Kane County
Division of Transportation

Roundabout Selection and Design Guide

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Section 1 – Executive Summary

Historical Overview

Modern roundabouts are in use throughout the world with thousands having been installed over the last 40 years. They are now gaining increasing popularity within the United States. Even in locations where the public was reluctant to accept them at first, after installation most have been enthusiastically accepted due to their increased safety, traffic calming benefits and aesthetic appeal.

Within Kane County, roundabouts could be advantageous over other traffic control at certain locations such as:

Safety
- Intersections with historical safety problems.
- Roads with a historical problem of excessive speeds.

Operation
- Intersections with relatively balanced traffic volumes.
- Intersections with a high percentage of turning movements.
- Intersections with high traffic volumes at peak hours but relatively low traffic volumes during non-peak hours.
- Intersections where widening one or more approach may be difficult or cost-prohibitive.
- Intersections where traffic growth is expected to be high and future traffic patterns are uncertain.

Traffic Control
- Existing two-way stop-controlled intersections with high side-street delays and do not warrant a traffic signal.

Aesthetics
- Intersections where a community enhancement may be desirable
- Locations with a need to provide a transition between land use environments (such as between residential and commercial uses).

As a result, Kane County is pursuing the modern roundabout concept for County highway projects when applicable. The Transportation Committee reached a consensus at their April 2005 meeting to proceed with development of a policy and these guidelines for roundabouts to be constructed within the County.

Kane County Roundabout Implementation Philosophy

Below are some of the guiding philosophies regarding the initial utilization of roundabouts in the County. Figure 1-1 can be used as a general guide to where these initial roundabouts will likely be located.

This guide is intended to be a dynamic document and will be adapted over time to expand the types and locations of roundabouts to be utilized as drivers grow more familiar with their use.

Introductory Design Complexity Policy

The County has determined that in order to establish an opportunity for drivers in Kane County to gain experience with the Roundabout concept, simpler roundabouts shall be introduced before introducing more complex

When designing a roundabout that is anticipated to be expanded in the future (e.g. single lane to multi-lane), the layout of the ultimate configuration should first be developed. Generally, the interim design should maintain the ultimate outside diameter and a larger central island or truck apron should be utilized. The right-of-way set aside for the roundabout should provide at least 10 additional feet around the outside of the inscribed circle diameter (20 feet total) to allow for sidewalks and buffer space. Until concept layouts are developed for the roundabout adequate to evaluate the actual right-of-way needs for the roundabout, it may be desirable to reserve even more right-of-way.

Transitions in Roadway Environments

Roundabouts may be effectively utilized at transitions in the roadway and/or surrounding roadway environment such as:

- Changes in land use (rural/urban or residential/commercial transitions),
- Gateway/entry point to a campus, neighborhood or commercial development, or
- Speed limit differential (i.e. 55 mph to 30 mph).

Facility Longevity and Right-of-Way Preservation

With the high current and projected future traffic volumes anticipated in the County, it is the County's desire to have roundabouts proposed for County and arterial roads to be designed to accommodate design year traffic as well as beyond (as projected in the County's latest Long Range Transportation Plan). Generally roundabouts on the County system shall be designed and constructed initially as multi-lane roundabouts with single lane capacity. The interim design should maintain the ultimate outside diameter and a larger central island or truck apron should be utilized. Also, the right-of-way shall be preserved to accommodate future roadway cross sections for the approaches as recommended in the County's latest Long Range Plan.

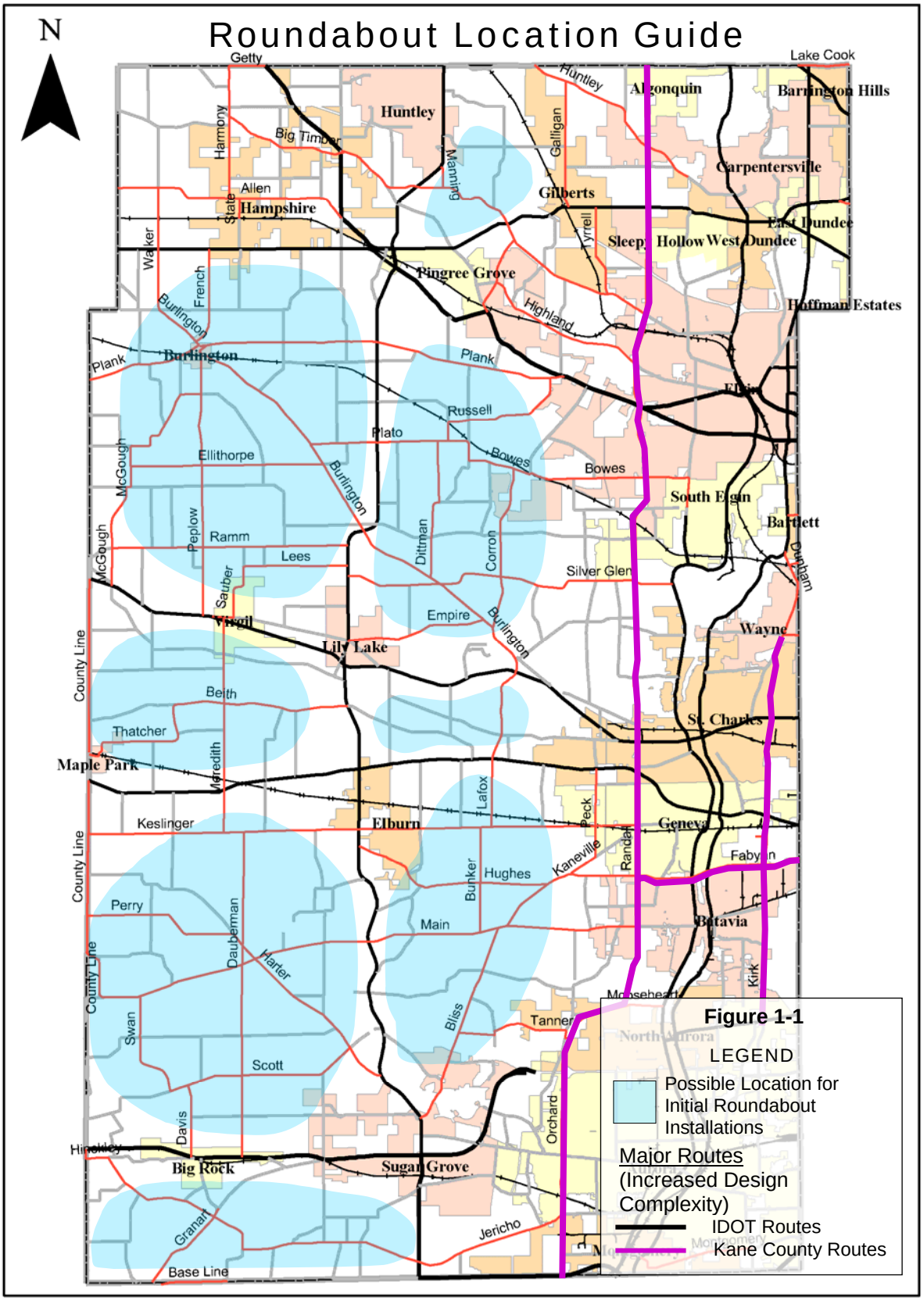
On township or local roads where it can be projected that multi lane operation will never be needed (generally on streets internal to a development that isn't expected to experience additional traffic growth after completion of the development), smaller single lane roundabouts may be utilized .

Access Control

Certain corridors within the County will be constructed as limited access corridors. Construction of roundabouts at select locations will allow for improved left turn ingress/egress for minor access locations along the route without the need for installation of a traffic signal. Roundabouts will also allow for U-turns to allow access at mid-block driveways and minor access locations without requiring additional median openings.

Traffic Calming

At select intersections or along select corridors, the roundabouts may also be utilized to address a need for traffic calming. These roundabouts are not necessarily required for intersection control.


Roundabout Location Guide
N
Getty
Lake Cook
Huntley
Algonquin
Barrington Hills
Harmony
Big Timber
Manning
Galligan
Carpentersville
Allen
Hampshire
State
Gilberts
Tyrrell
East Dundee
Sleepy Hollow
West Dundee
Walker
Pingree Grove
French
Burlington
Highland
Hoffman Estates
Plank
Burlington
Plank
Russell
Plato
Ellithorpe
Bowes
Bowes
McGough
Burlington
South Elgin
Bartlett
Peplow
Ramm
Dittman
Corron
Lees
Silver Glen
Sauber
Empire
Burlington
Virgil
Wayne
Lily Lake
County Line
Beith
Thatcher
St. Charles
Maple Park
Meredith
Lafox
Keslinger
Elburn
Peck
Geneva
Randall
Kaneville
Fabyan
Bunker
Hughes
Perry
Batavia
Main
Dauberman
Harter
Kirk
Swan
Bliss
Tanner
Scott
Orchard
Davis
Hinckley
Big Rock
Sugar Grove
Granart
Jericho
Base Line
Figure 1-1
LEGEND
Possible Location for Initial Roundabout Installations
Major Routes
(Increased Design Complexity)
IDOT Routes
Kane County Routes

Section 2 – Intersection Control Selection

Introduction

This guide is intended as supplemental information to existing guides, including the Federal Highway Administration's *Roundabouts: An Informational Guide* (FHWA Guide) and is not intended as a stand alone guide to the selection and design of roundabouts. Instead, it is intended to give a general overview of considerations that should be taken into account during the roundabout selection process and sets specific standards for some elements of selection and design for Kane County. **This Guide is directed primarily toward roundabouts which will be constructed on County and Township Roadways within the County. Roundabouts on Illinois Department of Transportation (IDOT) roads would need to first be approved by IDOT and follow IDOT's approval process and design requirements in addition to these guidelines.**

Design professionals considering evaluating or designing roundabouts in Kane County should be familiar with the FHWA Guide and have training in roundabout design. This Guide will set certain minimum requirements for those who are designing or evaluating roundabouts in the County based on the level of complexity of the roundabout.

Two primary resources should be considered in conjunction with this Guide, the FHWA Guide and the Kansas Roundabout Guide, prepared as a more detailed supplement to the FHWA Guide. Much of the Kane County Guide and figures are excerpted or adapted from these guides and should be referenced during the design process. Web links to these guides are provided in Appendix A. In addition, there are many other guides and resources available to assist with roundabout selection and design. The web links for these resources are also provided in Appendix A at the end of this document.

Roundabouts are a viable option for intersection control at many intersections. They should be added to the toolbox, along with common options such as side street stop control, all-way stop control and traffic signal control, for consideration when evaluating the design of a new intersection or reconstruction of an existing one. However, like these other options, roundabouts are not appropriate at every location.

As noted in Section 1, this Guide is directed toward County and Township roadways. A listing of all County-maintained roadways is provided in the Kane County Access Permit and Access Control Regulations starting on page 8-22. A listing of the functional classification for roadways within the County is also included in the regulations starting on page 8-27 and is included in Appendix B. Appendix B also includes several maps including the 2030 Conceptual Land Use Strategy Map (Figure 8 of the Land Resource Management Plan) and the Kane County Bicycle Route Map. Links to the Kane County web site for the regulations and maps are also provided in Appendix B.

Benefits of Roundabouts

Two of the leading benefits of roundabouts are improved safety and reduced delay. When appropriately located and designed, installation of roundabouts have been found to result in

substantially reduced accident rates, accident severity and vehicle delay compared to other forms of intersection control. A summary of some of the potential benefits of roundabouts are provided below:

- ***Safety –*** A study conducted by the Insurance Institute for Highway Safety (IIHS) found that "The safety benefits…are considerable. Previous research indicates that roundabouts reduce crashes by 37 percent overall – injury crashes by 75 percent – compared with intersections". For more information, see Section 5 of the FHWA Guide, Section 5 of the Kansas Guide and the IIHS web site (see Appendix A for links)
- ***Operation –*** For intersections with traffic volumes at the low end of the range where a traffic signal might otherwise be installed, vehicle delay at a roundabout has been found to be approximately 75% lower than a traffic signal. Delay at roundabouts is almost always lower than at traffic signals or all-way stop intersections (note that overall delay at a roundabout is typically higher than two-way stop control at an intersection that can operate effectively with stop control on the minor street). For more information, see Section 3.5 of the FHWA Guide.
- ***Space Requirements –*** While roundabouts may have a larger footprint on the corners of an intersection, often the overall space requirements for a roundabout are less than a traditional intersection. This is due to the lack of the need for left-turn and/or right-turn lanes approaching the intersection. Many times the need to widen a roadway from two lanes to four is driven by capacity constraints at major intersections. In certain cases the ability to place a multi-lane roundabout on a two-lane roadway by flaring the entries and exits could allow the entire corridor to operate with fewer lanes.
- ***Operation and Maintenance Costs –*** Roundabouts do not incur the traffic signal equipment maintenance and electricity costs that a signalized intersection would. In addition, roundabouts can often require a lower overall area of pavement, as noted above, also reducing pavement maintenance costs.
- ***Pedestrian Access –*** The design of roundabouts, with slower speeds and splitter islands, generally provides a safer and more attractive pedestrian crossing opportunity. The roundabouts force traffic to slow down, and as pedestrians cross one direction of traffic at a time, they can focus on traffic approaching from only that direction. Roundabouts have been successfully constructed adjacent to schools. Note that there is some concern regarding navigation of roundabouts by blind pedestrians, particularly multi-lane roundabouts. Research is currently underway to identify how to best address these concerns.
- ***Aesthetic Benefits –*** Roundabouts often provide a landscaping opportunity that can serve as a gateway to an area
- ***Traffic Calming –*** Speed reduction is a key component of a roundabout, and thus can have a traffic calming effect in the vicinity of the roundabout.
- ***Access Management –*** By providing easy opportunities for U-turns, roundabouts can reduce the need for providing median openings for mid-block left-turns.

Where Roundabouts Work Best

Expanding on the Kane County Implementation Philosophies described in Section 1, the following provides some expanded principals about potential locations for roundabouts.

Sites Where Roundabouts Are Often Advantageous

Roundabouts are often advantageous over other traffic control at the following locations and conditions:

- ***Safety***
  - Intersections with historical safety problems.
  - Roads with a historical problem of excessive speeds.
- ***Operation***
  - Intersections with relatively balanced traffic volumes.
  - Intersections with a high percentage of turning movements.
  - Intersections with high traffic volumes at peak hours but relatively low traffic volumes during non-peak hours.
  - Intersections where widening one or more approach may be difficult or cost-prohibitive, such as at bridge terminals.
  - Intersections where traffic growth is expected to be high and future traffic patterns are uncertain.
  - Locations where the speed environment of the road changes (for instance, at the fringe of an urban environment).

- ***Traffic Control***
  - Existing two-way stop-controlled intersections with high side-street delays (particularly those that do not meet signal warrants).
  - Intersections that must accommodate U-turns.
  - Intersections or corridors where traffic calming is a desired outcome of the project.
- ***Aesthetics***
  - Intersections at a gateway or entry point to a campus, neighborhood, commercial development, or urban area.
  - Intersections where a community enhancement may be desirable
  - Locations with a need to provide a transition between land use environments (such as between residential and commercial uses).

Sites at Which Caution Should Be Exercised With Roundabouts

There are a number of locations and site conditions that may present complications or difficulties for installing roundabouts. Some of these locations can also be difficult or problematic for other intersection alternatives as well. Therefore, these site conditions should not necessarily preclude a roundabout from consideration. However, extra caution should be exercised when considering roundabouts at these locations:

- Intersections in close proximity to a signalized intersection where queues may spill back into the roundabout.
- Intersections located within a coordinated arterial signal system.
- Intersections with a heavy flow of through traffic on the major street opposed by relatively light traffic on the minor street.
- Intersections with physical or geometric complications.
- Locations with steep grades and unfavorable topography that may limit visibility and complicate construction.
- Intersections with heavy bicycle volumes.
- Intersections with heavy pedestrian volumes.

Roundabout Design Do's and Don'ts

The following is some general advice for planners and designers considering roundabouts. This list has been prepared in the form of "do's" and "don'ts" with respect to evaluating and designing roundabouts. These "do's" and "don'ts" are based on designers' real-world experience and may not reflect every situation a planner or designer may encounter. More detailed information regarding each of these topics can be found in the Kansas Guide as well as the FHWA Roundabout Guide.

Do:

- Be sure you know the problem (operations and safety) before you create the solution.
- Be aware of any constraints (including right-of-way, utilities, structures, environmental, etc.) that may impact the space available for a roundabout. Roundabouts often require more property at the corners of existing intersections; however, they can result in less widening of approach roadways than signalized intersections.
- Understand the types of vehicles that will be using the roundabout and select the design vehicle based upon the intersection location, surrounding land uses, roadway facility type, and other considerations. The choice of design vehicle is often the biggest determinant of a roundabout's inscribed diameter and entry/exit width dimensions, particularly for single-lane roundabouts.
- Provide accommodations for the largest motorized vehicle likely to use the intersection. Roundabouts not properly designed for trucks can receive premature wear with maintenance concerns due to trucks driving over the top of curbs and tracking through the central island.
- Consider whether Kane County drivers are familiar with roundabouts. It may be helpful to start small when introducing roundabouts in a new geographic area. A single-lane roundabout will be more easily understood than multilane roundabouts and will help the driving population become more comfortable with navigating a roundabout.
- Consider the roundabout location and user population. Is the intersection in a rural or urban environment? Will the roundabout have frequent pedestrian and/or bicycle activity? The roundabout design should provide reasonable consideration to both auto and non-auto users.

- Check roundabout designs to ensure that the proposed geometry provides appropriate fastest path speeds. It is important that speeds are checked in preliminary and final designs alike to ensure that adequate operating speeds are maintained throughout the design process and into the field.
- Check multilane roundabout designs to ensure that appropriate natural vehicle paths can be achieved. Vehicle paths through the roundabout should not "overlap" each other. Designs with overlapping natural paths may experience a high number of vehicle collisions.
- Start the planning process by creating sketches in pencil over an aerial photograph or scaled drawing. This allows the designer to quickly create several different design concepts, capable of being altered significantly with little effort.

Don't:

- Don't approach intersection improvement projects with a preconceived solution. In other words, perform "intersection design studies," versus "roundabout design studies." This allows the designer to show the public that other alternatives have been examined, and the best solution is the one being proposed.
- Don't assume a roundabout design that works at one intersection location will work at another. Roundabouts are based on sound design PRINCIPLES, not standards—one size does not fit all.
- Don't begin detailed design until other design options or intersection configurations have been explored. A sketch layout will be sufficient at the beginning of the process to select an intersection configuration.
- Don't underestimate the time needed for public awareness. Roundabouts introduced into new areas may require additional effort to inform the general public about roundabouts and the proper way to use them. Public education efforts such as public awareness announcements, pamphlets, and other materials for public distribution may assist the public in becoming more comfortable in using roundabouts.
- Don't take risks with roundabouts in locations where you would not normally take risks for more traditional (signals, stop control, etc.) roadway solutions. Intersections having issues that make it difficult for other types of traffic control will also be difficult with a roundabout.
- Don't use a roundabout that is too small for the operating conditions in an attempt to stay within the existing right of way.
- Don't over-design the roundabout to accommodate a vehicle size that is unlikely to traverse the intersection (i.e. don't design to accommodate a WB-65 in a residential neighborhood if the largest likely motorized vehicle is a delivery truck or a bus). Designing a roundabout with geometry larger than necessary for its intended use can create operational and safety issues due to a lack of speed control, in addition to needing more right-of-way and costing more to construct.

Section 3 – Design Process

Roundabouts may be viable alternatives at almost any location where all-way stop or traffic signal control may be utilized. At locations where a roundabout is being considered, the roundabout and alternative intersection control measures should be evaluated and compared. This evaluation should be included in an intersection design report prepared by a qualified designer.

The level of detail of this report may vary greatly depending on the complexities of the location. For locations where a roundabout is clearly not viable, it may be as simple as stating the reasoning behind this conclusion. For increasing levels of complexity, additional detail may be necessitated.

Levels of Design and Designer Qualifications

For roundabouts in Kane County, three levels of design complexity have been established. Along with each of these, varying levels of evaluation and designer experience are required

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Level 1 – Low Volume Roundabouts

These roundabouts have the following components. They are often found within residential or smaller commercial developments at intersections of two local or collector streets. These streets will most often be residential township (unincorporated) roadways and highways.

- Single lane approaches and exits on all legs and single lane circulating roadway
- Volume/Capacity (v/c) ratio on all approaches of 0.50 or less for design year
- Inscribed Circle Diameter (ICD) of at least 120 feet (compact roundabouts present additional design complexities)
- No by-pass lanes
- No grades greater than four percent through the roundabout
- Four legs or less with minimum angle between any two legs of 75 degrees
- No "special conditions" as identified by the County that would require a higher level of design or review
- No high-speed (greater than 40 mph) approaches

The principal designer of these roundabouts shall have the following minimum qualifications. If the designer does not have these qualifications, then the designer shall utilize a peer reviewer to review the analysis and design submittals prior to submittal to the County. Qualifications shall be provided to the County upon request.

- The designer shall have direct design responsibility of at least five modern roundabouts in the past ten years, with at least three being constructed and open to traffic, and with at least three having been peer reviewed by a person qualifying as a Level 2 or 3 designer; or
- The peer reviewer shall qualify as a Level 2 or 3 designer.

Level 2 – Basic Roundabouts

These roundabouts have the following components. They are typically at an intersection of an arterial street with a low to moderate volume cross street. The arterial streets will most often be County highways that intersect with a local township roadway or another County highway.

NOTE: Only some Level 2 Roundabouts are currently permitted under this policy. See the *Design Complexity Policy* on the following page.

- No more than two lanes on any entry approach or departure leg
- Volume/Capacity ratio on all approaches of 0.75 or less for design year
- Roundabouts that qualify for Level 1 or 2 and have an "interim" design (e.g. single lane roundabout that is expandable to multi lanes)
- No angles between legs of the intersection of less than 60 degrees
- No more than four legs to the roundabout except a fifth leg might be allowed under special circumstances as determined by the County where it would provide substantial benefit to the major street network operation
- No "special conditions" as identified by the County that would require a higher level of design or review

The principal designer of these roundabouts shall have the following minimum qualifications. If the designer does not have these qualifications, then the designer shall utilize a peer reviewer to review the analysis and design submittals prior to submittal to the County. Qualifications shall be provided to the County upon request.

- The designer shall have direct design responsibility of at least five Level 2 roundabouts in the past ten years, with at least three being constructed and open to traffic, and with at least three having been peer reviewed by a person qualifying as a Level 3 designer; or
- The peer reviewer shall qualify as a Level 2 or 3 designer.
- The designer or peer reviewer shall have experience with the design of any special conditions at the roundabout (e.g. high speeds, unusual geometrics, etc.).

Level 3 – Complex Roundabouts

These are typically multi lane, high volume roundabouts that do not qualify as Level 1 or Level 2 or have some special condition that requires a higher level or experience.

NOTE: Level 3 Roundabouts are NOT currently permitted under this policy. See the *Design Complexity Policy* on the following page.

The principal designer of these roundabouts shall have the following minimum qualifications. If the designer does not have these qualifications, then the designer shall utilize a peer reviewer to review the analysis and design submittals prior to submittal to the County. Qualifications shall be provided to the County upon request.

- The designer or peer reviewer shall have direct design responsibility of at least ten Level 3 roundabouts in the past ten years with at least five being open to traffic; and
- The same individual shall have demonstrated experience, including constructed roundabouts open to traffic and operating under conditions similar to or applicable to those for the proposed roundabout (e.g. high v/c conditions, three or more entry lanes, similar special conditions).

Introductory Design Complexity Policy

NOTE: The County has determined that in order to establish an opportunity for drivers in Kane County to gain experience with simpler roundabouts before introducing more complex conditions, the first three Level 1 roundabouts and the first three Level 2 roundabouts constructed in the County that require County review or approval shall meet the following conditions. No Level 3 roundabouts shall be approved during this time.

- **Projected construction year volume/capacity ratio of 0.60 on all approaches**
- **No special or complex conditions as identified by the County**
- **Level 2 roundabouts shall be limited to single lane operation at initial construction (these roundabouts may be designed to accommodate future expansion to multilane operation, if it is determined that the single lane roundabout will operate adequately for the first five years of operation).**

Design Stages

For projects involving roundabouts to be reviewed or approved by the County, the following submittals will be required. The information to be submitted should be reviewed by the peer reviewer, as described above, prior to submittal. If a peer reviewer is utilized, then a memorandum should be provided by the reviewer summarizing review comments and a letter from the designer summarizing how these comments were addressed should be provided to the County along with the submittals.

Concept Design

Early in the design, while roadway geometrics and intersection control are still flexible, a design memorandum and intersection sketch shall be provided for each intersection where a roundabout is being considered, consisting of the following. Note that while these procedures focus on roundabout evaluation, the memorandum should also include evaluation and discussion of other forms of intersection control, as appropriate. This should occur during the Land Development Concept Phase and Subdivision Approval process. A Design Review Checklist for the Concept Design submittal is included in Section 6.

Table 3-1
Concept Design Components

Item	Description
Designer Information	Identification of the names and companies of the primary designer and peer reviewer (if the County is not familiar with their qualifications, additional information may be requested)
Traffic Volumes	Construction year and design year traffic volume projections, including A.M. and P.M. peak hour volumes (and other design periods, if appropriate). Existing peak hour turning movement counts should have been collected within the last year. Twenty-four hour approach counts should also be collected if traffic patterns are unusual or traffic signal warrants are also being analyzed.
Capacity Analysis	Capacity analysis results for construction and design year – can be a "planning level" analysis at this stage. If high v/c ratios are anticipated, more detailed analysis may be required.
Design Vehicle	Identification of design vehicles (may vary by path)
Approach Angles	Identify angle between each approach
Adjacent Intersections	Note proximity to adjacent driveways, intersections and traffic signals
Concept Sketch	A sketch of the proposed roundabout showing the following (the sketch can be approximate and hand drawn, but should be on a to-scale base map and accurate enough to evaluate the general feasibility of the concept)
Base Map	Existing major topographic features (roadways, parking lots, drives, buildings, significant utility poles, etc.) – could be topo survey or aerial photo
Adjacent Development	Any adjacent planned development projects (including building locations, parking areas, driveway/street locations, etc.). This should be considered for all quadrants of the intersection (e.g. if the roundabout is associated with a development project and there is undeveloped property on other quadrants of the intersection, at a minimum reasonable access locations to those other properties should be considered). For residential projects, if there are lots immediately adjacent to the roundabout, approximate driveway locations should be indicated.
Right-of-Way	Approximate existing right-of-way and anticipated additional right-or-way required
Roundabout Dimensions	Roundabout diameter, central island diameter, truck apron width, circulatory roadway width
Splitter Islands	Approximate splitter island layout
Sidewalks	General sidewalk and crosswalk locations
Turning Templates	Turning template paths for design vehicle for a typical left-turn, right-turn and through movement
Construction Phasing	If roundabout to be built under traffic, a description or sketch of the proposed construction phasing
Future Expansion	If the design is anticipated to have an interim layout (e.g. initial construction as single lane with expansion to multi lane), information on both the interim and ultimate layout should be provided (including an overlay of the two scenarios on top of each other) and the proposed transition year should be identified.

Preliminary Design

In conjunction with the submittal of the preliminary design plans for the project, the following information should be included for each roundabout (also see Design Review Checklist in Section 6):

Table 3-2
Preliminary Design Components

Item	Description
Capacity Analysis	Capacity analysis results for construction and design year – including printouts showing input and output data for each scenario analyzed
Baselines	Baselines for each approach and angles between the approaches, baselines around inscribed circle and around edge of pavement at truck apron
Adjacent Intersections	Proximity to adjacent driveways, intersections and traffic signals
Base Map	Topographic Survey, including utilities
Right-of-Way	Existing and proposed right-of-way and easements
Roundabout Dimensions	Roundabout diameter, central island diameter, truck apron width, circulatory roadway width, entry and exit radii, approach widths, entry widths
Splitter Islands	Splitter island layouts
Bike/Ped. Accommodations	Sidewalk and crosswalk locations, bicycle accommodations
Fastest Paths	Fastest path drawings and speeds for each movement
Turning Templates	Turning template paths for design vehicles for each movement
Typical Sections	Typical section through roundabout and splitter island showing curb types and dimensions, apron details, pavement type and thickness, typical cross slopes, etc.
Vertical Profiles	Vertical profile of each baseline
Sight Distances	Sight distances (should also include sketch of where any anticipated buildings, large landscaping, or other visual obstructions may be in vicinity of roundabout)
Pavement Markings	General pavement marking layout (doesn't have to be detailed pavement marking plans, but sufficient information to indicate lane layout and usage)
Construction Phasing	If roundabout to be built under traffic, a construction phasing plan (general sequence of construction, not full traffic control plans)
Future Expansion	If the design is anticipated to have an interim layout (e.g. initial construction as single lane with expansion to multi lane), information on both the interim and ultimate layout should be provided (including an overlay of the two scenarios on top of each other).
Street Lighting	Location of street lighting poles and lighting calculations

Final Design

The following information should be included with the final design plan submittal. A Design Review Checklist of final plan elements is provided in Section 6.

Table 3-2
Final Design Components

Item	Description
Typical Sections	Typical section(s) for the following: Approach roadways Splitter islands Roundabout Temporary pavement (if required during construction)
Overview Sheet	Roundabout Overview Sheet which shows overall layout, baselines and control information
Centerline Profiles	Centerline profile for each approach
Roundabout Profiles	Baseline profile around inscribed circle diameter (ICD) and around truck apron
Intersection Details	Intersection detail including all curb return radii and PC, PT, etc. stations, offsets, and elevations
Curb Return Profiles	Curb return profiles for all curb lines on approaches and through roundabout
Alignments	Alignment descriptions
Jointing Plan	Joint Layout Plan for concrete areas
Drainage Plan	Drainage Plan
Landscape Plan	Landscape Plan - illustrate height restricted areas (from sight distance evaluation)
Lighting Plan	Lighting Plan
Signing Plan	Signing Plan
Sign Details	Special Sign Detail Sheets
Pavement Marking Plan	Pavement Marking Plan
Construction Phasing	Construction Phasing Plan
Traffic Control Plan	Traffic Control/Detour Plan

Section 4 – Design Elements

The following elements should be considered in the selection, evaluation and design of roundabouts in Kane County.

Design Volumes

Once a roundabout has been constructed, it is difficult to make significant modifications to it unless they are planned in advance. In addition, it may be very difficult and costly to convert a roundabout intersection to some other form of control in the future. Therefore, it is essential to reasonably estimate the long term traffic volumes at the intersection. For the design study for potential roundabouts in Kane County, the designer shall utilize traffic forecasts from the County's current travel demand model. On roadways where significant traffic growth could be expected beyond 20 years, longer term traffic forecasts should also be considered.

Traffic volume forecasts should be developed for the A.M. and P.M. weekday peak hours. If other peak periods may dictate design, these periods should also be considered (e.g. at a plant entrance during shift change, or in a primarily retail area on Saturday afternoon).

While Kane County does have a travel demand model that can be readily used to forecast traffic growth on county roadways, often times this model may not provide the level of detail to accurately project traffic volumes at an intersection level. Appropriate engineering judgment should be utilized. It will also be necessary to convert these values to peak hour, by direction. On arterial roadway, the directional distribution generally ranges from 50% to 65% in the peak direction and the P.M. peak hour is generally around 9% to 11% of daily traffic volume. In areas heavily influenced by a particular land use type, these proportions may vary significantly.

Trip generation estimates may be utilized for roundabouts within defined development areas. For example, a roundabout on a collector roadway within a residential or commercial development area may primarily serve only traffic with origins or destinations within that development. The street network within the development should be evaluated to consider whether a significant volume of outside "cut-through" traffic may also use the roadway.

Volume Balance

While roundabouts can accommodate a wide differential in traffic volumes between the major street and the minor street, caution should be utilized when the minor street traffic volumes are low. In these cases, the overall intersection delay may increase since the increased delay for the major street traffic could outweigh the reduced delay for the minor street traffic. In addition, heavy major street traffic can result in inadequate gaps for minor street traffic.

Roundabout Size

Typical roundabout sizes are shown below on ***Table 4-1.*** For planning purposes (Concept Stage analysis), the upper end of the size range for the applicable roundabout type should be used until a more detailed concept plan can be developed. The "ultimate" roundabout traffic needs and size should also be utilized for this consideration as opposed to the interim needs in order to ensure that adequate right-of-way and design provisions are made to accommodate future traffic growth.

Table 4-1
Roundabout Categories and Design Characteristics

Design Element	Mini-Roundabout	Urban Compact	Urban Single-lane	Urban Double-lane	Rural Single-lane	Rural Double-Lane
Functional Highway Classification (typical applications)	Township residential collector	Township residential collector	County Arterial	County Arterial	County Arterial	County Arterial
Recommended maximum entry design speed	15 mph	15 mph	20 mph	25 mph	25 mph	30 mph
Maximum number of entering lanes per approach	1	1	1	2	1	2
Typical inscribed circle diameter	50 to 90 ft	100 to 120 ft	120 to 150 ft	150 to 220 ft	120 to 200 ft	175 to 250 ft
Splitter island treatment	Raised if possible, crosswalk cut if raised	Raised, with crosswalk cut	Raised, with crosswalk cut	Raised, with crosswalk cut	Raised and extended, with crosswalk cut	Raised and extended, with crosswalk cut
Typical daily service volume on 4-leg roundabout (veh/day)	10,000	15,000	20,000	Approximately 40,000-50,000 Refer to FHWA Roundabout Guide	20,000	Approximately 40,000-50,000 Refer to FHWA Roundabout Guide

Generally, the right-of-way set aside for the roundabout should provide at least 10 additional feet around the outside of the inscribed circle diameter (20 feet total) to allow for sidewalks and buffer space. Until concept layouts are developed for the roundabout adequate to evaluate the actual right-of-way needs for the roundabout, it may be desirable to reserve even more right-of-way.

Roundabout Capacity

As a general rule of thumb for a quick assessment of the viability of a roundabout, the typical daily entering traffic volumes indicated on Table 4-1 can be utilized.

For the next stage of assessment, procedures described in the FHWA Guide or the *Highway Capacity Manual* can be utilized. For Level 1 roundabouts, this may be the extent of analysis required. However, for all other roundabouts, a more thorough capacity analysis will be required.

The only software packages allowed by the County for performing capacity analyses at roundabouts will be RODEL and SIDRA. The use of any other software package will require the express approval by the County.

In certain conditions, simulation models may also be appropriate supplementary analysis tools, particularly to evaluate the interaction of a roundabout with adjacent intersections. Software packages including Paramics and VISSIM can be utilized for this purpose. Synchro/SimTraffic should not be used for the analysis of roundabouts, however, SimTraffic may be an effective tool for evaluating the impact of a roundabout on a corridor. Use of these software packages is not a substitute for using RODEL or SIDRA to perform the capacity analyses.

Design Speeds/Fastest Paths

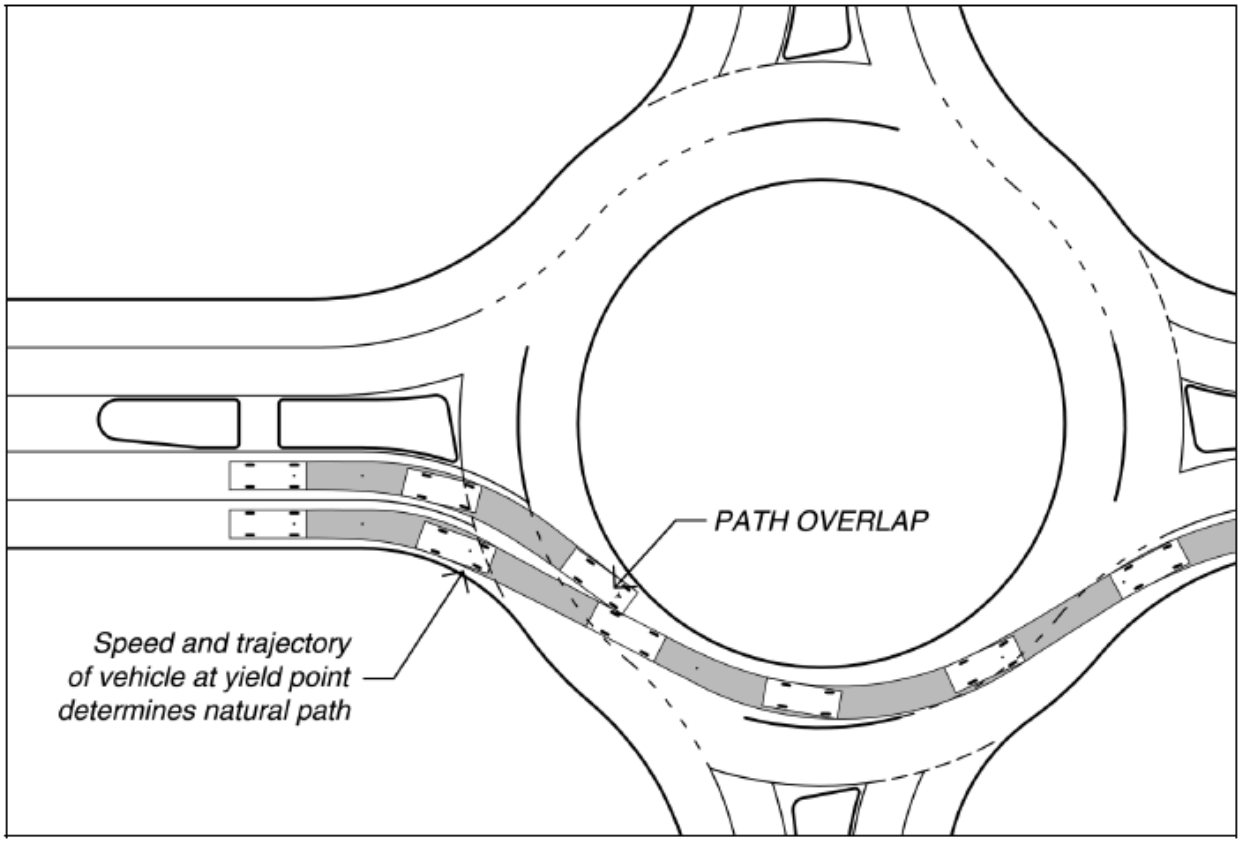
The design speed and fastest path analysis are critical elements in the design of a safe and effective roundabout. As noted in Section 3 of this Guide, design speeds and fastest paths shall be evaluated for all movements through the proposed roundabout and documented in the review submittal. Guidance on appropriate design speeds and identification of fastest paths can be found in Section 6.2 of the FHWA Guide. Similar information is also provided in Section 6.1 of the Kansas Guide.

Speed consistency is also a critical consideration. Ideally, the relative differences between all speeds within the roundabout should be no more than 6 mph. However, this is often difficult to achieve, particularly in roundabouts that must accommodate larger trucks. In these cases the maximum speed differential should be no more than 12 mph. In addition, the exit speed should not be less than the entry or circulatory speed. It is suggested that for the design memorandum, a table that summarizes the speeds for each radius for each approach and the speed differentials be created similar to the one shown on Exhibit 6-13 in the Kansas Guide.

Path Overlap

For multi-lane roundabouts, it is critical that the entries be designed so that path overlap is avoided. Path overlap occurs when the natural path through the roundabout of one traffic stream overlaps with the path of another, resulting in reduced capacity and an increased accident potential. The figure below from the FHWA guide demonstrates path overlap. See Section 6.4 of the FHWA Guide and Section 6.2 of the Kansas Guide for a discussion of path overlap and design principals to avoid it.

Figure 4-1
Path Overlap



Design Vehicle

For roundabouts in Kane County, the following minimum design vehicles shall be used in addition to following the guidelines shown on Figure 36-1R from the Illinois Department of Transportation *Bureau of Design and Environment Manual.* This figure is included in Appendix B.

- ***Arterials –*** The through movements along arterials shall accommodate WB-65 vehicles. At the intersection of two arterials, all movements shall accommodate WB-65 vehicles.
- ***Other Roadways –*** For all other roadways and for side street and turning movements at roundabouts along arterials, the minimum design vehicle shall be a bus, single unit truck or the largest fire vehicle in use in the county. Note that this is the minimum design vehicle.

At all roundabouts, consideration should be given for other large vehicles that may use the route on a regular basis. In commercial areas, this may include WB-50 or WB-65 vehicles making deliveries. On roadways serving residential areas, access by moving vans needs to be considered. Moving vans are typically WB-65 vehicles. Often there are multiple routes to access a house or a building, but at least one of these routes should be able to serve these vehicles – for infrequent use the design may allow the trucks to use the entire roadway to maneuver. Once these vehicles have arrived at their

destination, continuing their route back out of the area must also be considered. If WB-65 vehicles are not accommodated at a roundabout, the design memorandum should discuss either the lack of need to accommodate these vehicles in the area or alternate routes that are available.

See Figure 6-2 in the Kane County Transportation Plan for classification of County roadways.

Sight Distance

Sight distance should be evaluated for the following areas:

- Approach sight distance
- Sight distance on circulatory roadway
- Sight distance to crosswalk on exit
- Intersection sight distance

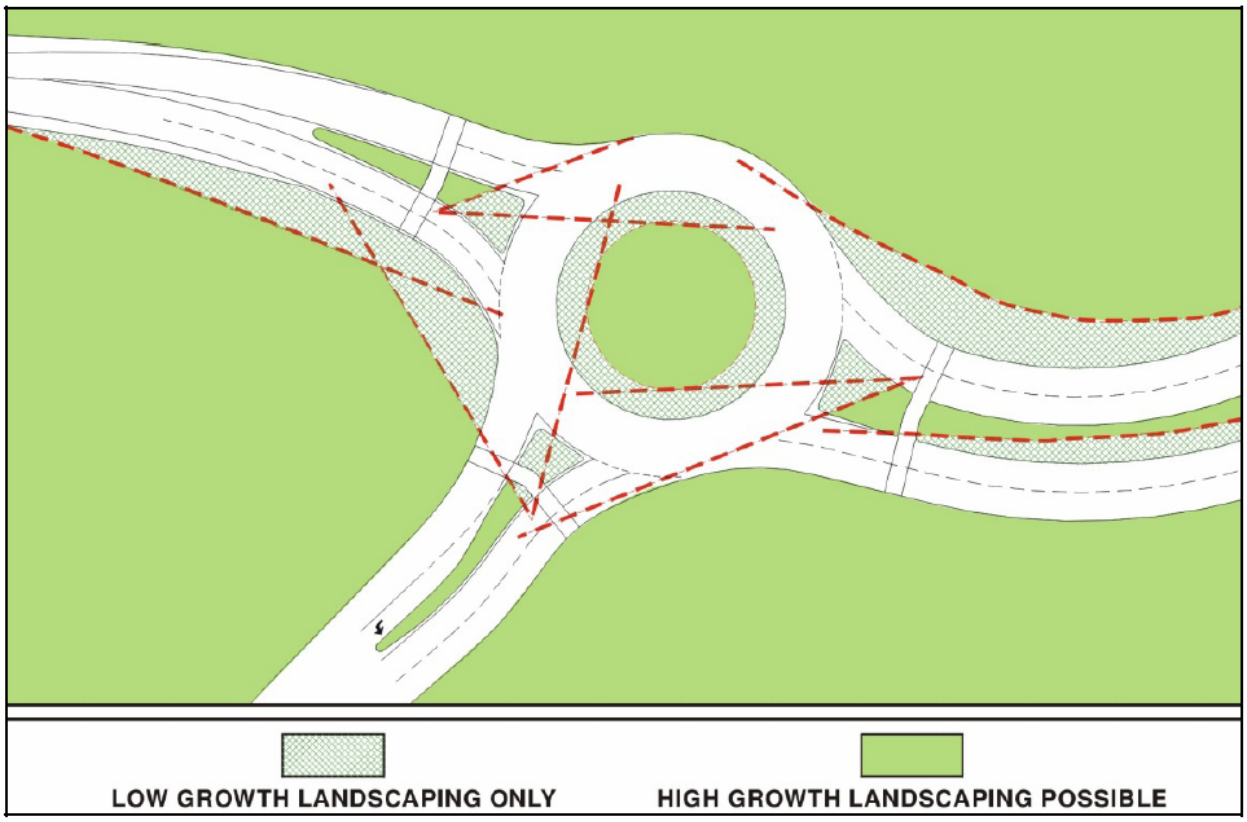
Processes for measuring these sight distances are documented in Sections 6.3.9 and 6.3.10 of the FHWA Guide. Additional information from the Kansas Guide is paraphrased below:

Equations and design values for determining the intersection sight distance components are provided in Section 6.3.10 of the FHWA Guide. The equations are also provided in the Intersections section of the AASHTO "Green Book". Calculations for intersection sight distance should assume a critical gap of 6.5 seconds, based on research of critical gaps at stop-controlled intersections, adjusted for yield controlled condition. However, in locations where site distance may be constrained by adjacent topographic features or buildings, the critical gap may be reduced to 4.6 seconds. This value is consistent with the lower bound identified for roundabouts in the *Highway Capacity Manual* (HCM 2000). The designer can approximate the speeds for the entering stream by averaging the entry path speed and circulating path speed (paths with radius R1 and R2 respectively). Likewise, the designer can approximate the speeds for the circulating stream by taking the speed of left turning vehicles (path with radius R4).

During design and review, roundabouts should be checked to ensure that adequate stopping and intersection sight distance is being provided. Checks for each approach should be overlaid onto a single drawing, as shown in Figure 4-2, to illustrate the clear vision areas for the intersection. This provides designers guidance on the appropriate locations for various types of landscaping or other treatments. In general, it is recommended to provide no more than the minimum required intersection sight distance on each approach, as excessive intersection sight distance can lead to higher speeds that reduce intersection safety. Landscaping can be effective in restricting sight distance to the minimum.

The hatched portions in Figure 4-2 are areas that should be clear of large obstructions that may hinder driver visibility. Objects such as low growth vegetation, poles, sign posts, and narrow trees may be acceptable within these areas provided that they do not significantly obstruct visibility of other vehicles, the splitter islands, the central island, or other key roundabout components. In the remaining areas (with solid shading), especially within the central island, taller landscaping may be used to break the forward view for through vehicles, thereby contributing to speed reductions and reducing oncoming headlight glare.

Figure 4-2
Sight Distance Diagram



Bicycle and Pedestrian Accommodations

All roundabouts in Kane County shall accommodate pedestrians across all legs of the roundabout. While sidewalks may not currently be present along a route, it should be anticipated that they will ultimately be installed. If no sidewalks are present in an area, sidewalks at the roundabout should, at a minimum, be constructed connecting the crossings across each leg. In certain rare circumstances where there are obstructions on one side of a roadway that will prevent sidewalks from ever reasonably being installed, a request for omission of sidewalks/crossings on the applicable corner may be made to the County.

Where on-street bike lanes are provided, provisions shall be made to allow cyclists to exit the bike lane onto an off-street path through the roundabout. For bike routes where cyclists remain within the traffic lane, it can be assumed that cyclist will continue through the roundabout in the travel lane.

Proximity to Signals and Other Intersections

The guidelines set forth in Section 2F of the Kane County Access Permit and Access Control Regulations will provide minimum spacing requirements between roundabouts and signalized or unsignalized intersections. The roundabout should be considered an unsignalized intersection, therefore Table 3, Unsignalized Full Access Intersection Spacing, from the Regulations should apply.

In addition to the minimum requirements listed in the Regulations, the location of roundabouts should be such that queuing does not extend between roundabouts and adjacent controlled intersections. This includes both the queues from the roundabouts extending into these intersections and queuing from other intersections backing into the roundabouts. Ninety-fifth percentile queues should be evaluated. Examples of critical locations include stop-sign controlled intersections, particularly all-way stops, traffic signals, and railroad crossings.

For downstream left-turn opportunities, queuing should also be evaluated. If there is not a left-turn bay, queues may generate behind a vehicle waiting to turn left. If there is a turn bay, then room should be provided to allow adequate distance for a transition and queue storage. Left-turn storage should be adjusted to accommodate anticipated 95th percentile queues, but should not be less than 150 feet.

Parking

Parking is prohibited on all Strategic Regional Arterials, County Freeways, Principal Arterials, and Minor Arterials. On street parking may be allowed on some County collectors. On local streets and collectors where parking is allowed, it should be restricted within 30 feet of the crosswalk. Additional evaluation should be performed to review the impact of parking on visibility of the roundabout and crosswalk and if frequent parking maneuvers may create queuing into the crosswalk or roundabout.

Section 5 – Design Details

Splitter Island

Splitter islands should be provided on all roundabouts (exceptions may be considered on very small roundabouts). The splitter island should provide a pedestrian refuge area at least 6 feet in length and 10 feet wide, located approximately one car length (25 feet) back from the yield line. At multi-lane roundabouts, consideration may be given to locating the pedestrian crossing two car lengths back from the yield line.

Figure 5-1
Minimum Splitter Island Dimensions

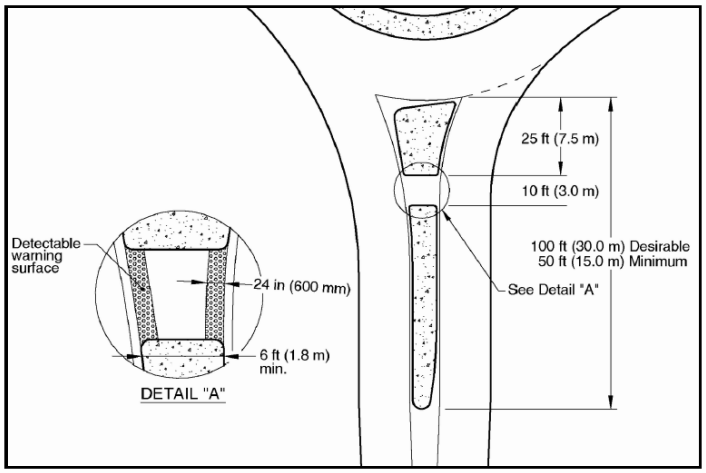
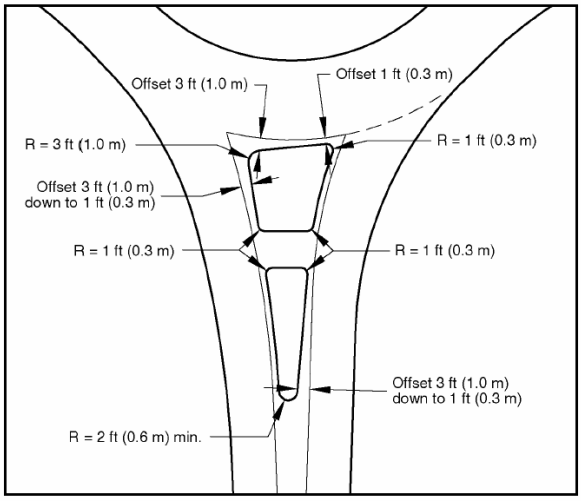


Figure 5-2
Minimum Splitter Island Nose Radii and Offsets

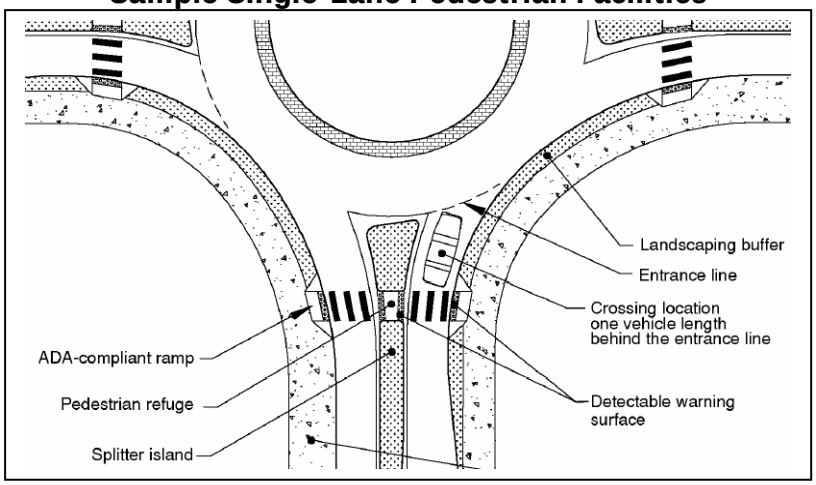


Crosswalks and Sidewalks

It is recommended that the crosswalk be generally perpendicular to the roadway and in a straight continuous alignment across the entire intersection approach. The crossing should be compliant with ADA requirements, including detectable warning surfaces at the outside ramps and within the splitter island. The path through the splitter island should be at street level, not raised.

Sidewalks adjacent to the roundabout should be separated from the curb by a landscape buffer of at least two feet in width.

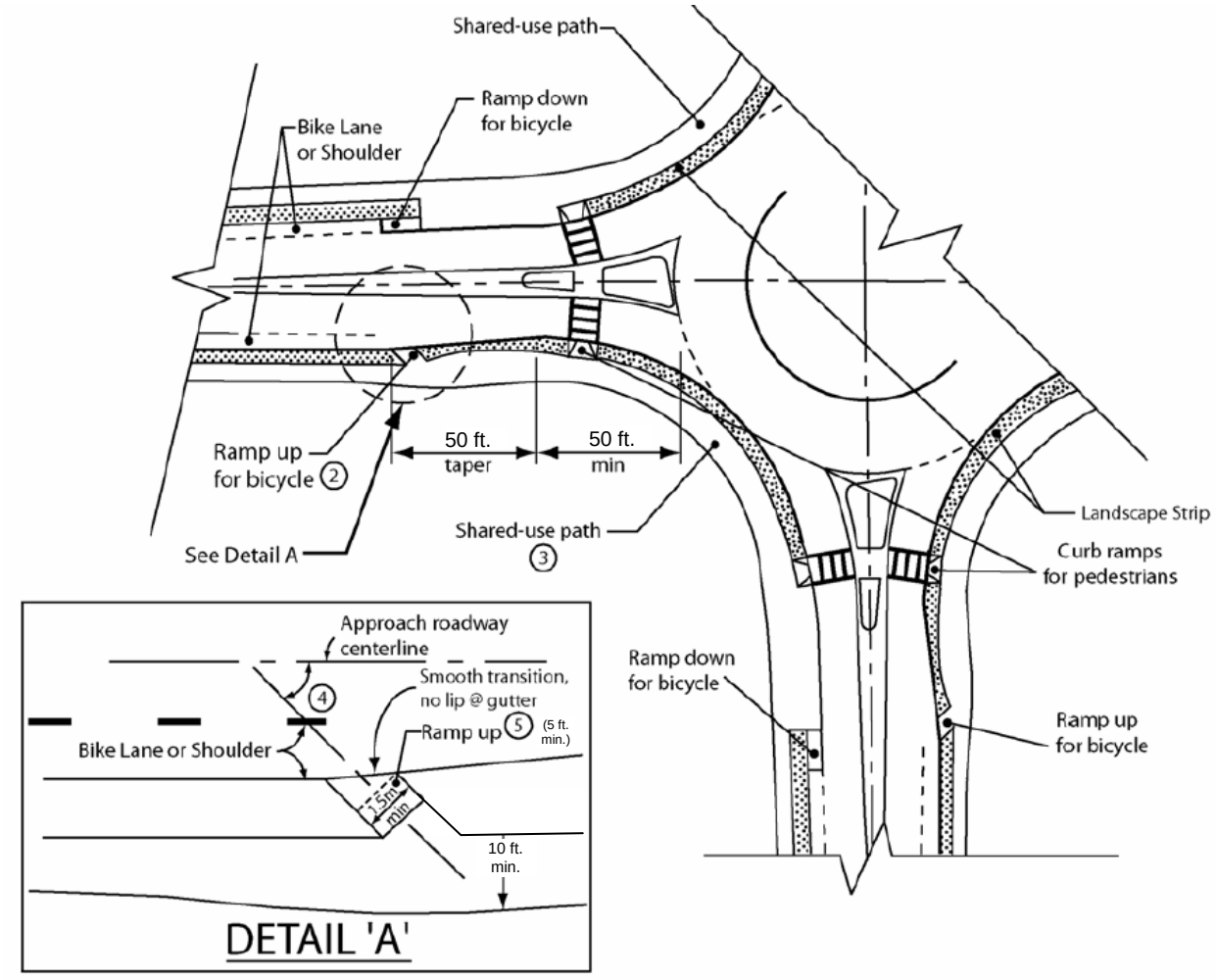
Figure 5-3
Sample Single-Lane Pedestrian Facilities



Bicycle Ramps

Where bicycle lanes are provided on a roadway, they should be terminated in advance of the roundabout (typically at least 100 feet from the yield line). Bicycle traffic should either merge into the vehicular traffic stream or dismount and circulate around the roundabout as a pedestrian. A variety of configurations for bicycle ramps have been developed; one is illustrated on Figure 5-4. The angle of the ramp from the roadway onto the shared use path should be between 30 and 45 degrees as shown. It is important that the ramps are not misconstrued as a pedestrian crossing, particularly by those with visual disabilities.

Figure 5-4
Bike Ramp Detail



NOTES

(1) Each roundabout intersection is unique and will require sound engineering judgement on the part of the designer as to the appropriate solution. These illustrations are only intended to show potential details that may be included in the design of a roundabout.

(2) Ramps for bicyclists choosing not to proceed through the roundabout as a vehicle should be designed to provide adequate stopping sight distance for the bicyclists and, for the comfort of the pedestrians using the path, balance the bicyclists' desire to maintain momentum with the possibility that conflicts may occur with pedestrians.

(3) Shared-use path will be used by both pedestrians and bicyclists and should be designed accordingly taking into account the unique behavior characteristics and needs of both types of users. For further discussion, see the Highway Design Manual and the AASHTO Guide for the Development of Bicycle Facilities, 1999.

(4) The target value for this angle is 45°(30° minimum); however, the actual angle designed at a given entrance should take into consideration all of the users of the path.

(5) Ramp up as necessary; should not exceed 15%. Round the landscape strip slopes to match the grade of the ramp. Curbs should not be placed between the landscape strip and the ramp.

Source: CalTrans Design Information Bulletin 80

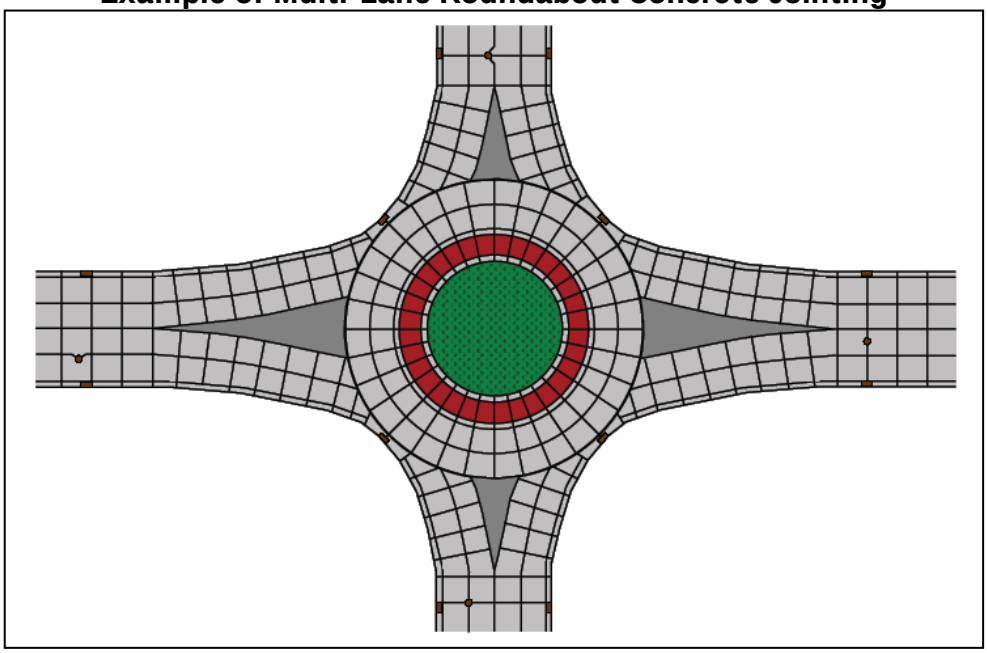
Pavement type

Both asphalt and concrete pavements have been utilized for roundabout construction. Concrete is more rigid and will generally last longer, but also often has a higher up-front construction cost and can be the more challenging material to use when constructing a roundabout under traffic. Asphalt is a flexible pavement, tends to have a lower construction cost and is more adaptable to construction sequencing in many cases, but generally requires more maintenance.

When using concrete pavement for roundabouts, the configuration of joints must be carefully considered. Two documents prepared by the American Concrete Pavement Association provide guidance on pavement thickness and jointing. These documents can be found online at www.pavement.com and www.teachamerica.com. The full links to these documents are provided in Appendix A

The splitter islands may be constructed separately, or to ease construction an alternative is to pave through the island areas and dowel them on top of the pavement.

Figure 5-5
Example of Multi-Lane Roundabout Concrete Jointing



Source: American Concrete Pavement Association

Interim Construction

When designing a roundabout that is anticipated to be expanded in the future (e.g. single lane to multi-lane), the layout of the ultimate configuration should first be developed. Generally, the interim design should maintain the ultimate outside diameter and a larger central island or truck apron should be utilized. The approach, splitter island and departure lanes also need to be customized separately for the interim and long-term configurations. The design of the interim configuration should take into consideration construction sequencing to maintain traffic during expansion to the ultimate layout.

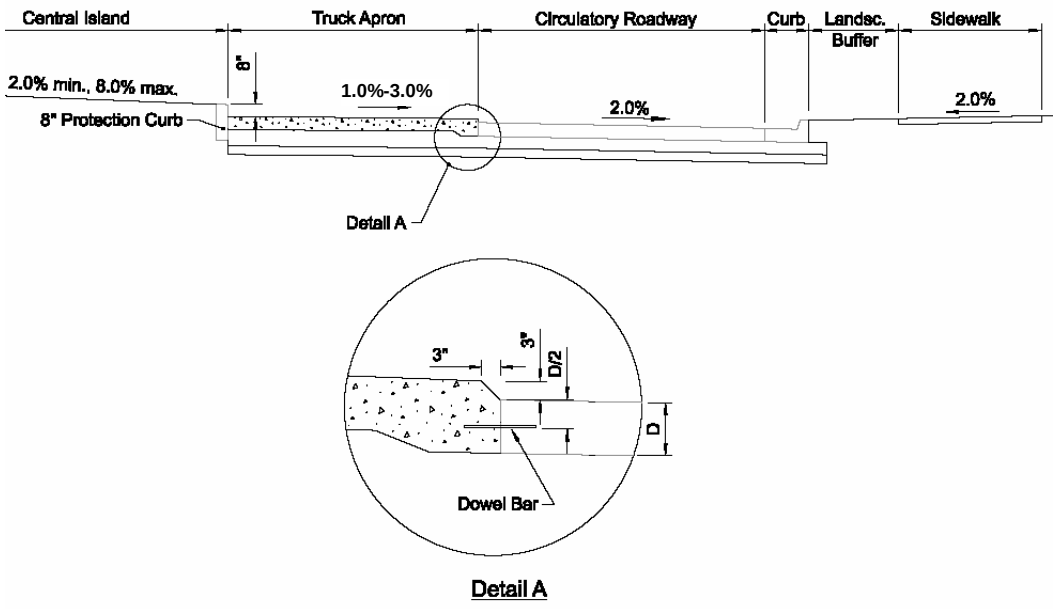
Typical section

A standard curb and gutter can be utilized on the outside of the roundabout and either a standard curb and gutter or a protection curb can be utilized on the splitter islands. Note that the curb on the splitter island should not be a "mountable" type curb except on very small roundabouts where required for truck movements. Between the circulatory roadway and the truck apron, a 3 inch curb should be utilized with a 45 degree edge, as shown below in Detail A on Figure 5-6. On the interior of the truck apron, an 8 inch protection curb is recommended.

Generally, a two percent cross slope on the circulatory roadway and one percent on the truck apron are recommended. However, drainage requirements will dictate the cross slopes. Cross slopes of greater than four percent are not recommended. Truck clearance and tipping must also be considered when determining the cross slope of the truck apron. It should be flat enough to minimize truck tipping potential but if "low-boy" type truck trailers are anticipated through the roundabout, the cross slope needs to provide clearance for these vehicles as well.

The pavement utilized for the truck apron should be colorized to provide contrast with the circulatory roadway. This is also true for the splitter islands if a paved surface is provided instead of landscaping.

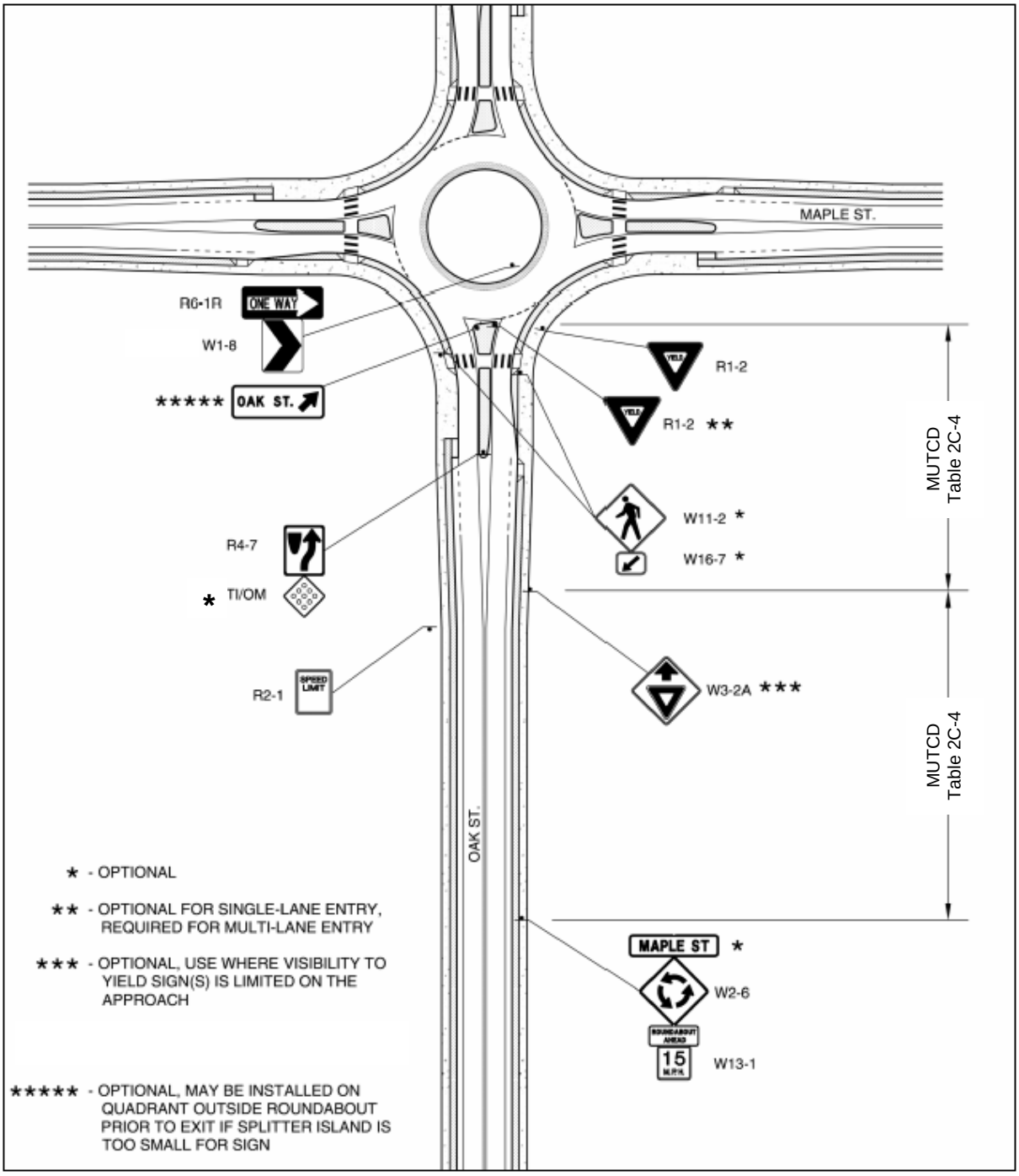
Figure 5-6
Typical Section – Circulatory Roadway



Signing

Typical signing for an approach to an urban single lane roundabout is illustrated on Figure 5-7. For applications at rural or high speed roundabouts, additional signing is sometimes required. Examples of these applications are provided in the Kansas Roundabout Guide.

Figure 5-7
Typical Roundabout Signing

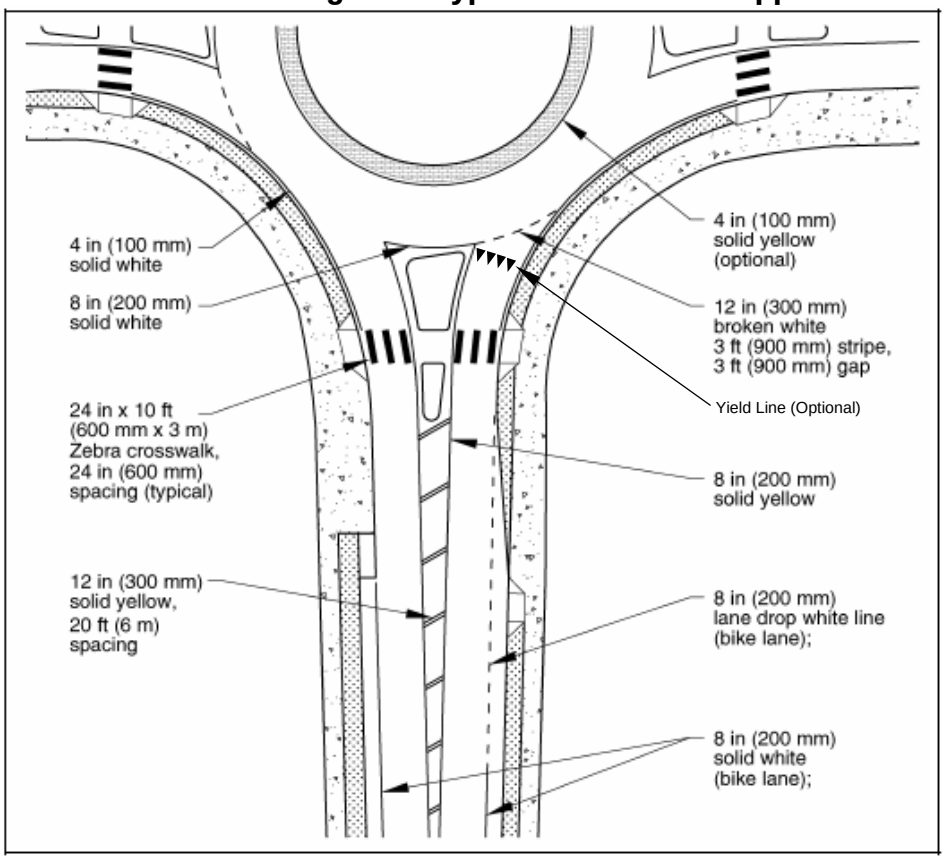


Pavement Markings

Pavement markings for a typical roundabout approach are shown on Figure 5-9. At multi-lane roundabouts, careful consideration of circulatory roadway markings is necessary. Additional discussion of markings in multi-lane roundabouts is provided in the Kansas Roundabout Guide.

With both pavement marking and signing, full utilization of the recommended typical applications is recommended as roundabouts are introduced in Kane County, including most "optional" features and pavement marking arrows. As drivers become more accustomed to driving roundabouts, some of the optional features may be eliminated in new applications or removed in existing applications.

Figure 5-8
Pavement Markings at a Typical Roundabout Approach



Lighting

Lighting shall be provided at all roundabouts and shall be in accordance with ANSI/IESNA PR-8-00 guidance. Critical lighting areas include vehicle conflict points where traffic enters the roundabout, vehicular-pedestrian conflict areas at crosswalks and at the beginning of splitter islands. It is generally recommended that lighting be provided on the outside edge of the roundabout.

Landscaping areas

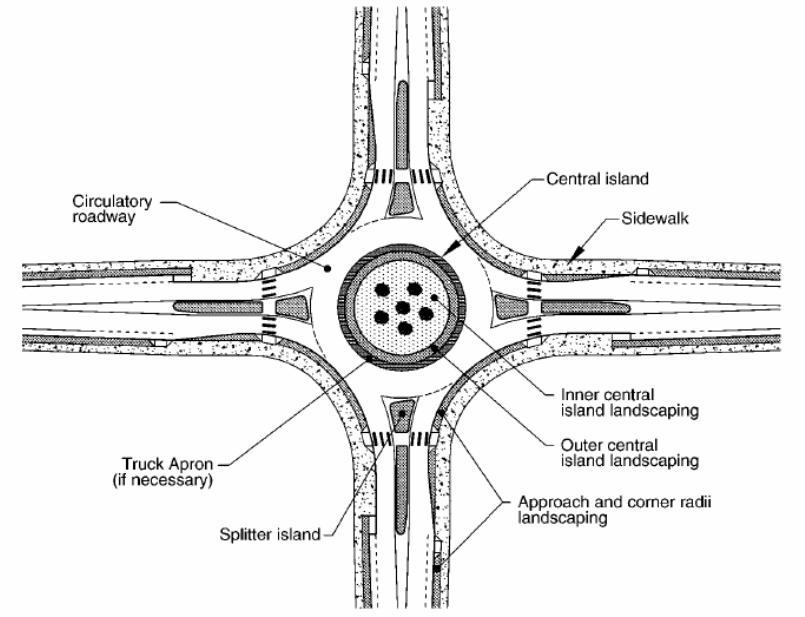
The use of landscaping at a roundabout is one of the distinguishing features that give roundabouts an aesthetic advantage over traditional intersections. However, maintenance is an important consideration, and maintenance agreements should be established if the landscaping is not going to be maintained by the County.

Planting such as grass and shrubs should be regularly trimmed or pruned to prevent obstruction of the sight triangles and to maintain the aesthetics of the intersection. Landscaping designs that require frequent watering may require installation of sprinkler systems. The design of the sprinkler system should minimize water runoff onto the circulatory roadway. Watering systems with a mist type spray head should be avoided as water spray onto windshields could create safety concerns.

Sight distance requirements at the intersection dictate the size and types of landscaping materials appropriate for the various areas within and adjacent to the roundabout. Plants should be placed to avoid obscuring the shape of the roundabout or the signing to the driver. Landscaping within the clear vision areas identified for the roundabout should be limited to a height of two feet to maintain adequate sight distance. Taller landscaping may be possible within the inner portion of the central island depending on the diameter of the inscribed circle.

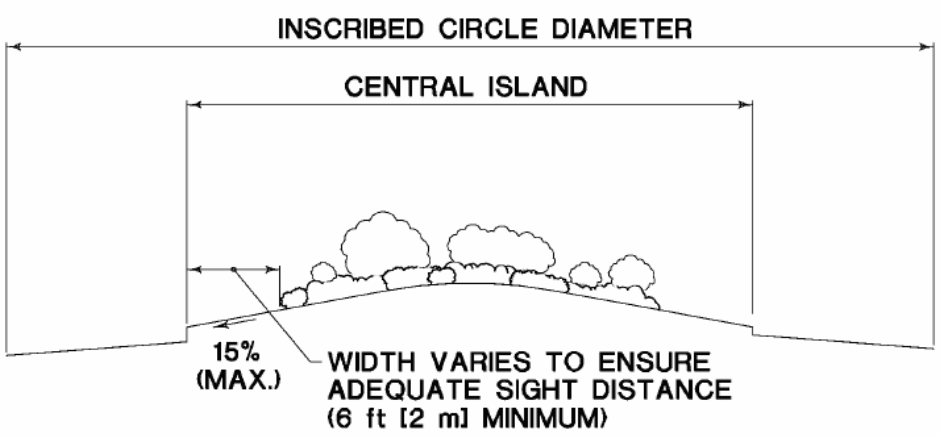
Landscaping within the central island provides enhancements to both aesthetics and safety for the intersection. The inner portion of the central island should be bermed and may be planted with bushes or other landscape material that would not be considered a "fixed object" from the standpoint of a vehicle striking it. These plantings help to make the central island more conspicuous by creating a terminal vista in which the line of sight straight through the roundabout is partially obscured. This clearly indicates to the driver that they cannot pass straight through the intersection and helps to make the central island more visible at night with the vehicle headlights illuminating the landscaping.

Figure 5-9
Roundabout Planting Areas



The perimeter of the central island should be landscaped with low-lying shrubs, grass, or groundcover so that stopping sight distance requirements are maintained for vehicles within the circulatory roadway. This width may vary depending on the size of the roundabout. Large, fixed landscaping objects such as trees, poles, rocks, statues, or walls will not be allowed. Shrubs and columnar growing species of trees may be appropriate within the inner portion of the central island. Consideration should be given to the size and shape of the mature plants. The slope of the central island should not exceed 6:1 per the requirements of the AASHTO Roadside Design Guide.

Figure 5-10
Central Island Landscaping



Landscaping within the central island should discourage pedestrian traffic to and through the central island. As such, the design of the central island shall not allow use of street furniture such as benches or monuments with small text. Where truck aprons are used, the material or pattern used for the surface of the apron should be different from that used for the sidewalks so that pedestrians are not encouraged to cross the circulatory roadway, or perceive that the truck apron is a sidewalk.

Vertical grades

It is generally not desirable to locate roundabouts in locations where grades through the intersection are greater than four percent. Section 6.3.11 of the FHWA Roundabout Guide provides more discussion of vertical grades at roundabouts.

Section 6 – Design Review Checklist

Below are checklists for the various submittal stages of the roundabout plans. This is not an all-inclusive list, additional information may be requested by the County on a case-by-case basis. Additional discussion of some of these components is provided elsewhere in this Guide.

Concept Plans

Complete	Item	Comments
	Designer Name	Name of company and engineer responsible for roundabout design
	Peer Reviewer	Name of company and reviewer, additional qualification information on reviewer if not previously submitted to County
	Existing Traffic Volumes	Peak hour turning movement counts (A.M. and P.M. peaks, plus others as appropriate). Collected within past year.
	Construction Year Traffic Volumes	Include discussion of growth forecasting procedure.
	Design Year Traffic Volumes	Generally 20 years beyond construction. Include discussion/documentation of growth forecasting procedure. If significant growth beyond design year is anticipated, provide additional discussion.
	Roundabout Capacity Analysis	At a minimum, report v/c by approach for construction and design year. If design year v/c is over 0.60 on any approach, more detailed analysis may be required. If interim and ultimate roundabout designs are anticipated, provide analysis for each and also provide transition year analysis.
	Alternatives Analysis	Provide discussion of other alternatives considered (two-way stop, all-way stop, traffic signal, etc.), capacity analysis results for options considered, discussions of pros/cons for options.
	Approach Speeds	Indicate existing or planned posted speeds on roadways approaching roundabout
	Grades	Indicate if any grades may exceed approximately 3%.
	Design Vehicle	Indicate design vehicle, may vary for various movements.
	Area Plan	Plan showing area within a minimum of ¼ mile in each direction of roundabout showing existing and planned adjacent development, buildings, parking areas, drives/streets, traffic signals, etc.
	Base Plan	Base plan should be to scale, can be aerial photo, aerial mapping or topographic survey. Should show existing roadways, parking lots, buildings, drives, etc.
	Major Utilities/Structures	Indicate utility poles, major apparent underground utilities or structures that may conflict with proposed roundabout
	Right-of-Way	Indicate approximate right-of-way on base plan and source of information (e.g. plat maps, County GIS data, title reports)
	Concept Layout	Prepare a concept layout of the proposed roundabout. May be CAD or hand drawn, but should be to scale. Should show central island, splitter islands, sidewalks, crosswalks and truck apron. Dimension ICD, circulatory roadway width, truck apron width, entry and departure lane widths, angles between approach centerlines. Both interim and ultimate layouts of the roundabout

		should be shown, if applicable. If multiple layouts are being considered, provide layouts of each. Show scale and north arrow.
	Pavement Type	Indicate anticipated pavement type.
	Fastest Paths	Document fastest paths on concept layout, indicate speeds and speed differentials.
	Truck Turning Templates	Indicate for all movements (if design is generally symmetrical can be limited to one approach)
	Right-of-way Impact	Anticipated additional right-of-way requirements.
	Construction Sequencing	If roundabout is to be built under traffic, sketch proposed sequencing.
	Sight Distances	Provide discussion of any existing or proposed features that may create sight distance constraints.

Preliminary Design

Normal County plan submittal requirements apply, these items relate to the roundabout elements of the submittal only.

Complete	Item	Comments
	Designer Name	Name of company and engineer responsible for roundabout design
	Peer Reviewer	Name of company and reviewer, additional qualification information on reviewer if not previously submitted to County
	Existing Traffic Volumes	Peak hour turning movement counts (A.M. and P.M. peaks, plus others as appropriate).
	Construction Year Traffic Volumes	Include discussion of growth forecasting procedure. Note if updated from Concept submittal.
	Design Year Traffic Volumes	Generally 20 years beyond construction. Note if updated from Concept submittal.
	Roundabout Capacity Analysis	Provide detailed capacity analysis, including v/c and delay by movement, and printouts from approved software package for construction year, interim (if applicable) and design year scenarios.
	Approach Speeds	Indicate existing or planned posted speeds on roadways approaching roundabout.
	Grades	Indicate grades on all approaches.
	Design Vehicle	Indicate design vehicle, may vary for various movements.
	Base Plan	Base plan on topographic survey (may be supplemented with aerial photo). Should include existing and planned streets or drives near the roundabout and existing and planned buildings, parking lots, etc. in the vicinity of the roundabout that may influence design.
	Utilities	Indicate utility poles, overhead and underground utilities within the survey limits.
	Right-of-Way	Indicate existing and proposed right-of-way, easements, etc. on the plan.
	Pavement Type	Indicate proposed pavement type.
	Baselines	Show and describe baselines for each approach, angles between approaches, baselines around inscribed circle and around edge of pavement at truck apron.
	Roundabout Dimensions	Indicate roundabout diameter, central island diameter, truck apron width, circulatory roadway width, entry and exit radii, approach and exit widths
	Splitter Islands	Show splitter island layouts and dimensions
	Sidewalks and Crosswalks	Show proposed sidewalk locations and widths, crosswalk locations, pedestrian and bicycle ramps.
	Fastest Paths	Document fastest paths on layout, indicate speeds and speed differentials.
	Truck Turning Templates	Indicate for all movements.
	Typical Sections	Provide typical sections through roundabout and splitter islands showing curb types and dimensions, apron details, pavement type and thickness, cross slopes, etc.

	Vertical Profiles	Provide profiles for each baseline.
	Pavement Marking Layout	Show proposed layout of markings (detailed marking plans not required at this stage).
	Construction Sequencing	If roundabout is to be built under traffic, indicate proposed sequencing.
	Sight Distances	Illustrate clear sight distance areas on layout and provide calculations for determining areas.
	Interim/Ultimate Layout	If interim and ultimate layouts are planned, information on both layouts should be provided, including and overlay of the two scenarios on top of each other.
	Street Lighting	Location of lighting poles and lighting calculations.
	Landscaping	Indicate areas of planned landscaping and nature of landscaping.

Final Plans

Normal County plan submittal requirements apply, these items relate to the roundabout elements of the submittal only. The information indicated with preliminary plans should also be provided with final plans.

Complete	Item	Comments
	Typical Section – Approach Roadways	
	Typical Section – Splitter Islands	
	Typical Section – Roundabout	
	Typical Section – Temporary Pavement	If temporary widening or shoo-fly required during construction
	Roundabout Overview Sheet	Showing overall layout, baselines, control information
	Centerline Profile – Approaches	
	Baseline Profile – Around ICD and around Truck Apron	
	Intersection Detail	Show all curb return radii and PC, PT, etc. stations, offsets, and elevations
	Curb Return Profiles	For all curb lines on approaches and through roundabout
	Alignment Descriptions	
	Joint Layout Plan	For concrete areas
	Drainage Plan	
	Landscape Plan	Illustrate height restricted areas (from sight distance evaluation) on plan as well
	Lighting Plan	
	Signing Plan	
	Special Sign Detail Sheets	
	Pavement Marking Plan	
	Construction Sequencing Plan	
	Traffic Control/Detour Plan	

Appendix A – Additional Roundabout Resources

Design Guidance

Resource	Web Link
Roundabouts: An Informational Guide (FHWA)	**http://www.tfhrc.gov/safety/00068.htm**
Kansas Roundabout Guide (Kansas DOT)	**http://www.ksdot.org/burTrafficEng/Roundabouts/Roundabout_Guide/RoundaboutGuide.asp**
New York Roundabout Design Guidance (NYSDOT)	http://www.dot.state.ny.us/roundabouts/guide.html
Florida Roundabout Guide (FDOT)	http://www.dot.state.fl.us/trafficoperations/pdf/Florida_Roundabout_guide_2nd_Ed.pdf
Modern Roundabouts for Oregon (Oregon DOT)	http://www.oregon.gov/ODOT/HWY/ENGSERVICES/docs/ModernRoundabouts.pdf
Roundabout Design Manual (Washington DOT)	http://www.wsdot.wa.gov/EESC/Design/DesignManual/desEnglish/915-E.pdf
Roundabout Design Information (Wisconsin DOT)	http://www.dot.wisconsin.gov/safety/motorist/roaddesign/roundabout-design.htm
Design Information Bulletin (CalTrans)	http://www.dot.ca.gov/hq/oppd/dib/dib80-01.htm
Tooele County Utah Roundabout Design Guidelines	http://www.co.tooele.ut.us/roadmanu.htm
Colorado Springs Roundabout Design Standards	http://www.springsgov.com/units/traffic/Roundabout%20Design%20Standards%20CTAB%20Oct%204th.pdf
Access Board Guidelines for Design in Public Rights-of-way	http://www.access-board.gov/prowac/index.htm
Pedestrian Access to Modern Roundabouts	http://www.access-board.gov/research/roundabouts/bulletin.htm
TRB 2005 Roundabout Conference Presentations	http://www.teachamerica.com/Roundabouts/RA_Conference.htm
Concrete Roundabout Pavement Design Brochure	http://www.pavement.com/Downloads/RT/RT6.03.pdf
Concrete Roundabout Pavement Design Presentation	http://www.teachamerica.com/Roundabouts/RA054B_ppt_Waalkes.pdf

Brochures, Videos, Educational Material

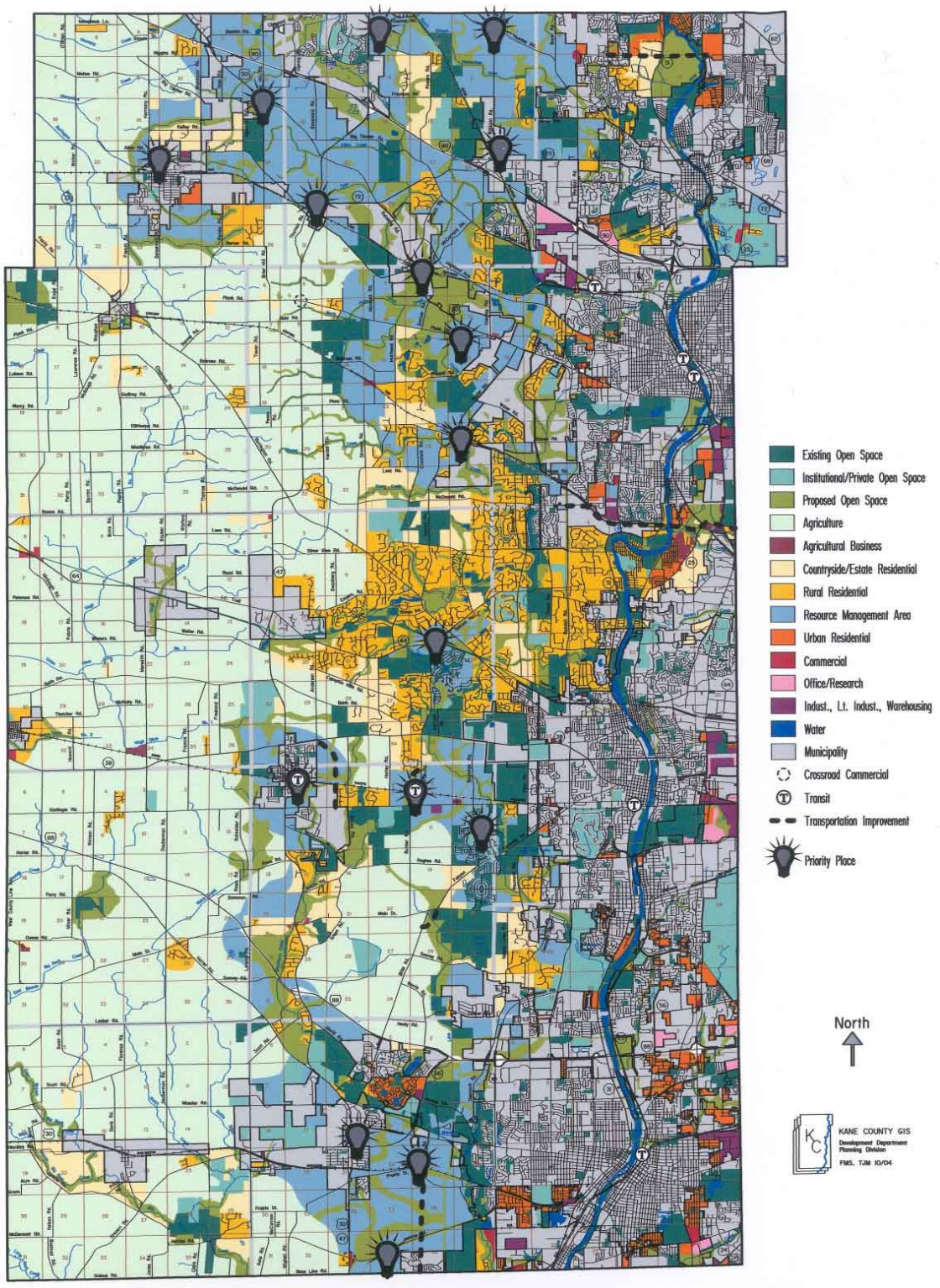
Resource	Web Link
Roundabouts in Kansas Video (Kansas DOT) (94 MB)	http://www.ksdot.org/burtrafficeng/Roundabouts/Roundabout_Guide/roundabout.wmv
Traveling Maryland's Roundabouts	http://www.sha.state.md.us/safety/oots/roundabouts/
Guide to Driving Roundabouts Brochure (New South Wales) (*Note – left hand driving)*	http://www.k-state.edu/roundabouts/news/rta.nsw.gov.au.roundbro.pdf
How Roundabouts Work (Brochure, Video) (Wisconsin DOT)	http://www.dot.wisconsin.gov/safety/motorist/roaddesign/roundabout-works.htm
What is a Roundabout? (Washington DOT)	http://www.wsdot.wa.gov/projects/roundabouts/
Roundabout Q&A (Insurance Institute for Highway Safety)	http://www.iihs.org/research/qanda/roundabouts.html
Roundabout Research (Insurance Institute for Highway Safety)	http://www.iihs.org/research/topics/roundabouts.html
FHWA Roundabout Brochure	http://www.vtsprawl.org/Pdfs/teamsafe_rndabout.pdf
Lethbridge, Alberta Brochure	http://www.lethbridge.ca/NR/rdonlyres/476BD772-ED07-4CD5-BB7E-D50C9710EA3B/5244/RoundaboutBrochureReducedSize.pdf
Davidson, North Carolina Brochure	http://www.ci.davidson.nc.us/blobbuilder.asp?BLOBID=330
Olympia, Washington Roundabout Information and Brochure	http://www.ci.olympia.wa.us/publicworks/transportation/roundabouts.asp
Missouri DOT Brochure	http://modot.mo.gov/newsandinfo/documents/RoundaboutBrochure.pdf
Santa Maria, CA Brochure	http://www.ci.santa-maria.ca.us/roundabout/Brochure.pdf
NYSDOT Brochure	http://www.dot.state.ny.us/roundabouts/files/roundabbrochure.pdf
Springfield, Oregon Brochure	http://www.ci.springfield.or.us/pubworks/Trans_Div/New%20Website/City%20double%20lane%20roundabout%20brochure.pdf

Appendix B – Reference Materials

These following Kane County resources should be consulted during roundabout design and can also be found on the County's web site.

Resource	Web Link
2030 Land Use Map (see attached)	**http://www.co.kane.il.us/Development/2030/images/map.jpg**
Kane and Northern Kendall Counties Bicycle Map (see attached)	**http://www.co.kane.il.us/dot/COM/Bicycle/index.asp**
Kane County 2030 Long Range Transportation Plan	http://www.co.kane.il.us/dot/2030/index.asp
Permit Regulations and Access Control Regulations Manual	http://www.co.kane.il.us/dot/Permitting/manual.asp
2030 Land Resource Management Plan	http://www.co.kane.il.us/Development/2030/index.asp

2030 Land Use Map



Kane and Northern Kendall Counties Bicycle Map

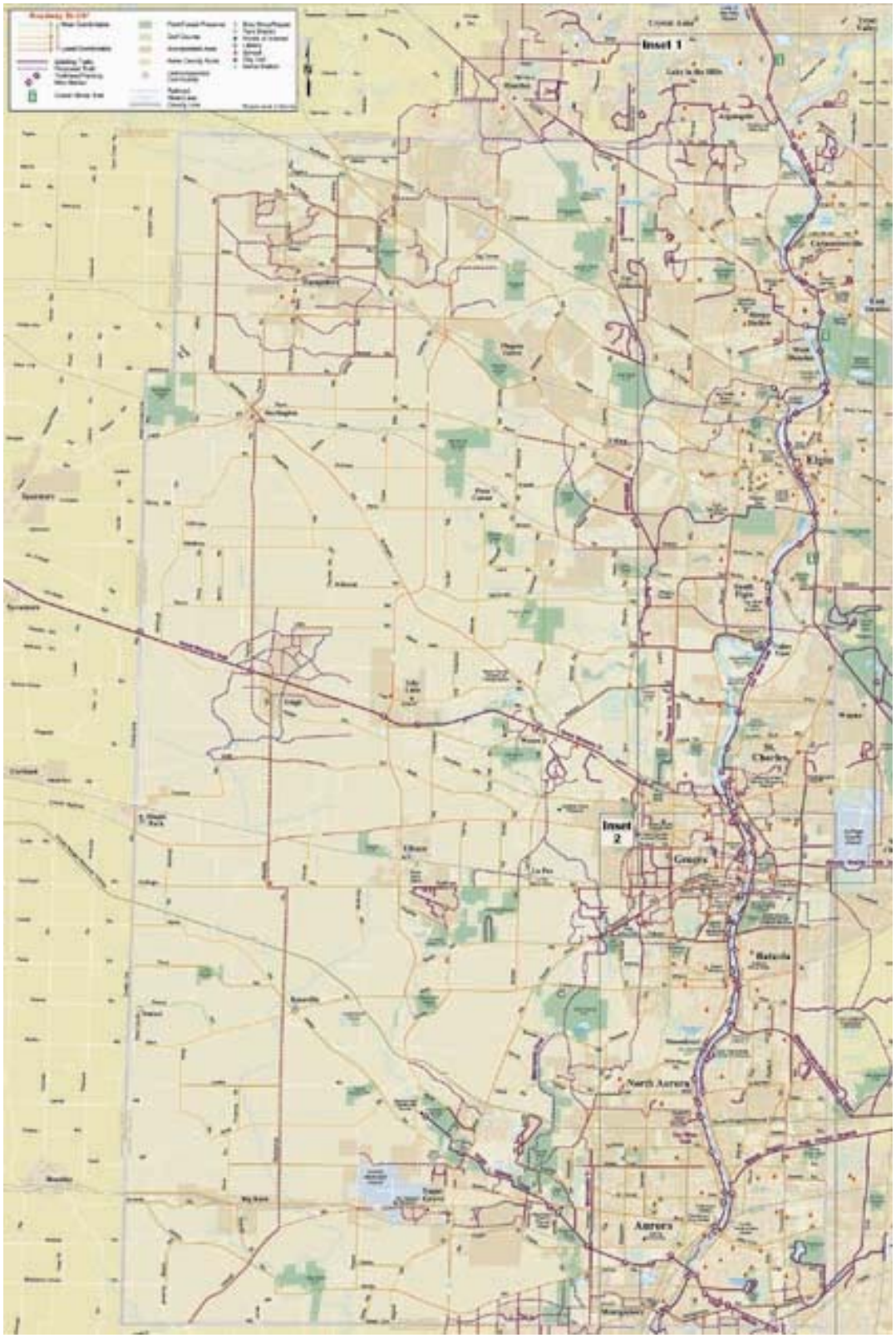
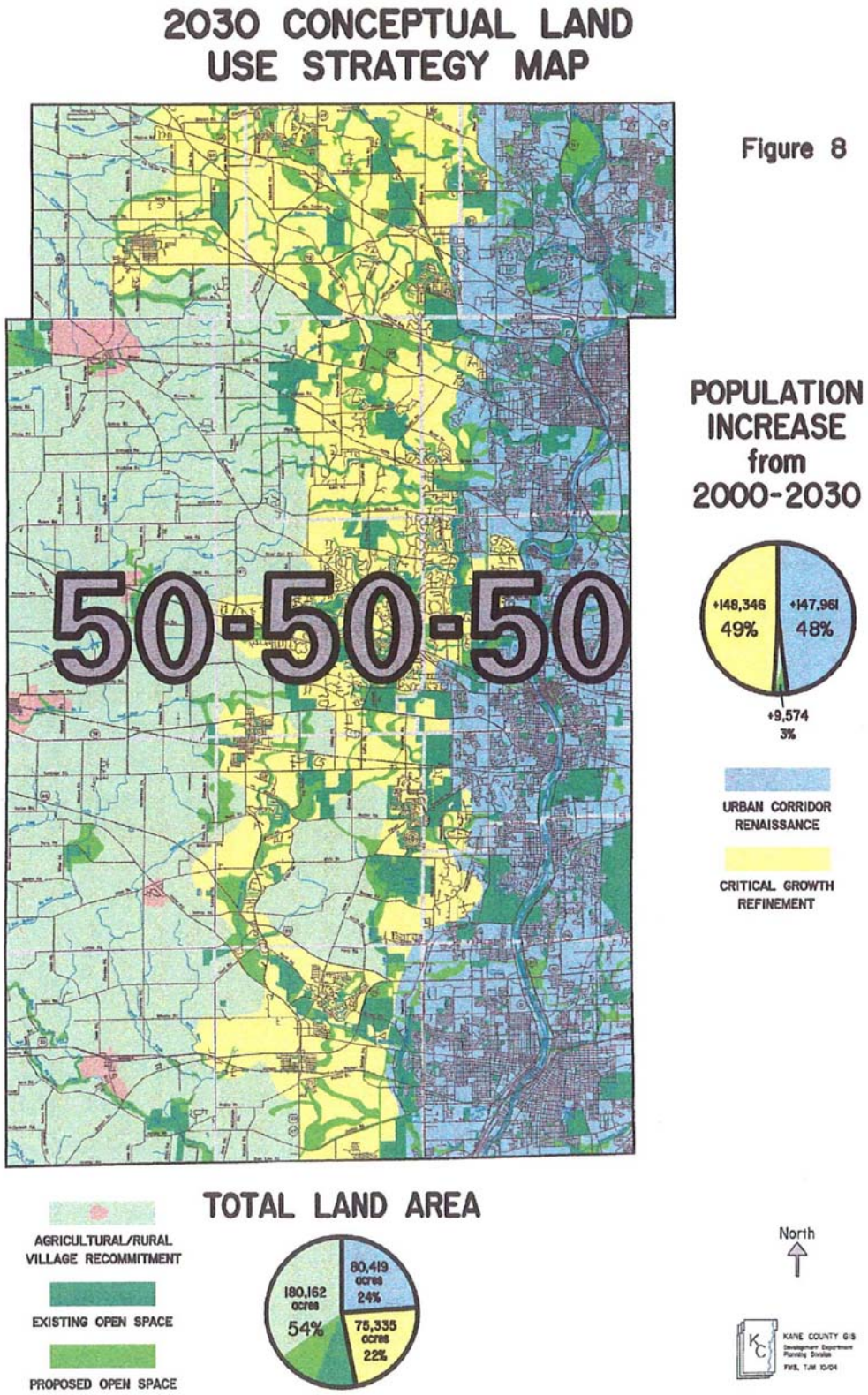


Figure 8 – 50.50.50 Map



Kane County Roadway Functional Classifications

Roadway Functional Classifications

Expressways
I-88
I-90
IL 56 (E. of IL 47)
US 20 (E. of Randall Rd)
US 30 (E. of IL 31)

Strategic Regional Arterials and County Freeways (minimum right-of-way 170' to 200')
Dunham Road (N. of Kirk Road)
Fabyan Parkway (E. of Randall Road)
Kirk Road
Orchard Road
Randall Road (N. of I-88)
IL 47
US 30
Hill Ave.
US 34
Farnsworth Ave.
IL 64
IL 25
IL 62
US 20 (W. of Randall Road)
IL 56 (E. of Kirk Road)
IL 72 (E. of IL 25)
Stearns Road

Principal Arterials (minimum right-of-way 120' to 150')
IL 72 (W. of IL 25)
Huntley Road (W. of IL 31)
Big Timber Road (W. of IL 31)
IL 38
Main Street (W. of Randall Road)
Bowes Road (W. of McLean)
Plato Road
Plank Road (W. of US 20)
Silver Glen Road
Keslinger Road (W. of Randall Road)
McDonald Road
Kreutzer Road
IL 31
IL 25 (non-freeway portion)
IL 56 (IL 31 to Kirk Road)
Muirhead Road (Plato Road to Bowes Road)

Kane County Roadway Functional Classifications (Cont.)

Roadway Functional Classifications

US 30 (W. of IL 47)
IL 68 (E. of IL 72)
Bliss Road
Fabyan Parkway (Main Street to Randall Road)

Minor Arterials (minimum right-of-way 120')
Allen Road
Army Trail Road
Bunker Road
Burlington Road (Walker to IL 64)
Corron Road
Dauberman Road
French Road
Galena Road
Galligan Road
Granart Road
Harmony Road
Harter Road
Healy Road
Highland Avenue (W. of Randall Road)
Hughes Road
Jericho Road (From Granart to IL 31)
Kaneville Road (Fabyan Parkway to Peck)
LaFox Road
Lake Cook Road
McLean Boulevard (IL 31 to US 20)
Meredith Road
Montgomery Road
Mooseheart Road (Orchard Road to IL 31)
Peck Road (Kaneville to IL 64)
Penny Road
Peplow Road
Tanner Road
Tyrrell Road
West Bartlett Road
West County Line Road
Indian Trail
Galena Blvd.
New York Street
Red Gate Road
Bolcum Road
Ashe Road
Oak Street
Nesler Road
Walker Road (Burlington to Allen)

Kane County Roadway Functional Classifications (Cont.)

Roadway Functional Classifications

Damisch Road
Perry Road
Gordon Road
Nelson Lake Road
Deerpath Road (Oak to Nelson Lake)
Melms Road
Freeman Road
Empire Road
Russell Road
Dittman Road
Beith (Thatcher to IL 47)
Hinckley Road
Getty Road
Thatcher Road
Elithorpe Road
McGough Road
Davis Road
Scott Road
Swan Road
Ramm Road

Collectors (minimum right-of-way 80' to 120')
All remaining County Highways (to include):
- Beith Road (Non-arterial portions)
- Cherry Lane
- Lees Road
- Manning Road
- Sauber Road
- Walker Road (N. of Allen)
- Galena (S. County Line)

All township and municipal roads generally over a half (1/2) mile in length whose primary purpose is to collect and distribute medium to low traffic volumes between arterials and local roads.

Local (minimum right-of-way 66' to 80')
Township and municipal roads whose primary purpose is to provide access to abutting property such as roads within a residential subdivision.

IDOT Bureau of Design & Environment Manual Fig. 36-1R

Illinois INTERSECTIONS December 2002

For Turn Made		Design Vehicle (1)(2)(3)
From	Onto	
Freeway Ramp	Other Facilities	WB-65 (WB-20)
Other Facilities	Freeway Ramp	WB-65 (WB-20)
Arterial or SRA(4)	Arterial/SRA	WB-65 (WB-20)
	Collector	WB-55 (WB-17)
	Local	WB-50 (WB-15)
	Local (Residential)	SU*
Collector	Arterial/SRA	WB-55 (WB-17)
	Collector	WB-55 (WB-17)
	Local	WB-50 (WB-15)
	Local (Residential)	SU*
Local	Arterial/SRA	WB-50 (WB-15)
	Collector	WB-50 (WB-15)
	Local	SU*
	Local (Residential)	SU
Local (Residential)	Arterial/SRA	SU*
	Collector	SU*
	Local	SU
	Local (Residential)	SU

**With encroachment, a WB-50 (WB-15) vehicle should physically be able to make the turn.*

Notes:

1. *Use this figure for new construction and reconstruction projects.*
2. *A smaller design vehicle may be considered as a design exception after an investigation of conditions and with justification.*
3. *For 3R projects, the design vehicle will be site specific with justification*
4. *SRA is a Strategic Regional Arterial route..*

SELECTION OF DESIGN VEHICLE AT INTERSECTIONS
(Functional Classification)

Figure 36-1R

36-1(30)

Excerpt from Illinois Department of Transportation *Bureau of Design and Environment Manual*