

BUTTE COUNTY GRAND JURY REPORT CITY OF OROVILLE PROPOSED ROUNDABOUT PROJECT

SUMMARY

The 2007/08 Butte County Grand Jury has investigated issues brought to their attention regarding the proposed installation of a roundabout traffic circle to be installed in Oroville.

This report provides information from the feasibility study, to the approval and funding of this project, and lists five major concerns brought to the attention of the Grand Jury.

Several meetings occurred with members of the Butte County Grand Jury and Oroville City management including the Oroville Director of Community Development and Public Works and the Oroville City Senior Engineer. The five major issues that were brought to the attention of the Grand Jury are listed in this report along with the corresponding responses by Oroville City Management. All responses have been reviewed by the Grand Jury.

The consensus of the Butte County Grand Jury is that each issue has been thoroughly studied and satisfactorily addressed by Oroville City management.

GLOSSARY

CMAC: Community Mobilization Advisory Committee

BCAG: Butte County Association of Governments

FHWA: Federal Highway Administration

NEPA: National Environment Protection Agency

CEQA: California Environmental Quality Act

ADA: Americans with Disabilities Act

RFP: Request for Proposal

BACKGROUND

The Butte County Grand Jury is authorized by law (Penal Code 925a) to investigate all branches of government operating within the County to assure they are being administered honestly, effectively and in the best interest of the citizens of Butte County. Inputs from the community are an important aspect of the Grand Jury's review process and may prompt an investigation.

The Butte County Grand Jury, upon receiving written correspondence, initiated an investigation regarding the proposed feasibility and installation project, titled FEATHER

RIVER ROUNDABOUT. This roundabout has been designed to radically modify the intersection of Montgomery Street, Washington Avenue and Table Mountain Boulevard in Oroville near the Feather River Bridge. There are two businesses affected by the construction of the proposed roundabout; an apartment complex and a restaurant. The Grand Jury sought to obtain comment from adjacent businesses, but the owner of the apartment complex declined comment.

FEASIBILITY

The Grand Jury looked at the approval of the Roundabout by the city.

The following has been taken from the City Council Minutes:

“The Oroville City Council approved resolution number 6504 which directed the Mayor to execute an agreement with Northstar Engineering to provide professional services for the (aforementioned) roundabout. Resolution number 6504 was approved at a regular City Council meeting on July 5th, 2005. The funding for the roundabout was the result of a federal CMAC grant through the Butte County Association of Governments (BCAG) a grant was awarded to the city of Oroville, and a resolution was adopted by the Council to accept the grant funds. Proposals were solicited from consultants; three proposals were received. The Oroville Public Works staff interviewed the consultants, and based upon the best proposal and presentation, the Northstar Engineering team and their expert on roundabouts were selected. The first phase of the project would be to prepare a feasibility study. An analysis was prepared that looked at the traffic volumes, geometrics of the intersection, capabilities and impacts to adjacent properties, environmental impacts, and other aspects. At this meeting of July 5th, 2005, council member Simpson asked if there would be public hearings regarding the roundabout construction. The Oroville Director of Community Development and Public Works said there would be several public forums held.” The Director further stated at this meeting that the biggest benefit of a roundabout was a much safer intersection.

APPROACH

To launch a comprehensive review of this project, the Butte County Grand Jury formulated the following plan of investigation:

- Interview selected Oroville citizens that may be affected, and list their concerns
- Interview the Oroville Director of Community Development and Public Works
- Substantiate as much as possible claims made by the above
- Review the blueprints and documents submitted by Northstar Engineering
- Review the minutes of the Oroville City Council meeting of July 5th, 2005 when the Roundabout Project received its initial impetus
- Address each major issue presented to the Grand Jury

DISCUSSION

The following is a listing of major concerns brought to the attention of the Butte County Grand Jury and corresponding conclusions reached regarding the concerns. The Grand Jury reached these conclusions after researching information including that provided by both the Oroville Department of Community Development and Public Works:

CONCERNS:

1. Impediment of cars entering the intersection from Table Mountain Road due to a pedestrian crosswalk
2. Impediment of delivery truck's egress during construction
3. Possible loss of business while construction is progress
4. Insufficient public disclosure/public forums by the city of Oroville
5. Improper environmental impact report

CONCLUSIONS REGARDING THE CONCERNS:

1. The pedestrian crosswalks on the Roundabout blueprints are ADA compliant. Cars attempting to enter businesses must stop for pedestrian traffic both before and after the installation of the Roundabout.
2. The contract for construction calls for deliveries to never be blocked. The paved parking lot area will be slightly enlarged over the existing configuration due to the relocation of a small public right-of-way to the driveway nearest Feather River.
3. The contract for construction calls for traffic to never be impeded during construction and full access to be granted to all businesses twenty-four hours a day, seven days a week.
4. The initial *Notice Of A Public Meeting* occurred January 17th 2006 (exhibit A). On February 7th 2006, a report was presented at an Oroville City Council meeting which included a Power Point presentation (exhibit B). Another discussion and Power Point presentation occurred on May 15th 2007 (exhibit C). This was followed with an update presentation at a City Council meeting on August 21st 2007 (exhibit D). Another presentation with a question and answer session occurred at an Oroville High School board meeting on November 5th 2007 (exhibit E). There are continuing City Council meetings pertaining to the proposed Roundabout Project, mostly involving the acquisition of adjacent properties, but open to public input. The City of Oroville website has a display and information regarding the Roundabout Project (exhibit F). All City Council agendas are posted on the bulletin board outside City Hall prior to the meetings.

5. The blueprints and related documents have been reviewed by both the federal and state government agencies for compliance with environmental laws (NEPA) and (CEQA) respectfully, and appropriate recommendations have been made. These recommendations have been incorporated into the RFP as necessary. Since then, both the state and federal government environmental agencies have ‘signed off’ on this project. (exhibit G).

FINDINGS

All items in this report listed under “APPROACH” were studied and investigated by the Butte County Grand Jury.

Upon conclusion of the investigation, no fault could be found regarding the aspects of the Roundabout Project involving the City Of Oroville. Furthermore, all major concerns have been addressed to the satisfaction of the Butte County Grand Jury.

RECOMMENDATIONS

None

RESPONSES REQUIRED:

None

NOTICE OF PUBLIC MEETING

NOTICE IS HEREBY GIVEN that the City Council of the City of Oroville will hold a public meeting on the Montgomery Street and Washington Avenue Roundabout Project. This meeting will be held on TUESDAY, JANUARY 17, 2006 from 5:30 P.M. to 7:00 P.M. at the Oroville City Council Chambers, 1735 Montgomery Street, Oroville.

Scott Ritchie from Roundabouts & Traffic Engineering will make a presentation regarding the benefits of the roundabout project to the City. A question and answer session will follow the presentation. All interested persons are invited to attend and learn about how a roundabout at the Montgomery and Washington intersection will function to improve traffic flow.

Additional information regarding the project described in this notice is available at the Public Works Department, 1735 Montgomery Street, Oroville.



**OROVILLE CITY COUNCIL ADJOURNED MEETING MINUTES
JANUARY 17, 2006 – 5:30 P.M.**

The agenda for the January 17, 2006 adjourned meeting of the Oroville City Council was posted on the bulletin board at the front of City Hall on Friday, January 13, 2006 at 3:20 p.m.

The January 17, 2006 adjourned meeting of the Oroville City Council was called to order by Mayor Gordon Andoe at 5:35 p.m.

ROLL CALL

Present: Council Members Berry, Prouty, Sharkey, Simpson , Vice Mayor Jernigan, Mayor Andoe
Absent: Council Member Corkin (Excused)

PUBLIC MEETING

MONTGOMERY STREET AND WASHINGTON AVENUE ROUNDABOUT PROJECT – staff report.

The Council held a public meeting to provide an opportunity for citizens of the City of Oroville to ask questions and comment on the proposed roundabout to be constructed at the intersection of Montgomery Street and Washington Avenue, Oroville. (Eric Teitelman, Director of Community Development and Public Works)

Mayor Andoe opened the Public Hearing for questions and comments from the public.

City Consultant, Scott Ritchie, from Roundabouts & Traffic Engineering gave a presentation regarding the benefits of the roundabout project to the City. The roundabout is proposed to improve traffic circulation, reduce air emissions, and improve vehicle and pedestrian safety.

Allen Young, 1284 Montgomery Street, stated that he was in favor of the roundabout at that intersection. He stated that he had traveled to England twice in the last year and driven in roundabouts and they do work but would feel more comfortable if the City would consider two lanes from the Montgomery Street approach instead of one.

Peter Gibson, owner of the apartment building next to "The Boss Burger" Restaurant, stated that his main concern was having the ability to make a left-hand turn onto his property, otherwise, he was in favor of the roundabout. Mr. Gibson was assured by Consultant Scott Ritchie that the medium would be shortened at his property to allow a left turn into the apartment complex.

John Anderson, a member of the audience, stated that he felt that the money should be spent elsewhere within the City's infrastructure or be used to widen Washington Avenue.

Jim Carpenter, 3604 Argonaut Avenue, stated that his primary concern was the entrance and egress to the Nature Center and as long as his concern was given consideration, he was in favor of the roundabout.

John Martin, owner of the "Boss Burger" Restaurant, stated that he had two concerns. One is the issue of pedestrian safety and the other is customers being able to enter and exit his property. Mr. Martin also stated that he had never seen traffic backed up over the bridge in the 25 years he had been there. Eric

A

Teidelman, Community Development and Public Works Director, explained that this was a projection of traffic volume over the next 20 years. Mr. Ritchie, City Consultant, assured Mr. Martin that one of the primary goals of this roundabout design was to leave his property untouched. Mr. Teidelman explained that the roundabout design allows Mr. Martin to keep his existing driveways at "The Boss Burger" Restaurant.

Phillip Collins, 155 Lakeland, stated that he was against the roundabout at the Montgomery Street and Washington Avenue intersection. Mr. Collins expressed concern about his children's safety because they cross that intersection to go to school.

Loren Gill, with the Feather River Nature Center, stated that the Nature Center is extremely difficult to enter and exit and did not see where access to the Nature Center was included in the preliminary design of the roundabout. Mr. Ritchie from Roundabouts & Traffic Engineering stated that the issue would be addressed. Mr. Gill also stated that there is a five acre native plant park at the Nature Center and requested that the roundabout be landscaped with native plants.

William Blackwell, owner of the property next to the road that goes to the Nature Center, stated that he supported the roundabout project because he had driven through roundabouts in Europe and they do function very well in eliminating traffic congestion.

Hearing no further comments or questions from the public, Mayor Andoe closed the public meeting.

ADJOURNMENT

The meeting was adjourned at 7:15 p.m. to an adjourned regular meeting of the Oroville City Council scheduled for 7:00 p.m. on Tuesday, January 17, 2006.

Sharon L. Atteberry, City Clerk

Gordon Andoe, Mayor

EXHIBIT
B

**OROVILLE CITY COUNCIL
ADJOURNED MEETING MINUTES
FEBRUARY 7, 2006 – 5:30 P.M.**

The agenda for the February 7, 2006 adjourned meeting of the Oroville City Council was posted on the bulletin board at the front of City Hall on Thursday, February 2, 2006 at 3:20 p.m.

The February 7, 2006 adjourned meeting of the Oroville City Council was called to order by Mayor Gordon Andoe at 5:32 p.m.

ROLL CALL

Present: Council Members Berry, Corkin, Prouty, Sharkey, Simpson, Vice Mayor Jernigan, Mayor Andoe
Absent: None

REGULAR BUSINESS

1. MONTGOMERY STREET AND WASHINGTON AVENUE ROUNDABOUT PROJECT – staff report.

The Council considered a resolution to accept the findings of a completed feasibility study for a roundabout to be constructed at the intersection of Montgomery Street and Washington Avenue, and authorize the Department of Public Works to proceed with the development of plans and specifications for construction of the project. **(Continued from the January 17, 2006 and January 26, 2006 City Council Meeting) (Eric Teitelman, Director of Community Development and Public Works)**

Eric Teitelman, Director of Community Development and Public Works, gave a PowerPoint presentation on the proposed Montgomery Street and Washington Avenue roundabout and on the overall success and safety statistics of roundabouts all over the United States.

Council Member Simpson expressed concerns regarding access to the Nature Center because it hadn't been included in the initial design concept. Council Member Simpson also stated that, in his opinion, pedestrian safety was still an issue that had not been properly addressed.

Council Member Prouty asked if this proposed roundabout was going to be build to CalTrans standards.

City Consultant, Scott Ritchie, from Roundabouts & Traffic Engineering, explained that the roundabout to be built at Montgomery Street and Washington Avenue was not a CalTrans intersection but the specifications for its construction would be equal to CalTrans standards.

Council Member Jernigan asked if the total cost of constructing this roundabout was known.

Eric Teitelman, Director of Community Development and Public Works, stated that the total cost would not be known until after the engineering and actual design were completed.

Al Steeple, 4050 Oro Bangor Hwy, stated that on Paige Street in San Francisco, roundabouts had been installed a four intersections and removed two months later due to pedestrian fatalities.

Gerardo Cueves, 2319 Via Canela, stated that he felt that the roundabout will not alleviate traffic congestion at this intersection.

John Anderson, a member of the audience, stated that he felt the feasibility study should have been done on traffic congestion on Washington Avenue.

Clay Castleberry, 13 Moonrich Court, stated that he was in favor of the roundabout. Mr. Castleberry stated that he felt this was an opportunity for the Oroville City Council to do something good for the City of Oroville by improving one of the gateways to the downtown area.

After discussion, a motion was made by Council Member Sharkey, seconded by Council Member Corkin, to:

Adopt Resolution No. 6627 - A RESOLUTION OF THE OROVILLE CITY COUNCIL ACCEPTING THE FINDINGS OF A FEASIBILITY STUDY FOR THE MONTGOMERY STREET AND WASHINGTON AVENUE ROUNDABOUT PROJECT AND AUTHORIZING THE DEPARTMENT OF PUBLIC WORKS TO PROCEED WITH DEVELOPMENT OF PLANS AND SPECIFICATIONS FOR THE PROJECT.

The motion was passed by the following vote:

Ayes:	Council Members Corkin, Prouty, Sharkey, Mayor Andoe
Noes:	Council Members Berry, Simpson, Vice Mayor Jernigan
Absent:	None
Abstain:	None

ADJOURNMENT

The meeting was adjourned at 6:57 p.m. to a regular meeting of the Oroville City Council to be held at 7:00 p.m., Tuesday, February 7, 2006.

Sharon L. Atteberry, City Clerk

Gordon Andoe, Mayor

PASSED AND ADOPTED by the Oroville City Council at an adjourned meeting on February 7, 2006, by the following vote:

AYES: Council Members Corkin, Prouty, Sharkey, Mayor Andoe

NOES: Council Members Berry, Simpson, Vice Mayor Jernigan

ABSTAIN: None

ABSENT: None

Gordon Andoe, Mayor

APPROVED AS TO FORM:

ATTEST:

Dwight L. Moore, City Attorney

Sharon L. Atteberry, City Clerk

**CITY OF OROVILLE
RESOLUTION NO. 6627**

**A RESOLUTION OF THE OROVILLE CITY COUNCIL RELATING TO A FEASIBILITY
STUDY FOR THE MONTGOMERY STREET AND WASHINGTON AVENUE
ROUNDAABOUT PROJECT AND AUTHORIZING THE DEPARTMENT OF
COMMUNITY DEVELOPMENT AND PUBLIC WORKS TO PROCEED WITH
DEVELOPMENT OF PLANS AND SPECIFICATIONS FOR THE PROJECT**

NOW THEREFORE, be it hereby resolved by the Oroville City Council as follows:

1. The construction of a new traffic roundabout at the intersection of Montgomery Street and Washington Avenue will provide improved and acceptable levels of traffic service, projected to 2015, is predicted to result in a reduction in automobile and pedestrian accidents, will provide an economic savings to the City as compared to completing a conventional intersection upgrade in the future, and will providing a reduction in automobile emissions during the project lifetime, and
2. A feasibility study was completed by City consultants, the results of which show that the design and construction of a traffic roundabout will provide a long term benefit to the City and the general public, and
3. A public meeting was held to inform the public about the history of and benefits of roundabouts, provide pictures and examples of similar completed roundabout projects in other municipalities, and answer questions from the general public about safety, aesthetics and the use of roundabouts, and
4. The public meeting showed general support for and understanding about the roundabout project, and
5. Based on the results of the feasibility study and general public support for a traffic roundabout at the intersection of Montgomery Street and Washington Avenue, the Public Works Department is authorized to proceed with the expenditure of funds for the development of final design documents (plans and specifications) for the project.

**OROVILLE CITY COUNCIL
STAFF REPORT**

TO: MAYOR AND COUNCIL MEMBERS

FROM: ERIC M. TEITELMAN, P.E., DIRECTOR OF COMMUNITY DEVELOPMENT & PUBLIC WORKS

RE: MONTGOMERY STREET AND WASHINGTON AVENUE ROUNDABOUT PROJECT

DATE: February 7, 2006

SUMMARY:

The Council will consider a resolution relating to a completed feasibility study for a roundabout to be constructed at the intersection of Montgomery Street and Washington Avenue, and the authorizing the Department of Community Development and Public Works (Department) to proceed with the development of plans and specifications for construction of the project.

DISCUSSION:

Staff previously submitted an application to the Butte County Air Quality Management District for Clean Air Funds to construct a roundabout at the intersection of Montgomery Street and Washington Avenue. The purpose for the roundabout is to provide relief to the congested intersection and to complement the City's overall plan of revitalizing the downtown area. The roundabout is proposed to improve traffic circulation, reduce air emissions, and improve vehicle and pedestrian safety.

City consultants have completed an initial feasibility study (FS) for the project. The FS concludes that the construction of a roundabout will increase the level of traffic service through the currently congested intersection, result in a reduced number of vehicular/pedestrian accidents, reduce vehicle air emissions, and provide greater fuel economy for vehicles using the roundabout. The roundabout is one of several key capitol improvement projects that will complement the City's overall plan to revitalize the downtown area.

A public meeting was held on January 17, 2006 between 5:30 PM and 7:00 PM. At that time, the City's roundabout consultant made a presentation for the benefit of both the City Council and the general public.

Staff previously submitted an application to the Butte County Air Quality Management District for Clean Air Funds to construct a roundabout at the intersection of Montgomery Street and Washington Avenue. The project was approved by the Butte County Association of Governments (local traffic planning agency), with federal funding of \$222,000 and a local match of \$28,000 (RDA funds) currently available for a feasibility study, and preliminary and detailed engineering design of the project.

FISCAL IMPACT

Funds are available in the 2005/06 fiscal year budget in account no. 307-8195-9601-482.

RECOMMENDATION:

1. Adopt Resolution No. 6627 - A RESOLUTION OF THE OROVILLE CITY COUNCIL RELATING TO A FEASIBILITY STUDY FOR THE MONTGOMERY STREET AND WASHINGTON AVENUE ROUNDABOUT PROJECT AND AUTHORIZING THE DEPARTMENT OF COMMUNITY DEVELOPMENT AND PUBLIC WORKS TO PROCEED WITH DEVELOPMENT OF PLANS AND SPECIFICATIONS FOR THE PROJECT

ATTACHMENTS:

Resolution No. 6627



City of Oroville
 Department of Community
 Development

Washington & Montgomery Roundabout

February 7, 2006
 Public Meeting No. 2

Eric M. Teitelman, P.E., Director
 Rick Walls, P.E., Project Manager

Background

- City applied for Congestion Mitigation Air Quality (CMAQ) Funds from the Butte County Association of Governments.
- City received initial allocation of \$720,000, which requires a 20% local match (\$180,000).
- City entered into contract with Northstar Engineering and RTE (Scott Ritchie) for preparation of feasibility study, and ultimately the environmental work and final design.

Purpose of Project

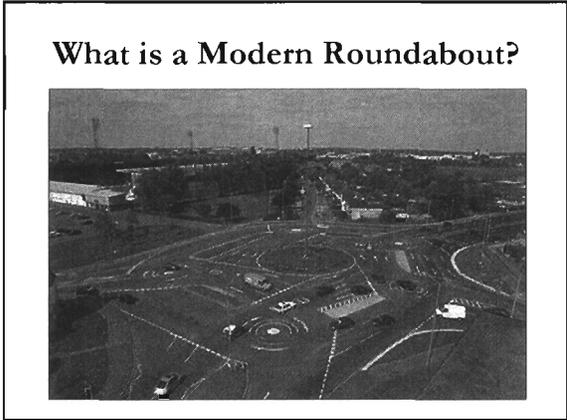
- Congestion Mitigation Air Quality Funds (CMAQ) are earmarked specifically for reduction of congestion and air pollutant emissions.
- City's nexus study identified the need for improvements at this intersection, indicating the level of service will degrade to an unacceptable level over the next 10 to 20 years.

Project Approach

- Staff considered widening the intersection and constructing a new traffic signal, versus constructing a single or double lane, modern roundabout.
- Staff recommended the roundabout over the traffic signal, pending a favorable opinion generated by an independent outside consultant, and presented in a feasibility study.

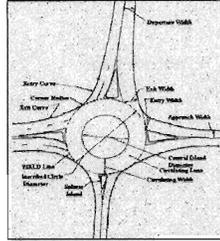
Justification for a Roundabout

Item	Modern Roundabout	Traffic Signal
Low Crash Severity	Excellent	Poor
Pedestrian Safety	Good	Fair
Bicycle Safety	Good	Fair
Low Vehicle Speeds	Excellent	Poor
Low Vehicle Delays	Excellent	Poor
Vehicle Movement	Excellent	Fair
Emission Reduction	Excellent	Poor
Aesthetics	Excellent	Poor



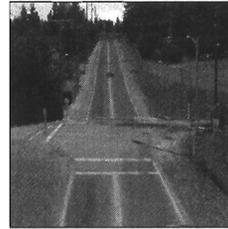
What is a Modern Roundabout?

- Modern roundabouts are circular intersections.
- Roundabout features include:
 - Yield control of entering traffic;
 - A center island to ensure that vehicle speeds around the circle are 15 to 20 mph; and
 - Splitter islands on the road approaches to guide vehicles and provide refuge for pedestrians.



Grandview Drive University Place, Washington

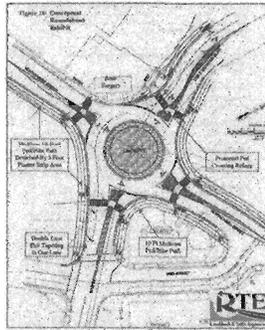
Before



After



Oroville's Modern Roundabout



Benefits of a Modern Roundabout

- Provide safer operations
- Reduce crash severity
- Lower vehicle speeds
- Operate with lower vehicle delays
- Reduce air pollutant emissions
- Increase aesthetics

What Others are Doing?

FOR IMMEDIATE RELEASE:
June 20, 2000

GOVERNOR: STATE AWARDS CONTRACT TO BUILD KINGSTON ROUNDABOUT

Governor George E. Pataki today announced the State Department of Transportation (DOT) has awarded a \$2.7 million contract for the construction of a traffic roundabout in the City of Kingston.

"The roundabout is designed to meet the unique characteristics of Kingston, and is a direct result of the state listening to the local community and our working partnership with Mayor Gallo," Governor Pataki said. "This innovative solution will provide increased safety, reduced congestion and an improved quality of life in Kingston."

What Others are Doing? Milpas Street Roundabout, Santa Barbara

April 2000

The biggest traffic roundabout in our country, on Milpas Street in Santa Barbara, opened to Highway 101 ramp traffic in late March. The question for bicyclists is whether it is more or less dangerous than the previous intersection that was controlled with traffic signals.



The Milpas Street roundabout is empty except for cyclists on a late Sunday morning. When the Highway 101 access ramps are open, motorist traffic will increase. Photo by Ralph Fertig.

The roundabout configuration consists of two lanes each entering from Milpas north, Milpas south, and the Highway 101 off-ramp, Capistrano Avenue has one entrance lane. Within the roundabout, there are no striped lanes, so traffic may move in a single line.

If this happens, it will be fairly safe for bicyclists who keep their speeds up to motorist speeds and who take the roundabout lane until they exit. This should not only make them more visible to entering motorists, but also prevent exiting motorists from cutting them off.

If the roundabout indeed slows motorists to 15 MPH, there may be few problems. Bicycle Coalition VP **Ralph Fertig** often bikes through the intersection, so he will be watching the situation with interest. If you have comments about bicyclist safety, phone Fertig at 962-1479, or email him at rfertig@sbcc.net.

What Others are Doing?

Los Altos Town Crier
Publication Date: October 17, 2001

Los Altos City Council approves city's first traffic roundabout
By Linda Taaffe

The Los Altos City Council unanimously agreed last week to move forward with the city's first roundabout, at the intersection of Springer and Berry avenues near Loyola School.

The 80-foot traffic circle is part of a list of street improvements intended to calm traffic in the Loyola School neighborhood under a half-million-dollar federal "Safe Routes to School" grant.

What Others are Doing?

Better Roads, September 2005
ROADWORKS

Award-winning Roundabout in Ohio

In Ohio, the Dublin Mansfield Drexel Road roundabout has proved so successful that the city plans to build three more of the innovative intersections. The roundabout opened a year ago and only two traffic accidents have been reported, a significant decrease compared to the previous intersection which averaged two to three accidents a month. By reducing speeds to 25 miles per hour and eliminating right-angle collisions, the modern roundabout reduces accidents. Construction of a roundabout at the intersection of Olrik Road, Avery Road, and Shawley Road and one of Dublin and Grand are underway and should be completed by year's end. The Shamrock Boulevard and Village Parkway intersection will be built next year. The Mansfield Grand

Roundabout won an outstanding achievement award from the American Council of Engineering

Engineering Companies of Ohio at the Engineering Excellence Awards Competition.



Low Crash Severity



Low Crash Severity Transportation Research Board Study

Intersections converted to roundabouts reduced overall crashes by 37%, and reduced injury accidents by 51%.

1997 Study conducted by the Transportation Research Board.

Low Crash Severity Reasons for Reduction in Crash Severity

- The number of conflict points are reduced
- Vehicle Speeds are lower
- Decision making is simplified
- The force of impact is much lower



Low Crash Severity Maryland Roundabout Safety Experience

As of September 2001, Maryland has more than 25 modern roundabouts in operation. Eight were intersection conversions.

Since conversion to roundabouts, the average annual accidents for the eight intersections fell by 64%. Accident severity also decreased, as injury accidents have shown a reduction of 83%.

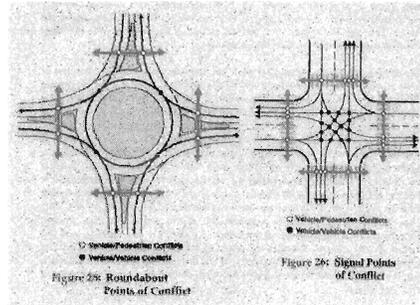
Maryland State Highway Administration
Office of Traffic and Safety
Traffic Safety Analysis Division

October 2, 2001

Pedestrian Safety



Pedestrian Safety Pedestrian Conflict Points



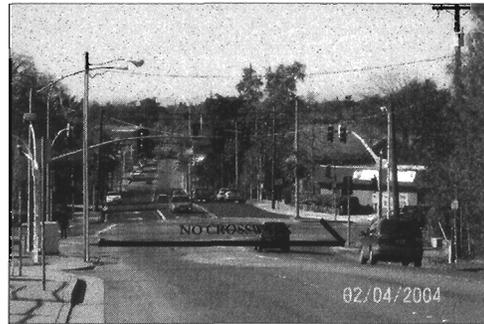
Pedestrian Safety Pedestrian Simulation Study

"Implementation of the model to the proposed roundabout predicts...a 7% reduction reduction in pedestrian-vehicle crashes..."

"For the accidents that might have occurred, their severity would be less because of decreased vehicle speeds dictated by the roundabout. Additional safety enhancement might occur because of the pedestrian refuge offered by the splitter islands..."

John R. Stone, Ph.D., Department of Civil Engineering, North Carolina State University, prepared for the Southeastern Transportation Center with a grant from the U.S. Department of Transportation.

Pedestrian Safety



Pedestrian Safety



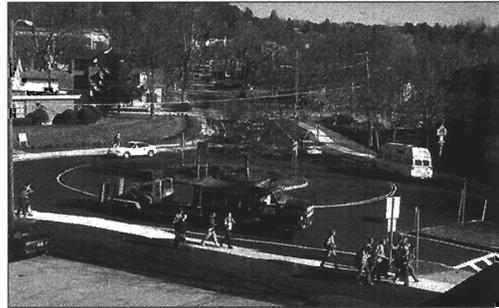
Pedestrian Safety



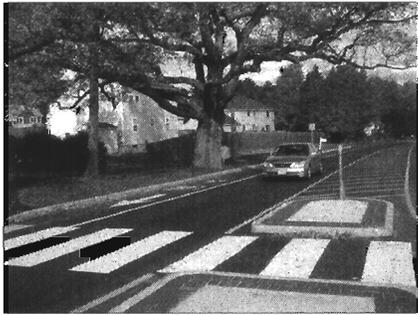
Pedestrian Safety
Bend, Oregon



Pedestrian Safety
Montpelier, Vermont



Pedestrian Safety
Nashua, New Hampshire



Pedestrian Safety
Olympia, Washington



Bicycle Safety

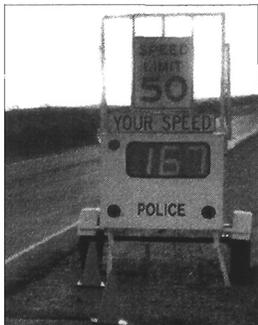


Bicycle Safety
U.S. Department of Transportation

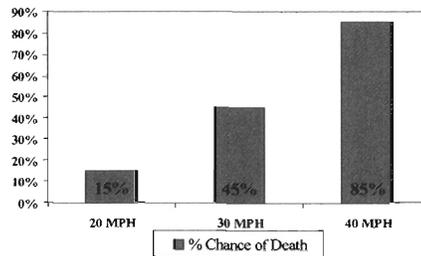
Roundabouts “slow drivers to speeds more compatible with bicycle speeds, while reducing high-speed conflicts and simplifying turn movements for bicyclists”.

US Department of Transportation's "Roundabouts. An Informational Guide", June 2009

Low Vehicle Speeds



Low Vehicle Speeds Pedestrian Fatality Rates



UK Department of Transportation

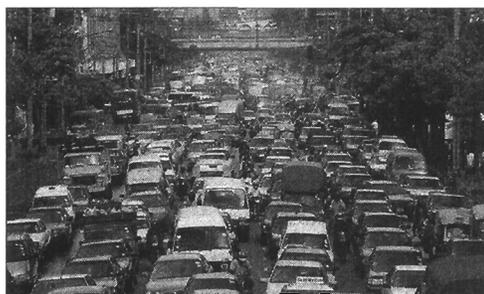
Low Vehicle Speeds Pedestrian Fatality Rates

“Regardless of age, pedestrians involved in crashes are more likely to be killed as vehicle speeds increase.”

In a report prepared by the Preusser Research Group for the National Highway Traffic Safety Administration, “Researchers found that fewer than 2% of struck pedestrians died in crashes that occurred where posted speed limits were slower than 25 mph.”

Insurance Institute for Highway Safety, Status Report, Vol. 35, No. 5, May 13, 2000

Low Vehicle Delays



Low Vehicle Delays Transportation Research Board

A study of eight intersections converted to roundabouts measured reductions in rush hour delays of 77%.

Transportation Research Board

Low Vehicle Delays Reason for Reduction in Vehicle Delays

- Roundabouts are 30 percent more efficient than traffic signals, and there is no wasted green time.
- Also, because traffic moves more slowly, drivers can take advantage of smaller gaps to make their turns.

Low Vehicle Delays

Table 3: Capacity Comparison
 Montgomery / Washington
 AM, PM, School Peak Hour Results - 2025

Intersection	Roundabout			Signal		
	AM	PM	School	AM	PM	School
DELAY (in seconds)	5.8	6.1	5.9	69.1	41.5	61.3
LOS	A	A	A	E	D	D

Source: RIE
 Orville Feasibility Tables.xls

Vehicle Movement



Vehicle Movement

Reason for Improved Vehicle Movement

- Four lane roads are needed for stacking cars waiting at red lights. Modern roundabouts distribute traffic evenly around all sides of the intersection, so extra storage lanes aren't needed.
- In other words, two lanes moving all the time have roughly the same capacity as four lanes stopped half the time at red lights.

Emission Reduction



Emission Reduction

Emissions Reduced ROG, NOX & PM-10	
612.6 lbs	1-year
12,240 lbs	20-years

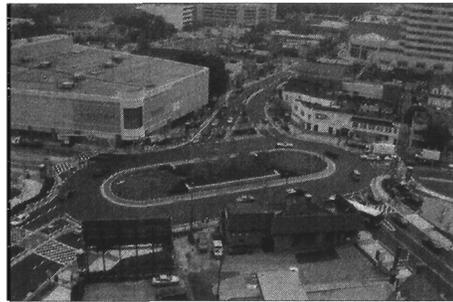
Aesthetics Conventional Intersection



Aesthetics
Rome, New York



Aesthetics
Towson, Maryland



Aesthetics
Hilton Head, South Carolina



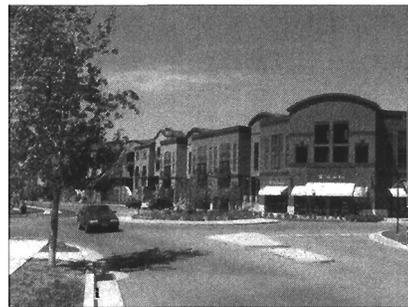
Aesthetics
Cotati, California



Aesthetics
Okemos, Michigan



Aesthetics
Provo, Utah



Aesthetics
Utah



Aesthetics
Portland, Oregon



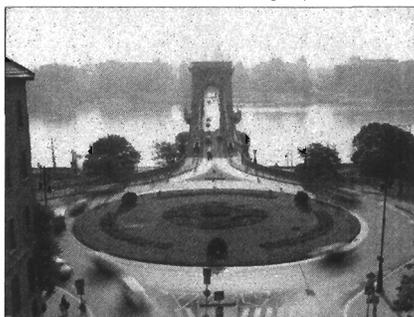
Aesthetics
Olympia, Washington



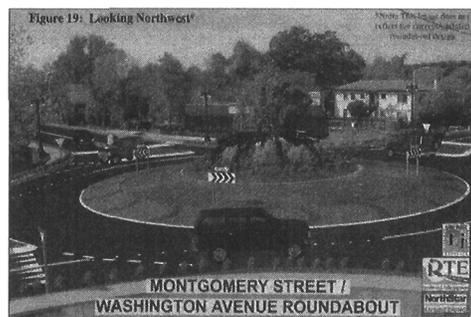
Aesthetics
Nashua, New Hampshire



Aesthetics
Budapest, Hungary



Aesthetics
Oroville, California



In Summary Feasibility Study Decision Matrix

Table 5: Decision Matrix
Comparison of Key Elements of Alternatives

Alternatives	Weight	Delay / LOS	Vehicle Safety	Const. Cost	EMS & Fire Safety	O & M Costs	Adv. Benefits	Total Score: Higher is Better
		30%	30%	19%	15%	5%	10%	
Signalized Intersection		2	3	5	2	3	2	2.65
Modern Roundabout		5	5	2	5	4	5	4.65

Legend: 0=Very Poor, 1=Poor, 2=Below Avg, 3=Average, 4=Above Avg, 5=Excellent

Source: RTE
Oroville Feasibility Tables.xls

In Summary Traffic Signal Widening



In Summary Roundabouts Provide the Following Benefits:

- Safer operations
- Reduced crash severity
- Lower vehicle speeds (Traffic calming)
- Lower vehicle delay
- Reduced air pollutant emissions
- Increased aesthetics

In Summary Driver Opinion Survey of Roundabouts

“Twice as many drivers favor roundabouts after installation...”

“A few months after installation show opinions had changed dramatically. The proportion in favor doubled overall, from 31% before construction to 63% after. Those who were strongly opposed dropped from 41% to 15%.”

Insurance Institute for Highway Safety, Status Report Vol. 36, No. 7, July 28, 2001.

In Summary More Time for Police Activities



In Summary Oroville, California

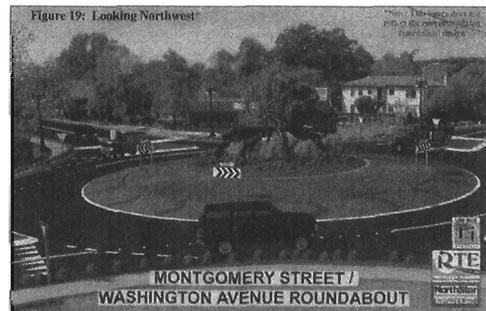


EXHIBIT C

**Montgomery & Table Mountain
Roundabout Project Update**
May 15, 2007 City Council Meeting

Orville Feasibility Study

**ROUNDABOUT
FEASIBILITY REPORT**

**MONTGOMERY STREET /
WASHINGTON AVENUE
ROUNDABOUT PROJECT**



Prepared For:
City of Orville, California



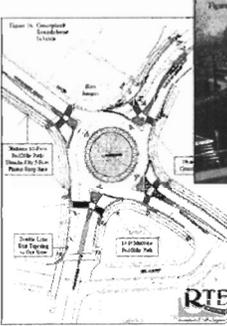
Prepared By:
Scott Spitzer, P.E.
Roundabouts & Traffic Engineering

20060715-0001



Existing Intersection

Orville Feasibility Study





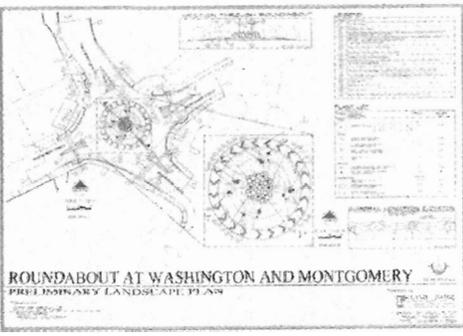
**MONTGOMERY STREET /
WASHINGTON AVENUE ROUNDABOUT**

Proposed Intersection

Design Submittal

ROUNDABOUT AT WASHINGTON AND MONTGOMERY

PRELIMINARY LANDSCAPE PLAN



Proposed Links for City Website

Description and Photos of Washington/Montgomery Roundabout:
http://www.roundabouts.us/images/project_links/California_Washington/Montgomery.htm
<http://www.cityoforville.org/roundabout2.htm>

Roundabout Questions and Answers:
<http://www.fhwa.org/research/qa/roundabouts.htm>

Websites:
 Federal Highway Administration: Roundabouts
<http://www.fhwa.gov/publications/p25/cp25041.htm>

Articles:
 Roundabouts: An Informational Guide (Federal Highway Administration)
<http://www.fhwa.gov/safety/00069.pdf>
 All About the Roundabout
<http://www.dot.wiscor.gov/safety/mofortit/obca/roundabout-brochure.pdf>
 How to Drive a Roundabout
http://www.okansas.gov/Assets/mw/roundabout/exhibit_2.pdf
 Features of a Roundabout
http://www.okansas.gov/Assets/mw/roundabout/exhibit_1.pdf
 Why Roundabouts Are Safer
http://www.okansas.gov/Assets/mw/roundabout/exhibit_3.pdf
http://www.okansas.gov/Assets/mw/roundabout/exhibit_4.pdf
 Roundabouts
<http://www.wisconsin.gov/pdfs/3655.pdf>
 A Critical Look at Roundabouts
<http://www.itsa.org/traffic/documents/AJAG6C63.pdf>

Videos:
http://www.okansas.gov/Res/Traffic_and_Transportation/Roundabouts/divina.cfm#two_line
<http://www.ca.scotstate.ca.us/Traffic/Roundabouts/Demo/Media/Player.asp?video=pedlight1.wmv>

Federal Highway Administration

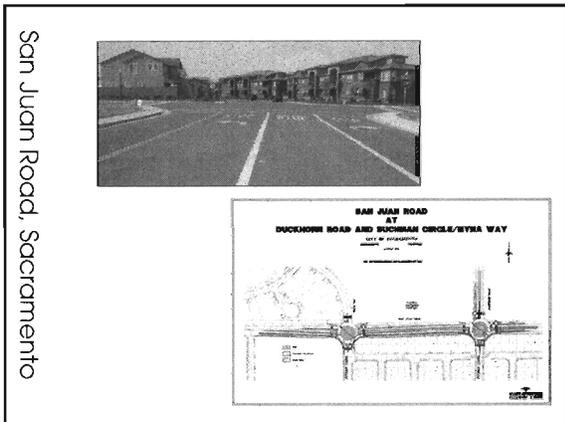
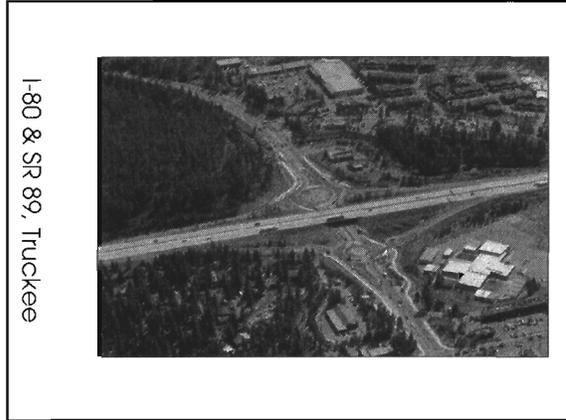
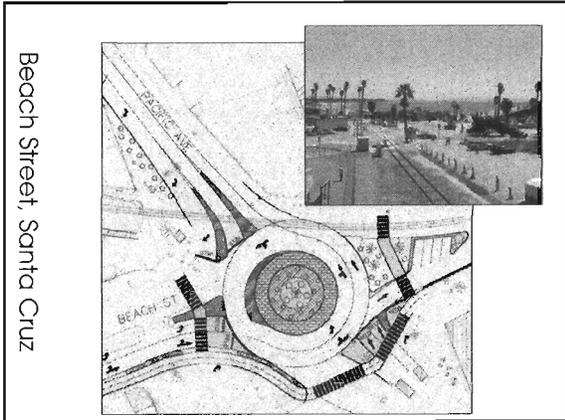


Roundabout Safety Comes to America

The superior safety record of modern roundabouts is well-known in Western Europe and in most third-world countries around the globe. Still, many in North America question whether there are any advantages with this type of intersection compared to a four-way stop.

But many American highway engineers have discovered that modern roundabouts, and they are designed and being roundabouts to reduce accident and increase capacity. Modern roundabouts have recently been built in California, Colorado, Florida, Maryland, Nevada, and Vermont. In 40 additional modern roundabouts are proposed for Texas, with changes in Maryland and California, and one modern roundabout interchange will built this summer on Interstate Highway 75 in Colorado.

This article takes a look at the "unfamiliar" accident experience of America's "official" high-speed modern roundabouts in 1998, and of some European countries, where no accident in ten years ago modern roundabouts were relatively new. See the text.



Pedestrian Safety Studies

"For the accidents that might have occurred, their severity would be less because of decreased vehicle speeds dictated by the roundabout. Additional safety enhancement might occur because of the pedestrian refuge offered by the splitter islands..." (1)

"Regardless of age, pedestrians involved in crashes are more likely to be killed as vehicle speeds increase... In a report prepared by the Preusser Research Group for the National Highway Traffic Safety Administration, "Researchers found that fewer than 2% of struck pedestrians died in crashes that occurred where posted speed limits were slower than 25 mph." (2)

(1) John R. Stone, Ph.D., Department of Civil Engineering, North Carolina State University, prepared for the Southeastern Transportation Center with a grant from the U.S. Department of Transportation.

(2) Insurance Institute for Highway Safety, Status Report, Vol. 35, No. 5, May 13, 2000

Speed Limit	% of Deaths
25 MPH	15%
35 MPH	45%
45 MPH	85%

Pedestrian Safety Studies
University of Tennessee

The Effects of Roundabouts on Pedestrian Safety

The Southeastern Transportation Center
University of Tennessee - Knoxville
August 2002

Table 1.1 Summary: Pedestrian Safety Issues at Roundabouts and Intersections

Issue	Roundabouts	Intersections
Pedestrian Crash Data	Little	Much
Speed	Lower	Higher
Traffic Calming	Enhancing	Hindering
Pedestrian Refuge Areas	Yes	No
Walk Distance	Greater	Lower
Pedestrian-Vehicle Conflicts	8	12*
Right-of-Way	Vehicle	Pedestrian
Driver/Pedestrian Familiarity	Little	Much
Judging Gaps (Sighted)	Easy (Low Speed)	Hard
Judging Gaps (Sight Disability)	Difficult (Continuous Traffic)	Easy (Discontinuous Traffic)
Auditory Cues (Sight Disability)	Difficult (Continuous Traffic)	Easy (Discontinuous Traffic)

* Lane 3 - Bicycle and Pedestrian Facilities at Small Roundabouts in Built-up Areas - 2nd International Symposium on Highway Planning Design, June 2000/98 - 606. Sponsored by Road Transportation Research Association, Germany and AASHTO.

Pedestrian Safety Studies
University of Tennessee

The Effects of Roundabouts on Pedestrian Safety

The Southeastern Transportation Center
University of Tennessee - Knoxville
August 2002

Figure 1.2 Comparing Conflicts

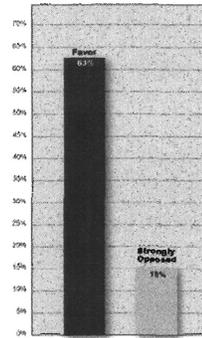
Legend:
 □ Vehicle/Vehicle Conflicts
 ■ Vehicle/Pedestrian Conflicts

The Effects of Roundabouts on Pedestrian Safety

The Southeastern Transportation Center
University of Tennessee - Knoxville
August 2002

Conclusions

Results of this study indicate that converting conventional signalized intersections to modern roundabouts may reduce pedestrian-vehicle crashes and conflicts according to available literature and three independent approaches (case study, regression and simulation). The literature suggests that lower speeds and fewer conflict points of roundabouts are the primary contributors to the safety increase. The simulation for this research shows that if traffic diversion occurs at a roundabout with fewer lanes than the conventional intersection it replaced, it can also produce a reduction in pedestrian accidents. At least in terms of measured pedestrian capacity, a surrogate for safety. In particular for typical pedestrian reaction times and walking speeds, when a 30% traffic diversion occurs, a single-lane roundabout can handle more pedestrians more safely than a four-lane signalized intersection.



The reasons most cited for concern were fear of the unknown. People initially prefer traffic signals and stop signs until they realize roundabouts allow them through the intersection safely without having to stop. Other concerns about safety and possibly being confused about where to go also dissipate with use.

Public opinion after driving roundabouts. Most favor them and only 18% are strongly opposed.

Questions?

$$PV^2 > 10^8$$

P = Pedestrians per hour
V = Vehicles per hour

V = 1,070 vph for southbound PM Peak

$$P > 10^8 / V^2$$

$$P > 100,000,000 / 1,070^2$$

P must be > 87 Pedestrians per hour

Pedestrian Signal Warrant in the USA

- MUTCD:
 - A. 100+ Ped/s/hr for 4 hours or 190 for 1 hour; and
 - B. There are fewer than 80 gaps per hour in the traffic stream. When there is a divided street median this applies in both directions of vehicle traffic.
 - OPTION: The Ped volume requirement may be reduced by up to 50% if ped crossing speed is less than 4 ft/s.
- A traffic control signal may not be needed if adjacent coordinated traffic control signals consistently provide gaps of adequate length for peds to cross the street. (for a Roundabout?)
- FHWA Ped Signal Alternatives Study:
 - 60+ Ped/s/hr for 4 hours or 90/hr for 2 hours, or 110/hr for 1 hour
- BOULDER, CO:
 - 50+ Ped/s/hr for 4 hours or 100/hr for 1 hour

EXHIBIT D

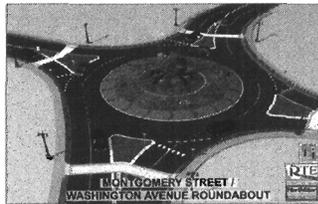
Montgomery & Washington Roundabout

August 21, 2007
City Council Meeting

What is a Modern Roundabout?

What is a Modern Roundabout?

- Modern roundabouts are circular intersections.
- Roundabout features include:
 - Yield control of entering traffic;
 - A center island to ensure that vehicle speeds around the circle are between 15 and 20 mph; and
 - Splitter islands on the road approaches to guide vehicles, and to provide refuge for pedestrians.



Benefits of a Modern Roundabout

- Provides safer operations
- Reduces crash severity
- Lowers vehicle speeds
- Operates with lower vehicle delays
- Reduces air pollutant emissions
- Increases aesthetics

What Others are Doing?

Better Roads, September 2005

ROADWORKS

Award-winning Roundabout in Ohio

In Ohio, the Dublin, Fairfield Drive Road roundabout has proved so successful that the city plans to build three more of the innovative intersections.

The roundabout opened a year ago and only two traffic accidents have been reported, a significant decrease compared to the previous intersection, which averaged two to three accidents a month. By reducing speeds to 25 miles per hour and eliminating right-angle collisions, the modern roundabout reduces accidents. Construction of the roundabout at the intersection of Clark Road, Avery Road, and Minley Road will get at Dublin and Bestel streets underway and should be completed by next June. The Sharnock Boulevard and Village Parkway intersections will be built next year. The Fairfield Roundabout roundabout won an outstanding achievement award from the American Council of Engineering Companies of Ohio at the Engineering Excellence Awards Competition.

What Others are Doing?

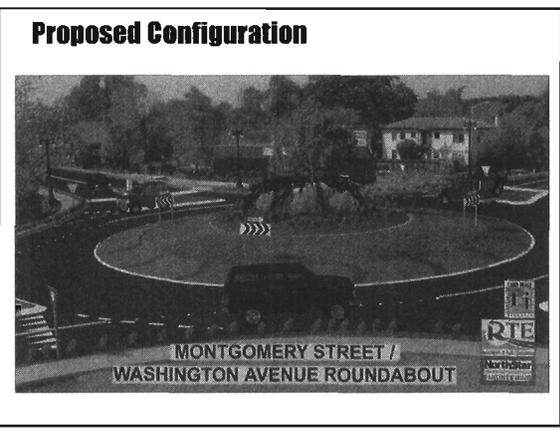
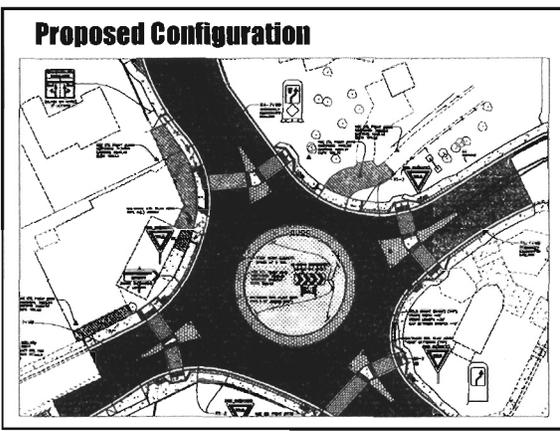
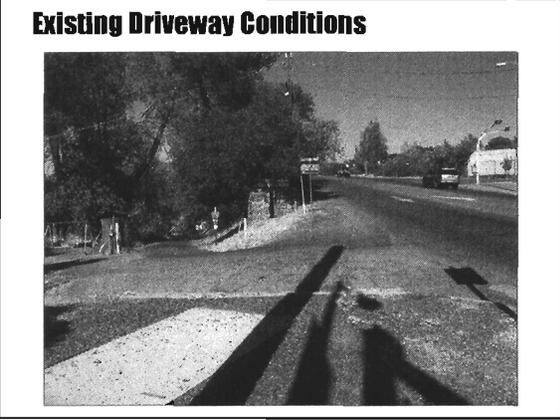
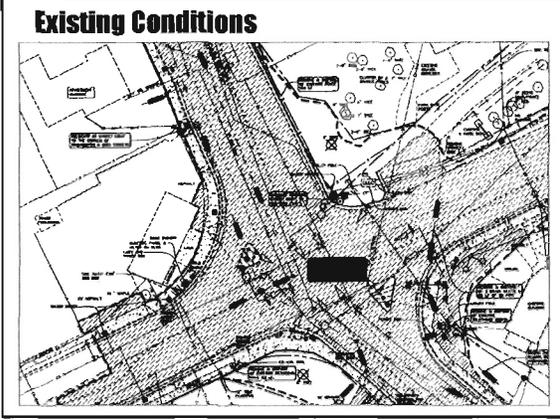
Los Altos Town Crier
Publication Date: October 17, 2001

Los Altos City Council approves city's first traffic roundabout
By Linda Taaffe

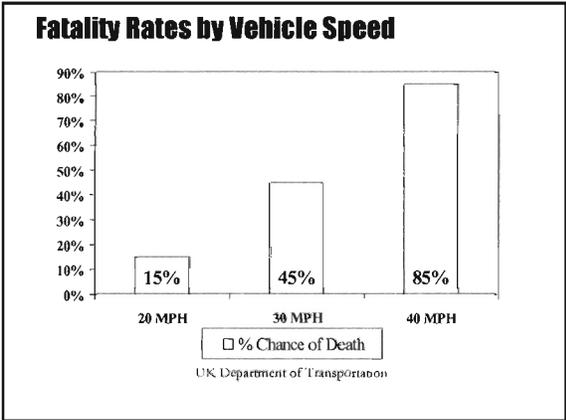
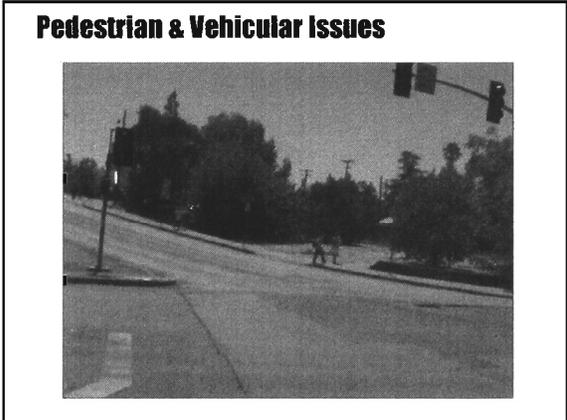
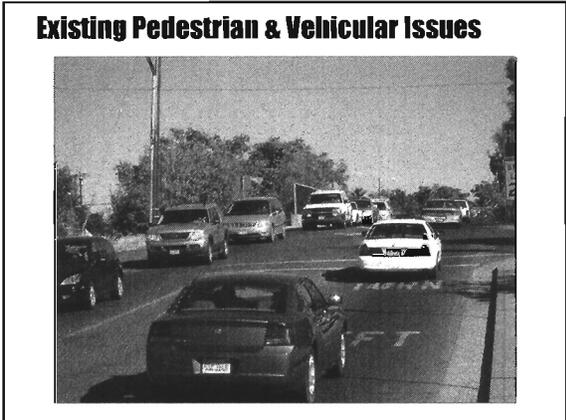
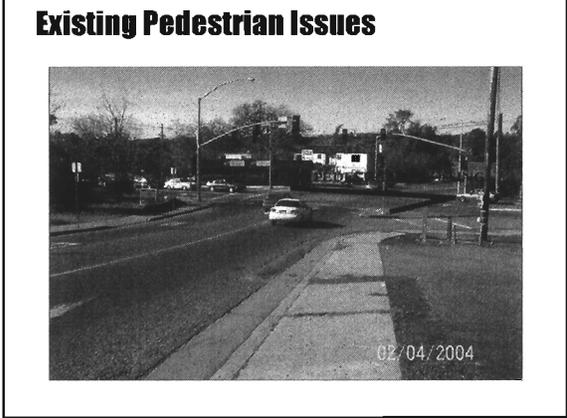
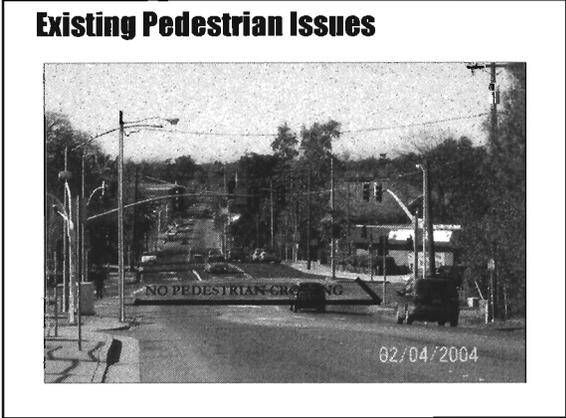
"The Los Altos City Council unanimously agreed last week to move forward with the city's first roundabout, at the intersection of Springer and Berry avenues near Loyola School."

"The 80-foot traffic circle is part of a list of street improvements intended to calm traffic in the Loyola School neighborhood under a half-million-dollar federal "Safe Routes to School" grant."

Existing vs. Proposed Configuration



Pedestrian and Bicycle Safety



Pedestrian Fatality Rates

"Pedestrians involved in crashes are more likely to be killed as vehicle speeds increase."

"In a report prepared by the Preusser Research Group for the National Highway Traffic Safety Administration, "Researchers found that fewer than 2% of struck pedestrians died in crashes that occurred where posted speed limits were slower than 25 mph."

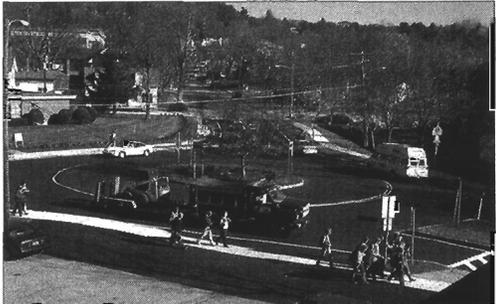
Insurance Institute for Highway Safety, Status Report, Vol. 35, No. 5, May 13, 2000

Bicycle Safety

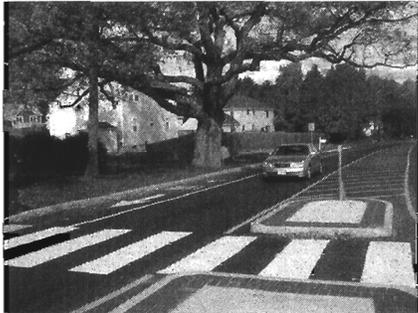
Roundabouts "slow drivers to speeds more compatible with bicycle speeds, while reducing high-speed conflicts and simplifying turn movements for bicyclists."

US Department of Transportation's "Roundabouts: An Informational Guide", June 2000

Pedestrian Safety - Montpelier, Vermont



Pedestrian Safety - Nashua, New Hampshire



Pedestrian Safety - Harford County, Maryland



"The roundabout at Tollgate Road and Montrose Way is located between Singer Road and Wheel Road, two collector roads. It was constructed by the developer of a major subdivision of approximately 1,400 housing units... There is an elementary school and library located just north of the roundabout, and another elementary school to the south."

Pedestrian Safety - Harford County, Maryland



"The roundabout at Tollgate Road and Wheel Road was constructed in 1999... There have been three reported accidents at this location (all very minor in nature). Wheel Road is a major collector road in the County. An elementary school is located in the area and some of the children walking to school must cross the roundabout. School buses easily navigate the roundabout and school children are assisted across by a crossing guard. The roundabout was landscaped by an Eagle Scout candidate in August 2000."

Vehicle Safety

Reduced Crash Severity

"Intersections converted to roundabouts reduced overall crashes by 37%, and reduced injury accidents by 51%."

1997 Study conducted by the Transportation Research Board.

Reasons for Reduction in Crash Severity

- The number of conflict points are reduced
- Vehicle speeds are lower
- Decision making is simplified
- The force of impact is much lower

<http://69.215.29.34/view/index.shtml>

Emissions Reduction

Vehicle Capacity Comparisons

Table 3: Capacity Comparison
Montgomery / Washington
AM, PM, School Peak Hour Results - 2025

Intersection	Roundabout			Signal		
	AM	PM	School	AM	PM	School
DELAY (in seconds)	5.8	5.1	5.9	69.1	41.5	51.3
LOS	A	A	A	E	D	D

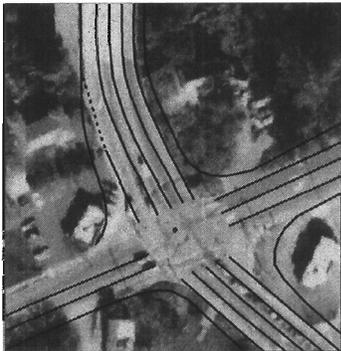
Source: RTE. [Oroville Feasibility Tables.xls](#)

Emissions Reduction

Emissions Reduced ROG, NOX & PM-10	
612.6 lbs	1-year
12,240 lbs	20-years

Widening for a Traffic Signal

Traffic Signal Widening



Maryland Roundabout Safety Experience

"As of September 2001, Maryland had more than 25 modern roundabouts in operation. Eight were converted from traffic signals to roundabouts."

"Since conversion to roundabouts, the average annual accidents for the eight intersections fell by 64%. Accident severity also decreased, as injury accidents have shown a reduction of 83%."

Maryland State Highway Administration
Office of Traffic and Safety
Traffic Safety Analysis Division

October 2, 2001

Aesthetics

Aesthetics - Utah



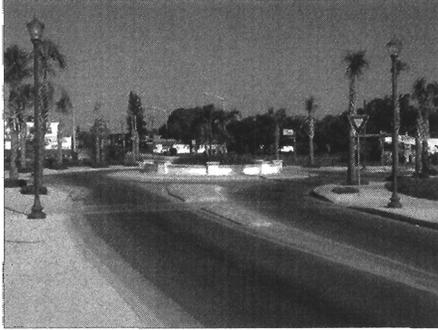
Aesthetics - Rome, New York



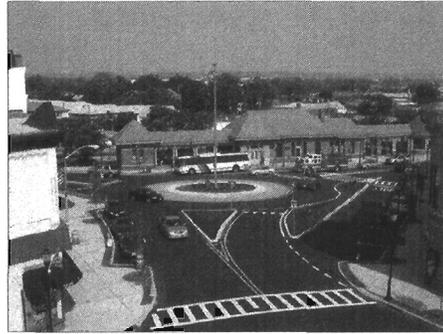
Aesthetics - Florida



Aesthetics - For Pierce, Florida



Aesthetics - Ruthford, New Jersey



Aesthetics - Okemos, Michigan



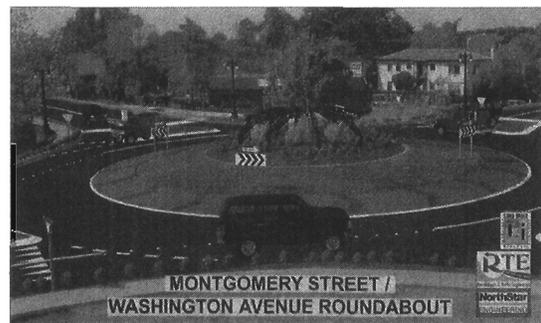
Aesthetics - Portland, Oregon



Aesthetics - Cotati, California



Aesthetics - Oroville, California



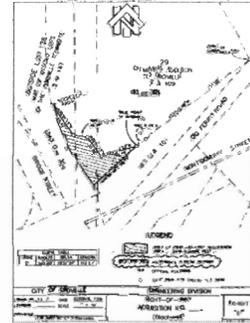
Estimate of Probable Costs

Preliminary Estimate of Probable Costs

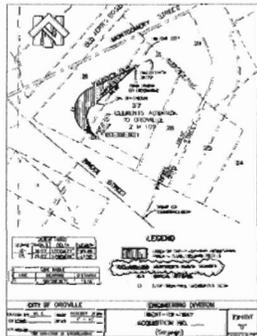
Item Description	Amount
Design, Survey & Permitting	\$250,000
Right-of-Way Acquisition	\$94,300
Pre-Roadway Work	\$199,000
Roadway Construction	\$420,000
Storm Drainage	\$18,000
Signing, Striping & Lighting	\$60,000
Landscaping	\$208,000
Contingency & Construction Management (19%)	\$295,000
Total	\$1,544,300

Property Acquisition

Property Acquisitions



Property Acquisitions



Questions?



Pedestrian Signal Warrants

UK Traffic Signal Warrants for Pedestrians

$PV^2 > 10^8$

P = Pedestrians per hour
 V = Vehicles per hour

V = 1,070 vph for southbound PM Peak

$P > 10^8 / V^2$
 $P > 100,000,000 / 1,070^2$

P must be > 87 Pedestrians per hour

Federal Highway Administration Warrants

Pedestrian Signal Warrant in the USA

- MUTCO:
 - A. 100+ Peds/hr for 4 hours or 190 for 1 hour; and
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 - OPTION: The Ped volume requirement may be reduced by up to 50% if ped crossing speed is less than 4 ft/s.

A traffic control signal may not be needed if adjacent coordinated traffic control signals consistently provide gaps of adequate length for peds to cross the street. (or a Roundabout?)
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Montgomery & Washington Roundabout

November 5, 2007
Oroville High School, Board Meeting

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Better Roads, September 2005

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Award-winning Roundabout in Ohio

In Ohio, the Dublin Murfield Drive roundabout proved so successful that the city plans to build three more of the innovative intersections.

The roundabout opened a year ago and only two traffic accidents have been reported, a significant decrease compared to the previous intersection which averaged two to three accidents a month. By reducing speeds to 25 miles per hour and eliminating right-angle collisions, the modern roundabout reduces accidents. Construction of a roundabout at the intersection of Gluck Road, Avery Road, and Montgomery Road and one at Dublin and Bristol are underway and should be completed by year end. The Shawnee Boulevard and Village Parkway intersections will be built next year. The Murfield Drive

Roundabout was an outstanding achievement award from the American Council of Engineering Companies of Ohio at the Engineering Excellence Awards Competition.

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Los Altos Town Crier
Publication Date: October 17, 2001

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By Linda Taaffe

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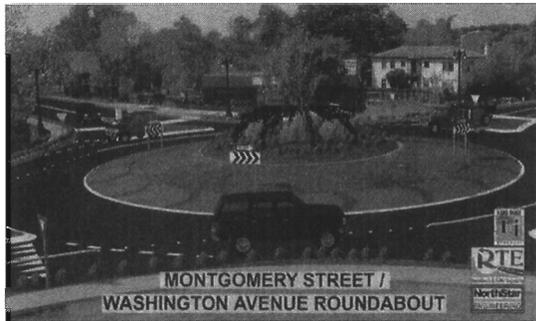
"The 80-foot traffic circle is part of a list of street improvements intended to calm traffic in the Loyola School neighborhood under a half-million-dollar federal "Safe Routes to School" grant."

Existing vs. Proposed Configuration

Existing Conditions



Proposed Configuration



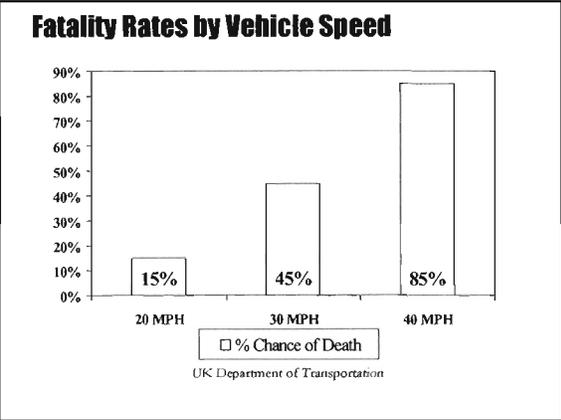
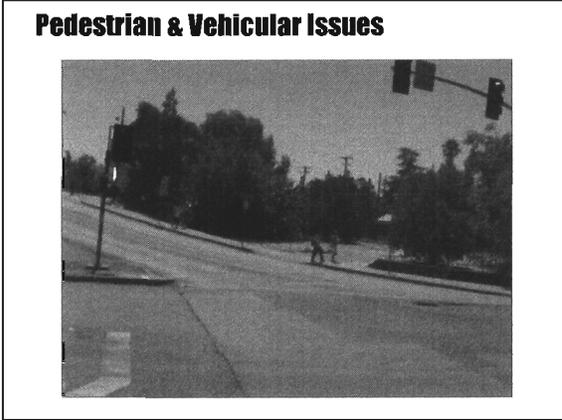
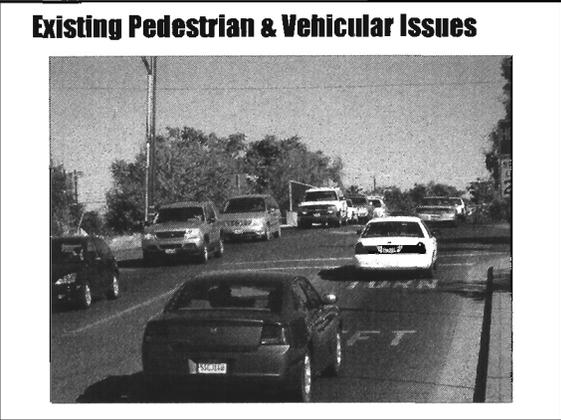
Pedestrian and Bicycle Safety

Existing Pedestrian Issues



Existing Pedestrian Issues





Pedestrian Fatality Rates

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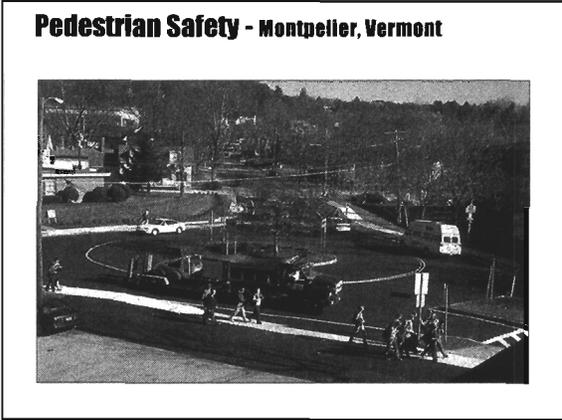
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Pedestrian Safety - Harford County, Maryland

"The roundabout at Tollgate Road and Montrose Way is located between Singer Road and Wheel Road, two collector roads. It was constructed by the developer of a major subdivision of approximately 1,400 housing units... There is an elementary school and library located just north of the roundabout, and another elementary school to the south."

Pedestrian Safety - Harford County, Maryland

"The roundabout at Tollgate Road and Wheel Road was constructed in 1999... There have been three reported accidents at this location (all very minor in nature). Wheel Road is a major collector road in the County. An elementary school is located in the area and some of the children walking to school must cross the roundabout. School buses easily navigate the roundabout and school children are assisted across by a crossing guard. The roundabout was landscaped by an Eagle Scout candidate in August 2000."

Vehicle Safety

Reduced Crash Severity

"Intersections converted to roundabouts reduced overall crashes by 37%, and reduced injury accidents by 51%."

1997 Study conducted by the Transportation Research Board.

Reasons for Reduction in Crash Severity

- The number of conflict points are reduced
- Vehicle speeds are lower
- Decision making is simplified
- The force of impact is much lower

Emissions Reduction

Vehicle Capacity Comparisons

Table 3: Capacity Comparison
Montgomery / Washington
AM, PM, School Peak Hour Results - 2025

Intersection	Roundabout			Signal		
	AM	PM	School	AM	PM	School
DELAY (in seconds)	5.8	5.1	5.9	68.1	41.5	51.3
LOS	A	A	A	E	D	D

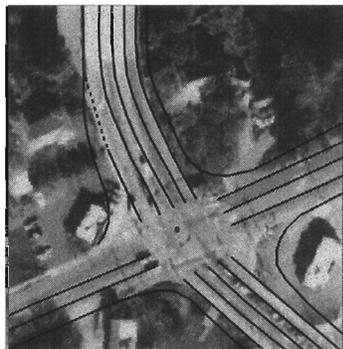
Source: RTE, Orovilla Feasibility Tables.xls

Emissions Reduction

Emissions Reduced ROG, NOX & PM-10	
612.6 lbs	1-year
12,240 lbs	20-years

Widening for a Traffic Signal

Traffic Signal Widening



Maryland Roundabout Safety Experience

"As of September 2001, Maryland had more than 25 modern roundabouts in operation. Eight were converted from traffic signals to roundabouts."

"Since conversion to roundabouts, the average annual accidents for the eight intersections fell by 64%. Accident severity also decreased, as injury accidents have shown a reduction of 83%."

Maryland State Highway Administration
Office of Traffic and Safety
Traffic Safety Analysis Division

October 2, 2001

Driver Opinion Survey of Roundabouts

"Twice as many drivers favor roundabouts after installation..."

"A few months after installation show opinions had changed dramatically. The proportion in favor doubled overall, from 31% before construction to 63% after. Those who were strongly opposed dropped from 41% to 15%."

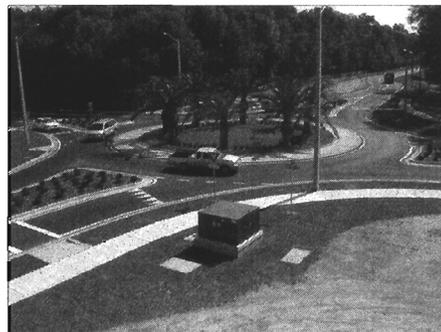
Insurance Institute for Highway Safety, Status Report Vol. 36, No. 7, July 28, 2001.

Aesthetics

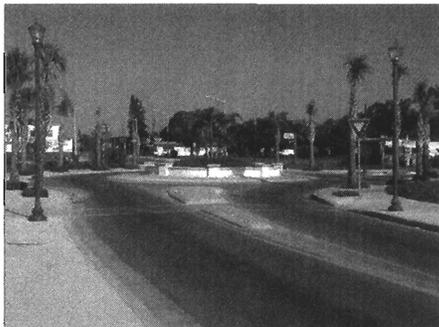
Aesthetics - Utah



Aesthetics - Florida



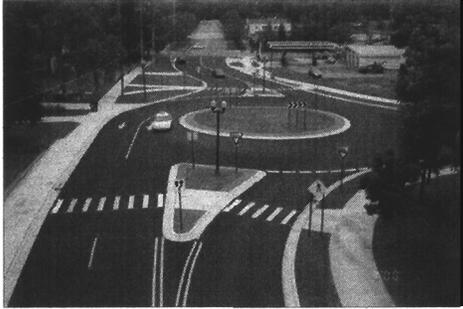
Aesthetics - For Pierce, Florida



Aesthetics - Ruthford, New Jersey



Aesthetics - Okemos, Michigan



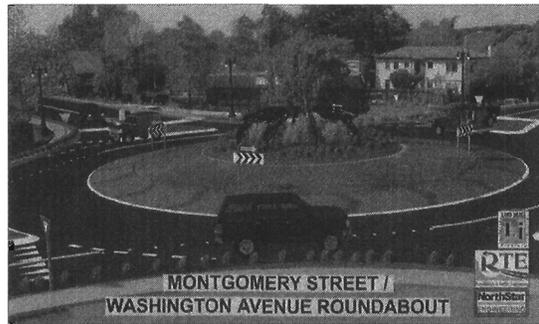
Aesthetics - Portland, Oregon



Aesthetics - Cotati, California



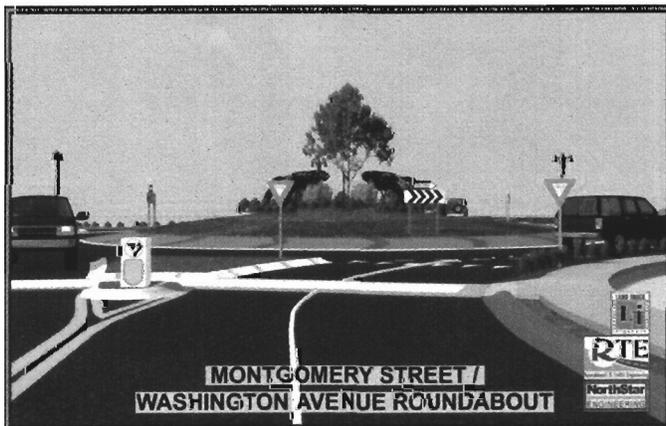
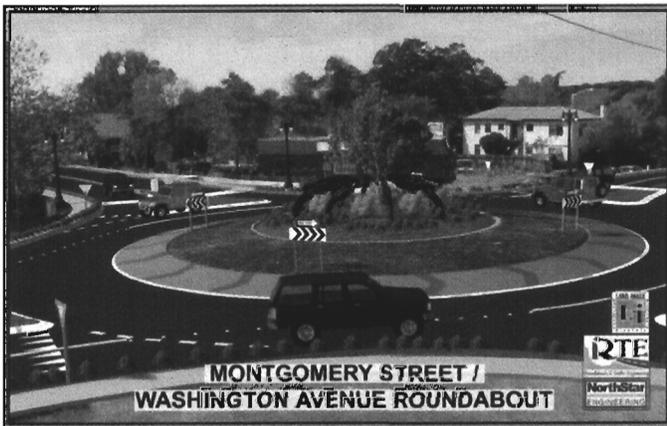
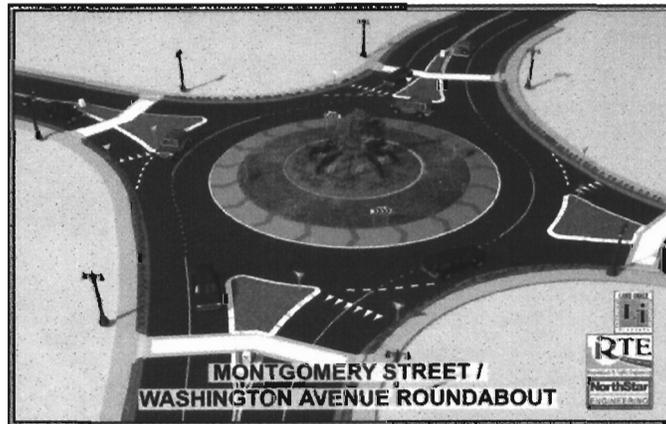
Aesthetics - Oroville, California



Questions?



Montgomery Street/Washington Avenue Roundabout Project





Montgomery Street/Washington Avenue Intersection

Roundabout Information

Roundabouts

A roundabout is an intersection where traffic travels around a central island in a counter-clockwise direction. Vehicles entering or exiting the roundabout must yield to vehicles, bicyclists, and pedestrians.

When you approach a roundabout:

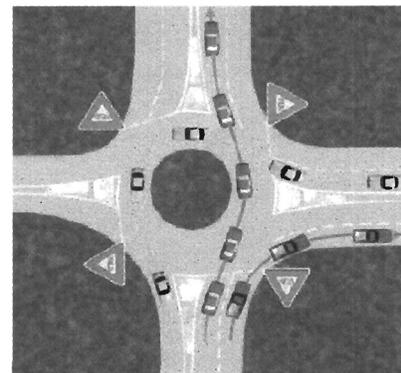
- Slow down as you approach the intersection.
- Yield to pedestrians and bicyclists crossing the roadway.
- Watch for signs and pavement markings that guide you or prohibit certain movements.
- Enter the roundabout when there is a big enough gap in traffic.

- Drive in a counter-clockwise direction. Do not stop or pass other vehicles.
- Use your turn signals when you change lanes or exit the roundabout.
- If you miss your exit, continue around until you return to your exit.

For roundabouts with multiple lanes, choose your entry or exit lane based on your destination. For example, to:

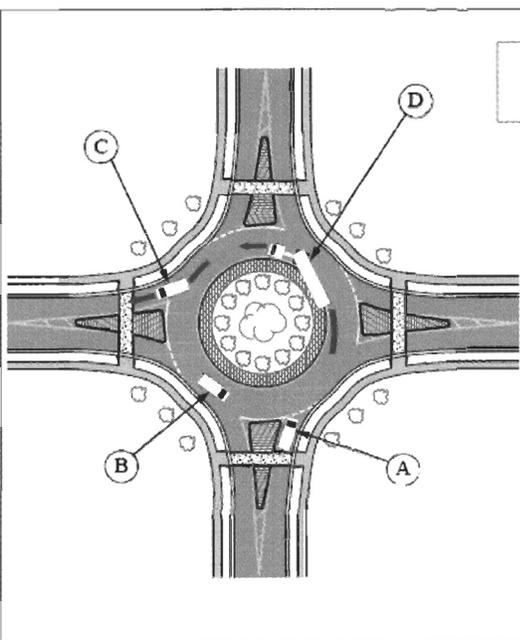
- Turn right at the intersection, choose the right-hand lane and exit in the right-hand lane. (Blue car)

- Go straight through the intersection, choose either lane, and exit in the lane you entered. (Red car)
- Turn left, choose the left lane, and exit. (Yellow car)



Multiple and single lane roundabout

*From *California Driver Handbook, 2007*
California Department of Motor Vehicles



HOW TO DRIVE A ROUNDABOUT

1) APPROACH AND ENTRY (A)

- When approaching a roundabout slow down and be prepared to yield. Beware of pedestrians in the crosswalk.
- Look to the left and check for approaching traffic in the circulating roadway which has the right of way (B).
- Pull up to the Yield Line and wait for a gap in the circulating traffic or enter if there is an adequate gap in traffic.

2) EXITING THE ROUNDABOUT (C)

- Once you have entered the roundabout, proceed counter-clockwise to your exit point. You now have the right of way.
- As you approach your exit, turn on your right turn signal.
- Exit the roundabout

3) TRUCKS (D)

- Roundabouts have very tight curves that are difficult for trucks to navigate. For this reason, a truck apron is provided.
- The truck may drive on the raised pavement of the truck apron to navigate the roundabout easier.
- The truck apron is 3" higher than the driving pavement to discourage cars from using it.

*From City of Overland Park, Kansas Website

Links:

•**Roundabout Questions and Answers**

<http://www.iihs.org/research/qanda/roundabouts.html>

•**Federal Highway Administration Roundabout Information**

<http://www.tfhrc.gov/pubrds/fall95/p95a41.htm>

•**RTE Website**

<http://www.roundabouts.us/>

•**Roundabout Feasibility Report**

[Oroville Roundabout Feasibility.pdf](#)

•**All About the Roundabout**

<http://www.dot.wisconsin.gov/safety/motorist/docs/roundabout-brochure.pdf>

•**California DMV 2007 Driver Handbook**

<http://www.dmv.ca.gov/pubs/dl600.pdf>

•**Roundabouts**

<http://www.iihs.org/sr/pdfs/sr3505.pdf>

F

- **Crash and Injury Reduction Article**

[roundabout\crashandinjuryreduction.pdf](#)

- **Benefits of Roundabouts**

<http://www.wsdot.wa.gov/Projects/roundabouts/benefits.htm>

- **Modern Roundabouts**

<http://www.k-state.edu/roundabouts/>

- **Description and Photos of Washington/Montgomery Roundabout:**

http://www.roundabouts.us/images/project_info/California_Washington@Montgomery.htm

- **Videos**

http://www.opkansas.org/_Res/Traffic_and_Transportation/Roundabouts/driving.cfm#two_lane

<https://www.ci.scottsdale.az.us/Traffic/Roundabouts/DemoMediaPlayer.asp?v=cyclepedright.wmv>

Notice of Exemption

Form D

To: Office of Planning and Research
PO Box 3044, 1400 Tenth Street, Room 212
Sacramento, CA 95812-3044

From: (Public Agency) City of Oroville
1735 Montgomery Street
Oroville, CA 95965

County Clerk
County of Butte

(Address)

Project Title: Montgomery Street and Washington Avenue Roundabout

Project Location - Specific:

The physical intersection of Montgomery Street and Washington Avenue in the City of Oroville.

Project Location - City: Oroville

Project Location - County: Butte

Description of Project:

Construction of a traffic roundabout within the existing intersection.

Name of Public Agency Approving Project: City of Oroville Public Works Department

Name of Person or Agency Carrying Out Project: City of Oroville Public Works Department

Exempt Status: (check one)

- Ministerial (Sec. 21080(b)(1); 15268);
- Declared Emergency (Sec. 21080(b)(3); 15269(a));
- Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- Categorical Exemption. State type and section number: 15301.c
- Statutory Exemptions. State code number: _____

Reasons why project is exempt:

This project involves the construction of a public work traffic improvement, with approximately 90% or more of the improvements being completed within existing City Rights-of-Way.

Lead Agency

Contact Person: Richard H. Walls, P.E. Area Code/Telephone/Extension: (530) 538-2507

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? Yes No

Signature: Richard H. Walls Date: 4/16/07 Title: Sr. Civil Engineer

Signed by Lead Agency

Date received for filing at OPR: _____

Signed by Applicant

January 2004