

## CHAPTER 6 – INTRODUCTION AND PRELIMINARY EVALUATION OF DESIGN OPTIONS AT NM 528

The following section introduces and evaluates design options at the intersection of US 550 and NM 528 that could be deployed with any of the previously described design alternatives. A summary of capacity and LOS analyses for all intersection options is provided as **Table 6.1**. All design options were evaluated based on the same criteria presented in Chapter 5 for the corridor design alternatives.

**Table 6.1 Capacity & LOS Analysis of Design Options for the NM 528 Intersection**

Intersection Alternative	AM Peak		PM Peak	
	V/C	LOS	V/C	LOS
WB Triple Left Option	1.22	F	1.35	F
WB Dual Left	1.45	F	1.86	F
Continuous Left-Turn Option	1.23	F	1.41	F
Arterial Super Street	1.5	F	1.05	F
Interchange (WB Ramp)	0.75	C	0.99	D
Interchange (EB Ramp)	0.93	A	0.8	A
Flyover (3 Through Lanes)	1.07	F	1.16	F
Flyover (4 Through Lanes)	0.87	B	0.99	D

The only option that is anticipated to accommodate projected 2035 demands are the interchange and flyover with four through-lanes options. The remainder will operate above capacity and thus an LOS F.

### 6.1 Option 1 - Four-Lane Section with WB Triple Left-turns

#### 6.1.1 Description

This option proposes four through-lanes in each direction on the US 550 approaches, triple westbound left-turn lanes, and triple northbound right-turns. See **Figure 6.1** for conceptual design option layout. As shown, the intersection footprint would be quite large and thus the intersection would be ROW intensive and challenging for pedestrian crossings. LOS analyses indicate some improvement in capacity and delay, but many movements would still be over capacity and thus still LOS F for projected 2035 traffic demands.

#### 6.1.2 Meets Purpose and Need

To some degree, this design option does meet the project purpose and need. It will address traffic congestion but may result in more complicated pedestrian and bicycle use at this location

#### 6.1.3 Traffic Operations

This design option will have several movements that are expected to operate beyond capacity and at an LOS F. It should be noted that this analysis does not take into account greater pedestrian crossing times which could be crossing as many as 11 vehicular lanes.

#### 6.1.4 Safety

Initially, this alternative will provide significant reductions for rear end crashes due to the initial handling of congestion. However, over the course of traffic demand growth this benefit will diminish especially when movements begin to operate over capacity. As mentioned, pedestrian and bicycle exposure to vehicular traffic would be increase due to the large intersection footprint.

#### 6.1.5 Feasibility

##### 6.1.5.1 Constructability

Lane closures will be required for constructions of additional lanes.

##### 6.1.5.2 Right-of-way Impacts

Approximately 200 square feet of right-of-way would be required in the southeast quadrant of the intersection for the triple right-turn movement.

##### 6.1.5.3 Drainage

Impervious area does not increase significantly with NM 258 Intersection Option 1. Drainage costs for this option are included in the costs associated with US 550 alternatives described above.

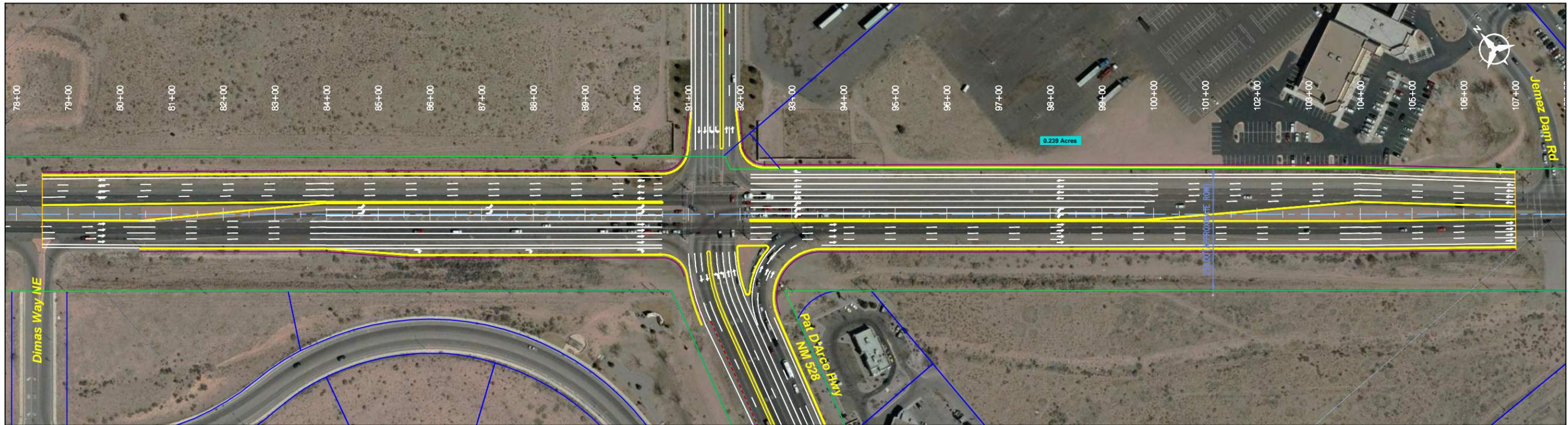
##### 6.1.5.4 Environmental & Community Impacts

In general there will be minor environmental impacts to geology, soils, water, vegetation, and wildlife and protected species. Air quality and noise levels are directly related to traffic operational LOS and therefore will initially improve emissions, but will degrade as traffic congestion increases as demands approach projected 2035 demands. Generally minimal cultural resource impacts would be felt by this project as most of the work will be within disturbed areas. Any visual degradation could be remedied with a landscaping component of construction. There is an existing cemetery located on the north corners of the intersection. However, it is not anticipated that construction would encroach on this area. A more detailed environmental analysis is provided in **Appendix E** of this report.

The larger intersection footprint of this design option does not foster community connections between the north and south side of the intersections, although these impacts are probably less impactful at NM 528 when compared to the east side intersections of NM 313 and Camino Don Tomas within the Town of Bernalillo. The corners of the NM 528 intersection are much less developed with the Santa Ana Casino parking lot on the northeast corner and a gas station on the southeast corner. With more lanes to cross, pedestrian exposure to vehicular traffic will be greater.

#### **6.1.6 Construction Cost Estimate**

The construction cost estimate is **\$3,450,000** including New Mexico Gross Receipts Tax and 8% Engineering and Contingencies. It was assumed that all of the pavement would be reconstructed at 6-inches hot mix asphalt over 10-inches of base course. 2014 average unit prices were used.



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8220 SAN PEDRO DRIVE NE  
 SUITE 150  
 ALBUQUERQUE, NM 87113  
 505/338-0988 FAX 505/338-0989



www.bhinc.com 800.877.5332

US 550 CORRIDOR



Figure 6.1  
 NM 528 Design Option 1  
 (WB Triple Left-Turn Lanes)

## 6.2 Option 2 - Continuous Flow Intersection

### 6.2.1 Description

The over capacity westbound left-turn movement could also be handled by incorporating a continuous movement geometry, as indicated in **Figure 6.2**. As shown, the westbound left-turn movement would cross the eastbound movements through a two phase signal just upstream of the US 550/NM 528 intersection. The left-turn movement would then be channelized to the right of the eastbound through-lanes at the US 550/NM 528 signalized intersection and thus allow all eastbound left-turn movement to operate simultaneously with both westbound left and through movements. Challenges to this concept include the potential restriction of right-turn on red for north/south approaches unless right-turn channelization is used, and complexity of the signal operation as there would be three closely spaced signals to accommodate the left-turn crossover movements. Pedestrians can be accommodated with several median refuges and tends to operate better with pedestrian crossings to the outside of the intersection.

### 6.2.2 Meets Purpose and Need

To some degree, this design option meets the project purpose and need. This option attempts to address current and future congestion, but will not accommodate all movements and will operate above capacity for projected 2035 traffic demands for both AM and PM peak. This design option would include improvements for pedestrian and bicycle modes of travel with less negative impacts due to the smaller intersection footprint when compared to Design Option 1.

### 6.2.3 Traffic Operations

LOS analyses indicates further capacity improvements as well as reduced delay. This design option will have several movements that are expected to operate beyond capacity and at an LOS F, which provides approximately 15% less capacity in the PM than the Design Option 1 scenario at NM 528 and little change between then in the AM. Again this analysis does not take into account pedestrian crossing phases and therefore does not account pedestrian crossing times which would be less impactful than Design Option 1.

### 6.2.4 Safety

Initially, this alternative will provide significant reductions for rear end crashes due to the initial handling of congestion. However, over the course of traffic demand growth this benefit will diminish especially when movements begin to operate over capacity. This option will also significantly reduce the opportunity for left-turn crashes as this option eliminates the conflict between oncoming traffic and left-turn traffic. Additionally, this option also offers more opportunities for pedestrian refuges due to the presence of several channelizing islands and thus safer pedestrian crossings with less continuous vehicular exposure.

### 6.2.5 Feasibility

#### 6.2.5.1 Constructability

Lane closures will be required for constructions of additional lanes.

#### 6.2.5.2 Right-of-way Needs

Approximately 4.5 acres of right-of-way would be required, mostly on the north side of the interchange. Some of the unpaved parking at Santa Ana Star Casino would be impacted.

#### 6.2.5.3 Drainage

NM 528 Intersection Option 2, with continuous left-turn lanes, increases impervious area and would impact the existing drainage ditch east of NM 528 on the south side of US 550. Drainage infrastructure improvements including increased capacity needs and replacement drainage infrastructure to off-set the impacts on the existing roadside ditch would be required for this intersection option.

#### 6.2.5.4 Environmental & Community Impacts

In general there will be minor environmental impacts to geology, soils, water, vegetation, and wildlife and protected species. Air quality and noise levels are directly related to traffic operational LOS and therefore will initially improve emissions, but will degrade as traffic congestion increases as demands approach projected 2035 demands. Generally minimal cultural resource impacts would be felt by this project as most of the work will be within disturbed areas. Again, construction associated with this design option should be able to be done without encroaching on the existing cemeteries located on the north corners. Any visual degradation could be remedied with a landscaping component of construction. There is an existing cemetery located on the north side of the intersection. A more detailed environmental analysis is provided in **Appendix E** of this report.

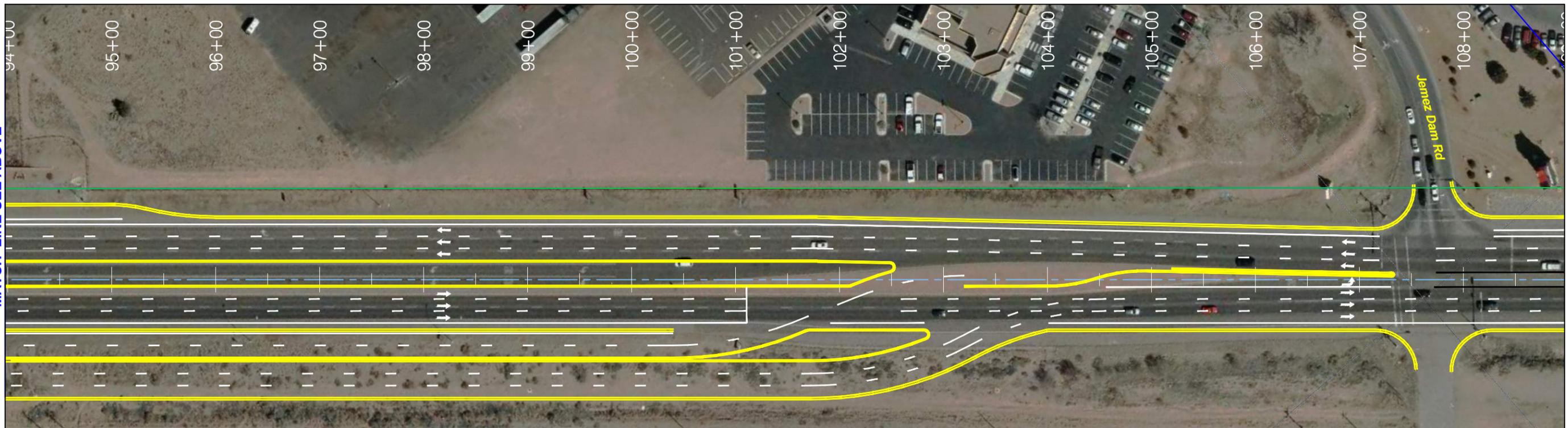
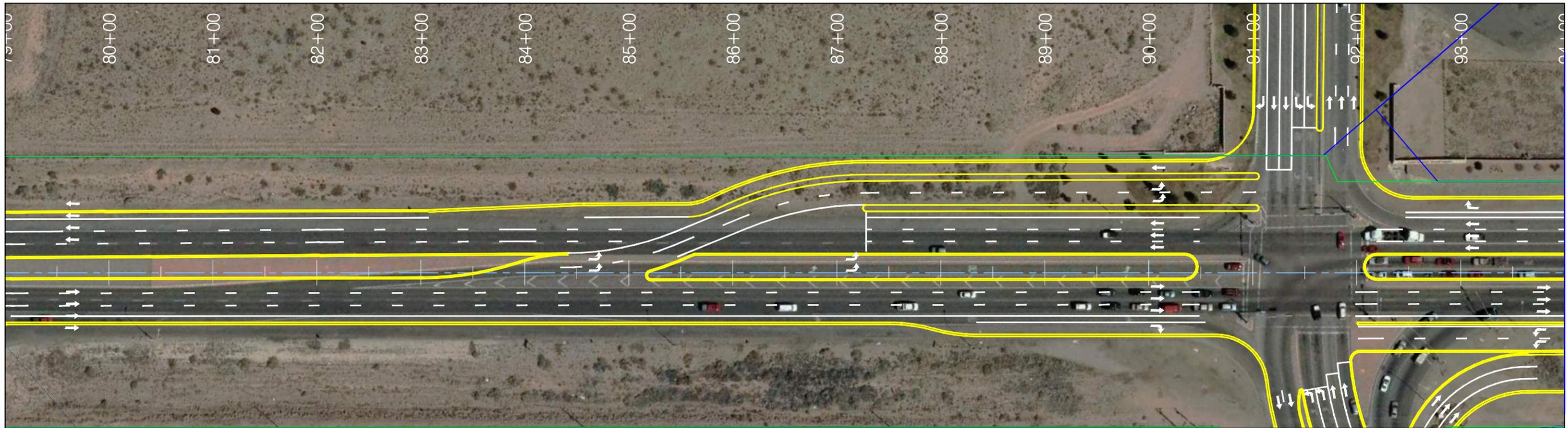
The larger intersection footprint of this design option does not foster community connections between the north and south side of the intersections, but less so than Option 1. With more lanes to cross, pedestrian exposure to vehicular traffic will be greater, but this could be remedied in this option with the provision of pedestrian refuge areas within channelizing medians.

The largest community impact will stem from the fact that this type of intersection incorporates geometry and operations not familiar within the state of New Mexico. Therefore, drivers will initially be confused with the operation of this design option. This could be mitigated by public outreach offering education of how to navigate this type of intersection. Also, most motorists on this corridor are local and regular commuters. Therefore, it will not take long for the local motorists to become acclimatized to this unfamiliar type of signalized intersection.

### **6.2.6 Construction Cost Estimate**

The construction cost estimate is **\$3,950,000** including New Mexico Gross Receipts Tax and 8% Engineering and Contingencies. It was assumed that all of the pavement would be reconstructed at 6-inches hot mix asphalt over 10-inches of base course. 2014 average unit prices were used.

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### US 550 CORRIDOR

Figure 6.2  
NM 528 Design Option 2  
(Continuous Flow Intersection)

## 6.3 Option 3 – Super Street

### 6.3.1 Description

Similar to Alternative 5, this option proposes to eliminate left-turn and through movements from the side street approaches at NM 528 only. These movements are then accommodated by two signalized U-turn pockets placed on either side of the intersection. Left-turns from the US 550 would still be allowed to access the side street at the main signalized intersection.

### 6.3.2 Meets Purpose and Need

To some degree, this design option meets the project purpose and need. This option attempts to address current and future congestion, but will not accommodate all movements and will operate above capacity for projected 2035 traffic demands for both AM and PM peak. This design option would include improvements for pedestrian and bicycle modes of travel with less negative impacts due to the smaller intersection footprint when compared to Design Option 1 but will also offer safety benefits due to reduction in conflict points and the potential for pedestrian refuges.

### 6.3.2 Traffic Operations

This design option will have a couple of movements that are expected to operate beyond capacity and at an LOS F, which provides approximately 20% more capacity than Design Option 1 in the AM, but 23% less capacity in the PM peak. Again, this analysis does not take into account pedestrian crossing phases and therefore does not account pedestrian crossing times. With medians as a major component of the design option, pedestrian refuges will be available for pedestrian crossing at the intersection and thus would mitigate any additional crossing length added by the additional lanes.

### 6.3.3 Safety

The safety benefits for this option will be the same as discussed for Alternative 5. Initially, this alternative will provide significant reductions for rear end crashes due to the initial handling of congestion. However, over the course of traffic demand growth this benefit will diminish. This alternative does offer some longer range safety benefits including the following:

1. The super street effectively reduces conflict points from 32 for a traditional eight-phase signalized intersection to 18 conflict points. Significant reductions in conflict points significantly reduce crash rates.

2. The super street eliminates direct left-turn movements from minor street approaches, which can be the most risky movement from a safety perspective, especially on arterials with wide cross-sections.
3. Two-phase signal operation eliminates protected permitted phasing and thus reduce the opportunity for angle crashes.
4. Two-phase signals and channelizing islands can offer pedestrians less exposure to vehicular traffic and provide median refuge.

### 6.3.4 Feasibility

#### 6.3.4.1 Constructability

Lane closures will be required for constructions of additional lanes.

#### 6.3.4.2 Right-of-Way Needs

The Super Street Alternative requires 961 square feet of right-of-way from the Santa Ana Star Casino property in order to construct the bulb out for the U-turn. This take could be avoided by shifting the alignment of US 550 to the south.

#### 6.3.4.3 Drainage

Impervious area does not increase significantly with NM 528 Intersection Option 3. Drainage costs for this option are included in the costs associated with US 550 alternatives described above.

#### 6.3.4.4 Environmental & Community Impacts

In general there will be minor environmental impacts to geology, soils, water, vegetation, and wildlife and protected species. Air quality and noise levels are directly related to traffic operational LOS and therefore will initially improve emissions, but will degrade as traffic congestion increases as demands approach projected 2035 demands. Generally minimal cultural resource impacts would be felt by this project as most of the work will be within disturbed areas. Again, construction associated with this design option should be able to be done without encroaching on the existing cemeteries located on the north corners. Any visual degradation could be remedied with a landscaping component of construction. A more detailed environmental analysis is provided in **Appendix E** of this report.

Although, this intersection will present a longer crossing length, the central channelizing islands offer the opportunity for pedestrians to use a refuge thus providing fewer conflicts between pedestrians and vehicles.

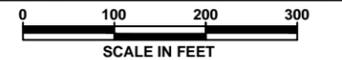
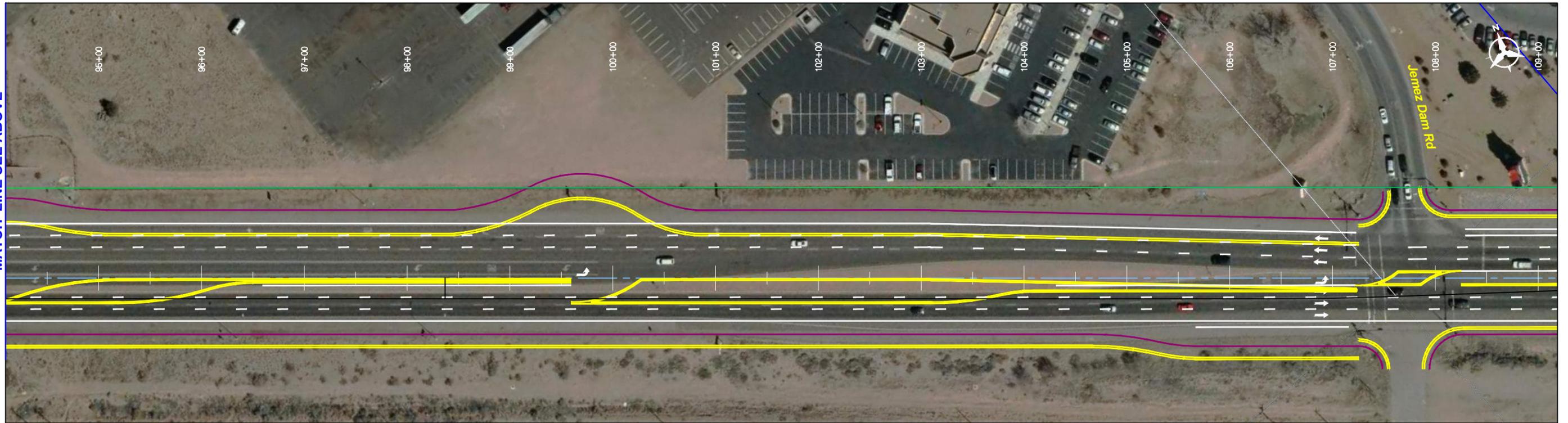
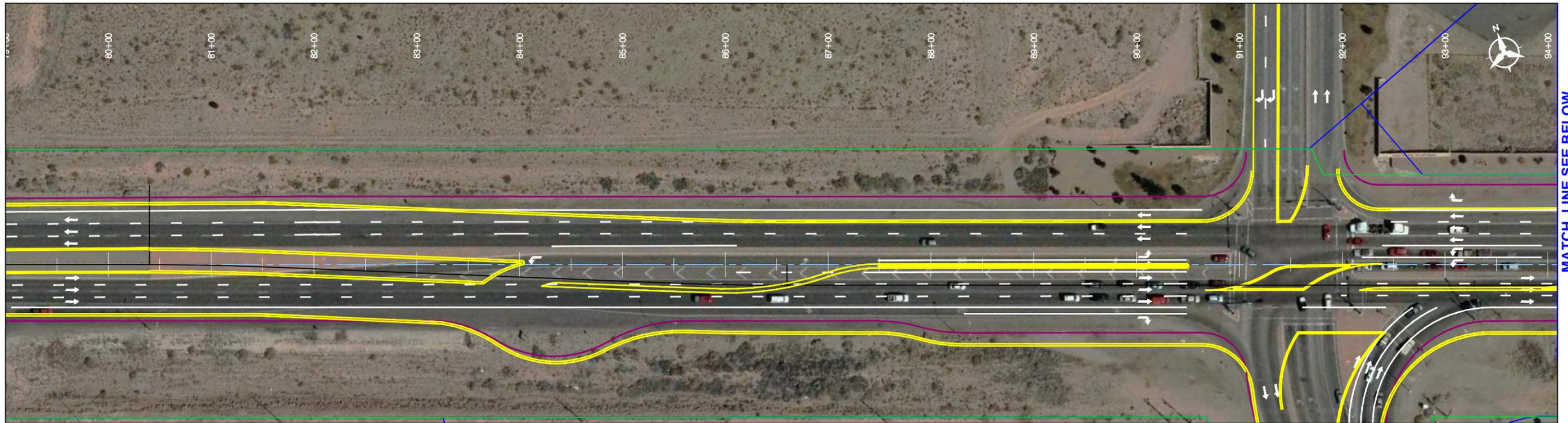
Again, this type of intersection incorporates geometry and operations not familiar within the state of New Mexico. Therefore, drivers will initially be confused with the operation of this design option. This could be mitigated by public outreach offering education of how to navigate this type of

intersection. Also, most motorists on this corridor are local and regular commuters. Therefore, it will not take long for the local motorists to become acclimatized to this unfamiliar type of signalized intersection.

### **6.3.5 Construction Cost Estimate**

The construction cost estimate is **\$3,100,000** including New Mexico Gross Receipts Tax and 8% Engineering and Contingencies. It was assumed that all of the pavement would be reconstructed at 6-inches hot mix asphalt over 10-inches of base course. 2014 average unit prices were used.

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### US 550 CORRIDOR

**Figure 6.3**  
**NM 528 Design Option 3**  
**(Super Street)**

## 6.4 Option 4 – Interchange

### 6.4.1 Description

A traditional interchange option is shown in **Figure 6.5**. A tight diamond or single point interchange could also be used. The disadvantage of any of these types of interchanges is that the intersections of Dimas Way and Jemez Dam Road are too close to the ramp terminals and would have to be closed. An interchange would also be viable with the Double Decker freeway alternative with the local road treated as a frontage road.

### 6.4.2 Meets Purpose and Need

This option attempts to address current and future congestion, and is expected to accommodate 2035 traffic demands. This design option would include improvements for pedestrian facilities. However, bicycle facilities would be limited along US 550 as this design option assumes that US 550 would be a freeway section.

### 6.4.3 Traffic Operations

This design option will accommodate projected 2035 traffic demands and is expected to operate at LOS ranging from LOS D in the PM at the westbound ramp terminal to LOS A for both peak periods at the eastbound ramp terminal. It will be imperative that these two ramp termini be coordinated well and that left-turn storage lengths on the bridge would accommodate expected queue demands.

### 6.4.4 Safety

Rear end crashes would be mitigated for this option due to the fact that through traffic will not stop at the signalized intersection.

### 6.4.5 Feasibility

#### 6.4.5.1 Constructability

The constructability of this option will be a challenge due to the fact that it is predicated on US 550 becoming a freeway section road closures would may be required to accommodate bridge construction.

#### 6.4.5.2 Right-of-way Needs

Approximately 4.5 acres of right-of-way would be required, mostly on the north side of the interchange. Some of the unpaved parking at Santa Ana Star Casino would be impacted.

#### 6.4.5.3 Drainage

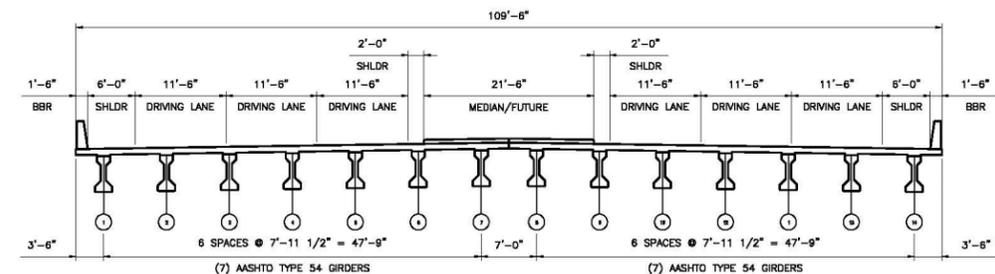
NM 528 Interchange Option 4 increases impervious area and impacts the existing drainage ditch along the south side of US 550 both east and west of NM 528. Drainage infrastructure

improvements including increased capacity needs and replacement drainage infrastructure to offset the impacts on the existing roadside ditches are required for this intersection option.

#### 6.4.5.4 Bridge

A new interchange of US 550 over US 528 requires a crossing length of approximately 100' to 110'. A single, simply-supported, or semi-integral bridge span can accommodate the entire span of the crossing using conventional, prestressed concrete I-girder construction. Preliminary design indicates a girder depth between 54" and 63". The number of girders required depends on the corridor alternative selected, as well as the girder depth and spacing. For Alternatives 1 and 3, the number of girders required is between 10 and 14. For Alternative 4, the number of girders required is between 12 and 16. For this intersection option, the existing roadway elevation needs to be increased between 22'-0" and 23'-6" to comply with the required 16'-6" minimum vertical clearance for new construction per Table 1.1 of the NMDOT Bridge Procedures and Design Guide (April 2013 Edition). Conventional, prestressed concrete superstructures are estimated to cost \$165 per square foot for an approximate total between \$2,000,000 and \$2,500,000 depending on the corridor alternative selected. Abutments constructed integrally with mechanically stabilized earthen (MSE) walls are assumed for the substructure, foundation and approach due to the limited right-of-way. This option has approximately 15,000 square feet of MSE walls; at an estimated cost of \$35 per square foot there is an additional cost of \$525,000 placing the total cost between \$2,600,000 and 3,000,000.

**Figure 6.4 NM 528 Design Option 4 Interchange Bridge Typical Section**



TYPICAL SECTION OPTION 4

#### 6.4.5.5 Environmental Impacts

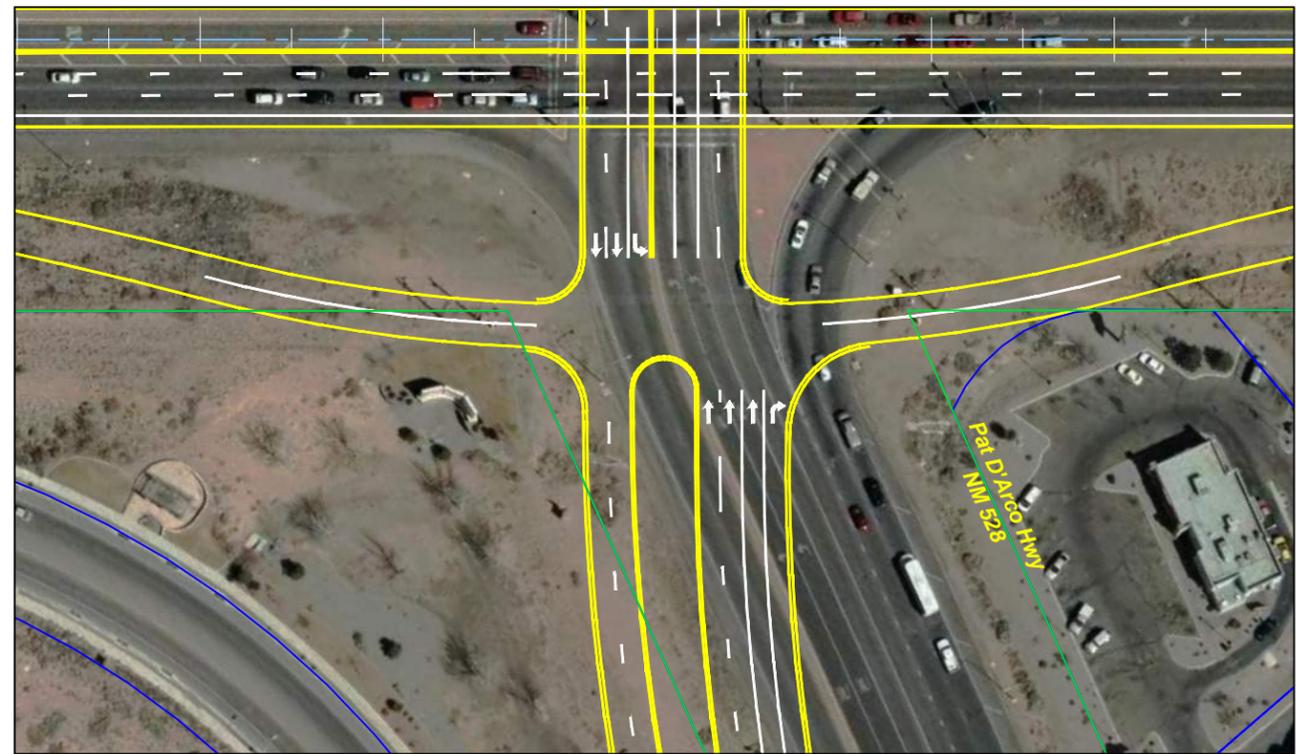
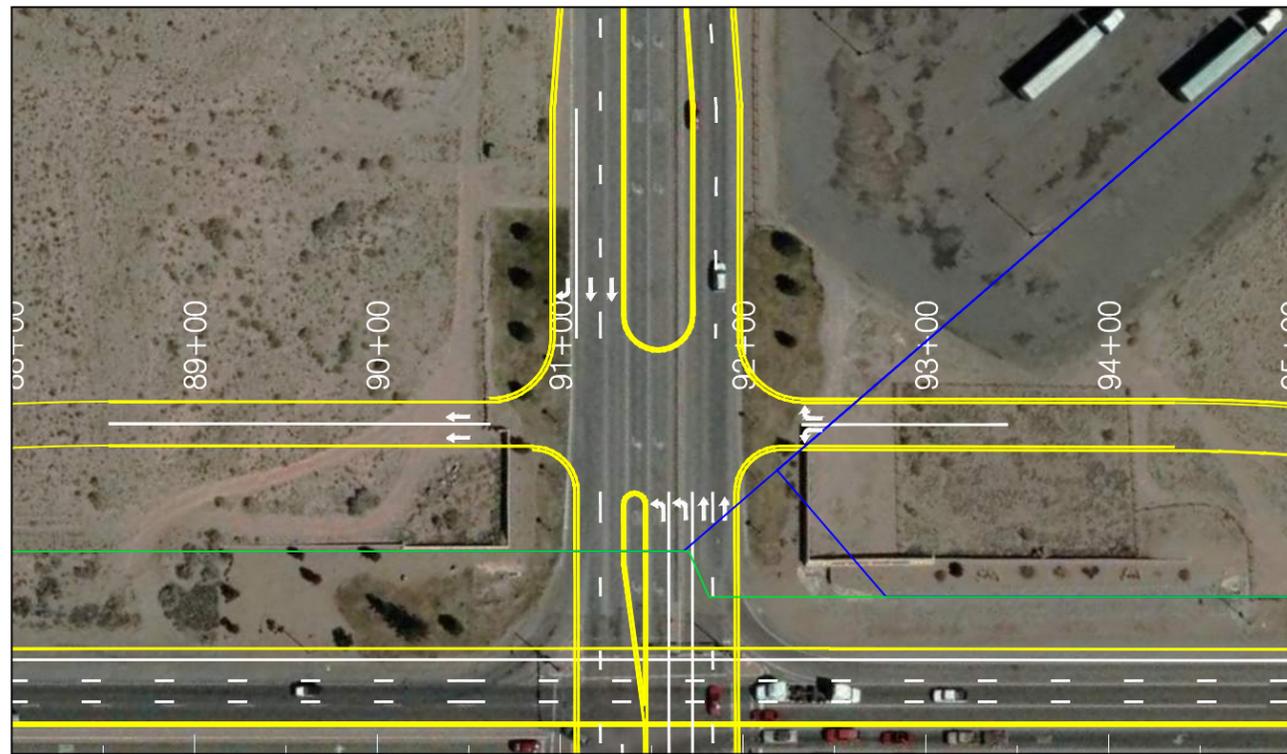
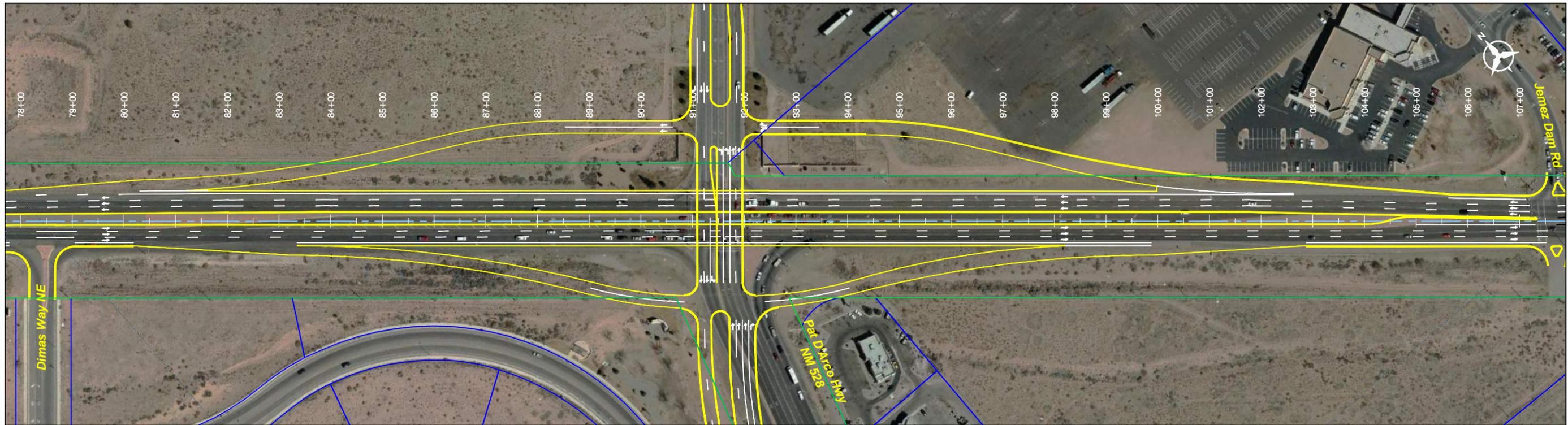
Since this particular option requires that US 550 incorporate a freeway section, there will be moderate environmental impacts to geology, soils, water, vegetation, and wildlife & protected species. Air quality would be better for this option due to the fact that this design option is expected to address projected 2035 traffic demands below capacity and at an acceptable LOS. Noise levels

would be greatly increased due to the higher speeds and higher elevation of some noise sources on structures that are associated with freeway facilities. This would likely require some sort of noise abatement mitigation such as sound barriers. Depending on the size of the proposed diamond interchange, cultural resource impacts would likely be much greater with this option. Traditional diamond interchange layouts would likely encroach onto the adjacent historical cemeteries located at the north corners of the intersection. Structures associated with this option would require deeper excavations and thus a greater potential to encounter archeological sites. Any visual degradation could be remedied with a landscaping component of construction and artistic features to the associated structures. A more detailed environmental analysis is provided in **Appendix E** of this report.

The design option would have the greatest community impacts, as this option requires a freeway section along US 550. A freeway section would not encourage communal interactions between land uses on the north and south side of the roadway. This would especially be undesirable to the community within the Town of Bernalillo, which would probably be most impacted by this division. The freeway section would also be less friendly to pedestrian and bicycle uses as these modes of transportation are not compatible with high speed vehicular traffic.

#### **6.4.6 Construction Cost Estimate**

The construction cost estimate is **\$8,100,000** including New Mexico Gross Receipts Tax and 8% Engineering and Contingencies. It was assumed that all of the pavement would be reconstructed at 6-inches hot mix asphalt over 10-inches of base course. 2014 average unit prices were used.



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US 550 CORRIDOR

Figure 6.5  
NM 528 Design Option 4  
(Interchange)

## 6.5 Option 5 - Flyover

### 6.5.1 Description

As mentioned, it is anticipated that there will be extremely heavy turn demands between the east and south legs of NM 528. Turn demands at NM 528 are such that even a triple left-turn will not operate at an acceptable level of service. Therefore, this movement would operate best under a free-flow scenario, such as a flyover. A fly-over would include a grade separated structure that would start on the east leg, traverse above the signalized intersection, and return to grade on the south leg. This option would not only include the expense of a significant bridge structure, but would also require limited access for adjacent approaches on the east and south legs. The flyover, shown in **Figure 6.6**, has been shifted to the south to maximize the use of the existing right-of-way.

**Figure 6.6 Example of a Flyover at Signalized Intersection**  
Source (WashDOT)



### 6.5.2 Meets Purpose and Need

To some degree, this design option meets the purpose and need of the project. This design option attempts to address future intersection demands and congestion and will accommodate them if four through-lanes are incorporated on US 550. Pedestrian and bicycles would be improved as part of this design option.

### 6.5.3 Traffic Operations

This design option will accommodate projected 2035 traffic demands if an eight-lane cross-section is constructed on US 550 with LOS of D or better. If a six-lane section is applied to US 550, the flyover would operate with some movements over capacity for a LOS F, but will offer 12 to 14 % and 11-18% additional capacity over Options 1, and 2 respectively. Pedestrians can still be accommodated at the at-grade approach lanes, but will be extremely long with the wider cross-section. An alternative pathway would be required to provide bicycles access from US 550 to NM 528.

### 6.5.4 Safety

This design options has the potential to reduce a proportion of rear end crashes that dominate this intersection due to the elimination of westbound left-turning traffic needing to stop at the signal. This reduction would be less significant when compared to the interchange option as that option eliminates east-west through traffic at the signal. With the addition of the free flow movement, there

may be an increase in side swipe crashes due to the requirement that vehicles negotiate weave sections at either end of the flyover.

### 6.5.5 Feasibility

#### 6.5.5.1 Constructability

Lane closures will be required with full road closures to accommodate construction of structures.

#### 6.5.5.2 Right-of-Way Needs

No right-of-way is needed to build the flyover if the alignment of US 550 is shifted to the south.

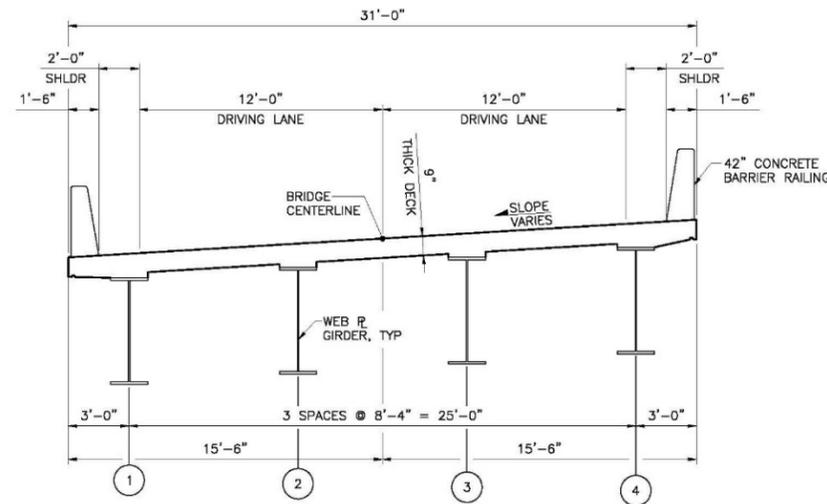
#### 6.5.5.3 Drainage

Impervious area does not increase significantly with NM 528 Intersection Option 5. Drainage costs for this option are included in the costs associated with US 550 alternatives described above.

#### 6.5.5.4 Bridge

For this option, a steel plate girder superstructure will be required due to the high degree of curvature of the proposed roadway. The proposed width of the flyover bridge is 31'-0" including standard NMDOT bridge barrier rails on each side. The required bridge length is approximately 600'. Strategically placing intermediate piers in medians and roadway islands, the maximum required span is approximately 140'. Preliminary design indicates that a minimum of four girders will be needed with a minimum depth of 5'-3". Steel plate girder superstructures are estimated to cost \$220 per square foot for an approximate total of \$4,100,000. Abutments constructed integrally with mechanically stabilized earthen (MSE) walls are assumed for the substructure, foundation and approach due to the limited right-of-way. This option has approximately 13,000 square feet of MSE walls; at an estimated cost of \$35 per square foot there is an additional cost of \$455,000 placing the total cost at approximately 4,550,000. There may, however, be some cost savings with this option compared with an interchange as the entire roadway need not be built-up in elevation reducing the total required fill.

**Figure 6.7 Flyover Structure Typical Section**



**TYPICAL STEEL GIRDER BRIDGE CROSS SECTION**

portion of the intersection. However, pier structures associated with the flyover could present sight obstructions between vehicles and pedestrians. Pedestrian crossing locations would need to be placed at locations with the best visual vantage point relative to any flyover structural supports.

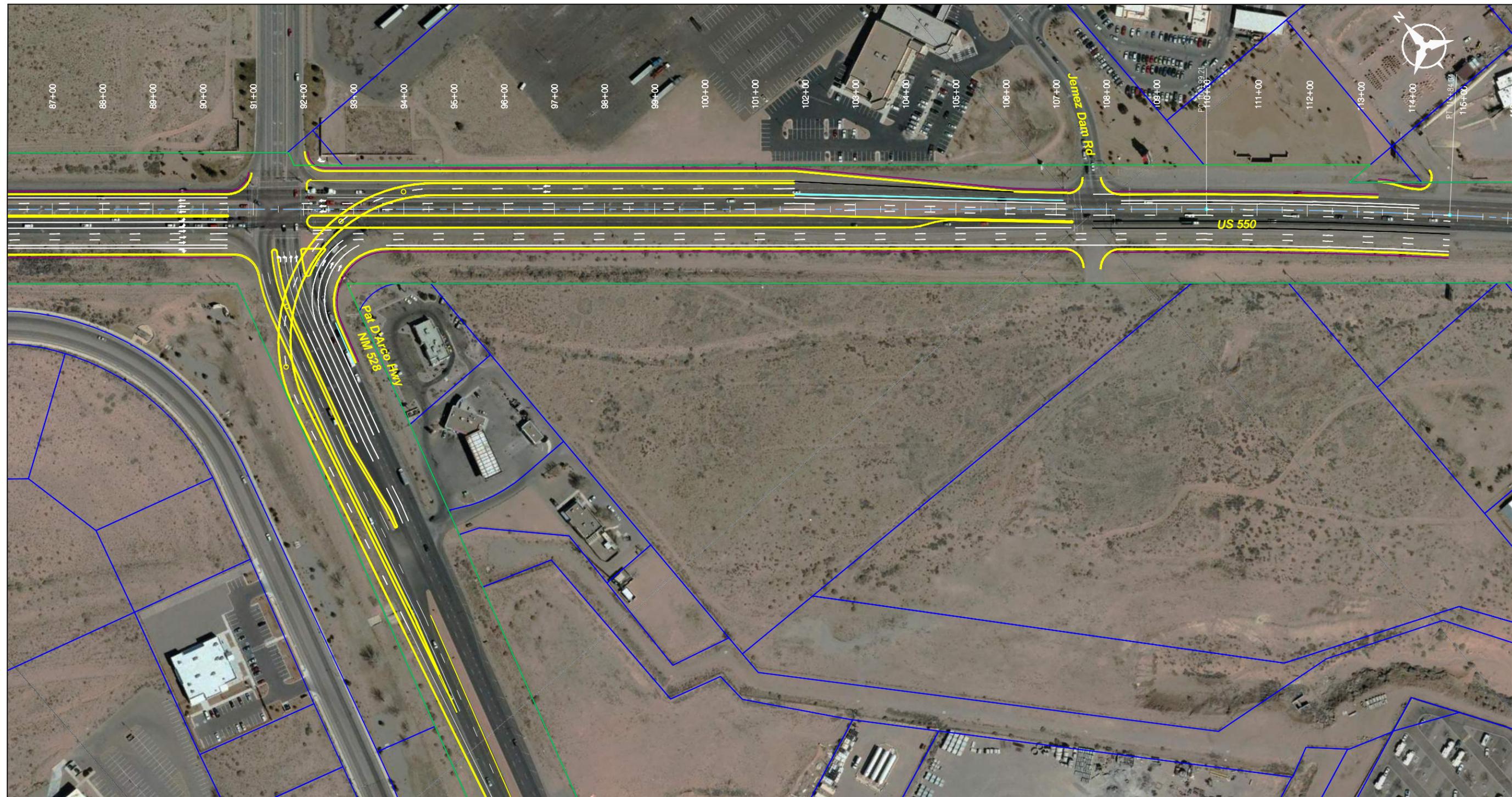
**6.6 Construction Cost Estimate**

The construction cost estimate is **\$9,500,000** including New Mexico Gross Receipts Tax and 8% Engineering and Contingencies. It was assumed that all of the pavement would be reconstructed at 6-inches hot mix asphalt over 10-inches of base course. 2014 average unit prices were used.

**6.5.5.5 Environmental & Community Impacts**

Since this particular option will incorporate overhead structures, there will be moderate environmental impacts to geology, soils, water, vegetation, and wildlife and protected species. Air quality would be better for this option due to the fact that this design option is expected to better address projected 2035 traffic demands especially if four through-lanes on US 550 are incorporated into the design. Noise levels would be increased due to the increased elevation of noise sources on the proposed flyover. This could require some sort of noise abatement mitigation such as sound barriers. However, further noise analysis would have to be conducted. The flyover layout indicates that there is no anticipated encroachment onto the adjacent historical cemeteries located at the north corners of the intersection. Structures associated with this option would require deeper excavations and thus a greater potential to encounter archeological sites. Any visual degradation could be remedied with a landscaping component of construction and artistic features to the associated structures. A more detailed environmental analysis is provided in **Appendix E** of this report.

Although there would be less community impacts than a full freeway section, there would still be some impact of the flyover between north and south sides of US 550. Additionally, the flyover structure would not accommodate bicycle traffic heading west to south. Therefore alternative bicycle facilities would have to be incorporated into the design if this movement for bicycles is to be accommodated. Pedestrian crossing movements would still be accommodated at the at-grade



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US 550 CORRIDOR

Figure 6.8  
NM 528 Design Option 5  
(Flyover)

## 6.6 Design Options at NM 528 Matrix Summary

Table 6.2 summarizes all US 550 design alternative evaluations discussed in this chapter.

**Table 6.2 Design Options at NM 528 Matrix Summary**

Criterion	No Build	Design Option 1 (WB Triple Left-Turns)	Design Option 2 (Continuous Left Turn)	Design Option 3 (Super Street)	Design Option 4 (Interchange)	Design Option 5 (Flyover)
<b>Meets Purpose and Need</b>	↓↓↓ Does not meet purpose and need	↑ To some degree meets purpose and need.	↑ To some degree meets purpose and need.	↑ To some degree meets purpose and need.	↑ To some degree meets purpose and need.	↑ To some degree meets purpose and need.
<b>Traffic Operations</b>	↓↓↓ Majority of AM/PM peak movements at LOS F in 2035.	↓ Some AM/PM peak movements at LOS F in 2035.	↓ Some AM/PM peak movements at LOS F in 2035.	↑ Some PM peak movements at LOS F in 2035.	↑↑ AM/PM peak movements at LOS D or above in 2035.	↑ Some PM peak movements at LOS F in 2035.
<b>Safety</b>	↓↓↓ No improvement to safety.	↓ Reduces rear-end crashes.	↑ Reduces angle crashes.	↑↑ Reduces overall conflicts.	↑↑ Reduces overall conflicts.	↑ Reduces left-turn conflicts.
<b>Feasibility</b>						
Constructability	↑↑ Maintenance only.	↑ Lane closures only.	↑ Lane closures only.	↑ Lane closures only.	↓ Roadway closures required for bridge construction.	↓ Roadway closures required for bridge construction.
Right-of-Way	↑↑ No additional ROW needed.	↓ 0.24 acres of ROW.	↑ 200 square feet of ROW .	↑↑ No ROW needed.	↓↓↓ 4.5 acres of ROW..	↑↑ No ROW needed.
Drainage	↓↓↓ Existing conditions need drainage improvements.	↑↑ Adequate drainage infrastructure installed.	↑↑ Adequate drainage infrastructure installed.			
Bridge Impacts	↑↑ No bridge construction.	↑↑ No bridge construction.	↑↑ No bridge construction.	↑↑ No bridge construction.	↓ New bridge required.	↓ New bridge required.
Environmental & Community Impacts	↓ No environmental impacts - no benefits.	↑ Minor environmental impacts - some benefits.	↑ Minor environmental impacts - some benefits.	↑ Minor environmental impacts - some benefits.	↓ Moderate environmental impacts - some benefits.	↑ Minor environmental impacts - some benefits.
Bicycle and Pedestrian Facilities	↓↓↓ No bicycle or pedestrian improvements.	↓ Challenging for pedestrians.	↑ Smaller footprint for pedestrians.	↑ Pedestrian refuges.	↓ Challenging for bicycle/pedestrians.	↑ Smaller footprint for pedestrians.
<b>Cost</b>	No construction costs. Only maintenance costs	\$3,450,000	\$3,950,000	\$3,100,000	\$8,100,000	\$9,500,000

↓↓↓ High Challenge  
 ↓ Moderate Challenge  
 ↑ Minimal Challenge  
 ↑↑ No Challenge