DelDOT – Development Coordination
ROUNDABOUT SUBMISSION AND REVIEW
REFERENCE GUIDE

The Department has a Design Guidance Memorandum (DGM 1-26) that discusses the design of roundabouts. While DGM 1-26 is helpful to internal designers, it was decided to clarify the design and submission requirements for the Development Coordination Section and all its customers. Below are additional design requirements and submission requirements for roundabout submissions to the Development Coordination Section. Please note, all items discussed in DGM 1-26 are still requirements for any roundabout design.

Design Requirements:

The following Design Requirements are based on DGM 1-26 or the National Cooperative Highway Research Program Report 672.

1. Per NCHRP 672, Section 6.3, entry alignment should be offset to the left of center. Entry alignments through the center of the roundabout are acceptable. Offset right alignments are discouraged. The inscribed circle diameter of the roundabout should typically be in the starting range of 130' with variation dependent on entrance alignment and number of legs.

2. Signing and striping shall follow the Delaware Manual for Uniform Traffic Control Devices.

3. Lighting, in accordance with DelDOT Lighting Design Guidelines, shall be provided at all locations on State maintained roads, with a functional class of Local or above.

4. The design vehicle for a roundabout on a local or higher functional classification road is a WB-67. Roundabouts located internal to a Subdivision will use the design vehicle as required by the Development Coordination Manual (DCM) Section 5.2.3.

5. The central radius shall be the maximum radius possible to accommodate the truck turning template for a WB-67 design vehicle.

6. The truck apron radius shall be designed to accommodate the fastest path design parameters in items 9-11.

7. The external radius shall be the minimum radius needed to accommodate the fastest path design parameters in items 9-11 and the outer radius to pass the truck turning requirements for the WB-67 design vehicle.

8. No landscaping will be allowed within the central island. The center island should be stabilized with perennial grass.

9. The vehicle centerline path must meet the following criteria: (from NCHRP 672 Section 6.7.1.1)

    a. 6 ft. wide vehicle, the vehicle centerline is not based on a specific vehicle type.

    b. 5 ft. from concrete curb (truck apron curb)

    c. 5 ft. from roadway centerline

    d. 3 ft. from painted edge line

    e. Radii 1 (R1) should be measured over a distance of 65 ft to 80 ft. R1 is the minimum radius that occurs along the approach entry path near the entrance line, but not more than 165 ft. in advance of the entrance.

10. The Maximum Design Speed (*V*) for a single lane roundabout is 25 mph. The Maximum Design Speed shall be calculated for each radii along the vehicle path. The following equations shall be used to calculate *V*.

    $V = 3.4415R^{0.3861}$ (*e* = +0.02 for entry and exit curves)   *R = radius of curve, ft*

    $V = 3.4614R^{0.3673}$ (*e* = -0.02 for circulatory curves)   *e = superelevation, ft/ft*

    The above equations apply where the specified superelevations are achieved. Where design constraints make these values infeasible, Appendix D.1 of NCHRP Report 672 applies.
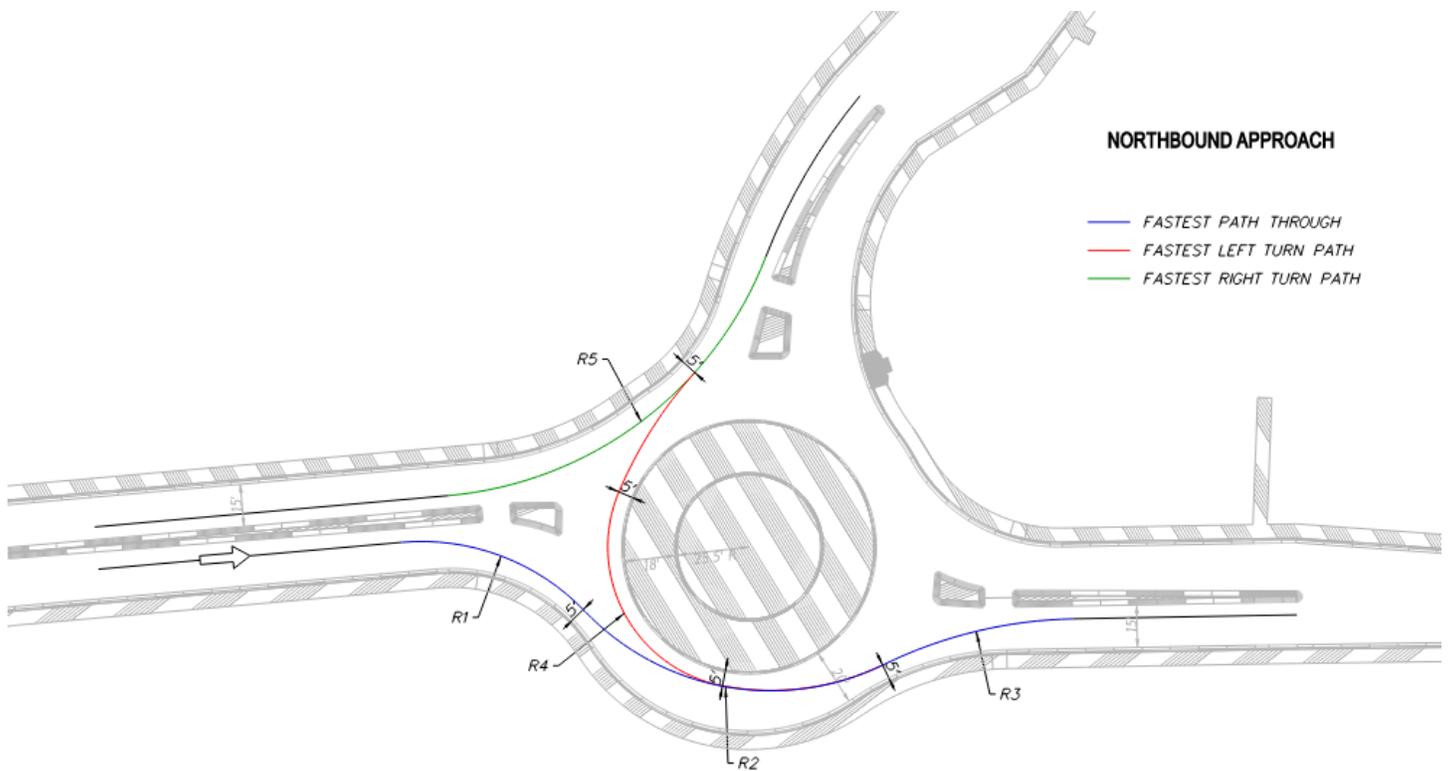
11. The difference between the minimum and maximum calculated velocity for ALL paths within the roundabout including each entrance radii will be no greater than 10 MPH.

Submission Requirements:

1. All roundabout designs will be submitted through the PDCA. They should be included in the entrance review, offsite review or the subdivision street review, whichever is applicable.
2. A vehicle path exhibit must be submitted for all approaches with radius offsets labeled.
3. A Roundabout Design Speed Summary Table must be submitted for all motions from each approach and each identified vehicle path radii in the vehicle path exhibit (assuming a perfect four way roundabout, this would mean five vehicle path radii for each approach or a minimum of 20 velocity data points submitted).
4. A lighting plan, including a photometric and lighting report must be submitted with the roundabout design.
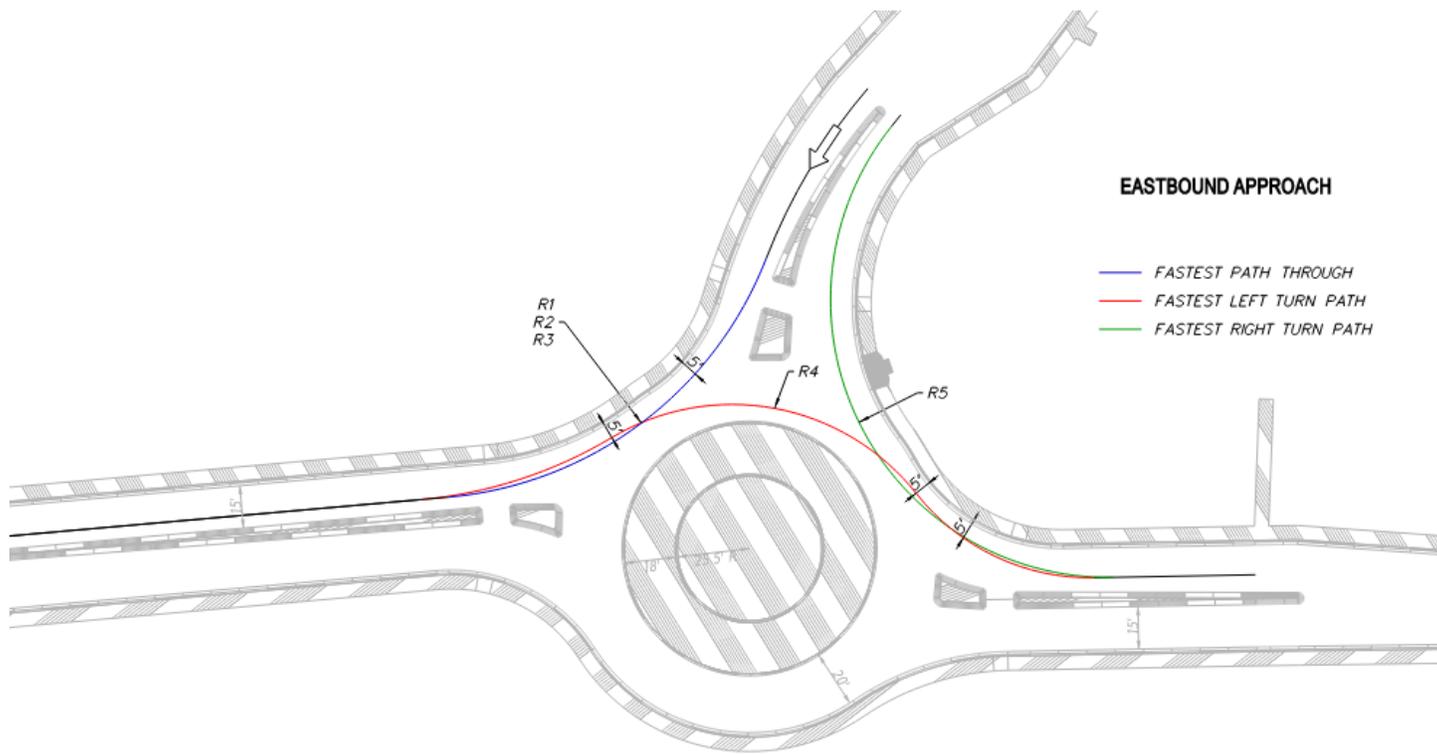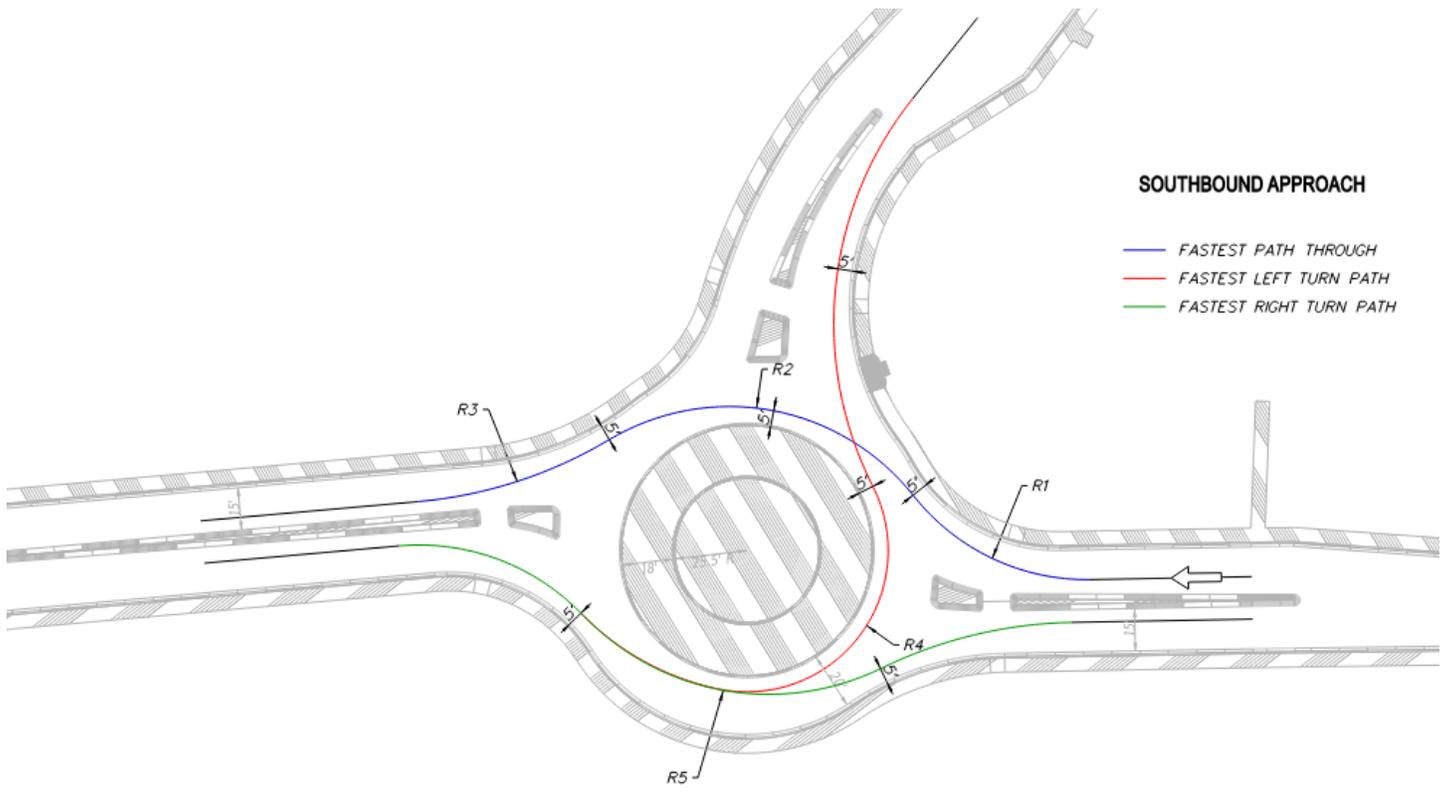
Example Vehicle Path Exhibits:

SOUTHBOUND APPROACH

— FASTEST PATH THROUGH
— FASTEST LEFT TURN PATH
— FASTEST RIGHT TURN PATH

EASTBOUND APPROACH

— FASTEST PATH THROUGH
— FASTEST LEFT TURN PATH
— FASTEST RIGHT TURN PATH

Roundabout Design Speed Summary Table

Project Name:	Example Project						

Road	Approach	Curve	Radius (ft)	e Super (ft/ft)	V (MDS) (mph)	Relative Speed Differential	
		R1	80	0.02	18.69		
		R2	91	-0.02	18.15		
Sample	Northbound	R3	160	0.02	24.42		
		R4	50	-0.02	14.56		
		R5	133	0.02	22.74		
		R1	78	0.02	18.50	Max =	24.42
		R2	83	-0.02	17.54	Min =	14.56
Sample	Southbound	R3	159	0.02	24.36		
		R4	50	-0.02	14.56	diff =	9.86
		R5	91	-0.02	18.15		
		R1	133	0.02	22.74		
		R2	133	0.02	22.74		
Sample	Eastbound	R3	133	0.02	22.74		
		R4	83	-0.02	17.54		
		R5	98	0.02	20.21		

$V = 3.4415R^{0.3861}$ (e=+0.02 for entry and exit curves)

$V = 3.4614R^{0.3673}$ (e=-0.02 for circulatory curves)