APPENDICES

Appendix A—Corridor Urbanization Decision Tree

Appendix B—Data Management Plan

Appendix C—Roundabout Standards

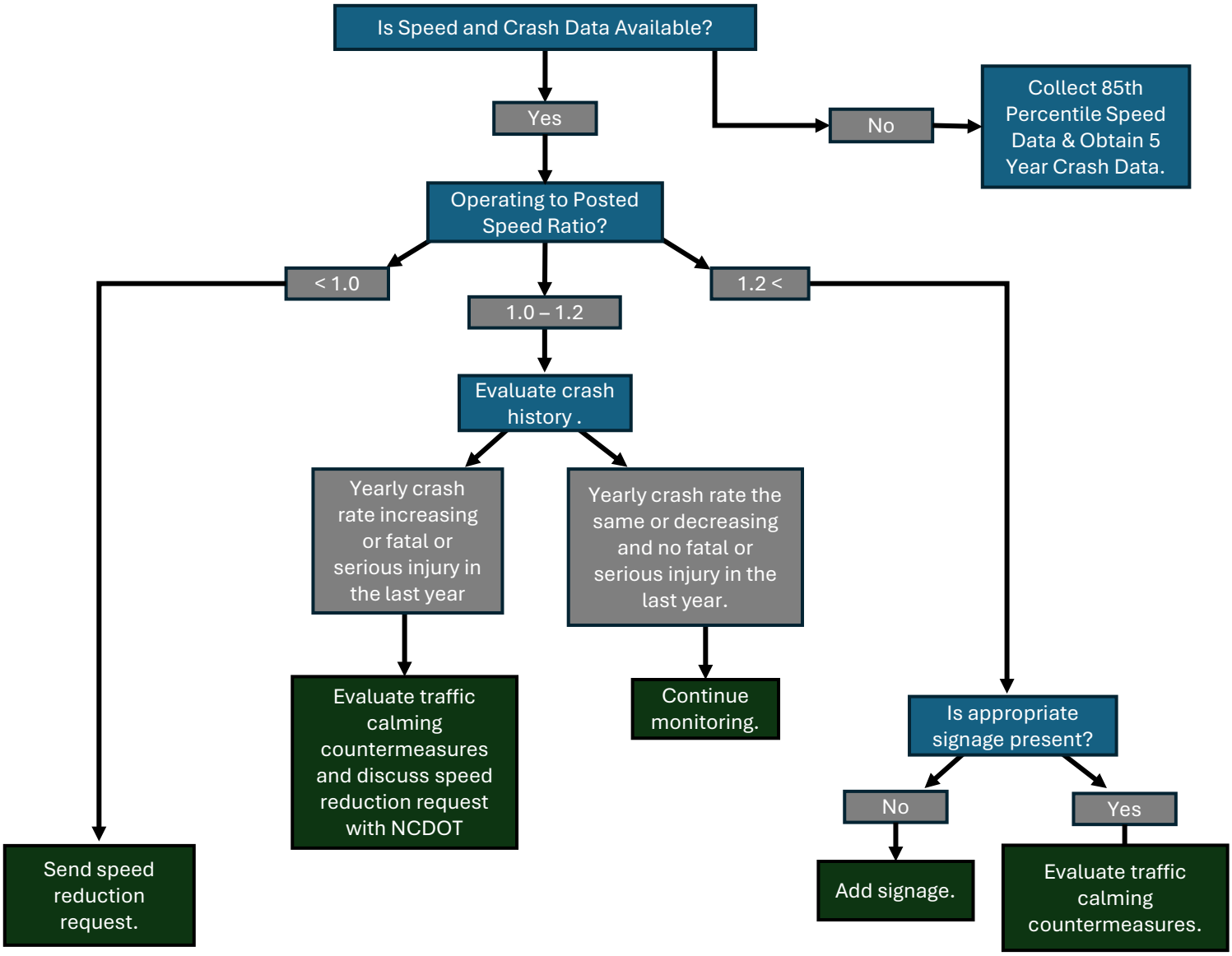
Appendix D—Roundabout Feasibility Assessment

Appendix E—Implementation Grant Checklist

APPENDIX A

Prior to evaluating a corridor for speed alterations, the following questions should be considered. If you answered 'yes' to any of the following, an evaluation for a speed change request should be performed using the methodology below.

1. Has the town received any complaints or have police noted speeding issues on the corridor?
2. Has AADT increased by 15% year over year?
3. Are crash rates increasing year over year or higher than rates for roads of a similar type?
4. Have there been any fatalities or serious injuries in the last year?
5. Has the corridor experienced changes in pedestrian/transit activity or land uses?



Vision Zero Data Management Plan

This document is intended to serve as a guide to the Town for maintaining the Knightdale Safety Action Plan via internal data management and updates to external data. Tracking and maintaining up-to-date information is essential to understanding the status of the Safety Action Plan and Vision Zero in Knightdale, and will allow the plan to be a living document that adapts to Knightdale's future needs.

The table below describes the relevant data to be collected and maintained, its source, and the recommended frequency of updates.

Description	Source	Tracked Metrics/Performance Measures	Recommended Collection Frequency
CRASH DATA			
NCDOT Crash Data GIS data including locations, types, severity, user type, and contributing factors	NCDOT 5-year crash history Email Daniel Carter at NCDOT (dlcarter4@ncdot.gov) or submit Crash Data Request Form	Number of fatal/serious injuries, crash type breakdown, user type breakdown, contributing factors breakdowns	Annually
Town Fatal/Serious Injury (FSI) Crash Data Use to create a combined dataset of NCDOT crashes and any additional FSI crashes	Knightdale Police Department	See above	Annually
High-Injury Network Use crash data to periodically update the High-Injury Network	Crash data (see above)	See above. Use updates to the HIN to track whether safety improvement projects are having an effect over time.	Update every 2-3 years
FACILITY DATA			
Bicycle and Pedestrian Facilities Maintain a continuously updated database of existing sidewalks, sidewalk gaps and bike facilities	Town of Knightdale	Miles of sidewalks, miles of bicycle facilities, miles of sidewalk gaps	Annually or continuously
Road Ownership Maintain record of road ownership/maintenance responsibility as new streets are built or change ownership	Town of Knightdale	Miles of HIN on Town-owned streets	Annually or continuously

APPENDIX B

Posted Speed Limits Maintain a GIS file of all speed limits in the Knightdale Planning Area (NCDOT and Town streets)	NCDOT via Web Map And Town of Knightdale	Number of speed limit reductions, percentage of road mileage above 35 mph	Annually or continuously
Annual Average Daily Traffic (AADT) Maintain record of AADT as recorded by NCDOT and by the Town when data is collected	NCDOT via ConnectNCDOT See link to download.		Annually
Recorded/Actual Speeds Maintain a record of recorded speeds on roadways in the Knightdale Planning Area	Manually recorded speed data (Town of Knightdale or NCDOT)	85th percentile speeds	At Town discretion when conditions surrounding a corridor change significantly from during initial speed audit
PROJECT DATA			
Transportation Projects Maintain a single feature class that combines all transportation projects in the Town.	NCDOT (STIP, MTP, Town Projects – Funded and Proposed) And Town of Knightdale	Number of projects completed by type (i.e., sidewalk, Complete Streets, traffic calming, crossing improvements, safety conversions), track which projects are on the HIN	Annually or continuously
Maintenance Projects	Town of Knightdale	Number of maintenance projects completed (i.e., resident-initiated sidewalk repair), track which projects are on the HIN	Annually or continuously
OTHER DATA			
Demographic Data Including commute mode, vehicle access, population, median household income, race/ethnicity	American Community Survey 5-Year Estimates via https://data.census.gov/	Notable demographic shifts such as population growth, income changes, etc. that may influence safety	Every 3-5 years
Education and Outreach Track awareness of Vision Zero and outreach materials distributed	Town of Knightdale	Number of Vision Zero pledges signed, number of students educated about Vision Zero through Driver's Education, promotional materials distributed, events hosted	Continuously
Development Track new and recently completed developments within the Knightdale planning area	Town of Knightdale	Proposed, approved, and under-construction developments that may influence need or priority of nearby safety improvements or speed reductions	Continuously

TOWN OF KNIGHTDALE
STANDARD DETAILS

REVISIONS	DESCRIPTION	DATE

SUBMITTAL REQUIREMENTS:

IN ACCORDANCE WITH THE GUIDANCE AND PROVISIONS OF THESE DISPLAYS, THE TOWN REQUIRES THE SUBMISSION OF A SET OF DESIGN CHECKS THAT INCLUDES:

1. DESIGN VEHICLE SWEPT PATHS

2. GEOMETRIC SPEED CHECKS (FASTEST PATH CALCULATIONS)

3. SIGHT DISTANCE CHECKS

PHYSICAL CHARACTERISTICS
SINGLE LANE ROUNDABOUT
(GEOMETRY)

PRINCIPLES:

THE DESIGN OF A SINGLE LANE ROUNDABOUT SHOULD HAVE ENOUGH ENTRY PATH DEFLECTION TO CREATE BALANCED SPEEDS THROUGH THE ROUNDABOUT. THE USE OF LEFT OFFSET HELPS IN REDUCING SPEEDS IN ADVANCE OF THE ENTRY LINE; THIS IS ESPECIALLY IMPORTANT FOR COMPACT ROUNDABOUTS.

GEOMETRY DEFINITIONS:

1. INSCRIBED CIRCLE DIAMETER: MEASURE OF THE SIZE OF A ROUNDABOUT. GOVERNED BY NUMBER OF ENTRY AND EXIT LANES, SIZE OF DESIGN VEHICLE, AND PROPERTY CONSTRAINTS.

2. CIRCULATORY ROAD: SHALL BE 16'–18' FROM EDGE OF TRAVEL TO EDGE OF TRAVEL (EOT–TO–EOT), OR 18'–20' TO OUTSIDE FACE OF CURB (FOC).

3. LANDSCAPED CENTRAL ISLAND: A CENTRAL NON–TRAVERSABLE AREA. SIGHTLINES SHALL BE MAINTAINED AROUND THE OUTSIDE, BUT MAY BE OBSTRUCTED THROUGH THE CENTRAL ISLAND BY LANDSCSAPING.

4. TRUCK APRON: A TRAVERSABLE AREA FOR TRUCKS. SEE STANDARD DETAIL 3.33, SHEET 8 OF 8 FOR COLORED AND STAMPED CONCRETE GUIDANCE.

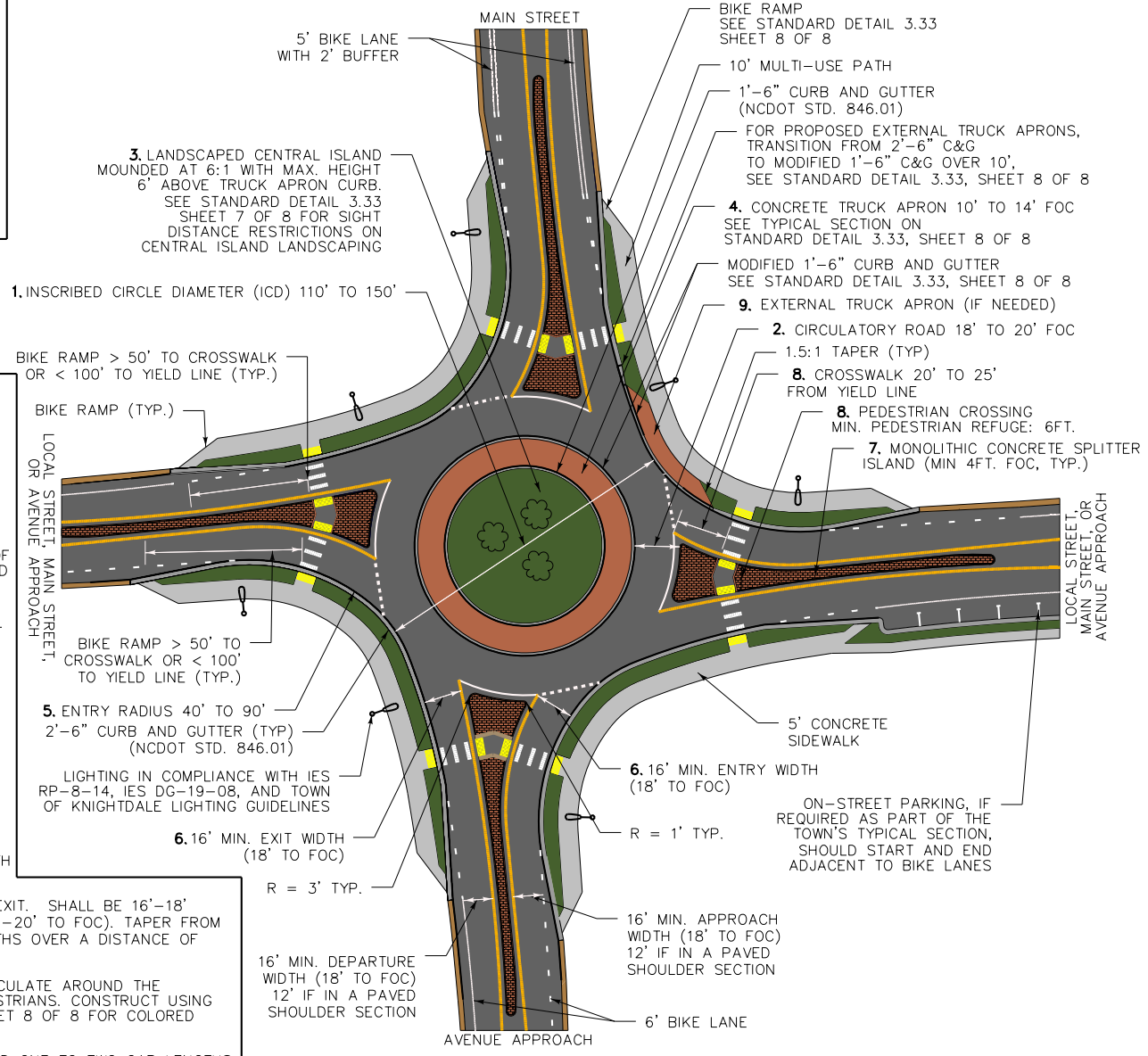
5. ENTRY RADIUS: THE SMALLEST CURB RADIUS BEFORE OR AT THE YIELD LINE. NOT THE SAME AS ENTRY PATH RADIUS OR DEFLECTION.

6. ENTRY/EXIT WIDTH: AT THE ROUNDABOUT ENTRANCE/EXIT. SHALL BE 16'–18' MEASURED FROM SPLITTER ISLAND STRIPE TO EOT (18'–20' TO FOC). TAPER FROM TYPICAL APPROACH LANE WIDTHS TO ENTRY/EXIT WIDTHS OVER A DISTANCE OF 75'–100'.

7. CONCRETE SPLITTER ISLAND: DIRECTS DRIVERS TO CIRCULATE AROUND THE ROUNDABOUT AND PROVIDES REFUGE AREA FOR PEDESTRIANS. CONSTRUCT USING NCDOT STD. 852.01. SEE STANDARD DETAIL 3.33, SHEET 8 OF 8 FOR COLORED AND STAMPED CONCRETE GUIDANCE.

8. PEDESTRIAN CROSSING: TWO–STAGE CROSSING LOCATED ONE TO TWO CAR LENGTHS (20'–25') BEHIND THE YIELD LINE. CROSSINGS SHOULD BE PERPENDICULAR TO THE TRAVEL LANE.

9. EXTERNAL TRUCK APRON: MAY BE USED AS NEEDED TO ACCOMMODATE LARGE DESIGN VEHICLES RIGHT TURN SWEPT PATH. TRANSITION FROM 2'–6" C&G TO MODIFIED 1'–6" C&G OVER 10'. CONSTRUCT CONCRETE EXTERNAL TRUCK APRON TO BE THE SAME DEPTH AS THE TRUCK APRON. EXTERNAL TRUCK APRONS SHOULD NOT PASS THROUGH CROSSWALKS. SEE STANDARD DETAIL 3.33, SHEET 8 OF 8 FOR COLORED AND STAMPED CONCRETE GUIDANCE.



GENERAL NOTES:

SHIFT FROM TOWN TYPICAL SECTION DIMENSIONS TO THE DIMENSIONS SHOWN IN THIS DETAIL USING THE APPROACH AND DEPARTURE TAPER LENGTHS AS SHOWN IN NCDOT ROADWAY DESIGN MANUAL (RDM) FIGURE 8–11

$$A = \frac{WS^2}{60} \text{ (WHEN S LESS THAN/EQUAL TO 40 MPH)}$$

$$A = WS \text{ (WHEN S GREATER THAN 40 MPH)}$$

A = APPROACH OR DEPARTURE TAPER LENGTH
W = WIDTH OF LATERAL SHIFT
S = DESIGN SPEED

FOR ROUTES MAINTAINED BY NCDOT, AN ENCROACHMENT AGREEMENT FROM NDCOT DIVISION OFFICE IS REQUIRED. COORDINATE WITH NCODT DIVISION OFFICE FOR DESIGN REVIEW.

REFER TO NCDOT ROADWAY DESIGN MANUAL SECTION 8.10.3 FOR STORM DRAIN DESIGN GUIDANCE.

REFER TO NCHRP REPORT 1043 FOR ADDITIONAL ROUNDABOUT DESIGN GUIDANCE.

STD. NO.
3.33

APPENDIX C

TOWN OF KNIGHTDALE
STANDARD DETAILS

REVISIONS	DESCRIPTION	DATE

SUBMITTAL REQUIREMENTS:

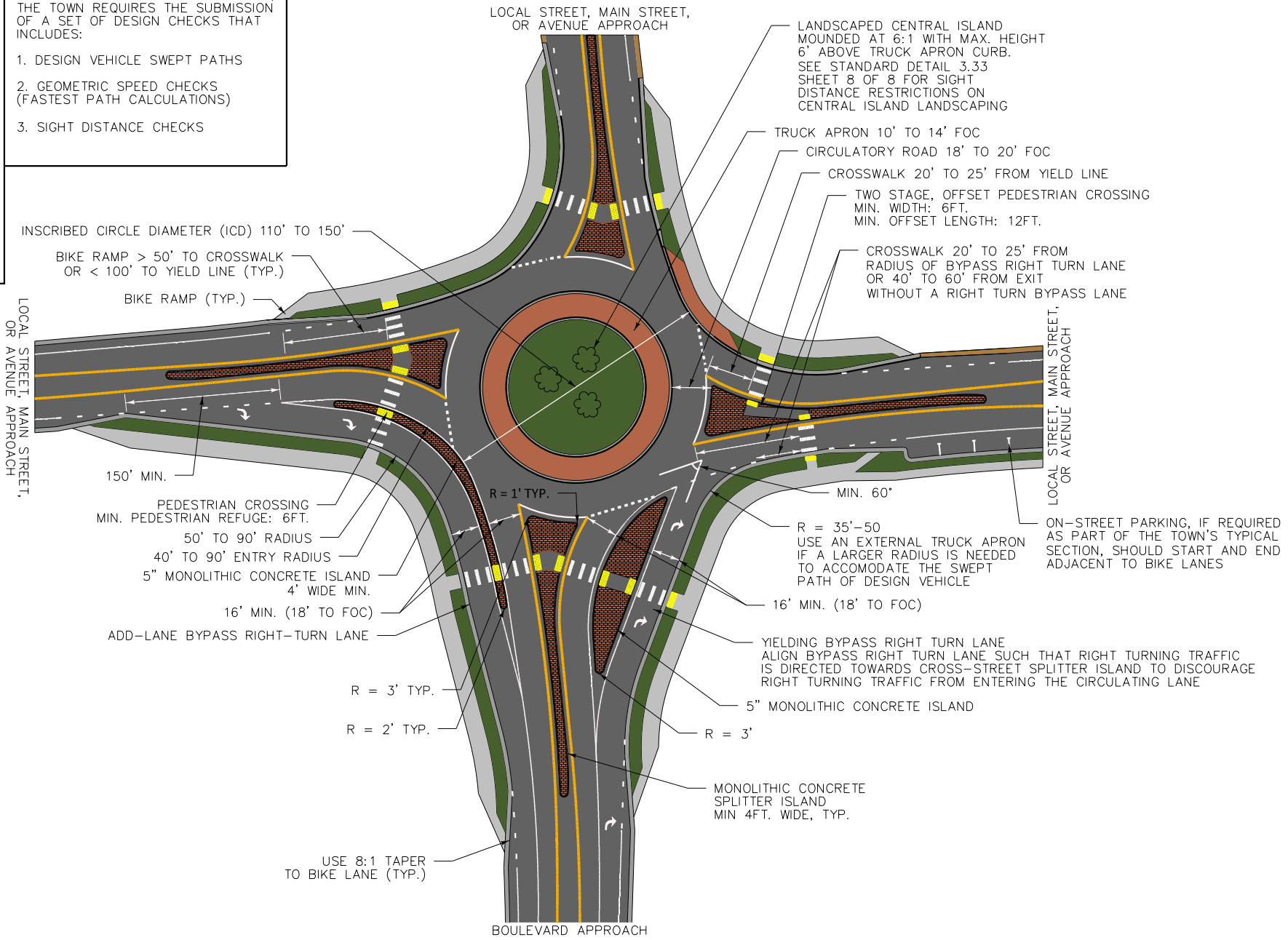
IN ACCORDANCE WITH THE GUIDANCE AND PROVISIONS OF THESE DISPLAYS, THE TOWN REQUIRES THE SUBMISSION OF A SET OF DESIGN CHECKS THAT INCLUDES:

1. DESIGN VEHICLE SWEPT PATHS

2. GEOMETRIC SPEED CHECKS (FASTEST PATH CALCULATIONS)

3. SIGHT DISTANCE CHECKS

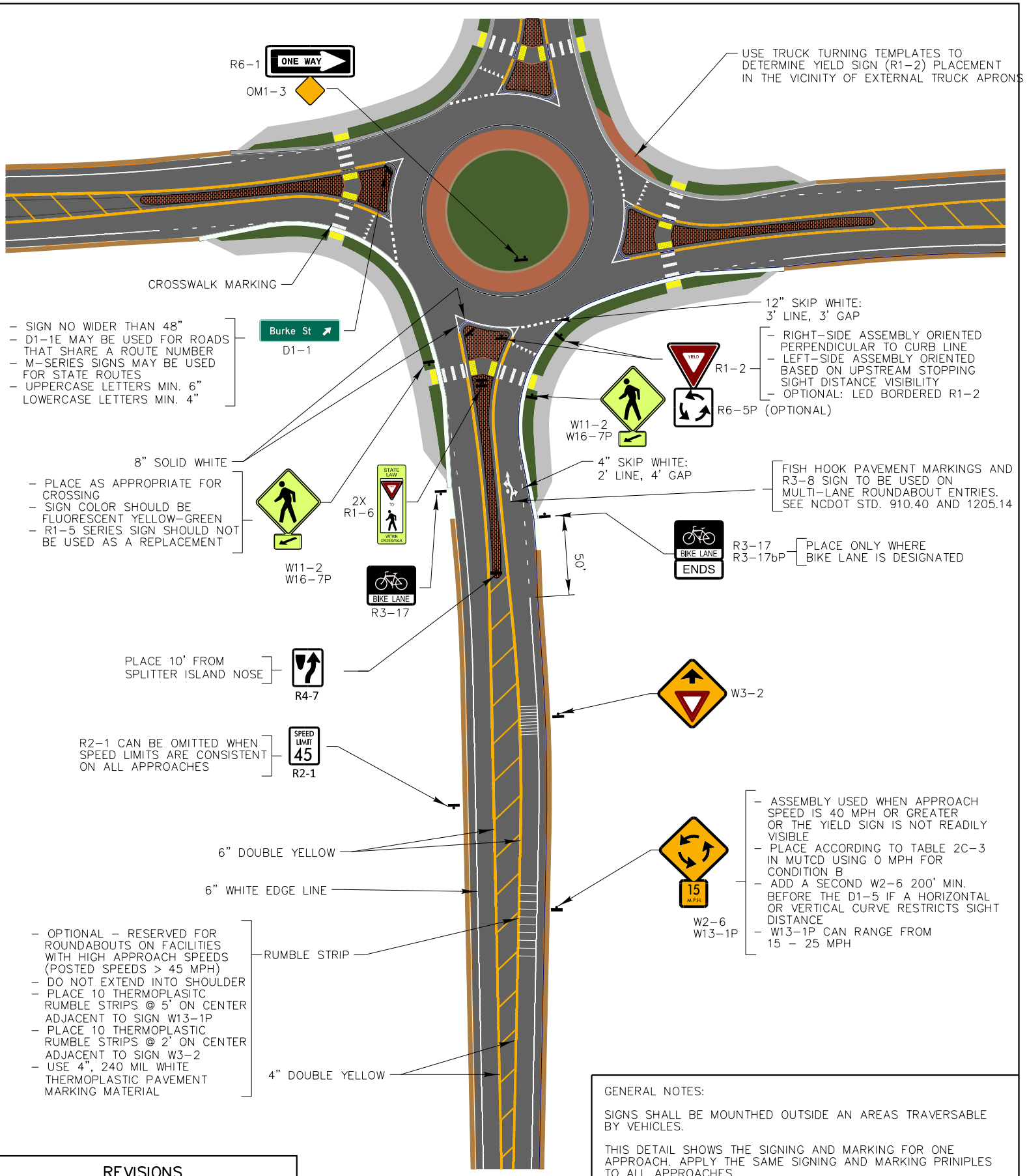
PHYSICAL CHARACTERISTICS
SINGLE LANE ROUNDABOUT WITH BYPASS LANES
(GEOMETRY)



GENERAL NOTES:

SEE STANDARD DETAIL 3.33, SHEET 1 OF 8 FOR DESIGN PRINCIPLES, GEOMETRY DEFINITIONS, SUBMITTAL REQUIREMENTS, AND ADDITIONAL ROUNDABOUT DESIGN GENERAL NOTES

STD. NO. 3.33



GENERAL NOTES:

SIGNS SHALL BE MOUNTHED OUTSIDE AN AREAS TRAVERSABLE BY VEHICLES.

THIS DETAIL SHOWS THE SIGNING AND MARKING FOR ONE APPROACH. APPLY THE SAME SIGNING AND MARKING PRINIPLES TO ALL APPROACHES.

REFER TO THE MUTCD AND NCDOT STANDARD DRAWINGS (DIVISION 09 - SIGNING AND DIVISION 12 - PAVEMENT MARKINGS, MARKERS AND DELINEATION) FOR ADDITIONAL SIGNING AND MARKING GUIDANCE.

REVISIONS	
DATE	DESCRIPTION

TOWN OF KNIGHTDALE
STANDARD DETAILS

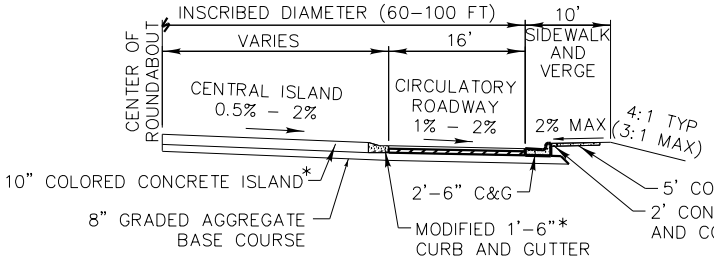
SIGNING AND PAVEMENT MARKING SINGLE LANE ROUNDABOUT

STD. NO.
3.33

TOWN OF KNIGHTDALE
STANDARD DETAILS

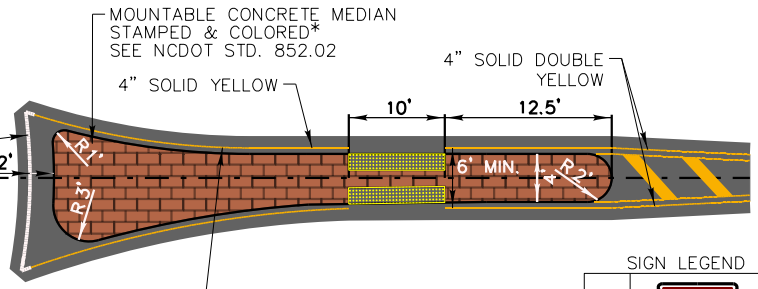
PHYSICAL CHARACTERISTICS
MINI-ROUNDABOUT

REVISIONS	DESCRIPTION	DATE

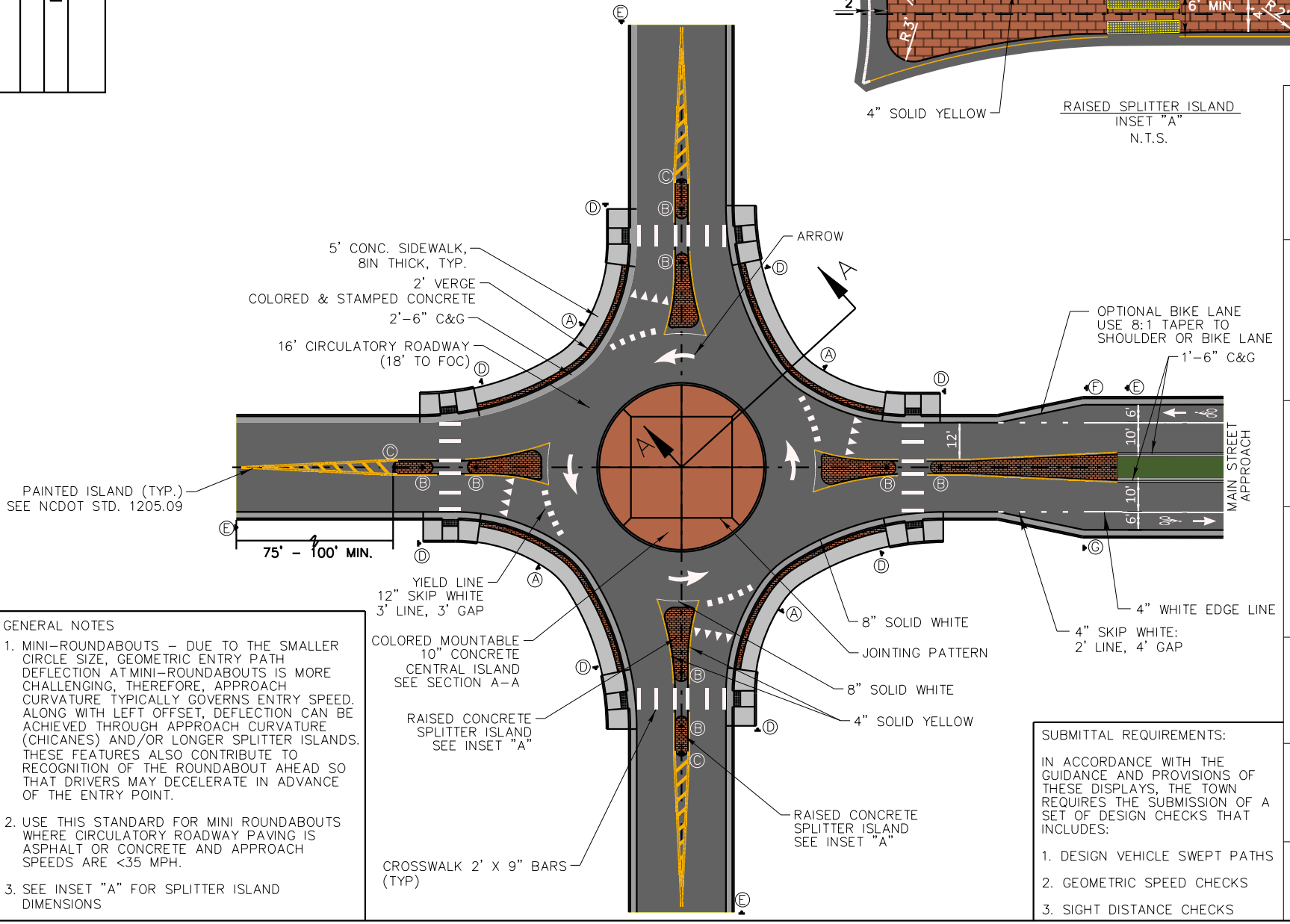


ROUNDABOUT TYPICAL SECTION
SECTION A–A
N.T.S.

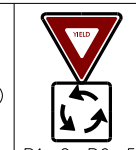
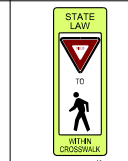
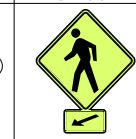
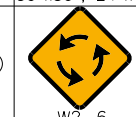
* NOTE: SEE STANDARD DETAIL 3.33, SHEET 8 OF 8 FOR COLORED AND STAMPED CONCRETE SPECIFICATIONS AND MODIFIED 1'–6" CURB AND GUTTER DETAILS



RAISED SPLITTER ISLAND
INSET "A"
N.T.S.



SIGN LEGEND

Ⓐ		R1–2, R6–5P 36"x36"x36" 30"X30"
Ⓑ		R1–6 12"x36" FLUORESCENT YELLOW–GREEN
Ⓒ		R4–7c 18"x30"
Ⓓ		W11–2, W16–7p 30"x30", 24"x12"
Ⓔ		W2–6 30"x30"
Ⓕ		R3–17, R3–17bP 24"x18", 24"x8"
Ⓖ		R3–17 24"x18"

GENERAL NOTES

1. MINI–ROUNDABOUTS – DUE TO THE SMALLER CIRCLE SIZE, GEOMETRIC ENTRY PATH DEFLECTION AT MINI–ROUNDABOUTS IS MORE CHALLENGING, THEREFORE, APPROACH CURVATURE TYPICALLY GOVERNS ENTRY SPEED. ALONG WITH LEFT OFFSET, DEFLECTION CAN BE ACHIEVED THROUGH APPROACH CURVATURE (CHICANES) AND/OR LONGER SPLITTER ISLANDS. THESE FEATURES ALSO CONTRIBUTE TO RECOGNITION OF THE ROUNDABOUT AHEAD SO THAT DRIVERS MAY DECELERATE IN ADVANCE OF THE ENTRY POINT.
2. USE THIS STANDARD FOR MINI ROUNDABOUTS WHERE CIRCULATORY ROADWAY PAVING IS ASPHALT OR CONCRETE AND APPROACH SPEEDS ARE <35 MPH.
3. SEE INSET "A" FOR SPLITTER ISLAND DIMENSIONS

SUBMITTAL REQUIREMENTS:

IN ACCORDANCE WITH THE GUIDANCE AND PROVISIONS OF THESE DISPLAYS, THE TOWN REQUIRES THE SUBMISSION OF A SET OF DESIGN CHECKS THAT INCLUDES:

1. DESIGN VEHICLE SWEPT PATHS
2. GEOMETRIC SPEED CHECKS
3. SIGHT DISTANCE CHECKS

STD. NO. 3.33

TOWN OF KNIGHTDALE
STANDARD DETAILS

REVISIONS			
DESCRIPTION			DATE

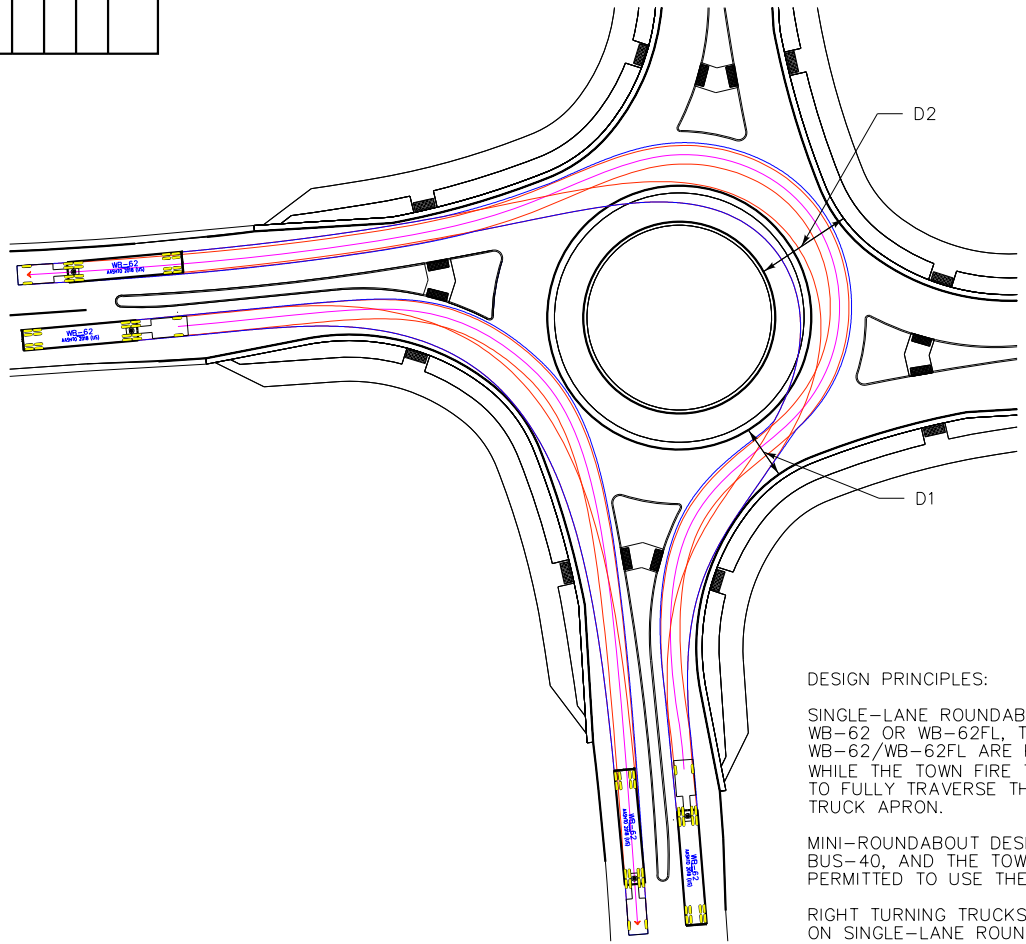
TURNING WIDTH REQUIRED FOR SINGLE-LANE ROUNDABOUTS ('D' IN FT)					
INSCRIBED CIRCLE DIAMETER	DESIGN VEHICLES				
	D1 (EOP)			D2 (FOC)	
	SU-30	BUS-40	FIRE TRUCK	WB-62	WB-62FL
110	14*	15	14	32	39
120	14*	15	14	30	36
130	14*	14	14*	27	33
140	14*	14	14*	26	30

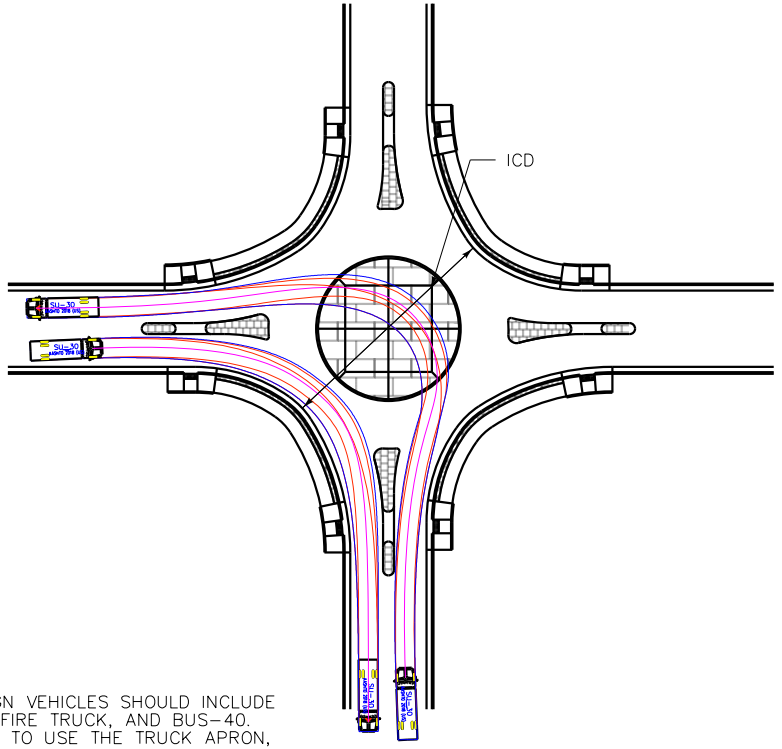
NOTE: THE VALUES PROVIDED ABOVE ARE FOR GENERAL GUIDANCE.
*14 FT MINIMUM EOP/18 FT FOC

MIN. RIGHT TURN RADIUS	
SU-30	30 FT
BUS-40	25 FT
FIRE TRUCK	16 FT
WB-62	DETERMINED BY AUTOTURN
WB-62FL	DETERMINED BY AUTOTURN

MINI-ROUNDABOUT ICD REQUIREMENTS FOR VEHICLE U-TURNS AND LEFT TURNS (LT)				
INSCRIBED CIRCLE DIAMETER	DESIGN VEHICLES			
	SU-30	BUS-40	FIRE TRUCK	WB-62
60	LT-ONLY	NO	LT-ONLY	NO
65	LT-ONLY	LT-ONLY	LT-ONLY	NO
70	LT-ONLY	LT-ONLY	YES	NO
80	LT-ONLY	LT-ONLY	YES	LT-ONLY
90	YES	YES	YES	YES
100	YES	YES	YES	YES

TABLE NOTE: SPLITTER ISLANDS SHOULD BE MOUNTABLE OR TRIMMED AS NEEDED BASED ON SWEPT PATHS





DESIGN PRINCIPLES:

SINGLE-LANE ROUNDABOUT DESIGN VEHICLES SHOULD INCLUDE WB-62 OR WB-62FL, THE TOWN FIRE TRUCK, AND BUS-40. WB-62/WB-62FL ARE PERMITTED TO USE THE TRUCK APRON, WHILE THE TOWN FIRE TRUCK AND BUS-40 SHOULD BE ABLE TO FULLY TRAVERSE THE ROUNDABOUT WITHOUT USING THE TRUCK APRON.

MINI-ROUNDABOUT DESIGN VEHICLES SHOULD INCLUDE SU-30, BUS-40, AND THE TOWN FIRE TRUCK, ALL OF WHICH ARE PERMITTED TO USE THE TRUCK APRON.

RIGHT TURNING TRUCKS ARE NOT TO USE THE TRUCK APRON ON SINGLE-LANE ROUNDABOUTS. WHERE ENTRY, EXIT, OR CIRCULATING WIDTHS BECOME EXCESSIVE FOR RIGHT TURNS, CONSIDER USING AN EXTERNAL TRUCK APRON. EXTERNAL TRUCK APRONS SHOULD NOT PASS THROUGH CROSSWALKS.

GENERAL NOTES:

1. CHECK LEFT, THROUGH, AND RIGHT TURN MOVEMENTS FOR EACH RELEVANT DESIGN VEHICLE.

2. D1: CIRCULATORY ROADWAY SHOULD BE 18FT TO 20FT MEASURED FROM THE FACE OF CURB

TRUCK MOVEMENTS
SINGLE-LANE ROUNDABOUT
AND MINI-ROUNDABOUT

STD. NO. 3.33

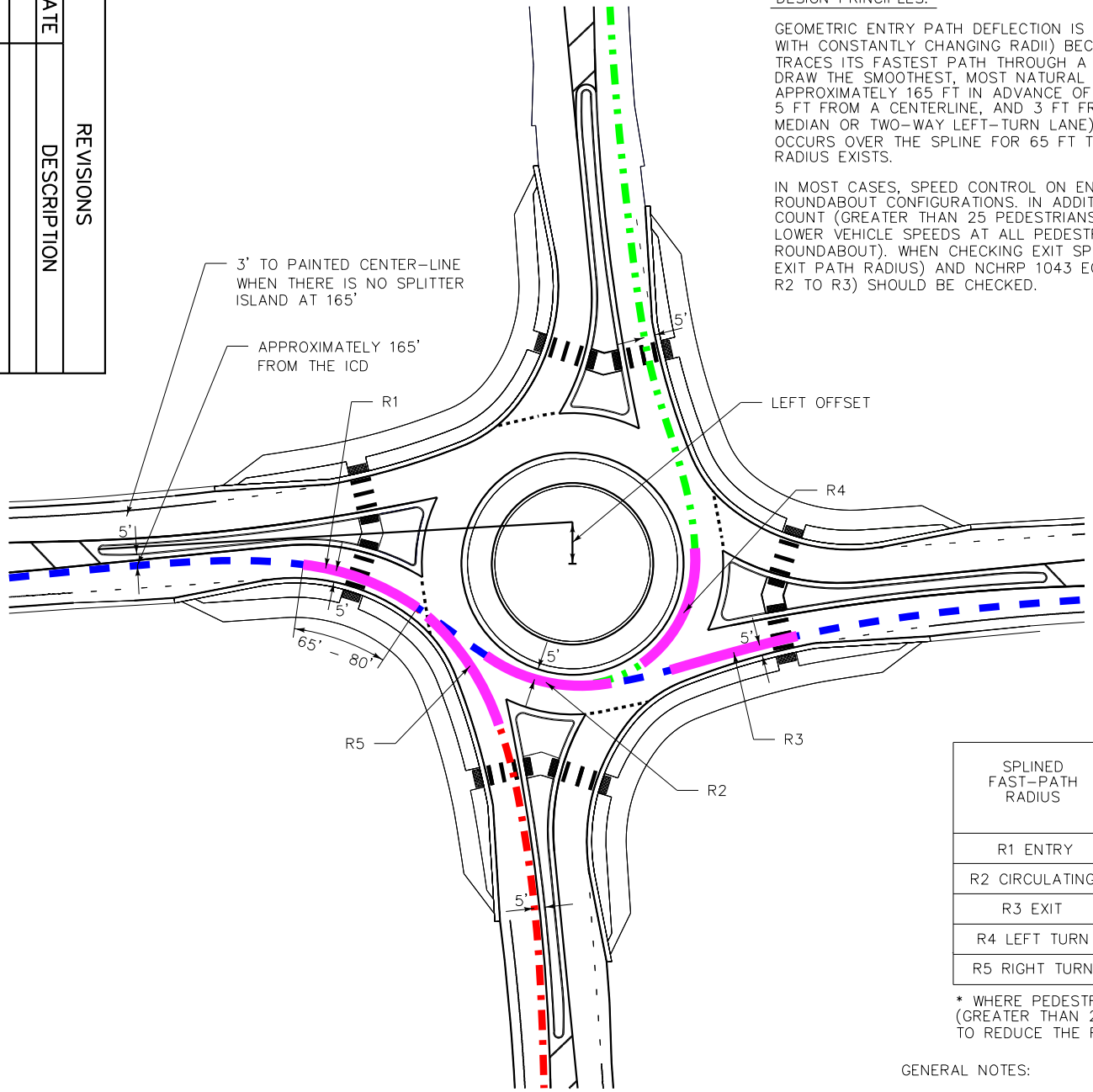
TOWN OF KNIGHTDALE
STANDARD DETAILS

REVISIONS

DATE	DESCRIPTION

GEOMETRIC SPEED CHECKS
SINGLE LANE ROUNDABOUT

STD. NO. 3.33



DESIGN PRINCIPLES:

GEOMETRIC ENTRY PATH DEFLECTION IS BEST REPRESENTED BY A CONTINUOUS SPLINE (A CURVE WITH CONSTANTLY CHANGING RADII) BECAUSE THIS MOST CLOSELY APPROXIMATES HOW A VEHICLE TRACES ITS FASTEST PATH THROUGH A ROUNDABOUT. A SPLINE ALSO ALLOWS ANALYSTS TO DRAW THE SMOOTHEST, MOST NATURAL VEHICULAR PATH. IT IS DRAWN FROM A STARTING POINT APPROXIMATELY 165 FT IN ADVANCE OF THE ENTRY LINE, WITH AN OFFSET OF 5 FT FROM CURBS, 5 FT FROM A CENTERLINE, AND 3 FT FROM OTHER PAVEMENT MARKINGS (SUCH AS A PAINTED MEDIAN OR TWO-WAY LEFT-TURN LANE). THE CRITICAL ENTRY PATH RADIUS, REFERRED TO AS R1, OCCURS OVER THE SPLINE FOR 65 FT TO 80 FT, NEAR THE YIELD POINT, WHERE THE TIGHTEST RADIUS EXISTS.

IN MOST CASES, SPEED CONTROL ON ENTRY IS THE MOST IMPORTANT FASTEST PATH CRITERIA FOR ROUNDABOUT CONFIGURATIONS. IN ADDITION, IF A LOCATION HAS A SIGNIFICANT PEDESTRIAN COUNT (GREATER THAN 25 PEDESTRIANS PER HOUR), STEPS SHOULD BE TAKEN TO FACLITATE LOWER VEHICLE SPEEDS AT ALL PEDESTRIAN CONFLICT AREAS (INCLUDING EXIT SPEEDS FROM THE ROUNDABOUT). WHEN CHECKING EXIT SPEEDS, BOTH THE PREDICTIVE METHOD (BASED ON THE R3 EXIT PATH RADIUS) AND NCHRP 1043 EQUATION 9.7 (WHICH ACCOUNTS FOR ACCELERATION FROM R2 TO R3) SHOULD BE CHECKED.

SPLINED FAST-PATH RADIUS	RECOMMENDED RADIUS FOR SINGLE-LANE ROUNDABOUT (FT)	RECOMMENDED RADIUS FOR MINI-ROUNDABOUT (FT)
R1 ENTRY	120FT TO 165FT	100FT TO 165FT
R2 CIRCULATING	70FT TO 120FT	70FT TO 100FT
R3 EXIT	120FT TO 300FT*	90FT TO 150FT
R4 LEFT TURN	TRUCK APRON R.+5FT	CENTER ISLAND R.+5FT
R5 RIGHT TURN	70FT TO 100FT	50FT TO 90FT

* WHERE PEDESTRIAN USE OF AN EXIT CROSSWALK IS FREQUENT (GREATER THAN 25 PEDESTRIANS PER HOUR), ADJUST EXIT RADII TO REDUCE THE R3 TO <200FT.

GENERAL NOTES:

1. R1, R2, R3 PATH TO FOLLOW NATURAL SPLINE.
2. GEOMETRIC ENTRY SPEED USUALLY GOVERNED BY R1 RADIUS, BUT MAY BE GOVERNED BY R5 RADIUS.
3. ON DESIGNS THAT CANNOT ACHIEVE DEFLECTION USING CENTRAL ISLAND AND APPROACH ALIGNMENT OFFSET TO THE LEFT OF CENTER-LINE, ADD REVERSE CURVES ON THE APPROACH SPLITTER ISLAND, SEPARATED BY A SHORT TANGENT 50FT TO 100FT. APPROACH CURVE RADII TO BE SIZED USING AASHTO GREEN BOOK TABLE 3-13, MINIMUM RADII AND SUPERELEVATION FOR LOW-SPEED STREETS IN URBAN AREAS TO MAINTAIN NORMAL CROWN.

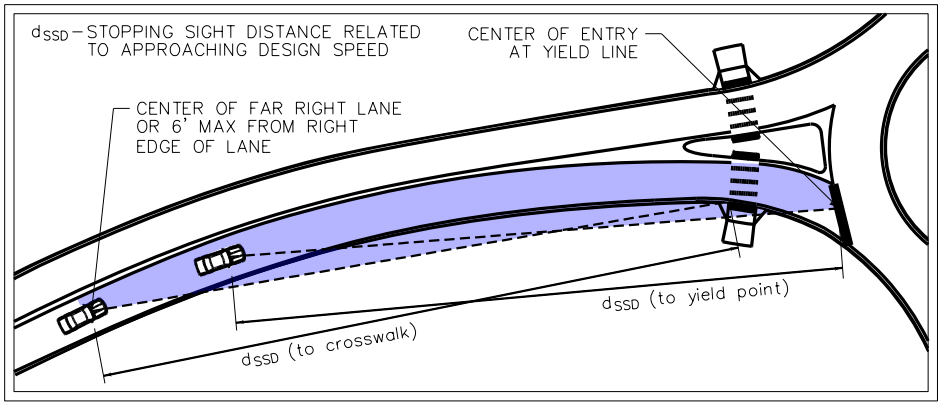
TOWN OF KNIGHTDALE
STANDARD DETAILS

REVISIONS		
DESCRIPTION		DATE

SIGHT DISTANCE CHECKS
SINGLE LANE ROUNDABOUT

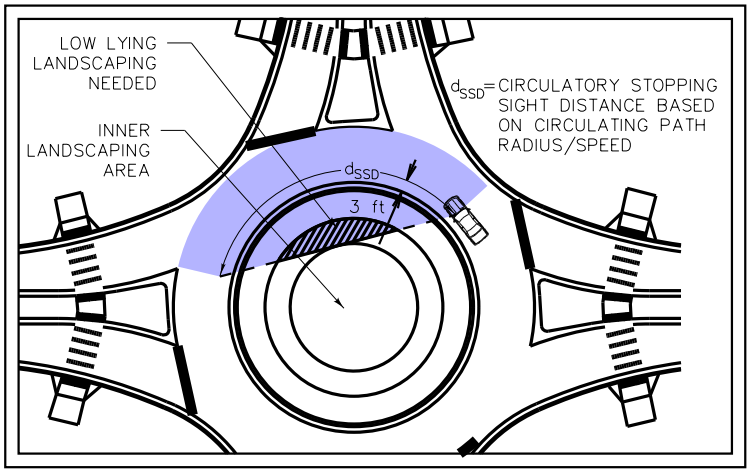
STD. NO. 3.33

APPROACH STOPPING SIGHT DISTANCE



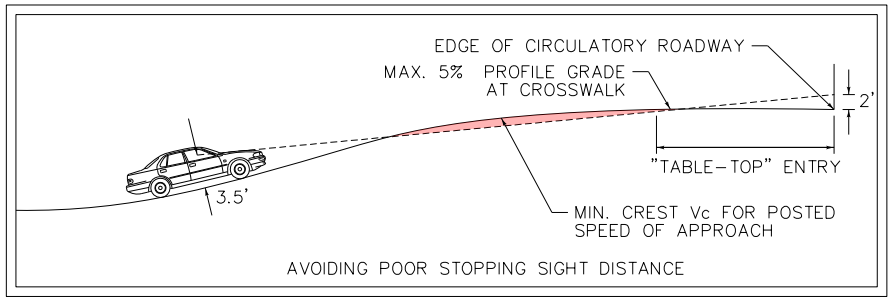
* SSD VALUES BASED ON APPROACH POSTED SPEED AND AASHTO GREEN BOOK CHAPTER 3.2 – SIGHT DISTANCE

CIRCULATING STOPPING SIGHT DISTANCE

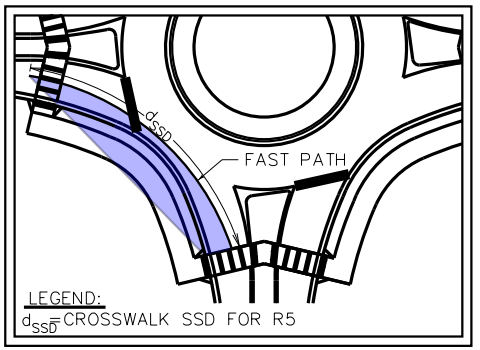


* SSD VALUES BASED ON APPROACH POSTED SPEED AND AASHTO GREEN BOOK CHAPTER 3.2 – SIGHT DISTANCE

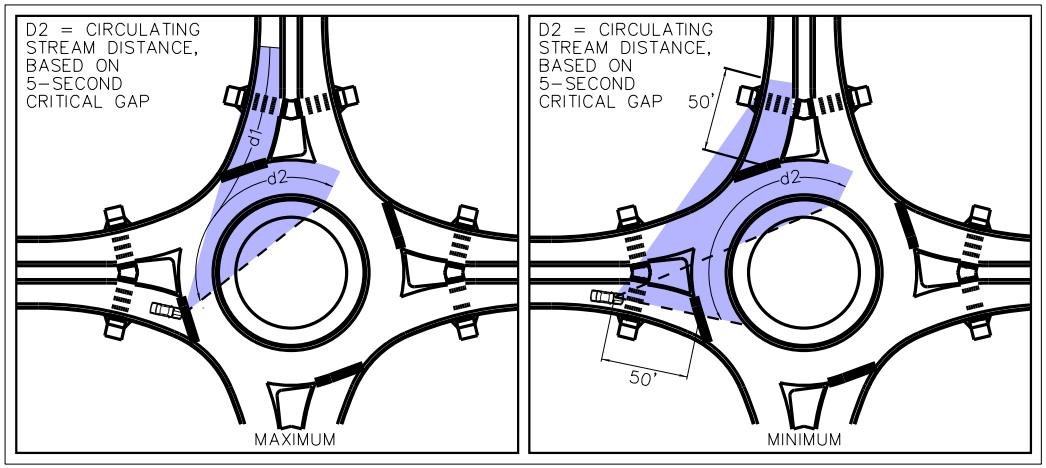
VERTICAL SIGHT DISTANCE



STOPPING SIGHT DISTANCE TO THE DOWNSTREAM CROSSWALK



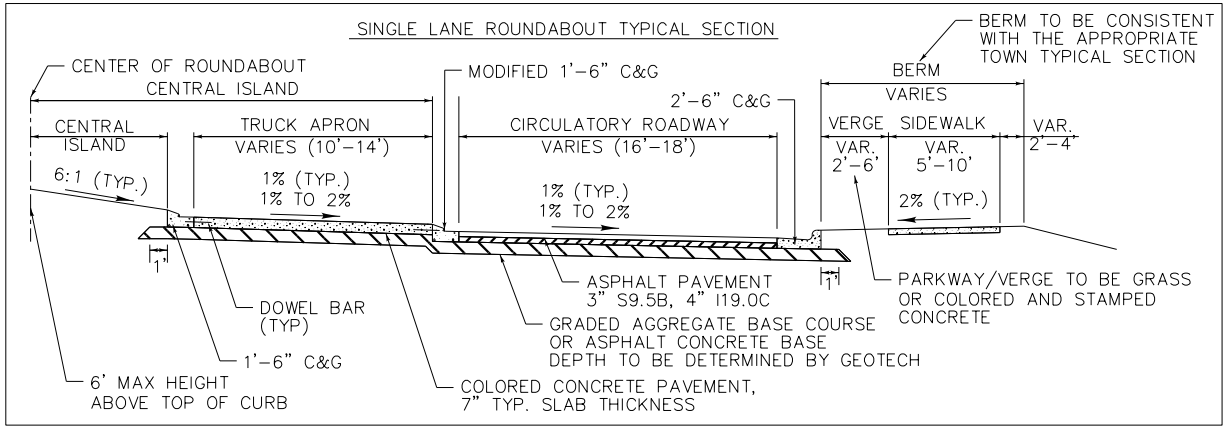
ENTERING AND CIRCULATING INTERSECTION SIGHT DISTANCE

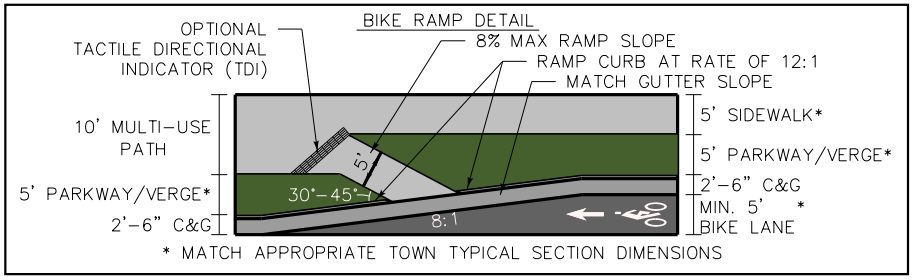


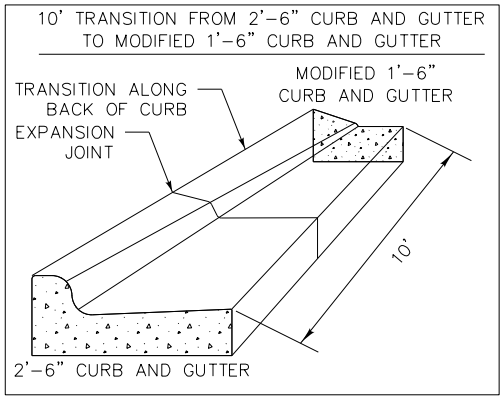
TOWN OF KNIGHTDALE
STANDARD DETAILS

MISCELLANEOUS
ROUNDABOUT DETAILS

REVISIONS	DESCRIPTION	DATE







COLORED AND STAMPED CONCRETE SPECIFICATIONS:

ALL CONCRETE TRUCK APRONS SHOULD BE COLORED CONCRETE BUT NOT STAMPED.

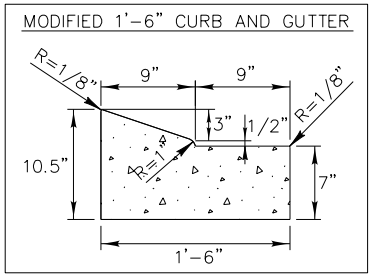
ALL CONCRETE SPLITTER ISLANDS AND CONCRETE VERGES BETWEEN CURB AND PEDESTRIAN SURFACES SHOULD BE COLORED AND STAMPED.

ALL CONCRETE SURFACES THAT ACCOMODATE PEDESTRIAN TRAFFIC (SIDEWALK, MULTI-USE PATH) SHOULD NOT BE COLORED OR STAMPED.

CONCRETE COLOR SHOULD BE FEDERAL STANDARD COLOR 10076 ACCORDING TO AEROSPACE MATERIAL SPECIFICATION STANDARD 595 (AMS-STD-595).

STAMPED CONCRETE SHOULD BE RUNNING BOND OR HERRINGBONE AND IS SUBJECT TO APPROVAL BY THE TOWN OF KNIGHTDALE.

COLORED CONCRETE SHOULD BE AN INTEGRAL CONCRETE MIX (MIXED IN THE TRUCK). SUBMIT COLORED CONCRETE SPECS AND PATTERN SHOP DRAWINGS TO THE TOWN OF KNIGHTDALE FOR REVIEW.



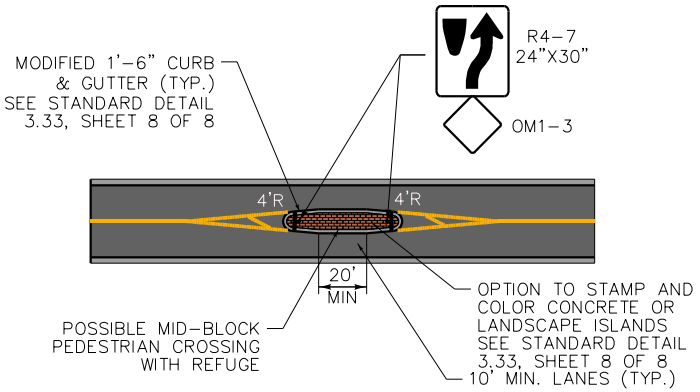
STD. NO.
3.33

TOWN OF KNIGHTDALE
STANDARD DETAILS

REVISIONS	DESCRIPTION	DATE

OTHER TRAFFIC CALMING MEASURES

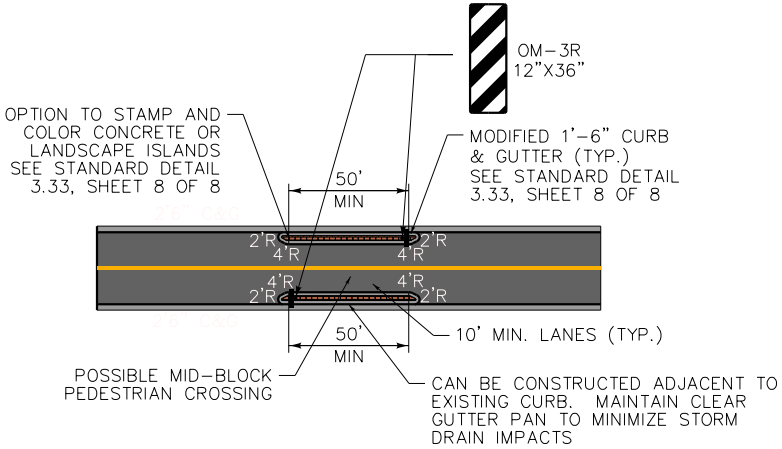
MEDIANS



WHILE MEDIANS PROVIDE LESS TRAFFIC CALMING PERFORMANCE THAN CHICANES, THEY ARE STILL GOOD TRAFFIC CALMING MEASURES THAT HAVE A WIDER RANGE OF APPLICATIONS SINCE MEDIANS CAN BE LONGER AND REQUIRE LESS TAPER LENGTH.

USE $A=WS^2/60$ TO CALCULATE TAPER LENGTHS – SEE FORMULA BELOW.

CHOKERS



CHOKERS PROVIDE TRAFFIC CALMING MEASURES THROUGH THE ENCOURAGEMENT OF LOWER SPEEDS THROUGH THE PINCH POINT. SHORTER PEDESTRIAN CROSSING DISTANCES ARE POSSIBLE IF A MID-BLOCK CROSSING IS PROVIDED.

CHICANES

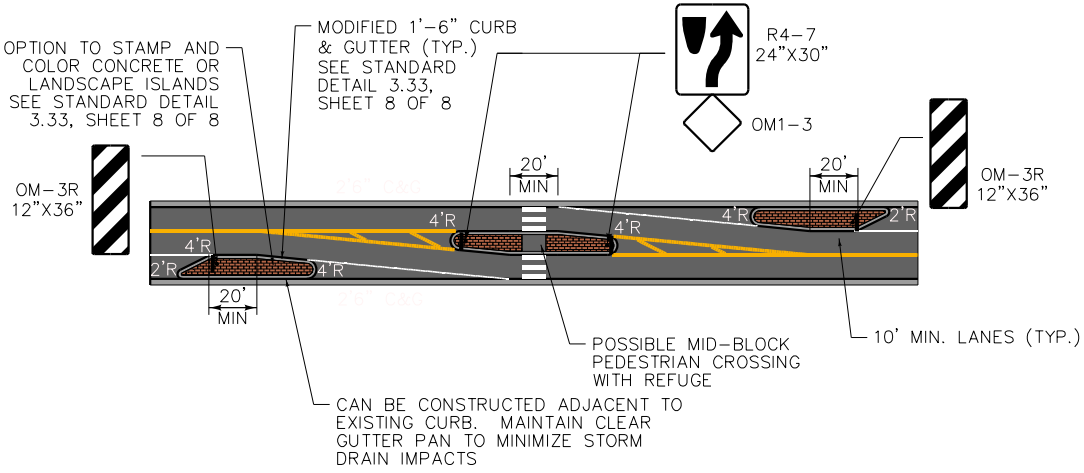
CHICANES ARE APPROPRIATE TRAFFIC CALMING MEASURES FOR COLLECTORS AND LOCAL STREETS.

CHICANES ARE MOST APPROPRIATE FOR ROADWAY FACILITIES WITH POSTED SPEEDS EQUAL TO OR LESS THAN 25 MPH.

THE DESIGN SPEED FOR CHICANES SHOULD BE THE SAME DESIGN SPEED USED DURING THE ORIGINAL ROADWAY DESIGN. VERIFY THAT ALL PROPOSED TRAFFIC CALMING MEASURES CAN BE SAFELY NAVIGATED BY EMERGENCY VEHICLES.

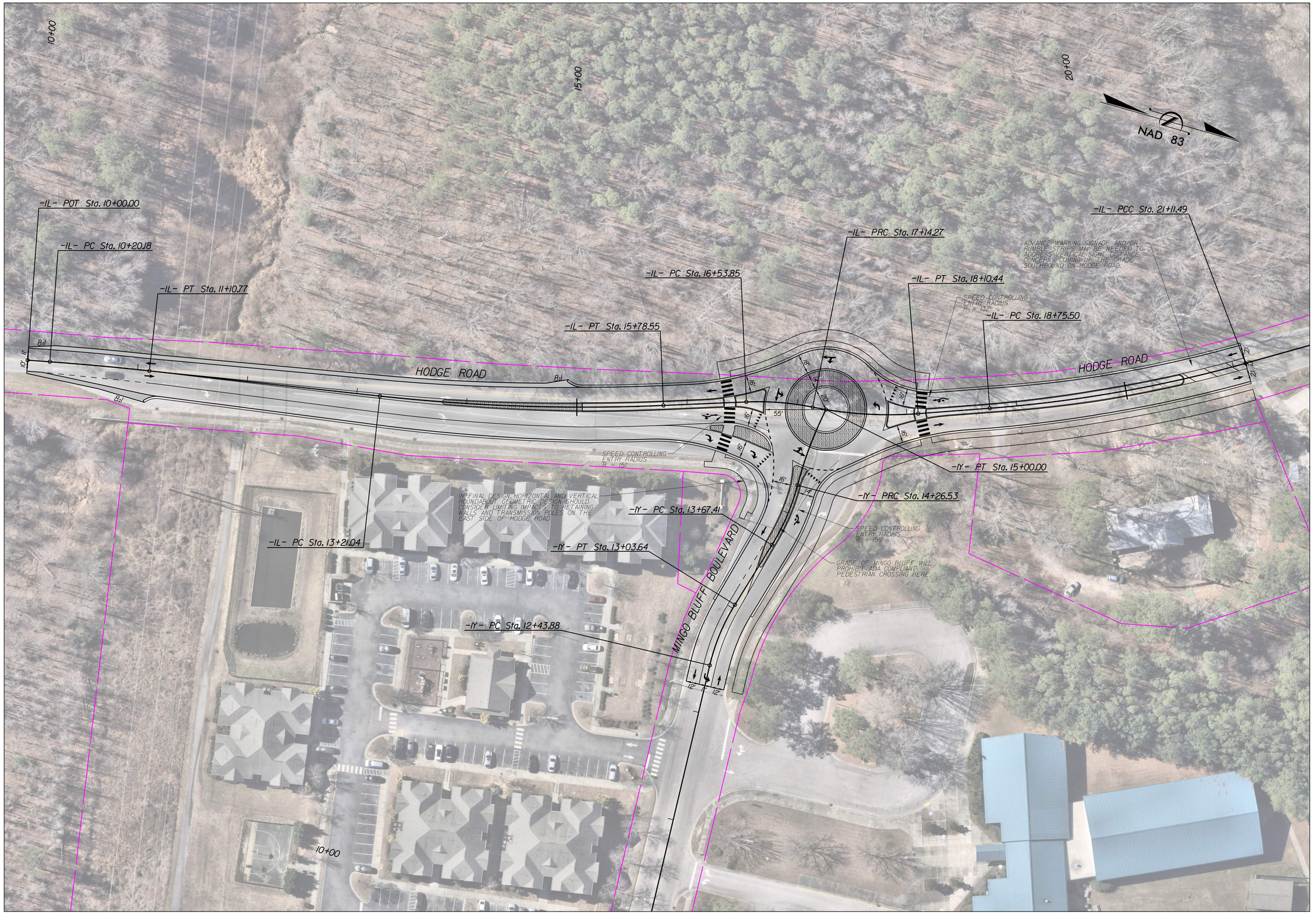
FOR SIGHT DISTANCE AND VISIBILITY PURPOSES, CHICANES ARE NOT RECOMMENDED FOR INSTALLATION ON ROADWAY SECTIONS WITH GRADES IN EXCESS OF 6%.

USE $A=WS^2/60$ TO CALCULATE TAPER LENGTHS, WHERE
A = APPROACH OR DEPARTURE TAPER LENGTH
W = WIDTH OF LATERAL SHIFT
S = POSTED SPEED
NOTE: USE POSTED SPEED AS OPPOSED TO DESIGN SPEED WHEN CALCULATING TRAFFIC CALMING MEASURE TAPER LENGTHS.



STD. NO. 3.34

APPENDIX D



No.	REVISIONS	DATE	BY

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HYDRAULIC ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ROADWAY ENGINEER

KHA PROJECT
013169012

DATE
11/7/2024

SCALE 1"=40'

DESIGNED BY: TGS

DRAWN BY: AMM

CHECKED BY: XXX

PLANS BY:
Kimley»Horn
© 2024
421 FAYETTEVILLE STREET
SUITE 600, RALEIGH, NC 27601
PHONE: 919-677-2000
WWW.KIMLEY-HORN.COM
NC LICENSE #: F-0102

CLIENT:
KNIGHTDALE
start something

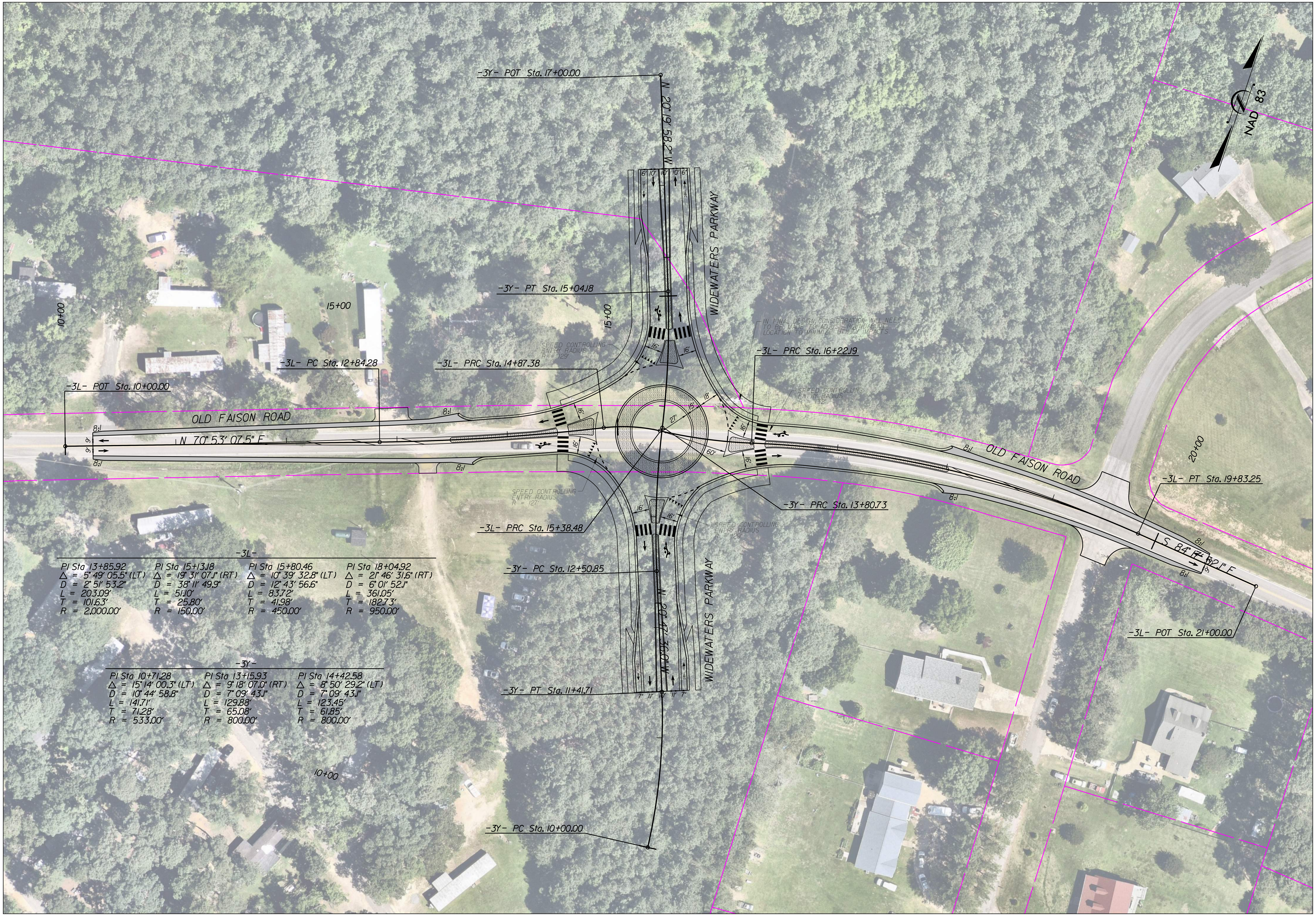
SHEET TITLE:
HODGE ROAD
MINGO BLUFF
BOULEVARD
ROUNDABOUT

PROJECT:
KNIGHTDALE
SAP RBT STDS
KNIGHTDALE, NORTH CAROLINA

SHEET NUMBER
1

K:\RAL_Roadway\016627000 - Knightdale SAP Rbt Stds\Roadway\Proj\016627000_rdy_psh_l_hodge_mlngo.dgn
11/7/2024

SHEET NUMBER 2	PROJECT: KNIGHTDALE SAP RBT STDS KNIGHTDALE, NORTH CAROLINA	SHEET TITLE: MAILMAN ROAD SMITHFIELD ROAD ROUNDABOUT	CLIENT: KNIGHTDALE start something	PLANS BY: Kimley»Horn 421 FAYETTEVILLE STREET SUITE 600, RALEIGH, NC 27601 PHONE: 919-677-2000 WWW.KIMLEY-HORN.COM NC LICENSE #: F-0102	KHA PROJECT 013169012 DATE 11/7/2024 SCALE 1"=40' DESIGNED BY: TGS DRAWN BY: AMM CHECKED BY: XXX	ROADWAY ENGINEER	PRELIMINARY PLANS NOT FOR BID OR CONSTRUCTION	HYDRAULIC ENGINEER	PRELIMINARY PLANS NOT FOR BID OR CONSTRUCTION	No.	REVISIONS	DATE	BY



K:\RAL_Roadway\016627000 - Knightdale SAP Rbt Stds\Roadway\Proj\016627000_rdy_psh_3_widewaters_oldfaison.dgn

11/7/2024

No.	REVISIONS	DATE	BY

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HYDRAULIC ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ROADWAY ENGINEER

KHA PROJECT	016627000
DATE	11/7/2024
SCALE	1"=40'
DESIGNED BY:	TGS
DRAWN BY:	AMM
CHECKED BY:	XXX

PLANS BY:
Kimley»Horn

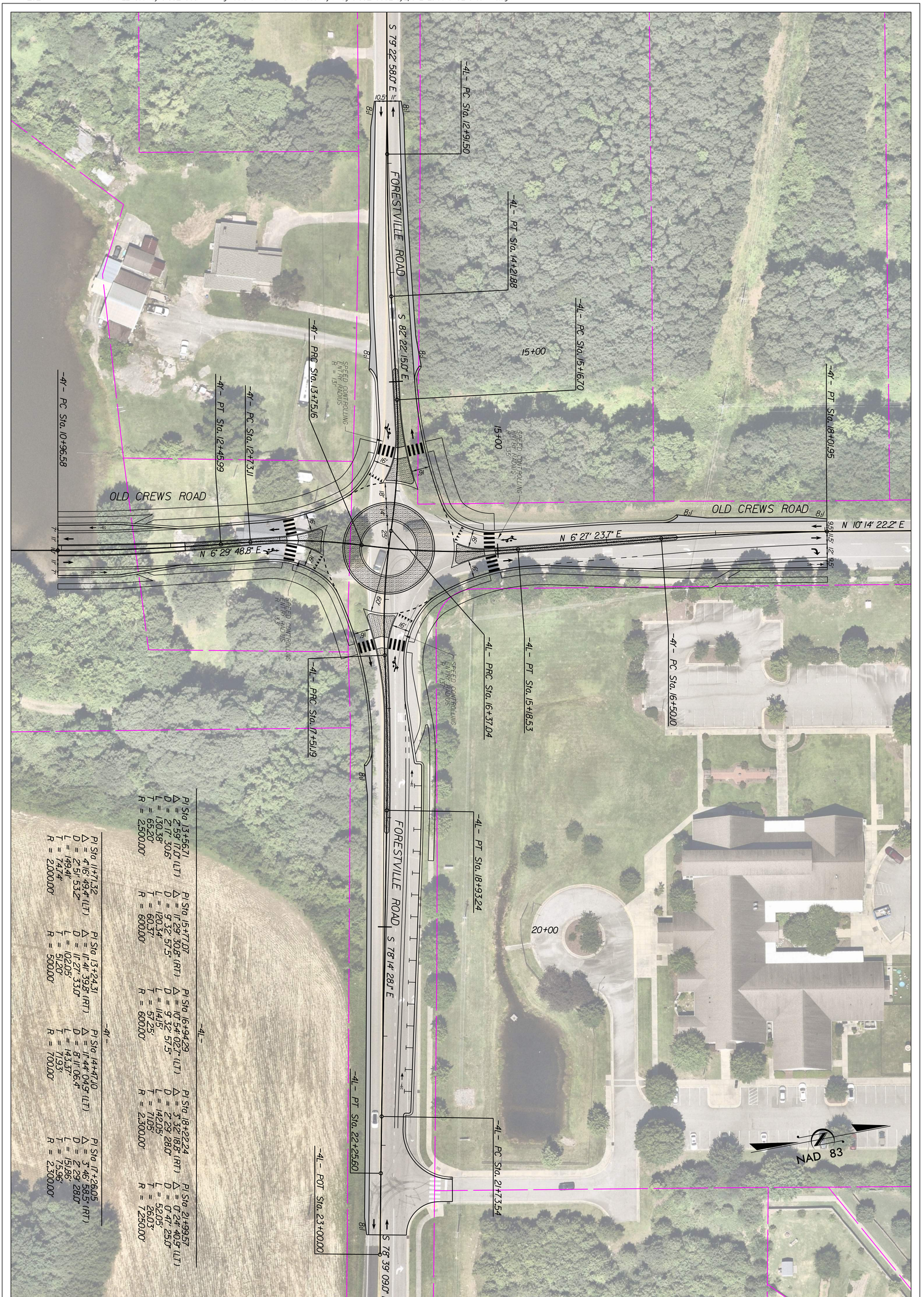
421 FAYETTEVILLE STREET
SUITE 600, RALEIGH, NC 27601
PHONE: 919-677-2000
WWW.KIMLEY-HORN.COM
NC LICENSE #: F-0102

CLIENT:
KNIGHTDALE
start something

SHEET TITLE:
WIDEWATERS PARKWAY
OLD FAISON RD
ROUNDABOUT

PROJECT:
KNIGHTDALE SAP RBT STDS
KNIGHTDALE, NORTH CAROLINA

SHEET NUMBER
3



PI Sta 13+56.71
Δ = 2° 59' 17.0" (LT)
D = 2° 17' 30.6"
L = 130.58'
T = 65.20'
R = 2,500.00'

PI Sta 15+71.07
Δ = 11° 29' 30.8" (RT)
D = 9° 32' 57.5"
L = 120.34'
T = 60.37'
R = 600.00'

-4L-

PI Sta 16+94.29
Δ = 10° 54' 02.2" (LT)
D = 9° 32' 57.5"
L = 114.15'
T = 57.25'
R = 600.00'

PI Sta 18+22.24
Δ = 3° 32' 18.8" (RT)
D = 2° 29' 28.0"
L = 142.05'
T = 71.05'
R = 2,300.00'

PI Sta 21+99.57
Δ = 0° 24' 40.9" (LT)
D = 0° 41' 25.0"
L = 52.05'
T = 26.03'
R = 7,250.00'

PI Sta 11+71.32
Δ = 4° 16' 49.4" (LT)
D = 2° 51' 53.2"
L = 149.41'
T = 74.74'
R = 2,000.00'

PI Sta 13+24.31
Δ = 11° 41' 39.8" (RT)
D = 11° 27' 33.0"
L = 102.05'
T = 51.20'
R = 500.00'

-4Y-

PI Sta 14+47.10
Δ = 11° 44' 04.9" (LT)
D = 8° 11' 06.4"
L = 143.37'
T = 71.93'
R = 700.00'

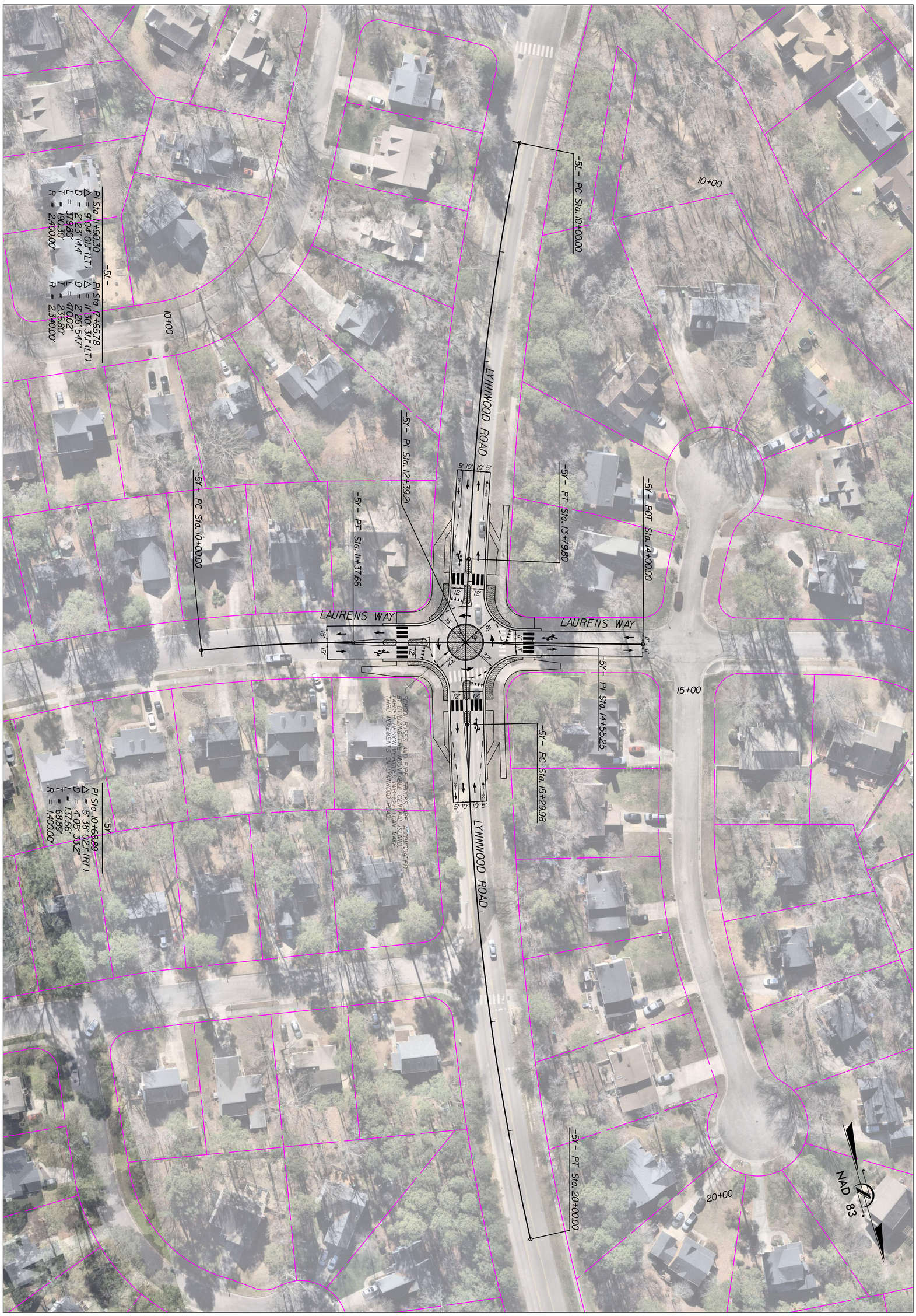
PI Sta 17+26.05
Δ = 3° 46' 58.5" (RT)
D = 2° 29' 28.0"
L = 151.86'
T = 75.96'
R = 2,300.00'

SHEET NUMBER 4	PROJECT: KNIGHTDALE SAP RBT STDS, KNIGHTDALE, NORTH CAROLINA	SHEET TITLE: OLD CREWS RD FORESTVILLE RD ROUNDABOUT	CLIENT: KNIGHTDALE start something	PLANS BY: Kimley»Horn © 2024 421 FAYETTEVILLE STREET SUITE 600, RALEIGH, NC 27601 PHONE: 919-677-2000 WWW.KIMLEY-HORN.COM NC LICENSE #: F-0102	KHA PROJECT 013169012; DATE 11/7/2024; SCALE 1"=40'; DESIGNED BY: TGS; DRAWN BY: AMM; CHECKED BY: XXX

ROADWAY ENGINEER — PRELIMINARY PLANS NOT SUITABLE FOR CONSTRUCTION

HYDRAULIC ENGINEER — PRELIMINARY PLANS NOT SUITABLE FOR CONSTRUCTION

No.	REVISIONS	DATE	BY



SHEET NUMBER 5	PROJECT: KNIGHTDALE SAP RBT STDS, KNIGHTDALE, NORTH CAROLINA	SHEET TITLE: LAURENS WAY LYNWOOD ROAD ROUNDABOUT	CLIENT: KNIGHTDALE start something	PLANS BY: Kimley»Horn © 2024 421 FAYETTEVILLE STREET SUITE 600, RALEIGH, NC 27601 PHONE: 919-677-2000 WWW.KIMLEY-HORN.COM NC LICENSE #: F-0102	KHA PROJECT 013169012 DATE 11/7/2024 SCALE 1"=40' DESIGNED BY: TGS DRAWN BY: AMM CHECKED BY: XXX	ROADWAY ENGINEER	PRELIMINARY PLANS NOT FOR CONSTRUCTION	HYDRAULIC ENGINEER	PRELIMINARY PLANS NOT FOR CONSTRUCTION	No.	REVISIONS / DATE / BY

Implementation Grant Checklist

Leadership and Goal Setting

- ☑ A high-ranking official and/or governing body in the jurisdiction publicly committed to an eventual goal of zero roadway fatalities and serious injuries
- ☑ The commitment includes either setting a target date to reach zero OR setting one or more targets to achieve significant declines in roadway fatalities and serious injuries by a specific date

Planning Structure

- ☑ To develop the Action Plan, was a committee, task force, implementation group, or similar body established and charged with the plan's development, implementation, and monitoring?

Safety Analysis

- ☑ Analysis of existing conditions and historical trends to provide a baseline level of crashes involving fatalities and serious injuries across a jurisdiction, locality, Tribe, or region
- ☑ Analysis of the location where there are crashes, the severity, as well as contributing factors and crash types
- ☑ Analysis of systemic and specific safety needs, as needed (e.g., high-risk road features or specific safety needs of relevant road users)
- ☑ A geospatial identification (geographic or locational data using maps) of higher risk locations

Engagement and Collaboration

- ☑ Engagement with the public and relevant stakeholders, including the private sector and community groups
- ☑ Incorporation of information received from the engagement and collaboration into the plan
- ☑ Coordination that included inter-and intra-governmental cooperation and collaboration, as appropriate

Equity Consideration

- ☑ Considerations of equity using inclusive and representative processes
- ☑ The identification of underserved communities through data
- ☑ Equity analysis developed in collaboration with appropriate partners, including population characteristics and initial equity impact assessments of proposed projects and strategies

Policy and Process Changes

- [x] The plan development included an assessment of current policies, plans, guidelines, and/or standards to identify opportunities to improve how processes prioritize safety

- [x] The plan discusses implementation through the adoption of revised or new policies, guidelines, and/or standards

Strategy and Project Selections

- [x] Does the plan identify a comprehensive set of projects and strategies to address the safety problems in the Action Plan, with information about time ranges when projects and strategies will be deployed, and an explanation of project prioritization criteria?

Progress and Transparecy

- [x] A description of how progress will be measured over time that includes, at a minimum, outcome data

- [x] The plan is posted publicly online

Action Plan Date

- [x] Was at least one of your plans finalized and/or last updated between 2019 and April 30, 2024?

Implementation Grant Checklist (Other Considerations)

Other Implementation Grant Considerations*

As identified in Amendment 1 to the USDOT FY24 Safe Streets and Roads for All Funding Opportunity document

- [x] Have ownership and/or maintainance responsibilities over a roadway network
- [x] Have safety responsibilities that affect roadways
- [x] Have agreement from the agency that has ownership and/or maintainance responsibilities within the applicant's jurisdiction
- [ ] Must include Eligible Activity C "Carrying out projects and strategies identified in an Action Plan"
- [ ] Ability to Meet Implementation Grant Selection Criteria:
  - Selection Criterion #1: Safety Impact
  - Selection Criterion #2: Equity, Engagement and Collaboration
  - Selection Criterion #3: Effective Practices and Strategies
  - Selection Criterion #4: Other DOT Strategic Goals (Climate and Sustainability, Economic Competitiveness, Workforce)
  - Selection Criterion #5: Supplemental Planning and Demonstration Activities
- [ ] Demonstration of Project Readiness (e.g., consideration of environmental, permitting, and review processes; design; and construction)
- [ ] Implementation Grant Supplement Estimated Budget (including Implementation Cost information)
- [ ] Federal funding requested per person(s) killed or seriously injured from 2017-2021
- [ ] Lead Applicant Unique Entity Identifier (UEI) and System for Award Management Registration
- [ ] Letters of Support (optional)