

To: El Paso County  
Planning & Development

From: Brian Horan, PE, PTOE  
Cooper Riddell-Brosig  
Galloway

Date: May 27, 2026  
Revised: July 9, 2026

Re: **The Markets at Bent Grass  
Roundabout Analysis Memorandum**



## INTRODUCTION

The intent of this memorandum is to respond to a comment provided by El Paso County on The Markets at Bent Grass Master Traffic Impact Study (MTIS) completed in March 2026 by SM Rocha. The comment provided by El Paso County stated “provide roundabout parameters table and exhibits including fastest path speeds and differentials, dimensions, widths, view angles, etc. Discuss specific needs and examples with staff. Include design vehicle and WB-67 tracking exhibits.” The following memorandum will address this comment with a roundabout analysis provided herein.

## BACKGROUND

This memorandum provides the results of a roundabout analysis performed in support of the MTIS for The Markets at Bent Grass. MTIS excerpts are provided in Attachment I. The proposed roundabout is located approximately 400 feet north of Woodmen Road along the future Switchgrass Drive. Figure 1 shows the location of this roundabout with a star. The site plan along with roundabout design exhibits are provided in Attachment II.

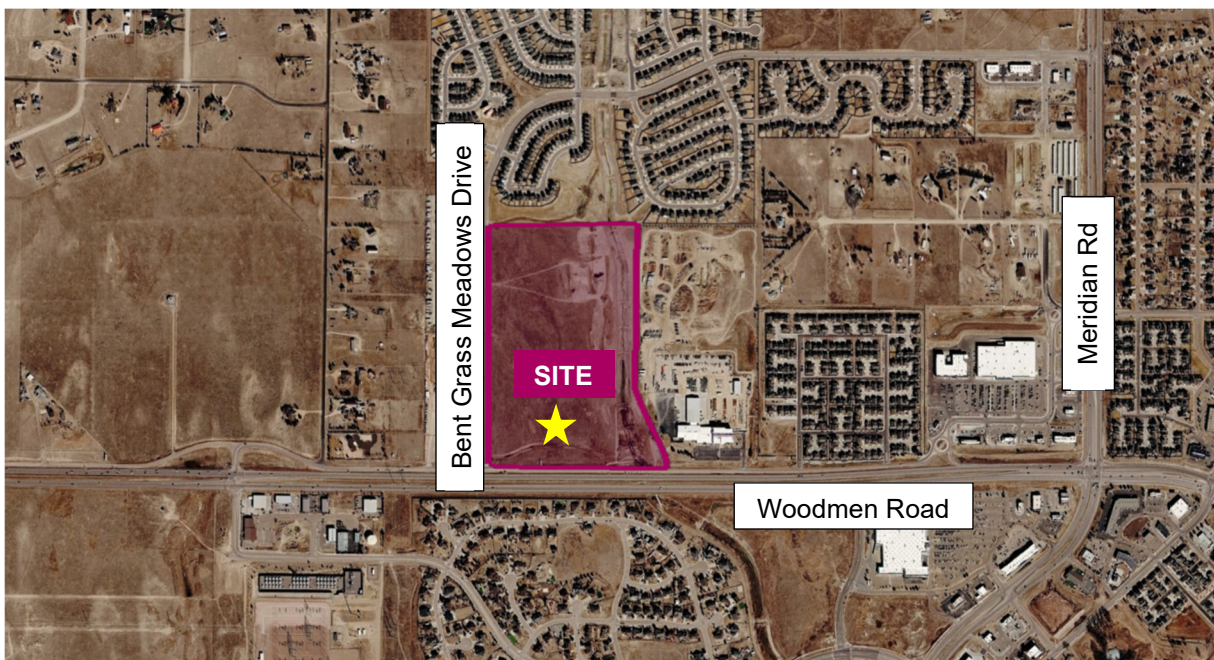


Figure 1 – Site Location

## ROUNABOUT ANALYSIS

Roundabout operations have been confirmed via Sidra and can be seen in Table 1. Sidra results sheets have been provided in Attachment III. The roundabout parameters, fastest path diagrams, and vehicle tracking diagrams are provided in Attachment IV as requested. The roundabout has been evaluated using the WB-67 design vehicle to confirm adequate operations for heavy vehicles within this roundabout for all directions of travel.

Table 1  
The Markets at Bent Grass Roundabout Analysis - El Paso County, CO  
Total Future Intersection Level of Service Summary <sup>(1)</sup>

| Intersection                                   | Operating Condition | Street Name              | Approach/ Movement | Total Future 2030 |              | Total Future 2045 |              |
|------------------------------------------------|---------------------|--------------------------|--------------------|-------------------|--------------|-------------------|--------------|
|                                                |                     |                          |                    | AM Peak Hour      | PM Peak Hour | AM Peak Hour      | PM Peak Hour |
| 1 Bent Grass Meadows Drive & Switchgrass Drive | ROUNABOUT           | Bent Grass Meadows Drive | EBLTR              | A [8.8]           | B [12.0]     | B [10.5]          | A [6.8]      |
|                                                |                     | Bent Grass Meadows Drive | WBLTR              | A [7.3]           | B [11.6]     | A [8.3]           | B [14.5]     |
|                                                |                     | Switchgrass Drive        | NBLT               | A [4.9]           | A [6.2]      | A [5.2]           | A [6.8]      |
|                                                |                     | Switchgrass Drive        | NBR                | A [0.0]           | A [0.0]      | A [0.0]           | A [0.1]      |
|                                                |                     | Switchgrass Drive        | SBLTR              | A [6.0]           | A [9.8]      | A [6.6]           | B [11.6]     |
|                                                |                     | Overall                  | A [6.2]            | A [7.9]           | A [7.0]      | A [7.5]           |              |

Notes : (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.

## CONCLUSION

As shown in Table 1, the proposed intersection of Bent Grass Meadows Drive & Switchgrass Drive is expected to operate with acceptable overall level of service "A" during the 2030 and 2045 weekday AM and PM Peak hours. The proposed roundabout would accommodate the anticipated demand and operate adequately as designed.

We trust that the information contained herein satisfies the comment from El Paso County, CO. If you have any questions or need further information, please contact Brian Horan at [BrianHoran@gallowayus.com](mailto:BrianHoran@gallowayus.com) or 303-770-8884.

The Markets at Bent Grass  
El Paso County, CO

# Attachment I

## MTIS Excerpts

# MASTER TRAFFIC IMPACT STUDY

For

**The Markets at Bent Grass**  
**El Paso County, Colorado**  
(EPC No.: CR-26-01, SP-26-02)

March 2026  
Revised: May 2026

Prepared for:

Evergreen  
2390 East Camelback Road, Suite 140  
Phoenix, AZ 85016

Prepared by:



**SM ROCHA, LLC**

TRAFFIC & TRANSPORTATION ENGINEERING CONSULTANTS

8700 Turnpike Drive, Suite 240  
Westminster, Colorado 80031  
(303) 458-9798

6 South Tejon Street, Suite 618  
Colorado Springs, Colorado 80903  
(719) 203-6639

Project Manager/Engineer:  
Mike Rocha, Principal  
Brandon Wilson, PE

Engineer in Responsible Charge:  
Fred Lantz, PE



25-022358





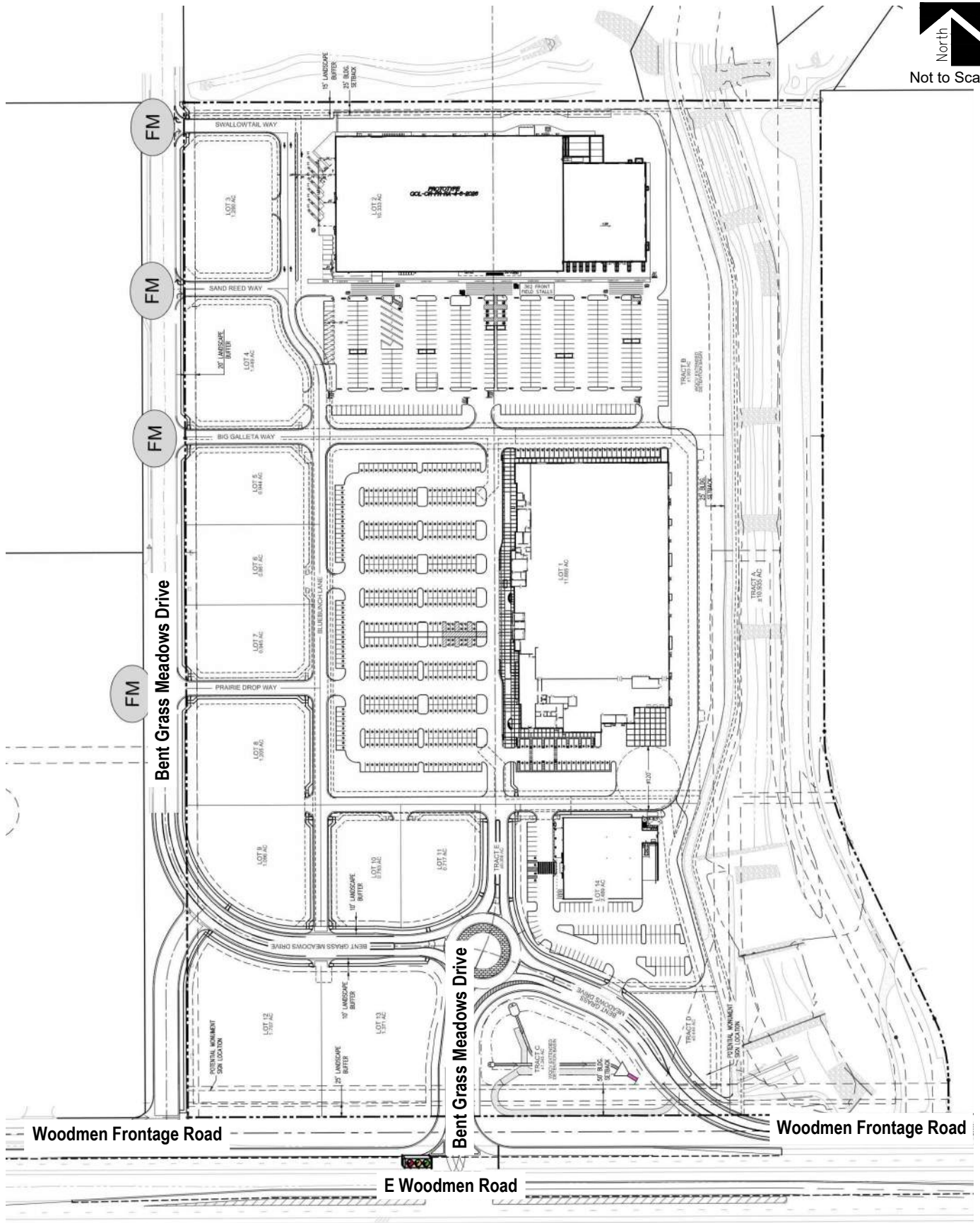
Not to Scale



Figure 1  
SITE LOCATION

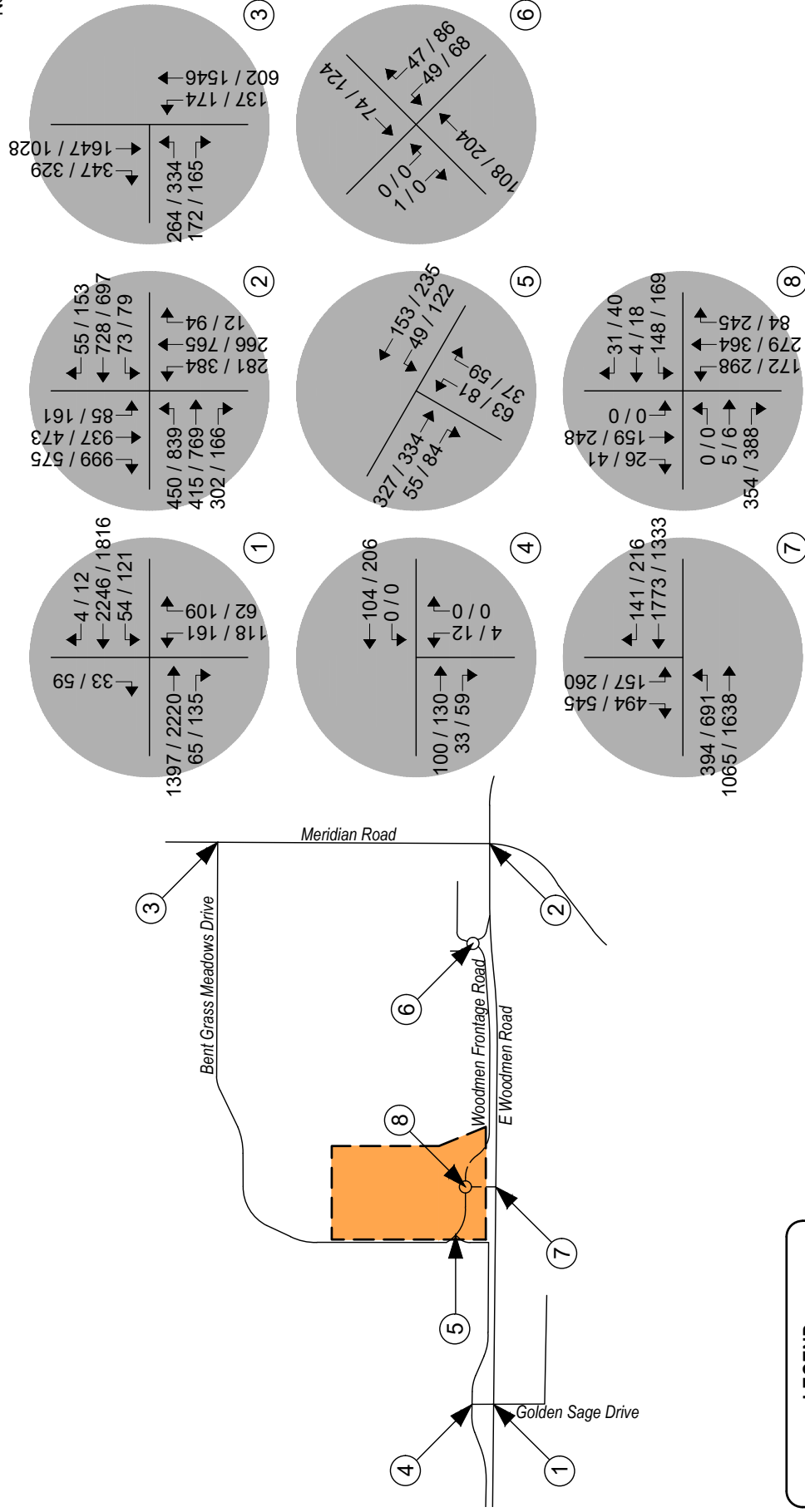








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**LEGEND**

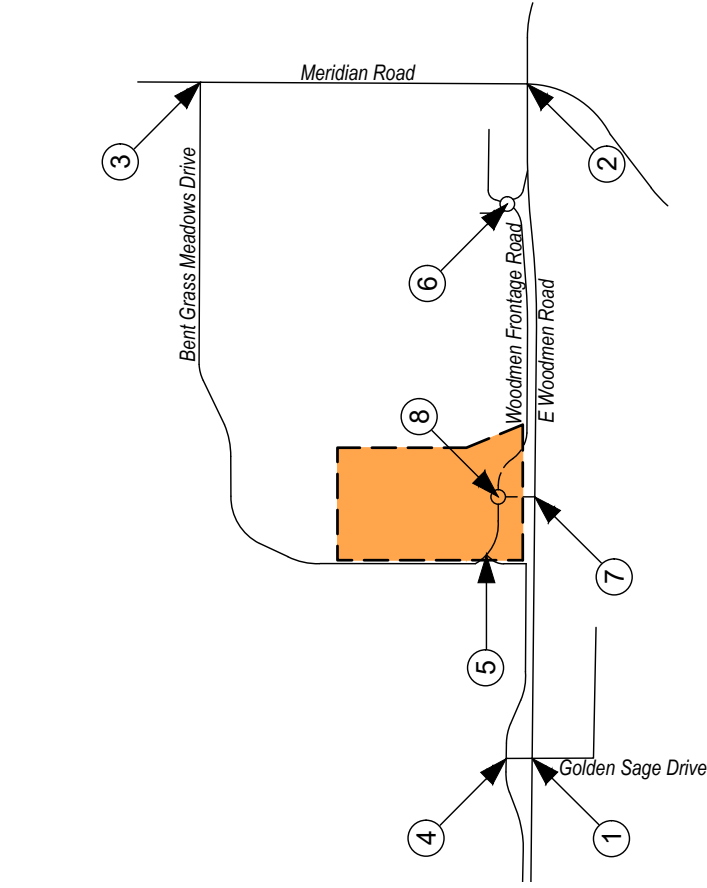
- Study Intersection Volumes
- Development Site

**Figure 7A**  
**TOTAL TRAFFIC - YEAR 2030**  
Intersection Volumes  
AM / PM Peak Hour

**THE MARKETS AT BENT GRASS**  
Traffic Impact Study



**SM ROCHA, LLC**  
Traffic & Transportation Engineering Consultants

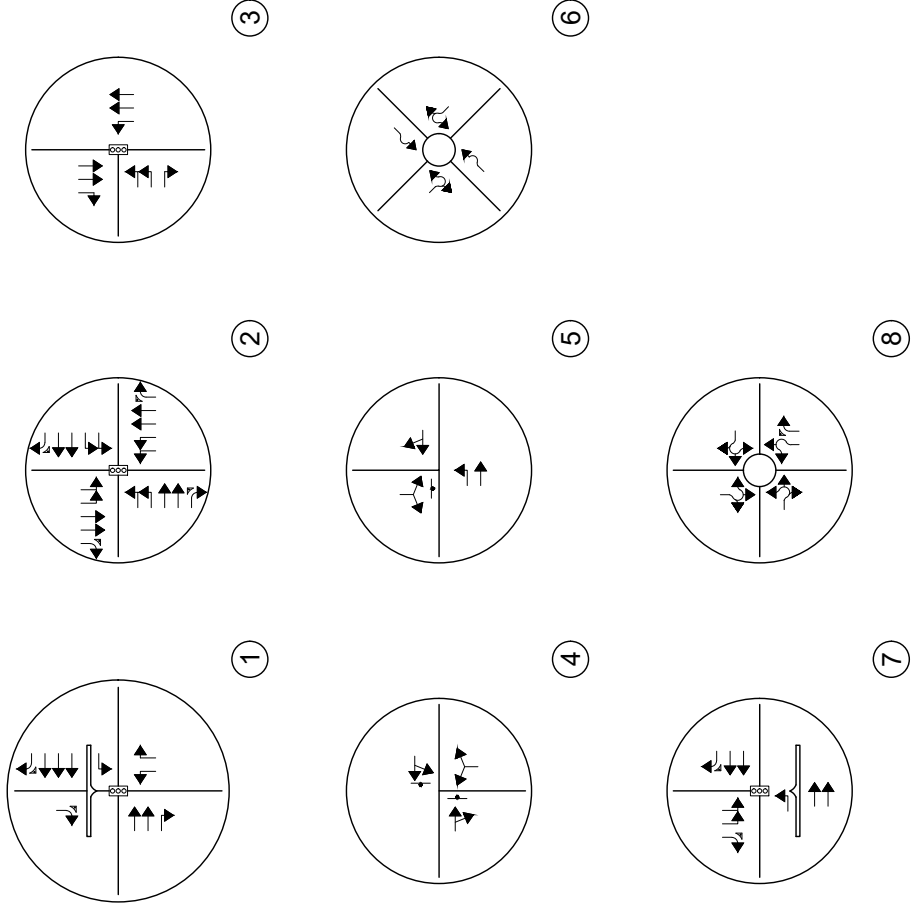


**LEGEND**

Study Intersection

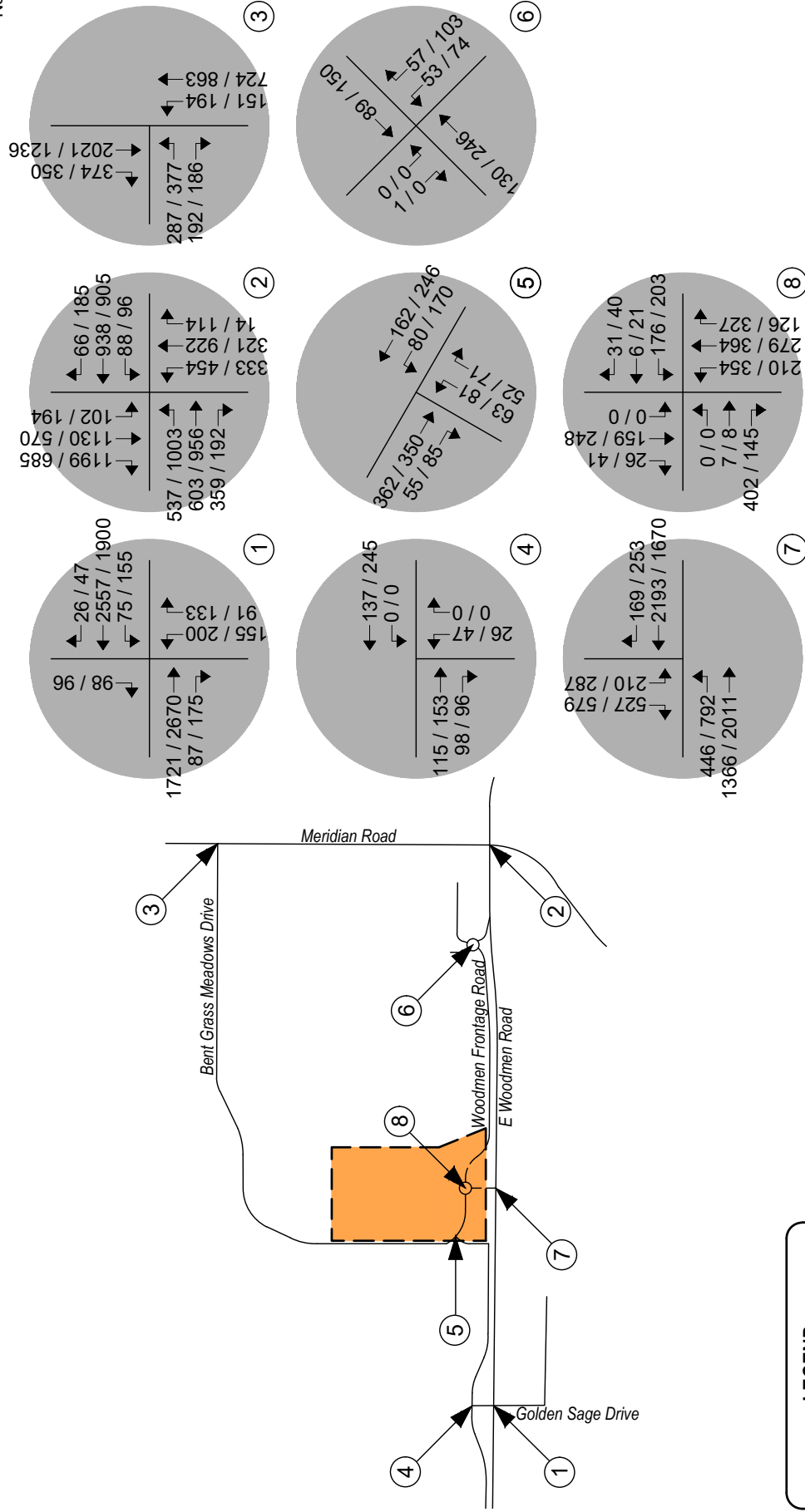
Lane Geometry

Development Site





Not to Scale



**LEGEND**

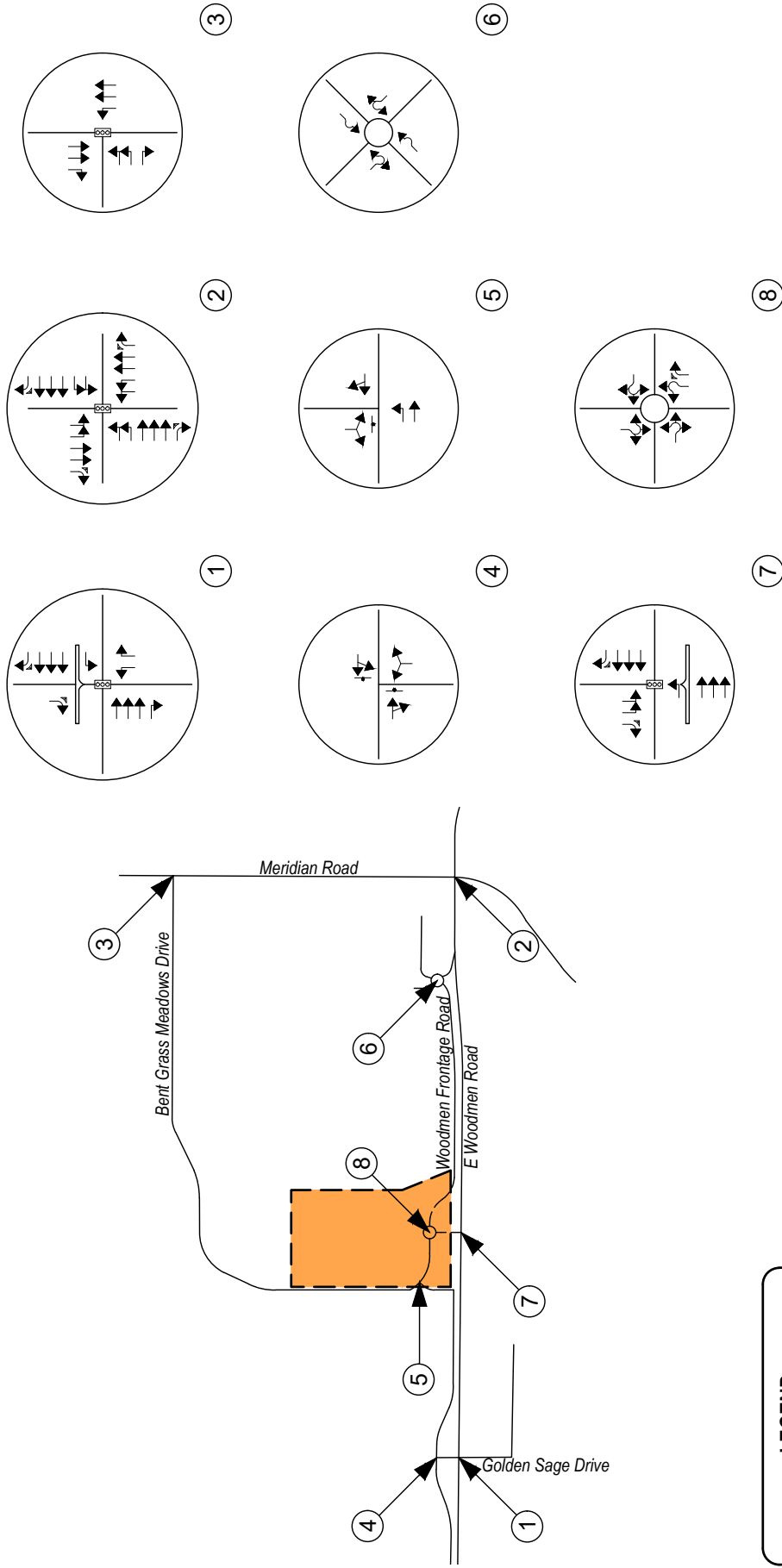
- Study Intersection Volumes
- Development Site

**THE MARKETS AT BENT GRASS**  
Traffic Impact Study



**SM ROCHA, LLC**  
Traffic & Transportation Engineering Consultants

**Figure 8A**  
**TOTAL TRAFFIC - YEAR 2045**  
Intersection Volumes  
AM / PM Peak Hour



LEGEND

○

Study Intersection

—

Lane Geometry

■

Development Site



## **Attachment II**

### **Site Plan & Roundabout Design Excerpts**



# THE MARKETS AT BENT GRASS

A PORTION OF THE SOUTHWEST QUARTER OF SECTION 1 TOWNSHIP 13 SOUTH,  
RANGE 65 WEST OF THE 6TH PRINCIPAL MERIDIAN, EL PASO COUNTY, COLORADO

**Galloway**

1155 Kelly Johnson Blvd., Suite 305  
Colorado Springs, CO 80920  
719.900.7220  
GallowayUS.com

Galloway & Company, LLC

**Evergreen**  
Multi-family Retail Industrial



| PARCEL AREA TABLE |           |                            |                                      |
|-------------------|-----------|----------------------------|--------------------------------------|
| PARCEL            | AREA (AC) | USE                        | OWNERSHIP & MAINTENANCE              |
| LOT 1             | 11.89     | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 2             | 10.33     | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 3             | 1.29      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 4             | 1.45      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 5             | 0.94      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 6             | 0.86      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 7             | 0.89      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 8             | 1.26      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 9             | 1.10      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 10            | 0.78      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 11            | 0.72      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 12            | 2.46      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 13            | 1.71      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| LOT 14            | 1.37      | COMMERCIAL DEVELOPMENT     | LOT OWNER                            |
| TRACT A           | 10.94     | DRAINAGE CHANNEL           | EL PASO COUNTY                       |
| TRACT B           | 1.00      | OPEN SPACE                 | BENT GRASS COMMERCIAL METRO DISTRICT |
| TRACT C           | 1.37      | DRAINAGE                   | BENT GRASS COMMERCIAL METRO DISTRICT |
| TRACT D           | 0.44      | DRAINAGE/PEDESTRIAN ACCESS | BENT GRASS COMMERCIAL METRO DISTRICT |
| TRACT E           | 0.36      | PRIVATE ROADWAY            | BENT GRASS COMMERCIAL METRO DISTRICT |
| PR PUBLIC R.O.W.  | 2.75      | PUBLIC R.O.W.              | EL PASO COUNTY                       |
| TOTAL ACERAGE     | 53.91     |                            |                                      |

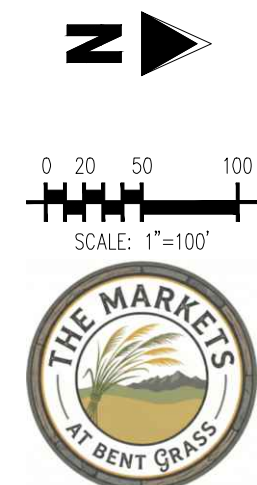
| PROPOSED EASEMENT AREA TABLE |           |                                      |
|------------------------------|-----------|--------------------------------------|
| TYPE                         | AREA (AC) | OWNERSHIP & MAINTENANCE              |
| GENERAL UTILITY              | 11.89     | BENT GRASS COMMERCIAL METRO DISTRICT |
| PUBLIC IMPROVEMENT           | 10.33     | BENT GRASS COMMERCIAL METRO DISTRICT |
| PUBLIC ACCESS                | 1.29      | BENT GRASS COMMERCIAL METRO DISTRICT |
| WATER UTILITY                | 1.45      | WHAID                                |
| ELECTRIC UTILITY             | 0.94      | MVEA                                 |

| LEGEND |                                       |
|--------|---------------------------------------|
|        | SIGHT DISTANCE LINE - 35 MPH (POSTED) |
|        | SIGHT DISTANCE LINE - 25 MPH (POSTED) |
|        | PROPERTY BOUNDARY LINE                |
|        | ADJACENT PROPERTY BOUNDARY LINE       |
|        | RIGHT OF WAY BOUNDARY LINE            |
|        | ROAD CENTERLINE                       |
|        | EXISTING EASEMENT LINE                |
|        | PROPOSED EASEMENT LINE                |
|        | PROPOSED WATER EASEMENT LINE          |
|        | BUILDING SETBACK LINE                 |
|        | LANDSCAPE SETBACK LINE                |
|        | EFFECTIVE 100 YEAR FLOOD PLAN         |
|        | CORRECTED 100 YEAR FLOOD PLAN         |
|        | PROPOSED PAN FLOWLINE                 |
|        | PROPOSED CURB AND GUTTER              |
|        | EXISTING CURB AND GUTTER              |
|        | FUTURE CURB AND GUTTER FLOWLINE       |
|        | PUBLIC RIGHT-OF-WAY                   |
|        | FUTURE SDP DRIVE AISLE                |

**NOTES**  
TRACT A IS INCLUSIVE OF THE OF THE EXISTING CHANNEL. THIS DEVELOPMENT IS EXCLUSIVE OF ANY IMPROVEMENTS IN TRACT A, WITH THE EXCEPTION OF POTENTIAL STORM DRAIN DISCHARGE LOCATIONS. THIS DEVELOPMENT DOES NOT PROPOSE ANY CHANNEL IMPROVEMENTS OR SIGNIFICANT DISTURBANCE WITHIN THE CHANNEL (TRACT A).

| OWNER OF RECORD                                                                                         |  |
|---------------------------------------------------------------------------------------------------------|--|
| LENA GAIL CASE<br>119 N. WASHATCH AVE<br>COLORADO SPRINGS, CO 80903                                     |  |
| OWNER OF RECORD                                                                                         |  |
| CYNTHIA DEYOUNG<br>10924 E HIGHWAY 24<br>Peyton, CO 80831                                               |  |
| APPLICANT                                                                                               |  |
| EVERGREEN DEVCO, INC.<br>1873 SOUTH BELLAIRE ST., SUITE 1200<br>DENVER, CO 80222<br>TEL: (303) 757-0414 |  |

| PLAN PREPARER                                                                                                                  |  |
|--------------------------------------------------------------------------------------------------------------------------------|--|
| JEFFREY ODOR<br>GALLOWAY & CO. LLC<br>1155 KELLY JOHNSON BLVD., SUITE 305<br>COLORADO SPRINGS, CO 80920<br>TEL: (719) 308-2519 |  |
| BASED ON SURVEY PERFORMED BY GALLOWAY & COMPANY, LLC ON 07/01/2025                                                             |  |



PRELIMINARY PLAN  
THE MARKETS AT BENT GRASS  
EVERGREEN DEVELOPMENT  
EPC FILE #: SP262

NEC OF WOODMEN RD. & BENT GRASS MEADOWS DR.  
FALCON, COLORADO

| # | Date       | Issue / Description            | Init. |
|---|------------|--------------------------------|-------|
| 1 | 03/04/2026 | 1ST PRELIMINARY PLAN SUBMITTAL |       |
| 2 | 05/22/2026 | 2ND PRELIMINARY PLAN SUBMITTAL |       |

Project No: EDI02  
Drawn By: ELB, AGC  
Checked By: JAO, TJE, CMWJ  
Date: 05/22/2026

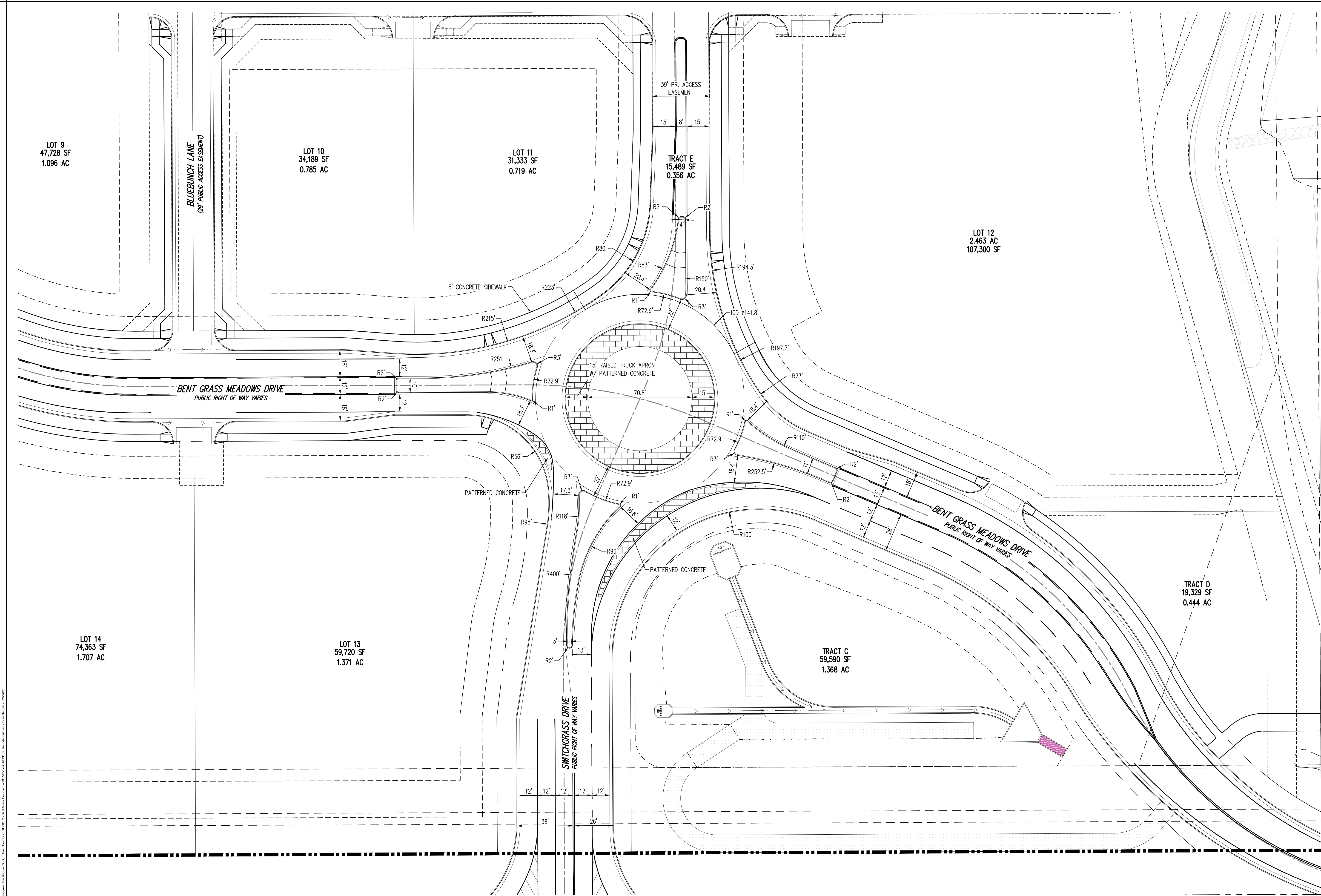
LOT & TRACT PLAN

SP262

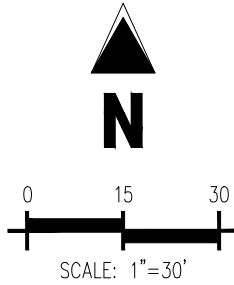
PP-3

3 OF 12





| SITE LEGEND |                                 |
|-------------|---------------------------------|
|             | OVERALL PROPERTY BOUNDARY LINE  |
|             | PROPERTY BOUNDARY LINE          |
|             | ADJACENT PROPERTY BOUNDARY LINE |
|             | RIGHT OF WAY BOUNDARY LINE      |
|             | ROAD CENTERLINE                 |
|             | EXISTING EASEMENT LINE          |
|             | PROPOSED EASEMENT LINE          |
|             | BUILDING SETBACK LINE           |
|             | LANDSCAPE SETBACK LINE          |
|             | PROPOSED SAWCUT LINE            |
|             | PROPOSED FLOW PATH              |
|             | EXISTING TO REMAIN              |
|             | PROPOSED NEW                    |
|             | PROPOSED EDGE OF ASPHALT        |
|             | PROPOSED EDGE OF GRAVEL         |
|             | PROPOSED CURB AND GUTTER        |
|             | PROPOSED SPILL CURB AND GUTTER  |
|             | PROPOSED FIRE LANE CURB PAINT   |
|             | EXISTING CURB AND GUTTER        |



## **Attachment III**

### **Sidra Results Pages**



# LANE SUMMARY

 **Site: [1] Total Future 2030 AM** (Bent Grass Meadows Drive & Switchgrass Drive)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Roundabout  
Site Category: (None)  
Roundabout  
**Site Scenario: 1 | Local Volumes**

| Lane Use and Performance       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
|--------------------------------|--------------------------------------------------|-----|---------------------------------------------------|-----|---------------|---------------------|--------------------|-----------------------|---------------------|-----------------------------------------------|----------------|----------------------|-------------------|----------------------|-----|
|                                | Demand Flows<br>[ Total    HV ]<br>veh/h       % |     | Arrival Flows<br>[ Total    HV ]<br>veh/h       % |     | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Aver.<br>Delay<br>sec | Level of<br>Service | 95% Back Of Queue<br>[ Veh       Dist ]<br>ft | Lane<br>Config | Lane<br>Length<br>ft | Cap.<br>Adj.<br>% | Prob.<br>Block.<br>% |     |
| South: Switchgrass Drive       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 504                                              | 2.0 | 504                                               | 2.0 | 1383          | 0.364               | 100                | 4.9                   | LOS A               | 2.2                                           | 54.8           | Full                 | 1600              | 0.0                  | 0.0 |
| Lane 2                         | 91                                               | 2.0 | 91                                                | 2.0 | 1642          | 0.056               | 100                | 0.0                   | LOS A               | 0.0                                           | 0.0            | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 595                                              | 2.0 | 595                                               | 2.0 |               | 0.364               |                    | 4.1                   | LOS A               | 2.2                                           | 54.8           |                      |                   |                      |     |
| East: Bent Grass Meadows Drive |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 199                                              | 2.0 | 199                                               | 2.0 | 792           | 0.251               | 100                | 7.3                   | LOS A               | 1.1                                           | 28.2           | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 199                                              | 2.0 | 199                                               | 2.0 |               | 0.251               |                    | 7.3                   | LOS A               | 1.1                                           | 28.2           |                      |                   |                      |     |
| North: Switchgrass Drive       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 202                                              | 2.0 | 202                                               | 2.0 | 932           | 0.217               | 100                | 6.0                   | LOS A               | 1.0                                           | 25.1           | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 202                                              | 2.0 | 202                                               | 2.0 |               | 0.217               |                    | 6.0                   | LOS A               | 1.0                                           | 25.1           |                      |                   |                      |     |
| West: Bent Grass Meadows Drive |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 418                                              | 2.0 | 418                                               | 2.0 | 950           | 0.440               | 100                | 8.8                   | LOS A               | 2.5                                           | 63.2           | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 418                                              | 2.0 | 418                                               | 2.0 |               | 0.440               |                    | 8.8                   | LOS A               | 2.5                                           | 63.2           |                      |                   |                      |     |
| All Vehicles                   | 1415                                             | 2.0 | 1415                                              | 2.0 |               | 0.440               |                    | 6.2                   | LOS A               | 2.5                                           | 63.2           |                      |                   |                      |     |

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).  
Roundabout LOS Method: Same as Sign Control.  
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
LOS F will result if v/c >1 irrespective of lane delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
Roundabout Capacity Model: US HCM 6.  
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.  
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

<sup>d</sup> Dominant lane on roundabout approach

| Approach Lane Flows (veh/h)    |     |     |    |       |     |       |       |       |        |      |  |
|--------------------------------|-----|-----|----|-------|-----|-------|-------|-------|--------|------|--|
| South: Switchgrass Drive       |     |     |    |       |     |       |       |       |        |      |  |
| Mov.                           | L2  | T1  | R2 | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |  |
| From S                         |     |     |    |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |  |
| To Exit:                       | W   | N   | E  |       |     | veh/h | v/c   | %     | %      | No.  |  |
| Lane 1                         | 187 | 317 | -  | 504   | 2.0 | 1383  | 0.364 | 100   | NA     | NA   |  |
| Lane 2                         | -   | -   | 91 | 91    | 2.0 | 1642  | 0.056 | 100   | NA     | NA   |  |
| Approach                       | 187 | 317 | 91 | 595   | 2.0 |       | 0.364 |       |        |      |  |
| East: Bent Grass Meadows Drive |     |     |    |       |     |       |       |       |        |      |  |
| Mov.                           | L2  | T1  | R2 | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |  |
| From E                         |     |     |    |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |  |
| To Exit:                       | S   | W   | N  |       |     | veh/h | v/c   | %     | %      | No.  |  |
| Lane 1                         | 161 | 4   | 34 | 199   | 2.0 | 792   | 0.251 | 100   | NA     | NA   |  |

|                                |      |     |     |       |     |       |       |       |        |      |
|--------------------------------|------|-----|-----|-------|-----|-------|-------|-------|--------|------|
| Approach                       | 161  | 4   | 34  | 199   | 2.0 |       | 0.251 |       |        |      |
| North: Switchgrass Drive       |      |     |     |       |     |       |       |       |        |      |
| Mov.                           | L2   | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |
| From N                         |      |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |
| To Exit:                       | E    | S   | W   |       |     | veh/h | v/c   | %     | %      | No.  |
| Lane 1                         | 1    | 173 | 28  | 202   | 2.0 | 932   | 0.217 | 100   | NA     | NA   |
| Approach                       | 1    | 173 | 28  | 202   | 2.0 |       | 0.217 |       |        |      |
| West: Bent Grass Meadows Drive |      |     |     |       |     |       |       |       |        |      |
| Mov.                           | L2   | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |
| From W                         |      |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |
| To Exit:                       | N    | E   | S   |       |     | veh/h | v/c   | %     | %      | No.  |
| Lane 1                         | 1    | 5   | 412 | 418   | 2.0 | 950   | 0.440 | 100   | NA     | NA   |
| Approach                       | 1    | 5   | 412 | 418   | 2.0 |       | 0.440 |       |        |      |
| Total %HV Deg.Satn (v/c)       |      |     |     |       |     |       |       |       |        |      |
| All Vehicles                   | 1415 | 2.0 |     | 0.440 |     |       |       |       |        |      |

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

|                                                                |                  |                      |                        |                          |                  |                       |                      |                |               |                |                 |                   |        |  |
|----------------------------------------------------------------|------------------|----------------------|------------------------|--------------------------|------------------|-----------------------|----------------------|----------------|---------------|----------------|-----------------|-------------------|--------|--|
| Merge Analysis                                                 |                  |                      |                        |                          |                  |                       |                      |                |               |                |                 |                   |        |  |
|                                                                | Exit Lane Number | Short Lane Length ft | Percent Opng in Lane % | Opposing Flow Rate veh/h | Critical Gap sec | Follow-up Headway sec | Lane Flow Rate veh/h | Capacity veh/h | Deg. Satn v/c | Min. Delay sec | Merge Delay sec | Merge Queue [ Veh | Dist ] |  |
| There are no Exit Short Lanes for Merge Analysis at this Site. |                  |                      |                        |                          |                  |                       |                      |                |               |                |                 |                   |        |  |

|                                |                       |                        |                                   |                      |
|--------------------------------|-----------------------|------------------------|-----------------------------------|----------------------|
| Variable Demand Analysis       |                       |                        |                                   |                      |
|                                | Initial Queued Demand | Residual Queued Demand | Time for Residual Demand to Clear | Duration of Oversatn |
|                                | veh                   | veh                    | sec                               | sec                  |
| South: Switchgrass Drive       |                       |                        |                                   |                      |
| Lane 1                         | 0.0                   | 0.0                    | 0.0                               | 0.0                  |
| Lane 2                         | 0.0                   | 0.0                    | 0.0                               | 0.0                  |
| East: Bent Grass Meadows Drive |                       |                        |                                   |                      |
| Lane 1                         | 0.0                   | 0.0                    | 0.0                               | 0.0                  |
| North: Switchgrass Drive       |                       |                        |                                   |                      |
| Lane 1                         | 0.0                   | 0.0                    | 0.0                               | 0.0                  |
| West: Bent Grass Meadows Drive |                       |                        |                                   |                      |
| Lane 1                         | 0.0                   | 0.0                    | 0.0                               | 0.0                  |

# LANE SUMMARY

 **Site: [1 (2)] Total Future 2030 PM** (Bent Grass Meadows Drive & Switchgrass Drive)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Roundabout  
Site Category: (None)  
Roundabout  
**Site Scenario: 1 | Local Volumes**

| Lane Use and Performance       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
|--------------------------------|--------------------------------------------------|-----|---------------------------------------------------|-----|---------------|---------------------|--------------------|-----------------------|---------------------|-----------------------------------------------|----------------|----------------------|-------------------|----------------------|-----|
|                                | Demand Flows<br>[ Total    HV ]<br>veh/h       % |     | Arrival Flows<br>[ Total    HV ]<br>veh/h       % |     | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Aver.<br>Delay<br>sec | Level of<br>Service | 95% Back Of Queue<br>[ Veh       Dist ]<br>ft | Lane<br>Config | Lane<br>Length<br>ft | Cap.<br>Adj.<br>% | Prob.<br>Block.<br>% |     |
| South: Switchgrass Drive       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 738                                              | 2.0 | 738                                               | 2.0 | 1381          | 0.534               | 100                | 6.2                   | LOS A               | 4.3                                           | 108.9          | Full                 | 1600              | 0.0                  | 0.0 |
| Lane 2                         | 266                                              | 2.0 | 266                                               | 2.0 | 1642          | 0.162               | 100                | 0.0                   | LOS A               | 0.0                                           | 0.0            | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 1004                                             | 2.0 | 1004                                              | 2.0 |               | 0.534               |                    | 4.6                   | LOS A               | 4.3                                           | 108.9          |                      |                   |                      |     |
| East: Bent Grass Meadows Drive |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 247                                              | 2.0 | 247                                               | 2.0 | 618           | 0.400               | 100                | 11.6                  | LOS B               | 2.0                                           | 51.7           | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 247                                              | 2.0 | 247                                               | 2.0 |               | 0.400               |                    | 11.6                  | LOS B               | 2.0                                           | 51.7           |                      |                   |                      |     |
| North: Switchgrass Drive       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 315                                              | 2.0 | 315                                               | 2.0 | 774           | 0.407               | 100                | 9.8                   | LOS A               | 2.2                                           | 57.0           | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 315                                              | 2.0 | 315                                               | 2.0 |               | 0.407               |                    | 9.8                   | LOS A               | 2.2                                           | 57.0           |                      |                   |                      |     |
| West: Bent Grass Meadows Drive |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 459                                              | 2.0 | 459                                               | 2.0 | 836           | 0.549               | 100                | 12.0                  | LOS B               | 4.4                                           | 112.5          | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 459                                              | 2.0 | 459                                               | 2.0 |               | 0.549               |                    | 12.0                  | LOS B               | 4.4                                           | 112.5          |                      |                   |                      |     |
| All Vehicles                   | 2025                                             | 2.0 | 2025                                              | 2.0 |               | 0.549               |                    | 7.9                   | LOS A               | 4.4                                           | 112.5          |                      |                   |                      |     |

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).  
Roundabout LOS Method: Same as Sign Control.  
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
LOS F will result if v/c >1 irrespective of lane delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
Roundabout Capacity Model: US HCM 6.  
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.  
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

<sup>d</sup> Dominant lane on roundabout approach

| Approach Lane Flows (veh/h)    |     |     |     |       |     |       |       |       |        |      |  |
|--------------------------------|-----|-----|-----|-------|-----|-------|-------|-------|--------|------|--|
| South: Switchgrass Drive       |     |     |     |       |     |       |       |       |        |      |  |
| Mov.                           | L2  | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |  |
| From S                         |     |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |  |
| To Exit:                       | W   | N   | E   |       |     | veh/h | v/c   | %     | %      | No.  |  |
| Lane 1                         | 324 | 414 | -   | 738   | 2.0 | 1381  | 0.534 | 100   | NA     | NA   |  |
| Lane 2                         | -   | -   | 266 | 266   | 2.0 | 1642  | 0.162 | 100   | NA     | NA   |  |
| Approach                       | 324 | 414 | 266 | 1004  | 2.0 |       | 0.534 |       |        |      |  |
| East: Bent Grass Meadows Drive |     |     |     |       |     |       |       |       |        |      |  |
| Mov.                           | L2  | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |  |
| From E                         |     |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |  |
| To Exit:                       | S   | W   | N   |       |     | veh/h | v/c   | %     | %      | No.  |  |
| Lane 1                         | 184 | 20  | 43  | 247   | 2.0 | 618   | 0.400 | 100   | NA     | NA   |  |



|                                |      |     |       |       |     |       |       |       |        |      |
|--------------------------------|------|-----|-------|-------|-----|-------|-------|-------|--------|------|
| Approach                       | 184  | 20  | 43    | 247   | 2.0 | 0.400 |       |       |        |      |
| North: Switchgrass Drive       |      |     |       |       |     |       |       |       |        |      |
| Mov.                           | L2   | T1  | R2    | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |
| From N                         |      |     |       |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |
| To Exit:                       | E    | S   | W     |       |     | veh/h | v/c   | %     | %      | No.  |
| Lane 1                         | 1    | 270 | 45    | 315   | 2.0 | 774   | 0.407 | 100   | NA     | NA   |
| Approach                       | 1    | 270 | 45    | 315   | 2.0 | 0.407 |       |       |        |      |
| West: Bent Grass Meadows Drive |      |     |       |       |     |       |       |       |        |      |
| Mov.                           | L2   | T1  | R2    | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |
| From W                         |      |     |       |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |
| To Exit:                       | N    | E   | S     |       |     | veh/h | v/c   | %     | %      | No.  |
| Lane 1                         | 1    | 7   | 451   | 459   | 2.0 | 836   | 0.549 | 100   | NA     | NA   |
| Approach                       | 1    | 7   | 451   | 459   | 2.0 | 0.549 |       |       |        |      |
| Total %HV Deg.Satn (v/c)       |      |     |       |       |     |       |       |       |        |      |
| All Vehicles                   | 2025 | 2.0 | 0.549 |       |     |       |       |       |        |      |

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

|                                                                |                  |                      |                        |                          |                  |                       |                      |                |               |                |                 |                   |        |  |
|----------------------------------------------------------------|------------------|----------------------|------------------------|--------------------------|------------------|-----------------------|----------------------|----------------|---------------|----------------|-----------------|-------------------|--------|--|
| Merge Analysis                                                 |                  |                      |                        |                          |                  |                       |                      |                |               |                |                 |                   |        |  |
|                                                                | Exit Lane Number | Short Lane Length ft | Percent Opng in Lane % | Opposing Flow Rate veh/h | Critical Gap sec | Follow-up Headway sec | Lane Flow Rate veh/h | Capacity veh/h | Deg. Satn v/c | Min. Delay sec | Merge Delay sec | Merge Queue [ Veh | Dist ] |  |
| There are no Exit Short Lanes for Merge Analysis at this Site. |                  |                      |                        |                          |                  |                       |                      |                |               |                |                 |                   |        |  |

|                                |                           |                            |                                       |                          |
|--------------------------------|---------------------------|----------------------------|---------------------------------------|--------------------------|
| Variable Demand Analysis       |                           |                            |                                       |                          |
|                                | Initial Queued Demand veh | Residual Queued Demand veh | Time for Residual Demand to Clear sec | Duration of Oversatn sec |
| South: Switchgrass Drive       |                           |                            |                                       |                          |
| Lane 1                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |
| Lane 2                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |
| East: Bent Grass Meadows Drive |                           |                            |                                       |                          |
| Lane 1                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |
| North: Switchgrass Drive       |                           |                            |                                       |                          |
| Lane 1                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |
| West: Bent Grass Meadows Drive |                           |                            |                                       |                          |
| Lane 1                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |

# LANE SUMMARY

 **Site: [1 (3)] Total Future 2045 AM** (Bent Grass Meadows Drive & Switchgrass Drive)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Roundabout  
Site Category: (None)  
Roundabout  
**Site Scenario: 1 | Local Volumes**

| Lane Use and Performance       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
|--------------------------------|--------------------------------------------------|-----|---------------------------------------------------|-----|---------------|---------------------|--------------------|-----------------------|---------------------|-----------------------------------------------|----------------|----------------------|-------------------|----------------------|-----|
|                                | Demand Flows<br>[ Total    HV ]<br>veh/h       % |     | Arrival Flows<br>[ Total    HV ]<br>veh/h       % |     | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Aver.<br>Delay<br>sec | Level of<br>Service | 95% Back Of Queue<br>[ Veh       Dist ]<br>ft | Lane<br>Config | Lane<br>Length<br>ft | Cap.<br>Adj.<br>% | Prob.<br>Block.<br>% |     |
| South: Switchgrass Drive       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 545                                              | 2.0 | 545                                               | 2.0 | 1380          | 0.395               | 100                | 5.2                   | LOS A               | 2.5                                           | 62.3           | Full                 | 1600              | 0.0                  | 0.0 |
| Lane 2                         | 137                                              | 2.0 | 137                                               | 2.0 | 1642          | 0.083               | 100                | 0.0                   | LOS A               | 0.0                                           | 0.0            | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 682                                              | 2.0 | 682                                               | 2.0 |               | 0.395               |                    | 4.2                   | LOS A               | 2.5                                           | 62.3           |                      |                   |                      |     |
| East: Bent Grass Meadows Drive |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 232                                              | 2.0 | 232                                               | 2.0 | 758           | 0.305               | 100                | 8.3                   | LOS A               | 1.4                                           | 35.0           | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 232                                              | 2.0 | 232                                               | 2.0 |               | 0.305               |                    | 8.3                   | LOS A               | 1.4                                           | 35.0           |                      |                   |                      |     |
| North: Switchgrass Drive       |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 202                                              | 2.0 | 202                                               | 2.0 | 862           | 0.235               | 100                | 6.6                   | LOS A               | 1.1                                           | 26.8           | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 202                                              | 2.0 | 202                                               | 2.0 |               | 0.235               |                    | 6.6                   | LOS A               | 1.1                                           | 26.8           |                      |                   |                      |     |
| West: Bent Grass Meadows Drive |                                                  |     |                                                   |     |               |                     |                    |                       |                     |                                               |                |                      |                   |                      |     |
| Lane 1 <sup>d</sup>            | 476                                              | 2.0 | 476                                               | 2.0 | 920           | 0.518               | 100                | 10.5                  | LOS B               | 4.0                                           | 101.5          | Full                 | 1600              | 0.0                  | 0.0 |
| Approach                       | 476                                              | 2.0 | 476                                               | 2.0 |               | 0.518               |                    | 10.5                  | LOS B               | 4.0                                           | 101.5          |                      |                   |                      |     |
| All Vehicles                   | 1592                                             | 2.0 | 1592                                              | 2.0 |               | 0.518               |                    | 7.0                   | LOS A               | 4.0                                           | 101.5          |                      |                   |                      |     |

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).  
Roundabout LOS Method: Same as Sign Control.  
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
LOS F will result if v/c >1 irrespective of lane delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
Roundabout Capacity Model: US HCM 6.  
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.  
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

<sup>d</sup> Dominant lane on roundabout approach

| Approach Lane Flows (veh/h)    |     |     |     |       |     |       |       |       |        |      |  |
|--------------------------------|-----|-----|-----|-------|-----|-------|-------|-------|--------|------|--|
| South: Switchgrass Drive       |     |     |     |       |     |       |       |       |        |      |  |
| Mov.                           | L2  | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |  |
| From S                         |     |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |  |
| To Exit:                       | W   | N   | E   |       |     | veh/h | v/c   | %     | %      | No.  |  |
| Lane 1                         | 228 | 317 | -   | 545   | 2.0 | 1380  | 0.395 | 100   | NA     | NA   |  |
| Lane 2                         | -   | -   | 137 | 137   | 2.0 | 1642  | 0.083 | 100   | NA     | NA   |  |
| Approach                       | 228 | 317 | 137 | 682   | 2.0 |       | 0.395 |       |        |      |  |
| East: Bent Grass Meadows Drive |     |     |     |       |     |       |       |       |        |      |  |
| Mov.                           | L2  | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |  |
| From E                         |     |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |  |
| To Exit:                       | S   | W   | N   |       |     | veh/h | v/c   | %     | %      | No.  |  |
| Lane 1                         | 191 | 7   | 34  | 232   | 2.0 | 758   | 0.305 | 100   | NA     | NA   |  |

|                                |      |     |     |       |     |       |       |       |        |      |  |
|--------------------------------|------|-----|-----|-------|-----|-------|-------|-------|--------|------|--|
| Approach                       | 191  | 7   | 34  | 232   | 2.0 |       | 0.305 |       |        |      |  |
| North: Switchgrass Drive       |      |     |     |       |     |       |       |       |        |      |  |
| Mov.                           | L2   | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |  |
| From N                         |      |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |  |
| To Exit:                       | E    | S   | W   |       |     | veh/h | v/c   | %     | %      | No.  |  |
| Lane 1                         | 1    | 173 | 28  | 202   | 2.0 | 862   | 0.235 | 100   | NA     | NA   |  |
| Approach                       | 1    | 173 | 28  | 202   | 2.0 |       | 0.235 |       |        |      |  |
| West: Bent Grass Meadows Drive |      |     |     |       |     |       |       |       |        |      |  |
| Mov.                           | L2   | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |  |
| From W                         |      |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |  |
| To Exit:                       | N    | E   | S   |       |     | veh/h | v/c   | %     | %      | No.  |  |
| Lane 1                         | 1    | 8   | 467 | 476   | 2.0 | 920   | 0.518 | 100   | NA     | NA   |  |
| Approach                       | 1    | 8   | 467 | 476   | 2.0 |       | 0.518 |       |        |      |  |
| Total %HV Deg.Satn (v/c)       |      |     |     |       |     |       |       |       |        |      |  |
| All Vehicles                   | 1592 | 2.0 |     | 0.518 |     |       |       |       |        |      |  |

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

|                                                                |        |        |         |           |       |          |           |       |          |      |       |       |       |        |
|----------------------------------------------------------------|--------|--------|---------|-----------|-------|----------|-----------|-------|----------|------|-------|-------|-------|--------|
| Merge Analysis                                                 |        |        |         |           |       |          |           |       |          |      |       |       |       |        |
|                                                                | Exit   | Short  | Percent | Opposing  |       | Critical | Follow-up | Lane  | Capacity | Deg. | Min.  | Merge | Merge | Queue  |
|                                                                | Lane   | Lane   | Opng in | Flow Rate |       | Gap      | Headway   | Flow  |          | Satn | Delay | Delay | [ Veh | Dist ] |
|                                                                | Number | Length | Lane    |           |       |          |           | Rate  |          |      |       |       |       |        |
|                                                                |        | ft     | %       | veh/h     | pcu/h | sec      | sec       | veh/h | veh/h    | v/c  | sec   | sec   |       | ft     |
| There are no Exit Short Lanes for Merge Analysis at this Site. |        |        |         |           |       |          |           |       |          |      |       |       |       |        |

|                                |         |  |          |     |
|--------------------------------|---------|--|----------|-----|
| Variable Demand Analysis       |         |  |          |     |
|                                | Initial |  | Residual |     |
|                                | Queued  |  | Queued   |     |
|                                | Demand  |  | Demand   |     |
|                                | veh     |  | veh      |     |
| South: Switchgrass Drive       |         |  |          |     |
| Lane 1                         | 0.0     |  | 0.0      | 0.0 |
| Lane 2                         | 0.0     |  | 0.0      | 0.0 |
| East: Bent Grass Meadows Drive |         |  |          |     |
| Lane 1                         | 0.0     |  | 0.0      | 0.0 |
| North: Switchgrass Drive       |         |  |          |     |
| Lane 1                         | 0.0     |  | 0.0      | 0.0 |
| West: Bent Grass Meadows Drive |         |  |          |     |
| Lane 1                         | 0.0     |  | 0.0      | 0.0 |



# LANE SUMMARY

 **Site: [1 (4)] Total Future 2045 PM** (Bent Grass Meadows Drive & Switchgrass Drive)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Roundabout  
Site Category: (None)  
Roundabout  
**Site Scenario: 1 | Local Volumes**

| Lane Use and Performance       |                                                  |     |                                                   |     |               |                  |                 |                    |                  |                                               |       |             |                   |                |                   |
|--------------------------------|--------------------------------------------------|-----|---------------------------------------------------|-----|---------------|------------------|-----------------|--------------------|------------------|-----------------------------------------------|-------|-------------|-------------------|----------------|-------------------|
|                                | Demand Flows<br>[ Total    HV ]<br>veh/h       % |     | Arrival Flows<br>[ Total    HV ]<br>veh/h       % |     | Cap.<br>veh/h | Deg. Satn<br>v/c | Lane Util.<br>% | Aver. Delay<br>sec | Level of Service | 95% Back Of Queue<br>[ Veh       Dist ]<br>ft |       | Lane Config | Lane Length<br>ft | Cap. Adj.<br>% | Prob. Block.<br>% |
| South: Switchgrass Drive       |                                                  |     |                                                   |     |               |                  |                 |                    |                  |                                               |       |             |                   |                |                   |
| Lane 1 <sup>d</sup>            | 798                                              | 2.0 | 798                                               | 2.0 | 1378          | 0.579            | 100             | 6.8                | LOS A            | 5.1                                           | 130.2 | Full        | 1600              | 0.0            | 0.0               |
| Lane 2                         | 355                                              | 2.0 | 355                                               | 2.0 | 1642          | 0.216            | 100             | 0.1                | LOS A            | 0.0                                           | 0.0   | Full        | 1600              | 0.0            | 0.0               |
| Approach                       | 1154                                             | 2.0 | 1154                                              | 2.0 |               | 0.579            |                 | 4.7                | LOS A            | 5.1                                           | 130.2 |             |                   |                |                   |
| East: Bent Grass Meadows Drive |                                                  |     |                                                   |     |               |                  |                 |                    |                  |                                               |       |             |                   |                |                   |
| Lane 1 <sup>d</sup>            | 287                                              | 2.0 | 287                                               | 2.0 | 579           | 0.496            | 100             | 14.5               | LOS B            | 2.9                                           | 72.7  | Full        | 1600              | 0.0            | 0.0               |
| Approach                       | 287                                              | 2.0 | 287                                               | 2.0 |               | 0.496            |                 | 14.5               | LOS B            | 2.9                                           | 72.7  |             |                   |                |                   |
| North: Switchgrass Drive       |                                                  |     |                                                   |     |               |                  |                 |                    |                  |                                               |       |             |                   |                |                   |
| Lane 1 <sup>d</sup>            | 315                                              | 2.0 | 315                                               | 2.0 | 695           | 0.454            | 100             | 11.6               | LOS B            | 2.7                                           | 67.7  | Full        | 1600              | 0.0            | 0.0               |
| Approach                       | 315                                              | 2.0 | 315                                               | 2.0 |               | 0.454            |                 | 11.6               | LOS B            | 2.7                                           | 67.7  |             |                   |                |                   |
| West: Bent Grass Meadows Drive |                                                  |     |                                                   |     |               |                  |                 |                    |                  |                                               |       |             |                   |                |                   |
| Lane 1 <sup>d</sup>            | 178                                              | 2.0 | 178                                               | 2.0 | 804           | 0.222            | 100             | 6.8                | LOS A            | 1.0                                           | 24.5  | Full        | 1600              | 0.0            | 0.0               |
| Approach                       | 178                                              | 2.0 | 178                                               | 2.0 |               | 0.222            |                 | 6.8                | LOS A            | 1.0                                           | 24.5  |             |                   |                |                   |
| All Vehicles                   | 1934                                             | 2.0 | 1934                                              | 2.0 |               | 0.579            |                 | 7.5                | LOS A            | 5.1                                           | 130.2 |             |                   |                |                   |

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).  
Roundabout LOS Method: Same as Sign Control.  
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
LOS F will result if v/c >1 irrespective of lane delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
Roundabout Capacity Model: US HCM 6.  
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).  
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.  
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.  
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

<sup>d</sup> Dominant lane on roundabout approach

| Approach Lane Flows (veh/h)    |     |     |     |       |     |            |           |            |              |          |  |
|--------------------------------|-----|-----|-----|-------|-----|------------|-----------|------------|--------------|----------|--|
| South: Switchgrass Drive       |     |     |     |       |     |            |           |            |              |          |  |
| Mov.                           | L2  | T1  | R2  | Total | %HV |            | Deg. Satn | Lane Util. | Prob. SL Ov. | Ov. Lane |  |
| From S                         |     |     |     |       |     | Cap. veh/h | v/c       | %          | %            | No.      |  |
| To Exit:                       | W   | N   | E   |       |     |            |           |            |              |          |  |
| Lane 1                         | 385 | 414 | -   | 798   | 2.0 | 1378       | 0.579     | 100        | NA           | NA       |  |
| Lane 2                         | -   | -   | 355 | 355   | 2.0 | 1642       | 0.216     | 100        | NA           | NA       |  |
| Approach                       | 385 | 414 | 355 | 1154  | 2.0 |            | 0.579     |            |              |          |  |
| East: Bent Grass Meadows Drive |     |     |     |       |     |            |           |            |              |          |  |
| Mov.                           | L2  | T1  | R2  | Total | %HV |            | Deg. Satn | Lane Util. | Prob. SL Ov. | Ov. Lane |  |
| From E                         |     |     |     |       |     | Cap. veh/h | v/c       | %          | %            | No.      |  |
| To Exit:                       | S   | W   | N   |       |     |            |           |            |              |          |  |
| Lane 1                         | 221 | 23  | 43  | 287   | 2.0 | 579        | 0.496     | 100        | NA           | NA       |  |

|                                |      |     |     |       |     |       |       |       |        |      |
|--------------------------------|------|-----|-----|-------|-----|-------|-------|-------|--------|------|
| Approach                       | 221  | 23  | 43  | 287   | 2.0 |       | 0.496 |       |        |      |
| North: Switchgrass Drive       |      |     |     |       |     |       |       |       |        |      |
| Mov.                           | L2   | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |
| From N                         |      |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |
| To Exit:                       | E    | S   | W   |       |     | veh/h | v/c   | %     | %      | No.  |
| Lane 1                         | 1    | 270 | 45  | 315   | 2.0 | 695   | 0.454 | 100   | NA     | NA   |
| Approach                       | 1    | 270 | 45  | 315   | 2.0 |       | 0.454 |       |        |      |
| West: Bent Grass Meadows Drive |      |     |     |       |     |       |       |       |        |      |
| Mov.                           | L2   | T1  | R2  | Total | %HV |       | Deg.  | Lane  | Prob.  | Ov.  |
| From W                         |      |     |     |       |     | Cap.  | Satn  | Util. | SL Ov. | Lane |
| To Exit:                       | N    | E   | S   |       |     | veh/h | v/c   | %     | %      | No.  |
| Lane 1                         | 1    | 9   | 169 | 178   | 2.0 | 804   | 0.222 | 100   | NA     | NA   |
| Approach                       | 1    | 9   | 169 | 178   | 2.0 |       | 0.222 |       |        |      |
| Total %HV Deg.Satn (v/c)       |      |     |     |       |     |       |       |       |        |      |
| All Vehicles                   | 1934 | 2.0 |     | 0.579 |     |       |       |       |        |      |

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

|                                                                |                  |                      |                        |                          |       |                  |                       |                      |                |               |                |                 |                   |           |
|----------------------------------------------------------------|------------------|----------------------|------------------------|--------------------------|-------|------------------|-----------------------|----------------------|----------------|---------------|----------------|-----------------|-------------------|-----------|
| Merge Analysis                                                 |                  |                      |                        |                          |       |                  |                       |                      |                |               |                |                 |                   |           |
|                                                                | Exit Lane Number | Short Lane Length ft | Percent Opng in Lane % | Opposing Flow Rate veh/h | pcu/h | Critical Gap sec | Follow-up Headway sec | Lane Flow Rate veh/h | Capacity veh/h | Deg. Satn v/c | Min. Delay sec | Merge Delay sec | Merge Queue [ Veh | Dist ] ft |
| There are no Exit Short Lanes for Merge Analysis at this Site. |                  |                      |                        |                          |       |                  |                       |                      |                |               |                |                 |                   |           |

|                                |                           |                            |                                       |                          |
|--------------------------------|---------------------------|----------------------------|---------------------------------------|--------------------------|
| Variable Demand Analysis       |                           |                            |                                       |                          |
|                                | Initial Queued Demand veh | Residual Queued Demand veh | Time for Residual Demand to Clear sec | Duration of Oversatn sec |
| South: Switchgrass Drive       |                           |                            |                                       |                          |
| Lane 1                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |
| Lane 2                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |
| East: Bent Grass Meadows Drive |                           |                            |                                       |                          |
| Lane 1                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |
| North: Switchgrass Drive       |                           |                            |                                       |                          |
| Lane 1                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |
| West: Bent Grass Meadows Drive |                           |                            |                                       |                          |
| Lane 1                         | 0.0                       | 0.0                        | 0.0                                   | 0.0                      |

## **Attachment IV**

### **Roundabout Parameters, Fastest Path Diagrams, and Vehicle Tracking Exhibits**

# Roundabout Critical Design Parameters

Bent Grass Meadows Drive & Switchgrass Drive

El Paso County, Colorado

| Design Parameters                                 | N Leg | S Leg | E Leg | W Leg |
|---------------------------------------------------|-------|-------|-------|-------|
| Entry Width, ft *                                 | 20.4  | 16.8  | 18.4  | 18.3  |
| Exit Width, ft *                                  | 20.4  | 17.3  | 18.4  | 18.3  |
| Inscribed Circle Diameter, ft *                   | 141.8 | 141.8 | 141.8 | 141.8 |
| Circulating Roadway Width Upstream of Entry, ft * | 22.0  | 22.0  | 22.0  | 22.0  |
| Truck Apron Width Upstream of Entry, ft **        | 15.0  | 15.0  | 15.0  | 15.0  |

\* Widths are measured from curb flange to curb flange

\*\* Width is measured from back of circulatory roadway curb to face of central island curb

## Fastest Speed Path

|                                       |     |    |     |    |     |    |     |    |
|---------------------------------------|-----|----|-----|----|-----|----|-----|----|
| R <sub>1</sub> , Radius/Speed, ft/mph | 121 | 19 | 113 | 19 | 157 | 21 | 181 | 22 |
| R <sub>2</sub> , Radius/Speed, ft/mph | 78  | 17 | 62  | 15 | 60  | 15 | 83  | 17 |
| R <sub>3</sub> , Radius/Speed, ft/mph | 573 | 36 | 404 | 30 | 384 | 30 | 177 | 22 |
| R <sub>4</sub> , Radius/Speed, ft/mph | 56  | 15 | 56  | 15 | 56  | 15 | 56  | 15 |
| R <sub>5</sub> , Radius/Speed, ft/mph | 86  | 17 | 83  | 17 | 119 | 19 | 47  | 14 |

## Stopping Sight Distance

|                            |     |    |     |    |     |    |     |    |
|----------------------------|-----|----|-----|----|-----|----|-----|----|
| Approach Design Speed, mph | 30  |    | 30  |    | 30  |    | 30  |    |
| Approach, ft               | 195 |    | 195 |    | 195 |    | 195 |    |
| Circulating, ft/mph        | 75  | 15 | 75  | 15 | 75  | 15 | 75  | 15 |
| Crosswalk on Exit, ft/mph  | N/A |    | 200 | 30 | 195 | 30 | N/A |    |

## Intersection Sight Distance

|                                               |     |    |     |    |     |    |     |    |
|-----------------------------------------------|-----|----|-----|----|-----|----|-----|----|
| <b>Vehicle at Entry</b>                       |     |    |     |    |     |    |     |    |
| Circulatory Roadway (b <sub>2</sub> ), ft/mph | 110 | 15 | 110 | 15 | 110 | 15 | 110 | 15 |
| <b>Vehicle 50' in Advance of Entry</b>        |     |    |     |    |     |    |     |    |
| Immediate Upstream Entry, ft                  | 132 |    | 126 |    | 134 |    | 145 |    |

## Additional Design Parameters

|                                     |                                                                |
|-------------------------------------|----------------------------------------------------------------|
| Design Vehicle                      | WB-67                                                          |
| Circulating Roadway Cross-Slope     | -2%                                                            |
| Bicycle & Pedestrian Accommodations | Pedestrian ramps/crossings on north and west leg of roundabout |

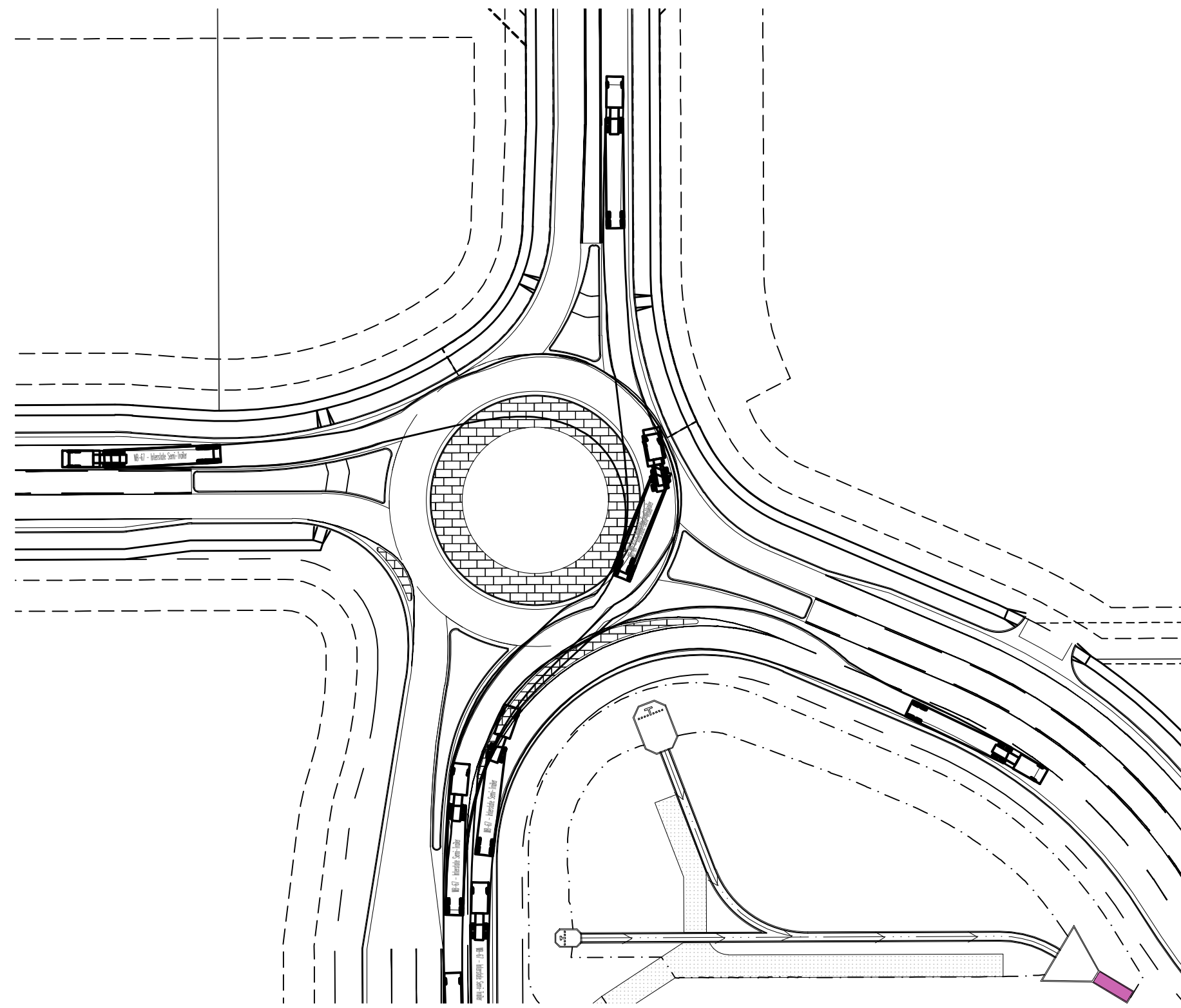


H/E Evergreen Development CO, El Paso County - ED(000102 - Bent Grass Commercial/CIV7-Exhibit ED102\_Roundabout Fastpass Path.dwg - 7/9/2026

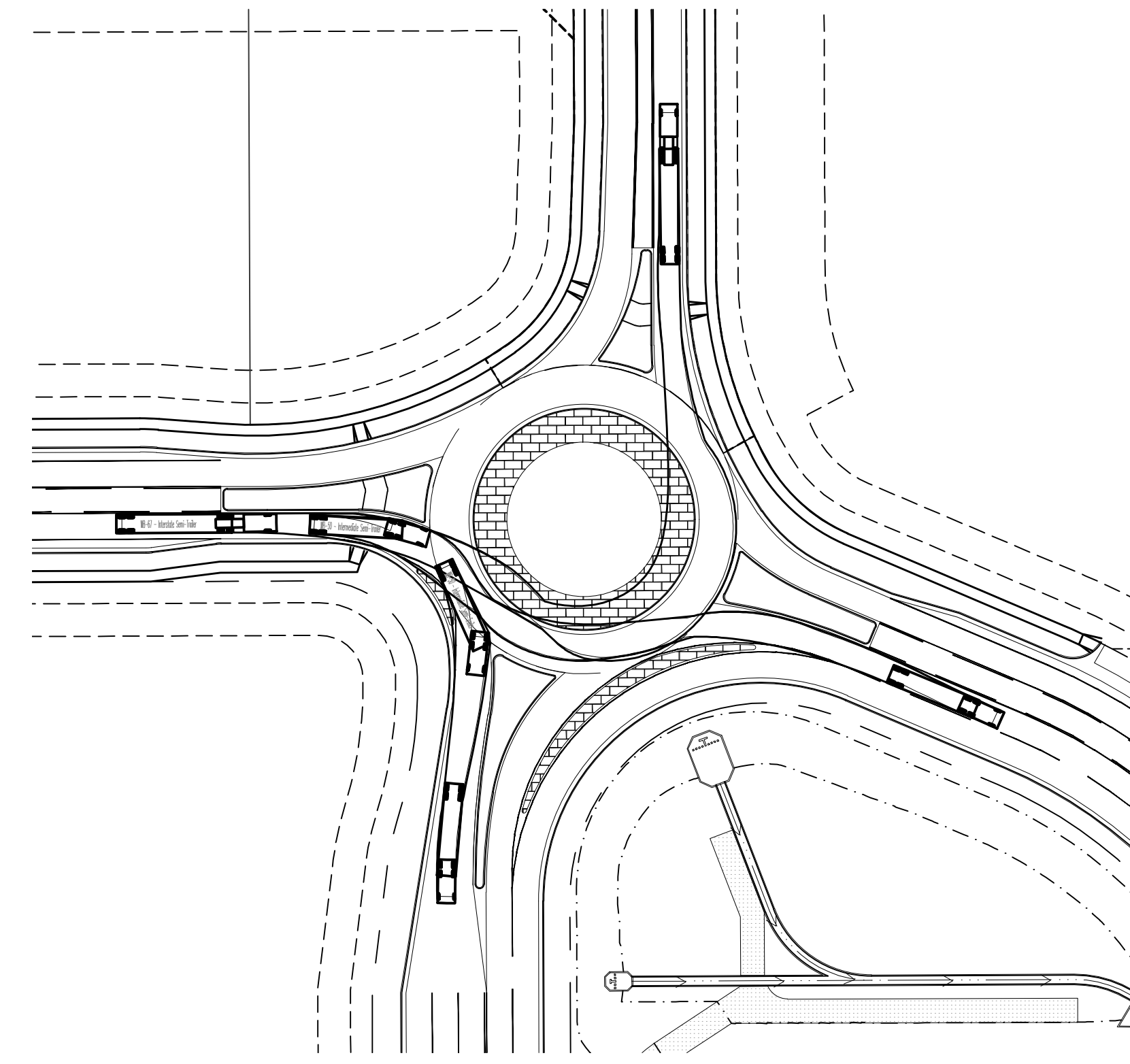
Arm 2 - WOODMEN ACCESS RD.  
R1 / V1: 120.63 ft / 19.35 mph  
R2 / V2: 77.73 ft / 16.51 mph  
R3 / V3: 572.82 ft / 35.84 mph  
R4 / V4: 56.32 ft / 14.71 mph  
R5 / V5: 86.39 ft / 17.15 mph  
FL : 86.39 ft / 17.15 mph  
Deflection: 7.50 ft

Arm 1 - WOODMEN ACCESS RD.  
R1 / V1: 113.45 ft / 18.92 mph  
R2 / V2: 62.43 ft / 15.26 mph  
R3 / V3: 403.69 ft / 30.46 mph  
R4 / V4: 56.42 ft / 14.72 mph  
R5 / V5: 83.49 ft / 16.94 mph  
FL: 83.49 ft / 16.94 mph  
Deflection: 15.00 ft

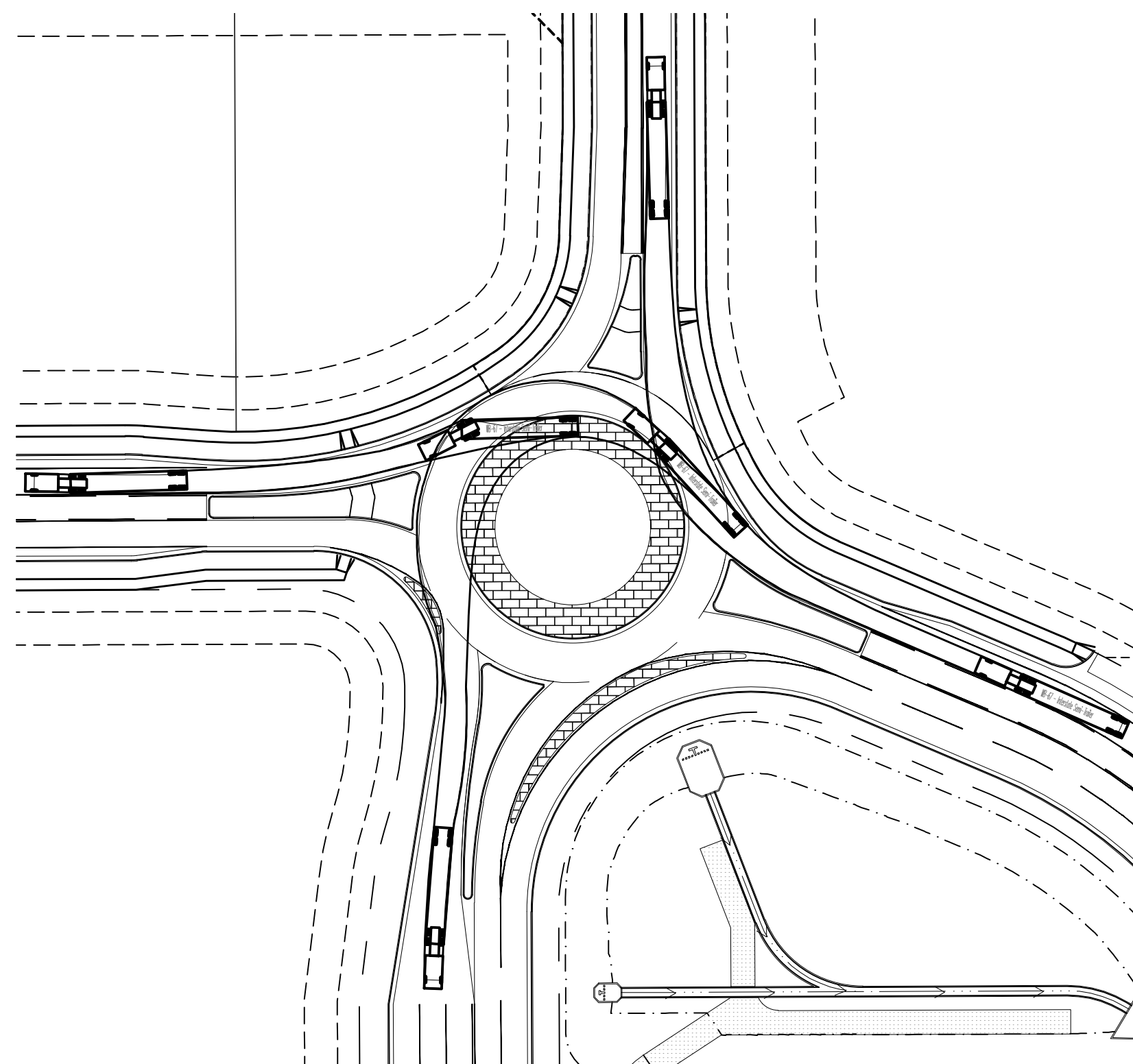




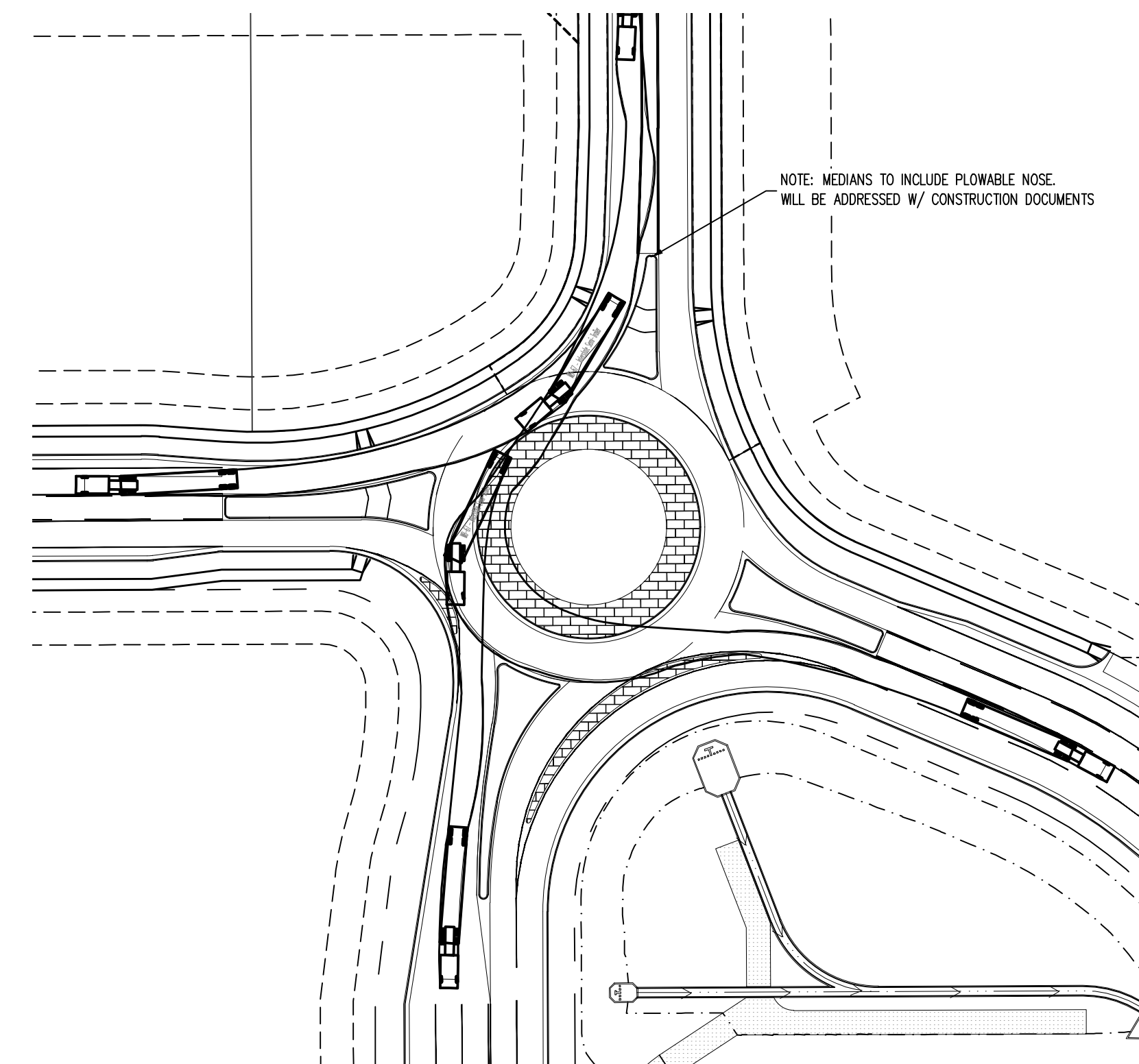
NORTHBOUND VEHICLE TRACKING PATH (WB-67)  
SCALE: 1"=60'



EASTBOUND VEHICLE TRACKING PATH (WB-67)  
SCALE: 1"=60'



WESTBOUND VEHICLE TRACKING PATH (WB-67)  
SCALE: 1"=60'



SOUTHBOUND VEHICLE TRACKING PATH (WB-67)  
SCALE: 1"=60'

