

APPENDIX A

LOOP CLOSURES

2006

GEODETTIC CONTROL DENSIFICATION  
AND RESTORATION

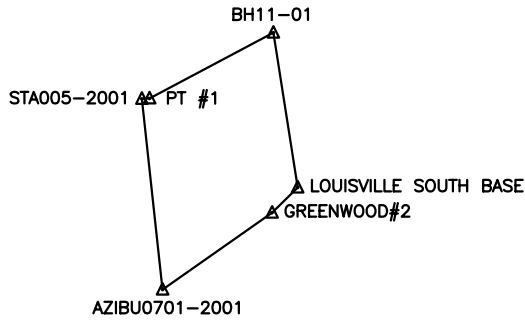
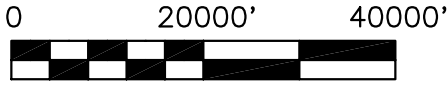
of

JEFFERSON COUNTY, KENTUCKY

JUNE 2006

Jacobi, Toombs and Lanz, Inc.  
401 West Main Street, Suite 600  
Louisville, Kentucky 40202





GPS Loop # 1:				
LOUISVILLE SOUTH BASE: BH11-01: PT#1: STA005-2001: AZIBU0701-2001:GREENWOOD#2:				
LOUISVILLE SOUTH BASE				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B60	S2	LOUISVILLE SOUTH	BH11-01	L1 fixed
B30	S5	BH11-01	PT#1	L1 fixed
B10	S7	STA005-2001	PT#1	L1 fixed
B2	S9	AZIBU0701-2001	STA005-2001	Iono free fixed
B43	S28	AZIBU0701-2001	GREENWOOD#2	L1 fixed
B38	S26	LOUISVILLE SOUTH	GREENWOOD#2	L1 fixed
Passed Combination for Loop 1:				
S2-S5-S7-S9-S28-S26				
		Length	Horiz	Vert
		69395.582sft	0.042sft	0.024sft
				PPM
				0.690

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #1 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

1 OF 15

SCALE: 1" = 20000'

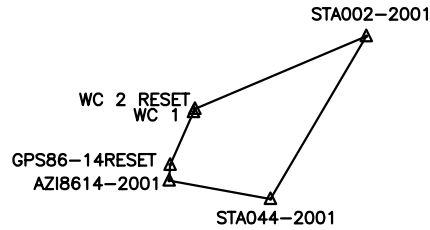
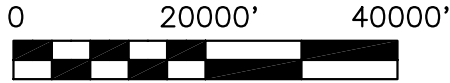
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 2:				
STA002-2001: WC 2 RESET: WC 1: GPS86-14 RESET:AZI8614-2001: STA044-2001:				
STA002-2001				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B14	S32	STA002-2001	WC 2 RESET	Iono free fixed
B4	S50	WC 1	WC 2 RESET	L1 fixed
B6	S53	WC 1	GPS86-14 RESET	L1 fixed
B16	S40	AZI8614-2001	GPS86-14 RESET	L1 fixed
B56	S43	STA044-2001	AZI8614-2001	L1 fixed
B54	S36	STA002-2001	STA044-2001	Iono free fixed
Passed Combination for Loop 2:				
S32-S50-S53-S40-S43-S36				
		Length	Horiz	Vert
		57804.560sft	0.026sft	-0.041sft
				PPM
				0.834

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #2 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

2 OF 15

SCALE: 1" = 20000'

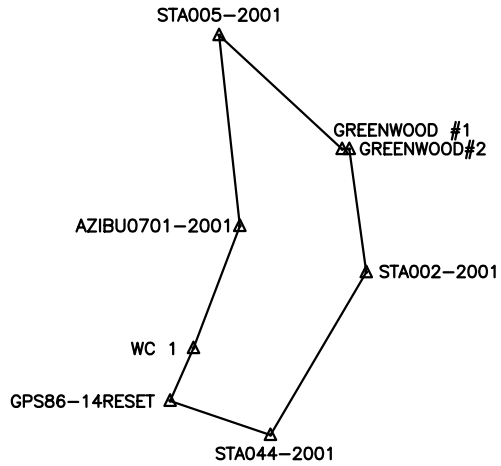
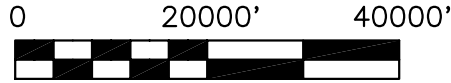
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 3:				
AZIBU0701-2001: STA005-2001: GREENWOOD#1: GREENWOOD#2: STA002-2001:				
STA044-2001: GPS86-14 RESET: WC 1: AZIBU0701-2001				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B2	S9	AZIBU0701-2001	STA005-2001	Iono free fixed
B32	S15	GREENWOOD#1	STA005-2001	Iono free fixed
B7	S55	GREENWOOD#1	GREENWOOD#2	L1 fixed
B17	S30	STA002-2001	GREENWOOD#2	L1 fixed
B54	S36	STA002-2001	STA044-2001	Iono free fixed
B35	S44	STA044-2001	GPS86-14 RESET	L1 fixed
B6	S53	WC 1	GPS86-14 RESET	L1 fixed
B3	S35	AZIBU0701-2001	WC 1	L1 fixed
Passed Combination for Loop 3:				
S9-S15-S55-S30-S36-S44-S53-S35				
		Length	Horiz	Vert
		101478.253sft	0.074sft	-0.086sft
				PPM
				1.120

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #3 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT  
3 OF 15

SCALE: 1" = 20000'

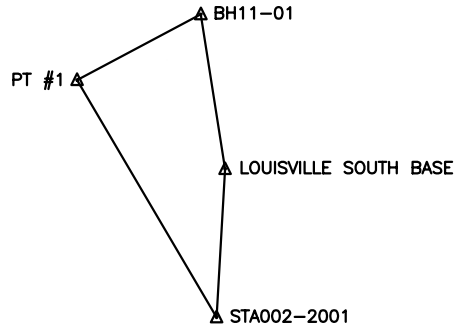
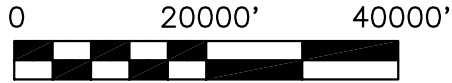
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 4:				
LOUISVILLE SOUTH BASE: STA002-2001: PT#1: BH11-01: LOUISVILLE SOUTH BASE				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B57	S57	LOUISVILLE SOUTH	STA002-2001	L1 fixed
B31	S60	PT#1	STA002-2001	Iono free fixed
B30	S5	BH11-01	PT#1	L1 fixed
B60	S2	LOUISVILLE SOUTH	BH11-01	L1 fixed
Passed Combination for Loop 4:				
S57-S60-S5-S2				
		Length	Horiz	Vert
		75075.903sft	0.022sft	-0.068sft
				PPM
				0.957

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #4 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

4 OF 15

SCALE: 1" = 20000'

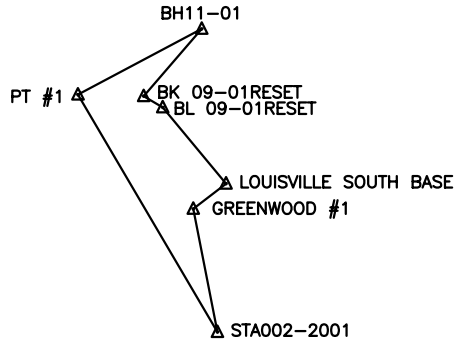
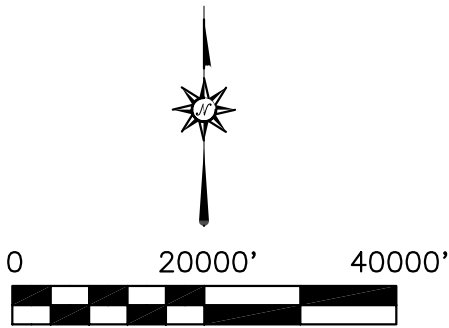
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 5:				
PT#1: STA002-2001: GREENWOOD#1: LOUISVILLE SOUTH BASE: BL 09-01 RESET:				
BK 09-01 RESET: BH 11-01: PT#1				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B31	S60	PT#1	STA002-2001	Iono free fixed
B27	S29	STA002-2001	GREENWOOD#1	L1 fixed
B47	S27	LOUISVILLE SOUTH	GREENWOOD#1	L1 fixed
B59	S18	LOUISVILLE SOUTH	BL 09-01 RESET	L1 fixed
B28	S13	BK 09-01 RESET	BL09-01 RESET	L1 fixed
B9	S4	BH11-01	BK 09-01 RESET	L1 fixed
B30	S5	BH11-01	PT#1	L1 fixed
Passed Combination for Loop 5:				
S60-S29-S27-S18-S13-S4-S5				
		Length	Horiz	Vert
		82530.858sft	0.088sft	0.016sft
				PPM
				1.082

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #5 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

5 of 15

SCALE: 1" = 20000'

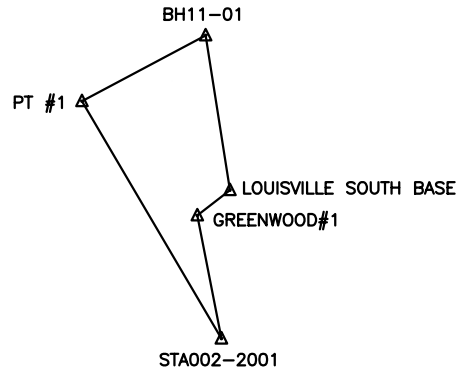
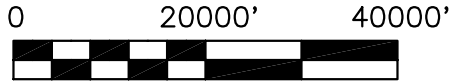
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 6:				
PT#1: STA002-2001: GREENWOOD#1: LOUISVILLE SOUTH BASE: BL 09-01 RESET:				
BH 11-01: PT#1				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B31	S60	PT#1	STA002-2001	Iono free fixed
B27	S29	STA022-2001	GREENWOOD#1	L1 fixed
B47	S27	LOUISVILLE SOUTH	GREENWOOD#1	L1 fixed
B60	S2	LOUISVILLE SOUTH	BH 11-01	L1 fixed
B30	S5	BH 11-01	PT#1	L1 fixed
Passed Combination for Loop 5:				
S60-S29-S27-S2-S5				
		Length	Horiz	Vert
		76968.646sft	0.024sft	0.069sft
				PPM
				0.953

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #6 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT  
6 OF 15

SCALE: 1" = 20000'

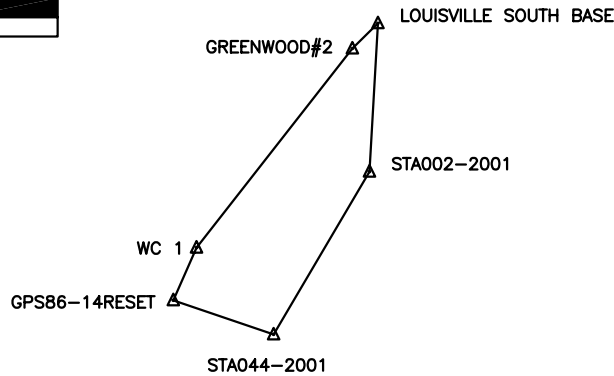
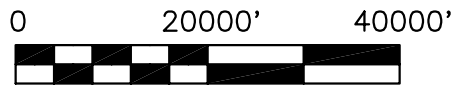
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 7:				
GREENWOOD#2: WC 1: GPS86-14 RESET: STA044-2001: LOUISVILLE SOUTH BASE:				
GREENWOOD#2:				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B33	S56	GREENWOOD#2	WC 1	Iono free fixed
B6	S53	WC 1	GPS86-14 RESET	L1 fixed
B35	S44	STA044-2001	GPS86-14 RESET	L1 fixed
B54	S36	STA002-2001	STA044-2001	Iono free fixed
B57	S57	LOUISVILLE SOUTH	STA002-2001	L1 fixed
B38	S26	LOUISVILLE SOUTH	GREENWOOD#2	L1 fixed
Passed Combination for Loop 7:				
S56-S53-S44-S36-S57-S26				
		Length	Horiz	Vert
		82277.476sft	0.039sft	0.149sft
				PPM
				1.869

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #7 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

7 OF 15

SCALE: 1" = 20000'

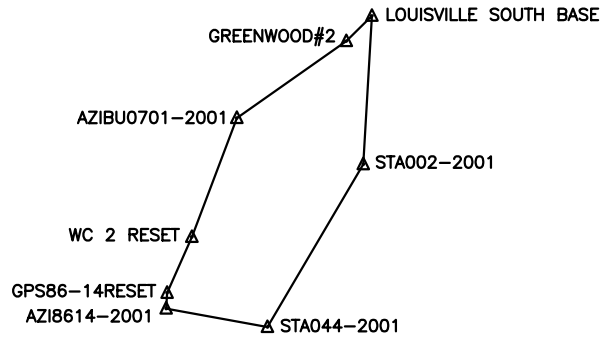
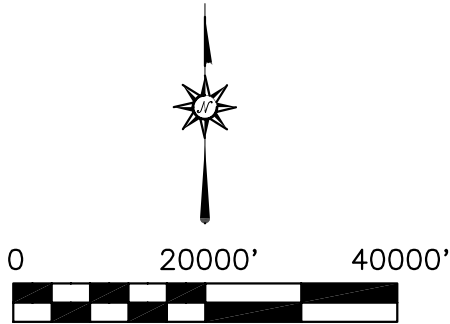
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 8:				
LOUISVILLE SOUTH: STA002-2001: STA044-2001: AZI8614-2001: GPS86-14 RESET:				
WC 2 RESET: AZIBU0701-2001: GREENWOOD#2: LOUISVILLE SOUTH BASE				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B57	S57	LOUISVILLE SOUTH	STA002-2001	L1 fixed
B54	S36	STA002-2001	STA044-2001	Iono free fixed
B56	S43	STA044.2001	AZI8614-2001	L1 fixed
B16	S40	AZI8614-2001	GPS86-14 RESET	L1 fixed
B5	S41	WC 2 RESET	GPS86-14 RESET	L1 fixed
B74	S62	AZIBU0701-2001	WC 2 REEST	L1 fixed
B43	S28	AZIBU0701-2001	GREENWOOD#2	L1 fixed
B38	S26	LOUISVILLE SOUTH	GREENWOOD#2	L1 fixed
Passed Combination for Loop 8:				
S57-S36-S43-S40-S41-S62-S28-S26				
		Length	Horiz	Vert
		84809.854sft	0.029sft	-0.027sft
				PPM
				0.461

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #8 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

8 of 15

SCALE: 1" = 20000'

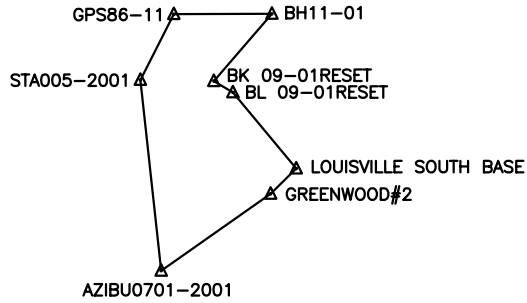
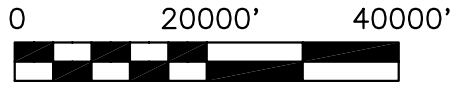
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 9:				
GPS86-11: STA005-2001:AZIBU0701-2001: GREENWOOD#2: LOUISVILLESOUTH BASE:				
BL 09-01 RESET:BK09-01 RESET: BH 11-01: GPS86-11				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B65	S66	GPS86-11	STA005-2001	L1 fixed
B2	S9	AZIBU0701-2001	STA005-2001	Iono free fixed
B43	S28	AZIBU0701-2001	GREENWOOD#2	L1 fixed
B38	S26	LOUISVILLE SOUTH	GREENWOOD#2	L1 fixed
B59	S18	LOUISVILLE SOUTH	BL 09-01 RESET	L1 fixed
B28	S13	BK 09-01 RESET	BL 09-01 RESET	L1 fixed
B9	S76	BH 11-01	BK 09-01 RESET	L1 fixed
B63	S67	BH 11-01	GPS86-11	L1 fixed
Passed Combination for Loop 9:				
S66-S9-S28-S26-S18-S13-S76-S67				
		Length	Horiz	Vert
		77448.236sft	0.041sft	-0.072sft
				PPM
				1.075

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #9 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT  
9 of 15

SCALE: 1" = 20000'

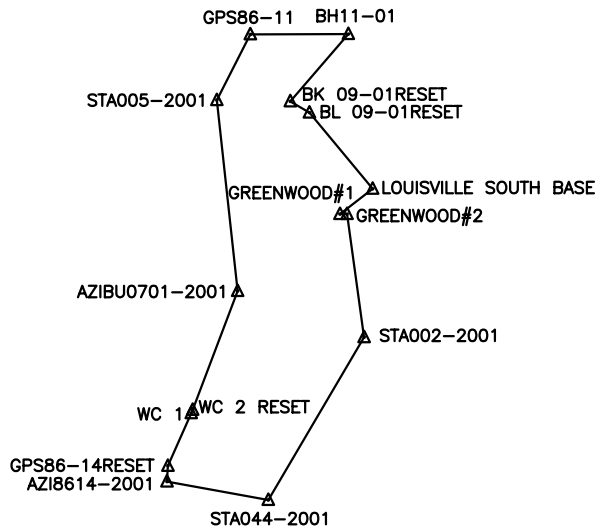
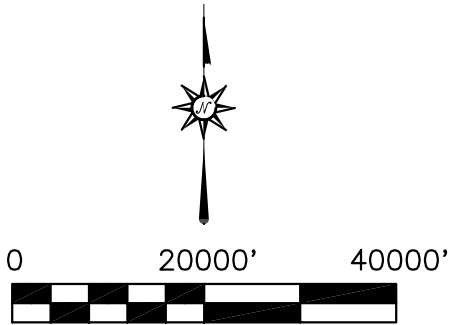
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 10:				
AZIBU0701-2001:WC 2 RESET: WC 1: GPS86-14 RESET: AZI8614-2001: STA044-2001				
STA002-2001: GREENWOOD#2: GREENWOOD#1: LOUISVILLE SOUTH BASE: BL 09-01 RESET:				
BK 09-01 RESET: BH 11-01: GPS86-11: STA005-2001: AZIBU0701-2001				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B74	S62	AZIBU0701-2001	WC 2 RESET	L1 fixed
B4	S50	WC 1	WC 2 RESET	L1 fixed
B6	S53	WC 1	GPS86-14 RESET	L1 fixed
B16	S40	AZI8614-2001	GPS86-14 RESET	L1 fixed
B56	S43	STA044-2001	AZI8614-2001	L1 fixed
B54	S36	STA002-2001	STA044-2001	Iono free fixed
B17	S30	STA002-2001	GREENWOOD#2	L1 fixed
B7	S55	GREENWOOD#1	GREENWOOD#2	L1 fixed
B47	S27	LOUISVILLE SOUTH	GREENWOOD#1	L1 fixed
B59	S18	LOUISVILLE SOUTH	BL 09-01 RESET	L1 fixed
B28	S13	BK 09-01 RESET	BL 09-01 RESET	L1 fixed
B9	S76	BH 11-01	BK 09-01 RESET	L1 fixed
B63	S67	BH 11-01	GPS86-11	L1 fixed
B65	S66	GPS86-11	STA005-2001	L1 fixed
B2	S9	AZIBU0701-2001	STA005-2001	Iono free fixed
Passed Combination for Loop 10:				
S62-S50-S53-S40-S43-S36-S30-S55-S27-S18-S13-S76-S67-S66-S9				
		Length	Horiz	Vert
		129412.390sft	0.033sft	-0.082sft
			PPM	0.680

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #10 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT  
100F15

SCALE: 1" = 20000'

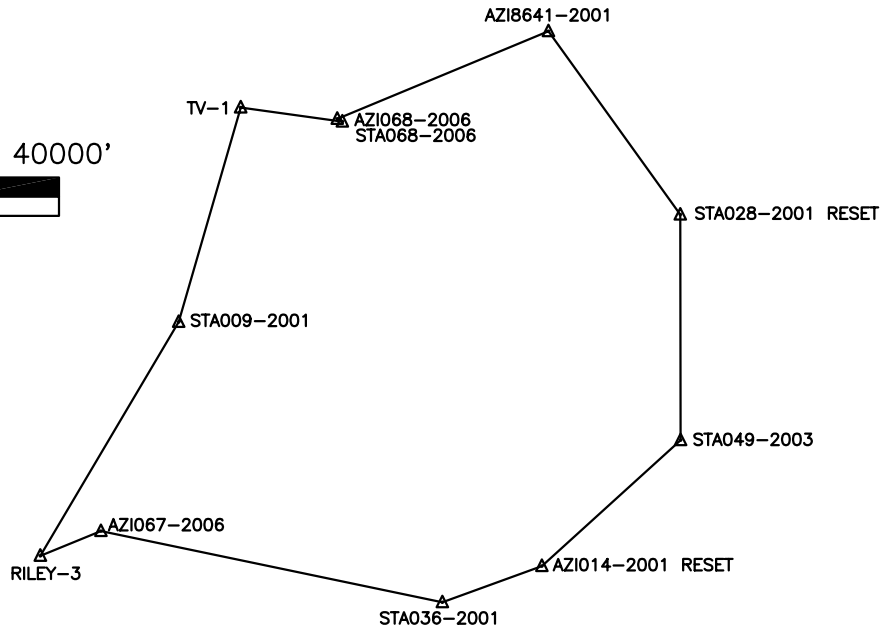
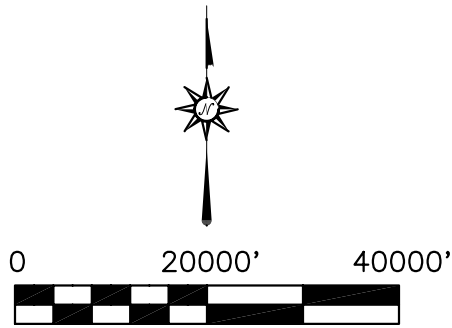
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 11:				
STA068-2006: AZI068-2006: AZI8641-2001 RESET: STA049-2003: AZI014 RESET:				
STA036-2001: AZI067-2006: RILEY-3: STA009-2001: TV-1: STA068-2006				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B51	S86	STA068-2006	AZI068-2006	L1 fixed
B50	S88	AZI8641-2001	AZI068-2006	Iono free fixed
B75	S69	AZI8641-2001	STA028-2001RESET	Iono free fixed
B7	S56	STA049-2003	STA028-2001RESET	Iono free fixed
B33	S49	STA049-2003	AZI014-2001RESET	Iono free fixed
B31	S44	AZI014-2001RESET	STA036-2001	L1 fixed
B4	S42	STA036-2001	AZI067-2006	Iono free fixed
B42	S33	RILEY-3	AZI067-2006	L1 fixed
B15	S29	RILEY-3	STA009-2001	Iono free fixed
B27	S22	TV-1	STA009-2001	Iono free fixed
B54	S2	TV-1	STA068-2006	L1 fixed
Passed Combination for Loop 11:				
S86-S88-S69-S56-S49-S4-S42-S33-S29-S22-S2				
		Length	Horiz	Vert
		207380.479sft	0.087sft	0.042sft
				PPM
				0.466

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #11 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

11 OF 15

SCALE: 1" = 20000'

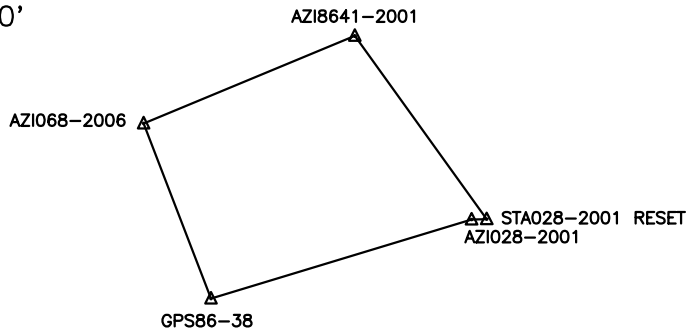
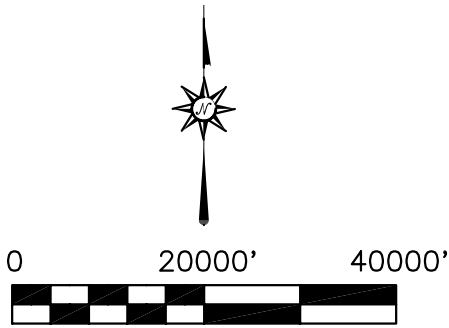
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 12:				
GPS86-38:AZI068-2006:AZI8641-2001:STA028-2001 RESET: AZI028-2001: GPS86-38				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B10	S85	GPS86-38	AZI068-2006	Iono free fixed
B50	S88	AZI8641-2001	AZI068-2006	Iono free fixed
B75	S69	AZI8641.2001	STA028-2001RESET	Iono free fixed
B47	S68	AZI028-2001	STA028-2001RESET	L1 fixed
B46	S61	AZI028-2001	GPS86-38	Iono free fixed
Passed Combination for Loop 12:				
S85-S88-S69-S68-S61				
		Length	Horiz	Vert
		96837.198sft	0.067sft	0.037sft
			PPM	0.791

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #12 CLOSURE

JACOBI, TOOMBS & LANZ, INC.  
CONSULTING ENGINEERS  
120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

12 OF 15

SCALE: 1" = 20000'

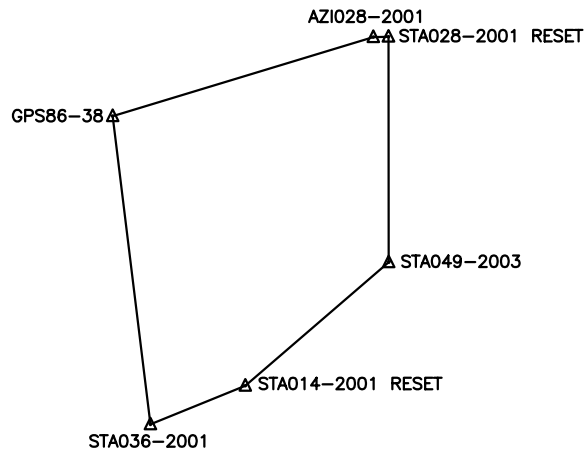
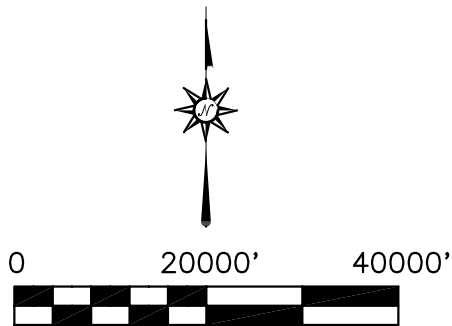
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 13:				
GPS86-38: STA036-2001: STA014-2001 RESET: STA049-2003: STA028-2001 RESET				
AZI028-2001: GPS86-38				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B5	S43	GPS86-38	STA036-2001	Iono free fixed
B57	S46	STA036-2001	STA014-2001RESET	L1 fixed
B34	S51	STA049-2003	STA014-2001RESET	Iono free fixed
B7	S56	STA049-2003	STA028-2001RESET	Iono free fixed
B47	S68	AZI028-2001	STA028-2001RESET	L1 fixed
B46	S61	AZI028-2001	GPS86-38	Iono free fixed
Passed Combination for Loop 13:				
S43-S46-S51-S56-S68-S61				
		Length	Horiz	Vert
		116180.907sft	0.041sft	-0.083sft
				PPM
				0.799

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #13 CLOSURE

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120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
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EXHIBIT

130F15

SCALE: 1" = 20000'

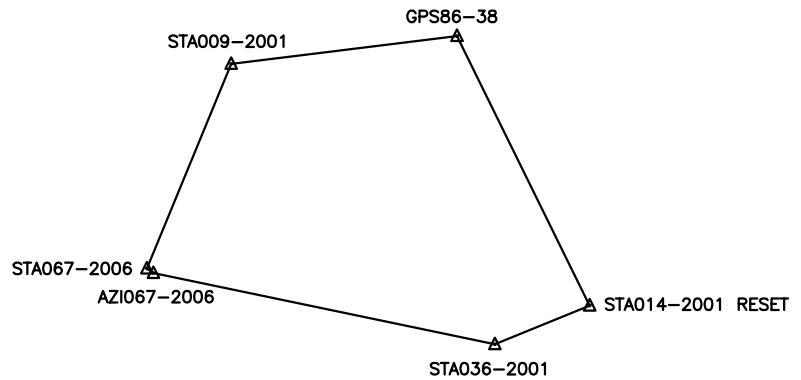
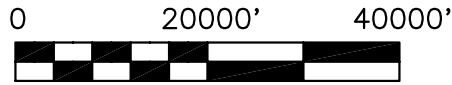
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 14:				
STA009-2001: GPS86-38: STA014-2001 RESET: STA036-2001: AZI067-2006				
STA067-2006: STA009-2001				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B38	S71	STA009-2001	GPS86-38	Iono free fixed
B18	S52	GPS86-38	STA014-2001RESET	Iono free fixed
B57	S46	STA036-2001	STA014-2001RESET	L1 fixed
B4	S42	STA036-2001	GPS86-14 RESET	Iono free fixed
B55	S35	AZI067-2006	STA067-2006	L1 fixed
B29	S37	STA009-2001	STA067-2006	Iono free fixed
Passed Combination for Loop 14:				
S71-S52-S46-S42-S35-S37				
		Length	Horiz	Vert
		125872.928sft	0.022sft	0.131sft
				PPM
				1.056

GPS NETWORK DENSIFICATION FOR  
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #14 CLOSURE

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120 BELL AVENUE  
CLARKSVILLE, INDIANA 47129  
(812) 288-6646



EXHIBIT

14 OF 15

SCALE: 1" = 20000'

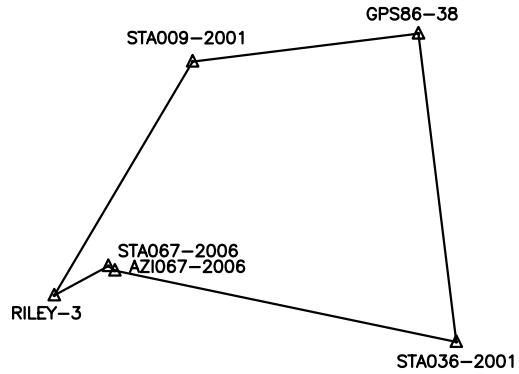
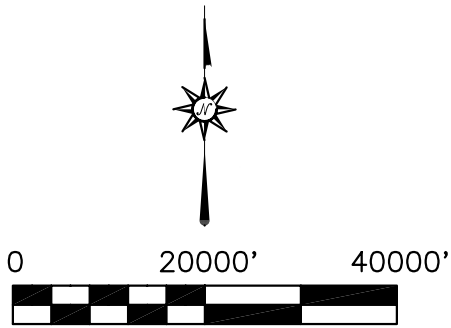
DATE: 6/26/2006

DRAWN: JAT

CHECKED: BTB

APPROVED: HLH

JOB No. 0260



GPS Loop # 15:				
STA009-2001: GPS86-38: STA036-2001: AZI067-2006: STA067-2006: RILEY-3:				
STA009-2001				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B38	S71	STA009-2001	GPS86-38	Iono free fixed
B5	S43	GPS86-38	STA036-2001	Iono free fixed
B4	S42	STA036-2001	AZI067-2006	Iono free fixed
B55	S35	AZI067-2006	STA067-2006	L1 fixed
B2	S31	RILEY-3	STA067-2006	L1 fixed
B15	S29	RILEY-3	STA009-2001	Iono free fixed
Passed Combination for Loop 15:				
S71-S43-S42-S35-S31-S29				
		Length	Horiz	Vert
		127919.844sft	0.009sft	0.064sft
				PPM
				0.503

GPS NETWORK DENSIFICATION FOR  
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STATIC NETWORK LOOP #15 CLOSURE

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EXHIBIT  
15 OF 15

SCALE: 1" = 20000'

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JOB No. 0260