

CHAPTER 7 – DESIGN ALTERNATIVE AUGMENTS

The following chapter discusses augments that could be and in many cases should be constructed with any of the previous listed alternatives to provide additional capacity or reduce vehicular demand thereby improving the effectiveness of that alternative.

7.1 Access Management

The incorporation of back access collector or frontage roads will not only provide better access management but would reduce traffic demands needing to use US 550 by as much as 20-25% based on the additional capacity of one-lane of traffic in each direction. This reduction in demand on US 550 could provide as much as an additional five years of capacity to the Three-Lane option discussed previously in this section, and would also remove significant amounts of mid-block turning demands which can inhibit progression and increase crash risks. Access management concepts and recommendations are discussed in detail in the next section.

7.1.1 Medians

The most effective method of traffic control is the implementation of raised medians to restrict a very dense area of full movement driveways to right-in right-out only. This will remove one of the most unsafe movements within the corridor, which is the minor street left-out movement. As traffic demands on US 550 increase and a third through lane has been added, this maneuver will be increasingly less safe. In an attempt to still provide left-in access for those poorly spaced and aligned driveways between NM 313 and Camino Don Tomas, one or two left-in only median openings can be provided with adjacent properties sharing access at these points indicated in the concept. As indicated in **Figure 7.1 and 7.2**, the number of conflict points has been reduced from 16 to 3 with left-in median access control and driveway consolidation has been introduced. This translates into a reduction of 54 conflict points between NM 313 and Camino Don Tomas.

**Figure 7.1 Conflict Points w/o Access Management
(Between Camino Don Tomas & NM 313)**

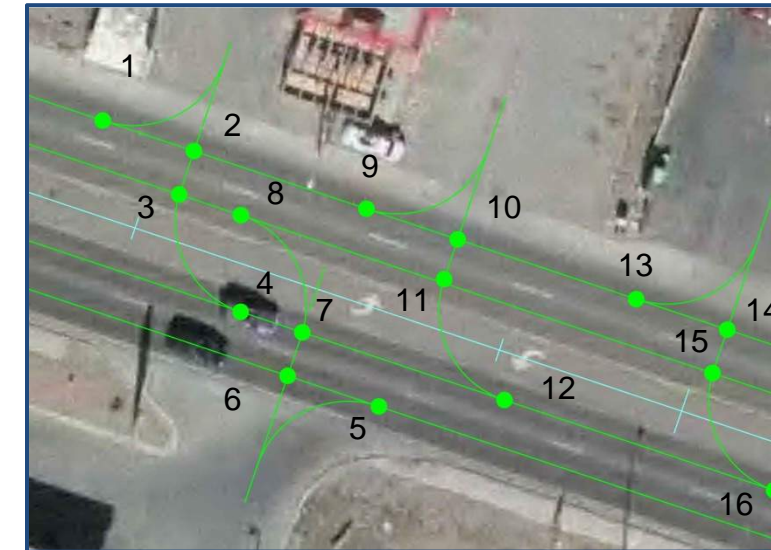
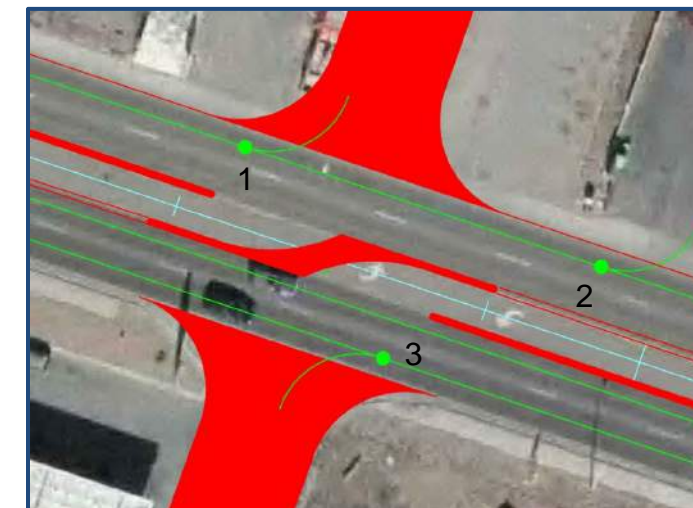


Figure 7.2 Conflict Points with Access Management



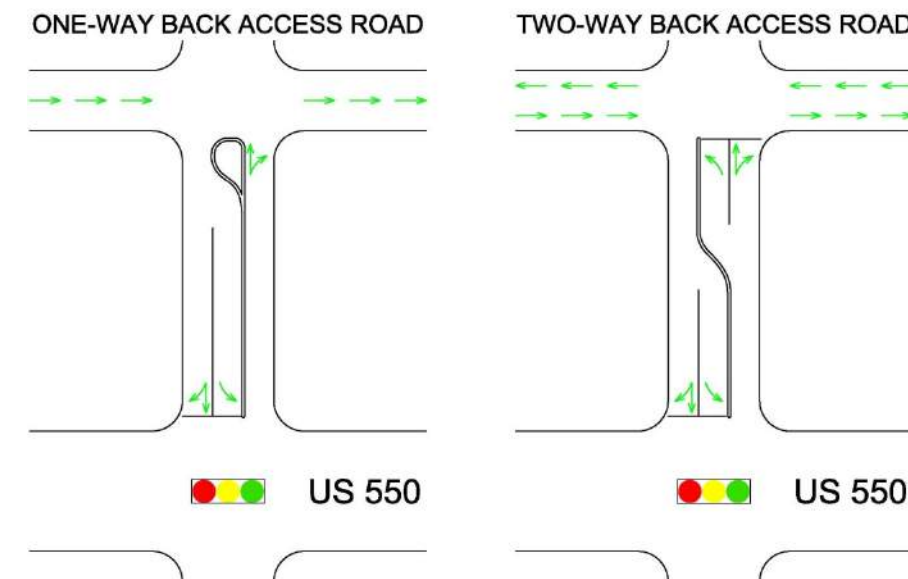
7.1.2 Back Access Roads

Continuing the back access road concept that is currently being constructed as part of the US 550/I-25 interchange project, the proposed access management concept proposes back access roads from NM 313 to just west of Camino Don Tomas. As shown, there already is a public street (Belle Lane) which the proposed back access road can use. However, this would likely require some Right-of-Way (ROW) acquisition in order to provide a three lane or two-lane cross-section. The north back access road would then extend to Ronald Drive. For the south side, more ROW acquisition would be required to provide a back access road adjacent to the US-550 commercial properties from NM 313 to just east of Camino Don Tomas. As commercial development continues, these back access roads are recommended on the west side of the river as well connecting potential properties east of Sheriff's Posse Road/Kuaua Road over to Jemez Dam on the north side and NM 528 on the south. Again this would require the need for significant ROW acquisition.

To reduce ROW acquisition requirements, back access roads could be restricted to one way couplets on either side of US 550. This could significantly reduce the required width of the new road network. If one way couplets were constructed it is recommended that the direction of flow should be counter to the adjacent US 550 flow. For example, the north side of US 550 would be recommended to flow west to east and the south side back access road would be recommended to flow east to west. This layout would provide the following benefits:

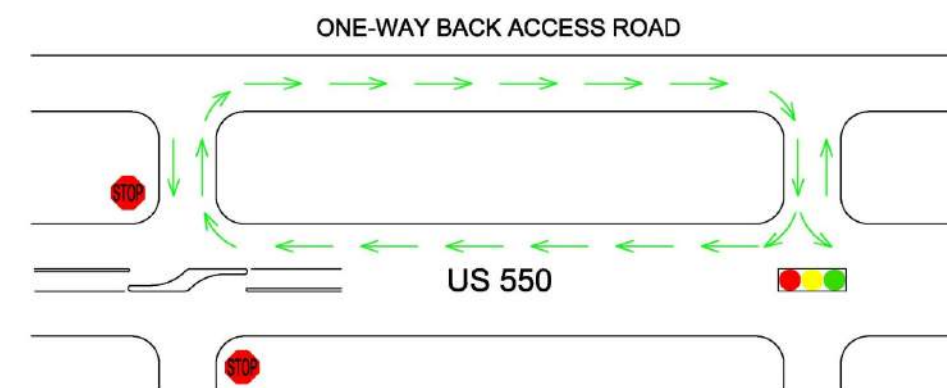
- A one-way street will require less pavement, thus requiring less material and ROW cost.
- One way operations would offer fewer conflict points for accessing vehicles thereby reducing risk for crashes.
- One way back access roads will eliminate the need for left-turn movements from US 550 via a side street and thus there will be no “back to back” competition for limited queue lane storage between the side street left-turn to US 550 and access to the back access road. This will allow much more storage where it is needed for vehicles turning left onto US 550 from the side street. **Figure 7.3** depicts this comparison.

Figure 7.3 One Way Back Access Comparison



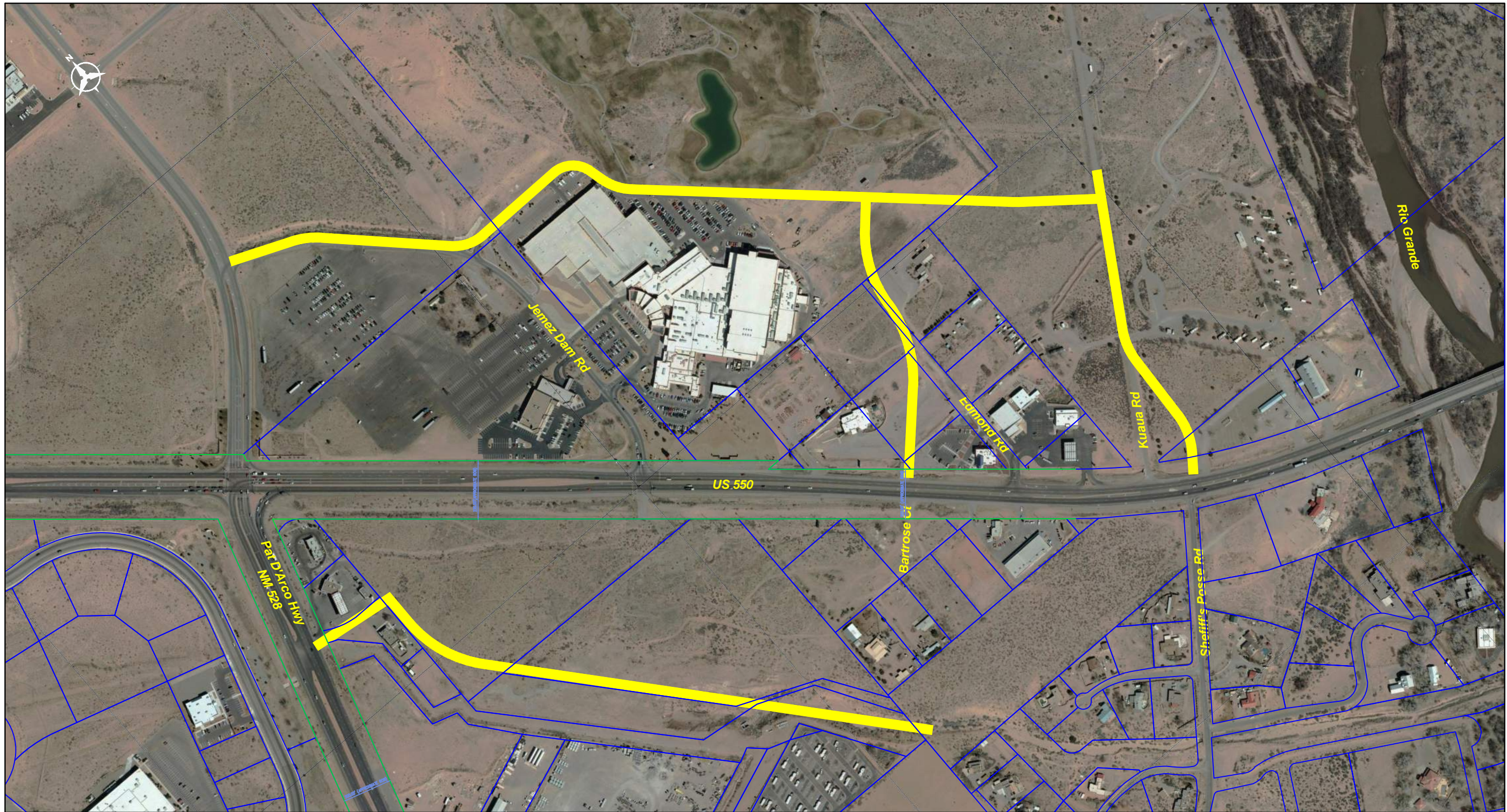
- This layout will provide a more natural movement for vehicles accessing adjacent businesses with simple right-turns. Vehicles exiting the adjacent businesses can exit either left or right by using the side street signal. A conceptual schematic demonstrates this in **Figure 7.4**.

Figure 7.4 One Way Back Access Concept



- One-way back access roads may also mitigate the need to signalize the back access road intersection due to the elimination of left-turn movements from the north-south street.

Proposed back access along this corridor would provide several benefits including the following:



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US 550 CORRIDOR

Figure 7.5
Back Access Road Concept
(West Side of Rio Grande)

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US 550 CORRIDOR

Figure 7.6
Back Access Road Concept
(East Side of Rio Grande)

- Back access will provide a much safer alternative to turning left from a minor street or driveway onto US 550. Vehicles desiring to head left onto US 550 would be able to make a right onto the back access road with much lighter demands and speeds and then make a left-turn at an existing signalized intersection. This is much safer movement and would reduce the risk for crashes.
- Back access streets will not only provide additional local capacity, but will also divert traffic that would otherwise have to use US 550 thus providing additional capacity for through-put on the corridor.
- Back access streets will provide an alternative for bike riders that are not comfortable riding on a high speed-high demand arterial roadway.
- These access streets will provide safe full access for all adjacent commercial properties even with the implementation of access control medians.

An analysis of the six-lane alternative with the incorporation of back access roads was conducted assuming that these access roads could attract around 550 vehicles in the dominate direction of travel from US 550. This adjusted capacity and LOS analysis is summarized in **Table 7.1**.

Table 7.1 Capacity & LOS Analysis of Alternative 1 with Back Access Roads

US 550/PDV				US 550/Sprint Blvd				US 550/NM 528				US 550/Jemez Dam Rd			
AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
0.83	A	0.93	C	1.00	F	0.89	B	1.07	F	0.99	D	1.20	F	1.18	F
US 550/Kuaua-Sheriff's Posse				US 550/Camino Don Tomas				US 550/NM 313							
AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak					
V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS				
1.24	F	1.14	F	1.06	F	0.99	C	0.93	C	0.99	D				

As indicated the back access roads could provide up to 15% more capacity on US 550 at many intersections, but many movements will still operate over capacity and therefore an LOS F. Based on this analysis, and the predicted annual growth of 3.5% per year from the 2035 model, the incorporation of back access roads would not only improve safety on the corridor and add access to adjacent properties, but also potentially provide an additional 5 years of life for the six-lane design alternative.

7.1.3 Access Alignment

There are several locations, especially between Camino Don Tomas and NM 313 where driveways are not aligned across from each other. Misaligned driveways can create opposing left-

turn conflicts with the existing two-way left-turn lane and violate driver expectation, which can lead to increased crash risk. To mitigate this situation, shared access points have been proposed that will allow left-in only movements that will access adjacent commercial properties and ultimately proposed back access streets.

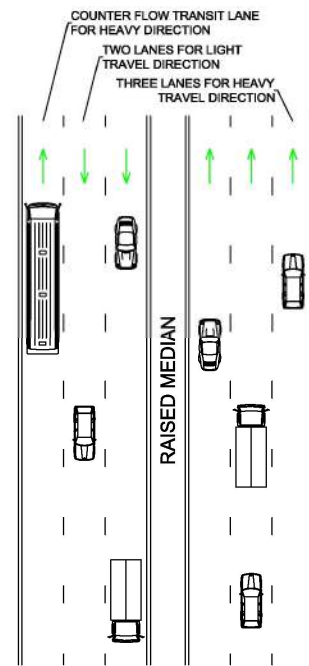
Both Sheriff's Posse Road and Kuaua Road are proposed to be aligned. Not only will this simplify access to and from these roads, but will also facilitate a much less complicated, safe shared median opening and signalized intersection when warranted.

Storm drains would be needed along backage roads when flow accumulation exceeds 10 cfs. The four backage road areas generate approximately 66 cfs cumulatively. The flow would be conveyed through approximately 5,500 feet of 24-inch culvert pipe with inlets, manholes, and lateral connections to convey the 50-year peak flow off of the roadway and into the continuous storm drain system for improvements to US 550. The low point located east of Camino Don Tomas and south of US 550 may require ponding to accommodate the flow generated along the backage road.

7.2 Transit Improvements

It could be possible to prolong the construction life of a six lane section by providing a reversible counter-flow BRT or transit lane in the lighter direction commuter travel. For example, in the AM peak, three through-lanes would be provided eastbound (the heavier demand) while only two through-lanes are provided on the westbound direction (the lighter demand) with the third outside westbound lane designated as a transit only lane running eastbound. The reverse lane configuration would be done for the PM peak hour. It is estimated that projected traffic demands for the lighter commuter direction could accommodate a two-lane section until sometime between 2021 to 2025. Furthermore, the addition of an exclusive transit lane in the heavier direction could increase transit modal choice and reduce standard vehicular demand possibly increasing the lifetime of a six-lane section. If back access roads are also implemented, the life of the six-lane section could be further increased as discussed in the Long Term Capacity Design Alternatives Section. A reverse exclusive transit lane concept is depicted in **Figure 7.7**.

Figure 7.7 Reversible Transit/BRT Lane



In addition to the previously discussed reversible transit lane several other transit improvements could be implemented to improve overall corridor capacity and potential attract current vehicular commuters to transit. They include the following:

- However, as development and growth continues in the City of Rio Rancho and Santa Ana Pueblo the need for more north-south corridor routes will increase. This would include potential routes on Paseo del Volcan, Willow Creek Road/Idalia Road, NM 528, and NM 313.
- The implementation of Bus Rapid Transit (BRT) should be considered in the coming years for the US 550 bridge crossing to and from the Rail Runner Transit Hub.
- To alleviate river crossing demands, a new park and ride facility could be located on the west side of the Rio Grande. This park and ride could impact modal choice on the US 550 thus potentially freeing up additional capacity. Therefore, potential locations for such a park and ride

Figure 7.8 Coors/Ellison Park and Ride



facility should be studied to determine the most serviceable and practical location. Additional capacity savings could also be realized by looking into providing a reversible BRT lane.

- Transit Priority is an adjustment in signal phasing in which transit is given its own green time to in effect get ahead of the platoon. This amenity can make travel times much shorter and provide an incentive for people who otherwise would drive to choose transit as their mode of transport. Getting the transit vehicle in front of the corridor platoon can further be augmented by provided what is called a queue jump lane that would be exclusive for transit vehicles only. A queue jump lane can also be used in combination with transit priority signalization.

7.3 Adaptive Signal System

An adaptive signal system could be deployed, which can provide up to 5% capacity improvements throughout a typical day. An adaptive system continuously recalculates the required offset, green splits and cycle length based on real time platoon data and traffic demand. Implementation of this type of traffic control would require additional detection both upstream and downstream from the signal locations, and usually includes a traffic management program that works with many existing controller types. The advantages for an adaptive system are the following:

- The system will continuously distribute green time to “real time” demands.
- The system can provide a consistent reliable travel time for corridor demands no matter what the time of day.
- The adaptive nature can customize peak hour plans by day of the week, whereas a static plan defines a plan to last from a predetermined time frame.

The main drawback to the system can be the initial cost and the continued maintenance of a larger amount of detection as the adaptive system depends on this data. If these additional detectors are not working, the adaptive system fails.

An adaptive system is a good option in conjunction with other strategies when a corridor cannot be widened or when the procurement of additional ROW is cost prohibitive. In order to get the most out of an adaptive signal system, other strategies such as transit enhancements, access management, traffic demand management, and pedestrian/bicycle improvements should also be pursued.

7.4 Pedestrian and Bicycle Improvements

It is recommended that curb, gutter, and sidewalk be a requirement as part of any site plans for any new development along this area, and should be placed such that a third through lane can be constructed at a later date. With the construction of a third through lane on the corridor, any lengths of corridor not incorporating sidewalk already will include sidewalk construction as part of this project. All new sidewalks shall be 6 feet wide per NMDOT requirements and pedestrian ramps

should incorporated pedestrian ramps with detectable surfaces and meet current PROWAG requirements.

As mentioned, there are currently there are no specific facilities for bicycle traffic along the US 550 corridor. It is therefore recommended that any widening improvements on US 550 should include at least include a shared lane of a minimum 14 feet on the outside through, but preferably would include an exclusive bicycle lane of 6 feet to face of curb.

If back access roads are constructed it is also recommended to include either a shared lane or exclusive bicycle lane. This will offer bicyclist that are not comfortable riding on US 550 with higher speed and heavy demand vehicular traffic. If a bicycle trail system is constructed along the Rio Grande within the project area, these back access roads could be used as an opportunity to provide direct access to river trails without requiring the rider to use US 550 for access.

Bicycle demands along the corridor are such that, bicycle detection could be warranted on some of the side streets along the corridor. Bicycle detection can be achieved through the following methods:

- Placing an in-pavement detector that is sensitive to the size of a bicycle. These can be limited due to the fact that these detectors cannot detect carbon fiber bicycles.
- Video detection is now offering the ability to place bicycle detectors along with vehicle detection. This form of detection is not limited by the material the bicycle is made of. At times, video detection can be adversely impacted by sun glare, in climate whether, and shadow locations.
- Radar detection also offers an alternative method to detecting bicycles regardless of material and is not impacted by sun glare.

In addition to bicycle detection, consideration should be given to providing a minimum green time for bicycle detection calls that will allow bicycles, which are much slower than motor vehicles, to safely traverse the intersection without encroaching on a conflicting green phase.

7.5 Alternative Bridge Crossings

Alternative bridge crossing have been looked at in the past. However a new bridge crossing would require many shareholders to agree on a location and so far no viable candidates have been put forth and seems unlikely that any will be progressed within the next couple of decades. Providing alternative Rio Grande Bridge crossings are beyond the scope of this project. However, the opportunity for new river crossings north or south of the US 550 corridor should continue to be pursued, especially as development continues in the area.

7.6 Comprehensive Adjacent Corridor Planning

It should be mentioned that addressing capacity issues on US 550 is only part of the solution to regional traffic congestion issues and the adjacent network needs planning cooperation from the local stake holders especially when looking to balance traffic operation with local community needs and continuity. The region needs to define additional north-south arterial corridors as well as adjacent parallel traffic circulation for the communities of Bernalillo, Rio Rancho, and Santa Ana Pueblo to provide some traffic demand relief for the study corridor. This planning can go a long way toward reducing the need for US 550 to become a freeway facility, which would be undesirable to the local residents and create a barrier to community connectivity and continuity between the north and south sides of US 550. The nearest major parallel roadway is Enchanted Hills, which serves more as a major collector for the west side of the Rio Grande. The closest arterial road way that connects the east and west side of the rivers is Alameda Boulevard, which is over eight miles to the south.

7.7 ITS and Traffic Demand Management

Currently, the NMDOT operates and maintains the following ITS field devices, along US 550 or nearby, at the following locations:

- | | |
|--------------------------------|------------------------------------|
| • Dynamic Message Sign | WB US 550 west of Paseo del Volcan |
| • Dynamic Message Sign | EB US 550 east of Sprint Blvd |
| • Dynamic Message Sign | NB NM 528 south of US 550 |
| • CCTV Camera | US 550 at NM 528 |
| • ATR Station | US 550 at Rio Grande |
| • 144 Strand Fiber Optic Cable | Paseo del Vulcan to I-25 |

The following additional ITS infrastructure is recommended:

- It is recommended that an additional DMS be placed eastbound on US 550 in advance of NM 313, giving motorists an opportunity to use an alternate route, such as NM 313, to destinations north or south.
- There could also be value in placing a DMS on the south legs of Paseo del Volcan and NM 313 for motorist wanting to access I-25 from these corridors.
- Recommended CCTV locations to expand the coverage would include at US 550, Camino Don Tomas, Paseo del Volcan, and near the bend in the road at US 550 and the Rio Grande.

Additionally efforts can be made in traffic demand control from a planning perspective by encouraging the following local employment, and business development practices:

- Carpooling or car sharing programs
- Implementation of flexible company work hours
- Encouragement of telecommuting and tele-meeting practices
- Incorporation of parking fees
- Development of work center destinations on the west side of the river to balance river crossing demands