PART B

AIR QUALITY OVERVIEW

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AIR QUALITY OVERVIEW

Southside Drive

From New Cut Road to Strawberry Lane
Jefferson County, Kentucky

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ABSTRACT
SOUTHSIDE DRIVE AIR QUALITY OVERVIEW
JEFFERSON COUNTY, KENTUCKY

The proposed project is the widening of approximately 1.2 miles of Southside Drive from New Cut Road to Strawberry Lane.

The National Turnpike/Southside Drive Intersection was selected as the "hotspot" in the project corridor that would be expected to have the highest levels of carbon monoxide (CO). Existing and future microscale emissions of CO were calculated using the USEPA MOBILE6.2.03 emissions model and the USEPA CALQ3HC Version 2.0 dispersion model. The maximum CO concentrations, based on computer modeling, are summarized in the following table.

MAXIMUM CALCULATED CARBON MONOXIDE CONCENTRATIONS
National Turnpike/Southside Drive Intersection

Alternative	One-Hour Average (NAAQS Standard = 35 ppm)	Eight-Hour Average (NAAQS Standard = 9 ppm)
2005 Existing	4.6	4.3
2029 No Build	4.8	4.4
2029 Build	4.6	4.3

The existing and future calculated CO levels are consistently below the National Ambient Air Quality Standards (NAAQS) one-hour concentration of 35 parts per million (ppm) and the eight-hour concentration of 9 ppm. The proposed Southside Drive project is not predicted to have a negative impact on the ambient air quality of Jefferson County or the Louisville Interstate Air Quality Control Region when these calculated CO levels are compared with the NAAQS.

Based on the computer modeling conducted for this air quality overview, the proposed project complies with the *Kentucky State Implementation Plan for Attainment and Maintenance of National and State Ambient Air Quality Standards*. A more detailed air quality analysis for the entire project corridor may be prepared at a future date as part of an Environmental Assessment.

I. PROJECT DESCRIPTION

The proposed project is the widening of approximately 1.2 miles of Southside Drive from New Cut Road to Strawberry Lane in Jefferson County. The project location is shown in Exhibit 1. The primary purposes of the proposed widening of Southside Drive are to eliminate potential safety hazards, improve traffic flow, and enhance the surrounding community.

A preliminary air quality assessment was conducted to provide an overview of the potential impact of carbon monoxide (CO) on areas of human activity. A worst-case receptor was selected in the "hot-spot" location, the area expected to experience the highest concentrations of carbon monoxide within the project corridor. The National Turnpike/Southside Drive intersection was identified as the "hot-spot" for the project, based on current and future traffic volumes and proximity of human activity to the roadway. Photographs of this intersection are shown in Exhibit 2.

II. ALTERNATIVES

A three-lane design and a five-lane design are being studied as possible alternatives for widening Southside Drive. The five-lane alternative was used with predicted 2029 traffic volumes for calculating maximum CO concentrations. Existing (2005) and No Build (2029) CO levels were calculated to compare with the Build (5-lane) Alternative. Future CO levels were calculated for the No Build Alternative by using 2029 traffic volumes with the existing intersection alignment. Vehicular speeds range from idle conditions to 35 mph for the Existing, No-Build, and Build Alternatives.

III. ASSESSMENT METHODOLOGY

Current state of the art models were utilized for calculating CO levels at the hot-spot receptor. Emission factors calculated by the U. S. Environmental Protection Agency's MOBILE6.2.03 emissions factor program were provided by the Louisville Metro Air Pollution Control District. Idle conditions and vehicular speeds of 2.5, 15, and 35 mph were used in the computer model to calculate CO emission factors for 2005 and 2029.

The BB&T Bank parking lot was designated as the receptor used in the computer modeling of the National Turnpike/Southside Drive Intersection. Existing and future CO concentrations were calculated by the U. S. Environmental Protection Agency's CAL3QHC Version 2.0

dispersion model. Roadway geometrics were expressed as a series of links defined by X and Y coordinates on a Cartesian coordinate system for input to the program. Other input data for each link included traffic volumes (Attachment A), emission factors calculated by MOBILE6.2.03, CO source height, link width, and meteorological data.

Meteorological input data for the modeled worst-case conditions were:

- Wind speed of 1 meter per second
- Pasquill Stability Class E.
- Mixing Height = 1,000 meters
- Roughness Length = 50 centimeters
- One-hour background concentration of 3.0 ppm (Eight-hour background= 2.1 ppm)

IV. MICROSCALE ANALYSIS

A hot-spot (limited) microscale analysis was conducted for the Existing (2005), No-Build (2029), and 5-Lane Build (2029) Alternatives. The roadway links and receptor location used in the computer model are shown in Exhibits 3 and 4. One-hour CO concentrations were obtained directly from the CAL3QHC model output (Attachment B). Eight-hour CO concentrations were calculated by subtracting the one-hour background concentration of 3.0 ppm from the total one-hour concentrations calculated by the model. The remainder was then multiplied by a persistence factor of 0.8. To this value, an eight-hour background concentration of 2.1 ppm is added to arrive at the eight-hour concentrations.

Table 1 summarizes the maximum calculated CO concentrations, based on computer modeling.

TABLE 1

MAXIMUM CALCULATED CARBON MONOXIDE CONCENTRATIONS
National Turnpike/Southside Drive Intersection

Alternative	One-Hour Average (NAAQS Standard = 35 ppm)	Eight-Hour Average (NAAQS Standard = 9 ppm)
2005 Existing	4.6	4.3
2029 No Build	4.8	4.4
2029 Build	4.6	4.3

V. CONCLUSIONS

The existing and future calculated CO levels are consistently below the National Ambient Air Quality Standards (NAAQS) one-hour concentration of 35 parts per million (ppm) and eight-hour concentration of 9 ppm. The proposed Southside Drive project is not predicted to have a negative impact on the ambient air quality of Jefferson County or the Louisville Interstate Air Quality Control Region when these calculated CO levels are compared with the NAAQS.

The proposed project is listed in the *Transportation Improvement Program for the Louisville and Southern Indiana Urbanized Area (FY2005-FY2007)*, published by the Kentuckiana Regional Planning and Development Agency in August 2004. Transportation control measures are not required for Jefferson County, pursuant to the Transportation Conformity Rule Amendments of August 2004.

Jefferson County was designated as a non-attainment area for ozone on June 15, 2004, based on the eight-hour standard for ozone. On April 5, 2005, Jefferson County was designated as a non-attainment area for fine particulates ($PM_{2.5}$). The County is in attainment for CO and all other transportation related pollutants. At this time, no models are available for accurately predicting ozone and $PM_{2.5}$ concentrations, which will be addressed on a regional basis rather than at the project level.

Based on the computer modeling conducted for this air quality overview, the proposed project complies with the *Kentucky State Implementation Plan for Attainment and Maintenance of National and State Ambient Air Quality Standards*. A more detailed air quality analysis for the entire project corridor may be prepared at a future date as part of an Environmental Assessment.

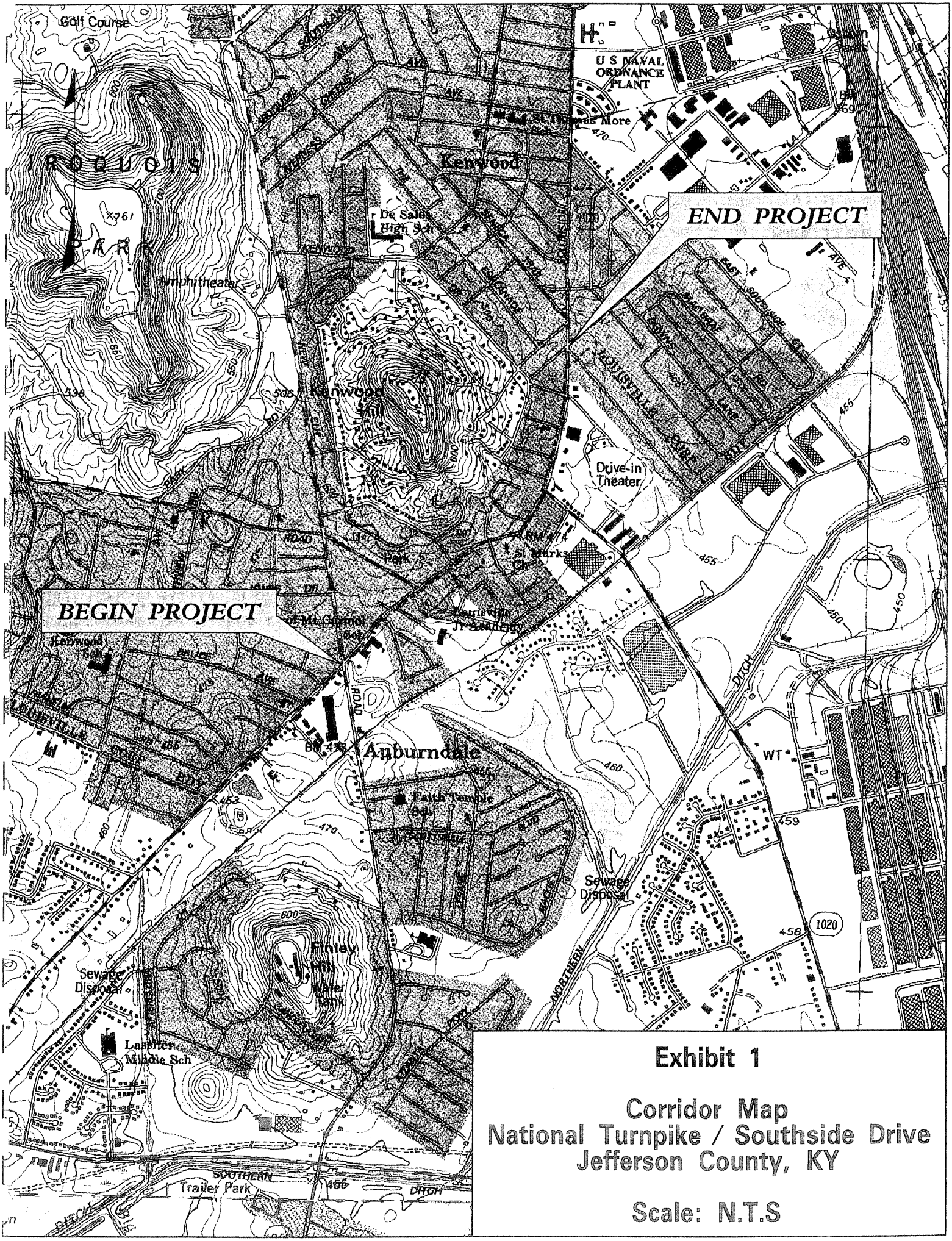
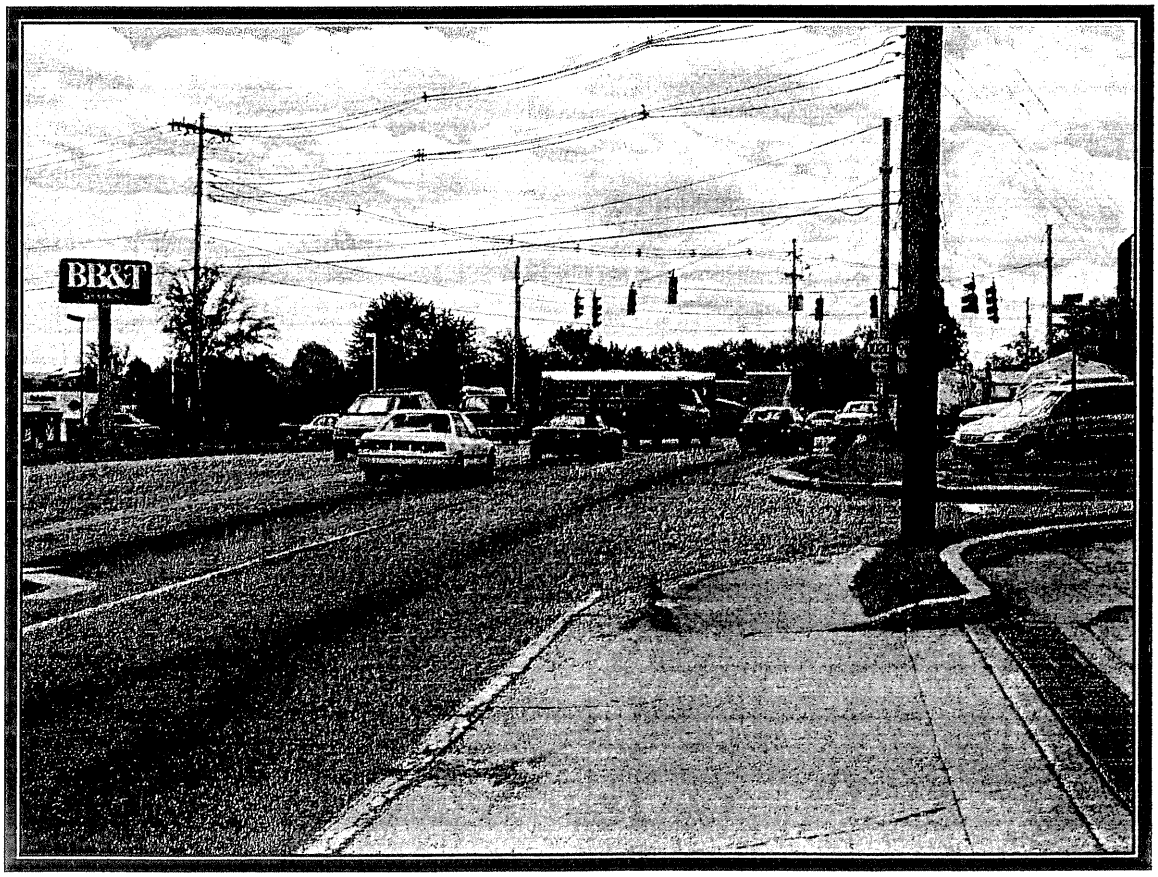


Exhibit 1

Corridor Map
National Turnpike / Southside Drive
Jefferson County, KY

Scale: N.T.S

Strawberry Lane/Southside Drive Intersection Looking South



National Turnpike/Southside Drive Intersection Looking South

EXHIBIT 2

New Cut Road/Southside Drive Intersection Looking South

EXHIBIT 2

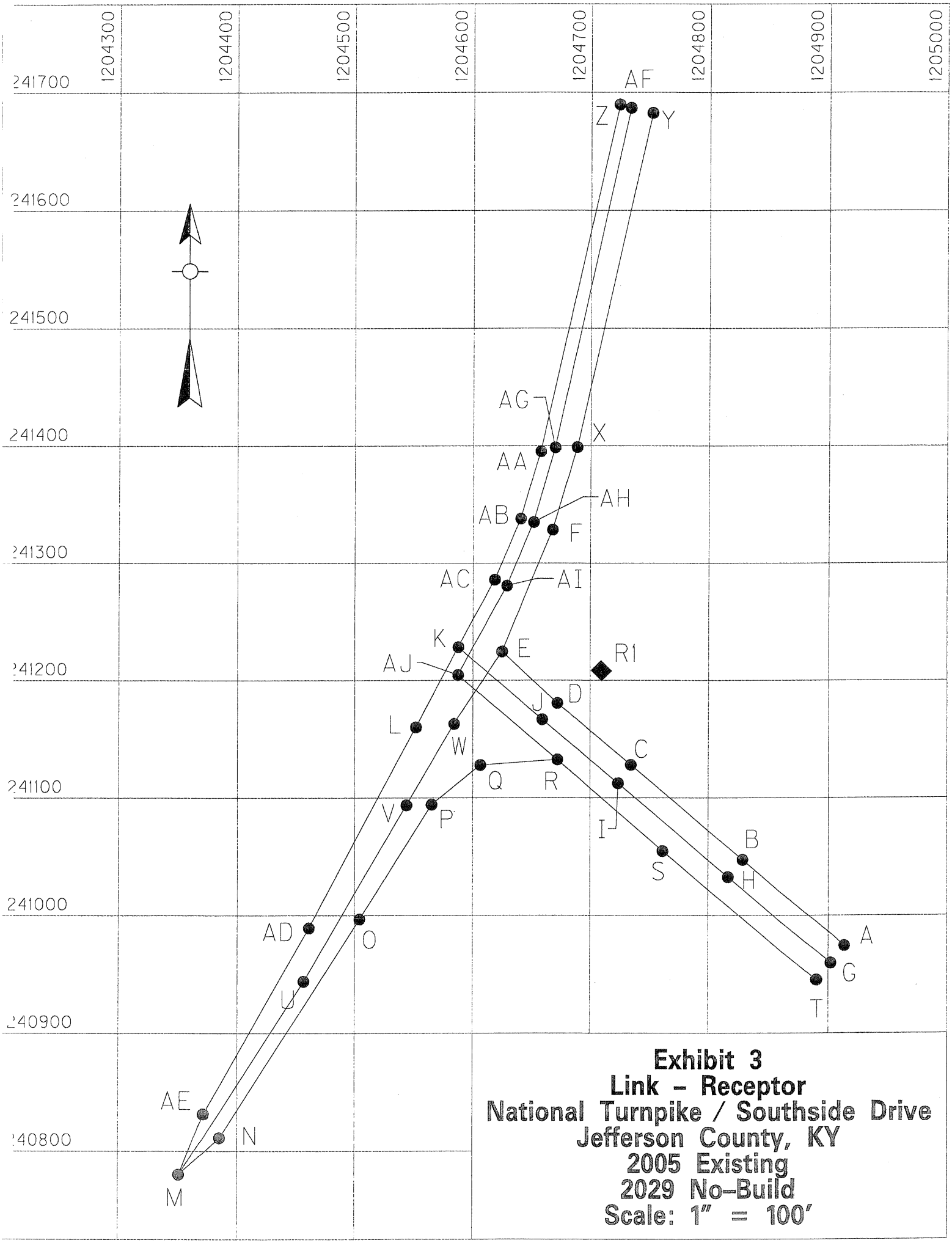


Exhibit 3
Link – Receptor
National Turnpike / Southside Drive
Jefferson County, KY
2005 Existing
2029 No-Build
Scale: 1" = 100'

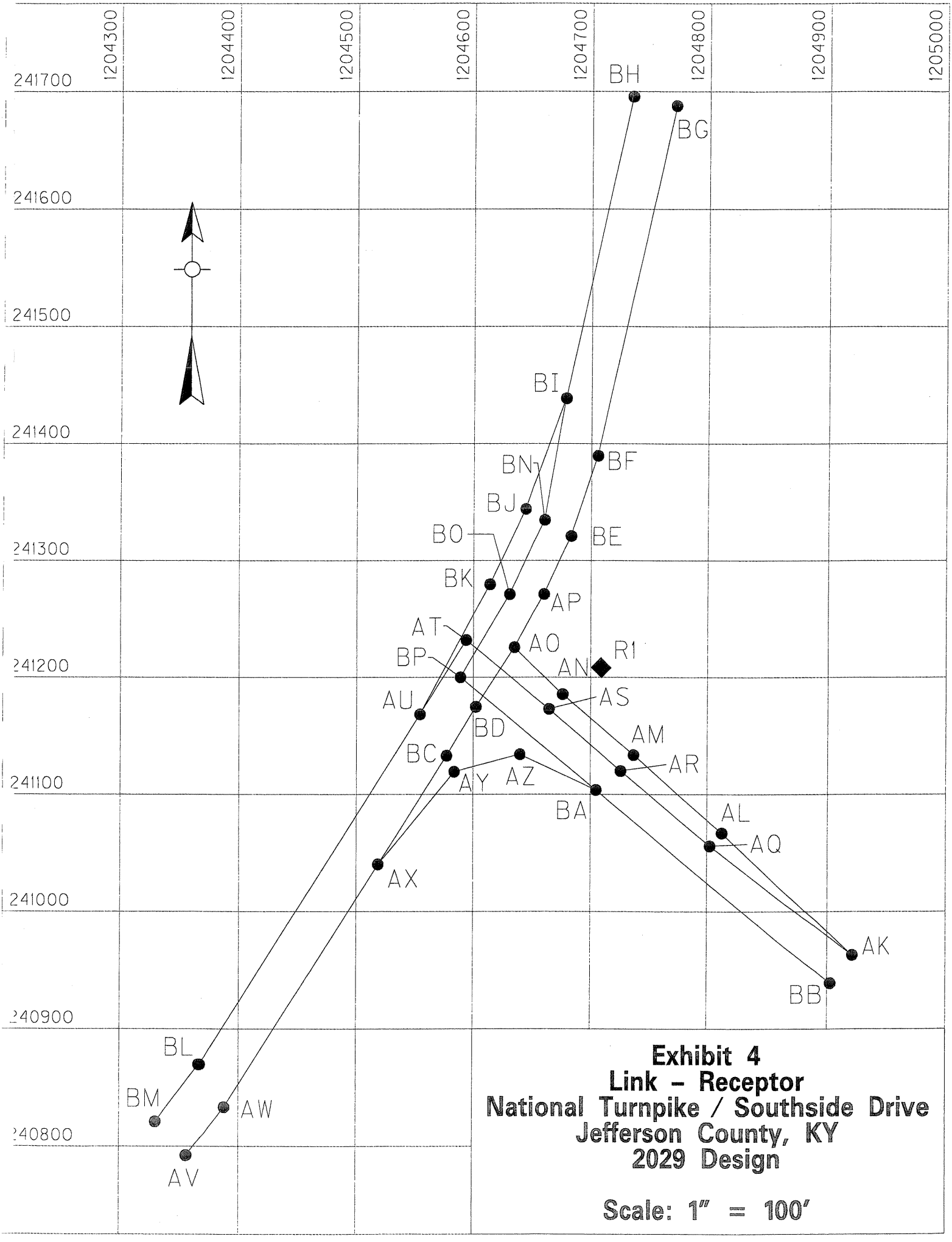


Exhibit 4
Link – Receptor
National Turnpike / Southside Drive
Jefferson County, KY
2029 Design

Scale: 1" = 100'

ATTACHMENT A

TRAFFIC TABLES

APPENDIX A
2005 EXISTING TRAFFIC

Segment		Southside Drive From New Cut Road to Strawberry Lane Description	Volume [1] veh/hr	Speed mi/hr
		National Turnpike/Southside Drive Intersection		
A	C	KY 1020 (National Turnpike) Northwestbound Thru, Right Turn Approach	540	15
C	D	KY 1020 (National Turnpike) Northwestbound Thru, Right Turn Approach	540	2.5
D	C	KY 1020 (National Turnpike) Northwestbound Thru, Right Turn Queue	540	0
D	E	KY 1020 (National Turnpike) Northwestbound Right Turn Depart	540	2.5
E	F	KY 1020 (National Turnpike) Northwestbound Right Turn Depart	840	15
G	I	KY 1020 (National Turnpike) Northwestbound Left Turn Approach	315	15
I	J	KY 1020 (National Turnpike) Northwestbound Left Turn Approach	315	2.5
J	I	KY 1020 (National Turnpike) Northwestbound Left Turn Queue	315	0
J	K	KY 1020 (National Turnpike) Northwestbound Left Turn Depart	315	2.5
K	L	KY 1020 (National Turnpike) Northwestbound Left Turn Depart	980	15
M	P	KY 907 (Southside Drive) Northbound Right Turn Approach	340	35
P	Q	KY 907 (Southside Drive) Northbound Right Turn Approach	340	15
Q	R	KY 907 (Southside Drive) Northbound Right Turn Depart	780	15
R	T	KY 1020 (National Turnpike) Southeastbound Thru Depart	780	35
M	U	KY 907 (Southside Drive) Northbound Thru Approach	305	35
U	V	KY 907 (Southside Drive) Northbound Thru Approach	305	15
V	W	KY 907 (Southside Drive) Northbound Thru Approach	305	2.5
W	V	KY 907 (Southside Drive) Northbound Thru Queue	305	0
W	E	KY 907 (Southside Drive) Northbound Thru Depart	305	2.5
E	F	KY 1020 (Southside Drive) Northbound Thru Depart	650	15
F	Y	KY 1020 (Southside Drive) Northbound Thru Depart	650	35
Z	AA	KY 1020 (Southside Drive) Southbound Thru Approach	660	35
AA	AB	KY 1020 (Southside Drive) Southbound Thru Approach	660	15
AB	AC	KY 1020 (Southside Drive) Southbound Thru Approach	660	2.5
AC	AB	KY 1020 (Southside Drive) Southbound Thru Queue	660	0
AC	K	KY 1020 (Southside Drive) Southbound Thru Depart	660	2.5
K	L	KY 907 (Southside Drive) Southbound Thru Depart	660	15
L	M	KY 907 (Southside Drive) Southbound Thru Depart	980	35
AF	AG	KY 1020 (Southside Drive) Southbound Left Turn Approach	440	35
AG	AH	KY 1020 (Southside Drive) Southbound Left Turn Approach	440	15
AH	AI	KY 1020 (Southside Drive) Southbound Left Turn Approach	440	2.5
AI	AH	KY 1020 (Southside Drive) Southbound Left Turn Queue	440	0
AI	AJ	KY 1020 (Southside Drive) Southeastbound Left Turn Depart	440	2.5
AJ	AK	KY 1020 (Southside Drive) Southeastbound Left Turn Depart	440	15

[1] Source of traffic data: KIPDA, 2004

APPENDIX A
2029 NO-BUILD TRAFFIC

Segment		Southside Drive From New Cut Road to Strawberry Lane Description	Volume [1] veh/hr	Speed mi/hr
		National Turnpike/Southside Drive Intersection		
A	C	KY 1020 (National Turnpike) Northwestbound Thru, Right Turn Approach	750	15
C	D	KY 1020 (National Turnpike) Northwestbound Thru, Right Turn Approach	750	2.5
D	C	KY 1020 (National Turnpike) Northwestbound Thru, Right Turn Queue	750	0
D	E	KY 1020 (National Turnpike) Northwestbound Right Turn Depart	750	2.5
E	F	KY 1020 (National Turnpike) Northwestbound Right Turn Depart	1,200	15
G	I	KY 1020 (National Turnpike) Northwestbound Left Turn Approach	450	15
I	J	KY 1020 (National Turnpike) Northwestbound Left Turn Approach	450	2.5
J	I	KY 1020 (National Turnpike) Northwestbound Left Turn Queue	450	0
J	K	KY 1020 (National Turnpike) Northwestbound Left Turn Depart	450	2.5
K	L	KY 1020 (National Turnpike) Northwestbound Left Turn Depart	1,410	15
M	P	KY 907 (Southside Drive) Northbound Right Turn Approach	350	35
P	Q	KY 907 (Southside Drive) Northbound Right Turn Approach	350	15
Q	R	KY 907 (Southside Drive) Northbound Right Turn Depart	350	15
R	T	KY 1020 (National Turnpike) Southeastbound Thru Depart	990	35
M	U	KY 907 (Southside Drive) Northbound Thru Approach	435	35
U	V	KY 907 (Southside Drive) Northbound Thru Approach	435	15
V	W	KY 907 (Southside Drive) Northbound Thru Approach	435	2.5
W	V	KY 907 (Southside Drive) Northbound Thru Queue	435	0
W	E	KY 907 (Southside Drive) Northbound Thru Depart	435	2.5
E	F	KY 1020 (Southside Drive) Northbound Thru Depart	1,200	15
F	Y	KY 1020 (Southside Drive) Northbound Thru Depart	1,200	35
Z	AA	KY 1020 (Southside Drive) Southbound Thru Approach	950	35
AA	AB	KY 1020 (Southside Drive) Southbound Thru Approach	950	15
AB	AC	KY 1020 (Southside Drive) Southbound Thru Approach	950	2.5
AC	AB	KY 1020 (Southside Drive) Southbound Thru Queue	950	0
AC	K	KY 1020 (Southside Drive) Southbound Thru Depart	1,410	2.5
K	L	KY 907 (Southside Drive) Southbound Thru Depart	1,410	15
L	M	KY 907 (Southside Drive) Southbound Thru Depart	1,410	35
AF	AG	KY 1020 (Southside Drive) Southbound Left Turn Approach	625	35
AG	AH	KY 1020 (Southside Drive) Southbound Left Turn Approach	625	15
AH	AI	KY 1020 (Southside Drive) Southbound Left Turn Approach	625	2.5
AI	AH	KY 1020 (Southside Drive) Southbound Left Turn Queue	625	0
AI	AJ	KY 1020 (Southside Drive) Southeastbound Left Turn Depart	625	2.5
AJ	AK	KY 1020 (Southside Drive) Southeastbound Left Turn Depart	625	15

[1] Source of traffic data: KIPDA, 2004

APPENDIX A
2029 5-LANE ALTERNATIVE TRAFFIC

Segment		Southside Drive From New Cut Road to Strawberry Lane Description	Volume [1] veh/hr	Speed mi/hr
		National Turnpike/Southside Drive Intersection		
AK	AM	KY 1020 (National Turnpike) Northwestbound Right Turn Approach	750	15
AM	AN	KY 1020 (National Turnpike) Northwestbound Right Turn Approach	750	2.5
AN	AM	KY 1020 (National Turnpike) Northwestbound Right Turn Queue	750	0
AN	AO	KY 1020 (National Turnpike) Northwestbound Right Turn Depart	750	2.5
AO	AP	KY 1020 (National Turnpike) Northwestbound Right Turn Depart	1,200	15
AK	AR	KY 1020 (National Turnpike) Northwestbound Left Turn Approach	450	15
AR	AS	KY 1020 (National Turnpike) Northwestbound Left Turn Approach	450	2.5
AS	AR	KY 1020 (National Turnpike) Northwestbound Left Turn Queue	450	0
AS	AT	KY 1020 (National Turnpike) Northwestbound Left Turn Depart	450	2.5
AT	AU	KY 1020 (National Turnpike) Northwestbound Left Turn Depart	1,410	15
AV	AX	KY 907 (Southside Drive) Northbound Thru,Right Turn Approach	350	35
AX	AY	KY 907 (Southside Drive) Northbound Right Turn Approach	350	35
AY	AZ	KY 907 (Southside Drive) Northbound Right Turn Approach	350	15
AZ	BA	KY 907 (Southside Drive) Northbound Right Turn Depart	350	15
BA	BB	KY 1020 (National Turnpike) Southeastbound Thru Depart	990	35
AX	BC	KY 907 (Southside Drive) Northbound Thru Approach	435	15
BC	BD	KY 907 (Southside Drive) Northbound Thru Approach	435	2.5
BD	BC	KY 907 (Southside Drive) Northbound Thru Queue	435	0
BD	AO	KY 907 (Southside Drive) Northbound Thru Depart	435	2.5
AO	AP	KY 1020 (Southside Drive) Northbound Thru Depart	1,200	15
AP	BG	KY 1020 (Southside Drive) Northbound Thru Depart	1,200	35
BH	BI	KY 1020 (Southside Drive) Southbound Thru, Left Turn Approach	950	35
BI	BJ	KY 1020 (Southside Drive) Southbound Thru Approach	950	15
BJ	BK	KY 1020 (Southside Drive) Southbound Thru Approach	950	2.5
BK	BJ	KY 1020 (Southside Drive) Southbound Thru Queue	950	0
BK	AU	KY 1020 (Southside Drive) Southbound Thru Depart	950	2.5
AU	BL	KY 907 (Southside Drive) Southbound Thru Depart	1,410	15
BL	BM	KY 907 (Southside Drive) Southbound Thru Depart	1,410	35
BI	BN	KY 1020 (Southside Drive) Southbound Left Turn Approach	625	15
BN	BO	KY 1020 (Southside Drive) Southbound Left Turn Approach	625	2.5
BO	BN	KY 1020 (Southside Drive) Southbound Left Turn Queue	625	0
BO	BP	KY 1020 (Southside Drive) Southeastbound Left Turn Depart	625	2.5
BP	BA	KY 1020 (Southside Drive) Southeastbound Left Turn Depart	625	15

[1] Source of traffic data: KIPDA, 2004

ATTACHMENT B

CAL3QHC RUNS