

APPENDIX D – TRAFFIC FORECAST MEMORANDUM

To:	Scott Thomson KYTC Division of Planning	From:	Len Harper Stantec
File:	I-65 Conceptual Improvements Study	Date:	October 14, 2019

Reference: Traffic Forecasting Technical Memorandum

Introduction

As a part of the I-65 Conceptual Improvements Study, Stantec is tasked with developing traffic forecasts for the study portion of I-65. Growth rates from the Kentuckiana Regional Planning & Development Agency (KIPDA) travel demand model will be used to develop the forecasts.

Figure 1 presents the study area, which includes I-65 from Lebanon Junction in the south to I-265 to the north.

Bullitt County Growth

Over the past 40 years, Bullitt County has experienced tremendous population growth, with 43,346 residents in 1980 growing to 80,284 residents in 2017. Based on projections from the Kentucky State Data Center, Bullitt County is expected to see continued growth to 98,245 residents in 2040, which corresponds to an annual growth rate of 0.88 percent from 2017 to 2040.

As the population in Bullitt County has grown, employment has grown at an even faster rate. Based on estimates from the Bureau of Economic Analysis (BEA), there were 7,768 jobs in Bullitt County in 1980 and 32,942 jobs in 2017, as shown in **Figure 2**.

Reference: I-65 Traffic Forecasting

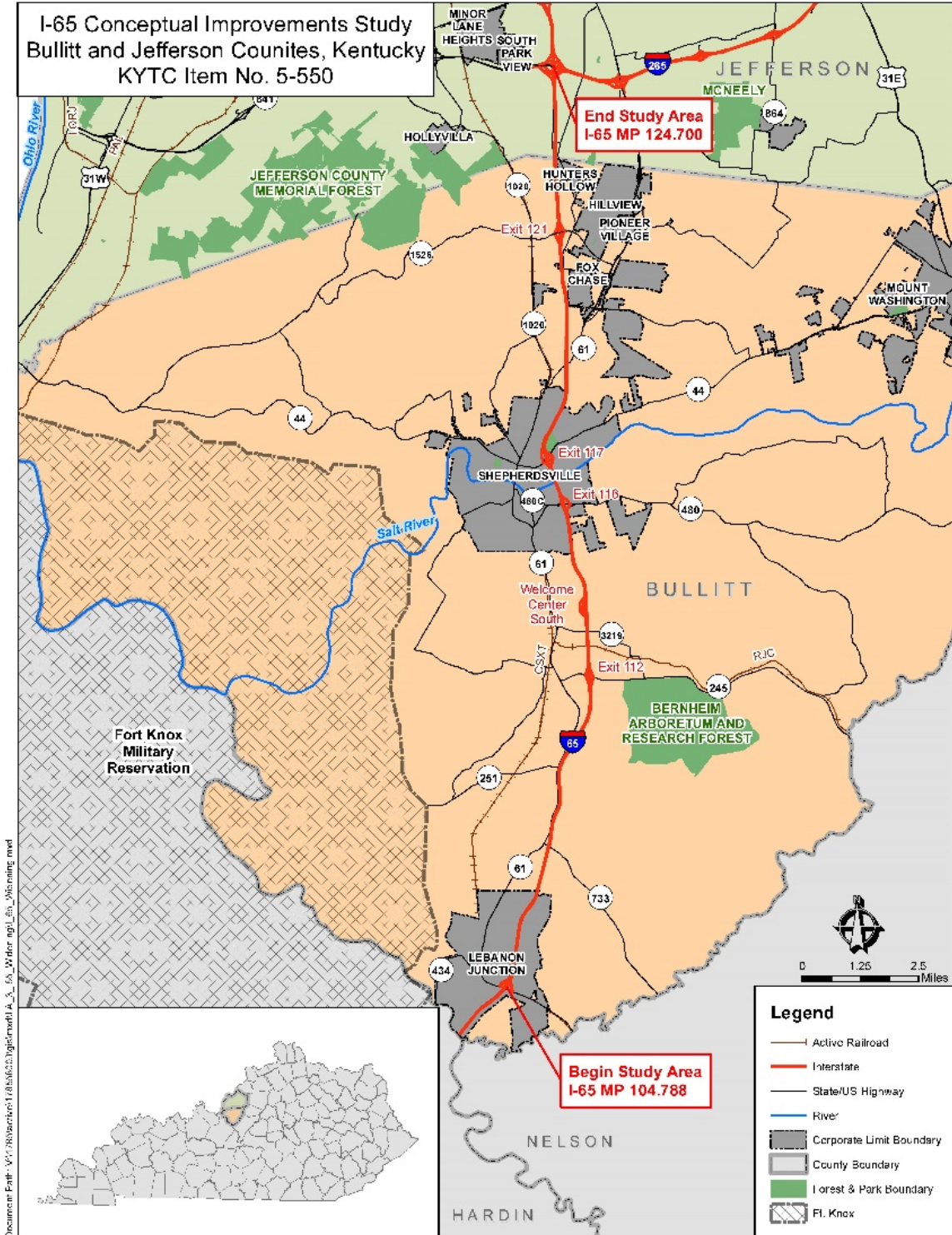


Figure 1: I-65 Conceptual Improvements Study Area

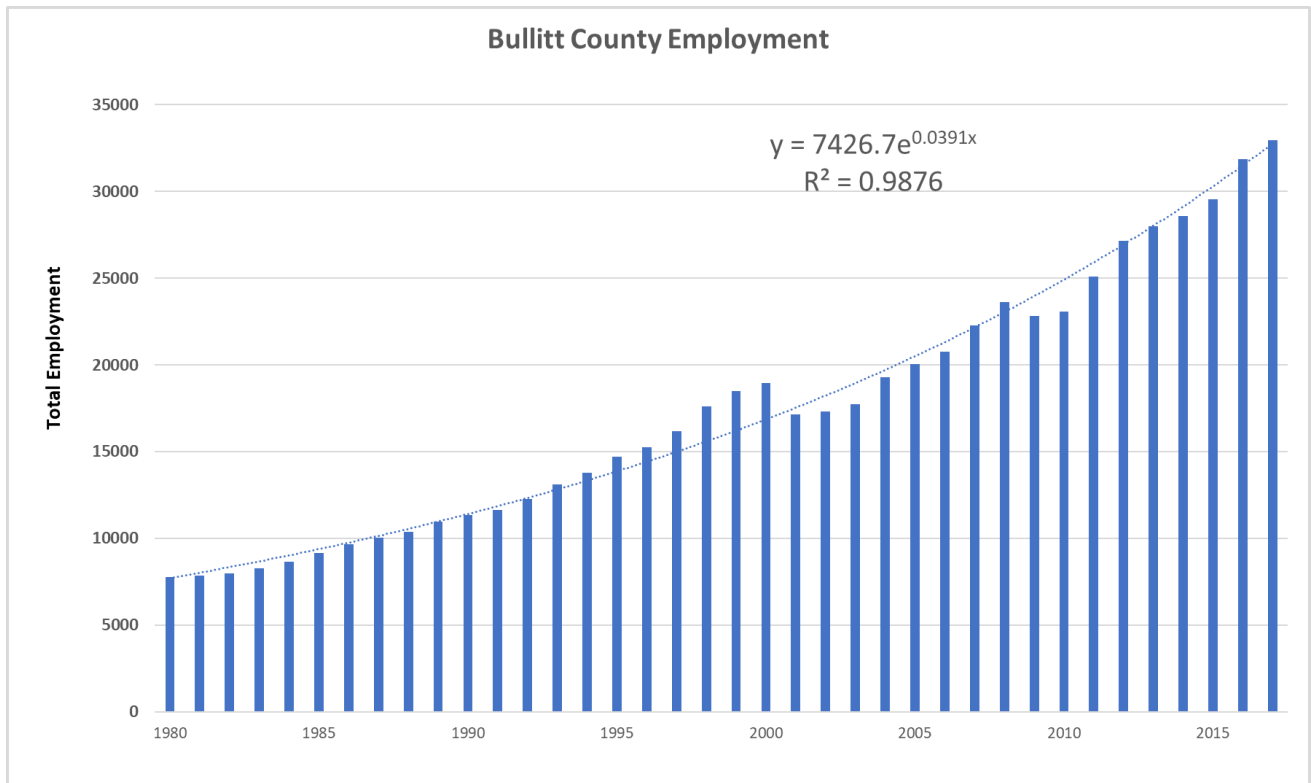
Reference: I-65 Traffic Forecasting

Figure 2: Bullitt County Employment Growth (1980 – 2017)
Source: Bureau of Economic Analysis (BEA)

As the number of Bullitt County jobs and residents have both steadily increased, the number of jobs per person has also increased. In 1980, there were 0.18 jobs per person (per capita) in Bullitt County. In 2017, however, that number rose to 0.41 jobs per person, as shown in **Figure 3**.

Reference: I-65 Traffic Forecasting

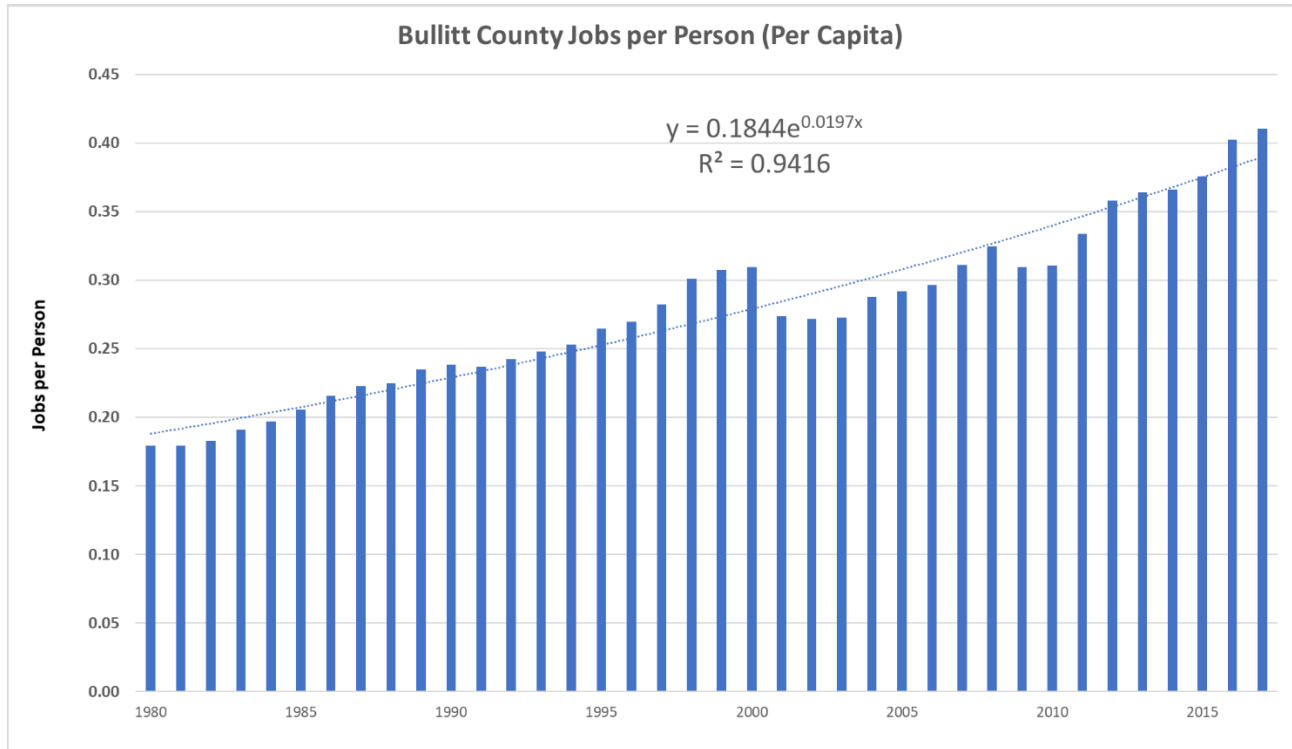


Figure 3: Bullitt County Jobs Per Person Growth (1980 – 2017)
Source: Kentucky State Data Center and BEA

For context, using the 2040 Kentucky State Data Center population projection of 98,245 and a jobs per person rate of 0.45 (slightly higher than the current estimate), Bullitt County would expect approximately 44,210 jobs in 2040.

KIPDA Model Growth

Bullitt County has 58 traffic analysis zones (TAZs) in the KIPDA travel demand model. These zones are used to allocate socioeconomic data such as households, employment, and population for the purpose of trip productions and attractions. These data, and particularly the estimated projections, are fundamental to the forecast development process. The 2015 base year model includes 29,763 total jobs and a population of 77,512 (0.38 jobs/person) in Bullitt County. The 2040 KIPDA model, however, includes 86,773 total jobs and a population of 97,879 (0.89 jobs/person) in Bullitt County. This tremendous employment growth can also be seen at the TAZ level. Of the 58 TAZs in Bullitt County, 46 have an annual employment growth rate of under 2.0 percent. The remaining 12 zones have annual employment growth rates ranging from 2.7 percent to 16.8 percent, as shown in **Figure 4**.

For comparison, the Kentucky Statewide Travel Demand Model (KYSTM) includes 38,708 jobs and in 2040 and a job/person ratio of 0.40.

Reference: I-65 Traffic Forecasting

Proposed Employment Updates

Although growth is expected to continue in Bullitt County, the employment trend depicted within the KIPDA model is incredibly optimistic. According to the Federal Reserve Bank of St. Louis' unemployment rate estimates, Bullitt County was near "full employment" (i.e. unemployment rates between 4.0 and 5.0 percent) for most of 2017 when the jobs per person rate was 0.41. Based on that, it would be logical to assume employment rates exceeding 0.41 jobs per person are only possible by attracting more workforce from other counties. This is potentially problematic as unemployment rates in surrounding counties are also low and many of the jobs that are forecast in Bullitt County are relatively low-wage positions for which long-distance commute travel may not be reasonable.

It is imperative to project employment at a reasonable level in order to properly plan for future transportation needs. Jobs represent the attraction component of trip generation, and a scenario where Bullitt County's employment vastly outpaces its population growth would result in dramatic increases in longer distance trips which would have widespread, adverse effects on forecasts throughout the region. With a majority of Bullitt County TAZs showing annual growth rates between 1.93 and 1.99 percent, as shown in **Table 1**, Stantec developed an alternative employment dataset based on capping annual employment growth rates for the identified high-growth zones to three percent. Eleven of the 58 TAZs, highlighted in yellow below, were updated with this new growth rate cap. With this cap in place, the resultant total 2040 Bullitt County employment dropped from 86,773 to 47,834. With a 2040 model population of 97,879, the resultant jobs/person rate is 0.49. In order to preserve the distribution of employment growth among the eleven affected zones, the proportion of total new employment from the 2040 KIPDA socioeconomic file for each of these zones was applied to factor the revised new total employment to each of these zones.

Table 1: Proposed TAZ-level Employment Updates

TAZ ID	2015 Population	2015 Employment	2040 Population	2040 Employment	Annual GR	Updated GR	Updated 2040 Employment
733	1,274	62	1,189	3,000	16.79%	3.00%	129.81
735	593	320	563	8,000	13.74%	3.00%	670.01
725	1,070	93	1,673	2,000	13.06%	3.00%	194.72
717	1,837	125	2,154	2,000	11.73%	3.00%	261.72
680	1,164	282	1,257	4,000	11.19%	3.00%	590.45
709	527	338	811	4,500	10.91%	3.00%	707.70
699	0	378	0	4,000	9.90%	3.00%	791.45
731	806	1,754	1,221	14,000	8.66%	3.00%	3672.49
700	1,010	487	1,402	3,000	7.54%	3.00%	1019.67
708	520	975	801	4,500	6.31%	3.00%	2041.43
684	1,637	1,185	2,186	2,500	3.03%	3.00%	2481.13

Reference: I-65 Traffic Forecasting

TAZ ID	2015 Population	2015 Employment	2040 Population	2040 Employment	Annual GR	Updated GR	Updated 2040 Employment
688	677	2,038	742	4,000	2.73%	2.73%	4000.00
726	682	41	1,060	67	1.99%	1.99%	67.05
698	1,311	71	1,418	116	1.98%	1.98%	115.92
713	1,175	80	1,843	130	1.97%	1.97%	130.41
727	296	72	470	117	1.97%	1.97%	117.13
691	1,742	107	1,410	174	1.96%	1.96%	173.89
696	1,865	132	1,971	214	1.96%	1.96%	214.46
695	426	58	457	94	1.96%	1.96%	94.16
732	772	133	4,577	216	1.95%	1.95%	215.59
715	2,195	161	3,420	261	1.95%	1.95%	260.83
729	1,339	179	1,666	290	1.95%	1.95%	289.81
697	1,915	188	1,969	304	1.94%	1.94%	304.30
716	1,267	188	2,225	304	1.94%	1.94%	304.30
705	1,300	197	1,982	319	1.94%	1.94%	318.79
714	1,961	206	2,124	333	1.94%	1.94%	333.28
706	2,304	215	3,477	348	1.94%	1.94%	347.77
722	1,930	215	2,858	348	1.94%	1.94%	347.77
685	2,562	319	2,815	516	1.94%	1.94%	515.86
724	877	295	1,367	477	1.94%	1.94%	476.98
682	2,689	285	2,505	461	1.94%	1.94%	460.80
719	1,427	511	1,345	826	1.94%	1.94%	825.96
710	2,025	260	2,147	420	1.94%	1.94%	420.22
701	1,539	296	1,679	478	1.94%	1.94%	478.18
686	2,472	305	2,599	493	1.94%	1.94%	492.68
693	2,555	588	2,425	950	1.94%	1.94%	949.77
718	1,392	375	1,311	606	1.94%	1.94%	605.70
711	1,906	314	2,064	507	1.94%	1.94%	507.17
703	61	376	99	607	1.94%	1.94%	607.26
723	1,559	332	2,409	536	1.94%	1.94%	536.15
689	1,368	734	1,738	1,185	1.94%	1.94%	1185.32
721	1,509	402	2,222	649	1.94%	1.94%	649.17
712	1,544	350	2,407	565	1.93%	1.93%	565.13
704	1,169	348	1,879	562	1.93%	1.93%	561.83
728	1,455	386	1,802	623	1.93%	1.93%	623.09
736	2,164	957	2,013	1,545	1.93%	1.93%	1544.68
683	3,925	255	3,674	412	1.93%	1.93%	411.53

Reference: I-65 Traffic Forecasting

TAZ ID	2015 Population	2015 Employment	2040 Population	2040 Employment	Annual GR	Updated GR	Updated 2040 Employment
692	1,374	1,427	1,914	2,303	1.93%	1.93%	2302.87
720	1,252	1,733	2,198	2,797	1.93%	1.93%	2796.66
694	152	480	167	775	1.93%	1.93%	774.59
690	578	351	674	566	1.93%	1.93%	566.40
734	720	818	684	1,320	1.93%	1.93%	1319.94
707	587	560	905	904	1.93%	1.93%	903.62
687	1,272	652	1,355	1,052	1.93%	1.93%	1052.01
730	1,431	952	1,812	1,536	1.93%	1.93%	1535.99
681	2,055	600	2,259	968	1.93%	1.93%	967.96
737	0	0	0	0	0.00%	0.00%	0.00
702	298	4,222	485	3,000	-1.36%	-1.36%	3000.00

KIPDA Growth Rates

Upon completion of demand model runs, annual traffic assignment growth rates were calculated using outputs from the 2015 KIPDA TDM and the updated 2040 KIPDA TDM based on the following formula:

$$\text{Annual Growth Rate} = \left(\frac{\text{2040 Assignment}}{\text{2015 Assignment}} \right)^{1/25} - 1$$

Figure 5 presents a summary of the annual growth rates for the mainline and ramp sections of I-65.

2045 AM & PM Peak Hour Forecasts

The annual growth rates were then used to forecast existing peak hour traffic counts to the future year 2045, as shown in **Figure 6**.

The 2040 KIPDA TDM includes the proposed interchange for the Cedar Grove business park, south of Exit 116. The forecasts from the 2016 Interchange Justification Study (IJS) done for that project were used as guidance for developing ramp forecasts for this I-65 Conceptual Improvements Study.

Reference: I-65 Traffic Forecasting

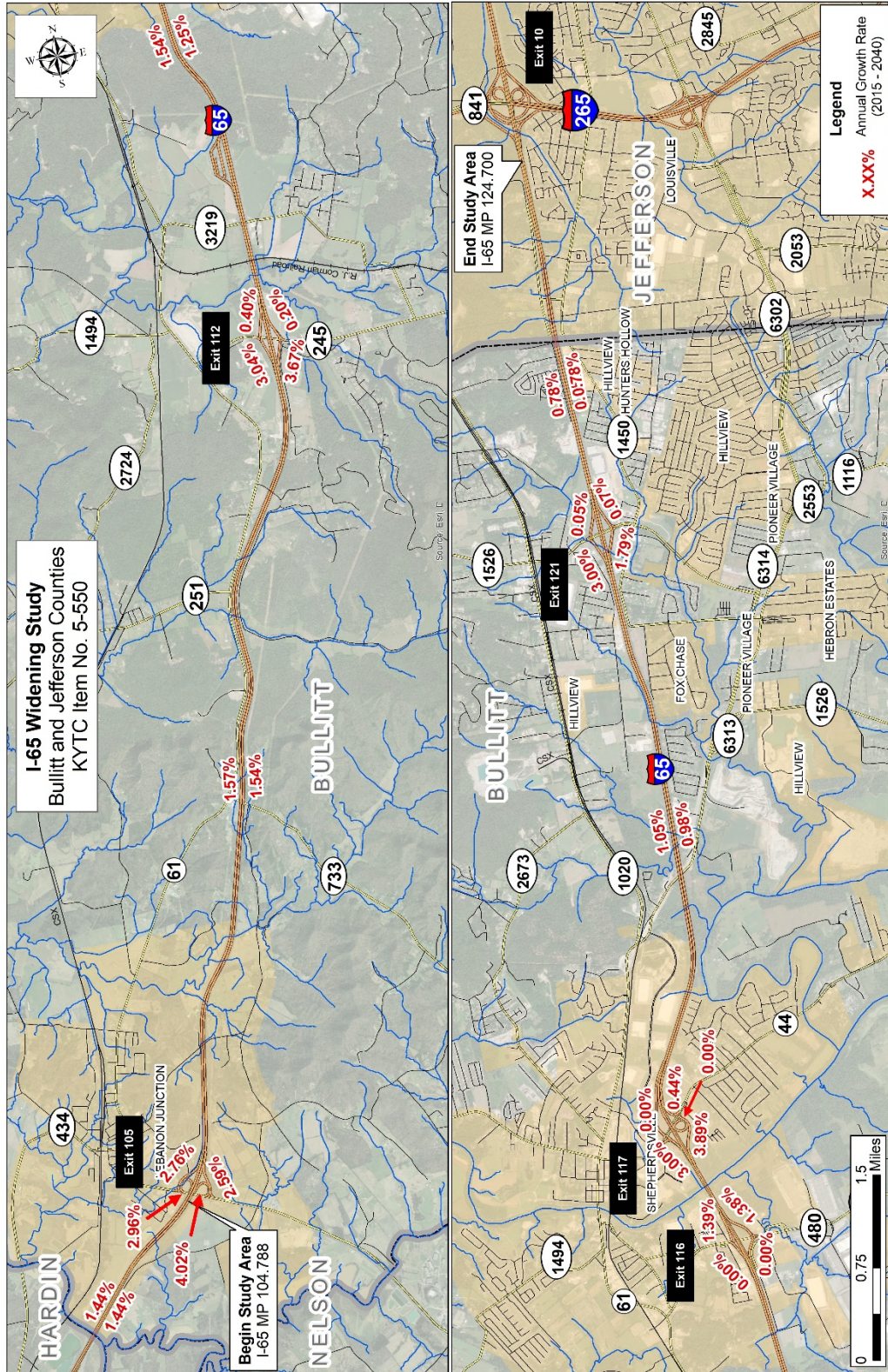


Figure 5: Annual Growth Rates (2015 to 2040)

Reference: I-65 Traffic Forecasting

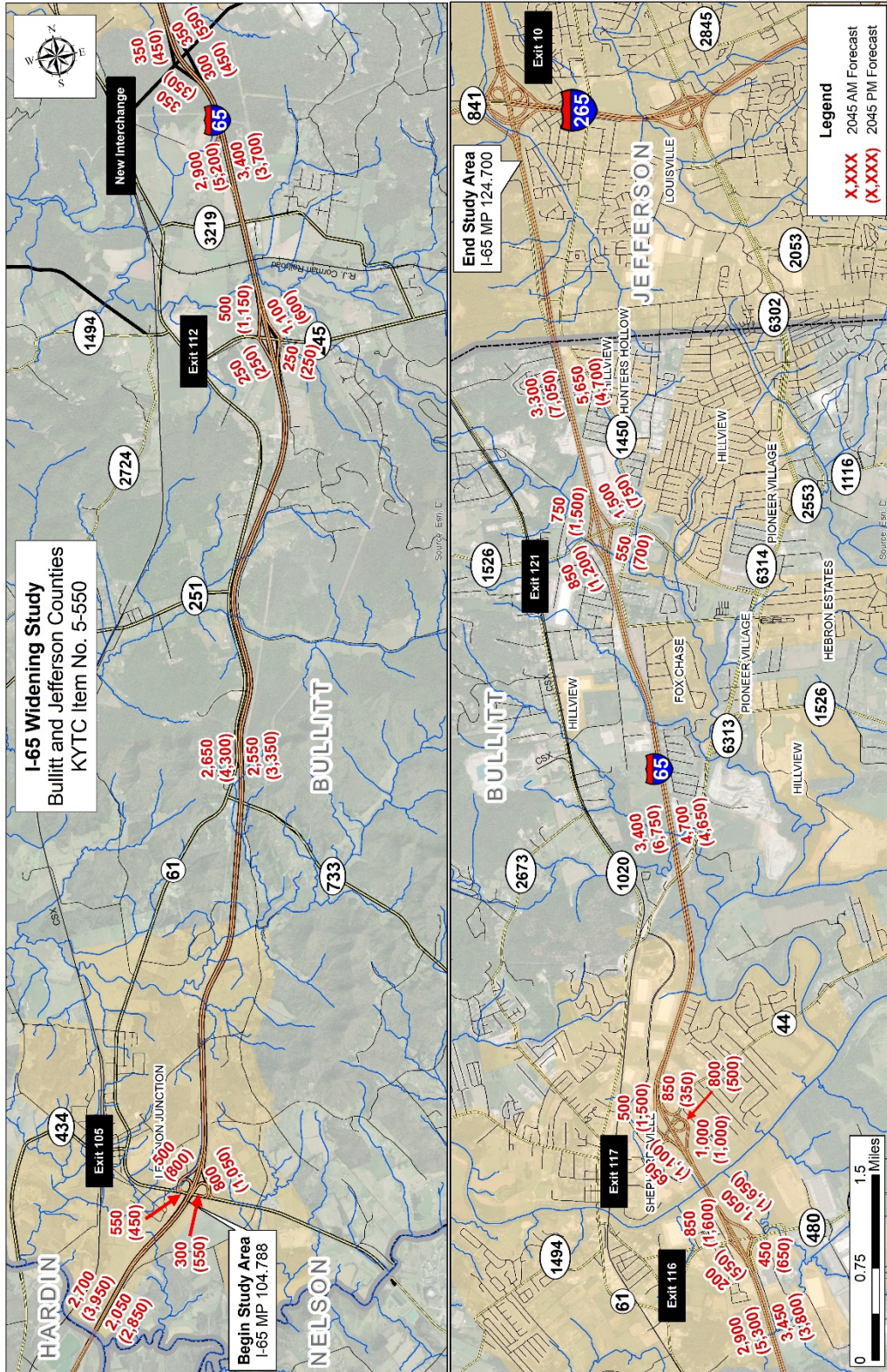


Figure 5: 2045 AM & PM Peak Hour Forecasts



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A handwritten signature in cursive script that reads "Leonard Harper".

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