OKLAHOMA DEPARTMENT OF TRANSPORTATION

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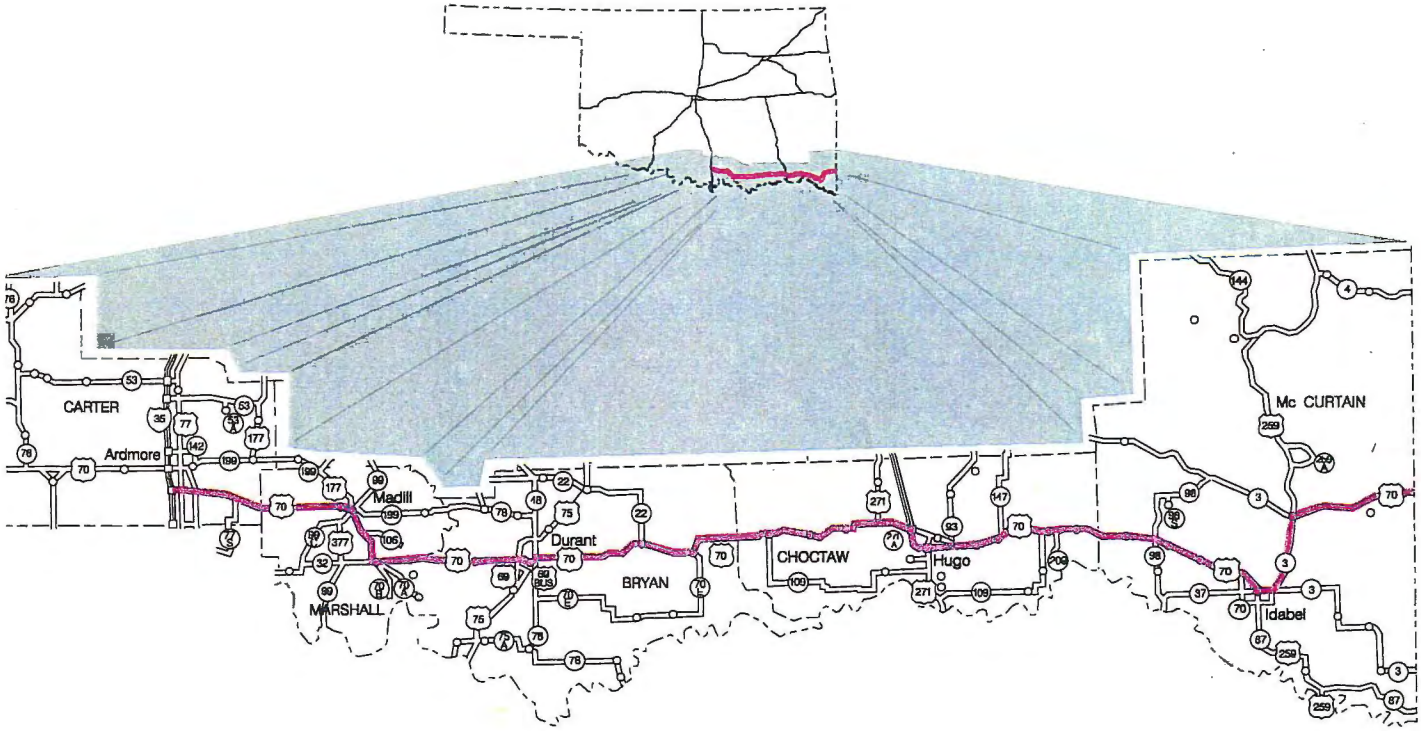
Following is a copy of a document entitled "US 70 Feasibility Study" created in 1997 which was the culmination of a multi-year study conducted by the Department. This document has been referenced by the Department as the original support document for the purpose and need of the proposed realignment of US-70 near Madill in Marshall County. The Department recognizes that the increased traffic in the Madill area, along with the current geometric and capacity deficiencies of the facility warrant a focused approach to solving the issues identified at this location. The proposed 2 mile improvement will utilize current information to design the project and address the critical needs in this segment in a fiscally constrained and environmentally responsible manner.

US 70 FEASIBILITY STUDY

for

Oklahoma Department of Transportation



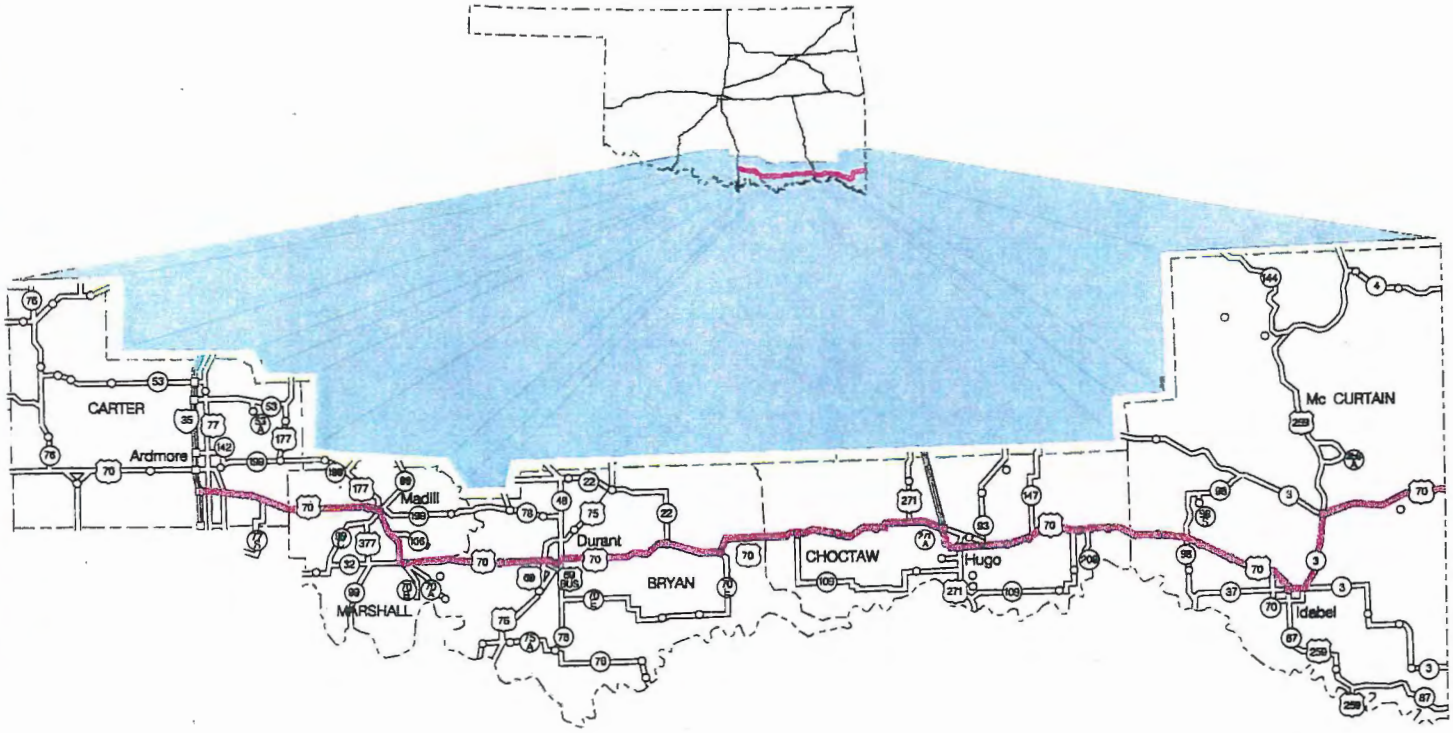
April 1997

EXECUTIVE SUMMARY

US 70 FEASIBILITY STUDY

for

Oklahoma Department of Transportation



April 1997

Prepared By:

EXECUTIVE SUMMARY

The Benham Group with Parsons Brinckerhoff

EXECUTIVE SUMMARY

Introduction

Background of Study: The Oklahoma Statewide Intermodal Transportation Plan, completed in May 1995, identified 16 highways in the state as Transportation Improvement Corridors. One of these highways was US 70, extending from I-35 south of Ardmore to the Arkansas State Line.

Transportation Improvement Corridors are highways needing improvement by the Year 2020 primarily due to predicted future deficiencies in level of service, which is the ability to adequately carry projected traffic loads. Oklahoma's sixteen improvement corridors are illustrated in Figure E-1. The US 70 corridor in the lower right area of the map is identified in red. US 70 is functionally classified as a principal arterial. Arterials are designed to convey large traffic volumes rapidly over long distances.

US 70 is also part of the National Highway System (NHS) in Oklahoma. The NHS contains all Interstates, other Freeways and Expressways, and all Principal Arterial roads in the state. The NHS system comprises the largest category of Federal Highway Funding under the current ISTEA legislation. Figure E-2 illustrates the location of all the NHS routes in Oklahoma, with US 70 in the southeastern portion of the state shown in red.

US 70 Feasibility Study: The focus of this feasibility study was to evaluate US 70 for improvement to four lanes from one mile west of I-35 at Ardmore to the Arkansas State Line, a total distance of approximately 180 miles. The study included an inventory of existing conditions in the corridor including traffic data and capacities, sufficiency ratings and environmental conditions. Also investigated were alternate bypass routes at 10 communities in the corridor, and a study of alternate alignments between Madill and Durant. A public involvement program during the study period was also part of the investigation. Recommended improvements throughout the corridor, including priorities for implementation, which are economical and contain minimal environmental impact were also determined. The recommendations will become a framework for future project planning and accomplishment in the entire US 70 corridor.

Existing Roadway Data

Number of Traffic Lanes: Existing US 70 is predominantly a two lane highway between Ardmore and the Arkansas state line. A small number of areas contain multiple lanes. Four lane, divided sections are located at or near Ardmore, Madill, Durant, Hugo, and between

Idabel and Broken Bow.

An additional two lanes and median are currently under construction from east of Broken Bow to the Mountain Fork River, extending for approximately 6 miles. Scheduled to begin construction in 1997, the bypass around the north side of Idabel will also be a four lane divided roadway.

Undivided sections with greater than two lanes appear along the study corridor, predominantly in the major urban areas. These locations include Madill, Durant, Idabel and Broken Bow.

Existing Roadway Conditions: US 70 between Ardmore and the Arkansas state line has primarily an asphaltic concrete surface. Some short segments are composed of portland cement concrete, located in or near several of the towns in the corridor.

Paved outside shoulders have been installed along most of the roadway in the corridor, varying from four feet to ten feet wide. Curbs often replace the paved shoulders for the widened segments of US 70, particularly in the towns. A few areas have sod shoulders. These sodded areas are east and west of Boswell and east of US 271 North near Hugo.

Most of the corridor does not meet the federal safety standards as defined in the Oklahoma Department of Transportation (ODOT) Roadway Inventory Manual. These safety standards require relatively flat slopes, no stationary objects within a clear zone extending various distances from the pavement edge, all bridges carrying full shoulder width and a minimum length on box culverts of 84 feet. Those segments of the US 70 study corridor meeting the federal safety standard criteria are:

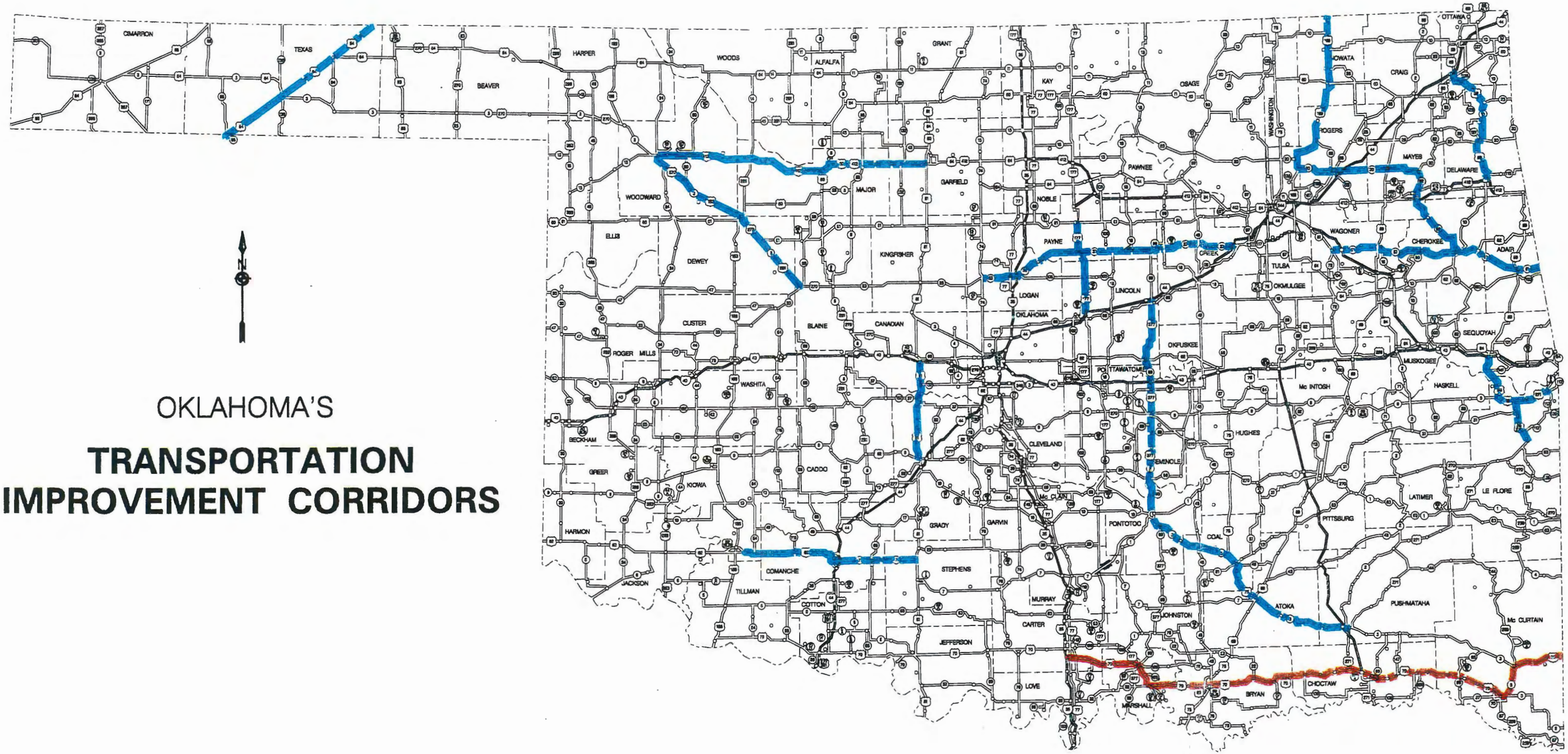
- The entire length in Carter County.
- A one mile segment approximately three miles west of Soper.
- The east end of the Hugo bypass near the US 70 Business junction.

Several areas of US 70 have experienced relatively high crash rates as compared to other similar facilities in the state. These areas are shown in Figure E-3.

Existing Right-of-Way Widths and Access Control: Various right-of-way widths exist throughout the route. As noted earlier, most of the route is a two lane facility; hence a majority of the existing right-of-way widths range between 100 and 150 feet. Most of right-of-way in the towns along the route is 100 feet or less. The minimum width in the corridor is 60 feet, located in downtown Durant. In the areas of four lane divided roadway the existing right-of-way varies from 175 feet to 300 feet.

OKLAHOMA'S

TRANSPORTATION IMPROVEMENT CORRIDORS



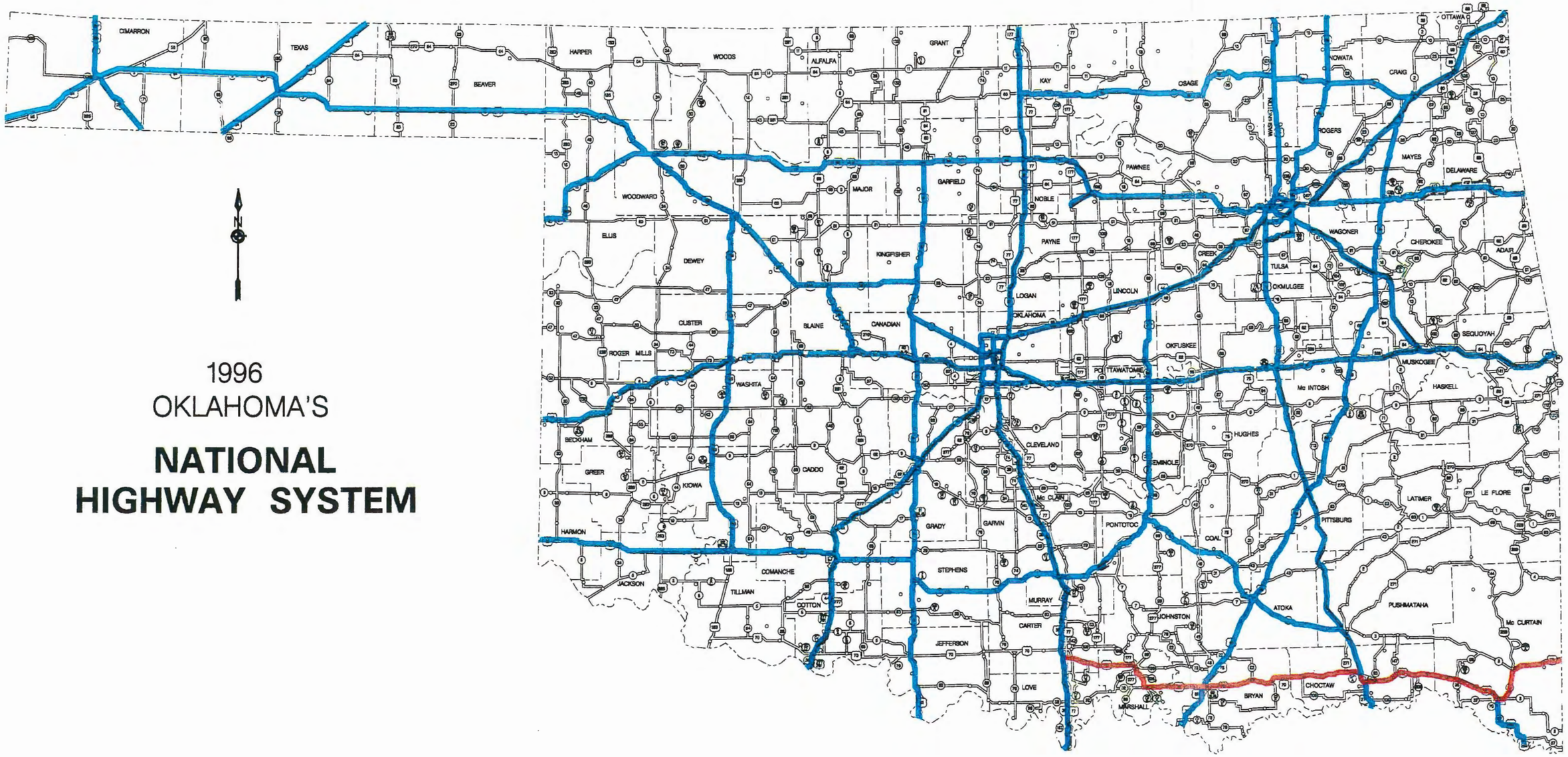
US 70 Feasibility Study

TRANSPORTATION IMPROVEMENT CORRIDORS

Figure E – 1

1996
OKLAHOMA'S

NATIONAL HIGHWAY SYSTEM



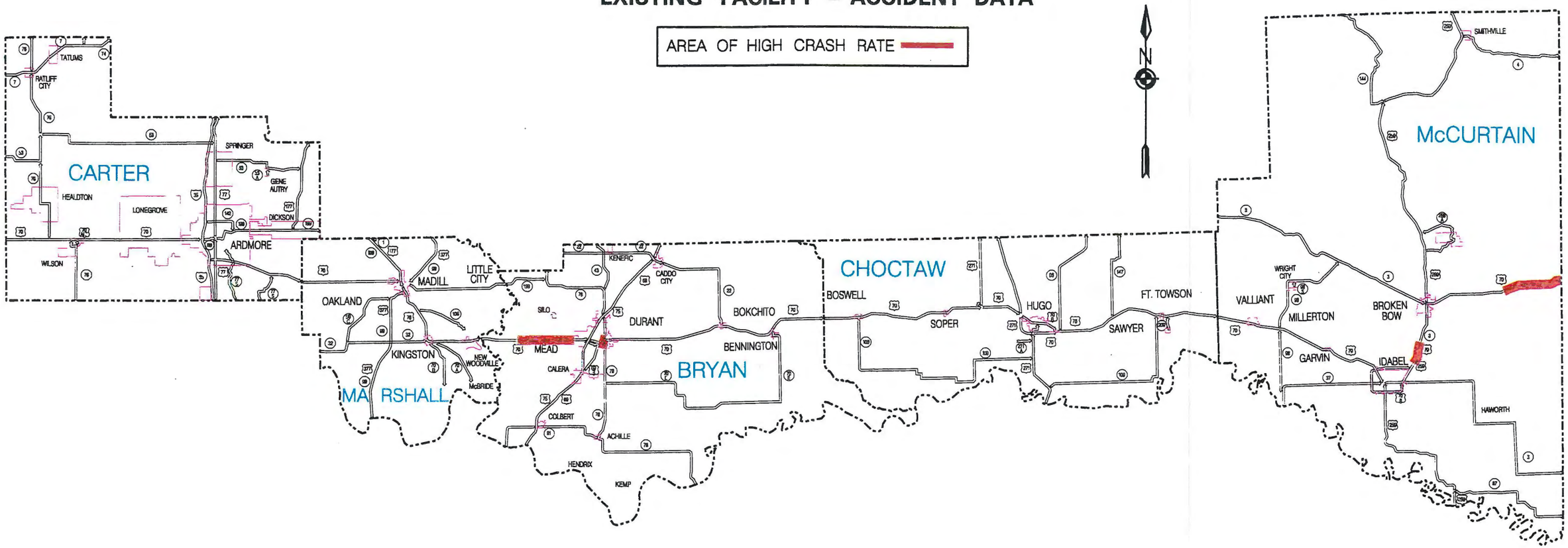
US 70 Feasibility Study

NATIONAL HIGHWAY SYSTEM MAP

Figure E – 2

EXISTING FACILITY – ACCIDENT DATA

AREA OF HIGH CRASH RATE



US 70 Feasibility Study

ACCIDENT DATA

Figure E – 3

There is no access control for right-of-way along US 70 except for the Hugo bypass area. No access control means the number of points of ingress or egress onto the roadway are unlimited except for control over the placement and geometrics of connections as necessary for the safety of the traveling public. In the Hugo bypass area full access control is used, providing access connections with selected public roads at interchanges only. Full access control also prohibits at-grade crossings or direct private driveway connections.

Sufficiency Ratings: ODOT prepares a statewide needs study and sufficiency rating report biennially. The latest study was published in 1995 and contains sufficiency ratings as of July 1, 1994. The study assesses the adequacy of the design and condition of the existing State Highway System to serve traffic for the next 20 years. Elements of design and condition are assigned relative point values to objectively evaluate the roadway. The sum of these standard elemental values is 100, which equates to the maximum possible rating for a given section. Overall sufficiency ratings are categorized as follows:

- Adequate 80-100
- Tolerable 70-79
- Inadequate 60-69
- Critical 00-59

Areas of the study corridor receiving an inadequate or critical rating areas are highlighted in yellow and red in Figure E-4.

Traffic Volumes - 1995 and 2020: Traffic counts were conducted at various stations on major roadways in the corridor. The data collected from these counts are used to develop average daily traffic (ADT) figures, which facilitate further analysis. The traffic counts were conducted prior to when public schools were in session, during a two-week period from August 6-17, 1995, to account for the increase in summer recreational traffic along the US 70 corridor. Three types of vehicle traffic counts were conducted during the period stated, which included 24-hour vehicle counts, machine classification counts, and manual classification counts.

ODOT requested the classification counts at specific sites on US 70. A machine counter was stationed for one week at the Lake Texoma Bridge between Madill and Durant. The manual counts were conducted at two additional stations along US 70.

Twenty 24-hour traffic counts were conducted on weekdays during the two-week counting period. Seventeen of these counts were completed at stations along US 70. Three counts were conducted along other adjoining roadways, which included SH 199 east of Madill, US 69/75 northeast of Durant, and SH 78 northeast of Durant.

The results of these counts are shown in Table E-1. Volumes on US 70 ranged from 2,214 (ADT=2,100), east of SH 70E and Bennington in Bryan County, to 12,977 (ADT=11,700) west of SH 70T in Idabel, McCurtain County. Three of the five highest volume stations were in McCurtain County and two were located in Bryan County. Three of the four lowest volume stations were located in Bryan and Choctaw counties.

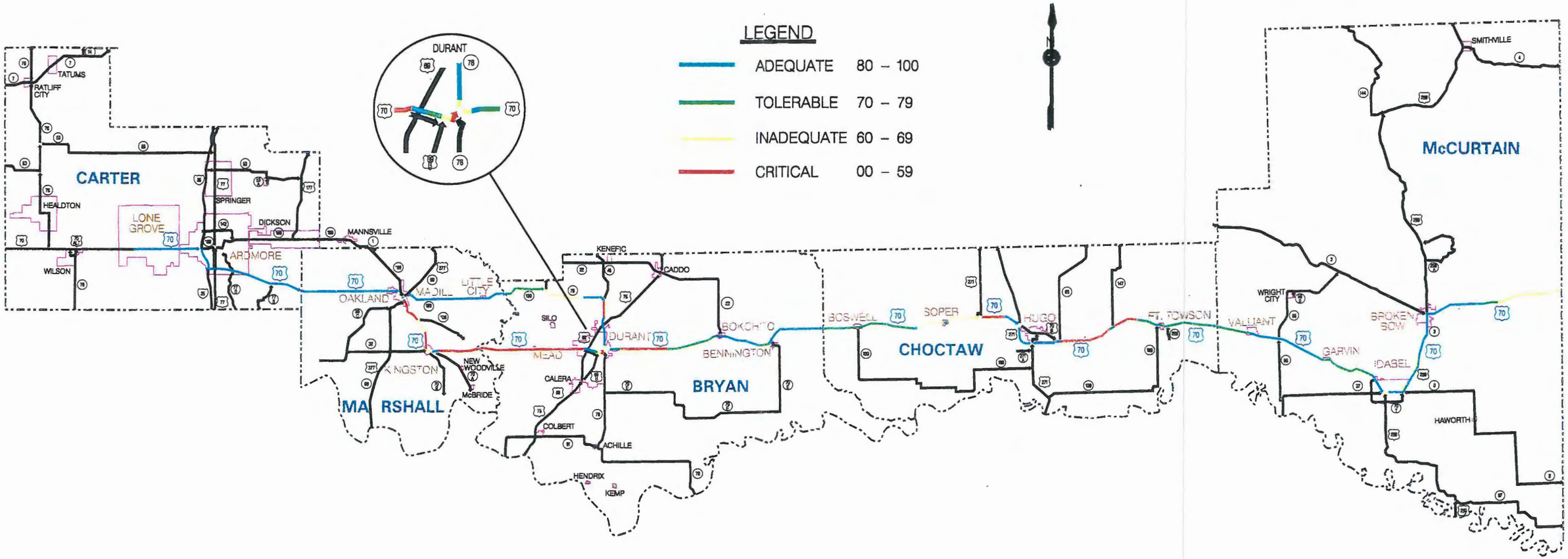
The single machine classification counter stationed on US 70 at the Lake Texoma Bridge between Madill and Durant classified all vehicles traversing the bridge for eight days, August 7-14, 1995. Total daily vehicle volumes by day of the week ranged from 4531 to 5881.

In addition to the week-long machine classification counts, two manual classification counts were conducted at stations on US 70, located at a site east of Broken Bow and a site east of Hugo. The Broken Bow station recorded a total volume of 4,180 and the Hugo station recorded 5,200 vehicles.

2020 Traffic Volumes: Trend line forecasted traffic volumes were based on review and analysis of existing traffic data and historical traffic trends in the region documented by ODOT. Documented sources included *1991 Oklahoma Traffic Historical*, *Oklahoma Traffic Characteristics 1991*, and numerous traffic data collection efforts and planning reports for facilities within the US 70 corridor. Table E-2 compares estimated traffic volumes on US 70 in 1995 with traffic volume projections for 2020. For both years, the estimates in the table assume the no-build alternative. (Alternatives for traffic forecasting purposes are described in *"Traffic Analysis - US 70 Corridor"* later in this text). These volumes are also indicated geographically in Figures E-5 and E-6 . Highway segments for the no-build and all build scenarios are listed in Table E-3 and Figure E-7. The highest increases are expected in the four highway segments located in the vicinity of Ardmore and in segment 16, which runs from Idabel to Broken Bow, with projected increases ranging from approximately 69 percent for segment 1 to 105 percent for segment 4. The remaining segments are all projected to show growth within the 50 to 60 percent range during the 25-year period between 1995 and 2020, with the slowest rate of growth (50 percent) expected for segment 8, from near State Highway 106 to the Marshall/Bryan County line.

OKLAHOMA DEPARTMENT OF TRANSPORTATION
HIGHWAY SUFFICIENCY RATINGS

SUFFICIENCY RATINGS AS OF JULY 1, 1994



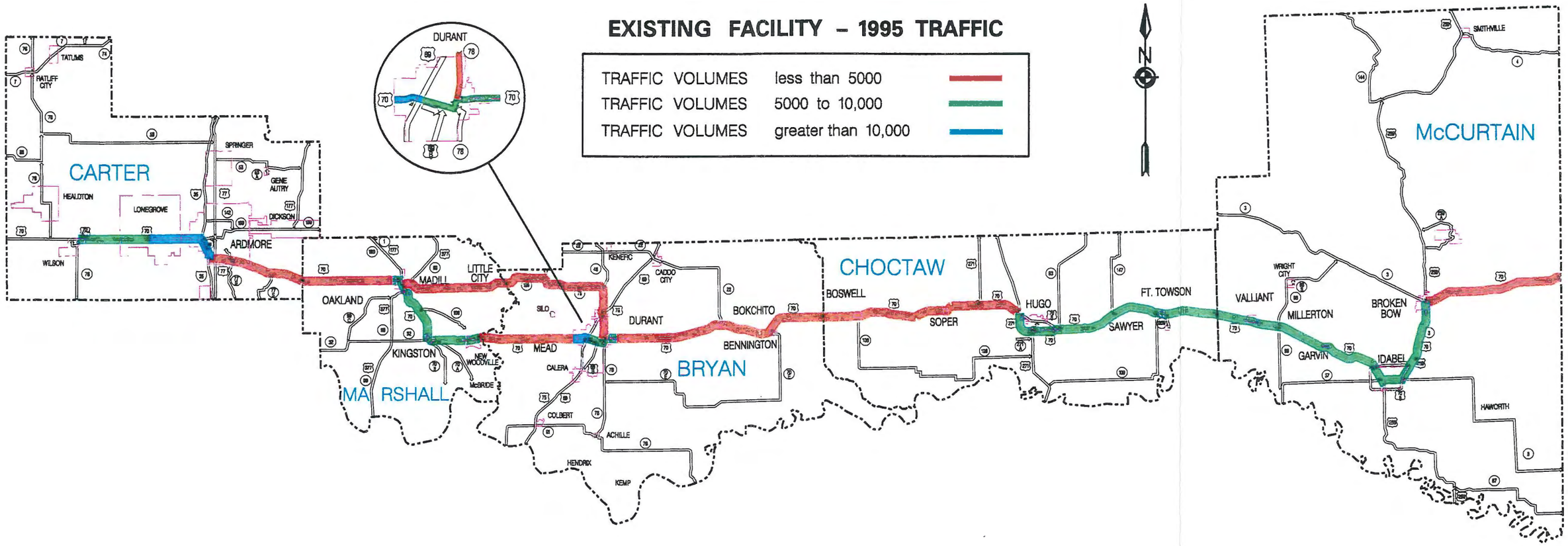
US 70 Feasibility Study

SUFFICIENCY RATINGS

Figure E – 4

EXISTING FACILITY – 1995 TRAFFIC

TRAFFIC VOLUMES	less than 5000	
TRAFFIC VOLUMES	5000 to 10,000	
TRAFFIC VOLUMES	greater than 10,000	



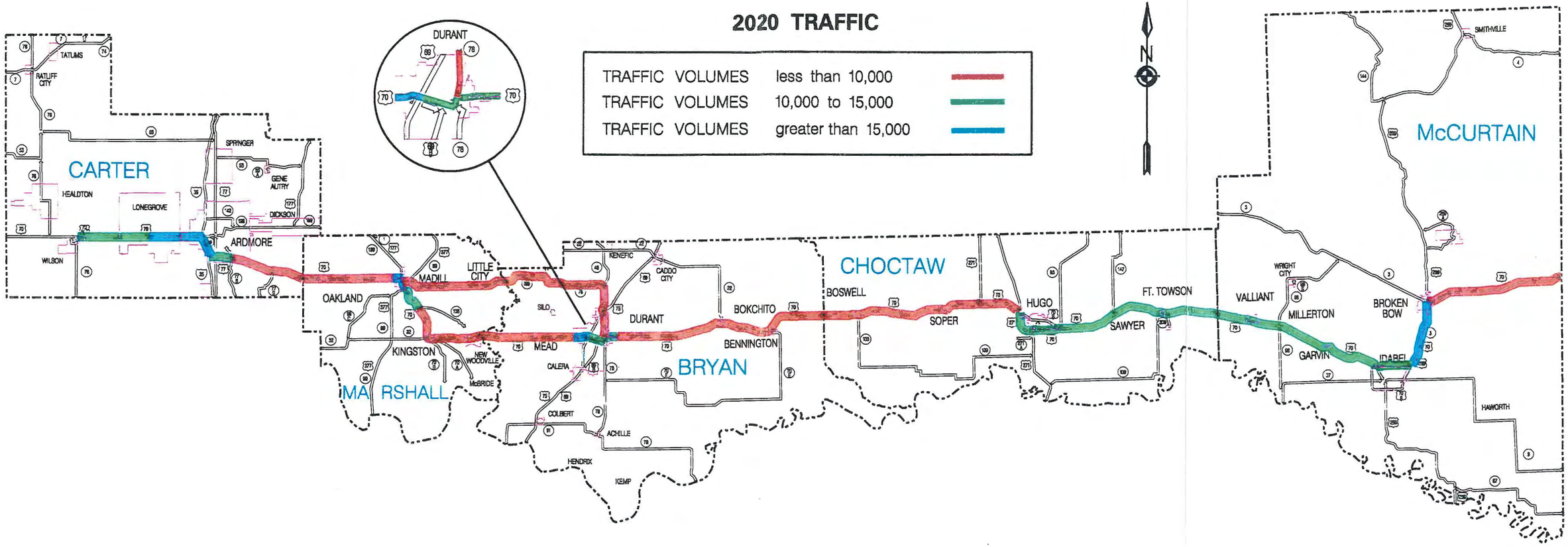
US 70 Feasibility Study

TRAFFIC VOLUMES: 1995

Figure E – 5

2020 TRAFFIC

TRAFFIC VOLUMES	less than 10,000	
TRAFFIC VOLUMES	10,000 to 15,000	
TRAFFIC VOLUMES	greater than 15,000	



US 70 Feasibility Study

TRAFFIC VOLUMES: 2020

Figure E – 6

Table E-1
U. S. 70 24 HOUR COUNTS AND ADT

STATION*	COUNTY	LOCATION	DATE	VOLUME	ADT
60	CARTER	US 70 7 MI. EAST OF IH 35	AUG 7/8	5,024	4,700
15	MARSHALL	SH 199 EAST OF MADILL W. OF LITTLE CITY	AUG 7/8	1,248	1,200
31	MARSHALL	US 70 EAST OF SH 70A NEAR KINGSTON	AUG 7/8	5,597	5,200
17	BRYAN	US 70 WEST OF DURANT CITY LIMITS	AUG 7/8	11,008	10,200
15	BRYAN	SH 78 NORTH OF US 69/75 N. OF DURANT	AUG 8/9	4,078	3,800
19	BRYAN	US 69/75 NE OF SH 78 NE OF DURANT	AUG 8/9	16,168	11,900
21	BRYAN	US 70 EAST OF DURANT CITY LIMITS	AUG 8/9	6,041	5,600
31	BRYAN	US 70 EAST OF SH 22/BOKCHITO	AUG 8/9	3,520	3,300
34**	BRYAN	US 70 EAST OF SH 70E/BENNIGNTON	AUG 8/9	2,214	2,100
5	CHOCTAW	US 70 EAST OF SH 109/BOSWELL	AUG 9/10	2,837	2,600
9	CHOCTAW	US 70 EAST OF US 271 & WEST OF TOLL RD.	AUG 9/10	4,232	3,900
10	CHOCTAW	US 70/271 SOUTH OF US 70b NEAR HUGO	AUG 9/10	5,060	4,700
12	CHOCTAW	US 70 EAST OF US 271 SOUTH OF HUGO	AUG 9/10	5,519	5,100
14	CHOCTAW	US 70 EAST OF SH 93 & EAST OF HUGO	AUG 14/15	6,758	6,300
19	CHOCTAW	US 70 WEST OF SH 109 & EAST OF SH 147	AUG 10/11	4,418	4,000
21	CHOCTAW	US 70 EAST OF SH 109 & WEST OF SH 209	AUG 10/11	4,382	4,000
26	McCURTAIN	US 70 WEST OF VALIANT	AUG 10/11	9,014	8,100
37	McCURTAIN	US 70 WEST OF SH 70T IN IDABEL	AUG 10/11	12,977	11,700
38	McCURTAIN	US 70 NORTH OF IDABEL	AUG 15/16	9,864	8,900
23***	McCURTAIN	US 70 EAST OF BROKEN BOW	AUG 15/16	5,579	5,000

Source: Parson Brinkerhoff and Traffic Monitoring by Wiley, August 1995

* STATION NUMBERS ARE THOSE CORRESPONDING TO ODOT COUNT MAPS.

** STATION # 34 BRYAN COUNTY HAD TO BE MOVED TO CHOCTAW COUNTY DUE TO CONSTRUCTION.

*** STATION # 23 McCURTAIN COUNTY HAD TO BE MOVED .8 MILES EAST DUE TO CONSTRUCTION.

Table E-2
1995 and 2020 Traffic
Volumes and Percent Growth

Segment	1995 ADT	2020 ADT	Percent Growth
1	6,800	11,500	69.1%
2	11,400	19,800	73.7%
3	4,300	8,800	104.7%
4	4,100	6,600	70.0%
5	3,900	6,200	59.0%
6	8,500	13,600	60.0%
7	6,800	10,900	60.3%
8	5,200	7,800	50.0%
9	4,700	7,500	59.6%
10	10,200	16,300	59.8%
11	5,600	9,000	60.7%
12	3,700	5,900	59.5%
13	3,300	5,300	60.6%
14	5,400	8,600	59.3%
15	6,000	9,600	60.0%
16	8,900	14,200	59.6%
17	4,500	7,000	55.6%

Source: Parsons Brinckerhoff, 1996

Origin - Destination Studies: License plate surveys were conducted on the principal arterials leading into and out of Ardmore, Madill, and Durant to determine the amount of "external local" and "external through" traffic in each area. External local traffic consists of those vehicles traveling from an origin outside the study area to a destination within the study area. External through traffic has both origin and destination outside the study area and is only passing through the area. The resulting data are central to analysis of the need for bypass construction in these communities. Two sites were surveyed in the Ardmore area, six near Madill, and five in the Durant area.

License plate surveys were conducted for one day in each town, with at least one surveyor stationed at each designated survey site. The surveyors using the laptop computers recorded the last three digits from the license plate of each vehicle passing the survey station. Time of day was automatically recorded as each license tag number was entered. Traffic in one direction was surveyed for a three-hour period in the morning and in the opposite direction for a three-hour period in the afternoon at each station. Both three-hour durations included peak and off-peak traffic periods.

Table E-3
Descriptions of US 70 Corridor Highway Segments

Segment	Route	Description
1	US 70 West	SH 76 to Lone Grove
2	US 70 West	Lone Grove to IH 35 east
2A	US 70 Bypass	West of Ardmore to US 70 & IH 35 southeast
3	US 70 East	IH 35 East to SH 77 south
4	US 70 East	SH 77 south to Carter/Marshall County line
5	US 70 East	Carter/Marshall County line to Oakland
6	US 70 East	Oakland (future bypass) to US 3
6A	US 70 East	Oakland to US 177 / SH 199
6B	Old US 70 East	US 177 / SH 199 to US 377
7	US 70 East	US 377 to (future bypass) near SH 106
7A	US 70 Bypass	US 177 to US 377 / SH 99
7B	US 70 Bypass	US 377 / SH 99 to SH 199
7C	US 70 Bypass	SH 199 to existing US 70 near SH 106
8	US 70 East	Near SH 106 to Marshall/Bryan County line
8A	US 70 Bypass	North of Kingston to east of Kingston
8B	US 70 East	Near SH 106 to bypass north of Kingston
8C	Old US 70	Bypass north of Kingston to east of city
8D	US 70 East	Bypass east of Kingston to Bryan County line
9	US 70 East	Marshall/Bryan County line to west of Durant
10	US 70 East	Future bypass west of Durant to US 69 / 75
10A	US 70 Bypass	West of Durant to US 69 / 75 south of Durant
11	US 70 East	US 69 / 75 to future bypass east of Durant
11A	US 70 Bypass	US 69 / 75 south of Durant to east of Durant
12	US 70 East	Future bypass east of Durant to Choctaw County line
12A	US 70 Alt North	US 70 east of Durant to US 69 / 75 north
12B	US 70 Alt North	US 69 / 75 north of Durant (SH 48) to SH 78
12C	US 70 Alt North	SH 48 / 78 to SH 78 / 199
12D	US 70 Alt North	SH 78 / 199 to Marshall/Bryan County line
12E	US 70 Alt North	Marshall/Bryan County line to future bypass
13	US 70 East	Bryan/Choctaw County line to Hugo
14	US 70 East	Hugo to Choctaw/McCurtain County line
15	US 70 East	Choctaw/McCurtain County line to Idabel
16	US 70 East	Idabel to Broken Bow
17	US 70 East	Broken Bow to Oklahoma/Arkansas state line

Source: Parsons Brinckerhoff, 1995

After the entire origin and destination survey was completed, the survey files were transferred to a central computer for analysis. The data were analyzed to determine the number of trips occurring between each station. The data developed with this procedure were used to compile an external-through trip matrix for each town, summarizing trip movements between stations.

The results at Ardmore indicate that 15 percent of traffic on US 70 consisted of through trips, and only five percent of traffic between US 70 west of town and SH 199 east of Ardmore were through trips.

Through trips accounted for 21 percent of all US 70 traffic in Madill, 12 percent of trips between SH 199 west of town and US 70 east of Madill, and lower percentages (five to eight percent) for other facilities on which traffic was observed.

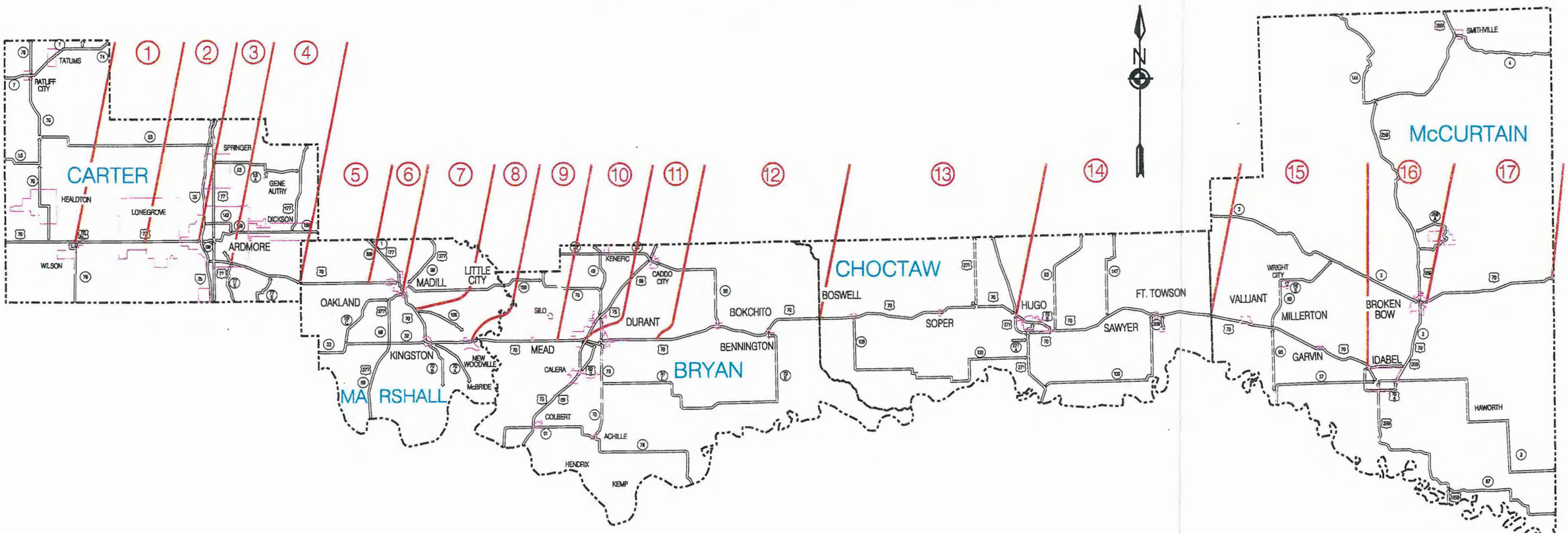
Only seven percent of US 70 traffic in Durant consisted of through trips, although 18 percent of all trips on US 69/75 were through trips. Through trip percentages of all trips ranged from four to eight percent for other roadways in the Durant area.

Typical Sections: Two typical sections for US 70 improvements were developed for the study, a rural section and a municipal section. The rural section will be utilized mostly in the stretches between the towns and along the bypass routes. The municipal section is used for routes through towns or rural areas where right-of-way is limited.

The rural section is a divided multi-lane roadway with paved shoulders. Two 12-foot traffic lanes, a 10-foot outside shoulder and a 4-foot inside shoulder compose the 38 foot roadway width shown at the top of Figure E-8. Drainage from the roadway will be carried away by open ditches located in the median and beyond the outside shoulders. The minimum amount of right-of-way required to construct this section is 250 feet and may be considerably greater, depending upon adjacent terrain, design requirements, utilities and other factors. At the time of construction, if traffic volumes do not warrant a four lane roadway, it is the intent of ODOT that two lanes will be constructed to one side of the right-of-way. This two-on-four concept is also illustrated in the center of Figure E-8.

The municipal section consists of a five lane roadway, including a center two-way left turn lane and a mountable curb along each edge. A 16 foot two-way left turn lane is the middle component of the 68 foot wide roadway shown at the bottom of Figure E-8. A drainage system with curb inlets would also be required. The curbed section would require at least 120 feet of right-of-way to allow for placement of utilities and other appurtenances behind the curb.

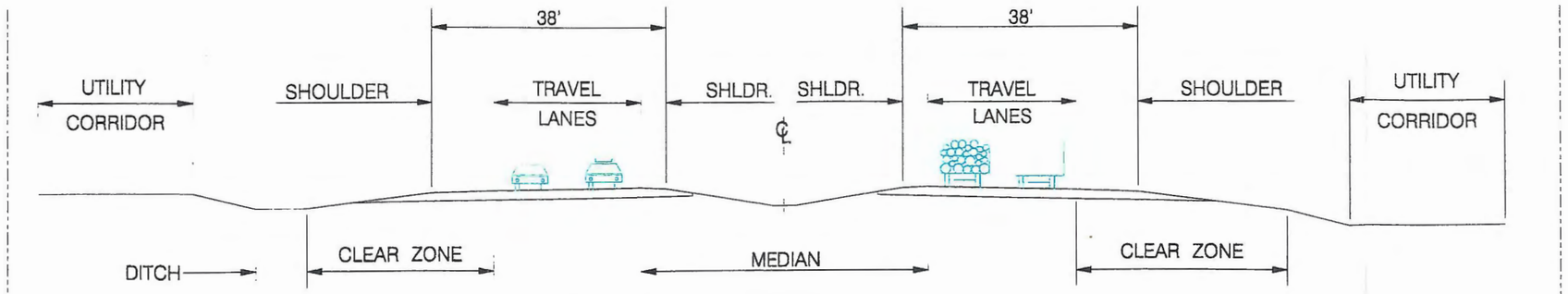
US 70 CORRIDOR HIGHWAY SEGMENTS



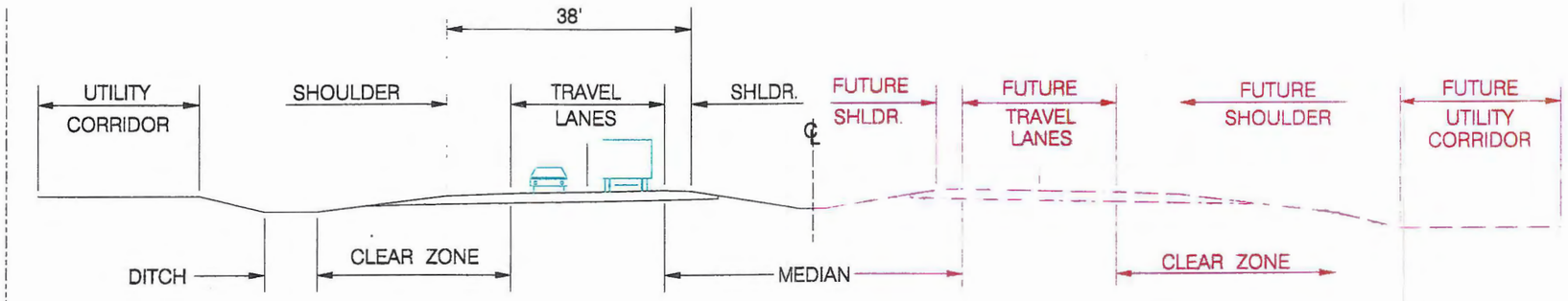
US 70 Feasibility Study

CORRIDOR HIGHWAY SEGMENTS

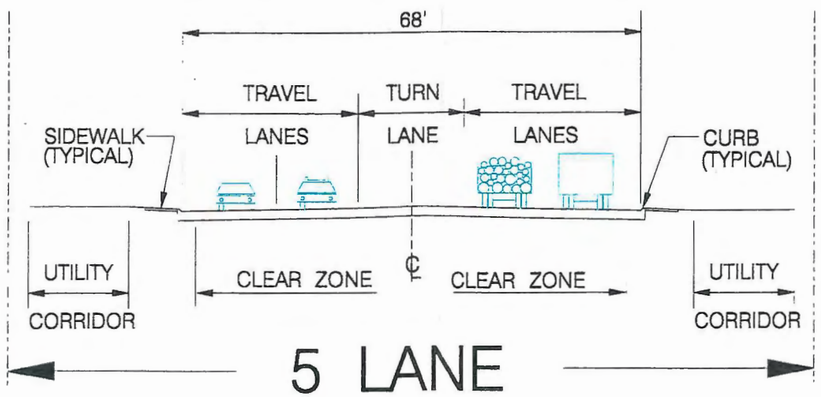
Figure E – 7



4 LANE DIVIDED [ULTIMATE]
(250' MINIMUM & VARIABLE R / W)



2 LANE ON 4 LANE R / W
(250' MINIMUM & VARIABLE R / W)

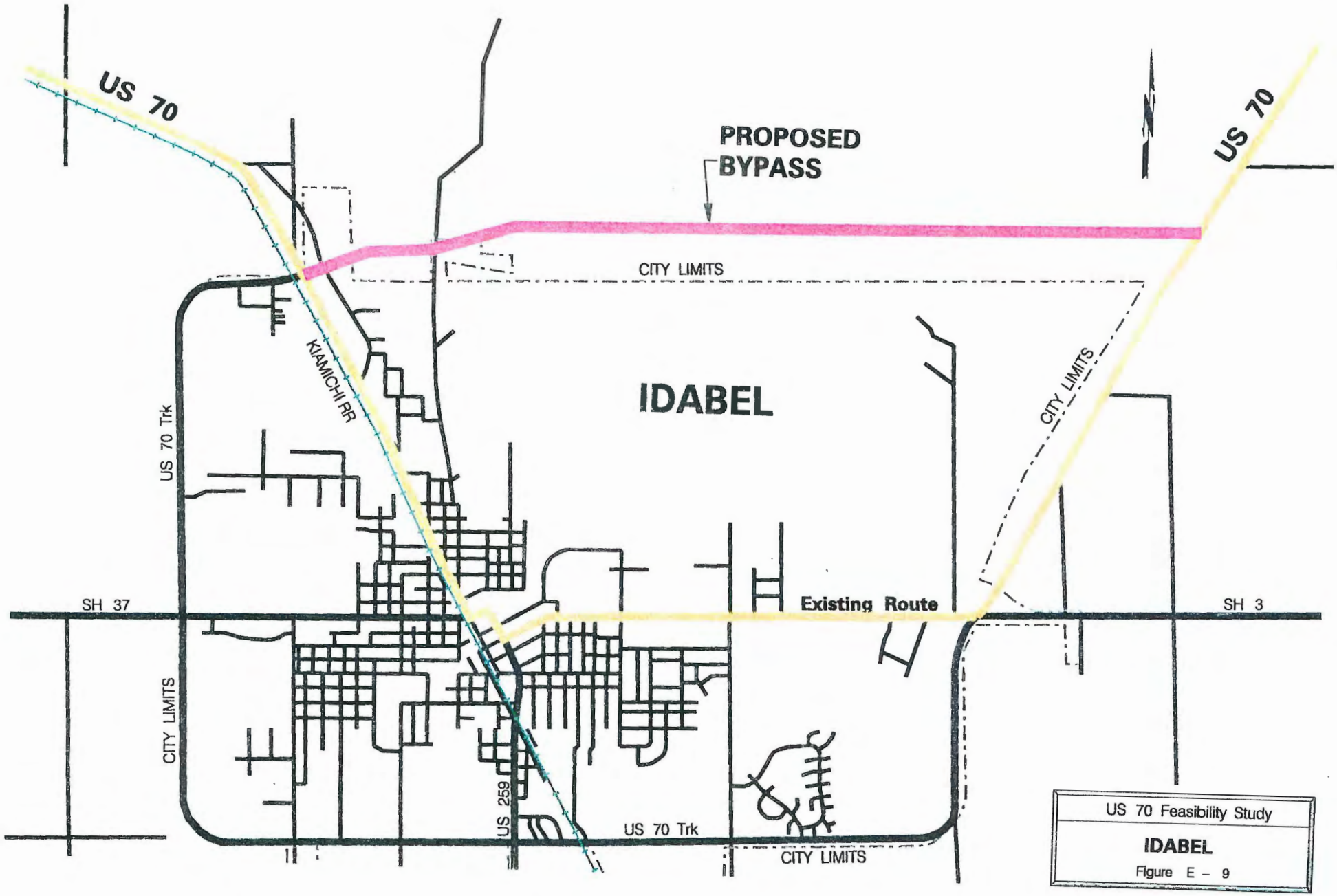


5 LANE
(120' MINIMUM & VARIABLE R / W)

US 70 Feasibility Study

TYPICAL SECTIONS

Figure E – 8



US 70 Feasibility Study

IDABEL

Figure E – 9

Environmental: Data for the evaluation of existing environmental conditions on highway alternatives was obtained from federal, state, and local agencies, as well as various published sources of data. Some agencies provided data specific to the proposed impact areas, but because of the size of the project, many agencies made their files available for the feasibility study and permitted the needed data to be extracted. Following initial data collections, a set of base maps was made and field-verified during a reconnaissance of major alternatives.

Following the reconnaissance, selected environmental considerations within a corridor 1800 feet wide in rural areas and ½ mile wide in urban areas were identified and mapped. In general, the number and density of environmental constraints tended to reflect the density of past use of the road segment. The exception is potential wetlands, which tend to be evenly distributed.

Programmed Projects along US 70 Corridor: All projects programmed in the study corridor between Fiscal Year 1995 and 2000 are located in Field Division 2. No projects were programmed for US 70 in Carter County, located in Field Division 7. A total of 9 projects are listed this period.

- For Fiscal Year 1996, the Idabel north bypass is programmed. Estimated cost of this 3.8 mile project around the northern edge of Idabel is $7,000,000.

- Choctaw County is the site of two projects programmed for 1997. From the US 271 junction to east Hugo, the lanes and shoulders of US 70 are to be reconstructed. The project is projected to cost $3,000,000. Another project for the relocation of utilities along this same segment is estimated at $500,000.

- Two projects are programmed for Fiscal Year 1998. One of the sites is in east Durant, the other site is east of Broken Bow. The $1,000,000 project at Durant involves acquiring the additional right-of-way necessary to four lane US 70 from US 69 Business east three miles. East of Broken Bow, a 5.4 mile stretch of existing US 70 roadway is to be rehabilitated. This rehabilitation of the existing lanes and bridges has been estimated to cost $4,500,000.

- The utility relocations and construction of the additional lanes for the previously mentioned Durant project will start during Fiscal Year 1999. Of the estimated $6,000,000, $1,000,000 is for the utility contract and $5,000,000 is for the roadway construction.

- Fiscal Year 2000 projects are for work east of Hugo. From SH 93 east 3 miles, US 70 is to be reconstructed. In addition to the roadway work, utility relocations are programmed. The total cost for both projects was estimated to be $3,500,000.

Data Analysis - Rural

Criteria for Project Prioritization: One of the study objectives was to prioritize improvements to US 70 along the entire corridor. To accomplish this objective, the corridor was divided into segments. Each segment in the study corridor was analyzed to determine the priority of each project. The segments were compared using three factors: accident rate, sufficiency rating, and future Level of Service. Level of Service is the ability of the existing roadway to accomodate future traffic, and is explained in more detail under *Future Travel Demand* on Page E-19. Each factor was weighted equally and the three items were added together. Subsections with lower total scores were given the higher priority. Priority categories were subdivided into three groups: high, moderate, and low, to create logical sections for improvements. Approximately one third of the total projects were assigned to each priority level.

Environmental Considerations: Environmental and cultural/social considerations on the rural highway segments are underground storage tanks (gas stations/convenience stores), abandoned/closed gas stations, aboveground storage tanks, schools, cemeteries, parks, junkyards/salvage yards, industrial areas (active and vacant), automotive maintenance businesses, county highway barns, electrical substations, sewage disposal plants, water treatment plants, historic building sites from 19th Century General Land Office maps, known archaeological sites, National Register of Historic Places/Oklahoma Landmarks Inventory properties, churches, 100-year floodplains, and mapped potential wetlands.

Generally, there are no clusters of environmental considerations that might cause exceptional problems, but there are two exceptions. On the existing US 70 route between Kingston and Durant, expanding the lake crossing may have a greater impact on significant archaeological sites and Section 4f recreational areas. Additionally, on existing SH 199, the site of a proposed realignment for US 70, the road passes near Ft. Washita, a state park and National Register property, where there may be some impact on unrecorded historical archaeological sites associated with the fort.

Cost Elements for Rural Projects: A goal of the study was to break the US 70 study corridor into constructable projects. For the purposes of this study a constructable project was a roadway segment whose total improvement cost was estimated to be approximately five million dollars. Due to bridge construction, urban limits, topographic features, and other factors, some of the projects were less than the target amount while others were significantly higher.

Using the roadway subsections from ODOT's 1994 Needs Study as a guide, costs to upgrade

each subsection were calculated. Typical sections as shown in Figure E-8 describe the ultimate facilities after improvements. Four improvement types were considered for the rural sections. The first type was new four lane construction on a new alignment. The second improvement category was parallel construction of two new lanes with no improvement to the existing roadway. The third type also added two new parallel lanes in addition to widening and resurfacing the existing lanes. The final category of improvements to rural sections called for two new parallel lanes along with major improvements to the existing lanes.

Construction costs on a per mile basis were estimated. Per mile cost information was taken from the Needs Study. Adjacent subsections were grouped together to arrive at a total cost near the target of approximately five million.

Data Analysis - Municipal

Locations Considered for Bypasses : The existing alignment of US 70 runs through several towns and communities in the study area. Existing right-of-way widths and environmental concerns along the route necessitated the investigation of realigning US 70 through or around these communities. Towns in which there is insufficient right-of-way to construct the proposed 5-lane sections are Madill, Kingston, Durant, Bokchito, Boswell, Soper, and Valliant. According to ODOT policy if a bypass replaces a portion of a State Highway, the old highway will revert back to local responsibility for continuing maintenance.

As a result of a previous request, a bypass route around the southwest portion of Ardmore was added to the feasibility study. The Ardmore bypass was to connect US 70 west of I-35 to US 70 east of I-35. Currently the two US 70 segments are offset by over two miles along I-35.

Construction plans have been completed by ODOT for a bypass around the north side of Idabel. Construction of the bypass is scheduled to start in 1997. Figure E-9 shows the approximate location of the proposed north bypass of Idabel. The total length of the bypass is approximately 3.8 miles.

Criteria for Bypass Alternative Consideration: At each potential bypass location, several alternate routes were considered, in addition to improvements along the existing route. Five factors were evaluated in the initial determination of the preferred route alternative at a town.

These five factors were as follows:

- Total cost
- Ability to serve US 70 traffic
- Number of relocations or displacements
- Affect on the local businesses
- Environmental considerations along the route

Most of the existing route alternatives were evaluated using the five lane section throughout their extents. A majority of the bypass routes were estimated using the four lane divided section. Costs of routes going through a town are generally higher due such factors as higher right-of-way costs, utility relocations, and necessity for storm sewer systems.

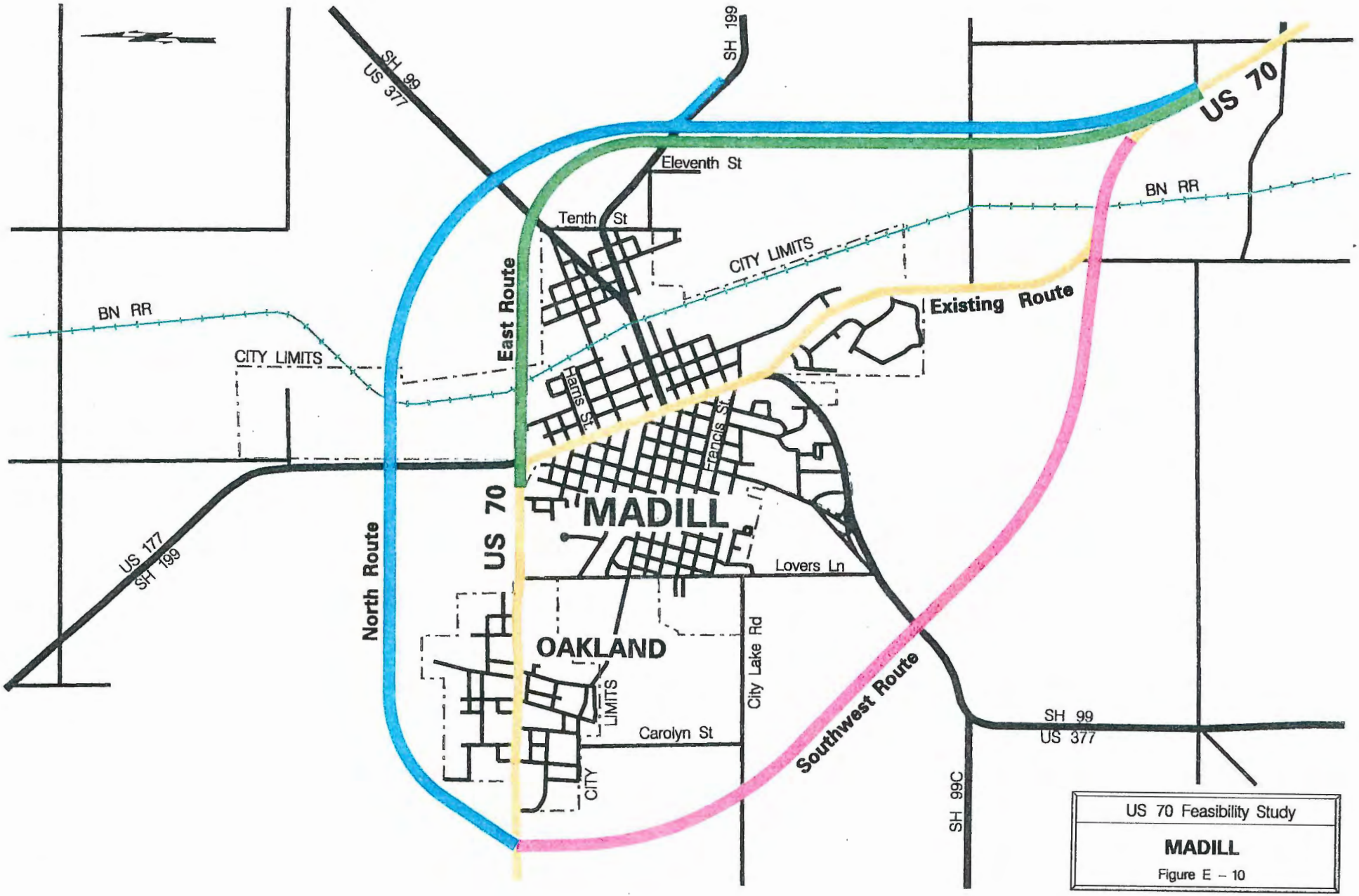
Widening to a five lane section in a developed area could cause the displacement of homes or businesses near the route. Some of the businesses may not have to be relocated but they would lose parking in front of their establishment. Homeowners may perceive an elevated noise level due to the traffic lanes located closer to their residences. Bypass alignments were chosen to lessen the impact on existing structures and residences.

Relocating US 70 away from the area of the towns could affect businesses along the existing route. Some businesses may leave the downtown area and move out to the bypass. Other businesses not moving may see benefits due to less congestion and truck traffic in town. Less vehicular traffic in the downtown area could increase safety in the area and promote pedestrian travel.

The most common environmental issue along the existing route through the various towns is the presence of underground storage tanks. Parks and cemeteries are located adjacent to the existing route in several locations. Bypass routes are normally located in undeveloped areas. Some of these areas contain wetlands and floodplains. Bypass alternatives as well as the existing route alternative were affected by railroad tracks along or crossing the routes.

The bypass alternatives were presented at the initial public meetings in May 1996. Comments received at these meetings were evaluated and the alternatives were refined appropriately. The alternatives at each location were then further evaluated with the objective screening criteria to determine a preferred alternative.

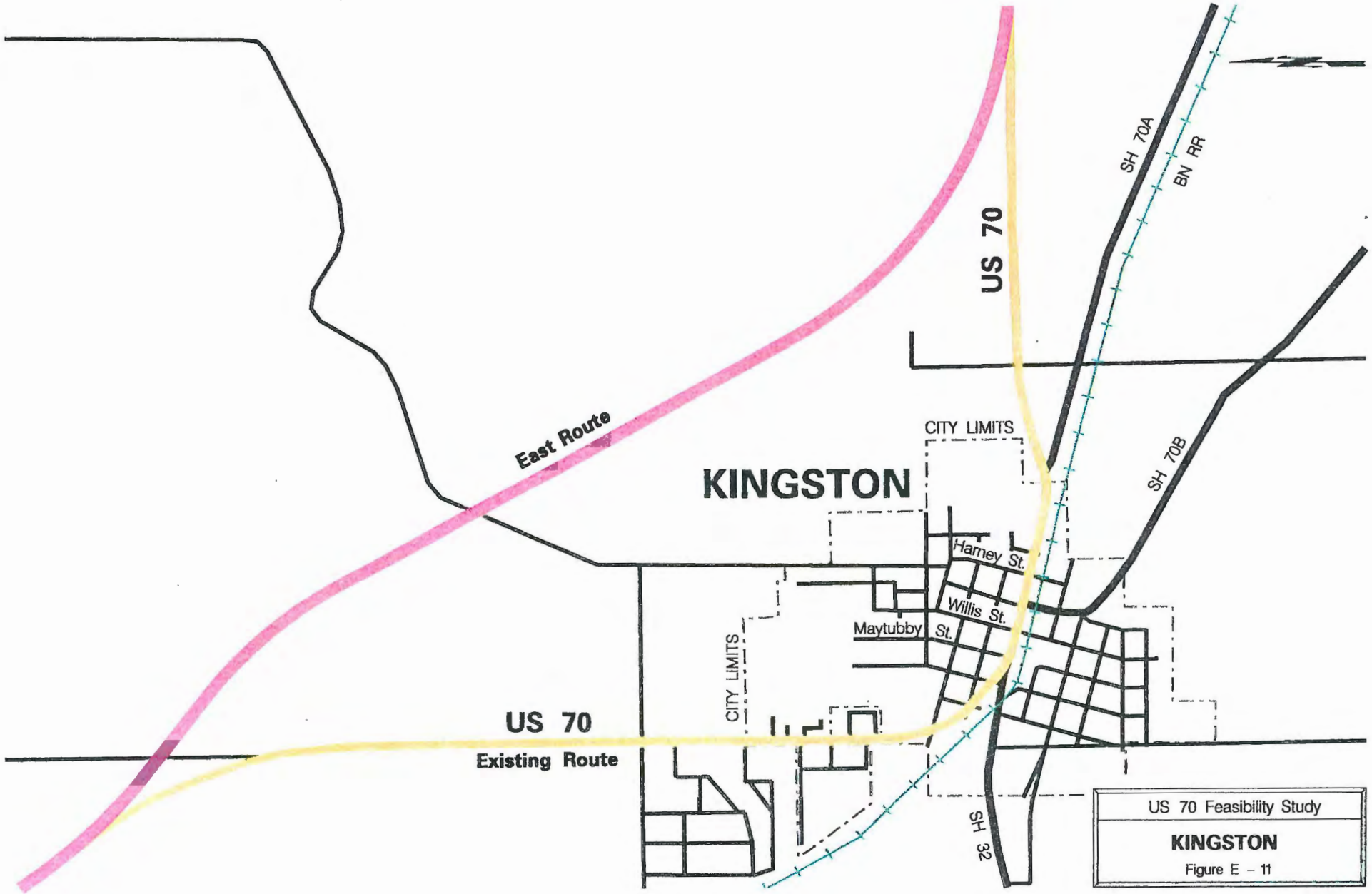
Each of the five factors for construction was evaluated on a scale of 1 to 5, with 1 being the most preferable and 5 being the least preferable. The totals from the factors were added together and the alternative with the lowest total became the tentative preferred alternative. In the case of a tie between the existing route and a bypass alternative the existing route was the preferred choice.

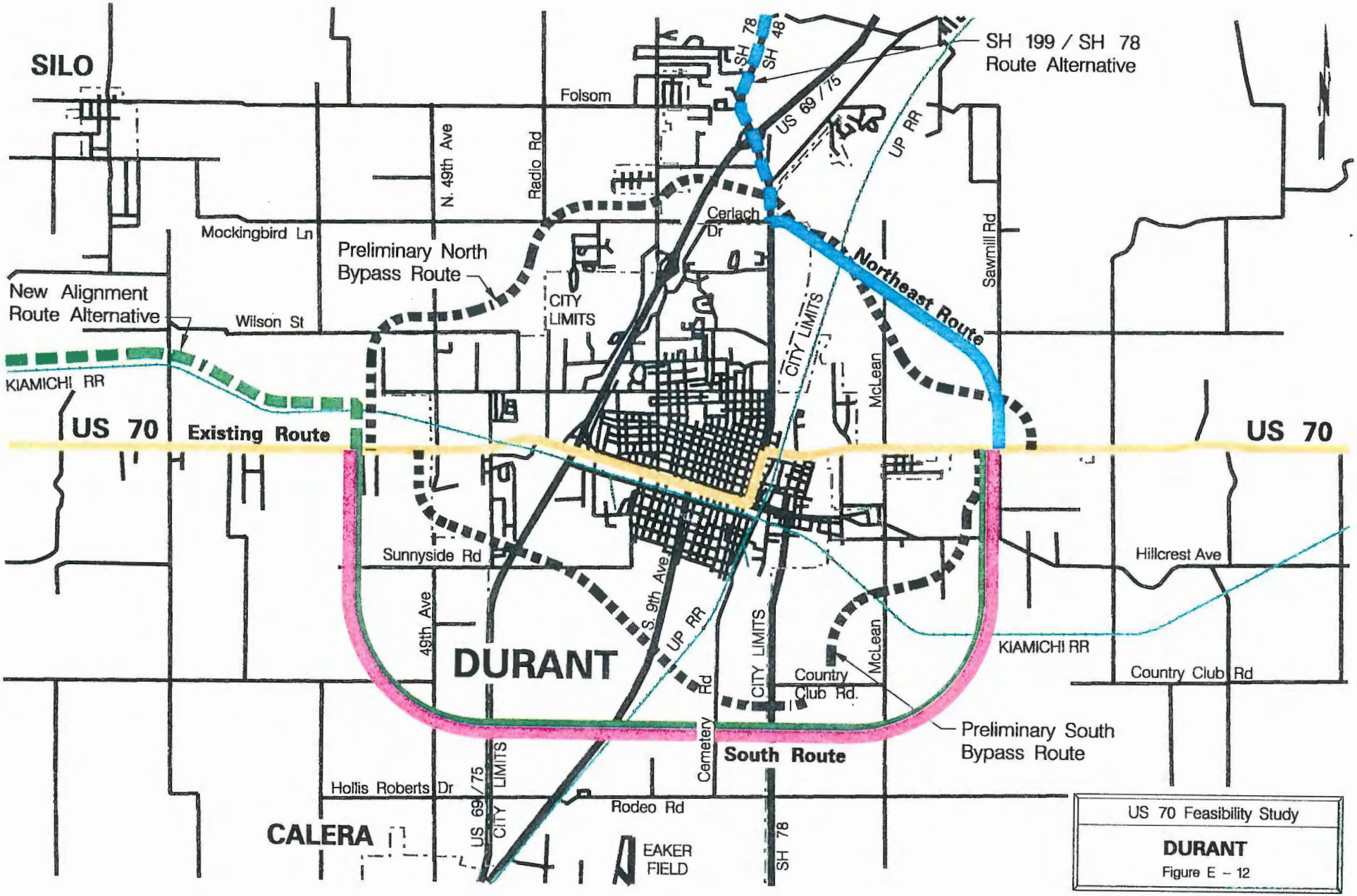


US 70 Feasibility Study

MADILL

Figure E – 10

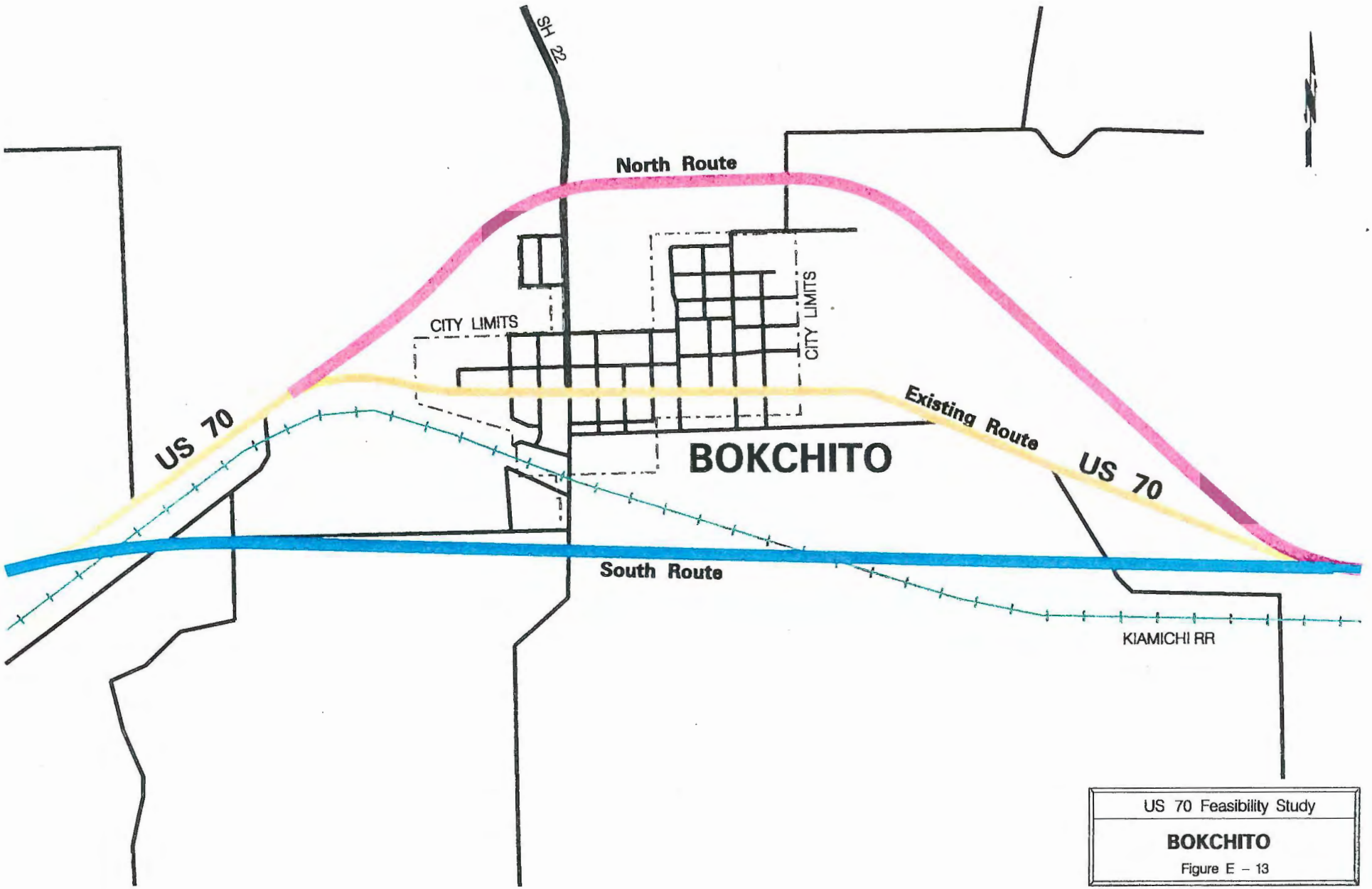

US 70
SH 70A
BN RR
East Route
CITY LIMITS
KINGSTON
SH 70B
Harney St.
Willis St.
Maytubby St.
CITY LIMITS
US 70
Existing Route
SH 32
US 70 Feasibility Study
KINGSTON
Figure E – 11



US 70 Feasibility Study

DURANT

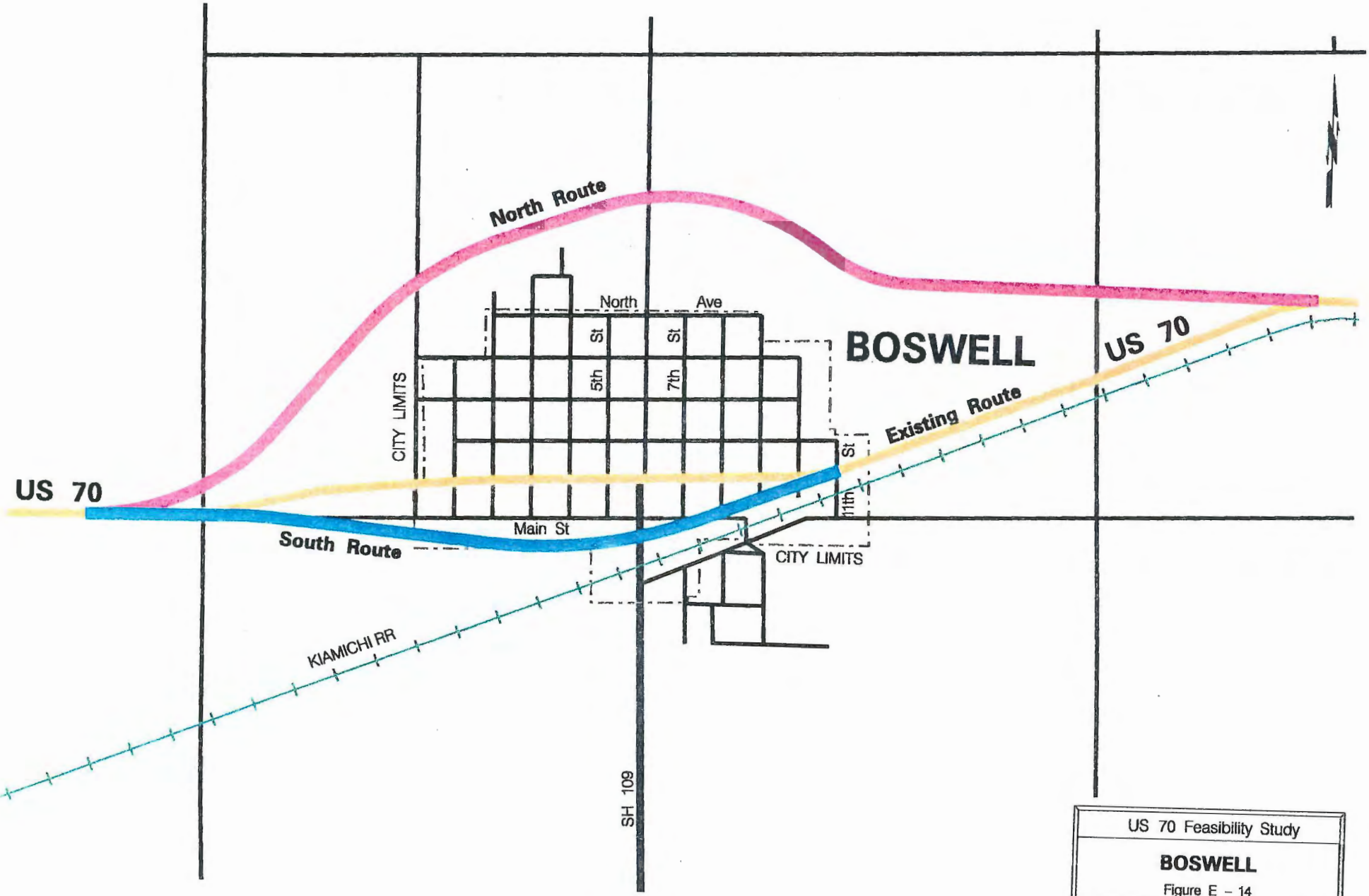
Figure E – 12



US 70 Feasibility Study

BOKCHITO

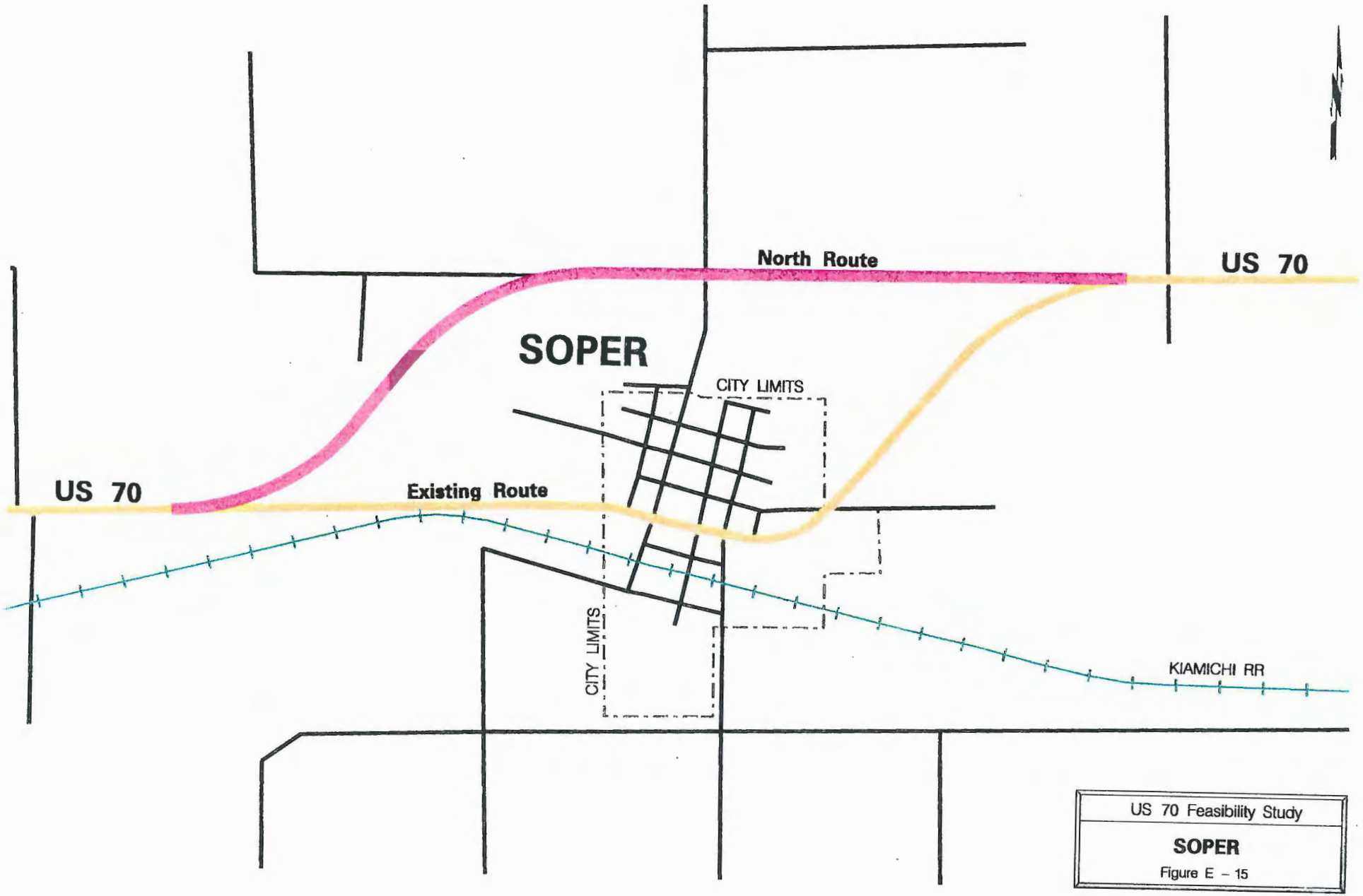
Figure E – 13



US 70 Feasibility Study

BOSWELL

Figure E – 14



US 70 Feasibility Study

SOPER

Figure E – 15

The preferred alternatives were presented at the public meetings in October 1996. Comments received at these meetings were also considered in developing a recommended route.

Environmental Analysis: Environmental and cultural/social considerations on the urban highway segments are underground storage tanks (gas stations/convenience stores), abandoned/closed gas stations, aboveground storage tanks, schools, cemeteries, parks, industrial areas, automotive maintenance businesses, electrical substations, sewage disposal plants, historic building sites from 19th Century General Land Office maps, known archaeological sites, National Register of Historic Places/Oklahoma Landmarks Inventory properties, churches, 100-year floodplains, and mapped potential wetlands.

The most significant considerations in the towns are cultural/social. Other kinds of considerations can be removed or mitigated in place, but under normal circumstances, significant cultural resources must be left in place.

All of the towns along US 70 are old enough to be considered historical. Some date back to the Indian Territory days. Others, while generally more modern, have elements that date back to those times. As a rule, the larger and wealthier the town, the more significant cultural resources exist to complicate matters. In addition to simple density of elements, larger towns tend to have more National Register nominations and larger public and private structures. The most complex of the towns being considered here are Durant and Oakland/Madill.

Discussion of Individual Alternative Bypass Routes:

Madill: Four alternatives for the alignment of US 70 in the Madill/Oakland area were considered. The first alternative was the improvement of existing US 70 through the two towns. A bypass around the southwest edge of both communities was also considered. A third alternative was a bypass running north of Oakland and around the north and east edges of Madill. The fourth alternative was a route along existing US 70 through Oakland and continuing east of the US 70/SH 199 intersection across the north and east sides of Madill. The four alternatives are shown in Figure E-10.

Kingston: Two alternatives were proposed at Kingston, including improvement of the existing route and an east bypass route. Alignments for the two routes are shown in Figure E-11.

Durant: Three options were initially considered at Durant. They included improvements of the existing route, north bypass and a south bypass. After the first public meetings in July 1996 and subsequent discussions with city officials the existing route was eliminated as an

alternative. Since the existing route went through a heavily developed residential area and the downtown business district, acquiring the additional right-of-way to construct the new section would be cost prohibitive. Numerous relocations and environmental issues would require mediation. Also due to local input, the north bypass was modified from a route across the entire north part of Durant to a shorter segment in the northeast quadrant of the city. The northwest portion of Durant is primarily a residential area and was considered by the local representatives to be an undesirable bypass location. In order for the area to continue to develop it was decided to omit a route from this quadrant of Durant. The south route was similarly altered to avoid a residential area and landfill. The revised south bypass route still serves the industrial interests located near the airport south of Durant.

For the final analysis, two choices were considered, a northeast bypass and a south bypass. Figure E-12 illustrates the two bypass routes. Each of the two choices is connected to one of the three US 70 route alternatives being considered between Madill and Durant. The preferred alignment for a bypass of Durant will be the option that coincides with the overall US 70 route alternative between Madill and Durant.

Bokchito: Three alignment alternatives were investigated. A north bypass around town, a bypass south of town and improvement of the existing route through the community were analyzed. All three routes are approximately 4 miles long and are shown in Figure E-13.

Boswell: Three alignment possibilities for the widened US 70 were considered for this community in western Choctaw County. Maintaining US 70 on its present alignment through the town as well as bypasses north and south of the town were the options. The north bypass goes completely around the town. The south route is similar to the existing route except it is located approximately two blocks south of the current alignment. All three alignments are graphically illustrated in Figure E-14.

Soper: Two alternatives were considered at Soper as shown in Figure E-15. The existing route traverses on a east-west bearing through town. A north bypass route, located west and north of Soper, was the other alternative. The bypass route is 2.1 miles long while the existing route has a length of 2.2 miles.

Fort Towson: Alternatives for the alignment of US 70 at Fort Towson were limited to two choices. The options were improving the existing route through town and a north bypass. Due to the presence of Lake Raymond Gary south and east of town, a south alternative was not considered. Alternatives at Fort Towson are shown in Figure E-16.

Valliant: US 70 currently runs north of the Kiamichi Railroad through Valliant. The only bypass consideration was to a route north of town. Because of the large Weyerhaeuser facility located south of town, it was considered impractical to propose a south bypass. Both

alternatives are depicted in Figure E-17.

Ardmore: Consideration for a bypass route around the southwest quadrant Ardmore was added to the US 70 Feasibility Study at the request of the City of Ardmore. The idea of realigning US 70 west of Ardmore to bypass the interchange of West Broadway and I-35 was brought to the attention of ODOT during the public meeting held in Ardmore for the Statewide Intermodal Transportation Plan in February 1995. In a letter from the City of Ardmore, Ardmore requested ODOT to add their town to the corridor study. ODOT agreed to investigate alignment possibilities for US 70 around southwest Ardmore. Ardmore's Comprehensive Plan shows a proposed conceptual bypass route extending west from the I-35/US 70 East intersection to Jay Norman Road and along Jay Norman Road until intersecting with US 70 West.

After modifying the alignment shown on the Comprehensive Plan and receiving comments from city officials, two bypass alignments were considered. Both routes have the same east terminus point, the intersection of I-35 and US 70 East. One route ends near the intersection of US 70 West and Kings Road. The other route connects with US 70 West at Jay Norman Road. The two alternatives are shown in Figure E-18.

Madill - Durant Alternatives

Alignment Description & Discussion: The segment of US 70 between Madill and Durant was identified as a key element of the corridor study. Specifically within this segment, the location of US 70 across Lake Texoma was a critical issue. However, finding the best location to cross the lake may produce negative impacts to the communities and developments along and near the lake. The US 70 route chosen between Madill and Durant will greatly influence the choice of the preferred bypass alternative in Madill and Durant.

Three route alternatives were considered in the analysis. The first alternative was to upgrade the roadway along the existing route of US 70. The second alternative was to widen and upgrade SH 199 running east of Madill, past Fort Washita to its intersection with SH 78, and continue south along SH 78 to Durant. The third route alternative was a combination of upgrading the existing SH 199 alignment and construction on a new alignment across Lake Texoma to the west side of Durant. The three route alternatives are illustrated in Figure E-19.

Environmental Considerations:

1. **Existing Route US 70:** Mapped environmental considerations between Madill and Durant along existing US 70 are as follows:

Underground Storage Tanks/Gas Stations	13
Abandoned/Closed Gas Stations	7
Aboveground Storage Tanks	5
Schools	1
Sewage Disposal Plants	1
Historic Building Locations from 1889 GLO Maps	14
Known Archaeological Sites	5
National Register of Historic Places/ Oklahoma Landmarks Inventory Properties	1
Churches	1
Section 4f Recreation Areas	1

The most environmentally sensitive part of this road segment is probably the crossing of Lake Texhoma, where issues may include water quality, cultural resources, and recreation areas.

2. **SH 199/78 Alignment:** Mapped environmental considerations between Madill and Durant along existing SH 199/78 are as follows:

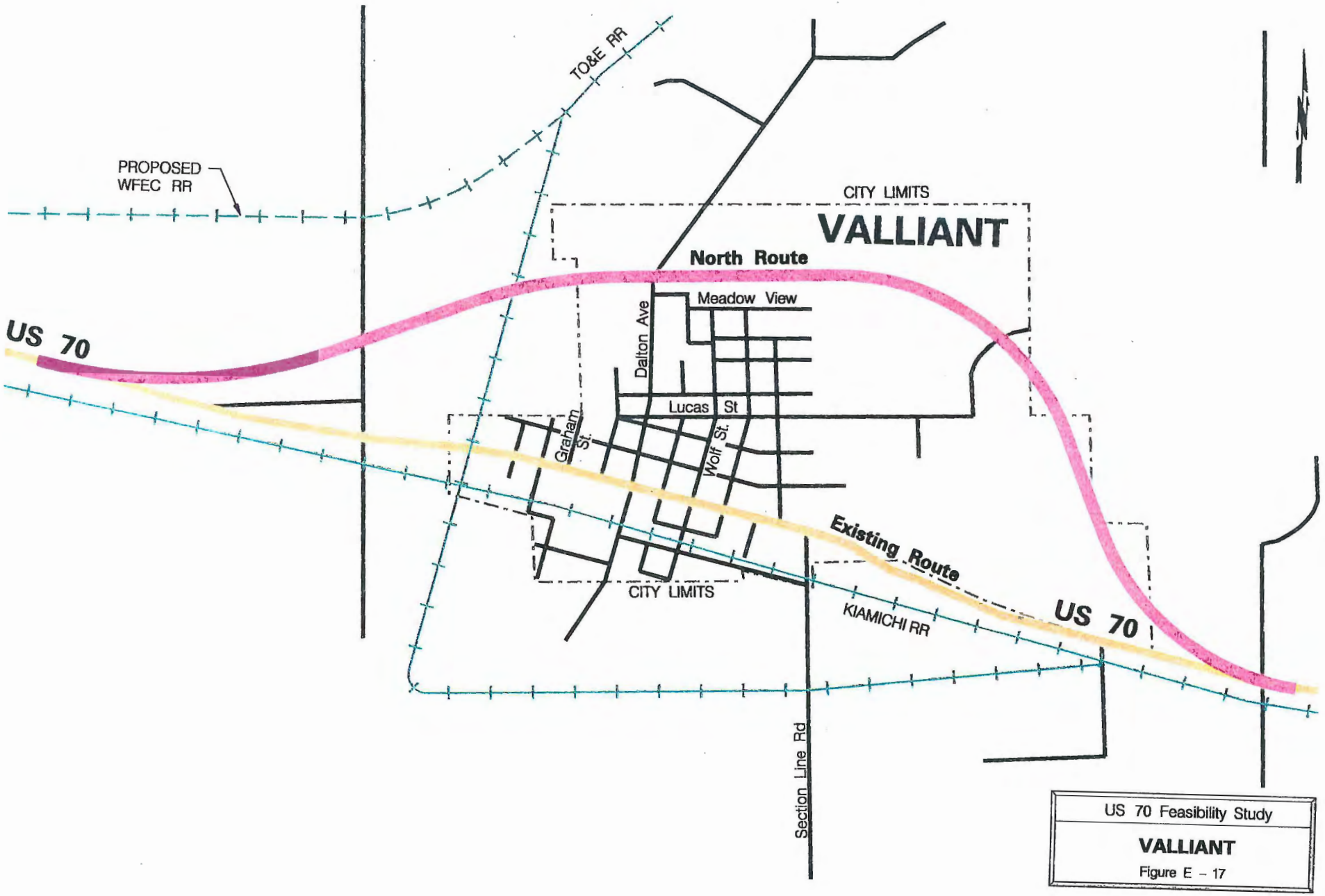
Underground Storage Tanks/Gas Stations	1
Aboveground Storage Tanks	2
Schools	1
Historic Building Location from 1889 GLO Maps	8
Known Archaeological Sites	1
National Register of Historic Places/ Oklahoma Landmarks Inventory Properties	1

The most environmentally sensitive part of this road segment probably is the vicinity of Ft. Washita, where issues will tend to focus on historic archaeological sites in the vicinity of the fort and nearby river crossings.

3. **New Alignment:** Mapped environmental considerations between Madill and Durant along SH 199 and the Cumberland Bypass are as follows:

Pipelines	unknown
Churches	1
Floodplains	2 (Lake Texhoma)
Wetlands	56

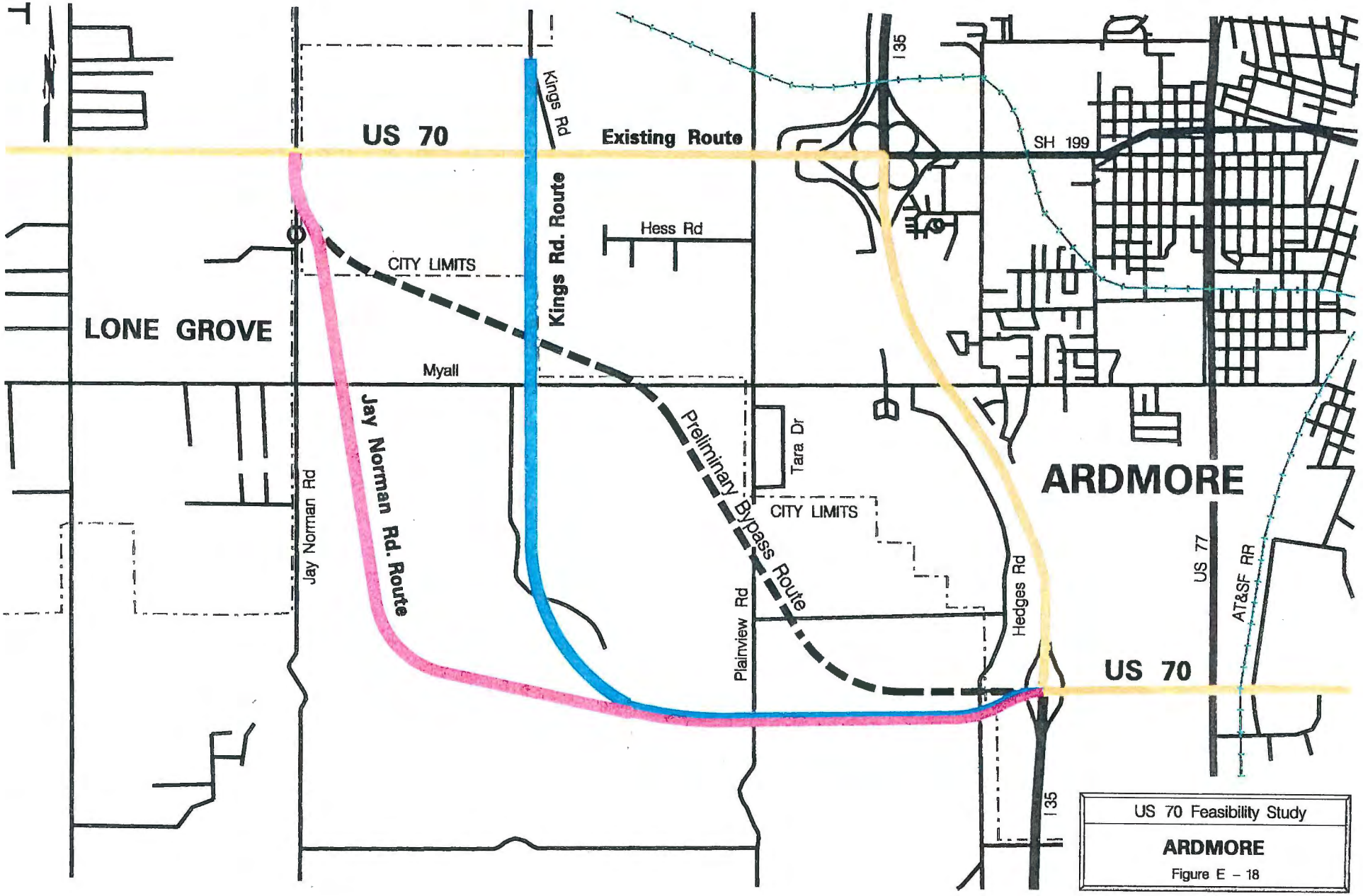
This corridor avoids population-related environmental considerations such as USTs, but crosses areas that have not been previously inspected for highway use. Sensitive issues



US 70 Feasibility Study

VALLIANT

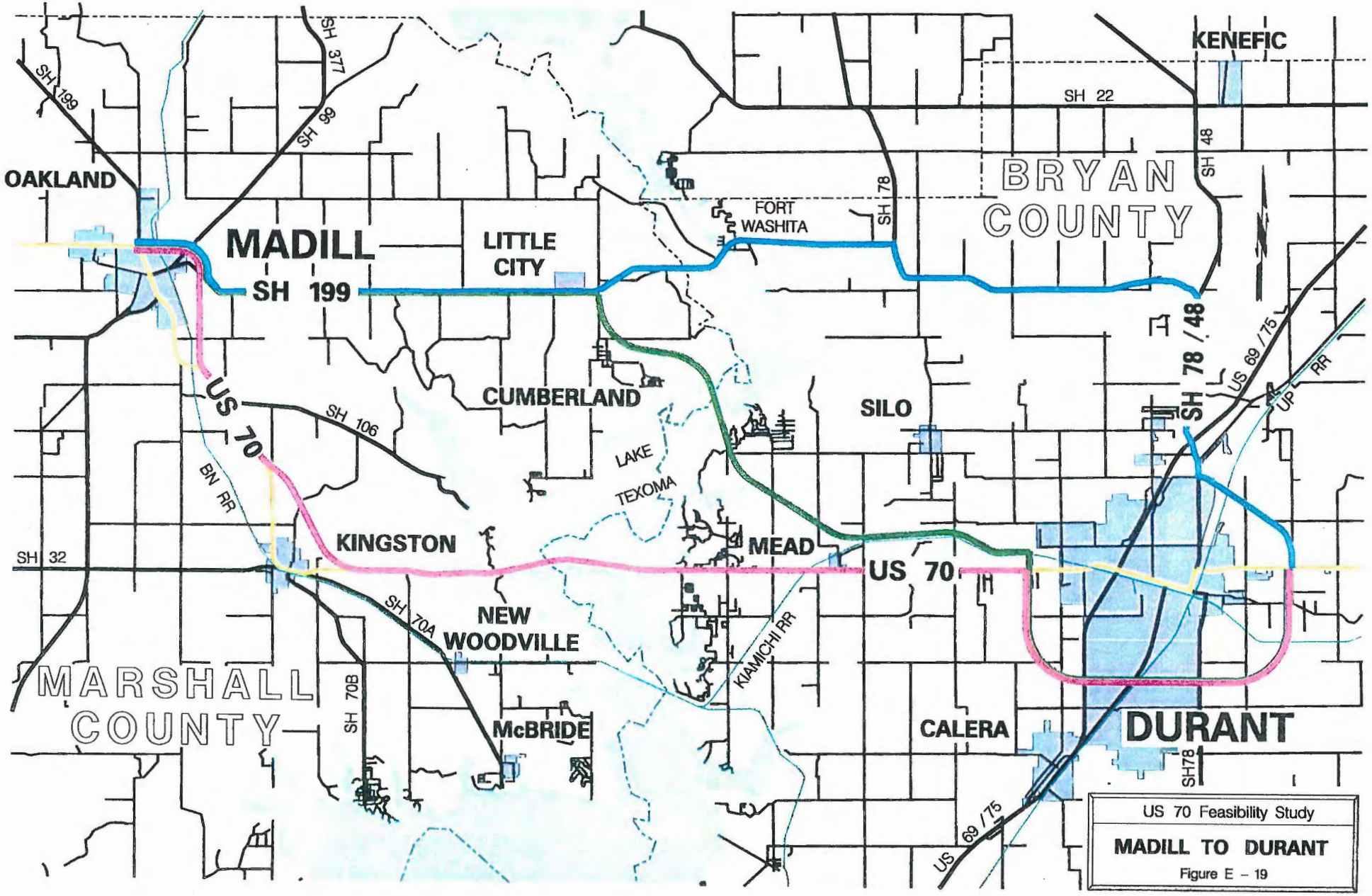
Figure E – 17



US 70 Feasibility Study

ARDMORE

Figure E – 18


KENEFIC
SH 22
SH 48
OAKLAND
SH 199
SH 377
SH 99
BRYAN
COUNTY
FORT
WASHITA
SH 78
MADILL
SH 199
LITTLE
CITY
US 69 / 75
UP RR
SH 78 / 48
CUMBERLAND
SILO
US 70
SH 106
BN RR
LAKE
TEXOMA
KINGSTON
MEAD
SH 32
US 70
SH 70A
NEW
WOODVILLE
KIAMICHI RR
MARSHALL
COUNTY
SH 70B
McBRIDE
CALERA
DURANT
SH78
US 69 / 75
US 70 Feasibility Study
MADILL TO DURANT
Figure E – 19

probably will be cultural resources, pipelines and water quality.

Traffic Analysis: Traffic forecasts for the year 2020 were developed for five alternatives proposed for the US 70 Corridor, and are described for the entire corridor under *Traffic Analysis-US 70 Corridor*. Portions of the traffic analysis relating specifically to the Madill to Durant portion of the study are presented below.

Traffic forecasts were provided for five 2020 alternatives as follows:

1. No build.
2. Improvement of US 70 to four lanes along the existing alignment
3. Alternative alignment (SH199/SH78 alignment) from Madill to Durant.
4. Improvement of US 70 with bypasses around Durant, Kingston, and Madill.
5. Bypass southwest of Ardmore, plus improvement of remainder of US 70 to four lanes along existing alignment (not directly applicable to this discussion, as it is identical to Alternative 2 from Madill to Durant.)

Each of the alternatives is divided into segments for purposes of traffic analysis.

Level of Service, 1995 and 2020: Those segments of US 70 subject to variation in volume, capacity, and level of service across the four alternatives affecting the Madill-Durant area include segments 6 through 11 and those segments of the proposed new facilities: 6a, 6b, 7a, 7b, 12a, 12b, 12c, 12d, and 12e (Table E-4). Level of Service (LOS) values reflect the traffic-carrying capability of a roadway, with values ranging from LOS A (free flow) to LOS F (extreme congestion).

Segments on the existing US 70 facility in 1995 were rated at level of service (LOS) C, except for two segments in the Durant area. Segment 10, west of US 69/75, operated at LOS D, while segment 11, east of US 69/75, operated at LOS B (see Table E-4). Projections for 2020 indicate that, under a no-build scenario (Alternative 1), LOS for segments 7 through 9 would deteriorate to LOS D, segments 6 (Madill) and 10 would decline to LOS E, and segment 11 would operate at LOS C.

Had a four-lane facility been in place in 1995, estimates indicate that all the segments in question would have operated at LOS A. Based on projections for a four-lane facility in 2020 (Alternative 2), operating conditions would be expected to remain at LOS A.

If Alternative 3, which includes an alternate facility between Durant and Madill, had been in place in 1995, much of the traffic from the two-lane segments would have been diverted to the alternate four-lane facility (segments 7a-7b and 12a-12e). The new facility would have operated at LOS A. Segment 6 was divided into 6a (west of the intersection with the

Table E-4
US 70 Level of Service
Madill-Durant Area, Oklahoma
1995 and 2020

Segment	Alternative and Year									
	1		2		3		4		5	
	1995	2020	1995	2020	1995	2020	1995	2020	1995	2020
6	C	E	A	A					A	A
6A					A	A	A	A		
6B					C	E	A	A		
7	C	D	A	A	B	C	A	A	A	A
7A					A	A	A	A		
7B					A	A	A	A		
7C							A	A		
8	C	D	A	A	B	C			A	A
8A							A	A		
8B							A	A		
8C							A	A		
8D							A	A		
9	C	D	A	A	B	C	A	A	A	A
10	D	E	A	A	C	D	A	A	A	A
10A							A	A		
11	B	C	A	A	B	C	A	A	A	A
11A							A	A		
12A					A	A				
12B					A	A				
12C					A	A				
12D					A	A				

Source: Parsons Brinckerhoff, 1997

proposed facility) and 6b (southeast of the intersection). Segment 6a would have operated at LOS A while Segment 6b in Madill would have been at LOS C. The diversion of traffic from the two-lane US 70 facility would have resulted in higher levels of service for segments 7 through 10 in comparison with the no-build scenario. All of these segments would operate at LOS B except segment 10, which would rate LOS C.

Projections for Alternative 3 in 2020 find segments 7, 8, 9, and 11 at LOS C, segment 10 at LOS D, and segment 6b at LOS E. These levels of service are generally lower than under Alternative 3 for 1995, but higher than under the 2020 no-build scenario.

Under Alternative 4, with local bypasses at Madill, Kingston, and Durant, estimates for segments of US 70 in the vicinity of these communities produce the same results as under Alternative 2 for both years (LOS A). The additional bypass segments all receive ratings of LOS A for both years, as well.

Traffic Analysis - US 70 Corridor

Future Travel Demand: Traffic forecasts for the year 2020 were developed for each of five alternatives proposed for the entire US 70 corridor. These trend line forecasts were based on review and analysis of existing traffic data and historical traffic trends in the region documented by ODOT. Documented sources included *1991 Oklahoma Traffic Historical*, *Oklahoma Traffic Characteristics 1991*, and numerous traffic data collection efforts and planning reports for facilities within the US 70 corridor. Future traffic was projected for a total of 34 existing and proposed segments of US 70. Not all of these segments are included in every alternative since the particular facilities they represent may not be a part of each scenario. Table E-3 describes the location of each of the segments. The forecasts consist of estimated 24-hour average daily traffic (ADT) volumes for the year 2020 and the percent of 2020 ADT that is truck traffic.

The five 2020 alternatives for which future traffic forecasts are provided are:

1. No build
2. Improvement of US 70 to four lanes along the existing alignment
3. Alternative alignment with an alternate facility, (SH199/SH78 alignment) extending from east of Durant to north of Madill
4. Alternative alignment with bypasses around Durant, Kingston, and Madill
5. Bypass southwest of Ardmore, plus improvement of remainder of US 70 to four lanes along existing alignment.

Seventeen segments comprise Alternatives 1 and 2. These are segments 1 through 17 and include none of the segments designated with letter-numeral combinations (such as 2A, 6B, 12E, etc.). In Alternatives 3 and 4, segment 6 is replaced with segments 6A and 6B. In addition, Alternative 3 includes segments 7A, 7B, 12A, 12B, 12C, 12D, and 12E. Alternative 4 replaces segment 8 with segments 8A, 8B, 8C, and 8D, and adds segments 7A, 7B, 7C, 10A, and 11A. Alternative 5 adds only segment 2A.

Tables E-5 and E-6, respectively, list average daily traffic volumes and percentages of trucks for all segments included in the various US 70 corridor alternatives for 2020. In each table, projected 2020 volumes are compared with estimated 1995 volumes based on actual traffic counts on existing facilities.

Not surprisingly, Alternative 2, which upgrades US 70 from a mostly two-lane facility to a four-lane facility, results in consistently higher ADT for all segments than Alternative 1, the no-build option, due to the expanded capacity of the roadway. Truck traffic is also higher for all segments, both in projected actual numbers and as a percentage of total volume for each segment.

Alternative 3 includes an alternate facility along SH 199 and SH 78 with the potential of diverting through traffic from existing US 70 between Madill and Durant. This would result in considerable reductions in total ADT and truck volumes along existing US 70 from US 377 at Madill east to where the proposed alternate facility rejoins US 70 east of Durant. The proportion of trucks to total traffic volume would also decline considerably with truck percentages on that same stretch of US 70 ranging from 2.3 percent to 12.8 percent for various segments, compared with 12.0 percent to 19.6 percent for those same segments under Alternative 2. Truck traffic is projected to be diverted primarily to the alternate route, with some segments of that facility exhibiting more than 20 percent truck traffic.

Alternative 4, which includes local bypasses around Madill, Durant, and Kingston, would result in similar though less dramatic diversions of traffic from US 70. Total traffic volumes on existing US 70 in Madill would be somewhat lower than under Alternative 3, although truck traffic would remain approximately the same in actual volumes, and slightly higher in proportion to total volumes. The bypass around Kingston would have essentially the same effect on total traffic volume on existing US 70 in Kingston as Alternative 3, although truck traffic would be less, both in projected volume and as a percentage of the total volume. Like Alternative 3, the Durant bypass would reduce total and truck ADT and truck percentages on US 70 through Durant, but the decrease would not be as great as in Alternative 3.

Table E-5
Projected Average Daily Traffic Volumes on US Highway 70, by Segment and Alternative

Segment	1995 Existin	2020 Alternatives				
		1	2	3	4	5
1	6,800	11,500	12,100	12,100	12,100	12,100
2	11,400	19,800	22,700	22,700	22,700	17,300
2A						5,900
3	4,300	8,800	10,600	10,600	10,600	10,600
4	4,100	6,600	7,900	7,900	7,900	7,900
5	3,900	6,200	7,500	7,500	7,500	7,500
6	8,500	13,600	15,800			15,800
6A				9,600	9,600	
6B				16,200	15,300	
7	6,800	10,900	12,800	9,300	8,800	12,800
7A				4,200	5,400	
7B				3,800	4,800	
7C					4,200	
8	5,200	7,800	9,300	6,000		9,300
8A					8,200	
8B					9,300	
8C					6,000	
8D					9,300	
9	4,700	7,500	8,900	5,000	8,900	8,900
10	10,200	16,300	18,900	13,900	13,400	18,900
10A					6,000	
11	5,600	9,000	10,700	7,300	6,800	10,700
11A					5,000	
12	3,700	5,900	7,100	7,100	7,100	7,100
12A				4,000		
12B				10,300		
12C				5,800		
12D				4,900		
12E				4,900		
13	3,300	5,300	6,600	6,600	6,600	6,600
14	5,400	8,600	10,300	10,300	10,300	10,300
15	6,000	9,600	11,000	11,000	11,000	11,000
16	8,900	14,200	16,100	16,100	16,100	16,100
17	4,500	7,000	8,200	8,200	8,200	8,200

Source: Parsons Brinckerhoff analysis, 1997

Table E-6
Projected Average Daily Truck Traffic as Percent of Total Volume on US Highway 70, by Segment and Alternative

Segment	1995 Existin	2020 Alternatives				
		1	2	3	4	5
1	13.2	13.0	13.9	13.9	13.9	13.9
2	10.5	10.5	11.0	11.0	11.0	5.2
2A						30.0
3	12.0	11.7	12.8	12.8	12.8	12.8
4	12.0	12.0	12.9	12.9	12.9	12.9
5	12.1	12.0	13.1	13.1	13.1	13.1
6	8.8	8.8	10.8			10.8
6A				11.6	11.6	
6B				2.0	2.1	
7	10.6	10.6	12.3	3.8	6.0	12.3
7A				25.0	24.1	
7B				25.0	24.0	
7C					26.4	
8	13.5	13.5	15.3	9.5		15.3
8A					14.9	
8B					15.7	
8C					5.3	
8D					15.3	
9	17.0	17.0	19.6	12.8	19.6	19.6
10	11.0	11.0	12.0	2.3	5.0	12.0
10A					25.0	
11	5.0	5.0	6.9	3.8	5.0	6.9
11A					9.2	
12	6.0	6.0	8.5	8.5	8.5	8.5
12A				10.0		
12B				11.7		
12C				19.7		
12D				21.4		
12E				21.4		
13	6.2	6.2	9.2	9.2	9.2	9.2
14	8.0	8.0	18.3	18.3	18.3	18.3
15	7.6	7.6	18.0	18.0	18.0	18.0
16	6.4	6.4	12.8	12.8	12.8	12.8
17	10.0	10.0	19.3	19.3	19.3	19.3

Source: Parsons Brinckerhoff analysis, 1997

The Ardmore bypass in Alternative 5 would result in a considerable diversion of traffic from US 70 through the town, especially in truck traffic. Truck volume on the bypass would comprise 30 percent of total ADT, while the percentage of trucks on US 70 in Ardmore would be only 5.2 percent of the total volume, compared with 11 percent under the other build alternatives.

Level of Service - 1995 and 2020: Essential to the development of alternate scenarios for the improvement of US 70 is the assessment of the need for highway bypass construction in more heavily traveled small urban areas within the corridor. In the case of US 70, the urban areas in question are Ardmore, Durant, and Madill. For that reason, level of service, origin-destination, and future travel demand analyses were performed for five alternative scenarios to estimate the traffic impacts of various possible improvements.

Determination of capacity and level of service along the US 70 corridor was based on existing and future ADT figures previously developed. Existing ADT and percentage share of truck traffic were used to determine the current level of service along the existing two-lane facility. The 2020 projections of ADT and truck traffic were used to estimate future levels of service for the five designated alternative scenarios.

Capacity and level of service were developed for each of the highway segments along US 70. Table E-3 describes the location of each of the segments.

The five levels of service used in this analysis are defined as follows:

- Level A: Free flow. Individual drivers are free to select desired speeds, a high degree of maneuverability is present within the traffic stream, and drivers are generally unaffected by the presence of other vehicles. The general level of comfort and convenience is excellent.
- Level B: Low-density stable flow. Drivers remain free to select desired speeds but a slight decline in maneuverability occurs compared with Level A and the presence of other vehicles becomes noticeable. The level of comfort and convenience is somewhat less than at Level A.
- Level C: Medium-density stable flow. Selection of speed is affected by the presence of other vehicles, maneuvering within the traffic stream requires substantial driver vigilance, and driver operations are affected significantly by others in the traffic stream. The general level of comfort and convenience is noticeably less at this level than at Levels A or B.
- Level D: High-density stable flow. Selection of speed and freedom to maneuver are severely restricted and small increases in traffic flow will generally cause operational problems. The level of comfort and convenience is generally poor.

- Level E: Unstable flow. Speed is reduced to a low, relatively uniform value and freedom to maneuver is extremely difficult. Operating conditions are at or near the capacity level. Comfort and convenience levels are extremely poor, and driver frustration is generally high.
- Level F: Forced/breakdown flow. Operations are extremely unstable. The amount of traffic approaching a point exceeds the amount that can traverse the point and arrival flow exceeds discharge flow. Queues form behind such locations and operations within the queue are characterized by stop-and-go waves.

The five 2020 alternatives for which level of service estimates for 1995 and 2020 are provided have been previously described in this section.

As shown in Table E-7, level of service (LOS) ranged from LOS A to LOS E on the existing facility in 1995. Only segment 10, in the Durant area, was as low as LOS E. Three segments, 1 and 2 at Ardmore and segment 16 between Idabel and Broken Bow, were actually four-lane segments operating at LOS A. Three segments along rural areas of the corridor (5, 12, and 13) rated LOS B, and three segments, 6 and 7 in the Madill area and 15 west of Idabel, rated LOS D. All others were estimated at LOS C. Projections for 2020 indicate that, under a no-build scenario (Alternative 1), LOS for all segments would deteriorate (Table E-8 and Figure E-20). No segments would remain at LOS A, and only two four-lane segments, 1 west of Ardmore and 16 east of Idabel, would rate LOS B. Segment 10 at Durant would decline to LOS F, and segments 6 and 7 at Madill and segments 14 and 15 between Hugo and Idabel would decline to LOS E, while the remaining segments would operate at LOS C or D.

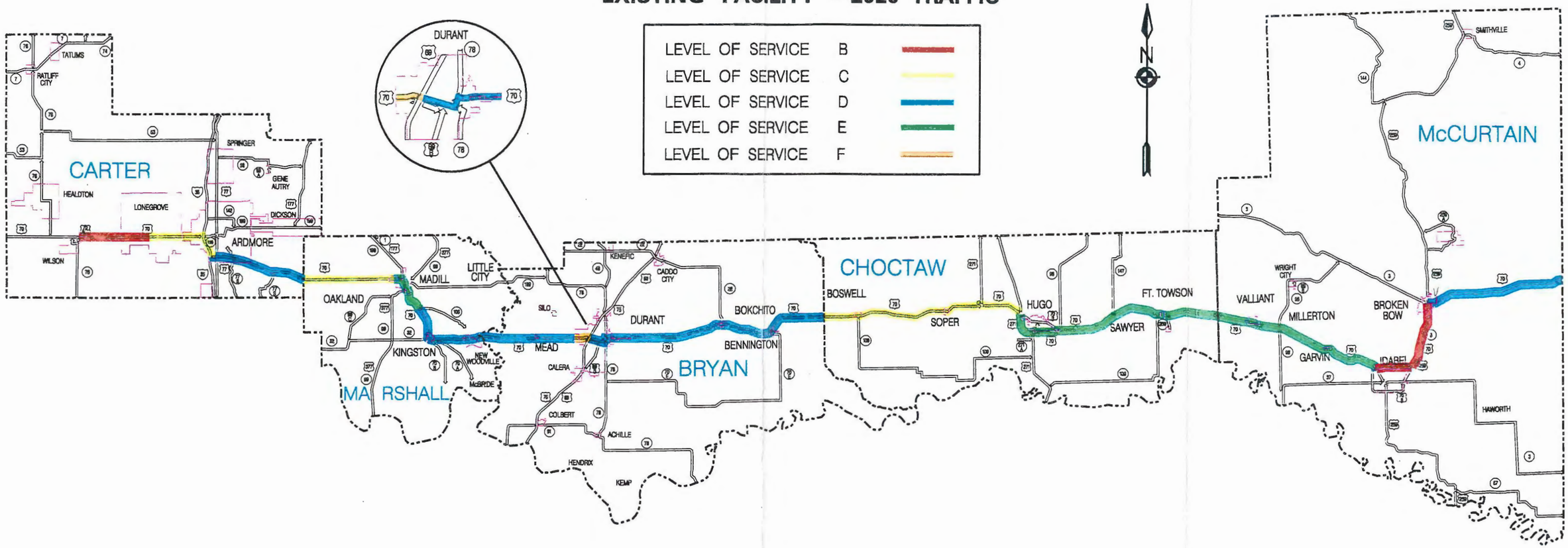
Had a four-lane facility been in place in 1995, estimates indicate that all segments, except segment 2 at Ardmore would have rated LOS A. Based on projections for a four-lane facility in 2020 (Alternative 2), most segments are estimated at LOS A. However, six segments would operate at LOS B (Table E-9) and only segment 2 at Ardmore would decline to LOS C.

If Alternative 3, which includes an alternate facility between Durant and Madill, had been in place in 1995, those two-lane facilities from which traffic would have been diverted to the alternate facility (segments 7-11) would generally have operated at improved LOS as compared to existing operations. Projections for 2020 find those same segments generally rated at one LOS lower (from B to C, or C to D) than in 1995, but one LOS higher (from D to C, or E to D) than under the 2020 no-build scenario (Table E-10).

Under Alternative 4, with local bypasses at Madill, Kingston, and Durant, estimates generally produce the same results as under Alternative 2 for both years. The additional bypass segments all receive ratings of LOS A for both years. Likewise, under Alternative

EXISTING FACILITY – 2020 TRAFFIC

LEVEL OF SERVICE	B
LEVEL OF SERVICE	C
LEVEL OF SERVICE	D
LEVEL OF SERVICE	E
LEVEL OF SERVICE	F



US 70 Feasibility Study

LEVEL OF SERVICE: 2020

Figure E – 20

Table E-7
Alternative 1 (No-Build): Existing Two-Lane Facility
1995 Traffic

SEGMENT	1995 ADT	% TRUCKS	f_{HV}	CAPACITY (SF_E) (vph)	K	DESIGN HOURLY VOLUME (vph)	V/C RATIO	LEVEL OF SERVICE
1*	6800	13.2	-	-	0.1	286	-	A
2*	11400	10.5	-	-	0.1	479	-	A
3	4300	12.0	0.64	1510	0.1	430	0.28	C
4	4100	12.0	0.64	1510	0.1	410	0.27	C
5	3900	12.0	0.64	1510	0.1	390	0.26	B
6	8500	10.0	0.67	1591	0.1	850	0.53	D
7	6800	12.1	0.63	1507	0.1	680	0.45	D
8	5200	15.4	0.59	1390	0.1	520	0.37	C
9	4700	19.2	0.54	1277	0.1	470	0.37	C
10	10200	12.0	0.64	1510	0.1	1020	0.68	E
11	5600	11.6	0.64	1526	0.1	560	0.37	C
12	3700	14.6	0.60	1417	0.1	370	0.26	B
13	3300	14.9	0.59	1407	0.1	330	0.23	B
14	5400	18.5	0.55	1296	0.1	540	0.42	C
15	6000	18.3	0.55	1302	0.1	600	0.46	D
16*	8900	12.8	-	-	0.1	374	-	A
17	4500	20.0	0.53	1255	0.1	450	0.36	C

Source: Parsons Brinckerhoff, 1997

* Existing segment is four-lane. Flow rate = 70%DDHV where directional DHV = ADT(K)(.6)

Incorporated Factors

(v/c)E =	0.97	v/c ratio at LOS E from Table 8-1, 1994 HCM
PR =	0.04	Proportion of RV's
PB =	0	Proportion of buses
ET =	5.0	Passenger-car equivalent for trucks from Table 8-6, 1994 HCM
ER =	3.3	Passenger-car equivalent for RV's from Table 8-6, 1994 HCM
EB =	2.9	Passenger-car equivalent for buses from Table 8-6, 1994 HCM
fd =	0.94	Adjustment factor for directional distribution from Table 8-4, 1994 HCM
fw =	0.93	Adjustment factor for lane and shoulder width from Table 8-5, 1994 HCM
fHV		Adjustment factor for heavy vehicles by segment
K =	0.1	Design hour factor based on historical counts and counts from Task 3.1

Note

The factors incorporated into the calculations are based on roadway and traffic characteristics which include rolling terrain, zero percent no passing zones, twelve foot lanes, two foot shoulders, directional distribution of 60/40, and default values of four and zero percent RV's and buses respectively.

Table E-8
Alternative 1 (No-Build): Existing Two-Lane Facility
2020 Traffic

SEGMENT	2020 ADT	% TRUCKS	f_{HV}	CAPACITY (SF_E) (vph)	K	DESIGN HOURLY VOLUME (vph)	V/C RATIO	LEVEL OF SERVICE
1*	11500	13.0	-	-	0.1	483	-	B
2*	19800	10.5	-	-	0.1	832	-	C
3	8800	11.7	0.64	1522	0.1	880	0.58	D
4	6600	12.0	0.64	1510	0.1	660	0.44	D
5	6200	12.0	0.64	1510	0.1	620	0.41	C
6	13600	10.0	0.67	1591	0.1	1360	0.85	E
7	10900	12.0	0.64	1510	0.1	1090	0.72	E
8	7800	15.5	0.58	1387	0.1	780	0.56	D
9	7500	19.3	0.54	1274	0.1	750	0.59	D
10	16300	12.0	0.64	1510	0.1	1630	1.08	F
11	9000	12.8	0.62	1480	0.1	900	0.61	D
12	5900	16.1	0.58	1368	0.1	590	0.43	D
13	5300	15.1	0.59	1400	0.1	530	0.38	C
14	8600	18.6	0.54	1293	0.1	860	0.67	E
15	9600	17.7	0.56	1319	0.1	960	0.73	E
16*	14200	12.7	-	-	0.1	596	-	B
17	7000	21.4	0.51	1219	0.1	700	0.57	D

Source: Parsons Brinckerhoff, 1997

* Existing segment is four-lane. Flow rate = 70%DDHV where directional DHV = ADT(K)(.6)

Incorporated Factors

(v/c)E =	0.97	v/c ratio at LOS E from Table 8-1, 1994 HCM
PR =	0.04	Proportion of RV's
PB =	0	Proportion of buses
ET =	5.0	Passenger-car equivalent for trucks from Table 8-6, 1994 HCM
ER =	3.3	Passenger-car equivalent for RV's from Table 8-6, 1994 HCM
EB =	2.9	Passenger-car equivalent for buses from Table 8-6, 1994 HCM
fd =	0.94	Adjustment factor for directional distribution from Table 8-4, 1994 HCM
fw =	0.93	Adjustment factor for lane and shoulder width from Table 8-5, 1994 HCM
fHV		Adjustment factor for heavy vehicles by segment
K =	0.1	Design hour factor based on historical counts and counts from Task 3.1

Note

The factors incorporated into the calculations are based on roadway and traffic characteristics which include rolling terrain, zero percent no passing zones, twelve foot lanes, two foot shoulders, directional distribution of 60/40, and default values of four and zero percent RV's and buses respectively.

Table E-9
Alternative 2: Four-Lane Facility
2020 Traffic

SEGMENT	Estimated 2020 ADT (based on 4 lanes)	% TRUCKS	K	D	DIRECTIONAL DESIGN HOURLY VOLUME (vph)	SERVICE FLOW RATE (70%DHV) (vphpl)	LEVEL OF SERVICE
1	12100	13.9	0.1	0.60	726	508	B
2	22700	11.0	0.1	0.60	1362	953	C
3	10600	12.8	0.1	0.60	636	445	A
4	7900	12.9	0.1	0.60	474	332	A
5	7500	13.1	0.1	0.60	450	315	A
6	15800	10.8	0.1	0.60	948	664	B
7	12800	12.3	0.1	0.60	768	538	B
8	9300	15.3	0.1	0.60	558	391	A
9	8900	19.6	0.1	0.60	534	374	A
10	18900	12.0	0.1	0.60	1134	794	B
11	10700	12.2	0.1	0.60	642	449	A
12	7100	15.5	0.1	0.60	426	298	A
13	6600	12.6	0.1	0.60	396	277	A
14	10300	18.3	0.1	0.60	618	433	A
15	11000	18.0	0.1	0.60	660	462	B
16	16100	12.8	0.1	0.60	966	676	B
17	8200	19.3	0.1	0.60	492	344	A

Source: Parsons Brinckerhoff, 1997

Incorporated Factors

K Design hour factor based on historical counts and counts from Task 3.1
D Directional distribution

Note

The factors incorporated into the calculations are based on roadway and traffic characteristics which include rolling terrain, twelve foot lanes, six foot clearance, divided highway, number of access points per mile = 20, and free-flow speed of 60 mph.

Table E-10
Alternative 3 (Madill-Durant Alternate): Four-Lane Facility
2020 Traffic

SEGMENT	Estimated 2020 ADT	% TRUCKS	K	D	DIRECTIONAL DESIGN HOURLY VOLUME (vph)	SERVICE FLOW RATE (70%DHV) (vphpl)	LEVEL OF SERVICE
1	12100	13.9	0.1	0.60	726	508	B
2	22700	11.0	0.1	0.60	1362	953	C
3	10600	12.8	0.1	0.60	636	445	A
4	7900	12.9	0.1	0.60	474	332	A
5	7500	13.1	0.1	0.60	450	315	A
6a	9600	11.6	0.1	0.60	576	403	A
6b*	16200	2.0	0.1	0.60	972	-	E
7*	9300	3.8	0.1	0.60	558	-	D
7a	4200	25.0	0.1	0.60	252	176	A
7b	3800	25.0	0.1	0.60	228	160	A
8*	6000	9.5	0.1	0.60	360	-	C
9*	5000	12.8	0.1	0.60	300	-	C
10*	13900	2.3	0.1	0.60	834	-	E
11*	7300	7.5	0.1	0.60	438	-	D
12	7100	15.5	0.1	0.60	426	298	A
12a	4000	18.3	0.1	0.60	240	168	A
12b	10300	11.7	0.1	0.60	618	433	A
12c	5800	19.7	0.1	0.60	348	244	A
12d	4900	21.4	0.1	0.60	294	206	A
12e	4900	21.4	0.1	0.60	294	206	A
13	6600	12.6	0.1	0.60	396	277	A
14	10300	18.3	0.1	0.60	618	433	A
15	11000	18.0	0.1	0.60	660	462	B
16	16100	12.8	0.1	0.60	966	676	B
17	8200	19.3	0.1	0.60	492	344	A

Source: Parsons Brinckerhoff, 1997

* Level of service based on existing US 70 remaining two-lane between Durant and Madill.

Incorporated Factors

K Design hour factor based on historical counts and counts from Task 3.1

D Directional distribution

Note

The factors incorporated into the calculations are based on roadway and traffic characteristics which include rolling terrain, twelve foot lanes, six foot clearance, divided highway, number of access points per mile = 20, and free-flow speed of 60 mph.

Table E-11
Alternative 4(Local Bypasses): Four-Lane Facility
2020 Traffic

SEGMENT	Estimated 2020 ADT (based on 4 lanes)	% TRUCKS	K	D	DIRECTIONAL DESIGN HOURLY VOLUME (vph)	SERVICE FLOW RATE (70%DHV) (vphpl)	LEVEL OF SERVICE
1	12100	13.9	0.1	0.60	726	508	B
2	22700	11.0	0.1	0.60	1362	953	C
3	10600	12.8	0.1	0.60	636	445	A
4	7900	12.9	0.1	0.60	474	332	A
5	7500	13.1	0.1	0.60	450	315	A
6a	9600	11.6	0.1	0.60	576	403	A
6b	15300	2.1	0.1	0.60	918	643	B
7	8800	6.0	0.1	0.60	528	370	A
7a	5400	24.1	0.1	0.60	324	227	A
7b	4800	24.0	0.1	0.60	288	202	A
7c	4200	26.4	0.1	0.60	252	176	A
8a	8200	14.9	0.1	0.60	492	344	A
8b	9300	15.7	0.1	0.60	558	391	A
8c	6000	5.3	0.1	0.60	360	252	A
8d	9300	15.3	0.1	0.60	558	391	A
9	8900	19.6	0.1	0.60	534	374	A
10	13400	5.0	0.1	0.60	804	563	B
10a	6000	25.0	0.1	0.60	360	252	A
11	6800	7.8	0.1	0.60	408	286	A
11a	5000	15.0	0.1	0.60	300	210	A
12	7100	15.5	0.1	0.60	426	298	A
13	6600	12.6	0.1	0.60	396	277	A
14	10300	18.3	0.1	0.60	618	433	A
15	11000	18.0	0.1	0.60	660	462	B
16	16100	12.8	0.1	0.60	966	676	B
17	8200	19.3	0.1	0.60	492	344	A

Source: Parsons Brinckerhoff, 1997

Incorporated Factors

K Design hour factor based on historical counts and counts from Task 3.1
D Directional distribution

Note

The factors incorporated into the calculations are based on roadway and traffic characteristics which include rolling terrain, twelve foot lanes, six foot clearance, divided highway, number of access points per mile = 20, and free-flow speed of 60 mph.

Table E-12
Alternative 5: Four-Lane Facility
2020 Traffic

SEGMENT	Estimated 2020 ADT (based on 4 lanes)	% TRUCKS	K	D	DIRECTIONAL DESIGN HOURLY VOLUME (vph)	SERVICE FLOW RATE (70%DHV) (vphpl)	LEVEL OF SERVICE
1	12100	13.9	0.1	0.60	726	508	B
2	17300	5.2	0.1	0.60	1038	727	B
2a	5900	30.0	0.1	0.60	354	248	A
3	10600	12.8	0.1	0.60	636	445	A
4	7900	12.9	0.1	0.60	474	332	A
5	7500	13.1	0.1	0.60	450	315	A
6	15800	10.8	0.1	0.60	948	664	B
7	12800	12.3	0.1	0.60	768	538	B
8	9300	15.3	0.1	0.60	558	391	A
9	8900	19.6	0.1	0.60	534	374	A
10	18900	12.0	0.1	0.60	1134	794	B
11	10700	12.2	0.1	0.60	642	449	A
12	7100	15.5	0.1	0.60	426	298	A
13	6600	12.6	0.1	0.60	396	277	A
14	10300	18.3	0.1	0.60	618	433	A
15	11000	18.0	0.1	0.60	660	462	B
16	16100	12.8	0.1	0.60	966	676	B
17	8200	19.3	0.1	0.60	492	344	A

Source: Parsons Brinckerhoff, 1997

Incorporated Factors

K Design hour factor based on historical counts and counts from Task 3.1

D Directional distribution

Note

The factors incorporated into the calculations are based on roadway and traffic characteristics which include rolling terrain, twelve foot lanes, six foot clearance, divided highway, number of access points per mile = 20, and free-flow speed of 60 mph.

5, with a local bypass at Ardmore, all highway segments receive the same LOS as in Alternative 2 for both 1995 and 2020, except that segment 2 at Ardmore operates at the higher LOS B rather than LOS C. Tables E-11 and E-12 illustrate levels of service for 2020.

Public Involvement

Public Involvement Program: The public involvement program for the US 70 Feasibility Study included two series of public meetings at multiple locations throughout the corridor, plus several informal workshops to discuss project issues at particular locations.

Public Meetings - May 1996: An initial series of public involvement in the study occurred in early May. Meetings were held in three towns along the corridor - Hugo, Ardmore, and Durant. The first of the three was held May 7 at the Kiamichi Vo-Tech Seminar Room in Hugo. The next night in Ardmore, a meeting was held at the Southern Vo-Tech Seminar Center. The final meeting occurred on May 9 at the Bryan County Kiamichi Vo-Tech Seminar Room in Durant.

All three meetings followed the same agenda. After welcoming the citizens, an explanation as to the purpose of the U.S. 70 feasibility study and how it correlated to ODOT's Statewide Transportation Plan was given. Information gathered to date on the study corridor was given via a slide presentation. Questions and comments from the citizens regarding the study were then received.

At the Hugo meeting opinions were expressed in favor of improving US 70 to four lanes. Some concern was expressed as to the negative impact bypasses may have on some of the small towns. Locations of potential hazardous environmental sites were also supplied by the citizens. Requests were made to assign high priority to future projects along US 70 in the unsafe areas of the corridor.

Input received at the Ardmore meeting supported a bypass around the southwest quadrant of town. The Ardmore Mayor, Henry Roberts, read a prepared letter from the City Commission supporting a bypass. A terminus at either Jay Norman Road or Kings Road with existing US 70 was acceptable. Some citizens felt one of the Ardmore bypass routes came too close to Plainview School located at the corner of Myall and Plainview Road. The route also interfered with a proposed residential development near the same intersection. An alternate route of US 70 between Ardmore and Durant was also suggested.

Most questions received at the meeting in Durant were related to project costs. Cost estimates would be prepared in the latter stages of the study, and would be presented at the next series of public meetings scheduled for the fall. Information was received on one of the south bypasses in Durant. The south route nearest town passed through a landfill and was located too close to a residential development.

In general, comments were favorable toward the study. Most of the citizens were eager to start four laning US 70 in southeast Oklahoma. Reaction to the bypass alternatives was limited but mostly favorable.

Alignment Workshops - July 1996: As a follow up to the initial public meetings held in May, alignment workshops were held in Ardmore, Durant and Madill to further discuss the alternatives for US 70 in these towns. The meetings were attended by various city officials and invited citizens. Bypass routes which had been refined due to previous public comments were presented at each location. Discussion at each meeting centered around the impact of the proposed routes on the community and the future growth pattern of the city.

Public Meetings - October 1996: The final public meetings on the US 70 feasibility study were held between October 21-24. Meetings were again conducted in Ardmore, Hugo and Durant, and a fourth meeting was also held in Madill. At each meeting a short presentation featured data gathered about and along the corridor and the findings of the initial analysis of project priorities and alignment alternatives. A detailed list of improvement projects and suggested priorities throughout the entire corridor, including the three Madill to Durant route alternatives was also presented. The four bypass alignments at Madill were shown without a preference.

An update was given on the progress of the study since the first series of public meetings. Revised bypass route alternatives were shown as well as the original alignments discussed at the first meetings held in May. In all towns except Madill and Bokchito, a preferred bypass alternative was noted. At the end of the presentation a question and answer session with the citizens was conducted.

In addition to the above corridor information, bypass alternatives for Ardmore, Madill, Kingston and Durant were presented and discussed at the Ardmore public meeting. During the question and answer session, local residents primarily from southwest Ardmore and Lone Grove presented signed petitions opposing a bypass in southwest Ardmore. Considerable verbal opposition to a bypass was also expressed. They felt the existing US 70 alignment utilizing a segment of I-35 was adequate. Opinions on the negative impacts to existing residences and the town of Lone Grove were expressed. Due to the comments received at the meeting, the feasibility of an Ardmore bypass was to be

reevaluated.

At the Hugo meeting, Durant, Bokchito, Boswell, Soper, Fort Towson and Valliant bypass alternatives were highlighted. The proposed bypass around north Idabel, soon to be under construction, was also discussed. Comments received during the open forum were strongly in favor of four laning US 70 throughout southeast Oklahoma. Numerous civic representatives presented letters of support to the study team from area businesses, Chambers of Commerce and other agencies.

The cities and their bypass alternatives discussed at the meeting in Madill City Hall were identical to the ones presented at the Ardmore meeting. Because no preferred bypass alternative had been chosen for Madill the alignments were discussed in detail. Cost estimates for each of the four choices were presented in addition to the environmental issues associated with each. The correlation between a Madill bypass and the route alternatives between Madill and Durant was illustrated. No consensus on a preferred bypass alternative was reached by the conclusion of the public meeting. City officials decided to meet at a later date and discuss the bypass alternatives and reach a consensus.

The final public meeting was held at the Bryan County Fairgrounds in Durant. Bypass alternatives were discussed for Ardmore, Madill, Kingston, Durant, and Bokchito. Cost information for the bypass and route alternatives was also presented. Citizens attending voiced their support for keeping US 70 on its present alignment between Madill and Durant. They were also in favor of a south bypass around Durant and the northern bypass around Bokchito.

On October 31, 1996 in Madill, city officials conducted an open public meeting to discuss the alternatives for US 70. Representatives from the study team or ODOT were not present at this meeting. The consensus gathered from the city council members and citizens of Madill attending the meeting was that the east route was the preferred bypass alternative. The southwest route was considered the least desirable bypass route by all of the attendees. The Madill Housing Authority agreed to the east route provided all its housing units were taken by ODOT. If the east bypass alignment would not require the removal of all the housing units, the Authority requested the route be realigned to the north. The City is willing to sell the wastewater plant if its location conflicts with the east bypass alignment. Citizens from Oakland attending the meeting preferred for US 70 to continue on its present route through their community, which would be compatible with the east bypass route. A majority of the attendees preferred the SH 199/SH 78 route alternative as the preferred alignment of US 70 between Madill and Durant. ODOT received a letter summarizing the meeting discussion from the City of Madill.

Recommendations

Madill to Durant Route: The preferred route alternative for US 70 between Madill and Durant is the existing US 70 route between the two towns as shown in Figure E-21. Upgrading the existing route would best serve the residents and businesses in the Lake Texoma area. Table E-13 contains the results of the analysis of the three options. Projects comprising the Existing Route alternative are shown in Figure E-22.

ODOT policy is to not add roadway mileage to the state highway system. If either the SH 199/SH 78 or the New Alignment alternative had been chosen, existing US 70 between Madill and Durant might have been removed from the state highway system. Environmentally, the existing route presents less impacts than the others. The total cost for improving the existing route was slightly more expensive than the SH 199/SH78 option. The total cost of the Existing Route shown in Table E-13 includes costs for the preferred bypasses routes at Madill, Kingston and Durant. Costs for the other route alternatives were estimated using a compatible version of the preferred bypass route at Madill.

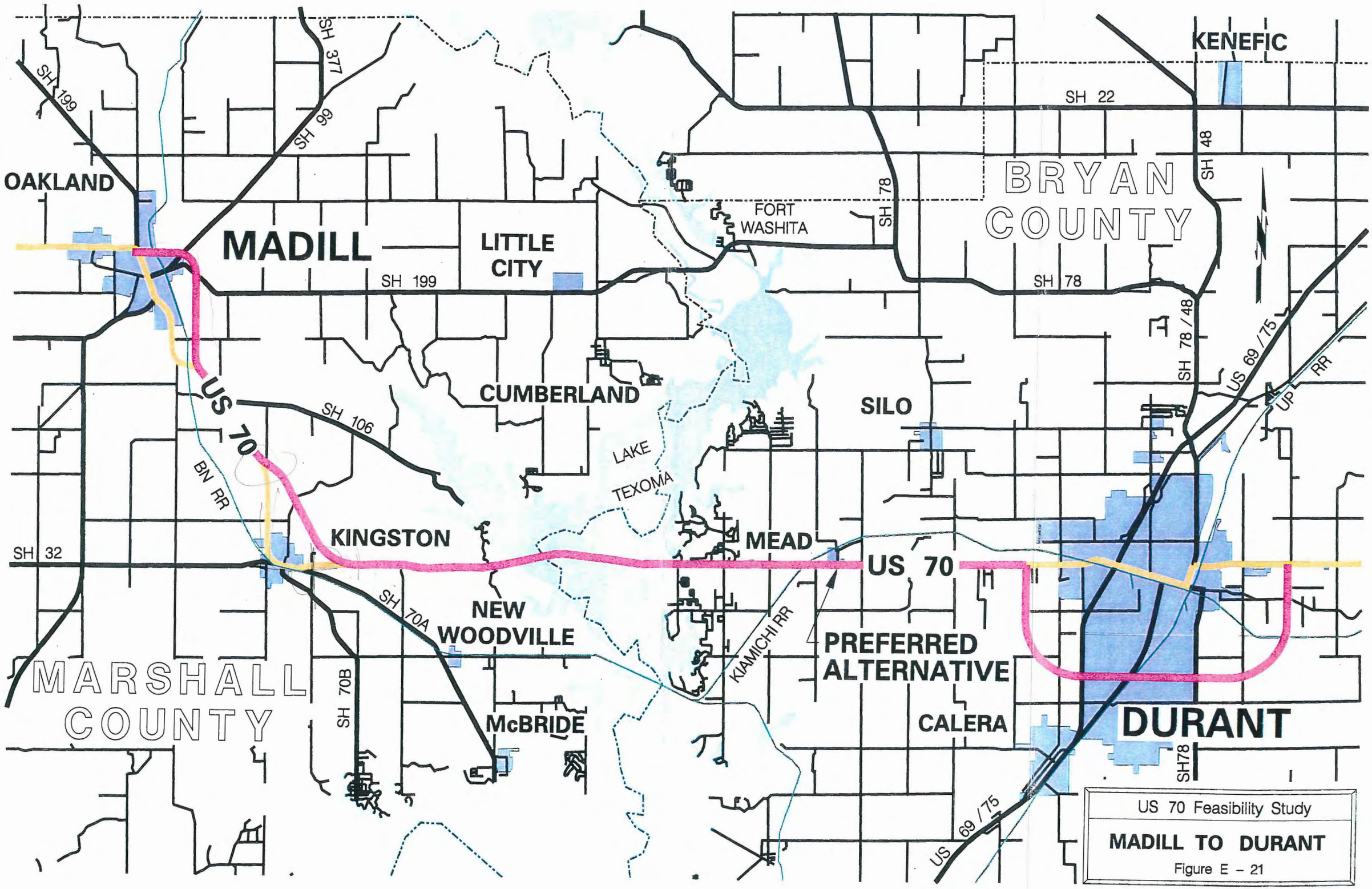
OPTION	TOTAL COST	RANKING
Existing Route	$103,720,138	1
SH 199/SH 78	$100,474,714	2
New Alignment	$127,612,094	3

Table E-13

Municipal Bypass Routes:

Madill: The East bypass was chosen as the recommended alternative in Madill. Input received from the City of Madill and the citizens in the Madill/Oakland area indicated they were in agreement the East Route was their preference. Even though the East bypass was not the least costly of the four alternatives, it was chosen because it would serve both the local community and the US 70 traffic better than the other alternatives.

Kingston: The route for US 70 chosen as the recommended alternative in Kingston was the East Bypass. Not only was the cost of the east route approximately half the existing route alternative, it was superior in its ability to serve US 70 traffic. The East Bypass also causes fewer displacements and has less severe environmental issues.



US 70 Feasibility Study

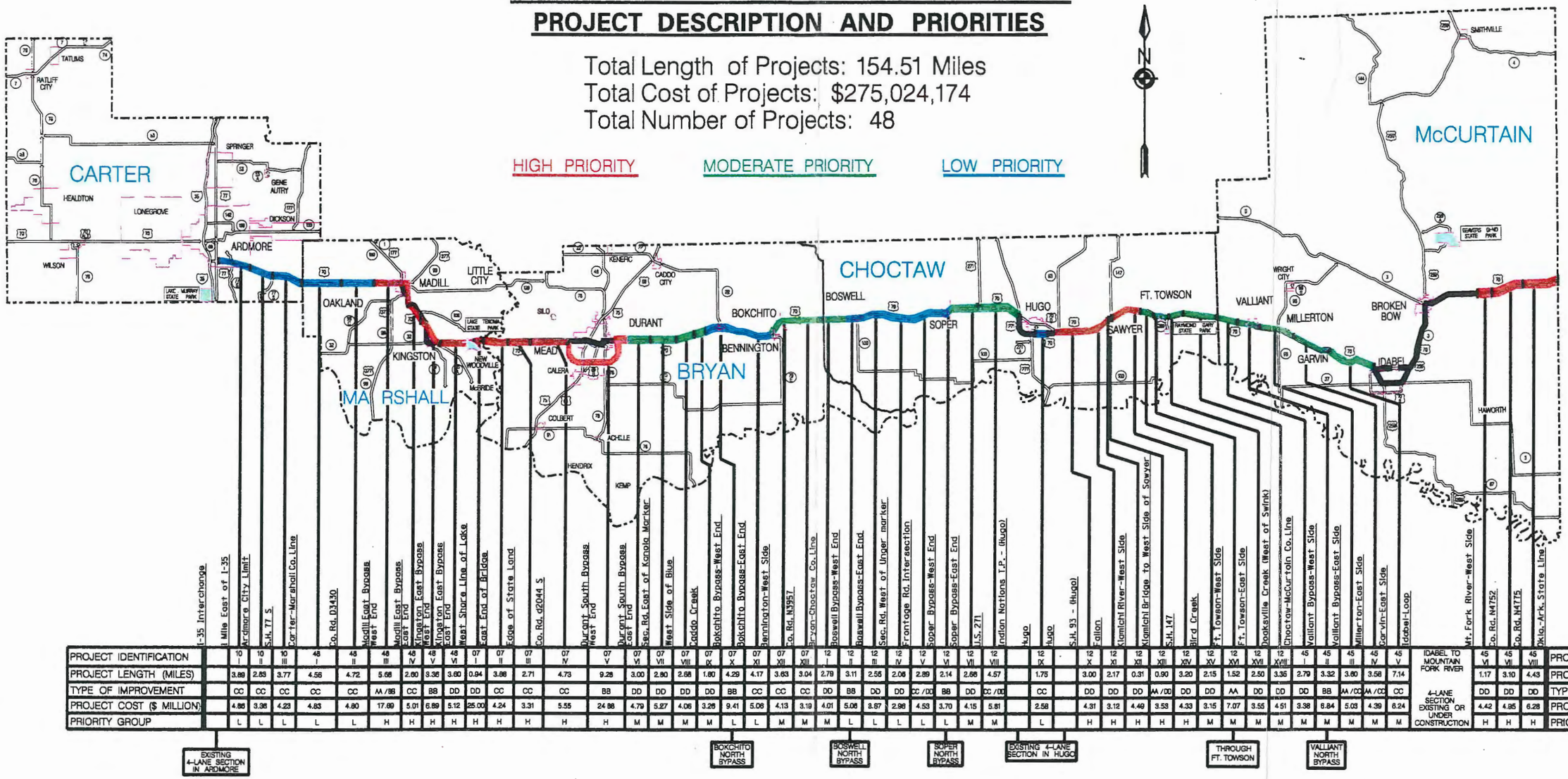
MADILL TO DURANT

Figure E – 21

U.S. HIGHWAY 70 IMPROVEMENT CORRIDOR
PROJECT DESCRIPTION AND PRIORITIES

Total Length of Projects: 154.51 Miles
Total Cost of Projects: $275,024,174
Total Number of Projects: 48

HIGH PRIORITY MODERATE PRIORITY LOW PRIORITY



	I-35 Interchange	1 Mile East of I-35	Ardmore City Limit	S.H. 77 S.	Carter-Marshall Co. Line	Co. Rd. D3430	Madill East Bypass West End	Madill East Bypass East End	Kingston East Bypass West End	Kingston East Bypass East End	West Shore Line of Lake	East End of Bridge	Edge of State Land	Co. Rd. d2044 S	Durant South Bypass West End	Durant South Bypass East End	Sec. Rd. East of Kanola Marker	West Side of Blue	Caddo Creek	Bokchito Bypass-West End	Bokchito Bypass-East End	Bennington-West Side	Co. Rd. N3957	Bryan-Choctaw Co. Line	Boswell Bypass-West End	Boswell Bypass-East End	Sec. Rd. West of Unger marker	Frontage Rd. Intersection	Soper Bypass-West End	Soper Bypass-East End	U.S. 271	Indian Nations T.P. - (Hugo)	Hugo	Hugo	S.H. 93 - (Hugo)	Fallon	Klamichi River-West Side	Klamichi Bridge to West Side of Sawyer	S.H. 147	Bird Creek	Ft. Towson-West Side	Ft. Towson-East Side	Booksville Creek (West of Swink)	Choctaw-McCurtain Co. Line	Valliant Bypass-West Side	Valliant Bypass-East Side	Millerton-East Side	Garvin-East Side	Idabel-Loop	IDABEL TO MOUNTAIN FORK RIVER	Mt. Fork River-West Side	Co. Rd. N4752	Co. Rd. N4775	Okla.-Ark. State Line	
PROJECT IDENTIFICATION			10 I	10 II	10 III	48 I	48 II	48 III	48 IV	48 V	48 VI	07 I	07 II	07 III	07 IV	07 V	07 VI	07 VII	07 VIII	07 IX	07 X	07 XI	07 XII	07 XIII	12 I	12 II	12 III	12 IV	12 V	12 VI	12 VII	12 VIII		12 IX		12 X	12 XI	12 XII	12 XIII	12 XIV	12 XV	12 XVI	12 XVII	12 XVIII	45 I	45 II	45 III	45 IV	45 V		45 VI	45 VII	45 VIII	PROJECT IDENTIFICATION
PROJECT LENGTH (MILES)		3.89	2.83	3.77	4.56	4.72	5.68	2.60	3.36	3.60	0.94	3.86	2.71	4.73	9.26	3.00	2.80	2.66	1.80	4.29	4.17	3.63	3.04	2.79	3.11	2.55	2.06	2.89	2.14	2.66	4.57		1.75		3.00	2.17	0.31	0.90	3.20	2.15	1.52	2.50	3.35	2.79	3.32	3.60	3.56	7.14		1.17	3.10	4.43	PROJECT LENGTH (MILES)
TYPE OF IMPROVEMENT		CC	CC	CC	CC	CC	AA/BB	CC	BB	DD	DD	CC	CC	CC	BB	DD	DD	DD	DD	BB	CC	CC	CC	DD	BB	DD	DD	CC/DD	BB	DD	CC/DD		CC		DD	DD	DD	AA/DD	DD	DD	AA	DD	DD	DD	BB	AA/CC	AA/CC	CC		DD	DD	DD	TYPE OF IMPROVEMENT
PROJECT COST ($ MILLION)		4.86	3.36	4.23	4.83	4.80	17.09	5.01	6.89	5.12	25.00	4.24	3.31	5.55	24.86	4.79	5.27	4.06	3.26	9.41	5.06	4.13	3.19	4.01	5.06	3.67	2.96	4.53	3.70	4.15	5.81		2.58		4.31	3.12	4.49	3.53	4.33	3.15	7.07	3.55	4.51	3.38	6.84	5.03	4.39	8.24		4.42	4.85	6.28	PROJECT COST ($ MILLION)
PRIORITY GROUP		L	L	L	L	L	H	H	H	H	H	H	H	H	H	M	M	M	M	L	L	M	M	M	L	L	L	L	L	M	M		L		H	H	H	H	H	M	M	M	M	M	M	M	M	M		H	H	H	PRIORITY GROUP
	EXISTING 4-LANE SECTION IN ARDMORE																			BOKCHITO NORTH BYPASS					BOSWELL NORTH BYPASS				SOPER NORTH BYPASS		EXISTING 4-LANE SECTION IN HUGO								THROUGH FT. TOWSON					VALLIANT NORTH BYPASS					4-LANE SECTION EXISTING OR UNDER CONSTRUCTION					

LEGEND

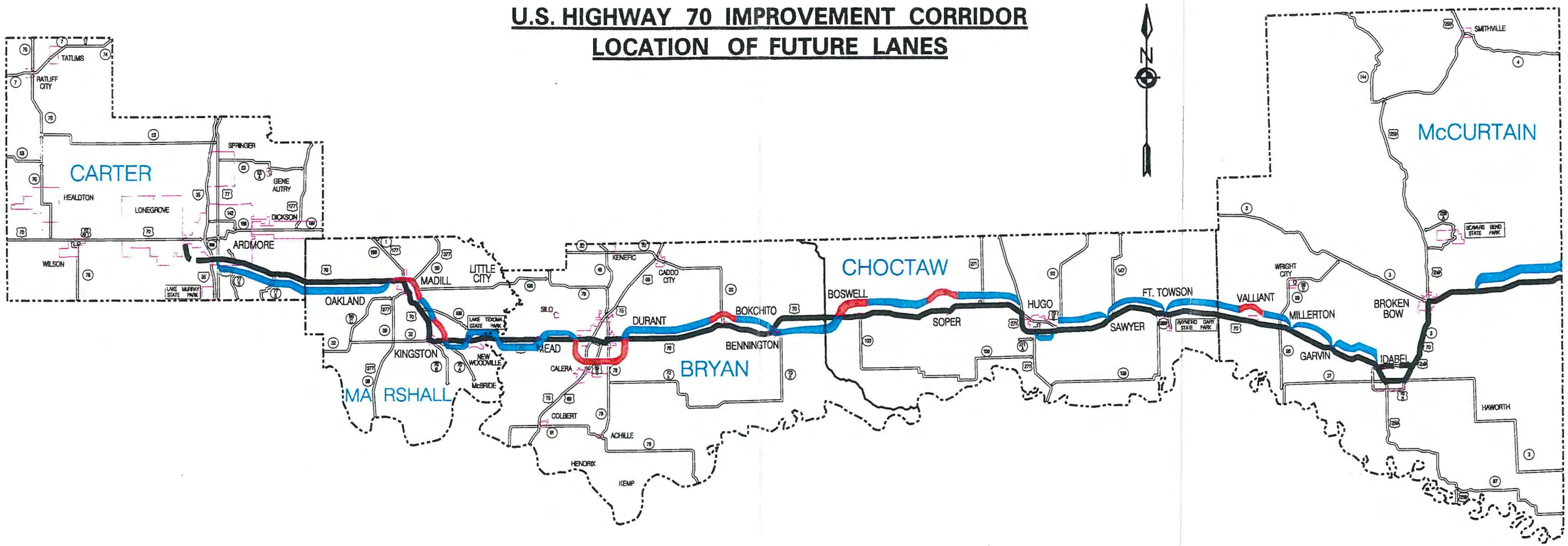
PROJECT IDENTIFICATION	10 COUNTY CODE IV SECTION NUMBER
TYPE OF IMPROVEMENT	AA 5 – LANE SECTION, CONSTRUCT ALONG EXISTING ALIGNMENT BB 4 NEW LANES, CONSTRUCT ALONG NEW ALIGNMENT CC ADD 2 NEW LANES, NO IMPROVEMENT TO EXISTING LANES DD ADD 2 NEW LANES, WIDEN & RESURFACE EXISTING LANES EE ADD 2 NEW LANES, MAJOR IMPROVEMENTS TO EXISTING LANES
PRIORITY GROUP	H HIGH PRIORITY M MODERATE PRIORITY L LOW PRIORITY

US 70 Feasibility Study

PROJECT PRIORITY MAP

Figure E – 23

U.S. HIGHWAY 70 IMPROVEMENT CORRIDOR
LOCATION OF FUTURE LANES



LEGEND:

- LOCATION OF FUTURE LANES
- PREFERRED BYPASS LOCATION

US 70 Feasibility Study

FUTURE LANES LOCATION

Figure E – 24

Durant: At Durant, the recommended alignment of US 70 is the South Bypass. This route was chosen because it connects to the existing route of US 70, the preferred route alternative between Madill and Durant. Because its total cost is approximately 25 million dollars, the bypass should be divided into multiple projects. Suggested project limits are: west terminus to US 69, US 69 to SH 78 and SH 78 to east terminus.

Bokchito: The North Bypass is the recommended alternative for the routing of US 70 in Bokchito. In the final analysis the North and South Routes were considered to be approximately equal in merit. Although responses were very limited, the North Bypass received more support from the citizens of Bokchito than the other two alternatives. The cost of the North Bypass was also less than either the South or Existing Route.

Boswell: The alignment for US 70 chosen as the recommended alternative in Boswell was the North Bypass. Even though it was the longest of the three options, it was estimated to be the least expensive. Fewer displacements and environmental problems are associated with the North Bypass.

Soper: At Soper, the recommended alignment of US 70 is the North Bypass. Compared to the existing alignment, the bypass better serves US 70 traffic, results in fewer relocations and displacements, and has no apparent environmental considerations. It is estimated to be about half the cost of improving along the existing route.

Fort Towson: Improving US 70 on its existing alignment through town is recommended over the North Bypass at Fort Towson. After the two alternatives were compared using the five criteria, they were essentially equal. Since the new route, the bypass, was considered no better than the existing route, the decision was made to stay with the current alignment. The North Bypass was the less expensive alternative, but its environmental issues were more complex.

Valliant: The North Bypass is the preferred alternative in Valliant. The bypass would serve motorists traveling along US 70 better than the existing alignment. Fewer environmental issues would have to be mediated along the North Bypass. In addition, its construction cost is considerably less then the amount to widen the existing route.

Ardmore: A US 70 Bypass of Ardmore is not recommended. Future traffic volumes and the projected level of service along the existing route for Year 2020 along the existing alignment do not warrant improvements be made. Opinions received from the residents of the area were unanimously opposed to the proposed alignments.

Table E-14 summarizes the results of the analysis of the municipal route alternatives.

two lanes should be positioned south of the existing roadway are:

- Between Ardmore and Oakland.
- From Kingston to west of the Lake Texoma Lodge.
- East of Lake Texoma to Mead.
- From Bennington to the north bypass around Boswell.
- Along the Hugo Bypass.

From the end of the Madill bypass to the beginning of the Kingston bypass, the new pavement would best be placed east of the current lanes.

The additional lanes should be built north of the existing facility:

- Across Lake Texoma.
- Between Mead and the Durant bypass.
- From the east end of the Durant bypass to Bennington.

The section across Lake Texoma would involve a new bridge parallel to the existing Roosevelt Bridge. With the exception of the Hugo bypass area, the Kiamichi Railroad runs parallel on the south side of US 70 between Boswell and Idabel. Therefore the additional lanes should be located north of the existing lanes, opposite of the railroad tracks, in this portion of the corridor. New lanes are presently under construction on the north side of US 70 from Broken Bow east to the Mountain Fork River. Future lanes east of the river to the state line should also be located north of the existing pavement.

Five-lane sections are planned in the following areas:

- Through Oakland.
- In front of the Lake Texoma Lodge.
- Through Sawyer, Fort Towson, Millerton and Garvin.

U.S. HIGHWAY 70 FEASIBILITY STUDY
RURAL, MUNICIPAL, & BYPASS SECTIONS
PROJECT PRIORITIZATION

Project Description				Project	Total Project	Project
Project #	County	From	To	Length (Mi.)	Cost ($)[1]	Priority
10-I	Carter	1 mi. E. of I-35	Ardmore Limits	3.89	4,864,478	Low
10-II	Carter	Ardmore Limits	S.H. 77 S	2.83	3,363,518	Low
10-III	Carter	S.H. 77 S	County Line	3.77	4,230,634	Low
48-I	Marshall	County Line	Co. Rd. D3430	4.56	4,825,741	Low
48-II	Marshall	Co. Rd. D3430	Madill Bypass	4.72	4,802,394	Low
48-III	Marshall	Madill East Bypass		5.68	17,687,363	High
48-IV	Marshall	Madill Bypass	Kingston Bypass	2.60	5,007,443	High
48-V	Marshall	Kingston East Bypass		3.36	6,885,320	High
48-VI	Marshall	Kingston Bypass	W. Lake Shore	3.60	5,124,160	High
07-I	Bryan	Lake Texoma Bridge		0.94	25,000,000	High
07-II	Bryan	W. Lake Shore	Edge State Land	3.88	4,237,348	High
07-III	Bryan	Edge State Land	Co.Rd.D2044 S	2.71	3,311,575	High
07-IV	Bryan	Co.Rd.D2044 S	Durant Bypass	4.73	5,551,074	High
07-V	Bryan	Durant South Bypass		9.28	24,884,855	High
07-VI	Bryan	Durant Bypass	Sec.Rd @Kanola	3.00	4,792,837	Moderate
07-VII	Bryan	Sec.Rd @Kanola	W. side of Blue	2.80	5,271,264	Moderate
07-VIII	Bryan	W. side of Blue	Caddo Creek	2.68	4,057,435	Moderate
07-IX	Bryan	Caddo Creek	Bokchito Bypass	1.60	3,261,945	Moderate
07-X	Bryan	Bokchito North Bypass		4.29	9,413,919	Low
07-XI	Bryan	Bokchito Bypass	W. Bennington	4.17	5,056,798	Low
07-XII	Bryan	W. Bennington	Co. Rd. N3957	3.63	4,129,662	Moderate
07-XIII	Bryan	Co. Rd. N3957	County Line	3.04	3,185,239	Moderate
12-I	Choctaw	County Line	Boswell Bypass	2.79	4,012,578	Moderate
12-II	Choctaw	Boswell North Bypass		3.11	5,058,104	Low
12-III	Choctaw	Boswell Bypass	Rd. W of Unger	2.55	3,667,410	Low
12-IV	Choctaw	Rd. W of Unger	N. Frontage Rd.	2.06	2,962,692	Low
12-V	Choctaw	N. Frontage Rd.	Soper Bypass	2.89	4,532,811	Low
12-VI	Choctaw	Soper North Bypass		2.14	3,703,940	Low
12-VII	Choctaw	Soper Bypass	U.S. 271	2.66	4,154,800	Moderate
12-VIII	Choctaw	U.S. 271	I.N. Turnpike	4.57	5,808,048	Moderate
12-IX	Choctaw	Hugo	Hugo	1.75	2,575,825	Low
12-X	Choctaw	S.H. 93 (Hugo)	Fallon	3.00	4,314,600	High
12-XI	Choctaw	Fallon	Kiamichi River	2.17	3,120,894	High
12-XII	Choctaw	Kiamichi River	W side of Sawyer	0.31	4,488,493	High
12-XIII	Choctaw	W side of Sawyer	S.H. 147	0.90	3,527,280	High
12-XIV	Choctaw	S.H. 147	Bird Creek	3.20	4,331,088	High
12-XV	Choctaw	Bird Creek	Fort Towson	2.15	3,151,605	Moderate
12-XVI	Choctaw	Through Fort Towson		1.52	7,074,086	Moderate
12-XVII	Choctaw	Fort Towson	Doaksville Creek	2.50	3,550,978	Moderate
12-XVIII	Choctaw	Doaksville Creek	County Line	3.35	4,514,309	Moderate
45-I	McCurtain	County Line	Valliant Bypass	2.79	3,384,276	Moderate
45-II	McCurtain	Valliant North Bypass		3.32	6,838,048	Moderate
45-III	McCurtain	Valliant Bypass	E. side Millerton	3.60	5,033,160	Moderate
45-IV	McCurtain	E. side Millerton	E. side of Garvin	3.58	4,386,288	Moderate
45-V	McCurtain	E. side of Garvin	Idabel	7 14	6,237,504	Moderate
45-VI	McCurtain	Mt. Fork River	Co. Rd. N4752	1.17	4,421,830	High
45-VII	McCurtain	Co. Rd. N4752	Co. Rd. N4775	3.10	4,952,374	High
45-VIII	McCurtain	Co. Rd. N4775	State Line	4.43	6,276,151	High
TOTALS:				154.51	275,024,174	

[1] Costs are based on 1994 dollars