INTRODUCTION

Implementing roundabouts in sites with unique challenges requires a breadth and depth of application regarding the principles of roundabout design, traffic planning, and transportation engineering. This understanding of a roundabout’s unique operational characteristics allows for development of appropriate solutions for each application. We feature projects in unique high-flow, constrained contexts. These projects have experienced severe congestion. Conventional solutions did not address the core problems and created higher impacts and costs. These projects illustrate the analysis and design tools that were successfully addressed by the specific roundabout designs. They demonstrate the application of roundabout design principles in unique settings.

SOLVING COMPLEX TRAFFIC ISSUES WITH UNIQUE ROUNDABOUT APPLICATIONS

HOLMAN HIGHWAY 68/HIGHWAY 1 ROUNDABOUT, MONTEREY, CA

The City of Monterey conducted a feasibility study for a roundabout at this location, and a final concept was included in the alternative analysis of the Environmental Impact Report (EIR) for the Pebble Beach Company Plan as an alternative to the signalized intersection. The analysis concluded that the roundabout alleviated the identified traffic impacts and was environmentally superior to the signalized intersection due to its smaller footprint in terms of tree loss, ground disturbance, archaeological impacts, and visual impacts.

HIGHLIGHTS
• Interchange-off-ramp serves as gateway to Carmel, Pebble Beach, Pacific Grove, Monterey
• Signing and wayfinding were key design components
• Operational characteristics of flared entry design preserved existing environment and existing infrastructure, including 2-lane bridge
• Routed analysis - flared entry bays lanes, high definition queuing theory
• Reduced congestion without significant impacts
• Maintained community identities of Pebble Beach, Carmel, Pacific Grove

DESIGN CONCEPT

Flared entry application

Necessary Design Elements

- A well-thought-out design of the elements and traffic controls necessary for fixed entry to work correctly include:
  - Signage
    - Alternative viewpoint, a larger view of the road
  - Proximity to roadway
    - Effective signalization
    - Location
    - Height
  - Protection
    - Pedestrian safety
    - Bicycle

HIGHLIGHTS
• Flared entry strength in the design
• Pedestrian-friendly environment

PEACEFUL HIGHLANDS ROUNDABOUT, DUBLIN, CA

The Village of Waunakee and WIDOT were seeking a solution to reduce congestion and improve safety and traffic flow. A feasibility study showed a flared entry roundabout would increase traffic flow efficiency, and improve safety for all modes, while maintaining one travel lane in each direction.

HIGHLIGHTS
• Constrained urban context
• Less impact with roundabout
• Pedestrian safety priority
• Improved traffic flow

DESIGN CONCEPT

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HIGHLIGHTS
• Flared entry strength in the design
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PEACEFUL HIGHLANDS ROUNDABOUT, DUBLIN, CA

The City’s first roundabout at the intersection of Pleasant Hill Road and Olympic Boulevard was successfully implemented to eliminate traffic congestion at the intersection, while improving pedestrian and bicycle mobility.

HIGHLIGHTS
• Balancing vehicular level of service with pedestrian and bicycle mobility and safety were a key priority
• Circulation and connectivity with existing trails and on-street bike lanes
• Inclusion of cycle track design features

DESIGN CONCEPT

Traffic Distribution

The traffic distribution must be accounted for in the operational analysis corresponding pavement markings.

HIGHLIGHTS
• Commercial driveway access
• Pedestrian/bicycle facility and safety
• Large truck and freight accommodations
• Includes two interchange ramp terminals
• High speed approach

VISUALIZATION

Pentagon view design

Main Street and Century Ave., Waunakee, WI

The Village of Waunakee and WIDOT were seeking a solution to reduce congestion and improve safety and traffic flow. A feasibility study showed a flared entry roundabout would increase traffic flow efficiency, and improve safety for all modes, while maintaining one travel lane in each direction.

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VISUALIZATION

Pentagon view design

3TH AND USH 18, WAUKESHA COUNTY, WI

This roundabout project began with a single, compact 125’ multi-lane roundabout at the US 18 and Blackwood Dr. interchange. It opened in 2016 and successfully served a new commercial development. This first roundabout was expressly designed to complement a second, future roundabout. The goal of the second roundabout was to replace an antiquated, inefficient traffic signal at Highway 83 and US 18. When it opened in late 2015, traffic from the first roundabout flowed through without interruption. The result: Seamless access to and from local businesses while maintaining high-performance traffic flow on these regional highways.

HIGHLIGHTS
• Evident existing businesses access
• Protect existing businesses from adverse impacts
• Integrate site designs of new businesses into current designs
• Create spaces for valuable landscaping
• Prioritize pedestrian safety
• Minimize costs

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I-94/CTH N AND CTH TT, COTTAGE GROVE, WI

This series of three roundabouts project includes two interchange ramp terminal roundabouts and a high-speed approach roundabout at the CTH N/CTH TT roundabout. Key to this effort was developing a design and analysis concept sensitive to ROW impacts and business access, while allowing safe residential routes to exist and ensure safety and access for all modes of travel.

HIGHLIGHTS
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VISUALIZATION

Pentagon view design

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