SPECIAL MEMORANDUM

PLANNING-LEVEL TRAFFIC OPERATIONAL ASSESSMENT (POST-COVID SENSITIVITY TEST)

1. Introduction

As part of the KYTC Statewide Interstate and Parkway Plan (SWIPP), a traffic analysis was performed to evaluate the Level of Service (LOS) of study corridors at a high planning level in 2045 No Build and 2045 Build conditions. This analysis used traffic forecasting data from the SWIPP Model, which assumed a normal growth without accounting for the COVID-19 pandemic impact, and an approach described by the Florida Department of Transportation (FDOT) Quality/Level of Service Handbook.

Per KYTC's request, a separate sensitivity test was conducted to evaluate the potential change in traffic forecasts due to the COVID-19 pandemic and the impacts on corridor LOS analysis. The test focused on a selection of representative corridor segments from the SWIPP and Statewide Corridor Plan (SWCP). The goal of the sensitivity test was to understand new traffic growth patterns in the post-COVID condition and its impact on the improvement concepts recommended by SWIPP and SWCP.

2. Corridor Segments for Analysis

To ensure a meaningful analysis, the Project Team selected five corridor segments to have a good balance of:

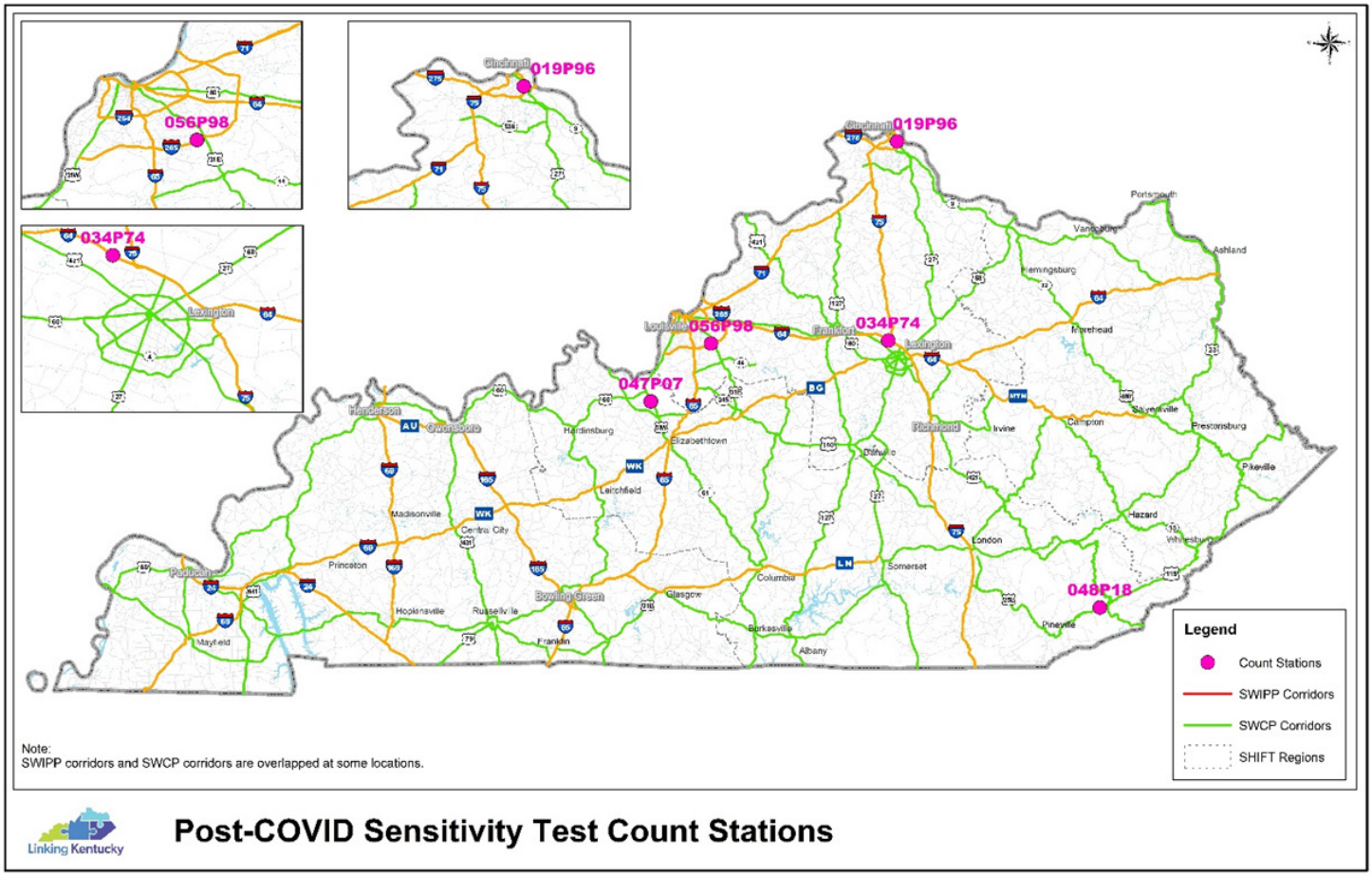
- SWIPP and SWCP corridors (freeways vs. arterials)
- Geographic areas
- Proposed improvement concepts (traditional capacity improvements vs. TSMO strategies)
- Area type (urban, suburban, urban)

All selected segments have the latest 2023 AADT counts from KYTC. **Table 1** provides details of these corridor segments while **Figure 1** shows the locations of corresponding count stations.

Table 1 – Corridor Segments for Sensitivity Test

Corridor Segment	Corridor ID	Count Station ID	Area Type	Major Improvement Concepts
US 31W (Knox Blvd to KY 361 near Radcliff)	SWCP - 18B	047P07	Rural	Adding auxiliary lane
US 119 (west of KY 840 near Loyall)	SWCP - 19	048P18	Rural	Improving shoulder and widening lanes
I-64 (US 62 to I-75)	SWIPP - 8E	034P74	Suburban	Widening (4 to 6 lanes)
I-265 (KY 864 to US 150)	SWIPP - 7B	056P98	Urban	Ramp metering
I-471 (I-275 to US 27)	SWIPP - 2	019P96	Urban	Hard shoulder running

Figure 1 – Locations of Count Stations



3. Adjustment of Traffic Forecasts

To reasonably account for the impact of pandemic on travel patterns and growth in Kentucky, 2023 AADT counts, along with a common pivoting process, were used to adjust the original traffic forecasts from the SWCP and SWIPP. The process is described below:

1. Derive 2023 synthetic traffic volume by interpolating the base year and future year forecasts from the traffic models used in SWIPP and SWCP. Note that SWIPP has a calibrated model based on v8_KYSTMv19 with a base year of 2019 and a future year of 2045, while SWCP used v8_KYSTMv18 with a base year of 2015 and a future year of 2045.
2. Apply the pivoting process to adjust 2045 traffic forecasts:

$$Future_{pivot\_diff} = Base_{observed} + (Future_{synthetic} - Base_{synthetic})$$
$$Future_{pivot\_ratio} = Base_{observed} \times (Future_{synthetic} / Base_{synthetic})$$
$$Future_{pivot} = (Future_{pivot\_diff} + Future_{pivot\_ratio}) / 2$$

Where,

$Future_{pivot}$ = Final future year (2045) forecasts after pivoting
$Future_{pivot\_diff}$ = Future year (2045) forecasts using the difference pivoting method
$Future_{pivot\_ratio}$ = Future year (2045) forecasts using the ratio pivoting method

$Base_{observed}$ = Base year (2023) observed counts

$Base_{synthetic}$ = Base year (2023) forecasts derived from model before pivoting

$Future_{synthetic}$ = Future year (2045) forecasts derived from model before pivoting

Table 2 compares traffic counts and model results for the 2023 base year, and summarizes the original and adjusted model forecasts for the 2045 future year. **Figure 2** also illustrates 2023 counts and the trendlines of original as well as adjusted growth in the No Build condition through 2045.

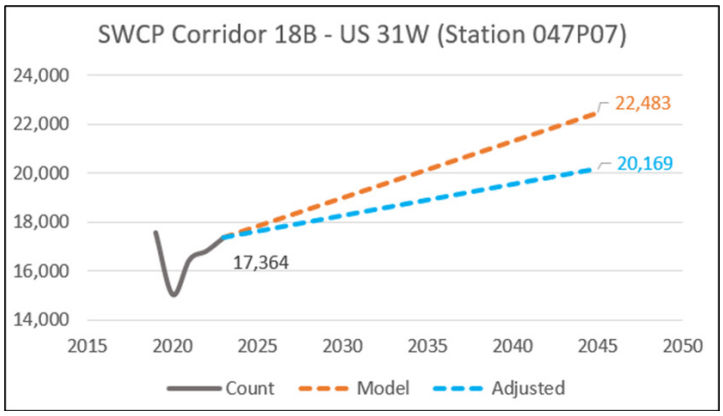
Table 2 – 2023 Traffic Counts and 2045 Forecast Adjustments

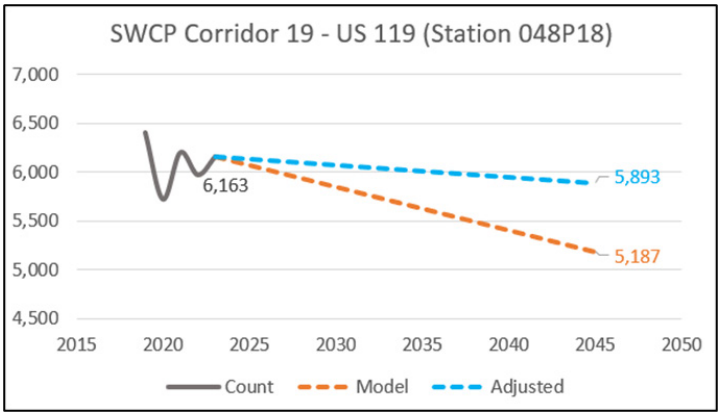
Corridor	Count Station	2023			2045 No Build Forecast			2045 Build Forecast		
		Counts	Model	Difference %	Original	Adjusted	Difference %	Original	Adjusted	Difference %
SWCP 18B - US 31W	047P07	17,364	19,514 [1]	12.4%	22,483	20,169	-10.3%	42,775	39,343	-8.0%
SWCP 19 - US 119	048P18	6,163	5,441 [1]	-11.7%	5,187	5,893	13.6%	4,946	5,636	14.0%
SWIPP 8E - I-64	034P74	35,443	45,338 [2]	27.9%	60,770	49,192	-19.1%	78,425	64,920	-17.2%
SWIPP 7B - I-265	056P98	74,441	76,636 [2]	2.9%	107,283	104,650	-2.5%	114,851	112,109	-2.4%
SWIPP 2 - I-471	019P96	94,400	96,292 [2]	2.0%	100,582	98,689	-1.9%	101,894	100,002	-1.9%
Overall Difference (%)				**6.8%**			**-6.0%**			**-6.1%**

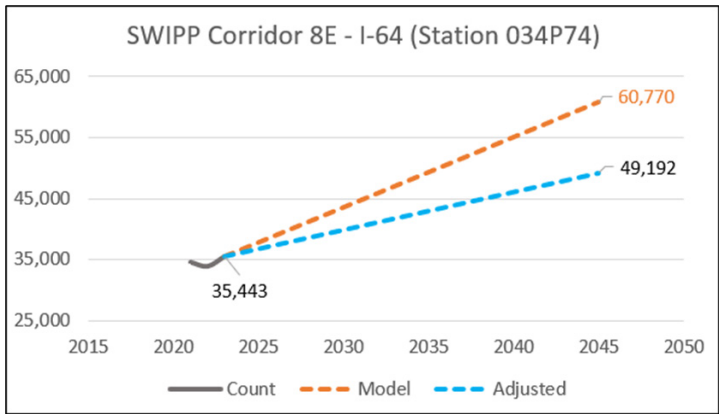
[1] For SWCP corridors, 2023 forecasts were interpolated from the SWCP Model data (2015 Base Year and 2045 Future Year).

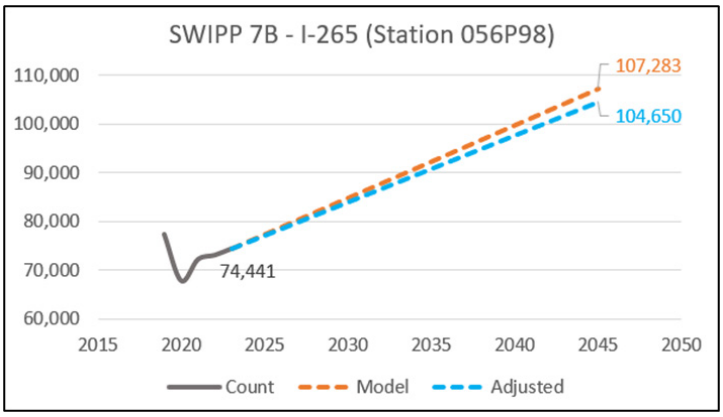
[2] For SWIPP corridors, 2023 forecasts were interpolated from the SWIPP Model data (2019 Base Year and 2045 Future Year).

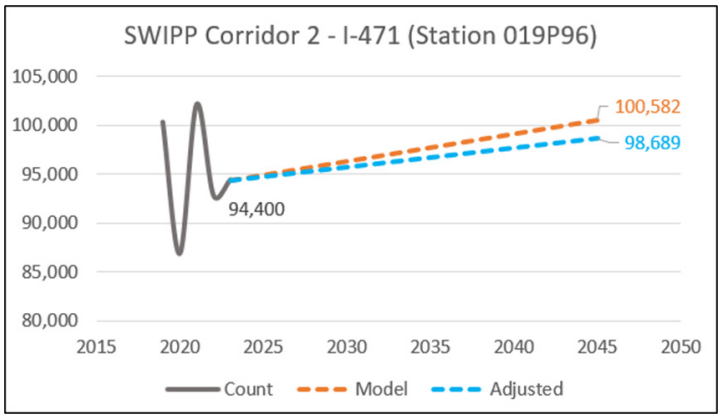
Figure 2 – Adjustment of Traffic Growth (2045 No Build)











It is noted that all segments, except for SWCP Corridor 19 (US 119 – count station 048P18), overestimated traffic in 2023. SWCP Corridor 18B (US 31W – count station 047P07) and SWIPP Corridor 8E (I-64 – count station 034P74) have noticeable overestimates of traffic, while other segments have slight traffic overestimates. Overall, all segments show that the original models (before pivoting adjustment) overestimated 2023 traffic by 6.8%, compared to counts. This indicates that the traffic seems to be still recovering from the pandemic. As a result from the pivoting calibration process, the adjusted 2045 traffic forecasts show a 6.0% decrease for No Build and a 6.1% decrease for Build, compared to the original traffic data used in SWIPP and SWCP. The decreased 2045 traffic volumes reflect the impact of the pandemic on traffic growth.

4. Sensitivity Test of Corridor LOS

The adjusted 2045 traffic forecasts (No Build and Build) were used for a sensitivity test of planning-level LOS assessment using the FDOT Generalized ADT/LOS tables. The adjusted results were then compared to the LOS analysis using original traffic model data in SWIPP and SWCP. **Table 3** summarizes the sensitivity test results.

Table 3 – Sensitivity Test of Corridor LOS

Corridor	Count Station	Direction	LOS - 2045 No Build		LOS - 2045 Build	
			Original	Adjusted	Original	Adjusted
SWCP 18B – US 31W	047P07	Both	C	C	C	C
SWCP 19 – US 119	048P18	Both	B	B	B	B
SWIPP 8E – I-64	034P74	Eastbound	D	C	C	C
		Westbound	C	C	C	B
SWIPP 7B – I-265	056P98	Eastbound	D	D	D	D
		Westbound	D	D	D	D
SWIPP 2 – I-471	019P96	Northbound	D	D	D	D
		Southbound	D	D	C	C

Note: The LOS analysis was performed for both directions of arterial corridors in SWCP and by direction of freeway corridors in SWIPP.

The sensitivity test of LOS assessment shows same results for all corridor segments, except for SWIPP Corridor 8E westbound (I-64 – count station 034P74), which has an improved LOS from C to B in 2045 Build. It is because this segment has decreased traffic forecasts after the pivoting adjustment process.

5. Findings

The analysis indicates the traffic seems to be still recovering from the COVID-19 pandemic in Kentucky, so the traffic models that were developed and/or calibrated before the pandemic tend to overestimate traffic volumes on freeways and major arterials. However, the impact of the post-COVID traffic growth on the planning-level LOS assessment seems to be minimal. The improvement concepts recommended by SWIPP and SWCP should be conservative by considering a “heavier traffic” condition without accounting for traffic decrease due to the pandemic.

It is noted that the sensitivity test was based on a small sample of selected SWIPP and SWCP corridors. For specific project development, it is recommended to collect detailed project-level traffic data for a more reliable assessment of the pandemic impact.