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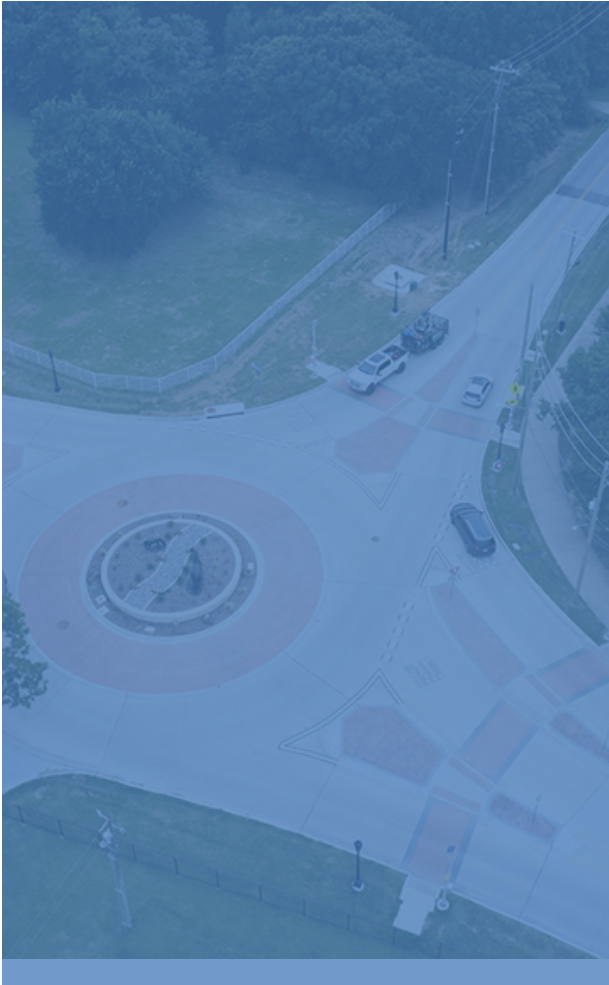
INNOVATIVE INTERSECTIONS DESIGN AIDS

Landscaping Recommendations for Roundabouts

OVERVIEW

This design aid presents guidelines for evaluating roundabout area landscaping and central island landscape treatments for roundabouts that have raised central islands. The design criteria developed in this review are used to judge the appropriateness of proposed landscape plans that may include fixed objects. The Landscape Aesthetics and Design Manual points out the value of landscaping to define corridors. Roundabouts are an excellent gateway or terminus feature in defining the character of a corridor.

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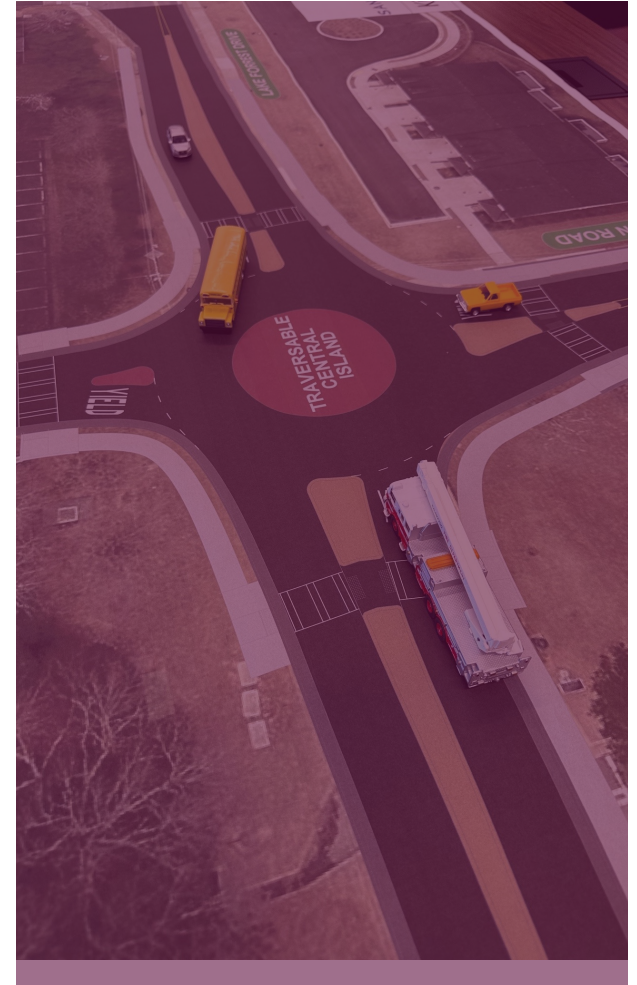
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OF LANDSCAPING CENTRAL
AND SPLITTER ISLANDS OF
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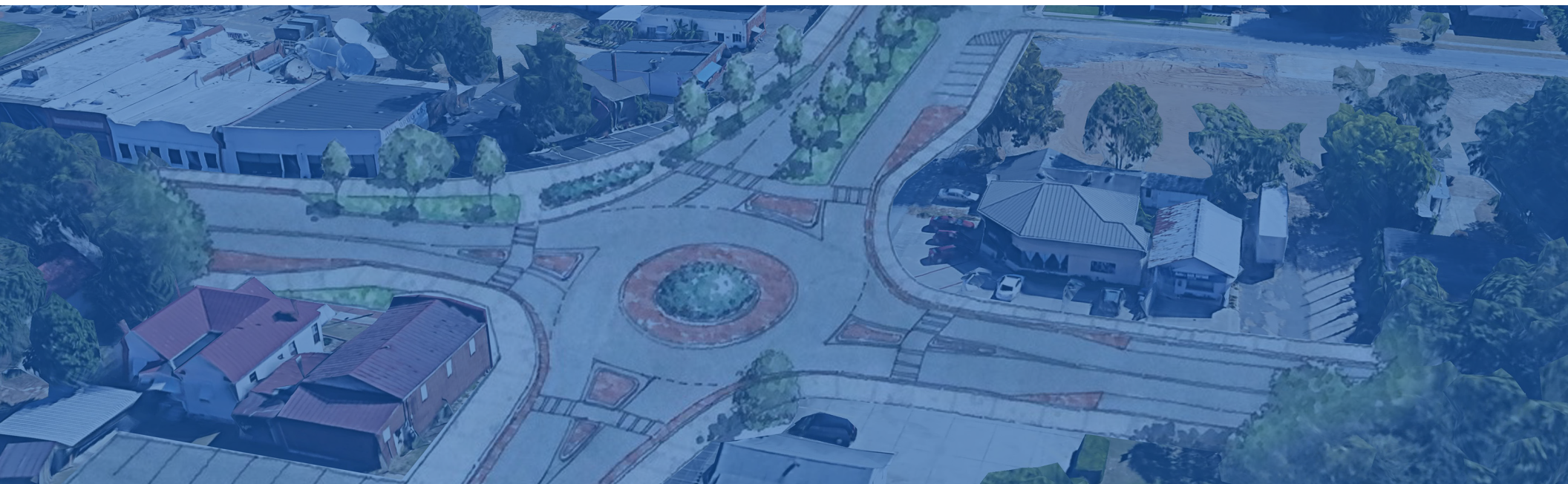
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SAFETY CONSIDERATIONS OF LANDSCAPING CENTRAL AND SPLITTER ISLANDS OF ROUNDABOUTS

The objective of this design aid is to balance aesthetics with the demands of a safe design for the driver. Safety is the primary criteria governing the placement of objects or landscaping on the central islands of roundabouts. Establishing minimum and desirable provisions for driver sight distance and clearance for fixed object hazards is also the subject of this review.

The central island is raised and landscaped to enhance driver recognition of the roundabout upon approach and to limit the ability of the approaching driver to see through to the other side. The inability to see through the roundabout reduces or eliminates headlight glare at night and driver distraction by other vehicles on the circulating roadway. The center or highest portion of the central island ground surface elevation should be raised to a minimum of 3.5 feet and maximum of 6 feet from the circulatory roadway surface. The ground slope in the central island should not exceed 6:1 to enable a recoverable slope for errant vehicles.

The construction of a mounded central island is a key element in improving the visibility of roundabouts for approaching drivers. Nonetheless, recent observations have shown that motorists disregarding the traffic control and entering the central island at excessive speeds may experience their vehicles launching as a result of the raised mound. To address this issue, it is advisable to consider additional treatments such as low-level vegetation lighting, terracing, or the installation of crash cushions within the central island. It should be emphasized that incorporating mounding remains a recommended aspect of roundabout design; by contrast, flush central islands may allow drivers to traverse the roundabout without reducing speed.

Landscape elements are vital to the safe operation of a roundabout and should be in place before the roundabout is opened to traffic. If this is not possible use temporary features, e.g. construction barrels to make the central island more visible.

PRINCIPLES

Besides providing the obvious aesthetic enhancement of a roundabout intersection, the purposes of landscape elements in the roundabout are to:

- + Make the central island conspicuous to drivers as they approach the roundabout
- + Clearly indicate to drivers that they cannot pass straight through the intersection
- + Restrict the ability to view traffic across the roundabout through mounding of the earth and plantings. This will lead to slower entering speeds, which increases safety
- + Require motorists to focus toward on-coming traffic from the left
- + Help break headlight glare, i.e. avoid a see-thru problem
- + Discourage pedestrian traffic through the central island
- + Help blind or low vision pedestrians locate sidewalks and crosswalks
- + Improve and complement the aesthetics of the area.

LANDSCAPE DESIGN CONSIDERATIONS

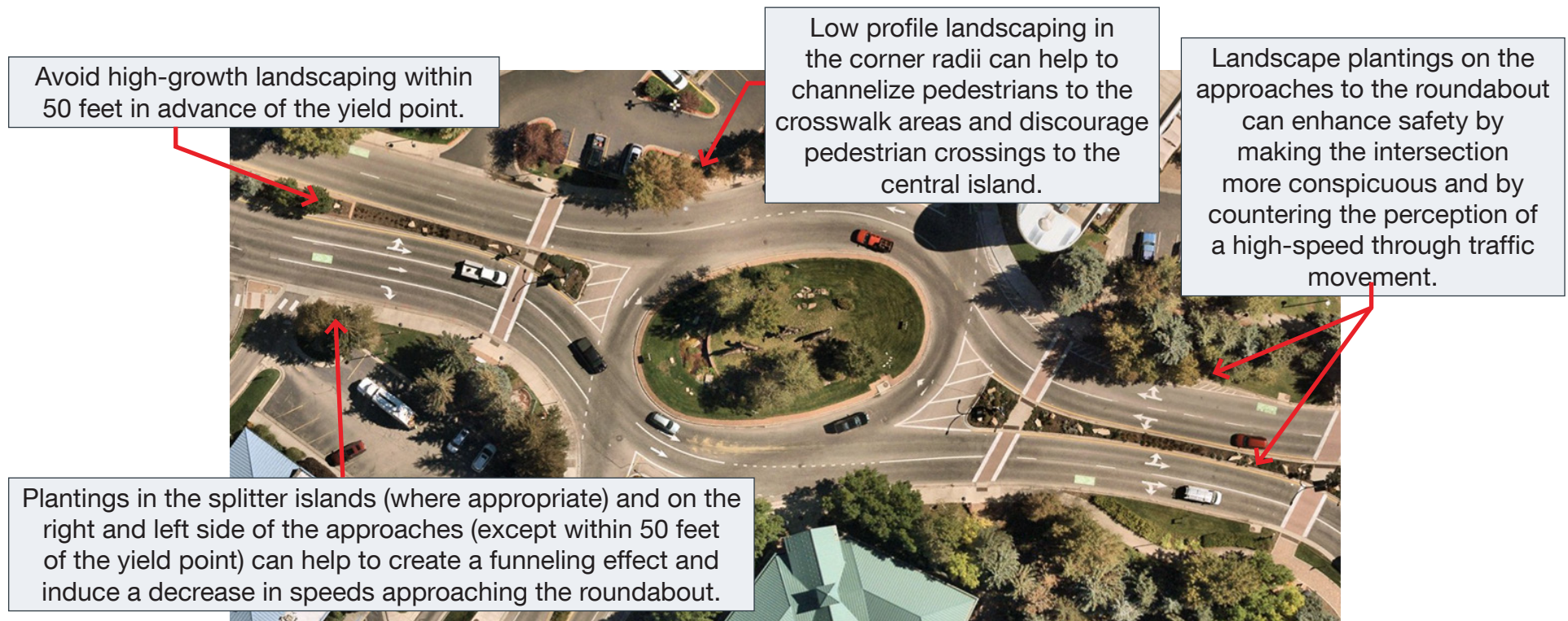
When designing landscaping for a roundabout, either on the central island or around the outside of the circle and splitter islands, it is important to:

- + Minimize driver distraction and provide central island crashworthiness
- + Consider maintenance requirements early in the program stages of development
- + Develop a formal municipal agreement describing the landscaping and maintenance requirements for roundabout elements early in the scoping process and prior to design of the facility
- + Maintain adequate intersection sight distances
- + Avoid obscuring the view to signs
- + Minimize fixed objects such as trees, poles, or guardrail within the central island, or provide suitable offset or crash protection for fixed objects.

Designers should consider avoiding items in the central island that may encourage pedestrians to walk onto the central island for pictures, or other objects that might distract drivers from the driving task. Decorative features that may attract pedestrians within the central island or lead to distracted driving include (not all inclusive):

- + Seating areas
- + Water fountains
- + Combination of these above features
- + Decorative statutes that can be climbed on
- + Street furniture that attracts seating or climbing (decorative and non-decorative)

Low-to-the-ground landscape plantings in the splitter islands and approaches can both benefit public safety and enhance the visual quality of the intersection and the community. In general, unless the splitter islands are wide enough for trees, planters, or light poles and still adhere to roadside design guidelines for clear zone, large infrangible or tall fixed objects should be discouraged on splitter islands.

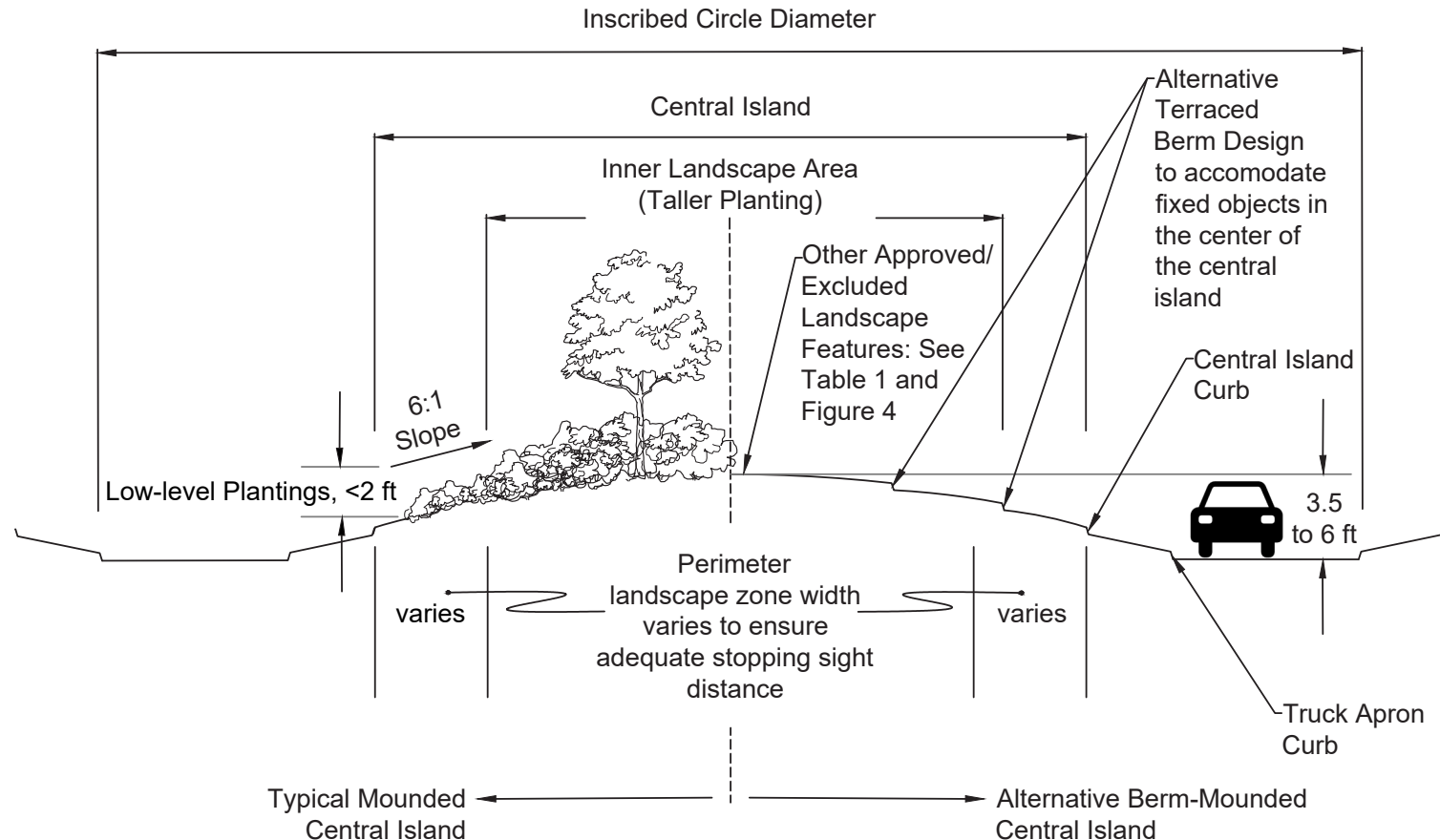


» **FIGURE 1 – LANDSCAPE PLACEMENT AND SCALE AT ROUNDABOUTS**

Designers are encouraged to prioritize decorative elements for the central island that are vegetative or natural in appearance and positioned close to ground level. Crashworthiness is a key element of roundabout central island landscaping design. While central island crashes are rare, they are often the most severe crashes. Optimize the crashworthiness of the central island design while balancing a community's desire to implement aesthetic treatments.

APPROVED PLANT MATERIALS AND SIGHT DISTANCE CONSIDERATIONS

Plant materials approved by the District Landscape Architect or Design Division Landscape Architecture Branch are approved for use on roundabouts owned, operated, and maintained by the Department.

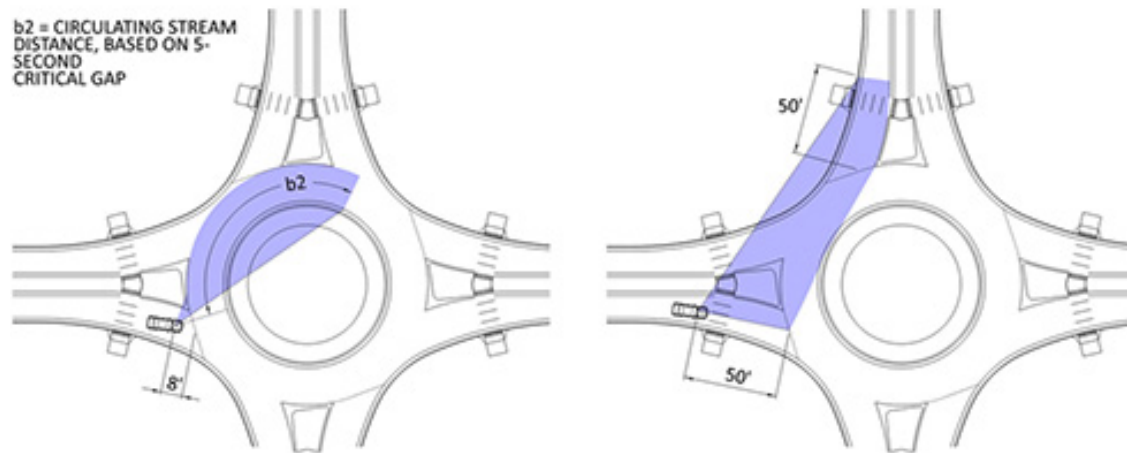


» **FIGURE 2 – CENTRAL ISLAND CROSS-SECTION**

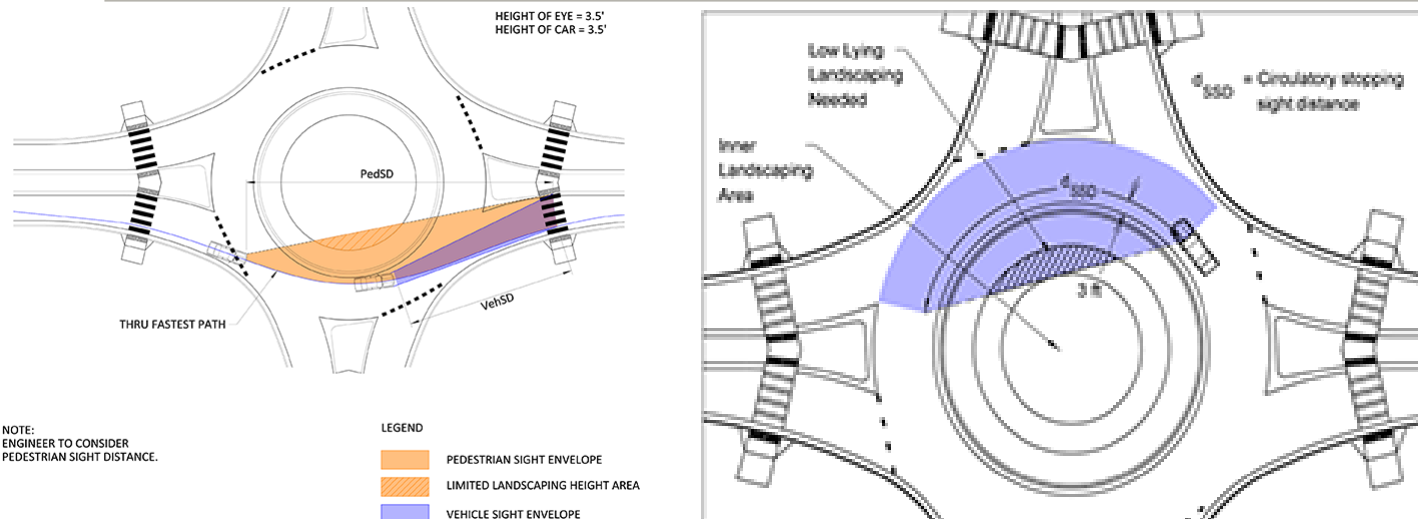
Note: introduce alternate surface treatments, textures and colors of concrete and / or and pavers to clearly differentiate between the central island and the roadway.

APPLICABLE SIGHT DISTANCE CONSIDERATIONS

Per the Texas Department of Transportation's Road Design Manual, Chapter 14, the design speed for intersection sight distance calculations is based on a vehicle through movement fast path speed or a minimum of 50ft behind the yield line on both entries. Circulating sight distance is a function of the circle diameter. National Cooperative Highway Research Program 1043, Chapter 9 provides guidance on the assessment of sight intersection and stopping distances. The Figures 2 and 3 below provide guidance to illustrate the intersection sight restriction considerations for roundabouts.



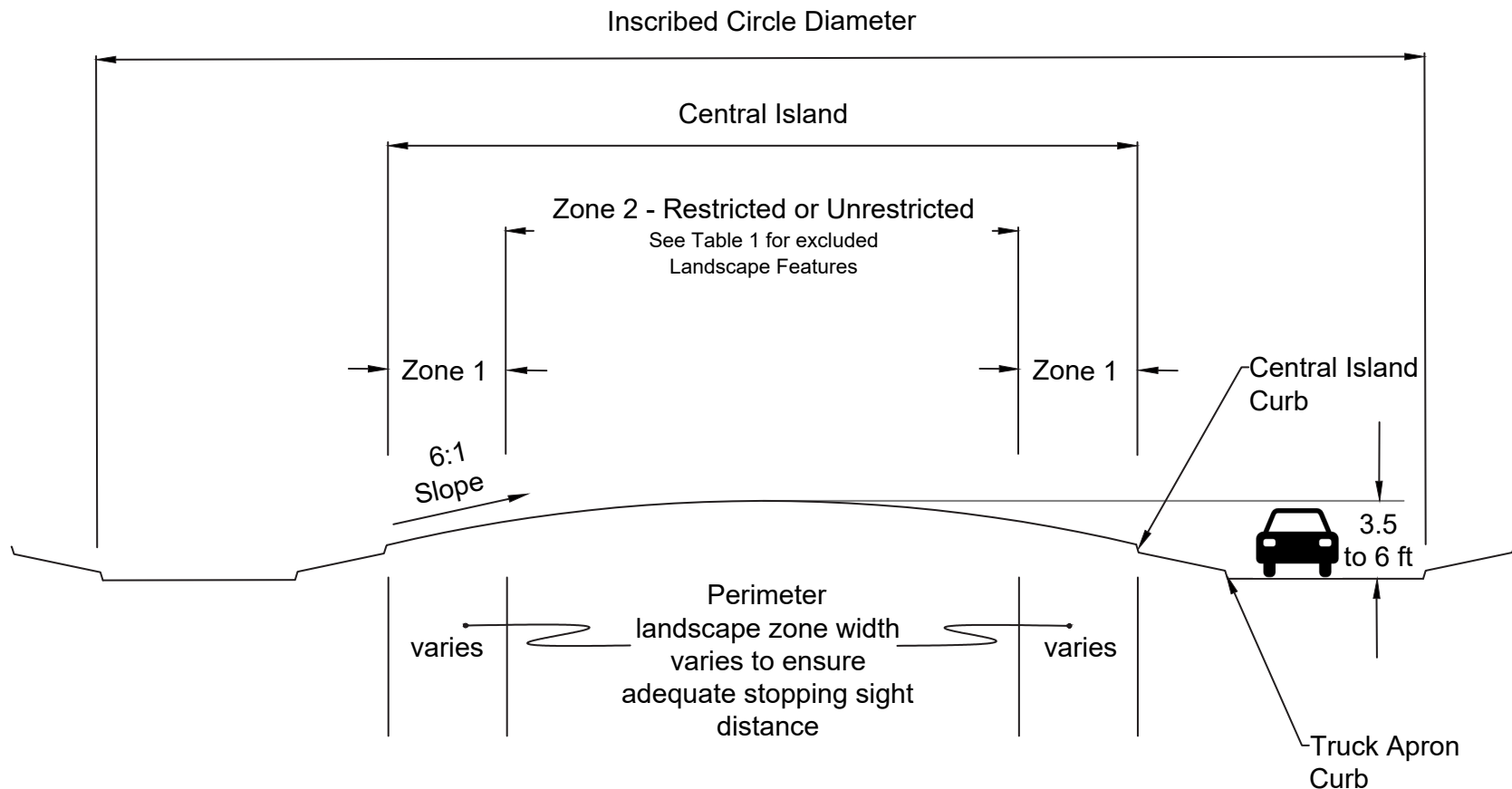
» **FIGURE 3 – INTERSECTION SIGHT DISTANCE (SOURCE: ADAPTED FROM NCHRP 1043)**



» **FIGURE 4 – CIRCULATING AND EXITING STOPPING SIGHT DISTANCE (SOURCE: ADAPTED FROM GDOT)**

SPEED-BASED GUIDELINES FOR CENTRAL ISLAND LANDSCAPE TREATMENTS

To define limits for placement of landscaping and other objects, the surface area of roundabout central islands can be divided into “zones” whereby the size and rigidity of objects placed on the central island can be managed in terms of clear zone setback and driver sight distance. With reference to **Figure 4**, a minimum ring of 6 feet constitutes Zone 1, to provide a clear zone and sight distance adjacent to the circulatory roadway. The allowances for planting and placement of fixed objects in the remaining area of a central island is categorized by either a Zone 2 Restricted or a Zone 2 Unrestricted area, governed by the roundabout approach posted speed. The diameter of the Zone 2 area will vary according to circle size, and the circulating design speed governing sight distance (**Figures 2 and 3**).



» **FIGURE 5 – SAMPLE CENTRAL ISLAND ZONE IDENTIFICATION** (SOURCE; WISDOT/FHWA WITH MODIFICATIONS)

The recommended exclusions for each of the three zones, according to design speed are tabulated as follows:

TABLE 1 OF 1 – ZONE OF INFLUENCE AND PREFERRED LANDSCAPE MATERIAL

Area of Influence	Excluded Materials Features
Zone 1: Traversable Zone	No visual obstructions or fixed objects. The outside 6 feet of the central island should be a low maintenance surface to maintain good visibility to the left upon entry as well as good forward and circulatory visibility on the circulatory roadway.
Zone 2 Restricted: Traversable/ Landscaped >35mph	Exclude the following from acceptable landscape features: — Earth slopes steeper than 6:1 — Grass/plants that grow tall and require regular maintenance — Anything that attracts a pedestrian to cross to the central island to get a closer look, to explore or to sit on, e.g., benches or low walls — Brightly lit objects or reflective features using glass or mirrors — Street light poles (are acceptable, being slender and easily break-away) — Trees >4-inch caliper full grown — Unprotected fixed objects without crash cushions, e.g. poles or statues or signs without breakaway supports
Zone 2 Unrestricted: Non-Traversable/ Landscaped <35mph	Introduce alternate surface treatments, textures and colors of concrete and / or and pavers to clearly differentiate between the central island and the roadway excluding the following: — Masonry or mortar retaining walls — Flagpoles and/or fountains — > 200lb. boulder would snag a car — Other non-yielding fixed objects

ZONE 1: CLEAR ZONE BUFFER (NO VISUAL OR FIXED OBSTRUCTIONS FOR ALL SPEED CONTEXTS)

Visual or fixed objects must be set back at least 6 feet from the outside edge of the central island, beyond the truck apron, to ensure roadside safety, accommodate snow storage, and maintain clear sight distance. Additionally, because roundabout circle sizes vary in diameter, intersection sight distance requirements must be checked to determine if additional clear width is required. Designers are advised to avoid the use of surfaces that look like concrete sidewalk for a central island landscape buffer or truck apron.

ZONE 2 RESTRICTED ENCROACHMENT ZONE (HIGH SPEED)

For roundabout locations where the posted speed of ANY approaching leg is greater than 35 mph, Zone 2 Restricted consists of the remainder of the central island not designated as Zone 1. Although plantings and small trees (< 4-inch caliper) are flexible or easily breakable and may be placed for aesthetic value, fixed objects, (large trees, walls or large rocks) are not recommended within the entire central island. This is because the trajectory of an errant vehicle at higher speeds is not deterred by curb and gutter. Encroachment distances onto the central island of a roundabout are presumed to include the diameter of the entire island.

Ramp Terminal Approach Speeds

Diamond interchange exit ramps departing from high-speed freeways and expressways will be considered as having a posted ramp termini approach speed exceeding 35 mph. On a case-by-case basis, designers may consider slower ramp termini approach speeds of 35 mph or less for exit ramps with sharper ramp curvature (e.g., loop ramp) that reduce operational speeds prior to the ramp termini.

ZONE 2 UNRESTRICTED: INTERIOR ZONE (LOW-SPEED CONTEXT)

For those locations where the posted speeds of ALL approaching legs are less than 35 mph, Zone 2 Unrestricted consists of the remainder of the central island not designated as Zone 1. Visual obstructions and fixed objects may be placed within Zone 2 Unrestricted. Fixed objects are recommended to adhere to the guidance suggested in Table 1.

At speeds lower than 35 mph, a curb is expected to deter most vehicles; thus, encroachment distances into the central island are reduced and fixed objects can be placed in the non-traversable zone.

Additionally, fountains are not permitted within Texas Department of Transportation's right-of-way, regardless of funding sources or maintenance agreements. Designers need to be mindful when considering non-hazardous aesthetic treatments. Consider an object's potential adverse impact on an errant vehicle, including abrupt deceleration, underside fuel tank or oil pan tears, launching and rollovers.

The approach highway speed is an indicator of the probability of an errant vehicle entering the central island. For additional guidance on using roundabout geometry and other treatments to reduce approach speeds, refer to [TxDOT's High-Speed Approaches to Roundabouts Design Aid](#).

In the lower speed, 35mph and under category, walls are not discouraged, subject to design that is forgiving or crash-worthy as outlined below. The following guidelines apply to the low-speed category (<35mph) of central island landscape design:

- 1.** Walls or natural boulders within the central island should be low and breakaway.
- 2.** Taller walls may be constructed using nonreinforced Concrete Masonry Unit with decorative facing.
- 3.** If light-weight walls are desired for aesthetic reasons, then a 20" height maximum is recommended to keep debris at a level and to avoid flying objects.
- 4.** It is recommended to not fill material behind light-weight brick/block wall for deeper than 2 feet. Starting at ground level, slope the fill behind a wall at 6:1 or flatter. Benching or terracing the slope is recommended per Figure 2 (Alternative Berm-Mounded Central Island)
- 5.** Keep larger diameter decorative boulders (recommended max. 24") toward the top of the central island and terrace or berm the approach slopes to mitigate vehicle encroachments.

SUMMARY

Roundabout aesthetics significantly influence safety. They provide opportunity to serve as a gateway feature that defines corridor character while guiding driver behavior. By carefully balancing the placement of landscape elements, fixed objects, and aesthetic treatments with operational and safety requirements, designers can create roundabouts that are both visually appealing and functionally effective. The recommendations outlined in this Design Aid—such as maintaining clear sight distances, prioritizing crashworthiness, and selecting appropriate materials based on approach speeds—offer practical strategies for achieving these goals. Ultimately, successful roundabout landscaping requires thoughtful coordination among designers, agencies, and communities to ensure that each installation enhances safety, supports local identity, and minimizes maintenance needs.

For additional support on these project types, coordinate with TxDOT's Landscape Architecture Branch Services group and the Innovative Intersections team. The Landscape Architecture Branch Services group can assist with developing ideas and identifying appropriate support for project needs; design support requests may be submitted to LAB_DESIGN_REQUEST@txdot.gov. The Innovative Intersections team is available to provide guidance on innovative intersection concepts and can be contacted at innovative.intersections@txdot.gov.



REFERENCES

- 1** NCHRP Research Report 1043: Guide for Roundabouts. National Cooperative Highway Research Program, Transportation Research Board, National Academies of Sciences, Engineering, and Medicine, Washington DC., 2023.
- 2** Roundabout Design Guide. Georgia Department of Transportation. Revision 2.3, 2023.
- 3** Facilities Development Manual. Wisconsin Department of Transportation, 2022.
- 4** TxDOT Landscape and Aesthetics Design Manual, 2024.