Street Network

Introduction

The K-7 Corridor Management Study focused on K-7 and the adjacent local street system as contrasted to the 2002 Technical Report which primarily focused on the mainline of K-7. This is because K-7 and the local street network are an integrated system that must work together. The Traffic Analysis section of the report discussed the development of the travel demand model used for the entire corridor and the nexus between land use and traffic. This section describes the significant freeway traffic volumes on K-7 and the required complementary local street system.

K-7 and the local street network function as an integrated system that serves different destination and travel purposes. The differing destinations are evident in the aerial photography shown with the network and interchange plate drawings provided in Appendix A and B respectively. With the freeway facility type determination made for the entire corridor, K-7's travel purpose will be to serve the higher traffic demand volumes and faster travel times. The local street network will provide access to final destinations and the ability to provide a reverse frontage road system to distribute traffic and facilitate development opportunities.

Laying out an effective street network will enhance the capacity of K-7 and make the most use of the surrounding land, both developed and undeveloped. To accomplish an effective layout of the street network around K-7, City and County existing long range transportation plans were used along with input in the form of City/County meetings. Three of these meetings were held with each city and county along the corridor over the course of the project.

K-7 Corridor

As stated previously, the recommendation is for K-7 to be developed to an access controlled freeway its entire length. While there isn't total agreement that a freeway is ultimately going to be needed, there is agreement that it would be prudent to plan and preserve right-of-way for a freeway. The Traffic Analysis section describes in detail how the recommendation was made and justified, but fundamentally the decision was driven by the future land use plans the communities and counties along K-7 provided to KDOT.

Appendix A presents the plate drawings at a scale that allows the proposed local street network system to be shown. Appendix B presents the interchange plate drawings at a larger scale to be able to see details and right-of-way preservation needs near the interchanges more clearly. For K-7, the drawings are developed with the following basic criteria:

- K-7 will be an access controlled freeway with primarily six through lanes.
- Long term goals are to eliminate any existing at grade access points along K-7 and provide access only at interchanges.
- K-7 will require approximately 300 feet of right-of-way for the mainline.
- KDOT will continue to have primary responsibility for maintaining K-7.
- Interchanges are typically laid out as standard KDOT diamond interchanges with standard right-of-way needs preserved where feasible.
- Desirable interchange spacing is every two miles to allow for safe weaving associated with ingress and egress to the freeway. However, more frequent access was uniformly desired by most communities along K-7 and the plate drawings in Appendix A and B generally show a minimum of one-mile spacing.
- One-mile spacing of interchanges will require additional auxiliary lanes between interchange ramps.
- Complex system to system interchanges at I-35 and I-70 have been laid out to serve the maximum amount of traffic possible but also be sensitive to socioeconomic considerations.

A typical section of the K-7 mainline is provided in Figure 14 (in the following page). Individual interchange configurations are summarized with the Segment Summaries given below and unique traffic challenges discussed within the Traffic Analysis section of the report.

Local Street Network

Through local input and the use of general traffic planning principles, the following guidelines were established for the local street network:

Arterials:

1.) The primary function is to distribute traffic away from the interchanges, serve as medium to long range travel on the local street network, and distribute traffic to the collector road system.

2.) Existing arterials are generally laid out in a one-mile grids.

3.) Arterials should be planned as 4-6 lane facilities with additional intersection turn lanes as dictated by turning movement volumes.

4.) Arterials should be planned to provide control of access as much as possible to facilitate the longer range nature of the travel trips.

5.) Access control is especially critical at interchange locations to more safely and effectively distribute the traffic desiring to enter and exit the K-7 freeway and to avoid adverse operations on the K-7 mainline. **Desired guidelines include having major intersections spaced a minimum of 1000 feet from the ramp intersections.**

6.) Arterial streets are recommended to have a minimum proposed right-of-way of 120 feet.

Street Network

Collectors:

1.) The primary function is to distribute traffic away from the arterials, provide short range trips to final destinations, and provide access into developments.

2.) Collectors should be planned as 2-3 lane facilities with the third lane being a continuous turn lane as warranted.

3.) The collectors immediately adjacent to K-7 act as reverse frontage roads to distribute traffic and provide access to properties for economic development.

4.) Collector streets are recommended to have a minimum proposed right-of-way of 80 feet.

5.) Access points should be a minimum of 600 feet from the collector and arterial street intersection.

Typical sections of the arterial and collector characteristics are provided in Figure 15 (in the following page).

Implementation

This report only shows approximate locations of the local street network. As development occurs, there may need to be changes to the local street network shown. As these developments occur however, the cities and counties should seek to preserve the right-of-way for both K-7 and the local street network.

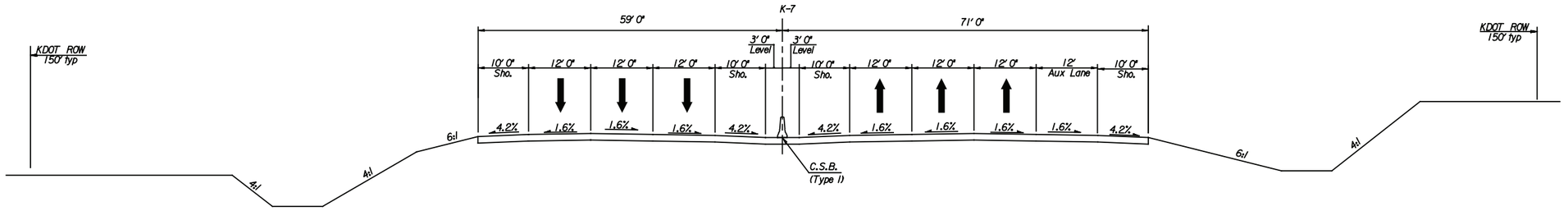
It will be important to incorporate the local street network into the city's and county's long range plans through updating their master plans. These long range plans should contain more detail about the exact location of the street network. The intent of this report is to show the right-of-way preservation needs that should be secured as development happens.

Segment 1 Summary

With the exception of the section through Olathe, this segment is largely undeveloped and already a high level expressway. Appendix A and B provide plate drawings showing the integrated K-7 freeway and local street system. The following is a brief summary of issues primarily focused on the interchanges:

- 223rd Street is a rapidly developing area and good connectivity to the local road system was desired. Future capacity enhancements to the existing interchange bridge are also desired.
- 215th Street was reviewed as a potential interchange location but eliminated due to the constrained 215th Street roadway section traveling east into Spring Hill. Capacity enhancements to 215th Street to serve the interchange traffic would be detrimental to the existing homes east of the interchange.
- 207th Street provides good connectivity to Spring Hill's industrial developments but requires the grade separation of the at-grade intersection at Lone Elm Road.
- 199th Street is a significant east-west arterial in Johnson County with substantial capacity enhancements programmed along its entire length.
- 191st and 183rd Streets are shown as one-mile interchange spacings due to the ultimate development anticipated north of Spring Hill and south of Olathe.
- 175th Street like 199th Street is a significant east-west arterial. A future interchange location to the west is needed to allow for the realignment of K-7 to provide a freeway through Olathe.
- 167th and 151st Street were initially examined as interchange locations but dropped since they were too close to the I-35 system to system interchange.
- The ultimate I-35 interchange concept will be a very large system to system fully directional interchange, but will also provide local access from K-7 to 159th Street. The I-35 interchange will utilize as much as possible of the bridges and right-of-way currently being acquired for the 159th/ Lone Elm Road service interchange. Impacts to the Cedar Lake Park are recognized but it is also noted that the lake has siltation issues and may not be a viable lake in the future when the system to system interchange is needed.
- An option was looked at to provide a freeway link between I-35 and approximately 119th Street on new alignment. Due to new development, terrain, and cost issues the existing K-7/Parker Street alignment was selected.
- The recommended K-7/Parker Street alignment will require converting an existing arterial street into a freeway. It impacts residences and businesses but achieves the goal of a continuous K-7 freeway with less impacts and constraints than a comparable western alignment. This conversion of K-7/Parker will be similar in character, concept, and impacts as Wichita experienced with the conversion of Kellogg/US 54 to a freeway. Old 56 Highway, Dennis Avenue, and Santa Fe Avenue would all be connected to the freeway by ramps and connected to each other by one way frontage roads. These frontage roads would provide access to local properties and to the local street system.
- The 127th Street interchange is immediately adjacent to Ernie Miller Park. To lessen the impact to the park but still provide access to it and 127th Street, a single roundabout is proposed. This will provide the capacity needed at this location, lessen the footprint of the interchange, and provide area for landscaping the entrance to the park.

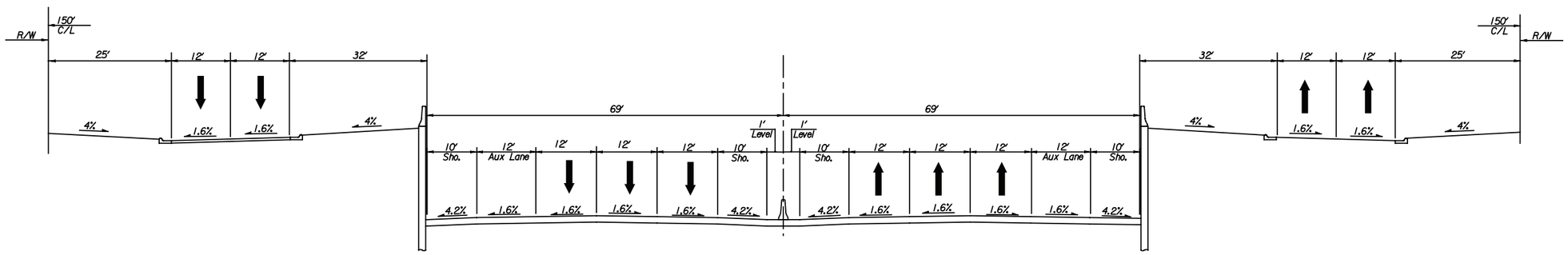
Mainline Typical Section - Figure 14



FILL SECTION

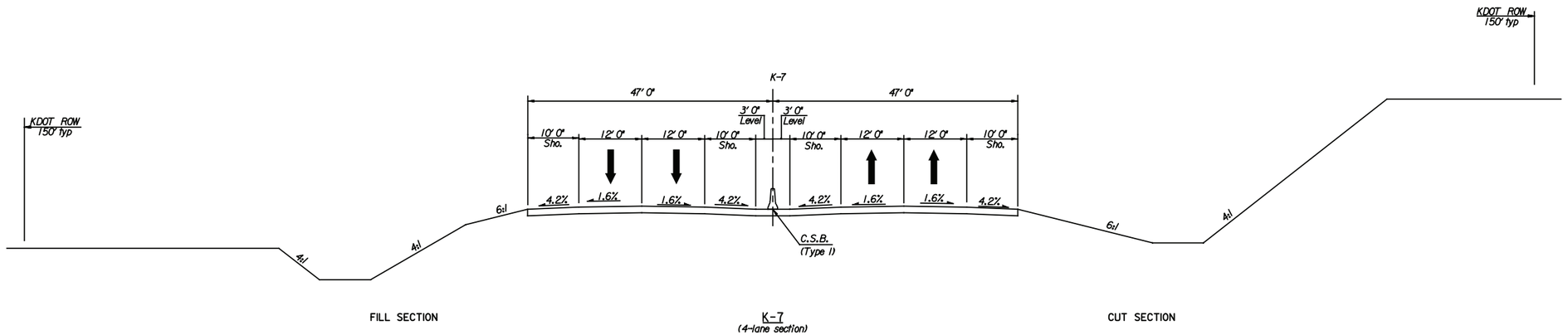
K-7
(6-lane section)

CUT SECTION



K-7 CLOSED MEDIAN
WITH ONE WAY FRONTAGE ROADS

(6-lane section)

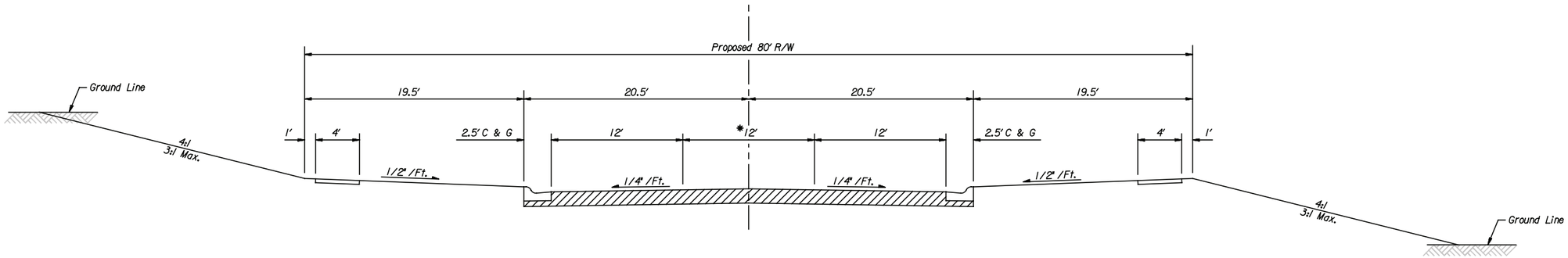


FILL SECTION

K-7
(4-lane section)

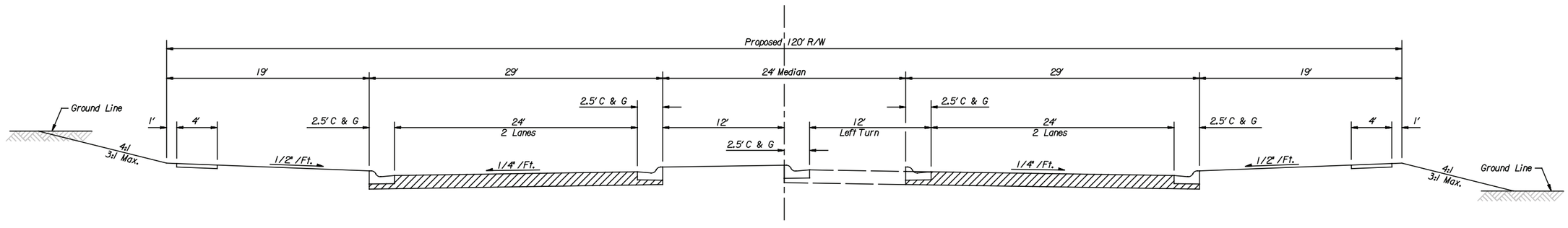
CUT SECTION

Street Network Typical Section - Figure 15



* 12' Left Turn at Intersections.
Street will be 36' Back to Back Normal.
Turn lane is optional, and used where traffic warrants.

2 - Lane Street
80' Right of Way



4 - Lane Arterial
120' Right of Way

Street Network

- North of 127th Street is essentially a freeway to the end of Segment 1, at K-10. There are currently interchanges at both 119th Street and College Boulevard and these interchanges will remain in place and be largely unchanged. However, the mainline traffic will go from 4 lane divided highway to a 6 lane closed median as shown in the typical sections.
- The College Boulevard and K-10 interchange configuration was studied in detail as part of the K-10 Corridor Study and referenced into this study without modification.

Segment 2 Summary

This segment is experiencing rapid development. K-7 is essentially a freeway from K-10 to 83rd Street with the exception of access closure needed at 91st Street. North of 83rd Street K-7 acts as an expressway with the exception of existing interchanges at Shawnee Mission Parkway, K-32, and Nettleton Avenue. Appendix A and B provide plate drawings showing the integrated K-7 and local street system. The following is a brief summary of issues primarily focused on the interchanges:

- The Prairie Star Parkway interchange configuration was studied in detail as part of the K-10 Corridor Study and referenced into this study without any modification.
- The 83rd Street, Shawnee Mission Parkway, K-32, and Nettleton Avenue interchange configurations remain the same with the notation that the pavement is assumed to be replaced in the report's cost estimates.
- The access point on the east and west side of K-7 at approximately 91st Street does not meet access control requirements for a freeway and will be removed with access provided to the properties via a collector street system.
- A new diamond interchange is proposed for 75th Street to provide one-mile access.
- An overpass of K-7 is proposed at 71st Street to provide local road network continuity.
- Clear Creek Parkway will become an overpass of K-7 once the interchange at Johnson Drive is constructed.
- The Johnson Drive interchange layout will be as it is currently designed by KDOT for construction.
- Due to their proximity to each other, the 47th Street and 43rd Street interchanges will be designed as a split diamond interchange with a collector distributor connection system.
- Due to right-of-way issues the Kansas Avenue and 130th Street interchanges are laid out as tight urban diamond interchanges with a single point at Kansas Avenue.
- The I-70 system to system interchange has complex geometrics that are a result of the desire to serve traffic demand, minimize impacts to existing businesses, and maximize the economic development opportunities on land vacant near the interchange.
- The US 24/US 40 interchange layout will be as it is currently designed by KDOT for construction.

Segment 3 Summary

The existing land use in Segment 3 is generally more rural in character and just beginning to experience development pressures. This segment of K-7 is currently an expressway. Appendix A and B provide plate drawings showing the integrated K-7 and local street system. The following is a brief summary of issues primarily focused on the interchanges:

- Given the limited physical constraints and the magnitude of the projected traffic volumes, standard diamond interchange configurations are generally proposed in Segment 3. Parallel Parkway, Leavenworth Road, and McIntyre Road interchanges are all standard KDOT diamond interchanges.
- Donahoo Road, Hollingsworth Road, and Fairmount Road are slightly modified diamond interchanges that include roundabouts that will effectively serve the traffic distribution from the ramps and reverse frontage roads.