

TOWER TERRACE ROAD DESIGN CONCEPT REPORT



**N10th Street to N35th Street Roundabout
Marion, Iowa**

December 2, 2010



TALLGRASS HISTORIANS L.C.

**TOWER TERRACE ROAD Design Concept Report
N10th Street to N35th Street Roundabout
Marion, Iowa**

**December 2, 2010
Ament Project No. G02010.10**

**Submitted to:
The City of Marion
Marion, Iowa**

**Submitted by:
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References

Tower Terrace Road Corridor Management Plan, prepared for the Corridor MPO, Snyder & Associates, March 18, 2010

Design Guidelines Manual for the Neighborhood at Indian Creek, RDG, December 2009

29th Avenue North Subarea- Plan, prepared for the City of Marion, Iowa, Shive-Hattery, 2009

2040 Transportation Plan for the Cedar Rapids Iowa Metropolitan Area, July 28, 2005, Linn County Regional Planning Commission

Appendices

Appendix A: Preliminary Geotechnical Engineering Report, Proposed Tower Terrace Road Extension From 10th Street to Proposed 35th Street, Marion, Iowa, March 18, 2010, Terracon Project No. 06105009.01

Appendix B: Wetland Delineation Report, Tower Terrace Road Extension, Marion, Iowa, May 26, 2010, Terracon Project No. 06107015

Appendix C: Tower Terrace Design Concept Project, City of Marion, Linn County, Iowa, Phase I Cultural Resources Investigation, July 2010, Tallgrass Historians Report No. TH10-477

Appendix D: Environmental Evaluation Report, Tower Terrace Road Extension From North 10th Street to 35th Street, Marion, Iowa, September 9, 2010, Terracon Project No. 06107015

Appendix E: Public Open House Events Information and Feedback

Appendix F: Hydraulic Data

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Project Goal

The goal of the Tower Terrace Road Design Concept Report was to develop the preferred alignment and bridge layout for the North 10th Street to N35th Street section of the Tower Terrace Road Corridor. This goal was accomplished by developing alignment options and selecting a preferred alignment which is an efficient, aesthetic, and cost-effective method to bisect the Linn-Mar Campus, cross Indian Creek, and tie into the North 35th Street roundabout. Several key issues were critical to the design and alignment evaluation process:

- Public Involvement
 - Two Public Open House Events were hosted, project information was posted on the City of Marion website, and the project was presented to the City Council
- FEMA Regulations & Hydraulic Analysis
 - The bridge design and hydraulic modeling was prepared in accordance with the applicable floodway requirements
- Crossing of the Linn-Mar Campus
 - The alignment accounts for the new football stadium currently under construction and the alignment options were evaluated for impacts to the Linn-Mar school facilities
- Aesthetics in-line with the City's design plans
 - The City has undertaken extensive planning efforts to create cohesive design guidelines for the project area and the final alignment and bridge layout blend with the City's plans
- Federal, State, & Local Permits
 - Preliminary work for applicable permits and reviews was performed to prepare the roadway section for future funding opportunities
- Intersection Relocations & Connectivity
 - The alignment will involve the relocation of the Winslow Road connection and closure of the Indian Creek Road intersection
- Right-of-Way and Property Acquisition
 - The alignment selected utilizes the existing City utility corridor between Winslow Road and Indian Creek Road and minimizes impacts to private property owners
- Wetlands & Environmental Impact
 - Multiple reports were prepared for the project corridor to identify wetlands, evaluate environmental impacts, and review the area for cultural/historical significance.
- Safety, Efficiency & Economics
 - The alignment was designed in accordance with applicable City, state, and federal design requirements and cost analyses were performed throughout the design process
- Multi-use Trails and Other Recreation
 - The alignment cross section provides for multi-use pathways in accordance with the City of Marion's design guidelines

The Tower Terrace Road Design Concept Report was prepared in general accordance with the Tower Terrace Road Corridor Management Plan (Corridor MPO – Hiawatha, Robins, Cedar Rapids, Linn County, Marion), dated March 18, 2010 and the other local design references listed in the Table of Contents.



Figure 1: Local Design References
(Full size Figures are included in Appendix G of this report.)

Project Overview

In January 2010 the City of Marion retained the services of Ament, Inc. and its select team of technical experts to develop alignment options and assist in selecting a preferred alignment and bridge layout for Tower Terrace Road between North 10th Street and the North 35th Street roundabout. The design team consisted of Ament, Inc., Calhoun –Burns & Associates, Terracon Consultants, and Tallgrass Historians.

The roadway alignment for the full Tower Terrace Road extending from Interstate 380 to the west and Highway 13 to the east was previously developed in the Tower Terrace Road Corridor Management Plan. The full alignment is shown in the Figure on the following page. The section of the alignment, between North 10th Street and the North 35th Street roundabout, was identified in this plan as a conflict point for further exploration. This report consists of an in-depth evaluation of that conflict area and provides a recommendation for the alignment in this area.

Design Process & Public Events

Following a review of the existing site conditions, available utility, GIS, traffic, and other data, and the aforementioned design guidelines, a project corridor consisting of several horizontal alignment options was developed. The environmental evaluation, wetland delineation, geotechnical exploration, and archeological survey were performed for this corridor. The results of the explorations are provided in the Appendix of this report and summarized in the following sections.

The multiple alignment options were then presented at a Public Open House on February 25, 2010. The public event was posted in the local newspapers, on the City of Marion’s website, and on the Linn-Mar school website; and letters were mailed to adjacent property owners. The information presented at the public event and the feedback received is included in the Appendix of this report. Feedback was solicited from the public at this event on their preferred alignment option.

The results of the public feedback, City input, the explorations, and design evaluations based on the key issues were reviewed to narrow the alignment options to progress to the next step of alignment design.



Figure 2: Alignment Options Presented at the First Public Event

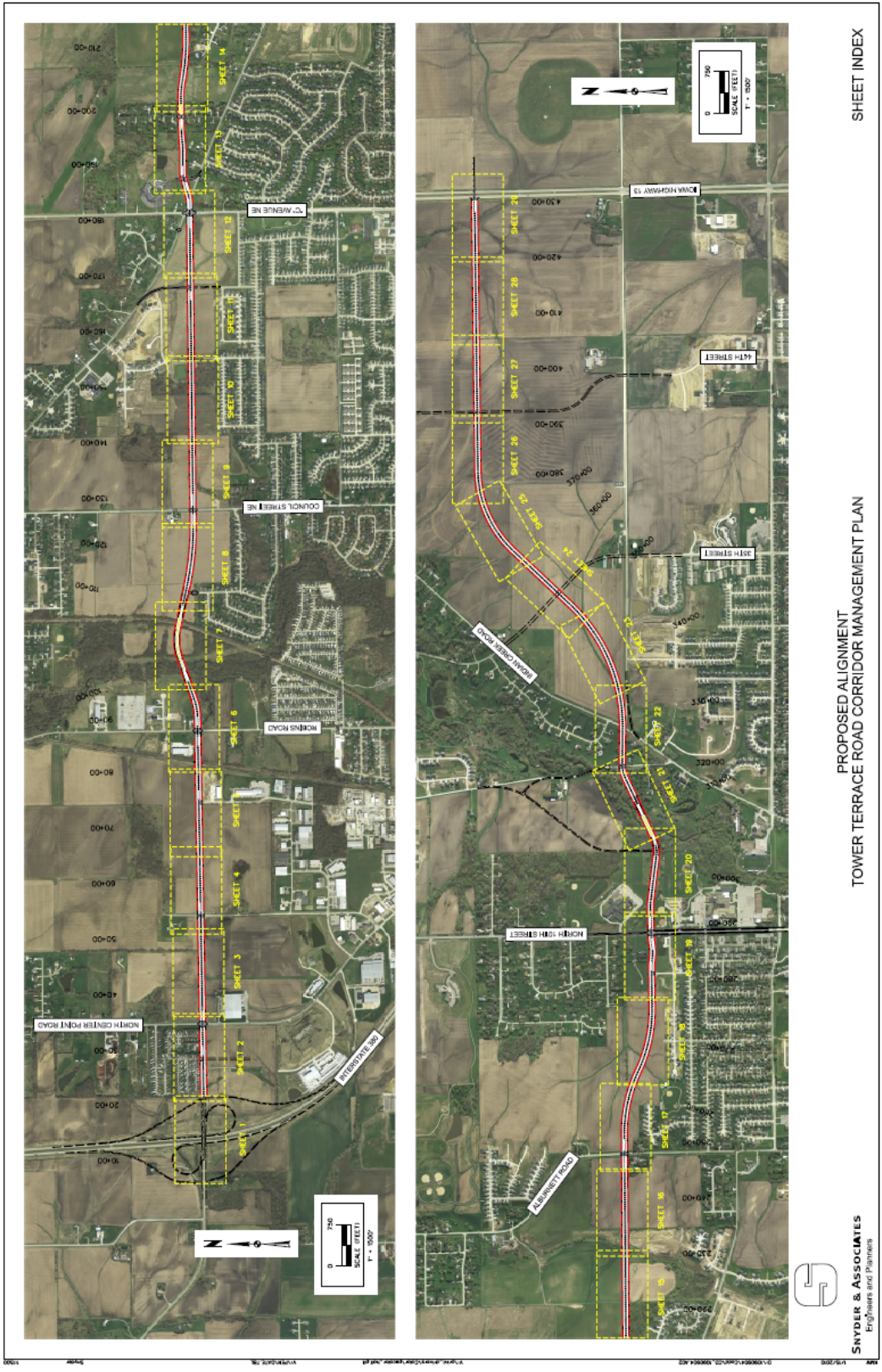


Figure 3: Full Alignment from the Tower Terrace Road Corridor Management Plan

The results narrowed the preferred alignment to option E, as shown in the following Figure. This option was then presented at the second Public Open House on May 20, 2010. The information presented at the second public event and the feedback received is included in the Appendix of this report. The information presented at the public event was also posted on the City of Marion's website. The project and preferred alignment was also presented on informational handouts at the City of Marion Arts Festival in the Summer of 2010.

With the preferred option selected, the bridge design, hydraulic analyses, traffic studies, vertical alignment and easement evaluations were completed.

The final alignment and a project summary were presented to the Marion City Council on November 4, 2010. The information provided in this presentation is included in the Appendix of this report.

The final alignment selected is shown in the Figure on the following page. The plan and profile sheets for the final alignment are included in the Appendix of this report.



Figure 4: Preferred Alignment E Presented at the Second Public Event

To aid in visualizing the full Tower Terrace Road alignment from Interstate 380 to Highway 13, a Google Earth video fly-through of the project corridor and proposed roadway was created. The video was presented to the City Council on November 4, 2010 and has been provided to the City of Marion. The video can be viewed online at the City of Marion website (www.cityofmarion.org) or at the Ament, Inc. website (www.ament.com).

Final Alignment Summary

In summary, the final alignment consists of:

- 6,562 lineal feet of roadway
- Four 12-foot wide lanes with a center boulevard.
- Minimum 120-foot right-of-way
- 8-foot wide multi-use path on both sides of the roadway.
- Design speed of 40 mph
- 389-foot-long pretensioned, prestressed concrete bridge
- Three residential buildings impacted
- Partial closure of the current Winslow Road intersection
- Relocation of Winslow Road with the new connection shifting to the west
- Closure of Indian Creek Road between Penny Lane and the future North 35th Street

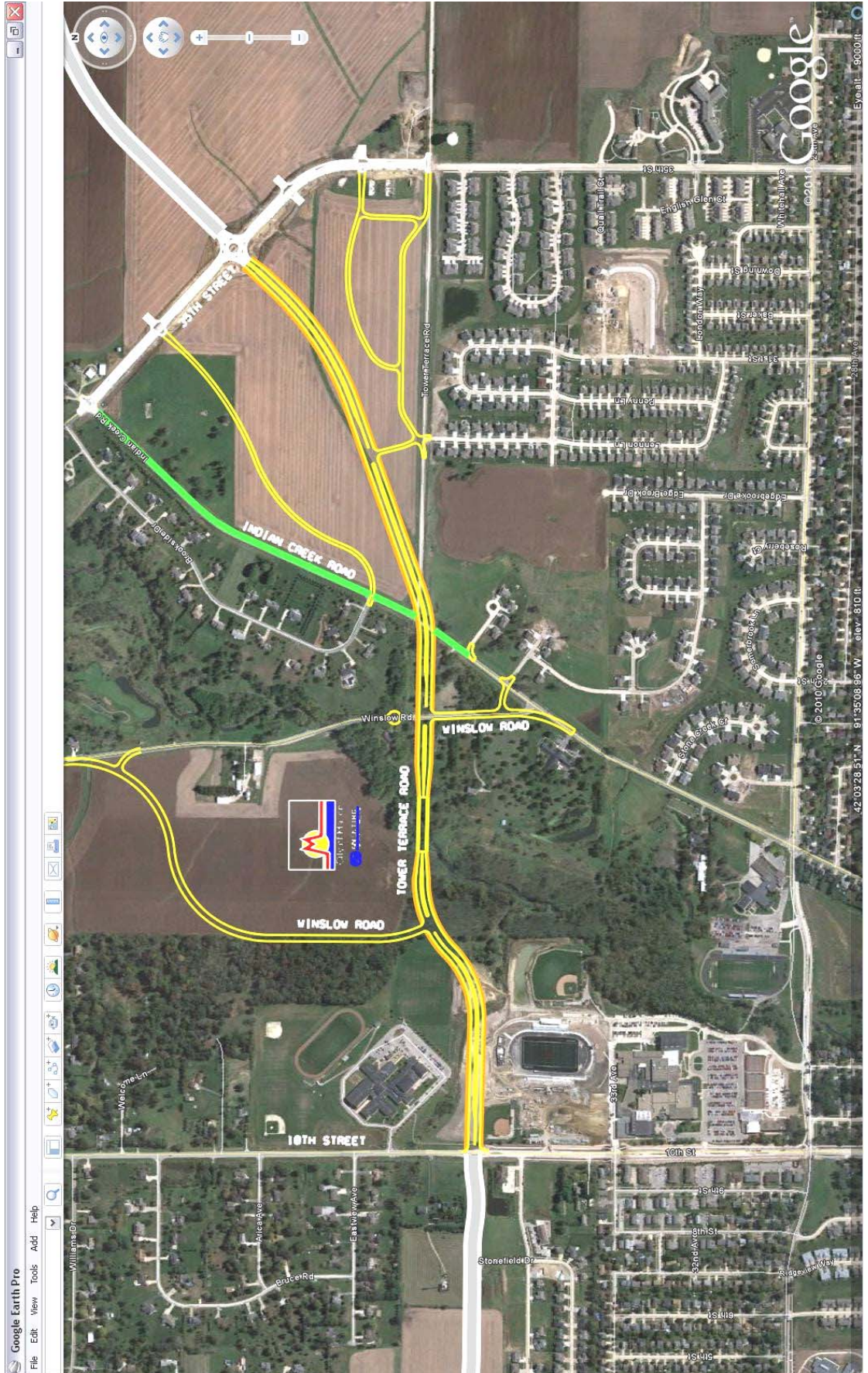


Figure 5: Final Alignment Selected

Bridge Design & Hydraulic Analyses

In designing the bridge and overall alignment, the goal of reducing the bridge length, and therefore, bridge cost was balanced with the other project impacts associated with property and environmental impacts. Several bridge materials were evaluated in the design process, including PC concrete slab, prestressed concrete beam, and steel beam. Each option was weighed for its benefits vs. costs in terms of bridge depth and hydraulic impacts, maximum beam length and resultant increase to number of bridge piers, and material costs. Consideration was also given to removal of the existing Winslow Road bridge over Indian Creek to reduce the hydraulic impacts of the Tower Terrace Road bridge. Removal of the bridge was not found to significantly improve the hydraulics with regards to the Tower Terrace Road bridge. The final alignment selected resulted in a recommended pretensioned, prestressed concrete bridge, 389 feet in length with two bridge piers in Indian Creek. The bridge type, size and location drawings and the hydraulic data are included in the Appendix of this report. The HEC-RAS hydraulic analysis has been provided to the Iowa Department of Natural Resources for their preliminary review. A CLOMR (conditional letter of map revision) will also be prepared to provide to FEMA for review.

Geotechnical Exploration

A total of six (6) borings were performed within the project corridor extending to depths of about 15 to 36 feet below the existing grades. Below the topsoil layer, deposits of clay and sand were encountered extending to a stratum of glacial till (sandy lean clay). Below the glacial till, the borings encountered limestone bedrock deposits. Based on the information available, the site appears suitable for the proposed roadway and bridge project. It should be noted that possible Karst (limestone with voids and decomposed layers) was encountered within the project site at the proposed bridge location. Drilled shafts with rock excavation techniques are recommended for the bridge foundations founded on the west bank of Indian Creek. Drilled shafts or driven piles could also be considered for the east bank of Indian Creek. The Preliminary Geotechnical Engineering Report is included in the Appendix of this report.

Wetlands Delineation

Based on the results of the delineation, 4,200 lineal feet of Water of the United States and 2.48 acres of wetlands were identified within or adjacent to the project site. The report has been provided to the Rock Island District U.S. Army Corps of Engineers for a Jurisdictional Determination. At the time of this report, review comments had not yet been received from the U.S. Army Corps of Engineers. The Wetland Delineation Report is included in the Appendix of this report.

Environmental Evaluation

An environmental evaluation was performed for the project to identify future permitting and review needs as part of the progression to final design and funding source requirements. The project was preliminarily evaluated for public involvement, traffic noise, air quality, mobile source air toxics, ROW and displacement impacts, cultural resources, threatened and endangered species, wetlands, parkland impacts, water quality, floodplains, farmland protection, regulated materials, construction/detour impacts, airspace considerations, cumulative impacts, and consistency. In addition, multiple city, local, state, and federal agencies were consulted. The Environmental Evaluation Report is included in the Appendix of this report.

Archeological Survey

A total of 39 acres was evaluated as part of the Phase I Cultural Resources Investigation for this project. One archeological site was found within the project corridor and one property was identified to be historic in age. However, the sites were concluded to be ineligible for the National Register of Historic Places and warrant no further investigation. No other potential historic properties were indicated within the Area of Potential Effect and no further cultural resources investigation appears warranted in association with this project. The Phase I Cultural Resources Investigation is included in the Appendix of this report.

Linn-Mar School Campus Crossing

The proposed roadway will bisect the Linn-Mar school campus between the new high school football stadium and Excelsior Middle School. The final alignment will impact portions of the existing recreational fields east of the Middle School. However, it is anticipated the fields could be rotated to maximize the space with minimal loss of field area. Consideration was also given to providing a pedestrian tunnel under Tower Terrace Road to connect the school campus. This option was not shown at this time due to concerns over safety, maintenance of a tunnel, and drainage impacts associated with the box culvert being installed in the existing drainage channel as part of the football stadium project. Consideration was also given to providing vehicular access from the new football stadium parking lot to Tower Terrace Road. This was not shown in the final alignment due to concerns over the proximity of the access to the intersections at North 10th Street and the future relocated Winslow Road.

Right-of-way / Easements

Limiting impacts to property owners was one of the key issues in developing the alignment options. The final alignment selected will impact three residential buildings as shown in the Figure on the following page. The plan-and-profile sheets included in the appendix identify the property owners along the project alignment and the proposed construction limits are shown to identify areas of impact to each property.

Intersections & Traffic Studies

The available traffic data was analyzed in determining the intersection layouts with regards to Opening Day traffic (2012-2013) as well as 2040 conditions. Detailed traffic studies were not performed for the North 10th Street intersection as part of this study due to road construction on North 10th Street.

The proposed intersection layouts are shown in the plan-and-profile sheets included in the Appendix of this report. The final alignment will result in the partial closure of the current Winslow Road alignment north of future Tower Terrace Road. This will result in the Winslow Road bridge over Indian Creek providing the only roadway access to one residential property located north of Tower Terrace Road. The alignment will also relocate Winslow Road to the west north of Tower Terrace Road and will result in the closure of Indian Creek Road between Penny Lane and the future North 35th Street.



Figure 6: Impacts to Residential Buildings

Utility Impacts

The final alignment will have minor impact on existing sanitary systems, water systems, and stormwater systems. The roadway alignment was shifted southward to locate the roadway pavement section south of the existing City property located between existing Winslow Road and existing Indian Creek Road (between Stations 131+00 and 137+00 on the plan-and-profile sheets included in the Appendix). This utility corridor serves as an open stormwater channel and has an existing sanitary sewer main. The roadway alignment will have minimal impact on the existing utilities in this corridor. The roadway alignment also crosses existing water mains located below existing Winslow Road and existing Indian Creek Road. It is anticipated the roadway will have minimal impact on the water distribution system

The final alignment crosses an existing drainage channel near Station 129+00 and a culvert will be needed in this area. The final alignment also crosses a future box culvert for a drainage channel north of the new high school football stadium and extending this culvert will be necessary to accommodate the proposed roadway.



Figure 7: Existing Utilities

Order of Magnitude Cost Opinion for Final Alignment

\$5.2 M – Grading & Drainage
 \$2.7 M – Paving
 \$4.2 M – Trails, Lighting, Utility Extensions
 \$0.9 M – Right-of-way
\$4.4 M – Bridge
 \$17.4 M TOTAL

Future Project Goals

The next step in the project is to secure funding and proceed to design:

Funding → Permits&Environmental Clearances, Property Negotiations → Final Design → Construction.