WH	6097.000	2.54	15541.80
1700	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	60966.000	0.38	23776.13
1705	653-3502	GLF	THERMO SKIP TRAF ST, 5 IN, YEL	2494.000	0.44	1113.07
1710	653-6004	SY	THERM TRAF STRIPING, WHITE	15796.000	4.05	64034.93
1715	653-6006	SY	THERM TRAF STRIPING, YELLOW	1580.000	5.04	7965.18
1720	654-1001	EA	RAISED PVMT MARKERS TP 1	400.000	5.23	2095.16
1725	654-1003	EA	RAISED PVMT MARKERS TP 3	300.000	4.79	1438.75
1730	654-1010	EA	RAISED PVMT MARKERS TP 10	90.000	48.88	4399.84
1735	657-1085	LF	PRF PL SD PVT MKG,8,B/W,TP PB	1750.000	7.65	13389.20
1736	657-3085	GLF	PRF PL SK PVMT MKG,8,B/W,TPPB	1750.000	4.32	7566.25
1737	657-6085	LF	PRF PL SD PVMT MKG,8,B/Y,TPPB	1750.000	7.53	13190.80
1738	668-1100	EA	CATCH BASIN, GP 1	8.000	3240.41	25923.32
1739	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	15.000	267.26	4008.96
1740	668-2100	EA	DROP INLET, GP 1	15.000	2748.87	41233.11
1745	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	40.000	228.05	9122.39
1750	668-4300	EA	STORM SEW MANHOLE, TP 1	9.000	2493.37	22440.38
1755	668-4311	LF	ST SEW MANHOLE,TP 1,A DEP,CL 1	22.000	324.03	7128.68
1760	668-4400	EA	STORM SEW MANHOLE, TP 2	5.000	4024.84	20124.20
1765	668-4412	LF	ST SEW MANHOLE,TP 2,A DEP,CL 2	11.000	374.33	4117.63
1775	163-0300	EA	CONSTRUCTION EXIT	13.000	2284.97	29704.73
1780	163-0520	LF	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	1275.000	19.12	24381.71
1785	163-0527	EA	CNST/REM RIP RAP CKDM,STN P RIPRAP/SN BG	1386.000	490.37	679659.78
1790	163-0528	LF	CONSTR AND REM FAB CK DAM -TP C SLT FN	10530.000	12.07	127186.50
1795	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	6097.000	4.02	24554.02

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1800	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	50.000	199.25	9962.93
1805	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	6928.000	0.43	2987.01
1810	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	13856.000	0.46	6397.18
1815	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	6651.000	3.36	22349.49
1819	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	6097.000	1.57	9613.32
1820	165-0101	EA	MAINT OF CONST EXIT	13.000	761.62	9901.12
1825	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	50.000	82.70	4135.19
1830	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	13856.000	2.34	32468.49
1835	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	27712.000	3.36	93177.17
1840	700-6001	LS	GRASSING - COMPLETE	1.000	550000.00	550000.00
1845	169-0005	EA	BIORETENTION BASIN, NO. - 19	1.000	52850.00	52850.00
1850	169-0005	EA	BIORETENTION BASIN, NO. - 21	1.000	14600.00	14600.00
1855	169-0005	EA	BIORETENTION BASIN, NO. - 23A	1.000	26150.00	26150.00
1860	169-0005	EA	BIORETENTION BASIN, NO. - 24	1.000	22000.00	22000.00
1865	169-0005	EA	BIORETENTION BASIN, NO. - 25	1.000	92300.00	92300.00

ITEM TOTAL 51178802.75
INFLATED ITEM TOTAL 51178802.75

TOTALS FOR JOB 0007836- SEG 4

ESTIMATED COST: 51178802.81
CONTINGENCY PERCENT (0.0): 0.00
ESTIMATED TOTAL: 51178802.81

JOB ESTIMATE REPORT

JOB NUMBER : 0007836- SEG 5 SPEC YEAR: 13
DESCRIPTION: SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE- SEGMENT 5

ITEMS FOR JOB 0007836- SEG 5

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
1850	150-1000		LS	TRAFFIC CONTROL - PI 0007836- SEGMENT 5- 2.5 MILES	1.000	677850.00	677850.00
1857	153-1300		EA	FIELD ENGINEERS OFFICE TP 3	1.000	85637.00	85637.01
1858	156-0100		LS	GPS DATA COLLECTION & SUBMITTAL	1.000	15000.00	15000.00
1859	158-1000		HR	TRAINING HOURS	3000.000	0.80	2400.00
1860	201-1500		LS	CLEARING & GRUBBING - PI 0007836- SEGMENT 5- 2.5 MILES	1.000	451900.00	451900.00
1865	205-0001		CY	UNCLASS EXCAV	296552.000	7.25	2150002.00
1870	207-0203		CY	FOUND BKFILL MATL, TP II	753.000	60.08	45241.38
1875	310-1101		TN	GR AGGR BASE CRS, INCL MATL	85700.000	25.95	2224460.91
1879	318-3000		TN	AGGR SURF CRS	3155.000	31.13	98226.86
1880	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	49700.000	78.00	3876600.00
1885	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	7320.000	89.54	655475.18
1890	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	18640.000	83.00	1547120.00
1894	402-4510		TN	RECYL AC 12.5 MM SP,GP2ONLY,INC P-MBM&HL	2000.000	108.61	217224.64
1895	413-0750		GL	TACK COAT	24200.000	3.25	78650.00
1900	456-2015		GLM	INDENT. RUMB. STRIPS - GRND-IN-PL (SKIP)	5.120	1258.42	6443.15
1905	441-0104		SY	CONC SIDEWALK, 4 IN	7820.000	33.69	263471.05
1909	439-0022		SY	PLN PC CONC PVMT CL3 10 THK	1300.000	123.96	161156.20
1910	441-0204		SY	PLAIN CONC DITCH PAVING, 4 IN	753.000	41.75	31442.34
1913	441-0748		SY	CONC MEDIAN, 6 IN	22815.000	41.87	955353.48
1914	441-5008		LF	CONC HEADER CURB, 6 IN, TP 7	750.000	17.37	13031.61
1915	441-6222		LF	CONC CURB & GUTTER/ 8X30TP2	15250.000	15.77	240506.38
1920	441-6740		LF	CONC CURB & GUTTER/ 8X30 TP7	39800.000	16.06	639585.60
1924	500-3002		CY	CL AA CONCRETE	151.000	781.58	118018.64
1925	500-3800		CY	CL A CONC, INCL REINF STEEL	301.000	1080.61	325264.82
1930	511-1000		LB	BAR REINF STEEL	12050.000	1.18	14329.50
1940	550-1180		LF	STM DR PIPE 18,H 1-10	1055.000	50.80	53598.42
1945	550-1240		LF	STM DR PIPE 24,H 1-10	1055.000	56.84	59967.02
1950	550-1300		LF	STM DR PIPE 30,H 1-10	557.000	75.70	42166.41
1955	550-1360		LF	STM DR PIPE 36,H 1-10	557.000	77.45	43140.35
1960	550-1480		LF	STM DR PIPE 48,H 1-10	422.000	145.07	61222.65
1965	550-4218		EA	FLARED END SECT 18 IN, ST DR	12.000	765.35	9184.29
1970	550-4224		EA	FLARED END SECT 24 IN, ST DR	12.000	874.38	10492.57
1975	550-4230		EA	FLARED END SECT 30 IN, ST DR	8.000	1093.23	8745.92
1980	550-4236		EA	FLARED END SECT 36 IN, ST DR	5.000	1424.01	7120.05
1985	603-2024		SY	STN DUMPED RIP RAP, TP 1, 24	226.000	64.12	14493.22
1990	603-2182		SY	STN DUMPED RIP RAP, TP 3, 24	226.000	56.56	12783.77
1995	603-7000		SY	PLASTIC FILTER FABRIC	452.000	5.04	2281.46
2000	620-0100		LF	TEMP BARRIER, METHOD NO. 1	904.000	38.44	34751.36
2005	621-4070		LF	CONCRETE SIDE BARRIER, TY 7C	452.000	220.00	99440.00

JOB ESTIMATE REPORT

2010	621-4085	LF	CONCRETE SIDE BARRIER, TP 7W	226.000	150.00	33900.00
2035	632-0003	EA	CHANGEABLE MESS SIGN,PORT,TP 3	2.000	10827.76	21655.54
2040	634-1200	EA	RIGHT OF WAY MARKERS	158.000	153.05	24182.60
2045	641-1100	LF	GUARDRAIL, TP T	75.000	90.21	6766.30
2050	641-1200	LF	GUARDRAIL, TP W	768.000	25.97	19947.00
2055	641-5001	EA	GUARDRAIL ANCHORAGE, TP 1	24.000	1524.03	36576.82
2060	641-5015	EACH	GUARDRL ANCHOR, TP 12A, 31 IN, TANG, E/A	24.000	3250.00	78000.00
2065	643-8200	LF	BARRIER FENCE (ORANGE), 4 FT	1205.000	1.97	2376.06
2080	636-1033	SF	HWY SIGNS, TP1MAT,REFL SH TP 9	888.000	16.26	14444.07
2085	636-1041	SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	256.000	24.34	6232.45
2090	636-2070	LF	GALV STEEL POSTS, TP 7	2108.000	7.97	16812.04
2100	639-2002	LF	STEEL WIRE STRAND CABLE, 3/8	301.000	5.37	1619.20
2105	639-4003	EA	STRAIN POLE, TP III	6.000	8500.00	51000.00
2129	653-0110	EA	THERM PVMT MARK, ARROW, TP 1	17.000	125.00	2125.00
2130	653-0120	EA	THERM PVMT MARK, ARROW, TP 2	330.000	81.46	26881.99
2135	653-0130	EA	THERM PVMT MARK, ARROW, TP 3	330.000	158.42	52281.11
2140	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	33140.000	0.50	16706.87
2145	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	33140.000	0.52	17556.58
2150	653-1704	LF	THERM SOLID TRAF STRIPE,24,WH	271.000	6.92	1876.80
2155	653-1804	LF	THERM SOLID TRAF STRIPE, 8,WH	3314.000	2.58	8561.16
2160	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	33140.000	0.41	13631.48
2165	653-3502	GLF	THERMO SKIP TRAF ST, 5 IN, YEL	1356.000	0.45	622.40
2170	653-6004	SY	THERM TRAF STRIPING, WHITE	8586.000	4.21	36148.35
2175	653-6006	SY	THERM TRAF STRIPING, YELLOW	859.000	5.18	4455.77
2180	654-1001	EA	RAISED PVMT MARKERS TP 1	300.000	5.32	1598.14
2185	654-1003	EA	RAISED PVMT MARKERS TP 3	250.000	4.81	1204.97
2190	654-1010	EA	RAISED PVMT MARKERS TP 10	125.000	47.92	5990.30
2198	668-1100	EA	CATCH BASIN, GP 1	10.000	3240.41	32404.15
2199	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	15.000	267.26	4008.96
2200	668-2100	EA	DROP INLET, GP 1	24.000	2719.57	65269.75
2205	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	15.000	260.76	3911.41
2210	668-4300	EA	STORM SEW MANHOLE, TP 1	13.000	2541.40	33038.27
2215	668-4311	LF	ST SEW MANHOLE,TP 1,A DEP,CL 1	12.000	334.88	4018.61
2220	668-4400	EA	STORM SEW MANHOLE, TP 2	4.000	4024.84	16099.36
2225	668-4412	LF	ST SEW MANHOLE,TP 2,A DEP,CL 2	6.000	374.33	2245.98
2235	163-0300	EA	CONSTRUCTION EXIT	20.000	2284.97	45699.59
2240	163-0520	LF	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	693.000	19.12	13252.18
2245	163-0527	EA	CNST/REM RIP RAP CKDM,STN P RIPRAP/SN BG	753.000	498.25	375188.85
2250	163-0528	LF	CONSTR AND REM FAB CK DAM -TP C SLT FN	5724.000	12.90	73863.76
2255	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	3314.000	4.34	14413.78
2260	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	72.000	194.30	13990.10
2265	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	3766.000	0.47	1788.36
2270	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	7532.000	0.52	3955.13
2275	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	3615.000	4.02	14564.47
2279	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	3314.000	1.75	5815.71
2280	165-0101	EA	MAINT OF CONST EXIT	20.000	755.35	15107.01
2285	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	72.000	81.49	5867.96
2290	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	7532.000	2.45	18482.77

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2295	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	15063.000	3.49	52624.25
2300	700-6001	LS	GRASSING - COMPLETE	1.000	300000.00	300000.00
2305	681-4303	EA	LT STD, 30' MH, 12' ARM	32.000	4500.00	144000.00
2310	681-6290	EA	LUMINAIRE, TP 3, LED	32.000	575.00	18400.00
2315	682-1404	LF	CABLE, TP XHHW, AWG NO 10	8000.000	0.92	7395.44
2320	682-6233	LF	CONDUIT, NONMETL, TP 3, 2 IN	3000.000	6.50	19500.00
2325	682-8500	EA	ELEC PWR SVC ASSBLY (AERIAL SERV POINT)	2.000	8500.00	17000.00
2330	682-9020	EA	ELEC JCT BOX	10.000	750.00	7500.00
2335	682-9950	LF	DIRECTIONAL BORE - 3 IN	1500.000	15.00	22500.00
2340	169-0005	EA	BIORETENTION BASIN, NO. - 27B	1.000	21550.00	21550.00
2345	169-0005	EA	BIORETENTION BASIN, NO. - 28B	1.000	114700.00	114700.00
2350	169-0005	EA	BIORETENTION BASIN, NO. - 31	1.000	14600.00	14600.00
2355	169-0005	EA	BIORETENTION BASIN, NO. - 32	1.000	27250.00	27250.00
2360	169-0005	EA	BIORETENTION BASIN, NO. - 35	1.000	28000.00	28000.00
2365	169-0005	EA	BIORETENTION BASIN, NO. - 36	1.000	11950.00	11950.00
2370	169-0005	EA	BIORETENTION BASIN, NO. - 37	1.000	13000.00	13000.00
2375	169-0005	EA	BIORETENTION BASIN, NO. - 39	1.000	16700.00	16700.00
2380	169-0005	EA	BIORETENTION BASIN, NO. - 40	1.000	38650.00	38650.00
2385	169-0005	EA	BIORETENTION BASIN, NO. - 45	1.000	40450.00	40450.00

ITEM TOTAL 17535687.07
INFLATED ITEM TOTAL 17535687.07

TOTALS FOR JOB 0007836- SEG 5

ESTIMATED COST: 17535687.09
CONTINGENCY PERCENT (0.0): 0.00
ESTIMATED TOTAL: 17535687.09

JOB ESTIMATE REPORT

JOB NUMBER : 0007836- SEG 6 SPEC YEAR: 13
DESCRIPTION: SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE- SEGMENT 6

ITEMS FOR JOB 0007836- SEG 6

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
2310	150-1000		LS	TRAFFIC CONTROL - PI 0007836- SEGMENT 6-0.5 MILES	1.000	150050.00	150050.00
2317	153-1300		EA	FIELD ENGINEERS OFFICE TP 3	1.000	60000.00	60000.00
2318	156-0100		LS	GPS DATA COLLECTION & SUBMITTAL	1.000	7500.00	7500.00
2319	158-1000		HR	TRAINING HOURS	1000.000	0.80	800.00
2320	201-1500		LS	CLEARING & GRUBBING - PI 0007836- SEGMENT 6-0.5 MILES	1.000	100050.00	100050.00
2325	205-0001		CY	UNCLASS EXCAV	60330.000	7.25	437392.50
2330	207-0203		CY	FOUND BKFILL MATL, TP II	167.000	65.85	10997.16
2335	310-1101		TN	GR AGGR BASE CRS, INCL MATL	18600.000	29.91	556396.31
2340	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	10410.000	81.07	844009.90
2345	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	1055.000	108.18	114140.18
2350	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	3910.000	89.85	351323.71
2354	402-4510		TN	RECYL AC 12.5 MM SP,GP2ONLY,INC P-MBM&HL	900.000	118.97	107075.52
2355	413-0750		GL	TACK COAT	5070.000	3.25	16477.50
2360	456-2015		GLM	INDENT. RUMB. STRIPS - GRND-IN-PL (SKIP)	1.134	1500.00	1701.00
2364	439-0022		SY	PLN PC CONC PVMT CL3 10 THK	650.000	123.96	80578.10
2365	441-0104		SY	CONC SIDEWALK, 4 IN	2800.000	35.87	100455.77
2370	441-0204		SY	PLAIN CONC DITCH PAVING, 4 IN	167.000	47.91	8001.40
2372	441-0748		SY	CONC MEDIAN, 6 IN	5560.000	49.15	273317.03
2374	441-5008		LF	CONC HEADER CURB, 6 IN, TP 7	375.000	19.18	7193.02
2375	441-6222		LF	CONC CURB & GUTTER/ 8X30TP2	5200.000	17.09	88915.89
2380	441-6740		LF	CONC CURB & GUTTER/ 8X30 TP7	8250.000	17.96	148208.94
2384	500-3002		CY	CL AA CONCRETE	33.000	781.58	25792.15
2385	500-3800		CY	CL A CONC, INCL REINF STEEL	67.000	1125.56	75413.01
2390	511-1000		LB	BAR REINF STEEL	2668.000	1.36	3641.61
2400	550-1180		LF	STM DR PIPE 18,H 1-10	233.000	59.86	13947.93
2405	550-1240		LF	STM DR PIPE 24,H 1-10	233.000	66.37	15465.10
2410	550-1300		LF	STM DR PIPE 30,H 1-10	123.000	86.66	10659.42
2415	550-1360		LF	STM DR PIPE 36,H 1-10	123.000	84.19	10356.41
2420	550-1480		LF	STM DR PIPE 48,H 1-10	93.000	145.07	13492.20
2425	550-4218		EA	FLARED END SECT 18 IN, ST DR	1.000	795.24	795.24
2430	550-4224		EA	FLARED END SECT 24 IN, ST DR	1.000	904.66	904.66
2435	550-4230		EA	FLARED END SECT 30 IN, ST DR	1.000	1101.02	1101.02
2440	550-4236		EA	FLARED END SECT 36 IN, ST DR	1.000	1424.01	1424.01
2445	603-2024		SY	STN DUMPED RIP RAP, TP 1, 24	50.000	69.40	3470.07
2450	603-2182		SY	STN DUMPED RIP RAP, TP 3, 24	50.000	62.03	3101.77
2455	603-7000		SY	PLASTIC FILTER FABRIC	100.000	5.43	543.28
2460	620-0100		LF	TEMP BARRIER, METHOD NO. 1	200.000	47.26	9453.12
2465	621-4070		LF	CONCRETE SIDE BARRIER, TY 7C	100.000	220.00	22000.00
2470	621-4085		LF	CONCRETE SIDE BARRIER, TP 7W	50.000	150.00	7500.00

JOB ESTIMATE REPORT

2500	634-1200	EA	RIGHT OF WAY MARKERS	8.000	172.12	1376.99
2505	641-1100	LF	GUARDRAIL, TP T	17.000	106.59	1812.04
2510	641-1200	LF	GUARDRAIL, TP W	170.000	28.39	4826.62
2515	641-5001	EA	GUARDRAIL ANCHORAGE, TP 1	1.000	1486.31	1486.31
2520	641-5015	EACH	GUARDRL ANCHOR, TP 12A, 31 IN, TANG, E/A	1.000	3250.00	3250.00
2525	643-8200	LF	BARRIER FENCE (ORANGE), 4 FT	267.000	2.43	651.12
2540	636-1033	SF	HWY SIGNS, TP1MAT,REFL SH TP 9	196.000	18.00	3529.21
2545	636-1041	SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	57.000	24.34	1387.69
2550	636-2070	LF	GALV STEEL POSTS, TP 7	467.000	9.27	4331.82
2560	639-2002	LF	STEEL WIRE STRAND CABLE, 3/8	67.000	7.34	492.35
2565	639-4003	EA	STRAIN POLE, TP III	2.000	8500.00	17000.00
2570	647-1000	LS	TRAF SIGNAL INSTALLATION NO - PI 0007836- SEGMENT 6-0.5 MILES	1.000	250000.00	250000.00
2589	653-0110	EA	THERM PVMT MARK, ARROW, TP 1	1.000	125.00	125.00
2590	653-0120	EA	THERM PVMT MARK, ARROW, TP 2	19.000	95.56	1815.73
2595	653-0130	EA	THERM PVMT MARK, ARROW, TP 3	19.000	158.42	3010.12
2600	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	7336.000	0.72	5315.01
2605	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	7336.000	0.65	4837.36
2610	653-1704	LF	THERM SOLID TRAF STRIPE,24,WH	60.000	7.55	453.35
2615	653-1804	LF	THERM SOLID TRAF STRIPE, 8,WH	734.000	2.67	1959.79
2620	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	7336.000	0.46	3442.56
2625	653-3502	GLF	THERMO SKIP TRAF ST, 5 IN, YEL	300.000	0.49	147.60
2630	653-6004	SY	THERM TRAF STRIPING, WHITE	1901.000	4.62	8788.40
2635	653-6006	SY	THERM TRAF STRIPING, YELLOW	190.000	5.56	1057.70
2640	654-1001	EA	RAISED PVMT MARKERS TP 1	50.000	5.91	295.91
2645	654-1003	EA	RAISED PVMT MARKERS TP 3	40.000	5.06	202.73
2650	654-1010	EA	RAISED PVMT MARKERS TP 10	8.000	56.61	452.95
2658	668-1100	EA	CATCH BASIN, GP 1	1.000	3240.41	3240.42
2659	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	2.000	267.26	534.53
2660	668-2100	EA	DROP INLET, GP 1	2.000	3463.41	6926.84
2665	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	5.000	302.98	1514.93
2670	668-4300	EA	STORM SEW MANHOLE, TP 1	1.000	2541.40	2541.41
2675	668-4311	LF	ST SEW MANHOLE,TP 1,A DEP,CL 1	3.000	361.09	1083.28
2680	668-4400	EA	STORM SEW MANHOLE, TP 2	1.000	4024.84	4024.84
2685	668-4412	LF	ST SEW MANHOLE,TP 2,A DEP,CL 2	1.000	374.33	374.33
2695	163-0300	EA	CONSTRUCTION EXIT	1.000	2248.15	2248.16
2700	163-0520	LF	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	154.000	19.12	2944.93
2705	163-0527	EA	CNST/REM RIP RAP CKDM,STN P RIPRAP/SN BG	167.000	518.26	86550.55
2710	163-0528	LF	CONSTR AND REM FAB CK DAM -TP C SLT FN	1267.000	15.19	19255.63
2715	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	734.000	5.26	3861.46
2720	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	4.000	237.20	948.81
2725	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	835.000	0.60	503.42
2730	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	1667.000	0.72	1203.61
2735	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	850.000	6.19	5268.91
2740	165-0101	EA	MAINT OF CONST EXIT	1.000	800.07	800.08
2744	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	734.000	2.28	1678.44
2745	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	4.000	91.54	366.20
2750	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	1667.000	2.75	4585.20

JOB ESTIMATE REPORT

2755	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	3335.000	3.84	12808.83
2760	700-6001	LS	GRASSING - COMPLETE	1.000	75000.00	75000.00
2770	681-4303	EA	LT STD, 30' MH, 12' ARM	16.000	4500.00	72000.00
2775	681-6290	EA	LUMINAIRE, TP 3, LED	16.000	575.00	9200.00
2780	682-1404	LF	CABLE, TP XHHW, AWG NO 10	4000.000	0.92	3697.72
2785	682-6233	LF	CONDUIT, NONMETL, TP 3, 2 IN	1500.000	6.50	9750.00
2790	682-8500	EA	ELEC PWR SVC ASSBLY (AERIAL SERV POINT)	1.000	8500.00	8500.00
2795	682-9020	EA	ELEC JCT BOX	5.000	750.00	3750.00
2800	682-9950	LF	DIRECTIONAL BORE - 3 IN	750.000	15.00	11250.00
2805	169-0005	EA	BIORETENTION BASIN, NO. - 46	1.000	43200.00	43200.00
2810	169-0005	EA	BIORETENTION BASIN, NO. - 47	1.000	67150.00	67150.00
2815	169-0005	EA	BIORETENTION BASIN, NO. - 48	1.000	28800.00	28800.00

ITEM TOTAL 4501255.80
INFLATED ITEM TOTAL 4501255.82

TOTALS FOR JOB 0007836- SEG 6

ESTIMATED COST: 4501255.82
CONTINGENCY PERCENT (0.0): 0.00
ESTIMATED TOTAL: 4501255.82

JOB ESTIMATE REPORT

JOB NUMBER : 0007836- SEG 7 SPEC YEAR: 13
DESCRIPTION: SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE- SEGMENT 7

ITEMS FOR JOB 0007836- SEG 7

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
2770	150-1000		LS	TRAFFIC CONTROL - PI 0007836- SEGMENT 7-0.4 MILES	1.000	96550.00	96550.00
2772	153-1300		EA	FIELD ENGINEERS OFFICE TP 3	1.000	60000.00	60000.00
2773	156-0100		LS	GPS DATA COLLECTION & SUBMITTAL	1.000	7500.00	7500.00
2774	158-1000		HR	TRAINING HOURS	1000.000	0.80	800.00
2775	201-1500		LS	CLEARING & GRUBBING - PI 0007836- SEGMENT 7-0.4 MILES	1.000	64375.00	64375.00
2780	205-0001		CY	UNCLASS EXCAV	59240.000	7.25	429490.00
2785	207-0203		CY	FOUND BKFILL MATL, TP II	107.000	67.66	7239.67
2790	310-1101		TN	GR AGGR BASE CRS, INCL MATL	6000.000	33.22	199371.66
2795	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	3875.000	89.39	346389.70
2800	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	730.000	112.15	81869.95
2805	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	1460.000	100.05	146078.14
2810	413-0750		GL	TACK COAT	1890.000	3.48	6577.37
2815	456-2015		GLM	INDENT. RUMB. STRIPS - GRND-IN-PL (SKIP)	0.730	1500.00	1095.00
2825	441-0204		SY	PLAIN CONC DITCH PAVING, 4 IN	107.000	49.90	5339.35
2829	441-0748		SY	CONC MEDIAN, 6 IN	1050.000	59.40	62374.73
2835	441-6740		LF	CONC CURB & GUTTER/ 8X30 TP7	1225.000	20.56	25189.72
2840	500-3002		CY	CL AA CONCRETE	22.000	781.58	17194.77
2845	500-3800		CY	CL A CONC, INCL REINF STEEL	43.000	1139.19	48985.21
2850	511-1000		LB	BAR REINF STEEL	1716.000	1.42	2438.64
2860	550-1180		LF	STM DR PIPE 18,H 1-10	150.000	62.79	9419.40
2865	550-1240		LF	STM DR PIPE 24,H 1-10	150.000	69.44	10416.56
2870	550-1300		LF	STM DR PIPE 30,H 1-10	79.000	90.16	7123.07
2875	550-1360		LF	STM DR PIPE 36,H 1-10	70.000	86.86	6080.52
2880	550-1480		LF	STM DR PIPE 48,H 1-10	60.000	145.07	8704.64
2885	550-4218		EA	FLARED END SECT 18 IN, ST DR	1.000	795.24	795.24
2890	550-4224		EA	FLARED END SECT 24 IN, ST DR	1.000	904.66	904.66
2895	550-4230		EA	FLARED END SECT 30 IN, ST DR	1.000	1101.02	1101.02
2900	550-4236		EA	FLARED END SECT 36 IN, ST DR	1.000	1424.01	1424.01
2905	603-2024		SY	STN DUMPED RIP RAP, TP 1, 24	32.000	71.04	2273.36
2910	603-2182		SY	STN DUMPED RIP RAP, TP 3, 24	32.000	63.75	2040.09
2915	603-7000		SY	PLASTIC FILTER FABRIC	64.000	5.55	355.35
2920	620-0100		LF	TEMP BARRIER, METHOD NO. 1	129.000	50.19	6474.73
2925	621-4070		LF	CONCRETE SIDE BARRIER, TY 7C	64.000	220.00	14080.00
2930	621-4085		LF	CONCRETE SIDE BARRIER, TP 7W	32.000	150.00	4800.00
2960	634-1200		EA	RIGHT OF WAY MARKERS	8.000	172.12	1376.99
2965	641-1100		LF	GUARDRAIL, TP T	11.000	111.93	1231.27
2970	641-1200		LF	GUARDRAIL, TP W	109.000	29.14	3177.02
2975	641-5001		EA	GUARDRAIL ANCHORAGE, TP 1	1.000	1486.31	1486.31
2980	641-5015		EACH	GUARDRL ANCHOR, TP 12A, 31 IN, TANG, E/A	1.000	3250.00	3250.00

JOB ESTIMATE REPORT

2985	643-8200	LF	BARRIER FENCE (ORANGE), 4 FT	172.000	2.59	446.28
3000	636-1033	SF	HWY SIGNS, TP1MAT,REFL SH TP 9	127.000	18.53	2354.53
3005	636-1041	SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	37.000	22.90	847.32
3010	636-2070	LF	GALV STEEL POSTS, TP 7	300.000	9.69	2908.96
3020	639-2002	LF	STEEL WIRE STRAND CABLE, 3/8	43.000	8.05	346.47
3025	639-4003	EA	STRAIN POLE, TP III	2.000	8500.00	17000.00
3049	653-0110	EA	THERM PVMT MARK, ARROW, TP 1	1.000	125.00	125.00
3050	653-0120	EA	THERM PVMT MARK, ARROW, TP 2	19.000	95.56	1815.73
3055	653-0130	EA	THERM PVMT MARK, ARROW, TP 3	19.000	158.42	3010.12
3060	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	4720.000	0.80	3802.34
3065	653-1502	LF	THERMO SOLID TRAF ST, 5 IN YEL	4720.000	0.70	3318.11
3070	653-1704	LF	THERM SOLID TRAF STRIPE,24,WH	38.000	7.75	294.80
3075	653-1804	LF	THERM SOLID TRAF STRIPE, 8,WH	472.000	2.69	1272.48
3080	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI	4720.000	0.48	2301.99
3085	653-3502	GLF	THERMO SKIP TRAF ST, 5 IN, YEL	193.000	0.50	96.90
3090	653-6004	SY	THERM TRAF STRIPING, WHITE	1223.000	4.75	5810.85
3095	653-6006	SY	THERM TRAF STRIPING, YELLOW	122.000	5.68	693.39
3100	654-1001	EA	RAISED PVMT MARKERS TP 1	50.000	5.91	295.91
3105	654-1003	EA	RAISED PVMT MARKERS TP 3	40.000	5.06	202.73
3110	654-1010	EA	RAISED PVMT MARKERS TP 10	8.000	56.61	452.95
3118	668-1100	EA	CATCH BASIN, GP 1	1.000	3240.41	3240.42
3119	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	2.000	267.26	534.53
3120	668-2100	EA	DROP INLET, GP 1	1.000	3463.41	3463.42
3125	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	2.000	343.38	686.78
3130	668-4300	EA	STORM SEW MANHOLE, TP 1	1.000	2541.40	2541.41
3135	668-4311	LF	ST SEW MANHOLE,TP 1,A DEP,CL 1	2.000	369.13	738.28
3140	668-4400	EA	STORM SEW MANHOLE, TP 2	1.000	4024.84	4024.84
3145	668-4412	LF	ST SEW MANHOLE,TP 2,A DEP,CL 2	1.000	374.33	374.33
3155	163-0300	EA	CONSTRUCTION EXIT	1.000	2248.15	2248.16
3160	163-0520	LF	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	99.000	19.12	1893.17
3165	163-0527	EA	CNST/REM RIP RAP CKDM,STN P RIPRAP/SN BG	107.000	524.33	56103.65
3170	163-0528	LF	CONSTR AND REM FAB CK DAM -TP C SLT FN	815.000	15.94	12993.50
3175	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	472.000	5.56	2625.43
3180	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	4.000	237.20	948.81
3185	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	536.000	0.64	346.67
3190	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	1072.000	0.79	849.62
3195	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	515.000	7.19	3705.75
3199	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	472.000	2.47	1166.34
3200	165-0101	EA	MAINT OF CONST EXIT	1.000	800.07	800.08
3205	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	4.000	91.54	366.20
3210	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	1073.000	2.84	3051.42
3215	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	2146.000	3.94	8473.67
3220	700-6001	LS	GRASSING - COMPLETE	1.000	35000.00	35000.00

ITEM TOTAL 1888946.50
INFLATED ITEM TOTAL 1888946.49

JOB ESTIMATE REPORT

TOTALS FOR JOB 0007836- SEG 7

ESTIMATED COST:	1888946.49
CONTINGENCY PERCENT (0.0):	0.00
ESTIMATED TOTAL:	1888946.49

GEORGIA DEPARTMENT OF TRANSPORTATION
PRELIMINARY ROW COST ESTIMATE SUMMARY *

Date: 4/4/2018
Revised:

Project: Reconstruction/Rehabilitation
County: Bartow/Cherokee
PI: 7836

Description: SR 20 from I-75 to I-575
Project Termini: SR 20 from I-75 to I-575

Existing ROW: Varies
Required ROW: Varies

Parcels: 200

Land and Improvements		$52,743,045.00
Proximity Damage	*$125,000.00*	
Consequential Damage	*$110,000.00*	
Cost to Cures	*$150,000.00*	
Trade Fixtures	*$50,000.00*	
Improvements	*$3,150,000.00*	
Valuation Services		$1,173,750.00
Legal Services		$1,260,000.00
Relocation		$2,130,000.00
Demolition		$750,000.00
Administrative		$1,707,500.00
TOTAL ESTIMATED COSTS		$59,764,295.00
TOTAL ESTIMATED COSTS (ROUNDED)		***$59,765,000.00***

Preparation Credits	Hours	Signature

Prepared By: Cheryl H Brewer CG#: 6418 (DATE) 4/4/18
Approved By: CG#: (DATE)

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

*** ROW Cost Estimate developed by Design Team. ~*OB***

Askew, Robert

From: Westberry, Lisa <lwestberry@dot.ga.gov>
Sent: Friday, January 10, 2020 11:33 AM
To: Askew, Robert; Igbalajobi, Theo
Cc: Perry, Verlin (Ryan)
Subject: PI 0007836, Bartow/Cherokee Counties - Estimated Mitigation Cost for Concept Report

As requested, the estimated mitigation cost for the subject project is **$3,142,580.00**. This estimate is based on credit calculations from the October 2019 PAR report for the preferred alternative. The total cost of mitigation credits could vary based on design changes, stream buffer requirements, and credit costs at time of purchase.

If you should have any questions or need any additional information, please do not hesitate to contact me.

Lisa Westberry
Special Projects Coordinator

Office of Environmental Services
One Georgia Center, 16th Floor
600 West Peachtree Street, NW
Atlanta, GA, 30308
404.631.1772

Hands-free cell phone use is the law when driving in Georgia. When drivers use cell phones and other electronic devices it must be with hands-free technology. There are many facets to the law. For details, visit https://www.gahighwaysafety.org/highway-safety/hands-free-law/

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE

Project No. CSSTP-0007-00(836)
County Bartow/Cherokee
P.I. # 0007836
Description SR 20 from I-75/Bartow to I-575/Cherokee

Office Cartersville
Date February 15, 2019

FROM Jun Birnkammer, District Utilities Manager

TO Theo Igbalajobi, Project Manager

SUBJECT **REVISED UTILITY COST ESTIMATE**

A review of utilities located on the above referenced project has been conducted based on the latest available plans. Listed below is a breakdown of the anticipated reimbursable and non-reimbursable cost.

Utility Owner	Reimbursable	Non-Reimbursable	Estimate Based on
Amicalolca EMC	$0.00	$1,200,000.00	Preliminary info from Utility
AT&T	$0.00	$3,000,000.00	Preliminary info from Utility
Atlanta Gas Light	$0.00	$4,073,152.00	Preliminary info from Utility
City of Cartersville - Gas**	$375,000.00	$375,000.00	Preliminary info from Utility
Cherokee County Water and Sewer Auth.**	$0.00	$9,775,000.00	Preliminary info from Utility
Bartow County Water**	$0.00	$6,500,000.00	Preliminary info from Utility
Comcast	$0.00	$665,000.00	Preliminary info from Utility
Dalton Utilities - Transmission	$0.00	$0.00	Preliminary info from Utility
Georgia Power - Distribution	$6,160,000.00	$0.00	Preliminary info from Utility
Georgia Power - Transmission	$400,000.00	$0.00	Preliminary info from Utility
Sunesys	$0.00	$85,000.00	Preliminary info from Utility
Windstream Communications	$0.00	$1,510,000.00	Preliminary info from Utility
	$0.00	$0.00	
	$0.00	$0.00	
TOTAL 100.00%	**$6,935,000.00**	**$27,183,152.00**	
Department Responsibility 100.00%	**$6,935,000.00**	**$27,183,152.00**	
Local Sponsor Responsibility 0.00%	**$0.00**	**$0.00**	**PFA Dated with**

** Indicates Potential Utility Aid Request from Local Gov't

Estimate is based on the best available information at the current stage, unforeseen prior rights information may be provided by the Utility Company at a later date that could cause some non-reimbursable costs to shift to the reimbursable cost column.

If additional information is needed, please contact Daniel Monteith at 678-721-5325.

cc:

Patrick Allen, P.E., State Utilities Engineer
David Acree, P.E., District Preconstruction Engineer

Concept Utility Report

Original Version: May 24, 2013
Revision: Feb. April 5, 2018

Concept Utility Report

Project Number: CSSTP-0007-00(836) **District:** 6

County: Bartow, Cherokee **Prepared by:** Daniel Monteith

P.I. # 0007836 **Date:** 12/17/19

Project Description: SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE

The information provided herein has been gathered from Georgia811and/or field visits and serves as an estimate. Nothing contained in this report is to be used as a substitute for 1st Submission or SUE.

Are SUE services recommended? Yes

Level: ☐A ☒B ☐C ☐D

Public Interest Determination (PID):

☐Automatic ☐Mandatory ☒Consideration ☐No Use ☐Exempt

Is a separate utility funding phase recommended? Yes

Potential Project (Schedule/Budget) Impacts: Click here to enter text.

Capital Improvement Projects (Utilities) Anticipated in the Area: Click here to enter text.

Project Specific Recommendations for Avoidance/Mitigation: Click here to enter text.

Right of Way Coordination: Easments should be bought with the right to place utilities.

Environmental Coordination: Click here to enter text.

Additional Remarks: Click here to enter text.

Original Version: May 24, 2013
Revision: Feb. March 8, 2018

Utilities have facilities within the project limits.

Utilities have been identified using Georgia811 and/or field visits.

Facility Owner	**Facility Owner Contact Email Address**	**Existing Facilities/ Appurtenances**	**General Description of Location**	**Facilities to Avoid** *approx. limits*	**Facilities Retention Recommended** *approx. limits*	**Comments**
Amicalola EMC	CodyM@amicalolaemc.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Atlanta Gas Light	msalter@southernco.COM	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Bartow County Water	ellisr@bartowga.org	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
AT&T	js957m@att.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Crown Castle	venesia.horne@crowncastle.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Cherokee Co. Water & Sewer Authority	dwayne@ccwsa.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
City of Canton Water/Sewer	david.hatabian@cantonga.gov	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
City of Cartersville Gas	bfriery@cityofcartersville.org	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Comcast	John_Pierno@comcast.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Dalton Utilities Transmission	rsmith@dutil.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
GA Power Distribution	SDVASSER@southernco.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
GA Power Transmission	MSWHEELE@southernco.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.

Windstream	Mike.Souther@windstream.com	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.

Note: *To add additional rows, click the bottom right corner of the box above, then click the blue* + *that will appear. Please add additional rows prior to entering text.*

Crash Summaries

Historic Crash Rates and Severity

At both the intersection and the roadway segment level, the average total, fatal, and injury crashes or crash rates were calculated for the five-year period from 2014 to 2018 for the SR 20 study corridor. The average crashes/crash rates were then compared to the statewide averages to determine how each study corridor intersection or roadway segment operates compared to similar facilities in Georgia. Analyzing crashes at both the intersection and roadway segment level enables an understanding of safety issues that may exist in any area of the corridor. Intersection crashes include crashes occurring on all intersection approaches while the segment crash rates include only crashes occurring along the SR 20 corridor.

1.1 Intersections

Table 1-1 compares the 2014-2018 five-year annual average number of total, injury, and fatal crashes occurring at each study corridor intersection to the five-year statewide annual average number of total, injury, and fatal crashes for similar intersections. The statewide average numbers of total, injury, and fatal intersection crashes are produced using historical data for intersections across the state with the same functional classification and a similar AADT range to the comparison intersection.

Table 1-1. 2014 to 2018 Average Yearly Intersection Crashes

Intersection	2014 – 2018 Average Crashes/Year			Statewide Average Crashes/Year		
	Total	Injury	Fatal	Total	Injury	Fatal
I-75 Southbound	10.8	4.0	0.00	11.5	3.2	0.00
I-75 Northbound	28.0	7.4	0.00	5.2	1.4	0.03
SR 20 Spur	18.2	6.6	0.00	6.5	1.8	0.02
Dean Rd/Simpson Cir	1.2	0.4	0.00	5.2	1.4	0.03
Rowland Springs Rd/Simpson Cir	2.0	0.4	0.00	4.7	1.2	0.01
Ranger Rd	0.4	0.2	0.00	4.7	1.2	0.01
Vulcan Quarry Rd	0.8	0.0	0.00	4.7	1.2	0.01
JR Rd	0.4	0.0	0.00	4.7	1.2	0.01
Roberson Dr/Holly Dr	1.8	0.2	0.00	4.7	1.2	0.01
Timber Lake Cove	1.8	0.4	0.00	4.7	1.2	0.01
Commerce Row	1.2	0.6	0.00	4.7	1.2	0.01
Wilderness Camp Rd/Bells Ferry Rd	5.2	1.4	0.00	4.7	1.2	0.01
Chandler Ln	1.0	0.7	0.00	3.8	1.2	0.02
Hawks Farm Rd	1.6	0.4	0.00	3.8	1.2	0.02
Woodall Rd/Brooke Rd	1.8	0.4	0.00	3.8	1.2	0.02
Deer Run Dr/Rose Brooke Cir	0.6	0.2	0.00	3.8	1.2	0.02
Clearwater Trl/Rhine Rd	3.2	1.0	0.00	3.8	1.2	0.02
Sutallee Woods Trl	2.0	0.6	0.00	3.8	1.2	0.02
Peachtree Dr	0.2	0.0	0.00	3.8	1.2	0.02
Highland View Pass	1.4	0.4	0.00	3.8	1.2	0.02
Upper Sweetwater Trl/Fincher Rd	11.0	3.8	0.00	3.8	1.2	0.02
Ficklen Church Way	3.8	1.0	0.00	4.7	1.2	0.01
Willie West Rd	1.4	0.6	0.00	4.7	1.2	0.01
Knox Campground Trl	2.6	0.8	0.00	4.7	1.2	0.01
Fields Chapel Rd	4.8	1.0	0.00	4.7	1.2	0.01
Veterans Cemetery Rd	1.8	0.4	0.00	4.7	1.2	0.01
Fields Landing Dr	1.6	0.2	0.00	4.7	1.2	0.01
Lusk Ct/Copper Hills Dr	1.8	0.0	0.00	4.7	1.2	0.01
Fieldstone Dr	2.6	0.4	0.00	4.7	1.2	0.01
Legend Creek Dr	2.8	0.4	0.00	5.2	1.4	0.03
Riverbend Way/Pope Cir	7.6	2.0	0.00	5.2	1.4	0.03
River Green Ave/Butterworth Rd	20.2	4.2	0.00	4.7	1.2	0.01
Teasley Middle School	2.2	0.5	0.20	4.7	1.2	0.01
Ridgemont Rd	0.4	0.0	0.00	4.7	1.2	0.01
Herndon Ln/Access Rd	30.4	7.6	0.00	4.7	1.2	0.01
Hickory Flat Hwy	40.8	5.4	0.00	6.5	1.8	0.02

Table 1-1 indicates that eleven intersections have crashes that exceed the statewide average for at least one crash category (total, injury, or fatal): SR 20 at I-75 southbound ramps, I-75 northbound ramps, SR 20 Spur, Wilderness Camp Road/Bells Ferry Road, Upper Sweetwater Trail/Fincher Road, Fields Chapel Road, Riverbend Way/Pope Circle, River Green Avenue/Butterworth Road, Teasley Middle School, Herndon Lane/Access Road, and Hickory Flat Highway.

1.1.1 Intersection Crash Type Analysis

The crash history at each of these eleven intersections was investigated further to identify the underlying crash type frequencies occurring at these intersections, which are presented in Figures 1-1 to 1-11.

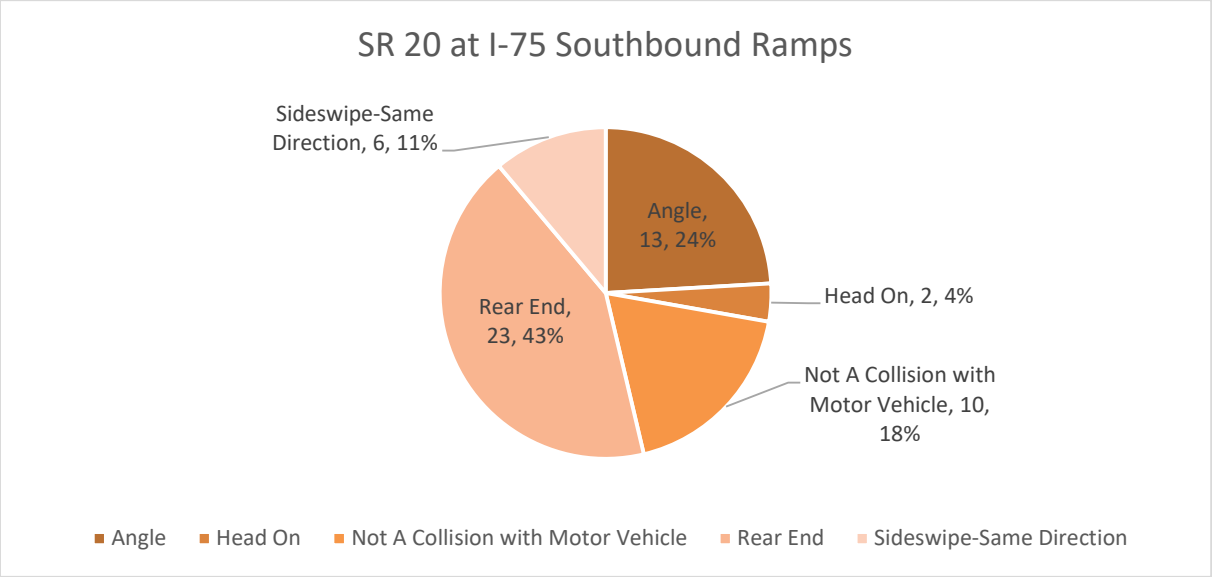


Figure 1-1. 2014 to 2018 Crashes by Crash Type for SR 20 at I-75 Southbound Ramps

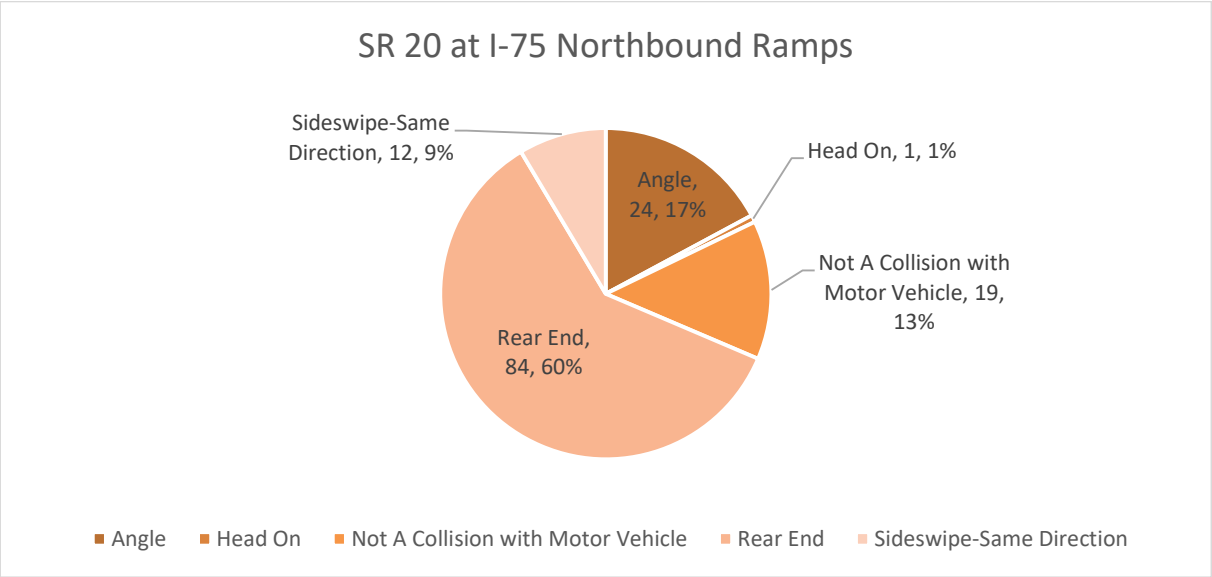


Figure 1-2. 2014 to 2018 Crashes by Crash Type for SR 20 at I-75 Northbound Ramps

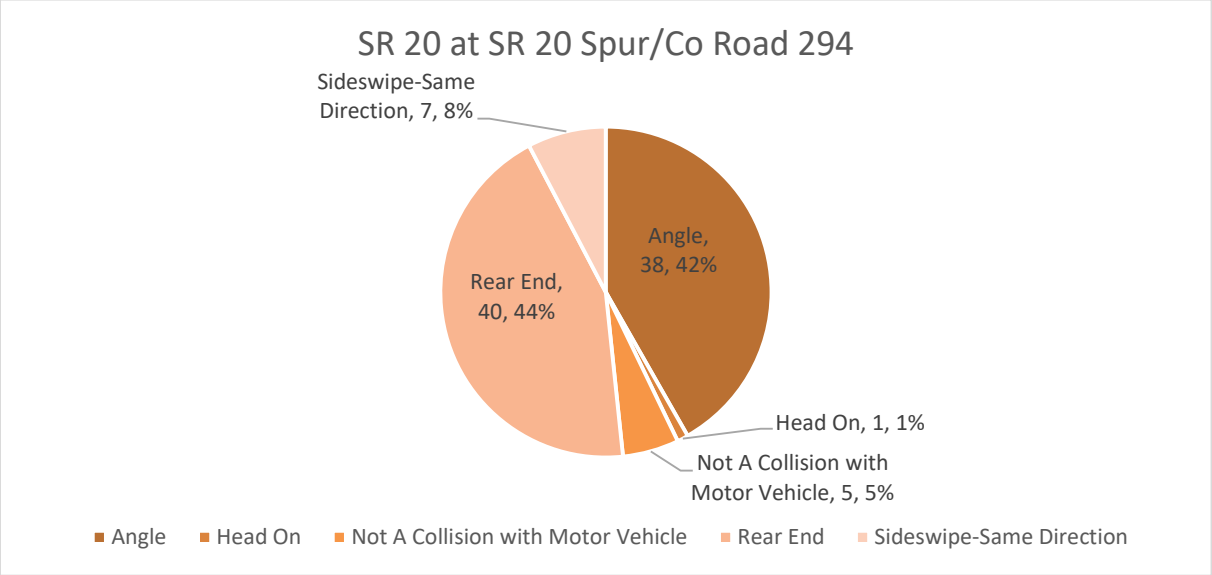


Figure 1-3. 2014 to 2018 Crashes by Crash Type for SR 20 at SR 20 Spur/Co Road 294

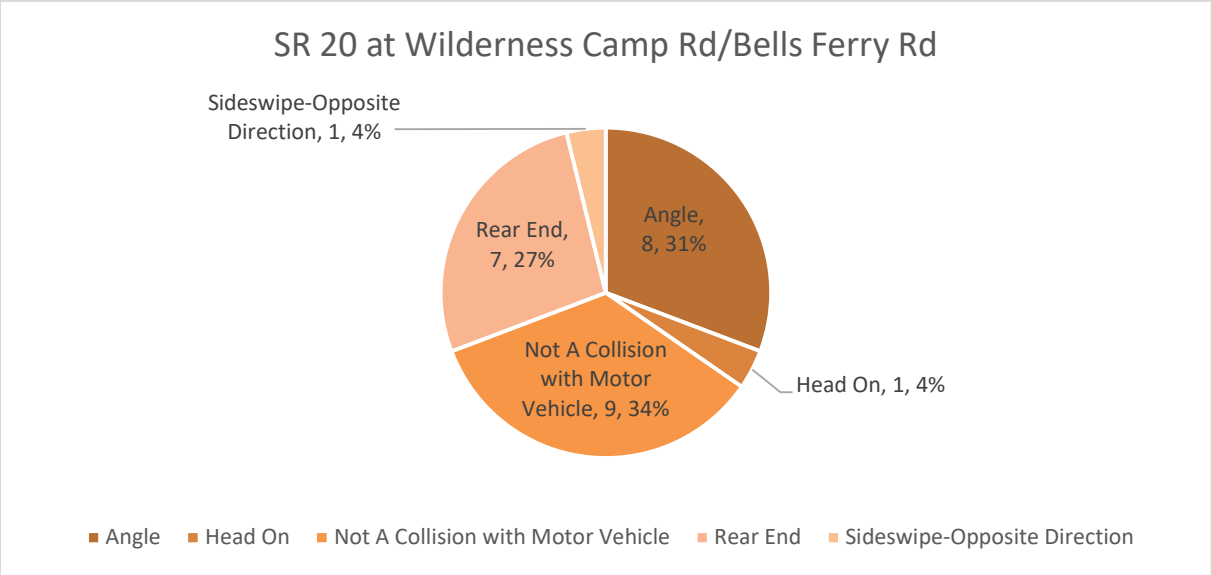


Figure 1-4. 2014 to 2018 Crashes by Crash Type for SR 20 at Wilderness Camp Rd/Bells Ferry Rd

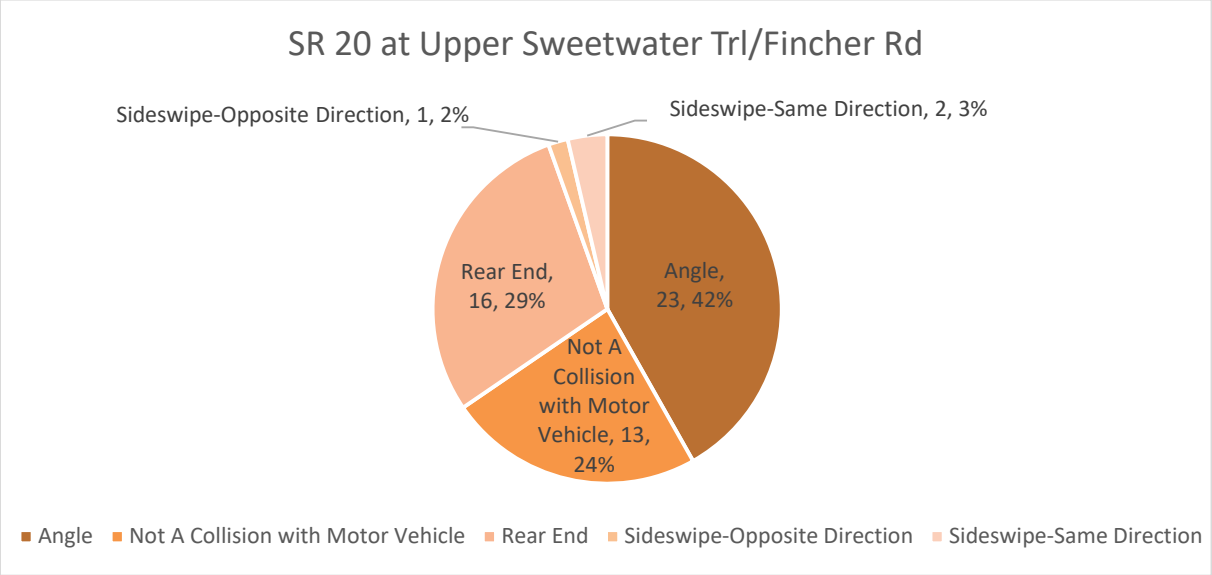


Figure 1-5. 2014 to 2018 Crashes by Crash Type for SR 20 at Upper Sweetwater Trl/Fincher Rd

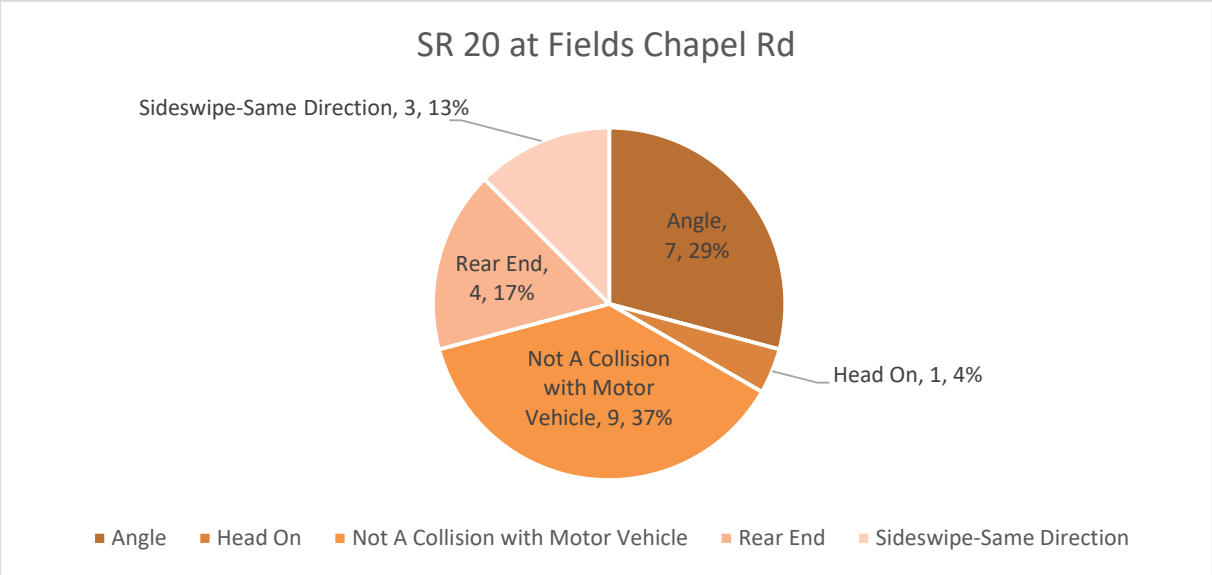


Figure 1-6. 2014 to 2018 Crashes by Crash Type for SR 20 at Fields Chapel Rd

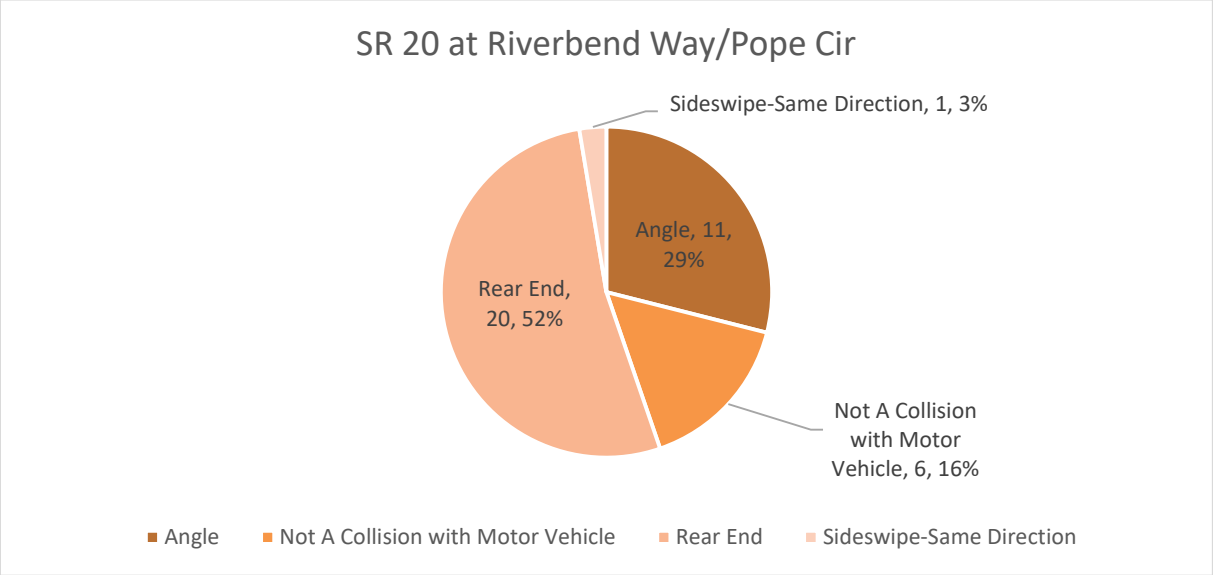


Figure 1-7. 2014 to 2018 Crashes by Crash Type for SR 20 at Riverbend Way/Pope Cir

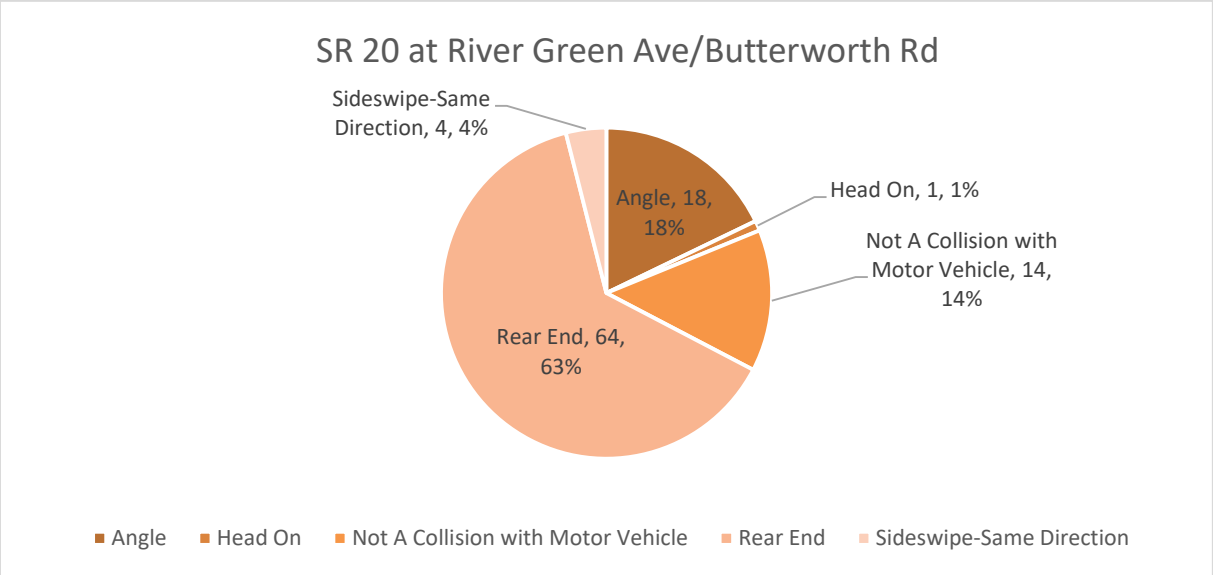


Figure 1-8. 2014 to 2018 Crashes by Crash Type for SR 20 at River Green Ave/Butterworth Rd

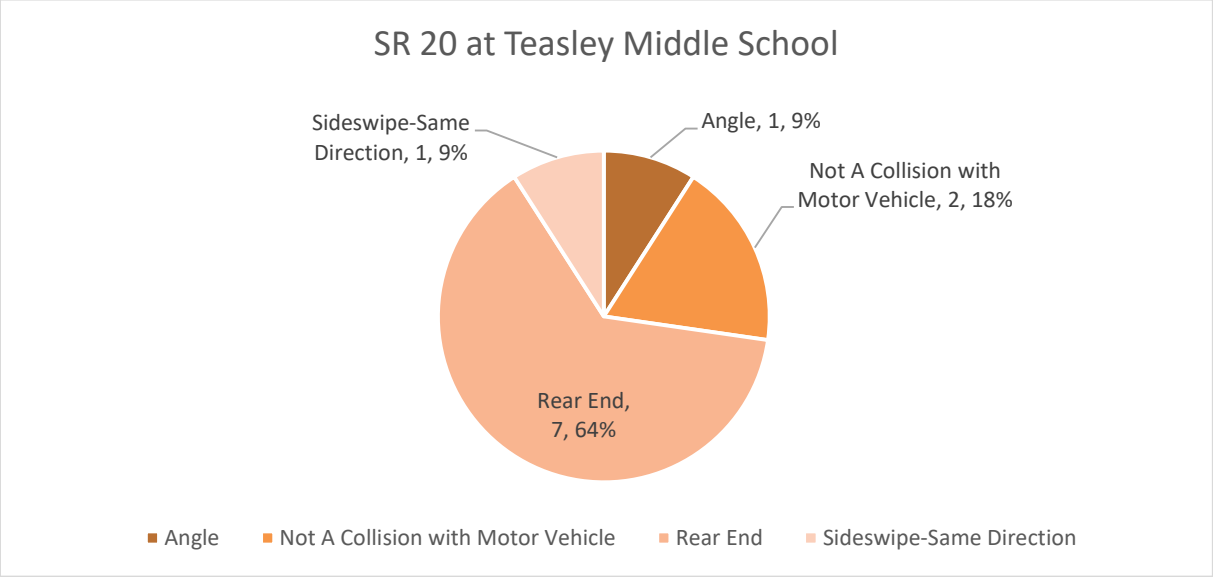


Figure 1-9. 2014 to 2018 Crashes by Crash Type for SR 20 at Teasley Middle School

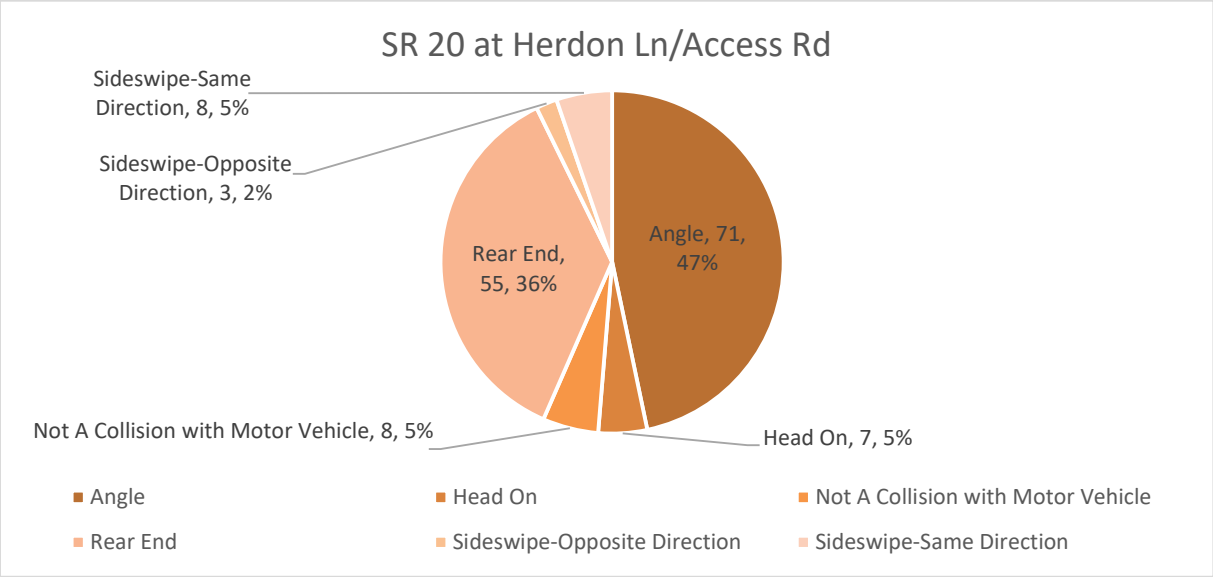


Figure 1-10. 2014 to 2018 Crashes by Crash Type for SR 20 at Herndon Lane/Access Road

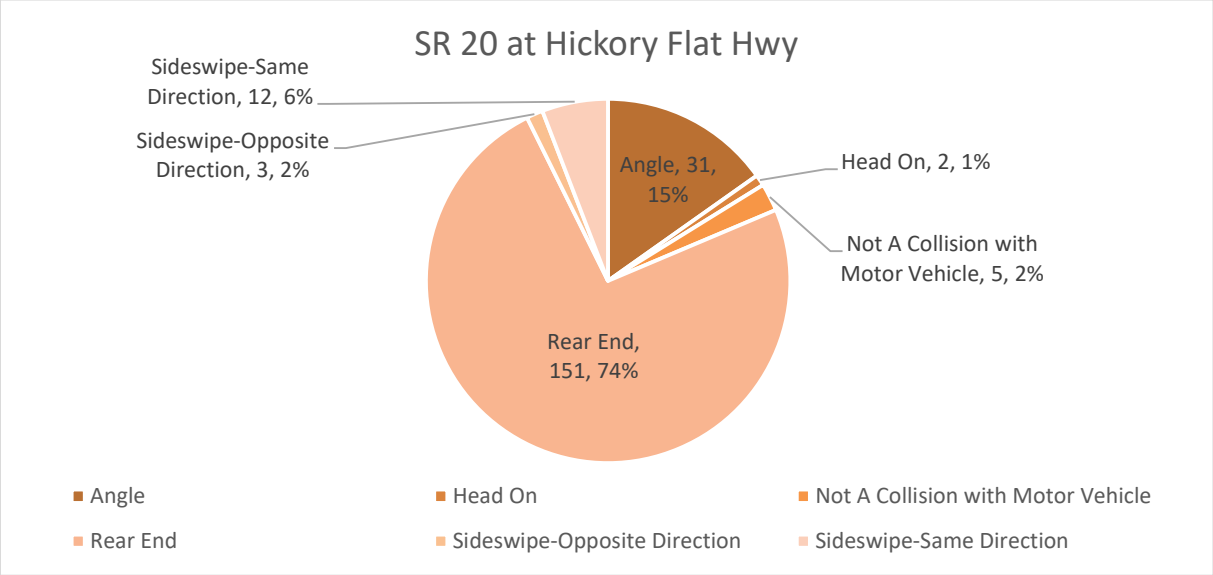


Figure 1-11. 2014 to 2018 Crashes by Crash Type for SR 20 at Hickory Flat Highway

Of the eleven intersections with crashes exceeding statewide average crashes, seven are signalized (I-75 southbound ramps, I-75 northbound ramps, SR 20 Spur, River Green Avenue/Butterworth Road, Teasley Middle School, Herndon Lane/Access Road, and Hickory Flat Highway) and four are unsignalized (Wilderness Camp Road/Bells Ferry Road, Upper Sweetwater Trail/Fincher Road, Fields Chapel Road, Riverbend Way/Pope Circle). Rear end crashes and angle crashes were the top two most prevalent crash types at eight of the eleven intersections – six of the seven signalized intersections (excluding the Teasley Middle School intersection) plus the Riverbend Way/Pope Circle unsignalized intersection. On average, these two crash types accounted for about 79 percent of the total crashes that occurred at these eight intersections. Typically, these two crash types are the most prevalent at signalized intersections. Factors such as limited sight distance and hidden driveways could have contributed to the prevalence of these crash types at the two unsignalized intersection.

At the remaining three high crash intersections, the top two crash types were either not a collision with a motor vehicle and angle (Wilderness Camp Road/Bells Ferry Road and Fields Chapel Rd) or rear end and not a collision with a motor vehicle (Teasley Middle School). The Wilderness Camp Road/Bells Ferry Road and Fields Chapel Rd intersections are unsignalized and the Teasley Middle School intersection is signalized. Collisions with an object other than a motor vehicle accounted for an average of about 33 percent of the crashes occurring at these three intersections. Several factors may contribute to these types of crashes including the sharp horizontal curves, the lack of medians, and the corridor's heavily wooded nature as these factors may make it more difficult for a vehicle to maintain their lane.

Although the not a collision with a motor vehicle crash type was the second most prevalent type at the Teasley Middle School intersection, this crash type only accounted for two out of the eleven total intersection crashes. One of those two crashes involved a motorcycle losing control for unspecified reasons and then hitting the curb and running off the road while the other crash involved a vehicle attempting to make a turn into the driveway too late, and then losing control and running off the road.

1.1.2 Intersection Crash Severity Analysis

Of the eleven intersections with crashes exceeding statewide averages, ten had either injury or fatal crashes that exceeded statewide averages. The severity of the crashes occurring at each of the ten high injury/fatal crash intersections was analyzed by calculating the percentage of each crash type that involved injuries or fatalities. Tables 1-2 through 1-11 present the crash severities by crash type for the ten intersections.

Table 1-2. SR 20 at I-75 Southbound Ramps Crash Severity (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	13	7	54%	0	0%
Head On	2	2	100%	0	0%
Not a Collision with a Motor Vehicle	10	3	30%	0	0%
Rear End	23	7	30%	0	0%
Sideswipe-Same Direction	6	1	17%	0	0%
Total	54	20	37%	0	0%

Table 1-3. SR 20 at I-75 Northbound Ramps Crash Severity (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	24	9	38%	0	0%
Head On	1	0	0%	0	0%
Not a Collision with a Motor Vehicle	19	3	16%	0	0%
Rear End	84	25	30%	0	0%
Sideswipe-Same Direction	12	0	0%	0	0%
Total	140	37	26%	0	0%

Table 1-4. SR 20 at SR 20 Spur Crash Severity (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	38	16	42%	0	0%
Head On	1	1	100%	0	0%
Not a Collision with a Motor Vehicle	5	2	40%	0	0%
Rear End	40	13	33%	0	0%
Sideswipe-Same Direction	7	1	14%	0	0%
Total	91	33	36%	0	0%

Table 1-5. SR 20 at Wilderness Camp Rd/Bells Ferry Rd (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	8	3	38%	0	0%
Head On	1	1	100%	0	0%
Not a Collision with a Motor Vehicle	9	1	11%	0	0%
Rear End	7	1	14%	0	0%
Sideswipe-Opposite Direction	1	1	100%	0	0%
Total	26	7	27%	0	0%

Table 1-6. SR 20 at Upper Sweetwater Trail/Fincher Rd (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	23	13	57%	0	0%
Not a Collision with a Motor Vehicle	13	3	23%	0	0%
Rear End	16	3	19%	0	0%
Sideswipe-Opposite Direction	1	0	0%	0	0%
Sideswipe-Same Direction	2	0	0%	0	0%
Total	55	19	35%	0	0%

Table 1-7. SR 20 at Riverbend Way/Pope Cir (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	11	4	36%	0	0%
Not a Collision with a Motor Vehicle	6	1	17%	0	0%
Rear End	20	5	25%	0	0%
Sideswipe-Same Direction	1	0	0%	0	0%
Total	38	10	26%	0	0%

Table 1-8. SR 20 at River Green Ave/Butterworth Rd (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	18	3	17%	0	0%
Head On	1	0	0%	0	0%
Not a Collision with a Motor Vehicle	14	3	21%	0	0%
Rear End	64	15	23%	0	0%
Sideswipe-Same Direction	4	0	0%	0	0%
Total	101	21	21%	0	0%

Table 1-9. SR 20 at Teasley Middle School (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	1	1	100%	0	0%
Not a Collision with a Motor Vehicle	2	0	0%	1	50%
Rear End	7	1	14%	0	0%
Sideswipe-Same Direction	1	1	100%	0	0%
Total	11	3	27%	1	9%

Table 1-10. SR 20 at Herndon Ln/Access Rd (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	71	20	28%	0	0%
Head On	7	2	29%	0	0%
Not a Collision with a Motor Vehicle	8	2	25%	0	0%
Rear End	55	14	25%	0	0%
Sideswipe-Opposite Direction	3	0	0%	0	0%
Sideswipe-Same Direction	8	0	0%	0	0%
Total	152	38	25%	0	0%

Table 1-11. SR 20 at Hickory Flat Hwy (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	31	7	23%	0	0%
Head On	2	0	0%	0	0%
Not a Collision with a Motor Vehicle	5	0	0%	0	0%
Rear End	151	17	11%	0	0%
Sideswipe-Opposite Direction	3	0	0%	0	0%
Sideswipe-Same Direction	12	3	25%	0	0%
Total	204	27	13%	0	0%

The intersection crash severity analysis shows that head on and angle crashes were the most severe crash types, with an average injury crash percentage of 47 and 43 percent, respectively. Overall, 25 percent of the crashes that occurred at the ten intersections involved injuries or fatalities. During the five years of historical data, one fatal crash occurred at an intersection along the SR 20 corridor. The fatal crash was a not a collision with a motor vehicle crash and occurred at the Teasley Middle School intersection. The crash involved an eastbound motorcycle that lost control for unspecified reasons and hit the curb and subsequently hit a tree.

1.2 Roadway Segments

In addition to investigating intersection crashes, historical crash rates were analyzed for roadway segments along the SR 20 corridor to scan for potential safety concerns or hotspots. Roadway segments were defined as the sections of the SR 20 corridor spanning between each study intersection. Roadway segment crash rates are calculated as the number of crashes per 100 million vehicle miles (100 MVM). Rather than conducting an individual yearly crash rate comparison, five-year annual average statewide crash rates were calculated to compare with the five-year (2014 to 2018) annual average historic project corridor segment crash rates. At the time of this analysis, the statewide average roadway segment crash rates were not available for 2017 or 2018; therefore, the statewide average rates for 2016 were used to represent 2017 and 2018 statewide average rates during calculation of the annual average.

Table 1-12 presents the statewide average total crash, injury crash, and fatal crash rates for principal arterial roadway segments in both rural and urban areas. The entire SR 20 project corridor has a functional classification of principal arterial. The section of SR 20 from the I-75 interchange to the Wilderness Camp Road/Bells Ferry Road intersection is categorized as urban, the section from the Wilderness Camp Road/Bells Ferry Road intersection to the Fields Landing Drive intersection is categorized as rural, and the section from the Fields Landing Drive intersection to the Hickory Flat Highway intersection is categorized

as urban again. Table 1-12 presents the statewide average crash rates for the years 2014-2016 (and 2017/2018) and the five-year annual average rates for both rural and urban principal arterial corridors. Figure 1-12 identifies the urban and rural section start and end locations as well as shows an overview of the crash densities along the corridor.

Table 1-12. 2014 to 2018 Statewide Average Roadway Segment Crash Rates

Functional Classification	Area Type	Year	Statewide Total Crashes (per 100 MVM)	Statewide Injury Crashes (per 100 MVM)	Statewide Fatal Crashes (per 100 MVM)
Principal Arterial	Rural	2014	129	38	1.27
		2015	109	33	1.51
		2016, 2017, 2018	108	34	1.57
		1-Year Annual Average	**112**	**35**	**1.50**
	Urban	2014	589	134	1.15
		2015	583	138	1.24
		2016, 2017, 2018	628	145	1.47
		1-Year Annual Average	**611**	**141**	**1.36**

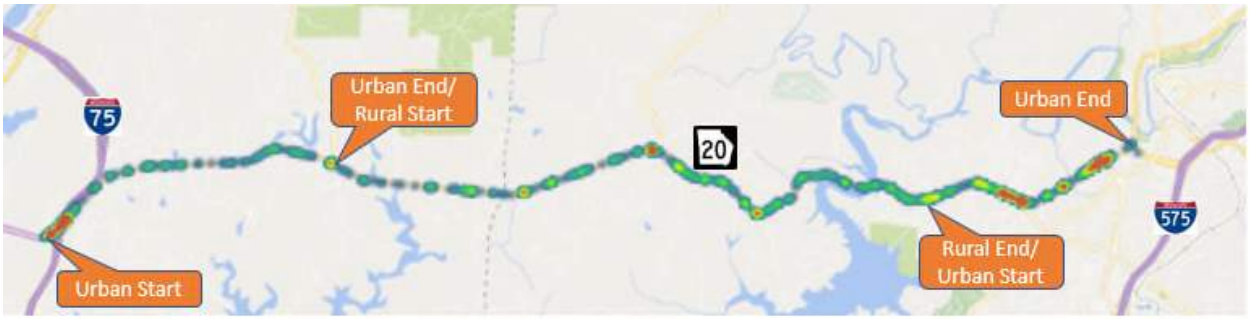


Figure 1-12. Corridor Crash Densities and Urban/Rural Start/End Locations

Tables 1-13 to 1-15 present the 2014-2018 five-year annual average crash rates for each roadway segment along the project corridor. Table 1-13 presents the urban section from the I-75 interchange to the Wilderness Camp Road/Bells Ferry Road intersection, Table 1-14 presents the rural section from the Wilderness Camp Road/Bells Ferry Road intersection to the Fields Landing Drive intersection, and Table 1-15 presents the urban section from the Fields Landing Drive intersection to the Hickory Flat Highway intersection.

The red fonts in Tables 1-13 to 1-15 denote crash rates that are above the comparable statewide average crash rate. In the western urban section of the study corridor, only the two segments spanning between the I-75 southbound ramps intersection and the SR 20 Spur intersection have crash rates that exceed the comparable statewide average crash rate. The section between the I-75 southbound and I-75 northbound ramps intersections exceeds the injury crash rate and the section between the I-75 northbound ramps and the SR 20 Spur intersections exceeds both the total and injury crash rates. For the rural section in the middle of the study corridor, all sections exceed the statewide average rate for either total crashes, injury crashes, or both except for the segment between the Deer Run Drive/Rose Brooke Circle and the Clearwater Trail/Rhine Road intersections. Additionally, the segment between the Fields Chapel Road and the Veterans Cemetery Road intersections exceeds the statewide average fatal crash rate. For the eastern urban section of the corridor, three segments exceed the average statewide rate for total and injury crashes and one segment exceeds the average statewide rate for fatal crashes.

Table 1-13. 2014 to 2018 Average Crash Rates for the Urban Section from I-75 Interchange to Wilderness Camp Rd/Bells Ferry Rd

Segment	Corridor Crashes (per 100 MVM)			Statewide Crashes (per 100 MVM)		
	Total	Injury	Fatal	Total	Injury	Fatal
I-75 Southbound to I-75 Northbound	505	159	0.00	611	141	1.36
I-75 Northbound to SR 20 Spur	1,388	385	0.00	611	141	1.36
SR 20 Spur to Dean Rd/Simpson Cir	217	101	0.00	611	141	1.36
Dean Rd/Simpson Cir to Rowland Springs Rd/Simpson Cir	70	13	0.00	611	141	1.36
Rowland Springs Rd/Simpson Cir to Ranger Rd	58	26	0.00	611	141	1.36
Ranger Rd to Vulcan Quarry Rd	146	0	0.00	611	141	1.36
Vulcan Quarry Rd to JR Rd	41	0	0.00	611	141	1.36
JR Rd to Roberson Dr/Holly Dr	46	0	0.00	611	141	1.36
Roberson Dr/Holly Dr to Timber Lake Cove	107	36	0.00	611	141	1.36
Timber Lake Cove to Commerce Row	169	45	0.00	611	141	1.36
Commerce Row to Wilderness Camp Rd/Bells Ferry Rd	152	38	0.00	611	141	1.36

Table 1-14. 2014 to 2018 Average Crash Rates for the Rural Section from Wilderness Camp Rd/Bells Ferry Rd to Fields Landing Dr

Segment	Corridor Crashes (per 100 MVM)			Statewide Crashes (per 100 MVM)		
	Total	Injury	Fatal	Total	Injury	Fatal
Wilderness Camp Rd/ Bells Ferry Rd to Chandler Ln	90	43	0.00	112	35	1.50
Chandler Ln to Hawks Farm Rd	251	72	0.00	112	35	1.50
Hawks Farm Rd to Woodall Rd/ Brooke Rd	382	63	0.00	112	35	1.50
Woodall Rd/Brooke Rd to Deer Run Dr/ Rose Brooke Cir	61	41	0.00	112	35	1.50
Deer Run Dr/Rose Brooke Cir to Clearwater Trail/ Rhine Rd	81	27	0.00	112	35	1.50
Clearwater Trail/ Rhine Rd to Sutallee Woods Trail	296	86	0.00	112	35	1.50
Sutallee Woods Trail to Peachtree Dr	159	35	0.00	112	35	1.50
Peachtree Dr to Highland View Pass	196	50	0.00	112	35	1.50
Highland View Pass to Upper Sweetwater Trail/ Fincher Rd	167	33	0.00	112	35	1.50
Upper Sweetwater Trail/ Fincher Rd to Ficklen Church Way	406	163	0.00	112	35	1.50
Ficklen Church Way to Willie West Rd	267	98	0.00	112	35	1.50
Willie West Rd to Knox Campground Trail	121	36	0.00	112	35	1.50
Knox Campground Trail to Fields Chapel Rd	256	116	0.00	112	35	1.50
Fields Chapel Rd to Veterans Cemetery Rd	183	39	3.00	112	35	1.50
Veterans Cemetery Rd to Fields Landing Dr	166	61	0.00	112	35	1.50

Table 1-15. 2014 to 2018 Average Crash Rate for the Urban Section from Fields Landing Dr to Hickory Flat Hwy

Segment	Corridor Crashes (per 100 MVM)			Statewide Crashes (per 100 MVM)		
	Total	Injury	Fatal	Total	Injury	Fatal
Fields Landing Dr to Luck Ct/ Copper Hills Dr	422	0	0.00	611	141	1.36
Luck Ct/ Copper Hills Dr to Fieldstone Dr	141	13	0.00	611	141	1.36
Fieldstone Dr to Legend Creek Dr	572	96	0.00	611	141	1.36
Legend Creek Dr to Riverbend Way/ Pope Cir	247	49	0.00	611	141	1.36
Riverbend Way/ Pope Cir to River Green Ave/ Butterworth Rd	954	236	0.00	611	141	1.36
River Green Ave/ Butterworth Rd to Teasley Middle School	183	44	0.00	611	141	1.36
Teasley Middle School to Ridgemont Rd	388	68	23.00	611	141	1.36
Ridgemont Rd to Access Rd	689	182	0.00	611	141	1.36
Access Rd to Herndon Ln	954	357	0.00	611	141	1.36
Herndon Ln to Hickory Flat Hwy	123	12	0.00	611	141	1.36

1.2.1 Segment Crash Type Analysis

The crash history at each of the twenty segments with crash rates exceeding statewide averages was investigated further to identify the underlying crash type frequencies. Instead of analyzing the twenty segments individually, crash types were analyzed for three aggregate segment groupings: segments exceeding statewide averages in the western urban section of the corridor, segments exceeding statewide averages in the rural section of the corridor, and segments exceeding statewide averages in the eastern urban section of the corridor. The aggregate segment crash type frequencies are presented in Figures 1-13 to 1-15.

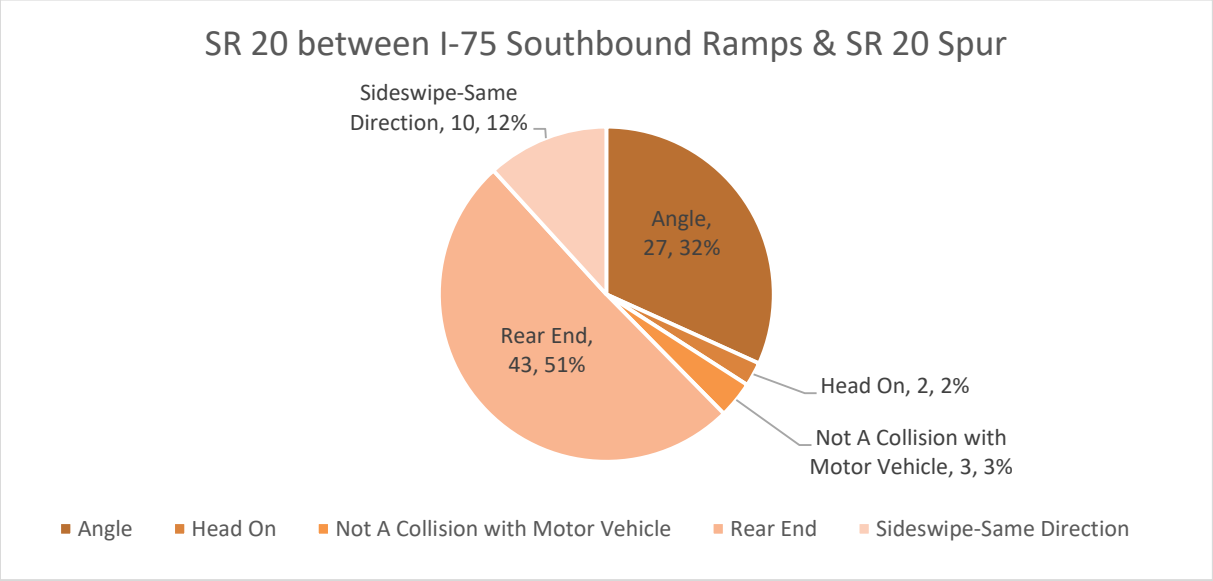


Figure 1-13. 2014 to 2018 Crashes by Crash Type for SR 20 from I-75 Southbound Ramps to SR 20 Spur

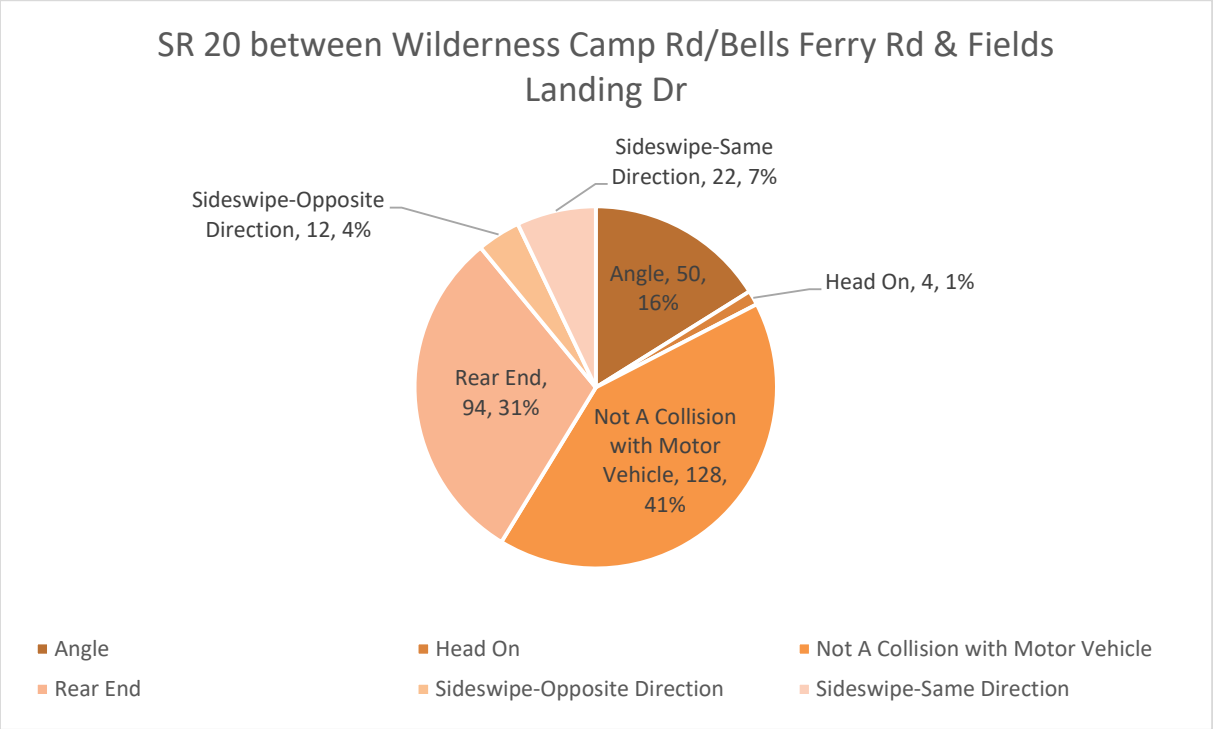


Figure 1-14. 2014 to 2018 Crashes by Crash Type for SR 20 from Wilderness Camp Rd/Bells Ferry Rd to Fields Landing Dr (excluding the segment from Deer Run Dr/Rose Brooke Cir to Clearwater Trail/ Rhine Rd)

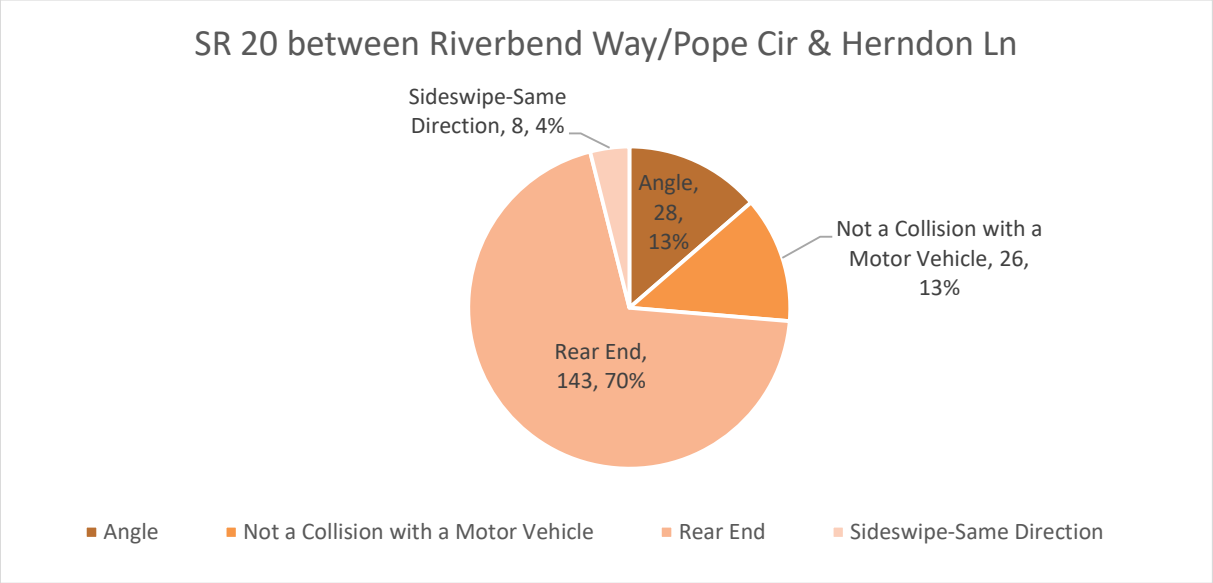


Figure 1-15. 2014 to 2018 Crashes by Crash Type for SR 20 from Riverbend Way/Pope Cir to Herndon Ln

The most common crash types at the western urban section of the corridor were rear end and angle crashes at 51 percent and 32 percent of the total crashes, respectively. This segment of the corridor has three signalized intersections; and, as discussed in the intersection crash type analysis section, these crash types are typically common in the vicinity of signalized intersections.

In the rural section of the corridor, the most common crash types were not a collision with a motor vehicle crashes and rear end crashes at 41 percent and 31 percent of the total crashes, respectively. Because of their high frequency, the not a collision with a motor vehicle crashes were analyzed further to identify underlying contributing factors. The rural section's not a collision with a motor vehicle crashes were analyzed by contributing factor (excluding those with no contributing factor identified) and by vehicle maneuver, with the results shown in Figures 1-16 and 1-17. Based on the data in Figures 1-16 and 1-17, 13 percent of the not a collision with a motor vehicle crashes had a contributing factor of the driver losing control and 22 percent of the not a collision with a motor vehicle crashes occurred while the vehicle was negotiating a curve. Some of these crashes may be corrected under the build condition when the roadway curvature is reduced, and the access control is improved.

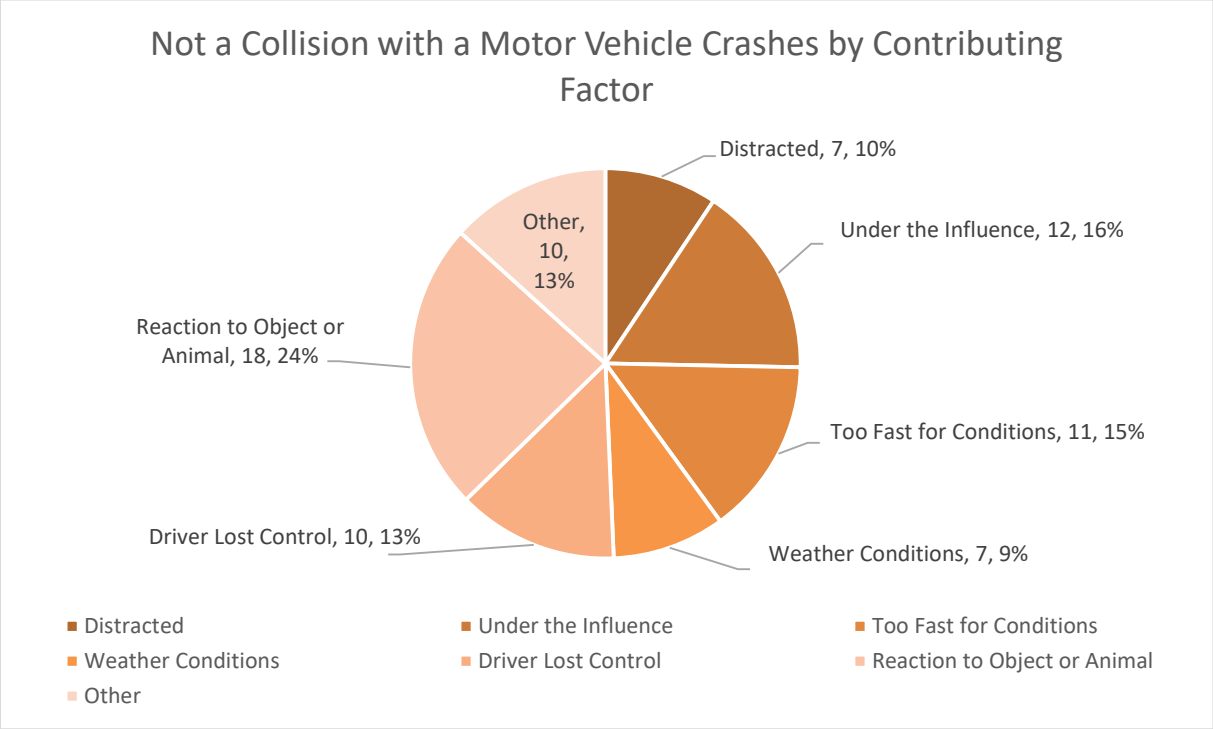


Figure 1-16. Not a Collision with a Motor Vehicle Crashes by Contributing Factor for the High Crash Rural Segments

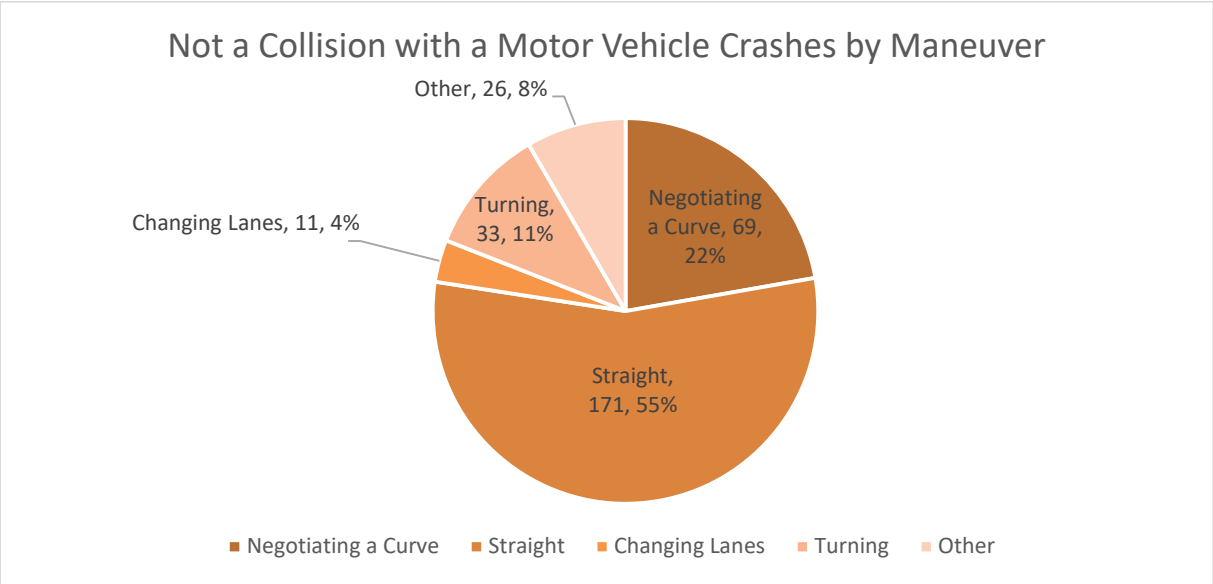


Figure 1-17. Not a Collision with a Motor Vehicle Crashes by Maneuver for the High Crash Rural Segments

The eastern urban section of the corridor experienced rear end crashes, not a collision with a motor vehicle crashes, and angle crashes as the top three crash types at 70 percent, 13 percent, and 13 percent of the total crashes, respectively. This segment of the SR 20 corridor contains three signalized intersections and experiences moderate levels of traffic congestion during peak hours. Both rear end and angle crashes are typical on signalized, congested corridors. As in the rural section of the corridor, some of the not a collision

with a motor vehicle crashes may be corrected through improvements to access control.

1.2.2 Segment Crash Severity Analysis

In addition to crash type frequencies, crash severities were also analyzed for the three aggregate segment groupings: segments exceeding statewide averages in the western urban section of the corridor, segments exceeding statewide averages in the rural section of the corridor, and segments exceeding statewide averages in the eastern urban section of the corridor. The crash severities by crash types for the three aggregate segments are presented in Tables 1-16 to 1-18. For the three aggregate segments overall, 30 percent of the total crashes resulted in injury and 0.3 percent resulted in a fatality. The most severe crash types were head on crashes and angle crashes, with 83 percent and 42 percent resulting in injuries, respectively.

The two fatal crashes were both not a collision with a motor vehicle crashes and one occurred on the rural section of the corridor and one occurred on the eastern urban section of the corridor. The rural segment fatal crash occurred in 2016 when a westbound vehicle failed to maintain their lane in a curve, first hitting the adjacent guardrail then crossing the roadway centerline and hitting an oncoming eastbound vehicle. The eastern urban segment fatal crash occurred between the Teasley Middle School and Ridgemont Road intersections at the Teasley Middle School intersection and was previously discussed in section 5.1.1.2.

Table 1-16. SR 20 from I-75 Southbound Ramps to SR 20 Spur Crash Severity (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	27	10	37%	0	0%
Head On	2	2	100%	0	0%
Not a Collision with a Motor Vehicle	3	1	33%	0	0%
Rear End	43	12	28%	0	0%
Sideswipe-Same Direction	10	0	0%	0	0%
Total	85	25	29%	0	0%

Table 1-17. SR 20 from Wilderness Camp Rd/Bells Ferry Rd to Fields Landing Dr (excluding the segment from Deer Run Dr/Rose Brooke Cir to Clearwater Trail/ Rhine Rd) Crash Severity (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	50	26	52%	0	0.0%
Head On	4	3	75%	0	0.0%
Not a Collision with a Motor Vehicle	128	37	29%	1	0.8%
Rear End	94	31	33%	0	0.0%
Sideswipe-Opposite Direction	12	2	17%	0	0.0%
Sideswipe-Same Direction	22	1	5%	0	0.0%
Total	310	100	32%	1	0.3%

Table 1-18. SR 20 from Riverbend Way/Pope Cir to Herndon Ln Crash Severity (2014 to 2018)

Collision Type	Total Crashes	Injury Crashes	Injury Crash Percentage	Fatal Crashes	Fatal Crash Percentage
Angle	28	8	21%	0	0.0%
Not a Collision with a Motor Vehicle	26	5	19%	1	3.8%
Rear End	143	42	29%	0	0.0%
Sideswipe-Same Direction	8	0	0%	0	0.0%
Total	205	53	26%	1	0.5%

1.3 Historical Crash Summary

The historical crash analysis shows that 11 of the 36 study corridor intersections and 20 of the 36 study corridor segments had crashes or crash rates that exceeded statewide averages between the years 2014 and 2018. For both the study corridor intersections and the study corridor segments, rear end, angle, and not a collision with a motor vehicle crashes were the most prevalent crash types. Overall, 24 percent of the intersection crashes resulted in an injury or fatality and 29 percent of the segment crashes resulted in an injury or fatality. Two fatalities occurred on the corridor during the five-year period, one at an intersection and one on a segment between intersections. The results of the crash severity analysis show that when accidents occur along this corridor, they tend to be particularly severe accidents. In addition to causing

property damage, injuries, and loss of life, accidents along the corridor also contribute to no-recurring congestion which can add to the congestion already present during the peak hours. The results show that improvements to access control, horizonal/vertical curvature, and intersection control have the potential to reduce the number and severity of crashes occurring along the corridor.

Design Traffic Diagrams

Georgia Department of Transportation

Interoffice Memo

DATE: 1/23/2020

FROM: Paul Tanner, State Transportation Planning Administrator

TO: Kimberly Nesbitt, State Program Delivery Administrator
Attention: Theo Igbalajobi

SUBJECT: Design Traffic Forecasts for PI# 0007836, Bartow & Cherokee Counties, SR 20 From I-75 Bartow to I- 575 Cherokee

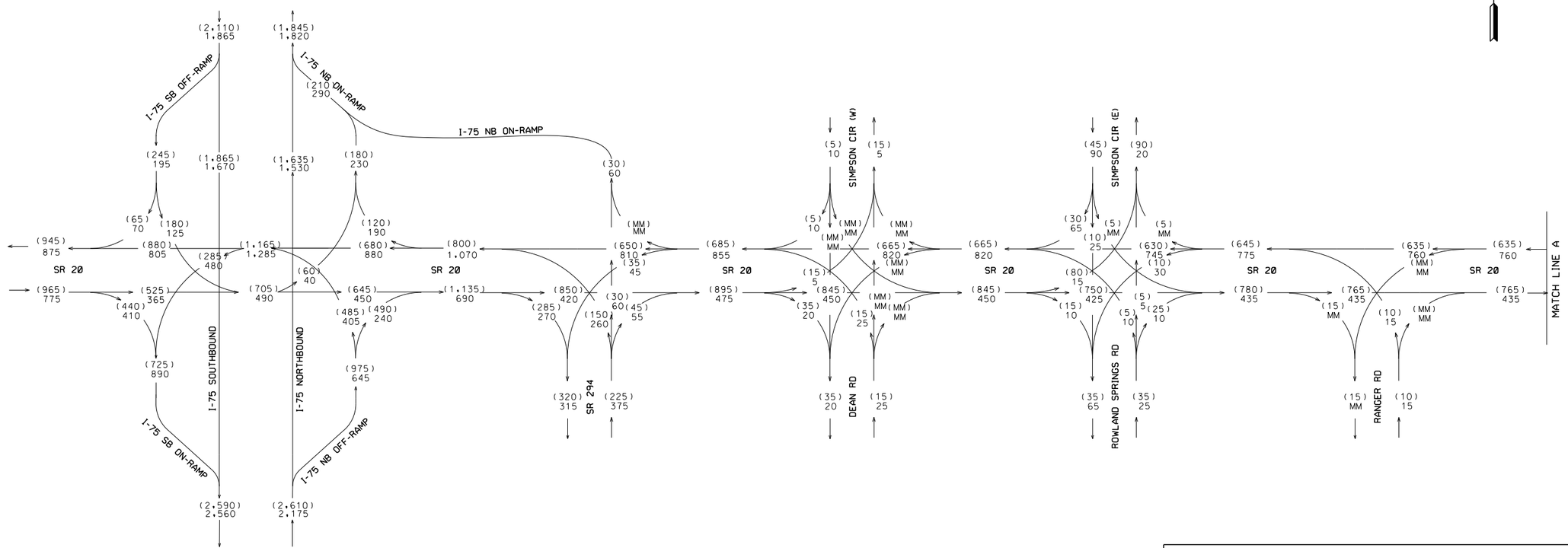
Per request, we have reviewed the consultant's design traffic for the above project. Based on the information furnished, we find the design traffic forecasts to be satisfactory, and the design traffic forecasting task to be complete for the above project.

If you have any questions concerning this information, please contact Dan Funk at 404 631 1959.

RPT/drf

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	01	84

DHV VOLUMES
SR 20
EXISTING YEAR
2014
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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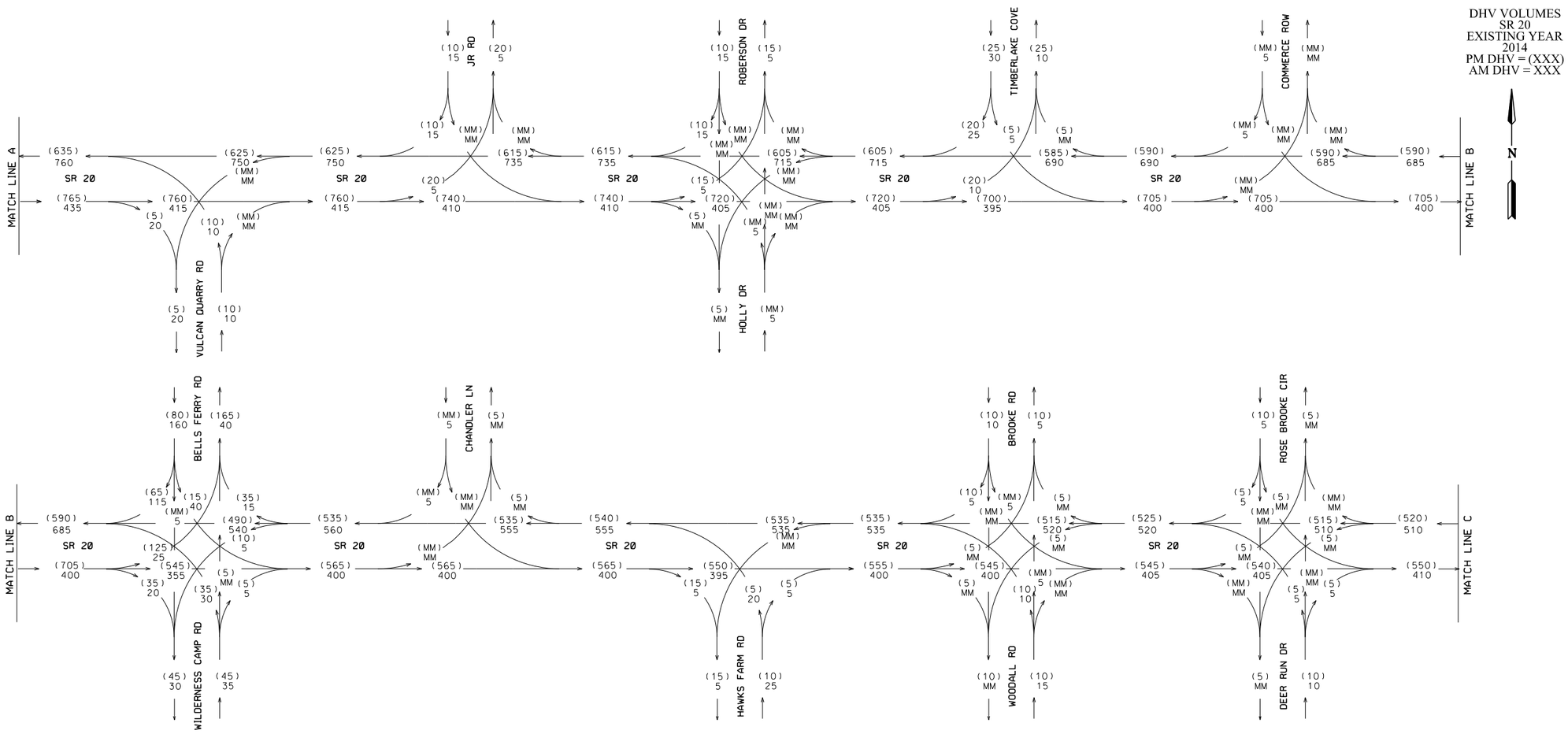
REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR DHV
SHEET 1 OF 6

DRAWING No. 10-0001

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	02	84



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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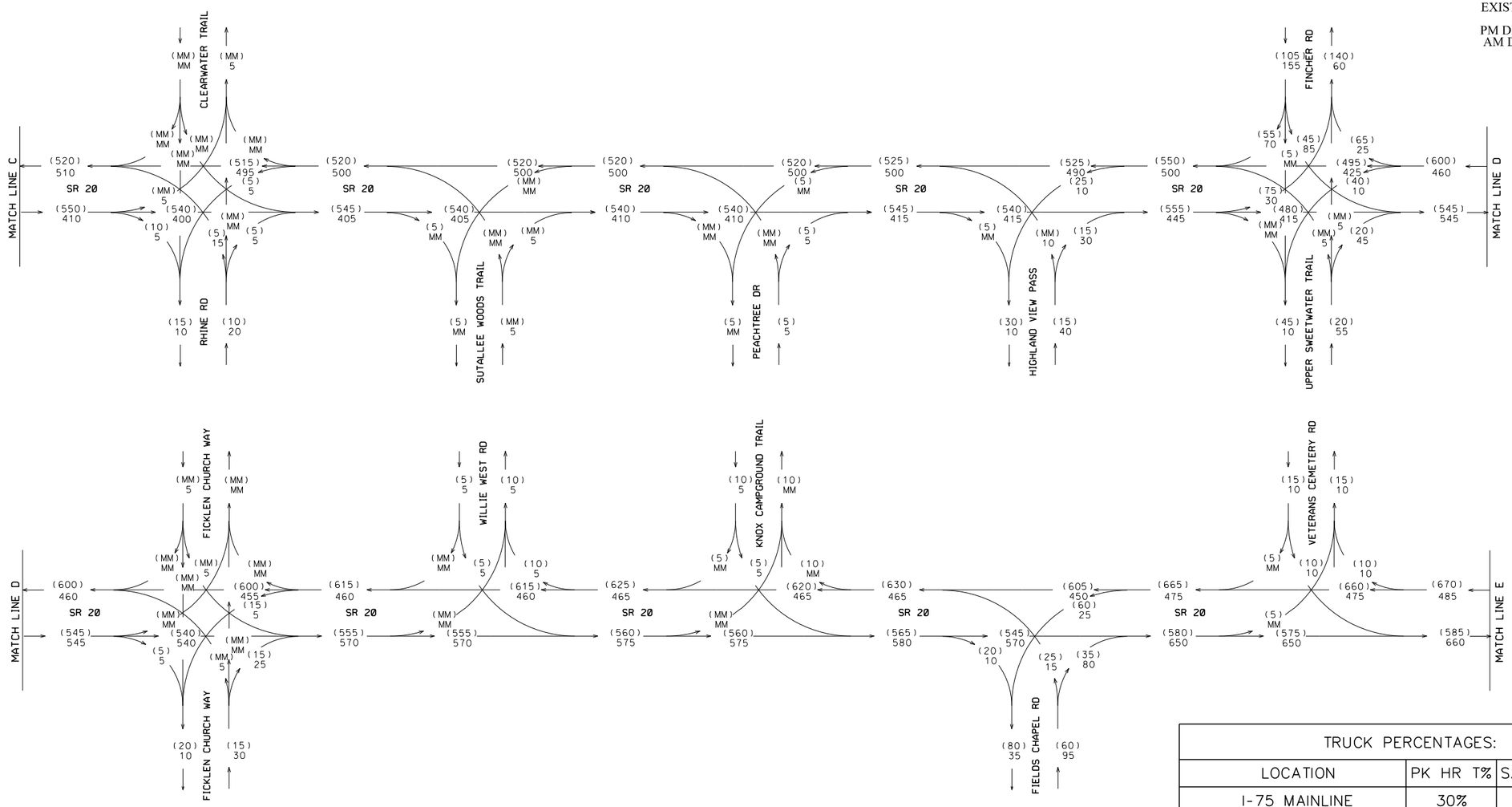
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR DHV
SHEET 2 OF 6

DRAWING No. 10-0002

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	03	84

DHV VOLUMES
SR 20
EXISTING YEAR
2014
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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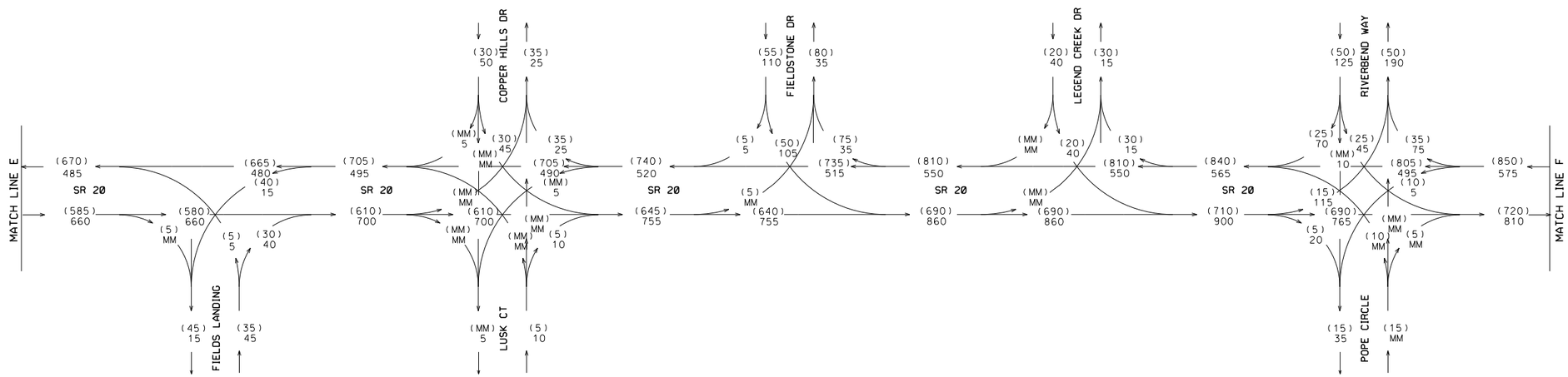
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR DHV
SHEET 3 OF 6

DRAWING No. 10-0003

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	04	84

DHV VOLUMES
SR 20
EXISTING YEAR
2014
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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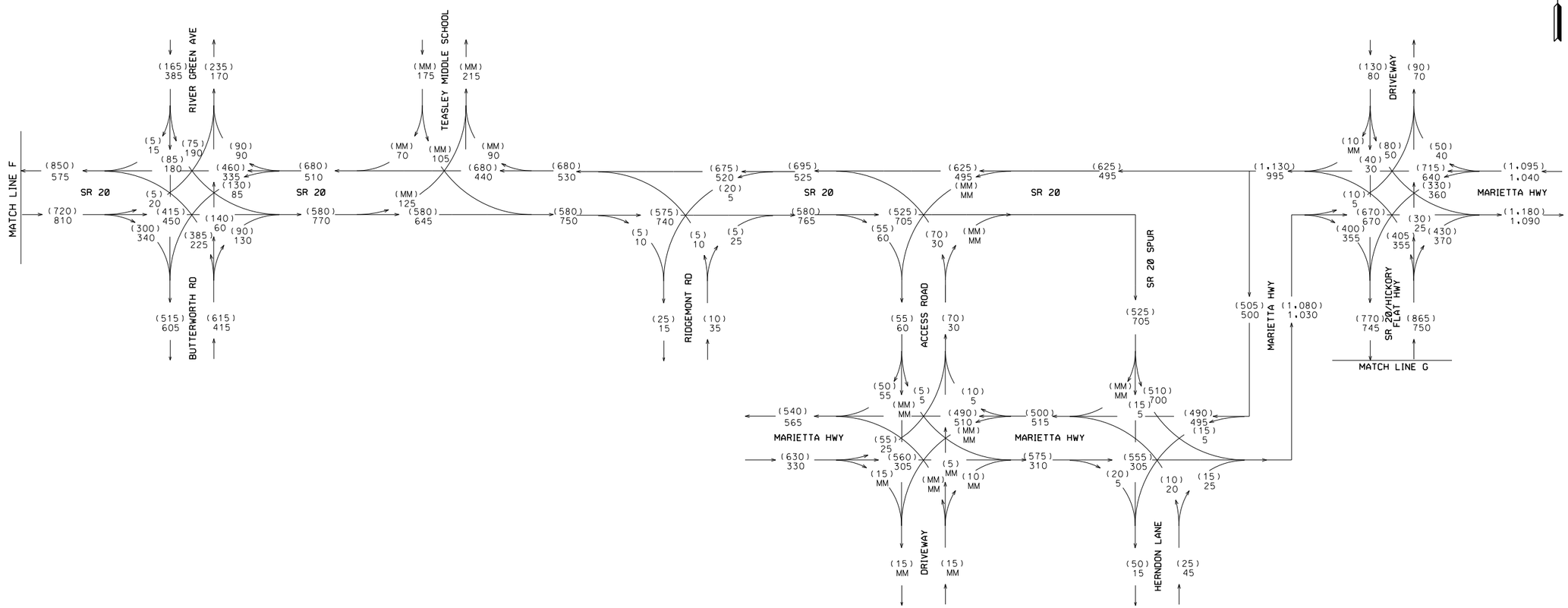
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR DHV
SHEET 4 OF 6

DRAWING No. 10-0004

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	05	84

DHV VOLUMES
SR 20
EXISTING YEAR
2014
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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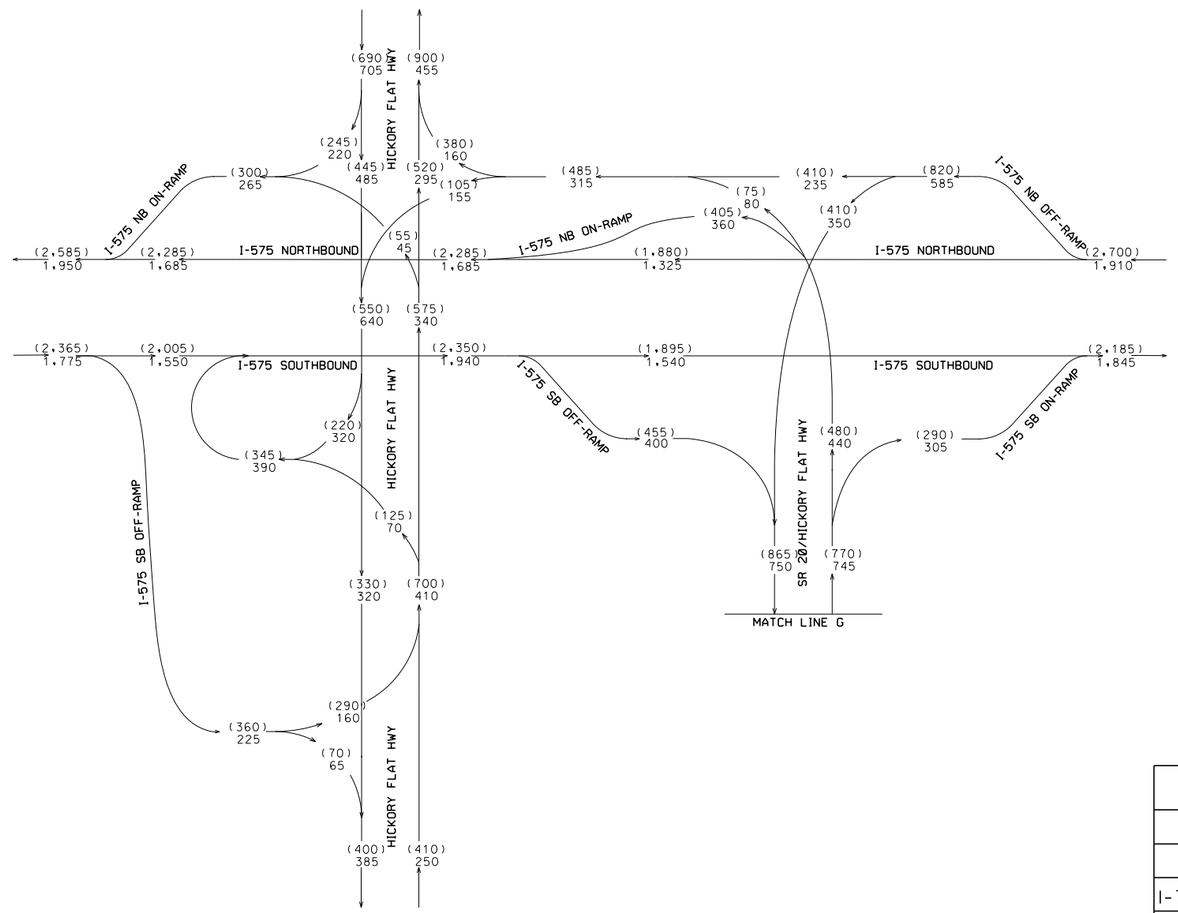
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR DHV
SHEET 5 OF 6

DRAWING No. 10-0005

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	06	84

DHV VOLUMES
SR 20
EXISTING YEAR
2014
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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STATE OF GEORGIA
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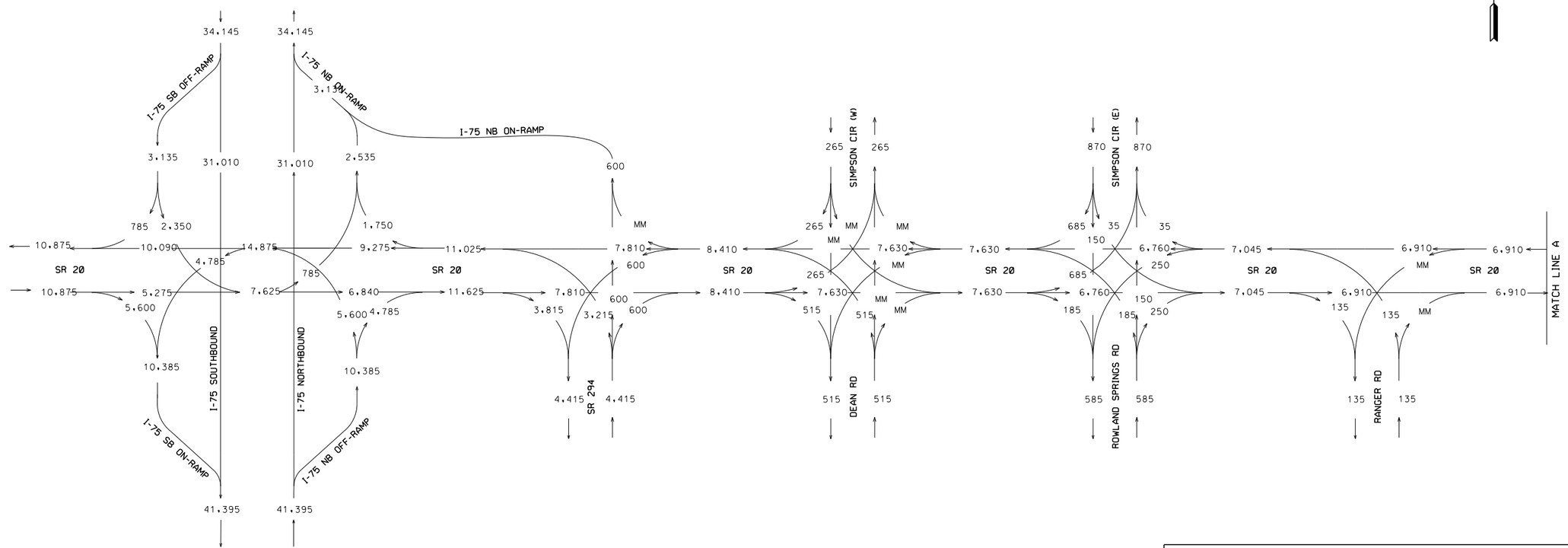
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR DHV
SHEET 6 OF 6

DRAWING No. 10-0006

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	07	84

AADT VOLUMES
SR 20
EXISTING YEAR
2014
AADT = XXX



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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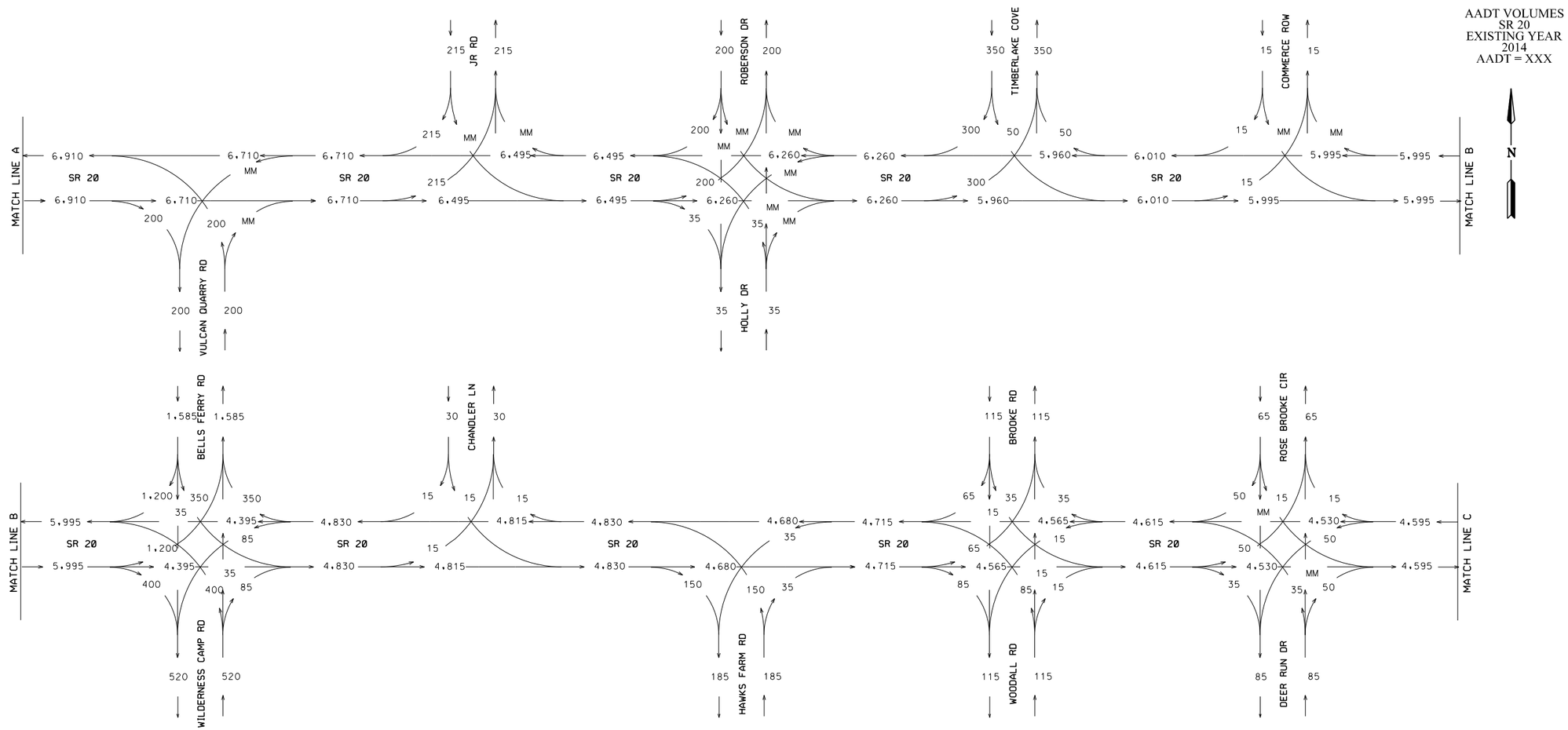
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR AADT
SHEET 1 OF 6

DRAWING No.
10-0007

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	08	84



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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STATE OF GEORGIA
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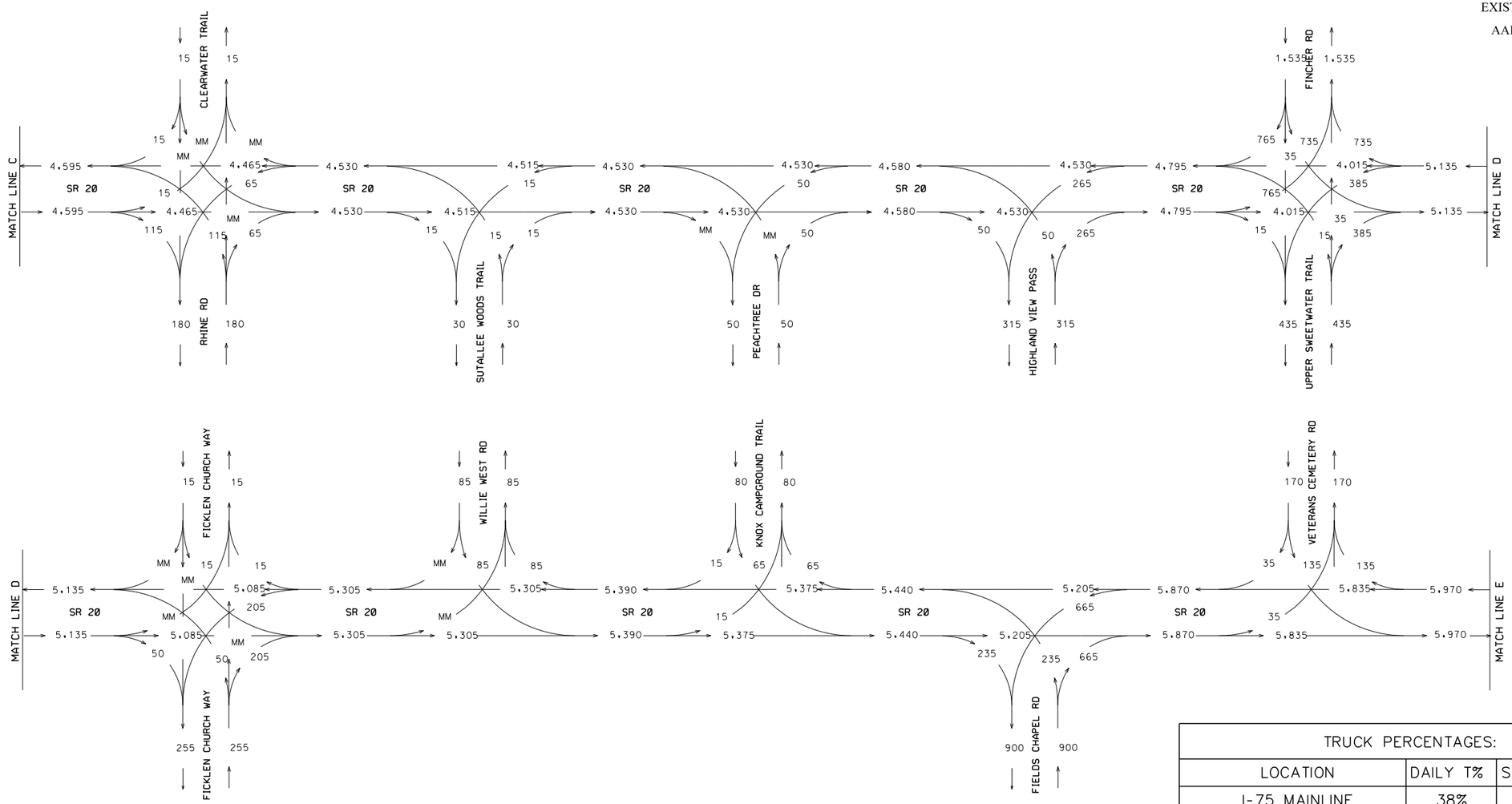
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR AADT
SHEET 2 OF 6

DRAWING No. 10-0008

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	09	84

AADT VOLUMES
SR 20
EXISTING YEAR
2014
AADT = XXX



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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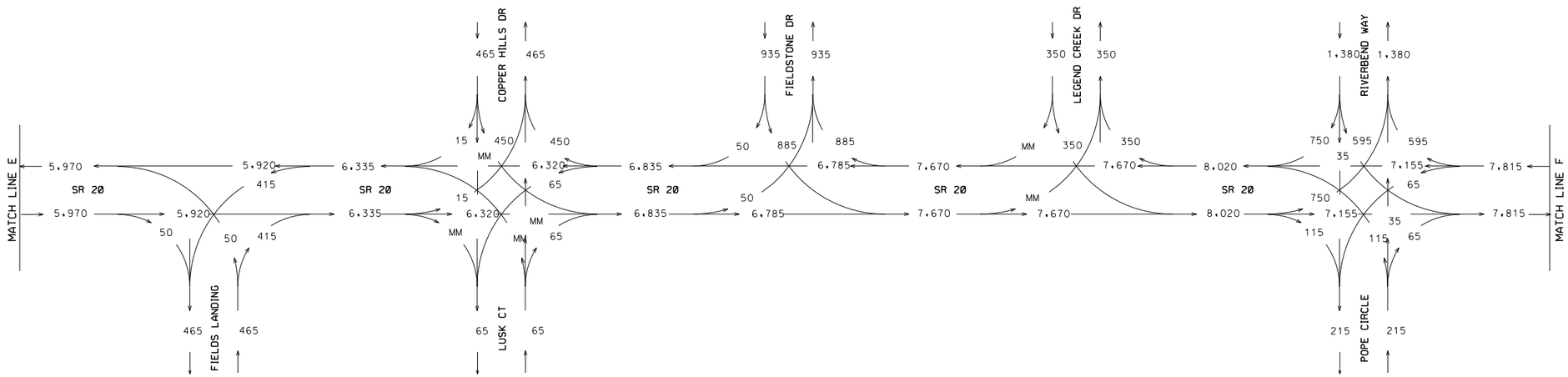
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR AADT
SHEET 3 OF 6

DRAWING No.
10-0009

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	10	84

AADT VOLUMES
SR 20
EXISTING YEAR
2014
AADT = XXX



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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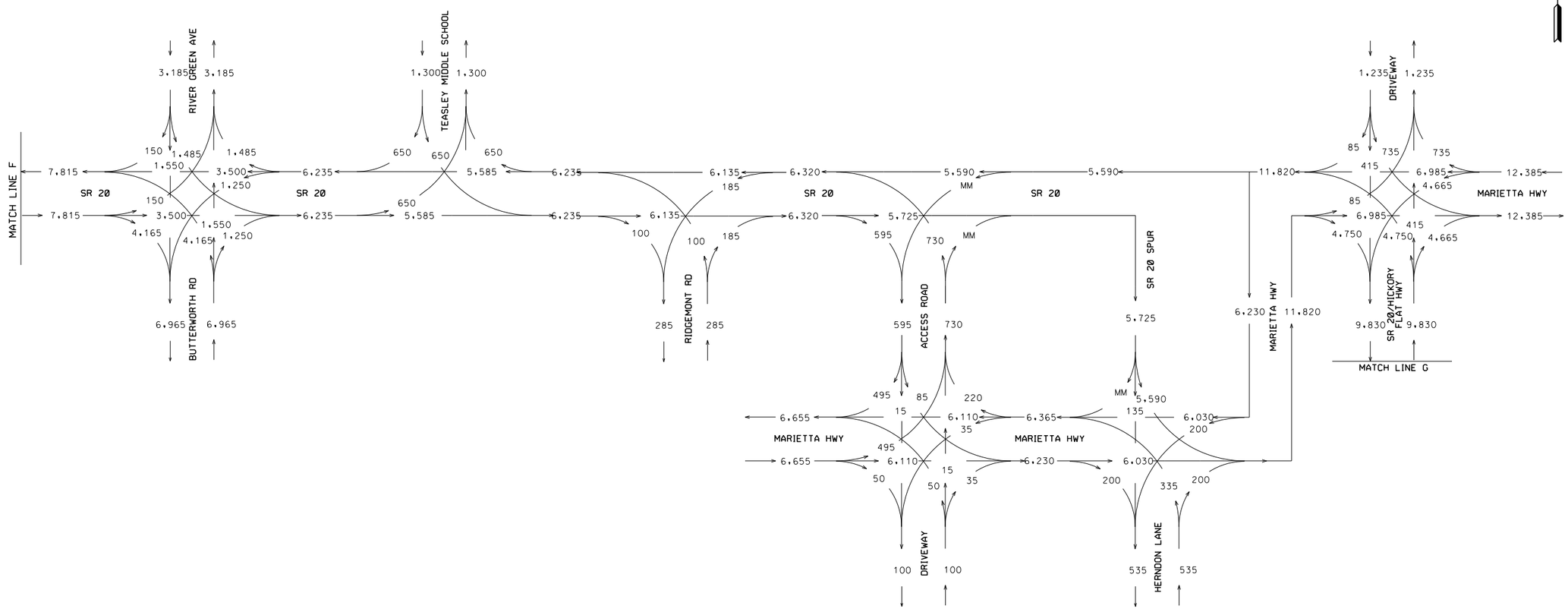
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR AADT
SHEET 4 OF 6

DRAWING No. 10-0010

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	11	84

AADT VOLUMES
SR 20
EXISTING YEAR
2014
AADT = XXX

N



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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STATE OF GEORGIA
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OFFICE OF PLANNING

TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

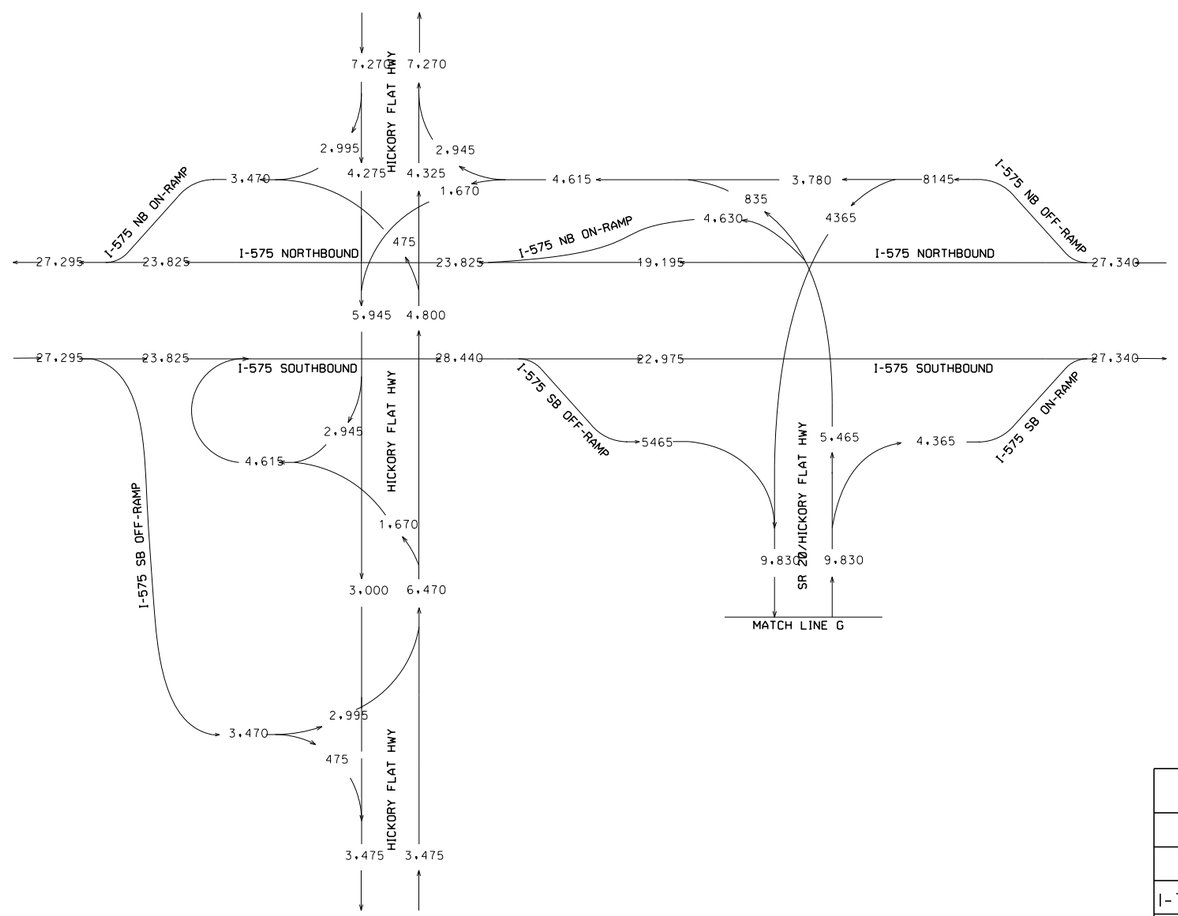
EXISTING YEAR AADT
SHEET 5 OF 6

DRAWING No.
10-0011

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	12	84

AADT VOLUMES
SR 20
EXISTING YEAR
2014
AADT = XXX

N



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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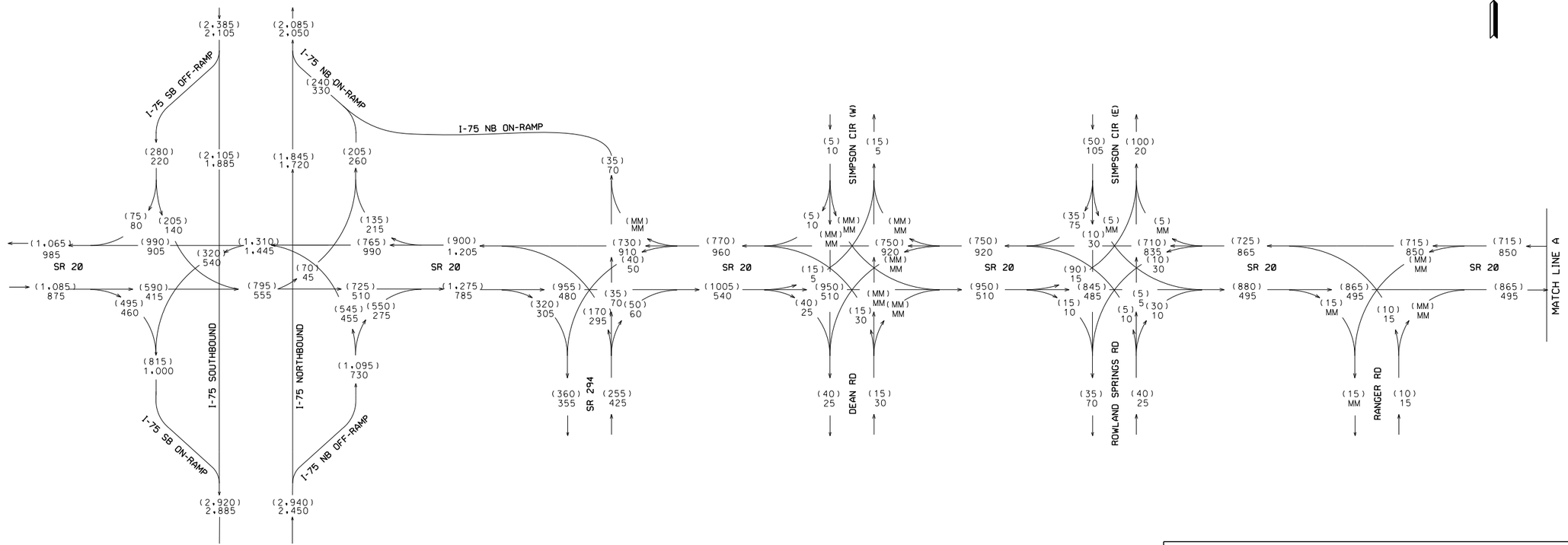
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
EXISTING YEAR AADT
SHEET 6 OF 6

DRAWING No.
10-0012

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	13	84

DHV VOLUMES
SR 20
OPEN YEAR
2026
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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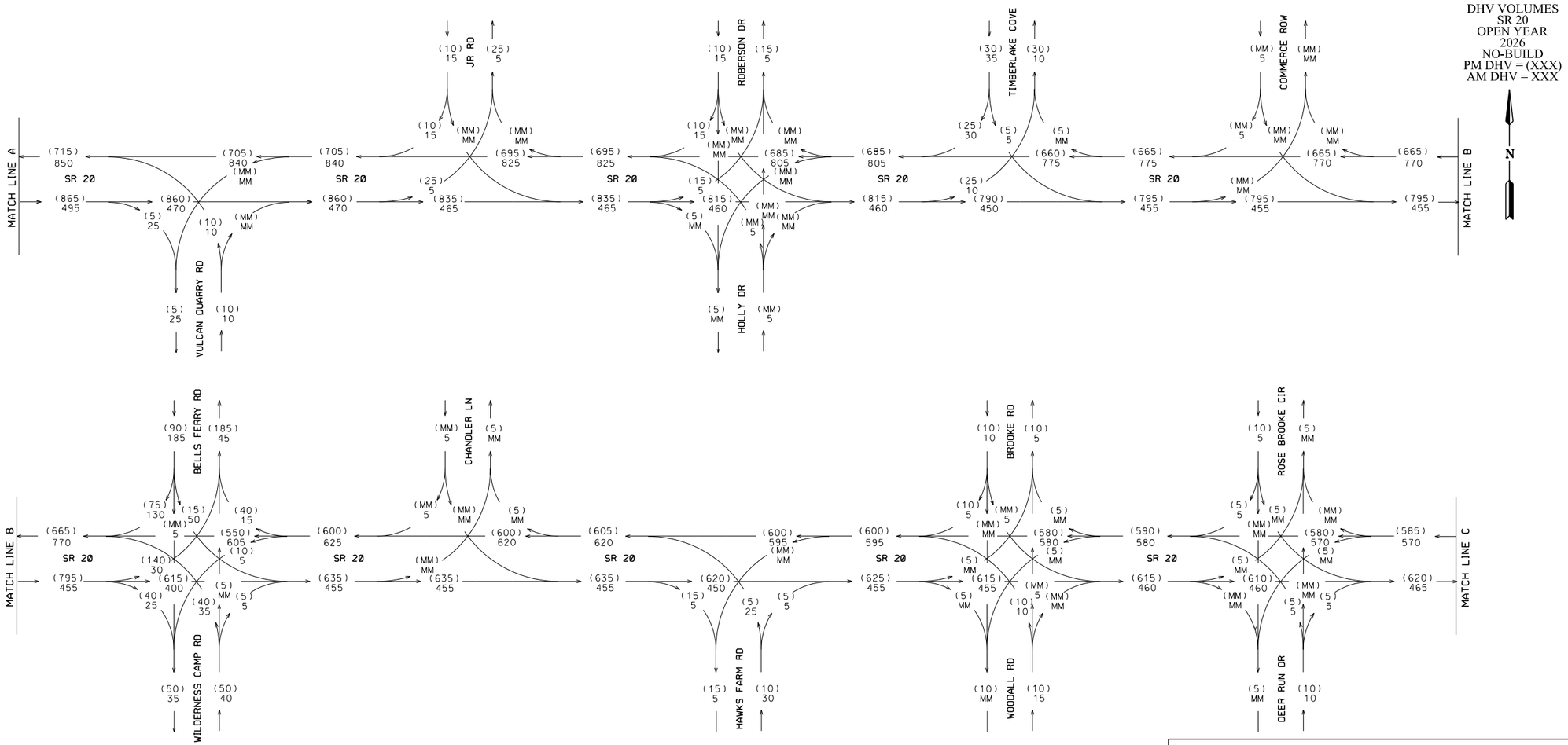
OFFICE OF PLANNING

TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR NO-BUILD DHV
SHEET 1 OF 6

DRAWING No. 10-0013

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	14	84



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

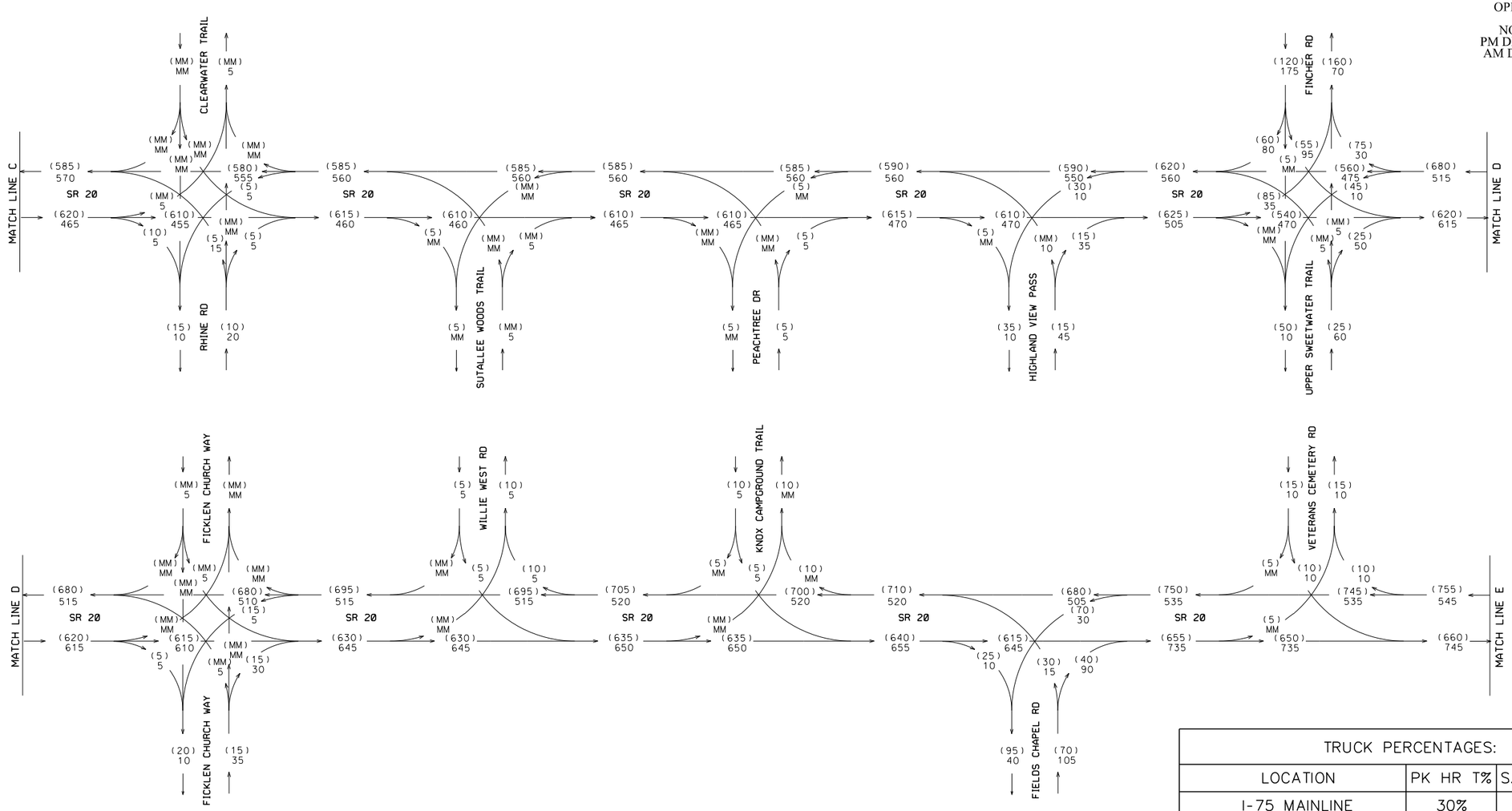
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

OPEN YEAR NO-BUILD DHV
SHEET 2 OF 6

DRAWING No.
10-0014

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	15	84

DHV VOLUMES
SR 20
OPEN YEAR
2026
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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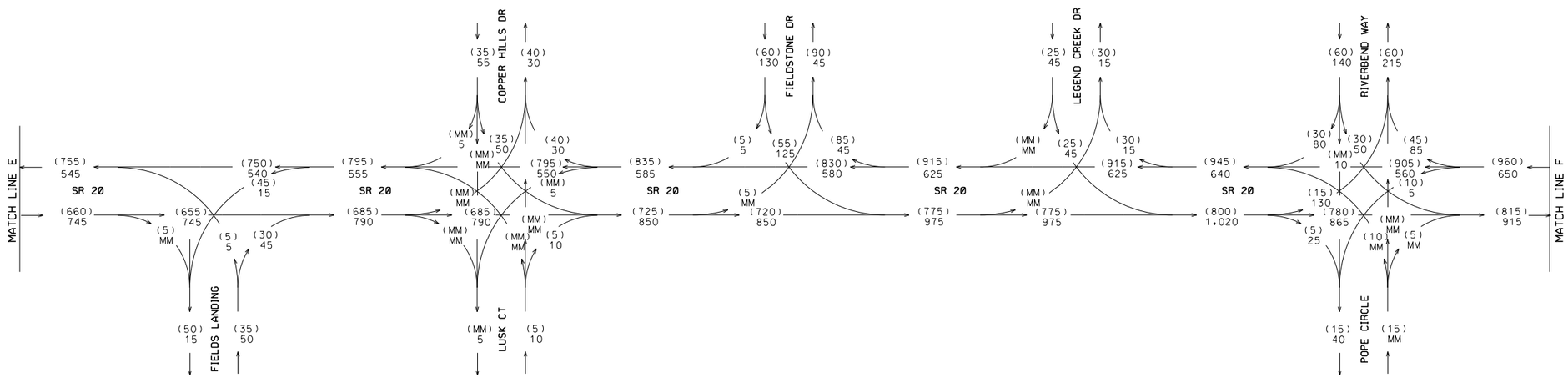
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR NO-BUILD DHV
SHEET 3 OF 6

DRAWING No. 10-0015

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	16	84

DHV VOLUMES
SR 20
OPEN YEAR
2026
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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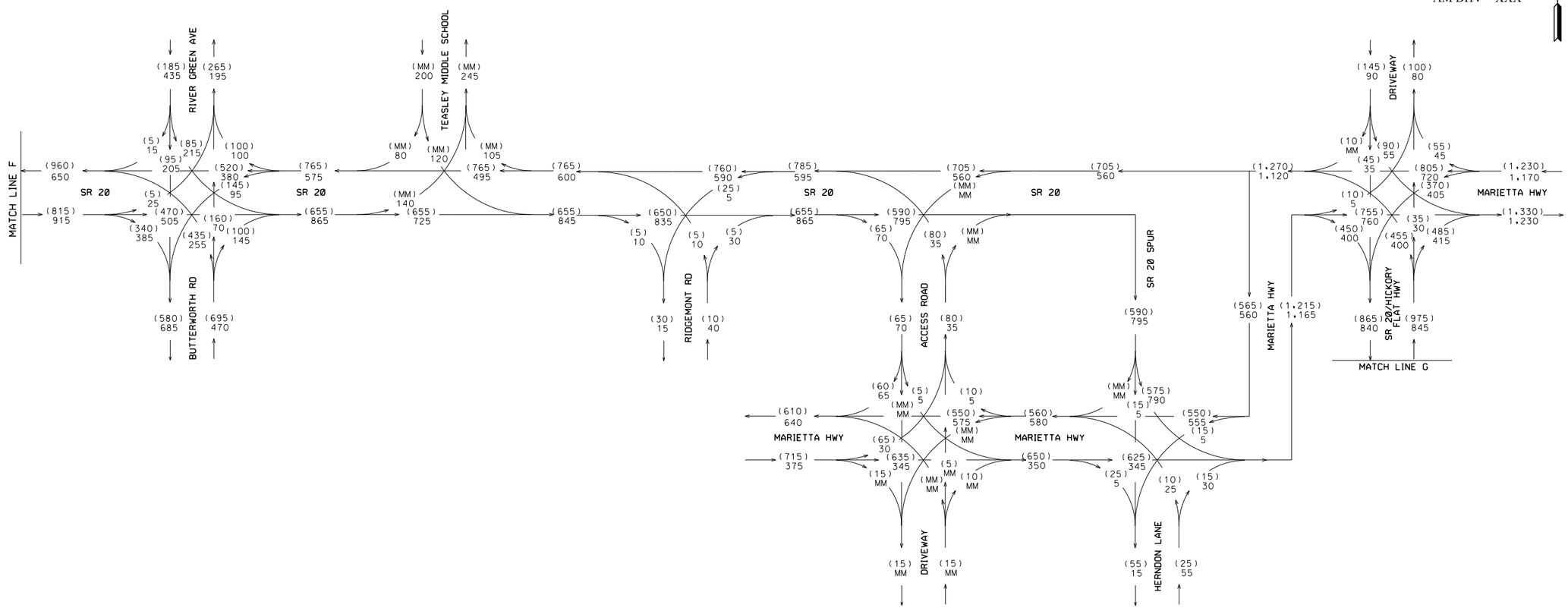
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR NO-BUILD DHV
SHEET 4 OF 6

DRAWING No. 10-0016

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	17	84

DHV VOLUMES
SR 20
OPEN YEAR
2026
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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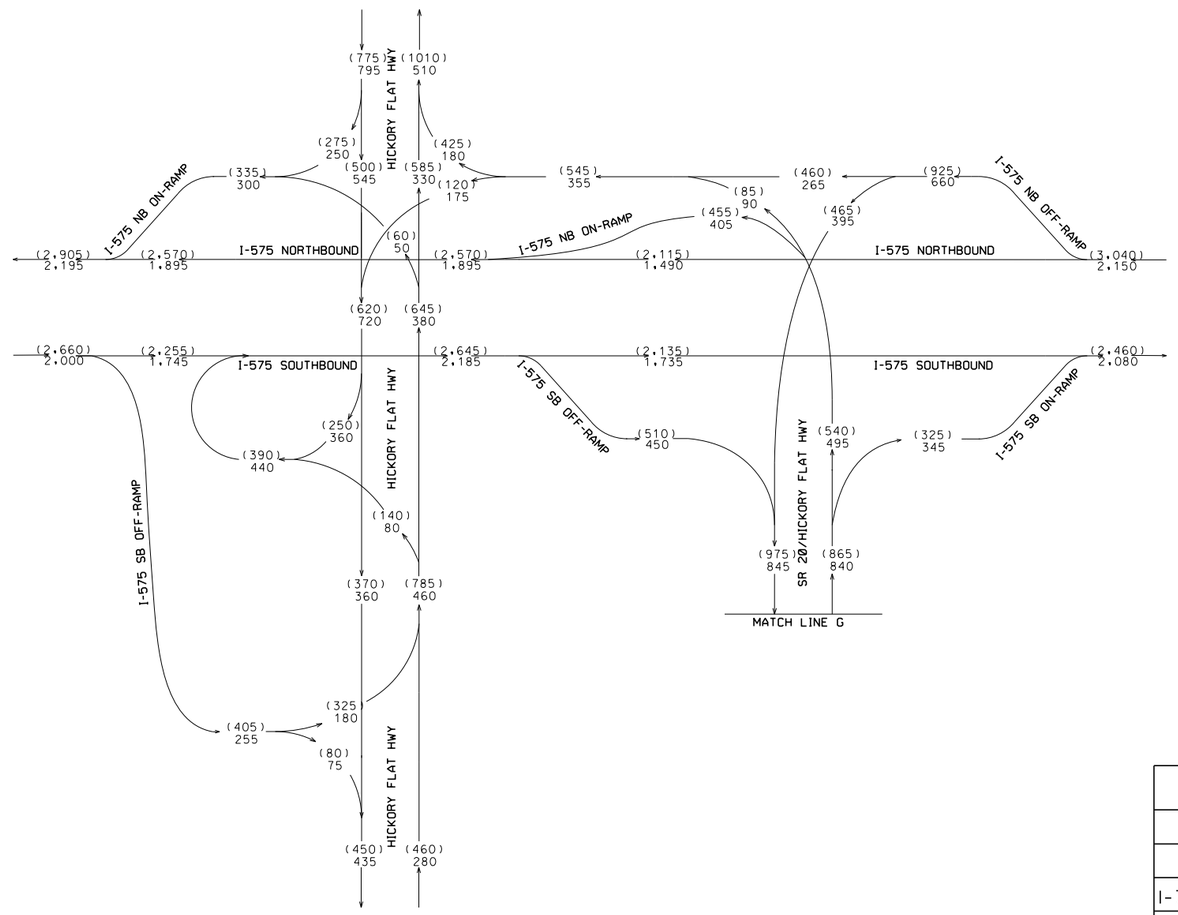
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR NO-BUILD DHV
SHEET 5 OF 6

DRAWING No. 10-0017

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	18	84

DHV VOLUMES
SR 20
OPEN YEAR
2026
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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OFFICE OF PLANNING

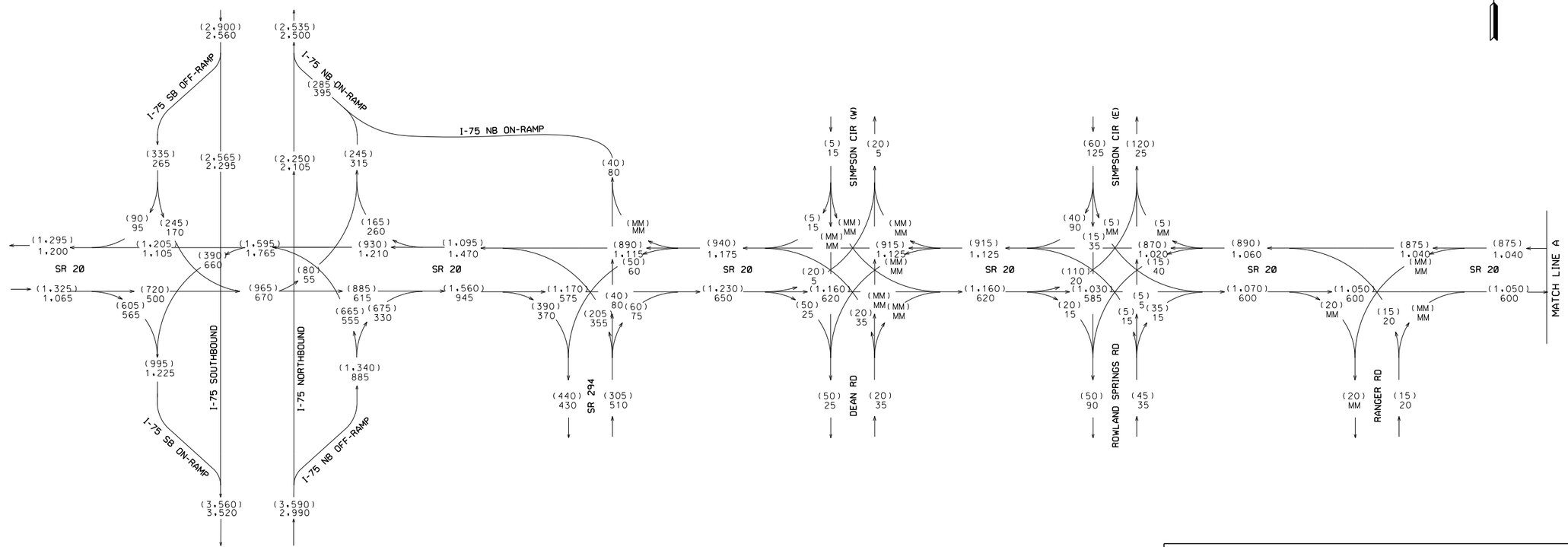
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

OPEN YEAR NO-BUILD DHV
SHEET 6 OF 6

DRAWING No. 10-0018

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	19	84

DHV VOLUMES
SR 20
DESIGN YEAR
2046
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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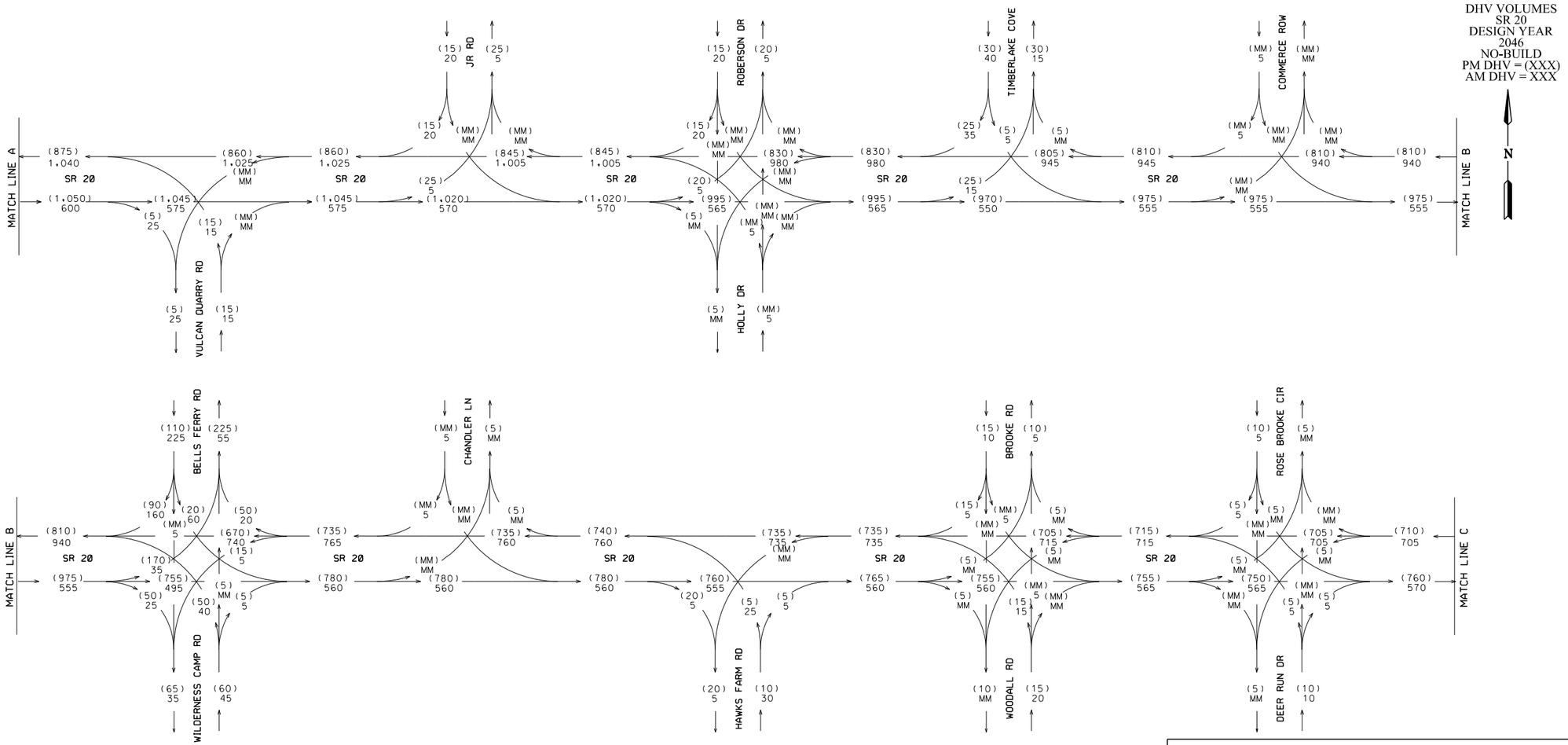
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR NO-BUILD DHV
SHEET 1 OF 6

DRAWING No. 10-0019

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	20	84



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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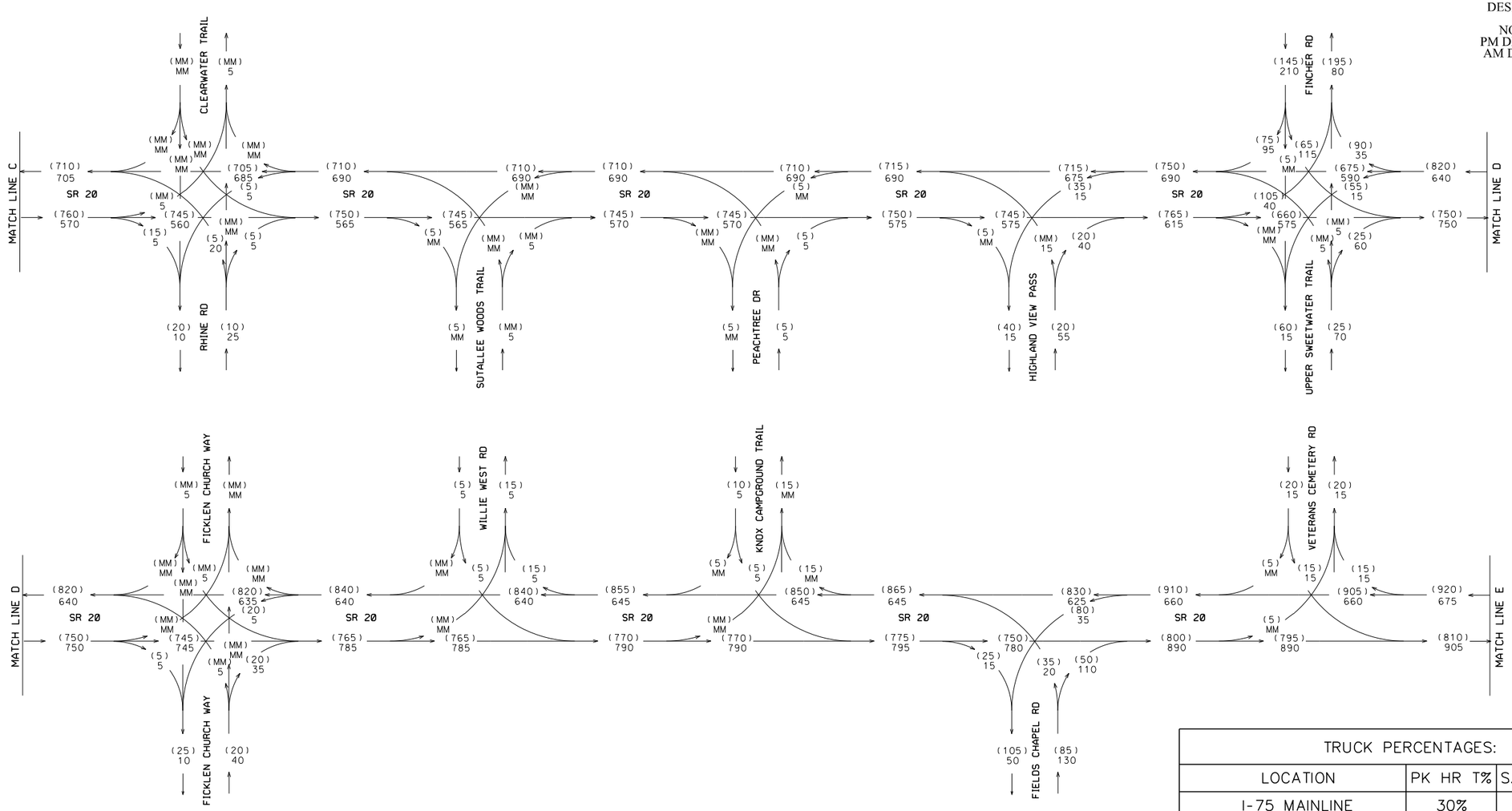
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR NO-BUILD DHV
SHEET 2 OF 6

DRAWING No. 10-0020

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	21	84

DHV VOLUMES
SR 20
DESIGN YEAR
2046
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

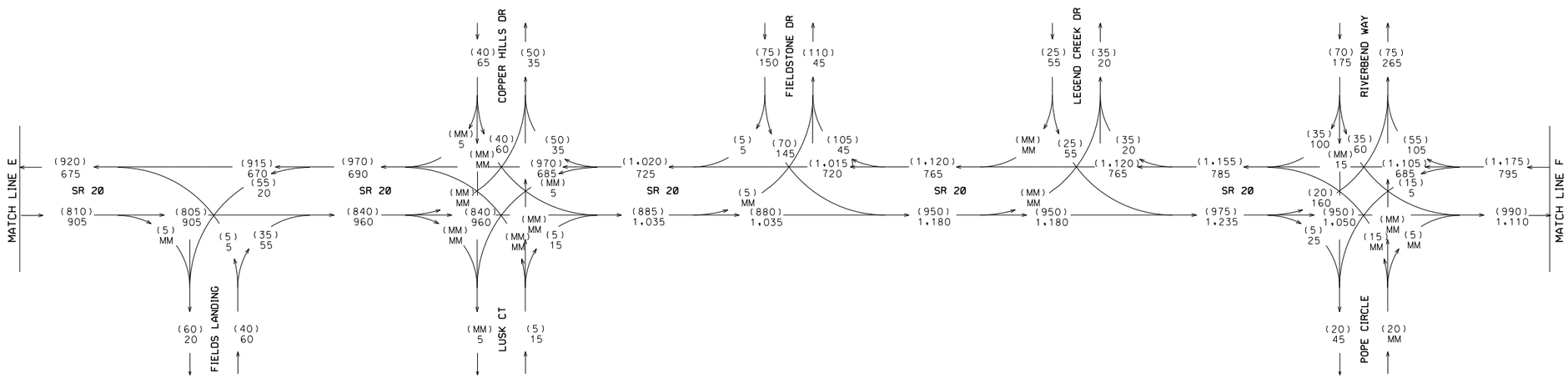
DESIGN YEAR NO-BUILD DHV
SHEET 3 OF 6

DRAWING No. 10-0021

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	22	84

DHV VOLUMES
SR 20
DESIGN YEAR
2046
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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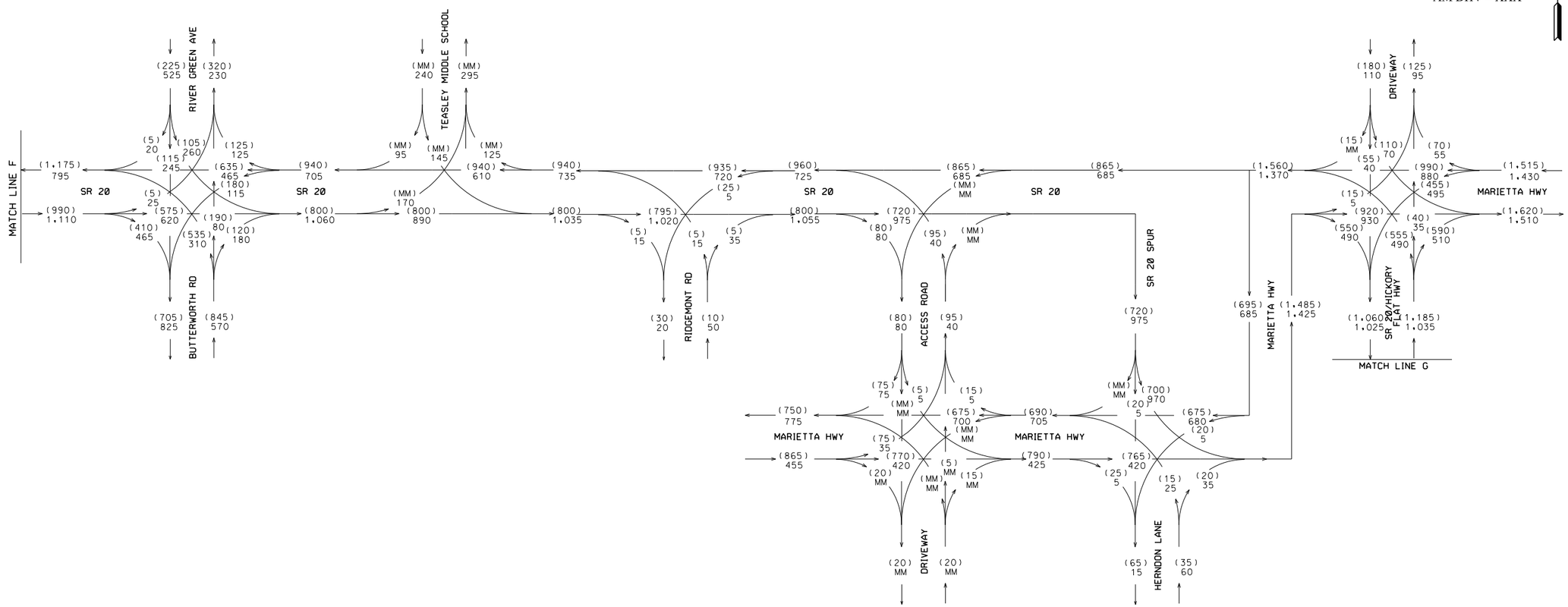
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR NO-BUILD DHV
SHEET 4 OF 6

DRAWING No. 10-0022

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	23	84

DHV VOLUMES
SR 20
DESIGN YEAR
2046
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

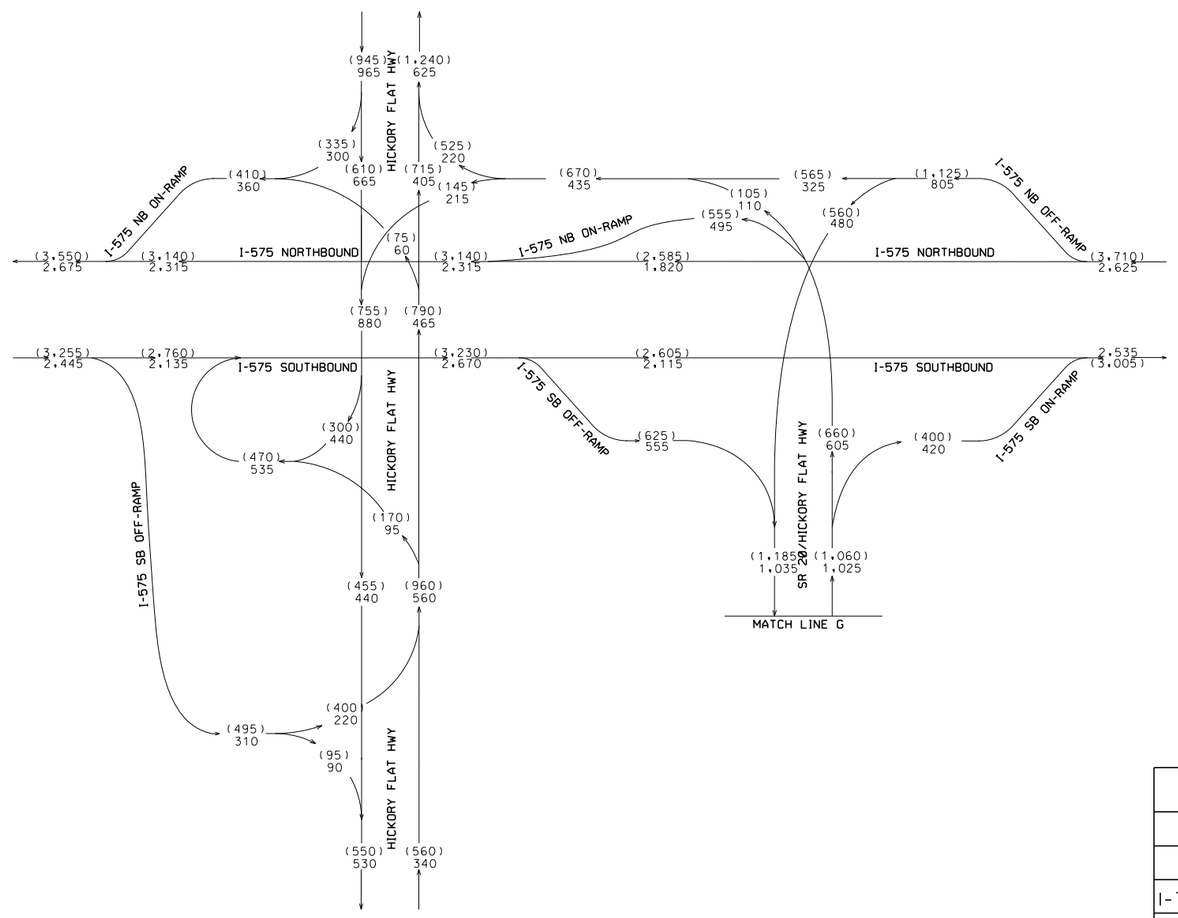
DESIGN YEAR NO-BUILD DHV
SHEET 5 OF 6

DRAWING No. 10-0023

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	24	84

DHV VOLUMES
SR 20
DESIGN YEAR
2046
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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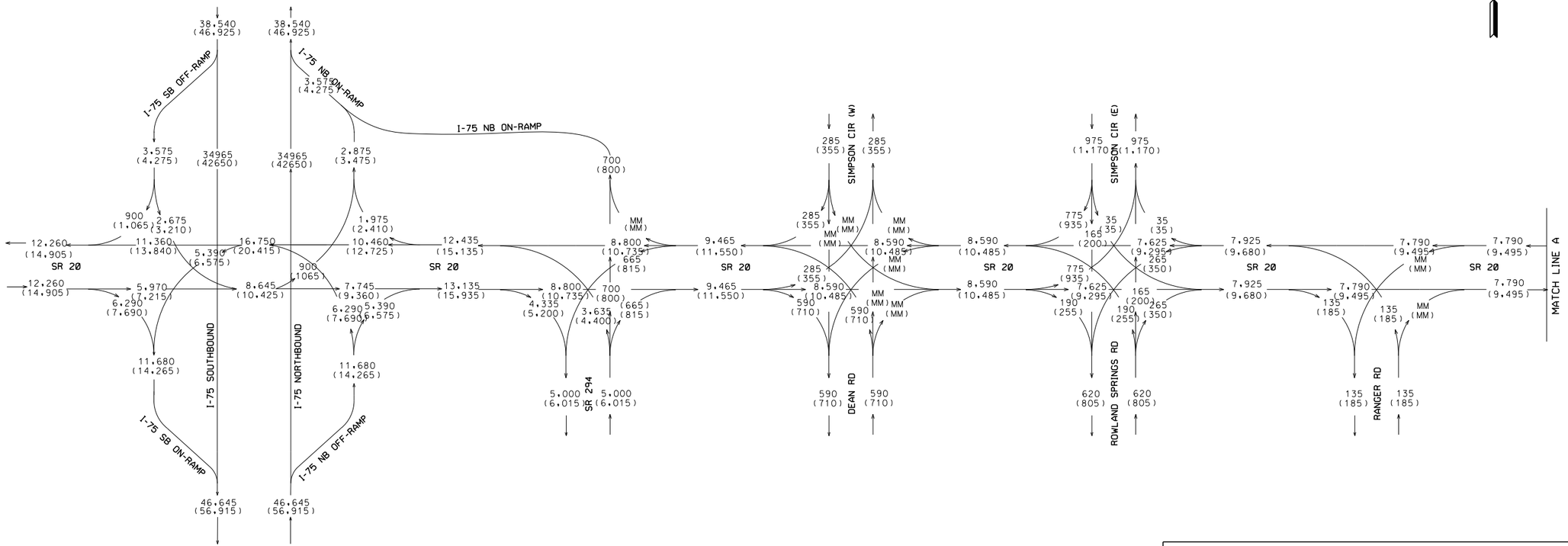
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR NO-BUILD DHV
SHEET 6 OF 6

DRAWING No. 10-0024

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	25	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
2026 & 2046
NO-BUILD
2026 AADT = XXX
2046 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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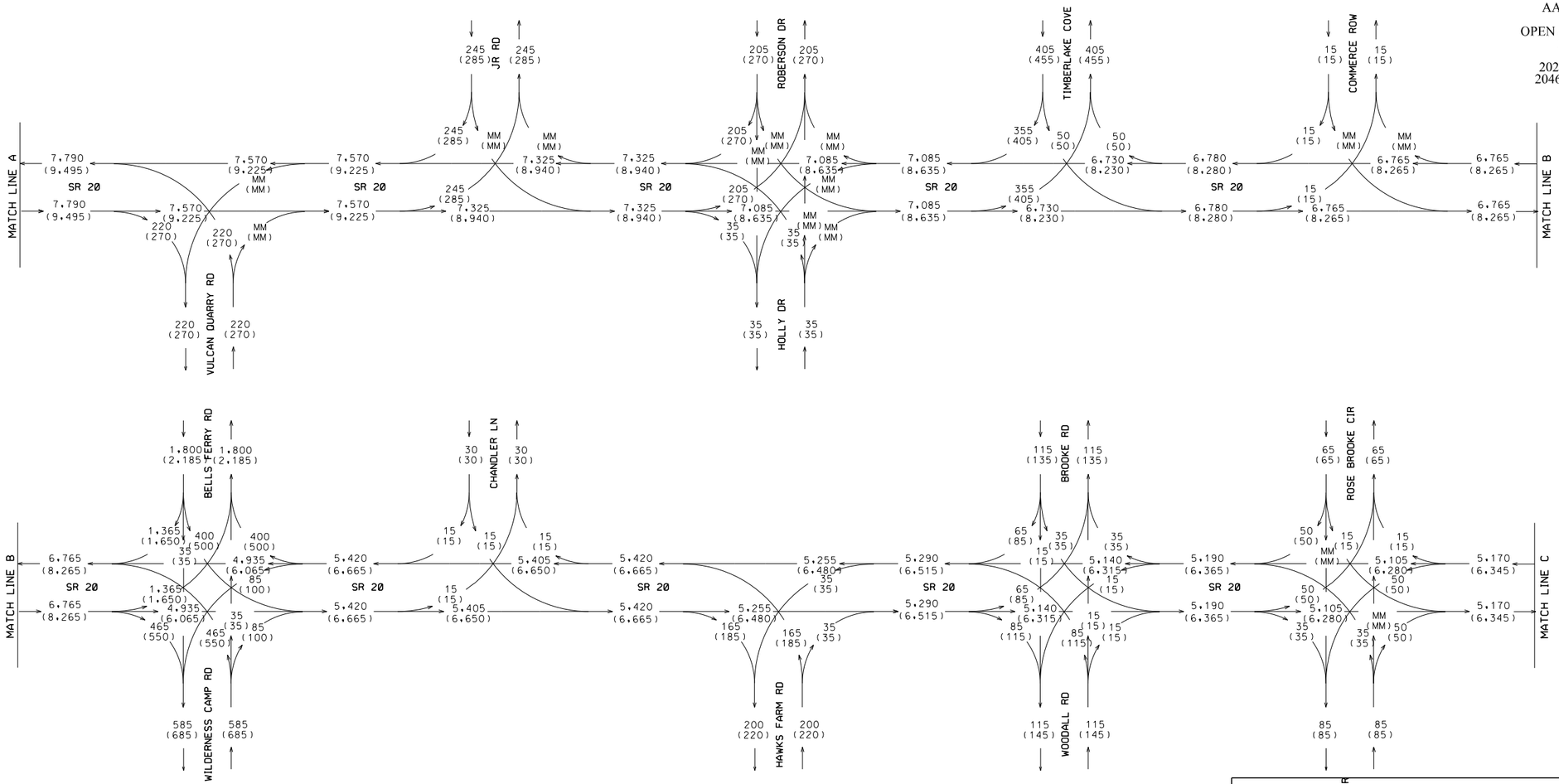
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS NO-BUILD AADT
SHEET 1 OF 6

DRAWING No. 10-0025

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	26	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
2026 & 2046
NO-BUILD
2026 AADT = XXX
2046 AADT = (XXX)



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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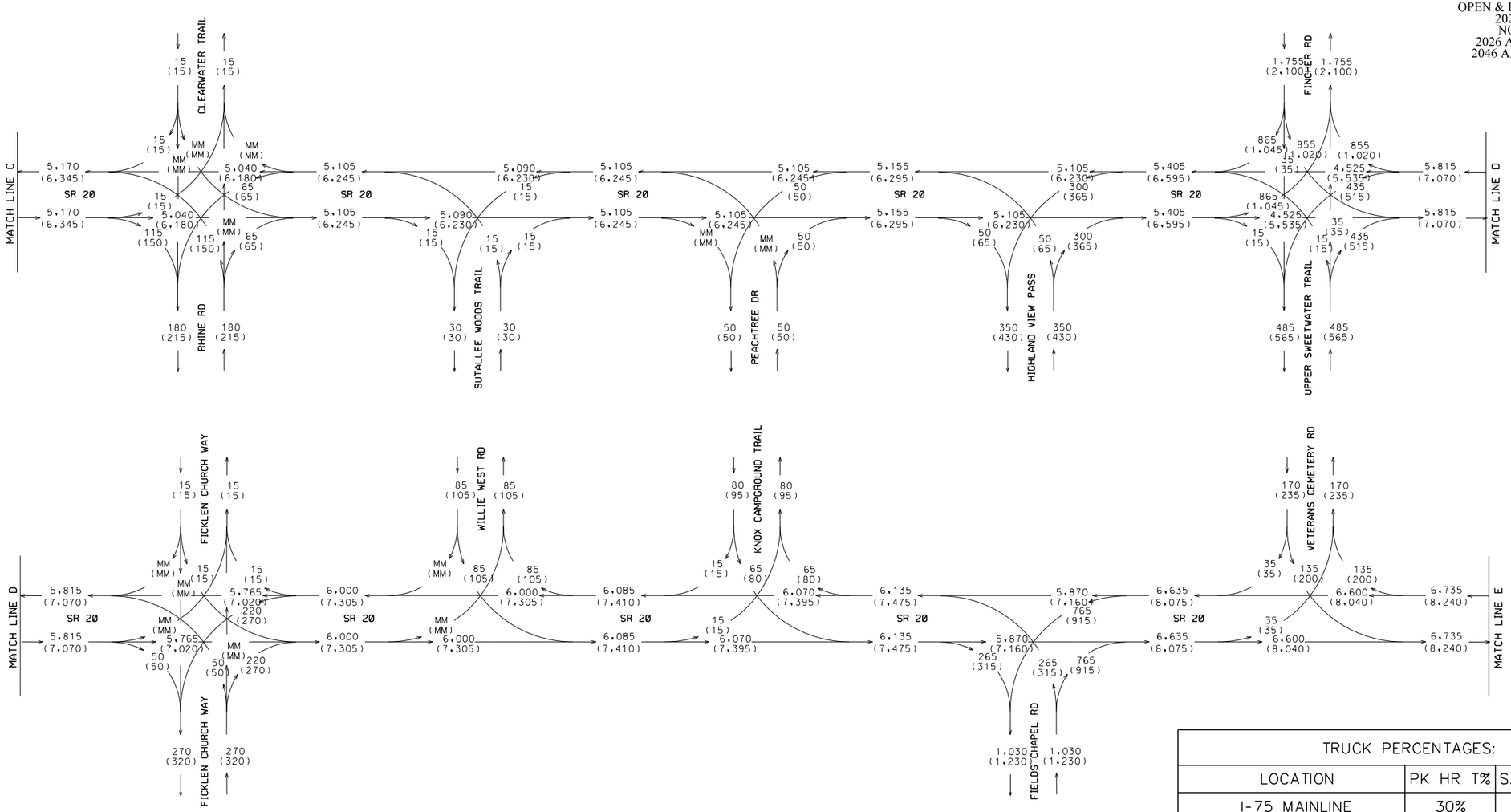
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS NO-BUILD AADT
SHEET 2 OF 6

DRAWING No. 10-0026

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	27	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
2026 & 2046
NO-BUILD
2026 AADT = XXX
2046 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

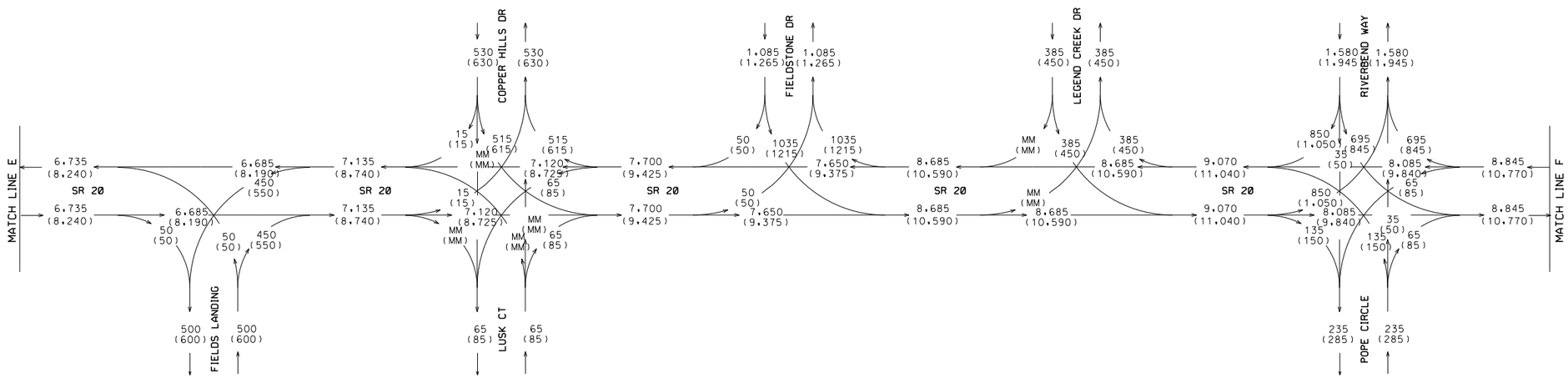
OPEN & DESIGN YEARS NO-BUILD AADT
SHEET 3 OF 6

DRAWING No. 10-0027

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	28	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
2026 & 2046
NO-BUILD
2026 AADT = XXX
2046 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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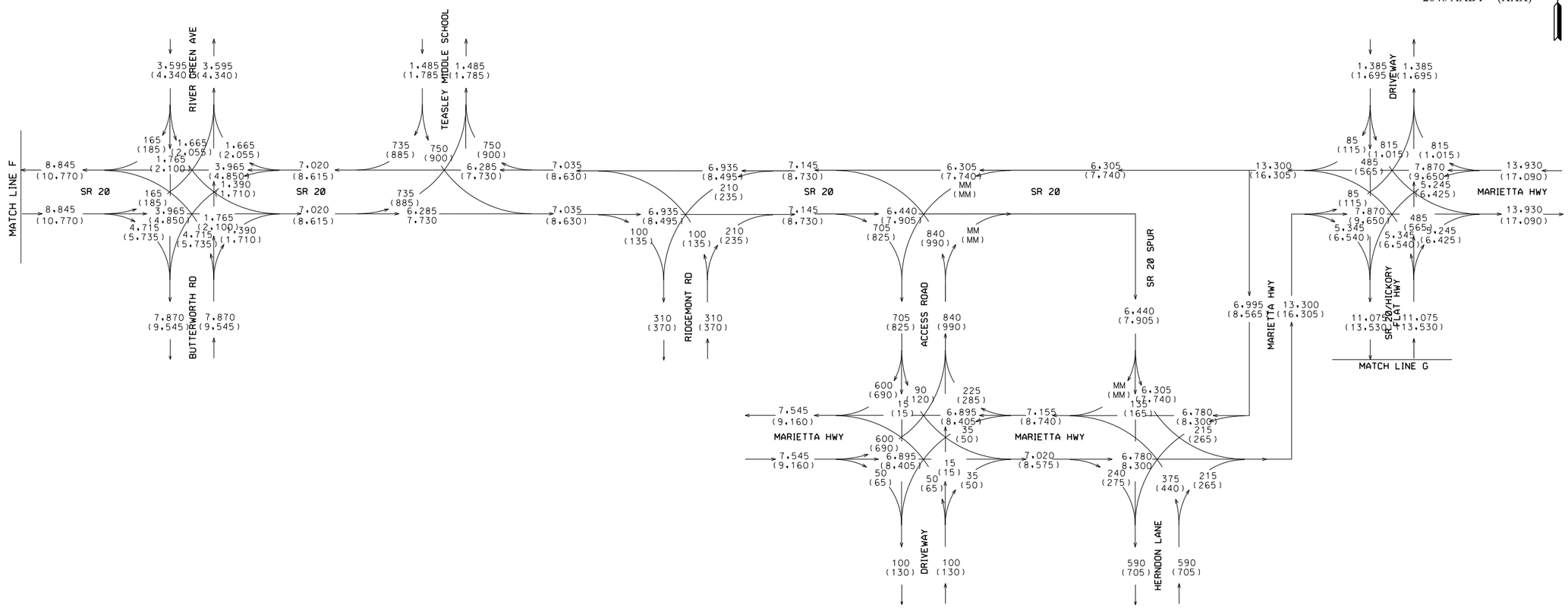
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS NO-BUILD AADT
SHEET 4 OF 6

DRAWING No. 10-0028

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	29	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
2026 & 2046
NO-BUILD
2026 AADT = XXX
2046 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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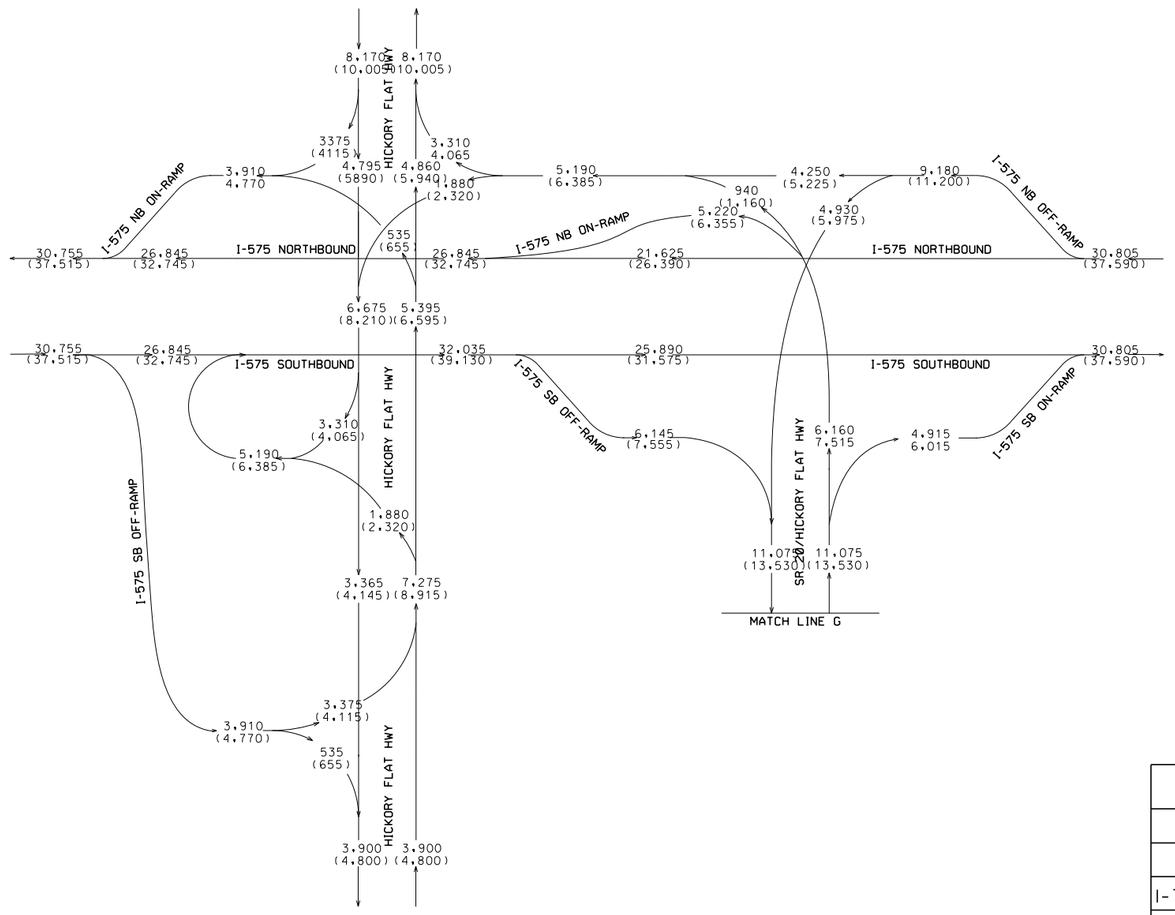
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS NO-BUILD AADT
SHEET 5 OF 6

DRAWING No. 10-0029

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	30	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
2026 & 2046
NO-BUILD
2026 AADT = XXX
2046 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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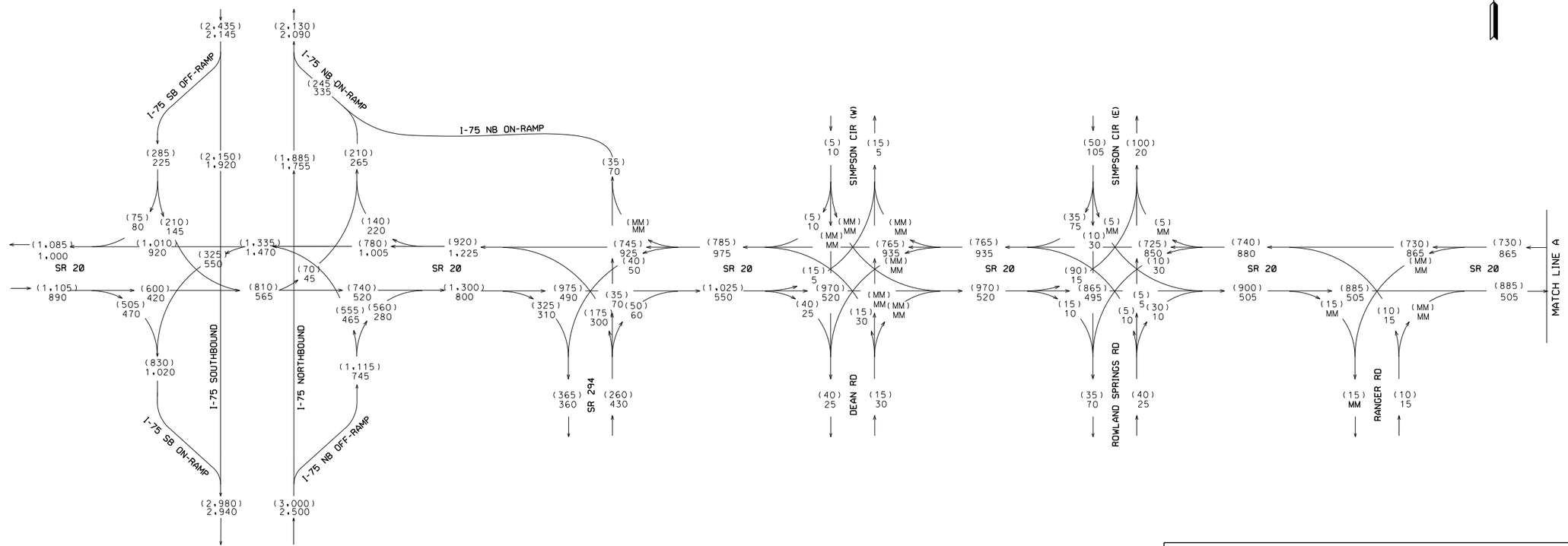
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS NO-BUILD AADT
SHEET 6 OF 6

DRAWING No. 10-0030

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	31	84

DHV VOLUMES
SR 20
OPEN YEAR +2
2028
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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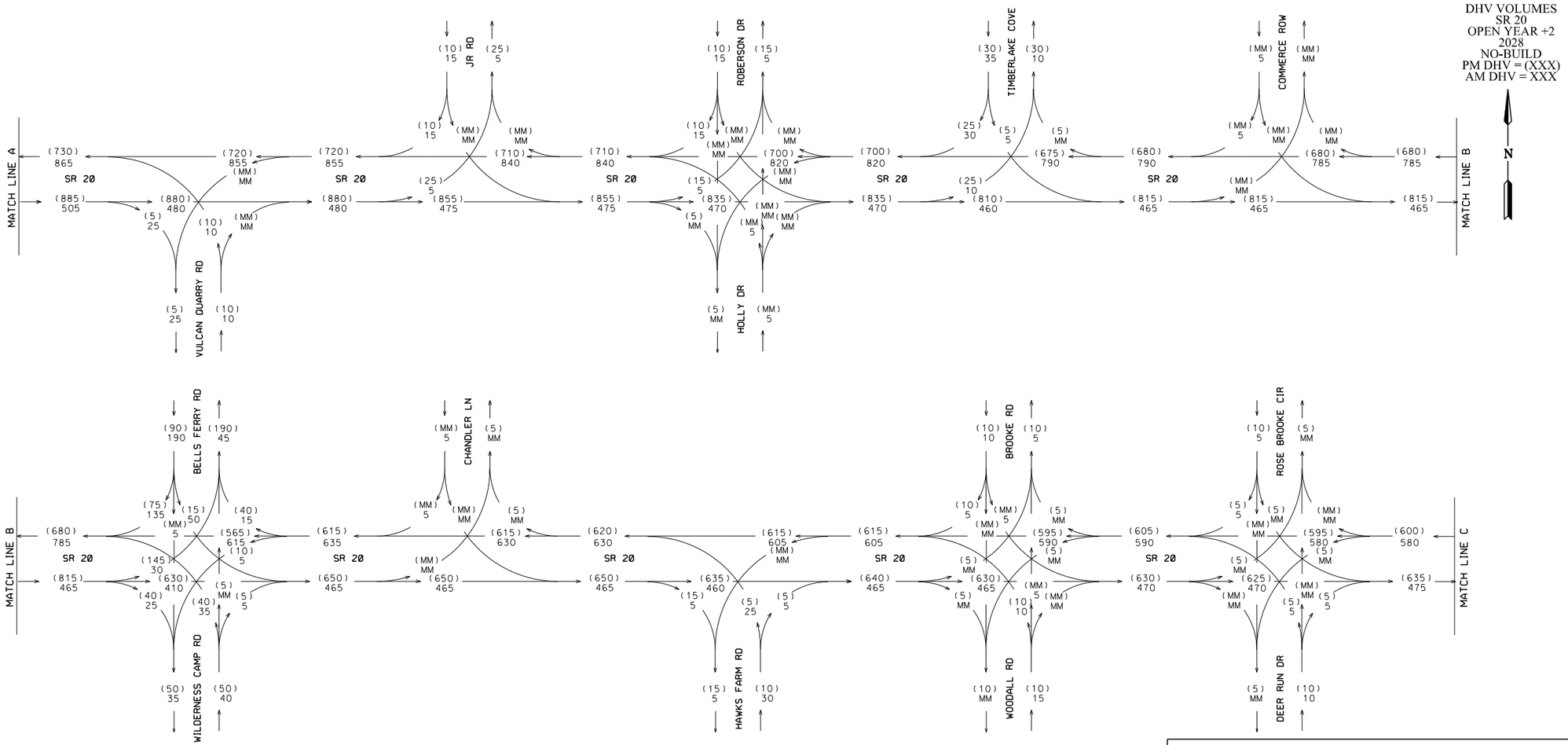
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR +2 NO-BUILD DHV
SHEET 1 OF 6

DRAWING No. 10-0031

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	32	84



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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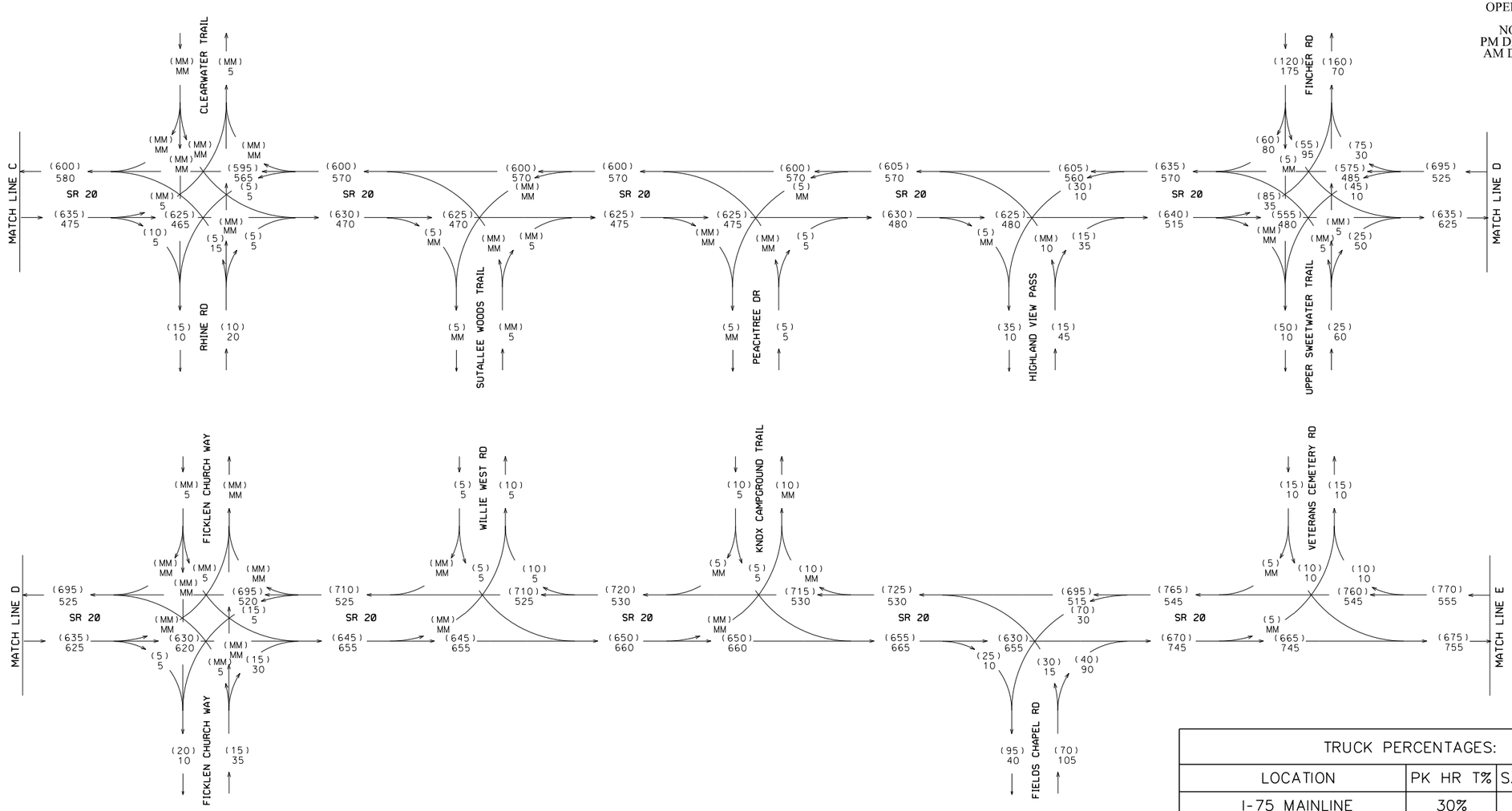
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR +2 NO-BUILD DHV
SHEET 2 OF 6

DRAWING No. 10-0032

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	33	84

DHV VOLUMES
SR 20
OPEN YEAR +2
2028
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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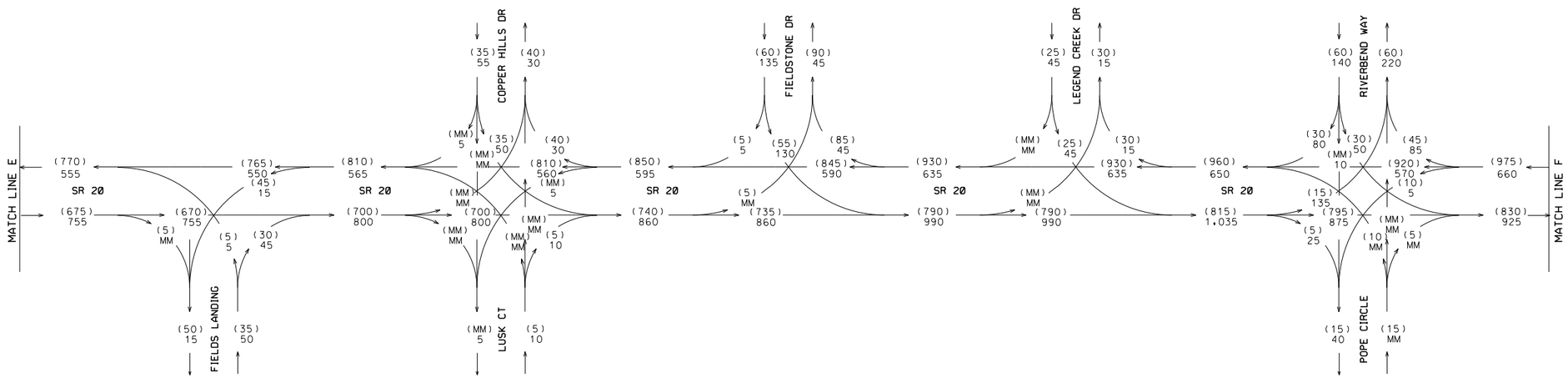
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR +2 NO-BUILD DHV
SHEET 3 OF 6

DRAWING No. 10-0033

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	34	84

DHV VOLUMES
SR 20
OPEN YEAR +2
2028
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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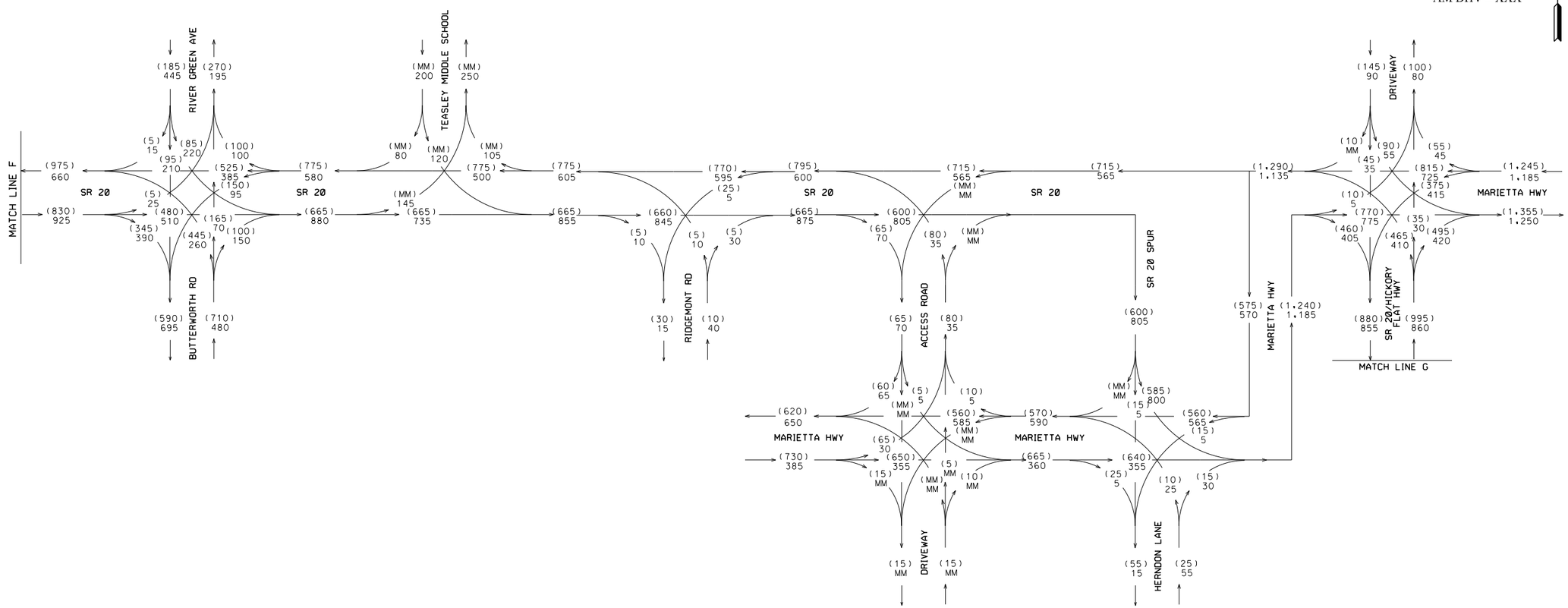
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR +2 NO-BUILD DHV
SHEET 4 OF 6

DRAWING No. 10-0034

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	35	84

DHV VOLUMES
SR 20
OPEN YEAR +2
2028
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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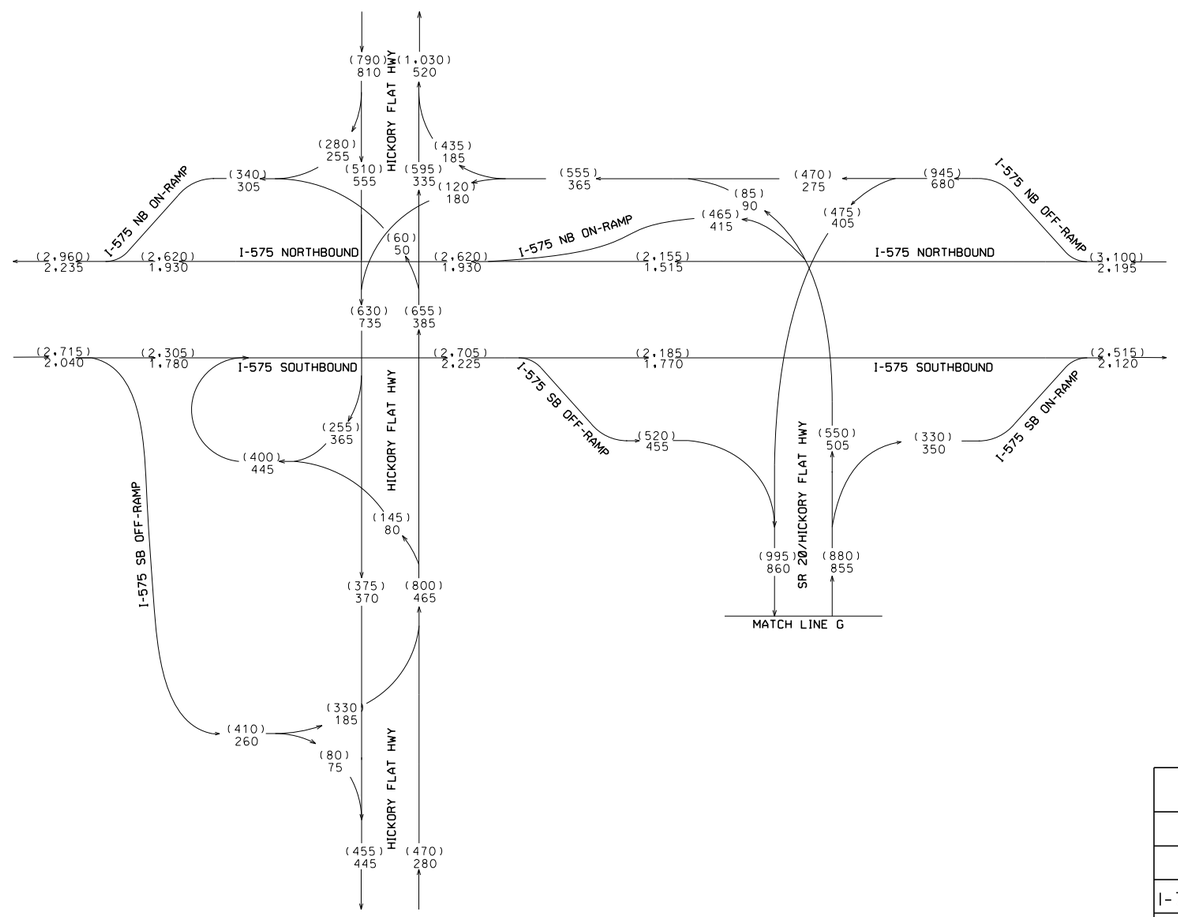
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR +2 NO-BUILD DHV
SHEET 5 OF 6

DRAWING No. 10-0035

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	36	84

DHV VOLUMES
SR 20
OPEN YEAR +2
2028
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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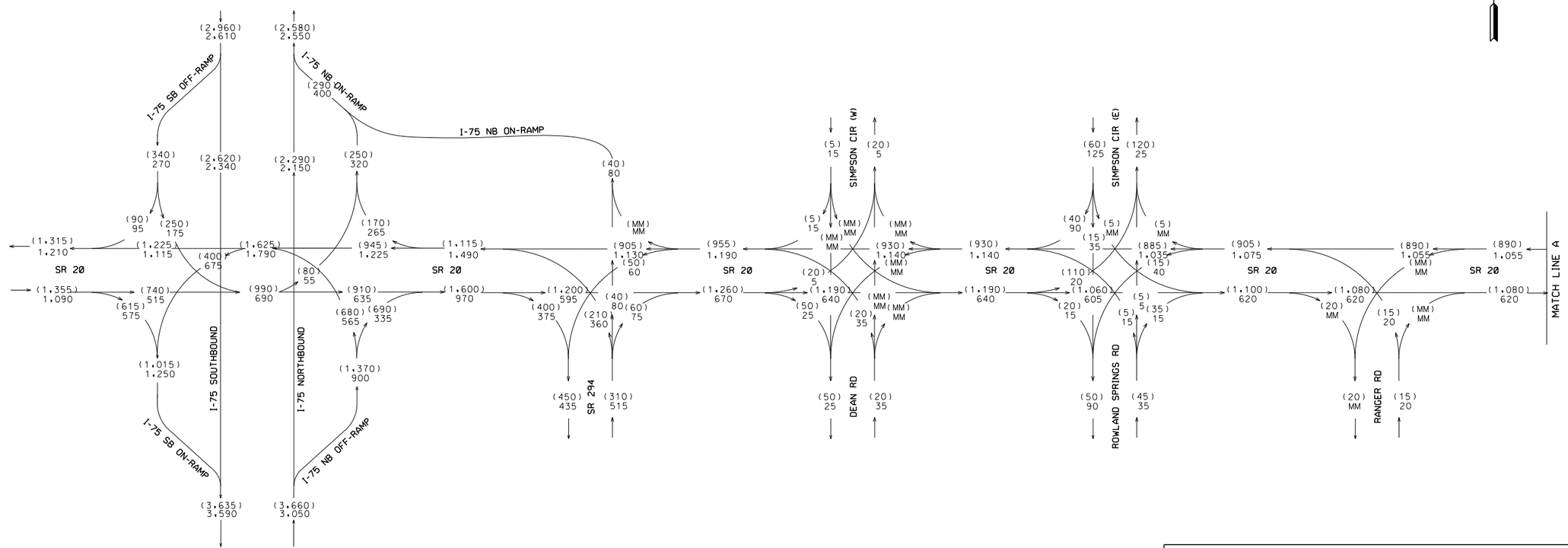
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR +2 NO-BUILD DHV
SHEET 6 OF 6

DRAWING No. 10-0036

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	37	84

DHV VOLUMES
SR 20
DESIGN YEAR +2
2048
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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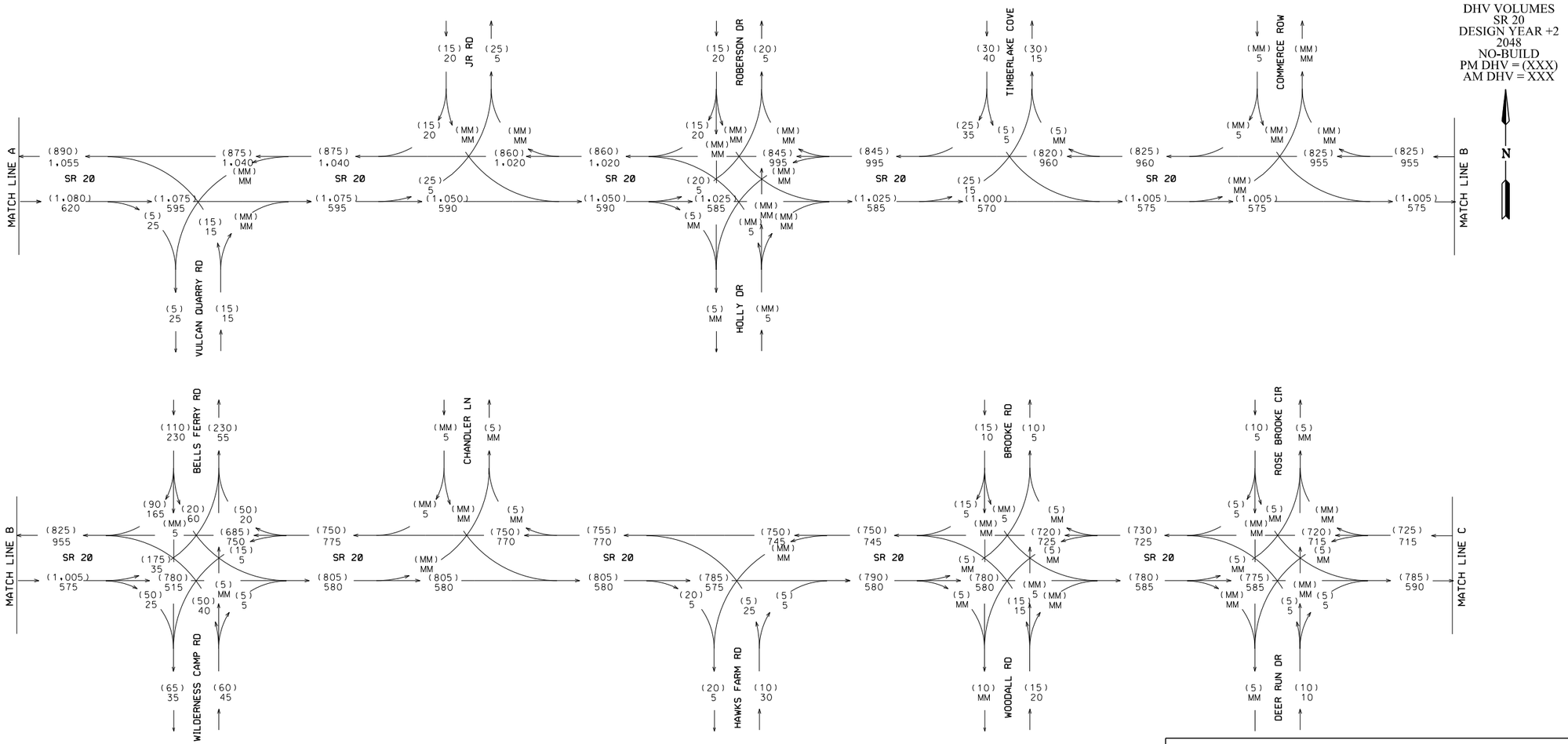
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR +2 NO-BUILD DHV
SHEET 1 OF 6

DRAWING No. 10-0037

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	38	84



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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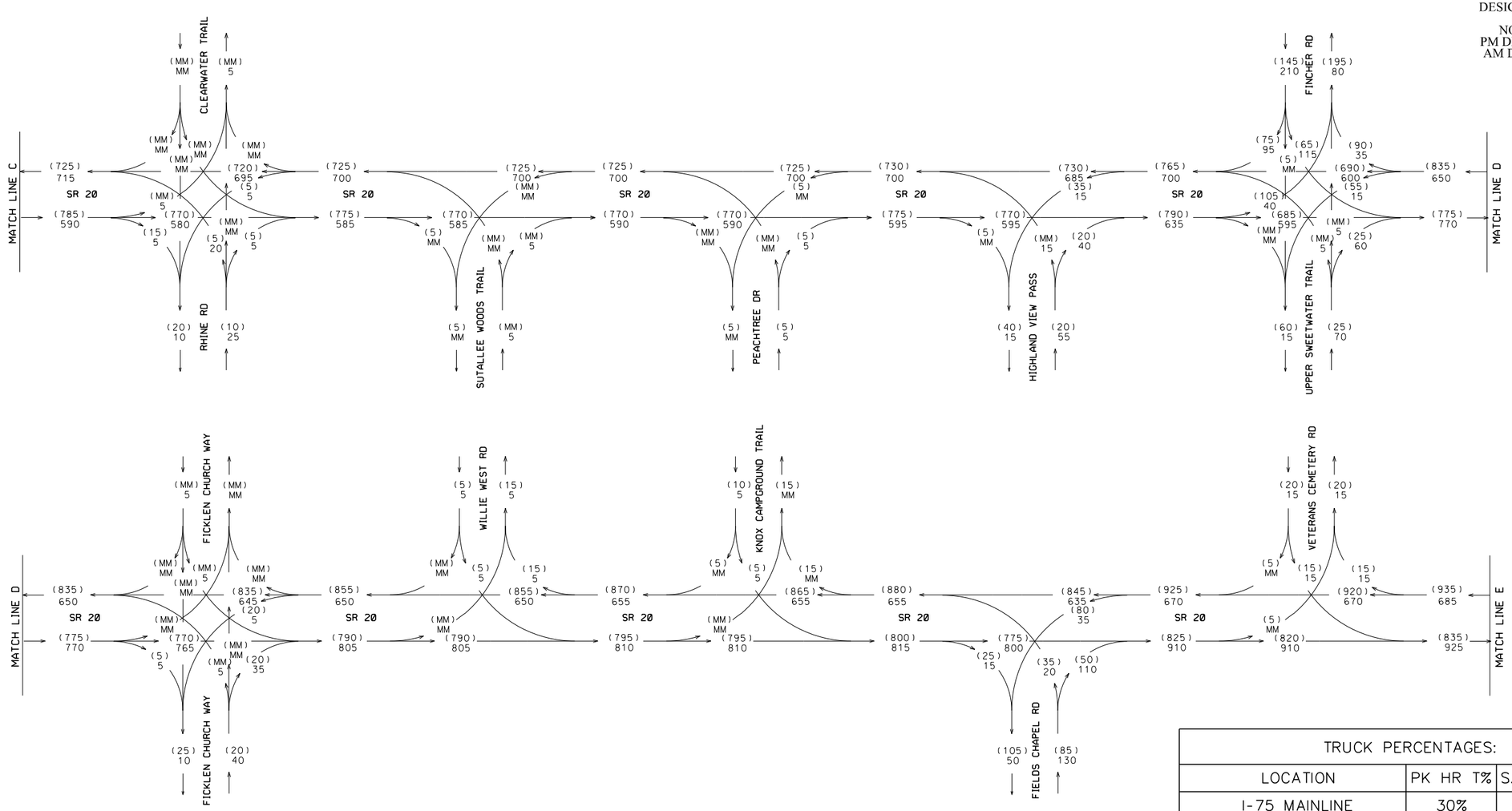
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR +2 NO-BUILD DHV
SHEET 2 OF 6

DRAWING No. 10-0038

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	39	84

DHV VOLUMES
SR 20
DESIGN YEAR +2
2048
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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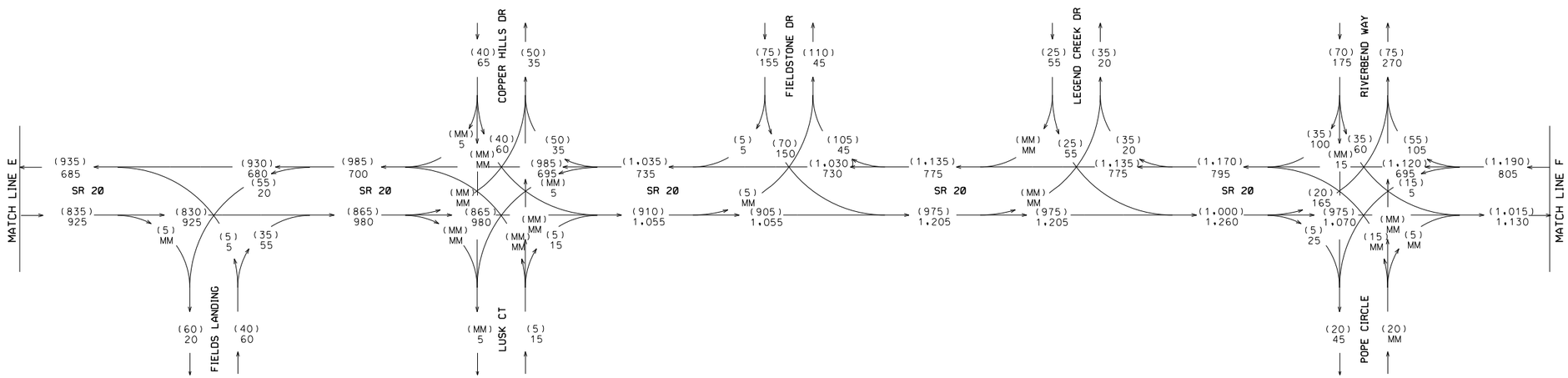
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR +2 NO-BUILD DHV
SHEET 3 OF 6

DRAWING No. 10-0039

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	40	84

DHV VOLUMES
SR 20
DESIGN YEAR +2
2048
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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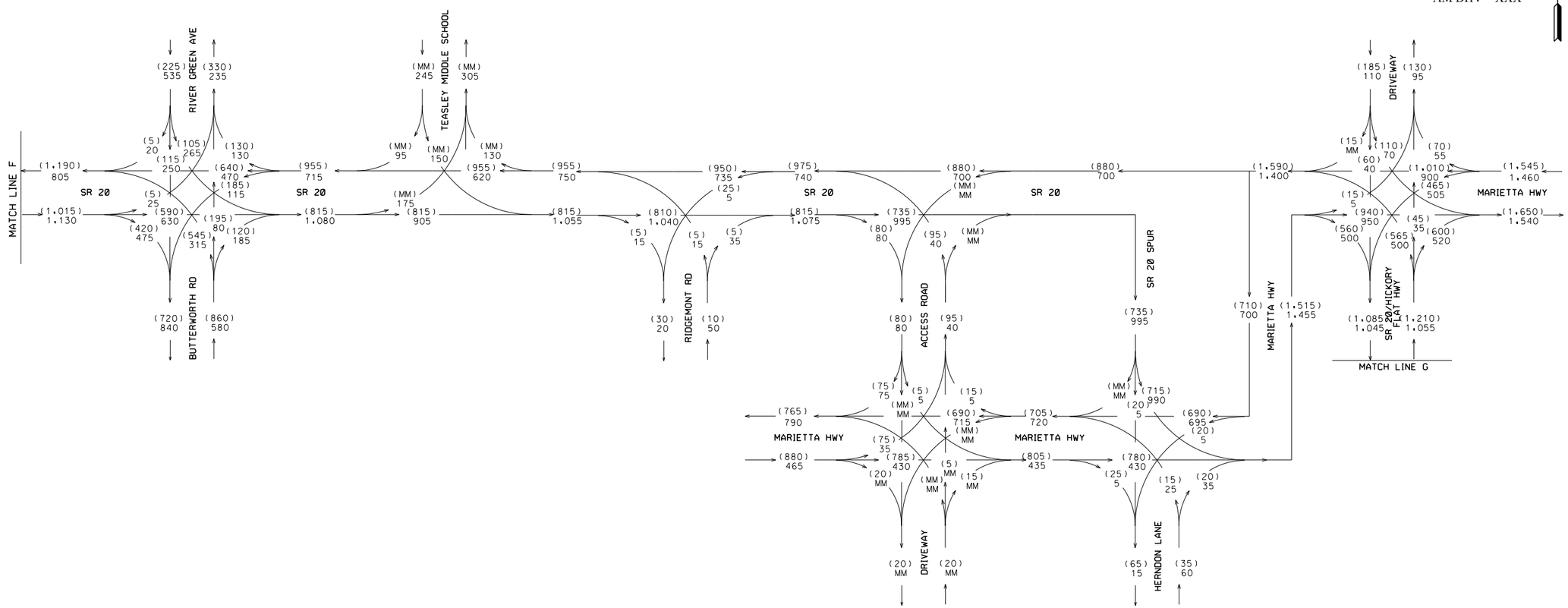
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR +2 NO-BUILD DHV
SHEET 4 OF 6

DRAWING No. 10-0040

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	41	84

DHV VOLUMES
SR 20
DESIGN YEAR +2
2048
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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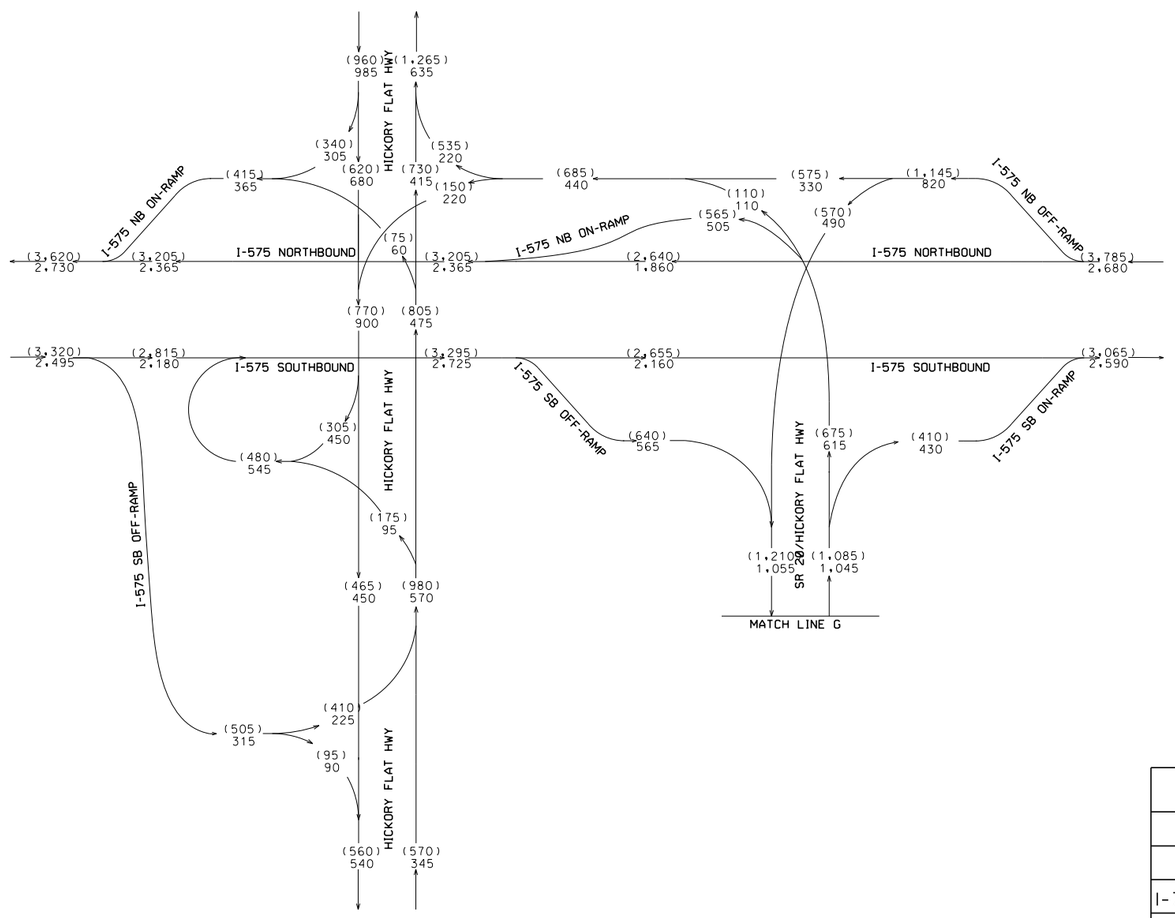
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR +2 NO-BUILD DHV
SHEET 5 OF 6

DRAWING No. 10-0041

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	42	84

DHV VOLUMES
SR 20
DESIGN YEAR +2
2048
NO-BUILD
PM DHV = (XXX)
AM DHV = XXX

N



TRUCK PERCENTAGES:			
LOCATION	PK HR T%	S.U. %	COMB %
I-75 MAINLINE	30%	11%	19%
I-75 RAMPS (N. OF SR 20)	13%	5%	8%
I-75 RAMPS (S. OF SR 20)	10%	8%	2%
SR 20/I-575 RAMPS	12%	10%	2%
I-575 MAINLINE	5%	2%	3%

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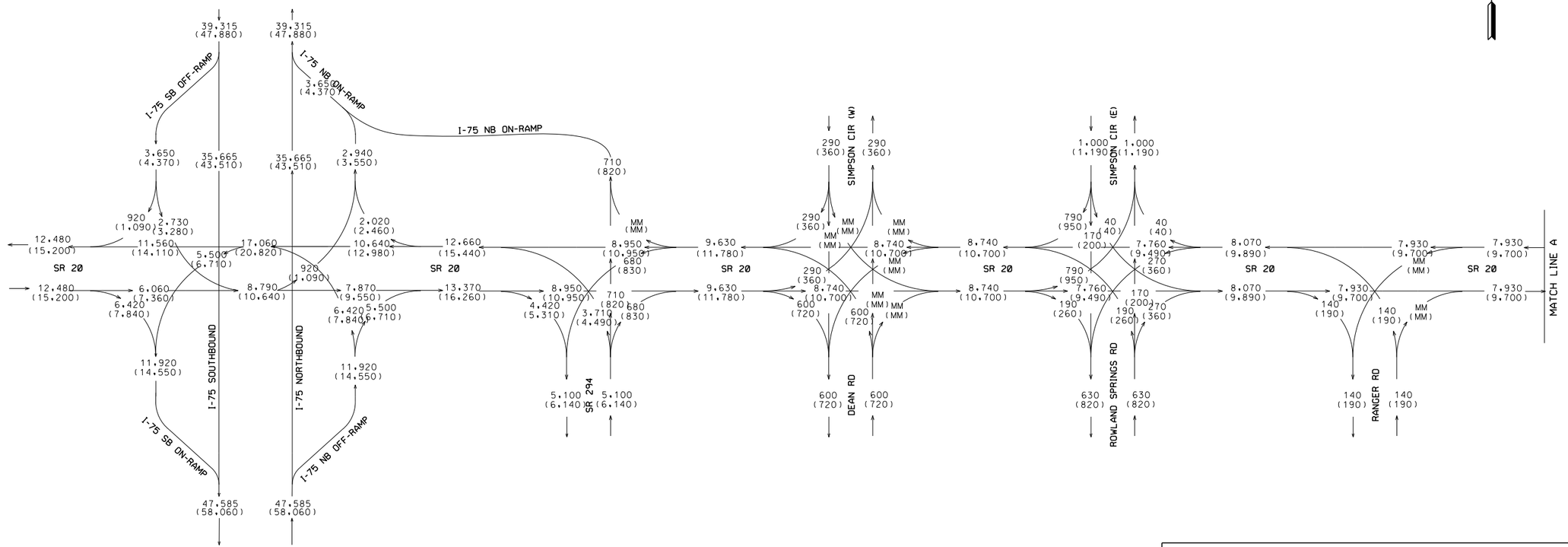
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR +2 NO-BUILD DHV
SHEET 6 OF 6

DRAWING No. 10-0042

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	43	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
(+2)
2028 & 2048
NO-BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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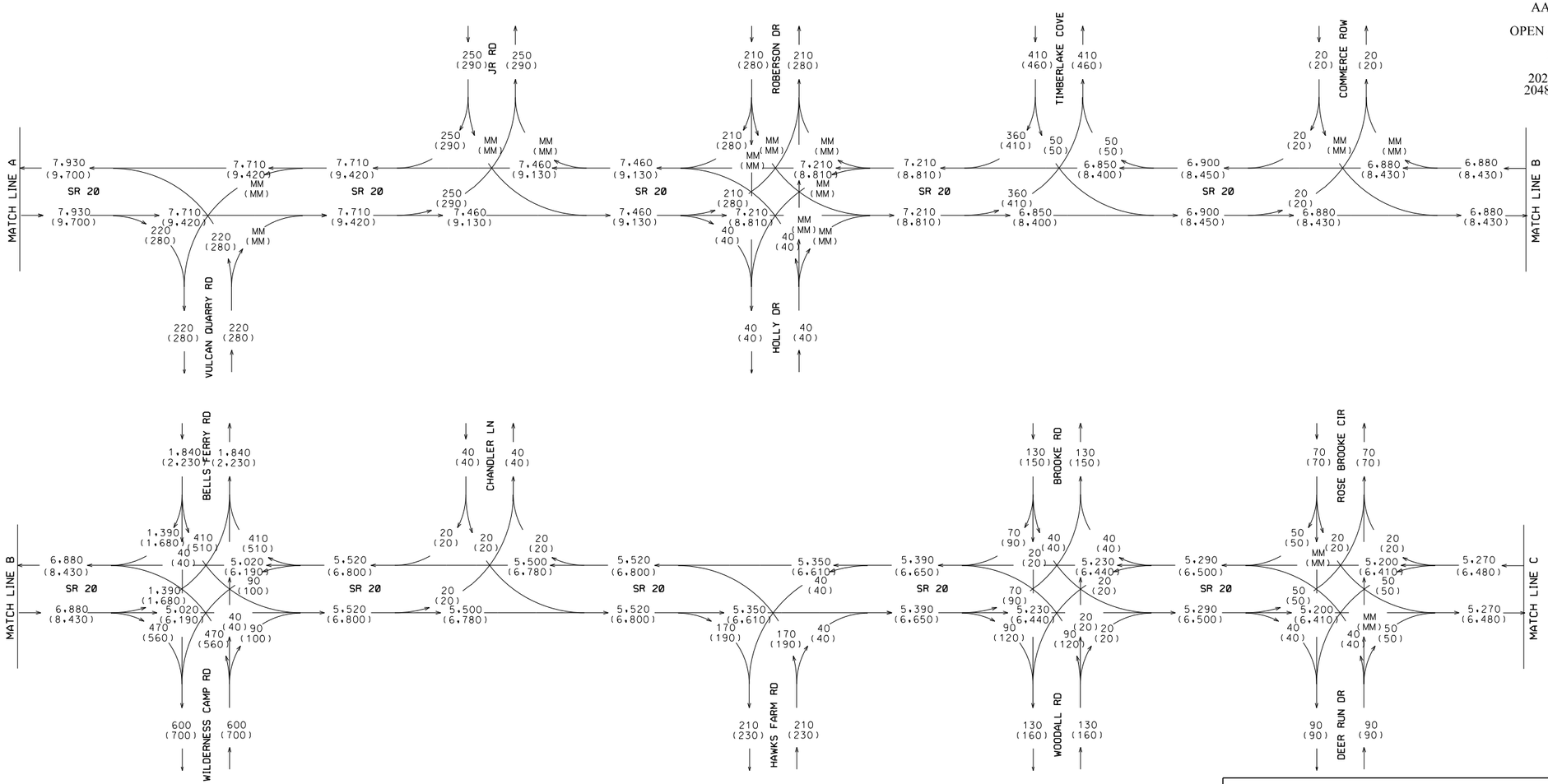
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) NO-BUILD AADT
SHEET 1 OF 6

DRAWING No. 10-0043

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	44	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
(+2)
2028 & 2048
NO-BUILD
2028 AADT = XXX
2048 AADT = (XXX)



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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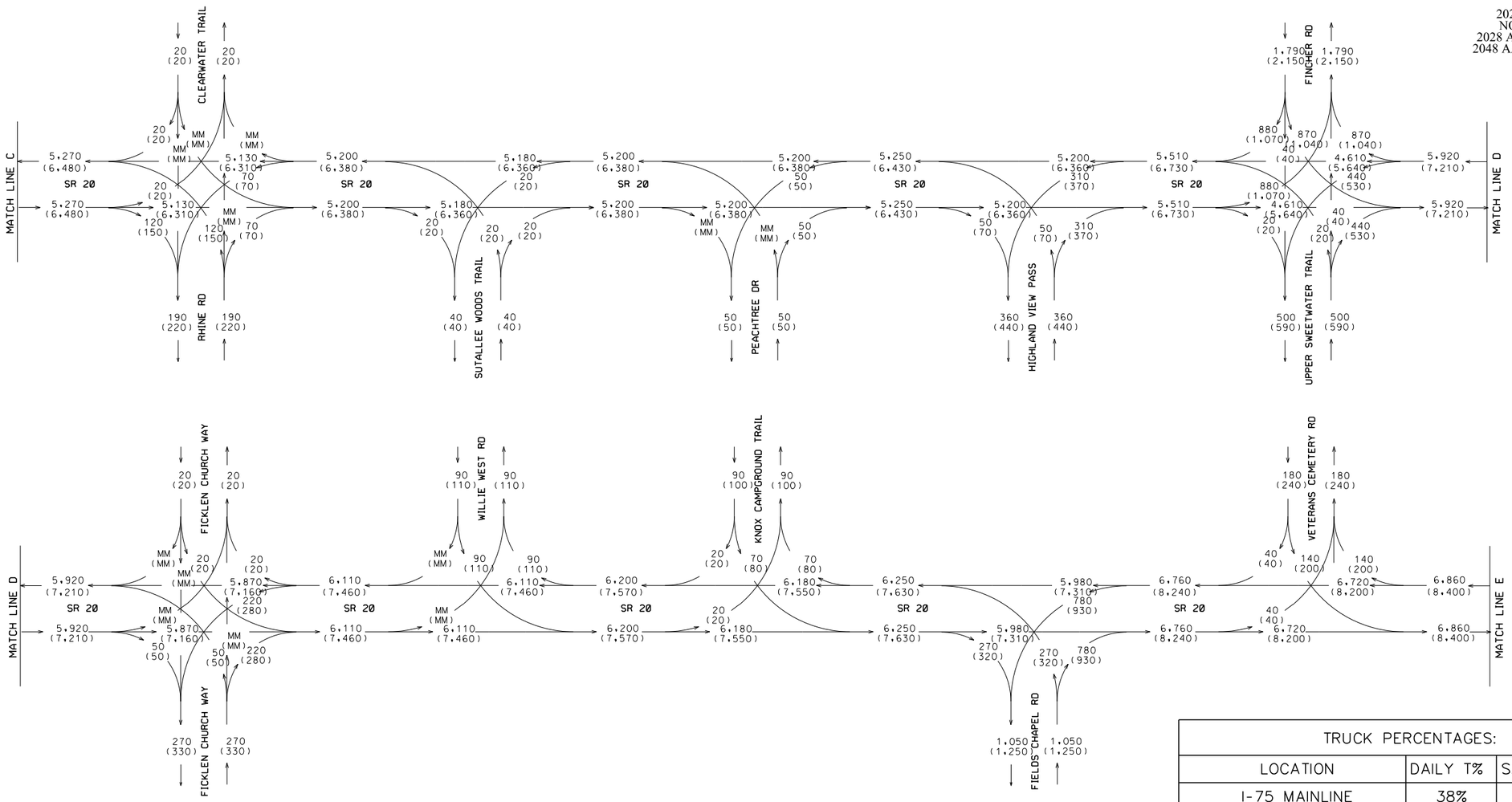
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) NO-BUILD AADT
SHEET 2 OF 6

DRAWING No. 10-0044

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	45	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
(+2)
2028 & 2048
NO-BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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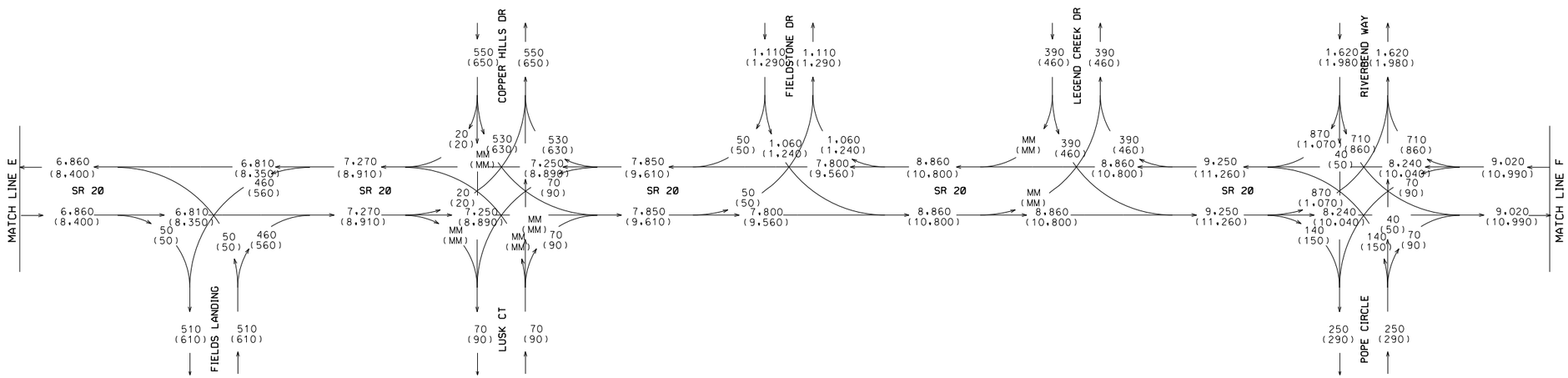
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) NO-BUILD AADT
SHEET 3 OF 6

DRAWING No. 10-0045

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	46	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
(+2)
2028 & 2048
NO-BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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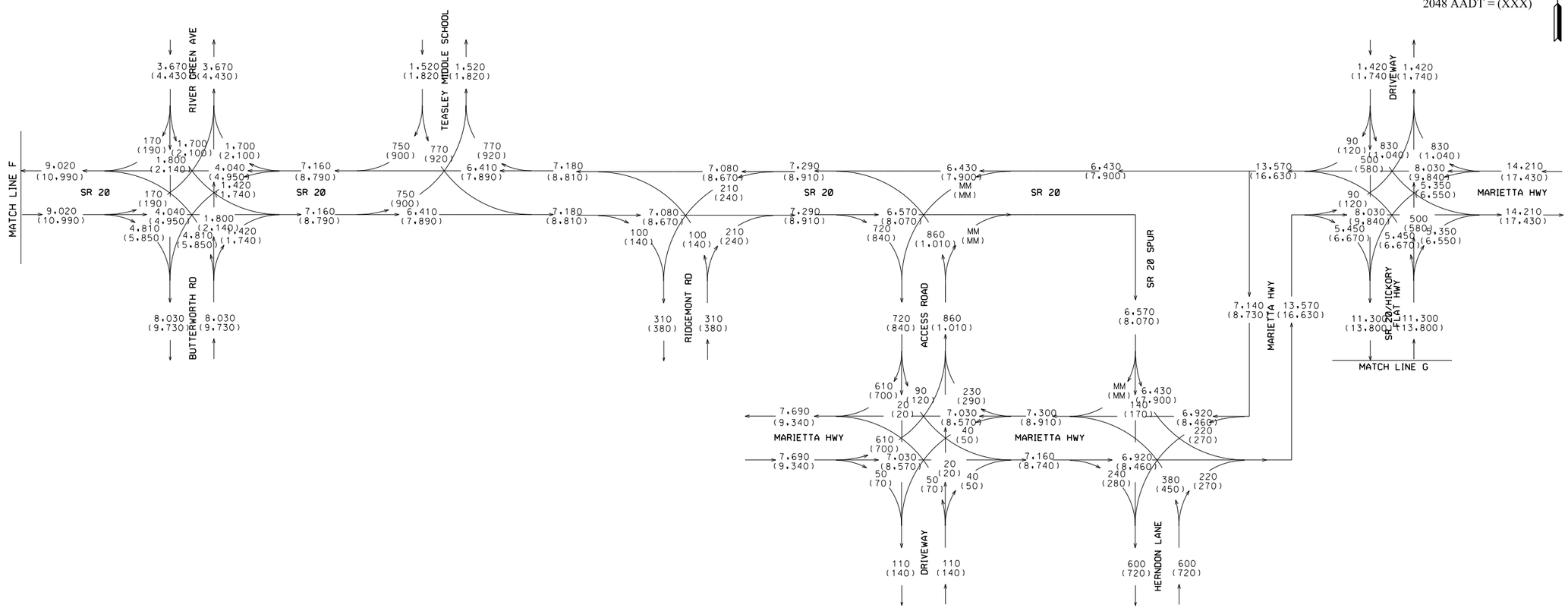
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) NO-BUILD AADT
SHEET 4 OF 6

DRAWING No. 10-0046

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	47	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
(+2)
2028 & 2048
NO-BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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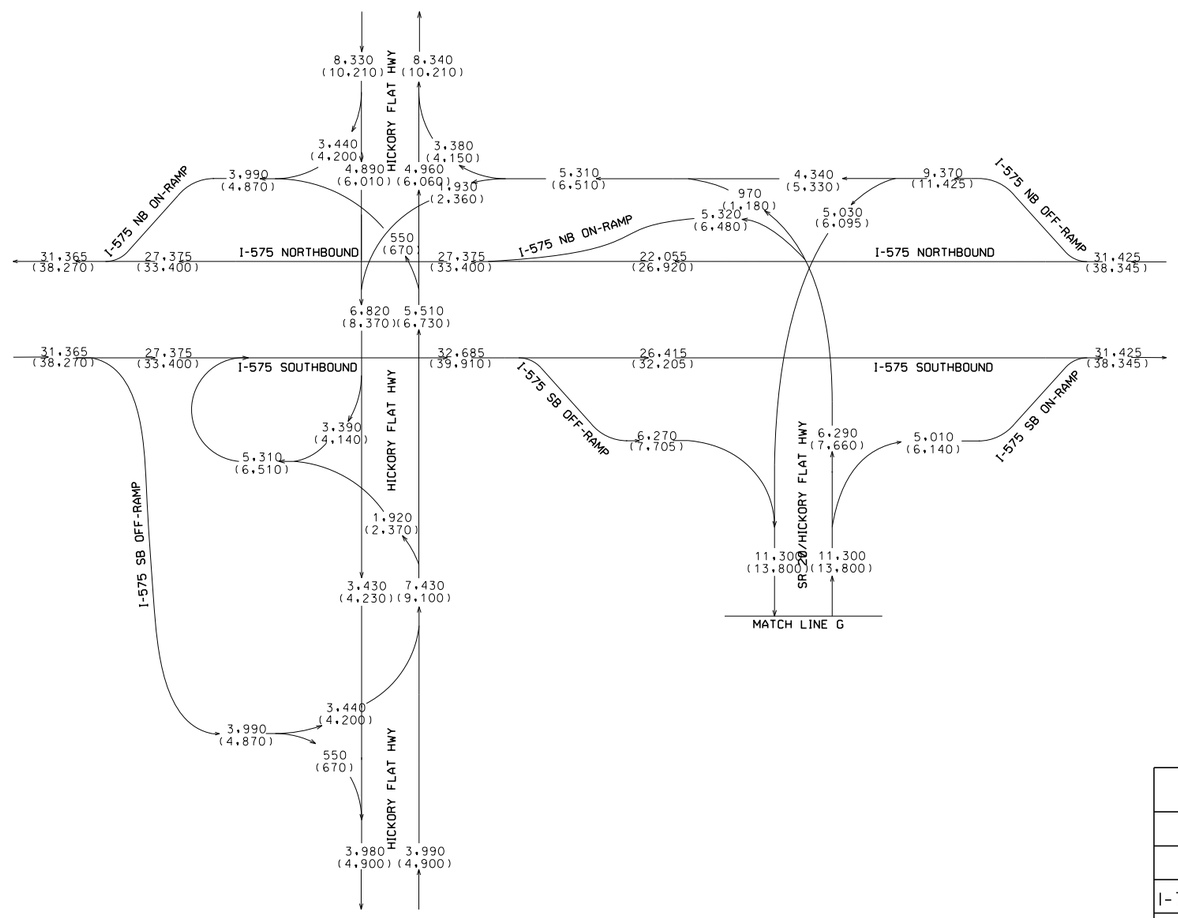
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) NO-BUILD AADT
SHEET 5 OF 6

DRAWING No. 10-0047

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	48	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
(+2)
2028 & 2048
NO-BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



TRUCK PERCENTAGES:			
LOCATION	DAILY T%	S.U. %	COMB %
I-75 MAINLINE	38%	10%	28%
I-75 RAMPS (N. OF SR 20)	15%	7%	8%
I-75 RAMPS (S. OF SR 20)	13%	10%	3%
SR 20/I-575 RAMPS	15%	11%	4%
I-575 MAINLINE	6%	2%	4%

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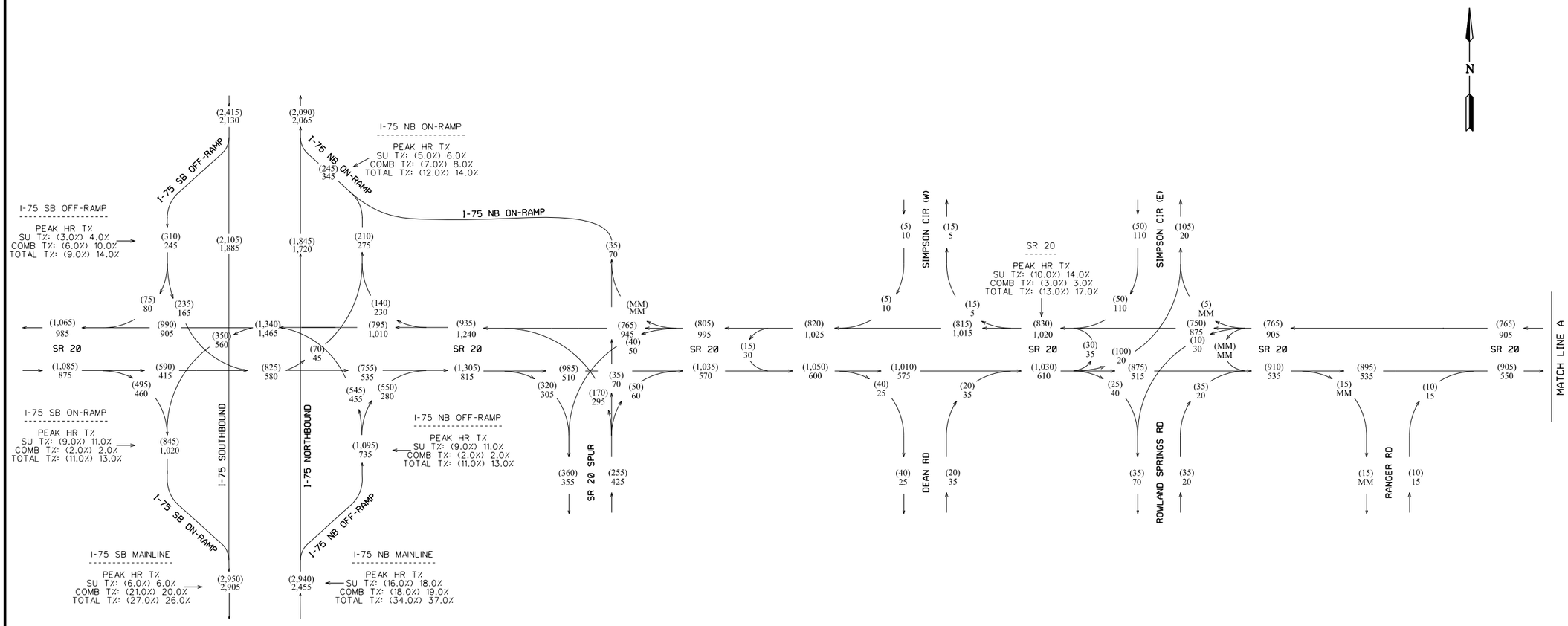
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) NO-BUILD AADT
SHEET 6 OF 6

DRAWING No. 10-0048

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	49	84

DHV VOLUMES
SR 20 OPEN YEAR
2026
BUILD
PM DHV = (XXX)
AM DHV = XXX



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REVISION DATES		

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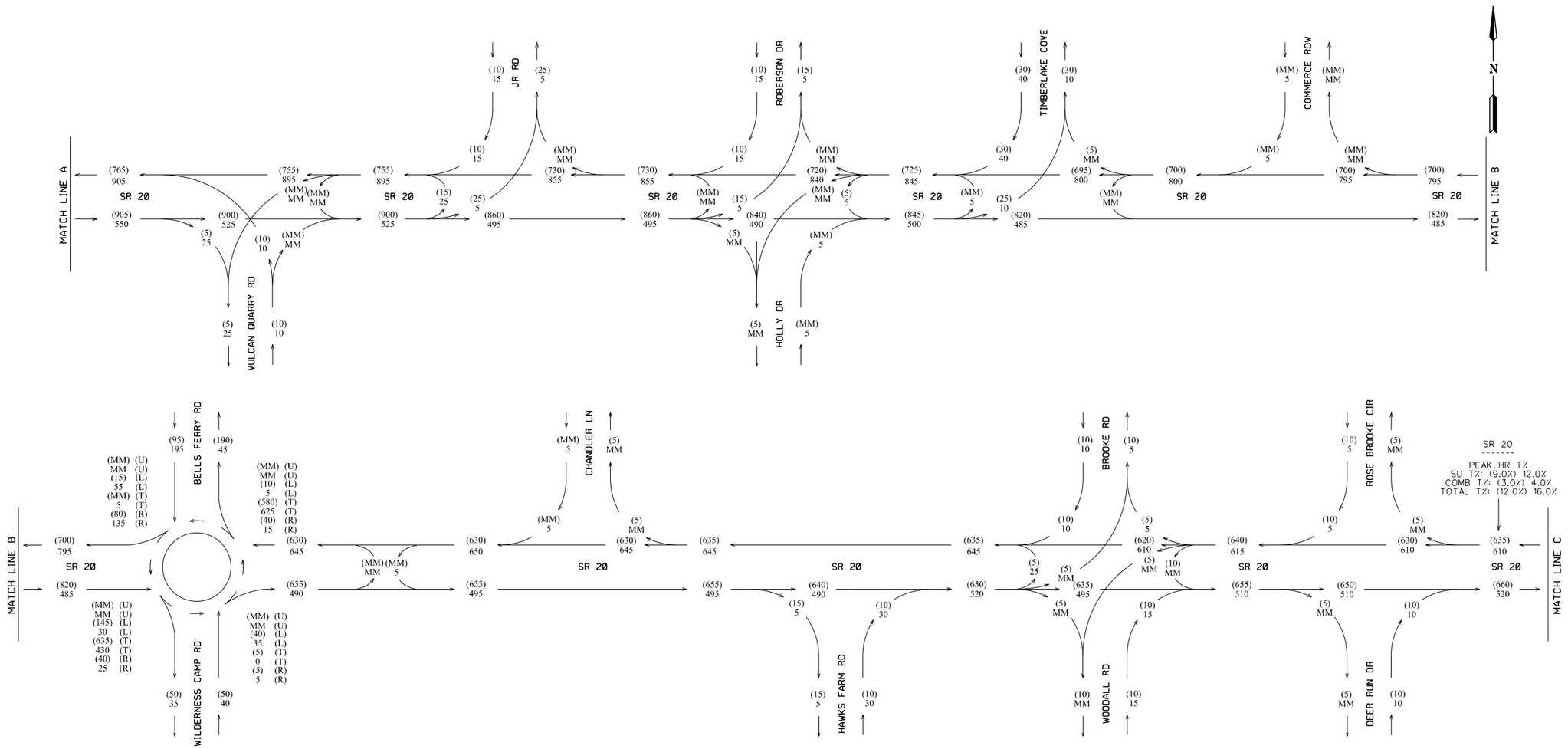
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR BUILD DHV
SHEET 1 OF 6

DRAWING No. 10-0049

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	50	84

DHV VOLUMES
SR 20 OPEN YEAR
2026
BUILD
PM DHV = (XXX)
AM DHV = XXX



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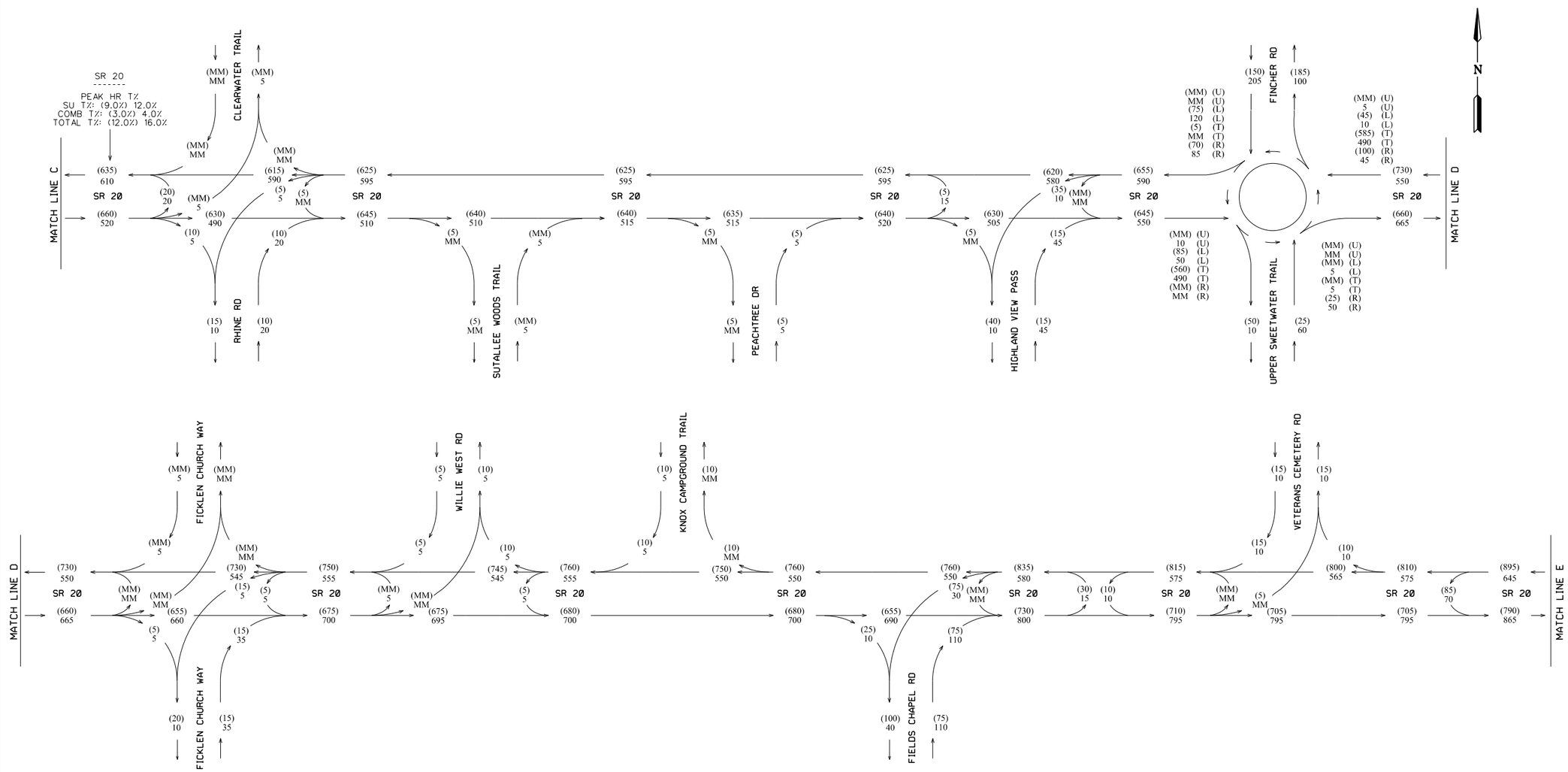
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

OPEN YEAR BUILD DHV
SHEET 2 OF 6

DRAWING No.
10-0050

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	51	84

DHV VOLUMES
SR 20 OPEN YEAR
2026
BUILD
PM DHV = (XXX)
AM DHV = XXX



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REVISION DATES		

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STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING
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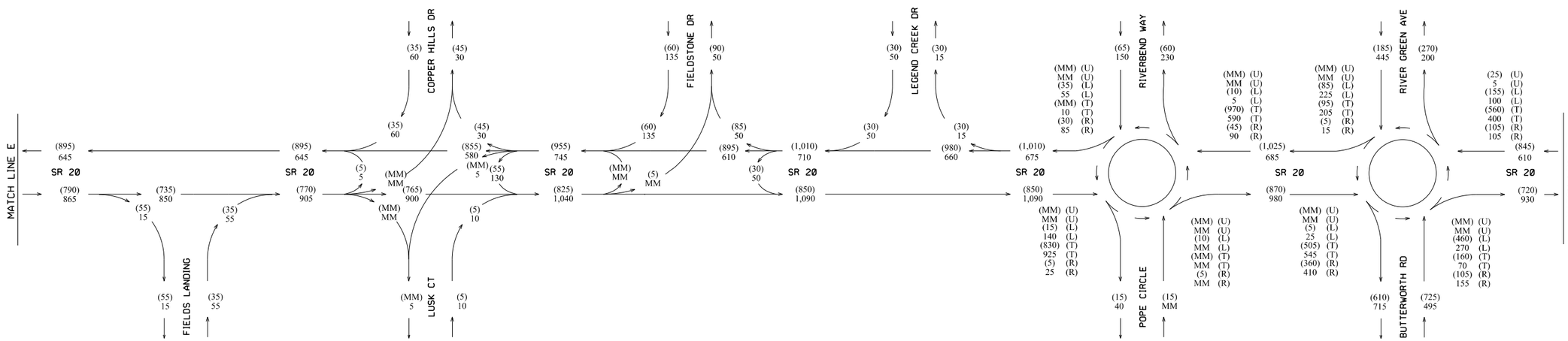
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR BUILD DHV
SHEET 3 OF 6

DRAWING No. 10-0051

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	52	84

DHV VOLUMES
SR 20 OPEN YEAR
2026
BUILD
PM DHV = (XXX)
AM DHV = XXX



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OFFICE OF PLANNING

TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

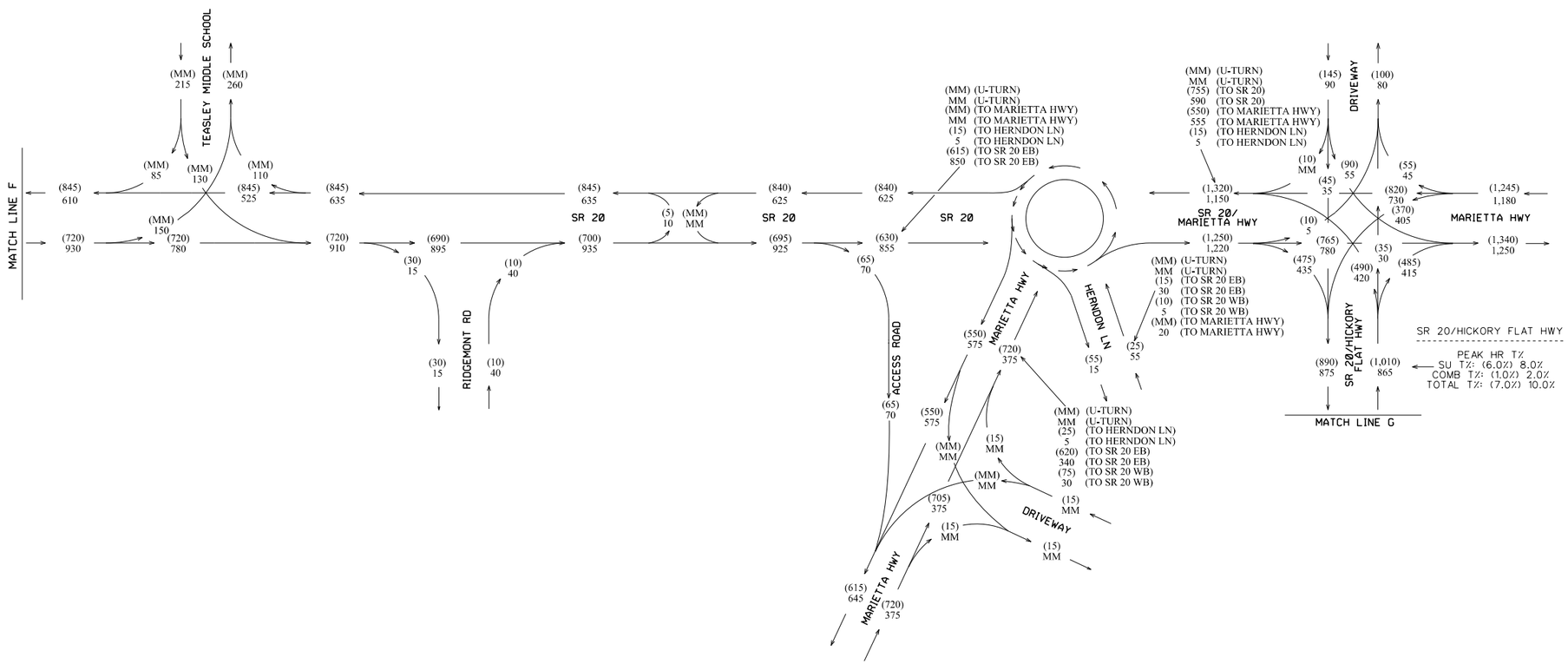
OPEN YEAR BUILD DHV
SHEET 4 OF 6

DRAWING No. 10-0052

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	53	84

DHV VOLUMES
SR 20 OPEN YEAR
2026
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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STATE OF GEORGIA
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OFFICE OF PLANNING
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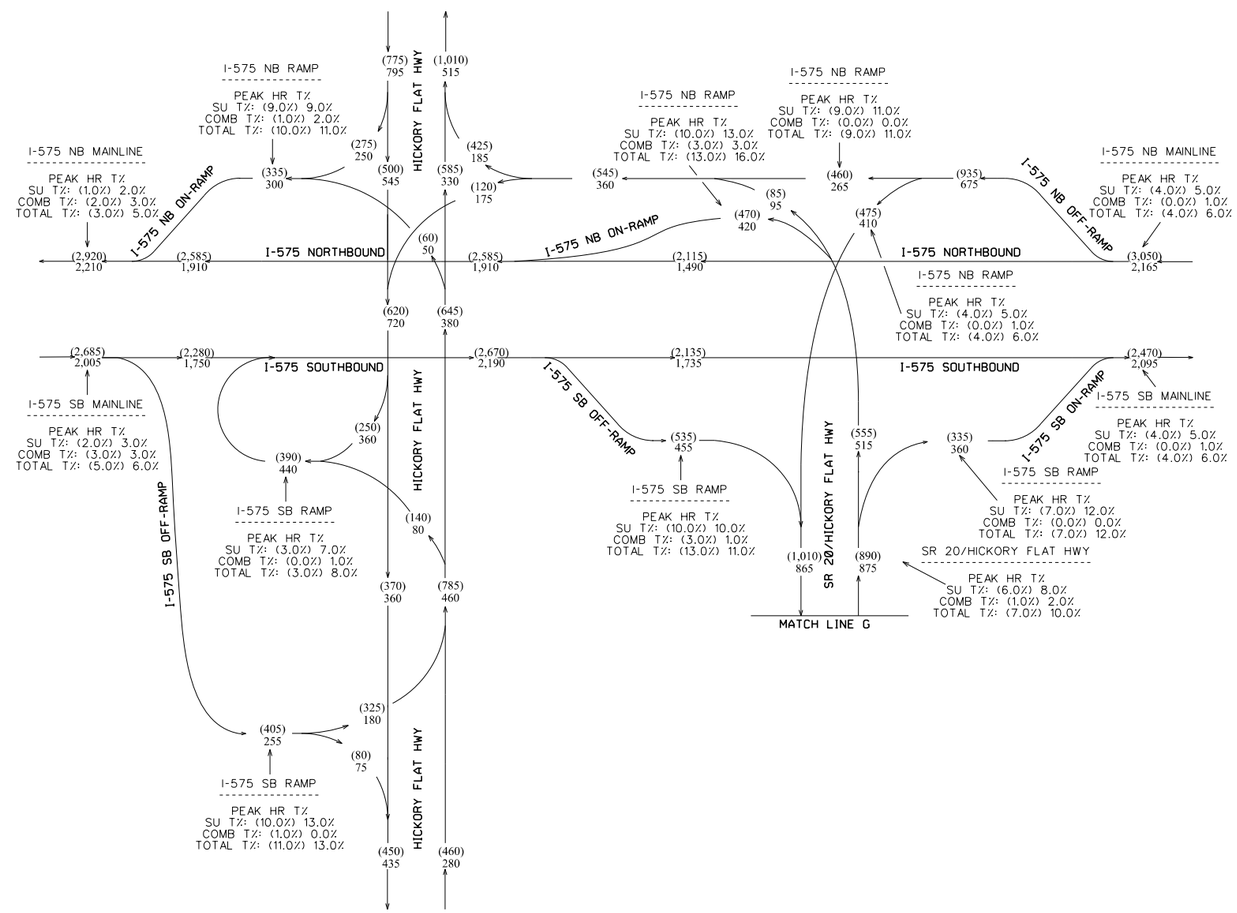
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR BUILD DHV
SHEET 5 OF 6

DRAWING No.
10-0053

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	54	84

DHV VOLUMES
SR 20 OPEN YEAR
2026
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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REVISION DATES		

STATE OF GEORGIA
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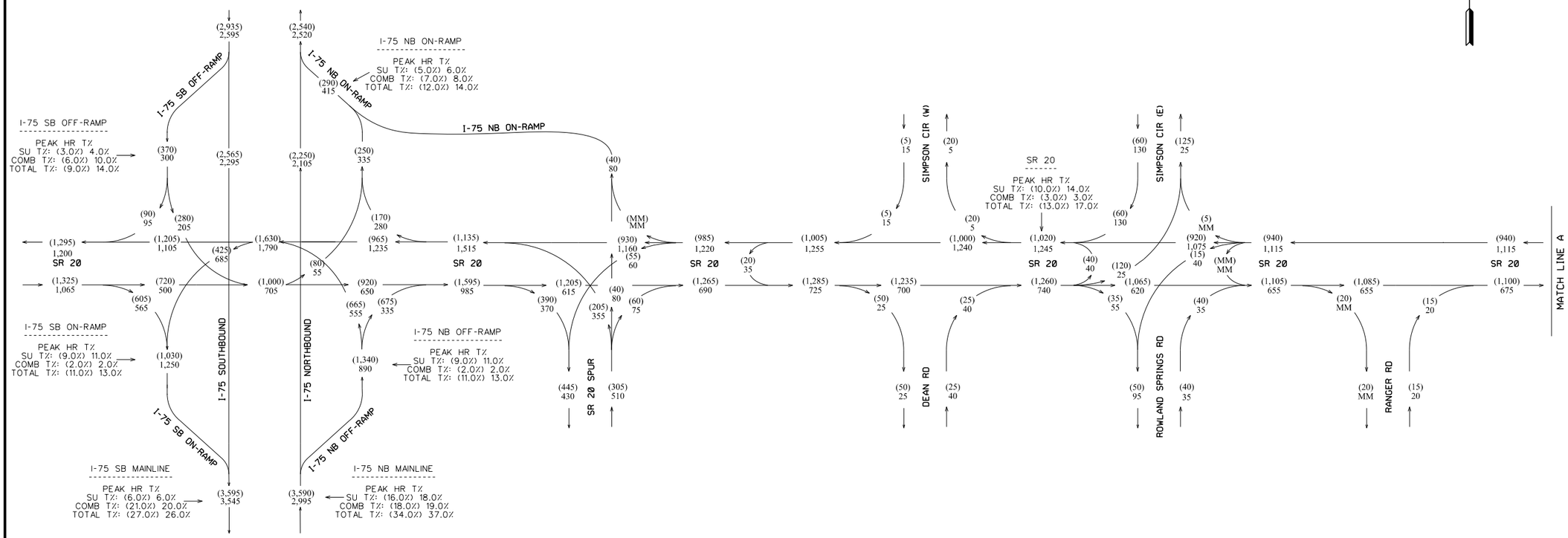
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR BUILD DHV
SHEET 6 OF 6

DRAWING No. 10-0054

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	55	84

DHV VOLUMES
SR 20 DESIGN YEAR
2046
BUILD
PM DHV = (XXX)
AM DHV = XXX



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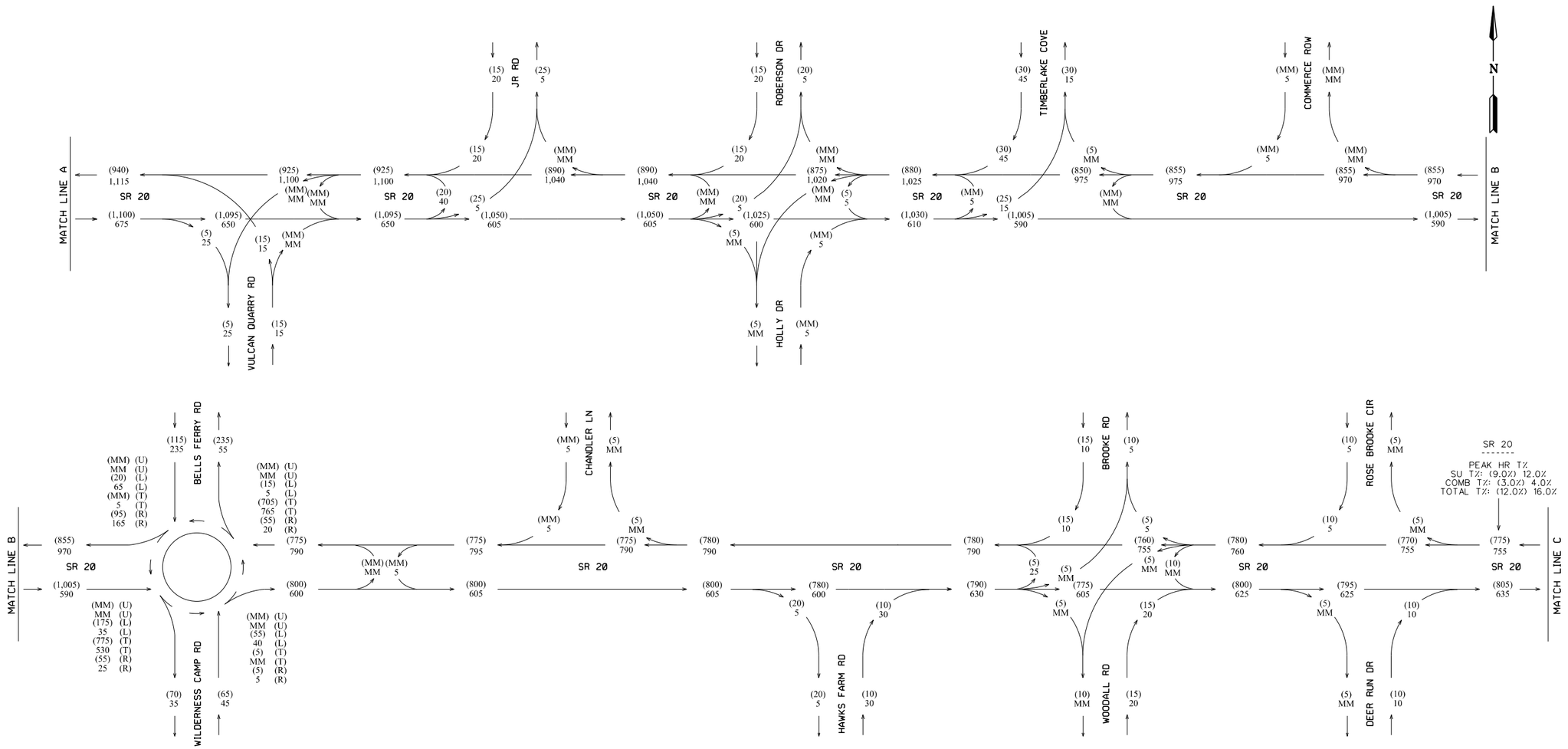
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

DESIGN YEAR BUILD DHV
SHEET 1 OF 6

DRAWING No. 10-0055

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	56	84

DHV VOLUMES
SR 20 DESIGN YEAR
2046
BUILD
PM DHV = (XXX)
AM DHV = XXX



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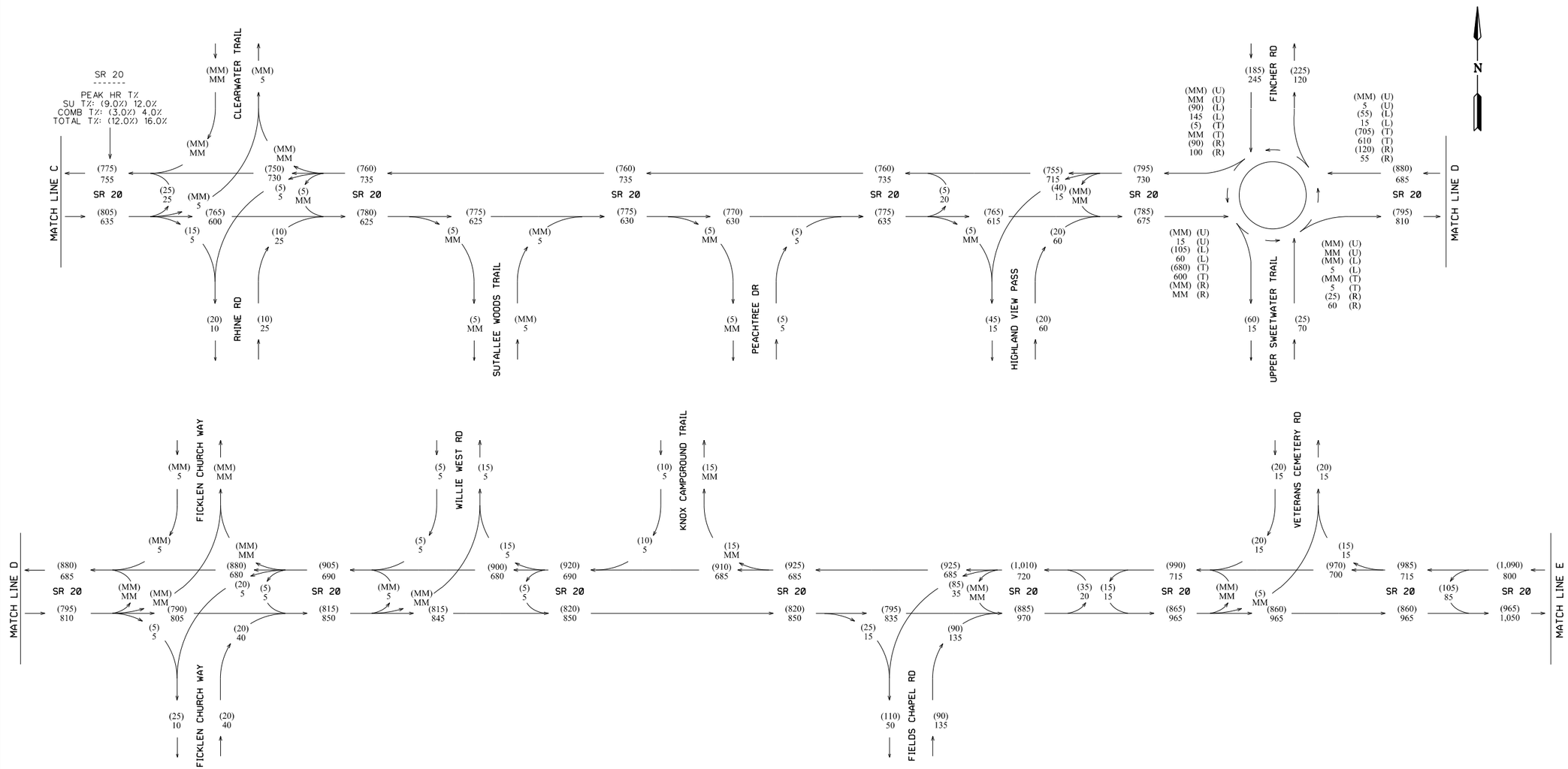
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

DESIGN YEAR BUILD DHV
SHEET 2 OF 6

DRAWING No. 10-0056

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	57	84

DHV VOLUMES
SR 20 DESIGN YEAR
2046
BUILD
PM DHV = (XXX)
AM DHV = XXX



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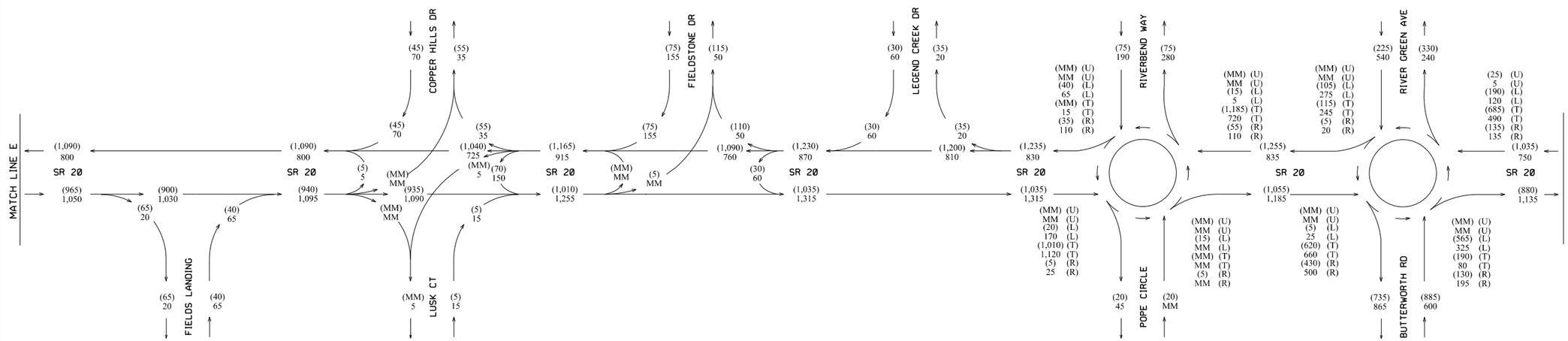
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR BUILD DHV
SHEET 3 OF 6

DRAWING No. 10-0057

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	58	84

DHV VOLUMES
SR 20 DESIGN YEAR
2046
BUILD
PM DHV = (XXX)
AM DHV = XXX



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TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

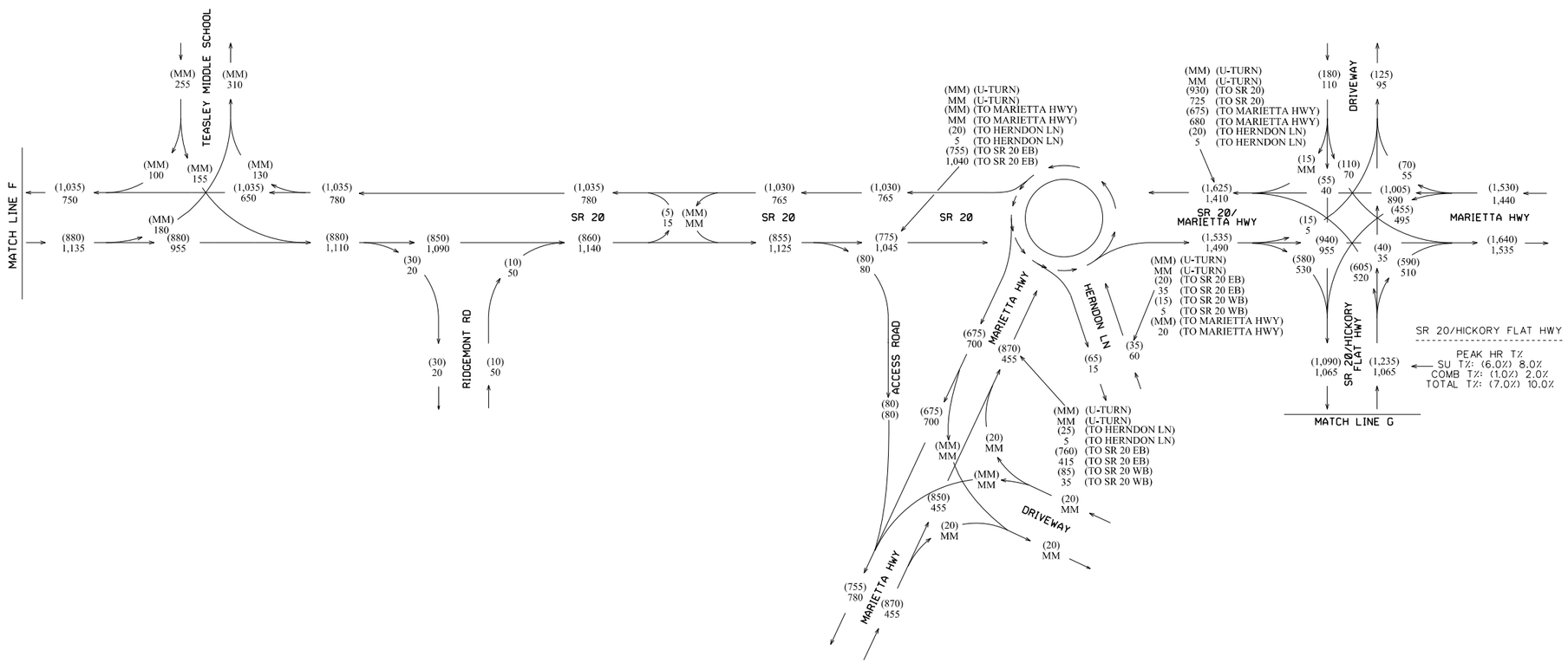
DESIGN YEAR BUILD DHV
SHEET 4 OF 6

DRAWING No. 10-0058

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	59	84

DHV VOLUMES
SR 20 DESIGN YEAR
2046
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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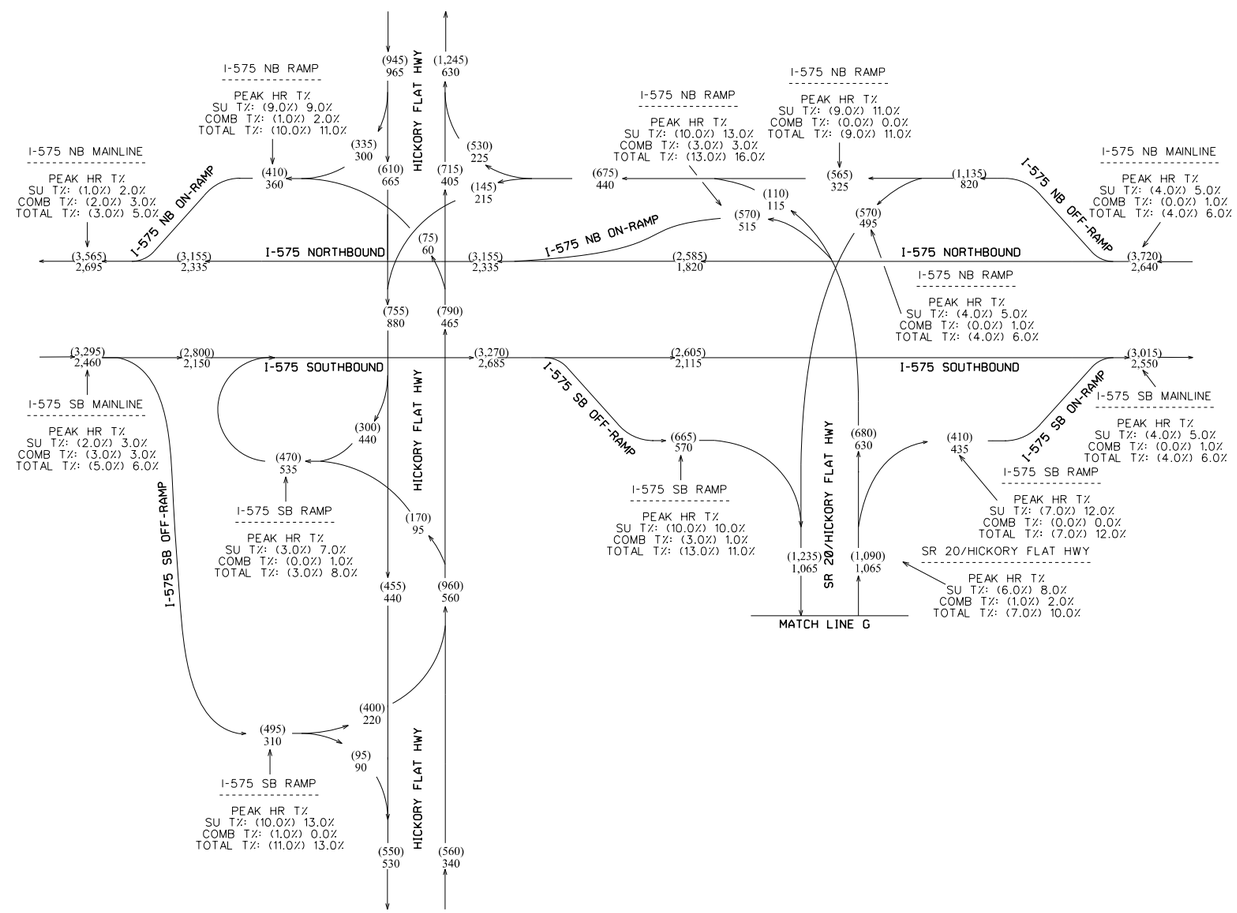
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR BUILD DHV
SHEET 5 OF 6

DRAWING No. 10-0059

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	60	84

DHV VOLUMES
SR 20 DESIGN YEAR
2046
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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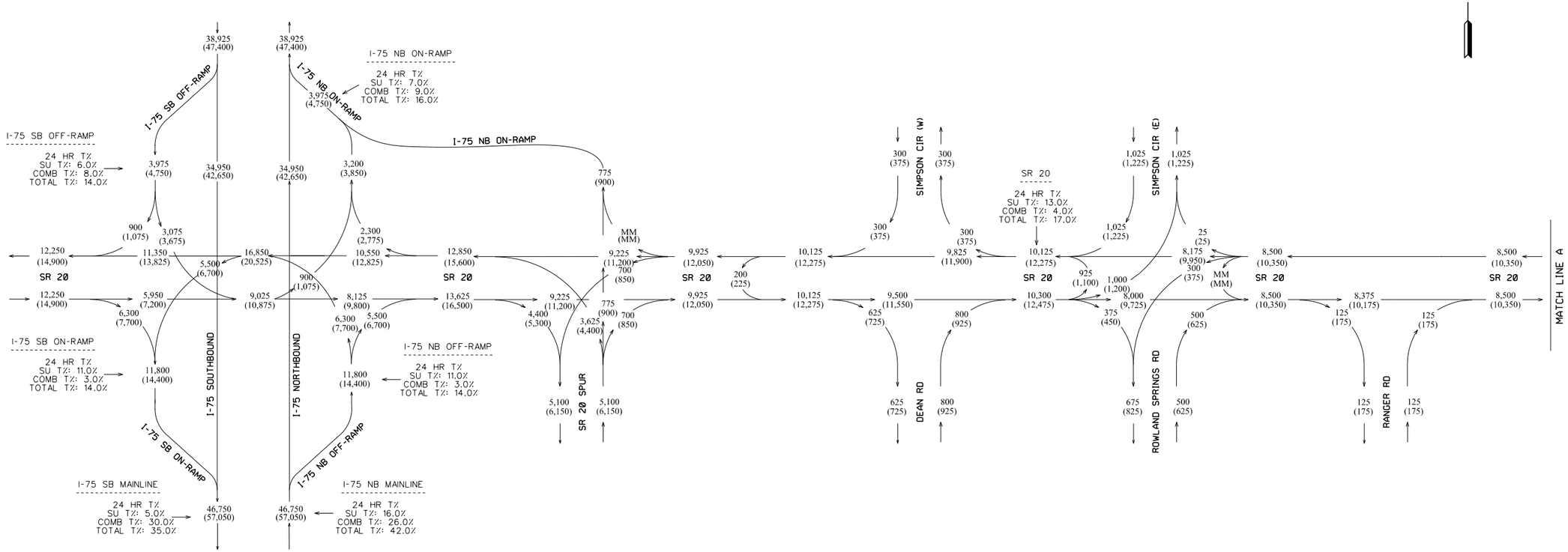
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR BUILD DHV
SHEET 6 OF 6

DRAWING No. 10-0060

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	61	84

AADT VOLUMES
SR 20
OPEN & DESIGN YEARS
2026 & 2046
BUILD
2026 AADT = XXX
2046 AADT = (XXX)



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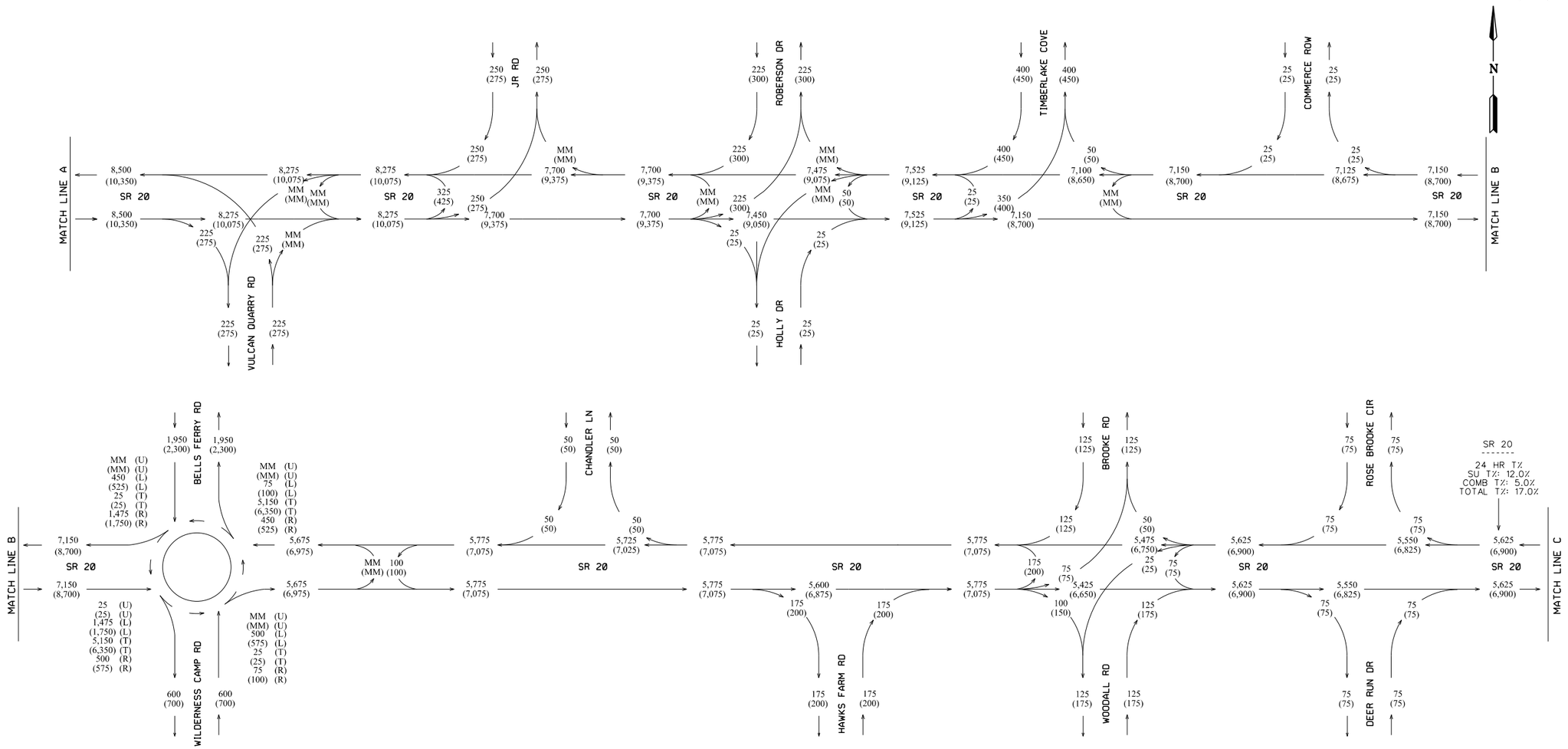
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS BUILD AADT
SHEET 1 OF 6

DRAWING No. 10-0061

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	62	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS
2026 & 2046
BUILD
2026 AADT = XXX
2046 AADT = (XXX)



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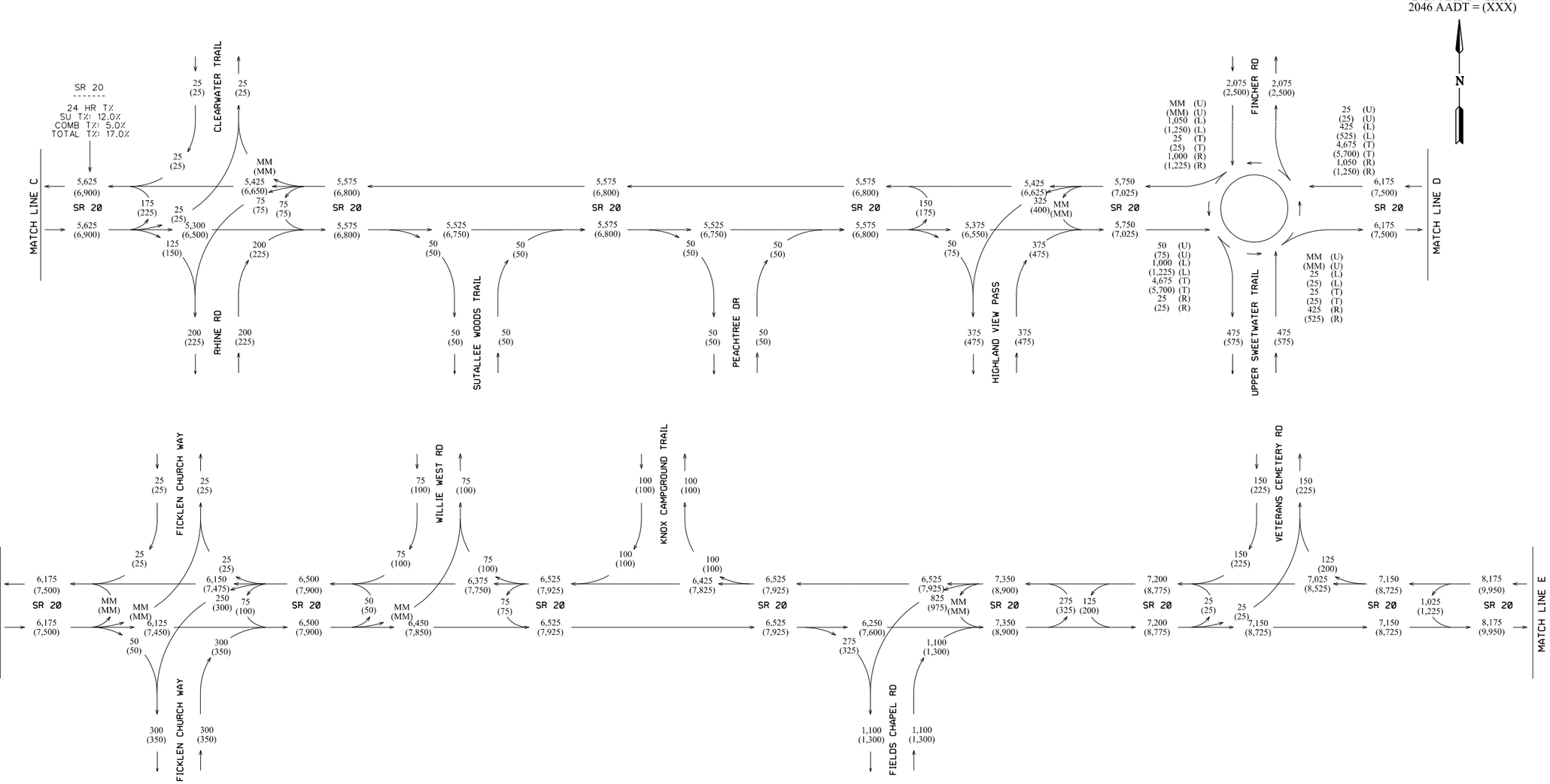
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS BUILD AADT
SHEET 2 OF 6

DRAWING No. 10-0062

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	63	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS
2026 & 2046
BUILD
2026 AADT = XXX
2046 AADT = (XXX)



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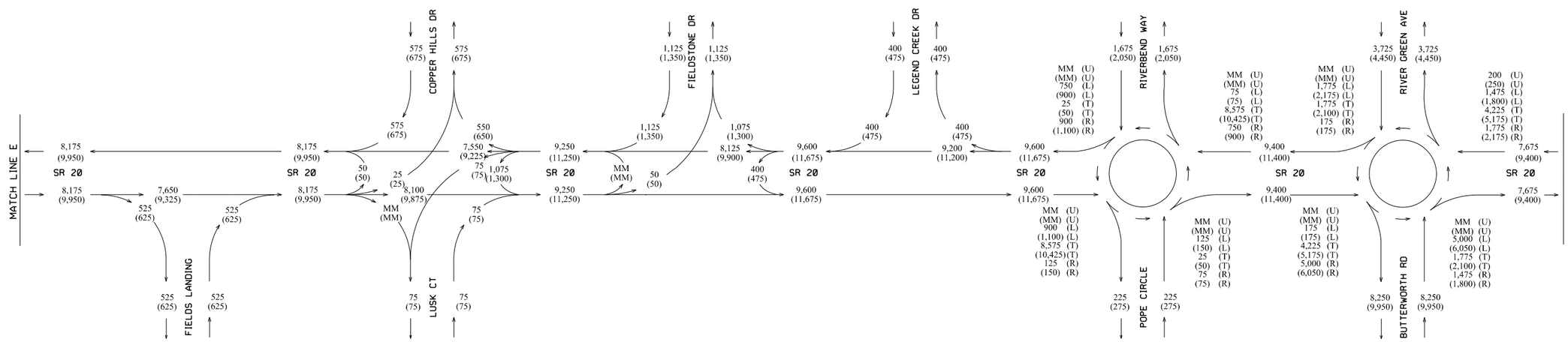
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS BUILD AADT
SHEET 3 OF 6

DRAWING No. 10-0063

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	64	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS
2026 & 2046
BUILD
2026 AADT = XXX
2046 AADT = (XXX)



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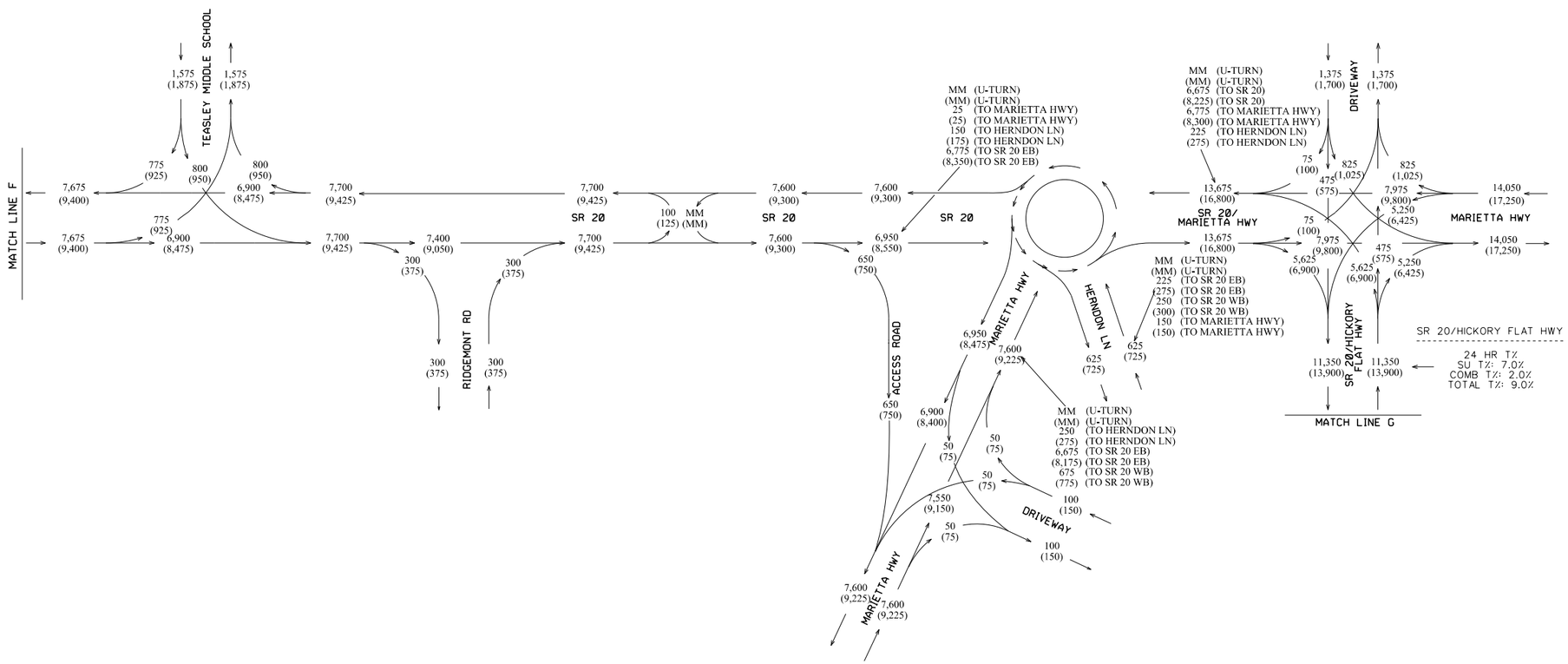
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS BUILD AADT
SHEET 4 OF 6

DRAWING No. 10-0064

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	65	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS
2026 & 2046
BUILD
2026 AADT = XXX
2046 AADT = (XXX)

N



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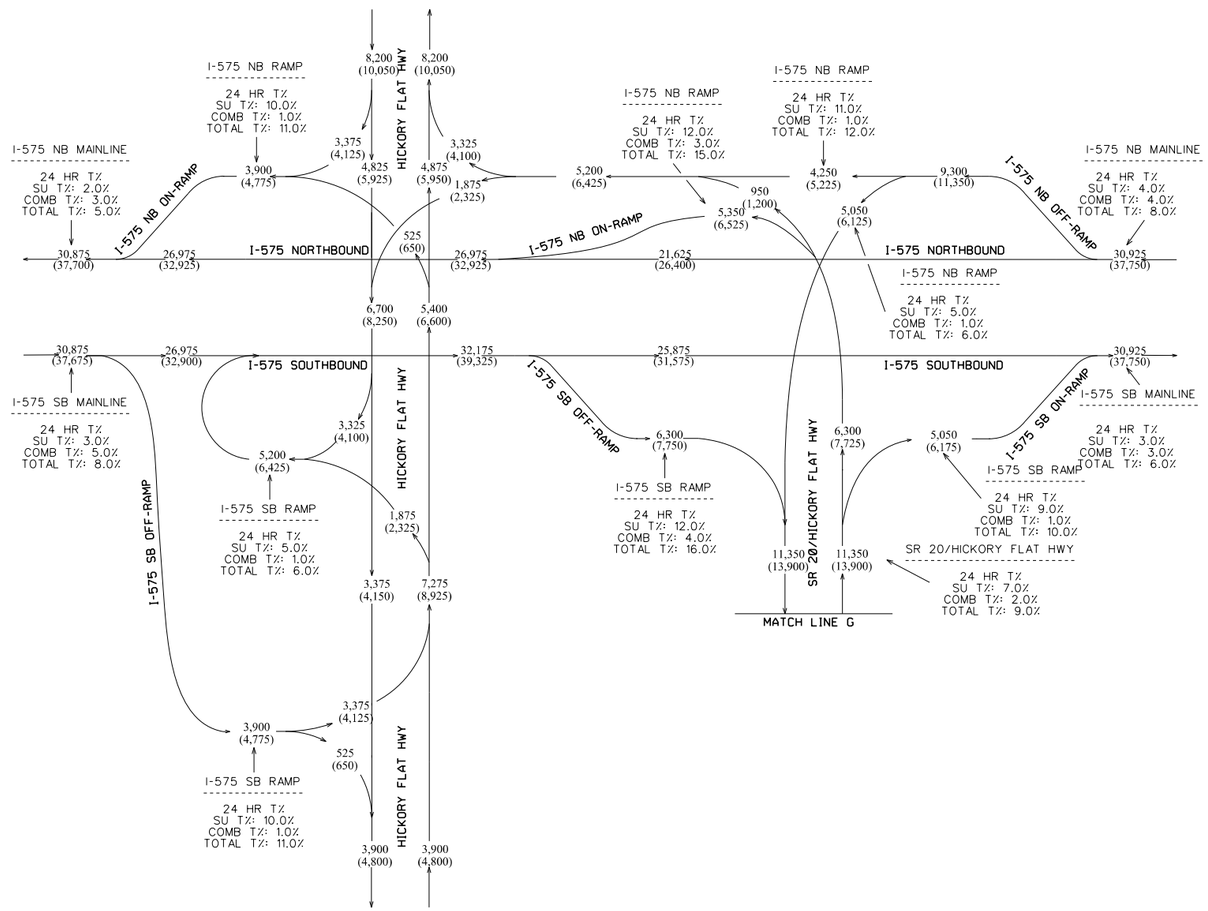
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS BUILD AADT
SHEET 5 OF 6

DRAWING No.
10-0065

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	66	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS
2026 & 2046
BUILD
2026 AADT = XXX
2046 AADT = (XXX)

N



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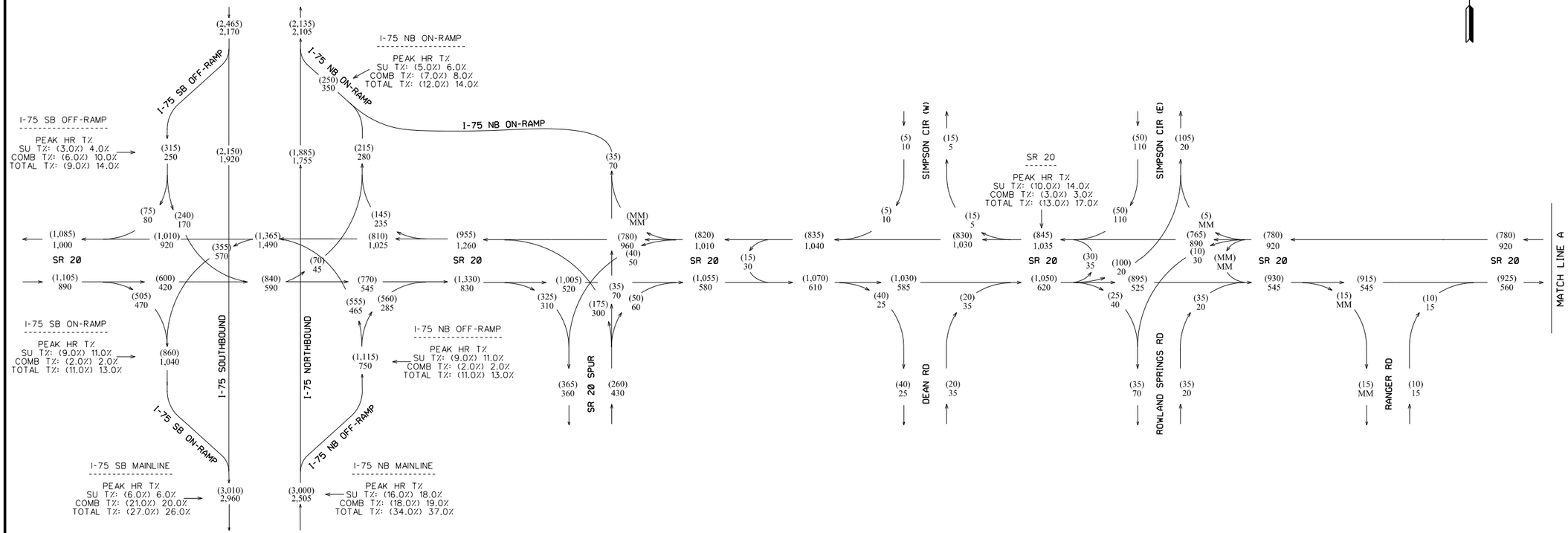
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS BUILD AADT
SHEET 6 OF 6

DRAWING No.
10-0066

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	67	84

DHV VOLUMES
SR 20 OPEN YEAR (+2)
2028
BUILD
PM DHV = (XXX)
AM DHV = XXX



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DEPARTMENT OF TRANSPORTATION
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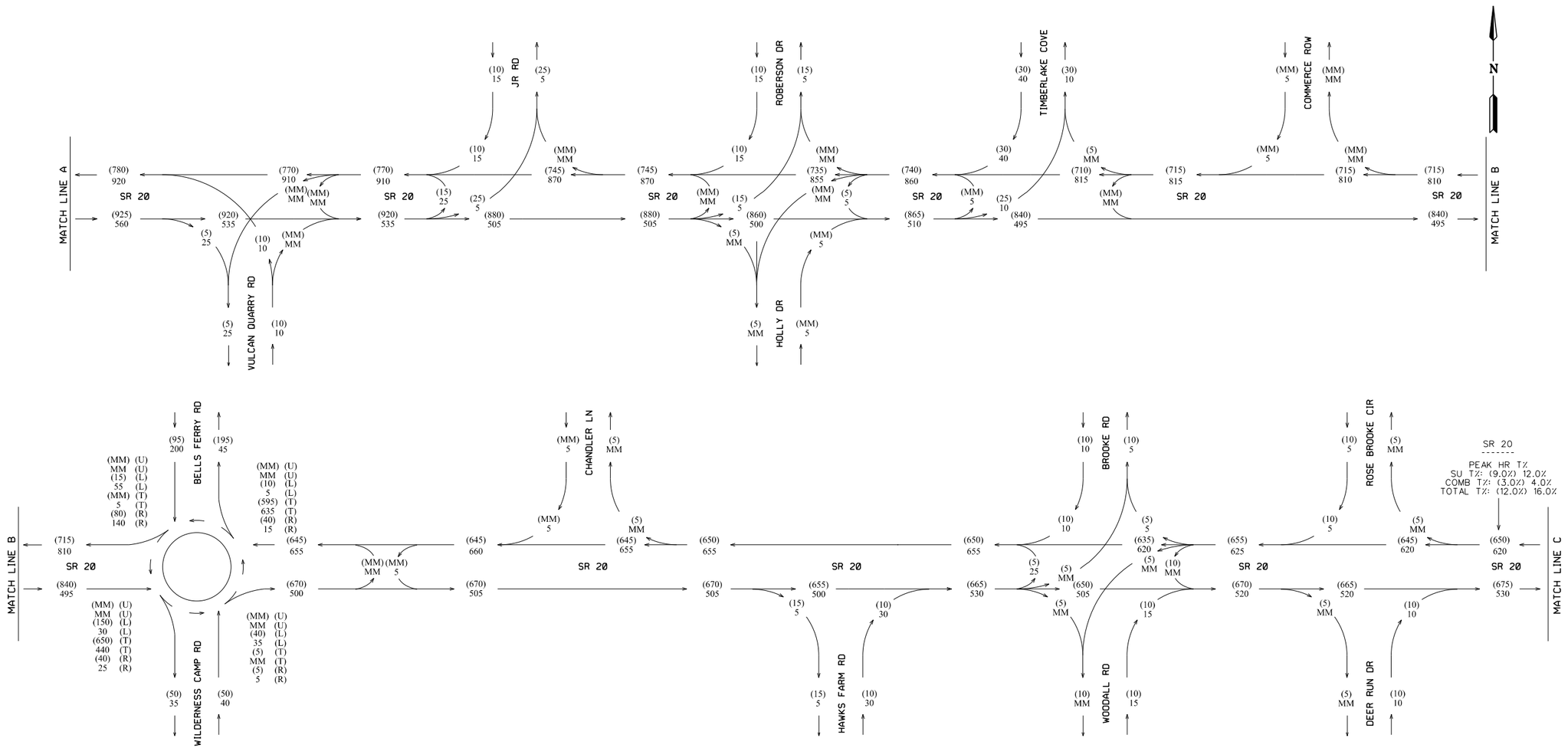
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR (+2) BUILD DHV
SHEET 1 OF 6

DRAWING No. 10-0067

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	68	84

DHV VOLUMES
SR 20 OPEN YEAR (+2)
2028
BUILD
PM DHV = (XXX)
AM DHV = XXX



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STATE OF GEORGIA
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OFFICE OF PLANNING

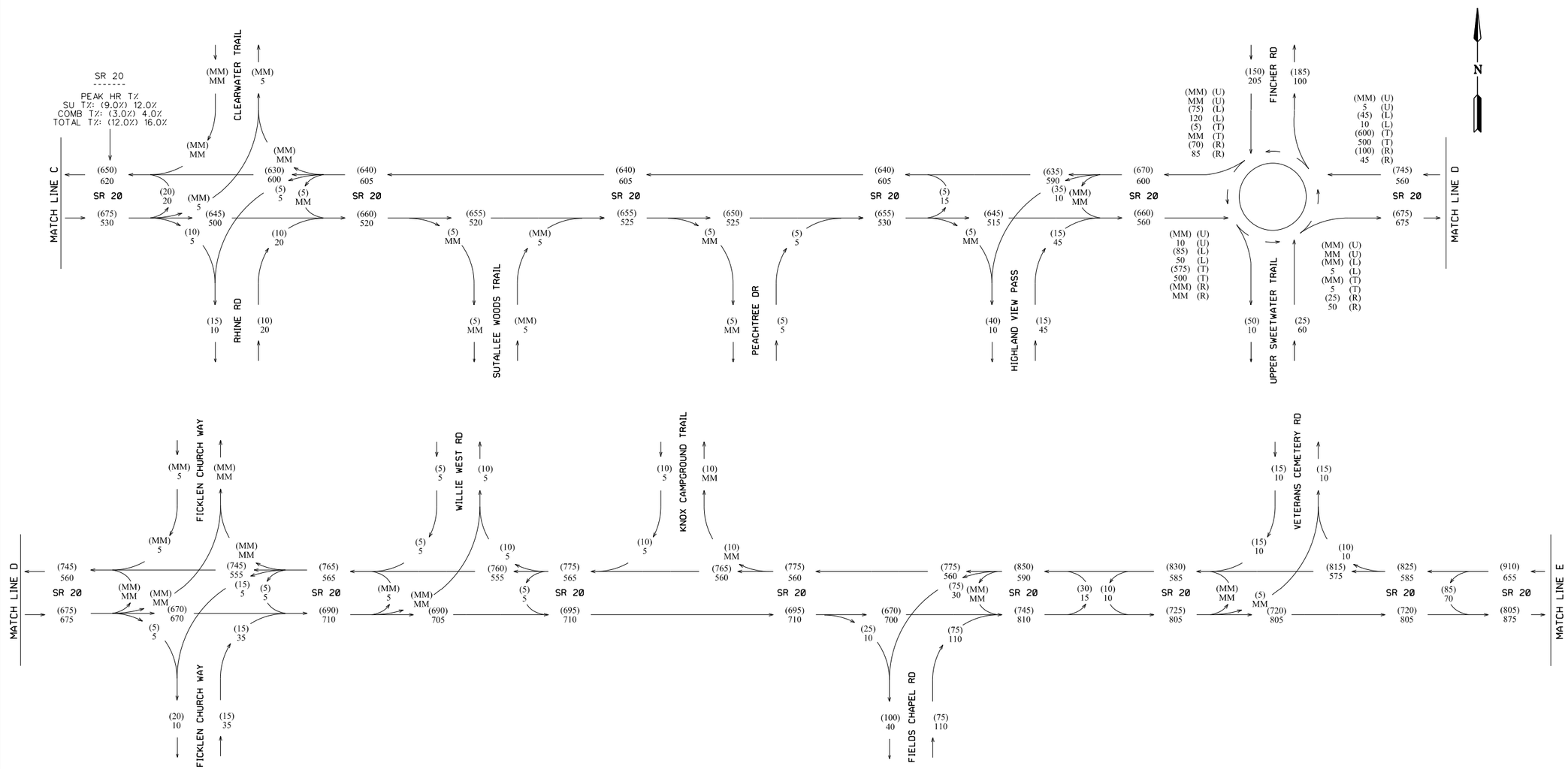
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

OPEN YEAR (+2) BUILD DHV
SHEET 2 OF 6

DRAWING No.
10-0068

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	69	84

DHV VOLUMES
SR 20 OPEN YEAR (+2)
2028
BUILD
PM DHV = (XXX)
AM DHV = XXX



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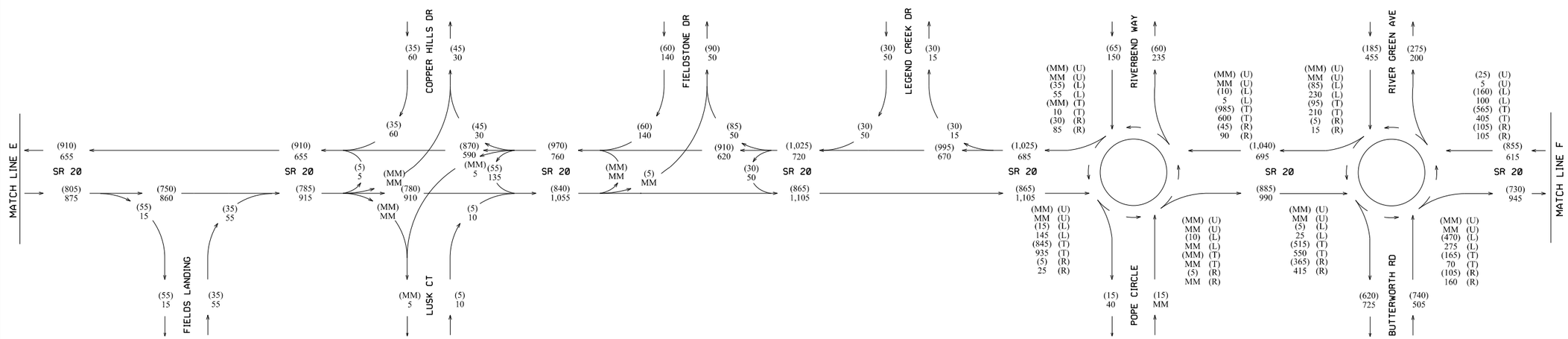
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR (+2) BUILD DHV
SHEET 3 OF 6

DRAWING No. 10-0069

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	70	84

DHV VOLUMES
SR 20 OPEN YEAR (+2)
2028
BUILD
PM DHV = (XXX)
AM DHV = XXX



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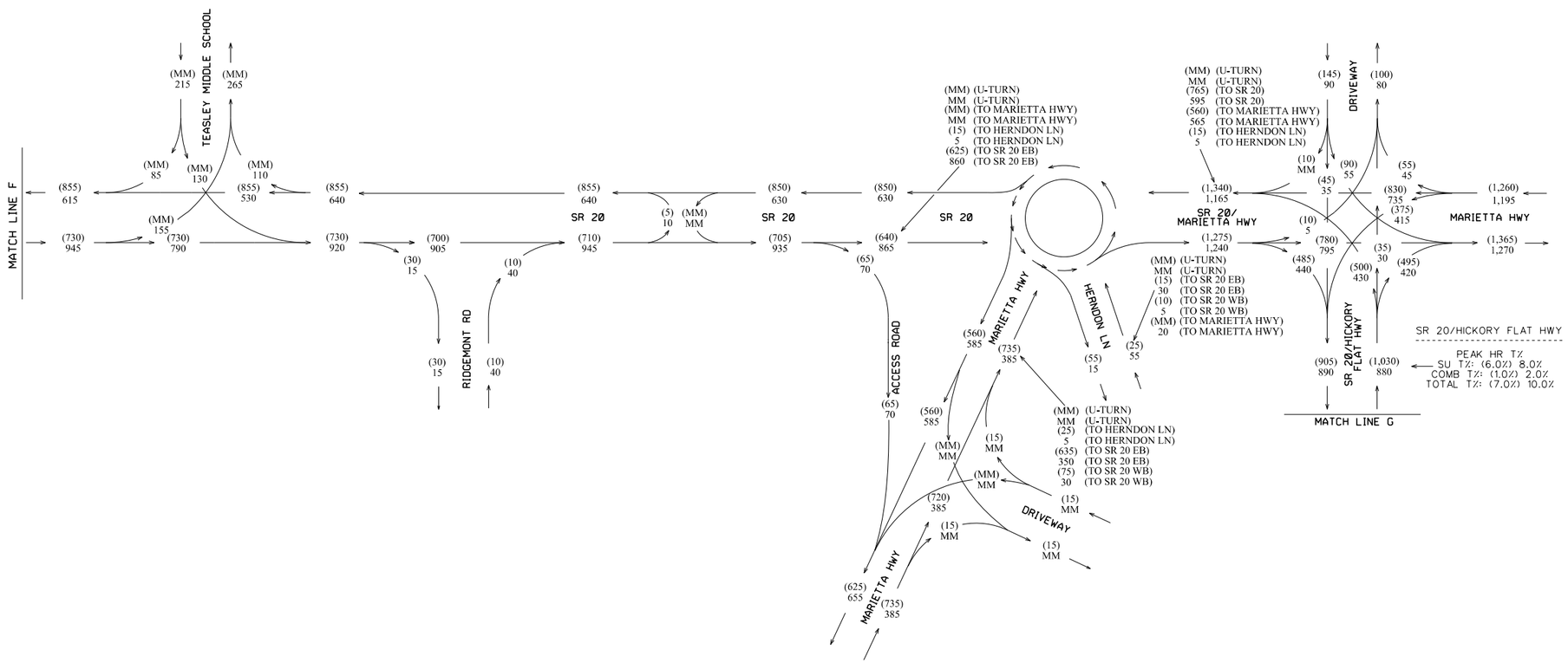
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR (+2) BUILD DHV
SHEET 4 OF 6

DRAWING No. 10-0070

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	71	84

DHV VOLUMES
SR 20 OPEN YEAR +2
2028
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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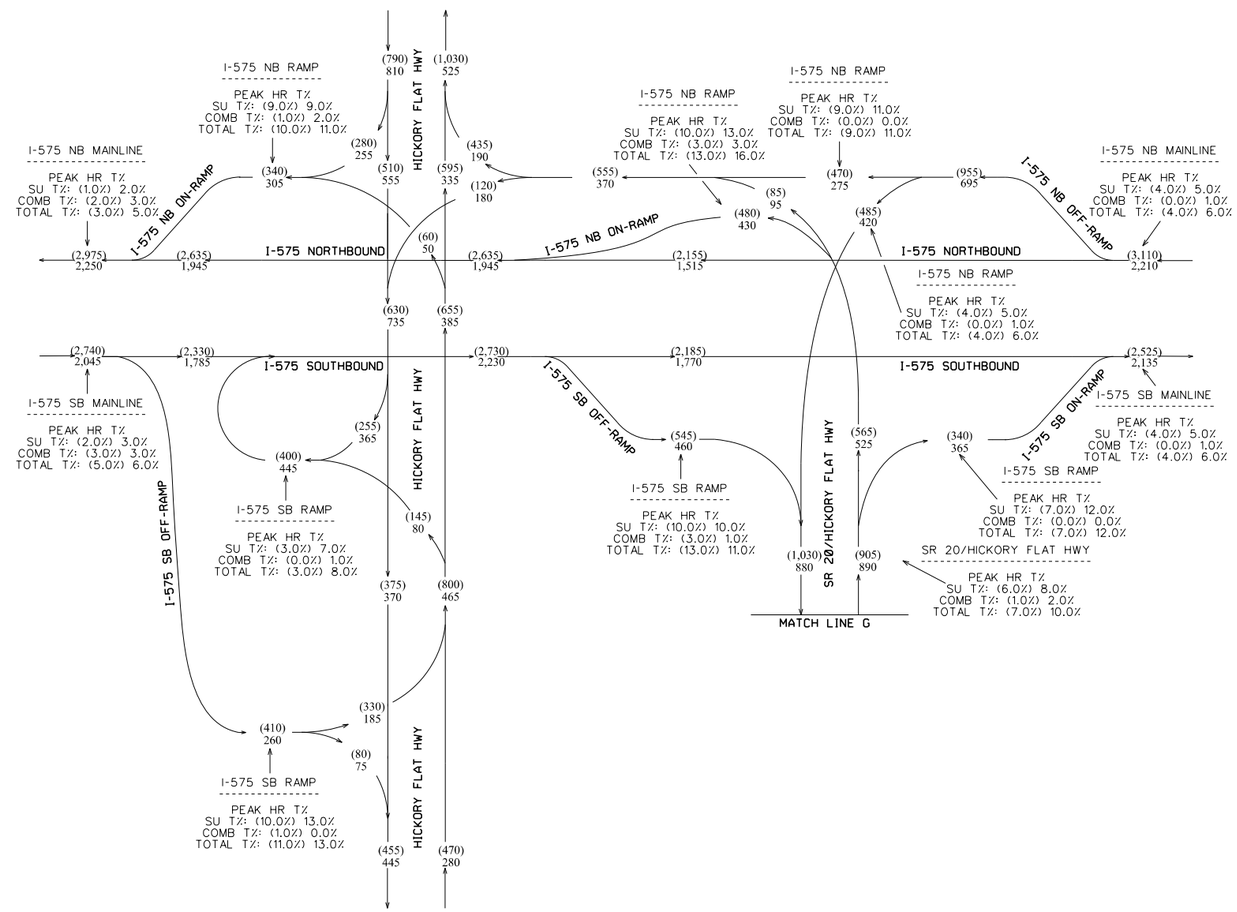
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR +2 BUILD DHV
SHEET 5 OF 6

DRAWING No.
10-0071

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	72	84

DHV VOLUMES
SR 20 OPEN YEAR (+2)
2028
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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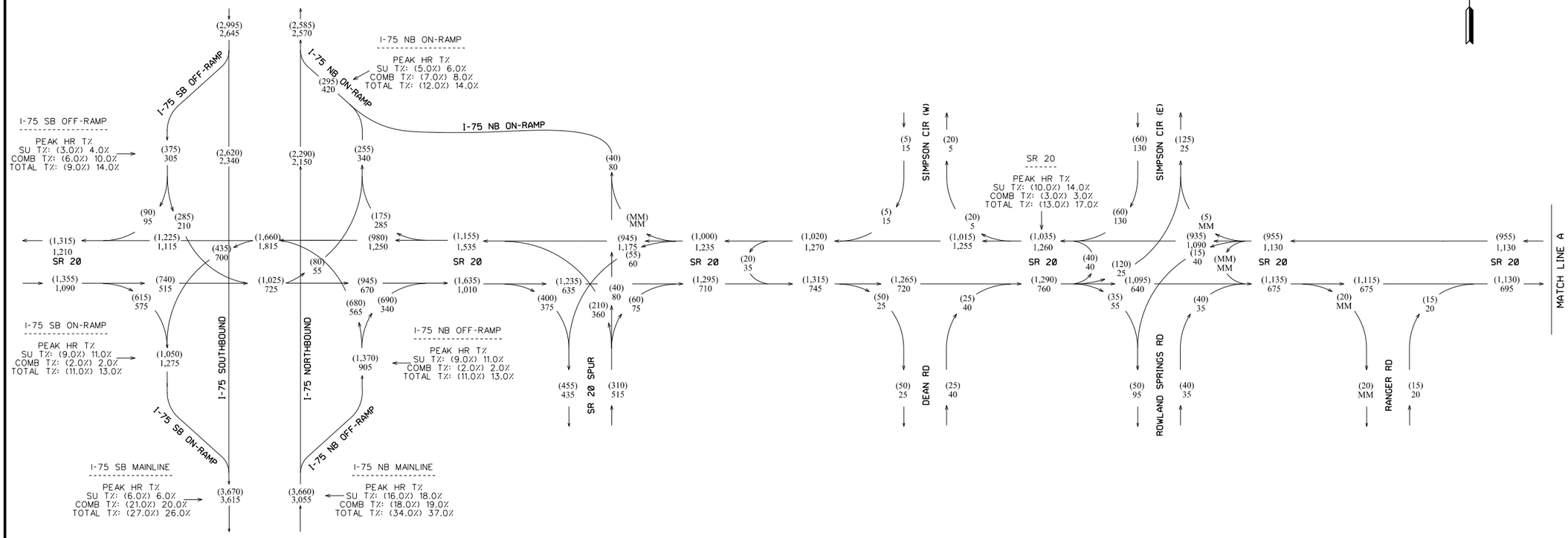
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN YEAR (+2) BUILD DHV
SHEET 6 OF 6

DRAWING No. 10-0072

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	73	84

DHV VOLUMES
SR 20 DESIGN YEAR
(+2)
2048
BUILD
PM DHV = (XXX)
AM DHV = XXX



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TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

DESIGN YEAR (+2) BUILD DHV
SHEET 1 OF 6

DRAWING No. 10-0073

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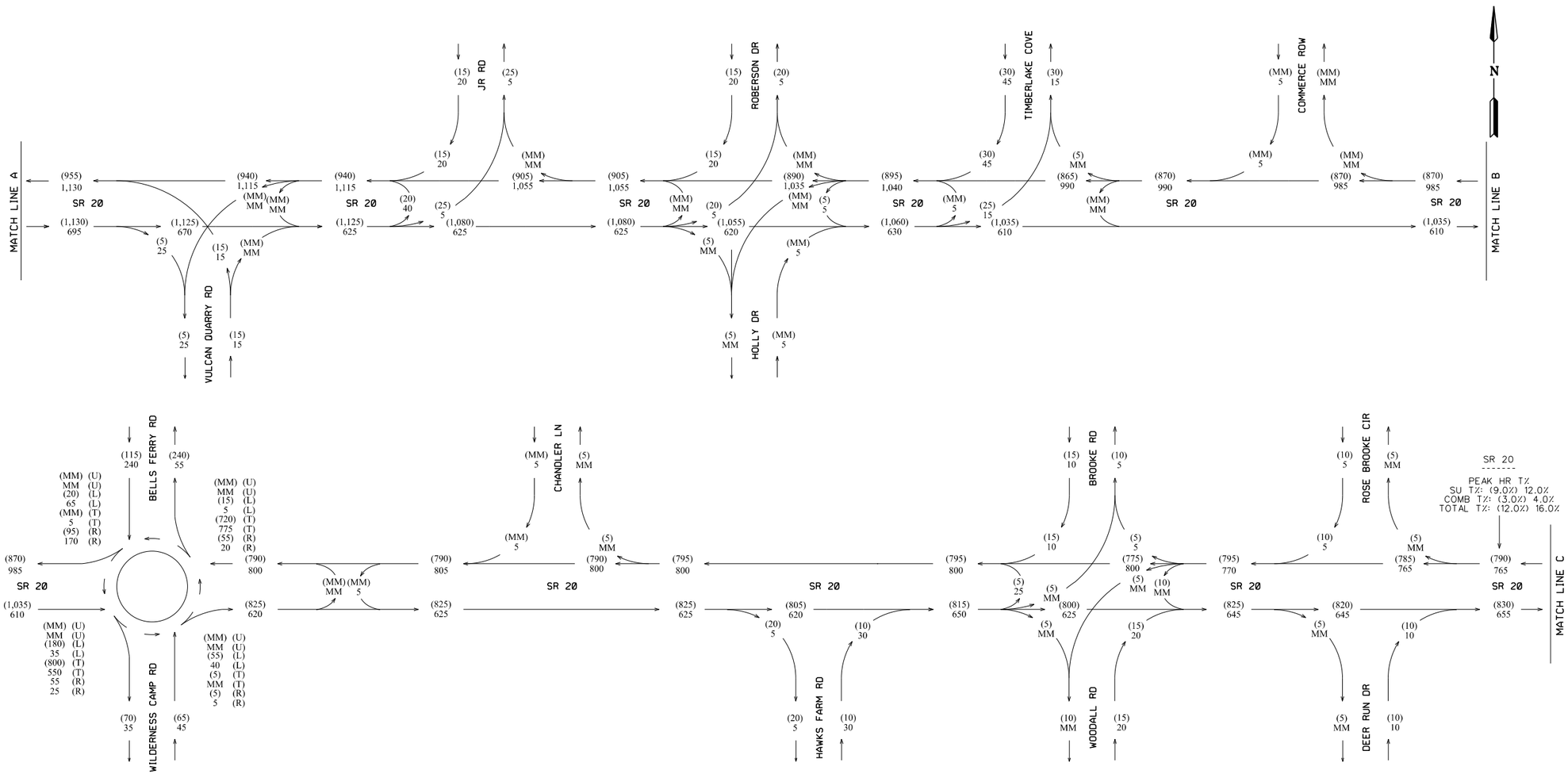
COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	74	84

DHV VOLUMES
SR 20 DESIGN YEAR
(+2)
2048
BUILD
PM DHV = (XXX)
AM DHV = XXX



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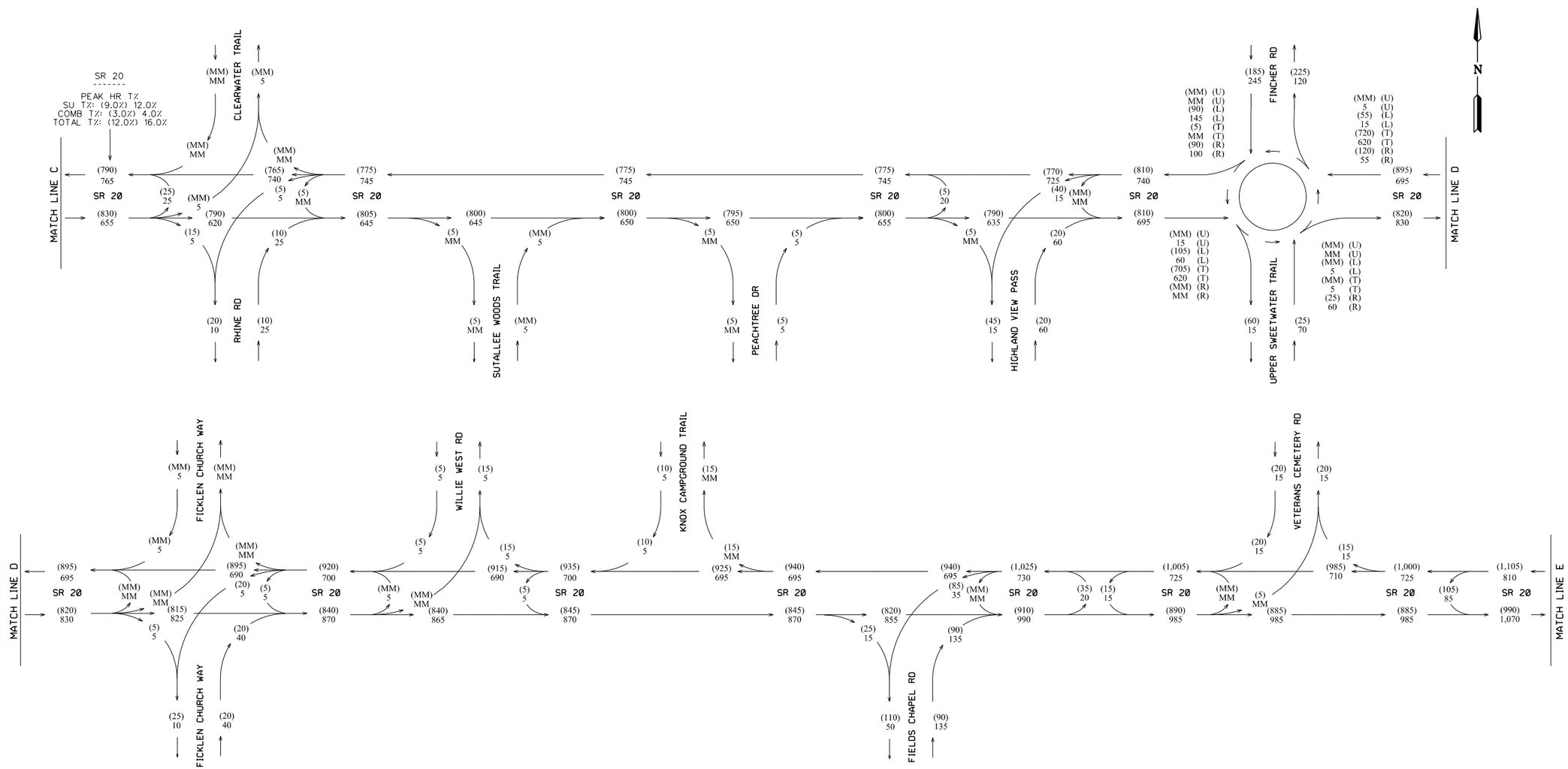
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

DESIGN YEAR (+2) BUILD DHV
SHEET 2 OF 6

DRAWING No.
10-0074

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	75	84

DHV VOLUMES
SR 20 DESIGN YEAR
(+2)
2048
BUILD
PM DHV = (XXX)
AM DHV = XXX



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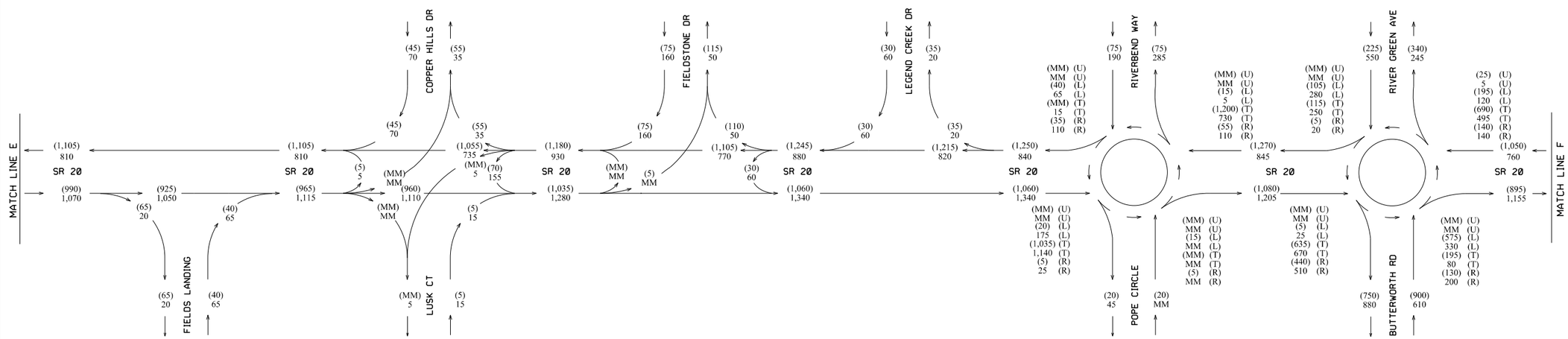
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
DESIGN YEAR (+2) BUILD DHV
SHEET 3 OF 6

DRAWING No. 10-0075

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	76	84

DHV VOLUMES
SR 20 DESIGN YEAR
(+2)
2048
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

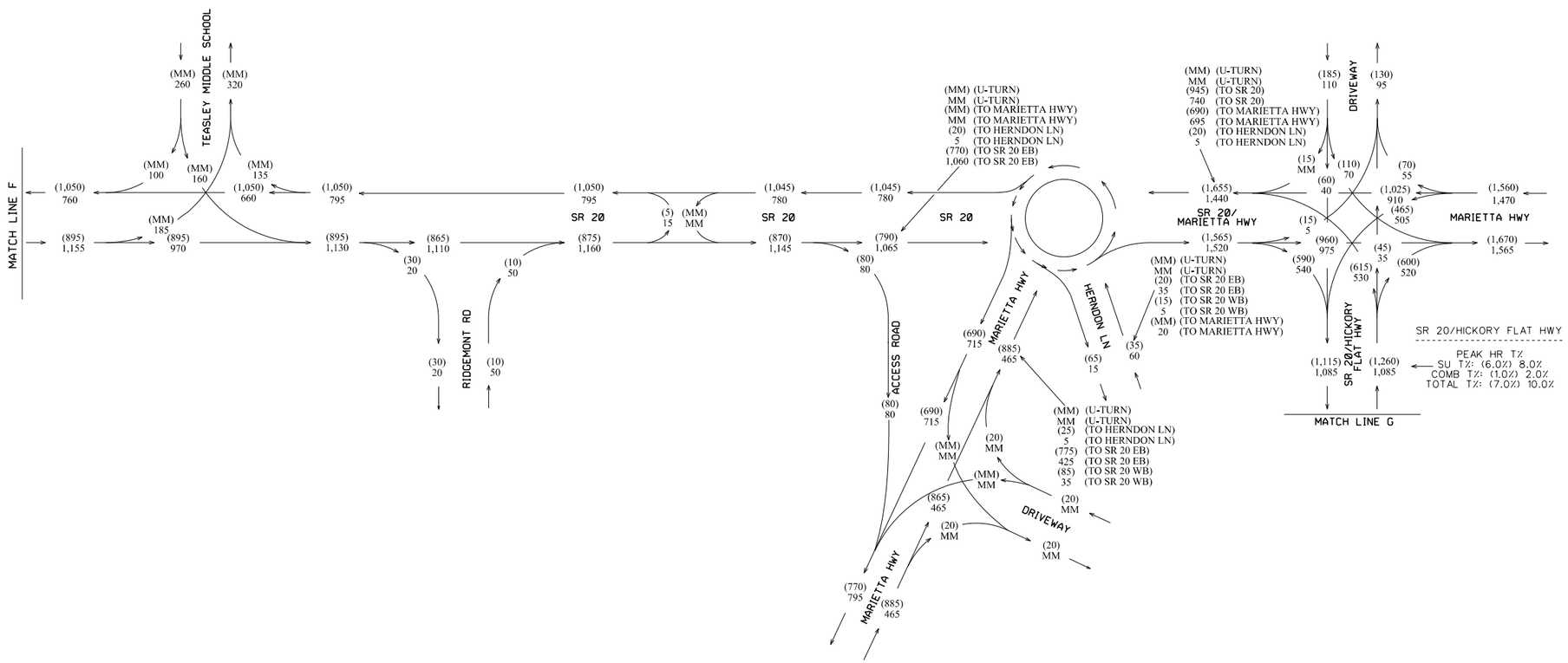
DESIGN YEAR (+2) BUILD DHV
SHEET 4 OF 6

DRAWING No. 10-0076

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	77	84

DHV VOLUMES
SR 20 DESIGN YEAR +2
2048
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

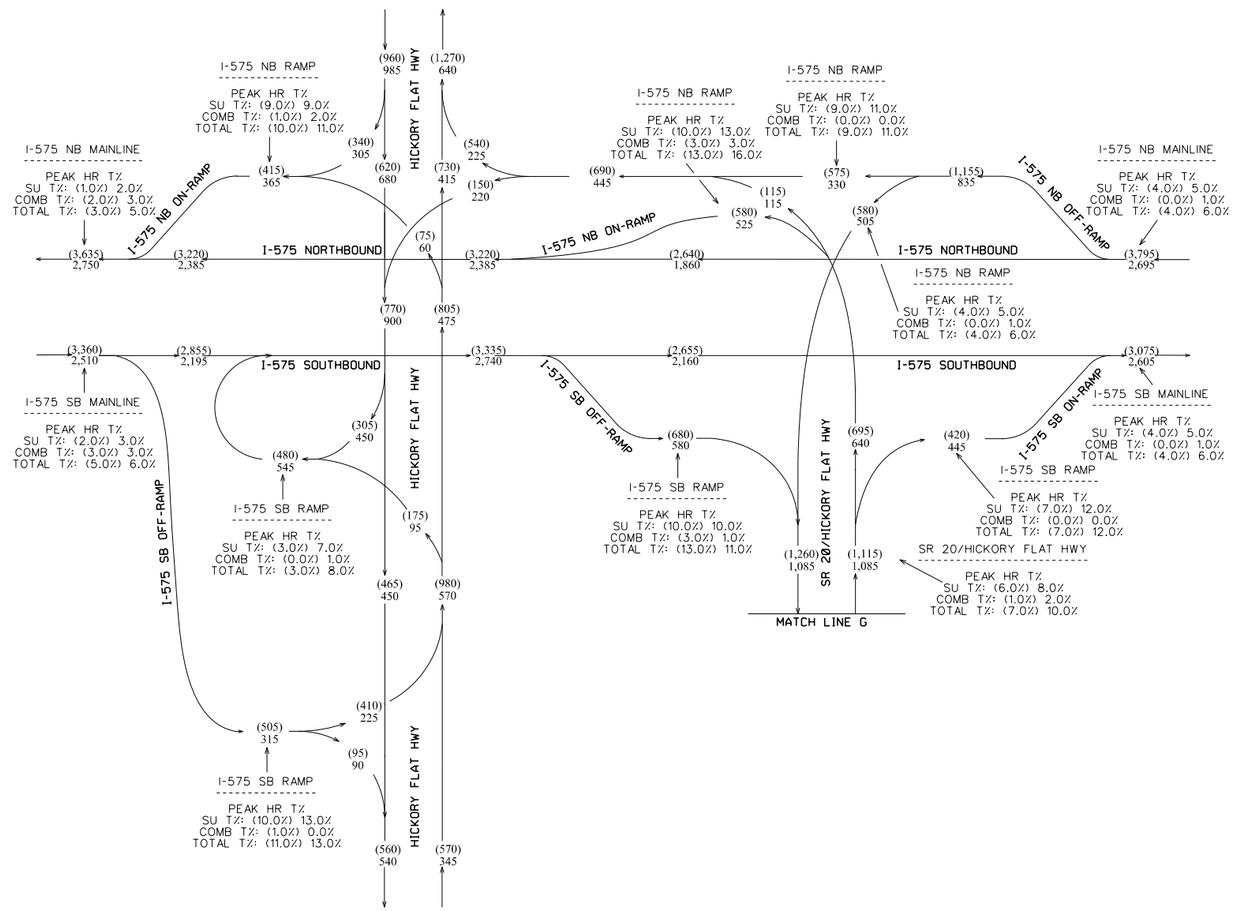
DESIGN YEAR +2 BUILD DHV
SHEET 5 OF 6

DRAWING No. 10-0077

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	78	84

DHV VOLUMES
SR 20 DESIGN YEAR
(+2)
2048
BUILD
PM DHV = (XXX)
AM DHV = XXX

N



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SR 20 FR I-75/BARTOW TO I-575/CHEROKEE

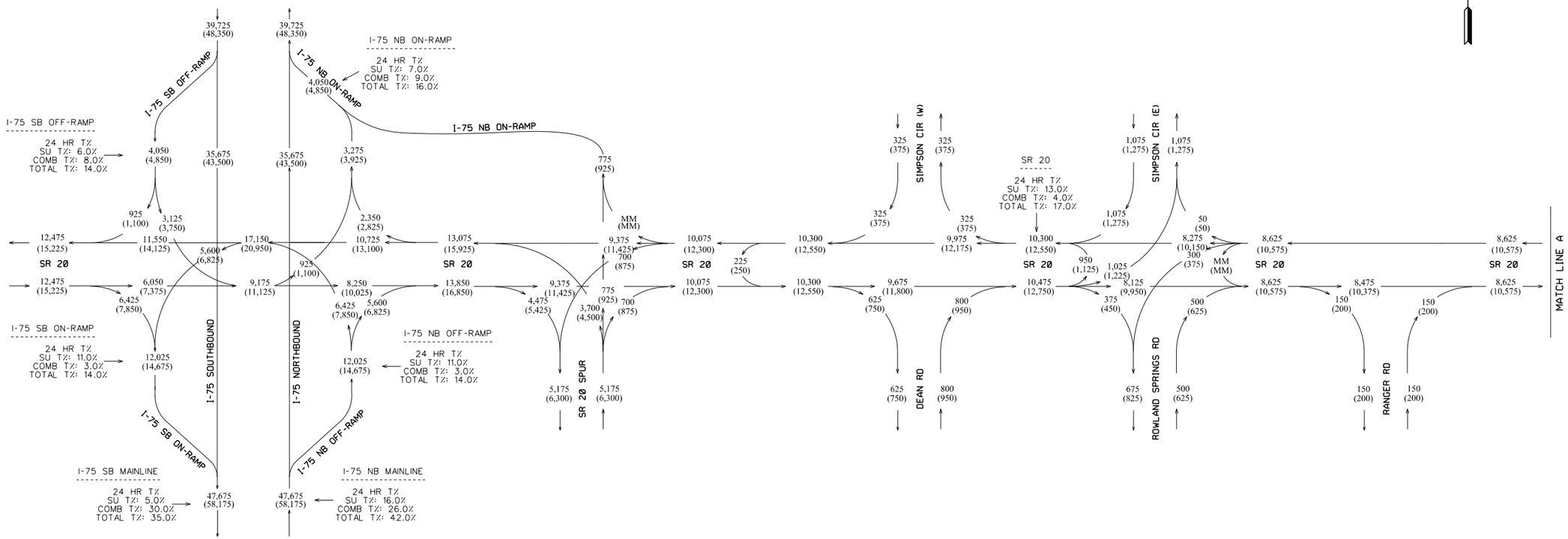
DESIGN YEAR (+2) BUILD DHV
SHEET 6 OF 6

DRAWING No. 10-0078

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	79	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS (+2)
2028 & 2048
BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



KCP 5/2019

REVISION DATES		

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

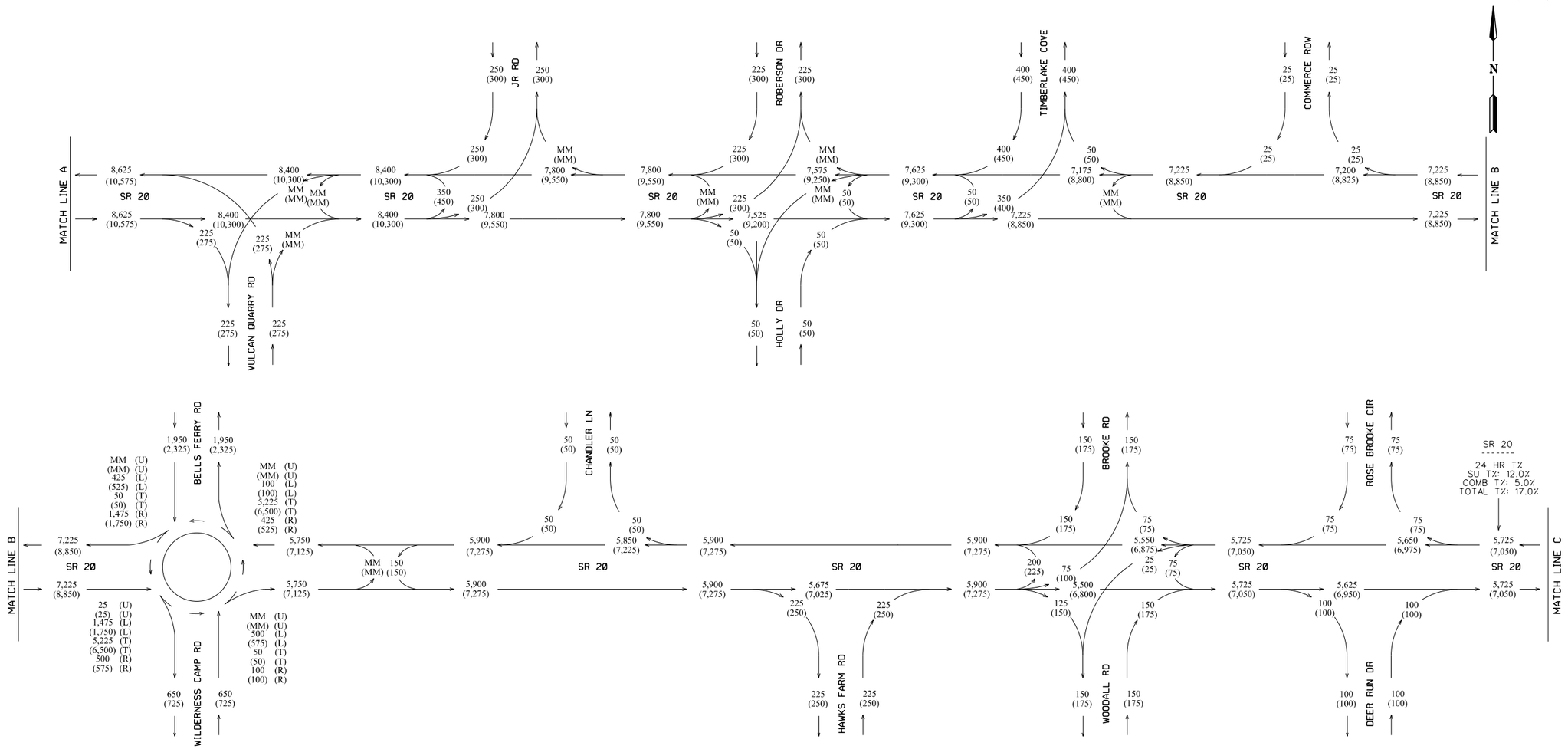
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) BUILD AADT
SHEET 1 OF 6

DRAWING No. 10-0079

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	80	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS (+2)
2028 & 2048
BUILD
2028 AADT = XXX
2048 AADT = (XXX)



KCP 5/2019

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

REVISION DATES		

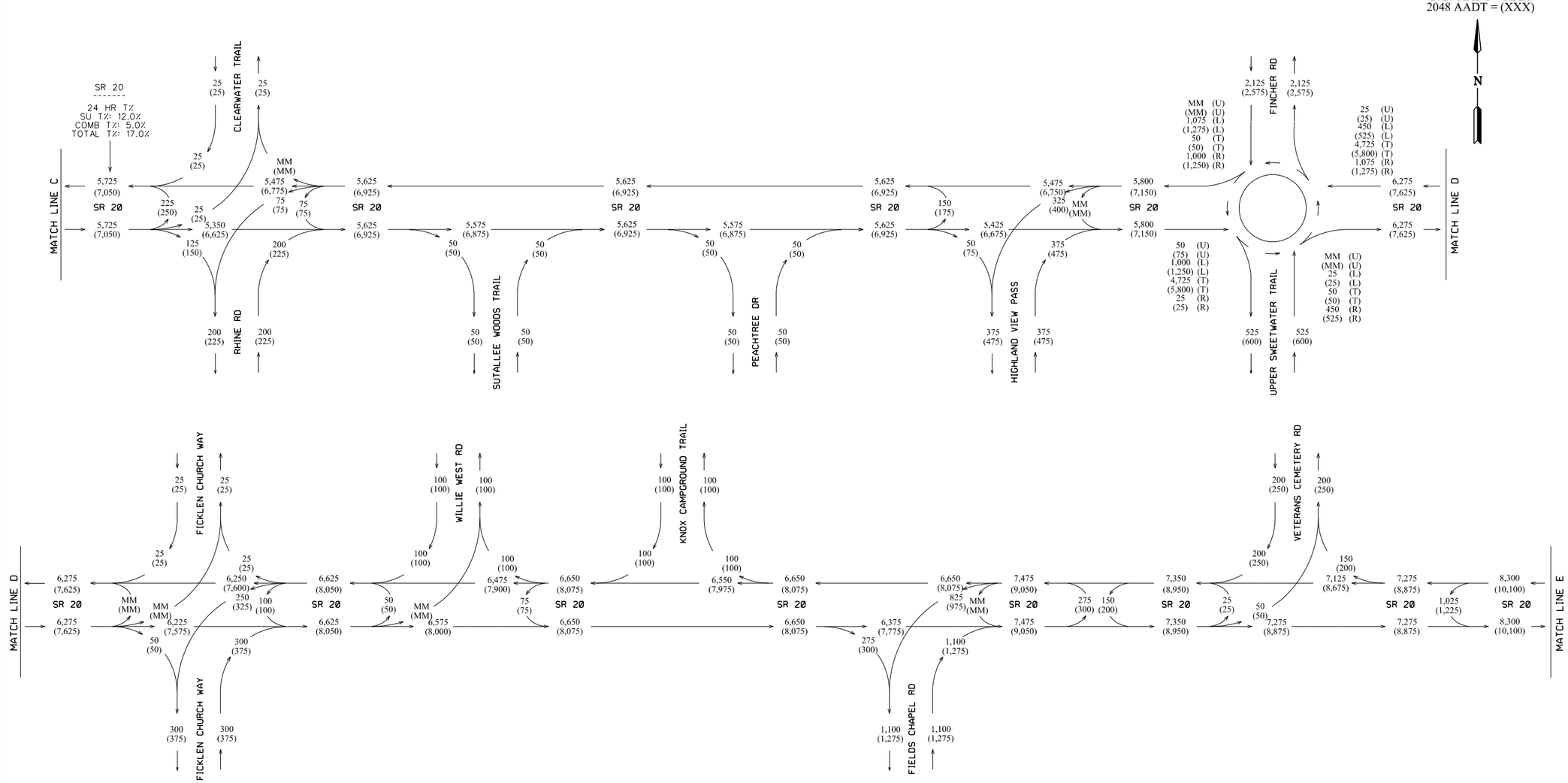
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) BUILD AADT
SHEET 2 OF 6

DRAWING No.
10-0080

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	81	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS (+2)
2028 & 2048
BUILD
2028 AADT = XXX
2048 AADT = (XXX)



KCP 1/2020

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

REVISION DATES		

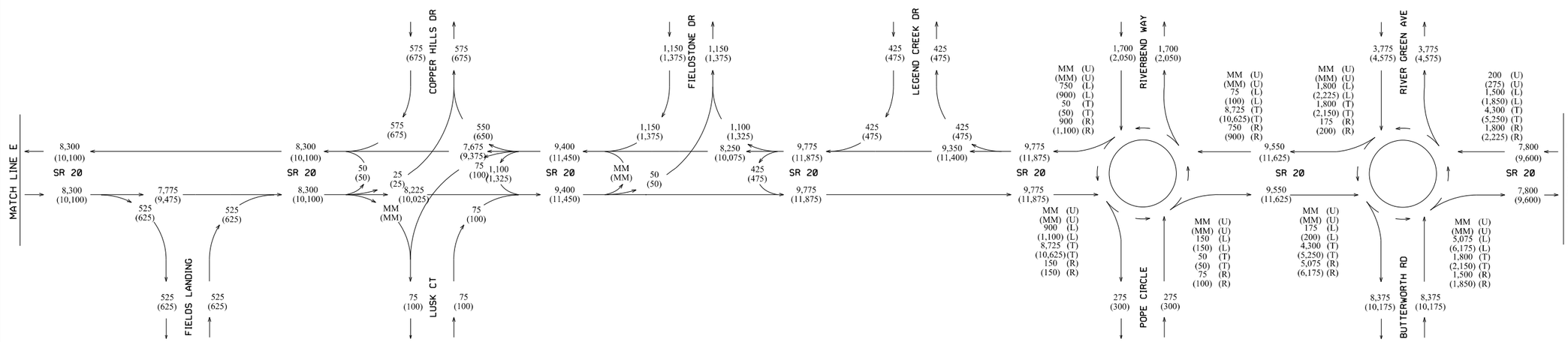
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) BUILD AADT
SHEET 3 OF 6

DRAWING No. 10-0081

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	82	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS (+2)
2028 & 2048
BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



KCP 5/2019

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

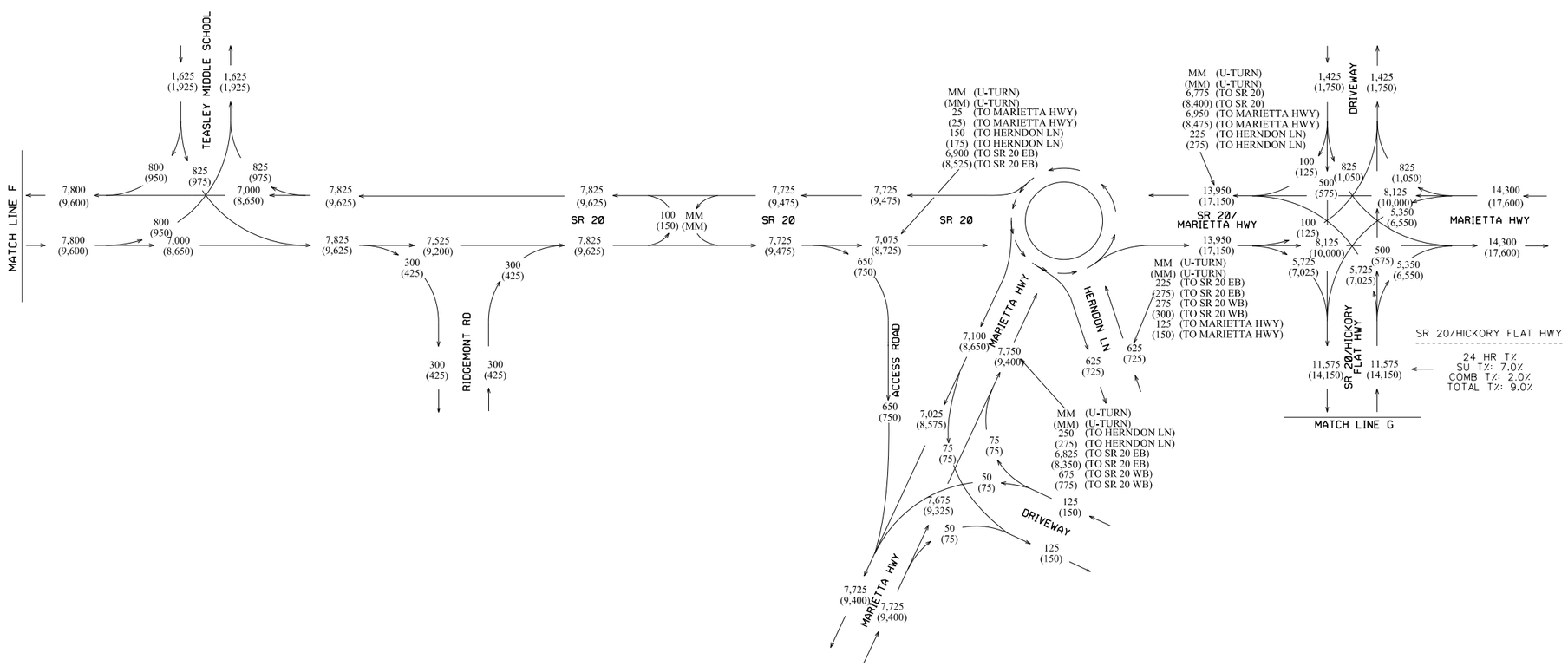
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) BUILD AADT
SHEET 4 OF 6

DRAWING No. 10-0082

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	83	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS (+2)
2028 & 2048
BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



KCP 5/2019

REVISION DATES		

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

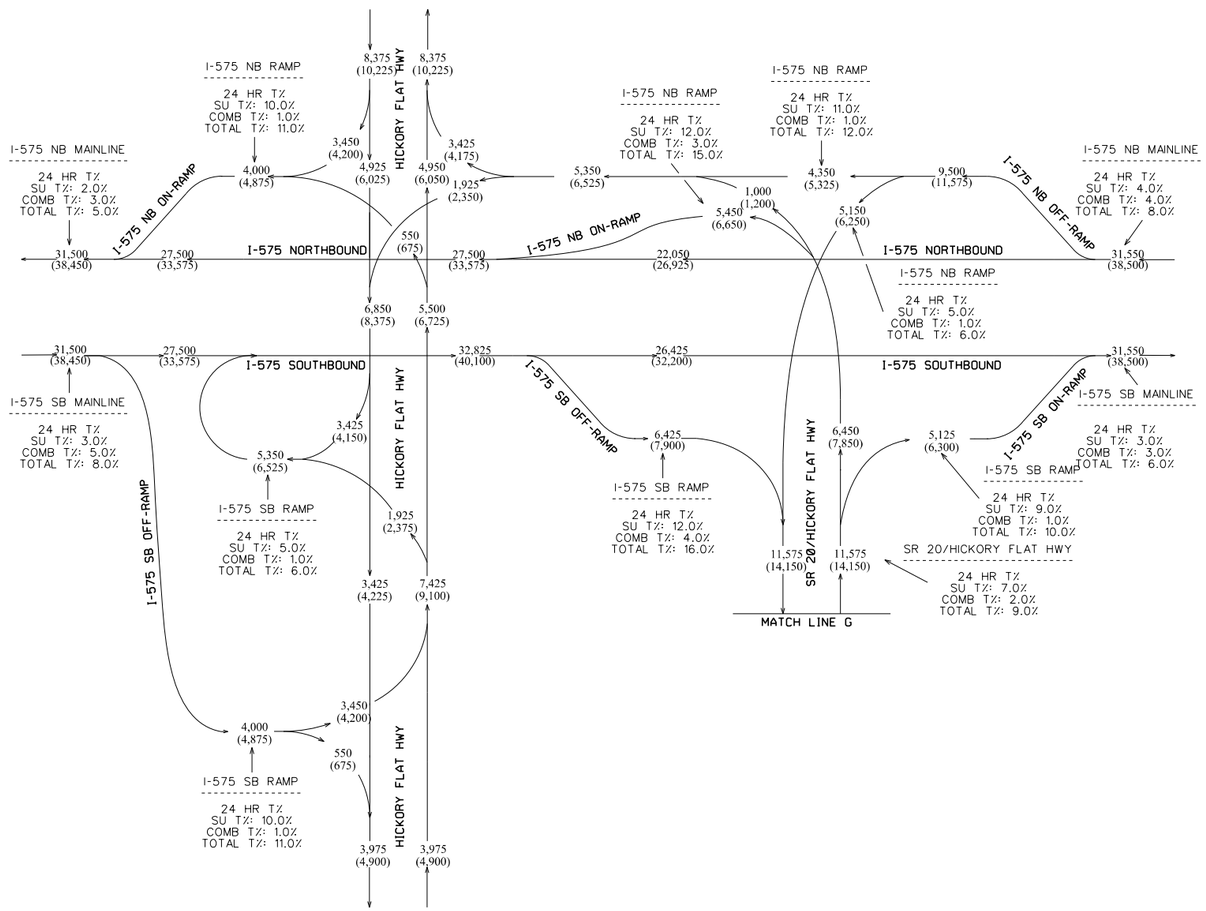
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) BUILD AADT
SHEET 5 OF 6

DRAWING No. 10-0083

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	84	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS (+2)
2028 & 2048
BUILD
2028 AADT = XXX
2048 AADT = (XXX)

N



KCP 5/2019

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS (+2) BUILD AADT
SHEET 6 OF 6

DRAWING No.
10-0084

Capacity Analysis Summary

Intersection	Existing/ No-Build Control Type	Build Control Type	Intersection Delay (sec/veh)									
			Existing Year (2014) AM Peak	Existing Year (2014) PM Peak	Open Year (2026)				Design Year (2046)			
					AM Peak		PM Peak		AM Peak		PM Peak	
					No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
SR 20 at I-75 Southbound	Traffic Signal	Traffic Signal	17.5	12.8	17.4	18.2	17.5	21.9	19.9	21.2	20.4	29.3
SR 20 at I-75 Northbound	Traffic Signal	Traffic Signal	15.7	19.2	16.2	15.1	21.3	16.4	17.5	17.6	31.3	32.7
SR 20 at SR 294	Traffic Signal	Traffic Signal	16.0	10.7	18.0	19.0	11.4	23.2	20.9	21.3	12.6	38.8
SR 20 at Dean Road/Simpson Circle	Conventional (Minor Stop)	RIRO	0.7	0.8	0.9	3.4	0.9	1.4	1.6	3.3	2.8	1.5
SR 20 at Rowland Springs Road/Simpson Circle	Conventional (Minor Stop)	RCUT (Unsignalized)	2.6	2.8	3.4	9.4	3.7	4.8	13.2	9.9	34.6	5.0
SR 20 at Ranger Road	Conventional (Minor Stop)	RIRO	0.6	0.6	0.8	0.5	0.7	0.3	1.9	0.6	2.6	0.4
SR 20 at Vulcan Quarry Road	Conventional (Minor Stop)	High-T (Unsignalized)	0.3	0.8	0.4	0.3	1.1	0.6	0.9	0.5	4.4	1.2
SR 20 at JR Road	Conventional (Minor Stop)	RCUT (Unsignalized)	0.3	0.4	0.3	0.2	0.4	0.2	0.5	0.2	0.5	0.2
SR 20 at Roberson Drive/Holly Drive	Conventional (Minor Stop)	RCUT (Unsignalized)	0.7	0.2	0.7	0.8	0.2	0.2	1.0	0.7	0.3	0.2
SR 20 at Timberlake Cove	Conventional (Minor Stop)	RCUT (Unsignalized)	0.6	0.6	0.7	1.0	0.6	0.8	0.8	0.9	0.7	0.7
SR 20 at Commerce Row	Conventional (Minor Stop)	RIRO	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
SR 20 at Wilderness Camp Road/Bells Ferry Road	Conventional (Minor Stop)	Multilane Roundabout	4.7	8.5	7.8	5.4	8.3	6.3	30.3	6.1	38.4	7.6
SR 20 at Chandler Road	Conventional (Minor Stop)	RIRO	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
SR 20 at Hawks Farm Road	Conventional (Minor Stop)	RIRO	0.9	0.3	1.2	0.8	0.3	0.2	1.5	0.7	0.3	0.1
SR 20 at Woodall Road/Brooke Road	Conventional (Minor Stop)	RCUT (Unsignalized)	0.8	0.8	0.8	2.3	0.9	1.1	1.4	2.3	2.2	1.3
SR 20 at Deer Run Drive/Rose Brooke Circle	Conventional (Minor Stop)	RIRO	0.4	0.7	0.4	0.4	0.8	0.6	0.5	0.3	1.0	0.5
SR 20 at Clearwater Trail/Rhine Road	Conventional (Minor Stop)	RCUT (Unsignalized)	0.6	0.3	0.7	2.1	0.3	0.6	1.2	2.2	0.4	0.5
SR 20 at Sutallee Woods Trail	Conventional (Minor Stop)	RIRO	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
SR 20 at Peachtree Drive	Conventional (Minor Stop)	RIRO	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0
SR 20 at Highland View Pass	Conventional (Minor Stop)	RCUT (Unsignalized)	0.7	0.4	0.8	1.8	0.4	0.4	1.1	2.1	0.5	0.4
SR 20 at Upper Sweetwater Trail/Fincher Road	Conventional (Minor Stop)	Multilane Roundabout	7.1	7.0	30.3	6.0	48.0	6.3	35.6	7.0	103.5	7.5
SR 20 at Ficklen Church Way	Conventional (Minor Stop)	RCUT (Unsignalized)	1.0	0.4	1.1	0.9	0.4	0.2	1.4	0.8	0.5	0.3
SR 20 at Willie West Road	Conventional (Minor Stop)	RCUT (Unsignalized)	0.2	0.1	0.2	0.3	0.1	0.2	0.3	0.2	0.1	0.2
SR 20 at Knox Campground Trail	Conventional (Minor Stop)	RIRO	0.2	0.5	0.2	0.3	0.5	0.3	0.3	0.2	0.6	0.2
SR 20 at Fields Chapel Road	Conventional (Minor Stop)	RCUT (Unsignalized)	2.1	2.2	2.5	3.3	3.5	4.6	5.5	3.7	11.6	4.8
SR 20 at Veterans Cemetery Road	Conventional (Minor Stop)	RCUT (Unsignalized)	0.4	0.5	0.5	0.9	0.5	0.9	1.2	1.1	1.1	1.1
SR 20 at Fields Landing Drive	Conventional (Minor Stop)	RIRO	0.8	0.6	0.9	0.5	0.7	0.3	1.1	0.6	0.8	0.5
SR 20 at Lusk Ct/Copper Hills Drive	Conventional (Minor Stop)	RCUT (Unsignalized)	1.6	0.9	2.1	3.8	1.2	2.1	5.9	3.9	2.4	2.3
SR 20 at Fieldstone Drive	Conventional (Minor Stop)	RCUT (Unsignalized)	28.7	2.7	66.0	9.0	4.9	3.4	175.9	11.2	22.1	3.7
SR 20 at Legend Creek Drive	Conventional (Minor Stop)	RIRO	3.9	1.0	9.2	1.4	1.9	0.7	33.7	1.8	4.5	0.7
SR 20 at Riverbend Way/Pope Circle	Conventional (Minor Stop)	Multilane Roundabout	46.6	3.3	87.3	8.8	7.5	7.0	289.7	12.2	24.4	8.5
SR 20 at River Green Avenue/Butterworth Road	Traffic Signal	Multilane Roundabout	33.8	34.1	38.6	8.6	39.4	8.2	61.4	12.7	61.3	12.2
SR 20 at Teasley Middle School	Traffic Signal	Traffic Signal	7.4	1.3	8.4	7.4	1.5	0.2	11.5	8.0	2.3	0.3
SR 20 at Ridgemont Road	Conventional (Minor Stop)	RIRO	0.5	0.3	0.6	0.9	0.3	0.3	0.7	1.0	0.3	0.3
SR 20 at Access Road	Conventional (Minor Stop)	Multilane Roundabout	0.4	1.1	0.5	10.4	1.3	9.6	0.6	13.6	1.9	12.5
SR 20 at Herndon Lane/Marietta Highway	Traffic Signal		46.2	33.7	69.8		38.9		143.7		69.5	
SR 20 at Hickory Flat Highway	Traffic Signal	Traffic Signal	63.9	70.6	82.8	51.7	86.8	63.2	135.2	61.0	144.3	81.9

TE Study-Signal Warrant Analysis

Intersection	Signal Warrant Analysis								
	Warrant 1	Warrant 2	Warrant 3	Warrant 4	Warrant 5	Warrant 6	Warrant 7	Warrant 8	Warrant 9
Simpson Circle/Dean Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Rowland Springs Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Vulcan Quarry Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
JR Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Roberson Drive	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Timberlake Cove	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Bells Ferry Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Woodall Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Rhine Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Sutallee Woods Trail	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Highland View Pass	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Fincher Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Ficklen Church Way	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Willie West Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Fields Chapel Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Veterans Cemetary Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Copper Hills Drive	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Fieldstone Drive	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Riverbend Way	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
River Green Avenue	Not Satisfied	Not Satisfied	Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Teasley Middle School	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
Ridgemont Road	Not Satisfied	Not Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
SR 20/Marietta Hwy @ Herndon Lane	Not Satisfied	Not Satisfied	Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated
SR 140/Hickory Flat Highway	Not Satisfied	Satisfied	Not Satisfied	Not Evaluated	Not Evaluated	Not Evaluated	Not Satisfied	Not Evaluated	Not Evaluated

ICE Reports

GDOT

GDOT ICE Tool: Summary Report for Multiple Locations

ICE Version 2.14 | Revised 08/22/2018

Stage 1 Decision Document PI# 0007836

Study Intersection	Existing Intersection Type	PI#	Waiver Request Type	UNSIGNALIZED														SIGNALIZED										
				Conventional (Minor Stop)	Conventional (All-Way Stop)	Mini Roundabout	Single Lane Roundabout	Multilane Roundabout	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	Offset-T Intersections	Diamond Interch (Stop Control)	Diamond Interch (RAB Control)	Add Turn Ln/Median (Unsig)	Other Unsignalized (provide description):	Traffic Signal	Median U-Turn (Indirect Left)	RCUT (signalized)	Displaced Left Turn (CFI)	Continuous Green-T	Jughandle	Quadrant Roadway	Diamond Interch (Signal Control)	Diverging Diamond	Single Point Interchange	Add Turn Ln/Median (Signal)	Other Signalized (provide description):
RIRO 1 - SR 20 at Ranger Road	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
RIRO 2 - SR 20 at Commerce Row	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
RIRO 3 - SR 20 at Chandler Lane	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
RIRO 4 - SR 20 at Hawks Farm Road	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
RIRO 5 - SR 20 at Deer Run Dr	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
RIRO 6 - SR 20 at Peachtree Dr	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
RIRO 7 - SR 20 at Knox Campground Trail	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
RIRO 8 - SR 20 at Fields Landing	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
RIRO 9 - SR 20 at Legend Creek Drive	Conventional (Minor Stop)	0007836	RIRO w/downstream U-turn																									
ICE 1 - SR 20 at Dean Road/Simpson Circle	Conventional (Minor Stop)	0007836		x					x	x																		
ICE 2 - SR 20 at Rowland Springs Road/Simpson Circle (E)	Conventional (Minor Stop)	0007836		x					x	x																		
ICE 3 - SR 20 at Vulcan Quarry Road	Conventional (Minor Stop)	0007836		x							x																	
ICE 4 - SR 20 at JR Road	Conventional (Minor Stop)	0007836		x					x	x																		
ICE 5 - SR 20 at Holly Dr/Roberson Dr	Conventional (Minor Stop)	0007836		x					x	x																		
ICE 6 - SR 20 at Timberlake Cove	Conventional (Minor Stop)	0007836		x					x	x	x																	
ICE 7 - SR 20 at Wilderness Camp Rd/Bells Ferry Rd	Conventional (Minor Stop)	0007836		x				x	x	x																		
ICE 8 - SR 20 at Woodall Rd/Brooke Rd	Conventional (Minor Stop)	0007836		x					x	x																		
ICE 9 - SR 20 at Rhine Rd/Clearwater Trail	Conventional (Minor Stop)	0007836		x					x	x																		
ICE 10 - SR 20 at Sutallee Woods Trail	Conventional (Minor Stop)	0007836		x					x	x	x																	
ICE 11 - SR 20 at Highland View Pass	Conventional (Minor Stop)	0007836		x					x	x	x																	
ICE 12 - SR 20 at Upper Sweetwater Trail/Fincher Rd	Signal (turn lanes on mainline)	0007836						x									x											
ICE 13 - SR 20 at Ficklen Church Way	Conventional (Minor Stop)	0007836		x					x	x																		
ICE 14 - SR 20 at Willie West Rd	Conventional (Minor Stop)	0007836		x					x	x	x																	
ICE 15 - SR 20 at Fields Chapel Rd	Conventional (Minor Stop)	0007836		x					x	x	x																	
ICE 16 - SR 20 at Veterans Cemetery Rd	Conventional (Minor Stop)	0007836		x					x	x	x																	
ICE 17 - SR 20 at Lusk Court/Copper Hills Dr	Conventional (Minor Stop)	0007836		x					x	x																		
ICE 18 - SR 20 at Fieldstone Dr	Conventional (Minor Stop)	0007836		x					x	x	x																	
ICE 19 - SR 20 at Pope Circle/Riverbend Way	Conventional (Minor Stop)	0007836		x				x	x																			
ICE 20 - SR 20 at Butterworth Rd/River Green Ave	Signal (turn lanes on mainline)	0007836						x									x											
ICE 21 - SR 20 at Teasley Middle School	Signal (turn lanes on mainline)	0007836															x				x							
ICE 22 - SR 20 at Ridgemont Road	Conventional (Minor Stop)	0007836		x					x	x	x																	
ICE 23 - SR 20 at Access Rd	Conventional (Minor Stop)	0007836																										
ICE 24 - SR 20 at SR 20 Spur/Herndon Lane	Signal (turn lanes on mainline)	0007836						x	x								x		x				x					
ICE 25 - SR 20 at Hickory Flat Highway/SR 140	Signal (turn lanes on mainline)	0007836						x									x										x	

Concur with: _____ **Date:** 7/19/19 **Name:** Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT ICE Tool: Waiver Form for Multiple RIRO Intersections

ICE Version 2.14 | Revised 08/22/2018

Project PI# (if applicable): 0007836

Study Intersection	Existing Intersection Type	Avg Daily Traffic (ADT)		Traffic Operations (optional):[1]			
				Opening Year		Design Year	
		Major Rd	Minor Rd	Delay	V/C	Delay	V/C
RIRO 1 - Ranger Rd	Conventional (Minor Stop)	14,090	270	0.9 sec	0.44	3.4 sec	0.80
RIRO 2 - Commerce Row	Conventional (Minor Stop)	12,020	30	0.1 sec	0.35	0.1 sec	0.42
RIRO 3 - Chandler Lane	Conventional (Minor Stop)	9,660	60	0.1 sec	0.42	0.1 sec	0.52
RIRO 4 - Hawks Farm Road	Conventional (Minor Stop)	9,660	370	1.1 sec	0.40	1.5 sec	0.49
RIRO 5 - Deer Run Road	Conventional (Minor Stop)	9,230	170	0.8 sec	0.45	1.0 sec	0.55
RIRO 6 - Peachtree Drive	Conventional (Minor Stop)	9,160	100	0.1 sec	0.41	0.1 sec	0.50
RIRO 7 - Knox Campground Trail	Conventional (Minor Stop)	10,880	160	0.5 sec	0.45	0.6 sec	0.55
RIRO 8 - Fields Landing Drive	Conventional (Minor Stop)	12,670	930	0.9 sec	0.39	1.1 sec	0.49
RIRO 9 - SR 20 at Legend Creek Dr	Conventional (Minor Stop)	16,040	700	11.7 sec	1.40	271.8 sec	3.55
	--- select one ---						

[1] Capacity data is optional unless needed to justify basis of the waiver request.

Approved By: _____ Date: 3/14/19 Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

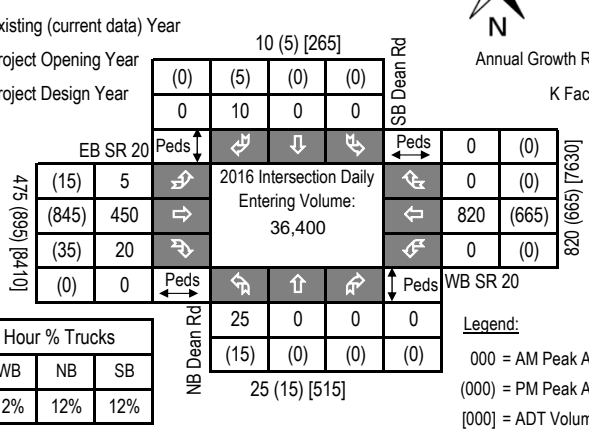
GDOT PI # (or N/A):	0007836	Request By:	
County:	Bartow	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	Dean Rd	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%

N



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

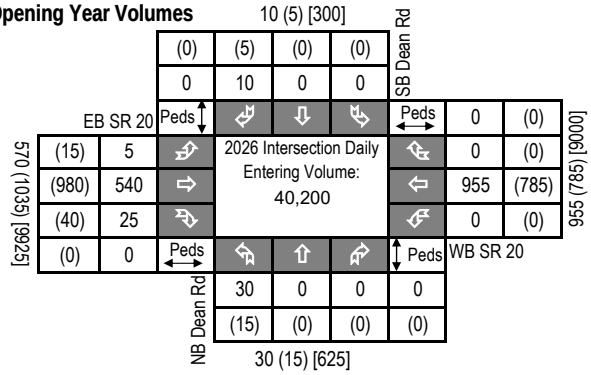
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

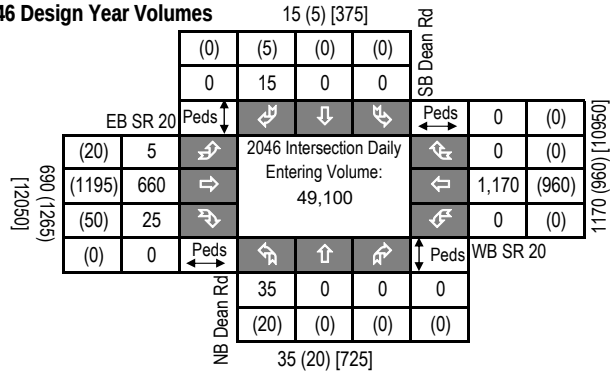
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.98 / Dean Rd - 0.02

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

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Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Dean Rd
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road.
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Low turning volumes. Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Bartow	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Dean Rd			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.9 sec	0.9 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.23	0.29
2046 Design Yr No-Build Peak Hr Intersection Delay	1.6 sec	2.8 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.42	0.74

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	1	0	0	17%
Head-On	1	0	0	17%
Rear End	0	0	0	0%
Sideswipe - same	1	0	0	17%
Sideswipe - opposite	0	1	0	17%
Not Collision w/Motor Veh	1	1	0	33%
TOTALS:	4	2	0	6

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$704,000		$580,000			
ROW Cost	$0		$3,000		$3,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$25,000		$20,000			
Design & Contingency Cost	$0		$176,000		$145,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$908,000		$748,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	1.8 sec	3.3 sec	3.3 sec	1.6 sec	3.3 sec	1.5 sec		
2046 Design Yr Build Intersection V/C	0.48	0.83	0.10	0.06	0.10	0.06		
Safety Analysis:								
Predefined CRF: PDO	0%		31%		35%			
Predefined CRF: Fatal/Inj	0%		53%		54%			
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	4.0		6.2		8.1			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Dean Rd	County:	Bartow	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Dean Rd			SB Dean Rd		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	2	1	1	2	0	0	1	0	0	1	0
Lane Widths*	12'	12'	12'	12'	12'	0'	0'	12'	0'	0'	12'	0'
Bay Length**	300'		330'	250'		0'	0'		0'	0'		0'
Median Width		0'			0'			12'			12'	
Right-of-Way	160'						100'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	1	1	0	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$105,000
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	29,358	$278,012	22,158	$209,831				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	3,820	$72,886	3,820	$72,886				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	5,730	$10,852	5,730	$10,852				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	1	$7,500	0	$0				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,910	$65,114	1,910	$65,114				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,910	$43,414	1,910	$43,414				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$100,714		$82,998				
Traffic Control - 20%	n/a	n/a		$0		$100,714		$82,998				
Reimbrusable Utility	n/a	n/a		$0		$25,178		$20,750				
Preliminary Engineering - 15%	n/a	n/a		$0		$75,535		$62,249				
Contigency - 20%	n/a	n/a		$0		$100,714		$82,998				
ROW Cost/Acre: Mixed (Average)	n/a	$105,000ac		$0		$1,928		$1,928				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$1,157		$1,157				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$910,000**		**$750,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	120	0.0	90	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.02	0.0	29,358	0.0	1,370	0.0	540	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.02	0.0	22,158	0.0	1,370	0.0	540	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

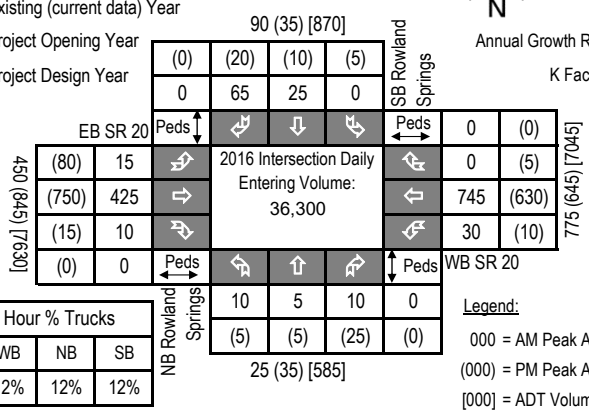
GDOT PI # (or N/A):	0007836	Request By:	
County:	Bartow	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	Rowland Springs	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

N

Annual Growth Rate: 1.0%

K Factor*: 8%



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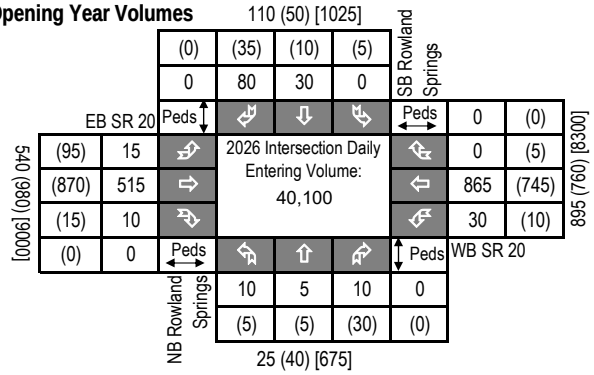

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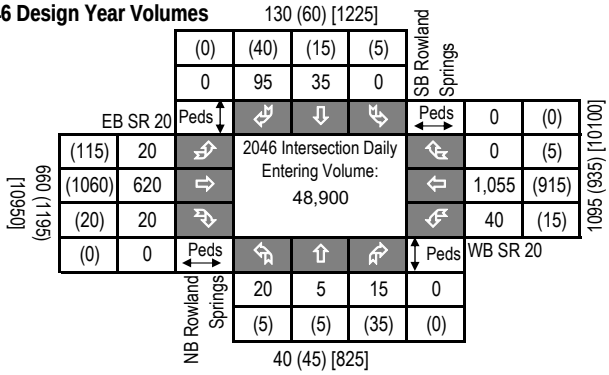

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Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Rowland Springs
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Low turning volumes. Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Intersection does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Bartow	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Rowland Springs			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	3.4 sec	3.7 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.42	0.44
2046 Design Yr No-Build Peak Hr Intersection Delay	13.2 sec	34.6 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	1.15	2.43

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type: *Crash Data: Enter 5 most recent years of intersection crash data*	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	1	2	0	30%
Head-On	0	0	0	0%
Rear End	0	0	0	0%
Sideswipe - same	2	0	0	20%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	5	0	0	50%
TOTALS:	8	2	0	10

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$704,000		$591,000			
ROW Cost	$0		$0		$0			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$25,000		$21,000			
Design & Contingency Cost	$0		$176,000		$147,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$905,000		$759,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	38.8 sec	9.2 sec	9.9 sec	5.0 sec	9.7 sec	4.4 sec		
2046 Design Yr Build Intersection V/C	3.02	1.55	0.33	0.20	0.34	0.13		
Safety Analysis:								
Predefined CRF: PDO	0%		31%		35%			
Predefined CRF: Fatal/Inj	0%		53%		54%			
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	1.3		5.7		6.1			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Rowland Springs	County:	Bartow	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Rowland Springs			SB Rowland Springs		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	2	1	1	2	1	0	1	0	0	1	0
Lane Widths*	12'	12'	12'	12'	12'	12'	0'	12'	0'	0'	12'	0'
Bay Length**	300'		330'	280'		300'	0'		0'	0'		0'
Median Width		0'			0'			12'			5'	
Right-of-Way	170'						110'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	N/A	N/A
Proposed Pavement Type	None	F.D. Asphalt	F.D. Asphalt	None	None
Reimbursable Utility:	Minimal	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	1	1	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	2%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$105,000
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	29,358	$278,012	22,158	$209,831				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	3,820	$72,886	3,820	$72,886				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	5,730	$10,852	5,730	$10,852				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	1	$7,500	1	$7,500				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,910	$65,114	1,910	$65,114				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,910	$43,414	1,910	$43,414				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$100,714		$84,498				
Traffic Control - 20%	n/a	n/a		$0		$100,714		$84,498				
Reimbrusable Utility	n/a	n/a		$0		$25,178		$21,125				
Preliminary Engineering - 15%	n/a	n/a		$0		$75,535		$63,374				
Contigency - 20%	n/a	n/a		$0		$100,714		$84,498				
ROW Cost/Acre: Mixed (Average)	n/a	$105,000ac		$0		$482		$482				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$289		$289				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$907,000**		**$761,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	None	0.00	0.0	0	0.0	130	0.0	80	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.00	0.0	29,358	0.0	1,380	0.0	530	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.00	0.0	22,158	0.0	1,380	0.0	530	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Rowland Springs
County: Bartow
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	15,260	
Existing Avg Daily Traffic (Minor Street):	1,740	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	9.4 sec	4.8 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.23	0.14
2046 Design Yr Peak Hour Intersection Delay:	9.9 sec	5.0 sec
2046 Design Yr Peak Hour Intersection V/C:	0.33	0.20

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data (Crash Type)	Crash Severity: PDO	Injury Crash*	Fatal Crash*
Angle	1	2	0
Head-On	0	0	0
Rear End	0	0	0
Sideswipe - same	2	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	5	0	0
TOTALS:	**8**	**2**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

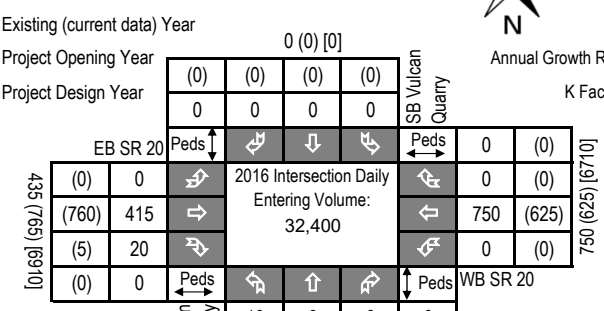
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Bartow	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	Vulcan Quarry	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

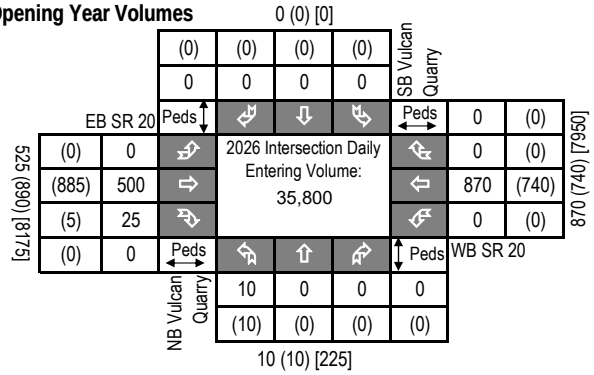
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

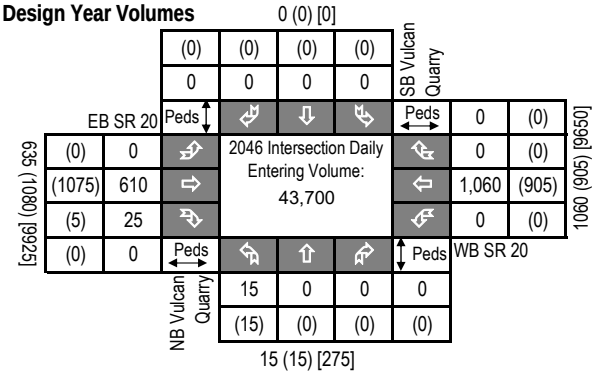
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.99 / Vulcan Quarry - 0.01

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Vulcan Quarry
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	No	No	No	No	No	No	No	Sight distance met. Not feasible to re-route all trucks to make a U-turn
	RIRO w/down stream U-Turn	No	No	No	No	No	No	No	Sight distance met. Not feasible to re-route all trucks to make a U-turn
	High-T (unsignalized)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing condition is a T-intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Bartow	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Vulcan Quarry			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.4 sec	1.1 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.12	0.33
2046 Design Yr No-Build Peak Hr Intersection Delay	0.9 sec	4.4 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.29	0.89

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	0	0	0	0%
Head-On	0	0	0	0%
Rear End	1	0	0	25%
Sideswipe - same	2	0	0	50%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	1	0	0	25%
TOTALS:	4	0	0	4

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		High-T (unsignalized)		N/A	N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*				
Construction Cost	$0		$386,000				
ROW Cost	$0		$42,000				
Environmental Cost	$0		$0				
Reimbursable Utility Cost	$0		$13,000				
Design & Contingency Cost	$0		$96,000				
Cost Adjustment (justification req'd)	0%		0%				
Total Cost	$0		$537,000				
Traffic Operations:							
Traffic Analysis Software Used	Synchro 10		Synchro 10				
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr			
2046 Design Yr Build Intersection Delay	1.2 sec	2.6 sec	0.5 sec	1.2 sec			
2046 Design Yr Build Intersection V/C	0.22	0.65	0.07	0.28			
Safety Analysis:							
Predefined CRF: PDO	0%		23%				
Predefined CRF: Fatal/Inj	0%		45%				
Predefined CRF Source:	N/A		FHWA Clearinghouse #s 2753 / 2755				
User Defined CRF: PDO							
User Defined CRF: Fatal/Inj							
User Defined CRF Source (write in if applicable):							
Environmental Impacts:[1]							
Historic District/Property	None		None				
Archaeology Resources	None		None				
Graveyard	None		None				
Stream	None		None				
Underground Tank/Hazmat	None		None				
Park Land	None		None				
EJ Community	None		None				
Wooded Area	None		None				
Wetland	None		None				
Stakeholder Posture:							
Local Community Support	Unknown		Unknown				
GDOT Support	Unknown		Unknown				
Final ICE Stage 2 Score:	6.0		6.8				
Rank of Control Type Alternatives:	2		1				

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Vulcan Quarry	County:	Bartow	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Vulcan Quarry			SB Vulcan Quarry		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	2	1	1	1	0	0	1	1	0	0	0
Lane Widths*	0'	12'	12'	12'	12'	0'	0'	12'	12'	0'	0'	0'
Bay Length**	0'		250'	250'		0'	0'		100'	0'		0'
Median Width		12'			0'			0'			0'	
Right-of-Way	180'						55'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	High-T (unsignalized)	N/A	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	2	2	2	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$105,000
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop) Quantity	Conventional (Minor Stop) Cost	High-T (unsignalized) Quantity	High-T (unsignalized) Cost	N/A Quantity	N/A Cost	N/A Quantity	N/A Cost	N/A Quantity	N/A Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	16,000	$151,515						
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0						
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	2,140	$40,831						
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0						
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	150	$7,737						
Median Landscaping	$100K/LM	$1.89/LF	0	$0	0	$0						
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	2	$15,000						
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,070	$36,477						
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0						
Signing & Marking	$0	$22.73/LF	0	$0	1,070	$24,321						
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0						
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0						
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0						
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0						
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0						
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0						
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0						
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0						
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0						
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0						
Grading Complete - 20%	n/a	n/a		$0		$55,176						
Traffic Control - 20%	n/a	n/a		$0		$55,176						
Reimbrusable Utility	n/a	n/a		$0		$13,794						
Preliminary Engineering - 15%	n/a	n/a		$0		$41,382						
Contigency - 20%	n/a	n/a		$0		$55,176						
ROW Cost/Acre: Mixed (Average)	n/a	$105,000ac		$0		$26,250						
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0						
ROW Multiplier - 1.6	n/a	n/a		$0		$15,750						
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0						
Grand Total Costs				**$0**		**$539,000**						

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	100	0.0	70	0.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.0	16,000	0.0	800	0.0	270	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

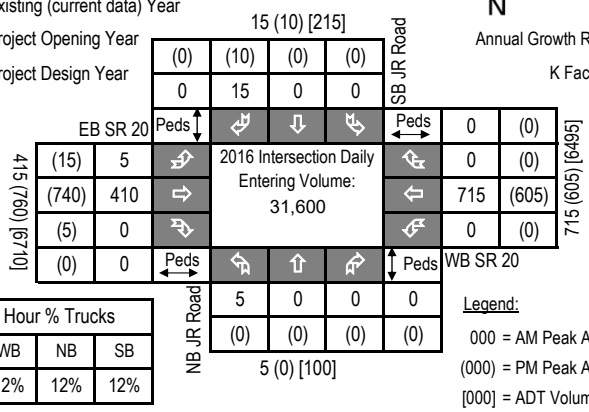
GDOT PI # (or N/A):	0007836	Request By:	
County:	Bartow	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	JR Road	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%

N



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

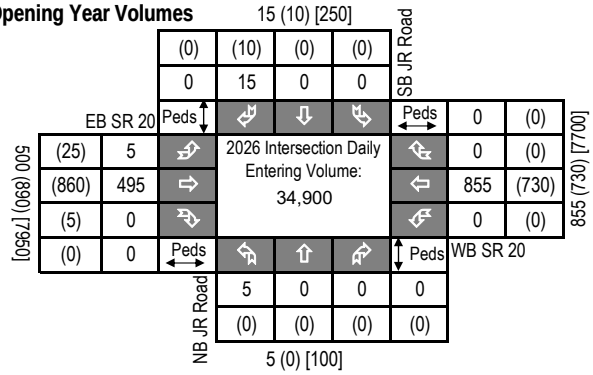
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

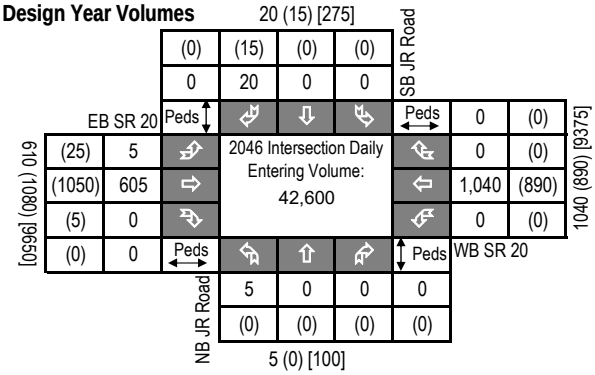
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.98 / JR Road - 0.02

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ JR Road
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	No	**Yes**	No	No	No	Low-volume driveway located across from JR Road. High-T not suitable
	Offset-T Intersections	No	No	No	No	No	No	No	Low turning volumes. Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Bartow	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ JR Road			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.3 sec	0.4 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.08	0.07
2046 Design Yr No-Build Peak Hr Intersection Delay	0.5 sec	0.5 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.14	0.14

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	0	0	0	0%
Head-On	0	0	0	0%
Rear End	0	0	0	0%
Sideswipe - same	0	0	0	0%
Sideswipe - opposite	1	0	0	50%
Not Collision w/Motor Veh	1	0	0	50%
TOTALS:	2	0	0	2

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$667,000		$554,000			
ROW Cost	$0		$4,000		$4,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$23,000		$19,000			
Design & Contingency Cost	$0		$166,000		$138,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$860,000		$715,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	0.3 sec	9.2 sec	0.2 sec	0.2 sec	0.2 sec	0.1 sec		
2046 Design Yr Build Intersection V/C	0.07	1.55	0.05	0.04	0.05	0.03		
Safety Analysis:								
Predefined CRF: PDO	0%		31%		35%			
Predefined CRF: Fatal/Inj	0%		53%		54%			
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	3.5		7.3		7.7			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ JR Road	County:	Bartow	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB JR Road			SB JR Road		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	2	0	0	1	1	0	0	0	0	1	0
Lane Widths*	12'	12'	0'	0'	12'	12'	0'	0'	0'	0'	12'	0'
Bay Length**	250'		0'	0'		275'	0'		0'	0'		0'
Median Width		0'			12'			0'			0'	
Right-of-Way	150'						50'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	N/A	N/A
Proposed Pavement Type	None	F.D. Asphalt	F.D. Asphalt	None	None
Reimbursable Utility:	Minimal	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	1	1	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	2%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$105,000
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop) Quantity	Conventional (Minor Stop) Cost	RCUT (stop control) Quantity	RCUT (stop control) Cost	RIRO w/down stream U- Quantity	RIRO w/down stream U- Cost	N/A Quantity	N/A Cost	N/A Quantity	N/A Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	26,870	$254,449	19,670	$186,267				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	3,760	$71,741	3,760	$71,741				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	5,640	$10,682	5,640	$10,682				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	1	$7,500	1	$7,500				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,880	$64,091	1,880	$64,091				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,880	$42,732	1,880	$42,732				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$95,397		$79,182				
Traffic Control - 20%	n/a	n/a		$0		$95,397		$79,182				
Reimbrusable Utility	n/a	n/a		$0		$23,849		$19,795				
Preliminary Engineering - 15%	n/a	n/a		$0		$71,548		$59,386				
Contigency - 20%	n/a	n/a		$0		$95,397		$79,182				
ROW Cost/Acre: Mixed (Average)	n/a	$105,000ac		$0		$2,777		$2,777				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$1,666		$1,666				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$863,000**		**$717,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	None	0.00	0.0	0	0.0	120	0.0	60	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.03	0.0	26,870	0.0	1,370	0.0	510	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.03	0.0	19,670	0.0	1,370	0.0	510	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ JR Road
County: Bartow
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	13,205	
Existing Avg Daily Traffic (Minor Street):	215	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	0.2 sec	0.2 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.03	0.04
2046 Design Yr Peak Hour Intersection Delay:	0.2 sec	0.2 sec
2046 Design Yr Peak Hour Intersection V/C:	0.05	0.04

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	0	0	0
Head-On	0	0	0
Rear End	0	0	0
Sideswipe - same	0	0	0
Sideswipe - opposite	1	0	0
Not Collision w/Motor Veh	1	0	0
TOTALS:	**2**	**0**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

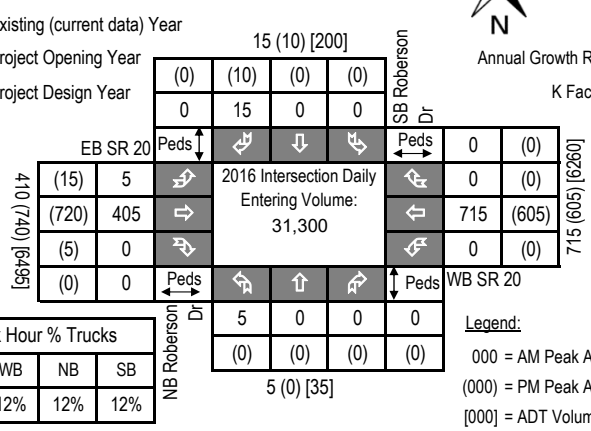
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Bartow	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Roberson Dr	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

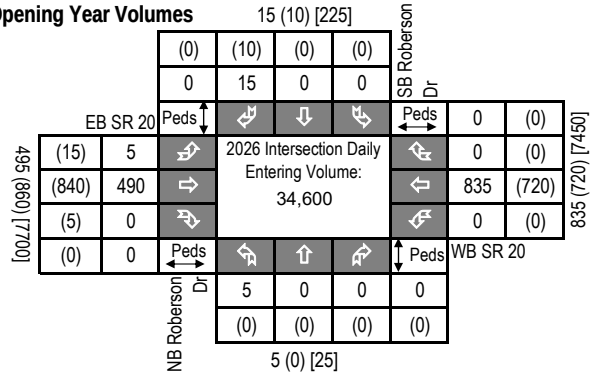
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

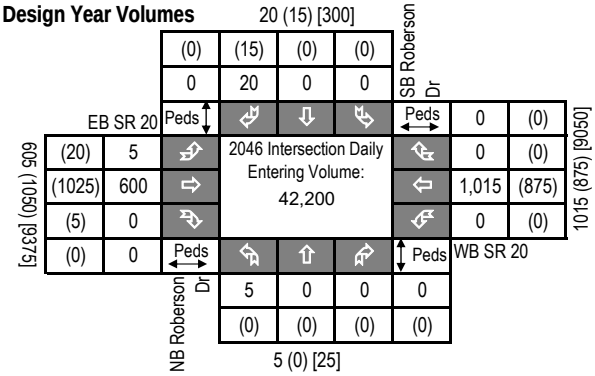
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.98 / Roberson Dr - 0.02

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Roberson Dr
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Low turning volumes. Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Bartow	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Roberson Dr			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.7 sec	0.2 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.11	0.04
2046 Design Yr No-Build Peak Hr Intersection Delay	1.0 sec	0.3 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.20	0.07

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	0	1	0	11%
Head-On	0	0	0	0%
Rear End	1	0	0	11%
Sideswipe - same	2	0	0	22%
Sideswipe - opposite	1	0	0	11%
Not Collision w/Motor Veh	4	0	0	44%
TOTALS:	8	1	0	9

Crash Data: *Enter 5 most recent years of intersection crash data*

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$700,000		$587,000			
ROW Cost	$0		$12,000		$12,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$25,000		$20,000			
Design & Contingency Cost	$0		$175,000		$146,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$912,000		$765,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	0.5 sec	0.2 sec	0.7 sec	0.2 sec	0.7 sec	0.1 sec		
2046 Design Yr Build Intersection V/C	0.09	0.04	0.05	0.03	0.05	0.03		
Safety Analysis:								
Predefined CRF: PDO	0%		31%		35%			
Predefined CRF: Fatal/Inj	0%		53%		54%			
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	5.2		6.0		6.4			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Roberson Dr	County:	Bartow	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Roberson Dr			SB Roberson Dr		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	2	0	1	1	1	0	1	0	0	1	0
Lane Widths*	12'	12'	0'	12'	12'	12'	0'	12'	0'	0'	12'	0'
Bay Length**	300'		0'	275'		300'	0'		0'	0'		0'
Median Width		0'			0'			0'			0'	
Right-of-Way	140'						60'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	1	1	1	1	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$105,000
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	29,358	$278,012	22,158	$209,831				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	3,760	$71,741	3,760	$71,741				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	5,640	$10,682	5,640	$10,682				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	1	$7,500	1	$7,500				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,880	$64,091	1,880	$64,091				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,880	$42,732	1,880	$42,732				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$100,110		$83,894				
Traffic Control - 20%	n/a	n/a		$0		$100,110		$83,894				
Reimbrusable Utility	n/a	n/a		$0		$25,027		$20,974				
Preliminary Engineering - 15%	n/a	n/a		$0		$75,082		$62,921				
Contigency - 20%	n/a	n/a		$0		$100,110		$83,894				
ROW Cost/Acre: Mixed (Average)	n/a	$105,000ac		$0		$7,713		$7,713				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$4,628		$4,628				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$913,000**		**$767,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	110	0.0	70	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.07	0.0	29,358	0.0	1,360	0.0	520	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.07	0.0	22,158	0.0	1,360	0.0	520	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Roberson Dr
County: Bartow
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	12,755	
Existing Avg Daily Traffic (Minor Street):	235	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	0.8 sec	0.2 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.03	0.02
2046 Design Yr Peak Hour Intersection Delay:	0.7 sec	0.2 sec
2046 Design Yr Peak Hour Intersection V/C:	0.05	0.03

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	0	1	0
Head-On	0	0	0
Rear End	1	0	0
Sideswipe - same	2	0	0
Sideswipe - opposite	1	0	0
Not Collision w/Motor Veh	4	0	0
TOTALS:	**8**	**1**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. Both RIRO and RCUT alternatives are noticed to provide operational and safety benefits at the current intersection. With low crash history, RCUT is selected as preferred alternative and therefore, a waiver is requested.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

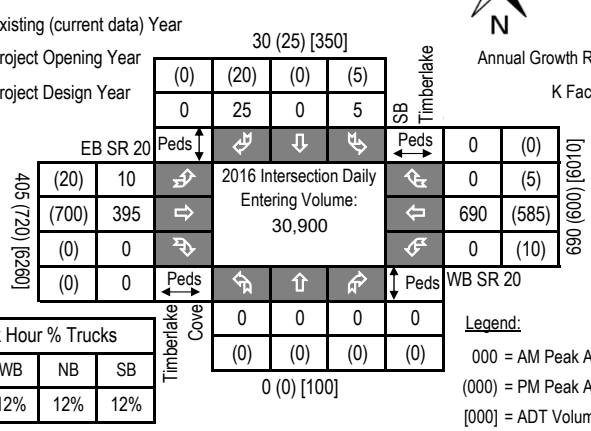
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Bartow	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Timberlake Cove	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

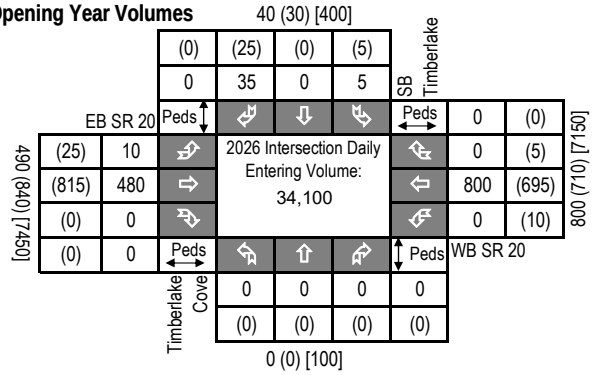
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

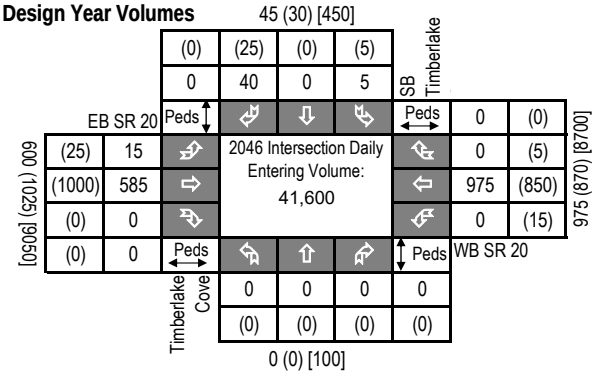
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.97 / Timberlake Cove - 0.03

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Timberlake Cove
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road approach
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road approach
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road approach
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road approach
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing condition is a T-intersection.
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Bartow	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Timberlake Cove			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.7 sec	0.6 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.14	0.14
2046 Design Yr No-Build Peak Hr Intersection Delay	0.8 sec	0.7 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.21	0.21

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	0	1	0	11%
Head-On	0	0	0	0%
Rear End	0	1	0	11%
Sideswipe - same	1	0	0	11%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	6	0	0	67%
TOTALS:	7	2	0	9

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*	*Additional description here*	*Additional description here*	*Additional description here*	
Construction Cost	$0	$366,000	$300,000	$384,000	
ROW Cost	$0	$0	$0	$42,000	
Environmental Cost	$0	$0	$0	$0	
Reimbursable Utility Cost	$0	$13,000	$10,000	$13,000	
Design & Contingency Cost	$0	$91,000	$75,000	$96,000	
Cost Adjustment (justification req'd)	0%	0%	0%	0%	
Total Cost	$0	$470,000	$385,000	$535,000	
Traffic Operations:					
Traffic Analysis Software Used	Synchro 10	HCS7	HCS7	Synchro 10	
Analysis Period	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	
2046 Design Yr Build Intersection Delay	0.6 sec / 0.4 sec	0.9 sec / 0.7 sec	0.8 sec / 0.6 sec	0.7 sec / 0.5 sec	
2046 Design Yr Build Intersection V/C	0.14 / 0.08	0.10 / 0.06	0.11 / 0.06	0.14 / 0.06	
Safety Analysis:					
Predefined CRF: PDO	0%	31%	35%	23%	
Predefined CRF: Fatal/Inj	0%	53%	54%	45%	
Predefined CRF Source:	N/A	NC/MO Table 4-7	FHWA Clearinghouse #s 5555 / 5556	FHWA Clearinghouse #s 2753 / 2755	
User Defined CRF: PDO					
User Defined CRF: Fatal/Inj					
User Defined CRF Source (write in if applicable):					
Environmental Impacts:[1]					
Historic District/Property	None	None	None	None	
Archaeology Resources	None	None	None	None	
Graveyard	None	None	None	None	
Stream	None	None	None	None	
Underground Tank/Hazmat	None	None	None	None	
Park Land	None	None	None	None	
EJ Community	None	None	None	None	
Wooded Area	None	None	None	None	
Wetland	None	None	None	None	
Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	5.2	6.2	6.5	5.7	
Rank of Control Type Alternatives:	4	2	1	3	

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Timberlake Cove	County:	Bartow	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Timberlake Cove			SB Timberlake Cove		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	1	0	0	2	0	0	0	0	0	1	0
Lane Widths*	12'	12'	0'	0'	12'	0'	0'	0'	0'	0'	12'	0'
Bay Length**	375'		0'	0'		0'	0'		0'	0'		0'
Median Width		0'			12'			0'			0'	
Right-of-Way	180'						55'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	2	2	2	2	2
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$105,000
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		High-T (unsignalized)		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	13,435	$127,225	9,835	$93,134	16,000	$151,515		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	1,860	$35,489	1,860	$35,489	2,120	$40,450		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895	150	$7,737		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	2,790	$5,284	2,790	$5,284	0	$0		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	2	$15,000	2	$15,000	2	$15,000		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	930	$31,705	930	$31,705	1,060	$36,136		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	930	$21,139	930	$21,139	1,060	$24,094		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$52,326		$42,929		$54,986		
Traffic Control - 20%	n/a	n/a		$0		$52,326		$42,929		$54,986		
Reimbrusable Utility	n/a	n/a		$0		$13,082		$10,732		$13,747		
Preliminary Engineering - 15%	n/a	n/a		$0		$39,245		$32,197		$41,240		
Contigency - 20%	n/a	n/a		$0		$52,326		$42,929		$54,986		
ROW Cost/Acre: Mixed (Average)	n/a	$105,000ac		$0		$0		$0		$26,250		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$0		$0		$15,750		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$471,000**		**$386,000**		**$537,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	100	0.0	60	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.00	0.0	26,870	13,435.0	1,350	675.0	510	255.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.00	0.0	19,670	9,835.0	1,350	675.0	510	255.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.0	16,000	0.0	800	0.0	260	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Timberlake Cove
County: Bartow
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	12,270	
Existing Avg Daily Traffic (Minor Street):	350	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	1.0 sec	0.8 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.08	0.06
2046 Design Yr Peak Hour Intersection Delay:	0.9 sec	0.7 sec
2046 Design Yr Peak Hour Intersection V/C:	0.10	0.06

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	0	1	0
Head-On	0	0	0
Rear End	0	1	0
Sideswipe - same	1	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	6	0	0
TOTALS:	**7**	**2**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. Both RIRO and RCUT alternatives are noticed to provide operational and safety benefits at the current intersection. With low crash history, RCUT is selected as preferred alternative and therefore, a waiver is requested.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

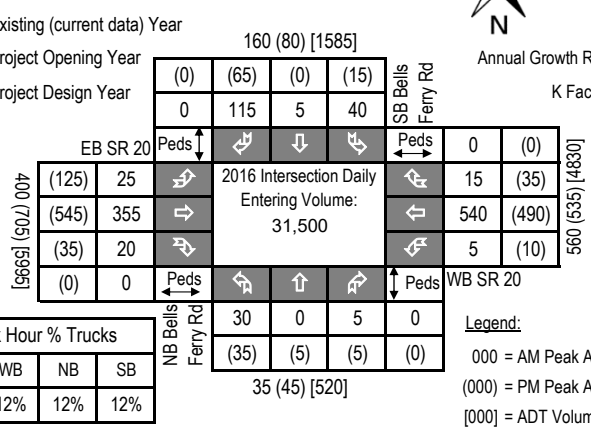
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Bartow	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Bells Ferry Rd	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

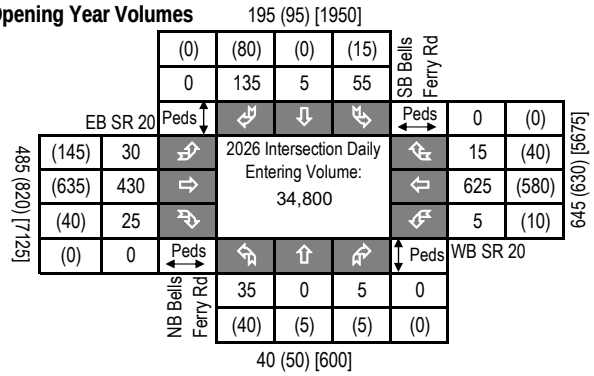
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

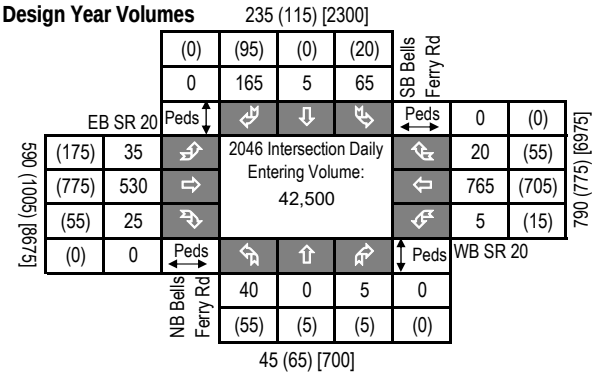
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.87 / Bells Ferry Rd - 0.13

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Bells Ferry Rd
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	Multilane approach
	Multilane Roundabout	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Bartow	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Bells Ferry Rd			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	7.8 sec	8.3 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.73	0.77
2046 Design Yr No-Build Peak Hr Intersection Delay	30.3 sec	38.4 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	1.25	1.76

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type: *Crash Data: Enter 5 most recent years of intersection crash data*	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	5	3	0	31%
Head-On	0	1	0	4%
Rear End	6	1	0	27%
Sideswipe - same	0	0	0	0%
Sideswipe - opposite	0	1	0	4%
Not Collision w/Motor Veh	8	1	0	35%
TOTALS:	19	7	0	26

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		Multilane Roundabout		RCUT (stop control)		RIRO w/down stream U-Turn		N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*		*Additional description here*		
Construction Cost	$0		$2,187,000		$704,000		$591,000		
ROW Cost	$0		$216,000		$19,000		$19,000		
Environmental Cost	$0		$0		$0		$0		
Reimbursable Utility Cost	$0		$65,000		$25,000		$21,000		
Design & Contingency Cost	$0		$611,000		$176,000		$147,000		
Cost Adjustment (justification req'd)	0%		0%		0%		0%		
Total Cost	$0		$3,079,000		$924,000		$778,000		
Traffic Operations:									
Traffic Analysis Software Used	Synchro 10		SIDRA 7		HCS7		HCS7		
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	
2046 Design Yr Build Intersection Delay	10.0 sec	37.8 sec	6.1 sec	7.6 sec	9.4 sec	7.3 sec	9.2 sec	6.8 sec	
2046 Design Yr Build Intersection V/C	0.76	2.45	0.38	0.47	0.47	0.26	0.47	0.23	
Safety Analysis:									
Predefined CRF: PDO	0%		32%		31%		35%		
Predefined CRF: Fatal/Inj	0%		71%		53%		54%		
Predefined CRF Source:	N/A		FHWA Clearinghouse #s 236 / 237		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556		
User Defined CRF: PDO									
User Defined CRF: Fatal/Inj									
User Defined CRF Source (write in if applicable):									
Environmental Impacts:[1]									
Historic District/Property	None		None		None		None		
Archaeology Resources	None		None		None		None		
Graveyard	None		None		None		None		
Stream	None		None		None		None		
Underground Tank/Hazmat	None		None		None		None		
Park Land	None		None		None		None		
EJ Community	None		None		None		None		
Wooded Area	None		None		None		None		
Wetland	None		None		None		None		

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	2.2	6.2	6.3	6.5	
Rank of Control Type Alternatives:	4	3	2	1	

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Bells Ferry Rd	County:	Bartow	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Bells Ferry Rd			SB Bells Ferry Rd		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	1	1	1	2	1	0	1	0	0	1	0
Lane Widths*	12'	12'	12'	12'	12'	12'	0'	12'	0'	0'	12'	0'
Bay Length**	300'		375'	375'		300'	0'		0'	0'		0'
Median Width		0'			0'			12'			12'	
Right-of-Way	130'						80'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	Multilane Roundabout	RCUT (stop control)	RIRO w/down stream U-Turn	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	1	1	1	1	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	4	0	0	0
New/Replace Sidewalks (LF)	0'	4'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$105,000
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		Multilane Roundabout		RCUT (stop control)		RIRO w/down stream U-		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	75,186	$946,951	29,358	$278,012	22,158	$209,831		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	2,400	$60,903	3,820	$72,886	3,820	$72,886		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	600	$41,161	500	$25,790	250	$12,895		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	3,600	$9,068	5,730	$10,852	5,730	$10,852		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	1	$9,975	1	$7,500	1	$7,500		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,200	$54,409	1,910	$65,114	1,910	$65,114		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	3,707	$50,540	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	1,200	$36,277	1,910	$43,414	1,910	$43,414		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	4	$104,469	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	4	$262	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$524,292		$100,714		$84,498		
Traffic Control - 20%	n/a	n/a		$0		$349,528		$100,714		$84,498		
Reimbrusable Utility	n/a	n/a		$0		$65,701		$25,178		$21,125		
Preliminary Engineering - 15%	n/a	n/a		$0		$262,146		$75,535		$63,374		
Contigency - 20%	n/a	n/a		$0		$349,528		$100,714		$84,498		
ROW Cost/Acre: Mixed (Average)	n/a	$105,000ac		$0		$135,372		$12,052		$12,052		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$81,223		$7,231		$7,231		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$3,082,000**		**$926,000**		**$780,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	120	0.0	90	0.0
Multilane Roundabout	High Speed Roundabout	F.D. Asphalt	1.29	0.0	75,186	0.0	600	0.0	600	0.0
RCUT (stop control)	--select one--	F.D. Asphalt	0.11	0.0	29,358	0.0	1,370	0.0	540	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.11	0.0	22,158	0.0	1,370	0.0	540	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Bells Ferry Rd
County: Bartow
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	10,825	
Existing Avg Daily Traffic (Minor Street):	2,105	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	5.4 sec	6.3 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.31	0.38
2046 Design Yr Peak Hour Intersection Delay:	6.1 sec	7.6 sec
2046 Design Yr Peak Hour Intersection V/C:	0.38	0.47

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	5	3	0
Head-On	0	1	0
Rear End	6	1	0
Sideswipe - same	0	0	0
Sideswipe - opposite	0	1	0
Not Collision w/Motor Veh	8	1	0
TOTALS:	**19**	**7**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. An open median is required at current intersection to provide U-turns for adjacent intersections. Multilane Roundabout alternative provides both operational and safety benefits at the intersecion, and hence it is selected as preferred alternative instead of highest scoring alternative and a waiver is requested

Proposed Intersection Control: Multilane Roundabout

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

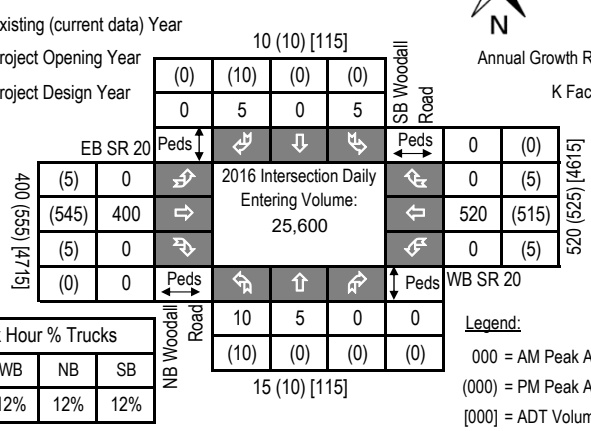
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Bartow	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Woodall Road	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

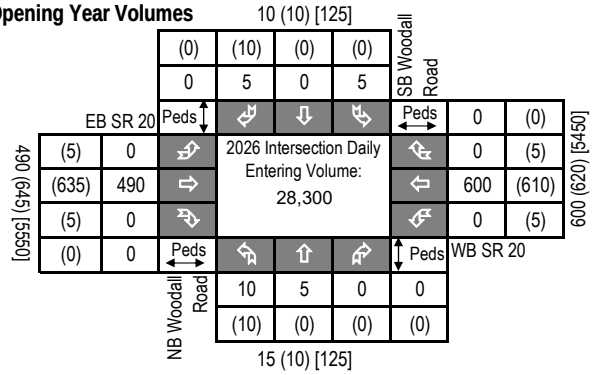
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

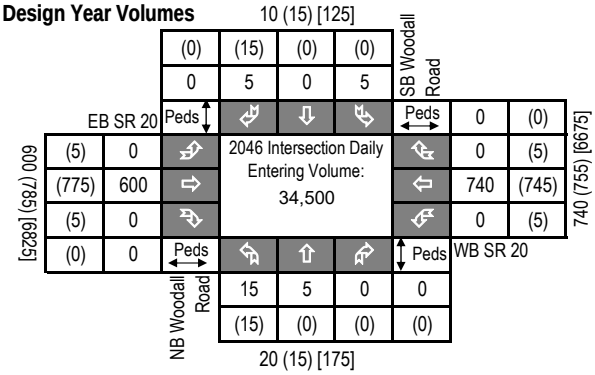
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.97 / Woodall Road - 0.03

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Woodall Road
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Low turning volumes. Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Bartow	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Woodall Road			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.8 sec	0.9 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.14	0.19
2046 Design Yr No-Build Peak Hr Intersection Delay	1.4 sec	2.2 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.29	0.50

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	0	1	0	11%
Head-On	0	0	0	0%
Rear End	5	1	0	67%
Sideswipe - same	0	0	0	0%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	2	0	0	22%
TOTALS:	7	2	0	9

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$684,000		$571,000			
ROW Cost	$0		$49,000		$49,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$24,000		$20,000			
Design & Contingency Cost	$0		$171,000		$142,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$928,000		$782,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	1.0 sec	1.4 sec	2.3 sec	1.3 sec	2.3 sec	1.2 sec		
2046 Design Yr Build Intersection V/C	0.22	0.35	0.03	0.03	0.03	0.03		
Safety Analysis:								
Predefined CRF: PDO	0%		31%		35%			
Predefined CRF: Fatal/Inj	0%		53%		54%			
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	4.8		6.2		6.5			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Woodall Road	County:	Bartow	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Woodall Road			SB Woodall Road		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane Widths*	0'	12'	0'	0'	12'	0'	0'	12'	0'	0'	12'	0'
Bay Length**	0'		0'	0'		0'	0'		0'	0'		0'
Median Width		0'			0'			0'			0'	
Right-of-Way	100'						40'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	N/A	N/A
Proposed Pavement Type	None	F.D. Asphalt	F.D. Asphalt	None	None
Reimbursable Utility:	Minimal	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	0	0	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	2%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$105,000
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	29,358	$278,012	22,158	$209,831				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	3,680	$70,214	3,680	$70,214				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	5,520	$10,455	5,520	$10,455				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	0	$0	0	$0				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,840	$62,727	1,840	$62,727				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,840	$41,823	1,840	$41,823				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$97,804		$81,589				
Traffic Control - 20%	n/a	n/a		$0		$97,804		$81,589				
Reimbrusable Utility	n/a	n/a		$0		$24,451		$20,397				
Preliminary Engineering - 15%	n/a	n/a		$0		$73,353		$61,192				
Contigency - 20%	n/a	n/a		$0		$97,804		$81,589				
ROW Cost/Acre: Mixed (Average)	n/a	$105,000ac		$0		$30,854		$30,854				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$18,512		$18,512				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$930,000**		**$784,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	None	0.00	0.0	0	0.0	70	0.0	70	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.29	0.0	29,358	0.0	1,320	0.0	520	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.29	0.0	22,158	0.0	1,320	0.0	520	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Woodall Road
County: Bartow
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	9,330	
Existing Avg Daily Traffic (Minor Street):	230	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	2.3 sec	1.1 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.02	0.02
2046 Design Yr Peak Hour Intersection Delay:	2.3 sec	1.3 sec
2046 Design Yr Peak Hour Intersection V/C:	0.03	0.03

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
	PDO	Injury Crash*	Fatal Crash*
Crash Type			
Angle	0	1	0
Head-On	0	0	0
Rear End	5	1	0
Sideswipe - same	0	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	2	0	0
TOTALS:	**7**	**2**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

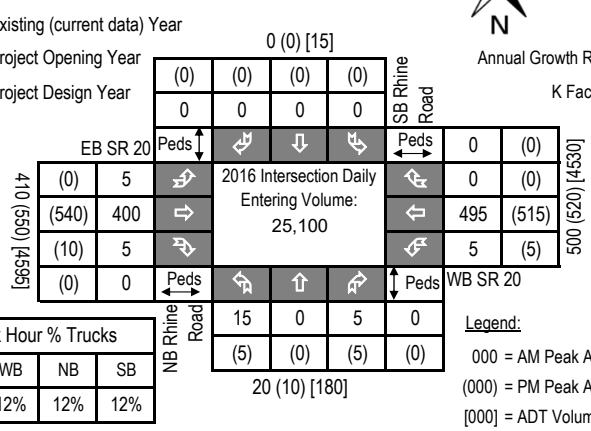
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Rhine Road	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	To improve operations at the intersection		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

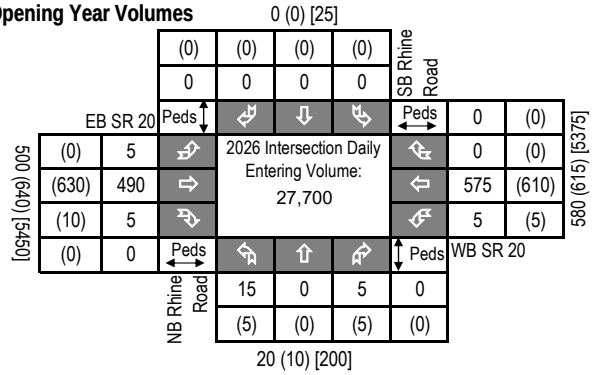
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

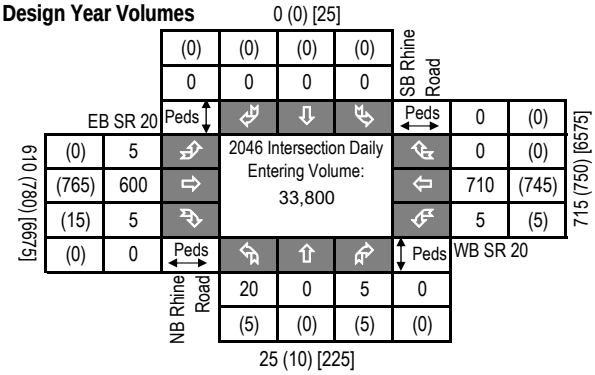
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.98 / Rhine Road - 0.02

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Rhine Road
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Low turning volumes. Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Rhine Road			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.7 sec	0.3 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.14	0.08
2046 Design Yr No-Build Peak Hr Intersection Delay	1.2 sec	0.4 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.31	0.13

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	1	2	0	19%
Head-On	0	0	0	0%
Rear End	5	2	0	44%
Sideswipe - same	4	0	0	25%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	1	1	0	13%
TOTALS:	11	5	0	16

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$1,074,000		$1,056,000			
ROW Cost	$0		$325,000		$315,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$38,000		$37,000			
Design & Contingency Cost	$0		$268,000		$264,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$1,705,000		$1,672,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	0.8 sec	0.3 sec	2.2 sec	0.5 sec	2.1 sec	0.5 sec		
2046 Design Yr Build Intersection V/C	0.18	0.08	0.04	0.02	0.04	0.02		
Safety Analysis:								
Predefined CRF: PDO	0%		31%		35%			
Predefined CRF: Fatal/Inj	0%		53%		54%			
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	5.1		6.4		6.5			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Rhine Road	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Rhine Road			SB Rhine Road		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	2	0	0	1	0	0	1	0	0	1	0
Lane Widths*	0'	12'	0'	0'	12'	0'	0'	12'	0'	0'	12'	0'
Bay Length**	0'		0'	0'		0'	0'		0'	0'		0'
Median Width		0'			0'			0'			0'	
Right-of-Way	80'						35'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	2	2	2	2	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	57,000	$539,773	57,000	$539,773				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	3,720	$70,978	3,720	$70,978				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	5,580	$10,568	5,580	$10,568				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	2	$15,000	2	$15,000				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,860	$63,409	1,860	$63,409				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,860	$42,278	1,860	$42,278				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$153,559		$150,980				
Traffic Control - 20%	n/a	n/a		$0		$153,559		$150,980				
Reimbrusable Utility	n/a	n/a		$0		$38,390		$37,745				
Preliminary Engineering - 15%	n/a	n/a		$0		$115,169		$113,235				
Contigency - 20%	n/a	n/a		$0		$153,559		$150,980				
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$203,438		$196,875				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$122,063		$118,125				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$1,708,000**		**$1,674,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	90	0.0	70	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.46	1.2	29,358	57,000.0	1,340	0.0	520	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.46	1.2	22,158	57,000.0	1,340	0.0	520	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Rhine Road
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 1/8/2020
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	9,190	
Existing Avg Daily Traffic (Minor Street):	360	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	2.1 sec	0.6 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.03	0.02
2046 Design Yr Peak Hour Intersection Delay:	2.2 sec	0.5 sec
2046 Design Yr Peak Hour Intersection V/C:	0.04	0.02

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	1	2	0
Head-On	0	0	0
Rear End	5	2	0
Sideswipe - same	4	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	1	1	0
TOTALS:	**11**	**5**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 01/14/2020

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

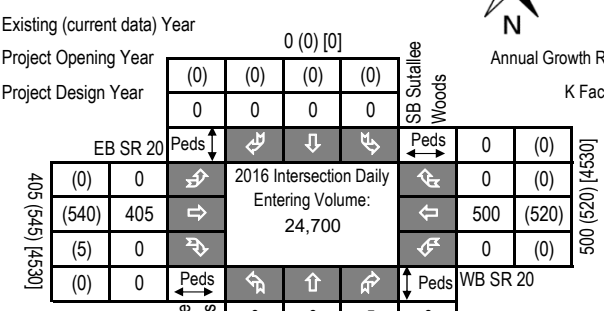
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Sutallee Woods	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

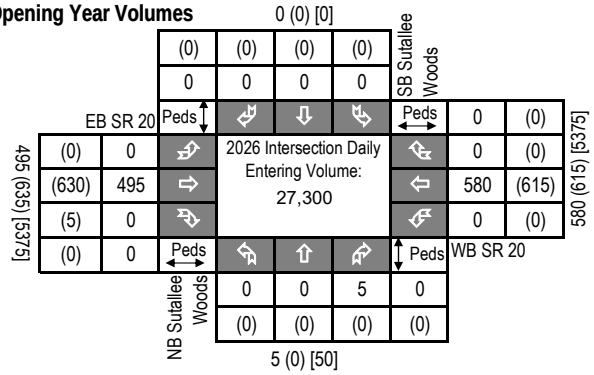
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

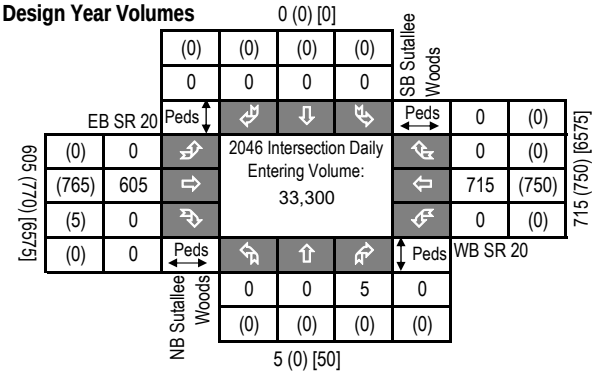
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.99 / Sutallee Woods - 0.01

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Sutallee Woods
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing condition is a T-intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Sutallee Woods			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.1 sec	0.0 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.02	0.00
2046 Design Yr No-Build Peak Hr Intersection Delay	0.1 sec	0.0 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.02	0.00

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type: *Crash Data: Enter 5 most recent years of intersection crash data*	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	2	0	0	20%
Head-On	0	0	0	0%
Rear End	2	1	0	30%
Sideswipe - same	1	0	0	10%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	2	2	0	40%
TOTALS:	7	3	0	10

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		High-T (unsignalized)		N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*		*Additional description here*		
Construction Cost	$0		$392,000		$326,000		$395,000		
ROW Cost	$0		$60,000		$60,000		$65,000		
Environmental Cost	$0		$0		$0		$0		
Reimbursable Utility Cost	$0		$14,000		$11,000		$14,000		
Design & Contingency Cost	$0		$98,000		$81,000		$98,000		
Cost Adjustment (justification req'd)	0%		0%		0%		0%		
Total Cost	$0		$564,000		$478,000		$572,000		
Traffic Operations:									
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7		Synchro 10		
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	
2046 Design Yr Build Intersection Delay	0.1 sec	0.0 sec	0.0 sec	0.0 sec	0.0 sec	0.0 sec	0.2 sec	0.0 sec	
2046 Design Yr Build Intersection V/C	0.02	0.00	0.01	0.00	0.01	0.00	0.02	0.00	
Safety Analysis:									
Predefined CRF: PDO	0%		31%		35%		23%		
Predefined CRF: Fatal/Inj	0%		53%		54%		45%		
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556		FHWA Clearinghouse #s 2753 / 2755		
User Defined CRF: PDO									
User Defined CRF: Fatal/Inj									
User Defined CRF Source (write in if applicable):									
Environmental Impacts:[1]									
Historic District/Property	None		None		None		None		
Archaeology Resources	None		None		None		None		
Graveyard	None		None		None		None		
Stream	None		None		None		None		
Underground Tank/Hazmat	None		None		None		None		
Park Land	None		None		None		None		
EJ Community	None		None		None		None		
Wooded Area	None		None		None		None		
Wetland	None		None		None		None		

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	5.3	6.4	6.7	7.7	
Rank of Control Type Alternatives:	4	3	2	1	

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Sutallee Woods	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Sutallee Woods			SB Sutallee Woods		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	2	0	0	1	0	0	1	0	0	0	0
Lane Widths*	0'	12'	0'	0'	12'	0'	0'	12'	0'	0'	0'	0'
Bay Length**	0'		0'	0'		0'	0'		0'	0'		0'
Median Width		0'			0'			0'			0'	
Right-of-Way	80'						50'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Proposed Pavement Type	None	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None
Reimbursable Utility:	Minimal	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted		3	3	3	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	2%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		High-T (unsignalized)		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	14,679	$139,006	11,079	$104,915	16,000	$151,515		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	1,850	$35,298	1,850	$35,298	2,120	$40,450		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895	150	$7,737		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	2,775	$5,256	2,775	$5,256	0	$0		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	3	$22,500	3	$22,500	3	$22,500		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	925	$31,534	925	$31,534	1,060	$36,136		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	925	$21,025	925	$21,025	1,060	$24,094		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$56,082		$46,685		$56,486		
Traffic Control - 20%	n/a	n/a		$0		$56,082		$46,685		$56,486		
Reimbrusable Utility	n/a	n/a		$0		$14,020		$11,671		$14,122		
Preliminary Engineering - 15%	n/a	n/a		$0		$42,061		$35,013		$42,365		
Contigency - 20%	n/a	n/a		$0		$56,082		$46,685		$56,486		
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$37,734		$37,734		$41,016		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$22,641		$22,641		$24,609		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$565,000**		**$481,000**		**$574,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	None	0.00	0.0	0	0.0	90	0.0	60	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.46	0.2	29,358	14,679.0	1,340	670.0	510	255.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.46	0.2	22,158	11,079.0	1,340	670.0	510	255.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.0	16,000	0.0	800	0.0	260	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Sutallee Woods
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	9,060	
Existing Avg Daily Traffic (Minor Street):	30	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	0.0 sec	0.0 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.01	0.00
2046 Design Yr Peak Hour Intersection Delay:	0.0 sec	0.0 sec
2046 Design Yr Peak Hour Intersection V/C:	0.01	0.00

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
	PDO	Injury Crash*	Fatal Crash*
Angle	2	0	0
Head-On	0	0	0
Rear End	2	1	0
Sideswipe - same	1	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	2	2	0
TOTALS:	**7**	**3**	**0**

Crash Type

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is High-T (Unsignalized). The selected alternative is RIRO, the second highest scoring alternative, because it provies better safety and operational benefits than a High-T. The current intersection also has access for U-turn movements at adjacent nearby intersections. Hence, a waiver is requested.

Proposed Intersection Control: RIRO w/down stream U-Turn

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

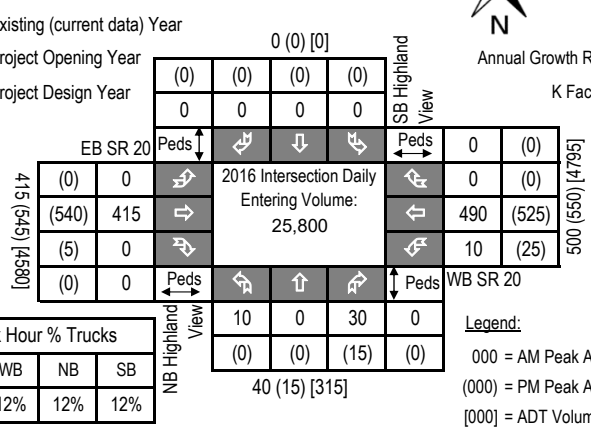
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Highland View	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

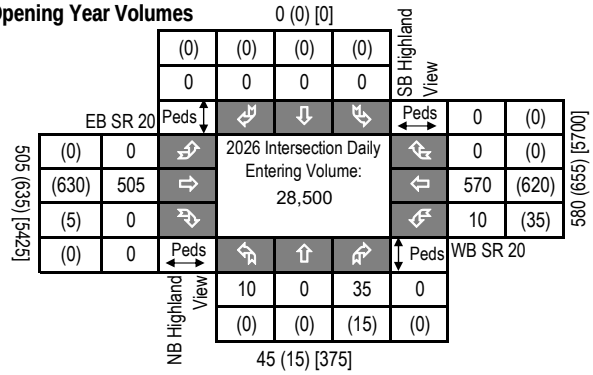
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

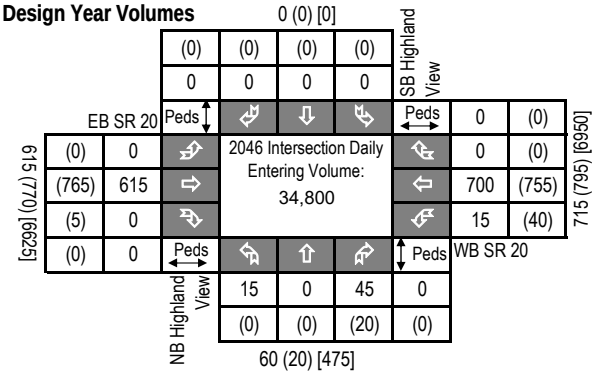
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.97 / Highland View - 0.03

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Highland View
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential solution to evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential solution to evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential solution to evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential solution to evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing condition is a T-intersection. Not suitable
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Highland View			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.8 sec	0.4 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.13	0.05
2046 Design Yr No-Build Peak Hr Intersection Delay	1.1 sec	0.5 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.23	0.08

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type: *Crash Data: Enter 5 most recent years of intersection crash data*	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	1	0	0	14%
Head-On	0	0	0	0%
Rear End	1	2	0	43%
Sideswipe - same	0	0	0	0%
Sideswipe - opposite	1	0	0	14%
Not Collision w/Motor Veh	2	0	0	29%
TOTALS:	5	2	0	7

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		High-T (unsignalized)		N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*		*Additional description here*		
Construction Cost	$0		$355,000		$289,000		$374,000		
ROW Cost	$0		$34,000		$34,000		$65,000		
Environmental Cost	$0		$0		$0		$0		
Reimbursable Utility Cost	$0		$12,000		$10,000		$13,000		
Design & Contingency Cost	$0		$88,000		$72,000		$93,000		
Cost Adjustment (justification req'd)	0%		0%		0%		0%		
Total Cost	$0		$489,000		$405,000		$545,000		
Traffic Operations:									
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7		Synchro 10		
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	
2046 Design Yr Build Intersection Delay	0.9 sec	0.5 sec	2.1 sec	0.4 sec	2.0 sec	0.1 sec	1.2 sec	0.3 sec	
2046 Design Yr Build Intersection V/C	0.18	0.06	0.10	0.06	0.10	0.04	0.14	0.04	
Safety Analysis:									
Predefined CRF: PDO	0%		31%		35%		23%		
Predefined CRF: Fatal/Inj	0%		53%		54%		45%		
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556		FHWA Clearinghouse #s 2753 / 2755		
User Defined CRF: PDO									
User Defined CRF: Fatal/Inj									
User Defined CRF Source (write in if applicable):									
Environmental Impacts:[1]									
Historic District/Property	None		None		None		None		
Archaeology Resources	None		None		None		None		
Graveyard	None		None		None		None		
Stream	None		None		None		None		
Underground Tank/Hazmat	None		None		None		None		
Park Land	None		None		None		None		
EJ Community	None		None		None		None		
Wooded Area	None		None		None		None		
Wetland	None		None		None		None		

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	5.1	6.3	6.6	5.8	
Rank of Control Type Alternatives:	4	2	1	3	

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Highland View	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Highland View			SB Highland View		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	1	1	1	1	0	0	1	0	0	0	0
Lane Widths*	0'	12'	12'	12'	12'	0'	0'	12'	0'	0'	0'	0'
Bay Length**	0'		200'	175'		0'	0'		0'	0'		0'
Median Width		12'			0'			0'			0'	
Right-of-Way	100'						50'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	1	1	1	1	1
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		High-T (unsignalized)		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	13,435	$127,225	9,835	$93,134	16,000	$151,515		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	1,850	$35,298	1,850	$35,298	2,120	$40,450		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895	150	$7,737		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	2,775	$5,256	2,775	$5,256	0	$0		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	1	$7,500	1	$7,500	1	$7,500		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	925	$31,534	925	$31,534	1,060	$36,136		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	925	$21,025	925	$21,025	1,060	$24,094		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$50,726		$41,328		$53,486		
Traffic Control - 20%	n/a	n/a		$0		$50,726		$41,328		$53,486		
Reimbrusable Utility	n/a	n/a		$0		$12,681		$10,332		$13,372		
Preliminary Engineering - 15%	n/a	n/a		$0		$38,044		$30,996		$40,115		
Contigency - 20%	n/a	n/a		$0		$50,726		$41,328		$53,486		
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$21,328		$21,328		$41,016		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$12,797		$12,797		$24,609		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$491,000**		**$406,000**		**$547,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	90	0.0	60	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.25	0.1	26,870	13,435.0	1,340	670.0	510	255.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.25	0.1	19,670	9,835.0	1,340	670.0	510	255.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.0	16,000	0.0	800	0.0	260	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Highland View
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	9,375	
Existing Avg Daily Traffic (Minor Street):	315	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	1.8 sec	0.4 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.07	0.05
2046 Design Yr Peak Hour Intersection Delay:	2.1 sec	0.4 sec
2046 Design Yr Peak Hour Intersection V/C:	0.10	0.06

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
	PDO	Injury Crash*	Fatal Crash*
Crash Type			
Angle	1	0	0
Head-On	0	0	0
Rear End	1	2	0
Sideswipe - same	0	0	0
Sideswipe - opposite	1	0	0
Not Collision w/Motor Veh	2	0	0
TOTALS:	**5**	**2**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

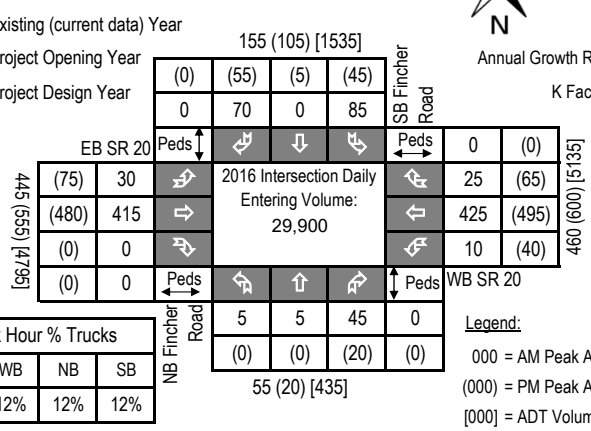
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District: 6 - Cartersville	
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Fincher Road	Speed Limit:	45 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Signal (turn lanes on mainline)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

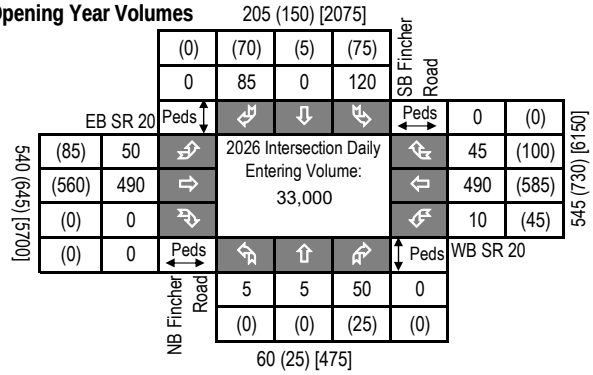
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

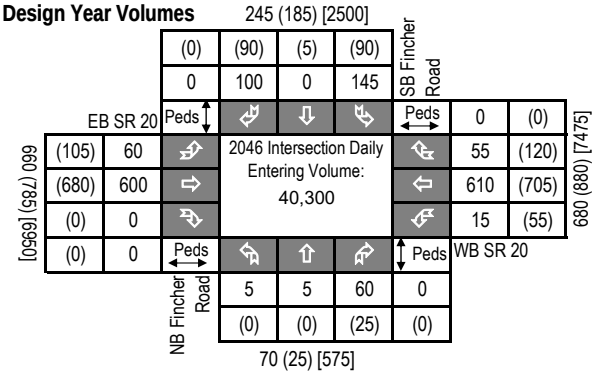
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.86 / Fincher Road - 0.14

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Fincher Road
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	No	No	No	No	No	No	No	Existing condition is signalized
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	Existing condition is signalized
	Mini Roundabout	No	No	No	No	No	No	No	High volumes and multiple lane approaches
	Single Lane Roundabout	No	No	No	No	No	No	No	Multiple lane approaches. Not suitable
	Multilane Roundabout	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RCUT (stop control)	No	No	No	No	No	No	No	Turning movement volumes are too high
	RIRO w/down stream U-Turn	No	No	No	No	No	No	No	Turning movement volumes are too high
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Not a T intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	High left-turn and thru volumes from minor road
	RCUT (signalized)	No	No	No	No	No	No	No	High left-turn and thru volumes from minor road
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Continuous Green-T	No	No	No	No	No	No	No	Not a T intersection
	Jughandle	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Quadrant Roadway	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Not an interchange
	Diverging Diamond	No	No	No	No	No	No	No	Not an interchange
	Single Point Interchange	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Signalized (provide description):	No	No	No	No	No	No	No	N/A

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Fincher Road			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Signal (turn lanes on mainline)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	Meets Signal Warrants	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	30.3 sec	48.0 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.92	1.03
2046 Design Yr No-Build Peak Hr Intersection Delay	35.6 sec	103.5 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.92	1.24

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type — ***Crash Data:*** *Enter 5 most recent years of intersection crash data*	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	10	13	0	42%
Head-On	0	0	0	0%
Rear End	13	3	0	29%
Sideswipe - same	2	0	0	4%
Sideswipe - opposite	1	0	0	2%
Not Collision w/Motor Veh	10	3	0	24%
TOTALS:	36	19	0	55

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Multilane Roundabout	Traffic Signal	N/A	N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*	*new pavement or overlay assum*			
Construction Cost	$2,220,000	$0			
ROW Cost	$334,000	$0			
Environmental Cost	$0	$0			
Reimbursable Utility Cost	$66,000	$0			
Design & Contingency Cost	$620,000	$0			
Cost Adjustment (justification req'd)	0%	0%			
Total Cost	$3,240,000	$0			
Traffic Operations:		*User Cost Override*			
Traffic Analysis Software Used	SIDRA 7	Synchro 10			
Analysis Period	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr			
2046 Design Yr Build Intersection Delay	7.0 sec / 7.5 sec	19.9 sec / 18.6 sec			
2046 Design Yr Build Intersection V/C	0.41 / 0.40	0.74 / 0.73			
Safety Analysis:					
Predefined CRF: PDO	26%	0%			
Predefined CRF: Fatal/Inj	71%	0%			
Predefined CRF Source:	FHWA Clearinghouse #s 4196 / 4195	N/A			
User Defined CRF: PDO					
User Defined CRF: Fatal/Inj					
User Defined CRF Source (write in if applicable):					
Environmental Impacts:[1]					
Historic District/Property	None	None			
Archaeology Resources	None	None			
Graveyard	None	None			
Stream	None	None			
Underground Tank/Hazmat	None	None			
Park Land	None	None			
EJ Community	None	None			
Wooded Area	None	None			
Wetland	None	None			
Stakeholder Posture:	*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*				
	[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report				
Local Community Support	Unknown	Unknown			
GDOT Support	Unknown	Unknown			
Final ICE Stage 2 Score:	6.3	5.0			
Rank of Control Type Alternatives:	1	2			

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Fincher Road	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Signal (turn lanes on mainline	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Fincher Road			SB Fincher Road		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Lane Widths*	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'
Bay Length**	550'		250'	230'		250'	200'		100'	200'		200'
Median Width		16'			12'			12'			12'	
Right-of-Way	120'						100'					

Table 2: Proposed Conditions

	Multilane Roundabout	Traffic Signal	N/A	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	None	None	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	0	0	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	4	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	4	0	0	0	0
New/Replace Sidewalks (LF)	4'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Multilane Roundabout Quantity	Multilane Roundabout Cost	Traffic Signal Quantity	Traffic Signal Cost	N/A Quantity	N/A Cost	N/A Quantity	N/A Cost	N/A Quantity	N/A Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	75,186	$946,951	0	$0						
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0						
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	2400	$60,903	200	$3,816						
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0						
Concrete Island (sqyd)	n/a	$51.58/syd	600	$41,161	0	$0						
Median Landscaping	$100K/LM	$1.89/LF	3600	$9,068	0	$0						
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	0	$0						
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	1200	$54,409	100	$3,409						
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	3707	$50,540	0	$0						
Signing & Marking	$0	$22.73/LF	1,200	$36,277	100	$2,273						
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0						
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0						
Lighting (per pole)	n/a	$5,607 ea	4	$29,829	0	$0						
Signalized Ped Crossings (ea)	n/a	$19,637 ea	4	$104,469	0	$0						
6' Sidewalk (LF)	n/a	$49.23/LF	4	$262	0	$0						
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0						
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0						
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0						
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0						
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0						
Grading Complete - 20%	n/a	n/a		$532,214		$0						
Traffic Control - 20%	n/a	n/a		$354,809		$0						
Reimbrusable Utility	n/a	n/a		$66,693		$475						
Preliminary Engineering - 15%	n/a	n/a		$266,107		$1,425						
Contigency - 20%	n/a	n/a		$354,809		$1,900						
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$209,259		$0						
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0						
ROW Multiplier - 1.6	n/a	n/a		$125,555		$0						
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0						
Grand Total Costs				**$3,243,000**		**$13,000**						

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Multilane Roundabout	High Speed Roundabout	F.D. Asphalt	1.28	0.0	75,186	0.0	600	0.0	600	0.0
Traffic Signal	No Paving	None	0.00	0.0	0	0.0	50	0.0	50	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

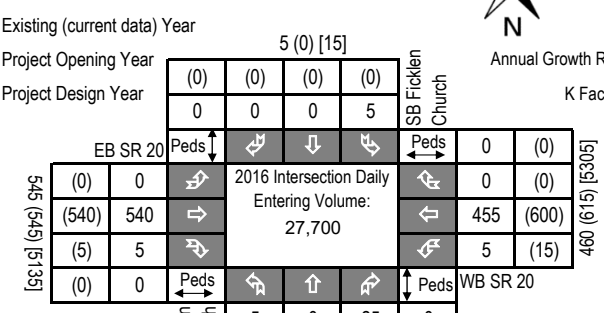
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Ficklen Church	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

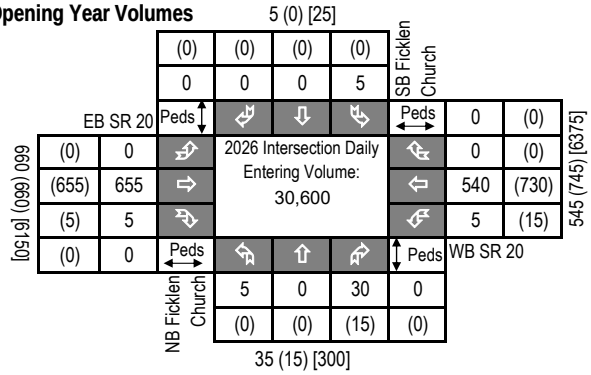
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

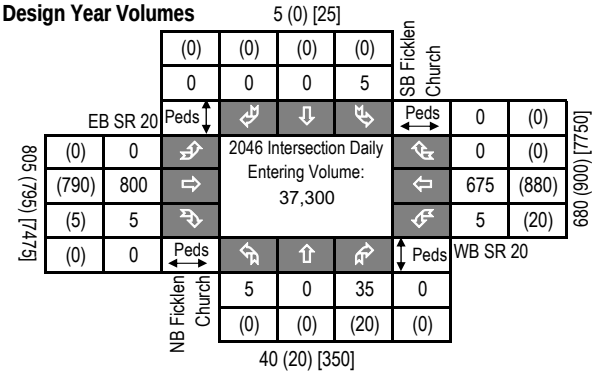
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.97 / Ficklen Church - 0.03

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Ficklen Church
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Low turning volumes. Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Ficklen Church			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	1.1 sec	0.4 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.17	0.06
2046 Design Yr No-Build Peak Hr Intersection Delay	1.4 sec	0.5 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.26	0.10

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	1	2	0	16%
Head-On	1	0	0	5%
Rear End	6	2	0	42%
Sideswipe - same	1	0	0	5%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	5	1	0	32%
TOTALS:	14	5	0	19

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$684,000		$571,000			
ROW Cost	$0		$120,000		$120,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$24,000		$20,000			
Design & Contingency Cost	$0		$171,000		$142,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$999,000		$853,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	1.0 sec	0.5 sec	0.8 sec	0.3 sec	0.8 sec	0.1 sec		
2046 Design Yr Build Intersection V/C	0.18	0.07	0.08	0.04	0.08	0.04		
Safety Analysis:								
Predefined CRF: PDO	0%		31%		35%			
Predefined CRF: Fatal/Inj	0%		53%		54%			
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	5.1		6.2		6.5			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in Sheet 1 are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Ficklen Church	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Ficklen Church			SB Ficklen Church		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane Widths*	0'	12'	0'	0'	12'	0'	0'	12'	0'	0'	12'	0'
Bay Length**	0'		0'	0'		0'	0'		0'	0'		0'
Median Width		0'			0'			0'			0'	
Right-of-Way	80'						40'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	N/A	N/A
Proposed Pavement Type	None	F.D. Asphalt	F.D. Asphalt	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	0	0	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	29,358	$278,012	22,158	$209,831				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	3,680	$70,214	3,680	$70,214				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	5,520	$10,455	5,520	$10,455				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	0	$0	0	$0				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,840	$62,727	1,840	$62,727				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,840	$41,823	1,840	$41,823				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$97,804		$81,589				
Traffic Control - 20%	n/a	n/a		$0		$97,804		$81,589				
Reimbrusable Utility	n/a	n/a		$0		$24,451		$20,397				
Preliminary Engineering - 15%	n/a	n/a		$0		$73,353		$61,192				
Contigency - 20%	n/a	n/a		$0		$97,804		$81,589				
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$75,327		$75,327				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$45,196		$45,196				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$1,001,000**		**$855,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	None	0.00	0.0	0	0.0	70	0.0	70	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.46	0.0	29,358	0.0	1,320	0.0	520	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.46	0.0	22,158	0.0	1,320	0.0	520	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Ficklen Church
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	10,440	
Existing Avg Daily Traffic (Minor Street):	270	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	0.9 sec	0.2 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.06	0.03
2046 Design Yr Peak Hour Intersection Delay:	0.8 sec	0.3 sec
2046 Design Yr Peak Hour Intersection V/C:	0.08	0.04

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	1	2	0
Head-On	1	0	0
Rear End	6	2	0
Sideswipe - same	1	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	5	1	0
TOTALS:	**14**	**5**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. A fire station is located on the north of the intersection at current location. In order to provide access to fire station, an RCUT with mountable median alternative is considered at the current location and a waiver is requested.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

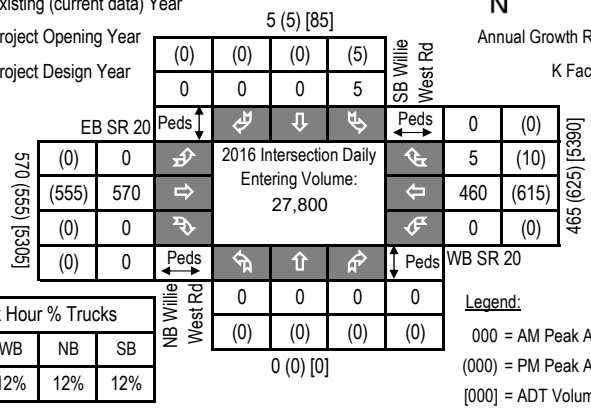
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Willie West Rd	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

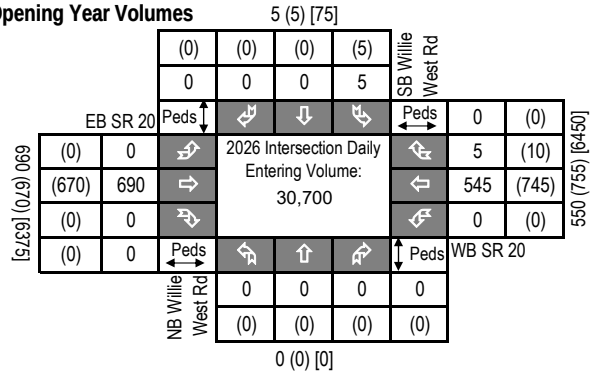
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

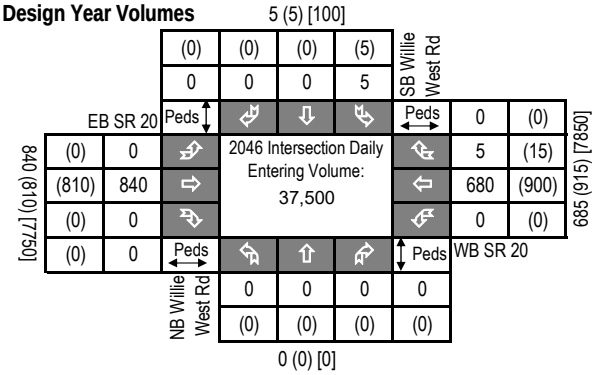
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.99 / Willie West Rd - 0.01

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Willie West Rd
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing condition is a T-intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Willie West Rd			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.2 sec	0.1 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.07	0.04
2046 Design Yr No-Build Peak Hr Intersection Delay	0.3 sec	0.1 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.12	0.06

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	1	0	0	14%
Head-On	0	0	0	0%
Rear End	2	2	0	57%
Sideswipe - same	0	0	0	0%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	1	1	0	29%
TOTALS:	4	3	0	7

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*	*Additional description here*	*Additional description here*	*Additional description here*	
Construction Cost	$0	$380,000	$314,000	$384,000	
ROW Cost	$0	$60,000	$60,000	$65,000	
Environmental Cost	$0	$0	$0	$0	
Reimbursable Utility Cost	$0	$13,000	$11,000	$13,000	
Design & Contingency Cost	$0	$95,000	$78,000	$96,000	
Cost Adjustment (justification req'd)	0%	0%	0%	0%	
Total Cost	$0	$548,000	$463,000	$558,000	
Traffic Operations:					
Traffic Analysis Software Used	Synchro 10	HCS7	HCS7	Synchro 10	
Analysis Period	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	
2046 Design Yr Build Intersection Delay	0.2 sec / 0.1 sec	0.2 sec / 0.2 sec	0.2 sec / 0.2 sec	0.2 sec / 0.3 sec	
2046 Design Yr Build Intersection V/C	0.08 / 0.04	0.01 / 0.01	0.01 / 0.01	0.04 / 0.06	
Safety Analysis:					
Predefined CRF: PDO	0%	31%	35%	23%	
Predefined CRF: Fatal/Inj	0%	53%	54%	45%	
Predefined CRF Source:	N/A	NC/MO Table 4-7	FHWA Clearinghouse #s 5555 / 5556	FHWA Clearinghouse #s 2753 / 2755	
User Defined CRF: PDO					
User Defined CRF: Fatal/Inj					
User Defined CRF Source (write in if applicable):					
Environmental Impacts:[1]					
Historic District/Property	None	None	None	None	
Archaeology Resources	None	None	None	None	
Graveyard	None	None	None	None	
Stream	None	None	None	None	
Underground Tank/Hazmat	None	None	None	None	
Park Land	None	None	None	None	
EJ Community	None	None	None	None	
Wooded Area	None	None	None	None	
Wetland	None	None	None	None	
Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	5.3	6.5	6.8	6.1	
Rank of Control Type Alternatives:	4	2	1	3	

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Willie West Rd	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Willie West Rd			SB Willie West Rd		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	1	0	0	1	0	0	0	0	0	1	0
Lane Widths*	0'	12'	0'	0'	12'	0'	0'	0'	0'	0'	12'	0'
Bay Length**	0'		0'	0'		0'	0'		0'	0'		0'
Median Width		0'			0'			0'			0'	
Right-of-Way	80'						30'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	2	2	2	2	2
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		High-T (unsignalized)		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	14,679	$139,006	11,079	$104,915	16,000	$151,515		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	1,830	$34,916	1,830	$34,916	2,120	$40,450		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895	150	$7,737		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	2,745	$5,199	2,745	$5,199	0	$0		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	2	$15,000	2	$15,000	2	$15,000		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	915	$31,193	915	$31,193	1,060	$36,136		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	915	$20,798	915	$20,798	1,060	$24,094		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$54,380		$44,983		$54,986		
Traffic Control - 20%	n/a	n/a		$0		$54,380		$44,983		$54,986		
Reimbrusable Utility	n/a	n/a		$0		$13,595		$11,246		$13,747		
Preliminary Engineering - 15%	n/a	n/a		$0		$40,785		$33,737		$41,240		
Contigency - 20%	n/a	n/a		$0		$54,380		$44,983		$54,986		
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$37,734		$37,734		$41,016		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$22,641		$22,641		$24,609		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$550,000**		**$465,000**		**$561,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	70	0.0	60	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.46	0.2	29,358	14,679.0	1,320	660.0	510	255.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.46	0.2	22,158	11,079.0	1,320	660.0	510	255.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.0	16,000	0.0	800	0.0	260	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Willie West Rd
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	10,695	
Existing Avg Daily Traffic (Minor Street):	85	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	0.3 sec	0.2 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.01	0.01
2046 Design Yr Peak Hour Intersection Delay:	0.2 sec	0.2 sec
2046 Design Yr Peak Hour Intersection V/C:	0.01	0.01

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data (Crash Type)	*Crash Severity* PDO	Injury Crash*	Fatal Crash*
Angle	1	0	0
Head-On	0	0	0
Rear End	2	2	0
Sideswipe - same	0	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	1	1	0
TOTALS:	**4**	**3**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Fields Chapel	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%

N

0 (0) [0]

			(0)	(0)	(0)	(0)	SB Fields Chapel		
			0	0	0	0			
		EB SR 20	Peds				Peds	0	(0)
580 (965) [5440]	(0)	0		2016 Intersection Daily Entering Volume: 30,500				0	(0)
	(545)	570						450	(605)
	(20)	10						25	(60)
	(0)	0	Peds				Peds	WB SR 20	475 (665) [5870]
NB Fields Chapel			15	0	80	0			
			(25)	(0)	(35)	(0)			

95 (60) [900]

Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.93 / Fields Chapel - 0.07

2026 Opening Year Volumes

0 (0) [0]

			(0)	(0)	(0)	(0)	SB Fields Chapel		
			0	0	0	0			
		EB SR 20	Peds				Peds	0	(0)
700 (680) [1600]	(0)	0		2026 Intersection Daily Entering Volume: 33,700				0	(0)
	(655)	690						535	(730)
	(25)	10						30	(75)
	(0)	0	Peds				Peds	WB SR 20	565 (805) [7050]
NB Fields Chapel			15	0	95	0			
			(30)	(0)	(45)	(0)			

110 (75) [1100]

2046 Design Year Volumes

0 (0) [0]

			(0)	(0)	(0)	(0)	SB Fields Chapel		
			0	0	0	0			
		EB SR 20	Peds				Peds	0	(0)
850 (820) [7900]	(0)	0		2046 Intersection Daily Entering Volume: 41,100				0	(0)
	(795)	835						665	(890)
	(25)	15						35	(85)
	(0)	0	Peds				Peds	WB SR 20	700 (975) [8550]
NB Fields Chapel			20	0	115	0			
			(35)	(0)	(55)	(0)			

135 (90) [1300]

Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Fields Chapel
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speed approaches and high volume on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speed approaches and high volume on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speed approaches and high volume on major road
	Multilane Roundabout	No	No	No	No	No	No	No	Not suitable for multilane roundabout
	RCUT (stop control)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing Condition is a T-intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Fields Chapel			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	2.5 sec	3.5 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.44	0.57
2046 Design Yr No-Build Peak Hr Intersection Delay	5.5 sec	11.6 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.76	1.08

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	5	2	0	29%
Head-On	0	1	0	4%
Rear End	4	0	0	17%
Sideswipe - same	3	0	0	13%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	7	2	0	38%
TOTALS:	19	5	0	24

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		High-T (unsignalized)		N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*		*Additional description here*		
Construction Cost	$0		$340,000		$274,000		$374,000		
ROW Cost	$0		$52,000		$52,000		$65,000		
Environmental Cost	$0		$0		$0		$0		
Reimbursable Utility Cost	$0		$12,000		$9,000		$13,000		
Design & Contingency Cost	$0		$85,000		$68,000		$93,000		
Cost Adjustment (justification req'd)	0%		0%		0%		0%		
Total Cost	$0		$489,000		$403,000		$545,000		
Traffic Operations:									
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7		Synchro 10		
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	
2046 Design Yr Build Intersection Delay	2.9 sec	5.8 sec	3.7 sec	4.8 sec	3.5 sec	4.4 sec	2.9 sec	2.5 sec	
2046 Design Yr Build Intersection V/C	0.56	0.81	0.28	0.18	0.29	0.20	0.42	0.36	
Safety Analysis:									
Predefined CRF: PDO	0%		31%		35%		23%		
Predefined CRF: Fatal/Inj	0%		53%		54%		45%		
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556		FHWA Clearinghouse #s 2753 / 2755		
User Defined CRF: PDO									
User Defined CRF: Fatal/Inj									
User Defined CRF Source (write in if applicable):									
Environmental Impacts:[1]									
Historic District/Property	None		None		None		None		
Archaeology Resources	None		None		None		None		
Graveyard	None		None		None		None		
Stream	None		None		None		None		
Underground Tank/Hazmat	None		None		None		None		
Park Land	None		None		None		None		
EJ Community	None		None		None		None		
Wooded Area	None		None		None		None		
Wetland	None		None		None		None		

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	3.9	5.9	6.2	5.1	
Rank of Control Type Alternatives:	4	2	1	3	

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Fields Chapel	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Fields Chapel			SB Fields Chapel		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	1	0	1	1	0	0	1	0	0	0	0
Lane Widths*	0'	12'	0'	12'	12'	0'	0'	12'	0'	0'	0'	0'
Bay Length**	0'		0'	140'		0'	0'		0'	0'		0'
Median Width		12'			12'			0'			0'	
Right-of-Way	80'						50'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	1	1	1	1	1
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		High-T (unsignalized)		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	12,304	$116,515	8,704	$82,424	16,000	$151,515		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	1,850	$35,298	1,850	$35,298	2,120	$40,450		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895	150	$7,737		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	2,775	$5,256	2,775	$5,256	0	$0		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	1	$7,500	1	$7,500	1	$7,500		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	925	$31,534	925	$31,534	1,060	$36,136		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	925	$21,025	925	$21,025	1,060	$24,094		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$48,584		$39,186		$53,486		
Traffic Control - 20%	n/a	n/a		$0		$48,584		$39,186		$53,486		
Reimbrusable Utility	n/a	n/a		$0		$12,146		$9,797		$13,372		
Preliminary Engineering - 15%	n/a	n/a		$0		$36,438		$29,390		$40,115		
Contigency - 20%	n/a	n/a		$0		$48,584		$39,186		$53,486		
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$32,813		$32,813		$41,016		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$19,688		$19,688		$24,609		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$490,000**		**$405,000**		**$547,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	90	0.0	60	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.41	0.2	24,608	12,304.0	1,340	670.0	510	255.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.41	0.2	17,408	8,704.0	1,340	670.0	510	255.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.0	16,000	0.0	800	0.0	260	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Fields Chapel
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	11,310	
Existing Avg Daily Traffic (Minor Street):	900	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	3.3 sec	4.6 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.20	0.14
2046 Design Yr Peak Hour Intersection Delay:	3.7 sec	4.8 sec
2046 Design Yr Peak Hour Intersection V/C:	0.28	0.18

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data (Crash Type)	Crash Severity: PDO	Injury Crash*	Fatal Crash*
Angle	5	2	0
Head-On	0	1	0
Rear End	4	0	0
Sideswipe - same	3	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	7	2	0
TOTALS:	**19**	**5**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

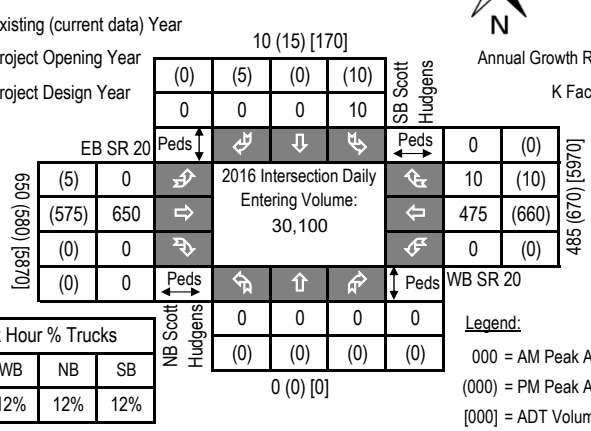
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Scott Hudgens	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

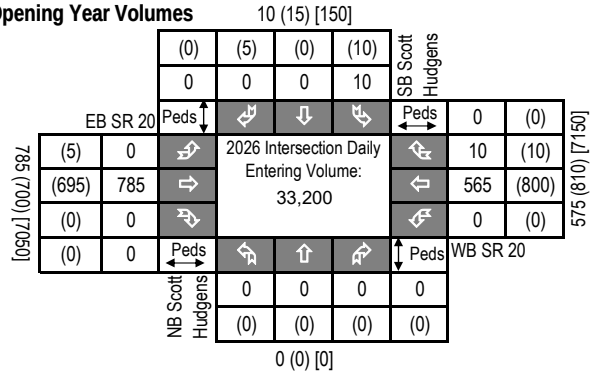
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

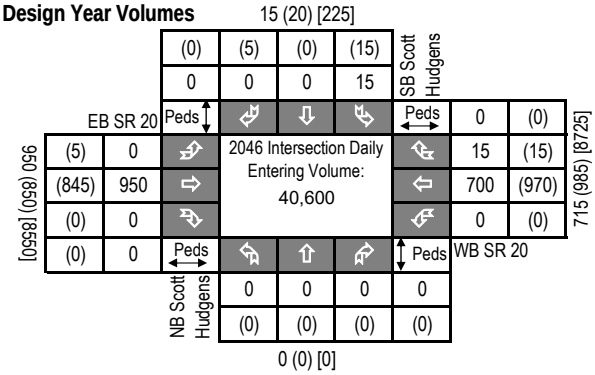
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.98 / Scott Hudgens - 0.02

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Scott Hudgens
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speed approaches and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speed approaches and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speed approaches and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speed approaches and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing intersection is a T intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Scott Hudgens			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.5 sec	0.5 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.15	0.15
2046 Design Yr No-Build Peak Hr Intersection Delay	1.2 sec	1.1 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.38	0.35

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type: *Crash Data: Enter 5 most recent years of intersection crash data*	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	1	0	0	11%
Head-On	0	0	0	0%
Rear End	3	1	0	44%
Sideswipe - same	1	0	0	11%
Sideswipe - opposite	1	0	0	11%
Not Collision w/Motor Veh	1	1	0	22%
TOTALS:	7	2	0	9

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*	*Additional description here*	*Additional description here*	*Additional description here*	
Construction Cost	$0	$359,000	$280,000	$700,000	
ROW Cost	$0	$0	$0	$215,000	
Environmental Cost	$0	$0	$0	$0	
Reimbursable Utility Cost	$0	$12,000	$10,000	$25,000	
Design & Contingency Cost	$0	$89,000	$70,000	$175,000	
Cost Adjustment (justification req'd)	0%	0%	0%	0%	
Total Cost	$0	$460,000	$360,000	$1,115,000	
Traffic Operations:					
Traffic Analysis Software Used	Synchro 10	HCS7	HCS7	Synchro 10	
Analysis Period	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	
2046 Design Yr Build Intersection Delay	0.6 sec / 0.7 sec	1.1 sec / 1.1 sec	1.1 sec / 1.1 sec	0.6 sec / 0.6 sec	
2046 Design Yr Build Intersection V/C	0.25 / 0.26	0.03 / 0.05	0.03 / 0.05	0.10 / 0.12	
Safety Analysis:					
Predefined CRF: PDO	0%	31%	35%	23%	
Predefined CRF: Fatal/Inj	0%	53%	54%	45%	
Predefined CRF Source:	N/A	NC/MO Table 4-7	FHWA Clearinghouse #s 5555 / 5556	FHWA Clearinghouse #s 2753 / 2755	
User Defined CRF: PDO					
User Defined CRF: Fatal/Inj					
User Defined CRF Source (write in if applicable):					
Environmental Impacts:[1]					
Historic District/Property	None	None	None	None	
Archaeology Resources	None	None	None	None	
Graveyard	None	None	None	None	
Stream	None	None	None	None	
Underground Tank/Hazmat	None	None	None	None	
Park Land	None	None	None	None	
EJ Community	None	None	None	None	
Wooded Area	None	None	None	None	
Wetland	None	None	None	None	
Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	4.8	6.7	7.0	4.9	
Rank of Control Type Alternatives:	4	2	1	3	

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Scott Hudgens	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Scott Hudgens			SB Scott Hudgens		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	1	0	0	1	1	0	0	0	0	1	0
Lane Widths*	12'	12'	0'	0'	12'	12'	0'	0'	0'	0'	12'	0'
Bay Length**	240'		0'	0'		175'	0'		0'	0'		0'
Median Width		0'			12'			0'			20'	
Right-of-Way	170'						190'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	0	0	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		High-T (unsignalized)		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	14,435	$136,695	9,835	$93,134	36,000	$340,909		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	1,870	$35,680	1,870	$35,680	3,200	$61,056		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895	150	$7,737		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	2,805	$5,313	2,805	$5,313	0	$0		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	0	$0	0	$0	0	$0		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	935	$31,875	935	$31,875	1,600	$54,545		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	935	$21,253	935	$21,253	1,600	$36,368		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$51,321		$40,030		$100,123		
Traffic Control - 20%	n/a	n/a		$0		$51,321		$40,030		$100,123		
Reimbrusable Utility	n/a	n/a		$0		$12,830		$10,007		$25,031		
Preliminary Engineering - 15%	n/a	n/a		$0		$38,491		$30,022		$75,092		
Contigency - 20%	n/a	n/a		$0		$51,321		$40,030		$100,123		
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$121		$121		$134,531		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$72		$72		$80,719		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$462,000**		**$360,000**		**$1,116,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	100	0.0	70	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.00	0.0	26,870	14,435.0	1,350	675.0	520	260.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.00	0.0	19,670	9,835.0	1,350	675.0	520	260.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.8	16,000	36,000.0	800	1,000.0	270	600.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Scott Hudgens
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	11,840	
Existing Avg Daily Traffic (Minor Street):	170	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	0.9 sec	0.9 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.02	0.03
2046 Design Yr Peak Hour Intersection Delay:	1.1 sec	1.1 sec
2046 Design Yr Peak Hour Intersection V/C:	0.03	0.05

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
	PDO	Injury Crash*	Fatal Crash*
Angle	1	0	0
Head-On	0	0	0
Rear End	3	1	0
Sideswipe - same	1	0	0
Sideswipe - opposite	1	0	0
Not Collision w/Motor Veh	1	1	0
TOTALS:	**7**	**2**	**0**

Crash Type

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. Both RIRO and RCUT alternatives are noticed to provide operational and safety benefits at the current intersection. With low crash history, RCUT is selected as preferred alternative and therefore, a waiver is requested.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

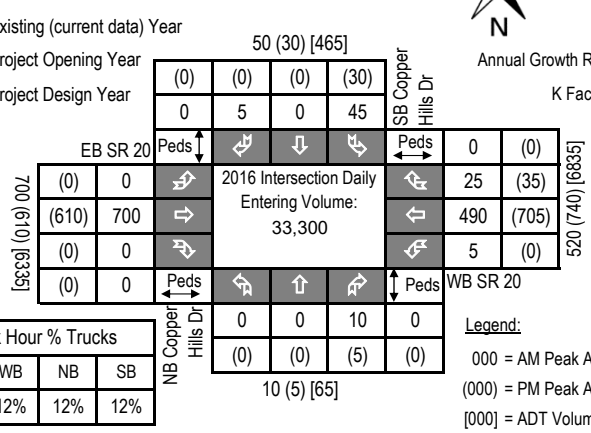
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District: 6 - Cartersville	
Major (State) Road:	SR 20	Speed Limit:	55 mph
Minor (Crossing) ST:	Copper Hills Dr	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

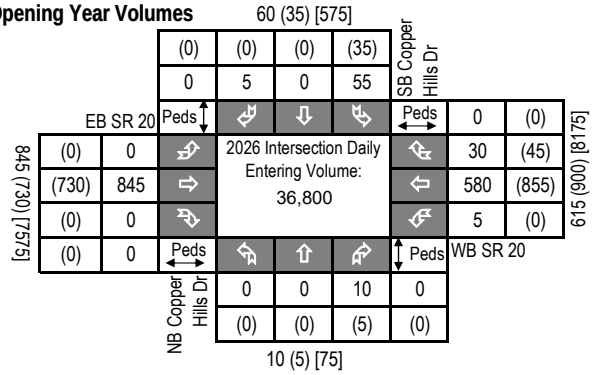
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

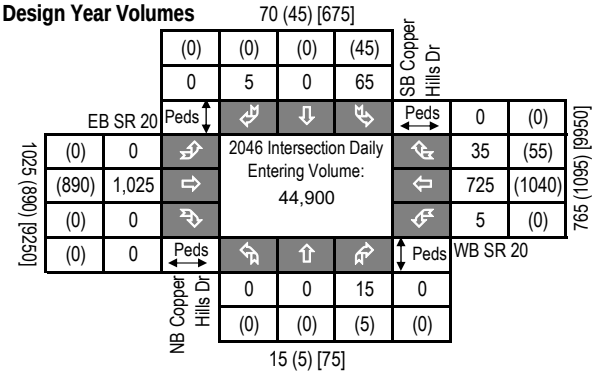
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.96 / Copper Hills Dr - 0.04

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Copper Hills Dr
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speed approaches and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speed approaches and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speed approaches and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speed approaches and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Copper Hills Dr			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	2.1 sec	1.2 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.47	0.33
2046 Design Yr No-Build Peak Hr Intersection Delay	5.9 sec	2.4 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.88	0.60

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Data: Enter 5 most recent years of intersection crash data	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
	Angle	0	0	0	0%
	Head-On	0	0	0	0%
	Rear End	1	0	0	11%
	Sideswipe - same	0	0	0	0%
	Sideswipe - opposite	1	0	0	11%
	Not Collision w/Motor Veh	7	0	0	78%
	TOTALS:	9	0	0	9

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$679,000		$566,000			
ROW Cost	$0		$106,000		$106,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$24,000		$20,000			
Design & Contingency Cost	$0		$169,000		$141,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$978,000		$833,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	11.8 sec	5.0 sec	3.9 sec	2.3 sec	3.9 sec	2.3 sec		
2046 Design Yr Build Intersection V/C	1.23	0.91	0.13	0.11	0.13	0.11		
Safety Analysis:								
Predefined CRF: PDO	0%		31%		35%			
Predefined CRF: Fatal/Inj	0%		53%		54%			
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	3.1		5.6		5.9			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Copper Hills Dr	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Copper Hills Dr			SB Copper Hills Dr		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	2	0	0	1	1	0	1	0	0	1	0
Lane Widths*	12'	12'	0'	0'	12'	12'	0'	12'	0'	0'	12'	0'
Bay Length**	190'		0'	0'		270'	0'		0'	0'		0'
Median Width		0'			12'			0'			0'	
Right-of-Way	80'						50'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	2	2	2	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	26,870	$254,449	19,670	$186,267				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	3,780	$72,122	3,780	$72,122				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	5,670	$10,739	5,670	$10,739				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	2	$15,000	2	$15,000				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,890	$64,432	1,890	$64,432				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,890	$42,960	1,890	$42,960				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$97,098		$80,883				
Traffic Control - 20%	n/a	n/a		$0		$97,098		$80,883				
Reimbrusable Utility	n/a	n/a		$0		$24,275		$20,221				
Preliminary Engineering - 15%	n/a	n/a		$0		$72,824		$60,662				
Contigency - 20%	n/a	n/a		$0		$97,098		$80,883				
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$66,559		$66,559				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$39,935		$39,935				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$980,000**		**$834,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	120	0.0	70	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.41	0.0	26,870	0.0	1,370	0.0	520	0.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.41	0.0	19,670	0.0	1,370	0.0	520	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Copper Hills Dr
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	13,170	
Existing Avg Daily Traffic (Minor Street):	530	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	3.8 sec	2.1 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.10	0.07
2046 Design Yr Peak Hour Intersection Delay:	3.9 sec	2.3 sec
2046 Design Yr Peak Hour Intersection V/C:	0.13	0.11

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	0	0	0
Head-On	0	0	0
Rear End	1	0	0
Sideswipe - same	0	0	0
Sideswipe - opposite	1	0	0
Not Collision w/Motor Veh	7	0	0
TOTALS:	**9**	**0**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

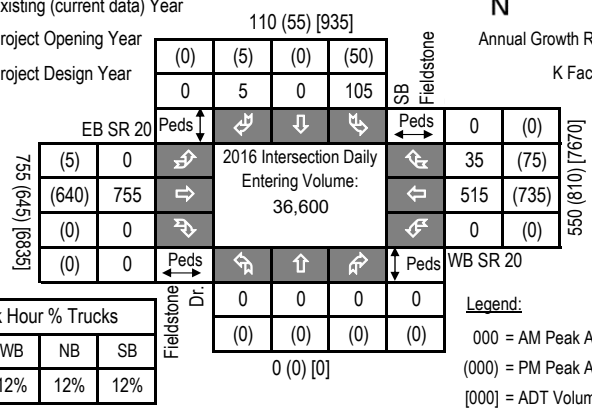
GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	Fieldstone Dr.	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%

N



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

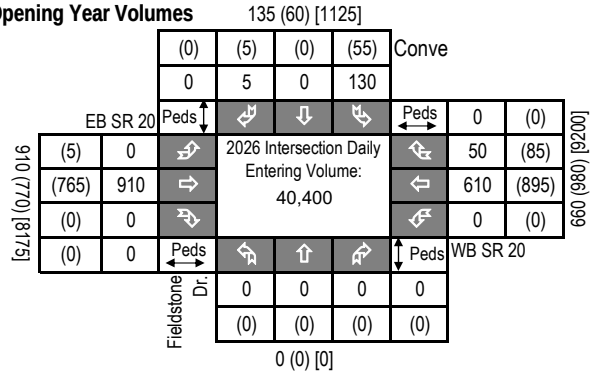
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

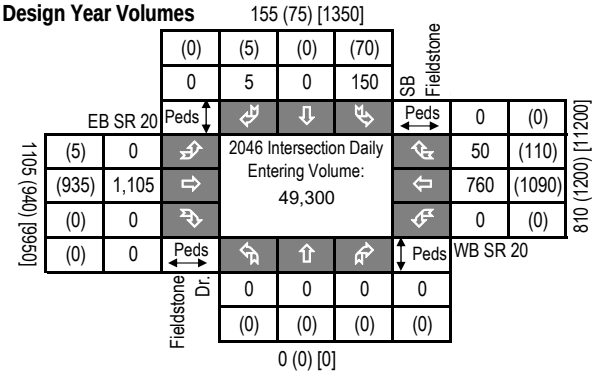
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.94 / Fieldstone Dr. - 0.0600000000000001

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Fieldstone Dr.
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing condition is a T-intersection.
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Fieldstone Dr.			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	66.0 sec	4.9 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	2.24	0.80
2046 Design Yr No-Build Peak Hr Intersection Delay	175.9 sec	22.1 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	4.80	1.82

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☑ TRANSIT

Crash Type — *Crash Data: Enter 5 most recent years of intersection crash data*	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	3	1	0	31%
Head-On	0	0	0	0%
Rear End	2	0	0	15%
Sideswipe - same	1	1	0	15%
Sideswipe - opposite	1	0	0	8%
Not Collision w/Motor Veh	4	0	0	31%
TOTALS:	11	2	0	13

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		High-T (unsignalized)		N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*		*Additional description here*		
Construction Cost	$0		$341,000		$275,000		$374,000		
ROW Cost	$0		$0		$0		$65,000		
Environmental Cost	$0		$0		$0		$0		
Reimbursable Utility Cost	$0		$12,000		$9,000		$13,000		
Design & Contingency Cost	$0		$85,000		$68,000		$93,000		
Cost Adjustment (justification req'd)	0%		0%		0%		0%		
Total Cost	$0		$438,000		$352,000		$545,000		
Traffic Operations:									
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7		Synchro 10		
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	
2046 Design Yr Build Intersection Delay	88.2 sec	10.3 sec	11.2 sec	3.7 sec	11.2 sec	3.7 sec	20.6 sec	9.3 sec	
2046 Design Yr Build Intersection V/C	2.90	1.24	0.30	0.19	0.30	0.19	1.03	0.95	
Safety Analysis:									
Predefined CRF: PDO	0%		31%		35%		23%		
Predefined CRF: Fatal/Inj	0%		53%		54%		45%		
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556		FHWA Clearinghouse #s 2753 / 2755		
User Defined CRF: PDO									
User Defined CRF: Fatal/Inj									
User Defined CRF Source (write in if applicable):									
Environmental Impacts:[1]									
Historic District/Property	None		None		None		None		
Archaeology Resources	None		None		None		None		
Graveyard	None		None		None		None		
Stream	None		None		None		None		
Underground Tank/Hazmat	None		None		None		None		
Park Land	None		None		None		None		
EJ Community	None		None		None		None		
Wooded Area	None		None		None		None		
Wetland	None		None		None		None		

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	1.6	5.8	6.2	4.9	
Rank of Control Type Alternatives:	4	2	1	3	

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Fieldstone Dr.	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Fieldstone Dr.			SB Fieldstone Dr.		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	1	0	0	1	1	0	0	0	0	1	0
Lane Widths*	12'	12'	0'	0'	12'	12'	0'	0'	0'	0'	12'	0'
Bay Length**	125'		0'	0'		220'	0'		0'	0'		0'
Median Width		12'			12'			0'			0'	
Right-of-Way	180'						50'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	1	1	1	1	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		High-T (unsignalized)		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	12,304	$116,515	8,704	$82,424	16,000	$151,515		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	1,870	$35,680	1,870	$35,680	2,120	$40,450		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895	150	$7,737		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	2,805	$5,313	2,805	$5,313	0	$0		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	1	$7,500	1	$7,500	1	$7,500		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	935	$31,875	935	$31,875	1,060	$36,136		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	935	$21,253	935	$21,253	1,060	$24,094		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$48,785		$39,388		$53,486		
Traffic Control - 20%	n/a	n/a		$0		$48,785		$39,388		$53,486		
Reimbrusable Utility	n/a	n/a		$0		$12,196		$9,847		$13,372		
Preliminary Engineering - 15%	n/a	n/a		$0		$36,589		$29,541		$40,115		
Contigency - 20%	n/a	n/a		$0		$48,785		$39,388		$53,486		
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$0		$0		$41,016		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$0		$0		$24,609		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$439,000**		**$354,000**		**$547,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	110	0.0	60	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.00	0.0	24,608	12,304.0	1,360	680.0	510	255.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.00	0.0	17,408	8,704.0	1,360	680.0	510	255.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.0	16,000	0.0	800	0.0	260	0.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Fieldstone Dr.
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	14,505	
Existing Avg Daily Traffic (Minor Street):	935	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	9.0 sec	3.4 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.23	0.13
2046 Design Yr Peak Hour Intersection Delay:	11.2 sec	3.7 sec
2046 Design Yr Peak Hour Intersection V/C:	0.30	0.19

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data :Enter 5 most recent years of intersection crash data	*Crash Severity*		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	3	1	0
Head-On	0	0	0
Rear End	2	0	0
Sideswipe - same	1	1	0
Sideswipe - opposite	1	0	0
Not Collision w/Motor Veh	4	0	0
TOTALS:	**11**	**2**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RIRO, which has a closed median. The GDOT Design Policy Manual states the maximum spacing between median openings in developed areas should be one mile. The selected alternative is RCUT, the second highest scoring alternative, because it has the open median needed to come in under the one mile maximum spacing between openings.

Proposed Intersection Control: RCUT (stop control)

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

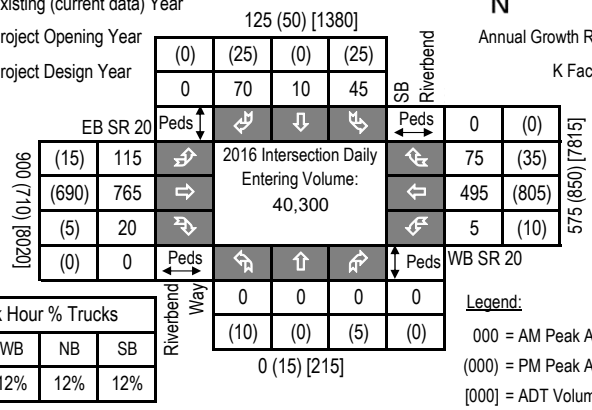
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	Riverbend Way	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

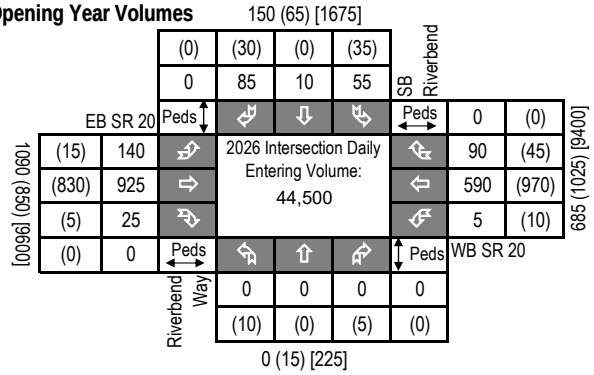
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

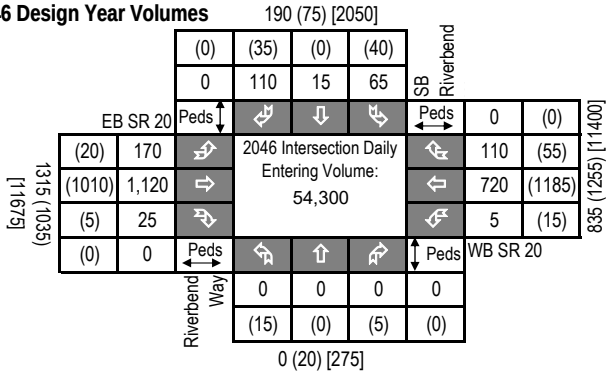
[000] = ADT Volume (Estimate)

pproach Splits: SR 20 - 0.94 / Riverbend Way - 0.0600000000000001

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Riverbend Way
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High volumes on mainline. Not suitable
	Mini Roundabout	No	No	No	No	No	No	No	High speed and high volume approaches. Not suitable
	Single Lane Roundabout	No	No	No	No	No	No	No	High speed and high volume approaches. Not suitable
	Multilane Roundabout	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Potential solution to Evaluate**
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential solution to Evaluate**
	RIRO w/down stream U-Turn	No	No	No	No	No	No	No	High left turn volumes from major street. Not suitable
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Riverbend Way			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	87.3 sec	7.5 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.24	1.11
2046 Design Yr No-Build Peak Hr Intersection Delay	289.7 sec	24.4 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	5.00	2.75

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	7	4	0	29%
Head-On	0	0	0	0%
Rear End	15	5	0	53%
Sideswipe - same	1	0	0	3%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	5	1	0	16%
TOTALS:	28	10	0	38

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)		Multilane Roundabout		RCUT (stop control)		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*			
Construction Cost	$0		$2,063,000		$673,000			
ROW Cost	$0		$390,000		$75,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$0		$61,000		$24,000			
Design & Contingency Cost	$0		$576,000		$168,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$0		$3,090,000		$940,000			
Traffic Operations:								
Traffic Analysis Software Used	Synchro 10		SIDRA 7		HCS7			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	158.2 sec	14.1 sec	12.2 sec	8.5 sec	5.7 sec	2.4 sec		
2046 Design Yr Build Intersection V/C	5.00	1.72	0.74	0.55	0.36	0.21		
Safety Analysis:								
Predefined CRF: PDO	0%		32%		31%			
Predefined CRF: Fatal/Inj	0%		71%		53%			
Predefined CRF Source:	N/A		FHWA Clearinghouse #s 236 / 237		NC/MO Table 4-7			
User Defined CRF: PDO								
User Defined CRF: Fatal/Inj								
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			
Stakeholder Posture:								
Local Community Support	Unknown		Unknown		Unknown			
GDOT Support	Unknown		Unknown		Unknown			
Final ICE Stage 2 Score:	-0.5		4.8		6.5			
Rank of Control Type Alternatives:	3		2		1			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): SimTraffic analysis is used for No-Build and Alternative 2 traffic analysis.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Riverbend Way	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Riverbend Way			SB Riverbend Way		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	1	0	1	2	1	0	1	0	0	1	1
Lane Widths*	12'	12'	0'	12'	12'	12'	0'	12'	0'	0'	12'	12'
Bay Length**	180'		0'	270'		260'	0'		0'	0'		75'
Median Width		12'			12'			0'			15'	
Right-of-Way	95'						50'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	Multilane Roundabout	RCUT (stop control)	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	4	4	4	4	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	4	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	4	0	0	0	0
New/Replace Sidewalks (LF)	4'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		Multilane Roundabout		RCUT (stop control)		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	75,186	$946,951	24,608	$233,028				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	2,400	$60,903	3,820	$72,886				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	600	$41,161	500	$25,790				
Median Landscaping	$100K/LM	$1.89/LF	0	$0	3,600	$9,068	5,730	$10,852				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	4	$39,900	4	$30,000				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,200	$54,409	1,910	$65,114				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	3,707	$50,540	0	$0				
Signing & Marking	$0	$22.73/LF	0	$0	1,200	$36,277	1,910	$43,414				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0				
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$0		$494,445		$96,217				
Traffic Control - 20%	n/a	n/a		$0		$329,630		$96,217				
Reimbrusable Utility	n/a	n/a		$0		$61,960		$24,054				
Preliminary Engineering - 15%	n/a	n/a		$0		$247,222		$72,163				
Contigency - 20%	n/a	n/a		$0		$329,630		$96,217				
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$244,098		$47,012				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$0		$146,459		$28,207				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$0**		**$3,093,000**		**$941,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	120	0.0	90	0.0
Multilane Roundabout	High Speed Roundabout	F.D. Asphalt	1.49	0.0	75,186	0.0	600	0.0	600	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.29	0.0	24,608	0.0	1,370	0.0	540	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location: SR 20 @ Riverbend Way
County: Cherokee
GDOT District: 6 - Cartersville
Area Type: Suburb/Transition
Existing Intersection Control: Conventional (Minor Stop)

GDOT PI # (or N/A): 0007836
Requested By: 0
Prepared By: Arcadis US Inc
Analyst: Kumari Duvvuri
Date: 5/29/2019
Waiver Request Type: GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	15,835	
Existing Avg Daily Traffic (Minor Street):	1,595	
Analysis Period:	AM Peak	PM Peak
2026 Opening Yr Peak Hour Intersection Delay:	8.8 sec	7.0 sec
2026 Opening Yr Peak Hour Intersection V/C:	0.59	0.44
2046 Design Yr Peak Hour Intersection Delay:	12.2 sec	8.5 sec
2046 Design Yr Peak Hour Intersection V/C:	0.74	0.55

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Type	*Crash Data :Enter 5 most recent years of intersection crash data*	*Crash Severity* PDO	Injury Crash*	Fatal Crash*
	Angle	7	4	0
	Head-On	0	0	0
	Rear End	15	5	0
	Sideswipe - same	1	0	0
	Sideswipe - opposite	0	0	0
	Not Collision w/Motor Veh	5	1	0
	TOTALS:	**28**	**10**	**0**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): The highest scoring alternative in Stage 2 is RCUT, which would require eastbound school buses exiting Joseph Knox Elementary School to make downstream U-turns at the RCUT at Fieldstone Drive. The selected alternative is Multilane Roundabout, the second highest scoring alternative, because it provides better safety and operations than the RCUT and also allows left turns exiting the elementary school.

Proposed Intersection Control: Multilane Roundabout

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: 12/18/19

Name: Andrew Heath, P.E.

Chief Engineer or (Approved Delegate)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

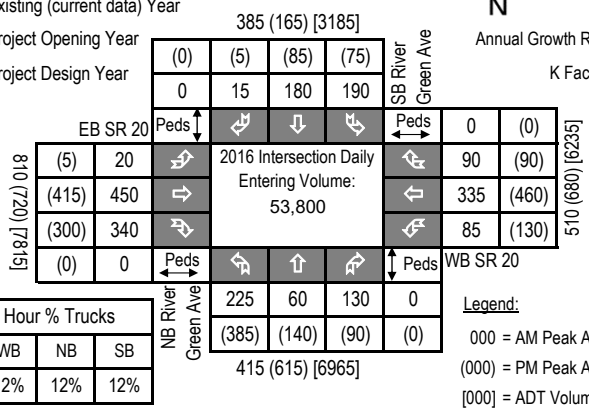
GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	River Green Ave	Speed Limit:	35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Signal (turn lanes on mainline)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%

N



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

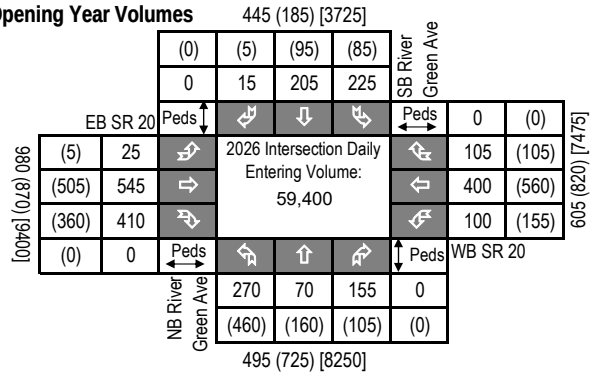
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

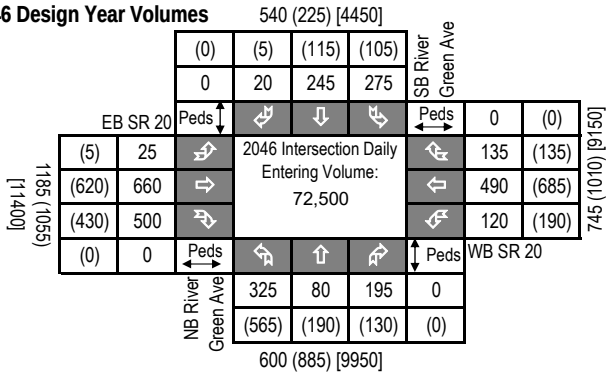
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.63 / River Green Ave - 0.37

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ River Green Ave
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	No	No	No	No	No	No	No	Intersection meets signal warrants
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	Intersection meets signal warrants
	Mini Roundabout	No	No	No	No	No	No	No	High speed approaches. Not suitable
	Single Lane Roundabout	No	No	No	No	No	No	No	Multiple lane approaches. Not suitable
	Multilane Roundabout	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RCUT (stop control)	No	No	No	No	No	No	No	Turning movement volumes are too high
	RIRO w/down stream U-Turn	No	No	No	No	No	No	No	Turning movement volumes are too high
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Not a T intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Potential Solution to Evaluate**
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	High left turn volumes. Not suitable
	RCUT (signalized)	No	No	No	No	No	No	No	High left-turn volume on minor road approach. Not suitable
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Continuous Green-T	No	No	No	No	No	No	No	Not a T intersection
	Jughandle	No	No	No	No	No	No	No	Not enough ROW available for Jughandle at current location
	Quadrant Roadway	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Not an interchange
	Diverging Diamond	No	No	No	No	No	No	No	Not an interchange
	Single Point Interchange	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Signalized (provide description):	No	No	No	No	No	No	No	N/A

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ River Green Ave			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Signal (turn lanes on mainline)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	Meets Signal Warrants	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	38.6 sec	39.4 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.83	0.86
2046 Design Yr No-Build Peak Hr Intersection Delay	61.4 sec	61.3 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	1.01	1.03

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	14	3	0	17%
Head-On	1	0	0	1%
Rear End	48	15	0	64%
Sideswipe - same	4	0	0	4%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	11	3	0	14%
TOTALS:	78	21	0	99

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Multilane Roundabout	Traffic Signal	N/A	N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*	*new pavement or overlay assum*			
Construction Cost	$2,254,000	$0			
ROW Cost	$323,000	$0			
Environmental Cost	$0	$0			
Reimbursable Utility Cost	$67,000	$0			
Design & Contingency Cost	$630,000	$0			
Cost Adjustment (justification req'd)	0%	0%			
Total Cost	$3,274,000	$0			
Traffic Operations:		*User Cost Override*			
Traffic Analysis Software Used	SIDRA 7	Synchro 10			
Analysis Period	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr			
2046 Design Yr Build Intersection Delay	12.7 sec / 12.2 sec	40.4 sec / 43.5 sec			
2046 Design Yr Build Intersection V/C	0.70 / 0.75	0.88 / 0.91			
Safety Analysis:					
Predefined CRF: PDO	26%	0%			
Predefined CRF: Fatal/Inj	71%	0%			
Predefined CRF Source:	FHWA Clearinghouse #s 4196 / 4195	N/A			
User Defined CRF: PDO					
User Defined CRF: Fatal/Inj					
User Defined CRF Source (write in if applicable):					
Environmental Impacts:[1]					
Historic District/Property	None	None			
Archaeology Resources	None	None			
Graveyard	None	None			
Stream	None	None			
Underground Tank/Hazmat	None	None			
Park Land	None	None			
EJ Community	None	None			
Wooded Area	None	None			
Wetland	None	None			
Stakeholder Posture:					
Local Community Support	Unknown	Unknown			
GDOT Support	Unknown	Unknown			
Final ICE Stage 2 Score:	5.2	4.2			
Rank of Control Type Alternatives:	1	2			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ River Green Ave	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Signal (turn lanes on mainline	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB River Green Ave			SB River Green Ave		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	1	1	1	2	1	1	1	1	1	1	1
Lane Widths*	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'
Bay Length**	250'		220'	250'		320'	200'		100'	135'		0'
Median Width		0'			0'			0'			12'	
Right-of-Way	155'						65'					

Table 2: Proposed Conditions

	Multilane Roundabout	Traffic Signal	N/A	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	None	F.D. Asphalt	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	2	0	2	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	4	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	4	0	0	0	0
New/Replace Sidewalks (LF)	4'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Multilane Roundabout Quantity	Multilane Roundabout Cost	Traffic Signal Quantity	Traffic Signal Cost	N/A Quantity	N/A Cost	N/A Quantity	N/A Cost	N/A Quantity	N/A Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	75,186	$946,951	0	$0						
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0						
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	2400	$60,903	200	$3,816						
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0						
Concrete Island (sqyd)	n/a	$51.58/syd	600	$41,161	0	$0						
Median Landscaping	$100K/LM	$1.89/LF	3600	$9,068	0	$0						
Typical Driveways Impacted (ea)	n/a	$7,500 ea	2	$19,950	0	$0						
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	1200	$54,409	100	$3,409						
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	3707	$50,540	0	$0						
Signing & Marking	$0	$22.73/LF	1,200	$36,277	100	$2,273						
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0						
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0						
Lighting (per pole)	n/a	$5,607 ea	4	$29,829	0	$0						
Signalized Ped Crossings (ea)	n/a	$19,637 ea	4	$104,469	0	$0						
6' Sidewalk (LF)	n/a	$49.23/LF	4	$262	0	$0						
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0						
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0						
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0						
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0						
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0						
Grading Complete - 20%	n/a	n/a		$540,174		$0						
Traffic Control - 20%	n/a	n/a		$360,116		$0						
Reimbrusable Utility	n/a	n/a		$67,691		$475						
Preliminary Engineering - 15%	n/a	n/a		$270,087		$1,425						
Contigency - 20%	n/a	n/a		$360,116		$1,900						
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$202,009		$0						
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0						
ROW Multiplier - 1.6	n/a	n/a		$121,205		$0						
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0						
Grand Total Costs				**$3,275,000**		**$13,000**						

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Multilane Roundabout	High Speed Roundabout	F.D. Asphalt	1.23	0.0	75,186	0.0	600	0.0	600	0.0
Traffic Signal	No Paving	None	0.00	0.0	0	0.0	50	0.0	50	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

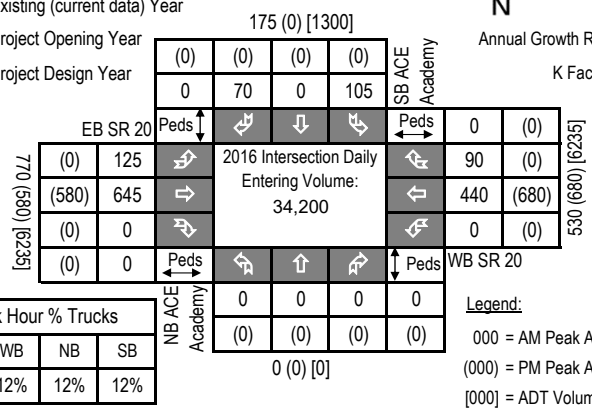
GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	ACE Academy	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Signal (turn lanes on mainline)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%

N



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

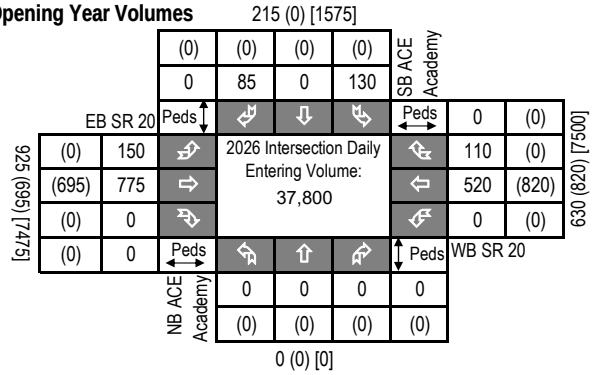
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

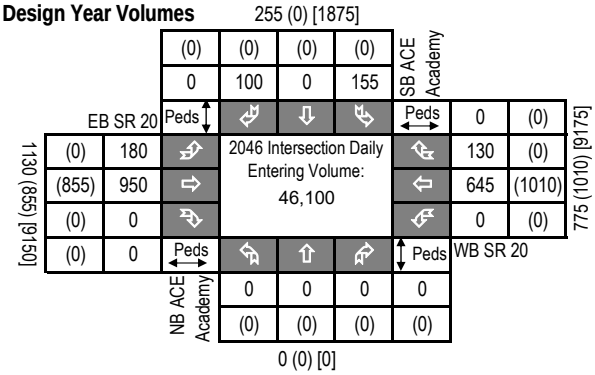
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.93 / ACE Academy - 0.07

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ ACE Academy
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	No	No	No	No	No	No	No	High speed roadway and high volume on major road
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High speed roadway and high volume on major road
	Mini Roundabout	No	No	No	No	No	No	No	High speed roadway and high volume on major road
	Single Lane Roundabout	No	No	No	No	No	No	No	High speed roadway and high volume on major road
	Multilane Roundabout	No	No	No	No	No	No	No	High speed roadway and high volume on major road
	RCUT (stop control)	No	No	No	No	No	No	No	High left turn volumes from minor road approach during AM peak period
	RIRO w/down stream U-Turn	No	No	No	No	No	No	No	High left turn volumes from minor road approach during AM peak period
	High-T (unsignalized)	No	No	No	No	No	No	No	High left turn volumes from minor road approach during AM peak period
	Offset-T Intersections	No	No	No	No	No	No	No	Existing condition is a T-intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	High left turn volumes. Not suitable
	RCUT (signalized)	No	No	No	No	No	No	No	High left turn volumes. Not suitable
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Not enough ROW for CFI at current location
	Continuous Green-T	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Jughandle	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Quadrant Roadway	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Not an interchange
	Diverging Diamond	No	No	No	No	No	No	No	Not an interchange
	Single Point Interchange	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Signalized (provide description):	No	No	No	No	No	No	No	N/A

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ ACE Academy			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Signal (turn lanes on mainline)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	Meets Signal Warrants	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	9.4 sec	0.9 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.69	0.63
2046 Design Yr No-Build Peak Hr Intersection Delay	13.4 sec	1.4 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.85	0.77

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	0	1	0	9%
Head-On	0	0	0	0%
Rear End	5	1	0	55%
Sideswipe - same	0	1	0	9%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	2	0	1	27%
TOTALS:	7	3	1	11

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Traffic Signal		Continuous Green-T		N/A	N/A	N/A
Project Cost: (From CostEst Worksheet)	*Add three LT bays*		*Additional description here*				
Construction Cost	$0		$1,070,000				
ROW Cost	$0		$288,000				
Environmental Cost	$0		$0				
Reimbursable Utility Cost	$0		$38,000				
Design & Contingency Cost	$0		$267,000				
Cost Adjustment (justification req'd)	0%		0%				
Total Cost	$0		$1,663,000				
Traffic Operations:	*User Cost Override*						
Traffic Analysis Software Used	Synchro 10		Synchro 10				
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr			
2046 Design Yr Build Intersection Delay	8.0 sec	0.3 sec	10.6 sec	0.3 sec			
2046 Design Yr Build Intersection V/C	0.54	0.40	0.51	0.40			
Safety Analysis:							
Predefined CRF: PDO	0%		1%				
Predefined CRF: Fatal/Inj	0%		15%				
Predefined CRF Source:	N/A		FHWA Clearinghouse #s 8655 / 8656				
User Defined CRF: PDO							
User Defined CRF: Fatal/Inj							
User Defined CRF Source (write in if applicable):							
Environmental Impacts:[1]							
Historic District/Property	None		None				
Archaeology Resources	None		None				
Graveyard	None		None				
Stream	None		None				
Underground Tank/Hazmat	None		None				
Park Land	None		None				
EJ Community	None		None				
Wooded Area	None		None				
Wetland	None		None				
Stakeholder Posture:							
Local Community Support	Unknown		Unknown				
GDOT Support	Unknown		Unknown				
Final ICE Stage 2 Score:	4.4		2.9				
Rank of Control Type Alternatives:	1		2				

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): HCM 2000 is used for Traffic Analysis since both HCM 2010 and HCM 6th edition do not provide delay and LOS at signalized intersections with U-Turns. Existing year volumes in introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ ACE Academy	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Signal (turn lanes on mainline	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB ACE Academy			SB ACE Academy		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	1	0	0	1	1	0	0	0	0	1	0
Lane Widths*	12'	12'	0'	0'	12'	12'	0'	0'	0'	0'	12'	0'
Bay Length**	300'		0'	0'		200'	0'		0'	0'		0'
Median Width		12'			12'			0'			0'	
Right-of-Way	85'						60'					

Table 2: Proposed Conditions

	Traffic Signal	Continuous Green-T	N/A	N/A	N/A
Proposed Pavement Type	None	F.D. Asphalt	F.D. Asphalt	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	0	0	0	0
Modify/Replace Traffic Signal	0	1	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Traffic Signal		Continuous Green-T		N/A		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	48,000	$454,545						
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0						
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	3000	$57,240	2,520	$48,082						
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0						
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	150	$7,737						
Median Landscaping	$100K/LM	$1.89/LF	0	$0	0	$0						
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	0	$0						
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	1500	$51,136	1,260	$42,955						
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0						
Signing & Marking	$0	$22.73/LF	1,500	$34,095	1,260	$28,640						
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0						
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	1	$182,575						
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0						
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0						
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0						
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0						
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0						
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0						
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0						
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0						
Grading Complete - 20%	n/a	n/a		$0		$152,907						
Traffic Control - 20%	n/a	n/a		$0		$152,907						
Reimbrusable Utility	n/a	n/a		$7,124		$38,227						
Preliminary Engineering - 15%	n/a	n/a		$21,371		$114,680						
Contigency - 20%	n/a	n/a		$28,494		$152,907						
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$180,469						
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0						
ROW Multiplier - 1.6	n/a	n/a		$0		$108,281						
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0						
Grand Total Costs				**$199,000**		**$1,665,000**						

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Traffic Signal	No Paving	None	0.00	0.0	12,000	0.0	500	0.0	1,000	0.0
Continuous Green-T	Median > 6'	F.D. Asphalt	0.25	1.1	16,000	48,000.0	860	1,000.0	260	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

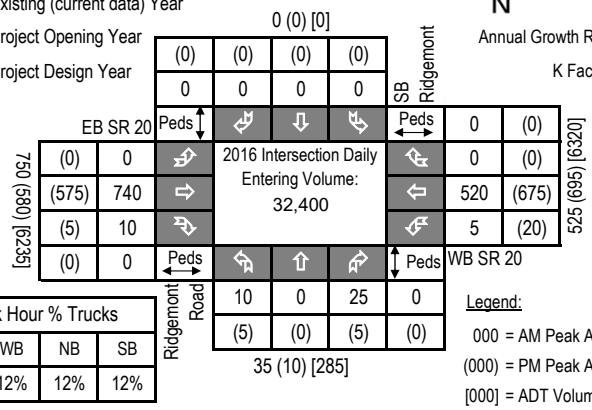
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	Ridgemont Road	Speed Limit:	< 35 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

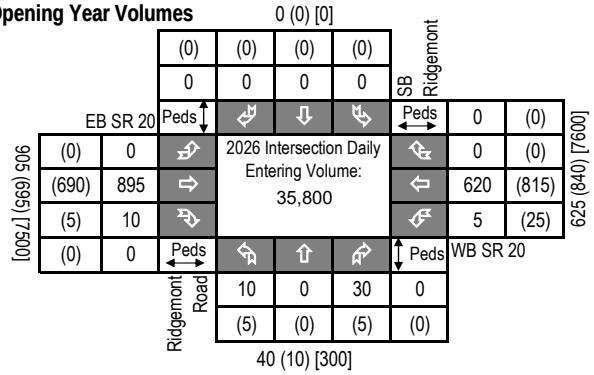
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

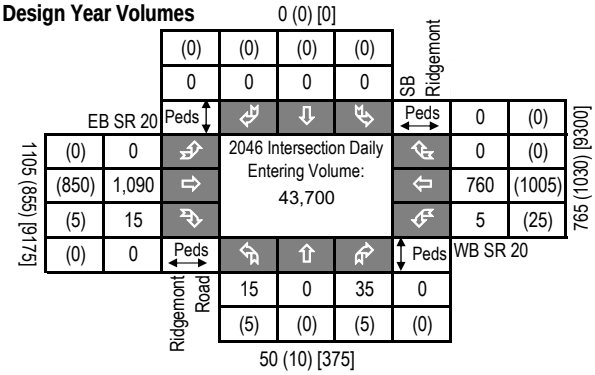
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.98 / Ridgemont Road - 0.02

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ Ridgemont Road
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High through volume on major approach. Not suitable
	Mini Roundabout	No	No	No	No	No	No	No	Multilane approaches. Not suitable
	Single Lane Roundabout	No	No	No	No	No	No	No	Multilane approaches. Not suitable
	Multilane Roundabout	No	No	No	No	No	No	No	High speeds and high volumes on major road. Not suitable
	RCUT (stop control)	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	High-T (unsignalized)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Potential Solution to Evaluate**
	Offset-T Intersections	No	No	No	No	No	No	No	Existing condition is a T-intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Does not meet signal warrants
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Does not meet signal warrants
	RCUT (signalized)	No	No	No	No	No	No	No	Does not meet signal warrants
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Does not meet signal warrants
	Continuous Green-T	No	No	No	No	No	No	No	Does not meet signal warrants
	Jughandle	No	No	No	No	No	No	No	Does not meet signal warrants
	Quadrant Roadway	No	No	No	No	No	No	No	Does not meet signal warrants
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Does not meet signal warrants
	Diverging Diamond	No	No	No	No	No	No	No	Does not meet signal warrants
	Single Point Interchange	No	No	No	No	No	No	No	Does not meet signal warrants
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	Does not meet signal warrants
	Other Signalized (provide description):	No	No	No	No	No	No	No	Does not meet signal warrants

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	SR 20 @ Ridgemont Road			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Conventional (Minor Stop)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	0.6 sec	0.3 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	0.11	0.03
2046 Design Yr No-Build Peak Hr Intersection Delay	0.7 sec	0.3 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	0.17	0.04

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Data: *Enter 5 most recent years of intersection crash data* (Crash Type)	*Crash Severity* PDO	Injury Crash*	Fatal Crash*	
Angle	1	0	0	50%
Head-On	0	0	0	0%
Rear End	0	0	0	0%
Sideswipe - same	0	0	0	0%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	1	0	0	50%
TOTALS:	2	0	0	2

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	**Alternative 1**		**Alternative 2**		**Alternative 3**		**Alternative 4**		**Alternative 5**
Proposed Control Type/Improvement:	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-Turn		High-T (unsignalized)		N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Additional description here*		*Additional description here*		*Additional description here*		
Construction Cost	$0		$330,000		$265,000		$365,000		
ROW Cost	$0		$24,000		$24,000		$65,000		
Environmental Cost	$0		$0		$0		$0		
Reimbursable Utility Cost	$0		$11,000		$9,000		$13,000		
Design & Contingency Cost	$0		$82,000		$66,000		$91,000		
Cost Adjustment (justification req'd)	0%		0%		0%		0%		
Total Cost	$0		$447,000		$364,000		$534,000		
Traffic Operations:									
Traffic Analysis Software Used	Synchro 10		HCS7		HCS7		Synchro 10		
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	
2046 Design Yr Build Intersection Delay	0.9 sec	0.6 sec	1.0 sec	0.4 sec	1.0 sec	0.3 sec	0.9 sec	0.2 sec	
2046 Design Yr Build Intersection V/C	0.22	0.07	0.13	0.04	0.13	0.02	0.11	0.03	
Safety Analysis:									
Predefined CRF: PDO	0%		31%		35%		23%		
Predefined CRF: Fatal/Inj	0%		53%		54%		45%		
Predefined CRF Source:	N/A		NC/MO Table 4-7		FHWA Clearinghouse #s 5555 / 5556		FHWA Clearinghouse #s 2753 / 2755		
User Defined CRF: PDO									
User Defined CRF: Fatal/Inj									
User Defined CRF Source (write in if applicable):									
Environmental Impacts:[1]									
Historic District/Property	None		None		None		None		
Archaeology Resources	None		None		None		None		
Graveyard	None		None		None		None		
Stream	None		None		None		None		
Underground Tank/Hazmat	None		None		None		None		
Park Land	None		None		None		None		
EJ Community	None		None		None		None		
Wooded Area	None		None		None		None		
Wetland	None		None		None		None		

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] *Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report*

Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	
GDOT Support	Unknown	Unknown	Unknown	Unknown	
Final ICE Stage 2 Score:	5.1	5.7	6.2	5.2	
Rank of Control Type Alternatives:	4	2	1	3	

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): Existing year volumes in the introduction page are from 2014.

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ Ridgemont Road	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Kumari Duvvuri
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB Ridgemont Road			SB Ridgemont Road		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	1	1	0	1	0	0	1	1	0	0	0
Lane Widths*	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'	12'
Bay Length**	0'		350'	0'		0'	0'		0'	0'		0'
Median Width		12'			12'			0'			0'	
Right-of-Way	110'						70'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	RCUT (stop control)	RIRO w/down stream U-Turn	High-T (unsignalized)	N/A
Proposed Pavement Type	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	0	0	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop)		RCUT (stop control)		RIRO w/down stream U-		High-T (unsignalized)		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	12,304	$116,515	8,704	$82,424	16,000	$151,515		
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0		
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	1,870	$35,680	1,870	$35,680	2,140	$40,831		
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0		
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	500	$25,790	250	$12,895	150	$7,737		
Median Landscaping	$100K/LM	$1.89/LF	0	$0	2,805	$5,313	2,805	$5,313	0	$0		
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	0	$0	0	$0	0	$0		
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	935	$31,875	935	$31,875	1,070	$36,477		
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	0	$0	0	$0	0	$0		
Signing & Marking	$0	$22.73/LF	0	$0	935	$21,253	935	$21,253	1,070	$24,321		
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0		
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0		
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0		
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0		
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0		
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0		
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0		
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0		
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0		
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0		
Grading Complete - 20%	n/a	n/a		$0		$47,285		$37,888		$52,176		
Traffic Control - 20%	n/a	n/a		$0		$47,285		$37,888		$52,176		
Reimbrusable Utility	n/a	n/a		$0		$11,821		$9,472		$13,044		
Preliminary Engineering - 15%	n/a	n/a		$0		$35,464		$28,416		$39,132		
Contigency - 20%	n/a	n/a		$0		$47,285		$37,888		$52,176		
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$0		$15,586		$15,586		$41,016		
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		
ROW Multiplier - 1.6	n/a	n/a		$0		$9,352		$9,352		$24,609		
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		
Grand Total Costs				**$0**		**$451,000**		**$366,000**		**$535,000**		

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	F.D. Asphalt	0.00	0.0	0	0.0	100	0.0	70	0.0
RCUT (stop control)	Loons/Leftovers Only	F.D. Asphalt	0.19	0.1	24,608	12,304.0	1,350	675.0	520	260.0
RIRO w/down stream U-Turn	Loons/Leftovers Only	F.D. Asphalt	0.19	0.1	17,408	8,704.0	1,350	675.0	520	260.0
High-T (unsignalized)	Median > 6'	F.D. Asphalt	0.25	0.0	16,000	0.0	800	0.0	270	0.0
N/A	#N/A	F.D. Asphalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

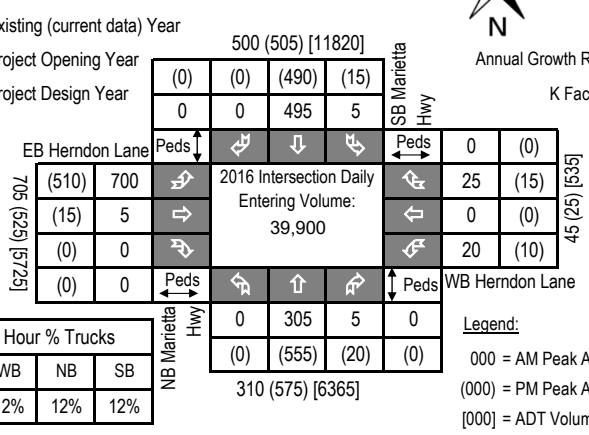
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	Marietta Hwy	Speed Limit:	45 mph
Minor (Crossing) ST:	Herndon Lane	Speed Limit:	35 mph
Major ST Direction:	North/South	Area Type:	Suburb/Transition
Intersection Control:	Signal (turn lanes on mainline)		
Prepared By:	Arcadis US Inc	Analyst:	Kumari Duvvuri
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

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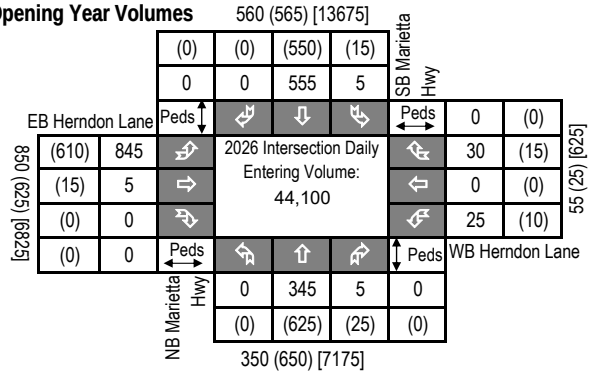
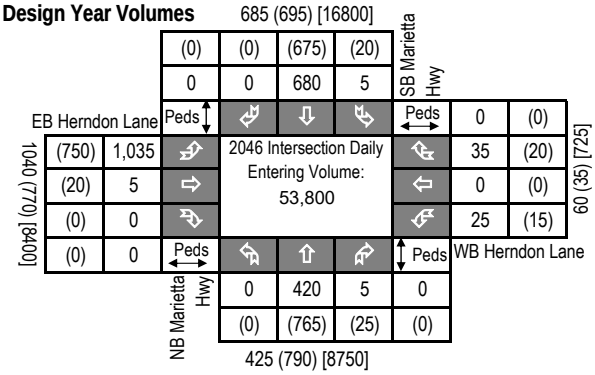
Approach Splits: Marietta Hwy - 0.59 / Herndon Lane - 0.41

2026 Opening Year Volumes



2046 Design Year Volumes



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Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	Marietta Hwy @ Herndon Lane
Prepared by:	Arcadis US Inc
Analyst:	Kumari Duvvuri
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	No	No	No	No	No	No	No	Existing condition is signalized
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	High volumes at the intesection. Not suitable
	Mini Roundabout	No	No	No	No	No	No	No	High volumes and high speed approaches. Not suitable.
	Single Lane Roundabout	No	No	No	No	No	No	No	High volumes and high speed approaches. Not suitable.
	Multilane Roundabout	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Solution to Evaluate
	RCUT (stop control)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Solution to Evaluate
	RIRO w/down stream U-Turn	No	No	No	No	No	No	No	High volumes. Not suitable
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a T intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Not enough ROW for offset-T alignment
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Solution to Evaluate
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	High volumes. Not suitable
	RCUT (signalized)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Solution to Evaluate
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Not enough ROW for CFI
	Continuous Green-T	No	No	No	No	No	No	No	Not a T intersection
	Jughandle	No	No	No	No	No	No	No	Not enough ROW for Jughandle
	Quadrant Roadway	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Solution to Evaluate
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Not suitable for grade separation
	Diverging Diamond	No	No	No	No	No	No	No	Not suitable for grade separation
	Single Point Interchange	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Signalized (provide description):	No	No	No	No	No	No	No	N/A

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis US Inc
Project Location:	Marietta Hwy @ Herndon Lane			Analyst:	Kumari Duvvuri
Existing Intersection Control:	Signal (turn lanes on mainline)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	Meets Signal Warrants	
Traffic Analysis Measure of Effectiveness	Network Delay	
Traffic Analysis Software Used	Synchro 9	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Open Yr No-Build Peak Hr Network Delay	228.4 sec	69.8 sec
2046 Design Yr No-Build Peak Hr Network Delay	257.2 sec	204.0 sec

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type — *Crash Data:* Enter 5 most recent years of intersection crash data	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	51	20	0	47%
Head-On	5	2	0	5%
Rear End	41	14	0	36%
Sideswipe - same	7	0	0	5%
Sideswipe - opposite	3	0	0	2%
Not Collision w/Motor Veh	6	2	0	5%
TOTALS:	113	38	0	151

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Multilane Roundabout	RCUT (stop control)	Traffic Signal	RCUT (signalized)	Quadrant Roadway
Project Cost: (From CostEst Worksheet)	*Additional description here*	*Additional description here*	*Add three LT bays*	*Additional description here*	*Additional description here*
Construction Cost	$2,098,105	$1,487,982	$0	$1,737,982	$1,933,187
ROW Cost	$320,000	$192,000	$0	$192,000	$99,360
Environmental Cost	$0	$0	$0	$0	$0
Reimbursable Utility Cost	$419,621	$297,596	$0	$347,596	$386,637
Design & Contingency Cost	$1,322,864	$752,631	$0	$872,631	$386,637
Cost Adjustment (justification req'd)					
Total Cost	$4,160,590	$2,730,209	$0	$3,150,209	$2,805,821
Traffic Operations:					
Traffic Analysis Software Used	SIDRA 7	Other (explain below)	Other (explain below)	Other (explain below)	Other (explain below)
Analysis Period	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr
2046 Design Yr Build Network Delay	13.6 sec / 12.5 sec	27.4 sec / 209.5 sec	53.1 sec / 57.8 sec	29.0 sec / 27.1 sec	33.9 sec / 28.4 sec
Safety Analysis:					
Predefined CRF: PDO	26%	33%	0%	15%	27%
Predefined CRF: Fatal/Inj	71%	50%	0%	22%	28%
Predefined CRF Source:	FHWA Clearinghouse #s 4196 / 4195	FHWA-SA-14-070	N/A	FHWA-HRT-17-083	FHWA Clearinghouse #s 463 / 464
User Defined CRF: PDO					
User Defined CRF: Fatal/Inj					
User Defined CRF Source (write in if applicable):					
Environmental Impacts:[1]					
Historic District/Property	None	None	None	None	None
Archaeology Resources	None	None	None	None	None
Graveyard	None	None	None	None	None
Stream	None	None	None	None	None
Underground Tank/Hazmat	Minimal	Minimal	Minimal	Minimal	Minimal
Park Land	None	None	None	None	None
EJ Community	None	None	None	None	None
Wooded Area	None	None	None	None	None
Wetland	None	None	None	None	None
Stakeholder Posture:					
Local Community Support	Unknown	Unknown	Unknown	Unknown	Unknown
GDOT Support	Unknown	Unknown	Unknown	Unknown	Unknown
Final ICE Stage 2 Score:	6.9	4.0	5.2	2.8	6.4
Rank of Control Type Alternatives:	1	4	3	5	2

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary): SimTraffic used for No-Build Alternative Analysis, and Build - RCUT (stop control), Traffic Signal, RCUT (signalized), and Quadrant Roadway Alternatives Analysis. Existing Year volumes on introduction sheet are from 2014.

Project Cost Estimation Spreadsheet

Project Identification	SR 20 at SR 20 Spur/Herndon Lane				
Description	RCUT (Signalized)			Proj. Type	WA
From Limit				District	
To Limit					
Notes					
SR 20/Marietta Hwy	0.66				
Herndon Lane	0.15	miles	total	0.81	

Cost Summary Incl. Contingency		per mile	Yr. of Exp.	Inflated Cost	Total Program Cost
Preliminary Engineering	**$417,116**	$ 514,958	2018	**$ 417,116**	**$479,683**
Reimbursable Utility	**$417,116**	$ 514,958	2018	**$ 417,116**	**$479,683**
Right-of-Way	**$230,400**	$ 284,444	2018	**$ 230,400**	**$264,960**
Construction	**$2,085,578**	$ 2,574,788	2018	**$ 2,085,578**	**$2,398,415**
Total	**$3,150,209**	$ 3,889,147	**Total**	**$3,150,209**	**$3,622,741**

Construction Costs

Average Per Lane-Mile Components	Unit Cost	Miles	Add Lanes	Lane-Miles	Cost
Surface Str. New Cst. base & pave	$410,000			0	$0
SR or High volume Rd widening	$500,000	0.70	1.00	0.70	$350,000
Surface Street Overlay	$64,000	0.70	1.00	0.70	$44,800
Concrete Widening (Ramps)	$843,744			0	$0
Cross Streets widening	$307,500			0	$0
					$0
			Factor		$0
Cross Street Overlay	$20,000				$0
Traffic Control	$150,000	0.40	1.00		$60,000
Typical Driveways	$75,000	0.42	1.00		$31,500
Typical E & S Control Temp&Perm	$150,000	0.42	1.00		$63,000
Typical Earthwork	$500,000	0.42	1.00		$210,000
Typical Drainage - Urban Section	$255,000	0.42	1.00		$107,100
Curb & Gutter both sides (mile)	$264,000	0.42	0.50		$55,440
Typical Drainage - Rural Section	$150,000				$0
Signing & Marking	$50,000	0.42	1.00		$21,000
Typical Clear & Grub-120 ft wide	$109,091	0.57	1.00		$62,182
Typical Guardrail Type W	$212,000				$0
20ft. Raised median +C&G (mile)	$968,000	0.02	1.00		$19,360
Median landscaping	$100,000	0.26	1.00		$26,000
Sidewalks 5 ft. ea.side (mile)	$294,000	0.70	1.00		$205,800
ADA Ramps	$1,500		20.00		$30,000
					$0
					$0
					$0
					$0
				Subtotal	**$1,286,182**

Additional Per Mile Components	Unit Cost	Length	factor	Cost
Add'l Major Earthwork (mile)	$350,000			$0
Add'l Major Drainage (mile)	$150,000			$0
Add'l Major Grade changes (mile)	$350,000			$0
Major alignment corrections (mile)	$750,000			$0
Maint of Traffic difficulty (mile)	$200,000			$0
Temporary Barrier	$30			$0
Concrete Island + C&G (SY)	$60	1280.00	1.00	$76,800
Add'l guardrail Type T (mile)	$423,000			$0
Paved Shoulders, 4 ft, 2 sides(mile)	$100,000			$0
blank	$0			$0
blank	$0			$0
Bikeway, 4 feet, both side (mile)	$333,333			$0
Add'l driveways (mile)	$75,000			$0
Cl. B Conc. Base or pvmt widening	$792,000			$0
Colored & Stamped Concrete + C&G	$100			$0
Special E&S control	$300,000			
				$0
			Subtotal	**$76,800**

Individual Components	Unit Cost	Length (ft)	Width (ft)	Ht (ft)	Cost
Retaining Walls - Gravity 0 - 5' (LF)	$60				$0
Retaining Walls-Gravity 5'-max (LF)	$120				$0
Retaining Walls-Special Design(SF)	$60				$0
Bridges - widen (SF)	$100				$0
Bridges - widen (SF)	$100				$0
Bridges - replace (SF)	$120				$0
Bridges - replace (SF)	$120				$0
Bridges - detour (SF)	$60				$0
Bridge Removal (SF)	$25				$0
Cofferdams (ea)	$20,000				$0
Box Culverts (SF)	$95				$0
Box Culverts (SF)	$95				$0
Large cross drains (LF)	$80				$0
Replace cross drains (LF)	$120				$0
Sediment/ detention ponds (ea)	$30,000				$0
Pavement patching (Sq yd)	$30				$0
New Lighting	$10,000				$0
Traffic Signalization / Upgrade (ea)	$125,000	3			$375,000
				Subtotal	**$375,000**
				Total Construction Cost	**$1,737,982**
					66%

Right-of-Way Costs

Area Type	Unit Cost (acre)	Miles	Width (ft)	Acres	Cost
Urban Residential	$800,000				$0
Easement Residential	$240,000			0.000	$0
Urban Commercial	$2,306,992			0.000	$0
Easement Commercial	$175,000			0.000	$0
Suburban/Rural Residential	$75,000			0.000	$0
Easement rural Residential	$180,000			0.000	$0
Suburban/Rural Commercial	$200,000			0.600	$120,000
Easement rural Commercial	$240,000			0.000	$0
Displacements		Number	factor		
Residential	$250,000	0	0.00		$0
Commercial	$1,000,000	0	0		$0
Damages	$0	0	0.00		$0
				ROW multiplier	1.6
				Total Right-of-Way Cost	**$192,000**
					7%

Reimbursable Utility Costs

					0
	20%				$ 347,596
				Total Reimbursable Utility Cost	**$347,596**
					13.24%

Preliminary Engineering Costs

PE %	20%	**Total Preliminary Engineering Cost**	**$347,596**
			13.24%

Contingency Costs

Contingency %	20%	**Total Contingency Cost**	**$525,035**
		Total (PE+Util.+ROW+CST)	**$2,625,175**
		Grand Total	**$3,150,209**

Project Cost Estimation Spreadsheet

Project Identification					
	SR 20 at SR 20 Spur/Herndon Lane				
Description	RCUT (Unsignalized)			Proj. Type	WA
From Limit				District	
To Limit					
Notes					
SR 20/Marietta Hwy	0.66				
Herndon Lane	0.15	miles	total	0.81	

Cost Summary Incl. Contingency		per mile	Yr. of Exp.	Inflated Cost	Total Program Cost
Preliminary Engineering	**$357,116**	$ 440,884	2018	**$ 357,116**	**$410,683**
Reimbursable Utility	**$357,116**	$ 440,884	2018	**$ 357,116**	**$410,683**
Right-of-Way	**$230,400**	$ 284,444	2018	**$ 230,400**	**$264,960**
Construction	**$1,785,578**	$ 2,204,418	2018	**$ 1,785,578**	**$2,053,415**
Total	**$2,730,209**	$ 3,370,629	**Total**	**$2,730,209**	**$3,139,741**

Construction Costs

Average Per Lane-Mile Components	Unit Cost	Miles	Add Lanes	Lane-Miles	Cost
Surface Str. New Cst. base & pave	$410,000			0	$0
SR or High volume Rd widening	$500,000	0.70	1.00	0.70	$350,000
Surface Street Overlay	$64,000	0.70	1.00	0.70	$44,800
Concrete Widening (Ramps)	$843,744			0	$0
Cross Streets widening	$307,500			0	$0
					$0
			Factor		$0
Cross Street Overlay	$20,000				$0
Traffic Control	$150,000	0.40	1.00		$60,000
Typical Driveways	$75,000	0.42	1.00		$31,500
Typical E & S Control Temp&Perm	$150,000	0.42	1.00		$63,000
Typical Earthwork	$500,000	0.42	1.00		$210,000
Typical Drainage - Urban Section	$255,000	0.42	1.00		$107,100
Curb & Gutter both sides (mile)	$264,000	0.42	0.50		$55,440
Typical Drainage - Rural Section	$150,000				$0
Signing & Marking	$50,000	0.42	1.00		$21,000
Typical Clear & Grub-120 ft wide	$109,091	0.57	1.00		$62,182
Typical Guardrail Type W	$212,000				$0
20ft. Raised median +C&G (mile)	$968,000	0.02	1.00		$19,360
Median landscaping	$100,000	0.26	1.00		$26,000
Sidewalks 5 ft. ea.side (mile)	$294,000	0.70	1.00		$205,800
ADA Ramps	$1,500		20.00		$30,000
					$0
					$0
					$0
					$0
				Subtotal	**$1,286,182**

Additional Per Mile Components	Unit Cost	Length	factor	Cost
Add'l Major Earthwork (mile)	$350,000			$0
Add'l Major Drainage (mile)	$150,000			$0
Add'l Major Grade changes (mile)	$350,000			$0
Major alignment corrections (mile)	$750,000			$0
Maint of Traffic difficulty (mile)	$200,000			$0
Temporary Barrier	$30			$0
Concrete Island + C&G (SY)	$60	1280.00	1.00	$76,800
Add'l guardrail Type T (mile)	$423,000			$0
Paved Shoulders, 4 ft, 2 sides(mile)	$100,000			$0
blank	$0			$0
blank	$0			$0
Bikeway, 4 feet, both side (mile)	$333,333			$0
Add'l driveways (mile)	$75,000			$0
Cl. B Conc. Base or pvmt widening	$792,000			$0
Colored & Stamped Concrete + C&G	$100			$0
Special E&S control	$300,000			
				$0
			Subtotal	**$76,800**

Individual Components	Unit Cost	Length (ft)	Width (ft)	Ht (ft)	Cost
Retaining Walls - Gravity 0 - 5' (LF)	$60				$0
Retaining Walls-Gravity 5'-max (LF)	$120				$0
Retaining Walls-Special Design(SF)	$60				$0
Bridges - widen (SF)	$100				$0
Bridges - widen (SF)	$100				$0
Bridges - replace (SF)	$120				$0
Bridges - replace (SF)	$120				$0
Bridges - detour (SF)	$60				$0
Bridge Removal (SF)	$25				$0
Cofferdams (ea)	$20,000				$0
Box Culverts (SF)	$95				$0
Box Culverts (SF)	$95				$0
Large cross drains (LF)	$80				$0
Replace cross drains (LF)	$120				$0
Sediment/ detention ponds (ea)	$30,000				$0
Pavement patching (Sq yd)	$30				$0
New Lighting	$10,000				$0
Traffic Signalization / Upgrade (ea)	$125,000	1			$125,000
				Subtotal	**$125,000**
				Total Construction Cost	**$1,487,982**
					65%

Right-of-Way Costs

Area Type	Unit Cost (acre)	Miles	Width (ft)	Acres	Cost
Urban Residential	$800,000				$0
Easement Residential	$240,000			0.000	$0
Urban Commercial	$2,306,992			0.000	$0
Easement Commercial	$175,000			0.000	$0
Suburban/Rural Residential	$75,000			0.000	$0
Easement rural Residential	$180,000			0.000	$0
Suburban/Rural Commercial	$200,000			0.600	$120,000
Easement rural Commercial	$240,000			0.000	$0
Displacements		Number	factor		
Residential	$250,000	0	0.00		$0
Commercial	$1,000,000	0	0		$0
Damages	$0	0	0.00		$0
				ROW multiplier	1.6
				Total Right-of-Way Cost	**$192,000**
					8%

Reimbursable Utility Costs

					0
	20%				$ 297,596
				Total Reimbursable Utility Cost	**$297,596**
					13.08%

Preliminary Engineering Costs

PE %	20%	**Total Preliminary Engineering Cost**	**$297,596**
			13.08%

Contingency Costs

Contingency %	20%	**Total Contingency Cost**	**$455,035**
		Total (PE+Util.+ROW+CST)	**$2,275,175**
		Grand Total	**$2,730,209**

Project Cost Estimation Spreadsheet

Project Identification				
	SR 20 at SR 20 Spur/Herndon Lane			
Description	Roundabout	Proj. Type	WA	
From Limit		District		
To Limit				
Notes				
SR 20/Marietta Hwy	0.83			
Herndon Lane	0.15 miles	total	0.98	

Cost Summary Incl. Contingency		per mile	Yr. of Exp.	Inflated Cost	Total Program Cost
Preliminary Engineering	**$755,318**	$ 770,733	2018	**$ 755,318**	**$868,616**
Reimbursable Utility	**$503,545**	$ 513,822	2018	**$ 503,545**	**$579,077**
Right-of-Way	**$384,000**	$ 391,837	2018	**$ 384,000**	**$441,600**
Construction	**$2,517,727**	$ 2,569,109	2018	**$ 2,517,727**	**$2,895,386**
Total	**$4,160,590**	$ 4,245,500	**Total**	**$4,160,590**	**$4,784,678**

Construction Costs

Average Per Lane-Mile Components	Unit Cost	Miles	Add Lanes	Lane-Miles	Cost
Surface Str. New Cst. base & pave	$410,000			0	$0
SR or High volume Rd widening	$500,000	0.97	1.00	0.97	$485,000
Surface Street Overlay	$64,000	0.97	1.00	0.97	$62,080
Concrete Widening (Ramps)	$843,744			0	$0
Cross Streets widening	$307,500			0	$0
					$0
			Factor		$0
Cross Street Overlay	$20,000				$0
Traffic Control	$150,000	0.50	1.00		$75,000
Typical Driveways	$75,000	0.50	1.00		$37,500
Typical E & S Control Temp&Perm	$150,000	0.50	1.00		$75,000
Typical Earthwork	$500,000	0.50	1.00		$250,000
Typical Drainage - Urban Section	$255,000	0.50	1.00		$127,500
Curb & Gutter both sides (mile)	$264,000	0.50	0.50		$66,000
Typical Drainage - Rural Section	$150,000				$0
Signing & Marking	$50,000	0.50	2.00		$50,000
Typical Clear & Grub-120 ft wide	$109,091	0.50	1.00		$54,545
Typical Guardrail Type W	$212,000				$0
20ft. Raised median +C&G (mile)	$968,000	0.30	1.00		$290,400
Median landscaping	$100,000	0.30	1.00		$30,000
Sidewalks 5 ft. ea.side (mile)	$294,000	0.97	1.00		$285,180
ADA Ramps	$1,500		30.00		$45,000
					$0
					$0
					$0
					$0
				Subtotal	**$1,933,205**

Additional Per Mile Components	Unit Cost	Length	factor	Cost
Add'l Major Earthwork (mile)	$350,000			$0
Add'l Major Drainage (mile)	$150,000			$0
Add'l Major Grade changes (mile)	$350,000			$0
Major alignment corrections (mile)	$750,000			$0
Maint of Traffic difficulty (mile)	$200,000			$0
Temporary Barrier	$30			$0
Concrete Island + C&G (SY)	$60	1460.00	1.00	$87,600
Add'l guardrail Type T (mile)	$423,000			$0
Paved Shoulders, 4 ft, 2 sides(mile)	$100,000			$0
blank	$0			$0
blank	$0			$0
Bikeway, 4 feet, both side (mile)	$333,333			$0
Add'l driveways (mile)	$75,000			$0
Cl. B Conc. Base or pvmt widening	$792,000			$0
Colored & Stamped Concrete + C&G	$100	773.00	1.00	$77,300
Special E&S control	$300,000			
				$0
			Subtotal	**$164,900**

Individual Components	Unit Cost	Length (ft)	Width (ft)	Ht (ft)	Cost
Retaining Walls - Gravity 0 - 5' (LF)	$60				$0
Retaining Walls-Gravity 5'-max (LF)	$120				$0
Retaining Walls-Special Design(SF)	$60				$0
Bridges - widen (SF)	$100				$0
Bridges - widen (SF)	$100				$0
Bridges - replace (SF)	$120				$0
Bridges - replace (SF)	$120				$0
Bridges - detour (SF)	$60				$0
Bridge Removal (SF)	$25				$0
Cofferdams (ea)	$20,000				$0
Box Culverts (SF)	$95				$0
Box Culverts (SF)	$95				$0
Large cross drains (LF)	$80				$0
Replace cross drains (LF)	$120				$0
Sediment/ detention ponds (ea)	$30,000				$0
Pavement patching (Sq yd)	$30				$0
New Lighting	$10,000				$0
Traffic Signalization / Upgrade (ea)	$125,000				$0
				Subtotal	**$0**
				Total Construction Cost	**$2,098,105**
					61%

Right-of-Way Costs

Area Type	Unit Cost (acre)	Miles	Width (ft)	Acres	Cost
Urban Residential	$800,000				$0
Easement Residential	$240,000			0.000	$0
Urban Commercial	$2,306,992			0.000	$0
Easement Commercial	$175,000			0.000	$0
Suburban/Rural Residential	$75,000			0.000	$0
Easement rural Residential	$180,000			0.000	$0
Suburban/Rural Commercial	$200,000			1.000	$200,000
Easement rural Commercial	$240,000			0.000	$0
Displacements		Number	factor		
Residential	$250,000	0	0.00		$0
Commercial	$1,000,000	0	0		$0
Damages	$0	0	0.00		$0
				ROW multiplier	1.6
				Total Right-of-Way Cost	**$320,000**
					9%

Reimbursable Utility Costs

			0
	20%		$ 419,621
		Total Reimbursable Utility Cost	**$419,621**
			12.10%

Preliminary Engineering Costs

PE %	30%	**Total Preliminary Engineering Cost**	**$629,432**
			18.15%

Contingency Costs

Contingency %	20%	**Total Contingency Cost**	**$693,432**
		Total (PE+Util.+ROW+CST)	**$3,467,158**
		Grand Total	**$4,160,590**

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

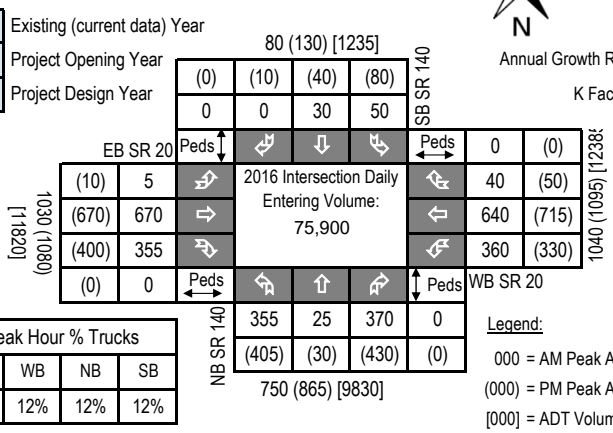
ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A):	0007836	Request By:	
County:	Cherokee	GDOT District:	6 - Cartersville
Major (State) Road:	SR 20	Speed Limit:	45 mph
Minor (Crossing) ST:	SR 140	Speed Limit:	55 mph
Major ST Direction:	East/West	Area Type:	Suburb/Transition
Intersection Control:	Signal (turn lanes on mainline)		
Prepared By:	Arcadis	Analyst:	K Picklesimer
Date:	5/29/2019	Project ID:	
Project Purpose:	Widen SR 20 from two to four lanes to improve capacity and safety.		

2016	Existing (current data) Year
2026	Project Opening Year
2046	Project Design Year

Annual Growth Rate: 1.0%

K Factor*: 8%



Peak Hour % Trucks			
EB	WB	NB	SB
12%	12%	12%	12%

Legend:

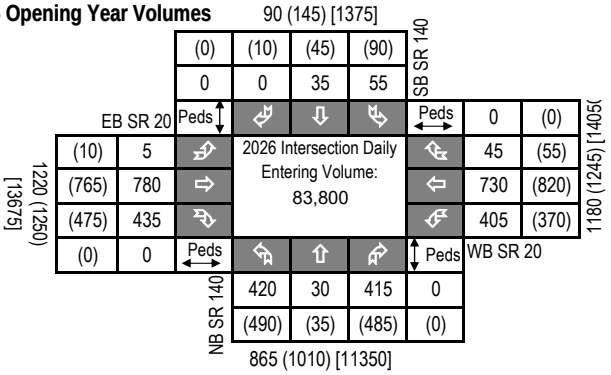
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

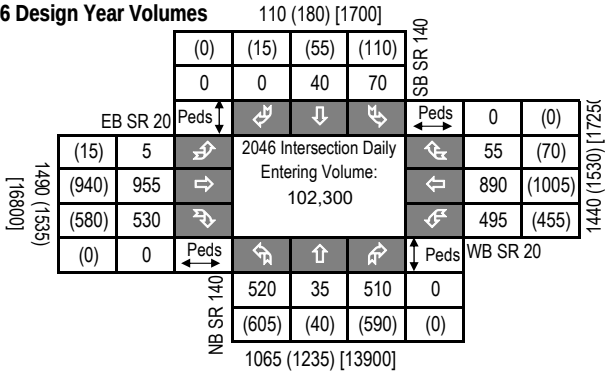
[000] = ADT Volume (Estimate)

Approach Splits: SR 20 - 0.69 / SR 140 - 0.31

2026 Opening Year Volumes



2046 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	0007836
Project Location:	SR 20 @ SR 140
Prepared by:	Arcadis
Analyst:	K Picklesimer
Date:	5/29/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	No	No	No	No	No	No	No	Intersection meets signal warrants
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	Intersection meets signal warrants
	Mini Roundabout	No	No	No	No	No	No	No	High volumes and high speed approaches. Not suitable
	Single Lane Roundabout	No	No	No	No	No	No	No	High volumes and multi lane approaches. Not suitable
	Multilane Roundabout	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Solution to Evaluate
	RCUT (stop control)	No	No	No	No	No	No	No	Intersection meets signal warrants
	RIRO w/down stream U-Turn	No	No	No	No	No	No	No	Intersection meets signal warrants
	High-T (unsignalized)	No	No	No	No	No	No	No	Intersection meets signal warrants
	Offset-T Intersections	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an Interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other unignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Solution to Evaluate
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Significant impact to create wide median. Not suitable
	RCUT (signalized)	No	No	No	No	No	No	No	High Left turn volumes. Not suitable.
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Continuous Green-T	No	No	No	No	No	No	No	Not a T intersection
	Jughandle	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Quadrant Roadway	No	No	No	No	No	No	No	Not enough ROW to re-align the intersection
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Not an Interchange
	Diverging Diamond	No	No	No	No	No	No	No	Not an Interchange
	Single Point Interchange	No	No	No	No	No	No	No	Not an Interchange
	Add LT Lanes on Both Roads No RT Lane Improvements	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Solution to Evaluate
	Other Signalized (provide description):	No	No	No	No	No	No	No	N/A

☐ = Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A)	0007836	GDOT District:	6 - Cartersville	Date:	5/29/2019
County:	Cherokee	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis
Project Location:	SR 20 @ SR 140			Analyst:	K Picklesimer
Existing Intersection Control:	Signal (turn lanes on mainline)			Type of Analysis:	Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	Meets Signal Warrants	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2026 Opening Yr No-Build Peak Hr Intersection Delay	91.7 sec	97.5 sec
2026 Opening Yr No-Build Peak Hr Intersection V/C	1.06	1.06
2046 Design Yr No-Build Peak Hr Intersection Delay	141.9 sec	156.2 sec
2046 Design Yr No-Build Peak Hr Intersection V/C ratio	1.29	1.29

Complete Streets Warrants Met?

- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Type	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Angle	23	6	0	14%
Head-On	2	0	0	1%
Rear End	134	17	0	75%
Sideswipe - same	9	3	0	6%
Sideswipe - opposite	3	0	0	1%
Not Collision w/Motor Veh	5	0	0	2%
TOTALS:	176	26	0	202

Crash Data: Enter 5 most recent years of intersection crash data

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1		Alternative 2		Alternative 3		Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Multilane Roundabout		Traffic Signal		Add Left Turn Lanes		N/A	N/A
Project Cost: (From CostEst Worksheet)	*Additional description here*		*Add LT bays (2) on Minor ST*		*Additional description here*			
Construction Cost	$2,254,000		$0		$1,875,000			
ROW Cost	$397,000		$0		$341,000			
Environmental Cost	$0		$0		$0			
Reimbursable Utility Cost	$67,000		$0		$66,000			
Design & Contingency Cost	$630,000		$0		$468,000			
Cost Adjustment (justification req'd)	0%		0%		0%			
Total Cost	$3,348,000		$0		$2,750,000			
Traffic Operations:			*User Cost Override*					
Traffic Analysis Software Used	SIDRA 7		Synchro 10		Synchro 10			
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr		
2046 Design Yr Build Intersection Delay	74.6 sec	107.5 sec	140.4 sec	157.9 sec	56.5 sec	78.8 sec		
2046 Design Yr Build Intersection V/C	1.30	1.51	1.31	1.29	0.93	1.02		
Safety Analysis:								
Predefined CRF: PDO	26%		0%		0%			
Predefined CRF: Fatal/Inj	71%		0%		0%			
Predefined CRF Source:	FHWA Clearinghouse #s 4196 / 4195		N/A		N/A			
User Defined CRF: PDO					29%			
User Defined CRF: Fatal/Inj					26%			
User Defined CRF Source (write in if applicable):								
Environmental Impacts:[1]								
Historic District/Property	None		None		None			
Archaeology Resources	None		None		None			
Graveyard	None		None		None			
Stream	None		None		None			
Underground Tank/Hazmat	None		None		None			
Park Land	None		None		None			
EJ Community	None		None		None			
Wooded Area	None		None		None			
Wetland	None		None		None			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Stakeholder Posture:			
Local Community Support	Unknown	Unknown	Unknown
GDOT Support	Unknown	Unknown	Unknown
Final ICE Stage 2 Score:	2.7	2.2	3.4
Rank of Control Type Alternatives:	2	3	1

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary):

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 20 @ SR 140	County:	Cherokee	Date:	5/29/2019
GDOT PI # (or N/A):	0007836	Area Type:	Suburb/Transition	Agency/Firm:	Arcadis
Existing Intersection Control:	Signal (turn lanes on mainlin	GDOT District:	6 - Cartersville	Analyst:	K Picklesimer
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

	EB SR 20			WB SR 20			NB SR 140			SB SR 140		
Movement	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	1	2	1	1	2	1	0	1	1	0	1	0
Lane Widths*	12'	12'	12'	12'	12'	12'	0'	12'	12'	0'	12'	0'
Bay Length**	150'		0'	125'		150'	0'		0'	0'		0'
Median Width		0'			0'			0'			0'	
Right-of-Way	80'						60'					

Table 2: Proposed Conditions

	Multilane Roundabout	Traffic Signal	Add Left Turn Lanes	N/A	N/A
Proposed Pavement Type	F.D. Asphalt	None	F.D. Asphalt	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	2	0	2	0	0
Modify/Replace Traffic Signal	0	0	3	0	0
Lighting Poles (ea)	4	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	4	0	0	0	0
New/Replace Sidewalks (LF)	4'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$164,063
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

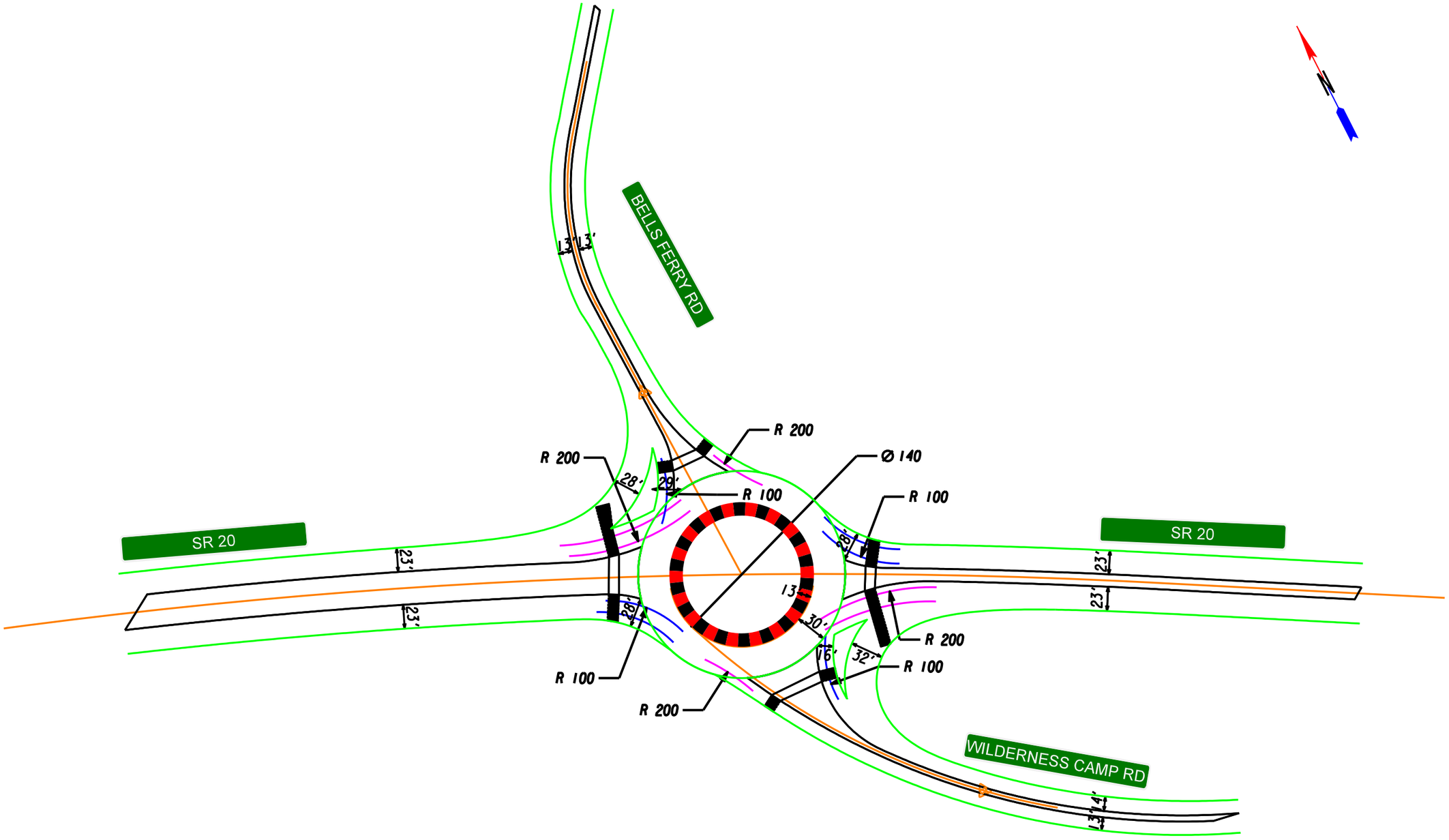
Pay Item	Per Ln Mi Unit Cost	Unit Cost	Multilane Roundabout		Traffic Signal		Add Left Turn Lanes		N/A		N/A	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	75,186	$946,951	0	$0	56,000	$530,303				
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0				
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	2400	$60,903	2,100	$40,068	5,200	$99,216				
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0				
Concrete Island (sqyd)	n/a	$51.58/syd	600	$41,161	0	$0	0	$0				
Median Landscaping	$100K/LM	$1.89/LF	3600	$9,068	0	$0	0	$0				
Typical Driveways Impacted (ea)	n/a	$7,500 ea	2	$19,950	0	$0	2	$15,000				
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	1200	$54,409	1,050	$35,795	2,600	$88,636				
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	3707	$50,540	0	$0	0	$0				
Signing & Marking	$0	$22.73/LF	1,200	$36,277	1,050	$23,867	2,600	$59,098				
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0				
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	3	$547,725				
Lighting (per pole)	n/a	$5,607 ea	4	$29,829	0	$0	0	$0				
Signalized Ped Crossings (ea)	n/a	$19,637 ea	4	$104,469	0	$0	0	$0				
6' Sidewalk (LF)	n/a	$49.23/LF	4	$262	0	$0	0	$0				
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0				
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0				
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0				
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0				
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0				
Grading Complete - 20%	n/a	n/a		$540,174		$0		$267,996				
Traffic Control - 20%	n/a	n/a		$360,116		$0		$267,996				
Reimbrusable Utility	n/a	n/a		$67,691		$4,986		$66,999				
Preliminary Engineering - 15%	n/a	n/a		$270,087		$14,959		$200,997				
Contigency - 20%	n/a	n/a		$360,116		$19,946		$267,996				
ROW Cost/Acre: Mixed (Average)	n/a	$164,063ac		$248,429		$0		$213,281				
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0				
ROW Multiplier - 1.6	n/a	n/a		$149,057		$0		$127,969				
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0				
Grand Total Costs				**$3,349,000**		**$140,000**		**$2,753,000**				

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Multilane Roundabout	High Speed Roundabout	F.D. Asphalt	1.51	0.0	75,186	0.0	600	0.0	600	0.0
Traffic Signal	--select one--	None	0.00	0.0	8,000	0.0	50	0.0	1,000	0.0
Add Left Turn Lanes	N/A	F.D. Asphalt	0.00	1.3	16,800	56,000.0	1,000	2,000.0	900	600.0
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
N/A	#N/A	None	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

Roundabout Data

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

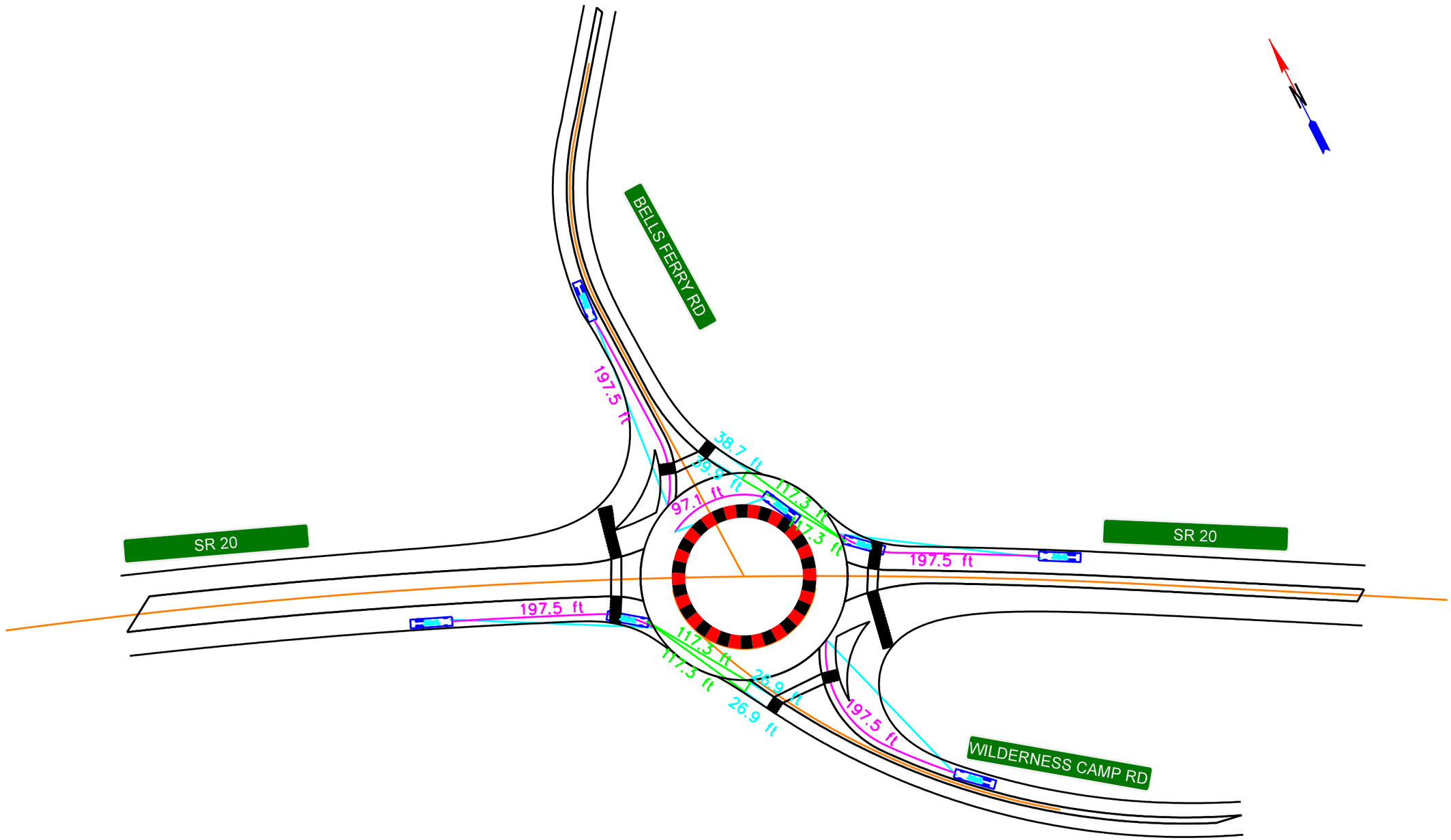
ROUNDABOUT 1
GEOMETRIC LAYOUT

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0001

10/23/2015 GPLN:

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 1
STOPPING SIGHT DISTANCE

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0002

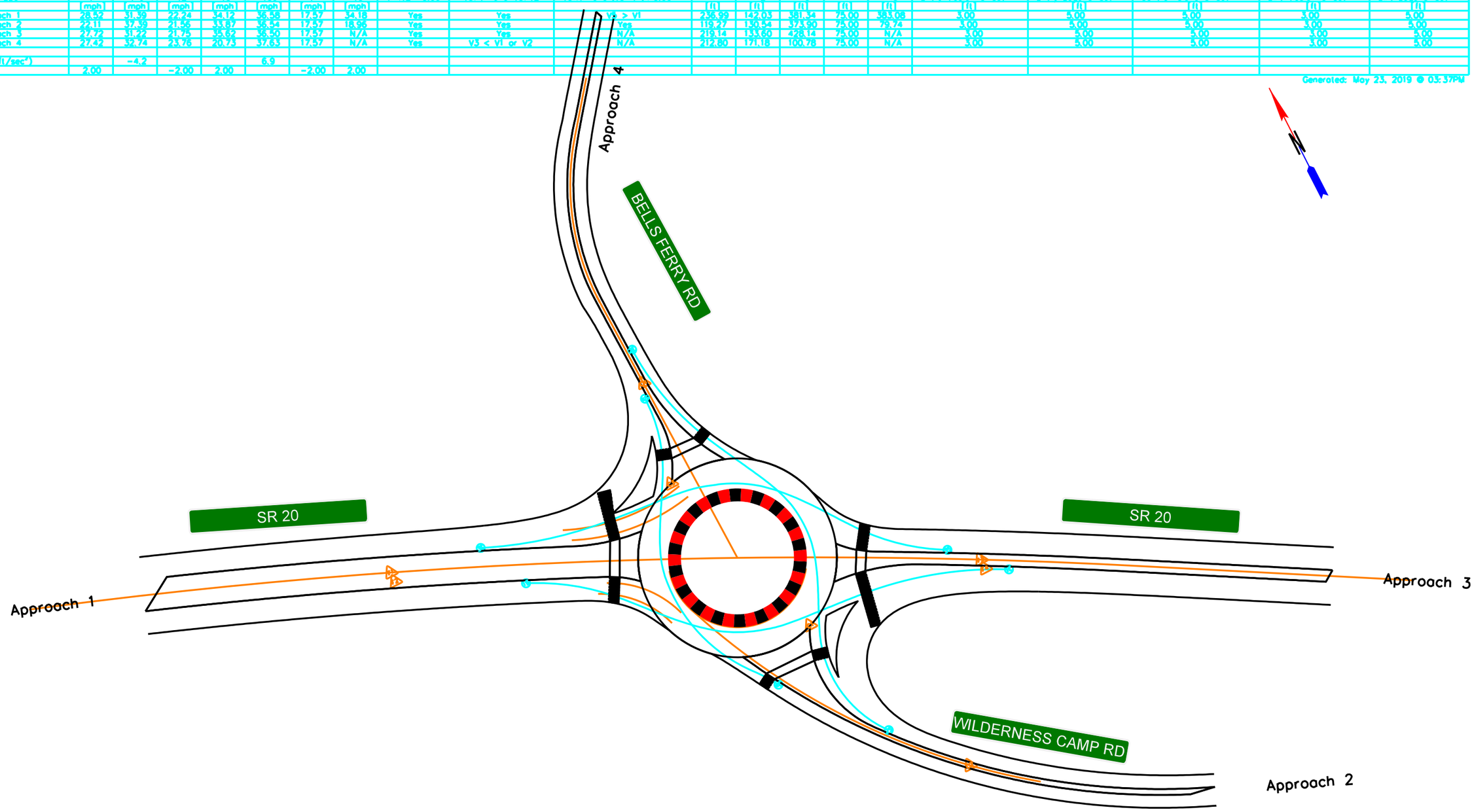
10/23/2015 GPLN

DATE$$$ TIME$$$ $PRFB$ DGN P.I. No.
$USER$ $$PENTABLE$$

FASTEST PATH RESULTS TABLE - THEORETICAL EDGES

	ENTRY LEG	V1	V1o	V2	V3	V3o	V4	V5	V1<V2+15.00	V3>V1 and V3>V2	V5<V1 and |V5-V4|<15.00	R1	R2	R3	R4	R5	Entry Median Offset	Entry Edge Offset	Control Island Offset	Exit Median Offset	Exit Edge Offset
		[mph]	[mph]	[mph]	[mph]	[mph]	[mph]	[mph]				[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]	[ft]
1	Approach 1	28.52	31.59	22.24	34.12	36.58	17.57	34.18	Yes	Yes	V3 > V1	236.99	142.03	381.34	75.00	383.08	3.00	5.00	5.00	3.00	5.00
2	Approach 2	22.11	37.39	21.56	33.87	36.54	17.57	18.96	Yes	Yes	Yes	119.22	130.54	373.90	75.00	79.74	3.00	5.00	5.00	3.00	5.00
3	Approach 3	27.72	31.22	21.75	35.62	36.50	17.57	N/A	Yes	Yes	N/A	219.14	133.60	428.14	75.00	N/A	3.00	5.00	5.00	3.00	5.00
4	Approach 4	27.42	32.74	23.76	20.73	37.63	17.57	N/A	Yes	V3 < V1 or V2	N/A	212.80	171.18	100.78	75.00	N/A	3.00	5.00	5.00	3.00	5.00
	Accel(ft/sec²)		-4.2			6.9															
	SE(%)	2.00		-2.00	2.00		-2.00	2.00													

Generated: May 23, 2019 @ 03:37PM



SCALE IN FEET
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REVISION DATES

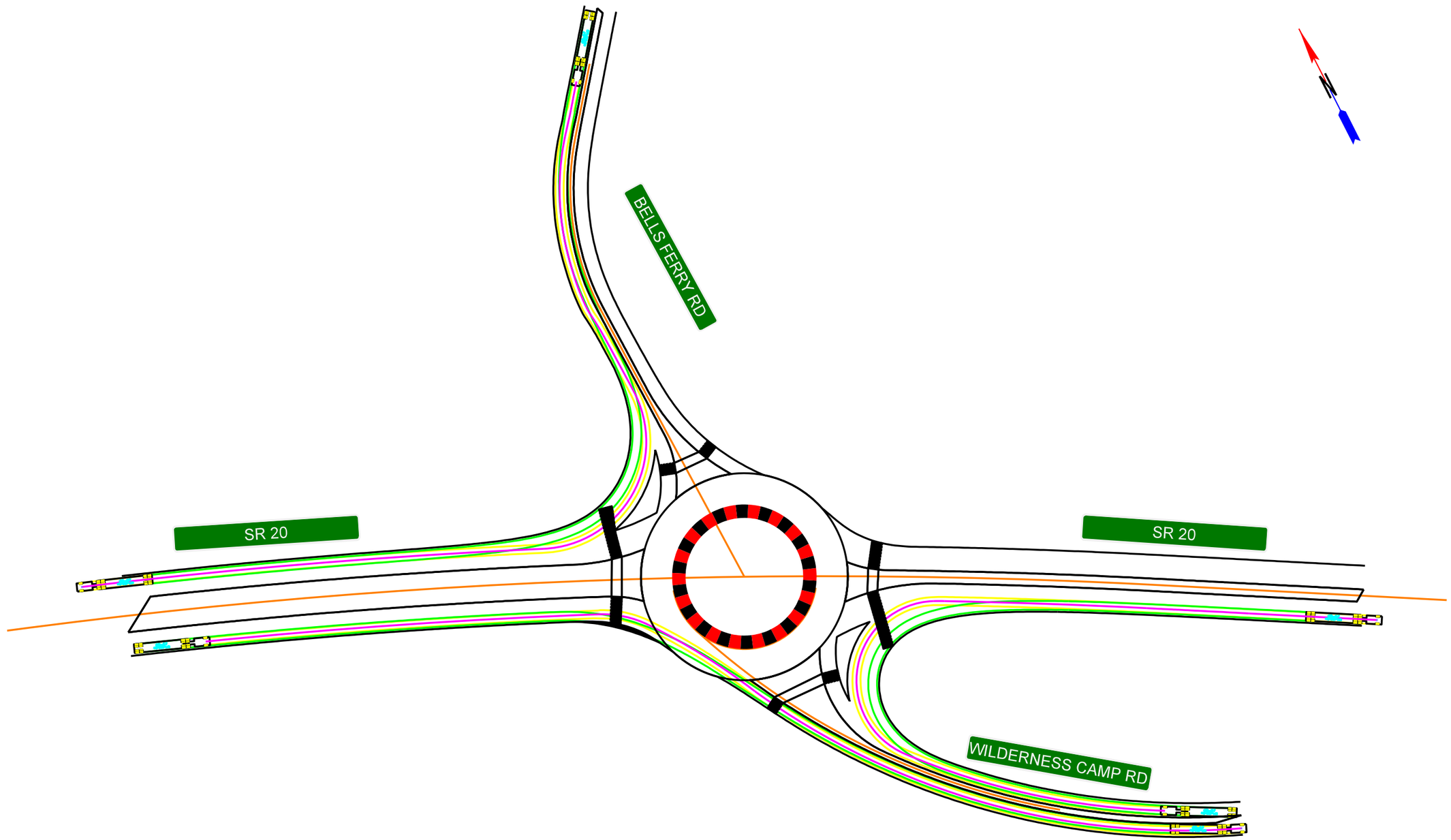
ROUNDABOUT 1
FASTEST PATH

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0003

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

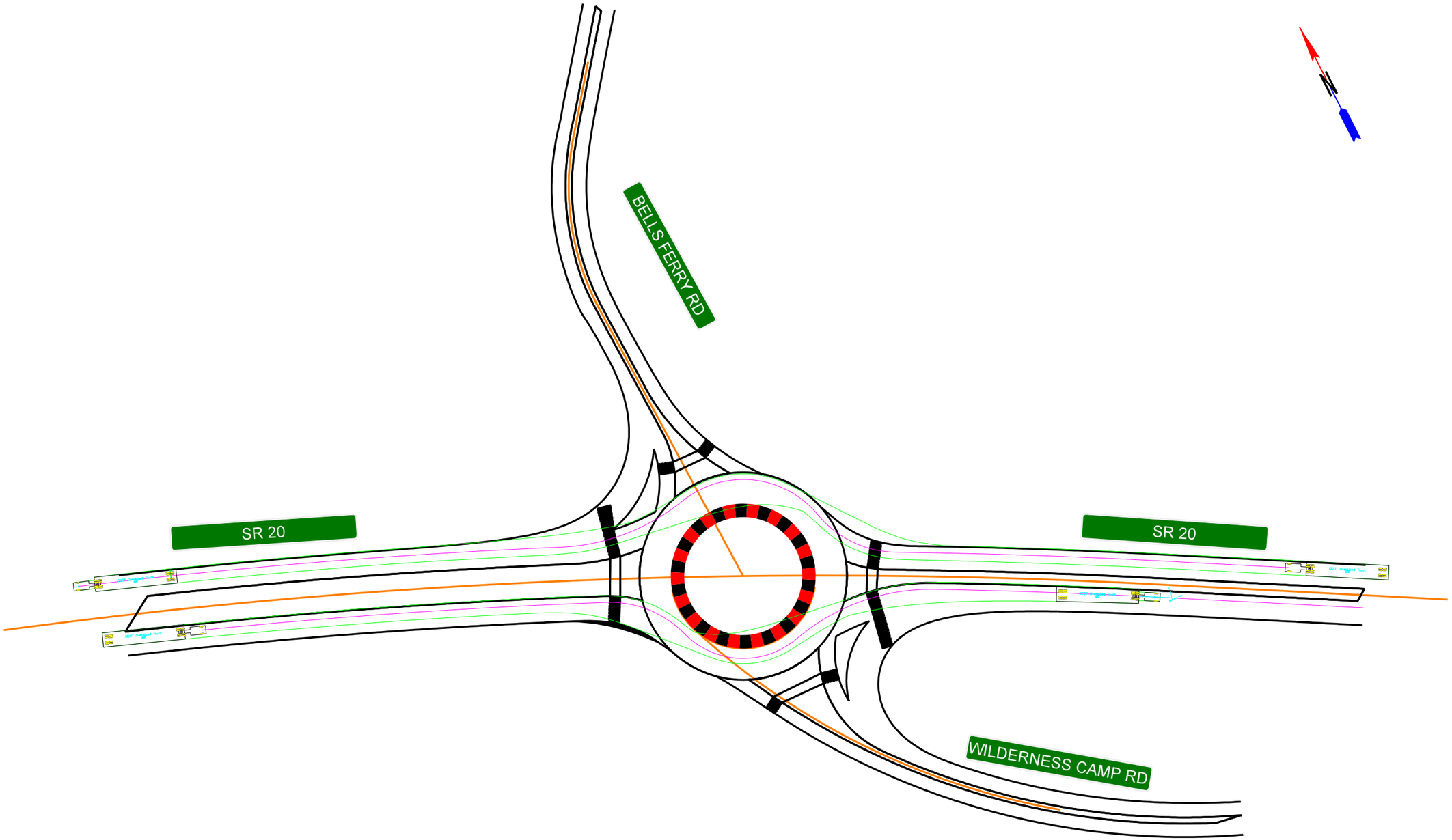
ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004A

10/23/2015 GPLN

DATE$$$ TIME$$$
$USER$
$PRF8$
$$PENTABLE$$
DGN
GDOT
P. I. No.



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004B

10/23/2015 GPLN

DATE$$$ TIME$$$
$USER$
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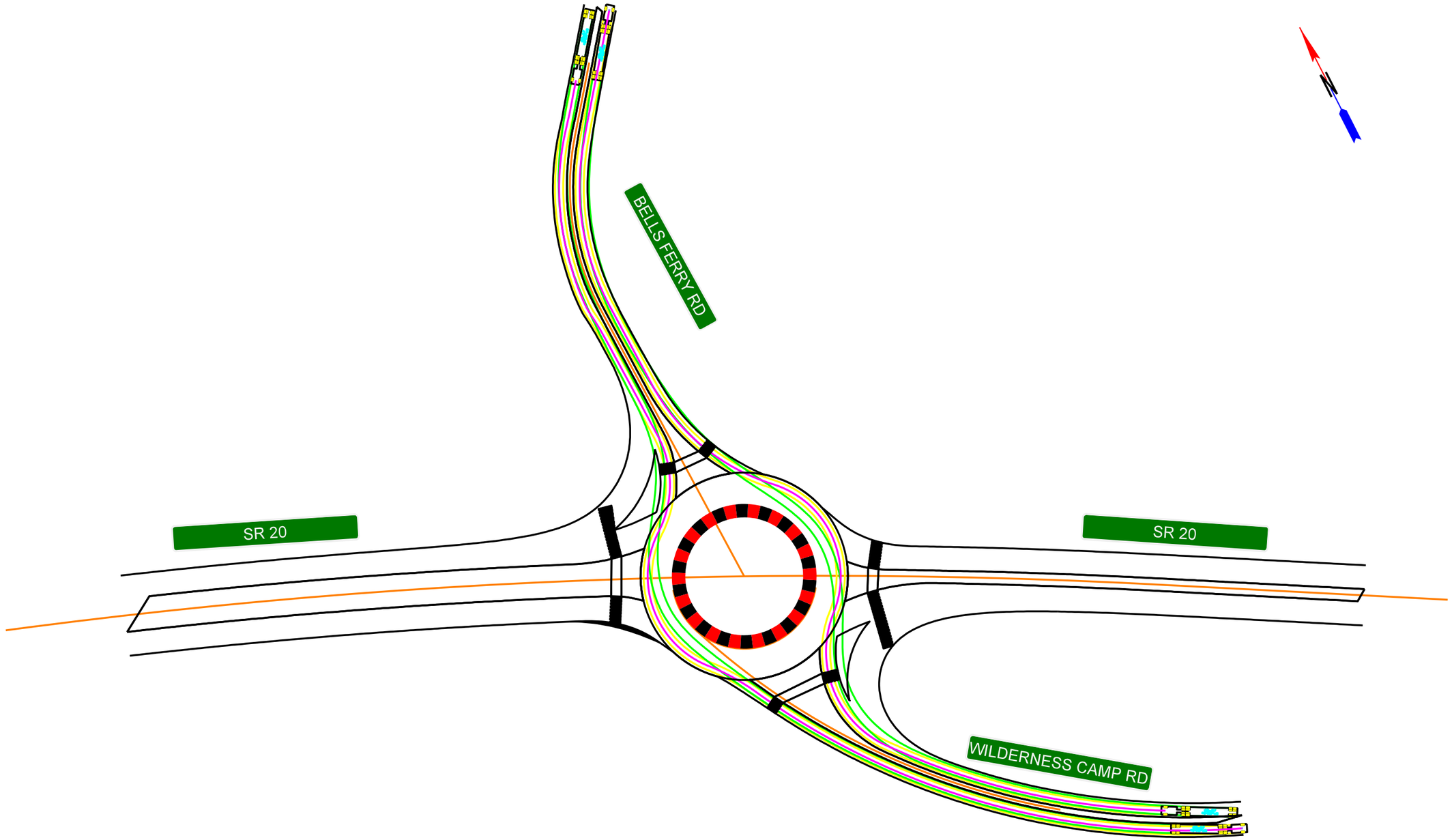
$$PENTABLE$$
DGN
P. I. No.



SCALE IN FEET
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REVISION DATES

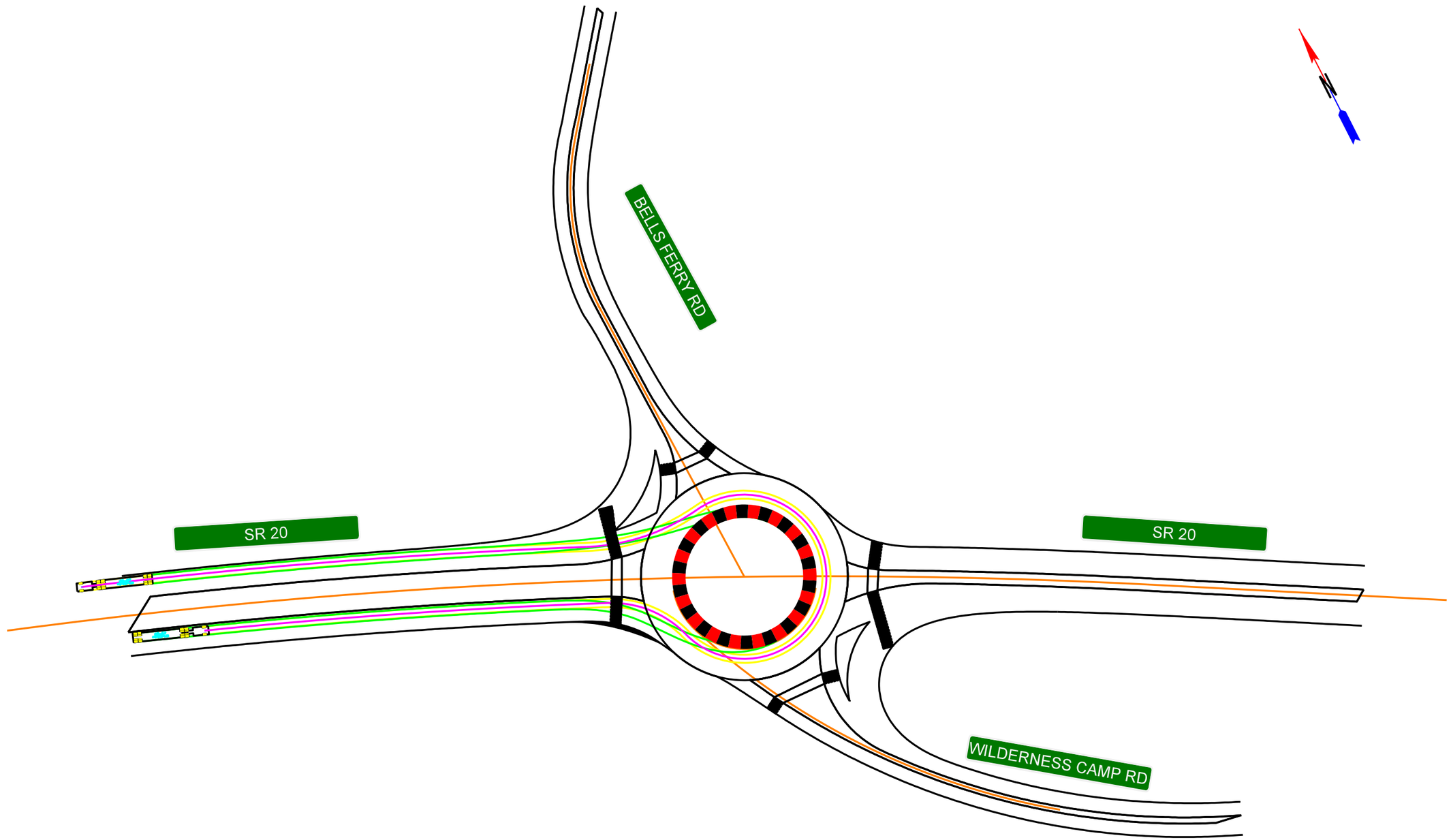
ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004C

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

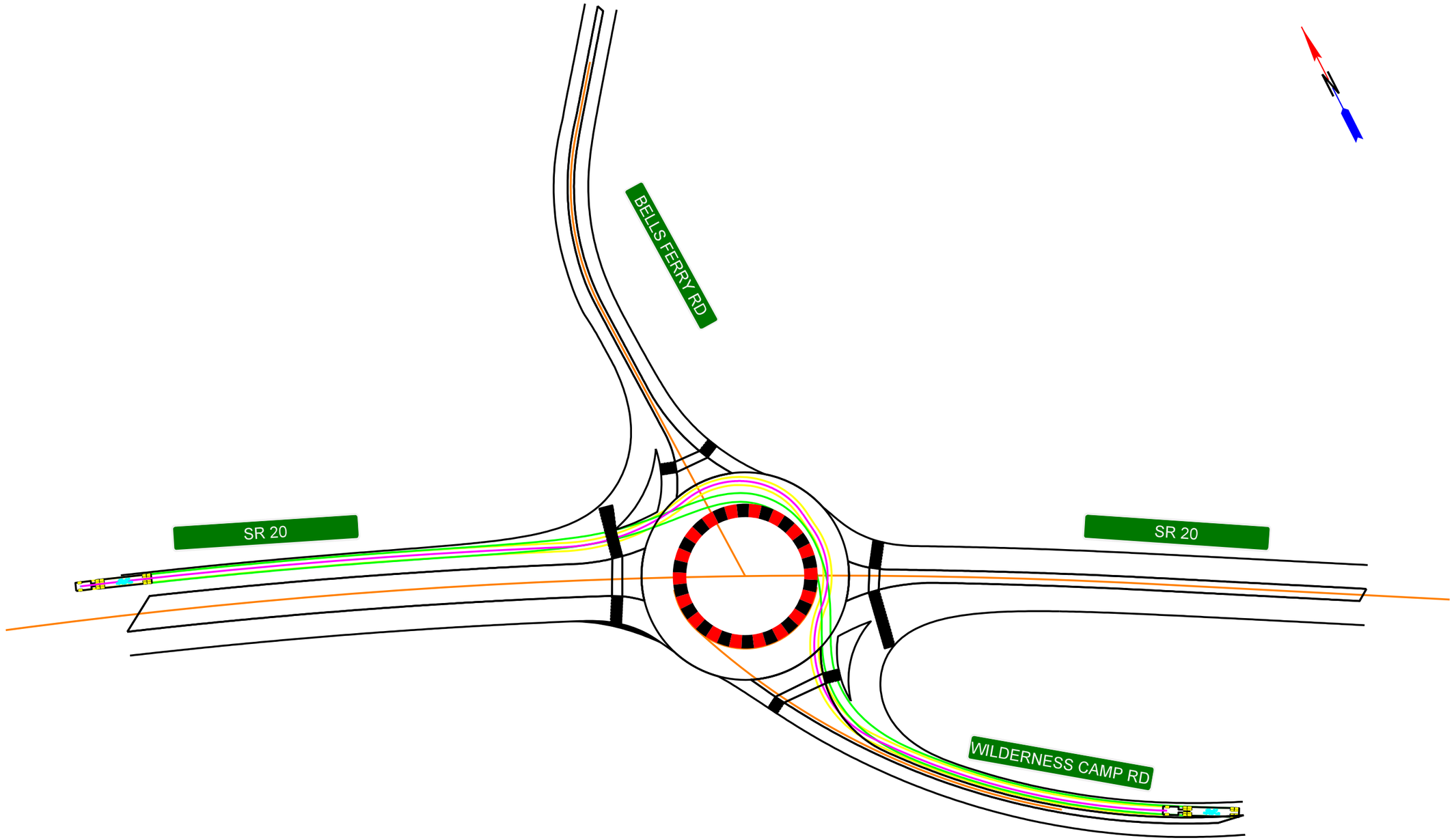
ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004D

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004E

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
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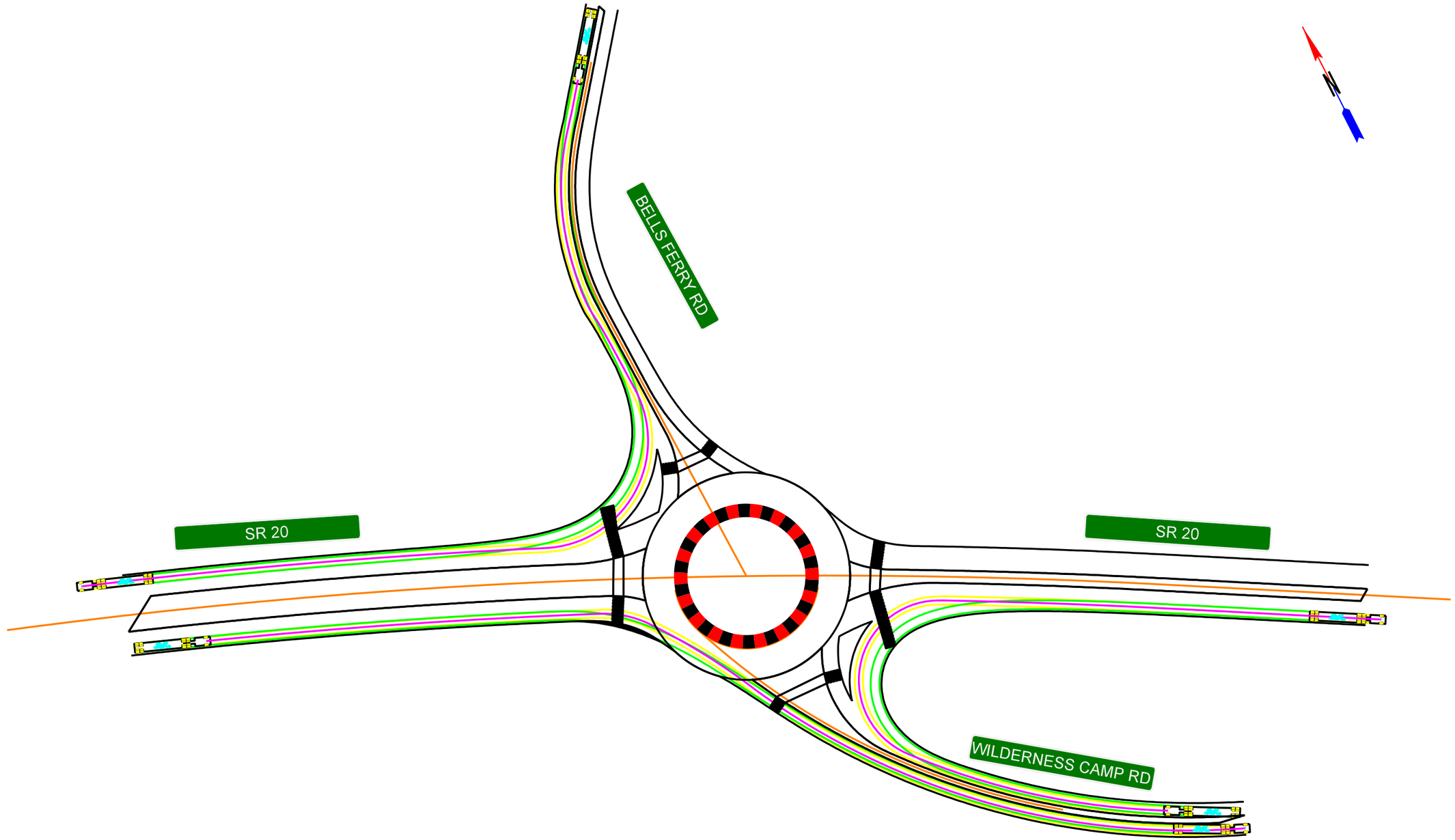

SCALE IN FEET
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REVISION DATES

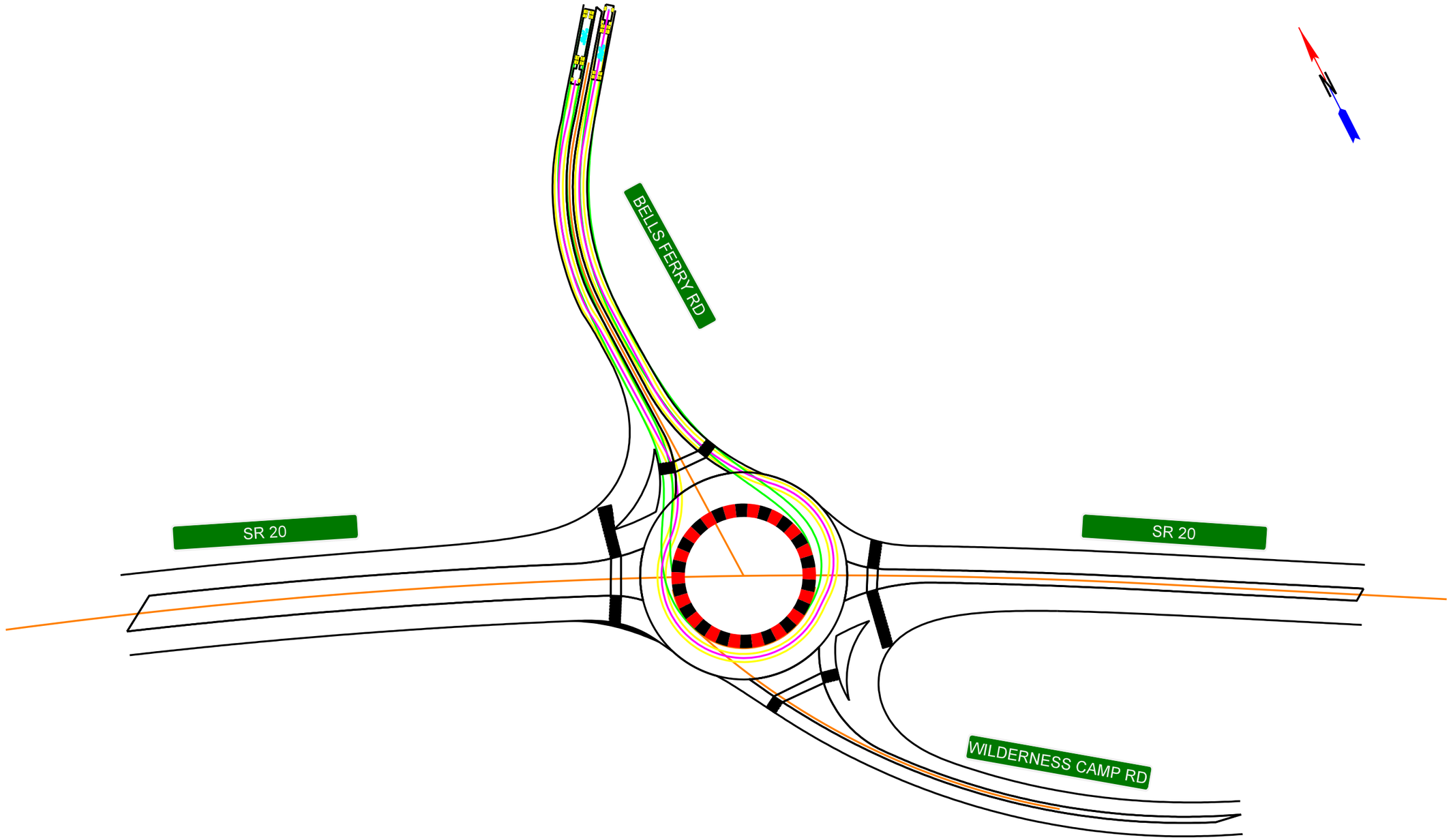
ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004F

10/23/2015 GPLN

DATE$$$ TIME$$$
$USER$
$PRF8$
$$PENTABLE$$
DGN
GDOT
P. I. No.



SCALE IN FEET
0 100 200 400

REVISION DATES

ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004G

10/23/2015 GPLN

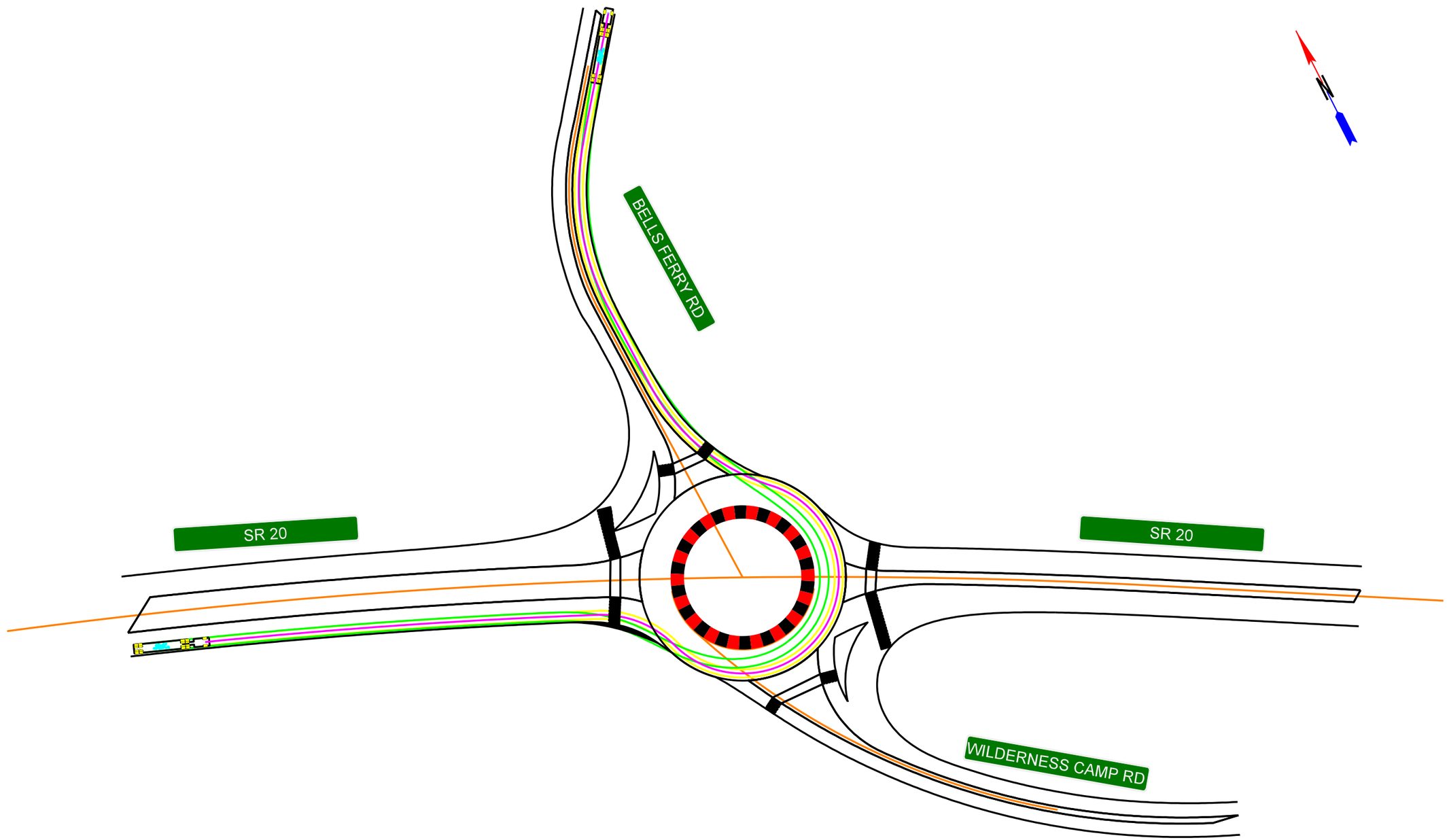
DATE$$$ TIME$$$
$USER$

$PRF8$
$$PENTABLE$$

DGN

GDOT

P. I. No.



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004H

10/23/2015 GPLN

DATE$$$ TIME$$$
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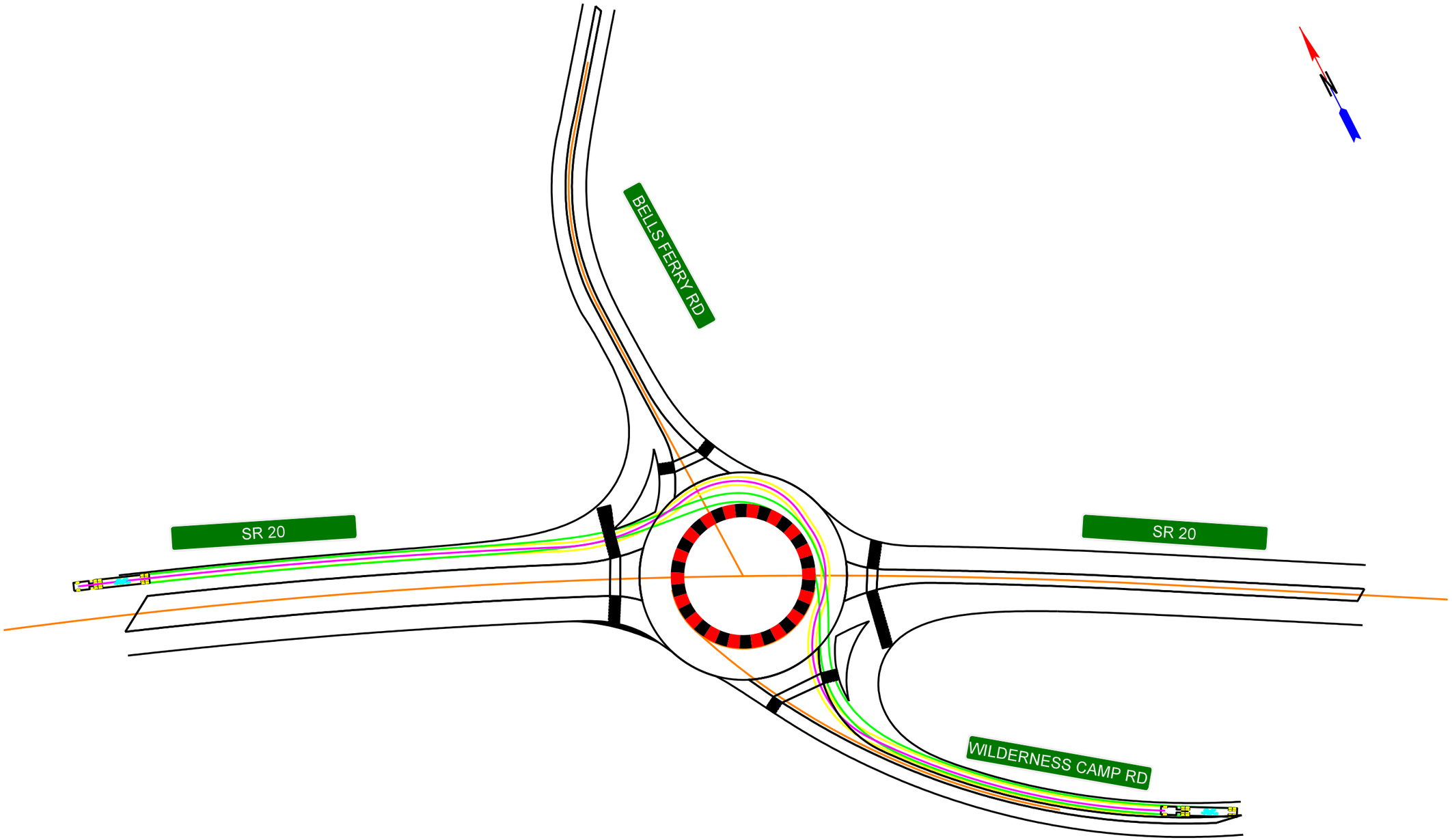
$PRF8$
$$PENTABLE$$
DGN
GDOT
P. I. No.



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004I

10/23/2015 GPLN

DATE$$$ TIME$$$
$USER$
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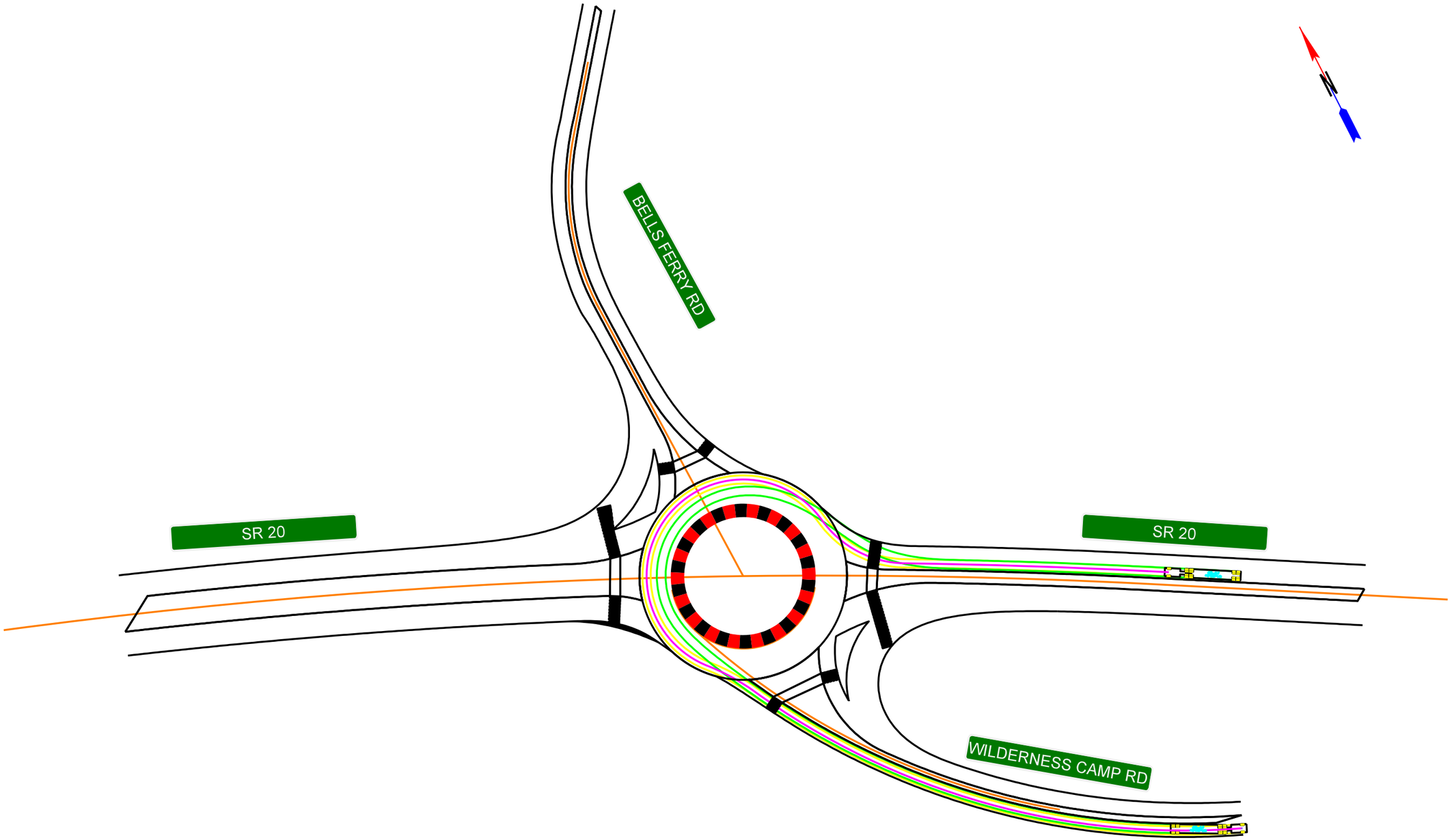
DGN
GDOT
P. I. No.



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004J

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
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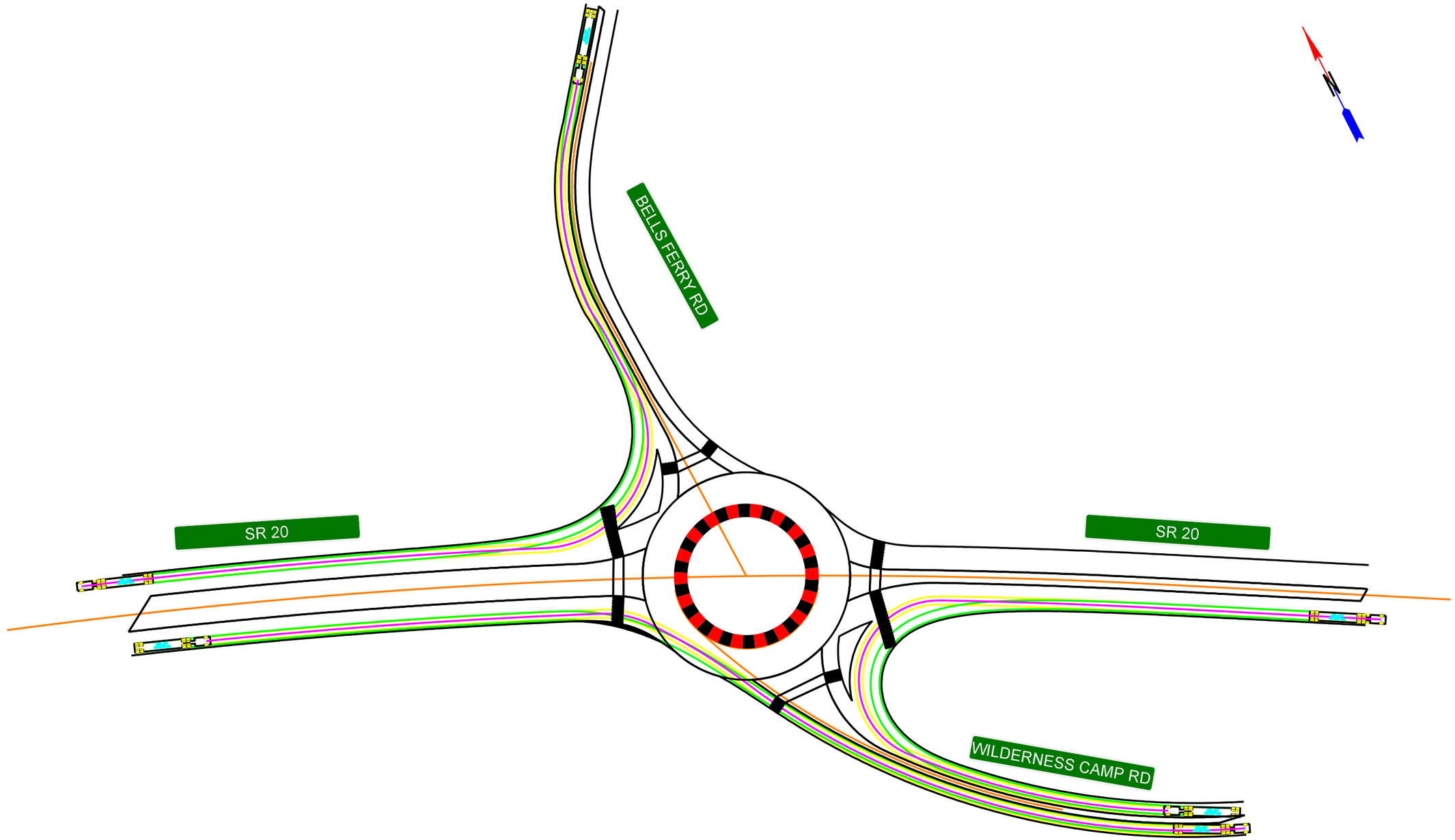

SCALE IN FEET
0 100 200 400

REVISION DATES

ROUNDABOUT 1
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0004K

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
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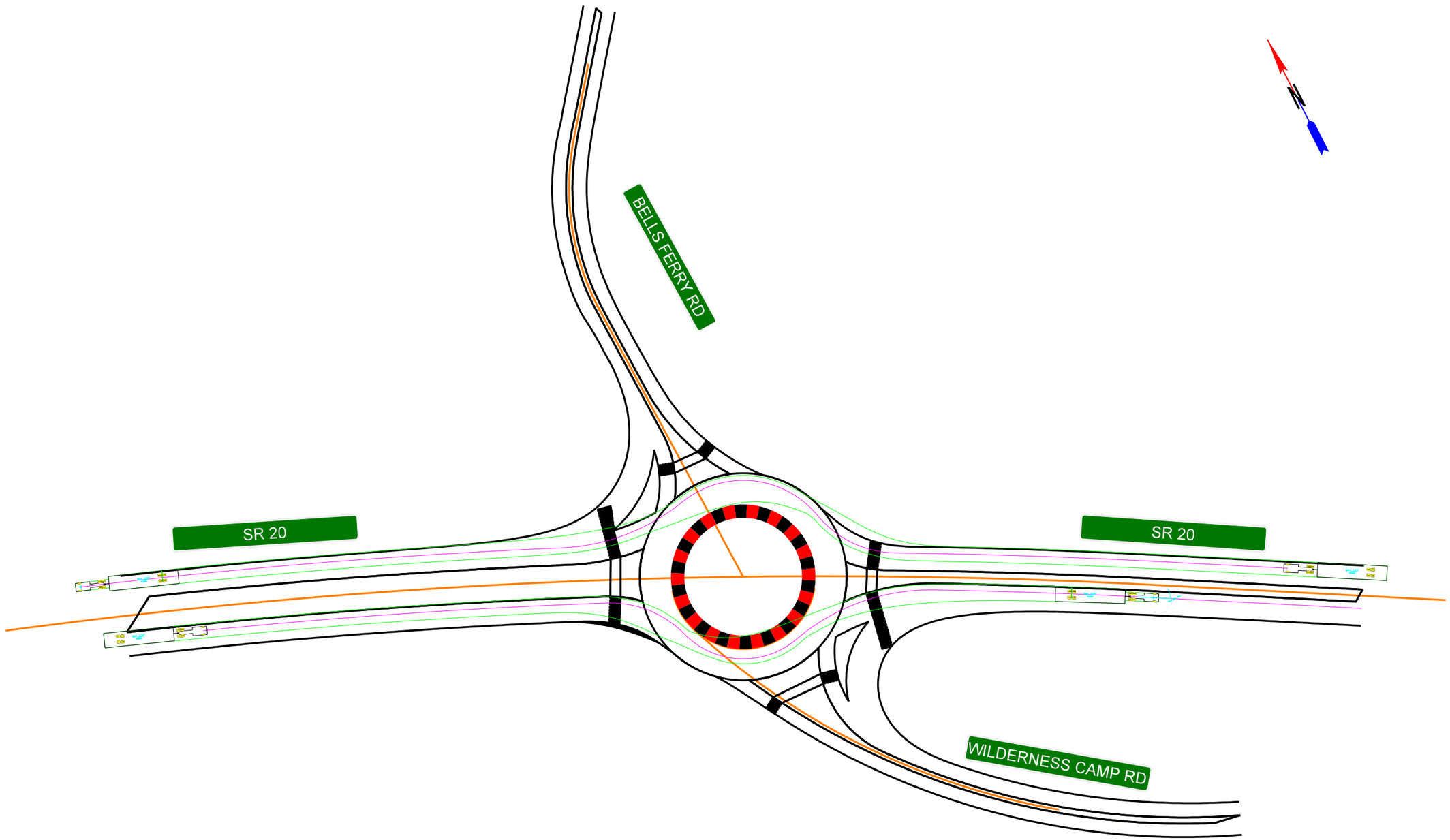

SCALE IN FEET
0 100 200 400

REVISION DATES

ROUNDABOUT 1
SWEPT PATH ANALYSIS (OSOW)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
01-0005

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
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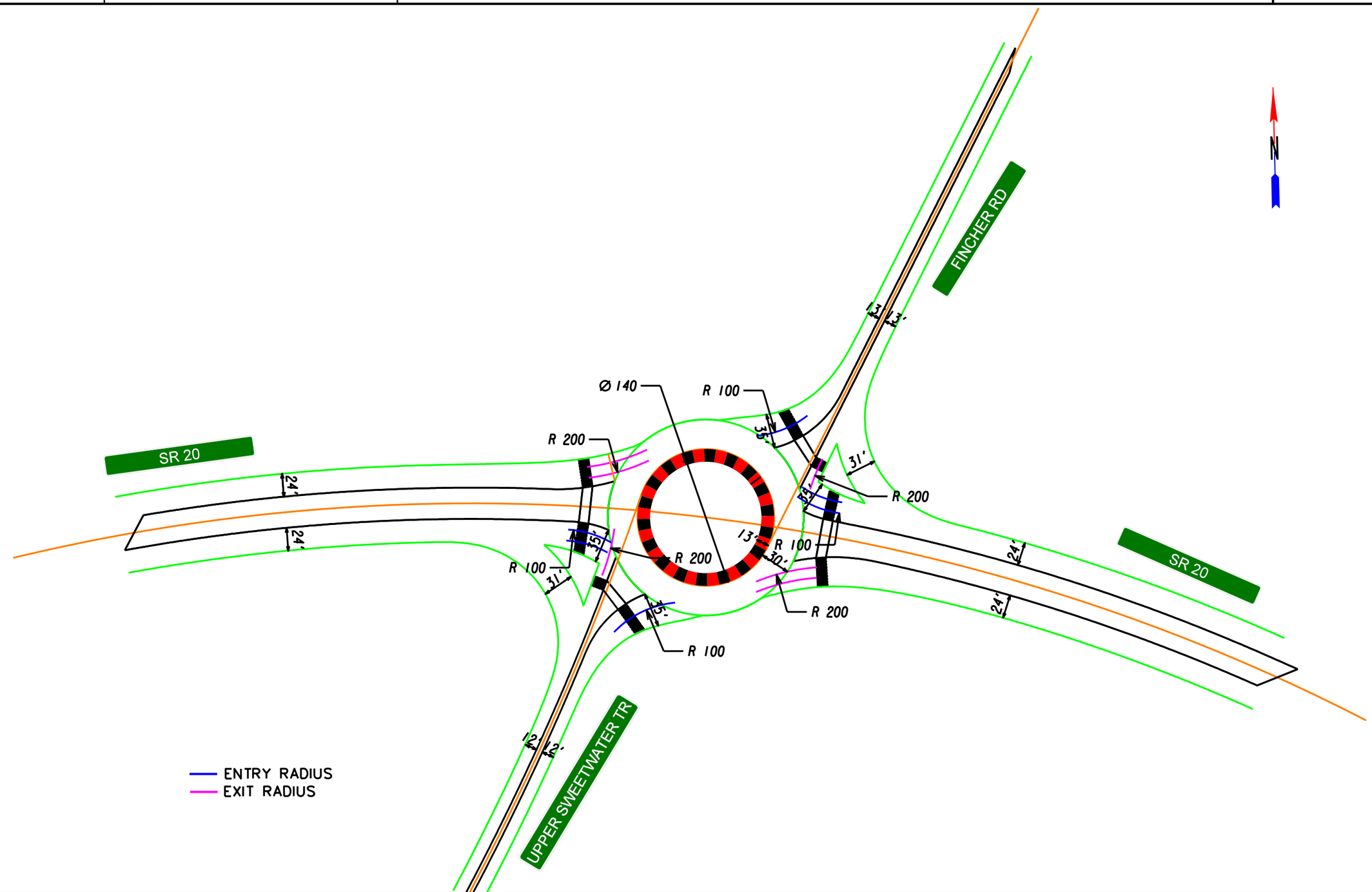

SCALE IN FEET
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REVISION DATES

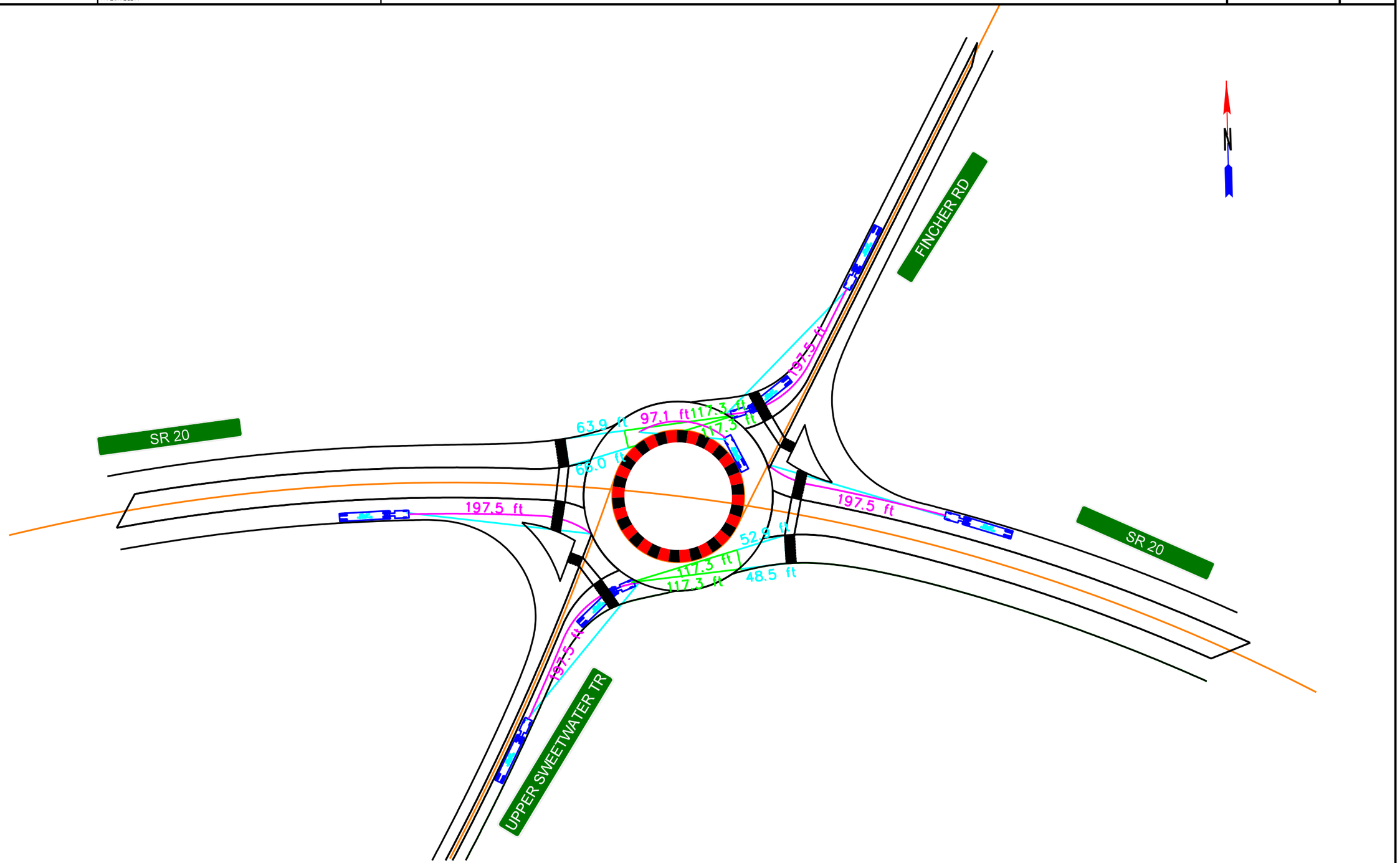
ROUNDABOUT 2
GEOMETRIC LAYOUT

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0001

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

ROUNDABOUT 2
STOPPING SIGHT DISTANCE

DRAWING No.
02-0002

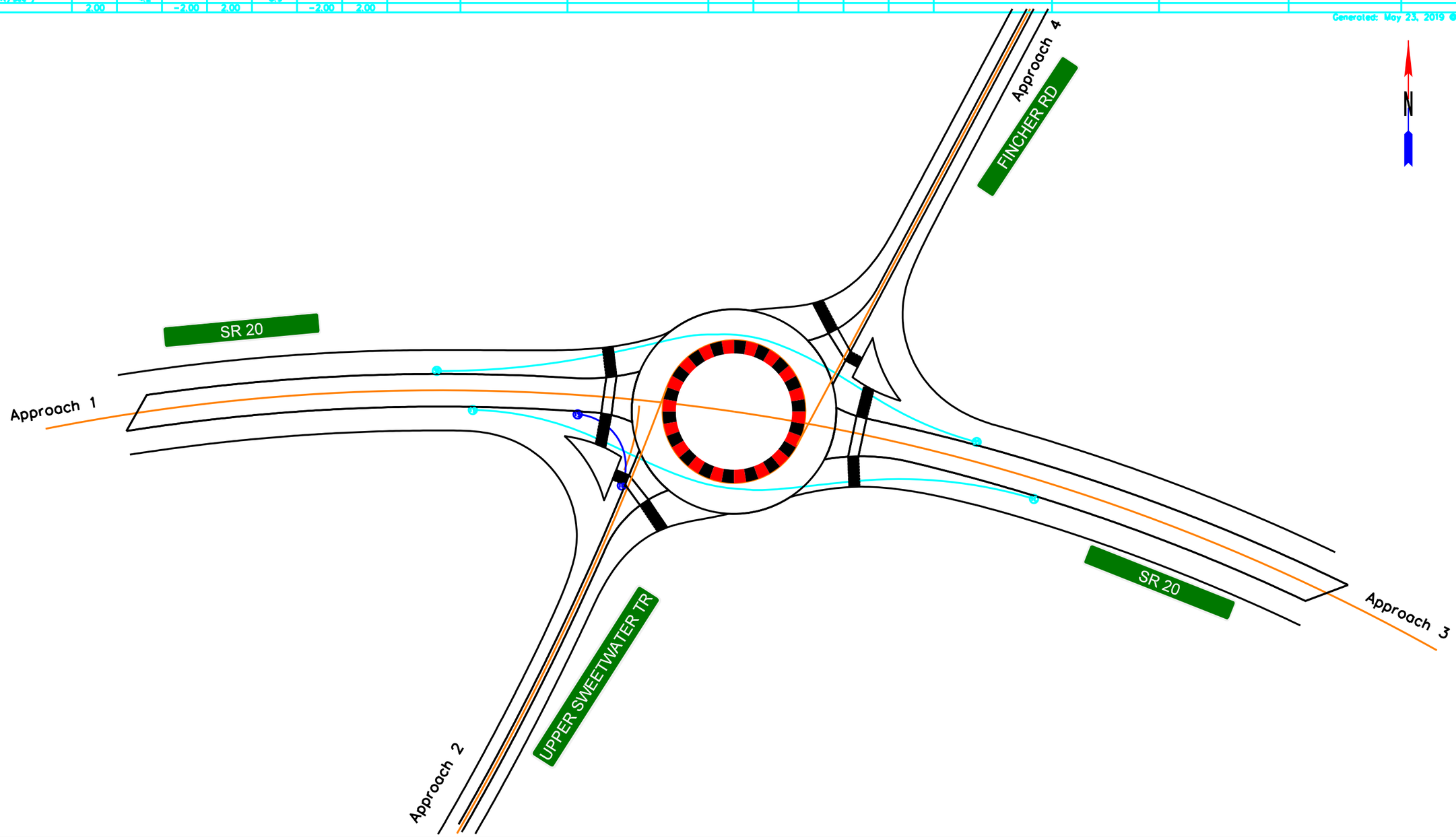
10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$

FASTEST PATH RESULTS TABLE - THEORETICAL EDGES

	ENTRY LEG	V1 (mph)	V1a (mph)	V2 (mph)	V3 (mph)	V3a (mph)	V4 (mph)	V5 (mph)	V1<V2+15.00	V3>V1 and V3>V2	V5<V1 and |V5-V4|<15.00	R1 (ft)	R2 (ft)	R3 (ft)	R4 (ft)	R5 (ft)	Entry Median Offset (ft)	Entry Edge Offset (ft)	Central Island Offset (ft)	Exit Median Offset (ft)	Exit Edge Offset (ft)
1	Approach 1	31.37	32.93	24.65	36.45	37.53	17.57	13.86	Yes	Yes	Yes	305.96	190.32	455.97	75.00	50.59	3.00	5.00	5.00	3.00	5.00
2	Approach 2	N/A	N/A	N/A	N/A	N/A	17.57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.00	N/A	3.00	5.00	5.00	3.00	5.00
3	Approach 3	32.93	31.94	22.71	44.30	36.74	17.57	N/A	Yes	Yes	N/A	347.19	150.63	763.42	75.00	N/A	3.00	5.00	5.00	3.00	5.00
4	Approach 4	N/A	N/A	N/A	N/A	N/A	17.57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.00	N/A	3.00	5.00	5.00	3.00	5.00
	Accel(ft/sec²)		-4.2			6.9															
	SE(%)	2.00		-2.00	2.00		-2.00	2.00													

Generated: May 23, 2019 @ 02:02PM



SCALE IN FEET
0 100 200 400

REVISION DATES

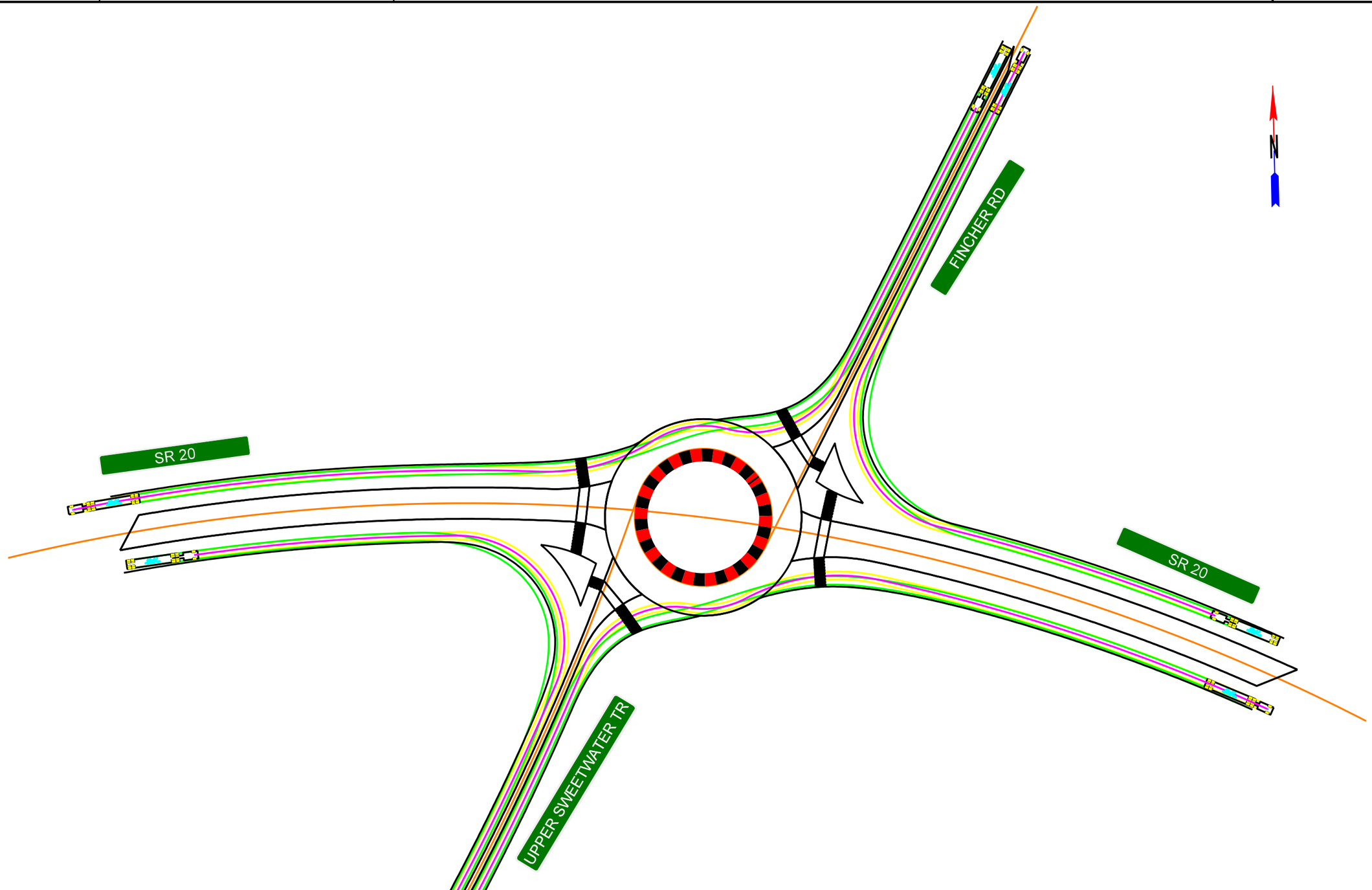
ROUNDABOUT 2
FASTEST PATH

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0003

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

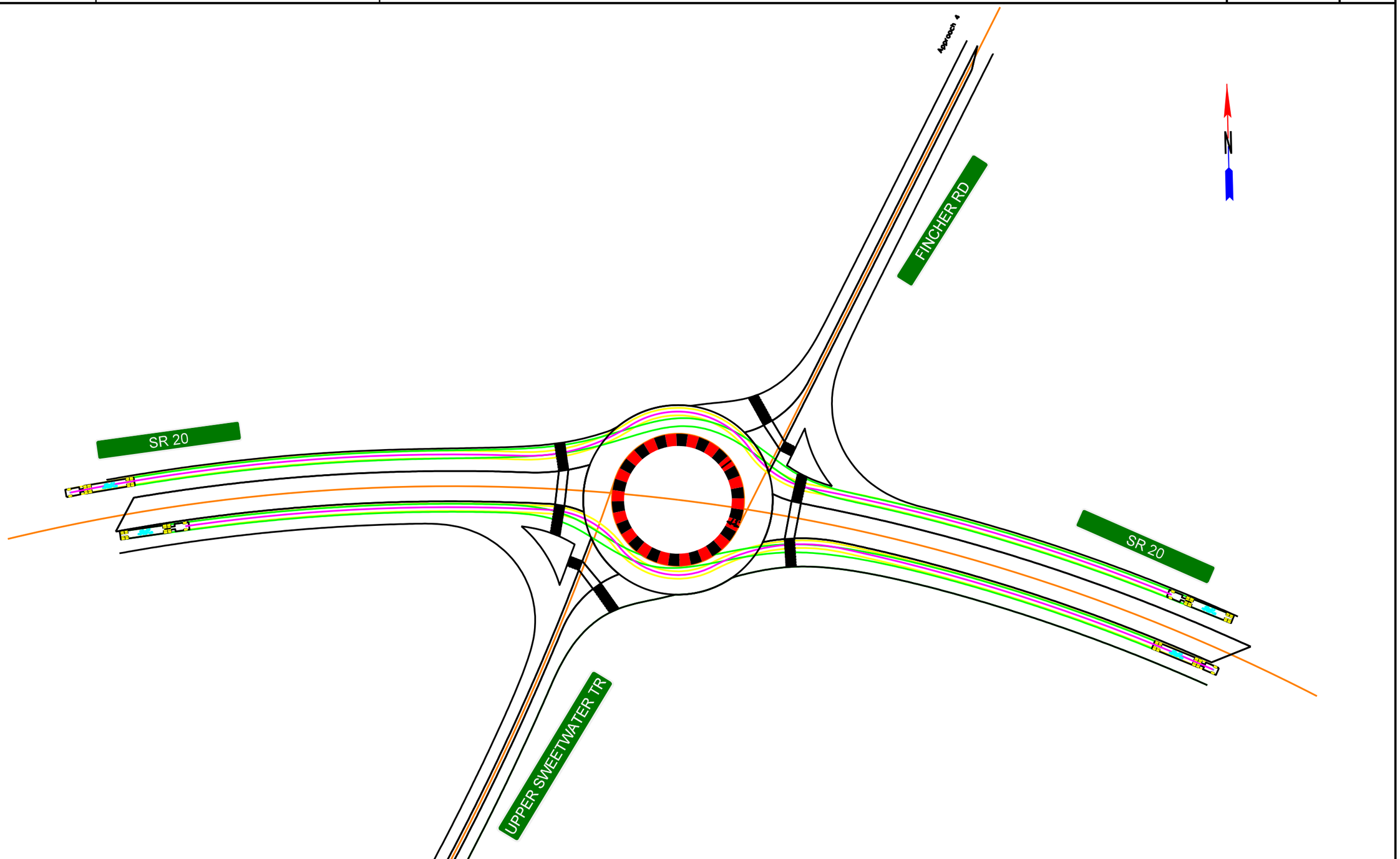
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004A

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES		

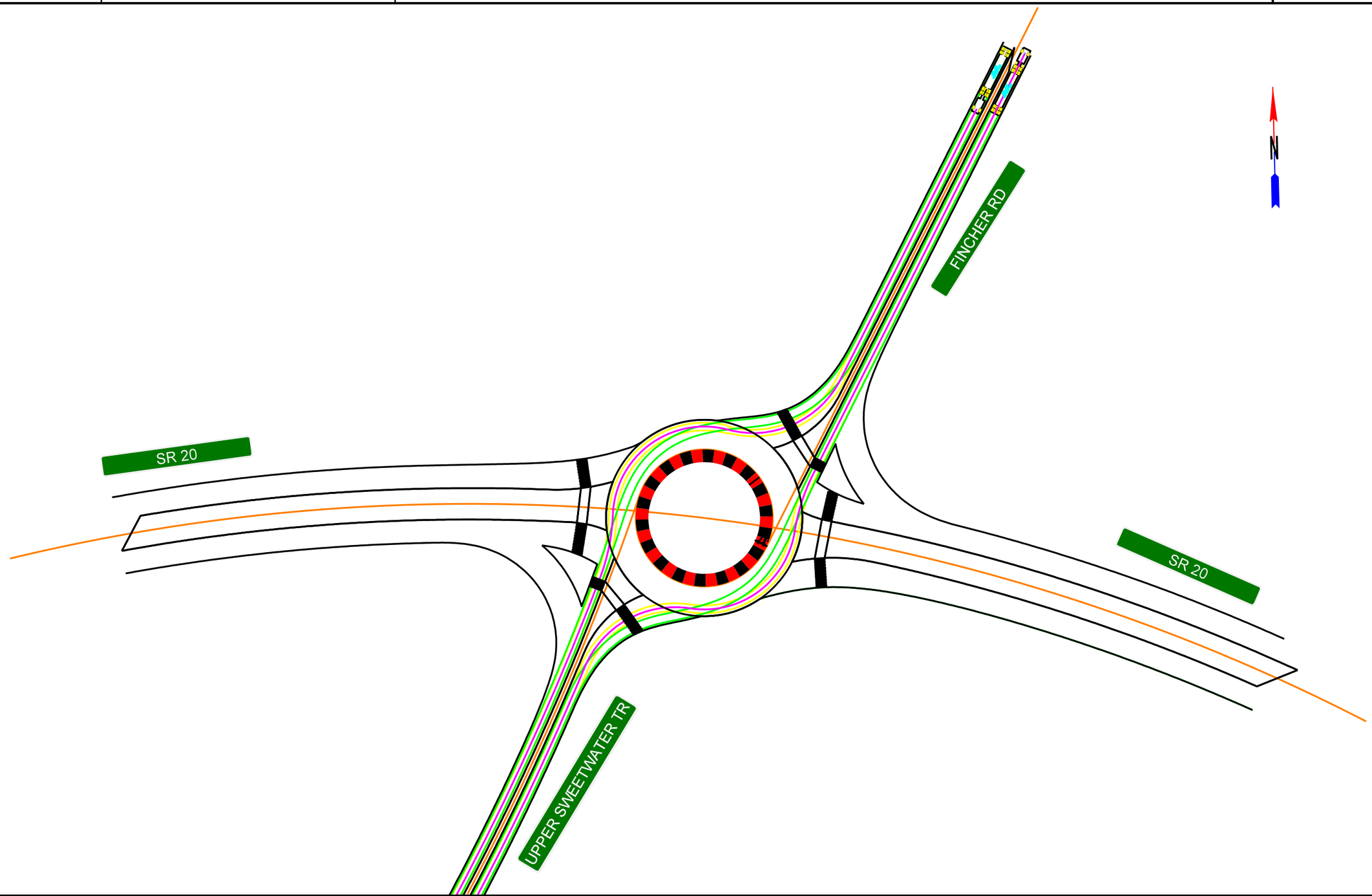
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004B

10/23/2015 GPLW

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

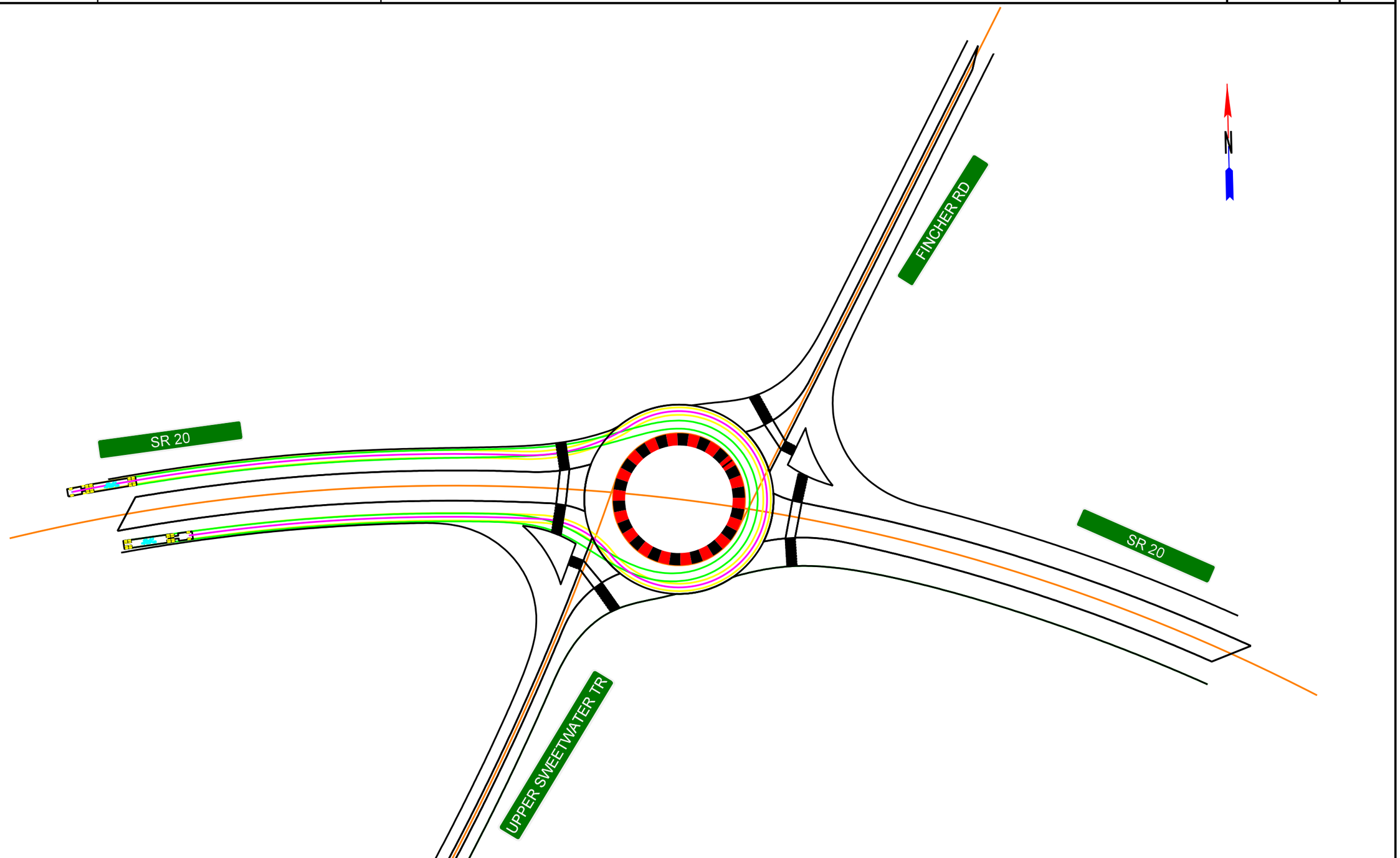
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004C

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

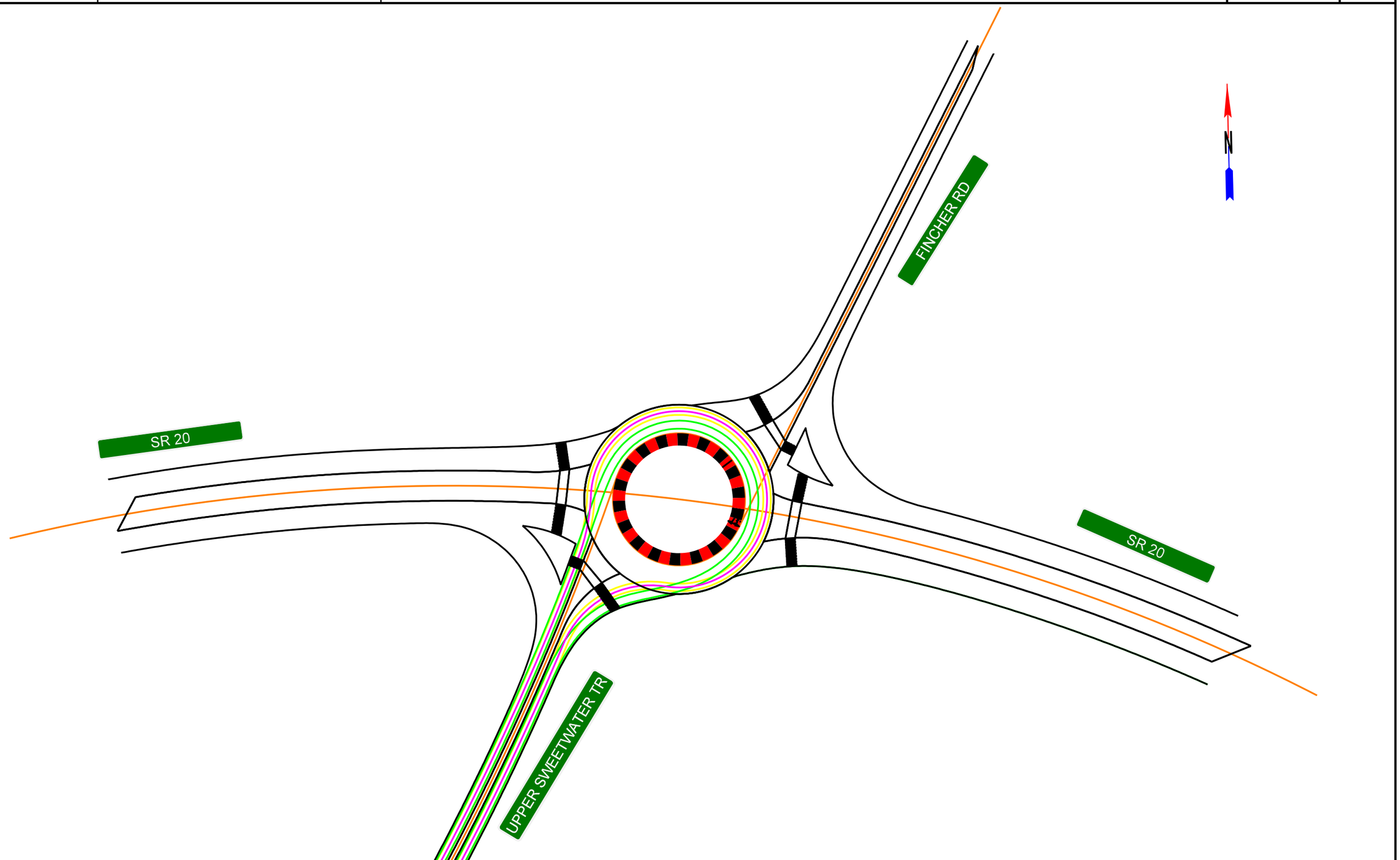
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004D

10/23/2015 GPLM

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004E

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
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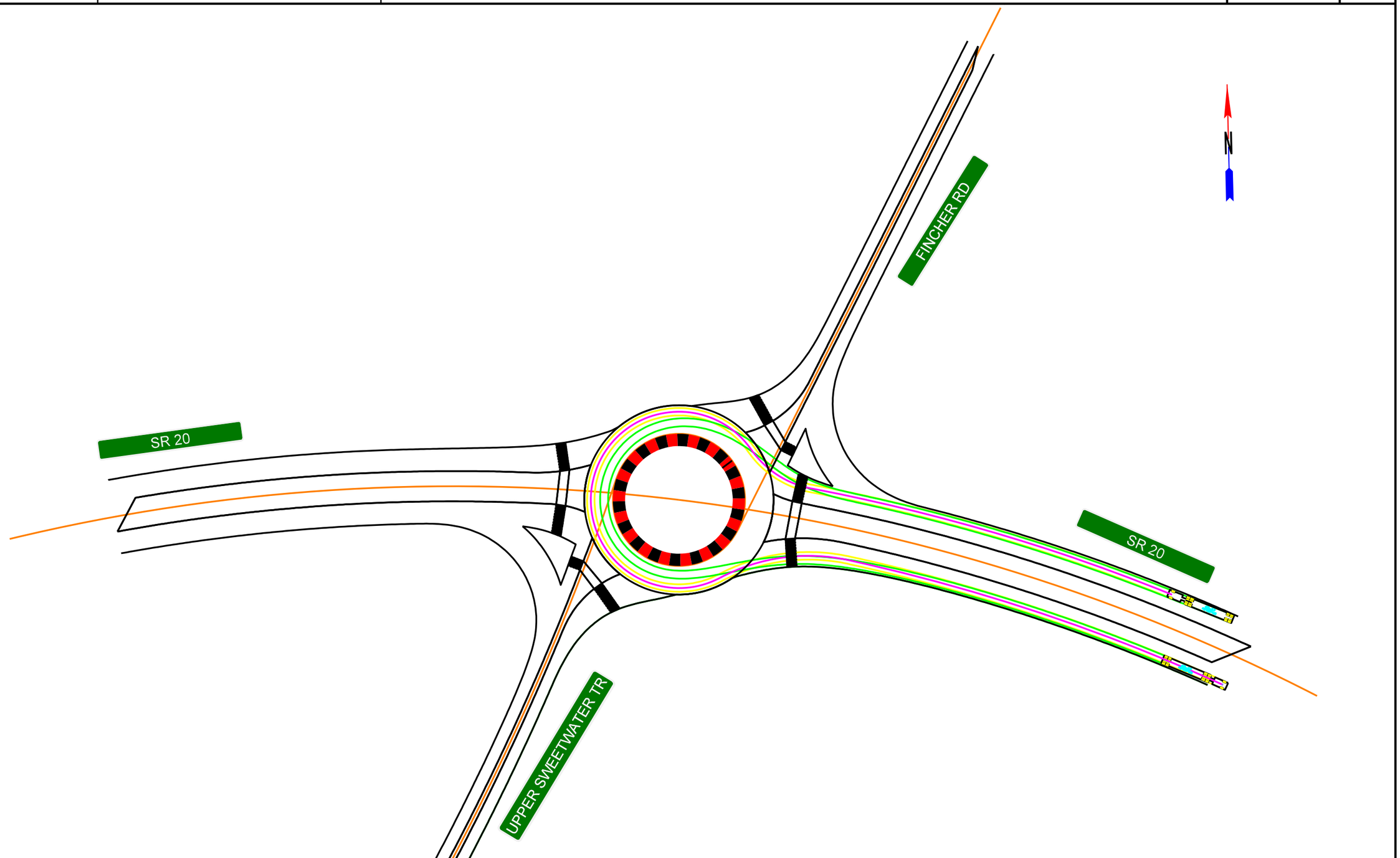

SCALE IN FEET
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REVISION DATES

ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004F

10/23/2015 GPLN

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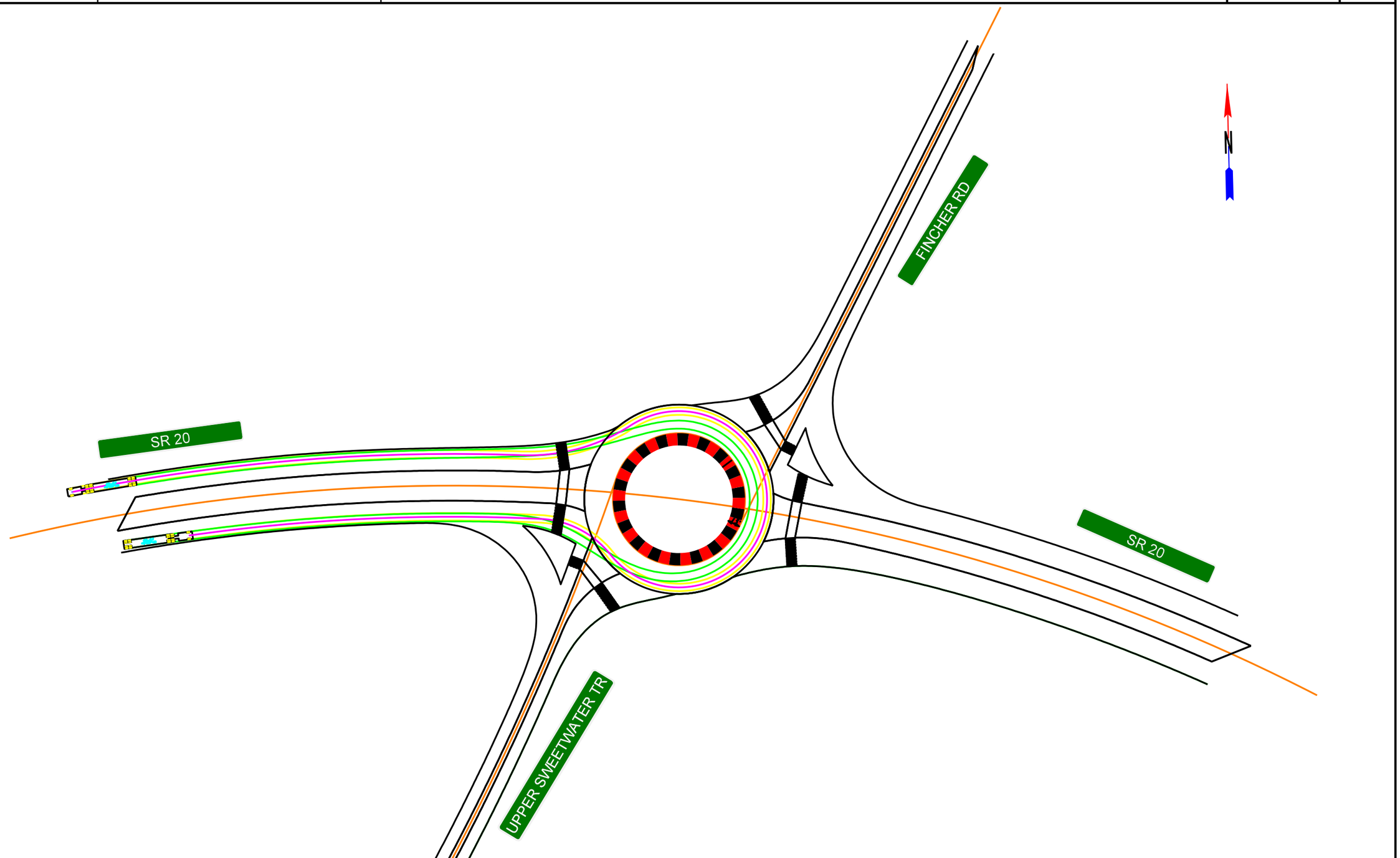

SCALE IN FEET
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REVISION DATES

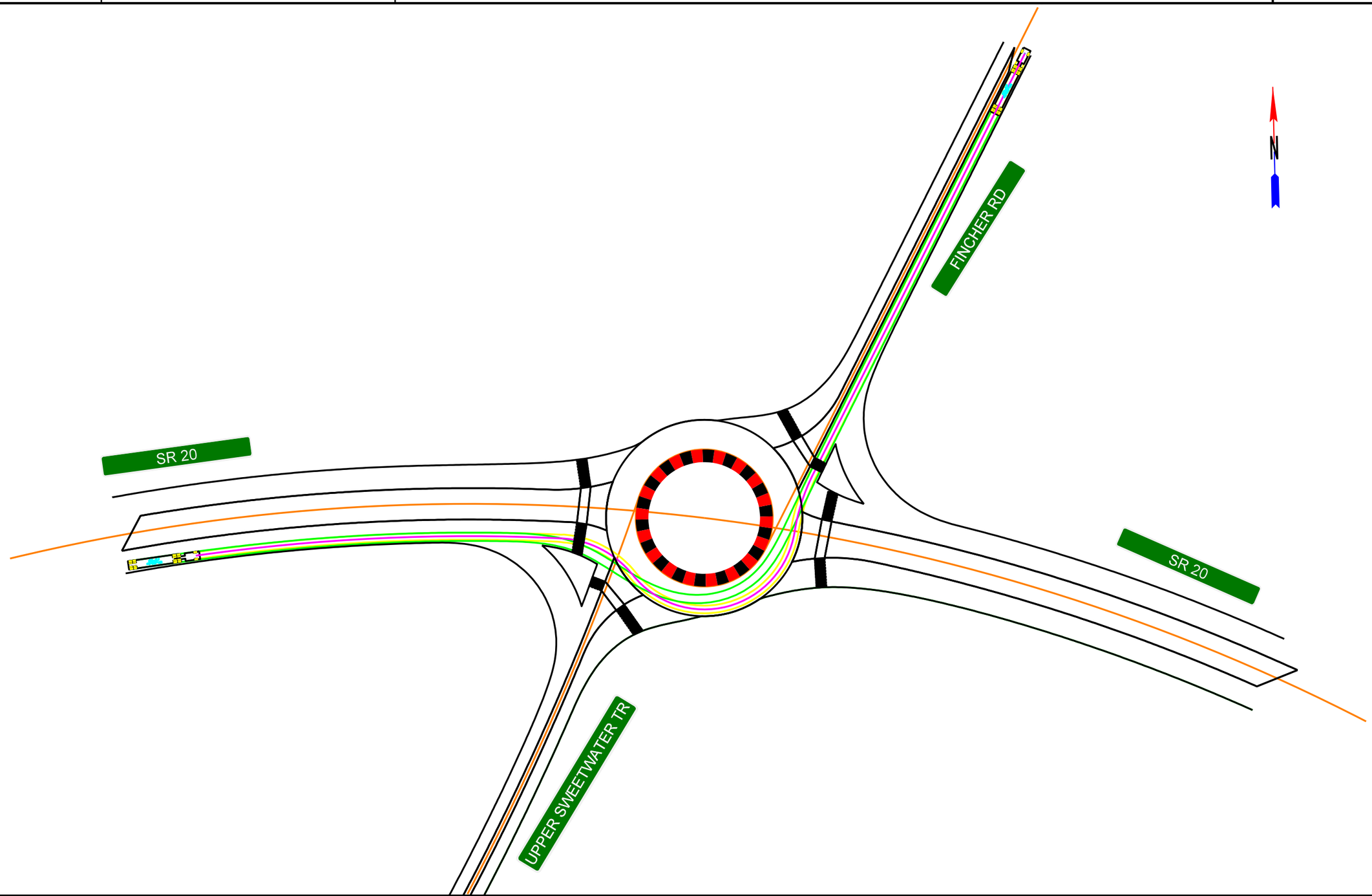
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004G

10/23/2015 GPLM

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

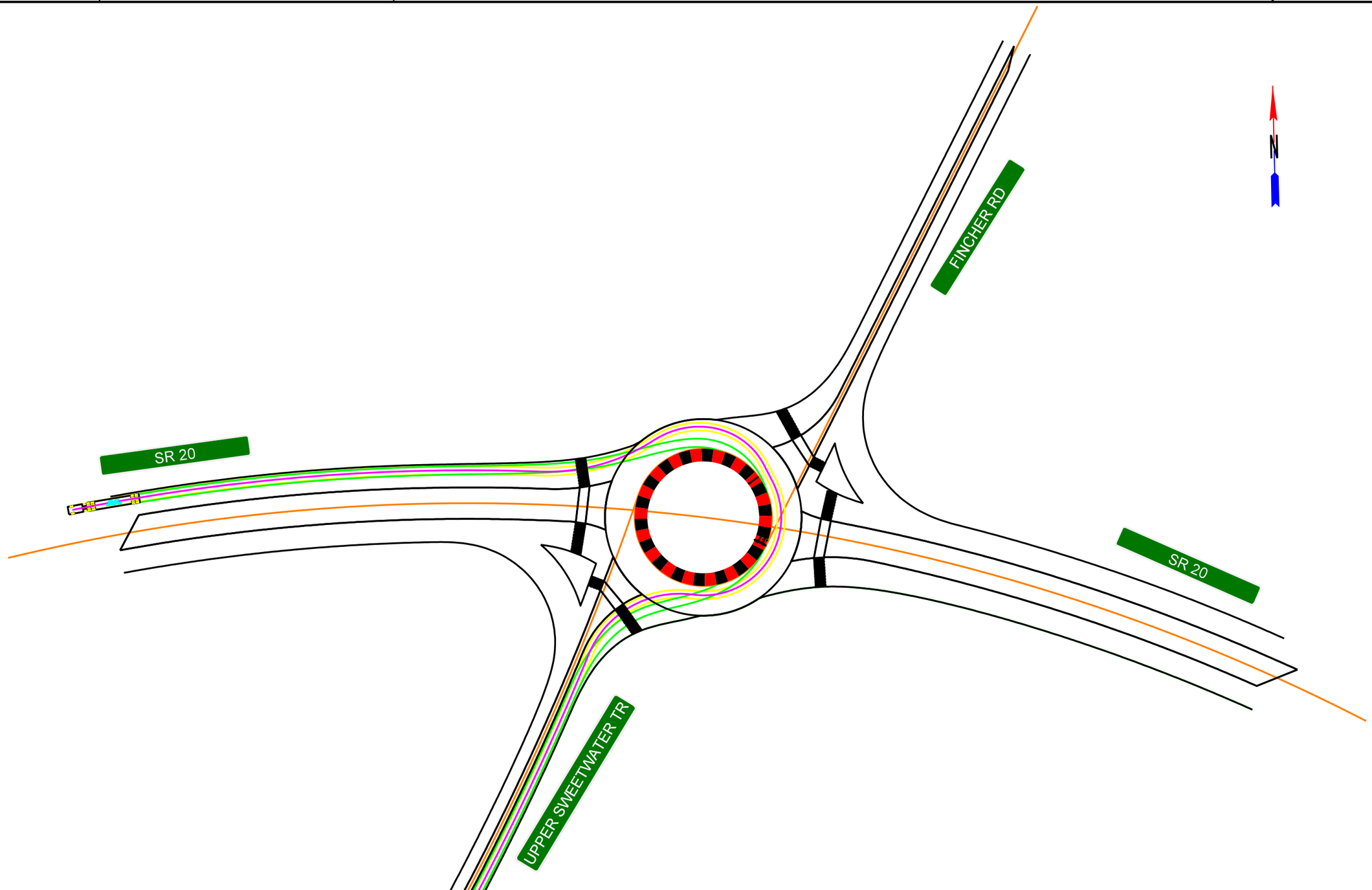
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004H

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

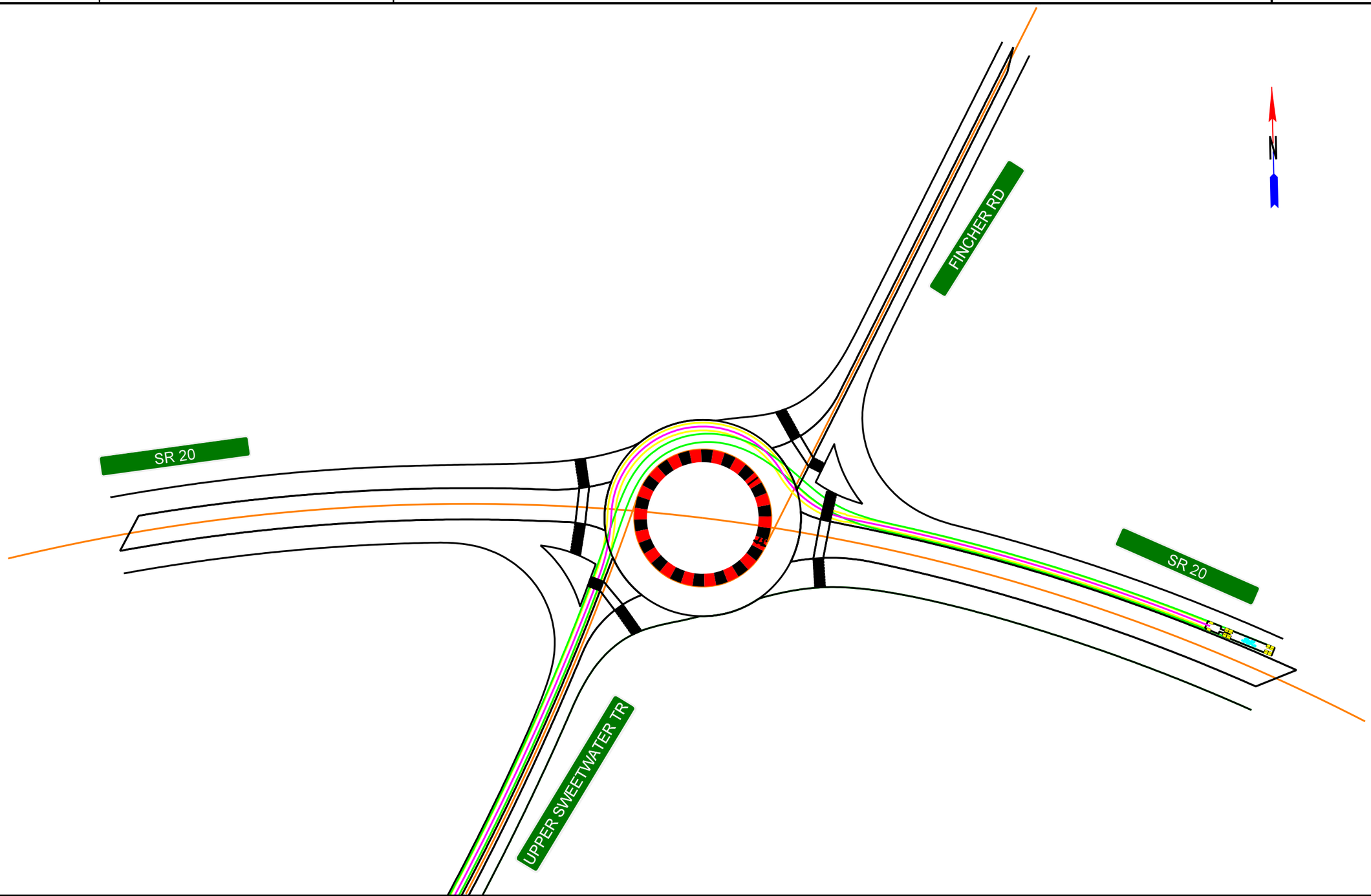
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004I

10/23/2015 GPLM

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES		

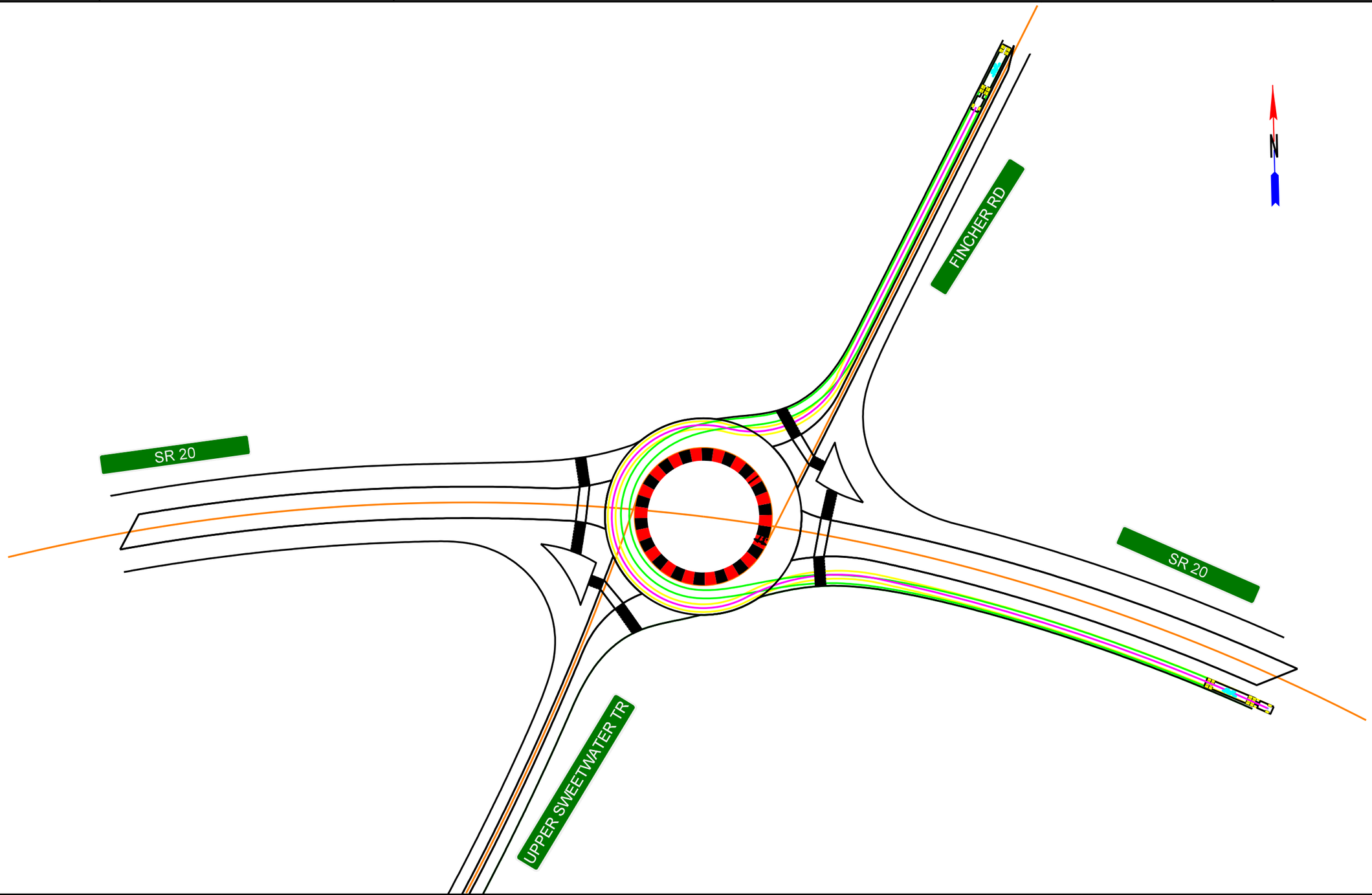
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004J

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

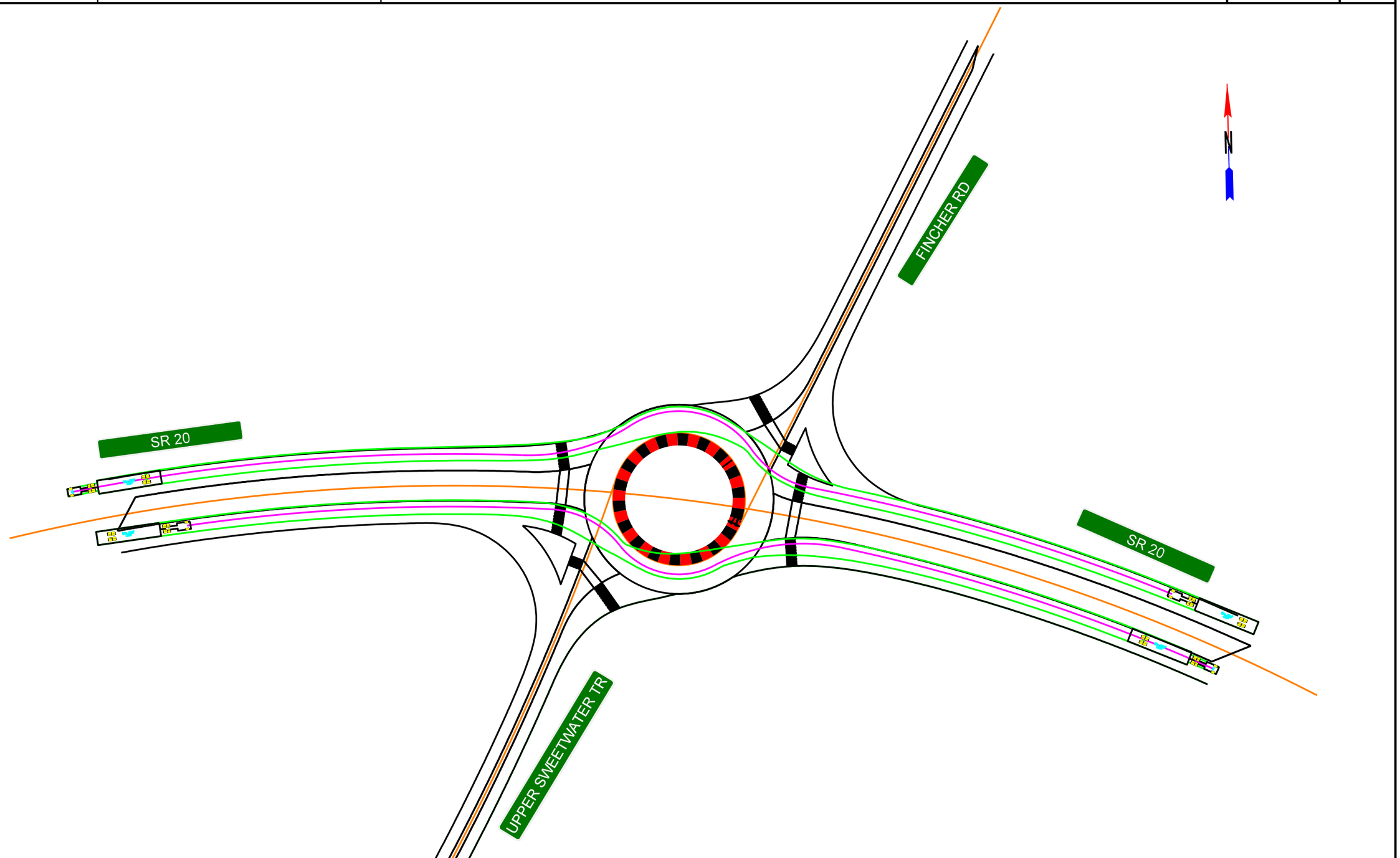
ROUNDABOUT 2
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
02-0004K

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

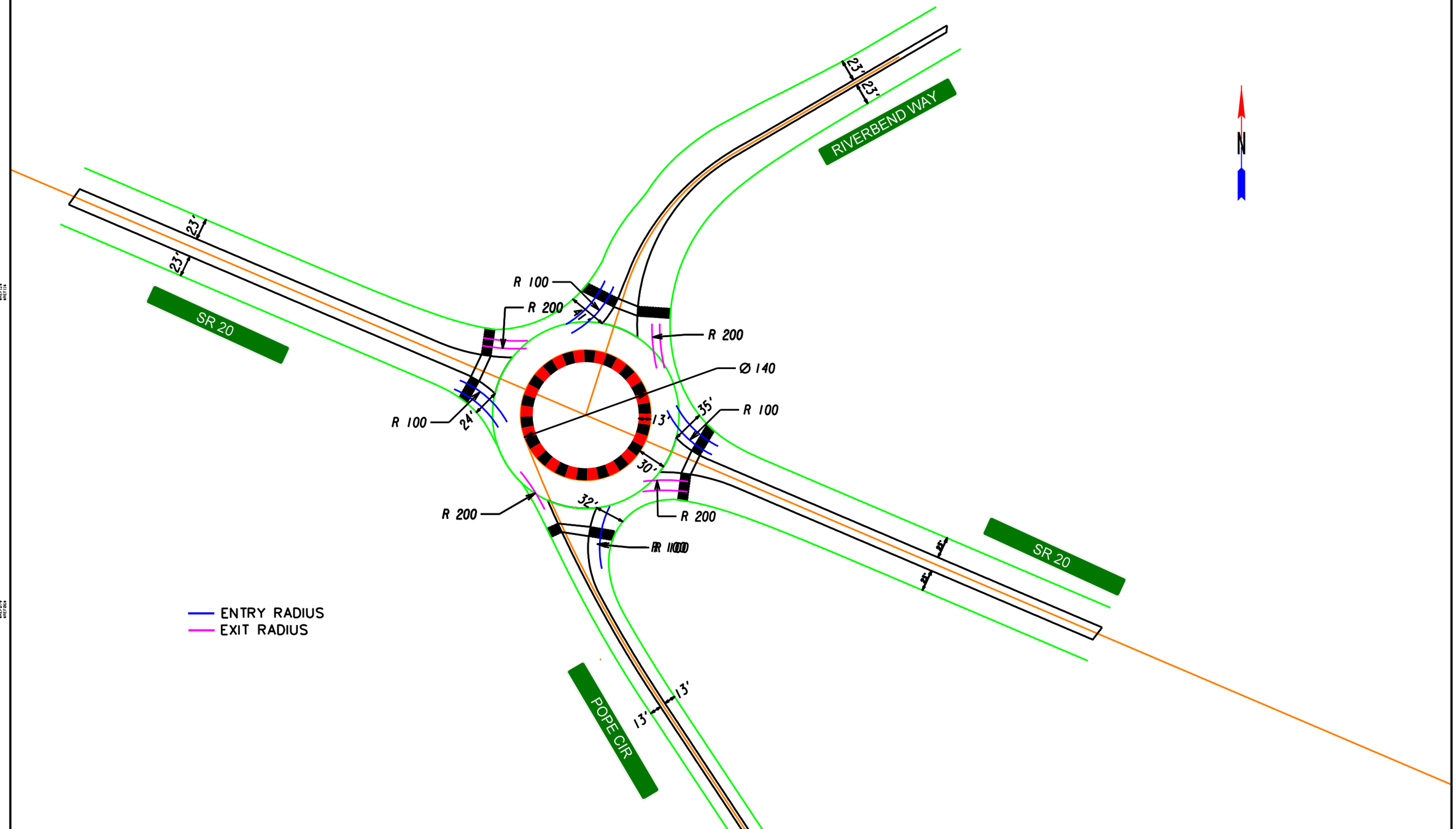
CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

ROUNDABOUT 2
SWEPT PATH ANALYSIS (OSOW)

DRAWING No.
02-0005

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

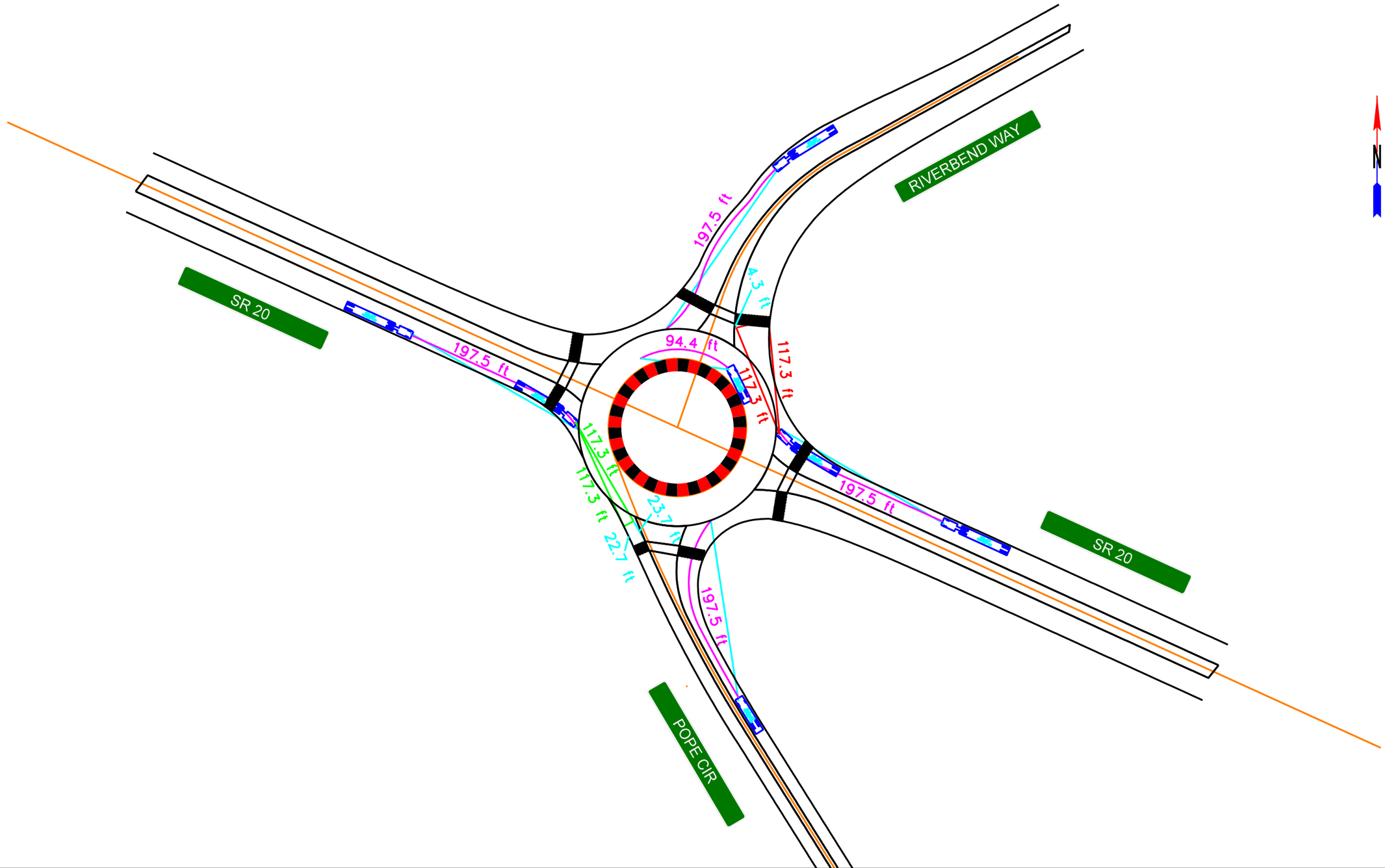
ROUNDABOUT 3
GEOMETRIC LAYOUT

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0001

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

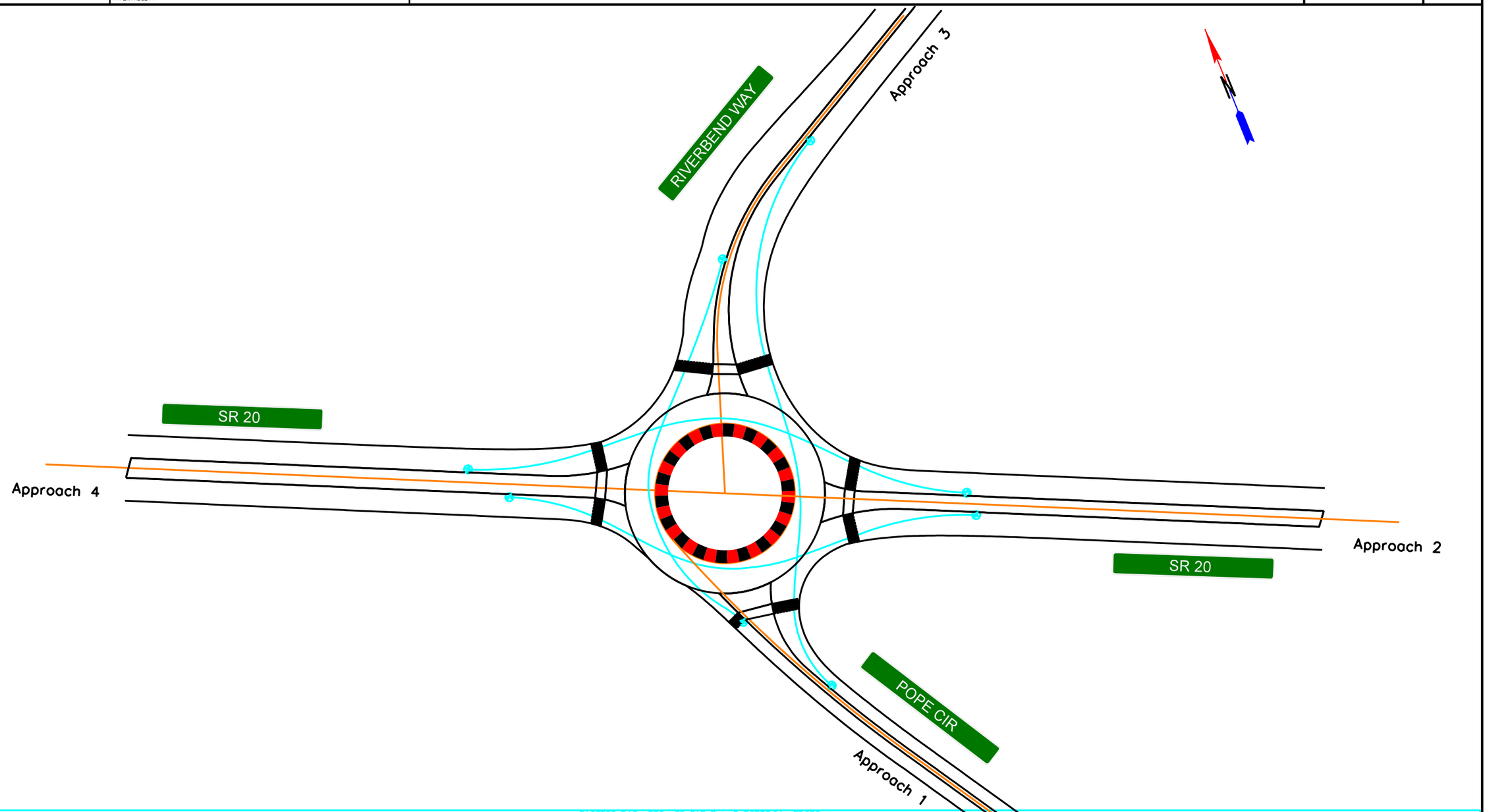
ROUNDABOUT 3
STOPPING SIGHT DISTANCE

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0002

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



FASTEST PATH RESULTS TABLE - THEORETICAL EDGES

	ENTRY LEG	V1 [mph]	V1o [mph]	V2 [mph]	V3 [mph]	V3o [mph]	V4 [mph]	V5 [mph]	V1<V2+15.00	V3>V1 and V3>V2	V5<V1 and |V5-V4k|<15.00	R1 [ft]	R2 [ft]	R3 [ft]	R4 [ft]	R5 [ft]	Entry Median Offset [ft]	Entry Edge Offset [ft]	Central Island Offset [ft]	Exit Median Offset [ft]	Exit Edge Offset [ft]
1	Approach 1	21.19	34.54	27.35	28.76	39.37	17.57	N/A	Yes	Yes	N/A	106.74	254.54	242.38	75.00	N/A	3.00	5.00	5.00	3.00	5.00
2	Approach 2	30.30	32.19	23.19	31.87	37.28	17.57	N/A	Yes	Yes	N/A	279.69	159.70	318.57	75.00	N/A	3.00	5.00	5.00	3.00	5.00
3	Approach 3	43.97	33.45	23.17	20.88	37.48	17.57	N/A	V1 > V2 + 15.00	V3 < V1 or V2	N/A	748.99	159.34	102.68	75.00	N/A	3.00	5.00	5.00	3.00	5.00
4	Approach 4	28.56	31.42	22.35	30.74	37.12	17.57	14.92	Yes	Yes	Yes	237.72	144.03	290.26	75.00	43.55	3.00	5.00	5.00	3.00	5.00
	Accel(ft/sec²)		-4.2			6.9															
	SE(%)	2.00		-2.00	2.00		-2.00	2.00													

Generated: May 23, 2019 @ 02:05PM

SCALE IN FEET
0 100 200 400

REVISION DATES

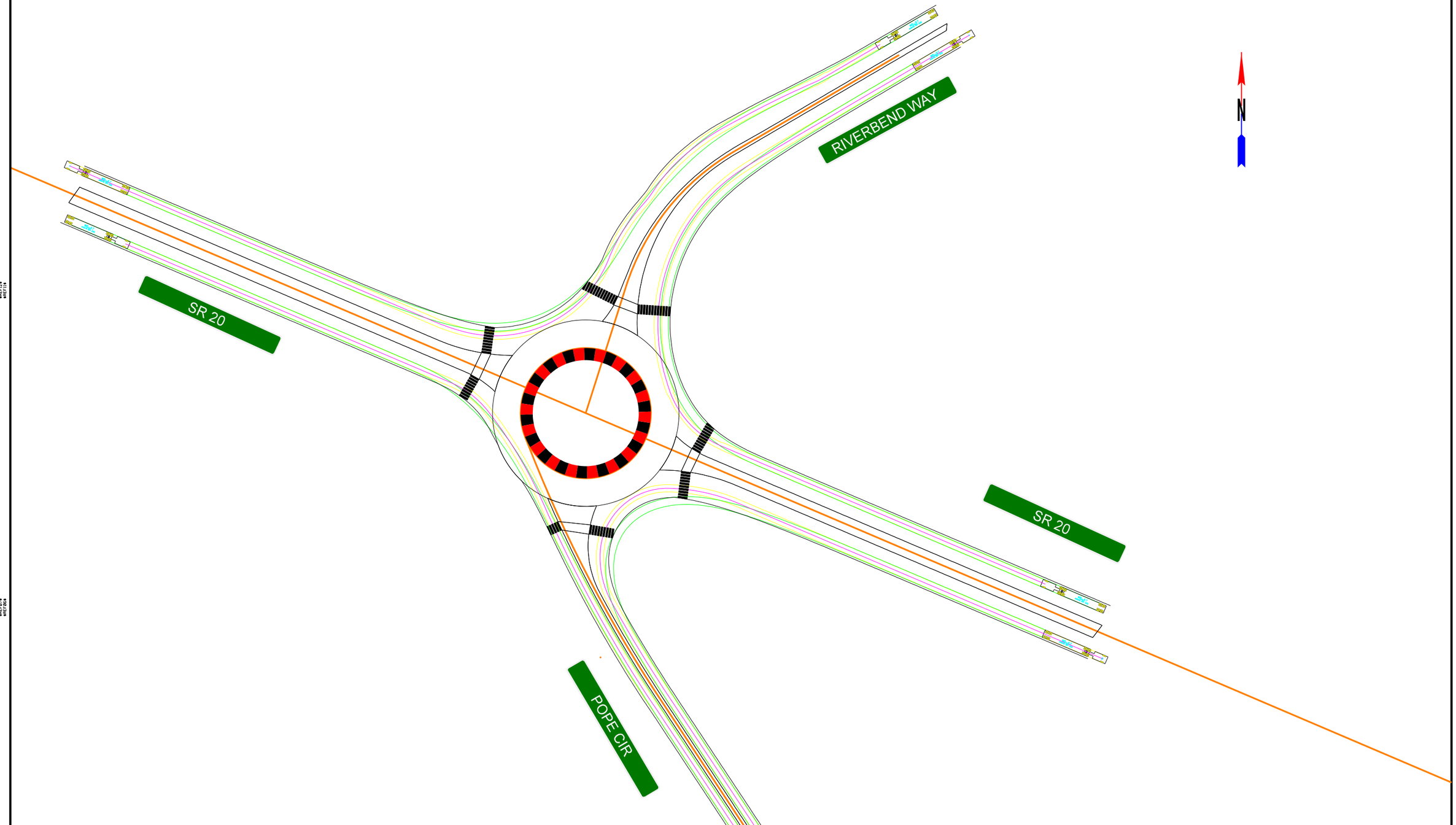
ROUNDABOUT 3
FASTEST PATH

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0003

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

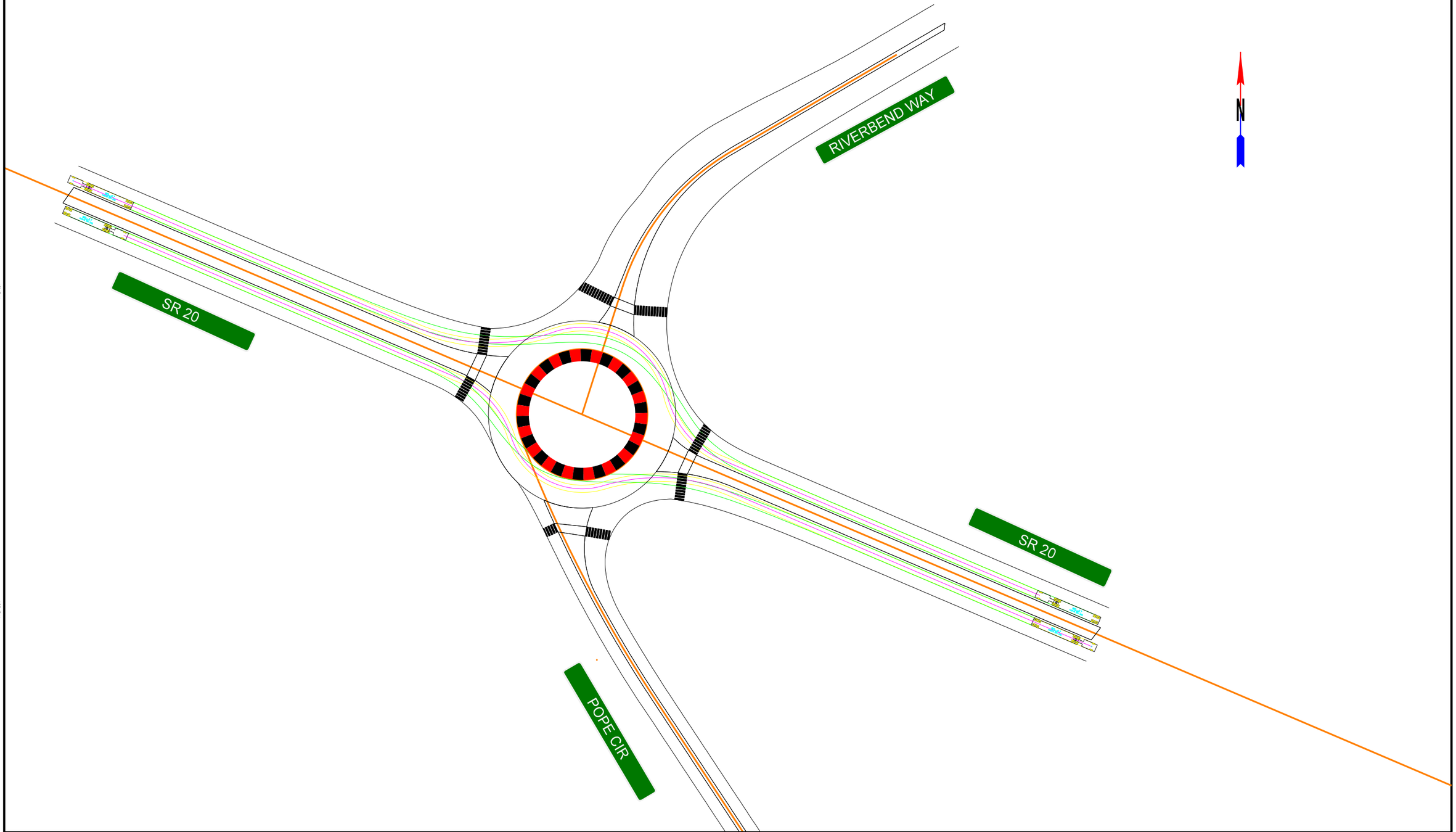
ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0004A

10/23/2015 GPLW

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

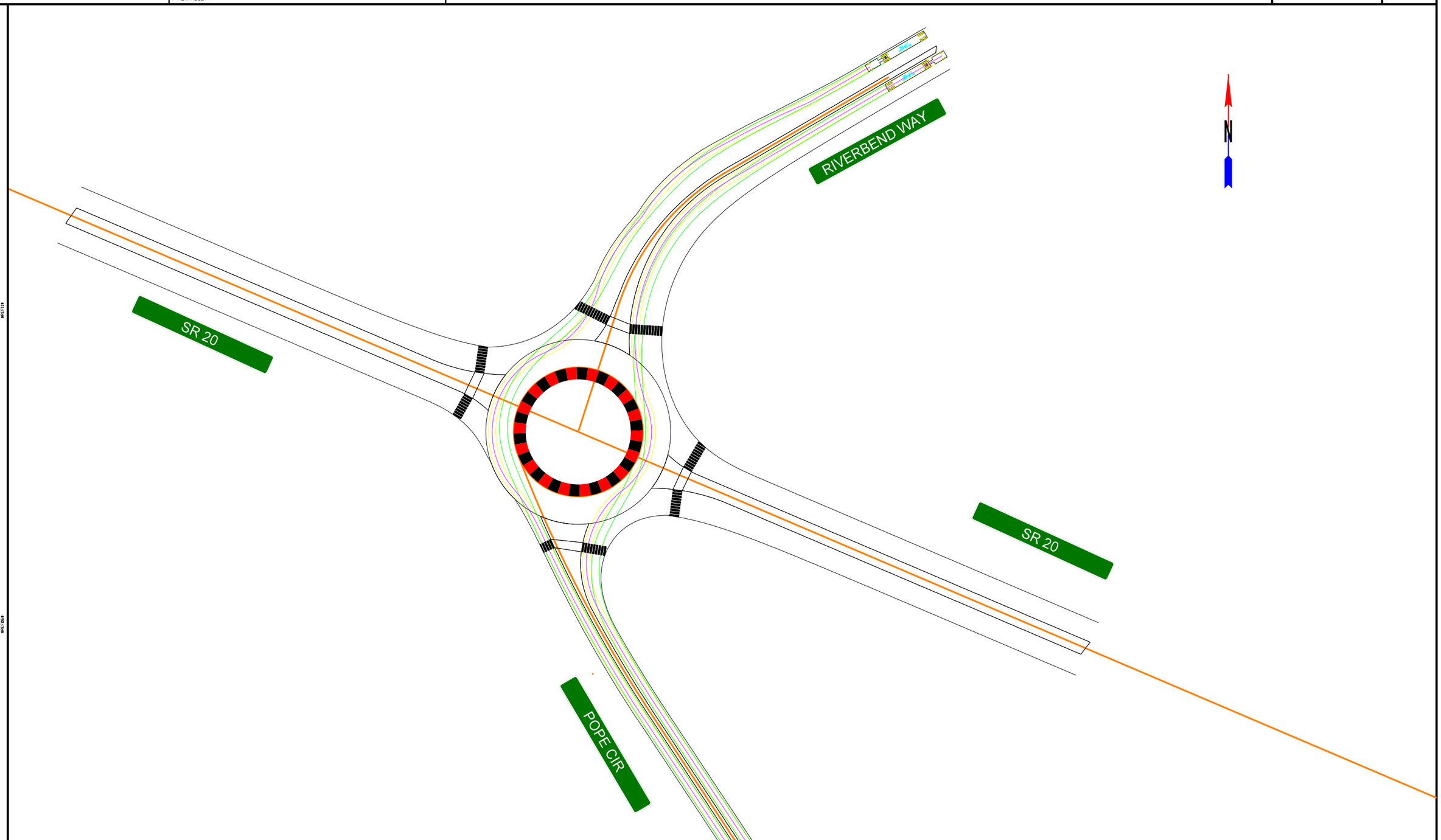
ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0004B

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

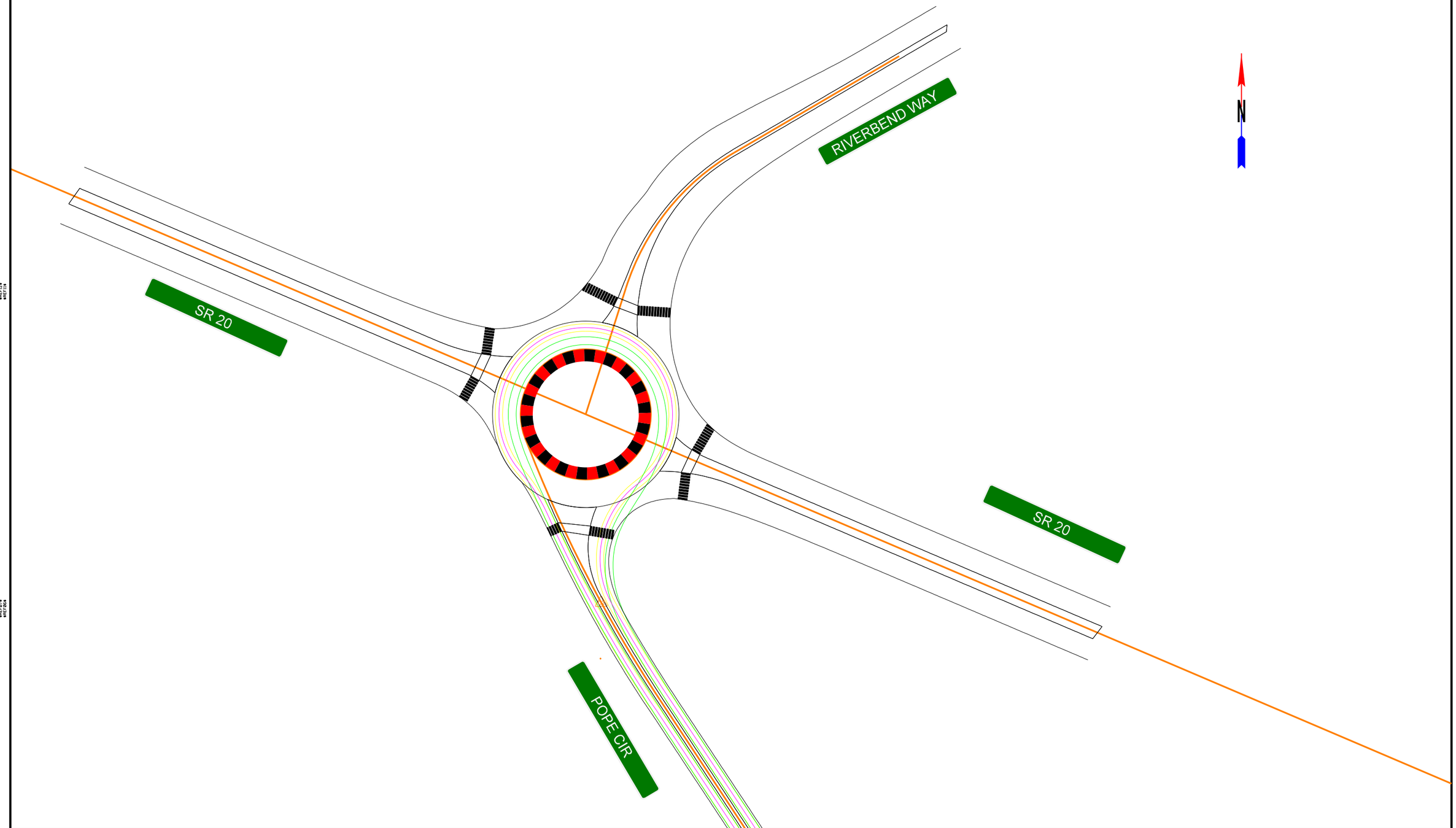
REVISION DATES		

ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		03-0004C
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

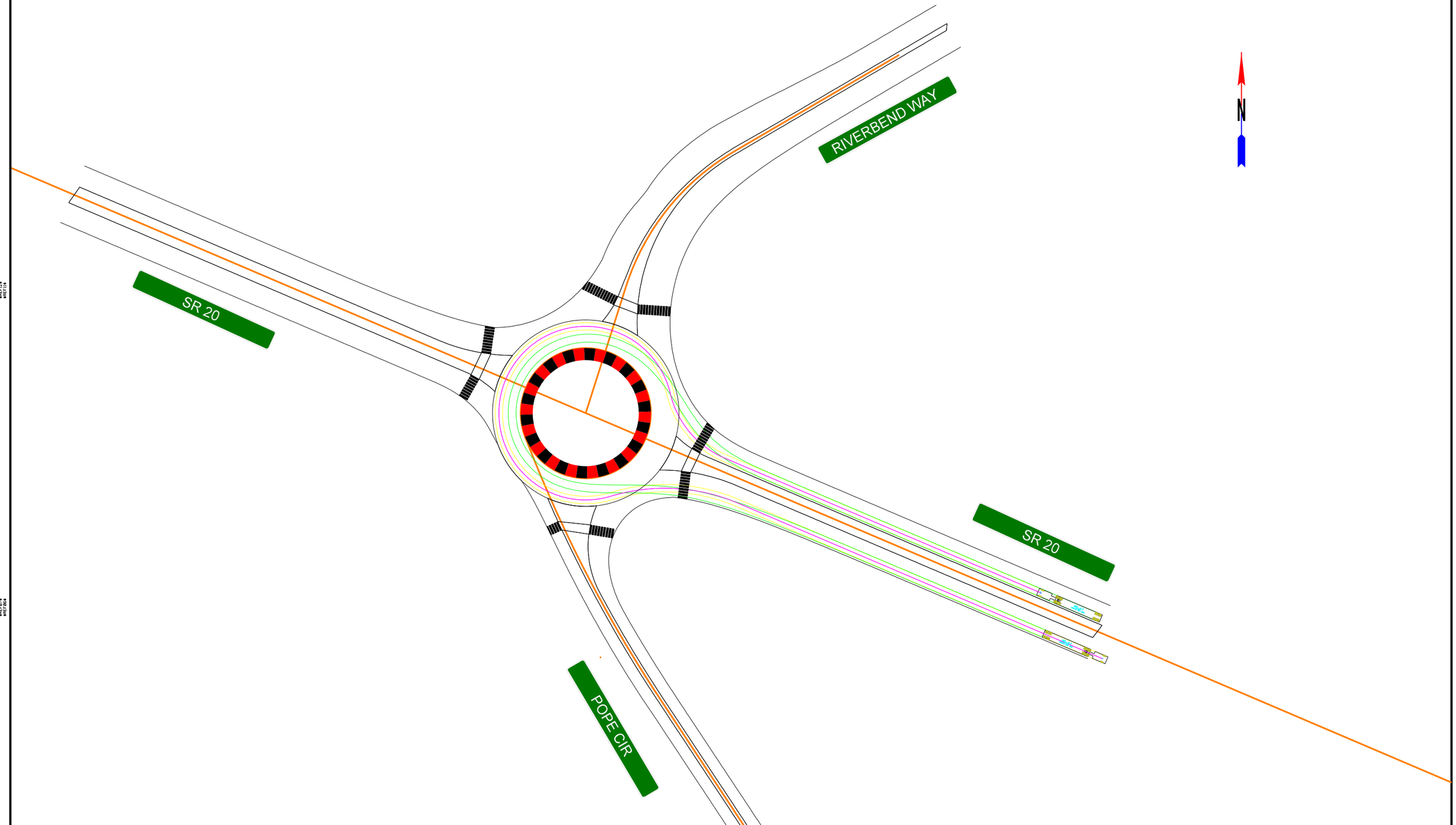
REVISION DATES		

ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		03-0004D
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

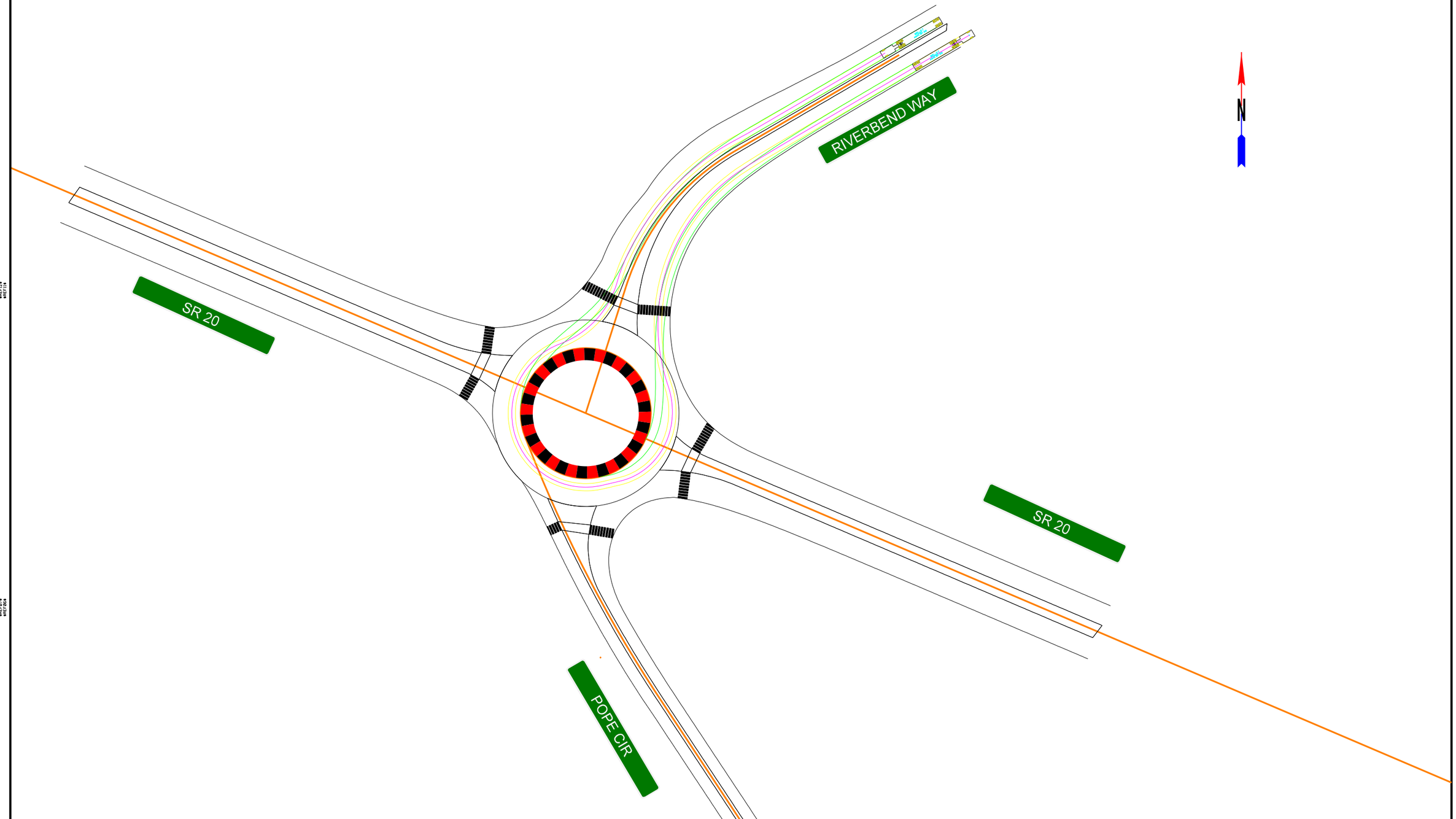
ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0004E

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

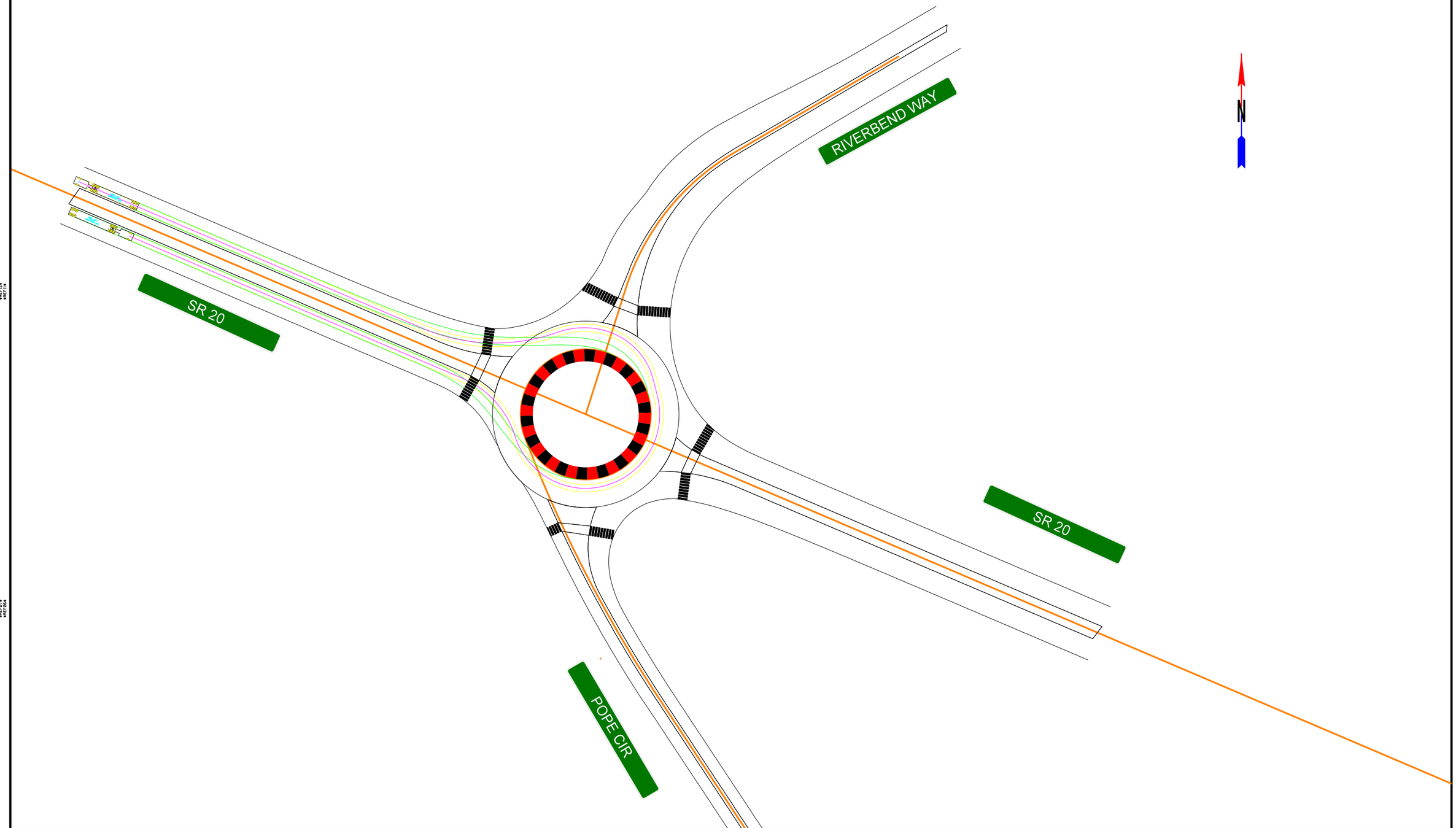
ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0004F

10/23/2015 GPLK

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES		

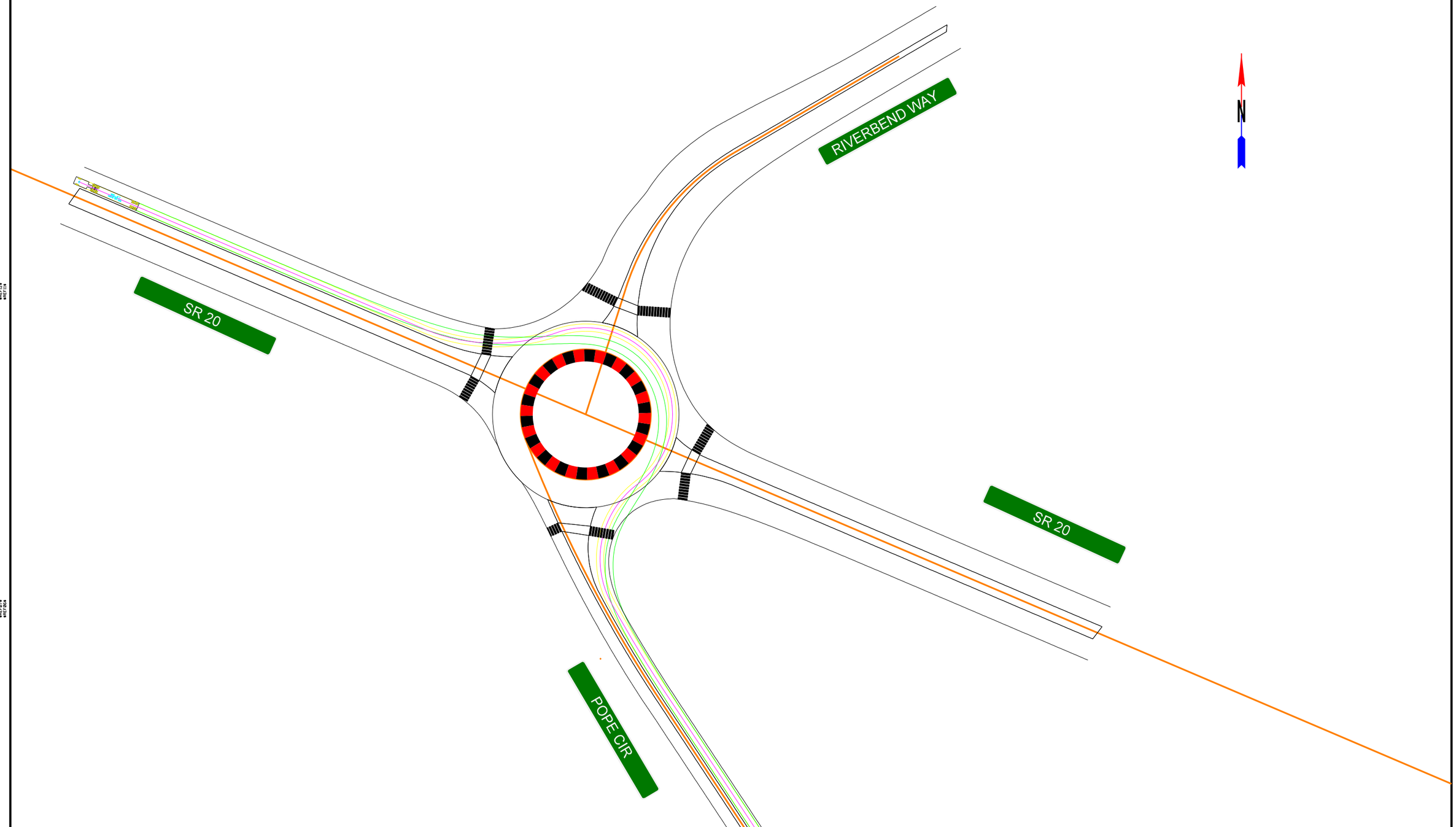
ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0004G

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

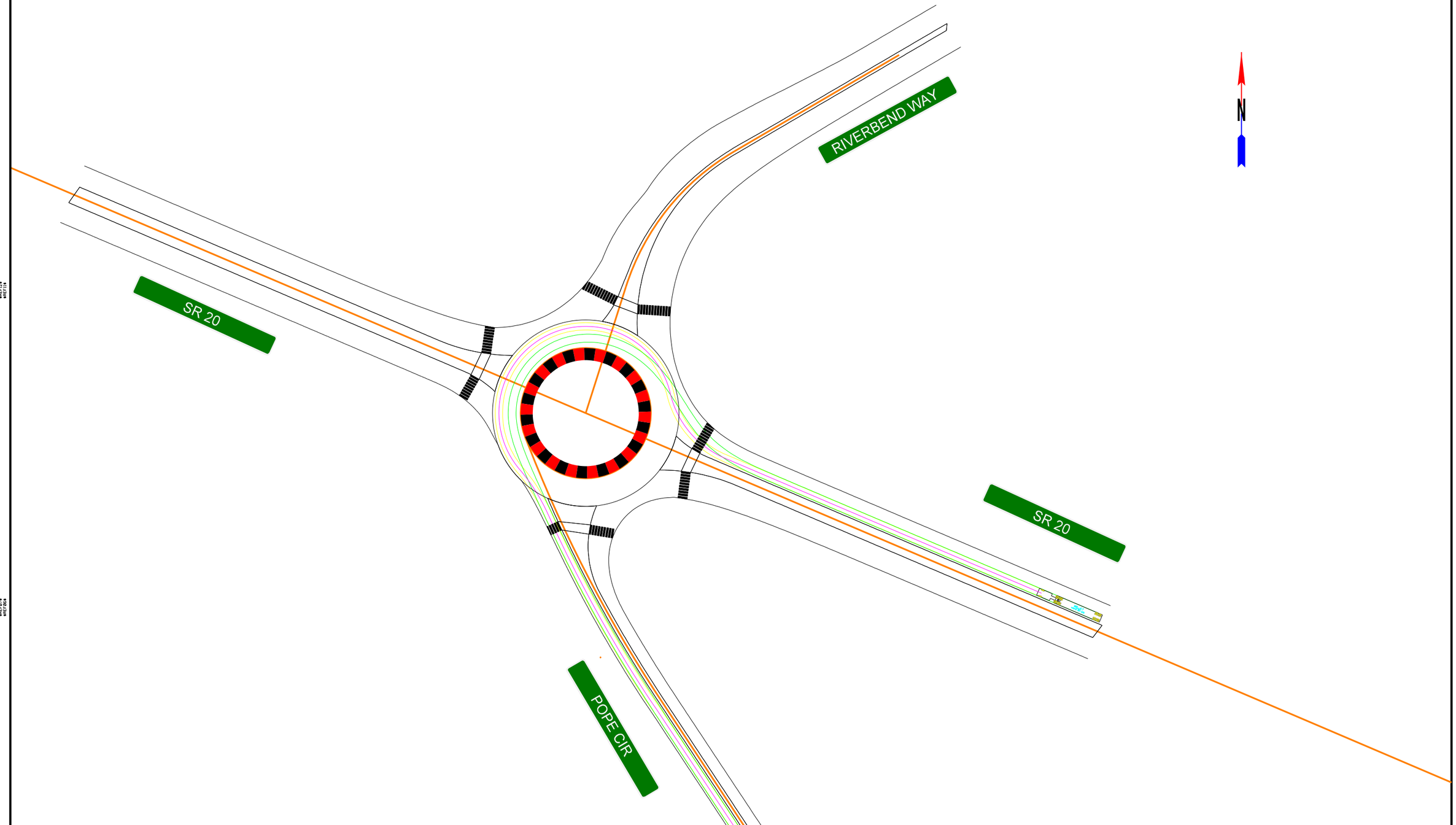
REVISION DATES		

ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		03-0004H
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

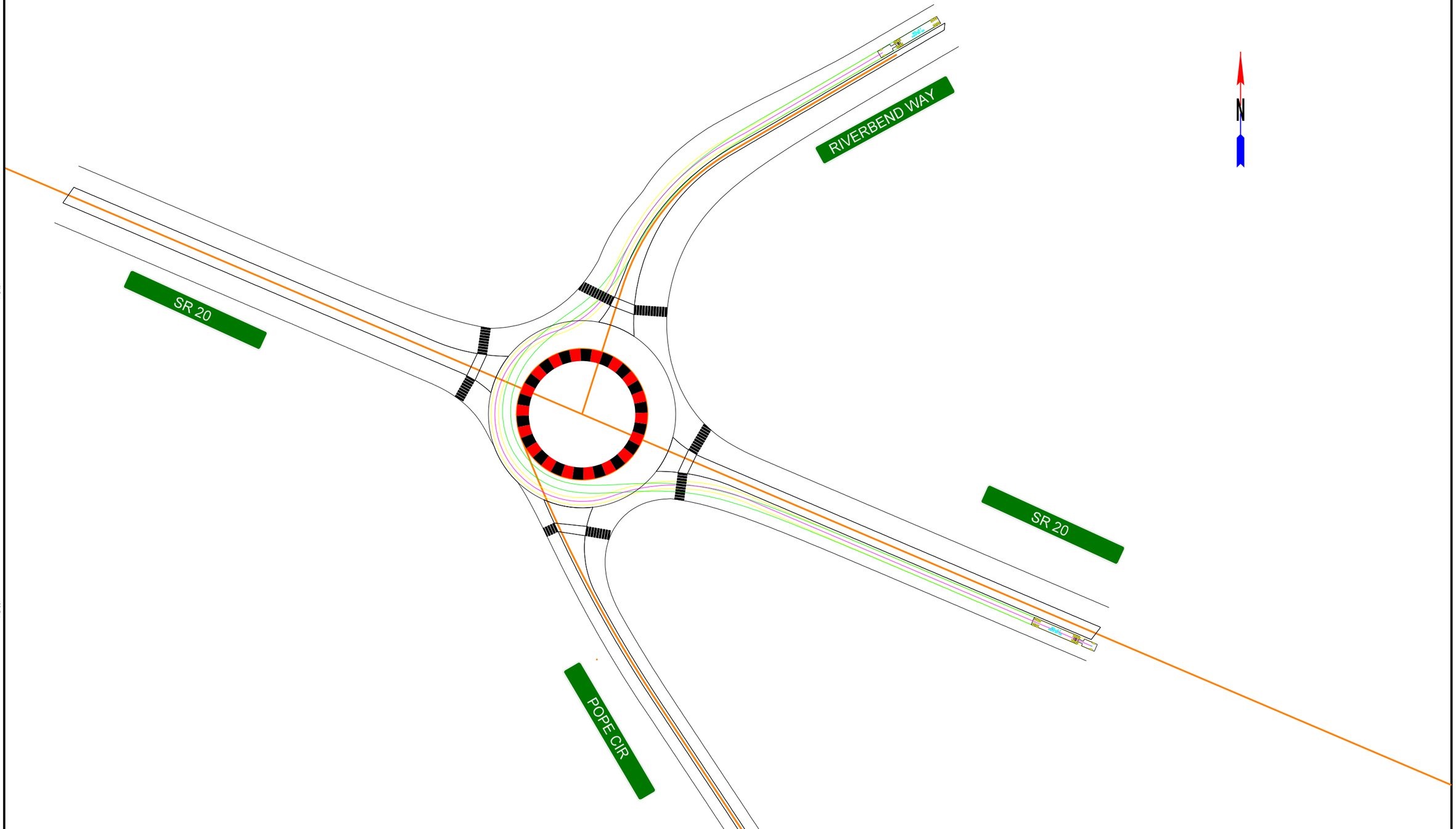
REVISION DATES		

ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		03-0004I
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLW

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

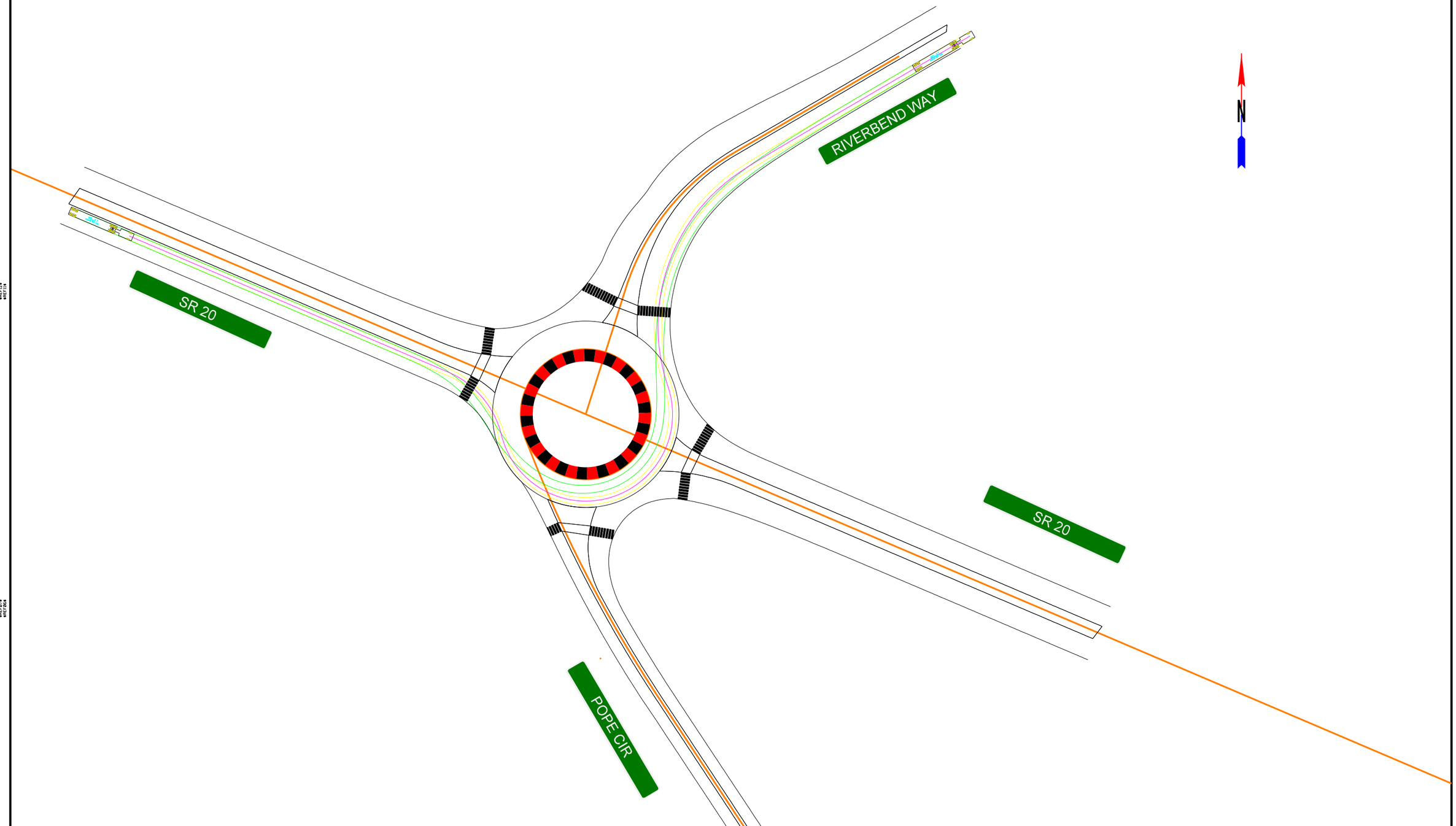
ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0004J

10/23/2015 GPLK

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
03-0004K

10/23/2015 GPLW

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
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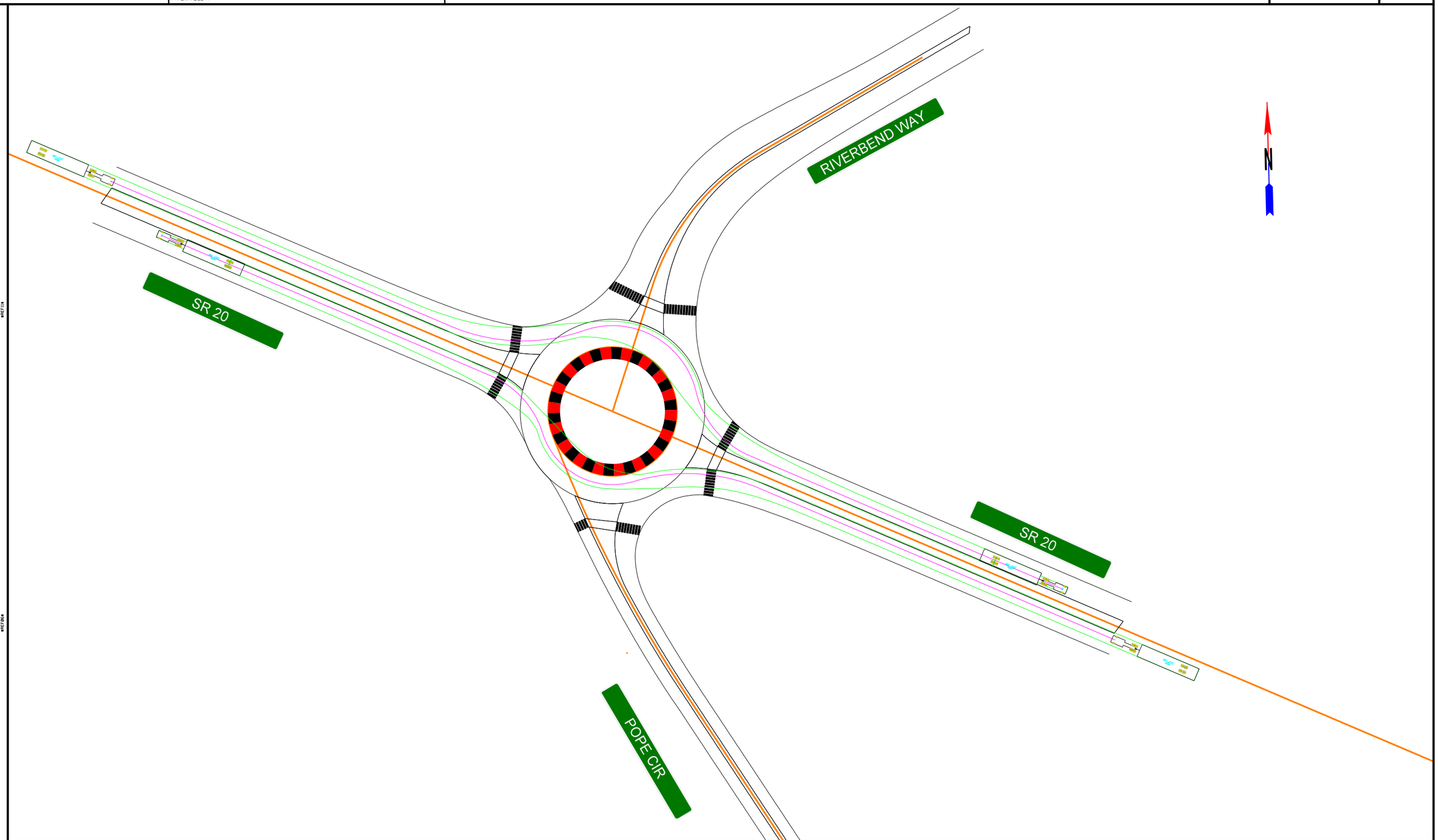

SCALE IN FEET
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REVISION DATES		

ROUNDABOUT 3
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		03-0005
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
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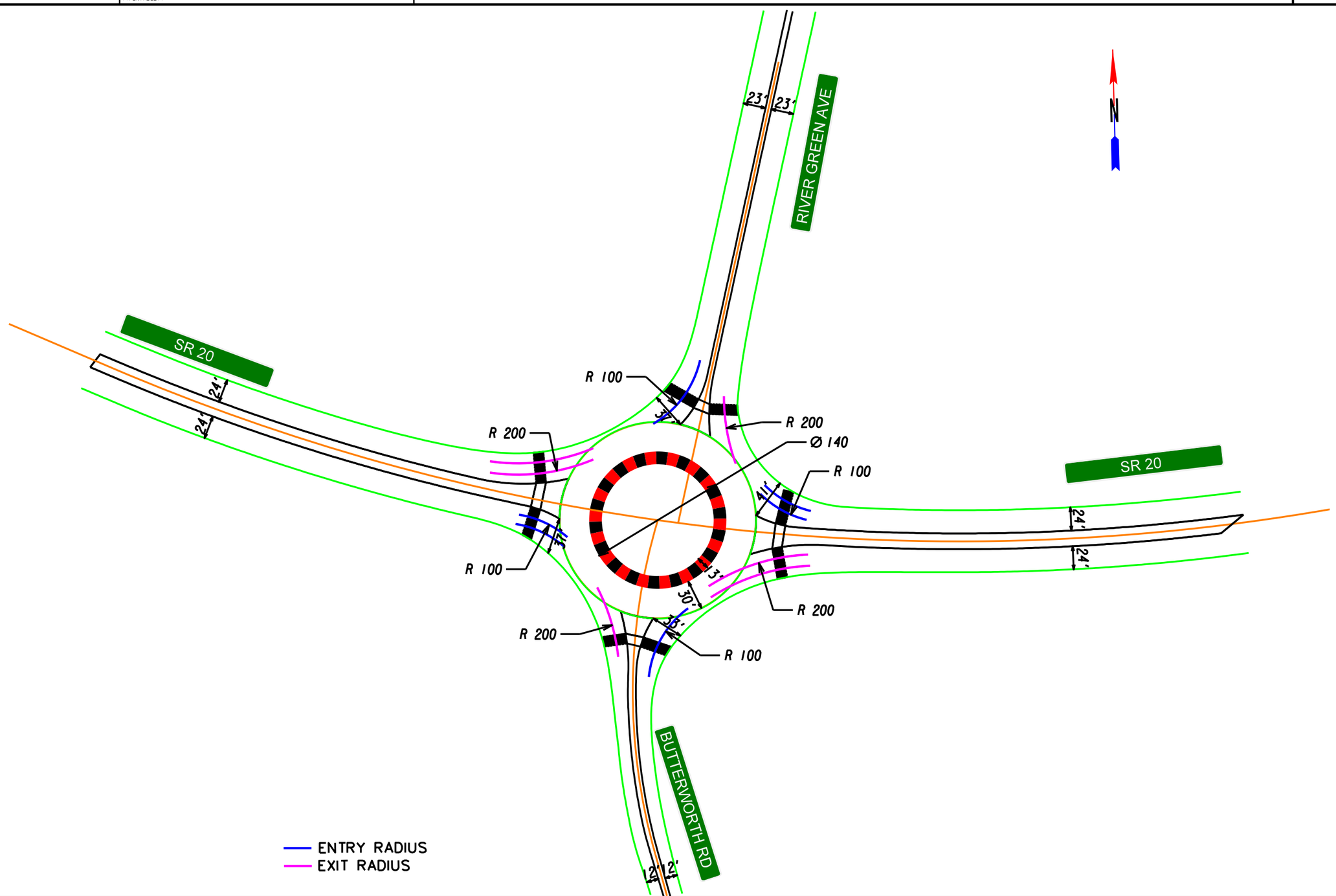


SCALE IN FEET
0 100 200 400

REVISION DATES

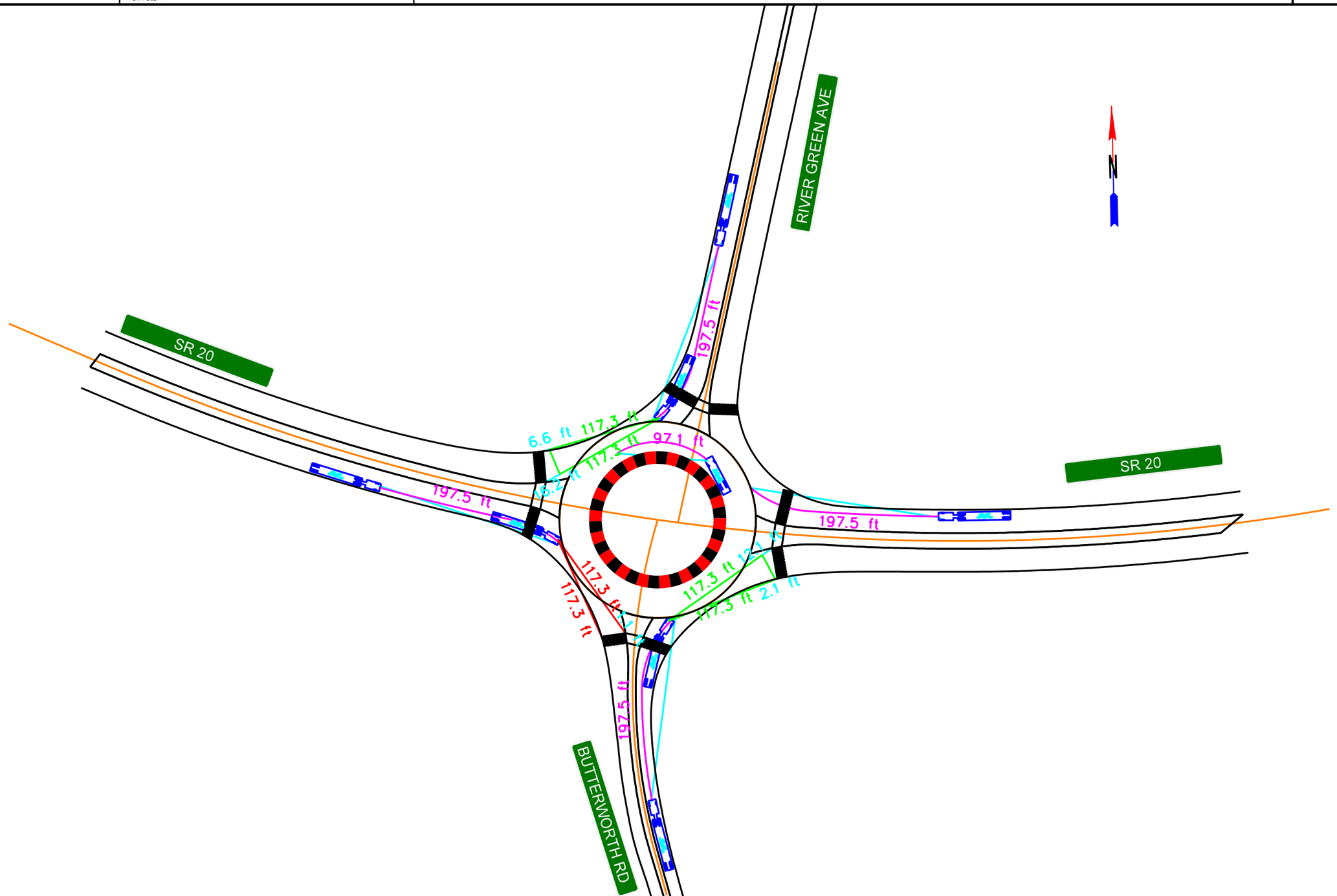
ROUNDABOUT 4
GEOMETRIC LAYOUT

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0001

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

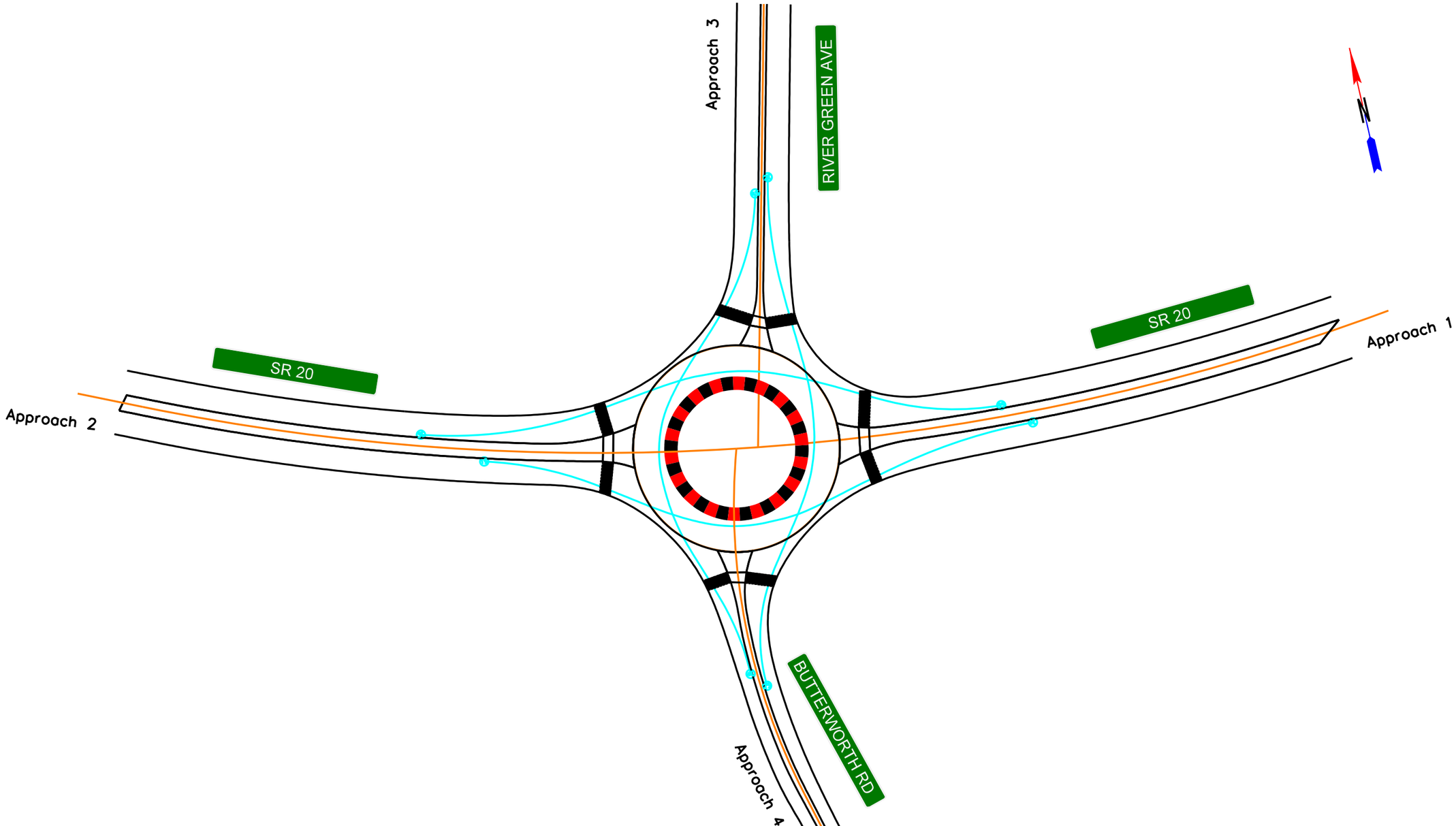
ROUNDABOUT 4
STOPPING SIGHT DISTANCE

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0002

10/23/2015 GPLN:

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



FASTEST PATH RESULTS TABLE - THEORETICAL EDGES

	ENTRY LEG	V1 [mph]	V1a [mph]	V2 [mph]	V3 [mph]	V3a [mph]	V4 [mph]	V5 [mph]	V1<V2+15.00	V3>V1 and V3>V2	V5<V1 and |V5-V4|<15.00	R1 [ft]	R2 [ft]	R3 [ft]	R4 [ft]	R5 [ft]	Entry Median Offset [ft]	Entry Edge Offset [ft]	Central Island Offset [ft]	Exit Median Offset [ft]	Exit Edge Offset [ft]
1	Approach 1	32.71	31.91	22.57	38.56	37.21	17.57	28.97	Yes	Yes	Yes	341.18	148.04	533.42	75.00	247.39	3.00	5.00	5.00	3.00	5.00
2	Approach 2	25.09	32.47	23.99	34.30	37.61	17.57	26.42	Yes	Yes	V5 > V1	168.17	175.84	386.84	75.00	192.76	3.00	5.00	5.00	3.00	5.00
3	Approach 3	29.65	33.24	24.69	35.03	37.79	17.57	N/A	Yes	Yes	N/A	263.94	191.15	409.32	75.00	N/A	3.00	5.00	5.00	3.00	5.00
4	Approach 4	28.40	31.63	21.29	29.40	36.85	17.57	N/A	Yes	Yes	N/A	234.11	126.01	257.64	75.00	N/A	3.00	5.00	5.00	3.00	5.00
	Accel(ft/sec²)		-4.2			6.9															
	SE(%)	2.00		-2.00	2.00		-2.00	2.00													

Generated: May 23, 2019 @ 02:05PM

SCALE IN FEET
0 100 200 400

REVISION DATES

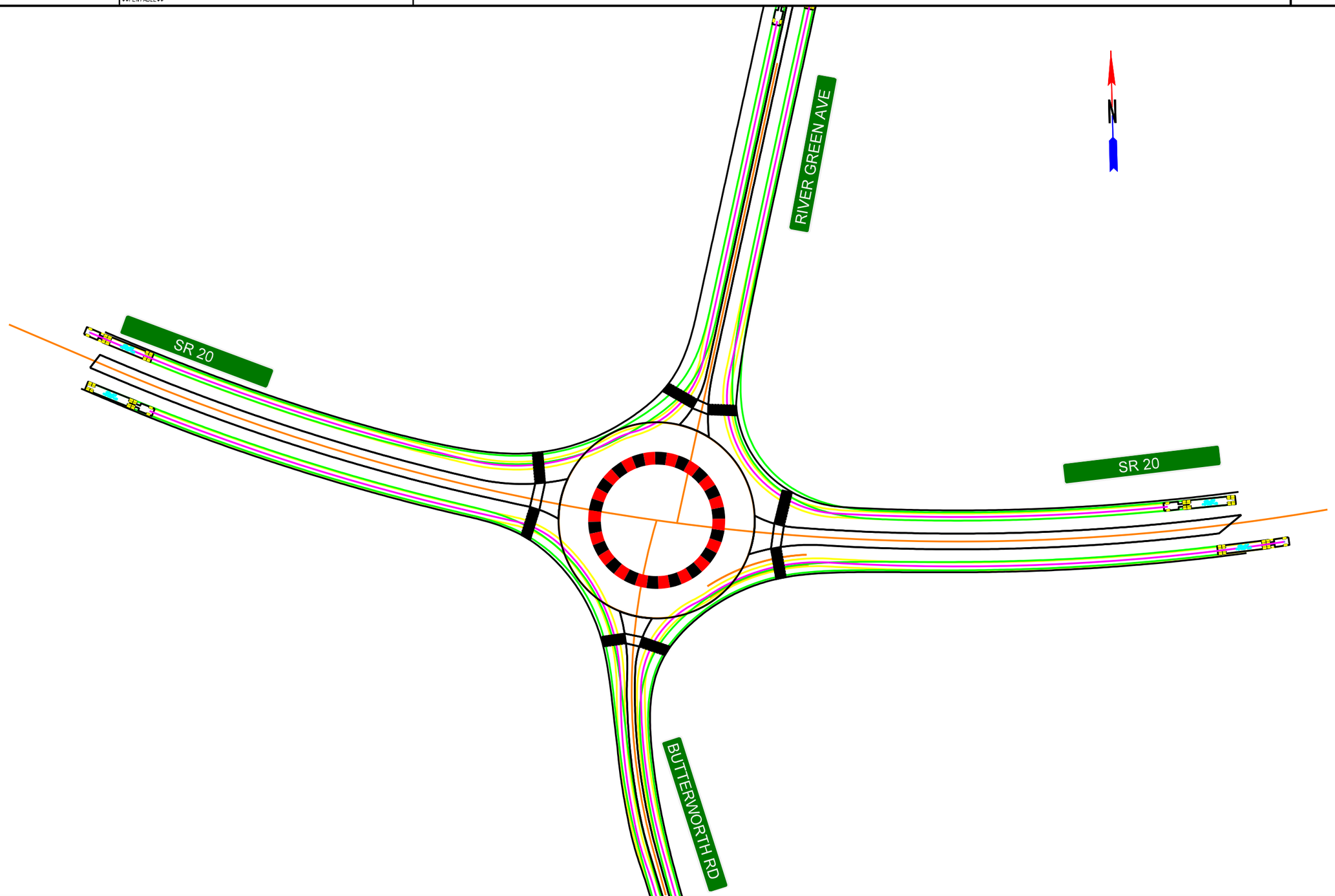
ROUNDABOUT 4
FASTEST PATH

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0003

10/23/2015 GPLK

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

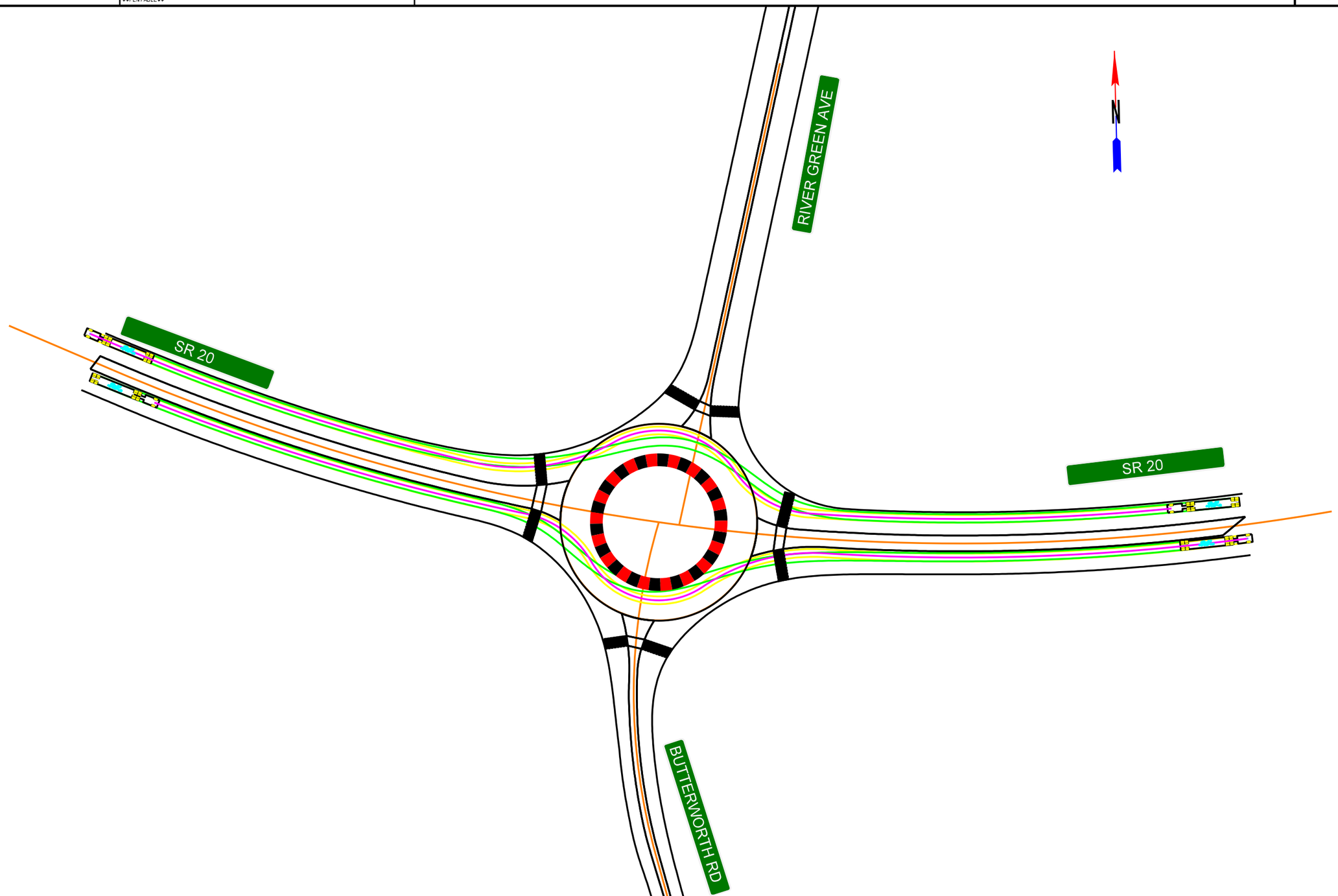
ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0004A

10/23/2015 GPLN:

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

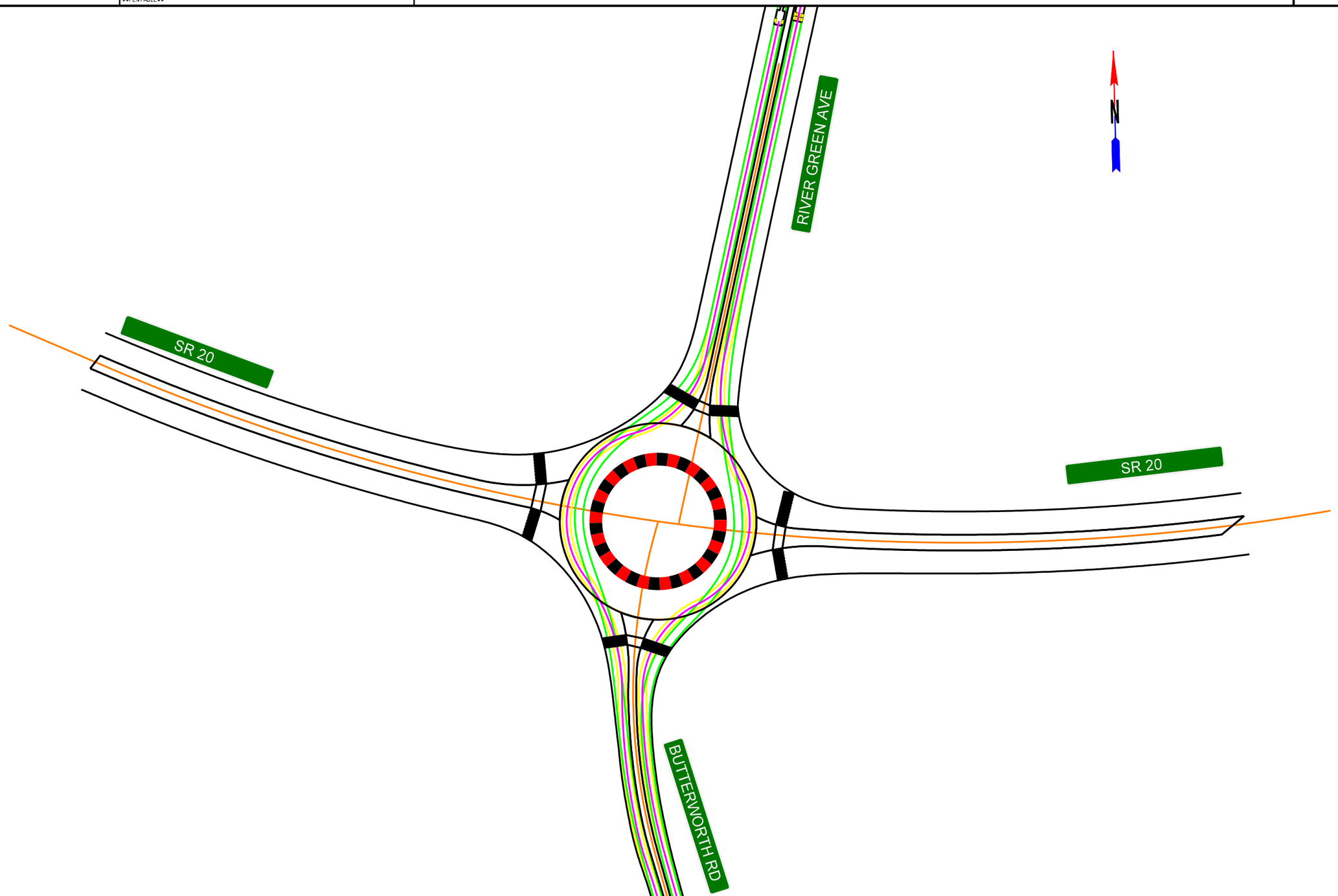
REVISION DATES

ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		04-0004B
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

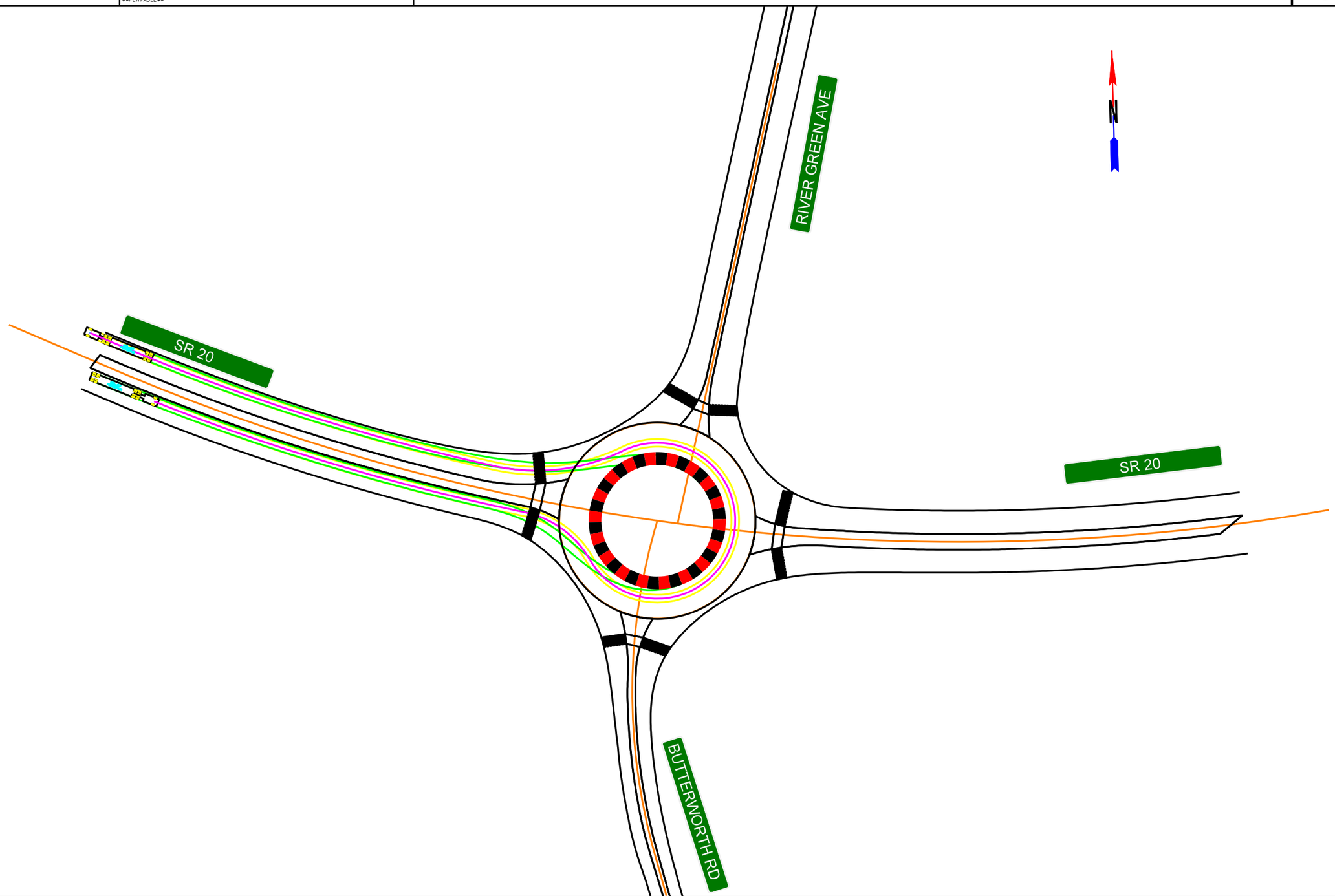
ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0004C

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

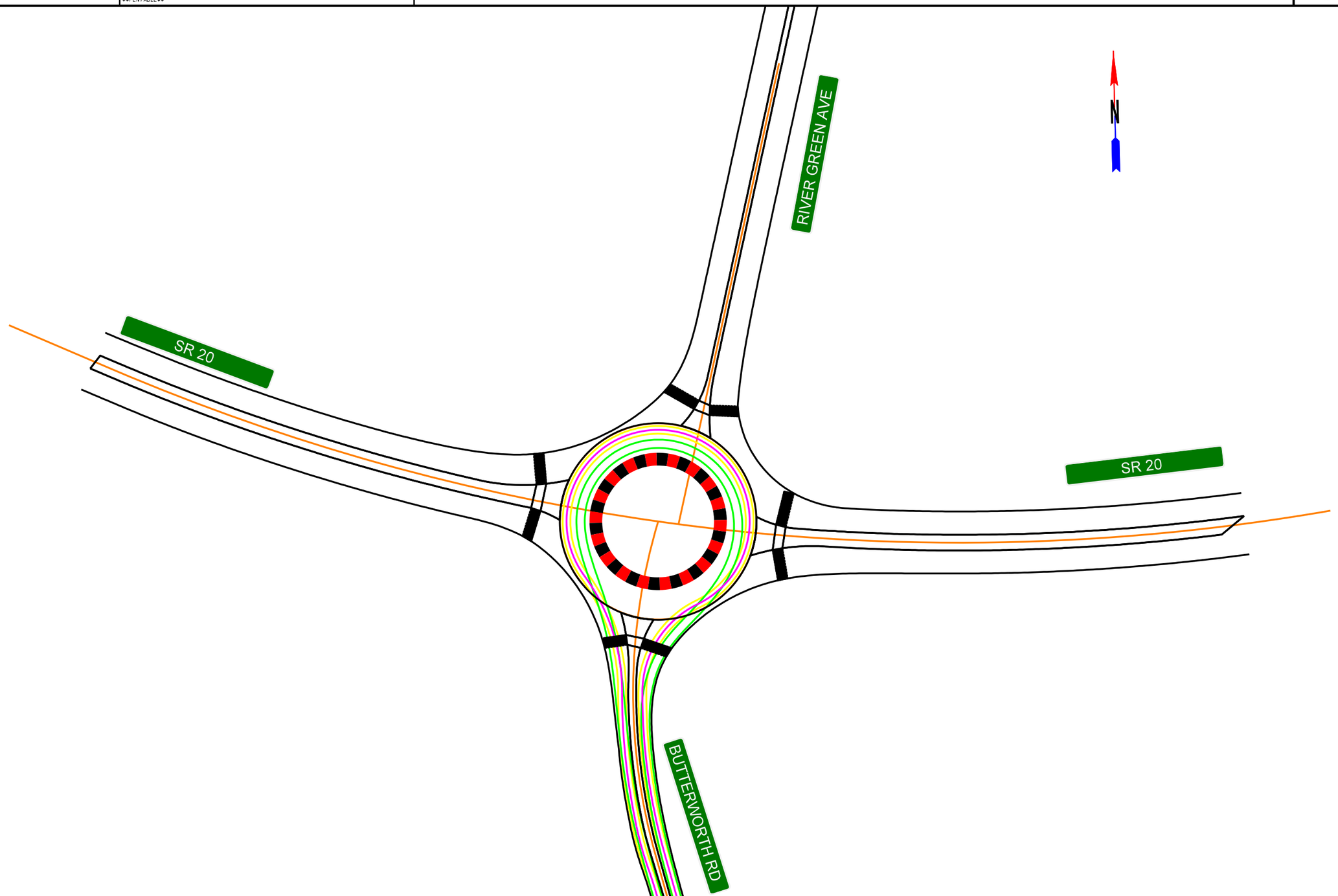
ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0004D

10/23/2015 GPLN: $$SHEET06 $$SHEET05 $$SHEET04 $$SHEET03 $$SHEET02 $$SHEET01

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



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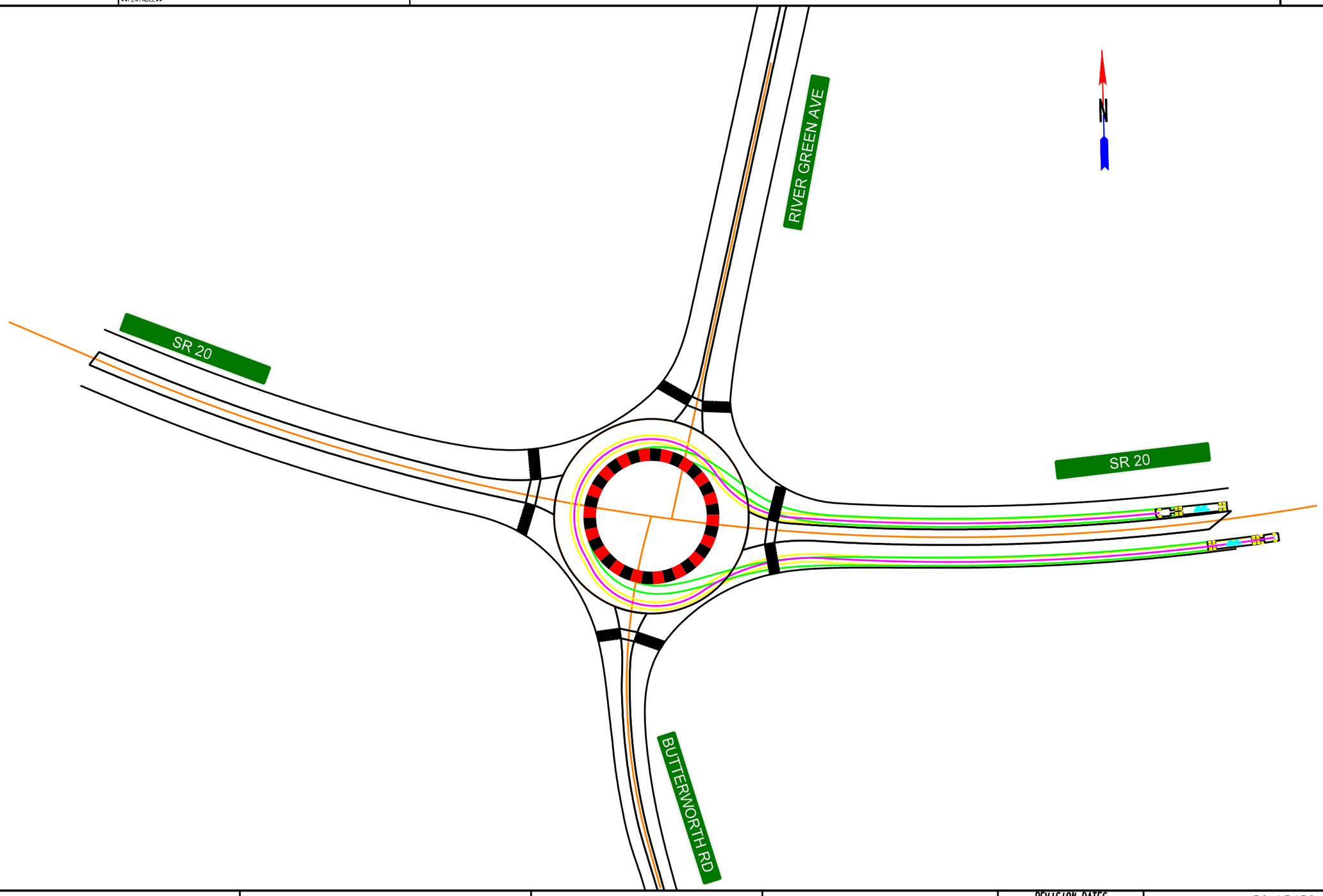
REVISION DATES

ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		04-0004E
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



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REVISION DATES

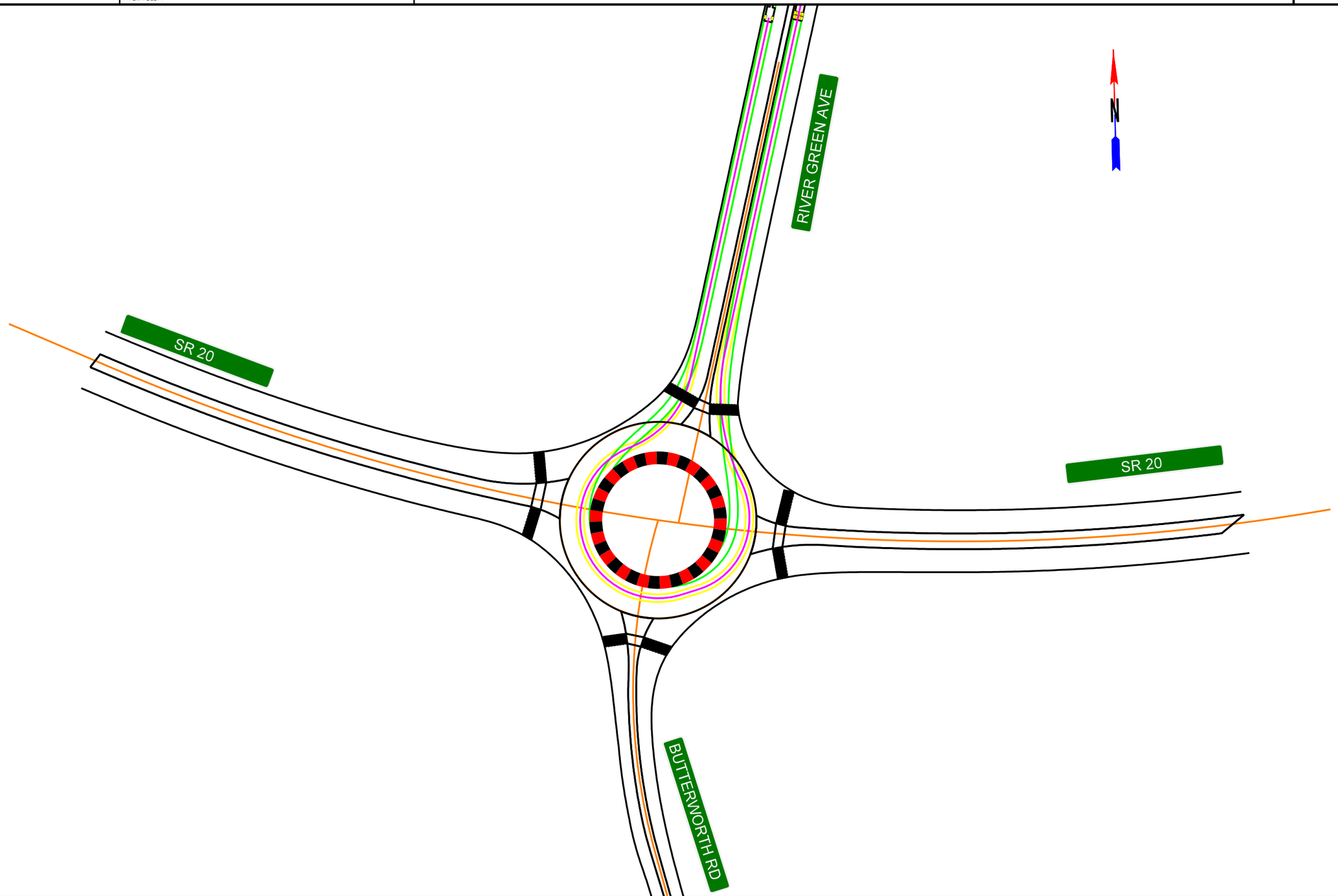
ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0004F

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0004G

10/23/2015 GPLN: $$SHEET$$

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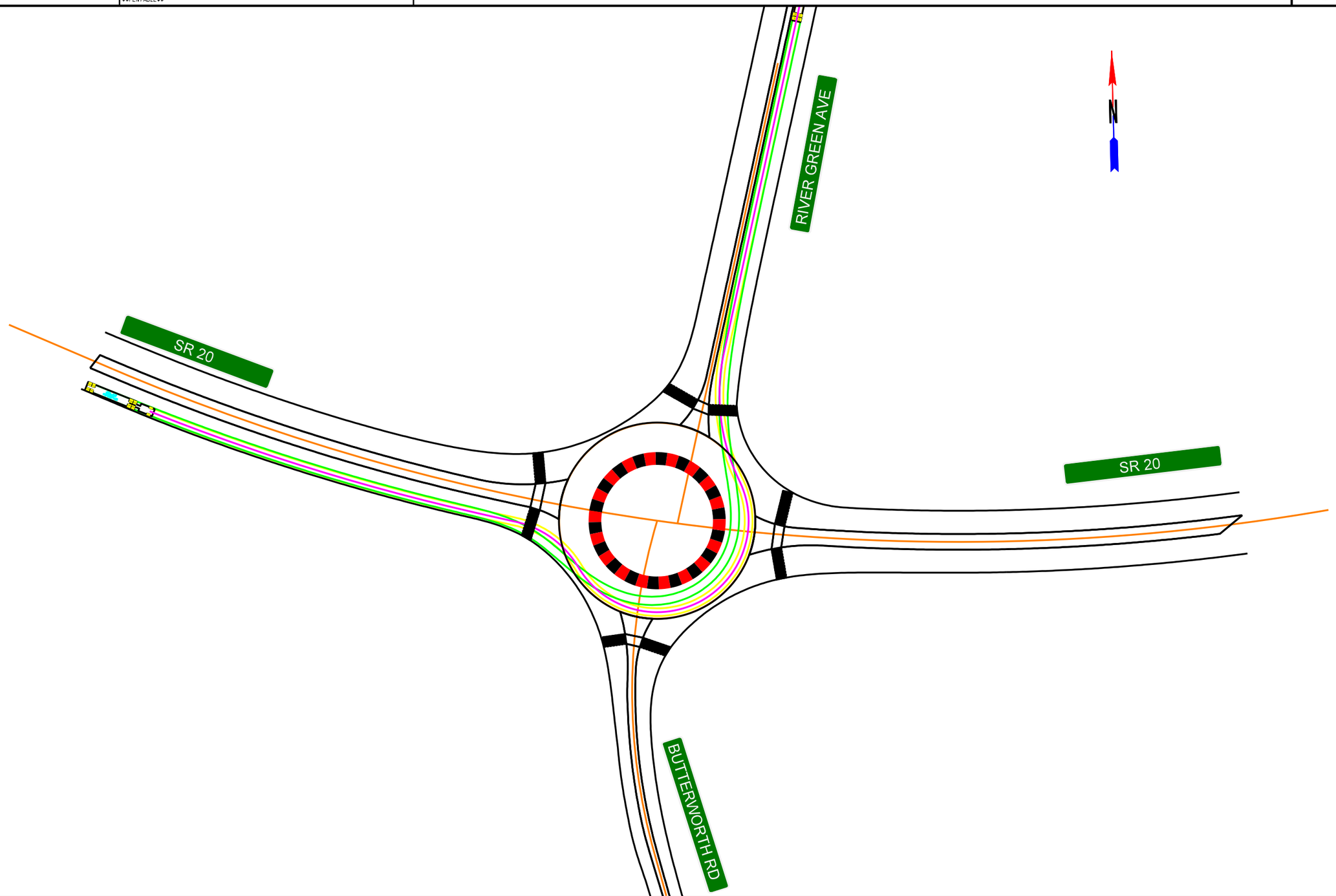

SCALE IN FEET
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REVISION DATES

ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
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10/23/2015 GPLN: $$SHEET$$

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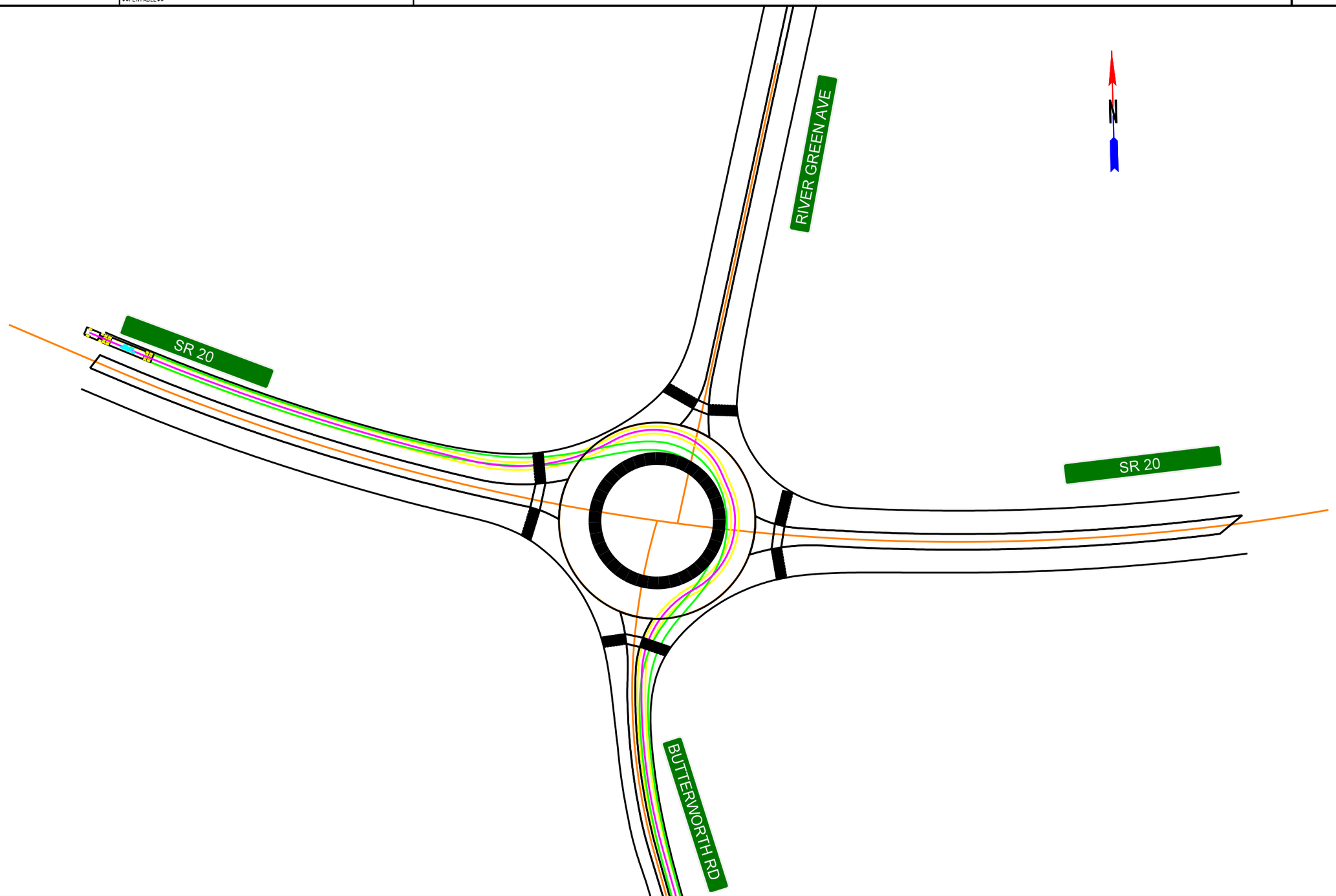

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REVISION DATES

ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0004I

10/23/2015 GPLN: $$SHEET06 $$SHEET05 $$SHEET04 $$SHEET03 $$SHEET02 $$SHEET01

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
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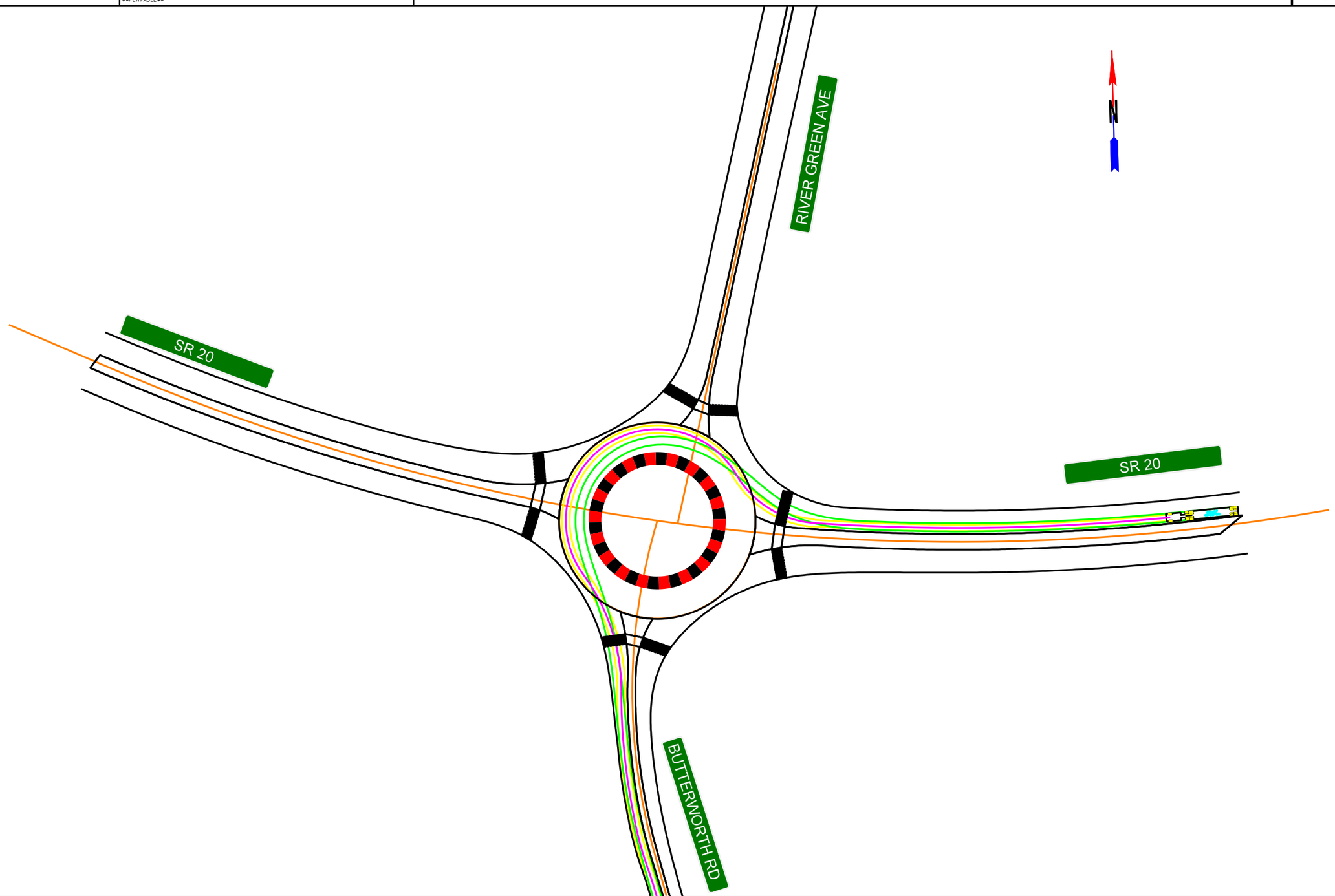

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REVISION DATES

ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0004J

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
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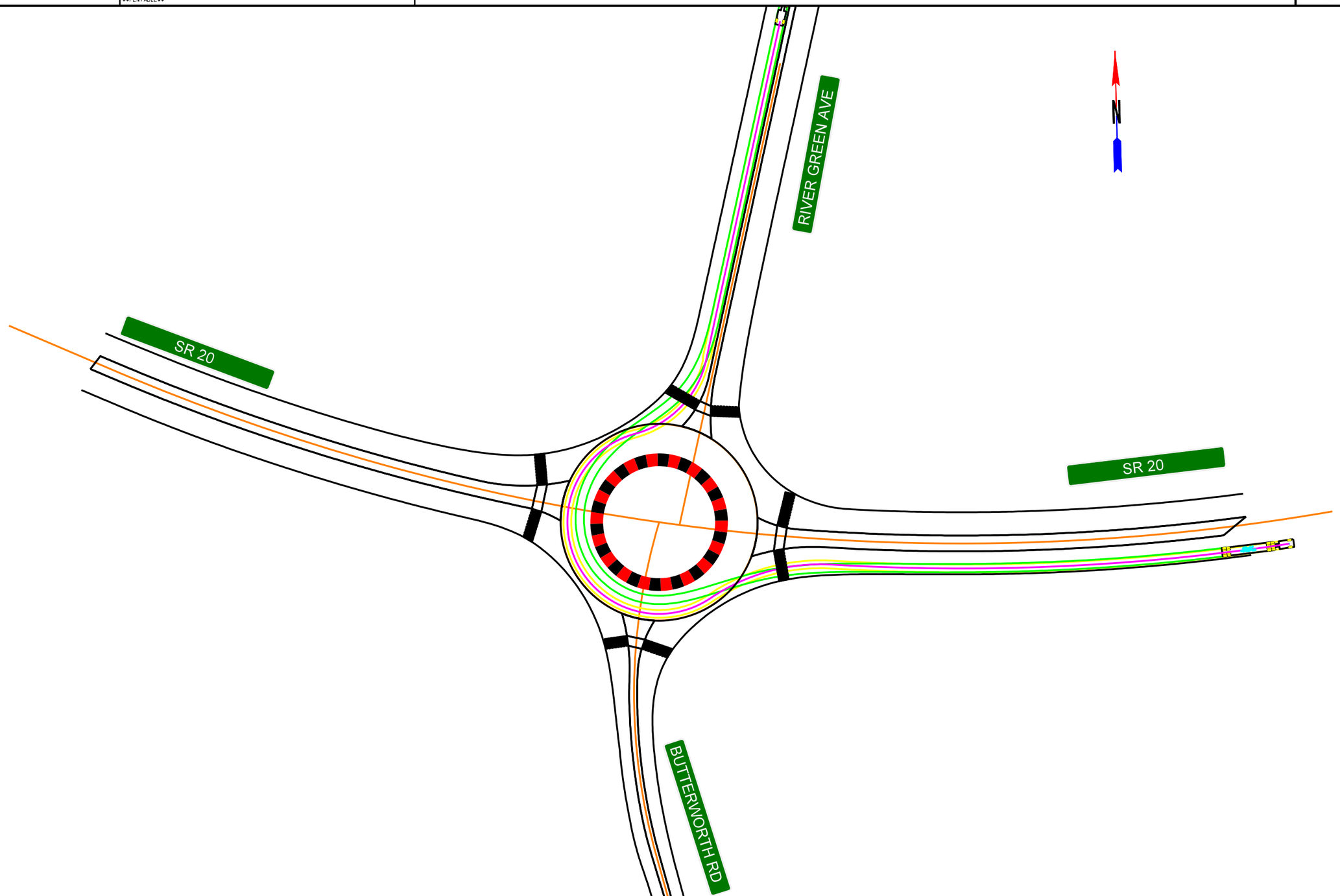

SCALE IN FEET
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REVISION DATES

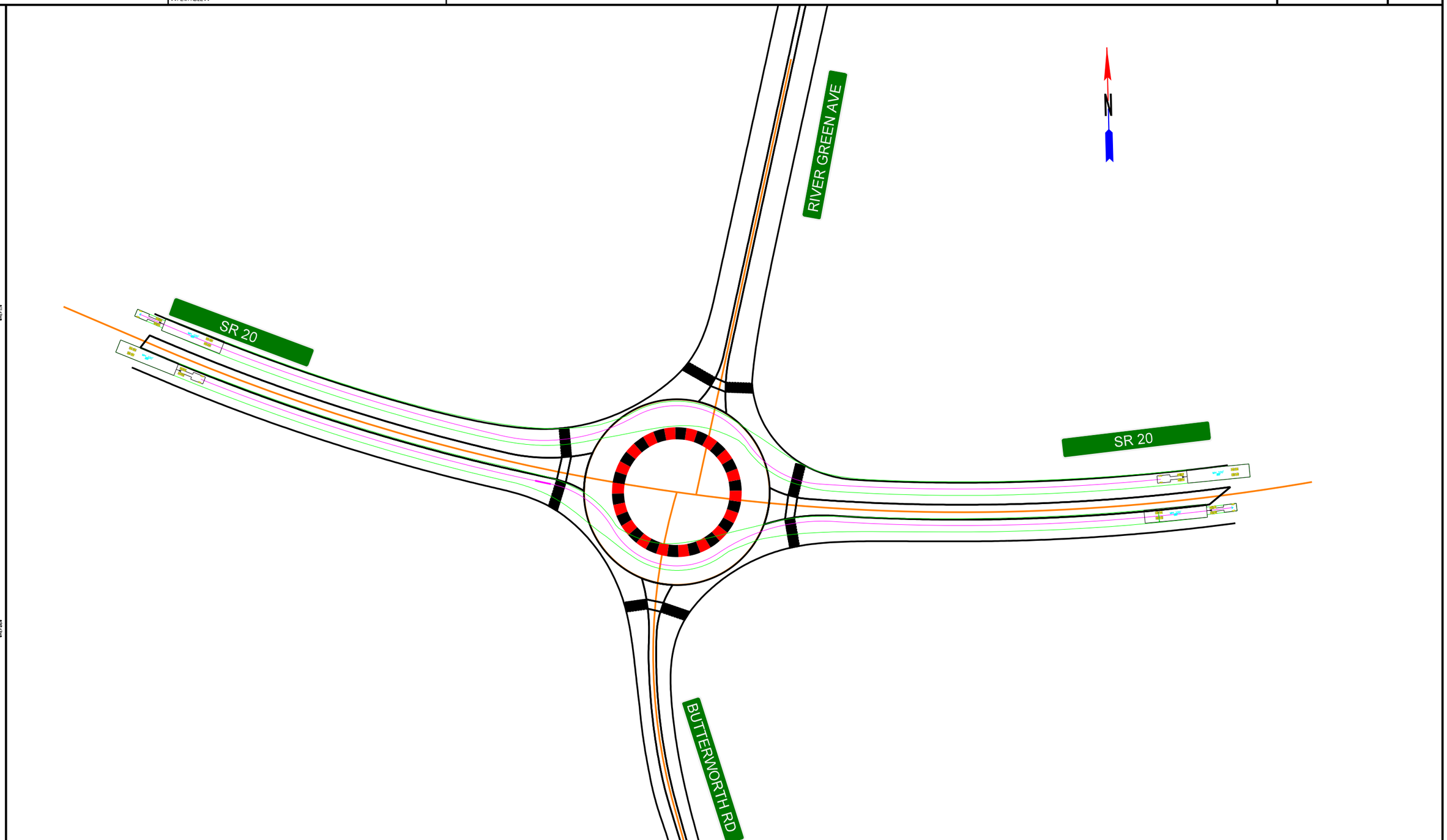
ROUNDABOUT 4
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
04-0004K

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

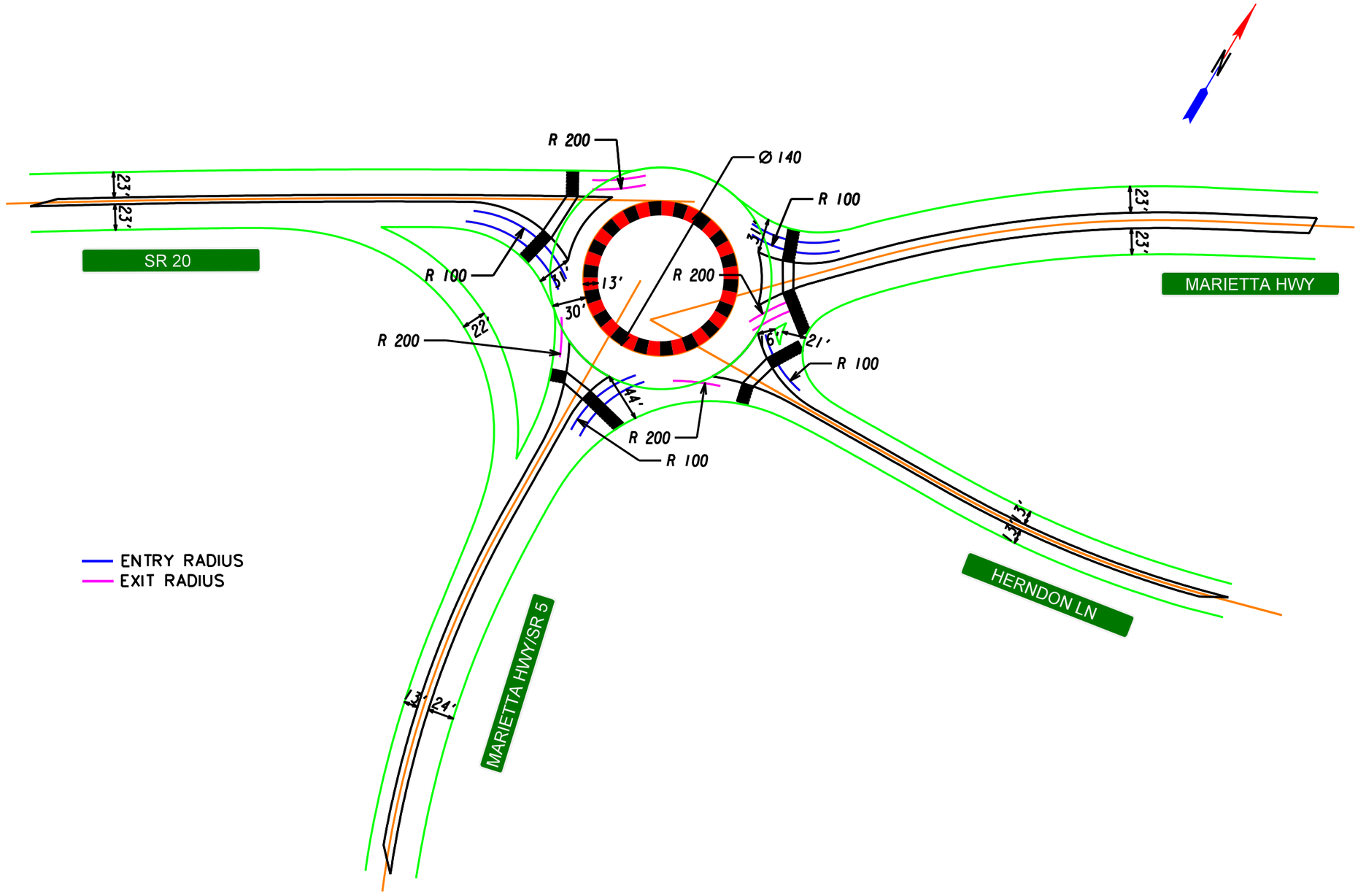
REVISION DATES

ROUNDABOUT 4
SWEPT PATH ANALYSIS (OSOW)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		04-0005
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

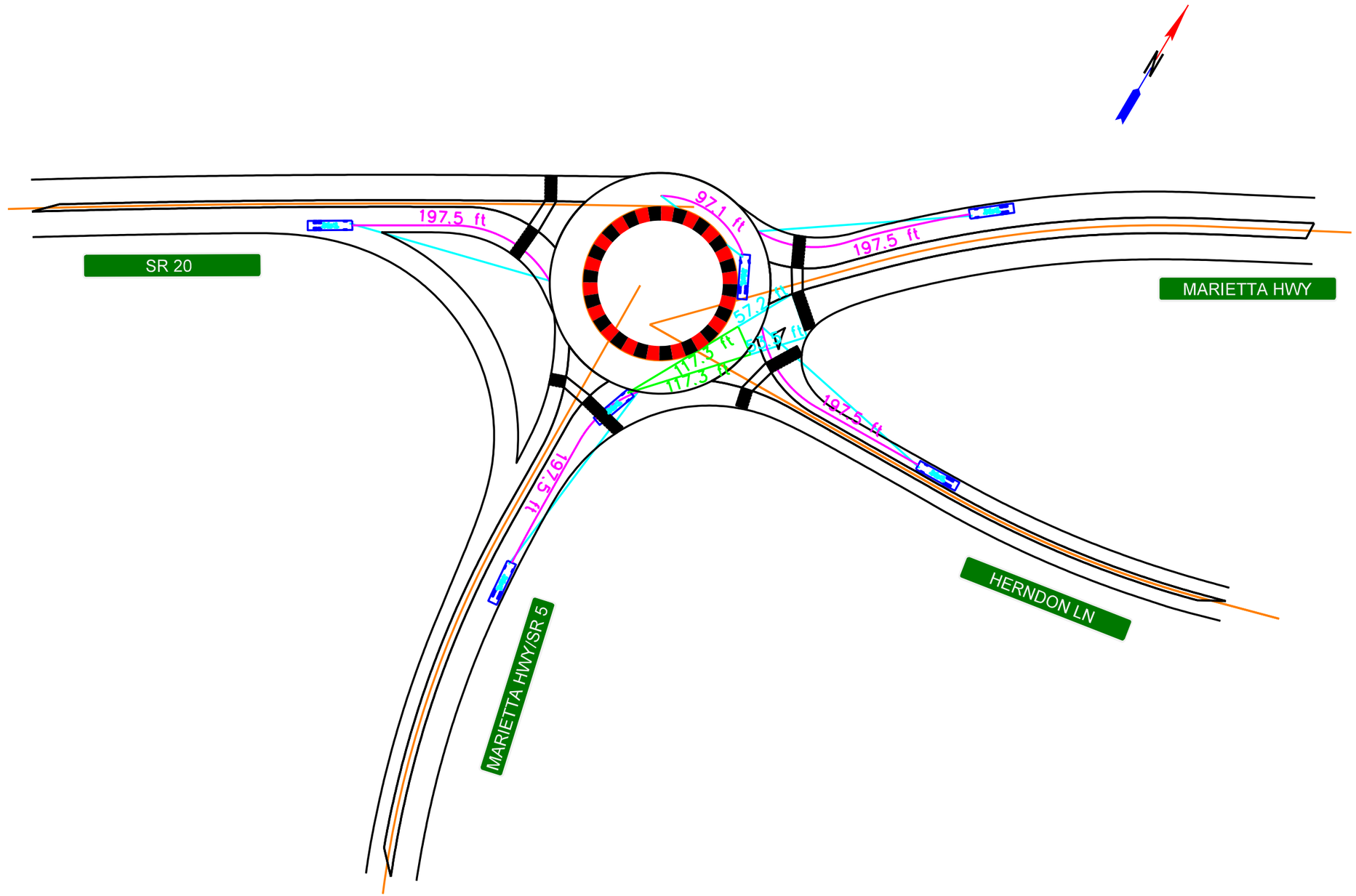
ROUNDABOUT 5
GEOMETRIC LAYOUT

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0001

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

ROUNDABOUT 5
STOPPING SIGHT DISTANCE

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0002

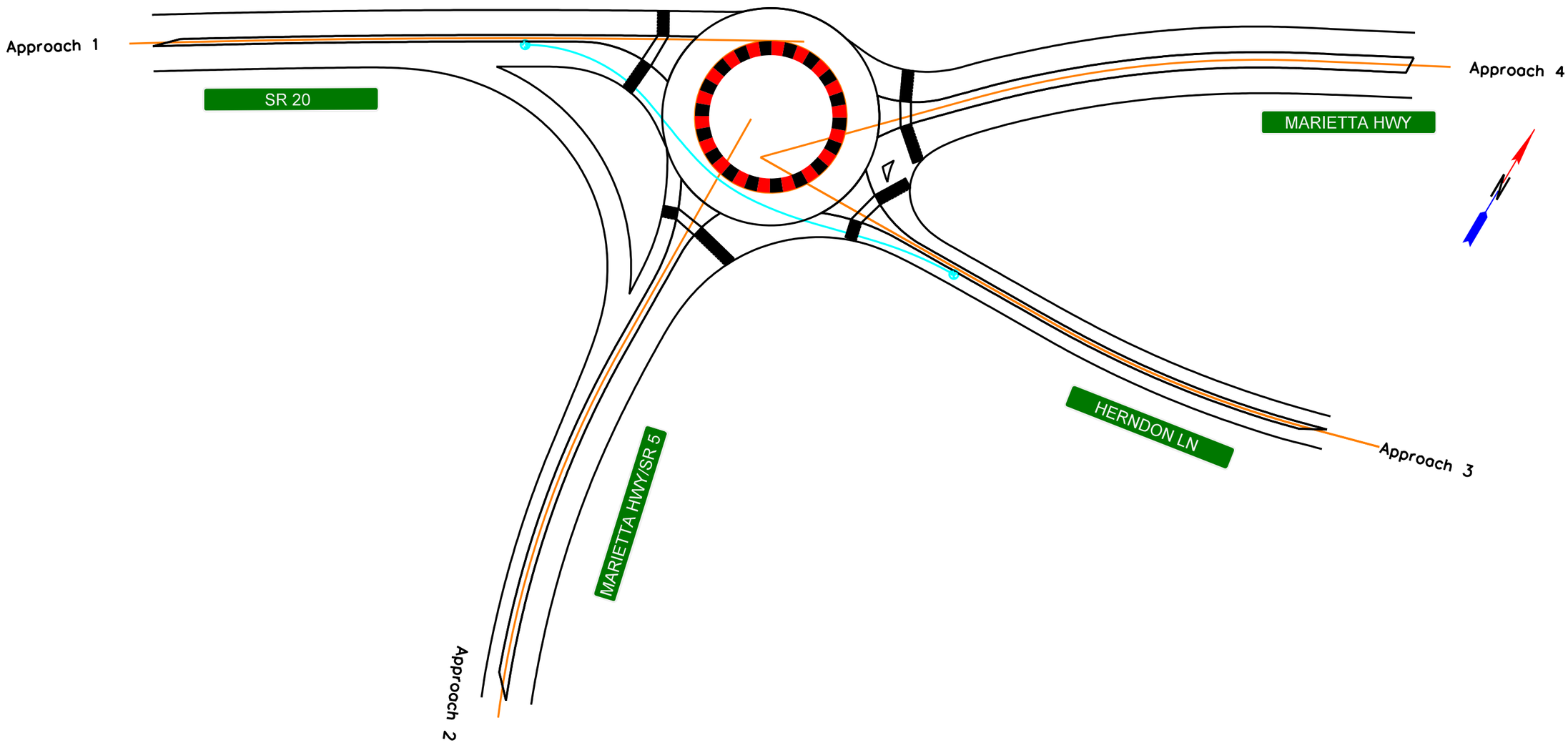
10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$

FASTEST PATH RESULTS TABLE - THEORETICAL EDGES

ENTRY LEG	V1	V1a	V2	V3	V3a	V4	V5	V1<V2+15.00	V3>V1 and V3>V2	V5<V1 and |V5-V4|<15.00	R1	R2	R3	R4	R5	Entry Median Offset	Entry Edge Offset	Central Island Offset	Exit Median Offset	Exit Edge Offset
	(mph)	(mph)	(mph)	(mph)	(mph)	(mph)	(mph)				(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
1 Approach 1	24.08	38.18	23.27	33.21	36.27	17.57	N/A	Yes	Yes	N/A	150.20	161.34	354.94	75.00	N/A	3.00	5.00	5.00	3.00	5.00
2 Approach 2	N/A	N/A	N/A	N/A	N/A	17.57	24.74	N/A	N/A	Yes	N/A	N/A	N/A	75.00	161.96	3.00	5.00	5.00	3.00	5.00
3 Approach 3	N/A	N/A	N/A	N/A	N/A	17.57	16.28	N/A	N/A	Yes	N/A	N/A	N/A	75.00	56.01	3.00	5.00	5.00	3.00	5.00
4 Approach 4	N/A	N/A	N/A	N/A	N/A	17.57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75.00	N/A	3.00	5.00	5.00	3.00	5.00
Accel(ft/sec²)		-4.2			6.9															
SE(%)	2.00		-2.00	2.00		-2.00	2.00													

Generated: May 24, 2019 @ 02:38PM



SCALE IN FEET
0 100 200 400

REVISION DATES

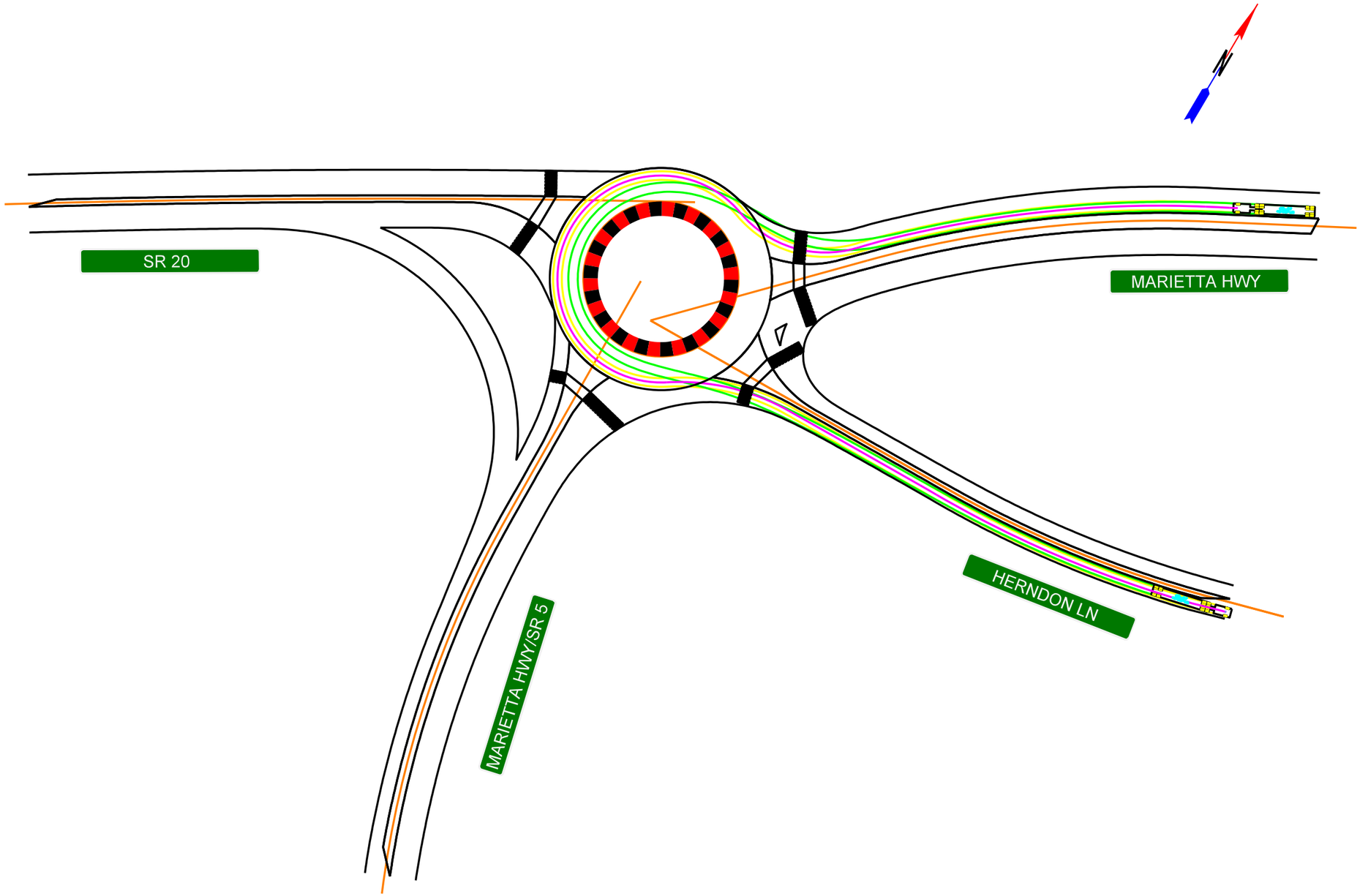
ROUNDABOUT 5
FASTEST PATH

CHECKED: DATE:
BACKCHECKED: DATE:
CORRECTED: DATE:
VERIFIED: DATE:

DRAWING No.
05-0003

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P. I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES		

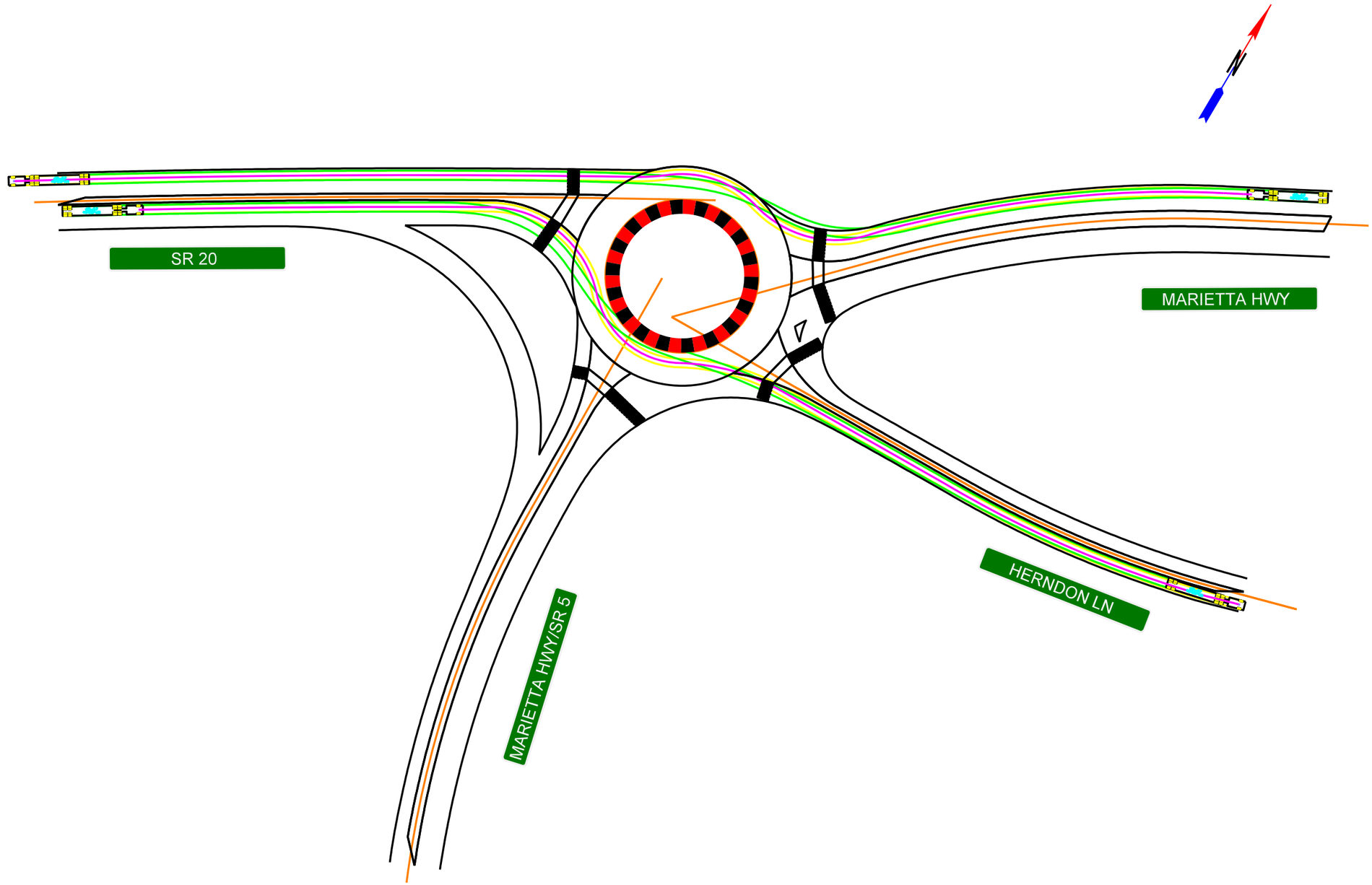
ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0004A

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRFB$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
0 100 200 400

REVISION DATES

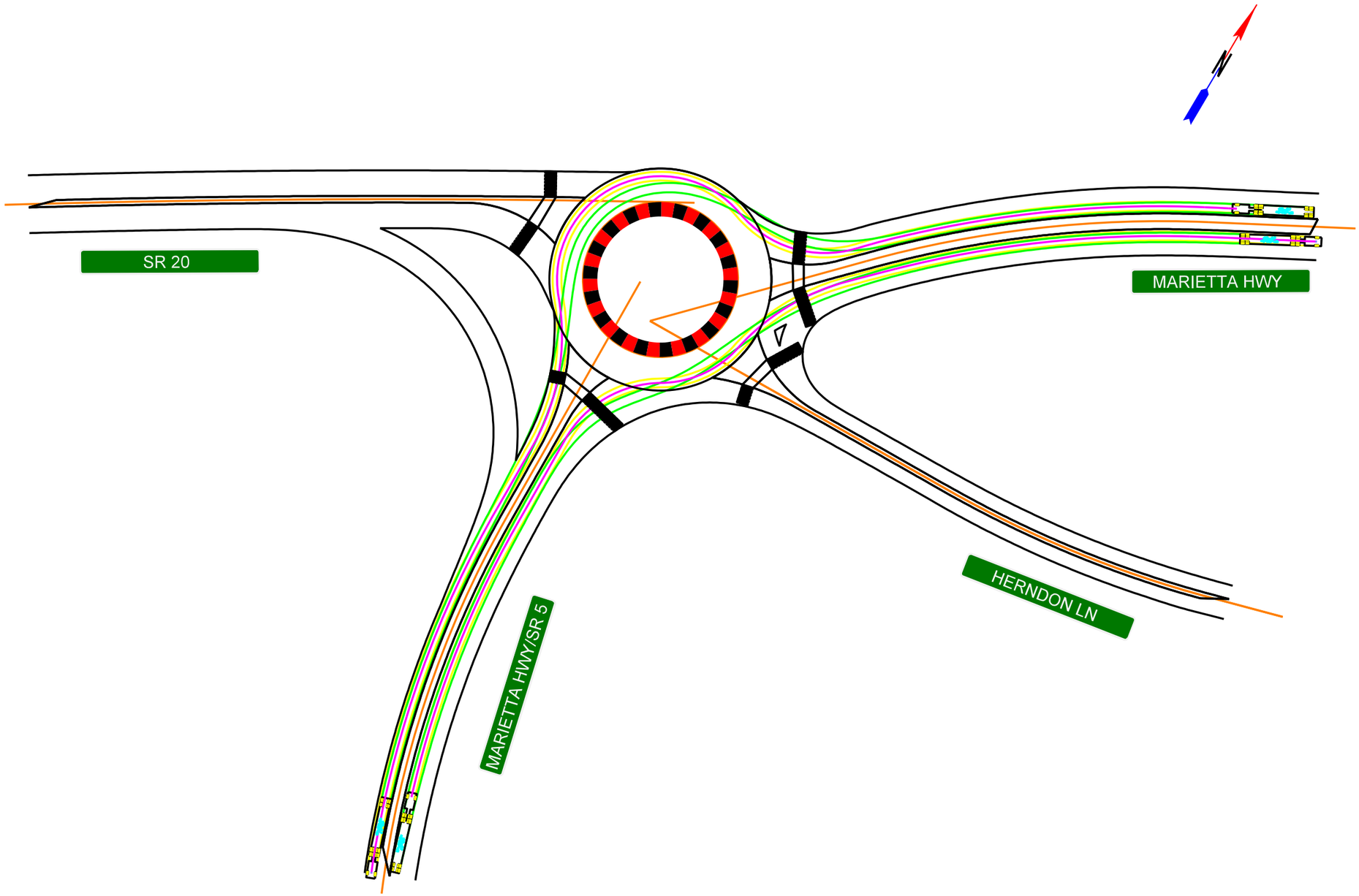
ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0004B

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

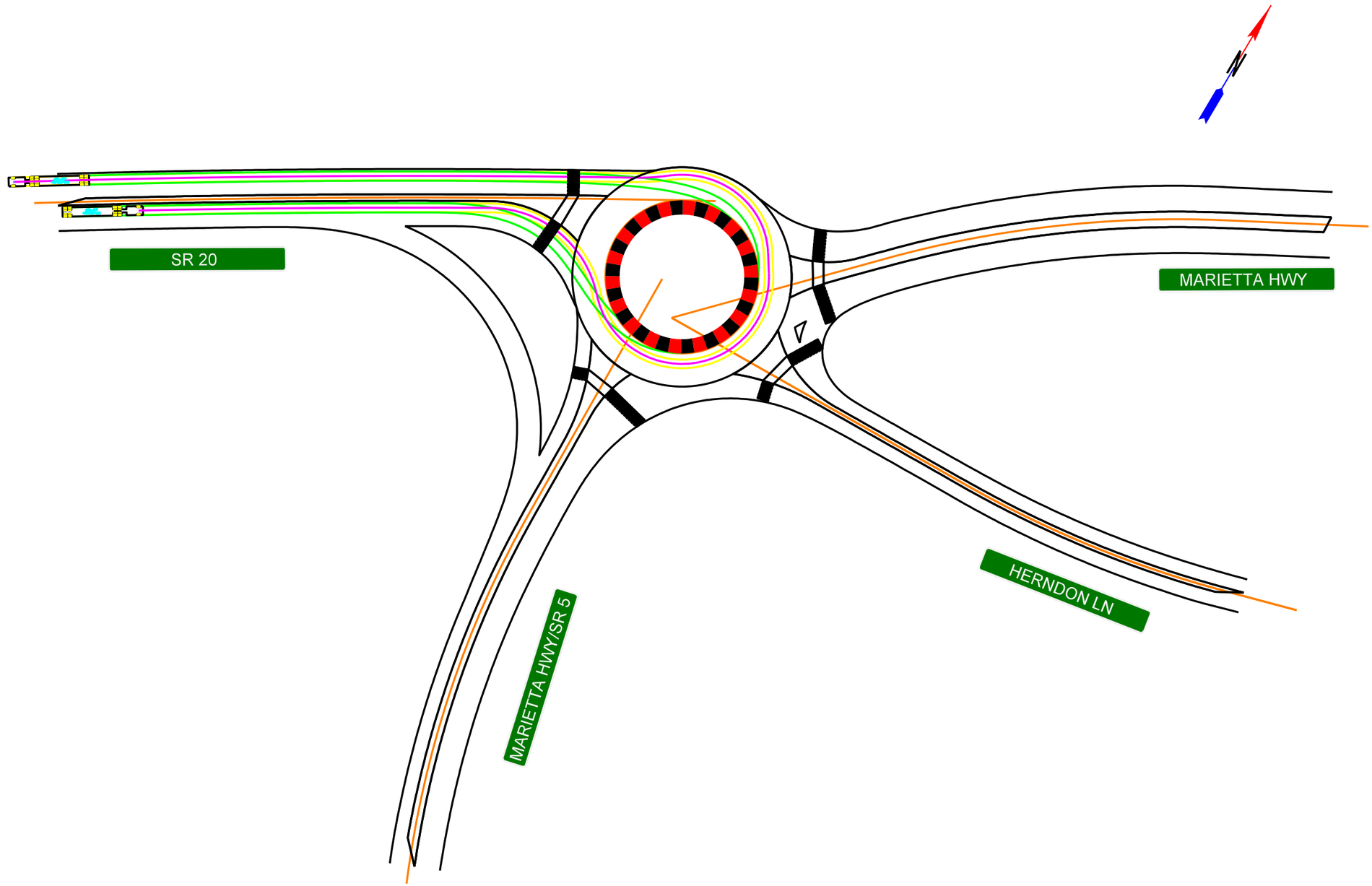
ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0004C

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

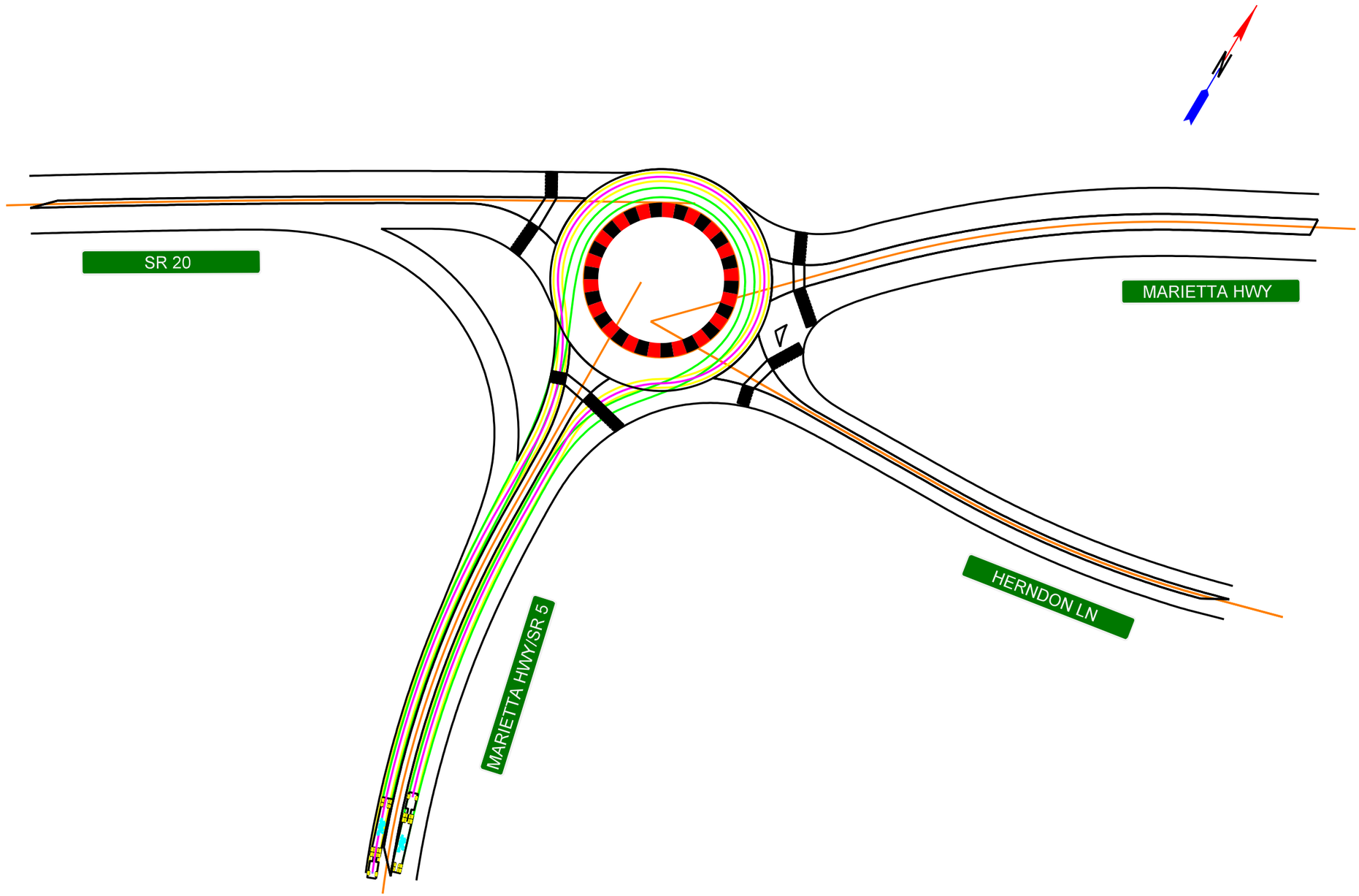
ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0004D

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
$USER$ $$PENTABLE$$



SCALE IN FEET
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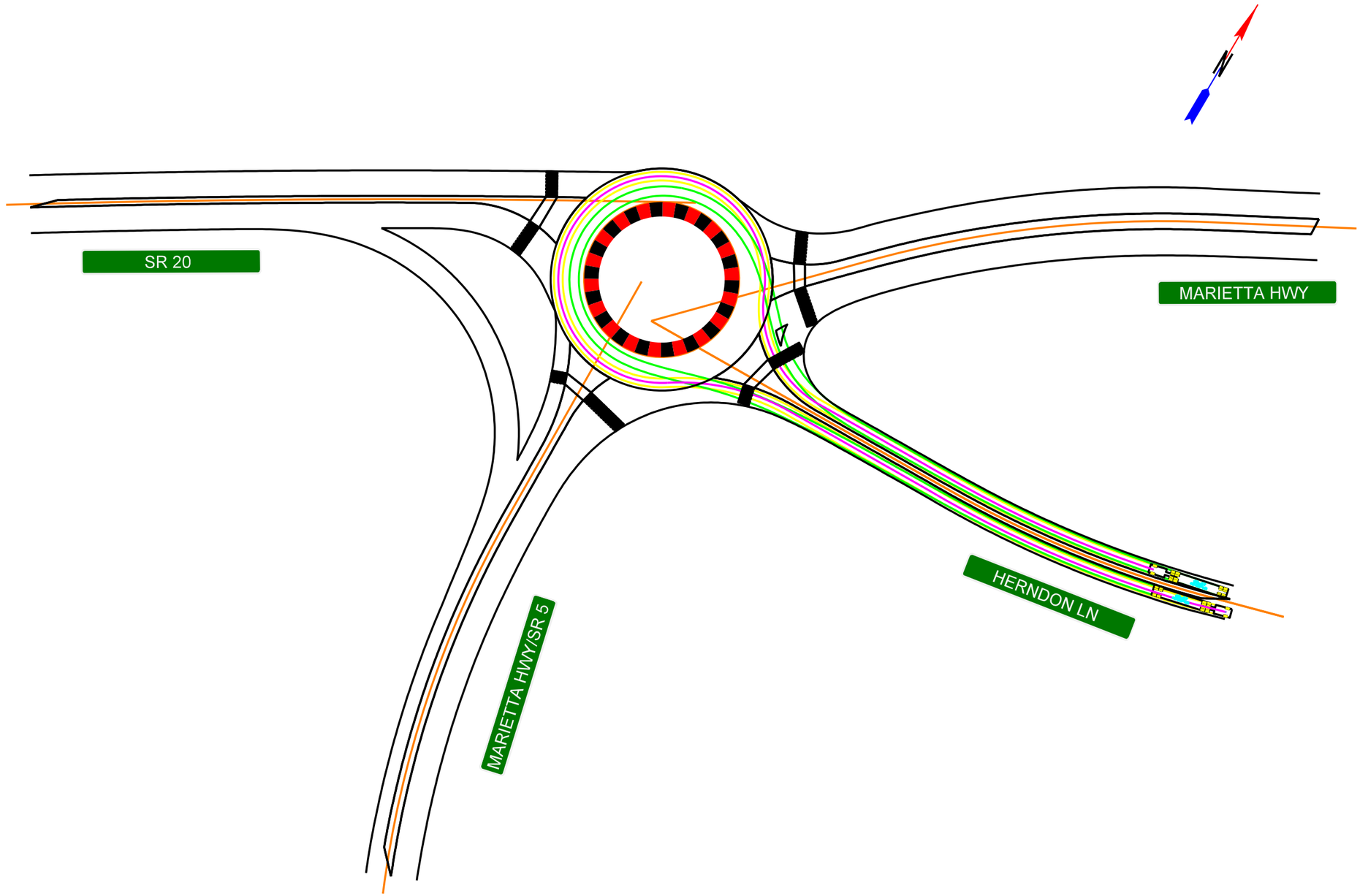
REVISION DATES		

ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		05-0004E
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

DATE$$$ TIME$$$
$USER$
$PRF8$
$$PENTABLE$$
DGN
GDOT
P. I. No.



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0004F

10/23/2015 GPLN

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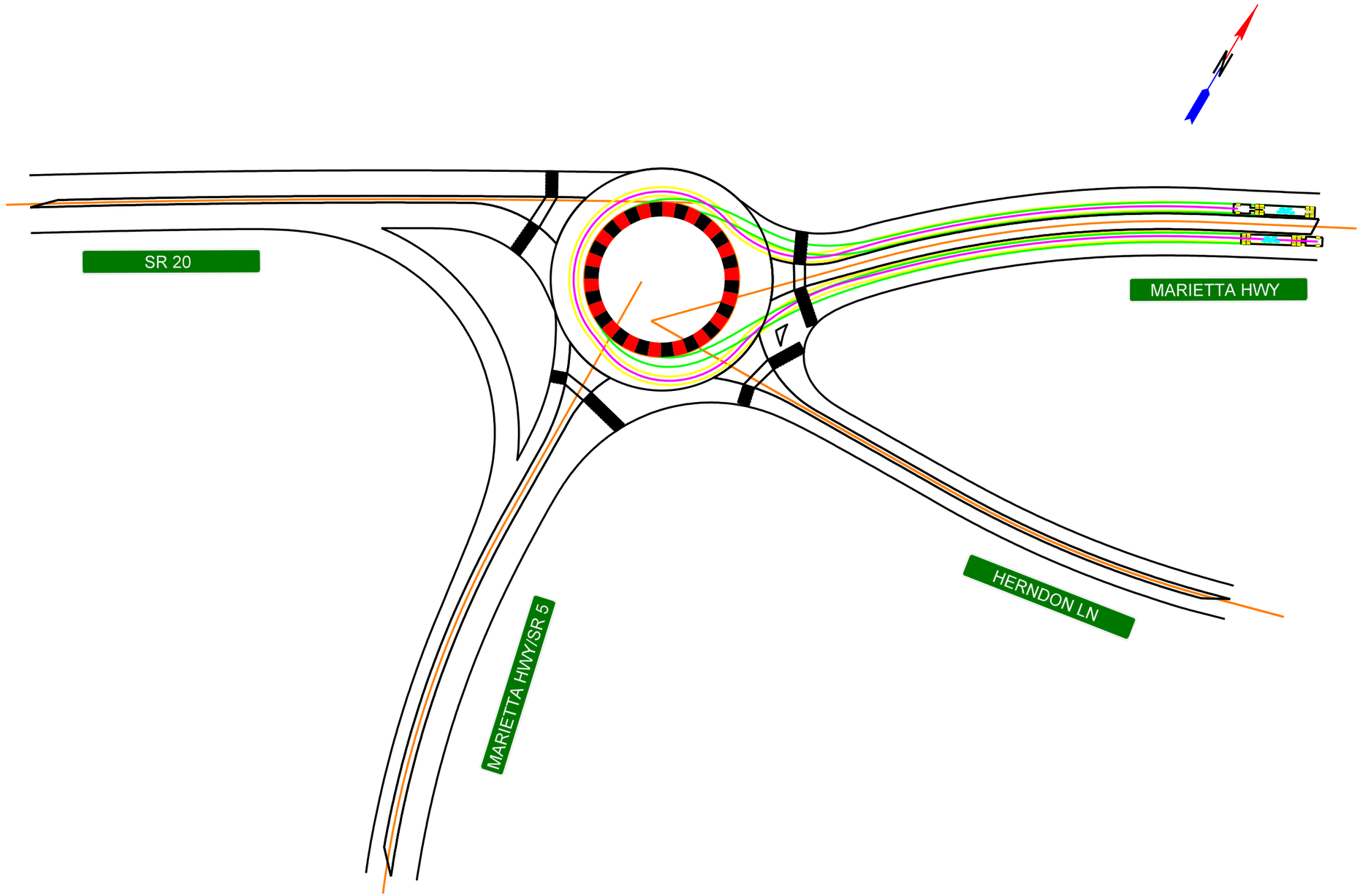

SCALE IN FEET
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REVISION DATES		

ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

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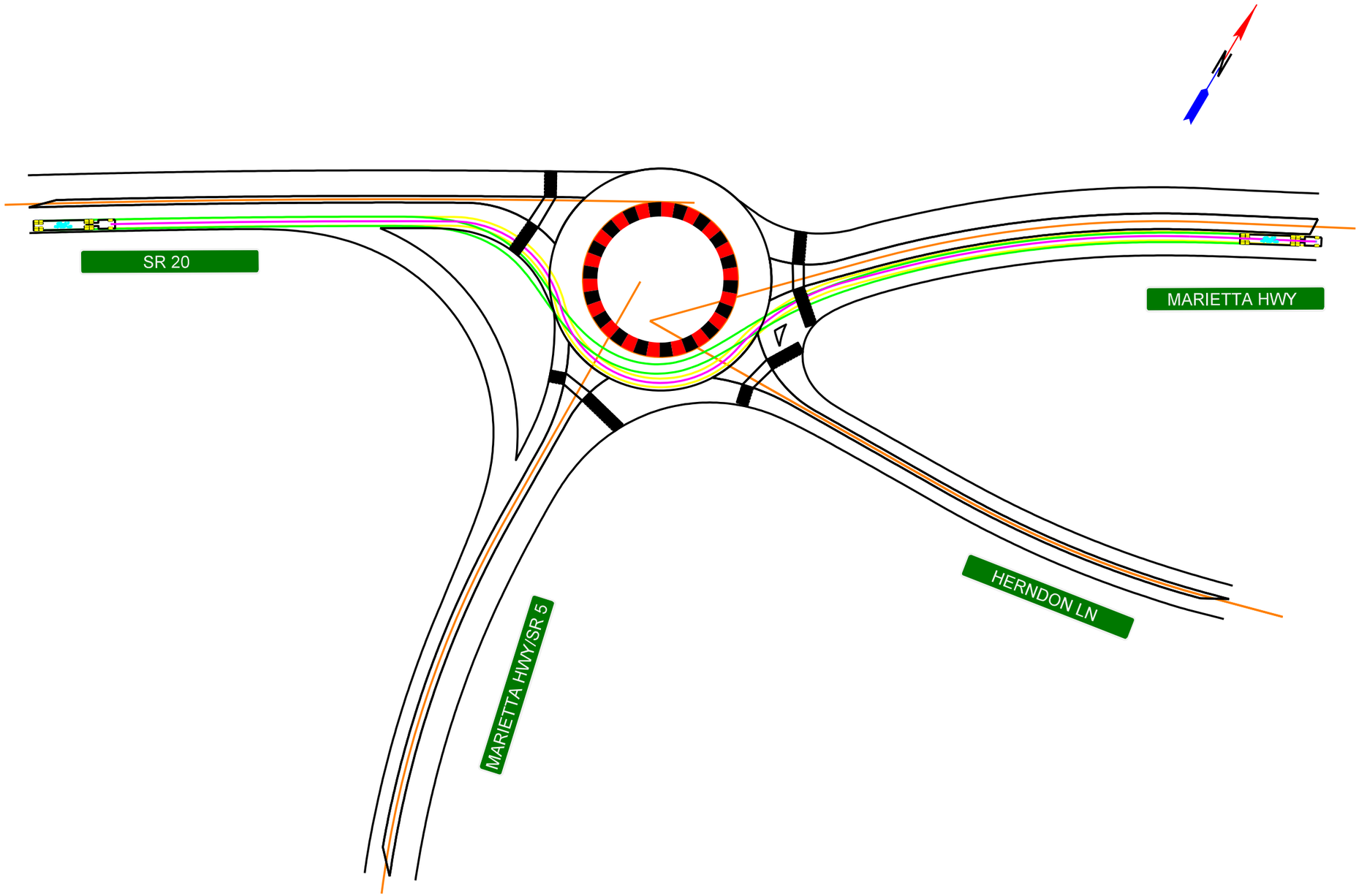
VERIFIED:		DATE:	

DRAWING No.
05-0004G

10/23/2015 GPLN

DATE$$$ TIME$$$
$USER$
$PRF8$
$$PENTABLE$$
DGN
GDOT
P. I. No.



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0004H

10/23/2015 GPLN

DATE$$$ TIME$$$ $PRF8$ DGN P.I. No.
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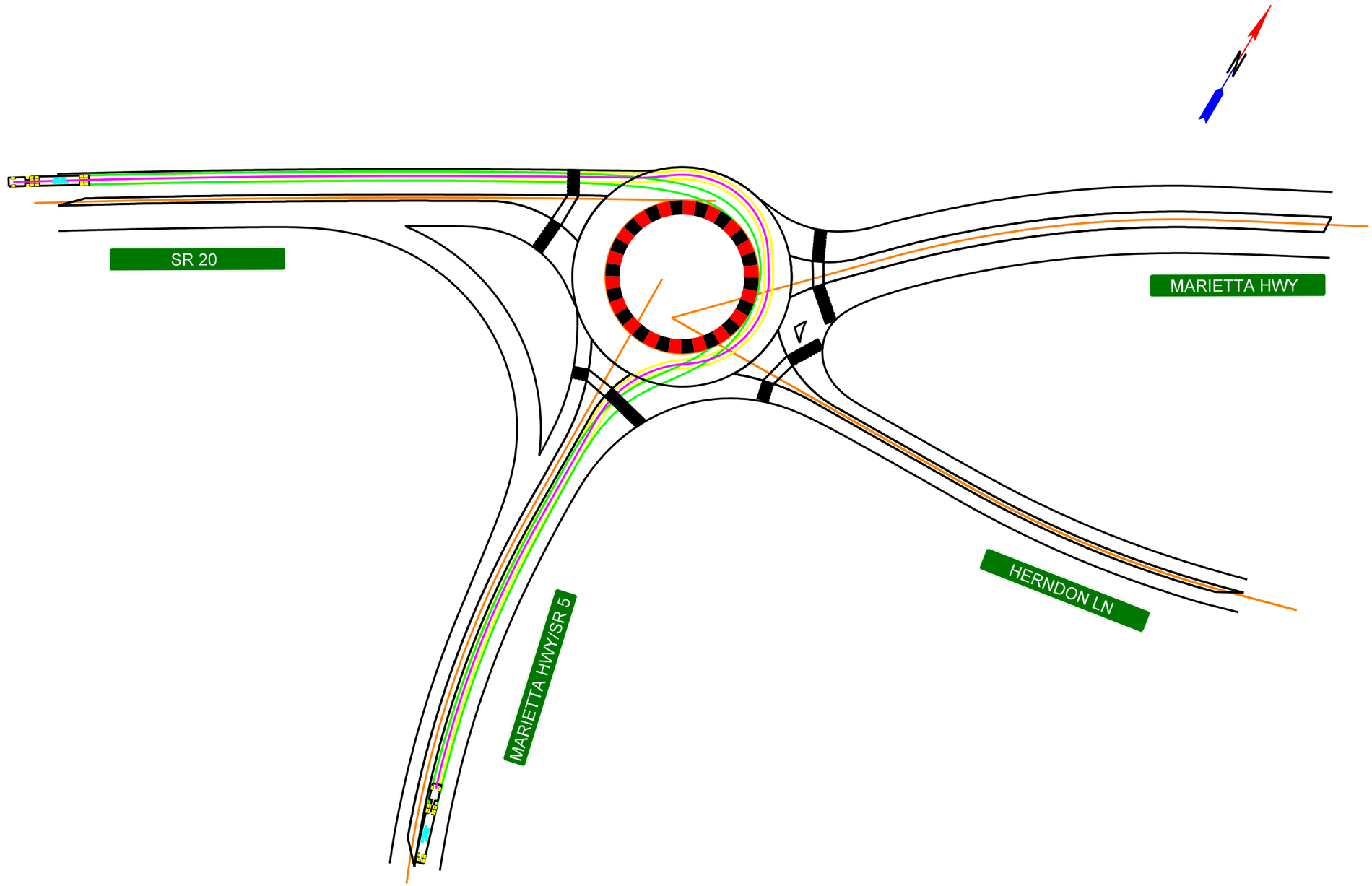

SCALE IN FEET
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REVISION DATES		

ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		05-0004I
CORRECTED:		DATE:		
VERIFIED:		DATE:		

10/23/2015 GPLN

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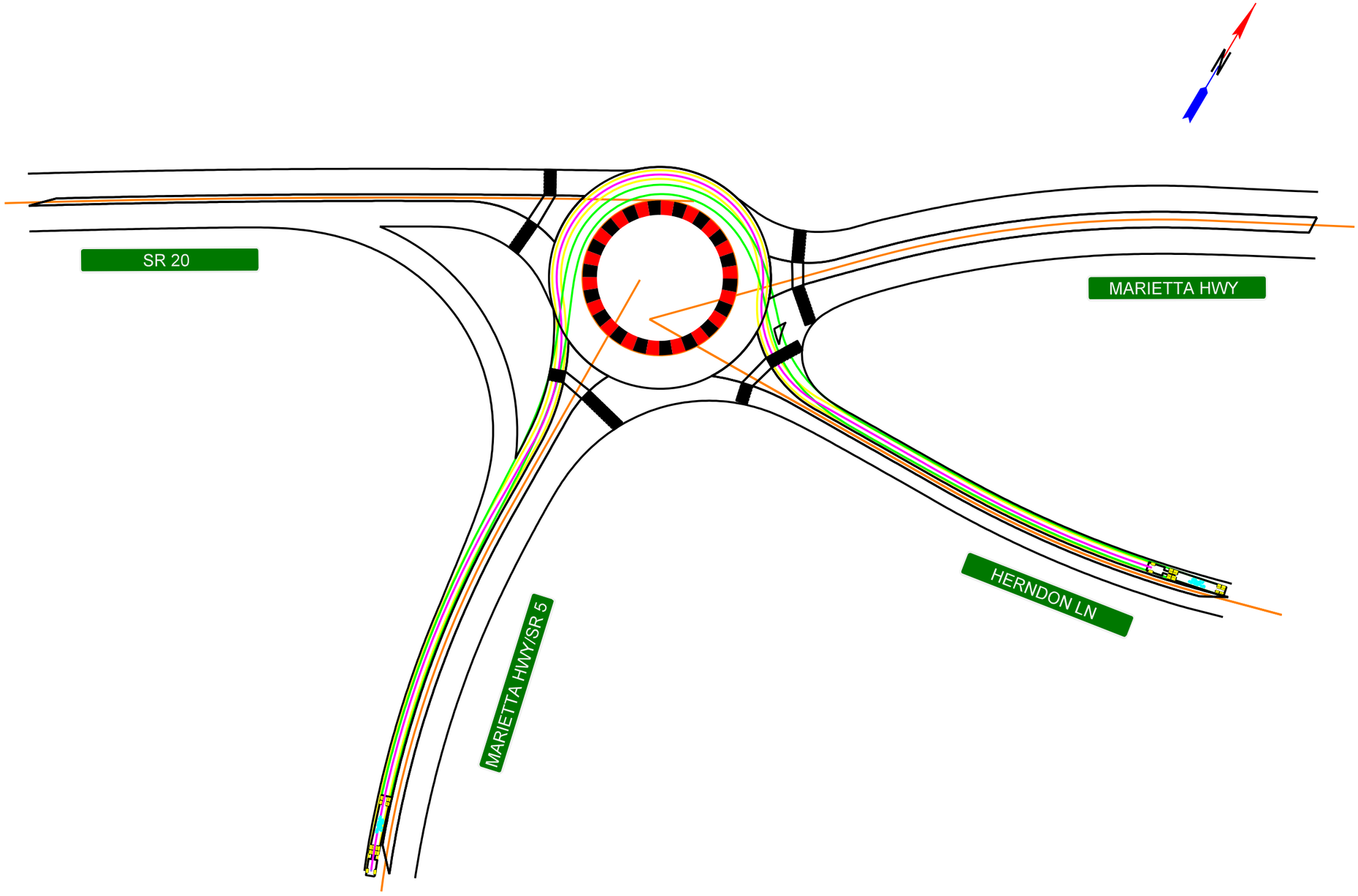

SCALE IN FEET
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REVISION DATES

ROUNDABOUT 5
SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:	
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DRAWING No.
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10/23/2015 GPLN

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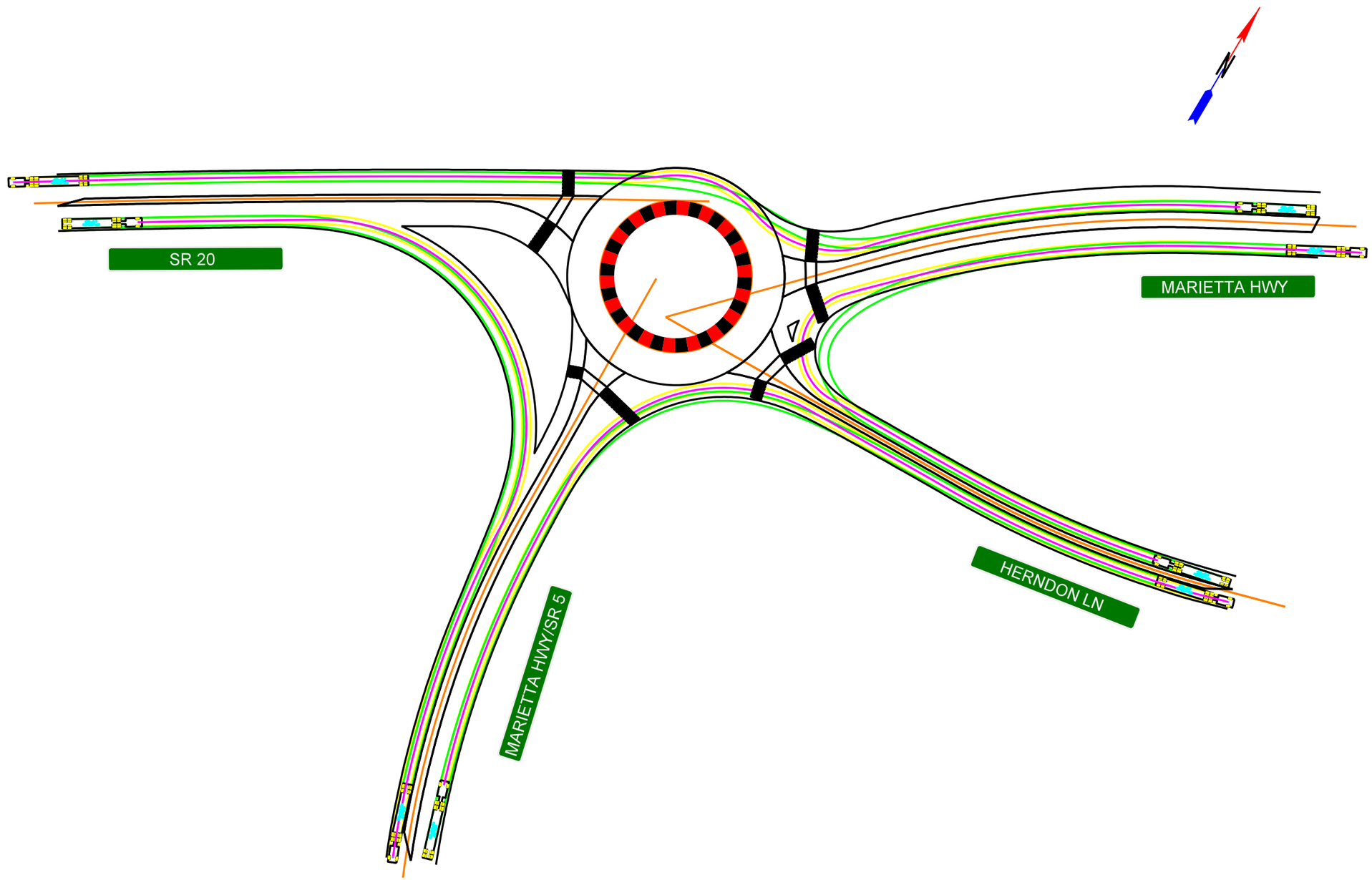

SCALE IN FEET
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REVISION DATES		

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SWEPT PATH ANALYSIS (WB-67)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		05-0004K
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10/23/2015 GPLN

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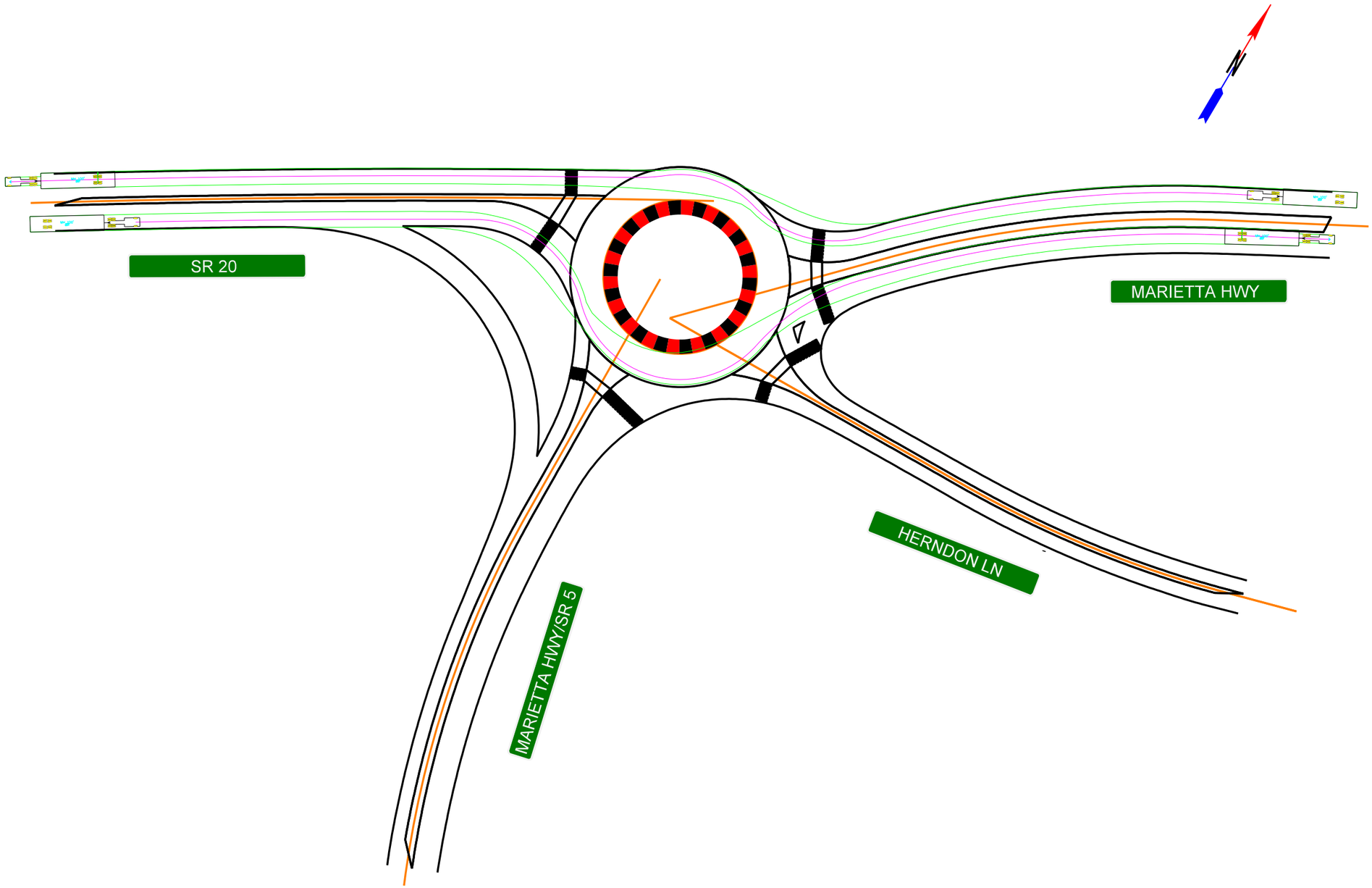

SCALE IN FEET
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REVISION DATES

ROUNDABOUT 5
SWEPT PATH ANALYSIS (OSOW)

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		05-0005A
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VERIFIED:		DATE:		

10/23/2015 GPLN

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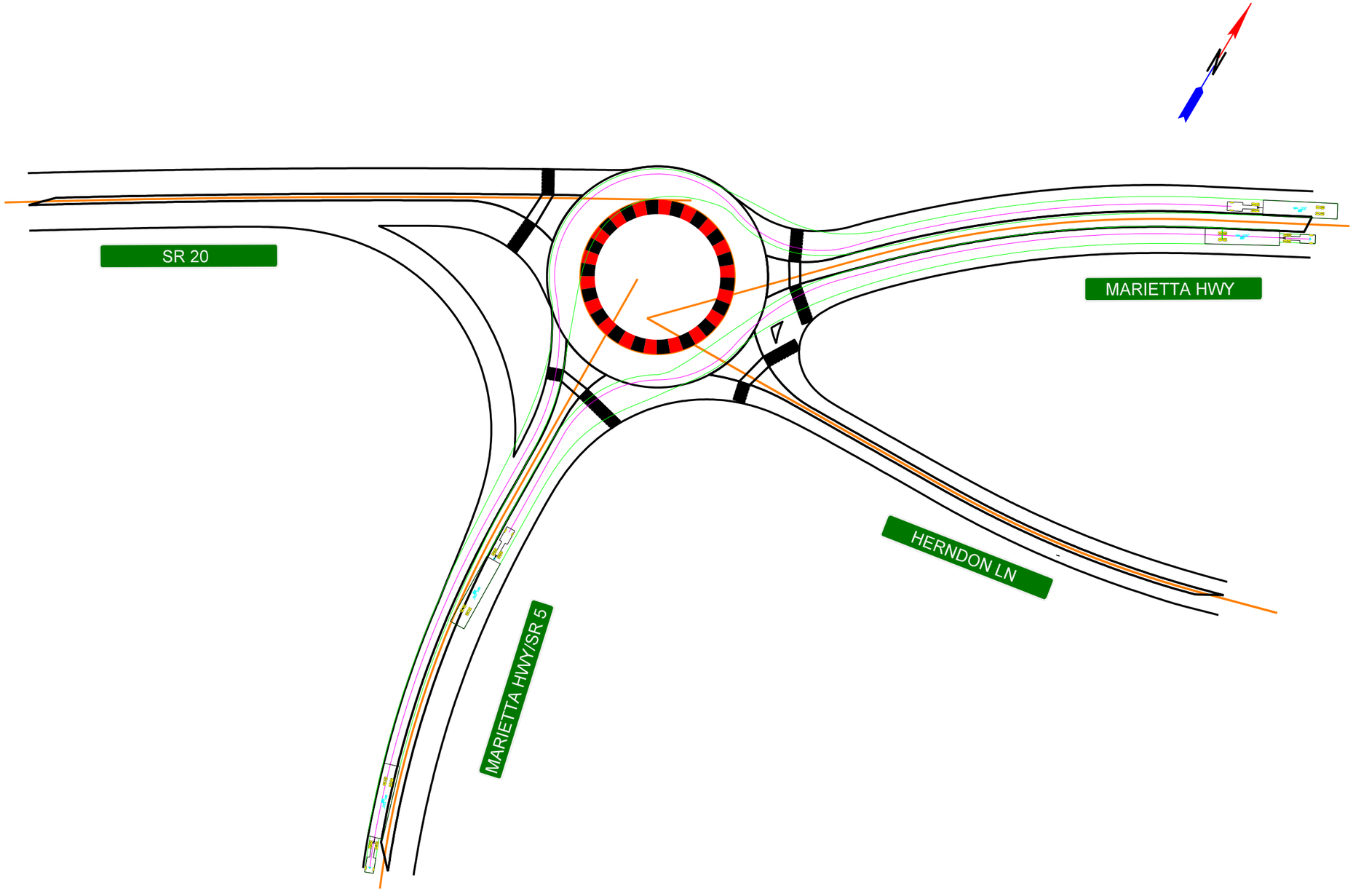
$USER$ $$PENTABLE$$



SCALE IN FEET
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REVISION DATES

ROUNDABOUT 5
SWEPT PATH ANALYSIS (OSOW)

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No.
05-0005B

10/23/2015 GPLN

SI-and-A Report

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:46:22 AM

Parameters: Bridge Serial Number

Bridge Serial Number: 015-0028-0 **County: Bartow** **SUFF. RATING: 70.0**

Location & Geography

Structure ID:	015-0028-0		
200 Bridge Information:	07		
*6 Feature Intersected:	MCKASKY CREEK		
*7A Route Number Carried:	SR00020		
*7B Facility Carried:	SR 20		
9 Location:	5 MI SE OF WHITE		
2 GDOT District:	4841600000 - D6 District Six Cartersville		
*91 Inspection Frequency:	24	Date:	Jul-16-2018
92A Fracture Critical Insp. Freq:	0	Date:	Feb-01-1901
92B Underwater Insp Freq:	0	Date:	Feb-01-1901
92C Other Spc. Insp Freq:	0	Date:	Feb-01-1901
* 4 Place Code:	00000		
*5A Inventory Route(O/U):	1		
5B Route Type:	3 - State		
5C Service Designation:	1- Mainline		
5D Route Number:	00020		
5E Directional Suffix:	0. Not applicable		
*16 Latitude:	34 - 13.2960		
*17 Longtitude:	84 - 42.0774		
98A Border Bridge:	0	98B: GA%	00
99 ID Number:	000000000000000		
*100 STRAHNET:	0- The Feature is not a STRAHNET route.		
12 Base Highway Network:	Yes		
13A LRS Inventory Route:	151002000		
13B Sub Inventory Route:	0		
101 Parallel Structure:	N. No parallel structure exists		
*102 Direction of Traffic:	2- Two Way		
*264 Road Inventory Mile Post:	21.19		
*208 Inspection Area:	Area 06		
*104 Highway System:	1-Inventory Route is on the NHS		
*26 Functional Classification:	2- Rural - Principal Arterial - Other		
*204A Federal Route Type:	F - Primary.		
*204B Federal Route Number:	00121		
105 Federal Lands Highway:	0. Not applicable		
*110 Truck Route:	0- The Feature is not part of the National Network for Trucks		
217 Benchmark Elevation:	0000.00		
* Location ID No:	015-00020D-021.19E		

218 Datum:	0- Not Applicable
*19 Bypass Length:	19
*20 Toll:	3- On a Free Road or Non-Highway
*21 Maintenance Responsibility:	01-State Highway Agency.
*22 Owner:	01-State Highway Agency.
*31 Design Load:	2- H 15
37 Historical Significance:	5- Not eligible for the National Register of Historic Places
205 Congressional District:	011
27 Year Constructed:	1954
106 Year Reconstructed:	0
33 Bridge Median:	0-None
34 Skew:	43
35 Structure Flared:	No
38 Navigation Control:	0- Navigation is not controlled by an Agency
213 Special Steel Design:	0- Not applicable or other
267A Type Paint Super Structure:	0- Not Applicable. Year : 0000
267B Type Paint Sub Structure:	0- Not Applicable Year : 0000
*42A Type of Service On:	1-Highway
*42B Type of Service Under:	5-Waterway
214A Movable Bridge:	0
214B Operator on Duty:	0
203 Type Bridge:	Q - Reinforced Concrete Bridge Culvert
259 Pile Encasement:	3
*43A Structure Type Main material:	1-Concrete
*43B Structure Type Main Type:	19- Culvert
45 Number of Main Spans:	2
44 Structure Type Approach:	A:0- Other B: 0- Other
46 Number of Approach Spans:	0
226 Bridge Curve:	A: Vertical: NoB: Horizontal: No
111 Pier Protection:	N - Navigation Control item coded 0, or Feature not a waterway
107 Deck Structure Type:	N - None
108A Wearing Surface Type:	N. Not applicable
108B Membrane Type:	N. Not applicable
108C Deck Protection:	N. Not applicable
265 Underwater Inspection Area:	0

Signs & Attachments

225 Expansion Joint Type:	00- No expansion joint.
242 Deck Drains:	0- None.
243A Parapet Location:	0- None present.
243B Parapet Height:	0.00
243C Parapet Width:	0.00
238A Curb Height:	0.0
238B Curb Material:	0- None.
239A Handrail Left:	0- None.
239B Handrail Right:	0- None.
*240 Median Barrier Rail:	0- None.
241A Bridge Median Height:	0
241B Bridge Median Width:	0
*230A Guardrail Location Direction Rear:	0- None.
*230B Guardrail Location Direction Fwrd:	0- None.
*230C Guardrail Location Opposing Rear:	0- None.
*230D Guardrail Location Opposing Fwrd:	0- None.
244 Approach Slab:	0- None.
224 Retaining Wall:	0- None.
233 Posted Speed Limit:	55
236 Warning Sign:	No
234 Delineator:	No
235 Hazard Boards:	No
237A Gas:	00- Not Applicable
237B Water:	00- Not Applicable
237C Electric:	00- Not Applicable
237D Telephone:	00- Not Applicable
237E Sewer:	00- Not Applicable
247A Lighting: Street:	No
247B Navigation:	No
247C Aerial:	No
*248 County Continuity No.:	00
36A Bridge Railings:	N- Not applicable
36B Transition:	N- Not applicable
36C Approach Guardrail:	N- Not applicable
36D Approach Guardrail Ends:	N- Not applicable

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:46:22 AM

Bridge Serial Number: 015-0028-0 | **County: Bartow** | **SUFF. RATING: 70.0**

Programming Data

201 Project Number:	S-1019 (1)
202 Plans Available:	1- Plans at General Office.
249 Proposed Project Number:	00000000000000000000000000
250A Reconstruction Approval Status:	No
250B Route Approval Status:	No
250C Approval Status Definition:	0
250D Approval Status Federal:	0
251Project Identification Number:	0000000
252 Contract Date:	Feb-01-1901
260 Seismic Number:	00000
75A Type Work Proposed:	0- Not Applicable
75B Work Done by:	0- Initial Inventory
94 Bridge Improvement Cost:(X$1,000)	$113
95 Roadway Improvement Cost: (X$1,000)	$11
96 Total Improvement Cost: (X$1,000)	$170
76 Improvement Length:	0'
97 Year Improvement Cost Based On:	2013
114 Future AADT:	19890
115 Future AADT Year:	2031

Hydraulic Data

113 Scour Critical:	8. Foundation stable for conditions; scour above footing
216A Water Depth:	2.6
216B Bridge Height:	6.9
222 Slope Protection:	0
221A Spur Dike Rear:	
221B Spur Dike Fwd:	
219 Fender System:	0- None.
220 Dolphin:	
223A Culvert Cover:	9
223B Culvert Type:	1- Concrete.
223C Number of Barrels:	2
223D Barrel Width:	10
223E Barrel Height:	7
223F Culvert Length:	94
223G Culvert Apron:	0
39 Navigation Vertical Clearance:	0'
40 Navigation Horizontal Clearance:	0
116 Navigation Vertical Clear Closed:	0

Measurements:

*29 AADT:		13260	
*30 AADT Year:		2011	
109 % Truck Traffic:		1	
* 28A Lanes On:		3	
*28B Lanes Under:		0	
210A Tracks On:		00	
210B Tracks Under:		0	
* 48 Maximum Span Length:		14	
* 49 Structure Length:		29	
51 Bridge Roadway Width:		0'	
52 Deck Width:		0'	
* 47 Total Horizontal Clearance:		30'	
50A Curb / Sidewalk Width Left:		0	
50B Curb / Sidewalk Width Right:		0	
32 Approach Rdwy. Width:		24'	
***229 Approach Roadway**			
Rear Shoulder Left: Width:	4	*Right Width:*4	Type: 4 - Asphalt and Grass.
Fwd Shoulder: Left Width:	4	*Right Width:*4	Type: 4 - Asphalt and Grass.
Rear Pavement: Width:	39	*Type:*2- Asphalt.	
Forward Pavement: Width:	39	*Type:*2- Asphalt.	
Intersection Rear:	0	*Forward:*0	
53 Minimum Vertical Clearance Over Rd:		99' 99"	
54A Under Reference Feature:		N- Feature not a highway or railroad.	
54B Minimum Clearance Under:		0' 0"	
***228 Minimum Vertical Clearance**			
228A Actual Odometer Direction:		99'99"	
228B Actual Opposing Direction:		99'99"	
228C Posted Odometer Direction:		00'00"	
228D Posted Opposing Direction:		00'00"	
55A Lateral Underclearance Reference:		N- Feature not a highway or railroad.	
55B Lateral Underclearance on Right:		0	
56 Lateral Underclearance on Left:		0	
10A Direction of Travel for Max Min:		0	
10B Max Min Vertical Clearance:		99'99"	
245A Deck Thickness Main:		0.0	
245B Deck Thickness Approach:		0	
246 Overlay Thickness:		0	

Ratings and Posting

65 Inventory Rating Method:	0-Field Eval and Documented Eng Judgement
63 Operating Rating Method:	0-Field Eval and Documented Eng Judgement
66A Inventory Type:	2 - HS loading.
66B Inventory Rating:	110
64A Operating Type:	2 - HS loading.
64B Operating Rating:	110

231Calculated Loads		**Posting Required**
231A H-Modified:	35	No
231B Type3/Tandem:	55	No
231C Timber:	61	No
231D HS-Modified:	50	No
231E Type 3S2:	66	No
231F Piggyback:	66	No

261 H Inventory Rating:	99
262 H Operating Rating:	99
67 Structural Evaluation:	7
58 Deck Condition:	N - Not Applicable
59 Superstructure Condition:	N - Not Applicable
* 227 Collision Damage:	
60A Substructure Condition:	N - Not Applicable
60B Scour Condition:	6 - Satisfactory Condition
60C Underwater Condition:	N - Not Applicable
71 Waterway Adequacy:	9-Superior to present desirable criteria.
61 Channel Protection Cond.:	7-Better than present minimum criteria.
68 Deck Geometry:	N
69 UnderClr. Horz/Vert:	N
72 Approach Alignment:	8-No reduction of vehicle operating speed required.
62 Culvert:	7 - Good Condition
70 Bridge Posting Required:	5. Equal to or above legal loads
41 Struct Open, Posted, CL:	A. Open, no restriction
* 103 Temporary Structure:	No

232 Posted Loads	
232A H-Modified:	00
232B Type3/Tandem:	00
232C Timber:	00
232D HS-Modified:	00
232E Type 3s2:	00
232F Piggyback:	00
253 Notification Date:	Feb-01-1901
258 Federal Notify Date:	Feb-01-1901

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:37:47 AM

Parameters: Bridge Serial Number

Bridge Serial Number: 015-0134-0 **County: Bartow** **SUFF. RATING: 70.0**

Location & Geography

Structure ID:	015-0134-0		
200 Bridge Information:	07		
*6 Feature Intersected:	CARTER CREEK		
*7A Route Number Carried:	SR00020		
*7B Facility Carried:	SR 20		
9 Location:	5 MI S OF WHITE		
2 GDOT District:	4841600000 - D6 District Six Cartersville		
*91 Inspection Frequency:	24	Date:	Jul-16-2018
92A Fracture Critical Insp. Freq:	0	Date:	Feb-01-1901
92B Underwater Insp Freq:	0	Date:	Feb-01-1901
92C Other Spc. Insp Freq:	0	Date:	Feb-01-1901
* 4 Place Code:	00000		
*5A Inventory Route(O/U):	1		
5B Route Type:	3 - State		
5C Service Designation:	1- Mainline		
5D Route Number:	00020		
5E Directional Suffix:	0. Not applicable		
*16 Latitude:	34 - 13.2132		
*17 Longtitude:	84 - 43.3170		
98A Border Bridge:	0	98B: GA%	00
99 ID Number:	000000000000000		
*100 STRAHNET:	0- The Feature is not a STRAHNET route.		
12 Base Highway Network:	Yes		
13A LRS Inventory Route:	151002000		
13B Sub Inventory Route:	0		
101 Parallel Structure:	N. No parallel structure exists		
*102 Direction of Traffic:	2- Two Way		
*264 Road Inventory Mile Post:	19.96		
*208 Inspection Area:	Area 06		
*104 Highway System:	1-Inventory Route is on the NHS		
*26 Functional Classification:	2- Rural - Principal Arterial - Other		
*204A Federal Route Type:	F - Primary.		
*204B Federal Route Number:	00121		
105 Federal Lands Highway:	0. Not applicable		
*110 Truck Route:	0- The Feature is not part of the National Network for Trucks		
217 Benchmark Elevation:	0000.00		
* Location ID No:	015-00020D-019.96E		

218 Datum:	0- Not Applicable
*19 Bypass Length:	19
*20 Toll:	3- On a Free Road or Non-Highway
*21 Maintenance Responsibility:	01-State Highway Agency.
*22 Owner:	01-State Highway Agency.
*31 Design Load:	2- H 15
37 Historical Significance:	5- Not eligible for the National Register of Historic Places
205 Congressional District:	011
27 Year Constructed:	1954
106 Year Reconstructed:	2004
33 Bridge Median:	0-None
34 Skew:	29
35 Structure Flared:	No
38 Navigation Control:	0- Navigation is not controlled by an Agency
213 Special Steel Design:	0- Not applicable or other
267A Type Paint Super Structure:	0- Not Applicable. Year : 0000
267B Type Paint Sub Structure:	0- Not Applicable Year : 0000
*42A Type of Service On:	1-Highway
*42B Type of Service Under:	5-Waterway
214A Movable Bridge:	0
214B Operator on Duty:	0
203 Type Bridge:	Q - Reinforced Concrete Bridge Culvert
259 Pile Encasement:	3
*43A Structure Type Main material:	1-Concrete
*43B Structure Type Main Type:	19- Culvert
45 Number of Main Spans:	2
44 Structure Type Approach:	A:0- Other B: 0- Other
46 Number of Approach Spans:	0
226 Bridge Curve:	A: Vertical: NoB: Horizontal: No
111 Pier Protection:	N - Navigation Control item coded 0, or Feature not a waterway
107 Deck Structure Type:	N - None
108A Wearing Surface Type:	N. Not applicable
108B Membrane Type:	N. Not applicable
108C Deck Protection:	N. Not applicable
265 Underwater Inspection Area:	0

Signs & Attachments

225 Expansion Joint Type:	00- No expansion joint.
242 Deck Drains:	0- None.
243A Parapet Location:	0- None present.
243B Parapet Height:	0.00
243C Parapet Width:	0.00
238A Curb Height:	0.0
238B Curb Material:	0- None.
239A Handrail Left:	0- None.
239B Handrail Right:	0- None.
*240 Median Barrier Rail:	0- None.
241A Bridge Median Height:	0
241B Bridge Median Width:	0
*230A Guardrail Location Direction Rear:	6- Both sides, approach and continuous.
*230B Guardrail Location Direction Fwrd:	6- Both sides, approach and continuous.
*230C Guardrail Location Opposing Rear:	0- None.
*230D Guardrail Location Opposing Fwrd:	0- None.
244 Approach Slab:	0- None.
224 Retaining Wall:	0- None.
233 Posted Speed Limit:	55
236 Warning Sign:	No
234 Delineator:	Yes
235 Hazard Boards:	No
237A Gas:	00- Not Applicable
237B Water:	00- Not Applicable
237C Electric:	00- Not Applicable
237D Telephone:	00- Not Applicable
237E Sewer:	00- Not Applicable
247A Lighting: Street:	No
247B Navigation:	No
247C Aerial:	No
*248 County Continuity No.:	00
36A Bridge Railings:	1- Meets current standards
36B Transition:	1- Meets current standards
36C Approach Guardrail:	1- Meets current standards
36D Approach Guardrail Ends:	1- Meets current standards

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:37:47 AM

Bridge Serial Number: 015-0134-0 | **County: Bartow** | **SUFF. RATING: 70.0**

Programming Data

201 Project Number:	S-1019 (1)
202 Plans Available:	1- Plans at General Office.
249 Proposed Project Number:	00000000000000000000000000
250A Reconstruction Approval Status:	No
250B Route Approval Status:	No
250C Approval Status Definition:	0
250D Approval Status Federal:	0
251Project Identification Number:	0000000
252 Contract Date:	Feb-01-1901
260 Seismic Number:	00000
75A Type Work Proposed:	0- Not Applicable
75B Work Done by:	0- Initial Inventory
94 Bridge Improvement Cost:(X$1,000)	$109
95 Roadway Improvement Cost: (X$1,000)	$11
96 Total Improvement Cost: (X$1,000)	$164
76 Improvement Length:	0'
97 Year Improvement Cost Based On:	2013
114 Future AADT:	19890
115 Future AADT Year:	2031

Hydraulic Data

113 Scour Critical:	8. Foundation stable for conditions; scour above footing
216A Water Depth:	4.3
216B Bridge Height:	3.7
222 Slope Protection:	0
221A Spur Dike Rear:	
221B Spur Dike Fwd:	
219 Fender System:	0- None.
220 Dolphin:	
223A Culvert Cover:	8
223B Culvert Type:	1- Concrete.
223C Number of Barrels:	2
223D Barrel Width:	9
223E Barrel Height:	8
223F Culvert Length:	100
223G Culvert Apron:	0
39 Navigation Vertical Clearance:	0'
40 Navigation Horizontal Clearance:	0
116 Navigation Vertical Clear Closed:	0

Measurements:

*29 AADT:		13260	
*30 AADT Year:		2011	
109 % Truck Traffic:		1	
* 28A Lanes On:		3	
*28B Lanes Under:		0	
210A Tracks On:		00	
210B Tracks Under:		0	
* 48 Maximum Span Length:		10	
* 49 Structure Length:		22	
51 Bridge Roadway Width:		0'	
52 Deck Width:		0'	
* 47 Total Horizontal Clearance:		59'	
50A Curb / Sidewalk Width Left:		0	
50B Curb / Sidewalk Width Right:		0	
32 Approach Rdwy. Width:		55'	
***229 Approach Roadway**			
Rear Shoulder Left: Width:	5	*Right Width:*4	Type: 2 - Asphalt.
Fwd Shoulder: Left Width:	5	*Right Width:*4	Type: 2 - Asphalt.
Rear Pavement: Width:	46	*Type:*2- Asphalt.	
Forward Pavement: Width:	46	*Type:*2- Asphalt.	
Intersection Rear:	0	*Forward:*1	
53 Minimum Vertical Clearance Over Rd:		99' 99"	
54A Under Reference Feature:		N- Feature not a highway or railroad.	
54B Minimum Clearance Under:		0' 0"	
***228 Minimum Vertical Clearance**			
228A Actual Odometer Direction:		99'99"	
228B Actual Opposing Direction:		99'99"	
228C Posted Odometer Direction:		00'00"	
228D Posted Opposing Direction:		00'00"	
55A Lateral Underclearance Reference:		N- Feature not a highway or railroad.	
55B Lateral Underclearance on Right:		0	
56 Lateral Underclearance on Left:		0	
10A Direction of Travel for Max Min:		0	
10B Max Min Vertical Clearance:		99'99"	
245A Deck Thickness Main:		0.0	
245B Deck Thickness Approach:		0	
246 Overlay Thickness:		0	

Ratings and Posting

65 Inventory Rating Method:	0-Field Eval and Documented Eng Judgement
63 Operating Rating Method:	0-Field Eval and Documented Eng Judgement
66A Inventory Type:	2 - HS loading.
66B Inventory Rating:	110
64A Operating Type:	2 - HS loading.
64B Operating Rating:	110

231Calculated Loads		**Posting Required**
231A H-Modified:	35	No
231B Type3/Tandem:	55	No
231C Timber:	61	No
231D HS-Modified:	50	No
231E Type 3S2:	66	No
231F Piggyback:	66	No

261 H Inventory Rating:	99
262 H Operating Rating:	99
67 Structural Evaluation:	7
58 Deck Condition:	N - Not Applicable
59 Superstructure Condition:	N - Not Applicable
* 227 Collision Damage:	
60A Substructure Condition:	N - Not Applicable
60B Scour Condition:	8 - Very Good Condition
60C Underwater Condition:	N - Not Applicable
71 Waterway Adequacy:	9-Superior to present desirable criteria.
61 Channel Protection Cond.:	8-Equal to present desirable criteria.
68 Deck Geometry:	N
69 UnderClr. Horz/Vert:	N
72 Approach Alignment:	8-No reduction of vehicle operating speed required.
62 Culvert:	7 - Good Condition
70 Bridge Posting Required:	5. Equal to or above legal loads
41 Struct Open, Posted, CL:	A. Open, no restriction
* 103 Temporary Structure:	No

232 Posted Loads	
232A H-Modified:	00
232B Type3/Tandem:	00
232C Timber:	00
232D HS-Modified:	00
232E Type 3s2:	00
232F Piggyback:	00
253 Notification Date:	Feb-01-1901
258 Federal Notify Date:	Feb-01-1901

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:50:21 AM

Parameters: Bridge Serial Number

Bridge Serial Number: 015-5125-0 **County: Bartow** **SUFF. RATING: 81.8**

Location & Geography

Structure ID:	015-5125-0		
200 Bridge Information:	02		
*6 Feature Intersected:	STAMP CREEK		
*7A Route Number Carried:	SR00020		
*7B Facility Carried:	SR 20		
9 Location:	5.8 MI SE OF WHITE		
2 GDOT District:	4841600000 - D6 District Six Cartersville		
*91 Inspection Frequency:	24	Date:	Jul-18-2018
92A Fracture Critical Insp. Freq:	0	Date:	Feb-01-1901
92B Underwater Insp Freq:	0	Date:	Feb-01-1901
92C Other Spc. Insp Freq:	0	Date:	Feb-01-1901
* 4 Place Code:	00000		
*5A Inventory Route(O/U):	1		
5B Route Type:	3 - State		
5C Service Designation:	1- Mainline		
5D Route Number:	00020		
5E Directional Suffix:	0. Not applicable		
*16 Latitude:	34 - 12.9780		
*17 Longtitude:	84 - 41.1642		
98A Border Bridge:	0	98B: GA%	00
99 ID Number:	000000000000000		
*100 STRAHNET:	0- The Feature is not a STRAHNET route.		
12 Base Highway Network:	Yes		
13A LRS Inventory Route:	151002000		
13B Sub Inventory Route:	0		
101 Parallel Structure:	N. No parallel structure exists		
*102 Direction of Traffic:	2- Two Way		
*264 Road Inventory Mile Post:	22.13		
*208 Inspection Area:	Area 06		
*104 Highway System:	1-Inventory Route is on the NHS		
*26 Functional Classification:	2- Rural - Principal Arterial - Other		
*204A Federal Route Type:	F - Primary.		
*204B Federal Route Number:	00121		
105 Federal Lands Highway:	0. Not applicable		
*110 Truck Route:	0- The Feature is not part of the National Network for Trucks		
217 Benchmark Elevation:	0000.00		
* Location ID No:	015-00020D-022.13E		

218 Datum:	0- Not Applicable
*19 Bypass Length:	19
*20 Toll:	3- On a Free Road or Non-Highway
*21 Maintenance Responsibility:	01-State Highway Agency.
*22 Owner:	01-State Highway Agency.
*31 Design Load:	6- HS 20 + Mod (2-24,000# Axles @ 4ft Ctrs., when they govern)
37 Historical Significance:	5- Not eligible for the National Register of Historic Places
205 Congressional District:	011
27 Year Constructed:	2007
106 Year Reconstructed:	0
33 Bridge Median:	0-None
34 Skew:	0
35 Structure Flared:	No
38 Navigation Control:	0- Navigation is not controlled by an Agency
213 Special Steel Design:	0- Not applicable or other
267A Type Paint Super Structure:	0- Not Applicable. Year : 0000
267B Type Paint Sub Structure:	0- Not Applicable Year : 0000
*42A Type of Service On:	1-Highway
*42B Type of Service Under:	5-Waterway
214A Movable Bridge:	0
214B Operator on Duty:	0
203 Type Bridge:	J - Concrete wall or footings on steel piles. O. Concrete O. Concrete O. Concrete
259 Pile Encasement:	3
*43A Structure Type Main material:	5-Prestressed Concrete
*43B Structure Type Main Type:	2-Stringer/Multi-Beam or Girder
45 Number of Main Spans:	3
44 Structure Type Approach:	A:0- Other B: 0- Other
46 Number of Approach Spans:	0
226 Bridge Curve:	A: Vertical: NoB: Horizontal: No
111 Pier Protection:	N - Navigation Control item coded 0, or Feature not a waterway
107 Deck Structure Type:	1 - C-I-P Portland Cement Concrete - Epoxy Coated Rebars
108A Wearing Surface Type:	1. Concrete
108B Membrane Type:	8. Unknown
108C Deck Protection:	8. Unknown
265 Underwater Inspection Area:	0

Signs & Attachments

225 Expansion Joint Type:	15- Evazote Joint.
242 Deck Drains:	0- None.
243A Parapet Location:	0- None present.
243B Parapet Height:	0.00
243C Parapet Width:	0.00
238A Curb Height:	0.0
238B Curb Material:	0- None.
239A Handrail Left:	9- Concrete New Jersey Type Barrier.
239B Handrail Right:	9- Concrete New Jersey Type Barrier.
*240 Median Barrier Rail:	0- None.
241A Bridge Median Height:	0
241B Bridge Median Width:	0
*230A Guardrail Location Direction Rear:	6- Both sides, approach and continuous.
*230B Guardrail Location Direction Fwrd:	6- Both sides, approach and continuous.
*230C Guardrail Location Opposing Rear:	0- None.
*230D Guardrail Location Opposing Fwrd:	0- None.
244 Approach Slab:	3- Forward and Rear.
224 Retaining Wall:	0- None.
233 Posted Speed Limit:	55
236 Warning Sign:	No
234 Delineator:	Yes
235 Hazard Boards:	No
237A Gas:	00- Not Applicable
237B Water:	00- Not Applicable
237C Electric:	00- Not Applicable
237D Telephone:	00- Not Applicable
237E Sewer:	00- Not Applicable
247A Lighting: Street:	No
247B Navigation:	No
247C Aerial:	No
*248 County Continuity No.:	00
36A Bridge Railings:	1- Meets current standards
36B Transition:	1- Meets current standards
36C Approach Guardrail:	1- Meets current standards
36D Approach Guardrail Ends:	1- Meets current standards

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:50:21 AM

Bridge Serial Number: 015-5125-0 **County: Bartow** **SUFF. RATING: 81.8**

Programming Data

201 Project Number:	BHF-012-1 (97)
202 Plans Available:	3- Plans at both locations.
249 Proposed Project Number:	00000000000000000000000000
250A Reconstruction Approval Status:	No
250B Route Approval Status:	No
250C Approval Status Definition:	0
250D Approval Status Federal:	0
251Project Identification Number:	0000000
252 Contract Date:	Feb-01-1901
260 Seismic Number:	00008
75A Type Work Proposed:	0- Not Applicable
75B Work Done by:	0- Initial Inventory
94 Bridge Improvement Cost:(X$1,000)	$848
95 Roadway Improvement Cost: (X$1,000)	$85
96 Total Improvement Cost: (X$1,000)	$1272
76 Improvement Length:	0'
97 Year Improvement Cost Based On:	2013
114 Future AADT:	14280
115 Future AADT Year:	2031

Hydraulic Data

113 Scour Critical:	8. Foundation stable for conditions; scour above footing
216A Water Depth:	1.1
216B Bridge Height:	41.4
222 Slope Protection:	1
221A Spur Dike Rear:	
221B Spur Dike Fwd:	
219 Fender System:	0- None.
220 Dolphin:	
223A Culvert Cover:	000
223B Culvert Type:	0- Not Applicable
223C Number of Barrels:	0
223D Barrel Width:	0
223E Barrel Height:	0
223F Culvert Length:	0
223G Culvert Apron:	0
39 Navigation Vertical Clearance:	0'
40 Navigation Horizontal Clearance:	0
116 Navigation Vertical Clear Closed:	0

Measurements:

*29 AADT:		9520	
*30 AADT Year:		2011	
109 % Truck Traffic:		1	
* 28A Lanes On:		2	
*28B Lanes Under:		0	
210A Tracks On:		00	
210B Tracks Under:		0	
* 48 Maximum Span Length:		99	
* 49 Structure Length:		217	
51 Bridge Roadway Width:		43.3'	
52 Deck Width:		46.9'	
* 47 Total Horizontal Clearance:		43.3'	
50A Curb / Sidewalk Width Left:		0	
50B Curb / Sidewalk Width Right:		0	
32 Approach Rdwy. Width:		28'	
***229 Approach Roadway**			
Rear Shoulder Left: Width:	2	*Right Width:*10	Type: 2 - Asphalt.
Fwd Shoulder: Left Width:	2	*Right Width:*2	Type: 2 - Asphalt.
Rear Pavement: Width:	24	*Type:*2- Asphalt.	
Forward Pavement: Width:	24	*Type:*2- Asphalt.	
Intersection Rear:	0	*Forward:*0	
53 Minimum Vertical Clearance Over Rd:		99' 99"	
54A Under Reference Feature:		N- Feature not a highway or railroad.	
54B Minimum Clearance Under:		0' 0"	
***228 Minimum Vertical Clearance**			
228A Actual Odometer Direction:		99'99"	
228B Actual Opposing Direction:		99'99"	
228C Posted Odometer Direction:		00'00"	
228D Posted Opposing Direction:		00'00"	
55A Lateral Underclearance Reference:		N- Feature not a highway or railroad.	
55B Lateral Underclearance on Right:		0	
56 Lateral Underclearance on Left:		0	
10A Direction of Travel for Max Min:		0	
10B Max Min Vertical Clearance:		99'99"	
245A Deck Thickness Main:		8.2	
245B Deck Thickness Approach:		0	
246 Overlay Thickness:		0	

Ratings and Posting

65 Inventory Rating Method:	1-Load Factor (LF)
63 Operating Rating Method:	1-Load Factor (LF)
66A Inventory Type:	2 - HS loading.
66B Inventory Rating:	31
64A Operating Type:	2 - HS loading.
64B Operating Rating:	52

231Calculated Loads		**Posting Required**
231A H-Modified:	21	No
231B Type3/Tandem:	31	No
231C Timber:	36	No
231D HS-Modified:	30	No
231E Type 3S2:	40	No
231F Piggyback:	40	No

261 H Inventory Rating:	22
262 H Operating Rating:	55
67 Structural Evaluation:	7
58 Deck Condition:	7 - Good Condition
59 Superstructure Condition:	8 - Very Good Condition
* 227 Collision Damage:	
60A Substructure Condition:	7 - Good Condition
60B Scour Condition:	8 - Very Good Condition
60C Underwater Condition:	N - Not Applicable
71 Waterway Adequacy:	9-Superior to present desirable criteria.
61 Channel Protection Cond.:	7-Better than present minimum criteria.
68 Deck Geometry:	5
69 UnderClr. Horz/Vert:	N
72 Approach Alignment:	8-No reduction of vehicle operating speed required.
62 Culvert:	N - Not Applicable
70 Bridge Posting Required:	5. Equal to or above legal loads
41 Struct Open, Posted, CL:	A. Open, no restriction
* 103 Temporary Structure:	No

232 Posted Loads	
232A H-Modified:	00
232B Type3/Tandem:	00
232C Timber:	00
232D HS-Modified:	00
232E Type 3s2:	00
232F Piggyback:	00
253 Notification Date:	Feb-01-1901
258 Federal Notify Date:	Feb-01-1901

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:51:17 AM

Parameters: Bridge Serial Number

Bridge Serial Number: 015-5126-0 **County: Bartow** **SUFF. RATING: 85.4**

Location & Geography

Structure ID:	015-5126-0		
200 Bridge Information:	02		
*6 Feature Intersected:	BOSTON CREEK		
*7A Route Number Carried:	SR00020		
*7B Facility Carried:	SR 20		
9 Location:	6.2 MI SE OF WHITE		
2 GDOT District:	4841600000 - D6 District Six Cartersville		
*91 Inspection Frequency:	24	Date:	Jul-18-2018
92A Fracture Critical Insp. Freq:	0	Date:	Feb-01-1901
92B Underwater Insp Freq:	0	Date:	Feb-01-1901
92C Other Spc. Insp Freq:	0	Date:	Feb-01-1901
* 4 Place Code:	00000		
*5A Inventory Route(O/U):	1		
5B Route Type:	3 - State		
5C Service Designation:	1- Mainline		
5D Route Number:	00020		
5E Directional Suffix:	0. Not applicable		
*16 Latitude:	34 - 12.9348		
*17 Longtitude:	84 - 40.6500		
98A Border Bridge:	0	98B: GA%	00
99 ID Number:	000000000000000		
*100 STRAHNET:	0- The Feature is not a STRAHNET route.		
12 Base Highway Network:	Yes		
13A LRS Inventory Route:	151002000		
13B Sub Inventory Route:	0		
101 Parallel Structure:	N. No parallel structure exists		
*102 Direction of Traffic:	2- Two Way		
*264 Road Inventory Mile Post:	22.62		
*208 Inspection Area:	Area 06		
*104 Highway System:	1-Inventory Route is on the NHS		
*26 Functional Classification:	2- Rural - Principal Arterial - Other		
*204A Federal Route Type:	F - Primary.		
*204B Federal Route Number:	00121		
105 Federal Lands Highway:	0. Not applicable		
*110 Truck Route:	0- The Feature is not part of the National Network for Trucks		
217 Benchmark Elevation:	0000.00		
* Location ID No:	015-00020D-022.62E		

218 Datum:	0- Not Applicable
*19 Bypass Length:	19
*20 Toll:	3- On a Free Road or Non-Highway
*21 Maintenance Responsibility:	01-State Highway Agency.
*22 Owner:	01-State Highway Agency.
*31 Design Load:	6- HS 20 + Mod (2-24,000# Axles @ 4ft Ctrs., when they govern)
37 Historical Significance:	5- Not eligible for the National Register of Historic Places
205 Congressional District:	011
27 Year Constructed:	2007
106 Year Reconstructed:	0
33 Bridge Median:	0-None
34 Skew:	30
35 Structure Flared:	No
38 Navigation Control:	0- Navigation is not controlled by an Agency
213 Special Steel Design:	0- Not applicable or other
267A Type Paint Super Structure:	0- Not Applicable. Year : 0000
267B Type Paint Sub Structure:	0- Not Applicable Year : 0000
*42A Type of Service On:	1-Highway
*42B Type of Service Under:	5-Waterway
214A Movable Bridge:	0
214B Operator on Duty:	0
203 Type Bridge:	O - Multiple combinations (be sure the different types are on file). O. Concrete O. Concrete O. Concrete
259 Pile Encasement:	3
*43A Structure Type Main material:	5-Prestressed Concrete
*43B Structure Type Main Type:	2-Stringer/Multi-Beam or Girder
45 Number of Main Spans:	4
44 Structure Type Approach:	A:0- Other B: 0- Other
46 Number of Approach Spans:	0
226 Bridge Curve:	A: Vertical: YesB: Horizontal: No
111 Pier Protection:	N - Navigation Control item coded 0, or Feature not a waterway
107 Deck Structure Type:	1 - C-I-P Portland Cement Concrete - Epoxy Coated Rebars
108A Wearing Surface Type:	1. Concrete
108B Membrane Type:	8. Unknown
108C Deck Protection:	8. Unknown
265 Underwater Inspection Area:	0

Signs & Attachments

225 Expansion Joint Type:	15- Evazote Joint.
242 Deck Drains:	0- None.
243A Parapet Location:	0- None present.
243B Parapet Height:	0.00
243C Parapet Width:	0.00
238A Curb Height:	0.0
238B Curb Material:	0- None.
239A Handrail Left:	9- Concrete New Jersey Type Barrier.
239B Handrail Right:	9- Concrete New Jersey Type Barrier.
*240 Median Barrier Rail:	0- None.
241A Bridge Median Height:	0
241B Bridge Median Width:	0
*230A Guardrail Location Direction Rear:	6- Both sides, approach and continuous.
*230B Guardrail Location Direction Fwrd:	6- Both sides, approach and continuous.
*230C Guardrail Location Opposing Rear:	0- None.
*230D Guardrail Location Opposing Fwrd:	0- None.
244 Approach Slab:	3- Forward and Rear.
224 Retaining Wall:	0- None.
233 Posted Speed Limit:	55
236 Warning Sign:	No
234 Delineator:	Yes
235 Hazard Boards:	No
237A Gas:	00- Not Applicable
237B Water:	00- Not Applicable
237C Electric:	00- Not Applicable
237D Telephone:	00- Not Applicable
237E Sewer:	00- Not Applicable
247A Lighting: Street:	No
247B Navigation:	No
247C Aerial:	No
*248 County Continuity No.:	00
36A Bridge Railings:	1- Meets current standards
36B Transition:	1- Meets current standards
36C Approach Guardrail:	1- Meets current standards
36D Approach Guardrail Ends:	1- Meets current standards

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:51:17 AM

Bridge Serial Number: 015-5126-0 | **County: Bartow** | **SUFF. RATING: 85.4**

Programming Data

201 Project Number:	BHF-012-1 (98)
202 Plans Available:	3- Plans at both locations.
249 Proposed Project Number:	0000000000000000000000000
250A Reconstruction Approval Status:	No
250B Route Approval Status:	No
250C Approval Status Definition:	0
250D Approval Status Federal:	0
251Project Identification Number:	0000000
252 Contract Date:	Feb-01-1901
260 Seismic Number:	00008
75A Type Work Proposed:	0- Not Applicable
75B Work Done by:	0- Initial Inventory
94 Bridge Improvement Cost:(X$1,000)	$1,004
95 Roadway Improvement Cost: (X$1,000)	$100
96 Total Improvement Cost: (X$1,000)	$1506
76 Improvement Length:	0'
97 Year Improvement Cost Based On:	2013
114 Future AADT:	14280
115 Future AADT Year:	2031

Measurements:

*29 AADT:	9520		
*30 AADT Year:	2011		
109 % Truck Traffic:	1		
* 28A Lanes On:	2		
*28B Lanes Under:	0		
210A Tracks On:	00		
210B Tracks Under:	0		
* 48 Maximum Span Length:	72		
* 49 Structure Length:	257		
51 Bridge Roadway Width:	43.3'		
52 Deck Width:	46.9'		
* 47 Total Horizontal Clearance:	43.3'		
50A Curb / Sidewalk Width Left:	0		
50B Curb / Sidewalk Width Right:	0		
32 Approach Rdwy. Width:	28'		
***229 Approach Roadway**			
Rear Shoulder Left: Width:	2	*Right Width:*2	Type: 2 - Asphalt.
Fwd Shoulder: Left Width:	2	*Right Width:*2	Type: 2 - Asphalt.
Rear Pavement: Width:	24	*Type:*2- Asphalt.	
Forward Pavement: Width:	24	*Type:*2- Asphalt.	
Intersection Rear:	0	*Forward:*0	
53 Minimum Vertical Clearance Over Rd:	99' 99"		
54A Under Reference Feature:	N- Feature not a highway or railroad.		
54B Minimum Clearance Under:	0' 0"		
***228 Minimum Vertical Clearance**			
228A Actual Odometer Direction:	99'99"		
228B Actual Opposing Direction:	99'99"		
228C Posted Odometer Direction:	00'00"		
228D Posted Opposing Direction:	00'00"		
55A Lateral Underclearance Reference:	N- Feature not a highway or railroad.		
55B Lateral Underclearance on Right:	0		
56 Lateral Underclearance on Left:	0		
10A Direction of Travel for Max Min:	0		
10B Max Min Vertical Clearance:	99'99"		
245A Deck Thickness Main:	8.0		
245B Deck Thickness Approach:	0		
246 Overlay Thickness:	0		

Ratings and Posting

65 Inventory Rating Method:	1-Load Factor (LF)
63 Operating Rating Method:	1-Load Factor (LF)
66A Inventory Type:	2 - HS loading.
66B Inventory Rating:	36
64A Operating Type:	2 - HS loading.
64B Operating Rating:	74

231Calculated Loads		**Posting Required**
231A H-Modified:	21	No
231B Type3/Tandem:	33	No
231C Timber:	37	No
231D HS-Modified:	30	No
231E Type 3S2:	40	No
231F Piggyback:	40	No

261 H Inventory Rating:	28
262 H Operating Rating:	60
67 Structural Evaluation:	7
58 Deck Condition:	7 - Good Condition
59 Superstructure Condition:	8 - Very Good Condition
* 227 Collision Damage:	
60A Substructure Condition:	7 - Good Condition
60B Scour Condition:	8 - Very Good Condition
60C Underwater Condition:	N - Not Applicable
71 Waterway Adequacy:	9-Superior to present desirable criteria.
61 Channel Protection Cond.:	8-Equal to present desirable criteria.
68 Deck Geometry:	5
69 UnderClr. Horz/Vert:	N
72 Approach Alignment:	8-No reduction of vehicle operating speed required.
62 Culvert:	N - Not Applicable
70 Bridge Posting Required:	5. Equal to or above legal loads
41 Struct Open, Posted, CL:	A. Open, no restriction
* 103 Temporary Structure:	No

232 Posted Loads	
232A H-Modified:	00
232B Type3/Tandem:	00
232C Timber:	00
232D HS-Modified:	00
232E Type 3s2:	00
232F Piggyback:	00
253 Notification Date:	Feb-01-1901
258 Federal Notify Date:	Feb-01-1901

Hydraulic Data

113 Scour Critical:	8. Foundation stable for conditions; scour above footing
216A Water Depth:	1.0
216B Bridge Height:	39.5
222 Slope Protection:	1
221A Spur Dike Rear:	
221B Spur Dike Fwd:	
219 Fender System:	0- None.
220 Dolphin:	
223A Culvert Cover:	000
223B Culvert Type:	0- Not Applicable
223C Number of Barrels:	0
223D Barrel Width:	0
223E Barrel Height:	0
223F Culvert Length:	0
223G Culvert Apron:	0
39 Navigation Vertical Clearance:	0'
40 Navigation Horizontal Clearance:	0
116 Navigation Vertical Clear Closed:	0

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:53:39 AM

Parameters: Bridge Serial Number

Bridge Serial Number: 057-0010-0 **County: Cherokee** **SUFF. RATING: 59.6**

Location & Geography

Structure ID:	057-0010-0		
200 Bridge Information:	07		
*6 Feature Intersected:	ETOWAH RIVER		
*7A Route Number Carried:	SR00020		
*7B Facility Carried:	SR 20		
9 Location:	4.5 MI WEST OF CANTON		
2 GDOT District:	4841600000 - D6 District Six Cartersville		
*91 Inspection Frequency:	24	Date:	Apr-02-2018
92A Fracture Critical Insp. Freq:	0	Date:	Feb-01-1901
92B Underwater Insp Freq:	60	Date:	Mar-03-2015
92C Other Spc. Insp Freq:	0	Date:	Feb-01-1901
* 4 Place Code:	00000		
*5A Inventory Route(O/U):	1		
5B Route Type:	3 - State		
5C Service Designation:	1- Mainline		
5D Route Number:	00020		
5E Directional Suffix:	0. Not applicable		
*16 Latitude:	34 - 12.9270		
*17 Longtitude:	84 - 33.8448		
98A Border Bridge:	0	98B: GA%	00
99 ID Number:	000000000000000		
*100 STRAHNET:	0- The Feature is not a STRAHNET route.		
12 Base Highway Network:	Yes		
13A LRS Inventory Route:	571002000		
13B Sub Inventory Route:	0		
101 Parallel Structure:	N. No parallel structure exists		
*102 Direction of Traffic:	2- Two Way		
*264 Road Inventory Mile Post:	5.89		
*208 Inspection Area:	Area 09		
*104 Highway System:	1-Inventory Route is on the NHS		
*26 Functional Classification:	2- Rural - Principal Arterial - Other		
*204A Federal Route Type:	F - Primary.		
*204B Federal Route Number:	00121		
105 Federal Lands Highway:	0. Not applicable		
*110 Truck Route:	0- The Feature is not part of the National Network for Trucks		
217 Benchmark Elevation:	0000.00		
* Location ID No:	057-00020D-005.91E		

218 Datum:	0- Not Applicable
*19 Bypass Length:	6
*20 Toll:	3- On a Free Road or Non-Highway
*21 Maintenance Responsibility:	01-State Highway Agency.
*22 Owner:	01-State Highway Agency.
*31 Design Load:	2- H 15
37 Historical Significance:	5- Not eligible for the National Register of Historic Places
205 Congressional District:	011
27 Year Constructed:	1950
106 Year Reconstructed:	0
33 Bridge Median:	0-None
34 Skew:	0
35 Structure Flared:	No
38 Navigation Control:	0- Navigation is not controlled by an Agency
213 Special Steel Design:	0- Not applicable or other
267A Type Paint Super Structure:	1- Lead Chromate Oil Alkyd System. Year : 1986
267B Type Paint Sub Structure:	0- Not Applicable Year : 0000
*42A Type of Service On:	1-Highway
*42B Type of Service Under:	5-Waterway
214A Movable Bridge:	0
214B Operator on Duty:	0
203 Type Bridge:	A- Spread footing. O. Concrete M. Steel O. Concrete
259 Pile Encasement:	3
*43A Structure Type Main material:	4-Steel (Continuous)
*43B Structure Type Main Type:	2-Stringer/Multi-Beam or Girder
45 Number of Main Spans:	4
44 Structure Type Approach:	A:0- Other B: 0- Other
46 Number of Approach Spans:	0
226 Bridge Curve:	A: Vertical: NoB: Horizontal: No
111 Pier Protection:	N - Navigation Control item coded 0, or Feature not a waterway
107 Deck Structure Type:	1 - C-I-P Portland Cement Concrete - Epoxy Coated Rebars
108A Wearing Surface Type:	1. Concrete
108B Membrane Type:	0. None
108C Deck Protection:	8. Unknown
265 Underwater Inspection Area:	1

Signs & Attachments

225 Expansion Joint Type:	04- Armored joint (spring tension).
242 Deck Drains:	1- Open Scuppers.
243A Parapet Location:	0- None present.
243B Parapet Height:	0.00
243C Parapet Width:	0.00
238A Curb Height:	1.1
238B Curb Material:	1- Concrete.
239A Handrail Left:	1- Concrete.
239B Handrail Right:	1- Concrete.
*240 Median Barrier Rail:	0- None.
241A Bridge Median Height:	0
241B Bridge Median Width:	0
*230A Guardrail Location Direction Rear:	3- Both sides.
*230B Guardrail Location Direction Fwrd:	3- Both sides.
*230C Guardrail Location Opposing Rear:	0- None.
*230D Guardrail Location Opposing Fwrd:	0- None.
244 Approach Slab:	3- Forward and Rear.
224 Retaining Wall:	0- None.
233 Posted Speed Limit:	55
236 Warning Sign:	No
234 Delineator:	Yes
235 Hazard Boards:	Yes
237A Gas:	22- Bottom Right.
237B Water:	31- Side Left.
237C Electric:	00- Not Applicable
237D Telephone:	00- Not Applicable
237E Sewer:	00- Not Applicable
247A Lighting: Street:	No
247B Navigation:	No
247C Aerial:	No
*248 County Continuity No.:	00
36A Bridge Railings:	2- Inspected feature meets acceptable construction date standards.
36B Transition:	2- Inspected feature meets acceptable construction date standards.
36C Approach Guardrail:	1- Meets current standards
36D Approach Guardrail Ends:	1- Meets current standards

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:53:39 AM

Bridge Serial Number: 057-0010-0 | **County: Cherokee** | **SUFF. RATING: 59.6**

Programming Data

201 Project Number:	CORP OF ENG 1607-B
202 Plans Available:	0- No Plans Available.
249 Proposed Project Number:	BRST-012-1 (111)
250A Reconstruction Approval Status:	No
250B Route Approval Status:	No
250C Approval Status Definition:	0
250D Approval Status Federal:	0
251Project Identification Number:	632900-
252 Contract Date:	Feb-01-2007
260 Seismic Number:	00028
75A Type Work Proposed:	34- Widening with deck rehabilitation or replacement
75B Work Done by:	1- Work to be done by contract
94 Bridge Improvement Cost:(X$1,000)	$1,414
95 Roadway Improvement Cost: (X$1,000)	$141
96 Total Improvement Cost: (X$1,000)	$2122
76 Improvement Length:	575'
97 Year Improvement Cost Based On:	2013
114 Future AADT:	17625
115 Future AADT Year:	2032

Hydraulic Data

113 Scour Critical:	U. No Load Rating; no scour critical data entered.
216A Water Depth:	16.1
216B Bridge Height:	31
222 Slope Protection:	1
221A Spur Dike Rear:	
221B Spur Dike Fwd:	
219 Fender System:	0- None.
220 Dolphin:	
223A Culvert Cover:	000
223B Culvert Type:	0- Not Applicable
223C Number of Barrels:	0
223D Barrel Width:	0
223E Barrel Height:	0
223F Culvert Length:	0
223G Culvert Apron:	0
39 Navigation Vertical Clearance:	0'
40 Navigation Horizontal Clearance:	0
116 Navigation Vertical Clear Closed:	0

Measurements:

*29 AADT:	11750
*30 AADT Year:	2012
109 % Truck Traffic:	1
* 28A Lanes On:	2
*28B Lanes Under:	0
210A Tracks On:	00
210B Tracks Under:	0
* 48 Maximum Span Length:	100
* 49 Structure Length:	362
51 Bridge Roadway Width:	23.8'
52 Deck Width:	29.6'
* 47 Total Horizontal Clearance:	23.8'
50A Curb / Sidewalk Width Left:	2.2
50B Curb / Sidewalk Width Right:	2.2
32 Approach Rdwy. Width:	27'

***229 Approach Roadway**

Rear Shoulder Left: Width:	1.5	*Right Width:*1.5	Type: 2 - Asphalt.
Fwd Shoulder: Left Width:	1.5	*Right Width:*1.5	Type: 2 - Asphalt.
Rear Pavement: Width:	24	*Type:*2- Asphalt.	
Forward Pavement: Width:	24	*Type:*2- Asphalt.	
Intersection Rear:	0	*Forward:*0	

53 Minimum Vertical Clearance Over Rd:	99' 99"
54A Under Reference Feature:	N- Feature not a highway or railroad.
54B Minimum Clearance Under:	0' 0"

***228 Minimum Vertical Clearance**

228A Actual Odometer Direction:	99'99"
228B Actual Opposing Direction:	99'99"
228C Posted Odometer Direction:	00'00"
228D Posted Opposing Direction:	00'00"
55A Lateral Underclearance Reference:	N- Feature not a highway or railroad.
55B Lateral Underclearance on Right:	0
56 Lateral Underclearance on Left:	0
10A Direction of Travel for Max Min:	0
10B Max Min Vertical Clearance:	99'99"
245A Deck Thickness Main:	7.0
245B Deck Thickness Approach:	0
246 Overlay Thickness:	0

Ratings and Posting

65 Inventory Rating Method:	2-Allowable Stress (AS)
63 Operating Rating Method:	2-Allowable Stress (AS)
66A Inventory Type:	2 - HS loading.
66B Inventory Rating:	24
64A Operating Type:	2 - HS loading.
64B Operating Rating:	38

231Calculated Loads		**Posting Required**
231A H-Modified:	20	No
231B Type3/Tandem:	26	No
231C Timber:	36	No
231D HS-Modified:	25	No
231E Type 3S2:	40	No
231F Piggyback:	40	No

261 H Inventory Rating:	15
262 H Operating Rating:	21
67 Structural Evaluation:	5
58 Deck Condition:	6 - Satisfactory Condition
59 Superstructure Condition:	6 - Satisfactory Condition
* 227 Collision Damage:	
60A Substructure Condition:	6 - Satisfactory Condition
60B Scour Condition:	7 - Good Condition
60C Underwater Condition:	6 - Satisfactory Condition
71 Waterway Adequacy:	8-Equal to present desirable criteria.
61 Channel Protection Cond.:	8-Equal to present desirable criteria.
68 Deck Geometry:	2
69 UnderClr. Horz/Vert:	N
72 Approach Alignment:	8-No reduction of vehicle operating speed required.
62 Culvert:	N - Not Applicable
70 Bridge Posting Required:	5. Equal to or above legal loads
41 Struct Open, Posted, CL:	A. Open, no restriction
* 103 Temporary Structure:	No

232 Posted Loads

232A H-Modified:	00
232B Type3/Tandem:	00
232C Timber:	00
232D HS-Modified:	00
232E Type 3s2:	00
232F Piggyback:	00
253 Notification Date:	Feb-01-1901
258 Federal Notify Date:	Feb-01-1901

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:54:43 AM

Parameters: Bridge Serial Number

Bridge Serial Number: 057-0071-0 **County: Cherokee** **SUFF. RATING: 97.6**

Location & Geography

Structure ID:	057-0071-0		
200 Bridge Information:	06		
*6 Feature Intersected:	SR 20		
*7A Route Number Carried:	CS00678		
*7B Facility Carried:	MARIETTA STREET		
9 Location:	IN SOUTH CANTON		
2 GDOT District:	4841600000 - D6 District Six Cartersville		
*91 Inspection Frequency:	24	Date:	Apr-26-2018
92A Fracture Critical Insp. Freq:	0	Date:	Feb-01-1901
92B Underwater Insp Freq:	0	Date:	Feb-01-1901
92C Other Spc. Insp Freq:	0	Date:	Feb-01-1901
* 4 Place Code:	12988		
*5A Inventory Route(O/U):	1		
5B Route Type:	4 - County		
5C Service Designation:	1- Mainline		
5D Route Number:	01375		
5E Directional Suffix:	0. Not applicable		
*16 Latitude:	34 - 13.2534		
*17 Longtitude:	84 - 29.7786		
98A Border Bridge:	0	98B: GA%	00
99 ID Number:	000000000000000		
*100 STRAHNET:	0- The Feature is not a STRAHNET route.		
12 Base Highway Network:	Yes		
13A LRS Inventory Route:	573067803		
13B Sub Inventory Route:	0		
101 Parallel Structure:	N. No parallel structure exists		
*102 Direction of Traffic:	2- Two Way		
*264 Road Inventory Mile Post:	0.55		
*208 Inspection Area:	Area 09		
*104 Highway System:	1-Inventory Route is on the NHS		
*26 Functional Classification:	16- Urban - Minor Arterial		
*204A Federal Route Type:	S - Secondary.		
*204B Federal Route Number:	01375		
105 Federal Lands Highway:	0. Not applicable		
*110 Truck Route:	0- The Feature is not part of the National Network for Trucks		
217 Benchmark Elevation:	0000.00		
* Location ID No:	057-01375F-014.20N		

218 Datum:	0- Not Applicable
*19 Bypass Length:	4
*20 Toll:	3- On a Free Road or Non-Highway
*21 Maintenance Responsibility:	01-State Highway Agency.
*22 Owner:	01-State Highway Agency.
*31 Design Load:	6- HS 20 + Mod (2-24,000# Axles @ 4ft Ctrs., when they govern)
37 Historical Significance:	5- Not eligible for the National Register of Historic Places
205 Congressional District:	011
27 Year Constructed:	1978
106 Year Reconstructed:	0
33 Bridge Median:	0-None
34 Skew:	32
35 Structure Flared:	No
38 Navigation Control:	N- Bridge is not over water
213 Special Steel Design:	0- Not applicable or other
267A Type Paint Super Structure:	5- Waterborne System (Type VI or VII) Year : 1999
267B Type Paint Sub Structure:	0- Not Applicable Year : 0000
*42A Type of Service On:	5-Highway-Pedestrian
*42B Type of Service Under:	1-Highway (with or without pedestrians)
214A Movable Bridge:	0
214B Operator on Duty:	0
203 Type Bridge:	O - Multiple combinations (be sure the different types are on file). O. Concrete M. Steel O. Concrete
259 Pile Encasement:	3
*43A Structure Type Main material:	4-Steel (Continuous)
*43B Structure Type Main Type:	2-Stringer/Multi-Beam or Girder
45 Number of Main Spans:	4
44 Structure Type Approach:	A:0- Other B: 0- Other
46 Number of Approach Spans:	0
226 Bridge Curve:	A: Vertical: NoB: Horizontal: No
111 Pier Protection:	N - Navigation Control item coded 0, or Feature not a waterway
107 Deck Structure Type:	1 - C-I-P Portland Cement Concrete - Epoxy Coated Rebars
108A Wearing Surface Type:	1. Concrete
108B Membrane Type:	0. None
108C Deck Protection:	8. Unknown
265 Underwater Inspection Area:	0

Signs & Attachments

225 Expansion Joint Type:	01- Armored joint (sliding plates).
242 Deck Drains:	0- None.
243A Parapet Location:	3- Both sides.
243B Parapet Height:	2.90
243C Parapet Width:	1.10
238A Curb Height:	0.5
238B Curb Material:	1- Concrete.
239A Handrail Left:	7- Aluminum.
239B Handrail Right:	7- Aluminum.
*240 Median Barrier Rail:	0- None.
241A Bridge Median Height:	0
241B Bridge Median Width:	0
*230A Guardrail Location Direction Rear:	3- Both sides.
*230B Guardrail Location Direction Fwrd:	3- Both sides.
*230C Guardrail Location Opposing Rear:	0- None.
*230D Guardrail Location Opposing Fwrd:	0- None.
244 Approach Slab:	3- Forward and Rear.
224 Retaining Wall:	0- None.
233 Posted Speed Limit:	35
236 Warning Sign:	No
234 Delineator:	No
235 Hazard Boards:	No
237A Gas:	21- Bottom Left.
237B Water:	22- Bottom Right.
237C Electric:	00- Not Applicable
237D Telephone:	24- Bottom Left and Right.
237E Sewer:	00- Not Applicable
247A Lighting: Street:	No
247B Navigation:	No
247C Aerial:	No
*248 County Continuity No.:	00
36A Bridge Railings:	1- Meets current standards
36B Transition:	2- Inspected feature meets acceptable construction date standards.
36C Approach Guardrail:	1- Meets current standards
36D Approach Guardrail Ends:	1- Meets current standards

Georgia Department of Transportation
Bridge Inventory Data Listing

Processed Date:Apr-22-2019 8:54:43 AM

Bridge Serial Number: 057-0071-0 | **County: Cherokee** | **SUFF. RATING: 97.6**

Programming Data

201 Project Number:	RF-012-1 (16) CT.1
202 Plans Available:	4- Plans in InfoImage/GAMS
249 Proposed Project Number:	000000000000000000000000
250A Reconstruction Approval Status:	No
250B Route Approval Status:	No
250C Approval Status Definition:	0
250D Approval Status Federal:	0
251Project Identification Number:	0000000
252 Contract Date:	Feb-01-1901
260 Seismic Number:	00023
75A Type Work Proposed:	0- Not Applicable
75B Work Done by:	0- Initial Inventory
94 Bridge Improvement Cost:(X$1,000)	$1,493
95 Roadway Improvement Cost: (X$1,000)	$149
96 Total Improvement Cost: (X$1,000)	$2239
76 Improvement Length:	0'
97 Year Improvement Cost Based On:	2013
114 Future AADT:	7545
115 Future AADT Year:	2032

Hydraulic Data

113 Scour Critical:	N. Bridge not over waterway.
216A Water Depth:	00.0
216B Bridge Height:	00.0
222 Slope Protection:	4
221A Spur Dike Rear:	
221B Spur Dike Fwd:	
219 Fender System:	0- None.
220 Dolphin:	
223A Culvert Cover:	000
223B Culvert Type:	0- Not Applicable
223C Number of Barrels:	0
223D Barrel Width:	0
223E Barrel Height:	0
223F Culvert Length:	0
223G Culvert Apron:	0
39 Navigation Vertical Clearance:	0'
40 Navigation Horizontal Clearance:	0
116 Navigation Vertical Clear Closed:	0

Measurements:

*29 AADT:	5030		
*30 AADT Year:	2012		
109 % Truck Traffic:	1		
* 28A Lanes On:	2		
*28B Lanes Under:	4		
210A Tracks On:	00		
210B Tracks Under:	0		
* 48 Maximum Span Length:	124		
* 49 Structure Length:	382		
51 Bridge Roadway Width:	40'		
52 Deck Width:	50.4'		
* 47 Total Horizontal Clearance:	40'		
50A Curb / Sidewalk Width Left:	4		
50B Curb / Sidewalk Width Right:	4		
32 Approach Rdwy. Width:	24'		
***229 Approach Roadway**			
Rear Shoulder Left: Width:	8	*Right Width*:8	Type: 8 - Grass (Dirt).
Fwd Shoulder: Left Width:	8	*Right Width*:8	Type: 8 - Grass (Dirt).
Rear Pavement: Width:	24	*Type*:2- Asphalt.	
Forward Pavement: Width:	24	*Type*:2- Asphalt.	
Intersection Rear:	1	*Forward*:1	
53 Minimum Vertical Clearance Over Rd:	99' 99"		
54A Under Reference Feature:	H- Highway beneath structure.		
54B Minimum Clearance Under:	19' 0"		
***228 Minimum Vertical Clearance**			
228A Actual Odometer Direction:	99'99"		
228B Actual Opposing Direction:	99'99"		
228C Posted Odometer Direction:	00'00"		
228D Posted Opposing Direction:	00'00"		
55A Lateral Underclearance Reference:	H- Highway beneath structure.		
55B Lateral Underclearance on Right:	33.5		
56 Lateral Underclearance on Left:	28		
10A Direction of Travel for Max Min:	0		
10B Max Min Vertical Clearance:	99'99"		
245A Deck Thickness Main:	8.5		
245B Deck Thickness Approach:	0		
246 Overlay Thickness:	0		

Ratings and Posting

65 Inventory Rating Method:	1-Load Factor (LF)
63 Operating Rating Method:	1-Load Factor (LF)
66A Inventory Type:	2 - HS loading.
66B Inventory Rating:	41
64A Operating Type:	2 - HS loading.
64B Operating Rating:	68

231Calculated Loads		**Posting Required**
231A H-Modified:	21	No
231B Type3/Tandem:	33	No
231C Timber:	37	No
231D HS-Modified:	30	No
231E Type 3S2:	40	No
231F Piggyback:	00	No

261 H Inventory Rating:	26
262 H Operating Rating:	44
67 Structural Evaluation:	7
58 Deck Condition:	7 - Good Condition
59 Superstructure Condition:	7 - Good Condition
* 227 Collision Damage:	
60A Substructure Condition:	7 - Good Condition
60B Scour Condition:	N - Not Applicable
60C Underwater Condition:	N - Not Applicable
71 Waterway Adequacy:	Not Applicable.
61 Channel Protection Cond.:	Not Applicable.
68 Deck Geometry:	5
69 UnderClr. Horz/Vert:	9
72 Approach Alignment:	8-No reduction of vehicle operating speed required.
62 Culvert:	N - Not Applicable
70 Bridge Posting Required:	5. Equal to or above legal loads
41 Struct Open, Posted, CL:	A. Open, no restriction
* 103 Temporary Structure:	No
232 Posted Loads	
232A H-Modified:	00
232B Type3/Tandem:	00
232C Timber:	00
232D HS-Modified:	00
232E Type 3s2:	00
232F Piggyback:	00
253 Notification Date:	Feb-01-1901
258 Federal Notify Date:	Feb-01-1901

MS4 Concept Report Summary

MS4 Concept Report Summary

SR 20, PI 064042, Bartow County, Georgia

Segment 1, I-75 to Sta 216+14

Is there a Project Level Exclusion that applies to this project: ☒ No ☐ Yes

If yes, please indicate which of the following exclusions apply:

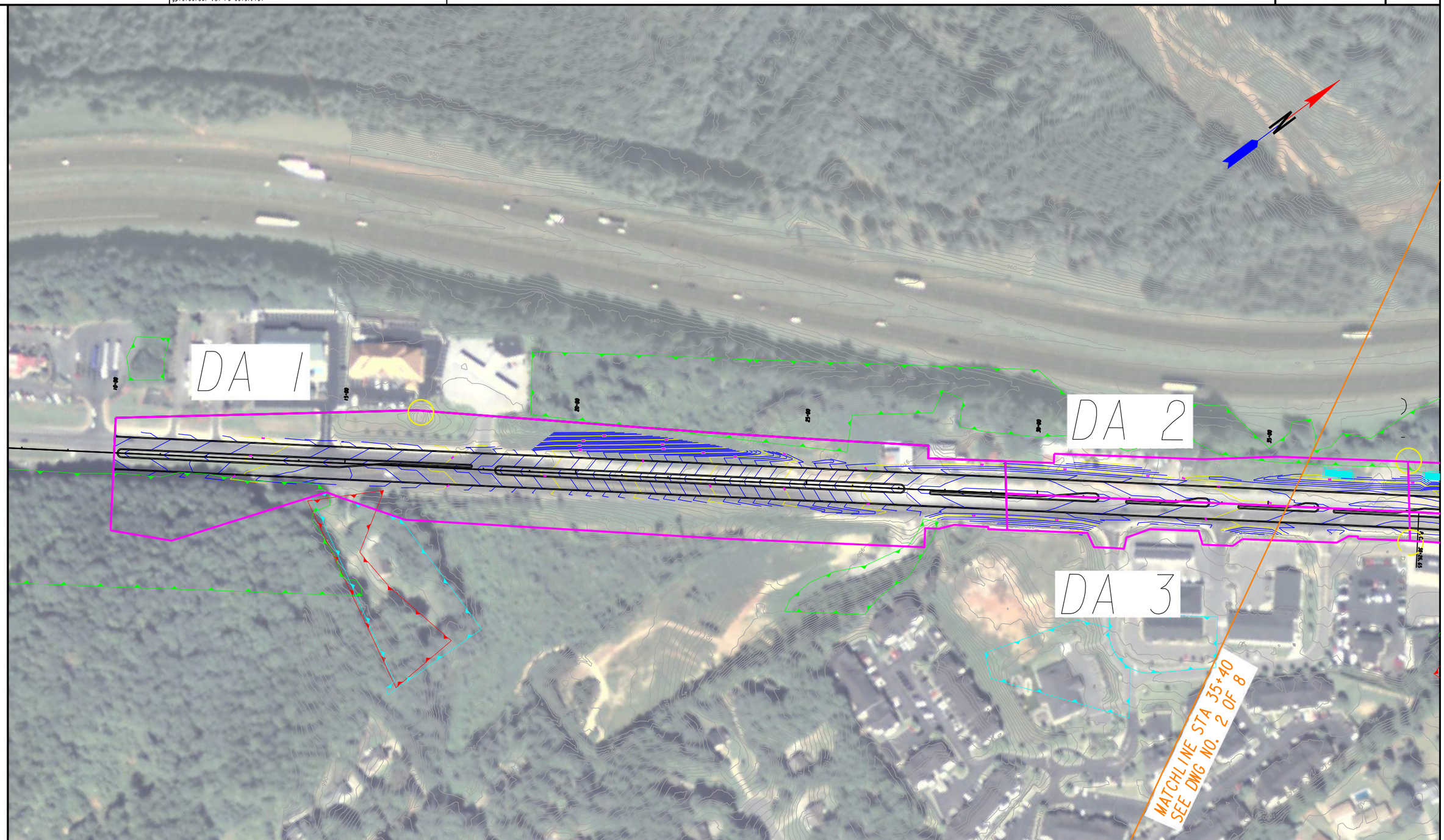
- ☐ Roadways that are not owned or operated (maintained) by GDOT may not require post-construction BMPs. Coordinate with the appropriate local government or entity to determine stormwater management requirements.
- ☐ The project location is not within a designated MS4 area.
- ☐ Maintenance and safety improvement projects whereby the sites are not connected and disturbs less than one acre at each individual site. This includes projects such as repaving, shoulder building, fiber optic line installation, sign addition, and sound barrier installation.
- ☐ Projects that have their environmental documents approved or right-of-way plans submitted for approval on or before June 30th, 2012.
- ☐ Road projects that disturb less than 1 acre or for site development projects that add less than 5,000 ft^2 of impervious area.

Drainage Area Summary									
	Pre-Development			Post-Development			Water Quality Volume (Cubic Feet)	Channel Protection Volume (Cubic Feet)	Required Detention Volume (Cubic Feet)
Outfall Area	Tc	Weighted CN	Area (Acres)	Tc	Weighted CN	Area (Acres)			
1	10	90	9.76	10	87	9.76	0	0	0
2	10	85	1.92	10	88	1.92	1176	9821	4065
3	10	94	1.52	10	94	1.52	0	0	0
4	10	87	3.90	10	89	3.90	1372	20752	7675
5	10	89	3.47	10	89	3.47	510	18464	5367
6A	10	81	1.38	10	85	1.38	784	6251	2990
6B	10	83	1.20	10	86	1.20	588	5663	2444
6C	10	80	1.92	10	83	1.92	980	7995	3682
6D	10	82	1.57	10	85	1.57	745	7111	3135
7	10	69	3.75	10	76	3.75	2783	11349	8235
8	10	64	0.88	10	78	0.88	1333	2929	2758
9A	10	60	3.19	10	71	3.19	3528	7448	8017
9B	10	78	8.52	10	78	8.52	0	0	0
9C	10	58	5.99	10	68	5.99	5410	11768	13131
9D	10	77	5.30	10	77	5.30	0	0	0
10A	10	80	4.13	10	86	4.13	5332	19491	10413
10B	10	87	2.68	10	85	2.68	0	0	0
11	10	87	9.02	10	85	9.02	0	0	0
12	10	79	4.72	10	84	4.72	5536	20505	10773
13A	10	72	3.89	10	73	3.89	588	10107	4687
13B	10	65	3.20	10	67	3.20	0	0	0
14	10	64	1.79	10	66	1.79	0	0	0
15	10	67	5.82	10	69	5.82	0	0	0
16A	10	85	5.53	10	84	5.53	0	0	0
16B	10	62	4.94	10	66	4.94	1294	8565	7422

Drainage Area Summary - continued									
Outfall Area	Pre-Development			Post-Development			Water Quality Volume (Cubic Feet)	Channel Protection Volume (Cubic Feet)	Required Detention Volume (Cubic Feet)
	Tc	Weighted CN	Area (Acres)	Tc	Weighted CN	Area (Acres)			
16C	10	80	3.88	10	82	3.88	1059	15477	6603
16D	10	82	2.06	10	82	2.06	0	0	0
16E	10	72	4.76	10	72	4.76	0	0	0
17A	10	65	1.05	10	68	1.05	0	0	0
17B	10	72	1.26	10	71	1.26	0	0	0

BMP Selection and Feasibility Summary						
	Outfall Level Exclusion?			Is the BMP Feasible?		
	Y/N	Exclusion No.	BMP Selected	Y/N	Infeasibility Criteria No.	[1]Feasibility of an Infiltration BMP
Outfall Area						
1	Y	6				
2	N		Bioretention Basin	Y	N/A	N/A
3	Y	6				
4	N		Bioretention Basin	Y	N/A	N/A
5	N		Bioretention Basin	N	5	N/A
6A	N		Bioretention Basin	Y	N/A	N/A
6B	N		Bioretention Basin	Y	N/A	N/A
6C	N		Bioretention Basin	Y	N/A	N/A
6D	N		Bioretention Basin	Y	N/A	N/A
7	N		Bioretention Basin	Y	N/A	N/A
8	N		Bioretention Basin	Y	N/A	N/A
9A	N		Bioretention Basin	Y	N/A	N/A
9B	Y	6				
9C	N		Bioretention Basin	Y	N/A	N/A
9D	Y	6				
10A	N		Bioretention Basin	Y	N/A	N/A
10B	Y	6				
11	Y	6				
12	N		Bioretention Basin	Y	N/A	N/A
13A	N		Bioretention Basin	Y	N/A	N/A
13B	Y	6				
14	Y	6				
15	Y	6				
16A	Y	6				
16B	N		Bioretention Basin	Y	N/A	N/A
16C	N		Bioretention Basin	Y	N/A	N/A
16D	Y	6				
16E	Y	6				
17A	Y	6				
17B	Y	6				

1 - For outfall areas considering an infiltration BMP indicate if an infiltration BMP is well-suited, potentially suitable, has limited suitability, or is unsuitable for the outfall area.



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 1
SR 20, PI 064042

CHECKED:		DATE:		DRAWING No.
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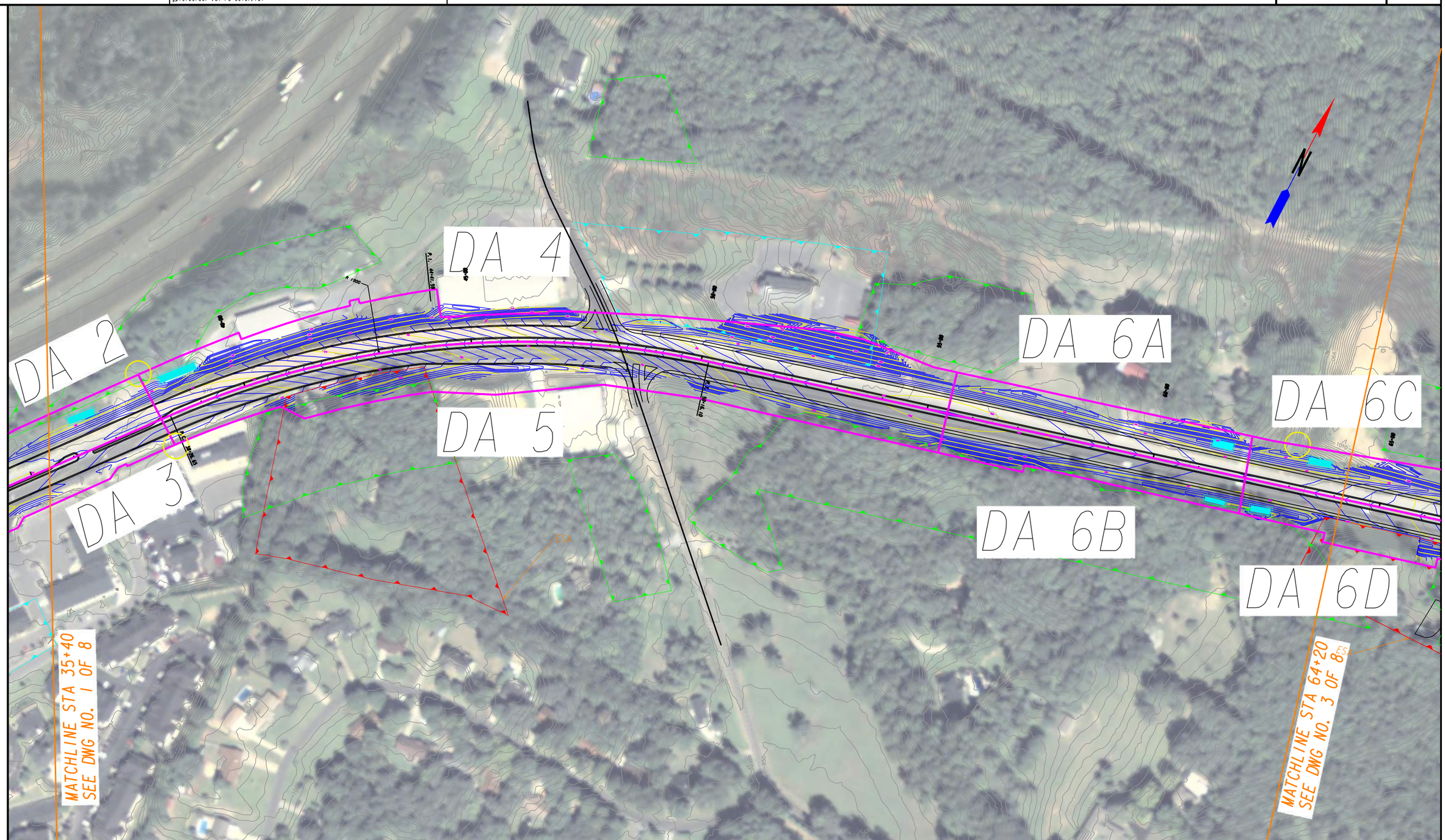

DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
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REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 1
SR 20, PI 064042

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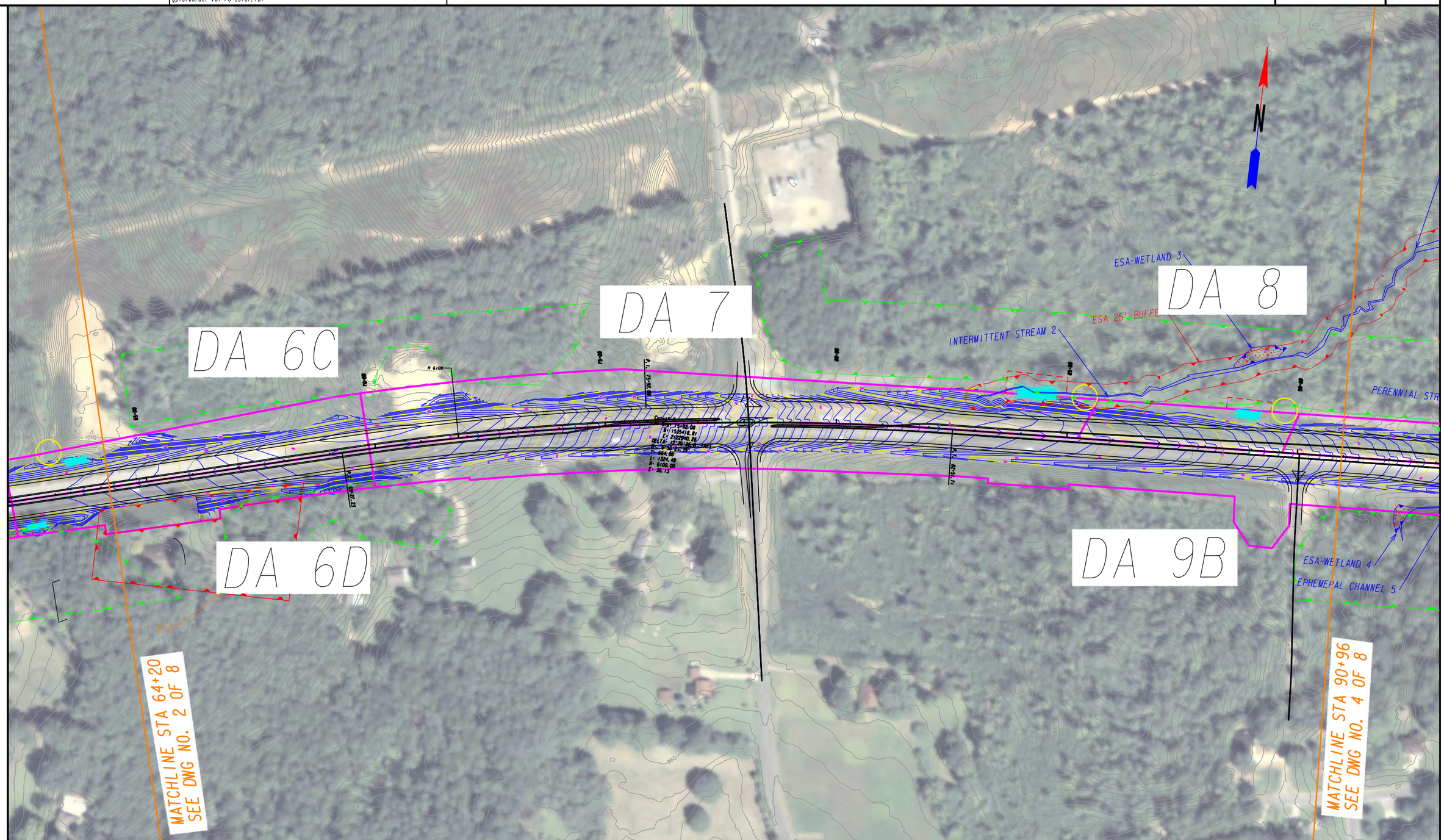

DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 1
SR 20, PI 064042

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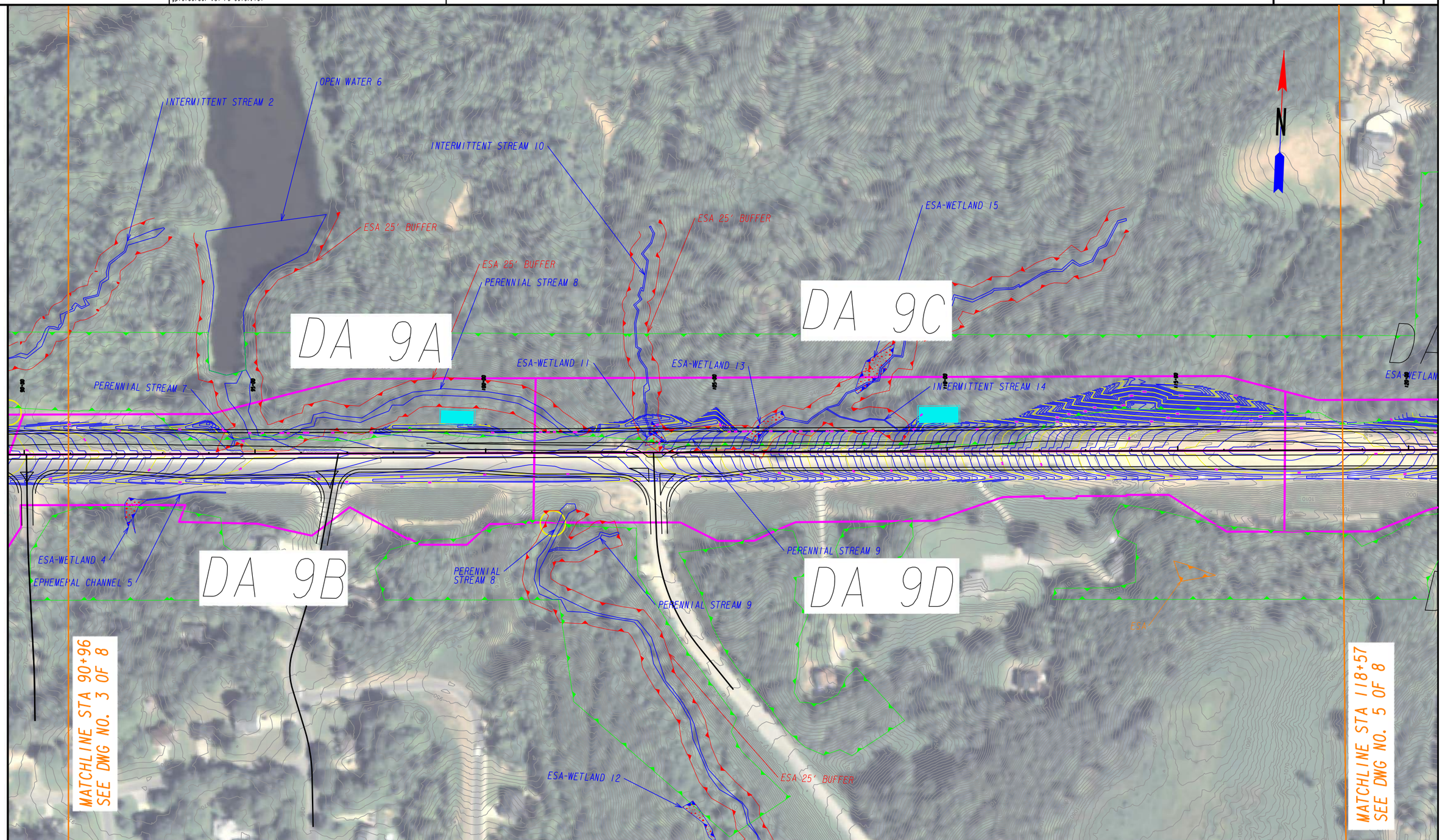
3 OF 8



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 1
SR 20, PI 064042

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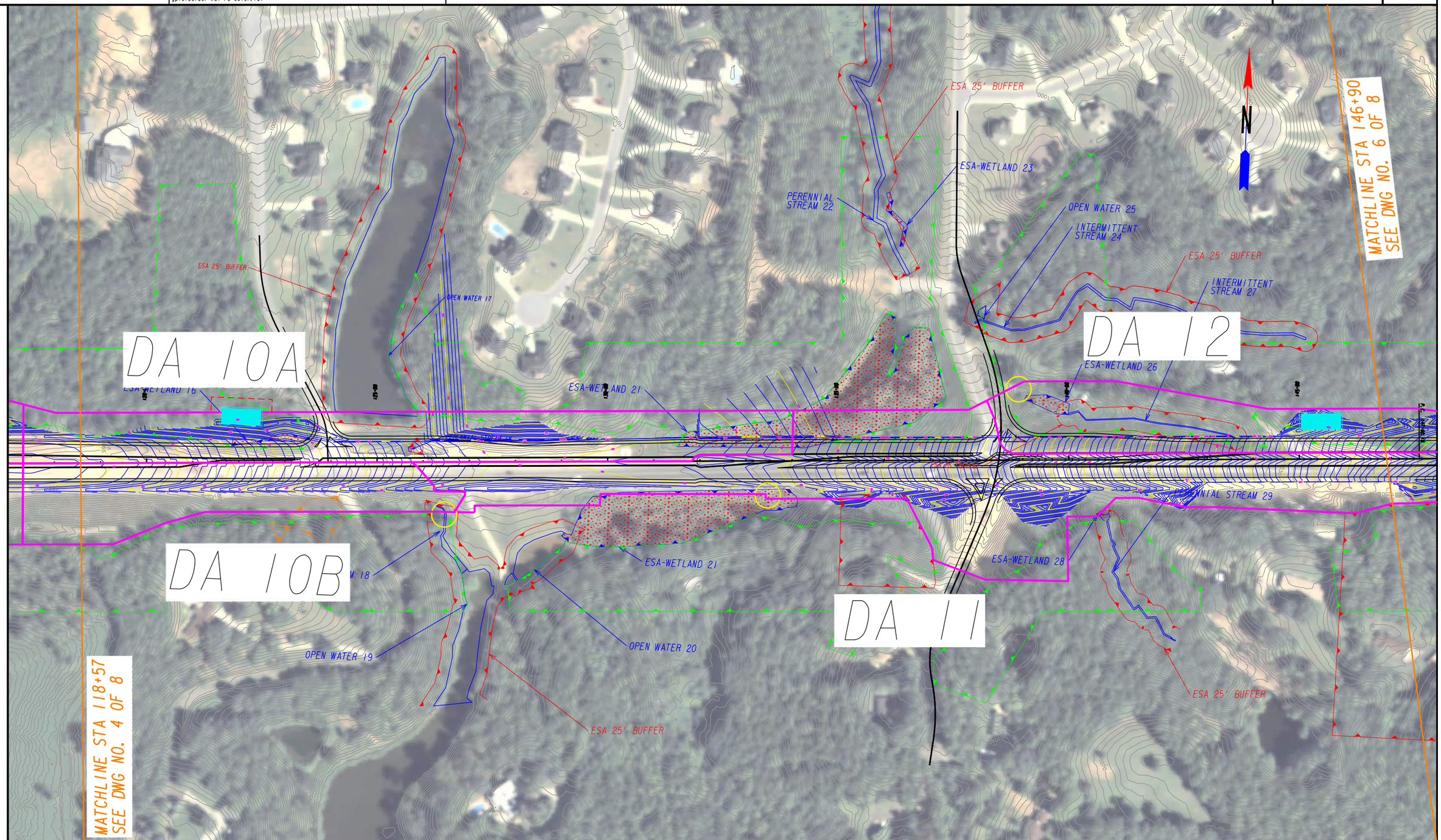
4 OF 8



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

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SEGMENT 1
SR 20, PI 064042

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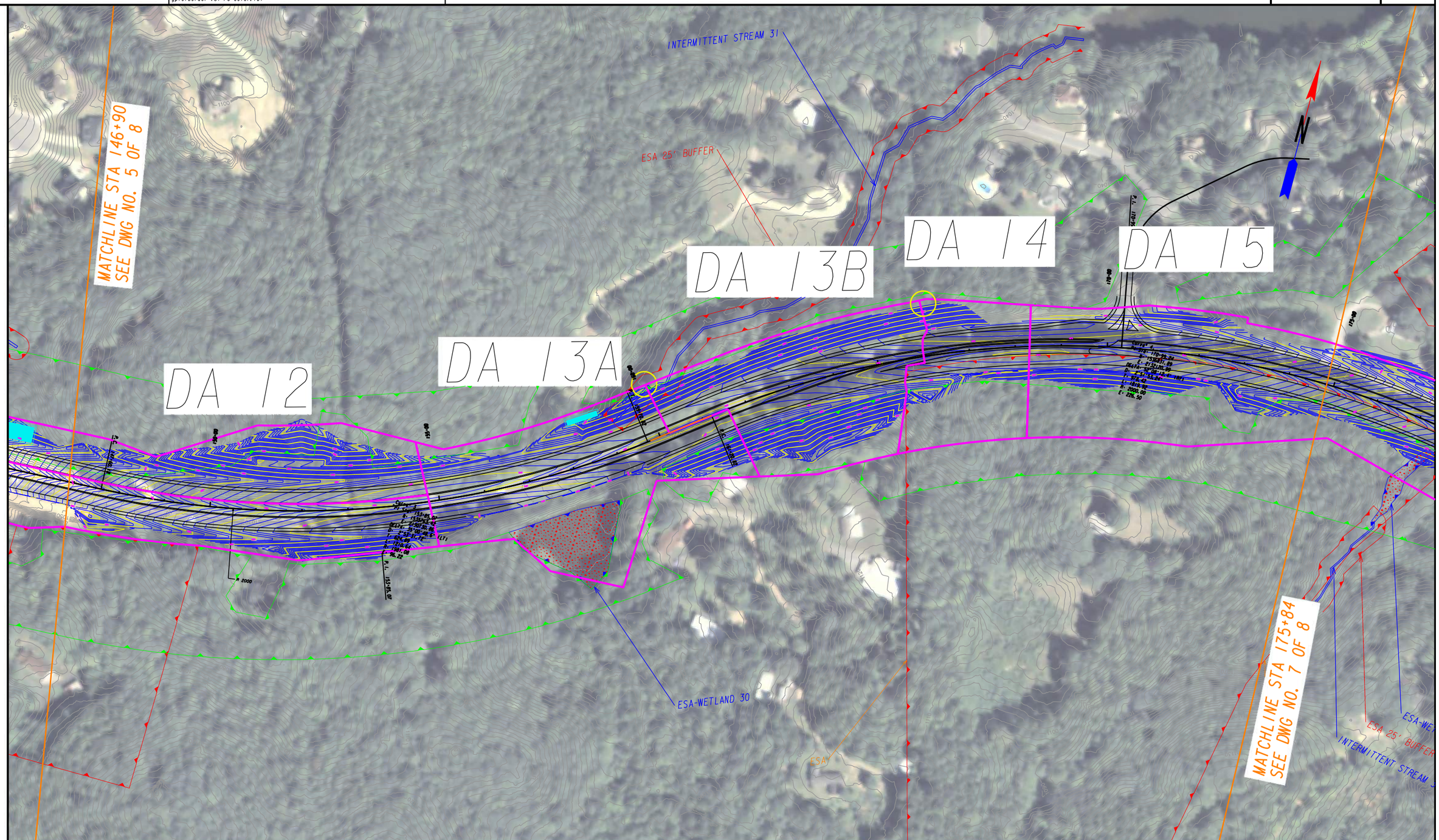
5 OF 8



DRAINAGE AREA BOUNDARY	ESA		
PROPOSED BMP	ESA		
PROPOSED RIGHT-OF-WAY	ESA		
OUTFALL	HISTORICAL BOUNDARY		

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 1
SR 20, PI 064042

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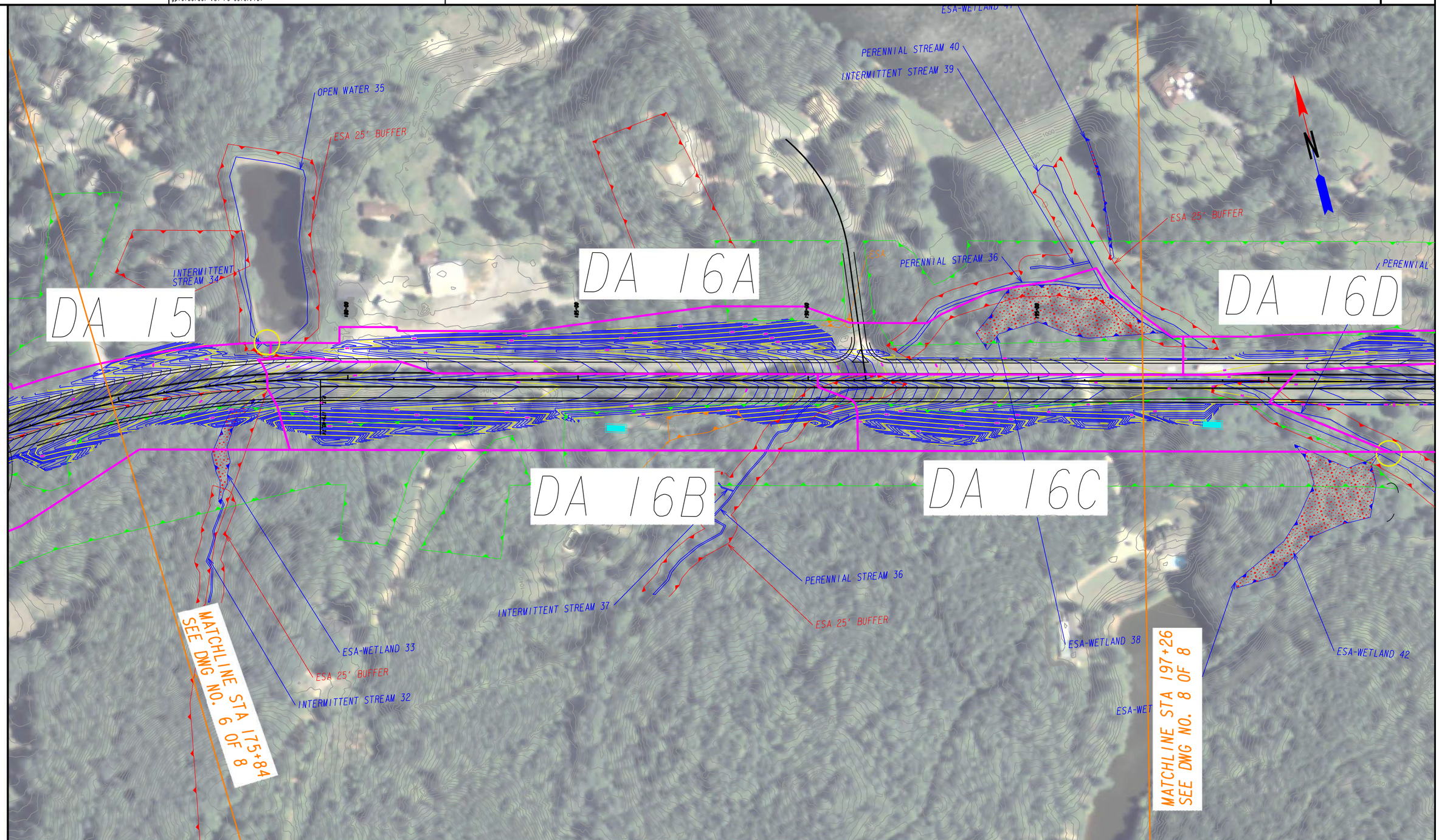
VERIFIED:		DATE:		



DRAINAGE AREA BOUNDARY	ESA		
PROPOSED BMP	ESA		
PROPOSED RIGHT-OF-WAY	ESA		
OUTFALL	HISTORICAL BOUNDARY		

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

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SEGMENT 1
SR 20, PI 064042

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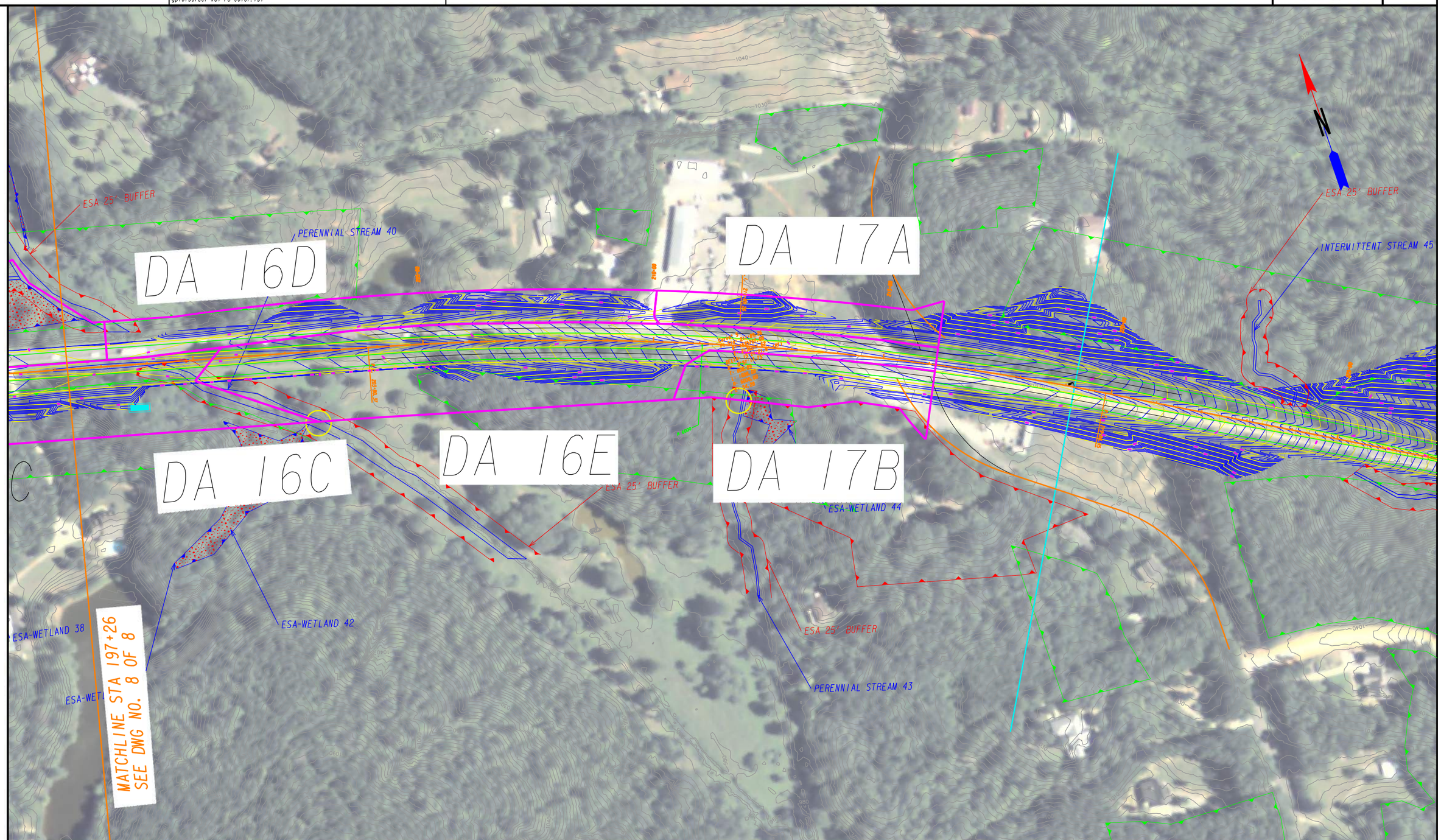
VERIFIED:		DATE:	



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

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SR 20, PI 064042

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DRAWING No.
8 OF 8

BMP Cost Estimate

Project Cost	$189,197,099	(excludes traffic control and signals)
Project Length (linear feet)	88176	
Unit Cost	$2,145.68	

Drainage Basin	Basin Length (linear feet)	Basin Cost
2	351.0	$753,194.89
4	713.0	$1,529,927.13
5	634.4	$1,361,242.85
6A	252.3	$541,358.83
6B	219.4	$470,746.81
6C	351.0	$753,194.89
6D	287.0	$615,893.74
7	685.6	$1,471,083.77
8	600.0	$1,287,405.41
9A	583.2	$1,251,401.93
9C	1095.1	$2,349,811.15
10A	755.1	$1,620,153.60
12	862.9	$1,851,604.11
13A	711.2	$1,526,004.24
16B	376.6	$808,115.35
16C	870.3	$1,867,295.67

Basin 2

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	270	$4,050.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	60	$120.00
Engineered Media	cy	$75.00	40	$3,000.00
Filter Fabric	sy	$3.29	60	$197.40
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	70	$1,120.00
Landscaping	sy	$14.00	60	$840.00
Guardrail	lf	$2.15	120	$258.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	42	$138.18
Rip Rap (Forebay)	sy	$50.00	42	$2,100.00
			MS4 BMP Cost Total	**$15,823.58**

Percent of Construction Cost	**2.10%**

Basin 4

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	410	$6,150.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	75	$150.00
Engineered Media	cy	$75.00	50	$3,750.00
Filter Fabric	sy	$3.29	75	$246.75
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	80	$1,280.00
Landscaping	sy	$14.00	75	$1,050.00
Guardrail	lf	$2.15	120	$258.00

Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	80	$263.20
Rip Rap (Forebay)	sy	$50.00	80	$4,000.00
			MS4 BMP Cost Total	**$21,147.95**

Percent of Construction Cost	**1.38%**

Basin 5

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	400	$6,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	30	$60.00
Engineered Media	cy	$75.00	20	$1,500.00
Filter Fabric	sy	$3.29	30	$98.70
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	80	$1,280.00
Landscaping	sy	$14.00	30	$420.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	50	$164.50
Rip Rap (Forebay)	sy	$50.00	50	$2,500.00
			MS4 BMP Cost Total	**$16,238.20**

Percent of Construction Cost	**1.19%**

Basin 6A

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	200	$3,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	50	$100.00
Engineered Media	cy	$75.00	35	$2,625.00
Filter Fabric	sy	$3.29	50	$164.50
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	60	$960.00
Landscaping	sy	$14.00	50	$700.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	25	$82.25
Rip Rap (Forebay)	sy	$50.00	25	$1,250.00
			MS4 BMP Cost Total	**$13,096.75**

Percent of Construction Cost	**2.42%**

Basin 6B

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	135	$2,025.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	35	$70.00
Engineered Media	cy	$75.00	25	$1,875.00
Filter Fabric	sy	$3.29	35	$115.15
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	60	$960.00

Landscaping	sy	$14.00	35	$490.00
Guardrail	lf	$2.15	70	$150.50
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	20	$65.80
Rip Rap (Forebay)	sy	$50.00	20	$1,000.00
			MS4 BMP Cost Total	**$10,751.45**

Percent of Construction Cost	**2.28%**

Basin 6C

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	220	$3,300.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	50	$100.00
Engineered Media	cy	$75.00	35	$2,625.00
Filter Fabric	sy	$3.29	50	$164.50
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	60	$960.00
Landscaping	sy	$14.00	50	$700.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	35	$115.15
Rip Rap (Forebay)	sy	$50.00	35	$1,750.00
			MS4 BMP Cost Total	**$13,929.65**

Percent of Construction Cost	**1.85%**

Basin 6D

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	170	$2,550.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	40	$80.00
Engineered Media	cy	$75.00	40	$3,000.00
Filter Fabric	sy	$3.29	40	$131.60
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	50	$800.00
Landscaping	sy	$14.00	40	$560.00
Guardrail	lf	$2.15	50	$107.50
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	30	$98.70
Rip Rap (Forebay)	sy	$50.00	30	$1,500.00
			MS4 BMP Cost Total	**$12,827.80**

Percent of Construction Cost	**2.08%**

Basin 7

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	650	$9,750.00
Outlet Structure	ea	$4,000.00	1	$4,000.00

Mulch Layer	sy	$2.00	140	$280.00
Engineered Media	cy	$75.00	95	$7,125.00
Filter Fabric	sy	$3.29	140	$460.60
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	120	$1,920.00
Landscaping	sy	$14.00	140	$1,960.00
Guardrail	lf	$2.15	120	$258.00
Right of Way	sf	$0.69	7100	$4,899.00
Filter Fabric (Forebay)	sy	$3.29	100	$329.00
Rip Rap (Forebay)	sy	$50.00	100	$5,000.00
			MS4 BMP Cost Total	**$35,981.60**

Percent of Construction Cost	**2.45%**

Basin 8

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	270	$4,050.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	75	$150.00
Engineered Media	cy	$75.00	50	$3,750.00
Filter Fabric	sy	$3.29	75	$246.75
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	80	$1,280.00
Landscaping	sy	$14.00	75	$1,050.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	3600	$2,484.00
Filter Fabric (Forebay)	sy	$3.29	30	$98.70
Rip Rap (Forebay)	sy	$50.00	30	$1,500.00
			MS4 BMP Cost Total	**$18,824.45**

Percent of Construction Cost	**1.46%**

Basin 9A

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	550	$8,250.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	175	$350.00
Engineered Media	cy	$75.00	120	$9,000.00
Filter Fabric	sy	$3.29	175	$575.75
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	150	$2,400.00
Landscaping	sy	$14.00	175	$2,450.00
Guardrail	lf	$2.15	120	$258.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	50	$164.50
Rip Rap (Forebay)	sy	$50.00	50	$2,500.00
			MS4 BMP Cost Total	**$29,948.25**

Percent of Construction Cost	**2.39%**

Basin 9C

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	900	$13,500.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	275	$550.00
Engineered Media	cy	$75.00	185	$13,875.00
Filter Fabric	sy	$3.29	275	$904.75
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	140	$2,240.00
Landscaping	sy	$14.00	275	$3,850.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	65	$213.85
Rip Rap (Forebay)	sy	$50.00	65	$3,250.00
			MS4 BMP Cost Total	**$42,598.60**

Percent of Construction Cost	**1.81%**

Basin 10A

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	750	$11,250.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	275	$550.00
Engineered Media	cy	$75.00	180	$13,500.00
Filter Fabric	sy	$3.29	275	$904.75
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	150	$2,400.00
Landscaping	sy	$14.00	275	$3,850.00
Guardrail	lf	$2.15	150	$322.50
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	65	$213.85
Rip Rap (Forebay)	sy	$50.00	65	$3,250.00
			MS4 BMP Cost Total	**$40,241.10**

Percent of Construction Cost	**2.48%**

Basin 12

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	900	$13,500.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	280	$560.00
Engineered Media	cy	$75.00	190	$14,250.00
Filter Fabric	sy	$3.29	280	$921.20
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	150	$2,400.00
Landscaping	sy	$14.00	280	$3,920.00
Guardrail	lf	$2.15	120	$258.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	60	$197.40
Rip Rap (Forebay)	sy	$50.00	60	$3,000.00
			MS4 BMP Cost Total	**$43,006.60**

Percent of Construction Cost	**2.32%**

Basin 13A

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	250	$3,750.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	35	$70.00
Engineered Media	cy	$75.00	25	$1,875.00
Filter Fabric	sy	$3.29	35	$115.15
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	50	$800.00
Landscaping	sy	$14.00	35	$490.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	2900	$2,001.00
Filter Fabric (Forebay)	sy	$3.29	60	$197.40
Rip Rap (Forebay)	sy	$50.00	60	$3,000.00
			MS4 BMP Cost Total	**$16,513.55**

Percent of Construction Cost	**1.08%**

Basin 16B

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	250	$3,750.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	65	$130.00
Engineered Media	cy	$75.00	45	$3,375.00
Filter Fabric	sy	$3.29	65	$213.85
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	60	$960.00
Landscaping	sy	$14.00	65	$910.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	25	$82.25
Rip Rap (Forebay)	sy	$50.00	25	$1,250.00
			MS4 BMP Cost Total	**$14,886.10**

Percent of Construction Cost	**1.84%**

Basin 16C

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	200	$3,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	60	$120.00
Engineered Media	cy	$75.00	40	$3,000.00
Filter Fabric	sy	$3.29	60	$197.40
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	60	$960.00
Landscaping	sy	$14.00	60	$840.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	16	$52.64
Rip Rap (Forebay)	sy	$50.00	16	$800.00

MS4 BMP Cost Total	**$13,185.04**

Percent of Construction Cost	**0.71%**

MS4 Concept Report Summary

SR 20, PI 064042, Cherokee County, Georgia

Segment 2, Sta 653+00 to Hickory Flat Hwy

Is there a Project Level Exclusion that applies to this project: ☒ No ☐ Yes

If yes, please indicate which of the following exclusions apply:

- ☐ Roadways that are not owned or operated (maintained) by GDOT may not require post-construction BMPs. Coordinate with the appropriate local government or entity to determine stormwater management requirements.
- ☐ The project location is not within a designated MS4 area.
- ☐ Maintenance and safety improvement projects whereby the sites are not connected and disturbs less than one acre at each individual site. This includes projects such as repaving, shoulder building, fiber optic line installation, sign addition, and sound barrier installation.
- ☐ Projects that have their environmental documents approved or right-of-way plans submitted for approval on or before June 30th, 2012.
- ☐ Road projects that disturb less than 1 acre or for site development projects that add less than 5,000 ft^2 of impervious area.

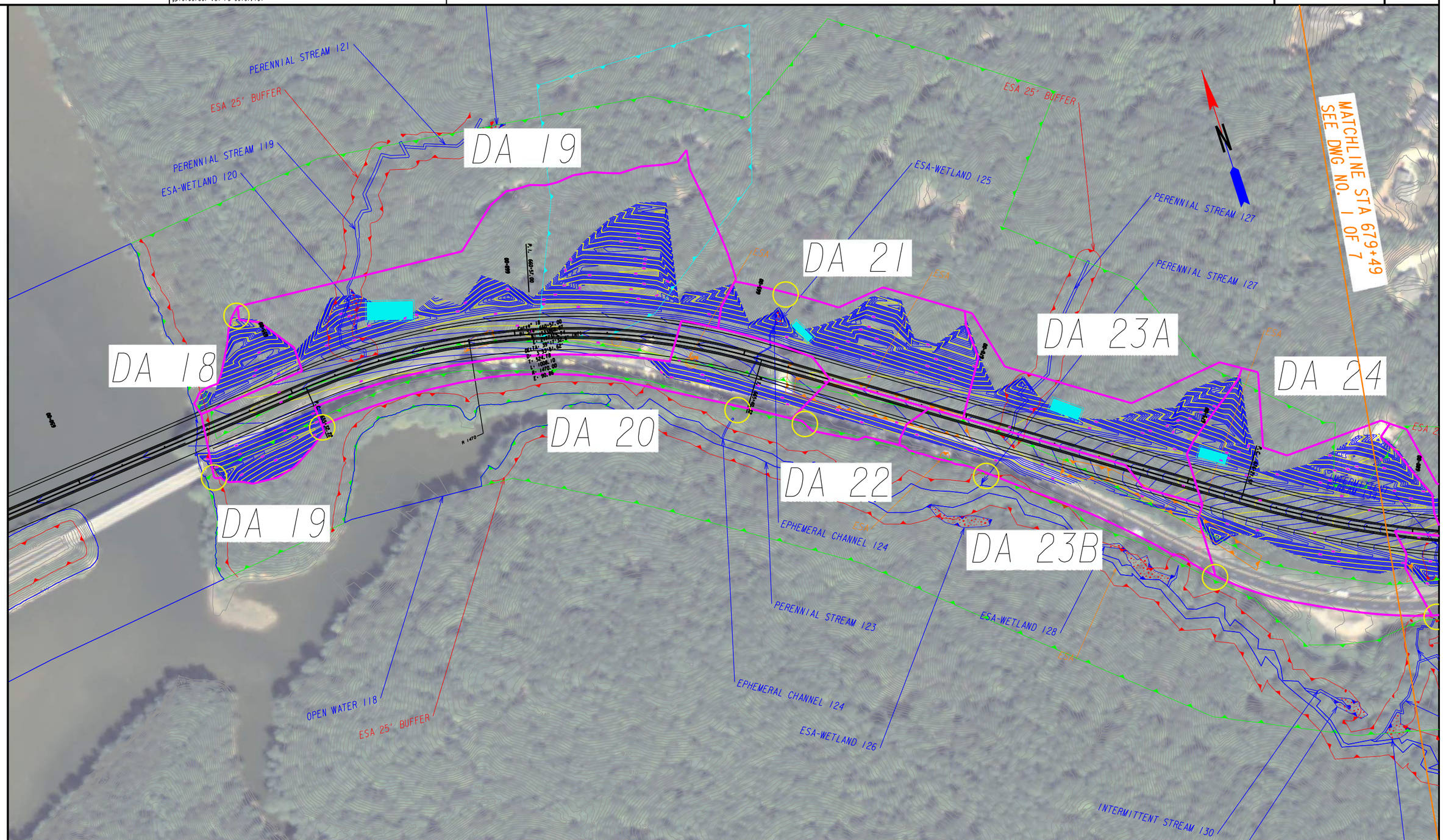
Drainage Area Summary									
	Pre-Development			Post-Development			Water Quality Volume (Cubic Feet)	Channel Protection Volume (Cubic Feet)	Required Detention Volume (Cubic Feet)
Outfall Area	Tc	Weighted CN	Area (Acres)	Tc	Weighted CN	Area (Acres)			
18	10	77	0.54	10	81	0.54	0	0	0
19	20	79	7.85	20	84	7.85	6351	33647	17917
20	10	87	1.88	10	86	1.88	0	0	0
21	10	78	2.15	10	81	2.15	1294	8209	3955
22	10	87	0.54	10	87	0.54	0	0	0
23A	10	77	2.09	10	84	2.09	2886	9080	5369
23B	10	85	1.72	10	85	1.72	0	0	0
24	10	80	4.07	10	83	4.07	2039	16948	7804
25	10	67	8.97	10	77	8.97	6077	28484	23984
26	10	63	2.71	10	63	2.71	0	0	0
27A	10	64	6.43	10	64	6.43	0	0	0
27B	10	62	3.20	10	69	3.20	1999	6667	6501
28A	10	61	5.58	10	74	5.58	6312	15263	16055
28B	10	73	4.14	10	74	4.14	0	0	0
29	10	67	0.43	10	70	0.43	0	0	0
30	10	67	0.47	10	70	0.47	0	0	0
31	10	88	3.07	10	90	3.07	1137	16986	6161
32	10	71	4.67	10	75	4.67	2039	13455	8221
33	10	75	0.56	10	78	0.56	0	0	0
34	10	72	0.21	10	73	0.21	0	0	0
35	10	78	4.35	10	82	4.35	1647	17351	8885
36	10	71	0.57	10	80	0.57	549	2081	1495
37	10	78	1.93	10	81	1.93	549	7369	3550
38	10	77	0.42	10	85	0.42	0	0	0
39	10	73	3.08	10	76	3.08	745	9321	5076

Drainage Area Summary - continued									
Outfall Area	Pre-Development			Post-Development			Water Quality Volume (Cubic Feet)	Channel Protection Volume (Cubic Feet)	Required Detention Volume (Cubic Feet)
	Tc	Weighted CN	Area (Acres)	Tc	Weighted CN	Area (Acres)			
40	10	77	5.19	10	83	5.19	3058	21612	12376
41	10	78	0.74	10	74	0.74	0	0	0
42	10	61	0.63	10	61	0.63	0	0	0
43	10	61	0.15	10	61	0.15	0	0	0
44	10	72	0.52	10	72	0.52	0	0	0
45	10	76	3.08	10	83	3.08	2352	12826	7767
46	10	77	6.02	10	81	6.02	2666	22985	12049
47	10	75	8.37	10	80	8.37	4783	30565	17661
48	10	89	3.44	10	94	3.44	1921	22153	9389

BMP Selection and Feasibility Summary						
Outfall Area	Outfall Level Exclusion?		BMP Selected	Is the BMP Feasible?		
	Y/N	Exclusion No.		Y/N	Infeasibility Criteria No.	[1]Feasibility of an Infiltration BMP
18	Y	6				
19	N		Bioretention Area	Y	N/A	N/A
20	Y	6				
21	N		Bioretention Area	Y	N/A	N/A
22	Y	6				
23A	N		Bioretention Area	Y	N/A	N/A
23B	Y	6				
24	N		Bioretention Area	Y	N/A	N/A
25	N		Bioretention Area	Y	N/A	N/A
26	Y	6				
27A	Y	6				
27B	N		Bioretention Area	Y	N/A	N/A
28A	N		Bioretention Area	Y	N/A	N/A
28B	Y	6				
29	Y	6				
30	Y	6				
31	N		Bioretention Area	Y	N/A	N/A
32	N		Bioretention Area	Y	N/A	N/A
33	Y	6				
34	Y	6				
35	N		Bioretention Area	Y	N/A	N/A
36	N		Bioretention Area	Y	N/A	N/A
37	N		Bioretention Area	Y	N/A	N/A
38	Y	6				
39	N		Bioretention Area	Y	N/A	N/A
40	N		Bioretention Area	Y	N/A	N/A
41	Y	6				
42	Y	6				
43	Y	6				
44	Y	6				
45	N		Bioretention Area	Y	N/A	N/A
46	N		Bioretention Area	Y	N/A	N/A

BMP Selection and Feasibility Summary - continued						
47	N		Bioretention Area	Y	N/A	N/A
48	N		Bioretention Area	N	5	N/A

1 - For outfall areas considering an infiltration BMP indicate if an infiltration BMP is well-suited, potentially suitable, has limited suitability, or is unsuitable for the outfall area.



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 2
SR 20, PI 064042

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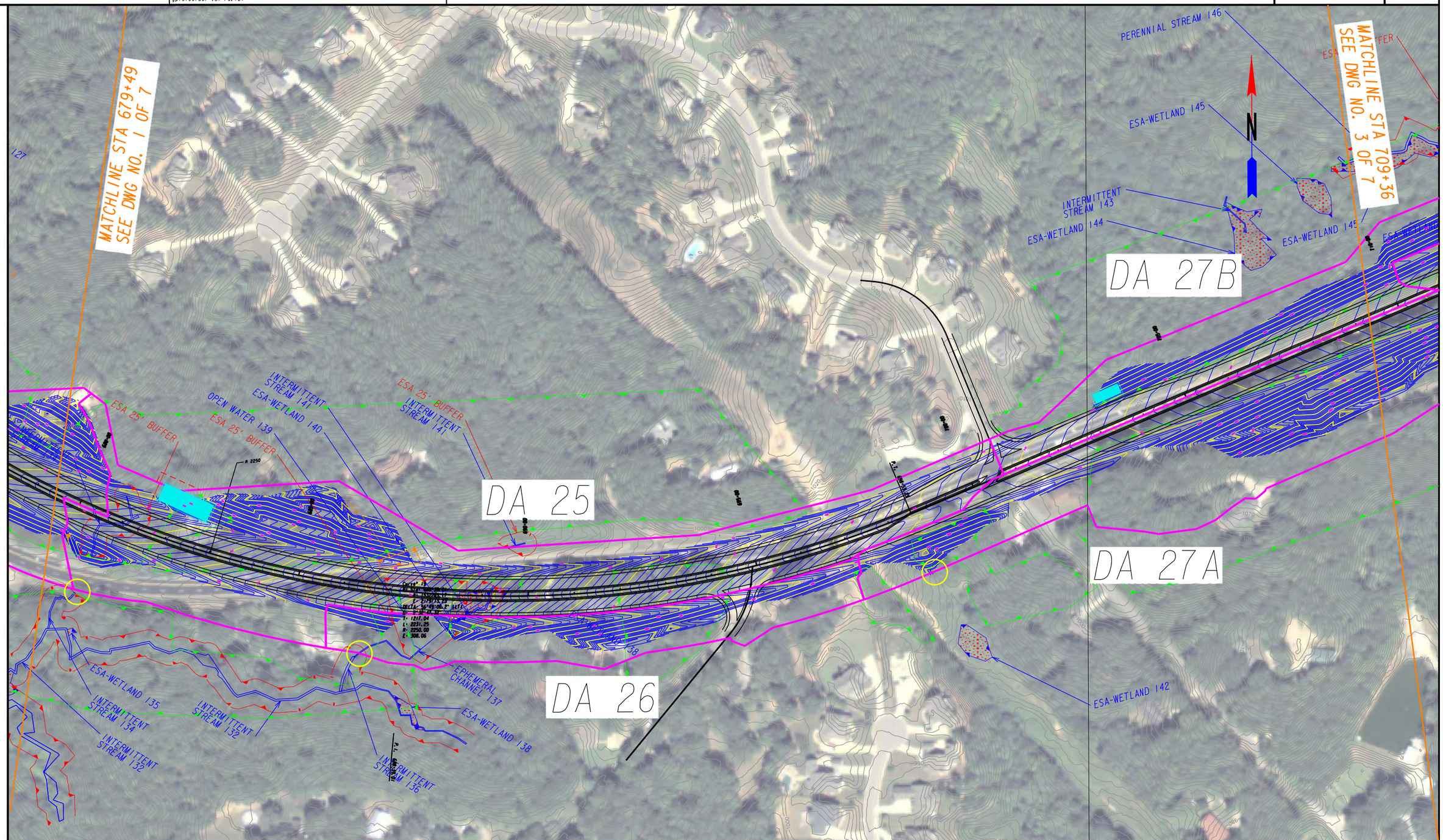

DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 2
SR 20, PI 064042

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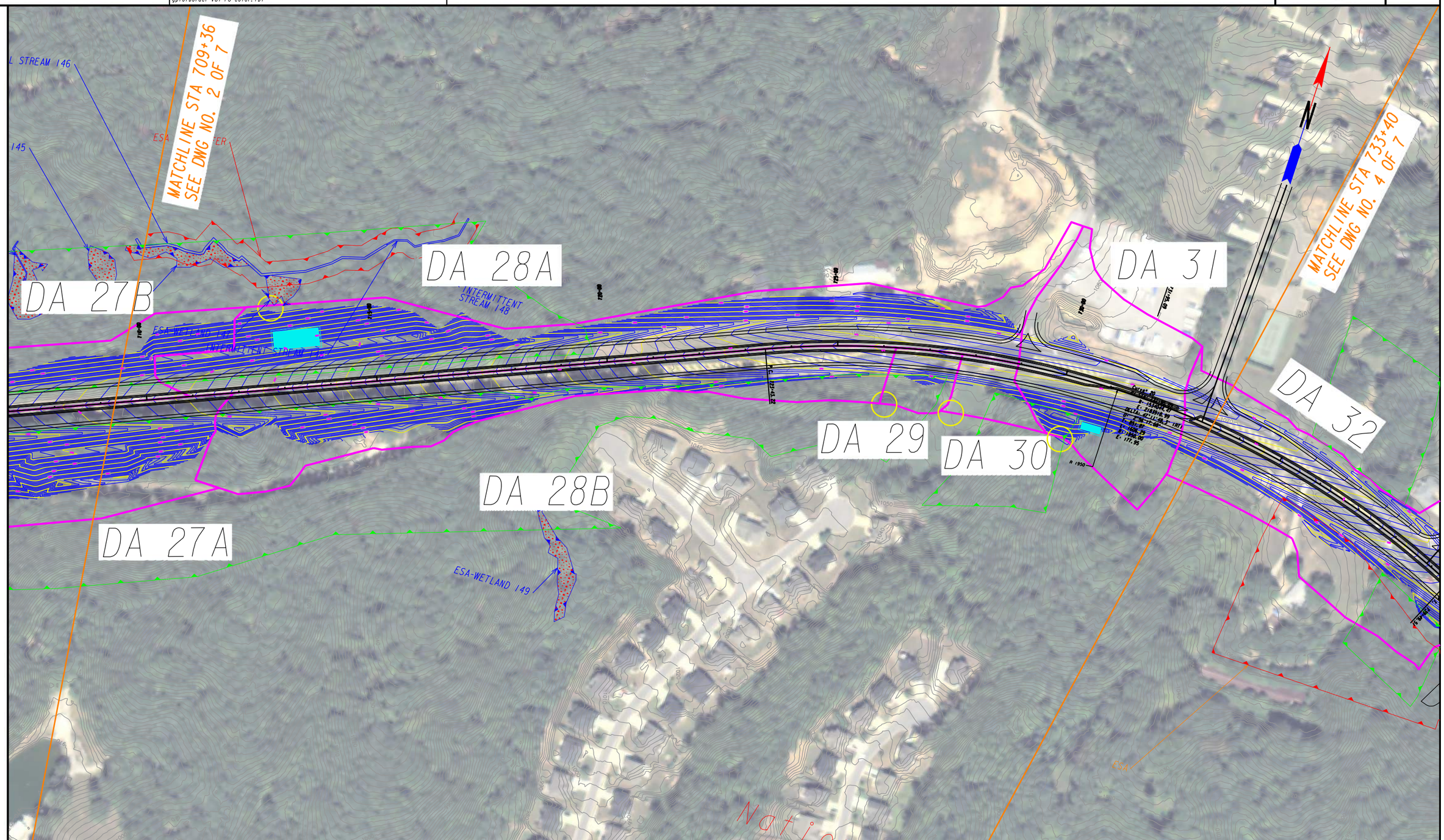
2 OF 7



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 2
SR 20, PI 064042

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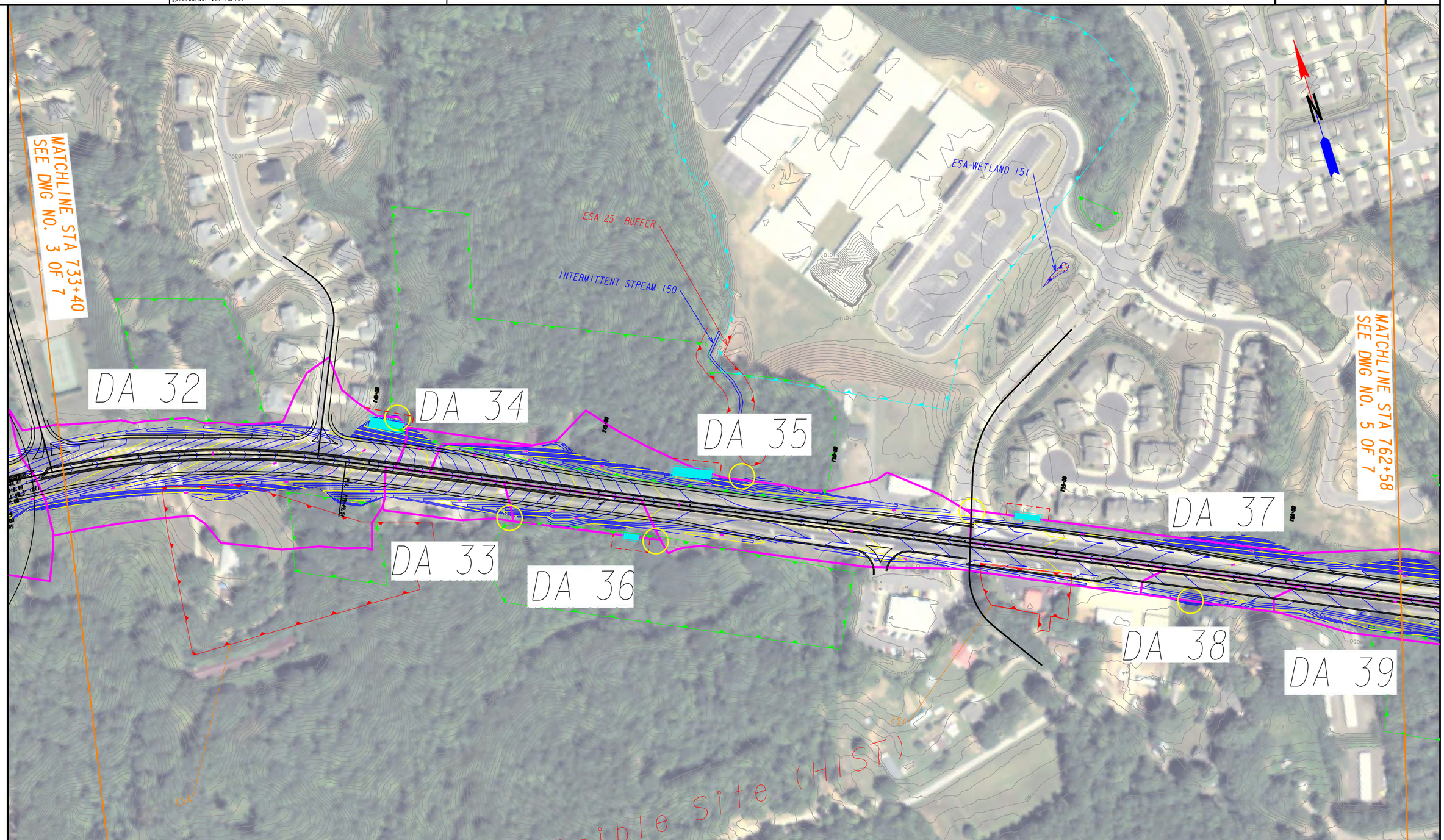
3 OF 7



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 2
SR 20, PI 064042

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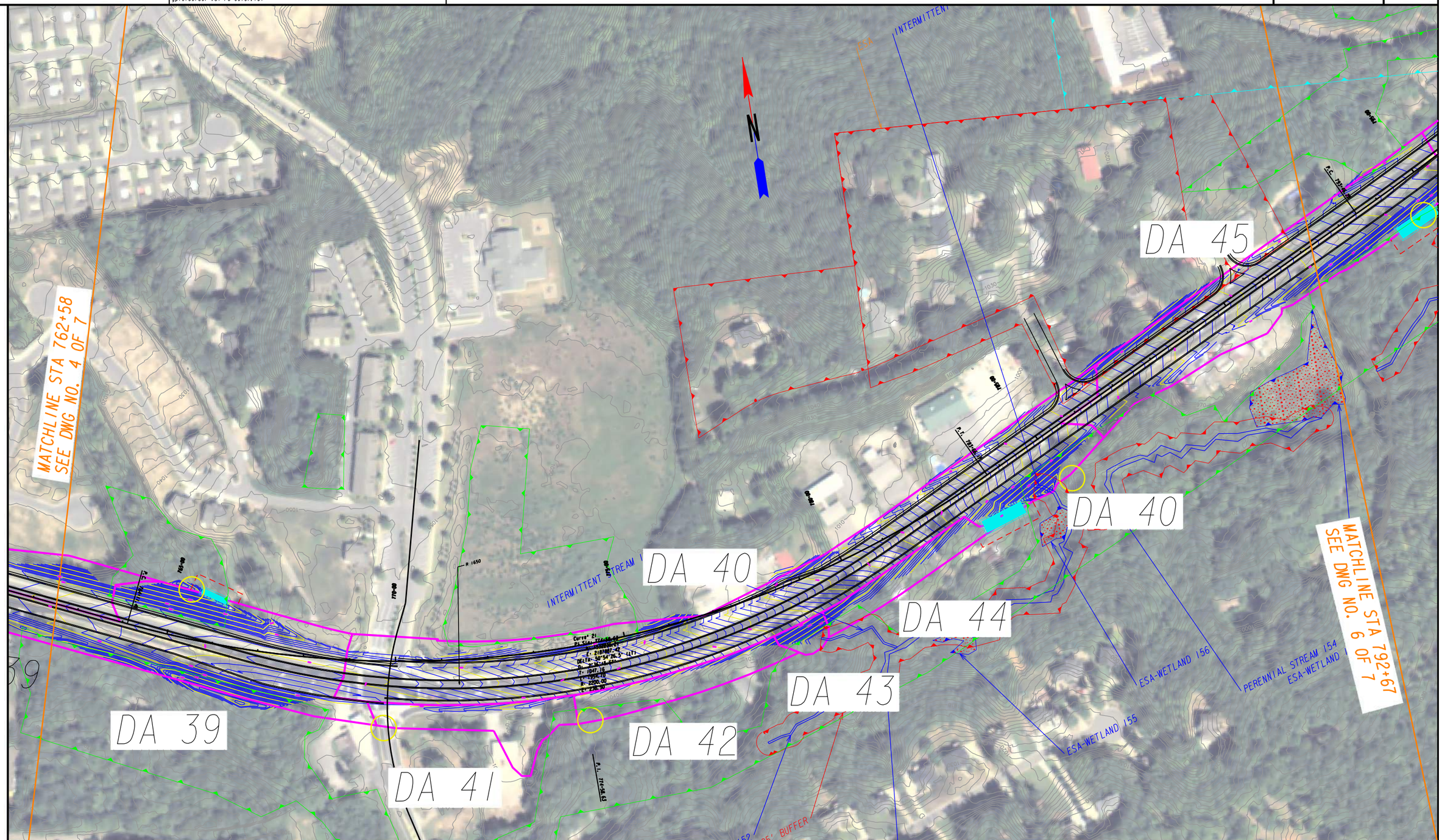
4 OF 7



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 2
SR 20, PI 064042

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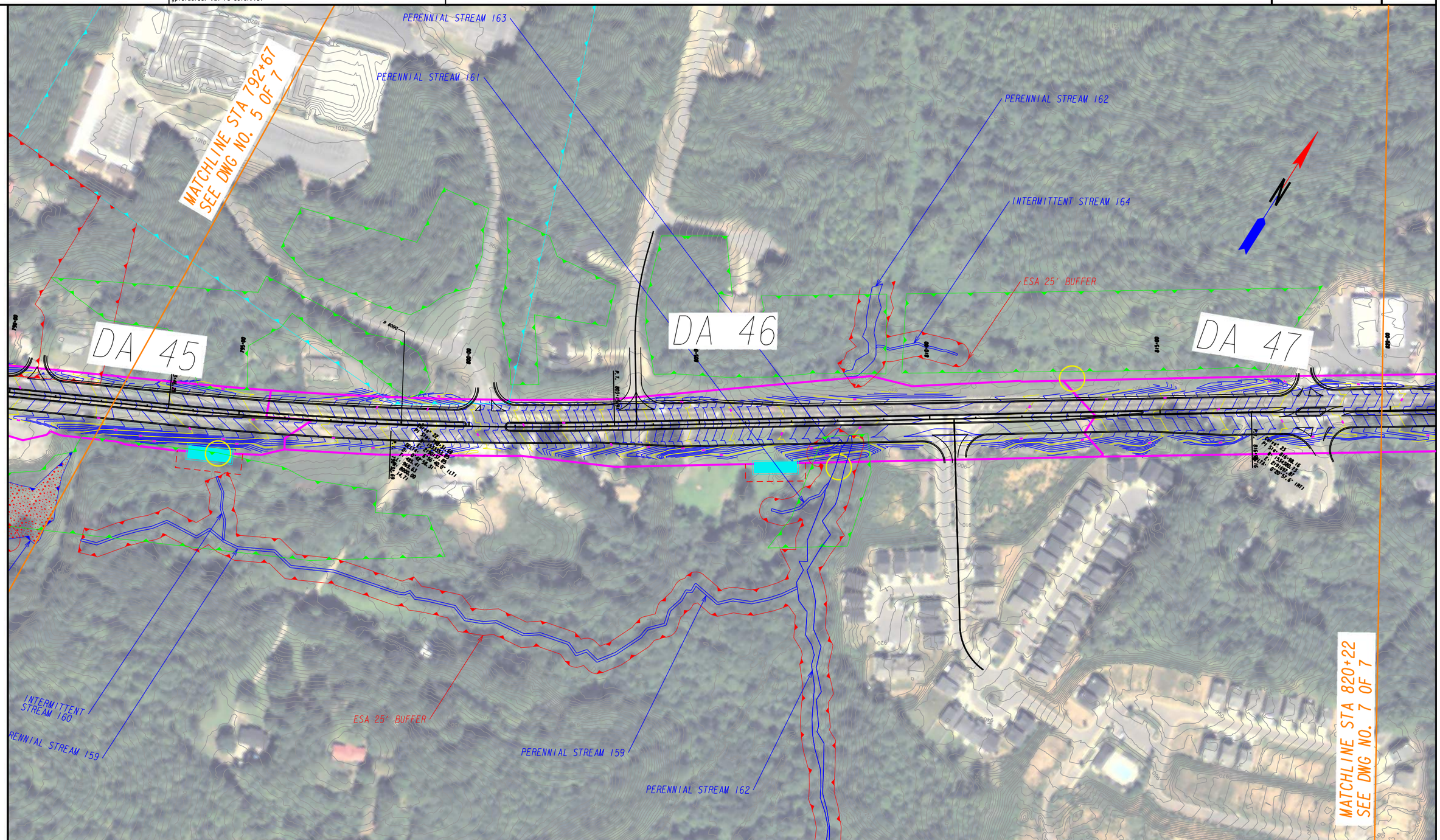

DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 2
SR 20, PI 064042

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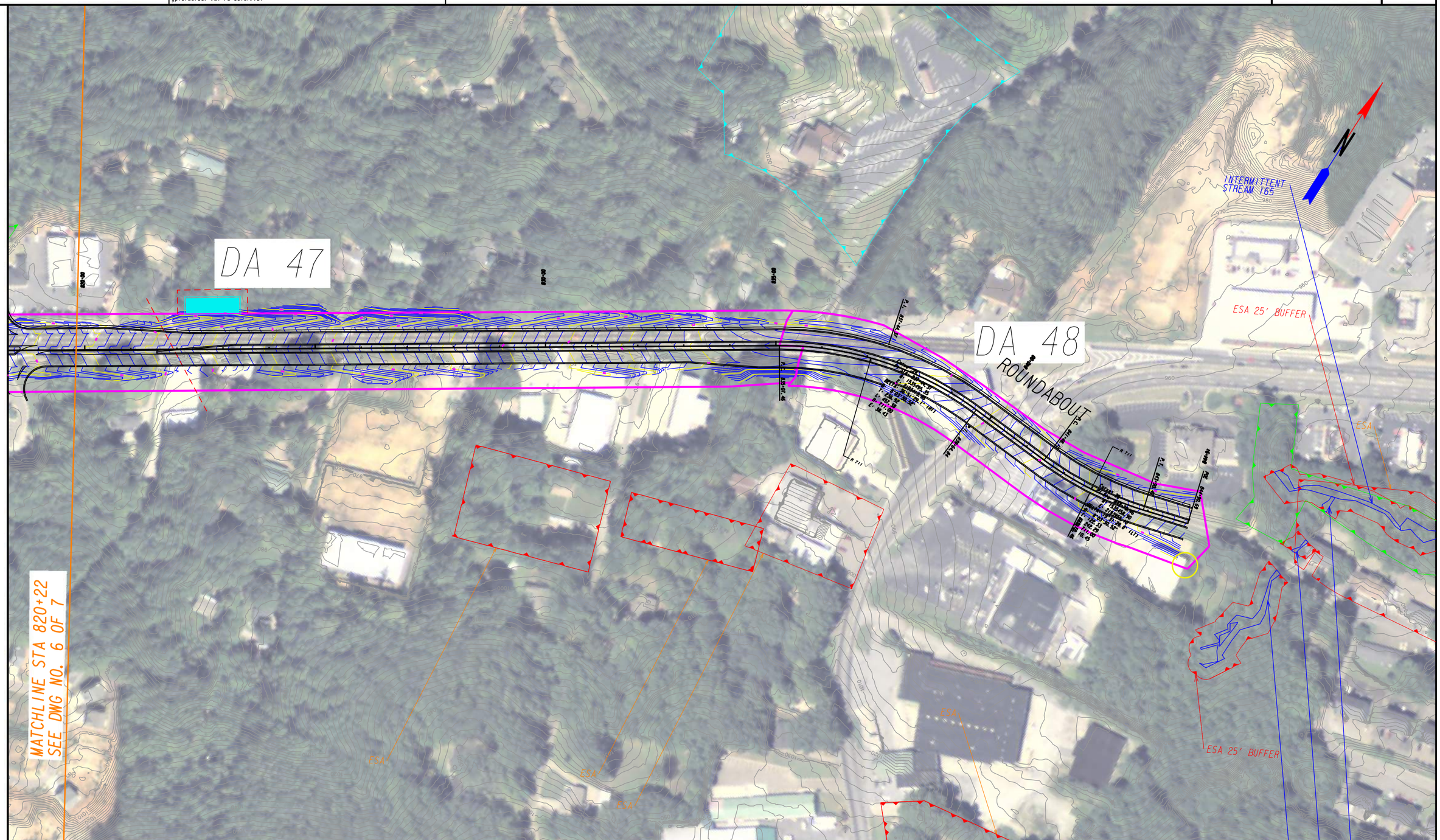
6 OF 7



DRAINAGE AREA BOUNDARY		ESA	
PROPOSED BMP		ESA	
PROPOSED RIGHT-OF-WAY		ESA	
OUTFALL		HISTORICAL BOUNDARY	

GDOT
Georgia Department of Transportation

SCALE IN FEET
0 100 200 400

REVISION DATES

MS4 DRAINAGE AREA MAP
SEGMENT 2
SR 20, PI 064042

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7 OF 7

BMP Cost Estimate

Project Cost	$189,197,099	(excludes traffic control and signals)
Project Length (linear feet)	88176	
Unit Cost	$2,145.68	

Drainage Basin	Basin Length (linear feet)	Basin Cost
19	1518.5	$3,258,300.03
21	415.9	$892,400.64
23A	404.3	$867,496.44
24	787.3	$1,689,335.17
25	1735.2	$3,723,178.50
27B	619.0	$1,328,224.22
28A	1000.0	$2,145,675.68
31	593.9	$1,274,265.11
32	903.4	$1,938,377.21
35	841.5	$1,805,554.79
36	110.3	$236,589.94
37	373.3	$801,085.23
39	595.8	$1,278,415.81
40	1004.0	$2,154,213.65
45	595.8	$1,278,415.81
46	1164.5	$2,498,721.80
47	1619.1	$3,474,136.46
48	665.5	$1,427,841.03

Basin 19

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	1000	$15,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	356	$712.00
Engineered Media	cy	$75.00	250	$18,750.00
Filter Fabric	sy	$3.29	356	$1,171.24
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	160	$2,560.00
Landscaping	sy	$14.00	356	$4,984.00
Guardrail	lf	$2.15	150	$322.50
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	100	$329.00
Rip Rap (Forebay)	sy	$50.00	100	$5,000.00
			MS4 BMP Cost Total	**$52,828.74**

Percent of Construction Cost	**1.62%**

Basin 21

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	225	$3,375.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	70	$140.00
Engineered Media	cy	$75.00	45	$3,375.00
Filter Fabric	sy	$3.29	70	$230.30

6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	80	$1,280.00
Landscaping	sy	$14.00	70	$980.00
Guardrail	lf	$2.15	70	$150.50
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	20	$65.80
Rip Rap (Forebay)	sy	$50.00	20	$1,000.00
			MS4 BMP Cost Total	**$14,596.60**

Percent of Construction Cost	**1.64%**

Basin 23A

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	500	$7,500.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	150	$300.00
Engineered Media	cy	$75.00	100	$7,500.00
Filter Fabric	sy	$3.29	150	$493.50
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	100	$1,600.00
Landscaping	sy	$14.00	150	$2,100.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	45	$148.05
Rip Rap (Forebay)	sy	$50.00	45	$2,250.00
			MS4 BMP Cost Total	**$26,106.55**

Percent of Construction Cost	**3.01%**

Basin 24

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	400	$6,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	110	$220.00
Engineered Media	cy	$75.00	75	$5,625.00
Filter Fabric	sy	$3.29	110	$361.90
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	100	$1,600.00
Landscaping	sy	$14.00	110	$1,540.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	45	$148.05
Rip Rap (Forebay)	sy	$50.00	45	$2,250.00
			MS4 BMP Cost Total	**$21,959.95**

Percent of Construction Cost	**1.30%**

Basin 25

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	1000	$15,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	356	$712.00

Engineered Media	cy	$75.00	710	$53,250.00
Filter Fabric	sy	$3.29	356	$1,171.24
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	160	$2,560.00
Landscaping	sy	$14.00	356	$4,984.00
Guardrail	lf	$2.15	160	$344.00
Right of Way	sf	$0.69	2500	$1,725.00
Filter Fabric (Forebay)	sy	$3.29	160	$526.40
Rip Rap (Forebay)	sy	$50.00	160	$8,000.00
			MS4 BMP Cost Total	**$92,272.64**

Percent of Construction Cost	**2.48%**

Basin 27B

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	390	$5,850.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	110	$220.00
Engineered Media	cy	$75.00	75	$5,625.00
Filter Fabric	sy	$3.29	110	$361.90
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	100	$1,600.00
Landscaping	sy	$14.00	110	$1,540.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	40	$131.60
Rip Rap (Forebay)	sy	$50.00	40	$2,000.00
			MS4 BMP Cost Total	**$21,543.50**

Percent of Construction Cost	**1.62%**

Basin 28B

Earthwork	cy	$15.00	1000	$15,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	3555	$7,110.00
Engineered Media	cy	$75.00	250	$18,750.00
Filter Fabric	sy	$3.29	3555	$11,695.95
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	160	$2,560.00
Landscaping	sy	$14.00	3555	$49,770.00
Guardrail	lf	$2.15	150	$322.50
Right of Way	sf	$0.69	1000	$690.00
Filter Fabric (Forebay)	sy	$3.29	90	$296.10
Rip Rap (Forebay)	sy	$50.00	90	$4,500.00
			MS4 BMP Cost Total	**$114,694.55**

Percent of Construction Cost	**5.35%**

Basin 31

Bioretention Area	Unit	Unit Cost	Quantity	Cost

Earthwork	cy	$15.00	210	$3,150.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	60	$120.00
Engineered Media	cy	$75.00	40	$3,000.00
Filter Fabric	sy	$3.29	60	$197.40
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	60	$960.00
Landscaping	sy	$14.00	60	$840.00
Guardrail	lf	$2.15	70	$150.50
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	40	$131.60
Rip Rap (Forebay)	sy	$50.00	40	$2,000.00
			MS4 BMP Cost Total	**$14,549.50**

Percent of Construction Cost	**1.14%**

Basin 32

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	480	$7,200.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	110	$220.00
Engineered Media	cy	$75.00	75	$5,625.00
Filter Fabric	sy	$3.29	110	$361.90
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	150	$2,400.00
Landscaping	sy	$14.00	110	$1,540.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	2400	$1,656.00
Filter Fabric (Forebay)	sy	$3.29	75	$246.75
Rip Rap (Forebay)	sy	$50.00	75	$3,750.00
			MS4 BMP Cost Total	**$27,214.65**

Percent of Construction Cost	**1.40%**

Basin 35

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	500	$7,500.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	90	$180.00
Engineered Media	cy	$75.00	60	$4,500.00
Filter Fabric	sy	$3.29	90	$296.10
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	150	$2,400.00
Landscaping	sy	$14.00	90	$1,260.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	3300	$2,277.00
Filter Fabric (Forebay)	sy	$3.29	100	$329.00
Rip Rap (Forebay)	sy	$50.00	100	$5,000.00
			MS4 BMP Cost Total	**$27,957.10**

Percent of Construction Cost	**1.55%**

Basin 36

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	130	$1,950.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	35	$70.00
Engineered Media	cy	$75.00	25	$1,875.00
Filter Fabric	sy	$3.29	35	$115.15
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	60	$960.00
Landscaping	sy	$14.00	35	$490.00
Guardrail	lf	$2.15	60	$129.00
Right of Way	sf	$0.69	2200	$1,518.00
Filter Fabric (Forebay)	sy	$3.29	15	$49.35
Rip Rap (Forebay)	sy	$50.00	15	$750.00
			MS4 BMP Cost Total	**$11,906.50**

Percent of Construction Cost	**5.03%**

Basin 37

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	200	$3,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	35	$70.00
Engineered Media	cy	$75.00	25	$1,875.00
Filter Fabric	sy	$3.29	35	$115.15
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	50	$800.00
Landscaping	sy	$14.00	35	$490.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	45	$148.05
Rip Rap (Forebay)	sy	$50.00	45	$2,250.00
			MS4 BMP Cost Total	**$12,963.20**

Percent of Construction Cost	**1.62%**

Basin 39

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	230	$3,450.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	40	$80.00
Engineered Media	cy	$75.00	25	$1,875.00
Filter Fabric	sy	$3.29	40	$131.60
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	120	$1,920.00
Landscaping	sy	$14.00	40	$560.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	2600	$1,794.00
Filter Fabric (Forebay)	sy	$3.29	50	$164.50
Rip Rap (Forebay)	sy	$50.00	50	$2,500.00
			MS4 BMP Cost Total	**$16,690.10**

Percent of Construction Cost	**1.31%**

Basin 40

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	800	$12,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	175	$350.00
Engineered Media	cy	$75.00	120	$9,000.00
Filter Fabric	sy	$3.29	175	$575.75
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	100	$1,600.00
Landscaping	sy	$14.00	175	$2,450.00
Guardrail	lf	$2.15	150	$322.50
Right of Way	sf	$0.69	2400	$1,656.00
Filter Fabric (Forebay)	sy	$3.29	125	$411.25
Rip Rap (Forebay)	sy	$50.00	125	$6,250.00
			MS4 BMP Cost Total	**$38,615.50**

Percent of Construction Cost	**1.79%**

Basin 45

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	800	$12,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	175	$350.00
Engineered Media	cy	$75.00	120	$9,000.00
Filter Fabric	sy	$3.29	175	$575.75
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	150	$2,400.00
Landscaping	sy	$14.00	175	$2,450.00
Guardrail	lf	$2.15	100	$215.00
Right of Way	sf	$0.69	4000	$2,760.00
Filter Fabric (Forebay)	sy	$3.29	125	$411.25
Rip Rap (Forebay)	sy	$50.00	125	$6,250.00
			MS4 BMP Cost Total	**$40,412.00**

Percent of Construction Cost	**3.16%**

Basin 46

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	700	$10,500.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	140	$280.00
Engineered Media	cy	$75.00	175	$13,125.00
Filter Fabric	sy	$3.29	140	$460.60
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	150	$2,400.00
Landscaping	sy	$14.00	140	$1,960.00
Guardrail	lf	$2.15	150	$322.50
Right of Way	sf	$0.69	5000	$3,450.00

Filter Fabric (Forebay)	sy	$3.29	125	$411.25
Rip Rap (Forebay)	sy	$50.00	125	$6,250.00
			MS4 BMP Cost Total	**$43,159.35**

Percent of Construction Cost	**1.73%**

Basin 47

Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	1150	$17,250.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	250	$500.00
Engineered Media	cy	$75.00	285	$21,375.00
Filter Fabric	sy	$3.29	250	$822.50
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	200	$3,200.00
Landscaping	sy	$14.00	250	$3,500.00
Guardrail	lf	$2.15	200	$430.00
Right of Way	sf	$0.69	7800	$5,382.00
Filter Fabric (Forebay)	sy	$3.29	200	$658.00
Rip Rap (Forebay)	sy	$50.00	200	$10,000.00
			MS4 BMP Cost Total	**$67,117.50**

Percent of Construction Cost	**1.93%**

Basin 48

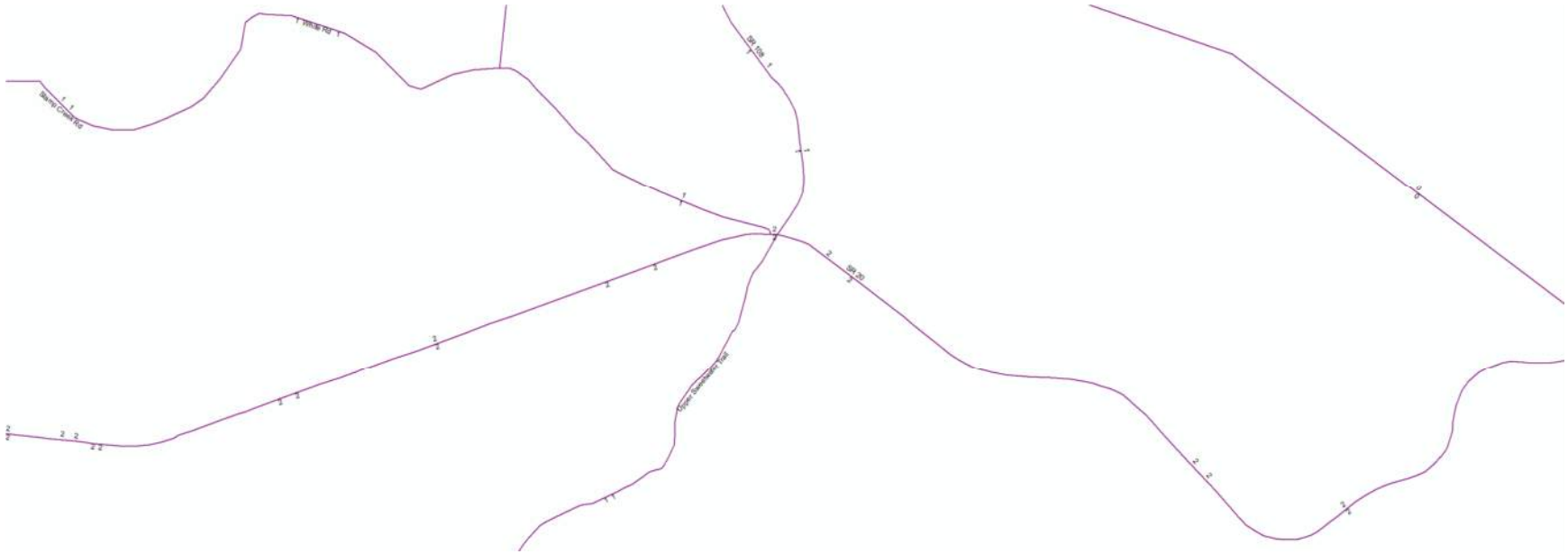
Bioretention Area	Unit	Unit Cost	Quantity	Cost
Earthwork	cy	$15.00	600	$9,000.00
Outlet Structure	ea	$4,000.00	1	$4,000.00
Mulch Layer	sy	$2.00	100	$200.00
Engineered Media	cy	$75.00	70	$5,250.00
Filter Fabric	sy	$3.29	100	$329.00
6" Underdrain Pipe, INCL Drainage AGGR	lf	$16.00	100	$1,600.00
Landscaping	sy	$14.00	100	$1,400.00
Guardrail	lf	$2.15	150	$322.50
Right of Way	sf	$0.69	0	$0.00
Filter Fabric (Forebay)	sy	$3.29	125	$411.25
Rip Rap (Forebay)	sy	$50.00	125	$6,250.00
			MS4 BMP Cost Total	**$28,762.75**

Percent of Construction Cost	**2.01%**

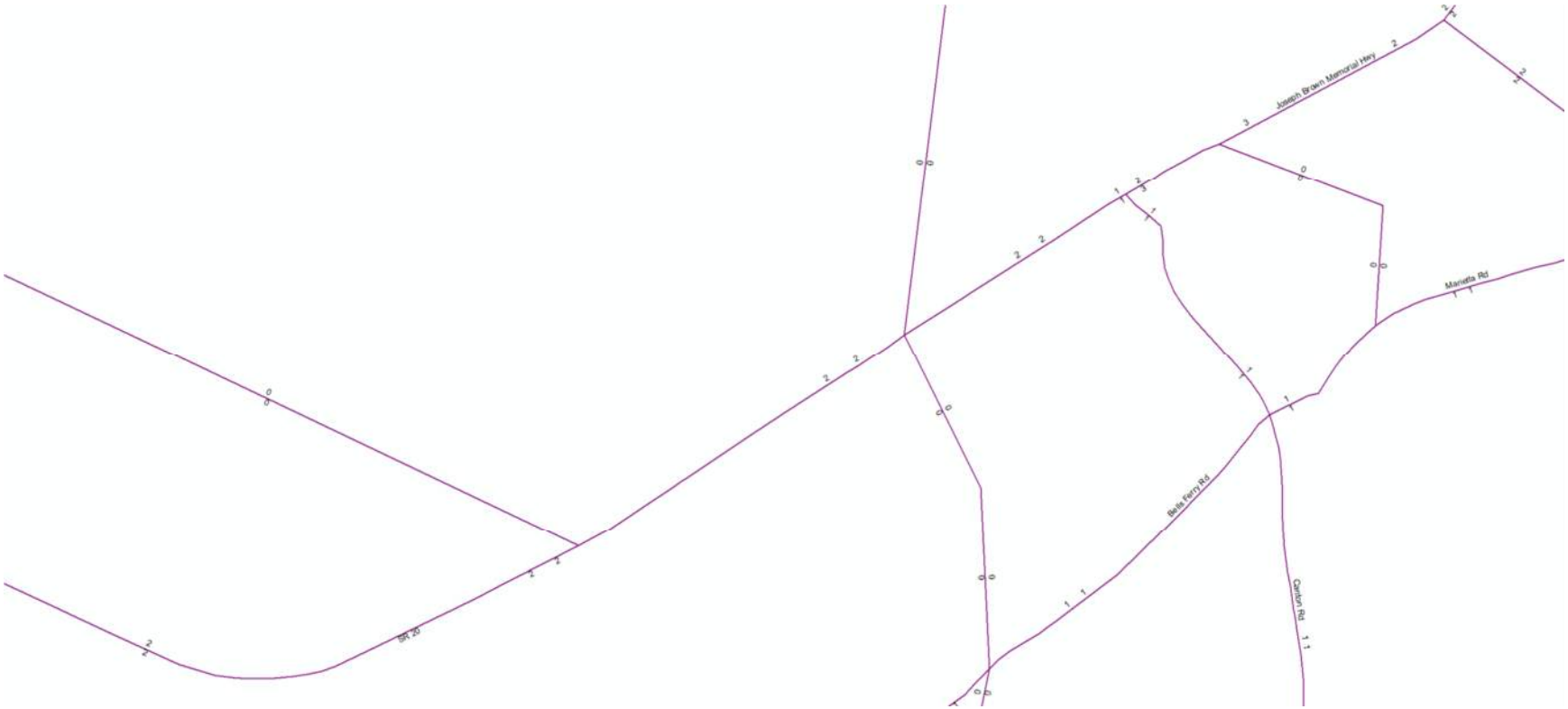
Network Schematics showing thru lanes

Conforming plan’s network schematics showing thru lanes

Conforming plan’s network schematics showing thru lanes



Conforming plan’s network schematics showing thru lanes



Initial Concept Team Meeting Minutes

RECORD OF MEETING

Arcadis U.S., Inc.
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Subject:

SR 20 from I-75 to I-575 PI 0007836
Bartow/Cherokee Initial Concept Team Meeting

Department:

Infrastructure

Arcadis Project No.:

GA064042

Meeting Location:
GDOT One Georgia Center
600 W Peachtree St NW
4th Floor Rooms 403-44
Atlanta, GA 30308

Participants:

[See Sign-In Sheet]

Copies :

Meeting Date:

April 27,2017

Minutes by:

Robert Askew, Melissa Rottenberg

Issue Date:

May 23, 2017

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1. Introductions
2. Keith Kunst discussed project background and overview, recap of previous Initial Concept Team Meeting held March 2015, and project progress to date (two alternatives have been laid out and ecological and historic resources identified).
3. Keith discussed expected outcomes of the Initial Concept Team Meeting:
    a. Input needed on design options – speed design, typical sections, impact approach.
    b. Information needed to push forward with Practical Alternatives Report (PAR)--make sure the project team presents to external agencies exactly what GDOT wants. The PAR meeting has a target date of October 2017.Validate Project Justification
    c. Discuss project milestones and progress to date
    d. Staging and maintenance of traffic were considered from the beginning of the process of laying out alternatives to present only layouts that are constructible.
    e. Alignment going through USACE easements are of concern for the design.
4. Melissa Rottenberg discussed environmental resources:
    a. 16 potentially National Register eligible historic resources identified, including two potentially eligible districts
    b. 175 water resources identified

   c. Allatoona Wildlife Management Area crosses corridor at two locations, owned by USACE and managed by the Georgia Department of Natural Resources (GDNR); includes one Day Use Area (boat ramp west of the Knox Bridge crossing)
   d. No net fill will be allowed in Lake Allatoona.
   e. Daniel Pass suggested that the project team contact Drew Martin to set up initial meeting with USACE to advance 408 process.
5. Kate Picklesimer discussed Traffic:
   a. Existing AM/PM traffic flow: In general, corridor is divided in half with AM peak headed toward I-75 in western half and toward I-575 in eastern half. PM peak consists of traffic headed from the two interstates towards the middle of the corridor.
   b. Existing Traffic Volumes were approved by GDOT October 1, 2014.
   c. Existing ADTs from 2014 at selected points along the corridor were presented, ranging from 21,800 vehicles per day (vpd) at I-75, to 9,600 vpd at SR 108, to 19,700 vpd at I-575.
   d. No-build ARC model was presented showing LOS of E or F for majority of corridor in 2040.
   e. Crash rates were presented showing 9 locations where average crash rates were higher than average for property damage only, injury and fatal crashes.
   f. Potential access restrictions were presented and discussed.
      i. Median openings or closures will be based on factors such as volume, sight distance and truck sight distance
      ii. Keith asked for GDOT position on RCUTs. Daniel mentioned that RCUTs serve a great need. Andrew Pearson said that Traffic Ops is pushing to use RCUTs where possible to reduce crash rates. Albert Shelby said that there needs to be a balanced, systemic approach to where to place RCUTs and had concerns about stakeholder input and public comments.
      iii. Keith said that the project team would not apply restricted access across the board, but would look at each intersection on a case-by-case basis.
      iv. Kate presented potential access restrictions based on traffic data: 9 locations that warrant a closed median, 2 locations that warrant an RCUT and 23 locations that warrant an open or signalized intersection.
6. Robert Askew discussed Geometric Layout:
   a. Two typical section layouts were presented. Alternative 1 consists of a 24’ raised median and Alternative 2 consists of a 24’ raised median at the western and eastern ends and 44’ depressed median along the middle of the corridor.
      i. The first and last miles of the corridor are more commercialized and urban than the middle 15 miles of the corridor. May be more context sensitive to make the typical section through these areas an urban section to reduce project footprint.
      ii. Albert would like to ensure that the entire corridor is looked at in terms of minimizing environmental and property impacts instead of uniform typical section approach.
      iii. Albert asked about current posted speed limits - corridor varies from posted warning speed limits of 35 mph at Allatoona Lake to posted regulatory limits of 55 mph.

iv. Keith handed out a design decision table the project team created to track the process of determining which side of the existing road to widen.

b. Video presentation showing a fly-through of the project from I-75 to I-575 and highlighting areas of concern and various options.

i. Start corridor with 45 mph design speed, transitioning to 55 mph around intersection with JR Road. This location is also the Alternative 2 typical section transition from 24' raised median to 44' depressed median. There is an existing vertical crest with a K-value good for 45 mph in this area. Keeping it at 45 mph will reduce earthwork and staging costs.

ii. An existing fill MSE wall between JR Road and Holly Drive on the south side of SR 20 has a sag curve good for only 30 mph. Question was asked by design team if wall should be rebuilt or salvaged. Albert said that project team should consider cost of saving wall versus increasing safety; cost may be minimal compared to entire cost of project. Daniel said that new FHWA Controlling Criteria may exempt stopping sight distance criteria in sag vertical curves. Project team will verify this.

iii. Design team will attempt to preserve the recently completed safety project (PI 0008965) as much as possible; however, two recently completed walls on the south side of SR 20 would have to be replaced to accommodate widening. At eastern end of PI 0008965, just west of Boston/Stamp Creek within the Allatoona Lake WMA, the new grade of SR 20 is 6.1% (steeper than allowed maximum grade of 6%). Would need to obtain a Design Variance.

iv. East of project PI 0008965, the corridor enters first segment within Allatoona WMA (Boston/Stamp Creek), this is owned by USACE and would require easement to widen through here. Existing bridges here were constructed in 2007 and would be kept for this project. Alternative 1 would turn the existing bridges into the westbound lanes, while Alternate 2 would turn them into the eastbound lanes. Existing jog in the road east of bridges would be eliminated in Alternative 1 and reduced in Alternative 2. Albert said that we will have to minimize impacts within the WMA, which may require reducing the median width.

v. East of the WMA, the alignment would be shifted to the south to eliminate three successive low K-value crests in the existing roadway. This would make staging easier and reduce earthwork.

vi. Corridor east of Sultallee Baptist Church passes between stream and wetland resources. Impacts will need to be studied to determine best way to widen and minimize impact. Albert mentioned that a bridge may need to be considered to minimize impacts here. Keith mentioned there may be impacts to community resources in this area as well. Albert asked if it would be beneficial to bring a cost-to-cure specialist to look at this and Keith replied yes. This may be included in the next Task Order.

vii. Presented option at intersection with SR 108 to flatten out existing curve. Option 'A' would preserve existing radius; Option 'B' would increase radius to flatten curve and increase sight distance. An intersection improvement project was completed in Fall 2016. Project team will look at what it would take to ensure safe

operation at 55 mph. Albert said that taking more R/W from property owners so soon after having property acquired for intersection improvement project may cause concern for residents. District 6 said that they think the current intersection may work well as is. The grade of SR 108 matches closely to the super-elevation rate of SR 20 through here.

viii. Segment of project west of the Lake Allatoona crossing has 6 consecutive reverse curves, 6% grade and posted warning speed limit of 35 mph. This area is also entering the second segment of the Allatoona WMA. Four options were presented to address this area. Option 'A' would try to follow existing alignment as close as possible, Option 'B' would shift roadway to new alignment north of existing road, Option 'C' would cut across three of the existing reverse curves with two large sweeping curves. Option 'D' would mostly follow Option 'C', but would cut across an existing USACE dredging staging area to avoid large rock cuts on north side of corridor and would require a bridge to span a small cove of the Lake.
    1. Associated costs were presented for each option, as of now, Option 'C' or 'D' is the preferred option.
    2. No driveways or side roads within this area. Project team will consider reducing median width or adding walls to minimize foot print.
    3. District 6 mentioned that this area has a higher rate of crashes, such as single car crashes, head on collisions, and off road crashes.
    4. District 6 said that the USACE dredging operation has been operating for at least 20 years.
    5. Keith asked about getting a geotechnical investigation underway to determine how much solid rock is within the proposed cuts in this area. Albert agreed that this would be a good idea.

ix. Discussion about proposed alignment at Lake Allatoona bridge crossing.
    1. USACE existing day-use area in this location (boat ramp access and parking lot)
    2. Proposed alignment would be north of existing bridge. This would allow for new bridge crossing to be constructed in one phase and would allow for the better day use/boat ramp access. The current driveway to day-use area is severely skewed and moving alignment farther north would allow for a driveway that ties into SR 20 closer to a perpendicular angle.
    3. Project team is proposing removing the existing rock jetty extending into the lake that accommodates existing bridge. This would increase storage volume of lake and would offset volume lost to new bridge columns. Proposed bridge would span the entire lake. Project team believes that USACE would not allow GDOT to widen existing jetty to accommodate a widened road. Input from USACE will be required.

x. East of Lake Allatoona, there are two existing broken back curves. Project team proposed changing alignment to two large sweeping curves to eliminate them. Daniel and Albert agreed that eliminating them now is the best option so that GDOT will not have to revisit this in the future.

xi. Between Legend Creek Rd and Riverbend Way, project team is proposing reducing design speed from 55 mph to 45 mph. Alternative 2 typical section would also change to 24' raised median.
xii. Corridor transitions to a more urban area with three schools in the vicinity. Project team will consider context sensitive design and look at using an urban shoulder with sidewalks. Daniel said that the corridor is not on the State Bicycle Network, but the project team should check local or regional plans to see if there are any plans to accommodate bicycles along the corridor. Albert said that he is open to using 10' wide sidewalk in this area to accommodate bicycles and pedestrians.
xiii. Discussion about intersection of SR 20 with SR 5/140/Marietta Hwy.
    1. Traditional T-intersection proposed by project team.
    2. Albert is interested in seeing alternative or non-traditional layouts as solutions to this intersection, including one-way pair or roundabout. Albert recommended looking at Tara Blvd redesign for ideas.
xiv. SR5//20/140 segment to Hickory Flat Hwy is not access controlled, traffic volume warrants raised median. This has potential to have public controversy.
    1. Cynthia Burney asked about crash data through here. Project team will pull the recent segment crash history for this section of the corridor.
    2. Albert stated that if crash data doesn't warrant a raised median, the project team should consider leaving it as-is.
xv. Proposed improvements to SR20/140/Hickory Flat Hwy would include adding a second eastbound lane to have a full two lanes all the way to ramp to I-575. A median would also be added to separate east and westbound traffic. Currently there is no median here.
    1. District 6 said they are considering restriping this segment of Hickory Flat Hwy to accommodate a second lane. Cynthia requested that the project team be kept in the loop by the District on what they plan to do in this area.

7. Discussion about needed coordination with USACE (Section 408, Section 4(f):
    a. Section 408
        i. Daniel outlined the draft process between GDOT and the USACE, which more clearly defines when coordination can occur and how the process works overall.
        ii. Contact Drew Martin for more information and obtain a copy of the draft procedures.
        iii. Initial 408 coordination meeting can be requested now with the USACE.
        iv. New draft process allows for the team to walk away from the initial coordination meeting with a clear path forward and the USACE
        v. GDOT can pay the USACE at initial meeting
        vi. If there are direct facility impacts, then it can cause a very lengthy coordination process. The project ream would like to try to avoid years of coordination with USACE.
    b. Section 4(f) Recreational Impacts – De minimis determination would require public involvement. USACE may want to lead public involvement for activities on their lands.

c. Order of items to address with regards to design and impacts within WMA:
    i. Bridge office input on design
    ii. USACE Lake Allatoona office input on design
    iii. Discussion with USACE Lake Allatoona to include potential mitigation options for removal of the rock jetty i.e.) leaving part of it and creating parking and boat ramp, WMA parking/trail access, dredging operation – would removal of jetty negate need for operation?
d. Test borings on potential rock cut located along north side of SR 20 within the WMA west and east of Lake Allatoona will aid in alignment decisions
e. Keith discussed need for Archeology survey (and therefore, an ARPA permit) now due to PAR schedule. There should be a Cultural Resources SME meeting regarding these items. Cynthia asked Gretel Sims to set up team meetings and invite all SMEs. Pam Baughman is the OES Archaeology SME. Keith Kunst suggested starting with an email to her, followed by a call/meeting if necessary. [Update: Email communication with Pam Baughman occurred on 4/27/17. Pam suggested starting the ARPA application as early as possible, and noted that there are fees that must be paid by GDOT or the consultant (if they are scoped to do so) in advance.]
f. Gretel said that the CE from bridge replacement project (PIs 631510 & 631515) let in 2006 not located from USACE or GDOT records (per Aaron Burgess). Cynthia and Gretel will look further in the records to see if they can find the CE. [Update: Cynthia could not locate records for them]

8. Keith asked if there any additional comments on the project team's design approach and no one had any now.
9. Meeting Adjourned.

ARCADIS Design & Consultancy for natural and built assets

SIGN IN SHEET

April 27, 2017
PI 0007836 – SR 20 from I-75 to I-575
Bartow and Cherokee Counties
Initial Concept Team Meeting

GDOT One Georgia Center
600 W Peachtree St NW
4th Floor Rooms 403-44
Atlanta, GA 30308

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Eddie Waters	GDOT - TMC	ewaters@dot.ga.gov
Albert Shelby	GDOT - Program Delivery	ashelby@dot.ga.gov

Concept Team Meeting- Bartow/Cherokee PI#0007836

April 27, 2017

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David Acree	Pre construction	dacree@dot.ga.gov
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Concept Team Meeting Minutes

RECORD OF MEETING

ARCADIS Design & Consultancy for natural and built assets

Subject:

SR 20 from I-75 to I-575 PI 0007836
Bartow/Cherokee Concept Team Meeting

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Department:

Infrastructure

Arcadis Project No.:

GA064042

Meeting Location:
GDOT District 6
30 Great Valley Parkway

White, GA 30184

Participants:

[See Sign-In Sheet]

Copies :

Meeting Date:

December 17, 2019

Minutes by:

Robert Askew, Robin Stevens

Issue Date:

December 20, 2019

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1. Theo Igbalajobi opened the meeting and led the introductions.
2. Keith Kunst provided project overview & project justification:
    a. Project is approximately 16.5 miles, widening from 2 lanes to 4 lanes (two in each direction) with a 20-32' variable width median.
    b. Primary justification is to improve future congestion in this corridor
    c. Secondary justification is to reduce crash frequency and severity
3. Kate Picklesimer presented traffic volume & crash analysis:
    a. Approved volumes:
        i. Current Year (2014): 9,000 to 23,600
        ii. Open Year (2026): 11,100 to 27,400
        iii. Design Year (2046): 13,600 to 33,600
    b. In the AM No-Build Design Year (2046) Scenario, 6 intersections will have a Level of Service (LOS) of F, and 4 intersections will have a LOS of E.
    c. In the PM No-Build Design Year (2046) Scenario, 5 intersections will have a Level of Service (LOS) of F, and 6 intersections will have a LOS of E.
    d. 20 of 36 segments of the corridor exceed the statewide average for total injury or fatal crashes.
4. Robert Askew presented existing roadway conditions:
    a. 2 to 4 lanes, with four passing lane segments
    b. Depressed median at western end of corridor, two-way left turn at eastern end

   c. Urban characteristics at the both ends of the corridor; the middle portion is rural.
   d. Three existing bridges at Stamp Creek, Boston Creek and Lake Allatoona
   e. Existing right-of-way varies from 80' to 200'
   f. 12 different utility owners within the corridor
   g. There is visual evidence of rock along the cut embankments, the terrain gets mountainous around Lake Allatoona. There is potential for rock blasting.
   h. There are two private dams adjacent to the corridor, one at JR Road and the other at Rhine Road.
5. Robin Steven presented the existing environmental conditions:
   a. Corridor crosses USACE Allatoona Lake Wildlife Management Area at two locations: Stamp/Boston Creek area and at Lake Allatoona area.
   b. Waters: 34 perennial streams, 54 intermittent streams, 66 wetlands, 15 open waters, 4 ephemeral streams
   c. 11 trout streams requiring 50-foot buffer, the remaining are warm water streams requiring a 25-foot buffer
   d. Threatened and Endangered species: Presence of federally listed Etowah, Cherokee, and amber darters and northern long-eared and gray bats; presence of state-listed Etowah crayfish, rock darter, Georgia aster, Cumberland rose gentian, and pink ladyslipper
   e. 14 National Register of Historic Places (NRHP)-eligible resources; State Historic Preservation Office (SHPO) concurrence received August 31, 2017.
   f. Phase I archaeology field work has been completed. Results are in process--numerous sites and cemeteries have been identified. ESAs to be developed upon SHPO concurrence with findings.
6. Robert Askew presented the Alternative Alignment process and how the preferred alignment was developed:
   a. Corridor was divided into 19 segments and alternatives to widen to the north, south and symmetrically were developed. Major cost driving factors (earthwork volume, right-of-way area, displacements and environmental resource impacts) weighted by unit price were applied to each segment to determine which direction to widen was the most efficient. A combined alignment was then developed and refined to consider factors such as geometric corrections, staging/maintenance of traffic and constructability in order to find the preferred alternative.
   b. In the segment just west of Lake Allatoona, the existing alignment contains six reverse curves at a near 6% grade. This segment also has a crash rate higher than the state average. Alternative alignments considered here were:
      i. Moving the alignment onto new location north of the existing roadway. This option was eliminated due to it being the highest cost.,
      ii. A recommendation from the Value Engineering (VE) Study was to use the existing alignment as mush as possible. This option was eliminated due to the geometry not working out. Two of the curves could not meet minimum length requirements and the curves could not be separated enough to allow for proper superelevation transition.
      iii. The preferred alternative straightened out the alignment, cutting though the middle of the reverse curves and reduced the number of curves from six to two.

c. Two typical sections are proposed:
    i. A raised median with a normal width of 20' at the western and eastern ends of the corridor where the design speed is 45 mph, a raised median with a width of 12' to 24' in the segments of the project that pass through the Corps property. The 12' width is to avoid impacting two Revolutionary War era cemeteries near Stamp Creek.
    ii. Outside the Corps property, we are proposed a 32' depressed median in the 55 mph segments. In the depressed median segments, the inside lane will be 11 feet wide, which is a recommendation that came out of the VE study.
d. Proposed bridge improvements:
    i. The two bridges at Stamp and Boston Creeks were replaced back in 2007. These bridges will be widened, and both will have raised medians.
    ii. Knox bridge over Lake Allatoona will be replaced with a new, higher bridge just north of the existing bridge.

7. Kate Picklesimer presented the median opening review and Intersection Control Evaluation (ICE) analysis:
    a. Median openings and U-turns balanced with median opening spacing criteria and distance needed to make U-turns.
    b. Intersection types based on ICE analysis: Traffic Signal, Right-In-Right-Out, Restricted Crossing U-Tun (RCUT), High-T and Roundabout.
8. Robert Askew presented the approved Design Exceptions and Variances (DE & DV) received:
    a. Design Exception for Maximum Grade
        i. Criteria for Mountainous Terrain at 55 mph is 6%
        ii. Proposed 6.8% grade between Roberson Drive & Timberlake Cove to match existing grade.
        iii. This segment of the project was upgraded as part of a passing lanes project in 2015. Meeting maximum grade would have required significant cuts and intersection redesign to achieve a 6% grade.
    b. Design Variance for Median Width
        i. Criteria for 4-Lane Arterial Roadway at 55 mph: 24' for a raised median
        ii. Proposed 12' raised median between Bells Ferry Rd/Wilderness Camp Road and just east of Stamp Creek bridge to avoid disturbing cemetery plots located on both sides of the road west of Stamp Creek.
9. Keith Kunst explained that the project will ultimately be broken up into 7 separate projects for construction. During the Preliminary Plans phase, the entire corridor will first be designed as one project because the Environmental Assessment will have to cover the entire corridor, then the dividing points will be identified based on constructability and independently constructible design packages will be developed, each with its own Preliminary Field Plan Review (PFPR).
10. Robert Askew presented a fly-thru video rendering with the preferred alternative.
11. Theo Igbalajobi opened the floor to questions and comments.
    a. US Army Corps of Engineers (USACE) asked about why the proposed alternative shifts the alignment to the north of existing roadway at Lake Allatoona. Keith responded that reasons for the shift include having the to maintain traffic on the existing bridge while the new bridge is under construction. Raising the profile of the road will reduce the cut limits,

therefore reducing impacts to USACE property. The driveway at the Knox Bridge Boat Ramp will be able to tie into the proposed alignment at an angle closer to perpendicular than the current heavily skewed angle. An added benefit that USACE can consider is that the existing rock jetty the current roadway sits on will be able to be removed, thereby increasing the storage volume of the lake.

b. USACE asked for more details about the alignment at the Stamp/Boston Creek area. Keith responded that the alignment was largely dictated by avoiding the archaeological sites west of Stamp Creek and to retain the existing bridges.
c. GDOT District 6 Utilities commented that the reimbursable utility cost estimate seemed low. Keith responded that as the design is developed and impacts are identified, we will be able to update the cost estimate more accurately.
d. Cherokee County Water Authority commented that there are plans for sewer line upgrades in the vicinity around Lake Allatoona and to keep them posted on the design so that they can plan their activities.
e. GDOT Road Design asked at what point will the corridor be broken up into separate projects and if whether each segment will have its own PI number. Theo responded it will be after Concept Phase and that each segment will have its own PI number assigned. There will only be one Concept Report for the entire corridor.
f. GDOT Traffic Operations asked how the proposed 8 median closings are being addressed. Keith explained the ICE analysis recommended those specific locations to be closed, that geometric considerations such as intersection sight distance were also used to determine where to close the medians, and that those movements would be accommodated with U-turns at adjacent intersections with median openings.
g. GDOT Office of Environmental Services (OES) – Archaeology commented that there are 15 sites that need to be considered, five of which are cemeteries. These will need to be factored as the design moves forward.
h. GDOT Design Policy asked about why lighting is proposed. Keith responded that there are five roundabouts proposed and that is where the lighting will be needed.
    i. GDOT OES commented that special lighting may need to be considered to accommodate reduce impacts to bats
i. GDOT OES asked about holding a Virtual PIOH that was previously proposed. Theo responded that the Virtual PIOH as been canceled due to GDOT determining that the cost of holding one was too expensive. A traditional PIOH is still planned.
j. GDOT Construction reiterated that they preferred separate PFPRs for each of the individually designed segments in order to evaluate tie-ins to existing roadway and maintenance of traffic.
k. GDOT Office of Engineering Services – No comments.
l. GDOT District 6 Maintenance – No comments. Keith mentioned that moving forward, any planned maintenance activities should be coordinated with the project in order to avoid any conflicts.
m. Cherokee County asked about the timing of the PIOH. Theo responded that the schedule is unknown at this time.
n. Cherokee County asked of the PowerPoint presentation and video will be included in the minutes. Theo responded yes.

o. GDOT Construction asked if the pavement will be asphalt. Keith responded yes.

12. Comments received via email:
    a. GDOT Office of Design Policy 12/13/2019
        i. Please find the following comments for your use in developing the CR report for PI# 0007836
        Page 1- Project type – Show as Widening.
        ii. Page 2- Location map- Include an additional map showing streets mentioned in justification statement, existing conditions and streets included in design features tables,
        iii. Page 3- Project justification statement- Include the preparer of the statement, Arcadis, Office of Planning or other.
        iv. Third paragraph- Revise wording to read …the western project limit for this project begin just east of I-75,..
        v. Page 3- Existing conditions- For clarity, revise the wording in the second paragraph and following sentences to read
        vi. The project begins (east or west of) the intersection of SR20 @ I-72 in Bartow County and ends (east or west of) the intersection of SR5/Marietta Hwy (and or @) I-575.
        vii. The existing road width has a four lane layout (at) the interstate systems (and) a two lane layout (at or along) Lake Allatoona.
        viii. Page 4-5- Use the abbreviation for ft on these pages so they are consistent with the remaining pages of the report.
        ix. Page 7- Design features SR20- Verify the Policy for Inside median, 6ft overall and 2ft paved.
        x. Pages 7-13- Include the roadway classification being used above each table.
        xi. Is it possible to group more side roads together and have less tables?
        xii. Page 20- Project cost- Verify Programmed PE cost, $13,577,056 or $16,577,056.
        xiii. Mitigation estimate- Verify with Lisa Westberry (lwestberry@dot.ga.gov) and include the correspondence as an attachment.
        xiv. Page 20- Alternatives Use number of parcels instead of or in addition to acres for estimated property impacts.
        xv. Rationale Alternatives 2 thru 5- Please include additional detail, alternatives 4 and 5 especially need more explanation since the ROW difference between the preferred is not that great.
        xvi. Attachments- Please ensure all attachment are included with the concept report submittal, the only attachment included here appears to be a roll plot showing the concept layout.
        xvii. The concept layout will need to be submitted in a larger scale format. This will need to be printed with the approved report. The PDP references 11 X 17 format, however, with the length of the project as currently shown, this will be more sheets than desired. Please try using a 400 or 500 scale (or other) ensuring that it will be legible when printed on 11 X 17 size sheets.
        xviii. Concept utility report- Please ensure this attachment from District 6 is included.

xix. Traffic attachments- Coordinate with Traffic Operations to ensure necessary files have been provided for them to complete their review for any Roundabouts.
xx. PAR- The entire PAR report is not needed; a summary will be sufficient.

b. GDOT Traffic Operations 12/16/2019:
   i. At Rhine Rd the concept layout and ops analysis for Woodall Rd are showing an RCUT here, but the ICE is recommending a RIRO. I recommend the RCUT over the RIRO at Rhine due to median opening spacing. If the Arcadis team agrees please submit a waiver for this intersection and update the Stage 2 summary sheet.
   ii. Please attach this ICE to the Concept Report, approval of the CR will be approval of the ICE.
   iii. Rowland Springs Rd – ops analyses showing E U-turn at Vulcan Quarry intersection. It may need to be here since JR Road is >0.75 miles away (which might be too far), and the high-t accel. lane at Vulcan Quarry may make providing a U-turn before it or after it (before JR Road) infeasible/impractical - please confirm this
   iv. Timberlake Cove – recommend also installing a WB U-turn here, otherwise drivers from Commerce Row up to Bells Ferry have >1 mile to reach a U-turn at Roberson Dr.
   v. Bells Ferry/Wilderness Camp – RB doesn't appear to need the SB RT bypass operationally. Recommend saving money by not proposing one if it is not needed
   vi. Rhine Rd – concept showing RCUT, and ops analysis for Woodall Rd showing U-turn at Rhine Rd, but RIRO ranked #1 in ICE and no waiver submitted. Recommend RCUT here since side-street volumes are low and will provide needed median break – please send waiver for signature
   vii. Highland View Pass – recommend also installing an EB U-turn for driveways and side-streets S of SR 20, since Rhine Rd is >0.75miles W
   viii. Fincher Rd – RB doesn't appear to need the SB RT bypass operationally. Recommend saving money by not proposing one if it is not needed
   ix. Willie West Rd – need a WB U-turn here since Knox Campground Trail is >1mile from Ficklen Church Rd
   x. Fields Chapel Rd – need an EB U-turn either at this intersection or before/after (if sight-distance is inadequate) for all side-streets/driveways S of SR 20 since Willie West Rd
   xi. Veterans Cemetery Rd – need to provide a WB U-turn at or in the vicinity of this intersection for Knox Bridge Trail and driveways on N side of SR 20 between Veterans and Copper Hills Dr.
   xii. Copper Hills/Lusk – need to provide a WB U-turn at or after this intersection, for Fieldstone Dr. and Legend Creek Dr., since a U-turn near Veterans Cemetery is >1mile away
   xiii. Riverbend Way – RB doesn't appear to need the SB RT bypass operationally. Recommend saving money by not proposing one. Note for future – RT bypass separated by raised concrete island preferred over that shown in ICE layout (fastest path concerns)

xiv. River Green Ave. – agree with RB configuration in ICE layout, except the N leg should only have one exit lane from the circle

13. Meeting adjourned

MEETING SIGN-IN SHEET

Project: 0007836	**Meeting Date:** 12/17/19
Facilitator: Theo Igbalajobi	**Place/Room:** District 6 – Magnolia Conference Room

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MEETING SIGN-IN SHEET

Project: 0007836	**Meeting Date:** 12/17/19
Facilitator: Theo Igbalajobi	**Place/Room:** District 6 – Magnolia Conference Room

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MEETING SIGN-IN SHEET

Project: 0007836	**Meeting Date:** 12/17/19
Facilitator: Theo Igbalajobi	**Place/Room:** District 6 – Magnolia Conference Room

Name		Company	Phone		E-Mail
Will Griffin		OES			
Cynthia Bueney		Program Delivery			
Robert Graham		Design Policy-Lighting			
Krystal Storall-Sixon		OPD			

PAR Report

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PRACTICABLE ALTERNATIVE REPORT

SR 20 FROM I-75/BARTOW COUNTY TO I-575/CHEROKEE COUNTY

CSSTP-0007-00(836)
PI No. 0007836

September 2019

Attached is a copy of the Practicable Alternative Report for your review and comment.

Distribution:
GDNR Environmental Protection Division
Federal Highway Administration
US Army Corps of Engineers
US Fish & Wildlife Service
US Environmental Protection Agency

PART I
INTRODUCTION

A. **Proposed Project.** Proposed Georgia Department of Transportation (GDOT) Project No. CSSTP-0007-00(836)/PI 0007836 is located along State Route (SR) 20 from the Interstate 75 (I-75) interchange to Interstate 575 (I-575) in Bartow and Cherokee counties, Georgia, for a total distance of approximately 17.5 miles (Figure 1: Project Vicinity Map). GDOT proposes to widen SR 20 in this area from two travel lanes (one in each direction) to four travel lanes (two in each direction) with a 24-foot to 44-foot variable width median (Sheet 05-001: Typical Sections).

The project is currently in the concept design phase, is currently in the Long Range Program, and construction has not yet been scheduled. Therefore, the discussion herein represents a high-level conservative impact assessment.

Additional right-of-way (ROW) would be required for the proposed project. Total ROW would vary between 150 to 500 feet and will be determined during more detailed project design. ROW width varies due to rolling/mountainous terrain along the project corridor. Conceptual design includes 4:1 roadway slopes, except for areas where slope height exceeds 10 feet. In these areas, design consists of 2:1 slopes per GDOT standard slope control.

The approximate beginning, midpoint, and end of the project are located at latitude 34.207326/ longitude -84.760727, latitude 34.2227/longitude -84.6204, and latitude 34.220563/longitude -84.494889, respectively. The project study area encompasses approximately 1,554 acres. The project is located in the Etowah Watershed [Hydrologic Unit Code (HUC) 03150104]. The Etowah Watershed is a USEPA Region 4 Priority Watershed.

Table 1 shows the proposed impacts to waters of the U.S. (WOTUS) for the Preferred Alternative/Least Environmentally Damaging Practicable Alternative (LEDPA) (Alternative A). Table 2 summarizes the estimated total project impacts and mitigation for the Preferred Alternative/LEDPA.

Table 1: Proposed Impacts to WOTUS from the Preferred Alternative/LEDPA		
Resource[1]	**Estimated Impact**	
	Length (Linear Feet [LF]) or Area (Acre [AC])[2]	**Impact Type**
IS1	0 LF	N/A
IS2	60 LF	Culvert
WL3	0.000 AC	N/A
WL4	0.000 AC	N/A
EC5	0 LF	N/A
OW6	0.000 AC	N/A
PS7	54 LF	Culvert/Retaining Wall
PS8	150 LF	Culvert/Retaining Wall
PS9	250 LF	Culvert
IS10	81 LF	Culvert/Retaining Wall
WL11	0.025 AC	Culvert
WL12	0.000 AC	N/A
WL13	0.015 AC	Culvert
IS14	3 LF	Retaining Wall
WL15	0.000 AC	N/A
WL16	0.052 AC	
OW17	0.000 AC	N/A
PS18	0 LF	N/A
OW19	0.000 AC	N/A
OW20	0.000 AC	N/A
WL21	0.220 AC	Retaining Wall
PS22	0 LF	N/A
WL23	0.000 AC	N/A
IS24	0 LF	N/A
OW25	0.000 AC	N/A
WL26	0.000 AC	N/A
IS27	39 LF	Culvert/Retaining Wall
WL28	0.000 AC	N/A
PS29	0 LF	N/A
WL30	0.000 AC	N/A
IS31	93 LF	Culvert Extension
IS32	0 LF	N/A
WL33	0.035 AC	Culvert Extension
IS34	0 LF	N/A
OW35	0.000 AC	N/A
PS36	271 LF	Culvert Extension
IS37	0 LF	N/A

Table 1 (Cont.): Proposed Impacts to WOTUS from the Preferred Alternative/LEDPA		
Resource[1]	**Estimated Impact**	
	Length (Linear Feet [LF]) or Area (Acre [AC])[2]	**Length (Linear Feet [LF]) or Area (Acre [AC])[2]**
WL38	0.000 AC	N/A
IS39	0 LF	N/A
PS40	118 LF	Culvert Extension
WL41	0.000 AC	N/A
WL42	0.000 AC	N/A
PS43	0 LF	N/A
WL44	0.000 AC	N/A
IS45	76 LF	Culvert Extension
PS46	0 LF	N/A
WL47	0.000 AC	N/A
PS48	0 LF	N/A
WL49	0.000 AC	N/A
PS50	0 LF	N/A
PS51	0 LF	N/A
IS52	0 LF	N/A
WL53	0.000 AC	N/A
PS54	44 LF	Culvert Extension
WL55	0.020 AC	Retaining Wall
IS56	0 LF	N/A
WL57	0.000 AC	N/A
PS58	220 LF	Culvert Extension
WL59	0.003 AC	Culvert Extension
WL60	0.000 AC	N/A
OW61	0.000 AC	N/A
IS62	0 LF	N/A
IS63	0 LF	N/A
PS64	0 LF	N/A
PS65	66 LF	Culvert Extension
WL66	0.000 AC	N/A
WL67	0.000 AC	N/A
WL68	0.000 AC	N/A
IS69	22 LF	Culvert Extension
WL70	0.000 AC	N/A
IS71	0 LF	N/A
IS72	0 LF	N/A
IS73	0 LF	N/A
OW74	0.000 AC	N/A

Table 1 (Cont.): Proposed Impacts to WOTUS from the Preferred Alternative/LEDPA		
Resource[1]	**Estimated Impact**	
	Length (Linear Feet [LF]) or Area (Acre [AC])[2]	**Length (Linear Feet [LF]) or Area (Acre [AC])[2]**
IS75	0 LF	N/A
OW76	0.016 AC	Retaining Wall
WL77	0.000 AC	N/A
OW78	0.000 AC	N/A
WL79	0.007 AC	Culvert
IS80	562 LF	Culvert
IS81	0 LF	N/A
WL82	0.000 AC	N/A
WL83	0.000 AC	N/A
PS84	261 LF	Culvert Extension
OW85	0.000 AC	N/A
EC86	0 LF	N/A
IS87	0 LF	N/A
PS88	130 LF	Culvert Extension
WL89	0.000 AC	N/A
WL90	0.000 AC	N/A
PS91	0 LF	N/A
IS92	0 LF	N/A
WL93	0.000 AC	N/A
IS94	0 LF	N/A
WL95	0.000 AC	N/A
IS96	0 LF	N/A
IS97	0 LF	N/A
WL98	0.000 AC	N/A
IS99	493 LF	Culvert
IS100	0 LF	N/A
WL101	0.001 AC	Culvert
PS102	0 LF	N/A
WL103	0.000 AC	N/A
WL104	0.000 AC	N/A
WL105	0.000 AC	N/A
IS106	0 LF	N/A
WL107	0.025 AC	Culvert
IS108	89 LF	Culvert
IS109	123 LF	Culvert
IS110	0 LF	N/A
PS111	67 LF	Culvert

Table 1 (Cont.): Proposed Impacts to WOTUS from the Preferred Alternative/LEDPA		
Resource[1]	**Estimated Impact**	
	Length (Linear Feet [LF]) or Area (Acre [AC])[2]	**Length (Linear Feet [LF]) or Area (Acre [AC])[2]**
WL112	0.000 AC	N/A
WL113	0.054 AC	Culvert
IS114	0 LF	N/A
IS115	0 LF	N/A
OW116	0.000 AC	N/A
OW117	0.000 AC	N/A
OW118	0.137 AC	Bridge
PS119	176 LF	Culvert/Embankment Wall
WL120	0.031 AC	Embankment Wall
PS121	0 LF	N/A
WL122	0.000 AC	N/A
PS123	0 LF	N/A
EC124	136 LF	Culvert
WL125	0.009 AC	Embankment Wall
WL126	0.000 AC	N/A
PS127	170 LF	Culvert Extension
WL128	0.000 AC	N/A
PS129	0 LF	N/A
IS130	0 LF	N/A
WL131	0.000 AC	N/A
IS132	0 LF	N/A
WL133	0.000 AC	N/A
IS134	203 LF	Culvert Extension
WL135	0.000 AC	N/A
IS136	0 LF	N/A
EC137	0 LF	N/A
WL138	0.000 AC	N/A
OW139	0.205 AC	Culvert
WL140	0.125 AC	Culvert
IS141	147 LF	Culvert
WL142	0.000 AC	N/A
IS143	0 LF	N/A
WL144	0.000 AC	N/A
WL145	0.000 AC	N/A
PS146	0 LF	N/A
WL147	0.000 AC	N/A
IS148	0 LF	N/A

Table 1 (Cont.): Proposed Impacts to WOTUS from the Preferred Alternative/LEDPA		
Resource[1]	**Estimated Impact**	
	Length (Linear Feet [LF]) or Area (Acre [AC])[2]	**Length (Linear Feet [LF]) or Area (Acre [AC])[2]**
WL149	0.000 AC	N/A
IS150	0 LF	N/A
WL151	0.000 AC	N/A
IS152	0 LF	N/A
IS153	0 LF	N/A
PS154	0 LF	N/A
WL155	0.000 AC	N/A
WL156	0.000 AC	N/A
IS157	39 LF	Culvert
WL158	0.000 AC	N/A
PS159	0 LF	N/A
IS160	0 LF	N/A
IS161	0 LF	N/A
PS162	57 LF	Culvert
IS163	71 LF	Culvert
IS164	0 LF	N/A
IS165	0 LF	N/A
IS166	0 LF	N/A
PS167	35 LF	Culvert Extension
IS168	0 LF	N/A
WL169	0.000 AC	N/A
WL170	0.004 AC	Culvert Extension
PS171	0 LF	N/A
WL172	0.000 AC	N/A
PS173	0 LF	N/A

Key: EC – Ephemeral Channel; OW - Open Water; IS – Intermittent Stream; PS – Perennial Stream; WL – Wetland

[1] Stream and Wetland number designations are per the May 2017 Ecology Resources Survey Report.
[2] Structure lengths are estimations based on typical design approaches with 4:1 slopes for slope heights less than 10 feet and 2:1 slopes for slope heights greater than 10 feet. Exact dimensions will be confirmed at a later date. Culvert widths are undetermined and will be confirmed at a later date. Wetland/Open Water structure is presented as fill impact acreage.

Table 2: Estimated Stream, Wetland, and Open Water Impacts and Mitigation Totals for the Preferred Alternative/LEDPA		
Resource	**Length of Impact***	**Area of Impact***
Perennial Stream	2,069 lf	n/a
Intermittent Stream	2,101 lf	n/a
Ephemeral Channel	136 lf	n/a
TOTAL	4,306 lf	n/a
Wetland	n/a	0.626 acre
Open Water	n/a	0.358 acre
TOTAL	n/a	0.984 acre
Mitigation**		
Credits Required	Streams: 40,934 grandfathered (3,411 2018); Wetlands: 5.04 grandfathered (0.63 2018)	
To be Purchased By:	GDOT	
Date of Request/Purchase:	TBD	
Credit Source:	Approved Mitigation Bank (Primary or Secondary) or In-Lieu Fee Purchase	
Key: n/a – Not Applicable *All impacts listed in the table are estimated permanent impacts. Temporary impacts have not yet been assessed. **Mitigation totals represent a high-level estimate using the *Savannah District's 2018 Standard Operating Procedure for Compensatory Mitigation*. Impacts to open waters were not included in mitigation estimates.		

B. **Applicant's Purpose and Need Statement**.

The primary purpose of this project is to improve future congestion along SR 20 between I-75 and I-575. SR 20 between I-75 and I-575 serves daily commuters living in the residential areas along the route, as well as some commercial traffic. There is a traffic pattern outward from the center of the corridor in the morning peak hours and inward during the afternoon peak hours due to the interstates at each end of the corridor. Commuters living in the area have limited routes available to access the I-75 and I-575 corridors, as well as the metropolitan Atlanta area. The closest adjacent east-west route to the north is SR 140, which intersects SR 20 near the I-575 interchange and intersects I-75 approximately 15 miles north of the SR 20/I-75 interchange. Additionally, the SR 20 corridor runs along the northern side of Lake Allatoona, which leaves few options for east-west routes on the southern side of SR 20. Bells Ferry Road provides access to SR 92, which is the closest adjacent east-west route on the southern side of SR 20, approximately 10.6 miles to the south.

As shown in Table 1, existing (2014) average daily traffic (ADT) volumes on SR 20 within the study limits are much higher on the western and eastern ends of the study corridor (near I-75 and I-575) compared to volumes in the center of the study corridor (near Fincher Road/Upper Sweetwater Trail [SR 108]). This is indicative of the traffic pattern inward and outward from the areas surrounding the two interchanges. Moderate growth is expected in the vicinity of the SR

20 corridor. Based on an analysis of historic GDOT traffic counts and projected future traffic volumes from the Atlanta Regional Commission's (ARC) travel demand model, a growth rate of 1.0 percent per year is expected to occur in the project area for the foreseeable future. Using this growth rate, future No-Build open year (2026) and design year (2046) ADT along the project corridor are shown in Table 3.

Table 3: Existing (2014) and Anticipated Open Year (2026) and Design Year (2046) ADT (in vpd) along the Project Corridor under No-Build Conditions

Location	Existing Year (2014)	Open Year (2026)	Design Year (2046)
SR 20 at I-75	22,650	25,570	31,070
SR 20 at Fincher Road/Upper Sweetwater Trail (SR 108)	10,270	11,630	14,140
SR 20 at SR 140	23,640	26,600	32,610

Intersection and approach delay can be associated with a level of service (LOS), or a grade given to each intersection or approach based on its operation. LOS is represented by a ranking letter from "A" to "F," with "A" representing free-flow conditions and "F" representing traffic breakdown conditions. Currently, the Statewide Transportation Plan defines congestion as LOS D to LOS F with a LOS E sometimes used to define congestion in large urban areas. Therefore, for this project corridor, congestion is defined as LOS E or LOS F.

An intersection capacity analysis was completed for the project and shows that seven of the study area intersections are anticipated to be performing at LOS F by the design year in one or both peak hours, and an additional six intersections are anticipated to be performing at LOS E. With the proposed improvements, no intersections are anticipated to operate at LOS F in the design year Build condition, while only 2 intersections (SR 20 at SR 294 and SR 20 at Hickory Flat Highway, both signalized) would operate at LOS E. However, the proposed improvements would greatly reduce the anticipated delays at these intersections.

A secondary purpose of the proposed project is to reduce crash frequency and severity along SR 20 within the project limits. There are numerous intersections along the corridor that do not meet current design standards. Several of the major intersections have extreme angles or steep horizontal/vertical curves that limit the visibility of the drivers. At both the intersection and the roadway segment levels, total crashes, fatality crashes, and injury crashes were calculated for the study corridor for the five-year period from 2014 to 2018. The number of crashes were then compared to the statewide averages to determine how each study corridor intersection or roadway segment operates compared to similar facilities in Georgia (roads and intersections with the same functional classifications and similar average annual daily traffic). Intersection crashes include crashes occurring on all intersection approaches, while the segment crash rates include only crashes occurring along the SR 20 corridor.

Intersection Safety Analysis

The results of the safety analysis for corridor intersections are summarized in Table 4.

Table 4. Comparison of Crashes at SR 20 Intersections within the Project Corridor with Statewide Averages

Intersection with SR 20	SR 20 2014-2018 Annual Average Crashes			Statewide Annual Average Crashes		
	Total	Injury	Fatal	Total	Injury	Fatal
I-75 Southbound Ramps	10.8	4.0	0.00	11.5	3.2	0.00
I-75 Northbound Ramps	28.0	7.4	0.00	5.2	1.4	0.03
SR 20 Spur	18.2	6.6	0.00	6.5	1.8	0.02
Simpson Circle W/Dean Road	1.2	0.4	0.00	5.2	1.4	0.03
Simpson Circle E/Rowland Springs Road	2.0	0.4	0.00	4.7	1.2	0.01
Ranger Road	0.4	2.0	0.00	4.7	1.2	0.01
Vulcan Quarry Road	0.8	0.0	0.00	4.7	1.2	0.01
JR Road	0.4	0.0	0.00	4.7	1.2	0.01
Holly Drive/Roberson Drive	1.8	0.2	0.00	4.7	1.2	0.01
Timberlake Cove	1.8	0.4	0.00	4.7	1.2	0.01
Commerce Row	1.2	0.6	0.00	4.7	1.2	0.01
Bells Ferry Road/Wilderness Camp Road	5.2	1.4	0.00	4.7	1.2	0.01
Chandler Lane	1.0	0.7	0.00	3.8	1.2	0.02
Hawks Farm Road	1.6	0.4	0.00	3.8	1.2	0.02
Brooke Road/Woodall Road	1.8	0.4	0.00	3.8	1.2	0.02
Deer Run Road/Rose Brooke Circle	0.6	0.2	0.00	3.8	1.2	0.02
Clearwater Trail/Rhine Road	3.2	1.0	0.00	3.8	1.2	0.02
Sutallee Woods Trail	2.0	0.6	0.00	3.8	1.2	0.02
Peachtree Drive	0.2	0.0	0.00	3.8	1.2	0.02
Highland View Pass	1.4	0.4	0.00	3.8	1.2	0.02
Upper Sweetwater Trail/Fincher Road/SR 108	11.0	3.8	0.00	3.8	1.2	0.02
Ficklen Church Way	3.8	1.0	0.00	4.7	1.2	0.01
Willie West Road	1.4	0.6	0.00	4.7	1.2	0.01
Knox Campground Trail	2.6	0.8	0.00	4.7	1.2	0.01
Fields Chapel Road	4.8	1.0	0.00	4.7	1.2	0.01
Veterans Cemetery Road	1.8	0.4	0.00	4.7	1.2	0.01
Fields Landing Drive	1.6	0.2	0.00	4.7	1.2	0.01
Copper Hills Drive/Lusk Court	1.8	0.0	0.00	4.7	1.2	0.01
Fieldstone Drive	2.6	0.4	0.00	4.7	1.2	0.01
Legend Creek Drive	2.8	0.4	0.00	5.2	1.4	0.03
Pope Circle/Riverbend Way	7.6	2.0	0.00	5.2	1.4	0.03
Butterworth Road/River Green Avenue	20.2	4.2	0.00	4.7	1.2	0.01
Teasley Middle School	2.2	0.5	0.20	4.7	1.2	0.01
Ridgemont Road	0.4	0.0	0.00	4.7	1.2	0.01
Herndon Lane/Access Road	30.4	7.6	0.00	4.7	1.2	0.01
Hickory Flat Highway	40.8	5.4	0.00	6.5	1.8	0.02

*Red cells indicate intersections that exceed statewide average total, injury, or fatal crash rates

The results of the crash analysis show that 11 of the study intersections have crashes that exceed the statewide average for at least one of the categories of total crashes, injury crashes, or fatal crashes. Of the 11 intersections with crashes exceeding statewide average crashes, seven are signalized (I-75 southbound ramps, I-75 northbound ramps, SR 20 Spur, River Green Avenue/Butterworth Road, Teasley Middle School, Herndon Lane/Access Road, and Hickory Flat Highway) and four are unsignalized (Wilderness Camp Road/Bells Ferry Road, Upper Sweetwater Trail/Fincher Road, Fields Chapel Road, Riverbend Way/Pope Circle). Rear-end crashes and angle crashes were the top two most prevalent crash types at eight of the 11 intersections, accounting for about 79 percent of the total crashes that occurred at these eight intersections. At the remaining three high crash intersections, the top crash types were not a collision with a motor vehicle, angle, or rear-end. Collisions with an object other than a motor vehicle accounted for an average of about 33 percent of the crashes occurring at these three intersections. Several factors may contribute to these types of crashes including the corridor's high speed limit, the sharp horizontal curves, the lack of medians, and the corridor's heavily wooded nature, as these factors may make it more difficult for a vehicle to maintain their lane.

Of the 11 intersections with crashes exceeding statewide averages, 10 had either injury or fatal crashes that exceeded statewide averages. The severity of the crashes occurring at each of the 10 high-injury/fatal crash intersections was analyzed by calculating the percentage of each crash type that involved injuries or fatalities. The intersection crash severity analysis shows that head-on and angle crashes were the most severe crash types, with an average injury crash percentage of 47 and 43 percent, respectively. Overall, 25 percent of the crashes that occurred at the 10 intersections involved injuries or fatalities. During the five years of historical data, one fatal crash occurred at an intersection along the SR 20 corridor. The fatal crash was a not a collision with a motor vehicle crash and occurred at the Teasley Middle School intersection. The crash involved an eastbound motorcycle that lost control for unspecified reasons and hit the curb and subsequently hit a tree.

Roadway Segment Safety Analysis

Historical crash rates were also analyzed for roadway segments along the SR 20 corridor to identify potential safety concerns. Roadway segments were defined as the sections of the SR 20 corridor spanning between each study intersection. Roadway segment crash rates are calculated as the number of crashes per 100 million vehicle miles (100 MVM). Five-year annual average statewide crash rates were calculated to compare with the five-year (2014 to 2018) annual average historic project corridor segment crash rates. At the time of this analysis, the statewide average roadway segment crash rates were not available for 2017 or 2018; therefore, the statewide average rates for 2016 were used to represent 2017 and 2018 statewide average rates during calculation of the annual average. The results of the analysis are presented in Table 5. The entire SR 20 project corridor has a functional classification of principal arterial. The section of SR 20 from the I-75 interchange to the Wilderness Camp Road/Bells Ferry Road intersection is categorized as urban, the section from the Wilderness Camp Road/Bells Ferry Road intersection to the Fields Landing Drive intersection is categorized as rural, and the section from

the Fields Landing Drive intersection to the Hickory Flat Highway intersection is categorized as urban again.

Table 5. 2014 to 2018 Average Crashes (per 100 MVM) for the SR 20 Roadway Corridor

Roadway Segment	Corridor Crashes			Statewide Crashes		
	Total	Injury	Fatal	Total	Injury	Fatal
Urban Section						
I-75 Southbound to I-75 Northbound	505	159	0.00	611	141	1.36
I-75 Northbound to SR 20 Spur	1,388	385	0.00	611	141	1.36
SR 20 Spur to Dean Road/Simpson Circle	217	101	0.00	611	141	1.36
Dean Road/Simpson Circle to Rowland Springs Road/ Simpson Circle	70	13	0.00	611	141	1.36
Rowland Springs Road/Simpson Circle to Ranger Road	58	26	0.00	611	141	1.36
Ranger Road to Vulcan Quarry Road	146	0	0.00	611	141	1.36
Vulcan Quarry Road to JR Road	41	0	0.00	611	141	1.36
JR Road to Roberson Drive/Holly Drive	46	0	0.00	611	141	1.36
Roberson Drive/Holly Drive to Timber Lake Cove	107	36	0.00	611	141	1.36
Timber Lake Cove to Commerce Row	169	45	0.00	611	141	1.36
Commerce Row to Wilderness Camp Road/Bells Ferry Road	152	38	0.00	611	141	1.36
Rural Section						
Wilderness Camp Road/Bells Ferry Road to Chandler Lane	90	43	0.00	112	35	1.50
Chandler Lane to Hawks Farm Road	251	72	0.00	112	35	1.50
Hawks Farm Road to Woodall Road/ Brooke Road	382	63	0.00	112	35	1.50
Woodall Road/Brooke Road to Deer Run Drive/Rose Brooke Circle	61	41	0.00	112	35	1.50
Deer Run Drive/Rose Brooke Circle to Clearwater Trail/ Rhine Road	81	27	0.00	112	35	1.50
Clearwater Trail/ Rhine Road to Sutallee Woods Trail	296	86	0.00	112	35	1.50
Sutallee Woods Trail to Peachtree Drive	159	35	0.00	112	35	1.50
Peachtree Drive to Highland View Pass	196	50	0.00	112	35	1.50
Highland View Pass to Upper Sweetwater Trail/Fincher Road	167	33	0.00	112	35	1.50
Upper Sweetwater Trail/Fincher Road to Ficklen Church Way	406	163	0.00	112	35	1.50
Ficklen Church Way to Willie West Road	267	98	0.00	112	35	1.50
Willie West Road to Knox Campground Trail	121	36	0.00	112	35	1.50
Knox Campground Trail to Fields Chapel Road	256	116	0.00	112	35	1.50
Fields Chapel Road to Veterans Cemetery Road	183	39	3.00	112	35	1.50
Veterans Cemetery Road to Fields Landing Drive	166	61	0.00	112	35	1.50

Table 5. 2014 to 2018 Average Crashes (per 100 MVM) for the SR 20 Roadway Corridor						
Roadway Segment	**Corridor Crashes**			**Statewide Crashes**		
	Total	**Injury**	**Fatal**	**Total**	**Injury**	**Fatal**
Urban Section						
Fields Landing Drive to Luck Court/Copper Hills Drive	422	0	0.00	611	141	1.36
Luck Court / Copper Hills Drive to Fieldstone Drive	141	13	0.00	611	141	1.36
Fieldstone Drive to Legend Creek Drive	572	96	0.00	611	141	1.36
Legend Creek Drive to Riverbend Way/Pope Circle	247	49	0.00	611	141	1.36
Riverbend Way/ Pope Circle to River Green Avenue/ Butterworth Road	954	236	0.00	611	141	1.36
River Green Avenue/ Butterworth Road to Teasley Middle School	183	44	0.00	611	141	1.36
Teasley Middle School to Ridgemont Road	388	68	23.00	611	141	1.36
Ridgemont Road to Access Road	689	182	0.00	611	141	1.36
Access Road to Herndon Lane	954	357	0.00	611	141	1.36
Herndon Lane to Hickory Flat Highway	123	12	0.00	611	141	1.36

Note: The orange highlighted cells denote crash rates that are above the comparable statewide average crash rate.

Twenty of the 36 studied segments of SR 20 exceed statewide average crash rates for total, injury, and/or fatal crashes. Overall, 30 percent of the total crashes resulted in injury and 0.3 percent resulted in fatality. In the western urban section of the study corridor, only the two segments (from the I-75 southbound ramps to the SR 20 Spur intersections) have crash rates that exceed the comparable statewide average rates. For the rural section in the middle of the study corridor, all sections exceed the statewide average rate for either total crashes, injury crashes, or both except for the segment between the Deer Run Drive/Rose Brooke Circle and the Clearwater Trail/Rhine Road intersections. Additionally, the segment between the Fields Chapel Road and the Veterans Cemetery Road intersections exceeds the statewide average fatal crash rate. For the eastern urban section of the corridor, three segments exceed the average statewide rate for total and injury crashes and one segment exceeds the average statewide rate for fatal crashes.

The most common crash types at the western urban section of the corridor were rear-end (51 percent of total crashes) and angle crashes (32 percent of total crashes). These crash types are typically common in the vicinity of signalized intersections, three of which are present in this section.

In the rural section of the corridor, the most common crash types were not a collision with a motor vehicle (41 percent) and rear-end crashes (31 percent). Because of their high frequency, the not a collision with a motor vehicle crashes were analyzed further to identify underlying contributing factors. Thirteen percent of these crashes had a contributing factor of the driver losing control and 22 percent occurred while the vehicle was negotiating a curve. Some of these crashes may be corrected under the build condition when the roadway curvature is reduced, and access control is improved.

The eastern urban section of the corridor experienced rear-end (70 percent of total crashes), not a collision with a motor vehicle (13 percent), and angle (13 percent) crashes as the top three crash types. This segment of the SR 20 corridor contains three signalized intersections and experiences moderate levels of traffic congestion during peak hours. Both rear-end and angle crashes are typical on signalized, congested corridors.

C. **Basic Project Purpose.**

The primary purpose of this project is to improve future congestion along SR 20 between I-75 and I-575. The project also aims to reduce crash frequency and severity along this corridor.

D. **Water Dependency.**

The proposed project is not expected to decrease the overall quality of water available or the water supply (e.g., drinking water or other water-consumptive purposes). The proposed project would not result in a large demand from available water resources and would not degrade the quality of waters in the state. The only waters of the US that would be impacted would be those needed for road crossings, fill for roadside slopes, or road widening. Therefore, we have determined that this road project is not a water dependent activity.

E. **Overall Project Purpose**.

The primary purpose of this project is to improve future congestion along SR 20 between I-75 and I-575. The project also aims to reduce crash frequency and severity along this corridor. SR 20 between I-75 and I-575 serves daily commuters living in the residential areas along the route, as well as some commercial traffic. Commuters living in the area have limited routes available to access the I-75 and I-575 corridors, as well as the metropolitan Atlanta area. The closest adjacent east-west route to the north is SR 140, which intersects SR 20 near the I-575 interchange and intersects I-75 approximately 15 miles north of the SR 20/I-75 interchange. Additionally, the SR 20 corridor runs along the northern side of Lake Allatoona, which leaves few options for east-west routes on the southern side of SR 20. Bells Ferry Road provides access to SR 92, which is the closest adjacent east-west route on the southern side of SR 20, approximately 10.6 miles to the south.

F. **Geographic Area of Review for Alternative Project Sites**.

The widening project layout is limited due to the existing SR 20 alignment, infrastructure, community facilities, and intersection tie-in locations along SR 20. The project study area includes the SR 20 interchange with I-75 in Bartow County and the interchange with I-575 in Cherokee County, as well as 36 intersections along the SR 20 corridor between the two interstates. The project corridor runs along the northern side of Lake Allatoona, which constrains alignment options on the southern side of SR 20.

Off-existing alignment build alternatives were considered for the project section of SR 20 between Knox Campground Trail and Veterans Cemetery Road, an approximately 1.6-mile

section of SR 20. This segment was evaluated for further alternative analysis because target design speed (55 mph) cannot be achieved by following the existing alignment due in part to the high concentrations of reverse curves in this roadway section. Reverse curves are described by the American Association of State Highway and Transportation Officials (AASHTO) as abrupt reversals in alignment that should be avoided[1]. These abrupt changes make it difficult for drivers to remain in their own lane and difficult to superelevate both curves which can result in erratic operation. According to the GDOT Design Policy Manual[2], alignment reversals require a sufficient tangent length between two curves to provide adequate superelevation (roadway banking) transition. Reverse curves have a tangent length of 0 between arcs. For design speeds greater than or equal to 50 mph, use of tangent lengths between reverse curves less than those calculated using AASHTO procedures require a design variance per GDOT Design Policy. In the reverse curve section of SR 20 west of Lake Allatoona, tangent lengths ranging between 533 and 673 feet would be required to meet AASHTO standards. For the remainder of the project corridor, target design speeds of 45 or 55 mph can be achieved by widening on existing alignment.

G. **Selection of Alternative Project Sites**.

GDOT considered environmental parameters as a part of the initial location investigation. Basic data pertaining to the corridor was reviewed, including aerial photography, topographic maps, traffic volumes (existing and projected), wetland inventory maps, soil survey maps, floodplain maps, and Georgia Department of Natural Resources (GDNR) historic resource survey maps. Wetland and hydric soil boundaries, floodplains, recreational facilities, known or suspected historical and archaeological sites, existing ROW, possible underground storage tanks (USTs)/ landfills/hazardous waste sites, and areas of possible protected species habitat were delineated on aerial photography. Other constraints, such as churches, cemeteries, schools, noise-sensitive areas, residential property, commercial businesses, and community developments were also identified on aerial photography.

Upon completion of this data review, a conceptual alignment was developed with every attempt made to avoid sensitive ecological, historical, and archaeological areas while also considering the avoidance and minimization of impacts to commercial, residential, and community developments and facilities. If avoidance was not possible, every attempt was made to minimize harm to such resources. The conceptual alignment, once laid out on aerial photography, was field checked and additional refinements were made to further minimize harm to both the natural and built environments.

Development along the corridor includes residential streets and neighborhoods, Vulcan Quarry, Georgia National Cemetery, Knox Elementary School, River Greene Academy, and Teasley Middle School. There are also commercial developments adjacent to the two interstate interchanges. However, the aforementioned developments are not located close enough to the proposed roadway to affect the location of the conceptual alignment.

[1] AASHTO. A Policy on Geometric Design of Highways and Streets. 6th Edition, 2011 p. 3-112.
[2] GDOT Design Policy Manual. Revision 5, December 22, 2017 p. 4-7.

1. Site Selection Screening Criteria.

Widening on existing alignment was analyzed to avoid and minimize impacts to the natural and built environment and reduce costs to the maximum extent practicable. Siting criteria factors included required ROW, earthwork (cut/fill) and associated construction components (total construction estimate), and utility impacts. Additional factors considered included residential and commercial displacements, community facilities, and environmental resource impacts. The result is a conceptual alignment that includes widening left and right of existing alignment, as well as symmetrical widening sections.

The three alternatives largely follow the same alignment, with the exception of the approximately two-mile section between Knox Campground Trail and Veterans Cemetery Road, as further described in Section G.2. Approximated impact and cost differences between siting criteria for the alternatives considered are summarized below in Table 6.

Table 6: Siting Criteria

Factor	Alternative A	Alternative B	Alternative C
Existing/Required ROW	$59.7 M	$62 M	$58.5 M
Required Earthwork (cut/fill)	3.8 M CY cut/fill	4.2 M CY cut/fill	3.7 M CY cut/fill
Utility Impacts*	$6.9 M (reimbursable)	$6.9 M (reimbursable)	$6.9 M (reimbursable)
Total Construction Cost	**$144.3 M**	**$146.8 M**	**$143.7 M**

Notes: M = Million, CY = cubic yards, ROW = right of way; *non-reimbursable utility relocation costs to be absorbed by utility owners

Conceptual design has also incorporated retaining walls to avoid or minimize impacts by narrowing the proposed roadway footprint in resource locations. These locations are listed in Table 7 and apply to all build alternatives evaluated. Retaining walls are not proposed along the alternative alignment sections (Knox Campground Trail to Veterans Cemetery Road), but a majority of these segments include 2:1 slopes due to required slope heights exceeding 10 feet. Proposed slopes at a majority of the culverts or culvert extensions are typically 2:1 due to required slope heights, thereby minimizing impacts to waters of the US.

Table 7: Retaining Walls Proposed to Avoid or Minimize Impacts to Waters of the U.S.

Resource	Would Wall Avoid or Minimize Impacts?	Avoided Impact Area (acre) (Wetlands or Open Waters)	Avoided Impact Length (linear feet) (Streams)
PS 7	Minimize	--	217
PS 8	Minimize	--	108
PS 9	Minimize	--	140
WL 13	Minimize	0.03	--
IS 14	Minimize	--	157
OW 17	Avoid	0.45	--
WL 26	Avoid	0.05	--

Table 7: Retaining Walls Proposed to Avoid or Minimize Impacts to Waters of the U.S.			
IS 27	Minimize	--	335
WL 30	Avoid	0.05	--
PS 40	Minimize	--	102
PS 50	Minimize	--	77
PS 54	Minimize	--	56
WL 55	Minimize	0.06	--
IS 56	Avoid	--	530
WL 60	Avoid	0.005	--
OW 76	Minimize	0.14	--
IS 115	Avoid	--	57
OW 118	Avoid	0.38	--
PS 123	Avoid	--	52
Total		**1.165**	**1,831**

Key: OW - Open Water; IS – Intermittent Stream; PS – Perennial Stream; WL - Wetland

Because the target design speed (55 mph) along the existing SR 20 alignment between Knox Campground Trail and Veterans Cemetery Road cannot be achieved by following existing alignment due in part to the high concentrations of reverse curves in this roadway section, alternatives considered for this section were reviewed for compliance with design criteria recommended by AASHTO and the GDOT Design Policy Manual.

2. Alternative Sites Screened for Practicability.

Four alternatives were considered, a No-Build alternative and three build alternatives, which vary in alignment between Knox Campground Trail and Veterans Cemetery Road. These are described in the following sections.

a. Under the no-build alternative, SR 20 would not be widened, and no improvements to enhance operations or reduce crash frequency or severity would occur. This alternative would not meet the need and purpose of the proposed project; therefore, it was **eliminated** from consideration.

b. Alternative A (Preferred Alternative/LEDPA) follows mostly existing alignment between Knox Campground Trail and Veterans Cemetery Road, but cuts across existing reverse curves, effectively eliminating all reverse curves. This alternative meets the site selection criteria and was **retained** for further consideration.

c. Alternative B consists of a new alignment north of the existing roadway between Knox Campground Trail and Veterans Cemetery Road and would also eliminate all reverse curves in this roadway section. This alternative meets the site selection criteria and was **retained** for further consideration.

d. Alternative C closely follows existing roadway alignment between Knox Campground Trail and Veterans Cemetery Road, but only eliminates two of the six existing

reverse curves. Construction of this alignment would maintain four reverse curves in close proximity to one another on this section of SR 20. The tangent length between curves on this alignment would remain at zero. Per Section 4.2.2 of the GDOT Design Policy Manual, "For reverse curves on a roadway with a design speed greater than or equal to 50 mph, the use of tangent lengths less than those calculated by AASHTO procedures shall require a comprehensive study by an engineer and the prior approval of a design variance." Because this alternative does not meet the site selection criteria (AASHTO guidelines and GDOT Design Policy), it was **eliminated** from further consideration.

The alternative alignments considered are shown on Figure 2 and environmental resources along each alternative are shown on Figures 3a-3y.

G. **Regulatory Guidance Letter (RGL) 93-02**.

Locating the entirety of the proposed project outside of the proposed location is not practical due to the existing road and bridge infrastructure along SR 20, existing intersections along this roadway, its existing interchanges with I-75 and I-575, existing development, and environmental resources/constraints along the project corridor. Therefore, an off-site project location for the entire project corridor would not be a feasible alternative due to exorbitant costs and impacts on the natural and built environment.

PART II
PROPOSED ACTION and ALTERNATIVES
[40 CFR SECTION 230.10(a)]

Two build alternative alignments (Alternatives A and B) are analyzed in this section to identify the LEDPA. A third build alternative, Alternative C, was eliminated from further consideration because it did not meet AASHTO and GDOT Design Policy guidelines for roadway geometry and therefore was determined not to be practicable.

A. Factors Used to Analyze Practicable Alternatives:

1. Stream Impacts (quantitative). Describe the type(s) of stream impacts that would result from construction of the project and the linear feet of stream that would be impacted.

2. Stream Function (qualitative). Describe the quality of the stream(s) that would be impacted and the assessment method used to determine stream quality. For the purposes of this assessment, overall loss in stream function that would result from construction of the project on each site is evaluated and rated as high, medium or low. The functional loss rating is to be based on the linear feet of stream(s) that would be impacted and the quality of the stream(s) impacted. The rationale for the stream function loss rating given to each site must be discussed.

3. Wetland Impacts (quantitative). Describe the type(s) of wetland impacts that would result from construction of the project and the acres of wetland that would be impacted.

4. Wetland Function (qualitative). Describe the quality of the wetland(s) that would be impacted and the assessment method used to determine wetland quality. For the purposes of this assessment, overall loss in wetland function that would result from construction of the project on each site is evaluated and rated as high, medium or low. The functional loss rating is to be based on the acres of wetland(s) that would be impacted and the quality of the wetland(s) impacted. The rationale for the wetland function loss rating given to each site must be discussed.

5. Impacts to Other Waters (quantitative). Describe the type(s) of ditch, open water, etc., impacts that would result from construction of the project and the quantity of other waters that would be impacted.

6. Other Waters Function (qualitative). Describe the quality of the waters that would be impacted and the assessment method used to determine quality. For the purposes of this assessment, overall loss in aquatic function that would result from construction of the project on each site is evaluated and rated as high, medium or low. The functional loss rating is to be based on the quantity of waters that would be impacted and the quality of the waters impacted. The rational for the aquatic function loss rating given to each site must be discussed.

7. Federally listed Threatened or Endangered Species. If federally listed species are within the proposed project's geographic area for review, each alternative site must be reviewed for the potential for threatened or endangered species to be present, or for the presence of suitable habitat for the listed species.

8. Cultural Resources. If sites listed as eligible or potentially eligible for listing in the National Register of Historic Places (NRHP) within the proposed project's geographic area for review, each alternative site must be reviewed for cultural resources.

9. Displacements. Each alternative was reviewed for the number and type (commercial, residential, etc.) of displacements it would require.

10. Community Impacts. Each alternative was reviewed for the number of community facilities (such as churches/religious facilities, schools, public buildings) that would be impacted by the alternative, as well as whether there were anticipated to be impacts to Environmental Justice (low income or minority) populations from the alternative.

B. **Proposed Action or Applicant's Preferred Alternative (Alternative A)**. Alternative A follows mostly existing alignment between Knox Campground Trail and Veterans Cemetery Road, but cuts across existing reverse curves, effectively eliminating all reverse curves.

1. Stream Impacts (quantitative). Alternative A would impact 4,306 linear feet of perennial, intermittent, and ephemeral streams. Temporary construction impacts have not been assessed. Alternative A would avoid impacts to 125 waters of the US.

2. Stream Function (qualitative). Of the 30 streams impacted by Alternative A (14 perennial streams, 15 intermittent streams, and 1 ephemeral channel), 5 were determined to be fully impaired due to extensive bank armoring, stormwater runoff from surrounding urban land use, bank erosion, culverting, heavy sedimentation, and/or downstream impoundment. Twenty-four of the impacted streams were determined to be somewhat impaired due to such factors as, but not limited to, moderately incised banks/erosion from roadway runoff, upstream impoundments, culverting, stormwater runoff from surrounding urban land use, substrate type, and sedimentation. One impacted stream was determined to be fully functional due to the presence of suitable habitat for a federally protected species. Stream function (for intermittent and perennial streams) discussed above was assessed under the Cowardin system Existing Condition values described in the Compensatory Mitigation Definition of Factors (CMDF) found in the USACE Savannah Regulatory District's March 2004 *Standard Operating Procedure for Compensatory Mitigation.* North Carolina Stream Data Forms were used to determine the stream type and were used to evaluate the streams in terms of their ability to perform their associated functions. Factors considered included vegetation diversity, hydrology, size, and surrounding landscape. High-level analysis of stream function was reassessed in 2018 under the *Savannah District's 2018 Standard Operating Procedure for Compensatory Mitigation* (2018 SOP) for the purposes of this PAR. Based on the assessment under the 2018 SOP, the stream qualitative functional capacity score

determined to be as high for all streams due to the collective hydrology, hydraulics, geomorphology, chemistry, and biology factors. Further analysis would be conducted for project permitting, including full analysis of each stream.

Overall, streams within the project corridor are impacted by the existing infrastructure and development already in place as described above and the proposed piping impacts associated with the roadway improvement project would not fully eliminate the functionality of impacted streams; therefore, a loss of stream function rating of low was used.

3. Wetland Impacts (quantitative). Alternative A would permanently impact approximately 0.626 acre of wetlands. Fifteen wetlands would be impacted. Temporary construction impacts have not been assessed.

4. Wetland Function (qualitative). Wetlands were characterized under the Cowardin system Existing Condition values described in the USACE's CMDF. Of the 15 wetlands that would be impacted by Alternative A, two are considered Class 1 wetlands due to the overstory age class, lack of hydrologic alteration, diverse biotic community observed, and/or suitable habitat for federally protected species. Eight of the 15 impacted wetlands are considered Class 2 wetlands due to the lack of hydrologic alteration, the surrounding mature hardwood canopy, overstory age class, presence of a mixed species hardwood forest, and/or being an impoundment providing suitable habitat for protected species. Four of the 15 impacted wetlands are considered Class 3 wetlands due to significant hydrologic alteration, overstory age class, mature hardwood canopy, and/or effects of hydrologic alteration associated with the adjacent impoundment. One of the 15 impacted wetlands is considered a Class 4 wetland due to the lack of overstory trees and a heavy infestation of kudzu surrounding the wetland. High-level analysis of wetland function was reassessed under the *Savannah District's 2018 Standard Operating Procedure for Compensatory Mitigation* (2018 SOP) for the purposes of this PAR. Based on the assessment under the 2018 SOP, the wetland qualitative functional capacity score was assumed as high for all wetlands due to the collective water storage, biogeochemical cycling, wetland community characteristics, and faunal habitat factors. Further analysis would be conducted for project permitting, including full analysis of each wetland.

   Overall, wetlands within the project corridor have been somewhat impacted by the existing infrastructure and development already in place as described above. However, the proposed fill impacts associated with the roadway improvement project would eliminate the functionality of the portions wetlands impacted by this project. Therefore, a loss of wetland function rating of high was used for the portion of the resource impacted by the proposed project.

5. Impacts to Other Waters (quantitative). Alternative A would permanently impact 0.358 acre of open waters. Temporary construction impacts have not been assessed.

6. Other Waters Function (qualitative). Open waters were characterized under the Cowardin system Existing Condition values described in the USACE's CMDF. Three open waters would be impacted by Alternative A. This includes one Class 2 open water (due to being an impoundment providing suitable habitat for protected species) and two Class 5 open waters due to loss of aquatic function due to stream impoundment or excavation. High-level analysis of function under the *Savannah District's 2018 Standard Operating Procedure for Compensatory Mitigation* (2018 SOP) for the purposes of this PAR was not conducted as compensation is no longer generally required for open waters. Should this approach be deemed inappropriate by SAS USACE for this project, then further analysis would be conducted for project permitting, including full analysis as directed.

7. Federally listed Threatened or Endangered Species. Suitable summer roosting and foraging habitat for the federally listed northern long-eared bat and Indiana bat, as well as foraging habitat for the gray bat (*Myotis grisescens*) was identified in the project study area. Species occurrence records from Georgia Department of Natural Resources (GDNR) indicate known occurrences of the northern long-eared bat on-site and gray bat approximately two miles northeast of the corridor. Bat habitat assessments were completed during the period of August 2016 to June 2017. Given the presence of suitable habitat, project location within the known range of the Indiana, northern long-eared, and gray bats, and GDNR records of gray and northern long-eared bats near or within the study area, GDOT is assuming presence of these species along the corridor.

   Suitable habitat for the federally listed Etowah darter (*Etheostoma etowahae*), Cherokee darter (*Etheostoma scotti*), and amber darter (*Percina antesella*) was identified in the project study area in PS 8, PS 48 (Stamp Creek), PS 51 (Boston Creek), OW 118 (Etowah River), PS 123, PS 162, and PS 173. Species occurrence records from GDNR indicate presence of the Etowah darter and Cherokee darter on-site in Stamp Creek [Perennial Stream (PS) 48] and the amber darter approximately 2.5 miles north of the project corridor in Shoal Creek, with the Cherokee Darter also in multiple tributaries in the project vicinity. United States Fish and Wildlife Service correspondence indicates occurrences of the Etowah darter and Cherokee darter in nearby reaches of Sweetwater Creek, Boston Creek, Scott Mill Creek, and Canton Creek. No federally listed fish species were collected during an October 2016 aquatic survey of Stamp Creek and other perennial streams with suitable habitat for federally listed fish. Surveys of the Etowah River/Lake Allatoona (OW 118) and three perennial tributaries (PS 123, 162, and 173) were not completed due to the well-documented presence of multiple protected aquatic species at these locations, and species presence will be assumed.

   Suitable habitat for the federally listed monkeyface orchid (*Platanthera integrilabia*), large flowered skullcap (*Scutellaria montana*), and Tennessee yellow-eyed grass (*Xyris tennesseensis*) was identified in the project study area. Surveys for large flowered skullcap were completed in May and June 2017, a monkeyface orchid survey was completed in August 2017, and a Tennessee yellow-eyed grass survey was completed in

September 2017. No federally listed plant species were observed in the project survey area.

Six federally listed species are known to exist along the Alternative A alignment: amber darter, Cherokee darter, Etowah darter, gray bat, Indiana bat, and northern long-eared bat. Alternative A would require approximately 163.67 acres of forest clearing (suitable habitat for federally listed bats). In addition, nine state-listed species were assumed to be present due to agency coordination or were confirmed as being present during species-specific surveys conducted along the Alternative A alignment: Coosa chub, lined chub, frecklebelly madtom, freckled darter, rock darter, Etowah crayfish, Cumberland rose gentian, Georgia aster, and pink ladyslipper.

8. Cultural Resources. Alternative A would result in impacts to the following seven NRHP eligible resources: Eaton House, Head House, Whispering Pines, Ellison House, Johnson House, Jiffy Freeze, and Blueberry Hills Historic District. It is not known at this time if these impacts would be considered adverse to any of these resources. In addition, impacts to archaeological resources have not yet been determined, as surveys have not been completed. Three cemeteries may be impacted by Alternative A.

9. Displacements. Alternative A would require 22 residential (single-family) displacements and 7 commercial displacements.

10. Community Impacts. Alternative A would impact six community facilities. No Environmental Justice (low income or minority) community impacts are anticipated.

C. **No Action Alternative**. In the No Action Alternative, GDOT would take no action to increasing capacity, improving operations, or reducing crash potential along the SR 20 project corridor. This alternative would not meet the need and purpose of the proposed project.

D. **Off-Site Alternatives (Alternative B)**. Alternative B consists of new alignment north of existing roadway between Knox Campground Trail and Veterans Cemetery Road and would also eliminate all reverse curves in this roadway section.

1. Stream Impacts (quantitative). Alternative B would impact 5,597 linear feet of perennial, intermittent, and ephemeral streams. Temporary construction impacts have not been assessed. Alternative B would avoid impacts to 123 waters of the US.

2. Stream Function (qualitative). Of the 32 streams impacted by Alternative B (16 perennial streams, 15 intermittent streams, and 1 ephemeral channel), 6 were determined to be fully impaired due to extensive bank armoring, stormwater runoff from surrounding urban land use, bank erosion, culverting, heavy sedimentation, and/or downstream impoundment. Twenty-four of the impacted streams were determined to be somewhat impaired due to such factors as, but not limited to, moderately incised banks/erosion from roadway runoff, upstream impoundments, culverting, stormwater runoff from surrounding urban land use, substrate type, and sedimentation. One impacted stream was determined to be

fully functional due to the presence of suitable habitat for a federally protected species. Stream function (for intermittent and perennial streams) discussed above was assessed under the Cowardin system Existing Condition values described in the CMDF found in the USACE Savannah Regulatory District's March 2004 *Standard Operating Procedure for Compensatory Mitigation.* North Carolina Stream Data Forms were used to determine the stream type and were used to evaluate the stream in terms of their ability to perform their associated functions. Factors considered included vegetation diversity, hydrology, size, and surrounding landscape. High-level analysis of stream function was reassessed under the *Savannah District's 2018 Standard Operating Procedure for Compensatory Mitigation* (2018 SOP) for the purposes of this PAR. Based on the assessment under the 2018 SOP, the stream qualitative functional capacity score was assumed as high for all streams due to the collective hydrology, hydraulics, geomorphology, chemistry, and biology factors. Further analysis would be conducted for project permitting, including full analysis of each stream.

Overall, streams within the project corridor are impacted by the existing infrastructure and development already in place as described above and the proposed piping impacts associated with the roadway improvement project would not fully eliminate the functionality of streams; therefore, a loss of stream function rating of low was used.

3. Wetland Impacts (quantitative). Alternative B would permanently impact approximately 0.737 acre of wetlands. Fifteen wetlands would be impacted. Temporary construction impacts have not been assessed.

4. Wetland Function (qualitative). Wetlands were characterized under the Cowardin system Existing Condition values described in the USACE's CMDF. Of the 15 wetlands that would be impacted by Alternative B, three are considered Class 1 wetlands due to the overstory age class, lack of hydrologic alteration, diverse biotic community observed, and/or suitable habitat for federally protected species. Seven of the 15 impacted wetlands are considered Class 2 wetlands due to the lack of hydrologic alteration, the surrounding mature hardwood canopy, overstory age class, presence of a mixed species hardwood forest, and/or being an impoundment providing suitable habitat for protected species. Four of the 15 impacted wetlands are considered Class 3 wetlands due to significant hydrologic alteration, overstory age class, mature hardwood canopy, and/or effects of hydrologic alteration associated with the adjacent impoundment. One of the 15 impacted wetlands is considered a Class 4 wetland due to the lack of overstory trees and a heavy infestation of kudzu surrounding the wetland. High-level analysis of wetland function was reassessed under the *Savannah District's 2018 Standard Operating Procedure for Compensatory Mitigation* (2018 SOP) for the purposes of this PAR. Based on the assessment under the 2018 SOP, the wetland qualitative functional capacity score was assumed as high for all wetlands due to the collective water storage, biogeochemical cycling, wetland community characteristics, and faunal habitat factors. Further analysis would be conducted for project permitting, including full analysis of each wetland.

Overall, wetlands within the project corridor have been somewhat impacted by the existing infrastructure and development already in place as described above; however, the proposed fill impacts associated with the roadway improvement project would eliminate the functionality of impacted portions of wetlands; therefore, a loss of wetland function rating of high was used.

5. Impacts to Other Waters (quantitative). Alternative B would permanently impact 0.358 acre of open waters. Temporary construction impacts have not been assessed.

6. Other Waters Function (qualitative). Open waters were characterized under the Cowardin system Existing Condition values described in the USACE's CMDF. Three open waters would be impacted by Alternative B. This includes one Class 2 open water (due to being an impoundment providing suitable habitat for protected species) and two Class 5 open waters due to loss of aquatic function due to stream impoundment or excavation. High-level analysis of function under the *Savannah District's 2018 Standard Operating Procedure for Compensatory Mitigation* (2018 SOP) for the purposes of this PAR was not conducted as compensation is no longer generally required for open waters. Should this approach be deemed inappropriate by SAS USACE for this project, then further analysis would be conducted for project permitting, including full analysis as directed.

7. Federally listed Threatened or Endangered Species. Six federally listed species are known to exist along the Alternative B alignment: amber darter, Cherokee darter, Etowah darter, gray bat, Indiana bat, and northern long-eared bat. Alternative B would require approximately 170.84 acres of forest clearing (suitable habitat for federally listed bats). In addition, nine state-listed species were assumed to be present due to agency coordination or were confirmed as being present during species-specific surveys conducted along the Alternative B alignment: Coosa chub, lined chub, frecklebelly madtom, freckled darter, rock darter, Etowah crayfish, Cumberland rose gentian, Georgia aster, and pink ladyslipper.

8. Cultural Resources. Alternative B would result in impacts to the following six NRHP eligible resources: Eaton House, Head House, Whispering Pines, Ellison House, Jiffy Freeze, and Blueberry Hills Historic District. It is not known at this time if these impacts would be considered adverse to any of these resources. In addition, impacts to archaeological resources have not yet been determined, as surveys have not been completed. Three cemeteries may be impacted by Alternative B.

9. Displacements. Alternative B would require 19 residential (single-family) displacements and 7 commercial displacements.

10. Community Impacts. Alternative B would impact six community facilities. No Environmental Justice (low income or minority) community impacts are anticipated.

E. **Summary of Alternatives Analysis.**

Table 8 compares the No Action Alternative, which would result in no environmental impacts, with the applicant's preferred alternative (Alternative A) and the other evaluated off-site alternative (Alternative B). The analysis presented in this document indicates that the applicant's preferred alternative (Alternative A) would be the least environmentally damaging practicable alternative (LEDPA) that would meet the overall project purpose.

Table 8. Summary of the Alternatives Analysis

FACTORS	No Action Alternative	Applicant's Preferred (Alternative A)	Alternative B
Stream Impacts (Linear Feet)	None	4,306 linear feet of perennial/intermittent stream and ephemeral channel	5,597 linear feet of perennial/intermittent stream and ephemeral channel
Loss in Stream Function	None	Low	Low
Wetland Impacts (Acres)	None	0.626 acre	0.737 acre
Loss in Wetland Function	None	High	High
Impacts to Other Waters	None	0.358-acre open water	0.358-acre open water
Federal and State Protected Species	None	6 federally protected species; 9 state protected species; 163.67 acres of forest clearing (suitable habitat for federally listed bats)	6 federally protected species; 9 state protected species; 170.84 acres of forest clearing (suitable habitat for federally listed bats)
Cultural Resources	None	7 NRHP eligible historic resources; 3 cemeteries; archaeological sites unknown	6 NRHP eligible historic resources; 3 cemeteries; archaeological sites unknown
Displacements	None	22 residential (single-family) displacements and 7 commercial displacements.	19 residential (single-family) displacements and 7 commercial displacements
Community Impacts	None	6 community facilities	6 community facilities
LEDPA	No	**Yes**	No

PART III
AVOIDANCE, MINIMIZATION AND COMPENSATORY MITIGATION

A. Measures Considered to Avoid Unnecessary Aquatic Impacts.

1. Total Avoidance of Impacts to Waters of the US. Traditionally, GDOT's projects are linear by design with project widths being the extent of the ROW. Most of the waters of the US along the proposed project corridor are part of linear systems that run perpendicular to the proposed alignment; therefore, no avoidance alternatives are available that would eliminate impacts to these resources. In addition, alternatives to the location and alignment of the proposed improvements along SR 20 are limited due to the existing road and bridge infrastructure along SR 20, existing intersections along this roadway, its existing interchanges with I-75 and I-575, existing development, and environmental resources/constraints along the project corridor. Any stream resource within the ROW would be subject to impact by the construction of the project. The preferred alternative is the most practicable alternative based on all considered factors. In summary, the preferred design demonstrates that adequate on-site avoidance measures were implemented based on all alternatives considered.

2. Development of Conceptual Plan. During conceptual design, widening on existing alignment sections was analyzed to avoid and minimize impacts and reduce costs to the maximum extent practicable. Factors considered included residential and commercial displacements, community facilities, environmental resource impacts, existing/required ROW, required earthwork (cut/fill), and utility impacts. The result is a conceptual alignment that includes widening left and right of existing alignment, as well as symmetrical widening sections.

   Conceptual design has also incorporated retaining walls to avoid impacts by narrowing the proposed roadway footprint in resource locations. These locations are listed in Table 9 and apply to both build alternatives (Alternative A and Alternative B). Note: Retaining walls are not proposed along the alternative alignment sections (Knox Campground Trail to Veterans Cemetery Road), but a majority of these segments include 2:1 slopes due to required slope heights exceeding 10 feet. Proposed slopes at a majority of the culverts or culvert extensions are typically 2:1 due to required slope heights, thereby minimizing impacts to waters of the US.

Table 9: Locations of Retaining Walls to Avoid Resource Impacts		
Resource Avoided	**Area (acres) (Wetlands or Open Waters)**	**Length (linear feet) (Streams)**
OW 17	0.45	--
WL 26	0.05	--
WL 30	0.05	--
IS 56	--	530
WL 60	0.005	--
IS 115	--	57
OW 118	0.38	--
PS 123	--	52
Total	**0.935 acres**	**630 linear feet**

Of the 173 waters of the US identified in the project survey area, both design alternatives would avoid impacts to 117 waters, including 18 perennial streams, 36 intermittent streams, 47 wetlands, 13 open waters, and three ephemeral channels. Of the 103 buffered state waters identified, both design alternatives would avoid impacts to 64 state waters buffers and result in exempt disturbance (i.e., roadway drainage structure exemption) to six additional buffers. Exempt buffer disturbances are based on preliminary drainage design and are subject to change.

3. Final Site Development Plan. The final site development plan would be included in the 404(b)(1) analysis to be conducted for permitting. However, based on the conceptual project layout discussed herein, Alternative A (Preferred Alternative) would impact 1,291 linear feet less of jurisdictional stream than Alternative B and 0.111 acre less wetland than Alternative B. Impacts to open waters and ephemeral channels would be the same under both alternatives. Impacts to other resources, including cultural resources, federally protected species, and communities, would be similar between the two alternatives. Since both alternatives would equally meet the project's need and purpose, Alternative A is the LEDPA.

B. **Aquatic Impact Minimization Measures**.

1. Site Specific Minimization Measures. Conceptual design has also incorporated retaining walls to minimize impacts to additional waters of the US. These locations are listed in Table 10 and apply to both build alternatives (Alternative A and Alternative B). As stated above, retaining walls are not proposed along the alternative alignment sections (Knox Campground Trail to Veterans Cemetery Road), but a majority of these segments include 2:1 slopes due to required slope heights exceeding 10 feet. Proposed slopes at a majority of the culverts or culvert extensions are typically 2:1 due to required slope heights, thereby minimizing impacts to waters of the US.

Table 10: Locations of Retaining Walls to Minimize Resource Impacts		
Resource Impact Minimized	**Area (acre) (Wetlands or Open Waters)**	**Length (linear feet) (Streams)**
PS 7	--	217
PS 8	--	108
PS 9	--	140
WL 13	0.03	--
IS 14	--	157
IS 27	--	335
PS 40	--	102
PS 50	--	77
PS 54	--	56
WL 55	0.06	--
OW 76	0.14	--
Total	**0.23 acres**	**1,192 linear feet**

Prior to determining the preferred project alignment, the possible occurrence of protected species habitat, floodplains, wetland boundaries, stream locations, historic properties, and existing ROW boundaries were considered in the planning process. Alignment shifts, 2:1 slopes, bridges, and other design elements were used where possible to minimize unavoidable impacts. As per the USACE 2017 Regional Conditions, proposed culverts within stream channels are being designed to match natural channel widths. All additional culverts will either be baffled to bank full height or placed at an elevation above the ordinary high-water mark. For perennial streams, culverts will be embedded 20 percent. The alignment was selected based on the factors listed above and what was feasible from a constructability standpoint.

The project would be expected to produce some increased siltation within streams during the construction phase. Environmental harm would be minimized by standard sedimentation, erosion and hydrological control measures. These include the following:

a. Preservation of roadside vegetation beyond the limits of construction where possible.
b. Early revegetation of disturbed areas so as to hold soil movement to a minimum.
c. The use of slope drains, detention/retention structures, surface, subsurface and cross drains, designed as appropriate or needed, so that discharge would occur in locations and in such a manner that surface and subsurface water quality would not be affected (the outlets may require aprons, bank protection, silt basins and energy dissipaters).
d. Inclusion of construction features for the control of predicted erosion and water pollution in the plans, specifications and contract pay items (Georgia Standard Specifications - Section 161 through 171 and 700 through 715 identify the pollution control measures, which may be used).
e. The prohibition of dumping of chemicals, fuels, lubricants, bitumens, raw sewage, other harmful waste into or alongside of streams or impoundments, or into natural or man-made channels leading thereto.

f. Compliance with terms of the National Pollutant Discharge Elimination System (NPDES) permit for construction activities to include preparation and submittal of project Notice of Intent (NOI) and Notice of Termination (NOT). The NPDES permit also requires preparation and implementation of an Erosion, Sedimentation, and Pollution Control Plan and a Comprehensive Monitoring Program. Best Management Practices (BMPs) outlined in the Erosion, Sedimentation, and Pollution Control Plan must be consistent with, and no less stringent than, practices set forth in the Manual for Erosion and Sedimentation Control in Georgia.

2. Minimization Special Permit Conditions. For any permit issued for the proposed project, the special conditions would be added. The intent of these conditions would be to further minimize unavoidable direct and indirect impacts to wetlands, and other waters of the US, and thereby, reduce potential project related losses in aquatic function. The 404(b)(1) analysis included in the permit application would further assess this section; however, this was not applicable to the analysis conducted for the PAR.

C. **Compensatory Mitigation.**

A conservative, high-level assessment of mitigation requirements was conducted for the PAR, which resulted in a total of 40,934 grandfathered (3,411 2018) stream credits and 5.04 grandfathered (0.63 2018) wetland credits being anticipated based on concept design as shown in Table 2. As the project design continues to be developed, impacts and compensatory mitigation requirements would be reassessed. The 404(b)(1) analysis included in the permit application would further assess this section and include description of the proposed mitigation plan, mitigation requirements, available credits, and any applicable special conditions.

PART IV
ENVIRONMENTAL SETTING/EXISTING CONDITIONS

The 404(b)(1) analysis conducted for the permitting would include completion of this section from the case document developed by the USACE SAS PM.

PART V
PROHIBITIONS AND SIGNIFICANT DEGRADATION

A. Subpart C - Potential Effects on Physical and Chemical Characteristics of the Aquatic Ecosystem

Factors discussed herein are based on high-level concept plan level analysis of the Preferred Alternative (Alternative A) conducted for the PAR. The 404(b)(1) analysis included with the permit would be based on finalized impacts to aquatic resources as the project plans are developed. Any changes to Part V factors would be reported at that time.

1. Substrate [40 CFR Section 230.20]. Impacts to open water and stream resources within the project impact footprint would impact sediments; however, BMPs would be implemented to minimize impacts to substrates. Impacts to streams would largely consist of culvert extensions or new pipes. Streams within the project corridor are impacted by the existing infrastructure and development in place. Wetlands within the project impact footprint are anticipated to be filled; however, impacts to the majority of surveyed wetlands were avoided and the implementation of BMPs would serve to further minimize impacts to substrates within wetlands beyond the construction impact footprint. Therefore, the proposed project was assessed as having an overall long-term and minor impact to substrates in impacted aquatic resources.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

2. Suspended Particulates/Turbidity (40 CFR Section 230.21). During construction, there would likely be some associated short-term non-point source turbidity from construction activities in the floodplain. The required BMPs would be employed and water quality monitored during and after construction to ensure that suspended particulates and turbidity would be negligible and have only the minutest effects. There would also likely be some associated short-term, non-point source erosion from cleared upland areas. Project construction would be subject to the Georgia Erosion and Sedimentation Control Act of 1975, as amended, which requires that measures be taken to control erosion, sedimentation, and turbidity. Once construction is completed and the area permanently stabilized, turbidity downstream of the project would likely decrease. For any permit issued for the proposed project, special conditions would be included to require the permittee to comply with applicable sections of the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Utilization of plans and specifications as contained in "Manual for Erosion and Sediment Control, (Latest Edition)," published by the Georgia Soil and Water Conservation Commission or their equivalent would aid in achieving compliance with the aforementioned minimal requirements. With implementation of special permit conditions, project-related adverse environmental impacts associated with suspended particulates and turbidity would be short-term and minor.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
_X_ Short Term Minor __ Long Term Minor

3. Water (40 CFR Section 230.22). The proposed project would cause a minimal, temporary and localized disturbance of water quality parameters in the immediate vicinity of the proposed project site during construction. A total of 34 perennial streams, 54 intermittent streams, 4 ephemeral channels, 15 open waters, and 66 wetlands were identified within or adjacent to the proposed project corridor.

   The Preferred Alternative (Alternative A) would impact 14 perennial streams, 15 intermittent streams, 15 wetlands, three open waters, and one ephemeral channel. A total of 4,306 linear feet of stream, 0.626 acre of wetlands, and 0.358 acre of open waters would be permanently impacted by the project based on concept plans. Temporary impacts on these resources have not been assessed. Culverts that would be constructed within perennial streams would be embedded.

   The State of Georgia would issue a Section 401 Water Quality Certification for the project. For any permit issued for the proposed project, special conditions would be included to require all work would comply with all of the conditions included in the Section 401 Water Quality Certification, and that the permittee obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. With implementation of these special permit conditions and all of the aforementioned factors, the USACE has determined that there would be a negligible effect on the potential reduction of sediment transport, concentration of chemical contaminants, and other associated water quality effects.

   Long-term water quality impacts would be minimized with the use of post-construction stormwater control measures as required by GDOT's General NPDES Stormwater Permit for Phase II Municipal Separate Storm Sewer Systems (MS4) for the portion of the project in Cherokee County. Bartow County is not within the MS4 area. However, water quality control measures for the entire corridor (including Bartow County) will be evaluated with U.S. Fish and Wildlife Service (USFWS) and Georgia Environmental Protection Division (EPD) as the project progresses.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

4. Currents Patterns & Water Circulation (40 CFR Section 230.23). Project construction is not expected to alter the overall ecological character of the area in general, or water circulation in particular. For any permit issued for the proposed project, special permit conditions would be included to require the permittee to obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. The project would be expected to have a negligible impact on current patterns and water circulation.

FINDINGS: __ No Effect _X_ Negligible __ Major (Significant)
__ Short Term Minor __ Long Term Minor

5. Normal Water Fluctuations (40 CFR Section 230.24). The road project would feature impervious surfaces that would increase storm water runoff and increase water fluctuations. Provisions in the GDOT's construction contract would require the contractor to exercise every reasonable precaution during construction to prevent the pollution of streams in the project vicinity. Where possible, early vegetation of disturbed areas would be accomplished to hold soil movement to a minimum. Dumping of chemicals, fuels, lubricants, bitumens, raw sewage, or other harmful wastes into or alongside of streams, impoundments, or natural or manmade channels leading thereto, would be prohibited.

   Additional contract provisions would require the use of temporary erosion control measures as shown on the construction plans or as deemed necessary during construction. These temporary measures may include the use of berms, dikes, dams, sediment, basins, fiber mates, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods, as applicable. These provisions are coordinated with the permanent erosion control features insofar as practical to assure economical, effective, and continuous erosion control throughout the construction and post-construction periods and would be in accordance with the Federal-Aid Policy Guide, Part 650, Subpart B.

   For any permit issued for the proposed project, special permit conditions would be included to require the permittee to obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. The project would be expected to have a negligible impact on current normal water fluctuations.

FINDINGS: **__ No Effect** **_X_ Negligible** **__ Major (Significant)**
__ Short Term Minor **__ Long Term Minor**

6. Salinity Gradients (40 CFR Section 230.25). The proposed project would only affect freshwater streams. No effect to salinity is anticipated.

FINDINGS: **_X_ No Effect** **__ Negligible** **__ Major (Significant)**
__ Short Term Minor **__ Long Term Minor**

B. **Subpart D - Potential Effects on Biological Characteristics of the Aquatic Ecosystem.**

1. Threatened or Endangered Species [40 CFR Section 230.30]. The project area was surveyed for the presence of federally threatened, endangered, and candidate species and their habitats. Six federally protected species are known to occur within three miles of the project study area: Etowah darter, Cherokee darter, amber darter, gray bat, northern long-eared bat, and Tennessee yellow-eyed grass. Suitable habitat for all of these species, as well as the federally protected monkeyface orchid and large flowered skullcap, is present within the project area. Field and aquatic surveys did not result in the identification of any of these species. However, given the known occurrences of Etowah and Cherokee darters in the project area, as well as the presence of suitable habitat and project location within known ranges of the Indiana, northern long-eared, and gray bats, these species are assumed present within the project area.

Suitable foraging and nesting habitats for bald eagle (*Haliaeetus leucocephalus*) are located within the project study area; however, a field survey did not identify any bald eagle individuals or nests in the project area.

The FHWA is the lead federal agency for this proposed action, and as such, would meet all lead federal agency responsibilities pursuant to Section 7 of the ESA prior to conducting any work in waters of the US subject to USACE jurisdiction. Given the stage of project development, determination of effects on federally protected species have not yet been made. However, it is currently anticipated that the project may affect, but is not likely to adversely affect, federally listed species. Due to the assumed presence of protected species and the presence of habitat for protected species in the project area, Special Provision 107.23H, which would outline clearing restrictions and other minimization measures, would be developed and implemented for species protection.

FINDINGS: __ No Effect _X_ May Affect Not Likely to Adversely Affect
__ Adverse Effect __ Jeopardy

2. Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in Food Web (40 CFR Section 230.31). Road construction activities would be expected to have minor and temporary adverse effects on fish, wildlife, and food chain organisms in the project area. These effects would be due to the increase in noise from construction activities, avoidance or abandonment of habitat, and/or an impact from decreased food sources. Construction-related effects would be expected to subside upon completion of the project. As discussed above, the Preferred Alternative would result in the permanent impact of 4,306 linear feet of stream, 0.626 acre of wetlands, and 0.358 acre of open waters (temporary impacts on these resources have not been assessed). The permanent loss of these habitats would be expected to have long-term, minor adverse effects on fish, wildlife, and food chain organisms that exist in affected portions of the wetlands, streams, and associated habitats in the project area. Therefore, the project, as proposed, would have a long-term, minor adverse impact on these factors.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

3. Other Wildlife (40 CFR Section 230.32). The project corridor is a combination of developed/landscaped areas, mixed-pine hardwood forest, upland hardwood forest, bottomland hardwood forest, pine woods, early successional/ scrub habitat, and agricultural lands. It is possible that wildlife reside within the proposed project corridor, as well as the project vicinity. Development of the project may reduce and further fragment available habitat for wildlife species and other food chain organisms. However, the amount of land that would be disturbed and/or cleared would be minor compared to the surrounding available habitat. Based on this, the proposed project would be expected to have a long-term, minor effect on wildlife due to displacement and loss of habitat.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

C. Subpart E - Potential Effects on Special Aquatic Sites.

1. Sanctuaries and Refuges (40 CFR Section 230.40). A portion of existing SR 20 within the project limits crosses through the Allatoona Wildlife Management Area (WMA), which is owned by the USACE and leased to the Georgia Department of Natural Resources (DNR) for wildlife management and recreation. The total amount of land owned by the USACE is approximately 25,000 acres, of which approximately 6,800 acres are leased to the state. The proposed project would require an additional easement within this area of approximately 37.8 acres, all of which would occur adjacent to the existing SR 20 roadway and easement. This small permanent loss of this WMA would be considered a long-term, minor impact.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

2. Wetlands (40 CFR Section 230.41). Alternative A would permanently impact approximately 0.626 acre of wetlands. Temporary construction impacts have not been assessed. Fifteen wetlands would be impacted. Of the 15 wetlands that would be impacted by Alternative A, two are considered Class 1 wetlands under USACE's CMDF due to the overstory age class, lack of hydrologic alteration, diverse biotic community observed, and/or suitable habitat for federally protected species. Eight of the 15 impacted wetlands are considered Class 2 wetlands under USACE's CMDF due to the lack of hydrologic alteration, the surrounding mature hardwood canopy, overstory age class, presence of a mixed species hardwood forest, and/or being an impoundment providing suitable habitat for protected species. Four of the 15 impacted wetlands are considered Class 3 wetlands under USACE's CMDF due to significant hydrologic alteration, overstory age class, mature hardwood canopy, and/or effects of hydrologic alteration associated with the adjacent impoundment. One of the 15 impacted wetlands is considered a Class 4 wetland under USACE's CMDF due to the lack of overstory trees and a heavy infestation of kudzu surrounding the wetland. High-level analysis of wetland function was reassessed under the *Savannah District's 2018 Standard Operating Procedure for Compensatory Mitigation* (2018 SOP) for the purposes of this PAR. Based on the assessment under the 2018 SOP, the wetland qualitative functional capacity score was assumed as high for all wetlands due to the collective water storage, biogeochemical cycling, wetland community characteristics, and faunal habitat factors. Further analysis would be conducted for project permitting, including full analysis of each wetland.

   Overall, wetlands within the project corridor have been somewhat impacted by the existing infrastructure and development already in place. The majority of wetlands surveyed are beyond the project footprint and would be avoided. The overall impacts to wetland systems would be considered long-term and minor in intensity.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

3. Mud Flats (40 CFR Section 230.42). There are no mud flats in the proposed project area. The proposed project would not impact mud flats.

FINDINGS: _X_ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor __ Long Term Minor

4. Vegetated Shallows (40 CFR Section 230.43). There are no vegetated shallows in the proposed project area. The proposed project would not impact vegetated shallows.

FINDINGS: _X_ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor __ Long Term Minor

5. Coral Reefs (40 CFR Section 230.44). There are no marine habitats in the proposed project area, and the proposed project would not impact coral reefs.

FINDINGS: _X_ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor __ Long Term Minor

6. Riffle and Pool Complexes (40 CFR Section 230.45). Riffles and/or pool complexes were observed in PS 8 (Rowland Spring Branch), PS 48 (Stamp Creek), and PS 51 (Boston Creek) during aquatic protected species survey conducted for the project. However, based on information from the U.S. Drought Monitor, the area was in extreme drought conditions at the time of the survey and low water levels may have influenced the findings. It is likely that additional streams in the project area have riffles and/or pool complexes. The Preferred Alternative would permanently impact approximately 150 linear feet of PS 8, but would not impact PS 48 or PS 51. Therefore, impacts on riffles and/or pool complexes resulting from the project are likely to be negligible.

FINDINGS: __ No Effect _X_ Negligible __ Major (Significant)
__ Short Term Minor __ Long Term Minor

D. **Subpart F - Potential Effects on Human Use Characteristics**.

1. Municipal and Private Water Supplies (40 CFR Section 230.50). Lake Allatoona (OW 118) supplies much of the drinking water for the counties and municipalities surrounding the lake. The proposed project would impact approximately 0.137 acre of this waterbody for reconstruction of Knox Bridge (SR 20 over Lake Allatoona). Coordination with the USACE, owner of this resource, has occurred and will continue to occur regarding required bridge clearance, flood storage compensation, stormwater runoff/drainage, and water quality requirements. Water quality best management practices (BMPs) would be implemented during construction to reduce construction-related water quality impacts from the project on the lake. Cherokee County, in which the Knox Bridge crossing of Lake Allatoona occurs, is in the area encompassed by GDOT's General NPDES Stormwater Permit for Phase II Municipal Separate Storm Sewer Systems (MS4).

Long-term water quality impacts would be minimized with the use of post-construction stormwater control measures as required by this permit.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

2. Recreational and Commercial Fisheries (40 CFR Section 230.51). Lake Allatoona (OW 118) is used for recreational fishing for a variety of fish species. The proposed project would impact Lake Allatoona for reconstruction of Knox Bridge (SR 20 over Lake Allatoona); however, the overall recreational fisheries use of this resource would not be affected. Coordination with the USACE, owner of Lake Allatoona, has occurred and will continue to occur regarding required stormwater runoff/drainage and water quality requirements. A portion of the perennial streams within the project corridor are designated as trout streams, near the lake, and are assumed to be used for recreational fisheries. Some of the perennial streams along the project corridor would be impacted during completion of the roadway improvements. Piped sections would no longer be conducive for recreational fisheries purposes. The project would have a temporary, minor, effect on aquatic species from the operation of heavy equipment during construction. However, this is a short-term effect and would subside once the construction is completed. To minimize impacts, stringent water quality best management practices (BMPs) would be implemented during construction to reduce construction-related water quality impacts from the project on the lake and streams. The new culverts in perennial streams would be buried/embedded to a depth of 20 percent of the culvert diameter (20 percent of the height of elliptical culverts), to allow natural substrate to colonize the structure's bottom, encourage fish movement and maintain the existing channel slope. The culverts would be of adequate size to accommodate flooding and sheet flow in a manner that does not cause flooding of associated uplands or disruption of hydrologic characteristics that support aquatic sites on either side of the culvert. Due to the overall known recreational use of streams, overall findings were assessed as long-term minor impacts.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

3. Water-related Recreation (40 CFR Section 230.52). Lake Allatoona (OW 118) is used for water-related recreation, including boating, fishing, swimming, and sight-seeing. As stated above, the proposed project would impact approximately 0.137 acre of this waterbody for reconstruction of Knox Bridge (SR 20 over Lake Allatoona). Adverse impacts to boating, fishing, swimming, and sight-seeing would be temporary, lasting the duration of construction, and would be negligible. No long-term, adverse impacts to these uses are anticipated. There is a boat ramp on the west side of the SR 20 crossing of Lake Allatoona that is a designed "Day Use Area" by the USACE. Currently, the access drive to this boat ramp off SR 20 is skewed/has poor sight distance. Access to this boat ramp is anticipated to remain open during construction. As part of the project, access to this boat ramp would be improved.

FINDINGS: __ No Effect _X_ Negligible __ Major (Significant)
__ Short Term Minor __ Long Term Minor

4. Aesthetics (40 CFR Section 230.53). Aesthetics is a very subjective factor, since some individuals place a higher value on developed aesthetics and some place a higher value on natural areas. The proposed project would be consistent with the existing aesthetics of the project corridor. Therefore, the USACE has determined that the impact on this factor would be negligible.

FINDINGS: __ No Effect _X_ Negligible __ Major (Significant)
__ Short Term Minor __ Long Term Minor

5. Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites and Similar Preserves (40 CFR Section 230.54). The Allatoona WMA, which is owned by the USACE and leased to the Georgia DNR for wildlife management and recreation, occurs in the project area. The total amount of land owned by the USACE is approximately 25,000 acres, of which approximately 6,800 acres are leased to the state. Existing SR 20 crosses this WMA in two locations. The proposed widening would require an additional easement within this WMA of approximately 37.8 acres, all of which would occur adjacent to the existing SR 20 roadway and easement. This small permanent loss of this WMA would be considered a long-term, minor impact.

FINDINGS: __ No Effect __ Negligible __ Major (Significant)
__ Short Term Minor _X_ Long Term Minor

For Cultural Resources Subject to Section 106 of the National Historic Preservation Act:
As previously discussed, the Preferred Alternative (Alternative A) is anticipated to result in impacts to the following seven NRHP eligible resources: Eaton House, Head House, Whispering Pines, Ellison House, Johnson House, Jiffy Freeze, and Blueberry Hills Historic District. It is not known at this time if these impacts would be considered adverse to any of these resources. In addition, impacts to archaeological resources have not yet been determined, as surveys have not been completed. Three cemeteries may be impacted by Alternative A. Therefore, recommended findings cannot be assessed at this time. The 404(b)(1) analysis conducted for the permit would further assess impacts to Section 106 resources.

E. **Subpart G - Evaluation and Testing.**

1. General Evaluation of Dredged or Fill Material (40 CFR Section 230.60).

The material used for construction would be obtained from a source free of contaminants. The dredged and fill material would be obtained from within the property boundary, where possible. The permit for the proposed project, if issued, would include special permit conditions, such as: "All dredged or borrowed material used as fill on this project would be from clean, uncontaminated sources and free from cultural resources." The GDOT has no reason to believe that any potential borrow area located within the project site would contain any chemical

contaminants of concern. A Phase I Environmental Site Assessment would be completed for the project corridor prior to construction, which will identify areas of concern for potential contamination. If any such areas are identified, a Phase II Environmental Site Assessment would be completed to test for contamination and provide a recommended strategy to safely handle and remove any contaminated soils from the project site.

2. Chemical, Biological, and Physical Evaluation and Testing (40 CFR Section 230.61).

Not applicable, see discussion at Part V.E. Subpart G.1.e. above.

PART VI
SUBPART H - ACTIONS TO MINIMIZE ADVERSE EFFECTS

Any permit issued for this project would include numerous general and special permit conditions addressing specific actions necessary to insure minimization of adverse project related impacts to the categories in Part VI. These measures would be further assessed in the 404(b)(1) analysis conducted with the permit application.

Examples of Special Conditions that may be applicable and included in the future permit, if issued, are outlined below; however, the exact wording included in these examples may not be representative of the final permit Special Conditions. This is not meant to be an all-inclusive list of Special Conditions that may be applicable to the project or included in the permit.

- All dredged or borrowed material used as fill on this project would be from clean, uncontaminated sources and free from cultural resources.

- That no construction activity or stockpiling would occur in waters of the United States, including wetland areas, outside of the areas authorized for filling under this permit.

- Borrow site or sites for stockpiling fill dirt shall be prohibited within 200 feet of streambanks, 50 feet of wetlands and open waters unless specifically authorized by this permit. Normal grading activities such as cutting and filling within 200 feet of streams or 50 feet of wetlands/open waters are authorized.

- Construction debris, liquid concrete, old riprap, old support materials, or other litter shall not be placed in streams or in areas where migration into streams and/or wetlands could reasonably be expected.

- Staging areas and equipment maintenance areas would be located at least 200 feet from streambanks to minimize the potential for wash water, petroleum products, or other contaminants from construction equipment entering the streams.

- Prior to the commencement of construction activities for this project, the limits of the proposed fill areas in jurisdictional waters shall be clearly flagged and staked. All construction personnel shall be shown the location(s) of all wetland and/or stream areas outside of the construction area to prevent encroachment from heavy equipment into these areas.

- The permittee shall minimize bank erosion and sedimentation in construction areas by utilizing BMPs for stream corridors, installing and maintaining significant erosion and sediment control measures, and providing daily reviews of construction and stream protection methods. Check dams and riprap placed in streams and wetlands as erosion control measures are considered a fill and not authorized under this permit unless they were specifically authorized by this permit.

- All work conducted under this permit shall be located, outlined, designed, constructed and operated in accordance with the minimal requirements as contained in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Utilization of plans and specifications as contained in "Manual for Erosion and Sediment Control, (Latest Edition)," published by the Georgia Soil and Water Conservation Commission or their equivalent would aid in achieving compliance with the aforementioned minimal requirements.

- The applicant shall obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. A stream buffer variance may be required. Variances are issued by the Director of the Georgia EPD, as defined in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. It is our understanding that you may obtain information concerning variances at the Georgia EPD's web site at www.gaepd.org or by contacting the Watershed Protection Branch at (404) 675-6240.

PART VII
DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM
[40 CFR Section 230.11(g)]

A complete assessment of the cumulative effects on the aquatic ecosystem cannot be completed at this time since the project design is only at concept level. However, it would be anticipated that the project would not result in a significant impact on the environment, considering the incremental impact of the action when added to other past, present, and foreseeable future actions. Additionally, there are two other SR 20 widening projects that are in various stages of development. A detailed determination of cumulative effects on the aquatic ecosystem would be conducted as part of the 404(b)(1) analysis conducted during project permitting after plan development and environmental documentation for the project have been developed.

PART VIII
DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEM
[40 CFR Section 230.11(h)]

A complete assessment of the secondary effects on the aquatic ecosystem cannot be completed at this time since the project design is only at concept level. However, the project was reviewed for potential secondary/indirect impacts such as those associated with utility relocation, satellite development and new infrastructure needs, etc. There would be the need for construction of a new power line from the project site to the nearby existing Georgia Integrated Transmission System. Construction of this utility line may require impacts to waters of the US. Based on the information available, such impacts could include vegetation change, wildlife change, and a change to water quality.

PART IX
FINDINGS

A. **Status of other authorizations and legal requirements.** The following findings are based on conceptual design. These findings would be updated, as needed, based on impacts assessed as design progresses. The revised findings would be included with the 404(b)(1) analysis conducted for the permitting.

1. Water Quality Certification: The project is currently in conceptual design phase and has not been reviewed pursuant to Section 401 of the Clean Water Act by Georgia EPD. This review would be completed and a final Water Quality Certification would be issued for the project prior to construction.

2. Coastal Zone Management Consistency Determination: This proposed project is not located in the coastal zone. A determination of consistency with the Coastal Zone Management Act is therefore not required.

3. Compliance with Section 106 of the National Historic Preservation Act: A Historic Resources Survey Report was prepared for the project, which identified 14 National Register of Historic Places (NRHP) eligible historic resources along the corridor. Surveys for archaeological resources, including cemeteries, are underway and ongoing. The USACE has not yet completed coordination and consultation pursuant to Section 106 of the National Historic Preservation Act. The project is currently in conceptual design phase. Effects on cultural resources will be evaluated as the project progresses.

4. Compliance with the Endangered Species Act: The FHWA is the lead federal agency for this proposed action, and as such, would meet all lead federal agency responsibilities pursuant to Section 7 of the ESA prior to conducting any work in waters of the US subject to USACE jurisdiction. Given the stage of project development, determination of effects on federally protected species have not yet been made. However, it is currently anticipated that the project may affect, but is not likely to adversely affect, federally listed species. Due to the assumed presence of protected species and the presence of habitat for protected species in the project area, Special Provision 107.23H, which would outline clearing restrictions and other minimization measures, would be developed and implemented for species protection. Effects on federal protected species will be evaluated as the project progresses.

5. Compliance with Clean Air Act: The project is located in a non-attainment area for ozone. The project will be evaluated for compliance with all state and federal air quality standards.

6. Other State and/or local authorizations: Since the project is in conceptual design phase, no authorizations have yet been issued for the project. The project will require a stream buffer variance and National Pollution Discharge Elimination System (NPDES) permit. Other needed permits and/or authorizations will be determined during the National Environmental Policy Act (NEPA) process.

The project is in the conceptual design phase; therefore, it is not appropriate to include evaluations of compliance with 404(b)(1) guidelines (restrictions on discharge, 40 CFR 230.10) and findings of compliance or non-compliance with restrictions on discharge (40 CFR Section 230.12). These evaluations would be completed for the permit.

PART X
SUMMARY AND CONCLUSION

A. The Preferred Alternative (Alternative A) represents the least environmentally damaging, practicable alternative. In addition, adverse impacts on the aquatic environment by this project would be compensated for by the proposed mitigation.

B. The Preferred Alternative (Alternative A) would not be expected to cause or contribute to violation of any applicable state water quality standard, does not violate any applicable toxic effluent standard, does not impact any marine sanctuary, and is not anticipated to adversely affect any endangered or threatened species.

C. The Preferred Alternative (Alternative A) would not be expected to cause or contribute to significant degradation of the waters of the US.

D. All appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. Further analysis would be conducted as design progresses.

E. The proposed project, with the standard conditions that would be placed on Department of the Army permits and other special conditions [found at Part V.D of the case document] would comply with the guidelines promulgated by the Administrator of the USEPA pursuant to Section 404(b) of the Clean Water Act.

Attachments:
(A) Typical Sections
(B) Environmental Resource Maps

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REVIEWED BY: Melissa Rottenberg, Arcadis U.S., Inc.

Stakeholder Interviews-Meeting summaries

6. Summary of Stakeholder Interviews

The Georgia Department of Transportation (Georgia DOT) is initiating the development of corridor-level transportation improvements along SR 20 between I-75 and I-575. This includes identifying, scheduling, and developing an overall corridor concept for SR 20 that will undergo the level of environmental review required to advance this concept to final design and construction.

The first step in effective communication is to identify and understand the characteristics of the project area, identify appropriate stakeholders, and define the desired level of participation of these groups. Stakeholder interviews were conducted in September and October 2014 to provide key stakeholders with an introduction to the project, including scope and schedule; gauge stakeholder reaction to the project and the local viewpoint; and discuss and collect information on whom to engage (local community leaders), how best to engage with the local communities, and what to expect when working with the local community. The project team held eight stakeholder interviews, including interviews with elected officials, school systems, and chambers of commerce in the project area. The following is a list of the entities, persons, and meeting dates of the stakeholder interviews.

Table 17: List of Entities, Persons, and Meeting Dates of Stakeholder Interviews

Organization	Attendees	Meeting Date
City of Cartersville	Tommy Sanders, Director of Public Works Matt Santini, Mayor Keith Kunst, ARCADIS Project Manager Haley Berry, ARCADIS	Monday, September 22, 2014
City of Canton	Gene Hobgood, Mayor Nathan Ingram, Chief Financial Officer Derrick Brown, Georgia DOT Project Manager Keith Kunst, ARCADIS Project Manager Haley Berry, ARCADIS	Friday, October 3, 2014
Bartow County	Steve Taylor, Sole Commissioner Peter Olson, County Administrator Keith Kunst, ARCADIS Project Manager Haley Berry, ARCADIS	Thursday, September 25, 2014
Cherokee County	Buzz Ahrens, Chairman Geoffrey Morton, Director of Public Works Jerry Cooper, County Manager Bonnie Bynum, ARCADIS NEPA Lead Kate Colberg, ARCADIS Haley Berry, ARCADIS	Tuesday, October 7, 2014

Organization	Attendees	Meeting Date
Bartow County Schools	Jody Elrod, Director of Transportation Keith Kunst, ARCADIS Project Manager Haley Berry, ARCADIS	Monday, September 22, 2014
Cherokee County Schools	Bill Sebring, Assistant Superintendent Mitch Hamilton, Planning and Forecasting Coordinator Regan Hammond, ARCADIS Haley Berry, ARCADIS	Tuesday, October 14, 2014
Cartersville-Bartow Chamber of Commerce	Joe Frank Harris, President and CEO Keith Kunst, ARCADIS Project Manager Haley Berry, ARCADIS	Thursday, September 25, 2014
Cherokee Chamber of Commerce	Pam Carnes, CEO Derrick Brown, Georgia DOT Project Manager Keith Kunst, ARCADIS Project Manager Haley Berry, ARCADIS	Friday, October 3, 2014

Each interview included an introduction of the project team, and overview of the project, discussion of the existing issues and opportunities along the corridor, and a question and answer (Q&A) period. Below is a summary of the meetings, with emphasis on the common themes heard among the stakeholders:

- SR 20 is considered a dangerous corridor between I-75 and I-575 and safety is a main concern expressed by all interviewees. SR 20 is a major east-west mobility corridor in northern metropolitan Atlanta, and it is generally agreed that safety concerns must be addressed along the corridor. Recent improvements along the corridor, including passing lanes and bridge improvements, have helped; however, more can be done. Poor sight distance, speeding, blind driveways, topography, and dangerous intersections were identified as some of the issues experienced by users of the corridor. Improving the corridor to four lanes in both directions between I-75 and I-575 is viewed as the best solution overall. Access control via a median is also viewed as a favorable solution for addressing safety issues.

- SR 20 between I-75 and I-575 and SR 20 between I-575 and GA 400 in Cumming, Georgia were compared in several interviews. Generally, SR 20 to the east of I-575 is viewed as having more issues that need to be addressed due to population and development along this section of the corridor. It was noted that there is significant room for growth west of I-575 throughout Cherokee and Bartow counties. The SR 20 corridor west of I-575 is generally viewed as the residential end of the corridor. In terms of safety, accidents are perceived as being more prevalent west of I-575 than east of I-575 to GA 400.

- Growth along the corridor is imminent. It was noted numerous times that there is room for growth along the corridor, although it will likely continue to remain residential and rural-residential in

nature. SR 20 west of I-75 is described as a growth area; Georgia Highlands College is continuing to grow and expand and is hoping to add student housing, while the conference center is driving demand for hotels and commercial uses in the area. The vision for this portion of SR 20 is that it be more like a parkway than a thoroughfare with a median, sidewalks, and limited curb cuts. Industry along the I-75 corridor is growing, and the US 411 Connector project is viewed as an important project to accommodate continuing growth in the area. In Bartow County, there is evidence of the housing market improving with approximately 1,000 approved permits across the county. In the long term, the corridor is planned to remain residential. The Lakepoint Sporting Complex development will likely spur growth throughout the county with impacts that could affect the wildlife management area. In Cherokee County, there is no sewer service west of the Etowah River; therefore, growth moving west along the corridor is limited at this time. However, long term, it is believed that sewer service will be provided, which will open up large land areas for development. East of the river, there are several subdivisions that are not built out and are planned for several hundred more housing units.

- It is generally thought that the community will support improvements along SR 20 that address mobility and safety. The project is not likely to be perceived as threatening the public's quality of life. The comparison to the Northern Arc is not a fair comparison and is not likely to be an issue with the public. Safety and improvements addressing safety should be a key message throughout development of the project. Providing a clear description and understanding of the process and timeline will help alleviate the public's concern that the project is considered long term. Another key message should be that the project is enhancing the existing corridor. The corridor should not be renamed as most people identify the corridor as Highway 20 from Canton to Cartersville. It will be important to work with land owners along the corridor, many of whom own large tracts of land that have been in the family for generations. Other stakeholders to engage include homeowner associations for the large subdivisions along the corridor, businesses, schools, rotary clubs, Coosa River Initiative, and Georgia Power (for understanding industry and economic growth in Bartow County).

Next Steps/Action Items:

- Finalize Public Involvement Plan. Incorporate findings from the stakeholder interviews.
- Develop public involvement schedule in coordination with the project schedule.
- Develop a stakeholder and issue matrix. Incorporate identified stakeholders from interviews.
- Develop a public-friendly schedule to share with those interviewed.

SR 20 Corridor Improvement Project (I-75-I-575)

Stakeholder Interview- City of Cartersville

Attending: Tommy Sanders, Director of Public Works, City of Cartersville
Mayor Santini, Mayor
Keith Kunst, ARCADIS PM
Haley Berry, ARCADIS

- SR 20 project is more important than the 411 project; however, those coming from the north use SR 41; therefore, the 411 project would be important to them
- Working on alternate route to the 411 project that would not impact the Rawlins property
- SR 20 is a dangerous road between Cartersville and Canton
- Improvements of passing lanes and bridge improvement has helped
- Passing lanes are posted at 45 mph- how do you pass at that speed? It serves as a speed trap now
- SR 20 west of I-75 to Cartersville- growth area with GA Highlands College and conference center. The vision is for it to be more of a parkway than a thoroughfare. Divided highway, student housing, and limited curb cuts
- Major growth goals for the city incudes the area around GA Highlands College- they (have) approval for another academic building, would like to add student housing
- Growth is happening in Cartersville, not Rome
- Bruce Thompson (state senator) lives in Hawks Farm along SR 20 (district is Bartow and Cherokee)
- Not enough turn lanes, significant delays if there is an accident, funeral, etc
- Sutallee Baptist Church needs to be a stakeholder
- Do not want to save the bridge over Lake Allatoona- bridge deck is in bad shape
- Barry Loudermilk- US Senate- project in his district. He recently had an op-ed piece in the AJC regarding the federal transportation reauthorization bill.
- Butterworth intersection- accidents probably a matter of volume
- Should work through the county for public meetings; however Rebecca Bolander is Cartersville communications person.
- Most commuters are traveling up and down I-75
- There are few new businesses and some expansion in Cartersville which would influence the corridor. Most jobs are north of the corridor.
- Industry- Beauxlieu International Group, Surya Rugs, Highland 75 Industrial Park, Anheuser-Bush, Adairsville Business expansion
- Cartersville is not as much a bedroom community as one would think- there are lots of businesses here.
- Would hate to see nothing get done
- Make sure the model is pulling the correct amount of traffic generators
- Cartersville side of SR 20- developer actively working to get retail in there
- Jeff Lewis- GDOT Board member- owns several billboards in the area

Stakeholder Interview- Bartow County Schools

Attending: Jody, Elrod, Director of Transportation, Bartow County Schools
Keith Kunst, ARCADIS PM
Haley Berry, ARCADIS

- There are several neighborhoods along SR 20 that they provide bus service too- Clover Elementary School District and the White Elementary School District (Stamp Creek Road is the line)
    - Two middle schools
    - Feed into one high school
- In the morning- pick up all at one time (K-12). Middle and highs school students switch buses after elementary school drop off. (pick up between 6:20 and 6:30am)
- In the afternoon- pick up at different times
- Operate separate special needs busses
- Many of the improvements along SR 20 already seem to have helped (passing lanes)
- Most of the busses are out of the area before congestion starts in the morning and in the afternoon.
- There are bus stops along SR 20- no crossing the street though.
- Would prefer not to have stops along SR 20
    - Hawks Farm (for example)- gated community so have to pick up on SR 20
- Very interested in the US 411 extension as project would greatly improve bus service- it's a challenge to get children from Kingston to Cassville HS
- No major issues along SR 20; although 4-laning it would be a plus.
- Accident- Rolling Springs Road- bus pulling out to make left. Blind spot. Bus caused the accident as a car had to veer off to miss the bus.
- Better sight distance is a needed improvement as there are lots of blind curves
- They do a bus stop evaluation at each bus stop.
- There is a speeding problem on SR 20
- 2 developments starting back up. Stamp Creek Road and Bells Ferry Road- feed onto SR 20. There is a lot of land available for growth.
- It would be beneficial to see improvements along SR 20 where there have not been any improvements
- Ideal corridor would be 4 lane median divided all the way through
- Communication is key to planning to get around construction. Please include school district in coordination meetings.

Stakeholder Interview: Bartow County

Attending: Steve Taylor, Bartow County Sole Commissioner
Peter Olson, County Administrator
Keith Kunst, ARCADIS PM
Haley Berry, ARCADIS

- How do the short term projects tie into the long term projects?

- Maintaining buffers will likely be important to property owners along the corridor
- SR 20 is an unsafe road- there is a lot of commercial traffic.
- Would like to see a divided four lane
- It is shame the Northern Arc didn't go through- everyone thought it would bring more traffic, not less
- Road is very windy and topography is an issue.
- Driveways are not in good placement
- Define what is meant by access control
- The Northern Arc shouldn't be an issue
- SR 20, west of I-75, is seen as a big commercial corridor
    - Need more hotels to support the conference center
    - The area is changing
    - Student population is growing
    - Would like to see sidewalks, street lights- more commercial and urban
    - Would like to see all the way to US 411
- Two big subdivisions in Bartow: Timberlake and Hawks Farm
- Hawks Farm HOA should be a major stakeholder
    - State Senator lives in Hawks Farm with constituents in both Bartow and Cherokee Counties
- Next 12 to 18 months- 3000 to 35000 jobs to be added (based on concrete announcements)
- Net job county – 29,500 going out for jobs, 15,000 coming in to the county for work
- Third Army interchange will benefit Paulding more than Bartow and Cobb
- Do not want Bartow roads to become corridors for commuting (in relation to access control)
- SR 20 is a big east/west mobility corridor
- SR 20 is low density
- Vulcan Quarry along there
- Don Evans (and his son)- large landowner in the area, but his property does not reach SR 20 (3/4 mile off of SR 20). 500 acres at Boston Creek and Stamp Creek). Son is an attorney in Cartersville
- Do not believe that the public is aware of the project; however, believes that the public will get behind the project overall.
- There is evidence that the housing market is returning, but it is lagging as compared to other parts of the metro region. There are 1,000 permits ready to go across the county
- Corridor is seen as being more residential long term from east of I-75 over to Canton. There is no sewage service out there and the topography makes it difficult to development- helps control growth
- Kathy Gill- County Clerk- she could help get information out about meetings, etc
- Commissioner requests a general timeline moving forward
- County would like a map of the project to put up once available.

Stakeholder Interview- Cartersville-Bartow Chamber of Commerce

Attending: Joe Frank Harris, President and CEO of Chamber
Keith Kunst, ARCADIS PM
Haley Berry, ARCADIS

- Typography is horrible and you always hear about people getting into accidents and hurt
- SR 20 (west of I-75)- Rome to Cartersville connector (US 411)- want to make sure that project gets done

- It's a shame the Northern ARC did not move forward- there is no way to get to Athens or Gwinnett and it thwarts a lot of what Bartow is able to do
- Would like to see interchange to the US 411 Connector at the Anheuser-Bush/Highland 75 Industrial Park area
- Whitefield, Floyd, Gordon, Bartow counties- manufacturing belt in the state- steel, carpet, cars
- SR 20 is a commuting corridor.
- SR 20 is a nuisance corridor, frustrating for residents to have to use SR 20 to get east. There is a tremendous amount of frustration to get across SR 20.
- There are safety issues along SR 20- it is a dangerous corridor
- Public will likely have environmental concerns, as it is seen by some as a scenic corridor
- Melinda Lemmon- Joint Development Authority- potential stakeholder to meet with. She has good data on industrial growth in the county and northwest Georgia region.
- Potential stakeholder meeting with Government Affairs Committee
- GA Power contact- Elyse Cochran, Community Economic Liaison for Northwest Georgia. edavis@southernco.com, 706-512-2177

Stakeholder Interview- City of Canton

Attending: Gene Hobgood, Mayor
Nathan Ingram, Chief Financial Officer
Derrick Brown, Georgia DOT PM
Keith Kunst, ARCADIS PM
Haley Berry, ARCADIS

- Cars can go faster along this stretch than going east from Canton
- This corridor has far less problems than SR 20 east of Canton
- Traffic cannot be nearly as much as traffic going east
- SR 20 east of Canton is a nightmare
- There is not as much development on SR 20 west of Canton as there is east of Canton
- Canton has sent a letter to Georgia DOT about signalization at River Bend (?)- there is cut through traffic and it is coming out at the school.
    - Requested copy of the letter
- SR 20 at Marietta Highway- this is the biggest problem intersection -- > to turn left and go west along SR 20. It is a terrible turn to make
    - Are you going to proceed with striping the intersection of SR 20 and Marietta Highway?
- The west has room for additional growth. Many of the subdivisions along there are not built out (River Green).
- Intersection improvements/corrections are the greatest need
- Not sure if widening is needed in the city
- Stakeholder- River Green subdivision- engage with the HOA- city manager and council member on the HOA board
- This is not a good substitute for the northern arc-
    - With growth, this road will be another Holcomb Bridge Road
- Anything (significant improvement) would need to be limited access to get expeditiously east-west. (but limited access is not likely to happen)

- Northern Arc should go up to SR 136
- Do not believe that the Northern Arc will be an issue
- Access Management (median)
    - Who gets access (cut in the median) and who doesn't- will only hear from those who do not get the access
    - Now is the time for access control (limited access/median) on SR 20 going west because of relatively sparse development and to minimize impacts
- City Council is up on commercial development- would probably keep annexing west for commercial development and may envision something more intense
- Commercial development will continue to crop up and down SR 20
- 8,000 to 8,500 undeveloped lots in the city of Canton
- Mayor would rather see infill development than continue to see development spread down SR 20
- The schools can really back things up at the intersection with Ridgewood Road
- River Green is planned for 1200-1500 homes. 800 are currently built out now.
- Board of Education should be a stakeholder
- There could be interest in bike paths along SR 20 (off-road). Without the bike lanes- people would raise the question- now is a great time to think about it along SR 20
- For announcements work through the city clerk- Susan Stanton
- Stakeholder: Coosa River Initiative.

Stakeholder Interview- Cherokee Chamber of Commerce

Attending: Pam Carnes, Cherokee Chamber of Commerce
Keith Kunst, ARCADIS PM
Haley Berry, ARCADIS

- Corridor is the residential side of SR 20 while east of Canton is the more commercial side.
- Truck traffic heavy from I-575 to GA 400
- SR 20 is the only east-west choice
- Trucks trying to get to I-75 have no other choice
    - They deal with school bus stops, residential driveways, etc
- Safety is an issue- hear more about accidents west of Canton on SR 20 than SR 20 on the east side of Canton
- "Death Trap"
- Nervousness about drivers who have no choice but to use that corridor
- Along SR 20- lake, Corp property, GA National Cemetery (SR 20 east of Canton is more commercial)
- In the area of Sutallee and Waleska- you will be dealing with families who have owned the land for generations. They can be hard to deal with
- Got to do something to grow the corridor from I-75 to I-575
- Safety should be a BIG message
- It is hard for the public to understand why projects that so long- do not understand the environmental studies, etc
- SR 20 is a connector- it affects traffic, growth, economic development

- Got to have it
- Message- you are enhancing their existing corridor. Most will look at it as Hwy 20 from Canton to Cartersville- not giving it a new name- it is the corridor they use.
- Message- growth is going and we got to be ready for it
- Stakeholder: Ga National Cemetery (Pam will send contact information)
- Chamber can help disperse information to the business community:
    - Email
    - Board of Directors (love outside speakers)
    - Regional Issues Advisory Meetings- 4 times a year
        - Promoted to membership and the general public
    - Good morning Cherokee- sponsor choices the program, attended by 250+
- Engage with Rotary Clubs

Stakeholder Interview- Cherokee County

Attending: Buzz Ahrens, Chairman, Cherokee County
Geoffrey Morton, Director, Cherokee County Public Works
Jerry Cooper, County Manager, Cherokee County
Bonnie Bynum, ARCADIS
Kate Colberg, ARCADIS
Haley Berry, ARCADIS

- SR 20 at the Etowah River bridge- it is the biggest bottleneck- very narrow, no shoulder. When the through movement is blocked, have to use SR 108 or SR 92 to get east and west
    - What happened to the bridge project?
    - PI No 632900- SR 20 over Etowah River, Project No: BRST-012-1(11)- Geoff has a Bridge Replacement Preliminary Layout Hydological and Hydraulic Studies dated January 2004 and prepared by Parsons Brinkerhoff
- The development is up I-75 on the Bartow side- it will spill both ways with the Lakepoint development (sporting complex)- that will have a big impact. The impact of development will spill into the wildlife management area (www.lakepointsports.com). Lakepoint will bring in nationwide sporting events.
- There is a lot of undeveloped land in Cherokee County
- Plans/ideas to extend SR 108 down to I-75 at one time
- Willoughby and Sewell development is not moving forward. Cherokee bought 100 acres along the lake. Sewell may be selling the land.
- Avoid SR 20 east of Canton
- GDOT safety improvement project (in vicinity of the GA National Cemetery) has helped with accidents.
- Signal at SR 108 and SR 20- under contract at the GDOT. This project will be a big improvement. There have been several fatalities at this intersection
    - PI No. 662650- SR 20 at SR 108; CR 17/White Road & CR 13/Mount Carmel Church Lane- intersection improvement with signalization- under construction.
- Corridor from GS 400 to I-575 would rate a 2 to 1 compared to the section west of I-575.
- No good solution to get to I-75
- There is no sewer out there so development is limited. Adding sewer maybe something the water authority is considering long term.

- Community is probably not going to oppose- as it will not be seen as a threat to their quality of life.
- Cemetery is a big draw- consider them a stakeholder
- People get upset over the disruption.
- Businesses will be upset of perceived impacts
- On the east side, the public doesn't like the new alignment (especially with limited access)
- Large land owners include Willoughby and Sewell and Canton West
- EJ communities close to Canton
- Cherokee Schools has brought land at SR 20 and SR 108 for future school site in the NW corner
- Send communication and public announcement to Geoff Morton
- Truck climbing lanes have helped
- The most needed improvements on the portion east of I-575 is from I-575 to Scott Road
- Intersection improvements are most needed on the section west of Canton
- Improvements east of I-575 are sorely needed because of traffic volume, accidents, no access control, population
- There is just not a lot of development on the west side. SR 20 is built on a ridge with no shoulder
- The EIS from I-575 to GA 400 was controversial because they showed alternatives through rural farm land
- Stakeholder - Hwy 20 Coalition- Robert Chambers
    - Has a Facebook page
    - Focused on the eastern portion of I-575 currently
    - Will go negative to get the people excited
- On the TIA list, Cherokee's biggest project was the widening of SR 20- it was at the top of their list because of accidents, congestion perception, legislation (for widening), commerce, development and redevelopment potential.

Stakeholder Interview- Cherokee County School District

Attending: Bill Sebring, Assistant Superintendent, Support Services and Facilities/Construction Management
Mitch Hamilton, Planning and Forecasting Coordinator
Regan Hammond, ARCADIS
Haley Berry, ARCADIS

- Assuming 4-laning was going to happen, but interested in potential short term projects at problem areas/intersections
- Asked about what "long range" means for widening project
- 2 schools located on SR 20
    - Ace Academy (formerly Teasly) is "alternative" middle/high school – sits back off of SR 20
    - Knox Elementary is close to SR 20, but entrance is off Riverbend Way
- Safety of transporting students is #1 priority. SR 20 is a dangerous road
- Buses may pick up some students directly on SR 20, but those are primarily on western end of corridor near county line. Try to use subdivision entrances and decel lanes when possible. Buses stop on near side of intersections and driveways.
- Believe 4 lane is in best interest, recognizing it will likely increase speed on corridor

- Bridges are also a concern, particularly Knox Bridge since it is narrow. Have been some close misses on that bridge. Interested in/concern about bridge replacement.
- Controlled access/medians are supported
- Knox Elementary boundary is west to county line, most students live off of SR 20
- Currently 755 enrolled at Knox with capacity up to 1200
- Knox Elementary dismisses at 2:15pm
- Separate bus runs for elementary and middle/high schools
- Kids on corridor go to Cherokee High School
- Kids not allowed to cross SR 20, SR 108 (Fincher) or SR 92 to catch bus. Buses pick up/drop off on both sides of street
- 3 elementary and 2 high schools have bus routes along SR 20
- 6:40am-7:40am are pickups, drop offs are 2:35pm-4:30/:45pm
- There are individual stops for homes along SR 20
- Last year was one minor crash on SR 20 where car ran into back of bus.
- Bus drivers say SR 20 @ SR 108 (Fincher) is problem area – curve and hill. Also SR 108 & White Rd.
- Buses do not make left turns onto major roads
- School system has 42 acre property off of SR 108 and White Rd. – they see a lot of potential growth in that area if sewer extended and transportation improvements made. Wiloughby and Sewell properties will eventually be developed
- Sewer currently stops east of Knox Bridge
- School system looking at another property (217 acres) off of SR 108 (Fincher)
- Rivergreen subdivision not yet fully built out
- Some students walk to Knox Elementary who live in Rivergreen, but not on SR 20
- Barbara Jacoby is contact for communications to get out meeting announcements
- HOAs would be good stakeholders
- Mitch Hamilton is primary contact for planning and forecasting

RECORD OF MEETING

ARCADIS Design & Consultancy for natural and built assets

Subject:

SR 20 from I-75 to I-575 PI 0007836
Bartow/Cherokee U.S. Army Corps of Engineers (USACE) Coordination Meeting

Arcadis U.S., Inc.
2410 Paces Ferry Road
#400
Atlanta
Georgia 30339
Tel 770 431 8666
Fax 770 435 2666
www.arcadis.com

Department:

Infrastructure

Arcadis Project No.:

GA064042

Meeting Location:
USACE Allatoona Lake Project Management Office
1138 GA Highway 20 Spur
Cartersville, GA 30121

Participants:

[See Sign-In Sheet]

Copies :

Meeting Date:

July 13, 2017

Minutes by:

Robert Askew, Robin Stevens

Issue Date:

July 21, 2017

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1. Introductions
2. Keith Kunst discussed project background and overview
3. Drew Martin stated that GDOT and USACE are working under a MOA regarding Section 408 coordination from 2015. GDOT Design Policy and Support and USACE have been working towards a new agreement over the past year to streamline the Section 408 process, which is currently in review. Main goals are early coordination and earlier input to improve schedule accuracy.
4. Discussion on Stamp-Boston Creek USACE land crossing:
    a. Four-lane concept with raised median and rural shoulders and 55 mph design speed.
    b. Existing bridges (reconstructed in mid-2000s) over the creeks will be retained and widened. The current preferred alternative widens the road to the south in this area to keep all impacts to one side (both construction and staging impacts). The roadway narrows from a 44' wide median to a 24' wide median in order to reduce impacts within the USACE property.
    c. Additional easement will be needed along the south side of the road. USACE requested to know how much additional easement is needed. Arcadis noted that the USACE could request U-turn openings along SR 20 to access their driveways within the WMA. The USACE mentioned that they could look at alternate driveway entrance locations to the WMA Check Station if access becomes an issue with reduced median width.

d. Stephen Cain pointed out two locations on either side of the road west of Stamp Creek where there are grave sites. One is a Revolutionary War grave near the WMA Check Station (which is visible from the road), and the other is a cemetery (Wafford Cemetery) on the opposite side of the road. There is also a significant cultural site (a village site) south of SR 20, near where Stamp and Boston Creek converge.
e. Doug Evans reminded the design team that the USACE Planning Department will not review any plans until funding is set up. The USACE Planning Department will review the project for any environmental concerns (cultural resources and threatened and endangered species).
f. Doug asked if retaining walls were considered to reduce impacts. Robert Askew stated yes retaining walls can be used if necessary. Arcadis will see what benefits would be gained by constructing walls. Keith mentioned that constructability and traffic control will be considered as well in determining the feasibility of walls. Minimization options will also be looked at where design deviations may need to be requested.
g. USACE noted that the bridge replacement projects from approximately 2005 were constructed under a Categorical Exclusion, so there isn't any documentation from USACE.
h. Arcadis questioned if there is a set buffer around cultural sites that we need to be aware of because they could be outside of the survey area. Doug and Stephen did not know, but the USACE Planning Department can advise of that once coordination begins with them (once funding is set up and ARPA permit is obtained).
i. To the USACE knowledge, there are no special issues related to Boston Creek in terms of environmental resources. There are gravel access driveways located around Boston Creek, including one larger pull off area.
j. USACE will have four types of review of the project from a land management perspective (outside of Section 404 review): 1) Planning review (environmental); 2) Real Estate office will look at the need for lease amendments; 3) Policy review (compliance with laws and regulations); and 4) local review (Lake Allatoona Office) of flood storage impacts.
k. USACE noted that Stamp and Boston Creeks may be seasonal trout streams. Stamp Creek is stocked further upstream of project area.
    i. Arcadis responded that Boston Creek watershed upstream of SR 20 is considered trout waters (requires 50-foot buffer), but Stamp Creek is not considered trout waters in the project area.
l. There is an easement through USACE land for an access driveway to property owned by Vulcan Materials just west of Boston Creek.
m. USACE wants to maintain access to all driveways within the WMA.

5. Discussion on Knox Bridge USACE land crossing area:
    a. Robert noted that all roadway widening will have to be to the north due to Lake Allatoona being parallel to the roadway to the south. This will require large cuts into the mountainside on the north side. Fill walls will be used on the south side in order to keep roadway improvements above the 863' elevation contour (max. operating level of lake).
    b. Currently, concept plans show worse-case scenario construction limits of 2:1 cuts with benching. However, if geotechnical investigations show suitable rock in the mountainside, 0.5:1 rock cut slopes may be used and the construction limits will be reduced.

c. Stephen raised concerns with invasive vegetative species moving in once cut slopes are cleared.
d. Removal of existing rock jetty may gain approximately 15 acre-feet of storage volume for the lake. Jetty removal may mitigate any fill that may be required along the project that encroaches into lake storage capacity.
e. Design team raised questions about the existing rock jetty:
    i. Has it created maintenance issues? USACE responded that it likely collects sediment, and that is one of the reasons why they have an ongoing dredging operation just west of this jetty at the bend in the lake.
    ii. Would it beneficial to remove this jetty? USACE responded that it would likely be beneficial to remove it, but their engineering/technical branch may look at it differently.
    iii. Could existing road bed leading to the existing bridge be used as additional parking? USACE responded that there is need for additional parking at this day use area; the current parking area is regularly full. USACE is supportive of using this land for parking or other improvements.
    iv. Is the jetty used for fishing? USACE responded that the jetty could be part of the Knox Bridge Day Use Area. Stephen will check to see if it is officially designated as such. Fishing occurs anywhere along the water's edge for the entire lake, including on the jetty. The jetty is not signed to prohibit use. USACE noted that all of their land is open to public use.
f. Arcadis noted that shifting the widened road to the north at Knox Bridge would allow for a reconfigured driveway and improve ingress/egress at the day use area/boat ramp. The current driveway to it is at an extreme skew and right turns are not allowed from the driveway due to this. The USACE is supportive of any efforts to improve access to this area.
g. USACE supports a *de minimis* finding under Section 4(f) if the Day Use Area/Boat Ramp is restored to present or better conditions (such as improved access). USACE does not feel that removal of the rock jetty and any associated fishing use of the jetty is an adverse impact on recreation use, since people will fish up to the water's edge regardless.
h. USACE noted that the Knox Bridge boat ramp closes in the winter, which may reduce any construction-related impacts to this area.
i. GDOT Bridge Office has given the design team concurrence with shifting the alignment to the north and bridging the full width of the lake.
j. USACE reminded the design team that the new Knox Bridge should be entirely above the 863' elevation level.
k. Robert asked if USACE has a newer design standard guide for "Design of Recreation Areas and Facilities" - the latest edition he found was published in 1982. Stephen will try to see if a newer edition is available.

6. ARPA permit may be needed before any geotechnical investigation occurs on USACE lands. Robin asked if this will be covered by Archeological ARPA permit (if one permit could be obtained to cover both activities, or any other project activities requiring this type of permit). *Not discussed at meeting - There are protected plant species on the project corridor and geotech and archeology disturbance cannot affect these areas without prior coordination.*

7. USACE Section 408 & 4(f) Coordination discussion:
    a. Section 404 personnel operate out of USACE office in Morrow (Savannah District).
    b. Arcadis indicated that PAR submittal was tentatively scheduled for January 2018
    c. Mitigation for affected waters – Lake Allatoona want any mitigation to be local to the lake. Mitigate losses at 1:1 ratio through easement agreement, real estate instruments, etc.
    d. Section 408 –If design is meeting USACE's engineering regulations and meeting environmental stewardship provisions, Section 408 shouldn't be a concern. Need to avoid impact to flood pool (863 elevation) USACE Environmental Stewardship Provisions: – USACE noted that the project would remove a lot of timber, which would no longer be able to be harvested (permanent impact). Mitigation for this would be to decrease the amount of easement needed. USACE indicated that in the past they have harvested timber in advance of a project. Need to maintain access to manage timber.
    e. USACE has a spreadsheet tool that calculates impacts from a project and produces a toolbox of mitigation strategies.
    f. Section 4(f) coordination is likely to be local level, USACE will check on this.
    g. Arcadis suggested a pre-application meeting/initial planning review with USACE Savannah District Regulatory Division and Mobile District Planning regarding Section 408 compliance. USACE indicated this wouldn't be necessary as Section 408 is not likely an issue.
8. GDOT will forward the ARPA permit information to everyone at the meeting when received from Aaron Burgess at GDOT.

Action Items:

1. Arcadis to provide USACE with an estimate of how much additional easement would be needed from USACE property.
2. Arcadis will review the proposed design to see if retaining walls can be incorporated to reduce impacts to and easements from USACE land.
3. USACE to provide fee request letter to GDOT.
4. GDOT to provide $25,000 check to USACE for funding reviews
5. USACE to check if Knox Bridge Jetty is officially designated as part of Day-Use Area
6. USACE to check if there is an updated "Design of Recreation Areas and Facilities" manual.
7. USACE to confirm who will handle Section 4(f) coordination on their end.
8. GDOT to confirm whether a single ARPA permit is needed for the project to cover all project-related activities such as Geotech and archaeology, or if separate permits are needed. Once ARPA permit information is received, Aaron Burgess (GDOT OES) will forward to meeting attendees.

ARCADIS Design & Consultancy for natural and built assets

SIGN IN SHEET

July 13, 2017
PI 0007836 – SR 20 from I-75 to I-575
Bartow and Cherokee Counties
USACE Coordination Meeting

USACE Allatoona Lake Project Management Office
1138 GA Highway 20 Spur
Cartersville, GA 30121

Name	Company	Email
Robert Askew	Arcadis	robert.askew@arcadis.com
Gayle S. Sims	GDOT	gsims@dot.ga.gov
Robin Stevens	Arcadis	Robin.Stevens@arcadis.com
Melissa Rottenberg	Arcadis	Melissa.Rottenberg@arcadis.com
Keith Kunst	Arcadis	Keith.Kunst@arcadis.com
Martika Wimberly	USACE-RE	Martika.J.Wimberly@usace.army.mil
Stephen Cain	USACE	troy.s.cain@usace.army.mil
Doug Evans	USACE	jon.d.evans@usace.army.mil
Phone:		
Aaron Burgess	- GDOT OES	
Drew Martin	- GDOT Design Policy + Support	
Jason Morell	- Arcadis	

VE Study
Implementation Letter

Georgia Department of Transportation

Interoffice Memo

FILE: CSSTP-0007-00(836) Bartow/Cherokee Co. PI# 0007836

DATE: September 18, 2018

FROM: Erik Rohde, State Project Review Engineer

TO: Kimberly Nesbitt, State Program Delivery Administrator
Attn: Gretel Sims, GDOT Project Manager

SUBJECT: Implementation of Value Engineering Study Alternatives

The VE Study for the above project was held January 29 thru February 1, 2018. These revised responses were finally received on September 18, 2018. Recommendations for final implementation of the Value Engineering Study Alternatives are indicated in the summary table below. The Project Manager shall incorporate the VE alternatives recommended for approval to the extent reasonable in the design of this project. Please note, if the implementation of any VE alternative may require a Design Exception and/or Design Variance, those must be requested separately.

ALT #	Description	Potential Savings/ LCC	Implement	Comments
R-1.0	Shift beginning of project from Sta.10+00 to 82+00, just East of Rowland Springs Rd. and transition to 55 mph from Sta. 48+00 to 82+00.	$4,269,889	No	The design team is currently performing traffic analysis for this project and only the No-Build Volumes have been approved (5/19/15) by GDOT Planning. Base year (2014) No-Build ADT in this segment is 16,820 & Design Year (2046) is 23,100. The Build Volumes must be approved but are expected to exceed the guidelines for positive separation noted in Table 6.3 in the Design Policy Manual (DPM).

R-2.0	Reduce raised median width from 24 feet to 20 feet at 45 mph portions of the project.	$648,947	Yes	This will be implemented.
R-3.0	Reduce design speed to 45 mph from Sta.655+00 to 710+00 and utilize existing alignment.	$6,034,179	No	When determining the design speed for this project the functional classification along with crash data, stakeholders input and traffic analysis was studied for SR 20. AASHTO recommends that principle arterials should normally be designed for speeds of 50 to 60 mph for this terrain. The existing alignment at this location were not up to this standard.
R-4.0	At rural roadway sections, reduce the depressed median width from 44 feet to 32 feet.	$2,263,375	Yes	This will be implemented.
R-5.0	Use 11-foot width for inside lane and 12-foot outside lane for entire corridor.	Proposed = $1,195,384 Actual = $499,100	Yes, with modifications	This will be implemented in the 32-foot median segments. However, due to the high truck volume (15%) a 12-ft inside lane will used for the 45 mph sections with the raised median.
R-5.1	For 45 mph sections, use 11-foot width for inside lane and 12-foot outside lane.	$184,348	No	Due to the high truck volume (15%) and that it is a freight corridor the lane width will remain 12 feet to match the SR20 project PI# 0009164 typical section.
R-6.0	Reduce the 16-foot outside shoulder width to 12-foot for the urban shoulders.	$3,619,500	Yes	This will be implemented.

R-8.0	Reduce Design speed to 45 mph from Sta. 540+00 to 617+00 and utilize existing alignment.	$10,209,198	No	When determining the design speed for this project the functional classification along with crash data, stakeholders input and traffic analysis was studied for SR 20. AASHTO recommends that principle arterials should normally be designed for speeds of 50 to 60 mph for this terrain. The current proposed design brings this section up to this standard.
R-8.1	Revise horizontal configuration from Sta. 540+00 to 617+00 and utilize more of the existing alignment at 55 mph design speed.	$6,084,722	No	The existing alignment contains six reverse curves with radii ranging from 955' to 1637' which would require super elevation rates ranging from 4.8% to 6.0% with runout lengths of 207' to 240'. Transitioning from curve to curve is not ideal especially for trucks. Also, Section 4.2.2 of the Design Policy Manual requires a minimum horizontal length of curve be 825' for 55mph. Two of the existing reverse curves have lengths of 325' & 735' which do not meet those requirements. (See attached layout)
R-10.0	Revise the intersection configuration at end of project to allow SR 20 be predominate movement at SR 5 business.	$0	No	The intersection configuration will be revised once ICE has been completed. This layout will be evaluated as a part of the process, but will not agree to this idea until that process has been done.

B-1.0	Reduce median width on Bridge 3 over the Etowah River /Lake Allatoona from 16 feet to 8 feet.	$707,280	No	Office of Bridge Design recommends to not implement this proposal. In addition, a left turn lane needs to be provided for the Knox Bridge Boat Access driveway.

The Office of Engineering Services concurs with the Project Manager's responses.

Approved: Margaret B. Pirkle **Date:** 10/10/18
Margaret Pirkle, P.E., Chief Engineer

EAR/CAH/MJS
Attachments
Cc:
Margaret Pirkle/Hiral Patel
Albert Shelby/Kimberly Nesbitt/Krystal Stovall-Dixon
Cynthia Clements/Gretel Sims
John Hancock
Steve Gaston
Aaron Burgess
D-6 Lisa Wesley
Andrew Pearson
Erik Rohde/Chuck Hasty/Matt Sanders

Georgia Department of Transportation

Interoffice Memo

FILE: P.I. 0007836, Bartow/Cherokee County
SR 20 from I-75/Bartow to I-575/Cherokee

DATE: September 04, 2018

Kimberly W. Nesbitt

FROM: Kimberly W. Nesbitt, State Program Delivery Administrator

TO: **Erik Rhode, State Project Review Engineer**
Attention: Matt Sanders, Value Engineering Specialist

SUBJECT: Value Engineering (VE) Study Report Responses

This office has received and reviewed the recommendations of the Value Engineering (VE) Study Report dated February 8, 2018. Attached are the responses of the VE report recommendations provided by Arcadis U.S., Inc. This office has reviewed and concurs with the attached responses.

If there are any questions or comments concerning these recommendations, please contact Gretel Sims at (404)631-1693 or email at gsims@dot.ga.gov.

KWN:KESD:CCB:GSS
Attachments

MEMO

ARCADIS Design & Consultancy for natural and built assets

To:
Gretel Sims, Project Manager
Georgia Department of Transportation
Office of Program Delivery (25th floor)
600 West Peachtree St. NW
Atlanta, GA 30308

Copies:
None

Arcadis U.S., Inc.
2410 Paces Ferry Road
#400
Atlanta
Georgia 30339
Tel 770 431 8666
Fax 770 435 2666

From:
Keith Kunst, PE, Project Manager

Date:
August 27, 2018

Arcadis Project No.:
GA064042

Subject:
PI 0007836, CSSTP-0007-00(836), Bartow/Cherokee Counties
SR 20 from I-75 to I-575 Widening/Reconstruction
VE Implementation Recommendations

Dear Gretel,

A Value Engineering (VE) study for the subject project was held January 29- February 1, 2018 and the final report was received February 8, 2018. Arcadis has reviewed each of the VE Study Alternatives with input from various offices at GDOT and our coordinated recommendations for implementation are summarized below. These recommendations are ordered as presented in the VE Study Report. Please consider these recommendations as the Office of Program Delivery decides whether to implement each alternative.

We appreciate the opportunity to work with GDOT in moving this project forward through Concept Approval. Please contact us if you have any questions or need any additional information.

Thank You,

Arcadis U.S., Inc.

Keith Kunst, PE, Project Manager

ARCADIS Design & Consultancy for natural and built assets

VE ALTERNATIVE #R-1.0

Shift beginning of project from STA 10+00 to 82+00, just east of Rowland Springs Road; shift transition to 55 MPH from Station 48+00 to 82+00

Disposition Recommendation:

☐ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☒ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

Current four-lane segment is a combination of depressed median, flush median and no median. East of Rowland Springs Rd, existing road tapers down to three lanes.

Currently, only No-Build Volumes have been approved by Office of Planning (Approved May 19, 2015): Base year (2014) No-build ADT in this segment is 16,820 and Design Year (2046) No-build volume is 23,100.

We are currently performing the traffic analysis for this project. Before a decision can be made for this recommendation, the Build Volumes must be approved by Office of Planning to determine if positive separation is required based on the following guidelines from Table 6.3 in the Design Policy Manual: 18,000 ADT base year, 24,000 design year.

ARCADIS Design & Consultancy for natural and built assets

VE ALTERNATIVE #R-2.0

Reduce raised median width from 24 feet to 20 feet at 45 MPH portions of the project

Disposition Recommendation:

☒ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☐ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

Yes, we will implement the recommendation.

VE ALTERNATIVE #R-3.0

Reduce Design Speed to 45 MPH from STA 655+00 to 710+00 and

utilize Existing Alignment

Disposition Recommendation:

☐ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☒ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

When determining the design speeds for this project the functional classification along with AASHTO's recommendation/preference, crash data, stakeholders input, and traffic analysis were studied for SR 20.

The GDOT functional classification map classifies SR 20 as a principal arterial, which AASHTO recommends a design speed of 55-mph in areas of no or minor commercial development to move traffic along a thoroughfare connector/arterial to collector roads, freeways, and Interstates. AASHTO recommends that principal arterials other than freeways, should normally be designed for speeds of

50 to 60 mph when in rolling terrain, which is the terrain determined for this project.

Historic crashes between the years 2009 and 2013, along this corridor of SR 20, were analyzed and compared with statewide average crash rates. Nine intersections were found to have crash rates exceeding statewide average crash rates for one or more of the categories of total crashes, injury crashes, or fatal crashes. One of the intersections (at Fields Landing Drive), within the limits of VE Idea #3, exceeds the Statewide Average for fatalities. The Existing Conditions and Needs Assessment (dated Oct 2014) document states that the results of the crash data analysis show that design improvements to the existing horizontal/vertical alignments would most likely reduce the number and severity of crashes along this portion of SR 20. This specific location for VE Idea #3 includes both broken back curves, and reverse curves with tangents not up to current standards between the curves at both locations and an intersection skew less than 45 degrees for a left turn from Fields Landing Drive on to SR 20.

VE ALTERNATIVE #R-4.0

At Rural Roadway Sections, reduce the depressed median width from 44 feet to 32 feet

Disposition Recommendation:

☒ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☐ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

Yes, we will implement the recommendation.

ARCADIS Design & Consultancy for natural and built assets

VE ALTERNATIVE #R-5.0

Use 11-foot width for inside lane and 12-foot outside lane for entire corridor

Disposition Recommendation:

☐ **AGREE** ☒ **AGREE, WITH MODIFICATIONS** ☐ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

Yes, we will implement the recommendation in 32-foot median segments. However, due to high truck volume percentage, 15% Base Year (2014) No-build & Design Year (2046) No-build, we will use 12-ft inside lanes on the 45 mph sections and raised median segments (urban segments and segments through USACE property)."

Quantity reduction calculations:

Two segments of 32' depressed median: STA 135+00 to 242+00 & 349+00 to 585+00 (34,600' total)

34,600' x 1' x 2 lanes = 69,200 SF = 7,700 SY

Item	Length (ft)	Unit	Quantity (sy)	Unit Cost	Total Cost
Asphalt Pavement (Reduction)	69,200	SY	7,700	$64.81	($499,100)

ARCADIS Design & Consultancy for natural and built assets

VE ALTERNATIVE #R-5.1

For 45 MPH sections, use 11-foot width for inside lane and 12-foot outside lane

Disposition Recommendation:

☐ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☒ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

We will not implement due to high truck volume percentage: 15% Base Year (2014) No-build & Design Year (2046) No-build. Because this is a freight corridor, the lane width in the urban will remain 12 feet; to allow for a matching typical section with SR 20-- PI #0009164

VE ALTERNATIVE #R-6.0

Reduce the 16-foot outside shoulder width to 12-foot for the urban shoulders

Disposition Recommendation:

☒ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☐ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

Yes, we will implement the recommendation.

ARCADIS Design & Consultancy for natural and built assets

VE ALTERNATIVE #R-8.0

Reduce Design Speed to 45 MPH from STA 540+00 to 617+00 and utilize Existing Alignment; utilize urban section from 540+00 to 585+00

Disposition Recommendation:

☐ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☒ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

When determining the design speeds for this project the functional classification along with AASHTO's recommendation/preference, crash data, stakeholders input, and traffic analysis were studied for SR 20.

The GDOT functional classification map classifies SR 20 as a principal arterial, which AASHTO recommends a design speed of 55-mph in areas of no or minor commercial development to move traffic along a thoroughfare connector/arterial to collector roads, freeways, and Interstates. AASHTO recommends that principal arterials other than freeways, should normally be designed for speeds of 50 to 60 mph when in rolling terrain, which is the terrain determined for this project.

Historic crashes between the years 2009 and 2013, along this corridor of SR 20, were analyzed and compared with statewide average crash rates. Nine intersections were found to have crash rates exceeding statewide average crash rates for one of more of the categories of total crashes, injury crashes, or fatal crashes. The Existing Conditions and Needs Assessment document (dated Oct 2014) states that the results of the crash data analysis show that design improvements to the existing horizontal/vertical alignments and bring it up to current standards would most likely reduce the number and severity of crashes along this portion of SR 20. This specific location for VE Idea #8 includes four consecutive horizontal curves causing three reverse curve situations with zero tangents between each of the curves. The proposed design brings this alignment up to current standards by including a 1400-ft length of tangent in the

horizontal alignment between two curves to provide adequate superelevation transitions for a 55-mph design speed.

VE ALTERNATIVE #R-8.1

Revise Horizontal Configuration from Station 540+00 to 617+00 and utilize more of the Existing Alignment at 55 MPH Design Speed

Disposition Recommendation:

☐ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☒ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

The existing alignment through this segment contains six reverse curves with radii ranging from 955' to 1637'. This will require superelevation ranging from 4.8% to 6.0%, corresponding to runout lengths ranging from 207' to 240'. Superelevation transitioning from 4.8% to 6.0% the other way while at a 6% grade will not be an ideal maneuver for drivers, especially trucks, to navigate.

This layout is achievable while roughly following the existing alignment. However, Section 4.2.2 of the GDOT Design Policy Manual states that the minimum length of horizontal curve should be L=15*V. At 55 mph, this equals a minimum length of 825'. Two of the reverse curves have lengths of 325' & 735', which do not meet requirements. See attached layout on next page.

R 8.1 - 55 MPH DESIGN SPEED

ARCADIS Design & Consultancy for natural and built assets

VE ALTERNATIVE #R-10.0

Revise Intersection Configuration at End Project to Allow SR 20 as predominant Movement at SR 5 Business

Disposition Recommendation:

☐ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☒ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

Intersection configuration will be revised once the following has been completed:

- ICE process needs to be completed. This layout will be evaluated as a part of the process

---

VE ALTERNATIVE #B-1.0

Reduce median width on Bridge 3 over the Etowah River/Lake Allatoona from 16 feet to 8 feet

Disposition Recommendation:

☐ **AGREE** ☐ **AGREE, WITH MODIFICATIONS** ☒ **DISAGREE**

Explain, comment, and/or discuss rationale for disposition recommendation:

Email from Steve Gaston, PE, Assistant State Bridge Engineer, dated February 8, 2018 provides reason for not implementing:

"The Bridge Office has concerns about what this "transition" pattern just at the limits of the bridge would mean for the travelling public. Generally, the bridge section within the travelway, including medians, matches the approach roadway section to ensure that there are no odd lanes shifts for vehicles. The Bridge Office recommends <u>not implementing</u> this proposal."

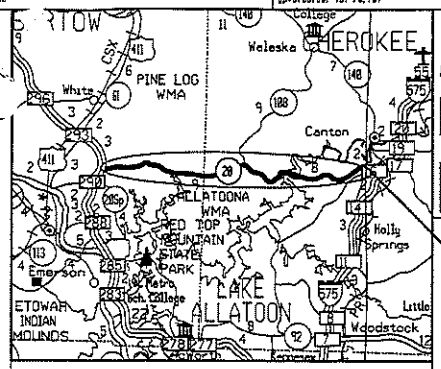
Additional reason for not implementing is that a left turn lane needs to be provided for the Knox Bridge Boat Access driveway. This left turn lane will be partly on the bridge and full median width is required to accommodate it.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

VE STUDY PLANS OF PROPOSED

WIDENING & RECONSTRUCTION OF SR 20 FROM I-75 TO I-575

FEDERAL AID PROJECT



LOCATION SKETCH

DESIGN DATA:

TRAFFIC A.D.T.: 16820 VPD
TRAFFIC D.H.V.: 1330 (AM) / 1580 (PM)
DIRECTIONAL DIST:
% TRUCKS: 12%
24 HR.TRUCKS %: 15%
SPEED DESIGN: 45 / 55 MPH

LOCATION & DESIGN APPROVAL DATE:

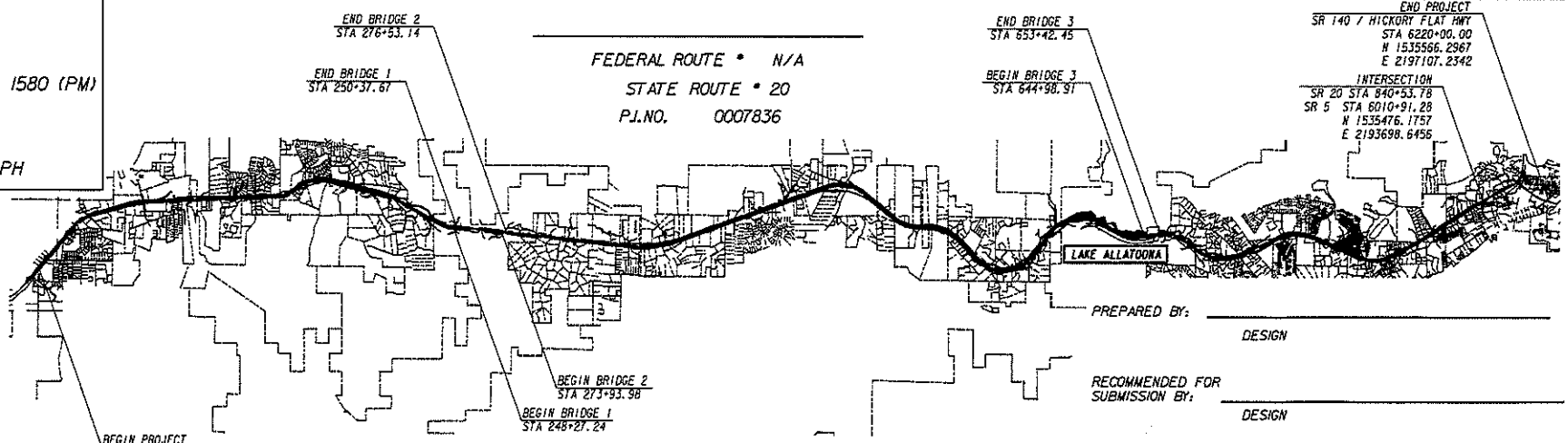
FUNCTIONAL CLASS:
PRINCIPAL URBAN/RURAL ARTERIAL

THIS PROJECT IS % IN COUNTY AND IS % IN CONG.DIST.NO. .

PROJECT DESIGNATION:

THIS PROJECT HAS BEEN PREPARED USING THE HORIZONTAL GEORGIA COORDINATE SYSTEM OF 1984 (NAD 1983)/94 WEST ZONE.AND THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

FEDERAL ROUTE • N/A
STATE ROUTE • 20
P.I.NO. 0007836



SCALE IN FEET
0 3000 6000 12000

NOTE :
ALL REFERENCES IN THIS DOCUMENT,WHICH INCLUDES ALL PAPERS,WRITINGS, DOCUMENTS,DRAWINGS,OR PHOTOGRAPHS USED,OR TO BE USED IN CONNECTION WITH THIS DOCUMENT,TO "STATE HIGHWAY DEPARTMENT OF GEORGIA ","STATE HIGHWAY DEPARTMENT ","GEORGIA STATE HIGHWAY DEPARTMENT ","HIGHWAY DEPARTMENT ",OR "DEPARTMENT "WHEN THE CONTEXT THEREOF MEANS THE STATE HIGHWAY DEPARTMENT OF GEORGIA,AND SHALL BE DEEMED TO MEAN THE DEPARTMENT OF TRANSPORTATION.

PREPARED BY: _____
DESIGN

RECOMMENDED FOR SUBMISSION BY: _____
DESIGN

SUBMITTED BY: _____
STATE DESIGN ENGINEER

DATE CHIEF ENGINEER

LENGTH OF PROJECT	COUNTY No. / Project No.
	MILES
NET LENGTH OF ROADWAY	
NET LENGTH OF BRIDGES	
NET LENGTH OF PROJECT	

PLANS COMPLETED	
REVISIONS	

THE DATA,TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS OR IN ANYWAY INDICATED THEREBY,WHETHER BY DRAWINGS OR NOTES,OR IN ANY OTHER MANNER,ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS.HOWEVER,THE

Preconstruction Status Report

PI NUMBER:	0007836	SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE							
COUNTY:	Bartow, Cherokee	SPONSOR:	GDOT	MEASURE:		BASELINE LET DT:		MGMT LET DT:	PRINT DATE: 09/18/18
LENGTH(MI):	19.41	MPO:	Atlanta TMA, Cartersville	DESIGN FIRM:	ARCADIS U.S., Inc.	SCHED LET DT:		MGMT ROW DT:	PAGE: 1
				PRIORITY CD:		LIGHTING TYP:	None	WHO LETS?:	GDOT Let
PROJ NO:	CSSTP-0007-00 (836)	TIP#:	CH-020A2	DOT DIST:	6	ENV DOC TYPE:	NEPA	LET WITH:	0
				CONG. DIST:	011	ENV CONSULTANT:	ARCADIS		
PROJ MGR:	Sims, Gretel Sheree	MODEL YR:	2030	COMPLETE STREETS:					
				SUFF:					
AOHD INITIALS:	KESD	TYPE WORK:	Widening						
OFFICE:	Program Delivery	CONCEPT:							
CONSULTANT:	Proposed for Consultant Design (contract	PROG TYPE:	Reconstruction/Rehabilitation						

BASE START	BASE FINISH	TASKS	START DATE	FINISH DATE	ACTUAL START	ACTUAL FINISH	%
5/11/17	1/22/19	Concept Development Summary	4/27/17	12/28/20	4/27/17		40
12/4/17	7/27/18	PAR Summary	10/17/19	6/12/20			0
11/8/18	11/8/18	PM Submit Concept Report	10/16/20	10/16/20			0
1/22/19	1/22/19	Management Concept Approval Complete	12/28/20	12/28/20			0
6/23/17	1/9/18	VE Study Summary	10/17/17	8/31/20	10/17/17		79
6/14/19	6/14/19	Public Information Open House Held	5/21/21	5/21/21			0
6/2/17	6/2/17	Environmental Activity Summary (11412 through 11499)	10/27/16	9/10/18	10/27/16		0
6/2/17	3/1/18	Environmental Resource Identification Summary	7/28/16	10/16/19	7/28/16		68
1/23/19	4/2/19	Database Summary	12/29/20	3/10/21			0

Phase	Approved	Proposed	Program	Cost	Fund	Status	Date Auth
PE	2018	2018		$6,251,927.28	HB170	AUTHORIZED	12/14/15
PE	2016	2016		$7,325,129.25	Z001	AUTHORIZED	12/14/15
ROW	2024	2024		$55,120,000.00	L980	PRECST	
CST	2027	2027		$110,124,005.51	HB170	PRECST	
CST		2027	NONE	$70,537,282.85	L980	PRECST	
UTL	2027	2027		$6,935,000.00	HB170	PRECST	
SCP	2013	2013		$3,000,000.00	M240	AUTHORIZED	

COST EST AMTS

PE	$13,577,056.53	5/6/09
ROW	$55,120,000.00	11/7/17
CST	$180,661,288.36	11/7/17
UTL	$6,935,000.00	11/7/17
SCP	$3,000,000.00	

STIP AMOUNTS

Activity	Cost	Fund
PE	$6,251,927.28	HB170
PE	$0.00	Z001
ROW	$0.00	L980
CST	$0.00	HB170
CST	$0.00	L980
UTL	$0.00	HB170
SCP	$5,000,000.00	M240

Bridge :	TBD
Design :	TWM:- In Procurement Process
EIS :	No sched dates | Federal process | EA/FONSI Not Apvd | Stevens/Beba 5Sept18
EMG :	RECST/REHAB (WIDENING)
Engr Services :	Rec'd Responses 9/18/18;
LGPA :	NOTIFICATION NEEDED
Office Heads :	8/2/16 PCRF needed 2/27/17 PCRF to OPC 5/1/17 PCRF appvd
Planning :	Non-attainment area.(CH-020A2) Project ALSO shown in the FY 2015-2018 STIP page 120 12/7/17 Working to get corridor designated on the ADHS, federal funds. Keep NEPA.
Programming :	STATE FUNDED NON-BANK PROJECT|#1 11-2012|#3 9-2016|CHANGED TO HB170 PER PLANNING 1-24-2018|PE 1625 2-2018
STIP :	provide additional capacity- improve mobility and reduce congestion- enhance economic development- reduce crash frequency.
Utility :	Need plans 11-1-11; Updated cost estimate to PM 3-15-17, 3-6-18

Project Manager

Contact: Keith Kunst - ARCADIS, (770) 431-8666, keith.kunst@arcadis.com
Scope:-TO 1(survey, traffic analysis & public involvement plan)
-TO 2 Concept Level Survey
-TO 3 Concept Report Approval, Phase 1 & Phase 2 Env Study.
-TO 4 Conceptual Traffic
-TO 5 Archaeology Study
-TO 6 ICE (in procurement)
-TO 7 Additional Arch (NTP 08/20/18)
Schedule:
- Current concept approval baseline 01/22/19
Next Milestone: Concept approval
Risk: ICE Initiation/Completion
Budget:
- Contract Exp. 12/16/21
-PE allot bal(contract)$11.8M;14.8%earned;(in-house)$1.65M;4.9% earned
GSS 08/31/18

Pre Parcel CT	200	Total Parcel in ROW System:	Cond Field:	Acquired by:	DOT	DEEDS CT:
Under Review		Options Pending:	Relocations:	Acquisition MGR:		
Released		Condemnations – Pend:	Acquired:	ROW Cert Date:		

No known maintenance issues

Askew, Robert

From: Igbalajobi, Theo <tigbalajobi@dot.ga.gov>
Sent: Tuesday, May 28, 2019 1:51 PM
To: Askew, Robert
Cc: Kunst, Keith
Subject: FW: 0007836 Bartow/Cherokee Existing Maintenance Issues

Please note the response of the District Maintenance Office and Area Office below. They are not aware of any existing maintenance issues that needs to be taken into consideration for this corridor.

Thanks,

Theo Igbalajobi
Project Manager

Office of Program Delivery
600 West Peachtree Street, NW – 25th Floor
Atlanta, GA, 30308
404.631.1297 office
404.780.0964 cell

From: Warlick, Glenn
Sent: Tuesday, May 28, 2019 1:49 PM
To: Igbalajobi, Theo <tigbalajobi@dot.ga.gov>
Subject: RE: 0007836 Bartow/Cherokee Existing Maintenance Issues

Theo,

The District Maintenance Office and the Area Office are not aware of any existing maintenance issues that should be taken into consideration or addressed with this Project.

Thanks,

Glenn Warlick
District Maintenance Manager

District Six - Maintenance
30 Great Valley Parkway
White, GA 30184
770-387-3605 Office

From: Igbalajobi, Theo <tigbalajobi@dot.ga.gov>
Sent: Tuesday, May 28, 2019 10:04 AM
To: Warlick, Glenn <gwarlick@dot.ga.gov>
Subject: FW: 0007836 Bartow/Cherokee Existing Maintenance Issues

Good morning Glenn, the consultant on this project will like to know if there are any existing maintenance issues along the SR 20 corridor that needs to be included in the Concept Report.

Thanks,

Theo Igbalajobi
Project Manager

Office of Program Delivery
600 West Peachtree Street, NW – 25th Floor
Atlanta, GA, 30308
404.631.1297 office
404.780.0964 cell

From: Askew, Robert [mailto:Robert.Askew@arcadis.com]
Sent: Tuesday, May 28, 2019 9:45 AM
To: Igbalajobi, Theo <tigbalajobi@dot.ga.gov>
Cc: Kunst, Keith <Keith.Kunst@arcadis.com>
Subject: 0007836 Bartow/Cherokee Existing Maintenance Issues

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Theo, would you be able to find out from the District 6 Maintenance Engineer about any existing maintenance issues along the SR 20 corridor that I can include in the Concept Report?

Thanks,

Robert N. Askew, P.E. | Senior Roadway Engineer | robert.askew@arcadis.com
Arcadis U.S. inc.
2839 Paces Ferry Road, Suite 900, Atlanta, GA | 30339 | USA
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Professional Engineer / PE-GA, 034588

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Be green, leave it on the screen.

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Section 404 Mitigation Cost Estimate

Approved Design Exceptions and Variances

Georgia Department of Transportation

Interoffice Memo

DESIGN EXCEPTION REQUEST

FILE: P.I. 0007836, Bartow, Cherokee County
SR 20 from I-75/Bartow to I-575/Cherokee

DATE: August 12, 2019

Kimberly W. Nesbitt

FROM: Kimberly W. Nesbitt, State Program Delivery Administrator

TO Brent Story, State Design Policy Engineer

SUBJECT Request for Design Exception for maximum grade

Approval of a Design Exception is requested for this project.

If there are any questions please contact the Project Manager, Theo Igbalajobi at (404) 631–1297.

KESD

KWN:KESD:CCB:TI
Attachments: PSR, Design Exception

ARCADIS Design & Consultancy for natural and built assets

FILE P.I. No. 0007836
Bartow Cherokee Counties
SR 20 Reconstruction and Widening
From I-75 to I-575

DATE August 6, 2019

FROM ARCADIS

TO State Contact

SUBJECT Request for Design Exception for maximum grade

Approval of a Design Exception is requested for this project.

PROJECT DESCRIPTION This project is in Bartow and Cherokee Counties, Georgia on SR 20 beginning from SR 20 and I-75 in Bartow County to approximately SR 20 and I-575 in Cherokee County. This 17-mile project will widen and reconstruct the critical East-West Corridor linking Cartersville and I-75 to Canton from two to four (11- to 12-ft) lanes (two lanes in each direction) divided with a median. The Design Speed varies from 45 to 55 mph. The type of median varies from a raised median to a depressed median and the outside shoulders also vary from a 12-ft urban shoulder (with curb and gutter) to a rural 10-ft shoulder depending both depending on the Context Classification and Design Speed. Major structures include widening of existing bridges over Stamp and Boston Creeks and replacement of Knox Bridge over Lake Allatoona/Etowah River. SR 20 is functionally classified as an urban or rural principal arterial depending on its location.

FEATURE REQUIRING A DESIGN EXCEPTION The design feature requiring a Design Exception is maximum grade on a high-speed facility (> 50-mph), located between approximate MP 19.90 and MP 20.40. The portion of SR 20 where the grade is of concern has a proposed design speed of 55-mph on a mountainous terrain, a 32-ft depressed grass median and 10-ft outside shoulder (6.5-ft paved). SR 20 is functionally classified as a rural principal arterial. The maximum grade for SR 20 with this design controls and criteria is 6.0%. The current proposed design is to retain the existing profile grade 6.8% which obviously exceeds the recommended max grade of 6% as determined by AASHTO.

CURRENT AND FUTURE TRAFFIC DATA For this section of SR 20 the No-Build traffic: the open year (2026) ADT is 14,170 vpd; the design year (2046) ADT 17,270 vpd. For this section of SR 20 the Build traffic: the open year (2026) ADT is 15,050 vpd; the design year (2046) ADT is 18,250 vpd. See attachment for additional traffic information.

CRASH DATA At both the *intersection and the roadway segment level*, the average total, fatal, and injury crashes or crash rates were calculated for the five-year period from 2014 to 2018 for the SR 20 study corridor. The only side-road intersection along this subject 6.8% grade is the crossroad intersection with Robertson Drive / Holly Drive. Table 5-1 from the Safety Analysis attachment compares the 2014-2018 five-year annual average total number of, injury, and fatal crashes occurring at intersection with Robertson Drive intersection to the five-year statewide annual average total number of, injury, and fatal crashes for similar intersections. The results of the calculations for the intersection at Robertson Drive / Holly Drive indicate there is not a crash frequency or severity problem since none of these statistics exceeds any of the statewide crash averages for total, injury, or fatal crashes (no fatalities) for the studies time period. The Intersection Crash-Type Analysis only investigated the crash history of the intersections with crash statistics higher than the Statewide Averages to identify the underlying crash type frequencies occurring at these

intersections. As already stated above, this subject intersection on SR 20 at Roberson Drive / Holly Drive has crash frequency and severity rates lower than the Statewide Averages therefore an intersection crash-type analysis was not computed.

In addition to investigating intersection crashes, historical crash rates were analyzed for roadway segments along the SR 20 corridor to scan for areas of potential safety concerns. Roadway segments were defined as the sections of the SR 20 corridor spanning between each study intersection. The SR 20 roadway segment of the segment crash analysis, which includes the 6.8% grade, would be between intersections at Roberson Drive / Holly Drive and at Timber Lake Cove. See Table 5-13 in the attached Safety Analysis for the crash frequency and severity rates along this section of SR 20 for the study period, which shows the rates were far below the Statewide Averages with no fatalities.

ALTERNATIVES CONSIDERED / RISK ASSESSMENT There are two alternatives for this profile grade, and they are proposing a grade that will meet the standard design criteria of 6%, and the other alternative is to retain the existing substandard (but acceptable) grade along this portion of SR 20 which is a 6.8%. Since the existing grade is acceptable, it was retained to save costs and reduce surrounding environmental and additional Right of Way impacts. There is virtually no difference in risk between the proposed 6.8% and standard 6% since SR 20 will have two lanes in each direction which will provide for slow traffic, a passing-lane and climbing-lane. For existing substandard conditions to be retained and where adequate crash data is provided (for years where that condition existed), no HSM analysis is required.

COST TO MEET STANDARD CRITERIA In order to reconstruct SR 20 to flatten the grade from 6.8% to 6.0% the construction cost would increase by $777,000 which is mostly additional earthwork, traffic control (to stage a 6-ft mainline and 4-ft side road cuts) and erosion control items. The required additional right of way (1.3 acres) would cost approximately $473,000 including land, damages, legal, acquisition, and administrative costs. The substantial additional cost would be approximately $1,250,000.

WHY THE CURRENT STANDARD CRITERIA CANNOT BE MET The design for this project proposes to maintain the existing roadway vertical alignment criteria to save costs and limit the environmental and right of way impacts. The existing horizontal and vertical alignments were just constructed in 2017 for passing lanes along this section of SR 20 under project PI No. 0008965. Also, the earthwork cut required to lower the grade to 6% would make the staging of construction and the maintenance of traffic a considerably more complex. Flattening the grade here to 6% would result in a significant increase in project costs in an area on SR 20 where the crash rates are substantially below the Statewide Averages. The only real noticeable adverse difference in these two grades is the acceleration or deceleration required to maintain a constant speed. After studying all the effects of maintaining the 6.8% grade it has been determined that it is good engineering to retain the existing grade.

MITIGATION PROPOSED The most significant mitigation is that the only intersection/median opening along this section of SR 20 has restricted left turns from the minor side roads onto SR 20, and does provide left turn lanes from SR 20 onto Roberts Drive and Holly Drive. Speed differential on highways with steep grades can contribute to safety and operational problems. From an operations standpoint the most important mitigation factor is the new roadway will be a four-lane facility, where traffic can continue at free-flow speeds by passing slow-moving vehicles safely. Providing passing opportunities with an additional lane reduces the probability of risky passing maneuvers. Similarly, adding a lane on the downgrade side of the facility may also be beneficial in some situations, where trucks or other slow-moving vehicles create additional risk for faster-moving vehicles approaching from behind.

RECOMMENDATION It is important to emphasis that the crash analysis shows the rates and severity along this section of SR 20 are considerably lower than the Statewide Averages for this type of roadway. Based also on the substantial increase in project costs and additional impacts to surrounding properties caused by flattening the grade to 6% it is recommended to retain the 6.8% existing grade and approve this Design Exception.

Recommend:	GA PE 34588	September 4, 2019
	Engineer of Record	Date
Concur:		09/12/19
	GDOT Director of Engineering	Date
Approve:	Margaret B. Pirkle	9/17/19
	GDOT Chief Engineer	Date
Approve:		11/13/19
	FHWA Division Administrator	Date

Attachments: Location sketch including latitude and longitude coordinates

Typical section

Traffic Diagrams

Crash rates comparison

Plan sheets denoting DE location

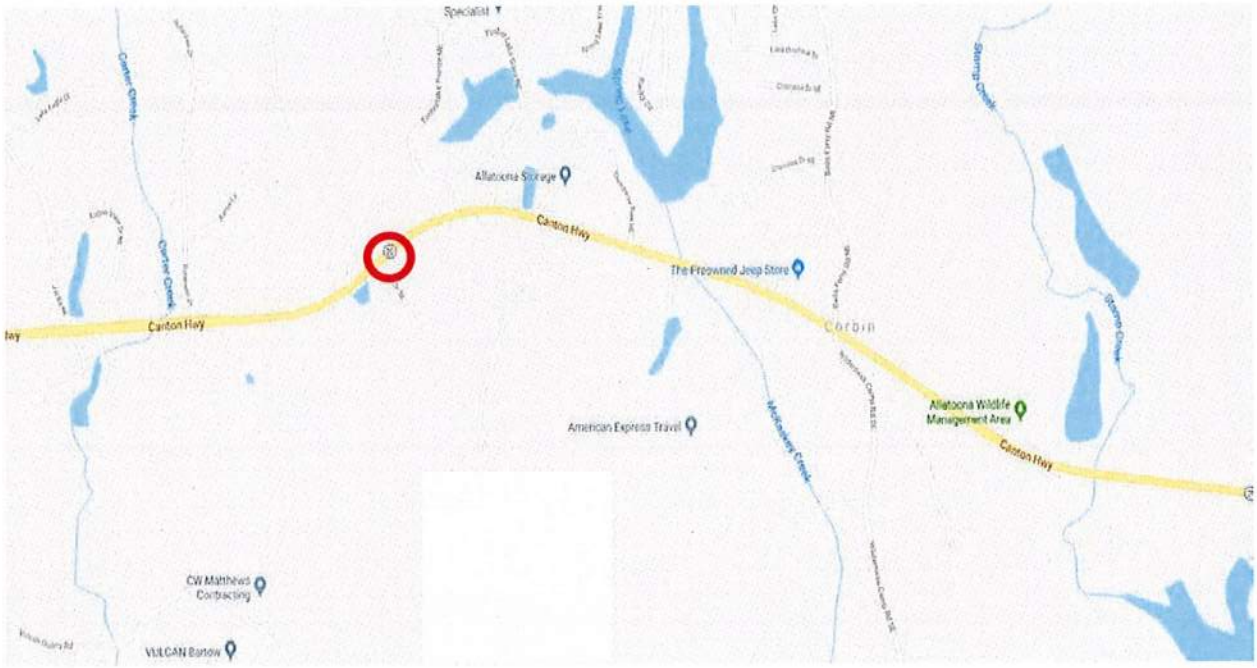
Profile sheets denoting location of DE

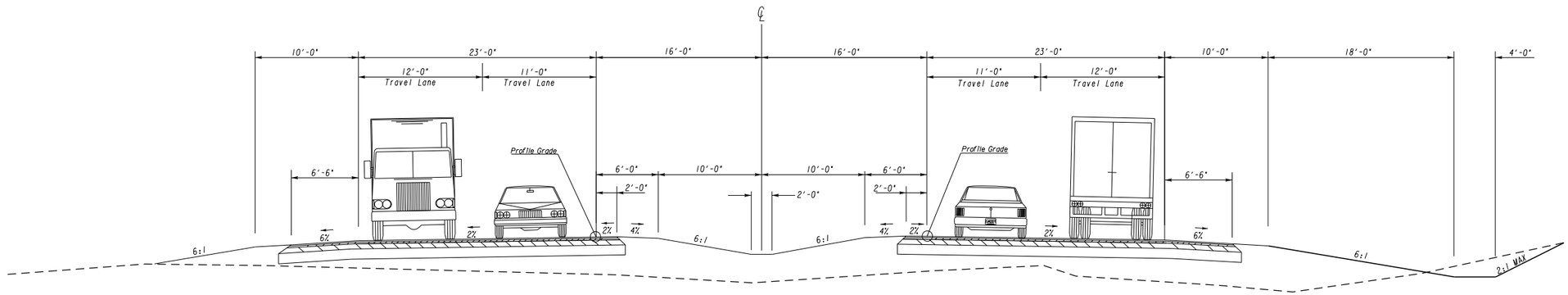
Additional costs estimate (Construction and R/W)

Design Exception Location

Latitude: 34°13'17.31"N

Longitude: 84°42'49.99"W





TYPICAL SECTION #3
DEPRESSED MEDIAN
SR 20
Roberson Dr/Holly Dr to Bells Ferry/Wilderness Camp Rd
Clearwater Tr/Rhine Rd to Allatoona WMA boundry
55 MPH D.S.

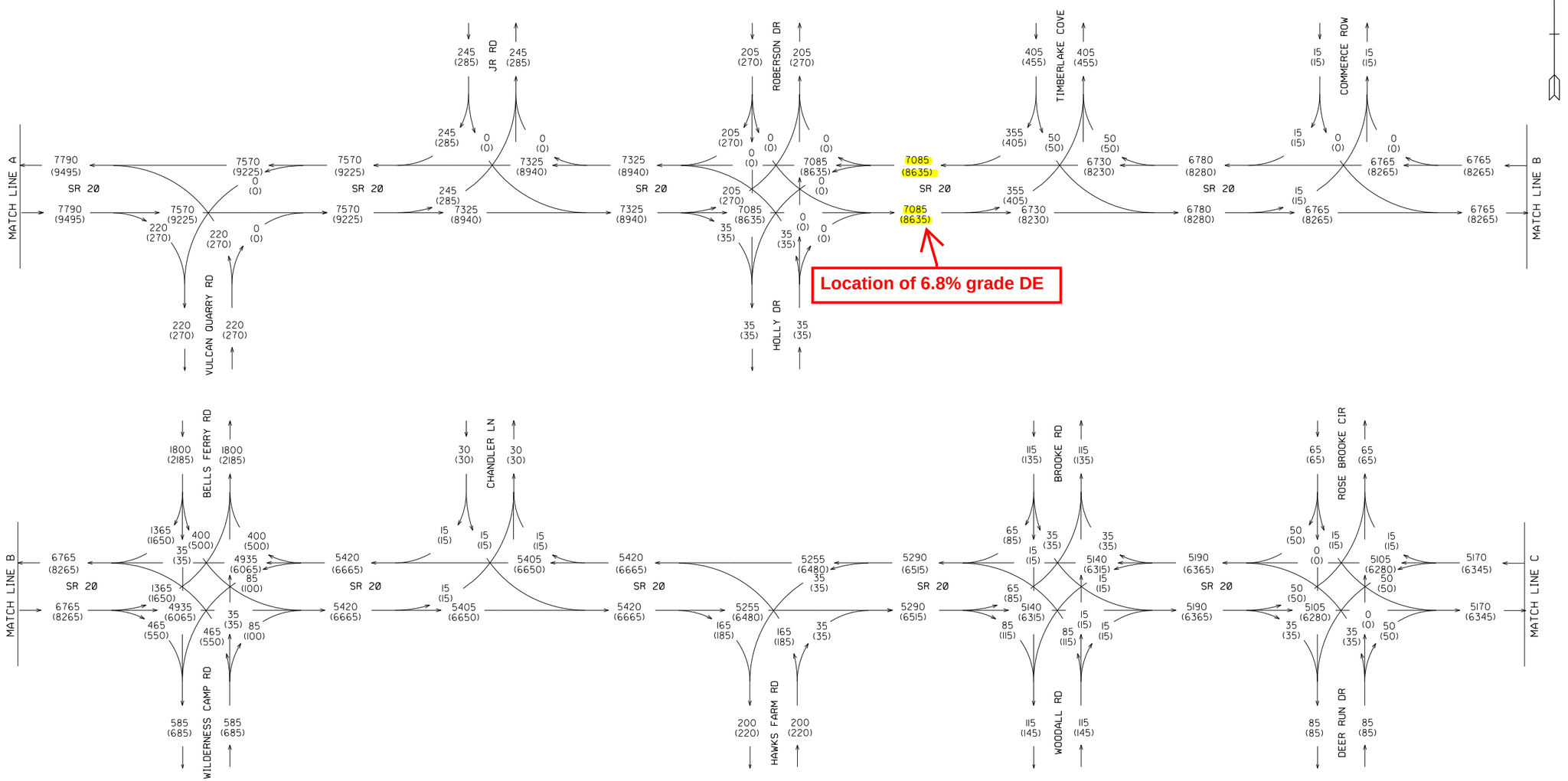
ARCADIS Design & Consultancy for natural and built assets

REVISION DATES		

TYPICAL SECTIONS
DESIGN EXCEPTION TYPICAL
SR 20 FROM I-75 TO I-575

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		05-002
CORRECTED:		DATE:		
VERIFIED:		DATE:		

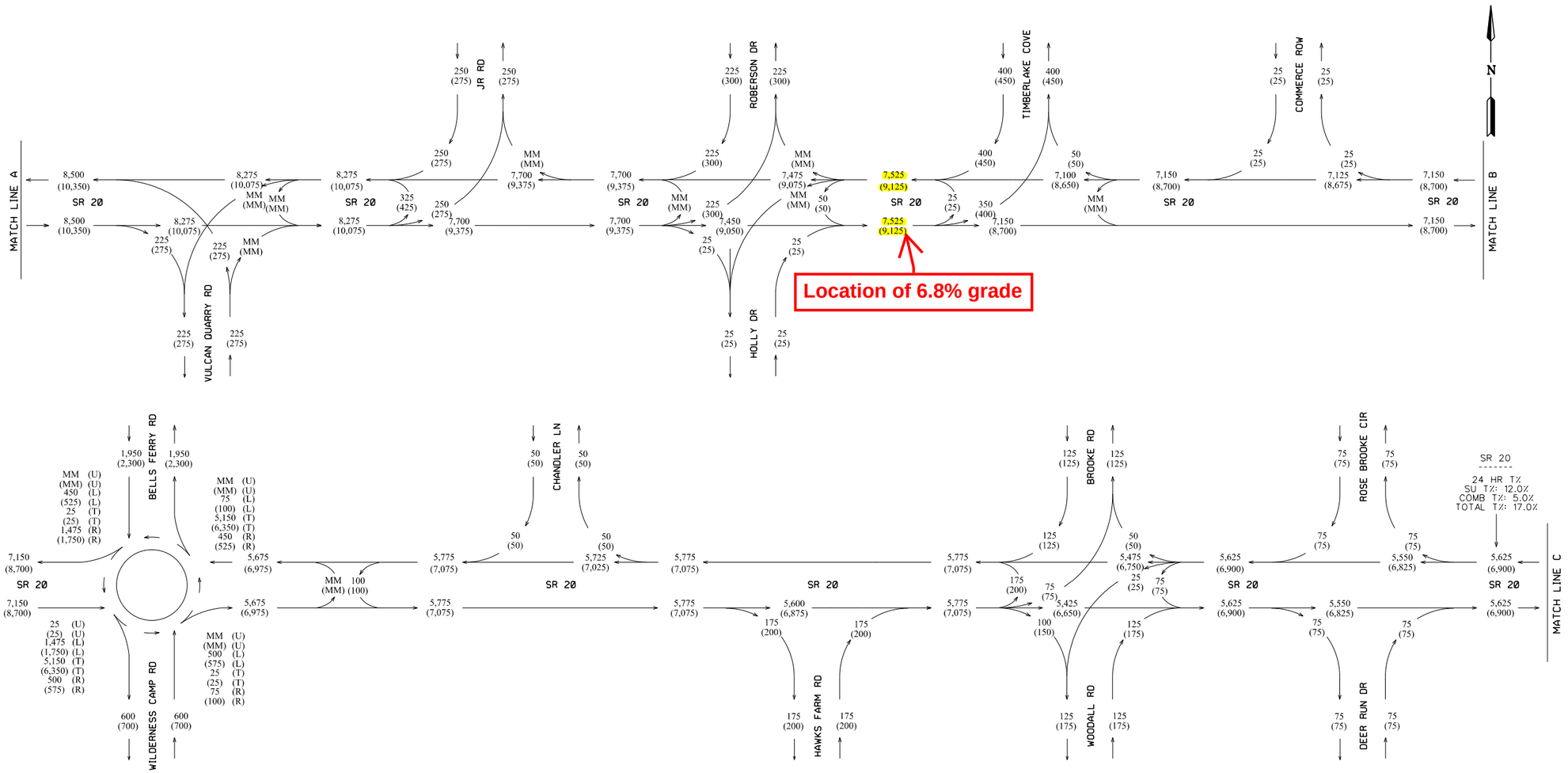
OPEN (2026)/DESIGN (2046) ADT (2)
NO-BUILD



AVERAGE DAILY TRAFFIC 2026 ADT = 000 2046 ADT = (000)	TRUCK PERCENTAGES:				SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE PI NO. 0007836 BARTOW/CHEROKEE COUNTIES
	LOCATION	DAILY T%	S.U. %	COMB %	
	I-75 MAINLINE	38%	10%	28%	
	I-75 RAMPS (N. OF SR 20)	15%	7%	8%	
COMPLETED BY: KC CHECKED BY: JP DATE: 9/5/2014	I-75 RAMPS (S. OF SR 20)	13%	10%	3%	ARCADIS Infrastructure, Water, Environment, Buildings
	SR 20/I-575 RAMPS	15%	11%	4%	
	I-575 MAINLINE	6%	2%	4%	

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	62	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS
2026 & 2046
BUILD
2026 AADT = XXX
2046 AADT = (XXX)



KCP 5/2019

REVISION DATES		

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

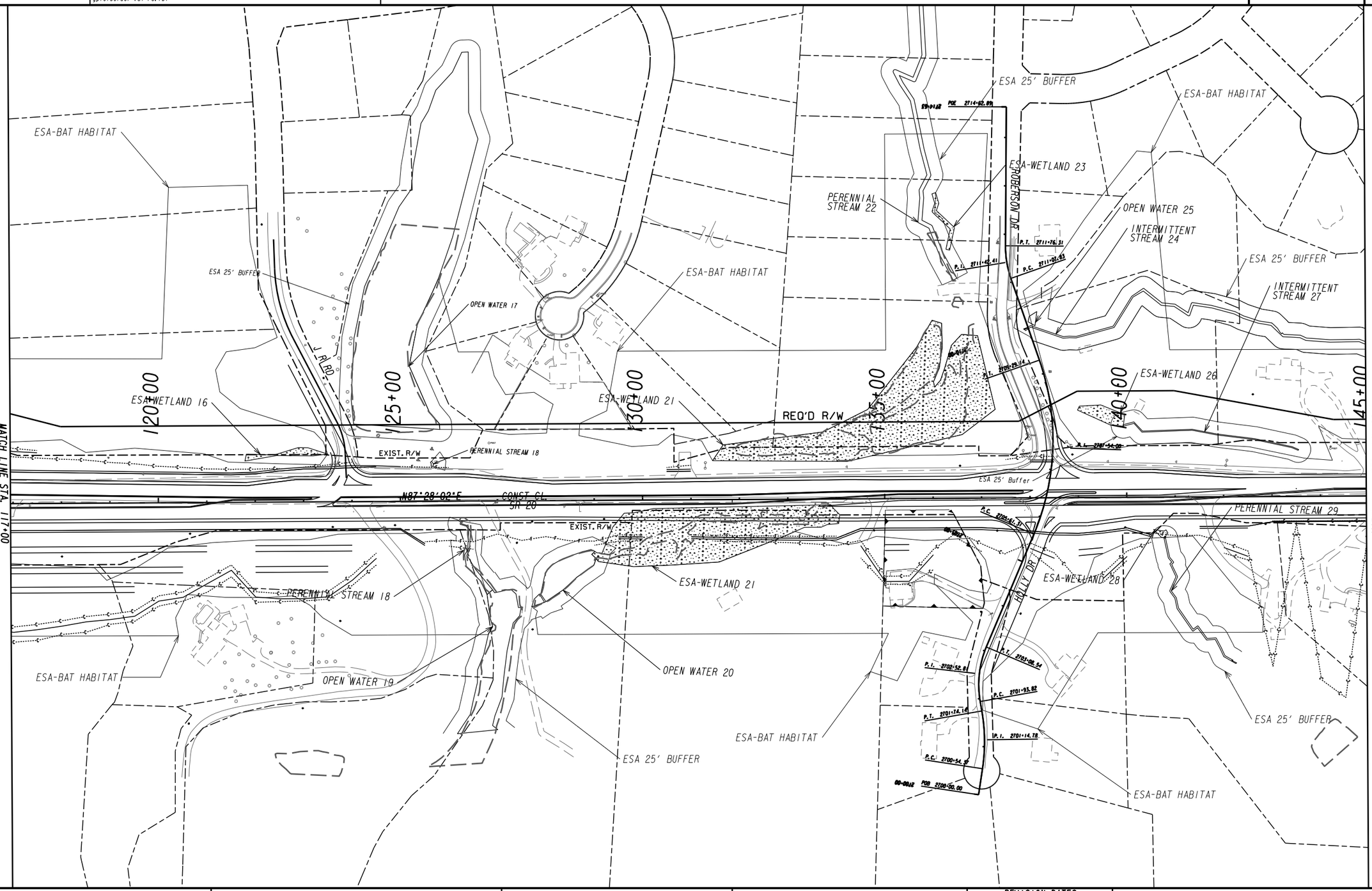
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS BUILD AADT
SHEET 2 OF 6

DRAWING No. 10-0062

Table 5-1. 2014 to 2018 Average Yearly Intersection Crashes

Intersection	2014 – 2018 Average Crashes/Year			Statewide Average Crashes/Year		
	Total	Injury	Fatal	Total	Injury	Fatal
I-75 Southbound	10.8	4.0	0.00	11.5	3.2	0.00
I-75 Northbound	28.0	7.4	0.00	5.2	1.4	0.03
SR 20 Spur	18.2	6.6	0.00	6.5	1.8	0.02
Dean Road/Simpson Circle	1.2	0.4	0.00	5.2	1.4	0.03
Rowland Springs Rd/Simpson Circle	2.0	0.4	0.00	4.7	1.2	0.01
Ranger Road	0.4	2.0	0.00	4.7	1.2	0.01
Vulcan Quarry Road	0.8	0.0	0.00	4.7	1.2	0.01
JR Road	0.4	0.0	0.00	4.7	1.2	0.01
Roberson Drive	1.8	0.2	0.00	4.7	1.2	0.01
Timber Lake Cove	1.8	0.4	0.00	4.7	1.2	0.01
Commerce Row	1.2	0.6	0.00	4.7	1.2	0.01
Wilderness Camp Rd/Bells Ferry Rd	5.2	1.4	0.00	4.7	1.2	0.01
Chandler Ln	1.0	0.7	0.00	3.8	1.2	0.02
Hawks Farm Road	1.6	0.4	0.00	3.8	1.2	0.02
Woodall Rd/Brooke Road	1.8	0.4	0.00	3.8	1.2	0.02
Deer Run Dr/Rose Brooke Cir	0.6	0.2	0.00	3.8	1.2	0.02
Clearwater Trail/Rhine Rd	3.2	1.0	0.00	3.8	1.2	0.02
Sutallee Woods Trail	2.0	0.6	0.00	3.8	1.2	0.02
Peachtree Drive	0.2	0.0	0.00	3.8	1.2	0.02
Highland View Pass	1.4	0.4	0.00	3.8	1.2	0.02
Upper Sweetwater Trail/Fincher Road	11.0	3.8	0.00	3.8	1.2	0.02
Ficklen Church Way	3.8	1.0	0.00	4.7	1.2	0.01
Willie West Road	1.4	0.6	0.00	4.7	1.2	0.01
Knox Campground Trail	2.6	0.8	0.00	4.7	1.2	0.01
Fields Chapel Road	4.8	1.0	0.00	4.7	1.2	0.01
Veterans Cemetery Road	1.8	0.4	0.00	4.7	1.2	0.01
Fields Landing Drive	1.6	0.2	0.00	4.7	1.2	0.01
Lusk Ct/Copper Hills Drive	1.8	0.0	0.00	4.7	1.2	0.01
Fieldstone Drive	2.6	0.4	0.00	4.7	1.2	0.01
Legend Creek Drive	2.8	0.4	0.00	5.2	1.4	0.03
Riverbend Way/Pope Circle	7.6	2.0	0.00	5.2	1.4	0.03
River Green Ave/Butterworth Road	20.2	4.2	0.00	4.7	1.2	0.01
Teasley Middle School	2.2	0.5	0.20	4.7	1.2	0.01
Ridgemont Road	0.4	0.0	0.00	4.7	1.2	0.01
Herndon Lane/Access Road	30.4	7.6	0.00	4.7	1.2	0.01
Hickory Flat Hwy	40.8	5.4	0.00	6.5	1.8	0.02



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

BEGIN LIMIT OF ACCESS.....BLA
END LIMIT OF ACCESS.....ELA
LIMIT OF ACCESS
REQ'D R/W & LIMIT OF ACCESS
ORANGE BARRIER FENCE
ESA - ENV. SENSITIVE AREA (SEE ERIT TABLE)

ARCADIS Design & Consultancy for natural and built assets

NOT FOR CONSTRUCTION

SCALE IN FEET
0 100 200 400

REVISION DATES

CONSTRUCTION PLAN

CONCEPT LAYOUT

SR 20 FROM I-75 TO I-575

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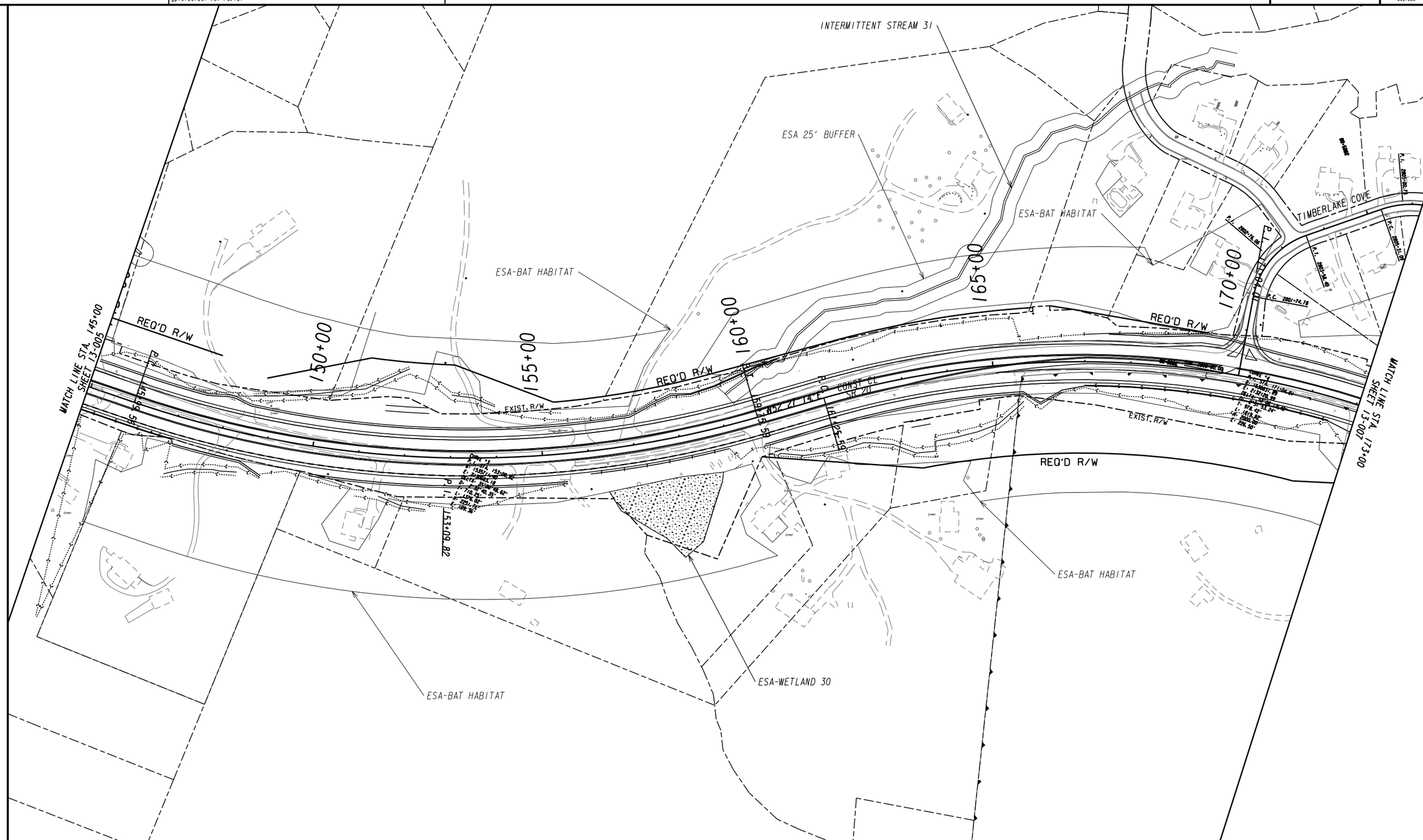

PROPERTY AND EXISTING R/W LINE	
REQUIRED R/W LINE	
CONSTRUCTION LIMITS	—C— —F—
EASEMENT FOR CONSTR & MAINTENANCE OF SLOPES	
EASEMENT FOR CONSTR OF SLOPES	
EASEMENT FOR CONSTR OF DRIVES	

BEGIN LIMIT OF ACCESS	BLA
END LIMIT OF ACCESS	ELA
LIMIT OF ACCESS	
REQ'D R/W & LIMIT OF ACCESS	
ORANGE BARRIER FENCE	
ESA - ENV. SENSITIVE AREA (SEE ERIT TABLE)	

ARCADIS Design & Consultancy for natural and built assets

NOT FOR CONSTRUCTION

SCALE IN FEET
0 100 200 400

REVISION DATES

CONSTRUCTION PLAN

CONCEPT LAYOUT

SR 20 FROM I-75 TO I-575

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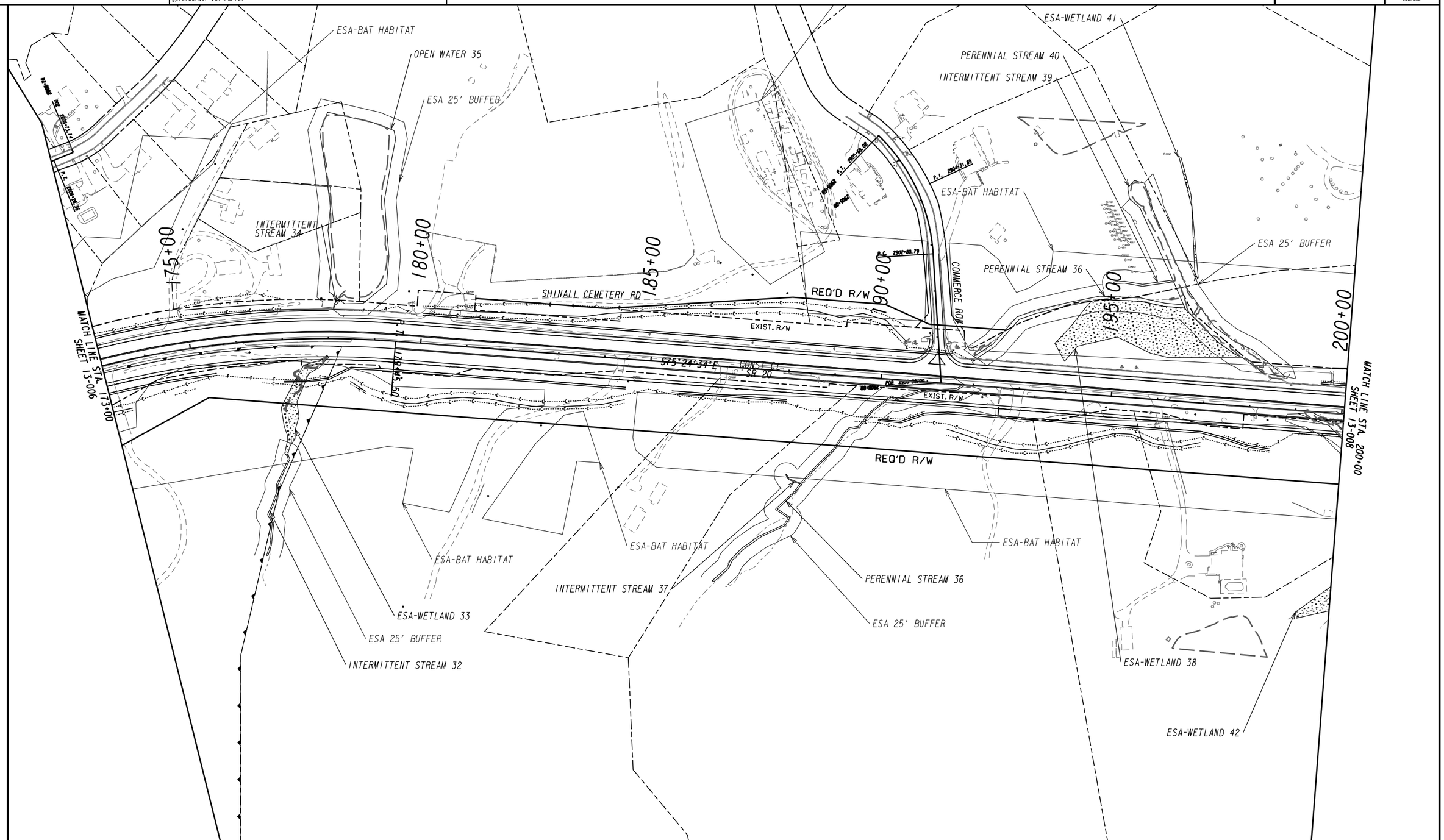

PROPERTY AND EXISTING R/W LINE	
REQUIRED R/W LINE	
CONSTRUCTION LIMITS	
EASEMENT FOR CONSTR & MAINTENANCE OF SLOPES	
EASEMENT FOR CONSTR OF SLOPES	
EASEMENT FOR CONSTR OF DRIVES	

BEGIN LIMIT OF ACCESS	BLA
END LIMIT OF ACCESS	ELA
LIMIT OF ACCESS	
REQ'D R/W & LIMIT OF ACCESS	
ORANGE BARRIER FENCE	
ESA - ENV. SENSITIVE AREA (SEE ERIT TABLE)	

ARCADIS Design & Consultancy for natural and built assets

NOT FOR CONSTRUCTION

SCALE IN FEET 0 100 200 400

REVISION DATES

CONSTRUCTION PLAN

CONCEPT LAYOUT

SR 20 FROM I-75 TO I-575

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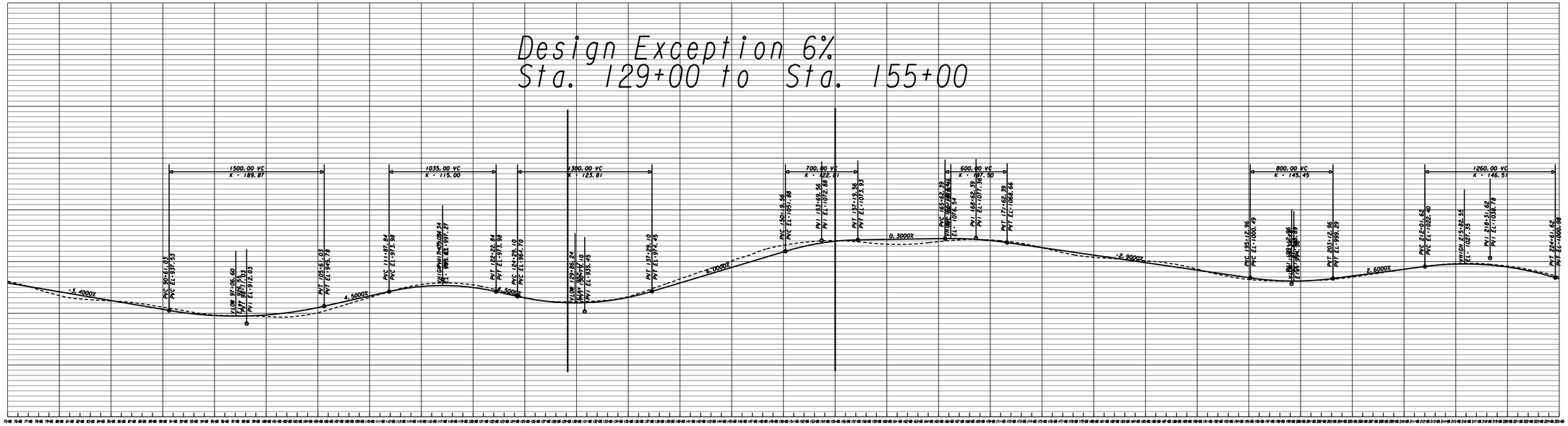
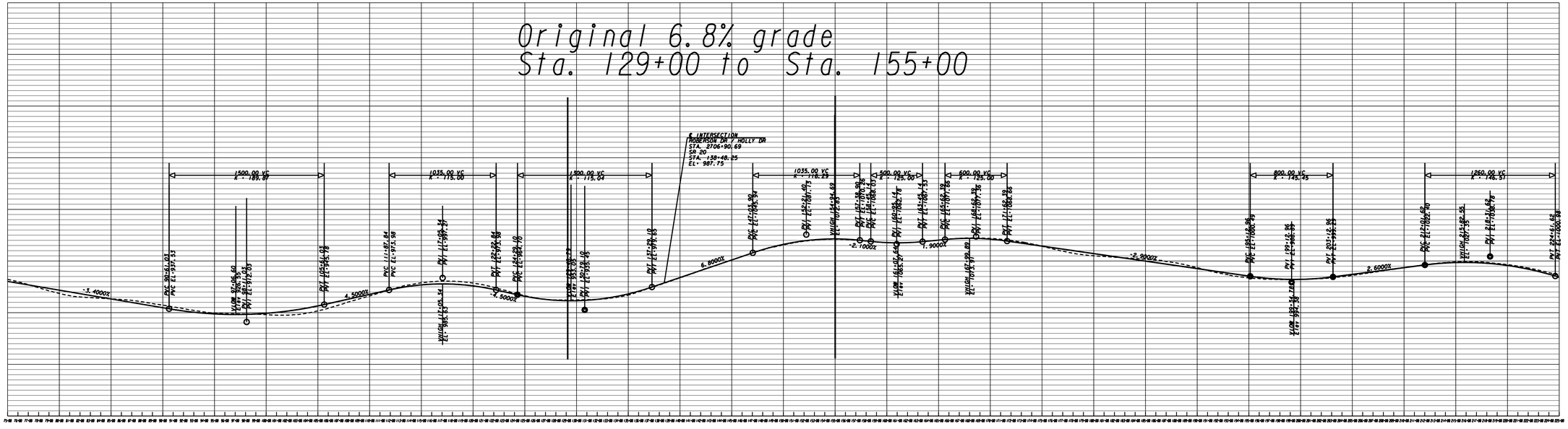
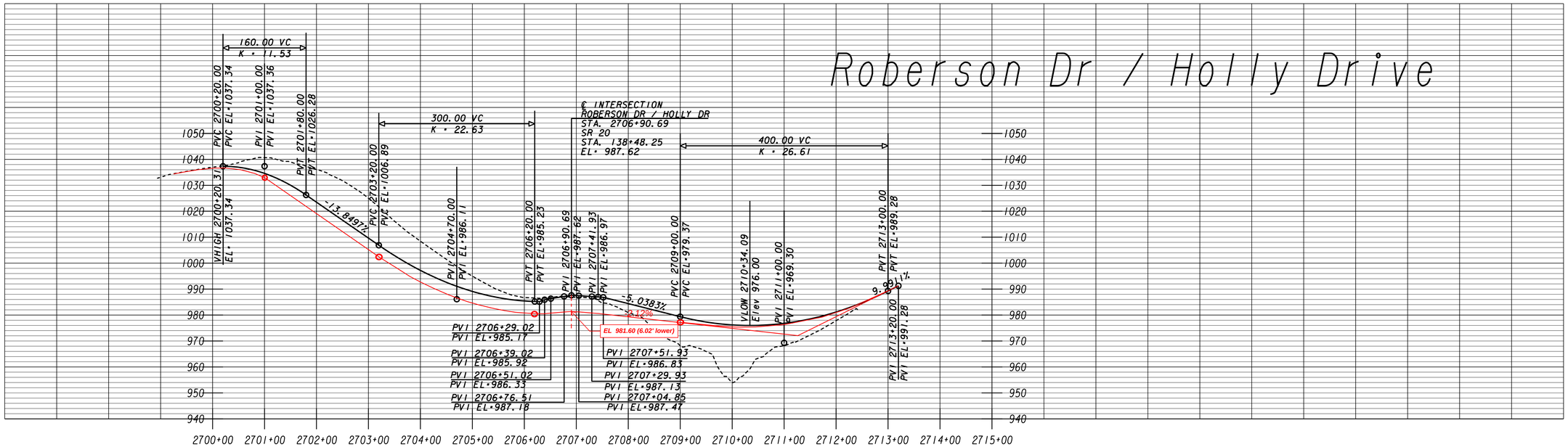




GDOT Georgia Department of Transportation	ARCADIS Design & Consultancy for natural and built assets	REVISION DATES	MAINLINE PROFILE
PRELIMINARY	SCALE :1" = 500' HORIZ. 1" = 50' VERT.		SR 20 WIDENING
		CHECKED: DATE:	DRAWING No.
		BACKCHECKED: DATE:	15-
		CORRECTED: DATE:	
		VERIFIED: DATE:	



GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

PRELIMINARY

SCALE : 1" = 100' HORIZ.
1" = 20' VERT.

REVISION DATES

MAINLINE PROFILE

SR 20 WIDENING

CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No. 15-

STATE HIGHWAY AGENCY DATE : 05/14/2019 PAGE : 1

JOB DETAIL ESTIMATE

JOB NUMBER : 0007836

ITEMS FOR JOB 0007836

Additional Costs for grade change

LINE	ITEM	UNITS	DESCRIPTION	QUANTITY	PRICE	Cost
0005	150-1000	LS	TRAFFIC CONTROL - PI 0007836	1	$50,000.00	$50,000.00
0010	201-1500	LS	CLEARING & GRUBBING - PI 0007836	1	$25,000.00	$25,000.00
0015	205-0001	CY	UNCLASS EXCAV	52000	$7.91	$411,320.00
0055	441-0204	SY	PLAIN CONC DITCH PAVING, 4 IN	400	$44.00	$17,600.00
0125	550-1180	EA	Storm Drain Pipe 18 IN, 1-10	100	$39.50	$3,950.00
0130	550-1240	EA	Storm Drain Pipe 24 IN, 1-10	100	$56.00	$5,600.00
0125	550-4218	EA	FLARED END SECT 18 IN, ST DR	2	$750.00	$1,500.00
0130	550-4224	EA	FLARED END SECT 24 IN, ST DR	2	$850.00	$1,700.00
0150	603-2182	SY	STN DUMPED RIP RAP, TP 3, 24	120	$53.87	$6,464.40
0155	603-7000	SY	PLASTIC FILTER FABRIC	120	$4.00	$480.00
0160	620-0100	LF	TEMP BARRIER, METHOD NO. 1	500	$33.50	$16,750.00
0195	632-0003	EA	CHANGEABLE MESS SIGN,PORT,TP 3	1	$8,100.10	$8,100.10
0200	634-1200	EA	RIGHT OF WAY MARKERS	20	$133.17	$2,663.40
0355	668-2100	EA	DROP INLET, GP 1	2	$2,584.88	$5,169.76
0385	163-0300	EA	CONSTRUCTION EXIT	2	$1,644.47	$3,288.94
0390	163-0527	EA	CNST/REM RIP RAP CKDM, STN PL RIPRAP/SN BG	100	$350.00	$35,000.00
0395	163-0528	LF	CNST/REM FAB CHECK DAM - TP C SILT FENCE	1000	$10.86	$10,860.00
0400	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	1500	$5.88	$8,820.00
0405	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	210	$230.00	$48,300.00
0410	165-0010	LF	MAINT OF TEMP SILT FENCE, TP A	1000	$1.27	$1,270.00
0415	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	1000	$1.27	$1,270.00
0420	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	1000	$5.00	$5,000.00
0425	165-0101	EA	MAINT OF CONST EXIT	2	$738.10	$1,476.20
0430	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	230	$84.33	$19,395.90
0435	171-0010	LF	TEMPORARY SILT FENCE, TYPE A	1000	$2.56	$2,560.00
0440	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	1000	$3.58	$3,580.00
0444	700-6001	LS	GRASSING - COMPLETE	5	$5,250.00	$26,250.00
0445	716-2000	SY	EROSION CONTROL MATS, SLOPES	2100	$0.98	$2,058.00
ITEM TOTAL						$725,427
INFLATED ITEM TOTAL		0	**(NOT INCLUDED)**			$0
CONTINGENCY PERCENT		7%				$50,780
ADDITONAL CST COST ESTIMATE TOTAL						$776,207
ADDTIONAL R/W COST ESTIMATE TOTAL						$473,000
					TOTAL ADDITIONAL COSTS	**$1,249,207**

Georgia Department of Transportation

Interoffice Memo

DESIGN VARIANCE REQUEST

FILE: P.I. 0007836, Bartow, Cherokee County
SR 20 from I-75/Bartow to I-575/Cherokee

DATE: August 12, 2019 Kimberly W. Nesbitt

FROM: Kimberly W. Nesbitt, State Program Delivery Administrator

TO Brent Story, State Design Policy Engineer

SUBJECT Request for Design Variance for Median Usage

Approval of a Design Variance is requested for this project.

If there are any questions please contact the Project Manager, Theo Igbalajobi at (404) 631–1297.

KESD
KWN:KESD:CCB:TI
Attachments: PSR, Design Variance Request

ARCADIS Design & Consultancy for natural and built assets

FILE P.I. No. 0007836
Bartow Cherokee Counties
SR 20 Reconstruction and Widening
From I-75 to I-575

DATE August 6, 2019

FROM ARCADIS

TO State Contact

SUBJECT Request for Design Variance for Median Usage

Approval of a Design Variance is requested for this project.

PROJECT DESCRIPTION This project is in Bartow and Cherokee Counties, Georgia on SR 20 beginning from SR 20 at I-75 in Bartow County to approximately SR 20 at I-575 in Cherokee County. This 17-mile project will widen and reconstruct the critical East-West Corridor linking Cartersville and I-75 to Canton from two to four (11-ft to 12-ft) lanes (two lanes in each direction) divided with a median. The Design Speed varies from 45 to 55 mph. The type of median varies from a 12-ft raised median to a 32-ft grass depressed median and the outside shoulders also vary from a 12-ft urban shoulder (with curb and gutter) to a rural 10-ft shoulder depending on the Context Classification and Design Speed. Major structures include widening of existing bridges over Stamp and Boston Creeks and replacement of Knox Bridge over Lake Allatoona/Etowah River. SR 20 is functionally classified as an urban or rural arterial depending on its location.

FEATURE REQUIRING A DESIGN VARIANCE The design feature requiring a Design Variance is Median Usage, specifically the median width. The portion of SR 20 where the median width is of concern has a proposed design speed of 55-mph on a mountainous terrain, proposes 12-ft lanes, a 12-ft wide raised median, and 10-ft outside shoulders (6.5-ft paved). SR 20 in this area is functionally classified as a rural arterial. The standard median width for SR 20's design criteria is either a 32-ft grass depressed median or a 24-ft raised median. The current proposed design is to use a raised median width that tapers from 24-ft to 12-ft wide from Bell Ferry Road/Wilderness Camp Road to just east Stamp Creek bridge,), approximate MP 21.56 to MP 22.38, which is less than the standard width required by GDOT.

CURRENT AND FUTURE TRAFFIC DATA For this section of SR 20 the No-Build: open year (2026) ADT is 10,840 vpd; the design year (2046) ADT is 13,330 vpd. For this section of SR 20 the Build: open year (2026) ADT is 11,350 vpd; the design year (2046) ADT is 13,950 vpd. See attachment for additional traffic information.

CRASH DATA At both the intersection and the roadway segment level, the averages for total, fatal, and injury crashes or crash rates were calculated for the five-year period from 2014 to 2018 for the SR 20 study corridor. The are no side road intersections along this section of SR 20 with the proposed substandard width raised median, therefore the intersection crash analysis is not relevant to this Design Variance.
In addition to investigating intersection crashes, historical crash rates were analyzed for roadway segments along the SR 20 corridor to scan for areas of potential safety concerns. Roadway segments were defined as the sections of the SR 20 corridor spanning between each study intersection. The SR 20 roadway segment of the segment crash analysis, which includes the substandard raised median width would be between intersections at Bells Ferry Rd / Wilderness Camp Rd and at Chandler Lane. See Table 5-14 in the attached Safety Analysis for the crash frequency and severity rates along this section of SR 20 for the

study period, which shows the frequency rate (for total crashes) below the Statewide Averages. Table 5-14 shows the Injury rate (in red) for this segment higher than the Statewide Averages, however there were no fatalities.

ALTERNATIVES CONSIDERED / RISK ASSESSMENT The other two Alternates that would meet standard designed median widths would be a 24-ft wide raised median or a 32-ft wide grassed depressed median. See Attachment Table for Arterial Roadway Median design criteria. Both these standard Alternatives with a wider roadway construction limits width, than the limits for the proposed narrower substandard median width (24-ft to a 12-ft median), would have more environmental impacts, more construction costs, and would also require additional Right of Way area. Since there will be no median openings (eliminating turning conflicts) along this segment of SR 20 and since a wide roadway with two standard 12-ft lanes and 10-ft outside shoulders will be provided in each direction these design features will help lessen any risks involved with a narrow median.

COST TO MEET STANDARD CRITERIA One of the advantages of the narrower median is the lower construction costs mainly because of less earthwork excavation, less embankment and pipe cross-drain lengths. The construction costs would increase approximately $161,000 for a standard 32-ft median for SR 20 along the COE property. Since the narrow right of way width is through Corp of Engineers property there is no difference in the required right of way cost to accommodate a wider standard median width.

WHY THE CURRENT STANDARD CRITERIA CANNOT BE MET The design for this project proposes to use a narrower than standard median width for a 55-mph design speed to limit the right of way width because of impacts to two Revolutionary War era cemetery plots located directly just north and south of the current alignment on Corps of Engineers property. A standard rural 32-ft grass depressed median will have significant more impacts on the historic cemeteries and COE property. Instead the design narrows the median from a 32-ft width to a 12-ft raised median which saves 20-ft of historic and environmental impacts which equates to 1.42 acres. There are no median openings (no intersections) along this segment of SR 20 which eliminates the points of conflict caused by traffic turning and crossing maneuvers. After studying all the effects of narrowing the width of the median to 12-ft it has been determined that it is acceptable design, mainly because there are no median openings and the horizontal alignment is mostly on a tangent with one curve.

MITIGATION PROPOSED An important mitigation feature along this stretch of SR 20 is there are no intersections/median openings eliminating any traffic points of conflict. Another form of design mitigation is the basically straight horizontal alignment with only one flat curve along this length of substandard narrow median.

RECOMMENDATION Based on the substantial decrease in the historic and environmental impacts to the two commentaries and along the Corp of Engineers property it is recommended to use a 12-ft wide raised median and approve this Design Variance.

Recommend: _____ GA PE 34588 September 4, 2019

Engineer of Record Date

Concur: Hiral Patel 09/12/19

GDOT Director of Engineering — Date

Approve: Margaret B. Pickle 9/17/19

GDOT Chief Engineer — Date

Attachments: Location sketch including latitude and longitude coordinates

Typical sections

Traffic Diagrams

Crash rates comparison

Plan sheets denoting DV location including latitude and longitude coordinates

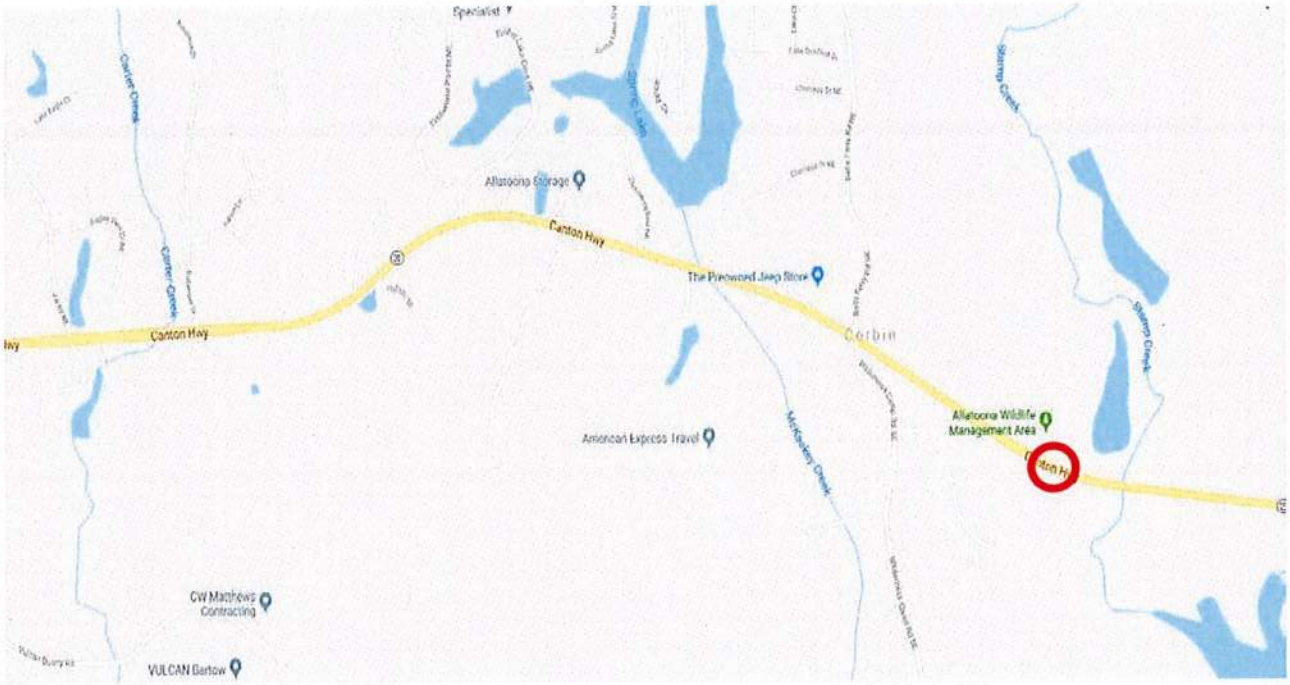
Additional costs estimate (Construction and R/W)

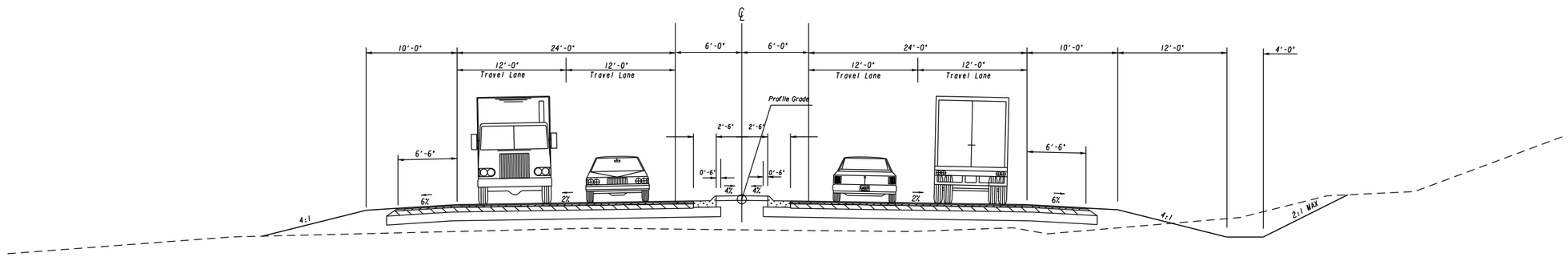
GDOT Design Policy Manual Criteria

Design Variance Location

Latitude: 34°13'0.83"N

Longitude: 84°41'21.44"W





TYPICAL SECTION #4
RAISED MEDIAN
SR 20
Bells Ferry/Wilderness Camp Rd to East of Stamp Creek Bridge
55 MPH D.S.

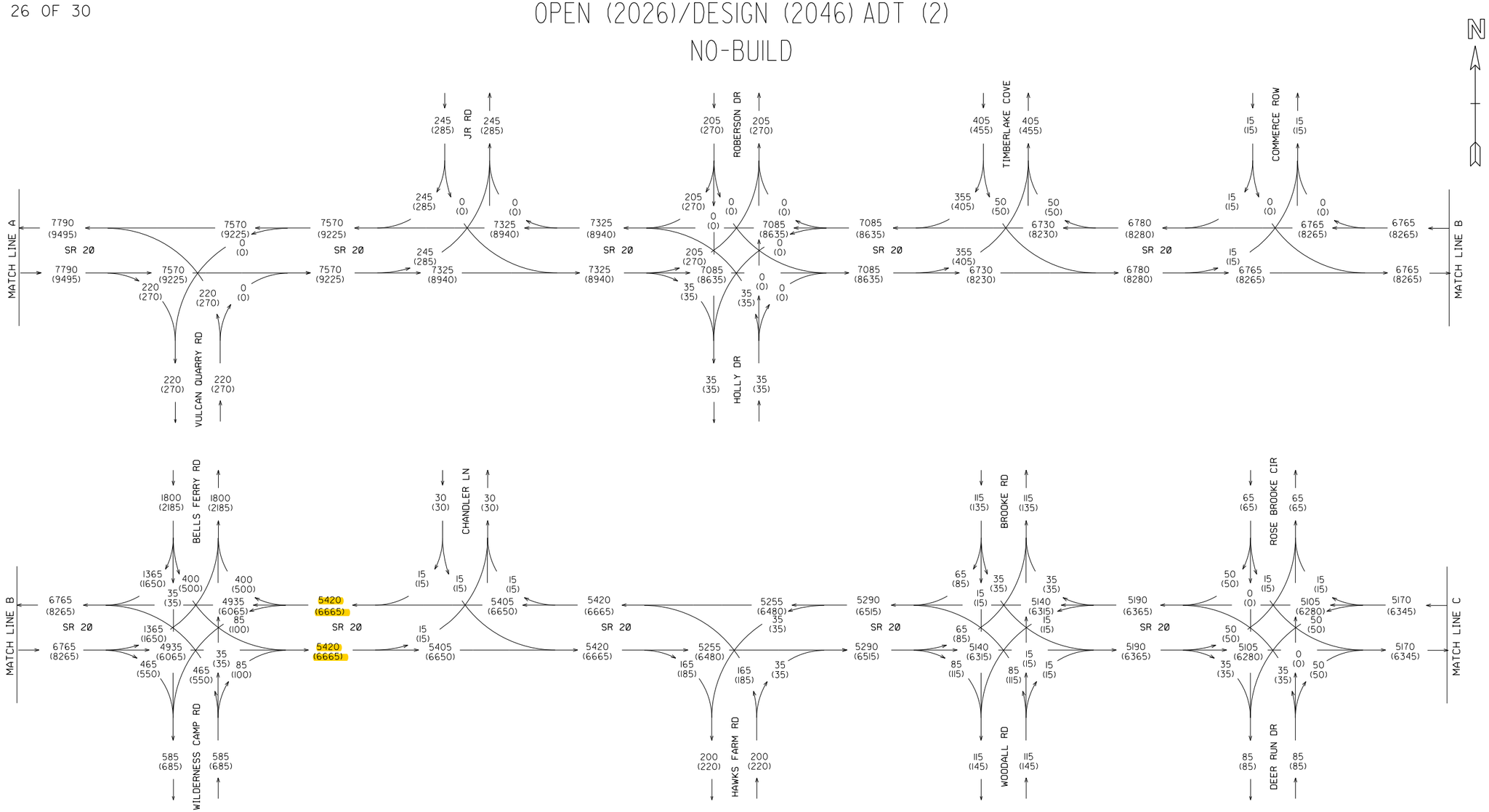
ARCADIS Design & Consultancy for natural and built assets

REVISION DATES		

TYPICAL SECTIONS
DESIGN VARIANCE TYPICAL
SR 20 FROM I-75 TO I-575

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		05-002
CORRECTED:		DATE:		
VERIFIED:		DATE:		

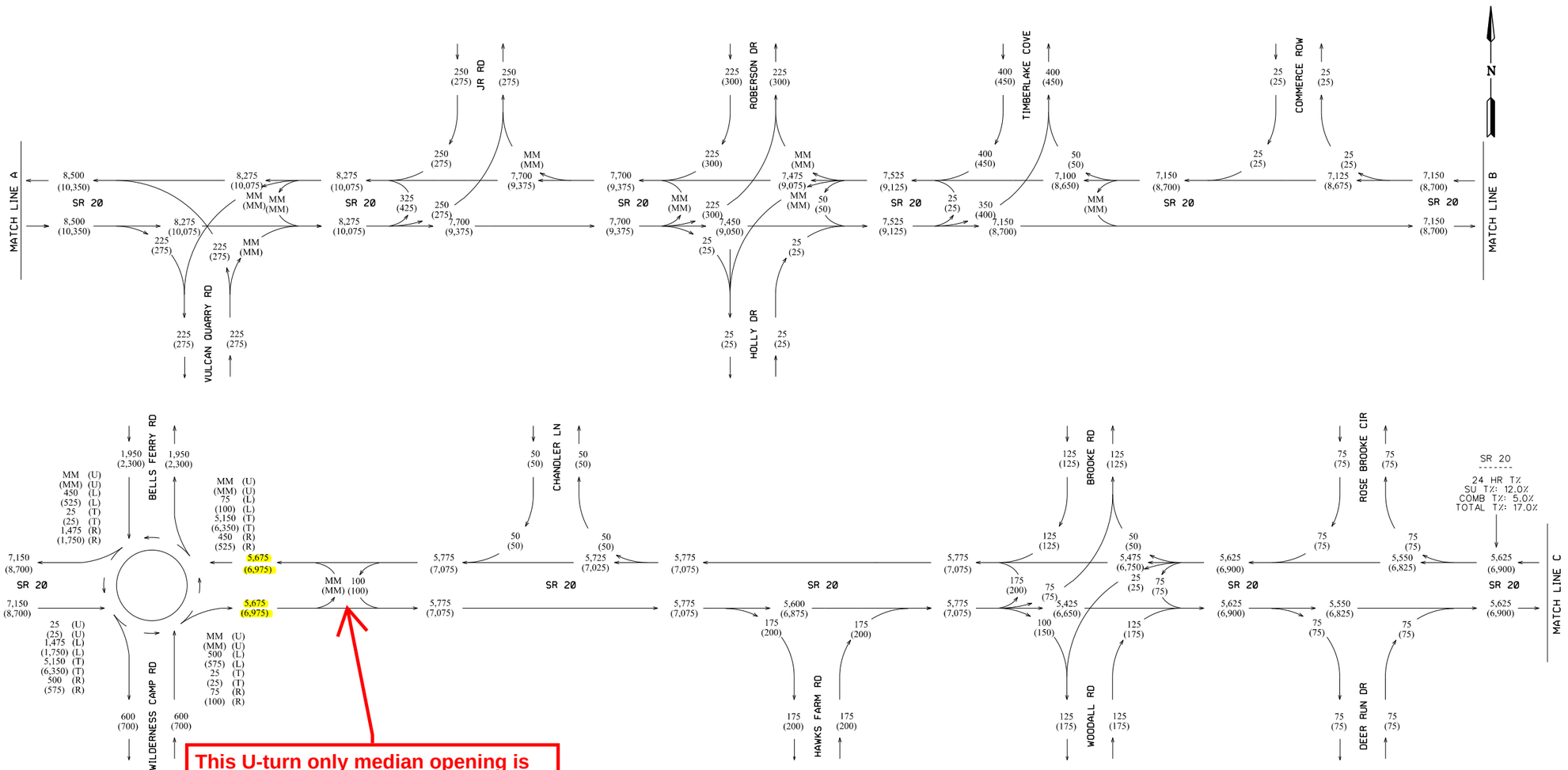
OPEN (2026)/DESIGN (2046) ADT (2)
NO-BUILD



AVERAGE DAILY TRAFFIC 2026 ADT = 000 2046 ADT = (000)	TRUCK PERCENTAGES:				SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE PI NO. 0007836 BARTOW/CHEROKEE COUNTIES
	LOCATION	DAILY T%	S.U. %	COMB %	
	I-75 MAINLINE	38%	10%	28%	
	I-75 RAMPS (N. OF SR 20)	15%	7%	8%	
COMPLETED BY: KC CHECKED BY: JP DATE: 9/5/2014	I-75 RAMPS (S. OF SR 20)	13%	10%	3%	ARCADIS Infrastructure, Water, Environment, Buildings
	SR 20/I-575 RAMPS	15%	11%	4%	
	I-575 MAINLINE	6%	2%	4%	

COUNTY	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
BARTOW/CHEROKEE	GA	PI.0007836	62	84

AADT VOLUMES
SR 20 OPEN & DESIGN
YEARS
2026 & 2046
BUILD
2026 AADT = XXX
2046 AADT = (XXX)



This U-turn only median opening is located outside The proposed 12-ft wide median Design Variance where the median has a standard width.

KCP 5/2019

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING
TRAFFIC DIAGRAM
SR 20 FR I-75/BARTOW TO I-575/CHEROKEE
OPEN & DESIGN YEARS BUILD AADT
SHEET 2 OF 6

DRAWING No. 10-0062

Attachment - Crash frequency & Severity rates for SR20 segment from intersection at Wilderness Camp Rd/ Bells Ferry Rd to intersection at Chandler Rd

Table 5-1. 2014 to 2018 Average Yearly Intersection Crashes

Intersection	2014 – 2018 Average Crashes/Year			Statewide Average Crashes/Year		
	Total	Injury	Fatal	Total	Injury	Fatal
I-75 Southbound	10.8	4.0	0.00	11.5	3.2	0.00
I-75 Northbound	28.0	7.4	0.00	5.2	1.4	0.03
SR 20 Spur	18.2	6.6	0.00	6.5	1.8	0.02
Dean Road/Simpson Circle	1.2	0.4	0.00	5.2	1.4	0.03
Rowland Springs Rd/Simpson Circle	2.0	0.4	0.00	4.7	1.2	0.01
Ranger Road	0.4	2.0	0.00	4.7	1.2	0.01
Vulcan Quarry Road	0.8	0.0	0.00	4.7	1.2	0.01
JR Road	0.4	0.0	0.00	4.7	1.2	0.01
Roberson Drive	1.8	0.2	0.00	4.7	1.2	0.01
Timber Lake Cove	1.8	0.4	0.00	4.7	1.2	0.01
Commerce Row	1.2	0.6	0.00	4.7	1.2	0.01
Wilderness Camp Rd/Bells Ferry Rd	5.2	1.4	0.00	4.7	1.2	0.01
Chandler Ln	1.0	0.7	0.00	3.8	1.2	0.02
Hawks Farm Road	1.6	0.4	0.00	3.8	1.2	0.02
Woodall Rd/Brooke Road	1.8	0.4	0.00	3.8	1.2	0.02
Deer Run Dr/Rose Brooke Cir	0.6	0.2	0.00	3.8	1.2	0.02
Clearwater Trail/Rhine Rd	3.2	1.0	0.00	3.8	1.2	0.02
Sutallee Woods Trail	2.0	0.6	0.00	3.8	1.2	0.02
Peachtree Drive	0.2	0.0	0.00	3.8	1.2	0.02
Highland View Pass	1.4	0.4	0.00	3.8	1.2	0.02
Upper Sweetwater Trail/Fincher Road	11.0	3.8	0.00	3.8	1.2	0.02
Ficklen Church Way	3.8	1.0	0.00	4.7	1.2	0.01
Willie West Road	1.4	0.6	0.00	4.7	1.2	0.01
Knox Campground Trail	2.6	0.8	0.00	4.7	1.2	0.01
Fields Chapel Road	4.8	1.0	0.00	4.7	1.2	0.01
Veterans Cemetery Road	1.8	0.4	0.00	4.7	1.2	0.01
Fields Landing Drive	1.6	0.2	0.00	4.7	1.2	0.01
Lusk Ct/Copper Hills Drive	1.8	0.0	0.00	4.7	1.2	0.01
Fieldstone Drive	2.6	0.4	0.00	4.7	1.2	0.01
Legend Creek Drive	2.8	0.4	0.00	5.2	1.4	0.03
Riverbend Way/Pope Circle	7.6	2.0	0.00	5.2	1.4	0.03
River Green Ave/Butterworth Road	20.2	4.2	0.00	4.7	1.2	0.01
Teasley Middle School	2.2	0.5	0.20	4.7	1.2	0.01
Ridgemont Road	0.4	0.0	0.00	4.7	1.2	0.01
Herndon Lane/Access Road	30.4	7.6	0.00	4.7	1.2	0.01
Hickory Flat Hwy	40.8	5.4	0.00	6.5	1.8	0.02

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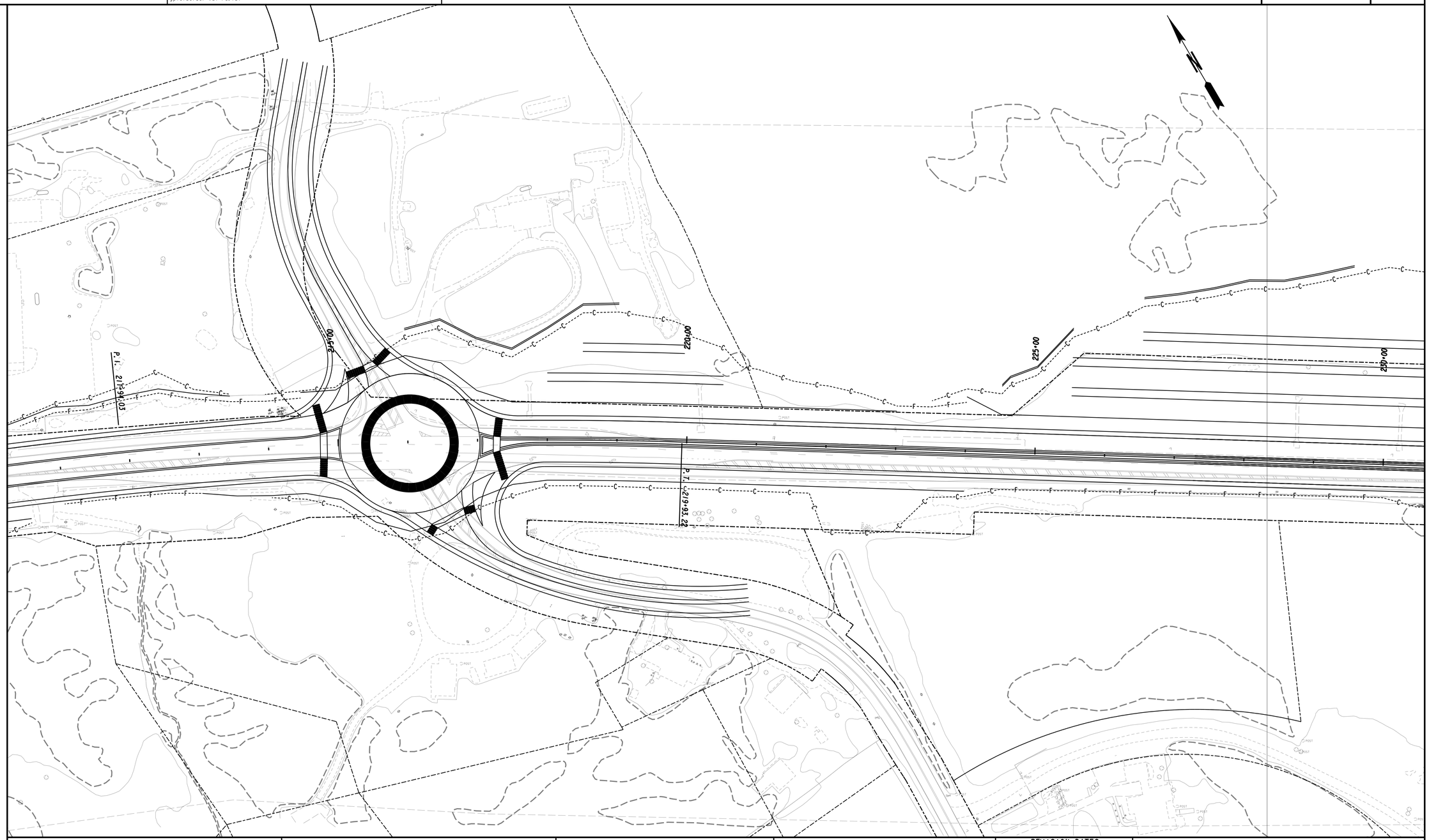

PROPERTY AND EXISTING R/W LINE
REQUIRED R/W LINE
CONSTRUCTION LIMITS
EASEMENT FOR CONSTR & MAINTENANCE OF SLOPES
EASEMENT FOR CONSTR OF SLOPES
EASEMENT FOR CONSTR OF DRIVES

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ORANGE BARRIER FENCE

GDOT Georgia Department of Transportation

PRELIMINARY

ARCADIS Design & Consultancy for natural and built assets

SCALE IN FEET
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REVISION DATES

MAINLINE PLAN

SR 83 CONNECTOR
FROM SR 11 TO SR 83

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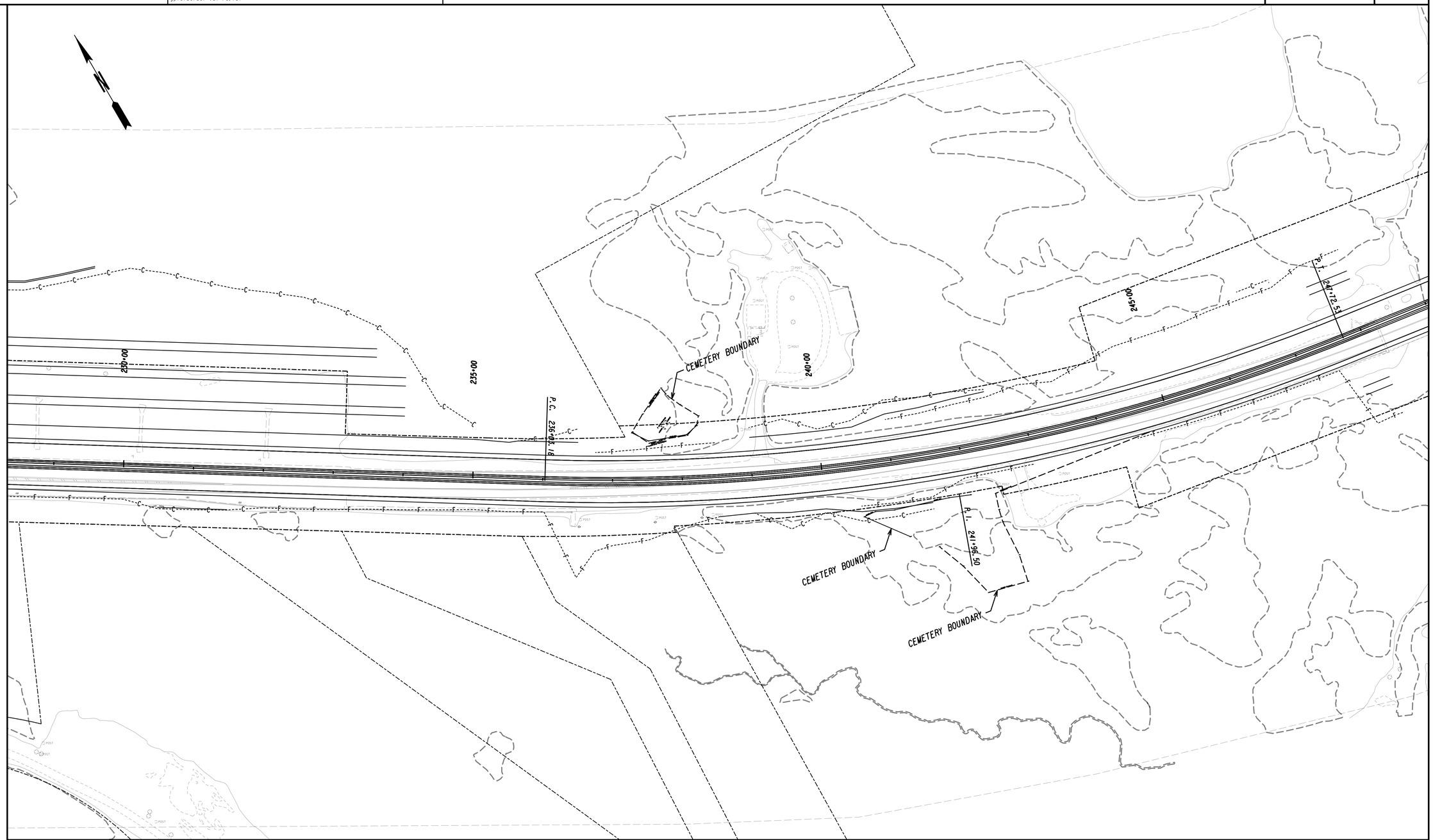

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GDOT Georgia Department of Transportation

PRELIMINARY

ARCADIS Design & Consultancy for natural and built assets

SCALE IN FEET
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REVISION DATES

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SR 83 CONNECTOR
FROM SR 11 TO SR 83

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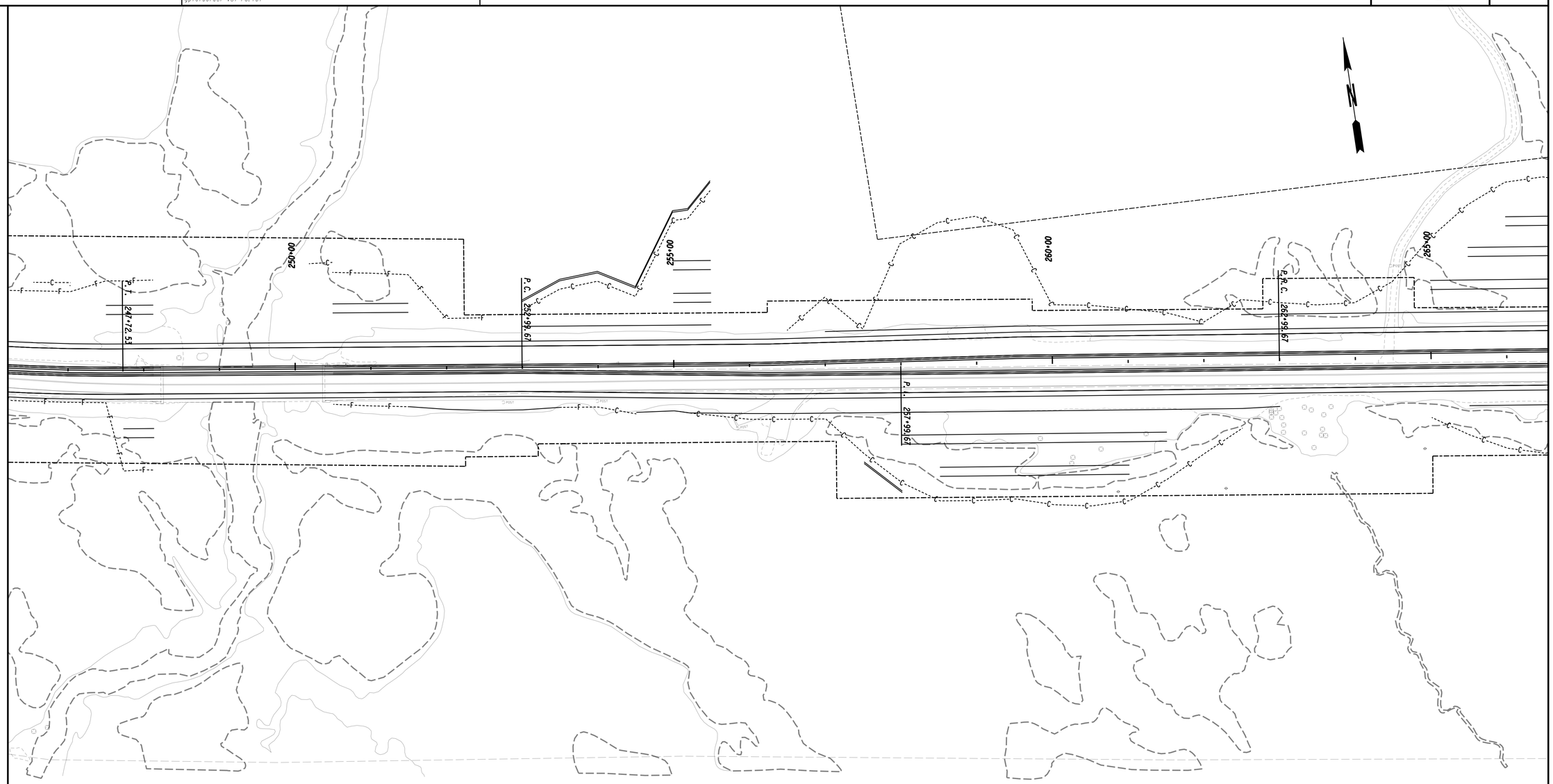

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ORANGE BARRIER FENCE	

GDOT Georgia Department of Transportation

PRELIMINARY

ARCADIS Design & Consultancy for natural and built assets

SCALE IN FEET

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REVISION DATES

MAINLINE PLAN

SR 83 CONNECTOR
FROM SR 11 TO SR 83

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DRAWING No.

13-0003

7/31/2015 GPLN

STATE HIGHWAY AGENCY DATE : 05/28/2019 PAGE : 1

JOB DETAIL ESTIMATE

JOB NUMBER : 0007836

ITEMS FOR JOB 0007836

Additional Costs for Standard 32' wide median

LINE	ITEM	UNITS	DESCRIPTION	QUANTITY	PRICE	Cost
0010	201-1500	LS	CLEARING & GRUBBING - PI 0007836 (AC)	1.42	$7,500.00	$10,650.00
0015	205-0001	CY	UNCLASS EXCAV (earthwork)	16074	$6.88	$110,589.63
0125	550-1180	EA	Storm Drain Pipe 18 IN, 1-10 (to extend 20' at each x-drain)	100	$39.50	$3,950.00
0130	550-1240	EA	Storm Drain Pipe 24 IN, 1-10 (to extend 20' at each x-drain)	100	$55.00	$5,500.00
0200	634-1200	EA	RIGHT OF WAY MARKERS	8	$133.47	$1,067.76
0395	163-0528	LF	CNST/REM FAB CHECK DAM - TP C SILT FENCE	250	$10.89	$2,722.50
0400	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	250	$5.50	$1,375.00
0420	165-0041	LF	MAINT OF CHECK DAMS - ALL TYPES	500	$5.00	$2,500.00
0444	700-6001	LS	GRASSING - COMPLETE (Ac)	1.42	$5,100.00	$7,242.00
0445	716-2000	SY	EROSION CONTROL MATS, SLOPES	5000	$0.98	$4,900.00
ITEM TOTAL						$150,497
INFLATED ITEM TOTAL	0		**(NOT INCLUDED)**			$0
CONTINGENCY PERCENT	7%					$10,535
ADDITONAL CST COST ESTIMATE TOTAL						$161,032
ADDTIONAL R/W COST ESTIMATE TOTAL						$0

TOTAL ADDITIONAL COSTS	**$161,032**

Table 6.6. Design Criteria for Arterial Roadways

Cross Section Element	Rural (open ditch sections) (ADT > 2000)[1]				Urban (curbed sections) (ADT > 2000)[1]	
	2-Lane	2-Lane	4-Lane	4-Lane	4-Lane	4-Lane
Design Speed	**45 mph**	**55 mph**	**55 mph**	**65 mph**	**45 mph**	**55 mph**
Desirable Level of Service (LOS)	B	B	B	B	C or D[2]	C or D[2]
Traveled – Way						
Lane width (min-desirable)[3]	11-12-ft	11-12-ft	11-12-ft	11-12-ft	11-12-ft	11-12-ft
Cross slope (normal)	2%	2%	2%	2%	2%	2%
Superelevation (max)	6% or 8%	6% or 8%	6% or 8%	6% or 8%	4%	4%
Shoulders (outside)						
Overall width	8-ft	10-ft	10-ft	10-ft	n/a	n/a
Paved width	4-ft /6.5-ft[4]	4-ft /6.5-ft[4]	6.5-ft	6.5-ft	n/a	n/a
Cross slope (normal)	6%	6%	6%	6%	n/a	n/a
Shoulders (median)						
Overall width (cross slope)	n/a	n/a	6-ft (4%)	6-ft (4%)	n/a	n/a
Paved width (cross slope with mainline)	n/a	n/a	2-ft (2%)	2-ft (2%)	n/a	2-ft
Border Area (urban shoulder) (width)	n/a	n/a	n/a	n/a	10 -16-ft	10 -16-ft
Cross slope (max)	n/a	n/a	n/a	n/a	2%	2%
Width of Median						
Depressed	n/a	n/a	32 - 44-ft	44-ft	n/a	n/a
Raised	n/a	n/a	24-ft	n/a	20-ft	24-ft
Flush	n/a	n/a	n/a	n/a	14-ft	n/a
Sidewalk (SW)						
Width of sidewalk	n/a	n/a	n/a	n/a	5-ft	5-ft
Desirable buffer from back of curb to SW	n/a	n/a	n/a	n/a	6-ft	6-ft
Cross slope (max)	n/a	n/a	n/a	n/a	2%	2%
Width of Bike Lanes	4-ft[4]	4-ft[4]	4-ft[4]	4-ft[4]	4-5-ft[5]	4-5-ft[5]
Foreslope (max/normal)[6]	2:1/4:1	2:1/4:1	2:1/4:1	2:1/6:1	2:1/4:1	2:1/4:1
Width of foreslope in cut	12-ft	12-ft	12-ft	18-ft	n/a	n/a
Ditch Bottom (width)	2-ft	4-ft	4-ft	4-ft	n/a	n/a
Backslope (max/normal)[6]	2:1/4:1	2:1/4:1	2:1/4:1	2:1/6:1	2:1/4:1	2:1/4:1
Vertical Clearance (min-desirable)[7](ft)	16.5-16.75	16.5-16.75	16.5-16.75	16.5-16.75	16.5-16.75	16.5-16.75
Lateral Offset to Obstruction[8]	Ch. 5	Ch. 5	Ch. 5	Ch. 5	Ch. 5	Ch. 5
Clear Zone[9]	24-ft	26-ft	26-ft	32-ft	AASHTO	AASHTO

Notes:

(1) Values shown are for roadways with ADT > 2000. Refer to the current AASHTO Green Book for design criteria on roadways with ADT< 2000, and the AASHTO "Guidelines for Geometric Design of Very Low-Volume Local Roads" for design criteria on roadways with ADT ≤ 400.

(2) LOS D is appropriate in heavily developed urban and suburban areas.

(3) See AASHTO Green Book, Chapter 7, Rural and Urban Arterials, for conditions to construct or retain 11-ft lanes.

(4) Bike Lane is incorporated into the overall width of a 6.5-ft paved shoulder to include a rumble strip and buffer area (refer to Ga. Construction Detail T-25). See **Section 9.4.2 Bicycle Warrants**.

(5) Bike Lane measured from the outside edge of traveled-way outward. The 4-ft dimension does not include curb & gutter or header curb. The 5-ft dimension is required when adjacent to a header curb, guardrail, or other vertical surface. A 6-ft width should be used adjacent to a concrete barrier, where practical.

(6) The use of a slope inside the "Clear Zone" that is steeper than 4:1 will require the installation of a roadside barrier (i.e. guardrail, barrier wall, crash attenuator, etc.). (See Ga.Std.Details, 4000 series).

(7) For additional guidelines, refer to Chapter 2.3.2 of the GDOT Bridge and Structures Policy Manual.

(8) For rural roadways, lateral offset is measured from the edge of traveled way outward. For urban roadways with curbed sections, lateral offset is measured from the face of curb outward. See Chapter 5 of this Manual for GDOT standard criteria for lateral offset to signs, light poles, utility installations, signal poles and hardware, and trees and shrubs.

(9) AASHTO defines Clear Zone as the unobstructed, relatively flat area beyond the edge of traveled way for the recovery of errant vehicles. Clear Zone recommendations are a function of design speed, traffic volumes, and embankment slope. For Clear Zone recommendations, refer to the current edition of the AASHTO Roadside Design Guide, Ch. 3.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INDICATION OF ROUNDABOUT SUPPORT

Georgia Department of Transportation
Office of Program Delivery
600 West Peachtree Street, 25th Floor
Atlanta, Georgia 30308
ATTN: Theo Igbalajobi, Project Manager

Location

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

Description: ***SR 20 at Wilderness Camp Road/ Bells Ferry Road***

State/County Route Numbers: ***SR 20***

Project: CSSTP-0007-00(836)***; Bartow, Cherokee Counties; P.I. No. 0007836***

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 1st day of July, 2020

By: Peter Olson

Title: County Administrator

Attest:

Debbie Anderson
Deputy County or ~~City~~ Clerk

Cherokee County Government
Community Development Agency
1130 Bluffs Parkway
Canton, GA 30114
678-493-6077
Fax 678-493-6088

July 8, 2020

Mr. Theo Igbalajobi
Division of Program Delivery
Georgia Department of Transportation
600 West Peachtree Street, NW; 25th Floor
Atlanta, Georgia 30308

Re: PI No. 0007836
SR 20
Roundabout Support Agreement

Dear Mr. Igbalajobi:

Cherokee County has approved and executed the attached Roundabout Support Agreement.

If you have any questions or if additional information is required, please contact me at 678-493-6057 or gmorton@cherokeega.com.

Sincerely,

Geoffrey E. Morton, P.E.
Community Development Agency Director

Attachment
cc: Jim Wilgus, P.E., SPLOST Program Manager

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INDICATION OF ROUNDABOUT SUPPORT

Georgia Department of Transportation
Office of Program Delivery
600 West Peachtree Street, 25th Floor
Atlanta, Georgia 30308
ATTN: Theo Igbalajobi, Project Manager

Location

Cherokee County supports the consideration of a roundabout at the locations specified below.

Description: ***SR 20 at SR 108/Fincher Road/Upper Sweetwater Trail; SR 20 at Riverbend Way/ Pope Circle; SR 20 at River Green Avenue/Butterworth Road; and SR 20 at Herndon Lane/Marietta Highway***

State/County Route Numbers: ***SR 20***

Project: CSSTP-0007-00(836)***; Bartow, Cherokee Counties; P.I. No. 0007836***

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 7th day of July, 2020

By: _____

Title: Chairman

Attest: _____
County or City Clerk

CHEROKEE COUNTY BOARD OF COMMISSIONERS