

Implementing MoDOT's Access Management Guidelines Along Route 763

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Abstract. The Missouri Department of Transportation (MoDOT) selected HDR to provide design services to upgrade Route 763 in Columbia, Missouri to a five-lane principal arterial. A key element included within the design process of upgrading the existing two-lane roadway to a five-lane roadway was the implementation of access management throughout the three-mile corridor. The existing corridor already was beginning to see the importance of access management based on its crash history causing MoDOT to proactively close driveways and place temporary channelizers within the corridor.

The focus of this paper is to highlight the importance of developing and implementing access management alternatives throughout the design process. Through close collaboration with stakeholders (City of Columbia, Boone County, North Area Columbia League), several access management design features were incorporated prior to as well as during the design process. The following includes a list of the major elements:

- Controlled access throughout corridor
- Channelized/divisional medians
- Unsignalized left turn pockets
- Right-In/Right-Out (RIRO) access only
- Design of signalized intersections to accommodate U-turns
- Adherence to principles throughout design process as well as during the right-of-way negotiations
- Consolidation of roadways to form a five-leg roundabout

Another element that became evident during the stakeholder meetings was creating a pedestrian friendly environment to complement both the residential and commercial development located within the corridor. The following includes some of the major elements that were incorporated into the project:

- Sidewalks along both sides of the roadway (typically not done)
- Australian Right Turn Design Concept (decreases crosswalk length)
- Count-Time Downers at Crosswalks
- Blank-Out Signs used for No Right Turn on Red indications
- All overhead utilities were buried along the corridor

Introduction

The purpose of this paper is to give an example of a typical roadway project that began with controversy but ended with overwhelming stakeholder support. One of the key components related to the ultimate success of the Route 763 project was developing a concept that treated everyone fairly. Route 763 is considered as a key arterial within the City of Columbia, Missouri. Columbia is a relatively small city (population 80,000) located halfway between

Kansas City and St. Louis along Interstate 70. The project limits commenced at Big Bear Boulevard on the south and extended to Route VV on the north. Figure 1 depicts the project limits in relation to the State of Missouri as well as within the City of Columbia.

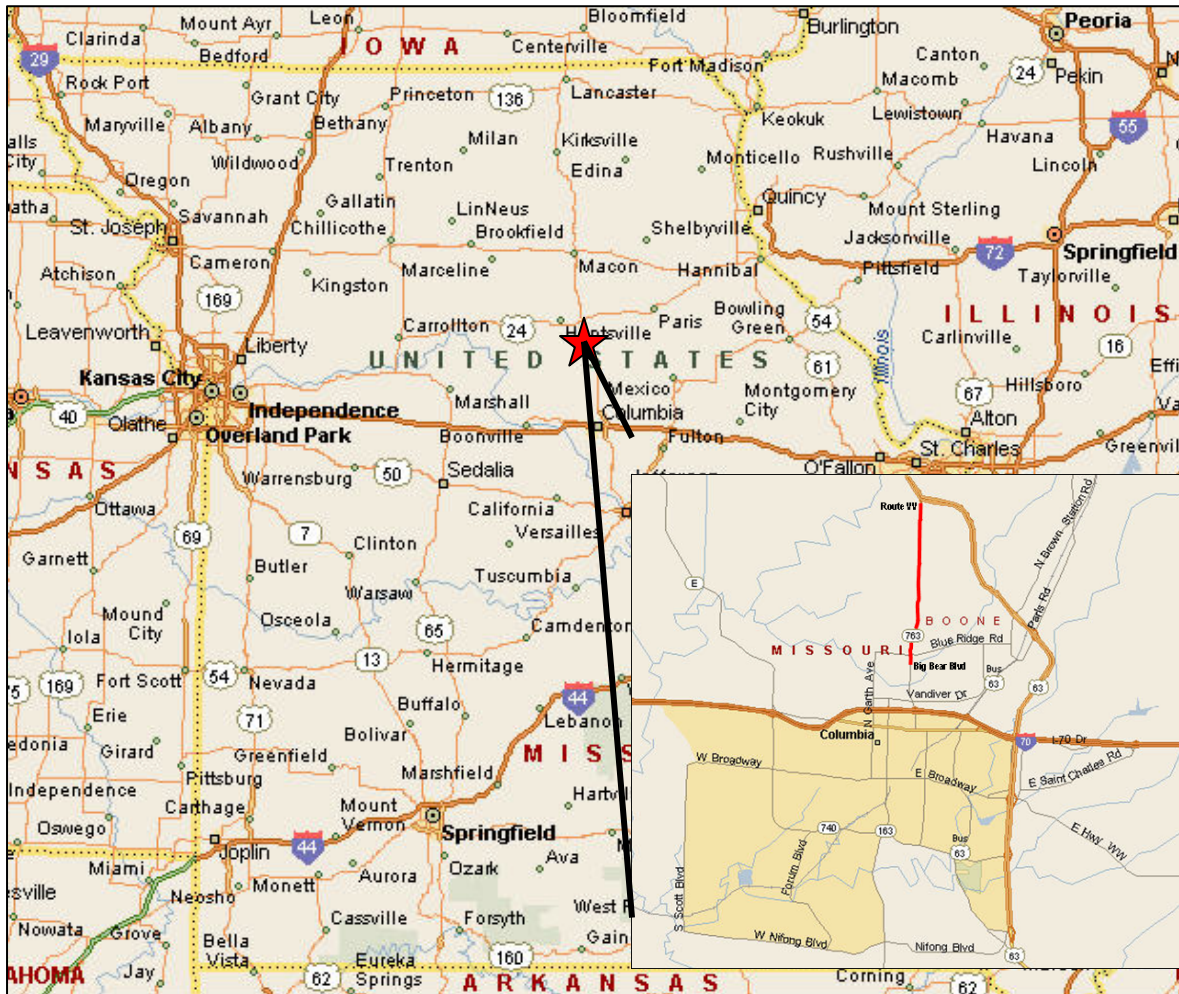


Figure 1 – Project Location Map

Project Background & History

MoDOT originally began the design of Route 763 during the 2000-2003 timeframe. Route 763 was a typical two-lane signalized arterial (consisting of five traffic signals) that was beginning to experience both safety and congestion issues. Average daily traffic volumes ranged from 10,000 vehicles per day (vpd) along the northern segments to 25,000 vpd along the southern segments. Several access points and driveways existed throughout the corridor, thus leading to issues related to safety and congestion (as depicted in Figure 2).



Figure 2 – Existing Congestion along Route 763

With a rather rapid pace of development occurring within the Route 763 corridor, (including residential, retail, and office development), it became apparent that the inclusion of access management concepts should be incorporated into the design. Figure 3 and 4 depict the growth in development surrounding the Route 763 corridor between the years 2000 and 2006.

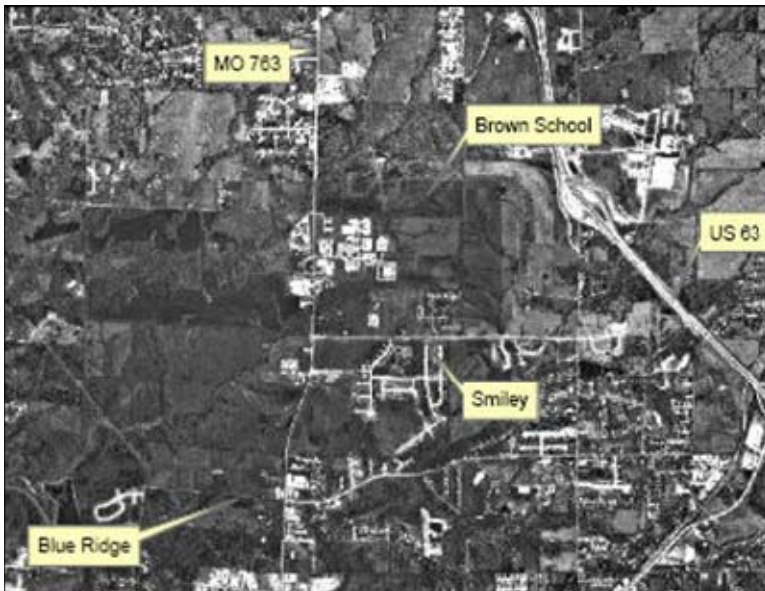


Figure 3 – Route 763 Corridor, 2000 Aerial

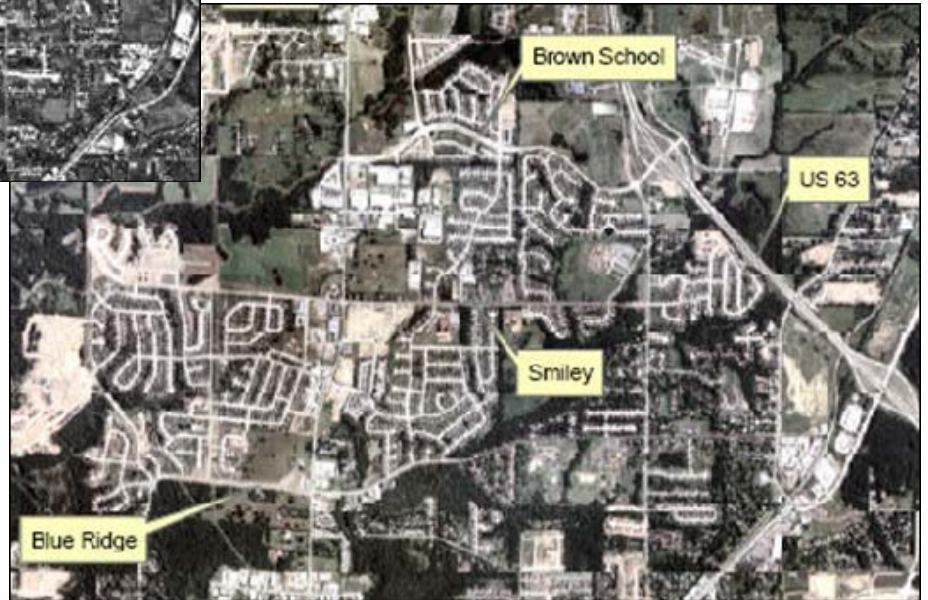


Figure 4 – Route 763 Corridor, 2006 Aerial

At this stage of the project, MoDOT did not have a formal access management policy but understood the importance of controlling access and therefore proposed various forms of access management within the Route 763 project limits. Figure 5 depicts the Original 107' typical section that MoDOT selected for use along Route 763. Within the corridor, access was limited by a mixture of signalized, right-in/right-out (RIRO), or $\frac{3}{4}$ intersections (●). Figure 6 depicts the Original MoDOT Plan that was proposed at the first public meeting.

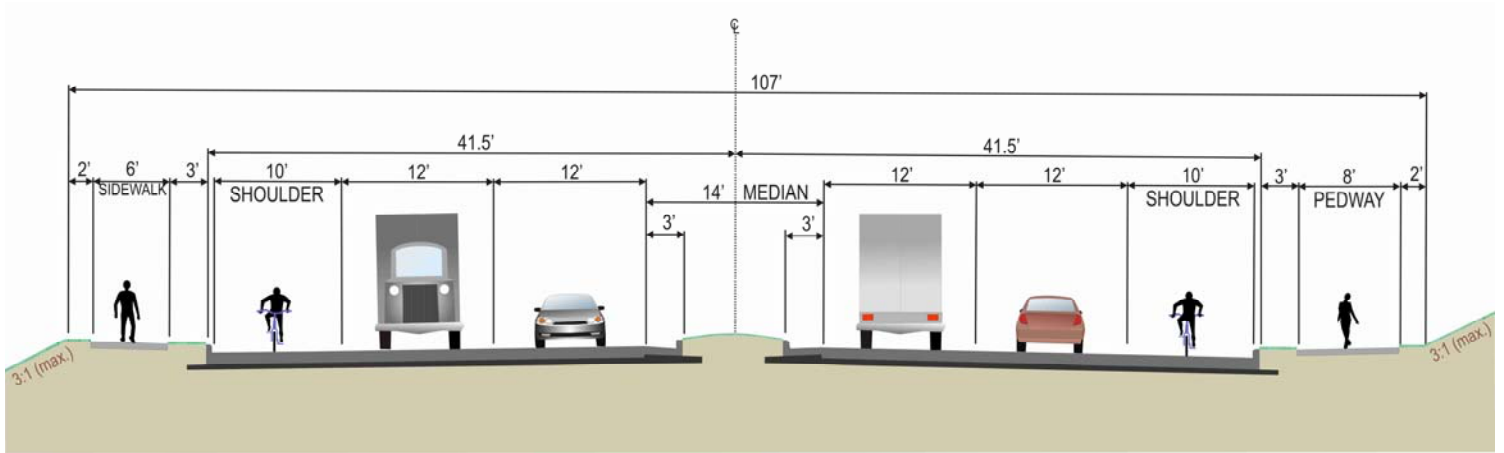


Figure 5 – Original Typical Section

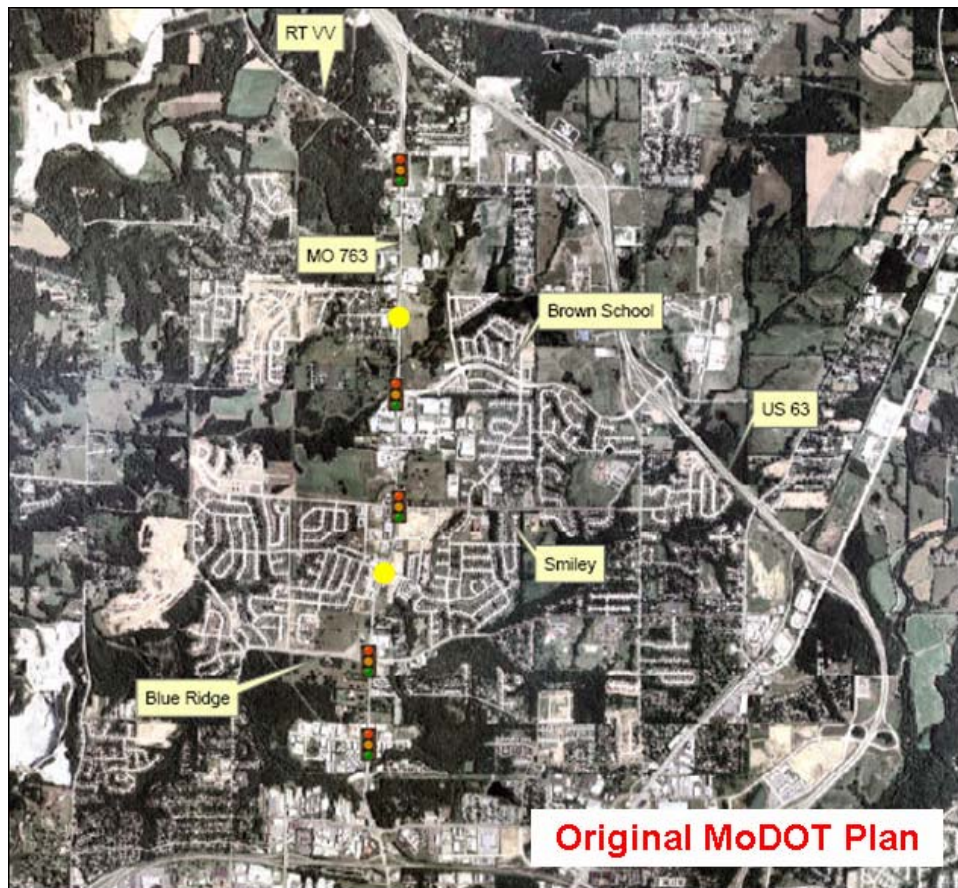


Figure 6 – Original MoDOT Plan

The public had some concern with the proposed plan based on the extent of the access limitations that were proposed. In addition to the five signalized intersection, only two $\frac{3}{4}$ intersections were being constructed to allow cross street and driveway access. In addition, the public also felt that the 107' wide corridor limited the development potential of several parcels due to the additional land required for utility easements and building setbacks. Figure 7 depicts a few of the newspaper headlines based on the Original MoDOT Plan.



North Columbia businesses push for road modifications

By MIGLENA STERNADORI of the Tribune's staff
Published Friday, July 30, 2004

A group of business owners is making rounds to promote an alternative to a state-proposed design for the planned widening of Range Line Street, which becomes Highway 763 north of Columbia.

The Missouri Department of Transportation plans to upgrade the road to four lanes and build a median. Members of the North Columbia League fear the median will limit drivers' access to stores and restaurants along the road.

On Tuesday, property owners and their attorney, Craig Van Matre, showed to city and county representatives a preliminary alternative plan calling for numerous breaks in the median.

Van Matre said the owners understand their plan might not be realistic but want to have room for negotiation with the state.

Figure 7 – Newspaper Articles Depicting Stakeholder Concern

Route 763's Dramatic Turnaround

How did MoDOT turnaround public sentiment from Public Meeting #1 to landowners donating right-of-way and supporting a raised median?

This section of the paper provides an overview of the steps MoDOT took to meet the needs of the public while at the same time achieving access management within the corridor. Through extensive collaboration with key stakeholders (City of Columbia, Boone County, and North Area Columbia League), MoDOT further refined the overall concept to meet the needs of the community. As time progressed, MoDOT had the opportunity to build on project successes that the City of Columbia (Figure 8) had recently completed where various access management concepts were implemented.



Figure 8 – Example City of Columbia ¾ Intersection

A key milestone for MoDOT also occurred during the refinement of the Route 763 Concept. In 2003, MoDOT adopted a formal access management policy that outlined a variety of issues that were present within the Route 763 project limits. Within this document, MoDOT outlined the use of several access management concepts and their appropriate use based on a roadway's classification. Figure 9 depicts a few example concepts and their recommended minimum guidelines.

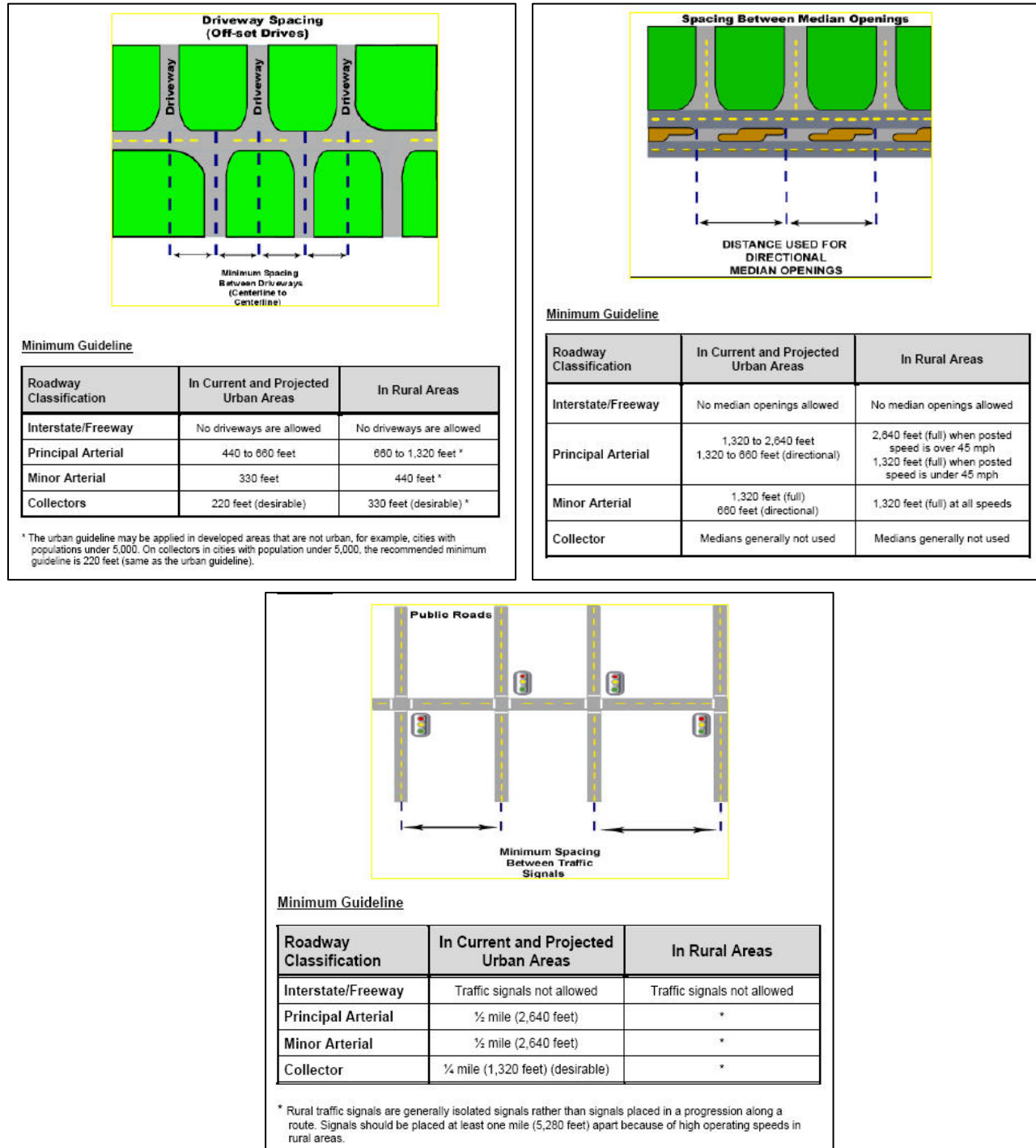


Figure 9 – Example MoDOT Access Management Guidelines

Five Unique Design Elements Incorporated into Revised Plan

As MoDOT began refining the design concept along Route 763, it became apparent that a variety of access management concepts would be required to satisfy the diverse group of stakeholders. In the simplest form, a minimum driveway spacing of 400' was the goal within the Route 763 Corridor. Many of the existing shared entrances were left in place and many of the multi-entrance parcels were combined into shared entrances. Entrances at all intersections were moved as far away as possible to the farthest property line to create minimal driveway activity at each intersection. From these basic principles, the following three key benefits would be perceived by users of Route 763;

- Improved Roadway Capacity
- Shortened Travel Times
- Reduction in Crashes

What made the Route 763 access management concepts unique was the actual design of the various concepts themselves that provided additional benefits to *all* roadway users. The following sections focus on five design elements and how they were incorporated into the overall concept;

- Right-of-Way at Back of Curb
- Turn Pockets at Signalized Intersections
- $\frac{3}{4}$ Intersection
- Roundabouts
- Australian Right Turn

Right-of-Way at Back of Curb

In the early stages of stakeholder involvement it was noted that a reduced right-of-way template was essential to maintaining development along Route 763. The revised design template consisted of a five-lane section including sidewalks/bike lanes with permanent right-of-way placed at the back of curb. This allowed for a permanent utility easement to be placed outside the right-of-way, thus reducing the overall width of state maintained area. This also reduced the required right-of-way purchased by MoDOT, thus reducing overall project costs. The permanent utility easement was then located under the sidewalk to further reduce right-of-way needs. This permitted all overhead utilities to be buried, thus enhancing the visibility for vehicles and pedestrians. The following bullets summarize a few of the key design elements related to the reduction right-of-way.

- Designed 5-Lane Section with 78' ROW (See Figure 10)
- Set ROW at Back of Curb
- Utility easement underneath sidewalk
- Signal interconnect located within median

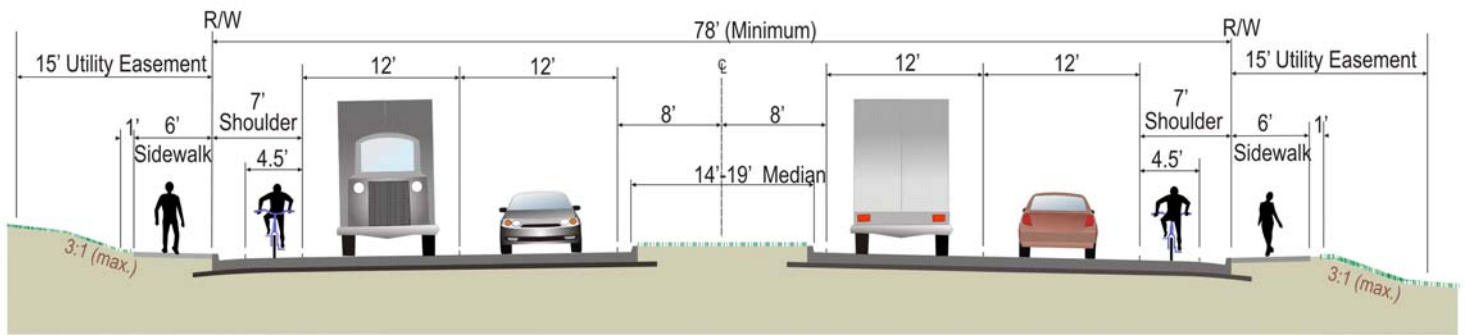


Figure 10 – MoDOT's Revised Route 763 Typical Section

Turn Pockets at Signalized Intersections

The five-lane section was designed with a raised center median between all major intersections with U- turns permitted at each traffic signal. U-turns were allowed with the use of a protected right turn lane along cross streets. Due to the narrow width of the proposed roadway template, U-turn pockets were designed at each intersection to allow vehicles an opening for maneuvering and completing the U-turn movement. AutoTURN was used at each intersection to individually size each turn pocket for passenger vehicles. The main benefit of the U-turn pocket was that it induced public support for the project because it allowed residents to negotiate through the corridor with minimal increases in travel distance.

- U-Turns provided at signals with protected right turn from sidestreets
- Used AutoTURN to size turn pockets (See Figure 11)
- Turn pockets induced public support
- Signal designs incorporated the use of *Blank-Out* signs (See Figure 12)

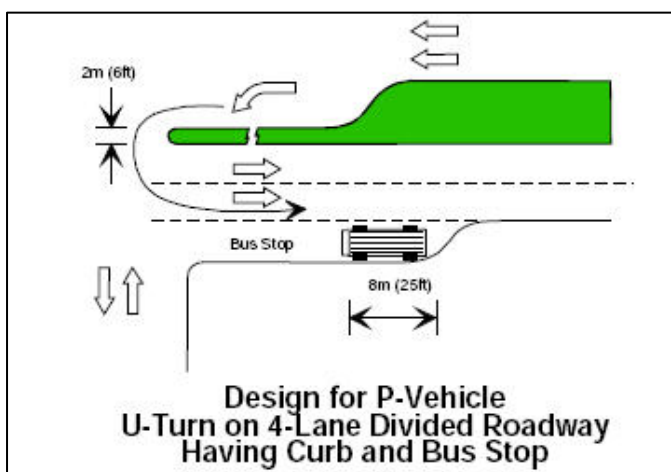


Figure 11 – Example U-Turn Design



Figure 12 – Example Blank-Out Sign

3/4 Intersections

The revised concept also employed the use of three-quarter intersections at all major intersections that were not signalized. One of the key benefits of this concept is that it reduces the number of conflict points from 11 to 6, thus improving safety. These intersections were spaced at a minimum of 600' along the corridor. Special attention was given to the design of the intersections since several businesses along the corridor transport mobile homes and business owners expressed their concern over this intersection design concept. The intersections were designed using a custom vehicle which accommodated a mobile home.

- Reduction in conflicts (See Figure 13)
- Allow left in and right-in/right- out only
- Designed to accommodate custom truck movements (See Figure 14)
- Traffic movements included in operational analysis (See Figure 15)

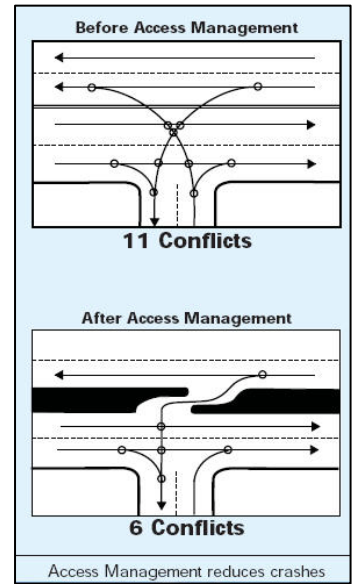


Figure 13 – Conflict Diagram

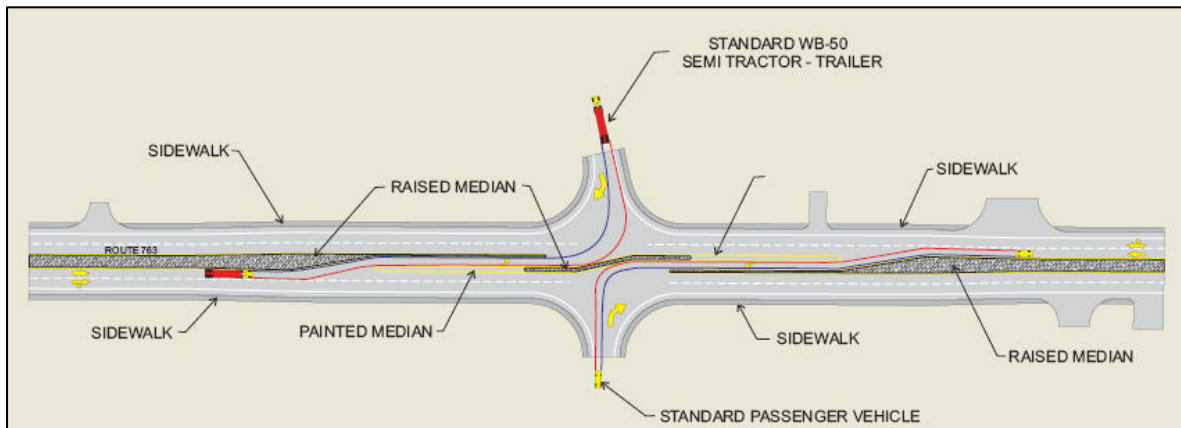


Figure 14 – Custom Truck Movements

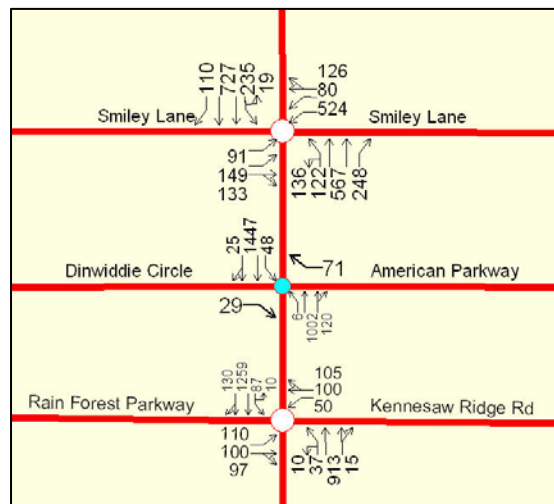


Figure 15 – Operational Analysis

Australian Right Turn

The deployment of bike lanes and sidewalks within the Route 763 corridor led to the need for an increased range of visibility to be designed throughout the corridor. At each of the major intersections, right turn lanes along the cross streets were designed based on a concept referred to as the *Australian Right Turn*. This concept features a high entry angle to improve visibility of pedestrians crossing the main street. The main objectives of this design feature are to reduce driver workload by reducing the angle that drivers must turn their heads to check approaching traffic. This concept also improves the visibility of pedestrians by reducing the viewing angle for drivers having to slow down for approaching pedestrians. This concept had successfully been implemented by the City of Columbia and thus motorists were familiar with the design.

- Used by the City of Columbia
- Unique geometrics (See Figure 16)
- Utilizes an acute entrance angle which reduces head turn movement
- Signal designs incorporated the use of *Blank-Out* signs (See Figure 12)

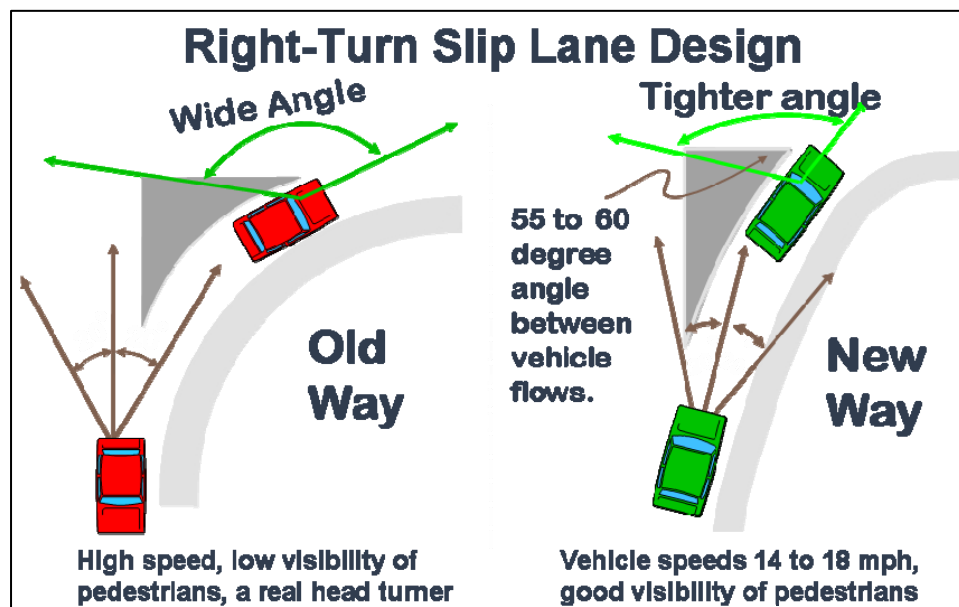


Figure 16 – Australian Right Turn Concept

Roundabout

The existing configuration of the northernmost signalized intersection within the corridor included a very closely spaced unsignalized intersection located to the east of Route 763 that led to driver confusion and presented safety concerns. The consolidation of the intersecting roadways into a five-leg roundabout created an overall less complicated intersection as well as improving the overall safety along the intersecting roadways. Once again, AutoTURN was used to design the roundabout to accommodate the custom mobile home trailer.

- Designed to accommodate mobile home trailer (See Figure 17 & 18)
- Eliminates complex geometric configuration
- Safer design for all roadway users

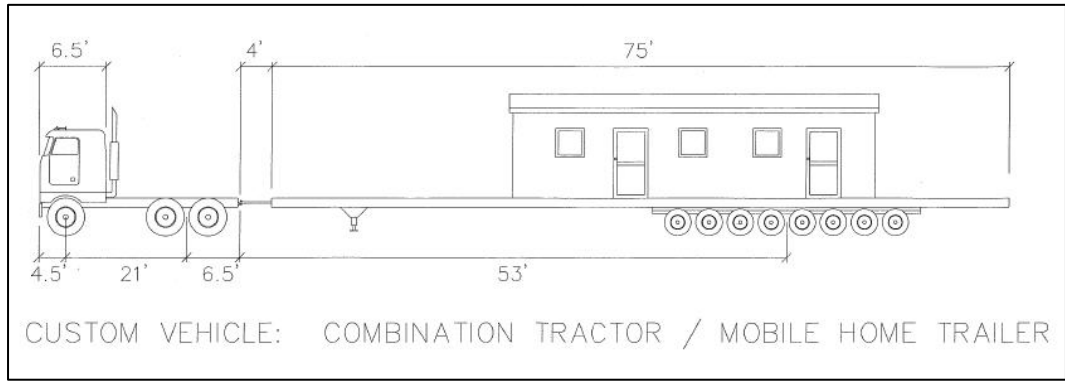


Figure 17 – Custom AutoTURN Vehicle

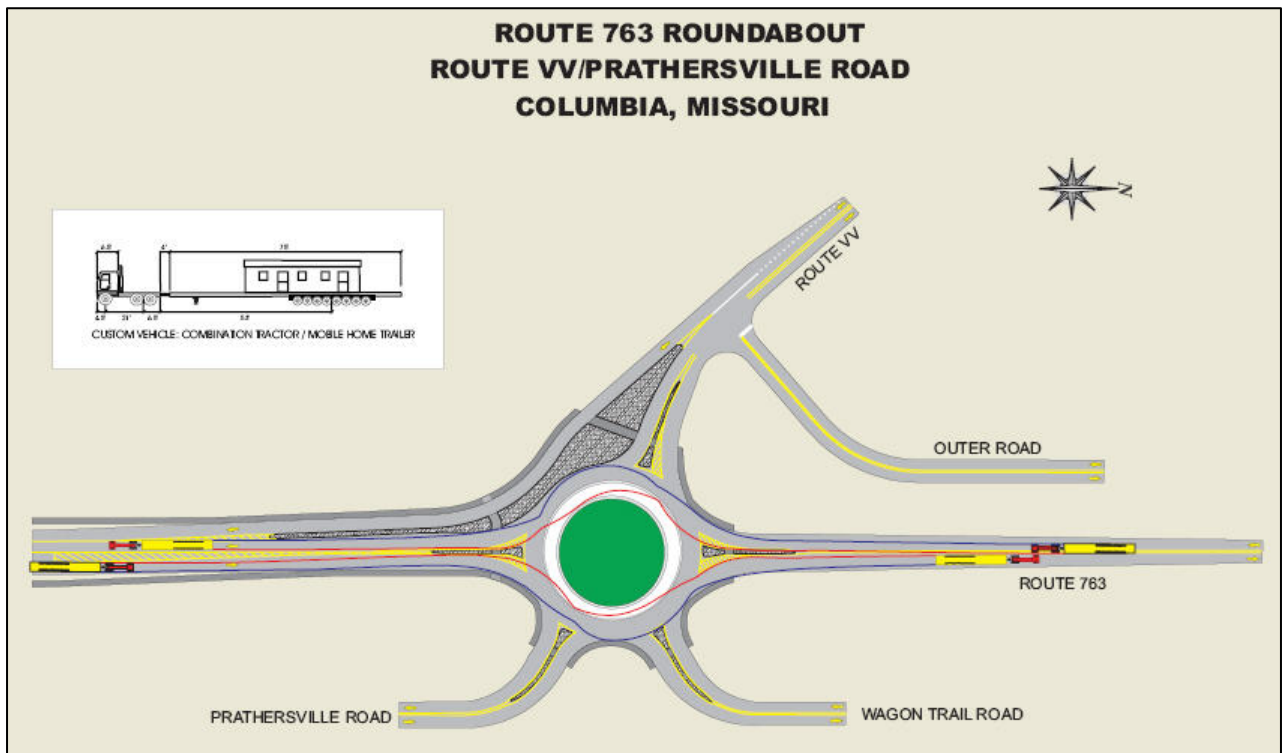


Figure 18 – Roundabout Concept

How Did Business Community & Public Come Around?

As noted above, MoDOT worked very hard at meeting the demands of stakeholders while maintaining system integrity that will be gained by the implementation of various access management concepts. By increasing mobility and number of access locations within the corridor, stakeholders actually donated right-of-way to show their support of the project, thus reducing overall project costs. Figure 19 depicts the location of the revised location of signalized intersections, right-in/right-out (RIRO) intersections, and/or $\frac{3}{4}$ intersections (●) as well as the proposed roundabout (●). The following five points were key to the success of the revised concept.

- Treated everyone “fairly”
- Raised median
- Inclusion of additional $\frac{3}{4}$ access points
- Reduced right-of-way impacts
- Improved mobility for all users

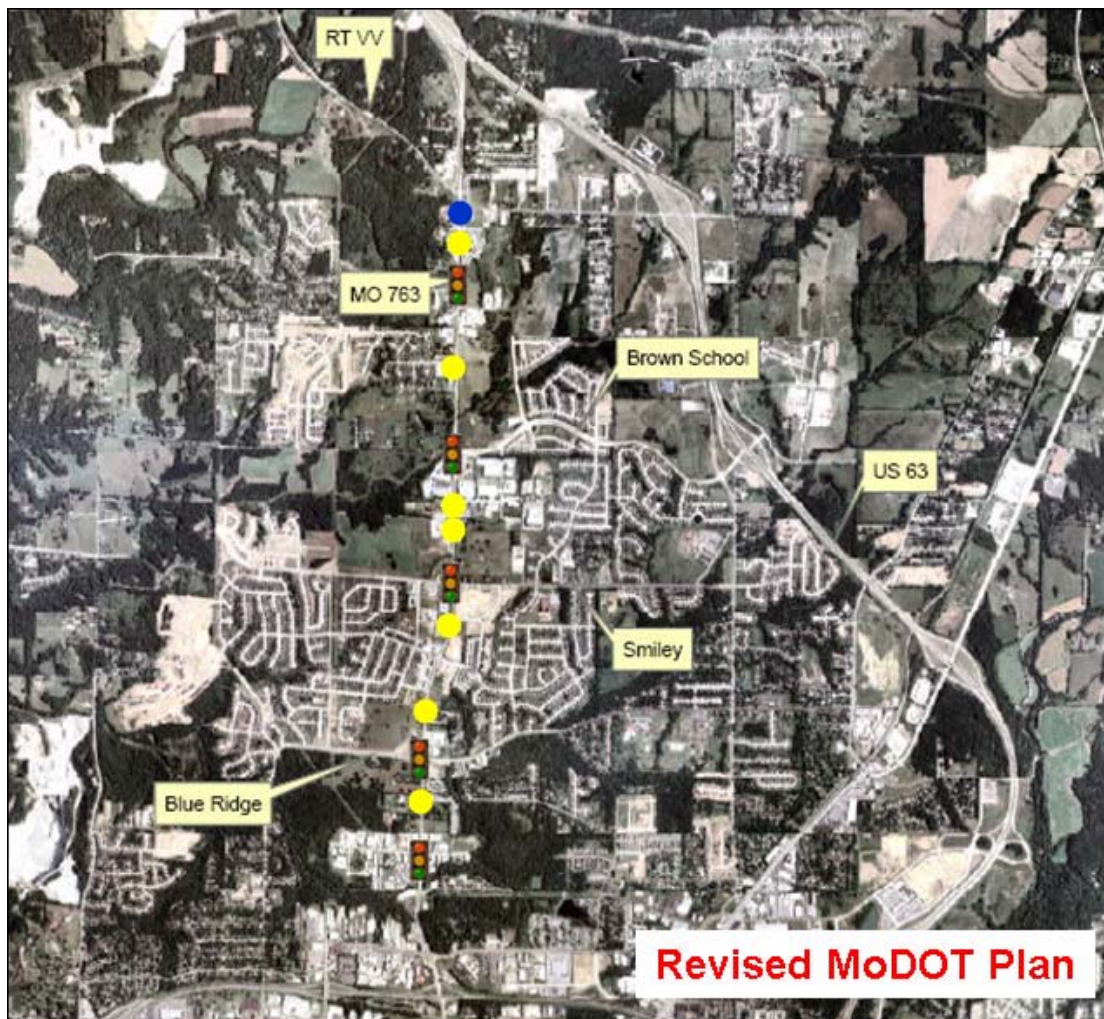


Figure 19 – MoDOT’s Revised Plan

By including the concepts discussed above, the overall safety and mobility within the corridor will significantly improve. Figure 20 depicts the public support of the revised concept.

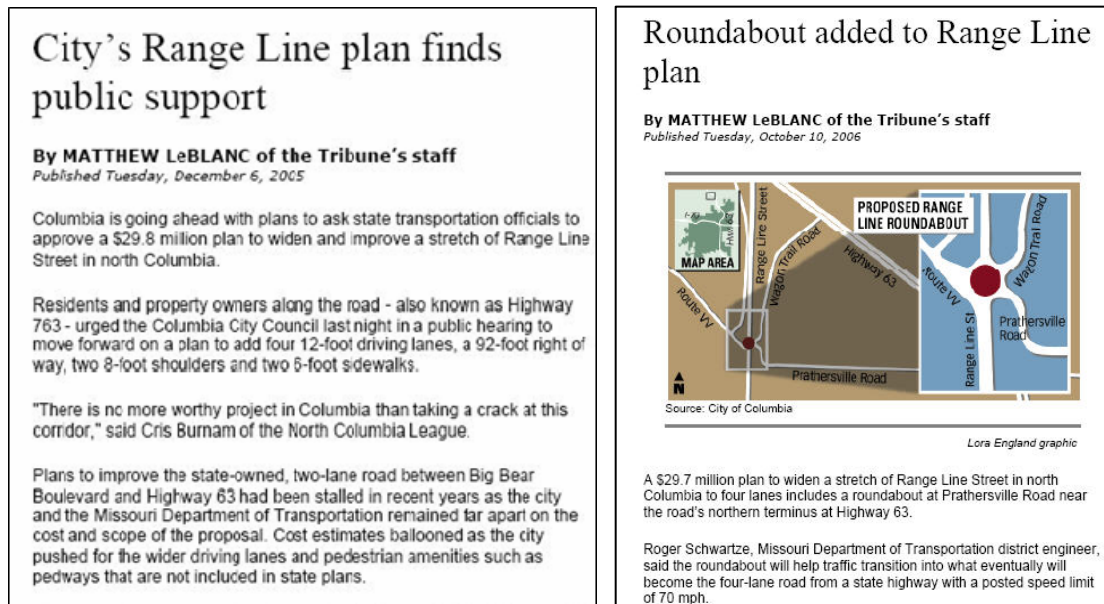


Figure 20 – Newspaper Articles Depicting Public’s Support

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