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July 12, 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 17.0 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 10 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. The general Eastonville Road corridor design speed is 50 mph.

We trust that our findings and recommendations will assist in the planning and design of the proposed roundabout. Please call if we can be of further assistance.

Respectfully submitted,

LSC Transportation Consultants, Inc.

By: 

Christopher S. McGranahan, P.E.
Principal/President

7-12-24

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.

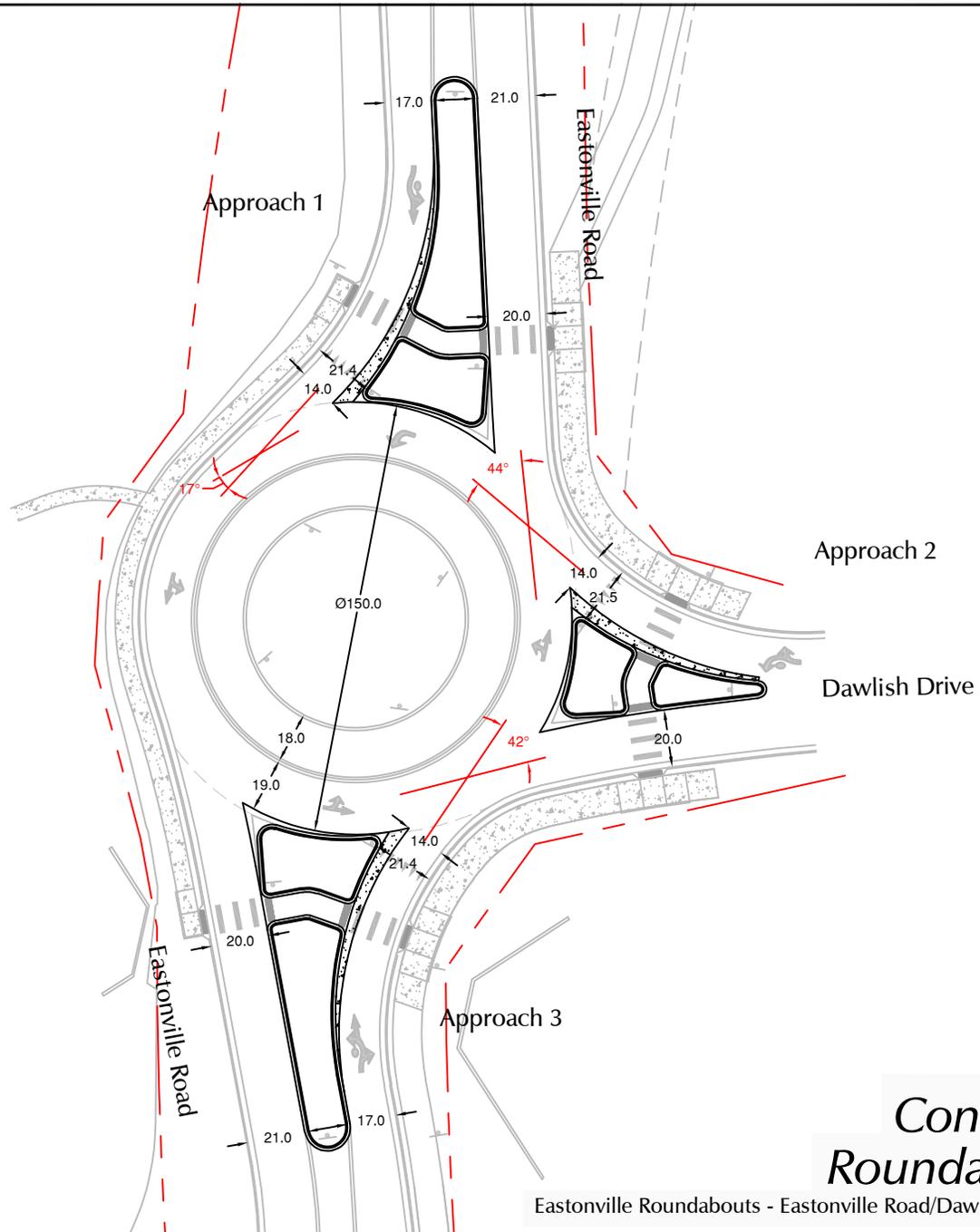
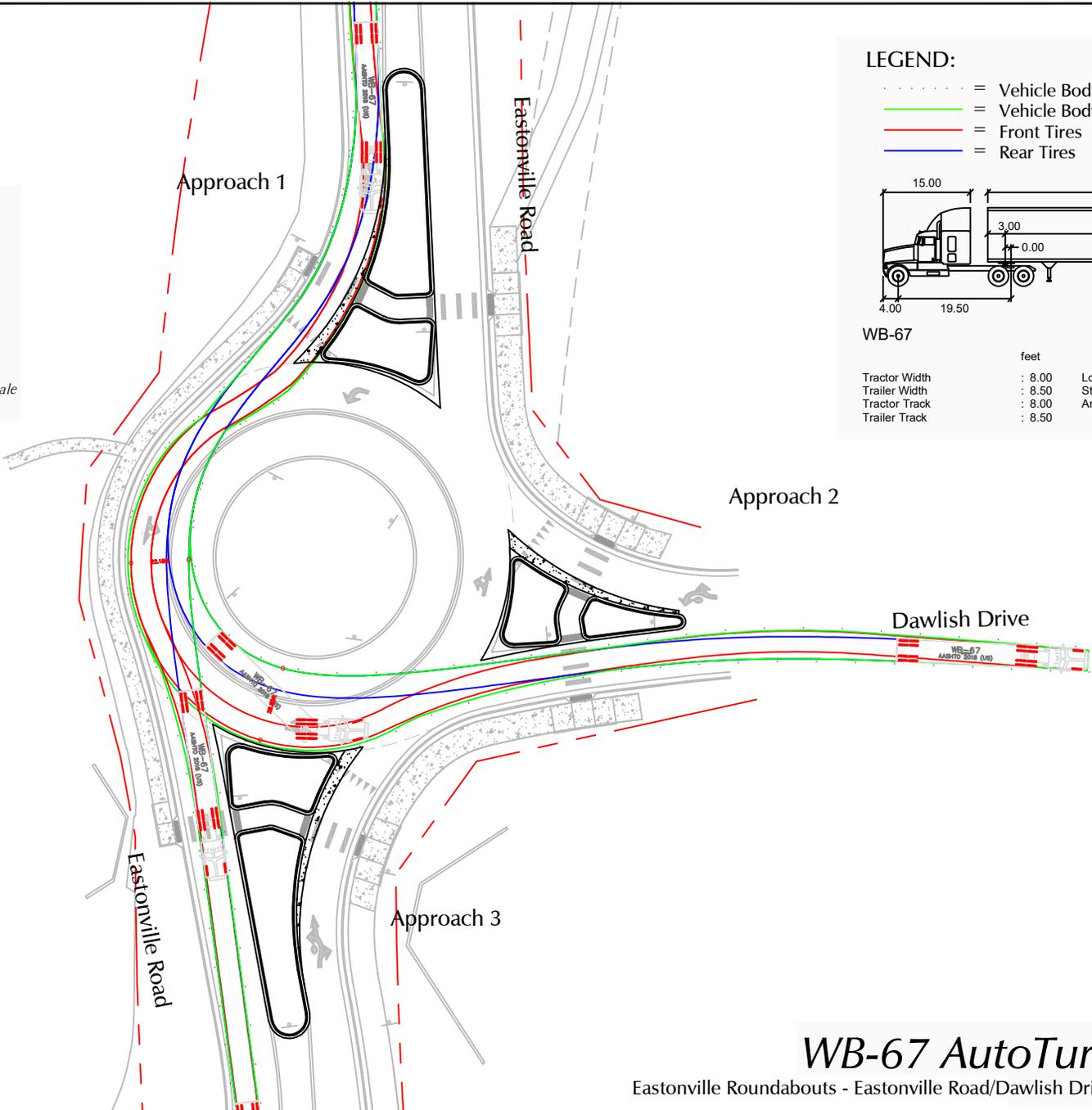
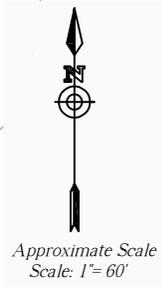


Figure 1

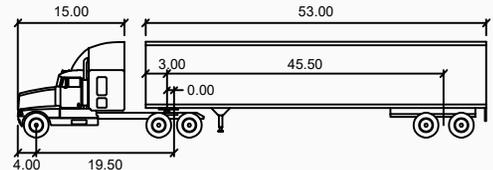
Conceptual 150' ICD Roundabout Parameters

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



LEGEND:

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



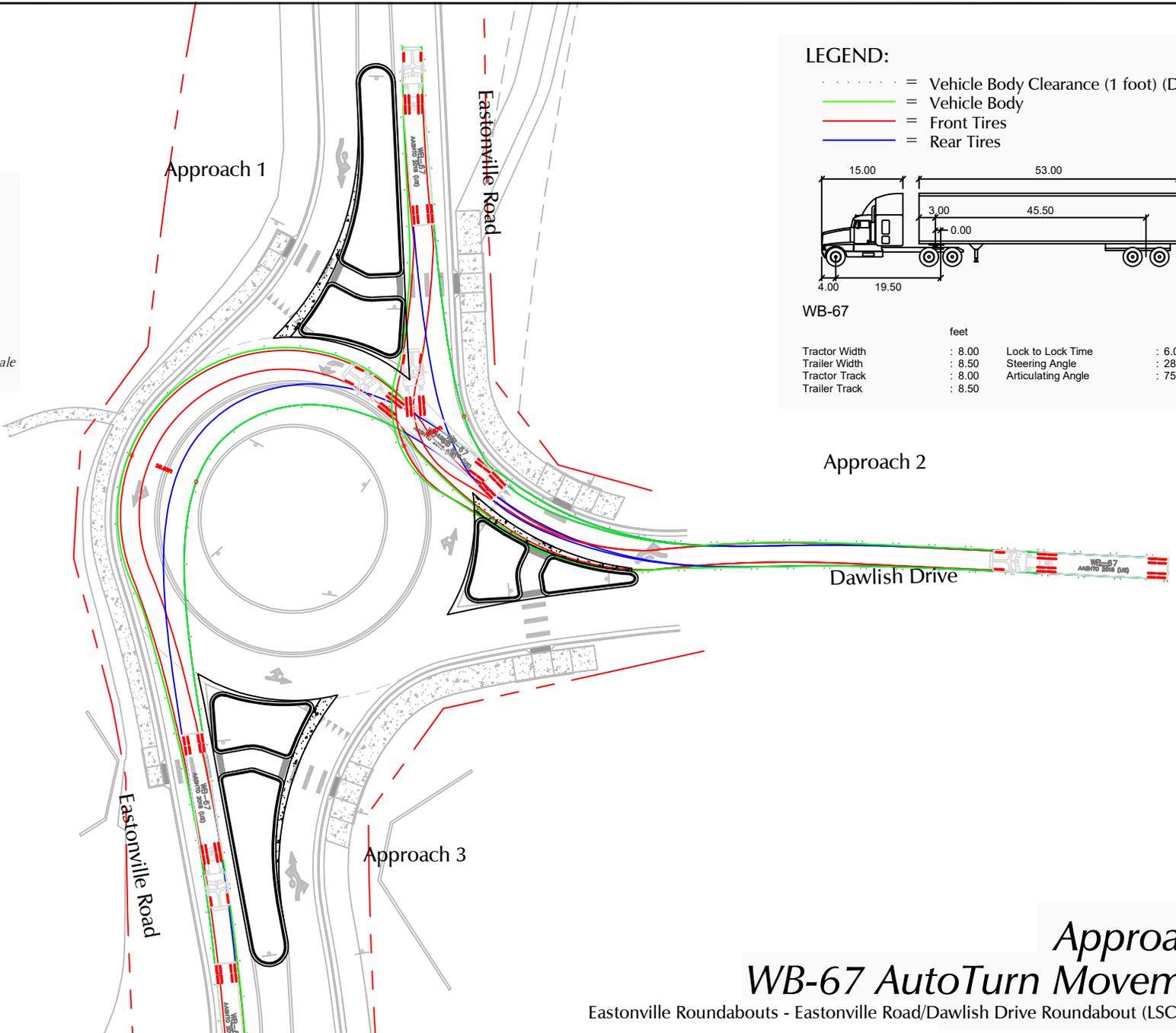
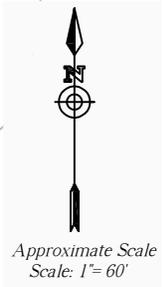
WB-67

	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)



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		

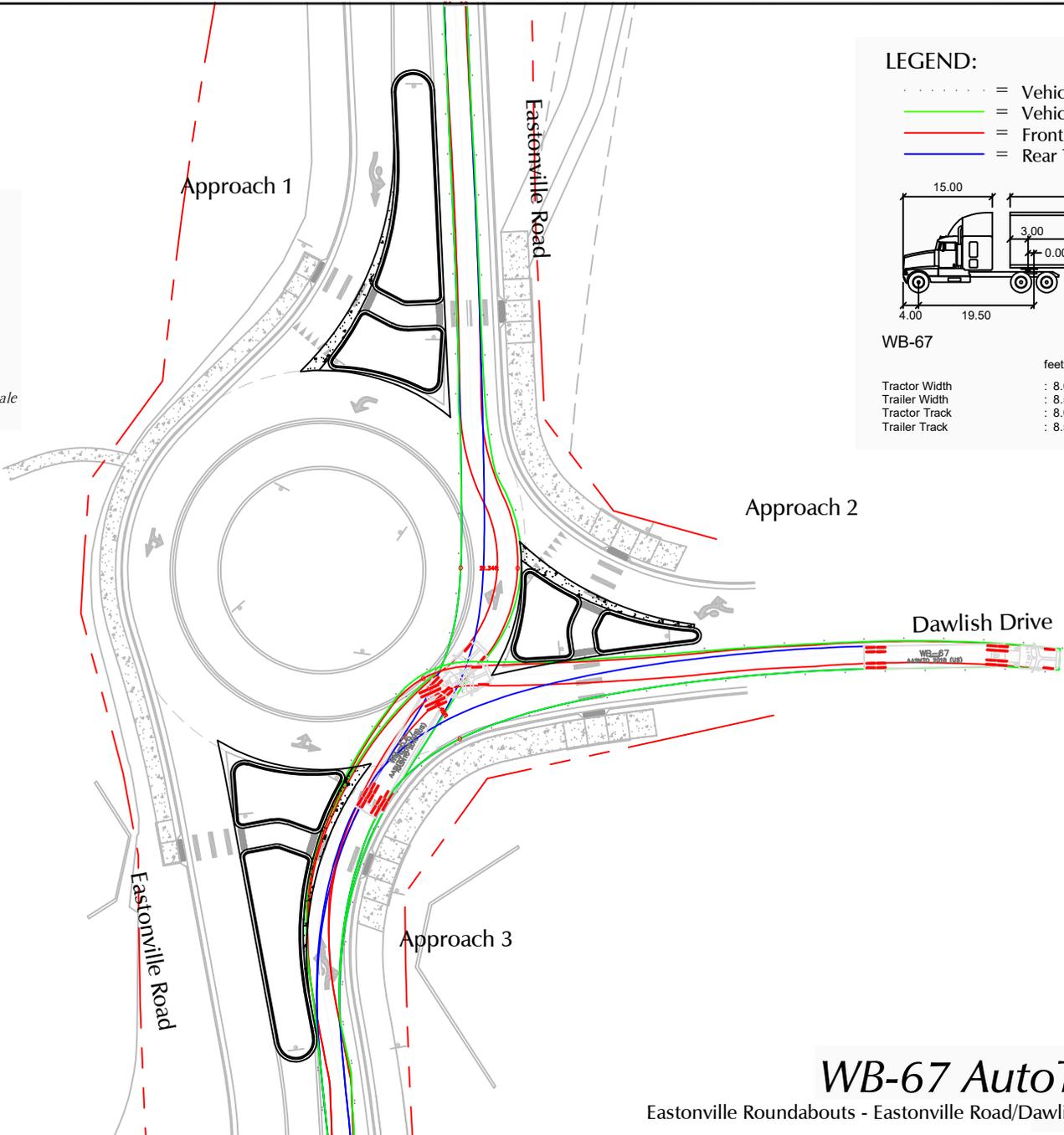
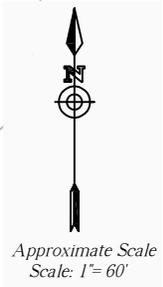
Approach 2

Dawlish Drive

Figure 3

Approach 2 WB-67 AutoTurn Movements

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 4
Approach 3
WB-67 AutoTurn Movements
 Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)

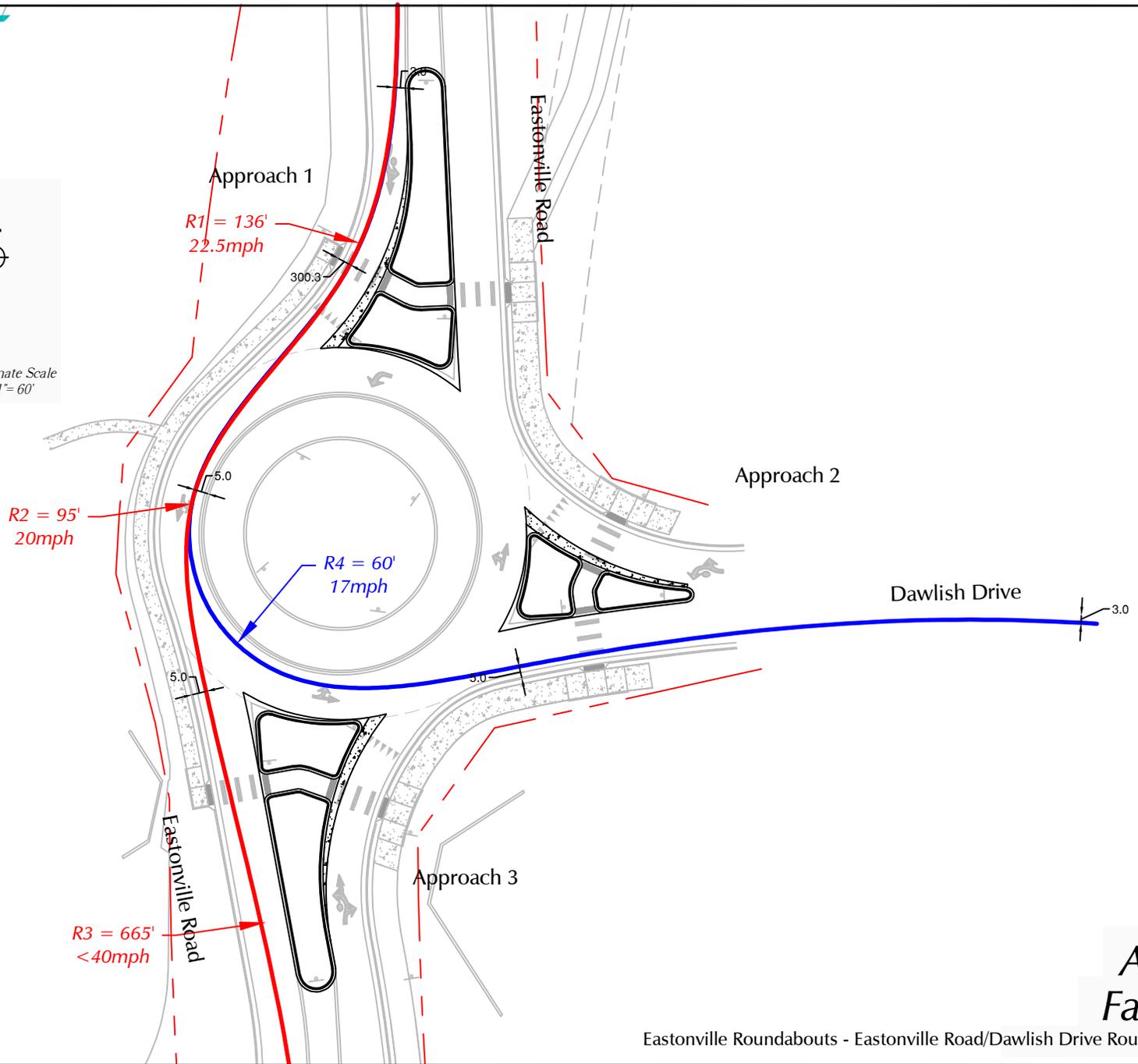
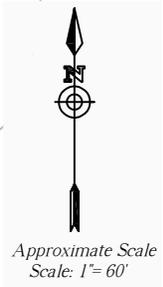


Figure 5

Approach 1 Fastest Paths

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

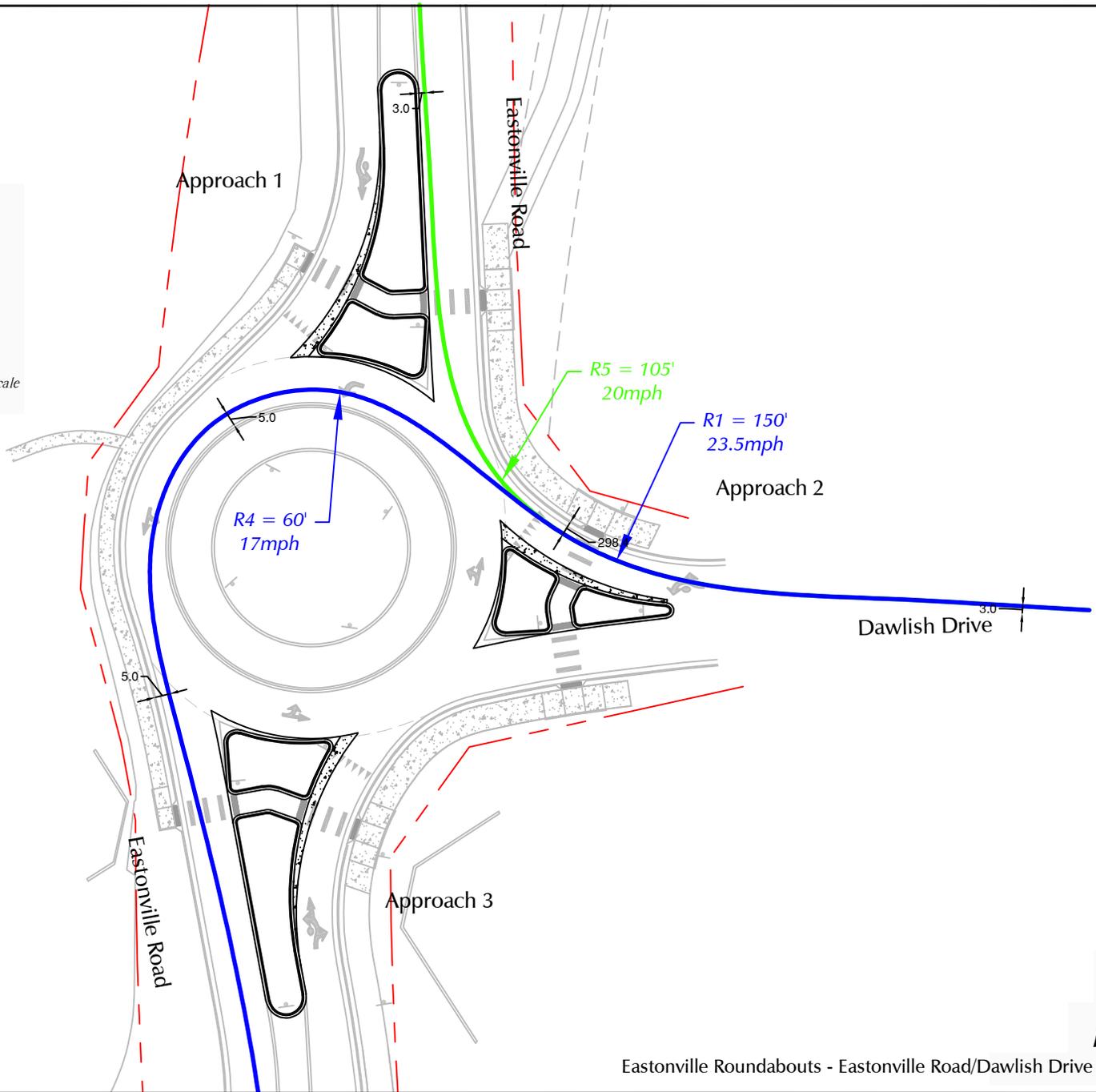
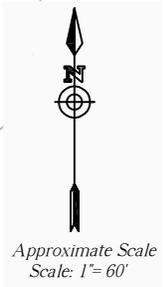


Figure 6

Approach 2 Fastest Paths

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

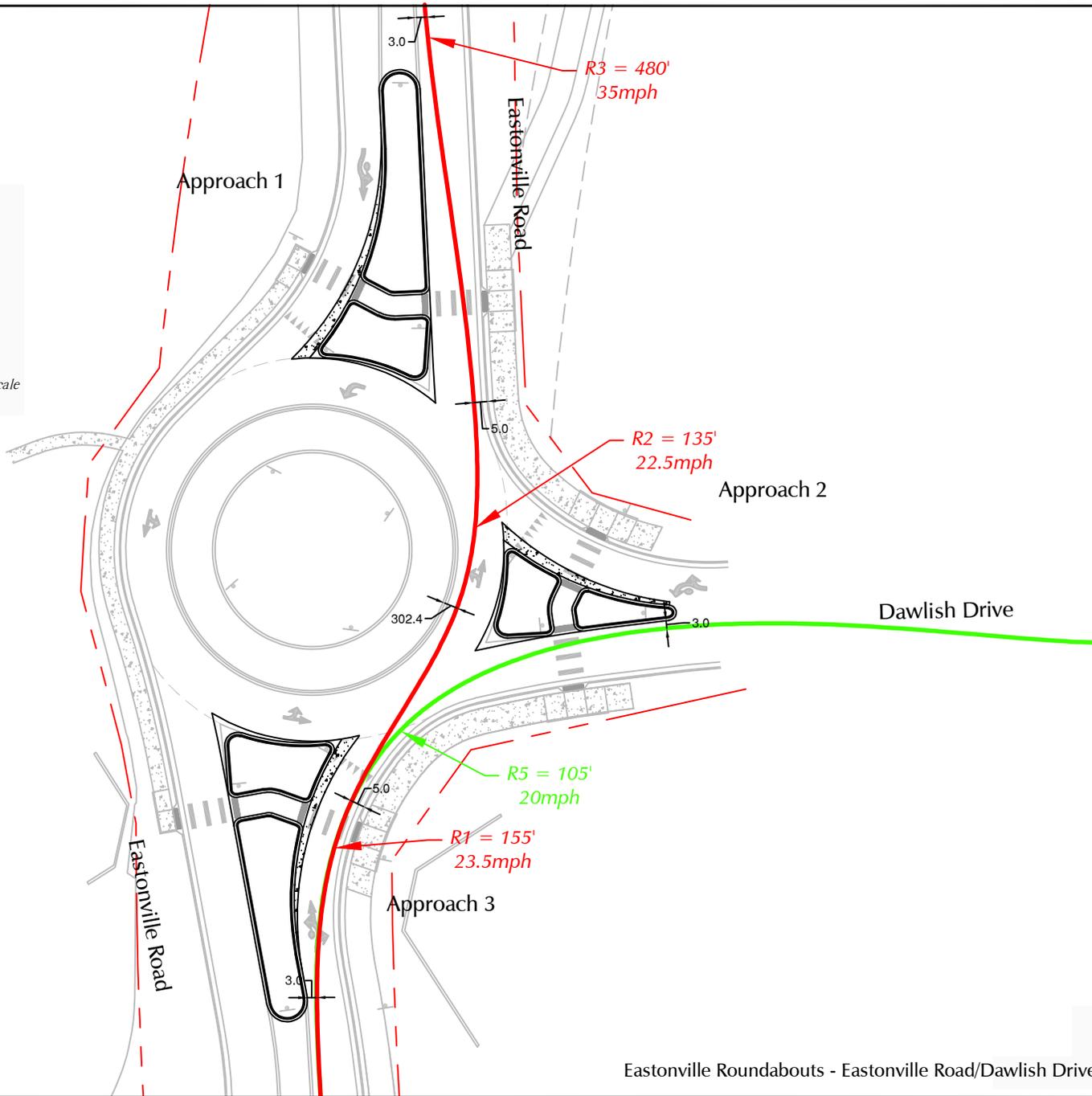
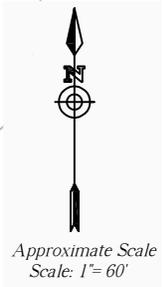


Figure 7

Approach 3 Fastest Paths

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

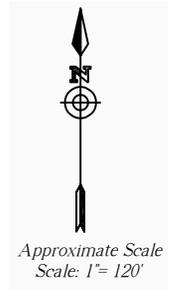
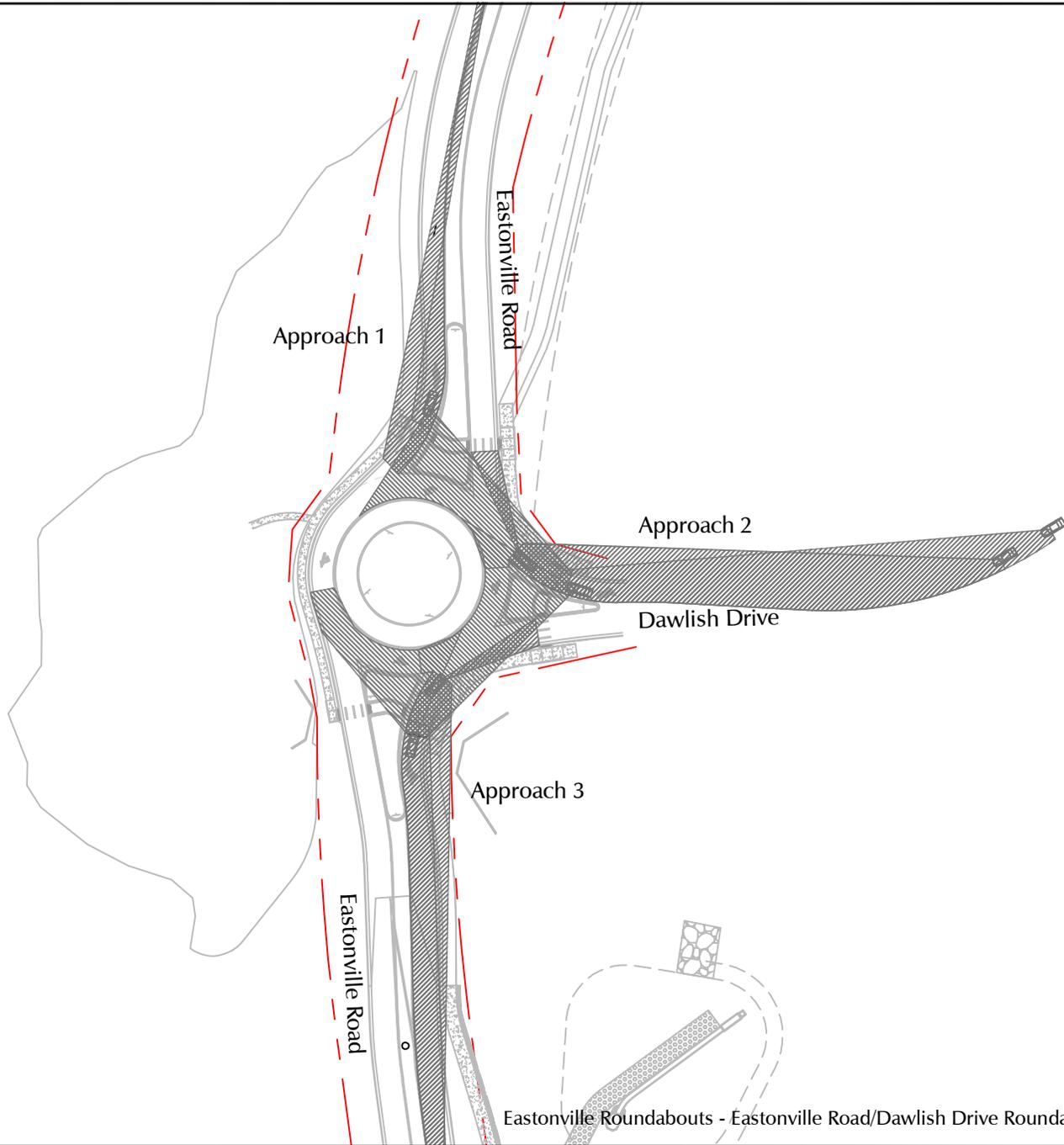


Figure 8
*Sight
Triangles*
Eastonville Roundabouts - Eastonville Road/Dawlish Drive Roundabout (LSC #224380)