

RESOLUTION NO. 2019-75

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF HOLLISTER ADOPTING
A POLICY FOR CONSIDERATION OF ROUNDABOUTS FOR INTERSECTION
CONTROL**

WHEREAS, the pending update to the 2005-2023 General Plan will incorporate provisions of the 2008 Complete Streets Act into the Circulation Element; and

WHEREAS, the City of Hollister General Plan does not have a policy for consideration of roundabouts in the existing General Plan; and

WHEREAS, roundabouts may improve safety by reducing the speed of traffic and conflict points at intersections, may improve efficiency of operation and aesthetics; and

WHEREAS, the City of Hollister received a report on March 4, 2019 recommending adoption of an interim policy for consideration of roundabouts at new development and some existing intersections until the pending General Plan update is completed.

NOW, THEREFORE, BE IT RESOLVED, that the City Council of the City of Hollister adopts the interim policy included in Exhibit 1 for consideration of roundabouts in new development and at some existing intersections until the update to the 2005-2023 General Plan is completed.

PASSED AND ADOPTED, by the City Council of the City of Hollister at a regular meeting held this 15th day of April, 2019, by the following vote:

- AYES: Council Members Richman, Resendiz, Spencer, Lenoir, and Mayor Velazquez.
- NOES: None.
- ABSTAINED: None.
- ABSENT: None.



Ignacio Velazquez, Mayor

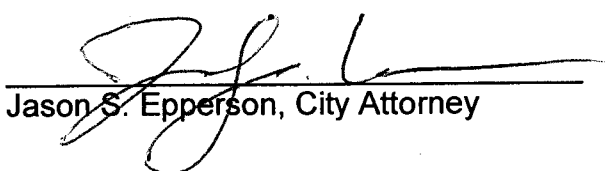
ATTEST:



Christine Black, MMC, City Clerk

APPROVED AS TO FORM:

Prentice, Long & Epperson, Attorneys at Law



Jason S. Epperson, City Attorney

Exhibit 1
Interim Roundabout Policy

Interim Policy: The City of Hollister recognizes that roundabouts may calm traffic and may improve the safety of intersections for pedestrians, bicyclists and vehicles by reducing speed and conflict points. Roundabouts may have the added benefits of improving efficiency of operation of intersections, reducing greenhouse gas emissions from idling and enhancing aesthetics. Roundabouts shall be considered when designing intersections on collectors, on arterials, and in new development projects near schools. It is recognized that roundabouts may not be appropriate in the built environment or at high volume intersections and shall be reviewed on a case-by-case basis. Two options for bicycle travel shall be incorporated into the design of all roundabout concepts, including riding through the roundabout or using on-ramps to sidewalks.



**STAFF REPORT
CITY COUNCIL REGULAR MEETING AGENDA
MEETING DATE: APRIL 15, 2019**

SUBMITTED:	April 2, 2019	AGENDA ITEM:	Consent Resolution
DEPARTMENT:	Development Services	CONTACT:	Mary Paxton, Program Manager
DEPARTMENT HEAD:	Bryan Swanson, Development Services Director		831-636-4360
SPONSOR(S):	Richman		

TITLE OF ITEM: RESOLUTION NO. 2019-75, A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF HOLLISTER ADOPTING A POLICY FOR CONSIDERATION OF ROUNDABOUTS FOR INTERSECTION CONTROL

BRIEF DESCRIPTION: The City Council will consider approval of a Resolution adopting an interim policy for consideration of roundabouts for intersection control.

RECOMMENDATION: Staff recommends that the City Council receive the report and ADOPT a Resolution approving an interim policy for consideration of roundabouts for intersection control.

DEPARTMENT SUMMARY: The City Council received a report at the March 4, 2019 meeting discussing a recommended interim policy for consideration of roundabouts when designing roadway intersections for pedestrians, bicyclists and vehicles and to reduce greenhouse gas emissions. The policy is recommended until the update to the 2005-2023 General Plan is completed. The report is attached. Roundabouts may result in cost-savings because the city spends about \$345,000 per year on power and on-call signal maintenance services. The roundabouts will not require lighted traffic control or on-call maintenance services.

Staff was directed to return with a resolution to adopt an interim policy until the update to the General Plan is completed. The proposed policy is provided below:

Interim Policy: The City of Hollister recognizes that roundabouts may calm traffic and may improve the safety of intersections for pedestrians, bicyclists and vehicles by reducing speed and conflict points. Roundabouts may have the added benefits of improving efficiency of operation of intersections, reducing greenhouse gas emissions from idling and enhancing aesthetics. Roundabouts shall be considered when designing intersections on collectors, on arterials, and in new development projects near schools. It is recognized that roundabouts may not be appropriate in the built environment or at high volume intersections and shall be reviewed on a case-by-case basis. Two options for bicycle travel shall be incorporated into the design of all roundabout concepts, including riding through the roundabout or using on-ramps to sidewalks.

FINANCIAL IMPACT: Initial capital costs may be higher from installation of a roundabout at an intersection, but the long-term maintenance could be less than a traffic signal. Fewer channelization lanes and associated right-of-way requirements could also be avoided at intersections.

CEQA: The location and timing for construction of future roundabouts is speculative at this time. The future consideration of the installation of roundabouts with new development or at existing intersections would be subject to future environmental review and reviewed on a case by case basis. The Staff Report from the March 4, 2019 City Council meeting documents that roundabouts can contribute to a reduction in greenhouse gas emissions at intersections and improve safety.

ATTACHMENTS:

- 1. Roundabout Presentation
- 2. 2019-03-04 Staff Report Recommendation for Interim Roundabout Policy
- 3. Exhibit 1 - Resolution for Interim Roundabout Policy

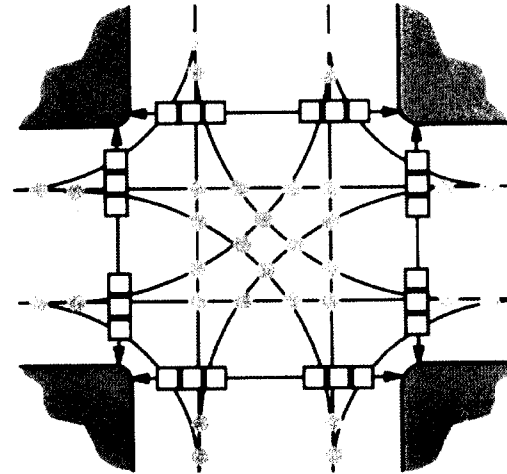
THIS REPORT WAS REVIEWED BY THE CITY MANAGER WHO CONCURS WITH THE STAFF RECOMMENDATION



William B. Avera, City Manager

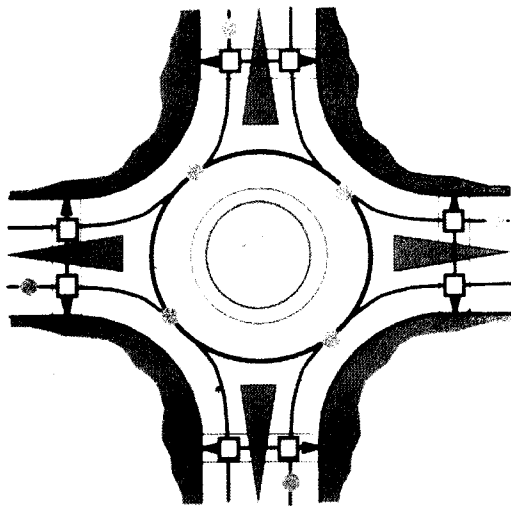
Conflicts At a Four-Way Intersection

Roundabouts
are safer



32 vehicle-to-vehicle
24 vehicle-to-pedestrian
conflicts

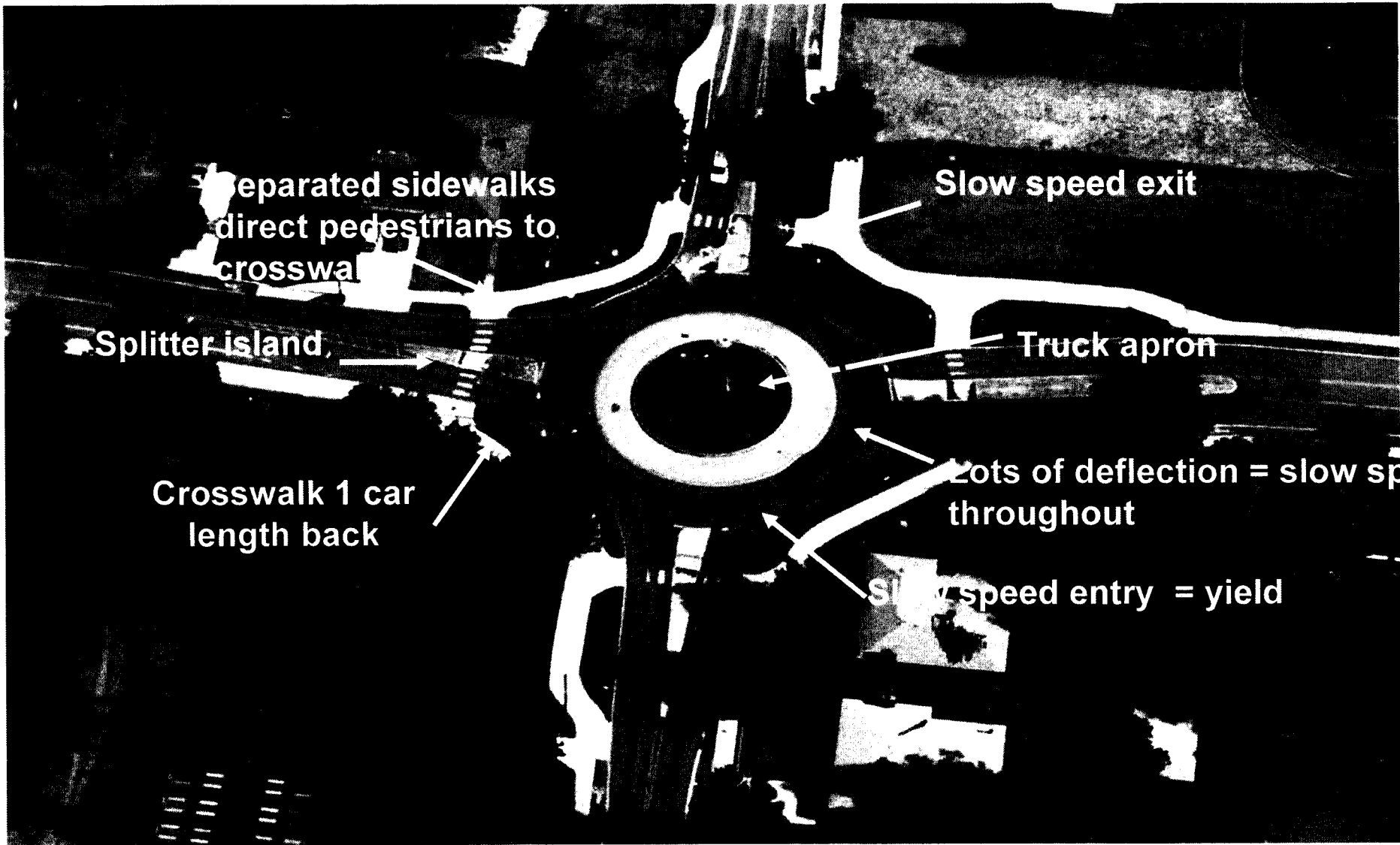
Conflicts At Roundabouts



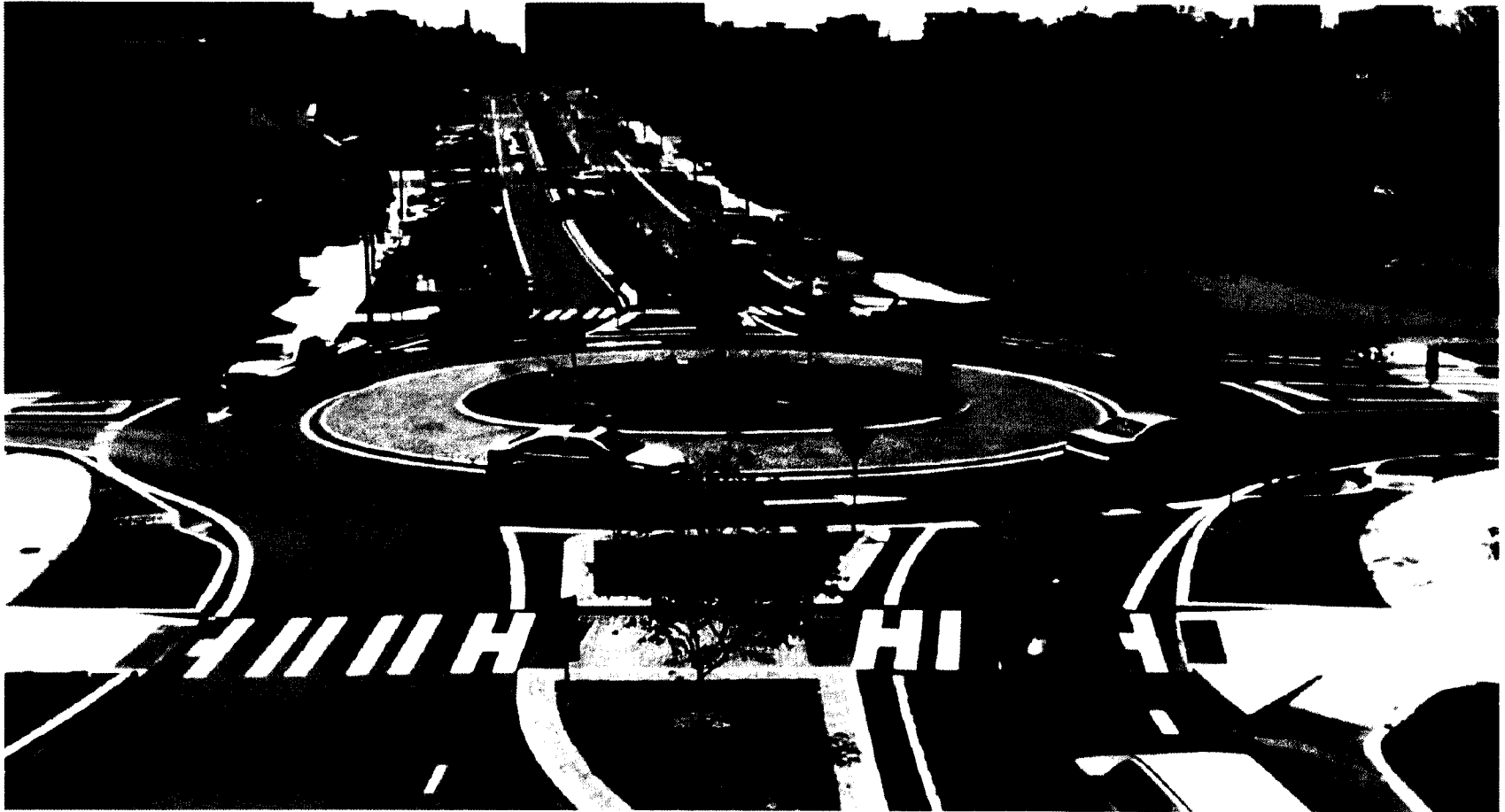
8 vehicle-to-vehicle
8 vehicle-to-pedestrian
conflicts

“Results of this study indicate that converting conventional intersections from stop sign or traffic signal control can produce substantial reductions in motor vehicle crashes.”

March 2000 Study by the Insurance Institute for Highway Safety



Roundabout



PUBLIC ART - PLACEMAKING





**STAFF REPORT
CITY COUNCIL REGULAR MEETING AGENDA
MEETING DATE: MARCH 4, 2019**

SUBMITTED:	February 14, 2019	AGENDA ITEM:	CITY COUNCIL OF THE CITY OF HOLLISTER:
DEPARTMENT:	Development Services	CONTACT:	Mary Paxton, Program Manager
DEPARTMENT HEAD:	Bryan Swanson, Development Services Director		831-636-4360
SPONSOR(S):	Richman, Velazquez		

TITLE OF ITEM: AUTHORIZATION TO DEVELOP A POLICY FOR ROUNDABOUTS

BRIEF DESCRIPTION: The City Council will receive a report on recommended interim policy for inclusion of roundabouts to implement Complete Streets.

RECOMMENDATION: Staff recommends that the City Council receives the report and directs staff by consensus to return with a Resolution adopting interim policy to require consideration of roundabouts when designing roadway intersections to calm traffic and improve the safety of intersections for pedestrians, bicyclists and vehicles and to reduce greenhouse gas emissions.

DEPARTMENT SUMMARY: The passage of the 2008 Complete Streets Act requires cities to integrate multi-modal transportation networks (= a road network for pedestrians, bicyclists, transit riders, vehicles, freight) into any substantial revision of a General Plan Circulation Element goals, policies, data collection techniques and implementation measures. A comprehensive examination of Complete Streets will be integrated into the pending update to Hollister's General Plan. Staff is recommending that the City Council adopt an interim policy in support of the consideration of roundabouts at signalized intersections and other locations where appropriate.

Roundabouts are recognized as a preferable form of intersection control at certain types of intersections for the following reasons:

- Improve efficiency of operation
- Safety - Intersections become slow speed environments and simplify decision-making for motorist and pedestrians because all movements are right turns and high speed accidents are substantially reduced.
- Roundabout can take more right-of-way at the intersection but there can be an overall net reduction in right of way on approaches from intervening roads by providing capacity where it is needed.
- Aesthetics – the center of roundabouts can be designed with landscaping or other features for placemaking.
- Traffic calming – Roundabouts are an effective tool particularly in residential subdivisions where they can be spaced in a series to calm traffic.
- Properly designed roundabout can provide one the safest forms of intersection control due to the creation of a low speed environment and the elimination of conflict points.
- Roundabouts are not affected by power outages.
- Maintenance costs are less.

- Reduced greenhouse gas emissions from idling at red lights.
- Reduced impacts on surrounding property from noise (traffic accelerating and pedestrian alerts), speeding cars and vehicle emissions from idling cars.
- The City has encouraged some subdivisions to be designed to avoid long stretches of road to check traffic. However, designs require pedestrians and bicyclist to navigate circuitous routes and the configuration increases travel distances for pedestrians, bicyclist and transit.

Roundabouts may be inappropriate in some circumstances where there is insufficient right-of-way particularly in the built environment, the total average daily traffic (ADT) volumes at an intersection are 70,000 or more, located too close to a signalized intersection, low volume roads where the roundabouts can decrease the efficiency of the roadway. It is recognized the roundabouts are not appropriate at every intersection.

Staff has requested examination of roundabouts as a requirement in environmental analysis and review of development projects. Some of staff's requests have been challenged because there is not clear policy in the City of Hollister Circulation Element for consideration of roundabouts. Staff recommends that the City Council direct staff to return with a Resolution adopting a policy. A draft policy is presented below. Samples of adopted policy from the Town of Truckee, City of Marina and County of Los Angeles are provided in Attachment A.

The City of Hollister recognizes that roundabouts calm traffic and improve the safety of intersections for pedestrians, bicyclists and vehicles by reducing speed. Roundabouts have the added benefits of improving efficiency of operation of intersections, reducing greenhouse gas emissions from idling and enhancing aesthetics. Roundabouts shall be considered when designing intersections on collectors, arterials and in new development projects and near schools. It is recognized that roundabouts may not be appropriate in the built environment, at high volume intersections and shall be reviewed on a case by case basis. Two options for bicycle travel shall be incorporated into the design, including riding through the roundabout or using on-ramps to sidewalks.

FINANCIAL IMPACT: Initial capital costs may be higher from installation of a roundabout at an intersection but over the long term cost savings from operation and maintenance would be less than a traffic signal. Fewer channelization lanes and associated right-of-way could also be avoided at intersections.

CEQA: Exempt

ATTACHMENTS:

1. ATTACHMENT A - ROUNDABOUT POLICIES FROM TRUCKEE, MARINA AND LOS ANGELES COUNTY

THIS REPORT WAS REVIEWED BY THE CITY MANAGER WHO CONCURS WITH THE STAFF RECOMMENDATION



William B. Avera, City Manager

TOWN OF TRUCKEE
2025 GENERAL PLAN
CIRCULATION ELEMENT

Circulation Element Guiding Principles

- ❖ Coordinate land use and transportation planning in Truckee to provide for the long-range development of the Town's roadway system consistent with the existing and future land use patterns described in the Land Use Element.
- ❖ Maintain acceptable traffic operations on the Town's roads through application of Level of Service thresholds, and by conditioning new development on the ability of local roads and intersections to accommodate projected traffic impacts.
- ❖ Eliminate, to the extent feasible, all traffic signals in Truckee.
- ❖ Minimize the negative impacts of transportation infrastructure upon Truckee's community character, local neighborhoods, and the environment.
- ❖ Ensure that new development minimizes impacts on the roadway network, is integrated into the existing transportation system and provides opportunities for use of alternate modes.
- ❖ Work cooperatively with adjacent jurisdictions to address regional traffic issues.
- ❖ Reduce automobile travel demand to reduce impacts on the Town's roadway system, lessen the need for new or expanded road facilities to accommodate increased demand, and decrease pollutants emissions from automobiles.
- ❖ Provide a safe, comprehensive, and integrated system of trails and bikeways as a key component of the circulation system.
- ❖ Promote a safe and efficient transit system, including both bus and rail, to reduce congestion, improve the environment, and provide viable alternatives to the automobile.

TOWN OF TRUCKEE
2025 GENERAL PLAN
CIRCULATION ELEMENT

- P6.7 Install new road lighting, and replace existing lighting with fixtures that minimize light pollution without compromising traffic safety.
- P6.8 Ensure that adequate parking is provided for commercial, residential and other land uses in Truckee, while, at the same time, limiting excess off-street parking.

Actions

- A6.1 Amend the Development Code design guidelines for traffic signals in the Historic Preservation (HP) overlay zoning district to ensure that fixture styles are aesthetically appropriate for the area.
- A6.2 Conduct an evaluation of parking requirements in the Development Code to ensure that excessive parking is not required, and to address options for shared parking and other parking lot alternatives, particularly in the Downtown and Gateway areas.

Goal CIR-7 Utilize roundabouts instead of traffic signals throughout Truckee.

Policies

- P7.1 Strive to replace existing traffic signals with roundabouts as a means of intersection control, including traffic signals on State Highways.
- P7.2 Install roundabouts instead of new traffic signals or capacity-enhancing improvements to existing signalized intersections, when roundabouts will achieve the same or better Level of Service as a traffic signal, where it is physically feasible to do so, and

TOWN OF TRUCKEE
2025 GENERAL PLAN
CIRCULATION ELEMENT

when installation of the roundabout will not be substantially costlier than a signal.

- P7.3 When traffic calming is desirable at unsignalized intersections, encourage roundabouts instead of multi-lane stop controlled intersections, or the addition of extra turn lanes when the roundabout will achieve the same or better level of service, where it is feasible to do so, and when installation of the roundabout will not be substantially costlier.

Actions

- A7.1 Conduct a study of existing signalized intersections in Truckee to determine which might be suitable for replacement with roundabouts, and develop a prioritization and implementation program for their replacement. Criteria that should be used in considering replacement of existing signals with roundabouts include pedestrian access and safety, historic character, urban design goals for a corridor or neighborhood, costs, and construction feasibility.

Goal CIR-8 Cooperate with regional agencies and neighboring jurisdictions to address regional traffic issues.

Policies

- P8.1 Work with the Nevada County Transportation Commission in periodically reviewing and updating the Regional Transportation Plan (RTP).
- P8.2 Work with adjacent jurisdictions, Caltrans, and the Nevada County Transportation Commission to:

Traffic calming devices should be employed to reduce travel speeds and increase pedestrian and bicyclist safety. (New Policy 2010-13)

street function, surplus right-of-way should be used to expand on-street parking if needed, or be devoted to pedestrian and/or bicycle circulation.

- 3.20 Landscaping of Local Residential Streets.** In order to provide greater visual and physical separation between moving vehicles and pedestrians and moving vehicles and residences, landscaping should be provided by the City, developer or homeowner, as appropriate. This includes but is not limited to street trees and low-maintenance groundcovers. Where existing street rights-of-way allowances are available, organizations such as homeowners associations and commercial landscape districts should be considered to maintain existing street landscaping and add it where it has yet to be provided. **(2010-13)**

Intersection Improvements

- 3.21** In conjunction with the roadway improvements identified in Table 3.1, the following intersection changes or improvements may be necessary to accommodate future vehicular travel needs.

1. If the State Public Utility Commission limits the number of rail crossings, the existing intersection of Paul Davis Drive with Del Monte Boulevard shall be closed so as to accommodate a rail crossing at the intersection of Del Monte Boulevard and extended Cardoza Avenue.
2. The Highway One/12th Street interchange will be reconstructed in conjunction with the realignment and reconstruction of 12th Street. The reconstructed interchange shall serve as the access route to the extension of Del Monte Boulevard.
3. The extension of Del Monte Boulevard to 2nd Avenue shall be designed so as to provide vehicular access to properties along its east side and to avoid disorientation of motorists by maintaining the evident continuity of the boulevard.
4. The intersection of Blanco and Reservation Roads shall be constructed in a manner which accommodates the expressway function of Blanco Road and the arterial function of a two-lane Reservation Road while also providing for a transit guideway parallel to or within the expressway right-of-way. The design shall also provide for safe and convenient linking of the Class I bikeways to the north and south of Reservation Road. **(2005-82)**

- 3.21.1 Roundabouts.** Roundabouts improve the safety of intersections for pedestrians, bicyclists and vehicles by eliminating conflict, reducing speed differentials, and forcing drivers to decrease speeds as they proceed through intersections. Roundabouts should be considered when designing new roadway intersections. Two options for bicyclist travel should be incorporated, including riding through the roundabout or using on-ramps to sidewalks. **(New Policy 2010-13)**

the maximum extent possible, that the provision of such services does not have a deleterious affect on either natural resources or the quality of life of residents of Marina or other potentially affected areas. The major concerns of this section are outlined below:

1. Develop future areas of the City, and redevelop existing developed areas, in patterns and to densities that make the provision of frequent regional and local transit economically feasible.
 - (a) The Marina Heights Specific Plan may be considered to be consistent with Section 3.3.1 if affordable housing goals are met, park and open space areas are provided, and amenities such as pedestrian and bicycle facilities (encouraging alternative access to transit routes and offsite destinations), and home office areas (to encourage telecommuting) are provided, thereby reducing reliance on the automobile. The City will actively work with Monterey Salinas Transit to develop and promote routes to minimize reliance on the private automobile by residents. **(2004-42)**
2. Reduce the length and travel time of work trips generated by local residents by maximizing opportunities for residents to work within the community. Figure 2.2, Land Use Plan, designates areas appropriate for industrial and commercial uses, including multiple use, office research, retail/service and visitor-serving uses. Land use changes that reduce future job opportunities in the City and immediate environs should be avoided. **(2004-42)**
3. The Marina Heights Specific Plan may be considered consistent with Policy 3.3.2 based upon contribution of appropriate impact fees, implementation of adequate mitigation and provision of design features and amenities necessary to reduce travel times to areas designated as employment centers in the community. **(2004-42)**
4. Reduce the number and length of vehicular trips and limit overall traffic congestion by promoting land use patterns which allow for multipurpose trips and trip deferral during peak travel times.
5. The City of Marina shall ensure that walking and bicycling routes are integral parts of street design and form a safe and preferred transportation network. **(2010-13)**
6. Protect existing and future residential areas from through-traffic that creates safety, noise, and pollution problems.
7. The City of Marina shall coordinate with surrounding jurisdictions and agencies, such as TAMC, Caltrans, California Department of Parks and Recreation, Monterey Peninsula Regional Parks District, CSUMB, AMBAG, FORA, BLM, City of Seaside and

Monterey County to pursue projects that develop new pedestrian and bicycle routes and that improve and maintain existing pedestrian and bicycle routes. New routes shall be linked to existing routes wherever possible. The City shall coordinate with these entities to apply for regional funds. (2010-13)

- 8. Link existing and future areas of the City with an integrated system of roads, transit, footpaths and bikeways that connects neighborhoods, commercial areas, schools, parks, and other major community-serving destinations.
- 9. Where necessary and feasible, accept some traffic congestion to achieve other community goals, such as encouraging the integrity of neighborhoods and the use of alternative means of travel.
- 10. Make all transportation decisions within a broad policy context that considers visual, environmental, economic and social objectives rather than being solely responsive to existing or projected traffic problems.
- 11. Minimize the consumption of water for urban purposes and make maximum possible use of recycled water.
- 12. Design stormwater runoff facilities so as to the recharge ground water aquifers while protecting the water quality of these aquifers.
- 13. Ensure long-term availability of required facilities and services prior to approval of new construction.
- 14. Support water resource programs, including desalinization and reclamation efforts, to provide an adequate water supply to accommodate General Plan-permitted growth.
- 15. Promote reductions in the generation of non-recyclable solid waste.
- 16. The City of Marina shall consider incorporating facilities, such as bikeways, sidewalks and recreational trails for non-vehicular users, when constructing or improving transportation facilities and when reviewing new development and redevelopment proposals. (New Policy 2010-13)

Transportation

3.4 At present, Marina residents and businesses, like residents and businesses in most small and medium-sized cities in the U.S., are almost totally dependent on the private automobile for transportation. Public transit service provided by Monterey-Salinas Transit (MST) is limited.

Opportunities to walk or bicycle to most destinations are hampered by the absence of continuous walkways or bike paths linking major community destinations, and where such paths exist, they are hampered by unsafe and unattractive conditions. The dependency of Marina residents on the private automobile is further exacerbated by a land use pattern and street system which makes the provision of transit service or the option of walking or biking from place to place difficult and inconvenient.

- 3.5** The environmental and social consequences of over dependency on the private automobile are now well documented. Air pollution, excessive energy consumption, traffic congestion, noise pollution, disruption of neighborhoods, and inordinate amounts of time devoted to travel for work and other purposes are among the many problems directly attributable to automobile-dominated transportation systems.
- 3.6** The intent of the General Plan is to reduce this dependency on the private automobile by providing Marina residents and others traveling in, out or within the City with other practical and pleasant means of travel. Future transportation and related land use decisions shall adhere to the following transportation-related policies and programs.

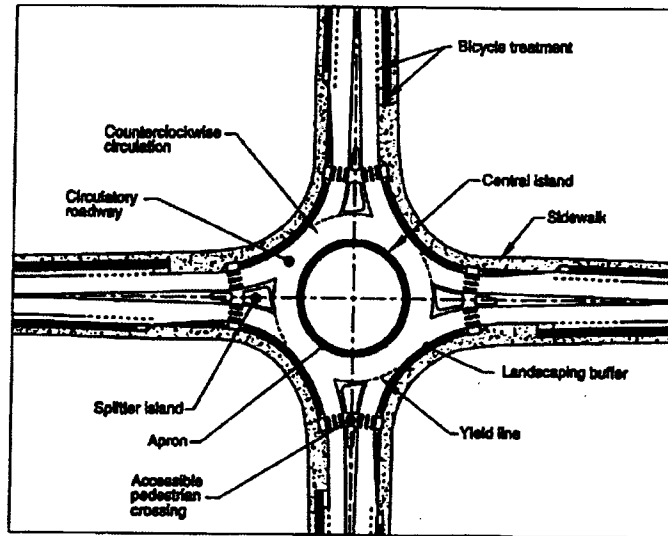
Protected Neighborhoods

- 3.7** Existing and future residential neighborhoods shall be protected from intrusion by heavy through-traffic and from safety, noise and pollution problems created by such traffic. To achieve this end, inter-city traffic shall be directed onto designated major arterials, and intra-city traffic to designated collector streets. The network of streets shall be designed to prevent or inhibit the use of local residential streets for intra-city or cross-town vehicular travel. All streets extended so as to be integrated with developed areas of the Armstrong Ranch and former Fort Ord shall be limited to two lanes, one lane in each direction. Streets so affected are De Forest Road, Crescent Avenue, Beach Road east of Del Monte Boulevard, and Carmel Avenue. **(2006-243)**

Streets and Highways

- 3.8** The network of roadways to accommodate the movement of private and commercial vehicles is shown in the Transportation Policy Map (Figure 3.1). Roads shall be designed in accordance with policies and programs listed below, and, to the extent feasible, roadway system improvements shall be implemented concurrent with major development as allowed by this plan. Forecasted 2020 traffic volumes for major or critical road segments and recommended roadway standards for accommodating projected travel demands are set forth in Table 3.1. See the Community Development and Design Element (Chapter 4) for further policies governing design of designated routes.
- 3.8.1 Pedestrian and Bicyclist Safety Considerations.** In the design and operation of new transportation facilities, pedestrian and bicyclist safety should be a priority in balance with avoiding automobile congestion.

Exhibit 1-1. Drawing of key roundabout features.



Splitter islands have multiple roles. They:

- Separate entering and exiting traffic
- Deflect and slow entering traffic
- Provide a pedestrian refuge

Exhibit 1-2. Description of key roundabout features.

Feature	Description
Central island	The <i>central island</i> is the raised area in the center of a roundabout around which traffic circulates.
Splitter island	A <i>splitter island</i> is a raised or painted area on an approach used to separate entering from exiting traffic, deflect and slow entering traffic, and provide storage space for pedestrians crossing the road in two stages.
Circulatory roadway	The <i>circulatory roadway</i> is the curved path used by vehicles to travel in a counterclockwise fashion around the central island.
Apron	If required on smaller roundabouts to accommodate the wheel tracking of large vehicles, an <i>apron</i> is the mountable portion of the central island adjacent to the circulatory roadway.
Yield line	A <i>yield line</i> is a pavement marking used to mark the point of entry from an approach into the circulatory roadway and is generally marked along the inscribed circle. Entering vehicles must yield to any circulating traffic coming from the left before crossing this line into the circulatory roadway.
Accessible pedestrian crossings	<i>Accessible pedestrian crossings</i> should be provided at all roundabouts. The crossing location is set back from the yield line, and the splitter island is cut to allow pedestrians, wheelchairs, strollers, and bicycles to pass through.
Bicycle treatments	<i>Bicycle treatments</i> at roundabouts provide bicyclists the option of traveling through the roundabout either as a vehicle or as a pedestrian, depending on the bicyclist's level of comfort.
Landscaping buffer	<i>Landscaping buffers</i> are provided at most roundabouts to separate vehicular and pedestrian traffic and to encourage pedestrians to cross only at the designated crossing locations. Landscaping buffers can also significantly improve the aesthetics of the intersection.



**ROUNABOUT POLICY AND
DESIGN PRACTICES FOR
COUNTY OF LOS ANGELES**

NOVEMBER 2007

*Prepared by the Public Works Roundabout Technical Reference Committee
County of Los Angeles Department of Public Works*

1.2 Layout of this Document

Section 2, the policy section of this document, defines Public Works' position with respect to the application of roundabout technology by addressing the questions of when roundabouts should be allowed, recommended, or required. The County's approach is similar in nature to that of the FHWA and other jurisdictions. County policy will set forth criteria that when combined with good engineering judgment and actual field conditions generally yield a clear cut decision on whether to allow, encourage, or require the installation of a roundabout.

Section 3 entitled, "Design Criteria" details design criteria that are specific to Los Angeles County and also provides criteria that the County subscribes to from other source documents, primarily the FHWA Roundabout Guide.

This document will not cover all the aspects of policy and design practices and is expected to evolve over time in response to technological improvements and revisions to Federal and state policies and practices. It is intended to be used in conjunction with other key sources identified herein.

The FHWA publication entitled, "Roundabouts: An Informational Guide" (FHWA-RD-00-067) dated June 2000 is referred to throughout this document and will be referred hereon forth as the "FHWA Guide."

Section 4 lists references that Public Works has found to be reliable sources of information regarding design criteria, site selection, and various other topics relating to roundabouts.

The **Appendices** include a single lane roundabout design drawing, typical layouts, a gallery of drawings and example photos of well-designed roundabouts, and other pertinent information.

2.0. ROUNABOUT POLICY

2.1 Recognition of Importance

The County of Los Angeles recognizes the roundabout as a standard form of intersection control. When constructed in appropriate locations based on criteria contained herein, roundabouts can provide increased efficiency of operation, enhanced safety, cost savings, enhanced aesthetics, and diminished impacts on surrounding property. In all cases, when appropriately applied and properly designed, roundabouts provide one of the safest forms of intersection control due to the creation of a low speed environment and the elimination of conflict points.

It is recognized that roundabouts are not appropriate for all traffic conditions and intersection volumes. Especially in intersection retrofit situations, there are evaluation factors that could lead to decisions against roundabout selection.

2.2 Education/Training

Public Works engineers who are involved with intersection type selection or design should be familiar with the contents of this document. Depending on their level of involvement, additional training opportunities should be pursued ranging from introductory courses aimed at raising awareness and providing criteria for appropriate site selection to more comprehensive courses appropriate for engineers tasked with design and review of roundabouts.

The Department should continue to send appropriate personnel to training courses hosted by other agencies and private firms. In-house training should also be considered when outside courses are not readily available.

Public Works should take a lead role for the County of Los Angeles in the development and use of this emerging technology.

2.3 Reasons to Use or Reject Roundabouts

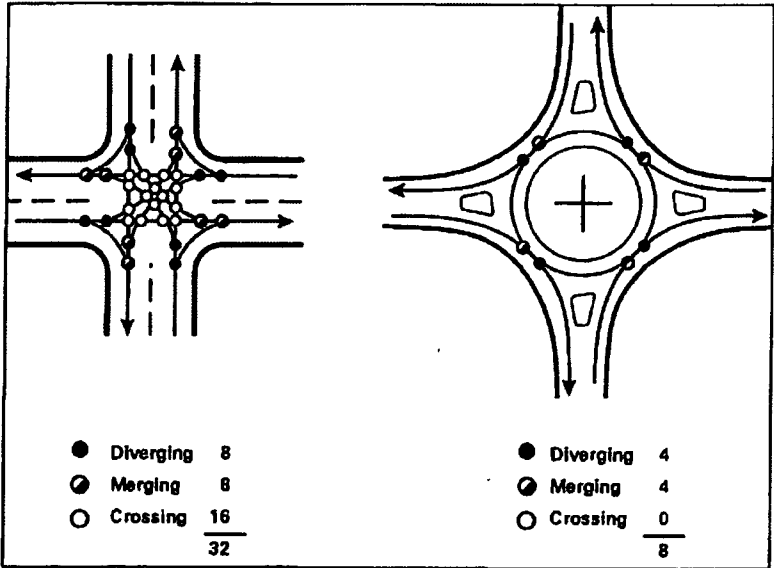
Intersection type should be determined based on analysis of factors including but not limited to: efficiency of operation, safety, cost, right of way requirements, impacts on the surrounding area, aesthetics, and neighborhood characteristics.

Roundabouts should be considered for the following reasons:

- Efficiency of Operation. Roundabouts operate continuously allowing traffic to move through the intersection whenever gaps are available. For certain traffic volume ranges, roundabouts will operate with greater efficiency than signalized or 4-way stop controlled intersections.
- Safety. Roundabouts cause intersections to be slow speed environments due to their geometric characteristics. They do not depend on traffic regulation to slow down traffic. Roundabouts minimize conflict points and simplify the decision making process for motorists and pedestrians by converting all movements to right turns. (See Exhibit 2-3 from FHWA Roundabout Guide below). Head-on and high speed accidents are substantially reduced. Worldwide and U.S. studies confirm reduction of deaths of about 90%, serious injuries of about 70% and general accident reductions at various levels depending on roundabout size and type when compared to conventional intersections.

Exhibit 2-3. Comparisons of vehicle-vehicle conflict points for intersections with four single-lane approaches.

Types of Intersection conflicts.



- Potential Right of Way and Cost Savings. Roundabouts take more right of way at intersections but save right of way on approaches and intervening roads by providing capacity where it is needed. Projects incorporating roundabouts may have a net reduction in right of way requirements and therefore cost savings. This is particularly important where bridge widths can be reduced.
- Aesthetics/Compatibility with Surrounding Community. The central island in a roundabout can be landscaped or decorated (hardscape, water features, etc.) to fit the community and enhance the environment. In some cases, splitter islands may also be landscaped or decorated.

Roundabouts may be rejected for the following reasons:

- Safety and Efficiency of Operation. As traffic volumes increase, the diameter of the circular roadway must also increase allowing higher speeds for circulating traffic. The safety and efficiency diminish with increased speed. As a rule of thumb, roundabouts should not be considered for Average Daily Traffic (ADT) total intersection volumes of 70,000 or greater. For low volume roads (less than 6,000 ADT), the inclusion of a roundabout can decrease efficiency by causing unnecessary slowing and stopping, especially when cross traffic volumes are low in comparison to the primary traffic movement. Roundabouts may still be considered for traffic calming when efficiency is not an important factor.

- Higher Costs. Right of way costs at intersections may exceed cost savings for the approach roads. This is especially true in built up areas where structures or utilities may exist close to intersection corners.
- Right of Way and Surrounding Area Impacts. As mentioned above, impacts from increased right of way requirements at intersections may not be acceptable.
- Steep Grades. Placement of a roundabout on grades greater than 3 percent are generally not recommended. A landing area may be created at 3 percent or less if adequate vertical sight distance is provided.
- Proximity of Signalized Intersections. Signalized intersections in close proximity may cause traffic to back up into the roundabout.
- Pedestrian or Bicycle Traffic. Heavy pedestrian or bicycle traffic could hamper the efficiency of operation.

2.4 Analysis Requirements

2.4.1. Long Term Volume Projections Should be Used. Potential roundabout sites should be evaluated based on long term (20 years or more) traffic volume projections for peak hours. Preferably the projections should result from a build out analysis of the surrounding area. Long term volumes are used in order to identify the ultimate right of way footprint for the project. Interim year volumes can be used to identify interim improvements that are different from the ultimate footprint.

2.4.2. Software Requirements. There are several software products designed to analyze roundabouts. The most popular are ARCADY, RODEL and SIDRA. RODEL is the only analysis program based on empirical data for all ranges of volumes which incorporates user-specified confidence levels.

The County requirement for roundabout analysis and selection of geometric parameters is to use the RODEL program set at the 85 percent confidence level yielding a Level of Service (LOS) of A. A lower level of service (B or C) can be accepted if the operational efficiency is better than that of a conventional intersection alternative or other factors are present to support selection of a roundabout alternative.