

3. ALTERNATIVES

A. Background

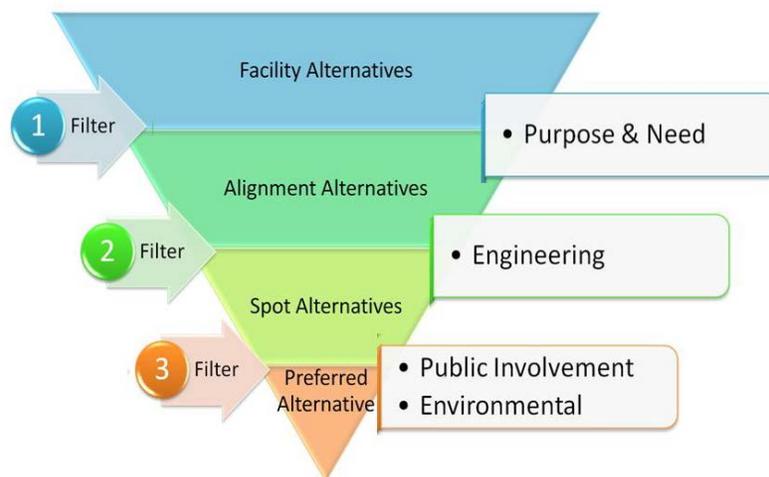
NEPA requires that reasonable alternatives, including the No Action or No-Build Alternative, be presented and evaluated. This chapter describes the process used to identify the range of alternatives considered and provides a detailed description of the alternatives carried forward in the document.

The Congressional Earmark for the Heartland Expressway corridor extends from Minatare to Alliance, and is made up of three smaller segments as discussed in **Section 2.B.1**. The segment from L62A to Alliance was selected as the first of the three segments to be constructed (of the corridor segments remaining to be improved) because this segment provides regional connectivity with the Nebraska Panhandle region, (by improving efficiency and safety of commerce and travel and further promoting economic development) in an area not served by a north-south expressway or a National Highway System facility. The north terminus of the project is within the City of Alliance because it is a regional economic hub in the Panhandle region and because this is where traffic splits at the junction with Nebraska Highway 2. The south terminus, at L62A, is the intersection junction where traffic volumes split—to the west to the City of Scottsbluff via L62A, another regional economic hub in the Panhandle; and to the south to I-80, the primary east-west transportation corridor in Nebraska.

For the alternatives screening process, the analysis first evaluated types of roadway facilities to determine if they would meet the project purpose and need, and project goal. Then alignment alternatives were evaluated for engineering feasibility and constructability issues. Finally, alternative alignments at certain locations were evaluated based on environmental impacts and public input as well as engineering considerations. **Figure 3.1** graphically shows how this process led to a preferred alternative.

Please note that the language of the Congressional Earmark specifically states that the facility is an Expressway, which is defined as a divided, limited-access highway; however other facility types are evaluated in the first step of the screening process.

Figure 3.1 – Alternative Selection Process



B. Facility Alternatives

Several types of highway facilities with different configurations were evaluated with regard to the project purpose and need, as well as the project goal. These configurations included:

- Super 2 Highway
- 2-Lane Highway with Climbing Lanes
- 2-Lane Highway with Auxiliary Turning Lanes
- 4-Lane Undivided Highway
- 4-Lane Divided Highway

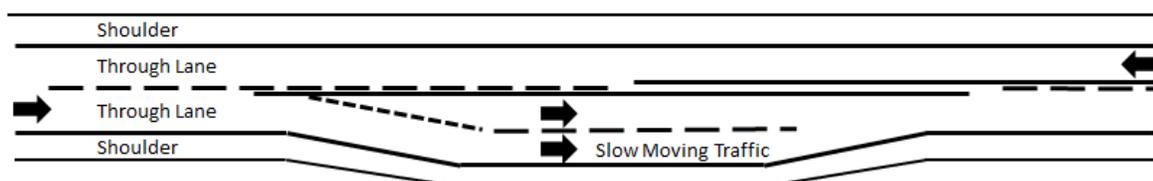
These alternatives were screened for support of the project purposes of (1) improving the highway to increase the efficiency and safety of commerce and travel as included in federal ISTEA legislation; (2) fulfilling the legislative intent of ISTEA and subsequent transportation acts; (3) fulfilling the legislative intent of the Build Nebraska Act; and (4) addressing roadway and operational deficiencies.

The alternatives were also screened for their support of the project goal of facilitating economic development by enhancing the efficiency and mobility of Nebraska Panhandle region commerce for residents, businesses, visitors, and interstate travel.

B.1 Super 2 Highway

This alternative would provide passing lanes along the project corridor. A Super 2 roadway would provide passing lanes along the project corridor at strategic locations. The purpose of passing lanes is to disperse platoons of vehicles behind slower moving vehicles such as trucks and farm equipment. **Figure 3.2** shows a typical passing lane. Two studies, FHWA/TX-02/4064-1, Design Guidelines for Passing Lanes on Two-Lane Roadways (Super 2), and FHWA/TX-11/0-6135-1, Operations and Safety of Super 2 Corridors With Higher Volumes, both performed by the Texas Transportation Institute, were referred to for guidance. These studies suggest that passing lanes are most appropriate below traffic volumes of 5,000 vehicles per day and that above 5,000 vehicles per day; performance and cost-effectiveness diminish to the point that a four-lane roadway is more advantageous. The 2036 anticipated design year, average daily traffic volume is 5,000 vehicles per day with approximately 19 percent trucks. Based on current peaks experienced during the beet and potato harvest season, the average daily traffic is anticipated to surpass 5,300 vehicles per day. Current traffic data show truck percentages nearly double during the fall harvests.

Figure 3.2 – Typical Passing Lane Layout



An analysis of this corridor indicated that the required passing lane density would approach 50 percent for maximum efficiency, but that the efficiency is still less than a four-lane roadway. Additional considerations are:

- On this corridor, with the approximately 50 percent density of passing lanes that would be required, the cost savings versus a four-lane roadway alternative diminishes significantly.
- On this corridor, with the approximately 50 percent density of passing lanes, as the density of the passing lanes increase, the in-out nature of the additional lanes violates driver expectancy.
- Vehicle conflict points at the ends of the passing lane increase without the added benefit of median separation of opposing traffic that is present with a four-lane roadway.
- The BNSF Railway parallels US 385 for approximately 19 miles along the corridor between Angora and Alliance. Within this area, the existing road would need to be widened to the west to construct the passing lanes due to the proximity of the BNSF Railway. Since the passing lane density is approximately 50 percent, and assuming a tail to tail passing lane configuration, the entire length of US 385 through this 19 miles would have a new lane added to form a three-lane roadway section. The center lane would be used for the passing lanes, alternating directions by segment. Based on typical practice in Nebraska, this configuration is believed to violate driver expectation.
- It is desirable to minimize conflicts with driveways and intersections in the transition sections of the passing lanes. There are over 60 field entrances or drives along the project, as well as 9 county roads, for a total of nearly 70 existing access points, where slow-moving vehicles can turn on or off the highway. Careful consideration must be given to placing passing lanes near horizontal and vertical curves to provide adequate sight distance and meet driver expectancy. A preliminary review of the plan and profile of the existing roadway indicates many conflicts among drives, intersections, and curves that would need to be resolved. This will lead to lengthening, shortening, and/or shifting of the passing lanes from their optimal positions.

Thus, this highway configuration would not meet the need for an improved highway that would provide efficient and safe travel without constructing the majority as a four-lane highway. Additionally, a Super 2 highway does not meet the legislative intent of ISTEA TEA-21, or SAFETEA-LU to construct an Expressway. In addition, traffic would be difficult to maintain in both directions for construction and future maintenance operations. For these reasons, the Super 2 alternative was eliminated from further consideration.

Results of Screening. This alternative was eliminated because it would not meet the purpose of addressing the roadway and operational deficiencies of this highway segment. Further, it did not meet the legislative intent to construct a 4-lane facility.

B.2 2-Lane Highway with Climbing Lanes

This alternative would provide passing lanes to disperse platoons of vehicles that build up behind vehicles that are slowed due to steep grades. This type of passing lane is typically called

a climbing lane. While the hills within the Sandhills portion of the project are very numerous, an analysis using standard NDOR and AASHTO Green Book methodology indicated that climbing lanes would not provide an effective solution because the hills are too short to cause enough speed reduction by the slower moving vehicles to warrant climbing lanes. In addition, this would also require construction and maintenance under lane closures for long durations, creating problems for maintaining traffic.

Results of Screening. This alternative was eliminated because it would not meet the purpose of addressing the roadway and operational deficiencies of this highway segment. Further, it did not meet the legislative intent to construct a 4-lane facility.

B.3 2-Lane Highway with Auxiliary Turn Lanes

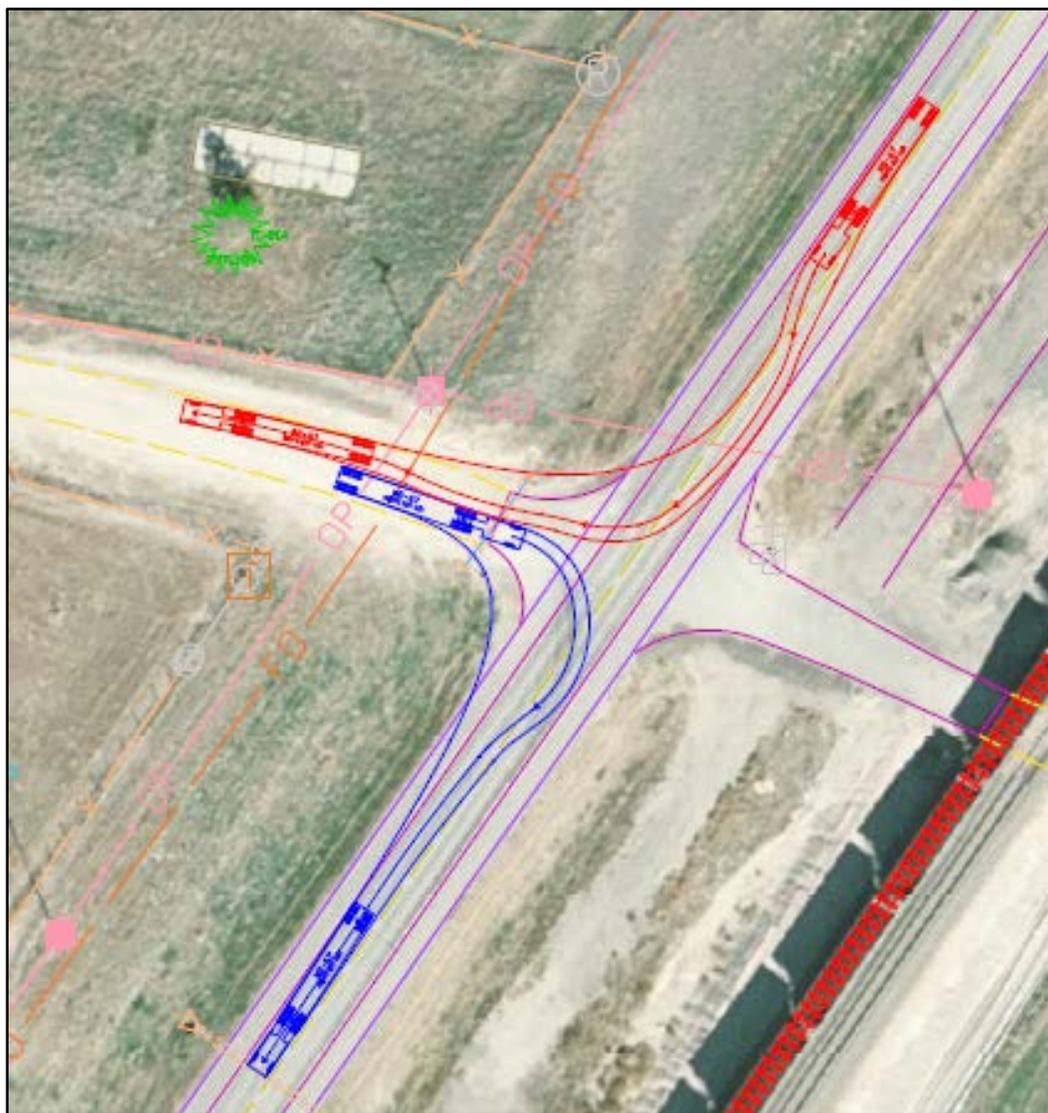
This alternative would construct auxiliary turn lanes at major intersections along the corridor. Turning vehicles currently encroach on opposing lanes to accomplish left and right turns. If turn lanes are not added at all of the facility access points, then large trucks would continue to encroach into oncoming traffic lanes in order to make a right turn. This is a potential hazard as vehicles heading in the opposite direction may not be able to stop in time to avoid a slow moving truck. The trucks that use US 385 are large, and many have “pup” trailers as well as semis. This photograph shows trucks hauling sugar beets on US 385 to a processing facility just north of the City of Alliance. Turning without running off the pavement can be challenging for these vehicles.



As an example of encroachment, **Figure 3.3** shows the theoretical movement of large trucks turning right into (red truck and path) and out of (blue truck and path) one of the facilities on US 385, the Dinklage Feedlot facility located south of the City of Alliance. Note that in each case, the truck must pull into the oncoming traffic lane to make the turn without running off the road. There are a total of 70 existing access points on the project. Providing right and left turn lanes at all of these locations would result in a four- or five-lane highway for large portions of the project alignment, and this alternative would need to be constructed and maintained with lane closures.

Results of Screening. This alternative was eliminated because it would not meet the purpose of addressing the roadway and operational deficiencies of this highway segment. Further, it did not meet the legislative intent to construct a 4-lane facility.

Figure 3.3 – Truck Right Turn Movement



B.4 4-Lane Undivided Highway

This alternative would provide two through lanes for traffic in each direction which would not be physically separated by a barrier or median. Passing would be internal to the thoroughfare and would not require cross over to oncoming traffic to pass a vehicle or slow-moving agricultural equipment. There is little to no reduction in crashes per kilometer, based on the Highway Safety Information Systems (HSIS) study on “Safety Effects of the Conversion of Rural Two-Lane Roadways to Four-Lane Roadways,” because the opposing traffic is not separated (<http://www.fhwa.dot.gov/publications/research/safety/humanfac/pdfs/99206.pdf>)

This alternative would not provide for the development of left turn lanes at access breaks, which are an important component of improving traffic flow, and decreasing potential for rear-end collisions. In addition, construction of the new lanes would need to match the existing roadway geometry and therefore, would not provide the improved geometry of a new divided roadway.

Results of Screening. While the 4-lane undivided highway meets legislative intent this alternative was eliminated because it would not meet the purpose of addressing the roadway and operational deficiencies of this highway segment. It would still require left-turning traffic to slow within the through lanes on the highway and does not allow for improved geometry,.

B.5 4-Lane Divided Highway (Preferred)

This alternative would provide 4-lane divided improvements the entire length of the project. The divided median could be raised or depressed. By definition, a divided highway is “a highway of four or more traffic lanes having two roadways with a median strip between them separating opposing traffic streams” (Merriam Webster 2014). A divided highway satisfies the “expressway” distinction, adds controlled access breaks and turning lanes, separates opposing traffic, provides a recovery area for out-of-control vehicles, provides a stopping area in case of emergencies, diminishes headlight glare, and provides width for future expansion. The HSIS study referenced previously notes a 40 to 60 percent reduction in crashes per kilometer when widening from a two-lane to a four-lane divided roadway. Additionally, the 4-lane divided cross-section is easier to construct because it allows the new lanes to be built while maintaining and not impacting existing traffic.

Results of Screening. Based on the above information and evaluations against the other alternatives, this alternative best addresses roadway and operational deficiencies of this highway segment and the project purpose of legislative intent to construct a 4-lane facility. Therefore, this is the Preferred Alternative carried forward.

B.6 Project Goal Analysis

Of importance to the project goal are findings of the original *Heartland Expressway Economic and Engineering Feasibility Study* conducted in 1993 (see **Section 2.B.4**). In addition, the analysis was updated as a *Technical Memorandum: Summary of the Benefit Cost Analysis for the Heartland Expressway Corridor in Nebraska*. The consultants conducting the updated economic study examined the 1993 results and indicated that they appear to be sound and that the final analysis using newer methodology results in an even higher Benefit to Cost ratio (**Table 3.1**). Note that the benefit/cost ratio for the Heartland Expressway improvements alone is 1.7 given a discount rate of 7 percent for inflation, and even higher if a discount rate reflecting an inflation rate of 3 percent is used. Thus, the project would have a substantial positive impact on the regional economy.

The new study assumed that all of the Heartland Expressway would be improved by *expansion to a four-lane facility*. These improvements typically provide benefits composed of travel time savings, increased safety; and operating cost savings, as detailed in the technical memoranda included in **Appendix A**.

Because the Technical Memorandum addressed the entire Heartland Expressway build-out, a further benefit to cost analysis was done for this project only (Olsson Associates, 2014). The results showed that even if only the L62A to Alliance segment was improved, there would still be a positive cost/benefit ratio. Using the two discount rates as discussed above, with a discount rate of 7 percent, this project would result in a benefit to cost ratio of 1.2, or a return of \$1.20 for

every dollar spent. With a lower discount rate of 3 percent, which has been more typical of the modern economy, the benefit to cost ratio would be 1.7, or a return of \$1.70 for every dollar spent.

Of the four alternatives, only the two 4-lane alternatives meet the project goal of economic development by providing benefits composed of travel time savings, increased safety; and operating cost savings. Only the 4-Lane Divided Alternative (Preferred) meets all the project purposes and is further supported by the project goal.

Table 3.1 – Summary of Benefit/Cost Analysis for Heartland Expressway

	7% Discount Rate				3% Discount Rate			
	Heartland Improvements	Heartland Improvements & Intensified Energy Resource Development	Entire PTP Improvements	Entire PTP Improvements & Intensified Energy Resource Development	Heartland Improvements	Heartland Improvements & Intensified Energy Resource Development	Entire PTP Improvements	Entire PTP Improvements & Intensified Energy Resource Development
Benefits								
Travel Time								
Existing Traffic	\$140.8	\$139.1	\$139.6	\$136.4	\$347.7	\$343.6	\$344.9	\$336.9
Diverted Traffic	\$1.0	\$1.0	\$25.4	\$23.1	\$2.5	\$2.4	\$62.7	\$57.1
Pavement Savings	\$0.4	\$0.4	\$0.4	\$0.4	\$1.1	\$1.1	\$1.1	\$1.0
Accident	\$94.8	\$94.8	\$94.8	\$94.8	\$226.7	\$226.7	\$226.7	\$226.7
Economic - Inventory Savings	\$215.4	\$215.4	\$215.4	\$215.4	\$532.1	\$532.1	\$532.1	\$532.1
Total	\$452.4	\$450.7	\$475.7	\$470.2	\$1,110.0	\$1,105.8	\$1,167.4	\$1,153.8
Costs								
Capital	\$224.1	\$224.1	\$224.1	\$224.1	\$361.8	\$361.8	\$361.8	\$361.8
M&O	\$16.3	\$16.3	\$16.3	\$16.3	\$40.2	\$40.2	\$40.2	\$40.2
Total	\$240.4	\$240.4	\$240.4	\$240.4	\$402.0	\$402.0	\$402.0	\$402.0
Benefit Cost Ratio	\$1.88	\$1.87	\$1.98	\$1.96	\$2.76	\$2.75	\$2.90	\$2.87

Note: This table provides benefits to costs for a variety of projects given two discount rates based on different inflation rates: 7% and 3%, which should encompass likely rates for the foreseeable future. Within each discount rate are calculated the benefit/ cost ratio for the improved Heartland Expressway, the Heartland Expressway with regional intensified energy resource development, the improved entire Ports-to-Plains Corridor, and the PTP corridor with intensified energy resource development. The bottom line shows the economic benefit for each dollar invested in the project.

Source: NDOR, Technical Memoranda for Heartland Expressway Corridor Development and Management Plan, 2013.

C. Alignment Alternatives

Three alignment alternatives were considered for widening the roadway:

- East Offset Alignment Alternative: Additional lanes to be located east of the existing roadway
- Centered on Existing Alignment Alternative: New roadway to be centered on the existing centerline
- West Offset Alignment Alternative (Preferred): Additional lanes to be located west of the existing roadway

Alignment alternatives were screened based on construction feasibility, operational impacts to the highway during construction, cost, social impacts, and environmental impacts.

C.1 East Offset Alignment Alternative

Alternatives that would add lanes on the east side of US 385 were eliminated from further consideration due to the proximity of the Burlington Northern Santa Fe (BNSF) Railway double mainline tracks that parallel existing US 385 for approximately 19 miles of the project. The BNSF mainline tracks are a major freight and coal hauling route for the railroad, currently carrying approximately 60 to 70 trains per day. For much of the project length, US 385 and BNSF share a common right-of-way (ROW) line, with no other property between them. The railroad proximity is an issue for approximately 16 miles of US 385 within the project limits, in that it shares a common ROW line with the highway. For these 16 miles, widening on the east side of US 385 would require shifting the railroad alignment and additional ROW to maintain the railroad's required 50-foot ROW on each side of the tracks. The cost of ROW and shifting the railroad's alignment would be in the multimillions of dollars for the length needed. Given the high train volume on this mainline, relocating tracks would have to be done in small windows of time in order to minimally disrupt rail traffic, increasing time and expense still further.

Results of Screening. Based on the screening criteria of engineering feasibility and constructability, the East Alignment Alternative was not considered feasible.

C.2 Centered on Existing Alignment Alternative

An alternative centered on the existing centerline would require complicated construction phasing, costly temporary pavement or closing large segments of at least one lane during construction, and more time to construct. Lane closure was not considered feasible for the volume of traffic on this roadway and the lack of suitable detour routes. Due to the sparse nature of suitable traffic routes in this area, a detour around the proposed project to the nearest federal or state highway system would require a trip of approximately 107 miles in length to get from Alliance to the Junction of L62A, or 80 additional miles travelled. Furthermore, this detour route would require improvements to a total of approximately 68 miles of N-2 and N-17 connecting Alliance to Scottsbluff, as these two-lane rural roads have narrow, unpaved shoulders and would need upgrading to meet FHWA detour requirements. Detouring traffic during construction is considered unreasonable. In addition, this alternative would have substantial impacts on railroad ROW, potential relocations of the BNSF mainline tracks, and disruption of rail operation

Results of Screening. Based on the screening criteria of engineering feasibility and constructability, the alternative was not considered feasible.

C.3 West Offset Alignment Alternative (Preferred)

The West Offset Alignment avoids the complications and expenses associated with the East Offset and Centered Alternatives. It allows for phased construction without a detour, avoids the railroad ROW, and has fewer relocations.

Results of Screening. The West Offset Alignment alternative best addresses the screening criteria of engineering feasibility and constructability, and was carried forward for further evaluation.

D. Spot Design Alignment Alternatives

Several location-specific design alternatives were considered to minimize impacts along the West Offset Alignment. Locations were identified where potential impacts to social, economic, or natural environmental resources might be minimized, or for which public input was desired. These locations included:

- Junction of US 385 and L62A
- Unincorporated community of Angora
- Dinklage Feedlot
- City of Alliance

D.1 Junction of US 385 with L62A Design Alternatives

The Heartland Expressway route follows L62A and then continues north along US 385. Currently, US 385 is the through movement (free traffic flow from Bridgeport to Alliance), with L62A teeing into US 385 (with a stop sign for eastbound left-turning traffic). Currently more traffic moves in this direction (55 percent vs. 45 percent continuing on US 385) and this is anticipated to increase as the Heartland Expressway is built out.

Alternatives were developed to make the Heartland Expressway the priority through movement (free traffic flow between Bayard and Alliance), with US 385 to be the secondary movement (with a stop sign for traffic from Bridgeport to Alliance). **Figure 3.4** shows the three sweeping curve alternatives considered at the junction of L62A and US 385; these are identified as:

- Alternative 1: Large Sweeping Curve (Preferred)
- Alternative 2: Mid Sweeping Curve
- Alternative 3: Small Sweeping Curve

Alternative 1: Large Sweeping Curve (Preferred). The Large Sweeping Curve realignment would start on L62A near Mile Marker (MM) 7.00 and with a gradual curve ties back into existing US 385 near MM 86.50. This curve alignment would result in the best option for creating the eventual full build-out of the Heartland Expressway, which would continue west on L62A. This alternative allow for the most preferred geometry and most direct/shortest path of the three alternatives, which would benefit drivers. In addition, although it requires the most ROW, it would be most beneficial to potential black footed ferret habitat, by minimizing the existing roadway barrier between fairly large areas of prairie dog towns.

Results of Screening. Based on environmental impacts and public comments, as well as benefits to drivers, this alternative was carried forward as the Preferred Alternative. NDOR is committed to building the Large Sweeping Curve phase of the project when funding is available. This construction phase of the project would be considered in the second round of the Build Nebraska Act projects. In the interim, the project construction would include an interim build-out (**Figure 3.5**).

Figure 3.4 – Alignment Alternatives at L62A (Alternatives 1–3) and at Angora (Alternatives 4–6)

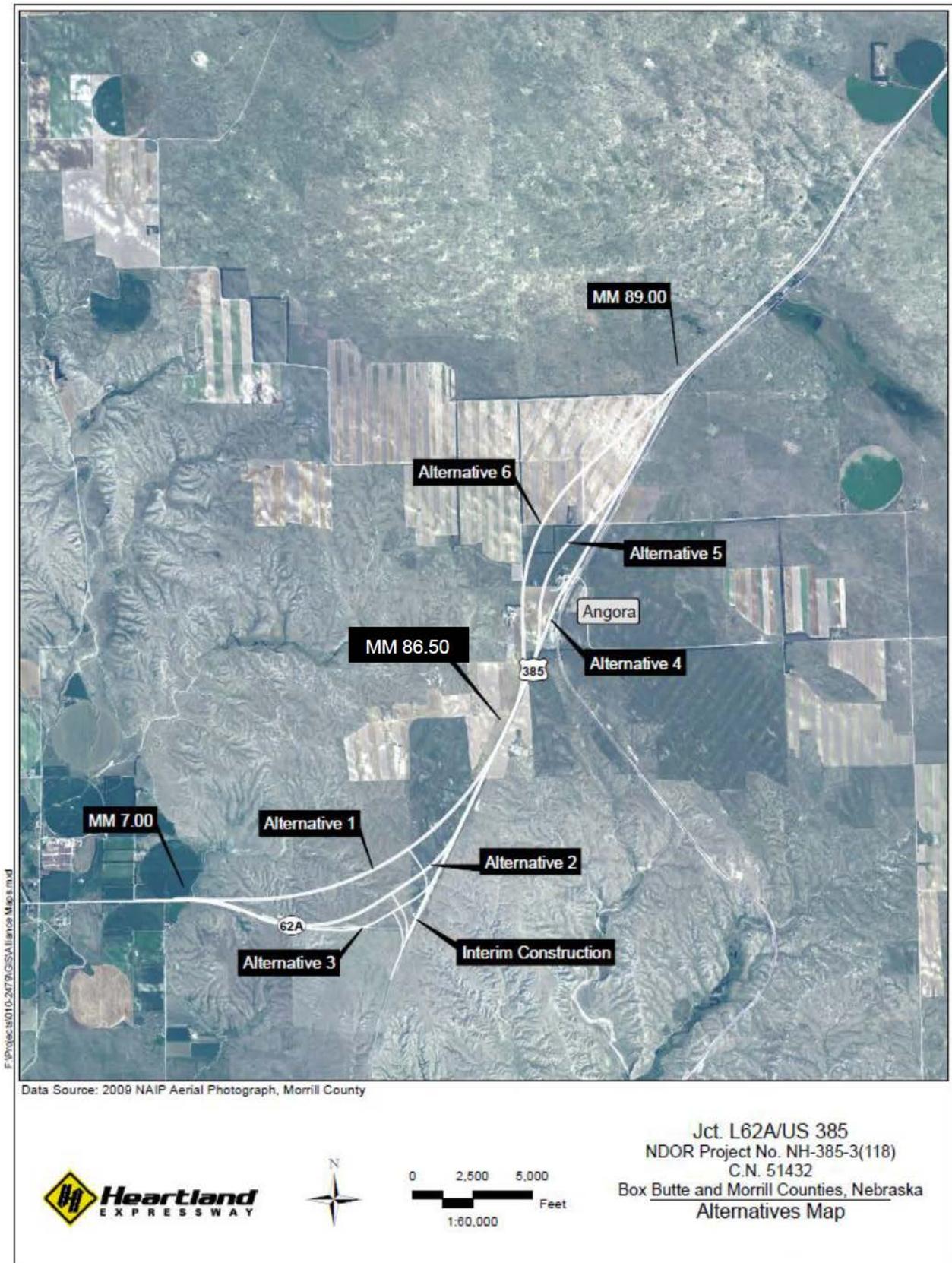
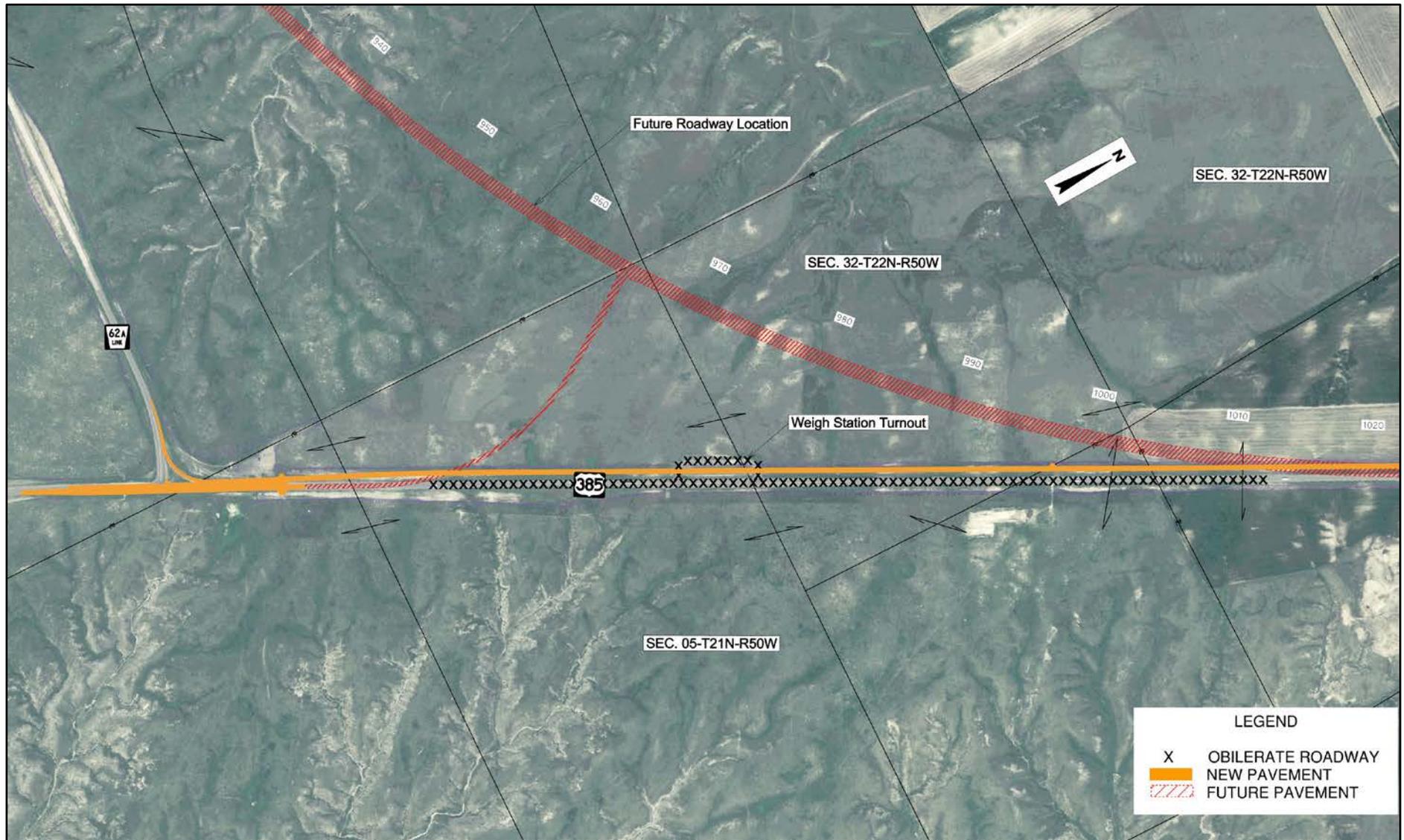


Figure 3.5 – Interim Phase Build Out at Junction L62A/US 385



Alternative 2: Mid Sweeping Curve. The Mid Sweeping Curve realignment would start on L62A near Mile Marker (MM) 7.00, with a gradual curve, continue with a straight section through the junction, and tie back into existing US 385 with a similar gradual curve near MM 86.00. The realignment would be just under 2 miles long and cut through some large hills and ravines, resulting in cuts and fills of 40 feet or more. Drainage structures would be installed as needed. Intercepting dikes and drop pipes would likely be required to collect overland flow and prevent it from eroding the backslopes. This alternative would also realign US 385 South to tee into the new highway. The realignment would start just south of the existing junction and would be approximately 2,500 feet long. An auxiliary left-turn lane would be constructed at the intersection.

Results of Screening. Based on environmental impacts and public comments, Alternative 2: Mid Sweeping Curve was eliminated in the preliminary screening for the following reasons:

1. Lack of Public Support: Had little to no public support at the public meeting held on 3 May 2011.
2. Potential Black-Footed Ferret Habitat Impacts: Has the largest ROW impact on prairie dog colonies, which are potential habitat for the Federal and State listed endangered black-footed ferret. Less Preferable Horizontal Geometry: Results in a short segment with back to back curves (reverse curvature), which is undesirable because it is contrary to what most drivers expect for a new highway facility.
3. Less Preferable Cross-Slope Geometry: NDOR preferred an alignment that would minimize banking (one edge of road slopes down to the other, also known as superelevation) to minimize snow melting and refreezing across the driving lanes in the winter.
4. Longer Travel Path: Has a longer travel path than that of Alternative 1, Large Sweeping Curve.

Alternative 3: Small Sweeping Curve. The Small Sweeping Curve realignment would start on L62A at MM 7.00, with a relatively tight curve, continue with a straight section through the proposed junction, and tie back into existing US 385 with a tight curve near MM 85.50. The realignment would be approximately 1 mile long and would cut through fewer large hills and ravines than the mid or large curves, resulting in minimal cuts and fills of 40 feet or more. Drainage structures would be installed as needed.

This alternative would also realign US 385 South to tee into the new highway. The realignment would begin just south of the existing junction and would be approximately 1,900 feet long. An auxiliary left-turn lane would be constructed at the intersection.

Results of Screening. Based on environmental impacts and public comments, Alternative 3: Small Sweeping Curve was eliminated in the preliminary screening for the following reasons:

1. **Black-Footed Ferret Habitat Impacts:** Has large ROW impacts on prairie dog colonies, which are potential habitat for the Federal and State listed endangered black-footed ferret. **Less Preferable Horizontal Geometry:** Results in a short segment with back to back curves (reverse curvature), which is undesirable because it is contrary to what most drivers would expect for a new highway facility.
2. **Less Preferable Cross-Slope Geometry:** NDOR preferred an alignment that would minimize banking (one edge of road slopes down to the other, also known as superelevation) to minimize snow melting and refreezing the driving lanes in winter across.
3. **Longer Travel Path:** Has a longer travel path than that of Alternatives 1 or 2.
4. **Utility Impacts:** Has the greatest number of impacts on existing utility infrastructure, including an additional 7,500 feet of overhead power lines and 1,200 feet of fiber optic lines, which would require relocation.

Table 3.2 summarizes the comparison of the design alternatives for the Junction L62A/US 385 intersection

Table 3.2 – Comparison of Design Alternatives for the L62A/US 385 Intersection

Evaluation Factors	Alternative 1 Large Sweeping Curve	Alternative 2 Mid Sweeping Curve	Alternative 3 Small Sweeping Curve
Projected Property Impacts			
Right-of-Way - Acres Acquired*	138	75	55
Number of Farms/Properties Impacted	7	5	5
Environmental Impacts			
Acres of Grasslands within footprint that are occupied by prairie dogs	9.6	26.3	25.2
Acres of Rocky Ravines within footprint	37.4	3.8	3
Acres of Prairie Dog Colony outside of footprint to be reconnected with the main colony located south of L62A	62	34	10
Land Use Compatibility	Reasonable	Reasonable	Reasonable
Drainage / Runoff Impacts	7 Major Crossings	2 Major Crossings	1 Major Crossing
Local Support			
Supported by Local Community- (Comment Sheets)	Moderate	Less	Moderate
Traffic/Access			
Directional Access to Properties	Some Properties Split; May Use Ext. Roadway for Access	Most Existing Access Points Maintained	Existing Access Points Maintained
Context Sensitive Design- (Need to Adjust Speeds, Superelevation)	DS=65mph for Realigned 385, Reverse 2%	DS=65mph for Realigned 385, 3.5% Super	DS=65mph for Realigned 385, 5.3% Super
Safety			
Potential for Rear-end Conflicts	Realigned 385 - Deceleration Length Reduced Due to Stop Control Intersection	Realigned 385 Deceleration within Horizontal Curve	Realigned 385 Deceleration within Horizontal Curve
Potential for Left Turn Conflicts	Ample Sight Distance Provided at Intersection on Curve	Ample Sight Distance Provided at Intersection on Tangent	Ample Sight Distance Provided at Intersection on Tangent
Construction			
Utility Impacts	1.4 mi of OHP & 2.0 mi FO	2.6 mi of OHP & 1.2 mi FO	2.9 mi of OHP & 1.5 mi FO
Construction Phasing	Majority New Alignment, May Require Interim Build	Split Between New and Existing Alignment	Majority on Existing Alignment
Earthwork - Cubic Yards of Material	1,666,000 CY	950,000 CY	770,000 CY
Construction Cost (Millions) ‡	\$15.31	\$12.87	\$10.84
Evaluation Summary	Advantages: <ul style="list-style-type: none"> • Most acres of Prairie Dog habitat integration • Can be built with reverse 2% crown Disadvantages: <ul style="list-style-type: none"> • Greatest ROW acquisition • Highest construction cost 	Advantages: <ul style="list-style-type: none"> • Less acres of rocky ravines Disadvantages: <ul style="list-style-type: none"> • Superelevation of 3.5% • Greatest acres of ROW with Prairie Dogs 	Advantages: <ul style="list-style-type: none"> • Least ROW acquisition • Lowest construction cost Disadvantages: <ul style="list-style-type: none"> • Superelevation of 5.3% • Greatest acres of ROW with Prairie Dogs • Least acres of rocky ravines
Alternative Selection	Yes	No	No
* ROW Acquired is calculated by adding 10% to area of roadway footprint outside of existing ROW.			
‡ Includes 4-lane construction and Interim construction. Pavement Area @ \$50/SY			

D.2 Angora Design Alternatives

The Heartland Expressway route extends along US 385 through the unincorporated community of Angora. Widening centered on the existing alignment would result in impacts on various structures adjacent to the existing highway. In addition, there are several existing access points along the highway in this area. Therefore, alternatives were developed that shifted off alignment in an attempt to minimize impacts and reduce access points. **Figure 3.4** shows the three Angora alternatives that were considered; these identified as:

- Alternative 4: Angora East Alternative (Preferred)
- Alternative 5: Angora Middle Alternative
- Alternative 6: Angora West Alternative

Alternative 4: Angora East Alternative (Preferred). This Angora East Alternative keeps the improvements on the existing alignment, with widening to the west of the existing alignment as is proposed elsewhere. It would require the relocation of County Road 118 on the west leg, to reduce the number of access points along US 385. This alignment is preferred as it requires the least ROW and does not split existing properties or county roads, and provides more direct access to the highway. The existing CR 118 is disjointed by US-385 and requires users to travel on US-385 for approximately 500 feet to continue on the county road. Two alternative county road alignments were reviewed to reduce the number of access points along US-385. These included realigning the west leg and realigning the east leg of CR 118. The west leg was chosen for realignment because the existing structures were already being impacted by the highway widening, and the east leg had the existing at-grade railroad crossing. The east leg was chosen to remain because of the existing at-grade railroad crossing. Realigning the east leg would require obtaining a new crossing on a double track mainline, which is significantly more difficult, and the trains stopped on the existing spur line that services the grain facility could block the crossing on occasion. This alternative was preferred when presented at the public information meeting.

Results of Screening. Based on the screening criteria of environmental impacts and public comments, as well as the reduced ROW and county road impacts, the use of the existing highway lanes, and public preference, this is the Preferred Alternative and was carried forward for further analysis.

Alternative 5: Angora Middle Alternative. The Angora Middle Alternative would locate the highway on a new alignment to the west of Angora. This alternative would come off the alignment just north of County Road (CR) 95 near MM 87.00, splitting between existing US 385 and CR 95. Horizontal curves would be used to navigate along the west side of Angora and to tie back into US 385 approximately 1 mile north of Angora near MM 88.50. This alternative would also realign CR 120 to form a perpendicular intersection.

Results of Screening. Based on the screening criteria of environmental impacts and public comments, the Alternative 5: Angora Middle Alternative was eliminated for the following reasons:

1. Lack of Public Support: There was less support for this alternative at the public meeting held on 3 May 2011.
2. Right-of-Way Impacts: Requires substantially more ROW than Alternative 4: Angora East Alternative, but is less than Alternative 6: Angora West Alternative, and would sever several properties.
3. Connectivity to the System: Properties that currently have direct access to the highway would have longer, indirect access in the future. Additional access points would be required to service adjacent properties.
4. Initial Construction Costs: Requires higher initial construction costs to build full roadway section on new alignment.

Alternative 6: Angora West Alternative. The Angora West Alternative would locate the expressway on new alignment to the west of Angora. This alternative would come off the alignment just south of CR 95 near MM 87.00, using portions of CR 95. Horizontal curves would be used to navigate along the western fringe of Angora and then to tie back into US 385 approximately 2 miles north of Angora near MM 89.50. This alternative would also realign CR 120 to form a perpendicular intersection.

Results of Screening. Based on the screening criteria of environmental impacts and public comments, the Alternative 6: Angora West Alternative was eliminated in the preliminary screening, and prior to being shown to the public, for the following reasons:

1. Project Proponent Dismissal: NDOR eliminated prior to public meeting due to higher ROW and initial construction costs.
2. Right-of-Way Impacts: Requires substantially more ROW than that of Alternative 4: Angora East, would sever several properties, and have potential impacts on cemetery property.
3. Connectivity to the System: Properties that currently have direct access to the highway would have longer, indirect access in the future. Additional access points would be required to service adjacent properties.
4. Initial Construction Costs: Requires higher initial construction costs to build full roadway section on new alignment.

Table 3.3 summarizes the comparison of the design alternatives at Angora.

Table 3.3 – Comparison of Design Alternatives at Angora

Evaluation Factors	Alternative 4 Angora East Alignment Existing Hwy	Alternative 5 Angora Middle Alignment Split Hwy and County Rd 95	Alternative 6 Angora West Alignment Along County Rd 95
Projected Property Impacts			
Right-of-Way - Acres Acquired	31	55	94
Number of Farms/Properties Impacted	8	7	7
Environmental Impacts			
Acres of Shortgrass Prairie within Footprint	10.7	20.1	23.4
Acres of Non-irrigated Cropland within Footprint	16.1	29.4	66.5
Swift Fox: Are there gently rolling to level intact grasslands with vegetation less than 6 inches in height, and outside of densely populated areas?	Yes	Yes	Yes
Archeological Resources	No resources found	No resources found	No resources found
Standing Structure Resources	12	3	None
Land Use Compatibility	Reasonable	Splits Several Properties	Splits Several Properties; Closer to Cemetery
Noise Impacts (Closest Receptors)	Shifts Closer	Closer to New Receptors	Closer to Cemetery
Local Support			
Supported by Local Community- (Comment Sheets)	Greatest	Least	Not Presented to Public
Traffic/Access			
Directional Access to Properties	Consolidates Access Points for County Rd 118	Realignment of County Rd 120	Realignment of County Rd 120, Utilizes County Rd 95
Negotiating Right Turn Maneuvers	Comparable	Comparable	Comparable
Construction			
Utility Impacts	FO & Minor OHP	Minor OHP	Minor OHP
Construction Phasing	Offset on Existing	New Alignment	New Alignment
Earthwork - Cubic Yards of Material	146,100 CY	324,700 CY	923,500 CY
Construction Cost (Millions) ‡	\$5.27	\$5.49	\$5.60
Evaluation Summary	Advantages: <ul style="list-style-type: none"> • Least ROW impacts • Least construction cost • Most public support Disadvantages: <ul style="list-style-type: none"> • Realignment of County Rd 118 	Advantages: <ul style="list-style-type: none"> • Less ROW impacts • Good separation of intersections Disadvantages: <ul style="list-style-type: none"> • Splits several properties • Closer to noise receptors • Least public support 	Advantages: <ul style="list-style-type: none"> • Good separation of intersections Disadvantages: <ul style="list-style-type: none"> • Greatest ROW impacts • Greatest construction costs • Splits several properties • Closer to cemetery
Alternative Selection	Yes	No	No
* ROW Acquired is calculated by adding 10% to area of roadway footprint outside of existing ROW ‡ Includes 4-lane construction and Interim construction. Pavement Area @ \$50/SY			

D.3 Dinklage Feedlot Design Alternatives

The Dinklage Feedlot sits adjacent to US 385 along the west side of the highway between approximately MM 104.00 and MM 105.00. During the preliminary design, it was determined if the widening of US 385 would have an impact on the individual cattle pens, the feedlot operation would be required to relocate the cattle pens and waste lagoons elsewhere on the property. The topography of the feedlot property (with the lowest elevations located adjacent to US 385) would make relocation of the waste lagoons difficult and expensive due to drainage and create operation permit issues for the feedlot. Because of this, alternatives were developed to eliminate impacts to the individual cattle pens and waste lagoons. **Figure 3.6.** shows the two Feedlot alternatives that were considered. These are identified as:

- Alternative 7: Dinklage Feedlot West: Widening the highway to the west (as elsewhere).
- Alternative 8: Dinklage Feedlot Shifted (Preferred): Shifting the highway 30 feet east.

Alternative 7: Dinklage Feedlot West. This alternative would be consistent with the overall West Alignment Alternative; the existing highway would become the new northbound lanes and new southbound lanes would be constructed to the west of the existing lanes while separated by a 40-foot median.

The grading limits required for this alternative would encroach into the cattle pens and waste lagoons. This would require purchasing up to a 40-foot strip of property from the feedlot and relocating several cattle pens and waste lagoons. The relocation of the cattle pens would require a severe change in operations and would affect the existing regulatory permits that the facility has in place.

Results of Screening. Based on the screening criteria of environmental impacts and public comments, and given the severity of the impacts to the facility and operations, this alternative was eliminated from further consideration.

Alternative 8: Dinklage Feedlot Shifted (Preferred): The existing highway alignment in the immediate vicinity of the feedlot gently pulls away from the Railroad alignment to provide an additional 30 feet of separation from the Railroad tracks. This additional 30 feet is currently highway ROW. By shifting the highway alignment to utilize these 30 feet of existing ROW, approximately 30 feet to the east, the impacts to the cattle pens and lagoons are eliminated without any additional impacts to the Railroad. Further, the backslope of the roadside ditch would be steepened from a 4:1 to a 3:1. This increases the buffer distance between the back of slope and feedlot pens. This alternative would completely avoid impacts to the feedlot pens and the feedlot lagoons, and is the preferred alternative. Additional ROW would still be required from the property owner, but not in the areas of the feedlot pens. The additional ROW would be south and north of the feedlot operation.

Results of Screening. Based on the screening criteria of environmental impacts and public comments, including the lack of impacts to the cattle pens and the waste lagoons, this was the Preferred Alternative and would be carried forward. **Table 3.4** summarizes the comparison of the design alternatives at the Dinklage Feedlot.

Figure 3.6 – Dinklage Feedlot Alternatives Location Map

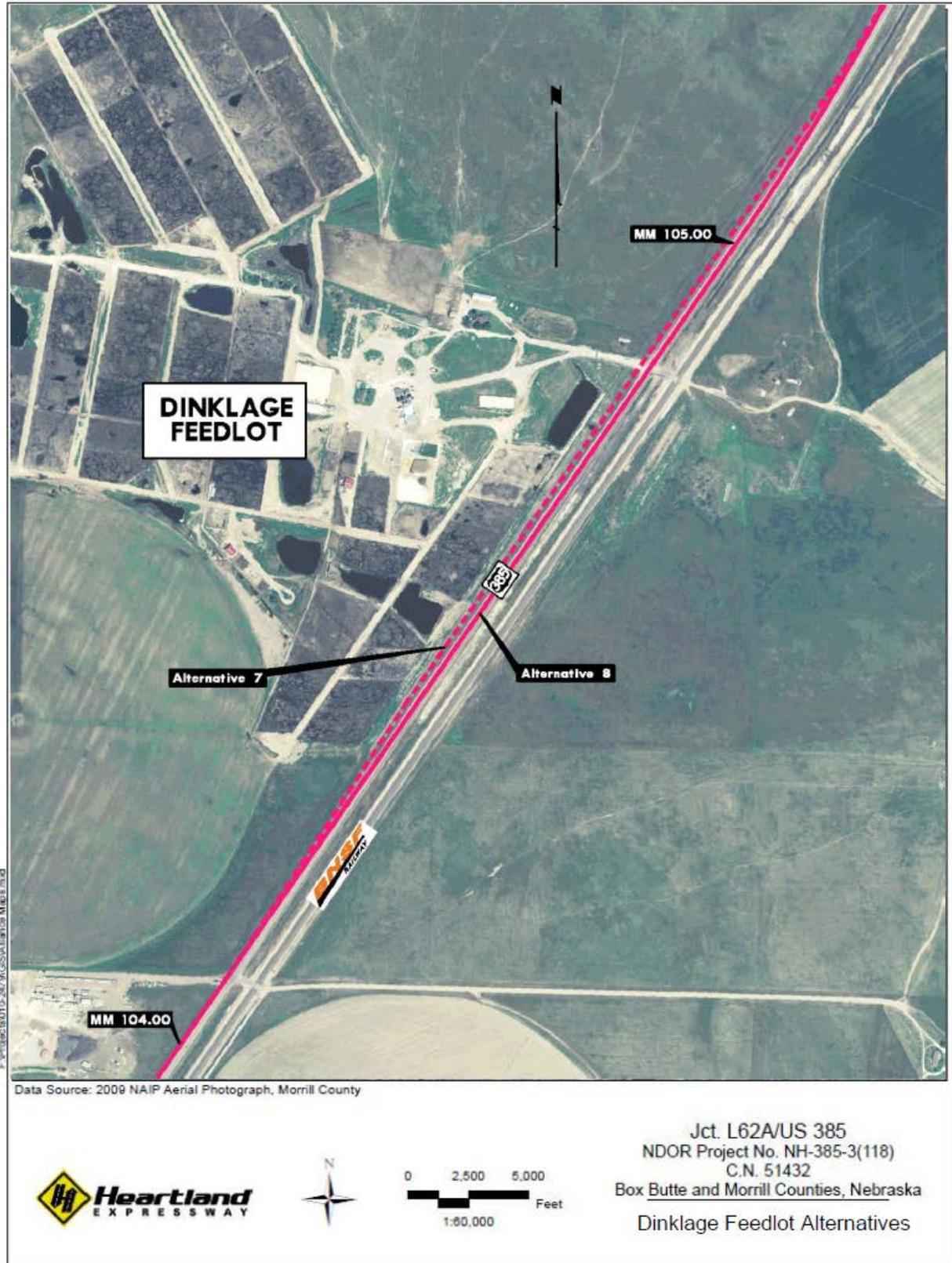


Table 3.4 – Comparison of Design Alternatives at the Dinklage Feedlot

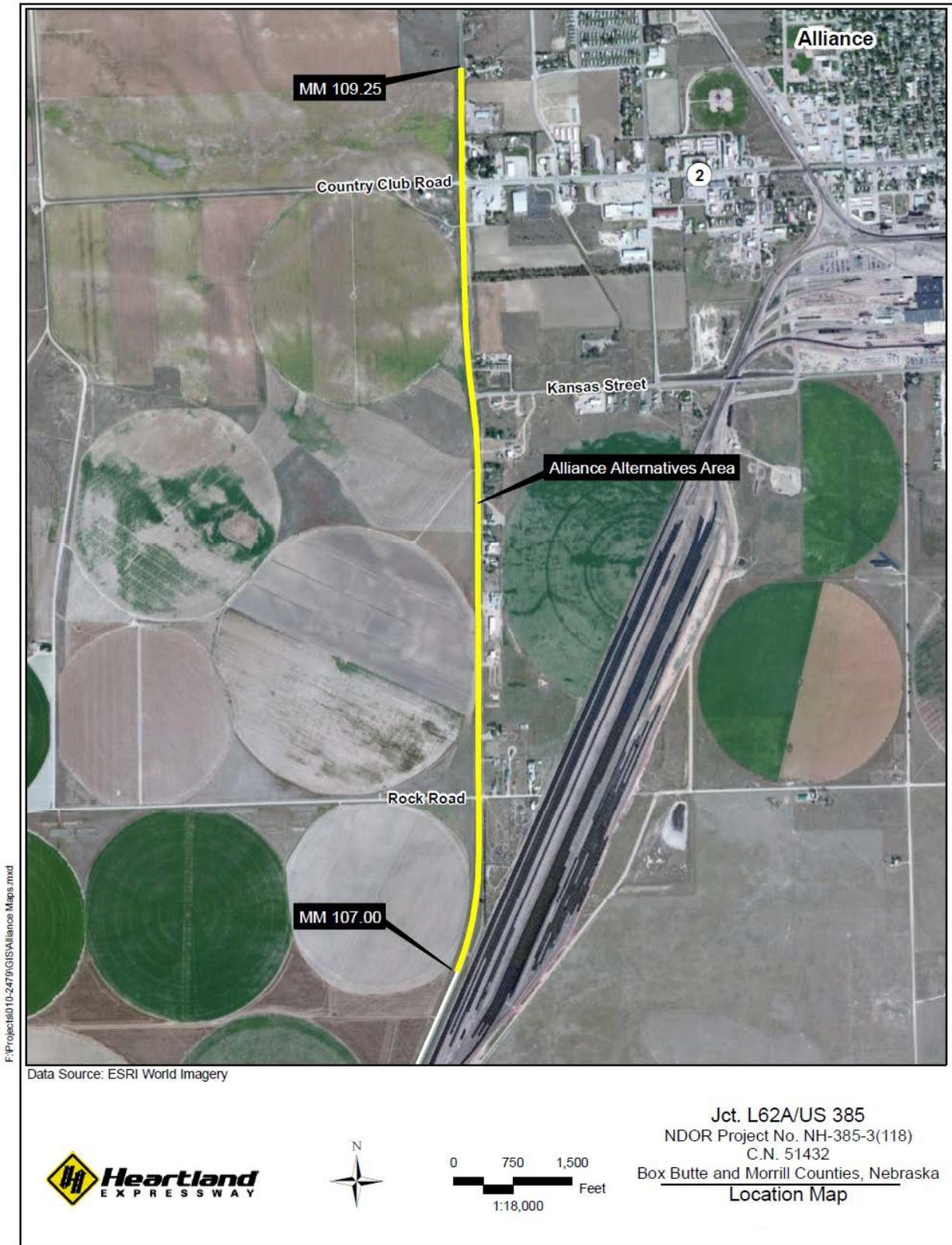
Evaluation Factors	Alternative 7 Feedlot Existing Alignment	Alternative 8 Feedlot Shifted Alignment
Projected Property Impacts		
Right-of-Way - Acres Acquired	5.5	2.4
Number of Feedlot Pens Impacted	5 - 8	0
Environmental Impacts		
Swift Fox: Are there gently rolling to level intact grasslands with vegetation less than 6 inches in height, and outside of densely populated areas?	Yes	Yes
Noise Impacts (Closest Receptors)	Shifts Closer to Feedlot	Shifts Away from feedlot
Local Support		
Supported by Local Community- (Comment Sheets)	No	Yes
Construction		
Utility Impacts 1976+00 - 1981+00	Minor OHP Gasline	Minor OHP
Construction Phasing	Offset on Existing	Will require additional Phasing
Earthwork - Cubic Yards of Material	83,800 CY	62,200 CY
Construction Cost (Millions)	\$2.37 ‡	\$2.68
Evaluation Summary	Advantages: <ul style="list-style-type: none"> • Maintains current alignment • Least construction phasing Disadvantages: <ul style="list-style-type: none"> • Would impact feed lot • Greater ROW impacts • Potential mitigation for feed lot lagoon 	Advantages: <ul style="list-style-type: none"> • Would avoid impacts to adjacent feed lot • Less ROW impacts • Greater public support Disadvantages: <ul style="list-style-type: none"> • Higher construction cost • Would require greater construction phasing
Alternative Selection	No	Yes
<small>* ROW Acquired is calculated by adding 10% to area of roadway footprint outside of existing ROW. ‡ Does not include the cost of Pen impacts and cost associated with relocating the Pens.</small>		

D.4 Alliance Design Alternatives

As US 385 approaches the west side of the City of Alliance from the south, the surrounding context changes from rural to more of an urban setting, particularly along the east side of the highway. The posted speed limit decreases from 65 mph to 45 mph. Access points to private driveways and businesses would increase substantially, as well as the number of intersecting public streets. Because of this, five alternatives were developed and evaluated to determine a preferred alternative. **Figure 3.7** shows the general area for the five Alliance roadway alternatives that were considered. The alternatives are too close together to show on this figure; instead see **Figures 3.8 and 3.9** for lane configurations. The alternatives are:

- Alternative 9: Five-Lane with Two-Way Left Turn Lane (TWLTL)
- Alternative 10: Four-Lane Divided Roadway with Raised Median
- Alternative 11: Four-Lane Divided Roadway with Depressed Median
- Alternative 12: Offset Four-Lane Divided Roadway with Raised Median
- Alternative 13: Offset Four-Lane Divided Roadway with Depressed Median

Figure 3.7 – Alliance Alternatives Location Map (Overview)



F:\Project\8010-2-479\GIS\Alliance Maps.mxd

Data Source: ESRI World Imagery



0 750 1,500
Feet
1:18,000

Jct. L62A/US 385
NDOR Project No. NH-385-3(118)
C.N. 51432
Box Butte and Morrill Counties, Nebraska
Location Map

Figure 3.8 – Alliance Alternatives Location Map (Detailed)

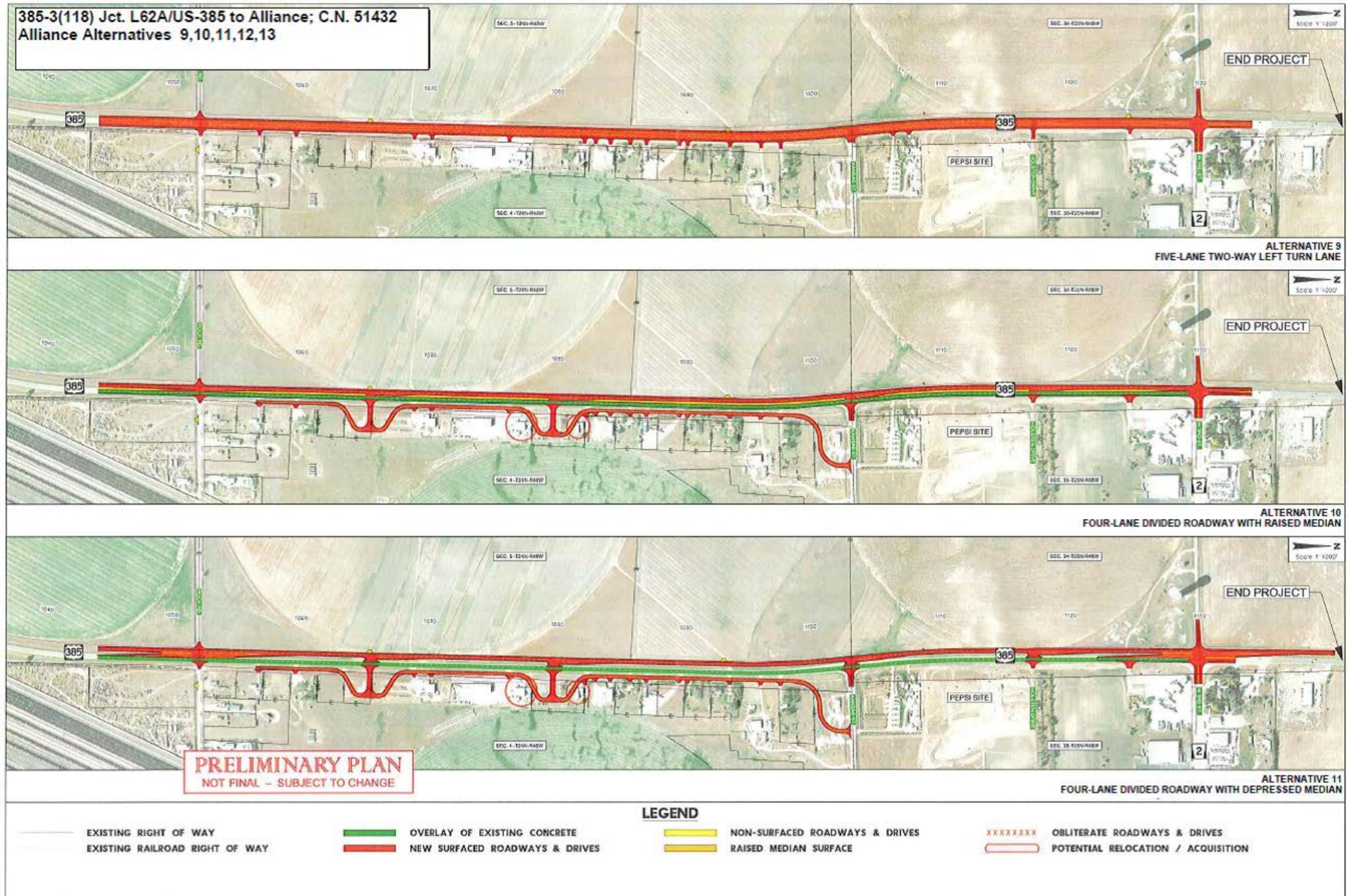
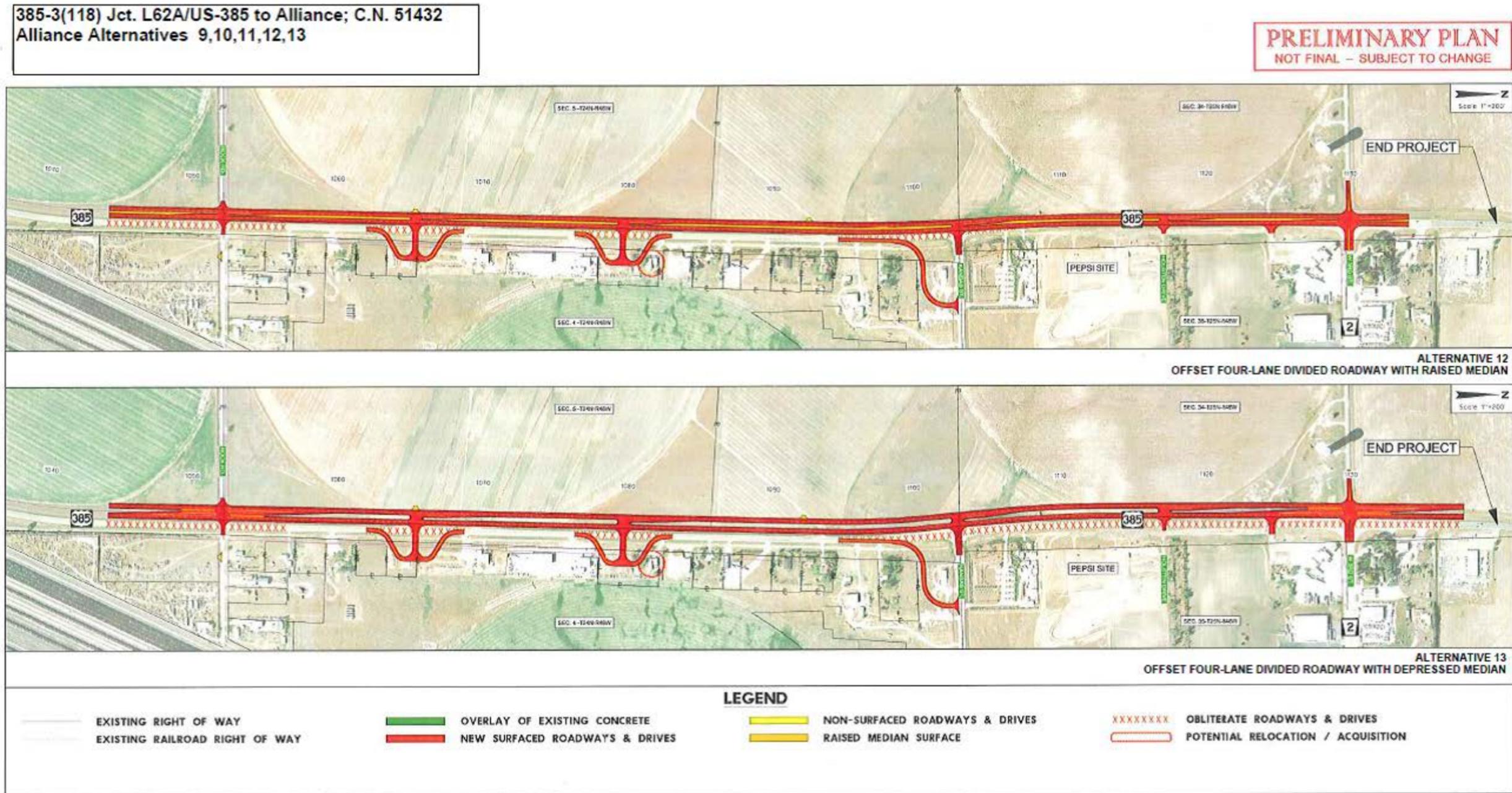


Figure 3.9 – Alliance Alternatives Location Map (Detailed)

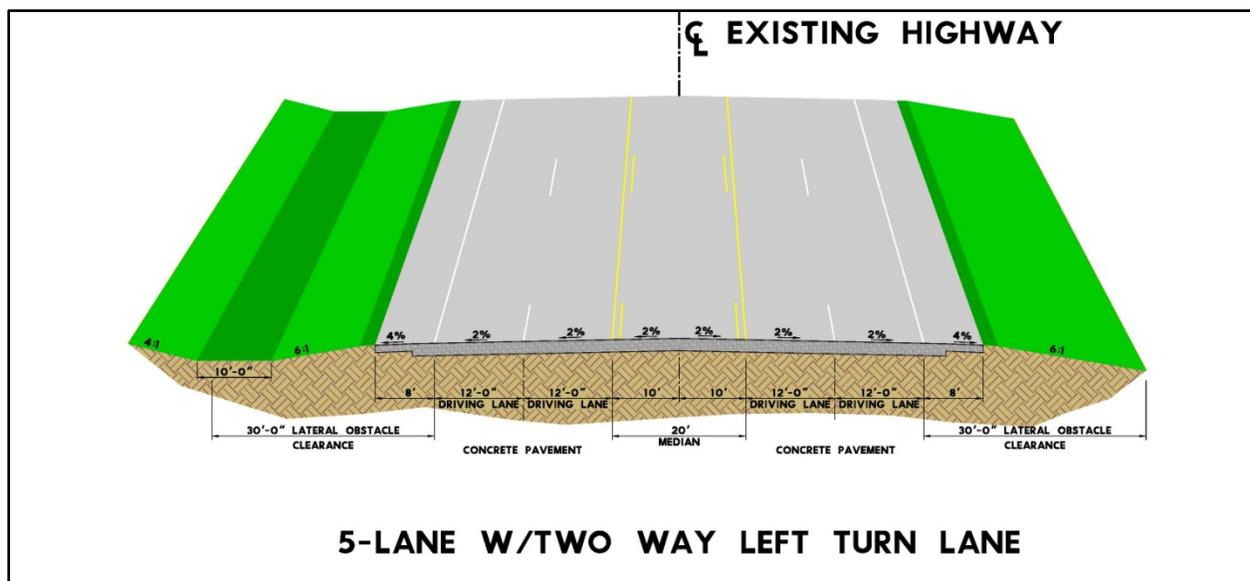


Alternative 9: Five-Lane with Two-Way Left Turn Lane (TWLTL) (Preferred Alternative):

The Five-Lane with TWLTL would consist of constructing a new five-lane roadway centered on the existing alignment (**Figure 3.10**). This alternative would provide a TWLTL from Rock Road through the junction with N-2 (West 3rd Street). The TWLTL would provide left-turn lanes for northbound and southbound traffic and unrestricted access for vehicles entering onto US 385. The existing frontage road would be eliminated, and access for drives would be provided onto US 385. Where possible, driveways would be consolidated to reduce the number of access points.

Additional ROW would still be required from the Dinklage property owner, but not in the areas of the feedlot pens. The additional ROW would be south and north of the feedlot operation.

Figure 3.10 – Typical Cross Section for Alternative 9

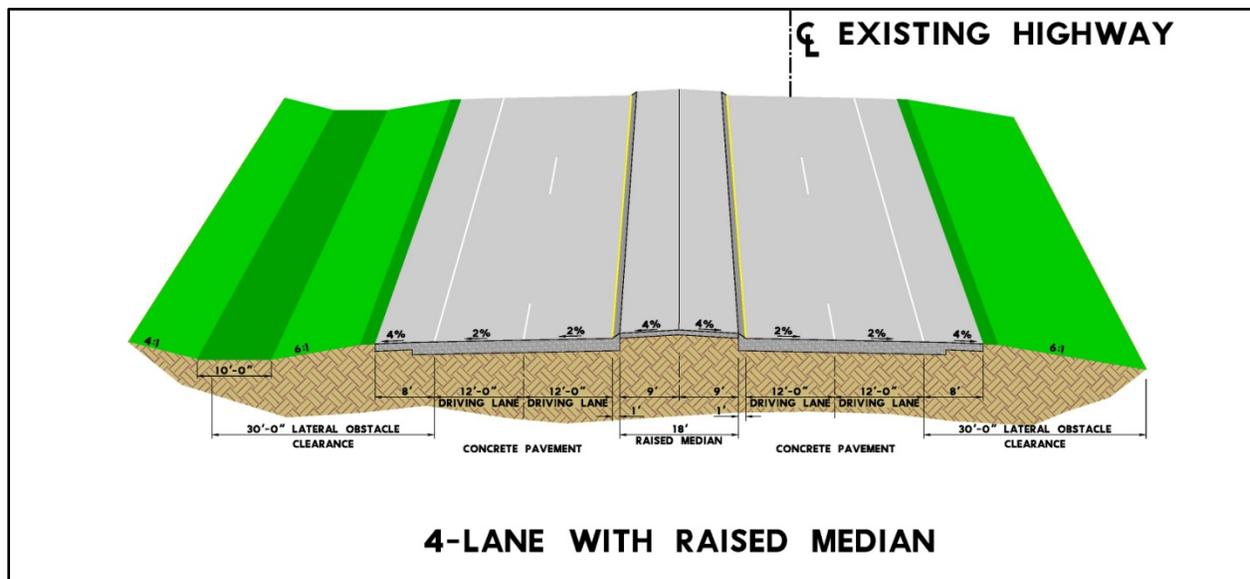


Results of Screening. Based on the screening criteria of environmental impacts and public comments, and due to the benefits of least ROW and farmland impacts, and strong public support, this alternative was carried forward for further analysis as the Preferred Alternative.

Alternative 10: Four-Lane Divided Roadway with Raised Median. This alternative would consist of constructing a new four-lane roadway with an 18-foot-wide raised median (Figure 3.11). This alternative would maintain the same east edge of the travel lanes. The new northbound lanes would be constructed in the same location as the existing roadway. This would shift the centerline of the new roadway west approximately 22 feet. The existing frontage road, which runs from Rock Road to Kansas Street on the east side of US 385, would be reconstructed and access would be consolidated to two new jug handle intersections with US 385. Access to the frontage road would also be provided from Kansas Street. No other direct access to the highway would be permitted. Northbound and southbound left-turn lanes would be provided at each access point and intersection. The middle jug handle intersection would require acquisition of one business and one residence. At the public meeting, the public voiced a strong preference to eliminate the middle access point to the frontage road. As such, the middle intersection was removed from Alternative 10, leaving one jug handle intersection near the south end of the frontage road and a connection to Kansas Street on the north end.

Additional ROW would still be required from the property owner, but not in the areas of the feedlot pens. The additional ROW would be south and north of the feedlot operation.

Figure 3.11 –Typical Cross-Section for Alternative 10

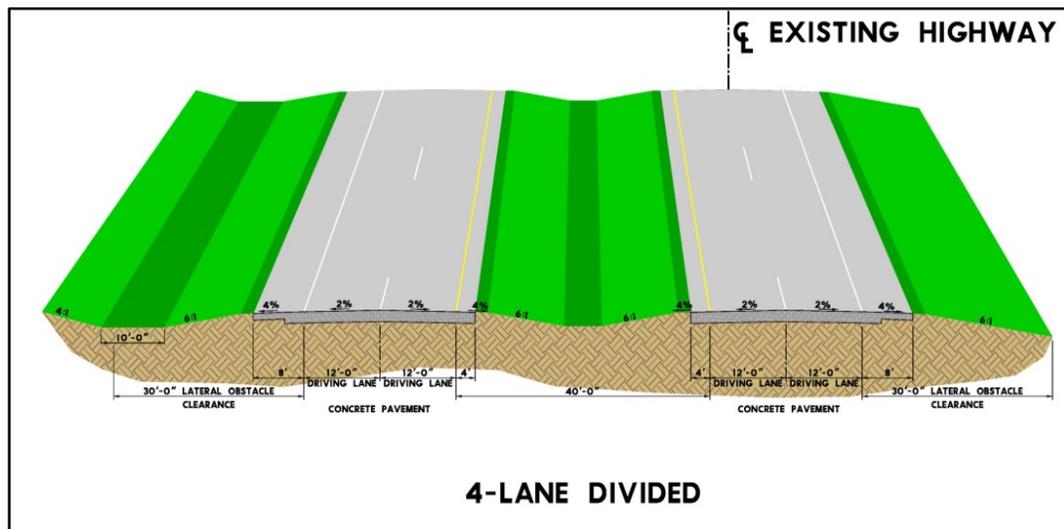


Results of Screening. Based on the screening criteria of environmental impacts and public comments, Alternative 10 was eliminated for the following reasons:

1. Maintenance Concerns: This alternative would require additional effort to plow the center raised median to minimize snow melting and refreezing across the driving lanes, as well as additional maintenance and snow removal for frontage roads.
2. Cost: This alternative would be the most expensive alternative.

Alternative 11: Four-Lane Divided Roadway with Depressed Median. This alternative would consist of construction of a new four-lane divided roadway with a 40-foot-wide depressed median (**Figure 3.12**). This alternative would maintain the same east edge of the travel lanes. The new northbound lanes would be constructed in the same location as the existing roadway. This would shift the new centerline of the roadway west approximately 32 feet. The existing frontage road, which runs from Rock Road to Kansas Street on the east side of US 385, would be reconstructed and access would be consolidated to two new jug handle intersections with US 385. Access to the frontage road would also be provided from Kansas Street. Northbound and southbound left-turn lanes would be provided at each access point and intersection.

Figure 3.12 – Typical Cross-Section for Alternatives 11

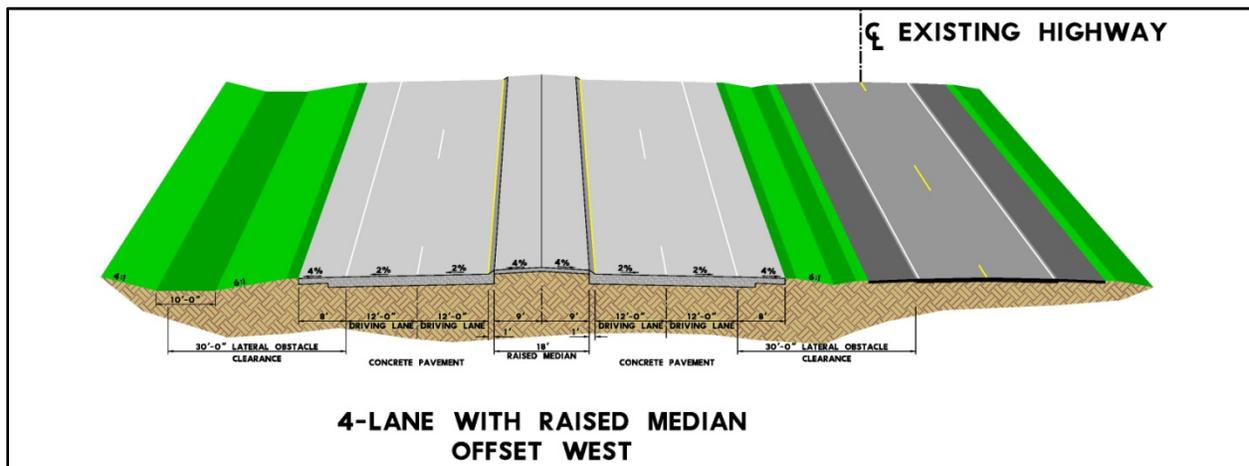


Results of Screening. Based on the screening criteria of environmental impact and public comment, Alternative 11 was eliminated for the following reasons:

1. **Driver Expectancy:** In this vicinity, the road transitions from a rural to urban setting. The northbound posted speed limit on US 385 decreases from 65 mph to 45 mph south of the intersection with Rock Road. Continuing the 40-foot depressed median would not provide any visual cues to drivers that speeds should be reduced.
2. **Limited Public Support:** The public expressed concern that this alternative would encourage higher speeds on the highway.
3. **Footprint:** This alternative would have a wider footprint and would require more property rights acquisition than Alternatives 9 and 10. This alternative would also have a considerable impact on three irrigation center pivots.
4. **Additional Maintenance:** This alternative would require additional maintenance and snow removal for frontage roads.

Alternative 12: Offset Four-Lane Divided Roadway with Raised Median. This alternative would consist of constructing a new four-lane roadway with an 18-foot raised median, on new alignment, west of the existing roadway (**Figure 3.13**). This alternative would shift the centerline approximately 76 feet to the west of the existing road centerline. The existing two-lane highway would become a frontage road. The frontage road would be provided from Rock Road to Kansas Street, and access onto US 385 would be provided by two new jug handle intersections. Access to the frontage road would also be provided from Kansas Street. At the public meeting, the public voiced a strong preference to eliminate the middle access point to the frontage road. Therefore, the middle intersection was removed from this alternative, leaving one jug handle intersection near the south end of the frontage road, and a connection to Kansas Street on the north end. North of Kansas Street the new roadway would not be offset to the west and would maintain the same east edge of the travel lanes. The new northbound lanes would be constructed in the same location as the existing roadway. Northbound and southbound left-turn lanes would be provided at each access point and intersection.

Figure 3.13 – Typical Cross-Section for Alternative 12

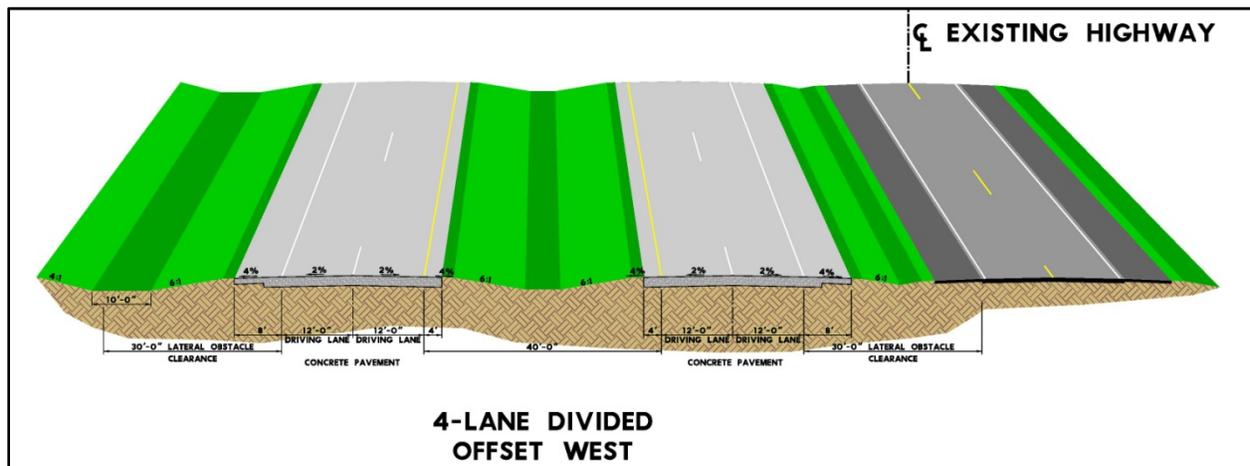


Results of Screening. Based on the screening criteria of environmental impacts and public comments, Alternative 12 was eliminated for the following reasons:

1. **Footprint:** This alternative would require more property rights acquisition than the other alternatives except Alternative 13. This alternative would also have a considerable impact on three irrigation center pivots.
2. **Additional Maintenance:** This alternative would require additional maintenance and snow removal for frontage roads and the raised median to minimize snow melting and refreezing across the driving lanes.
3. **Cost:** This alternative would be more expensive than all other alternatives, except Alternative 10.

Alternative 13: Offset Four-Lane Divided Roadway with Depressed Median. This alternative would consist of construction of a new four-lane divided roadway with a 40-foot-wide depressed median, on new alignment, west of the existing roadway (**Figure 3.14**). This alternative would shift the centerline approximately 76 feet to the west of the existing road centerline. The existing two-lane highway would become a frontage road. The frontage road would be provided from Rock Road to Kansas Street, and two new jug handle intersections would provide access onto US 385. Access to the frontage road would also be provided from Kansas Street. At the public meeting, the public voiced a strong preference to eliminate the middle access point to the frontage road. Therefore, the middle intersection was removed from this alternative, leaving one jug handle intersection near the south end of the frontage road, and a connection to Kansas Street on the north end. North of Kansas Street the new roadway would not be offset to the west and would maintain the same east edge of the travel lanes. The new northbound lanes would be constructed in the same location as the existing roadway. Northbound and southbound left-turn lanes would be provided at each access point and intersection.

Figure 3.14 – Typical Cross-Section for Alternative 13



Results of Screening. Based on the screening criteria of environmental impacts and public comment, Alternative 13 was eliminated for the following reasons:

1. **Driver Expectancy:** In this vicinity, the road transitions from a rural to an urban setting. The northbound posted speed limit on US 385 decreases from 65 mph to 45 mph south of the intersection with Rock Road. Continuing the 40-foot depressed median would not provide any visual cues to drivers that speeds should be reduced.
2. **Footprint:** This alternative would have a wider footprint and would require more property rights acquisition than the other alternatives. This alternative would also have a considerable impact on three irrigation center pivots.
3. **Limited Public Support:** The public expressed concern that this alternative would encourage higher speeds on the highway.
4. **Additional Maintenance:** This alternative would require additional maintenance and snow removal for frontage roads.

Table 3.5 summarizes the comparison of the Alliance alternatives.

Table 3.5 – Comparison of Design Alternatives at Alliance

Evaluation Factors	Alternative 9 Alliance 5-Lane TWLTL	Alternative 10 Alliance 4-Lane Raised Median	Alternative 11 Alliance 4-Lane Divided Median	Alternative 12 Alliance Offset 4-Lane Raised Median	Alternative 13 Alliance Offset 4-Lane Divided Median
Right-of-Way - Acres Acquired	3.11	13.67	17.95	18.66	30.19
Number of Farms Impacted	4 Minor	4 Minor	4	4	4 Most
Number of Pivots Impacted	3 Minor	3 Minor	2 Minor 1 Major	1 Minor 2 Major	3 Major
Environmental Impacts					
Acres of Shortgrass Prairie within Footprint	0.5	1.4	3.6	5.1	7.3
Acres of Irrigated Cropland within Footprint	0.3	1.1	2.9	3.9	6.4
Acres of Non-irrigated Cropland within Footprint	0.0	1.0	2.3	2.9	5.0
Drainage / Runoff Impacts	Moderate Runoff	Moderate Runoff	Less Runoff- Open Drainage	Moderate	Least - Open Drainage
Prime Farmland Impacts	Least	Less	Moderate	Moderate	Greatest
Land Use Compatibility	Greatest	Reasonable	Reasonable	Reasonable	Reasonable
Noise Impacts (Closest Receptors)	NB & SB Closer	Increase Volume NB	Increase Volume NB- Shifts SB	Shifts NB & SB Away	Shifts NB & SB Further Away
Local Support					
Supported by Local Community- (Comment Sheets)	Strong	Strong	Less	Moderate	Less
Traffic/Access					
Consolidated Access to Properties	Direct Unrestricted- More Conflicts	Consolidates Left turns	Consolidates Left Turns	Consolidates Left Turns	Consolidates Left Turns
Negotiating Right Turn Maneuvers	Tightest with Higher Speed Traffic	Indirect on Frontage Road	Indirect on Frontage Road	Best Separation from Frontage Rd	Best Separation from Frontage Rd
Local Circulation Between Parcels	Not Provided	Frontage Road	Frontage Road	Frontage Road	Frontage Road
Context Sensitive Design- (Need to Adjust Speeds, superelevation)	Shift in Context	Gradual Shift in Context	No Indication of Different Context	Gradual Shift in Context	No Indication of Shift in Context
Safety					
Potential for Rearend Conflicts	Greatest Conflicts-Allows All Movements at All Drives	Defines Right Turn Movements at Limited Access Points	Defines Right Turn Movements at Limited Access Points	Defines Right Turn Movements at Limited Access Points	Defines Right Turn Movements at Limited Access Points
Potential for Left Turn Conflicts	Provides Separate Left Turn Lane - Unrestricted Left Turns Entering/Exiting	Defines and Limits Left Turn Movements	Defines and Limits Left Turn Movements	Defines and Limits Left Turn Movements	Defines and Limits Left Turn Movements
Potential for Headon Conflicts	Least Separation from Oncoming Traffic	Good Separation From Oncoming Traffic	Greatest Separation from Oncoming Traffic	Good Separation From Oncoming Traffic	Greatest Separation from Oncoming Traffic
Construction					
Earthwork - Cubic Yards of Material	28,000 CY	42,300 CY	25,100 CY	48,200 CY	87,700 CY
Construction Phasing	Tightest	Some Restrictions	Fewer Restrictions	Best- New Alignment	Best- New Alignment
Construction Cost (Millions)	\$3.90	\$4.63	\$3.59	\$4.42	\$4.49
Maintenance					
Ability to Store Snow	Good	Less	Good	Less	Good
Signs and Markings/ Mowing/ Patching/ etc	Fewer Signs / More Markings	Signing to Delineate Curbs	Mowing Medians	Signing to Delineate Curbs	Mowing Medians
Evaluation Summary	<p>Advantages:</p> <ul style="list-style-type: none"> • Least right-of-way required • Least impact to prime farmland • Strong Public Support • Least impact to current access • No frontage roads to maintain • Provides visual cue for driver to slow down <p>Disadvantages:</p> <ul style="list-style-type: none"> • Less than desirable access management • Potential for conflicting left turn movements • Increased effort to plow median 	<p>Advantages:</p> <ul style="list-style-type: none"> • Frontage road provides controlled access to Hwy • Conflict points reduced with raised median • Provides visual cue for driver to slow down • Strong public support • Good separation from oncoming traffic <p>Disadvantages:</p> <ul style="list-style-type: none"> • Highest construction cost • Requires additional ROW along west side of Hwy • Difficult to plow raised median • Require maintenance/snow removal for frontage roads 	<p>Advantages:</p> <ul style="list-style-type: none"> • Frontage road provides controlled access to Hwy • Lowest construction cost • Can push snow to the median <p>Disadvantages:</p> <ul style="list-style-type: none"> • Considerable right-of-way required • Would impact center pivot on west side • No visual cue to slow down • Less public support • Require maintenance/snow removal for frontage roads 	<p>Advantages:</p> <ul style="list-style-type: none"> • Frontage road provides controlled access to Hwy • Conflict points reduced with raised median • Provides visual cue for driver to slow down • Moderate public support <p>Disadvantages:</p> <ul style="list-style-type: none"> • Highest construction cost • Considerable right-of-way required • Would impact 2 center pivots on west side • Difficult to plow raised median • Require maintenance/snow removal for frontage roads 	<p>Advantages:</p> <ul style="list-style-type: none"> • Frontage road provides controlled access to Hwy • Can push snow to the median <p>Disadvantages:</p> <ul style="list-style-type: none"> • Higher right-of-way required • would impact 3 center pivots on the west side • No visual cue to slow down • Less public support • Require maintenance/snow removal for frontage roads
Alternative Selection	Yes	No	No	No	No

* ROW Acquired is calculated by adding 10% to area of roadway footprint outside of existing ROW.

E. Alternatives Carried Forward for Detailed Evaluation

E.1 No-Build Alternative

The No-Build Alternative would perpetuate the existing L62A and US 385 roadway alignments, geometry, and cross sections. The US 385 roadway has several vertical curves that do not meet current design criteria, incurs snow drifting and increased maintenance during winter driving conditions due to side slopes, and has a relatively high percentage of truck traffic. Beet trucks are allowed to be 15 percent overweight and can be as much as 120 feet in length, exacerbating passing opportunities. The roadway was constructed in 1958. Due to its age and the increasing volume of overweight trucks, maintenance requirements such as patching and overlays are anticipated to increase in extent and frequency.

Although the No-Build Alternative would not meet the project Purpose and Need, it is being carried forward for analysis and is discussed in subsequent sections to establish a baseline for comparison of the build alternative.

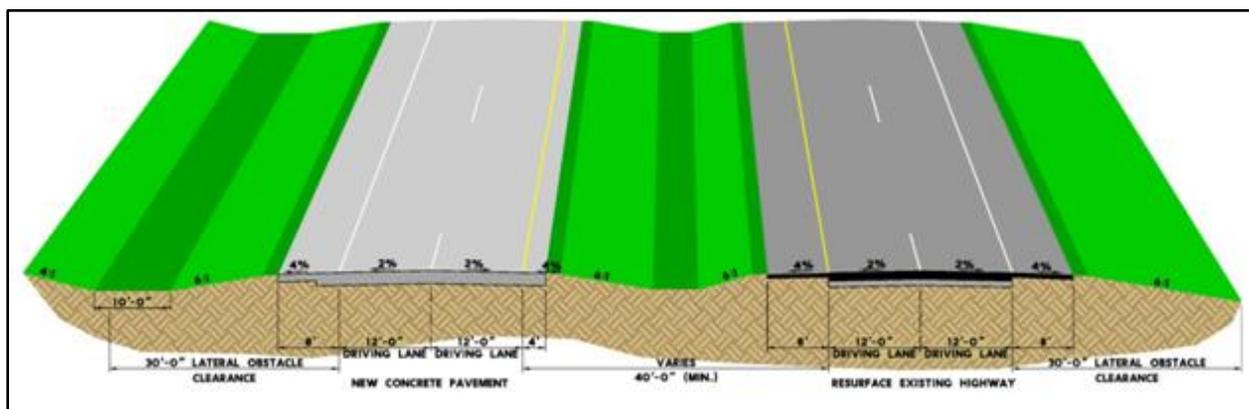
E.2 Preferred Alternative (Four-Lane West Alignment)

As a result of the preliminary screening and location-specific alternatives analysis, the Preferred Alternative would consist of the Four-Lane Divided, West Alignment Alternative, with the following site-specific (spot design) alternatives:

- Alternative 1: Large Sweeping Curve Alternative for the Junction of L62A/US 385
- Alternative 4: Angora East Alternative
- Alternative 8: Dinklage Feedlot Shifted Alternative
- Alternative 9: Alliance Five-Lane TWLTL Alternative

The Preferred Alternative would begin on L62A near MM 7.00, or CR 89, and continue through the junction at MM 9.26. It would then continue north on US 385 from MM 84.70, to Alliance near MM 109.00. The roadway would be constructed along the existing alignment for a majority of the project and would be built under traffic with minimal temporary construction impacts. The Preferred Alternative would be widened to a four-lane roadway west of the existing alignments of L62A and US 385. The horizontal and vertical design of the ultimate four-lane section would accommodate the interim construction of the southbound lanes, while using the existing highway as the northbound lanes of the roadway, as shown in **Figure 3.15**.

Figure 3.15 – Typical Rural Cross Section with Phased Construction

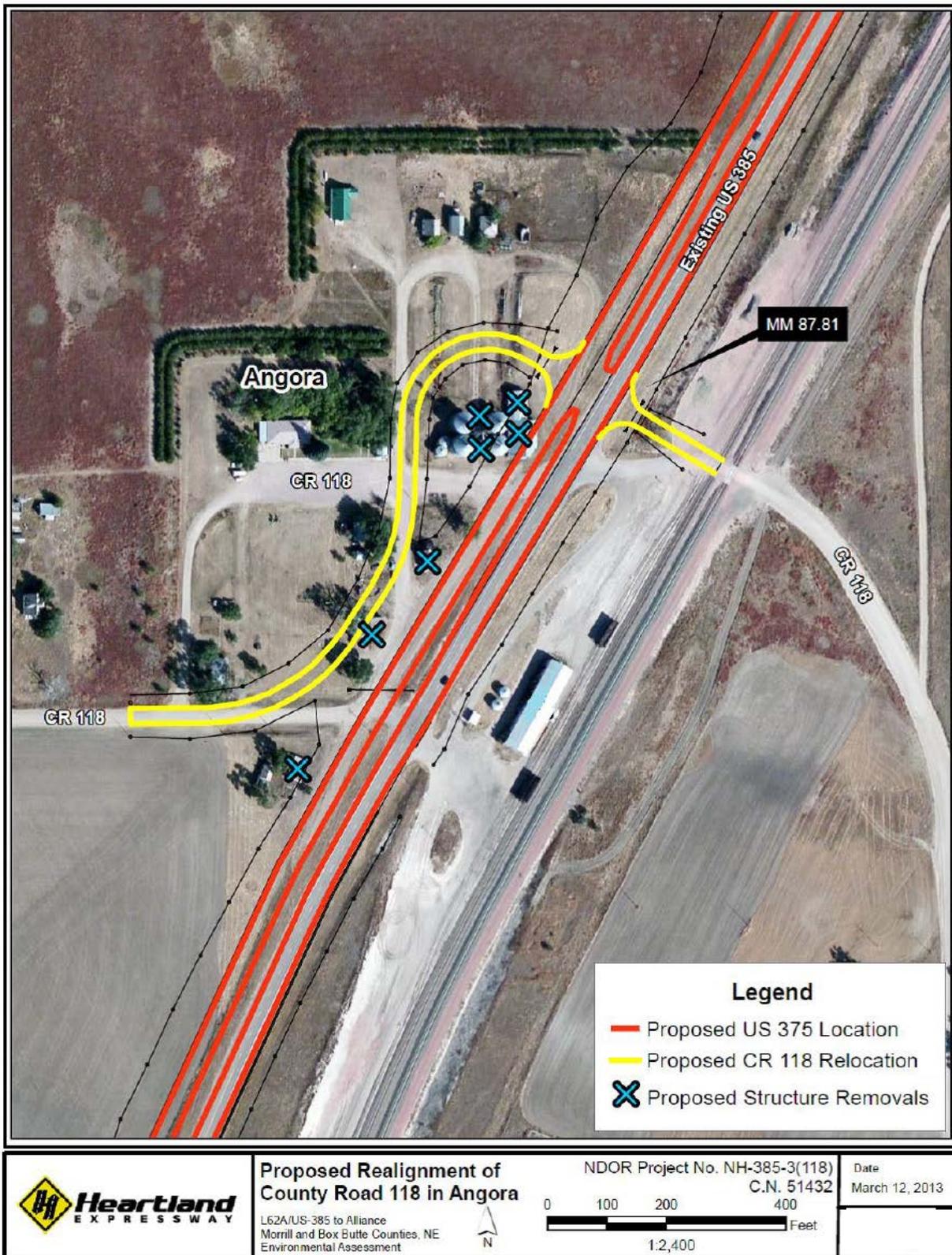


To use the existing US 385 pavement, the new project centerline would shift west to a point where the vertical deficiencies of the existing highway are corrected for the new southbound lanes, while maintaining a reasonable median width and ditch section between the existing (northbound) and the new (southbound) lanes. Based on guidance from *A Policy on Geometric Design of Highways and Streets*, 6th Edition (AASHTO, 2011), a maximum median width of 80 feet was used in analyzing the interim grading between the new southbound lanes and the existing highway at locations where there are county road intersections, commercial drives, and residential drives. For areas outside the vicinity of proposed intersections and drives, median widths greater than 80 feet could be used.

The project includes many culvert extensions, as well as new culverts, in the areas of new alignment. Median breaks would be provided at county roads, driveways, and field entrances as allowed through the Access Control Management policy for this project, with consolidation where feasible. **Appendix B** shows county road locations.

The county roads along the southern portion of the project, including CR 95, to the south of Angora, and CR 118, in Angora, would be realigned to correct excessive skew angles and reduce access points (**Figure 3.16**). A number of alternatives for the CR 118 intersection were considered however, the proposed alternative was preferred by landowners because it minimizes impacts to farm ground, and allows properties to remain functional. Although it requires impacts to a number of buildings and grain storage structures, most of the buildings are beyond use. Further, property acquisition will be handled following the Federal Uniform Acquisition and Property Relocation Act which will allow owners to replace or relocate existing grain storage structures. CRs 89, 116, and 120 would have the intersection returns reconstructed only. The north entrance and portion of surrounding roadway for the former Angora Wayside Area would be removed.

Figure 3.16 – Proposed Realignment of County Road 118 in Angora



Description of the Preferred Alternative

The Preferred Alternative would include Alternative 1: Large Sweeping Curve Alternative, to replace the existing L62A/US 385 Junction. The sweeping curve would cut through several large hills and ravines, resulting in cuts and fills of 40 feet or more. Drainage structures would be installed as needed. Intercepting dikes and drop pipes would be required to collect overland flow and prevent it from eroding the backslopes. This alternative would include a livestock crossing structure to be constructed near the realigned US 385 Junction.

The realignment of the south leg of US 385 would tee into the new four-lane highway near MM 85.00, as shown in **Figure 3.5** The realignment would begin just north of the existing junction and would be approximately 0.5-mile long. An auxiliary left-turn lane would be constructed at the intersection.

This alternative would have the least impact on potential habitat, would be the most direct route, would have the smoothest geometry, and has strong public support based on comments at past public meetings.

Through Angora, the Preferred Alternative would locate the new four-lane highway with a depressed median on the existing alignment, or Alternative 4: Angora East Alternative. The widening would occur to the west, which would result in some acquisition of ROW and relocations. The access drives within Angora, including CR 118, would be reconfigured to provide a single access point and reduce the number of median breaks. See **Figure 3.16** for CR 118 realignment.

This alternative would require the least amount of ROW, would have the least impact on prime farmland, has strong public support based on comments at past public meetings, and would have the least construction costs.

Continuing north from Angora through Morrill County, the US 385 alignment would be smoothed and flattened to provide a more traversable roadway. CR 128 would be realigned to both reduce the intersection skew and realign the intersection to be directly across from another driveway. The driveway connection to CR 128 would also be realigned to provide greater separation from the new southbound lanes of US 385. Several field entrances along the project would be consolidated to meet NDOR access control management guidelines.

The existing alignment of US 385 near MM 98.00 would be shifted west to remove the existing highway off the existing railroad ROW. Near MM 101.00, the existing alignment of US 385 would also be shifted west to avoid any impacts on the railroad ROW on the east side of US 385 and reduce impacts to the irrigation pivot and commercial businesses near the county line.

The Preferred Alternative would continue north of the Box Butte-Morrill county line through the junction with N-2 in the City of Alliance. The existing alignment would follow the existing highway in this segment such that the existing highway would become the northbound lanes and the southbound lanes would be constructed to the west. The Dinklage Feedlot Alternative would take advantage of an additional 30 feet of separation from the railroad tracks, while also avoiding impacts to the cattle pens and waste lagoons., and the Alliance Alternative would construct a five-lane roadway with a TWLTL.

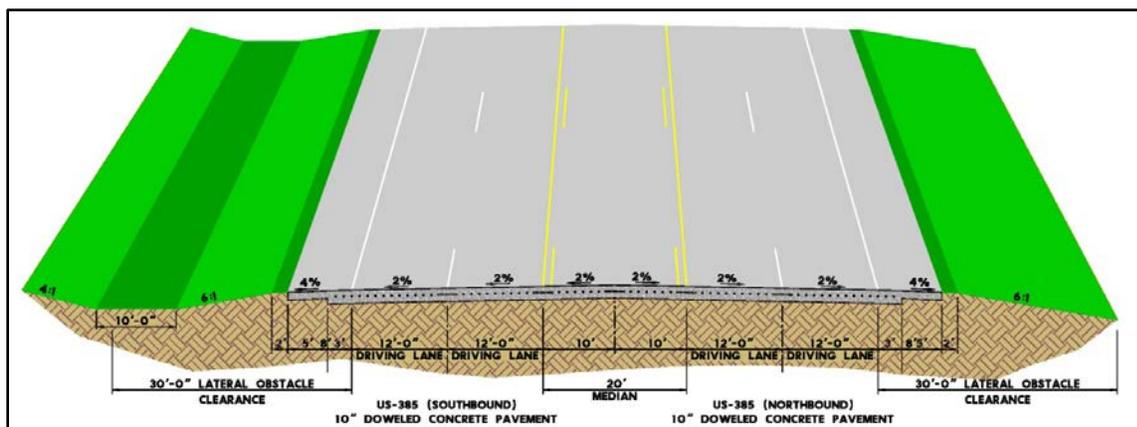
To minimize or avoid impacts on the feedlot, the design team studied the existing highway alignment and its relationship with the railroad alignment. In the area of the feedlot, the existing highway alignment gently pulls away from the railroad alignment, resulting in an additional 30-foot clearance between the railroad and the highway. By revising the alignment to maintain the same separation from the railroad tracks, as is elsewhere the highway alignment in the vicinity of the feedlot would be shifted approximately 30 feet to the east.

In addition, in the area immediately adjacent to the feedlot, the backslope of the roadside ditch would be steepened from a 4:1 to a 3:1. This would increase the buffer distance between the back of slope and the feedlot pens. This alternative would completely avoid impacts on the feedlot pens and the feedlot lagoons.

Additional ROW would still be required from the property owner, but not in the areas of the feedlot pens and lagoons. The additional ROW would be south and north of the feedlot operation. For these reasons, Alternative 8: Feedlot Shifted Alignment was selected as the Preferred Alternative.

In Alliance, Alternative 9: Five-Lane with TWLTL would consist of constructing a new five-lane roadway centered on the existing alignment (**Figure 3.17**). This alternative would provide a TWLTL from Rock Road through the junction with N-2 (West 3rd Street). The TWLTL would provide left-turn lanes for northbound and southbound traffic and unrestricted access for vehicles entering onto US 385. The existing frontage road would be eliminated, and access for drives would be provided onto US 385. Where possible, driveways would be consolidated to reduce the number of access points.

Figure 3.17 – Typical Cross Section in Alliance



This alternative, compared to the other Alliance alternatives, would require the least amount of ROW, would have the least impact on prime farmland, has strong public support based on comments at past public meetings, would have the least impact on existing access points along the highway, would not require frontage roads to maintain and plow in the winter, and would provide good visual cues for drivers to slow down as they approach the City of Alliance urban area.

Construction Phasing

The first construction project would be within the City of Alliance. The second construction project would begin south of the Alliance improvements, this project includes an interim build phase that uses the existing US 385 lanes as the northbound lanes, while constructing two new southbound lanes to the west. This phase would extend to south of Angora to the existing junction of L62A. Once the improvements approach the junction, the depressed median would be tapered down to establish auxiliary turn lanes at the intersection. The outside southbound lane would transition into the existing free right, and the US 385 median would continue to taper down to zero south of the intersection. A dedicated left-turn lane would be formed at the junction for northbound left turns. The existing US 385 lanes would be resurfaced as needed to extend the pavement life until such time they could no longer be resurfaced. Once this occurs, the northbound lanes would be reconstructed at the 40-foot median width and match the elevation of the southbound lanes. The sweeping curve connection to L62A and realignment of US 385 would be constructed during the third construction project.

General Project Schedule and Anticipated Funding

NDOR considers the proposed project a “planned expressway.” Planned expressways are not considered for traditional funding. However, they are eligible for innovative, non-traditional funds, such as Congressional earmarks, local funds, private funds, or any combination of these.

This project includes Federal funding in the amount of \$21.5 million. **Chapter 2, Section B.2** provides a breakdown of designated funding. It is anticipated that this money would be used to perform the environmental reviews and documentation, engineering design, and purchase of the ROW for the first two construction projects, with any remaining funds being used toward construction.

In addition, this project is one of the roadway improvement projects to be funded by the Build Nebraska Act, with funds in the Tier II grouping (FY 2016–2019). The act created the State Highway Capital Improvement Fund, which directs general fund money for construction of expressway system and high-priority highway projects, such as this one. The funding began in 2013 and would continue for 20 years until 2033.

The first construction project, Alliance South, DPS-385-4(139), CN 51522, programmed in the STIP for FY15, would construct US 385 from the junction of N-2 to approximately MM 100+00. The project would use designated federal funds and is estimated at \$25 million for construction costs and construction engineering.

The second construction project, L62A North, S-385-3(1021), CN 51443, programmed in the STIP for FY16, would construct US 385 from approximately MM 100+00 to the junction of US 385 and L62A. This project would use Build Nebraska Act funds and is estimated at \$30 million for construction costs and construction engineering.

The two projects above could be constructed in four construction seasons.

The third construction project, currently not programmed because it is more than five years out, would construct the segment of highway connecting L62A to US 385, via the long sweeping curve. This project would also require reconstructing the south leg of US 385 to connect to the new sweeping curve.

Upon completion of Phase II, interim phase construction will occur to prepare the project for Phase III construction (see **Figure 3.5**). As mentioned above, the third construction project which would be built when the transportation needs of the corridor warrant it and NDOR is committed to constructing Phase III of the project in the future when funding becomes available. Funding is anticipated to be included in the next Build Nebraska Act. Of note, the interim phase build-out meets the outlines Purpose & Need of this project as a useable and function facility. The interim construction would have operational independence and is a reasonable solution until the third construction project would be built. Refer to **Section S. Temporary Construction Impacts** for additional information.

Preliminary engineering, ROW and utilities have or would occur under a separate project NH-385-3(118), CN 51432, and are estimated at \$10 million.

The total cost (in today's dollars) of the project contemplated is estimated at \$90 million, which includes an estimated \$25 million to construct the sweeping curve and reconstruct the northbound lanes.