

### PRELIMINARY GEOMETRIC REVIEW – EXAMPLE SUBMITTALS

*Reference: 14-2.01(03) Preliminary Geometrics Review [Rev. Aug. 2024]*

#### INTRODUCTION

This Road Design Aid provides guidance on preparing a Preliminary Geometrics Review submittal in accordance with Indiana Design Manual Section 14-2.01(03), supporting the plan development framework of revised Chapter 103. Preliminary geometrics review before formal plan development begins is required for non-conventional or innovative intersections, and is used to confirm layout feasibility, geometric design compliance, operational considerations, and design vehicle accommodation early in project development.

The purpose of this RDA is to introduce example submittals that illustrate the expected quality, organization, and level of detail for this review stage.

#### ABOUT THE EXAMPLE SUBMITTALS

This Road Design Aid presents three sample Preliminary Geometrics Review submittals:

- Reduced Conflict Intersection (RCUT) Example
- Single-Lane Roundabout Example 1
- Single-Lane Roundabout Example 2

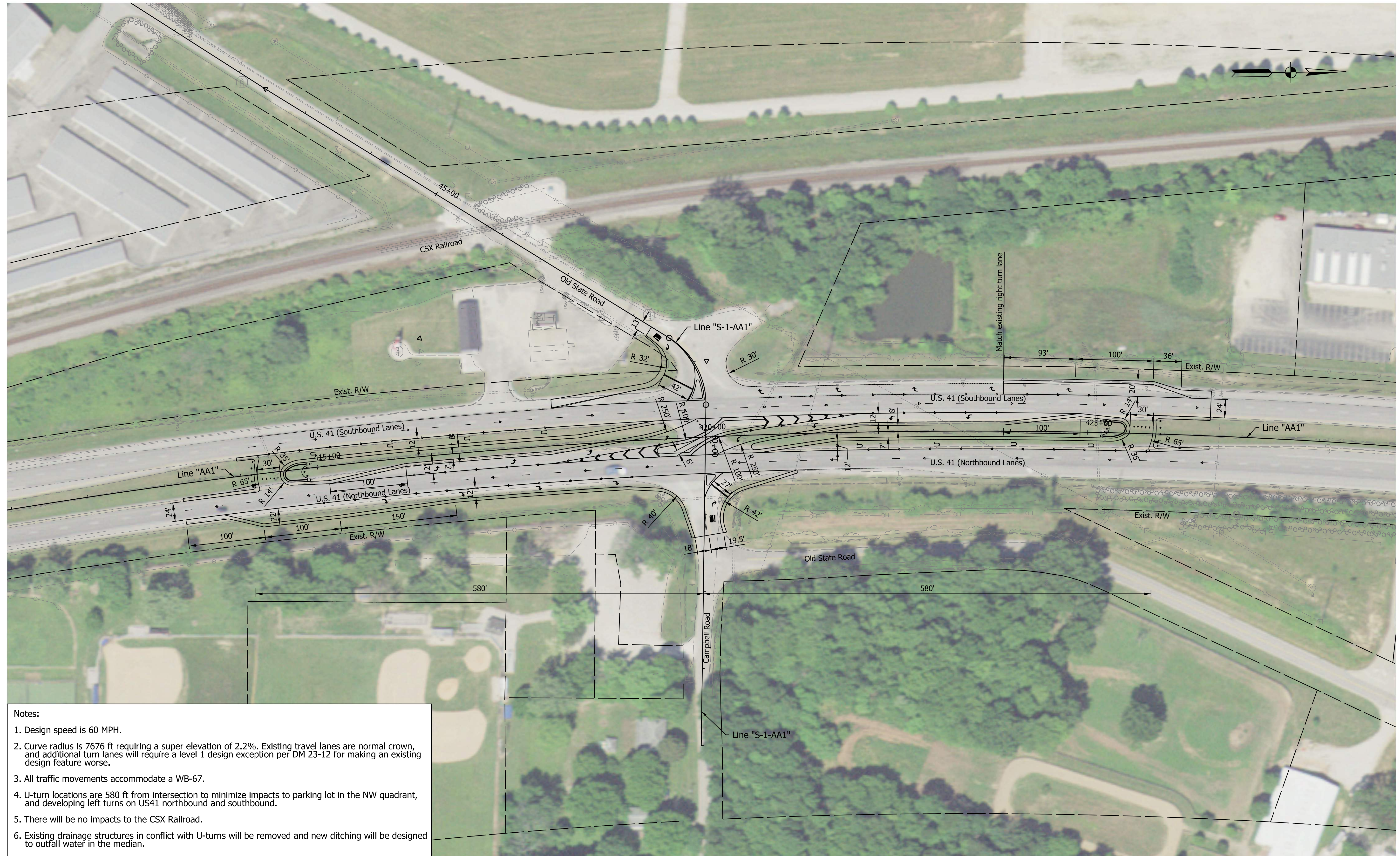
Each example demonstrates how required elements can be documented, including:

- Typical sections
- An overall plan view at appropriate scale
- Lane configurations, tapers, radii, traffic islands, and auxiliary lanes
- Existing right-of-way, utilities, drainage features, and adjacent access points
- Preliminary pavement marking concept
- Design-vehicle wheel-path diagrams
- For roundabouts: entry geometry, circulating width, truck apron configuration, and fastest-path evaluation

These examples are intended as reference illustrations, not prescriptive standards. Designers should adapt the formatting and content to each project's context while meeting all requirements of Section 14-2.01(03).

#### CONTACT INFORMATION

If you have any questions regarding the content of this Road Design Aid, please contact [lularacuenta@indot.in.gov](mailto:lularacuenta@indot.in.gov).



- Notes:
1. Design speed is 60 MPH.
  2. Curve radius is 7676 ft requiring a super elevation of 2.2%. Existing travel lanes are normal crown, and additional turn lanes will require a level 1 design exception per DM 23-12 for making an existing design feature worse.
  3. All traffic movements accommodate a WB-67.
  4. U-turn locations are 580 ft from intersection to minimize impacts to parking lot in the NW quadrant, and developing left turns on US41 northbound and southbound.
  5. There will be no impacts to the CSX Railroad.
  6. Existing drainage structures in conflict with U-turns will be removed and new ditching will be designed to outfall water in the median.

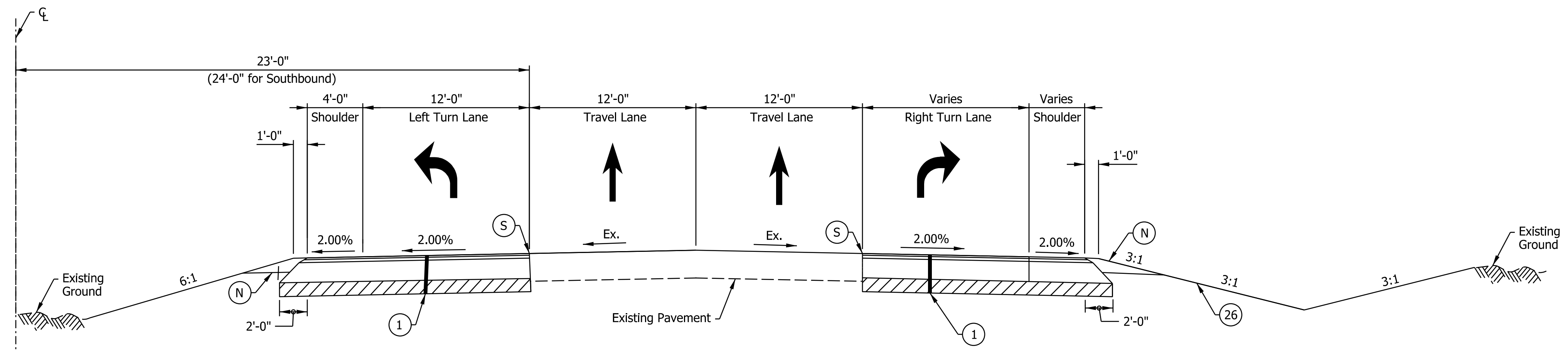
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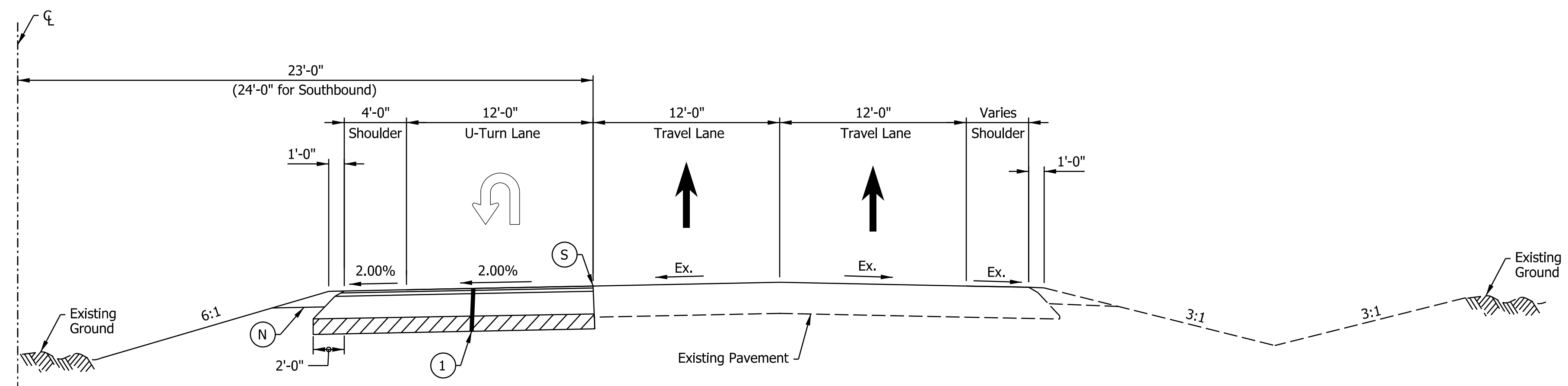
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DESIGNED: _____ MBM	DRAWN: _____ RJS	
CHECKED: _____ LMC	CHECKED: _____ LMC	

**INDIANA**  
**DEPARTMENT OF TRANSPORTATION**  
  
**PROJECT OVERVIEW**

HORIZONTAL SCALE	BRIDGE FILE
1"=60'	N/A
VERTICAL SCALE	DESIGNATION
N/A	2301093
SURVEY BOOK	SHEETS PO-01
ELECTRONIC	1 of 5
CONTRACT	PROJECT
R-45274	2301093



US-41 NB TYPICAL SECTION  
(Mirror for Southbound)



US-41 NB TYPICAL SECTION  
(Mirror for Southbound)

Legend:

- (S) Saw Cut (No Direct Pay)
- (N) Compacted Aggregate, No. 53
- (26) Seed Mixture, R
- (1) Full Depth Widening:  
Saw cut and remove pavement at existing edge to create a clean vertical face, then  
165#/Syd. OC/QA-HMA, 4, 58E, Surface 9.5 mm, on  
275#/Syd. OC/QA-HMA, 4, 58E, Intermediate, 19.0 mm, on  
440#/Syd. OC/QA-HMA, 4, 58S, Base, 19.0 mm, on  
440#/Syd. OC/QA-HMA, 4, 58S, Base, 19.0 mm, on  
7" Compacted Aggregate, No. 53, on  
Subgrade Treatment, Type IC

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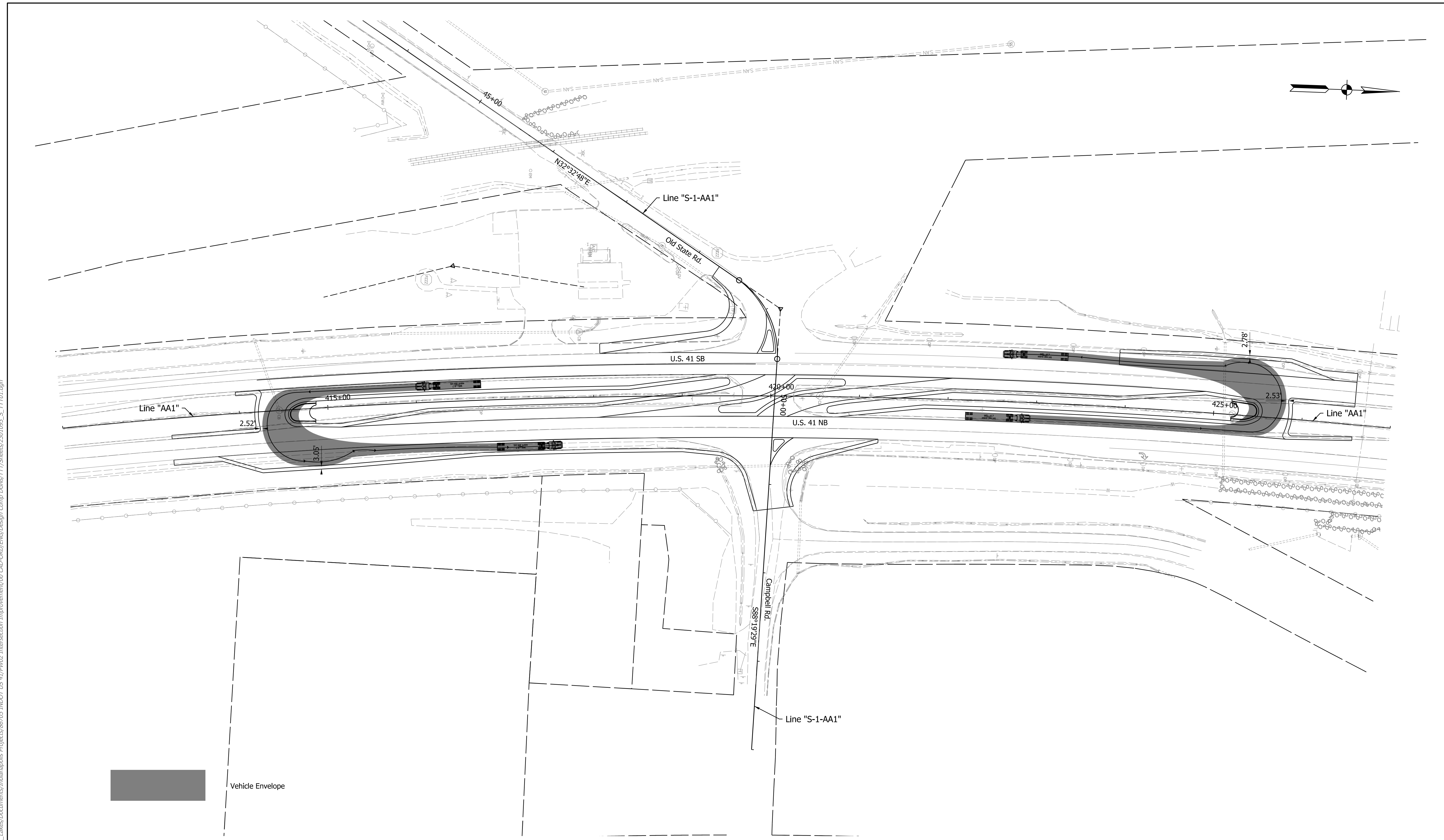
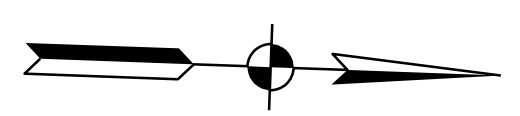
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DESIGNED: _____ RJS _____	DRAWN: _____ RJS _____	
CHECKED: _____ LMC _____	CHECKED: _____ LMC _____	

INDIANA  
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

HORIZONTAL SCALE	BRIDGE FILE
3/16"=1'-0"	N/A
VERTICAL SCALE	DESIGNATION
3/16"=1'-0"	2301093
SURVEY BOOK	SHEETS TYP-01
ELECTRONIC	2 of 5
CONTRACT	PROJECT
R-45274	2301093



Vehicle Envelope

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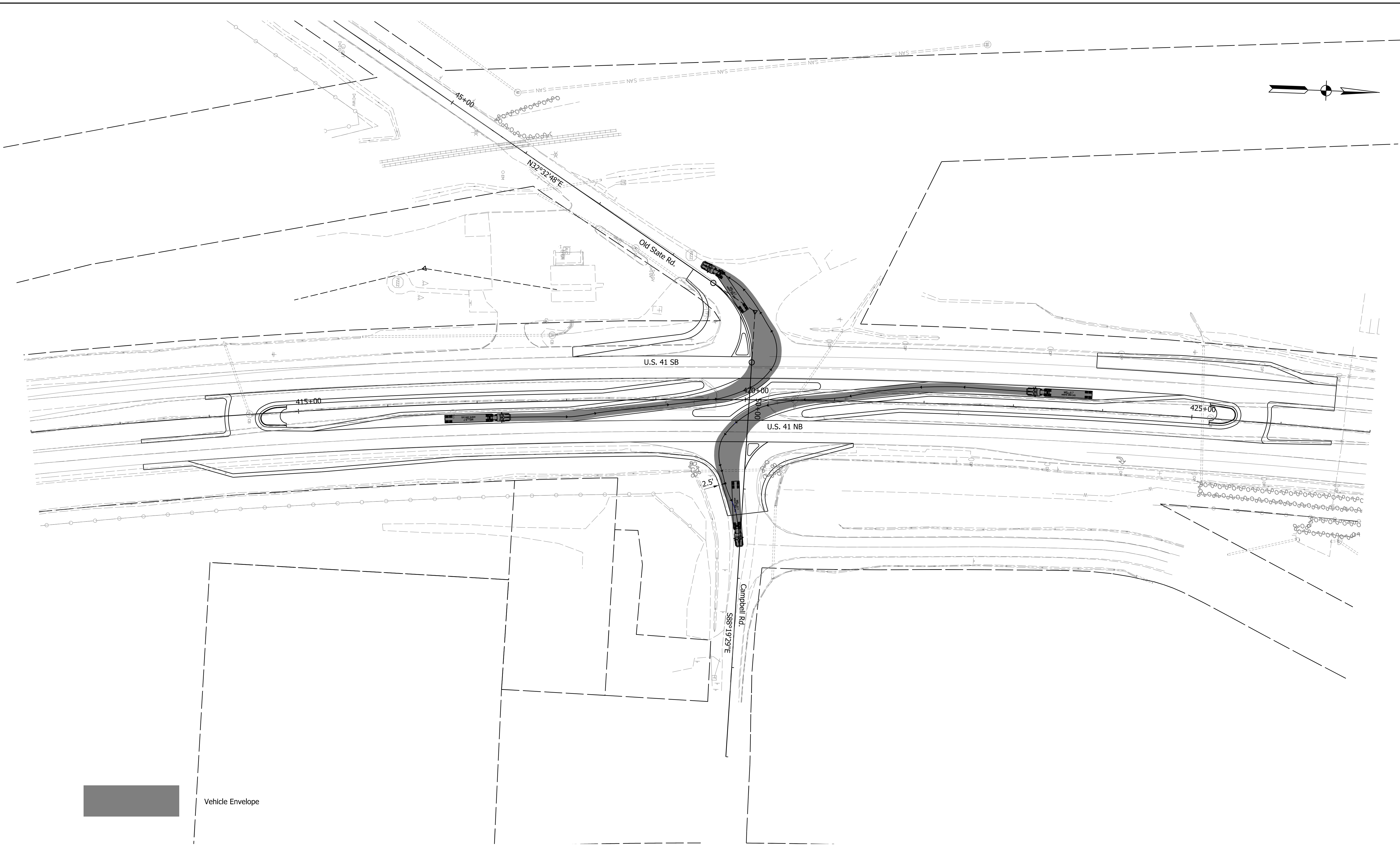
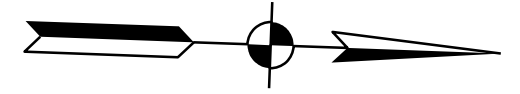
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DESIGNED: MBM	DRAWN: RJS	
CHECKED: LMC	CHECKED: LMC	

INDIANA  
 DEPARTMENT OF TRANSPORTATION

TRUCK TURNING TEMPLATE - WB 67  
 U-TURN ONTO U.S. 41 NB/SB

HORIZONTAL SCALE	BRIDGE FILE	
1"=50'	N/A	
VERTICAL SCALE	DESIGNATION	
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SURVEY BOOK	SHEETS	TTT-01
ELECTRONIC	1	of
CONTRACT	PROJECT	
R-45274	2301093	



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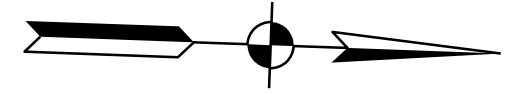
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CHECKED: LMC	CHECKED: LMC	

INDIANA  
 DEPARTMENT OF TRANSPORTATION

TRUCK TURNING TEMPLATE - WB 67  
 LEFT TURN FROM U.S. 41 EB/WB

HORIZONTAL SCALE	BRIDGE FILE
1"=50'	N/A
VERTICAL SCALE	DESIGNATION
N/A	2301093
SURVEY BOOK	SHEETS
ELECTRONIC	2 of
CONTRACT	PROJECT
R-45274	2301093



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CHECKED: LMC	CHECKED: LMC	

INDIANA  
 DEPARTMENT OF TRANSPORTATION

TRUCK TURNING TEMPLATE - WB 67  
 RIGHT TURN ONTO U.S. 41 NB/SB

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1"=50'	N/A	
VERTICAL SCALE	DESIGNATION	
N/A	2301093	
SURVEY BOOK	SHEETS	TTT-03
ELECTRONIC	3	of
CONTRACT	PROJECT	
R-45274	2301093	

# **Engineering Assessment**

## **US 41 at Boonville-New Harmony Rd. & US 41 at Old State Rd.**

**Vanderburgh County, IN  
Vincennes District**

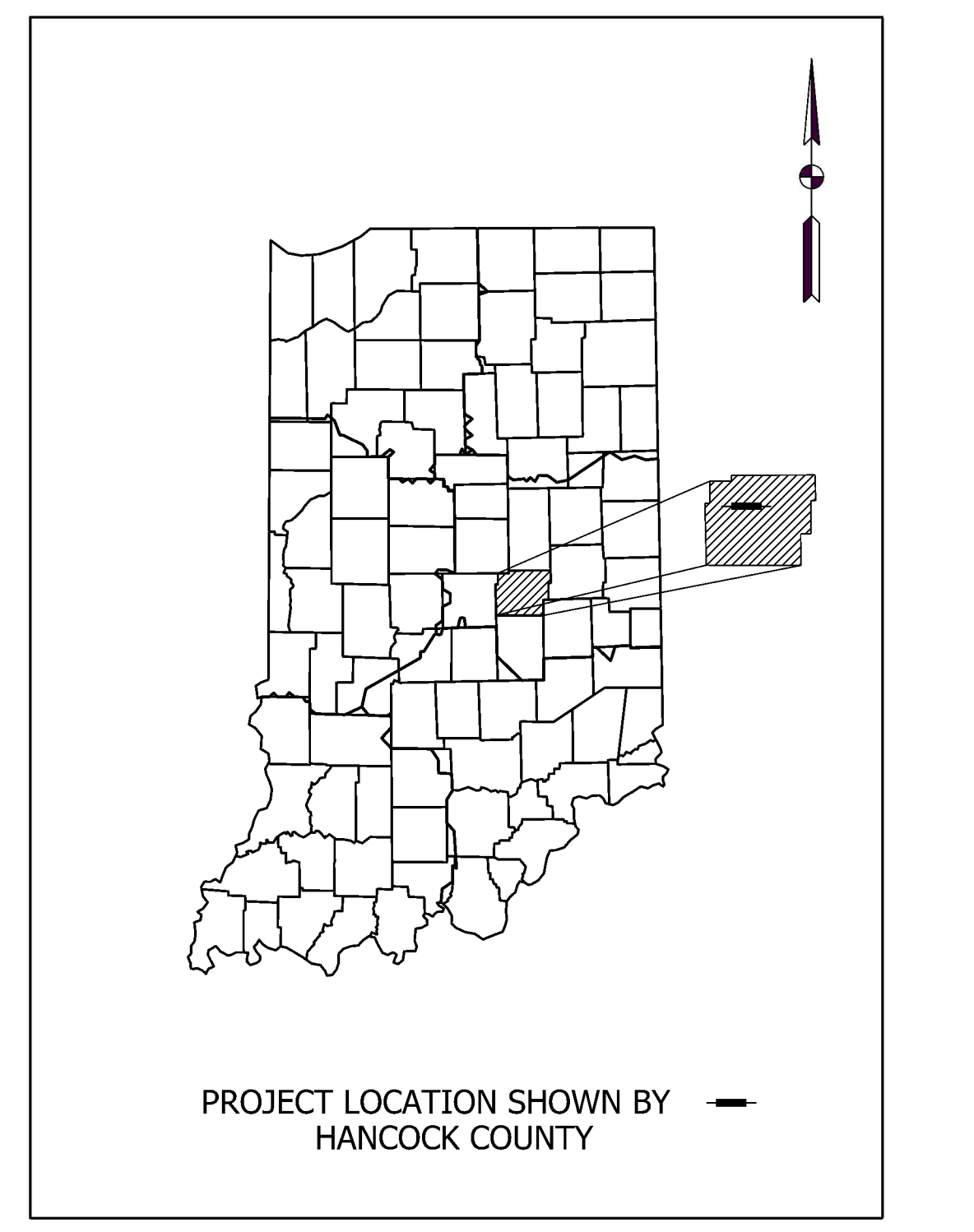
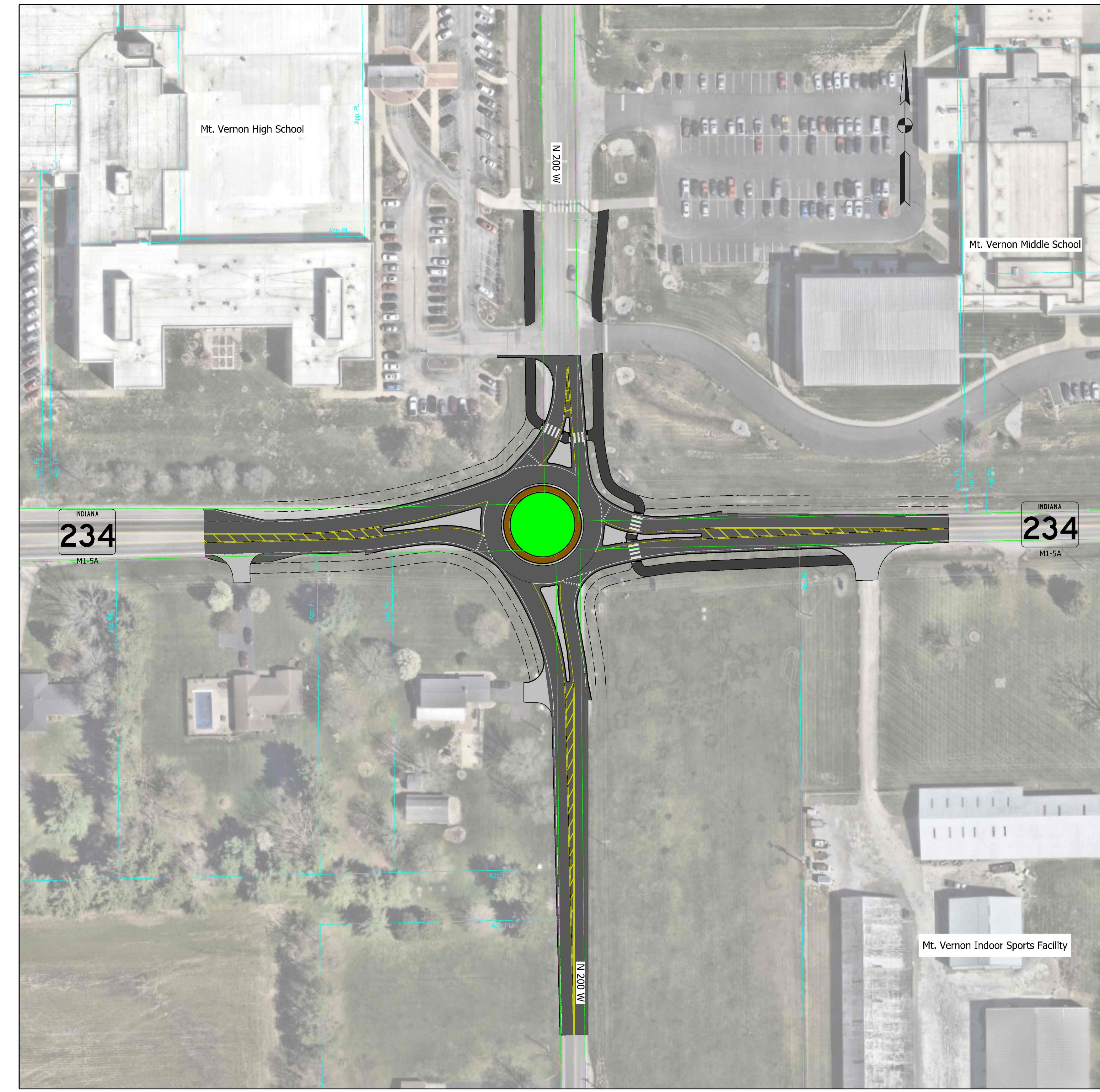
Prepared By:  
Emily Siler, P.E.  
Infrastructure Engineering, Inc.

Prepared For:  
Duane Decker, P.E.  
Vincennes District Scoping Manager

November 11, 2022

Prepared For  
**Indiana Department  
of Transportation**



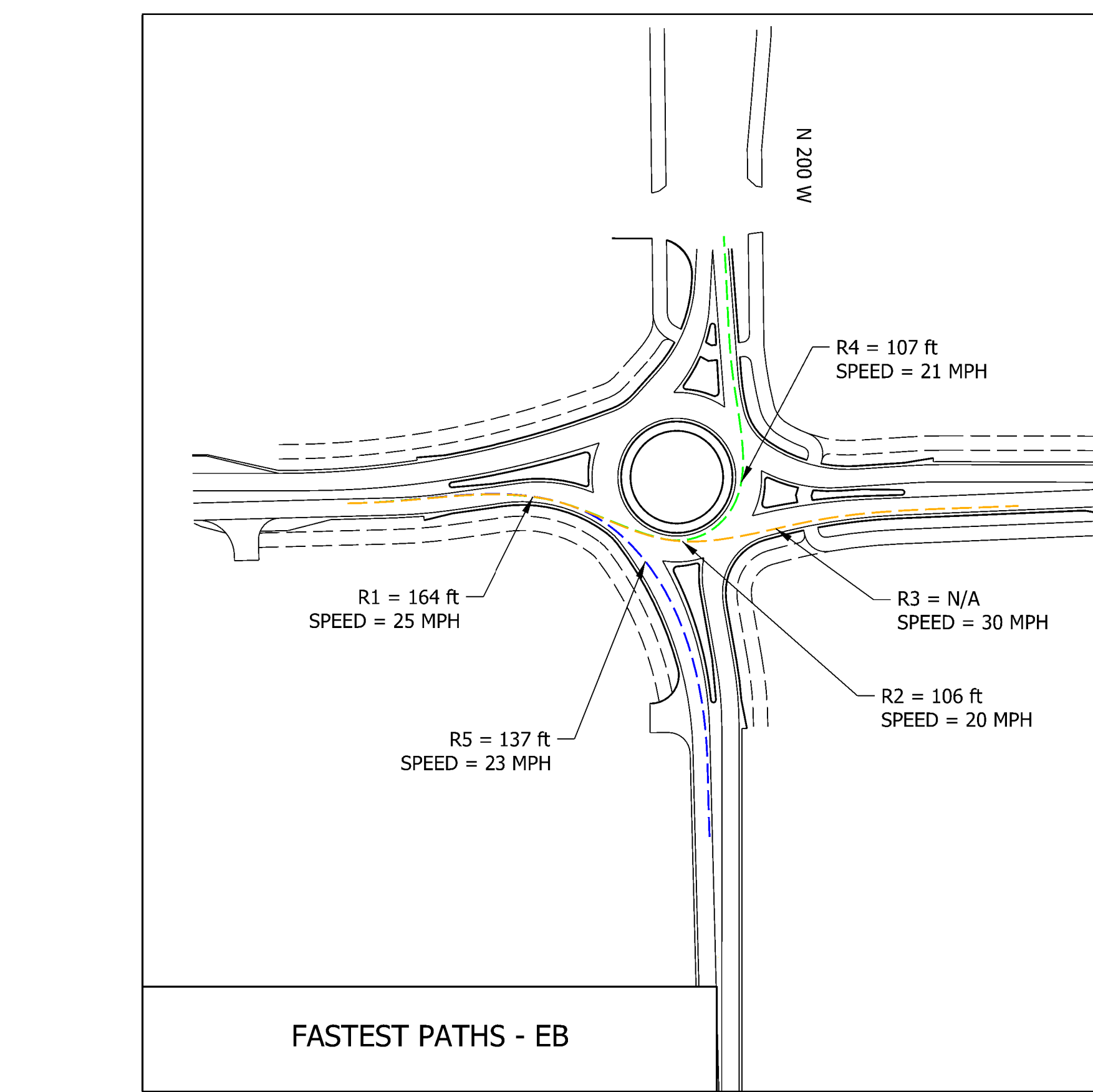
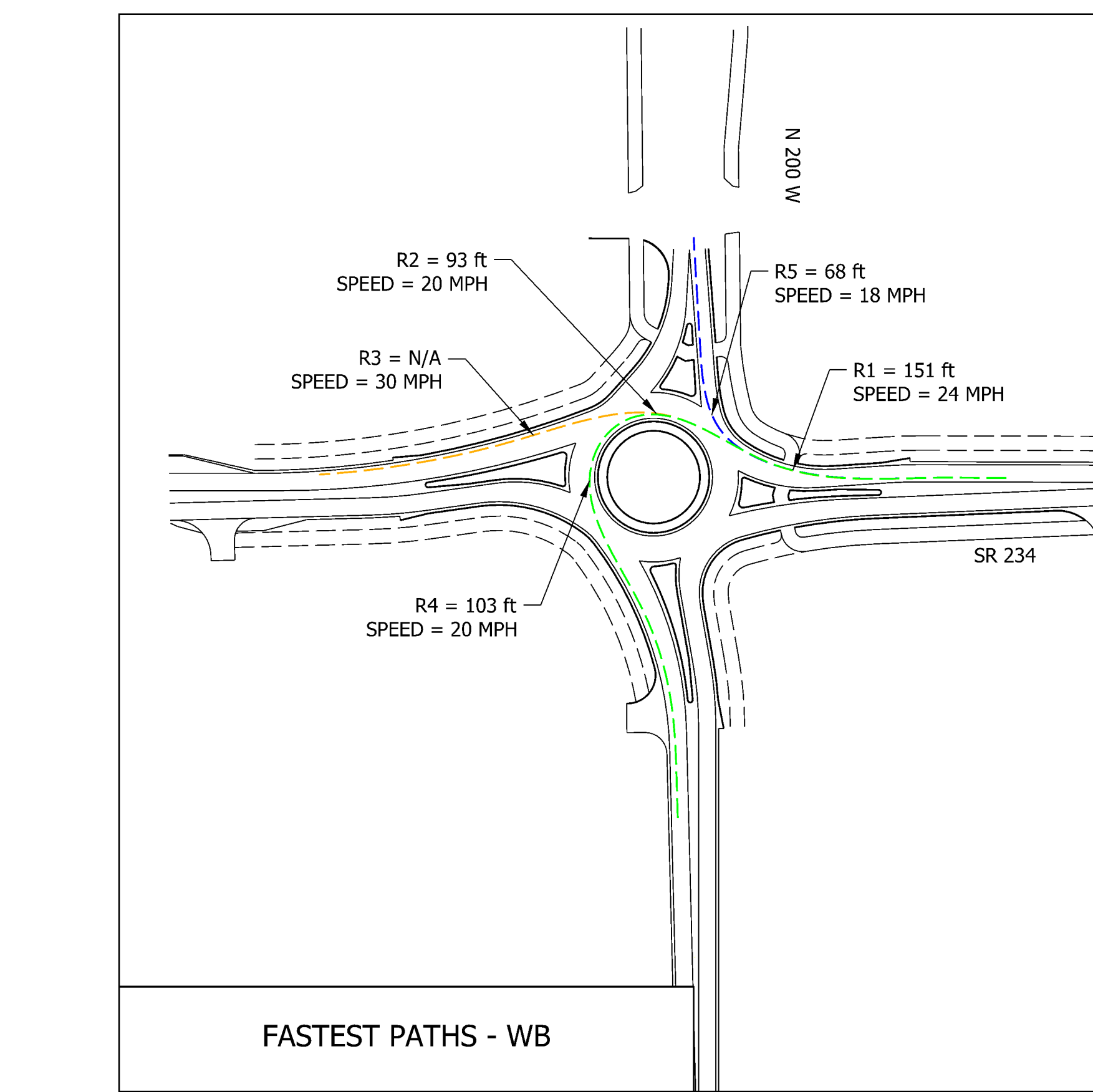
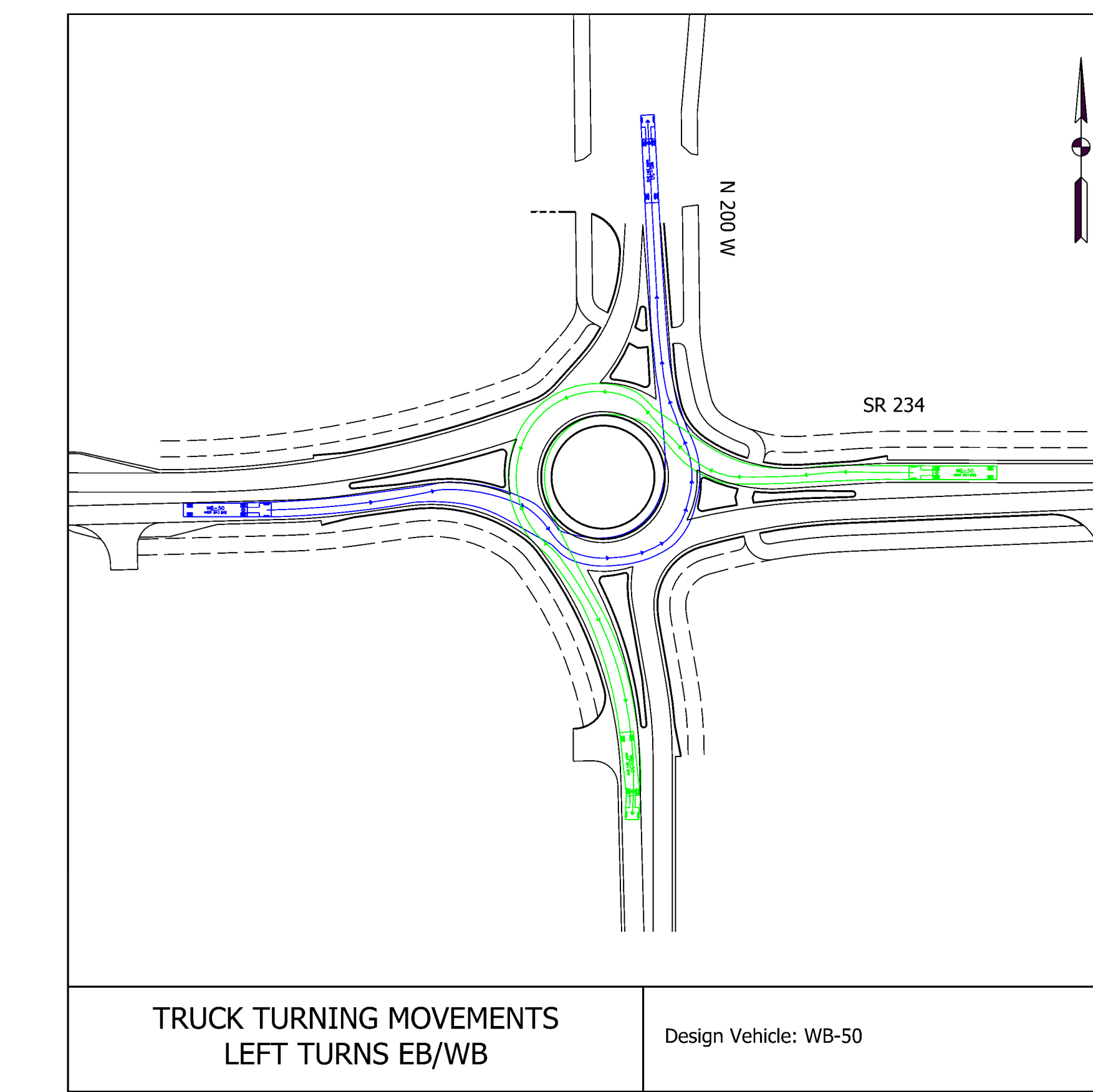
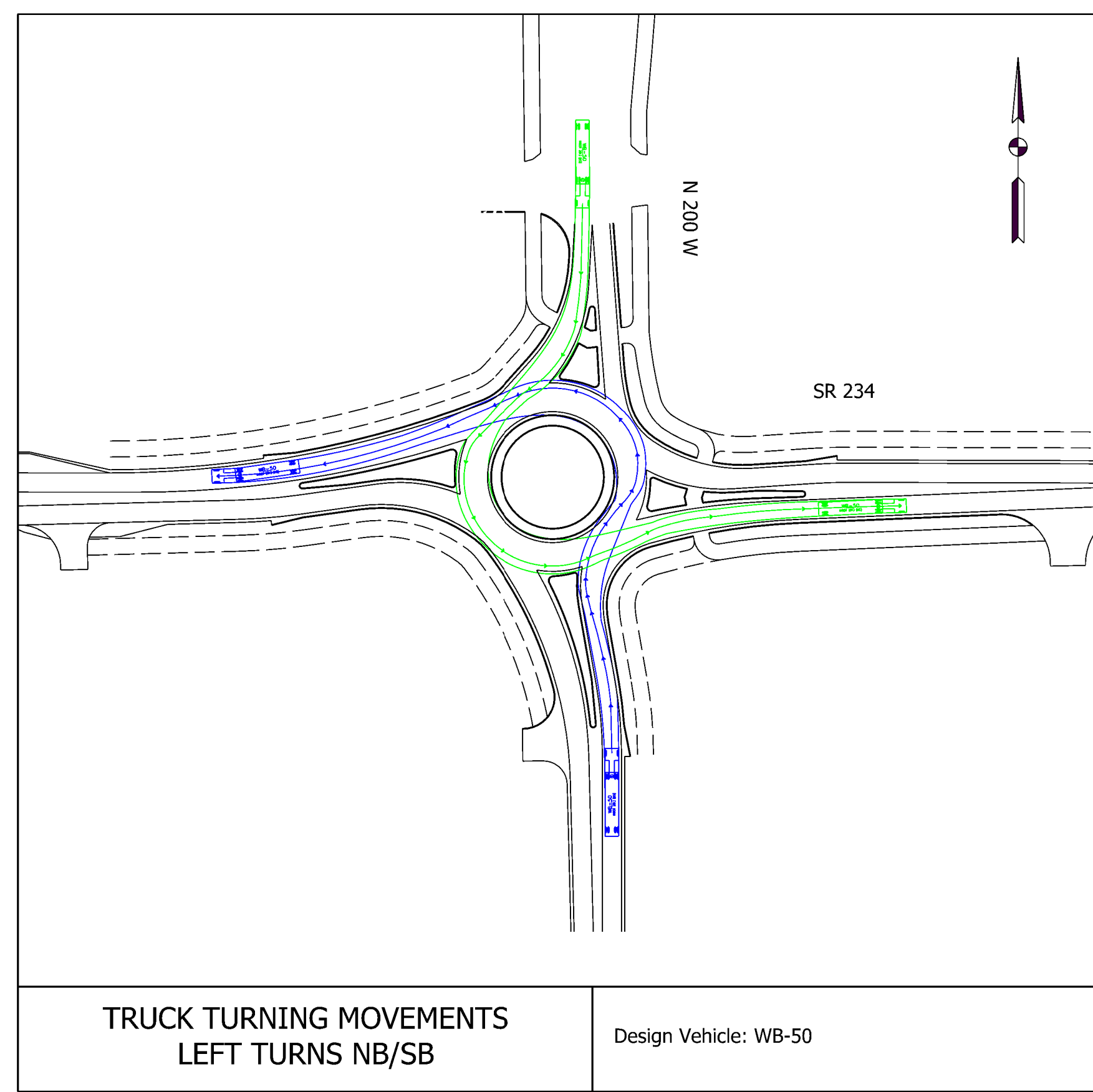
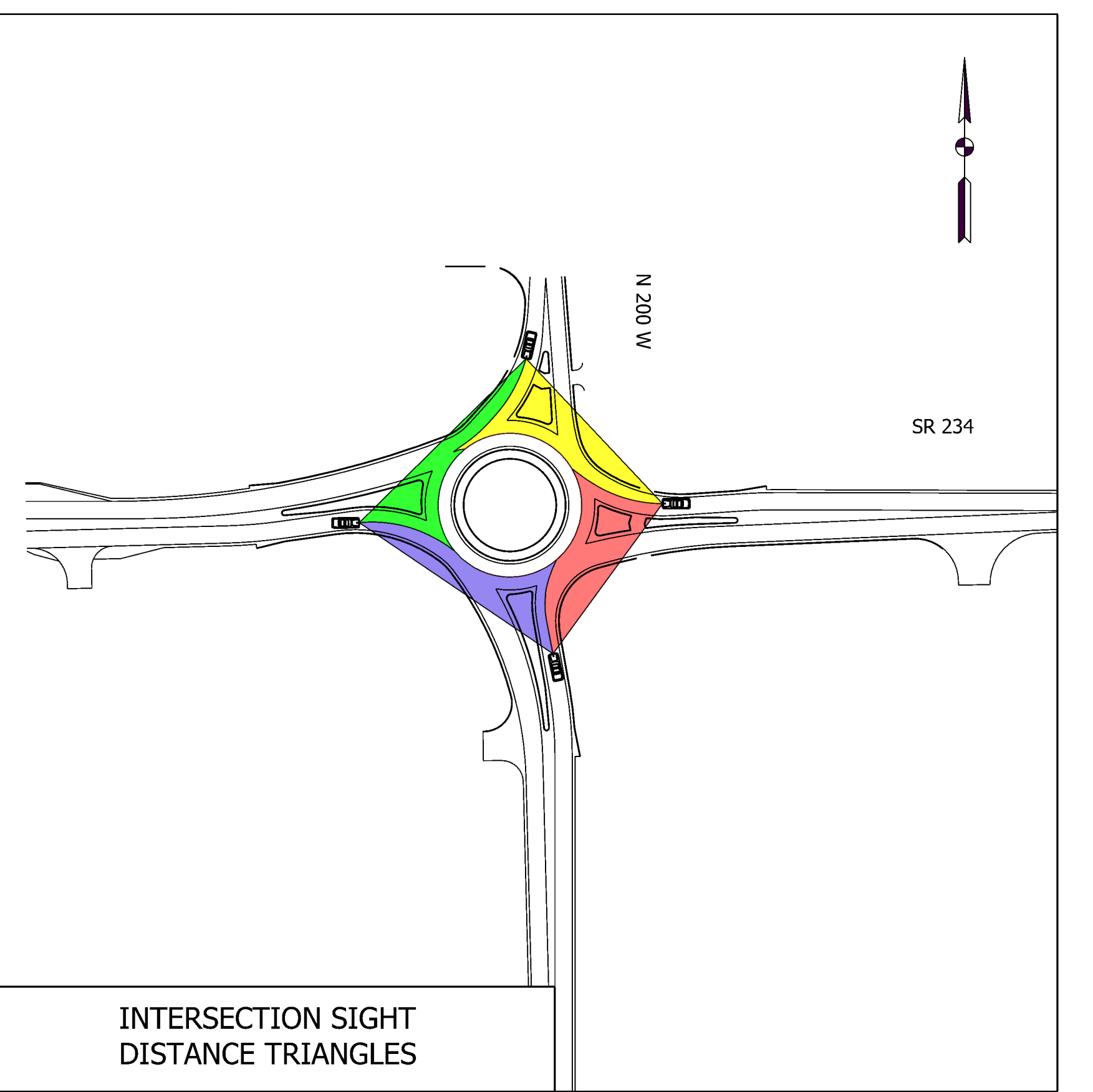
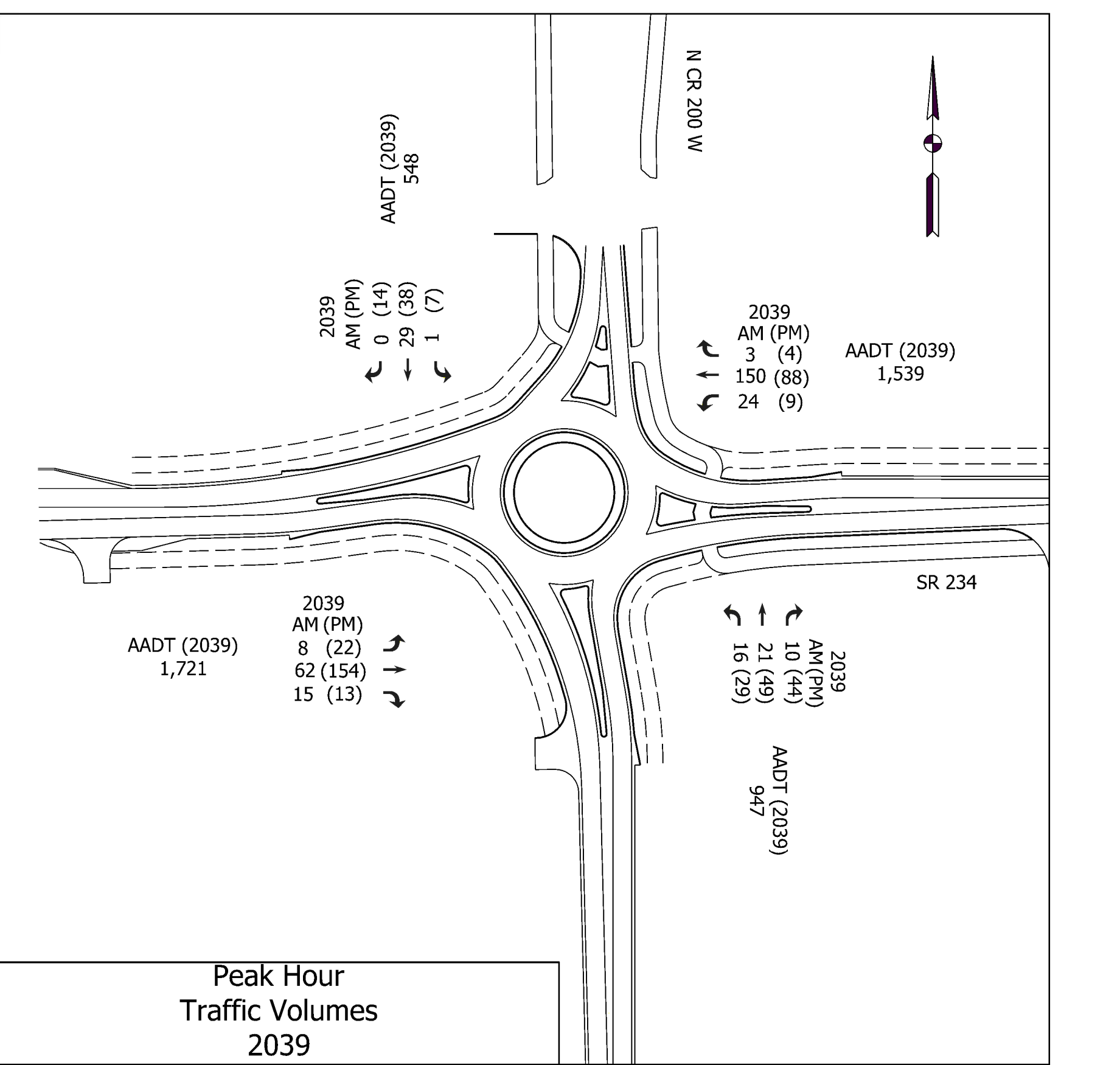
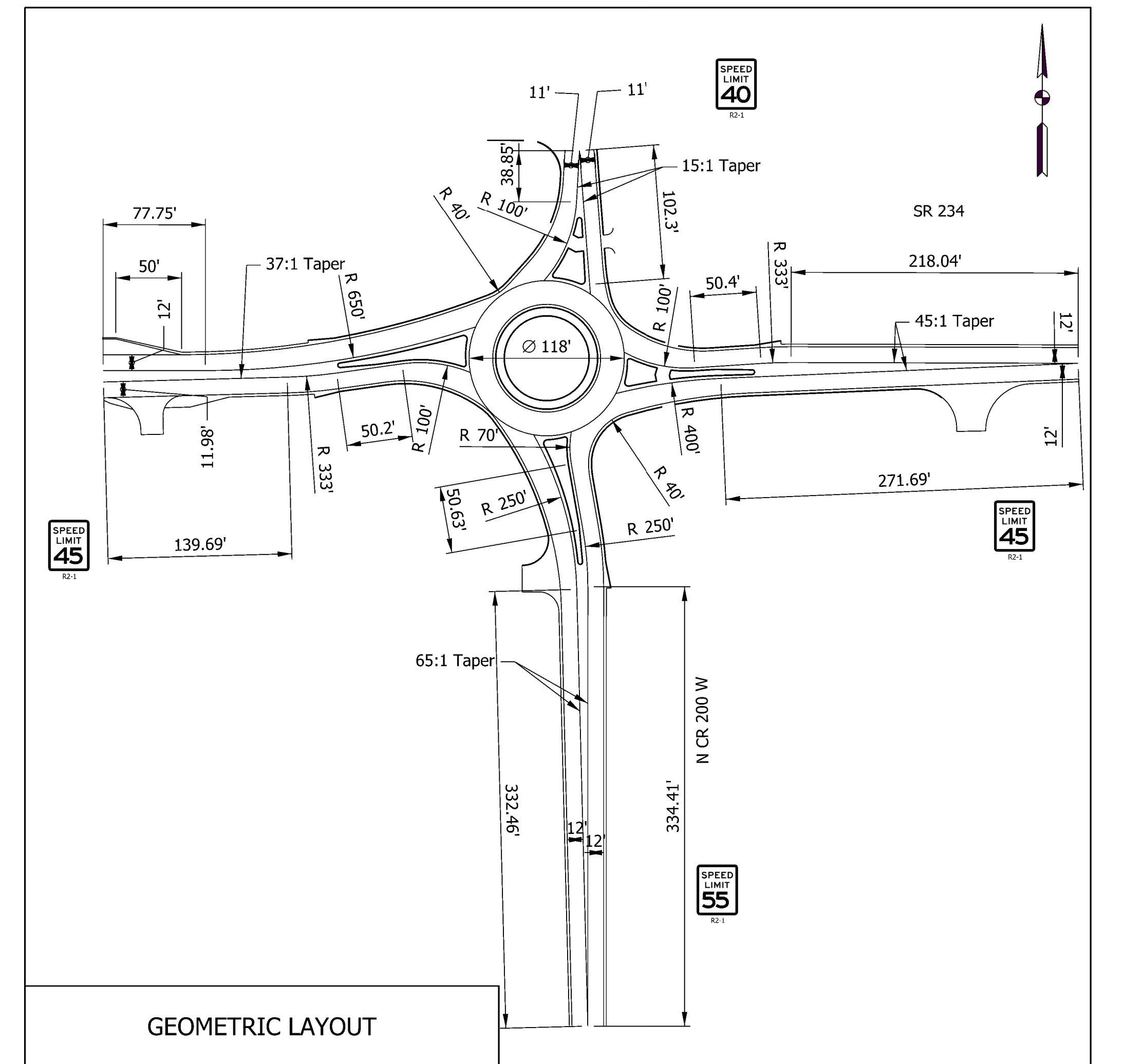
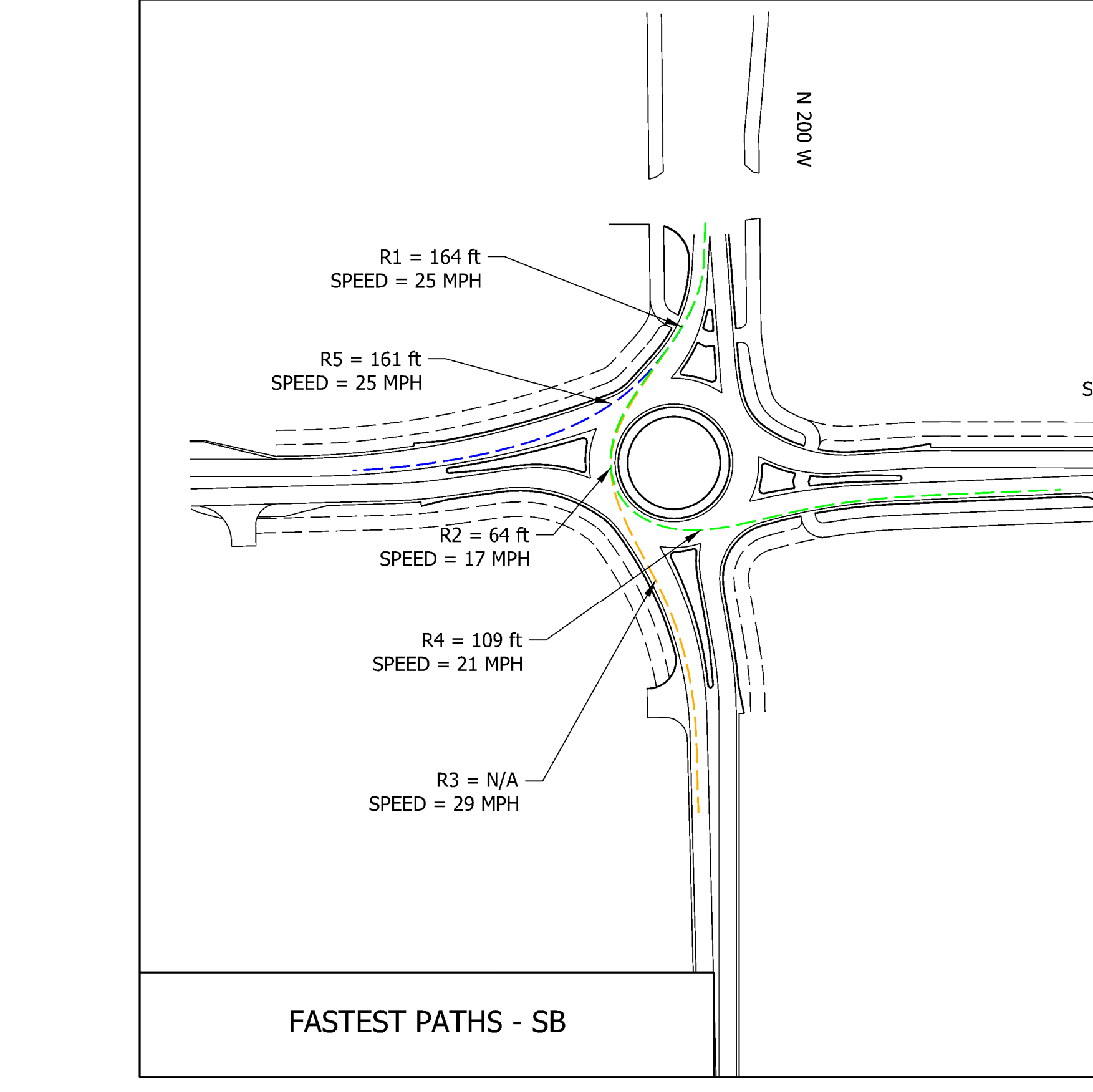
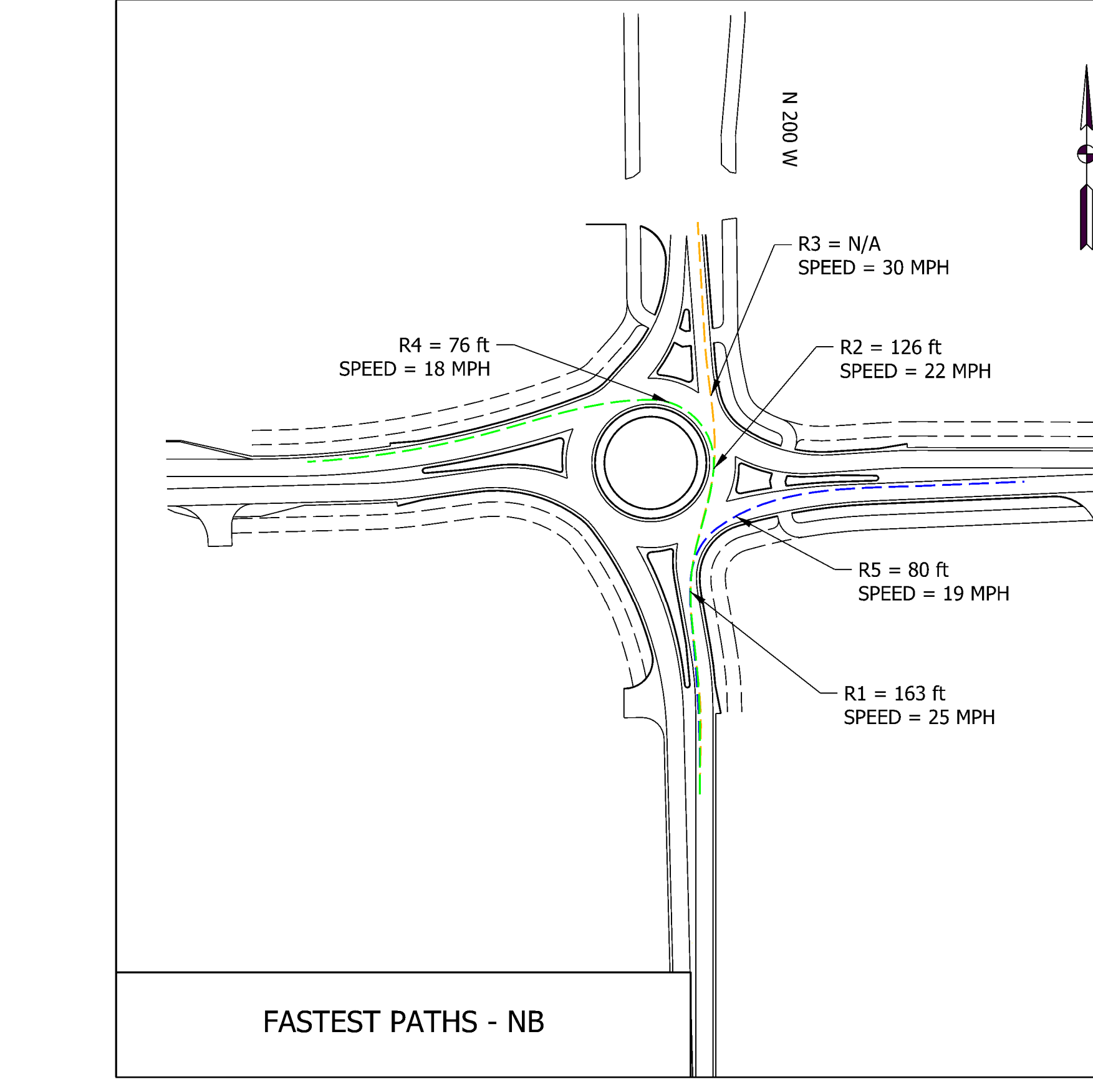
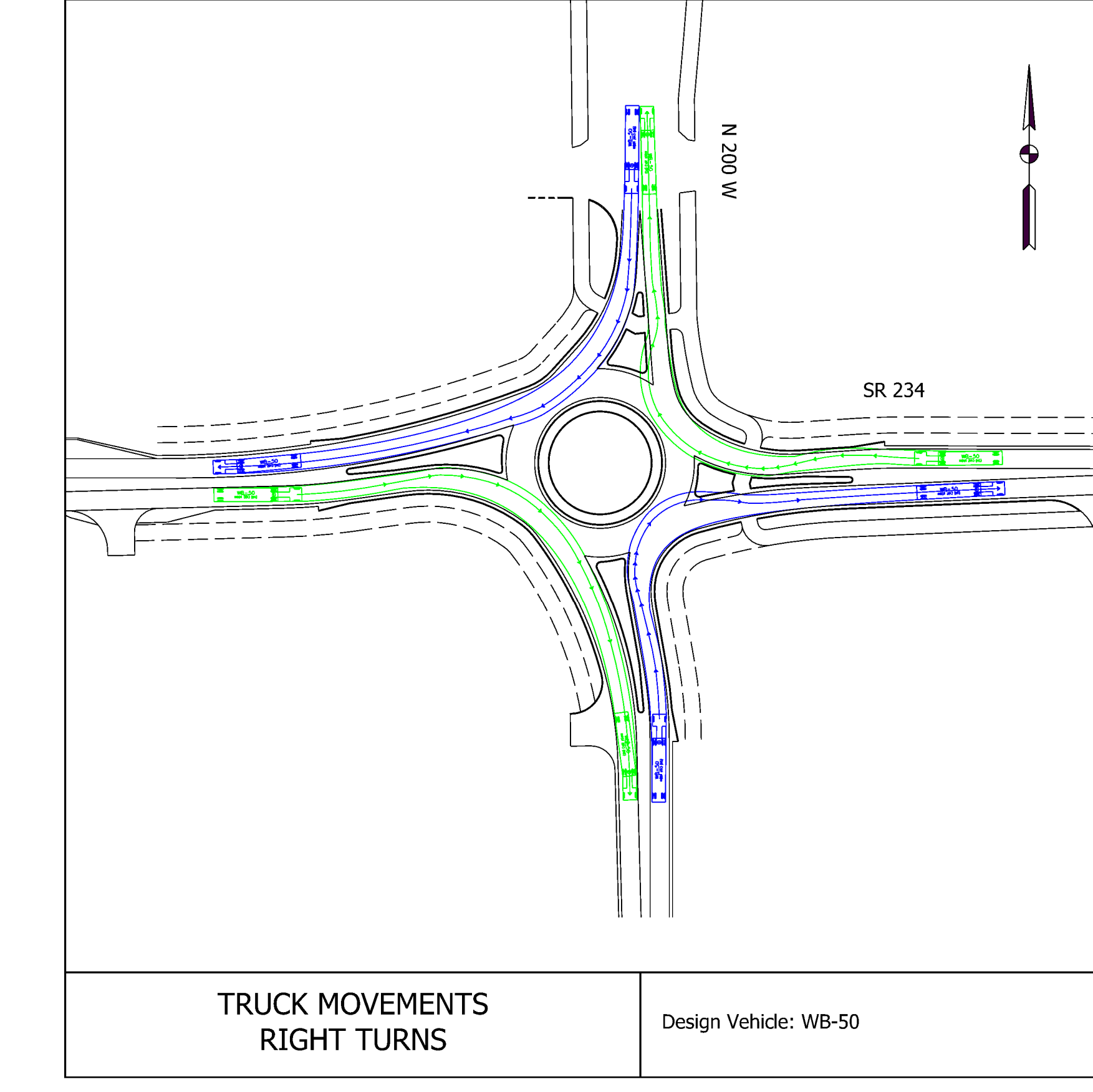
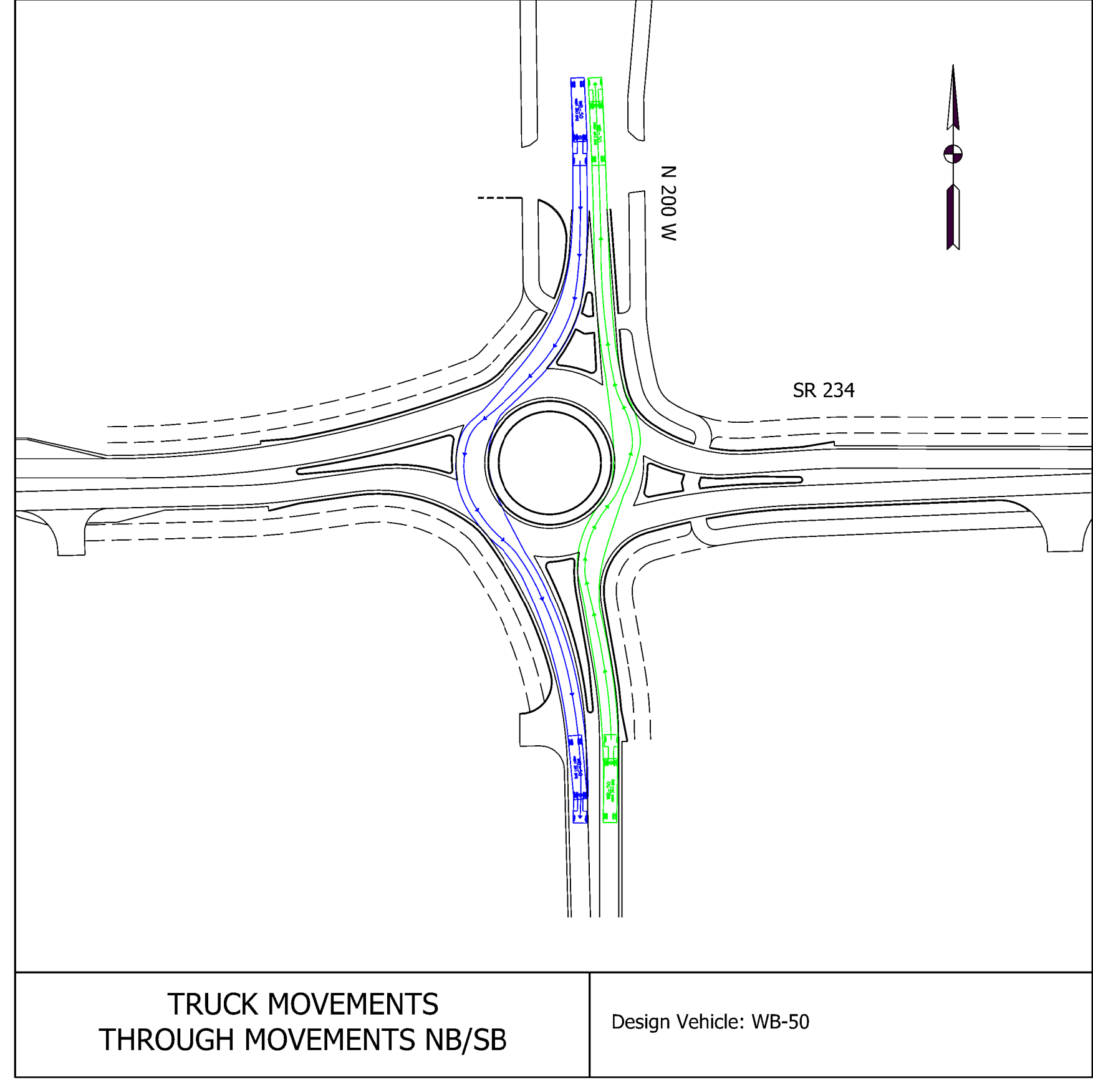
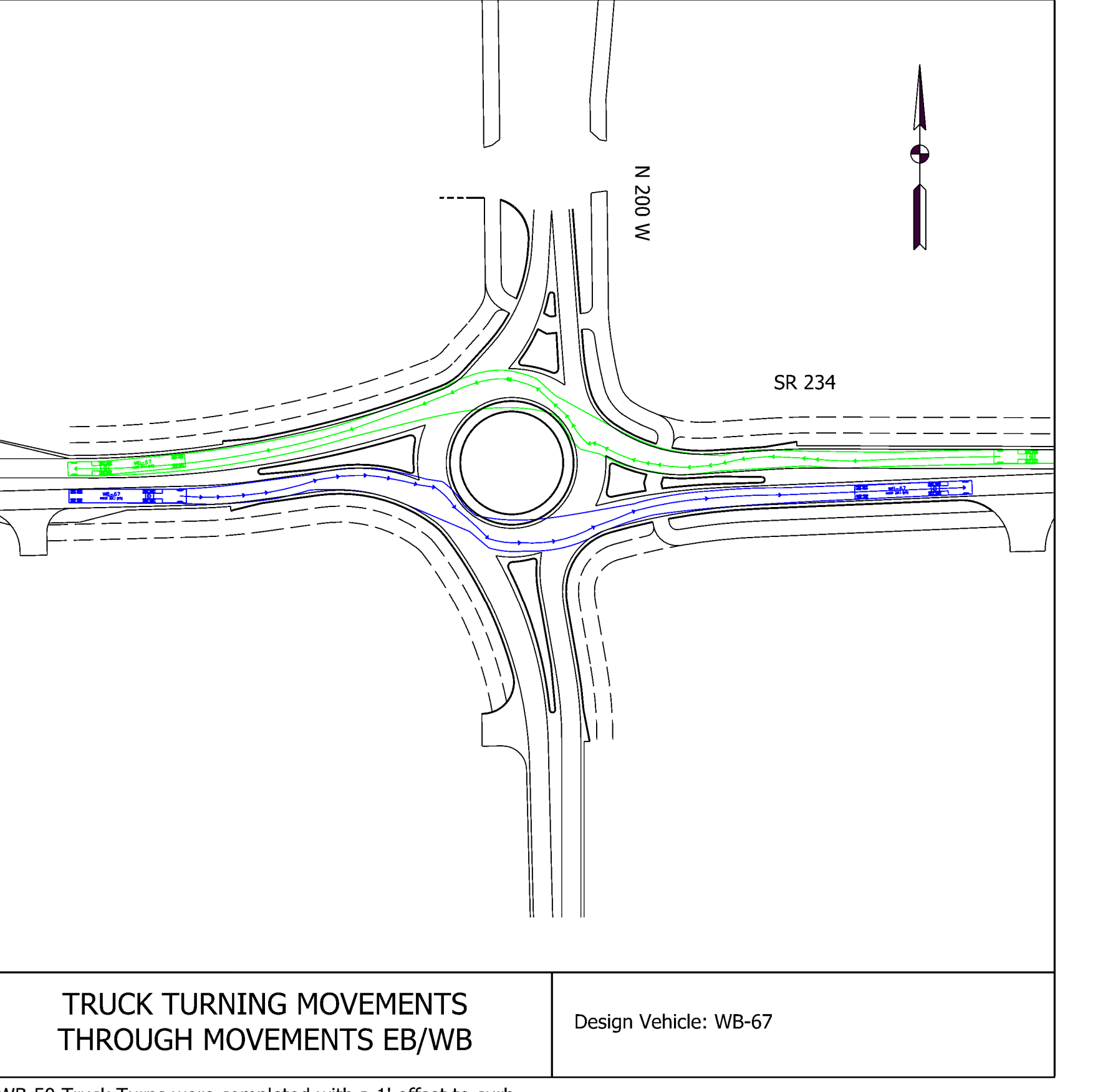
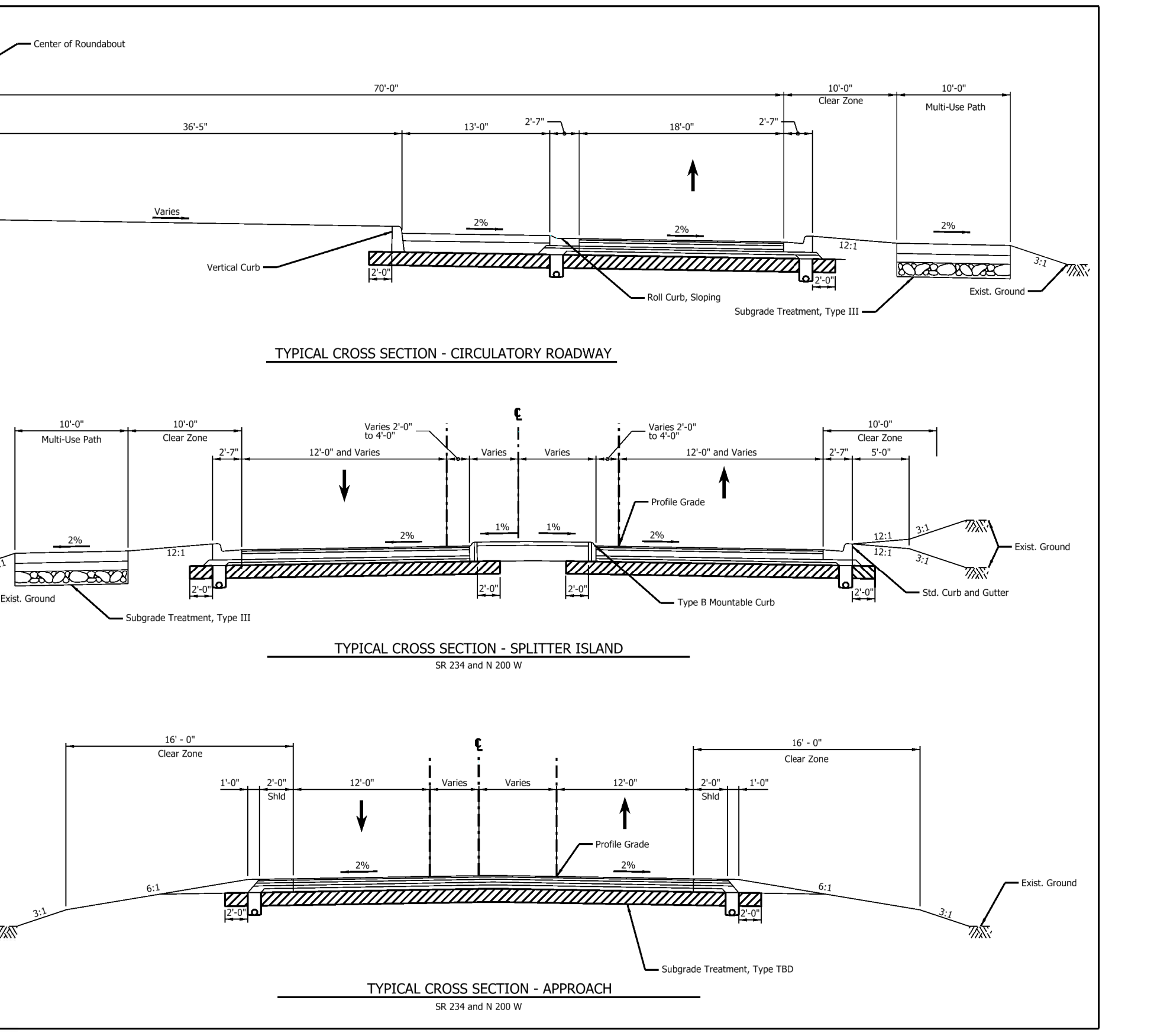


**DESIGN PARAMETERS**

	LEG 1 SB	LEG 2 W/B	LEG 3 NB	LEG 4 EB
Approach Width, FT	10.83	12.00	11.50	12.75
Entry Width (EP/EP), FT	18.0	17.6	18.4	17.4
Entry Angle, PHI $\phi$ , DEG	12.2	25.7	27.7	17.6
Inscribed Circle Diameter, FT	118	118	118	118
Exit Width (EP/EP), FT	13.8	16.5	17.1	17.3
Circulating Roadway Width Upstream of Entry, FT	18	18	18	18

**FASTEST SPEED PATH**

	107	21	151	24	163	25	164	25
$R_1$ , Radius/Speed, FT/MPH	64	17	93	20	126	22	106	20
$R_2$ , Radius/Speed, FT/MPH	N/A	29	N/A	30	N/A	30	N/A	30
$R_3$ , Radius/Speed, FT/MPH	109	21	103	20	76	18	107	21
$R_4$ , Radius/Speed, FT/MPH	131	23	68	18	97	21	137	23
Bypass $R_5$ , Radius/Speed, FT/MPH		NA		NA		NA		NA



DESIGNED: BBS	DRAWN: BBS	CHECKED: TAH	CHECKED: TAH
INDIANA DEPARTMENT OF TRANSPORTATION			
GEOMETRIC REVIEW EXHIBIT			

SCALE: BRIDGE FILE  
 VARIOUS  
 DESIGNATION: 2300706  
 SHEETS: 1 OF 1  
 CONTRACT: R-45177  
 PROJECT: 2300706

NOTES:  
 PLAN VIEW SCALE: 1" = 60'  
 TYPICAL SECTIONS: NTS

SR 234 and N 200 W Roundabout  
 Des# 2300706  
 Hancock County

### ROUNDBOUT DESIGN CHECKLIST

DESIGNER		REVIEWER	
DATE:	7/7/2025	DATE:	
DESIGNATION No.:	2300706	NAME:	
LOCATION:	SR 234 at CR 200W, Hancock County, Greenfield District		
PREPARED BY:	Reece Soel, EI		
CHECKED BY:	Tom Heustis, PE		

	DESIRED VALUE	REFERENCE	CALCULATIONS PROVIDED	MEETS DESIRED VALUE	EXPLANATION PROVIDED	REQUIRED & TAGED	REMARKS	DESIGNER COMMENTS
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#### PLANNING DOCUMENTATION

1	Location Appropriate for Roundabout		INDOT Intersection Decision Guide and Intersection Traffic Analysis Procedures	X		1	The Engineer's Assessment/Report should include documentation in accordance with the INDOT's <i>Intersection Traffic Analysis Procedures</i> and the <i>Intersection Decision Guide</i> to demonstrate that the appropriate analyses have been completed to determine the feasibility of a roundabout.	
2	Traffic Data for 10 and 20 Years After Construction		INDOT Intersection Traffic Analysis Procedures	X	X	1	Traffic Forecasts should be provided. It may be desirable to phase construction if a multi-lane roundabout is not required at 10 years, but will be in 20 years. If phased construction approach is utilized, engineer must provide appropriate documentation.	Engineer's Report forecasted volumes through 2048. Updated Traffic Forecast shown in Preliminary Geometrics is for 10 years, but will be revised at Stage 1 submittal for 20 years.
3	Capacity Analysis for 10 and 20 Years After Construction		INDOT Intersection Traffic Analysis Procedures	X		1	The analysis should be in accordance with the INDOT Intersection Traffic Analysis Procedures document located on the INDOT Designer's web page.	
4	Meets LOS Threshold		IDM Chap. 53 - 56, NCHRP 8.4.1, 8.4.2	X		1		
5	Meets Queue Length Threshold	Approach Geometry matches dimensions included in capacity analysis.		X	X	1	Queue lengths do not cause blocking of nearby major driveways, intersections or railroad crossings.	AM Peak is 50 ft, PM peak is 35 ft, along the north leg which does not impact school drives to the north

#### DESIGN DOCUMENTATION

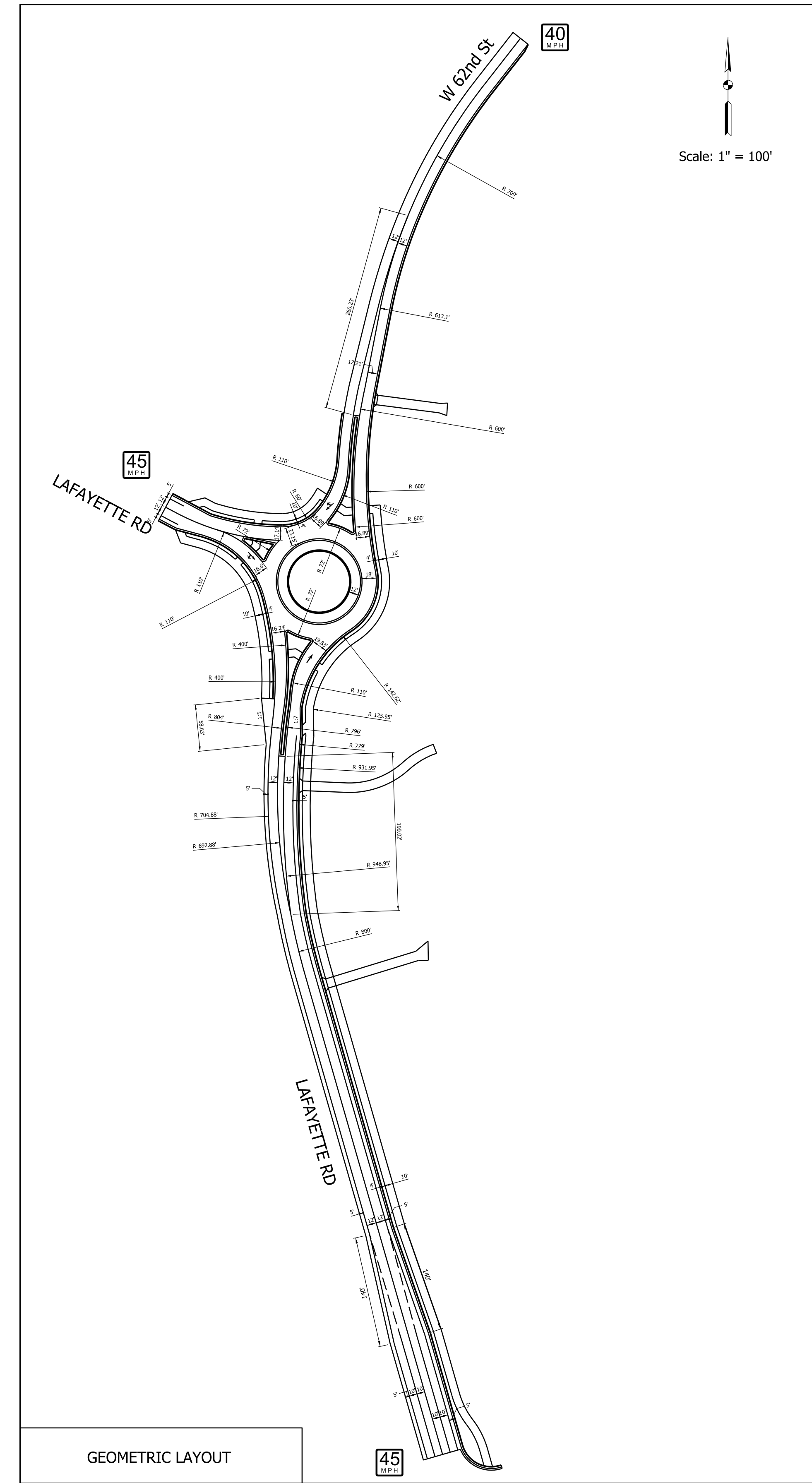
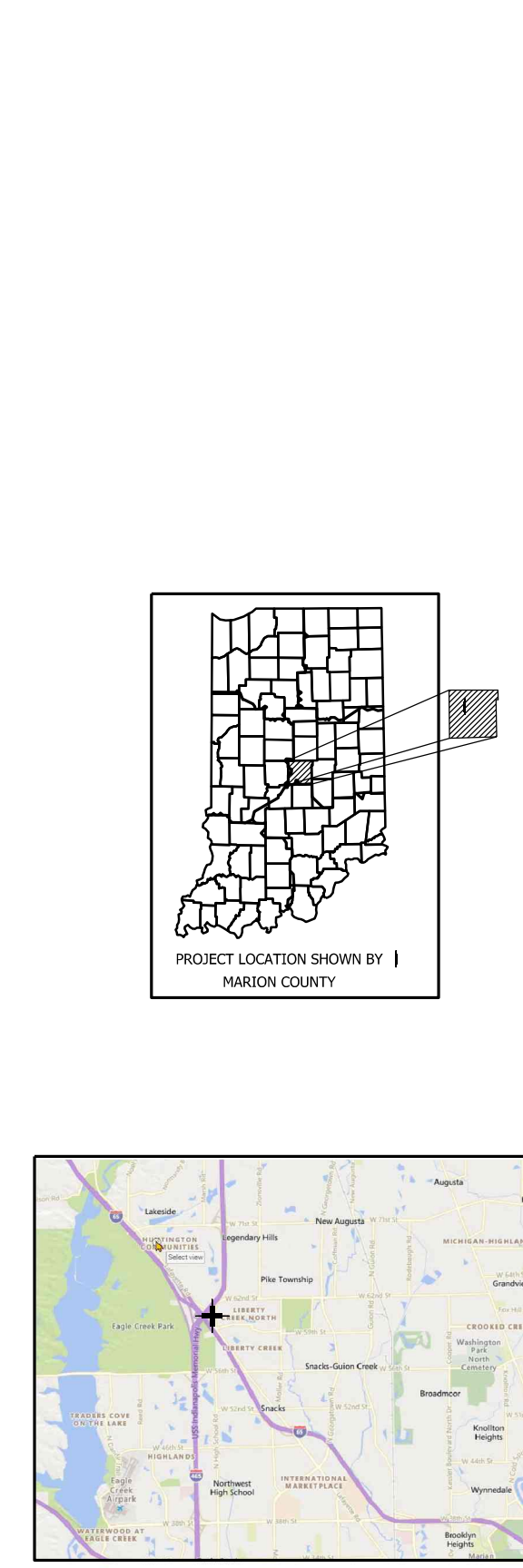
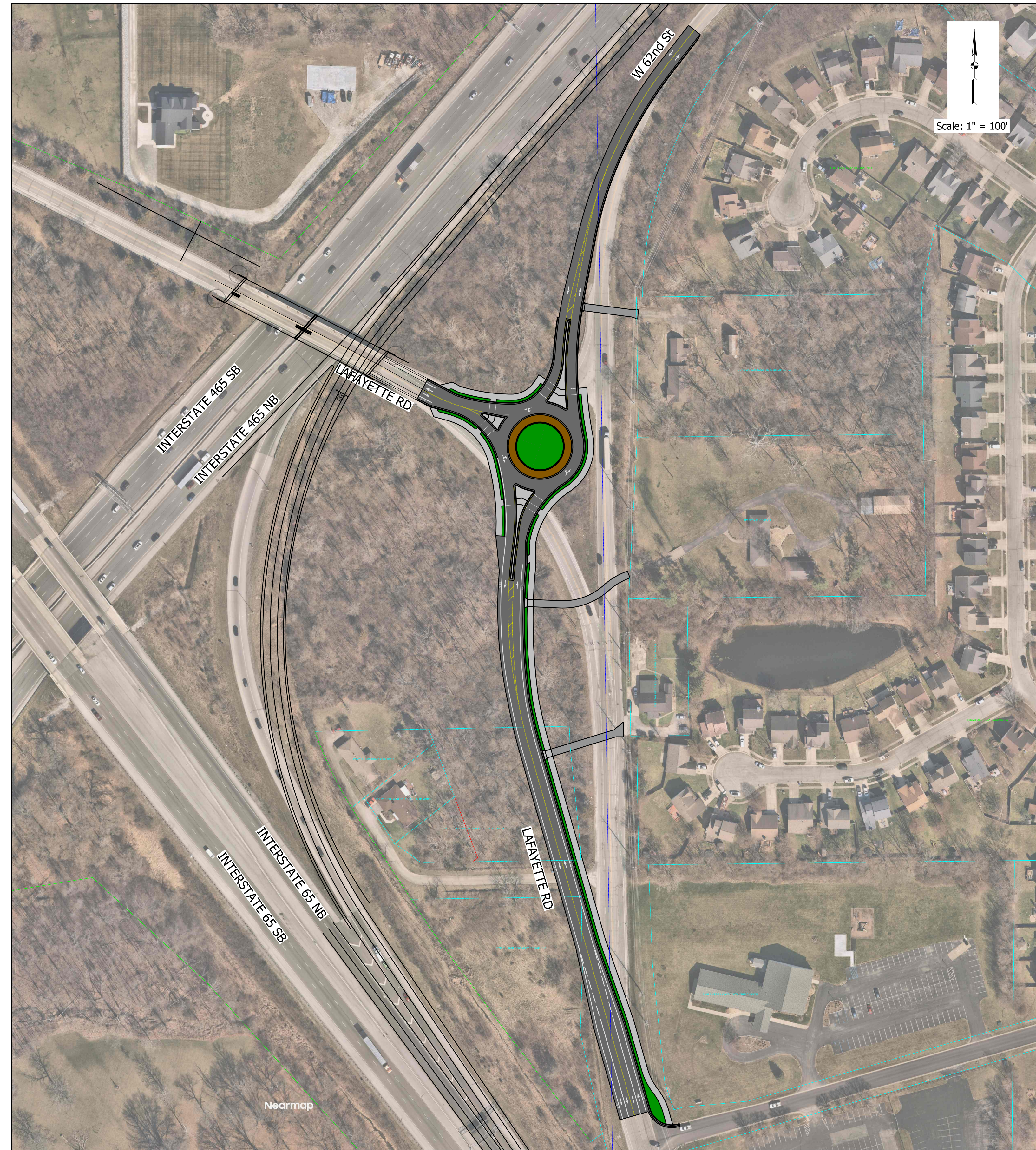
6	Speeds Appropriate / Fastest Paths	Mini - 20mph Single Lane - 25mph Multi-Lane - 25mph - 30mph	NCHRP 9.4 IDM	X	X	1	Fastest Path diagrams need to be submitted with Level 2 calculations and should be constructed consistent with NCHRP 672 process. Exit Speeds must be a calculated using acceleration equation (NCHRP Equation 6-4), instead of fastest path tables. Any and all fastest paths not meeting desired values should be explained as a part of calculations submittal. The desired speeds shown are recommended values only. If good engineering judgement has been used, speeds in excess of the desired speeds listed can be accepted.	Maximum Speed is 30 mph. Coordination with INDOT District and Central Office to balance slightly higher speeds with cost savings on RAB footprint and construction costs
7	Speed Differential / Consistency	10mph - 15mph	NCHRP 10.14.3, IDM	X	X	1	Any and all fastest paths not meeting desired values should be explained as a part of calculations submittal. As with other design elements, speed consistency should be balanced with other objectives in establishing a design.	
8	* Stopping Sight Distance		NCHRP 9.5.1, IDM		X	1	SSD for circulating movements should be shown graphically, based on the appropriate fastest path speed. Three SSD locations should be checked. SSD Calculations should be included in Level 2 calculations.	
9	* Intersection Sight Distance		NCHRP 9.5.2, IDM		X	1	ISD should be shown graphically and included in Level 2 design calculations. It is very important that pedestrians are clearly visible by approaching vehicles.	
10	Allowable Landscaping Areas		NCHRP Chapter 14.4			2	Designer should include an overlay of graphical checks of ISD and SSD to reveal the areas where landscaping height is not restricted. Additionally, designer should identify locations where landscaping is restricted. Restrictions on the properties of the	
11	Lighting Design		NCHRP Chapter 14.1, 14.2, 14.3, IESNA Publication DG-19-08			3	Illumination calculations and graphical checks match the lighting fixtures and proposed heights of fixtures. Light poles can be placed in central island if necessary, but should not be placed in splitter islands.	

#### ROUNDBOUT DESIGN

12	Geometry matches capacity analysis		ENGINEER'S REPORT	X		1	Capacity of a roundabout is directly correlated to its geometry, therefore, the design must be completed in accordance with the parameters used in the capacity analysis.	
13	Inscribed Circle Diameter Range	Mini / Compact SU 30 45' - 90'  Single Lane B-40 90' - 150' WB-50 105' - 150' WB-67 130' - 180'  Two Lane WB-50 150' - 220' WB-67 165' - 220'  Three Lane WB-50 200' - 250' WB-67 220' - 300'	NCHRP 2.3.1	X	X	1	See NCHRP 672, Section 6.3.1 for recommended sizes of roundabouts by design vehicle type.	ICD = 118'

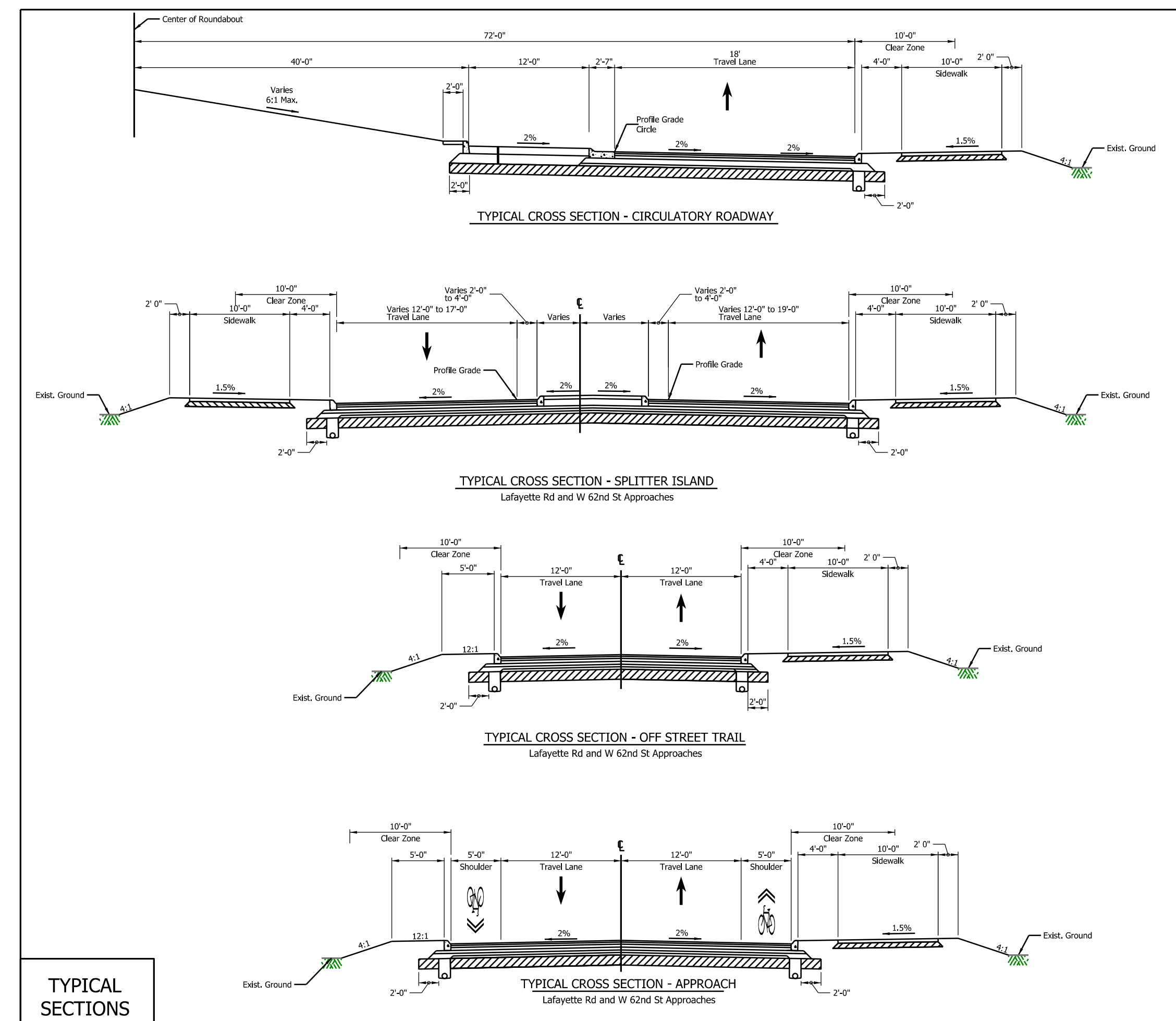
	DESIRED VALUE	REFERENCE	CALCULATIONS PROVIDED			MEETS DESIRED VALUE	EXPLANATION PROVIDED	REQUIRED STAGE	REMARKS	DESIGNER COMMENTS
<b>ROUNDBOUT DESIGN</b>										
14	Approach Alignment Offset Left or Centered	Right offset should be avoided, Left offset preferred	NCHRP 10.3.3	X	X		1	Left offset typically provides better deflection and reduces speeds more effectively. Justification for right offset approaches should be included with Level 2 calculations.		
15	Circulatory Roadway Width	Single Lane - 16' - 20' Multi Lane - 14'-16' per lane 1.0-1.2 x Entry Lane Width	NCHRP 10.6.6	X	X		1	Single Lane Roundabout Rule of thumb 100%-120% of entry width.	18' Circulatory Lane Width	
16	Approach Radii	Single Lane - 50'-100' Multi-Lane - 65'-120'	NCHRP 10.6.4	X	X		1	Design should match geometry used in scoping document / capacity analysis. A wide range of entry curb radii may be appropriate depending upon the other components of the design.		
17	Entry Width	Single Lane - 14'-18' Two-Lane - 24'-30' Three Lane - 36'-45'	NCHRP 10.6.4	X	X		1	Measured from point where entrance line intersects the left edge of traveled way to the right edge of the traveled way, along a line perpendicular to the right curb line.		
18	Exit Radii	100'-800' Allowable 300'-600' Desirable	NCHRP 10.6.5	X	X		1	Exit Radii as small as 50 ft can be used if necessary to control exit speeds at the crosswalk in certain situations. However, small exit radii can affect the natural flow of traffic through a roundabout and therefore reduce capacity and increase the pote		
19	Checking for Vehicle Path Overlap (Multi-lane only)		IDM Section 51-12.09(14)				1	See NCHRP 672, Sections 6.2.3, 6.5.4, & 6.5.6 for additional information.	N/A	
20	Central Island Truck Apron Width	Desirable - 12-ft. Minimum - 5 ft. Max - Per Design Vehicle Templates	NCHRP 10.5.2	X	X		1	The apron width is dependent on the design vehicle turning templates. Curb height for truck aprons on INDOT routes should be a 2" sloping curb on single lane RABs. On multi-lane RABs, 3" sloping curb maybe considered providing the center island design accommodates encroachments by OSOW vehicles and has the approval of the District Traffic Engineer.		
21	Pedestrian Crossing Placement	20'-40' (One (1) to Two (2) car lengths) behind Yield Line	NCHRP 10.4.7	X	X		1	Ample length and width of splitter island should be designed to provide a safe refuge for pedestrians. Location of crosswalks at the locations shown in guides typically coincides with a vehicles slowest approach speeds.		
22	Pavement Markings Appropriate		MUTCD 3C / NCHRP 12				1	Pavement markings play a major role in the operation of a roundabout, pavement marking schematics should be included in early plan submissions.	No markings completed due to stage	
23	Entry Grade Profile	Entry Grade Profile should be leveled out so as not to exceed 3%	NCHRP 11.3				1	The Entry Grade Profile is not the same as the approaching road grade. Roundabouts have been placed on roadways with a mainline grade up to 10%. The entry grade profile is defined as the area approximately two car lengths from the outer edge of the circle.	No profile design completed due to stage	
24	No Drainage Structures in Circulatory Roadway	Avoid Drainage Structures within Circulatory Roadway. Desirable location is between circulatory roadway and curb ramps.	NCHRP 11.4.1				2	Placing inlets within circulatory roadway should be avoided. Primary concern with inlets in the circulatory roadway include maintenance difficulties (traffic restrictions in roundabout may be necessary for cleaning) and lane encroachment/spread within the roundabout and approaches.		
25	Signs		MUTCD 2B.43-45 / NCHRP 12				3			
26	Lighting Structures Placement	All roundabout elements must be lit so they are clear to motorists. Lights must be located in advance of crosswalks to avoid pedestrian backlighting.	NCHRP Chapter 14, IESNA Publication DG-19-08				3	Light poles can be placed in central island if necessary, but should not be placed in splitter islands.		
<b>DESIGN PLANS</b>										
27	Radii Clearly Labeled			X			1	Stage 1 submittal should include enough information for a reviewer to identify the critical radii elements (ICD, Approach Radii Exit Radii)		
28	Spot Elevations and/or Grading Plans are Clear and Concise.						3	Can a contractor build the roundabout with the information provided?		
29	Sign Types and Locations Clearly Defined.						3	Signs should be located outside the path of the Design Vehicle.		
30	Specialty Markings Clearly Detailed.						3			
<a href="#">NCHRP 1043 Link:</a> * Denotes level 1 criteria. All level 1 calculations should be included with standard INDOT Level 1 checklist just as any other project. All other criteria should be considered Level 2. Deviation from standards on Level 2 items requires written approval										

Lafayette Rd Intersection Improvement Roundabout at W 62nd St  
 Des# 2002581  
 Marion County

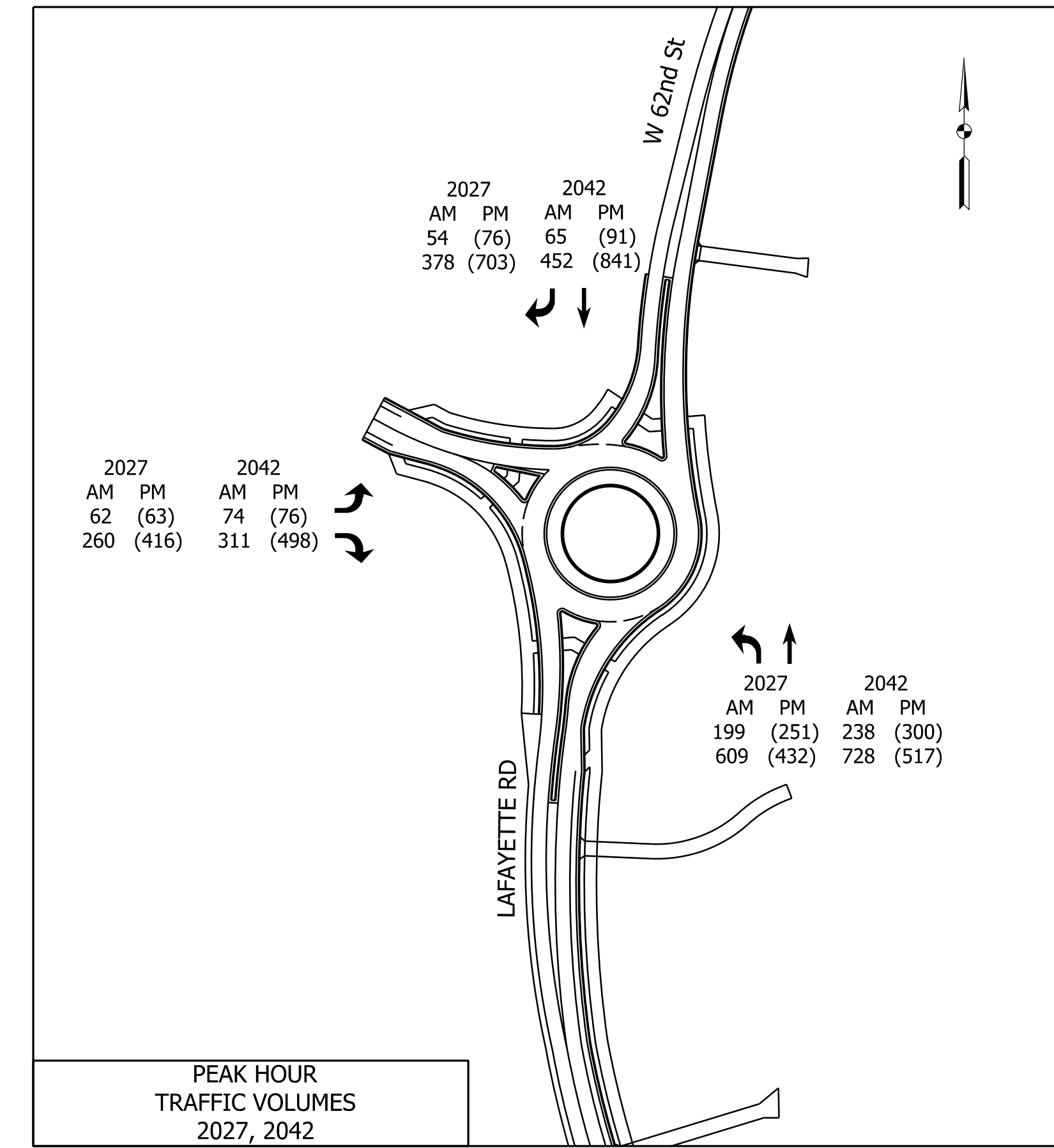


	W 62ND ST (NORTH LEG)	LAFAYETTE ROAD (WEST LEG)	LAFAYETTE ROAD (SOUTH LEG)
DESIGN SPEED (MPH)	40	45	45
SPLITTER ISLANDS LENGTH (FT)	140	34	150
DECELERATION LENGTH (FT)	235	295	295

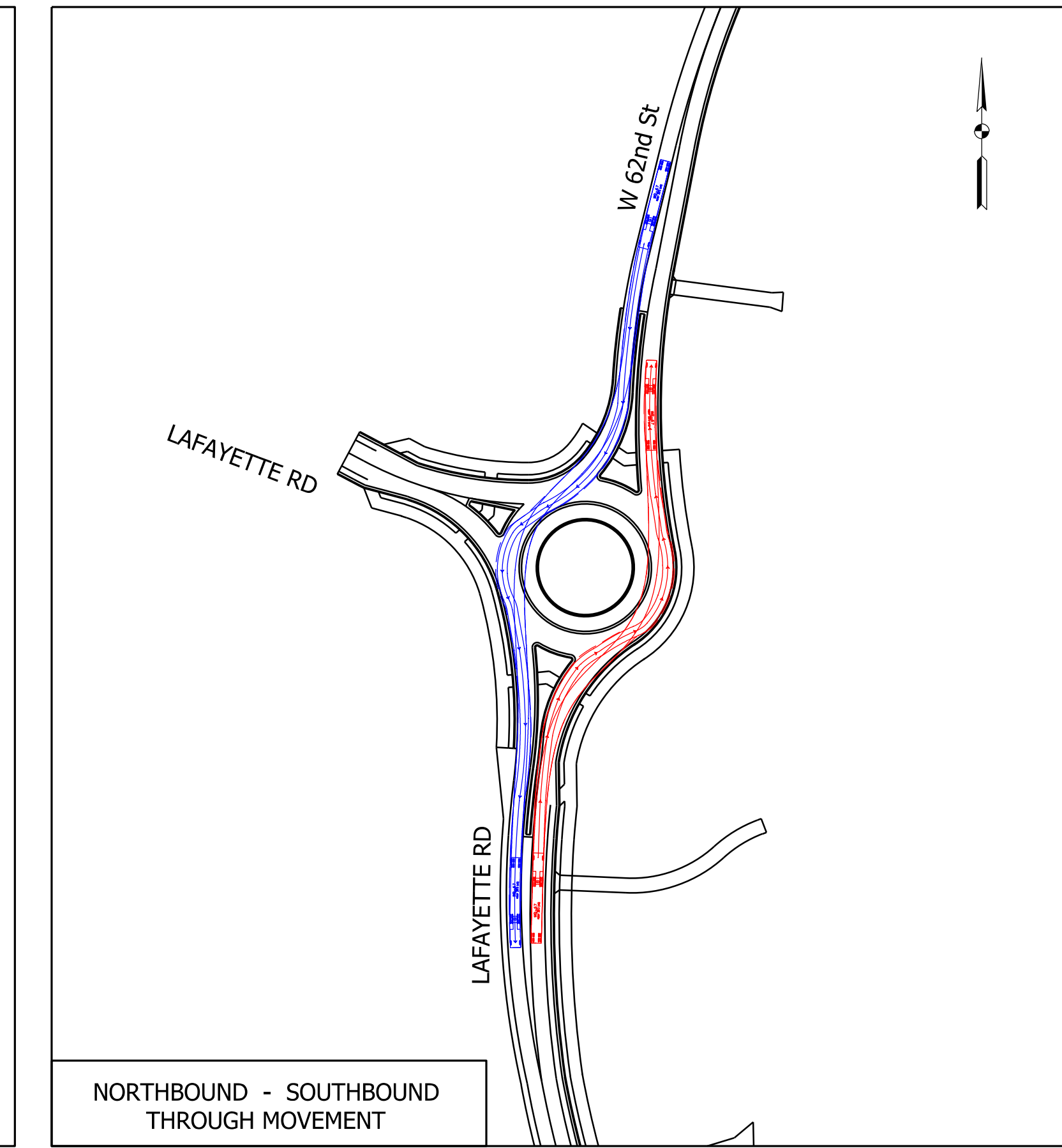
NOTES:  
 PLAN VIEW SCALE: 1" = 100'  
 TYPICAL SECTIONS: NTS



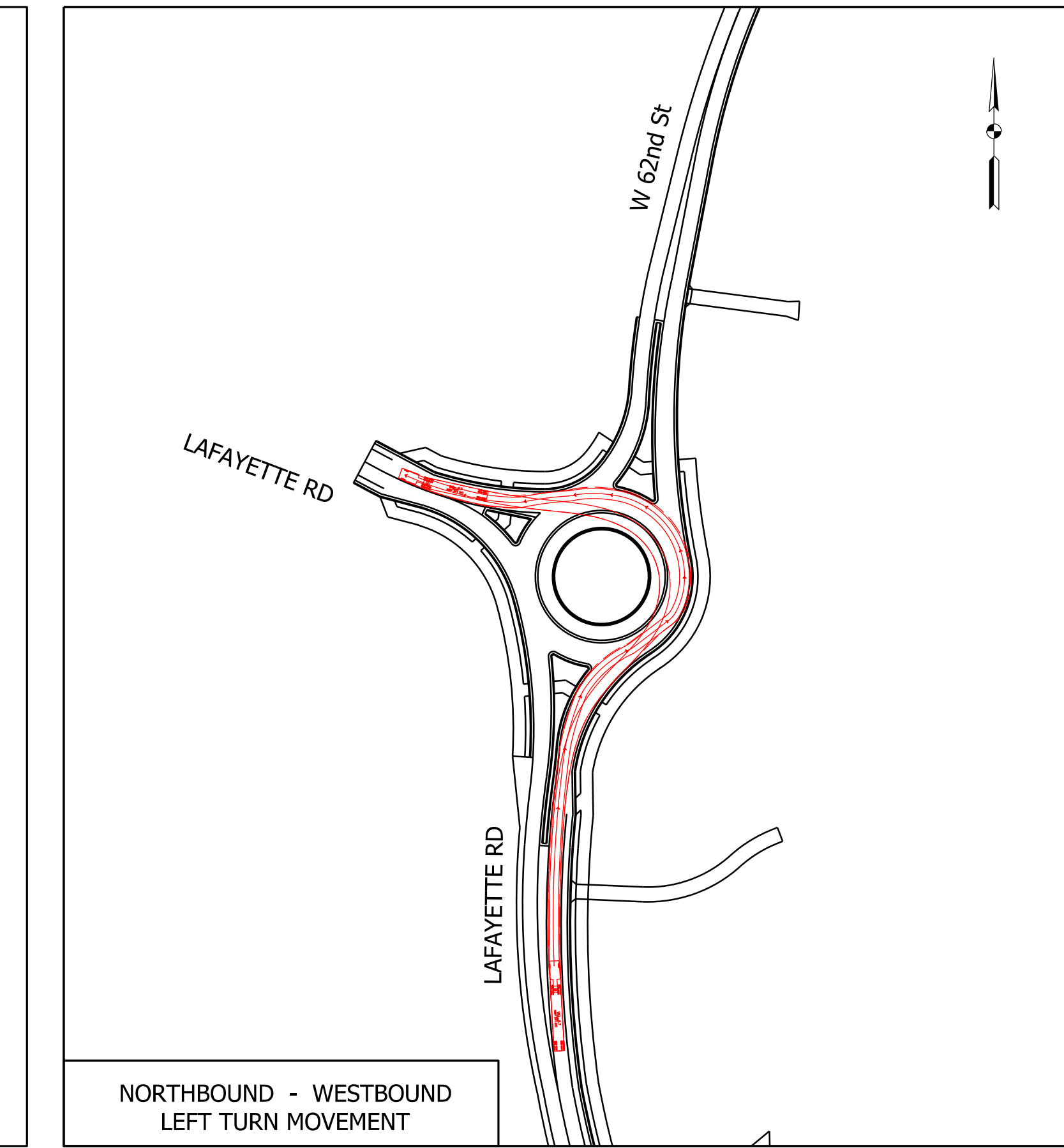
TYPICAL SECTIONS



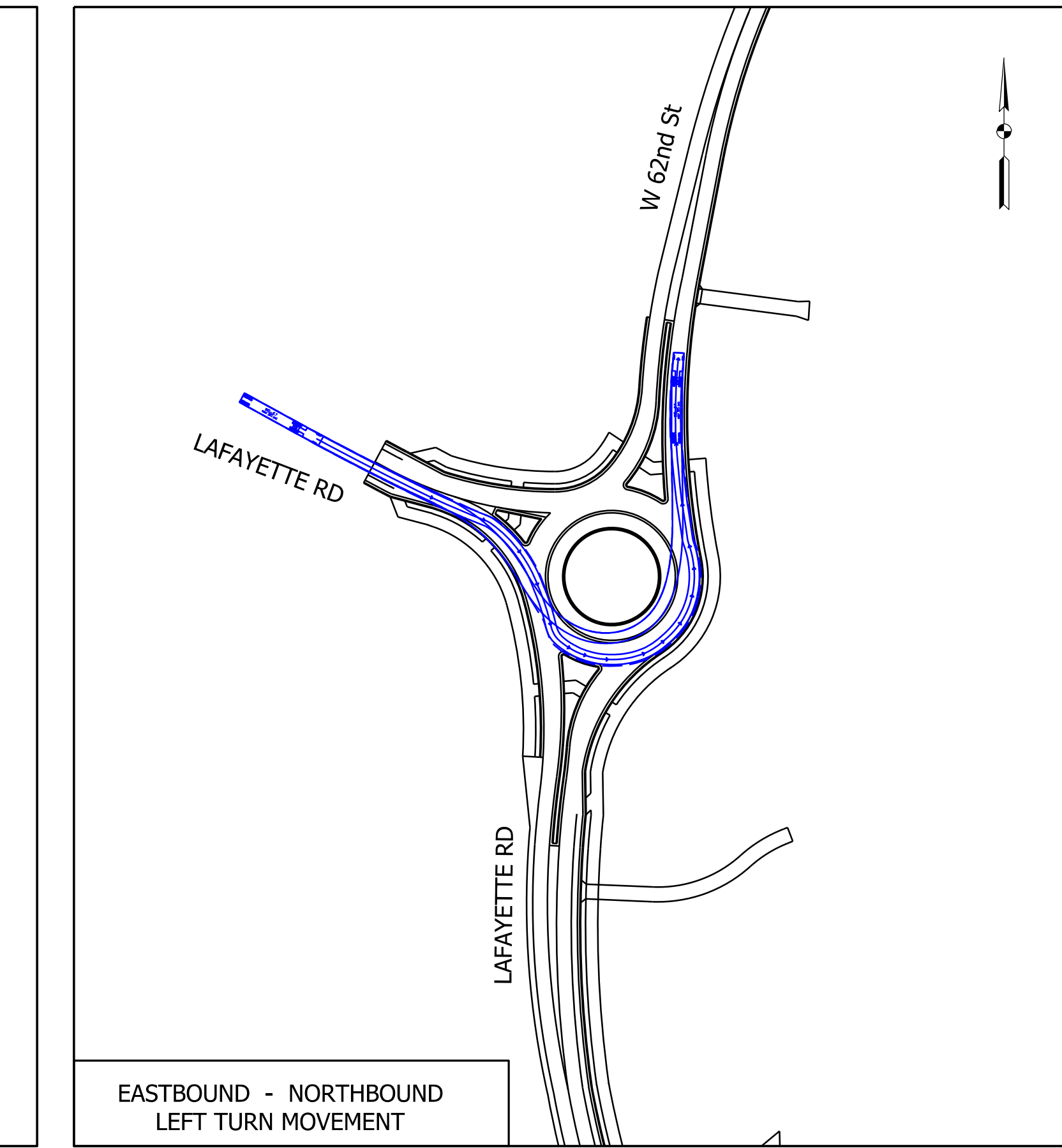
PEAK HOUR TRAFFIC VOLUMES 2027, 2042



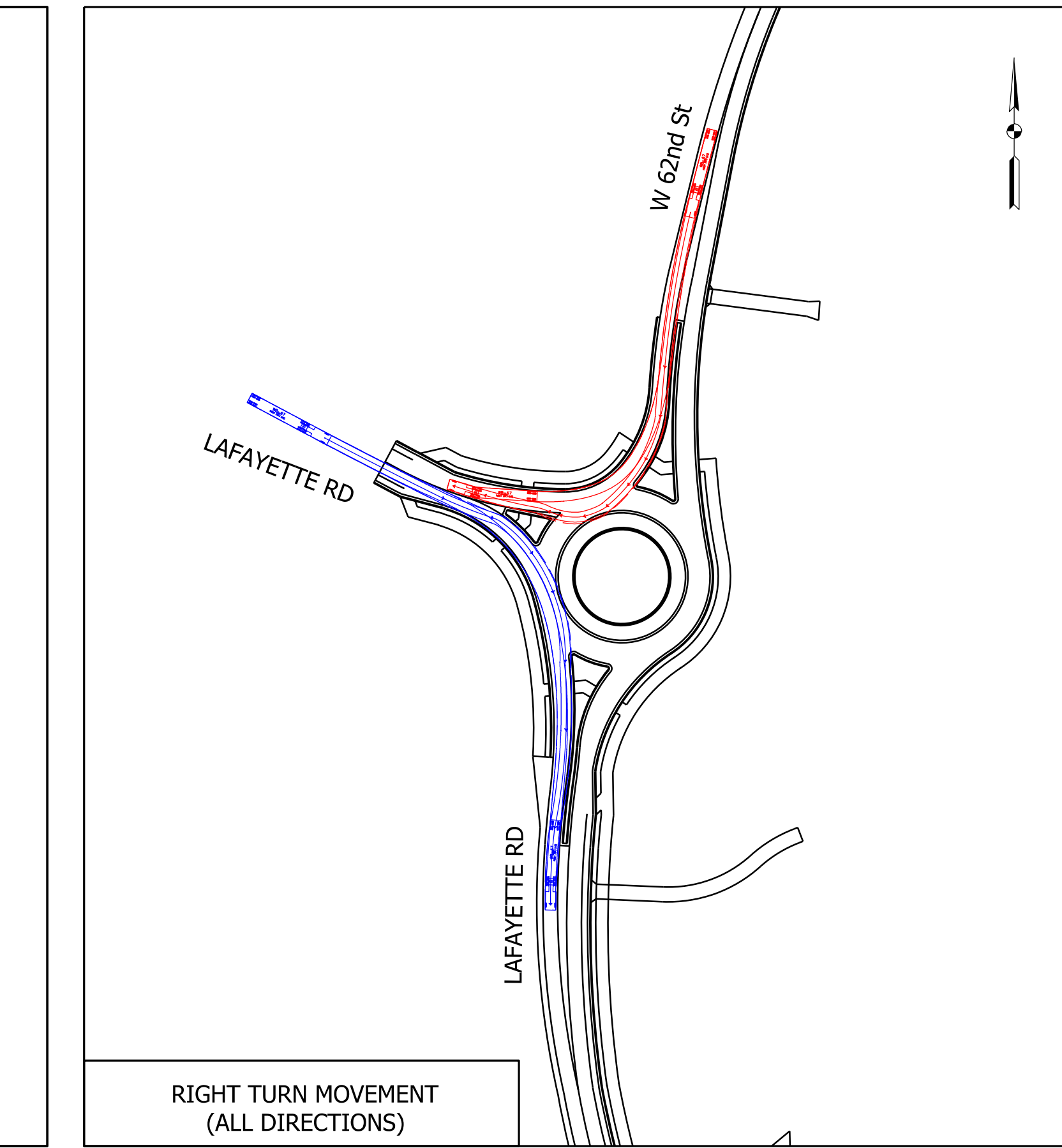
NORTHBOUND - SOUTHBOUND THROUGH MOVEMENT



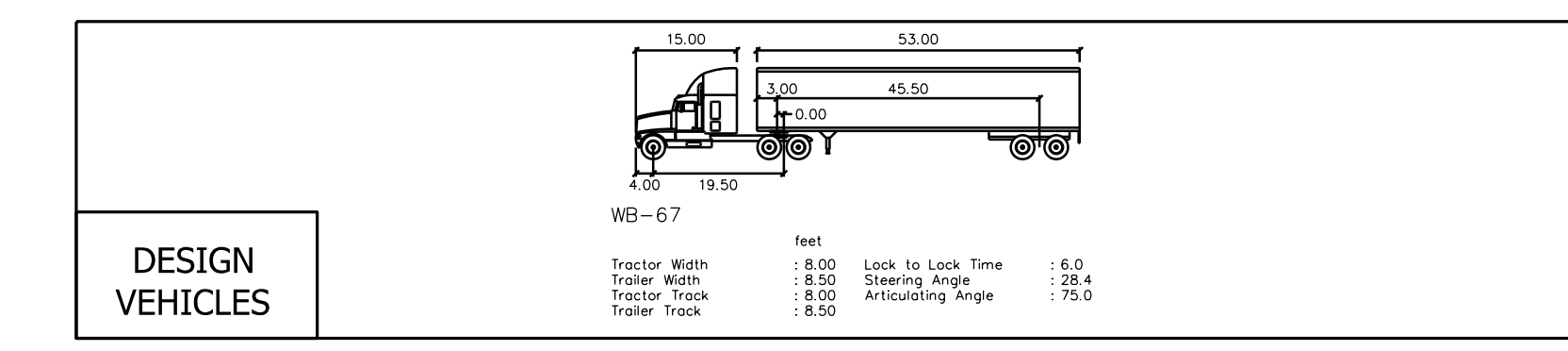
NORTHBOUND - WESTBOUND LEFT TURN MOVEMENT



EASTBOUND - NORTHBOUND LEFT TURN MOVEMENT



RIGHT TURN MOVEMENT (ALL DIRECTIONS)



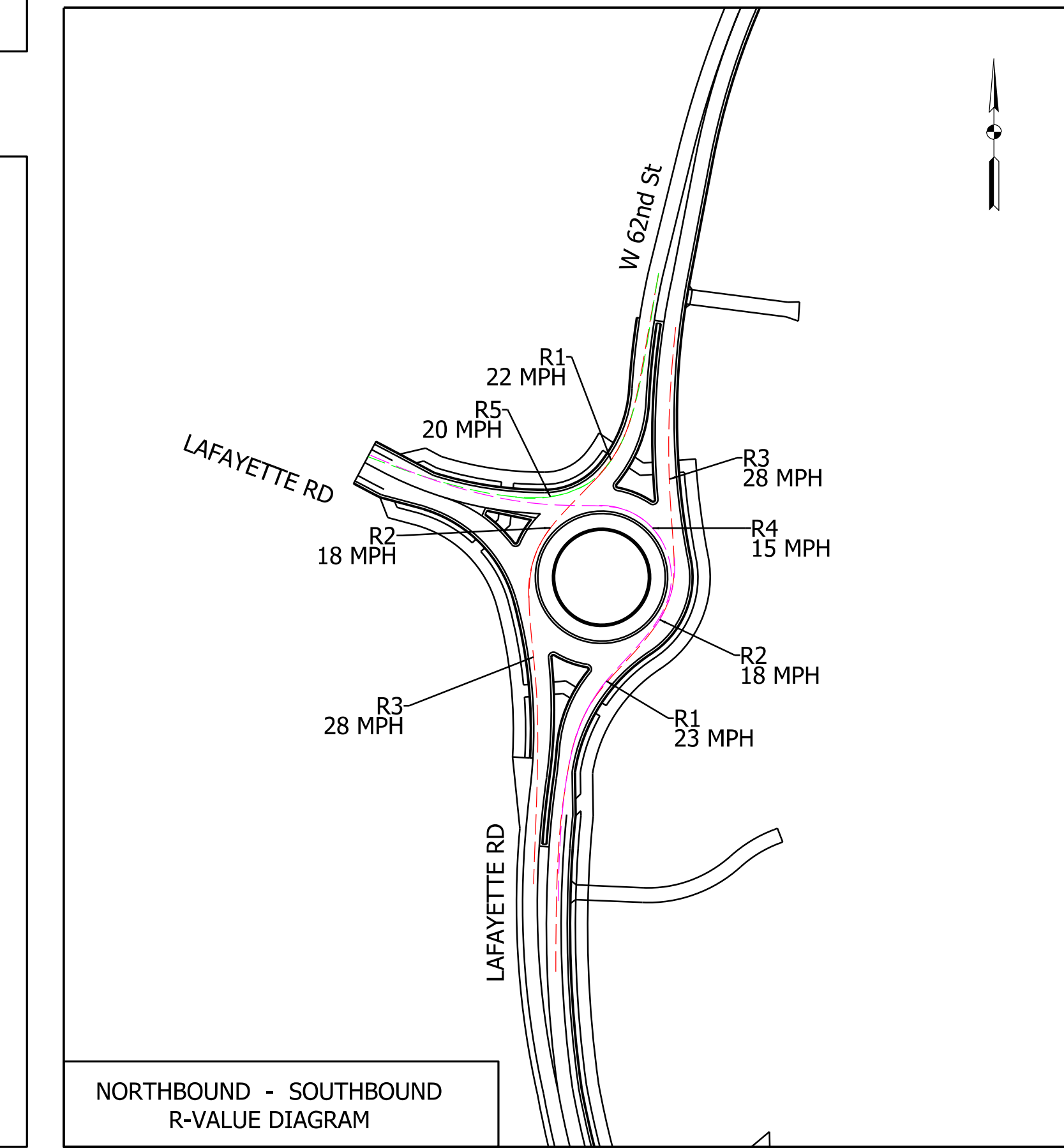
DESIGN VEHICLES

DESIGN PARAMETERS	W 62ND ST (NORTH LEG)	LAFAYETTE ROAD (WEST LEG)	LAFAYETTE ROAD (SOUTH LEG)
Approach Width, FT	12	12	12
Entry Width (EP/EP), FT	20.9	20.6	23.8
Entry Angle, PHI (°), DEG	14.9	21.1	23.7
Inscribed Circle Diameter, FT	148	148	148
Exit Width (EP/EP), FT	20.9	24.1	20.2
Circulating Roadway Width Upstream of Entry, FT	18	18	18

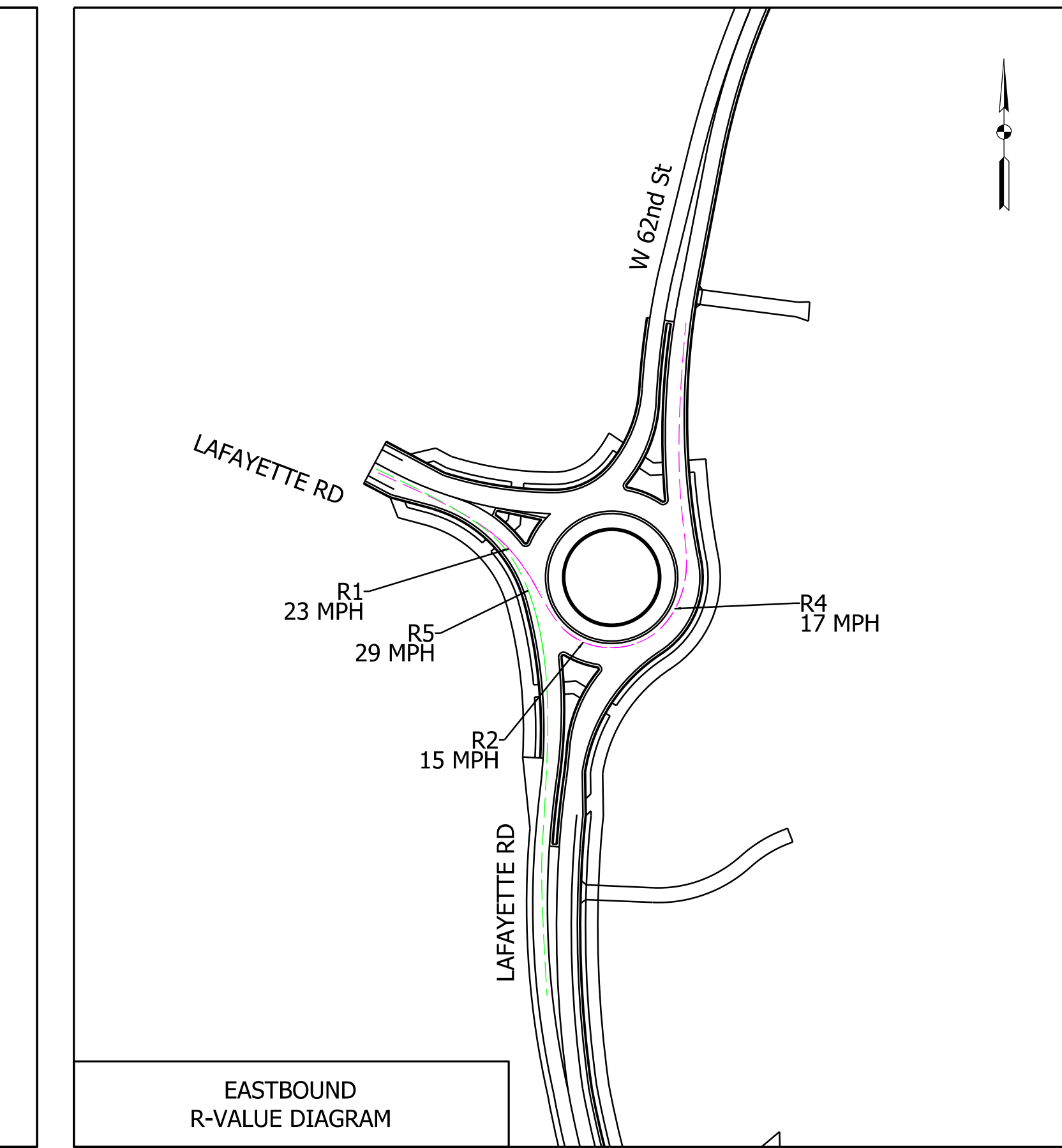
APPROACH	CURVE	RADIUS (FT)	e (FT/FT)	SPEED (MPH)	RELATIVE SPEED DIFFERENCE (MPH)
LEG 1 SOUTHBOUND	R1	121	0.02	22	7
	R2	84	-0.02	18	3
	R3	NA	0.02	28*	NA
	R4	NA	-0.02	NA	NA
	R5	92	0.02	20	5
LEG 2 EASTBOUND	R1	143	0.02	23	8
	R2	57	-0.02	15	0
	R3	NA	0.02	NA	NA
	R4	76	-0.02	17	2
	R5	247	0.02	29	14
LEG 3 NORTHBOUND	R1	135	0.02	23	8
	R2	85	-0.02	18	3
	R3	NA	0.02	28*	NA
	R4	57	-0.02	15	0
	R5	NA	0.02	NA	NA

\* Calculated Speed R3, based on distance from R2 to 20 ft beyond Roundabout (NCHRP Report 1043 Equation 9.8)

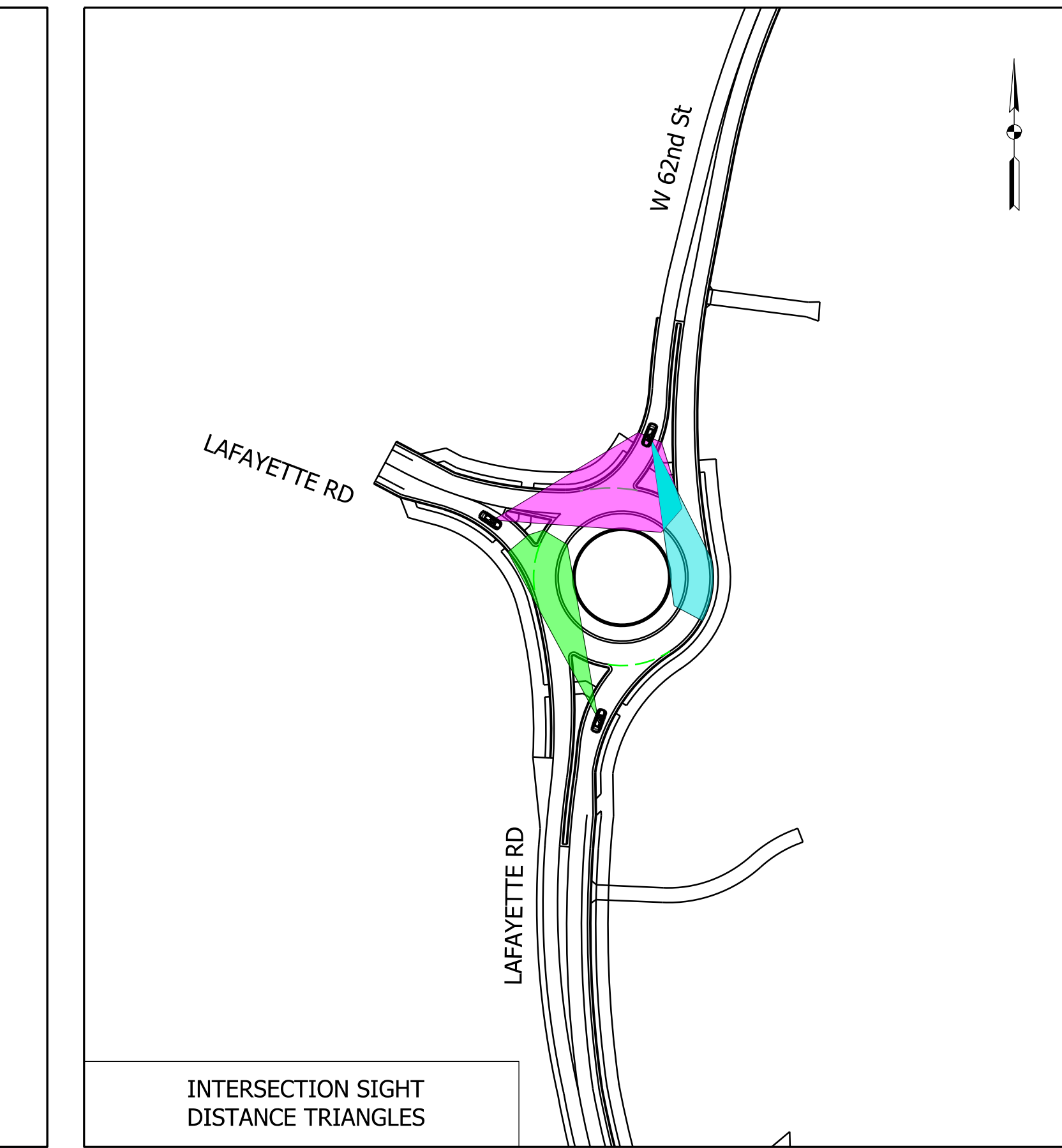
ROUNDABOUT CRITICAL DESIGN PARAMETERS



NORTHBOUND - SOUTHBOUND R-VALUE DIAGRAM



EASTBOUND R-VALUE DIAGRAM



INTERSECTION SIGHT DISTANCE TRIANGLES

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	DATE
DESIGNED: JPH	4/25/25	DRAWN: JTV
CHECKED: TAH	4/25/25	CHECKED: JPH

INDIANA DEPARTMENT OF TRANSPORTATION  
 LAFAYETTE RD. & 62ND ST. ROUNDABOUT GEOMETRIC REVIEW EXHIBIT

SCALE	BRIDGE FILE
VARIABLES	N/A
DESIGNATION	2002581
SHEETS	1 of 1
CONTRACT	PROJECT
R-44762	2002581