Executive Summary
Northern Bridge Corridor Study

Bismarck-Mandan Metropolitan Planning Organization
February 2005

INTRODUCTION

The Bismarck-Mandan Metropolitan Planning Organization (BMMPO), representing the cities of Bismarck, Mandan, and Lincoln, along with Burleigh and Morton County, initiated The *Northern Bridge Corridor Study* in July of 2003. This report describes the project background and study process, and includes the purpose and need; issue identification; corridor alternatives and engineering analysis; conclusion and recommendations; and implementation plan. The final report will serve as a basis to preserve a right-of-way corridor for the northern component of a future regional beltway around the Bismarck-Mandan area.

PURPOSE

The purpose of this study is to identify a future regional beltway corridor and associated right-of-way that should be preserved for possible future development—as well as to identify an implementation process for acquiring and preserving this corridor. The purpose of the regional beltway is to connect people to places by facilitating transportation across the urbanized area through continuity and connections between other arterials and collectors.

NEED

The need for the *Northern Bridge Corridor Study* is directly related to the study's purpose. As mentioned above, the purpose is to identify a future regional beltway corridor and associated right-of-way that should be preserved for possible future development—as well as to identify an implementation process. Therefore, the need for this study is based upon three different elements: population growth, transportation system network, and traffic capacity.

Population Growth

The Bismarck-Mandan metropolitan area is one of the few locations in North Dakota to experience a population increase according to the United States Census 2000. This is part of a shift from rural-to-urban living in North Dakota, which has been recognized by the U.S. Census Bureau. With the increase of population comes a demand on different living options: living in the city or living in the extraterritorial areas—which often offer larger lot sizes. Indeed, statistics show that in recent years there have been more residential building permits outside the cities of Bismarck and Mandan than there have been inside the cities. The rural farming communities of North Dakota are losing farms and population, while urban areas (mainly Fargo and Bismarck-Mandan) gain population.

The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* indicates there were 5,337 households north of I-94 in 2001, and has forecasted 10,625 new households and 1,388 new jobs north of I-94 by the year 2025. The households generate an average of 9.4 trips per day, resulting in an increase of 99,875 new trips per day on the transportation system north of I-94 in year 2025. These new trips do not include new trips generated south of I-94 that may travel north of I-94. Based on these projections, it is clear that a system of arterial and collector streets will be needed north of I-94 to meet the transportation demand.

Transportation System Network

The regional beltway proposed in the *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* is expected to function as a principal arterial. The FHWA defines urban principal arterials as routes whose primary function is to facilitate trips across and/or through an urban area, with a minimum amount of direct land access and with a typical spacing between principal arterials of 1 to 2 miles. FHWA also recommends urban minor arterial routes, such as Old Red Trail and Century Avenue, be spaced ½-mile to 1 mile apart.

There is currently no continuous urban principal arterial north of I-94 to serve connections across the area. Based on FHWA guidelines, a continuous urban principal arterial should be located 1 to 2 miles north of I-94 to accommodate urban development. The study area for the Northern Bridge Corridor varies from 1 to 4 miles north of I-94, and meets the criteria for the location of an urban principal arterial.

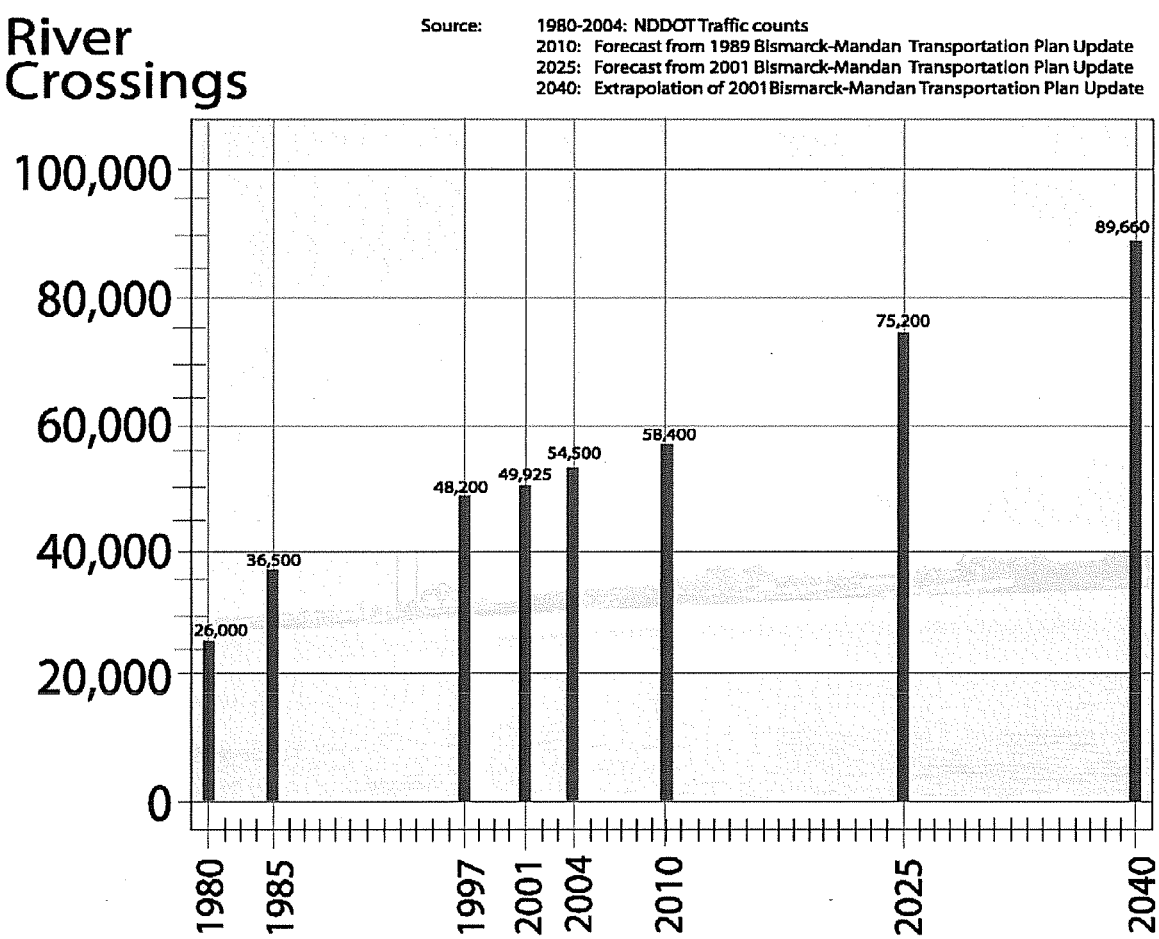
Based on population growth projected in and around the study area—resulting in an increase in traffic—a system of arterials and collectors will be needed north of I-94 to meet future transportation demand. The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* proposes a beltway, functioning as a principal arterial, to encircle the metro area. This study focuses on the northern segment of this beltway, to determine where the route will cross the Missouri River and location of the roadways leading to this future bridge.

Traffic Capacity

During the previous century, the Bismarck-Mandan area had grown within a relatively compact area on either side of the Missouri River. New growth is now focused primarily on the very northern and very southern portion of the urbanized area. Currently, the Bismarck-Mandan area has three bridges: Liberty Memorial Bridge, Grant Marsh I-94 Bridge, and the Bismarck Expressway Bridge.

The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* indicated additional capacity beyond that of the existing bridges would not be necessary by the year 2025 based upon projected growth. The transportation plan's assumptions were based upon Memorial Bridge being widened to four lanes in the near future. The NDDOT estimated the three existing four-lane bridges would have a combined design capacity of about 75,000 vehicles per day, and an ultimate combined capacity of about 90,000 vehicles per day. However, a

review of historic NDDOT traffic counts and projected river crossing traffic from the transportation plan indicates the existing bridges are projected to reach about 75,000 vehicles per day in year 2025. In year 2025, the transportation plan traffic model projects 40,000 vehicles per day on the I-94 Bridge, which indicates there may be capacity related issues appearing on that facility by then. Extending the same growth rate beyond year 2025 yields 90,000 vehicles per day in year 2040. Based on the traffic demand for river crossings, it appears additional river crossing capacity may be needed in the next 20 to 40 years, primarily for trips on the north side of the urbanized area. It is interesting to note that the *1989 Long Range Transportation Plan* projected 58,400 river crossings for the year 2010. The latest river crossing traffic count of 54,500 in 2004 indicates the 2010 projection made in 1989 may be met two years early.



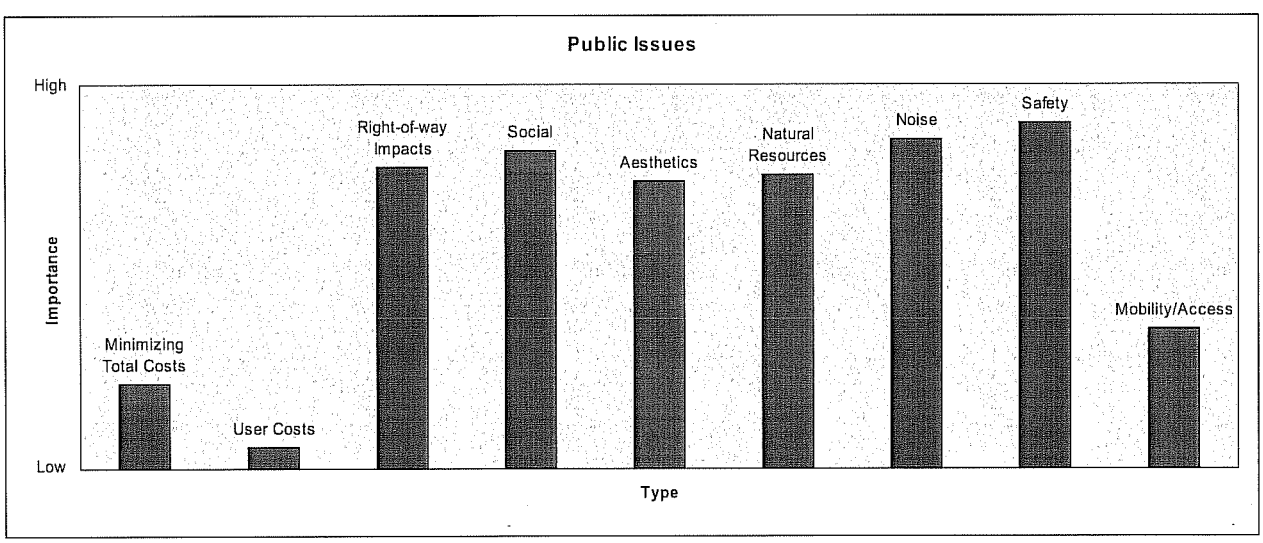
ISSUE IDENTIFICATION

This study recognizes several issue categories relating to the development of alternatives and recommendations. Several factors must be analyzed in order to determine the appropriate alternatives to present in this study. These factors include engineering issues, environmental impacts, the public involvement process, and the corridor vision.

Engineering issues include items that could affect the construction feasibility, design, and/or cost of a proposed improvement. The primary engineering issues include soils, floodplains, bridge elevation, grades, railroad crossings, intersecting roads and access control. Identifying these issues provides the basis and inventory for the engineering analysis in order to continue with a recommendation and implementation plan.

Environmental clearance issues must be considered when planning future projects to identify and/or eliminate potential fatal flaws in the planning process. The primary environmental issues include: a discussion of NEPA (National Environmental Policy Act of 1969), land use, cultural resources, environmental justice, the natural environment, and the human environment.

A public issues survey was developed for the first round of public input meetings to analyze what issues were important to the public and to help identify the different categories of concern.



The vision of the corridor, which the BMMPO TAC recommended; is that the study strives for 200 foot right-of-way to accommodate a five-lane undivided rural roadway and a 55 mph design speed. It is envisioned that as portions of the beltway become surrounded by urban development, the corridor could be reconstructed with an urban section, which would allow more lanes as needed by eliminating the ditches of a rural roadway. Opportunities for buffer zones between existing development and the beltway should be

identified where practical. The buffer zones would allow for green space or "parkway" development to function as visual and noise buffers.

CORRIDOR ALTERNATIVES AND ENGINEERING ANALYSIS

This study provides the information on the development and evaluation of corridor alternatives, including Alternative A—the Do Nothing Alternative, and three alternative river crossing locations and associated approach alignments. Approach roadway alignments were identified for Alternatives B and D, while the Alternative C river crossing location was ruled out from further study On either side of the Missouri River, at least two route options leading to the corresponding bridge alternative are presented. The study also provides a summary of right-of-way needs and costs. ***Please refer to Exhibits Appendix for all maps that illustrate the different alternatives and options.***

Alternative A

Alternative A is the Do Nothing Alternative. In this alternative, a future bridge site is not reserved and a corridor alignment is not identified. Assuming that a river crossing would be needed sometime in the future, identification of a principal arterial corridor and right-of-way acquisition would be more controversial, more costly, and would result in greater social impacts (such as relocations, traffic noise impacts, etc.) than they would today. When the study area is filled with urban growth, the lack of a river crossing in the area will require longer trips from one side of the river to the other, creating higher user costs and indirection. The Do Nothing Alternative would only postpone the inevitable.

Alternative B

Alternative B includes a corridor in the northern portion of the project study area. The estimated cost of the Alternative B river crossing is approximately $52 million for a bridge 3500 feet in length, and up to $70 million for the entire corridor. The north route would provide the most direct connection and highest arterial function between ND Highway 25 and US Highway 83. It provides a relatively direct east-west alignment that is more conducive to typical orderly north-south/east-west development patterns on both sides of the river. While it would require relocation of several properties, it takes less overall right-of-way from other uses, is nearly $4 million cheaper in overall corridor costs, and has the least amount of natural environmental impacts to wetlands and parklands.

Four potential horizontal alignment options (routes) have been identified for the Alternative B corridor; two options for each side of the Missouri River. Routes B-1 and B-2 are located in Morton County, and Routes B-3 and B-4 are located in Burleigh County. In addition, there are also options for major intersection alignments within each route.

Morton County Options

Route B-1 would follow the section line along 37th Street SW on the south side of the Landeis subdivision. This route follows existing roadway right-of-way and would result in several residential and two commercial access driveways on the corridor. Additional right-

of-way would be required along the existing road alignment. Shifting the roadway centerline south of the existing road would reduce relocations, yet still require the relocation of a home and the Central Dakota Humane Society.

There are two intersection options with **Route B-1** and ND Highway 1806:

- **Option 1** would leave the highway in its current location with an intersection angle of approximately 60°. This option would require the least amount of right-of-way and would have the fewest impacts, but would be built to the minimum design guidelines.
- **Option 2** would realign ND Highway 1806 to intersect with Alternative B at 90°. This would create the optimal angle of intersection, but would require right-of-way acquisition and possible business/home relocation to realign the state highway.

Route B-2 would be located south of and parallel to Route B-1, approximately 640 feet south of the section line. The route would bisect an occupied 16 acre rural residential lot, passing just south of a row of trees in the northeast corner of Section 9, T139N, R81W. This route would have no access driveways on the corridor, and would intersect ND Highway 1806 at nearly a 90° intersection.

Routes	Advantages	Disadvantages
Morton County B-1 Option 1	• Follows more existing section line right-of-way • Maintains straight alignment of ND Highway 1806 through intersection	• Requires driveway access on route • Creates curve on road off the end of the bridge • Requires relocation of one 37th Street home and one riverbank home • Requires relocation of Central Dakota Humane Society • Maximum allowed skew for ND Highway 1806 intersection
Morton County B-1 Option 2	• Follows more existing section line right-of-way • Eliminates curve on road off the end of the bridge • Provides a 90° intersection with ND Highway 1806	• Requires driveway access on route • Creates curve on road off the end of the bridge • Requires relocation of one 37th Street home and one riverbank home • Requires relocation of Central Dakota Humane Society • Introduces curves on ND Highway 1806 at intersection
Morton County B-2	• Avoids realignment of ND Highway 1806 intersection • Intersects ND Highway 1806 with a 90° intersection • Fewer impacts to homes • No driveway access on route • Straighter alignment off the end of bridge	• Requires about half of the yard of a home or possible relocation, and relocation of one riverbank home • Less section line right-of-way used

Burleigh County Options

Route B-3 would angle northeast across Section 2, T139N, R81W to connect with ND Highway 1804 at the existing Burnt Creek Loop intersection. Burnt Creek Loop and River Road would be realigned to the west to create a 90° intersection with the route. This route avoids the costs associated with the steep bluff east of River Road at the expense of roadway system continuity.

Route B-4 would generally follow the undeveloped section line already master planned to be a minor arterial (71st Avenue), climb the steep bluff east of River Road, and connect with ND Highway 1804.

There are also two intersection options with **Route B-4 and ND Highway 1804**:

- **Option 1** would follow the section line and intersect directly with the east/west segment of ND Highway 1804. The north/south leg of ND Highway 1804 would be realigned west of River Road to allow a 90° intersection with Route B-4 below the high fills required for Route B-4 to traverse the bluff. River Road south of Route B-4 would curve west to intersect with the north leg of ND Highway 1804, creating a 4-legged 90° intersection. River Road would be located west of the section line to avoid impacts to wetlands and the creek bed.
- **Option 2** would establish the intersection of ND Highway 1804 and Route B-4 at the tangent point of the horizontal curve on ND Highway 1804. River Road would curve to the west and intersect the corridor approximately 500 feet southwest of the new intersection on ND Highway 1804.

Routes	Advantages	Disadvantages
Burleigh County B-3	• Avoids high bluff • Eliminates skewed and Y intersections at River Road, ND Highway 1804 and Burnt Creek Loop	• Requires relocation of River Road and Burnt Creek Loop. • Bisects irrigated agricultural field • Indirect route • Requires stop condition on beltway corridor • Does not utilize section line right-of-way
Burleigh County B-4 Option 1	• Direct straight route • Follows master planned minor arterial alignment • No stop condition on beltway corridor • No adjustment of high voltage transmission lines needed • Maintains continuity of north-south traffic from ND Highway 1804 to River Road	• Requires relocation of River Road and north-south approach of ND Highway 1804 • Creates stop condition on north-south movements of ND Highway 1804
Burleigh County B-4 Option 2	• More direct route than B-3 • Avoids relocation of River Road, ND Highway 1804 north-south, and Burnt Creek • Less roadway construction cost than B-4 Option 1	• Intersects ND Highway 1804 with a 90° intersection • Less direct route than B-4 Option 1 • Requires stop condition on beltway corridor • Discontinuity of north-south traffic between ND Highway 1804 and River Road

Alternative C

Alternative C includes a river-crossing corridor in the middle portion of the project study area. This alternative was discarded from further analysis in this Corridor Study because of negative impacts that would render environmental clearance infeasible. The route bisects an existing developed subdivision along with a new subdivision in Burleigh County. It would affect two historic properties, in addition to disturbing a cultural resource site. Those issues combined with the following engineering issues would make this alternative inappropriate for further analysis:

- The route would require the relocation of two fly ash disposal sites at an estimated $1–$2 million per site.
- An underpass structure for power plant vehicles would be required at an estimated $1 million.
- The route would require the realignment of Rockhaven Creek and the associated mitigation costs.

Alternative D

Alternative D involves a corridor in the southern portion of the project area. The estimated cost for the Alternative D river crossing is approximately $53 million for a bridge 3600 feet in length, and up to $74 million for the entire corridor. The south route provides a through connection meeting the needs of a principal arterial and regional beltway. However, Alternative D creates a "U" shaped alignment, resulting in about two miles of additional travel distance than Alternative B, and higher overall corridor cost.

Five potential horizontal alignment options (routes) have been identified for the Alternative D corridor. Routes D-1 and D-2 are located in Morton County; Routes D-3, D-4, and D-5 are located in Burleigh County. Alternative D would consist of one route option from each county.

Morton County Options

- **Route D-1** would traverse diagonally in a southeast direction through the rugged terrain in Sections 8 and 9, T139N, R81W.
- **Route D-2** would also traverse Sections 8 and 9 diagonally southeast and turn east onto east-west section line (38th Street) about ½ mile west of where Route D-1 reaches 38th Street.

Existing plans call for ND Highway 1806 to be realigned southwest connecting with the I-94 Sunset Interchange at some time in the future. There are three options for the realignment of ND Highway 1806 and the associated intersections with 38th Street/ND Highway 1806/Northern Bridge Corridor intersections:

Option 1 (yellow) locates the future realignment of ND Highway 1806 about ¼-mile west to provide adequate intersection spacing on the Alternative D corridor while intersecting Alternative D at a 90° angle.

Option 2A (red) locates the future realignment of ND Highway 1806 south of the 38th Street intersection, and relocates the existing ND Highway 1806 about ¼-mile east across Tesoro Refinery property to provide adequate intersection spacing on the Alternative D corridor.

Option 2B (red) would use the same Option 2A roadway alignment between Sunset Interchange and ND Highway 1806, but the existing ND Highway 1806 would turn west to intersect the new ND Highway 1806 alignment south of 38th Street.

Burleigh County Options

- **Route D-3** would climb the bluff east of River Road along the north side of the Burnt Creek Loop alignment, with a bridge over River Road. River Road access would be provided by a frontage road intersecting the corridor west of the overpass bridge. Once on top of the bluff, Route D-3 would curve northeast to cross Section 7, T139N, R80W before finally curving into and assuming the alignment of ND Highway 1804.

- **Route D-4** would depart from the Burnt Creek Loop alignment, angling southeast ¼-mile to take advantage of a large coulee to provide an at-grade intersection with River Road. It would cross River Road and follow the coulee until Section 18, where it would curve northeast. Route D-4 would cross through Section 7 and intersect ND Highway 1804 in the same fashion as Route D-4.
- **Route D-5** would climb the bluff east of River Road along the north side of the Burnt Creek Loop alignment, with a bridge over River Road. The alignment along the north side of Burnt Creek Loop would minimize impacts to a parallel high voltage transmission line south of Burnt Creek Loop. River Road access would be provided by a frontage road intersecting the corridor west of the overpass bridge. Once up on top of the bluff, the route would parallel the section line east about a mile before curving north onto the 15th Street alignment. The route would create a 90° intersection with ND Highway 1804 at 15th Street, which is a planned future north-south minor arterial.

Alternative D and Burnt Creek Loop

- **Option 1** would reroute Burnt Creek Loop further east to intersect with Fernwood Drive. Both Burnt Creek Loop and Fernwood Drive are proposed to be a future continuous minor arterial in the *Fringe Area Road Master Plan*. The alignment would create an 82° intersection with Alternative D, with a 35 mph design speed on Burnt Creek Loop.

- **Option 2** shows the proposed realignment of Fernwood Drive as shown in the *Fringe Area Road Master Plan*. This route would create a 65° intersection with Alternative D. The original alignment of Fernwood Drive would still remain in place to provide access to existing development, creating two closely spaced intersections on the Alternative D corridor.

Bridge Alternatives

- **Alternative B** would require a 3500-foot long bridge, based on the existing topography, railroad proximity, navigational clearance requirements, and a 20-foot maximum earth-fill height at the bridge ends. The first 1200 feet and the last 400 feet of bridge are within the limits of horizontal curves. The remainder of the bridge is on a straight alignment.
- **Alternative D** would require a 3600-foot long bridge, based on the same criteria as Alternative B. The first 150 feet of bridge is within the limits of a horizontal curve. The reminder of the bridge is located on a straight alignment.

Cost Estimates

The right-of-way and construction cost estimates of the bridge structure and approach roadway alignments were based on 2004 costs. Construction estimates for the bridge structure alone are $52 million for Alternative B (north route), and $53 million for Alternative D (south route). Adding in the right-of-way costs and roadway construction costs of Alternative B yields a total cost of about $70 million, and about $74 million for Alternative D.

A user cost analysis has been done on routes B-2 and B-4 versus D-2 and D-3. The average vehicle (typical commuter on the Northern Bridge route) will save about $53 per year if Alternative B is chosen instead of Alternative D. This is assuming two trips per day, five days a week and fifty weeks per year. Assuming an average annual daily traffic volume of 10,000 per day, the total amount of money saved for the commuters would be over half a million dollars.

Right-of-Way

The proposed Northern Bridge Corridor would require right-of-way along existing roads as well where there are no existing roads, from both developed and undeveloped property.

Undeveloped agricultural right-of-way could be acquired as the land is platted for other land uses, the same process as is used today by all of the local jurisdictions. Additional right-of-way from developed property along existing roads such as 37th Street in Morton County and ND Highway 1804 in Burleigh County could be acquired if and when the existing roadway is widened in the future. Those right-of-way parcels would consist primarily of slope easements, narrow strips or corners of lots. The cost of those small parcels was not estimated, as those roadways and the right-of-way costs are the same for both Alternate B and D. Alternate D would also require acquisition of Tesoro Refinery property

approximately 200′ wide by 4800′ long or about 22 acres. The Tesoro property would not be required until a bridge is actually built on Alternate D, so a cost estimate was not included at this time since acquisition may be delayed for many years.

Note that utility relocation costs have not been estimated, as the identification of all underground utilities was beyond the scope of this study. Typically, utilities that are within existing roadway right-of-way would have to be relocated at the utility's expense, while those outside of existing right-of-way may be an expense of the roadway jurisdiction. Known major utilities, such as high-voltage transmission lines, were avoided as much as practical in this study.

Some options would require relocation of existing homes, or acquisition of platted lots ready for development. In those cases, right-of-way costs were estimated based on the following average figures:

- $300,000 per home relocation
- $20,000 per platted lot
- $80,000 per platted riverfront lot

A summary of right-of-way costs per jurisdiction and alternative is as follows:

	Home Relocations	Platted Lots	Platted River Lots
Morton – Alt. B	**2 to 3**	**1 to 3**	**0**
Unit Cost	**$300,000**	**$20,000**	**$80,000**
Morton Cost- Alt. B	**$600,000**	**$60,000**	**0**

Morton County – Alternate B estimated right-of-way cost = $660,000

	Home Relocations	Platted Lots	Platted River Lots
Morton – Alt. D	**0**	**3**	**0**
Unit Cost	**$300,000**	**$20,000**	**$80,000**
Morton Cost- Alt. D	**0**	**$60,000**	**0**

Morton County – Alternate D estimated right-of-way cost = $60,000 + 22 acres Tesoro land

	Home Relocations	Platted Lots	Platted River Lots
Burleigh – Alt. B	3	11	3
Unit Cost	$300,000	$20,000	$80,000
Morton Cost- Alt. B	$900,000	$220,000	$240,000

Burleigh County – Alternate B estimated right-of-way cost = $1,360,000

	Home Relocations	Platted Lots	Platted River Lots
Burleigh – Alt. D	0	0	0
Unit Cost	$300,000	$20,000	$80,000
Morton Cost- Alt. D	0	0	0

Burleigh County – Alternate D estimated right-of-way cost = $0

CONCLUSION AND RECOMMENDATIONS

The following table presents a summary of the advantages and disadvantages for alternatives studied:

COMPARATIVE SUMMARY OF CORRIDOR ALTERNATIVES A, B AND D		
Alternative	**Advantages**	**Disadvantages**
Alternative A (Do Nothing)	• No right-of-way acquisition from Tesoro or platted property • No bridge construction cost to plan for • Leaves option open for a future bridge on south route	• Doesn't plan for the inevitable need to accommodate increased river crossing demand • Does not provide for principal arterial corridor • Greatest indirection • Highest user cost • Inconsistent with adopted plans and planning guidelines • A stand-alone future bridge at south route would have less utility without connections • May result in higher overall cost when a bridge is needed
Alternative B (North route)	• Best arterial route • Shorter route • Fits terrain better • Lower user costs • $4 million lower total cost	• 4 to 6 relocations required • Requires replat and purchase of Olive Tree subdivision lots • Adjacent to more existing development
Alternative D (South route)	• No relocations required • Avoids most existing development	• 2 mile longer route • Indirect travel route • Steeper grades in Morton County • Requires future purchase of Tesoro property • Bridge over River Road less conducive to phase construction • $4 million higher total cost

The following recommendation is based on a review of the purpose, need, and analysis, and the feasibility of obtaining environmental clearance. The recommendation is to preserve Alternative B (north route) along with the following options:

- Morton County Route B-2 (approximately 640 feet south of 37th Street)
- Burleigh County Route B-4 (straight east section line alignment)
- ND 1804 Intersection Option 1 (straight east up the bluff)

IMPLEMENTATION PLAN

An implementation plan provided in this report will guide the BMMPO in acquiring land for the future roadway. The following is a list of options to do this:

1. Purchase of corridor right-of-way
2. Dedication of ROW through the platting process
3. "First Right of Refusal"
4. Donation
5. Acquire right-of-way in the future when the project is constructed

Comments
For the Draft Northern Bridge Corridor Study

Comments on the Draft Northern Bridge Corridor Study were received between June 25, 2004 and July 29, 2004. ***Please refer to the BMMPO TAC Comments Appendix for the full comment letters/emails.*** Comments and responses are as follows:

Morton County Highway Superintendent
Draft Northern Bridge Corridor Study
Chuck Morman
July 8, 2004

1. Page 39, On this page it says the segment along 37th Street from North Dakota 25 to Highland Road will be able to follow existing road centerlines and would not interfere with any homes in that particular area. I don't believe that is true at the east end, toward the Highland Road area.

   For the first mile there are no homes, for the second mile there are two homes on the north side of the road, for the third mile in there is a home on the north side that belongs to Toby Huber and another cabin on the south side of the road. I believe that both of these are far enough back to get out of the right-of-way strip, although it will be close to the road. A little farther east there is a Mr. Backer who is close to the road. With this big of right-of-way it will definitely be up into his front yard. A little further east of Mr. Backer is Jan Froehlich, although his home is back far it will use a good chunk of his front yard. On the south side of the section line is another home. I don't believe that the right-of-way can be squeezed in through this area. Then immediately east of that is a home almost on the section line itself which is going to cause some real problems. If your going to move the road north of this home enough to clear it your going to be down in a deep valley. East of the last home is the original Norton farm. He has built extremely close to the section line and will cause problems. Another issue that comes up is that this is where the main water line for Missouri West Water starts and continues easterly along this particular area. As you get further east as noted in the study you enter into the south side of Landeis subdivision and then there are various options available here.

   Response: The proposed Northern Corridor will follow the section line from ND25 towards the east until Section 8, T139N R81W. At this point, just west of Mr. Backer's property, the alignment alternatives turn towards the south before crossing Highland Road. Eventual widening of 37th Street west of Highland Road would require slope easements, narrow strips or corners for additional right-of-way, although there would be no relocation of existing homes. The language in the report has been clarified.

2. Page 40, On this page I don't know if I'm looking at something wrong but it appears as if on page xi at the beginning of the book it is recommending Alternative B2 which is on 37th Street but on Exhibit 4.2, it shows B2 as being south of 37th Street, so I'm not sure which one you are recommending.

   Response: Alternative B-2 is parallel to 37th Street and is located approximately 640 feet south. Language has been clarified and an exhibit of Alternative B-2 has been added to the report.

3. Page 43, On this page as for Options 1 or 2, Option 1 is present and is used effectively. Although the increase in east-west traffic expected to be rather significant I think it can't be handled in the same situation it is now. The north-south or Option 2 would have some severe impacts on both Zachmeier Manufacturing and on Donnie Entzel's storage units and on his subdivision that is presently under construction. The south end would also infringe on some people's front yards rather severely, although there is no development taking place. Exhibit 4.4 route B1 is shown as being on the section line or 37th Street as being the choice. This page does not show B2 as even an option. I think maybe that needs to be put on there and still discussed somewhere along the line. Again I refer back to the fact that the water distribution line is in this area west of the last home you see in Landeis Subdivision, so that has to be addressed somewhere in this study as to the cost of moving that. There is also a power transmission line running along the entire length of this section line so far. It turns south into Heskett east of the Humane Society.

   Response: Language has been clarified and an exhibit of Alternative B-2 has been added to the report. Note that utility relocation costs have not been estimated, as the identification of all underground utilities was beyond the scope of this study. Typically, utilities that are within existing roadway right-of-way would have to be relocated at the utility's expense, while those outside of existing right-of-way may be an expense of the roadway jurisdiction. Known major utilities, such as high-voltage transmission lines, were avoided as much as practical in this study.

3. Page 49, This is along the south route and there are various access options available to do this. Option 1 is shown in yellow. Option 1 would be difficult to put in because it would require another large change in Sunset Drive. I believe Sunset Drive's construction future is earlier than this is. Option 1 also with the frontage road would work for the homes on the frontage and would not create a real problem but somewhere along the line we need to get the other folks out to the west of 1806. There are two residents at this time and probably more by the time this goes in. Option 2 in red is basically the Sunset Drive as identified in the Long Range Transportation Study that appears to be fine. The one through Tesoro Oil Refinery I think would be a dead issue no matter when you go with the bridge.

Response: Comment noted. In the development of this study, it was assumed the connection between ND 1806 and Sunset Interchange would be designated as a new route for ND Highway 1806. It appears this issue is unresolved and may merit a separate study for the proposed connection to Sunset Interchange. A third option for the intersection of ND Highway 1806 and the Sunset Interchange connector has been added to the report.

4. As a final thought on this corridor, I believe that I would support corridor D or the southern route. Along with that corridor, Option D2 for getting back up into the hills, north of Mandan. The reason is that a portion of this is an industrial area, so therefore it does fit in with the use. There are no homes to be moved. I like the idea of the D2 Option to have the green space along the very steep hillside on the east side of Highland Road. In all practicality though, Morton County will not really be a player in this particular corridor because this all lies within the extraterritorial zoning of the City of Mandan. They will be the ones that will be imposing their wishes on the future zoning of this particular area. Also, I don't feel comfortable recommending anything on the east side of the river, as I personally am not acquainted with either of the options on that side.

   Response: Comment noted

Local Government Division
Urban/MPO Engineer
Draft Northern Bridge Corridor Study
Paul Benning
July 29, 2004

1. **Page 37:** NDDOT will not commit to taking the corridor on the state system. From NDDOT's point of view, the Northern Bridge Corridor only holds value in moving mostly local traffic for the economic benefit of the counties and cities of the area (similar to the benefits seen on Century Avenue from Tyler Parkway to Centennial Road).

   Response: Comment noted

   The NDDOT sees only a limited value in moving Interstate and intrastate freight. For major freight movements, north and south to east and west, the department already has existing corridors well outside the areas of development that could be expanded at lower cost. For example, US 83 southbound to westbound I-94 movements can be accommodated with the Washburn Bridge and ND 200a and ND 25. Similar movements to I-94 East can be accommodated with ND 36 at Wilton and ND 14 north of Sterling.

   Response: Comment noted

2. **Page 41:** The NDDOT recommends **Alternative B (North Route)** as the preferred alternative.

   Response: Comment noted

3. **Page 43:** Option 1 or 2 relating to Route B-1

   NDDOT Recommends **Option 2 relating to Route B-1** and the intersection of ND Highway 1806. As development occurs around the area, signalization of the intersection is likely and a 90 degree intersection is more desirable than a 60 degree intersection.

   Response: Comment noted

4. **Page 46:** Option 1 and 2 with respect to B-4.

   NDDOT Recommends **Option 2 relating to Route B-4** to preserve logic of direction and intersections of River Road. Right-of-way impacts are limited to land and not buildings, since it avoids relocation of River Road, ND Highway 1804 north-south, and Burnt Creek.

   Response: Comment noted

5. **Page 50:** If Route D is selected as the chosen alternative, the Department recommends that an additional option be developed that keeps the existing alignment of 1806 and provides for a county/city route north of the Sunset Interchange to the intersection of the new corridor. The current two alternatives will likely result in too few corridors servicing the developing area and would in effect make 1806 take the brunt of future development traffic. Also, moving 1806 makes for a harder tie of continuity between 1806 north of I-94 and 1806 south of I-94.

   Response: In the development of this study, it was assumed the connection between ND 1806 and Sunset Interchange would be designated as a new route for ND Highway 1806. It appears this issue is unresolved and may merit a separate study for the proposed connection to Sunset Interchange. A third option for the intersection of ND Highway 1806 and the Sunset Interchange connector has been added to the report.

Burleigh County Highway Department
Draft Northern Bridge Corridor Study
Jon R. Mill
July 1, 2004

1. The above referenced study has required considerable time and effort and has revolved around sensitive social issues. As the study progressed, the final location recommendation seemed to be leaning towards accommodation of the social issues. The tendency to do this is strong, but analytical, technical, non-emotional reasoning sometimes dictates a different recommendation. This issue is an instance where clear conscience does not allow acquiescence to the social constraints of route selection.

   Response: Comment noted

2. After due deliberation of the draft report, I agree that Alternative B is the overall best route location to pursue. This route is the most direct, possible link between tie points of 37th Street on the west side of the river and ND 1804 on the east side of the river. Alternative B appears to be over two miles shorter and involves much less indirection than Alternative D. Alternative B also offers a significant cost savings over Alternative D.

   Response: Comment noted

3. Alternative B-2 is preferable to Alternative B-1 since there are less social impacts without materially affecting the function or vision of the beltway function.

   Response: Comment noted

4. On the east side of the river, Alternative B-4 provides a much more direct alignment routing to the intended tie point then does Alternative B-3. Free flowing traffic use of the beltway is facilitated with Alternative B-4. This same desire for directness demands selection of Option 1 as the best treatment for the beltway-ND 1804 intersection.

   Response: Comment noted

5. The MPO Policy Board has a difficult decision to make in selecting a recommended route location. In the event that Alternative D is selected as the target corridor, there are some options to the large plan that have more merit than other options. Alternative D-2 requires flatter profile grades with shallower fill sections than Alternative D-1.

   Response: Comment noted

6. Of the presented options for the treatment of the beltway-ND 1806 intersection, Option 2 provides a smoother alignment for ND 1806. Careful study of this intersection suggests that an Option 3 that would follow the existing alignment of ND 1806, with minor tweaking, might be a viable option to consider.

   Response: Comment noted

7. On the east side of the river, Alternative D-3 is the clear choice since it avoids the misdirection and additional length offered by Alternative D-4 and the misdirection and undesirable social impacts to Crested Butte Subdivision offered by Alternative D-5. The River Road bridge structure required by Alternative D-3 is actually a benefit since the structure assists the profile grade challenges in the area and enhances the north-south arterial type traffic flows for River Road. For the beltway-Burnt Creek Road intersection, Option 2 is preferred since it softens the social impact, matches fringe road layouts, and is less disruptive to the area. The frontage road to the Burnt Boat Ramp area is really not needed since the ramp area will be accessible under the beltway bridge with a very short roadway connection between existing roads and Misty Waters's roadways.

   Response: The frontage road was dropped and Exhibit 4.10 has been revised to show park access under the bridge and through Misty Waters.

Burleigh County Highway Department
Draft Northern Bridge Corridor Study
Jon R. Mill
July 2, 2004

1. As per your request, I reviewed the options list in the draft report to comment on all of the options, whether I preferred the route or not. The only option I did not comment on is for route B-1 as it intersects ND 1806. My option preference at this location is Option 1. This option offers a significant cost savings and has a very soft social and neighborhood impact. The intersection angle still meets minimums and is not undesirable enough to address.

   Response: Comment noted

MPO Transportation Planner
Draft Northern Bridge Corridor Study
Steve Saunders
June 25, 2004

1. Overall Alternatives Choice—B Route (Northern Crossing)

   Response: Comment noted

2. Specific route choices—B2 and B4; D2 and D3

   Response: Comment noted

3. Option Choices
   A. Alignment B1 Option Choice—Option 2
   B. Alignment B4 Option Choice—Option 1
   C. Alignment D Option Choice—Option 2
   D. Burnt Creek Loop Alignment Option Choice—Option 1

   Response: Comments noted

   Grammatical and typographic errors that were discovered were changed accordingly.

4. Page *vi* is a signature certification of the MPO Policy Board by all five Board members. Recommend that only Chairman, Claus Lembke sign off on this certification.

   Response: Page vi has been revised.

5. Page *vii* is jurisdictional Resolution of Adoption. Paragraph 5 States, "Whereas, the engineering and planning staff have reviewed the Northern Bridge Corridor Study, and have unanimously indicated their support for it as a guide for their future planning and development policies: and" Recommend that this paragraph is be stricken.

   Response: Page vii has been revised.

6. Page 1 concerns the Introduction of the Corridor Study Development. Line 2 of the first paragraph states "...the beltway is between ND Highway 25 in Morton County (one mile north of I-94) and North 66th Street in Burleigh County (three miles north of I-94)." Recommend that the paragraph state, "That the beltway is between 24th Avenue and North 66th Street..." ND Highway 25 is not actually part of the planned beltway. Although we wanted KLJ to address the road connection between Highway 25 and 24th Avenue in this corridor study, we did not envision Highway 25 as part of the beltway. I further recommend that any other applicable references in the report should refer to 24th Avenue and not ND Highway 25 as the western north/south leg of the beltway. Also the map on the bottom of page 1 should be changed to show that the connection between Highway 25 and 24th Avenue is being studied but not part of the beltway.

   Response: The report has been revised as noted.

7. Overall a well written report, that lays out the situation and choices well.

   Response: Comment noted

8. Alternative A (do nothing) does not address an upcoming transportation problem. It is clear that Alternative B (northern route) is the superior bridge/corridor route. It is also clear that this study has encountered local resistance that makes Alternative D (southern route) the more politically acceptable choice. But, it is important to remember that the route we protect will be our "transportation tool" for many decades. The route we choose should be something we are proud of now and in the future. Although some pain is involved in its selection, in my professional opinion, Alternative B is the selection the MPO should embrace.

   Response: Comment noted

Bismarck City Engineer
Draft Northern Bridge Corridor Study
Mel J. Bullinger
July 2, 2004

I have finished my review of the referenced draft report on the Northern Bridge Corridor Study. In keeping with your request, I am pleased to offer the following comments:

1. In general I found the report to be well organized and to provide sufficient information about the process and the various alternates to allow the reader to reach a conclusion regarding their individual preferences for one alternative over another. However, I do believe this draft report would have benefited greatly from an enlarged version of the figure labeled as Exhibit 4.2 in the draft report. While that figure presents an overall view of the various alternatives and routes, the scale is too small to be able to discern much more than a general comparison of the approximate location of one alternative route to another. I would suggest that the final report should contain a version of Exhibit 4.2 that is at a minimum several times larger than the current version of that exhibit.

   Response: An 11"x17" version of Exhibit 4.2 was included in the Exhibits Appendix. The captions underneath the exhibits have been revised to note that larger versions are included in the Exhibits Appendix.

2. In regard to my recommendation for an alternative, in my professional opinion the best route of those studied is the northern route. Specifically I believe that Morton County alternate route B-2, Burleigh County route B-4 with the Option 1 realignment of River Road is the best option of those presented for the long term functionality of the beltway. In essence, I agree with the recommendations of the KLJ firm on this matter.

Response: Comments noted

3. By separate letter directly to Mr. Bob Shannon, PE, Kadrmas, Lee & Jackson, Inc., I will directly provide him with my miscellaneous comments regarding typographical corrections and other errata contained within the report.

   Response: The comments pertaining to grammatical and typographic corrections were received and revisions were made.

City of Mandan Engineer
Draft Northern Bridge Corridor Study
Tom Little
June 28, 2004

1. This office supports the alignments B-2 (in Morton County) and B-4 (in Burleigh County).

   Response: Comment noted

2. I also support Option 1 for the 1804 intersection and Option 1 for the intersection with 1806.

   Response: Comment noted

   Grammatical and typographic errors that were discovered were changed accordingly.

   Page vi — Suppose one of the entities does not approve the study. Their representative can not execute this document. Does that mean that the resolution is not valid and can not move forward? I recommend that only the Chairman of the MPO and the Secretary execute the resolution.

   Response: Page vi has been revised to have only the Chairman of the MPO sign.

   Page x — (Table—Alternative A—Advantages) On page ix, Alternative A, you state that this Alternative would only postpone the inevitable. Yet in this location you state there will be no right-of-way or bridge costs.

   Response: Choosing Alternative A, the do nothing alternative, is a choice to not plan for the future right-of-way or bridge costs. A "disadvantage" of choosing Alternative A has been added to the table: "Does not plan for inevitable need to accommodate increasing river crossings."

Page x (Table—Alternative A—Disadvantages) You list Greatest indirection; but if we do nothing, where is the indirection. I agree there will be indirection, but we need to explain this concept more thoroughly.

Response: The report has been revised to clarify this.

Page x (Table—Alternative B—Advantages) Do we know what the user costs will be. This should be expound on in the verbiage, and made part of the cost estimates.

Response: User costs have been added to the report.

Page x (Table—Alternative B—Advantages) Replace 6% with a hard number.

Response: The table has been revised with $4million instead of 6%.

Page x (Table—Alternative D—Disadvantages) Replace 6% with a hard number and add: Probable need for truck climbing lanes, and steeper grades.

Response: The outside lane of a multi-lane roadway would function as the truck-climbing lane, adding no additional cost to the five-lane roadway used for estimating purposes. "Steeper grades" has been added to the table as noted.

Page xi (Under IMPLEMENTATION PLAN—Item #2) I don't understand how revision of Road Master Plan will assist in the acquisition of right-of-way. Remove item #2 as stated.

Response: This has been revised to state "dedication of right-of-way through the platting process."

Page 43 (At the bottom of the page you list two Options for the intersection of 1806 and this corridor alignment) Another option would be to have the existing 1806 curve westerly to connect with the future 1806 (south of the proposed B-1).

Response: A third option has been added in the report as noted.

Page 61 (Table) Does not include cost for possible/probable truck climbing lanes or for user costs.

Response: The outside lane of a multi-lane roadway would function as the truck-climbing lane, adding no additional cost to the five-lane roadway used for estimating purposes. A discussion of user costs has been added to the report.

Page 61 (Table) Remove 37th Street Segment and $5,014,288. What and where are they? Is there a length in Burleigh Co. that should be listed?

Response: The 37th Street Segment and associated cost estimate refers to upgrading 37th Street from ND Highway 25 to Highland Road. While this cost would be born with either Alternate B or D, it was included since the impacts of a new 55 mph alignment on this road were evaluated in detail. Since ND Highway 1804 in Burleigh County is already constructed to a 55 mph design speed, the impacts and costs of widening to a future five lane roadway were not evaluated in detail. Additionally, the existing right-of-way along ND Highway 1804 is 150 feet wide. Widening the highway to a future five-lane roadway would require an additional 25 feet of right-of-way and/or easements on either side of the road.

City of Mandan Engineer
Draft Northern Bridge Corridor Study
Tom Little
July 2, 2004

1. As a supplement to my comments emailed to you on June 28, 2004; I wish to indicate my support—should Route D be selected—for Option 2 at the 1806 intersection. More specifically, referring to page 50 of the draft report, I recommend that the said Option 2 be tweaked by curving the existing 1806 westerly so that it intersects (perpendicularly) with the future 1806. My thoughts are that with the 1806 in place, the old 1806 will become a very minor route and not warrant an intersection with the Route D.

   Response: An additional option has been added to Route D (Option 2b), which would route existing ND Highway 1806 west and south of 38th Street (See Exhibit 4.7).

City of Bismarck Planning Director
Draft Northern Bridge Corridor Study
Carl Hokenstad
No date

Page 23 Under SOCIAL IMPACTS, the second paragraph may sound too positive.

Response: A paragraph has been added regarding potential negative social impacts.

Page 37 Under CORRIDOR VISION, Questions the sentence, "The BMMPO would ultimately like the NDDOT to designate the beltway (or portions of it) as a state highway.

Response: This statement, while not an official position adopted by the BMMPO, reflects discussions held at BMMPO TAC and Policy Board meetings.

Page 69 Under LAND USE, the second paragraph, last sentence the word should" needs to be changed to "could". After that sentence, add the sentence: Policies should be developed to guide the location, design, and timing of commercial and industrial zoning outside the corporate limits of cities.

Response: The report has been revised as noted.

Page 70 In the first paragraph, questions the last sentence, "Relying solely on a PUD for creation of commercial or industrial areas does not plan for appropriate buffers between PUD and existing/future residential land use."

Response: Jurisdictions currently have the choice to approve, reject, or identify acceptable compromises regarding planned unit developments. Typically, the burden of establishing appropriate buffers is placed on the developer, with the buffers designed within the confines of a PUD. Adjacent landowners are left to their own resources in fending off perceived undesirable development due to the lack of established buffer regulations. This type of situation resulted in new feedlot regulations regarding buffers between adjacent residences, but have not been as well developed for industrial, commercial or mixed use PUD developments. The flexibility provided by existing PUD regulations has not created a major public outcry yet; but as elected and appointed officials change, there may be different interpretations for what constitutes an acceptable buffer treatment, which leaves existing landowners with a feeling of insecurity.

Grammatical and typographic errors that were discovered were changed accordingly.

SUMMARY OF BISMARCK-MANDAN MPO TECHNICAL ADVISORY COMMITTEE RECOMMENDATIONS	Paul Benning-NDDOT	Mel J. Bullinger-City of Bismarc	Tom Little-City of Mandan	Jon R. Mill-Burleigh County	Chuck Morman-Morton County	Steve Saunders-BMMPO
Alternative A (Do Nothing)						
Alternative B (North Route)	X	X	X	X		X
Morton County Route B-2		X	X	X		X
Burleigh County Route B-4		X	X	X		X
Route B-1 and ND Highway 1806 Option 1				X	X	
Route B-1 and ND Highway 1806 Option 2	X					
Route B-3 and ND Highway 1804 Intersection Option 1			X			X
Route B-3 and ND Highway 1804 Intersection Option 2				X		X
Route B-4 and ND Highway 1804 Option 1		X				X
Route B-4 and ND Highway 1804 Option 2	X					
Alternative D (South Route)					X	
Morton County Route D-2				2	X	2
Burleigh County Route D-3				2		2
Route D and ND Highway 1804 Option 1						
Route D and ND Highway 1804 Option 2						
Route D and ND Highway 1806 Option 1						
Route D and ND Highway 1806 Option 2			2		X	
Route D and Burnt Creek Loop Option 1						2
Route D and Burnt Creek Loop Option 2				X		
X First choice 2 Second choice if indicated						

Chapter One
Corridor Study Development

1.1. Introduction

The *Northern Bridge Corridor Study* identifies a northern component of a future regional beltway around the Bismarck-Mandan area. The beltway is between 24th Avenue and North 66th Street. The *Northern Bridge Corridor Study* focuses on roadway alignments west of US Highway 83, following ND Highway 1804 west towards the Missouri River valley. The purpose of this study is to identify a future roadway alignment that can be preserved for future development, as well as to identify an implementation process for acquiring and preserving this corridor. ***Please refer to Exhibit 1.1, the Project Location Map.***

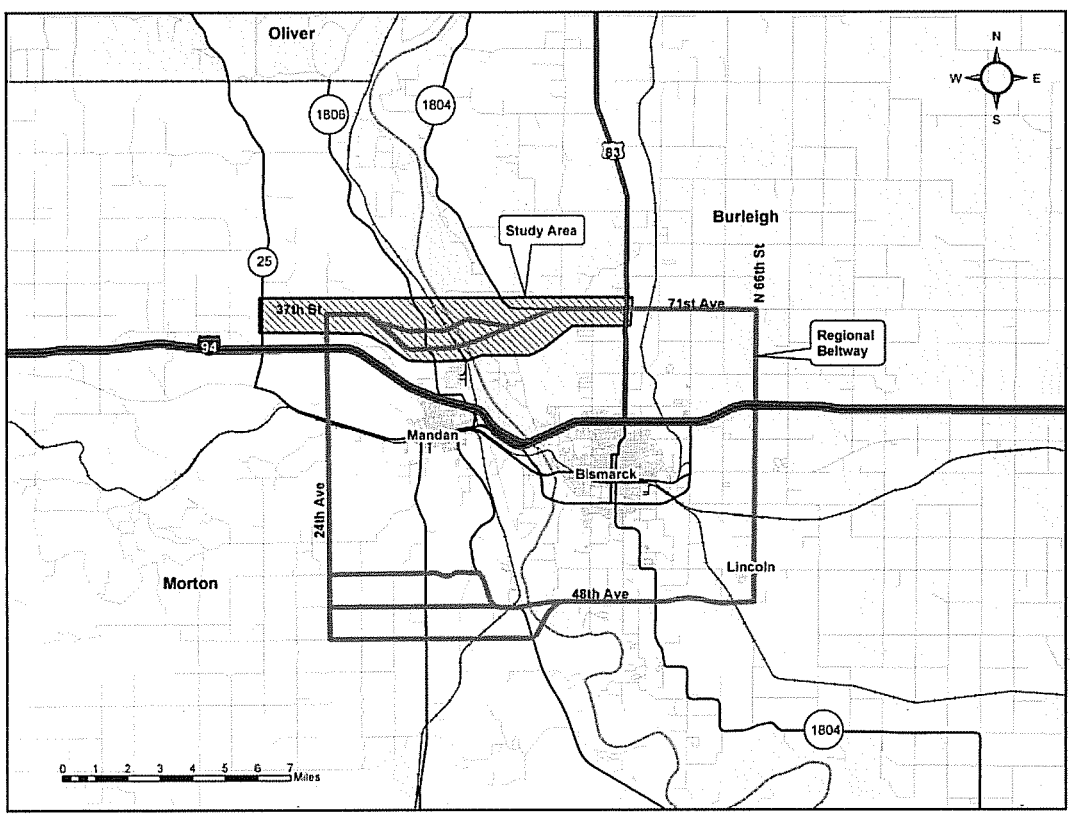


Exhibit 1.1, Project Location Map *(full-size located in the Exhibits Appendix)*

1.2. Project Background

The United States Census Bureau defines an urbanized area as an area of continuous urban development comprising a population greater than 50,000 and less than 250,000 persons. This definition crosses jurisdictional boundaries and therefore includes the cities of Bismarck, Mandan, and Lincoln, and the counties of Burleigh and Morton. Federal laws require that for urbanized areas to receive federal transportation funding assistance, they must participate in a Metropolitan Planning Organization (MPO) that maintains a continuous, comprehensive, and coordinated transportation planning process within the metropolitan planning area. The metropolitan planning area is defined as the area that can be reasonably expected to experience the influences of urban growth within a 20-year planning horizon. In the case of the Bismarck-Mandan metropolitan planning area, this area also includes the city of Lincoln; therefore the BMMPO (Bismarck-Mandan Metropolitan Planning Organization) includes the jurisdictions of Lincoln, Bismarck, Mandan, Burleigh County, and Morton County. The USDOT (United States Department of Transportation) provides federal funding assistance for MPO transportation planning activities through the FHWA (Federal Highway Administration) and FTA (Federal Transit Administration).

A federal requirement of the MPO is to maintain a current long range transportation plan which identifies transportation issues and solutions for a minimum of a 20-year planning horizon. In August 2001, the *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan*[1] identified a number of transportation system improvements ranging from rehabilitation projects, capacity improvements and roadway widening, and system continuity improvements (such as new interchanges), to right-of-way preservation for existing and future corridors. These transportation improvement recommendations included identifying the future arterial roadways in the fringe areas and the creation of a regional beltway to facilitate future travel with longer trips through the metropolitan planning area. A regional beltway corridor was identified in the *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* that connected and followed existing infrastructure and right-of-way as much as was practical, while also providing the mobility function of a principal arterial roadway. The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* ultimately recommended a series of more detailed corridor studies to identify and preserve right-of-way for various portions of the future regional beltway. The first recommended priority was a corridor study to identify the northern route and river crossing, due to the area's high suburban residential growth on both sides of the Missouri River. This fast paced suburban style development may cause land use conflicts and increase the need for transportation systems in unanticipated locations. The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* identified this as a potential problem; and as a solution, recommended preserving a corridor for a river crossing corridor now—before even more development occurs in the area.

[1] The *Bismarck–Mandan Metropolitan Area Long Range Transportation Plan* was adopted in August 2001. A copy of this Plan may be viewed at the Bismarck-Mandan Metropolitan Planning Organization office.

The BMMPO completed a *Fringe Area Road Master Plan*[2] in 2003 that identified future arterial and collector streets and their alignments in areas outside the cities' corporate limits. The *Fringe Area Road Master Plan* considered the two proposed river crossing locations identified in the *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan*, but deferred recommendation of a river crossing location to a future study (this study addresses the specific location of the northern river crossing).

Additionally, the city of Bismarck prepared a *Growth Management Plan* in 2003. The purpose of the *City of Bismarck Growth Management Plan*[3] was to help manage change in growing areas of the city, allowing the community to guide change rather than be guided by change; and to promote orderly growth that saves tax dollars, while maintaining the city of Bismarck's quality of life and community character.

The *Growth Management Plan* confirmed that rural non-farm growth was significantly on the rise immediately north of Bismarck, with city services anticipated to extend to within 1 mile of ND Highway 1804 within the next 15 years. The *Growth Management Plan* also recommended preservation of a corridor for a future northern river crossing and the creation of greenway corridors. While the *Growth Management Plan* was being developed, the city of Bismarck placed a temporary moratorium on new residential subdivision plats within the extraterritorial limits of the city of Bismarck. This moratorium extended from January 2, 2003 until September 30, 2003.

In the last year, both cities of Bismarck and Mandan extended their extraterritorial limits. To assist in managing the growth experienced and projected in the extraterritorial areas, the city of Mandan extended their extraterritorial limits from 1 to 2 miles, and the city of Bismarck extended their extraterritorial limits from 2 to 4 miles beyond their respective city limits.

In preparation for the *Northern Bridge Corridor Study*, the BMMPO conducted a cultural resource survey of the proposed study area in 2002. This survey identified historic properties that could preclude the development of potential alignments for the Northern Bridge Corridor. Some types of historic properties would have to be avoided during a future construction project, such as human burials, Native American village/home sites, and possibly sites determined to be eligible for the National Register of Historic Places (although in some cases these may be eligible for mitigation, determination would need to be made by the appropriate agencies). Other types of historic properties might be allowed to be impacted with a future construction project, but may require or have potential for costly mitigation. The cultural resource survey was approved by the SHPO (State Historic Preservation Officer) and consultation with tribal affiliates was conducted by the NDDOT

[2] The *Fringe Area Road Master Plan* was adopted in September 2003. A copy of this Plan may be viewed at the Bismarck-Mandan Metropolitan Planning Organization office.

[3] The *City of Bismarck Growth Management Plan* was adopted in August 2003. A copy of this Plan may be viewed at the City of Bismarck office.

(North Dakota Department of Transportation) Cultural Resource staff. To protect the integrity of the identified historic properties, the details and location of various properties are not identified in detail within the *Northern Bridge Corridor Study* report.

1.3. Study Process

The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* recommended a detailed corridor study to identify and preserve right-of-way for various portions of a regional beltway proposed to connect ND State Highway 25 in Morton County and US Highway 83 in Burleigh County. In July 2003, the BMMPO selected Kadrmas, Lee & Jackson to develop the *Northern Bridge Corridor Study*, including issue identification, alternatives analysis, action plan, and a public involvement program.

The purpose of this study is to identify a corridor for a future roadway and river crossing that can be preserved for future development, as well as to identify an implementation process for acquiring and preserving this corridor. This Corridor Study includes the following:

- Direction and monthly coordination with the BMMPO TAC (Technical Advisory Committee) and the Policy Board
- A comprehensive public involvement program
- Cultural resource surveys
- Development of alternatives and analysis of each alternative based on engineering criteria, environmental criteria, public involvement, the overall purpose of the study, and the corridor vision
- Development of an action plan for steps to preserve the corridor for a future roadway and river crossing
- Development of proposed roadway plan and profile indicating needed right-of-way

The first step in the study process was monthly coordination with the BMMPO TAC and Policy Board. Beginning in July 2003, this has been an ongoing activity which involved providing status reports and issue identification, including engineering, environmental, and public issues.

Data collection began as soon as the study commenced. Data collection included gathering floodplain maps, National Wetland Inventory Maps, GIS (Geographic Information Systems) maps including subdivision and road maps, previous studies and aerial maps, aerial photography, and elevation data for the study area. SOV (Solicitation of Views) letters were sent to federal, state, regional, and local agencies to solicit information regarding potential impacts to property or resources in the study area. In addition, a series of meetings were conducted with various stakeholders, including the Tesoro Refinery, Montana-Dakota

Utilities, and R. M. Heskett Plant, proposed Misty Waters Subdivision, county commissioners, city officials, and the general public.

A cultural resource survey was conducted to determine the boundaries of a cultural site located near the Missouri River. This information was used to help determine feasibility of potential river crossing sites.

Multiple field survey site visits were conducted by the project team to identify issues, alternatives, and impacts. A geotechnical survey and report were also conducted at this time to verify any soils issues that may influence the development of transportation infrastructure within the study area.

Three roadway and river crossing location alternatives were identified based upon data collection, cultural resources, and site visits, use of a digital terrain model, GIS, and information included in the *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan*. The alternatives were then analyzed based on bridge profiles, roadway profiles, access, engineering issues, and environmental impacts.

Following the preliminary alternatives analysis, the public involvement process began, playing a key role in the development of the *Northern Bridge Corridor Study*. Property owners in the study area and adjacent areas were sent letters describing the study and announcing the upcoming public input meetings. The public input meetings were also advertised in the Bismarck Tribune and the Mandan News. A public service announcement was sent to all news media and the Bismarck Tribune ran a story of the upcoming meetings and study. The first public input meeting was held in Mandan on December 11, 2003 and the second meeting was held in Bismarck on December 15, 2003. Public comments were solicited during the meetings and for a two-week comment period following each meeting. Comments received were incorporated into the *Northern Bridge Corridor Study, Volume II*.

The next step of the study process was to refine alternatives for the corridor, taking public comment and additional data collection into consideration. At the January 16, 2004 BMMPO TAC and Policy Board meetings, Kadrmas, Lee & Jackson recommended that Alternative C (the middle crossing) would not be further analyzed in the Northern Bridge Corridor Study for numerous reasons, including impacts to cultural resources, fly-ash disposal sites, and a subdivision. ***Please refer to Chapter 4 for more details on discarding Alternative C.***

Further analysis was conducted on the remaining alternatives: Alternative A (do nothing), Alternative B (north crossing), and Alternative D (south crossing). This *Draft Northern Bridge Corridor Study* was developed for distribution to the BMMPO TAC and Policy Board on June 14, 2004.

The final steps of the *Northern Bridge Corridor Study* are summarized as follows:

- BMMPO TAC and Policy Board review and comment on the *Draft Northern Bridge Corridor Study*
- Comments will be addressed in a revised *Draft Northern Bridge Corridor Study* report
- BMMPO TAC and Policy Board review of revised report; move to approve the *Draft Northern Bridge Corridor Study* by July 2004
- Public hearings will be held in Mandan and Bismarck, tentatively scheduled for early September 2004.
- A *Summation of Public Hearing* document will be prepared and presented to the BMMPO TAC and Policy Board.
- BMMPO TAC and Policy Board approval of the *Summation of Public Hearing* document
- Preparation and submittal of the *Final Northern Bridge Corridor Study* to the city of Bismarck, city of Mandan, Burleigh and Morton Counties for approval.
- BMMPO TAC and Policy Board approval of the *Final Northern Bridge Corridor Study*

Chapter Two
Purpose and Need

2.1. Purpose

The purpose of this study is to identify a corridor of a future regional beltway that can be preserved for possible future development as needed, as well as to identify an implementation process for acquiring and preserving this corridor. The purpose of the proposed regional beltway is to connect people to places by facilitating transportation across the urbanized area through continuity and connections between other arterials and collectors.

2.2. Need

2.2.1. Population Growth

The Bismarck-Mandan metropolitan area is one of the few locations in North Dakota to experience a population increase according to the United States Census 2000. This is part of a shift from rural-to-urban living in North Dakota, which has been recognized by the U.S. Census Bureau. With the increase of population comes a demand on different living options: living in the city or living in the extraterritorial areas—which often offer larger lot sizes. Indeed, statistics show that in recent years there have been more residential building permits outside the cities of Bismarck and Mandan than there have been inside the cities. The rural farming communities of North Dakota are losing farms and population, while urban areas (mainly Fargo and Bismarck-Mandan) gain population.

The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* indicates there were 5,337 households north of I-94 in 2001, and has forecasted 10,625 new households and 1,388 new jobs north of I-94 by the year 2025. The households generate an average of 9.4 trips per day, resulting in an increase of 99,875 new trips per day on the transportation system north of I-94 in year 2025. These new trips do not include new trips generated south of I-94 that may travel north of I-94. Based on these projections, it is clear that a system of arterial and collector streets will be needed north of I-94 to meet the transportation demand.

2.2.2. Transportation System Network

The regional beltway proposed in the *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* is expected to function as a principal arterial. The FHWA defines urban principal arterials as routes whose primary function is to facilitate trips across and/or through an urban area, with a minimum amount of direct land access and with a typical spacing between principal arterials of 1 to 2 miles. FHWA also recommends urban minor arterial routes, such as Old Red Trail and Century Avenue, be spaced ½-mile to 1 mile apart. The area is served by the following principal arterials north of Interstate 94:

North/South:

- ND Highway 25
- ND Highway 1806
- ND Highway 1804
- US Highway 83

East/West:

- Interstate 94

There is currently no continuous urban principal arterial north of I-94 to serve connections across the area. Based on FHWA guidelines, a continuous urban principal arterial should be located 1 to 2 miles north of I-94 to accommodate urban development. The study area for the Northern Bridge Corridor varies from 1 to 4 miles north of I-94, and meets the criteria for the location of an urban principal arterial. ***See Figure 2.1 and Table 2.1.***

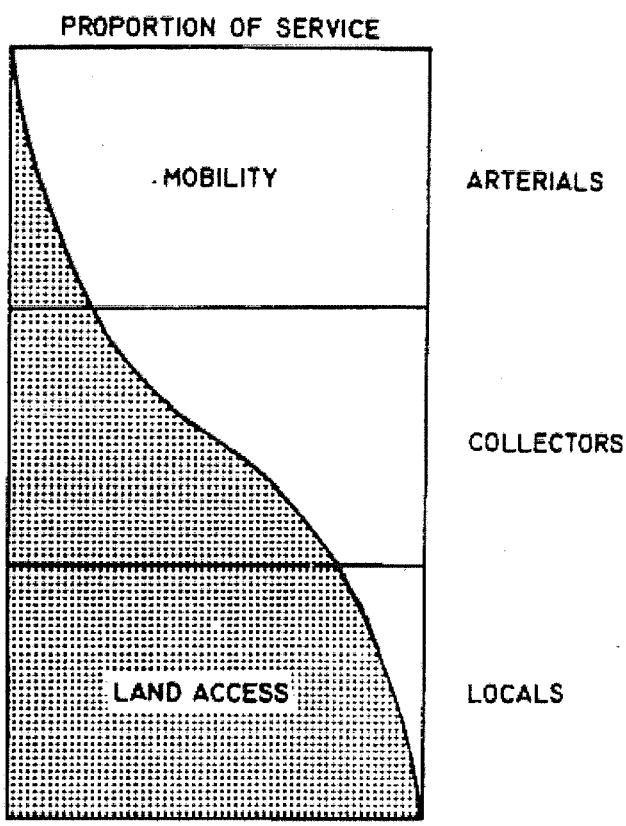


Figure 2.1. Roles of Roadways
Source: Highway Functional Classification, Federal Highway Administration

	Freeway and Expressway	Primary Arterial	Secondary Arterial	Collector	Local
Function	Traffic Movement and mobility	Primary - longer-distance intercommunity and intra-metro area high-capacity traffic movement Secondary - land access	Primary - moderate distance intercommunity, intra-metro area traffic movement Secondary - land access	Primary - collect/distribute traffic between local streets and arterial system. Secondary - land access. Tertiary inter-neighborhood traffic.	Land Access
Continuity and length (typical length, miles)	Continuous (varies widely)	Highly Continuous (5-25)	Continuous (3-10)	Not necessarily continuous; often not extended across arterials (2-5)	Within neighborhood only (<2)
Approximate spacing, miles	4	1 to 2	1/2 to 1	1/2 or less	As needed
Direct Land Access	None	Limited to intersecting public streets, and driveways to major generators	Restricted - some movements may be prohibited; number and spacing of driveways controlled	Safety controls; limited regulation	Safety controls only
Minimum roadway intersection spacing	1 to 2 miles	1/4 mile	1/8 mile	300 feet	300 feet
Speed Limit, mph	45 to 65	35 to 45	30 to 35	25 to 35	20 to 30
Parking	Prohibited	Prohibited	Limited	Limited	Permitted
Comments	Supplements capacity of arterial street system and provides high-speed mobility for thru traffic	Backbone of street system		Through traffic should be discouraged	Through traffic should be discouraged

Table 2.1 Urban Roadway Classifications and General Planning Guidelines

Source: Planning Urban Arterial and Freeway Systems, Institute of Transportation Engineers

2.2.3. Traffic Capacity

During the previous century, the Bismarck-Mandan area had grown within a relatively compact area on either side of the Missouri River. New growth is now focused primarily on the very northern and very southern portion of the urbanized area. A description of the current (2004) bridges over the Missouri River is as follows:

- The Liberty Memorial Bridge on US Highway 10 was opened in 1922 as the first motorcar bridge across the Missouri River in North Dakota. The Liberty Memorial Bridge will be removed and replaced with a four-lane structure, with construction beginning in 2006. The bridge is part of a principal arterial known as the I-94 Business Loop.
- The four-lane Grant Marsh I-94 Bridge was completed in 1966, with I-94 passing north of existing urban development. Since then, urban growth has enveloped the Interstate on both sides of the river. The interstate is the highest functional classification, above a principal arterial.
- The four-lane Bismarck Expressway Bridge was opened in 1984 to meet the growing transportation access needs on the southern side of the cities. The bridge is part of a principal arterial known as I-810 (Bismarck Expressway).

The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* indicated additional capacity beyond that of the existing bridges would not be necessary by the year 2025 based upon projected growth. The transportation plan's assumptions were based upon Memorial Bridge being widened to four lanes in the near future. The NDDOT estimated the three existing four-lane bridges would have a combined design capacity of about 75,000 vehicles per day, and an ultimate combined capacity of about 90,000 vehicles per day. However, a review of historic NDDOT traffic counts and projected river crossing traffic from the transportation plan indicates the existing bridges are projected to reach about 75,000 vehicles per day in year 2025. In year 2025, the transportation plan traffic model projects 40,000 vehicles per day on the I-94 Bridge, which indicates there may be capacity related issues appearing on that facility by then. Extending the same growth rate beyond year 2025 yields 90,000 vehicles per day in year 2040. Based on the traffic demand for river crossings, it appears additional river crossing capacity may be needed in the next 20 to 40 years, primarily for trips on the north side of the urbanized area. It is interesting to note that the *1989 Long Range Transportation Plan* projected 58,400 river crossings for the year 2010. The latest river crossing traffic count of 54,500 in 2004 indicates the 2010 projection made in 1989 may be met two years early. ***Please refer to Figure 2.2, "River Crossing Traffic".***

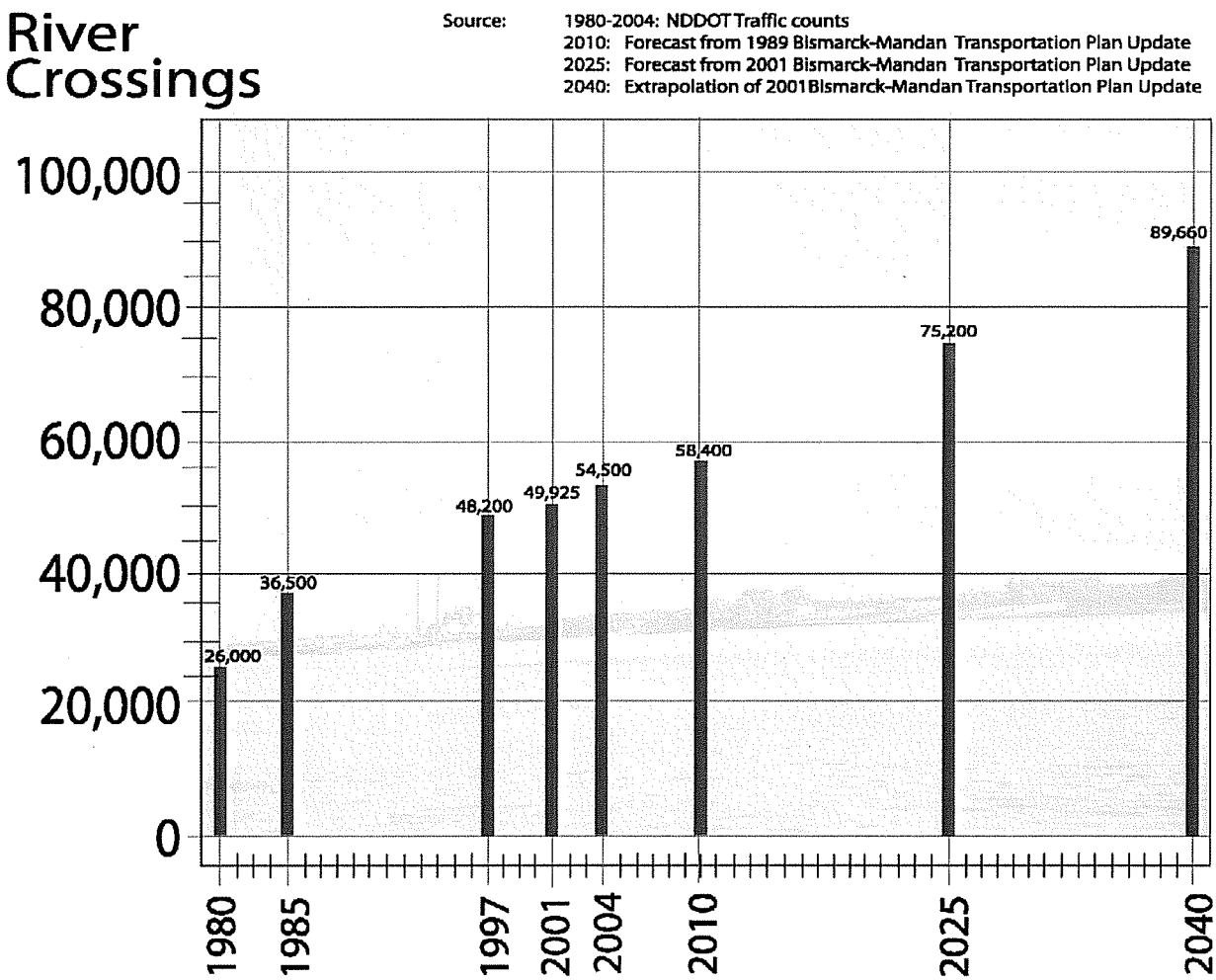


Figure 2.2. River Crossing Traffic

Chapter Three
Issue Identification

3.1. Introduction

This study has identified three alternatives for the corridor that can be preserved for a future river crossing and roadway. The alternatives that have been further analyzed in this study are one do nothing alternative and two different corridor alternatives:

- Alternative A (do nothing)
- Alternative B (north route)
- Alternative D (south route)

For further discussion of these corridor alternatives and engineering analysis, please refer to Chapter Four.

This chapter will discuss the engineering issues, environmental issues, and the public involvement process for the overall study area and the individual alternatives.

3.2. Engineering Issues

Engineering issues include items that could affect the construction feasibility, design and/or cost of a proposed improvement. The primary engineering issues include the following items:

- Soils
- Floodplains
- Bridge elevation
- Grades
- Railroad crossings
- Intersecting roads and access control

3.2.1. Soils

Soils issues could include the potential for landslides, unstable slopes, ground water, and poor quality soils below bridge foundations. Braun Intertec's geotechnical engineers conducted a site visit of the study area to visually identify any soils issues that could influence the proposed study. Their review noted the following issues:

- There is evidence of landslides between ND Highway 1804 and River Road. If these slide areas are encountered on the final roadway alignments, the grading

would have to address stabilization of any slide areas. Any cutting into the high bluff along River Road should incorporate periodic flat bench sections on the backslopes of a new roadway to minimize sliding and erosion. There is a possibility of encountering ground water springs when cutting into the high bluff, which could be accommodated with subsurface drainage, if required.

- The hilly terrain on either side of the Missouri River could involve high fill sections for a new roadway, which may be subject to some settlement.
- The east bank of the Missouri River along the Burnt Creek Loop alignment is a low swampy area that may have a higher potential for encountering deep organic deposits. Deep organic deposits would be more susceptible to settlement resulting from the weight of overlying embankment.

3.2.2. Floodplain

Floodplains are regulated to minimize changes in flood elevations. A new bridge across the Missouri River would be required to keep impacts to the 100 year flood elevation to an increase of 0.1 feet or less. To accomplish this, any filling within the floodway must be kept to a minimum amount by spanning the floodway. Any filling in the floodway would be limited to the bridge piers themselves. Boundaries of the floodway were obtained from floodplain maps. A detailed hydraulic study of a proposed structure would be required prior to obtaining environmental clearances for construction.

3.2.3. Bridge Elevation

Bridge elevation will affect construction costs and possibly impacts to adjacent properties. The bridge elevation must consider the effects of a 100 year flood as well as navigational clearance. Since the Missouri River is considered a navigable waterway, the US Coast Guard requires a minimum of 30 feet vertical navigational clearance under the bridge with a 50 year flood elevation, and a minimum of 250-foot-wide navigational clearance between two bridge piers.

3.2.4. Grades

Grades refer to the steepness of the roadway in the direction of travel. It is desirable to keep bridge grades below 3 percent to minimize bridge costs. Design guidelines[4] for maximum grades on rural arterials in rolling terrain range from 4 percent for 60 and 70 mph design speed to 5 percent for 50 mph design speed. For mountainous terrain the maximum grades are 5 percent at 70 mph, 6 percent at 60 mph, and 7 percent at 50 mph design speed. The Americans with Disabilities Act of 1990 (ADA) guidelines require pedestrian facilities to have continuous grades of 5 percent maximum, and shorter steeper grades with periodic landings limited to 8.33 percent maximum. It is anticipated that the regional beltway would

[4] AASHTO Policy on Geometric Design of Highways and Streets

incorporate pedestrian/bicycle facilities within developed areas; therefore, a desirable maximum roadway grade is 5 percent. However, from a practical standpoint, the steep rolling terrain of the river valley may require steeper grades, but in no case should it exceed 8.33 percent. Intersections with other roadways must also be considered when setting the roadway grade to avoid having an intersection that is considerably higher or lower than the adjoining land, which could complicate access for adjacent development.

The need for truck climbing lanes is determined through a function of overall traffic volumes, truck volumes, free-flow speed, and the reduced speed of trucks on the grade. This information is not available for the planning level analysis of this corridor study, and any need for truck climbing lanes should be evaluated in the future when the proposed facilities are actually constructed.

3.2.5. Railroad Crossings

The Morton County side of the valley includes a BNSFRR (Burlington Northern-Santa Fe Railroad) line parallel to the river. This rail line currently serves several trains per week. However, a new grain terminal is being constructed along the line further north in Oliver County that will serve 110 car trains. The rail line also includes six sets of tracks along the south side of the R. M. Heskett Power Plant. These tracks are used for switching and unloading coal at the power plant. Power plant officials indicated that rail cars are not allowed to be stored on the tracks across the roadway. The roadway, 38th Street, terminates just east of the railroad tracks at a parking lot for shore fishing access. The rail line is only one set of tracks north of the power plant. A bridge over the railroad tracks is desirable to minimize accident potential and facilitate arterial travel. The BNSFRR currently requires a minimum bridge clearance of 23.5 feet above their tracks.

3.2.6. Intersecting Roads and Access Control

Intersecting roads are an engineering issue in that AASHTO (American Association of State Highway and Transportation Officials) roadway design guidelines recommend intersections ideally be at 90 degree angles, with 70 degree or greater angle desirable, and an absolute minimum angle of 60 degrees. Typical arterial roadway intersection spacing is ¼-mile or greater, with greater spacing for higher design speeds. Additionally, arterial roadways should have a minimum amount of access driveways, and typically direct access is only provided for major traffic generators. Placing a new arterial roadway along an existing roadway with driveways may create future traffic operations issues; therefore alternative access provisions may need to be considered.

3.3. Environmental Issues

Environmental clearance is a legal process used to screen and select alternatives for a federally funded project. Environmental clearance issues must be considered when planning future projects to identify and/or eliminate potential fatal flaws in the planning process.

The inventory and evaluation of the existing environment provides the necessary baseline from which to determine the impacts of the proposed alternatives. The potential effects of the Northern Bridge Corridor preservation and future roadway project to the human environment, physical environment and natural environment are discussed. It is important to note that if the *Northern Bridge Corridor Study* is adopted then the preservation of the corridor may take place immediately and on-going, however the jurisdictions decide to take action. For this reason, there are no quantifiable environmental impacts with just preservation of the corridor. In this chapter, an inventory of possible environmental impacts was taken to provide the BMMPO with possible impacts that may be further evaluated in the NEPA (National Environmental Policy Act of 1969) process. The NEPA process will be initiated when the need for the proposed project is warranted. The primary environmental issues include:

- NEPA
- Environmental Impact Categories, including:
  - Land Use
  - Cultural Resources
  - Environmental Justice
  - Natural Environment
  - Human Environment

The *Northern Bridge Corridor Study* is one of the first steps in the process of meeting the corridor vision for a future river crossing and roadway. When the *Final Northern Bridge Study* is adopted by the BMMPO Policy Board and local jurisdictions, the jurisdictions may be able to preserve the corridor and acquire right-of-way dependant upon which funding source is used to preserve the corridor. NEPA compliance will be required once federal funding is used for the corridor, whether it is used for right-of-way acquisition, design, or construction.

3.3.1. Understanding NEPA

The National Environmental Policy Act of 1969 was enacted "to declare a national policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the

ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality."

NEPA requires that all major Federal actions provide an analysis of alternatives and the economic, social, and environmental impacts of each alternative. Under NEPA, three levels of documentation exist. These levels are referred to as Classes of Action, and are described below:

- **Categorical Exclusion (CAT EX)**—Categories of actions which would not have a significant affect on the environment.
- **Environmental Assessment (EA)**—Categories of actions which may or may not have a significant affect on the environment.
- **Environmental Impact Statement (EIS)**—Categories of actions which would significantly affect the environment.

The following list of environmental impact categories would need to be evaluated during NEPA documentation:

Aesthetics	Permits
Air Quality	Relocation
Bicycle and Pedestrian Issues	Secondary and Cumulative Impacts
Cultural Resources	Section 4(f)/Section 6(f) Properties
Economic	Short-term Uses Versus Long-Term Benefits
Energy	Social
Environmental Justice	Temporary Construction Impacts
Farmland	Threatened and Endangered Species
Floodplain	Water Quality
Hazardous Waste	Watershed Management
Irreversible/Irretrievable Use of Resources	Wetlands
Joint Development	Wild and Scenic Rivers
Land Use	Wildlife, Habitat, and Ecosystems
Noise	

Under the current NEPA process, it is anticipated that an Environmental Impact Statement (EIS) will be required for this project (once the project has met the need), prior to construction. A new controlled access freeway or highway projects of four or more lanes on a new location are examples of actions that normally require an EIS (40 CFR 1805.27).

NEPA offers a systematic and interdisciplinary approach to project planning. Investigations, reviews, consultations, and compliance are coordinated as a single process. Alternatives are evaluated based on meaningful data, and agency and public involvement are required. In many cases, avoidance, minimization, and/or mitigation are required for adverse impacts.

NEPA acts as an umbrella for other environmental laws and regulations which may apply to a project, such as, but not limited to:

- Americans with Disabilities Act of 1990
- Archaeological and Historic Preservation Act of 1974
- Clean Air Act of 1990
- Clean Water Act of 1977
- Endangered Species Act of 1973
- Executive Order 11988 (Floodplains)
- Executive Order 11990 (Protection of Wetlands)
- Executive Order 12898 (Environmental Justice)
- Farmland Protection Policy Act of 1981
- National Historic Preservation Act of 1966
- Noise Control Act of 1972/FHWA Highway Traffic Noise Analysis & Abatement Policy & Guidance of 1995
- Resource Conservation Recovery Act of 1976
- Section 4(f) of the US DOT Act
- Section 6(f) of the Land and Water Conservation Fund Act of 1965
- Transportation Equity Act for the 21st Century
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970

3.3.2. Environmental Impacts

For the purposes of this study, potential environmental impacts resulting from the acquisition and preservation of a corridor were analyzed on a preliminary basis. Often the impacts were not quantifiable based on preservation alone. Once the NEPA process is initiated, potential environmental impacts resulting from the proposed action will be analyzed and evaluated in greater detail, but a preliminary inventory has been conducted for the purposes of the corridor study. The NEPA document will ultimately provide information to the decision maker to determine which alternative for the roadway is most feasible and prudent. The NEPA document will also provide information regarding the avoidance and/or minimization of adverse impacts, as well as possible mitigation for unavoidable adverse environmental impacts.

Table 3.1., Environmental Impacts, on the next page summarizes the preliminary inventory for the corridor study. The table looks at the potential differences of environmental impacts for Alternative A, Alternative B, and Alternative D. It is evident from the inventory of the environmental impacts and the public involvement process that certain categories need to be further discussed and are discussed on the following pages.

Environmental Impacts Summary

Subject Area	Do Nothing Alternative	Alternative B	Alternative D
Land Use	No change, but the trend in the area is converting agriculture land to residential developments.	Converstion of agricultural land to transportation facilities, residential development, and possibly some commercial properties	Converstion of agricultural land to transportation facilities, residential development, and possibly some commercial properties
Farmland (Farmland Protection Policy Act of 1981)	No impact	Changes in neighborhoods or community cohesion for various social groups; changes in travel patterns and improved accessibility for recreation access; recreation areas, churches, businesses, police and fire protection; changes on highway, traffic, and overall public safety. Neighborhoods and residential developments would inevitably be near a major transportation facility. This includes some of the human environment changing when the study changes to project development.	Changes in neighborhoods or community cohesion for various social groups; changes in travel patterns and improved accessibility for recreation access; recreation areas, churches, businesses, police and fire protection; changes on highway, traffic, and overall public safety. Neighborhoods and residential developments would inevitably be near a major transportation facility. This includes some of the human environment changing when the study changes to project development.
Social	No impact Maintains physical barrier to community cohesion	Changes in neighborhoods or community cohesion for various social groups; changes in travel patterns and improved accessibility for recreation access; recreation areas, churches, businesses, police and fire protection; changes on highway, traffic, and overall public safety. Neighborhoods and residential developments would inevitably be near a major transportation facility. This includes some of the human environment changing when the study changes to project development.	Changes in neighborhoods or community cohesion for various social groups; changes in travel patterns and improved accessibility for recreation access; recreation areas, churches, businesses, police and fire protection; changes on highway, traffic, and overall public safety. Neighborhoods and residential developments would inevitably be near a major transportation facility. This includes some of the human environment changing when the study changes to project development.
Relocation (Uniform Relocation Assistance and Real Property Acquistion Policies Act of 1970)	No impact	4–6 homes, and the Central Dakota Humane Society	No impact
Economic Impacts	No impact	While some houses or businesses may experience temporary negative economic impacts through relocating, or future road and bridge construction itself; others may experience temporary or long-term positive economic impacts from the same activities.	While some houses or businesses may experience temporary negative economic impacts through relocating, or future road and bridge construction itself; others may experience temporary or long-term positive economic impacts from the same activities.
Pedestrian/Bicycle	No impact	May improve with added areas with the future roadway and bridge.	May improve with added areas with the future roadway and bridge.
Air Quality (Clean Air Act of 1990)	Possible negative impact due to indirection of travel and congestion	Positive impact with reduced indirection of travel.	Positive impact with reduced indirection of travel.
Noise Impacts	No impact	Increase in noise with new roadway and bridge built in an area that currently does not exist. Although, noise will need to be in compliance with FHWA and the NDDOT noise abatement criteria.	Increase in noise with new roadway and bridge built in an area that currently does not exist. Although, noise will need to be in compliance with FHWA and the NDDOT noise abatement criteria.
Water Quality (Clean Water Act of 1972)	No impact	Floodplain and wetland impacts more extensive than currently	Floodplain and wetland impacts more extensive than currently
Wetlands	No impact	Wetlands impacted, acreage unknown	Wetlands impacted, acreage unknown
Water Body Modification and Wildlife Impacts	No impact	No water body modifications, wildlife habitat in the Missouri River breaks may be slightly altered	No water body modifications, wildlife habitat in the Missouri River breaks may be slightly altered
Floodplain	No impact	Construction would be in the 100 year and 500 year floodplain, no impact anticipated.	Construction would be in the 100 year and 500 year floodplain, no impact anticipated.
Threatened & Endangered Species (Endangered Species Act of 1973)	No impact	Bald eagle, may affect, is not likely to affect; Interior least tern, may affect, is not likely to affect; Piping plover, may affect, is not likely to affect; Pallid sturgeon, may affect, is not likely to affect.	Bald eagle, may affect, is not likely to affect; Interior least tern, may affect, is not likely to affect; Piping plover, may affect, is not likely to affect; Pallid sturgeon, may affect, is not likely to affect.
Cultural Resources (National Historic Preservation Act of 1966)	No impact	2 sites that are adjacent to the proposed roadway, one of the sites is unevaulated but may be eligible for listing on the National Register of Historic Places, mitigation applicable, the other site is adjacent to the proposed roadway but is not eligible for listing on the National Register of Historic Places	1 site adjacent to the proposed roadway (the site is unevaulated but may be eligible for listing on the National Register of Historic Places, mitigation applicable)
Hazardous Waste Sites	No impact	No impact	No impact
Visual Impacts	No impact	Viewshed impacts, from extraterritorial residential and agricultural to new roadway and bridge, aesthetics will change in the area	Viewshed impacts, from extraterritorial residential and agricultural to new roadway and bridge, aesthetics will change in the area
Section 4(f)		none currentlly	Burnt Boat Boat Ramp Park
Section 6(f)		none currentlly	Fishing landing and boat ramp, picnic area (does not include any cultural resources)

3.3.3. Land Use

The majority of existing land use and zoning in the study area is currently either agricultural or residential; there are small sections that are zoned for Heavy Commercial. Land on the west side of the Missouri is zoned industrial for the R. M. Heskett Power Plant and the Tesoro Refinery. Most of the agricultural land in the study area may be rezoned residential in the future. Assuming a particular corridor route is chosen, commercial zoning may be appropriate in some areas, especially near intersections of minor arterials.

In addition to the recreational benefits of the Missouri River, the study area includes areas adjacent to the river set aside as boat-ramps, parks, and fishing access points.

3.3.4. Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended, requires that federally funded projects be evaluated for the effects on historic and cultural properties included in, or eligible for listing on, the National Register of Historic Places. The Archaeological and Historic Preservation Act of 1974 provides for the survey, recovery, and preservation of significant scientific, prehistoric, archaeological, or paleontological data when such data may be destroyed or irreparably lost due to a federal, federally licensed, or federally funded project.

A Class III Cultural Resource Survey was performed in conjunction with the North Dakota State Historic Preservation Office and the North Dakota Department of Transportation Cultural Resource Staff, and in accordance with today's federal and state laws. There are cultural resource sites that must be avoided. These sites may include Native American villages and properties eligible for listing on the National Register of Historic Places (NRHP).

A common question asked by the public during the development of this study is, "Why avoid Native American villages but not existing development?" Previous projects have identified a high probability for human remains to be found in Native American villages accidentally encountered during construction. Laws pertaining to cemeteries require permission to relocate graves from next of kin. If permission is not granted, the grave cannot be relocated. For this reason, known villages are treated as any other cemetery; they are avoided at all costs in most cases.

Alternative B and Alternative D are adjacent to one cultural resource site located in Morton County that is potentially eligible for the listing on NHRP, additional testing would have to be conducted to determine the boundaries of the site as the project progresses. When these alternatives and alignments are carried forth in the NEPA process, potential impacts will be clearly identified. Any impacts to cultural resource sites would require coordination with

agencies having jurisdiction and/or an interest in these properties, and mitigation would likely be required.

3.3.5. Environmental Justice

A 1994 Presidential Executive Order (Executive Order 12898) directed every Federal agency to make environmental justice part of its mission by identifying and addressing the effects of all programs, policies, and activities on "minority populations and low-income populations."

Environmental Justice has three main fundamental principles:

1. To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
3. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations

Environmental Justice is not a new requirement, the recipients of Federal aid have been required to certify and the US Department of Transportation must ensure nondiscrimination under Title VI of the Civil Rights Act of 1964.

The approach that is used for environmental justice in transportation decision making is to:

- Make better transportation decisions that meet the needs of all people
- Design transportation facilities that fit more harmoniously into communities
- Enhance the public involvement process, strengthen community-based partnerships, and provide minority and low-income populations with opportunities to learn about and improve the quality and usefulness of transportation in their lives
- Improve data collection, monitoring, and analysis tools that assess the needs of, and analyze the potential impacts on, minority and low-income populations
- Partner with other public and private programs to leverage transportation-agency resources to achieve a common vision for communities
- Avoid disproportionately high and adverse impacts on minority and low-income populations
- Minimize and/or mitigate unavoidable impacts by identifying concerns early in the planning phase and providing offsetting initiatives and enhancements measures to benefit affected communities and neighborhoods

One of the approaches of environmental justice is to identify concerns early in the planning phase. Identifying concerns from the public were received by the public input meetings, formal comments, telephone calls, and other meetings put on by the public. At this time, environmental justice impacts are not anticipated with the Northern Bridge Corridor.

3.3.6. Natural Environment

The natural environment pertains to agricultural land, water quality, wetlands, watersheds, threatened and endangered species, wildlife, and ecosystems. The proposed project will impact prime and unique farmland, trees, and wetlands. The acreage of potentially impacted farmland, trees, and wetlands are unknown at this time. During the NEPA process, the acreage will be calculated and evaluated; and if necessary, mitigation will also be included in the environmental document. The locations of wetlands and floodplains have been identified; this inventory is based on our current year, 2004. ***Please refer to the wetland and floodplain map located in the Exhibit Appendix, Exhibit 3.1.***

3.3.6.1. Threatened and Endangered Species

According to the USFWS (US Fish & Wildlife Service), species of concern in the project area are the federally endangered least tern and pallid sturgeon, and the federally threatened piping plover and bald eagle. Other threatened or endangered species may be found in Burleigh or Morton Counties, but are either transient or not found within the corridor area. These species are the threatened and endangered species of 2004, as the project develops and under the NEPA document a full biological report would typically be conducted and evaluated.

In 1992, the USFWS designated piping plover critical habitat along the entire stretch of the Missouri River, from Garrison Dam to Lake Oahe. Least terns also use this same habitat.

Threatened and endangered species are protected under the Endangered Species Act, which is administered by the USFWS and the NMFS (National Marine Fisheries Service). The USFWS and NMFS work with other agencies to plan or modify federal projects so that they will have minimal impact on listed species and their habitat.

3.3.6.2. Wildlife and Ecosystems

Wildlife and their ecosystems in the Missouri River corridor in North Dakota have been changing with the movement of man into this natural environment. Historically, habitat has changed from the time of Lewis & Clark, particularly with the increases in human settlement and the installation of dams on the Missouri River. The natural habitat in the project area continues to change with increased development. The *City of Bismarck Growth Management Plan* recommended the following measures to minimize impacts to the natural environment:

- Utilize greenway corridors to preserve sensitive environments, mitigate erosion, and provide for the management of storm water
- Protect land that is environmentally unsuitable for development by retaining floodways, drainage ways, steep slopes, and other sensitive areas as open space networks for recreation and environmental protection and enhancement
- Encourage the preservation of natural features in the design of subdivisions
- Identify future access points and preserve existing public access to the Missouri River

Preservation of a greenway along the corridor may be recommended as part of the planning for this study. Additionally, as this project develops in conjunction with a NEPA document, a biological report would typically be prepared to more fully identify the existing conditions and potential impacts to the natural environment.

3.3.7. Human Environment

The human environment constitutes social impacts, relocations, economics, visual/aesthetics considerations, and noise.

3.3.7.1. Social Impacts

By definition, social impacts affect the quality of life for residents within the study area. A discussion of social impacts could address community cohesion, traffic safety, pedestrian and bicyclists, travel pattern and accessibility, and impacts to school districts, churches, and businesses.

The *Northern Bridge Corridor Study* will have some social impacts on the residents of the area. Community cohesion, travel pattern and accessibility, and pedestrian and bicyclist facilities may improve with the proposed roadway and bridge. There may be a positive impact on residences and businesses as well, due to improved accessibility of emergency vehicles. Potential adverse impacts may also pertain to community cohesion if intact neighborhoods or homes are bisected, joined, and/or isolated by a future river crossing and roadway. The beltway has potential to open the northern area of Bismarck and Mandan to more development, including residential and small commercial (i.e. gas stations), this also may be an adverse social impact. Potential social impacts resulting from this project would be fully disclosed in the NEPA document.

3.3.7.2. Relocations

The "Uniform Act" or Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, and amendments, provide important protections and assistance for people affected by federally funded projects which, although designed to benefit the public

as a whole, may result in acquisition of private property and displacement of people from their homes, businesses, or farms.

Alternative B may require 4–6 relocations (dependent on which Option is chosen). The relocations consist of residents and a business.

Alternative D may require no relocations.

Houses and/or businesses that may experience relocation could be compensated under the federal guidelines of the Uniform Act during relocation or could simply be purchased when they are offered for sale. Others may experience temporary or long-term positive economic impacts from the same activities.

3.3.7.3. Visual/Aesthetic Impacts

Visual impacts involve the viewer's response to a resource change and the degree of change or influence an action or modification has on a view, scenic resource, or man-made feature. The extent of potential visual contrast/compatibility affects with adjacent landforms and land uses are usually addressed from two vantage points: the roadway user traversing the system and those looking to the roadway from outside the system. As this project proceeds, planning may include natural barriers such as trees lining the highway and a context sensitive design for the structure and roadway.

3.3.7.4. Noise

Thresholds have been developed to establish when traffic noise generated from a federally funded project is considered not only an annoyance, but an impact. The United States Code of Federal Regulations Part 772 (23 CFR 772), *Procedures for Abatement of Highway Traffic Noise and Construction Noise,* establishes standards for mitigating traffic noise. The North Dakota Department of Transportation has issued the *Traffic Noise Analysis and Abatement Guidelines* as a supplement to 23 CFR 772. Federal Highway Administration's *Highway Traffic Noise Analysis and Abatement Policy and Guidance* provides policies and guidance for analysis and abatement of traffic noise.

The Federal Highway Administration has established noise abatement criteria levels, which are defined as absolute sound levels where abatement measures must be considered. A traffic noise impact occurs when the predicted levels approach or exceed the noise abatement criteria levels, or when predicted traffic noise levels substantially exceed the existing noise levels, even when predicted levels may not exceed the noise abatement criteria levels. In other words, traffic noise impacts can occur under either of two separate conditions: (1) when noise levels are unacceptably high (absolute level), or (2) when a proposed project would substantially increase the existing noise environment.

The NEPA document would analyze noise levels per the criteria set forth by federal regulation, the North Dakota Department of Transportation, and the Federal Highway Administration.

Abatement measures may include noise barriers and/or pavement specifications to minimize noise. An economic analysis is often used to determine whether the abatement measures are appropriate for the range of benefits provided.

3.4. Public Concerns

3.4.1. Public Issues Survey

A public issues survey was developed for the first round of public input meetings to analyze what issues were important to the public and to help identify the different categories of concern. The goal of the public issues survey was to help identify concerns of the proposed project from the public and provide the BMMPO and each jurisdiction a clear picture of the concerns. Identifying the public concerns of a project in the planning stages is key for future project development, as well as key to the action plan for preserving the corridor.

The public determined if a category was *very important, moderately important, not important, moderately unimportant,* or *very unimportant* to them individually. The survey included nine categories and a description of each:

1. **Minimizing Total Costs**—A new river crossing may cost $30 million to over $50 million. A longer bridge costs more than a shorter bridge. A short river crossing may have more right-of way costs in the form of relocating several homes, but may save many millions of dollars in construction cost. In the same way, a shorter approach roadway minimizes roadway construction cost. Please rate the importance of minimizing total cost (construction cost + right of way cost).
2. **User Costs**—A longer route to where you are going will have higher vehicle and time costs than a shorter route. For example, a 2-mile longer route with 10,000 vehicles per day would consume 1000 more gallons of fuel per day if the average fuel mileage was 20 miles per gallon. A weekday commuter on that 2-mile longer route would drive 1000 more miles annually. Note that total vehicle operating costs include more than fuel, but also include items such as tire wear, maintenance, and depreciation. An even longer route without a new river crossing would have an even greater impact. Please rate the importance of minimizing user costs.
3. **Right-of-Way Impacts**—Right-of-way impacts include the acquisition of real estate, and/or affecting the value of remaining real estate such as reducing the customer parking for a business. Right-of-way impacts to existing developments are typically addressed by paying fair market value for the right-of-way. The

right-of-way impacts affect not only the total project cost, but may also affect the public acceptance of a particular alternative even though it may have a lower total project cost. Please rate the importance of minimizing right-of-way impacts.

4. **Social Impacts**—Social impacts include changes in neighborhoods, "quality of life", or community unity for various groups and individuals in the proposed area. The changes may be positive or negative, and may include splitting neighborhoods, generating new development, or changing development patterns, connecting/separating residents from community facilities, or enhancing/detracting from the quality of a location. Please rate the importance of minimizing social impacts.

5. **Aesthetics**—Aesthetics considers the view from the project area; it also includes the residents' view of the area. Aesthetics may include landscaping to enhance or screen the views, design quality, art, and architecture in the project area. Please rate the importance of minimizing aesthetic impacts.

6. **Natural Resources**—Some examples of natural resources include wetlands, air and water quality, threatened and endangered species, and cultural resources. Analyzing the natural and cultural resources plays a major role in determining the different alternatives. Please rate the importance of minimizing natural resource impacts.

7. **Noise**—Noise is often a concern when new roadways are proposed. The increase or decrease of noise for developed and undeveloped land needs to be considered. Gathering information on noise sensitive areas, such as, churches and schools is also essential for developing alternatives. Please rate the importance of minimizing noise impacts.

8. **Safety**—Safety is often a concern for motorists and non-motorists. Safety impacts can cover anywhere from design of the roadway and bridge to intersections, or railroad crossings. Safety also includes changes in emergency response time and pedestrian facilities. Please rate the importance of minimizing safety impacts.

9. **Mobility/Access**—Mobility/Access is a concern with vehicle access to businesses, public services, and other facilities. Positive or negative changes in mobility/access with this project, creating additional access may increase access to jobs. Mobility/Access also includes public transportation services and non-motorist accesses. Please rate the importance of minimizing mobility/access impacts.

The results were based on 40 surveys received. The survey was handed out at the two public input meetings and at different presentations given on the corridor study. The average percentile was then taken for each category/question from the survey. Pie charts were created to feature each category/question and the percentage of responses received

from *no answer, very important, moderately important, not important, moderately unimportant,* and *very important*. The *no answer* is due to either lack of an answer to one of the questions or filling in two responses for the category/question (i.e. marking both *very important* and *moderately unimportant* for Question 1).

The question/categories with the highest percentage that was very important to the public are:

- Safety 65%
- Noise 60%
- Social 54%
- Aesthetics 54%
- Right-of-way Impacts 52%

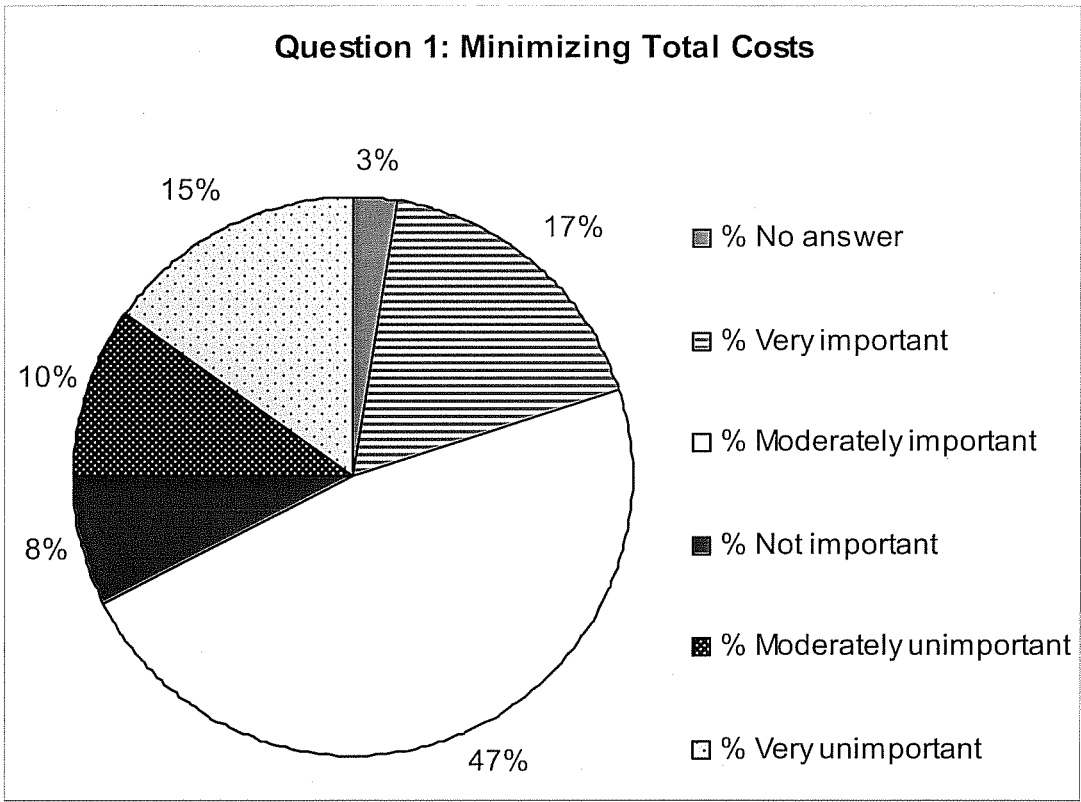
The question/categories with the highest percentage that was *moderately important* to the public are:

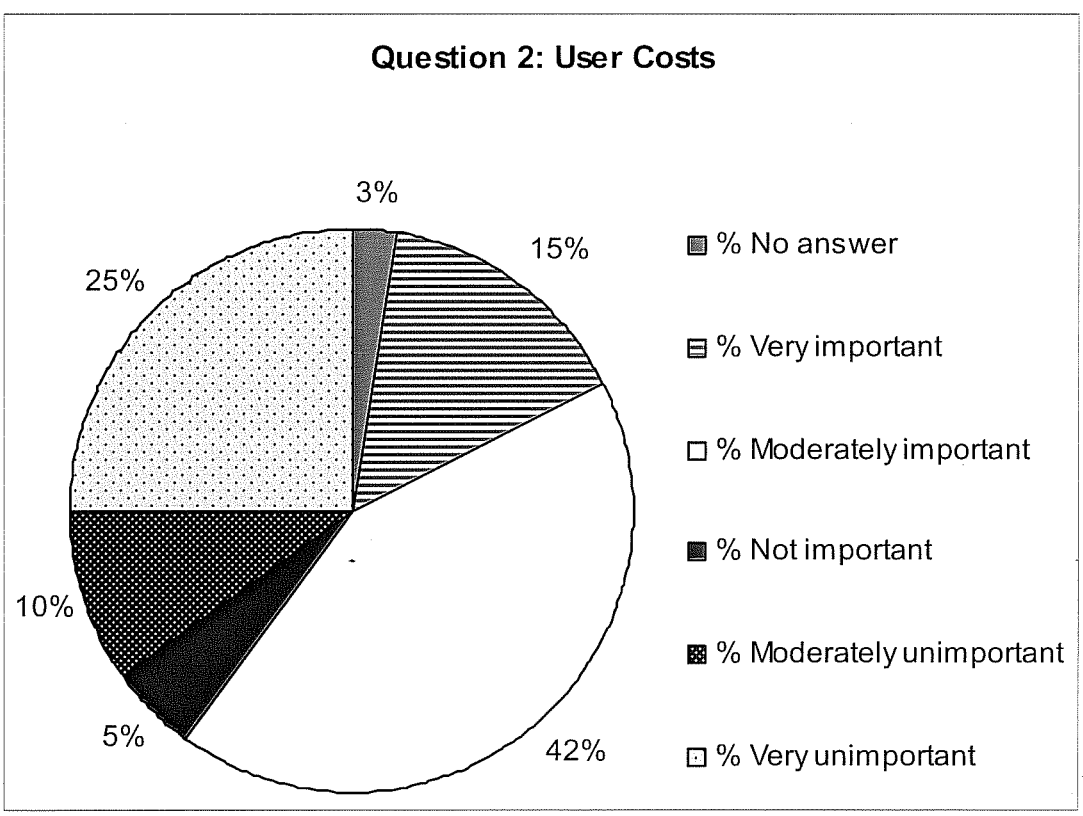
- Mobility/Access 57%
- Natural Resources 52%
- Minimizing Total Costs 47%
- User Costs 42%

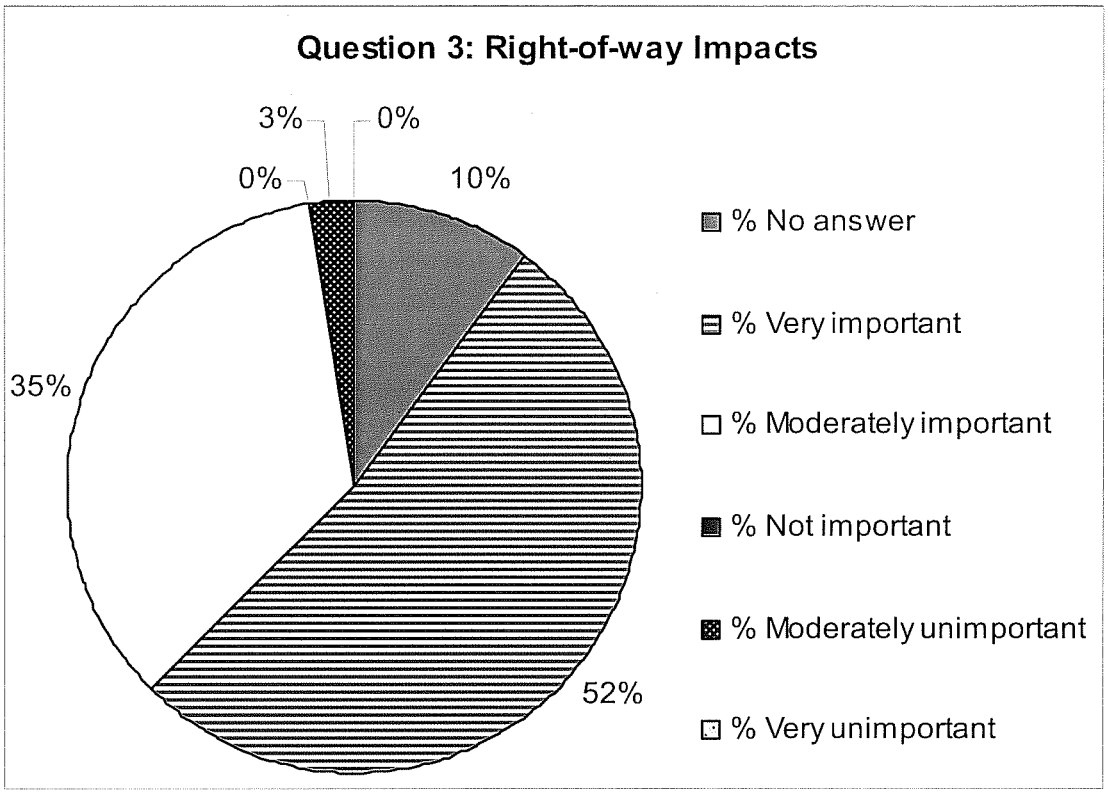
The question/categories with the highest percentage that was *very unimportant* to the public are:

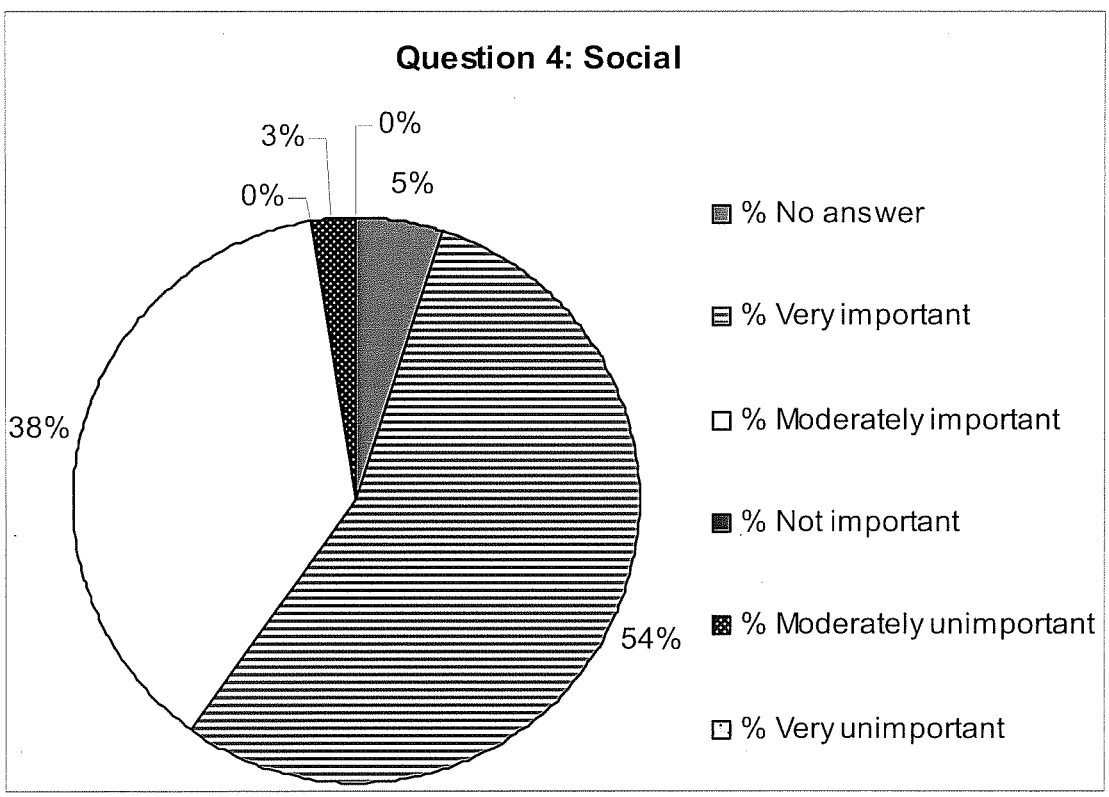
- User Costs 25%
- Minimizing Total Costs 15%
- Mobility/Access 10%

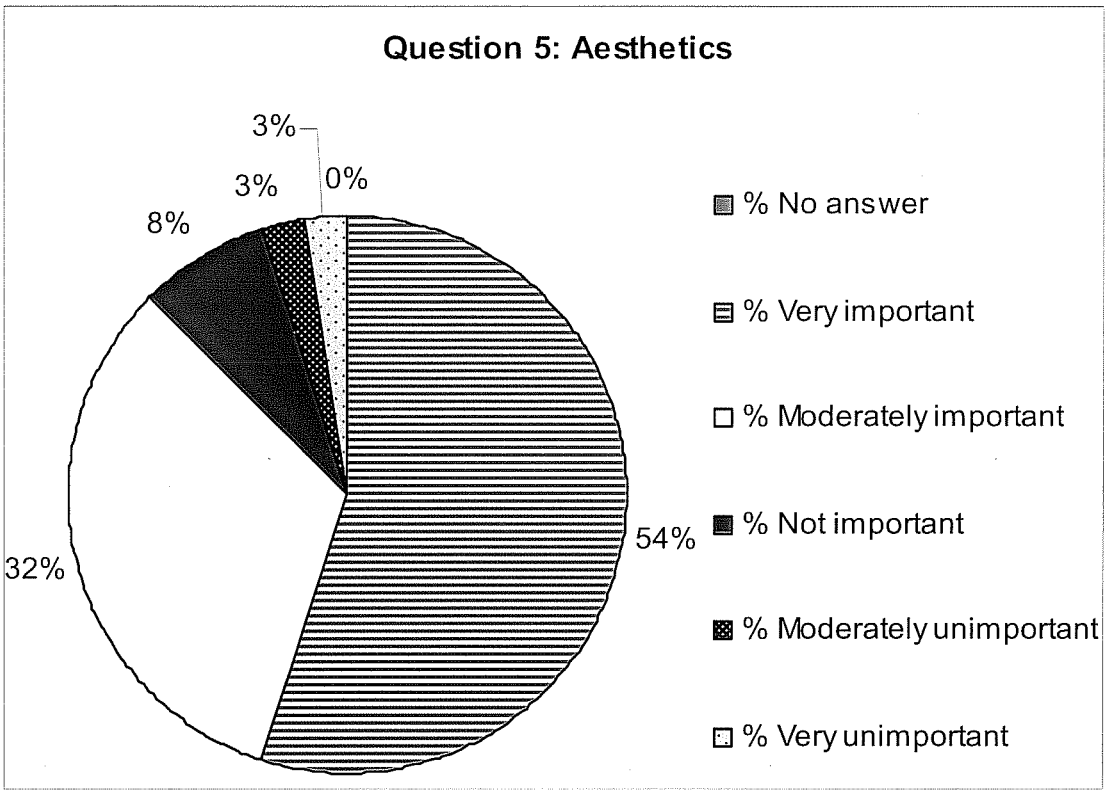
These percentages are graphically depicted in the charts on the following pages.

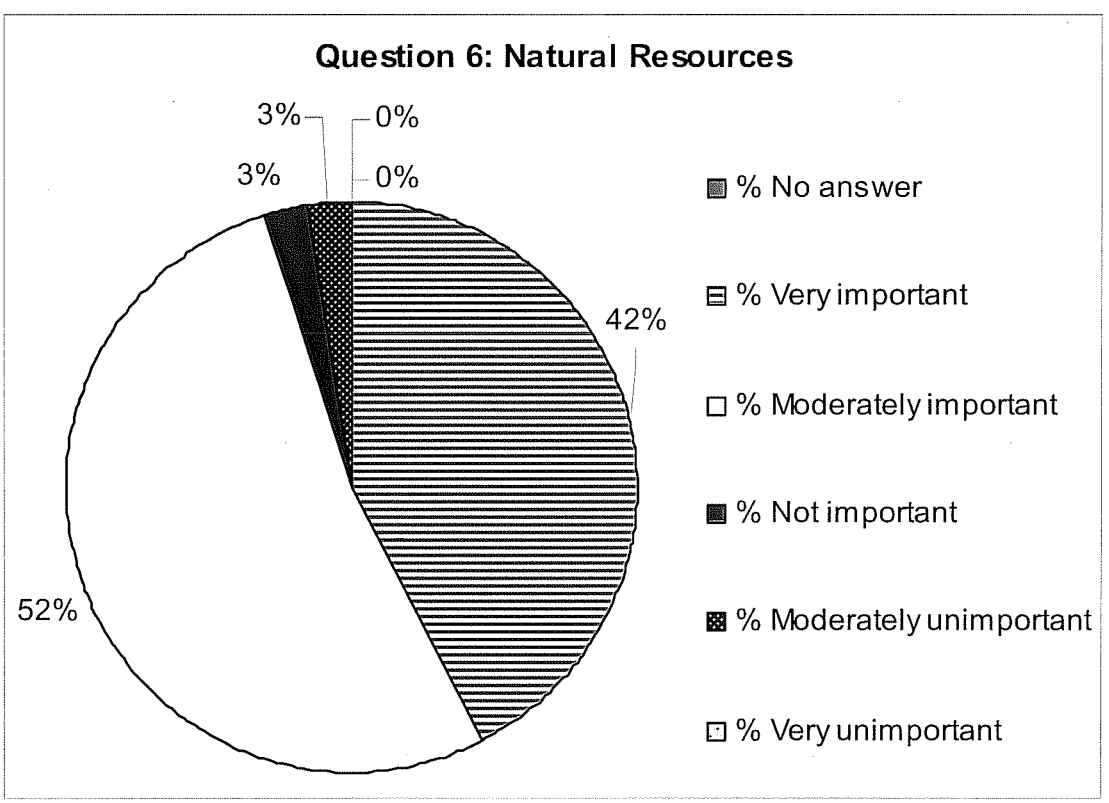

Question 1: Minimizing Total Costs
3%
17%
47%
8%
10%
15%
% No answer
% Very important
% Moderately important
% Not important
% Moderately unimportant
% Very unimportant

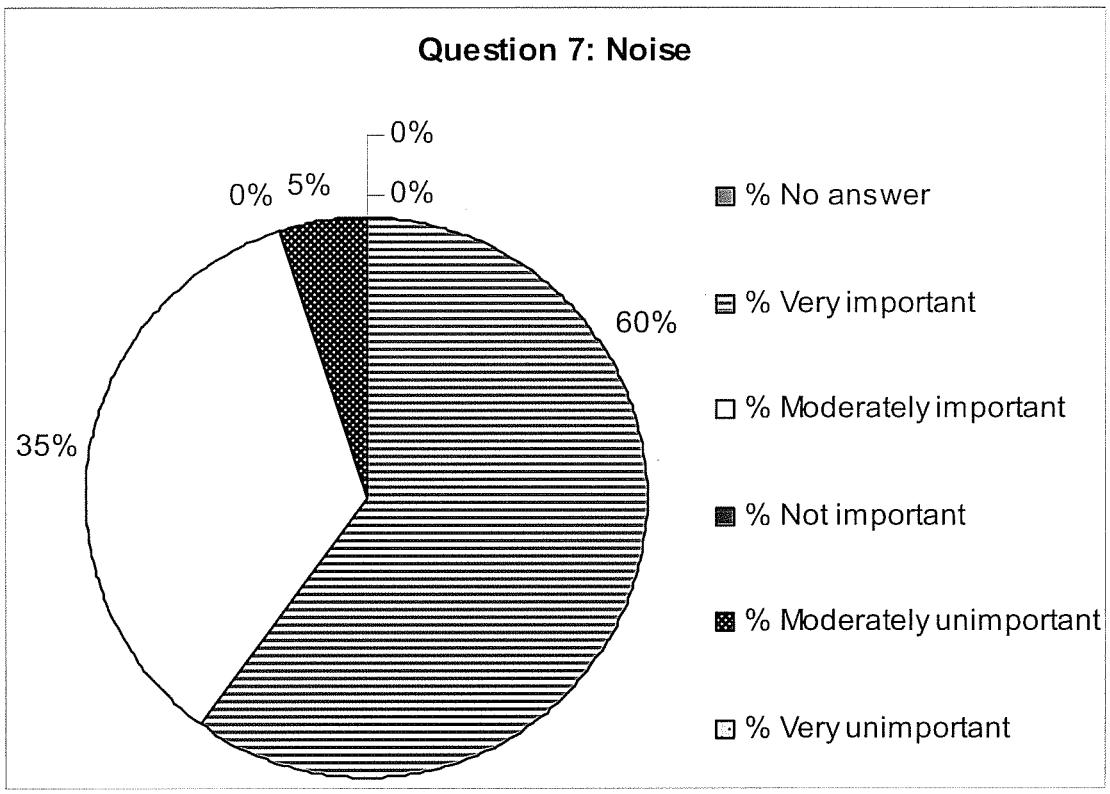

Question 2: User Costs
3%
15%
42%
5%
10%
25%
% No answer
% Very important
% Moderately important
% Not important
% Moderately unimportant
% Very unimportant

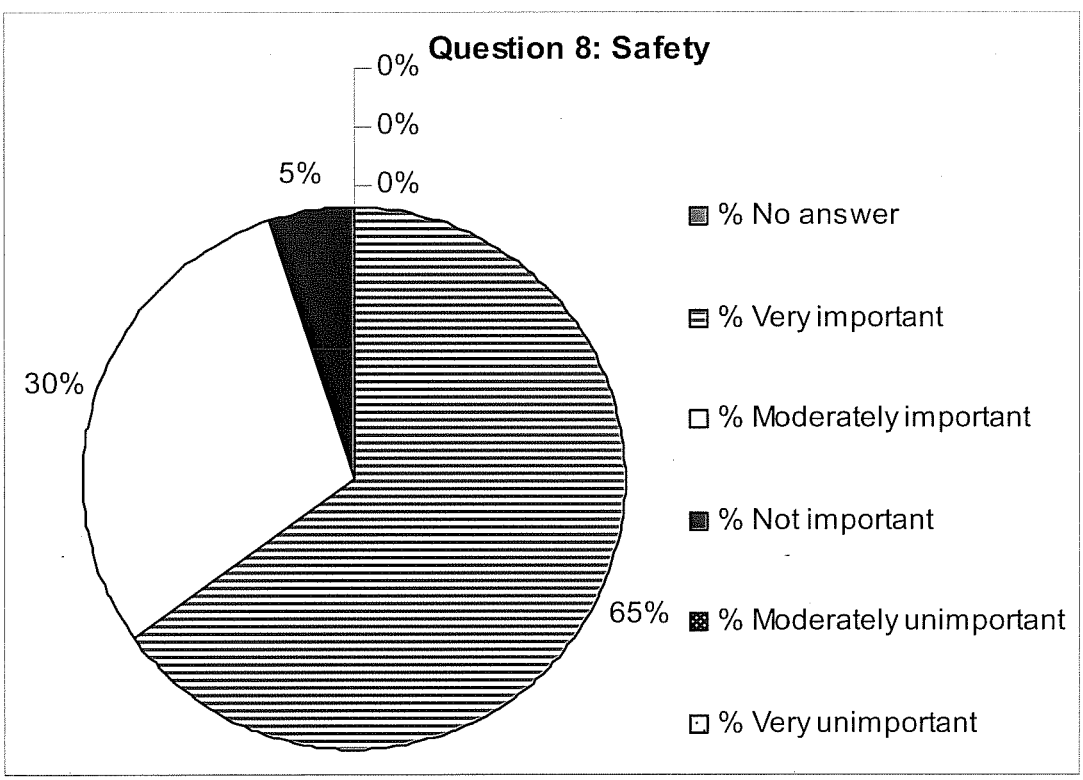

Question 3: Right-of-way Impacts
3%
0%
0%
10%
35%
52%
% No answer
% Very important
% Moderately important
% Not important
% Moderately unimportant
% Very unimportant

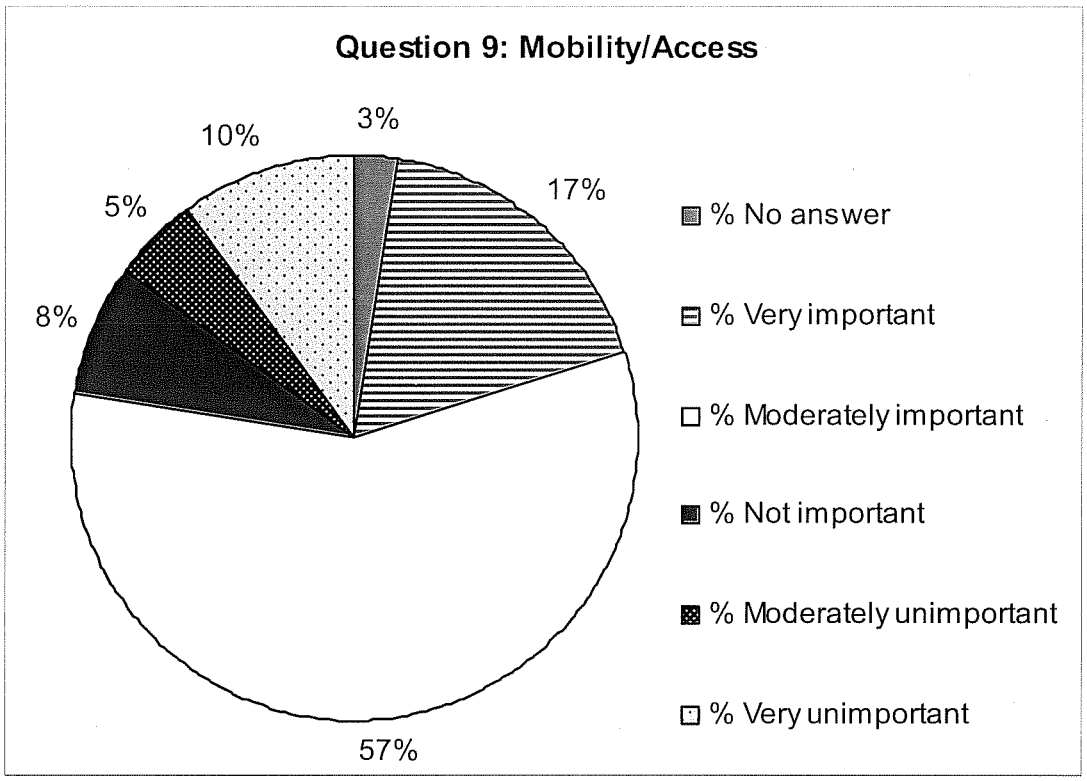

Question 4: Social
3%
0%
0%
5%
38%
54%
% No answer
% Very important
% Moderately important
% Not important
% Moderately unimportant
% Very unimportant


Question 5: Aesthetics
3%
0%
3%
8%
54%
32%
% No answer
% Very important
% Moderately important
% Not important
% Moderately unimportant
% Very unimimportant


Question 6: Natural Resources
3%
0%
3%
0%
42%
52%
% No answer
% Very important
% Moderately important
% Not important
% Moderately unimportant
% Very unimportant


Question 7: Noise
0%
0%
0%
5%
60%
35%
% No answer
% Very important
% Moderately important
% Not important
% Moderately unimportant
% Very unimportant


Question 8: Safety
0%
0%
0%
5%
30%
65%
% No answer
% Very important
% Moderately important
% Not important
% Moderately unimportant
% Very unimportant



3.4.2. Conclusion

The public issues survey categories and the overall formal comments received coincided with the impact categories the public was concerned with. The public issues survey is a more focused account of certain categories of areas of concern. The public issues survey serves as another step in trying to gather and analyze public comment.

3.5. Comments and Coordination

3.5.1. Coordination

As part of the coordination process, numerous federal, state, and local agencies were contacted to determine the project's consistency with current and proposed plans, programs, and policies. Their instructions were incorporated into the *Northern Bridge Corridor Study* where appropriate. ***Copies of the agency responses are found in Volume II, Appendix A, along with the mailing list, solicitation letters, and other materials sent to local, state, and federal agencies.***

3.5.2. Meeting Notifications

In an effort to target the general public, a legal display advertisement announcing the public input meeting was published in the Mandan News and the Bismarck Tribune two weeks

prior to the meeting. A public service announcement was sent to all local news media five days prior to the meetings. Adjacent landowners throughout the corridor were sent a letter announcing the public input meetings prior to the meetings. ***A copy of the landowner letter and database is located in Volume II, Appendix A. A copy of the advertisement and public service announcement is located in Volume II, Appendix B.***

3.5.3. Public Input Meetings

Two public input meetings were held regarding this project. The first meeting was held December 11, 2003, from 5:30–7:30 p.m. at Mandan City Hall in Mandan, North Dakota. The second meeting was held on December 15, 2003, from 5:30–7:30 p.m. at Bismarck State College, Prairie Room in Bismarck, North Dakota. At both meetings, a registration table at the entrance provided sign-in sheets, comment forms, a public issue survey, Frequently Asked Questions, and corridor maps. The purpose of the meetings was to provide the same preliminary information to the public in both cities and counties regarding the proposed project and a description of the proposed alignments, as well as to identify public concerns and comments regarding possible alternatives. ***A copy of the sign-in sheets, public issues survey, FAQ's, evaluation forms, and the location map are located in Volume II, Appendix B.***

3.5.4. Participation

There were 47 individuals registered at the first public input meeting held in Mandan. Federal, state, and local business representatives were present in addition to local citizens. A representative from the Mandan News and the Bismarck Tribune attended the public meeting and provided subsequent news coverage. At the Bismarck public input meeting, 56 people were registered, which included federal, state, county, and local citizens.

This project had a high amount of public input and coverage through the news media. Approximately 44 formal comments, 40 public issues surveys, and 25 evaluation forms were received; in addition, 32 telephone conversations were summarized with businesses and the public. ***A copy of the public comments, public issue survey responses, evaluation form responses, and telephone conversations are located in Volume II, Appendix C. Copies of the newspaper articles and editorials are located in Volume II, Appendix E.***

3.5.5. Citizens Group

As a result of the public input meetings and the project, an informal citizens group formed the "Save Our Valley Committee" (Committee). The Committee wanted to "re-direct this initiative" of the *Northern Bridge Corridor Study*. The Committee organized a community meeting, on January 6, 2004 at the Good Shepherd Lutheran Church, which was attended by BMMPO members and Kadrmas, Lee & Jackson representatives. The Committee believes, "the proposed Northern Bridge will destroy our: Quality of Life, Property Value, Natural Environment, Peace and Tranquility, and Neighborhoods." ***A copy of the handouts from the***

Committee meeting and other handouts from the Committee are located in Volume II, Appendix F.

The Committee also presented their views at the VFW Wednesday Breakfast Club on March 10, 2004. *Copies of the handouts from this presentation are located in Volume II, Appendix F.*

3.5.6. Other Meetings and Communications

Each month, since July 2003, representatives of Kadrmas, Lee & Jackson attended the Metropolitan Planning Organization (MPO) Technical Advisory Committee (TAC) and Policy Board meetings. These meetings were frequently attended by the public and the Committee. The BMMPO Policy Board typically opened the table for input from these attendees. *Copies of the memos for the MPO TAC and Policy Board are located in Volume II, Appendix D.*

Other meetings and presentations were held in conjunction with this corridor study, including:

- R. M. Heskett Power Plant, MDU
- Steve McCormick, Misty Waters Subdivision
- Tesoro Refinery
- VFW Breakfast Club
- North Dakota Department of Transportation
- Transportation Committee, Bismarck-Mandan Chamber of Commerce
- Public, home and landowners, and affected parties
- City and county officials

Other communication included multiple conversations with the Bismarck Tribune and other media sources.

3.5.7. Summary

In summary, this project received much input from the private sector, especially from parties that may be directly impacted. This information was generated to identify issues within the proposed project and to help evaluate information, including public involvement for the proposed project. Only formal written comments were analyzed based on their content, and these six categories emerged after analysis:

- Alternatives
- Natural Environment
- Public Expressed Alternatives
- Purpose & Need
- Social
- Economics

3.5.7.1. Alternatives

Public comments regarding alternatives were based on the alternatives presented at the first round of public input meetings. These comments are summarized below:

- Three formal comments supported Alternative B (north route)
- Two formal comments opposed Alternative B
- Two formal comments supported Alternative D (south route)
- One comment opposed Alternative C (not further analyzed)
- Six comments supported the beltway concept and/or thought the study was "good planning"
- Twenty-one comments opposed the corridor and/or opposed the beltway concept
- The Bismarck Tribune endorsed the study and supported Alternative B
- Letters to the Bismarck Tribune Editor both supported and opposed the corridor study, with landowners within the study area typically opposed to the study

3.5.7.2. Natural Environment

Eighteen of the 44 formal comments received addressed concerns regarding the natural environment, in particular a concern that the development of this project may harm natural areas in Burleigh and Morton Counties. Comments relating to the natural environment are summarized below:

- Archaeology was not complete nor accurate
- Missouri River habitat would be destroyed
- Wildlife would be adversely impacted by the future roadway and bridge
- Threatened and endangered species within the area would be adversely impacted
- Noise would increase in this extraterritorial area if the roadway and bridge are built
- The overall environment would be impacted

3.5.7.3. Public Expressed Alternatives

Twenty-two public comments included suggestions for the following alternatives:

- Move the proposed bridge alignment north of the study area
- Add extra lanes to Interstate 94 to support traffic and truck traffic
- Additional north-south routes in this area
- Take Hoge Island Park land north of the study area and use this as an alternative

3.5.7.4. Purpose and Need

Twenty-one public comments were received regarding the purpose and need of the corridor study, as summarized below:

- There is no problem with east to west traffic.
- There is no need for another highway.
- The other bridges currently across the Missouri River in this area will hold future capacity; therefore, this project is not needed.
- Future population projections for the cities of Bismarck and Mandan and Burleigh and Morton counties do not constitute having another roadway or bridge; traffic projections for the above four entities do not constitute another roadway or bridge.
- Because of the growth in the extraterritorial areas of Bismarck, Mandan, Burleigh County, and Morton County, a future bridge and roadway may be needed.
- This project is an example of good planning and forethought before problems arise in this area.
- This proposed roadway and bridge will be utilized as a truck bypass, and trucks should not be entering into residential areas. The trucking community would not utilize the proposed roadway and bridge, as the majority of the trucking is from east of Bismarck to north of Bismarck.

3.5.7.5. Social

The social category represents the "quality of life" for residents in the project area. Seventeen comments addressed the following issues:

- Quality of life
- Increase of crime
- Threaten lawsuits if this project goes forth to project development

3.5.7.6. Economics

Of the 44 formal comments received, 22 were concerned with the following issues related to economics:

- Impacts to property values
- Compensation for homeowners and landowners
- The cost of a future bridge and roadway
- Negative impact to downtown Mandan

3.6. Corridor Vision

The *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan* recommended that the regional beltway be planned as a principal arterial with an ultimate design of a four-lane divided rural roadway with a parallel multi-use trail. The transportation plan also recommended 250 feet of right-of-way width be reserved for the future beltway in this configuration. The BMMPO would ultimately like the NDDOT to designate the beltway (or portions of it) as a state highway. NDDOT design guidelines for a rural four-lane divided principal arterial include a 70 mph design speed. However, at this time the NDDOT will not commit to taking it over as a state highway now or in the future. It is anticipated that portions, if not all, of the regional beltway will be surrounded by urban development at some time in the future. Portions of the beltway follow existing roadway alignments where existing developments already enjoy direct access to those roadways. The concept of a limited access facility like the interstate, with access only at interchanges, would require development of frontage road systems, overpasses, and interchanges to accommodate the existing road system while eliminating direct access to the beltway. A limited access facility similar to the interstate system is not recommended for the beltway due to the high impacts and costs associated with the access control.

The BMMPO Technical Advisory Committee (TAC) initially recommended a 70 mph design speed for the regional beltway to be consistent with NDDOT design guidelines. However, the NDDOT recommended a 55 mph design speed would be more appropriate for an urban principal arterial, and the BMMPO subsequently agreed to use the 55 mph design speed given the urban character and steep terrain of the valley. The 55 mph design speed also gives more flexibility in setting roadway alignments, and the roadway grades could more closely follow existing terrain.

The BMMPO TAC also considered the appropriateness of a four-lane divided rural roadway section, since the regional beltway will likely be surrounded by urban development at some time in the future, and the impacts of a 250-foot-wide right-of-way may be too great in some areas. The BMMPO TAC recommended the corridor study strive for 200-foot-wide right-of-way to accommodate a five-lane undivided rural roadway. It is envisioned that as portions of the beltway become surrounded by urban development, the corridor could be recon-

structed with an urban section (underground storm sewer) which would allow more lanes, as needed, by eliminating the ditch section. Note that the regional beltway is conceived to begin as a two-lane rural roadway and evolve as needs dictate. ***A typical section of the five-lane rural roadway section is shown in Figure 3.1 on the following page.***

The access control plan for the corridor is to be consistent with a principal arterial's function—emphasizing mobility, not access. In that regard, access would be limited to intersections of other roadways. Existing access driveways should be minimized as much as possible through the use of frontage or backage roads and consolidation of driveways.

Opportunities for buffer zones between existing development and the beltway should be identified where practical. The buffer zones would allow for green space or "parkway" development to function as visual and noise buffers.

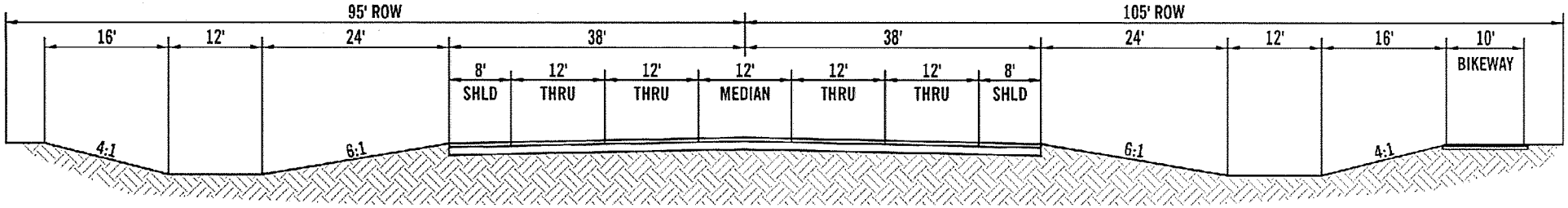


Figure 3.1., Proposed Typical Section

Chapter Four
Corridor Alternatives and Engineering Analysis

4.1. Introduction

This chapter provides information on the development and evaluation of corridor alternatives, including Alternative A—the Do Nothing Alternative and three alternative river crossing locations and associated approach roadway alignments.

The study area was based upon the location of the proposed regional beltway identified in the *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan*. The alternatives were evaluated based on the vision of the corridor presented in Chapter Three. ***The study area and Fringe Area Road Master Plan are illustrated in Exhibit 4.1.***

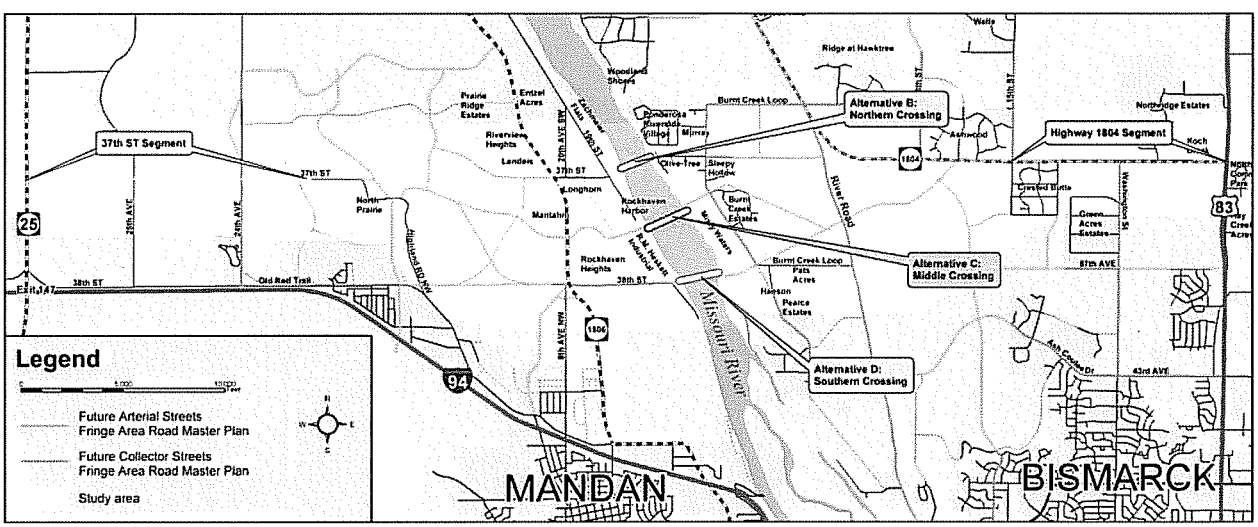


Exhibit 4.1., Study Area and Fringe Area Road Master Plan *(full-size located in the Exhibits Appendix)*

For the purpose of this study, the segment along 37th Street from ND Highway 25 to just west of Highland Road (in Morton County), and along ND Highway 1804 from 15th Street to US Highway 83 (in Burleigh County) would follow the existing roadway centerlines. A 55 mph design speed would require regrading 37th Street, while ND Highway 1804 has already been constructed and posted for a 55 mph speed limit. To accommodate the ultimate five-lane roadway section, ND Highway 1804 would need approximately 25 feet of additional right-of-way on either side of the existing slope easements (which vary) and right-of-way (currently 150 feet total width). Right-of-way needs for 37th Street vary due to the need for slope easements in some locations, but no homes would be relocated. The *Final Northern Bridge Corridor Study* will include a strip map indicating specific right-of-way needs throughout the chosen corridor. ***See Exhibit 4.2 on the following page.***

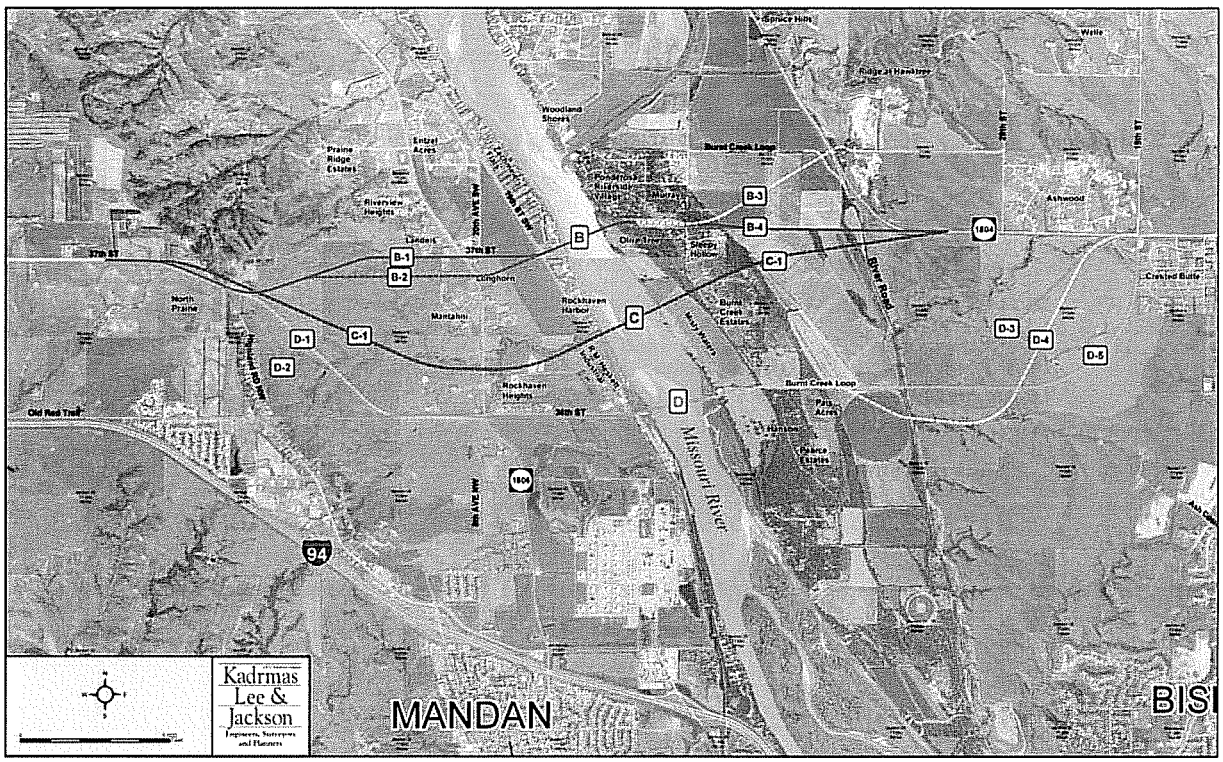


Exhibit 4.2., Project Alternatives and Routes *(full-size located in the Exhibits Appendix)*

4.2. Alternative A

Alternative A is the Do Nothing Alternative. This alternative would ignore the need to plan for a beltway to serve future growth in the northern Bismarck-Mandan area, which is contrary to the recommendations identified in the *Bismarck-Mandan Metropolitan Area Long Range Transportation Plan, Fringe Area Road Master Plan,* and *City of Bismarck Growth Management Plan.* If the population of the Bismarck-Mandan fringe area continues to grow as projected, there will be a transportation demand for a continuous principal arterial across the metropolitan planning area and Missouri River north of the interstate in future decades. If no continuous corridor is preserved, each county will have an opportunity to preserve other minor arterial and collector roads as identified in the *Fringe Area Road Master Plan.* However, it is highly unlikely that an undeveloped continuous principal arterial corridor will exist in the study area north of Bismarck-Mandan by the time construction of a new river crossing is warranted.

Should the Do Nothing Alternative be selected, a future bridge could possibly be built on the alignment of Alternative D (immediately south of the R.M. Heskett Power Plant) providing a connection between ND Highway 1806 and River Road, since there are already existing roads leading up to the river at that location. However, that river crossing would lack continuity and connections to areas north and west of Mandan, and northeast of River Road to ND Highway 1804. The lack of continuity would reduce the utility of the corridor for longer trips and ultimately reduce the value of the infrastructure investment.

Future identification of a principal arterial corridor and right-of-way acquisition would likely be more controversial, more costly, and would result in greater social impacts (such as relocations, traffic noise impacts, etc.) than they would today. The Do Nothing Alternative would only postpone the inevitable.

4.3. Alternative B

Alternative B includes a corridor in the northern portion of the project study area. This corridor would begin at the intersection of ND State Highway 25 and 37 St. NW (NW Corner of Section 11, T139N, R82W) in Morton County and follow the section line east until it intersects Highland Road. The alignment would then curve south to avoid historic and residential properties located near the section line. The route would wind its way eastward through the valley until meeting up again with 37th Street NW near ND Highway 1806. The route would then cross the river through a Morton County riverfront home and angle northeast until it reaches the north side of Olive Tree Drive in Burleigh County. The Morton County riverfront home lot is wider than the required amount of right-of-way needed, which could allow for greenway development as a buffer to adjacent properties.

Olive Tree Drive is within the Olive Tree Subdivision, but the subdivision has not yet been developed. The route would pass through the north row of lots in Olive Tree Subdivision, requiring the relocation of an existing cabin and home. Acquisition of the north row of subdivision lots would provide additional right-of-way that could be used for creation of a greenway buffer between the corridor and the adjacent Ponderosa Riverside Village Subdivision homes to the north. The corridor alignment would leave one intact riverfront lot north of the bridge, which could be accessed underneath the bridge. Olive Tree Drive within the Olive Tree Subdivision would function as a frontage road south of the corridor, providing access to adjacent residential lots. Two additional undeveloped Olive Tree lots would be required to provide a connection of the south frontage road to Burnt Creek Loop. A replat of the Olive Tree Subdivision would be required to make the necessary access revisions. ***Please refer to Exhibit 4.11. located in the Exhibits Appendix.***

Proceeding straight east along the north side of the section line, the corridor would relocate a home just east of Burnt Creek Loop. Acquisition of additional right-of-way (from the home to be relocated) would allow for creation of a greenway buffer between the corridor and the adjacent Sleepy Hollow Subdivision homes to the south. Proceeding eastward past Sleepy Hollow Subdivision, the route angles southward back to the section line, and then directly follows the undeveloped section line (71st Avenue NE) eastward to ND Highway 1804. The corridor then becomes ND Highway 1804 to the intersection of US Highway 83.

4.4. Horizontal Alignment Options for Alternative B: Routes B-1 through B-4

Four potential horizontal alignment options (Routes) have been identified for the Alternative B corridor; two options for each side of the Missouri River. Routes B-1 and B-2 are located in Morton County, and Routes B-3 and B-4 are located in Burleigh County. In addition, there are also options for major intersection alignments within each route. Therefore, the full corridor alignment of Alternative B would consist of one route option and associated intersection options from each county. Note that all route options of Alternative B would require relocation of a home on the river bank. Individual route options impact additional homes as detailed in the following option descriptions.

4.4.1. Morton County Options

- *Route B-1* would follow the section line along 37th Street SW on the south side of the Landeis subdivision. This route follows existing roadway right-of-way and would result in several residential and two commercial access driveways on the corridor. Additional right-of-way would be required along the existing road alignment. Shifting the roadway centerline south of the existing road would reduce relocations, yet still require the relocation of a home and the Central Dakota Humane Society. *There are two intersection options with Route B-1 shown in Exhibit 4.3.*

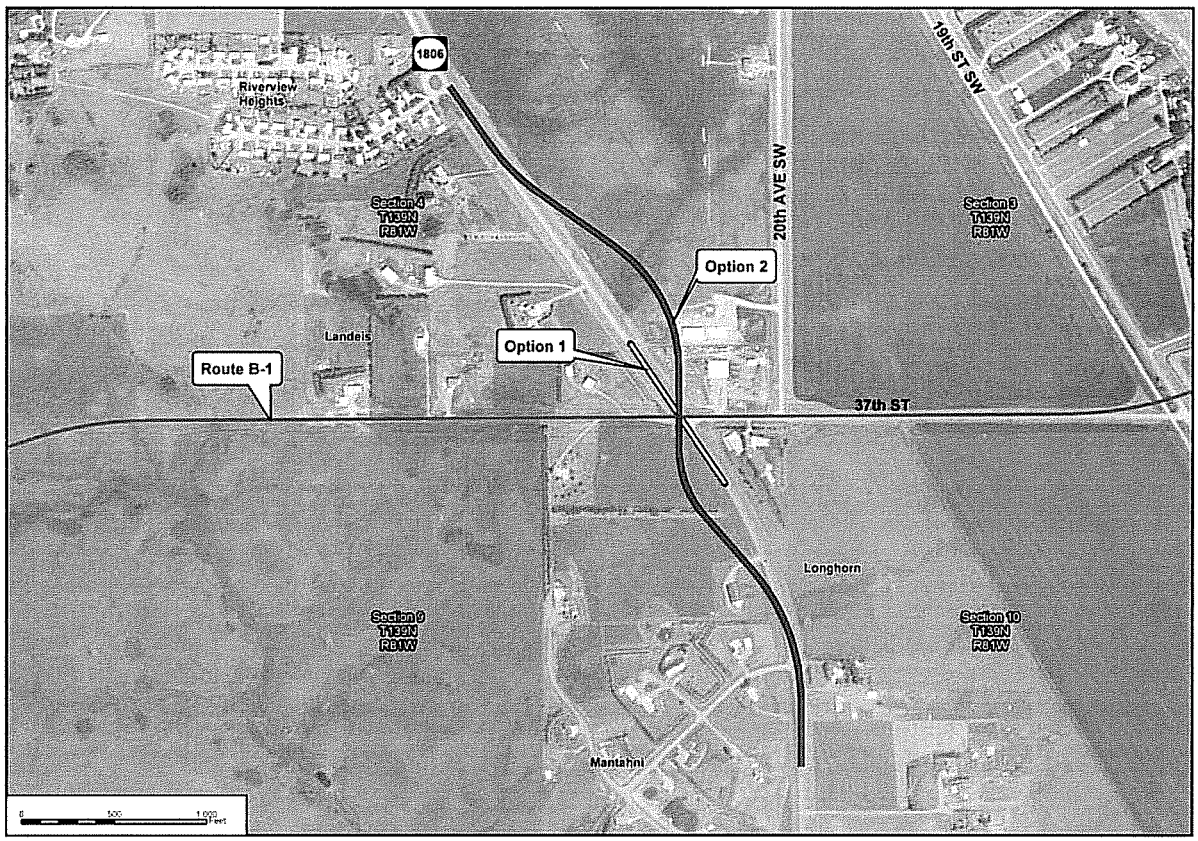


Exhibit 4.3., Route B-1 and ND Highway 1806 *(full-size located in the Exhibits Appendix)*

- **Option 1** (shown in yellow) relating to Route B-1 and the intersection of ND Highway 1806, would leave the highway in its current location with an intersection angle of approximately 60°. A 60° intersection skew is the maximum skew angle recommended by the AASHTO geometric design guide. This option would require the least amount of right-of-way and would have the fewest impacts, but would be built to the minimum design guidelines.
- **Option 2** (shown in red) relating to Route B-1 and the intersection of ND Highway 1806, would realign ND Highway 1806 to intersect with Alternative B at 90°. This would create the optimal angle of intersection, but would require right-of-way acquisition to realign the state highway. With this alignment, it is recommended the stop condition be placed on ND Highway 1806 because of the curves entering the intersection. An alternative realignment of Route B-1 to provide a 90° intersection with ND Highway 1806 would have required relocation of a business and/or residences, and was not carried forward as an option.

- *Route B-2* would be located south of and parallel to Route B-1, approximately 640 feet south of the section line. The route would bisect an occupied 16 acre rural residential lot, passing just south of a row of trees in the northeast corner of Section 9, T139N, R81W. *This route would have no access driveways on the corridor, and would intersect ND Highway 1806 at nearly a 90° intersection as shown on Exhibit 4.4.*

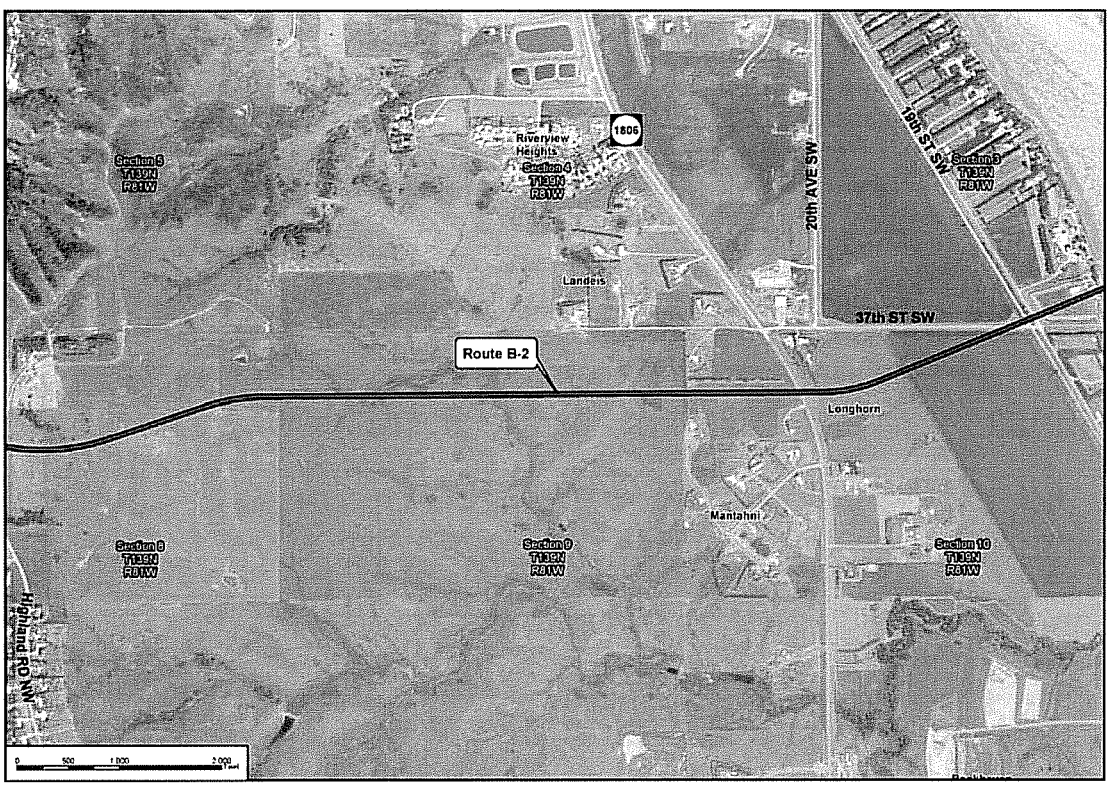


Exhibit 4.4., Route B-2 *(full-size located in the Exhibits Appendix)*

Routes	Advantages	Disadvantages
Morton County B-1 Option 1	• Follows more existing section line right-of-way • Maintains straight alignment of ND Highway 1806 through intersection	• Requires driveway access on route • Creates curve on road off the end of the bridge • Requires relocation of one 37th Street home and one riverbank home • Requires relocation of Central Dakota Humane Society • Maximum allowed skew for ND Highway 1806 intersection
Morton County B-1 Option 2	• Follows more existing section line right-of-way • Eliminates curve on road off the end of the bridge • Provides a 90° intersection with ND Highway 1806	• Requires driveway access on route • Creates curve on road off the end of the bridge • Requires relocation of one 37th Street home and one riverbank home • Requires relocation of Central Dakota Humane Society • Introduces curves on ND Highway 1806 at intersection
Morton County B-2	• Avoids realignment of ND Highway 1806 intersection • Intersects ND Highway 1806 with a 90° intersection • Fewer impacts to homes • No driveway access on route • Straighter alignment off the end of bridge	• Requires about half of the yard of a home or possible relocation, and relocation of one riverbank home • Less section line right-of-way used

4.4.2. Burleigh County Options

- *Route B-3* would angle northeast across Section 2, T139N, R81W to connect with ND Highway 1804 at the existing Burnt Creek Loop intersection. ***Burnt Creek Loop and River Road would be realigned to the west to create a 90° intersection with the route as shown in Exhibit 4.5.*** This route avoids the costs associated with the steep bluff east of River Road at the expense of roadway system continuity.

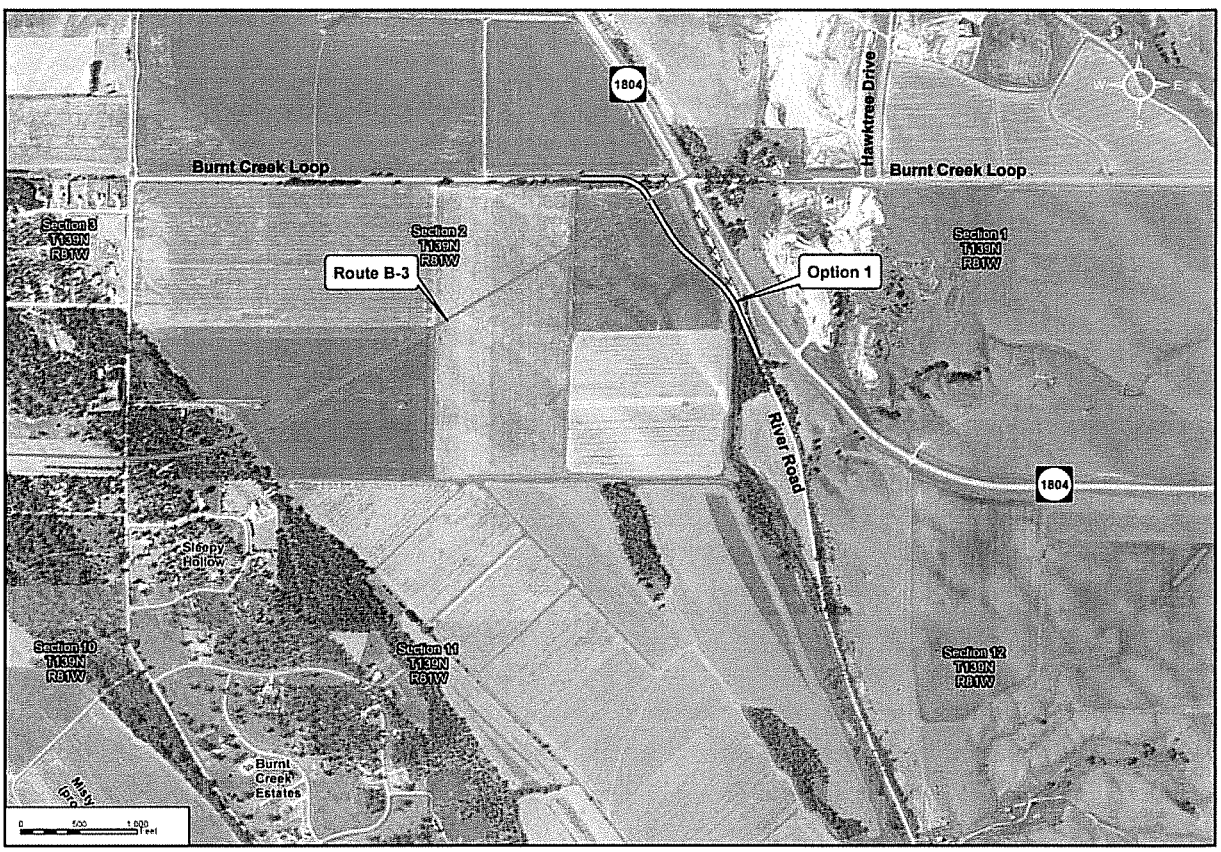


Exhibit 4.5., Route B-3 and ND Highway 1804 *(full-size located in the Exhibits Appendix)*

- *Route B-4* would generally follow the undeveloped section line already master planned to be a minor arterial (71st Avenue), climb the steep bluff east of River Road, and connect with ND Highway 1804. *There are two intersection options, shown in Exhibit 4.6.*

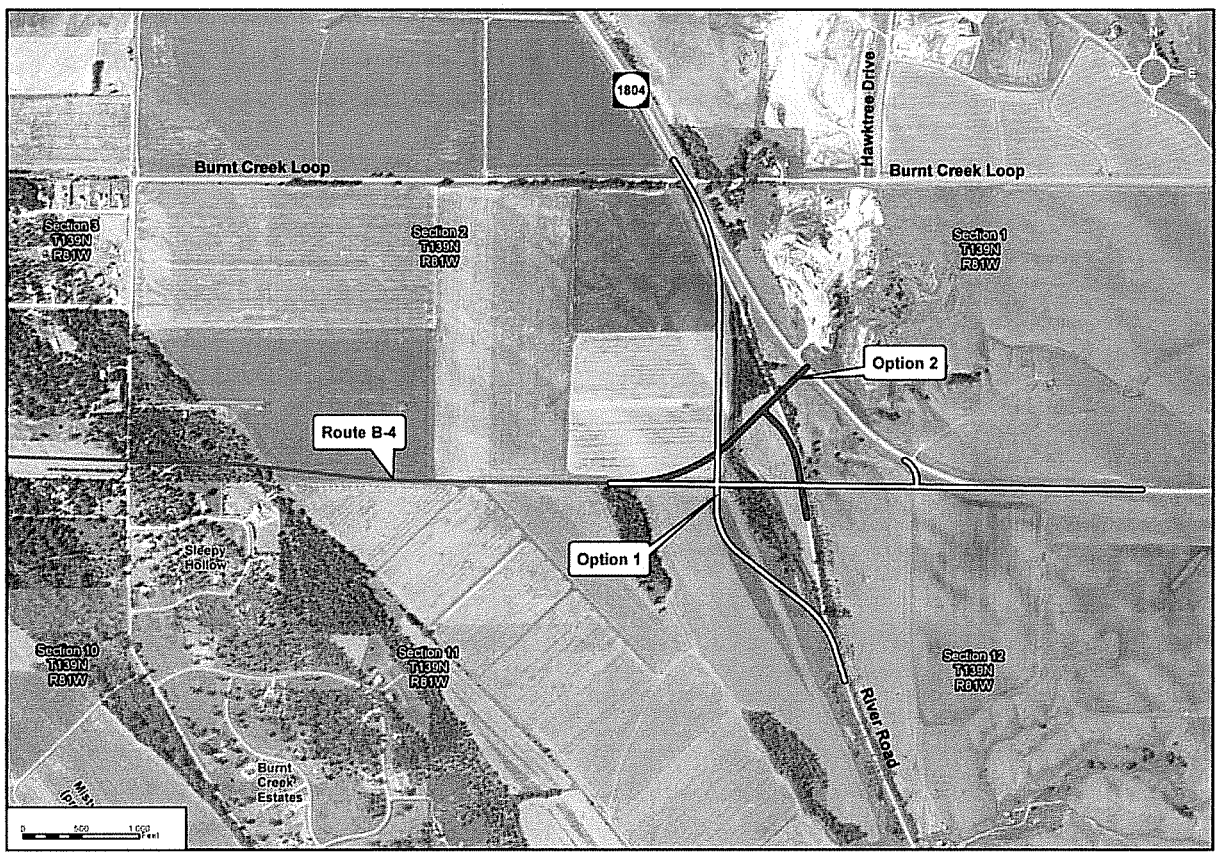


Exhibit 4.6., Route B-4 and ND Highway 1804 *(full-size located in the Exhibits Appendix)*

- **Option 1** (shown in yellow) would follow the section line and intersect directly with the east/west segment of ND Highway 1804. The north/south leg of ND Highway 1804 would be realigned west of River Road to allow a 90° intersection with Route B-4 below the high fills required for B-4 to traverse the bluff. The existing horizontal curve on ND Highway 1804 could be removed north of the existing gravel pit and used as a source for embankment material if needed. River Road south of Route B-4 would curve west to intersect with the north leg of ND Highway 1804, creating a 4-legged 90° intersection. River Road would be located west of the section line to avoid impacts to wetlands and the creek bed.
- **Option 2** (shown in red) would establish the intersection of ND Highway 1804 and Route B-4 at the tangent point of the horizontal curve on ND Highway 1804. River Road would curve to the west and intersect the corridor approximately 500 feet southwest of the new intersection on ND

Highway 1804. River Road would have to be raised to intersect Route B-4, which may also require raising the overhead high voltage transmission line. Further analysis of sight distance on the intersection with ND Highway 1804 is recommended to determine if any regrading of ND Highway 1804 is required.

Routes	Advantages	Disadvantages
Burleigh County B-3	• Avoids high bluff • Eliminates skewed and Y intersections at River Road, ND Highway 1804 and Burnt Creek Loop	• Requires relocation of River Road and Burnt Creek Loop. • Bisects irrigated agricultural field • Indirect route • Requires stop condition on beltway corridor • Does not utilize section line right-of-way
Burleigh County B-4 Option 1	• Direct straight route • Follows master planned minor arterial alignment • No stop condition on beltway corridor • No adjustment of high voltage transmission lines needed • Maintains continuity of north-south traffic from ND Highway 1804 to River Road	• Requires relocation of River Road and north-south approach of ND Highway 1804 • Creates stop condition on north-south movements of ND Highway 1804
Burleigh County B-4 Option 2	• More direct route than B-3 • Avoids relocation of River Road, ND Highway 1804 north-south, and Burnt Creek • Less roadway construction cost than B-4 Option 1	• Intersects ND Highway 1804 with a 90° intersection • Less direct route than B-4 Option 1 • Requires stop condition on beltway corridor • Discontinuity of north-south traffic between ND Highway 1804 and River Road

4.5. Alternative C

Alternative C includes a river crossing corridor in the middle portion of the project study area. On the Morton County side, the roadway alignment would begin along 37th Street east to Highland Road and then cross the rugged terrain in Sections 8 and 9. After crossing ND Highway 1806 the alignment would pass by the north side of the Rockhaven Heights Subdivision and bisect the R.M. Heskett Power Plant property and follow the Rockhaven Creek to the river. Continuing east to Burleigh County the alignment would pass through the proposed Misty Waters and Burnt Creek Estates subdivisions until connecting with the east-west portion of Highway 1804.

Alternative C, the middle crossing route; has been discarded from further analysis in this Corridor Study for the following reasons:

- The route would bisect an existing developed subdivision in Burleigh County, requiring the acquisition of several homes and a replat of the subdivision.
- Cultural Resources have identified two historic properties on either side of the proposed route. Preliminary analysis indicates that there would be a high probability for encountering cultural resources during future construction, and may not allow environmental clearances for the route. Mitigation would be required for unavoidable impacts. Adjusting the route north or south is not an option due to the presence of historic properties.
- The route would require the relocation of two fly ash disposal sites located at the R.M. Heskett Power Plant owned by Montana-Dakota Utilities, Inc., at an estimated $1–$2 million per site.
- An underpass structure would be required for off-road mine trucks to travel between the R.M. Heskett Power Plant and disposal sites, at an estimated $1 million.
- The route would require the realignment of Rockhaven Creek and the associated mitigation costs.

4.6. Alternative D

Alternative D involves a corridor in the southern portion of the project area. This corridor would begin at the intersection of ND State Highway 25 and 37th Street (NW Corner of Section 11, T139N, R82W). The corridor follows the section line east until it intersects Highland Road. The alignment would then curve southeast one mile to meet 38th Street, an undeveloped section line. The corridor follows 38th Street east and angles to the south side of 38th before crossing ND Highway 1806. East of ND Highway 1806 the corridor would be on new right-of-way owned by the Tesoro Refinery, to allow the existing 38th Street to function as a frontage road north of the corridor. The frontage road would eliminate direct driveway access from existing homes onto the corridor. The corridor bridge would cross over six railroad tracks before crossing the river on the south side of the R. M. Heskett Power Plant. A stairway for shoreline fishing access would be impacted by the new bridge. A replacement stairway could be accommodated under or alongside the new bridge. The corridor angles northeast across the river to the section line road (Burnt Boat Boat Ramp access road), and proceeds east along the north side of Burnt Creek Loop to avoid right-of-way impacts to three residences on the south side of Burnt Creek Loop. This also allows for existing trees to remain as a buffer between the existing homes and corridor. Climbing the bluff above River Road, the corridor curves northeast to intersect with ND Highway 1804 near 15th Street. The corridor proceeds east on ND Highway 1804 alignment to the end at the intersection of US Highway 83.

Five potential horizontal alignment options (Routes) have been identified for the Alternative D corridor. Routes D-1 and D-2 are located in Morton County; Routes D-3, D-4, and D-5 are located in Burleigh County. Alternative D would consist of one route option from each county.

4.6.1. Morton County Options

- ***Route D-1*** would traverse diagonally in a southeast direction through the rugged terrain in Sections 8 and 9, T139N, R81W. This route would require a very large fill section, approximately 70 feet high in some areas, and would result in a grade of about 7 percent.
- ***Route D-2*** would also traverse Sections 8 and 9 diagonally southeast and turn east onto east-west section line (38th Street) about ½-mile west of where Route D-1 reaches 38th Street. Route D-2 would follow the crests and side slopes of the hills so that the grade would be less, about 6 percent, and the fill sections would be approximately 30 to 40 feet. Principal arterials typically do not provide access driveways to adjacent development. In this case, a parcel of land between Highland Road and Route D-2 would be unbuildable if access driveways are not allowed on Route D-2. The unbuildable area is also steep terrain which reduces the development potential, so it may be best suited as public greenway space.

The *Fringe Area Road Master Plan* includes a realignment of ND Highway 1806 from 38th Street southwest to the Sunset Drive Interchange (Exit 152) on Interstate 94. Note that the existing ND Highway 1806 roadway would still remain in place south of 38th Street to provide access to existing development. There are two options for the realignment of ND Highway 1806 and the associated intersections with 38th Street/ND Highway 1806/Northern Bridge Corridor intersections. ***The realignment and intersection options are shown in Exhibit 4.7.*** This area also features the existing 38th Street roadway converted into a frontage road, which is shown in white. A bulb-out frontage road access point is proposed just west of the power plant to provide adequate setback distance for the stacking of large trucks.

Option 1 (shown in yellow) locates the future realignment of ND Highway 1806 about ¼-mile west to provide adequate intersection spacing on the Alternative D corridor while intersecting Alternative D at a 90° angle.

Option 2 (shown in red) locates the future realignment of ND Highway 1806 south of the 38th Street intersection, and relocates the existing ND Highway 1806 about ¼-mile east across Tesoro Refinery property to provide adequate intersection spacing on the Alternative D corridor.

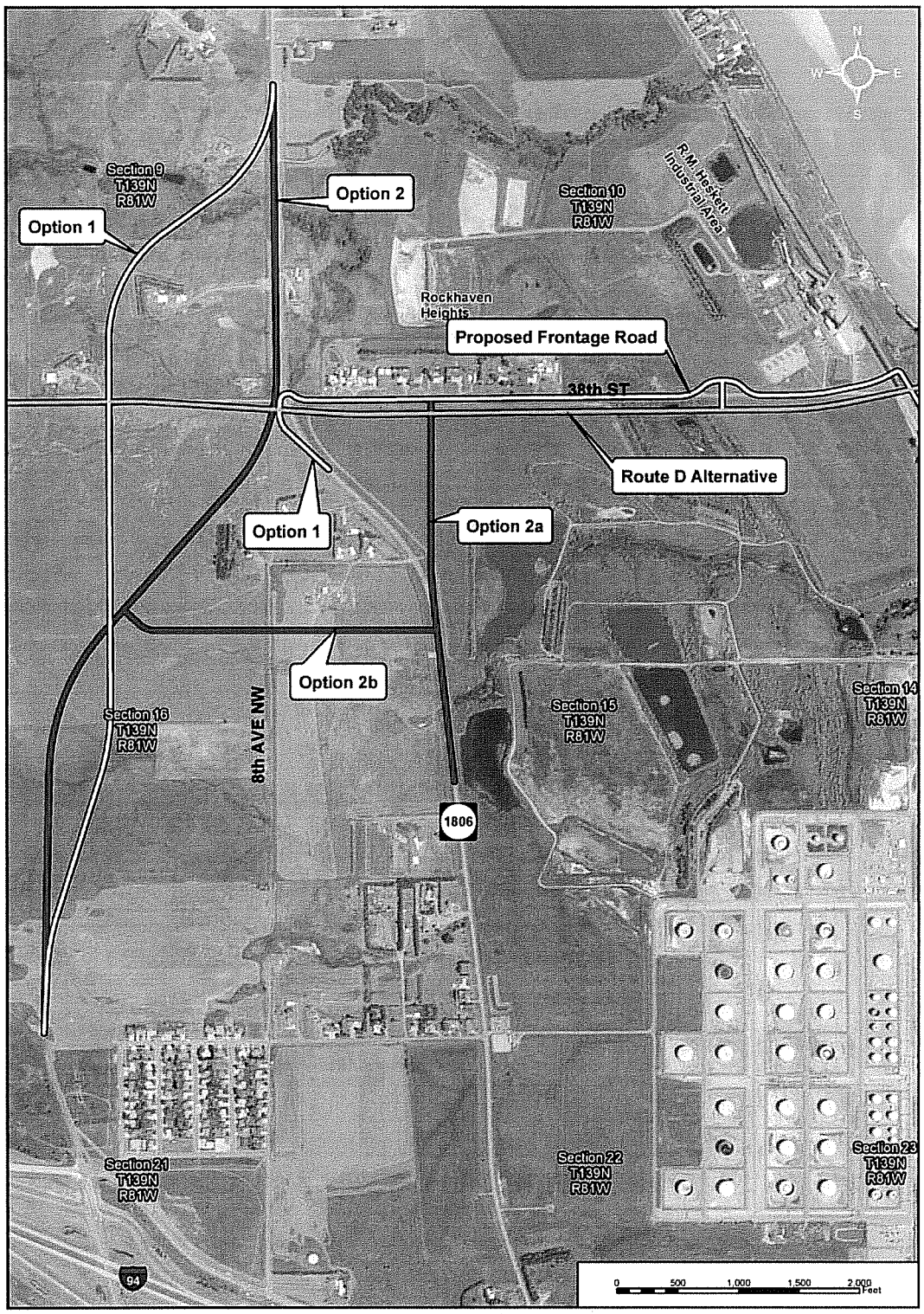


Exhibit 4.7., Route D and ND Highway 1806 *(full-size located in the Exhibits Appendix)*

Routes	Advantages	Disadvantages
Morton County D-1	• Keeps new road alignment further away from existing development along Highland Road	• 7% grade • Requires 70' high fills which are not as conducive to future adjacent development • More diagonal alignment is less conducive to typical north-south/east-west development patterns. • Uses less section line right-of-way
Morton County D-2	• Follows more existing section line right-of-way • Slightly flatter grade (6%) • Unbuildable parcel could be used as greenway space • Lower heights of fill • More conducive to typical north-south/east-west development	• Leaves an unbuildable land parcel between Highland Road and D-2
Morton County Alignment D Option 1	• Provides principal arterial intersection spacing • Intersects ND Highway 1806 with a 90° intersection • Does not require additional right-of-way from Tesoro	• Greater amount of new roadway construction
Morton County Alignment D Option 2	• Provides principal arterial intersection spacing • Intersects ND Highway 1806 with a 90° intersection • Less new road construction	• Requires additional right-of-way from Tesoro

4.6.2. Burleigh County Options: Routes D-3, D-4, D-5 and Highway 1804 (*See Exhibit 4.8 and Exhibit 4.9*)

- *Route D-3* would climb the bluff east of River Road along the north side of the Burnt Creek Loop alignment, with a bridge over River Road. The alignment along the north side of Burnt Creek Loop would minimize impacts to a parallel high voltage transmission line south of Burnt Creek Loop. River Road access would be provided by a frontage road intersecting the corridor west of the overpass bridge. Once up on top of the bluff, Route D-3 would curve northeast to cross Section 7, T139N, R80W before finally curving into and assuming the alignment of ND Highway 1804. ND Highway 1804 west of 15th Street would intersect the corridor as a tee intersection with a stop condition on the state highway.

- *Route D-4* would depart from the Burnt Creek Loop alignment, angling southeast ¼-mile to take advantage of a large coulee to provide an at-grade intersection with River Road. It would cross River Road and follow the coulee until Section 18, where it would curve northeast. Route D-4 would cross through Section 7 and intersect ND Highway 1804 in the same fashion as Route D-3.
- *Route D-5* would climb the bluff east of River Road along the north side of the Burnt Creek Loop alignment, with a bridge over River Road. The alignment along the north side of Burnt Creek Loop would minimize impacts to a parallel high voltage transmission line south of Burnt Creek Loop. River Road access would be provided by a frontage road intersecting the corridor west of the overpass bridge. Once up on top of the bluff, the route would parallel the section line east about a mile before curving north onto the 15th Street alignment. The route would create a 90° intersection with ND Highway 1804 at 15th Street, which is a planned future north-south minor arterial. There are right-of-way constraints at the 15th Street intersection, with an electrical substation on the west and Waste Management on the east side of the corridor. Right-of-way impacts at these properties could be reduced through the use of an urban section past the properties.

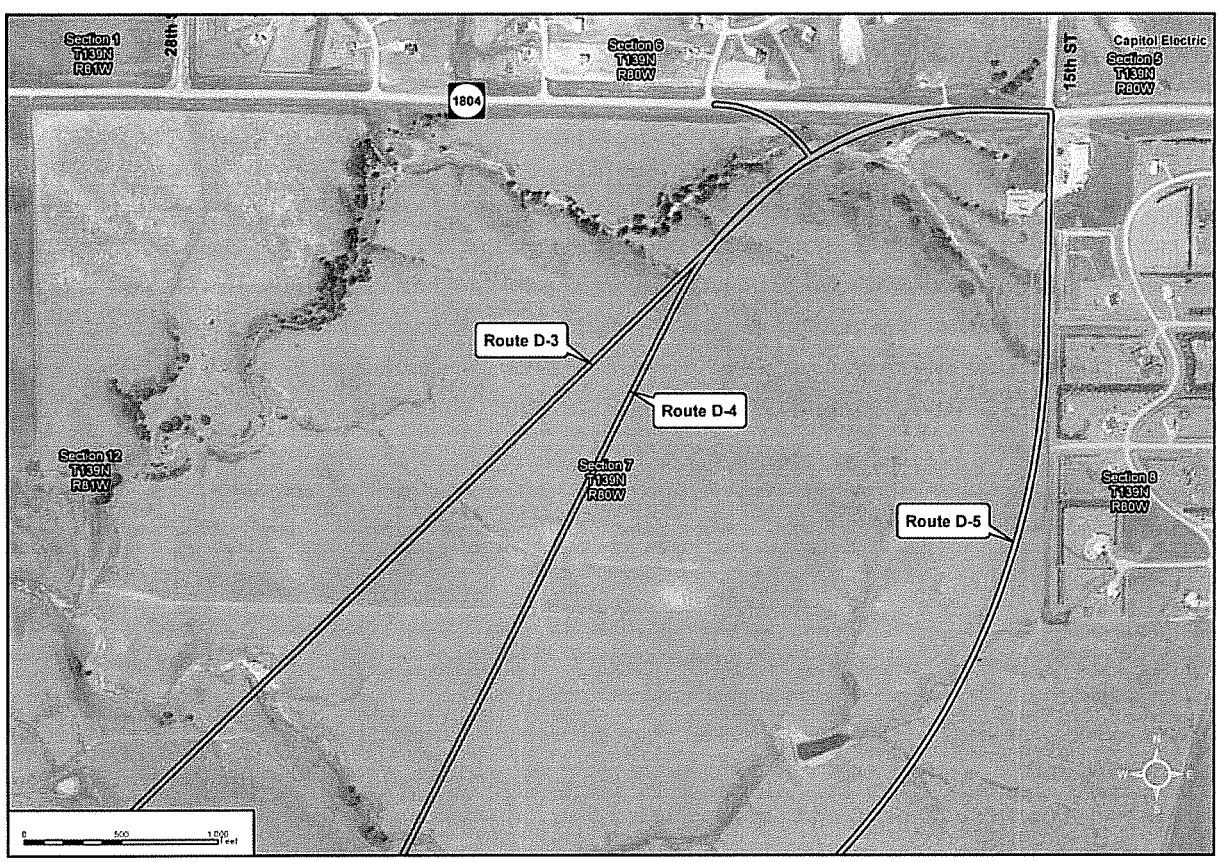


Exhibit 4.8., Routes D-3, D-4, D-5 and ND Highway 1804 *(full-size located in the Exhibits Appendix)*

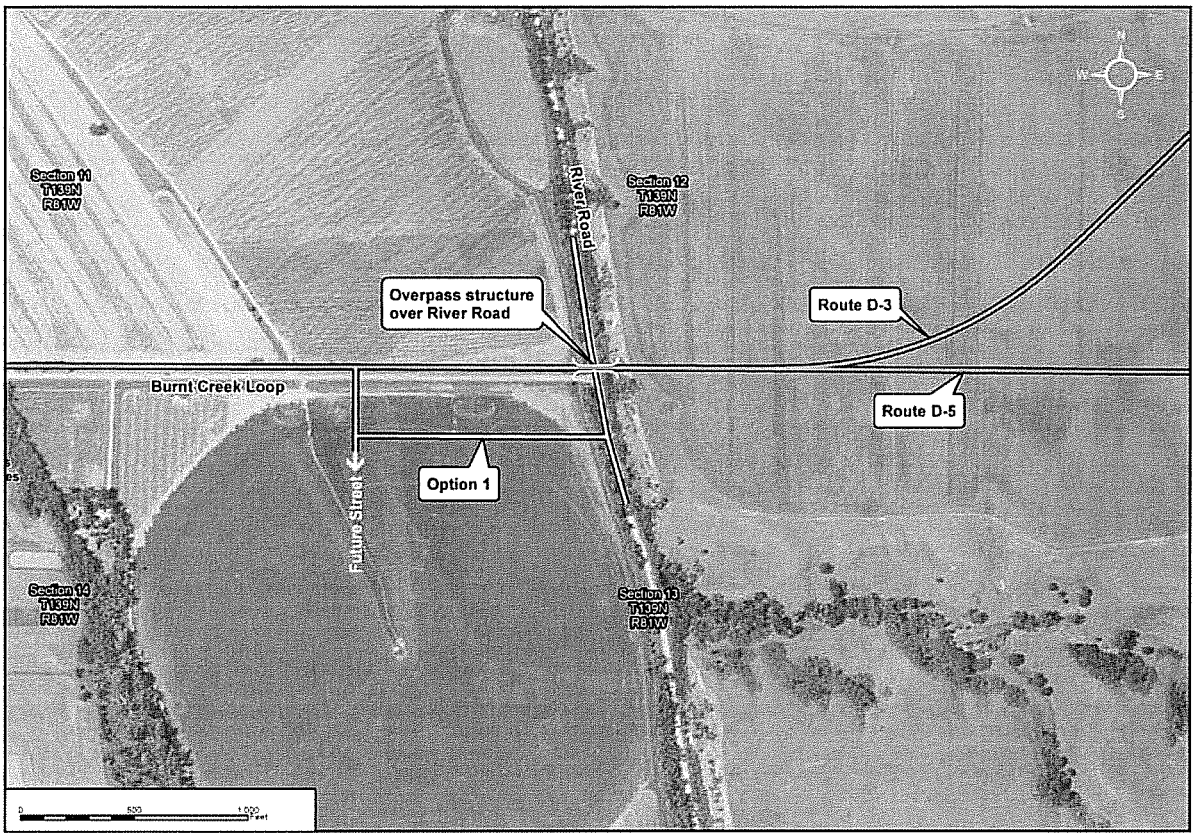


Exhibit 4.9., Routes D-3, D-5, and River Road *(full-size located in the Exhibits Appendix)*

4.6.3. Alternative D & Burnt Creek Loop (*See Exhibit 4.10.*)

Option 1 (shown in yellow) would reroute Burnt Creek Loop further east to intersect with Fernwood Drive. Both Burnt Creek Loop and Fernwood Drive are proposed to be a future continuous minor arterial in the *Fringe Area Road Master Plan*. The alignment would create an 82° intersection with Alternative D, with a 35 mph design speed on Burnt Creek Loop. Access to the Burnt Boat Boat Ramp Park would be provided by a future frontage road south of Alternative D. Access to the proposed Misty Waters Subdivision would be provided by a frontage road north of Alternative D, with direct access onto Burnt Creek Loop.

Option 2 (shown in red) shows the proposed realignment of Fernwood Drive as shown in the *Fringe Area Road Master Plan*. This route would create a 65° intersection with Alternative D. The original alignment of Fernwood Drive would still remain in place to provide access to existing development, creating two closely spaced intersections on the Alternative D corridor. Access to the Burnt Boat Boat Ramp Park would be provided by a future frontage road south of Alternative D. Access to the proposed Misty Waters Subdivision would be provided by a frontage road north of Alternative D, with direct access onto Burnt Creek Loop.

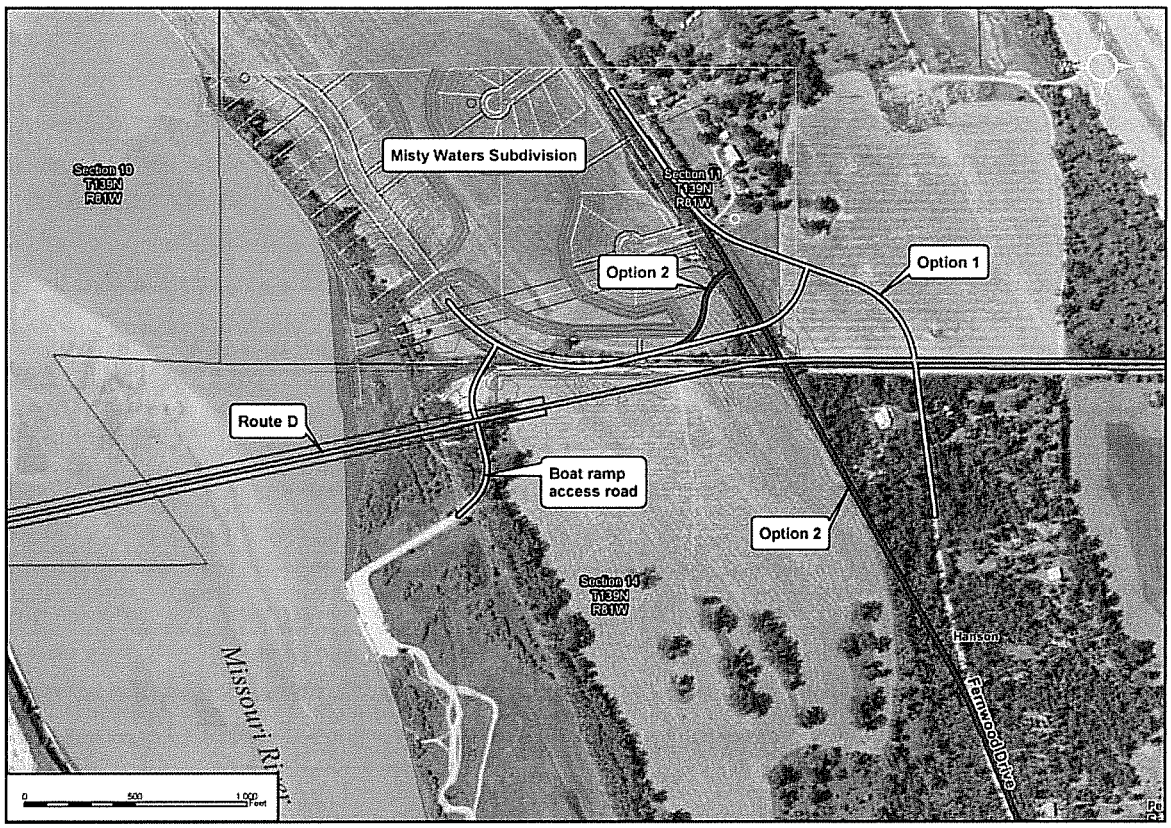


Exhibit 4.10., Route D and Burnt Creek Loop *(full-size located in the Exhibits Appendix)*

Routes	Advantages	Disadvantages
Burleigh County D-3	• Most direct route of Alternative D routes • No stop condition on beltway corridor	• Requires bridge over River Road with indirect connection to River Road and associated costs • May require adjustment of high voltage transmission line • Creates stop condition on ND Highway 1804
Burleigh County D-4	• Avoids high bluff • No bridge required over River Road • No stop condition on beltway corridor • No adjustment of high voltage transmission lines needed	• Longest route introduces more indirection • Creates stop condition on ND Highway 1804
Burleigh County D-5	• No stop condition on ND Highway 1804	• Requires bridge over River Road with indirect connection to River Road and associated costs • Requires stop condition on beltway corridor • Right-of-way impacts to electrical substation or Waste Management at 15th Street
Burleigh County Burnt Creek Loop Option 1	• No closely spaced intersections on Alternative D • Less intersection skew • Provides greater intersection spacing on Burnt Creek Loop	• Deviates from *Fringe Area Road Master Plan* recommendation
Burleigh County Burnt Creek Loop Option 2	• Consistent with *Fringe Area Road Master Plan* recommendation • Intersection skew meets minimum guidelines	• Greater intersection skew • Two intersections 600' apart on Alternative D • Two intersections 500' apart on Burnt Creek Loop

4.7. Bridge Alternatives and Analysis

This section of the report provides estimated bridge lengths, approximate costs, and minimum right-of-way requirements for Alternatives B and D. This section also includes the criteria used to determine the bridge lengths and a discussion of the span optimization process used for the cost estimates.

4.7.1. Design Criteria

The following design criteria for determining the bridge lengths and for calculating the estimated bridge costs:

Bridge Deck Width: Based on the typical section for the approach roadways, the minimum deck width is 82 feet. The bridge cross-section consists of four 12-foot lanes, two 8-foot shoulders, a 14-foot multi-use path, and 4 feet to allow for traffic and pedestrian/bicycle rails.

Railroad Clearance: The minimum vertical clearance from top of rail to the bottom of the superstructure is 23.5 feet per the NDDOT Design Manual.

Navigational Clearance: The USCG (United States Coast Guard) typically requires a 250-foot-wide navigation span for bridges on the upper Missouri River. The minimum vertical clearance in the navigation span is 30 feet above the 2 percent flowline (50-year flood elevation).

Maximum Fill: The assumption used was a maximum fill height at the abutments from the existing ground to the profile grade line (centerline of road) of 20 feet.

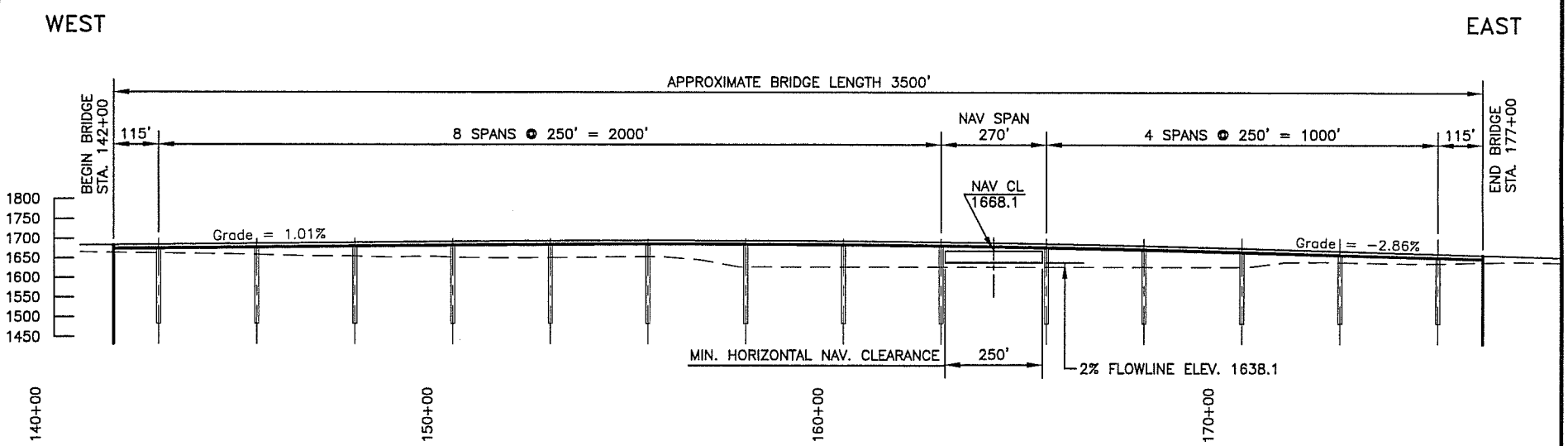
Bridge Type: The bridge lengths and costs are based on using steel I-shaped plate girders for the beams, a cast in place concrete deck, and cast in place concrete piers and abutments supported on piling.

Please refer to Figure 4.1., Bridge Layout Alternative B, and Figure 4.2., Bridge Layout Alternative D on the following pages.

4.7.2. Span Optimization

For typical bridges in North Dakota (e.g. roadway overpasses, small river crossings), preliminary bridge costs can usually be estimated on a cost per square foot basis using actual costs from past projects. Since Missouri River bridges in North Dakota are constructed infrequently, there is minimal information available to estimate costs based on the bridge surface area alone. For this reason, a preliminary span optimization was performed to assist in estimating the bridge costs.

Span optimization is a process used to determine the most cost effective bridge span arrangement. More simply, span optimization is determining how many piers a bridge should have to minimize the bridge costs. Bridge costs will generally decrease as the number of piers decreases. However, as the number of piers is reduced, the cost of the superstructure (beams) increases due to the need for larger beams as the span length increases. The optimum span arrangement is found just before the increase to the superstructure costs outweighs the savings gained by reducing the number of piers.



ELEVATION

NOTES

1. Elevations are based on NAVD-29 Datum.
2. Railroad tracks are located at approximate Station 149+50.
3. Estimated bridge length is based on the following:
   - Maximum fill height at abutments = 20'-0"
   - Minimum vertical clearance over railroad tracks = 23'-6"
   - Minimum vertical clearance over 2% flowline in navigation span = 30'-0"
   - Minimum horizontal clearance in navigation span = 250'-0"

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scale 1"=400' feet

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Kadrmas Lee & Jackson Engineers, Surveyors and Planners	BRIDGE LAYOUT ALTERNATIVE B			
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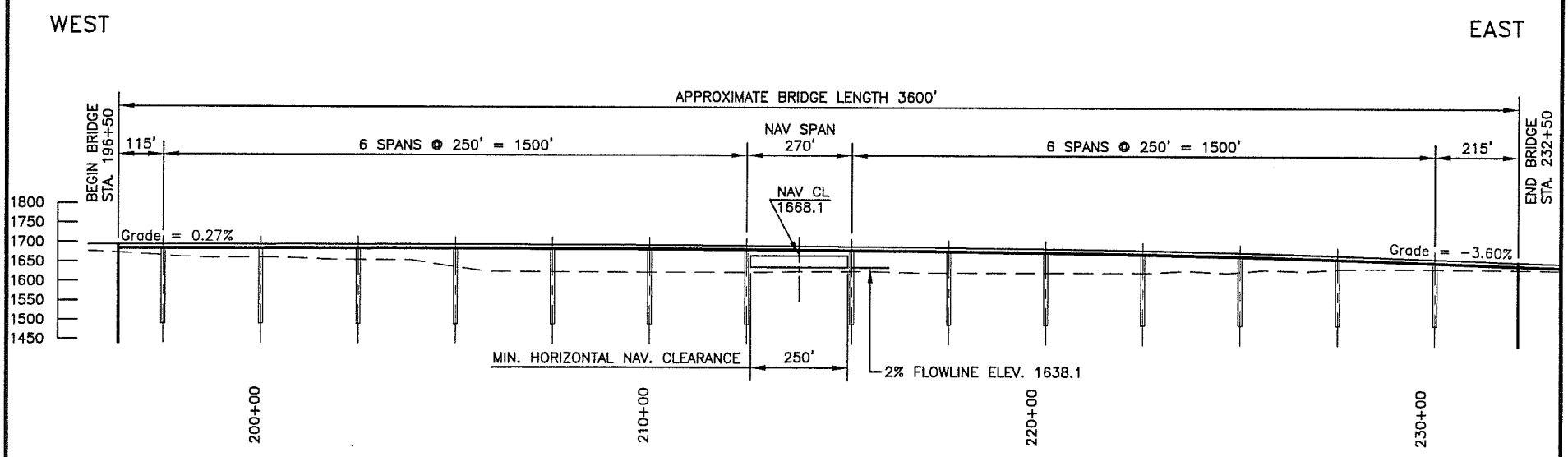

ELEVATION

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scale 1"=400' feet

NOTES
1. Elevations are based on NAVD-29 Datum.
2. Railroad tracks are located at approximate Station 201+00.
3. Estimated bridge length is based on the following:
   - Maximum fill height at abutments = 20'-0"
   - Minimum vertical clearance over railroad tracks = 23'-6"
   - Minimum vertical clearance over 2% flowline in navigation span = 30'-0"
   - Minimum horizontal clearance in navigation span = 250'-0"

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The span optimization for this study consisted of the following:

- Estimating the steel beam costs for typical spans ranging from 150 feet to 400 feet using $1.50 per pound for the steel unit cost.
- Estimating the steel beam costs using a steel cost ranging from $1.20 to $1.70 per pound.
- Combining the beam costs with estimated pier costs ranging from $400,000 per pier to $2,000,000 per pier.

The results of the span optimization analysis were:

- For pier costs in the $400,000 to $600,000 per pier range, the optimum span length is approximately 200 feet.
- For pier costs ranging from $800,000 to $1,900,000 per pier, the optimum span length is approximately 250 feet.
- For pier costs of $2,000,000 per pier and higher, the optimum span length is approximately 300 to 350 feet.
- The steel cost range studied did not affect the optimum span length determination. For steel costs of $2.00 per pound or higher, the optimum span length would be approximately 150 to 200 feet.

Preliminary estimates indicate that the actual pier costs will be approximately $1,000,000 to $1,500,000 per pier, and the structural steel cost will be within the $1.20 to $1.70 per pound range studied. Therefore, the cost estimates for the bridge alternatives will be based on an optimum typical span length of 250 feet.

4.7.3. Navigational Clearance

As stated previously, the USCG typically requires 30 feet of navigational clearance above the 50-year flood elevation. The scope of this study does not include hydrologic and hydraulic analysis. Therefore, the navigational clearance envelope is based on an estimated 50-year flood elevation using Flood Insurance Rate Maps and USGS (United States Geological Survey) gage data.

The current flood maps indicate that the 100-year flood elevation in the vicinity of the bridge crossings is approximately 1639.0 (1988 Datum). The flood maps are currently being updated and an increase of 1 foot to the 100-year flood is anticipated. Since the flood maps do not provide it, the 50-year flood elevation for this study was calculated assuming that the difference between the 50-year flood and 100-year flood elevations is the same for the flood insurance study as it is for USGS gage data. The closest stream gage to the sites is USGS Gaging Station 06342500, located on the Missouri River in Bismarck. Data for this gage

shows that the 50-year flood elevation is approximately 0.5 feet less than the 100-year flood elevation. The estimated 50-year flood elevation was calculated as follows:

Current 100-year elevation	1639.0 (1988 datum)
Correction to 1929 datum	- 1.4
Anticipated increase to 100-year elevation	+ 1.0
Difference between 100 and 50-year elevations	- 0.5
Estimated 50-year flood elevation	1638.1

Therefore, the superstructure must be at elevation 1668.1 or higher at the navigation span to meet US Coast Guard requirements.

4.7.4. Alternative B

Based on the existing topography, the railroad and navigational clearance requirements, and a 20-foot maximum fill height at the abutments; the estimated bridge length for Alternative B is 3,500 feet. The first 1,200 feet and the last 400 feet of bridge are within the limits of horizontal curves. The remainder of the bridge is on a straight alignment.

The cost estimate for this alternative is based on a fifteen-span steel plate girder bridge consisting of two 115-foot end spans, twelve 250-foot typical spans, and a 270-foot navigation span. Approximately 250 to 260 feet of right-of-way will be required at the bridge ends to accommodate the 20-foot fill height. The estimated bridge cost for Alternative B is approximately $52 million with contingencies. *See Figure 4.3.*

4.7.5. Alternative D

To meet the same criteria as Alternative B, the estimated bridge length for Alternative D is 3,600 feet. The first 150 feet of the bridge is within the limits of a horizontal curve. The remainder of the bridge is located on a straight alignment.

The cost estimate for this alternative is based on a fifteen-span steel plate girder bridge consisting of one 115-foot end span, one 215-foot end span, twelve 250-foot typical spans, and a 270-foot navigation span. Approximately 250 to 260 feet of right-of-way will be required at the bridge ends to accommodate the 20-foot fill height. The estimated bridge cost for Alternative D is approximately $53 million with contingencies. *See Figure 4.3.*

4.7.6. Summary

Both alternatives are suitable for constructing a bridge across the Missouri River. Alternative B would likely be more difficult to design and construct, as nearly half of the bridge would be built on horizontal curves. With more detailed survey data, analysis, and design, the bridge length and fill height can be further optimized to determine the optimum balance between bridge length, fill height, and right-of-way.

The location of the navigation spans for both alternatives was estimated based on the available data. Prior to designing a preferred alternative, the designers would submit the preferred corridor alternative to the USCG. The USCG can then determine the actual location of the navigation channel. If the location specified by the USCG varies significantly from the location used in this study, the bridge profile, length, and cost estimates may need to be revised.

4.8. Cost Summary

Alternative bridge structures and routes were developed assuming 2004 costs. The chart and table shown below summarizes the various costs associated with this project. The most expensive item on the project will be the Missouri River bridge structure. It is estimated that the structure will cost $52 million for Alternative B, and $53 million for Alternative D. These estimates include a 15 percent contingency. The costs for constructing the roadway and associated right-of-way costs are shown for each of the route options. ***The bridge and route combinations along with their costs are displayed on the chart shown in Figure 4.4.*** The cost of the bridge alternative and any roadway alignment route can be compared at a glance. Note that the cost of the 37th Street from ND Highway 25 to Highland Road segment is included on this chart. ***Detailed cost estimates can be found in the Cost Summary Appendix.***

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars
Cost Summary

Bridge Structure	Route	Intersection Options	COST
	37th St Segment (ND 25 to Highland Rd)		$5,014,288
Bridge Alternative B			$51,800,000
	Route B-1		$7,894,865
	Route B-2		$7,720,410
	Route B-3		$6,200,104
	Route B-4		$6,374,968
		Route B-1 & ND Highway 1806—Option 1	$163,777
		Route B-1 & ND Highway 1806—Option 2	$1,306,785
		Route B-4 & ND Highway 1804—Option 1	$1,084,734
		Route B-4 & ND Highway 1804—Option 2	$427,222
Bridge Alternative D			$52,800,000
	Route D-1		$7,720,525
	Route D-2		$7,932,815
	Route D-3		$8,128,350
	Route D-4		$8,802,480
	Route D-5		$8,392,585
		Route D & ND Highway 1806—Option 1	$1,217,862
		Route D & ND Highway 1806—Option 2	$1,801,843
		Route D & ND Highway 1806—Frontage Road	$741,946
		Route D & Burnt Creek Loop—Option 1	$675,280
		Route D & Burnt Creek Loop—Option 2	$767,119
		Route D & Burnt Creek Loop—Frontage Road	$316,819

Figure 4.3, Cost Summary

Note that utility relocation costs have not been estimated, as the identification of all underground utilities was beyond the scope of this study. Typically, utilities that are within existing roadway right-of-way would have to be relocated at the utility's expense, while those outside of existing right-of-way may be an expense of the roadway jurisdiction. Known major utilities, such as high-voltage transmission lines, were avoided as much as practical in this study.

The cost for acquiring a platted lot is assumed to be $20,000. Riverfront lots are estimated at $80,000 each. All residential or commercial relocations are estimated at $300,000. A cost was not applied to farmland; it is assumed that it will be acquired through platting.

A user cost analysis has been done on routes B-2 and B-4 versus D-2 and D-3. The average vehicle (typical commuter on the Northern Bridge route) will save about $53 per year if Alternative B is chosen instead of Alternative D. This is assuming two trips per day, five days a week and fifty weeks per year. Assuming an average annual daily traffic volume of 10,000 per day, the total amount of money saved for the commuters would be over half a million dollars.

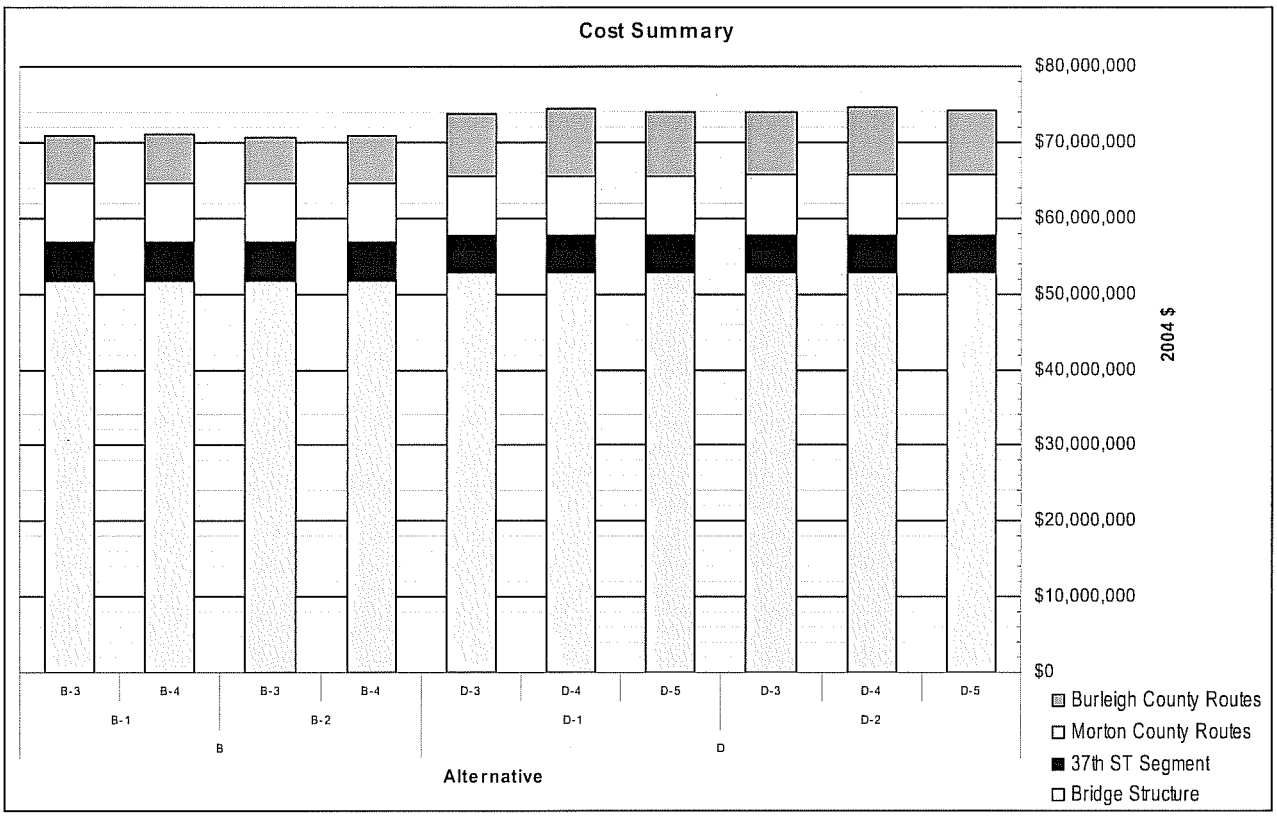


Figure 4.4., Cost Summary by Route

Chapter Five
Conclusion and Recommendations

A comprehensive review of the three remaining alternatives (A: do nothing, B: north route, and D: south route) must begin by comparing each alternative to the purpose and need for the proposed corridor. The purpose of this study is to identify a corridor of a future regional beltway that can be preserved for possible future development as needed, as well as to identify an implementation process for acquiring and preserving this corridor. The purpose of the proposed regional beltway is to connect people to places by facilitating transportation across the urbanized area through continuity and connections between other arterials and collectors. The need for the corridor is based upon population growth, traffic capacity, and the lack of a continuous urban principal arterial north of I-94 to serve connections across the area demanded by future urban and suburban growth.

5.1. Alternative A (Do Nothing)

The no-build alternative would not provide a continuous principal arterial corridor across the north side of the communities, and would also limit the effectiveness of the remaining master planned regional beltway. The lack of continuity in the transportation system would create greater motorist indirection, higher user costs, emissions and demand for fossil fuels. Future fixed route transit operations would be less efficient. Existing corridors would have greater demand for capacity improvements with associated impacts.

If the no-build alternative is chosen, a future river crossing location would still exist along the south route (Alternative D) because there are existing roads leading to both sides of the river at that location. However, a lack of direct connections between ND Highway 1806 and northwest Mandan, and between River Road and ND Highway 1804 would leave significant indirection and lessen the utility of the river crossing. A river crossing as such would function more on the level of a collector, or possibly a minor arterial if ND Highway 1806 were realigned to the Sunset Drive Interchange as planned. It would not contribute to the planned regional beltway.

5.2. Alternative B (North route)

The north route would provide the most direct connection and highest arterial function between ND Highway 25 and US Highway 83. It provides a relatively direct east-west alignment that is more conducive to typical orderly north-south/east-west development patterns on both sides of the river. While it would require relocation of several properties, it takes less overall right-of-way from other uses and has the least amount of natural environmental impacts to wetlands and park lands.

5.3. Alternative D (South route)

The south route would provide a through connection meeting the needs of a principal arterial and regional beltway. However, Alternative D would create a "U" shaped alignment, resulting in about 2 miles of additional travel distance than does Alternative B. From a transportation system perspective, Alternative D would be less desirable for trips generated west, east, and north of the area because it would be less efficient, and therefore, would provide less benefit to those trips. Conversely, there may be some trips generated just south of Alternative D that may see more benefit for their trip destination.

For example, a motorist originating from the north side of Mandan traveling to Bismarck via the Northern Bridge Corridor may be tempted to turn south on River Road after crossing the Missouri River, rather than following the beltway north toward Highway 1804. This is a function of "driver expectancy" in that a motorist's natural tendency is to follow the most direct route to their destination, and turning north may violate that natural tendency. In contrast, a motorist traveling from north of Mandan to Bismarck under Alternative B would be more likely to remain on the beltway than to turn right at River Road; this alignment would provide a faster connection to more established/higher capacity north-south routes such as Washington Street or State Street. While driver expectancy is difficult to quantify, it is a consideration in transportation system planning and design. Trip destinations to future development north of the cities and the congestion levels and travel times of other corridors will all influence travel patterns in the future.

COMPARATIVE SUMMARY OF CORRIDOR ALTERNATIVES A, B, AND D		
Alternative	**Advantages**	**Disadvantages**
Alternative A (Do Nothing)	• No right-of-way acquisition from Tesoro or platted property • No bridge construction cost • Leaves option open for a future bridge on south route	• Does not plan for the inevitable need to accommodate increased river crossings. • Does not provide for principal arterial corridor • Greatest indirection • Highest user cost • Inconsistent with adopted plans and planning guidelines • A stand-alone future bridge at south route would have less utility without connections • May result in higher overall cost when a bridge is needed
Alternative B (North route)	• Best arterial route • Shorter route • Fits terrain better • Lower user costs • $4 million lower total cost	• 4 to 6 relocations required • Requires replat and purchase of Olive Tree subdivision lots • Adjacent to more existing development
Alternative D (South route)	• No relocations required • Avoids most existing development	• 2 mile longer route • Indirect travel route • Requires future purchase of Tesoro property • Bridge over River Road less conducive to phase construction • Slightly higher cost • $4 million higher total cost • Steeper grades in Morton County

5.4. Recommendation

The following recommendation is based on a review of the purpose, need, analysis, and the feasibility of obtaining environmental clearance. The recommendation is to preserve Alternative B (north route) along with the following options:

- Morton County Route B-2 (south of 37th Street)
- Burleigh County Route B-4 (straight east section line alignment)
- ND 1804 Intersection Option 1 (straight east up the bluff)

Chapter Six
Implementation Plan

Corridor planning is all about minimizing future regret. Only time will tell when it is appropriate to begin the process of obtaining environmental clearance, and designing and constructing a new river crossing. However, it is the actions taken in the coming years that will be used to measure the success or failure of minimizing future regret. The following implementation plan recommends strategies, priorities, and timelines for preserving a corridor.

6.1. Right-of-Way

The right-of-way requirements for the Northern Bridge Corridor are based upon the corridor vision determined earlier in this study. A minimum right-of-way width of 200 feet will be required. There will be some areas requiring additional right-of-way, including intersection realignments and areas of high fill slopes. Slope easements or permanent right-of-way will also be required along areas of deep cuts. Additional right-of-way is recommended alongside existing developments to provide a greenway buffer. The *Final Northern Bridge Corridor Study Report* will include a right-of-way strip map of the adopted route (if any) indicating where the additional right-of-way width will be required, based upon the plan and profile of the proposed road.

Undeveloped agricultural right-of-way could be acquired as the land is platted for other land uses, the same process as is used today by all of the local jurisdictions. Additional right-of-way from developed property along existing roads such as 37th Street in Morton County and ND Highway 1804 in Burleigh County could be acquired if and when the existing roadway is widened in the future. Those right-of-way parcels would consist primarily of slope easements, narrow strips or corners of lots. The cost of those small parcels was not estimated, as those roadways and the right-of-way costs are the same for both Alternate B and D. Alternate D would also require acquisition of Tesoro Refinery property approximately 200′ wide by 4800′ long or about 22 acres. The Tesoro property would not be required until a bridge is actually built on Alternate D, so a cost estimate was not included at this time since acquisition may be delayed for many years.

6.2. Corridor Preservation

There are several methods that are available to cities to be able to preserve future road right-of-way. Only some of these options are available for counties to use. On any major project, quite often a mix of the options would be used depending on the location and specific circumstances of the area.

The first option available to both cities and counties is the most certain. That would be the purchase of corridor right-of-way. This would not require a department to "keep track" of the corridor in future years and the corridor would be in the public domain. The negative side of this is that acquisition money would be needed prior to a project, and the land would be taken off the tax roles. The land could then either be used as public open space and/or rented to private users. Additionally, mitigation areas could be developed in appropriate areas of the right-of-way to offset any anticipated loss of wetlands and trees.

Subpart A of the Federal Highway Act (paragraph 630.106) allows for early acquisition of some parcels for "Protective Buying or Hardship Acquisition". The section states that FHWA can issue an authorization to proceed for this type of right-of-way acquisition where it is necessary to preserve the corridor for future highway purposes. There are specific requirements that need to be fulfilled in order to comply with FHWA rules. These include adding the project to a currently approved Statewide Transportation Improvement Program; meeting public involvement requirements; complying with historic preservation procedures; and ensuring that the acquisition of property under this section shall not influence the environmental assessment of the project. At this time there are no federal funds allocated specifically for the acquisition of the right-of-way. Counties and cities do receive an annual allocation of federal transportation funds through the NDDOT. Current policies of NDDOT do not allow the counties to use their federal transportation funding for right-of-way acquisition, although a special request could be made. The cities are allowed to use their federal transportation funding for right-of-way acquisition, but only within the "urban limits"—the area that is currently developed with an urban character. The urban limits definition often extends beyond a city's official corporate boundary, but would not be applicable to the Northern Bridge Corridor until urban development reaches the area.

North Dakota cities are not allowed to spend property tax revenue outside the city. However, city sales tax revenue can be spent outside of a city.

North Dakota counties have authority to create a property tax mill levy for road purposes, and this type of funding could be applied towards right-of-way acquisition along with any county general fund revenue that might be available.

Special assessments are often used by cities to assess public facility costs to benefited properties, which would not apply to the Northern Bridge Corridor since it is outside city limits. North Dakota counties are not allowed to initiate special assessments for road improvements; instead the public must petition the county for a special assessment improvement with 60 percent of the benefited properties endorsing the proposed improvement. Once the proposed improvement costs are finalized, a 50 percent majority of benefited and assessed property owners can kill the proposed project through a protest petition. Based on this information, special assessments could only be used if requested and favored by a majority of the benefited public.

An alternative to purchasing right-of-way that hasn't been platted is adoption, or revision in this case, of a Road Master Plan, sometimes called Official Mapping. The approval process for the Northern Bridge Corridor Study includes amending the *Fringe Area Road Master Plan.* In addition to amending the *Fringe Area Road Master Plan* to include this corridor, the corridor needs to be added to the functional classifications of both counties, which requires concurrence from NDDOT. Once included in the *Fringe Area Road Master Plan*, the property could then be acquired at the time of platting.

Another alternative that has been used in Minot for a project is an option for "First Right of Refusal". This would not change any property until an owner is ready to sell the property. At that time, the county would then have the option to acquire the needed right-of-way prior to it being sold to another individual. The program in Minot was for a $1,000.00 payment made upfront for each landowner agreeing to the option. The option has a specific time limit and could be for 20 or 25 years, and then if the project were no longer feasible the option could expire.

Donation of right-of-way is another option, whereby a landowner has the right to donate property if they choose to waive compensation. The donations often provide tax benefits to the donor, and can provide a win-win situation for land that has been difficult to sell yet still retains some intrinsic value, or where back taxes are owed on the land.

A final option would be to acquire any developed property (buildings) if and when a future construction project is developed and the right-of-way is acquired at that time. This would delay acquisition costs, but would be subject to the appraised value at that time.

1. ***Issue:***
   Acquiring non-platted property

   Recommended Strategy:
   Amend the Fringe Area Road Master Plan and acquire non-platted property through the platting process. Secure NDDOT concurrence on amendments to the roadway functional classification system.

   Timeframe:
   Immediately

2. ***Issue:***
   Acquiring undeveloped platted property

   Recommended Strategy:
   Alternative B would require right-of-way from the Olive Tree Subdivision in Burleigh County, while both alternatives would require two platted lots along Highland Road in Mandan. A replat of the Olive Tree subdivision is also

required. Most of the lots that would be acquired have not been developed. The undeveloped lots can not be used by the owner in the same manner that a home or business could remain in use until the future corridor is constructed. Undeveloped platted property is recommended to be acquired through purchase, trade, and/or donation. Possible trades include section line access to the river that could be vacated in trade for some of the Olive Tree platted property.

Timeframe:
As soon as funding can be identified and incorporated into the county budget cycle.

3. ***Issue:***
Acquiring developed property (buildings)

Recommended Strategy:
Initiate a "First Right of Refusal", whereby the counties would make an upfront payment for the first right to purchase the property at fair market value when an owner is ready to sell the property. The county would then have the option to acquire the needed right-of-way prior to it being sold to another individual. If the owner is willing to keep their property for a while, this will initially require a small funding commitment for the county while providing time to identify an appropriate funding source and incorporate the funding into the county budget cycle. If an owner demands to be bought out immediately, a county will have to determine if they have adequate funding in their current budget. If there is no funding available for immediate purchase, a "First Right of Refusal" could be offered to the next buyer of the property, thereby assuring potential buyers that they will have a chance to sell to the county at fair market value.

Timeframe:
As soon as funding can be identified and incorporated into the county budget cycle.

6.3. Land Use

The majority of the study area is zoned agricultural, with land use plans calling for residential zoning as the area develops. Existing residential development is focused along Highland Road on the north side of Mandan, and along ND Highway 1806, the Missouri River in both counties, and along ND Highway 1804. Major industrial complexes in Morton County include the R.M. Heskett Power Plant, the Mandan Water Treatment Plant, and the Tesoro Refinery. The only other non-residential land use is confined to two small commercial/industrial properties on 37th Street east of ND Highway 1806, the Waste Management office/shop on ND Highway 1804, and a commercially zoned undeveloped lot at the corner of Washington Street and ND Highway 1804. There has been recent interest in

additional commercial development at the intersection of ND Highway 1804 and US Highway 83, which already includes commercial/industrial land uses southeast of this intersection.

Principal arterial roadways are often candidates for commercial or industrial zoning, due to the compatibility of that land use with higher traffic volumes and truck route access. Consideration should be given to designating some commercial zoning such as Neighborhood Commercial near major intersections. This would allow for a service station and/or a convenience store to serve the growing area neighborhoods. More intensive commercial zoning could be considered where natural or manmade buffers can be placed between residential land uses. Policies should be developed to guide the location, design, and timing of commercial and industrial zoning outside of the corporate limits of the cities.

While zoning is available to both cities and counties, zoning is typically not used to reserve road right-of-way. The zoning district lines typically run down the centerline of roads or along property lines making it impractical to try to use this method to reserve land for future roads. Larger blocks of land for public use are typically reserved such as parks and schools. Currently, commercial development could be placed in the planned residential areas through the use of a Planned Unit Development (PUD) subject to approval of the local jurisdiction. Relying solely on a PUD for creation of commercial or industrial areas does not plan for appropriate buffers between the PUD and existing/future residential land use.

1. ***Issue:***
   Commercial/industrial land use along the corridor

   Recommended Strategy:
   Revise area land use plans based upon a review and identification of potential buffers between residential and commercial/industrial uses, and the potential to provide required urban utilities to such properties.

   Timeframe:
   One to two years

6.4. Access Control

Typical access control spacing for urban principal arterials is ¼-mile to ½-mile. When the area is developed enough to warrant traffic signals at major intersections, a ¼-mile spacing between traffic signals provides for equal traffic progression in both directions at a speed of 25 to 30 mph. Note that progression could favor one direction or another at various times of the day according to predominate traffic directions, which would increase the progression speed and length of uninterrupted flow for one direction while requiring the other direction to periodically stop at a red light. If the traffic signals are spaced ½-mile apart, equal traffic

progression in both directions could be obtained at a speed of 40 to 50 mph. Traffic signals are typically not recommended for speeds over 55 mph.

Existing access control policies vary by jurisdiction as follows:

NDDOT State and US Highways:	5 approaches per mile
Morton County:	None identified
City of Mandan:	None identified
Burleigh County	2 approaches per ¼-mile per side of the road
City of Bismarck	2 approaches per ¼-mile per side of the road

1. ***Issue:***
   Uniform access control policy

   Recommended Strategy:
   Each jurisdiction adopt an access control policy for the Northern Bridge Corridor and remaining regional beltway as part of its *Fringe Area Road Master Plan,* which would allow major intersections (minor arterials or collectors) every ½-mile and minor intersections every ¼-mile.

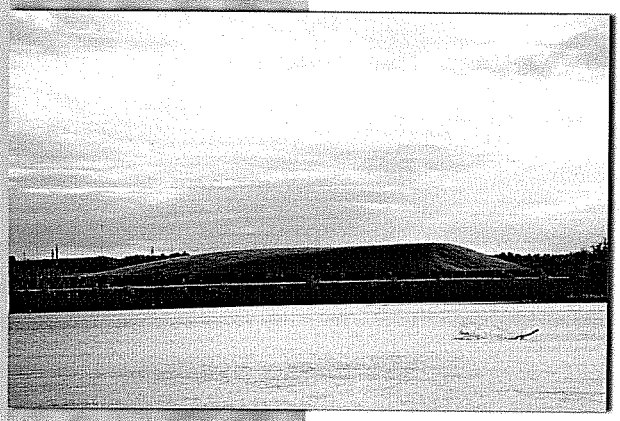
   Timeframe:
   Immediately

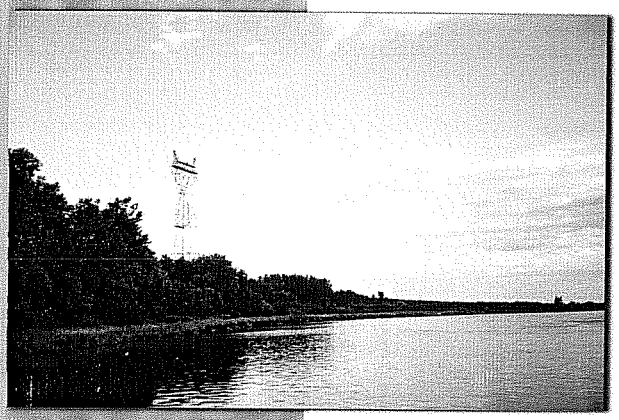
6.5. Corridor Phasing

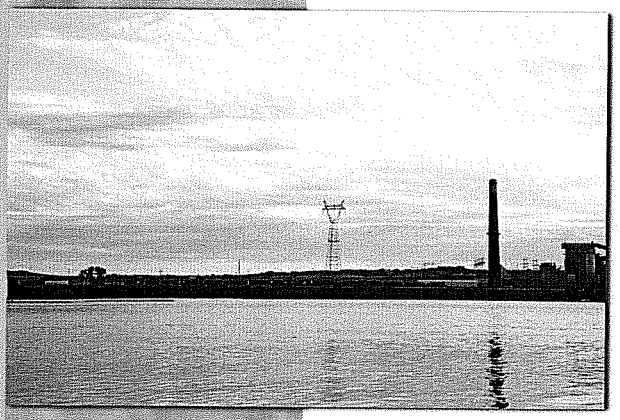
1. ***Issue:***
   Construction phasing and responsibility

   Recommended Strategy:
   It is envisioned that the Northern Bridge Corridor will develop piece by piece over time as land is platted and developed. Developers would be required to construct the portion of road through or along their plats, as they are required to do so now. As the area fills in with development, there may become a time when a final segment or two are needed to be constructed by the local jurisdiction in order to provide system continuity within a localized area. The final piece to be constructed would be the river crossing, when development and traffic levels demand the relief of an additional river crossing.

   Timeframe:
   As demand dictates







Northern Bridge Corridor Study

-Final Report-

Volume I of III

Prepared for:

Bismarck-Mandan
Metropolitan Planning Organization

By:

Kadrmas, Lee & Jackson, Inc.
Bismarck, ND

February 2005

Bismarck-Mandan
Metropolitan Planning Organization

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Bismarck-Mandan
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Northern Bridge Corridor Study

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February 2005

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The contents of this document reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the policies of the State and Federal Departments of Transportation.

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Volume II of III ***Comments and Coordination: July 2003 through June 10, 2004***
Volume III of III ***Public Hearing Summation and Project Decisions***

Bismarck-Mandan Metropolitan Planning Organization Project Participants

Policy Board Members

Claus Lembke, Chairman of Policy Board
Burleigh County Commission

Matt Erhardt, Morton County Commission

Board President Ken LaMont, City of Mandan

Helen Magilke, City of Lincoln Council

Mayor John Warford, City of Bismarck

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Mel Bullinger, Bismarck City Engineer

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Jon Mill, Burleigh County Engineer

Charles Morman, Morton County Roads Superintendent

Steve Saunders, MPO Transportation Planner

Paul Trauger, Morton County Auditor

Robin Werre, Bis-Man Transit Board

Resolution of Adoption

For the 2005 Bismarck-Mandan and Burleigh and Morton Counties Metropolitan Area Northern Bridge Corridor Study

WHEREAS, the U.S. Department of Transportation requires the formulation, approval, and maintenance of a Metropolitan Transportation Plan for the urban area as a condition of federal transportation funding; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization has been designated by the Governor of North Dakota as the Metropolitan Planning Organization responsible for preparing and maintaining the Metropolitan Transportation Plan; and

WHEREAS, the Bismarck-Mandan Metropolitan Area Long Range Transportation Plan (2001) recommended the Northern Bridge Corridor Study be conducted; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization after extensive public involvement and substantial consideration of technical, environmental, financial and social factors has prepared the Northern Bridge Corridor Study, which is in compliance with federal transportation planning standards; and

WHEREAS, all cognizant State and Federal agencies have reviewed the Corridor Study and indicated their full support; and

NOW, THEREFORE BE IT RESOLVED, by the Bismarck-Mandan Metropolitan Planning Organization Policy Board that it adopts the Project Decisions located in the 2005 Northern Bridge Corridor Study and directs staff to publish the final document and distribute copies to all appropriate local governments and interested parties; and

BE IT FURTHER RESOLVED, that the Fringe Area Road Master Plan is hereby revised to be consistent with the Northern Bridge Corridor Study Project Decisions; and

BE IT FURTHER RESOLVED, that all jurisdictions and their elected officials and staff covered by the document are encouraged to cooperatively implement the recommendations of the Project Decisions located in the 2005 Northern Bridge Corridor Study.

Certificate

The undersigned, duly qualified Chairman of the Bismarck-Mandan Metropolitan Planning Organization Policy Board, certify that the foregoing is a true and correct copy of a Resolution, adopted at a legally convened meeting of the Policy Board held on 2-15-05.

Claus H. Lembke

2-15-05

Claus Lembke
Chairman of Policy Board
Burleigh County Representative
Bismarck-Mandan MPO Policy Board

Date

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WHEREAS, the U.S. Department of Transportation requires the formulation, approval, and maintenance of a Metropolitan Transportation Plan for the urban area as a condition of federal transportation funding; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization has been designated by the Governor of North Dakota as the Metropolitan Planning Organization responsible for preparing and maintaining the Metropolitan Transportation Plan; and

WHEREAS, the Bismarck-Mandan Metropolitan Area Long Range Transportation Plan (2001) recommended a the Northern Bridge Corridor Study be conducted; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization after extensive public involvement and substantial consideration of technical, environmental, financial and social factors has prepared the Northern Bridge Corridor Study, which is in compliance with federal transportation planning standards; and

WHEREAS, all cognizant State and Federal agencies have reviewed the Corridor Study and indicated their full support; and

NOW, THEREFORE BE IT RESOLVED, that the Bismarck City Commission, on November 23, 2004 endorsed River Crossing, Alternative D, in the 2005 Northern Bridge Corridor Study.

John Warford
Mayor
City of Bismarck

1/18/2005
Date

Resolution of Adoption

For the 2005 Bismarck-Mandan and Burleigh and Morton Counties Metropolitan Area

Northern Bridge Corridor Study

WHEREAS, the U.S. Department of Transportation requires the formulation, approval, and maintenance of a Metropolitan Transportation Plan for the urban area as a condition of federal transportation funding; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization has been designated by the Governor of North Dakota as the Metropolitan Planning Organization responsible for preparing and maintaining the Metropolitan Transportation Plan; and

WHEREAS, the Bismarck-Mandan Metropolitan Area Long Range Transportation Plan (2001) recommended a the Northern Bridge Corridor Study be conducted; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization after extensive public involvement and substantial consideration of technical, environmental, financial and social factors has prepared the Northern Bridge Corridor Study, which is in compliance with federal transportation planning standards; and

WHEREAS, all cognizant State and Federal agencies have reviewed the Corridor Study and indicated their full support; and

NOW, THEREFORE BE IT RESOLVED, that the Mandan City Commission on December 7, 2004 endorsed River Crossing, Alternative D, in the 2005 Northern Bridge Corridor Study.

Ken LaMont
Ken LaMont
Board President
City of Mandan

2-1-05
Date

Resolution of Adoption

For the 2005 Bismarck-Mandan and Burleigh and Morton Counties Metropolitan Area

Northern Bridge Corridor Study

WHEREAS, the U.S. Department of Transportation requires the formulation, approval, and maintenance of a Metropolitan Transportation Plan for the urban area as a condition of federal transportation funding; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization has been designated by the Governor of North Dakota as the Metropolitan Planning Organization responsible for preparing and maintaining the Metropolitan Transportation Plan; and

WHEREAS, the Bismarck-Mandan Metropolitan Area Long Range Transportation Plan (2001) recommended a the Northern Bridge Corridor Study be conducted; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization after extensive public involvement and substantial consideration of technical, environmental, financial and social factors has prepared the Northern Bridge Corridor Study, which is in compliance with federal transportation planning standards; and

WHEREAS, all cognizant State and Federal agencies have reviewed the Corridor Study and indicated their full support; and

NOW, THEREFORE BE IT RESOLVED, that the Burleigh County Commission on December 6, 2004 did not endorse any action from the 2005 Northern Bridge Corridor Study.

Jerry Woodcox

Jerry Woodcox, Chairman
Burleigh County Commission
Burleigh County

1-24-05

Date

Resolution of Adoption

For the 2005 Bismarck-Mandan and Burleigh and Morton Counties Metropolitan Area Northern Bridge Corridor Study

WHEREAS, the U.S. Department of Transportation requires the formulation, approval, and maintenance of a Metropolitan Transportation Plan for the urban area as a condition of federal transportation funding; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization has been designated by the Governor of North Dakota as the Metropolitan Planning Organization responsible for preparing and maintaining the Metropolitan Transportation Plan; and

WHEREAS, the Bismarck-Mandan Metropolitan Area Long Range Transportation Plan (2001) recommended a the Northern Bridge Corridor Study be conducted; and

WHEREAS, the Bismarck-Mandan Metropolitan Planning Organization after extensive public involvement and substantial consideration of technical, environmental, financial and social factors has prepared the Northern Bridge Corridor Study, which is in compliance with federal transportation planning standards; and

WHEREAS, all cognizant State and Federal agencies have reviewed the Corridor Study and indicated their full support; and

NOW, THEREFORE BE IT RESOLVED, that the Morton County Commission on December 7, 2004 endorsed Do Nothing, Alternative A, in the 2005 Northern Bridge Corridor Study.

James Boehm
Jim Boehm, Chairman
Morton County Commission
Morton County

1-2-05
Date

Project Decisions—Bismarck-Mandan Metropolitan Planning Organization

Northern Bridge Corridor Study

Bismarck-Mandan Metropolitan Planning Organization
January 2005

1. **Which bridge corridor alternative should be adopted?**

   _____ **Alternative A: Do Nothing**

   _____ **Alternative B: Northern Route**

   __X__ **Alternative D: Southern Route**

   Comments:

   _____

   _____

   _____

   _____

2. **If Alternative B is chosen, which horizontal alignment should be adopted in Morton County?**

   _____ **Route B-1**—*would follow the section line from 37th Street past the south side of the Landeis subdivision.*

   ✓ If route B-1 is chosen, which intersection option should be adopted for ND Highway 1806?

   _____ **Intersection Option 1**—*would keep ND Highway 1806 in its current location and intersect with Alternative B at 60°.*

   _____ **Intersection Option 2**—*would realign ND Highway 1806 with Alternative B at 90°.*

   _____ **Route B-2**—*would be located south of and parallel to Route B-1, approximately 640 feet south of the section line.*

   Comments:

   _____

   _____

   _____

   _____

3. **If Alternative B is chosen, which horizontal alignment should be adopted in Burleigh County?**

_____ **Route B-3**—*would angle northeast across Section 2, T139N, R81W to connect with ND Highway 1804 at the existing Burnt Creek Loop intersection.*

_____ **Route B-4**—*would generally follow the undeveloped section line already master planned to be a minor arterial (71st Avenue), climb the steep bluff east of River Road, and connect with ND Highway 1804.*

✓ If route B-4 is chosen, which intersection option should be adopted for ND Highway 1804?

_____ **Intersection Option 1**—*would follow the section line and intersect directly with the east/west segment of ND Highway 1804, creating a 90° intersection with River Road.*

_____ **Intersection Option 2**—*would establish the intersection of ND Highway 1804 and Route B-4 at the tangent point of the horizontal curve on ND Highway 1804.*

Comments:

_____

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_____

4. **If Alternative D is chosen, which horizontal alignment should be adopted in Morton County?**

_X_ **Route D-1**—*would traverse diagonally in a southeast direction through the rugged terrain in Sections 8 and 9, T139N, R81W.*

_____ **Route D-2**—*would also traverse Sections 8 and 9 diagonally southeast and turn east onto east-west section line (38th Street) about ½-mile west of where Route D-1 reaches 38th Street.*

✓ Which intersection option should be adopted for ND Highway 1806?

_____ **Intersection Option 1**—*locates the future realignment of ND Highway 1806 about ¼-mile west to provide adequate intersection spacing on the Alternative D corridor while intersecting Alternative D at a 90° angle.*

__X__ **Intersection Option 2A**—*locates the future realignment of ND Highway 1806 south of the 38th Street intersection, and relocates the existing ND Highway 1806 about ¼-mile east across Tesoro Refinery property to provide adequate intersection spacing on the Alternative D corridor.*

_____ **Intersection Option 2B**—*would be identical to option 2A except for the connection to the old Highway 1806 alignment, which would run east-west.*

Comments:

_____

_____

_____

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5. **If Alternative D is chosen, which horizontal alignment should be adopted in Burleigh County?**

__X__ **Route D-3**—*would climb the bluff east of River Road along the north side of the Burnt Creek alignment, with a bridge over River Road.*

_____ **Route D-4**—*would depart from the Burnt Creek Loop alignment, angling southeast ¼-mile to take advantage of a large coulee to provide an at-grade intersection with River Road.*

_____ **Route D-5**—*would climb the bluff east of River Road along the north side of the Burnt Creek alignment, with a bridge over River Road. This route would intersect ND Highway 1804 at a 90° angle.*

✓ Which intersection option should be adopted for Fernwood Drive?

__X__ **Intersection Option 1**—*would reroute Burnt Creek Loop further east to intersect with Fernwood Drive. The alignment would create an 82° intersection with Alternative D.*

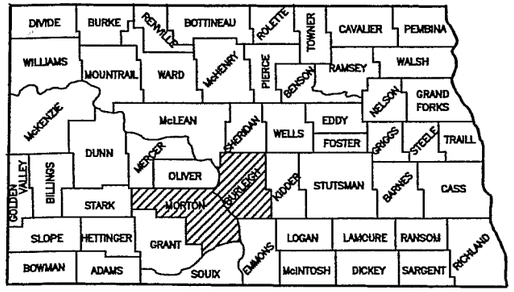
_____ **Intersection Option 2**—*would use the proposed realignment of Fernwood Drive as shown in the Fringe Area Road Master Plan. This route would create a 65° intersection with Alternative D.*

Comments:

6. **Amendments/Comments for Northern Bridge Corridor Study.**

Claus Lembke
Chairman of Policy Board
Burleigh County Representative
Bismarck-Mandan MPO Policy Board

1-19-05
Date



STATE OF NORTH DAKOTA
SHOWING COUNTIES

BISMARCK–MANDAN MPO

NORTHERN BRIDGE CORRIDOR PRESERVATION AREA IN BURLEIGH & MORTON COUNTIES

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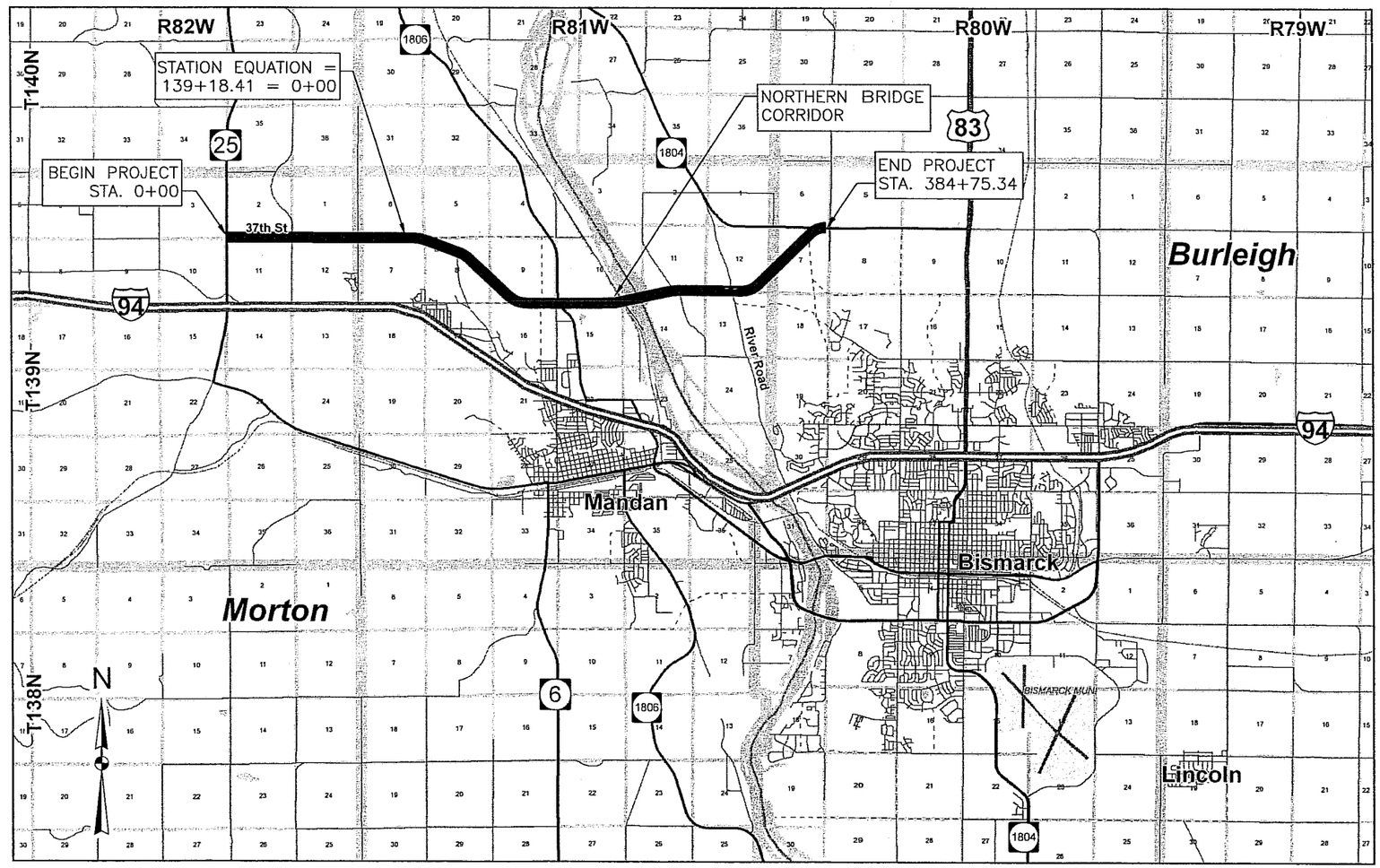

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ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER NO. 3268 NORTH DAKOTA

ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

DATE: 4/4/05

ANY QUESTIONS REGARDING THESE PLANS CAN BE DIRECTED TO:
ROBERT SHANNON
KADRMAS, LEE & JACKSON
3237 E BROADWAY or
PO BOX 1157
BISMARCK, ND 58502–1157
PHONE (701)–355–8400
FAX (701)–255–0943

Date: 02–01–2005

Kadrmas Lee & Jackson
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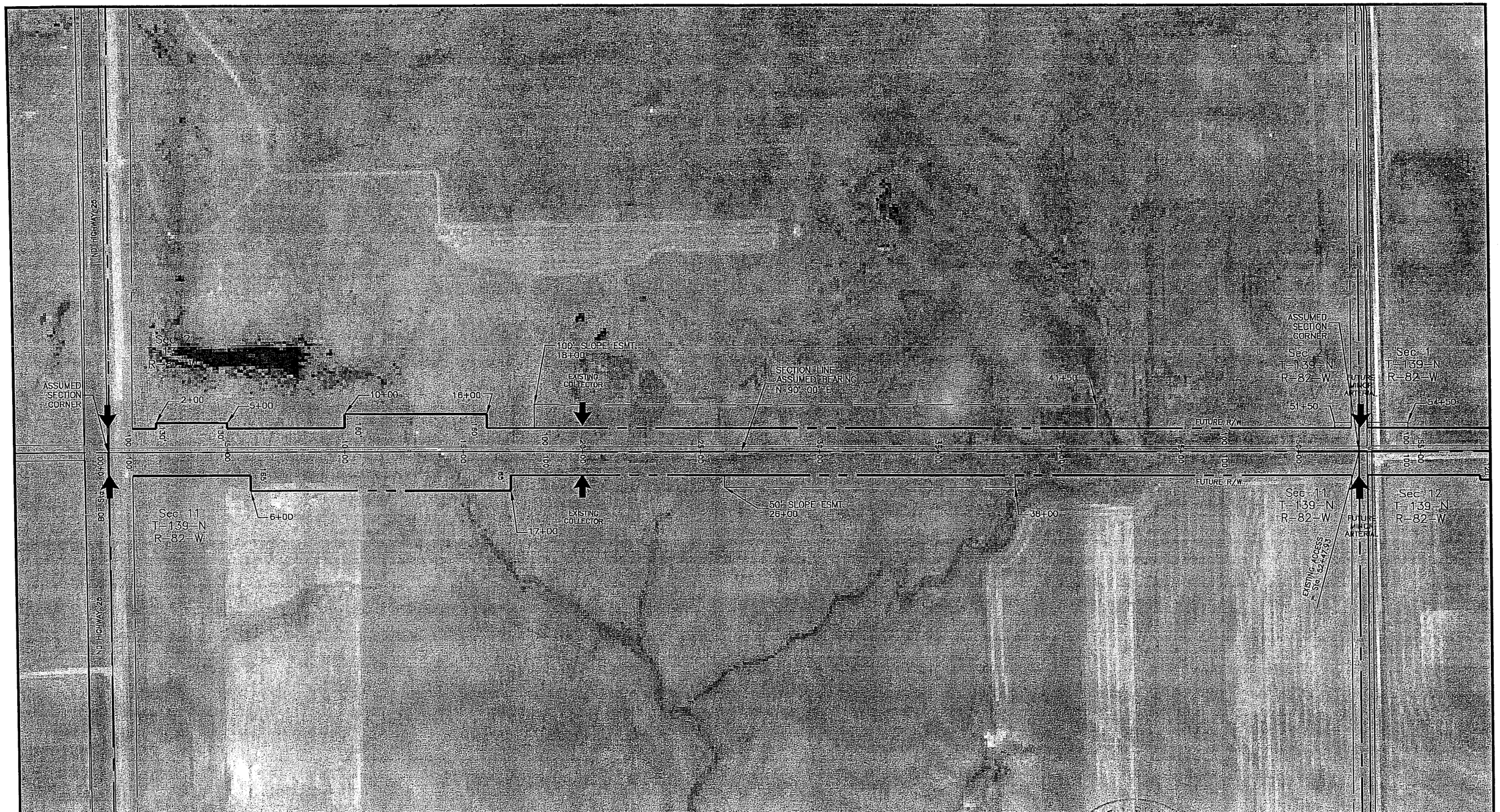

LEGEND

- EXISTING ACCESS OR FUTURE FRINGE AREA ROAD MASTER PLAN INTERSECTION
- FUTURE RIGHT OF WAY BOUNDARY
- EXISTING RIGHT OF WAY BOUNDARY
- SLOPE EASEMENT
- SECTION LINE

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ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER

ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

DATE 4/12/05

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NORTHERN BRIDGE CORRIDOR
Bismarck–Mandan MPO
Burleigh & Morton Counties

SHEET NO. 2

Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

CORRIDOR PRESERVATION PLAN VIEW

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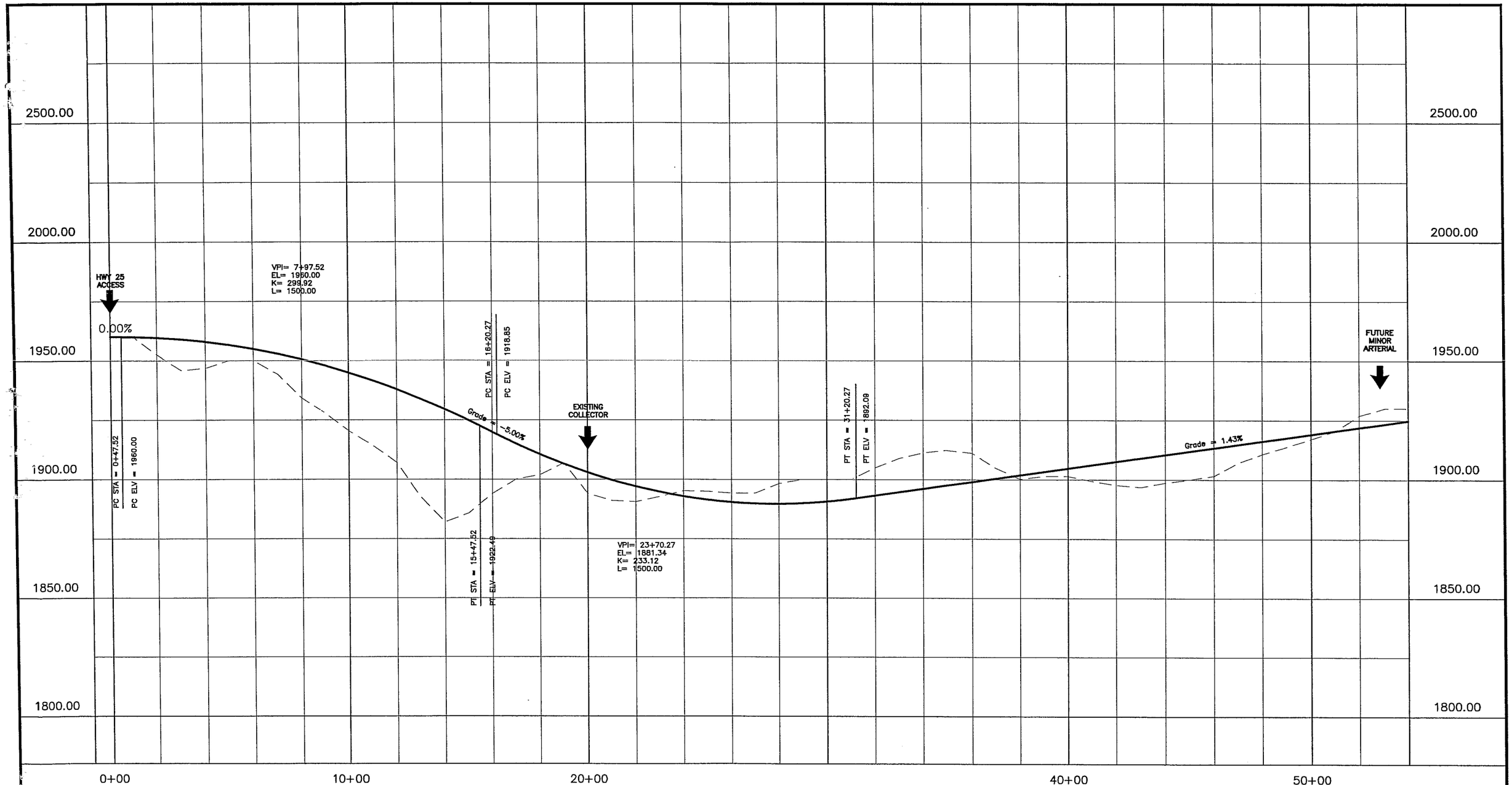

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ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

DATE: 4/4/05

ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER PE-2278 NORTH DAKOTA

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NORTHERN BRIDGE CORRIDOR
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Burleigh & Morton Counties

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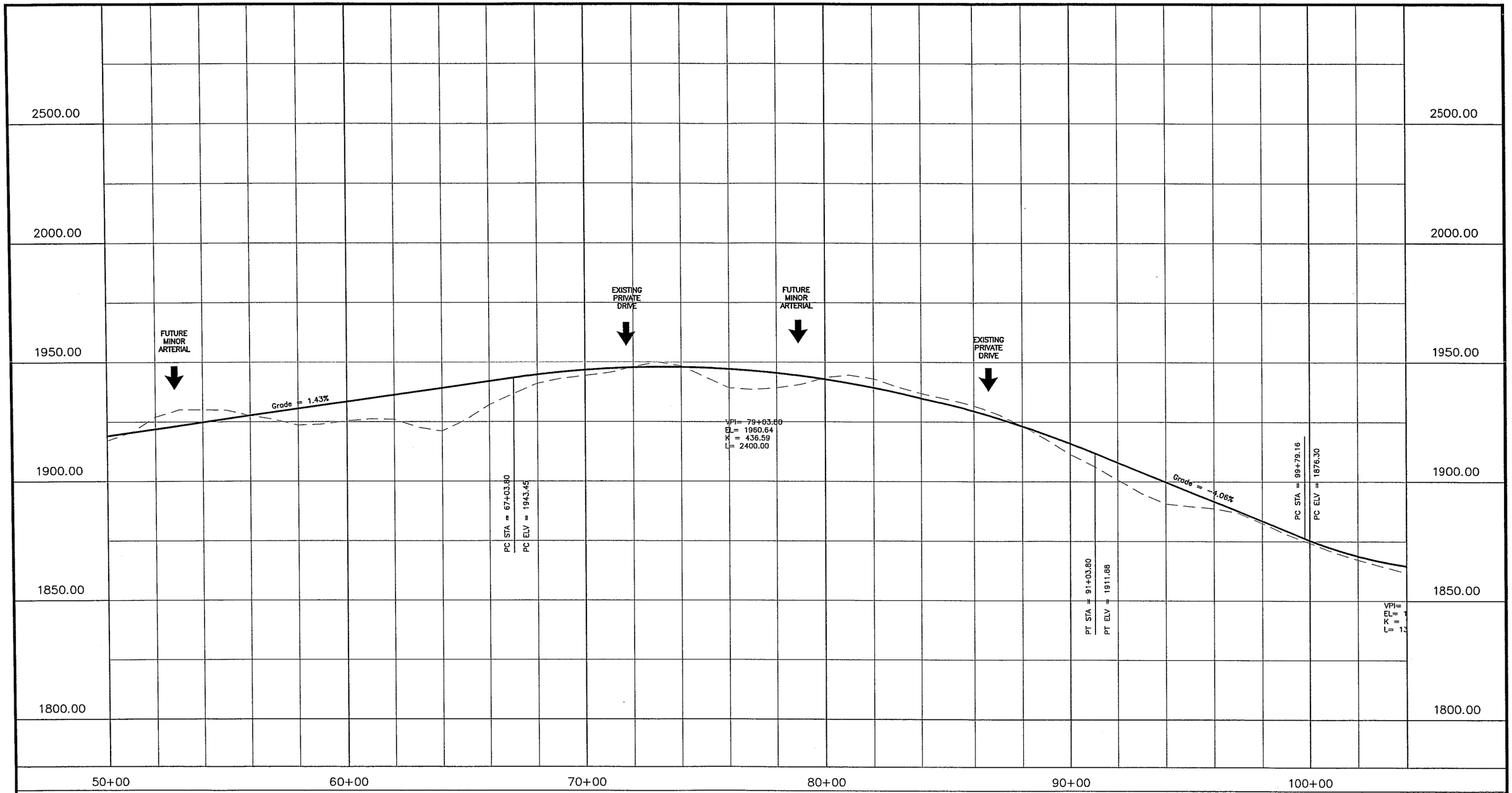

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ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER PE 3258 NORTH DAKOTA

ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

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NORTHERN BRIDGE CORRIDOR
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Burleigh & Morton Counties

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ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

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NORTHERN BRIDGE CORRIDOR
Bismarck-Mandan MPO
Burleigh & Morton Counties

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CORRIDOR PRESERVATION PLAN VIEW

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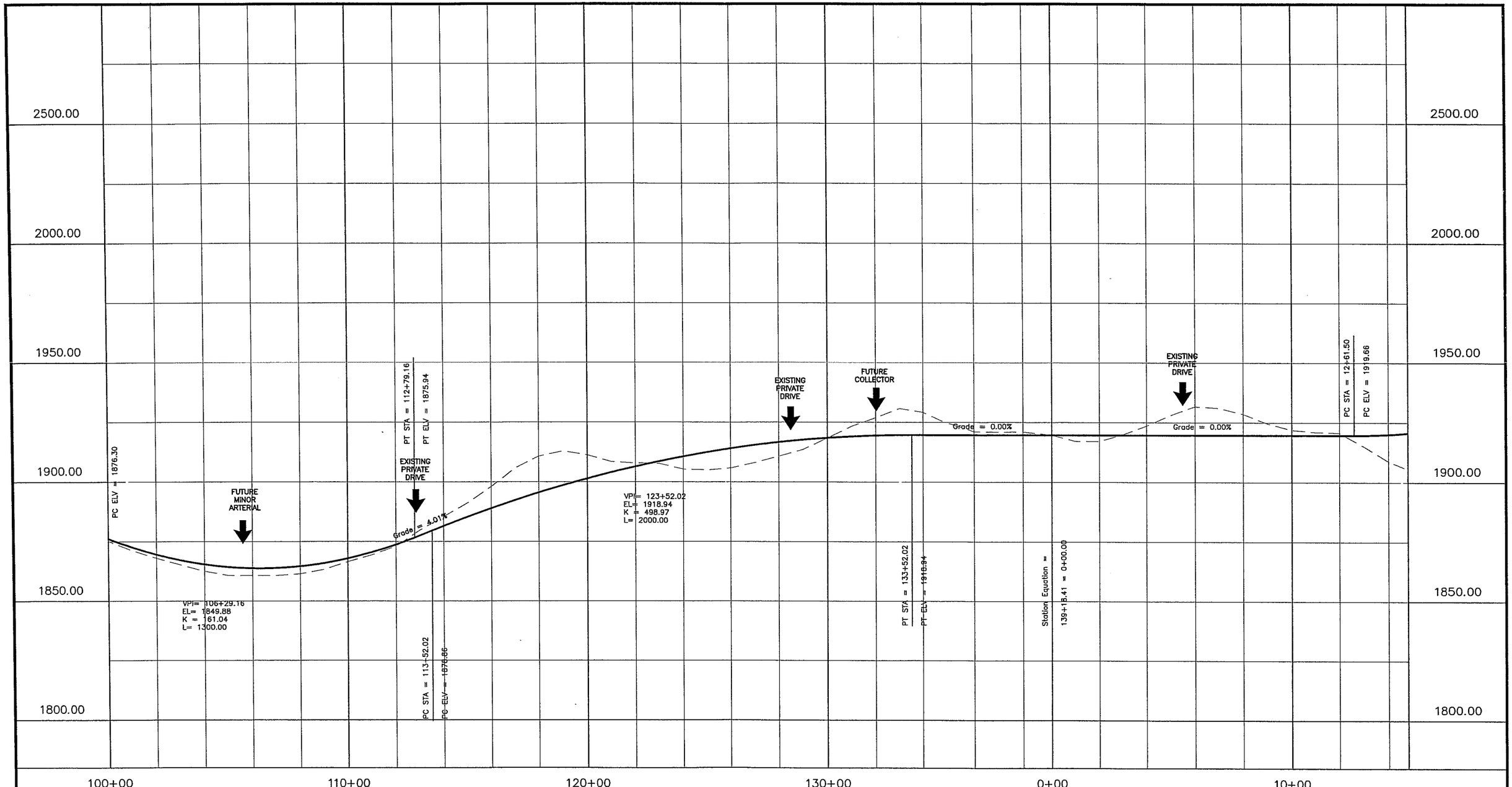

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ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER PE 3258 NORTH DAKOTA

ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

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NORTHERN BRIDGE CORRIDOR
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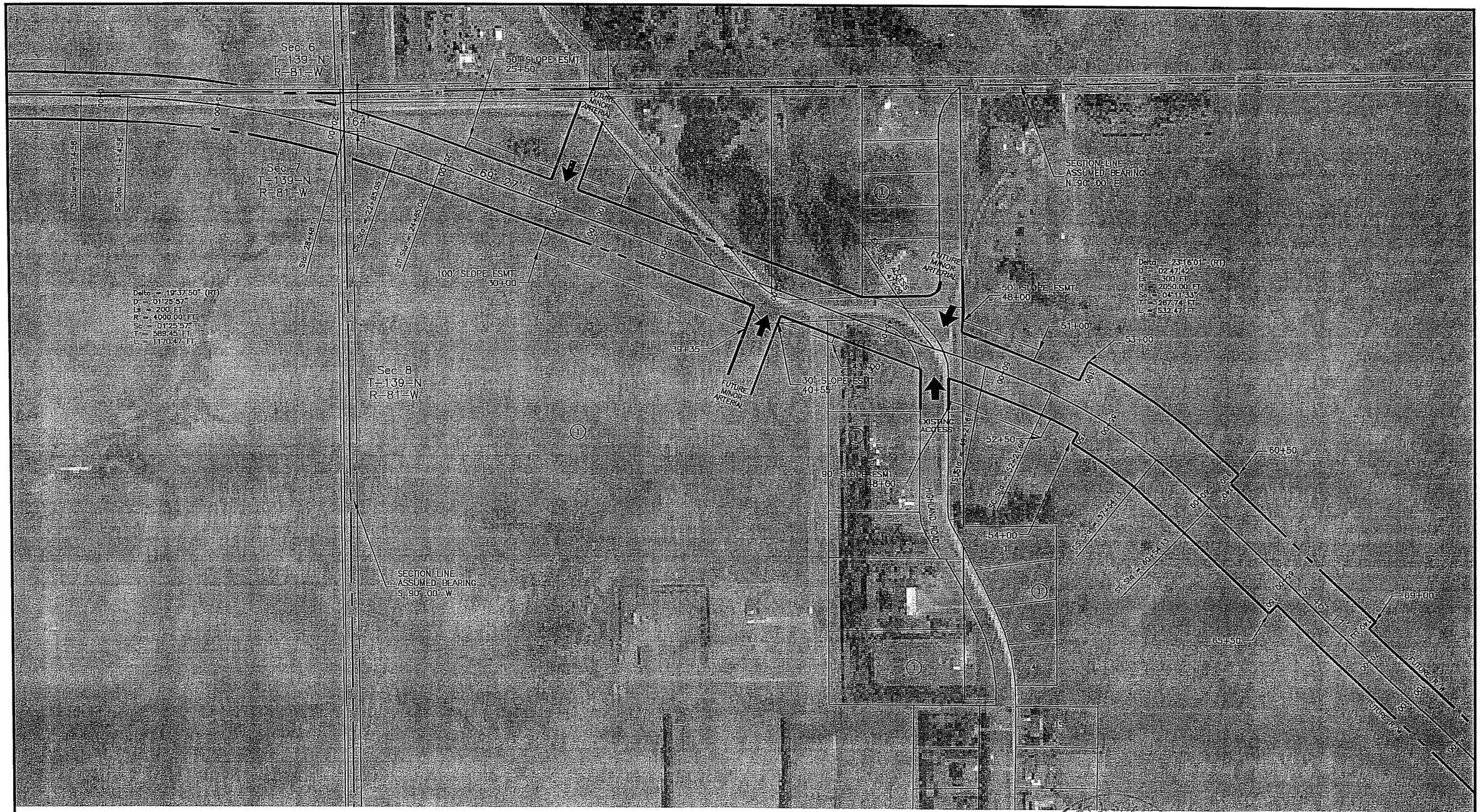

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ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

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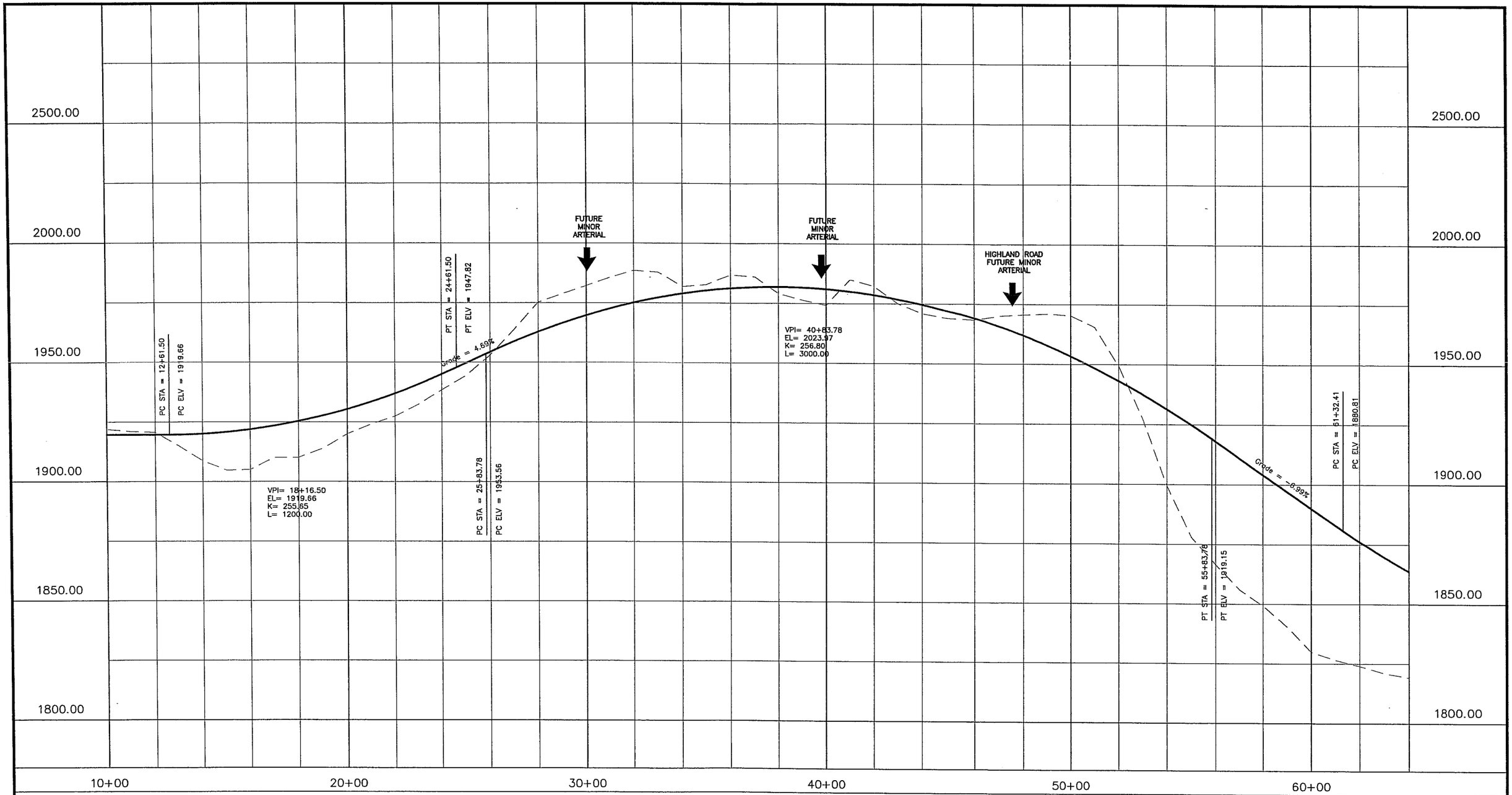

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ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

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NORTHERN BRIDGE CORRIDOR
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Burleigh & Morton Counties

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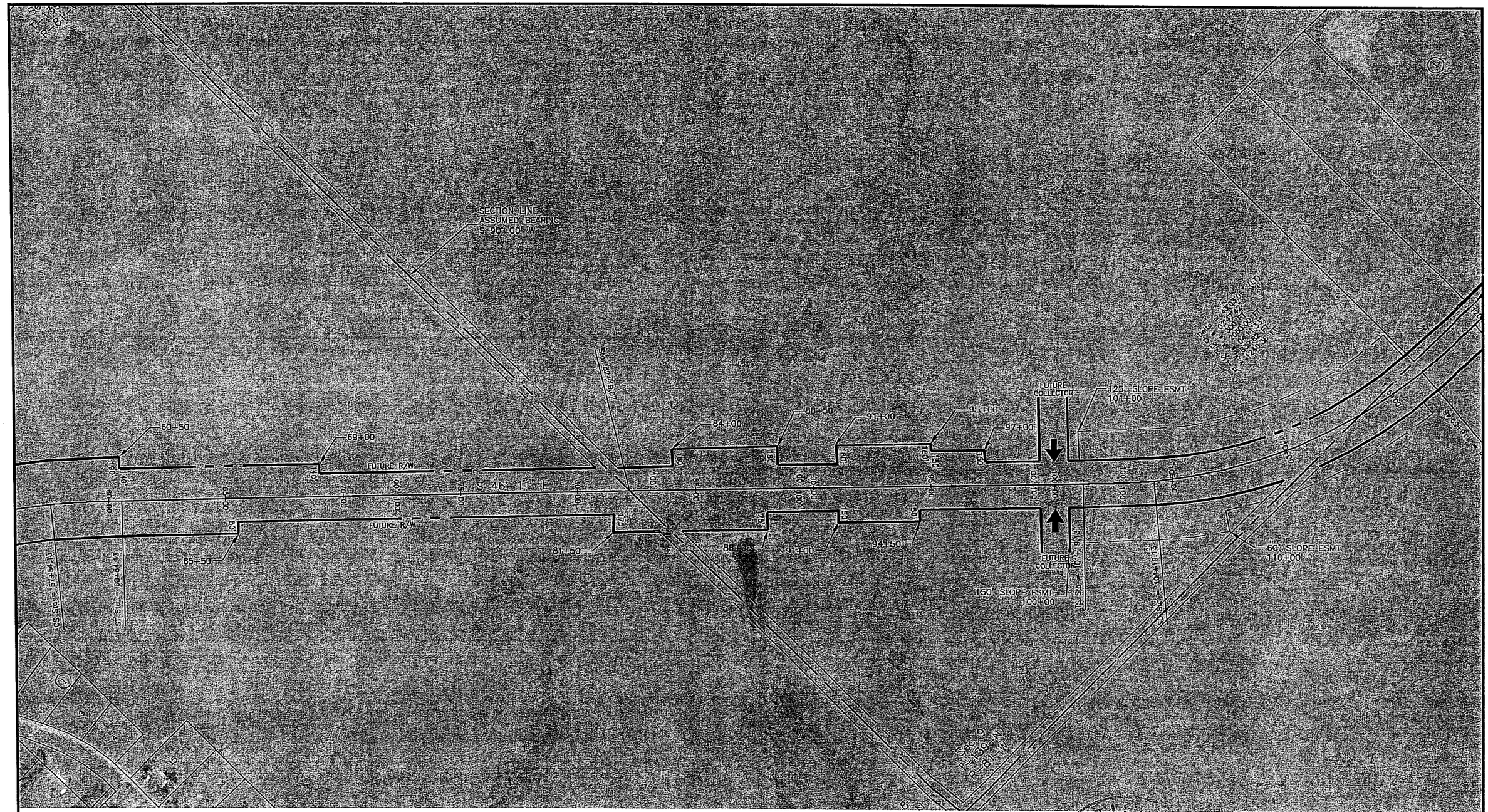

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ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

DATE: 4/4/05

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NORTHERN BRIDGE CORRIDOR
Bismarck–Mandan MPO
Burleigh & Morton Counties

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Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

CORRIDOR PRESERVATION PLAN VIEW

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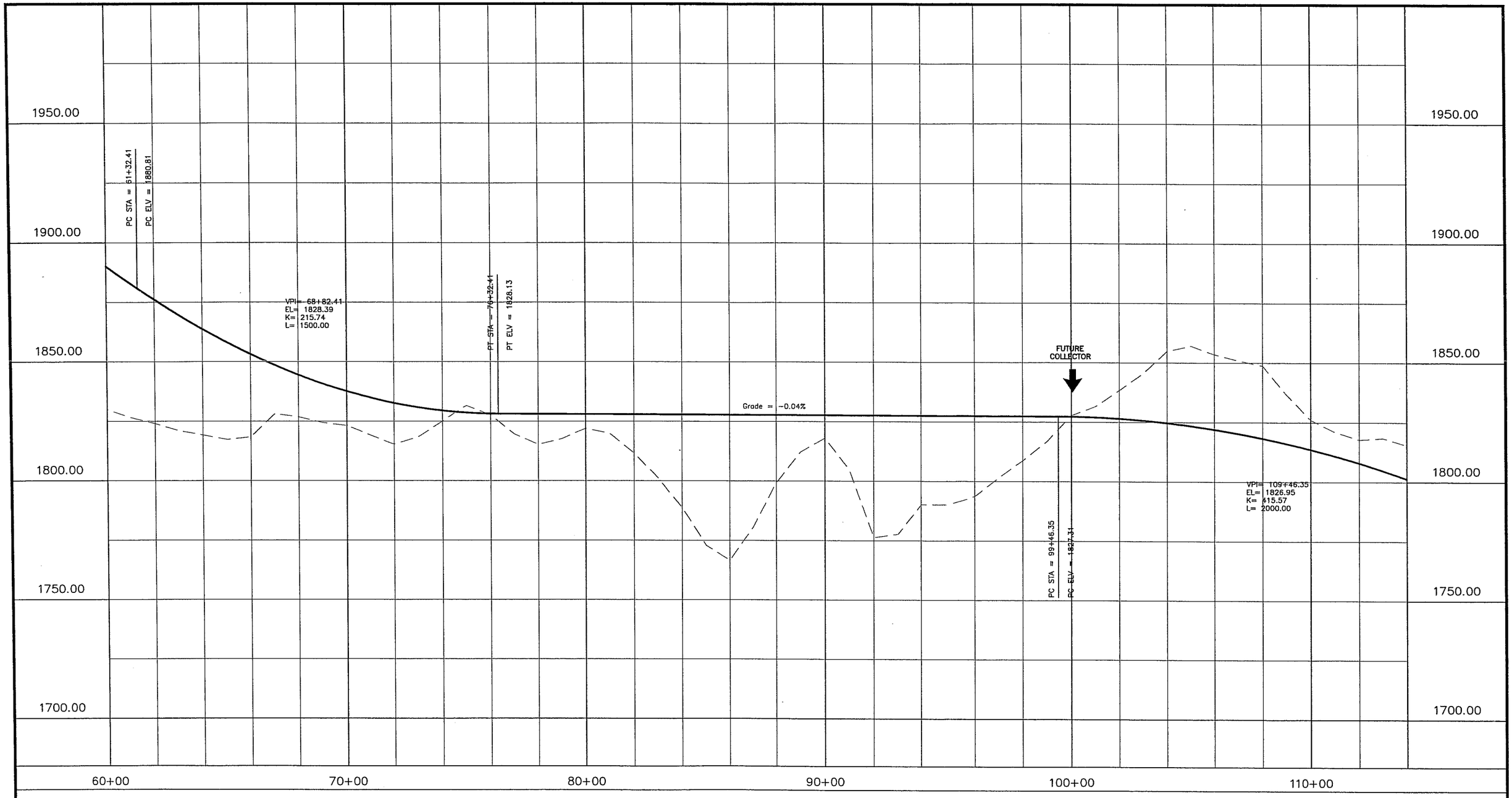

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ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER PE 3258 NORTH DAKOTA

DATE: 4/4/05

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NORTHERN BRIDGE CORRIDOR
Bismarck–Mandan MPO
Burleigh & Morton Counties

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LEGEND

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- FUTURE RIGHT OF WAY BOUNDARY
- EXISTING RIGHT OF WAY BOUNDARY
- SLOPE EASEMENT
- SECTION LINE

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ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA
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CORRIDOR PRESERVATION PLAN VIEW

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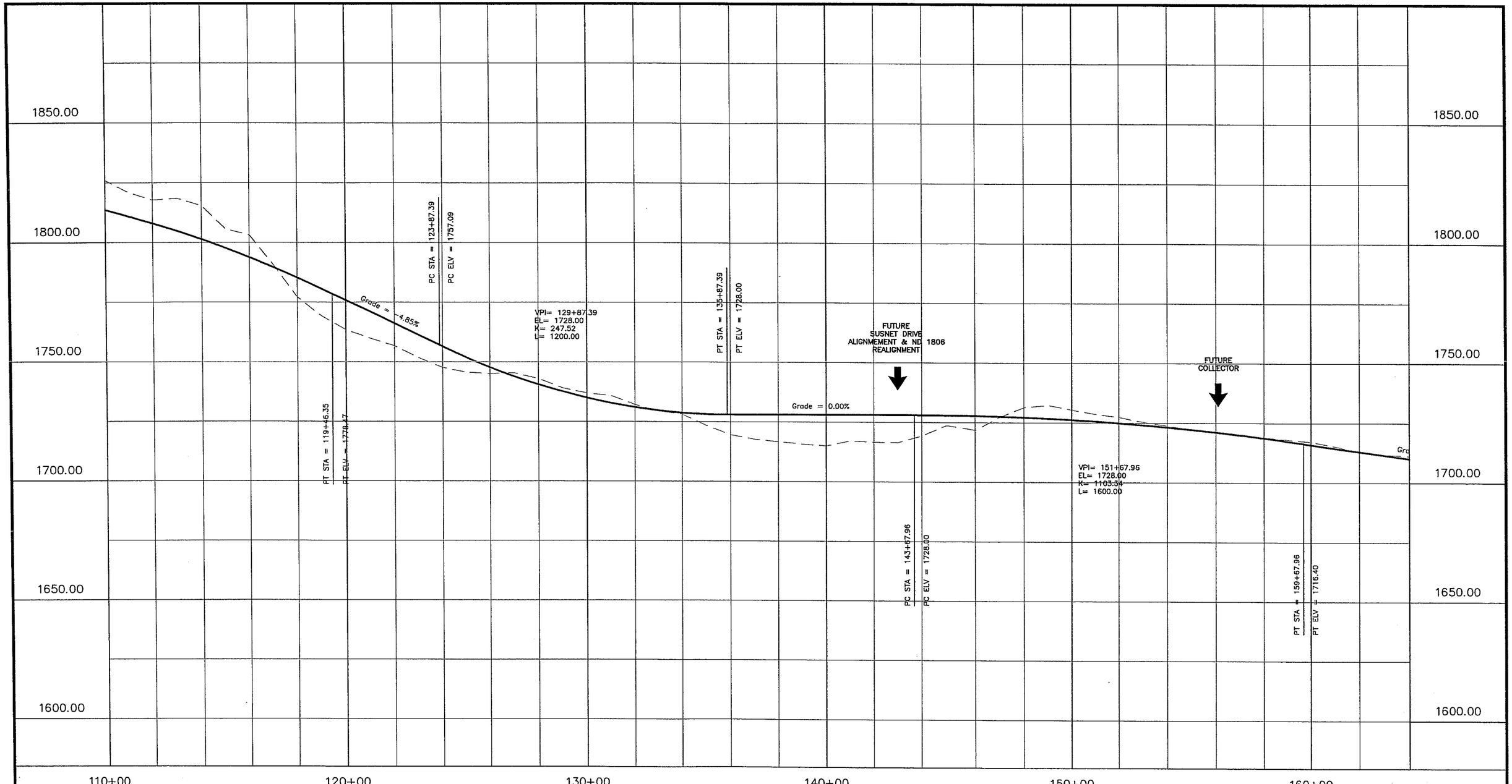

LEGEND

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- FUTURE VERTICAL PROFILE
- EXISTING VERTICAL PROFILE

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PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

DATE: 4/4/05

ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

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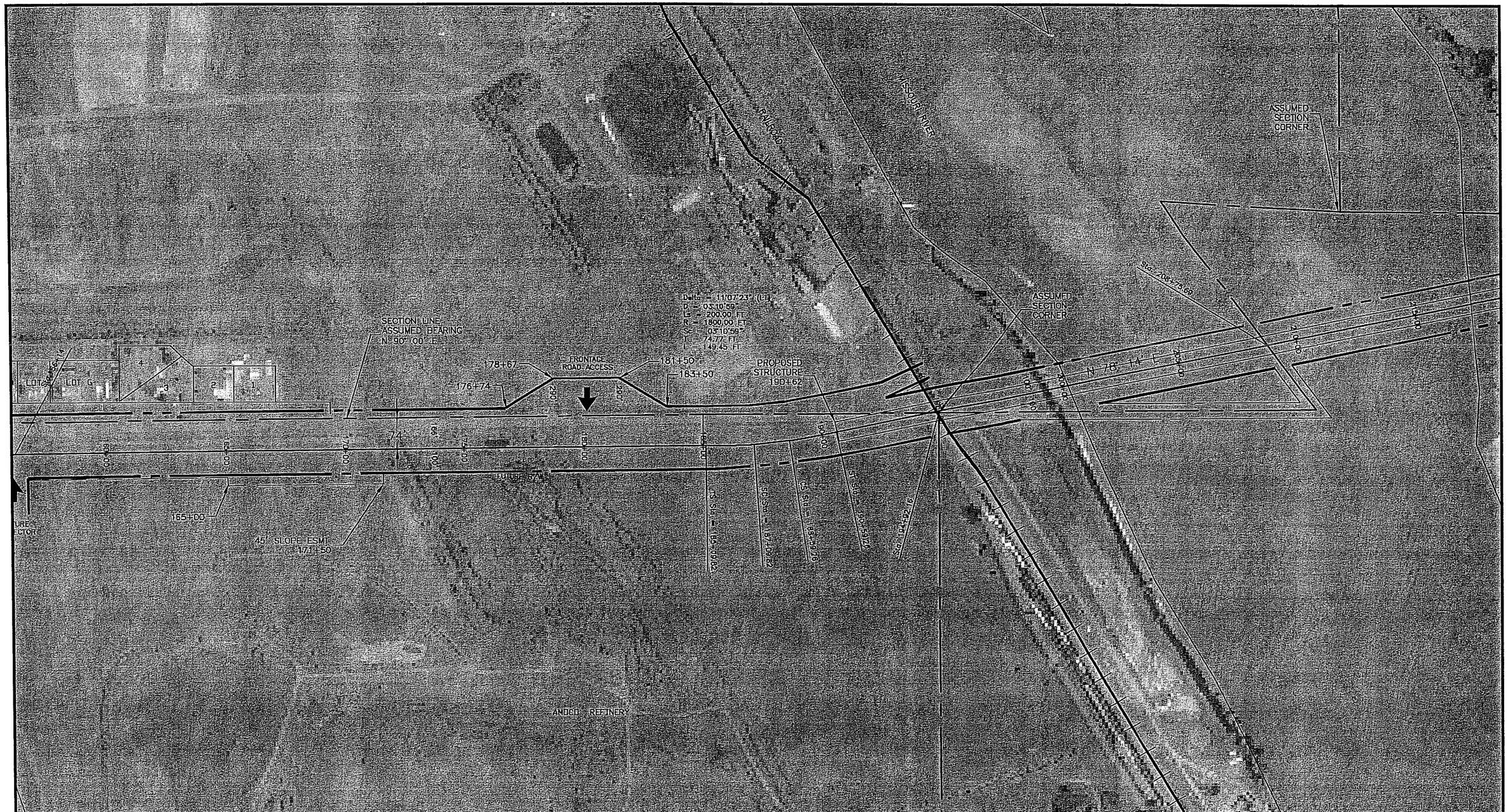

LEGEND

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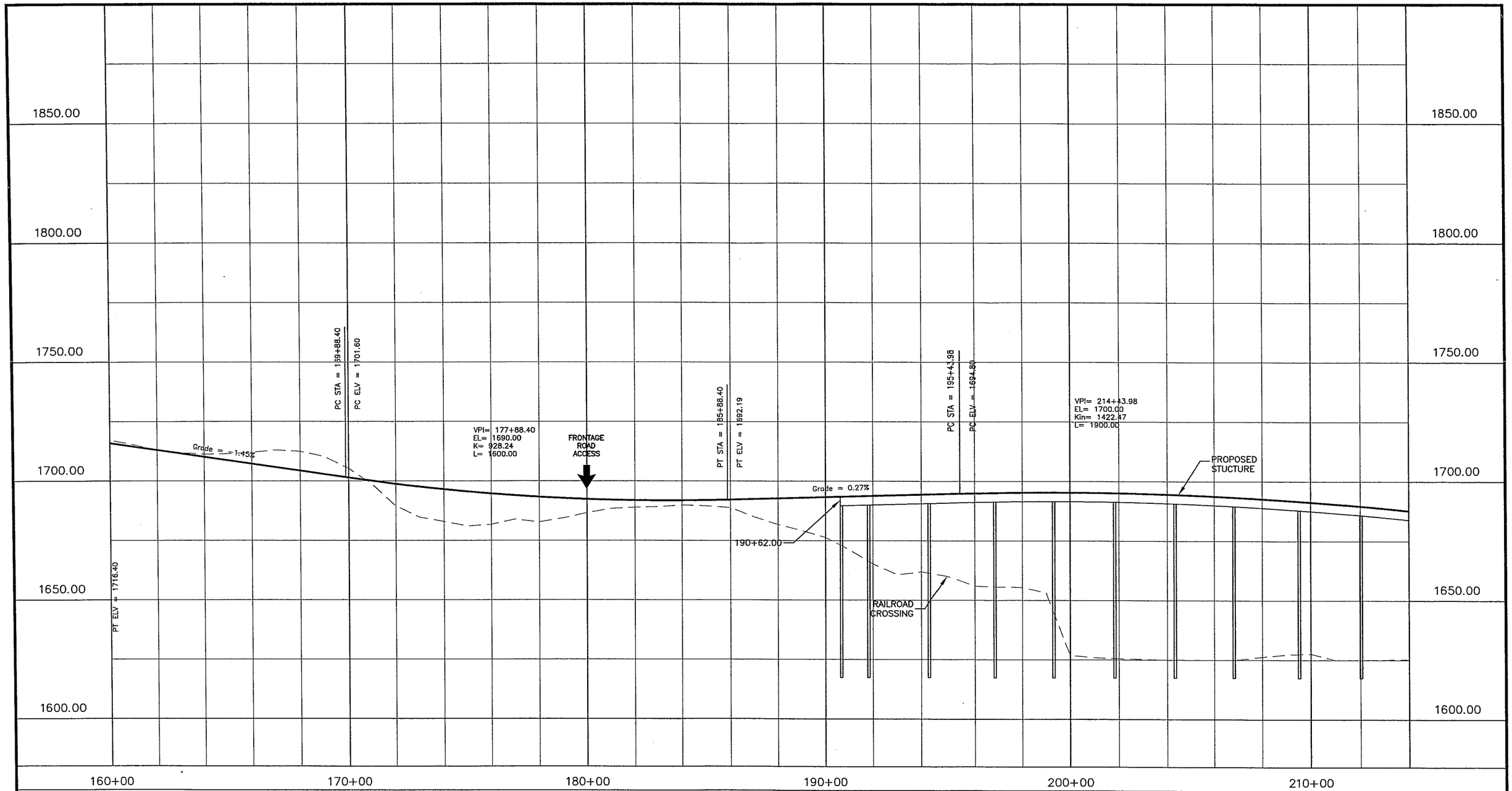

LEGEND

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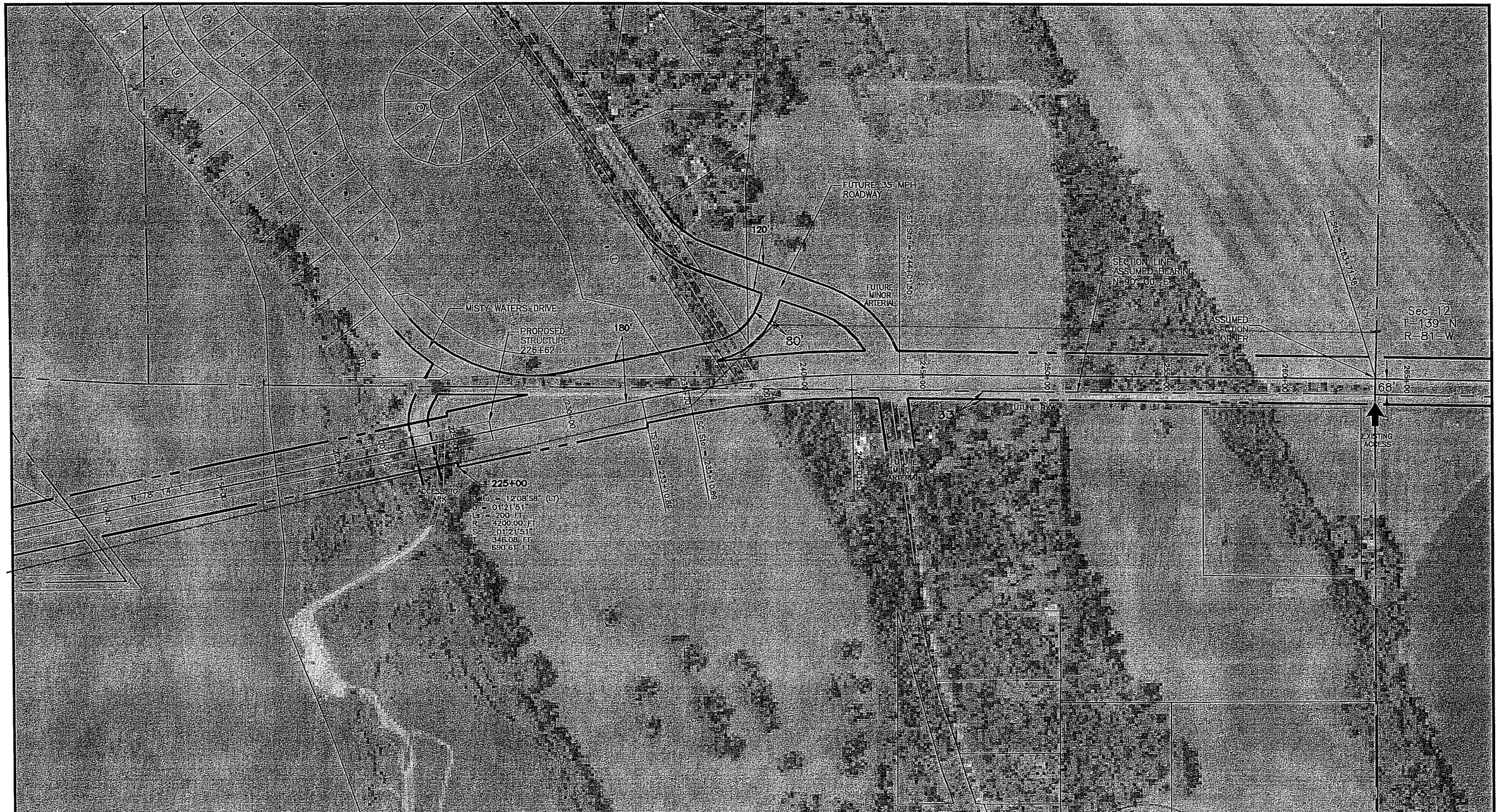

LEGEND

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ROBERT J. SHANNON REGISTERED PROFESSIONAL ENGINEER PE-3258 NORTH DAKOTA

ROBERT J. SHANNON, P.E.
PROJECT ENGINEER
BISMARCK, NORTH DAKOTA

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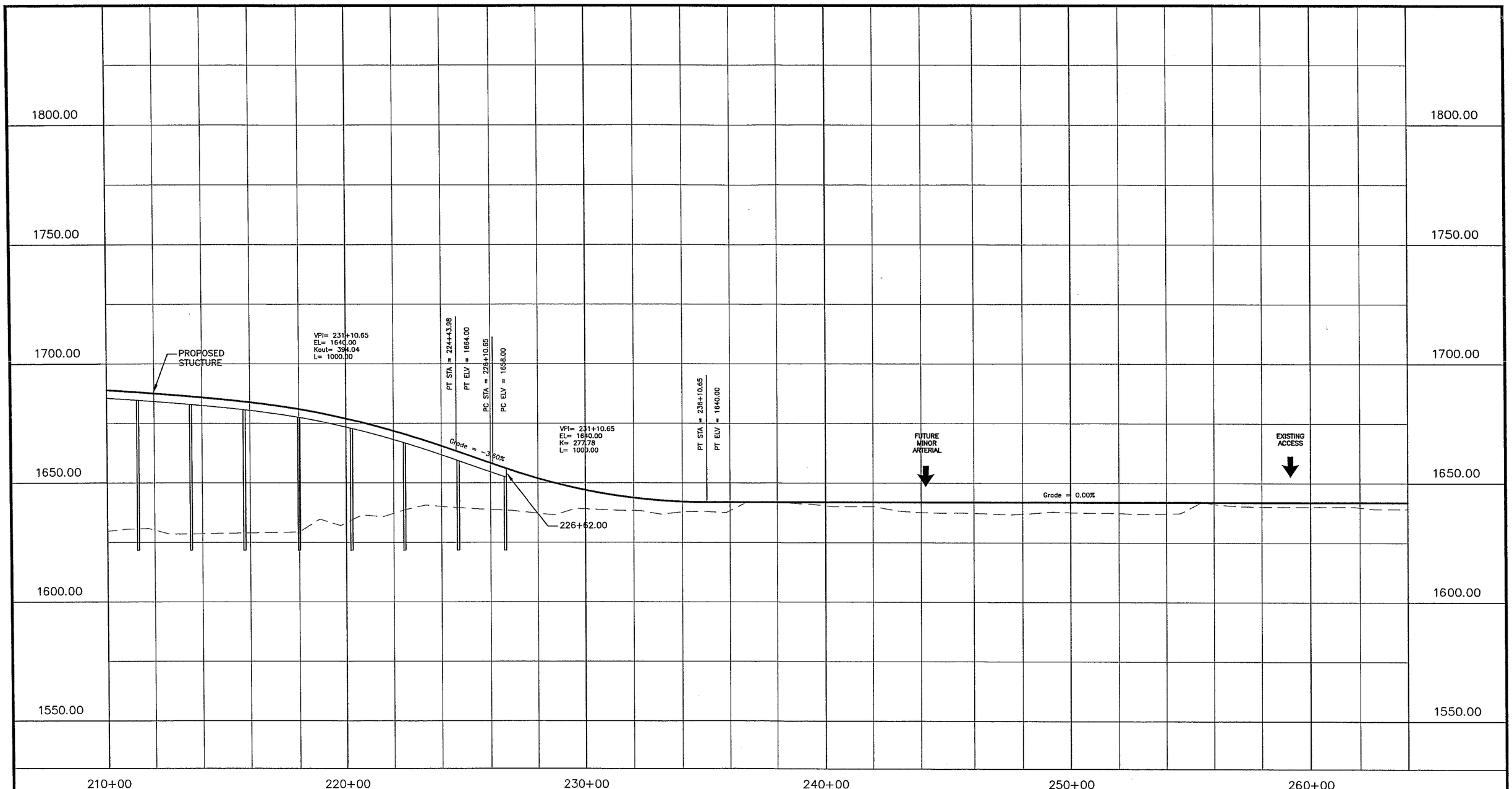

LEGEND

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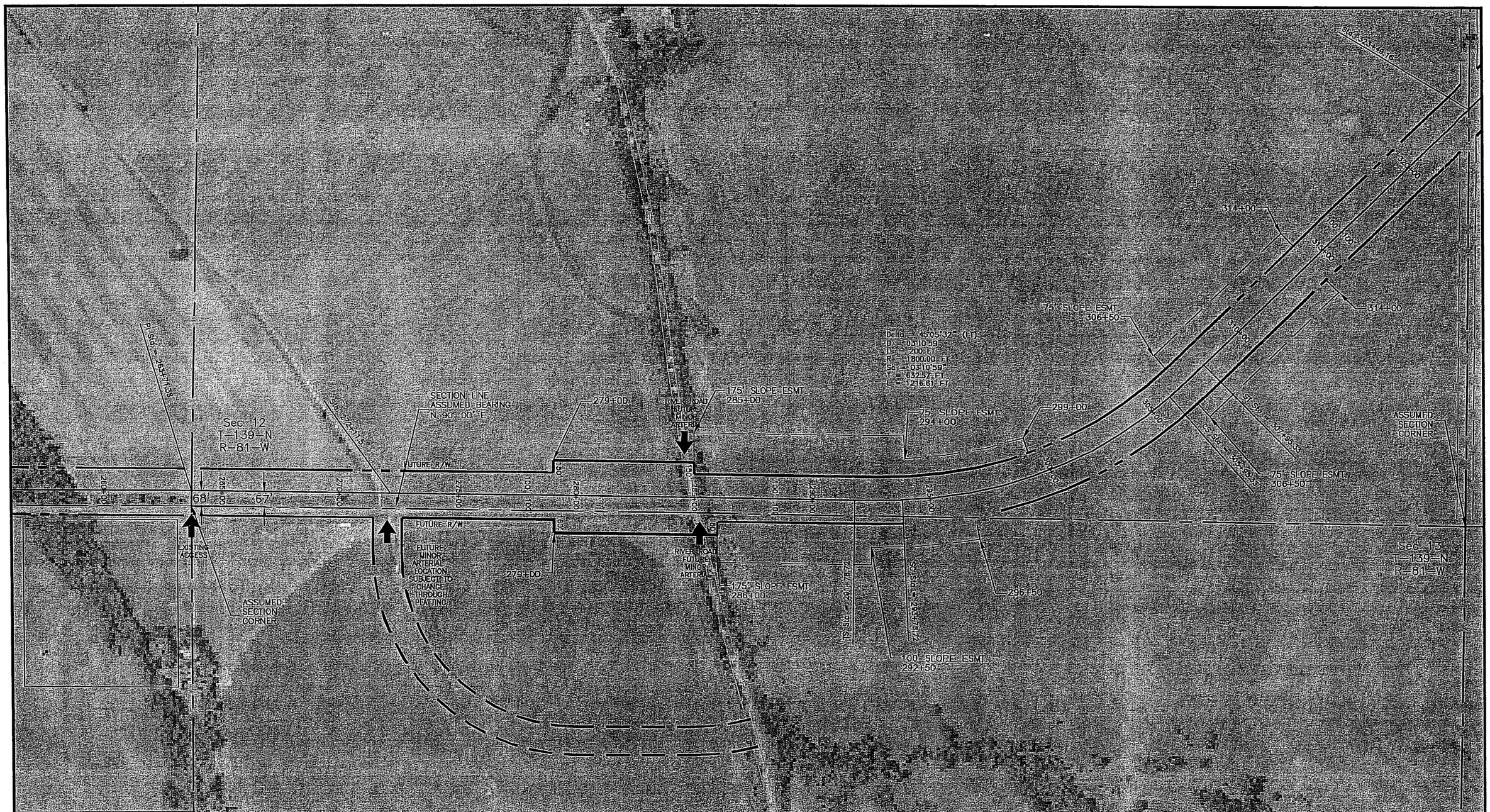

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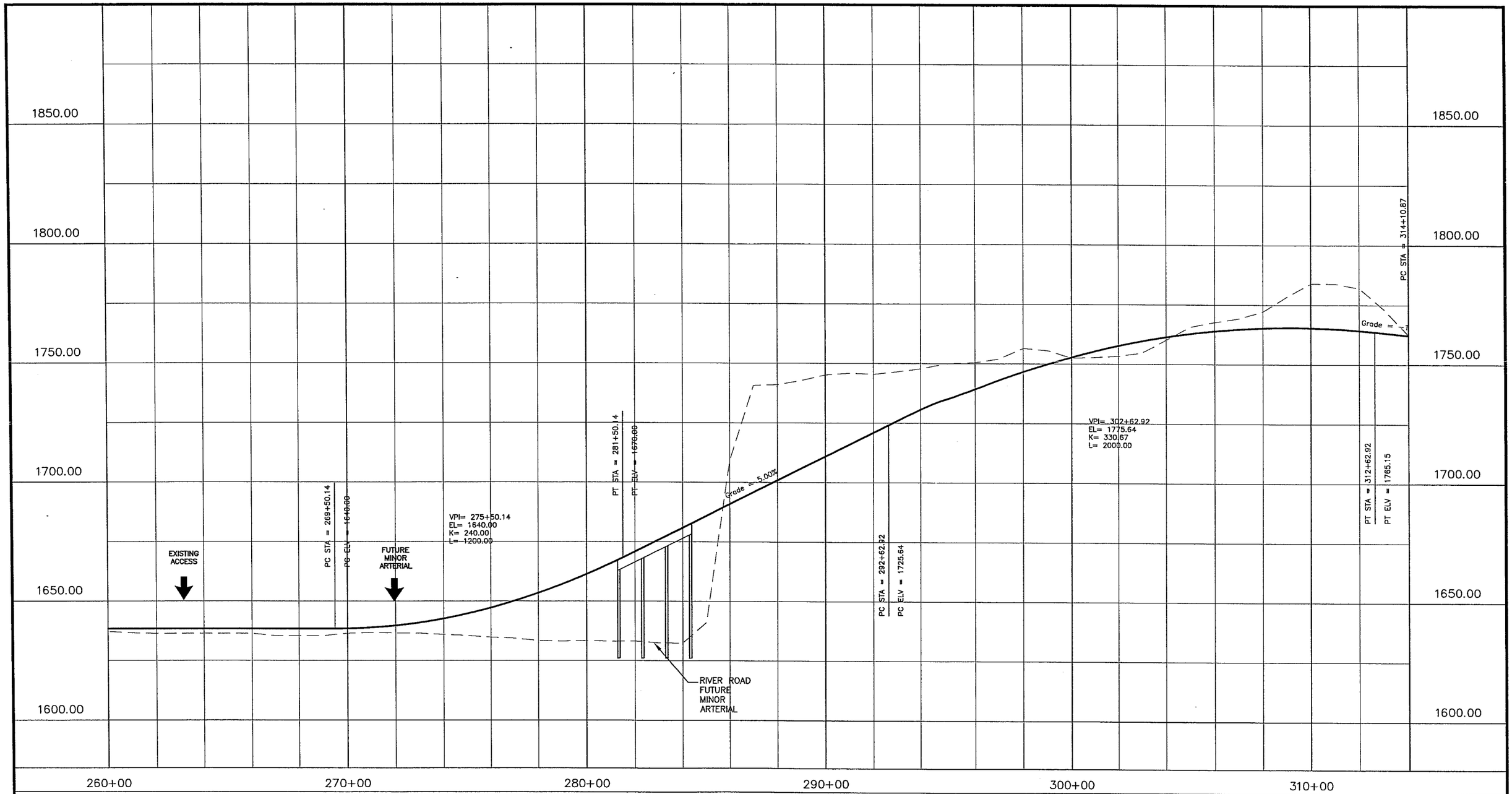

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PROJECT ENGINEER
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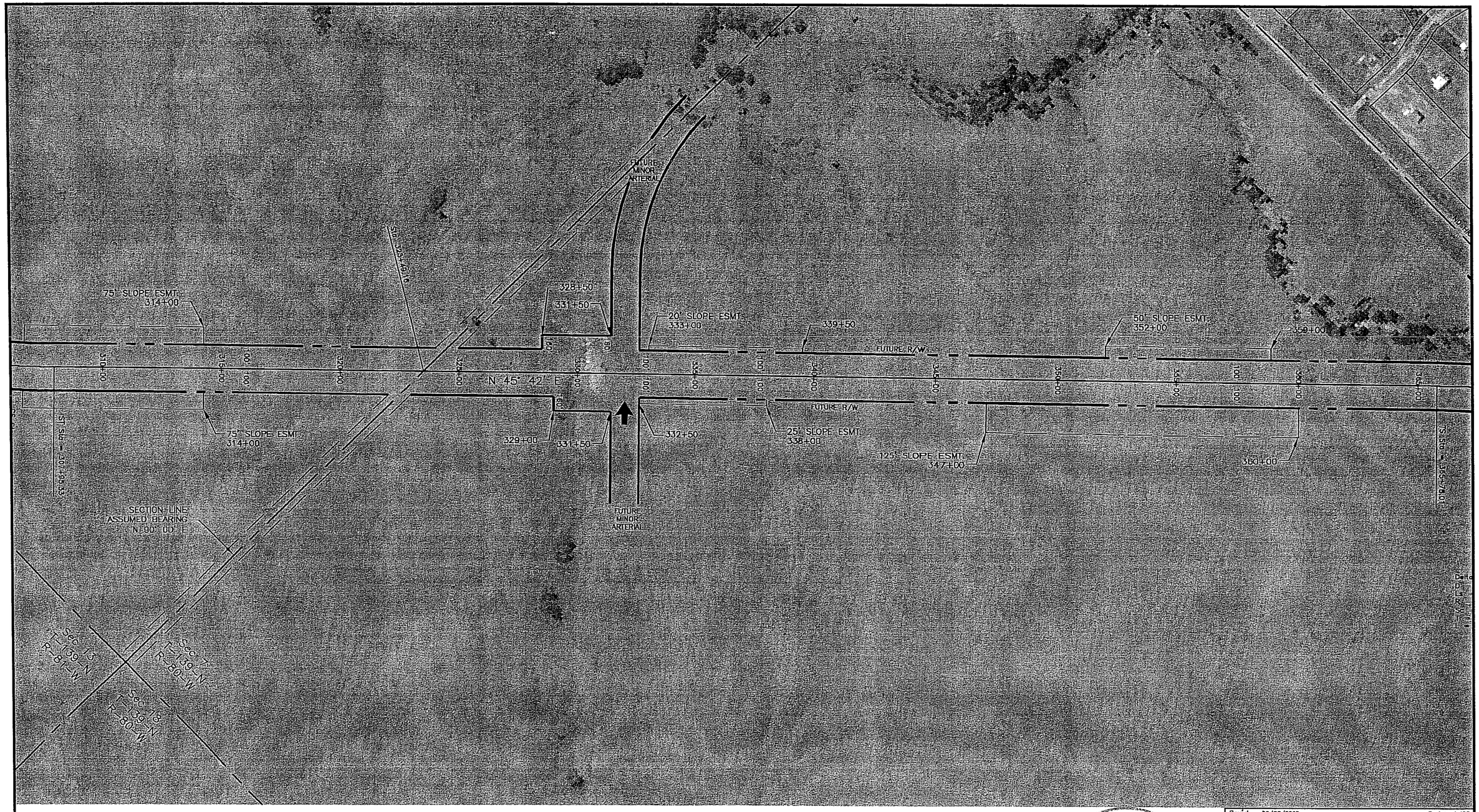

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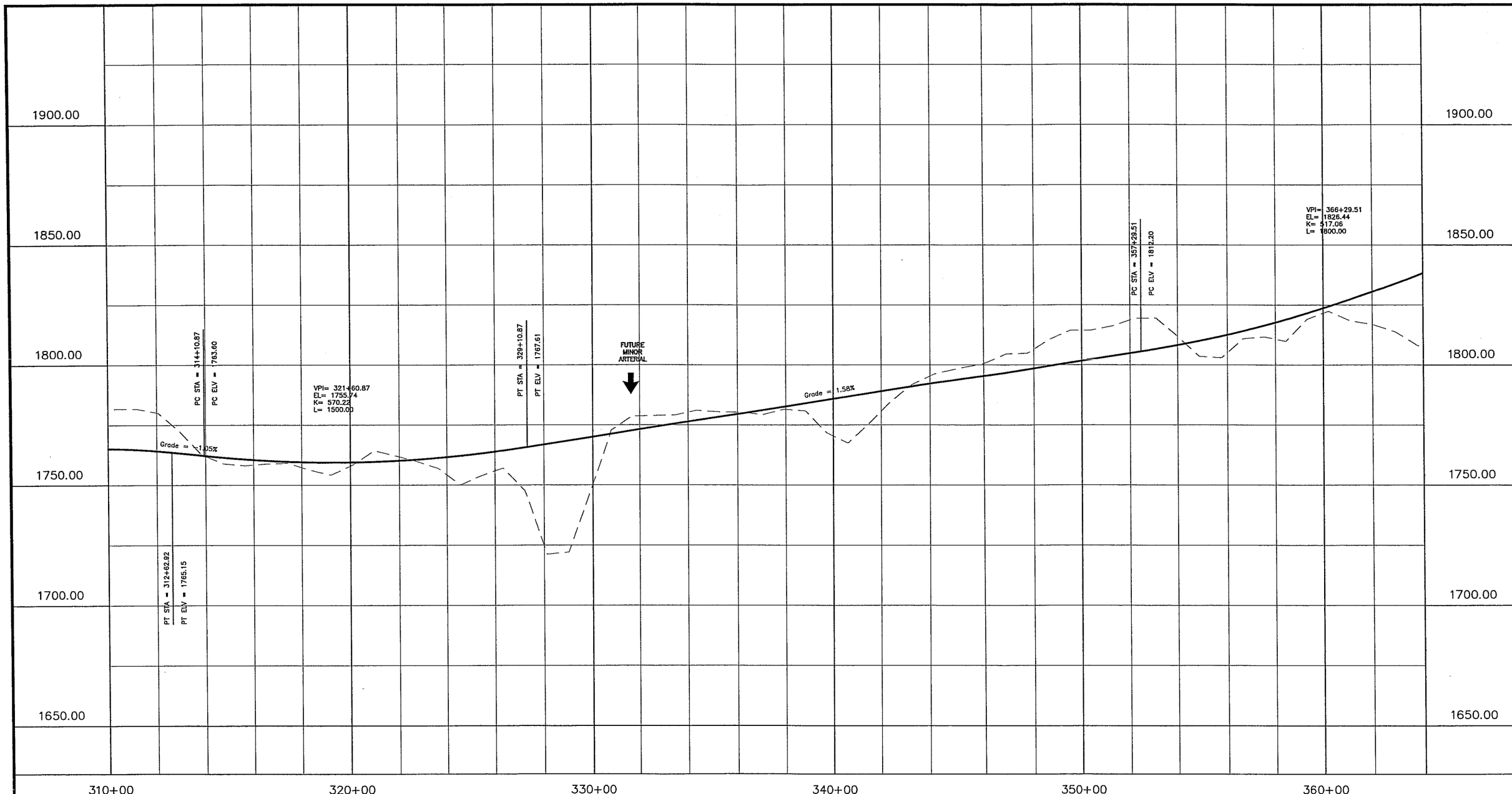

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BISMARCK, NORTH DAKOTA

DATE: 4/4/05

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NORTHERN BRIDGE CORRIDOR
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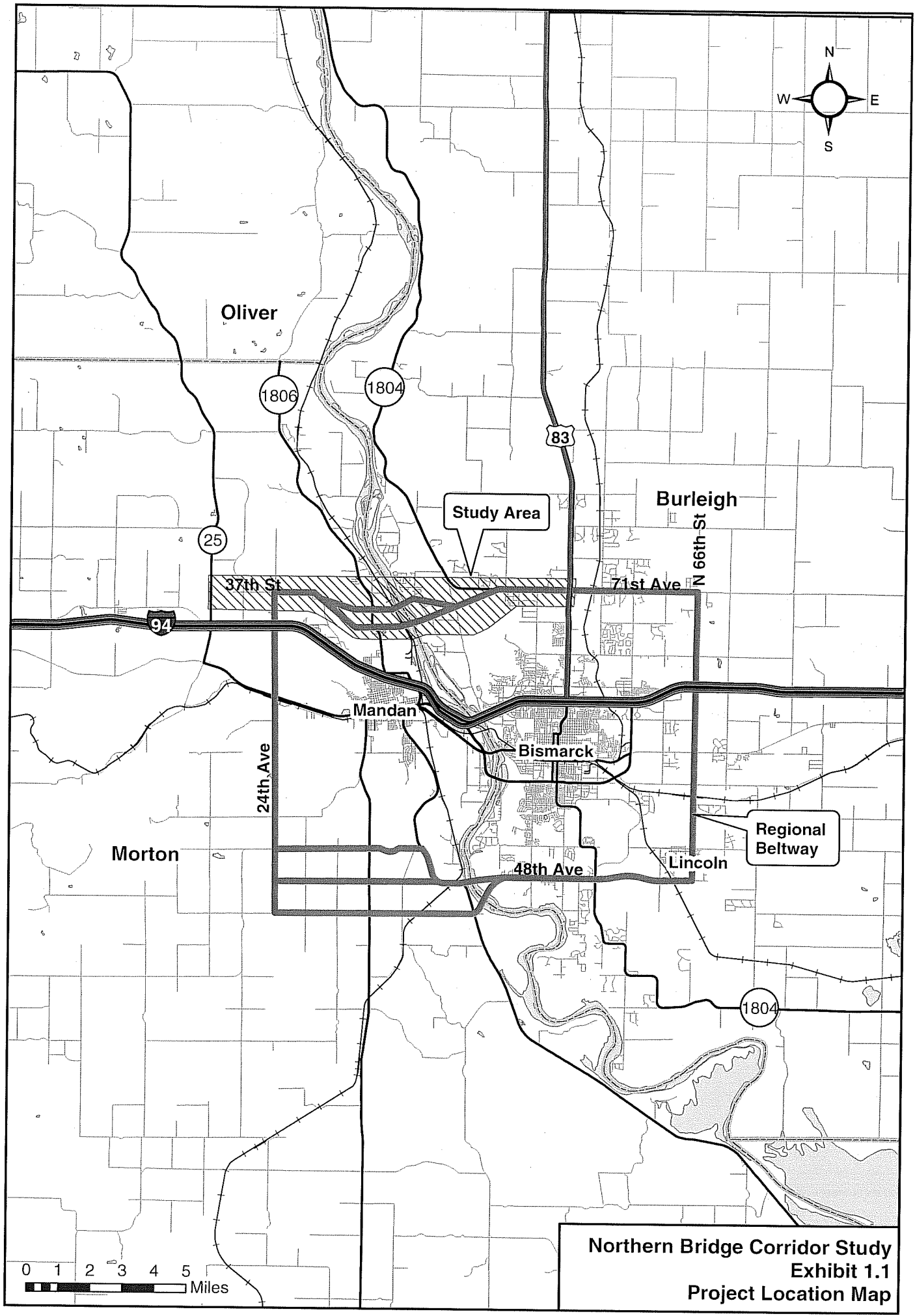
Exhibits Appendix

Exhibit 1.1	Project Location Map
Exhibit 3.1	Wetlands and Floodplain Maps
Exhibit 4.1	Project Alternatives
Exhibit 4.2	Project Alternatives and Routes
Exhibit 4.3	Route B and Olive Tree Subdivision
Exhibit 4.4	Route B-1 and ND Highway 1806
Exhibit 4.5	Route B-3 and ND Highway 1804
Exhibit 4.6	Route B-4 and ND Highway 1804
Exhibit 4.7	Route D and ND Highway 1806
Exhibit 4.8	Routes D-3, D-4, D-5, and ND Highway 1804
Exhibit 4.9	Route D-3, D-5 and River Road
Exhibit 4.10	Route D and Burnt Creek Loop

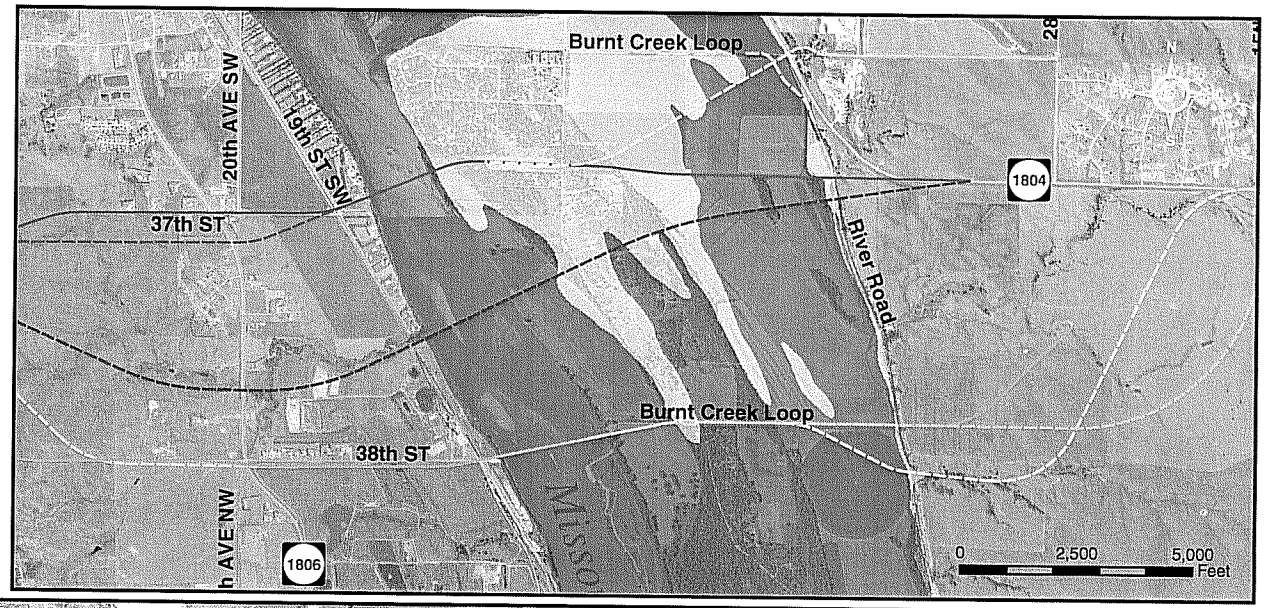


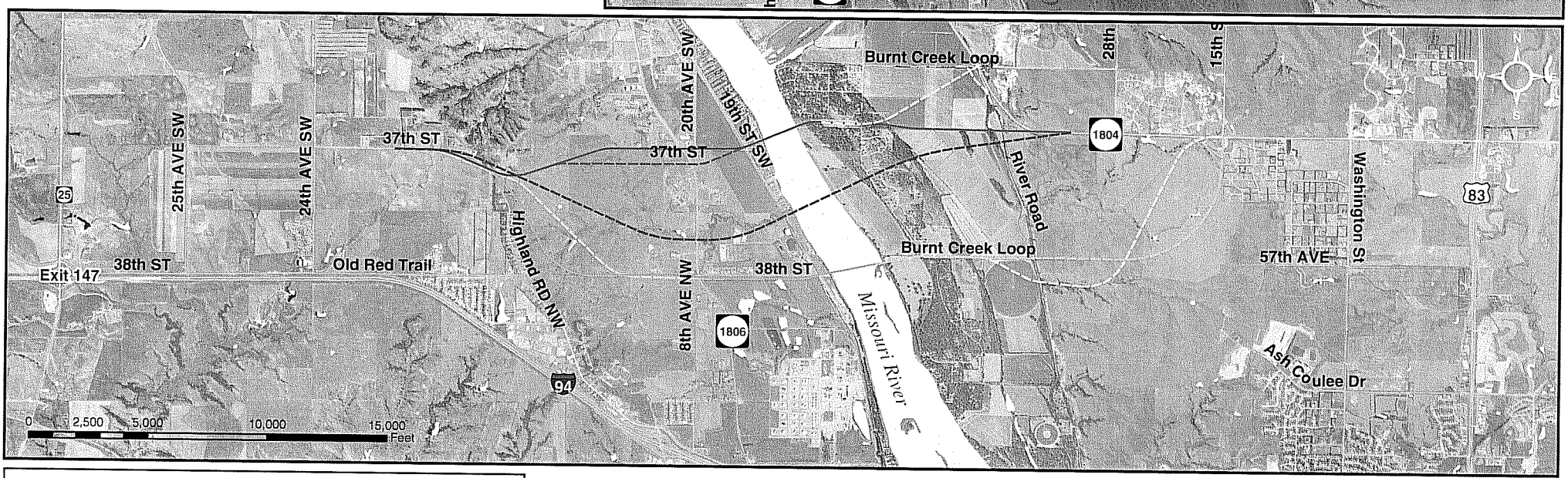
Northern Bridge Corridor Study
Exhibit 1.1
Project Location Map

Zone AE: the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by detailed methods of analysis. Mandatory flood insurance purchase requirements apply.

Zone X500: this area falls between the 100 and 500-year flood zone. X zones are the flood insurance rate zones that correspond to areas outside the 1-percent annual chance floodplain, areas of 1-percent annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1-percent annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1-percent annual chance flood by levees. Insurance purchase is not required in these zones.

Wetlands: From National Wetland Inventory data





Northern Bridge Corridor Study
Exhibit 3.1
Wetlands & Floodplain Maps

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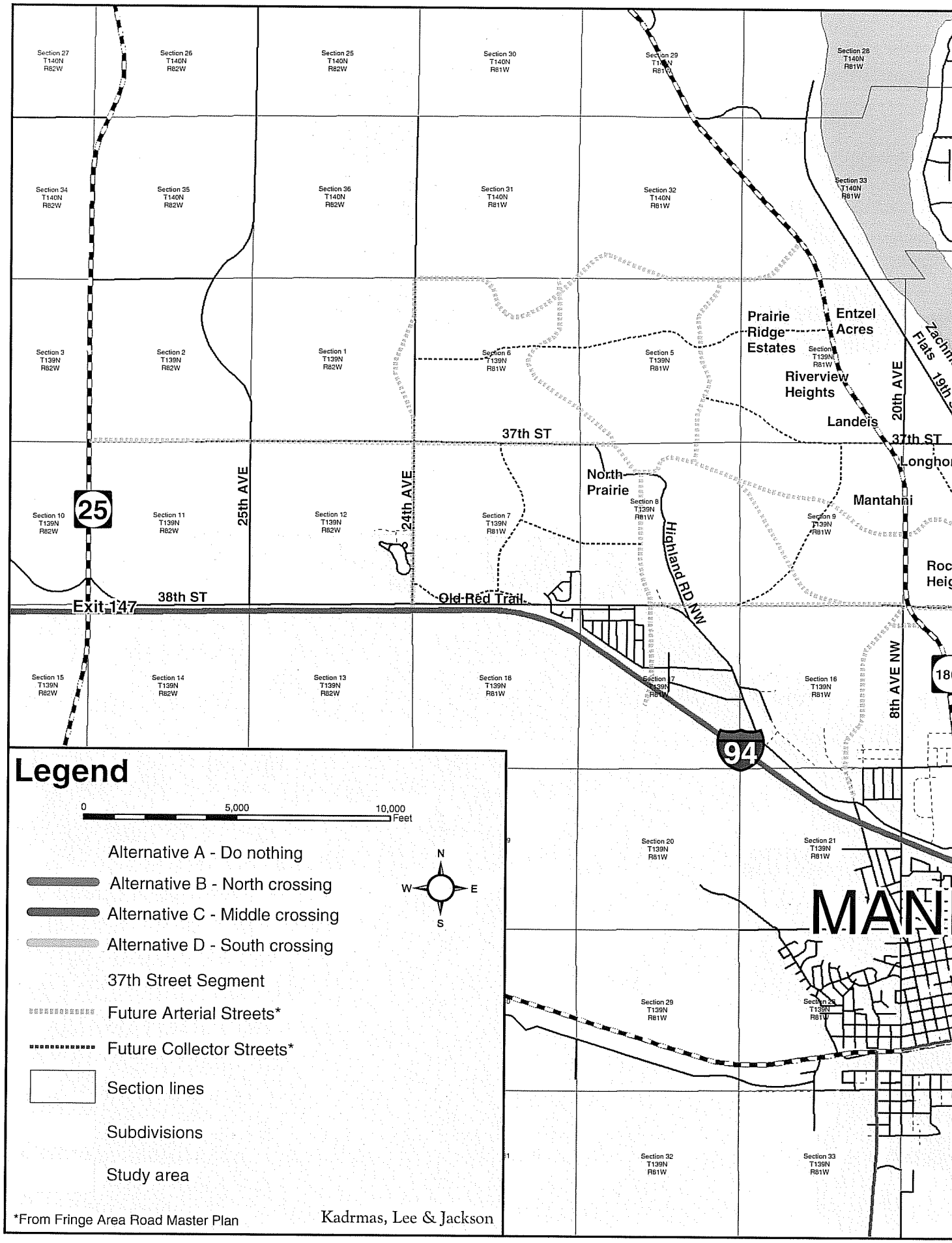
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5,000
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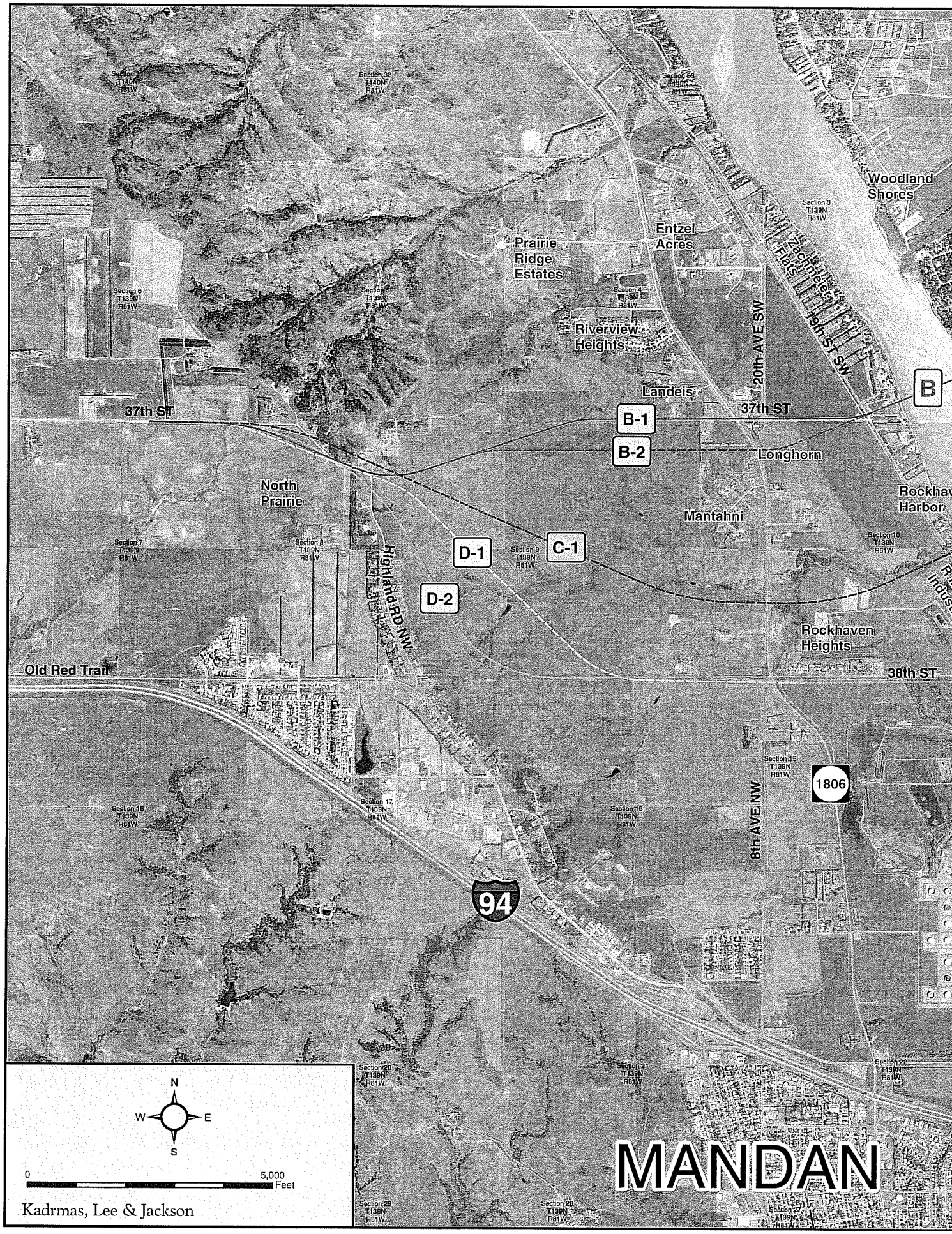
Feet
Alternative A - Do nothing
Alternative B - North crossing
Alternative C - Middle crossing
Alternative D - South crossing
37th Street Segment
Future Arterial Streets*
Future Collector Streets*
Section lines
Subdivisions
Study area
N
W
E
S
*From Fringe Area Road Master Plan
Kadrmas, Lee & Jackson
Prairie Ridge Estates
Entzel Acres
Riverview Heights
Landeis
Mantahni
North Prairie
37th ST
38th ST
25th AVE
24th AVE
20th AVE
8th AVE NW
Highland RD NW
Old Red Trail
Exit 147
25
94
MAN



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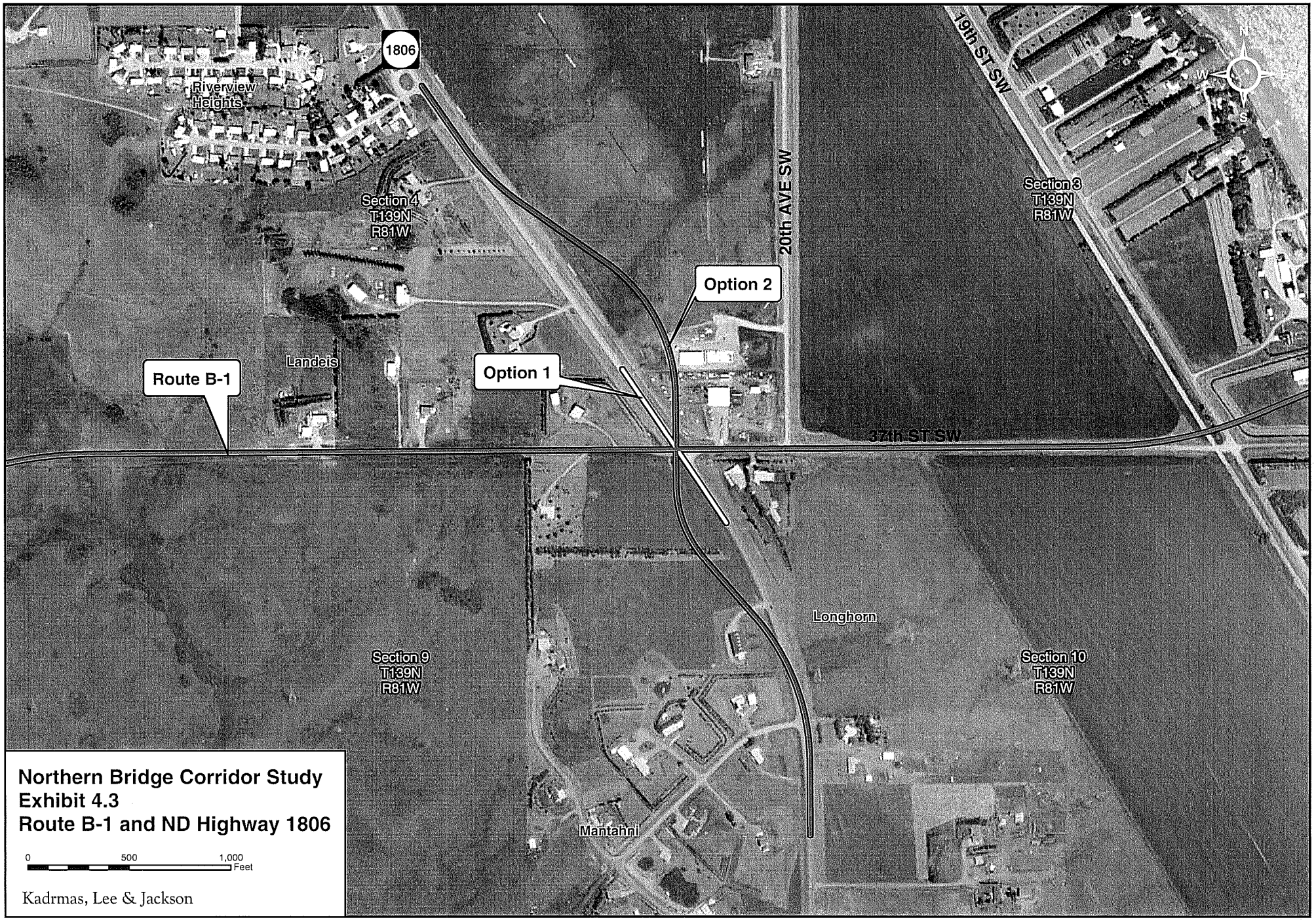

Northern Bridge Corridor Study
Exhibit 4.3
Route B-1 and ND Highway 1806

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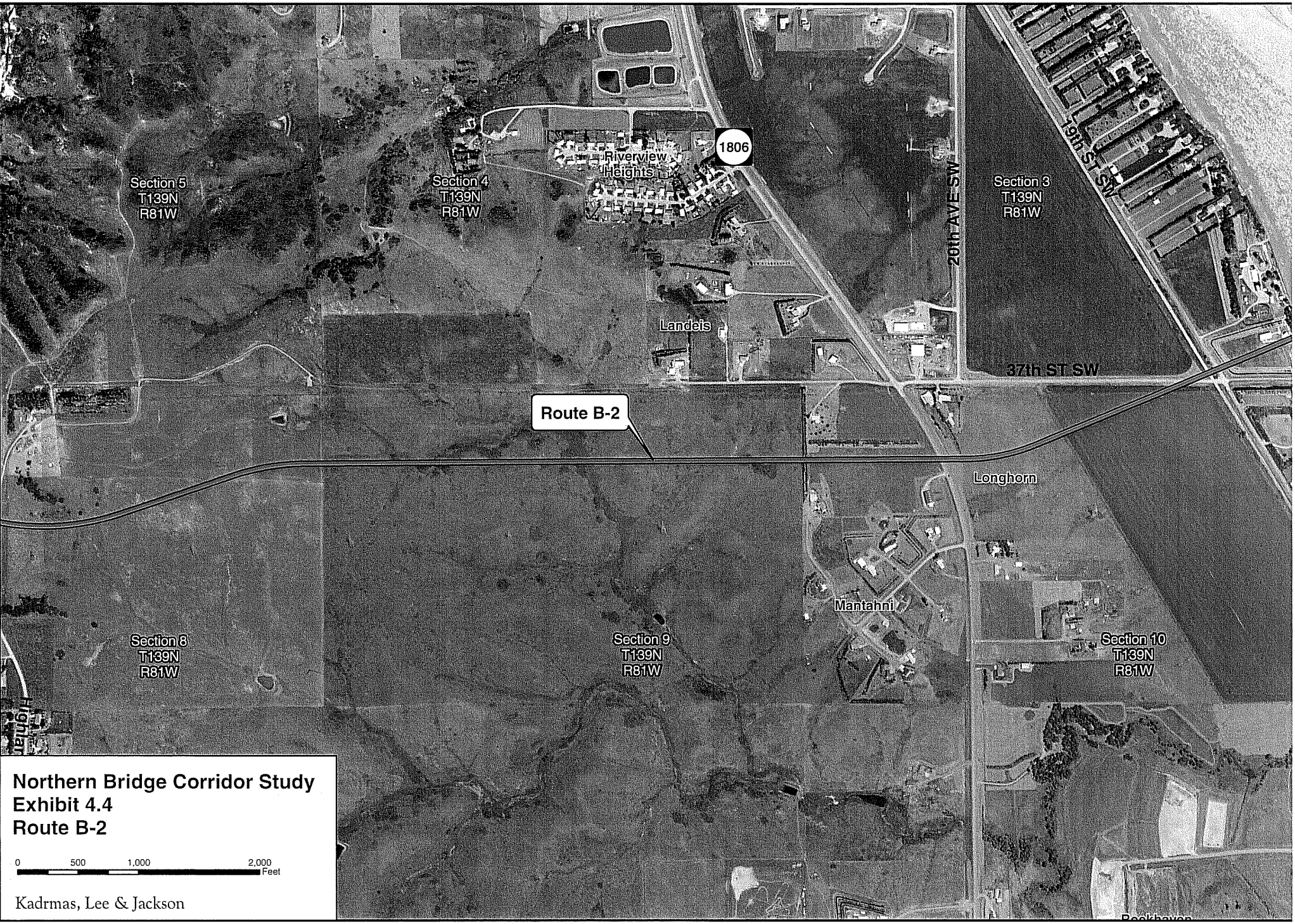

Northern Bridge Corridor Study
Exhibit 4.4
Route B-2

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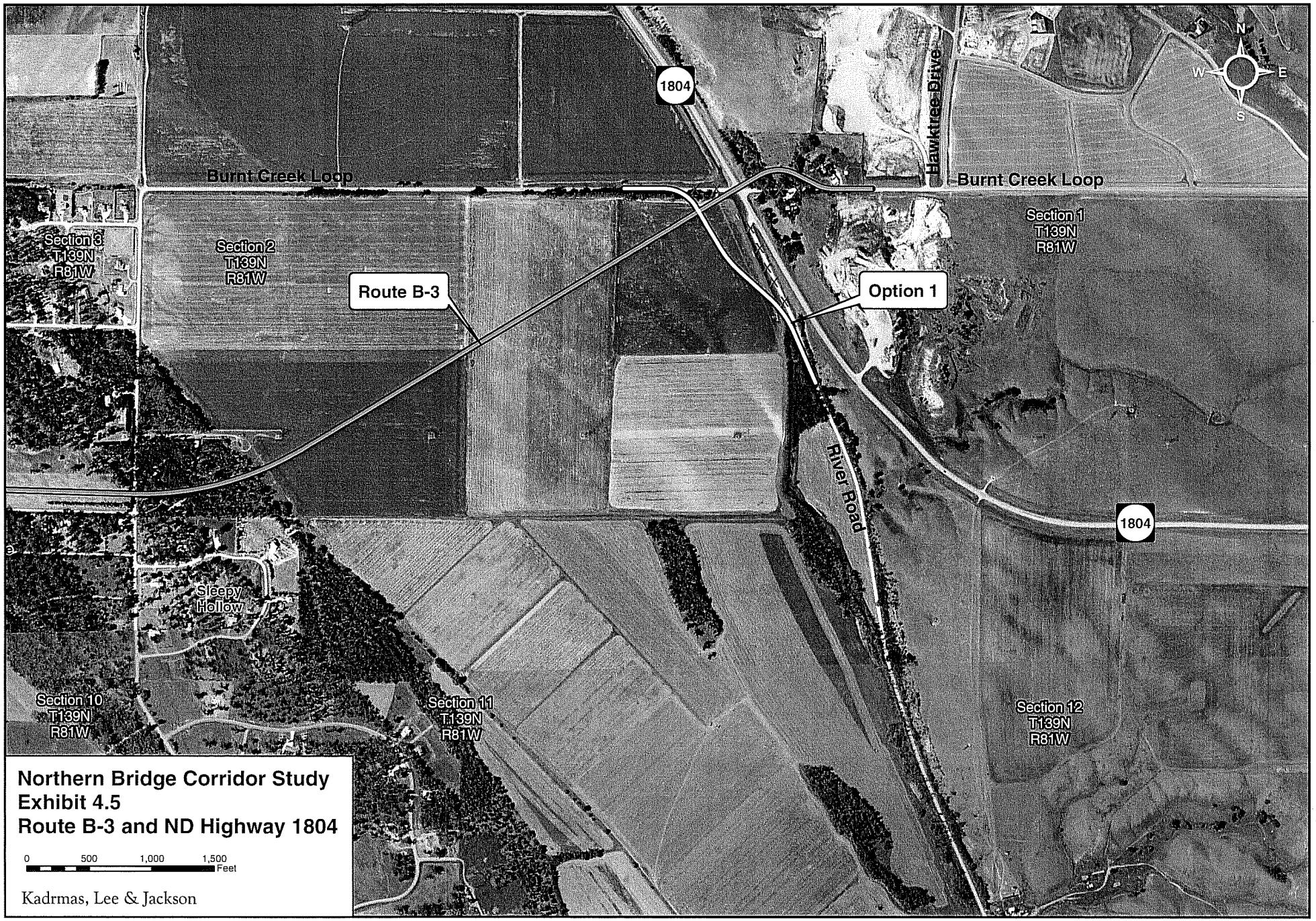

Northern Bridge Corridor Study
Exhibit 4.5
Route B-3 and ND Highway 1804

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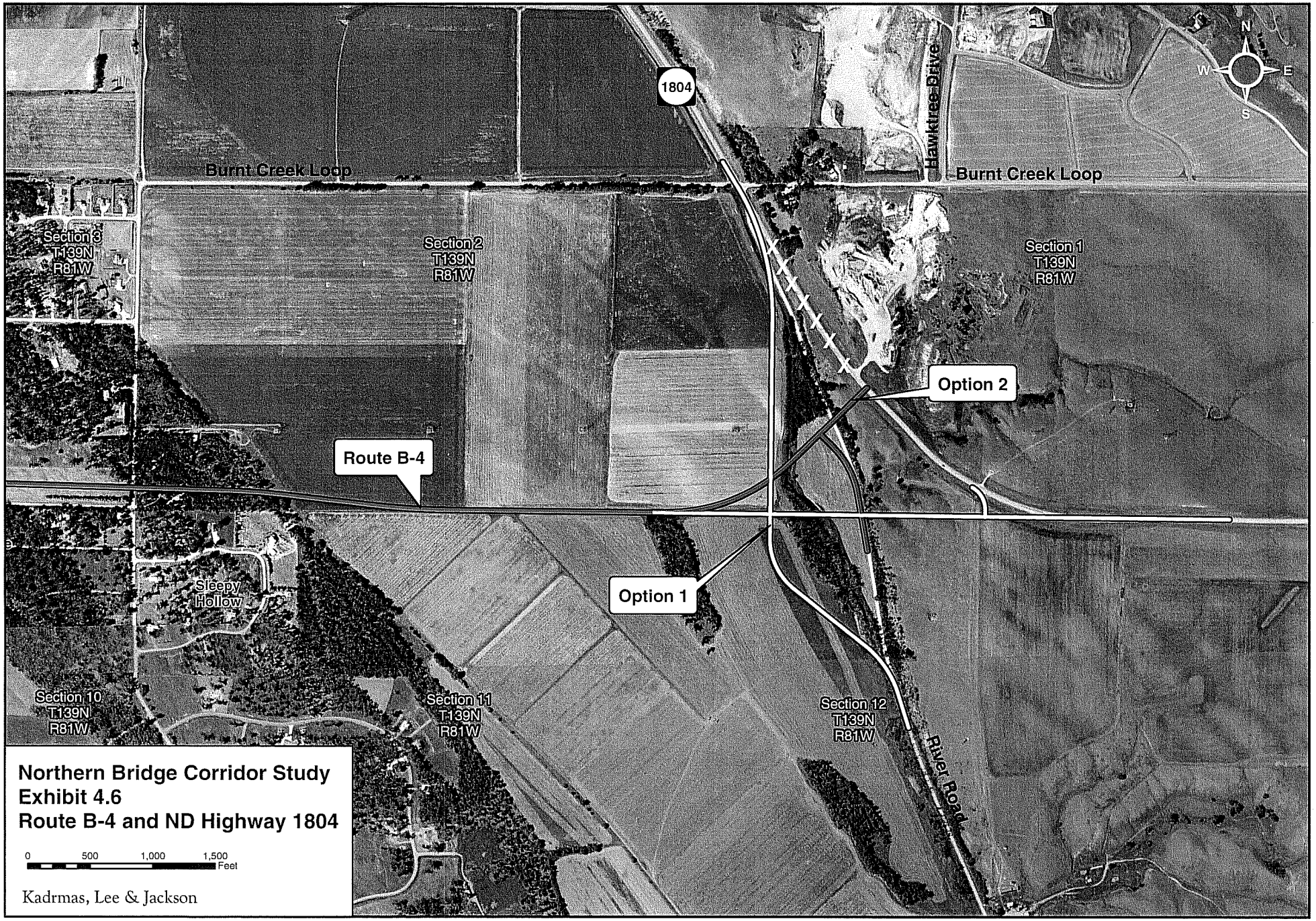

Northern Bridge Corridor Study
Exhibit 4.6
Route B-4 and ND Highway 1804

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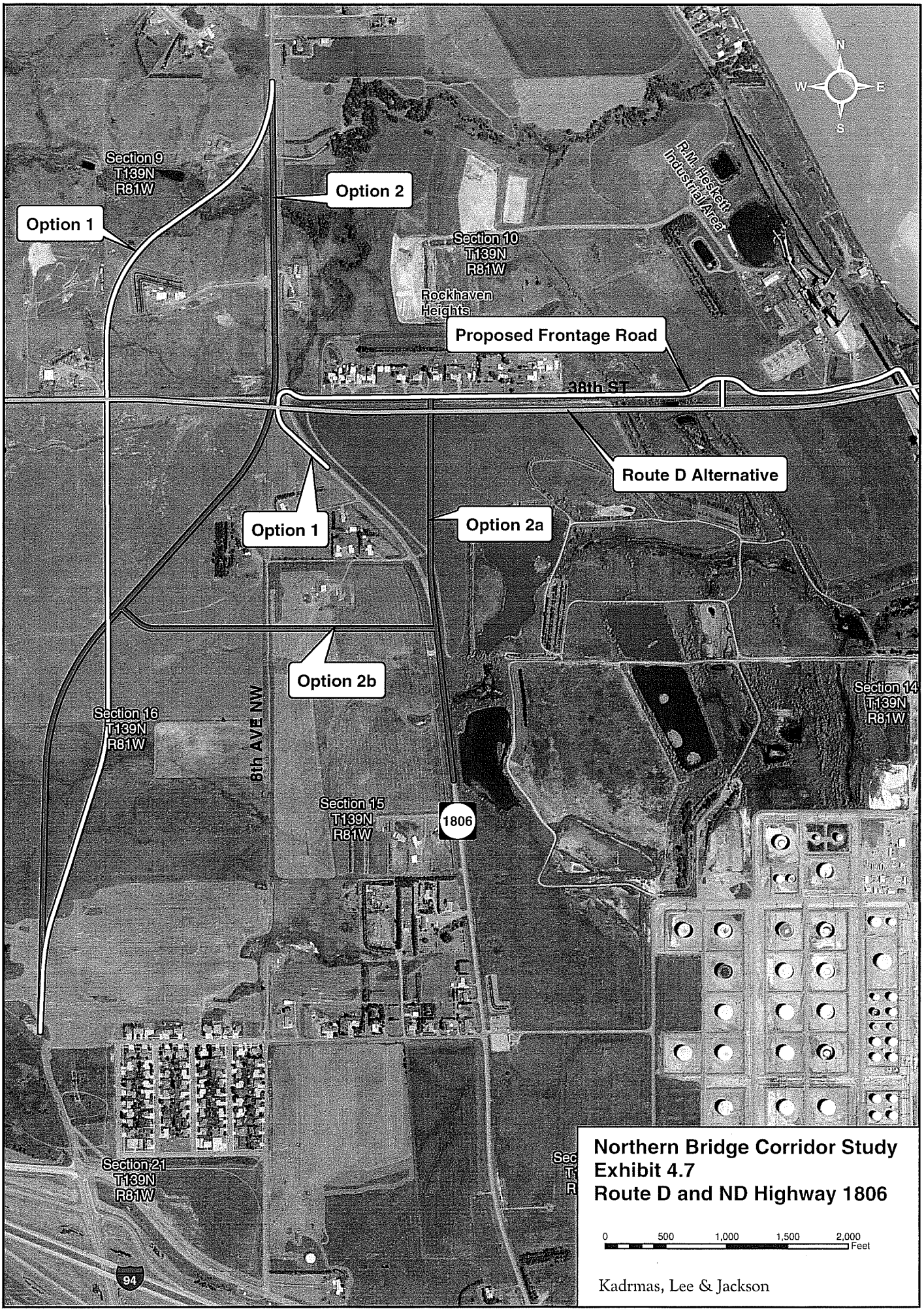
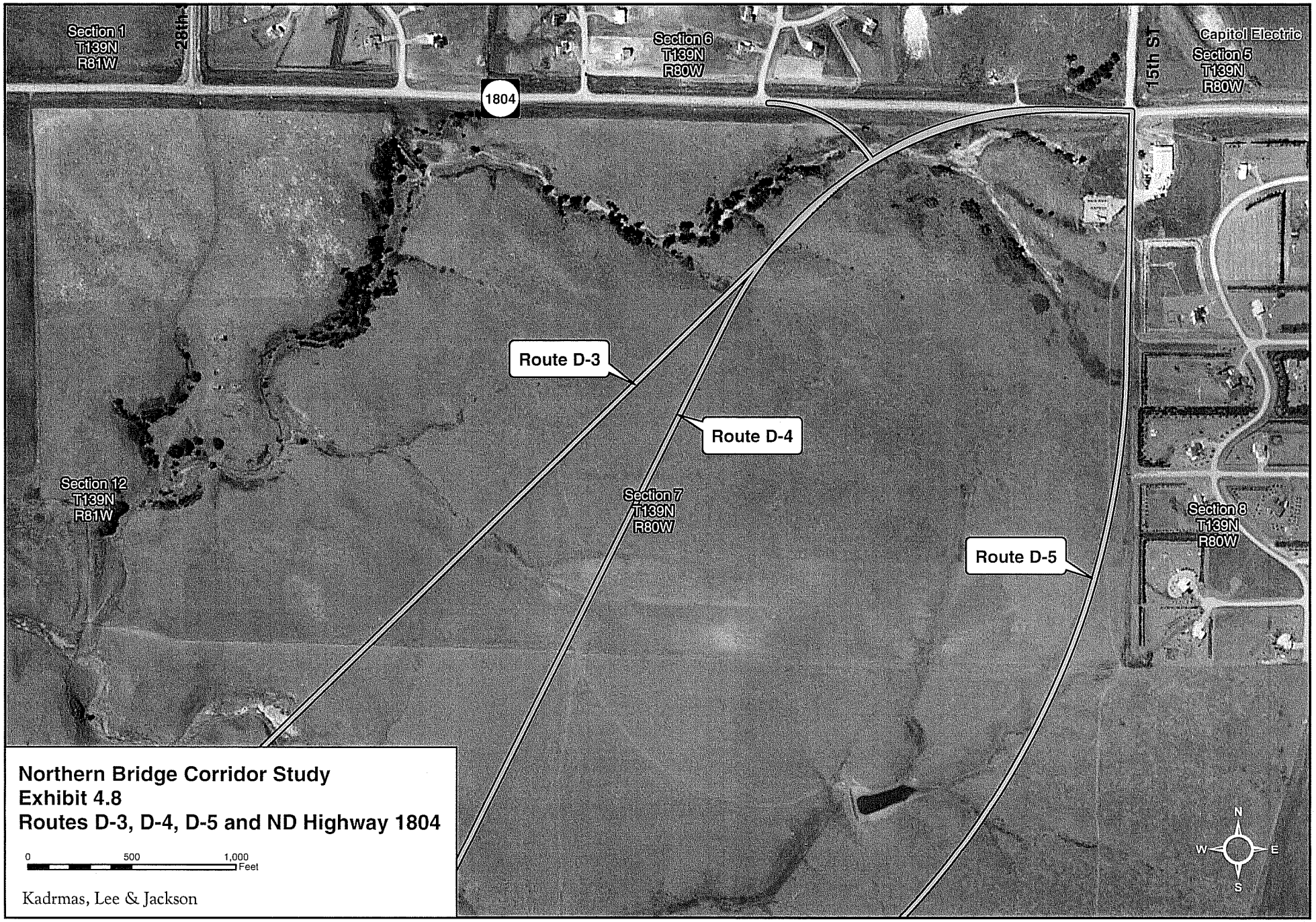


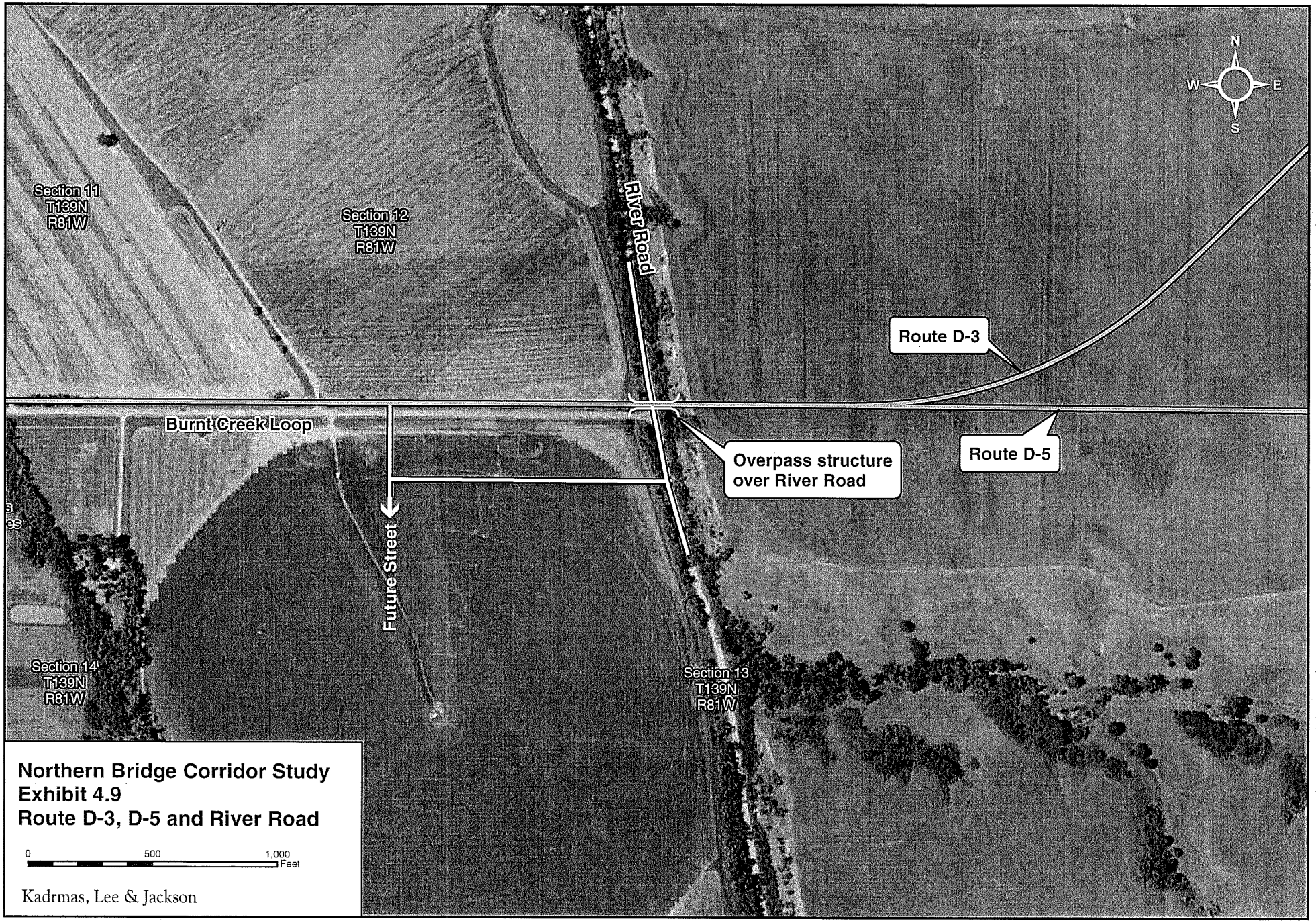
Northern Bridge Corridor Study
Exhibit 4.7
Route D and ND Highway 1806

Kadrmas, Lee & Jackson



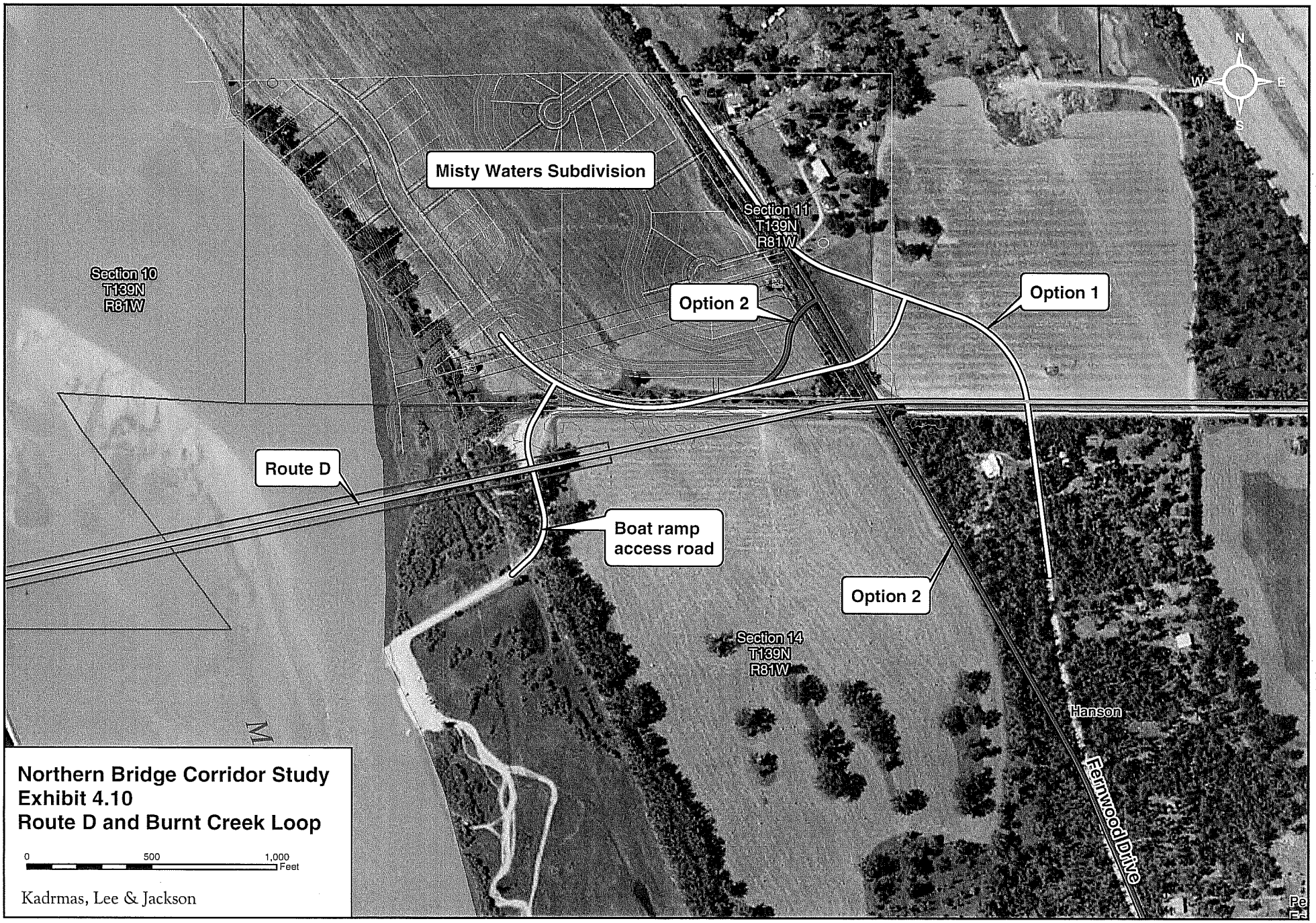
Northern Bridge Corridor Study
Exhibit 4.8
Routes D-3, D-4, D-5 and ND Highway 1804

Kadrmas, Lee & Jackson



Northern Bridge Corridor Study
Exhibit 4.9
Route D-3, D-5 and River Road

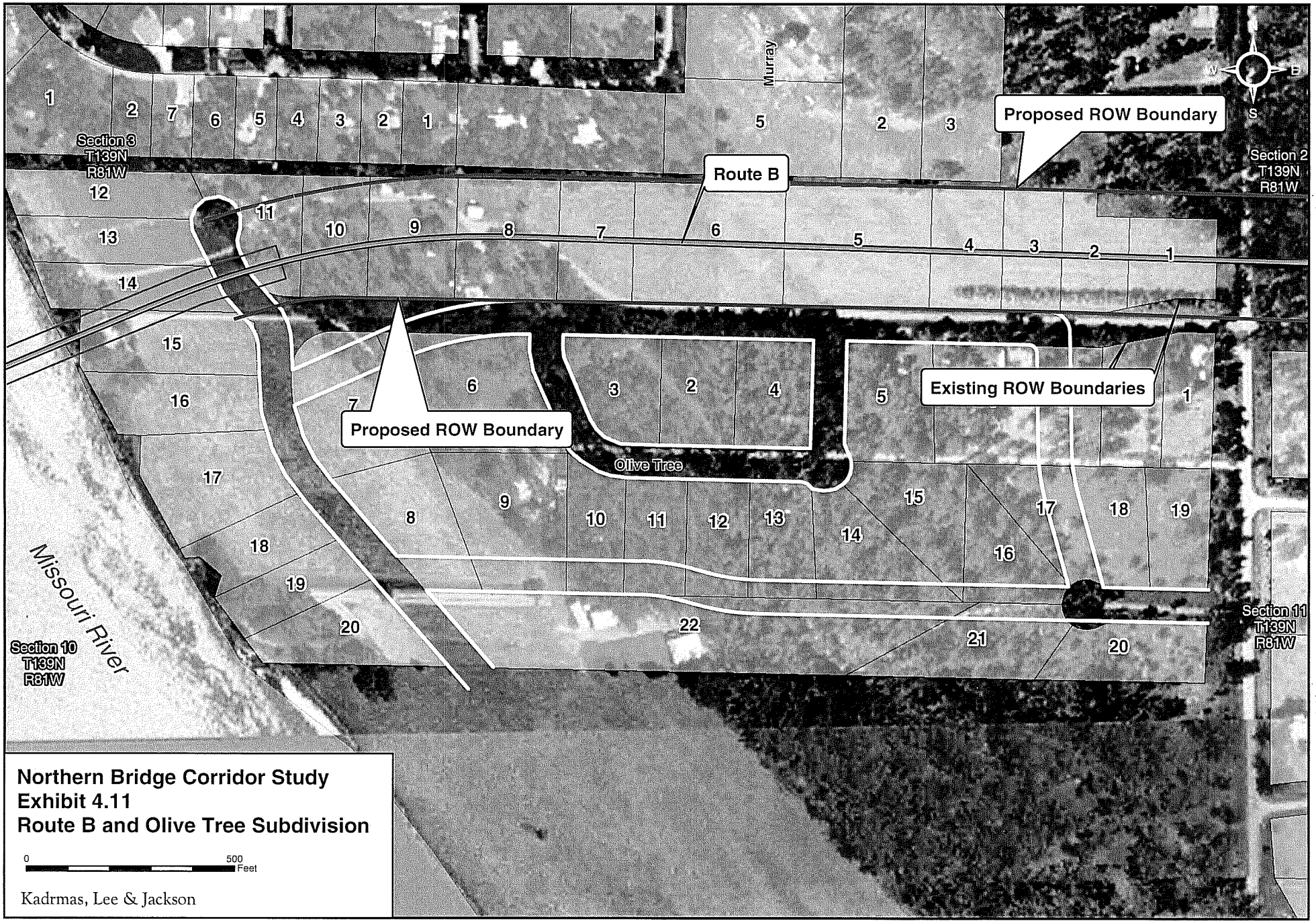
Kadrmas, Lee & Jackson



Northern Bridge Corridor Study
Exhibit 4.10
Route D and Burnt Creek Loop

0 500 1,000 Feet

Kadrmas, Lee & Jackson

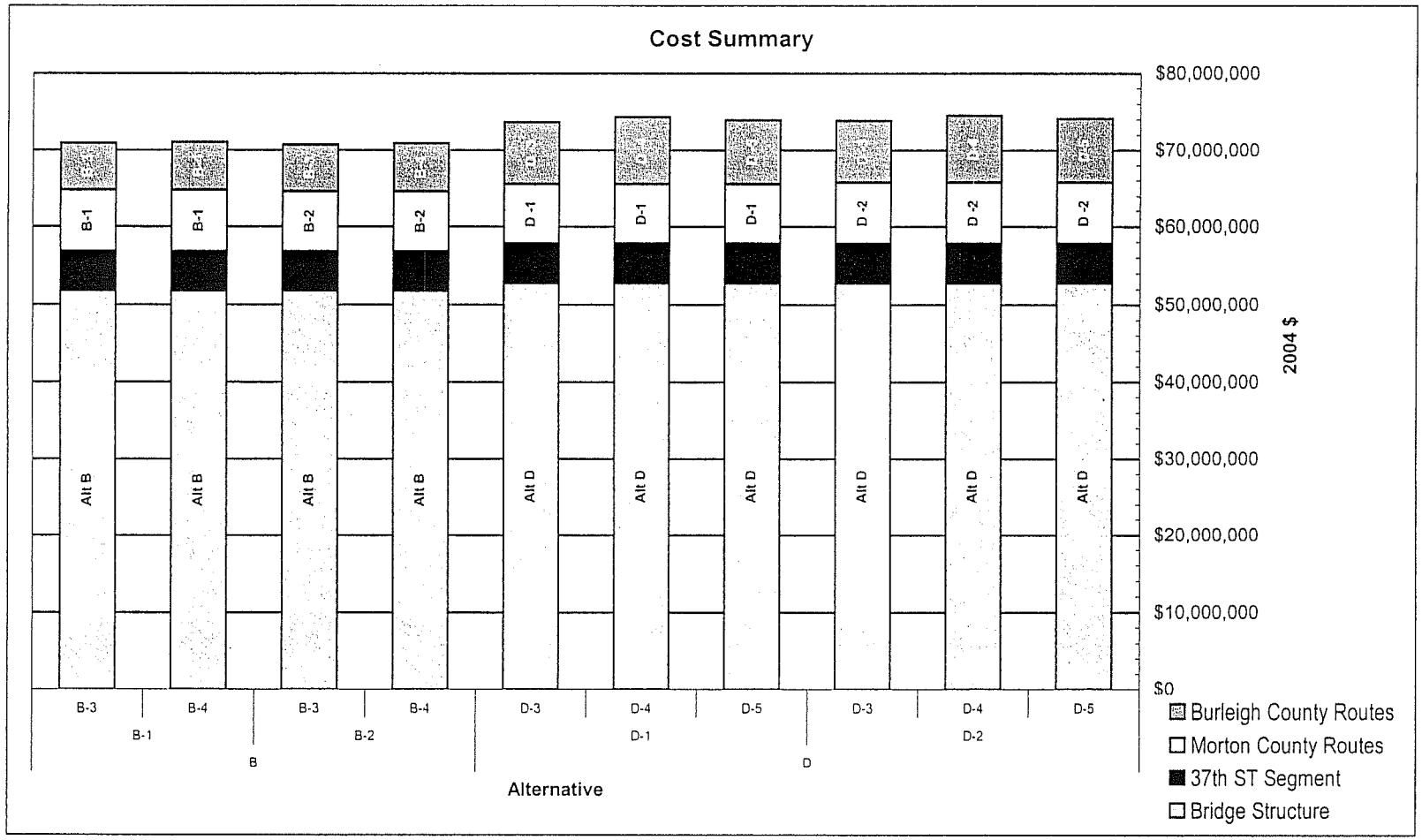


Northern Bridge Corridor Study
Exhibit 4.11
Route B and Olive Tree Subdivision

Kadrmas, Lee & Jackson

Cost Summary Appendix

Cost Summary
Engineers Estimate of Cost—Cost Summary
Engineers Estimate of Cost—Bridge Structure
Engineers Estimate of Cost—Alternative B: North Route
Engineers Estimate of Cost—Alternative D: South Route
Engineers Estimate of Cost
Engineers Estimate of Cost—Route B-1 and ND Highway 1806
Engineers Estimate of Cost—Route B-4 and ND Highway 1804
Engineers Estimate of Cost—Route D and ND Highway 1806
Engineers Estimate of Cost—Route D and Burnt Creek Loop


Cost Summary
$80,000,000
$70,000,000
$60,000,000
$50,000,000
$40,000,000
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D-5
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D-1
D-2
B
D
Alternative
Burleigh County Routes
Morton County Routes
37th ST Segment
Bridge Structure

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars
Cost Summary

Bridge Structure	Route	Intersection Options	COST
	37th St Segment (ND 25 to Highland Rd)		$5,014,288
Bridge Alternative B			$51,800,000
	Route B-1		$7,894,865
	Route B-2		$7,720,410
	Route B-3		$6,200,104
	Route B-4		$6,374,968
		Route B-1 & ND Highway 1806—Option 1	$163,777
		Route B-1 & ND Highway 1806—Option 2	$1,306,785
		Route B-4 & ND Highway 1804—Option 1	$1,084,734
		Route B-4 & ND Highway 1804—Option 2	$427,222
Bridge Alternative D			$52,800,000
	Route D-1		$7,720,525
	Route D-2		$7,932,815
	Route D-3		$8,128,350
	Route D-4		$8,802,480
	Route D-5		$8,392,585
		Route D & ND Highway 1806—Option 1	$1,217,862
		Route D & ND Highway 1806—Option 2	$1,801,843
		Route D & ND Highway 1806—Frontage Road	$741,946
		Route D & Burnt Creek Loop—Option 1	$675,280
		Route D & Burnt Creek Loop—Option 2	$767,119
		Route D & Burnt Creek Loop—Frontage Road	$316,819

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars
Bridge Structure

			ALTERNATE B		*ALTERNATE D*	
ITEMS	UNIT	UNIT COST	QUANTITY	TOTAL	QUANTITY	TOTAL
Abutments	EA	$400,000	2	$800,000.00	2	$800,000.00
Piers	EA	$1,000,000	14	$14,000,000.00	14	$14,000,000.00
Deck Concrete	CY	$500	9,600	$4,800,000.00	9,900	$4,950,000.00
Deck Rebar	LB	$0.80	2,900,000	$2,320,000.00	3,000,000	$2,400,000.00
Structural Steel	LB	$1.50	10,800,000	$16,200,000.00	11,200,000	$16,800,000.00
Floor Drains	EA	$1,000	70	$70,000.00	72	$72,000.00
Bearings	EA	$2,000	112	$224,000.00	112	$224,000.00
Expansion Joints	LF	$1,000	570	$570,000.00	570	$570,000.00
Approach Slab	SY	$175	360	$63,000.00	360	$63,000.00
Bridge Rail	LF	$125	7,000	$875,000.00	7,200	$900,000.00
Ped Rail	LF	$150	3,500	$525,000.00	3,600	$540,000.00
Foundation Prep/Excavation	LS	$1,000,000	1	$1,000,000.00	1	$1,000,000.00
Riprap	CY	$35	3,000	$105,000.00	3,000	$105,000.00
Lighting/Nav Lighting	LS	$500,000	1	$500,000.00	1	$500,000.00
Mobilization	LS	$3,000,000	1	$3,000,000.00	1	$3,000,000.00
Subtotal	LS			$45,052,000.00		$45,924,000.00
Contingency	15%			$6,757,800.00		$6,888,600.00
Total				$51,800,000		$52,800,000

Bridge Length =	3,500	3,600
Bridge Width =	82	82
Deck Area =	287,000	295,200
Cost/sf =	$180	$179

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars
Alternative B - North Route

			ALTERNATIVE B-1		*ALTERNATIVE B-2*		*ALTERNATIVE B-3*		*ALTERNATIVE B-4*	
ITEMS	UNIT	UNIT COST	QUANTITY	TOTAL	QUANTITY	TOTAL	QUANTITY	TOTAL	QUANTITY	TOTAL
Construction										
Asphalt	LF	$110.00	15600	$1,716,000.00	15900	$1,749,000.00	11945	$1,313,950.00	11700	$1,287,000.00
Base	LF	$100.00	15600	$1,560,000.00	15900	$1,590,000.00	11945	$1,194,500.00	11700	$1,170,000.00
Earthwork	CY	$2.25	920000	$2,070,000.00	940000	$2,115,000.00	450000	$1,012,500.00	545000	$1,226,250.00
Topsoil	CY	$1.50	39000	$58,500.00	39000	$58,500.00	29000	$43,500.00	29000	$43,500.00
Culverts	MILE	$100,000.00	3.0	$300,000.00	3.0	$300,000.00	2.3	$230,000.00	2.2	$220,000.00
Box Culverts	EA	$75,000.00	1	$75,000.00	1	$75,000.00	1	$75,000.00	1	$75,000.00
Seeding/Erosion Control	LF	$1.00	15600	$15,600.00	15900	$15,900.00	11945	$11,945.00	11700	$11,700.00
Utility Relocation	LS									
Misc	LS	$150,000.00	1	$150,000.00	1	$150,000.00	1	$150,000.00	1	$150,000.00
Right of Way										
River Bottom Farmland*	ACRE	$0.00	9	$0.00	10	$0.00	37	$0.00	21	$0.00
Pasture/Farmland*	ACRE	$0.00	28	$0.00	57	$0.00	7	$0.00	9	$0.00
Platted Lots	EA	$20,000.00	1	$20,000.00	3	$60,000.00	11	$220,000.00	11	$220,000.00
Riverfront lots	EA	$80,000.00					3	$240,000.00	3	$240,000.00
Residential/Commercial Relocations	LS	$300,000.00	3	$900,000.00	2	$600,000.00	3	$900,000.00	3	$900,000.00
ROW Subtotal				$920,000.00		$660,000.00		$1,360,000.00		$1,360,000.00
15% Contingency				$1,029,765.00		$1,007,010.00		$808,709.25		$831,517.50
Subtotal				$7,894,865.00		$7,720,410.00		$6,200,104.25		$6,374,967.50

*Farmland to be acquired through platting

Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars
Alternative D - South Route

			ALTERNATIVE D-1		*ALTERNATIVE D-2*		*ALTERNATIVE D-3*		*ALTERNATIVE D-4*		*ALTERNATIVE D-5*	
ITEMS	UNIT	UNIT COST	QUANTITY	TOTAL	QUANTITY	TOTAL	QUANTITY	TOTAL	QUANTITY	TOTAL	QUANTITY	TOTAL
Construction												
Asphalt	LF	$110.00	20000	$2,200,000.00	20600	$2,266,000.00	17580	$1,933,800.00	19280	$2,120,800.00	17900	$1,969,000.00
Base	LF	$100.00	20000	$2,000,000.00	20600	$2,060,000.00	17580	$1,758,000.00	19280	$1,928,000.00	17900	$1,790,000.00
Earthwork	CY	$2.25	780000	$1,755,000.00	800000	$1,800,000.00	773000	$1,739,250.00	853000	$1,919,250.00	840000	$1,890,000.00
Topsoil	CY	$1.50	49000	$73,500.00	51000	$76,500.00	43000	$64,500.00	48000	$72,000.00	44000	$66,000.00
Culverts	MILE	$100,000.00	3.8	$380,000.00	3.9	$390,000.00	3.3	$330,000.00	3.7	$370,000.00	3.4	$340,000.00
Box Culverts	EA	$75,000.00	1	$75,000.00	1	$75,000.00	1	$75,000.00	1	$75,000.00	1	$75,000.00
Seeding/Erosion Control	LF	$1.00	20000	$20,000.00	20600	$20,600.00	17580	$17,580.00	19280	$19,280.00	17900	$17,900.00
Overpass Bridge	EA	$1,000,000.00					1	$1,000,000.00	1	$1,000,000.00	1	$1,000,000.00
Utility Relocation	LS											
Misc	LS	$150,000.00	1	$150,000.00	1	$150,000.00	1	$150,000.00	1	$150,000.00	1	$150,000.00
Right of Way												
River Bottom Farmland*	ACRE	$0.00	11	$0.00	17	$0.00	26	$0.00	28	$0.00	8	$0.00
Pasture/Farmland*	ACRE	$0.00	50	$0.00	46	$0.00	45.5	$0.00	55.5	$0.00	46	$0.00
Platted Lots	EA	$20,000.00	3	$60,000.00	3	$60,000.00		$0.00		$0.00	0	$0.00
Residential/Commercial Relocations	LS	$300,000.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00
Riverfront lots	EA	$80,000.00										
ROW Subtotal				$60,000.00		$60,000.00		$0.00		$0.00		$0.00
15% Contingency				$1,007,025.00		$1,034,715.00		$1,060,219.50		$1,148,149.50		$1,094,685.00
Subtotal				$7,720,525.00		$7,932,815.00		$8,128,349.50		$8,802,479.50		$8,392,585.00

*Farmland to be acquired through platting

Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars

			Hwy 25 to the start of Alternatives B & D	
ITEMS	UNIT	UNIT COST	QUANTITY	TOTAL
Construction				
Asphalt	LF	$110.00	14000	$1,540,000.00
Base	LF	$100.00	14000	$1,400,000.00
Earthwork	CY	$2.25	415000	$933,750.00
Topsoil	CY	$1.50	35000	$52,500.00
Culverts	MILE	$100,000.00	2.7	$270,000.00
Box Culverts	EA	$75,000.00		
Seeding/Erosion Control	LF	$1.00	14000	$14,000.00
Missouri River Bridge Structure	SF			
Utility Relocation	LS			
Misc	LS	$150,000.00	1	$150,000.00
Right of Way				
River Bottom Farmland*	ACRE	$0.00		
Pasture/Farmland*	ACRE	$0.00	44	$0.00
Platted Lots	EA	$20,000.00		$0.00
Residential/Commercial Relocations	LS	$300,000.00		$0.00
15% Contingency				$654,037.50
Total				$5,014,287.50

*Farmland to be acquired through platting

Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars
Route B-1 & ND Highway 1806 (see exhibit 4.4)

			OPTION 1		*OPTION 2*	
ITEMS	UNIT	UNIT COST	QUANTITY	TOTAL	QUANTITY	TOTAL
Construction						
Asphalt	LF	$45.00	915	$41,175.00	4385	$197,325.00
Base	LF	$35.00	915	$32,025.00	4385	$153,475.00
Earthwork	CY	$1.15	2000	$2,300.00	11000	$12,650.00
Topsoil	CY	$1.50	2000	$3,000.00	11000	$16,500.00
Culverts	MILE	$65,000.00	0.2	$13,000.00	0.8	$52,000.00
Box Culverts	EA	$75,000.00	0	$0.00	0	$0.00
Seeding/Erosion Control	LF	$1.00	915	$915.00	4385	$4,385.00
Utility Relocation	LS					
Misc	LS	$100,000.00		$50,000.00		$100,000.00
Right of Way						
River Bottom Farmland*	ACRE	$0.00				
Pasture/Farmland*	ACRE	$0.00	4.2	$0.00	19.5	$0.00
Platted Lots	EA	$20,000.00		$0.00		$0.00
Residential Relocations	EA	$300,000.00		$0.00	2	$600,000.00
15% Contingency				$21,362.25		$170,450.25
Total				$163,777.25		$1,306,785.25

*Farmland to be acquired through platting

Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

Northern Bridge Corridor Study

Engineers Estimate of Cost

2004 Dollars

Route B-4 and ND Highway 1804 (see exhibit 4.6)

			OPTION 1		*OPTION 2*	
ITEMS	UNIT	UNIT COST	QUANTITY	TOTAL	QUANTITY	TOTAL
Construction						
Asphalt	LF	$45.00	9625	$433,125.00	3090	$139,050.00
Base	LF	$35.00	9625	$336,875.00	3090	$108,150.00
Earthwork	CY	$1.15	24000	$27,600.00	8000	$9,200.00
Topsoil	CY	$1.50	24000	$36,000.00	8000	$12,000.00
Culverts	MILE	$65,000.00	1.8	$22.16	0.6	$7.39
Box Culverts	EA	$75,000.00	0		0	$0.00
Seeding/Erosion Control	LF	$1.00	9625	$9,625.00	3090	$3,090.00
Utility Relocation	LS					
Misc	LS	$100,000.00		$100,000.00		$100,000.00
Right of Way						
River Bottom Farmland*	ACRE	$0.00	23.1	$0.00	14.2	$0.00
Pasture/Farmland*	ACRE	$0.00	14.2	$0.00		$0.00
Platted Lots	EA	$20,000.00		$0.00		$0.00
Residential Relocations	EA	$300,000.00		$0.00		$0.00
15% Contingency				$141,487.07		$55,724.61
Total				$1,084,734.23		$427,221.99

*Farmland to be acquired through platting

Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars
Route D & ND Highway 1806 (see exhibit 4.7)

			OPTION 1		*OPTION 2*		*FRONTAGE ROAD*	
ITEMS	UNIT	UNIT COST	QUANTITY	TOTAL	QUANTITY	TOTAL	QUANTITY	TOTAL
Construction								
Asphalt	LF	$45.00	9610	$432,450.00	14670	$660,150.00	5470	$246,150.00
Base	LF	$35.00	9610	$336,350.00	14670	$513,450.00	5470	$191,450.00
Earthwork	CY	$1.15	24000	$27,600.00	37000	$42,550.00	14000	$16,100.00
Topsoil	CY	$1.50	24000	$36,000.00	36000	$54,000.00	14000	$21,000.00
Culverts	MILE	$65,000.00	1.8	$117,000.00	2.8	$182,000.00	1.0	$65,000.00
Box Culverts	EA	$75,000.00	0	$0.00	0	$0.00	0	$0.00
Seeding/Erosion Control	LF	$1.00	9610	$9,610.00	14670	$14,670.00	5470	$5,470.00
Utility Relocation	LS							
Misc	LS	$100,000.00		$100,000.00		$100,000.00		$100,000.00
Right of Way			QUANTITY		QUANTITY		QUANTITY	
River Bottom Farmland*	ACRE	$0.00		$0.00		$0.00	25.2	$0.00
Pasture/Farmland*	ACRE	$0.00	44.2	$0.00	67.4	$0.00		$0.00
Platted Lots	EA	$20,000.00		$0.00		$0.00		$0.00
Residential Relocations	EA	$300,000.00		$0.00		$0.00		$0.00
15% Contingency				$158,851.50		$235,023.00		$96,775.50
Total				$1,217,861.50		$1,801,843.00		$741,945.50

*Farmland to be acquired through platting

Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

Northern Bridge Corridor Study
Engineers Estimate of Cost
2004 Dollars
Route D & Burnt Creek Loop (see exhibit 4.10)

			OPTION 1		*OPTION 2*		*FRONTAGE ROAD*	
ITEMS	UNIT	UNIT COST	QUANTITY	TOTAL	QUANTITY	TOTAL	QUANTITY	TOTAL
Construction								
Asphalt	LF	$45.00	4900	$220,500.00	5660	$254,700.00	1795	$80,775.00
Base	LF	$35.00	4900	$171,500.00	5660	$198,100.00	1795	$62,825.00
Earthwork	CY	$1.15	12000	$13,800.00	14000	$16,100.00	4000	$4,600.00
Topsoil	CY	$1.50	12000	$18,000.00	14000	$21,000.00	4000	$6,000.00
Culverts	MILE	$65,000.00	0.9	$58,500.00	1.1	$71,500.00	0.3	$19,500.00
Box Culverts	EA	$75,000.00	0	$0.00	0	$0.00	0	$0.00
Seeding/Erosion Control	LF	$1.00	4900	$4,900.00	5660	$5,660.00	1795	$1,795.00
Utility Relocation	LS							
Misc	LS	$100,000.00		$100,000.00		$100,000.00		$100,000.00
Right of Way								
River Bottom Farmland*	ACRE	$0.00	15.5	$0.00	16.1	$0.00	8.3	$0.00
Pasture/Farmland*	ACRE	$0.00		$0.00		$0.00		$0.00
Platted Lots	EA	$20,000.00		$0.00		$0.00		$0.00
Residential Relocations	EA	$300,000.00		$0.00		$0.00		$0.00
15% Contingency		$84,012.55		$88,080.00		$100,059.00		$41,324.25
Total				$675,280.00		$767,119.00		$316,819.25

*Farmland to be acquired through platting

Kadrmas Lee & Jackson
Engineers, Surveyors and Planners

BMMPO TAC Comments

Paul Benning, NDDOT
Mel J. Bullinger, City of Bismarck
Carl Hokenstad, City of Bismarck
Tom Little, City of Mandan
Jon R. Mill, Burleigh County
Chuck Morman, Morton County
Steve Saunders, MPO

North Dakota Department of Transportation

David A. Sprynczynatyk, P.E.
Director

John Hoeven
Governor

July 29, 2004

Mr. Steve Saunders
Transportation Planner
Bismarck/Mandan MPO
221 North 5 Street
P.O. Box 5503
Bismarck, ND 58506

COMMENTS ON THE DRAFT BISMARCK/MANDAN NORTHERN BRIDGE CORRIDOR STUDY

The North Dakota Department of Transportation (NDDOT) has reviewed the Draft Bismarck/Mandan Bridge Corridor Study dated June 2004 and offer the following:

- **Page 37:** NDDOT will not commit to taking the corridor on the state system. From NDDOT's point of view, the Northern Bridge Corridor only holds value in moving mostly local traffic for the economic benefit of the counties and cities of the area (similar to the benefits seen on Century Avenue from Tyler Parkway to Centenial Road).

  The NDDOT sees only a limited value in moving Interstate and intrastate freight. For major freight movements, north and south to east and west, the department already has existing corridors well outside the areas of development that could be expanded at lower cost. For example, US 83 southbound to westbound I-94 movements can be accommodated with the Washburn Bridge and ND 200a and ND 25. Similar movements to I-94 East can be accommodated with ND 36 at Wilton and ND 14 north of Sterling.

- **Page 41:** The NDDOT recommends **Alternative B (North Route)** as the preferred alternative.

- **Page 43:** Option 1 or 2 Relating to Route B-1

  NDDOT Recommends **Option 2 relating to Route B-1** and the intersection of ND Highway 1806. As development occurs around the area, signalization of the intersection is likely and a 90 degree intersection is more desirable than a 60 degree intersection.

- **Page 46:** Option 1 and 2 with respect to Route B-4.

  NDDOT Recommends **Option 2 relating to Route B-4** to preserve logic of direction and intersections of River road. Right of way impacts are limited to land and not buildings, since it avoids relocation of River Road, ND Highway 1804 north-south, and Burnt Creek.

- **Page 50:** If Route D is selected as the chosen alternative, the department recommends that an additional option be developed that keeps the existing alignment of 1806 and provides for a county/city route north of the Sunset Interchange to the intersection of the new corridor. The current two alternatives will likely result in too few corridors servicing the developing area and would in effect make 1806 take the brunt of future development traffic. Also, moving 1806 also makes for a harder tie of continuity between 1806 north of I-94 and 1806 south of I-94.

If you have any additional questions or comments, please call me at (701) 328-2217.

Paul M. Benning

PAUL M. BENNING, P.E. - URBAN/MPO ENGINEER - LOCAL GOVERNMENT

38:PMB
c: Mark Johnson - FHWA Transportation Planner and Research Manager
Tim Horner - Transportation Programs Director
Dave Leftwich - Local Government Engineer
Kevin Levi - Bismarck District Engineer

Bismarck Engineering Department

July 2, 2004

MEMORANDUM

To: Steve Saunders, PE
MPO Transportation Planner

From: Mel J. Bullinger, PE
City Engineer

Subject: Northern Bridge Corridor Study
Comments on June 2004 Draft Report

I have finished my review of the referenced draft report on the Northern Bridge Corridor Study. In keeping with your request, I am pleased to offer the following comments:

In general I found the report to be well organized and to provide sufficient information about the process and the various alternates to allow the reader to reach a conclusion regarding their individual preferences for one alternate over another. However, I do believe this draft report would have benefited greatly from an enlarged version of the figure labeled as Exhibit 4.2 in the draft report. While that figure presents an overall view of the various alternatives and routes, the scale is too small to be able to discern much more than a general comparison of the approximate location of one alternative route to another. I would suggest that the final report should contain a version of Exhibit 4.2 that is at a minimum several times larger than the current version of that exhibit.

In regard to my recommendation for an alternative, in my professional opinion the best route of those studied is the northern route. Specifically I believe that Morton County alternate route B-2, Burleigh County alternate route B-4 with the Option 1 realignment of River Road is the best option of those presented for the long term functionality of the beltway. In essence, I agree with the recommendations of the KLJ firm on this matter.

By separate letter directly to Mr. Bob Shannon, PE, Kadrmas Lee & Jackson, Inc., I will directly provide him with my miscellaneous comments regarding typographical corrections and other errata contained within the report.

If you have any questions, please contact me @ 222-6580. Thank you.

MJB

Melvin J. Bullinger, P.E., City Engineer
Phone: 701-222-6580 ★ TDD: 711 ★ FAX: 701-222-6593 ★ 221 N. Fifth Street ★ P.O. Box 5503 ★ Bismarck, ND 58506-5503

Steve Saunders

From: Thomas Little [tlittle@cityofmandan.com]
Sent: Monday, June 28, 2004 2:20 PM
To: Steve Saunder (E-mail)
Subject: Northern Bridge Corridor Study—Comments

Steve,

This office supports the alignments B-2 (in Morton County) and B-4 (in Burleigh Co.).

I also support option 1 for the 1804 intersection and option 1 for the intersection with 1806.

I have also attached my list of recommended changes to the document in general. If there are wide differences of opinion concerning the recommendations, might I suggest a sit-down to go over everyone's thoughts.

If you have any questions, please feel free to contact me at your convenience.

Tom.

Steve Saunders

From: Thomas Little [tlittle@cityofmandan.com]
Sent: Friday, July 02, 2004 7:57 AM
To: Steve Saunder (E-mail)
Subject: North Bridge Corridor Study—Comments # 2

Steve,

As a supplement to my comments emailed to you on June 28, 2004; I wish to indicate my support —should Route D unfortunately be sellected— for Option 2 at the 1806 intersection. More specifically, referring to page 50 of the draft report, I recommend that the said option 2 be tweaked by curving the existing 1806 westerly so that it intersects (perpendicularly) with the future 1806. My thoughts are that with the new 1806 in place, the old 1806 will become a very minor route and not warrant a intersection with the Route D.

If you have any questions, please contact Sarah H. (at this office) at your convenience.

Tom.

Comments; Draft Northern Bridge Corridor Study

1. Page ivMayor LaMont should be Board President LaMont.

2. Page v (The 6th Whereas) This item should be removed. Suppose one of the entities does not approve the study; no one else can execute it, because they are signing/stating that all entities have approved it.

3. Page vi Suppose one of the entities does not approve the study. Their representative can not execute this document. Does that mean that the resolution is not valid and can not move forward? I recommend that only the Chairman of the MPO and the Secretary execute the resolution.

4. Page viii (Under PURPOSE--2nd line) the word can should be replaced with the word should.

5. Page viii (Under PURPOSE--2nd sentence) I don't understand the sentence.

6. Page ix(Under Alternative A--1st line--2nd sentence) Should read: In this alternative, a future bridge site is not----.

7. Page ix(Under Alternative A--2nd line--2nd sentence) Should read: Assuming that a river crossing would be needed sometime in the future, identification of --

8. Page ix(Under Alternative B--2st line) The word for should be replaced with the word of.

9. Page ix(Under Alternative C--1st bullet--2nd line) The word located should be removed.

10. Page ix(Under Alternative C--2nd bullet--2nd line) The words or more should be removed.

11. Page ix(Under Alternative C--3rd Bullet) Should read The route would require the realignment of the Rockhaver Creek----.

12. Page ix(Under Alternative D--4th line) That sentence should read: However, Alternative D creates a "U" shaped alignment, resulting in about two miles of additional travel distance than does Alternative B---.

13. Page x (The paragraph above CONCLUSION AND RECOMMENDATIONS) The word for should be replace with the word of.

14. Page x (Table--Alternative A--Advantages) On page ix, Alternative A, you state that this Alternative would only postpone the inevitable. Yet in this location you state there will be no right-of-way or bridge costs.

15. Page x (Table--Alternative A--Disadvantages) You list Greatest indirection; but if we do nothing, where is the indirection. I agree there will be indirection, but we need to explain this concept more thoroughly.

16. Page x (Table--Alternative B--Advantages) Do we know what the user costs will be. This should be expound on in the verbiage, and made part of the cost estimates.

17. Page x (Table--Alternative B--Advantages) Replace 6% with a hard number.

18. Page x (Table--Alternative D--Disadvantages) Replace 6% with a hard number and add: Probable need for truck climbing lanes, and steeper grades.

19. Page xi(1st sentence) Should read: The following recommendation is based---.

20. Page xi(1st Bullet) Should read: Morton County Route B-2 (in the northerly portion of the study area).

21. Page xi(Under IMPLEMENTATION PLAN--Item # 2) I don't understand how revision of Road Master Plan will assist in the acquisition of right-of-way. Remove item # 2 as stated.

22. Page xi(Under IMPLEMENTATION PLAN--Number items) Add: Dedication during the platting process.

23. Page 2 (Under Project Background--4th line) Add Lincoln to the list.

24. Page 3 (1st paragraph--2nd line) Should read: --- areas outside the cities' corporate limits.

25. Page 3 (1st paragraph--5th line) Should read: --- river crossing location to a future study (this study addresses the specific location of the northern river crossing).

26. Page 3 (4th paragraph--2nd sentence) This is not a sentence.

27. Page 3 (5th paragraph--4th line) Remove the word for and insert the word during.

28. Page 5 (6th paragraph--3rd line) The word meeting should be meetings.

29. Page 15 (Under Environmental Issues--2nd paragraph--10th line) National Environmental Act--- should be National Environmental Policy Act---.

30. Page 32 (Under Conclusion--3rd line) The word on should be of.

31.	Page 40	(Under Alternative A--2nd line) Should read:---Bismarck-Mandan area, which is contrary to the recommendations identified in---.
32.	Page 40	(Under Alternative A--10th line) Should read:---will exist in the study area north of Bismarck-----.
33.	Page 40	(Under Alternative A--2nd paragraph--1st line) Should read: Should the "Do Nothing Alternative" be selected, a future bridge could----.
34.	Page 43	(At the bottom of the page you list 2 Options f or the intersection of 1806 and this corridor alignment) Another option would be to have the existing 1806 curve westerly to connect with the future 1806 (south of the proposed B-1).
35.	Page 61	(Table) Does not include cost for possible/probable truck climbing lanes or for user costs.
36.	Page 61	(Table) Remove 37th St Segment & $5,014,288. What and were are they? Is there a length in Burleigh Co. that should be listed?

BURLEIGH COUNTY
HIGHWAY DEPARTMENT
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701-221-6870
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JON R. MILL, RPE, RLS
COUNTY
ENGINEER

RODNEY NESS
HIGHWAY
SUPERINTENDENT

1 July 2004

Mr. Steve Saunders
MPO Transportation Planner
PO Box 5503
Bismarck, ND 58506

RE: Northern Bridge Corridor
Study Recommendations

Dear Mr. Saunders,

The above referenced study has required considerable time and effort and has revolved around sensitive social issues. As the study progressed, the final location recommendation seemed to be leaning towards accommodation of the social issues. The tendency to do this is strong, but analytical, technical, non-emotional reasoning sometimes dictates a different recommendation. This issue is an instance where clear conscience does not allow acquiescence to the social constraints of route selection.

After due deliberation of the draft report, I agree that Alternative B is the overall best route location to pursue. This route is the most direct, possible link between the tie points of 37th Street on the west side of the river and ND 1804 on the east side of the river. Alternative B appears to be over 2 miles shorter and involves much less indirection than Alternative D. Alternative B also offers a significant cost savings over Alternative D.

Alternative B-2 is preferable to Alternative B-1 since there are less social impacts without materially affecting the function or vision of the beltway function.

On the east side of the river, Alternative B-4 provides a much more direct alignment routing to the intended tie point then does Alternative B-3. Free flowing traffic use of the beltway is facilitated with Alternative B-4. This same desire for directness demands selection of Option 1 as the best treatment for the beltway-ND 1804 intersection.

The MPO Policy Board has a difficult decision to make in selecting a recommended route location. In the event that Alternative D is selected as the target corridor, there are some options to the large plan that have more merit than other options. Alternative D-2 requires flatter profile grades with shallower fill sections than Alternative D-1.

Of the presented options for the treatment of the beltway-ND 1806 intersection, Option 2 provides a smoother alignment for ND 1806. Careful study of this intersection suggests

that an Option 3 that would follow the existing alignment of ND 1806, with minor tweaking , might be a viable option to consider.

On the east side of the river, Alternative D-3 is the clear choice since it avoids the misdirection and additional length offered by Alternative D-4 and the misdirection and undesirable social impacts to Crested Butte Subdivision offered by Alternative D-5. The River Road bridge structure required by Alternative D-3 is actually a benefit since the structure assists the profile grade challenges in the area and enhances the north-south arterial type traffic flows for River Road. For the beltway-Burnt Creek Road intersection, Option 2 is preferred since it softens the social impact, matches fringe road layouts, and is less disruptive to the area. The frontage road to the Burnt Boat Ramp area is really not needed since the ramp area will be accessible under the beltway bridge with a very short roadway connection between existing roads and Misty Waters roadways.

Please contact this office if you have any questions concerning this issue.

Sincerely,

Jon R Mill

Jon R. Mill, RPE & RLS
Burleigh County Engineer

Steve Saunders

From: Mill, Jon R. [jmill@state.nd.us]

Sent: Friday, July 02, 2004 10:57 AM

To: Saunders, Steve L.

Subject: Northern Bridge Draft Comment Addendum

As per your request, I reviewed the options list in the draft report to comment on all of the options, whether I preferred the route or not. The only option I did not comment on is for route B-1 as it intersects ND 1806. My option preference at this location is Option 1. This option offers a significant cost savings and has a very soft social and neighborhood impact. The intersection angle still meets minimums and is not undesirable enough to address.

Jon R. Mill, P.E., R.L.S.
Burleigh County Engineer
2000 N 52 St
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Bob Shannon

From: Steve Saunders [ssaunder@state.nd.us]
Sent: Thursday, July 08, 2004 10:47 AM
To: bob.shannon@kljeng.com

Hi Bob.

Here is Chuck's latest review of the N. Bridge draft. Please disregard the first review and replace it with this one. Thanks Bob.

Steve

REPORT FOR NORTHERN BRIDGE CORRIDOR STUDY

PAGE 39, On this page it says the segment along 37th Street from North Dakota 25 to Highland Road will be able to follow existing road center lines and would not interfere with any homes in that particular area. I don't believe that is true at the east end, toward the Highland Road area.

For the first mile there is no homes, for the second mile there are 2 homes on the north side of the road, for the third mile in there is a home on the north side that belongs to Toby Huber and another cabin on the south side of the road. I believe that both of these are far enough back to get out of the right-of-way strip, although it will be close to the road. A little farther east there is a Mr. Backer who is close to the road. With this big of right-of-way it will definitely be up into his front yard. A little further east of Mr. Backer is Jan Froehlich, although his home is back far it will use a good chunk of his front yard. On the south side of the section line is another home. I don't believe that the Right-of-Way can be squeezed in thru this area. Then immediately east of that is a home almost on the section line itself which is going to cause some real problems. If your going to move the road north of this home enough to clear it your going to be down in deep valley. East of the last home is the original Norton farm. He has built extremely close to the section line and will cause problems. Another issue that comes up is that this is where the main water line for Missouri West Water starts and continues easterly along this particular area. As you get over further east as noted in the study you enter into the south side of the Landeis subdivision and then there are various options available there.

PAGE 40, On this page I don't know if I'm looking at something wrong but it appears as if on page xi at the beginning of the book it is recommending alternate B2 which is on 37th Street but on exhibit 4.2 it shows B2 as being south of 37th Street, so I'm not sure which one you are recommending.

PAGE 43, On this page as for options 1 or 2, Option 1 is present and is used effectively. Although the increase in east-west traffic expected to be rather significant I think it can't be handled in the same situation it is now. The north-south or option 2 would have some severe impacts on both Zachmeier Manufacturing & on Donnie Entzel's storage units and on his subdivision that is presently under construction. The south end would also infringe on some people's front yards rather severely, although there is no development taking place. Exhibit 4.4 route B1 is shown as being on the section line or 37th Street as being the choice. This page does not show B2 as even an option. I think maybe that needs to be put on there and still discussed somewhere along the line. Again I refer back to the fact that the water distribution line is in this area west of the last home you see in Landeis Subdivision, so that has to be addressed somewhere in this study as to the cost of moving that. There is also a power transmission line running along the entire length of this section line so far. It turns south into Heskett east of the Humane Society.

PAGE 49, This is along the south route and there are various access options available to do

this. Option 1 is shown in yellow. Option 1 would be difficult to put in because it would require another large change in Sunset Drive. I believe Sunset Drive's construction future is earlier than this is. Option 1 also with the frontage road would work for the homes on the frontage and would not create a real problem but somewhere along the line we need to get the other folks out to the west of 1806. There are 2 residents at this time and probably more by the time this goes in. Option 2 in red is basically the Sunset Drive as identified in the Long Range Transportation Study that appears to be fine. The one through Tesoro Oil Refinery I think would be a dead issue no matter when you go with the bridge.

As a final thought on this corridor, I believe that I would support corridor D or the southern route. Along with that corridor, option D2 for getting back up into the hills, north of Mandan. The reason is that a portion of this is an industrial area, so therefore it does fit in with the use. There are no homes to be moved. I like the idea of the D2 option to have the green space along the very steep hillside on the east side of Highland Road. In all practicality though, Morton County will not really be a player in this particular corridor because this all lies within the extraterritorial zoning of the City of Mandan. They will be the ones that will be imposing their wishes on the future zoning of this particular area. Also, I don't feel comfortable recommending anything on the East side of the river, as I personally am not acquainted with either of the options on that side.

Steve Saunders
6/25/04

CHOICES, REVIEW, AND COMMENTS OF N. BRIDGE DRAFT STUDY

CHOICES

1. Overall Alternatives Choice – B Route (Northern Crossing)
2. Specific route choices -
   A. B2 and B4
   B. D2 and D3
3. Option Choices
   A. Alignment B1 Option Choice – Option 2
   B. Alignment B4 Option Choice - Option 1
   C. Alignment D Option Choice – Option 2
   D. Burnt Creek Loop Alignment Option Choice – Option 1

REVIEW

1. Page vi is a signature certification of the MPO Policy Board by all 5 Board members. Recommend that only Chairman, Clause Lembke sign off on this certification.

2. Page vii is jurisdictional Resolution of Adoption. Paragraph 5 States, "Whereas, the engineering and planning department staff have reviewed the Northern Bridge Corridor Study, and have unanimously indicated their support for it as a guide for their future planning and development policies: and" Recommend that this paragraph be stricken.

3. Page 1 concerns the Introduction of the Corridor Study Development. Line 2 of the first paragraph states "…the beltway is between ND Highway 25 in Morton County (one mile north of I-94) and North 66th Street in Burleigh County (three miles north of I-94)." Recommend that the paragraph state, "that the beltway is between 24th Avenue and North 66th Street…" ND Highway 25 is not actually part of the planned beltway. Although we wanted KLJ to address the road connection between Highway 25 and 24th Avenue in this corridor study, we did not envision Highway 25 as a part of the beltway. I further recommend that any other applicable references in the report should refer to 24th Avenue and not ND Highway 25 as the western north/south leg of the beltway. Also the map on the bottom of page 1 should be changed to show that the connection between Highway 25 and 24th Avenue is being studied but not part of the beltway.

COMMENTS

Overall a well written report, that lays out the situation and choices well.

Alternative A (do nothing) does not address an upcoming transportation problem. It is clear that Alternative B (northern route) is the superior bridge/corridor route. It is also clear that this study has encountered local resistance that makes Alternative D (southern route) the more politically acceptable choice. But, it is important to remember that the route we protect will be our "transportation tool" for many decades. The route we choose should be something we are proud of now and in the future. Although some pain is involved in its selection, in my professional opinion, Alternative B is the selection the MPO should embrace.