TRANSPORTATION CABINET
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INTRA-DEPARTMENTAL MEMO

TO: Matt Bullock, P.E.
Chief District Engineer
District 5 – Louisville

ATTN: Tala Quino, P.E.

FROM: Daryl J. Greer, P.E.
Director
Division of Planning

DATE: July 10, 2007

SUBJECT: Jefferson County Traffic Forecast
Gilliland Interchange and Connectors
Item No. 5-8200.00

In response to your August 29, 2006, request, we are providing the following forecasts on the attached maps and worksheets:

- 2006 and 2030 Average Daily Traffic for 10 route alternates
- 2006 and 2030 Truck Percentages for the specified route
- 2006 and 2030 Daily and Design Hour Turning Movements for the specified alternate

If you have any questions, please contact Scott Thomson of this Division at (502) 564-7183.

DJG/JST/BC

Attachments

c/att: J. R. Ham
Dan Hite
Ananias Calvin
John Callihan
Mary Ann Bond
Steve Ross

TF07_054

Executive Summary

Traffic Forecast Report
Jefferson County
Proposed Gilliland Interchange and Connectors
Item No. 5-8200.00

Prepared for:

Prepared by:
Scott Thomson
Division of Planning
Kentucky Transportation Cabinet

July 2007

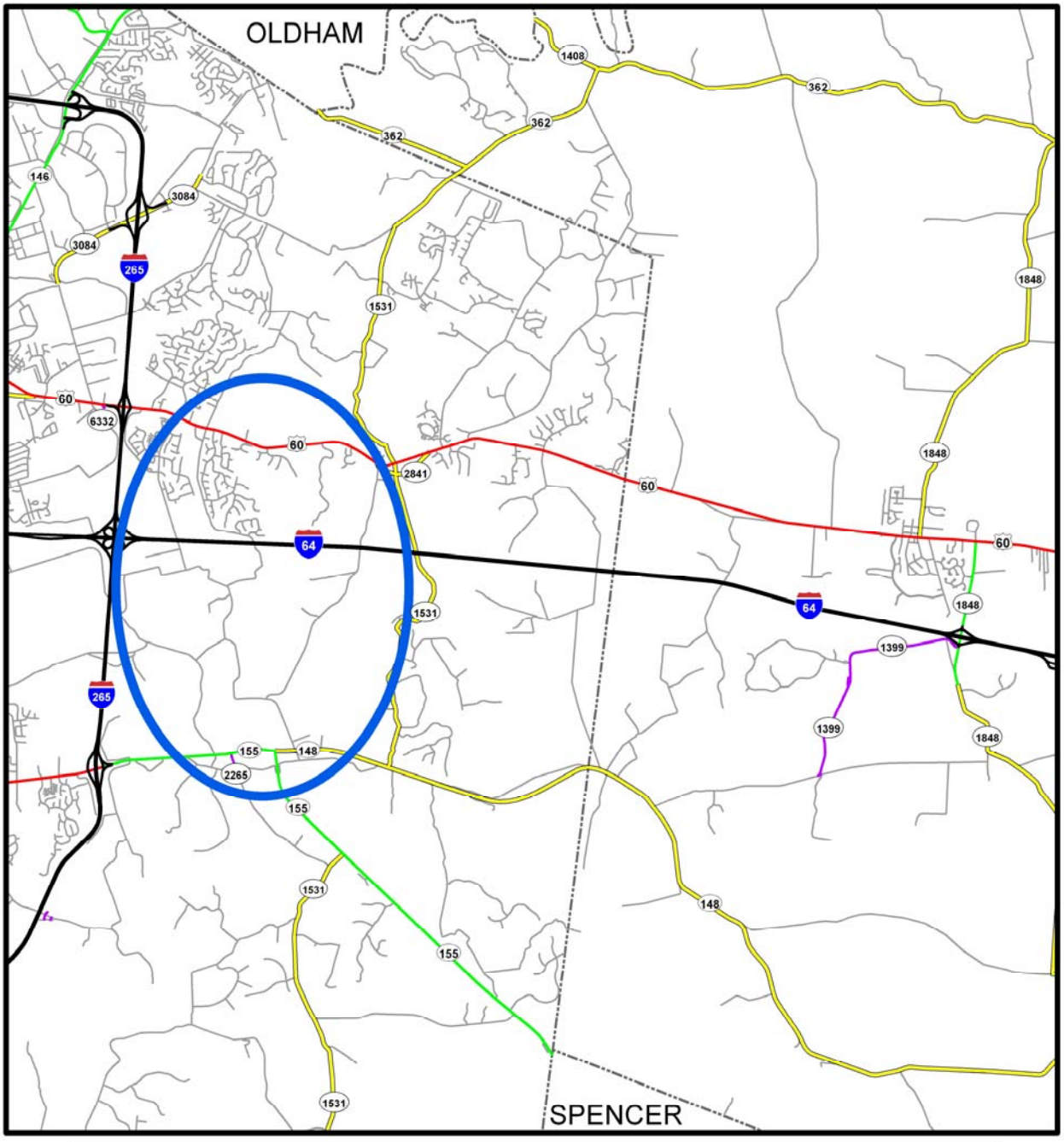
Table of Contents

Commonly Used Abbreviations and their Descriptions

ADT	Average Daily Traffic	Without any adjustment
DHV	Design Hour Volume	30th highest hour of a year
ESAL	Estimated Single Axle Load	A measure of traffic's impact on roadway
%T	Truck Percentage	The percentage trucks to total volume
FC	Functional Class	Refers to a road's importance
GR	Growth Rate	A value normally compounded annually
PHF	Peak Hour Factor	Considers a 15 minute spike in an hourly count
K-Factor	K-30th hour Factor	DHV divided by ADT (DHV/ADT)
D-Factor	Directional Factor	Percentage of dominant flow to total
MP	Mile Point	Miles increase easterly and northerly
ATR	Automatic Traffic Recorder	A permanent & continuous recording station
KYSTM	Kentucky Statewide Model	A computerized representation of KY roads

KIPDA Kentucky-Indiana Planning Development Agency

Vicinity Map



LEGEND

Project Site Location

Jefferson County
Gilliland Road Interchange Study
Item # 5-8200.00

Kentucky UNBRIDLED SPIRIT

0 1 2 Miles

Traffic Forecast Executive Summary
Jefferson County: Gilliland Interchange Analysis
Item No. 05-8200.00

FORECAST SUMMARY

Traffic forecasts were developed to analyze traffic movements along roads in the vicinity of a proposed interchange in Jefferson County, Kentucky. Bounded by I-265 to the west, US 60 to the north, KY 155 to the south, and the Simpsonville interchange to the east, three different locations were studied for a new interchange on I-64. The Gilliland Interchange project analyzed, three general routes (see Figure 2) initially called West (W), Center (C), and East (E). As the project developed, alternate routes were created that blended the original segments into routes that varied from incomplete to complete linkages between US 60 and KY 155. This traffic forecast estimated 2006 and 2030 ADT volumes on the adjacent roads, for each alternative. For alternative #4, ADT and DHV turn movements at the interchange were estimated for 2006 and 2030 (See appendix C). Finally, truck percentages were estimated for alternative #4 as well. ESALs were not requested at this time.

Appendix A references the segment labels shown in Figure 2 and summarizes 2006 or 2030 segment volumes for each alternative. To further clarify each analyzed alternative, the use of color at the top of each column as well as in the lower half of each table corresponds to the final analyzed route link. Yellow routes only considered a link between US 60 and I-64. All other alternatives expanded from one of these initial routes. Appendix B is a continuation of appendix A, but compares the change in the existing road segment volume for each alternate to the segment's no-build volume.

BASE-YEAR VOLUMES

The 2006 base-year traffic volumes for this forecast were developed using historical daily traffic counts at stations maintained by the Kentucky Transportation Cabinet, as well as a statewide traffic demand model (KYSTM). The study area in the KYSTM was calibrated to no more than 20% error; using 34 count stations in or near the area (see Figure 3). Because of its significance, I-64 was modeled within 3% error for the section between Simpsonville and I-265. Overall, the model captured 85% of the total traffic counted at stations within the study area. The difference is due to the limited ability of models to capture very short trips. A model maintained by KIPDA of Jefferson and Oldham County did not include the Simpsonville interchange in Shelby County and therefore, could not be used. Output from the KIDPA model was compared to the KYSTM. The results from the KYSTM better matched ADTs from count station records. For the purpose of this forecast the proposed widening of I-64 was not considered in the base-year.

2030 DESIGN YEAR VOLUMES/ GROWTH FACTORS

The 2030 design year traffic volumes were determined using long term growth factors to assign traffic volumes for each road segment. Once base-year volumes were synthesized for the build scenarios, estimated traffic and truck volumes were then grown to obtain 2030 design year volumes.

The KYSTM and KIPDA models were initially considered to estimate future volumes, however the simulated annual growth rates (1.0-2.0%) were much lower than the observed growth rates from the count station data. Based on discussions with Planning and Zoning, this area in Jefferson County is rapidly developing. Further, the Kentucky Data Center predicts that Spencer County will grow at a rate of 3.5% in total. Annual growth rates along KY 155 (Taylorsville Road) are on a 7% trend, suggesting growth in Spencer County to be concentrated adjacent to Louisville. Thus, the final growth rates were based on the historical data trend of each count station. For the purpose of this forecast, future volumes were determined by analyzing each count station and applying a linear or exponential trend to that area. As a result, annualized growth rates for each segment ranged from 2.6 to 6.8%, but with an overall growth rate of less than 3%. The growth rate of each segment is summarized on the tables contained in appendix A and appendix B.

DESIGN HOUR FACTORS

DHVs were taken from data maintained by the Kentucky Transportation Cabinet at various permanent traffic count stations on similar functional class roads. These data were further refined using matrix manipulation and considered the trend toward lower peak hour volumes as a percentage of the ADT. K-factors of 9.5-10.2% were used for AM design hour and 10.9-11.0% for PM design hour.

TRUCK PERCENTAGES

Truck percentages used in this report relied on existing class counts at 24 locations along the main corridors within the study area. From 1992 to 2007, truck percentages along I-64 and I-265 have been declining, so trucks in the area were studied as a function of volume instead. Once volumes were identified, truck movements were analyzed separately to develop count estimates on each of the proposed interchange ramps. In 2006, US 60 carried 9-14% trucks, I-65 carried 15-19%, I-265 carried 11-14% and KY 155 carried 7-13%. The variances in truck percentages were principally due to the presence of car volumes and to a lesser extent variations in truck volume. In the vicinity of the proposed interchange, truck percentages were estimated to be about 15%, except for the connector to KY 155 which was estimated at 10%. Studies of truck traffic in Kentucky indicated a truck percent growth rate of 2.5% for rural interstates; however, the urban interstate rate of 2.0% was used in this forecast due to its proximity to Louisville.

ESALs

ESALs were not requested to be a part of this forecast.

TURN MOVEMENTS

At the direction of the project's consultant, route Wa-Wb-Cc-Cd (Alternative #4) was chosen for the purpose of developing turn movements (see Appendix C). This route developed the greatest volumes, based on the KYSTM simulations.

Figure 2. Study Area

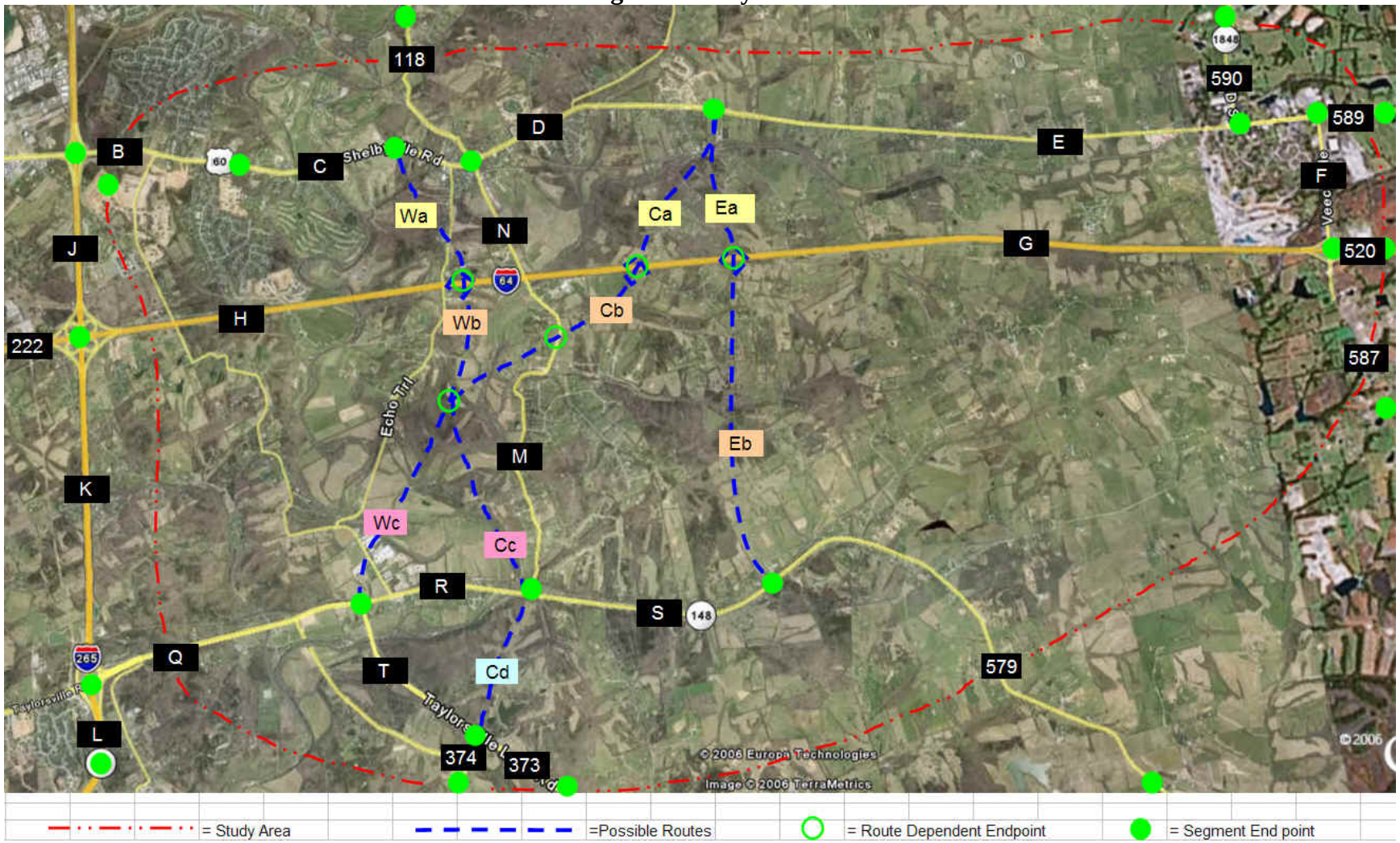
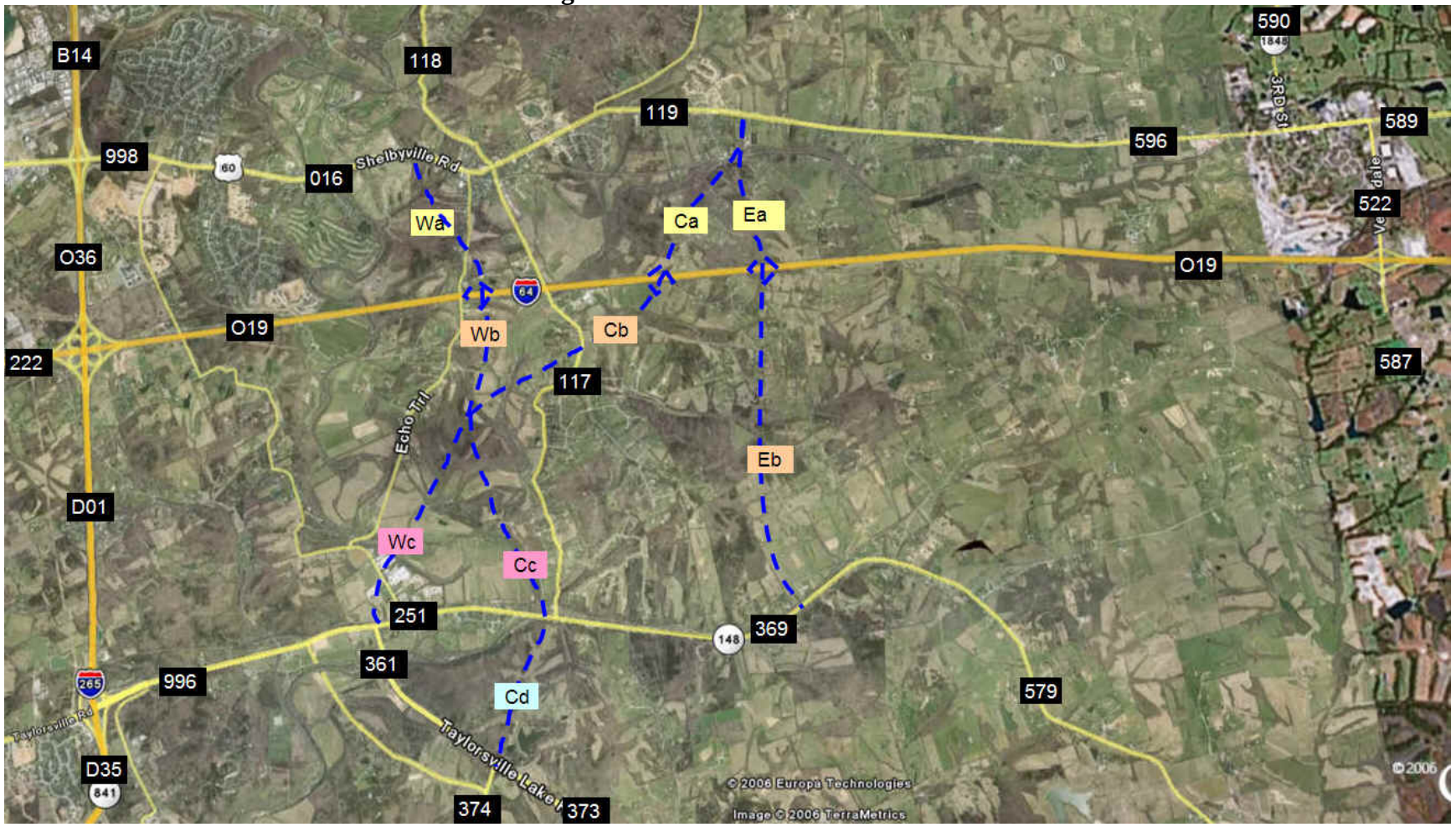
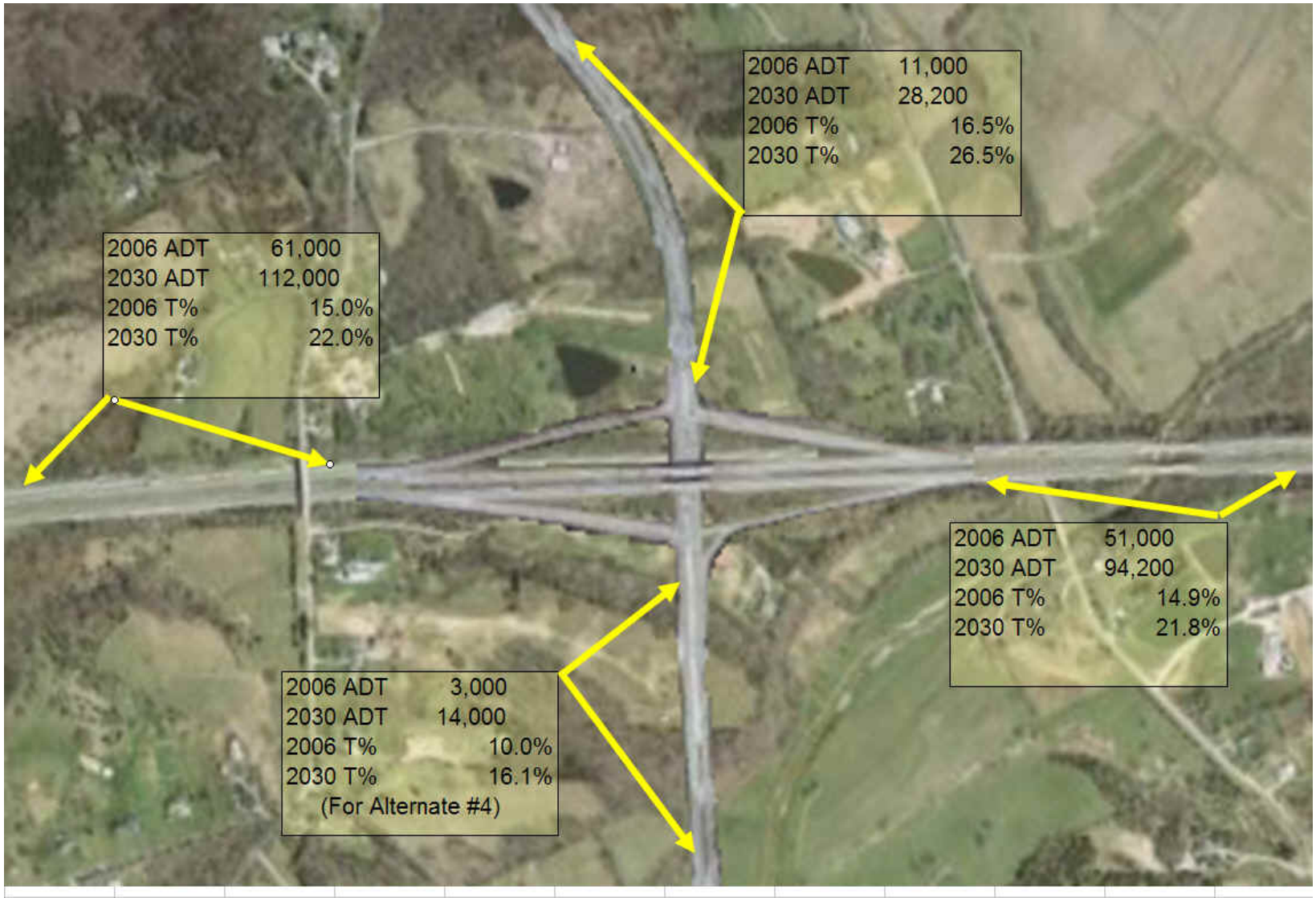


Figure 3: Count Station Locations





Note: The interchange style here neither depicts the final location nor the type. For illustrative purposes only.

Appendix A

Volume Summaries for Route Alternates

2006 UNADJUSTED AND ROUNDED														
			No Build	Alternative Build Sceniaros										
				West Connector				Center Connector				East Connector		
	Segments	Sta ID	No Build	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5	Alt #6	Alt #7	Alt #8	Alt #9	Alt #10
US 60	B	998	28000	19000	19000	19000	19000	25800	24600	24600	24600	26800	26700
	C	16	15000	6500	6500	6600	6600	12800	11700	11700	11700	13700	13700
	D	119	9000	9200	9300	9400	9400	8100	6800	6800	6800	7400	7300
	E	596	5200	3300	3300	3300	3300	4900	4500	4500	4500	4400	4400
I-64	H	19	50000	60000	60000	61000	61000	55000	56000	56000	57000	53000	53000
	G	19	50000	51000	51000	51000	51000	50000	50000	50000	50000	50000	49000
KY-148	Q	996	16000	16000	15000	14700	14000	16000	15500	15300	14800	16000	15500
	R	251	2000	2000	2800	2800	800	2000	2400	2400	1300	2000	1900
	S	369	1300	1300	1400	1400	1400	1300	1400	1400	1400	1300	1100
KY-155	T	361	15100	15100	16000	16000	14300	15100	15500	15500	14700	15100	15200
I-265	J	O36	49000	41000	41000	41000	40000	46000	46000	46000	45000	47000	47000
	K	D01	34000	34000	34000	33000	32000	34000	34000	34000	33000	34000	33000
	L	D35	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000
KY-1531	N	117	500	500	500	500	400	500	3500	3500	3500	500	400
KY-1531	M	117	500	500	500	500	400	500	300	100	100	500	400
KY-1848	F	522	5000	4300	4300	4300	4200	3700	3300	3300	3300	3300	3300
	Wa	Alt #1		11000	11000	11000	11000	0	0	0	0	0	0
Wa+	WbWc	Alt #2		0	1200	0	0	0	0	0	0	0	0
Wa+	WbCc	Alt #3		0	0	1500	3000	0	0	0	0	0	0
Wa+	WbCcCd	Alt #4		0	0	0	1700	0	0	0	0	0	0
	Ca	Alt #5		0	0	0	0	5500	5000	5000	5000	0	0
Ca+	CbWc	Alt #6		0	0	0	0	0	1200	0	0	0	0
Ca+	CbCc	Alt #7		0	0	0	0	0	0	1200	2000	0	0
Ca+	CbCd	Alt #8		0	0	0	0	0	0	0	1300	0	0
	Ea	Alt #9		0	0	0	0	0	0	0	0	5700	5700
Ea+	Eb	Alt #10		0	0	0	0	0	0	0	0	0	1600

2030 UNADJUSTED AND ROUNDED														
			No Build		Alternative Build Sceniaros									
					West Connector				Center Connector				East Connector	
	Segments	Sta ID	No Build	GR %	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5	Alt #6	Alt #7	Alt #8	Alt #9	Alt #10
US 60	B	998	58000	4.5%	40000	40000	40000	40000	54000	51000	51000	51000	56000	56000
	C	16	29000	4.0%	13000	13000	13000	13000	25000	23000	23000	23000	27000	27000
	D	119	21000	3.5%	21000	21000	21000	21000	18000	16000	16000	16000	17000	17000
	E	596	11000	3.0%	6700	6700	6700	6700	10000	9100	9100	9100	8900	8900
I-64	H	19	92000	3.5%	110000	110000	112000	112000	101000	103000	103000	105000	98000	98000
	G	19	92000	3.5%	94000	94000	94000	94000	92000	92000	92000	92000	92000	90000
KY-148	Q	996	58000	5.5%	58000	54000	53000	51000	58000	56000	55000	53000	58000	56000
	R	251	6500	5.0%	6500	9000	9000	2600	6500	7700	7700	4200	6500	6100
	S	369	2700	4.5%	2700	2900	2900	2900	2700	2900	2900	2900	2700	2300
KY-155	T	361	49000	5.0%	49000	52000	52000	46000	49000	50000	50000	47000	49000	49000
I-265	J	O36	84000	3.0%	71000	71000	71000	69000	79000	79000	79000	77000	81000	81000
	K	D01	58000	3.0%	58000	58000	57000	55000	58000	58000	58000	56800	58000	56800
	L	D35	53000	4.0%	53000	53000	53000	53000	53000	53000	53000	53000	53000	53000
KY-1531	N	117	1100	3.5%	1100	1100	1100	900	1100	8000	8000	8000	1100	900
KY-1531	M	117	2300	6.5%	2300	2300	2300	1800	2300	1400	500	500	2300	1800
KY-1848	F	522	16000	5.0%	14000	14000	14000	14000	12000	11000	11000	11000	11000	11000
					0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0
	Wa	Alt #1	0	4.0%	28200	28200	28200	28200	0	0	0	0	0	0
Wa+	WbWc	Alt #2	0	6.5%	0	5400	0	0	0	0	0	0	0	0
Wa+	WbCc	Alt #3	0	6.5%	0	0	6800	13600	0	0	0	0	0	0
Wa+	WbCcCd	Alt #4	0	6.5%	0	0	0	7700	0	0	0	0	0	0
	Ca	Alt #5	0	3.5%	0	0	0	0	12600	11400	11400	11400	0	0
Ca+	CbWc	Alt #6	0	6.5%	0	0	0	0	0	5400	0	0	0	0
Ca+	CbCc	Alt #7	0	6.5%	0	0	0	0	0	0	5400	9100	0	0
Ca+	CbCd	Alt #8	0	6.5%	0	0	0	0	0	0	0	5900	0	0
	Ea	Alt #9	0	3.5%	0	0	0	0	0	0	0	0	13000	13000
Ea+	Eb	Alt #10	0	3.5%	0	0	0	0	0	0	0	0	0	3700

Appendix B

Differences in No-Build and Build Alternate Volumes

UNADJUSTED 2006 CHANGES IN VOLUME ROUNDED														
			No Build	Alternative Build Sceniaros										
				West Connector				Center Connector				East Connector		
	Segments	Sta ID	No Build	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5	Alt #6	Alt #7	Alt #8	Alt #9	Alt #10
US 60	B	998	28000	(9000)	(9000)	(9000)	(9000)	(2200)	(3400)	(3400)	(3400)	(1200)	(1300)
	C	16	15000	(8500)	(8500)	(8400)	(8400)	(2200)	(3300)	(3300)	(3300)	(1300)	(1300)
	D	119	9000	200	300	400	400	(900)	(2200)	(2200)	(2200)	(1600)	(1700)
	E	596	5200	(1900)	(1900)	(1900)	(1900)	(300)	(700)	(700)	(700)	(800)	(800)
I-64	H	19	50000	10000	10000	11000	11000	5000	6000	6000	7000	3000	3000
	G	19	50000	1000	1000	1000	1000	0	0	0	0	0	(1000)
KY-148	Q	996	16000	0	(1000)	(1300)	(2000)	0	(500)	(700)	(1200)	0	(500)
	R	251	2000	0	800	800	(1200)	0	400	400	(700)	0	(100)
	S	369	1300	0	100	100	100	0	100	100	100	0	(200)
KY-155	T	361	15100	0	900	900	(800)	0	400	400	(400)	0	100
I-265	J	O36	49000	(8000)	(8000)	(8000)	(9000)	(3000)	(3000)	(3000)	(4000)	(2000)	(2000)
	K	D01	34000	0	0	(1000)	(2000)	0	0	0	(1000)	0	(1000)
	L	D35	27000	0	0	0	0	0	0	0	0	0	0
KY-1531	N	117	500	0	0	0	(100)	0	3000	3000	3000	0	(100)
KY-1531	M	117	500	0	0	0	(100)	0	(200)	(400)	(400)	0	(100)
KY-1848	F	522	5000	(700)	(700)	(700)	(800)	(1300)	(1700)	(1700)	(1700)	(1700)	(1700)
	Wa	Alt #1	0	11000	11000	11000	11000	0	0	0	0	0	0
Wa+	WbWc	Alt #2	0	0	1200	0	0	0	0	0	0	0	0
Wa+	WbCc	Alt #3	0	0	0	1500	3000	0	0	0	0	0	0
Wa+	WbCcCd	Alt #4	0	0	0	0	1700	0	0	0	0	0	0
	Ca	Alt #5	0	0	0	0	0	5500	5000	5000	5000	0	0
Ca+	CbWc	Alt #6	0	0	0	0	0	0	1200	0	0	0	0
Ca+	CbCc	Alt #7	0	0	0	0	0	0	0	1200	2000	0	0
Ca+	CbCd	Alt #8	0	0	0	0	0	0	0	0	1300	0	0
	Ea	Alt #9	0	0	0	0	0	0	0	0	0	5700	5700
Ea+	Eb	Alt #10	0	0	0	0	0	0	0	0	0	0	1600
								=Reduction in Volume					
								=Increase in Volume					

UNADJUSTED 2030 CHANGES IN VOLUME ROUNDED														
			No Build		Alternative Build Sceniaros									
					West Connector				Center Connector				East Connector	
	Segments	Sta ID	No Build	GR %	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5	Alt #6	Alt #7	Alt #8	Alt #9	Alt #10
US 60	B	998	58000	4.5%	(19000)	(19000)	(19000)	(19000)	(5000)	(7000)	(7000)	(7000)	(2000)	(3000)
	C	16	29000	4.0%	(17000)	(17000)	(16000)	(16000)	(4000)	(6000)	(6000)	(6000)	(3000)	(3000)
	D	119	21000	3.5%	0	1000	1000	1000	(2000)	(5000)	(5000)	(5000)	(4000)	(4000)
	E	596	11000	3.0%	(3900)	(3900)	(3900)	(3900)	(600)	(1400)	(1400)	(1400)	(1600)	(1600)
I-64	H	19	92000	3.5%	18000	18000	20000	20000	9000	11000	11000	13000	6000	6000
	G	19	92000	3.5%	1800	1800	1800	1800	0	0	0	0	0	(1800)
KY-148	Q	996	58000	5.5%	0	(3600)	(4700)	(7200)	0	(1800)	(2500)	(4300)	0	(1800)
	R	251	6500	5.0%	0	2600	2600	(3900)	0	1300	1300	(2300)	0	(300)
	S	369	2700	4.5%	0	200	200	200	0	200	200	200	0	(400)
KY-155	T	361	49000	5.0%	0	2900	2900	(2600)	0	1300	1300	(1300)	0	300
I-265	J	O36	84000	3.0%	(14000)	(14000)	(14000)	(15000)	(5000)	(5000)	(5000)	(7000)	(3000)	(3000)
	K	D01	58000	3.0%	0	0	(1700)	(3400)	0	0	0	(1700)	0	(1700)
	L	D35	53000	4.0%	0	0	0	0	0	0	0	0	0	0
KY-1531	N	117	1100	3.5%	0	0	0	(200)	0	6800	6800	6800	0	(200)
KY-1531	M	117	2300	6.5%	0	0	0	(500)	0	(900)	(1800)	(1800)	0	(500)
KY-1848	F	522	16000	5.0%	(2300)	(2300)	(2300)	(2600)	(4200)	(5500)	(5500)	(5500)	(5500)	(5500)
					0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0
	Wa	Alt #1	0	4.0%	28000	28000	28000	28000	0	0	0	0	0	0
Wa+	WbWc	Alt #2	0	6.5%	0	5000	0	0	0	0	0	0	0	0
Wa+	WbCc	Alt #3	0	6.5%	0	0	7000	14000	0	0	0	0	0	0
Wa+	WbCcCd	Alt #4	0	6.5%	0	0	0	8000	0	0	0	0	0	0
	Ca	Alt #5	0	3.5%	0	0	0	0	13000	11000	11000	11000	0	0
Ca+	CbWc	Alt #6	0	6.5%	0	0	0	0	0	5000	0	0	0	0
Ca+	CbCc	Alt #7	0	6.5%	0	0	0	0	0	0	5000	9000	0	0
Ca+	CbCd	Alt #8	0	6.5%	0	0	0	0	0	0	0	6000	0	0
	Ea	Alt #9	0	3.5%	0	0	0	0	0	0	0	0	13000	13000
Ea+	Eb	Alt #10	0	3.5%	0	0	0	0	0	0	0	0	0	4000

=Reduction in Volume
=Increase in Volume

Appendix C

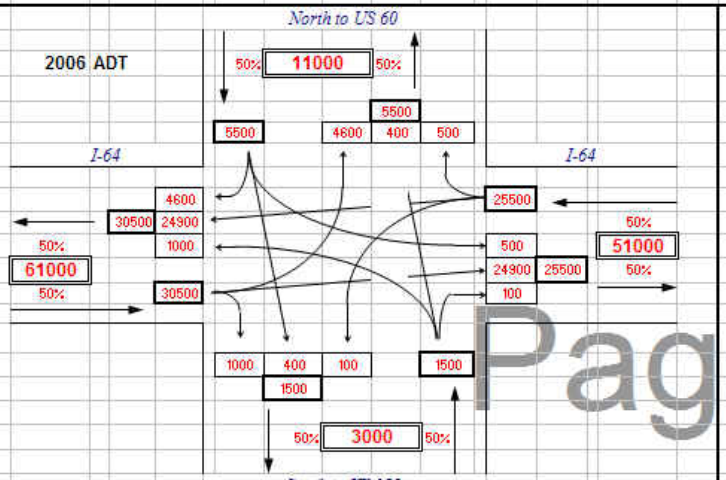
Interchange Turn Movements

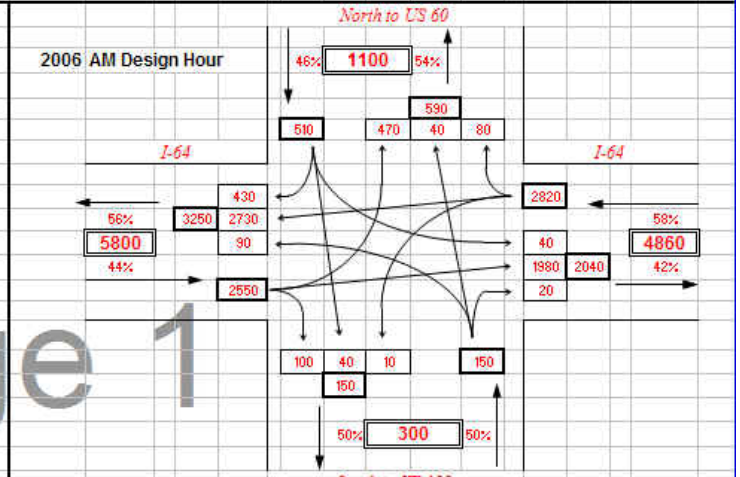
PROJECT:	TF 06-054
ITEM NUMBER:	6-8200.00
MARS NUMBER:	7-26001D
REQUEST DATE	8/29/2006
ANALYST:	S. Thomson
SCENARIO:	2006 Current ADT and Design Hour Volumes
INTERSECTION:	T2: Proposed Gilliland Interchange

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2006 Turni
Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

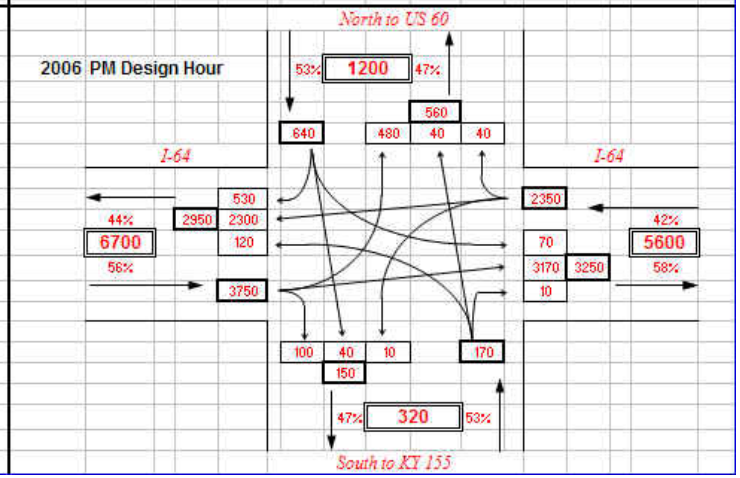
Peak Hour Factors		AM	PM	Thru AM	Thru PM	Right AM	Right PM	Left AM	Left PM
↓	Southbound	0.99	1.00	1.00	1.00	1.00	1.00	0.98	0.97
↑	Northbound	0.99	0.99	1.00	1.00	1.00	0.83	0.98	1.00
←	Westbound	1.00	1.00	1.00	1.00	1.00	1.00	0.83	0.83
→	Eastbound	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

* Arrows indicate approach direction, PHF given by approach and approach movement



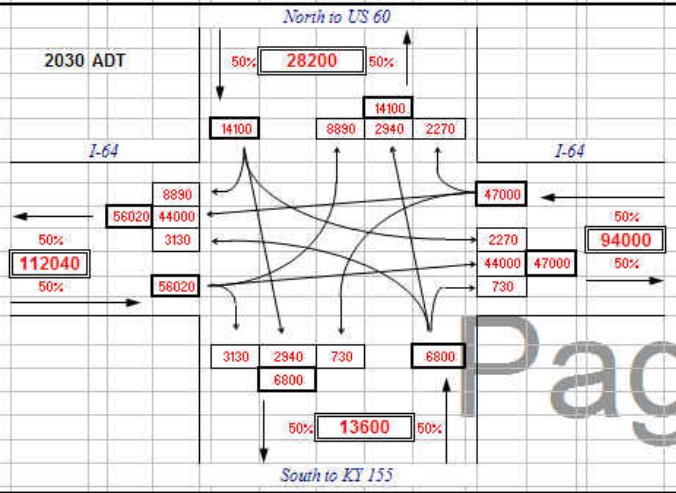


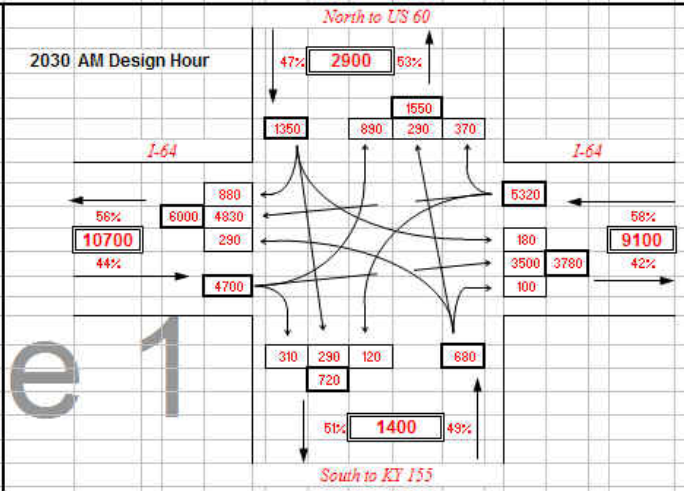
Location Map



PROJECT:	TF 06-054
ITEM NUMBER:	6-8200.00
MARS NUMBER:	7826001D
REQUEST DATE:	8/29/2006
ANALYST:	S. Thomson
SCENARIO:	2030 Current ADT and Design Hour Volumes
INTERSECTION:	T2: Proposed Gilliland Interchange

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2006 Turn Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.





Location Map