



LSC TRANSPORTATION CONSULTANTS, INC.
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March 3, 2020

Mr. Mark McWilliams
Monument Academy
1150 Village Ridge Point
Monument, CO 80132

Re: Monument Academy
Roundabout Report
Walker Road/Jane Lundeen Drive
El Paso County, CO
LSC #184820

Dear Mr. McWilliams,

CDR-20-001 ¹

We are pleased to submit this roundabout design report for the proposed intersection of Walker Road/Jane Lundeen Drive in 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 Walker Road but is designed to be expandable to two through lanes in each direction on Walker Road.

Also, the north leg of the intersection has been designed (but not planned to be built with the initial construction) such that a future developer on the north side of Walker Road could construct the north leg to serve future development and realign Shannon Road to this north leg as well.

Roundabout Layout

Interim roundabout Figure 1 and Table 1 show the conceptual roundabout design parameters. The overall diameter is 180 feet and the entry phi angles are between 27.0 and 46.0 degrees (interim roundabout) on each of the approaches. The parameters for the ultimate roundabout are presented in ultimate roundabout Figure 1 and Table 2.

Design Vehicles

Interim roundabout Figures 2 through 5 show WB-67 truck paths through the proposed interim roundabout for the three initial approaches. A minimum of one foot of clearance is maintained between all wheel paths and vertical curbs. The truck paths for the ultimate roundabout are also attached.

Summary of Comments on LSC Responses to Roundabout Report Redline Comments.pdf

Page: 1

☰ Number: 1 Author: dsdrice Subject: Text Box Date: 3/23/2020 16:34:42

[CDR-20-001](#)

👉 Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 14:19:54
LSC Response: Added as requested.

Table 1
Walker/Jane Lundeen Roundabout - Interim
Date: 2-28-19
Monument Academy Charter School
El Paso County

ROUNDBABOUT CRITICAL DESIGN PARAMETERS

| DESIGN PARAMETERS | LEG 1 | LEG 2 | LEG 3 | LEG 4 16 | LEG 5 | LEG 6 |
|---|-------|-------|-------|-------------|-------|-------|
| Approach Width, FT | 28.0 | 28.0 | 14.0 | | | |
| Entry Width, FT | 28.0 | 28.0 | 14.0 | | | |
| Entry Angle, PHI Φ , DEG | 46.0 | 39.0 | 27.0 | | | |
| Inscribed Circle Diameter, FT | 180.0 | 180.0 | 180.0 | | | |
| Exit Width, FT | 28.0 | 20.0 | 20.0 | | | |
| Circulating Roadway Width Upstream of Entry, FT | 18.0 | 18.0 | 28.0 | | | |

FASTEST SPEED PATH

| | | | | | | | | | | |
|-------------------------------------|-------|-----|-----|----|-----|----|--|--|--|--|
| R_1 , Radius/Speed, FT/MPH | 241 | 28 | 230 | 27 | 145 | 23 | | | | |
| R_2 , Radius/Speed, FT/MPH | 155 | 24 | | | 152 | 23 | | | | |
| R_3 , Radius/Speed, FT/MPH | <1000 | <40 | 192 | 25 | 192 | 25 | | | | |
| R_4 , Radius/Speed, FT/MPH | | | 62 | 17 | 62 | 17 | | | | |
| R_5 , Radius/Speed, FT/MPH | 137 | 22 | 168 | 24 | | | | | | |
| Bypass R_5 , Radius/Speed, FT/MPH | | | | | | | | | | |

MINIMUM SIGHT PARAMETERS

| | | | | | | |
|---|------|------|------|--|--|--|
| Approach Design Speed, MPH | 40.0 | 40.0 | 40.0 | | | |
| Horizontal Stopping Sight Distance, FT | TBD* | TBD* | TBD* | | | |
| Circulating Intersection Sight Distance, FT/MPH | TBD* | TBD* | TBD* | | | |
| Entering Intersection Sight Distance, FT/MPH | TBD* | TBD* | TBD* | | | |

Design Vehicle: WB-67



Truck Apron Width: 15'

OSOW Accommodations:

Circulating Roadway Cross-Slope:

Access Control:

Parking Control:

Bicycle & Pedestrian Accommodations: All approaches as necessary

Designer: S.M. Romero
 Reviewer: C.S. McGranahan

SIGNATURE: _____

DATE: 2/28/2020

NAME: Chris S. McGranahan, P.E., PTOE

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.



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March 3, 2020

Mr. Mark McWilliams
Monument Academy
1150 Village Ridge Point
Monument, CO 80132

Re: Monument Academy
Roundabout Report
1 Jane Lundeen Drive/Pinehurst Circle
El Paso County, CO
LSC #184820

State that WB-50 is the design vehicle, WB-67 path was to verify wheel tracking areas.

Dear Mr. McWilliams,

We are pleased to submit this roundabout design report for the proposed Jane Lundeen Drive/Pinehurst Circle in El Paso County, Colorado. This intersection will be constructed as a mini roundabout intersection.

Roundabout Layout

Figure 1 and Table 1 show the conceptual roundabout design parameters. The overall diameter is 100 feet and the entry phi angles are between 22.0 and 63.0 degrees on each of the approaches. Note: there is no westbound departure leg on the west leg of the intersection ("Approach 2") as Pinehurst is planned as a one-way street from SH 83 to this mini roundabout.

Design Vehicles

Figures 2 through 9 show WB-67 and WB-50 truck paths through the proposed mini roundabout for the various approaches. The center island and splitter islands will be truck-mountable.

Design Speeds

Figures 10 through 13 show the estimated fastest path radii for each of the approaches to the proposed mini roundabout. These paths are drawn in accordance with the methodology outlined in the Roundabout Informational Guide (NCHRP 672). 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. The fastest entry path for each of the four approaches meets these criteria.

Number: 1 Author: dsdrice Subject: Callout Date: 3/23/2020 16:51:13

State that WB-50 is the design vehicle, WB-67 path was to verify wheel tracking areas.

Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 21:48:13

LSC Response: Added as requested.

Ensure that PHI angles are correct per Method 1 (attached)

1

Table 1
Pinehurst/Jane Lundeen Mini Roundabout
Date: 2-28-19
Monument Academy Charter School
El Paso County

ROUNDBOUT CRITICAL DESIGN PARAMETERS

27, 37, 24? 2

| DESIGN PARAMETERS | LEG 1 | LEG 2 | LEG 3 | LEG 4 16 | LEG 5 | LEG 6 |
|---|-------|-------|-------|-------------|-------|-------|
| Approach Width, FT | 16.0 | 16.0 | 16.0 | 16.0 | | |
| Entry Width, FT | 16.0 | 16.0 | 16.0 | 16.0 | | |
| Entry Angle, PHI Φ , DEG | 22.0 | 54.0 | 63.0 | 48.0 | | |
| Inscribed Circle Diameter, FT | 100.0 | 100.0 | 100.0 | 100.0 | | |
| Exit Width, FT | 20.0 | N/A | 20.0 | 20.0 | | |
| Circulating Roadway Width Upstream of Entry, FT | 18.0 | 18.0 | 18.0 | 18.0 | | |

FASTEST SPEED PATH

| | | | | | | | | | | |
|-------------------------------------|-----|----|-----|----|-----|----|-----|----|--|--|
| R_1 , Radius/Speed, FT/MPH | 165 | 24 | 120 | 22 | 165 | 24 | 160 | 24 | | |
| R_2 , Radius/Speed, FT/MPH | 120 | 22 | 145 | 23 | 116 | 21 | | | | |
| R_3 , Radius/Speed, FT/MPH | 240 | 28 | 195 | 25 | 68 | 18 | 264 | 28 | | |
| R_4 , Radius/Speed, FT/MPH | 45 | 15 | 40 | 16 | | | 35 | 15 | | |
| R_5 , Radius/Speed, FT/MPH | | | | | | | 85 | 19 | | |
| Bypass R_5 , Radius/Speed, FT/MPH | | | | | | | | | | |

MINIMUM SIGHT PARAMETERS

| | | | | | | |
|---|------|------|------|------|--|--|
| Approach Design Speed, MPH | 40.0 | 30.0 | 25.0 | 30.0 | | |
| Horizontal Stopping Sight Distance, FT | TBD* | TBD* | TBD* | TBD* | | |
| Circulating Intersection Sight Distance, FT/MPH | TBD* | TBD* | TBD* | TBD* | | |
| Entering Intersection Sight Distance, FT/MPH | TBD* | TBD* | TBD* | TBD* | | |

Design Vehicle: WB-67, WB-50

Truck Apron Width: 50' - Entire Center Island

OSOW Accommodations:

Circulating Roadway Cross-Slope:

Access Control:

Parking Control:

Bicycle & Pedestrian Accommodations: All approaches as necessary

3

Designer: S.M. Romero
 Reviewer: C.S. McGranahan

SIGNATURE: _____

DATE: 2/28/2020

NAME: Chris S. McGranahan, P.E., PTOE

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.

Page: 87

 Number: 1 Author: dsdrice Subject: Callout Date: 3/23/2020 17:41:57

[Ensure that PHI angles are correct per Method 1 \(attached\)](#)

 Author: jchodsdon Subject: Sticky Note Date: 4/8/2020 10:30:10

LSC Response: The tables have been revised per the comment.

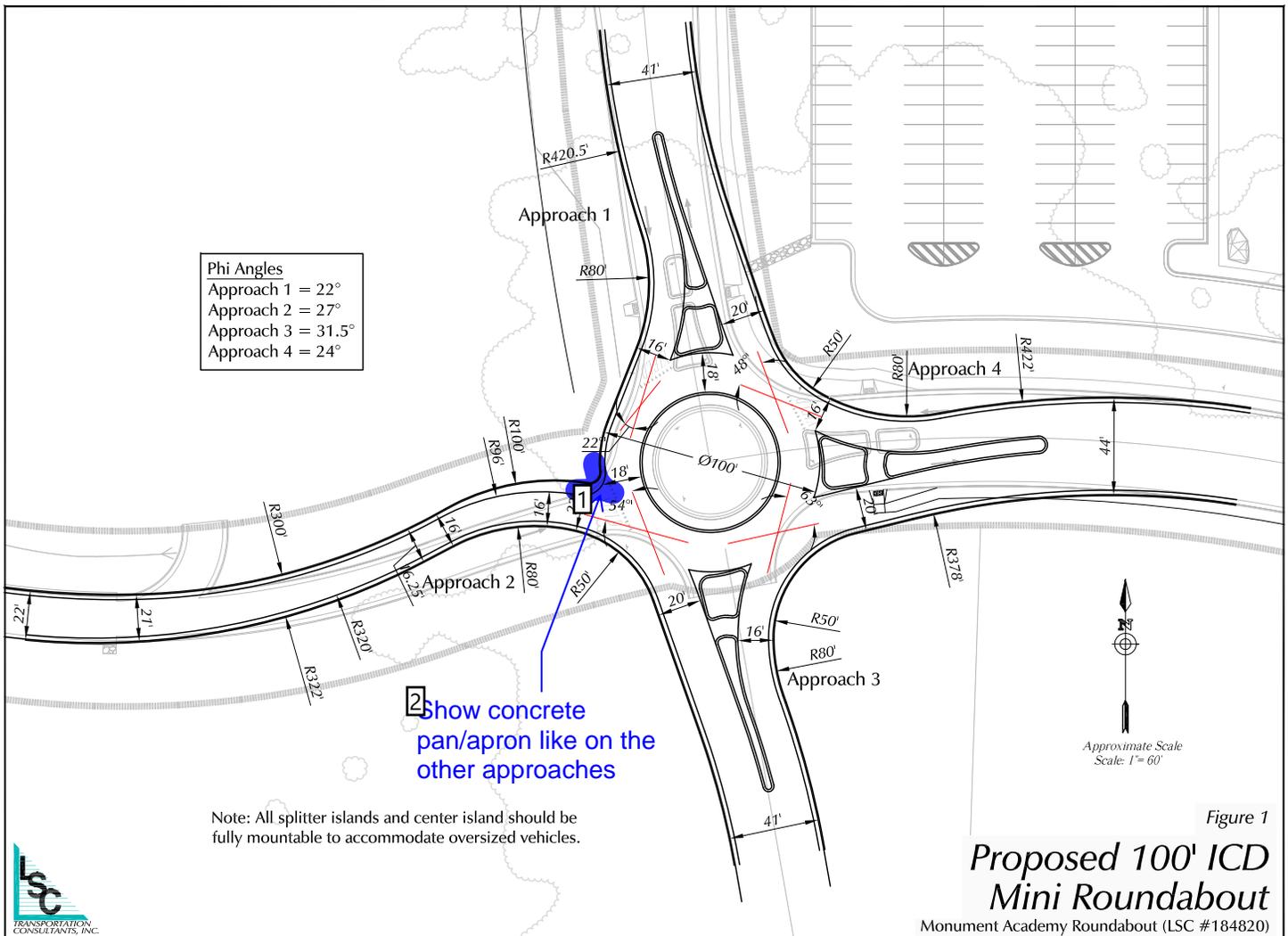
 Number: 2 Author: dsdrice Subject: Callout Date: 3/23/2020 17:41:01

[27, 37, 24?](#)

 Author: jchodsdon Subject: Sticky Note Date: 4/8/2020 11:28:21

LSC Response: The tables have been revised per the comment.

 Number: 3 Author: dsdrice Date: 3/23/2020 17:39:53



| Phi Angles | |
|------------|---------|
| Approach 1 | = 22° |
| Approach 2 | = 27° |
| Approach 3 | = 31.5° |
| Approach 4 | = 24° |

2 Show concrete pan/apron like on the other approaches

Note: All splitter islands and center island should be fully mountable to accommodate oversized vehicles.

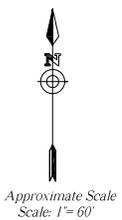


Figure 1
**Proposed 100' ICD
 Mini Roundabout**
 Monument Academy Roundabout (LSC #184820)



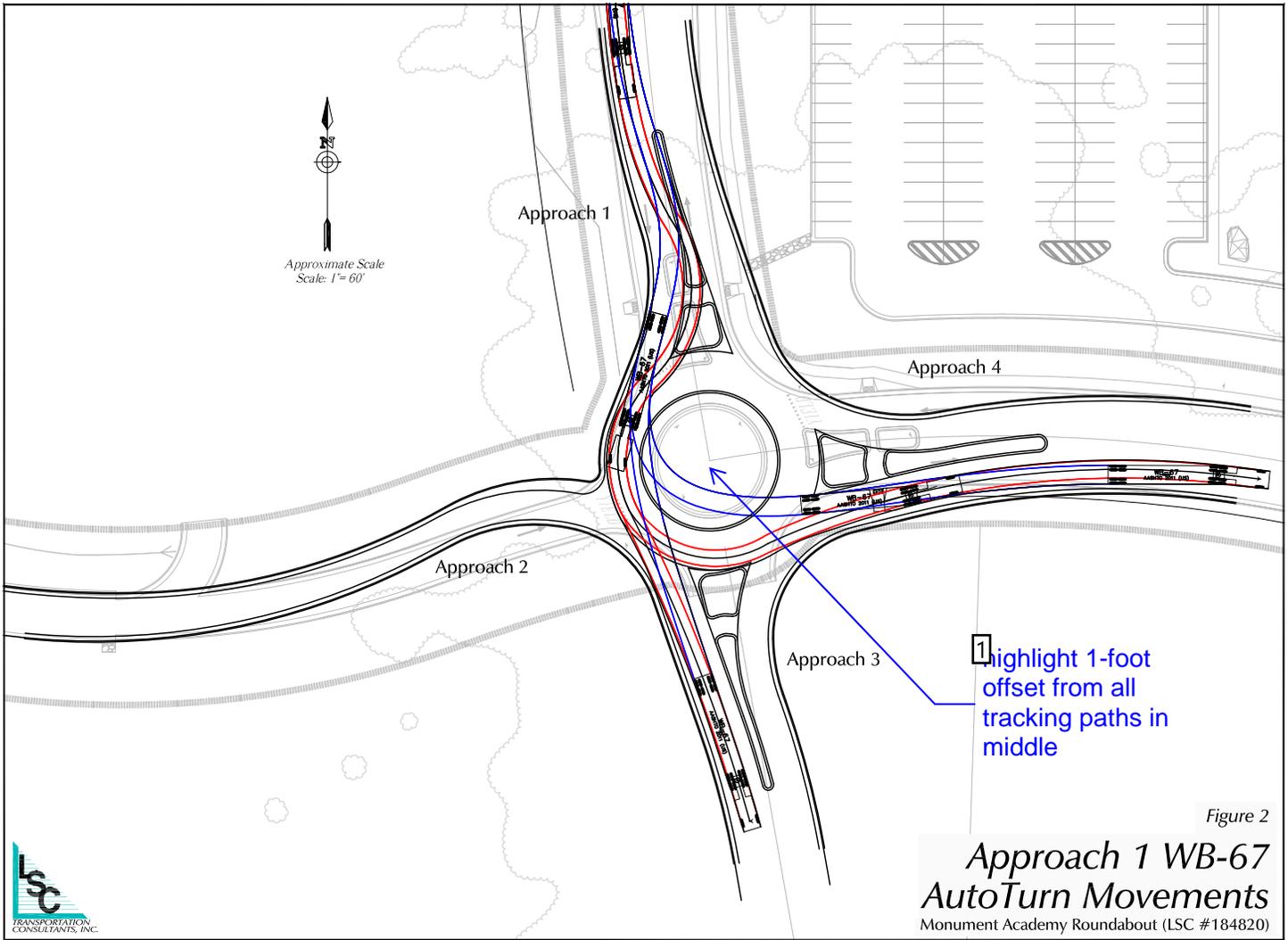
 Number: 1 Author: dsdrice Date: 3/23/2020 16:08:43

 Number: 2 Author: dsdrice Subject: Callout Date: 3/23/2020 16:09:38

[Show concrete pan/apron like on the other approaches](#)

 Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 21:50:43

LSC Response: Modified as requested.

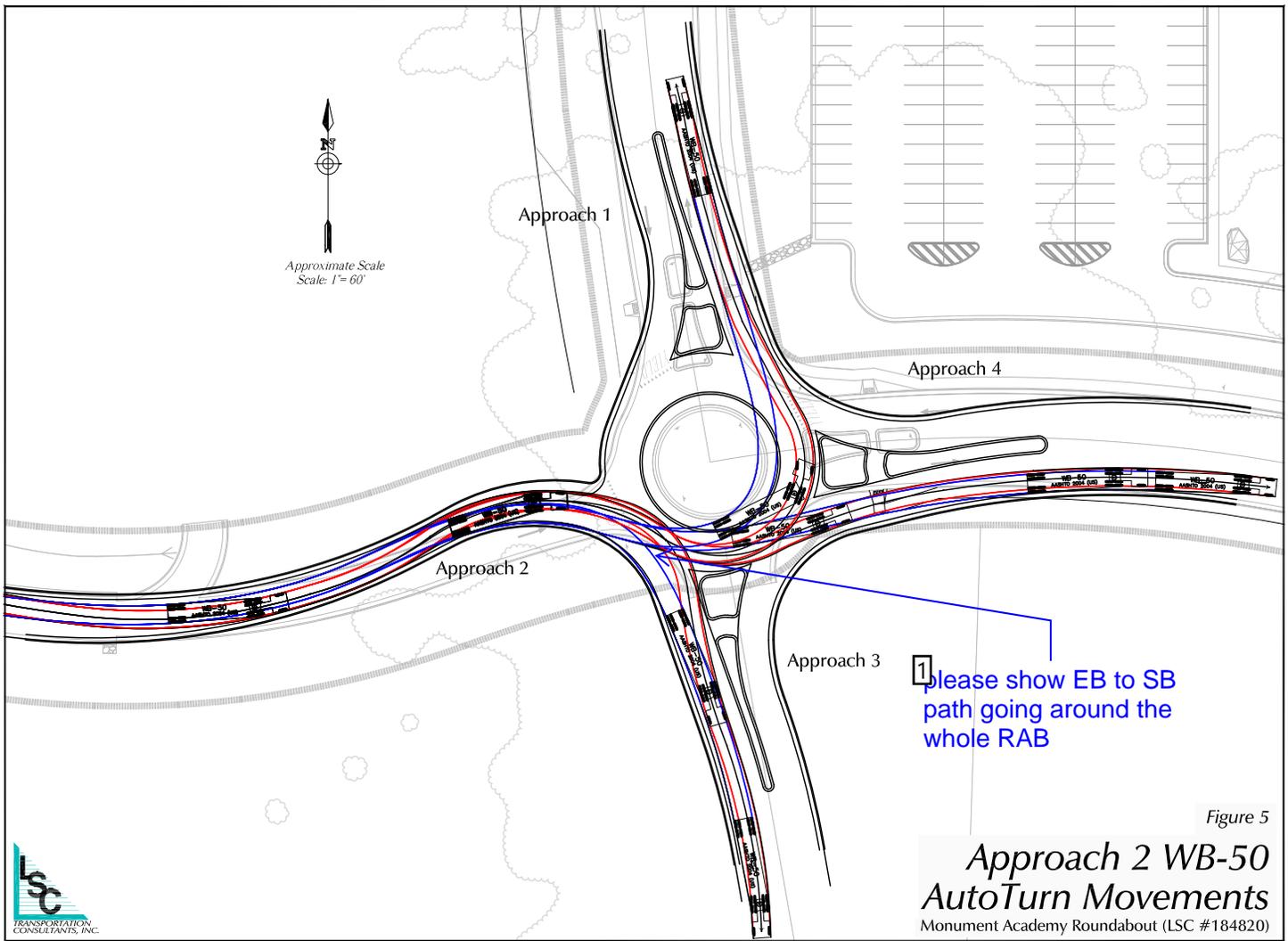


Number: 1 Author: dsdrice Subject: Callout Date: 3/23/2020 16:11:22

highlight 1-foot offset from all tracking paths in middle

Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 21:50:59

LSC Response: Added as requested.

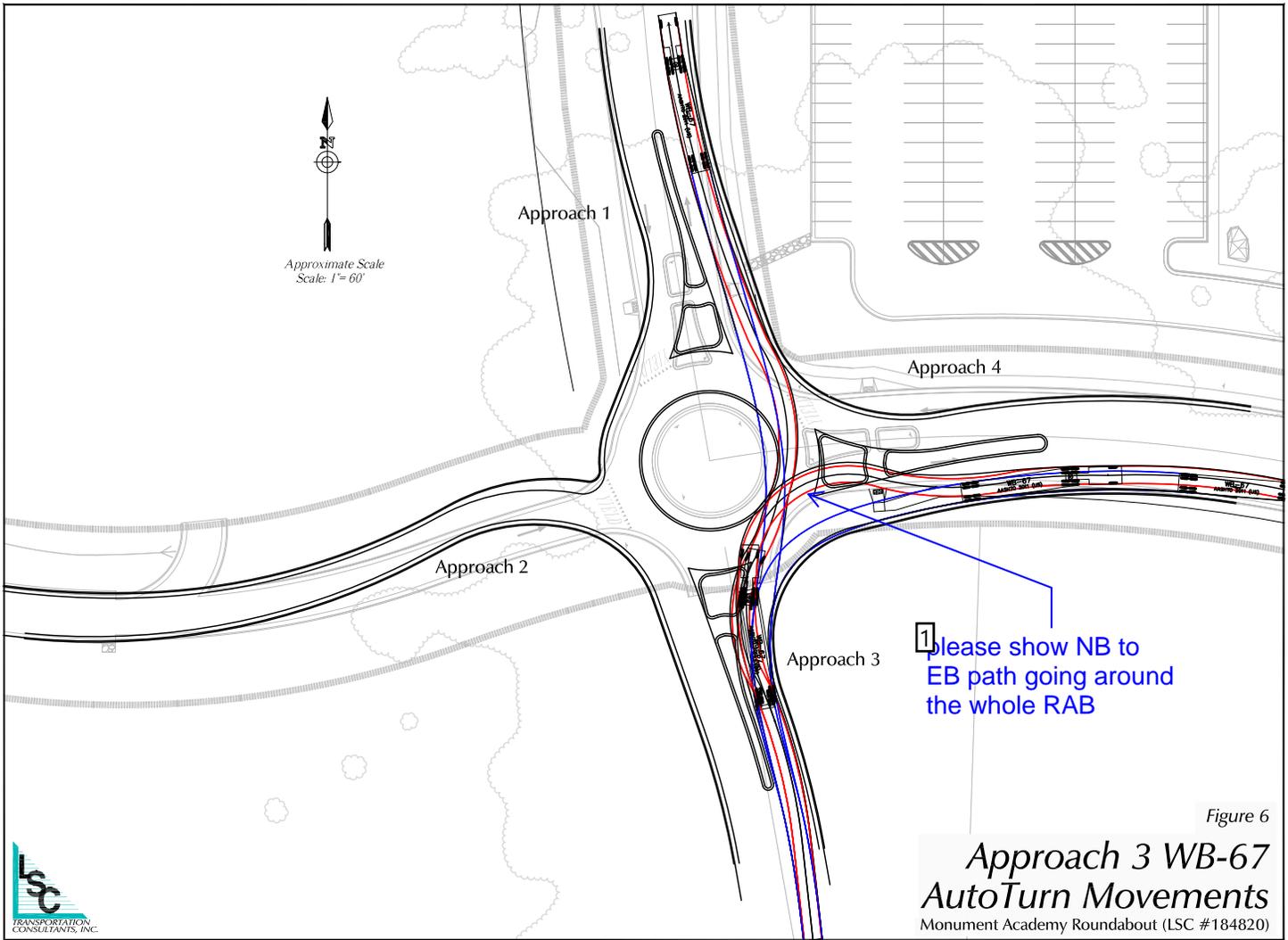


Number: 1 Author: dsdrice Subject: Callout Date: 3/23/2020 16:16:35

please show EB to SB path going around the whole RAB

 Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 21:58:38

LSC Response: The mini roundabout is too small for a large truck to do a u-turn or go 270 degrees around the center island – that is why the center and splitter islands have been designed to be mountable.

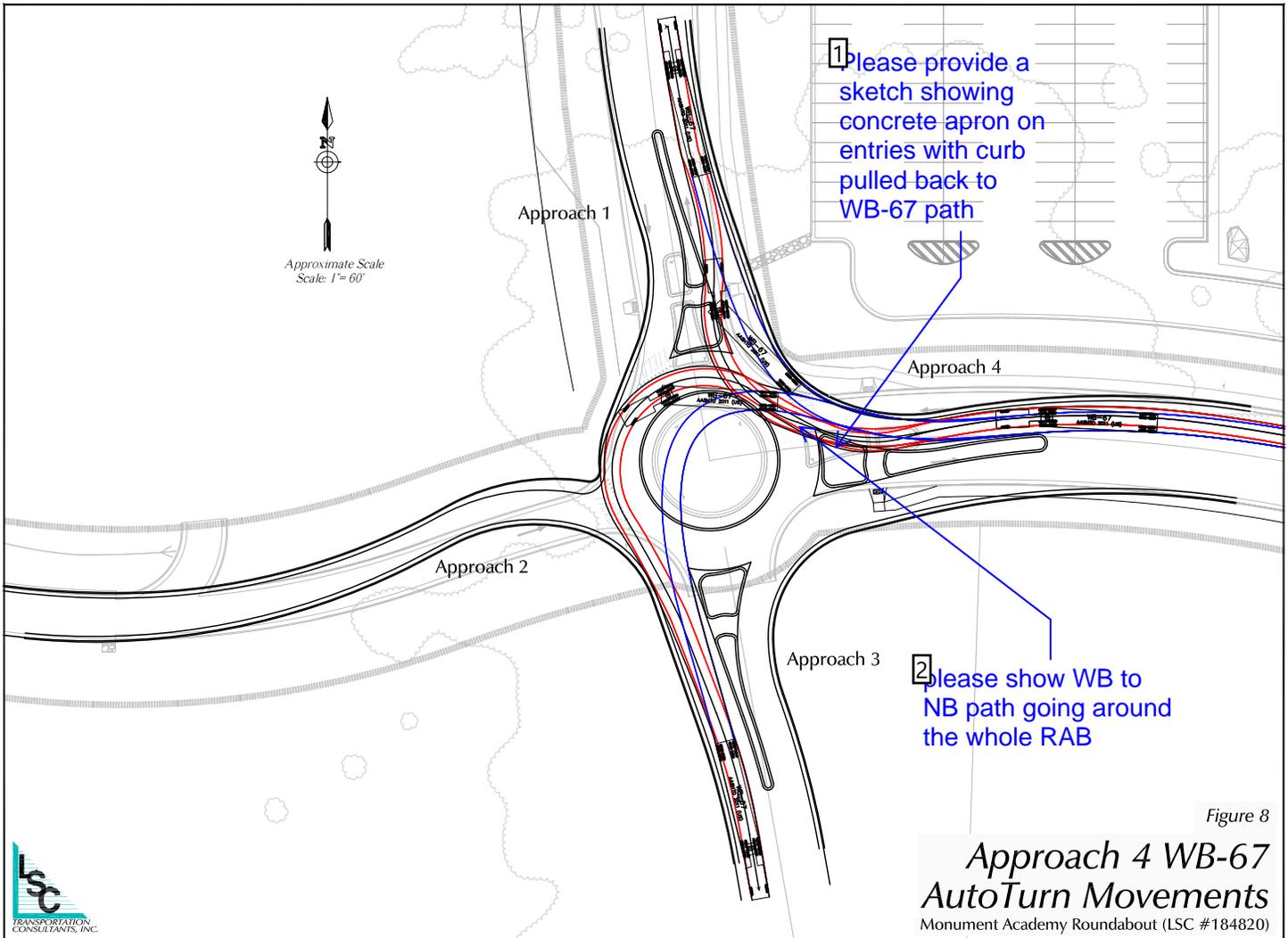


Number: 1 Author: dsdrice Subject: Callout Date: 3/23/2020 16:18:22

please show NB to EB path going around the whole RAB

 Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 21:59:09

LSC Response: The mini roundabout is too small for a large truck to do a u-turn or go 270 degrees around the center island – that is why the center and splitter islands have been designed to be mountable.



Number: 1 Author: dsdrice Subject: Callout Date: 3/23/2020 16:25:02

Please provide a sketch showing concrete apron on entries with curb pulled back to WB-67 path

Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 22:04:25

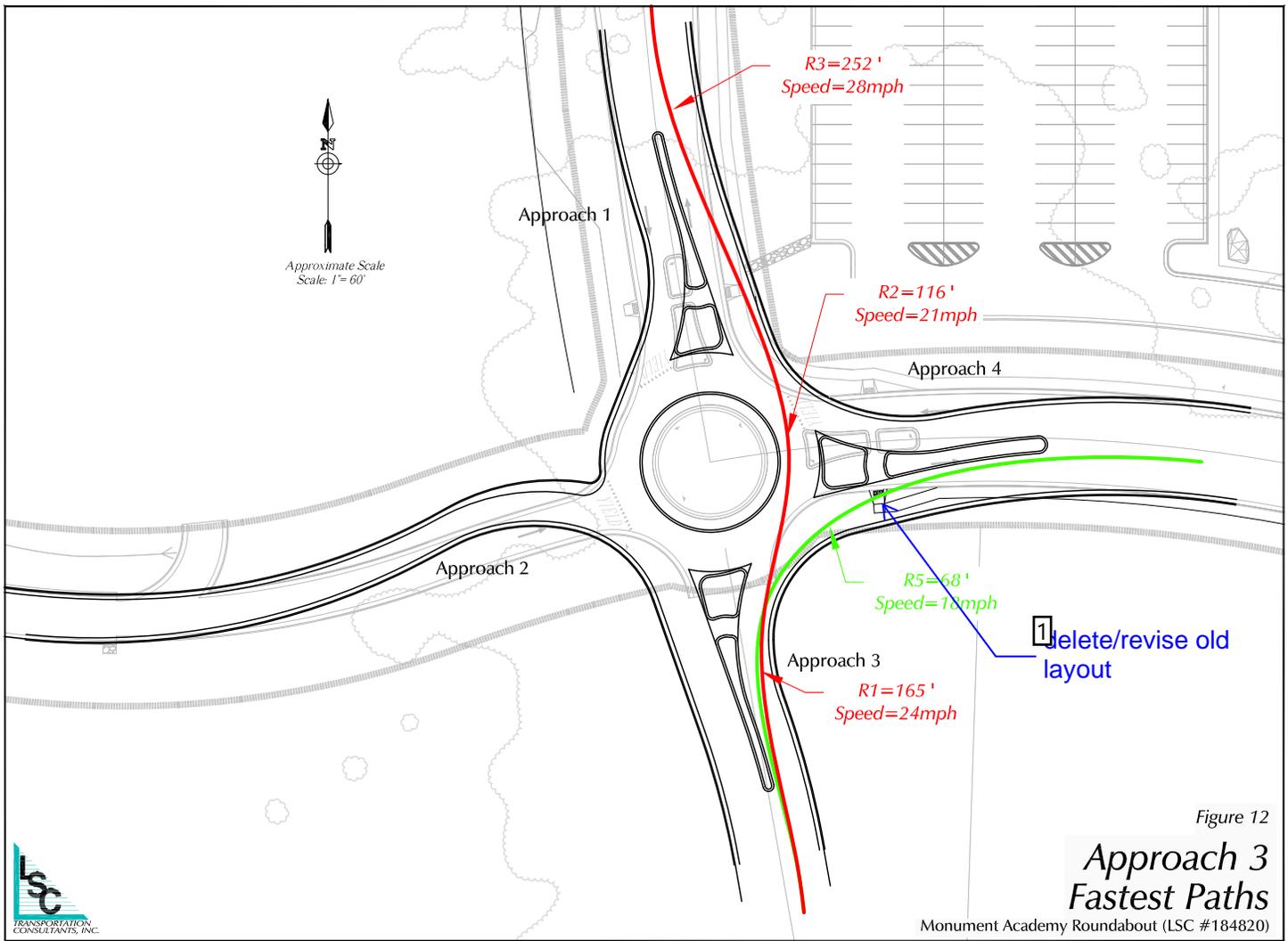
LSC Response: The curbs on the splitter islands has been pulled back, leaving room for concrete aprons on the entries (for the larger vehicles). The specific design of the aprons - color, pattern etc. is a design detail that will be finalized later. Note: The splitter islands and center island will be mountable.

Number: 2 Author: dsdrice Subject: Callout Date: 3/23/2020 16:14:38

please show WB to NB path going around the whole RAB

Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 21:59:20

LSC Response: The mini roundabout is too small for a large truck to do a u-turn or go 270 degrees around the center island – that is why the center and splitter islands have been designed to be mountable.



Number: 1 Author: dsdrice Subject: Callout Date: 3/20/2020 12:03:50

[delete/revise old layout](#)

 Author: jchodsdon Subject: Sticky Note Date: 4/7/2020 21:52:10

LSC Response: Revised as requested.