

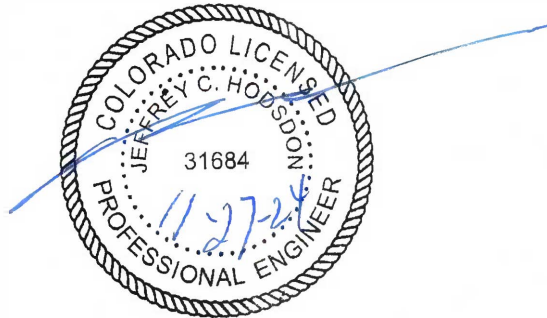


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Eastonville Road Project
TIS Memo and Roundabout Design Reports
PCD File No. CDR2321
(LSC #S224380)
November 27, 2024

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

Date



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November 27, 2024

Colleen Monahan, P.E., LEED AP
Site Leader | Group Leader – Land Development
HR Green
1975 Research Parkway | Suite 160
Colorado Springs, CO 80920

Re: Eastonville Road Project TIS
Memo and Roundabout
Design Reports
EPC PCD File No. CDR2321
LSC #S224380

Dear Colleen,

We are pleased to submit this Memorandum containing the roundabout design reports for the proposed intersections of Rex Road/Eastonville Road and Eastonville Road/Dawish Drive and supporting traffic impact study (TIS) information for the Eastonville Road improvements project in the Falcon area of El Paso County, Colorado. This memo also contains TIS information regarding the intersection of Eastonville Road & the County Regional Park access to Eastonville Road. The regional park access is located just south of the Rex Road/Eastonville Road intersection.

Roundabout Design Reports

The roundabout design reports for the proposed roundabout intersections of Rex Road/Eastonville Road and Eastonville Road/Dawish Drive are attached.

Supporting Traffic Impact Study (TIS) Information

Excerpts of the following two TIS reports are attached in support of the design of the Rex Road/Eastonville Road and Eastonville Road/Dawish Drive intersections and the Eastonville Road/County Regional Park access to Eastonville Road.

- LSC Report: **Grandview Reserve Phase 1 Updated TIS** (May 9, 2022) (PUDSP-21-010)(LSC#S214240)
- Wilson & Co. Report: **Traffic Impact Study Eastonville Road Project** (April 2021) (On Call CON 17067Z Task Release #17-067-47)

The excerpt from the LSC Grandview report contains a corridor intersection exhibit with centerline spacing. Note: This exhibit is a modified version of the original. Also included are copies of TIS figures showing the projections of future traffic volumes and intersection levels of service for the two proposed roundabout intersections.

The excerpt from the Wilson & Co. report contains copies of TIS figures showing the projections of future traffic volumes, tables with projected intersection levels of service for the Eastonville Road/County Regional Park access to Eastonville Road, and copies of the corresponding Synchro reports.

The attached Figure 1 provides a detail of the Eastonville Road/County Regional Park access to Eastonville Road. This figure shows the centerline spacing along Eastonville Road north to Rex Road and south to Dawish Drive. The figure also calls out the specific dimensions for the northbound left-turn lane for this access, as shown on the Eastonville design plans. This access is planned to remain stop-sign controlled.

Eastonville Road Proposed Cross Section and Other Key Design Elements

A copy of the Design Criteria Memo for Eastonville Road by El Paso County is also attached. This memo documents the cross section for Eastonville Road along with other key design elements.

* * * * *

Please contact me if you have any questions regarding this report.

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

By: Jeffrey C. Hodsdon, P.E.
Principal

JCH:jas

Enclosures: Roundabout Design Report - Rex Road/Eastonville Road
Roundabout Design Report - Eastonville Road/Dawish Drive
EXCERPTS from **Grandview Reserve Phase 1 Updated TIS**
EXCERPTS from **Traffic Impact Study Eastonville Road Project**
Figure 1 - Eastonville Road/County Regional Park access Details
Design Criteria Memo for Eastonville Road

Roundabout Design Report - Rex Road/Eastonville Road





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November 27, 2024

Colleen Monahan, P.E., LEED AP
Site Leader | Group Leader – Land Development
HR Green
1975 Research Parkway | Suite 160
Colorado Springs, CO 80920

Re: Roundabout Design Report
Eastonville Road/Rex Road
EPC PCD File No. CDR2321
LSC #224380

Dear Colleen,

We are pleased to submit this roundabout design report for the proposed intersection of Eastonville Road/Rex Road in Grandview Reserve community (Phase 1) in the Falcon area of El Paso County, Colorado. This intersection will be constructed as a modern roundabout intersection. The roundabout has been designed for one through lane in each direction on each approach.

Roundabout Layouts

The attached Figure 1 and “Roundabout Critical Design Parameters” table show the geometric layout and roundabout design parameters. The overall (“inscribed circle”) diameter is 150 feet and the entry phi angles are between 16.0 and 22.5 degrees on each of the approaches.

Design Vehicles

The roundabout Figures 2 through 5 show vehicle turning paths through the proposed roundabout for all approaches. The design vehicle is WB-67 per the El Paso County *Engineering Criteria Manual (ECM)*. The results show the WB-67 vehicle type could be accommodated. A minimum of one foot of clearance is maintained between all wheel paths and vertical curbs.

Design Speeds

The attached Figures 6 through 9 show the estimated fastest path radii for each of the approaches to the proposed roundabout. These paths are drawn in accordance with the methodology outlined in the Wisconsin Department of Transportation (WSDOT) *Facilities Development Manual* (Chapter 11, Section 26). The fastest entry path should generally be no more than about 25 miles per hour (mph) for single-lane approaches and 30 mph for two-lane approaches (not applicable at this roundabout). The fastest entry path for each of the four approaches meets the 25-mph criteria.

Pedestrian Safety and Accessibility

Pedestrian crossings with pedestrian refuge areas on the splitter islands have been designed on all four approaches. The WSDOT *Facilities Development Manual* (Chapter 11, Section 26) gives recommendations for placement and design of pedestrian crossings. The recommendations given in the WSDOT *Facilities Development Manual* (Chapter 11, Section 26) were followed in the proposed design, including the following:

- Pedestrian refuge widths are a minimum of 6 feet;
- Pedestrian refuge widths that will accommodate bicycles should be increased to a minimum of ten feet;
- Pedestrian crossings are generally set back 25 feet from the yield line.

In addition, detached sidewalks should be provided on the corners of the roundabout that provide pedestrian crossings. The following recommendations are given when designing the vertical aspects of the proposed roundabout:

- Pedestrian refuge areas should be designed at street level rather than elevated to the height of the splitter island;
- Ramps should be provided and designed in accordance with ADA standards on each end of the crosswalk;
- Detectable warning surfaces in accordance with ADA standards should be provided at ramps and the pedestrian refuge area of the splitter islands;
- The truck apron should be textured and raised above the circulating roadway. The truck apron width (18.5') is shown on Figure 1. The specific design will be determined as part of the construction plans.

Sight Triangles

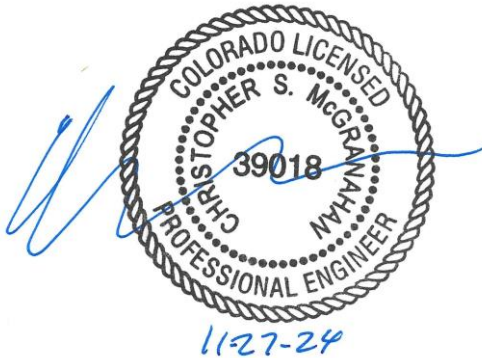
The sight triangles are shown in Figure 10. The sight triangles represent areas in which no items taller than two feet that would restrict sight distance should be located. Note: in areas on the northwest and southeast corners where the sight triangles encroach into the adjacent lots or just outside the ROW line, sight distance easements will be shown on the plat. The design speed of the intersecting streets will be 40 mph on the approaches to the roundabouts. Note:

The approach stopping sight distance triangles shown on Figure 10 would allow for stopping sight distances for a design speed of 45 mph (360 feet) as shown in the attached design parameters table, assuming grades of less than three percent on the approaches. The general Eastonville corridor design speed is 50 mph.

* * * * *

Respectfully submitted,

LSC Transportation Consultants, Inc.



By: _____
Christopher S. McGranahan, P.E.
Principal

CSM/JCH:jas

Enclosures: Roundabout Critical Design Parameters Table
Roundabout Figures 1-10

EPC PCD File No. CDR2321
Eastonville Road Roundabouts (Grandview Reserve)
(LSC#S224380)
Eastonville Road & Rex Road Roundabout
County: El Paso

ROUNDAABOUT CRITICAL DESIGN PARAMETERS

DESIGN PARAMETERS	LEG 1	LEG 2	LEG 3	LEG 4	LEG 5	LEG 6
Approach Width, FT	16.8	17.0	17.0	18.4		
Entry Width, FT	21.4	21.5	21.4	21.5		
Entry Angle, PHI Φ , DEG	20.0	21.0	16.0	22.5		
Inscribed Circle Diameter, FT	150.0	150.0	150.0	150.0		
Exit Width, FT	20.0	21.0	20.0	21.0		
Circulating Roadway Width Upstream of Entry, FT	18.0	18.0	18.0	18.0		

FASTEST SPEED PATH

R_1 , Radius/Speed, FT/MPH	140	23	128	22	128	22	135	23		
R_2 , Radius/Speed, FT/MPH	130	22	100	20	95	20	96	20		
R_3 , Radius/Speed, FT/MPH	330	31	410	33	433	34	1000	<40		
R_4 , Radius/Speed, FT/MPH	60	17	60	17	60	17	60	17		
R_5 , Radius/Speed, FT/MPH	115	21	110	21	128	22	95	20		
Bypass R_5 , Radius/Speed, FT/MPH										

MINIMUM SIGHT PARAMETERS

Approach Design Speed, MPH	50.0	50.0	50.0	50.0		
Horizontal Stopping Sight Distance, FT	368.0	368.0	368.0	368.0		
Circulating Intersection Sight Distance, FT/MPH	125	17	124	17	125	17
Entering Intersection Sight Distance, FT/MPH	156	24	163	24	154	24

Design Vehicle: WB-67

Truck Apron Width: 18.5

OSOW Accommodations: N/A


Circulating Roadway Cross-Slope: 2% or less

Access Control: N/A

Parking Control: No Parking

Bicycle & Pedestrian Accommodations: Ped ramps and sidewalks

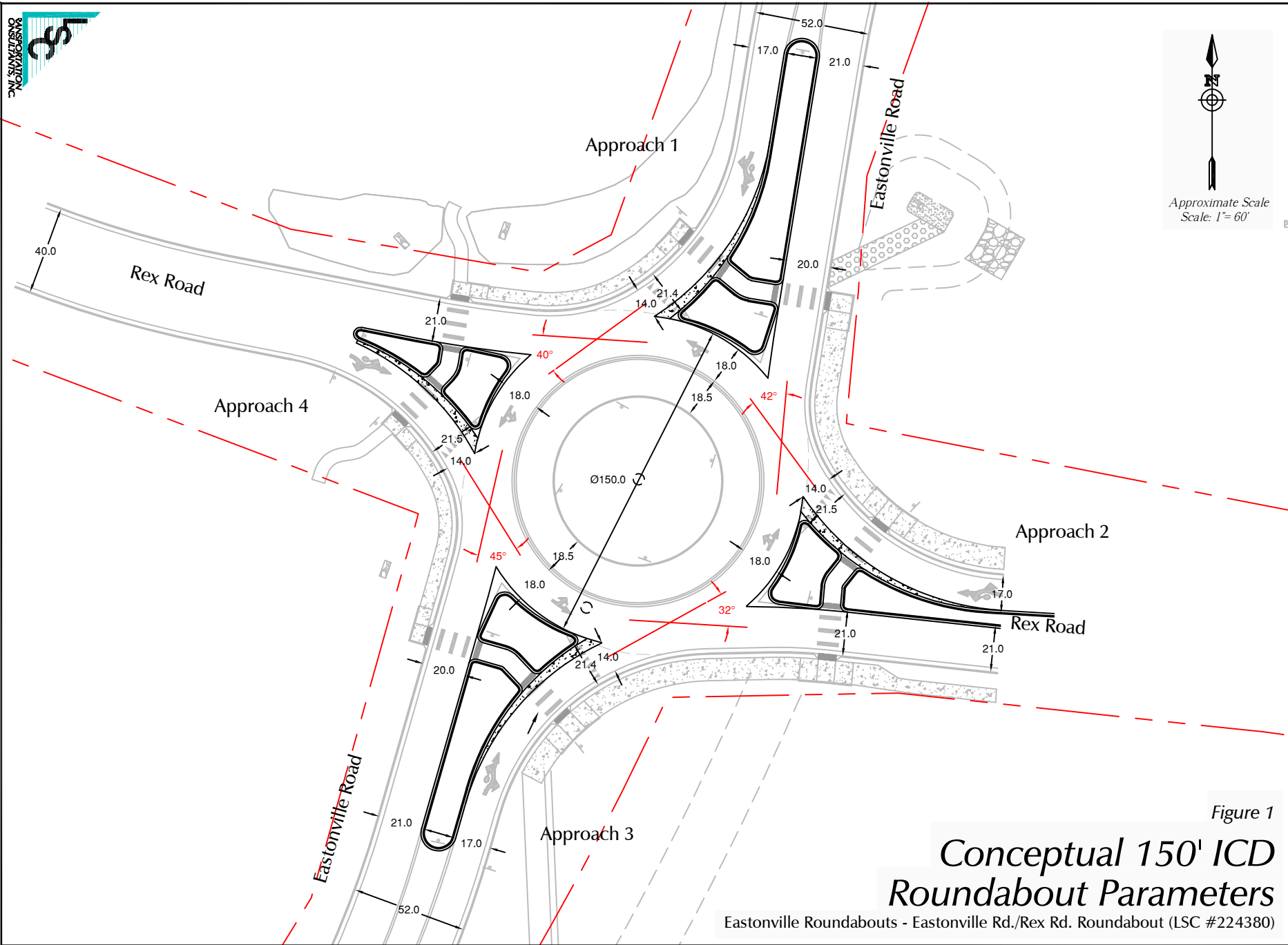
Designer: Matt Romero
 Reviewer: Chris McGranahan, P.E.

SIGNATURE: 

DATE: 7/12/2024

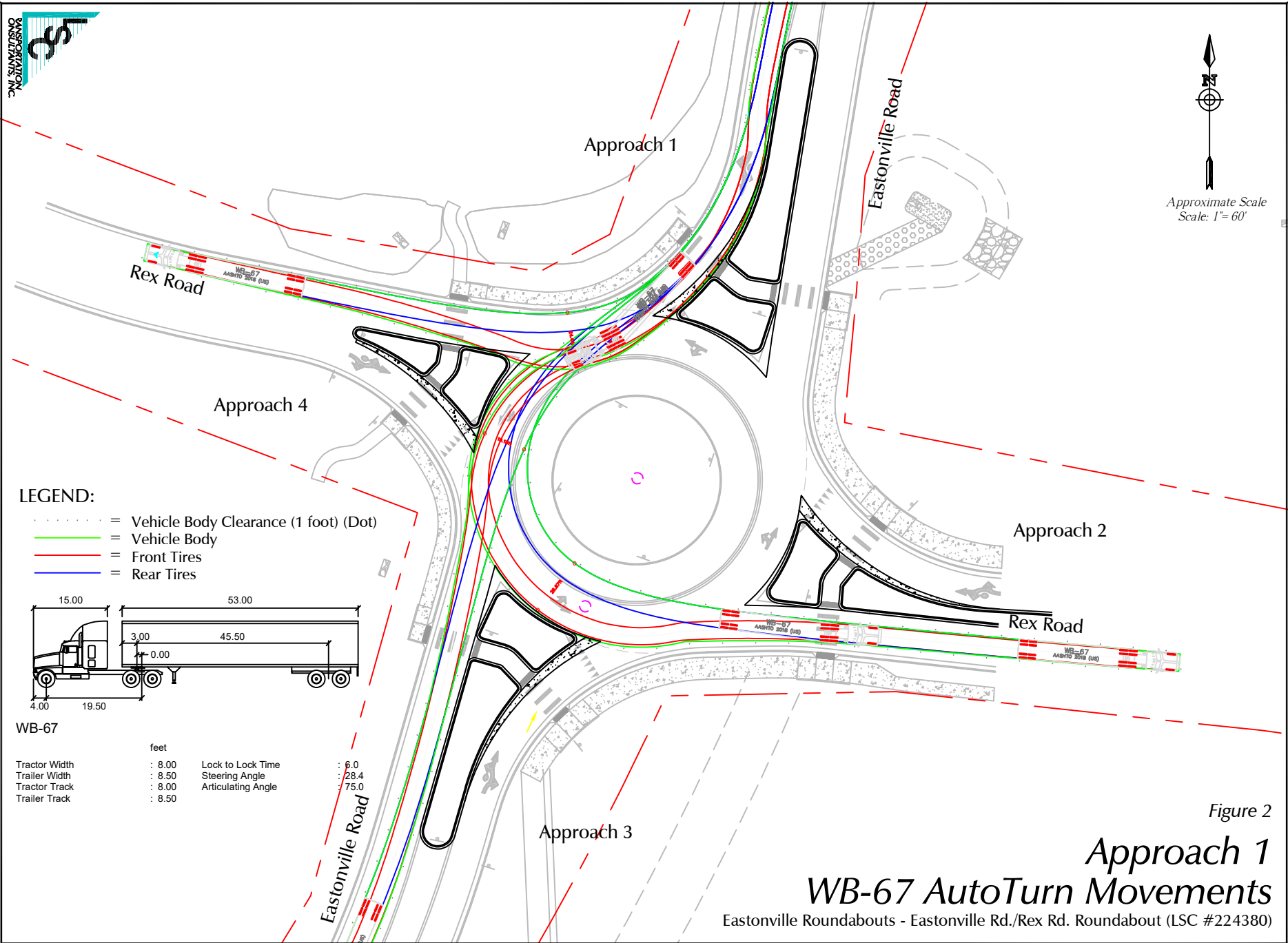
NAME: Christopher S. McGranahan, P.E.

The reviewer's signature on this document indicates that the design has been reviewed and is in general compliance with good roundabout principals. The critical design elements have been addressed. The project design engineer in responsible charge of final plan development will stamp the plans when applicable.



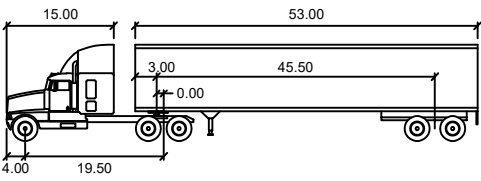
Approximate Scale
Scale: 1" = 60'

Figure 1
**Conceptual 150' ICD
Roundabout Parameters**
Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)



LEGEND:

- = Vehicle Body Clearance (1 foot) (Dot)
- = Vehicle Body
- = Front Tires
- = Rear Tires



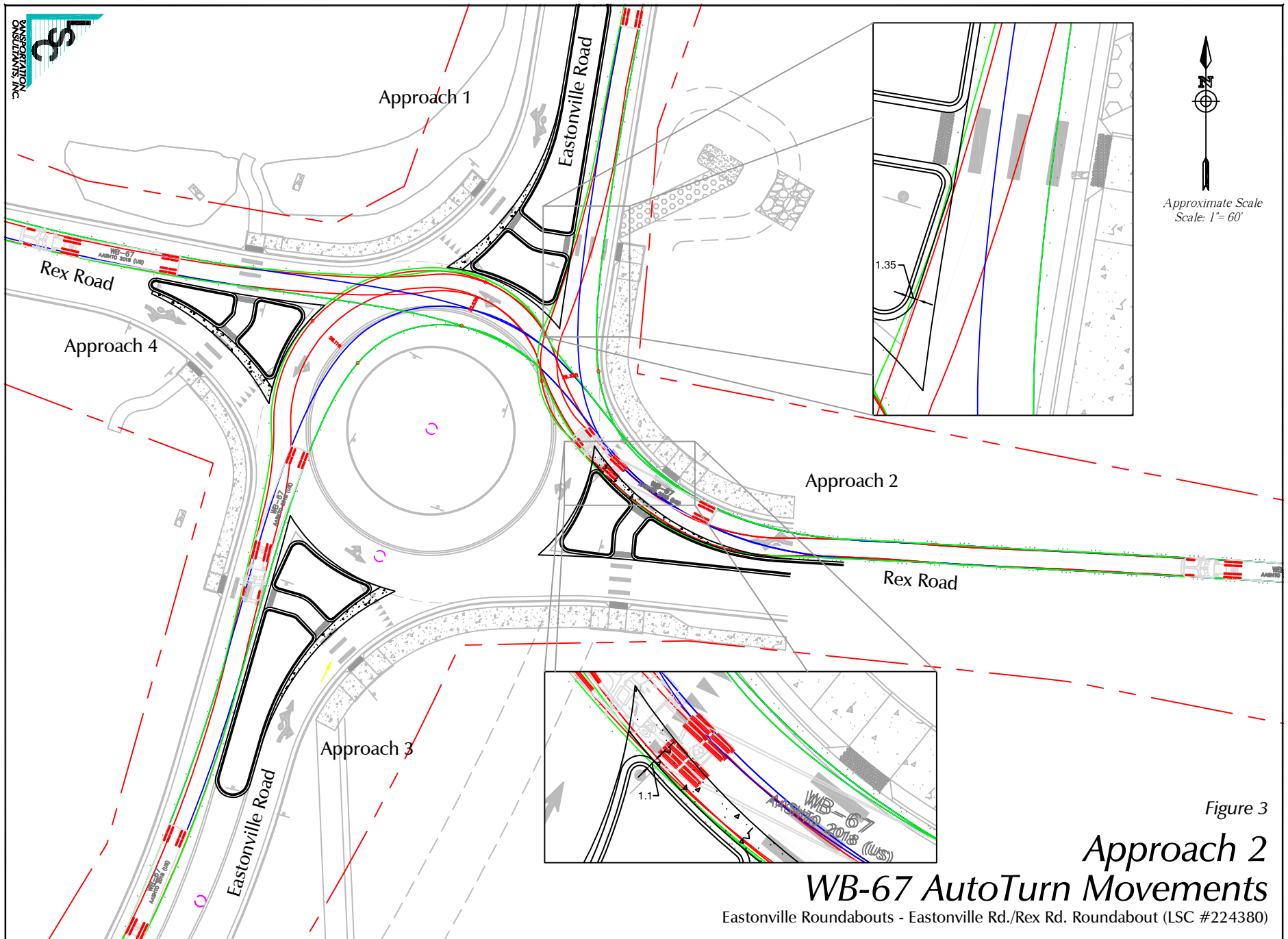
WB-67

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 75.0
Trailer Track	: 8.50		

Figure 2

Approach 1 WB-67 AutoTurn Movements

Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)



North Arrow
Approximate Scale
Scale: 1" = 60'

Figure 3

Approach 2 WB-67 AutoTurn Movements

Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)

Revised Version (11/27/2024)

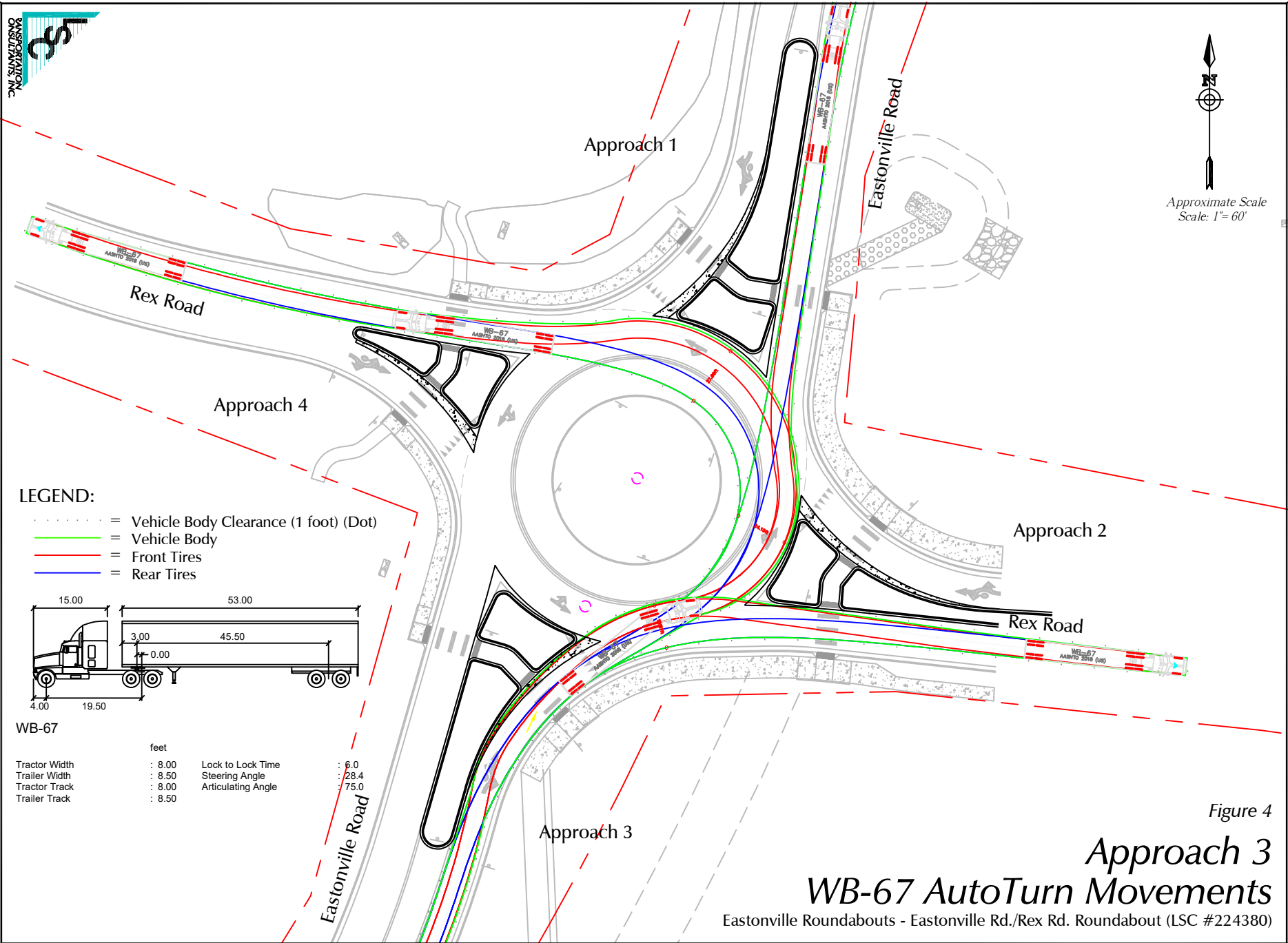


Figure 4
Approach 3
WB-67 AutoTurn Movements
Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)

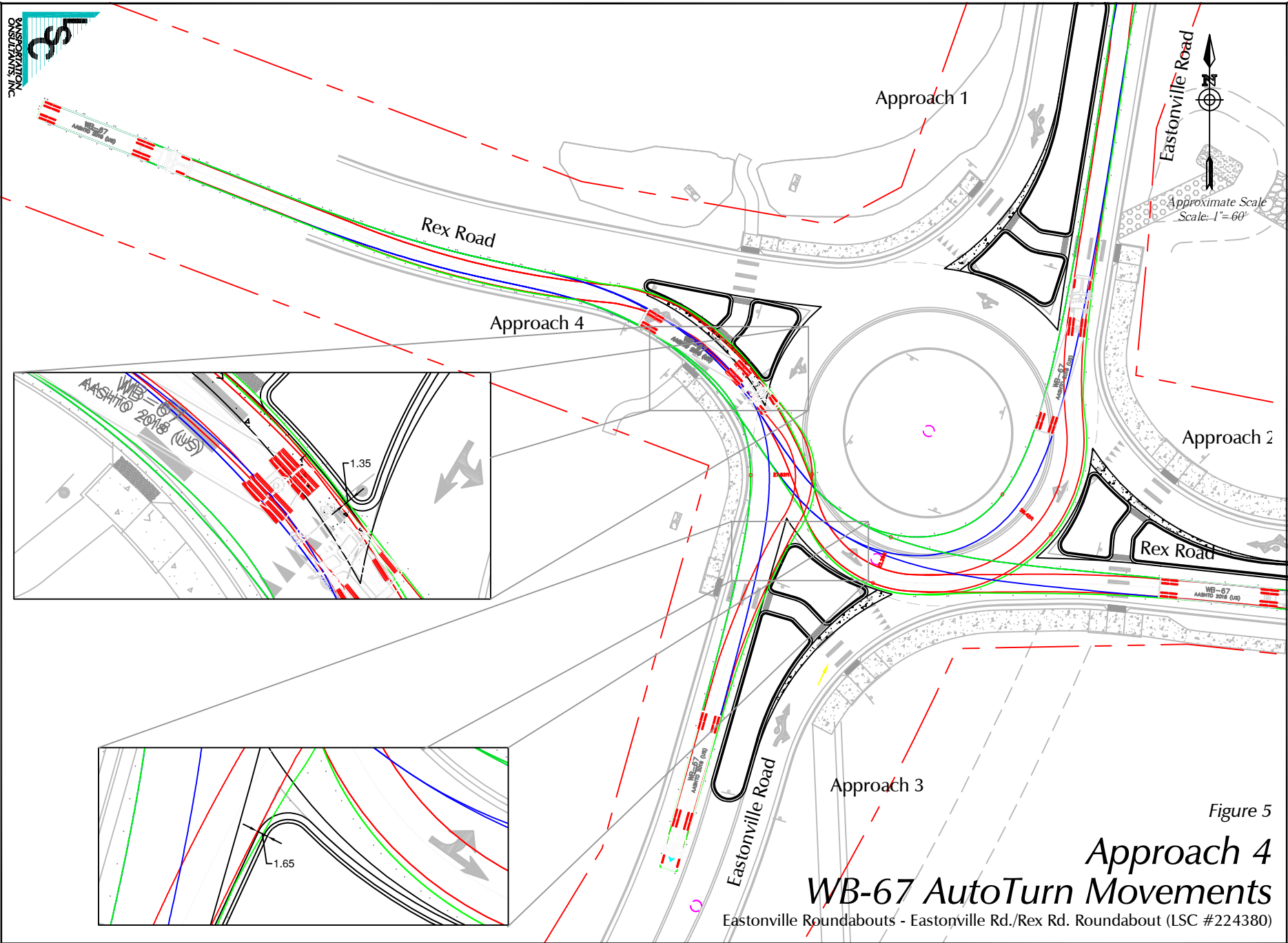


Figure 5

Approach 4 WB-67 AutoTurn Movements

Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)

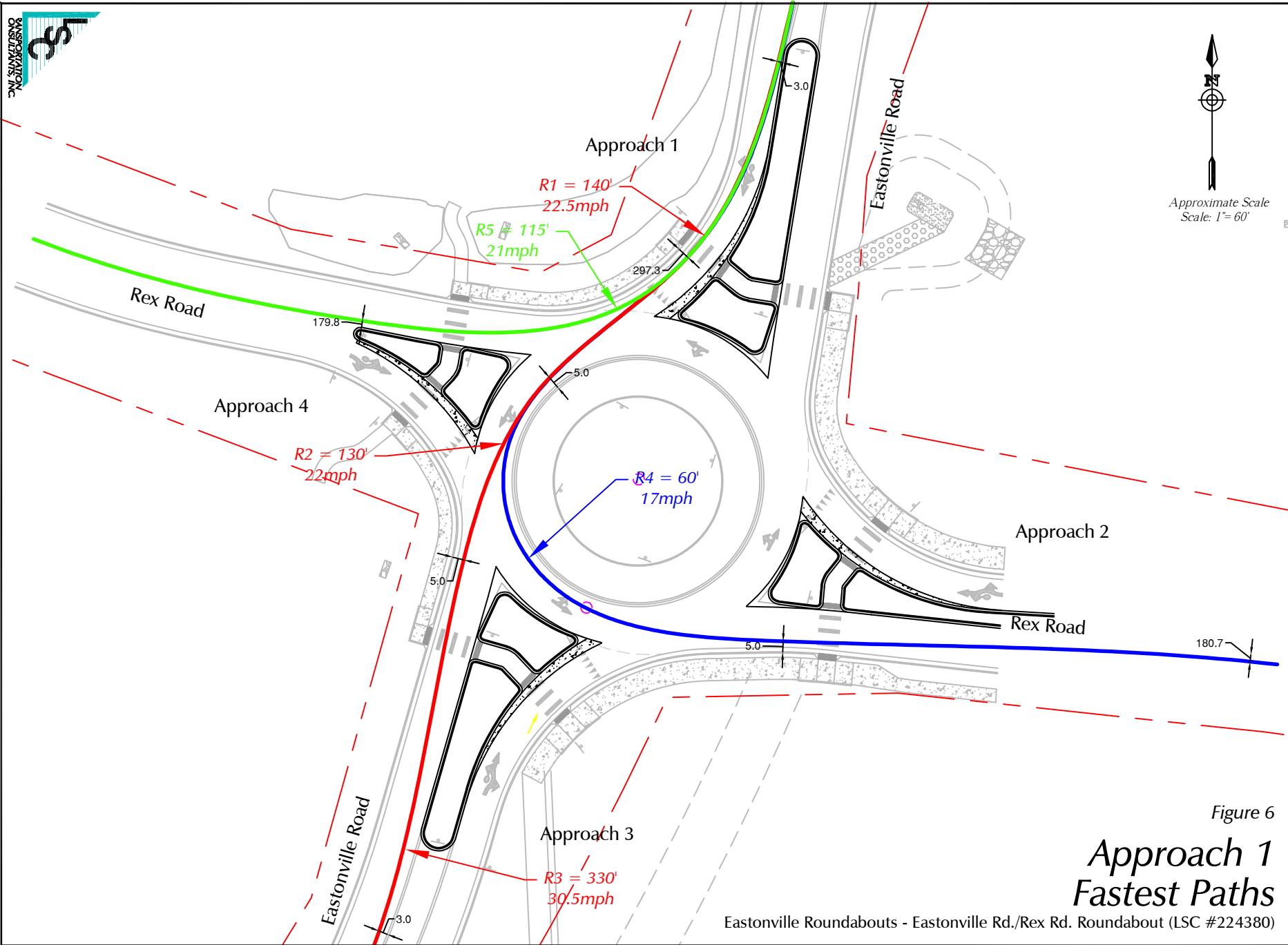
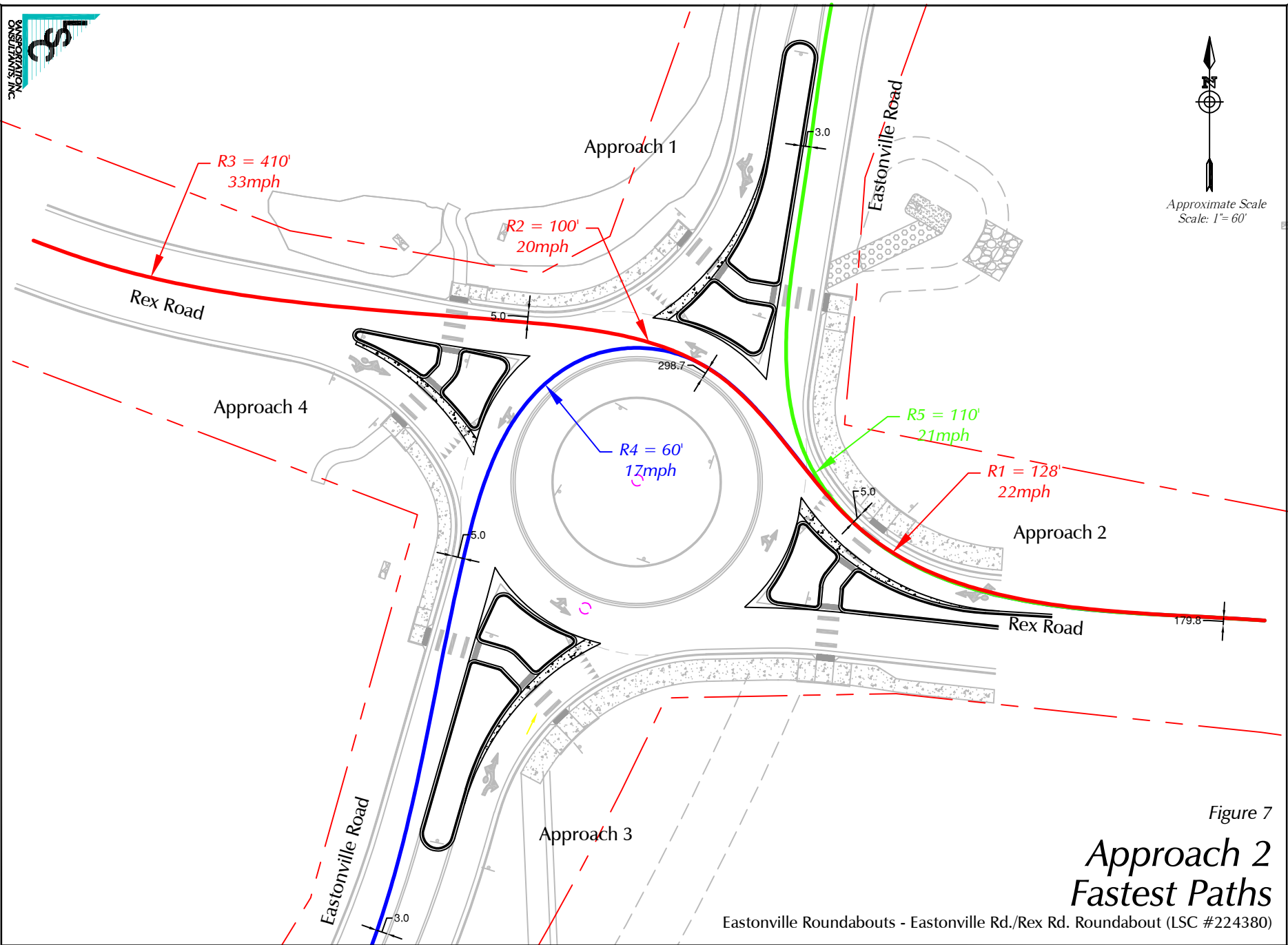


Figure 6

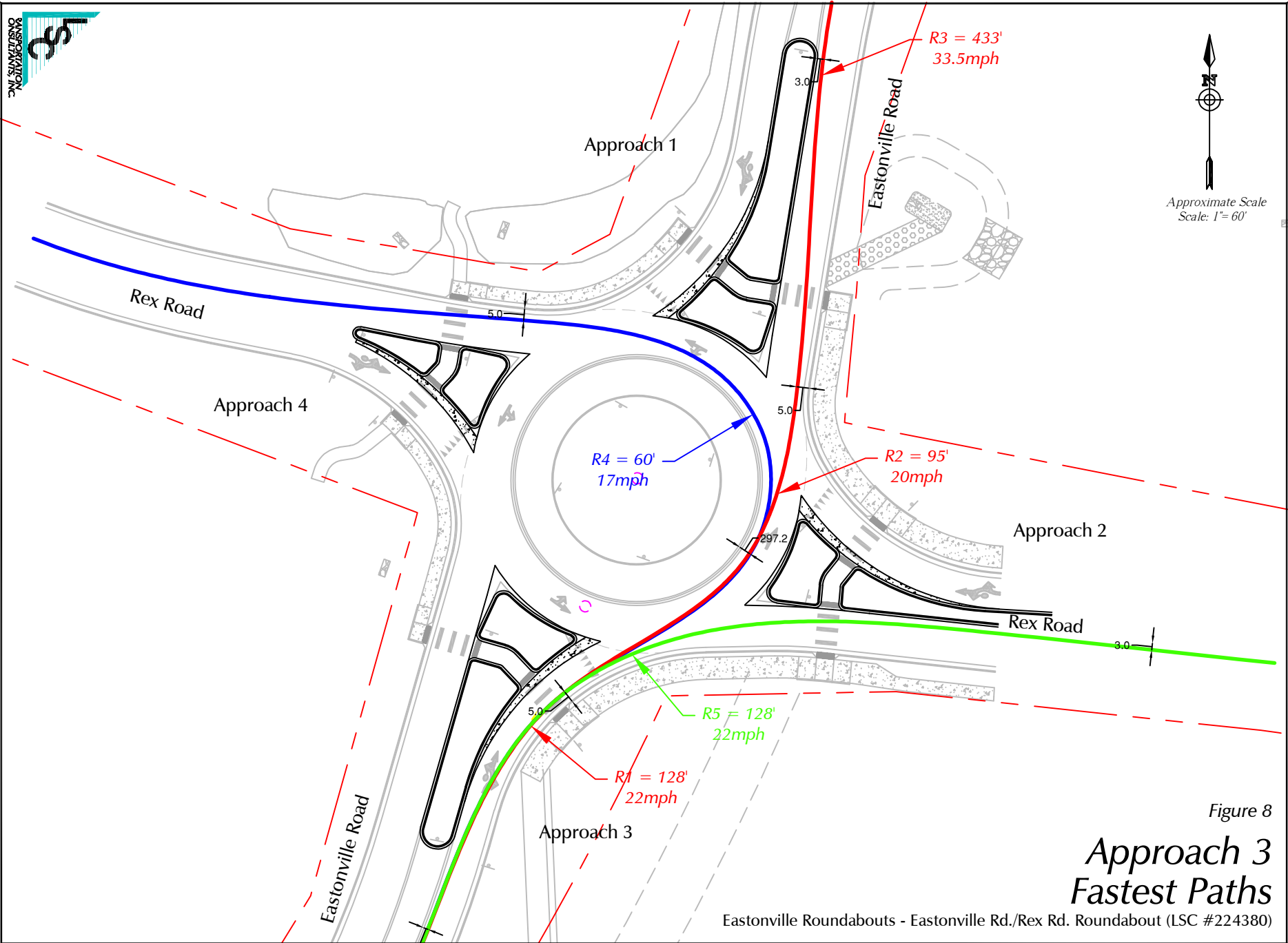
Approach 1 Fastest Paths

Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)



Approximate Scale
Scale: 1" = 60'

Figure 7
**Approach 2
Fastest Paths**



North arrow symbol
Approximate Scale
Scale: 1" = 60'

Figure 8
**Approach 3
Fastest Paths**
Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)

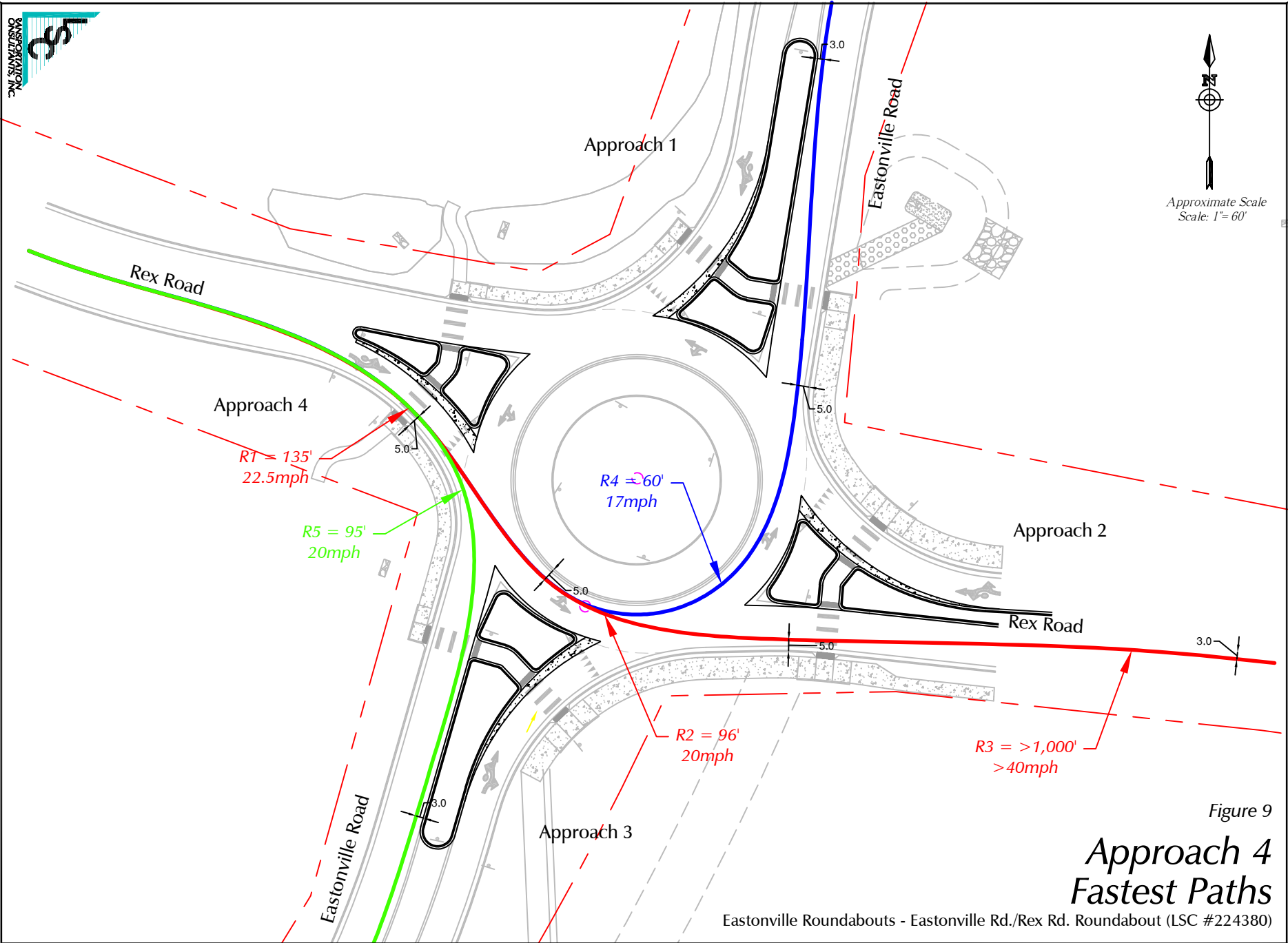
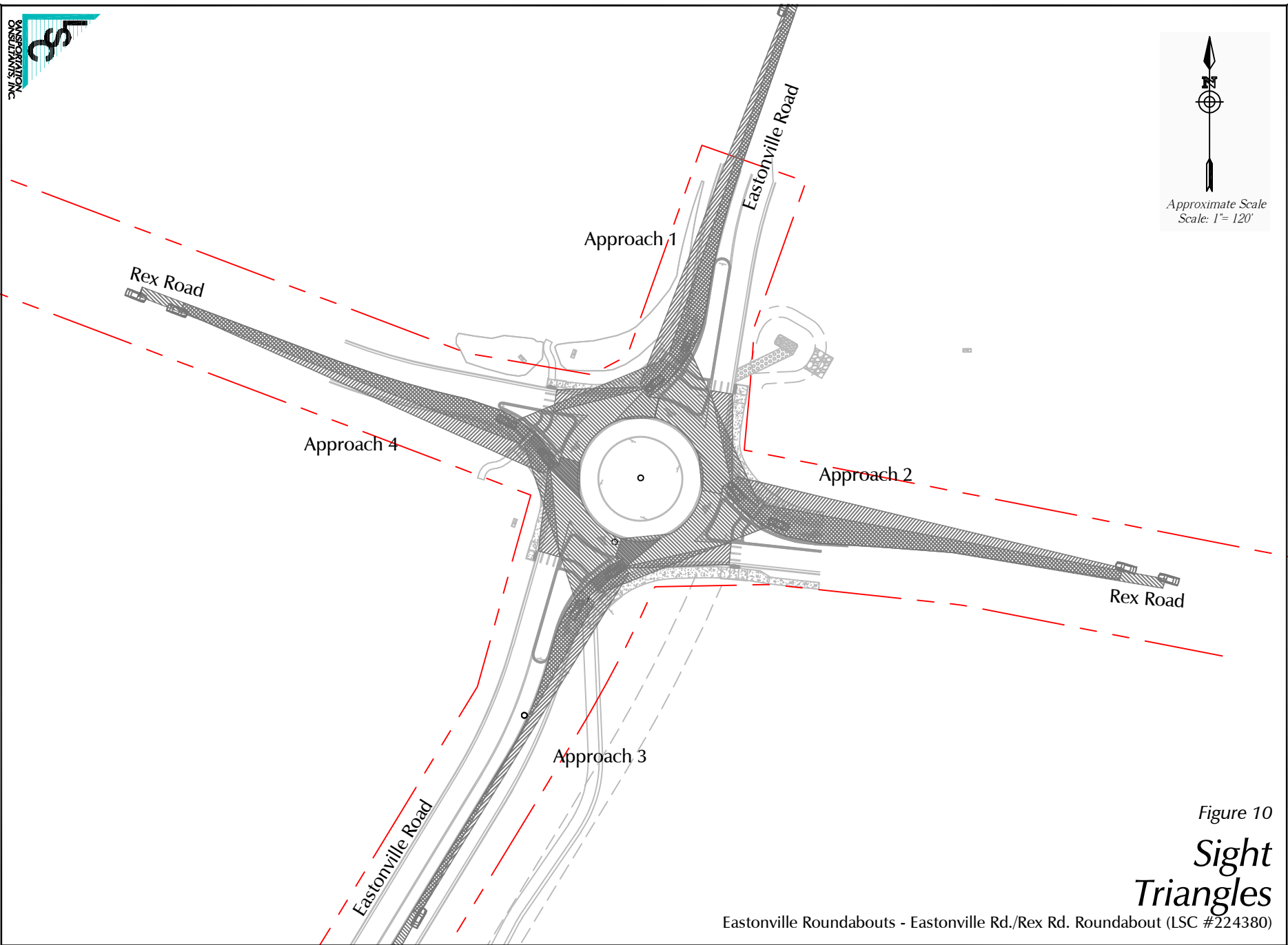


Figure 9

Approach 4 Fastest Paths

Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)



North Arrow
Approximate Scale
Scale: 1" = 120'

Figure 10
**Sight
Triangles**

Eastonville Roundabouts - Eastonville Rd./Rex Rd. Roundabout (LSC #224380)

Roundabout Design Report - Eastonville Road/Dawish Drive





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November 27, 2024

Colleen Monahan, P.E., LEED AP
Site Leader | Group Leader – Land Development
HR Green
1975 Research Parkway | Suite 160
Colorado Springs, CO 80920

Re: Roundabout Design Report
Eastonville Road/Dawish Drive
EPC PCD File No. CDR2321
LSC #224380

Dear Colleen,

We are pleased to submit this roundabout design report for the proposed intersection of Eastonville Road/Dawish Drive in Grandview Reserve community (Phase 1) in the Falcon area of El Paso County, Colorado. This intersection will be constructed as a modern roundabout intersection. The roundabout has been designed for one through lane in each direction on each approach.

Roundabout Layouts

The attached Figure 1 and “Roundabout Critical Design Parameters” table show the geometric layout and roundabout design parameters. The overall (“inscribed circle”) diameter is 150 feet and the entry phi angles are between 16.0 and 22 degrees on each of the approaches.

Design Vehicles

The roundabout Figures 2 through 4 show vehicle turning paths through the proposed roundabout for all approaches. The design vehicle is WB-67 for Eastonville Road and WB-50 for Dawish Drive per the El Paso County *Engineering Criteria Manual (ECM)*, but a WB-67 truck/trailer combination has been analyzed for all turning movements. The results show the WB-67 vehicle could be accommodated. A minimum of one foot of clearance is maintained between all wheel paths and vertical curbs.

Design Speeds

The attached Figures 5 through 7 show the estimated fastest path radii for each of the approaches to the proposed roundabout. These paths are drawn in accordance with the methodology outlined in the Wisconsin Department of Transportation (WSDOT) *Facilities Development Manual* (Chapter 11, Section 26). The fastest entry path should generally be no more than about 25 miles per hour (mph) for single-lane approaches and 30 mph for two-lane approaches (not applicable at this roundabout). The fastest entry path for each of the four approaches meets the 25-mph criteria.

Pedestrian Safety and Accessibility

Pedestrian crossings with pedestrian refuge areas on the splitter islands have been designed on all three approaches. The WSDOT *Facilities Development Manual* (Chapter 11, Section 26) gives recommendations for placement and design of pedestrian crossings. The recommendations given in the WSDOT *Facilities Development Manual* (Chapter 11, Section 26) were followed in the proposed design, including the following:

- Pedestrian refuge widths are a minimum of 6 feet;
- Pedestrian refuge widths that will accommodate bicycles should be increased to a minimum of ten feet;
- Pedestrian crossings are generally set back 25 feet from the yield line.

In addition, detached sidewalks should be provided on the corners of the roundabout that provide pedestrian crossings. The following recommendations are given when designing the vertical aspects of the proposed roundabout:

- Pedestrian refuge areas should be designed at street level rather than elevated to the height of the splitter island;
- Ramps should be provided and designed in accordance with ADA standards on each end of the crosswalk;
- Detectable warning surfaces in accordance with ADA standards should be provided at ramps and the pedestrian refuge area of the splitter islands;
- The truck apron should be textured and raised above the circulating roadway. The truck apron width (18') is shown on Figure 1. The specific design will be determined as part of the construction plans.

Sight Triangles

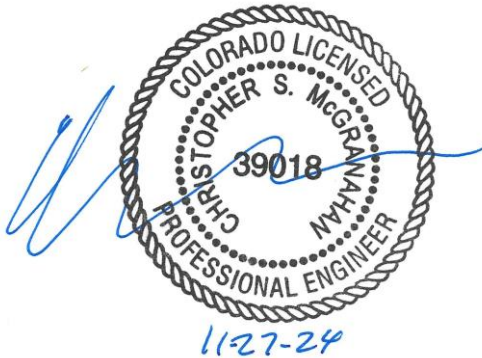
The sight triangles are shown in Figure 8. The sight triangles represent areas in which no items taller than two feet that would restrict sight distance should be located. Note: in areas on the northwest and southeast corners where the sight triangles encroach into the adjacent lots or just outside the ROW line, sight distance easements will be shown on the plat. The design speed of the intersecting streets will be 40 mph on the approaches to the roundabouts. Note:

The approach stopping sight distance triangles shown on Figure 8 would allow for stopping sight distances for a design speed of 45 mph (360 feet) as shown in the attached design parameters table, assuming grades of less than three percent on the approaches. The general Eastonville Road corridor design speed is 50 mph.

* * * * *

Respectfully submitted,

LSC Transportation Consultants, Inc.



By: _____
Christopher S. McGranahan, P.E.
Principal

CSM/JCH:jas

Enclosures: Roundabout Critical Design Parameters Table
Roundabout Figures 1-8

EPC PCD File No. CDR2321
Eastonville Road Roundabouts (Grandview Reserve)
(LSC#224380)
Eastonville Road & Dawlish Drive ("Middle") Roundabout
County: El Paso

ROUNDAABOUT CRITICAL DESIGN PARAMETERS

DESIGN PARAMETERS	LEG 1	LEG 2	LEG 3	LEG 4	LEG 5	LEG 6
Approach Width, FT	17.0	18.4	17.0			
Entry Width, FT	21.4	21.5	21.4			
Entry Angle, PHI Φ , DEG	17.0	22.0	21.0			
Inscribed Circle Diameter, FT	150.0	150.0	150.0			
Exit Width, FT	20.0	20.0	20.0			
Circulating Roadway Width Upstream of Entry, FT	19.0	19.0	19.0			

FASTEST SPEED PATH

R_1 , Radius/Speed, FT/MPH	136	23	150	24	155	24				
R_2 , Radius/Speed, FT/MPH	95	20			135	23				
R_3 , Radius/Speed, FT/MPH	665	<40			480	35				
R_4 , Radius/Speed, FT/MPH	60	17	60	17						
R_5 , Radius/Speed, FT/MPH			105	20	105	20				
Bypass R_5 , Radius/Speed, FT/MPH										

MINIMUM SIGHT PARAMETERS

Approach Design Speed, MPH	50.0	50.0	50.0			
Horizontal Stopping Sight Distance, FT	368.0	368.0	368.0			
Circulating Intersection Sight Distance, FT/MPH	175	17	175	17	175	17
Entering Intersection Sight Distance, FT/MPH	156	24	148	23	169	24

Design Vehicle: WB-67

Truck Apron Width: 18

OSOW Accommodations: N/A


Circulating Roadway Cross-Slope: 2% or less

Access Control: N/A

Parking Control: No Parking

Bicycle & Pedestrian Accommodations: Ped ramps and sidewalks

Designer: *Matt Romero*
 Reviewer: *Chris McGranahan, P.E.*

SIGNATURE: 

DATE: 7/12/2024

NAME: Christopher S. McGranahan, P.E.

The reviewer's signature on this document indicates that the design has been reviewed and is in general compliance with good roundabout principals. The critical design elements have been addressed. The project design engineer in responsible charge of final plan development will stamp the plans when applicable.

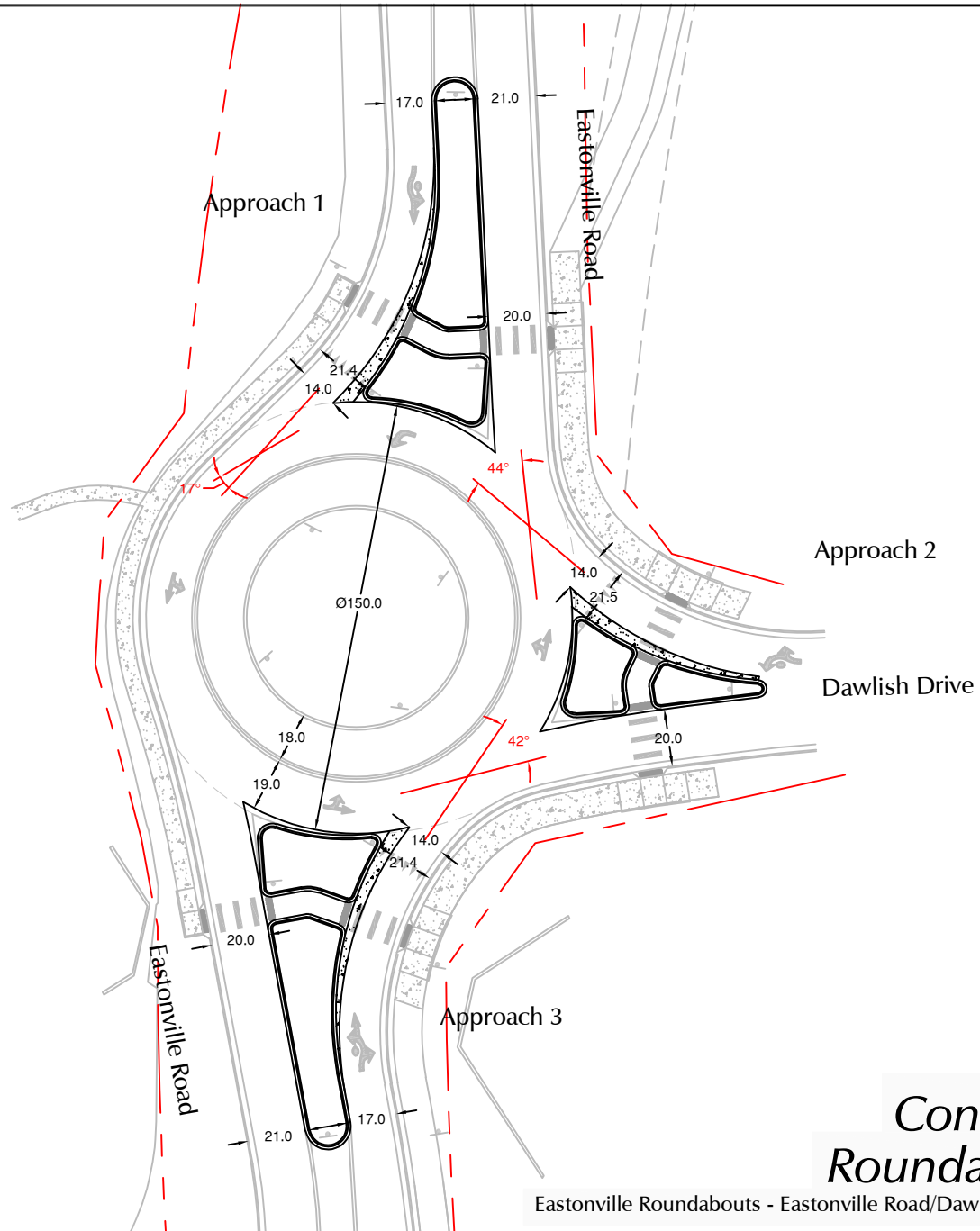
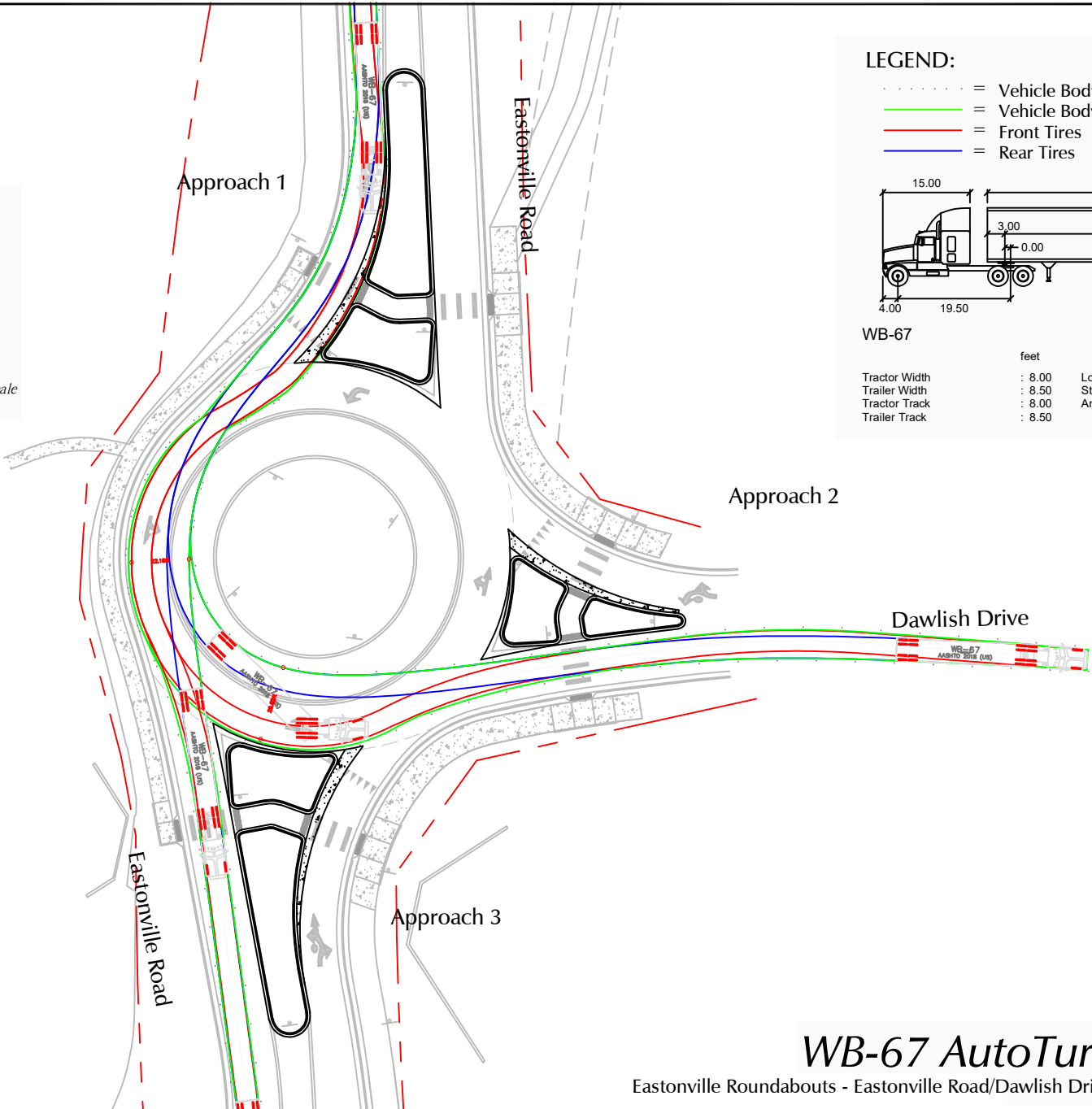
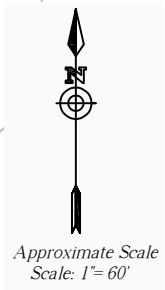


Figure 1

Conceptual 150' ICD Roundabout Parameters

Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)



LEGEND:

- = Vehicle Body Clearance (1 foot) (Dot)
- = Vehicle Body
- = Front Tires
- = Rear Tires

WB-67

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 75.0
Trailer Track	: 8.50		

Figure 2
Approach 1
WB-67 AutoTurn Movements
 Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)

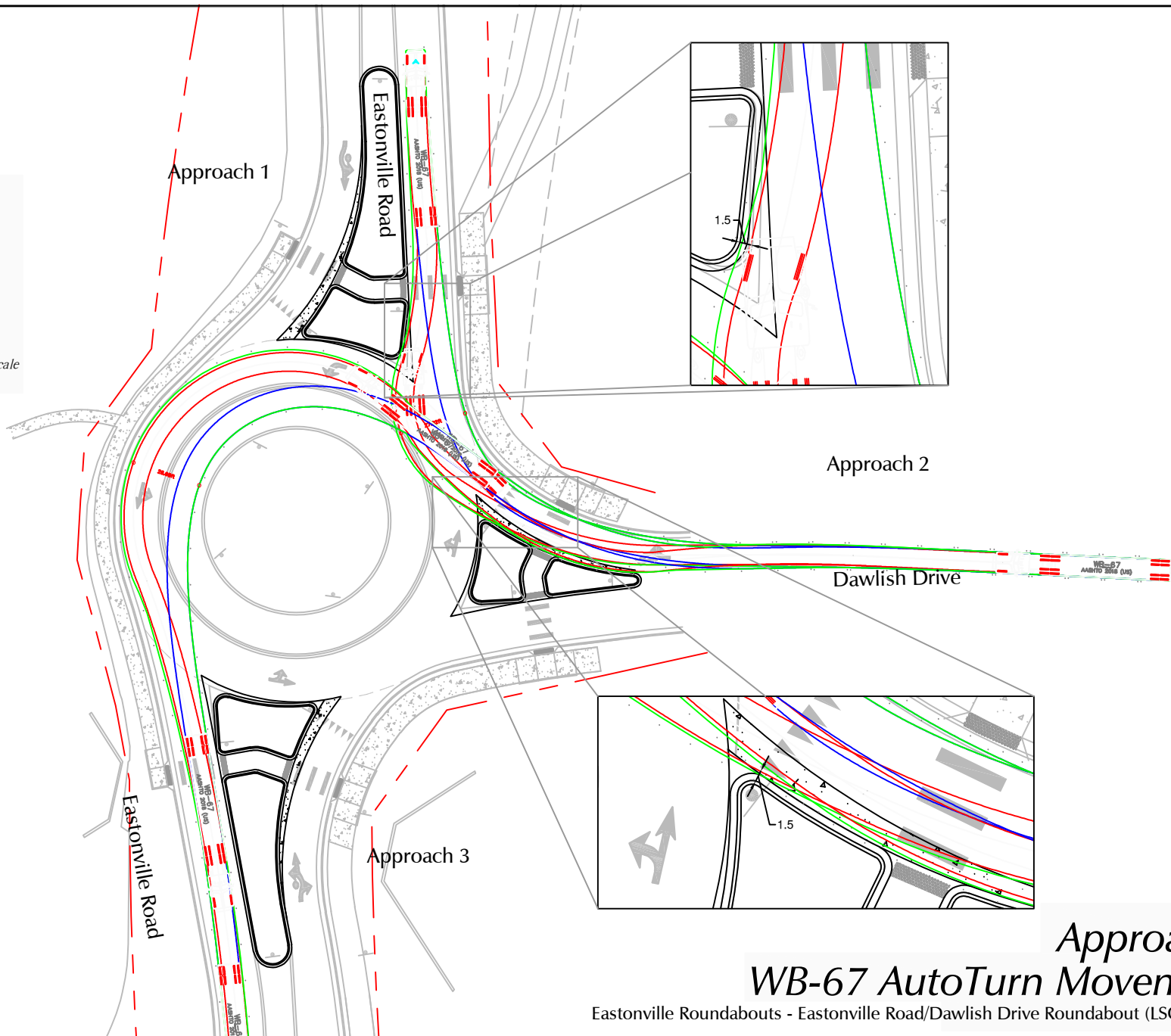
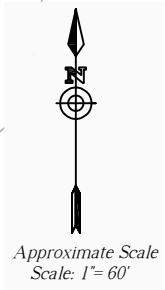


Figure 3

Approach 2 WB-67 AutoTurn Movements

Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)

Revised Version (11/27/2024)

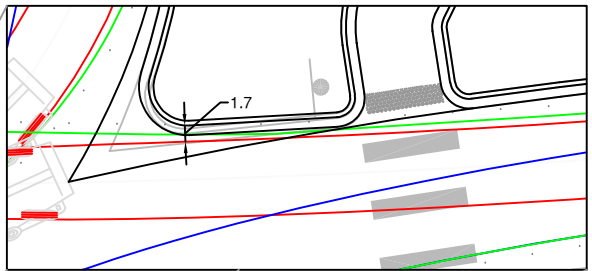
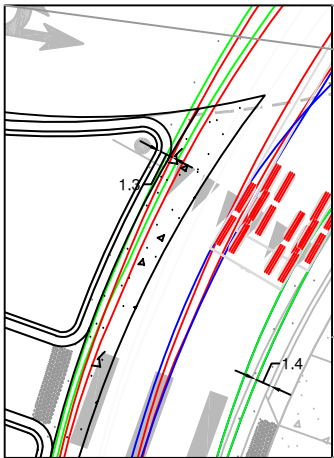
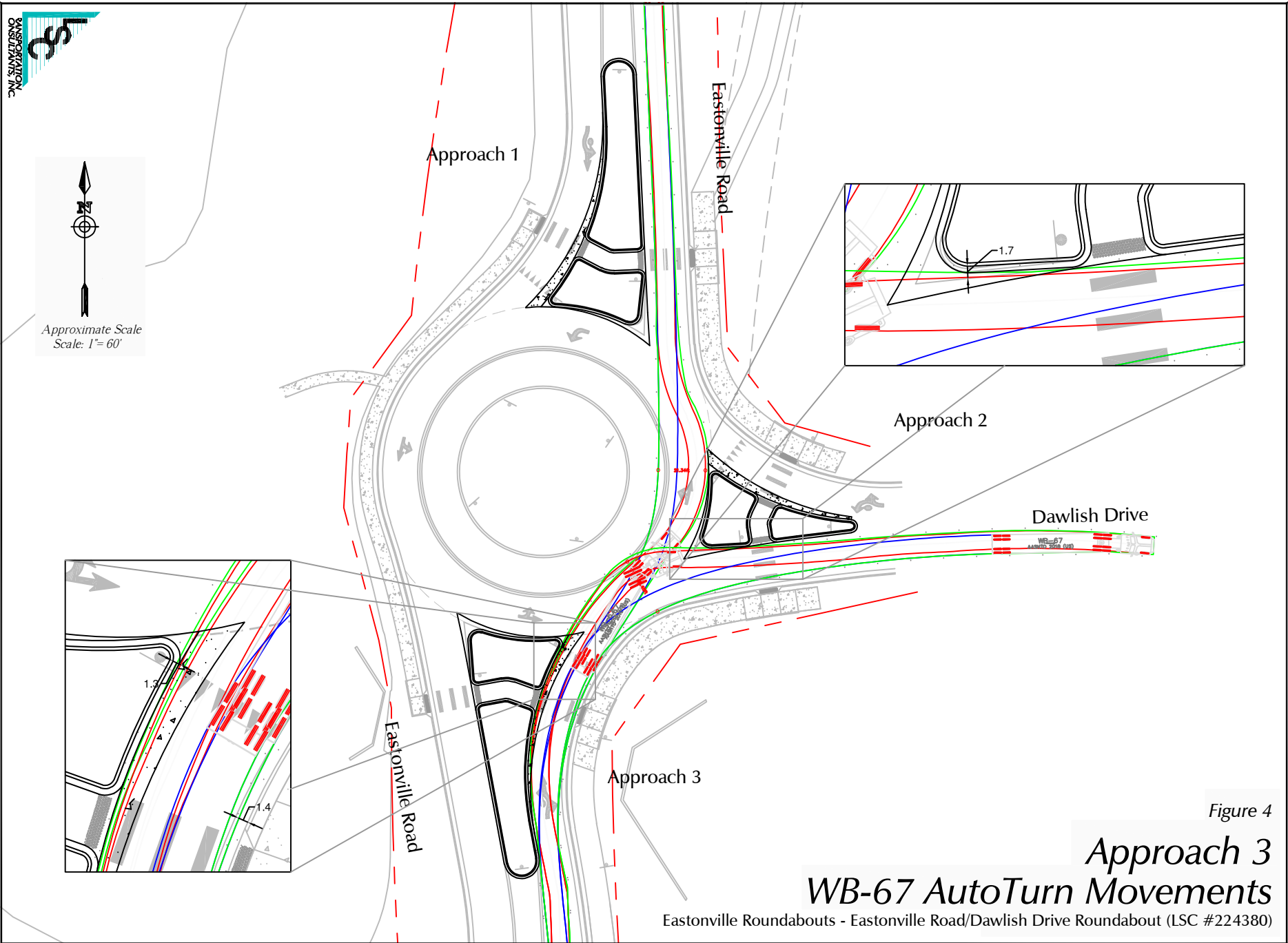
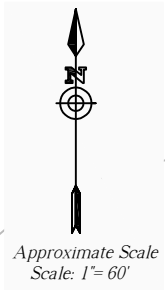


Figure 4

Approach 3 WB-67 AutoTurn Movements

Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)

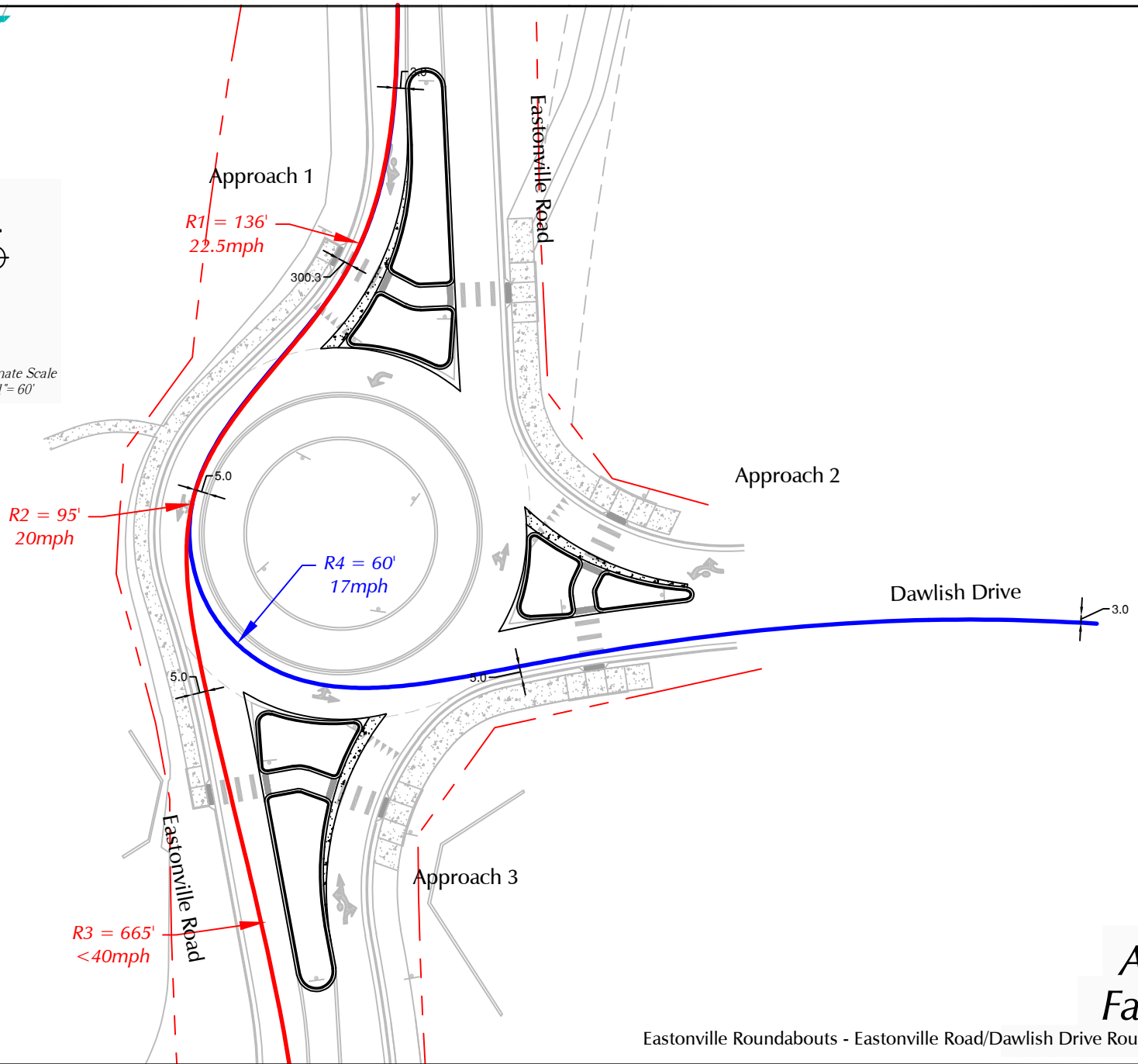
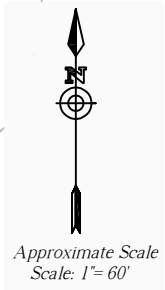


Figure 5

Approach 1 Fastest Paths

Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)

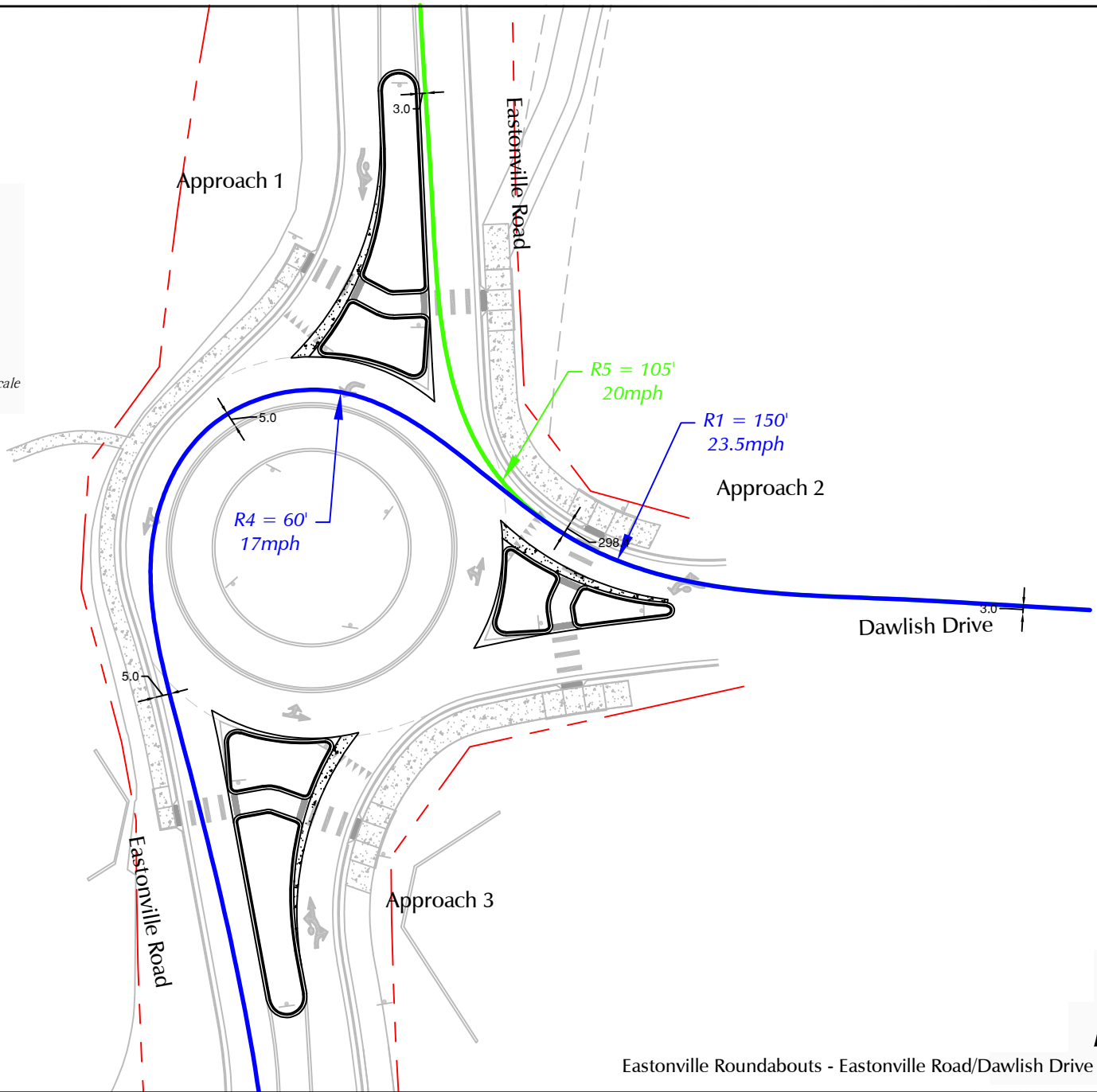
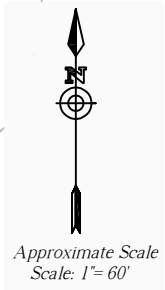


Figure 6

Approach 2 Fastest Paths

Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)

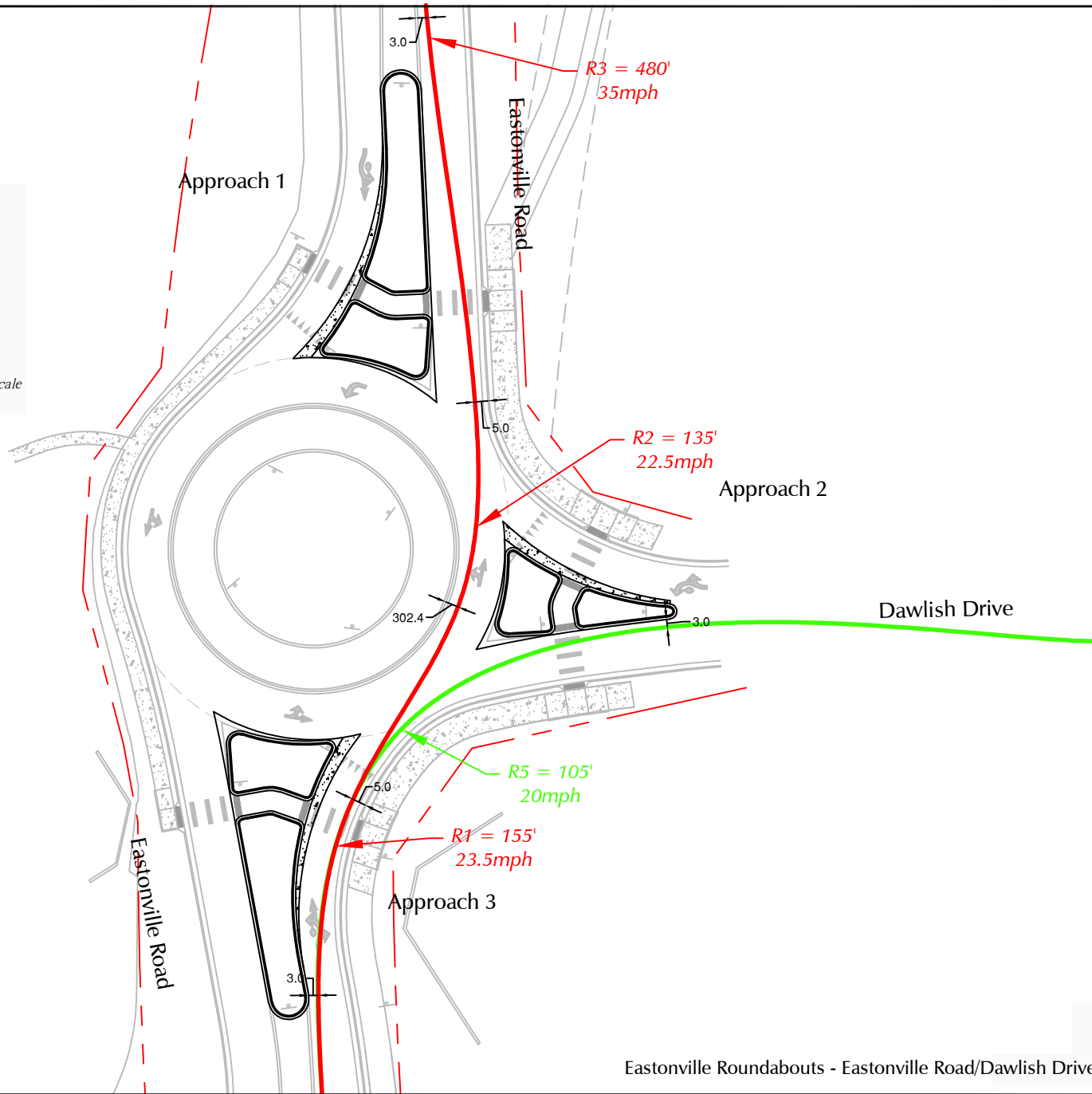
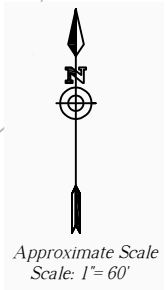


Figure 7

Approach 3 Fastest Paths

Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)

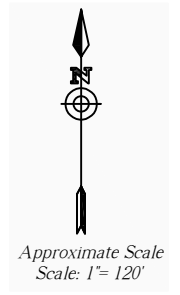
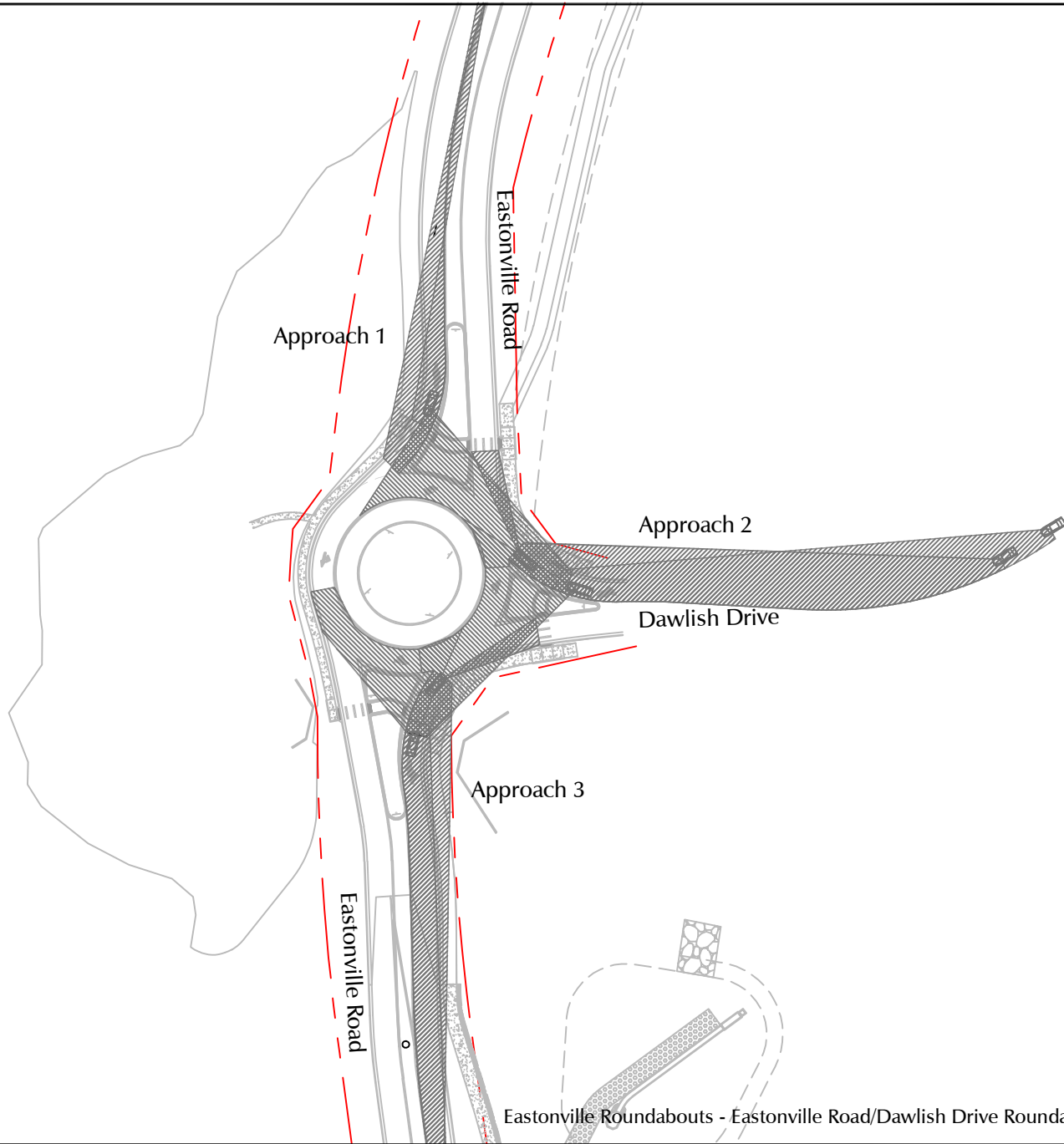


Figure 8
*Sight
Triangles*
Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)

EXCERPTS from Grandview Reserve Phase 1 Updated TIS





LSC TRANSPORTATION CONSULTANTS, INC.
2504 East Pikes Peak Avenue, Suite 304
Colorado Springs, CO 80909
(719) 633-2868
FAX (719) 633-5430
E-mail: lsc@lscctrans.com
Website: <http://www.lscctrans.com>

Grandview Reserve Phase 1
Updated Traffic Impact Analysis
PUDSP-21-010
(LSC #S214240)
May 9, 2022


Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.



PAUL J. HOWARTH AS MANAGER

05/09/2022
Date

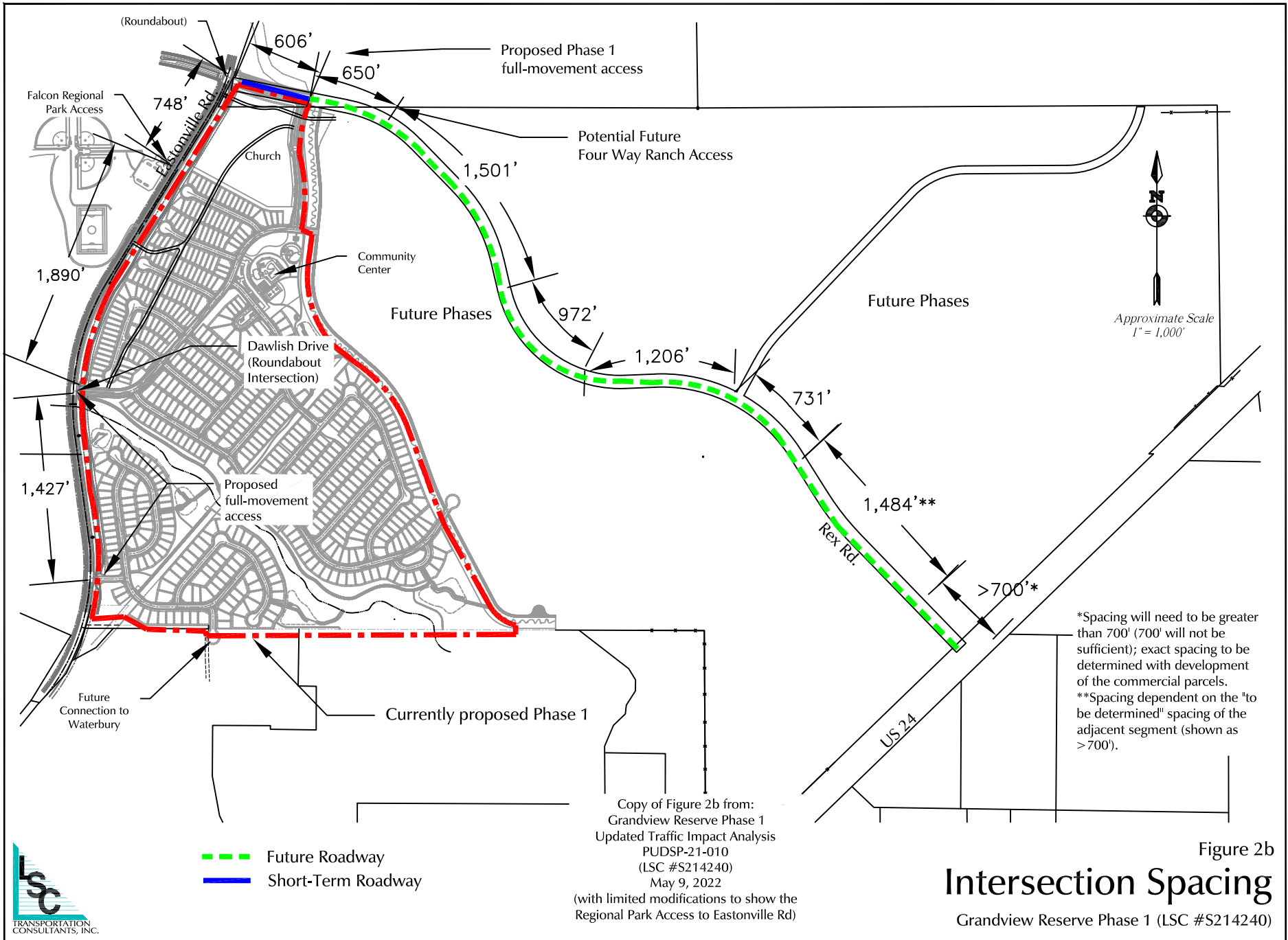
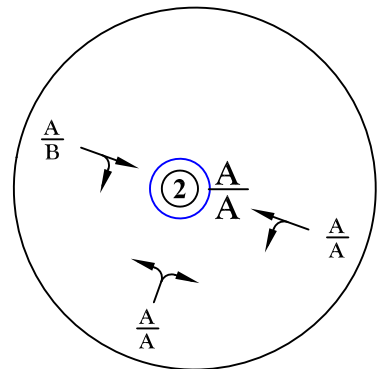
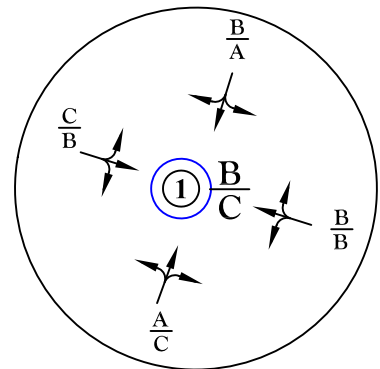


Figure 2b
Intersection Spacing
 Grandview Reserve Phase 1 (LSC #S214240)





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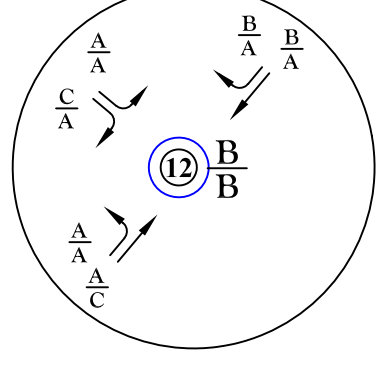
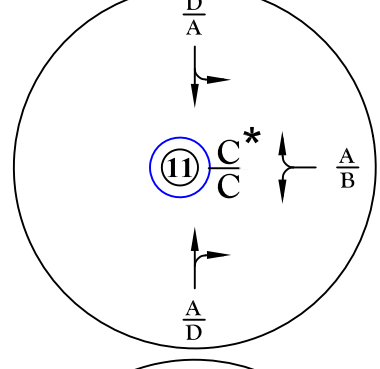
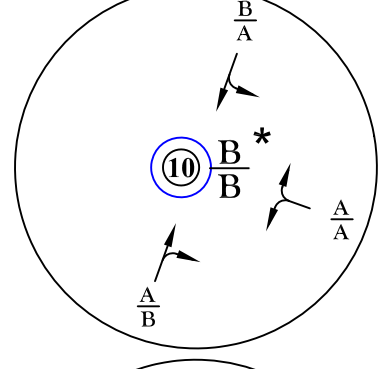
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

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*Note: Roundabout analysis shown, however, due to wetlands constraints, the preferred option is a conventional intersection. The determination will be made at the final plat stage.

LEGEND:
Traffic Control Used in the Analysis:
 = Stop Sign
 = Traffic Signal
 = Modern Roundabout
 LOS Analysis Results:
 $\frac{A}{B}$ = AM Individual Movement Peak-Hour Level of Service
 $\frac{C}{C}$ = PM Individual Movement Peak-Hour Level of Service
 $\frac{A}{C}$ = AM Entire Intersection Peak-Hour Level of Service
 $\frac{B}{C}$ = PM Entire Intersection Peak-Hour Level of Service

Approximate Scale
Scale: 1" = 4,000'

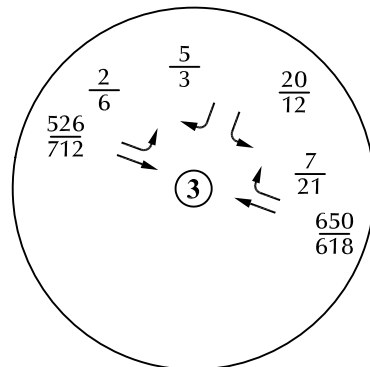
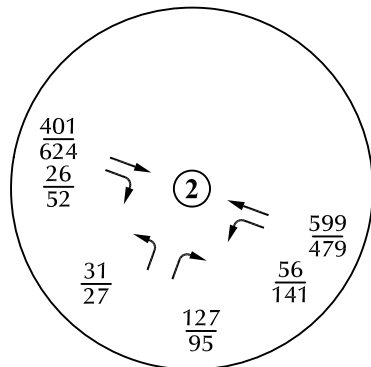
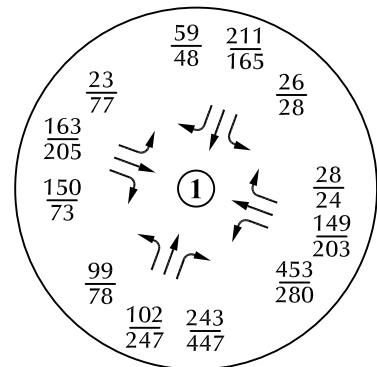


Copy of Figure 2b from:

Final Lane Geometry,
Traffic Control and Levels of Service
with Modern Roundabouts

Figure 12d





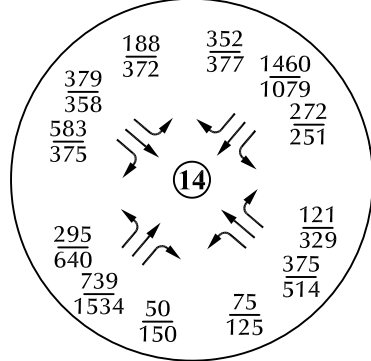
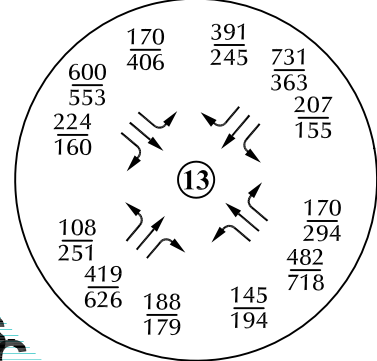
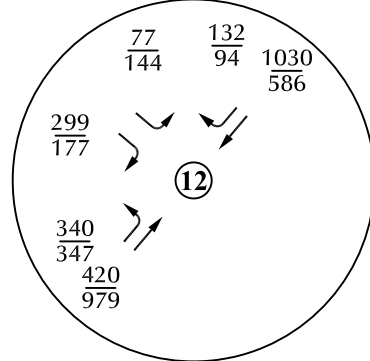
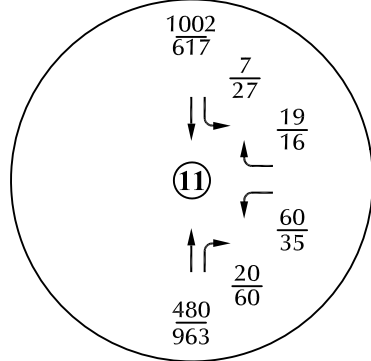
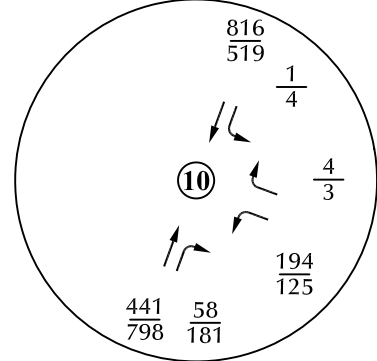
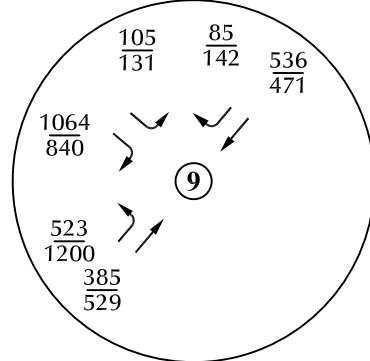
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LEGEND:
 $\frac{XX}{XX}$ = AM Weekday Peak-Hour Traffic (vehicles per hour)
 $\frac{XX}{XX}$ = PM Weekday Peak-Hour Traffic (vehicles per hour)
 X,XXX = Annual Average Daily Traffic (vehicles per day)

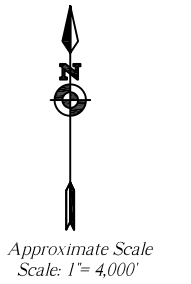


Figure 12a
**Year 2041
 Total Traffic**

EXCERPTS from Traffic Impact Study Eastonville Road Project

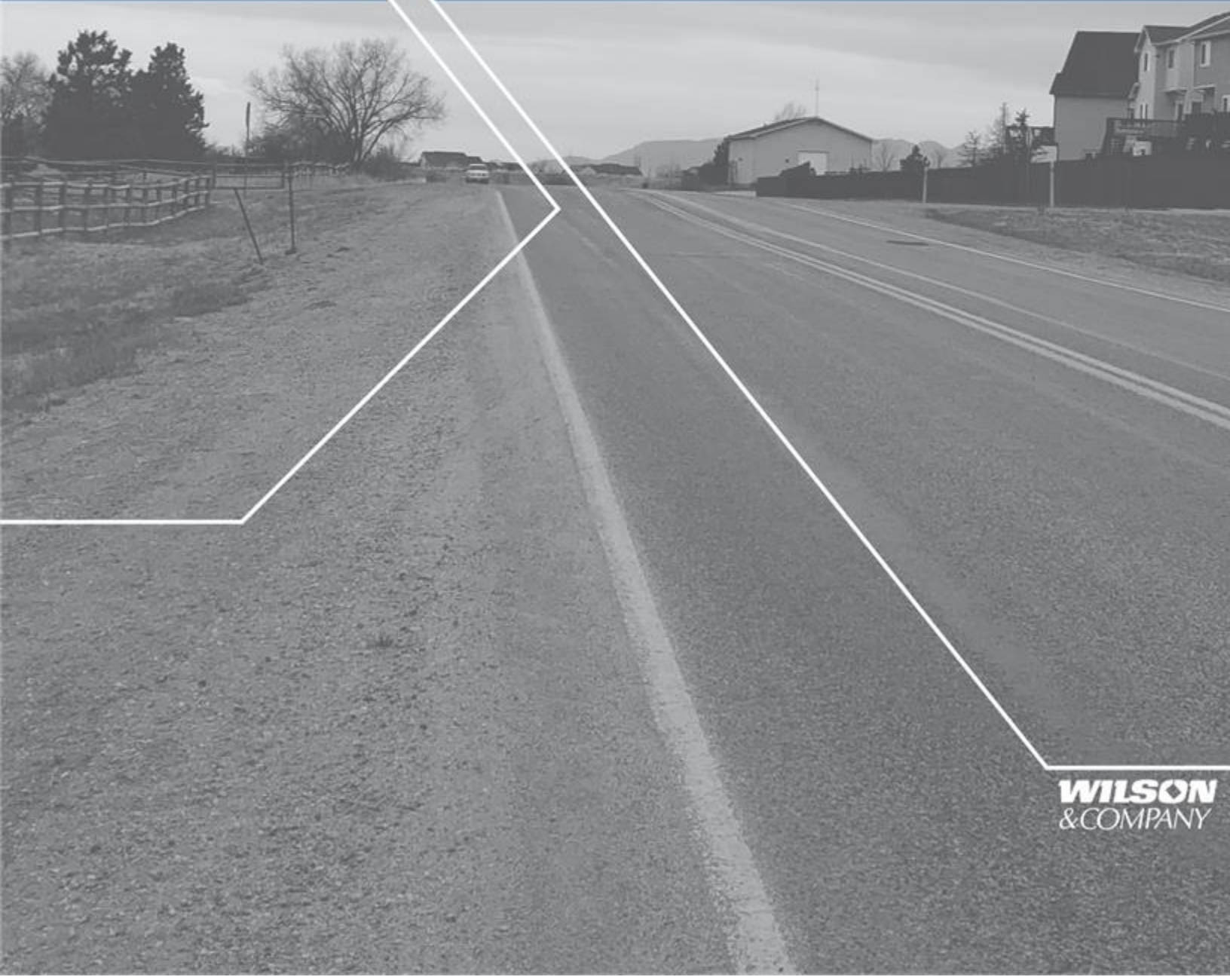


El Paso County, Colorado
April 2021

Traffic Impact Study Eastonville Road Project



On-Call CON 17-067Z
Task Release #17-067-47



WILSON
& COMPANY

EASTONVILLE ROAD PROJECT

Traffic Impact Study

El Paso County Contract Number 17-067-47

Wilson & Company, Inc., Engineers & Architects
5755 Mark Dabling Boulevard, Suite 220 Colorado Springs, CO 80919



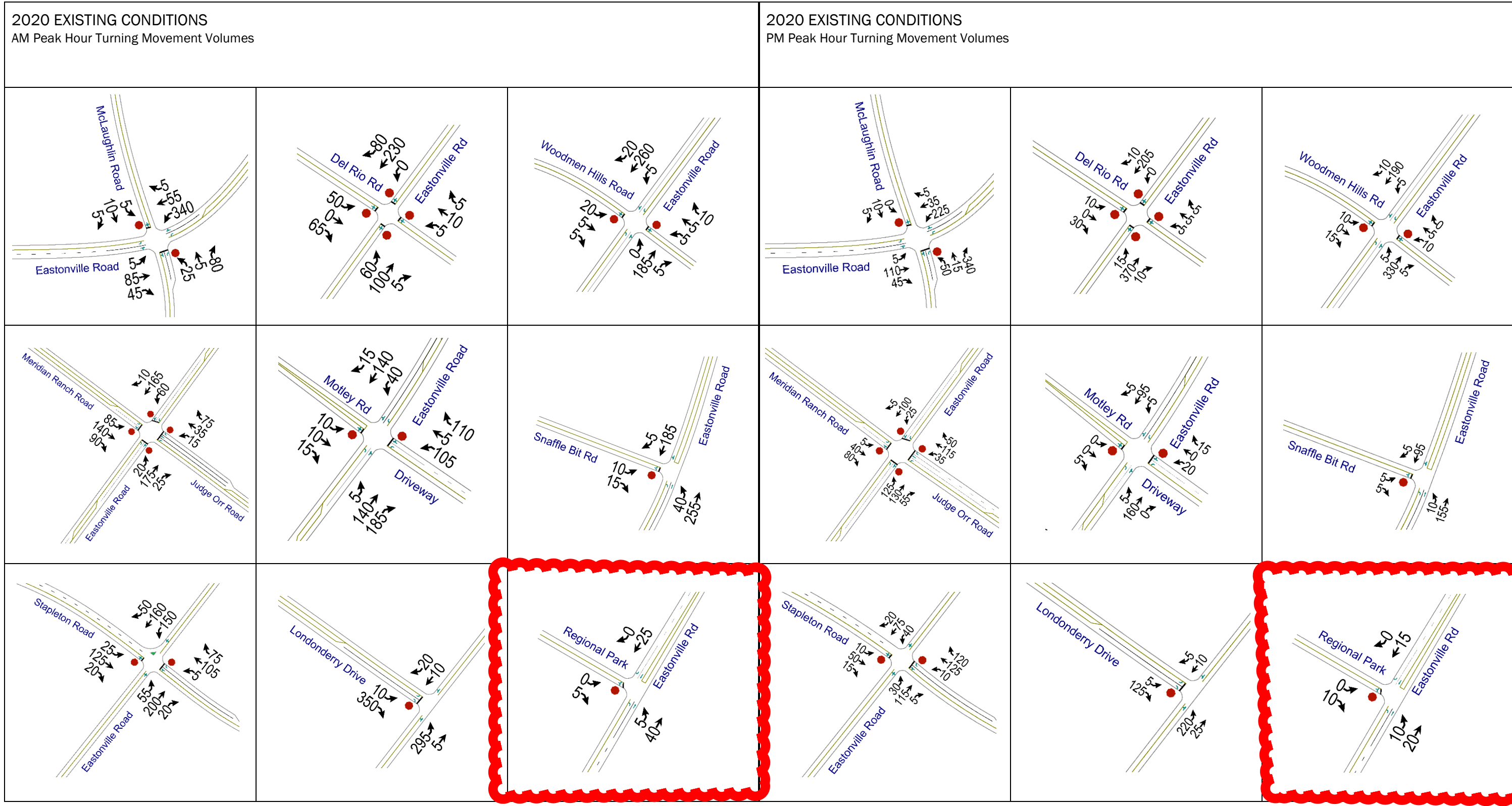


Figure 3.2. 2020 Existing Peak Hour Intersection Volumes

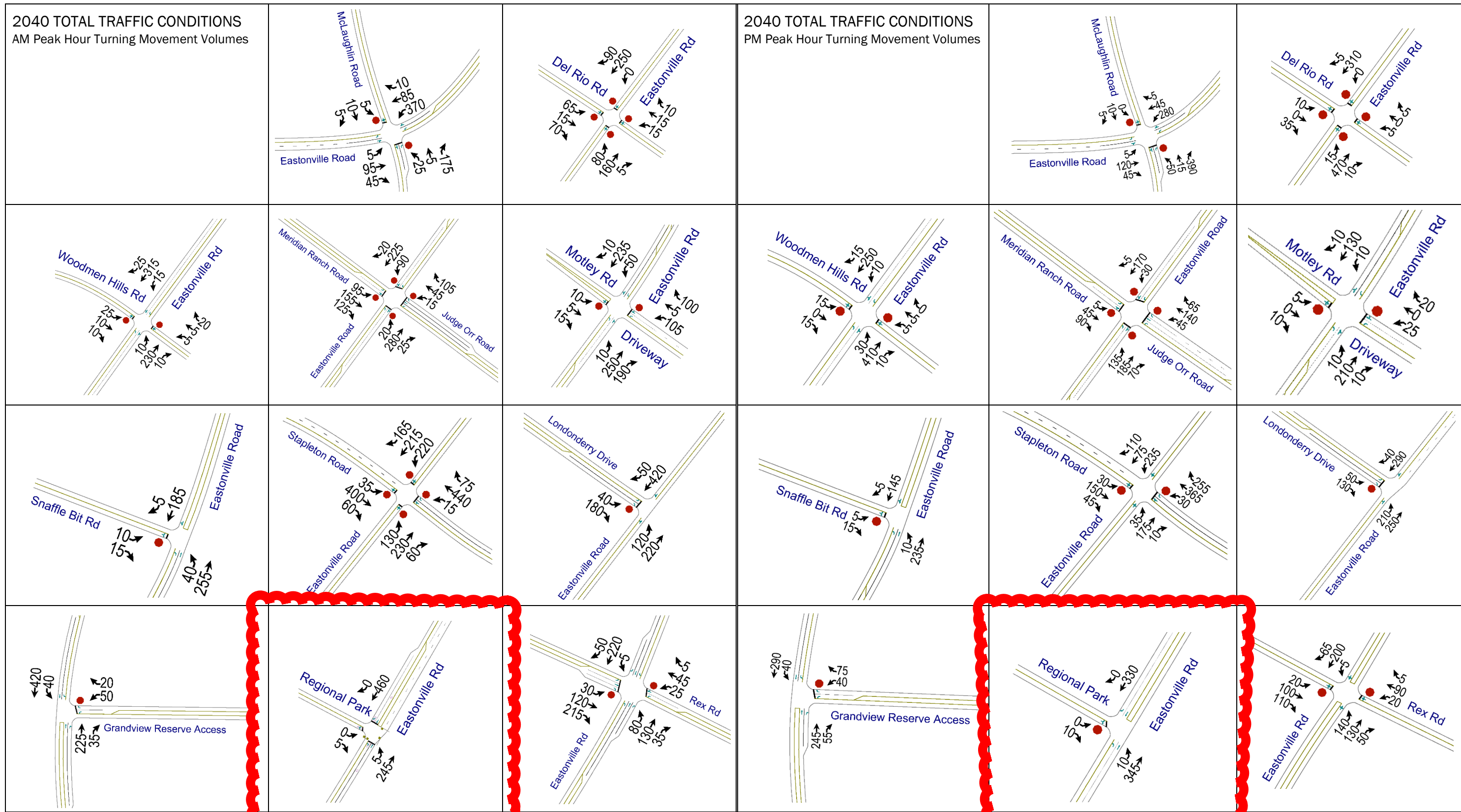


Figure 3.3. 2040 Total Traffic Peak Hour Intersection Volumes

Table 5.2. 2040 No-Build Traffic Operations Summary

Control	Intersection	LOS/Delay [in seconds/vehicle] (Critical Movement)	
		AM Peak Hour	PM Peak Hour
TWSC	Eastonville Road & McLaughlin Road	d / 34.5 (NB THRU/LT)	d / 27.2 (NB THRU/LT)
AWSC	Eastonville Road & Del Rio Road	B / 11.1	B / 13.6
TWSC	Eastonville Road & Del Rio Road	c / 17.5 (EB Approach)	c / 16.2 (EB Approach)
TWSC	Eastonville Road & Woodmen Hills Drive	c / 15.3 (EB Approach)	c / 18.9 (EB Approach)
TWSC	Motley Road & Eastonville Road	d / 25.2 (WB Approach)	b / 13.5 (WB Approach)
AWSC	Eastonville Road & Judge Orr Road	C / 22.4	B / 13.3
TWSC	Eastonville Road & Judge Orr Road	e / 41.4 (EB LT)	e / 43.9 (EB LT)
Roundabout	Eastonville Road & Judge Orr Road	A / 5.3	A / 5.0
TWSC	Eastonville Road & Snaffle Bit Road	b / 12.8 (EB)	a / 9.8 (EB)
AWSC	Eastonville Road & Stapleton Road	F / 252.1	E / 44.4
TWSC	Eastonville Road & Londonderry Road	c / 23.6 (EB LT)	c / 31.2 (EB LT)
TWSC	Eastonville Road & Grandview Reserve	c / 17.3 (WB LT)	b / 14.8 (WB LT)
TWSC	Eastonville Road & Rex Road	d / 32.9 (WB LT)	d / 29.9 (WB LT)
TWSC	Eastonville Road & Falcon Regional Park	b / 10.6 (EB Approach)	a / 9.8 (EB Approach)

5.3 2040 Total Traffic Build Analysis

The LOS and delay measures shown in **Table 5.3** are for 2040 total traffic flows (including development traffic) and upgraded roadway geometry and lane utilization. Intersection control for all corridor intersections except the Eastonville Road/Stapleton Road intersection remains unchanged from the existing condition. That intersection was evaluated both as a signalized intersection and a two-lane modern roundabout. While preferred AWSC near-term alternative would operate at a LOS F (see **Section 5.2**), either of these higher-capacity alternatives would operate at a LOS C or better with 2040 total traffic flows.

The geometric improvements included in the 2040 Total Traffic Build scenarios are: the addition of dedicated left-turn lanes at all intersections (integral to proposed three-lane cross section); the addition of a dedicated right-turn and left-turn lanes on the eastbound (EB) Stapleton Road approach to the Eastonville Road/Stapleton Road intersection; and the addition of right-turn lanes on the EB and WB approaches to the Eastonville Road/Rex Road intersection. Additionally, the proposed access to the Grandview Reserve development from Eastonville Road was configured with a NB right-turn lane, SB left-turn lane, and WB right-turn lane. This is the configuration that was shown in the submitted traffic impact studies for Grandview Reserve and Rolling Hills. As shown in **Table 5.3**, all corridor intersections, or critical movements/approaches, operate at a LOS D or better for 2040 total traffic flows and the identified intersection-specific control and geometric improvements.

Conversion of the Judge Orr Road and Stapleton Road intersections to a roundabout or signal should be considered when warrants are met or when traffic flows increase to levels that result in LOS performance below a LOS C for AWSC or a LOS e for TWSC. In addition, considerations should be evaluated when determining appropriate traffic control at intersections include corridor progression and roadway functional classifications.

Table 5-3. 2040 Total Traffic Build Traffic Operations Summary

	Intersection	LOS/Delay [in seconds/vehicle] (Critical Movement)	
		AM Peak Hour	PM Peak Hour
		TWSC	Eastonville Road & McLaughlin Road
AWSC	Eastonville Road & Del Rio Road	B / 11.2	B / 13.8
TWSC	Eastonville Road & Del Rio Road	c / 18.0 (EB Approach)	c / 16.1 (EB Approach)
TWSC	Eastonville Road & Woodmen Hills Drive	c / 15.4 (EB Approach)	c / 18.1 (EB Approach)
TWSC	Motley Road & Eastonville Road	d / 25.2 (WB Approach)	b / 12.3 (WB Approach)
AWSC	Eastonville Road & Judge Orr Road	C / 22.4	B / 13.3
TWSC	Eastonville Road & Judge Orr Road	e / 41.4 (EB LT)	e / 35.9 (EB LT)
Roundabout	Eastonville Road & Judge Orr Road	A / 5.3	A / 4.7
TWSC	Eastonville Road & Snaffle Bit Road	b / 12.8 (EB Approach)	a / 9.9 (EB)
Signal	Eastonville Road & Stapleton Road	C / 20.7	B / 17.9
Roundabout	Eastonville Road & Stapleton Road	B / 10.8	A / 8.6
TWSC	Eastonville Road & Londonderry Road	c / 23.1 (EB LT)	d / 29.8 (EB LT)
TWSC	Eastonville Road & Grandview Reserve	c / 17.3 (WB LT)	b / 14.8 (WB LT)
TWSC	Eastonville Road & Rex Road	d / 32.9 (WB LT)	d / 32.0 (WB LT)
TWSC	Eastonville Road & Falcon Regional Park	b / 11.4 (EB Approach)	b / 10.3 (EB Approach)

Timing of phased build-out of new development within the study area is unknown. In order to gauge when additional upgrade to the Eastonville Road/Stapleton Road intersection might be needed, a demand sensitivity analysis was conducted. For this analysis incremental development build-out shares were calculated as the present between 2020 traffic flows and 2040 total traffic flows. The calculated development traffic was added to 2020 volumes and then evaluated under AWSC. The analysis scenarios began with 20% build-out of planned development. Increments of 5% additional development traffic were added. The results of the analysis (see Table 5.4) show that the AM peak hour would be most affected, and that 30 percent and 40 percent build-out of new development would bring the intersection to a LOS E and a LOS F, respectively, during the AM peak hour.

Table 5.4. Eastonville Road/Stapleton Road LOS versus Development Build-Out Level

	Intersection LOS/Delay (in seconds/vehicle)				
	20% Build-Out	25% Build-Out	30% Build-Out	35% Build-Out	40% Build-Out
AM Peak Hour	C / 24.3	D / 29.7	E / 39.0	E / 46.6	F / 57.5
PM Peak Hour	B / 10.5	B / 11.0	B / 11.4	B / 11.9	B / 12.5

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘↗		↘	↑	↑	↘
Traffic Vol, veh/h	0	5	5	275	370	0
Future Vol, veh/h	0	5	5	275	370	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	250	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	5	299	402	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	711	402	402	0	-	0
Stage 1	402	-	-	-	-	-
Stage 2	309	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	400	648	1157	-	-	-
Stage 1	676	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	398	648	1157	-	-	-
Mov Cap-2 Maneuver	398	-	-	-	-	-
Stage 1	673	-	-	-	-	-
Stage 2	745	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1157	-	648	-	-
HCM Lane V/C Ratio	0.005	-	0.008	-	-
HCM Control Delay (s)	8.1	-	10.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘↗		↘	↑	↑	↘
Traffic Vol, veh/h	0	10	10	345	330	0
Future Vol, veh/h	0	10	10	345	330	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	250	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	11	375	359	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	756	359	359	0	-	0
Stage 1	359	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	376	685	1200	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	373	685	1200	-	-	-
Mov Cap-2 Maneuver	373	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1200	-	685	-	-
HCM Lane V/C Ratio	0.009	-	0.016	-	-
HCM Control Delay (s)	8	-	10.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Figure 1 - Eastonville Road/County Regional Park access Details





Approximate Scale
1" = 150'

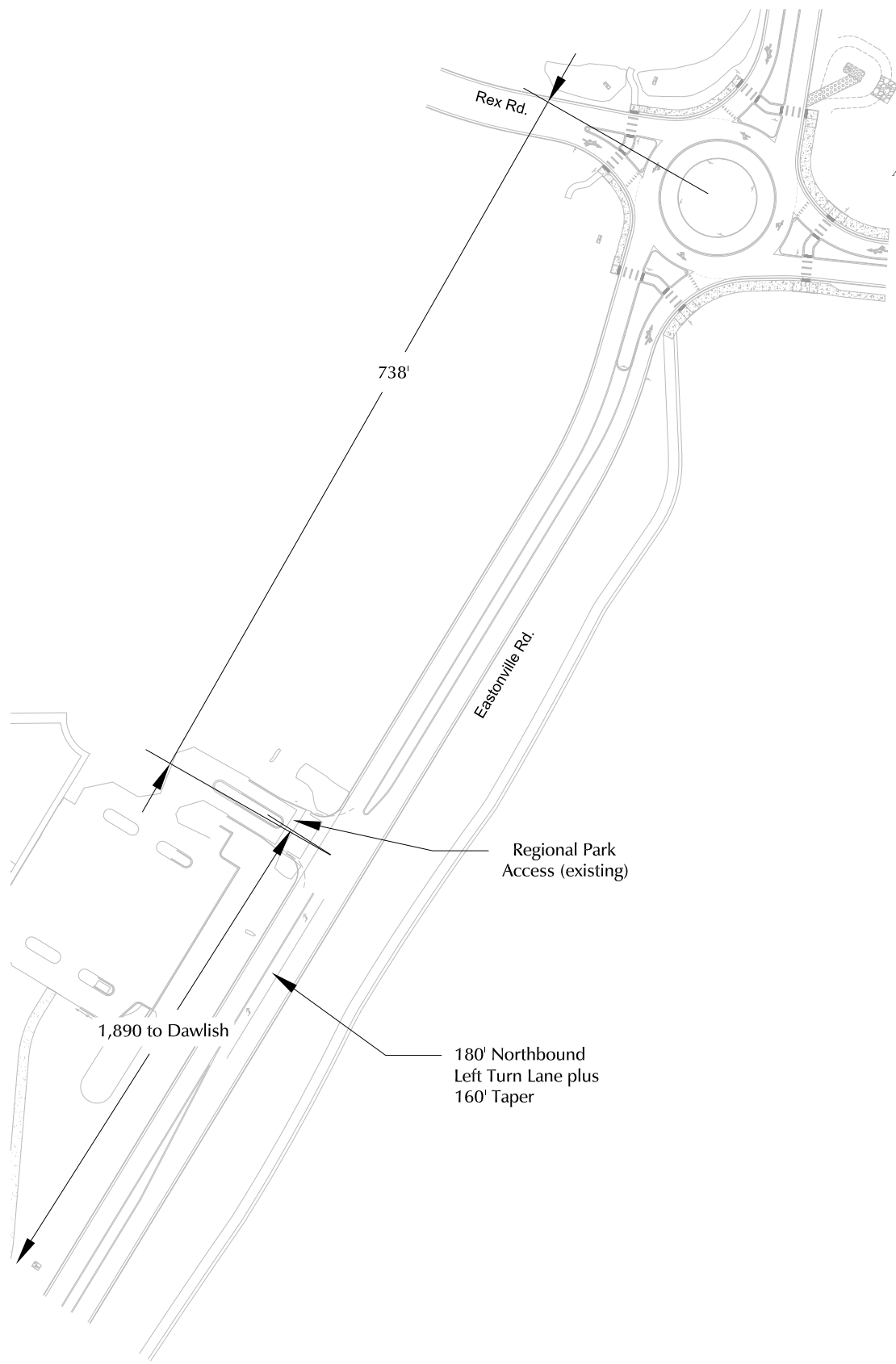


Figure 1

Eastonville Rd/County Regional Park Access Detail

Eastonville Roundabout Design (LSC #S224380)



Design Criteria Memo for Eastonville Road

(by El Paso County for the subject section of Eastonville Road – North of Londonderry Drive to Future Rex Road)



Department of Public Works

Engineering Division

719-520-6460
Chuck Brown Transportation Complex
3275 Akers Drive
Colorado Springs, CO 80922
www.ElPasoCo.com

Board of County Commissioners

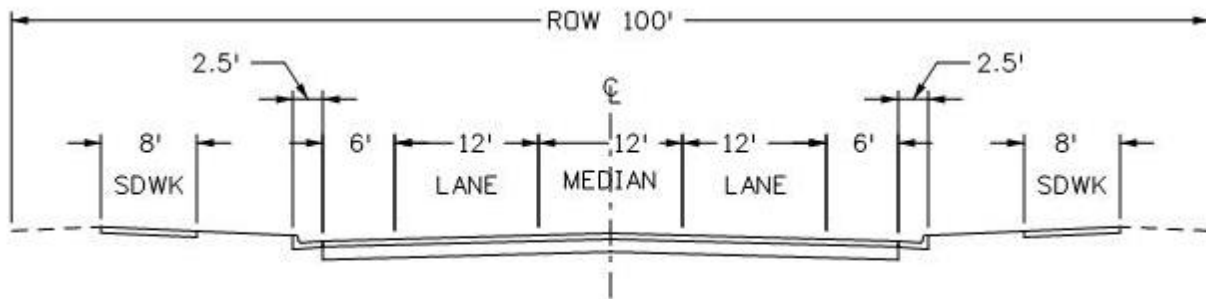
Holly Williams, District 1
Carrie Geitner, District 2
Stan VanderWerf, District 3
Longinos Gonzalez, Jr., District 4
Cami Bremer, District 5

April 26, 2022

RE: **DESIGN CRITERIA – Eastonville Road – North of Londonderry Drive to Future Rex Road**
Location: Eastonville Road – El Paso County, Colorado

With support from Stanley Consulting, El Paso County has investigated and determined acceptable design criteria for Eastonville Road development, north of Londonderry Road to proposed Rex Road intersection. The specific criteria determined was (1) alignment, (2) cross section and (3) design speed. Use of the *existing alignment*, with a *Modified Urban Nonresidential Collector* based on a *50-mph design speed* will best meet the future needs of the corridor with minimal impacts.

Further details for the approved cross section is outlined in the *Conceptual Design Report – Eastonville Road Project*, dated April 2021. The figure below can be found within the report and has been pulled out for reference.



Proposed Eastonville Road Cross-Section North of Stapleton Drive

The above design criteria has been approved through El Paso County Department of Public Works County Engineer. Please reference the attached technical memorandum, *Eastonville Road Classification Alternatives*, dated April 25, 2022 for additional details. If you have further questions or concerns, please email johnlantz@elpasoco.com.

Sincerely,

John Lantz, P.E.
Project Manager
El Paso County Dept. of Public Works

MEMORANDUM

Date: April 25, 2022

To: John Lantz, PE – El Paso County

From: Rob Pratt, PE

Subject: Eastonville Road Classification Alternatives

El Paso County Public Works requested Stanley Consulting to take a closer look at the impacts of different roadway classifications and subsequent design speeds on Eastonville Road from Londonderry Road to Latigo Boulevard. Wilson & Company developed a Conceptual Design Report for the corridor in April 2021. As part of this report, they recommended a modified 3 lane typical section north of Londonderry with an Urban Minor Arterial roadway classification. Based on multiple discussions between El Paso County and Stanley, there are some lingering questions and concerns about whether the roadway should be classified as an urban or rural arterial.

Currently, Eastonville is a winding gravel roadway posted at 45-mph north of Londonderry. It is paved south of Londonderry and posted at 45-mph to approximately Snaffle Bit Road. Based on observation the 85th percentile speed is likely much higher than 45-mph. Due to all the signalized intersections on Meridian Road, many residents north of Falcon have begun utilizing Eastonville more frequently. The argument has been made that the roadway north of Londonderry should be designed as a rural minor arterial. The rural design requires a 60-mph design speed instead of the 40-mph design speed recommended for the urban section.

Stanley utilized GIS data available through various sources to develop an existing roadway surface. An existing alignment and ROW were best fit to the associated aerial. This data was used to develop two new alignments and profiles based on the El Paso County Criteria Manual: one for an urban minor arterial and one for a rural minor arterial. Both alignments utilized a modified three lane typical section with detached sidewalks/trails.

Horizontally, the recommended minimum radius for the rural alignment is 1505' at the centerline with 4% maximum superelevation. For the urban alignment, the minimum centerline radius is 565' with a normal cross-slope. *This differs from AASHTO, which requires a 4% superelevation to utilize a 565' radius.* This is summarized in the table below:

Minor Arterial	Design Speed	Clear Zone	Min. CL Radius (ECM)	Min. CL Radius (AASHTO)
Rural	60 mph	30-ft	1505-ft (1)	1500-ft (1)
Modified	50 mph	20-ft	930-ft (1)	926-ft (1)
Urban	40 mph	14-ft	565-ft	533-ft (1)

(1) With 4% Superelevation

Vertically, requirements are based on the rate of vertical curvature (K-value) for 40, 50, and 60-mph design speeds (tables 2-12 and 2-14 in the El Paso County Criteria Manual). Roadway classification is not a factor for vertical alignments, only design speed. In a couple locations, vertical curve lengths for 60-mph are 1.5-2.0 times longer where 50-mph are 0.5 times longer than the required curve lengths of 40-mph. The difference in right-of-way impacts between the three design speeds is minimal.

With the same typical section used for each design speed, toe of slope impacts are similar. With 4% maximum superelevation rate and curvature requirements, in several locations, grading for the urban with rural design speeds section extended slightly (5-10-ft) outside of the right-of-way than the urban section. This is primarily based on the need for 4% superelevation along curves for 60-mph. In tangent sections along the corridor, impacts are the similar due to the typical section used.

Conclusion and Recommendation:

Based on the GIS surface data available, there are limited differences between the Urban, Modified, and Rural Minor Arterials. The primary grading differences are on the west side of the roadway where some of the grading limits extend out 20' or more. On the east side for the several locations that grading is different this impact is minimal (5-10-ft). Using the existing alignment, a Modified minor arterial with a 50-mph design speed will best meet the future needs of the corridor with minimal impacts.