

GENERAL

1. Description

This standard identifies minimum requirements that shall be met for Roundabouts and Neighborhood Traffic Circles in the design and construction of elements for Arlington County Horizontal Design Standards. The development of this standard is to provide greater guidance in the design and construction of roundabouts and neighborhood traffic circles while meeting the County's guiding principles for increasing pedestrian safety and accessibility, decreasing county infrastructure costs and balancing the use of the Right-of-Way between all modes of transportation.

2. Related Arlington County Standards

- A. Arlington County Construction Standards and Specifications
- B. Arlington County Horizontal Standards H-3.2 Curb Ramps
- C. Arlington County Horizontal Standards H-3.7 Crosswalks
- D. Arlington County Master Transportation Plan – Pedestrian Element
- E. Arlington County Master Transportation Plan – Streets Element

3. Applicable Standards and Specifications

- A. Americans with Disabilities Act - Accessibility Guidelines for Building and Facilities (ADAAG)
- B. American with Disabilities Accessibility Guidelines for Public Rights-of-Way (PROWAG)
- C. National Cooperative Highway Research Program, Report 672 – Roundabouts: An Informational Guide, second edition
- D. US Department of Transport, Federal Highway Administration – Roundabouts, Technical Summary
- E. Manual of Uniform Traffic Control Devices (MUTCD)
- F. American Association of State Highway and Transportation Officials (AASHTO) – Geometric Design of Highways and Streets, 2011 6th Edition

4. Quality Assurance

- A. Reserved

5. Submittals

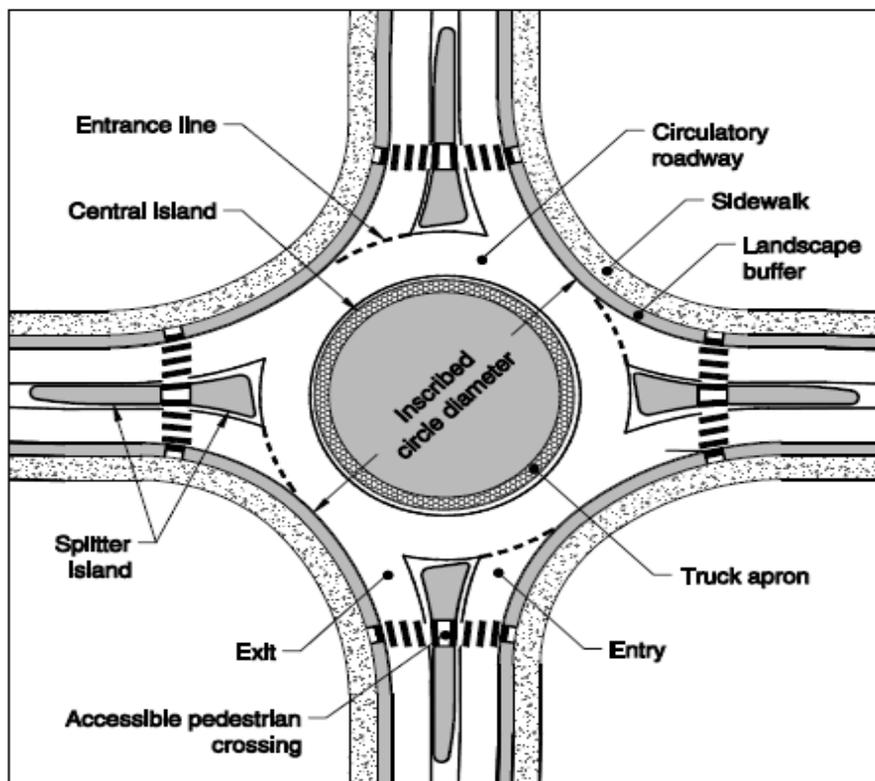
- A. Design and placement of all Roundabouts and Traffic Circles shall be approved by DES Transportation Engineering and Operations (TE&O) Bureau Chief.

DESIGN CONSIDERATIONS

A. Definitions

1. Roundabout - A Roundabout is a form of circular intersection in which traffic travels counterclockwise around a central island and in which entering traffic must yield to circulating traffic. Roundabouts provide intersection control while allowing free flowing traffic movement. The geometric design typically includes yield control of all entering traffic, raised splitter islands, a central island, crosswalks, and a truck apron. The size of the roundabout is largely influenced by the choice of design vehicle, available right-of-way and traffic volume.
2. Neighborhood Traffic Circles - Neighborhood traffic circles are typically constructed in the intersections of neighborhood streets for the purpose of slowing traffic by providing a degree of horizontal deflection. The size of the center island, which is not always circular, is related to the design vehicle chosen, the width of the intersecting streets and street alignment and geometry. The outer edge of the central island is constructed with a mountable concrete curb and a two-foot wide concrete truck apron. The circle is usually landscaped and a water source may be provided for irrigation of the plant material.
3. Central Island - The central island is the raised area in the center of a traffic circle around which traffic circulates. The central island is typically but not necessarily circular in shape.
4. Inscribed circle diameter - Is the distance diagonally across the roundabout inscribed by the outer curb (or edge) of the circulatory roadway. It is the sum of the central island diameter and two times the circulatory roadway width.
5. Intersection Diameter – Is the minimum distance, measured diagonally across the traffic circle from one curb return radius to the opposite curb return radius, refer to detail TC-1.0. The intersection diameter is measured perpendicular from the face of curb to face of curb. When designing a traffic circle the intersection diameter shall be large enough to accommodate the central island diameter and two times the opening width.
6. Splitter Island - A splitter island is a raised or painted area on an approach used to deflect, slow and direct entering traffic, and may provide refuge to pedestrians crossing the road.
7. Circulatory roadway - The circulatory roadway is the curved path within a roundabout used by vehicles to travel in a counterclockwise fashion around the central island.

8. **Opening Width** – Is the minimum distance, measured diagonally from the edge of the central island to one curb return radius. The opening width is measured perpendicular from the face of curb to face of curb.
9. **Truck Apron** – The truck apron is the mountable portion of the central island adjacent to the circulatory roadway that may be needed to accommodate the wheel tracking of large vehicles.
10. **Entrance line** - The entrance line marks the point of entry into the circulatory roadway and is physically an extension of the circulatory roadway edge line. This line is typically marked on a roundabout.
11. **Accessible pedestrian crossings** - For roundabouts designed with pedestrian pathways, the crossing location is typically set back from the circulatory roadway edge line, and the splitter island is typically cut to allow pedestrians, wheelchairs, strollers, and bicycles to pass through. The pedestrian crossings must be accessible with detectable warnings and appropriate slopes in accordance with ADA requirements.
12. **Landscape strip** - Landscape strips separate vehicular and pedestrian traffic and assist with guiding pedestrians to the designated crossing locations. This feature is particularly important as a wayfinding cue for individuals who are visually impaired. Landscape strips can also significantly improve the aesthetics and safety of the intersection.

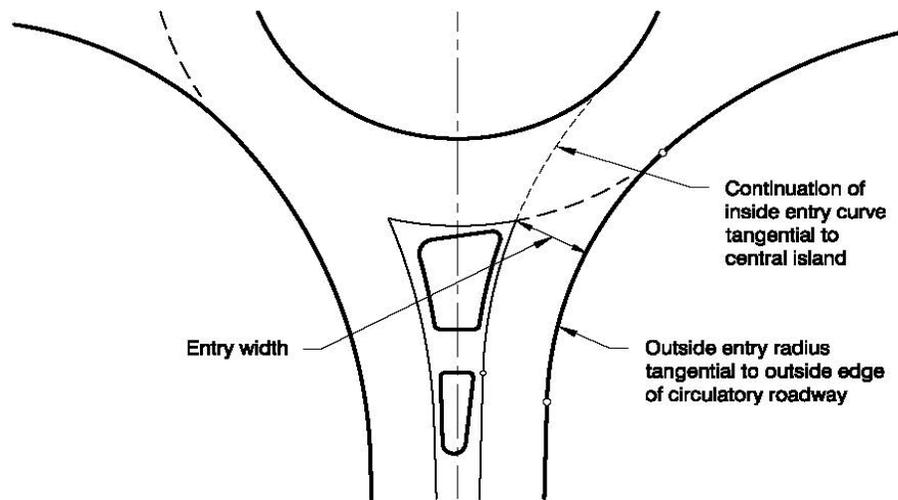


PLACEMENT**A. Placement**

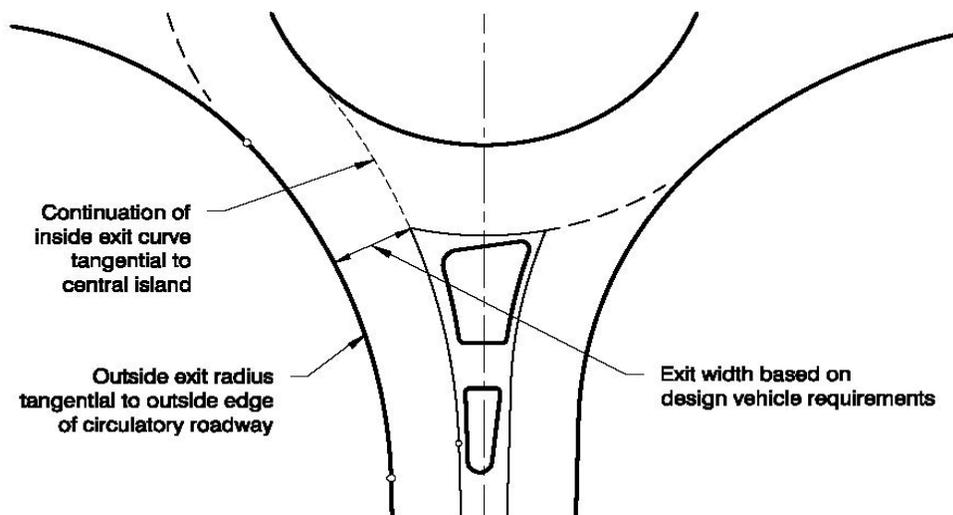
1. Roundabouts should be considered for all projects at the intersection of arterial/arterial, arterial/neighborhood principal and neighborhood principal/neighborhood principal streets.
2. Neighborhood Traffic Circles may be considered for all projects at the intersection of any neighborhood street.

DESIGN**A. Roundabouts**

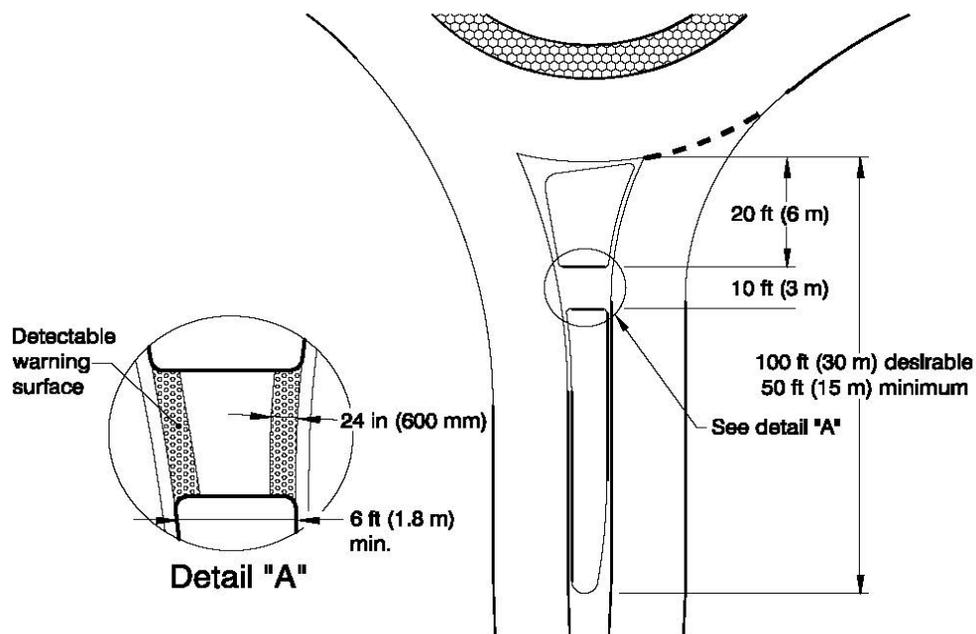
1. Design Consideration – When designing a roundabout the designer shall give consideration to the proximity of existing/proposed signalized intersections and expected vehicle, bicycle and pedestrian volumes. In particular the traffic control at nearby downstream intersections should be considered.
2. Design Speed – The desirable maximum entry design speed is 10 mph below the posted speed limit on the major street at the intersection with a minimum value of 20 mph.
3. Design Vehicle – When determining the width of the circulatory roadway the design vehicle shall be a 40 ft school bus (B-40) with a travel speed of 15 mph. When determining the width of the truck apron the design vehicle shall be a fire truck (WB50) with a travel speed of 5 mph.
4. Circle Diameter – A single lane roundabout should typically have an inscribed circle diameter of 90 to 180 ft. On a case by case basis the circle diameter may be reduced to an inscribed diameter of 45 to 90 ft due to limiting site conditions. If an inscribed circle is reduced to less than 90 ft in diameter then the center island should be designed to be fully traversable. On a case by case basis the center island may be landscaped for roundabouts with an inscribed circle diameter of less than 90 ft.
5. Point of Entry Width – Is where the traveled way intersects with the entrance line, along a line perpendicular to the right curb line. The entrance width is dictated by the needs of the entering traffic stream, principally the design vehicle. Typical entry widths for single-lane entrances range from 14 to 18 ft with 15 ft used as a common starting value.

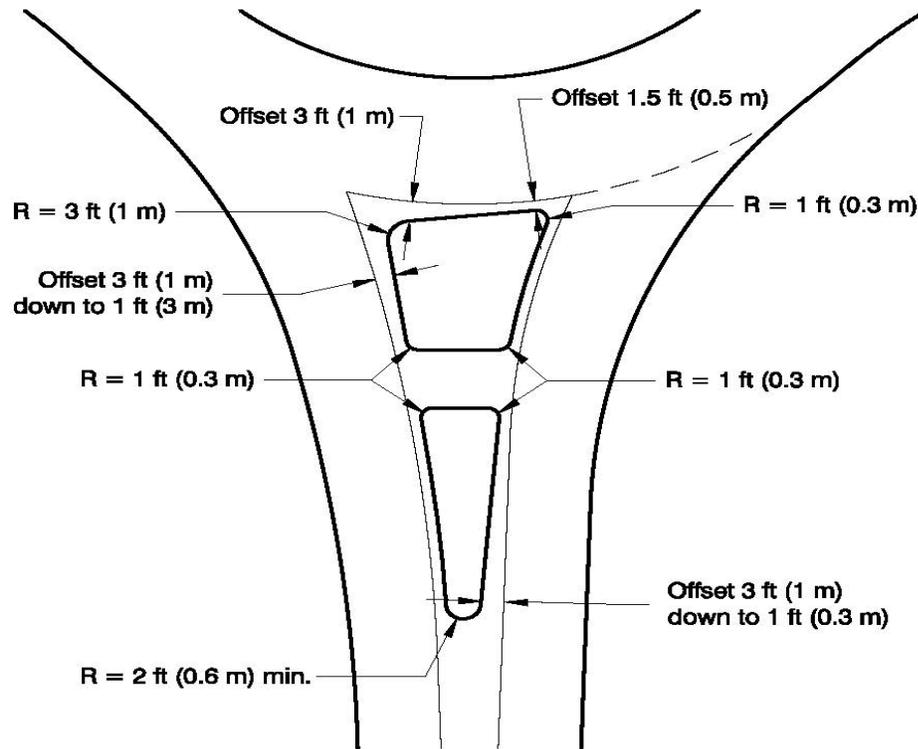


6. **Entry Curb Radius** - Entry radii at a single-lane roundabout typically range from 50 to 100 ft. A common starting point is an entry radius in the range of 60 to 90 ft; however, a larger or smaller radius may be needed to accommodate large vehicles or serve small diameter roundabouts, respectively.
7. **Exit Curb Radius** - The exit curb radii are usually larger than the entry curb radii in order to minimize the likelihood of congestion and crashes at the exits. The exit radii design is also influenced by the design environment, pedestrian demand, the design vehicle, and physical constraints. Typically, exit curb radii should be no less than 50 ft, with values of 100 to 200 ft being more common. At single-lane roundabouts in urban environments, exits should be designed to enforce slow exit path speeds to maximize safety for pedestrians crossing the exiting traffic stream.



8. **Circulatory Roadway Width** – The required width of the circulatory roadway is determined from the number of entering lanes and the turning requirements of the design vehicle. Typically the circulating width should be at least as wide as the maximum entry width and up to 120% of the maximum entry width. For single lane roundabouts the typical circulatory roadway widths range from between 16' – 20'.
9. **Central Island** – The central island diameter is dependent upon the inscribed circle diameter and the required circulatory roadway width. The central island will typically be installed with a standard County mountable curb and a raised truck apron which will have a minimum width of 2 ft. The center of the island may be landscaped or identified for public art, storm water management or other appropriate uses. Roundabouts with a central island greater than 20' in diameter may be planted with appropriate landscape. The placement of plantings/installations shall be set back within the central island to ensure safe stopping sight distances are achievable, based on the appropriate design vehicle and speed.
10. **Splitter Island** – Raised splitter islands shall be installed on all entrances to roundabouts. The total length of the raised island should generally be at least 50 ft, although 100 ft is desirable, to alert approaching drivers to the geometry of the roundabout, and a minimum width of 6 feet at the crosswalk to provide sufficient protection for pedestrians. Painted splitter islands or the removal of the splitter island may be considered on a case by case basis due to limiting site conditions. Parking shall be prohibited within 30 ft of the crosswalk when approaching a roundabout. On the departing side of a roundabout, parking shall not be allowed until 10 ft beyond the crosswalk.





11. Accessible pedestrian crossings – The pedestrian crossing is typically set back 20ft from the roundabout entrance line.
12. Landscape strip – The landscape strip is typically 4 wide with a minimum width of 2.5 ft. The landscape strip may be planted with ground cover or identified for use as bioretention. Plantings in the landscape strip shall have a maximum mature height of 3ft above the height of the roadway surface. Trees shall not be planted in this area due to the adverse effect on vertical and horizontal sight distances.
13. Traffic Control – Yield signs shall be placed on all entries to the roundabout. Refer to the MUTCD for further details regarding required traffic controls.

B. Neighborhood Traffic Circles

1. Design Speed – The desirable maximum entry design speed is 15 mph.
2. Design Vehicle – The design vehicle shall be a 40 ft school bus (B-40) with a travel speed of 5 mph. The design vehicle may use the truck apron when making a left hand turn.

3. Intersection Diameter – A neighborhood traffic circle shall not be installed at any intersection with an intersection diameter of less than 41ft’.
4. Opening Width – typical opening widths range from between 16ft – 20ft for a neighborhood traffic circle.
5. Central Island – The central island diameter is dependent upon the intersection size and the required opening width. The center island shall have a minimum circle diameter of 9ft and be constructed with a mountable curb and a raised 2ft wide truck apron.

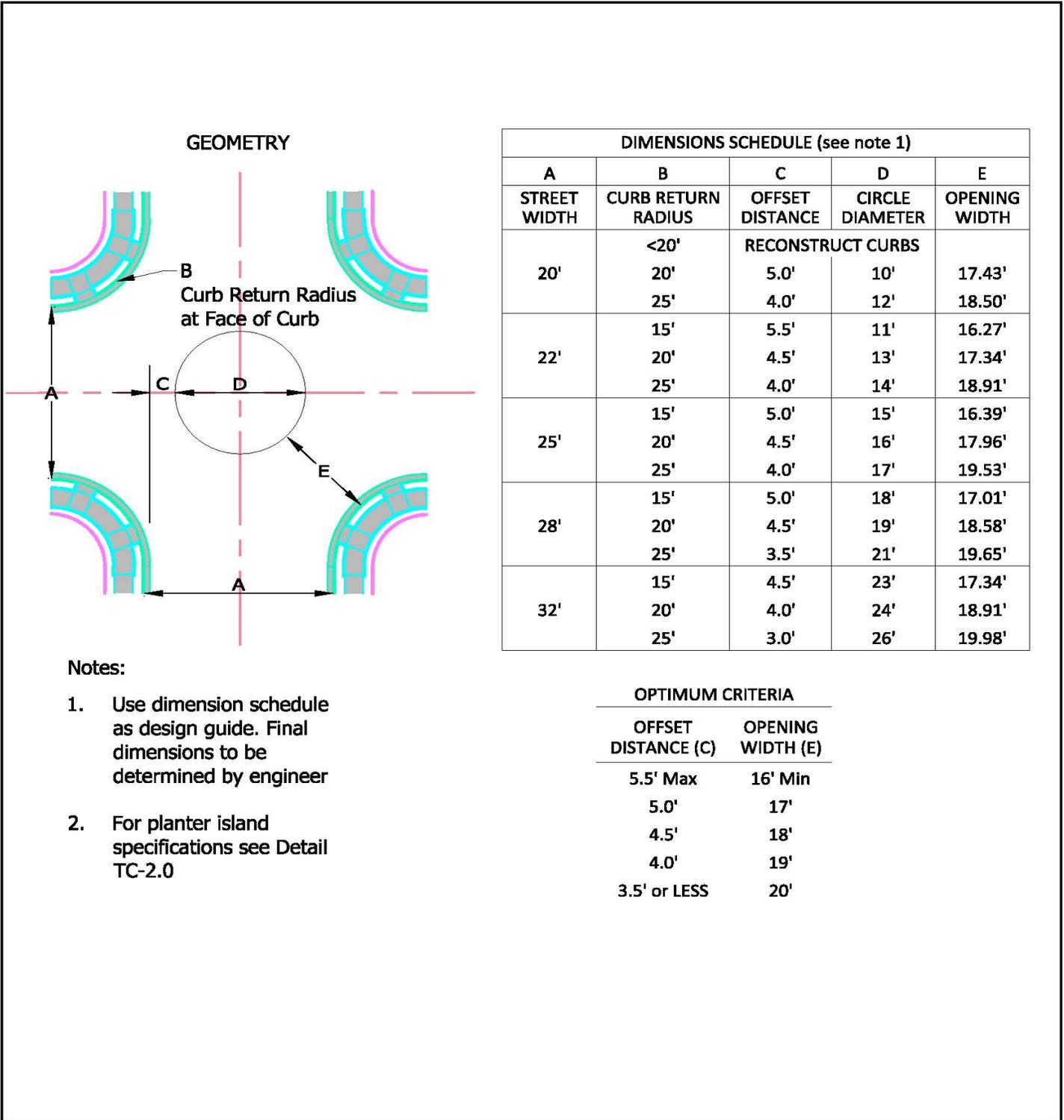
The center of the island may be landscaped or identified for public art, storm water management or other appropriate uses. Traffic circles may be planted with appropriate landscape and central islands greater than 12ft in diameter may be planted with a tree. Trees shall be placed a minimum of 6 ft from the road side clear zone and the placement of plantings/installations shall be set back within the central island to ensure safe stopping sight distances are achievable, based on the appropriate design vehicle and speed.

Once a trees branches spread to the edge of the central island they shall be either trimmed back to the edge of the traffic circle or limbed up to 14’ above the road surface. Vertical and horizontal sight distances shall be considered when selecting plant species.

6. Splitter Island – Splitter islands are not installed.
7. Traffic Control – Consideration should be given to removing existing traffic control signs at the intersection when installing a traffic circle. On a case by case basis it may be determined that stop controls be placed on entries from minor streets.

C. Materials

1. Mountable curb, raised splitter islands and truck aprons shall be constructed of concrete. Painted splitter islands shall be designated with a 4” solid edge lines.
2. Limited alternate material combinations may be considered to on a case by case basis as identified by the Transportation Division chief. Materials may include different colored surface treatments and edge markings.



DIMENSIONS SCHEDULE (see note 1)				
A	B	C	D	E
STREET WIDTH	CURB RETURN RADIUS	OFFSET DISTANCE	CIRCLE DIAMETER	OPENING WIDTH
20'	<20'	RECONSTRUCT CURBS		
	20'	5.0'	10'	17.43'
22'	25'	4.0'	12'	18.50'
	15'	5.5'	11'	16.27'
25'	20'	4.5'	13'	17.34'
	25'	4.0'	14'	18.91'
28'	15'	5.0'	15'	16.39'
	20'	4.5'	16'	17.96'
32'	25'	4.0'	17'	19.53'
	15'	5.0'	18'	17.01'
	20'	4.5'	19'	18.58'
	25'	3.5'	21'	19.65'
	15'	4.5'	23'	17.34'
	20'	4.0'	24'	18.91'
	25'	3.0'	26'	19.98'

Notes:

1. Use dimension schedule as design guide. Final dimensions to be determined by engineer
2. For planter island specifications see Detail TC-2.0

OPTIMUM CRITERIA

OFFSET DISTANCE (C)	OPENING WIDTH (E)
5.5' Max	16' Min
5.0'	17'
4.5'	18'
4.0'	19'
3.5' or LESS	20'

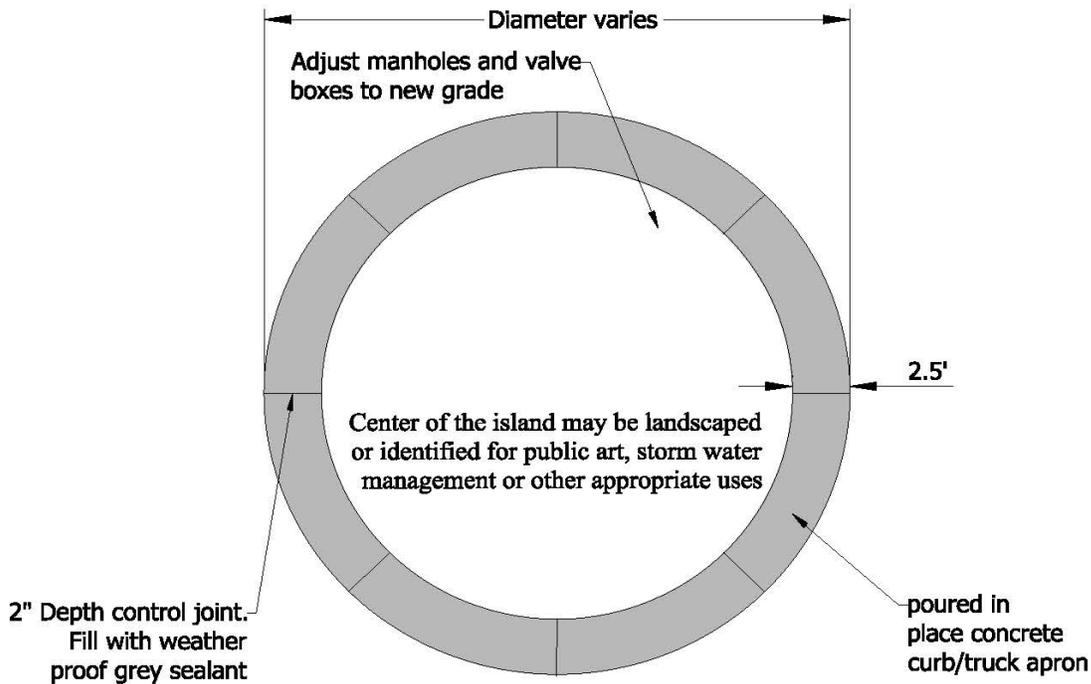
TRAFFIC CIRCLE DIMENSIONS

REVISION & DATE	

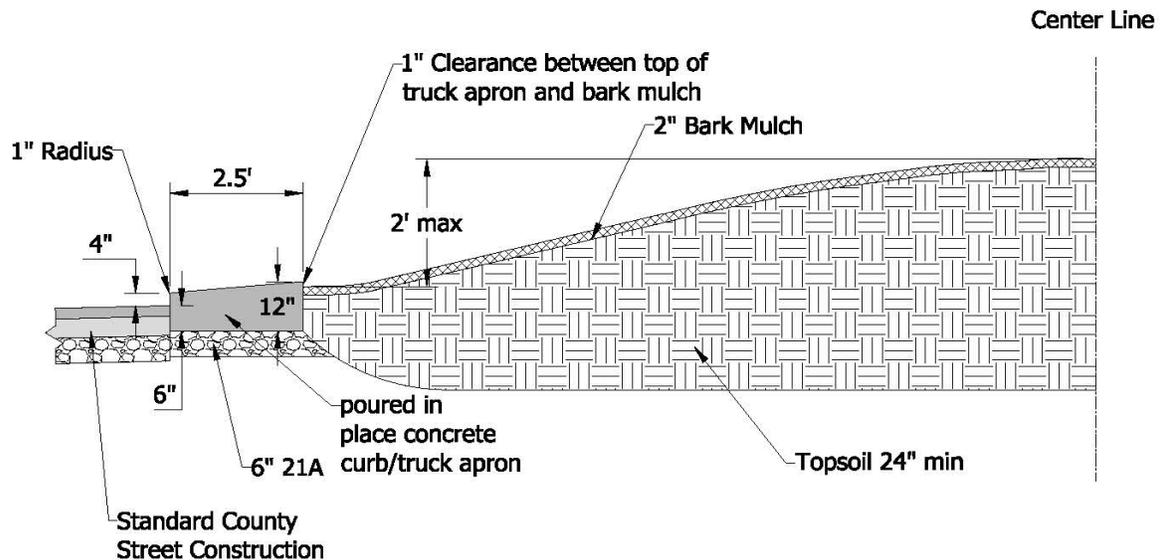


ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
TC-1.0
SHEET 1 OF 1



Typical Traffic Circle



Typical Section

TYPICAL TRAFFIC CIRCLE

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
TC-2.0
SHEET 1 OF 1