2.0 Alternatives

2.1 Alternative Development and Screening

This chapter discusses the alternatives considered and analyzed to address the Purpose and Need for the Preferred Alternative. A range of alternatives for the project were developed and screened, as detailed in **Appendix B**. The following sections summarize the alternatives considered and the screening process used to identify and select the Preferred Alternative for the project.

The alternatives development process entailed screening of the alternatives to determine which warrant further consideration for the project. The Initial Alternatives Screening was qualitative in nature as described in Section 3.0 of the Alternatives Analysis Memo, **Appendix B**. Under the Initial Alternatives screening, all Initial Alternatives were evaluated against the Purpose and Need criteria established for the project.

Following the screening of the Initial Alternatives, Alternatives that proved feasible transitioned into a second round called the Reasonable Alternatives screening. These Reasonable Alternatives were further evaluated quantitively to determine their potential impacts in comparison to the No-Build Alternative and each other.

2.1.1 Alternatives Screening Process

The alternatives analysis process entailed screening of the alternatives to determine which warranted further consideration as Reasonable Alternatives. The Initial Alternatives Screening was conducted utilizing screening criteria established for the project, encompassing elements of the Purpose and Need, the natural and human environment, engineering and costs, and public stakeholder input (a full breakdown of the screening criteria can be found in **Appendix B**). The initial screening was qualitative in nature. Under the Initial Alternatives screening, all Initial Alternatives were evaluated first against the Purpose and Need criteria established for the project. In addition to the No-Build Alternative, only those alternatives that satisfied the Purpose and Need criteria as standalone alternatives were carried forward for additional Reasonable Alternatives screening against natural and human environment criteria, engineering and cost criteria, and public stakeholder criteria.

As an outcome of the screening of the Reasonable Alternatives, a Preferred Alternative, or Proposed Action, was selected. The Preferred Alternative is the alternative that best meets the Purpose and Need for the project while avoiding, minimizing, or mitigating impacts to both the natural and human environment, considers engineering factors and costs, and stakeholder input. **Appendix B** provides more detailed information on the screening of the Initial and Reasonable Alternatives for the project.

2.1.2 Alternatives Considered

As part of the environmental clearance process, a No-Build Alternative is used as a benchmark for comparison against the other improvement alternatives being evaluated. In addition to the No-Build Alternative, a total of six alternatives were considered. These alternatives were developed by KDOT in coordination with the City of Lenexa, City of Olathe, City of De Soto, and other project stakeholders. The team also drew upon alternatives during previous studies within the corridor. The range of potential alternatives included the following:

- No-Build
- Improvement of Alternate Routes
- Existing Capacity Management
- Multimodal
- Transit
- Add Capacity – Traditional Widening (Traditional Widening Alternative)
- Add Capacity – Express Toll Lanes (Express Toll Lanes Alternative)

Appendix B provides detailed descriptions of the alternatives.

2.1.3 Alternatives Considered but Dismissed

Through the Initial Alternatives development and screening process, three of the six proposed alternatives were dismissed from further consideration as standalone alternatives for improving the K-10 Corridor. During the Initial Alternatives screening process, the Improvement of Alternate Routes, Existing Capacity Management, and Multimodal alternatives as stand-alone alternatives did not satisfy the Purpose and Need for the project. Components of those alternatives may ultimately be incorporated as part of the Preferred Alternative, if appropriate, and coordinated with city, county, region, and transit agency plans.

Improvement of Alternate Routes – This Initial Alternative was eliminated from consideration as a stand-alone alternative due to its low achievement at improving safety performance and infrastructure condition, connectivity to bicycle and pedestrian facilities, and reliability for transit riders. In addition, it did not have a high rating in compatibility with local planning.

Existing Capacity Management – This Initial Alternative was eliminated from consideration as a stand-alone alternative due to its low achievement at reducing congestion and improving infrastructure condition issues along the K-10 corridor. This alternative also performs poorly when compared to other Initial Alternatives at providing flexible choices.

Multimodal – This Initial Alternative was eliminated from consideration as a stand-alone alternative due to its low achievement at reducing congestion and improving traffic operations along the K-10 corridor. The alternative has moderate, even substantial

achievement at reaching the project's goals of providing flexible choices and some aspects of supporting local and regional growth. Although this alternative was eliminated from consideration as a stand-alone solution due to the above reasons, individual elements may be incorporated into the Preferred Alternative.

2.2 Reasonable Alternatives

Alternatives that were determined to meet the Purpose and Need following the Initial Alternatives Screening Process were moved forward in the screening process as Reasonable Alternatives. Both add capacity alternatives were advanced. In addition, the No-Build Alternative was brought forward as a benchmark.

2.2.1 No-Build Alternative

As part of the environmental clearance process, a No-Build Alternative is used as a benchmark for comparison against other alternatives being evaluated to improve a project. The No-Build Alternative means that no roadway and/or bridge reconstruction or capacity improvements would be constructed on the K-10 corridor. This alternative will include ongoing maintenance of the K-10 corridor along with minor pavement and bridge rehabilitation. This alternative also includes all future projects that are currently planned and already committed within the corridor's project area and noted in state, regional, and local transportation improvement plans through the 2060 design year of the project as outlined in **Section 1.3** earlier in this document.

While this alternative does not meet the Purpose and Need it is carried forward for further study because it provides a baseline for comparing the potential impacts of the other alternatives being considered, as required by the Council on Environmental Quality (CEQ) regulations for implementing NEPA.

2.2.2 Express Toll Lanes Alternative

This alternative includes adding an additional lane in each direction of travel that would provide express toll service along the corridor by managing congestion in the lanes through pricing, vehicle eligibility, and access strategies. This alternative also includes reconstruction of bridges and pavement in the corridor.

Geometric and condition improvements include:

- Add an additional travel lane in each direction for express toll lane service;
- Reconfigure portions of interchange at K-10 and K-7;
- Reconfigure portions of interchange at K-10 and I-435;
- Reconfigure portions of interchange at I-435 and I-35;
- Reconfigure the interchange at K-7 and Prairie Star Parkway;
- Reconfigure the interchange at Lackman Road and I-435;
- Reconfigure interchanges along K-10 at Evening Star Road, Lexington Avenue, Woodland Road, and Renner Boulevard;
- Additional interchange at Lone Elm Road;

- Improvements to local interchanges and supporting cross streets; and,
- Reconstruction of existing pavement and bridges.

2.2.3 Traditional Widening Alternative

This alternative considers the reconstruction of pavement and bridges along the corridor and constructing an additional general-purpose lane in each direction of travel. The alternative also incorporates additional capacity to improve connections to and from interchange ramps along the corridor, such as auxiliary lanes, which provide a continuous lane of travel between closely spaced interchange entrance ramps and exit ramps.

Geometric and condition improvements include:

- Add an additional travel lane in each direction;
- Reconfigure portions of interchange at K-10 and K-7;
- Reconfigure portions of interchange at K-10 and I-435;
- Reconfigure portions of interchange at I-435 and I-35;
- Reconfigure the interchange at K-7 and Prairie Star Parkway;
- Reconfigure the interchange at Lackman Road and I-435;
- Reconfigure interchanges along K-10 at Evening Star Road, Lexington Avenue, Woodland Road, and Renner Boulevard;
- Additional interchange at Lone Elm Road;
- Improvements to local interchanges and supporting cross streets; and,
- Reconstruction of existing pavement and bridges.

2.3 Preferred Alternative

The Traditional Widening Alternative was selected as the Preferred Alternative, designated as the Proposed Action for the K-10 Capacity Improvements Project. The Traditional Widening Alternative was recommended by the K-10 Project team due to its ability to meet the Purpose and Need of the project, address congestion and traffic safety concerns within the corridor, results in fewer impacts to the natural and human environment over the other Reasonable Alternative, and its ability to provide a lower cost solution. KDOT will work with local partners to accommodate multimodal, existing capacity management, improvement of alternate routes, and other complementary improvements to the Preferred Alternative. The Preferred Alternative can be seen in **Figure 2-2** at the end of the chapter.

2.3.1 Purpose and Need Criteria

The Traditional Widening Alternative met the Purpose and Need of the project by:

- **Enhancing Safety Performance –** The implementation of the Traditional Widening Alternative will enhance safety performance through adding new lanes of travel capacity which will address crashes caused by stop and go traffic and

include improvements to roadway, ramp, and interchange geometrics along the corridor.

- **Improving Traffic Operations –** The Traditional Widening Alternative and the Express Toll Lanes (ETL) Alternatives had the highest ratings for improving traffic operations. The Traditional Widening Alternative would provide more capacity options for all vehicles. Additional lanes would also increase the overall corridor's travel speed and increase the corridor's throughput.
- **Improve Infrastructure Condition –** Adding additional capacity has the highest rating to improve the infrastructure condition through the replacement of pavement and bridges along the corridor. The addition of lanes through traditional widening would impact long-term travel reliability and life-cycle costs through additional capacity in the corridor.
- **Provide Flexible Transportation Choices –** The Traditional Widening Alternative offers additional capacity through the addition of lanes for other modes of transportation, such as transit, by alleviating roadway congestion. In addition, as a result of construction, there would be improved access to transit, bicycle, and pedestrian connections in the study area.
- **Support Local and Regional Growth –** Both the Traditional Widening and ETL Alternatives were evaluated to best align with the various city and the region's anticipated growth strategies. These alternatives are incorporated into the planned and committed transportation improvements within state, regional, and local planning documents to help accommodate future growth plans.

2.3.2 Natural and Human Environment Criteria

The Traditional Widening Alternative was shown to have fewer natural and human environment impacts then the ETL Alternative. This includes fewer displacements of floodplains, wetlands, and streams. This is due to the smaller footprint of the Traditional Widening Alternative than the ETL Alternative.

2.3.3 Engineering and Cost Criteria

From an engineering and cost standpoint the Traditional Widening Alternative has an overall lower construction cost of $1.16 billion, which is $40 million lower than the ETL Alternative. The Traditional Widening Alternative has an overall lower life-cycle cost than the ETL Alternative due to the lack of tolling infrastructure. The Traditional Widening Alternative also has fewer ROW impacts.

2.3.4 Project Phasing, Project Costs and Funding

The Preferred Alternative will be constructed utilizing a phased approach. This phased approach allows for critical areas with the greatest need to be addressed with the initial phase and the full scope of improvements to be constructed in phases as traffic demand throughout the corridor grows.

The project is split into a minimum of three separate project phases that are planned to be constructed by 2060. **Figure 2-1** shows the three project phases within the project area.

Figure 2-1: K-10 Corridor Project Phases

Project development and construction of the Preferred Alternative is anticipated to occur over a period of several decades with prioritized near-term, mid-term, and long-term improvements represented by the three colors in **Figure 2-1**. Preliminary engineering, right-of-way definition and acquisitions, and utility relocations are anticipated to occur within the current KDOT IKE Program in 2025-2030. Construction of Phase 1, represented in orange in Figure 2-1, is anticipated in the early 2030 decade and includes the following improvements:

- Addition of the Lone Elm Road interchange and auxiliary lanes between Woodland Road and K-7
- Complete K-10 improvements between Woodland Road and I-435, including new bridges where needed
- Addition of an auxiliary lane on southbound I-35 from 95th Street to I-435
- Enhancements to the certain I-35/I-435 ramps.

Phase 2, represented in green in **Figure 2-1**, is anticipated to be constructed in the early 2040 decade and includes the following improvements:

- Complete the K-10 interchange at Woodland Road
- Complete K-10 improvements between Woodland Road and Cedar Creek Parkway, including the reconfiguration of the K-10/K-7 interchange
- Complete K-7 improvements between College Boulevard and Prairie Star Parkway
- Construction of the K-10 interchanges in De Soto at Lexington Avenue and Evening Star Road

Phase 3, represented in blue in **Figure 2-1**, is anticipated to be constructed beyond the 2040 decade but within the design year of 2060. Phase 3 includes the remainder of the Preferred Alternative including the following improvements:

- Complete K-10 improvements from Cedar Creek Parkway to the Johnson/Douglas County line including reconstruction of the K-10 interchanges at Edgerton Road and Kill Creek Road
- Complete I-435 improvements from 87th Street to I-35 including enhancements at the I-435 interchanges at 95th Street, Lackman Road, and I-35.

In 2024 dollars, the total project cost for the entire NEPA scope is estimated to be $1.454 billion. The costs for each phase break down as follows:

Phase 1 (orange) – Total project cost: $387 million:

- PE (8% of construction) - $25 million
- ROW/utilities - $30 million
- Construction - $313 million
- CE (6% of construction) - $19 million

Phase 2 (Green) – Total project cost: $540 million

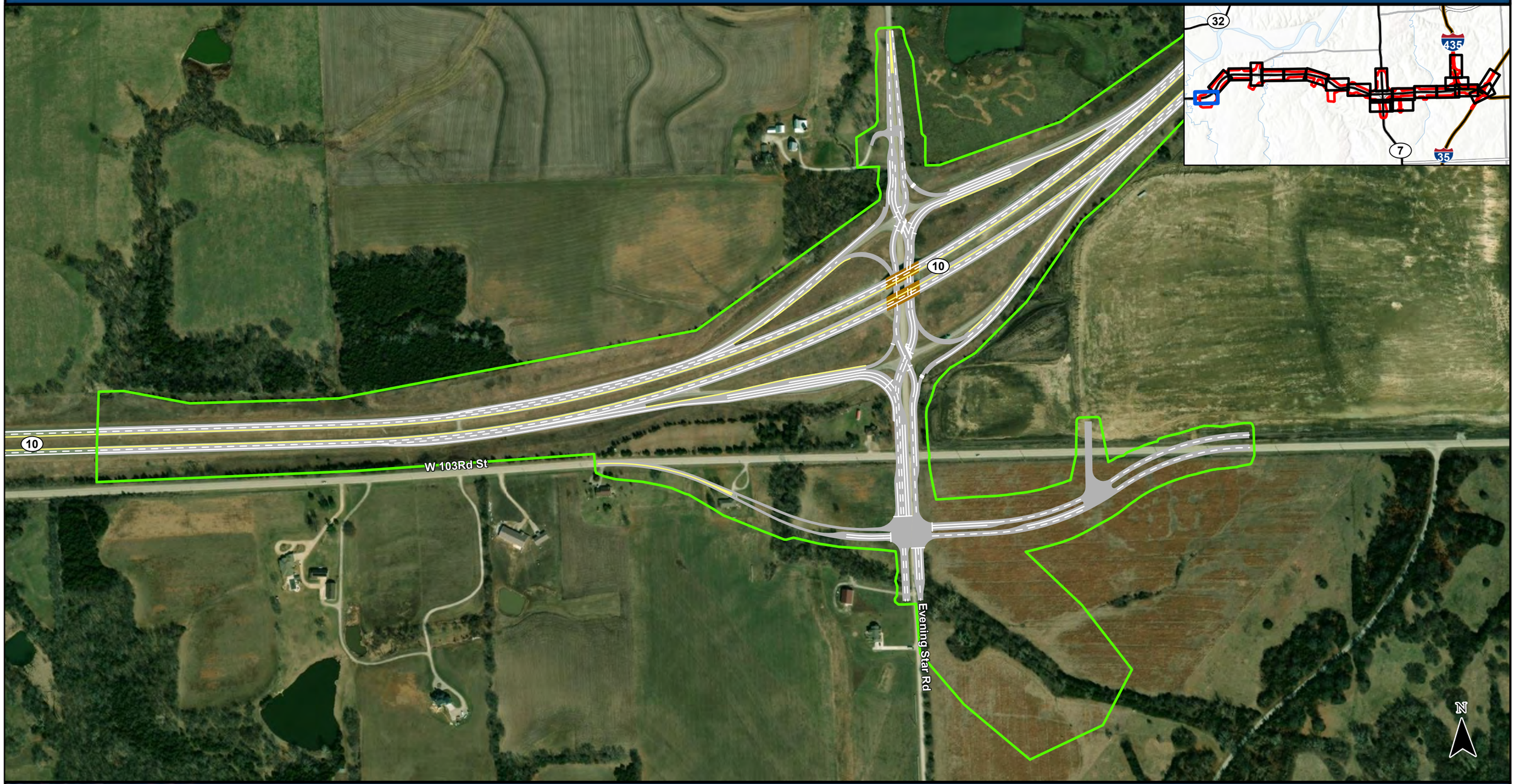
- PE (8% of construction) - $37 million
- ROW/utilities - $12 million
- Construction - $463 million
- CE (6% of construction) - $28 million

Phase 3 (blue) – Total project cost: $527 million:

- PE (8% of construction) - $37 million
- ROW/utilities - $3 million
- Construction - $459 million
- CE (6% of construction) - $28 million

Preferred Alternative Conceptual Alignment

Figure 2-2



K-10 Capacity Improvements

KDOT # 10-46 KA-6549-01

0 0.07 0.15 Miles

Legend

- Construction Limits
- Pavement
- Bridges
- Sidewalk

K10 CORRIDOR

Kansas Department of Transportation

Preferred Alternative Conceptual Alignment

Figure 2-2

K-10 Capacity Improvements

KDOT # 10-46 KA-6549-01

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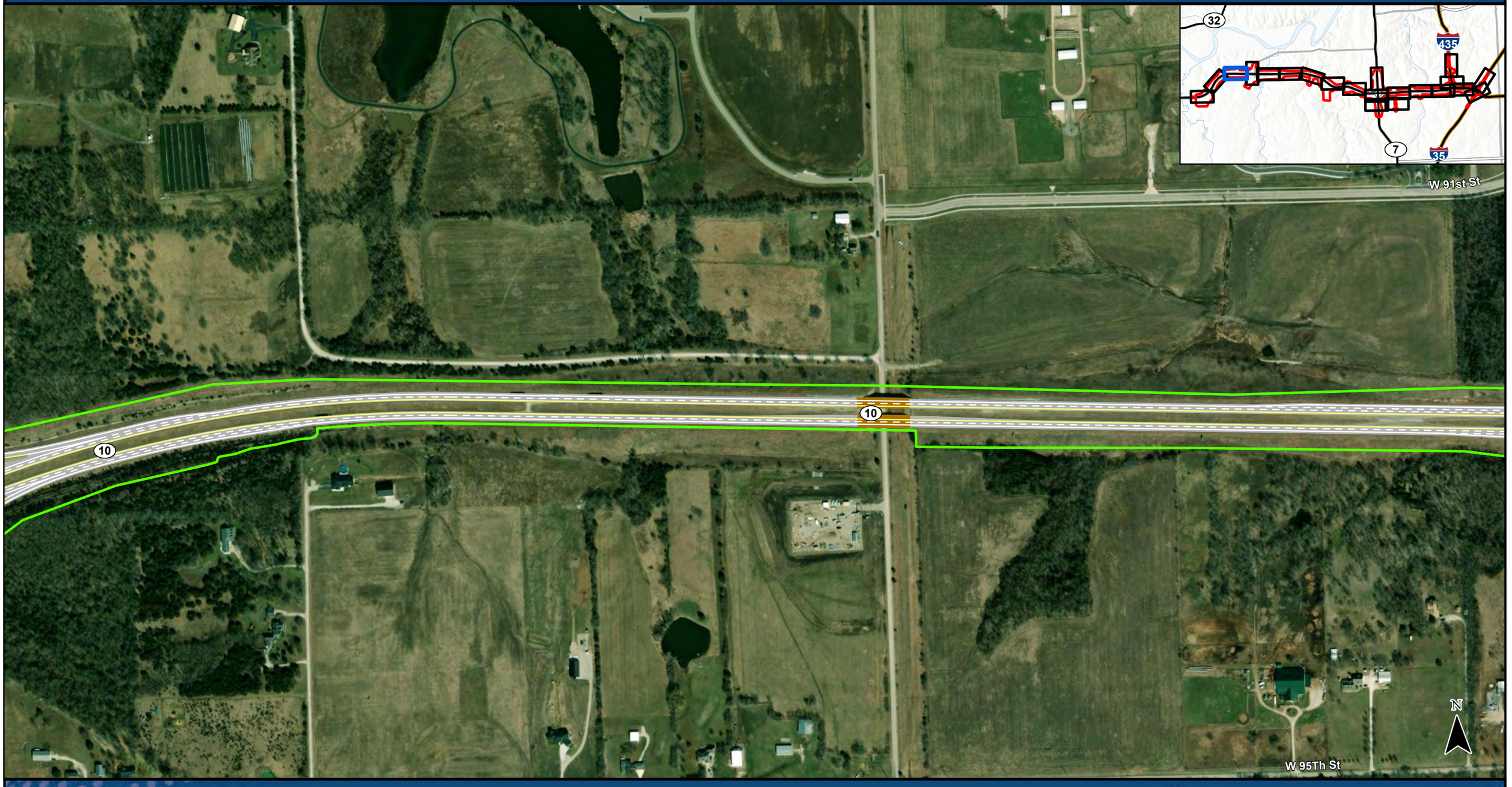
K10 CORRIDOR

Kansas Department of Transportation

Preferred Alternative Conceptual Alignment

Figure 2-2



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K10 CORRIDOR

Kansas Department of Transportation

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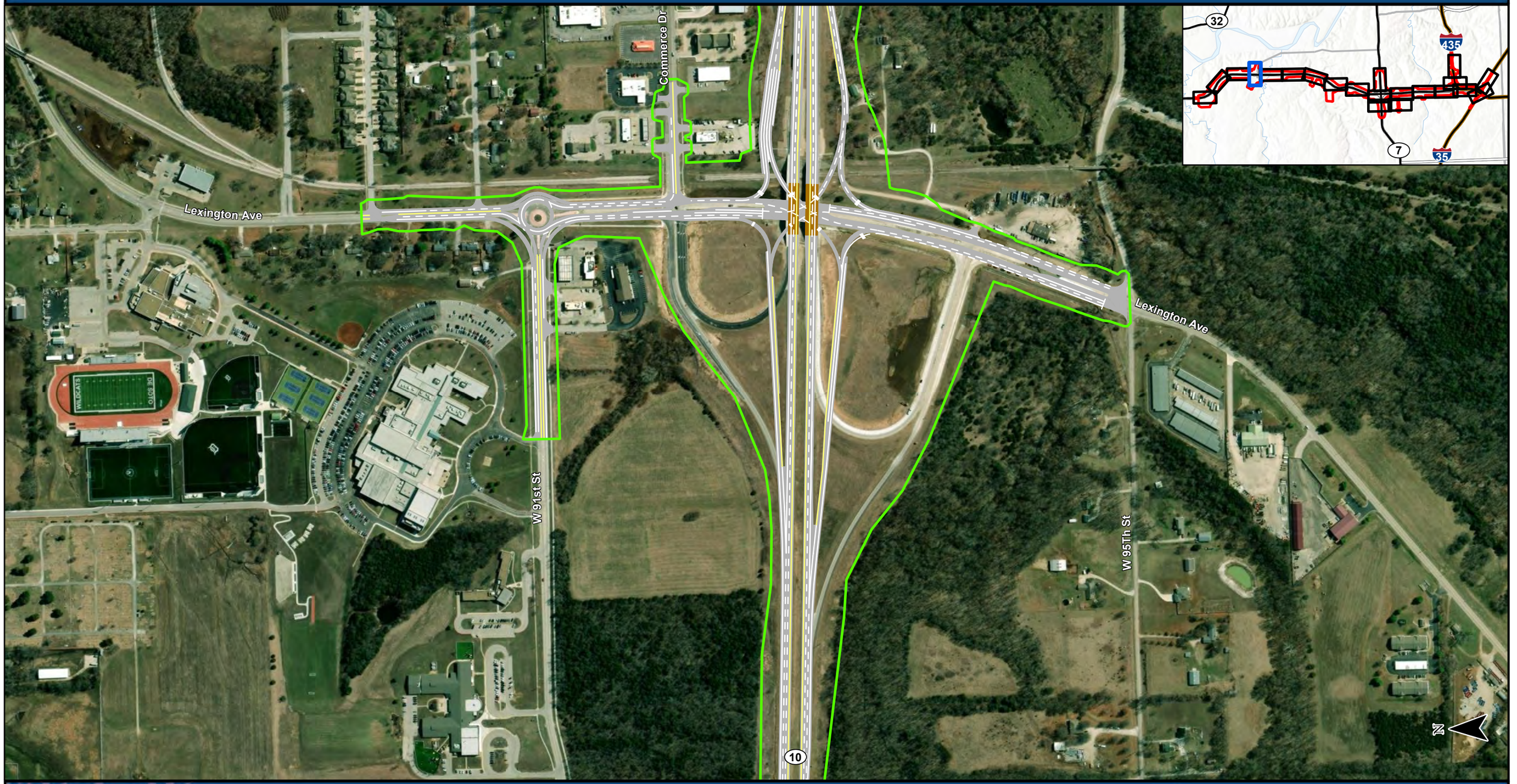

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Kansas Department of Transportation

Preferred Alternative Conceptual Alignment

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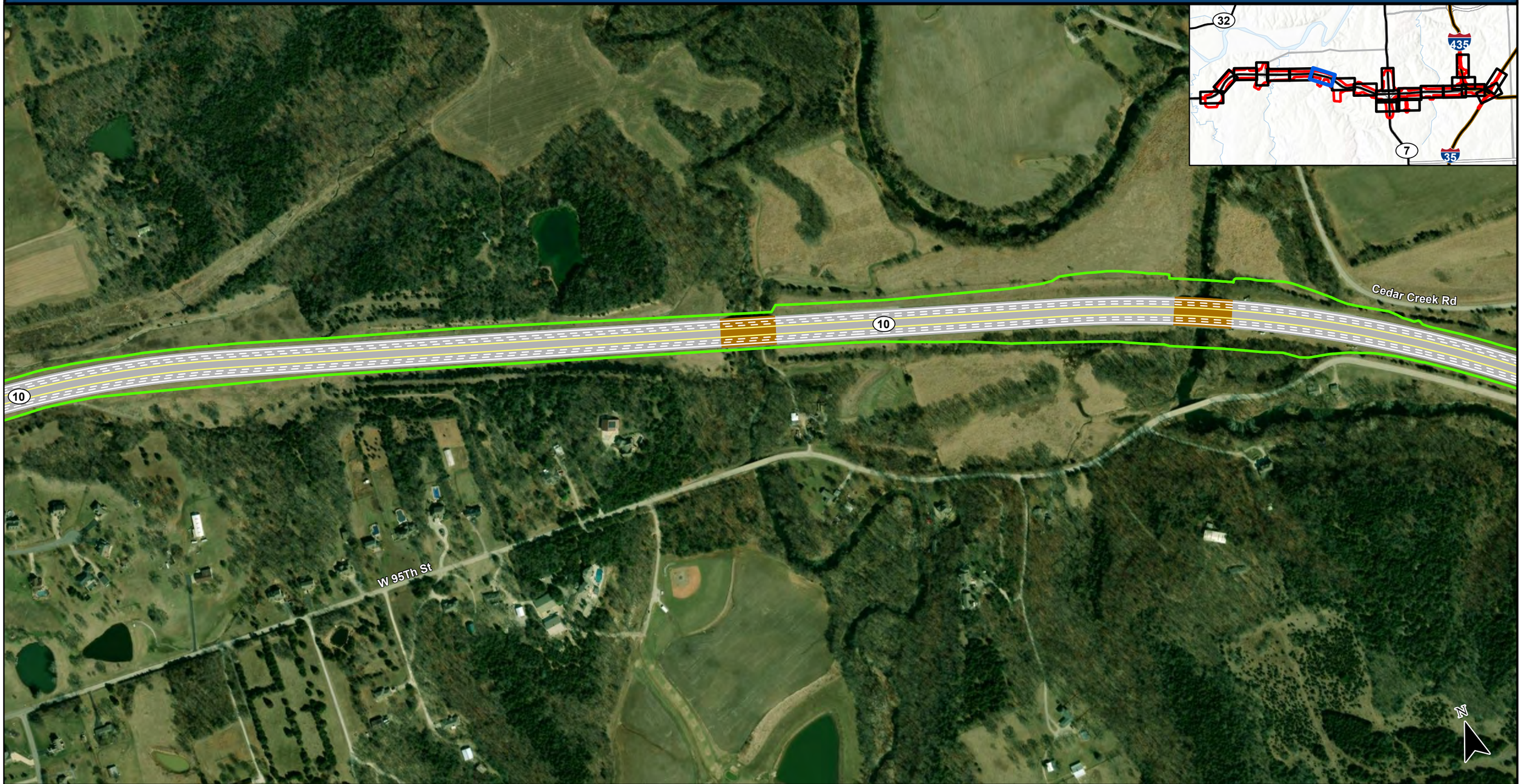

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Kansas Department of Transportation

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Kansas Department of Transportation

Preferred Alternative Conceptual Alignment

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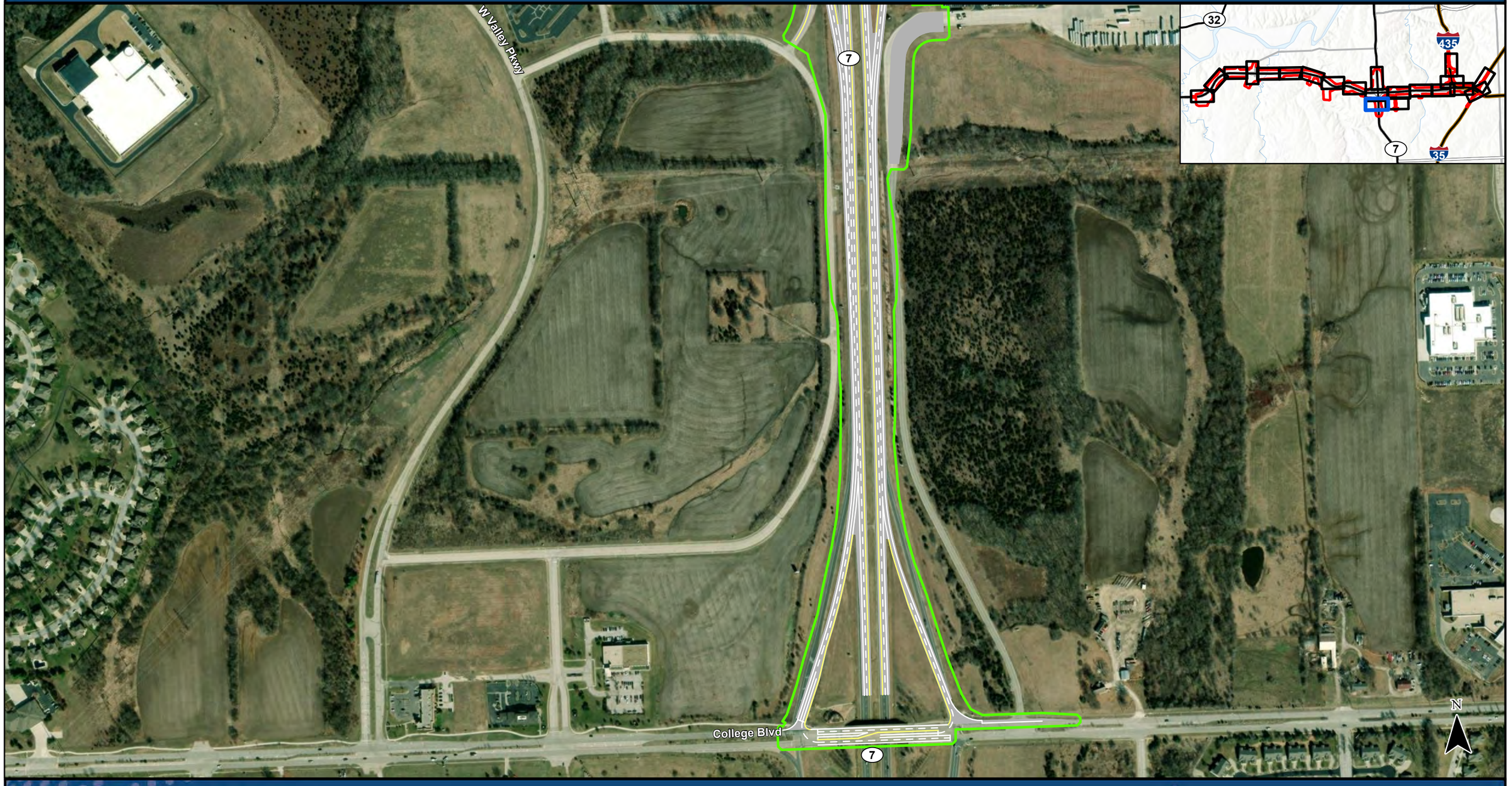

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Kansas Department of Transportation

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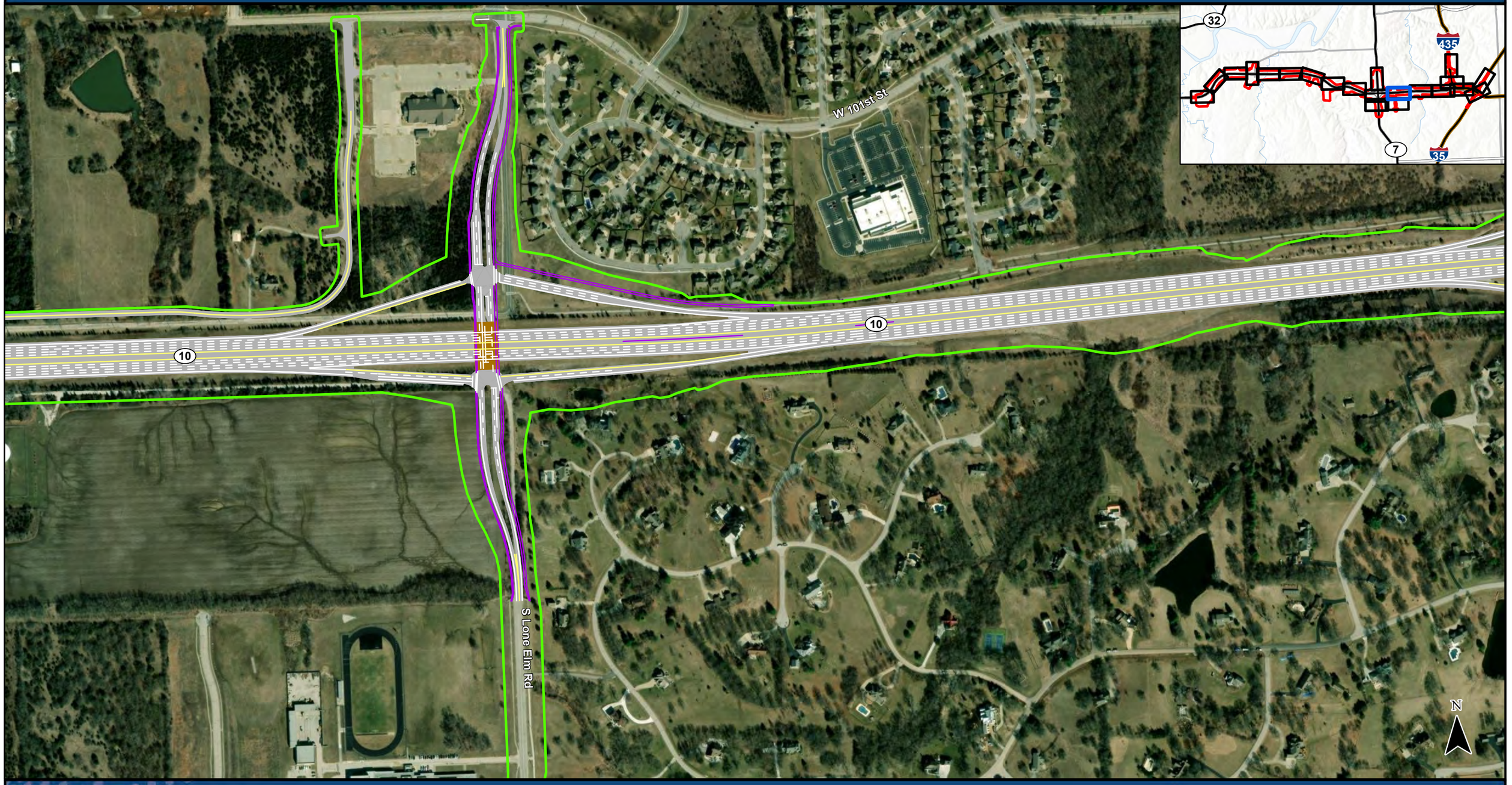

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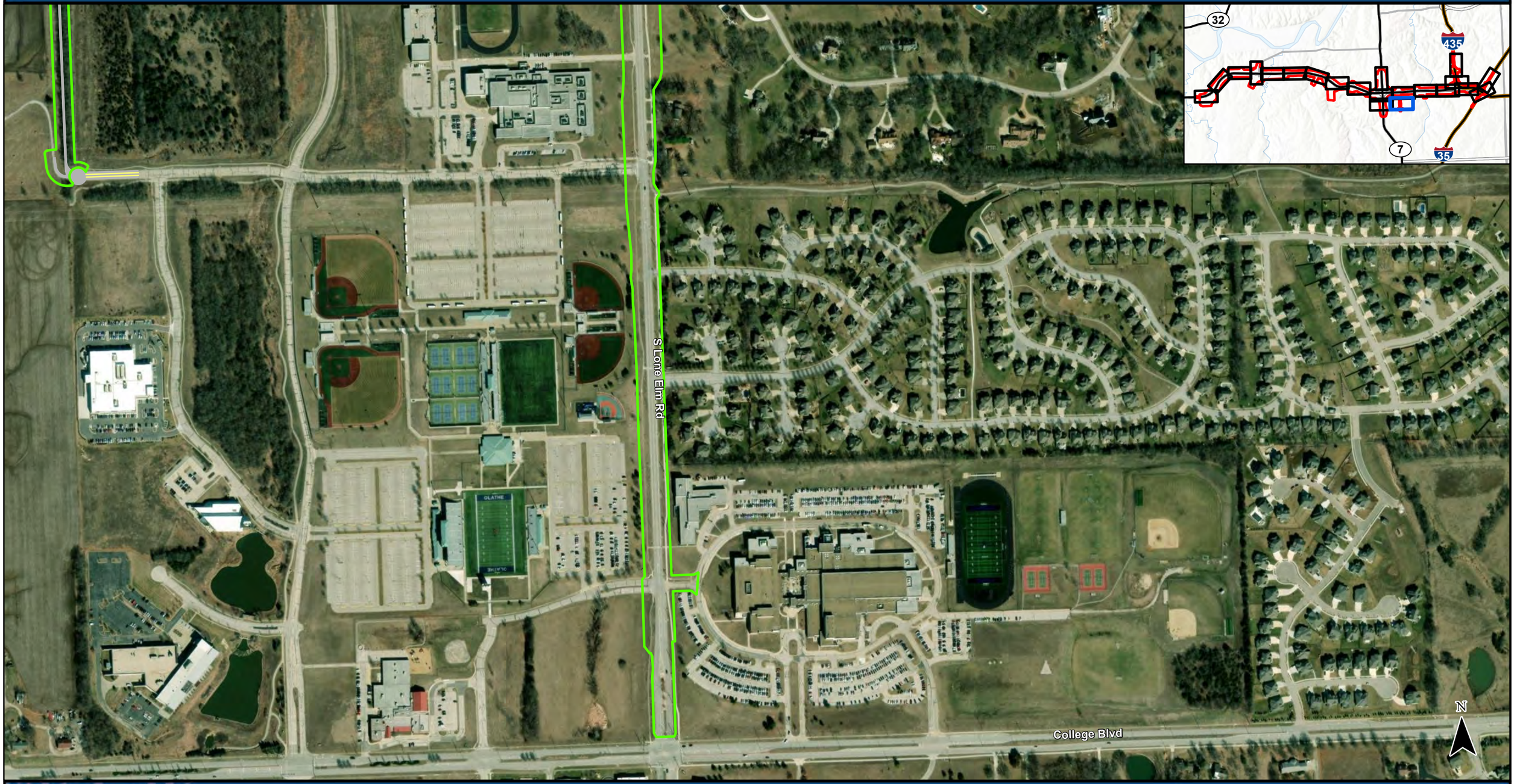

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Kansas Department of Transportation

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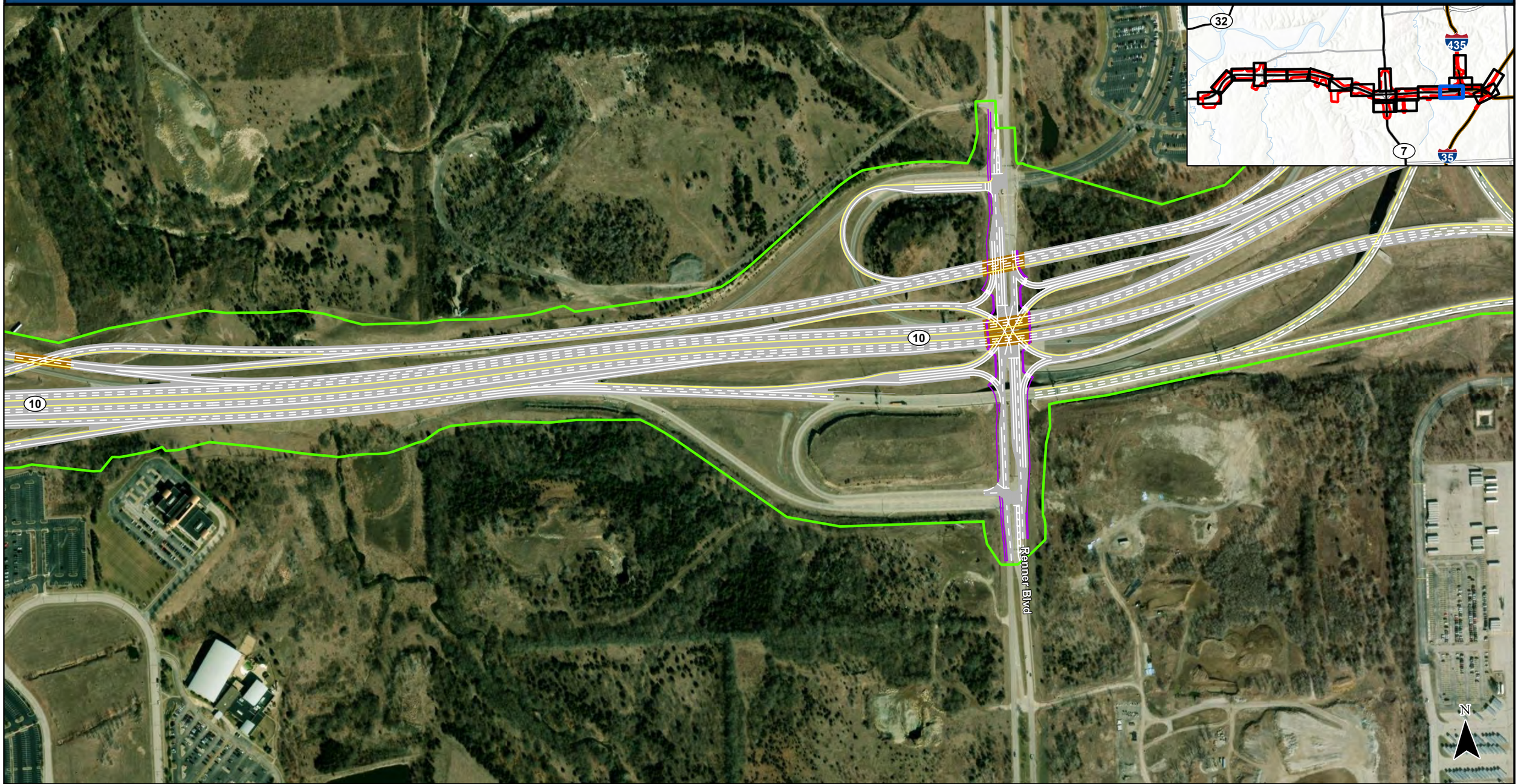

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Kansas Department of Transportation

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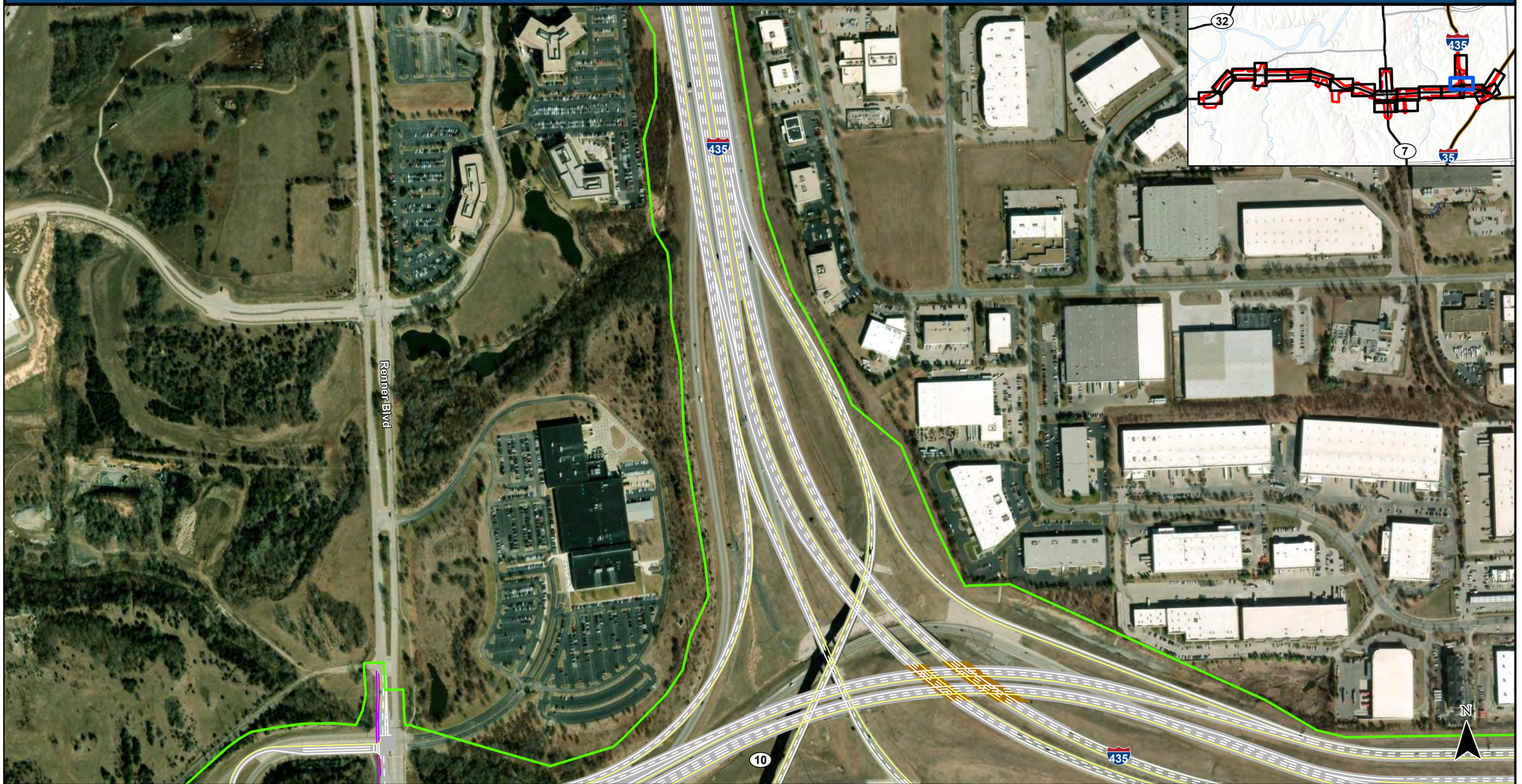

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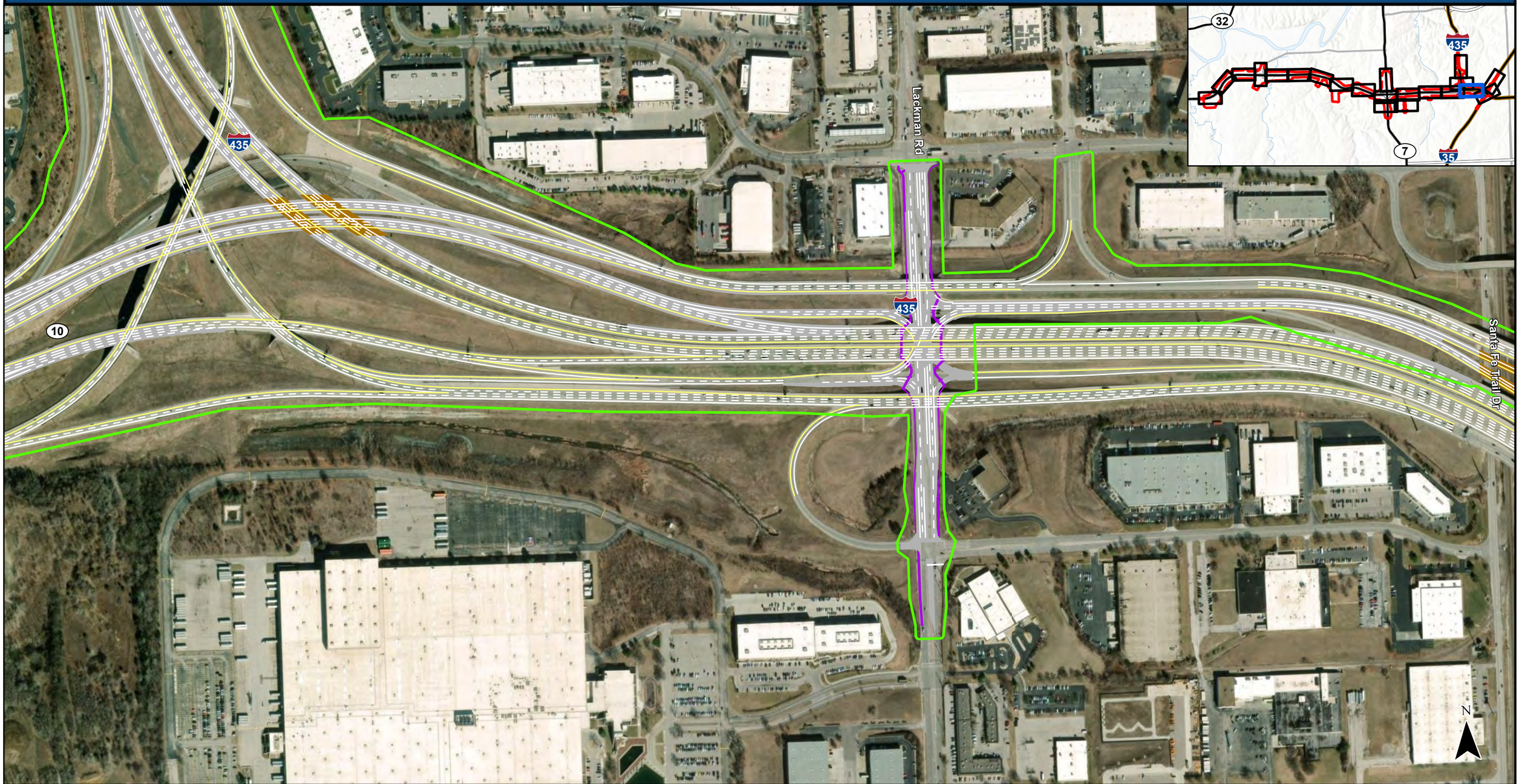

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Kansas Department of Transportation

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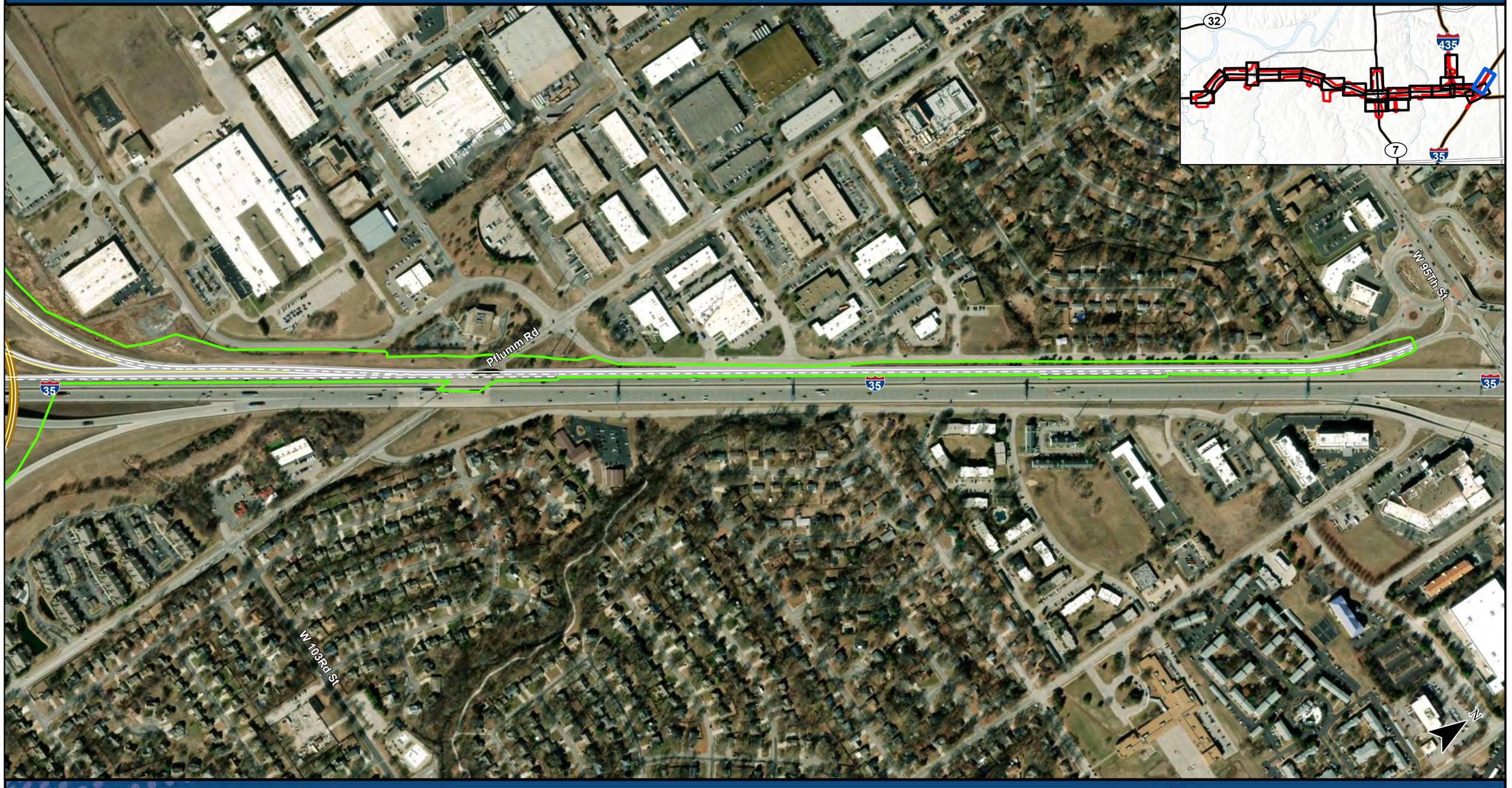

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Kansas Department of Transportation