MEMORANDUM

To: El Paso County

From: Sean Hays, PE

Kimley-Horn and Associates, Inc.

Date: June 22nd, 2021

Subject: Design Documentation - Proposed Roundabout at Meadowbrook Pkwy and Newt Dr

A new roundabout is proposed at the intersection of Meadowbrook Pkwy and Newt Dr in El Paso County, Colorado. This memo summarizes the design criteria and critical design parameters for the proposed roundabout.

The design of this roundabout is based upon the criteria established in the Wisconsin Department of Transportation Facilities Development Manual, Chapter 11 Section 26 (Wisconsin DOT FDM 11-26).

Lane Configuration and Geometrics

The Crossroads Mix Use Traffic Study Letter (dated 6-13-2021) prepared by Kimley-Horn recommends a roundabout with a single circulatory lane and one lane entering on each approach at the project intersection. The report shows that the roundabout will operate at a Level of Service (LOS) of B in design year 2040. Refer to the traffic impact study for additional details.

To meet the criteria in the Wisconsin DOT FDM 11-26, the proposed roundabout was designed with the geometry displayed in Table 1. A graphical representation of the roundabout with supporting dimensions, is included as Exhibit 2 at the end of this memo.

TABLE 1 ROUNDAOUT GEOMETRICS

Inscribed Circle Diameter (ICD)	95 feet
Minimum lane width (on approach)	12 feet
Circulatory roadway width	20 feet

Fastest Path Speeds

Fastest path performance is an evaluation of the geometric elements that control driver negotiation speeds. Two primary elements were evaluated to determine the fastest path speed:

- Estimated vehicle speeds at critical path radii on the fastest path
- Speed consistency between the critical path radii

Fastest paths were reviewed in CADD with spline curves based on a technique described in the Wisconsin DOT FDM 11-26 Attachment 50.2.

Estimated vehicle speeds for entry, circulating, exit, left turn and right turn paths were calculated using standard estimation of +2%/-2% cross slope / superelevations for vehicles traveling on the estimated fastest path.

Graphical representations of the estimated fastest paths and the locations of the critical path radius used to calculate R1 thru R5 speeds, are included as Exhibits 7-10 at the end of this memo.

Table 2 below summarizes the results of the fastest path evaluation. Table 3 and Figure 1 provide additional information on the design criteria used for the calculation of the fastest paths.

TABLE 2 – FASTEST PATH RESULTS	**LEG 1** SB		**LEG 2** EB		**LEG 3** NB		**LEG 4** WB	
R_1, Radius/Speed, FT/MPH	62	18	100	21	93	20	137	24
R_2, Radius/Speed, FT/MPH	89	20	48	16	72	19	65	18
R_3, Radius/Speed, FT/MPH		25		21		24		23
R_4, Radius/Speed, FT/MPH	32	14	30	14	30	14	30	14
R_5, Radius/Speed, FT/MPH	58	17	54	17	51	16	59	17

TABLE 3 FASTEST PATH PERFORMANCE CRITERIA

Path offset from curb face	5 feet
Path offset from centerline	5 feet
Path offset from painted edge of travel way	3 feet
Single lane entry (maximum)	25 mph
Speed consistency	10-15 mph

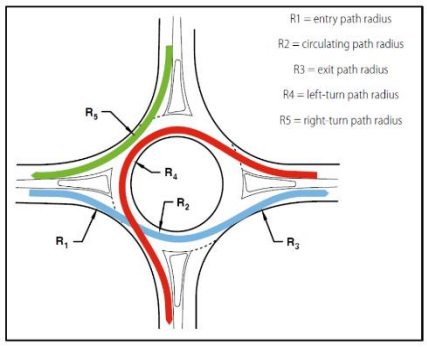

Figure 1 Typical Vehicle Speed Paths

Design Vehicle

Design vehicle paths were evaluated for likely design vehicles and their associated path required to navigate the roundabout. Vehicle profile, path and tire tracking offsets are shown in Exhibits 3-6 included at the end of this memo. The following design vehicles and design criteria were used to evaluate the tire tracking offsets:

TABLE 4 DESIGN VEHICLES

Vehicle	Category	Case	Notes
WB-50	Accommodate	Case 1	Full Access

Category and case shown above refer to criteria established in the Wisconsin DOT FDM 11-26. Information is provided below on the criteria. For additional details refer to the Wisconsin DOT FDM 11-26.

- Category – Accommodate: is used for low percentage of design vehicles of this type. Preferable in low speed, urban environments where pedestrian and bike traffic is prevalent. The vehicle will be able to navigate the roundabout but may do so at reduced speeds and/or encroach on the gutter. Tire tracking offsets should not encroach on non-mountable curb.
- Case – Case 1: Design vehicle may encroach and occupy adjacent lanes to navigate the approach, circulating and departure lanes.

MEADOWBROOK PARKWAY ROUNDABOUT

MEADOWBROOK PKWY & NEWT DR

COLORADO SPRINGS, COLORADO

JUNE 22ND, 2021

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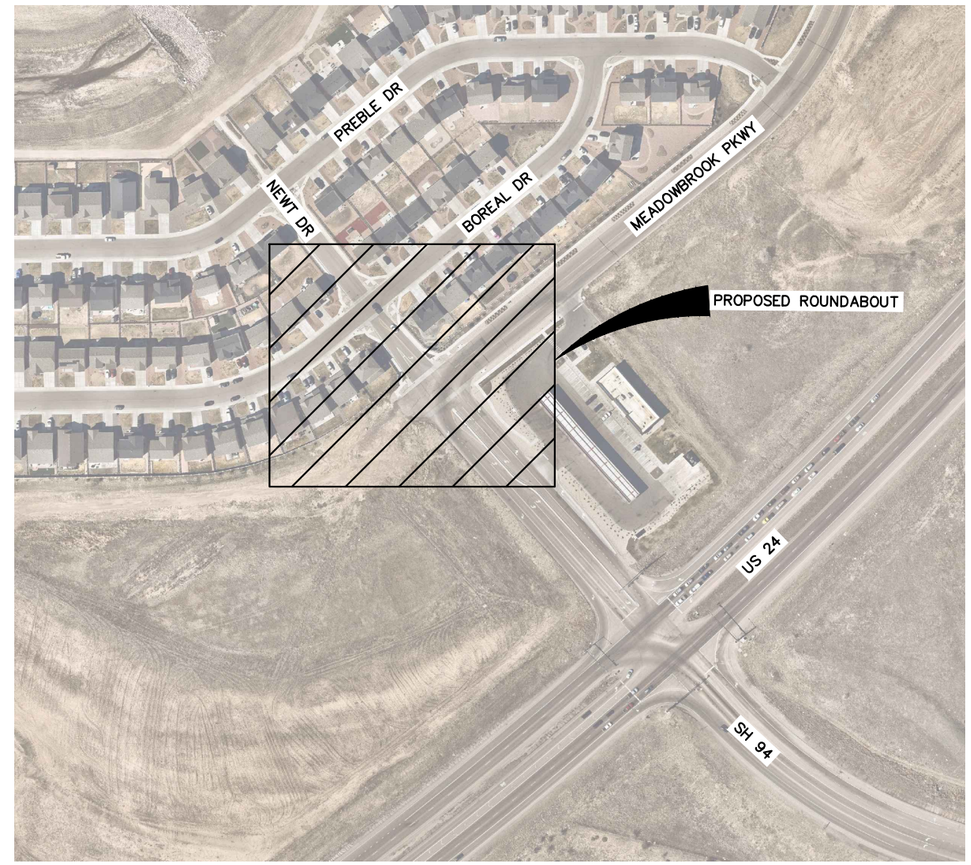
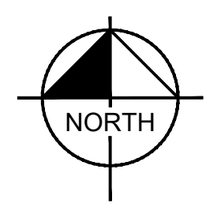
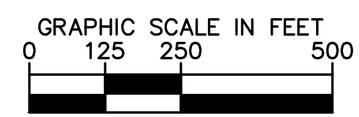


LOCATION MAP





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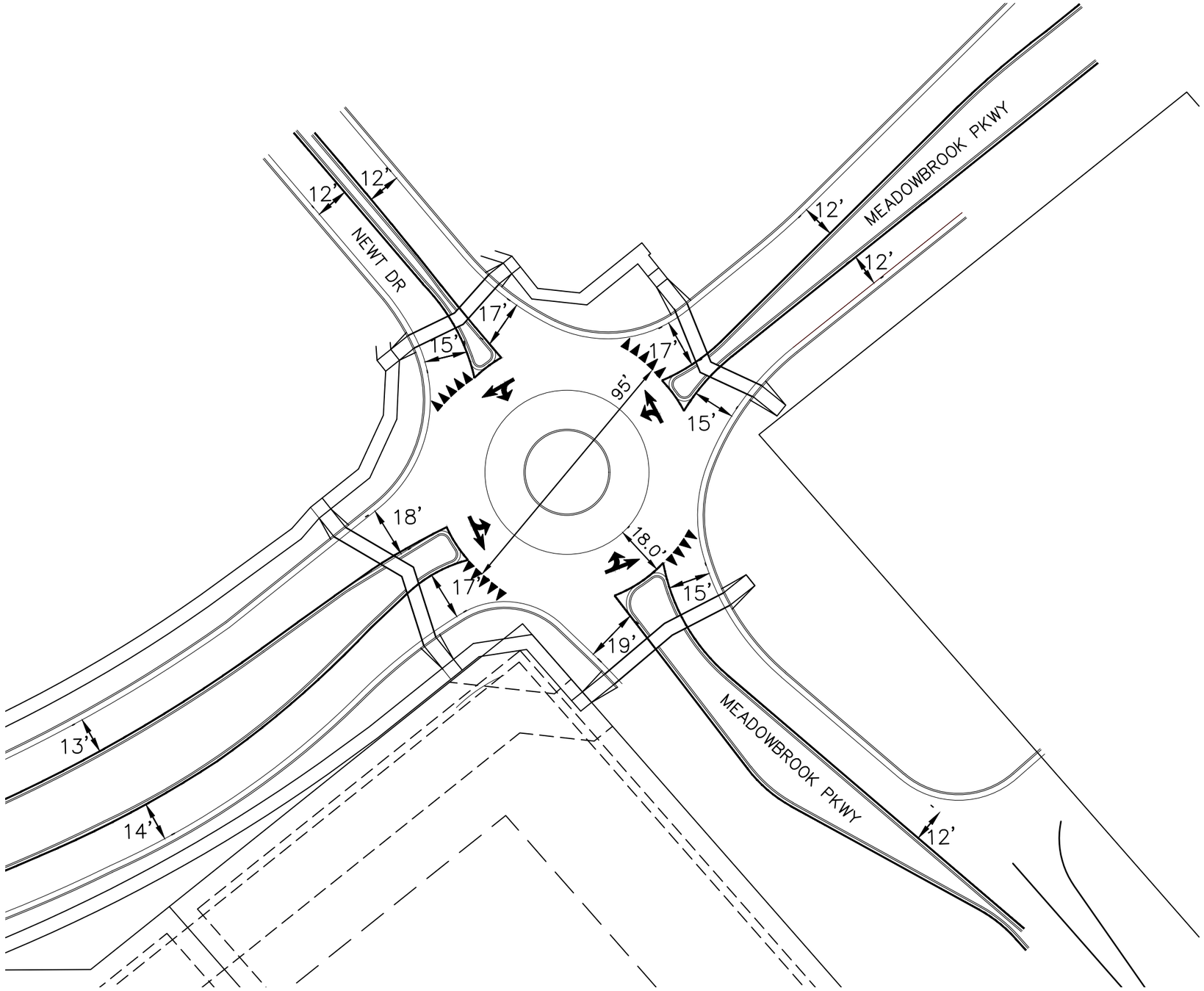

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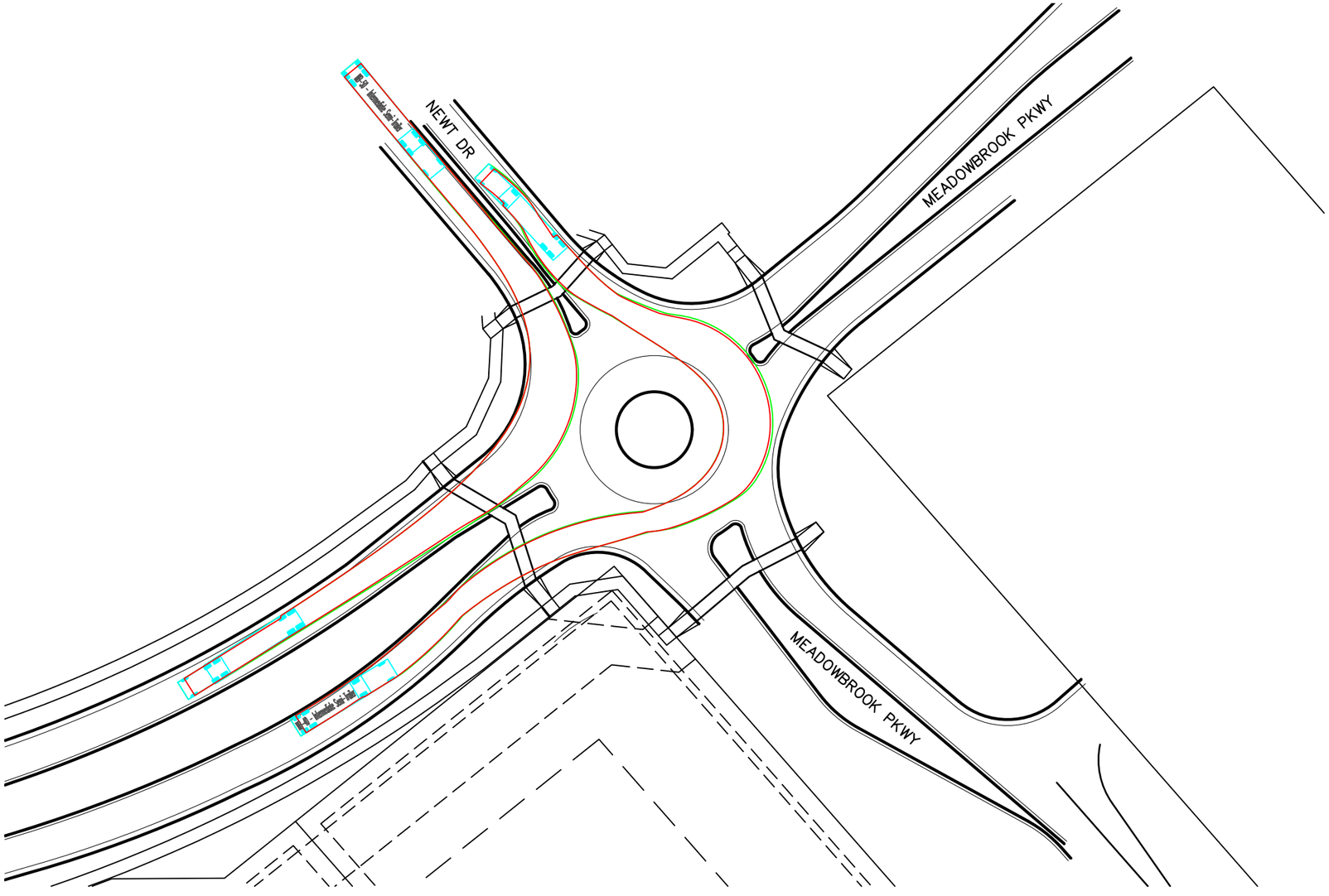
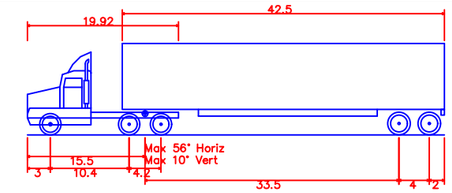
MEADOWBROOK PARKWAY ROUNDABOUT

ROUNDABOUT OVERVIEW

GRAPHIC SCALE IN FEET
0 10 20 40
NORTH

EXHIBIT: 2





WB-50 – Intermediate Semi-Trailer

Overall Length	55.000ft
Overall Width	8.500ft
Overall Body Height	12.052ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	17.90°

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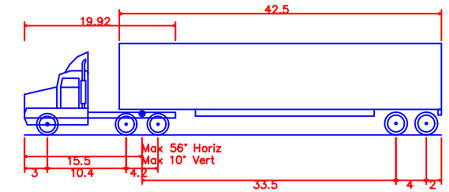
MEADOWBROOK PARKWAY ROUNDABOUT

VEHICLE PATH - DESIGN VEHICLE: WB-50

GRAPHIC SCALE IN FEET
0 12.5 25 50

NORTH

EXHIBIT: 3



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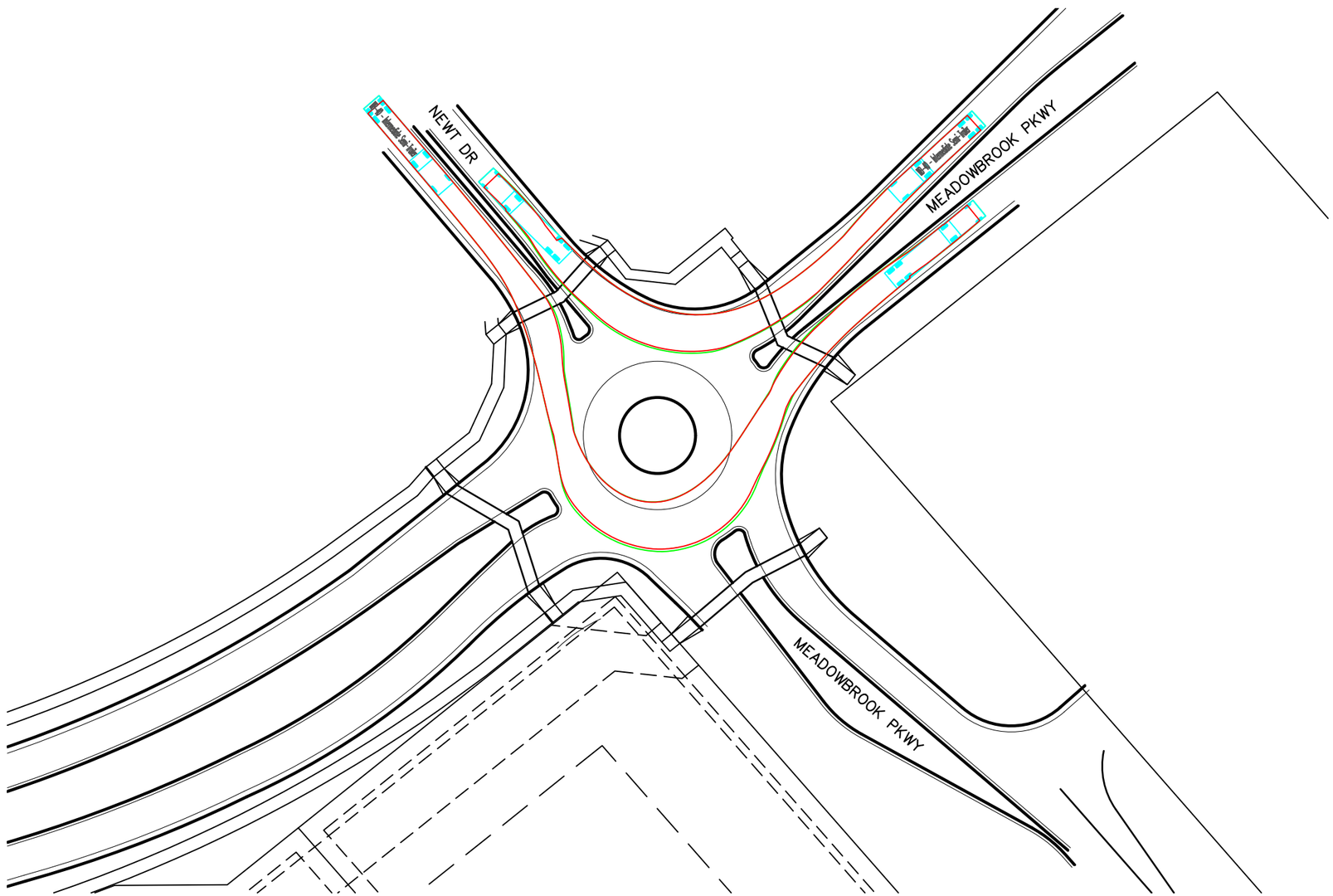

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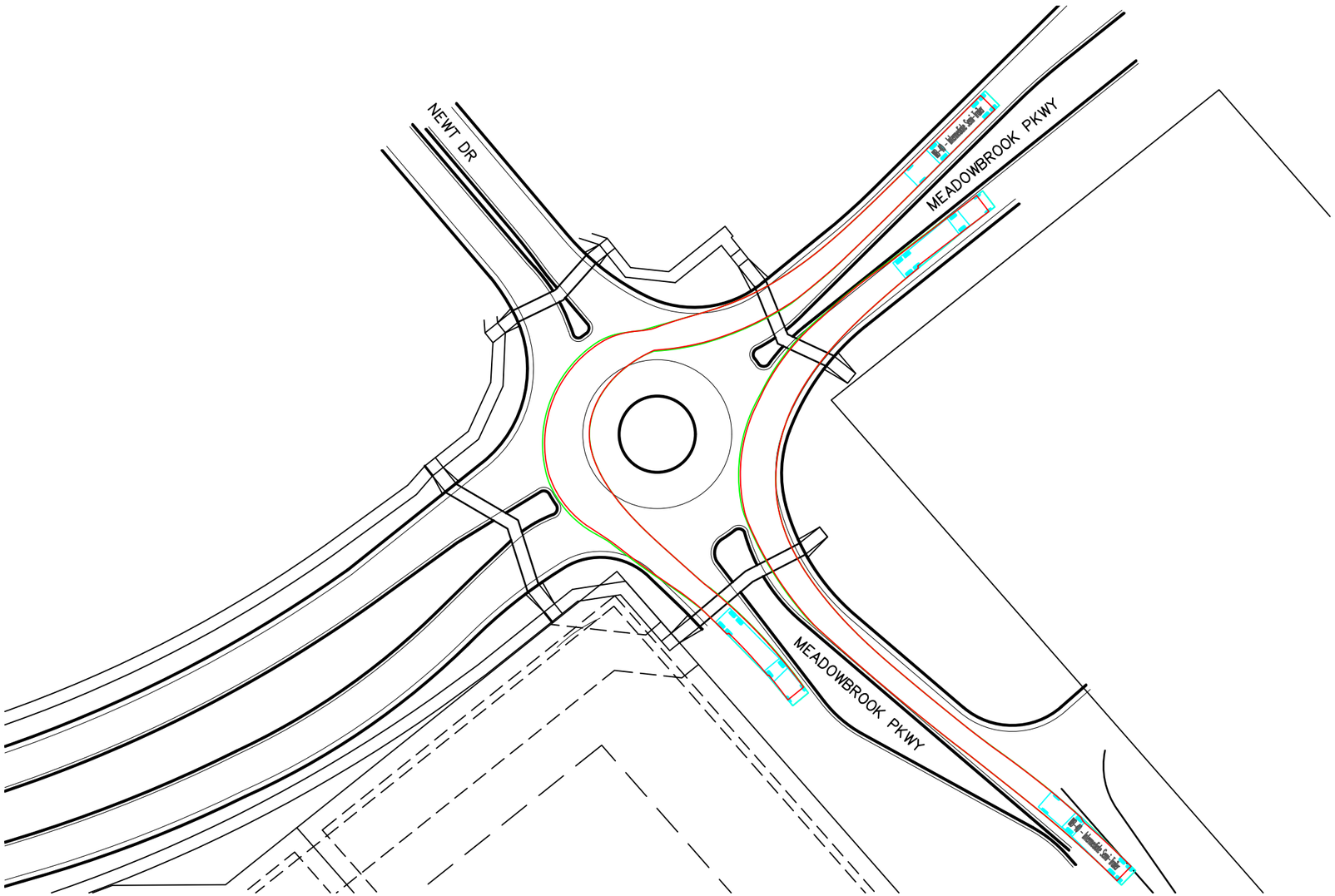
MEADOWBROOK PARKWAY ROUNDABOUT

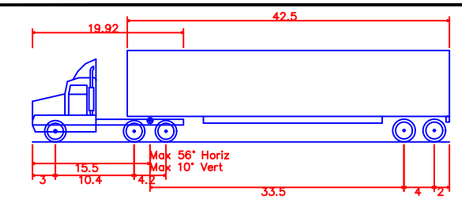
VEHICLE PATH - DESIGN VEHICLE: WB-50

GRAPHIC SCALE IN FEET
0 12.5 25 50

NORTH

EXHIBIT: 4





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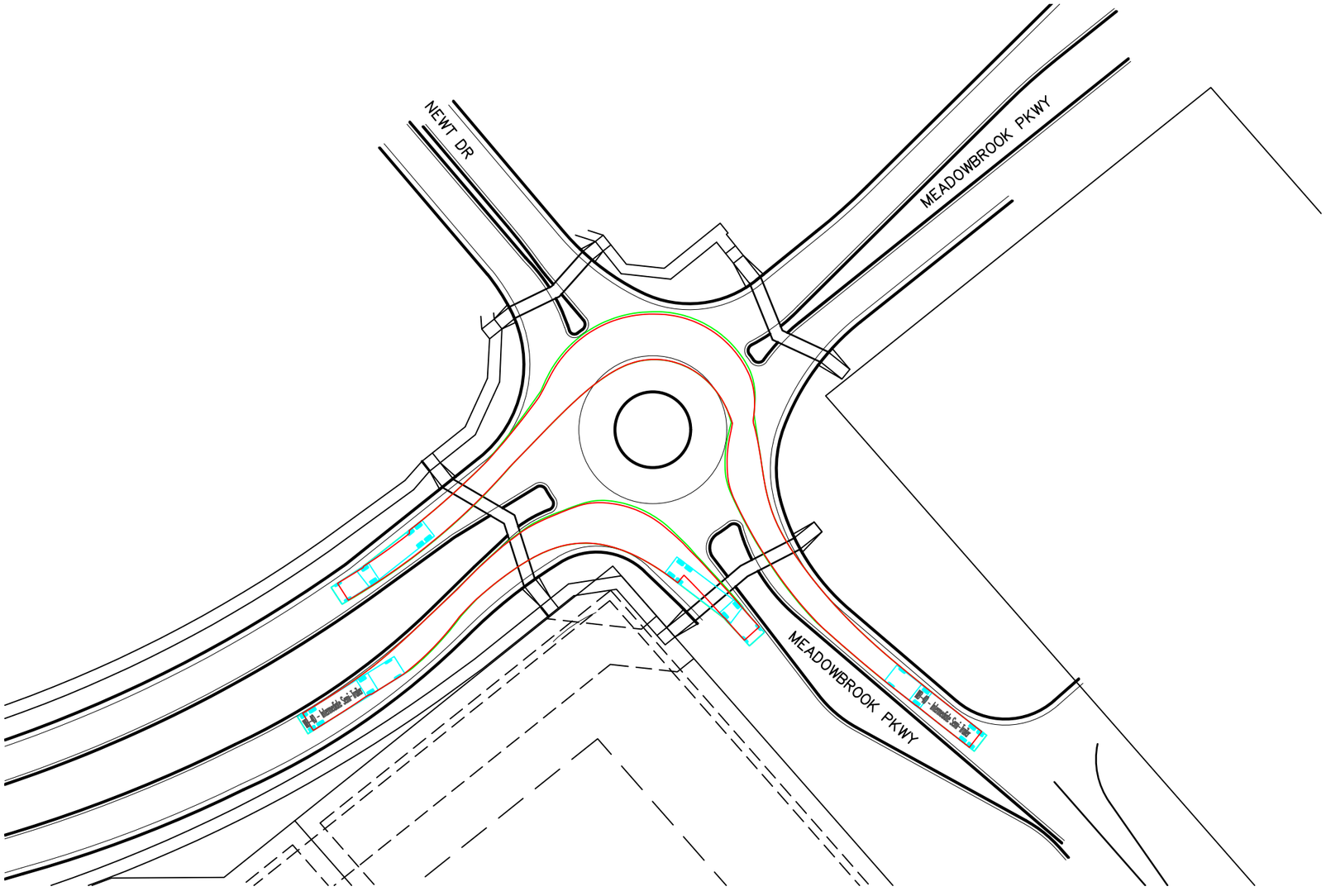
MEADOWBROOK PARKWAY ROUNDABOUT

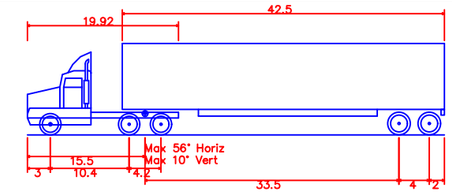
VEHICLE PATH - DESIGN VEHICLE: WB-50

GRAPHIC SCALE IN FEET
0 12.5 25 50

NORTH

EXHIBIT: 5





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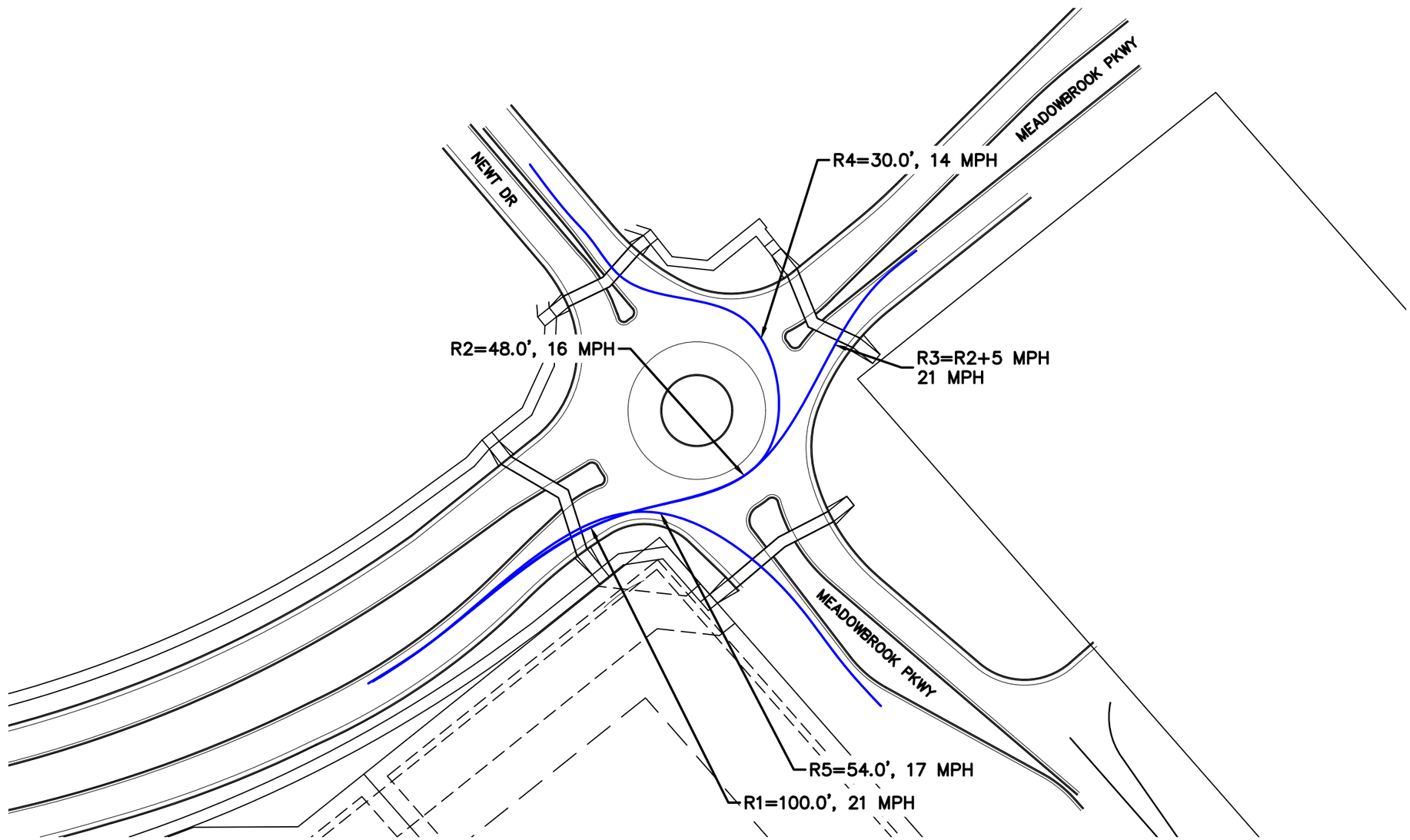
MEADOWBROOK PARKWAY ROUNDABOUT

VEHICLE PATH - DESIGN VEHICLE: WB-50

GRAPHIC SCALE IN FEET
0 12.5 25 50

NORTH

EXHIBIT: 6



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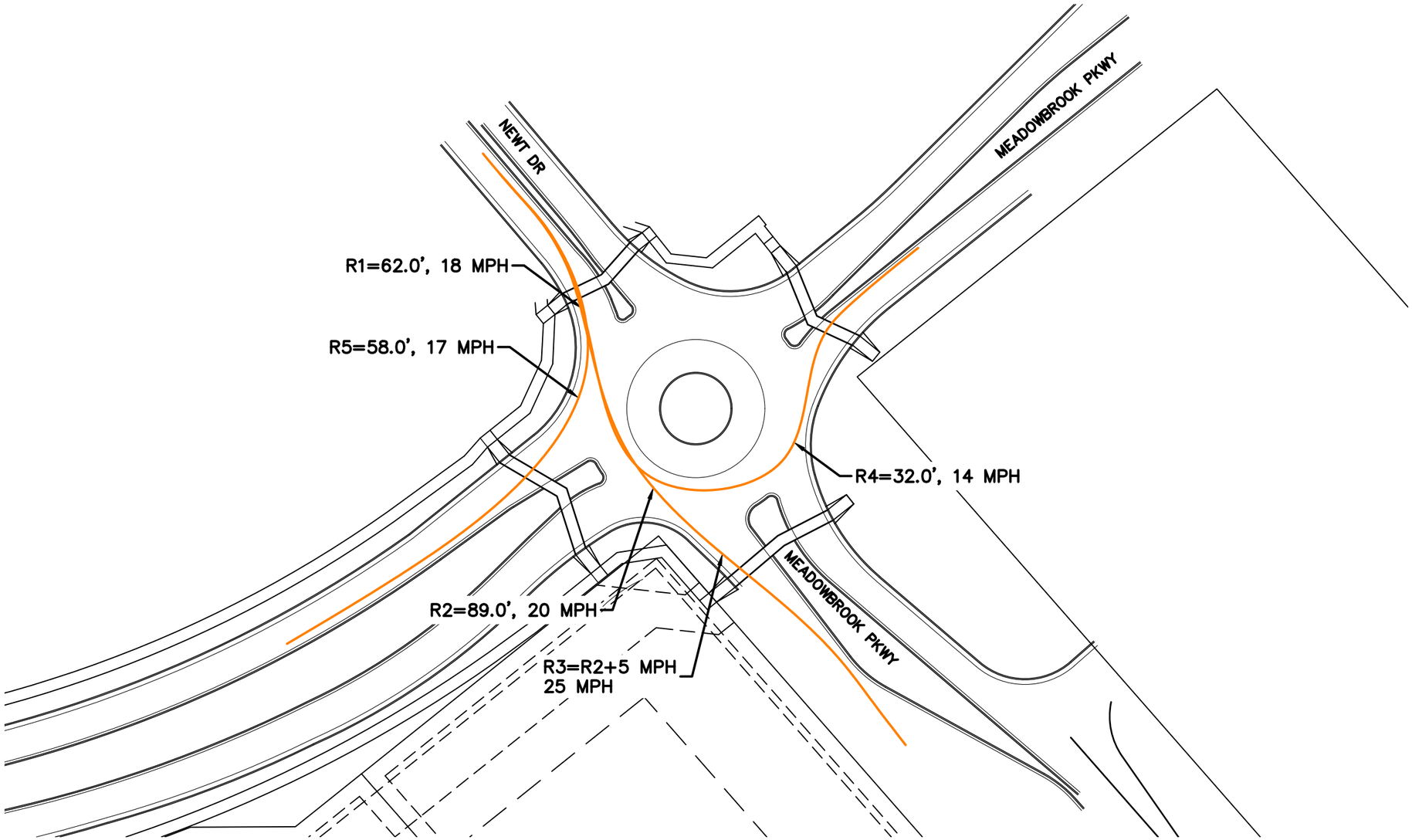
MEADOWBROOK PARKWAY ROUNDABOUT

EB FASTEST PATH

GRAPHIC SCALE IN FEET
0 12.5 25 50

NORTH

EXHIBIT: 7



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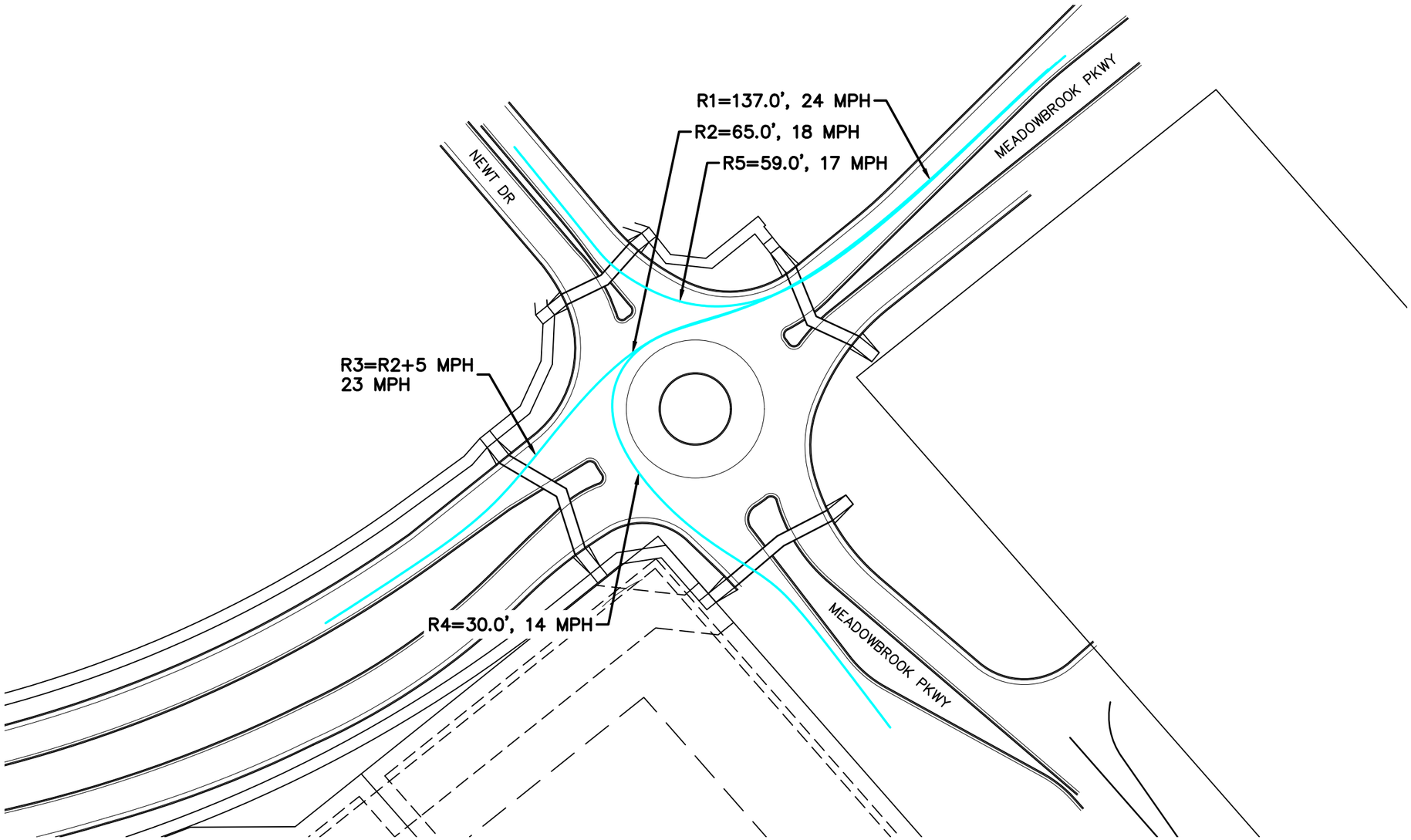
MEADOWBROOK PARKWAY ROUNDABOUT

SB FASTEST PATH

GRAPHIC SCALE IN FEET
0 12.5 25 50

NORTH

EXHIBIT: 8



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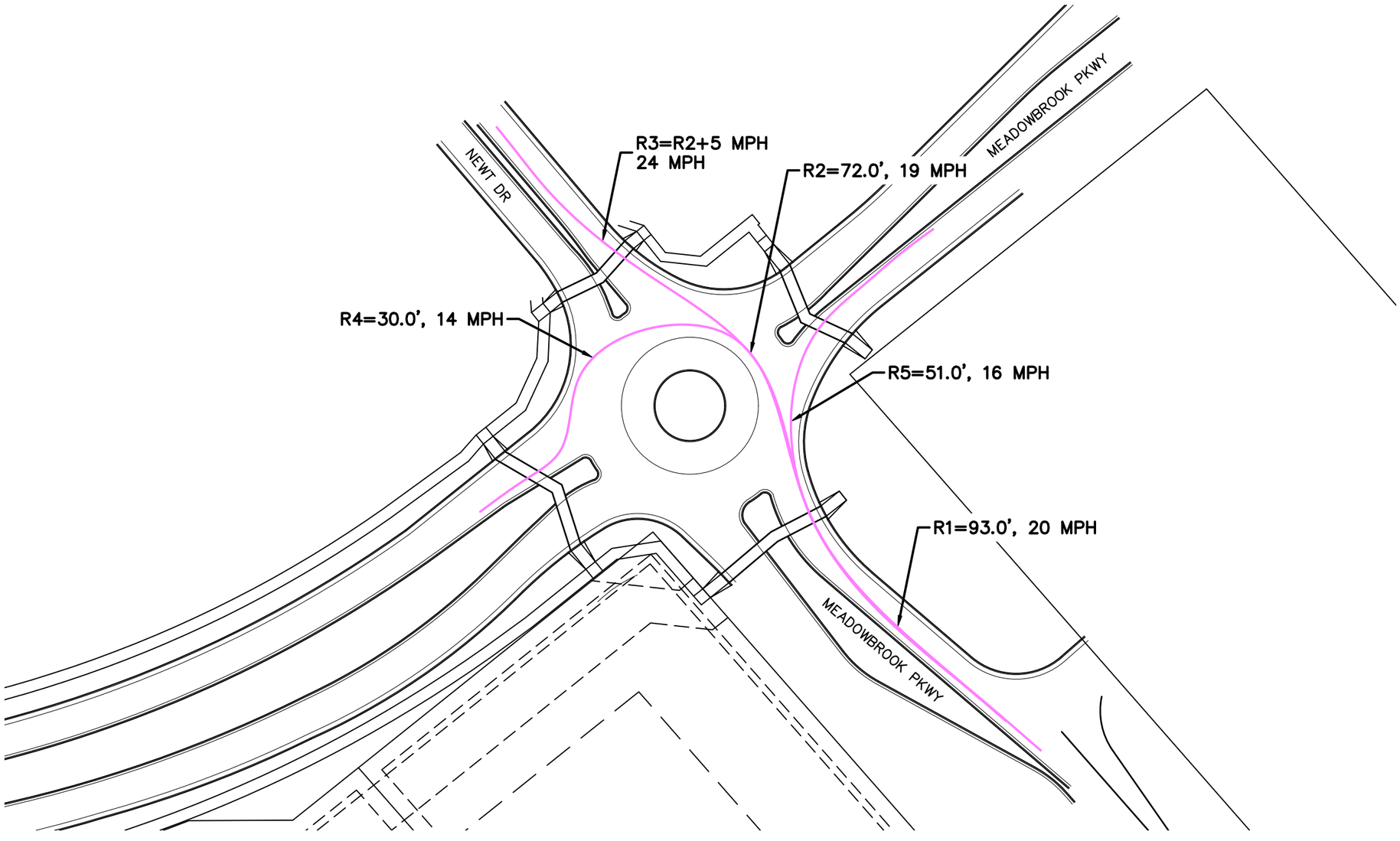
MEADOWBROOK PARKWAY ROUNDABOUT

WB FASTEST PATH

GRAPHIC SCALE IN FEET
0 12.5 25 50

NORTH

EXHIBIT: 9



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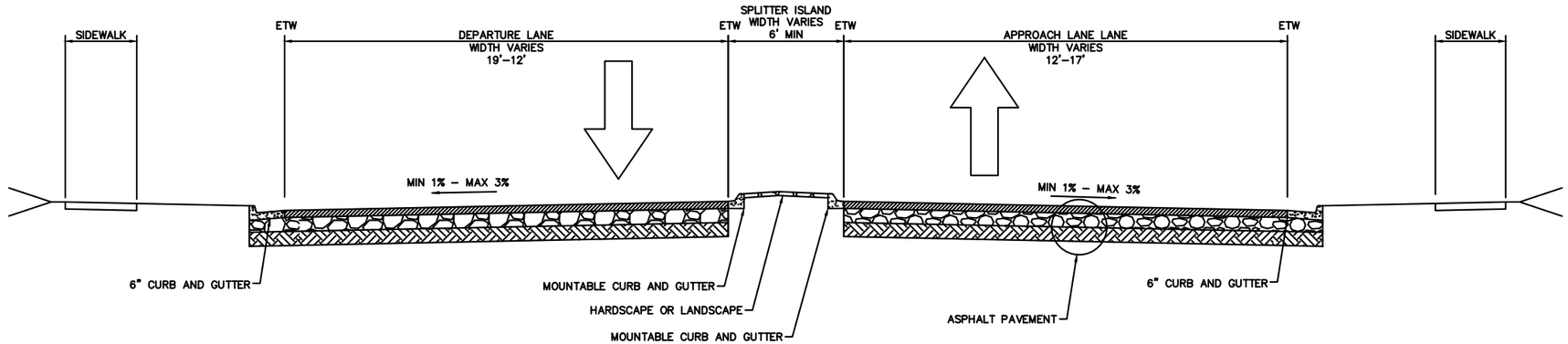
MEADOWBROOK PARKWAY ROUNDABOUT

NB FASTEST PATH

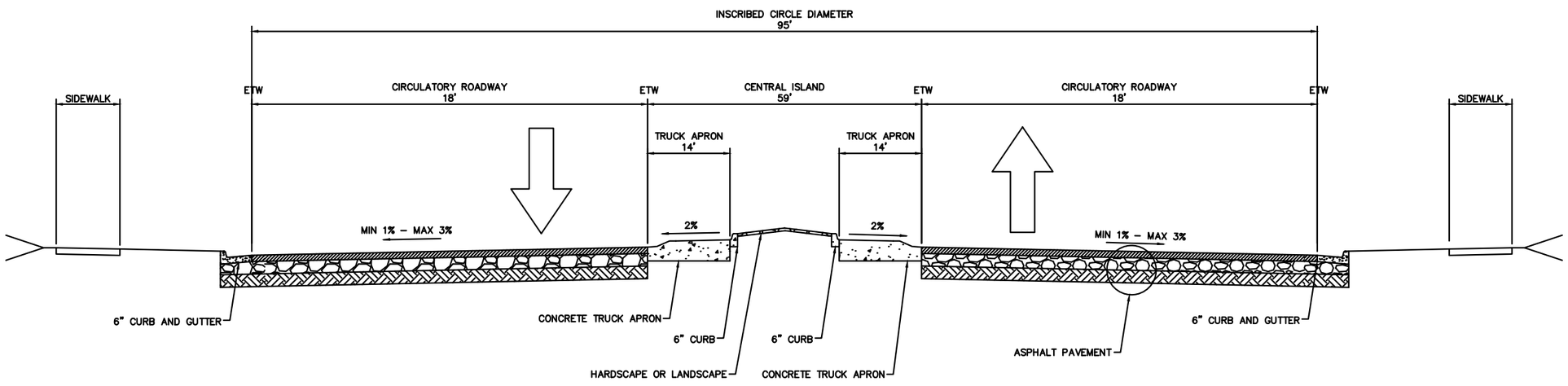
GRAPHIC SCALE IN FEET
0 12.5 25 50

NORTH

EXHIBIT: 10



TYPICAL SECTION APPROACH



TYPICAL SECTION CIRCULATORY ROADWAY

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MEADOWBROOK PARKWAY ROUNDABOUT

ROUNDABOUT TYPICAL SECTIONS

EXHIBIT: 11