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VILLANOVA UNIVERSITY
LANCASTER AVENUE
STUDENT RESIDENT HALLS

TRANSPORTATION IMPACT STUDY

Radnor Township

Delaware County, Pennsylvania

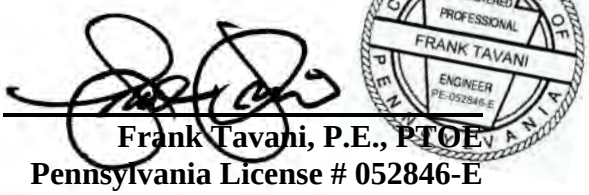
prepared for submission to:

RADNOR TOWNSHIP & PENNDOT DISTRICT 6-0

prepared by:

F. TAVANI AND ASSOCIATES, INC.

16 SEPTEMBER 2014



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FTA JOB NUMBER 211-027

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EXECUTIVE SUMMARY

The purpose of this transportation impact study is to examine the potential traffic impact associated with a proposed Villanova University project located near the intersection of Route 30 and Ithan Avenue. The central feature of the project is a collection of undergraduate student residence hall buildings which is proposed to address presently-unmet on-campus housing demands of the existing student body. The project – and the results of this study – are summarized as follows:

- The project includes 1,135 new beds for undergraduate students, a new performing arts center (PAC), a new 1,293-space garage, and approximately 15,000 SF of Villanova-centric retail space on either side of Ithan Avenue south of Route 30, all of which is targeted to open in 2018.
- The residential component of the site will result in a reduction of peak hour traffic (since currently commuting students will now reside on campus) but to be conservative peak hour traffic associated with 1,135 currently-commuting students was left remaining in the road network and site driveways.
- The retail component of the site is estimated to generate 22 new vehicle trips during the weekday AM peak hour and 64 new vehicle trips during the weekday PM peak hour.
- The PAC will replace currently existing outdated theater / classroom space found on the north side of campus and will not result in new peak hour traffic.
- The project includes elimination of multiple driveways, consolidation of other small parking lots, and some expanded (existing) structured parking on main campus.
- Access to the project will take place via existing driveways along Route 30 and Ithan Avenue, though some will be removed, relocated, or otherwise altered in some fashion. The access modifications can be summarized as follows:
    - Between Route 320 and the Church Walk signalized intersection, eight (8) unsignalized and unrestricted driveways will be consolidated to one (1) unsignalized right-in/right-out (RIRO) driveway.
    - At the Church Walk signalized intersection along Route 30:
        - New auxiliary turn lanes along Route 30 will be provided,
        - A second exit lane will be provided, and
        - A grade-separated pedestrian bridge will be constructed.
    - At the unsignalized exit-only driveway along Route 30 just east of Ithan Avenue:
        - The driveway shall be modified to two-way operation (entry/exit),
        - A new auxiliary turn lane along Route 30 will be provided, and
        - Exiting left turns will be prohibited.
    - At the four (4) unsignalized driveways along Ithan Avenue just south of Route 30:
        - One driveway along the west side of Ithan Avenue will be eliminated,
        - The remaining driveway along the west side of Ithan Avenue will be converted to two-way operation,

- Up to three (3) driveways will be provided on the east side of Ithan Avenue though two (2) will be one-way *and* limited access (i.e., emergencies, deliveries, etc.), and
- The main garage access driveway along the east side of Ithan Avenue will be located opposite the driveway along the west side of Ithan Avenue and will be also be two-way operation.

- The measured sight distances at the proposed site driveways will satisfy all PennDOT sight distance requirements.
- F. Tavani and Associates, Inc. (FTA) recommends the following roadway improvements as outlined at key study area intersections:

Route 30 and Route 320/Kenilworth Street/Aldwyn Lane

- Optimize signal timings at the intersection during the studied peak hours in order to improve operations and queuing.

Route 30 and New RIRO Access

- Provide channelization islands to prohibit entering and exiting left turns.
- Provide new EB right-turn only lane with 75 feet of taper, 125 feet of storage, and 14 feet width.

Route 30 and Church Walk

- Optimize signal timings at the intersection during the studied peak hours in order to improve operations and queuing.
- Provide grade-separated pedestrian bridge.
- Eliminate existing pedestrian crosswalks crossing Route 30.
- Provide new EB right-turn only lane with 75 feet of taper, 125 feet of storage, and 14 feet width.
- Provide new WB left-turn only lane with 75 feet of taper, 100 feet of storage, and 10 feet width.
- Provide 11 foot wide inside and 12 foot wide outside travel lanes (10-foot travel lanes presently exist).

Route 30 and Ithan Avenue

- Optimize signal timings at the intersection during the studied peak hours in order to improve operations and queuing.
- Extend the existing EB left-turn only lane to provide a 75 feet of taper, 200 feet of storage, and 10 feet width.
- Extend the existing WB left-turn only lane to provide a full-width (10 feet) section of approximately 250 feet (between Ithan Avenue and the PAC driveway) plus an additional full-width section east of the PAC driveway measuring 100 feet with a 75-foot taper.
- Provide 11 foot wide inside and 12 foot wide outside travel lanes (10-foot travel lanes presently exist).
- Investigate reducing the existing 26-second long all-red ped-scramble phase.

Additional Site Access Points

- At the currently-existing exit-only unsignalized driveway along Route 30 just east of Ithan Avenue:
  - Modify the driveway to two-way operation (entry/exit).
  - Provide new WB left-turn only lane with 75 feet of taper, 100 feet of storage, and 10 feet width.
  - Prohibit exiting left turns.
- At the four (4) unsignalized driveways along Ithan Avenue just south of Route 30:
  - Eliminate one driveway along the west side of Ithan Avenue.
  - Relocate the remaining driveway further south along the west side of Ithan Avenue and convert to two-way operation (entry/exit).
  - Provide up to three (3) driveways on the east side of Ithan Avenue though two (2) will be limited access (i.e., emergencies, deliveries, etc.) subject to final garage design.
  - Locate the 3rd driveway will be the main garage access driveway along the east side of Ithan Avenue opposite the driveway along the west side of Ithan Avenue and provide two-way operation (entry/exit) and all-way stop-control (AWSC) with a pedestrian crosswalk connecting the garage and the resident halls.

- Level of service comparison tables were prepared in accordance with PennDOT requirements. The offered improvements, where needed, exceed the required mitigations as shown in the tables.
- Queue summary tables were prepared in accordance with PennDOT requirements. Proposed storage lengths reflect projected queues.
- Requested accident investigations reveal no correctable patterns or significant roadway design elements which should be considered.
- Additional information relative to special event parking and traffic management is being addressed by other consultants.
- The addition of a new exclusive EB right-turn lane on Lancaster Avenue at Ithan Avenue is of limited value during ordinary traffic conditions and not needed to satisfy SOL requirements. During special event conditions, its role is also likely to be insignificant since the project will result in fundamental changes to parking and circulation in the immediate vicinity of this intersection. Additional information relative to special event parking and traffic management is being addressed by other consultants.
- The intersection of Ithan Avenue and LAH/Garage Access should be designated as AWSC to benefit pedestrian mobility and garage entry/exit traffic (and related queue management).
- All other SOL-required / additional PennDOT-requested information to date (photo-documentation, pedestrian and bicycle facility descriptions, etc.) is provided.
- Levels of service (LOS) for the study area intersections have been summarized in matrix form (**Table I**) on the following pages.

Table I
Level of Service Comparisons

1. Lancaster Avenue & Spring Mill Road/Kenilworth Road/Aldwyn Lane														
Direction	Movement	AM Peak Hour						PM Peak Hour						
Lancaster Avenue		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	
Eastbound	L	**F 201**	**F 117**	**F 117**	**F 121**	**F121**	**None Required**	**F 283**	**F 136**	**F135**	**F 140**	**F 140**	**F 139**	
	TT	**D**	**C**	**D**	**C**	**D**		**D**	**D**	**D**	**D**	**D**	**D**	
	R	**A**	**A**	**A**	**A**	**A**		**B**	**B**	**A**	**B**	**B**	**A**	
Westbound	L	**D**	**D**	**D**	**D**	**D**		**D**	**E**	**D**	**E**	**E**	**D**	
	TTR	**F 93**	**F 81**	**F 84**	**F 83**	**F 87**		**D**	**E**	**E**	**F 83**	**F 101**	**E**	
Spring Mill Road														
Northbound	L	**F 121**	**F 112**	**F 112**	**F 119**	**F 119**		**F 158**	**F 121**	**F 228**	**F 132**	**F 132**	**F 235**	
	TR	**D**	**D**	**D**	**D**	**D**		**D**	**C**	**D**	**C**	**C**	**D**	
Southbound	L	**D**	**D**	**D**	**D**	**D**		**D**	**D**	**D**	**D**	**D**	**D**	
	TR	**F 146**	**F 106**	**F 106**	**F 109**	**F 109**		**F 352**	**F 110**	**F 129**	**F 114**	**F 114**	**F 134**	
Aldwyn Lane														
Northbound	LTR	**E**	**F 170**	**F 170**	**F 170**	**F 170**		**E**	**F 189**	**F 236**	**F 189**	**F 189**	**F 236**	
Kenilworth Road														
Southbound	LTR	**E**	**F 86**	**F 86**	**F 86**	**F 86**		**E**	**F 83**	**F 83**	**F 83**	**F 83**	**F 83**	
OVERALL:		**E 79**	**E 68**	**E 69**	**E 70**	**E 71**		**F 99**	**E 75**	**E 78**	**E 78**	**F 83**	**E 80**	

2. Lancaster Avenue & Church Walk														
Direction	Movement	AM Peak Hour						PM Peak Hour						
Lancaster Avenue		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 Proj'd w/ Imp's	
Eastbound	TTR	**A**	**A**	**A**	**A**	**A**	**None Required**	**A**	**A**	**A**	**A**	**A**	**None Required**	
Westbound	LTT	**A**	**A**	**A**	**A**	**A**		**A**	**A**	**A**	**A**	**A**		
Church Walk														
Northbound	LR	**C**	**C**	**C**	**C**	**C**		**C**	**C**	**C**	**C**	**C**		
OVERALL:		**A 2**	**A 3**	**A 2**	**A 3**	**A 2**		**A 6**	**A 6**	**A 7**	**A 6**	**A 7**		

3. Lancaster Avenue & Ithan Avenues

Direction	Movement	AM Peak Hour						PM Peak Hour					
Lancaster Avenue		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 Proj'd w/EB RT	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 Proj'd w/ EB RT
Eastbound	L	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
	TTR	**D**	**D**	**D**	**D**	**D**	**C**	**D**	**D**	**D**	**D**	**D**	**D**
Westbound	L	**C**	**C**	**C**	**C**	**C**	**C**	**D**	**D**	**E**	**D**	**E**	**D**
	TTR	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
Ithan Avenue													
Northbound	L	**F 92**	**F 116**	**E**	**F 112**	**E**	**E**	**F 94**	**F 126**	**F 135**	**F 137**	**F 143**	**F 143**
	TR	**E**	**E**	**F 85**	**E**	**F 86**	**F 86**	**D**	**E**	**D**	**E**	**D**	**D**
Southbound	L	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**
	TR	**E**	**E**	**D**	**E**	**D**	**D**	**F 88**	**F 100**	**F 82**	**F 102**	**F 83**	**F 83**
OVERALL:		**D 43**	**D 45**	**D 41**	**D 46**	**D 41**	**D40**	**D 48**	**D 48**	**D 48**	**D 49**	**D 49**	**D 43**

4. Lancaster Avenue & Lowrys Lane

Direction	Movement	AM Peak Hour						PM Peak Hour					
Lancaster Avenue		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	LTTR	**A**	**A**	**A**	**A**	**A**	**None Required**	**A**	**A**	**B**	**A**	**B**	**None Required**
Westbound	LTTR	**A**	**A**	**A**	**A**	**A**		**A**	**A**	**A**	**A**	**A**	
Lowrys Lane													
Northbound	LTR	**B**	**C**	**C**	**C**	**C**		**B**	**B**	**B**	**B**	**B**	
Southbound	LTR	**B**	**C**	**C**	**C**	**C**		**B**	**C**	**C**	**C**	**C**	
OVERALL:		**A 7**	**A 7**	**A 10**	**A 7**	**B 10**		**A 9**	**A 7**	**B 11**	**A 7**	**B 12**	

5. Conestoga Road & Sproul Road

Direction	Movement	AM Peak Hour						PM Peak Hour					
Conestoga Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	L	**D**	**D**	**D**	**D**	**E**	**None Required**	**C**	**C**	**C**	**C**	**C**	**None Required**
	TR	**C**	**C**	**C**	**C**	**C**		**C**	**C**	**C**	**C**	**C**	
Westbound	L	**C**	**C**	**C**	**C**	**C**		**C**	**C**	**C**	**C**	**C**	
	TR	**F 93**	**E**	**E**	**E**	**E**		**D**	**D**	**D**	**D**	**D**	
Sproul Road													
Northbound	L	**E**	**F 141**	**F 141**	**F 151**	**F 151**		**C**	**C**	**C**	**C**	**C**	
	TR	**B**	**C**	**C**	**C**	**C**		**B**	**B**	**B**	**B**	**B**	
Southbound	LTR	**D**	**D**	**D**	**E**	**E**		**D**	**D**	**D**	**D**	**D**	
OVERALL:		**D 50**	**D 52**	**D 51**	**D 52**	**D 53**		**C 33**	**C 35**	**C 34**	**D 36**	**C 35**	

6. Conestoga Road & Ithan Avenue

Direction	Movement	AM Peak Hour						PM Peak Hour					
Conestoga Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	LTR	**F 114**	**F 105**	**F 88**	**F 128**	**F 107**	**None Required**	**B**	**B**	**B**	**B**	**B**	**None Required**
Westbound	LTR	**B**	**B**	**B**	**B**	**B**		**B**	**B**	**A**	**B**	**A**	
Ithan Avenue													
Northbound	LTR	**B**	**C**	**C**	**C**	**C**		**B**	**B**	**B**	**B**	**B**	
Southbound	LTR	**C**	**C**	**C**	**C**	**C**		**B**	**B**	**B**	**B**	**B**	
OVERALL:		**D 52**	**D 49**	**D 43**	**E 58**	**D 50**		**B 12**	**B 12**	**B 11**	**B 12**	**B 11**	

7. Conestoga Road & Garrett Avenue

Direction	Movement	AM Peak Hour						PM Peak Hour					
Conestoga Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	LTR	**A**	**A**	**A**	**A**	**A**	**None Required**	**A**	**A**	**A**	**A**	**A**	**None Required**
Westbound	LTR	**A**	**A**	**A**	**A**	**A**		**A**	**A**	**A**	**A**	**A**	
Garrett Avenue													
Northbound	LTR	**C**	**C**	**C**	**C**	**C**		**C**	**C**	**C**	**C**	**C**	
Southbound	LTR	**C**	**C**	**C**	**C**	**C**		**C**	**C**	**C**	**C**	**C**	
OVERALL:		**A 6**	**A 6**	**A 6**	**A 6**	**A 6**		**A 7**	**A 7**	**A 7**	**A 7**	**A 7**	

8. County Line & Spring Mill Roads

Direction	Movement	AM Peak Hour						PM Peak Hour					
County Line Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	LTR	**B**	**B**	**B**	**B**	**B**	**None Required**	**C**	**C**	**C**	**C**	**C**	**None Required**
Westbound	LTR	**B**	**B**	**B**	**B**	**B**		**C**	**C**	**C**	**C**	**C**	
Spring Mill Road													
Northbound	LTR	**B**	**B**	**B**	**B**	**B**		**B**	**B**	**B**	**B**	**B**	
Southbound	LTR	**B**	**C**	**B**	**C**	**B**		**B**	**C**	**C**	**C**	**C**	
OVERALL:		**B 13**	**B 16**	**B 15**	**B 16**	**B 15**		**C 21**	**C 28**	**C 22**	**C 30**	**C 24**	

9. Lancaster Avenue & Garrett Avenue

Direction	Movement	AM Peak Hour						PM Peak Hour					
Lancaster Avenue		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Westbound	L	**B**	**B**	**B**	**C**	**C**	**None Required**	**B**	**B**	**C**	**B**	**C**	**None Required**
Northbound	R	**C**	**C**	**C**	**C**	**C**		**C**	**C**	**C**	**C**	**C**	
OVERALL:		**A 3**	**A 4**	**A 4**	**A 4**	**A 4**		**A 1**	**A 2**	**A 2**	**A 2**	**A 2**	

10. Conestoga Road & Spring Mill Road

Direction	Movement	AM Peak Hour						PM Peak Hour					
Conestoga Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	L	A	A	A	A	A	None Required	A	A	A	A	A	None Required
Spring Mill Road													
Southbound	LR	C	C	C	C	C		C	C	C	D	C	
OVERALL:		A 1	A 1	A 1	A 1	A 1		A 1	A 1	A 1	A 1	A 1	

11. Conestoga Road & Lowrys Lane

Direction	Movement	AM Peak Hour						PM Peak Hour					
Conestoga Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	L	A	A	A	A	A	None Required	A	A	A	A	A	None Required
Westbound	L	A	A	A	A	A		A	A	A	A	A	
Lowrys Lane													
Northbound	LTR	E	E	E	E	E		C	D	D	D	D	
Southbound	LTR	C	C	C	C	C		C	C	C	C	C	
OVERALL:		A 4	A 4	A 4	A 4	A 4		A 3	A 3	A 3	A 3	A 3	

12. County Line Road & Ithan Avenue North

Direction	Movement	AM Peak Hour						PM Peak Hour					
County Line Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	LR	D	D	C	D	C	None Required	D	D	D	D	D	None Required
Ithan Avenue													
Southbound	TR	D	D	C	D	C		D	D	D	D	D	
OVERALL:		D 30	D 30	C 25	D 30	C 25		D 30	D 30	D 30	D 30	D 30	

13. County Line Road & Ithan Avenue South

Direction	Movement	AM Peak Hour						PM Peak Hour					
County Line Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Westbound	LR	C	C	B	C	C	None Required	C	C	C	C	C	None Required
Ithan Avenue													
Northbound	TR	C	C	B	C	C		C	C	C	C	C	
OVERALL:		C 20	C 20	B 15	C 20	C 16		C 20	C 20	C 15	C 20	C 15	

14. County Line Road & Lowrys Lane

Direction	Movement	AM Peak Hour						PM Peak Hour					
County Line Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Westbound	L	**A**	**A**	**A**	**A**	**A**	**None Required**	**A**	**A**	**A**	**A**	**A**	**None Required**
Lowrys Lane													
Northbound	LR	**B**	**B**	**B**	**B**	**B**		**B**	**B**	**B**	**B**	**B**	
OVERALL:		**A 4**	**A 4**	**A 4**	**A 4**	**A 4**		**A 2**	**A 2**	**A 2**	**A 2**	**A 2**	

15. County Line Road & Airdale Road

Direction	Movement	AM Peak Hour						PM Peak Hour					
County Line Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	LR	**A**	**A**	**A**	**A**	**A**	**None Required**	**A**	**A**	**A**	**A**	**A**	**None Required**
Airdale Road													
Northbound	L	**B**	**B**	**B**	**B**	**B**		**B**	**B**	**B**	**B**	**B**	
OVERALL:		**A 4**	**A 4**	**A 4**	**A 4**	**A 4**		**A 4**	**A 4**	**A 4**	**A 4**	**A 4**	

16. County Line Road & Roberts Road

Direction	Movement	AM Peak Hour						PM Peak Hour					
County Line Road		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	L	**A**	**A**	**A**	**A**	**A**	**None Required**	**A**	**A**	**A**	**A**	**A**	**None Required**
Westbound	L	**A**	**A**	**A**	**A**	**A**		**A**	**A**	**A**	**A**	**A**	
Roberts Road													
Northbound	LTR	**F 181**	**F 201**	**F 201**	**F 222**	**F 222**		**E**	**E**	**E**	**E**	**E**	
Southbound	LTR	**D**	**E**	**E**	**E**	**E**		**D**	**D**	**D**	**D**	**D**	
OVERALL:		**C 24**	**D 26**	**D 26**	**D 29**	**D 29**		**A 3**	**A 3**	**A 3**	**A 3**	**A 3**	

17. Ithan Avenue & Aldwyn Lane

Direction	Movement	AM Peak Hour						PM Peak Hour					
Aldwyn Lane		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Eastbound	LTR	**B**	**B**	**B**	**B**	**B**	**None Required**	**B**	**B**	**B**	**B**	**B**	**None Required**
Westbound	LTR	**B**	**B**	**B**	**B**	**B**		**B**	**B**	**B**	**B**	**B**	
Ithan Avenue													
Northbound	L	**A**	**A**	**A**	**A**	**A**		**A**	**A**	**A**	**A**	**A**	
Southbound	L	**A**	**A**	**A**	**A**	**A**		**A**	**A**	**A**	**A**	**A**	
OVERALL:		**A 2**	**A 2**	**A 2**	**A 2**	**A 2**		**A 2**	**A 2**	**A 3**	**A 3**	**A 3**	

18. Lancaster Avenue & WLL RIRO Drive

Direction	Movement	AM Peak Hour						PM Peak Hour					
WLL RIRO Drive		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Northbound	R			**B**		**B**	**NA**			**B**		**B**	**NA**
OVERALL:				**A 1**		**A 1**				**A 1**		**A 1**	

19. Lancaster Avenue & PAC RILIRO Drive

Direction	Movement	AM Peak Hour						PM Peak Hour					
Lancaster Avenue		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ Imp's
Westbound	L			**B**		**B**	**NA**			**B**		**B**	**NA**
PAC RILIRO Drive													
Northbound	R			**B**		**B**				**C**		**C**	
OVERALL:				**A 1**		**A 1**				**A 1**		**A 1**	

20. Ithan Avenue & LAH / Garage Drive

Direction	Movement	AM Peak Hour						PM Peak Hour					
LAH / Garage Drive		2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ AWS	2012 Existing	2018 Base	2018 Projected	2023 Base	2023 Projected	2023 w/ AWS
Eastbound	LTR			**C**		**C**	**A**			**C**		**C**	**A**
Westbound	LTR			**B**		**C**	**A**			**C**		**C**	**B**
Ithan Avenue													
Northbound	L / LTR			**A**		**A**	**B**			**A**		**A**	**B**
Southbound	L / LTR			**A**		**A**	**B**			**A**		**A**	**B**
OVERALL:				**A 3**		**A 3**	**B 12**			**A 7**		**A 7**	**B 11**

Base = No-Build Scenario
Projected = Build Scenario
For Ithan/LAH, 2023 Projected was performed twice -- once as an TWSC and once as AWSC.

INTRODUCTION

Villanova University ("Villanova") proposes construction of new undergraduate student residence halls on the site of an existing parking lot (known as "Main Lot") near the intersection of Lancaster Avenue and Ithan Avenue. Construction of the new halls will displace 1,126 existing surface parking spaces currently found on the Main Lot. The majority of replacement parking is provided in a new parking structure to be constructed east of Ithan Avenue in an area currently occupied by a surface parking lot having a capacity of 577 spaces ("Pike Lot"). The project also includes a performing art center and approximately 15,000 SF of Villanova-centric retail space, the exact users of which are to be determined. This transportation impact study was prepared per the requirements of the CICD ordinance of Radnor Township as adopted in January 2014 (Zoning 280-68.1). The ordinance features a requirement for traffic investigations pursuant to PennDOT Strike Off Letter (SOL) 470-09-4.

Traffic investigations and related due diligence with the Township and PennDOT began well before ordinance adoption. Radnor Township provided input on scope of work in mid 2012 with most data collection taking place that fall. See **Appendix A** for more details and other project correspondence. Additional efforts unfolded as ordinance deliberation continued through 2013. With the ordinance recently adopted and a conditional use hearing now underway, additional comments have been received from both PennDOT and the Township and are reflected herein.

The new student residence halls will provide a total of 1,135 new beds and are intended to address currently-unmet undergraduate student housing demand. This unmet demand results in students living off campus and commuting to classes. Construction of the new halls will result in reduced student commuting activity. Radnor Township places limits on student housing and some Villanova students live outside of the Township. Regardless of their location and the possibility of more distanced students 'backfilling' nearby student housing, the number of peak hour commuting trips will be less after the project is constructed as 1,135 currently-commuting students – near or far – will become campus-residing (non-commuting) students. The study area and the project location are shown in **Figure 1**. An excerpt of the site plan is shown in **Figure 2**.

EXISTING ROAD NETWORK

A field review of the existing roadway system in the study area was conducted. The existing roadway characteristics are summarized in Table 1. Photographs of the study area are provided in **Appendix B**.

TABLE 1
ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Roadway Name	Route #	Smart Trans. Guidelines Roadway Class/Type	Directional Orientation	Posted Speed Limit	AADT per iTMS (09/2014)
Lancaster Avenue	SR 0030	Regional Arterial	E-W	25	17,264

TABLE 1 (continued)
ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Roadway Name	Route #	Smart Trans. Guidelines Roadway Class/Type	Directional Orientation	Posted Speed Limit	AADT per iTMS (09/2014)
Conestoga Road	SR 1019	Regional Arterial	E-W	25-35	10,000
County Line Road	G 847	Community Collector	E-W	25	1,906
Spring Mill Road / Sproul Road	SR 0320	Regional Arterial	N-S	25-45	8,449
Ithan Avenue	G 309	Neighborhood Collector	N-S	25	1,814
remaining streets	none	Local	N-S and E-W	25 (typical)	not available

LAND USE CONTEXT

Land use context guidance is provided in Chapter 4 of the Smart Transportation Guidebook (March 2008). The immediate area surrounding Villanova University most closely resembles the Suburban Center definition.

ROADWAY CLASSIFICATION

Roadway type guidance is provided in Chapter 5 of the Smart Transportation Guidebook (March 2008). The roadways closest to the project are Lancaster Avenue and Ithan Avenue. As summarized in **Table 1**, these roadways are defined as Regional Arterials and Neighborhood Collectors.

Applicable excerpts from the Smart Transportation Guidebook are provided in **Appendix C**.

PEDESTRIAN, MASS TRANSIT, AND BICYCLE FACILITIES

Both the Villanova campus and the roadways closest to the project provide sidewalks, painted pedestrian crosswalks, bicycle facilities, and/or designated pedestrian-only paths. There are also several mass transit opportunities in the area:

- SEPTA Regional Rail Paoli/Thorndale (formerly R5) line, north side of Route 30;
- SEPTA Norristown High Speed Line (formerly RT 100) line, south side of Route 30; and
- SEPTA Bus Routes 105 & 106 along Route 30 (stops near Ithan Avenue & Church Walk).

Additional details are provided in a figure in **Appendix D**.

EXISTING TRAFFIC VOLUMES

The site will generate traffic at various times throughout the day, though typical weekday commuter peak periods (i.e., 7:00-9:00 AM and 4:00-6:00 PM) are when the demands of the site plus existing traffic at study area intersections will be at a combined maximum. Data collection for this study was scheduled reflective of this and was performed by FTA principally in the fall of 2012 following receipt of a scope of work by the Township in June 2012.

MANUAL TURNING MOVEMENT COUNTS

Manual traffic counts were conducted using 15-minute intervals during weekday commuter peak periods (7:00-9:00 AM and 4:00-6:00 PM) at the following locations:

1) Lancaster Avenue and Spring Mill Road / Kenilworth Road / Aldwyn Lane
2) Lancaster Avenue and Church Walk
3) Lancaster Avenue and Ithan Avenue
4) Lancaster Avenue and Lowrys Lane
5) Lancaster Avenue and Garrett Avenue
6) Conestoga Road and Sproul Road
7) Conestoga Road and Spring Mill Road
8) Conestoga Road and Ithan Avenue
9) Conestoga Road and Lowrys Lane
10) Conestoga Road and Garrett Avenue
11) County Line Road and Spring Mill Road
12) County Line Road and Ithan Avenue North
13) County Line Road and Ithan Avenue South
14) County Line Road and Lowrys Lane
15) County Line Road and Airedale Road
16) County Line Road and Roberts Road
17) Ithan Avenue and Aldwyn Lane

In addition, counts were also conducted at the unsignalized driveways serving Villanova's main parking lots (Main Lot and Pike Lot) which are located on either side of Ithan Avenue south of Lancaster Avenue. These driveways were counted twice – in 2011 and in 2013.

The analyzed peak hours were 7:30 to 8:30 AM and 5:00 to 6:00. Turning movement peak hour volumes are presented in **Figures 3** and **4**. Pedestrian crossing activity was also counted and is presented in separate figures. The counts were conducted during ordinary class days.

Additional information regarding existing traffic volumes – including count data – is provided in the **Appendix E**. Note that "Special event" data collection was also conducted namely during Homecoming (10-26-12) and a weekday evening during a basketball game (St. Joes 12-11-12) and is referenced in the appendix. In all cases, the data collection efforts were also selected during normal weather and when no area road construction or detours were underway.

BASE CONDITIONS

The opening date of the project is expected to be 2018, or approximately six (6) years from the date of the data collection of the site (Fall 2012). This timeframe includes engineering, land development approvals, construction, fit out, and occupancy of the site. PennDOT

regulations require adding five (5) additional years to the full build condition to arrive at a Design Year (2023). Thus this report includes two base conditions:

- 1.51% (0.25% per year for 6 years) for Full-Build (2018), and
- 2.78% (0.25% per year for 11 years) for Design Year (2023).

BACKGROUND GROWTH

In 2013 the Delaware Valley Regional Planning Commission (DVRPC) performed studies which resulted in a recommended growth rate for the study area in Radnor Township. This TIS incorporates the recommended rate (0.25% per annum) and was approved by PennDOT. DVRPC growth rate documentation is provided in **Appendix A**.

NEARBY PROPOSED DEVELOPMENTS

At this time there are no other significant approved land development projects in the immediate vicinity of the project. The Base (No Build) scenario includes existing traffic volumes and either 6 or 11 years of compounded growth at 0.25% per year applied to all through movements (i.e., excluding driveways and dead-end streets). 2018 and 2023 Base Condition turning movement peak hour volumes are presented in **Figures 5** thru **8**.

PROJECT DESCRIPTION

The most significant component of the project is the residence halls which yield 1,135 new beds on campus. These beds will be used by existing commuting undergraduate students, many of whom currently use Main Lot. In the future, while many 'converted' campus-residing (former commuting) students will continue to own automobiles, these automobiles will – in large part – not be utilized or moving during weekday commuter peak periods. This is but one of a few fundamental changes in traffic patterns which will result from the project. Other changes include:

- added parking to existing garages (HSB and SAC) on the north side of campus,
- consolidation of several small parking lots plus added supply west of Church Walk,
- elimination of several unregulated driveways along Route 30 west of Church Walk,
- construction of a new grade-separated pedestrian bridge at Church Walk, and
- other capacity-adding and mobility-improving features.

See **Appendix F** for map figure which identifies locations of buildings and parking lots throughout campus.

Note that even though the automobiles owned by the new campus-residing students will typically not be active or moving during weekday peak periods, this TIS assumes *all* parking spaces continue to be active during peak hours, just as they are today (without the new residence halls). This adds a significant measure of conservativeness to the Projected Conditions scenarios.

TRIP GENERATION

Trip generation activity for many land uses can be investigated utilizing the Institute of Transportation Engineers' (ITE) publication entitled Trip Generation Manual and land use code 550 (University/College) is available for review. However, the data is intended to reflect entirely new universities / new students. This project provides for the conversion of

currently-commuting students to campus-residing students – not net new students – so a different approach is needed.

The project may result in a small net increase in parking. More importantly, the project includes significant shifts in the location of parking spaces as well as their function. For example, there currently exists 1,126 parking spaces in the Main Lot (west side of Ithan Avenue) and 577 spaces in Pike Lot (east side of Ithan Avenue). With the project constructed, there will be 62 parking spaces in the 'former' Main Lot and 1,293 spaces in a structure on the 'former' Pike Lot (many of which will be occupied by non-moving student-owned vehicles).

As mentioned earlier, the project continues to assume parking space activity 'turns over' in the same manner as it does today (i.e., as it does with currently-commuting students). The trip generation for the project is thus conservatively based upon the trip generating characteristics of the existing parking spaces in Main and Pike Lots and is effectively a reallocation of current peak hour activity based on the location of new parking spaces throughout campus, including at the new Pike garage, at the expanded HSB garage, at the expanded SAC garage, and at the 'new' West Lancaster surface lot (WLL). More details about trip generation rates for existing parking is provided in **Appendix G** and are summarized below.

TABLE 2
PARKING SPACE TRIP GENERATION

Trip Generation (Parking Spaces)	**AM Peak Hour**			**PM Peak Hour**		
	IN	**OUT**	**TOTAL**	**IN**	**OUT**	**TOTAL**
Rates	0.227	0.028	0.255	0.199	0.225	0.424

Note that the plans submitted with the conditional use application revealed a small net increase in parking (19 spaces) but this number is subject to further refinement as land development ensues.

In addition to this trip generation, the Township traffic engineer requested (in a letter dated 23 July 2014 as found in **Appendix A**) that the trip generation potential of the university-centric retail space be examined and discussed. This was conducted as requested and was based upon similar retail space found at St. Joe's University and is described in greater detail in **Appendix G**. In summary, the retail component of the site is estimated to generate 22 new vehicle trips during the weekday AM peak hour and 64 new vehicle trips during the weekday PM peak hour. Even though the Township traffic engineer only asked for a discussion of the potential of this traffic, the referenced trips were in fact included in the Projected Conditions of this TIS. **Table 3** summarizes the weekday AM and PM peak hour new vehicular trip generation potential of the site.

TABLE 3
TRIP GENERATION (NEW VEHICULAR TRIPS)

Trip Component	**AM Peak Hour**			**PM Peak Hour**		
	IN	**OUT**	**TOTAL**	**IN**	**OUT**	**TOTAL**
Retail	11	11	22	34	30	64
Net Parking Gain (potential)	4	1	5	4	4	8
TOTAL	15	12	27	38	34	72

TRIP DISTRIBUTION

The distribution of site traffic is essentially an extensive redistribution of existing traffic due to the reassignment of parking supply in different locations throughout the core campus area (HSB & SAC garages, WLL, etc). In addition there are proposed changes to driveway locations and functionality, such as the Lancaster Avenue inbound access to the Pike Lot garage (which currently exist but is presently exit-only). As a result, several different models were created to track traffic assignments which result from parking changes in different locations which are affected by the project. The principal parking locations affected include:

- Pike Lot (Garage),
- LAH surface parking and the West Lancaster Lot, and
- the expanded HSB/SAC Garages.

More information regarding the derivation of trip distribution models is provided in **Appendix H**. Essentially, trips are added or subtracted throughout the network proportionate to existing driveway volumes (and adjacent intersections which are sources or sinks of said volumes). Retail traffic was added along Route 30 equally in each direction as further described in the worksheets. **Appendix H** includes the results of all individual peak hour worksheet in summary figures presented at the end of the Appendix. Proposed road improvements are described later but are summarized in **Figures 9** and **10**. The combination of site traffic with Base Condition volumes yield Projected Conditions peak hour volumes, **Figures 11** thru **14**.

CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday AM and PM peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the 2010 *Highway Capacity Manual* (where applicable) and using *Synchro 8* software. The following conditions were analyzed:

- 2012 Existing Conditions,
- 2018 Base Conditions,
- 2018 Projected Conditions,
- 2023 Base Conditions, and
- 2023 Projected Conditions.

In addition, capacity analyses were conducted at the proposed site driveway intersections under the Projected Condition scenarios.

Note that per chapter 10 of PennDOT's *Publication 46,* certain default values in *Synchro 8* were changed. These adjustments were made using Suburban classification data at all intersections and driveways in the study area.

PennDOT's transportation impact study guidelines outlined in Strike Off Letter 470-09-4, dated February 2009 last updated December 2013 contain the following criteria regarding levels of service:

- Page 29 of the Guidelines describes that if evaluation of the Base Condition to the Projected Condition results in an overall level of service increase greater than 10 seconds then the Applicant will be required to mitigate the impact.
- Page 31 of the Guidelines states that new driveways shall be designed to operate at LOS C in rural areas and LOS D in urban areas.

Base Condition analysis signal timings were optimized. Overall PHFs were utilized.

LEVELS OF SERVICE IN THE STUDY AREA

Levels of service (LOS) at the study area intersections for the weekday AM and PM peak hours are summarized in **Tables I** as found in the **Executive Summary**. As revealed in the tables, all levels of service at the study area intersections comply with the requirements outlined in the PennDOT SOL.

Note that at the intersection of Lancaster Avenue and Ithan Avenue, the 2023 Projected Condition was analyzed twice – once with a new exclusive EB right-turn lane added and once without said lane. Adding the lane provides a small benefit – a reduction of 1 second of delay in the AM peak hour and slightly more during the PM peak hour. However, PennDOT SOL regulations (as well as the CICD ordinance) are satisfied without the addition of the lane. The benefit of the lane during special event management will no longer be as important as it is today since both the location of parking and the management of special events are proposed to be significantly different. An exclusive EB right-turn lane also extends pedestrian crosswalk distance and for all these reasons is not recommended.

The intersection of Ithan Avenue and LAH/Garage Access was also examined twice – as an AWSC and as a TWSC intersection. The levels of service in either case are comparable but AWSC provides added benefit to pedestrian crossing / mobility and garage turning movement queue management. For these reasons, AWSC control is recommended at this location.

The large number of intersections in the study area and the complexity of the analysis – which incorporates both alternating HCM 2010 and Percentile Delay methodologies as well as alternating lane configuration / traffic control treatment at certain locations – precludes a manageable printed output of capacity worksheets. More details regarding capacity analyses are explained in **Appendix I**. The signal plans utilized in the analyses are provided in **Appendix J**.

QUEUE LENGTH ANALYSIS

Projected 95th percentile queues are available from *Synchro's* electronic files which can be produced upon request for all AM and PM peak hour investigations. In terms of requirements, PennDOT Guidelines provide direction in Strike Off Letter 470-09-4, specifically, page 27 of the Guidelines describes for both Base and Projected Conditions queue and turn lane analysis shall be conducted and provided "as appropriate".

The project primarily affects the intersections of Lancaster Avenue and Ithan Avenue and Lancaster Avenue and Church Walk as well as the proposed points of access both along Lancaster Avenue and along Ithan Avenue. Queue estimates at these locations are summarized in **Table 6**.

TABLE 6
QUEUE ANALYSIS (FEET)

LANCASTER AVENUE & ITHAN AVENUE

Lane Group	2023 Base Conditions			2023 Projected Conditions		
	Available	AM	PM	Proposed	AM	PM
EB L	100	59	63	200	90	63
EB T	--	453	623	--	492	682
EB TR	--			--		
WB L	70	112	107	250	82	147
WB T	--	496	241	--	502	243
WB TR						
NB L	100	173	147	200	138	187
NB TR	--	346	243	--	381	149
SB L	70	48	99	70	49	95
SB TR	--	367	456	--	208	377

LANCASTER AVENUE & CHURCH WALK

Lane Group	2023 Base Conditions			2023 Projected Conditions		
	Available	AM	PM	Proposed	AM	PM
EB T	--	101	206	--	102	206
EB R	n/a	--	--	125	25	0
WB L	n/a	--	--	100	25	0
WB T	--	329	109	--	318	210
NB L	--	25	67	200	25	73
NB R	n/a	--	--	200	25	25

LANCASTER AVENUE & WLL RIRO

Lane Group	2023 Base Conditions			2023 Projected Conditions		
	Available	AM	PM	Proposed	AM	PM
EB R	n/a	--	--	125	0	0
NB R	n/a	--	--	100+	25	25

LANCASTER AVENUE & PAC RILIRO

Lane Group	2023 Base Conditions			2023 Projected Conditions		
	Available	AM	PM	Proposed	AM	PM
EB R	n/a	--	--	--	0	0
WB L	n/a	--	--	100	25	25
NB R	n/a	--	--	200+	25	25

ITHAN AVENUE & LAH / GARAGE ACCESS

Lane Group	2023 Base Conditions			2023 Projected Conditions		
	Available	AM	PM	Proposed	AM	PM
NB L	n/a	--	--	50	0	0
SB L	n/a	--	--	100	25	25

n/a indicates lane does not exist under base (current) conditions. + indicates proposed length = length of driveway / throat
minimum value of 25 used if returned value is <25 and >0 0 value used if prediction is 0
-- indicates through lane (or shared through lane) having no defined stacking distance or not applicable/not proposed.

TURN LANE WARRANT ANALYSIS

The project includes providing new auxiliary left- and right-turn lanes as appropriate at nearly all proposed points of access. As they are offered with the project, the warrant analysis is inconsequential. The locations where a new auxiliary left or right turn lanes are *not* proposed – and the reasons for the proposed omission – follow:

- Route 30 WLL driveway, no WB left turn lane is suggested since the movement is prohibited.
- Route 30 PAC driveway, no EB right turn lane is suggested since it is not warranted.
- Ithan Ave LAH/Garage driveways, no NB/SB right turn lanes are suggested since they are not warranted.

Evidence of the lack of need for the PAC and LAH/Garage auxiliary lanes were based on SOL 470-08-4 as well as PennDOT *Publication 46* Chapter 11 page 11-46 Turn Lane Warrants. The details of the investigations are included in **Appendix K**.

CRASH DATA INVESTIGATIONS

Crash history investigations using PennDOT-supplied cluster list, homogenous report, crash resumes, and a crash summary for 01/2008 to 12/2012 data along the Lancaster Avenue corridor (from Spring Mill Road to County Line Road) were conducted.

The study area featured 112 reportable accidents. Highlights of the data include:

- 0 accidents involved fatalities
- 6 accidents involved pedestrians
- 8 accidents involved injuries classified as *moderate* or *major*
- 24 accidents involved injuries classified *minor*
- 13 accidents involved environmental conditions such as ice- or snow-covered roadways

The segment in question covers approximately 1.23 miles and is classified as an urban, NFAC (non full-access control) roadway. The calculated crash rate (C) of the study corridor is 2.40 crashes per million vehicle miles whereas the latest Department-provided homogenous report gives a rate of 2.25 crashes per million vehicle miles for similar roadways which are undivided, are 41-99 feet wide, and which feature 10-99k ADT. The difference in crash rates (between the study area and similar roadways per the homogenous report) is not significant. It is also appropriate to eliminate certain crashes given the involvement of conditions unrelated to the design of the roadway including – but not limited to – environmental factors such as snow, ice, etc. Eliminating the 13 accidents (per the last bullet point above) which involve these conditions, for example, produces a redacted crash rate (C') of 2.12 crashes per million vehicle miles, which is lower than the homogenous report rate for similar roadways.

Whether using C or C', the crash history of the corridor is consistent with the crash history of other roadways having similar attributes. The absence of any crash involving a fatality and the relatively low number of accidents involving major injuries, moderate injuries, and pedestrians also supports this conclusion.

Note that the individual crash data for the 6 accidents involving pedestrians were reviewed and no correctable pattern or element was discovered.

Crash data is not provided in any appendix but will be kept on file should PennDOT or the township traffic engineer wish to review it.

PARKING

Parking demands have been documented throughout the entire campus under both 'ordinary class' conditions and 'special event' conditions including home basketball games. Copies of detailed campus-wide parking tabulations (including summaries of observed demand and available supply) on more than a dozen different days are summarized in **Appendix L**. As shown, there typically exist hundreds of unused parking spaces throughout campus regardless of time of day or circumstance.

West Campus has some similarities with the proposed student resident halls since it is principally occupied by undergraduate upperclassmen. The unconstrained parking demand rate at West Campus is ~55% which suggests that auto ownership at the proposed student resident halls (which may be comparable) may be significant. The number of spaces in the garage which will not be moving during weekday commuter peak periods could potentially be about 600 and possibly more. Regardless and as previously explained, *all* parking in the garage is assumed to be "peak hour moving" to provide the most conservative results.

Questions regarding midday vehicular activity by the proposed student hall residents have been raised. The likelihood that campus residing students are any more (or less) likely to make midday trips is questionable, but regardless West Campus midday parking "turnover" was examined in an attempt to quantify midday trip making. Investigations occurred on Tuesday, 30 April 2013. Traffic counts were conducted at the only driveway which is used by student residents to gain access to / from West Campus student parking areas between 10 AM to 12 PM. In addition, during the counts, a random sample of approximately 5% of the available parking spaces (30 out of 596 spaces) were monitored for turnover. The investigations determined:

- The peak hour was 11:00 AM to 12:00 PM.
- During the peak hour, 30 entering vehicles and 23 exiting vehicles (53 total trips) were recorded at the driveway.
- During the same hour, there was turnover at 2 of the 30 parking spaces which were monitored and the turnover activity at these spaces amounted to 2 arriving (entering) vehicles and 2 departing (exiting) vehicles (4 total trips).

The results suggest that midday peak hour parking turnover – and thus trip generation – is on the order of about 1 out of every 10 parking spaces during class days. This activity is much lower than AM and PM peak hour trip generation. AM peak hour trip generation is approximately 1 trip for every 4 parking spaces and PM peak hour trip generation is approximately 1 trip for every 3 parking spaces

More details on the study are provided in **Appendix L**.

SIGHT DISTANCE ANALYSIS

A sight distance analysis was prepared for the proposed site driveways. In general, recommended sight distances depend upon the posted speed limit and roadway grades. Existing sight distances were measured in accordance with PennDOT Publication 282 and compared to

PennDOT's desirable (aka tabular) and SSSD (aka formulaic) sight distance as found in Title 67 Chapter 441 of the PA Code. Comparisons with available sight distances at the proposed unsignalized site accesses are presented below. Note that the posted speed limit along both Lancaster Avenue and Ithan Avenue is 25 mph. Note also that if the available sight distance is well beyond the required minimum then the full extent of available sight distance was not documented. Grades are field estimates.

TABLE 7
SIGHT DISTANCES

RT 30 WLL RIRO	**DIRECTION**	**GRADE (APPROX)**	**SIGHT DISTANCE (FT)**		
			DES	SSSD	**EXIST**
EXITING	Looking to the left	0%	300	265	**500+**
	Looking to the right	NOT APPLICABLE; LEFTS OUT PROHIBITED			
ENTERING	Approaching same direction	NOT APPLICABLE; LEFTS IN PROHIBITED			
	Approaching opposite direction				

RT 30 PAC RILIRO	**DIRECTION**	**GRADE (APPROX)**	**SIGHT DISTANCE (FT)**		
			DES	SSSD	**EXIST**(1)
EXITING	Looking to the left	0%	300	265	**470**
	Looking to the right	NOT APPLICABLE; LEFTS OUT PROHIBITED			
ENTERING	Approaching same direction	0%	N/A	265	**500+**
	Approaching opposite direction	0%	320	265	**500+**

LAH (W. SIDE OF ITHAN)	**DIRECTION**	**GRADE (APPROX)**	**SIGHT DISTANCE (FT)**		
			DES	SSSD	**EXIST**
EXITING	Looking to the left	-2%	440	274	**500+**
	Looking to the right	-2%	350	274	**500+**
ENTERING	Approaching same direction	-2%	N/A	274	**500+**
	Approaching opposite direction	-2%	300	274	**450**

GAR (E. SIDE OF ITHAN)	**DIRECTION**	**GRADE (APPROX)**	**SIGHT DISTANCE (FT)**		
			DES	SSSD	**EXIST**
EXITING	Looking to the left	-2%	440	274	**500+**
	Looking to the right	-2%	350	274	**450**
ENTERING	Approaching same direction	-2%	N/A	274	**500+**
	Approaching opposite direction	-2%	300	274	**500+**

EMR (E. SIDE OF ITHAN)	**DIRECTION**	**GRADE (APPROX)**	**SIGHT DISTANCE (FT)**		
			DES	SSSD	**EXIST**
EXITING	Looking to the left	NOT APPLICABLE; ENTRY-ONLY DRIVEWAY			
	Looking to the right				
ENTERING	Approaching same direction	0%	N/A	274	**500+**
	Approaching opposite direction	+2%	300	256	**500+**

DES based on posted speed limit + 10
SSSD based on posted speed limit + 10

(1) existing wrought iron fence assumed to be removed or set back ~ 3 feet from current location.

The site plans may evolve throughout land development and these sight distances will be measured again by the site civil engineer and included with the HOP application which will later be made by the site civil engineer. Vegetation trimming/removal was considered for some locations. Finally, note that while sight distances for entering left turns, approaching same direction have been provided, they are essentially irrelevant since separate entering left-turn lanes are provided (where applicable) at all site access points.

SPECIAL EVENT TRAFFIC AND PARKING MANAGEMENT

Radnor Police Department and Villanova Public Safety are present to direct traffic and chaperone motorists (and pedestrians) during events such as basketball games, homecoming, graduation events, etc. Since either Radnor Police, Villanova Public Safety, or both are present directing traffic / controlling intersection operation at most of these events, level of service analyses cannot be modeled or conducted. In addition, total intersection volumes during special events have been demonstrated to be comparable to or less than weekday peak hour traffic, and the township traffic engineer has previously given an opinion that LOS analyses are not required, but that a special event management plan *is* necessary (see **Appendix A**). Villanova has retained Chance Management Advisors, Inc. to prepare a Special Event Management Plan for future conditions.

RECOMMENDATIONS

F. Tavani and Associates, Inc. (FTA) recommends the following roadway improvements as outlined at key study area intersections:

Route 30 and Route 320/Kenilworth Street/Aldwyn Lane

- Optimize signal timings at the intersection during the studied peak hours in order to improve operations and queuing.

Route 30 and New RIRO Access

- Provide channelization islands to prohibit entering and exiting left turns.
- Provide new EB right-turn only lane with 75 feet of taper, 125 feet of storage, and 14 feet width.

Route 30 and Church Walk

- Optimize signal timings at the intersection during the studied peak hours in order to improve operations and queuing.
- Provide grade-separated pedestrian bridge.
- Eliminate existing pedestrian crosswalks crossing Route 30.
- Provide new EB right-turn only lane with 75 feet of taper, 125 feet of storage, and 14 feet width.
- Provide new WB left-turn only lane with 75 feet of taper, 100 feet of storage, and 10 feet width.
- Provide second NB exit lane.
- Provide 11 foot wide inside and 12 foot wide outside travel lanes (10-foot travel lanes presently exist).

Route 30 and Ithan Avenue

- Optimize signal timings at the intersection during the studied peak hours in order to improve operations and queuing.
- Extend the existing EB left-turn only lane to provide a 75 feet of taper, 200 feet of storage, and 10 feet width.
- Extend the existing WB left-turn only lane to provide a full-width (10 feet) section of approximately 250 feet (between Ithan Avenue and the PAC driveway) plus an additional full-width section east of the PAC driveway measuring 100 feet with a 75-foot taper.
- Provide 11 foot wide inside and 12 foot wide outside travel lanes (10-foot travel lanes presently exist).
- Investigate reducing the existing 26-second long all-red ped-scramble phase.

Additional Site Access Points

- At the currently-existing exit-only unsignalized driveway along Route 30 just east of Ithan Avenue:
  - Modify the driveway to two-way operation (entry/exit).
  - Provide new WB left-turn only lane with 75 feet of taper, 100 feet of storage, and 10 feet width.
  - Prohibit exiting left turns.
- At the four (4) unsignalized driveways along Ithan Avenue just south of Route 30:
  - Eliminate one driveway along the west side of Ithan Avenue.
  - Relocate the remaining driveway further south along the west side of Ithan Avenue and convert to two-way operation (entry/exit).
  - Provide up to three (3) driveways on the east side of Ithan Avenue though two (2) will be limited access (i.e., emergencies, deliveries, etc.) subject to final garage design.
  - Locate the 3rd driveway will be the main garage access driveway along the east side of Ithan Avenue opposite the driveway along the west side of Ithan Avenue and provide two-way operation (entry/exit) and all-way stop-control (AWSC) with a pedestrian crosswalk connecting the garage and the resident halls.

Figures 9 and **10** provide added details.

CONCLUSIONS

Based on the results of this transportation impact study, FTA offers the following conclusions:

- The project will result in a more equitable distribution of parking – and the traffic associated therewith – as compared with present day conditions.

- The project is forecasted to generate a small amount of net new vehicular traffic. Even with conservative assumptions and trip generation estimates, fewer than 100 trips during either the AM or PM weekday peak hour are predicted.
- The project includes access points which will adequately serve the projected weekday peak hour traffic volumes associated with the project.
- Many offered traffic improvements (pedestrian bridge construction, multiple driveway closures and consolidation, etc.) are not required to mitigate the impact of the site but are provided regardless.
- Available sight distances exceed requirements.
- Crash history investigations reveal no correctable patterns or significant roadway design elements which should be considered.
- The addition of a new exclusive EB right-turn lane on Lancaster Avenue at Ithan Avenue is of limited value during ordinary traffic conditions and not needed to satisfy SOL requirements. During special event conditions, its role is also likely to be insignificant since the project will result in fundamental changes to parking and circulation in the immediate vicinity of this intersection. Additional information relative to special event parking and traffic management is being addressed by other consultants.
- The intersection of Ithan Avenue and LAH/Garage Access should be designated as AWSC to benefit pedestrian mobility and garage entry/exit traffic (and related queue management).
- All other SOL-required / additional PennDOT-requested information to date (photo-documentation, pedestrian and bicycle facility descriptions, etc.) have been provided and no other deficiencies or concerns have been identified.

Study Area / Project Location

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

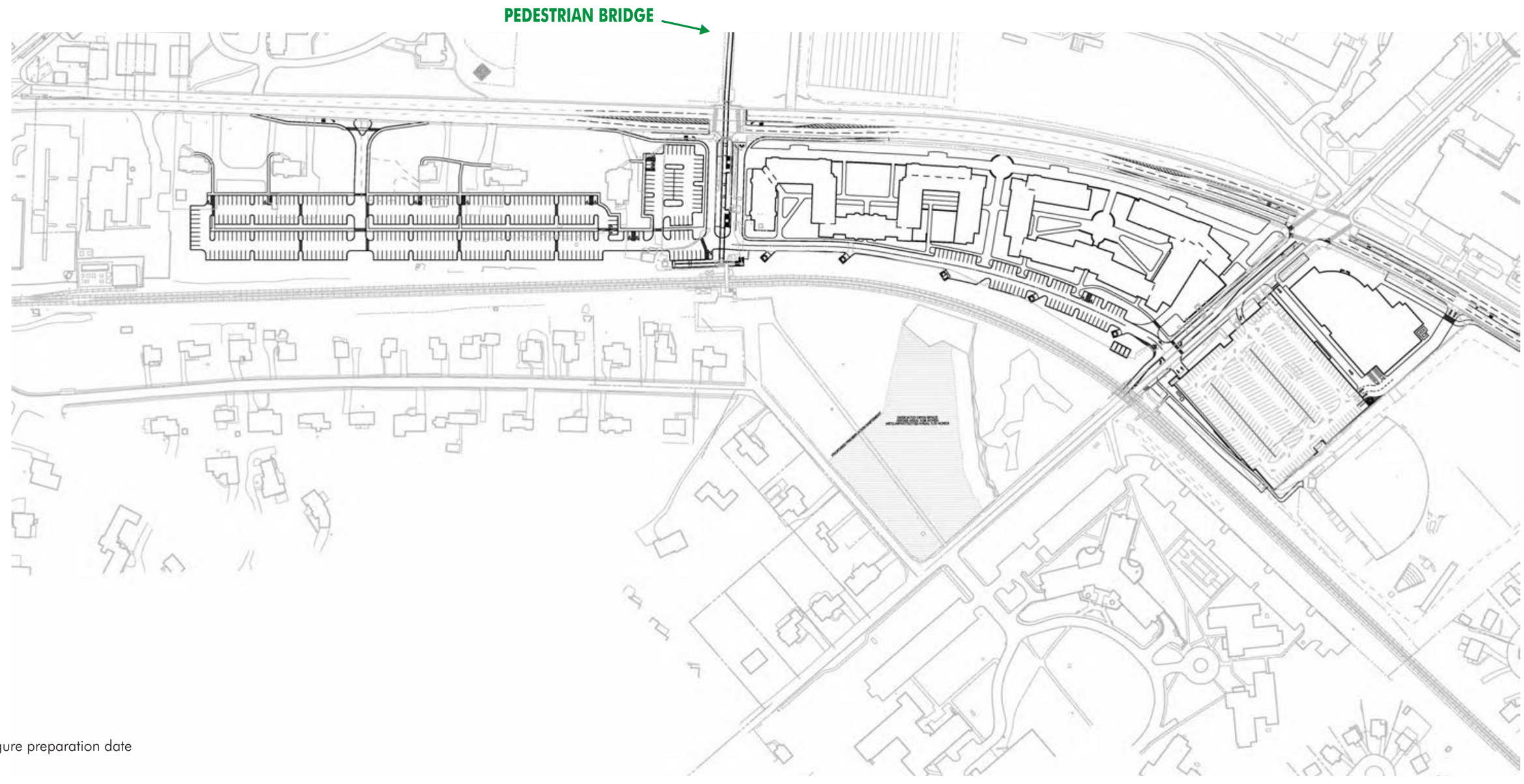
September 2014*

* figure preparation date

Site Plan Excerpt

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*



* figure preparation date

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

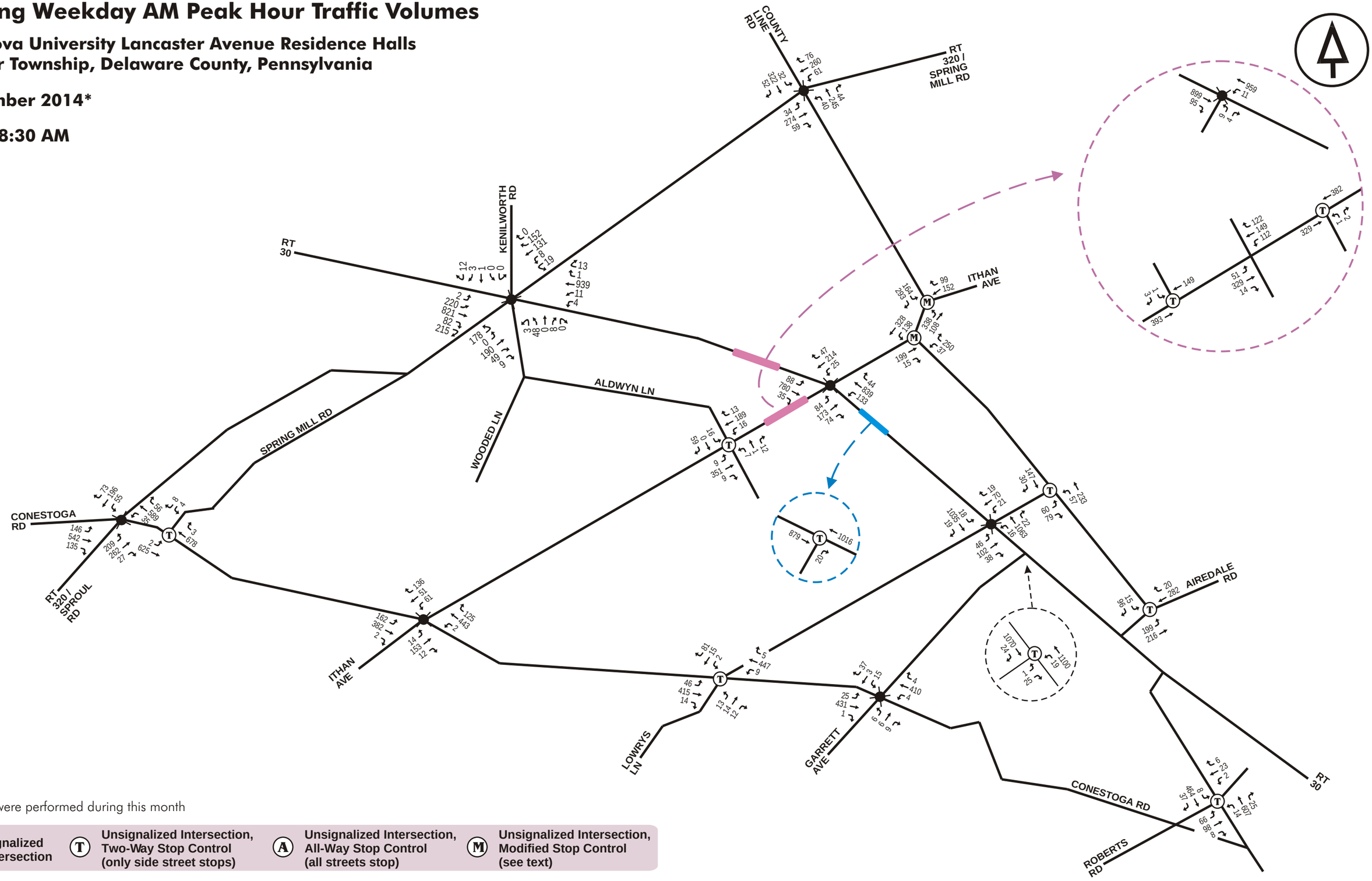
Figure 3

Existing Weekday AM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

7:30 - 8:30 AM



* counts were performed during this month

Signalized Intersection	(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)	(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)	(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

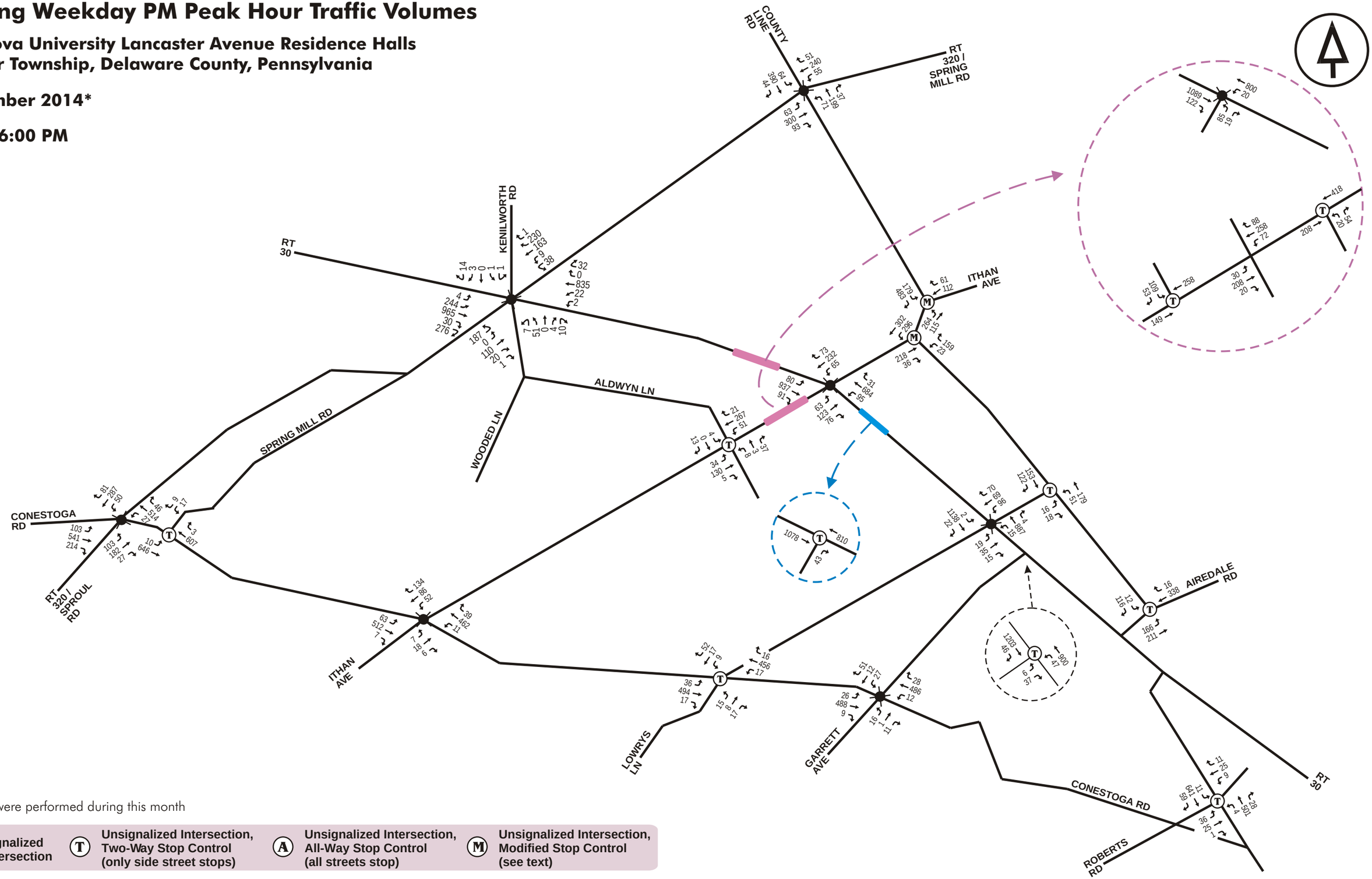
Figure 4

Existing Weekday PM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

5:00 - 6:00 PM



* counts were performed during this month

Signalized Intersection	(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)	(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)	(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

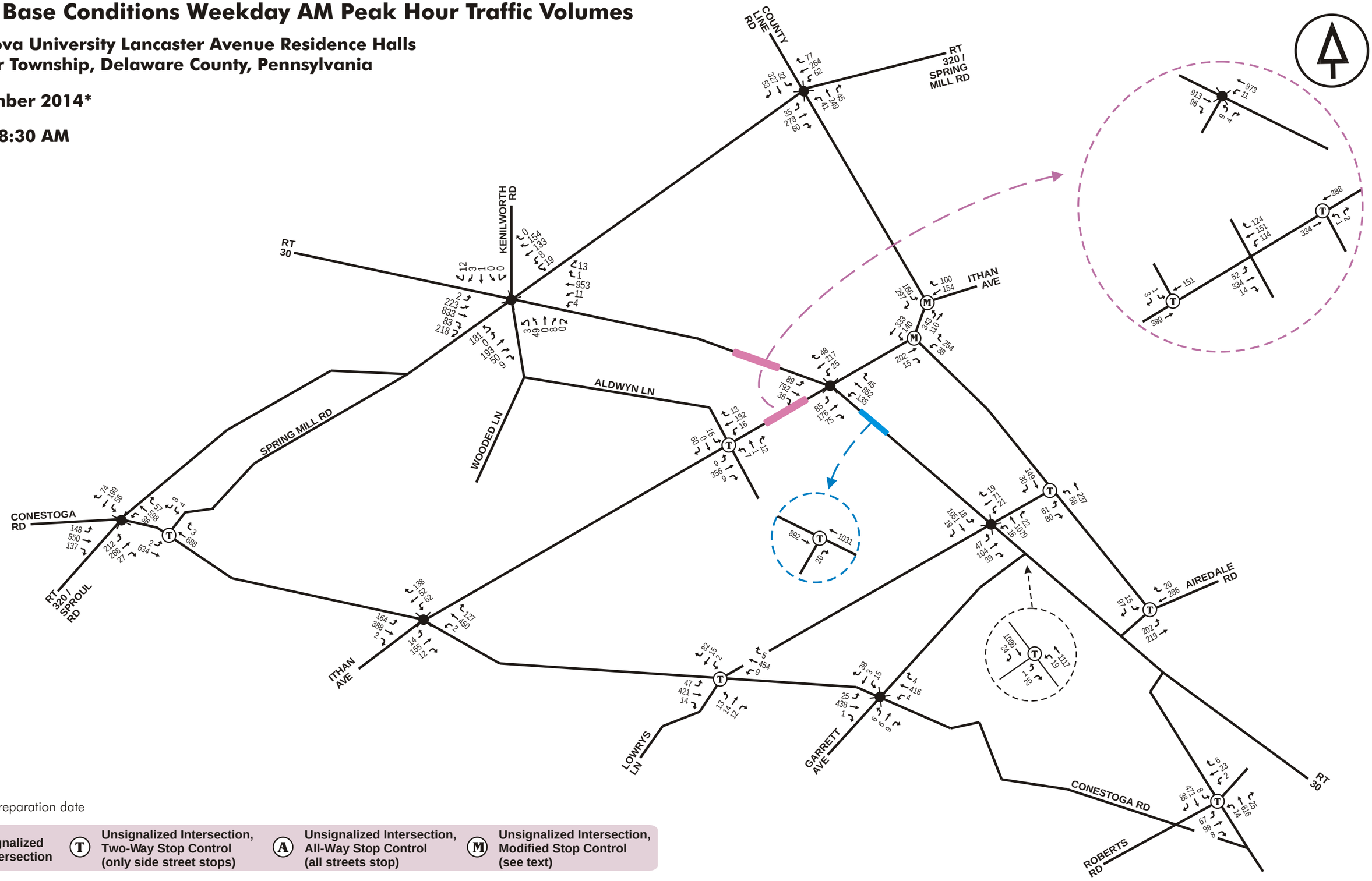
Figure 5

2018 Base Conditions Weekday AM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

7:30 - 8:30 AM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

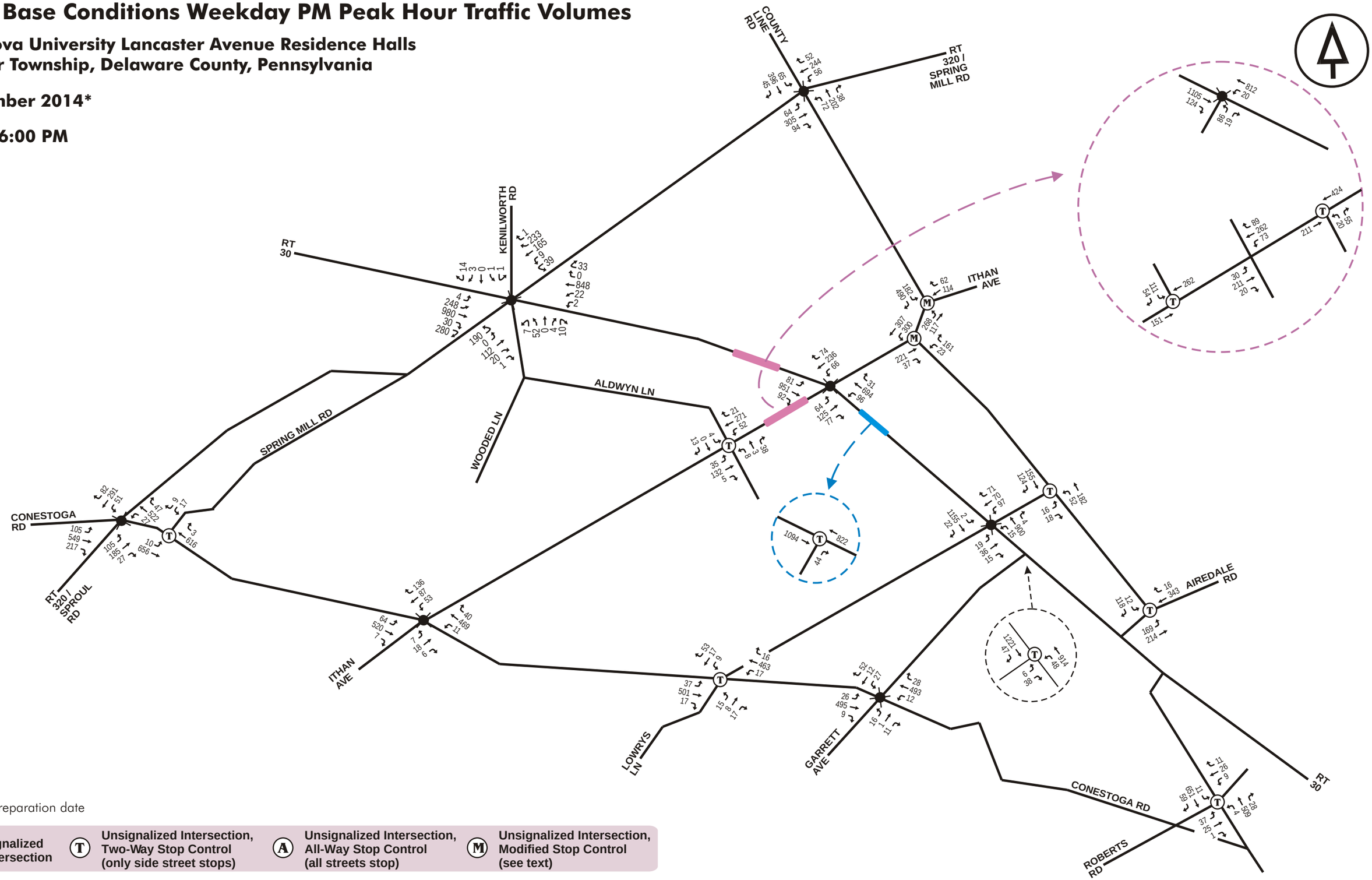
Figure 6

2018 Base Conditions Weekday PM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

5:00 - 6:00 PM



* figure preparation date

Signalized Intersection	(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)	(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)	(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

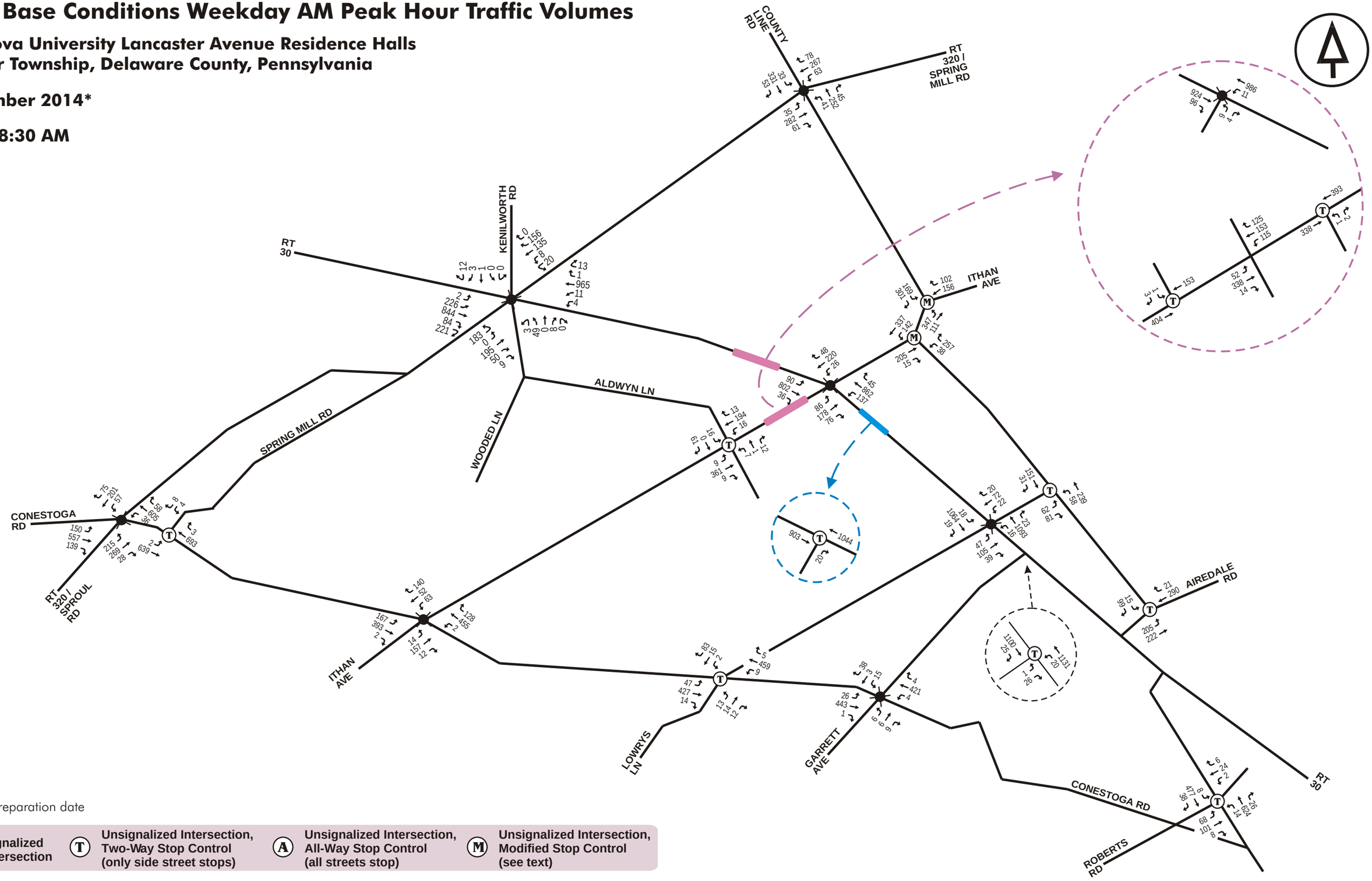
Figure 7

2023 Base Conditions Weekday AM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

7:30 - 8:30 AM



* figure preparation date

Signalized Intersection | **(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)** | **(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)** | **(M) Unsignalized Intersection, Modified Stop Control (see text)**

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

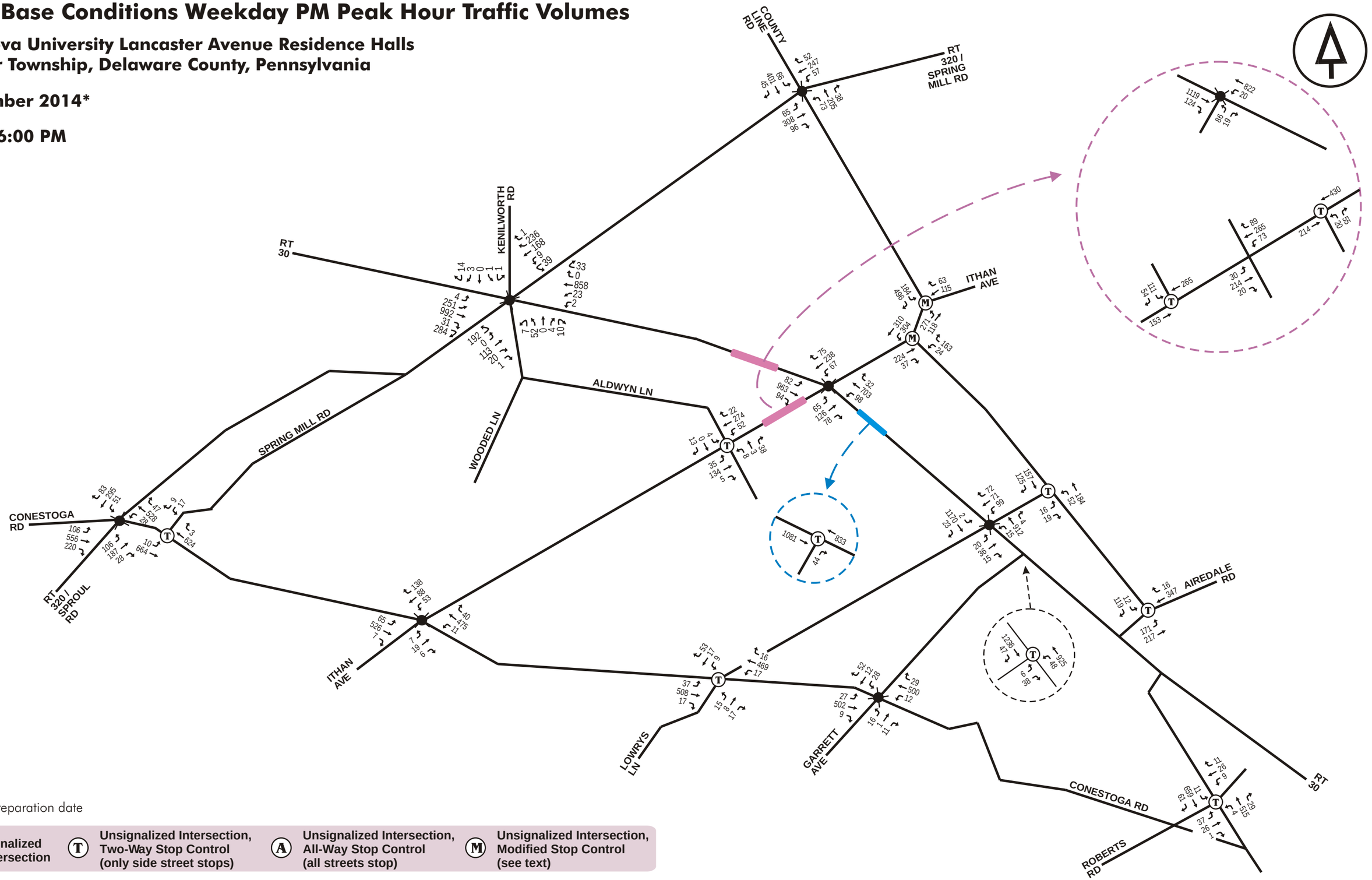
Figure 8

2023 Base Conditions Weekday PM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

5:00 - 6:00 PM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

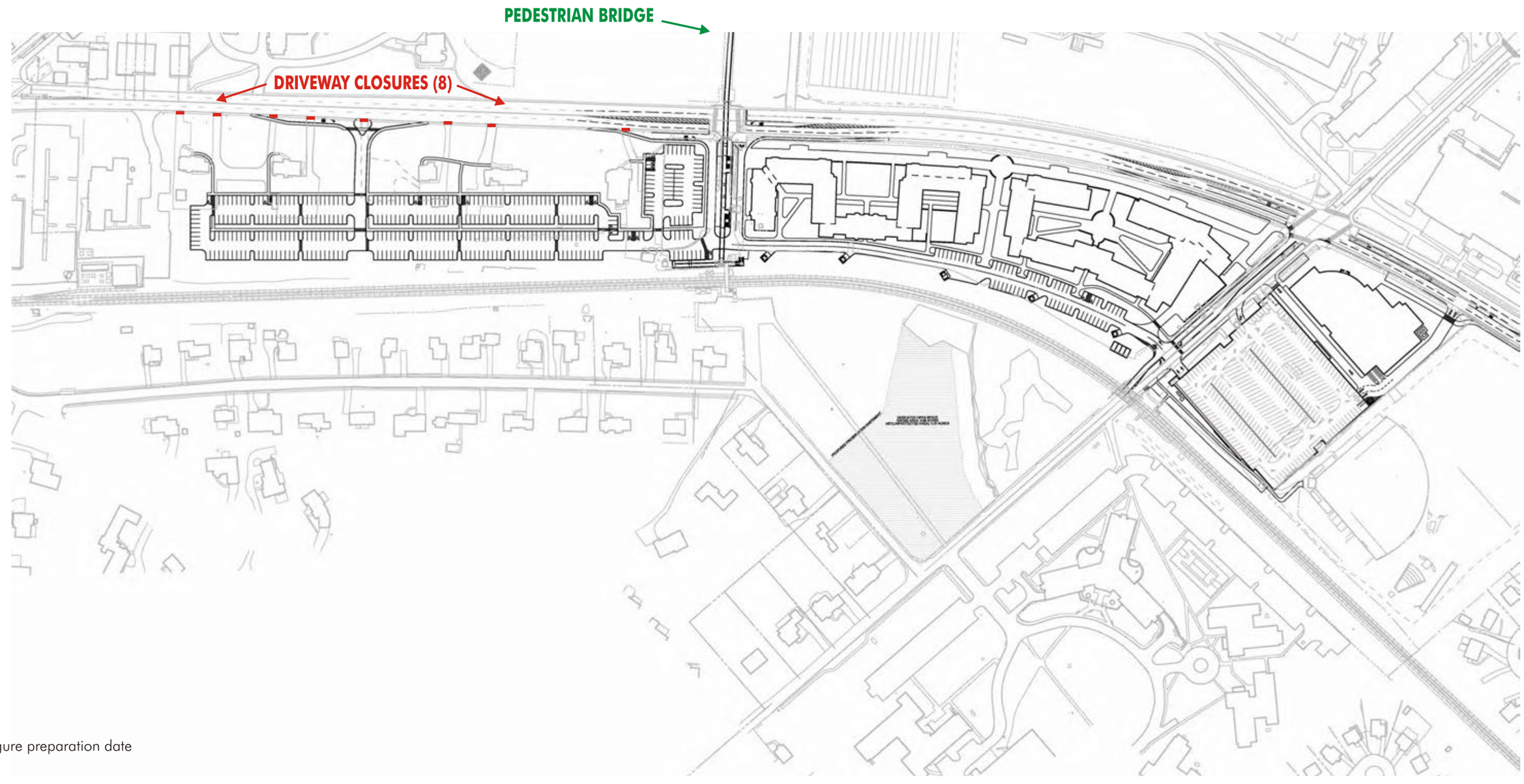
(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

Proposed Traffic Improvements 1

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

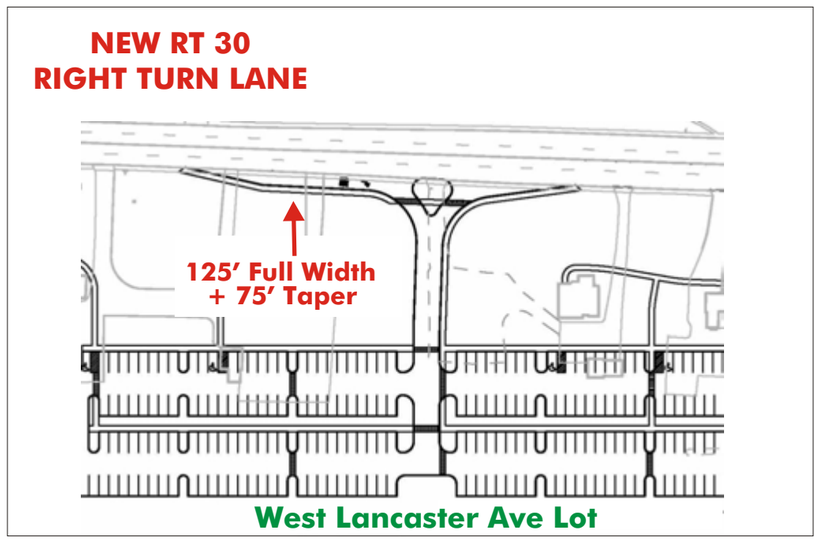


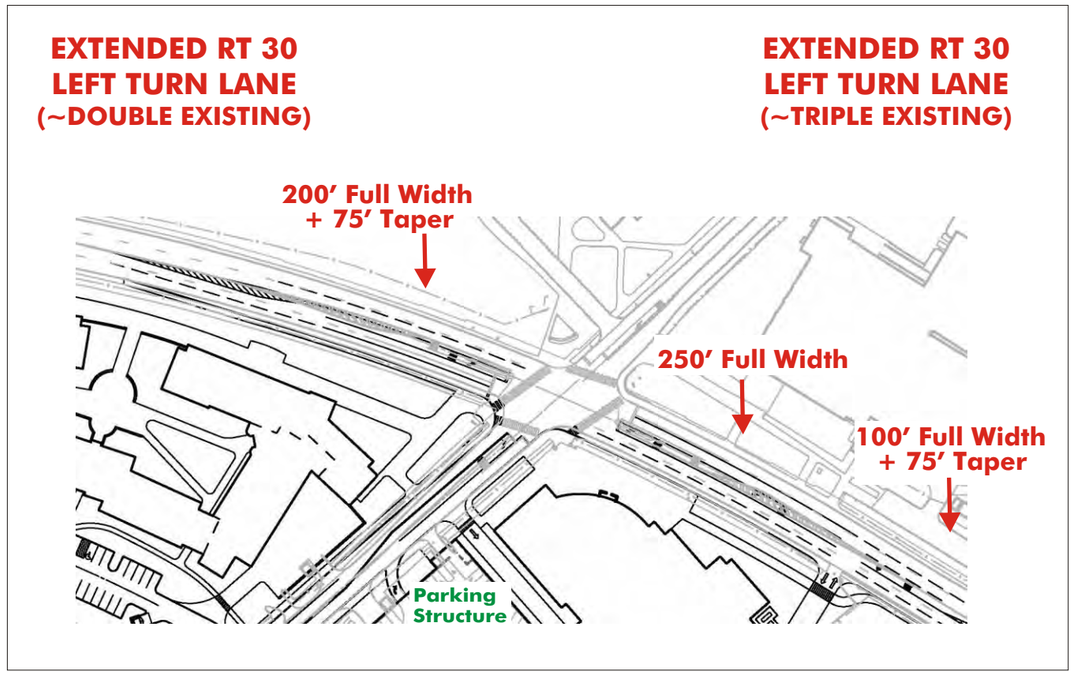
* figure preparation date

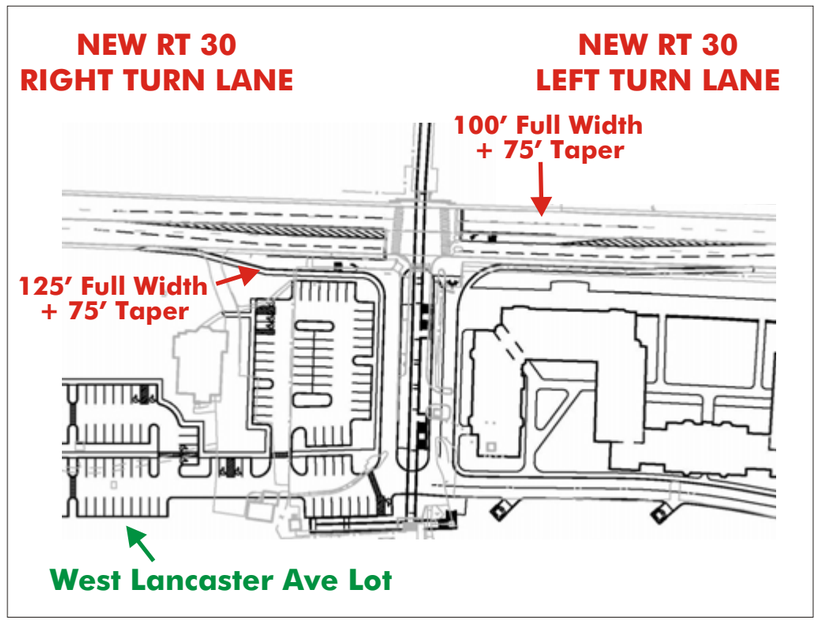
Proposed Traffic Improvements 2

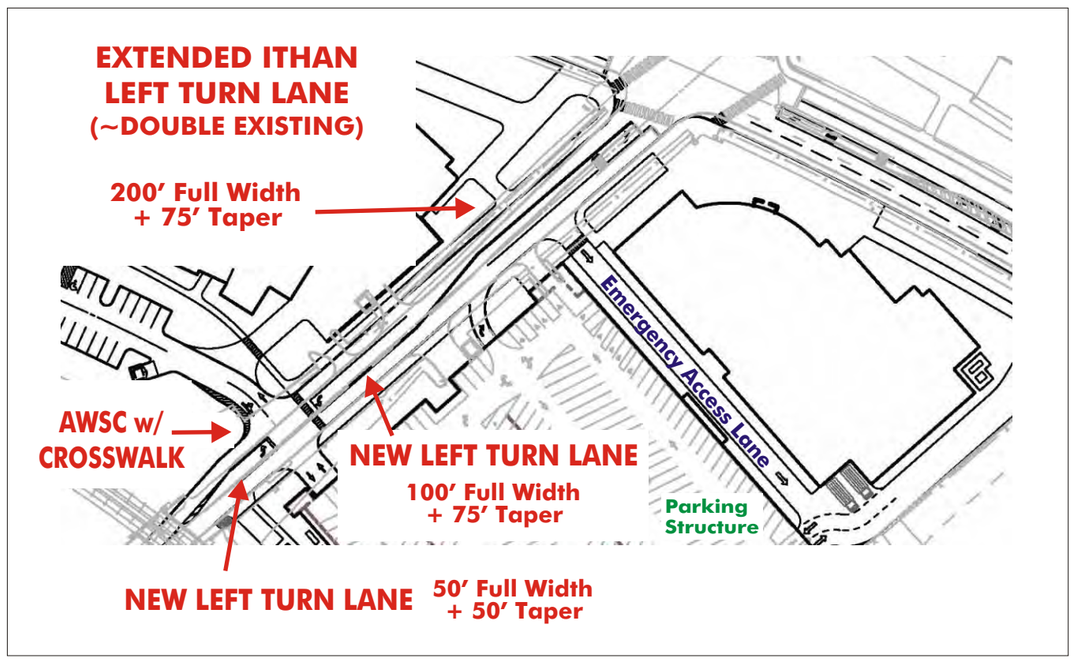
Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*









* figure preparation date

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

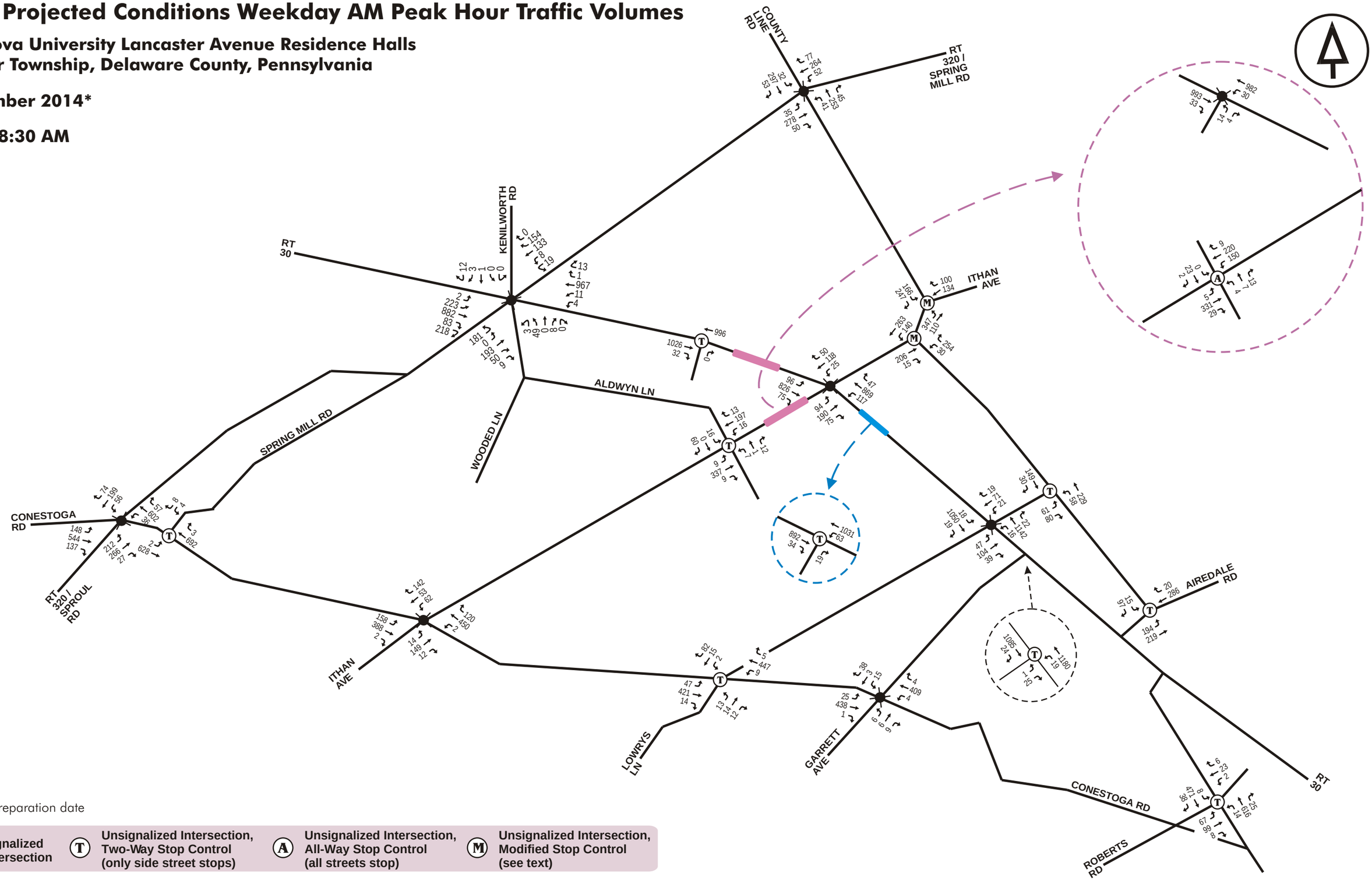
Figure 11

2018 Projected Conditions Weekday AM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

7:30 - 8:30 AM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

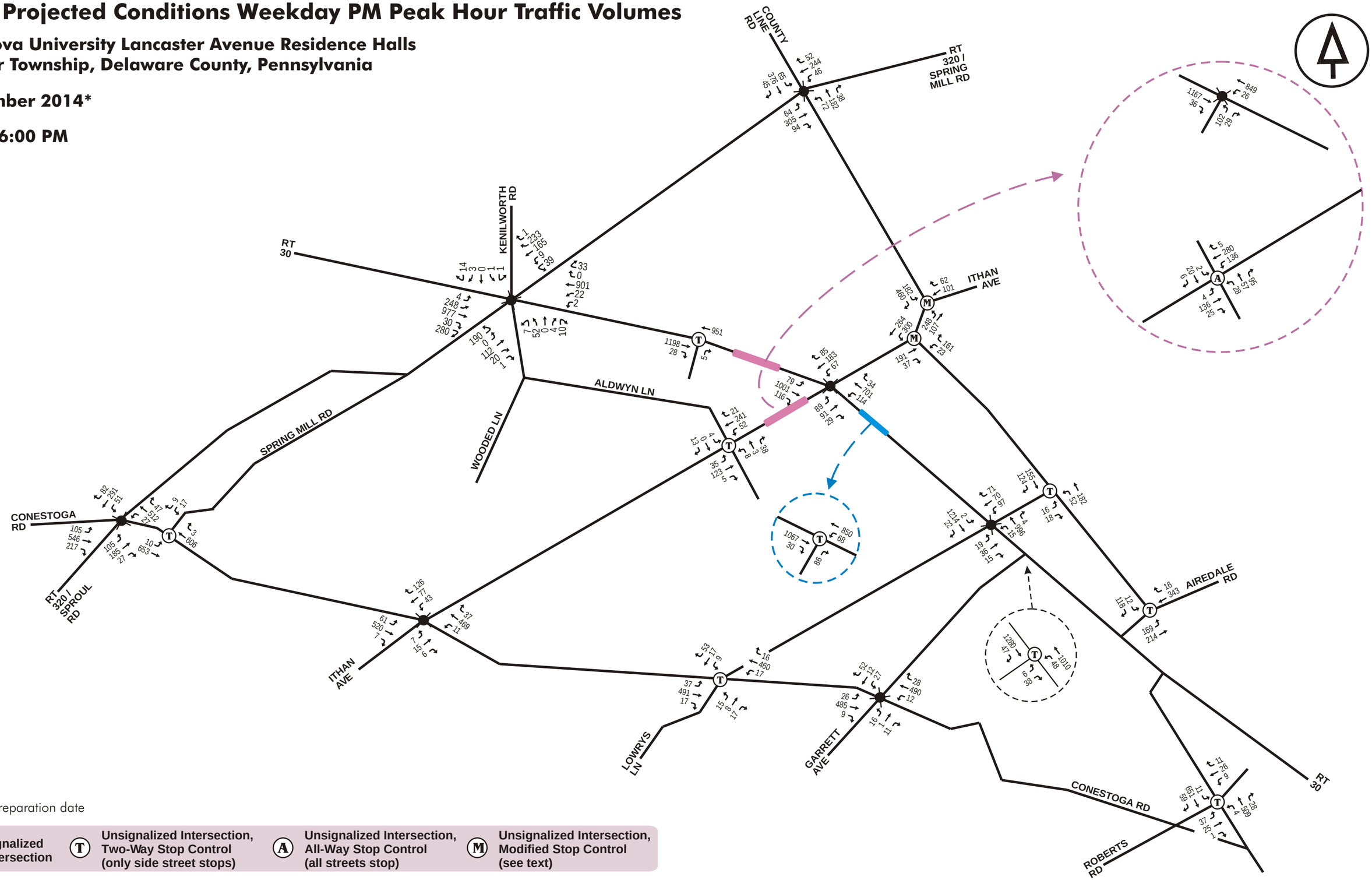
Figure 12

2018 Projected Conditions Weekday PM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

5:00 - 6:00 PM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

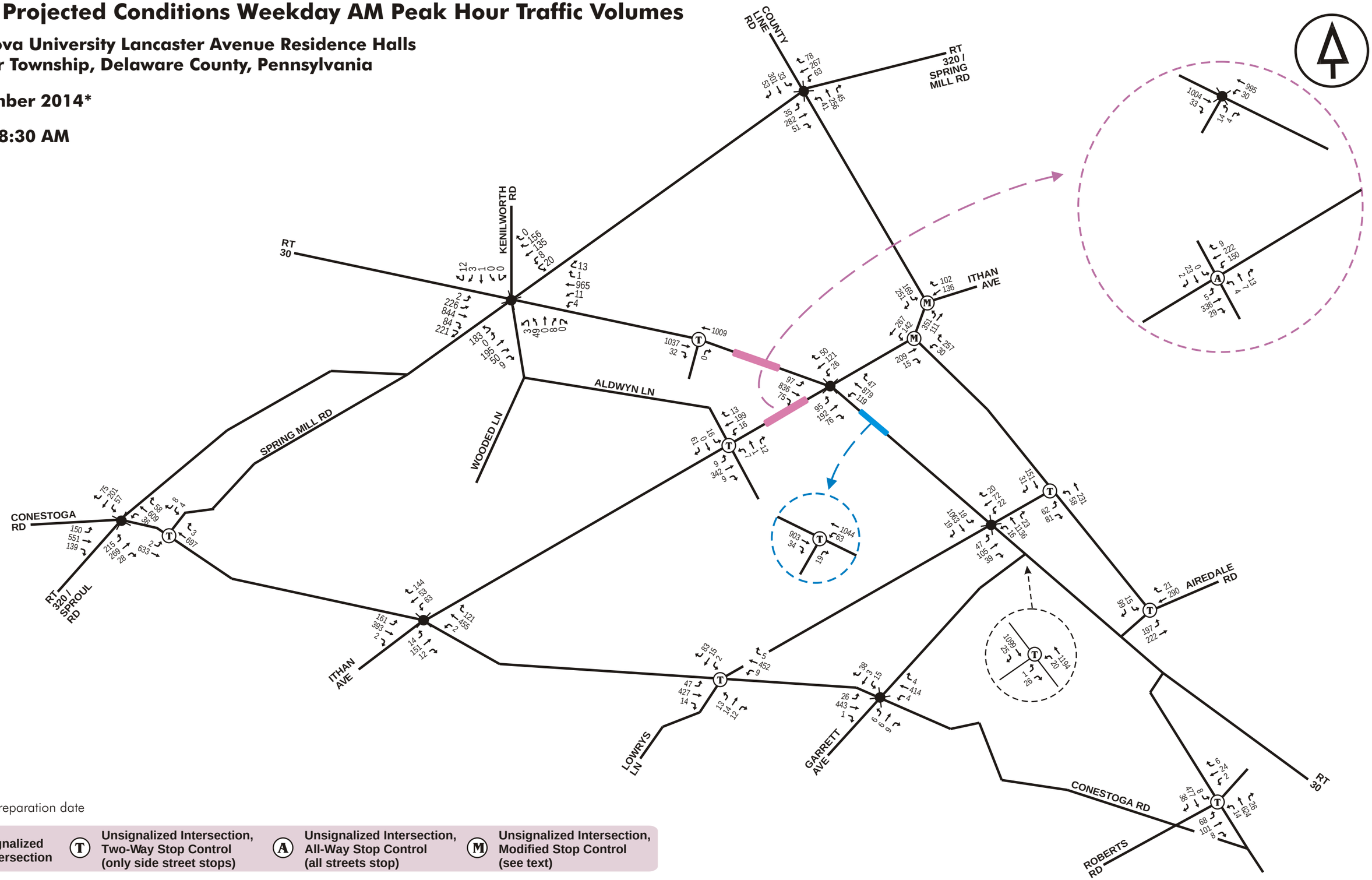
Figure 13

2023 Projected Conditions Weekday AM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

7:30 - 8:30 AM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

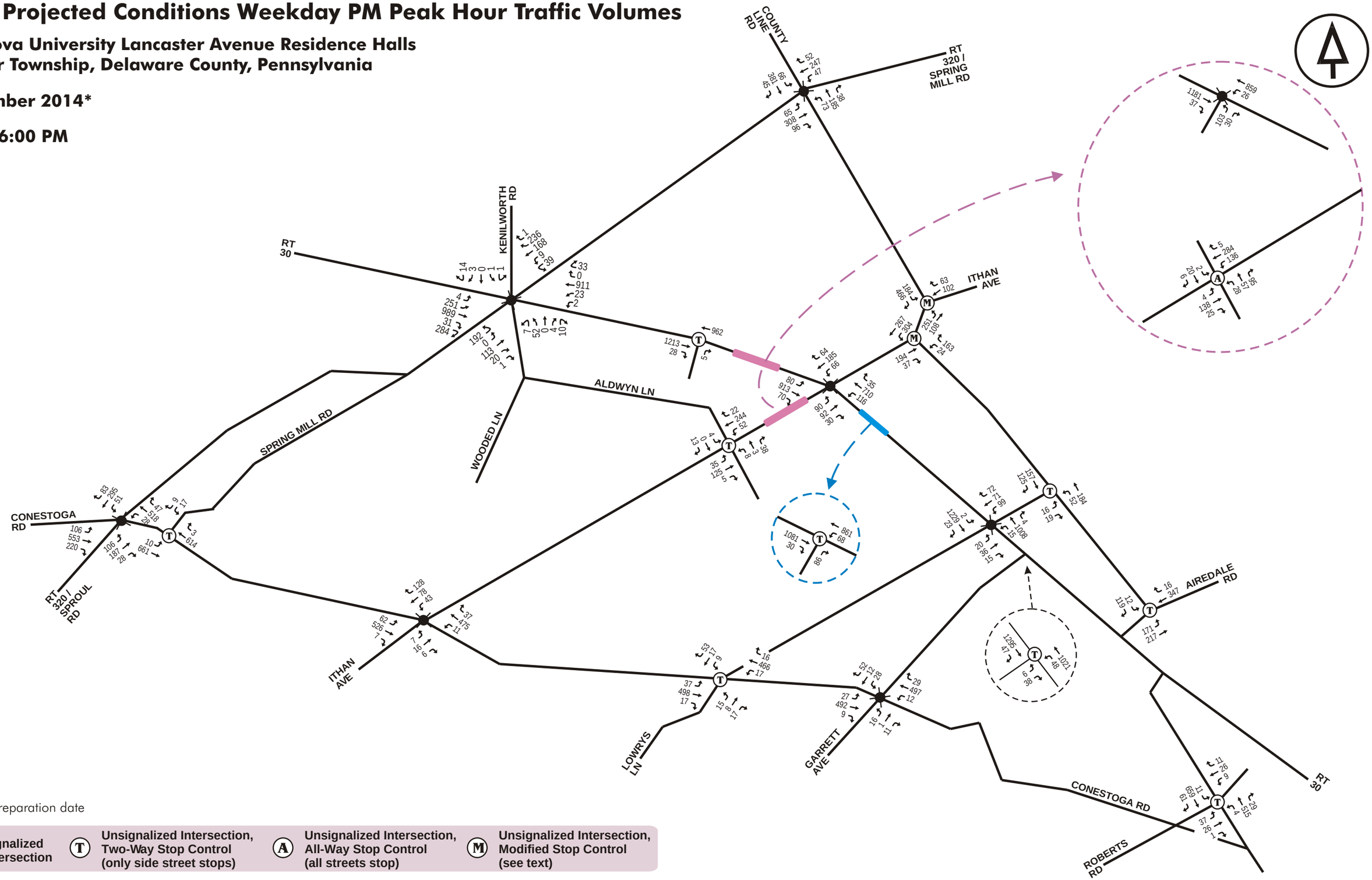
Figure 14

2023 Projected Conditions Weekday PM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*

5:00 - 6:00 PM



* figure preparation date

Signalized Intersection	(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)	(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)	(M) Unsignalized Intersection, Modified Stop Control (see text)

APPENDIX A

Project Correspondence

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

105 Kenilworth Street • Philadelphia • PA • 19147 • (215) 625-3821 Phone • (484) 792-9495 Fax
www.FTAVANIASSOCIATES.com

Villanova University Lancaster Avenue Housing Initiative **15 October 2012**
Transportation Impact Investigations joint meeting with Radnor Township & PennDOT
Meeting Minutes revised 8 November 2012

Attendees

Name	Affiliation
Fran Hanney	PennDOT
Steve Hildebrand	Villanova University
Amy Kaminski	Radnor Township / Gilmore
Susan LaPenta	PennDOT
Officer Ray Matus	Radnor Township
Bob Morro	Villanova University
Steve Norcini	Radnor Township
Marilou Smith	Villanova University
Frank Tavani	FTA, Inc.

Discussion Points

BACKGROUND

Bob Morro started off by bringing PennDOT up to speed on the project and explained how it includes new dormitory buildings with up to approximately 1,150 beds for juniors and seniors and a new parking structure – both located on the sites of the current parking lots flanking Ithan Avenue near Lancaster Avenue. The new dorms are aimed at bringing more of the existing undergraduate population on campus, not growing the school population. Even with the new beds, some undergrads will continue to live off campus, but the new dorms will significantly reduce this number and, in turn, significantly reduce student commuting trips.

Bob explained how proposed new parking will be found in not only the new parking structure but also in a new surface lot (west of the proposed dormitory buildings), and in new levels to be built atop existing parking structures on the main campus. As the project unfolds and through its parking permit program, the University plans to implement revised parking policies which will dictate where faculty, staff, resident students, commuter students, and visitors will park.

Bob next went over the proposed new ped bridge, the rationale behind the location of same (including the SEPTA Rt. 100 station platforms, grades, and the locations of classrooms).

Finally, it should be noted that while a new performing arts center (PAC) is shown on the plans as a placeholder, it will not be part of upcoming plan submittals. The plans will focus on the new resident halls, the new parking structure and other campus parking changes, and a new pedestrian bridge.

DATA COLLECTION

Frank T. then began discussion of the meeting agenda and first commented that Villanova will include the 14 intersections mentioned in the June 2012 scope of work email as requested by the twp. Given the large

scope, Frank indicated that data collection may be spread over 2 or 3 days, to accommodate limitations of personnel and count boards. FTA may also elect not to count through volumes at certain locations to minimize personnel requirements and avoid redundancy. Collected data will reflect traffic demand as well as traffic served. Locations which are immediately adjacent to each other and do not feature significant or meaningful driveways in between are likely candidates. Gilmore (Amy K.) indicated acceptance of this approach, as long as it was properly documented and defendable.

PED SCRAMBLE PHASE

Some discussion then took place regarding the 26-second all-red ped-scramble phase at Ithan. The township indicated it thinks most residents want the ped phase duration reduced, to improve traffic flow. With the proposed pedestrian bridge, it may be possible to pursue reducing the duration of the ped phase. One possible remedy includes agreement to a post-development monitoring condition wherein ped activity (and traffic counts) will be monitored following the opening of the new pedestrian bridge, with subsequent retiming and tweaking of the signal controller performed at a later date. Villanova will be required to post escrow for the post-development analysis and possible retiming efforts (permit plan modifications and controller retiming).

SPECIAL EVENTS

Much discussion took place regarding the township-requested special event traffic counts (4 intersections). It was agreed that Homecoming (Saturday, 10/27/12) would be the targeted special event and in the event of moderate to heavy rain an alternate (a home basketball game) may be chosen instead. The counts will be conducted from 12 noon to 3:00 PM. The township has concerns regarding not only traffic but thinks an analysis and/or discussion of the logistics – including buying parking tickets in advance ($10 vs $40, to facilitate planning), better wayfinding, etc. – should be included in the traffic study.

TRIP GENERATION

Much discussion also took place regarding the trip generation approach for the project. Frank mentioned that the project will not result in an increase in peak hour traffic and in fact will capture/reduce the traffic impact of 1,150 currently-commuting students since those students will now live on campus. In addition, other proposed features/uses proposed within the new buildings – such as a bookstore, a bistro, etc. – will be targeted at serving the campus population of student, faculty, staff, and visitors and will not result in any meaningful external trip generation. In addition, any space which is vacated on the main campus (i.e., relocating the bookstore) will be 'backfilled' with offices of current faculty/staff who are currently working in basements or other undesirable locations on campus which, again, will not result in new external trip generation. Frank noted that the proposed trip generation methodology/approach will be to 'grow' traffic in the study area using trip generation rates of the existing parking lots (i.e., a trip rate per 'parking space') and applying that to the net increase in proposed new parking which will result from the project. In addition, Frank mentioned that the commuting student traffic which is currently found in the existing off-site traffic counts today cannot be removed or extracted from the road network, so it will be left. Thus, the combination of leaving those trips in the road network AND adding new traffic based on current parking trip generation activity will result in a very conservative trip generation methodology in the traffic study. This was discussed at length and consensus was reached that the approach was appropriate but should still be adequately documented in the study.

DRIVEWAYS, ACCESS, & CIRCULATION

Much discussion took place regarding a number of circulation and access issues, including neighbors' request to cul-de-sac Aldwyn Lane; the possibility of a reverse frontage road parallel to Lancaster Avenue behind existing Villanova-owned properties between the site and Route 320, conversion of Aldwyn Lane to

one-way away from the intersection of Route 320 and Route 30; a long-term study of the intersection to include possible conversion to a roundabout; conversion of existing unsignalized driveways to right-in/right-out; investigation into converting Kenilworth Road to one-way away from the intersection of Route 320 and Route 30; discussion regarding an investigation into providing additional clearance for sanitation trucks, school busses and emergency services at the rail overpass on Ithan Avenue (currently 10 ft clearance); and elimination/consolidation of certain driveways. In the end, some decisions/agreements include: that a roundabout may or may not be feasible but analysis of same will not be part of Villanova's project; that consolidation of driveways will be investigated further, that a reverse frontage road is likely not feasible due to grade challenges and SEPTA equipment, and that certain other improvements such as conversion of Aldwyn to one-way may be feasible. These issues will be investigated further by Villanova and further discussion of this topic (including a decision about which scenario will be included in the upcoming TIS' Future Build section) will be part of the staged submittals as suggested by Amy K. as mentioned below.

'CHURCH WALK' INTERSECTION

The proposed ped bridge and its relationship to the existing signalized T intersection at what is called the "Church Walk" was discussed at length. Discussion points included: the possible shifting of the driveway; permanent or temporary closure(s) of the driveway(s) serving the main lot on Ithan Avenue (and the effect of driving – or reducing – traffic at Church Walk; signal warrants; signal head visibility; providing two outbound left-turn lanes; stacking length; auxiliary lane analysis (WB left and EB right) along Route 30; and ped compliance. Regarding the last issue, the township and PennDOT expressed a desire to see implementation of whatever measures may be useful to compel peds to use the proposed ped bridge (and not cross Lancaster Avenue at grade). No definitive agreement on any of the items was reached other than a general agreement that all of the issues raised (warrants, circulation, etc.) will be carefully considered as the traffic study unfolds. More definitive steps will likely evolve as part of the staged submittal process referenced earlier and explained below.

ACCIDENT STUDY

Some discussion took place regarding the requested traffic investigations. Amy indicated the township was not interested in anything more than a standard investigation of crash data of the last 5 years and that such investigation should include reportable and non-reportable accidents. No accident diagrams need be drawn.

PARKING STUDY

Township will accept, review, and consider recent parking data collection efforts already conducted by Villanova's Public Safety officers. Frank will incorporate and explain the approach taken by the officers and include the many detailed spreadsheets in the upcoming traffic study.

OTHER DEVELOPMENTS

No other developments in the Township are close enough to – or large enough – to mandate consideration /inclusion in the study. The township accepts that Villanova's trip generation is all that needs to be included.

Finally, note that some other agreements were already reached regarding the traffic study in previous emails with the township. Specifically, in an email dated 10 October 2012, the township upheld its request for 14-intersection study area; agreed to a 4-interection special event study area; and agreed that it will accept PennDOT's methodology for level of service degradations as noted in SOL 470-09-4 in its review of the upcoming traffic study. Also, Amy K. previously suggested that Villanova consider submitting the traffic study in parts (i.e., existing conditions first, no build second, trip generation/distribution third, etc.) to

facilitate a smoother review. Steve N. stated that Frank should continue to coordinate traffic efforts with Amy and used words to the effect that “if Amy and Gilmore are satisfied with how you suggest or approach a traffic issue, then the township is satisfied”.

If any part of these minutes is believed to be inaccurate or if there are significant omissions, please contact FTA by 12 November 2012 after which time the contents of these minutes will be binding. Thank you.

YAHOO! SMALL BUSINESS

RE: Villanova Lancaster Avenue Expansion Wednesday, October 10, 2012 4:16 PM

From: "Amy Kaminski" <akaminski@gilmore-assoc.com>

To: "Frank Tavani" <frank@ftavaniassociates.com>

Cc: "Zienkowski Robert" <rzienkowski@radnor.org>, "Norcini, Steve" <snorcini@radnor.org>, Kkochanski@radnor.org, "John Sartor" <JSARTOR@gilmore-assoc.com>, "Dave Leh" <DLEH@gilmore-assoc.com>, "Michael Shinton" <mshinton@gilmore-assoc.com>, "April Bauer" <abauer@gilmore-assoc.com>

Good afternoon Frank—

The Township has considered your request regarding a scope reduction and offers the following responses and direction:

As a reminder, Section 255-20.B(5)(d) indicates, "*The transportation impact study shall contain, **but not be limited to**, the following information*" (emphasis added). The term "but not be limited to" indicates that additional information may be required in addition to the scope identified in this section of the SALDO.

Discussion 1: Count Locations
Response: The number of intersections studied will remain including the previously identified 14 intersections. In addition to requiring a detailed parking analysis, the reportable and non-reportable crash records are to be included in the study for the identified intersections along with an analysis of the information.

Discussion 2: Trip Generation: The SALDO Trip Generation Rates table (255 Attachment 4) does not include all of the proposed land uses, specifically, the Performing Arts Center, Parking Garage, Student Book Store, Fitness Center, Convenience Store, Bistro, and dormitory rooms. Furthermore, many of the identified sources for 255 Attachment 4 are outdated.

As indicated in SALDO 255.20.B(5)(d)[4] "*Where the appropriate data is not available, the developer shall provide the rates and document the appropriate source. If the developer requests to use significantly different rates than those given, he shall submit the rates and the specific justification to the Planning Commission prior to submission of the transportation impact study for its approval or denial.*" Given the proposed mixed uses for the site, it will be up to the applicant to provide a discussion regarding no increase in traffic. The traffic impact study should also include a discussion regarding the anticipated redistribution of any traffic movements in and around the site and campus. At a minimum, moving the Book Store from the current location, north of Lancaster Avenue , to the proposed location south of Lancaster Avenue may alter pedestrian and vehicular traffic patterns.

In addition, the TIS should include discussions regarding the planned reuse of the vacated north campus space with information regarding the square footage and the anticipated type of use. Villanova offers public use of meeting facilities and the planned reuse of the

proposed vacated spaces will need discussed more fully in the required traffic study.

Discussion 3: LOS 'C' Requirement: The Township agrees with utilizing the methodology outlined in PennDOT Strike Off Letter (SOL 470-09-4) regarding mitigation requirements for a 10 second degradation to delay.

Discussion 4: Special Events Scope: The Township agrees with reducing the scope of study for the Special Events as follows:

1. Ithan Ave & Conestoga Road
2. Conestoga Road, Sproul Road , & Spring Mill Road
3. Sproul Road/Spring Mill Road & Lancaster Avenue
4. Ithan Ave & Lancaster Avenue

Please let me know if you require clarification of the information--

Sincerely,

Amy

Amy B. Kaminski, P.E., PTOE | **Gilmore & Associates**
Senior Transportation Engineer
65 E. Butler Avenue, Suite 100 | New Britain , PA 18901
Direct: 267-337-6979 | Company: 215 - 345 - 4330 Ext. 346 | Fax: 215 - 345 - 8606
Email: akaminski@gilmore-assoc.com

From: Frank Tavani [mailto:frank@ftavaniassociates.com]
Sent: Wednesday, September 26, 2012 4:16 PM
To: Amy Kaminski
Cc: SteveNorcini; Kkochanski@radnor.org; Dave Leh ; Michael Shinton; Marilou Smith; Steven Hildebrand; John Sartor
Subject: Re: Villanova Lancaster Avenue Expansion

Amy, I know that you have been asked to look for a date to meet with Villanova to discuss traffic. In anticipation of that meeting, I have revisited your June email (below) as well as the SALDO and have a few comments and questions:

1) Count Locations. The SALDO language (255.20.B.5.d.3) states that "all major intersections" in a study area should be counted. Several of the 14 intersections in the June email are not major intersections. I believe the ordinance requires the following to be studied:

1. Congestoga Road, Sproul Road , & Spring Mill Road
2. Ithan Ave & Lancaster Avenue
3. Sproul Road/Spring Mill Road & Lancaster Avenue
4. Spring Mill Road & County Line Road
5. Ithan Ave & County Line
6. Ithan Ave and Aldwyn Lane

2) Trip Generation. The SALDO language (255.20.B.5.d.4) requires use of trip generation tables which are provided at the end of chapter 255. Those trip generation rates support a trip generation estimate of 0 peak hour trips for the project (since no increase in student body or instructional space is proposed). As you know, I believe the project will result in a *reduction* in peak hour traffic in the study area. Nonetheless, we have in the past and still currently suggest using non-zero trip generation based on the net increase in parking spaces which are part of the project, specifically using rates which are derived from the existing parking spaces today. We also propose "leaving" the existing traffic in the road network which is due to the currently-commuting students. I believe the combination of these two types of trips results in a very conservative estimate of site impact.

3) LOS 'C' Requirement. The SALDO language (255.20.B.5.d.6.a) requires a list of recommended improvements to achieve LOS C operation at the study area intersections. The ordinance does not clarify if this is by overall LOS, or by turning movement, or what the township will do to address underlying (existing) conditions which do not meet the ordinance. Realizing several intersections will have existing conditions which do not meet the ordinance, I suggest using PennDOT's methodology for LOS impact assessment.

There are other matters I'd like to discuss with you as well, such as how the ordinance does not appear to require accident analyses or parking studies, but these 3 issues are more urgent and need to be resolved before data collection can begin. Can you provide responses on these topics in the next week or two? Thanks.

Frank

_____
Frank Tavani, P.E., PTOE
Principal

F. Tavani and Associates, Inc.
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--- On **Thu, 6/14/12, Amy Kaminski <*akaminski@gilmore-assoc.com*>** wrote:

From: Amy Kaminski <akaminski@gilmore-assoc.com>
Subject: Villanova Lancaster Avenue Expansion
To: "Frank Tavani" <frank@ftavaniassociates.com>
Cc: "Norcini, Steve" <snorcini@radnor.org>, Kkochanski@radnor.org, " Dave Leh " <DLEH@gilmore-assoc.com>, "Michael Shinton" <mshinton@gilmore-assoc.com>
Date: Thursday, June 14, 2012, 8:26 AM

Good morning Frank—
Radnor Township has indicated the Villanova transportation impact study should include the

following information:

The Transportation Impact Study shall follow SALDO §255.20.B.5 with the following scope extent of study area, identified intersections and studied time periods:

Extent of Study Area:

1. North – Spring Mill Road from Conestoga to County Line Road
2. East – County Line Road from N. Spring Mill Road to Roberts Road
3. South – Roberts Road from County Line Road to S. Ithan Ave
4. West – S. Ithan Ave from Roberts Road to Mill Road; Mill Road from S. Ithan Ave to Conestoga Road; Conestoga Road from Mill Road to Sproul Road

2. Intersections:

1. Lowrey's Lane & Conestoga Road
2. Garrett Ave & Conestoga Road
3. Congestoga Road, Sproul Road , & Spring Mill Road
4. Ithan Ave & Conestoga Road
5. Lowrys Lane & Lancaster Avenue
6. Ithan Ave & Lancaster Avenue
7. Garrett Ave & Lancaster Avenue
8. Roberts Road & Lancaster Avenue
9. Sproul Road/Spring Mill Road & Lancaster Avenue
10. Spring Mill Road & County Line Road
11. Ithan Ave & County Line
12. Lowrey's Lane & County Line
13. Ithan Ave and Aldwyn Lane
14. County Line Road and Airdale Road

3. Study Periods:

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour
3. Major Campus event: Basketball, Graduation, Football game or other acceptable event approved by Township.

Crash Records:

1. Reportable and non-reportable crash records; 5 year history (from both PennDOT and Radnor Township Police Department
2. Locations:
    i. All approaches at Lancaster Avenue and Ithan Avenue intersection;
    ii. Lancaster Avenue from Spring Mill Road to Black Friar Road

5. Pedestrian Traffic

6. Parking Utilization:

1. Parking turnover
2. Parking duration
3. Parking occupancy

Please note Steve's comment below regarding seasonal adjustments and his suggestion that counts should be obtained in September, after school is in full session. As discussed in our meeting on April 24, 2012, the Township is interested in obtaining as much information as possible and we will assist the board in making an informed decision through our professional review services. Although the identified 14 studied intersections may appear excessive, it is important to the township that an extensive transportation analysis is inclusive of all intersections within close proximity to Villanova.
Thanks so much---
Amy

Amy B. Kaminski, P.E., PTOE| Gilmore & Associates
Senior Transportation Engineer
65 E. Butler Avenue , Suite 100 | New Britain , PA 18901
Direct: 267-337-6979|Company: 215 - 345 - 4330 Ext. 346 | Fax: 215 - 345 - 8606
Email: akaminski@gilmore-assoc.com
* **Please consider the environment before printing.**

From: Norcini, Steve [mailto:snorcini@radnor.org]
Sent: Wednesday, April 25, 2012 6:50 AM
To: 'Frank Tavani'
Cc: 'Kevin Kochanski'; Amy Kaminski; Dave Leh ; ' Marilou Smith '; ' Steven Hildebrand '; Zienkowski Robert
Subject: RE: Villanova traffic information

Good morning Frank,

The Township has received your transmission and will provide direction regarding the study area. As far as the data collection is concerned, you may have to wait until September to obtain meaningful counts. Seasonal adjustment factors would not be appropriate in this case.

Thank you

Stephen F. Norcini P.E.
Director of Public Works
Radnor Township
610.688.5600 x156
snorcini@radnor.org

From: Frank Tavani [mailto:frank@ftavaniassociates.com]
Sent: Tuesday, April 24, 2012 5:49 PM
To: Steve Norcini
Cc: Kevin Kochanski; Amy Kaminski; David Leh; Marilou Smith ; Steven Hildebrand
Subject: villanova traffic information

Steve,

This email is addressed to you as requested but is merely the transmission of some additional traffic information intended for Amy. One PDF file is attached. It is 30 pages. It contains the figures I handed out earlier today followed by raw count data.

As we mentioned toward the close of the meeting, we would like some direction from the township regarding our trip generation methodology as well as our study area. I should re-iterate that -- as Marilou mentioned -- the school year is in its final week this week and next weeks are final examinations, so there is very limited opportunity, if any, for additional data collection.

Finally -- and I'm embarassed to only be mentioning this now -- but one of the things that occured to me AFTER our meeting today impacts what Mr. Kochanski was discussing regarding the 1159 beds which are going to be vacated off campus if and when LAH is built. Specifically we discussed how those bedrooms/houses may be filled with other tenants who may (or may not) drive in our study area and how it would be helpful if the township could say (to residents or anyone else) that we were asked to include the impacts of *that* traffic in our study. I just realized that that in fact is exactly what we did. Specifically, we did NOT reduce the traffic along Route 30, Ithan, Aldwyn, etc. at all to reflect the 1159 students now being "on site", we **simply added more** traffic based on the parking space trip generation methodology which I explained.

We will wait to hear back from you and of course if you have any questions call or email anytime. Thx.

-Frank

_____
Frank Tavani, P.E., PTOE
Principal

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Villanova University Lancaster Avenue Housing Initiative **14 November 2012**
Traffic meeting with Radnor Township **revised 27 November 2012**

Meeting Minutes

Attendees

Name	Affiliation		
Lt. Chris Flanagan	Radnor Township	Bob Morro	Villanova University
Steve Hildebrand	Villanova University	Steve Norcini	Radnor Township
Amy Kaminski	Radnor Township / Gilmore	Marilou Smith	Villanova University
Chris Kovoloski	Villanova University	Frank Tavani	FTA, Inc.
Officer Ray Matus	Radnor Township		

Discussion Points

SPECIAL EVENT COUNTS

Since our last meeting, "special event" counts took place as previously discussed and agreed. They were conducted during homecoming weekend and during the counts there was no precipitation and attendance was normal. Some discussion ensued about the possibility of doing additional counts during a home basketball game, namely one scheduled for December 5th but this issue was left unresolved (see next page, last paragraph). Also discussed was how the point of the special event exercise was mainly to determine if traffic could be better managed through improved logistics and wayfinding. Villanova is already investigating ways to do this, including assigned parking to season ticket holders (which will rotate on an annual basis to treat all holders fairly), charging a fee for the parking in the proposed structure for non-season ticket holders, and other strategies, all of which will be documented later in the traffic report. Traffic count data has not yet been plotted but will be presented to the township – along with the 'ordinary' traffic data – later in December.

OTHER CAMPUS CHANGES

Bob M. talked about changes to parking permits and locations are being considered not only for special events but also for faculty and staff during the regular school year, including the possibility of changing the roadways leading to the SAC Parking Garage from one-way to two-way.

CHURCH WALK SIGNAL

Steve N. asked about the signal at Church Walk and how signal heads visibility would be affected by the proposed pedestrian bridge. Frank explained that the bridge will be essentially centered over the existing driveway, which is currently aligned with the Church Walk, so there will be no visibility issues as the signal heads will simply be mounted on mast arms on either side of the structure.

Some lengthy discussion took place regarding a WB left-turn lane and why it may not be needed at Church Walk, but that this will be investigated during the TIS production. There was discussion that in the EB direction an exclusive right turn lane at Church Walk is not needed due to proposed right-in/right-out driveway which will be located east of Church Walk, about midway between Church Walk and Route 320. Improved

access management will be provided through the elimination of 6 driveways and the reallocation of parking which will have access to the Church Walk signal (for left turns in and out).

Some discussion ensured about pedestrian crossings at grade at this location and how to prevent that. Some peds may attempt to cross, especially others in the community who Villanova can't control (joggers, SEPTA bus riders, etc.) This will be investigated further but initial thoughts include still providing sidewalks along Route 30 at Church Walk, installing post-mounted signs that prohibit ped crossings, elimination of painted crosswalks in Route 30, possibly fencing and other controls, moving SEPTA bus stops, etc.

ALDWYN LANE

Amy K. asked about any discussion which took place with the neighbors regarding Aldwyn Lane changes. At the meeting there were many neighbors not in favor of a cul-de-sac anywhere along Aldwyn Lane. Wooded Lane residents were also concerned. Frank T. mentioned a possibility may be to make Aldwyn Lane one-way for a short segment, such as between Route 320 and Wooded Lane, and further that such one-way orientation should be away from Route 30, meaning the signal heads for Aldwyn Lane could be eliminated, thereby possibly improving levels of service.

ITHAN AVENUE

Officer Matus mentioned an EB exclusive right-turn lane at Ithan might be useful as well adding a second NB left-turn lane. He also mentioned how the SB side sidewalk on Ithan is seldom used and does not extend under the Route 100 overpass. The upcoming TIS will investigate all these possibilities, including possibly extending the existing WB exclusive left-turn lane (at Ithan). Officer Matus expressed concern about directing / controlling ped flow on the east side of Ithan (i.e., from the stadium to the existing surface lot) and how controlling that should be considered in upcoming design work for the PAC and the parking structure.

Steve N. requested Villanova perform some investigations of what would need to be done to make the Ithan Avenue underpass traversable by trash trucks and emergency vehicles. Bob M. agreed to have Nave Newell investigate this and report back later. Villanova is not committing to this improvement but will provide some preliminary engineering investigations to the township.

Frank T. and others talked about traffic control devices along Ithan south of Route 30 and how the intersection of the parking structure driveway and the apartment surface parking lot area (i.e., the driveways along Ithan Avenue nearest to the Route 100 overpass) may be all-way stop-controlled. A gate may also be installed on the driveway serving the apartment surface parking lot area. Said gate would normally be open and would be provided just in the event that cut through traffic from the structure to Route 30 (at Church Walk) needs to be regulated or discouraged during certain events.

Some discussion took place regarding Dougherty Drive, which is the small road just north of Route 30 on the west side of Ithan Avenue. This unsignalized intersection permits all turning movements since some truck deliveries have to be made from Route 30 (they can't fit under the Regional Rail bridge to the north). Part of Villanova's master plan calls for a new gate and turn around area along Dougherty Drive and this will help regulate traffic flow there. This improvement is unrelated to the apartments and is moving forward presently and should be installed early next year.

If any part of these minutes is believed to be inaccurate or if there are significant omissions, please contact FTA by 30 November 2012 after which time the contents of these minutes will be binding. *Note that subsequent to the meeting, Villanova authorized FTA to move forward with additional data collection on a date TBD.*

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

February 1, 2013

File No. 11-04054T

Mr. Steve Norcini, P.E.
Public Works Director
Radnor Township
301 Iven Avenue
Wayne, PA 19087

Reference: Villanova University – Lancaster Avenue Redevelopment Traffic Study
Review of Deliverable #1:
Data Collection, Existing Traffic Volumes, and Initial LOS Analysis
Radnor Township, Delaware County, PA

Dear Mr. Norcini:

Gilmore & Associates, Inc. has completed the review of the referenced materials (*Villanova Traffic Study Deliverable #1*), dated: January 15, 2013, prepared for Villanova University; prepared by F. Tavani and Associates, Inc. and offers the following comments for your consideration:

BACKGROUND

The applicant, Villanova University, intends to develop/redevelop several parcels located along Lancaster Avenue, southeast and southwest of Ithan Avenue, in Radnor Township, Delaware County. The project will include the construction of student housing, retail shops, a performing arts center along with a multilevel parking structure. In addition, Villanova University intends to eliminate many of the existing driveway accesses to Villanova buildings, located south of Lancaster Avenue, and construct a shared surface parking facility to the rear of the existing university buildings with a combined shared access at "Church Walk". As such, the University is required to provide a traffic impact study for the existing, proposed, and future conditions of the roadway infrastructure. In order to expedite the review process, the applicant has agreed to provide Radnor Township and Pennsylvania Department of Transportation (PennDOT) the traffic impact study in a segmented approach to eliminate future tedious revisions.

All the below comments do not require a response or a resubmission of *Deliverable #1*; however, omissions should be addressed in subsequent submissions and in the final Report:

SUMMARY

TRAFFIC COUNT LOCATIONS:

Vehicle turning movement counts were obtained at the below requested intersections:

1. Lancaster Avenue and Spring Mill Road / Kenilworth Road / Aldwyn Lane
2. Lancaster Avenue and Church Walk
3. Lancaster Avenue and Ithan Avenue
4. Lancaster Avenue and Lowrys Lane
5. Lancaster Avenue and Garrett Avenue
6. Conestoga Road and Sproul Road
7. Conestoga Road and Spring Mill Road
8. Conestoga Road and Ithan Avenue
9. Conestoga Road and Lowrys Lane
10. Conestoga Road and Garrett Avenue
11. County Line Road and Spring Mill Road
12. County Line Road and Ithan Avenue North
13. County Line Road and Ithan Avenue South
14. County Line Road and Lowrys Lane
15. County Line Road and Airedale Road
16. County Line Road and Roberts Road
17. Ithan Avenue and Aldwyn Lane

In addition to the above intersections, turning movement counts were conducted at the five unsignalized driveways serving Villanova's main parking lots along Ithan Avenue and Lancaster Avenue, for a total of twenty-two (22) count locations.

COUNT PERIODS:

1. Morning Peak Hour (AM) 7:00 AM – 9:00 AM
2. Afternoon/Evening Peak Hour (PM) 4:00 PM – 6:00 PM
3. Requested Special Event No. 1: Homecoming Traffic (October 27, 2012) Noon-3:00 PM
4. Requested Special Event No. 2: Basketball Traffic (December 11, 2012) 6:00 PM-8:00 PM

COMMENTS:

1. **Special Event Analyses**: Included in the *Deliverable #1* submission was a discussion regarding the comparison of the AM and PM peak hour data with the "Special Event" peak hour data. The discussion concluded there is no real value in developing a level of service analysis for the "Special Events" because the total intersection volumes during "Special Events" were less than both the AM and PM Peak hours studied. While we do agree with this conclusion and support eliminating the unnecessary level of service analysis for the two "Special Events", we remind the applicant that a Special Event Traffic Plan is required in the final submission, as discussed during recent scoping meetings.

2. **Adjustments: Traffic Demand versus Traffic Served:** It appears that no volumetric adjustments were made to any of the studied intersections concerning the observation of unmet demand. Evidently, the only approach exhibiting excessive queues from unserved vehicles occurred on the southbound approach of E. County Line Road at Airdale Road. Information provided in *Deliverable #1* indicates that an excess of five (5) vehicles were observed during both the AM and PM peak 15 minutes analyzed.

Although the explanation provided regarding the unserved demand volumes indicated the queues were directly related to the metering effect from the adjacent signalized intersection, no adjustment to the analysis data was included. An adjustment should be made to the traffic volumes, or further discussion regarding the excessive queue on the southbound approach of E. County Line Road at Airdale Road should be included in the final report. The discussion should include a more detailed explanation of causal factors rather than an general discussion.

3. We remind the applicant of the following information as indicated in Strike-off Letter (SOL) 470-09-04, *Policies and Procedures Transportation Impact Guidelines,* Dated: February 12, 2009

    a. Page 8: PennDOT requires a five (5) year projection beyond the anticipated full build-out of the proposed site.
    b. Page 13: Crash records shall be provided along with a crash pattern discussion.
    c. Page 15: A detailed level-of-service and delay table by approach and movement for the various studied scenarios shall be provided.

GENERAL:

4. For verification, the Synchro Reports should include the detector layouts in the report. It appears the detector option was not selected when generating the report. Please include in future submissions.

5. Unsignalized intersection capacity analysis must be provided through Report selection for HCM Unsignalized Intersection Capacity Analysis. The provided Report did not identify LOS or Delay for the unsignalized intersections.

6. PennDOT File No. 0779 *Lancaster Avenue & Villanova Parking Lot* was not included in this submission; please include the Signal Permit Plan in subsequent submissions.

INTERSECTION:

7. Pages 3 and 62 of 208: AM & PM Synchro data for Intersection 3: *County Line Road & Spring Mill Road*:
    a. Verify posted speed limit on both approaches of Spring Mill Road; it appears the speed limit is 25 MPH.
    b. Per the Signal Permit Plan, revise the OFFSET to “0” for both AM and PM timings
    c. AM timing should reflect a total of 20 seconds for phase 2+6 (Spring Mill Road) and 40 seconds for phase 4+8 (County Line Road) for a total Cycle Length of 60 seconds.
    d. PM timing should reflect a total of 22 seconds for phase 2+6 (Spring Mill Road) and 38 seconds for phase 4+8 (County Line Road) for a total Cycle Length of 60 seconds.

8. Page 31 and 67 of 208: AM and PM Synchro data for Intersection 7: *Sproul Rd/Spring Mill Rd & Aldwyn Ln/Kenilworth Rd & Lancaster Ave* and PennDOT System Plan I-0156: revise the control type to FREE operation.

9. Pages 37 and 73 of 208: AM & PM Synchro data for Intersection 16: *Conestoga Road & Sproul Road* and PennDOT File No. 0886.
    a. Verify this intersection is the MASTER intersection and Offset = 0; the permit plan does not identify the offset or typical coordination notes regarding the system limits.
    b. Verify the Minimum Initial for Phases 4+8 and 2+6; it appears the values may have been transposed.

10. Pages 42 and 78 of 208: AM and PM Synchro data for Synchro Intersection 27: *Lancaster Avenue & Ithan Avenue* and PennDOT File 0780:
    a. Minimum Initial for Phase 2+6 should be verified; the signal permit plan indicates a value of 34.0 seconds for the minimum initial.

11. Page 47 and 83 of 208: AM & PM Synchro data for Intersection 33 *Williams Rd/Garrett Ave & Conestoga Rd*; verify the posted speed limit and lane widths on all approaches to this intersection. It appears Williams Road/Garrett Avenue is posted at 15 MPH and Conestoga Road is posted at 25 MPH; and the lane width default value of 12 feet was utilized.

12. Pages 52 of 208: AM Synchro data for Intersection 51: *Lowrys Lane & Lancaster Avenue* and System Plan I-0156: Revise the offset to 25 as indicated on the System Plan

13. Page 82 of 208: PM Synchro data for Intersection 29: *Strathmore Dr/Lowrys Ln & Conestoga Rd*; verify the turning movement counts for the northbound approach; both the count data and figures indicate 15, 8, 17 for the left, through and right movements.

As indicated previously, none of the above comments require a response or a resubmission of *Deliverable #1*; however, we recommend the applicant resolve identified omissions/corrections in subsequent submissions and in the final Report. We hope you find the above discussion useful and, please do not hesitate to contact this office if the Township has any questions.

Sincerely,

Amy B. Kaminski

Amy B. Kaminski, P.E., PTOE
Senior Transportation Engineer
Gilmore & Associates, Inc.

Cc (via email):
Kevin W. Kochanski, R.L.A, C.Z.O, Director of Community Development
John Sartor, P.E. Vice President, Gilmore & Associates, Inc.
David Leh, P.E., Senior Project Manager, Gilmore & Associates, Inc.
Roger A. Phillips, Senior Project Manager, Gannett Fleming, Inc.

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

April 24, 2013

File No. 11-04054T

Mr. Steve Norcini, P.E.
Public Works Director
Radnor Township
301 Iven Avenue
Wayne, PA 19087

Reference: Villanova University – Lancaster Avenue Redevelopment Traffic Study
Review of Deliverable #2:
Parking Supply & Demand, Trip Generation, Trip Distribution, Trip Redistribution
Radnor Township, Delaware County, PA

Dear Mr. Norcini:

Gilmore & Associates, Inc. has completed the review of the referenced materials (*Villanova Traffic Study Deliverable #2*), dated: February 21, 2013, prepared for Villanova University; prepared by F. Tavani and Associates, Inc. and offers the following comments for your consideration:

BACKGROUND

The applicant, Villanova University, intends to develop/redevelop several parcels located along Lancaster Avenue, southeast and southwest of Ithan Avenue intersection, in Radnor Township, Delaware County. The project includes construction of student housing (1,159 bed apartment-style residence halls), retail shops (University Bookstore, bistro and small convenience store) to be located on the southwest corner of Lancaster Avenue and Ithan Avenue. In addition, the project includes construction of a Performing Arts Center (with 500 – 650 total seats in two theaters) and multilevel parking structure to be located on the southeast corner of Lancaster Avenue and Ithan Avenue. Villanova University intends to eliminate many of the existing driveway accesses located on the south side of Lancaster Avenue, west of Ithan Avenue and construct a shared surface parking facility to the rear of the existing university buildings with limited access to Lancaster Avenue at the signalized intersection of Chapel Walk. Villanova University is required to provide a traffic impact study to both Pennsylvania Department of Transportation (PennDOT) and Radnor Township for the existing, proposed, and future conditions of the roadway infrastructure. In order to expedite the review process, the applicant has agreed to provide Radnor Township and PennDOT with the traffic impact study in a segmented approach to eliminate future extensive reviews and revisions. This submission represents the second deliverable provided to both PennDOT and Radnor Township and examines the following information:

1. Parking Supply and Demand
2. Trip Generation
3. Trip Distribution (new traffic)
4. Trip Re-Distribution (existing traffic)

All of the below comments do not require a response or resubmission of *Deliverable #2*; however, comments should be addressed in subsequent submissions and in the final Traffic Impact Study analysis:

COMMENTS:

DELIVERABLE #1

1. *Deliverable #1:* While reviewing *Deliverable #2,* the Synchro® files from *Deliverable #1* were submitted for review and revealed the AM and PM networks include many bends in the roadway coding. Bends are typically used for lane adds or drops in a roadway network. Synchro cautions users to use curved links instead of bends where possible. We recommend eliminating the short link bends entirely for bends number 39 and 63, and revise other bends to curved links.

PARKING DISCUSSION:

1. Given the length of *Deliverable #2*, many of the following discussion points are intended to provide a summary and discussion of *Deliverable #2* to clarify the content.

2. **Parking Demand at On-Campus Residence Halls:** *Deliverable #2* information concludes that Villanova on-campus residential hall students tend to remain parked during the school day; however, provided data does not analyze parking turnover information that might provide insight as to the movement of vehicles. The table provided on page 20 of *Deliverable #2*, indicates West and South Campus parking facilities have minimal difference in the number of available parking spaces during the 10:00 AM and 12:00 PM data collection periods but does not include the parking turnover rate.

   Comment: We recommend a parking turnover analysis during the school day for West Campus to support the applicant's conclusion that parking turnover is minimal at the West Campus residential halls. The scope of work should be cleared with township staff prior to conducting the turnover analysis.

3. **Class Day Demand v. Special Event Demand:** *Deliverable #2* included information regarding a campus wide parking inventory obtained on typical class days and during several Special Events (basketball games). The information provided indicates that the typical class day parking demand is more intense than the basketball events; therefore, the focus of the parking analysis should be for a typical class day.

Comment: Based on the provided information, we agree with this conclusion and support eliminating the "Special Event" parking analysis. However, we remind the applicant that a Special Event Traffic Plan is required in the final submission, as discussed during recent scoping meetings and as a comment provided on *Deliverable #1*.

4. **Performing Arts Center:** *Deliverable #2* includes a discussion regarding parking supply and demand for the proposed Performing Arts Center. Presently, a performance stage/theater facility currently operates on campus at Vasey Hall. The existing theatre includes 167 seats and offers twelve performances per year. The new facility will include 350 – 450 seats in the main auditorium with an additional 150 - 200 seats in the "black box" theater. Discussions in *Deliverable #2* centered on the scheduling of performances to avoid conflicts with other campus Special Events like basketball games.

   Comment: The applicant concludes the events associated with the Performing Arts Center would occur in the evening, during non-peak traffic conditions when parking supply was readily available. We agree with this information and conclusion.

5. **Institute of Transportation Engineers (ITE) Parking Generation, 4th Edition:** Based on the industry standard for determining parking demand by land use type in a Suburban environment, along with the existing school population independent variable (students, faculty and staff), the Weekday Peak Period parking demand for Villanova University is calculated at 4,126 parking spaces. Data collected by Villanova indicates the peak parking demand is 4,382 parking spaces, which indicates 256 additional parking spaces are required (demand) for Villanova's campus as compared to other University Campuses of similar size and environment. The actual number of on-campus parking spaces supplied is 5,130, which exceeds the existing demand based on the school population at Villanova. Note: ITE provides parking rates based on both Urban and Suburban environments; however, the more conservative analysis used in the deliverable focused on the more intensely parked Suburban environments.

   Comment: We agree with this methodology.

6. **West Campus Housing Discussion:**
   a. The existing West Campus apartment-type residence halls have 1,244 beds and provide housing for undergraduate upperclassmen, which is similar to what is being proposed at the Lancaster Avenue Housing (LAH). A statement is included in *Deliverable # 2* indicating that it is unlikely vehicles will be moving during the peak periods on class days. The table provided on page 20 *Villanova Parking Lot Inventory* indicates minimal change in parking occupancy during the data collection periods (10AM and 12PM); however, it is unclear if the 10AM occupied/unoccupied spaces were consistent with the 12PM data or if a turnover occurred between 10AM and 12PM. Villanova has consistently maintained the construction of the LAH will reduce vehicular traffic, as off-campus students will now reside on-campus and vehicles will not be utilized during the typical class day.

Comment: We recommend a parking turnover analysis during the school day for West Campus to support the applicant's conclusion that parking turnover is minimal at the West Campus residential halls. The scope of work should be cleared with township staff prior to conducting the turnover analysis.

b. Details of the West Campus residential occupation indicate that only 1,097 of the total 1,244 beds are occupied by undergraduate juniors. Villanova has indicated that housing demand exceeds housing supply; however, the provided information indicates 147 beds are presently unused.

Comment: More detail should be provided to clarify the unoccupied beds.

c. *Deliverable #2* includes an analysis that equates the forecasted parking demand for the Proposed LAH based on the parking demand at the existing West Campus residence hall.

Comment: The analysis follows a valid methodology for projecting the number of student parking demand for the proposed LAH; we agree with this validation methodology and subsequent analysis

i. Based on the provided information that assumes the retail portion of the LAH is restricted to only Villanova University "traffic", the projected parking demand would be 550 parking spaces to be utilized by staff, visitor's and vehicular student commuters. As a comparison, the existing Pike Surface Lot provides 577 parking spaces for staff and students.

Comment: We concur that the identified 550 Pike Garage parking spaces would satisfy the existing parking demand currently provided by the Pike Surface Lot.

ii. Figure 7 indicates the net increase/decrease of parking spaces by quadrant for the proposed Lancaster Expansion. The net results indicate an increase of 653 parking spaces at the proposed Pike Garage, to be located on the southeast corner of Lancaster Avenue and Ithan Avenue. *Deliverable # 2* identifies 930 spaces will be utilized by vehicles that are not likely to be driven during the AM and PM peak hours and 300 of the remaining spaces will be utilized by Villanova staff, visitors and others.

Comment: The pedestrian traffic from the 300 parking spaces may require the signalized intersection at Lancaster Avenue and Ithan Avenue continue to operate with a protected pedestrian phase (pedestrian scramble phase) and will continue to create delays to Lancaster Avenue through motorists.

TRIP GENERATION

1. In general, when a new development is proposed, the vehicular trips associated with the new land development are calculated based on the type of land use and the size of the proposed land use. The applicant indicates there will be no net increase in traffic for the proposed University Student Bookstore, Bistro and the small convenience store. While we agree that it is very likely the University Student Bookstore will generate fewer trips than predicted by the industry standard, *ITE Trip Generation*, it is unclear how many new trips will be generated.

   Comment: As a comparison and for information purposes, the final report should include the total potential trip generation based on the square footage of the proposed Bookstore, Bistro, and convenience store in an effort to determine what the maximum number of vehicle trips generated for the development would be if the development were constructed elsewhere in the Township.

2. *Deliverable #2* indicates the Trip Generation portion of the study will take a conservative approach, analyzing the roadways and intersections to include the existing Villanova commuters that will no longer commute to campus because the students will utilize the new on-campus housing. In other words, the report acknowledges that off-campus housing vacated by Villanova students moving to on-campus housing will likely be rented by new tenants who may or may not be Villanova commuters. As such, the existing trips associated with the off-campus rental units will be included in the "background" traffic volumes and no attempt will be made to eliminate the Villanova commuters from the traffic counts obtained by the applicant.

   Comment: The conservative approach taken by the applicant dismisses taking a "credit" for traffic volumes associated with students that no longer commute to Villanova and provides a future analysis that is in all probability more intense than the existing conditions. We acknowledge and agree with this conservative approach.

TRIP DISTRIBUTION

3. *Deliverable #2* assumes the following operations and intersection traffic control:

   a. <u>Western Lancaster Avenue Housing (LAH) Lot Driveway</u>: Right-in, right-out, left-in turning movements permitted (left turning movement out of the driveway will be prohibited) and stop control for motorists exiting the driveway to access Lancaster Avenue.

      COMMENT: Previous discussions with the applicant indicated this driveway would include a right-in, right-out operation and no left turns would be permitted at the driveway intersection. If the applicant intends to include lefts into the site, a dedicated left turn lane would be necessary to reduce delay for motorists traveling westbound on Lancaster Avenue.

   b. <u>Ithan Avenue & Pike Garage North Driveway</u>: This driveway would operate as an exit only; left and right turns with stop control for the driveway.

COMMENT: We recommend altering this exit driveway to a channelized right turn and eliminating the left turn movement at the north driveway for the following reasons:

i. Left turning vehicles continuing south on Ithan Avenue would increase the delay to vehicles on the southbound approach of Ithan Avenue at the proposed all-way stop control at the Pike Garage South Driveway.
ii. Vehicles queued on northbound Ithan Avenue at Lancaster Avenue may extend beyond the Pike Garage North Driveway which increases the potential for crash incidents with southbound Ithan Avenue vehicular traffic.
iii. Eliminating left turns from the north driveway may eliminate the need for police control at the north driveway during Special Events.

c. Ithan Avenue & Lancaster Avenue Lot/Pike Garage South Driveway: Full access (all turning movements provided for all approaches) and an all-way stop control.

COMMENT: The final TIS should include detailed information regarding queue and delay for this all-way stop control; in addition, a signal warrant analysis should be included in future studies. We recognize the intersection location is a less than desirable distance from the signal at Ithan Avenue and Lancaster Avenue; however, a warrant analysis would determine if a signal might be considered at this intersection.

d. Lancaster Avenue and Pike Garage Eastern Driveway: This driveway would include left and right turns into Pike Garage, and right turns out of the driveway to continue eastbound on Lancaster Avenue.

COMMENT: Township staff has expressed concern for pedestrians using the existing de facto mid-block pedestrian crossing on Lancaster Avenue near the Villanova Stadium. Although the proposed Pike Garage Eastern driveway access provides an efficient operation for vehicular traffic, the Township may want to consider eliminating the driveway from the proposed plan or require design measures that permanently deter pedestrians crossing Lancaster Avenue east of Ithan Avenue.

4. **Pike Parking Garage Location** Although perhaps premature as this is a land development comment, we recommend the Township consider having the applicant investigate altering the location of the Pike Garage to a more campus neutral site near the proposed pedestrian bridge. Moving the parking structure to a central campus location, adjacent to the pedestrian bridge would:

a. encourage much of the pedestrian traffic to utilize the pedestrian bridge, which would reduce the number of pedestrians crossing at Lancaster Avenue and Ithan Avenue. This could provide an opportunity to eliminate the pedestrian scramble; however, adequate signage would be necessary to alert pedestrians to the new pedestrian phasing.

b. reduce the number of driveway curb cuts on Ithan Avenue and Lancaster Avenue as most vehicle traffic would take direct access to Lancaster Avenue via the traffic signal near Church Walk

c. provide a more concentrated Police detail/effort during Villanova Special Events on Lancaster Avenue near Church Walk and could potentially reduce or eliminate the need for police detail along Ithan Avenue at Lancaster Avenue near the stadium

d. concentrate vehicle turning movements at the signalized intersection on Lancaster Avenue/Church Walk without conflicting with street level pedestrian traffic.

As indicated previously, none of the above comments elicits a response or a resubmission of *Deliverable #2*; however, we recommend the applicant resolve identified omissions/corrections in subsequent submissions and in the final Report. We hope you find the above discussion useful; please do not hesitate to contact this office if the Township has any questions.

Sincerely,

Amy B. Kaminski

Amy B. Kaminski, P.E., PTOE
Senior Transportation Engineer
Gilmore & Associates, Inc.

Cc (via email):
Kevin W. Kochanski, R.L.A, C.Z.O, Director of Community Development
Roger A. Phillips, Senior Project Manager, Gannett Fleming, Inc.

DELAWARE VALLEY
dvrpc
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PLANNING COMMISSION

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www.dvrpc.org

April 26, 2013

Mr. Francis Hanney
PennDOT, District 6.0
7000 Geerdes Bvld
King of Prussia, PA 19406

RE: US 30 Radnor Township Corridor Study.

Dear Mr. Hanney:

DVRPC was asked to provide an annual background traffic growth factor to support the evaluation of alternatives to improve congestion along US 30 in the vicinity of Villanova University during peak periods. We suggest that you use an average annual factor of 0.25 percent per year between the 2012 base year and the 2035 horizon year.

This factor is based on an examination of current and forecast traffic volumes, as well as historical trends in traffic volumes and DVRPC's Board-adopted population and employment forecasts in the study area. DVRPC's new traffic demand model (TIM2.0), which was just recently validated against base year conditions, was used to support this analysis. If you have any questions or need additional information, please contact me at (215) 238-2911 or mgates@dvrpc.org.

Sincerely,

Matthew T. Gates
Manager, Office of Modeling and Analysis

Cc: Ashwin Patel, PennDOT District 6.0
David Anderson, DVRPC
Jerry Coyne, DVRPC
Keith Hartington, DVRPC

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

July 23, 2014

File No. 12-04054T

Mr. William Bolla, Esq.
McNamara, Bolla & Panzer
116 East Court Street
Doylestown, PA 18901

Reference: Villanova University – Lancaster Avenue Redevelopment
CICD Conditional Use Transportation Review #1-*Revised*
Radnor Township, Delaware County, PA

Dear Mr. Bolla:

Gilmore & Associates, Inc. has completed the conditional use Transportation review of the submitted materials and offers the following comments for Radnor Township consideration:

I. BACKGROUND

The applicant, Villanova University, intends to develop/redevelop several parcels located along Lancaster Avenue, southeast and southwest of Ithan Avenue intersection, in Radnor Township, Delaware County. The project includes construction of student housing (1,159 bed apartment-style residence halls), retail shops (University Bookstore, bistro and small convenience store) along with 147 surface parking spaces to be located on the southwest corner of Lancaster Avenue and Ithan Avenue. In addition, the project includes construction of a Performing Arts Center (with 500 – 650 total seats in two theaters) and multilevel parking structure (1,265 spaces) to be located on the southeast corner of Lancaster Avenue and Ithan Avenue. Villanova University intends to eliminate many of the existing driveway accesses located on the south side of Lancaster Avenue, west of Ithan Avenue and construct a shared surface parking facility to the rear of the existing university buildings with limited access to Lancaster Avenue at the signalized intersection of Chapel Walk.

II. DOCUMENTS SUBMITTED

The following documents were submitted to Gilmore & Associates for review:

A. Conditional use plan set (11 sheets) for Villanova University prepared by Voith & Mactavish Architects, LLP and Robert A.M. Stern Architects, LLP, dated May 2, 2014.

65 E. Butler Avenue | Suite 100 | New Britain, PA 18901
Phone: 215-345-4330 | Fax: 215-345-8606

www.gilmore-assoc.com

B. Landscape plans (3 sheets) for Villanova University prepared by Voith & Mactavish Architects, LLP and Robert A.M. Stern Architects, LLP, dated May 2, 2014.

C. Transportation Impact Assessment for Villanova University Lancaster Avenue Student Resident Halls, prepared by F. Tavani and Associates, Inc. dated May 4, 2014.

D. Development Impact Statement for the Villanova University CICD Development dated May 2, 2014.

III. IMPROVEMENTS

According to the submitted Transportation Impact Assessment, Villanova University proposes the following improvements/accesses:

A. Lancaster Avenue at Church Walk-Signalized Intersection

1. Left and right turn lane exit from Chapel Walk to Lancaster Avenue.
2. Improvements on Lancaster Avenue at Church Walk include:
    a. Right in/right out on the eastbound approach of Lancaster Avenue, east of Church Walk
    b. A westbound dedicated left-turn lane entering Church Walk
    c. An Eastbound dedicated right-turn lane entering Church Walk
3. Full access on Ithan Avenue at Pike Lot Parking Garage
4. New pedestrian bridge spanning Lancaster Avenue at Church Walk.
5. Elimination of eight (8) existing full access driveways along Lancaster Avenue
6. Consolidation of existing parking lots with access to existing signalized intersection at Lancaster Avenue and Church Walk.

B. Pike Lot Parking Garage Accesses (Southeast corner of Lancaster Avenue and Ithan Avenue)

1. Left/right in and right out access on Lancaster Avenue, east of Ithan Avenue.
2. Full access to Ithan Avenue with northbound and southbound left-turn lanes on Ithan Avenue.
3. Right out, north of the full access to Ithan Avenue

C. Lancaster Avenue and Ithan Avenue-Signalized Intersection:

1. Lancaster Avenue eastbound dedicated left lane, one through lane and one shared through/right turn lane.
2. Lancaster Avenue westbound: extended dedicated left turn lane, one through lane and one shared through/right turn lane.
3. Ithan Avenue northbound: extended dedicated left turn lane; one shared through/right turn lane.
4. Ithan Avenue southbound: dedicated left turn lane; one shared through/right turn lane.

5. New entering left-turn movement directly from westbound Lancaster Avenue to Pike Garage including eastbound Lancaster Avenue right in/right out (prohibit left turn movement out of Pike Garage onto Lancaster Avenue.

IV. COMMENTS

A. Conditional Use Plans

1. §280-135F(1); Truck turning templates should be provided to ensure access is adequate for the "Mechanical/Loading Pit" located just west of Lancaster Avenue & Ithan Avenue. In addition, a mechanical gate is needed for this location during non-use to discourage illegal parking.

2. The conditional use plans and the TIA should provide consistent lane configurations. The TIA indicates one shared northbound lane for the Church Walk Access approach driveway while the plans indicate a left-turn lane and a shared left/right turn lane. At the intersection of Ithan Avenue and Lancaster Avenue, the TIA indicates a dedicated right turn lane is proposed for the eastbound approach Lancaster Avenue at Ithan Avenue (Synchro Report in TIA, page 296) ; however, the plans indicate a shared right/though lane.

3. As discussed during coordination meetings with Villanova and Township staff, revise the plans to include a dedicated eastbound right turn lane on Lancaster Avenue to provide Radnor Township Police Department the ability to close the travel lane during special events without impeding non-event traffic.

4. Previous coordination meetings included the construction of a pedestrian activated rectangular rapid flashing beacon (RRFB) crosswalk at the unsignalized crossing on Ithan Avenue near South Campus dormitories and Aldwyn Park

5. The unsignalized access to Lancaster Avenue, east of Ithan Avenue, is shown on the conditional use plans as a full access (all turning movements allowed) while the Transportation Impact Assessment (TIA) describes this access as a right-in, right-out with a westbound left-in from Lancaster Avenue. The access should prohibit left turns out of the Pike Garage with channelization to restrict the left movement out of the access as indicated in the TIA.

6. The pedestrian bridge indicates that pedestrians will access the street level on the south side of Lancaster Avenue (adjacent to the proposed dormitories within the driveway median. This is not acceptable and the design should be revised as follows:

    a. The steps should place Villanova foot traffic outside the driveway limits to discourage pedestrians from crossing the Church Walk driveway.

    b. Dormitory students should have direct access from the dormitories to the Pedestrian Bridge without the need to move to the street level. We recommend constructing a raised direct access between the dormitories

and the pedestrian bridge with a possible key card entry for dormitory students to encourage the use of the Pedestrian Bridge over the at-grade pedestrian crossing. Students at street level are less inclined to walk up the steps to gain access to the Pedestrian Bridge if a street level crossing is readily available.

c. Construct a fence along the north side of Lancaster Avenue to prohibit Villanova foot traffic from utilizing the traffic signal at street level to gain access to the parking lot or campus. The fence should be installed along the north site frontage the fullest extent possible to deter Villanova pedestrian traffic from utilizing the traffic signal at Church Walk to cross Lancaster Avenue.

d. Provide an elevator, ramp or other acceptable method to allow handicap users access to the pedestrian bridge where direct access to the pedestrian bridge is not provided.

7. Traffic Calming: The strategy discussed in the Development Impact Study (DIS) includes moving traffic along Lancaster Avenue in an effort to reduce the cut-through traffic experienced in neighborhoods; however, the improvements along Lancaster Avenue are not likely to move traffic along any more quickly than is currently experienced. We recommend discussing traffic calming with nearby affected neighborhoods, particularly Aldwyn Lane residents and considering installing a traffic adaptive system beginning at Lancaster Avenue and Sproul Road/Spring Mill Road & Aldwyn Lane & Kenilworth Road and continuing to County Line Road for a total of six (6) intersections. Furthermore, the traffic calming and traffic adaptive system should be constructed during phase 1.

8. Provide a special event plan with permanent dynamic message signage prior to conditional use approval.

9. Provide a mechanical gate for the Ithan Avenue accesses to both the surface lot and the Pike Garage; the gates will offer Radnor Township Police Department the ability to close or open the accesses during special events.

10. Develop permanent reverse signage and internal vehicular flow for the Pike Garage to allow reverse flow for all accesses during special events.

11. Develop a parking lot identification system with signage and assigned parking for campus users.

B. Development Impact Statement/Transportation Impact Assessment

1. §280-135G(1)(c) indicates the Transportation Impact Assessment (TIA) must follow PennDOT SOL 470-09-4 Transportation Impact Study Guidelines, dated February 12, 2009, as amended, regarding *Policies and Procedures For Transportation Impact Studies*, the TIS should be revised to include the following:

a. Executive Summary
b. List of intersections for study area.
c. Provides dates for when counts were conducted.
d. Intersection Level of Service (LOS) Table with LOS and delay for each approach and critical movement.
e. Provide a description of the existing roadways and intersections within the study area.

2. As required in PennDOT Publication 46 *Traffic Engineering Handbook*

a. Provide a turn-lane length analysis.
b. Provide a table indicating the 95th percentile queues for all intersections.
c. Provide the available and proposed storage length for all movements. The applicant should design the proposed turn-lanes lengths to be the greater of the storage length based on the turn lane analysis and the 95% queue analysis.
d. The capacity analysis should use PennDOT defaults as required in Exhibits 10-9 through 10-11.

2. Revise the TIS to follow HCM2010 methodology in Synchro. We note other approved methodologies may be used at intersections where HCM 2010 methodology cannot be applied; however, most studied intersections can and should follow HCM2010 methodology in Synchro.

3. All signal timings should be optimized for No-Build conditions in accordance with PennDOT SOL 470-09-4.

4. Traffic volumes and Level of Service analysis should be provided for the figures for the proposed right-in/right-out driveway.

5. The actual AM and PM peak hour period may vary from intersection to intersection; however, the analysis should provide the traffic volumes for the peak hour of each individual intersection despite different peak hours in the study area. It appears a consistent uniform peak hour was selected for all studied intersections and the provided analysis does not adequately analyze the worst case scenario.

6. As discussed at previous coordination meetings, the applicant must include a discussion regarding Special Event Transportation Plan. This plan should consider signal timing revisions (including a possible split phase at Ithan and Lancaster), alternative vehicular lane use strategies, social media alerts, and the use of changeable electronic message boards. The strategies should also consider the post event release of vehicles from the Pike Garage and Church Walk surface lot.

7. In general, when a new development is proposed, the vehicular trips associated with the new land development are calculated based on the type of land use and the size of the proposed land use. The applicant indicates there will be no net increase in traffic for the proposed University Student Bookstore, Bistro and the

small convenience store. While we agree that it is very likely the University Student Bookstore will generate fewer trips than predicted by the industry standard, *ITE Trip Generation*, it is unclear how many new trips will be generated. As a comparison and for information purposes, the analysis should include a discussion regarding the total potential trip generation based on the square footage of the proposed Bookstore, Bistro, and convenience store in an effort to determine what the maximum number of vehicle trips generated for the development would be if the development if all trips associated with the improvements were considered "new" trips.

Please let me know if you require additional information or further clarification related to this subject.

Sincerely,

Amy B. Kaminski

Amy B. Kaminski, P.E., PTOE
Department Manager of Transportation
Gilmore & Associates, Inc.

RETTEW

We answer to you.

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Engineers
Planners
Surveyors
Landscape Architects
Environmental Consultants

August 19, 2014

Mr. William J. Bolla, Esquire
McNamara, Bolla, and Panzer
116 East Court Street
Doylestown, PA 18901-4321

RE: Villanova CICD Conditional Use Development Impact Statement
Review No. 1
RETTEW Project No. 101442003

Dear Bill:

At your request, we have completed our review of the above referenced document as prepared by Voith & Mactavish Architects LLP. Our review was of the following information received on July 15, 2014:

1. Thirteen (13) plan sheets dated May 2, 2014;
2. Development Impact Statement dated May 2, 2014;
3. Traffic Impact Statement dated May 2, 2014; and,
4. Miscellaneous Township ordinances and related documents.

Project Overview:

Applicant:	Villanova University
Requested Action/Use:	CICD Conditional Use – Development Impact Statement Review
Zoning District:	PI – Planned Institutional; CO – Commercial Office
Location and Size:	CICD Conditional Use Property is located between Lancaster Avenue and the SEPTA R-100 tracks, and between Pike Field and Moriarty Hall on the Villanova campus, a gross site area of approximately 13.81 acres.
Existing Use:	Surface parking lots
Proposed Use:	Student dormitories, Performing Arts Center, Parking Structure, and student-centered retail.

We have performed a general review of the Development Impact Statement supported by conditional use plans and related documents, and have included comments on the Impact Statement at this point. We may have additional comments as the Conditional Use application moves through the review process and will when more detailed land development plans are submitted.

Our comments below are in the same order as the contents for a Development Impact Statement are listed in the CICD Use in the Planned Institutional zoning district.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – ENVIRONMENTAL & NATURAL RESOURCES

1. Objectives 1 – 3: No comments.

2. Objective 4: In addition to the University's response, the proposed 13-acre development provides for 2 acres of preserved land in the Aldwyn Triangle, which has been designated, at least partially, as a "core reserve wooded area." The Comprehensive Plan strongly recommends that the Township protects and preserves these existing natural areas to the maximum extent *(2-40)*. Preservation by the University of the remainder of the Aldwyn Triangle would help to protect the environmental integrity of the sensitive natural features in the dedicated 2-acre portion and be an indication of the University's intent for the Triangle property to remain a quiet part of the neighborhood.

3. Objectives 5 – 7: No comments.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – HOUSING, DEMOGRAPHICS, AND SOCIOECONOMICS

4. Objectives 1 – 4: No comments.

5. Objective 5: In addition to the University's response, the new on-campus housing provided for over 1,100 off-campus resident students may consequently increase the availability of housing in Radnor Township, especially of rental units. Current demand for housing in Radnor is high, and the Township Comprehensive Plan indicates that another downside of this "more demand than supply" market condition above and beyond rapid increases in price is that households wanting to move into Radnor in the future… will not be able to move in and will be forced to seek alternative locations. This factor may be more significant for certain types of households, certain age groups, or ethnic and racial groups which are more income-constrained, all of which can have implications for future Radnor community building *(3-14)*.

6. Objectives 6 – 10: No comments.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – BUSINESS AND ECONOMIC DEVELOPMENT

7. Objectives 1 – 6: No comments.

8. Objective 7: The University indicates that it pays applicable taxes on unrelated business generating activities. It does not, however, pay business privilege taxes on those business activities it conducts which it considers part of its core mission. The University also does not pay property taxes.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – TRANSPORTATION AND CIRCULATION PLAN

9. One of the goals of Section 5 – Transportation and Circulation Plan of the Comprehensive Plan is to develop traffic calming strategies for implementation, as appropriate, to help preserve neighborhoods. The Development Impact Statement on page 11, however, indicates that no traffic calming is proposed as a method to "reduce the likelihood of cut-through traffic." Instead, proposed traffic improvements to Lancaster Avenue are cited as improving the performance of that key arterial roadway and in doing so will reduce cut-through traffic. Until the University submits its Special Events Management Plan for the post-development condition, and it reworks its Traffic Impact Study to comply with all PennDOT requirements for such studies (see comment under Transportation Impact below), the ability of Lancaster Avenue improvements to reduce cut-through traffic cannot be confirmed. The University has indicated a willingness to install a raised crosswalk and Rapid Reaction Flashing Beacon at Aldwyn and at the two-way access/egress to the Parking Garage on Ithan for pedestrian safety, both of which will help calm traffic speeds. Similar consideration will be needed for traffic calming on Aldwyn Lane, particularly for special event traffic.

10. Section 5 – Transportation and Circulation Plan of the Comprehensive Plan outlines an Access Management Program that "should apply to all roads in the Township, as practical. Reducing the amount of unnecessary curb cuts and access points can also help to reduce delays in traffic flow, accident levels, and pedestrian conflicts" *(5-29).* The University's plan includes the elimination of eight (8) existing 'unrestricted' driveways along Lancaster Avenue between State Route 320 and Church Walk at the West Lancaster Parking area properties.

11. Section 5 – Transportation and Circulation Plan of the Comprehensive Plan also states that the Township should encourage access management methods along U.S. Route 30 and provide access easements through adjoining parcels *(5-32)*. The proposed development contains offered/suggested traffic improvements that include side accesses, deceleration lanes and a reverse frontage road.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – OPEN SPACE AND RECREATION

12. Objective 1: No comments.

13. Objective 2: The proposed development includes the open space dedication of 87,120 square feet (2 acres) in the Aldwyn Triangle in order to meet the CICD ordinance requirement for exceeding 30% building coverage, consistent with the Comprehensive Plan's strong recommendation that such an existing natural area be preserved to the maximum extent *(2-40)*.Preservation by the University of the remainder of the Aldwyn Triangle would help to protect the environmental integrity of the sensitive natural features in the dedicated 2-acre portion and be an indication of the University's intent for the Triangle property to remain a quiet part of the neighborhood.

14. Objectives 3 – 9: No comments.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – HISTORICAL AND ARCHAEOLOGICAL RESOURCES

15. The goal in this plan is not applicable to this development.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – INSTITUTIONAL USE

(Institutional Use is not explicitly listed in CICD Ordinance as a required subject for review but is certainly applicable and comes under the heading of "including, but not limited to" in the text of the CICD Ordinance Development Impact Statement requirement.)

16. The Development Impact Statement does not include any analysis of consistency with Section 8 – Institutional Use of the Comprehensive Plan. As noted above, the project needs to be consistent with the goals and objectives stated in Section 8. Our comments on Section 8 consistency are provided below.

17. The Comprehensive Plan lays out some general principles to be kept in mind when dealing with Institutional land use. For example, the expansion of institutions is to be limited to the areas within the present boundaries of the campus zoned for Institutional use. The University's CICD plan does not expand the current limits of the campus, although the proposed development activity does extend beyond the PI – Planned Institutional zoning district in the form of the 'West Lancaster Parking' area proposed for University property in the CO – Commercial Office zoning district.

18. Further, the Comprehensive Plan asks that existing institutions be harmonized with adjacent land uses by promoting physical buffering. Villanova's plans include the installation of deciduous trees, evergreens, shrubs, and ground cover along most of the CICD district boundaries. To properly buffer adjoining properties (along both the R-100 line and those on Barley Cone Lane), existing buffer vegetation needs to be retained to the fullest applicable extent along with the addition of new vegetation and landscaping. Strategic placement of berms along University property boundaries are needed to help with visual and noise impacts. Section and elevation views of proposed buffering need to be provided to demonstrate the sufficiency of the proposed buffering plan that the University presently suggests will include safety fence and could include modest, sound-dampening masonry walls as appropriate.

19. Section 8 – Institutional Use of the Comprehensive Plan, which was last updated in 2003, states that Villanova University has prioritized a number of plans and projects moving forward. The Comprehensive Plan acknowledges the University's intention of implementing several major building projects, most of which will be in the form of student housing, while maintaining the status quo enrollment figures. Reducing the need for off-campus housing, improving the quality of student life, and minimizing community issues occurring due to a large number of students living off campus are presented as key reasons for the need to build additional residential facilities.

20. Section 8 – Institutional Use of the Comprehensive Plan specifically recognizes that an important issue to the community relates to Villanova's long range plans for its land holdings south of Lancaster Avenue that contain the Main and Pike surface parking lots. The Plan notes that the University has considered the development of a major convocation center there, including a

bookstore plus structured parking with related facilities, very similar to that proposed under the CICD Conditional Use. Features of such a development were to include possible application of traffic calming, gateway enhancements, and other appearance improvements *(8-6)*.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – COMMUNITY SERVICES AND FACILITIES

21. No comments.

COMPREHENSIVE PLAN CONSISTENCY REVIEW – EXISTING LAND USE & LAND USE PLAN

22. Objectives 1 – 4: No comments.

23. Objective 5: The proposed development includes the open space dedication of 87,120 square feet (2 acres) in the Aldwyn Triangle in order to meet the CICD ordinance requirement for exceeding 30% building coverage. Consistent with the Comprehensive Plan's strong recommendation that such existing natural features be preserved to the maximum extent *(2-40),* preservation by the University of the remainder of the Aldwyn Triangle would help to protect the environmental integrity of the sensitive natural features in the dedicated 2-acre portion and be an indication of the University's intent for the Triangle property to remain a quiet part of the neighborhood.

24. Objective 6: In addition to the University's response, to properly buffer adjoining properties (along both the R-100 line and those on Barley Cone Lane), existing buffer vegetation needs to be retained to the fullest applicable extent along with the addition of new vegetation and landscaping. Strategic placement of berms along University property boundaries are needed to help with visual and noise impacts. Section and elevation views of proposed buffering need to be provided to demonstrate the sufficiency of the proposed buffering plan that the University presently suggests will include safety fence and could include modest, sound-dampening masonry walls as appropriate.

REVIEW OF IMPACT ON SENSITIVE NATURAL FEATURES

25. In addition to the University's response, the proposed 13-acre development provides for 2 acres of preserved land in the adjacent Aldwyn Triangle, which has been designated, at least partially, as a "core reserve wooded area" *(2-41)*. Preservation by the University of the remainder of the Aldwyn Triangle would help to protect the environmental integrity of the sensitive natural features in the dedicated 2-acre portion and be an indication of the University's intent for the Triangle property to remain a quiet part of the neighborhood.

26. On page 2, the Development Impact Statement states it is anticipated that redevelopment of the parking lots will increase potential habitat for local wildlife. However, the statement fails to describe the ramifications of increasing wildlife habitat, such as wildlife interactions with humans, motorized vehicles, etc.

27. Page 4 of the report states the proposed development will locate more students within easy walking distance of university related activities, thereby reducing the need to drive to campus and improve air quality in the area. The report further addresses the carbon footprint of moving 1,160

students from off-campus housing to new LEED certified residence halls on campus. This would equate to a reduction of 2,100 car trips per day and would equate to a reduction of 1,162,000 pounds of CO-2 emission every year; however, the reports further states the vacated rental units would be filled with commuter students thereby eliminating all the indicated carbon footprint gains.

REVIEW OF IMPACT ON THE TOWNSHIP AND REGIONAL TRANSPORTATION SYSTEM AND THE ABILITY OF ADJACENT STREETS AND INTERSECTIONS TO EFFICIENTLY AND SAFELY HANDLE THE TRAFFIC GENERATED BY THE PROPOSED DEVELOPMENT

The University's Development Impact Statement indicates that compliance with this section is by virtue of the Traffic Impact Study (TIS) submitted for the development proposal. Therefore, our review of transportation impact focuses on a review of the TIS.

28. As indicated in the Gilmore Review as well as the recent PennDOT review, the TIS must be prepared in accordance with Section 280-135G(1)(c) which indicates it must follow PennDOT's guidelines as contained in PennDOT SOL 470-09-4. Therefore the TIS should be revised to include queue analyses, turn lane needs analyses, and the HCM 2010 methodology. In addition, all SYNCHRO analyses should be revised to incorporate the PennDOT approved default factors and to also include the actual pedestrian calls per hour at the signalized intersections. The level of service tables should be expanded to include the seconds of delay for any unsatisfactory levels of service. A 95th percentile queue table should also be provided. Any recommended turn lane length should be the maximum length as determined from the turn lane needs analysis and/or the queue analysis. These significant revisions to the TIS need to be prepared and reviewed by the Township before any conditional use decision-making occurs in order that the Township can know that the general set of transportation improvements laid out in the plan will efficiently and safely handle the traffic generated by the proposed development.

29. Trip generation for the commercial uses fronting on Lancaster Avenue should be developed from the ITE Trip Generation manual unless specific justification can be provided that would indicate no new trips would be generated from these uses.

30. The analysis in the TIS assumes 4-way STOP control at the intersection of the garage and parking lot along Ithan Avenue. Always stopping traffic flow on South Ithan is not desirable. The analysis of this intersection should assume two-way STOP control of the side streets approaches only. Consideration by the University of a raised crosswalk and Rapid Reaction Flashing Beacon (RRFB) with the 'intersection' designed to accommodate a 4-way stop if determined appropriate in the future is a welcome approach.

31. There is discussion in the TIS that a detailed Special Events Plan for the future development condition is to be prepared by a different consultant. A copy of this plan should be provided for review and comment prior to any decision-making on the conditional use.

32. Capacity and Queue analyses should be provided for the "special event" conditions, particularly along Ithan Avenue and at its intersection with Lancaster Avenue. The TIS 'projects' 176

Eastbound right turns and 220 Westbound left turns onto Ithan Avenue for the peak hour of a special event.

33. The addition of a dedicated Eastbound Lancaster Avenue right-turn lane at Ithan Avenue needs to be investigated for both day-to-day operation as well as special events. Trying to send event traffic further to the east past Ithan to the proposed Lancaster Avenue entrance to the parking garage will still have event traffic out on the mainline of Lancaster Avenue, waiting to make entrance into the garage through a narrow, single lane driveway, while blocking through traffic.

34. There has been discussion by the University of sending special event visitors to the new parking garage via a new entrance into the West Lancaster Parking area, through the West Lancaster Parking area, across Church Walk, and through the parking lot behind the new dorms to Ithan Avenue. No analysis or plan has been submitted to illustrate how this would function.

35. Pedestrian crossings at the intersection of Lancaster Avenue and Ithan Avenue should be reviewed and revised such that they are more perpendicular to the sidewalks. This will provide a shorter distance and less WALK time at the intersection.

36. The TIS indicates the driveway to the east of the Performing Arts Center (PAC) would prohibit left turns out of the driveway, however the submitted plans indicate full egress movement. The plans should be revised to indicate a left turn-out restriction. In addition, information should be provided relating to truck access in and around the PAC.

37. Aldwyn Lane Access: Restricting the traffic flow to a permanent one-way flow would alleviate “cut-through” traffic. This or some other traffic management approach on Aldwyn would require agreement from the residents along this street.

REVIEW OF IMPACT ON RADNOR SCHOOL DISTRICT

38. On Page 20, the report states the addition of student housing will not materially affect the rental housing market in the Township because vacated off-campus student rental housing will be filled by another student living farther away. This statement is contrary to how the report addresses Housing Objectives on Page 5, which states many houses previously rented to Villanova students could be brought back onto the open rental market or potentially sold for re-conversion back to single family residences.

39. There are 125 licensed off-campus student rental units in Radnor Township all within several miles of three colleges and two universities. The report concludes that the quality of these dwelling units is such that they are unlikely to appeal to families, especially families with school age children, and that should any of these units become available they will likely be occupied by another student and not by a family with children. Based on this conclusion, it is estimated that only three new school age students will be generated as a result of this development.

    There is a trend in the housing market away from home ownership. The report should explore this trend and the impact of these rental units not being filled by other students. The age and quality of these units may generate rental prices on the open market that make them affordable

for young families and single-parent households, which will impact student enrollment in the school district.

REVIEW OF IMPACT ON COMMERCIAL FACILITIES WITHIN THE TOWNSHIP AND OTHER MUNICIPALITIES

40. The Development Impact Statement indicates on page 26 that the project includes between 20,000 and 25,000 square feet of retail and restaurant space. However, the development plans submitted with the Impact Statement show a total of 17,000 square feet of bookstore, bistro, and convenience store space. The amount of square feet of the retail/personal service spaces needs to be clarified.

41. Overall, it appears that the proposed development will have a marginal effect on commercial businesses within the Township and other municipalities. More students on campus might increase patronage for Garrett Hill and Wayne businesses. However, the presence of the bistro and convenience store on campus might make it less likely for students to go off campus for those needs. Students already have favorite retail and restaurant establishments and established patronage patterns as a result. It is not likely that there will be significant changes in those patterns.

REVIEW OF IMPACT ON PUBLIC UTILITIES

42. The University's Conceptual Stormwater Management Narrative highlights the 2-year volume difference in runoff as the key objective for the project. However, the University must provide infiltration for one (1) inch of runoff from all proposed impervious surfaces of the project, regardless of the 2-year volume difference. This is a requirement of the Darby/Cobbs Creeks Act 167 Plan and the Township Stormwater Management Ordinance. The infiltration of one (1) inch of runoff was generated as a standard by PADEP and is also a requirement of the City of Philadelphia. Some jurisdictions in other areas require infiltration of 1.5 inches.

43. Section 245.18.B of the Township Stormwater Management Ordinance states that applicants are required to find practicable alternatives to surface discharge of stormwater runoff. Such alternatives would include reuse, ponds, and underground storage. As a minimum to address downstream residents' identified issues the University needs to provide no surface discharge for up to a 10-year storm, but the most environmentally conscious thing they could do would be providing no surface discharge for up to a 100-year storm. This would assist in offsetting flood-causing runoff from the remainder of the Villanova facilities in the drainage area and would be consistent with Villanova's nationwide reputation for stormwater management research and for having been labeled by the Princeton Review as one of the 322 most environmentally responsible universities in the nation.

44. It does not appear that the infiltration/detention facilities under the western end of the West Lancaster Parking area will be feasible due to the substantial slope of the land and existing trees present. The University has indicated that infiltration/detention facilities are no longer being proposed for the land west of Farrell Hall, the Public Safety Building.

REVIEW OF IMPACT ON POLICE AND FIRE PROTECTION

(Reviewed under Fiscal Impact Analysis Overview)

REVIEW OF IMPACT ON OPEN SPACE AND RECREATION FACILITIES

45. The Development Impact Statement does not provide an analysis of the number of students currently using the Township's recreation facilities, nor what facilities they use, and it concludes that all students will utilize on-campus open space and recreation facilities.

    To accurately determine the impact this project has on the Township's open space and recreation facilities, the Impact Statement needs to identify Township open space and recreation facilities that are reasonably accessible, estimate the number of students currently utilizing the Township's open space and recreation facilities, and determine the impact moving more students on campus will have on student usage of Township open space and recreation facilities.

    In addition, Section 255-43.1.B(2) of the Township Code requires non-residential developments to dedicate open space/recreational lands or pay a fee in lieu of.

REVIEW OF IMPACT ON CHARACTER OF SURROUNDING NEIGHBORHOOD

46. The West Lancaster Avenue Parking area, while located outside of the CICD and the Planning Institutional zoning district, is a key element of the proposed development. It is the first project component to be constructed since replacement parking must be provided before spaces in the Pike Lot are lost during parking garage construction and spaces are lost in the Mail Lot during dormitory construction. The West Lancaster Avenue Parking area is separated from nearby residences only by the R-100 Trolley line. Evidence of sufficient noise and light buffering along the proposed parking area in the form of section and elevation drawings need to be provided showing the anticipated results of buffer plantings, gap filling, and retention of existing trees and shrubs. Similarly, buffering elevations for the property behind the parking garage and Performing Arts Center need to be provided.

47. The Development Impact Statement states on page 28 that "the new buildings will create a new audio and visual buffer between Lancaster Avenue and the residential neighborhoods at the South side of the development." However, the presence of approximately 1160 students in the new dorms, plus other proposed traffic generators (parking garage, Performing Arts Center, retail businesses, surface parking), will create new audio and light sources for the neighborhood. In addition, the construction of the new buildings will close off the view of the Chapel and fronting lawn and introduce a new visual – the parking garage and dorms. Thus, buffering section and elevations drawings including combinations of new trees and shrubs, berming, safety fence, modest masonry walls as appropriate to different locations need to be provided.

FISCAL IMPACT ANALYSIS OVERVIEW

48. On page 29, the report indicates that "many of the students who will be living in the proposed development will be moving in from outside of the Township" and "these new residents will now

be more likely to patronize Township establishments more often," leading to more sales and increased gross receipts tax revenues (Business Privilege Tax) for the Township. However, in item #6 on page 6, the report states that "the retail incorporated into the development will also provide ready access to many of the needs of daily student life," suggesting that students will have less need to go off campus as a result of the development. Further, some of the students moving into the new dorms will be those currently occupying West Campus dorms and are already on campus. Students, whether currently living on or off campus have favorite places inside and outside of the Township and their patronage patterns are not likely to change much. It is unclear which direction gross receipts tax revenues (Business Privilege Tax) will head.

49. The report notes that the University is not subject to property taxes nor is it expected that the retail uses that are part of the project and the University's core mission will pay any business taxes. The report goes on to say that roughly $5.6 million dollars in one-time permit fees and gross receipts taxes will be paid by the University and its contractors as a result of the construction of the proposed development. These one-time fees are not a windfall for the Township. They are fees to cover the costs of Township services provided during the development process including construction code plans review and inspections. Further, most all development in the Township must pay building permit fees and their contractors pay gross receipts taxes. The key distinction is that the University pays no property taxes. Private sector development at a value similar to the $269 million cited for the proposed development would generate approximately $1,009,000 annually in property taxes to the Township (at the 2014 property tax rate), plus roughly $750,000 in Business Privilege taxes could be generated on gross receipts each year.

50. On page 30, the report indicates that "the project will not cause any additional burden on Township administration" or the Community Development budget. The administration, coordination, and execution of review of the project and enabling zoning ordinance amendment has actually caused quite a burden on Township administration and Community Development.

51. The report on page 32 states that the potential increase in police calls (estimated to be 55) attributable to the project is small compared to the total number of calls handled by the Police Department. The report needs to state the total number of calls, calculate what percent of total calls is represented by the 55 additional calls, and apply that percentage to the Police Department's budget of roughly $8 million to calculate the approximate cost of those 55 additional calls and to determine the need for additional resources by the Police.

52. On Page 33 under Public Works, the report states that it is possible that the Township will see a decline in roadway maintenance expenditures due to fewer students driving. This contradicts the statement earlier in the Development Impact Statement that it is anticipated that the vacated off-campus student housing is expected to be filled with students, requiring them to drive, or rented on the open market. Those occupants will have similar driving patterns as those who currently live in those units such that there would be an overall increase in driving activity and wear and tear on area streets.

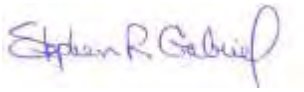
53. The report also notes on page 33 that "the University will maintain the sidewalks along Lancaster Avenue, further decreasing possible Township expenses." Section 250-9 of the Township Code requires property owners to maintain the sidewalk along their property such that this

maintenance of the sidewalks by the University is a current duty and does not represent a shift in responsibility and a decrease in possible Township expenses.

54. On page 34, the report notes that the proposed development's township-compliant stormwater management system will help reduce stormwater runoff from the site, potentially lowering costs borne by Township Public Works. It should also be noted that there has been a burden on the Township for many years of stormwater runoff discharge from the surface parking lots where there has been little or no stormwater management in place.

Should you have any questions or require any additional information, please do not hesitate to contact us at any time.

Sincerely,



Stephen R. Gabriel, PP
Township Planning Consultant

copy: Robert Zienkowski, Township Manager
Steve Norcini, Public Works Director
Roger Phillips, Township Engineer
Amy Kaminski, Township Traffic Engineer
Nicholas Caniglia, Esq.
File

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pennsylvania
DEPARTMENT OF TRANSPORTATION
www.dot.state.pa.us

August 1, 2014

DELAWARE COUNTY, RADNOR TOWNSHIP
S.R. 0030 (LANCASTER AVENUE)
HIGHWAY OCCUPANCY PERMIT APPLICATION NO. pre913
VILLANOVA UNIVERSITY
TRAFFIC LOG NO.: D13-008XR
PRELIMINARY REVIEW

Frank Tavani, P.E., PTOE
F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Dear Mr. Tavani:

The Department has reviewed the preliminary submission of the Traffic Impact Assessment dated August 27, 2013 for compliance with applicable Department Regulations. This review has identified deficiencies that must be addressed in order for your application submission to be processed as efficiently as possible.

The Department understands that the provided analysis is preliminary in nature. As such, the Department reserves the right to make future additional comments based on the formal submission of a complete Transportation Impact Study.

Our comments on your preliminary submission are as follows:

PRELIMINARY COMMENTS

1. Future submissions should include a letter that describes how each comment, from this or previous reviews, has been addressed and where each can be found in the associated studies or plans. Based on the manner in which this project has taken place the inclusion of formal review letters and/or comments provided via email may be appropriate.
2. Transportation Impact Study
   a. The PennDOT project number, D13-008XR, for this preliminary review must be referenced when the formal HOP application is submitted.
   b. In consideration of the previously submitted information and coordination to date, future submissions to the Department may be limited to:
      i) Site accesses to State Routes

ii) S.R. 0030, from S.R. 0320 to Garrett Avenue

iii) S.R. 0320 and County Line Road

c. Based on the magnitude of the anticipated modifications associated with the proposed development, including roadway modifications and traffic re-distribution, the submitted document is considered a Transportation Impact **Study** and should conform to the Department guidelines as such. As previously noted, this includes:

i) Land Use Context

ii) Roadway Classification (reference the Smart Transportation Guidelines)

iii) Pedestrian and Bicycle Facilities

iv) Photographs of study intersections and accesses

v) Sight distances at access

vi) Turn lane warrant analysis for site accesses and intersections serving the site (e.g. Ithan Avenue)

d. The study should consider an alternative that includes providing an eastbound right turn lane on S.R. 0030 approaching Ithan Avenue. The right turn lane is a recommended improvement and not a requirement from the Department.

e. As previously noted, tables and figures should be organized so that there is a clear flow from trip generation to trip distribution and the resulting Levels-of-Service.

f. The crash history noted six accidents involving pedestrians. Additional information should be provided to determine if there is a correctable pattern or other elements that should be considered as part of this project.

g. As previously noted, additional information is also needed for the Performing Arts Center accesses, addressing proximity to the signal, flow and restrictions, etc. Specific issues include the manner in which previous submissions appeared to direct traffic away from Ithan Avenue and the operation of the full-movement access to S.R. 0030, including evaluation of the access pre and post event.

h. Please note that the various materials submitted in relation to this project include minor discrepancies in the campus-wide parking supply figures. These are generally minimal and are not expected to change the results of the analyses; however they should be addressed as part of future submissions.

i. As previously noted, Level-of-Service data tables should include the delay in seconds for each lane group operating at LOS F.

j. Verify that the figures clearly illustrate proposed volumes at all accesses to state roads, including but not limited to the proposed right in and right out access to the modified commuter lot along S.R. 0030.

k. The Synchro analyses should address the following:

   i) Ensure that Future Build volumes are consistent with the submitted figures.

   ii) Per the current Highway Capacity Manual the overall intersection peak hour factor should be used.

   iii) Ensure that all turn lanes are coded appropriately.

   iv) As previously noted, ensure that the pedestrian phase clearance intervals are coded appropriately. In particular, for S.R. 0030 and Ithan Avenue:

      (1) Ensure that pedestrian times meet or exceed the minimums for existing (26 seconds per the current Traffic Signal Permit) and future conditions.

      (2) Enter an appropriate number of pedestrian calls. If the number of calls is assumed to be reduced under future conditions due to proposed improvements, include documentation of the methodology used to develop the assumed number of calls.

   v) Ensure the appropriate coordination and recall settings are utilized.

l. The submitted Conditional Use Plan shows two lanes exiting Chapel Drive to S.R. 0030; verify that this is addressed in the analyses.

3. Conditional Use Plans

   a. Note that all improvements will be required to comply with current ADA standards.

   b. To the maximum extent feasible existing accesses to S.R. 0030 within the project limits should be removed where new access is provided as part of the proposed development (e.g. the two story buildings adjacent to the West Lancaster Parking).

   c. Future submissions should include calculations supporting the proposed transition taper lengths.

   d. The westbound stop bar for S.R. 0030 approaching Church Walk appears too far west; adjusting this will impact the proposed eastbound transition taper.

   e. The eastbound stop bar for the S.R. 0030 left turn lane approaching Ithan Avenue may need to be adjusted to account for the shifting of the northbound left turn lane.

   f. Consideration of re-aligning the crosswalks at S.R. 0030 and Ithan Avenue may be warranted as a means to reduce pedestrian crossing distances.

   g. Ensure that appropriate visibility is maintained for the pedestrian crossing of the Performance Arts Center access; the magnitude of the setback may warrant reconsideration.

The Department has performed this preliminary review based only on the limited information provided. We reserve the right to make future, additional, detailed comments based on the formal submission and application for a Highway Occupancy Permit. If you have any questions pertaining to the technical aspects of this review, please contact Albert Federico, P.E., PTOE of McCormick Taylor, Inc. at 215.592.4200 or apfederico@mtmail.biz.

Respectfully,

Francis J. Hanney
District Traffic Services Manager
Engineering District 6-0

cc: M. Miele
L.R. Belmonte
Traffic Services File
Radnor Township
Delaware County Planning Commission

APPENDIX B

Study Area Photographs

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Spring Mill Rd/Kenilworth Rd/Aldwyn Lane

Description: Eastbound on Route 30 (approaching intersection)

Description: Westbound on Route 30 (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Spring Mill Rd/Kenilworth Rd/Aldwyn Lane

Description: Northbound on Spring Mill Road (approaching intersection)

Description: Southbound on Spring Mill Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Spring Mill Rd/Kenilworth Rd/Aldwyn Lane

Description: Northbound on Aldwyn Lane (approaching intersection)

Description: Southbound on Kenilworth Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Church Walk

Description: Eastbound on Route 30 (approaching intersection)

Description: Westbound on Route 30 (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Church Walk

Description: Northbound on Church Walk (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Ithan Avenue

Description: Eastbound on Route 30 (approaching intersection)

Description: Westbound on Route 30 (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Ithan Avenue

Description: Northbound on Ithan Avenue (approaching intersection)

Description: Southbound on Ithan Avenue (approaching intersection)

Description: Northbound on Ithan Avenue (approaching Route 30)

Description: Southbound on Ithan Avenue (looking from Route 30)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Lowrys Lane

Description: Eastbound on Route 30 (approaching intersection)

Description: Westbound on Route 30 (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Lowrys Lane

Description: Northbound on Lowrys Lane (approaching intersection)

Description: Southbound on Lowrys Lane (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Garrett Avenue

Description: Eastbound on Route 30 (approaching intersection)

Description: Westbound on Route 30 (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Route 30 & Garrett Avenue

Description: Northbound on Garrett Avenue (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga and Sproul Roads

Description: Eastbound on Conestoga Road (approaching intersection)

Description: Westbound on Conestoga Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga and Sproul Roads

Description: Northbound on Sproul Road (approaching intersection)

Description: Southbound on Sproul Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga and Spring Mill Roads

Description: Eastbound on Conestoga Road (approaching intersection)

Description: Westbound on Conestoga Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga and Spring Mill Roads

Description: Northbound on Spring Mill Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga Road and Ithan Avenue

Description: Description: Eastbound on Conestoga Road (approaching intersection)

Description: Westbound on Conestoga Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga Road and Ithan Avenue

Description: Northbound on Ithan Avenue (approaching intersection)

Description: Southbound on Ithan Avenue (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga Road and Lowrys Lane

Description: Eastbound on Conestoga Road (approaching intersection)

Description: Westbound on Conestoga Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga Road and Lowrys Lane

Description: Northbound on Strathmore Drive (approaching intersection)

Description: Southbound on Lowrys Lane (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga Road & Garrett Avenue

Description: Eastbound on Conestoga Road (approaching intersection)

Description: Westbound on Conestoga Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* Conestoga Road & Garrett Avenue

Description: Northbound on Williams Road (approaching intersection)

Description: Southbound on Garrett Avenue (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line & Spring Mill Roads

Description: Eastbound on County Line Road (approaching intersection)

Description: Westbound on County Line Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line & Spring Mill Roads

Description: Northbound on Spring Mill Road (approaching intersection)

Description: Southbound on Spring Mill Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line Road & Ithan Avenue North

Description: Eastbound on County Line Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line Road & Ithan Avenue North

Description: Northbound on Ithan Avenue North (approaching intersection)

Description: Southbound on Ithan Avenue North (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line Road & Ithan Avenue South

Description: Westbound on County Line Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line Road & Ithan Avenue South

Description: Northbound on Ithan Avenue South (approaching intersection)

Description: Southbound on Ithan Avenue South (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line Road & Lowrys Lane

Description: Eastbound on County Line Road (approaching intersection)

Description: Westbound on County Line Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line Road & Airdale Road

Description: Northbound on Lowrys Lane (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line Road & Airdale Road

Description: Eastbound on County Line Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line Road & Airdale Road

Description: Northbound on Airedale Road (approaching intersection)

Description: Southbound on Airedale Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line & Roberts Roads

Description: Eastbound on County Line Road (approaching intersection)

Description: Westbound on County Line Road (approaching intersection)

Job #: 211-027 *Date Taken:* 9/4/14 *Intersection of:* County Line & Roberts Roads

Description: Northbound on Roberts Road (approaching intersection)

Description: Southbound on Roberts Road (approaching intersection)

APPENDIX C

Smart Transportation Guidelines

SMART TRANSPORTATION GUIDEBOOK

Planning and Designing Highways and Streets that Support Sustainable and Livable Communities

New Jersey Department of Transportation

Pennsylvania Department of Transportation

MARCH 2008

4.0 Land Use Context

Land use context and roadway type comprise the organizing framework for the selection of appropriate roadway design values. A context area is a land area comprising a unique combination of different land uses, architectural types, urban form, building density, roadways, and topography and other natural features. The existing and planned land use context should be defined on every project. The roadway design should be compatible with the existing land use context, or a planned land use context that reflects the community vision.

4.1 WHY CONTEXT MATTERS

Understanding the land use context provides guidance on who will need to use the road and how. This understanding influences the geometric design of the roadway and the types of amenities required in the right-of-way.

For this document, the design elements are organized into three general categories:

Desired Operating Speed: This is the speed at which it is intended that vehicles travel. The roadway context should play a large role in determining the desired operating speed. For example, pedestrian travel and the presence of civic uses and retail close to the street all suggest the need to use the lower range of the desired operating speed.

Roadway: The design team should select roadway elements and geometry with a clear understanding of surrounding land uses. For example, in urban areas the design team should always seek to provide parking lanes. Travel lanes are often narrower than in suburban areas, particularly if this enables the installation of bike lanes.

Roadside: The roadside primarily serves the pedestrian and the transit rider and provides a transition between public and private space. The design of the roadside elements should support the land use context. Civic uses such as schools and parks, and high density neighborhoods which generate higher pedestrian activity may require wider sidewalks.

A Tale of Two Contexts

Route 30, classified as a principal arterial, has a cross-section of four 10 ft. travel lanes in both Ardmore, PA, and Wayne, PA, as shown below. The speed limit on both roads is 25 mph. In a workshop for this guidebook, DVRPC stakeholders agreed that the Wayne town center is friendlier for pedestrians, identifying Route 30 in Wayne as "an example of an arterial roadway that has evolved to a village feeling." The difference? In Wayne, the presence of on-street parking and the traditional town center context (with zero building setbacks) results in more watchful motorists and creates a defined space for pedestrians. With sporadic on-street parking and with the greater prominence of parking lots, Ardmore is an example of a suburban center.

4.2 DEFINING LAND USE CONTEXT

Seven context areas are described in the following section, from the least to the most developed: Rural, Suburban Neighborhood, Suburban Corridor, Suburban Center, Town/Village Neighborhood, Town Center, and Urban Core.

The context areas are illustrated in Figure 4.2. This drawing does not arrange the areas in order of intensity, but is an illustrative example of how these areas might fall across the land.

"Quantifiable characteristics," summarized in figure 4.3, are provided for each context. They are similar to what community planners refer to as "bulk standards," normally used to prescribe the desired appearance of land uses within a zoning district. Each land use context should be identified based upon this information.

In practice, land uses do not always fit neatly into the defined context areas, or the boundaries between context areas may be fluid. The planner or designer should use their best judgment in selecting the context that most closely matches the existing and proposed land uses.

It is recommended that contexts be broadly defined, avoiding segments less than 600 ft. in length. This is largely an issue of practicality. There is a limit on the number of different roadway cross-sections that can be implemented to respond to land use context within a small area.

1. Rural

This context area consists of a few houses and structures dotting a farm or forest landscape. The areas are predominantly natural wetlands, woodlands, meadow or cultivated land. Small markets, gas stations, diners, farm supplies, convenience grocers, etc. are often seen at the intersections of arterial or collector roads. Areas with a few commercial or civic uses and a number of homes close to the roadway can be placed into the sub-context type of "rural hamlet." Once the population of the settled area exceeds 250, it should be classified into the town/village context.

Examples include areas of Burlington and Gloucester Counties to the east, and Tioga and Jefferson Counties to the west.

2. Suburban Neighborhood

Predominantly low-density residential communities, many built since WWII. House lots are typically arranged along a curvilinear internal system of streets with limited connections to regional road network or surrounding streets. Lot sizes are usually two acres to one-quarter acre, but in older suburbs, it is common to find one-eighth acre lots. Garden apartments are also included in this type. Neighborhoods can include community facilities such as schools, churches, recreational facilities, and some stores and offices. When suburban houses line an arterial roadway but have their primary access to frontage roads or rear access roads, it is possible to classify this area as a "suburban corridor."

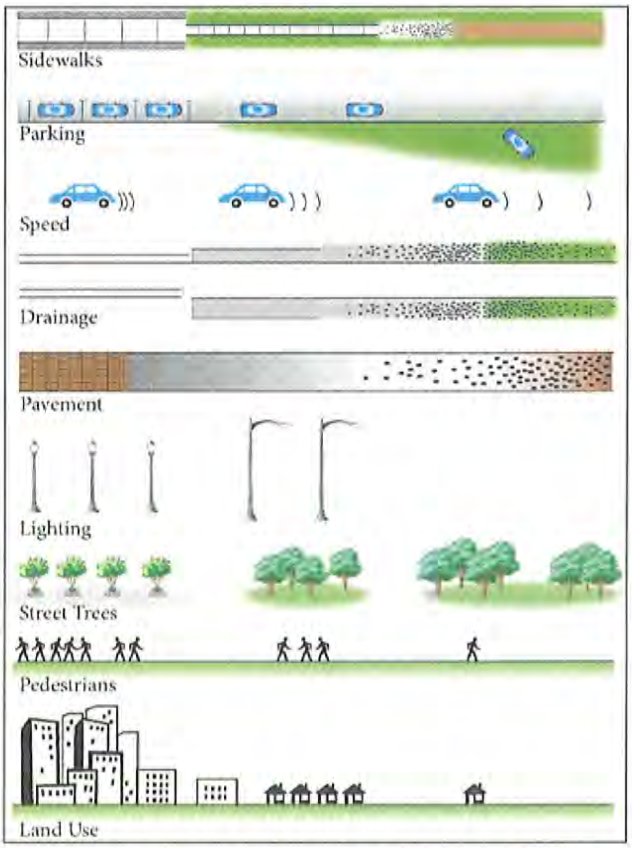


Figure 4.1 From Urban to Rural. As intensity and mix of uses along a roadway increase, there is a greater need to accommodate and prioritize other modes of travel, including bicyclists, pedestrians, and transit riders.

Figure 4.2 The Seven Land Use Contexts

3. Suburban Corridor

This area is characterized by big box stores, commercial strip centers, restaurants, auto dealerships, office parks, and gas stations. These uses are sometimes interspersed with natural areas and occasional clusters of homes. Buildings are usually set back from the roadway behind surface parking. Office buildings are usually set back a bit more than adjacent retail frontage to establish garden separation from ground windows.

These areas are found along many arterial roadways, such as Route 38 in Cherry Hill and Route 611 north of Philadelphia.

4. Suburban Center

Often a mixed-use, cohesive collection of land uses that may include residential, office, retail, and restaurant uses where commercial uses serve surrounding neighborhoods. These areas are typically designed to be accessible by car, and may include large parking areas and garages.

They are less accommodating to pedestrians than town centers, and opportunities to cross the primary roadway can be limited. On-street parking may or may not be provided.

Examples include Lancaster Avenue in Ardmore, PA, and Montgomery Avenue in Bryn Mawr, PA.

5. Town/Village Neighborhood

Predominantly residential neighborhoods, sometimes mixed with retail, restaurants and offices. In urban places, residential buildings tend to be close to the street. Rowhouses fronting the sidewalk, and houses back 30 feet behind a front lawn are both common types. Small retail establisments sometimes occupy principal corners. Block sizes are regular and often small in comparison to suburban neighborhood blocks. Even where streets are narrow, on-street parking is common and typically well used. The large majority of neighborhoods have sidewalks.

Existing examples include Fairview in Camden and Society Hill in Philadelphia.

Figure 4.3 Defining Contexts

	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town Center	Urban Core
Density Units	1 DU/20 ac	1 DU/ac - 8DU/ac	2 - 30 DU/ac	3 - 20 DU/ac	4 - 30 DU/ac	8 - 50 DU/ac	16 - 75 DU/ac
Building Coverage	NA	< 20%	20% - 35%	35% - 45%	35% - 50%	50% - 70%	70% - 100%
Lot Size/Area	20 acres	5,000 - 80,000 sf	20,000 - 200,000 sf	25,000 - 100,000 sf	2,000 - 12,000 sf	2,000 - 20,000 sf	25,000 - 100,000 sf
Lot Frontage	NA	50 to 200 feet	100 to 500 feet	100 to 300 feet	18 to 50 feet	25 to 200 feet	100 to 300 feet
Block Dimensions	NA	400 wide x varies	200 wide x varies	300 wide by varies	200 by 400 ft	200 by 400 ft	200 by 400 ft
Max. Height	1 to 3 stories	1.5 to 3 stories	retail -1 story; office 3-5 stories	2 to 5 stories	2 to 5 stories	1 to 3 stories	3 to 60 stories
Min./Max. Setback	Varies	20 to 80 feet	20 to 80 ft	20 to 80 ft	10 to 20 ft	0 to 20 ft	0 to 20 ft

6. Town/Village Center

A mixed use, high density area with buildings adjacent to the sidewalk, typically two to four stories tall with commercial operations on the ground floor and offices or residences above. Parallel parking usually occupies both sides of the street with parking lots behind the buildings. Important public buildings, such as the town hall or library, are provided special prominence.

Places like Haddon Avenue in Collingswood and State and Main Streets in Doylestown are classic "Main street" town centers.

7. Urban Core

Downtown areas consisting of blocks of higher density, mixed use buildings. Buildings vary in height from 3 to 60+ stories with most buildings dating from an era when elevators were new technology - so five to twelve stories were the standard.

Examples are Trenton's Downtown and Center City Philadelphia.

4.3 PLANNING FUTURE CONTEXT AREAS

The planned land use context along the corridor is assessed by consulting the following plans and documents:

- Municipal comprehensive plan (referred to as master plan in New Jersey)
- Multi-municipal or regional comprehensive plan (applicable in Pennsylvania)
- Zoning ordinance
- Redevelopment plan (if applicable)
- State Plan designation (applicable in New Jersey)

As part of the collaboration between state and community, the study team consults with local stakeholders on the vision for their community. If no vision exists, a workshop or charrette can be held to help crystallize the community vision.

5.0 Transportation Context

Routes 1 and 27 in Central New Jersey (below) are both classified as principal arterials in traditional functional classification, but they have very different roles within the roadway network. This chapter proposes a new roadway typology to better capture the role of roadways in a community.

The transportation context consists of the role that the roadway plays, or is anticipated to play within the local community and the larger region. It also refers to the supporting street network, and the interaction of the roadway with that network.

5.1 ROADWAY TYPE

A new roadway typology is proposed for the Guidebook in order to design roadways that better reflect their role in the community and the larger transportation network.

Currently, every roadway owned by NJDOT or PennDOT, or by county governments in New Jersey, is assigned a functional classification consistent with the AASHTO Green Book:

- Principal Arterial
- Minor Arterial
- Collector (subdivided into major collector and minor collector within rural areas)
- Local

A problem with the existing functional classification system is that an entire highway is sometimes placed into a certain class based on select characteristics – such as the overall highway length, or traffic volumes – although its level of access and mobility are not consistent with other roadways in that class. For example, many state highways are classified as principal arterials even if they are far more vital to community access than to regional mobility. This creates a dilemma for highway designers: the application of design standards for that class may encourage higher operating speeds than are appropriate for segments serving community access.

To address this issue, a roadway typology is proposed which better captures the role of the roadway within the community. It focuses more narrowly on the characteristics of access, mobility and speed. If a segment of an arterial roadway has a relatively low speed, is important to community access, and has a lower average trip length, it should not be designed like a high order arterial. Further, under this approach, roadways


Route 1


Route 27

are segmented to a greater degree than traditional functional classification. If one segment of a roadway has low average trip lengths and has consistently lower speeds, its design should be different than another section which carries long trips.

The roadway typology is presented in Table 5.1 and illustrated in Figure 5.1. It should be emphasized that this should be used only as a planning and design "overlay" for individual projects, and does not replace the traditional functional classification system used in both states. The roadway classes shown in Table 5.1 correspond to the classifications of arterial, collector and local as described in the 2001 AASHTO Green Book. Their design values should likewise correspond to the design guidelines provided in the Green Book.

Different state highways have different community roles, and the Guidebook recommends that this should be reflected in the design. Some state highways, such as NJ Route 1, will be considered as a Regional Arterial because of their importance to regional mobility. On the other hand, Route 27, which is classified as a principal arterial by NJDOT, actually operates more like a community arterial or a community collector. Parallel to Route 1 and the New Jersey Turnpike, this highway has a low average trip length. Maintaining regional mobility becomes a smaller concern on Route 27 and similar state roadways.

Whatever the road classification, traffic mobility and safety are important goals on state highways, and must be considered on all roadway projects. These goals will continue to receive significant attention on roads with acute safety or congestion problems. Mobility and safety goals are balanced with local development goals on projects.

PennDOT owns many roads in Pennsylvania, from arterials down through local roads. NJDOT controls a much smaller share of the road network, and virtually all of its roadways are arterials. Because of the relatively high volumes found on many NJDOT roadways, the maintenance of mobility on regional arterials remains a strong emphasis.

5.1.1 Main Street

Although not one of the Smart Transportation roadway categories, the concept of Main Street has an important place in Smart Transportation. Anchoring the center of a town, village or city, the Main Street is characterized by:

- Wide sidewalks and regular pedestrian activity;
- Mostly commercial and civic uses, with residential uses primarily found on the upper level of buildings;
- High building density;
- Buildings oriented to the street, with little or no building setbacks;
- Street furniture and public art;
- Heavy use of on-street parking;
- Speeds of 30 mph or less;
- Preferably no more than two travel lanes, although three to four lanes are seen on occasion.

Table 5.1 Roadway Categories

Roadway Class	Roadway Type	Desired Operating Speed (mph)	Average Trip Length (mi)	Volume	Intersection Spacing (ft)	Comments
Arterial	Regional	30-55	15-35	10,000-40,000	660-1,320	Roadways in this category would be considered "Principal Arterial" in traditional functional classification.
Arterial	Community	25-55	7-25	5,000-25,000	300-1,320	Often classified as "Minor Arterial" in traditional classification but may include road segments classified as "Principal Arterial."
Collector	Community	25-55	5-10	5,000-15,000	300-660	Often similar in appearance to a community arterial. Typically classified as "Major Collector."
Collector	Neighborhood	25-35	<7	<6,000	300-660	Similar in appearance to local roadways. Typically classified as "Minor Collector."
Local	Local	20-30	<5	<3,000	200-660	

Route 27, Kingston

Route 27, Princeton

The Main Street would typically belong to the Community Arterial road type, or to the Collector road type. This is the case on Route 27 in New Jersey; this roadway hosts two Main Street segments between New Brunswick and Trenton, in the towns of Princeton and Kingston. As defined here, a municipality can have more than one Main Street.

Main Streets are desirable in Smart Transportation because they support more sustainable communities, and because of their potential to increase walking, biking and transit use, as well as vehicular trip chaining.

For information on planning Main Streets, see Section 6.2.1.

5.2 ROADWAY NETWORK

Network design establishes critical parameters for roadway design—type of roadway, its general purpose (i.e., what type of traffic it is to handle) and number of lanes necessary to achieve the purpose. By increasing the options of motorists to travel from one point to another, a well-connected regional network permits greater flexibility in designing individual roadways. Improving roadway connectivity can serve regional mobility equally well as widening major roadways, and a well-connected network always serves the needs of pedestrians and bicyclists better than simply widening arterial roadways.

Because network connectivity is so important in Smart Transportation Solutions, it appears as a recurring theme in this guidebook. Network types, basic principles, and evaluating and creating a network are discussed in this section and in Chapter 3, "A Local Commitment."

5.2.1 Network types

The traditional urban grid has short blocks, straight streets, and a crosshatched pattern (Figure 5.2). The typical contemporary suburban street network has large blocks, curving streets, and a branching pattern (Figure 5.3). The two networks differ in three respects: (1) block size, (2) degree of curvature, and (3) degree of interconnectivity.

Both network designs have advantages and disadvantages. Traditional grids disperse traffic rather than concentrating it at a handful of intersections. They offer more direct routes and hence generate fewer vehicle miles of travel (VMT) than do contemporary networks. By offering many different routes to a destination, they better meet the needs of local motorists. They encourage walking and biking with their direct routing and their options for travel. Grids are also more transit-friendly; transit ridership is greatest between tracts that have relatively direct transit connections.[3]

Contemporary networks do have some advantages, such as the ability to lessen traffic on local residential streets. With their curves and dead ends, contemporary networks can go around or stop short of valuable natural areas.

Traditional grids best fulfill Smart Transportation goals, and are recommended for application in most areas.

5.2.2 Evaluation of the network

All roadway networks should be evaluated using the measures on internal connectivity, external connectivity, and route directness.

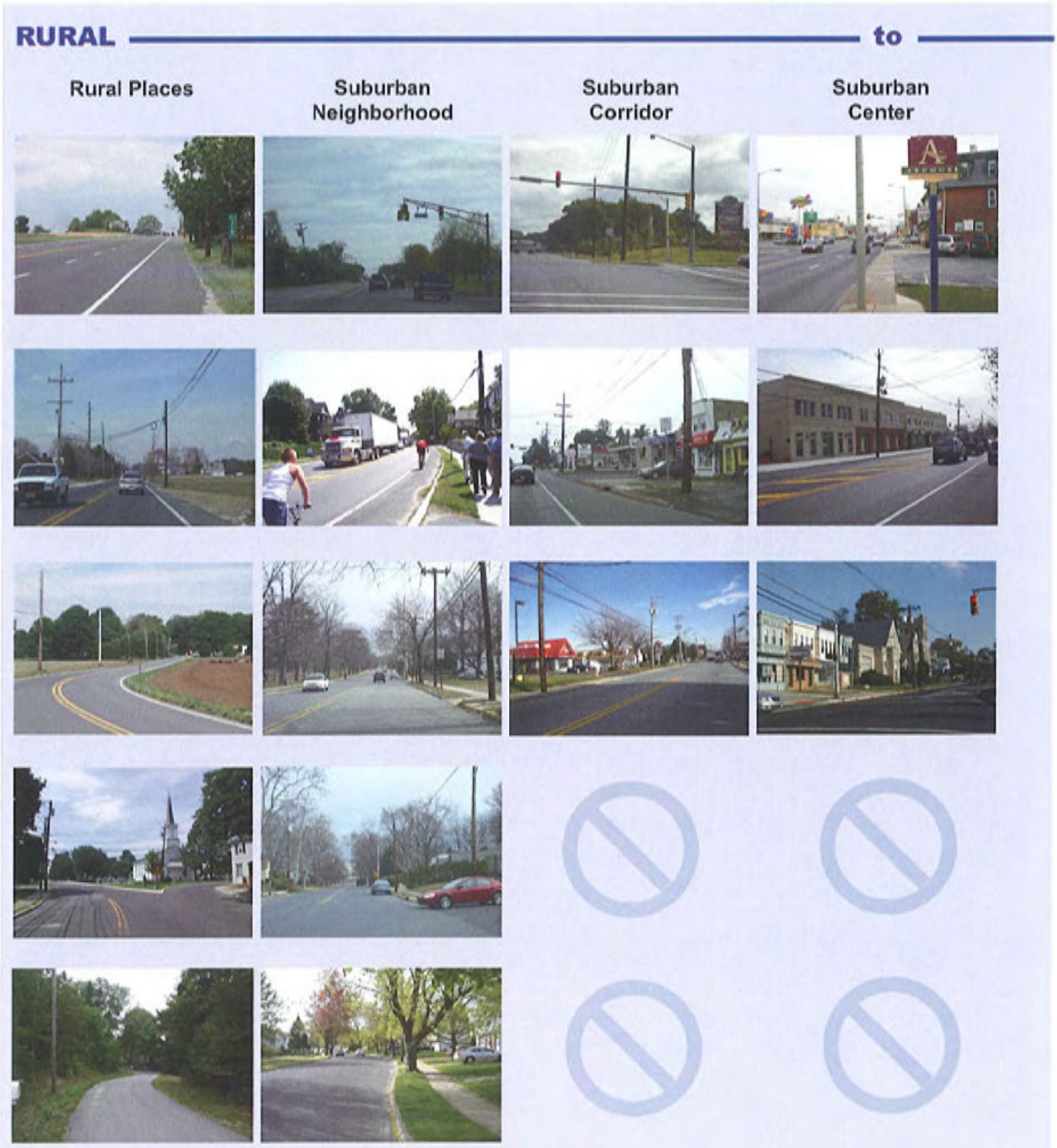


Figure 5.1 Roads in Context

URBAN

Town/Village Neighborhood	Town Center	Urban Core		
			REGIONAL	Regional Arterial
				Community Arterial
			to	Community Collector
				Neighborhood Collector
			LOCAL	Local Road/ Street

The photos enclosed in a yellow box indicate the Town Center and Core City streets that also operate as a local or regional Main Street.

Internal Connectivity. *Use either of the following two measures:*

- **Beta Index** — This is equal to the number of street links divided by the number of nodes or link ends. A higher ratio indicates higher street connectivity. When applied to the developments shown in Figures 5.2 and 5.3, Apalachicola is rated 1.69, and Haile Plantation is rated 1.19. Traditional developments generally rate above 1.4. [4]
- **Intersections per square mile** — Strict grid systems have about 25 intersections per square mile, while conventional branching systems have about one-third to one-half that many. [5]

External Connectivity

- All neighborhoods in the community should be connected to the larger street system at least every ¼ mile.

Route Directness

- This measures the distance a pedestrian would walk between two points compared to the straight line (or radial) distance between the same two points. The closer the ratio is to 1.0, the more direct the route; route directness values of 1.2-1.5 describe reasonably connected walkable networks. [6]

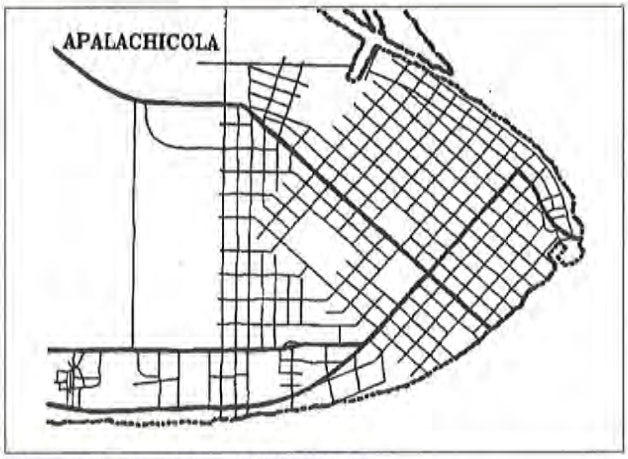


Figure 5.2. Traditional Urban Grid

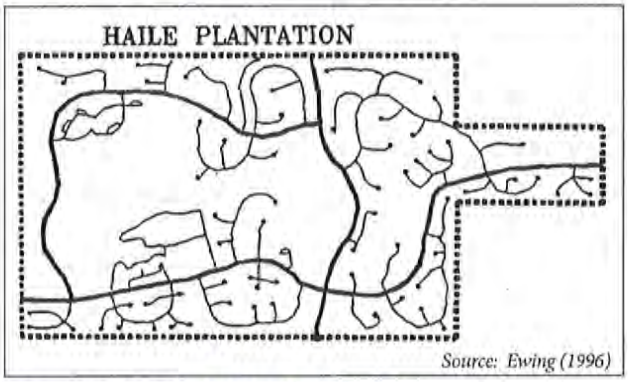


Figure 5.3. Contemporary Branching Network

5.3 CREATING EFFICIENT NETWORKS

In Smart Transportation, network evaluation becomes a critical task anytime existing or projected traffic congestion is identified as a potential issue on projects. The role of the network differs somewhat for projects in built-out areas versus newly developing areas.

5.3.1 Existing and Built-out Areas

In a built-out area, can the network be improved such that local traffic can use local streets to a greater degree? It should be determined how much traffic can be removed from regional roadways if the local and collector system is made to work more effectively. The network should be evaluated using measures of internal connectivity, external connectivity, and pedestrian route directness, described in Section 5.2.2.

If improving the network will not address the problem or is not an option, the two primary choices are to widen the roadway or to build a parallel roadway.

Roadway widening

The planner should first determine if segment improvements, access management, or intersection changes will address the problem, and then consider mainline widening. Widening should be done only if the resulting roadway is compatible with the land use context. Planners should identify the existing roadway role, its consistency with the community vision, and whether an alternative roadway type would better support the community.

Parallel roadway

If a parallel roadway is necessary, the planner should consider development of a regional or community arterial. It should be consistent with an area network plan, and be tied in where possible to the existing road system. This would improve the effectiveness of this road link.

5.3.2 Creating a Road Framework for New Development

A newly developing area offers the opportunity to implement a highly connected street system with less reliance on multi-lane arterials. Following are guidelines to be used in laying out a context sensitive roadway network capable of providing safe, multimodal choices for all trips. Initial planning should identify higher order roads needed for ultimate build-out; local roads and neighborhood collectors should then be included, depending upon specific developments proposed.

Network Configuration – Areawide

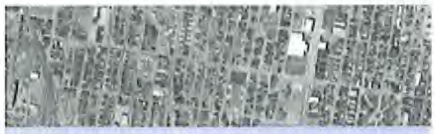
- Arterial roadways should be continuous and networked in generally rectilinear form with spacing of ½ to 1 mile in suburban contexts and ¼ to ½ mile in urban contexts. Closer spacing may be needed depending on activity levels and through movements.
- Collectors may be spaced at 1/8 mile intervals, if needed.
- Urban cores and town centers should be connected by community arterials and community collectors. These roadways should have the area's highest level transit service.
- Collectors should link neighborhood centers with adjacent neighborhood centers and town centers. All such connectors should be able to accommodate transit service.
- Major roadways that are to serve as major truck routes or primary through traffic routes should avoid the centers of urban areas or neighborhoods wherever possible. Community arterials and community collectors may be designated local truck routes to reach clusters of commercial uses in centers or cores.
- Sketch planning demand estimation or travel forecasting models should be used to estimate the density/spacing and capacity needs for major roadways beyond the minimum spacing described above.

Spacing

- Irrespective of thoroughfare spacing, pedestrian facilities should be well networked. In suburban contexts, block sizes of no more than 600 feet on a side with a maximum area of 7 acres will provide a reasonable level of connectivity.[7] In urban contexts, block sizes of 300 to 400 feet with a maximum area of 3-4 acres are ideal.
- Where streets cannot be connected, provide bike and pedestrian connections at cul-de-sac heads or midblock locations as a second-best solution to accessibility needs. Recommended maximum spacing is 330 ft.
- Bicycle-compatible roadways should comprise a bicycle network of parallel routes with effective spacing of ½ mile.

5.3.3 Network principles

All new networks should be evaluated using the measures on connectivity in Section 5.2.



Route 63, a principal arterial highway, runs through Harleysville, PA (top) and Lansdale, PA (bottom). Harleysville lies six miles northwest of Lansdale, with I-476 passing between the two municipalities. Motorists on Route 63 in Harleysville have an average trip length of 30 miles, much longer than the 10 mile average trip length of motorists found on Route 63 in Lansdale. Motorists commuting from the north prefer to take I-476 into Philadelphia, and avoid driving through Lansdale. Further, Route 63 in Lansdale serves as that borough's main street. The highway thus serves a different role in these two municipalities.

5.4 SIGNAL SPACING

Recommended signal spacing corresponds to the optimal spacing of arterial, collector and local streets (Table 5.2), although signals should be installed only where warranted.

Signal spacing of 300 ft. on arterials and collectors can be an important strategy in complementing traditional grid networks where low traffic speeds and high pedestrian activity are desired. On roadways in traditional urban contexts where regular cross traffic flows can be accommodated by stop-controlled intersections, signal spacing of 500 to 660 ft. on arterials and collectors may be sought.

On lower order suburban roadways, spacing of 660 ft. (1/8 mile) permits safe pedestrian crossings at the upper boundary of desirable block lengths. Signal spacing of 1320 ft. (1/4 mile) begins to permit the speed progression sought by NJDOT or PennDOT on those corridors where traffic flow is a priority.

The spacing of traffic signals has a major influence on roadway operating speeds and capacity. Studies have found that a four lane divided arterial roadway with signal spacing of 2640 ft. carries the same amount of traffic as a six lane arterial with signals spaced at 1320 ft.[8] Neither situation is optimal for pedestrians. On the one hand, narrower roadways are more amenable to pedestrian crossings. On the other hand, wider signal spacing reduces the opportunities for pedestrians to cross roadways at controlled locations. Further, motorists who desire to turn left onto an undivided major roadway may be tempted to access it at a Stop-controlled crossing, rather than traveling farther out of their way to access the roadway at a signal. On higher-order roadways where major pedestrian generators straddle the corridor, the best choice is sometimes smaller signal spacing and acceptance of a lower progression speed.

Table 5.2. Recommended Signal Spacing

	Urban Contexts	Suburban Contexts	Rural Contexts
Regional Arterial	660 to 1320 ft.	1320 to 1540 ft.	1980 ft.
Community Arterial	300 ft. to 1100 ft.	1320 ft.	1540 ft.
Community Collector	300 to 660 ft.	660 to 1320 ft.	1540 ft.

APPENDIX D

Ped/Bike/Transit Figure


County Line Road
West Campus Entrance
Pedestrian Tunnel
SEPTA Metro Parking Only
Villanova Station
SEPTA Regional Rail - Paoli/Thorndale Line
Main Campus Spring Mill Road Entrance
Spring Mill Road/PA 320
To US 1–476
Lancaster Avenue/US 30
Main Lot Parking
Ithan Avenue
Main Campus Ithan Avenue Entrance
Office of Conference Services
Summer Conference Service Desk
Stadium Station
Pedestrian Bridge
Villanova Station
South Campus Entrance
SEPTA Norristown High Speed Line
Parking
1. Alumni Hall
2. Austin Hall
3. Bartley Hall
4. Burns Hall
5. Butler Annex
6. Caughlin Hall
7. CEER: Center for Engineering Education and Research
8. Chemical Engineering Building
9. Connelly Center
10. Corr Hall
11. Davis Center for Athletics and Fitness
12. Delurey Hall
13. Donahue Hall
14. Dougherty Hall
15. Driscoll Hall
16. Facilities Management Building
17. Falvey Memorial Library
18. Farley Hall
19. Farrell Hall
20. Fedigan Hall
21. Galberry Hall
22. Gallen Hall
23. Garey Hall
24. Geraghty Hall
25. Good Counsel Hall
26. Griffin Hall
27. Health Services Building
28. Health Services Building Parking Garage
29. Jackson Hall
30. Jake Nevin Field House
31. John Barry Hall
32. Katharine Hall
33. Kennedy Hall
34. Klekotka Hall
35. McGuire Hall
36. Mendel Science Center
37. Middleton Hall
38. Military Sciences Building
39. Moriarty Hall
40. Moulden Hall
41. O'Dwyer Hall
42. Pavilion
43. Picotte Hall At Dundale
44. Rudolph Hall
45. St. Augustine Center for the Liberal Arts
46. St. Augustine Center for the Liberal Arts Parking Garage
47. St. Clare Hall
48. St. Mary's Hall
49. St. Monica Hall
50. St. Rita's Hall
51. St. Thomas of Villanova Church
52. St. Thomas of Villanova Monastery
53. School of Law
54. Sheehan Hall
55. Simpson Hall
56. Spring Mill Parking Garage
57. Stanford Hall
58. Steam Plant
59. Stone Hall
60. Structural Engineering Teaching and Research Laboratory
61. Sullivan Hall
62. Technology Services Building
63. Tolentine Hall
64. Vasey Hall
65. Villanova University Conference Center (601 County Line Road, not shown)
66. Villanova Stadium
67. Welsh Hall
68. White Hall
Bike Rack
Crosswalk
Pedestrian Only Roads
SEPTA Bus Stop (105 & 106 lines)
VILLANOVA UNIVERSITY

APPENDIX E

Data Collection

DATA COLLECTION DETAILS

(This appendix is based on a submittal entitled "Deliverable #1" which was shared with the township and PennDOT on or about 01-15-2013)

FTA conducted turning movement traffic counts at the following 17 intersections in the fall of 2012:

1) Lancaster Avenue and Spring Mill Road / Kenilworth Road / Aldwyn Lane
2) Lancaster Avenue and Church Walk
3) Lancaster Avenue and Ithan Avenue
4) Lancaster Avenue and Lowrys Lane
5) Lancaster Avenue and Garrett Avenue
6) Conestoga Road and Sproul Road
7) Conestoga Road and Spring Mill Road
8) Conestoga Road and Ithan Avenue
9) Conestoga Road and Lowrys Lane
10) Conestoga Road and Garrett Avenue
11) County Line Road and Spring Mill Road
12) County Line Road and Ithan Avenue North
13) County Line Road and Ithan Avenue South
14) County Line Road and Lowrys Lane
15) County Line Road and Airedale Road
16) County Line Road and Roberts Road
17) Ithan Avenue and Aldwyn Lane

COUNT PERIODS

The count periods selected for analysis were weekday commuter AM and PM peak periods. These count periods were chosen for multiple reasons. First, Automatic Traffic Recorder (ATR) or 'tube' counts were available and recently conducted along Route 30 by the Delaware Valley Regional Planning Commission (DVRPC). The results of these counts identify that the sum of all traffic volumes in the study area -- which includes both Villanova traffic and non-Villanova traffic (commuter traffic, regional through traffic, other institutional traffic, etc.) -- combine to reach a peak typically between 7 and 9 AM in the morning and 4 and 6 PM in the afternoon. Discussions with Villanova staff also support these hours as featuring peak activity levels on campus. FTA's experience with the campus also supports this claim, and in fact traffic counts conducted for other Villanova projects since 2004 were also conducted during commuter peak periods. Finally, in an email dated 06-14-12, the Township's traffic engineer specifically requested that the AM and PM peak hours be the hours examined (see **Appendix A**).

The basis of this effort are 'ordinary condition' traffic counts, and these counts were conducted over a period of several days beginning the week of 11-05-12 during which time Villanova was in regular session. In addition to these counts, the Township requested the University conduct additional traffic counts during 2 other 'special event' traffic conditions. These events included Homecoming (10-26-12) and a weekday evening during a basketball game (vs St. Joe's, 12-11-12).

COUNT ADJUSTMENTS

Traffic data collection efforts typically focus on traffic which is processed or 'served' at an intersection. In some cases, however, the traffic 'demand' might be more than what is actually processed at an intersection. When this occurs, it is typically found only at signalized intersections and only in cases where traffic demand is *significantly* greater than intersection capacity. In addition a separate, related phenomenon is called 'initial unmet demand'. This is when a persistent queue of traffic is present at the *beginning* of an analysis period (i.e., the beginning of a peak hour) and also when said queue is not processed adequately at a signalized intersection. Traffic analysis methods and software account for either of these phenomenona to some extent, but if either is excessive, additional measures can be taken to adjust count data.

After the peak hours were determined, FTA revisited the study area in the first week of December 2012 to document additional details regarding the traffic demand vs traffic served issue as well as the initial unmet demands. Summary tables were developed to summarize the following: subject intersection, intersection type, approach, initial unmet demand observations, excessive unmet demand observations, and findings. These tables are included with this appendix. More details behind the purpose and methodology of the investigation are explained under the 'Purpose' heading found on page two of each table (one for each peak hour).

ANALYSIS RESULTS -- 'ORDINARY TRAFFIC'

AM and PM commuter 'system peak' hours were determined using a spreadsheet and the identified peak hours were found to be 7:30 to 8:30 AM and 5:00 to 6:00 PM. Spreadsheets were prepared both for the study area and for the Lancaster Avenue corridor and are attached to the end of this report in the appendix. The spreadsheets are based on vehicular volumes – pedestrian volumes were excluded. The highlighting used in the spreadsheets identifies individual intersection peak hours (in red). Only a handful of non-critical locations had individual peak hours different from the system peak (and typically only shifted by 15 minutes as shown in the tables).

ANALYSIS RESULTS -- 'HOMECOMING TRAFFIC'

In 2012, Homecoming occurred on Saturday, 10-27-12 and – per discussions with the Township – traffic counts were conducted at a reduced study area from 12:00 Noon to 3:00 PM. Spreadsheets were prepared both for the entire study area and for the Lancaster Avenue corridor and are attached to the end of this report in the appendix. The identified peak hours was found to be: 12:00 to 1:00 PM.

Interestingly, the traffic volumes for virtually every traffic *turning movement* in the study area during the peak hour of Homecoming are either comparable to or significantly less than the data that was collected during the weekday AM or weekday PM peak hour. In many cases, *total intersection* volume – such as at Lancaster Avenue and Spring Mill Road / Kenilworth Road / Aldwyn Lane – were also significantly lower than the 'ordinary traffic' counterpart. Realizing all this, there is no value in performing additional LOS calculations, since the LOS outputs of weekday commuter conditions represent a comparable – or worse – peak hour operational conditions. Additionally, level of service calculations are not even possible at intersections which are under manual police control, which was the case at certain key locations in the study area during Homecoming. The township traffic engineer agreed with this conclusion in a letter dated 1 February 2013 though the need for a "Special Event Management Plan" was mentioned (see **Appendix A**).

ANALYSIS RESULTS -- 'BASKETBALL TRAFFIC'

After Homecoming was over, the Township requested Villanova perform additional data collection during a Basketball home game. This traffic is somewhat different from Homecoming since Homecoming occurs on Saturday while a home basketball game occurs during a week night during which time some lingering remaining 'day' student, faculty, and staff may be *leaving* campus while at the same time some 'night' student, faculty, and staff are *arriving* at campus. Per discussions with the Township – traffic counts were conducted using the same study area as Homecoming and from 6:00 to 8:00 PM since the game starts at approximately 7:00 PM. Once again, a 'system peak' hour was determined using a spreadsheet. The identified peak hours was found to be: 6:00 to 7:00 PM.

Coincidentally, as with Homecoming, the traffic volumes for virtually every traffic *turning movement* in the study area during the peak hour of the Basketball game data collection effort are either comparable to or significantly less than the data that was collected during the weekday AM or weekday PM peak hour. In many cases, *total intersection* volume – such as at Lancaster Avenue and Spring Mill Road / Kenilworth Road / Aldwyn Lane – was also significantly lower than the 'ordinary traffic' counterpart. Realizing all this, there is once again no value in performing additional LOS calculations, and once again levels of service calculations at certain key locations are not even possible due to manual police control. The township traffic engineer agreed with this conclusion in a letter dated 1 February 2013 though the need for a "Special Event Management Plan" was mentioned (see **Appendix A**).

ADDITIONAL ATTACHMENTS:

- DVRPC ATR data spreadsheet,
- count data system peak spreadsheets (for Ordinary, Homecoming, and Basketball conditions),
- raw manual turning movement traffic count data and unmet demand summary tables
- ped volume figures
- special event volume figures

DVRPC ATR TRAFFIC COUNT DATA -- PEAK HOUR DETERMINATION MATRIX

DVRPC ATR Data for Rt 30*

hour beginning	Tuesday 9/11/12			Wednesday 9/12/12			Thursday 9/13/12		
	30 West	30 East	Total	30 West	30 East	Total	30 West	30 East	Total
6:00 AM	n/a			325	413	738	312	413	725
7:00 AM	n/a			662	684	1346	683	715	1398
8:00 AM	n/a			710	752	1462	688	825	1513
9:00 AM	n/a			565	787	1352	580	803	1383
10:00 AM				570	778	1348	332	389	721
11:00 AM				591	695	1286			
12:00 PM				541	781	1322			
1:00 PM	584	658	1242	544	783	1327			
2:00 PM	632	747	1379	573	769	1342			
3:00 PM	437	797	1234	641	807	1448	n/a		
4:00 PM	510	777	1287	660	836	1496	n/a		
5:00 PM	712	855	1567	632	625	1257	n/a		
6:00 PM	558	684	1242	484	604	1088	n/a		
7:00 PM	517	439	956	632	625	1257	n/a		
8:00 PM	438	415	853	484	604	1088	n/a		

peak hour indicated in red

volume dbl checked, ~200 lower than day before

*Machines placed between Spring Mill Road and Barleycone Lane

Conclusions:

AM peak hour falls between 7 and 9 AM on both days.

PM peak hour falls between 4 and 6 PM on both days.

"ORDINARY CONDITIONS" TRAFFIC COUNT DATA -- SYSTEM PEAK HOUR DETERMINATION MATRIX

Total Intersection Volume

time beginging	30 & Sproul	30 & Ithan	30 & Lowry	Sproul & Conestoga	Conestoga & Spring Mill	Conestoga & Ithan	Spring Mill & County Line	County Line & Roberts	Conestoga & Garret	Conestoga & Lowrys	Ithan & Aldwyn	Ithan & County Line (North)	Ithan & County Line (South)	County Line & Lowrys	County Line & Aldwyn	total	
7:00	523	234	296	351	192	179	187	220	140	160	46	105	99	55	134	2921	
7:15	677	465	419	486	291	280	252	234	215	219	111	139	127	75	152	4142	
7:30	741	514	533	586	347	377	360	305	225	244	158	258	218	116	191	5173	
7:45	811	555	663	639	385	479	354	337	270	334	206	316	256	166	233	6004	18240
8:00	760	588	658	576	314	375	391	331	231	251	155	277	235	175	202	5519	20838
8:15	807	594	618	524	274	311	394	385	225	244	151	303	258	149	204	5441	22137
8:30	689	493	477	491	281	274	321	310	199	224	104	240	196	126	212	4637	21601
8:45	757	464	487	546	285	290	308	346	230	232	84	222	179	120	196	4746	20343
16:00	732	556	563	437	297	343	316	341	256	279	145	272	174	128	193	5032	
16:15	727	433	491	497	277	323	337	326	269	258	117	234	204	111	199	4803	
16:30	699	509	497	473	282	343	339	309	283	288	125	247	206	136	228	4964	
16:45	727	435	491	583	299	329	298	322	251	258	125	260	227	101	200	4906	19705
17:00	801	542	629	534	299	397	409	308	316	298	139	302	274	139	208	5595	20268
17:15	807	572	625	575	337	332	425	357	291	283	158	322	272	148	220	5724	21189
17:30	841	552	517	537	331	325	387	354	260	273	146	284	236	138	220	5401	21626
17:45	811	514	541	529	325	343	386	332	300	300	130	306	252	132	211	5412	22132

"ORDINARY CONDITIONS" TRAFFIC COUNT DATA -- SYSTEM PEAK HOUR DETERMINATION MATRIX (LANCASTER AVENUE CORRIDOR, ONLY)

time beginging	Total Intersection Volume				
	30 & Sproul	30 & Ithan	30 & Lowry	total	
7:00	523	234	296	1053	
7:15	677	465	419	1561	
7:30	741	514	533	1788	
7:45	811	555	663	2029	6431
8:00	760	588	658	2006	7384
8:15	807	594	618	2019	7842
8:30	689	493	477	1659	7713
8:45	757	464	487	1708	7392
16:00	732	556	563	1851	
16:15	727	433	491	1651	
16:30	699	509	497	1705	
16:45	727	435	491	1653	6860
17:00	801	542	629	1972	6981
17:15	807	572	625	2004	7334
17:30	841	552	517	1910	7539
17:45	811	514	541	1866	7752

"HOMECOMING CONDITIONS" TRAFFIC COUNT DATA -- SYSTEM PEAK HOUR DETERMINATION MATRIX

time beginging	Total Intersection Volume						
	30 & Sproul	30 & Ithan	Sproul & Conestoga	Conestoga & Spring Mill	Conestoga & Ithan	total	
12:00	721	433	351	196	204	1905	
12:15	717	523	393	217	207	2057	
12:30	663	569	384	211	214	2041	
12:45	684	621	398	224	205	2132	8135
13:00	635	485	362	201	203	1886	8116
13:15	633	619	379	211	206	2048	8107
13:30	661	549	361	219	221	2011	8077
13:45	629	562	402	219	215	2027	7972
14:00	629	523	358	194	194	1898	7984
14:15	569	535	384	211	204	1903	7839
14:30	620	523	339	186	190	1858	7686
14:45	586	566	378	212	193	1935	7594

"HOMECOMING CONDITIONS" TRAFFIC COUNT DATA -- SYSTEM PEAK HOUR DETERMINATION MATRIX (LANCASTER AVENUE CORRIDOR, ONLY)

time beginging	Total Intersection Volume			
	30 & Sproul	30 & Ithan	total	
12:00	721	433	1154	
12:15	717	523	1240	
12:30	663	569	1232	
12:45	684	621	1305	4931
13:00	635	485	1120	4897
13:15	633	619	1252	4909
13:30	661	549	1210	4887
13:45	629	562	1191	4773
14:00	629	523	1152	4805
14:15	569	535	1104	4657
14:30	620	523	1143	4590
14:45	586	566	1152	4551

"BASKETBALL GAME CONDITIONS" TRAFFIC COUNT DATA -- SYSTEM PEAK HOUR DETERMINATION MATRIX

time beginging	Total Intersection Volume						
	30 & Sproul	30 & Ithan	Sproul & Conestoga	Conestoga & Spring Mill	Conestoga & Ithan	total	
18:00	788	609	504	296	293	2490	
18:15	861	589	500	310	331	2591	
18:30	785	599	477	277	322	2460	
18:45	752	596	371	197	229	2145	9686
19:00	574	497	340	200	203	1814	9010
19:15	542	486	304	171	177	1680	8099
19:30	502	406	236	126	129	1399	7038
19:45	491	362	232	132	113	1330	6223

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Spring Mill/Sproul Rd
& Kenilworth Rd/Aldwyn Ln

File Name : 01-30SproulAM
Site Code : 00000000
Start Date : 11/8/2012
Page No : 1

Groups Printed- cars - HV

	North Spring Mill Road Southbound							Lancaster Avenue Westbound							Aldwyn Lane Northwestbound							Sproul Road Northbound							Lancaster Avenue Eastbound							Kenilworth Road Southeastbound							
Start Time	L to Lanc	L to Ald					App. Total	L to Ald	L to Spr					App. Total	L to Spr	L to Lanc					App. Total	L to Lanc	L to Ken					App. Total	L to Ken	L to S Mill					App. Total	L to S Mill	L to Lanc					App. Total	Int. Total
07:00 AM	6	0	12	25	0	0	43	0	0	121	1	0	0	122	0	11	0	1	0	0	12	71	0	26	2	1	0	100	1	43	153	11	38	0	246	0	0	0	0	0	0	0	523
07:15 AM	5	5	27	40	0	0	77	0	1	188	0	2	0	191	1	22	0	0	0	0	23	69	1	36	7	3	0	116	0	48	154	16	47	0	265	0	0	0	1	4	0	5	677
07:30 AM	8	2	36	32	0	1	79	0	4	192	0	2	0	198	0	16	0	2	0	0	18	36	0	40	7	1	0	84	0	62	224	17	59	1	363	0	0	0	0	1	0	1	743
07:45 AM	4	3	28	28	0	2	65	1	1	221	0	2	0	225	2	7	0	2	0	0	11	50	0	51	17	2	0	120	0	54	231	39	62	0	386	0	0	1	1	4	0	6	813
Total	23	10	103	125	0	3	264	1	6	722	1	6	0	736	3	56	0	5	0	0	64	226	1	153	33	7	0	420	1	207	762	83	206	1	1260	0	0	1	2	9	0	12	2756
08:00 AM	5	3	38	48	0	4	98	1	2	233	0	3	1	240	1	11	0	2	0	0	14	45	0	37	9	4	0	95	2	63	193	13	42	0	313	0	0	0	0	5	0	5	765
08:15 AM	2	0	29	44	0	1	76	2	4	293	1	6	1	307	0	14	0	2	0	0	16	47	0	62	16	2	0	127	0	41	173	13	52	0	279	0	0	0	2	2	0	4	809
08:30 AM	11	1	31	40	0	2	85	0	5	205	0	8	0	218	0	9	0	2	1	0	12	40	0	44	7	1	0	92	0	72	167	7	34	0	280	0	1	0	0	3	0	4	691
08:45 AM	5	2	16	31	0	1	55	0	3	255	0	3	2	263	2	6	0	0	0	0	8	46	1	44	8	1	0	100	0	59	217	14	42	0	332	0	0	0	1	1	0	2	760
Total	23	6	114	163	0	8	314	3	14	986	1	20	4	1028	3	40	0	6	1	0	50	178	1	187	40	8	0	414	2	235	750	47	170	0	1204	0	1	0	3	11	0	15	3025
Grand Total	46	16	217	288	0	11	578	4	20	1708	2	26	4	1764	6	96	0	11	1	0	114	404	2	340	73	15	0	834	3	442	1512	130	376	1	2464	0	1	1	5	20	0	27	5781
Apprch %	8	2.8	37.5	49.8	0	1.9		0.2	1.1	96.8	0.1	1.5	0.2		5.3	84.2	0	9.6	0.9	0		48.4	0.2	40.8	8.8	1.8	0		0.1	17.9	61.4	5.3	15.3	0		0	3.7	3.7	18.5	74.1	0		
Total %	0.8	0.3	3.8	5	0	0.2	10	0.1	0.3	29.5	0	0.4	0.1	30.5	0.1	1.7	0	0.2	0	0	2	7	0	5.9	1.3	0.3	0	14.4	0.1	7.6	26.2	2.2	6.5	0	42.6	0	0	0	0.1	0.3	0	0.5	
cars	38	16	186	272	0	11	523	4	19	1660	2	22	4	1711	6	90	0	0	0	0	96	377	2	324	71	15	0	789	3	414	1462	130	339	1	2349	0	1	1	4	20	0	26	5494
% cars	82.6	100	85.7	94.4	0	100	90.5	100	95	97.2	100	84.6	100	97	100	93.8	0	0	0	0	84.2	93.3	100	95.3	97.3	100	0	94.6	100	93.7	96.7	100	90.2	100	95.3	0	100	100	80	100	0	96.3	95
HV	8	0	31	16	0	0	55	0	1	48	0	4	0	53	0	6	0	11	1	0	18	27	0	16	2	0	0	45	0	28	50	0	37	0	115	0	0	0	1	0	0	1	287
% HV	17.4	0	14.3	5.6	0	0	9.5	0	5	2.8	0	15.4	0	3	0	6.2	0	100	100	0	15.8	6.7	0	4.7	2.7	0	0	5.4	0	6.3	3.3	0	9.8	0	4.7	0	0	0	20	0	0	3.7	5

	North Spring Mill Road Southbound						Lancaster Avenue Westbound						Aldwyn Lane Northwestbound						Sproul Road Northbound						Lancaster Avenue Eastbound						Kenilworth Road Southeastbound						
Start Time	L to Lanc	L to Ald	T to Spr	R to Lanc	R to Ken	App. Total	L to Ald	L to Spr	T to Lanc	R to Ken	R to S Mill	App. Total	L to Spr	L to Lanc	T to Ken	R to S Mill	R to Lanc	App. Total	L to Lanc	L to Ken	T to S Mill	R to Lanc	R to Ald	App. Total	L to Ken	L to S Mill	T to Lanc	R to Ald	R to Spr	App. Total	L to S Mill	L to Lanc	T to Ald	R to Spr	R to Lanc	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																																					
Peak Hour for Entire Intersection Begins at 07:30 AM																																					
07:30 AM	**8**	2	36	32	0	78	0	**4**	192	0	2	198	0	**16**	**0**	**2**	0	**18**	36	0	40	7	1	84	0	62	224	17	59	362	0	0	0	0	1	1	741
07:45 AM	4	**3**	28	28	0	63	1	1	221	0	2	225	**2**	7	0	2	0	11	**50**	**0**	51	**17**	**2**	120	0	54	**231**	**39**	**62**	**386**	0	0	**1**	1	4	**6**	**811**
08:00 AM	5	3	**38**	**48**	**0**	**94**	1	2	233	0	3	239	1	11	0	2	0	14	45	0	37	9	**4**	95	**2**	**63**	193	13	42	313	0	0	0	0	**5**	5	760
08:15 AM	2	0	29	44	0	75	**2**	4	**293**	**1**	**6**	**306**	0	14	0	2	0	16	47	0	**62**	16	2	**127**	0	41	173	13	52	279	0	0	0	**2**	2	4	807
Total Volume	19	8	131	152	0	310	4	11	939	1	13	968	3	48	0	8	0	59	178	0	190	49	9	426	2	220	821	82	215	1340	0	0	1	3	12	16	3119
% App. Total	6.1	2.6	42.3	49	0		0.4	1.1	97	0.1	1.3		5.1	81.4	0	13.6	0		41.8	0	44.6	11.5	2.1		0.1	16.4	61.3	6.1	16		0	0	6.2	18.8	75		
PHF	.594	.667	.862	.792	.000	.824	.500	.688	.801	.250	.542	.791	.375	.750	.000	1.00	.000	.819	.890	.000	.766	.721	.563	.839	.250	.873	.889	.526	.867	.868	.000	.000	.250	.375	.600	.667	.961
cars	16	8	111	144	0	279	4	10	914	1	11	940	3	44	0	0	0	47	166	0	181	48	9	404	2	204	802	82	196	1286	0	0	1	2	12	15	2971
% cars	84.2	100	84.7	94.7	0	90.0	100	90.9	97.3	100	84.6	97.1	100	91.7	0	0	0	79.7	93.3	0	95.3	98.0	100	94.8	100	92.7	97.7	100	91.2	96.0	0	0	100	66.7	100	93.8	95.3
HV	3	0	20	8	0	31	0	1	25	0	2	28	0	4	0	8	0	12	12	0	9	1	0	22	0	16	19	0	19	54	0	0	0	1	0	1	148
% HV	15.8	0	15.3	5.3	0	10.0	0	9.1	2.7	0	15.4	2.9	0	8.3	0	100	0	20.3	6.7	0	4.7	2.0	0	5.2	0	7.3	2.3	0	8.8	4.0	0	0	0	33.3	0	6.3	4.7

F. Tavani and Associates, Inc.
105 Kenilworth Street
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Lancaster Avenue & Spring Mill/Sproul Rd
& Kenilworth Rd/Aldwyn Ln

File Name : 01-30SproulAM
Site Code : 00000000
Start Date : 11/8/2012
Page No : 1

Groups Printed- HV

	North Spring Mill Road Southbound							Lancaster Avenue Westbound							Aldwyn Lane Northwestbound							Sproul Road Northbound							Lancaster Avenue Eastbound							Kenilworth Road Southeastbound							
Start Time	L to Lanc	L to Ald					App. Total	L to Ald	L to Spr					App. Total	L to Spr	L to Lanc					App. Total	L to Lanc	L to Ken					App. Total	L to Ken	L to S Mill					App. Total	L to S Mill	L to Lanc					App. Total	Int. Total
07:00 AM	0	0	1	1	0	0	2	0	0	1	0	0	0	1	0	1	0	1	0	0	2	9	0	1	0	0	0	10	0	3	3	0	7	0	13	0	0	0	0	0	0	0	28
07:15 AM	0	0	5	3	0	0	8	0	0	3	0	0	0	3	0	0	0	0	0	0	0	2	0	0	1	0	0	3	0	5	9	0	7	0	21	0	0	0	0	0	0	0	35
07:30 AM	2	0	1	1	0	0	4	0	1	5	0	0	0	6	0	2	0	2	0	0	4	2	0	4	0	0	0	6	0	2	3	0	4	0	9	0	0	0	0	0	0	0	29
07:45 AM	0	0	9	1	0	0	10	0	0	4	0	0	0	4	0	0	0	2	0	0	2	3	0	4	0	0	0	7	0	4	7	0	4	0	15	0	0	0	0	0	0	0	38
Total	2	0	16	6	0	0	24	0	1	13	0	0	0	14	0	3	0	5	0	0	8	16	0	9	1	0	0	26	0	14	22	0	22	0	58	0	0	0	0	0	0	0	130
08:00 AM	1	0	8	2	0	0	11	0	0	12	0	1	0	13	0	0	0	2	0	0	2	4	0	1	0	0	0	5	0	6	5	0	5	0	16	0	0	0	0	0	0	0	47
08:15 AM	0	0	2	4	0	0	6	0	0	4	0	1	0	5	0	2	0	2	0	0	4	3	0	0	1	0	0	4	0	4	4	0	6	0	14	0	0	0	1	0	0	1	34
08:30 AM	2	0	3	3	0	0	8	0	0	9	0	1	0	10	0	1	0	2	1	0	4	0	0	5	0	0	0	5	0	1	9	0	2	0	12	0	0	0	0	0	0	0	39
08:45 AM	3	0	2	1	0	0	6	0	0	10	0	1	0	11	0	0	0	0	0	0	0	4	0	1	0	0	0	5	0	3	10	0	2	0	15	0	0	0	0	0	0	0	37
Total	6	0	15	10	0	0	31	0	0	35	0	4	0	39	0	3	0	6	1	0	10	11	0	7	1	0	0	19	0	14	28	0	15	0	57	0	0	0	1	0	0	1	157
Grand Total	8	0	31	16	0	0	55	0	1	48	0	4	0	53	0	6	0	11	1	0	18	27	0	16	2	0	0	45	0	28	50	0	37	0	115	0	0	0	1	0	0	1	287
Apprch %	14.5	0	56.4	29.1	0	0		0	1.9	90.6	0	7.5	0		0	33.3	0	61.1	5.6	0		60	0	35.6	4.4	0	0		0	24.3	43.5	0	32.2	0		0	0	0	100	0	0		
Total %	2.8	0	10.8	5.6	0	0	19.2	0	0.3	16.7	0	1.4	0	18.5	0	2.1	0	3.8	0.3	0	6.3	9.4	0	5.6	0.7	0	0	15.7	0	9.8	17.4	0	12.9	0	40.1	0	0	0	0.3	0	0	0.3	

	North Spring Mill Road Southbound						Lancaster Avenue Westbound						Aldwyn Lane Northwestbound						Sproul Road Northbound						Lancaster Avenue Eastbound						Kenilworth Road Southeastbound						
Start Time	L to Lanc	L to Ald	T to Spr	R to Lanc	R to Ken	App. Total	L to Ald	L to Spr	T to Lanc	R to Ken	R to S Mill	App. Total	L to Spr	L to Lanc	T to Ken	R to S Mill	R to Lanc	App. Total	L to Lanc	L to Ken	T to S Mill	R to Lanc	R to Ald	App. Total	L to Ken	L to S Mill	T to Lanc	R to Ald	R to Spr	App. Total	L to S Mill	L to Lanc	T to Ald	R to Spr	R to Lanc	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																																					
Peak Hour for Entire Intersection Begins at 07:30 AM																																					
07:30 AM	**2**	0	1	1	0	4	0	**1**	5	0	0	6	0	**2**	0	**2**	0	**4**	2	0	**4**	0	0	6	0	2	3	0	4	9	0	0	0	0	0	0	29
07:45 AM	0	0	**9**	1	0	10	0	0	4	0	0	4	0	0	0	2	0	2	3	0	4	0	0	**7**	0	4	**7**	0	4	15	0	0	0	0	0	0	38
08:00 AM	1	0	8	2	0	**11**	0	0	**12**	**0**	**1**	**13**	0	0	0	2	0	2	**4**	0	1	0	0	5	0	**6**	5	0	5	**16**	0	0	0	0	0	0	**47**
08:15 AM	0	0	2	**4**	0	6	0	0	4	0	1	5	0	2	0	2	0	4	3	0	0	**1**	0	4	0	4	4	0	**6**	14	0	0	0	**1**	0	**1**	34
Total Volume	3	0	20	8	0	31	0	1	25	0	2	28	0	4	0	8	0	12	12	0	9	1	0	22	0	16	19	0	19	54	0	0	0	1	0	1	148
% App. Total	9.7	0	64.5	25.8	0		0	3.6	89.3	0	7.1		0	33.3	0	66.7	0		54.5	0	40.9	4.5	0		0	29.6	35.2	0	35.2		0	0	0	100	0		
PHF	.375	.000	.556	.500	.000	.705	.000	.250	.521	.000	.500	.538	.000	.500	.000	1.00	.000	.750	.750	.000	.563	.250	.000	.786	.000	.667	.679	.000	.792	.844	.000	.000	.000	.250	.000	.250	.787

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105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Ithan Avenues

EB Peds = diag peds NE-SW
WB Peds = diag peds NW-SE

File Name : 02-30IthanAM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound					Lancaster Avenue Westbound						Ithan Avenue Northbound					Lancaster Avenue Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NW-SE Peds	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NE-SW Peds	Peds	App. Total	Int. Total
07:00 AM	3	19	2	7	31	6	106	2	5	13	132	10	8	1	0	19	5	86	4	0	5	100	282
07:15 AM	2	29	14	4	49	19	196	3	12	3	233	12	17	5	0	34	14	193	6	0	5	218	534
07:30 AM	5	48	12	2	67	9	196	6	6	8	225	20	38	18	0	76	22	191	13	1	4	231	599
07:45 AM	9	62	9	6	86	23	196	13	23	7	262	23	55	21	1	100	20	196	8	0	15	239	687
Total	19	158	37	19	233	57	694	24	46	31	852	65	118	45	1	229	61	666	31	1	29	788	2102
08:00 AM	8	38	12	3	61	44	212	15	69	3	343	23	42	23	0	88	20	202	7	0	33	262	754
08:15 AM	3	66	14	3	86	57	235	10	193	10	505	18	38	12	0	68	26	191	7	0	56	280	939
08:30 AM	9	37	11	3	60	16	206	15	57	10	304	13	41	8	0	62	22	166	6	0	26	220	646
08:45 AM	5	19	9	1	34	15	189	6	25	8	243	6	33	9	0	48	33	166	7	0	11	217	542
Total	25	160	46	10	241	132	842	46	344	31	1395	60	154	52	0	266	101	725	27	0	126	979	2881
Grand Total	44	318	83	29	474	189	1536	70	390	62	2247	125	272	97	1	495	162	1391	58	1	155	1767	4983
Apprch %	9.3	67.1	17.5	6.1		8.4	68.4	3.1	17.4	2.8		25.3	54.9	19.6	0.2		9.2	78.7	3.3	0.1	8.8		
Total %	0.9	6.4	1.7	0.6	9.5	3.8	30.8	1.4	7.8	1.2	45.1	2.5	5.5	1.9	0	9.9	3.3	27.9	1.2	0	3.1	35.5	
cars	42	307	76	29	454	189	1475	67	390	61	2182	120	266	94	1	481	157	1298	53	1	155	1664	4781
% cars	95.5	96.5	91.6	100	95.8	100	96	95.7	100	98.4	97.1	96	97.8	96.9	100	97.2	96.9	93.3	91.4	100	100	94.2	95.9
HV	2	11	7	0	20	0	61	3	0	1	65	5	6	3	0	14	5	93	5	0	0	103	202
% HV	4.5	3.5	8.4	0	4.2	0	4	4.3	0	1.6	2.9	4	2.2	3.1	0	2.8	3.1	6.7	8.6	0	0	5.8	4.1

	Ithan Avenue Southbound				Lancaster Avenue Westbound				Ithan Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	5	48	12	65	9	196	6	211	20	38	18	76	22	191	**13**	226	578
07:45 AM	**9**	62	9	80	23	196	13	232	**23**	**55**	21	**99**	20	196	8	224	635
08:00 AM	8	38	12	58	44	212	**15**	271	23	42	**23**	88	20	**202**	7	**229**	646
08:15 AM	3	**66**	**14**	**83**	**57**	**235**	10	**302**	18	38	12	68	**26**	191	7	224	**677**
Total Volume	25	214	47	286	133	839	44	1016	84	173	74	331	88	780	35	903	2536
% App. Total	8.7	74.8	16.4		13.1	82.6	4.3		25.4	52.3	22.4		9.7	86.4	3.9		
PHF	.694	.811	.839	.861	.583	.893	.733	.841	.913	.786	.804	.836	.846	.965	.673	.986	.936
cars	23	205	45	273	133	805	43	981	79	169	71	319	85	729	32	846	2419
% cars	92.0	95.8	95.7	95.5	100	95.9	97.7	96.6	94.0	97.7	95.9	96.4	96.6	93.5	91.4	93.7	95.4
HV	2	9	2	13	0	34	1	35	5	4	3	12	3	51	3	57	117
% HV	8.0	4.2	4.3	4.5	0	4.1	2.3	3.4	6.0	2.3	4.1	3.6	3.4	6.5	8.6	6.3	4.6

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Ithan Avenues

EB Peds = diag peds NE-SW
WB Peds = diag peds NW-SE

File Name : 02-30IthanAM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound					Lancaster Avenue Westbound						Ithan Avenue Northbound					Lancaster Avenue Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NW-SE Peds	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NE-SW Peds	Peds	App. Total	Int. Total
07:00 AM	0	0	1	0	1	0	3	0	0	0	3	0	0	0	0	0	0	5	1	0	0	6	10
07:15 AM	0	1	1	0	2	0	3	0	0	0	3	0	0	0	0	0	0	12	0	0	0	12	17
07:30 AM	0	6	1	0	7	0	5	1	0	0	6	3	1	1	0	5	1	14	3	0	0	18	36
07:45 AM	1	0	0	0	1	0	10	0	0	0	10	0	1	1	0	2	1	15	0	0	0	16	29
Total	1	7	3	0	11	0	21	1	0	0	22	3	2	2	0	7	2	46	4	0	0	52	92
08:00 AM	0	1	0	0	1	0	7	0	0	0	7	2	1	0	0	3	1	12	0	0	0	13	24
08:15 AM	1	2	1	0	4	0	12	0	0	0	12	0	1	1	0	2	0	10	0	0	0	10	28
08:30 AM	0	1	2	0	3	0	15	2	0	0	17	0	1	0	0	1	0	11	0	0	0	11	32
08:45 AM	0	0	1	0	1	0	6	0	0	1	7	0	1	0	0	1	2	14	1	0	0	17	26
Total	1	4	4	0	9	0	40	2	0	1	43	2	4	1	0	7	3	47	1	0	0	51	110
Grand Total	2	11	7	0	20	0	61	3	0	1	65	5	6	3	0	14	5	93	5	0	0	103	202
Apprch %	10	55	35	0		0	93.8	4.6	0	1.5		35.7	42.9	21.4	0		4.9	90.3	4.9	0	0		
Total %	1	5.4	3.5	0	9.9	0	30.2	1.5	0	0.5	32.2	2.5	3	1.5	0	6.9	2.5	46	2.5	0	0	51	

	Ithan Avenue Southbound				Lancaster Avenue Westbound				Ithan Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	**6**	**1**	**7**	0	5	**1**	6	**3**	**1**	**1**	**5**	**1**	14	**3**	**18**	**36**
07:45 AM	**1**	0	0	1	0	10	0	10	0	1	1	2	1	**15**	0	16	29
08:00 AM	0	1	0	1	0	7	0	7	2	1	0	3	1	12	0	13	24
08:15 AM	1	2	1	4	0	**12**	0	**12**	0	1	1	2	0	10	0	10	28
Total Volume	2	9	2	13	0	34	1	35	5	4	3	12	3	51	3	57	117
% App. Total	15.4	69.2	15.4		0	97.1	2.9		41.7	33.3	25		5.3	89.5	5.3		
PHF	.500	.375	.500	.464	.000	.708	.250	.729	.417	1.00	.750	.600	.750	.850	.250	.792	.813

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Lowrys Lane

File Name : 03-30LowrAM
Site Code : 00000000
Start Date : 11/7/2012
Page No : 1

Groups Printed- cars - HV

	Lowrys Lane Southbound					Lancaster Avenue Westbound					Lowrys Lane Northbound					Lancaster Avenue Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	2	1	1	4	2	122	1	2	127	15	15	6	3	39	1	130	1	1	133	303
07:15 AM	4	4	3	0	11	3	193	3	0	199	22	14	3	0	39	0	162	5	0	167	416
07:30 AM	7	17	4	9	37	6	199	1	1	207	9	25	6	4	44	2	250	4	1	257	545
07:45 AM	4	21	7	3	35	6	271	8	0	285	8	34	17	3	62	7	276	4	0	287	669
Total	15	44	15	13	87	17	785	13	3	818	54	88	32	10	184	10	818	14	2	844	1933
08:00 AM	2	18	4	1	25	3	292	4	0	299	17	28	8	2	55	3	271	8	0	282	661
08:15 AM	8	14	4	0	26	1	301	9	0	311	12	15	7	6	40	6	238	3	0	247	624
08:30 AM	4	8	5	1	18	3	230	10	0	243	3	23	8	6	40	3	177	3	0	183	484
08:45 AM	11	6	2	1	20	2	235	8	1	246	4	11	9	3	27	2	194	3	0	199	492
Total	25	46	15	3	89	9	1058	31	1	1099	36	77	32	17	162	14	880	17	0	911	2261
Grand Total	40	90	30	16	176	26	1843	44	4	1917	90	165	64	27	346	24	1698	31	2	1755	4194
Apprch %	22.7	51.1	17	9.1		1.4	96.1	2.3	0.2		26	47.7	18.5	7.8		1.4	96.8	1.8	0.1		
Total %	1	2.1	0.7	0.4	4.2	0.6	43.9	1	0.1	45.7	2.1	3.9	1.5	0.6	8.2	0.6	40.5	0.7	0	41.8	
cars	39	88	30	16	173	26	1797	44	4	1871	86	164	63	27	340	24	1639	27	2	1692	4076
% cars	97.5	97.8	100	100	98.3	100	97.5	100	100	97.6	95.6	99.4	98.4	100	98.3	100	96.5	87.1	100	96.4	97.2
HV	1	2	0	0	3	0	46	0	0	46	4	1	1	0	6	0	59	4	0	63	118
% HV	2.5	2.2	0	0	1.7	0	2.5	0	0	2.4	4.4	0.6	1.6	0	1.7	0	3.5	12.9	0	3.6	2.8

	Lowrys Lane Southbound				Lancaster Avenue Westbound				Lowrys Lane Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	7	17	4	28	**6**	199	1	206	9	25	6	40	2	250	4	256	530
07:45 AM	4	**21**	**7**	**32**	6	271	8	285	8	**34**	**17**	**59**	**7**	**276**	4	**287**	**663**
08:00 AM	2	18	4	24	3	292	4	299	**17**	28	8	53	3	271	**8**	282	658
08:15 AM	**8**	14	4	26	1	**301**	**9**	**311**	12	15	7	34	6	238	3	247	618
Total Volume	21	70	19	110	16	1063	22	1101	46	102	38	186	18	1035	19	1072	2469
% App. Total	19.1	63.6	17.3		1.5	96.5	2		24.7	54.8	20.4		1.7	96.5	1.8		
PHF	.656	.833	.679	.859	.667	.883	.611	.885	.676	.750	.559	.788	.643	.938	.594	.934	.931
cars	20	68	19	107	16	1038	22	1076	42	102	37	181	18	1009	16	1043	2407
% cars	95.2	97.1	100	97.3	100	97.6	100	97.7	91.3	100	97.4	97.3	100	97.5	84.2	97.3	97.5
HV	1	2	0	3	0	25	0	25	4	0	1	5	0	26	3	29	62
% HV	4.8	2.9	0	2.7	0	2.4	0	2.3	8.7	0	2.6	2.7	0	2.5	15.8	2.7	2.5

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Lowrys Lane

File Name : 03-30LowrAM
Site Code : 00000000
Start Date : 11/7/2012
Page No : 1

Groups Printed- HV

	Lowrys Lane Southbound					Lancaster Avenue Westbound					Lowrys Lane Northbound					Lancaster Avenue Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	7
07:15 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	5	1	0	6	11
07:30 AM	1	1	0	0	2	0	4	0	0	4	0	0	0	0	0	0	2	0	0	2	8
07:45 AM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	13	2	0	15	21
Total	1	1	0	0	2	0	15	0	0	15	0	0	0	0	0	0	27	3	0	30	47
08:00 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	9
08:15 AM	0	1	0	0	1	0	10	0	0	10	4	0	1	0	5	0	7	1	0	8	24
08:30 AM	0	0	0	0	0	0	7	0	0	7	0	1	0	0	1	0	12	0	0	12	20
08:45 AM	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	0	9	0	0	9	18
Total	0	1	0	0	1	0	31	0	0	31	4	1	1	0	6	0	32	1	0	33	71
Grand Total	1	2	0	0	3	0	46	0	0	46	4	1	1	0	6	0	59	4	0	63	118
Apprch %	33.3	66.7	0	0		0	100	0	0		66.7	16.7	16.7	0		0	93.7	6.3	0		
Total %	0.8	1.7	0	0	2.5	0	39	0	0	39	3.4	0.8	0.8	0	5.1	0	50	3.4	0	53.4	

	Lowrys Lane Southbound				Lancaster Avenue Westbound				Lowrys Lane Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**1**	**1**	0	**2**	0	4	0	4	0	0	0	0	0	2	0	2	8
07:45 AM	0	0	0	0	0	6	0	6	0	0	0	0	0	**13**	**2**	**15**	21
08:00 AM	0	0	0	0	0	5	0	5	0	0	0	0	0	4	0	4	9
08:15 AM	0	1	0	1	0	**10**	0	**10**	**4**	0	**1**	**5**	0	7	1	8	**24**
Total Volume	1	2	0	3	0	25	0	25	4	0	1	5	0	26	3	29	62
% App. Total	33.3	66.7	0		0	100	0		80	0	20		0	89.7	10.3		
PHF	.250	.500	.000	.375	.000	.625	.000	.625	.250	.000	.250	.250	.000	.500	.375	.483	.646

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Garrett Avenues

File Name : 04-30GarAM
Site Code : 21102771
Start Date : 11/7/2012
Page No : 1

Groups Printed- cars - HV

	Lancaster Avenue Westbound				Garrett Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	3	0	0	3	0	5	1	6	0	4	0	4	13
07:15 AM	0	0	0	0	0	3	0	3	0	5	0	5	8
07:30 AM	3	0	0	3	0	3	4	7	0	9	0	9	19
07:45 AM	8	0	1	9	0	7	6	13	0	4	0	4	26
Total	14	0	1	15	0	18	11	29	0	22	0	22	66
08:00 AM	4	0	0	4	1	10	4	15	0	4	0	4	23
08:15 AM	4	0	0	4	0	5	6	11	0	7	0	7	22
08:30 AM	2	0	0	2	1	6	4	11	0	3	0	3	16
08:45 AM	4	0	0	4	2	12	2	16	0	12	0	12	32
Total	14	0	0	14	4	33	16	53	0	26	0	26	93
Grand Total	28	0	1	29	4	51	27	82	0	48	0	48	159
Apprch %	96.6	0	3.4		4.9	62.2	32.9		0	100	0		
Total %	17.6	0	0.6	18.2	2.5	32.1	17	51.6	0	30.2	0	30.2	
cars	28	0	1	29	4	51	27	82	0	48	0	48	159
% cars	100	0	100	100	100	100	100	100	0	100	0	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0

	Lancaster Avenue Westbound			Garrett Avenue Northbound			Lancaster Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	3	0	3	0	3	3	0	**9**	**9**	15
07:45 AM	**8**	0	**8**	0	7	7	0	4	4	**19**
08:00 AM	4	0	4	**1**	**10**	**11**	0	4	4	19
08:15 AM	4	0	4	0	5	5	0	7	7	16
Total Volume	19	0	19	1	25	26	0	24	24	69
% App. Total	100	0		3.8	96.2		0	100		
PHF	.594	.000	.594	.250	.625	.591	.000	.667	.667	.908
cars	19	0	19	1	25	26	0	24	24	69
% cars	100	0	100	100	100	100	0	100	100	100
HV	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Garrett Avenues

File Name : 04-30GarAM
Site Code : 21102771
Start Date : 11/7/2012
Page No : 1

Groups Printed- HV

	Lancaster Avenue Westbound				Garrett Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		
Total %													

	Lancaster Avenue Westbound			Garrett Avenue Northbound			Lancaster Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Sproul & Conestoga Roads

File Name : 05-SprConAM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Sproul Road Southbound					Conestoga Road Westbound					Sproul Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	10	30	7	0	47	0	98	17	0	115	36	51	4	0	91	25	65	8	0	98	351
07:15 AM	15	26	22	0	63	6	127	20	0	153	61	57	4	0	122	21	110	17	1	149	487
07:30 AM	19	45	17	0	81	17	137	11	0	165	64	60	7	0	131	30	150	29	0	209	586
07:45 AM	12	62	20	0	94	7	158	11	0	176	48	71	11	0	130	37	161	41	0	239	639
Total	56	163	66	0	285	30	520	59	0	609	209	239	26	0	474	113	486	95	1	695	2063
08:00 AM	12	48	14	0	74	4	157	14	0	175	48	65	2	0	115	45	127	40	0	212	576
08:15 AM	12	41	22	0	75	7	137	20	0	164	49	66	7	0	122	34	104	25	0	163	524
08:30 AM	6	42	22	0	70	3	143	15	0	161	49	58	7	0	114	28	94	24	0	146	491
08:45 AM	12	37	25	0	74	8	134	10	0	152	64	72	11	0	147	39	107	27	0	173	546
Total	42	168	83	0	293	22	571	59	0	652	210	261	27	0	498	146	432	116	0	694	2137
Grand Total	98	331	149	0	578	52	1091	118	0	1261	419	500	53	0	972	259	918	211	1	1389	4200
Apprch %	17	57.3	25.8	0		4.1	86.5	9.4	0		43.1	51.4	5.5	0		18.6	66.1	15.2	0.1		
Total %	2.3	7.9	3.5	0	13.8	1.2	26	2.8	0	30	10	11.9	1.3	0	23.1	6.2	21.9	5	0	33.1	
cars	77	307	134	0	518	46	1067	108	0	1221	408	464	48	0	920	246	900	199	1	1346	4005
% cars	78.6	92.7	89.9	0	89.6	88.5	97.8	91.5	0	96.8	97.4	92.8	90.6	0	94.7	95	98	94.3	100	96.9	95.4
HV	21	24	15	0	60	6	24	10	0	40	11	36	5	0	52	13	18	12	0	43	195
% HV	21.4	7.3	10.1	0	10.4	11.5	2.2	8.5	0	3.2	2.6	7.2	9.4	0	5.3	5	2	5.7	0	3.1	4.6

	Sproul Road Southbound				Conestoga Road Westbound				Sproul Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**19**	45	17	81	**17**	137	11	165	**64**	60	7	**131**	30	150	29	209	586
07:45 AM	12	**62**	20	**94**	7	**158**	11	**176**	48	**71**	**11**	130	37	**161**	**41**	**239**	**639**
08:00 AM	12	48	14	74	4	157	14	175	48	65	2	115	**45**	127	40	212	576
08:15 AM	12	41	**22**	75	7	137	**20**	164	49	66	7	122	34	104	25	163	524
Total Volume	55	196	73	324	35	589	56	680	209	262	27	498	146	542	135	823	2325
% App. Total	17	60.5	22.5		5.1	86.6	8.2		42	52.6	5.4		17.7	65.9	16.4		
PHF	.724	.790	.830	.862	.515	.932	.700	.966	.816	.923	.614	.950	.811	.842	.823	.861	.910
cars	44	180	70	294	31	574	54	659	201	245	24	470	139	527	125	791	2214
% cars	80.0	91.8	95.9	90.7	88.6	97.5	96.4	96.9	96.2	93.5	88.9	94.4	95.2	97.2	92.6	96.1	95.2
HV	11	16	3	30	4	15	2	21	8	17	3	28	7	15	10	32	111
% HV	20.0	8.2	4.1	9.3	11.4	2.5	3.6	3.1	3.8	6.5	11.1	5.6	4.8	2.8	7.4	3.9	4.8

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Sproul & Conestoga Roads

File Name : 05-SprConAM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Sproul Road Southbound					Conestoga Road Westbound					Sproul Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	3	1	3	0	7	0	4	4	0	8	0	4	1	0	5	3	0	0	0	3	23
07:15 AM	4	3	7	0	14	1	0	2	0	3	2	1	0	0	3	0	1	1	0	2	22
07:30 AM	2	3	1	0	6	1	7	0	0	8	2	3	1	0	6	4	10	3	0	17	37
07:45 AM	2	6	1	0	9	2	3	1	0	6	1	4	1	0	6	2	2	3	0	7	28
Total	11	13	12	0	36	4	14	7	0	25	5	12	3	0	20	9	13	7	0	29	110
08:00 AM	2	4	1	0	7	1	3	1	0	5	1	4	0	0	5	0	2	3	0	5	22
08:15 AM	5	3	0	0	8	0	2	0	0	2	4	6	1	0	11	1	1	1	0	3	24
08:30 AM	2	2	1	0	5	0	5	1	0	6	1	5	0	0	6	1	2	1	0	4	21
08:45 AM	1	2	1	0	4	1	0	1	0	2	0	9	1	0	10	2	0	0	0	2	18
Total	10	11	3	0	24	2	10	3	0	15	6	24	2	0	32	4	5	5	0	14	85
Grand Total	21	24	15	0	60	6	24	10	0	40	11	36	5	0	52	13	18	12	0	43	195
Apprch %	35	40	25	0		15	60	25	0		21.2	69.2	9.6	0		30.2	41.9	27.9	0		
Total %	10.8	12.3	7.7	0	30.8	3.1	12.3	5.1	0	20.5	5.6	18.5	2.6	0	26.7	6.7	9.2	6.2	0	22.1	

	Sproul Road Southbound				Conestoga Road Westbound				Sproul Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	2	3	**1**	6	1	**7**	0	**8**	2	3	**1**	6	**4**	**10**	**3**	**17**	**37**
07:45 AM	2	**6**	1	**9**	**2**	3	**1**	6	1	4	1	6	2	2	3	7	28
08:00 AM	2	4	1	7	1	3	1	5	1	4	0	5	0	2	3	5	22
08:15 AM	**5**	3	0	8	0	2	0	2	**4**	**6**	1	**11**	1	1	1	3	24
Total Volume	11	16	3	30	4	15	2	21	8	17	3	28	7	15	10	32	111
% App. Total	36.7	53.3	10		19	71.4	9.5		28.6	60.7	10.7		21.9	46.9	31.2		
PHF	.550	.667	.750	.833	.500	.536	.500	.656	.500	.708	.750	.636	.438	.375	.833	.471	.750

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga & Spring Mill Roads

File Name : 06-ConSpMAM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Spring Mill Road Southbound				Conestoga Road Westbound				Conestoga Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
07:00 AM	0	2	0	2	114	0	0	114	0	76	0	76	192
07:15 AM	2	5	0	7	146	1	0	147	1	136	0	137	291
07:30 AM	1	3	0	4	167	0	0	167	0	176	0	176	347
07:45 AM	1	1	0	2	183	1	0	184	1	198	0	199	385
Total	4	11	0	15	610	2	0	612	2	586	0	588	1215
08:00 AM	0	3	0	3	172	2	0	174	1	136	0	137	314
08:15 AM	2	1	0	3	156	0	0	156	0	115	0	115	274
08:30 AM	1	2	0	3	166	1	0	167	0	111	0	111	281
08:45 AM	1	3	0	4	147	1	0	148	1	132	0	133	285
Total	4	9	0	13	641	4	0	645	2	494	0	496	1154
Grand Total	8	20	0	28	1251	6	0	1257	4	1080	0	1084	2369
Apprch %	28.6	71.4	0		99.5	0.5	0		0.4	99.6	0		
Total %	0.3	0.8	0	1.2	52.8	0.3	0	53.1	0.2	45.6	0	45.8	
cars	8	18	0	26	1213	6	0	1219	4	1041	0	1045	2290
% cars	100	90	0	92.9	97	100	0	97	100	96.4	0	96.4	96.7
HV	0	2	0	2	38	0	0	38	0	39	0	39	79
% HV	0	10	0	7.1	3	0	0	3	0	3.6	0	3.6	3.3

	Spring Mill Road Southbound			Conestoga Road Westbound			Conestoga Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	1	**3**	**4**	167	0	167	0	176	176	347
07:45 AM	1	1	2	**183**	1	**184**	**1**	**198**	**199**	**385**
08:00 AM	0	3	3	172	**2**	174	1	136	137	314
08:15 AM	**2**	1	3	156	0	156	0	115	115	274
Total Volume	4	8	12	678	3	681	2	625	627	1320
% App. Total	33.3	66.7		99.6	0.4		0.3	99.7		
PHF	.500	.667	.750	.926	.375	.925	.500	.789	.788	.857
cars	4	8	12	656	3	659	2	599	601	1272
% cars	100	100	100	96.8	100	96.8	100	95.8	95.9	96.4
HV	0	0	0	22	0	22	0	26	26	48
% HV	0	0	0	3.2	0	3.2	0	4.2	4.1	3.6

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga & Spring Mill Roads

File Name : 06-ConSpMAM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Spring Mill Road Southbound				Conestoga Road Westbound				Conestoga Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	6	0	0	6	0	3	0	3	9
07:15 AM	0	1	0	1	2	0	0	2	0	5	0	5	8
07:30 AM	0	0	0	0	9	0	0	9	0	11	0	11	20
07:45 AM	0	0	0	0	6	0	0	6	0	5	0	5	11
Total	0	1	0	1	23	0	0	23	0	24	0	24	48
08:00 AM	0	0	0	0	6	0	0	6	0	2	0	2	8
08:15 AM	0	0	0	0	1	0	0	1	0	8	0	8	9
08:30 AM	0	1	0	1	7	0	0	7	0	3	0	3	11
08:45 AM	0	0	0	0	1	0	0	1	0	2	0	2	3
Total	0	1	0	1	15	0	0	15	0	15	0	15	31
Grand Total	0	2	0	2	38	0	0	38	0	39	0	39	79
Apprch %	0	100	0		100	0	0		0	100	0		
Total %	0	2.5	0	2.5	48.1	0	0	48.1	0	49.4	0	49.4	

	Spring Mill Road Southbound			Conestoga Road Westbound			Conestoga Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	0	0	**9**	0	**9**	0	**11**	**11**	**20**
07:45 AM	0	0	0	6	0	6	0	5	5	11
08:00 AM	0	0	0	6	0	6	0	2	2	8
08:15 AM	0	0	0	1	0	1	0	8	8	9
Total Volume	0	0	0	22	0	22	0	26	26	48
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.611	.000	.611	.000	.591	.591	.600

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Ithan Avenue

File Name : 07-ConIthAM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound					Conestoga Road Westbound					Ithan Avenue Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	2	0	7	0	9	0	83	5	0	88	1	8	1	0	10	18	54	0	2	74	181
07:15 AM	9	2	21	0	32	0	89	16	0	105	4	14	1	0	19	41	83	0	0	124	280
07:30 AM	13	12	26	0	51	0	113	25	0	138	0	39	1	0	40	53	96	0	0	149	378
07:45 AM	19	16	47	0	82	1	112	54	1	168	2	60	4	0	66	46	116	2	0	164	480
Total	43	30	101	0	174	1	397	100	1	499	7	121	7	0	135	158	349	2	2	511	1319
08:00 AM	22	16	42	0	80	1	116	25	0	142	9	33	3	0	45	31	77	0	0	108	375
08:15 AM	7	7	21	0	35	0	102	21	0	123	3	21	4	0	28	32	93	0	0	125	311
08:30 AM	3	2	14	0	19	0	113	13	0	126	0	16	1	0	17	30	81	1	0	112	274
08:45 AM	5	3	15	0	23	4	100	13	0	117	0	17	2	1	20	35	96	0	0	131	291
Total	37	28	92	0	157	5	431	72	0	508	12	87	10	1	110	128	347	1	0	476	1251
Grand Total	80	58	193	0	331	6	828	172	1	1007	19	208	17	1	245	286	696	3	2	987	2570
Apprch %	24.2	17.5	58.3	0		0.6	82.2	17.1	0.1		7.8	84.9	6.9	0.4		29	70.5	0.3	0.2		
Total %	3.1	2.3	7.5	0	12.9	0.2	32.2	6.7	0	39.2	0.7	8.1	0.7	0	9.5	11.1	27.1	0.1	0.1	38.4	
cars	78	50	185	0	313	6	800	167	1	974	18	201	15	1	235	269	676	2	2	949	2471
% cars	97.5	86.2	95.9	0	94.6	100	96.6	97.1	100	96.7	94.7	96.6	88.2	100	95.9	94.1	97.1	66.7	100	96.1	96.1
HV	2	8	8	0	18	0	28	5	0	33	1	7	2	0	10	17	20	1	0	38	99
% HV	2.5	13.8	4.1	0	5.4	0	3.4	2.9	0	3.3	5.3	3.4	11.8	0	4.1	5.9	2.9	33.3	0	3.9	3.9

	Ithan Avenue Southbound				Conestoga Road Westbound				Ithan Avenue Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	13	12	26	51	0	113	25	138	0	39	1	40	**53**	96	0	149	378
07:45 AM	19	**16**	**47**	**82**	**1**	112	**54**	**167**	2	**60**	**4**	**66**	46	**116**	**2**	**164**	**479**
08:00 AM	**22**	16	42	80	1	**116**	25	142	**9**	33	3	45	31	77	0	108	375
08:15 AM	7	7	21	35	0	102	21	123	3	21	4	28	32	93	0	125	311
Total Volume	61	51	136	248	2	443	125	570	14	153	12	179	162	382	2	546	1543
% App. Total	24.6	20.6	54.8		0.4	77.7	21.9		7.8	85.5	6.7		29.7	70	0.4		
PHF	.693	.797	.723	.756	.500	.955	.579	.853	.389	.638	.750	.678	.764	.823	.250	.832	.805
cars	60	43	130	233	2	428	122	552	14	146	10	170	152	368	1	521	1476
% cars	98.4	84.3	95.6	94.0	100	96.6	97.6	96.8	100	95.4	83.3	95.0	93.8	96.3	50.0	95.4	95.7
HV	1	8	6	15	0	15	3	18	0	7	2	9	10	14	1	25	67
% HV	1.6	15.7	4.4	6.0	0	3.4	2.4	3.2	0	4.6	16.7	5.0	6.2	3.7	50.0	4.6	4.3

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Ithan Avenue

File Name : 07-ConIthAM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound					Conestoga Road Westbound					Ithan Avenue Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	2	0	2	0	2	1	0	3	1	0	0	0	1	1	2	0	0	3	9
07:15 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	2	0	0	3	6
07:30 AM	0	2	2	0	4	0	5	1	0	6	0	4	0	0	4	5	9	0	0	14	28
07:45 AM	0	4	3	0	7	0	2	1	0	3	0	2	0	0	2	3	1	1	0	5	17
Total	0	6	7	0	13	0	12	3	0	15	1	6	0	0	7	10	14	1	0	25	60
08:00 AM	1	1	1	0	3	0	7	1	0	8	0	1	0	0	1	1	1	0	0	2	14
08:15 AM	0	1	0	0	1	0	1	0	0	1	0	0	2	0	2	1	3	0	0	4	8
08:30 AM	0	0	0	0	0	0	6	1	0	7	0	0	0	0	0	4	1	0	0	5	12
08:45 AM	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	1	1	0	0	2	5
Total	2	2	1	0	5	0	16	2	0	18	0	1	2	0	3	7	6	0	0	13	39
Grand Total	2	8	8	0	18	0	28	5	0	33	1	7	2	0	10	17	20	1	0	38	99
Apprch %	11.1	44.4	44.4	0		0	84.8	15.2	0		10	70	20	0		44.7	52.6	2.6	0		
Total %	2	8.1	8.1	0	18.2	0	28.3	5.1	0	33.3	1	7.1	2	0	10.1	17.2	20.2	1	0	38.4	

	Ithan Avenue Southbound				Conestoga Road Westbound				Ithan Avenue Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	2	2	4	0	5	**1**	6	0	**4**	0	**4**	**5**	**9**	0	**14**	**28**
07:45 AM	0	**4**	**3**	**7**	0	2	1	3	0	2	0	2	3	1	**1**	5	17
08:00 AM	**1**	1	1	3	0	**7**	1	**8**	0	1	0	1	1	1	0	2	14
08:15 AM	0	1	0	1	0	1	0	1	0	0	**2**	2	1	3	0	4	8
Total Volume	1	8	6	15	0	15	3	18	0	7	2	9	10	14	1	25	67
% App. Total	6.7	53.3	40		0	83.3	16.7		0	77.8	22.2		40	56	4		
PHF	.250	.500	.500	.536	.000	.536	.750	.563	.000	.438	.250	.563	.500	.389	.250	.446	.598

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Lowrys Lane/Strathmore Drive

File Name : 08-ConLowAM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Lowrys Lane Southbound					Conestoga Road Westbound					Strathmore Drive Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	5	6	1	13	2	76	0	0	78	5	4	4	2	15	3	54	0	1	58	164
07:15 AM	0	3	8	1	12	1	99	3	1	104	11	1	0	0	12	5	83	5	1	94	222
07:30 AM	0	5	19	0	24	4	98	0	1	103	5	2	3	2	12	7	94	7	3	111	250
07:45 AM	0	3	32	0	35	4	133	1	0	138	3	5	3	0	11	18	127	5	0	150	334
Total	1	16	65	2	84	11	406	4	2	423	24	12	10	4	50	33	358	17	5	413	970
08:00 AM	1	5	16	1	23	1	105	2	1	109	3	3	3	0	9	11	99	2	0	112	253
08:15 AM	1	2	14	0	17	0	111	2	0	113	2	4	3	0	9	10	95	0	0	105	244
08:30 AM	2	6	15	0	23	2	103	2	0	107	6	0	2	0	8	9	74	3	0	86	224
08:45 AM	2	4	7	2	15	5	92	3	1	101	5	2	1	1	9	7	101	3	1	112	237
Total	6	17	52	3	78	8	411	9	2	430	16	9	9	1	35	37	369	8	1	415	958
Grand Total	7	33	117	5	162	19	817	13	4	853	40	21	19	5	85	70	727	25	6	828	1928
Apprch %	4.3	20.4	72.2	3.1		2.2	95.8	1.5	0.5		47.1	24.7	22.4	5.9		8.5	87.8	3	0.7		
Total %	0.4	1.7	6.1	0.3	8.4	1	42.4	0.7	0.2	44.2	2.1	1.1	1	0.3	4.4	3.6	37.7	1.3	0.3	42.9	
cars	7	32	113	5	157	19	795	13	4	831	39	20	18	5	82	67	712	19	6	804	1874
% cars	100	97	96.6	100	96.9	100	97.3	100	100	97.4	97.5	95.2	94.7	100	96.5	95.7	97.9	76	100	97.1	97.2
HV	0	1	4	0	5	0	22	0	0	22	1	1	1	0	3	3	15	6	0	24	54
% HV	0	3	3.4	0	3.1	0	2.7	0	0	2.6	2.5	4.8	5.3	0	3.5	4.3	2.1	24	0	2.9	2.8

	Lowrys Lane Southbound				Conestoga Road Westbound				Strathmore Drive Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	**5**	19	24	**4**	98	0	102	**5**	2	**3**	10	7	94	**7**	108	244
07:45 AM	0	3	**32**	**35**	4	**133**	1	**138**	3	**5**	3	**11**	**18**	**127**	5	**150**	**334**
08:00 AM	**1**	5	16	22	1	105	**2**	108	3	3	3	9	11	99	2	112	251
08:15 AM	1	2	14	17	0	111	2	113	2	4	3	9	10	95	0	105	244
Total Volume	2	15	81	98	9	447	5	461	13	14	12	39	46	415	14	475	1073
% App. Total	2	15.3	82.7		2	97	1.1		33.3	35.9	30.8		9.7	87.4	2.9		
PHF	.500	.750	.633	.700	.563	.840	.625	.835	.650	.700	1.00	.886	.639	.817	.500	.792	.803
cars	2	14	79	95	9	435	5	449	12	13	12	37	45	406	10	461	1042
% cars	100	93.3	97.5	96.9	100	97.3	100	97.4	92.3	92.9	100	94.9	97.8	97.8	71.4	97.1	97.1
HV	0	1	2	3	0	12	0	12	1	1	0	2	1	9	4	14	31
% HV	0	6.7	2.5	3.1	0	2.7	0	2.6	7.7	7.1	0	5.1	2.2	2.2	28.6	2.9	2.9

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Lowrys Lane/Strathmore Drive

File Name : 08-ConLowAM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Lowrys Lane Southbound					Conestoga Road Westbound					Strathmore Drive Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	0	3	0	0	3	6
07:15 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	0	1	0	2	5
07:30 AM	0	0	1	0	1	0	4	0	0	4	0	0	0	0	0	0	4	3	0	7	12
07:45 AM	0	1	0	0	1	0	4	0	0	4	0	0	0	0	0	0	3	0	0	3	8
Total	0	1	1	0	2	0	13	0	0	13	0	0	1	0	1	1	10	4	0	15	31
08:00 AM	0	0	1	0	1	0	4	0	0	4	1	0	0	0	1	1	1	1	0	3	9
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
08:30 AM	0	0	2	0	2	0	2	0	0	2	0	0	0	0	0	1	1	1	0	3	7
08:45 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	5
Total	0	0	3	0	3	0	9	0	0	9	1	1	0	0	2	2	5	2	0	9	23
Grand Total	0	1	4	0	5	0	22	0	0	22	1	1	1	0	3	3	15	6	0	24	54
Apprch %	0	20	80	0		0	100	0	0		33.3	33.3	33.3	0		12.5	62.5	25	0		
Total %	0	1.9	7.4	0	9.3	0	40.7	0	0	40.7	1.9	1.9	1.9	0	5.6	5.6	27.8	11.1	0	44.4	

	Lowrys Lane Southbound				Conestoga Road Westbound				Strathmore Drive Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	**1**	**1**	0	**4**	0	**4**	0	0	0	0	0	**4**	**3**	**7**	**12**
07:45 AM	0	**1**	0	1	0	4	0	4	0	0	0	0	0	3	0	3	8
08:00 AM	0	0	1	1	0	4	0	4	**1**	0	0	**1**	**1**	1	1	3	9
08:15 AM	0	0	0	0	0	0	0	0	0	**1**	0	1	0	1	0	1	2
Total Volume	0	1	2	3	0	12	0	12	1	1	0	2	1	9	4	14	31
% App. Total	0	33.3	66.7		0	100	0		50	50	0		7.1	64.3	28.6		
PHF	.000	.250	.500	.750	.000	.750	.000	.750	.250	.250	.000	.500	.250	.563	.333	.500	.646

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Garrett Avenue/
Williams Road

File Name : 09-ConGarAM
Site Code : 21102701
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Garrett Avenue Southbound					Conestoga Road Westbound					Williams Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	0	5	1	7	0	63	1	3	67	3	1	0	0	4	3	62	1	0	66	144
07:15 AM	6	2	5	2	15	0	102	2	0	104	4	2	2	0	8	3	87	0	0	90	217
07:30 AM	5	1	7	0	13	3	98	1	2	104	2	2	3	3	10	1	102	0	0	103	230
07:45 AM	3	2	7	0	12	0	116	1	1	118	2	1	2	0	5	11	125	0	1	137	272
Total	15	5	24	3	47	3	379	5	6	393	11	6	7	3	27	18	376	1	1	396	863
08:00 AM	3	0	13	1	17	1	94	1	1	97	1	1	2	1	5	5	110	0	0	115	234
08:15 AM	4	0	10	0	14	0	102	1	1	104	1	2	2	0	5	8	94	1	2	105	228
08:30 AM	7	1	2	0	10	1	91	1	0	93	1	4	4	1	10	7	80	0	1	88	201
08:45 AM	7	1	5	0	13	1	92	5	0	98	2	1	1	1	5	7	106	2	0	115	231
Total	21	2	30	1	54	3	379	8	2	392	5	8	9	3	25	27	390	3	3	423	894
Grand Total	36	7	54	4	101	6	758	13	8	785	16	14	16	6	52	45	766	4	4	819	1757
Apprch %	35.6	6.9	53.5	4		0.8	96.6	1.7	1		30.8	26.9	30.8	11.5		5.5	93.5	0.5	0.5		
Total %	2	0.4	3.1	0.2	5.7	0.3	43.1	0.7	0.5	44.7	0.9	0.8	0.9	0.3	3	2.6	43.6	0.2	0.2	46.6	
cars	36	7	54	4	101	6	758	13	8	785	16	14	16	6	52	45	766	4	4	819	1757
% cars	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Garrett Avenue Southbound				Conestoga Road Westbound				Williams Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**5**	1	7	13	**3**	98	**1**	102	**2**	**2**	**3**	**7**	1	102	0	103	225
07:45 AM	3	**2**	7	12	0	**116**	1	**117**	2	1	2	5	**11**	**125**	0	**136**	**270**
08:00 AM	3	0	**13**	**16**	1	94	1	96	1	1	2	4	5	110	0	115	231
08:15 AM	4	0	10	14	0	102	1	103	1	2	2	5	8	94	**1**	103	225
Total Volume	15	3	37	55	4	410	4	418	6	6	9	21	25	431	1	457	951
% App. Total	27.3	5.5	67.3		1	98.1	1		28.6	28.6	42.9		5.5	94.3	0.2		
PHF	.750	.375	.712	.859	.333	.884	1.00	.893	.750	.750	.750	.750	.568	.862	.250	.840	.881
cars	15	3	37	55	4	410	4	418	6	6	9	21	25	431	1	457	951
% cars	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Garrett Avenue/
Williams Road

File Name : 09-ConGarAM
Site Code : 21102701
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Garrett Avenue Southbound					Conestoga Road Westbound					Williams Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

	Garrett Avenue Southbound				Conestoga Road Westbound				Williams Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Spring Mill and County Line Roads

File Name : 10-SpMCoLAM
Site Code : 00000000
Start Date : 11/13/2012
Page No : 1

Groups Printed- cars - HV

	County Line Road Southbound					Spring Mill Road Westbound					County Line Road Northbound					Spring Mill Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	3	18	17	0	38	7	47	5	0	59	11	16	3	0	30	4	46	10	0	60	187
07:15 AM	6	36	12	0	54	14	55	5	0	74	11	29	7	0	47	11	53	13	0	77	252
07:30 AM	9	70	13	0	92	16	72	23	0	111	9	41	7	0	57	6	80	14	0	100	360
07:45 AM	13	78	11	0	102	13	54	15	0	82	9	54	16	0	79	11	61	19	0	91	354
Total	31	202	53	0	286	50	228	48	0	326	40	140	33	0	213	32	240	56	0	328	1153
08:00 AM	7	84	13	0	104	17	51	24	0	92	10	87	9	0	106	6	71	12	0	89	391
08:15 AM	3	90	15	0	108	15	83	14	0	112	12	63	12	0	87	11	62	14	0	87	394
08:30 AM	9	49	16	0	74	8	45	15	0	68	11	62	8	0	81	15	70	13	0	98	321
08:45 AM	6	66	20	0	92	12	47	13	0	72	8	53	7	0	68	15	49	12	0	76	308
Total	25	289	64	0	378	52	226	66	0	344	41	265	36	0	342	47	252	51	0	350	1414
Grand Total	56	491	117	0	664	102	454	114	0	670	81	405	69	0	555	79	492	107	0	678	2567
Apprch %	8.4	73.9	17.6	0		15.2	67.8	17	0		14.6	73	12.4	0		11.7	72.6	15.8	0		
Total %	2.2	19.1	4.6	0	25.9	4	17.7	4.4	0	26.1	3.2	15.8	2.7	0	21.6	3.1	19.2	4.2	0	26.4	
cars	54	480	105	0	639	101	430	110	0	641	77	397	66	0	540	70	473	102	0	645	2465
% cars	96.4	97.8	89.7	0	96.2	99	94.7	96.5	0	95.7	95.1	98	95.7	0	97.3	88.6	96.1	95.3	0	95.1	96
HV	2	11	12	0	25	1	24	4	0	29	4	8	3	0	15	9	19	5	0	33	102
% HV	3.6	2.2	10.3	0	3.8	1	5.3	3.5	0	4.3	4.9	2	4.3	0	2.7	11.4	3.9	4.7	0	4.9	4

	County Line Road Southbound				Spring Mill Road Westbound				County Line Road Northbound				Spring Mill Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	9	70	13	92	16	72	23	111	9	41	7	57	6	**80**	14	**100**	360
07:45 AM	**13**	78	11	102	13	54	15	82	9	54	**16**	79	**11**	61	**19**	91	354
08:00 AM	7	84	13	104	**17**	51	**24**	92	10	**87**	9	**106**	6	71	12	89	391
08:15 AM	3	**90**	**15**	**108**	15	**83**	14	**112**	**12**	63	12	87	11	62	14	87	**394**
Total Volume	32	322	52	406	61	260	76	397	40	245	44	329	34	274	59	367	1499
% App. Total	7.9	79.3	12.8		15.4	65.5	19.1		12.2	74.5	13.4		9.3	74.7	16.1		
PHF	.615	.894	.867	.940	.897	.783	.792	.886	.833	.704	.688	.776	.773	.856	.776	.918	.951
cars	31	317	47	395	60	246	75	381	37	239	42	318	30	263	58	351	1445
% cars	96.9	98.4	90.4	97.3	98.4	94.6	98.7	96.0	92.5	97.6	95.5	96.7	88.2	96.0	98.3	95.6	96.4
HV	1	5	5	11	1	14	1	16	3	6	2	11	4	11	1	16	54
% HV	3.1	1.6	9.6	2.7	1.6	5.4	1.3	4.0	7.5	2.4	4.5	3.3	11.8	4.0	1.7	4.4	3.6

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Spring Mill and County Line Roads

File Name : 10-SpMCoLAM
Site Code : 00000000
Start Date : 11/13/2012
Page No : 1

Groups Printed- HV

	County Line Road Southbound					Spring Mill Road Westbound					County Line Road Northbound					Spring Mill Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	1	0	1	0	1	1	0	2	1	0	0	0	1	1	1	1	0	3	7
07:15 AM	0	1	3	0	4	0	4	1	0	5	0	0	0	0	0	0	3	2	0	5	14
07:30 AM	0	3	1	0	4	0	2	1	0	3	1	2	0	0	3	2	3	0	0	5	15
07:45 AM	1	0	2	0	3	0	8	0	0	8	1	2	1	0	4	1	0	1	0	2	17
Total	1	4	7	0	12	0	15	3	0	18	3	4	1	0	8	4	7	4	0	15	53
08:00 AM	0	1	0	0	1	1	3	0	0	4	0	0	0	0	0	0	2	0	0	2	7
08:15 AM	0	1	2	0	3	0	1	0	0	1	1	2	1	0	4	1	6	0	0	7	15
08:30 AM	1	3	2	0	6	0	1	1	0	2	0	0	0	0	0	1	3	0	0	4	12
08:45 AM	0	2	1	0	3	0	4	0	0	4	0	2	1	0	3	3	1	1	0	5	15
Total	1	7	5	0	13	1	9	1	0	11	1	4	2	0	7	5	12	1	0	18	49
Grand Total	2	11	12	0	25	1	24	4	0	29	4	8	3	0	15	9	19	5	0	33	102
Apprch %	8	44	48	0		3.4	82.8	13.8	0		26.7	53.3	20	0		27.3	57.6	15.2	0		
Total %	2	10.8	11.8	0	24.5	1	23.5	3.9	0	28.4	3.9	7.8	2.9	0	14.7	8.8	18.6	4.9	0	32.4	

	County Line Road Southbound				Spring Mill Road Westbound				County Line Road Northbound				Spring Mill Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	**3**	1	**4**	0	2	**1**	3	**1**	**2**	0	3	**2**	3	0	5	15
07:45 AM	**1**	0	**2**	3	0	**8**	0	**8**	1	2	**1**	**4**	1	0	**1**	2	**17**
08:00 AM	0	1	0	1	**1**	3	0	4	0	0	0	0	0	2	0	2	7
08:15 AM	0	1	2	3	0	1	0	1	1	2	1	4	1	**6**	0	**7**	15
Total Volume	1	5	5	11	1	14	1	16	3	6	2	11	4	11	1	16	54
% App. Total	9.1	45.5	45.5		6.2	87.5	6.2		27.3	54.5	18.2		25	68.8	6.2		
PHF	.250	.417	.625	.688	.250	.438	.250	.500	.750	.750	.500	.688	.500	.458	.250	.571	.794

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan Avenue & County Line Road N

File Name : 11-IthCoLNAM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound				Ithan Avenue Northbound				County Line Road Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
07:00 AM	15	2	2	19	37	11	0	48	16	24	0	40	107
07:15 AM	26	12	0	38	38	11	0	49	18	34	0	52	139
07:30 AM	35	18	0	53	73	30	0	103	42	60	0	102	258
07:45 AM	44	19	0	63	89	33	0	122	58	73	0	131	316
Total	120	51	2	173	237	85	0	322	134	191	0	325	820
08:00 AM	34	25	0	59	84	27	0	111	37	70	1	108	278
08:15 AM	39	37	0	76	92	18	0	110	27	90	1	118	304
08:30 AM	29	29	0	58	77	17	0	94	25	63	0	88	240
08:45 AM	19	30	0	49	74	13	0	87	36	50	2	88	224
Total	121	121	0	242	327	75	0	402	125	273	4	402	1046
Grand Total	241	172	2	415	564	160	0	724	259	464	4	727	1866
Apprch %	58.1	41.4	0.5		77.9	22.1	0		35.6	63.8	0.6		
Total %	12.9	9.2	0.1	22.2	30.2	8.6	0	38.8	13.9	24.9	0.2	39	
cars	235	167	2	404	554	160	0	714	255	449	4	708	1826
% cars	97.5	97.1	100	97.3	98.2	100	0	98.6	98.5	96.8	100	97.4	97.9
HV	6	5	0	11	10	0	0	10	4	15	0	19	40
% HV	2.5	2.9	0	2.7	1.8	0	0	1.4	1.5	3.2	0	2.6	2.1

	Ithan Avenue Southbound			Ithan Avenue Northbound			County Line Road Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	35	18	53	73	30	103	42	60	102	258
07:45 AM	**44**	19	63	89	**33**	**122**	**58**	73	**131**	**316**
08:00 AM	34	25	59	84	27	111	37	70	107	277
08:15 AM	39	**37**	**76**	**92**	18	110	27	**90**	117	303
Total Volume	152	99	251	338	108	446	164	293	457	1154
% App. Total	60.6	39.4		75.8	24.2		35.9	64.1		
PHF	.864	.669	.826	.918	.818	.914	.707	.814	.872	.913
cars	148	95	243	331	108	439	160	286	446	1128
% cars	97.4	96.0	96.8	97.9	100	98.4	97.6	97.6	97.6	97.7
HV	4	4	8	7	0	7	4	7	11	26
% HV	2.6	4.0	3.2	2.1	0	1.6	2.4	2.4	2.4	2.3

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan Avenue & County Line Road N

File Name : 11-IthCoLNAM
Site Code : 00000000
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Groups Printed- HV

	Ithan Avenue Southbound				Ithan Avenue Northbound				County Line Road Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
07:00 AM	1	0	0	1	0	0	0	0	0	1	0	1	2
07:15 AM	0	0	0	0	0	0	0	0	0	3	0	3	3
07:30 AM	3	1	0	4	4	0	0	4	2	1	0	3	11
07:45 AM	0	0	0	0	0	0	0	0	1	1	0	2	2
Total	4	1	0	5	4	0	0	4	3	6	0	9	18
08:00 AM	0	1	0	1	2	0	0	2	0	2	0	2	5
08:15 AM	1	2	0	3	1	0	0	1	1	3	0	4	8
08:30 AM	0	1	0	1	2	0	0	2	0	3	0	3	6
08:45 AM	1	0	0	1	1	0	0	1	0	1	0	1	3
Total	2	4	0	6	6	0	0	6	1	9	0	10	22
Grand Total	6	5	0	11	10	0	0	10	4	15	0	19	40
Apprch %	54.5	45.5	0		100	0	0		21.1	78.9	0		
Total %	15	12.5	0	27.5	25	0	0	25	10	37.5	0	47.5	

	Ithan Avenue Southbound			Ithan Avenue Northbound			County Line Road Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	**3**	1	**4**	**4**	0	**4**	**2**	1	3	**11**
07:45 AM	0	0	0	0	0	0	1	1	2	2
08:00 AM	0	1	1	2	0	2	0	2	2	5
08:15 AM	1	**2**	3	1	0	1	1	**3**	**4**	8
Total Volume	4	4	8	7	0	7	4	7	11	26
% App. Total	50	50		100	0		36.4	63.6		
PHF	.333	.500	.500	.438	.000	.438	.500	.583	.688	.591

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan Avenue & County Line Road S

File Name : 12-IthCoLSAM
Site Code : 00000000
Start Date : 11/15/2012
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Groups Printed- cars - HV

	Ithan Avenue Southbound				County Line Road Westbound				Ithan Avenue Northbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	10	25	0	35	0	34	0	34	25	5	0	30	99
07:15 AM	19	41	0	60	8	35	0	43	24	0	0	24	127
07:30 AM	35	65	0	100	7	55	0	62	52	4	0	56	218
07:45 AM	39	91	0	130	4	64	0	68	54	4	0	58	256
Total	103	222	0	325	19	188	0	207	155	13	0	168	700
08:00 AM	33	77	0	110	13	54	0	67	56	2	0	58	235
08:15 AM	31	95	0	126	13	77	0	90	37	5	0	42	258
08:30 AM	34	57	0	91	6	55	0	61	39	5	0	44	196
08:45 AM	30	44	0	74	14	60	0	74	30	1	0	31	179
Total	128	273	0	401	46	246	0	292	162	13	0	175	868
Grand Total	231	495	0	726	65	434	0	499	317	26	0	343	1568
Apprch %	31.8	68.2	0		13	87	0		92.4	7.6	0		
Total %	14.7	31.6	0	46.3	4.1	27.7	0	31.8	20.2	1.7	0	21.9	
cars	228	478	0	706	64	430	0	494	308	23	0	331	1531
% cars	98.7	96.6	0	97.2	98.5	99.1	0	99	97.2	88.5	0	96.5	97.6
HV	3	17	0	20	1	4	0	5	9	3	0	12	37
% HV	1.3	3.4	0	2.8	1.5	0.9	0	1	2.8	11.5	0	3.5	2.4

	Ithan Avenue Southbound			County Line Road Westbound			Ithan Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	35	65	100	7	55	62	52	4	56	218
07:45 AM	**39**	91	**130**	4	64	68	54	4	**58**	256
08:00 AM	33	77	110	**13**	54	67	**56**	2	58	235
08:15 AM	31	**95**	126	13	**77**	**90**	37	**5**	42	**258**
Total Volume	138	328	466	37	250	287	199	15	214	967
% App. Total	29.6	70.4		12.9	87.1		93	7		
PHF	.885	.863	.896	.712	.812	.797	.888	.750	.922	.937
cars	136	319	455	36	248	284	194	14	208	947
% cars	98.6	97.3	97.6	97.3	99.2	99.0	97.5	93.3	97.2	97.9
HV	2	9	11	1	2	3	5	1	6	20
% HV	1.4	2.7	2.4	2.7	0.8	1.0	2.5	6.7	2.8	2.1

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan Avenue & County Line Road S

File Name : 12-IthCoLSAM
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Groups Printed- HV

	Ithan Avenue Southbound				County Line Road Westbound				Ithan Avenue Northbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	0	0	1	0	0	0	0	0	1	0	1	2
07:15 AM	0	3	0	3	0	0	0	0	2	0	0	2	5
07:30 AM	0	4	0	4	0	2	0	2	2	1	0	3	9
07:45 AM	1	0	0	1	0	0	0	0	0	0	0	0	1
Total	2	7	0	9	0	2	0	2	4	2	0	6	17
08:00 AM	0	2	0	2	0	0	0	0	2	0	0	2	4
08:15 AM	1	3	0	4	1	0	0	1	1	0	0	1	6
08:30 AM	0	4	0	4	0	1	0	1	1	1	0	2	7
08:45 AM	0	1	0	1	0	1	0	1	1	0	0	1	3
Total	1	10	0	11	1	2	0	3	5	1	0	6	20
Grand Total	3	17	0	20	1	4	0	5	9	3	0	12	37
Apprch %	15	85	0		20	80	0		75	25	0		
Total %	8.1	45.9	0	54.1	2.7	10.8	0	13.5	24.3	8.1	0	32.4	

	Ithan Avenue Southbound			County Line Road Westbound			Ithan Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	**4**	**4**	0	**2**	**2**	**2**	**1**	**3**	**9**
07:45 AM	**1**	0	1	0	0	0	0	0	0	1
08:00 AM	0	2	2	0	0	0	2	0	2	4
08:15 AM	1	3	4	**1**	0	1	1	0	1	6
Total Volume	2	9	11	1	2	3	5	1	6	20
% App. Total	18.2	81.8		33.3	66.7		83.3	16.7		
PHF	.500	.563	.688	.250	.250	.375	.625	.250	.500	.556

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line Road & Lowrys Lane

File Name : 13-CoLLowAM
Site Code : 21102791
Start Date : 11/13/2012
Page No : 1

Groups Printed- cars - HV

	County Line Road Southbound				County Line Road Northbound				Lowrys Lane Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
07:00 AM	19	0	1	20	2	21	0	23	7	6	1	14	57
07:15 AM	20	2	0	22	3	38	0	41	4	8	1	13	76
07:30 AM	32	9	1	42	11	33	0	44	12	19	1	32	118
07:45 AM	39	5	0	44	22	59	0	81	11	30	0	41	166
Total	110	16	2	128	38	151	0	189	34	63	3	100	417
08:00 AM	42	6	0	48	17	72	0	89	19	19	0	38	175
08:15 AM	34	10	0	44	7	69	0	76	18	11	1	30	150
08:30 AM	34	5	0	39	9	58	0	67	11	9	1	21	127
08:45 AM	19	11	0	30	5	61	0	66	13	11	3	27	123
Total	129	32	0	161	38	260	0	298	61	50	5	116	575
Grand Total	239	48	2	289	76	411	0	487	95	113	8	216	992
Apprch %	82.7	16.6	0.7		15.6	84.4	0		44	52.3	3.7		
Total %	24.1	4.8	0.2	29.1	7.7	41.4	0	49.1	9.6	11.4	0.8	21.8	
cars	239	48	2	289	76	411	0	487	95	113	8	216	992
% cars	100	100	100	100	100	100	0	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0

	County Line Road Southbound			County Line Road Northbound			Lowrys Lane Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	32	9	41	11	33	44	12	19	31	116
07:45 AM	39	5	44	**22**	59	81	11	**30**	**41**	166
08:00 AM	**42**	6	**48**	17	**72**	**89**	**19**	19	38	**175**
08:15 AM	34	**10**	44	7	69	76	18	11	29	149
Total Volume	147	30	177	57	233	290	60	79	139	606
% App. Total	83.1	16.9		19.7	80.3		43.2	56.8		
PHF	.875	.750	.922	.648	.809	.815	.789	.658	.848	.866
cars	147	30	177	57	233	290	60	79	139	606
% cars	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line Road & Lowrys Lane

File Name : 13-CoLLowAM
Site Code : 21102791
Start Date : 11/13/2012
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Groups Printed- HV

	County Line Road Southbound				County Line Road Northbound				Lowrys Lane Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		
Total %													

	County Line Road Southbound			County Line Road Northbound			Lowrys Lane Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line & Airdale Roads

File Name : 14-CoLAirAM
Site Code : 00000000
Start Date : 11/13/2012
Page No : 1

Groups Printed- cars - HV

	Airdale Road Southbound				County Line Road Westbound				Airdale Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
07:00 AM	2	14	1	17	42	2	0	44	20	54	0	74	135
07:15 AM	2	20	2	24	43	3	0	46	31	53	0	84	154
07:30 AM	3	24	2	29	57	3	0	60	28	76	0	104	193
07:45 AM	4	23	4	31	85	7	0	92	58	56	1	115	238
Total	11	81	9	101	227	15	0	242	137	239	1	377	720
08:00 AM	4	27	3	34	73	6	2	81	51	41	0	92	207
08:15 AM	4	22	9	35	67	4	0	71	62	43	1	106	212
08:30 AM	2	28	3	33	56	2	0	58	50	74	0	124	215
08:45 AM	1	18	6	25	70	3	5	78	53	51	0	104	207
Total	11	95	21	127	266	15	7	288	216	209	1	426	841
Grand Total	22	176	30	228	493	30	7	530	353	448	2	803	1561
Apprch %	9.6	77.2	13.2		93	5.7	1.3		44	55.8	0.2		
Total %	1.4	11.3	1.9	14.6	31.6	1.9	0.4	34	22.6	28.7	0.1	51.4	
cars	19	176	30	225	479	28	7	514	350	444	2	796	1535
% cars	86.4	100	100	98.7	97.2	93.3	100	97	99.2	99.1	100	99.1	98.3
HV	3	0	0	3	14	2	0	16	3	4	0	7	26
% HV	13.6	0	0	1.3	2.8	6.7	0	3	0.8	0.9	0	0.9	1.7

	Airdale Road Southbound			County Line Road Westbound			Airdale Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	3	24	27	57	3	60	28	**76**	104	191
07:45 AM	**4**	23	27	**85**	**7**	**92**	58	56	**114**	**233**
08:00 AM	4	**27**	**31**	73	6	79	51	41	92	202
08:15 AM	4	22	26	67	4	71	**62**	43	105	202
Total Volume	15	96	111	282	20	302	199	216	415	828
% App. Total	13.5	86.5		93.4	6.6		48	52		
PHF	.938	.889	.895	.829	.714	.821	.802	.711	.910	.888
cars	13	96	109	276	19	295	197	215	412	816
% cars	86.7	100	98.2	97.9	95.0	97.7	99.0	99.5	99.3	98.6
HV	2	0	2	6	1	7	2	1	3	12
% HV	13.3	0	1.8	2.1	5.0	2.3	1.0	0.5	0.7	1.4

F. Tavani and Associates, Inc.
105 Kenilworth Street
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County Line & Airdale Roads

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Groups Printed- HV

	Airdale Road Southbound				County Line Road Westbound				Airdale Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
07:00 AM	1	0	0	1	1	0	0	1	0	1	0	1	3
07:15 AM	0	0	0	0	1	0	0	1	0	0	0	0	1
07:30 AM	0	0	0	0	3	1	0	4	1	0	0	1	5
07:45 AM	2	0	0	2	1	0	0	1	1	1	0	2	5
Total	3	0	0	3	6	1	0	7	2	2	0	4	14
08:00 AM	0	0	0	0	2	0	0	2	0	0	0	0	2
08:30 AM	0	0	0	0	1	0	0	1	0	1	0	1	2
08:45 AM	0	0	0	0	5	1	0	6	1	1	0	2	8
Total	0	0	0	0	8	1	0	9	1	2	0	3	12
Grand Total	3	0	0	3	14	2	0	16	3	4	0	7	26
Apprch %	100	0	0		87.5	12.5	0		42.9	57.1	0		
Total %	11.5	0	0	11.5	53.8	7.7	0	61.5	11.5	15.4	0	26.9	

	Airdale Road Southbound			County Line Road Westbound			Airdale Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	0	0	**3**	**1**	**4**	**1**	0	1	**5**
07:45 AM	**2**	0	**2**	1	0	1	1	**1**	**2**	5
08:00 AM	0	0	0	2	0	2	0	0	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	2	0	2	6	1	7	2	1	3	12
% App. Total	100	0		85.7	14.3		66.7	33.3		
PHF	.250	.000	.250	.500	.250	.438	.500	.250	.375	.600

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line & Roberts Roads

File Name : 15-CoLRobAM
Site Code : 00000000
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Groups Printed- cars - HV

	County Line Road Southbound					Roberts Road Westbound					County Line Road Northbound					Roberts Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	70	0	0	71	1	1	2	0	4	0	129	1	0	130	11	4	0	0	15	220
07:15 AM	1	83	4	3	91	1	3	0	1	5	0	124	2	0	126	11	4	1	0	16	238
07:30 AM	0	110	10	1	121	0	3	0	0	3	1	141	10	0	152	13	14	3	1	31	307
07:45 AM	5	119	11	2	137	0	5	4	1	10	3	143	2	0	148	14	30	1	0	45	340
Total	7	382	25	6	420	2	12	6	2	22	4	537	15	0	556	49	52	5	1	107	1105
08:00 AM	1	124	9	0	134	2	5	0	1	8	6	132	6	1	145	18	28	0	1	47	334
08:15 AM	2	111	7	1	121	0	10	2	1	13	4	191	7	0	202	21	26	4	0	51	387
08:30 AM	4	107	11	0	122	1	5	1	0	7	0	146	10	2	158	13	12	0	0	25	312
08:45 AM	0	136	7	1	144	0	7	4	0	11	0	153	15	0	168	14	10	0	1	25	348
Total	7	478	34	2	521	3	27	7	2	39	10	622	38	3	673	66	76	4	2	148	1381
Grand Total	14	860	59	8	941	5	39	13	4	61	14	1159	53	3	1229	115	128	9	3	255	2486
Apprch %	1.5	91.4	6.3	0.9		8.2	63.9	21.3	6.6		1.1	94.3	4.3	0.2		45.1	50.2	3.5	1.2		
Total %	0.6	34.6	2.4	0.3	37.9	0.2	1.6	0.5	0.2	2.5	0.6	46.6	2.1	0.1	49.4	4.6	5.1	0.4	0.1	10.3	
cars	14	813	57	8	892	5	37	13	4	59	14	1150	51	3	1218	114	128	9	3	254	2423
% cars	100	94.5	96.6	100	94.8	100	94.9	100	100	96.7	100	99.2	96.2	100	99.1	99.1	100	100	100	99.6	97.5
HV	0	47	2	0	49	0	2	0	0	2	0	9	2	0	11	1	0	0	0	1	63
% HV	0	5.5	3.4	0	5.2	0	5.1	0	0	3.3	0	0.8	3.8	0	0.9	0.9	0	0	0	0.4	2.5

	County Line Road Southbound				Roberts Road Westbound				County Line Road Northbound				Roberts Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	110	10	120	0	3	0	3	1	141	**10**	152	13	14	3	30	305
07:45 AM	**5**	119	**11**	**135**	0	5	**4**	9	3	143	2	148	14	**30**	1	45	337
08:00 AM	1	**124**	9	134	**2**	5	0	7	**6**	132	6	144	18	28	0	46	331
08:15 AM	2	111	7	120	0	**10**	2	**12**	4	**191**	7	**202**	**21**	26	**4**	**51**	**385**
Total Volume	8	464	37	509	2	23	6	31	14	607	25	646	66	98	8	172	1358
% App. Total	1.6	91.2	7.3		6.5	74.2	19.4		2.2	94	3.9		38.4	57	4.7		
PHF	.400	.935	.841	.943	.250	.575	.375	.646	.583	.795	.625	.800	.786	.817	.500	.843	.882
cars	8	442	35	485	2	23	6	31	14	603	23	640	66	98	8	172	1328
% cars	100	95.3	94.6	95.3	100	100	100	100	100	99.3	92.0	99.1	100	100	100	100	97.8
HV	0	22	2	24	0	0	0	0	0	4	2	6	0	0	0	0	30
% HV	0	4.7	5.4	4.7	0	0	0	0	0	0.7	8.0	0.9	0	0	0	0	2.2

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line & Roberts Roads

File Name : 15-CoLRobAM
Site Code : 00000000
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Groups Printed- HV

	County Line Road Southbound					Roberts Road Westbound					County Line Road Northbound					Roberts Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	5	0	0	5	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	7
07:15 AM	0	6	0	0	6	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	7
07:30 AM	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
07:45 AM	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Total	0	21	0	0	21	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	24
08:00 AM	0	5	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
08:15 AM	0	7	1	0	8	0	0	0	0	0	0	4	2	0	6	0	0	0	0	0	14
08:30 AM	0	5	0	0	5	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	6
08:45 AM	0	9	0	0	9	0	1	0	0	1	0	2	0	0	2	1	0	0	0	1	13
Total	0	26	2	0	28	0	1	0	0	1	0	7	2	0	9	1	0	0	0	1	39
Grand Total	0	47	2	0	49	0	2	0	0	2	0	9	2	0	11	1	0	0	0	1	63
Apprch %	0	95.9	4.1	0		0	100	0	0		0	81.8	18.2	0		100	0	0	0		
Total %	0	74.6	3.2	0	77.8	0	3.2	0	0	3.2	0	14.3	3.2	0	17.5	1.6	0	0	0	1.6	

	County Line Road Southbound				Roberts Road Westbound				County Line Road Northbound				Roberts Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
07:45 AM	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
08:00 AM	0	5	**1**	6	0	0	0	0	0	0	0	0	0	0	0	0	6
08:15 AM	0	**7**	1	**8**	0	0	0	0	0	**4**	**2**	**6**	0	0	0	0	**14**
Total Volume	0	22	2	24	0	0	0	0	0	4	2	6	0	0	0	0	30
% App. Total	0	91.7	8.3		0	0	0		0	66.7	33.3		0	0	0		
PHF	.000	.786	.500	.750	.000	.000	.000	.000	.000	.250	.250	.250	.000	.000	.000	.000	.536

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan & Aldwyn Lanes

File Name : 16-IthAldAM
Site Code : 00000000
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Groups Printed- cars - HV

	Ithan Avenue Southbound					South Campus Westbound					Ithan Avenue Northbound					Aldwyn Lane Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	9	1	4	15	0	0	0	3	3	7	21	1	0	29	0	0	6	0	6	53
07:15 AM	3	37	0	0	40	2	0	3	1	6	13	33	2	0	48	5	0	13	0	18	112
07:30 AM	6	51	2	1	60	2	0	1	2	5	1	67	2	0	70	5	0	21	0	26	161
07:45 AM	5	68	0	5	78	2	0	6	5	13	4	96	1	1	102	5	0	20	1	26	219
Total	15	165	3	10	193	6	0	10	11	27	25	217	6	1	249	15	0	60	1	76	545
08:00 AM	4	26	1	80	111	2	1	1	2	6	0	103	2	2	107	5	0	10	1	16	240
08:15 AM	1	44	0	115	160	1	0	4	0	5	4	85	4	0	93	1	0	8	0	9	267
08:30 AM	6	23	0	9	38	2	0	6	3	11	6	56	1	0	63	1	0	3	1	5	117
08:45 AM	7	19	0	16	42	1	0	4	5	10	1	45	1	3	50	3	0	3	0	6	108
Total	18	112	1	220	351	6	1	15	10	32	11	289	8	5	313	10	0	24	2	36	732
Grand Total	33	277	4	230	544	12	1	25	21	59	36	506	14	6	562	25	0	84	3	112	1277
Apprch %	6.1	50.9	0.7	42.3		20.3	1.7	42.4	35.6		6.4	90	2.5	1.1		22.3	0	75	2.7		
Total %	2.6	21.7	0.3	18	42.6	0.9	0.1	2	1.6	4.6	2.8	39.6	1.1	0.5	44	2	0	6.6	0.2	8.8	
cars	30	267	4	230	531	11	1	21	21	54	28	496	13	6	543	25	0	78	3	106	1234
% cars	90.9	96.4	100	100	97.6	91.7	100	84	100	91.5	77.8	98	92.9	100	96.6	100	0	92.9	100	94.6	96.6
HV	3	10	0	0	13	1	0	4	0	5	8	10	1	0	19	0	0	6	0	6	43
% HV	9.1	3.6	0	0	2.4	8.3	0	16	0	8.5	22.2	2	7.1	0	3.4	0	0	7.1	0	5.4	3.4

	Ithan Avenue Southbound				South Campus Westbound				Ithan Avenue Northbound				Aldwyn Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**6**	51	**2**	59	**2**	0	1	3	1	67	2	70	**5**	0	**21**	**26**	158
07:45 AM	5	**68**	0	**73**	2	0	**6**	**8**	**4**	96	1	101	5	0	20	25	**207**
08:00 AM	4	26	1	31	2	**1**	1	4	0	**103**	2	**105**	5	0	10	15	155
08:15 AM	1	44	0	45	1	0	4	5	4	85	**4**	93	1	0	8	9	152
Total Volume	16	189	3	208	7	1	12	20	9	351	9	369	16	0	59	75	672
% App. Total	7.7	90.9	1.4		35	5	60		2.4	95.1	2.4		21.3	0	78.7		
PHF	.667	.695	.375	.712	.875	.250	.500	.625	.563	.852	.563	.879	.800	.000	.702	.721	.812
cars	14	180	3	197	7	1	9	17	4	343	9	356	16	0	58	74	644
% cars	87.5	95.2	100	94.7	100	100	75.0	85.0	44.4	97.7	100	96.5	100	0	98.3	98.7	95.8
HV	2	9	0	11	0	0	3	3	5	8	0	13	0	0	1	1	28
% HV	12.5	4.8	0	5.3	0	0	25.0	15.0	55.6	2.3	0	3.5	0	0	1.7	1.3	4.2

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan & Aldwyn Lanes

File Name : 16-IthAldAM
Site Code : 00000000
Start Date : 11/15/2012
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Groups Printed- HV

	Ithan Avenue Southbound					South Campus Westbound					Ithan Avenue Northbound					Aldwyn Lane Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	2
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
07:30 AM	1	7	0	0	8	0	0	1	0	1	1	1	0	0	2	0	0	0	0	0	11
07:45 AM	0	0	0	0	0	0	0	1	0	1	1	4	0	0	5	0	0	0	0	0	6
Total	1	7	0	0	8	0	0	2	0	2	3	5	0	0	8	0	0	3	0	3	21
08:00 AM	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	3
08:15 AM	0	2	0	0	2	0	0	1	0	1	3	2	0	0	5	0	0	0	0	0	8
08:30 AM	0	1	0	0	1	1	0	0	0	1	2	2	1	0	5	0	0	1	0	1	8
08:45 AM	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	3
Total	2	3	0	0	5	1	0	2	0	3	5	5	1	0	11	0	0	3	0	3	22
Grand Total	3	10	0	0	13	1	0	4	0	5	8	10	1	0	19	0	0	6	0	6	43
Apprch %	23.1	76.9	0	0		20	0	80	0		42.1	52.6	5.3	0		0	0	100	0		
Total %	7	23.3	0	0	30.2	2.3	0	9.3	0	11.6	18.6	23.3	2.3	0	44.2	0	0	14	0	14	

	Ithan Avenue Southbound				South Campus Westbound				Ithan Avenue Northbound				Aldwyn Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**1**	**7**	0	**8**	0	0	**1**	**1**	1	1	0	2	0	0	0	0	**11**
07:45 AM	0	0	0	0	0	0	1	1	1	**4**	0	**5**	0	0	0	0	6
08:00 AM	1	0	0	1	0	0	0	0	0	1	0	1	0	0	**1**	**1**	3
08:15 AM	0	2	0	2	0	0	1	1	**3**	2	0	5	0	0	0	0	8
Total Volume	2	9	0	11	0	0	3	3	5	8	0	13	0	0	1	1	28
% App. Total	18.2	81.8	0		0	0	100		38.5	61.5	0		0	0	100		
PHF	.500	.321	.000	.344	.000	.000	.750	.750	.417	.500	.000	.650	.000	.000	.250	.250	.636

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Spring Mill/Sproul Rd
& Kenilworth Rd/Aldwyn Ln

File Name : 01-30SproulPM
Site Code : 00000000
Start Date : 11/8/2012
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Groups Printed- cars - HV

	North Spring Mill Road Southbound							Lancaster Avenue Westbound							Aldwyn Lane Northwestbound							Sproul Road Northbound							Lancaster Avenue Eastbound							Kenilworth Road Southeastbound							
Start Time	L to Lanc	L to Ald					App. Total	L to Ald	L to Spr					App. Total	L to Spr	L to Lanc					App. Total	L to Lanc	L to Ken					App. Total	L to Ken	L to S Mill					App. Total	L to S Mill	L to Lanc					App. Total	Int. Total
04:00 PM	5	1	33	59	0	2	100	1	9	238	0	4	1	253	2	7	0	1	2	0	12	63	0	34	3	0	0	100	1	43	166	8	49	0	267	0	0	0	1	2	0	3	735
04:15 PM	7	1	30	59	0	2	99	1	2	206	0	5	0	214	1	20	0	1	3	0	25	37	1	24	3	0	0	65	1	47	192	11	69	0	320	0	0	0	3	3	0	6	729
04:30 PM	8	0	32	52	0	3	95	0	5	199	0	3	0	207	1	20	0	1	3	0	25	57	1	31	7	2	0	98	0	44	169	3	60	0	276	0	0	0	0	1	0	1	702
04:45 PM	10	1	54	50	0	5	120	0	2	188	0	4	0	194	3	14	0	2	2	0	21	49	0	26	6	0	0	81	0	53	185	7	67	0	312	0	0	0	2	2	0	4	732
Total	30	3	149	220	0	12	414	2	18	831	0	16	1	868	7	61	0	5	10	0	83	206	2	115	19	2	0	344	2	187	712	29	245	0	1175	0	0	0	6	8	0	14	2898
05:00 PM	11	2	36	64	1	4	118	0	4	224	0	4	0	232	0	9	0	1	3	2	15	36	0	30	3	0	0	69	0	63	223	5	77	0	368	0	0	0	1	4	0	5	807
05:15 PM	11	2	45	70	0	2	130	1	9	206	0	8	0	224	1	15	0	2	2	0	20	61	0	26	4	0	0	91	1	45	215	7	71	0	339	1	1	0	0	3	0	5	809
05:30 PM	7	3	40	50	0	0	100	0	2	224	0	10	0	236	2	14	0	0	4	1	21	45	0	23	3	0	0	71	1	66	269	7	66	1	410	0	0	0	2	3	0	5	843
05:45 PM	9	2	42	46	0	0	99	1	7	181	0	10	0	199	4	13	0	1	1	0	19	45	0	31	10	1	0	87	2	70	258	11	62	0	403	0	0	0	0	4	0	4	811
Total	38	9	163	230	1	6	447	2	22	835	0	32	0	891	7	51	0	4	10	3	75	187	0	110	20	1	0	318	4	244	965	30	276	1	1520	1	1	0	3	14	0	19	3270
Grand Total	68	12	312	450	1	18	861	4	40	1666	0	48	1	1759	14	112	0	9	20	3	158	393	2	225	39	3	0	662	6	431	1677	59	521	1	2695	1	1	0	9	22	0	33	6168
Apprch %	7.9	1.4	36.2	52.3	0.1	2.1		0.2	2.3	94.7	0	2.7	0.1		8.9	70.9	0	5.7	12.7	1.9		59.4	0.3	34	5.9	0.5	0		0.2	16	62.2	2.2	19.3	0		3	3	0	27.3	66.7	0		
Total %	1.1	0.2	5.1	7.3	0	0.3	14	0.1	0.6	27	0	0.8	0	28.5	0.2	1.8	0	0.1	0.3	0	2.6	6.4	0	3.6	0.6	0	0	10.7	0.1	7	27.2	1	8.4	0	43.7	0	0	0	0.1	0.4	0	0.5	
cars	68	12	299	440	1	18	838	4	39	1624	0	47	1	1715	14	107	0	7	19	3	150	378	2	218	39	3	0	640	6	422	1651	59	516	1	2655	1	1	0	8	22	0	32	6030
% cars	100	100	95.8	97.8	100	100	97.3	100	97.5	97.5	0	97.9	100	97.5	100	95.5	0	77.8	95	100	94.9	96.2	100	96.9	100	100	0	96.7	100	97.9	98.4	100	99	100	98.5	100	100	0	88.9	100	0	97	97.8
HV	0	0	13	10	0	0	23	0	1	42	0	1	0	44	0	5	0	2	1	0	8	15	0	7	0	0	0	22	0	9	26	0	5	0	40	0	0	0	1	0	0	1	138
% HV	0	0	4.2	2.2	0	0	2.7	0	2.5	2.5	0	2.1	0	2.5	0	4.5	0	22.2	5	0	5.1	3.8	0	3.1	0	0	0	3.3	0	2.1	1.6	0	1	0	1.5	0	0	0	11.1	0	0	3	2.2

	North Spring Mill Road Southbound						Lancaster Avenue Westbound						Aldwyn Lane Northwestbound						Sproul Road Northbound						Lancaster Avenue Eastbound						Kenilworth Road Southeastbound						
Start Time	L to Lanc	L to Ald	T to Spr	R to Lanc	R to Ken	App. Total	L to Ald	L to Spr	T to Lanc	R to Ken	R to S Mill	App. Total	L to Spr	L to Lanc	T to Ken	R to S Mill	R to Lanc	App. Total	L to Lanc	L to Ken	T to S Mill	R to Lanc	R to Ald	App. Total	L to Ken	L to S Mill	T to Lanc	R to Ald	R to Spr	App. Total	L to S Mill	L to Lanc	T to Ald	R to Spr	R to Lanc	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																																					
Peak Hour for Entire Intersection Begins at 05:00 PM																																					
05:00 PM	**11**	**2**	36	64	**1**	114	0	4	**224**	0	4	232	0	9	0	1	3	13	36	0	30	3	0	69	0	63	223	5	**77**	368	0	0	0	1	**4**	**5**	801
05:15 PM	11	2	**45**	**70**	**0**	**128**	**1**	**9**	206	0	8	224	1	**15**	**0**	**2**	2	**20**	**61**	**0**	26	4	0	**91**	1	45	215	7	71	339	**1**	**1**	0	0	3	5	807
05:30 PM	7	**3**	40	50	0	100	0	2	224	0	**10**	**236**	2	14	0	0	**4**	20	45	0	23	3	0	71	1	66	**269**	7	66	**409**	0	0	0	**2**	3	5	**841**
05:45 PM	9	2	42	46	0	99	1	7	181	0	10	199	**4**	13	0	1	1	19	45	0	**31**	**10**	**1**	87	**2**	**70**	258	**11**	62	403	0	0	0	0	4	4	811
Total Volume	38	9	163	230	1	441	2	22	835	0	32	891	7	51	0	4	10	72	187	0	110	20	1	318	4	244	965	30	276	1519	1	1	0	3	14	19	3260
% App. Total	8.6	2	37	52.2	0.2		0.2	2.5	93.7	0	3.6		9.7	70.8	0	5.6	13.9		58.8	0	34.6	6.3	0.3		0.3	16.1	63.5	2	18.2		5.3	5.3	0	15.8	73.7		
PHF	.864	.750	.906	.821	.250	.861	.500	.611	.932	.000	.800	.944	.438	.850	.000	.500	.625	.900	.766	.000	.887	.500	.250	.874	.500	.871	.897	.682	.896	.928	.250	.250	.000	.375	.875	.950	.969
cars	38	9	160	226	1	434	2	22	817	0	31	872	7	51	0	4	9	71	186	0	109	20	1	316	4	237	955	30	274	1500	1	1	0	3	14	19	3212
% cars	100	100	98.2	98.3	100	98.4	100	100	97.8	0	96.9	97.9	100	100	0	100	90.0	98.6	99.5	0	99.1	100	100	99.4	100	97.1	99.0	100	99.3	98.7	100	100	0	100	100	100	98.5
HV	0	0	3	4	0	7	0	0	18	0	1	19	0	0	0	0	1	1	1	0	1	0	0	2	0	7	10	0	2	19	0	0	0	0	0	0	48
% HV	0	0	1.8	1.7		1.6			2.2		3.1	2.1					10.0	1.4	0.5		0.9			0.6		2.9	1.0		0.7	1.3							1.5

F. Tavani and Associates, Inc.

105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Spring Mill/Sproul Rd
& Kenilworth Rd/Aldwyn Ln

File Name : 01-30SproulPM
Site Code : 00000000
Start Date : 11/8/2012
Page No : 1

Groups Printed- HV

	North Spring Mill Road Southbound							Lancaster Avenue Westbound							Aldwyn Lane Northwestbound							Sproul Road Northbound							Lancaster Avenue Eastbound							Kenilworth Road Southeastbound							
Start Time	L to Lanc	L to Ald					App. Total	L to Ald	L to Spr					App. Total	L to Spr	L to Lanc					App. Total	L to Lanc	L to Ken					App. Total	L to Ken	L to S Mill					App. Total	L to S Mill	L to Lanc					App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0	2	0	0	0	0	2	3	0	1	0	0	0	4	0	1	1	0	0	0	2	0	0	0	1	0	0	1	19
04:15 PM	0	0	2	2	0	0	4	0	0	7	0	0	0	7	0	3	0	1	0	0	4	3	0	2	0	0	0	5	0	0	6	0	2	0	8	0	0	0	0	0	0	0	28
04:30 PM	0	0	3	0	0	0	3	0	1	3	0	0	0	4	0	0	0	1	0	0	1	6	0	0	0	0	0	6	0	1	3	0	1	0	5	0	0	0	0	0	0	0	19
04:45 PM	0	0	5	4	0	0	9	0	0	4	0	0	0	4	0	0	0	0	0	0	0	2	0	3	0	0	0	5	0	0	6	0	0	0	6	0	0	0	0	0	0	0	24
Total	0	0	10	6	0	0	16	0	1	24	0	0	0	25	0	5	0	2	0	0	7	14	0	6	0	0	0	20	0	2	16	0	3	0	21	0	0	0	1	0	0	1	90
05:00 PM	0	0	1	3	0	0	4	0	0	6	0	1	0	7	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	5	1	0	0	0	6	0	0	0	0	0	0	0	19
05:15 PM	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	4
05:30 PM	0	0	1	0	0	0	1	0	0	5	0	0	0	5	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2	4	0	2	0	8	0	0	0	0	0	0	0	15
05:45 PM	0	0	1	0	0	0	1	0	0	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	10
Total	0	0	3	4	0	0	7	0	0	18	0	1	0	19	0	0	0	0	1	0	1	1	0	1	0	0	0	2	0	7	10	0	2	0	19	0	0	0	0	0	0	0	48
Grand Total	0	0	13	10	0	0	23	0	1	42	0	1	0	44	0	5	0	2	1	0	8	15	0	7	0	0	0	22	0	9	26	0	5	0	40	0	0	0	1	0	0	1	138
Apprch %	0	0	56.5	43.5	0	0		0	2.3	95.5	0	2.3	0		0	62.5	0	25	12.5	0		68.2	0	31.8	0	0	0		0	22.5	65	0	12.5	0		0	0	0	100	0	0		
Total %	0	0	9.4	7.2	0	0	16.7	0	0.7	30.4	0	0.7	0	31.9	0	3.6	0	1.4	0.7	0	5.8	10.9	0	5.1	0	0	0	15.9	0	6.5	18.8	0	3.6	0	29	0	0	0	0.7	0	0	0.7	

	North Spring Mill Road Southbound						Lancaster Avenue Westbound						Aldwyn Lane Northwestbound						Sproul Road Northbound						Lancaster Avenue Eastbound						Kenilworth Road Southeastbound						
Start Time	L to Lanc	L to Ald	T to Spr	R to Lanc	R to Ken	App. Total	L to Ald	L to Spr	T to Lanc	R to Ken	R to S Mill	App. Total	L to Spr	L to Lanc	T to Ken	R to S Mill	R to Lanc	App. Total	L to Lanc	L to Ken	T to S Mill	R to Lanc	R to Ald	App. Total	L to Ken	L to S Mill	T to Lanc	R to Ald	R to Spr	App. Total	L to S Mill	L to Lanc	T to Ald	R to Spr	R to Lanc	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																																					
Peak Hour for Entire Intersection Begins at 05:00 PM																																					
05:00 PM	0	0	**1**	**3**	0	**4**	0	0	**6**	0	**1**	**7**	0	0	0	0	0	0	**1**	0	**1**	0	0	**2**	0	**5**	1	0	0	6	0	0	0	0	0	0	**19**
05:15 PM	0	0	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4
05:30 PM	0	0	1	0	0	1	0	0	5	0	0	5	0	0	0	0	**1**	**1**	0	0	0	0	0	0	0	2	**4**	0	**2**	**8**	0	0	0	0	0	0	15
05:45 PM	0	0	1	0	0	1	0	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	10
Total Volume	0	0	3	4	0	7	0	0	18	0	1	19	0	0	0	0	1	1	1	0	1	0	0	2	0	7	10	0	2	19	0	0	0	0	0	0	48
% App. Total			42.9	57.1	0		0	0	94.7	0	5.3						100		50	0	50	0	0		0	36.8	52.6	0	10.5		0	0	0	0	0		
PHF	.000	.000	.750	.333	.000	.438	.000	.000	.750	.000	.250	.679	.000	.000	.000	.000	.250	.250	.250	.000	.250	.000	.000	.250	.000	.350	.625	.000	.250	.594	.000	.000	.000	.000	.000	.000	.632

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Ithan Avenues

EB Peds = diag peds NE-SW
WB Peds = diag peds NW-SE

File Name : 02-30IthanPM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound					Lancaster Avenue Westbound						Ithan Avenue Northbound					Lancaster Avenue Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NW-SE Peds	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NE-SW Peds	Peds	App. Total	Int. Total
04:00 PM	11	26	10	6	53	19	141	3	67	10	240	23	39	22	0	84	13	208	5	4	43	273	650
04:15 PM	15	50	26	3	94	12	153	5	81	13	264	8	36	15	0	59	19	174	11	1	30	235	652
04:30 PM	12	43	23	1	79	17	209	15	45	13	299	12	26	17	0	55	12	188	13	1	29	243	676
04:45 PM	18	49	20	1	88	19	124	10	72	11	236	15	22	12	0	49	24	193	16	5	31	269	642
Total	56	168	79	11	314	67	627	33	265	47	1039	58	123	66	0	247	68	763	45	11	133	1020	2620
05:00 PM	10	58	19	2	89	21	197	6	81	14	319	13	33	19	1	66	25	211	17	2	61	316	790
05:15 PM	16	55	26	1	98	22	178	8	175	14	397	21	38	22	6	87	22	243	18	3	84	370	952
05:30 PM	25	61	20	0	106	18	166	6	99	4	293	13	20	20	0	53	14	264	31	4	69	382	834
05:45 PM	14	58	8	1	81	34	143	11	104	12	304	16	32	15	0	63	19	219	25	0	88	351	799
Total	65	232	73	4	374	95	684	31	459	44	1313	63	123	76	7	269	80	937	91	9	302	1419	3375
Grand Total	121	400	152	15	688	162	1311	64	724	91	2352	121	246	142	7	516	148	1700	136	20	435	2439	5995
Apprch %	17.6	58.1	22.1	2.2		6.9	55.7	2.7	30.8	3.9		23.4	47.7	27.5	1.4		6.1	69.7	5.6	0.8	17.8		
Total %	2	6.7	2.5	0.3	11.5	2.7	21.9	1.1	12.1	1.5	39.2	2	4.1	2.4	0.1	8.6	2.5	28.4	2.3	0.3	7.3	40.7	
cars	120	392	152	15	679	162	1274	63	724	91	2314	121	239	141	7	508	146	1675	136	20	435	2412	5913
% cars	99.2	98	100	100	98.7	100	97.2	98.4	100	100	98.4	100	97.2	99.3	100	98.4	98.6	98.5	100	100	100	98.9	98.6
HV	1	8	0	0	9	0	37	1	0	0	38	0	7	1	0	8	2	25	0	0	0	27	82
% HV	0.8	2	0	0	1.3	0	2.8	1.6	0	0	1.6	0	2.8	0.7	0	1.6	1.4	1.5	0	0	0	1.1	1.4

	Ithan Avenue Southbound				Lancaster Avenue Westbound				Ithan Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	10	58	19	87	21	**197**	6	**224**	13	33	19	65	**25**	211	17	253	629
05:15 PM	16	55	**26**	97	22	178	8	208	**21**	**38**	**22**	**81**	22	243	18	283	**669**
05:30 PM	**25**	**61**	20	**106**	18	166	6	190	13	20	20	53	14	**264**	**31**	**309**	658
05:45 PM	14	58	8	80	**34**	143	**11**	188	16	32	15	63	19	219	25	263	594
Total Volume	65	232	73	370	95	684	31	810	63	123	76	262	80	937	91	1108	2550
% App. Total	17.6	62.7	19.7		11.7	84.4	3.8		24	46.9	29		7.2	84.6	8.2		
PHF	.650	.951	.702	.873	.699	.868	.705	.904	.750	.809	.864	.809	.800	.887	.734	.896	.953
cars	65	228	73	366	95	667	30	792	63	119	76	258	78	925	91	1094	2510
% cars	100	98.3	100	98.9	100	97.5	96.8	97.8	100	96.7	100	98.5	97.5	98.7	100	98.7	98.4
HV	0	4	0	4	0	17	1	18	0	4	0	4	2	12	0	14	40
% HV	0	1.7	0	1.1	0	2.5	3.2	2.2	0	3.3	0	1.5	2.5	1.3	0	1.3	1.6

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Ithan Avenues

EB Peds = diag peds NE-SW
WB Peds = diag peds NW-SE

File Name : 02-30IthanPM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound					Lancaster Avenue Westbound						Ithan Avenue Northbound					Lancaster Avenue Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NW-SE Peds	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NE-SW Peds	Peds	App. Total	Int. Total
04:00 PM	1	0	0	0	1	0	4	0	0	0	4	0	0	0	0	0	0	4	0	0	0	4	9
04:15 PM	0	2	0	0	2	0	4	0	0	0	4	0	1	1	0	2	0	3	0	0	0	3	11
04:30 PM	0	1	0	0	1	0	9	0	0	0	9	0	1	0	0	1	0	2	0	0	0	2	13
04:45 PM	0	1	0	0	1	0	3	0	0	0	3	0	1	0	0	1	0	4	0	0	0	4	9
Total	1	4	0	0	5	0	20	0	0	0	20	0	3	1	0	4	0	13	0	0	0	13	42
05:00 PM	0	1	0	0	1	0	5	0	0	0	5	0	0	0	0	0	0	4	0	0	0	4	10
05:15 PM	0	1	0	0	1	0	5	1	0	0	6	0	2	0	0	2	1	3	0	0	0	4	13
05:30 PM	0	1	0	0	1	0	4	0	0	0	4	0	0	0	0	0	0	4	0	0	0	4	9
05:45 PM	0	1	0	0	1	0	3	0	0	0	3	0	2	0	0	2	1	1	0	0	0	2	8
Total	0	4	0	0	4	0	17	1	0	0	18	0	4	0	0	4	2	12	0	0	0	14	40
Grand Total	1	8	0	0	9	0	37	1	0	0	38	0	7	1	0	8	2	25	0	0	0	27	82
Apprch %	11.1	88.9	0	0		0	97.4	2.6	0	0		0	87.5	12.5	0		7.4	92.6	0	0	0		
Total %	1.2	9.8	0	0	11	0	45.1	1.2	0	0	46.3	0	8.5	1.2	0	9.8	2.4	30.5	0	0	0	32.9	

	Ithan Avenue Southbound				Lancaster Avenue Westbound				Ithan Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**1**	0	**1**	0	**5**	0	5	0	0	0	0	0	**4**	0	**4**	10
05:15 PM	0	1	0	1	0	5	**1**	**6**	0	**2**	0	**2**	**1**	3	0	4	**13**
05:30 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	4	0	4	9
05:45 PM	0	1	0	1	0	3	0	3	0	2	0	2	1	1	0	2	8
Total Volume	0	4	0	4	0	17	1	18	0	4	0	4	2	12	0	14	40
% App. Total	0	100	0		0	94.4	5.6		0	100	0		14.3	85.7	0		
PHF	.000	1.00	.000	1.00	.000	.850	.250	.750	.000	.500	.000	.500	.500	.750	.000	.875	.769

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Lowrys Lane

File Name : 03-30LowrPM
Site Code : 00000000
Start Date : 11/8/2012
Page No : 1

Groups Printed- cars - HV

	Lowrys Lane Southbound					Lancaster Avenue Westbound					Lowrys Lane Northbound					Lancaster Avenue Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	17	17	3	1	38	4	226	4	1	235	13	11	6	3	33	0	254	8	1	263	569
04:15 PM	13	6	3	0	22	3	200	0	0	203	3	2	6	8	19	3	246	6	3	258	502
04:30 PM	22	18	2	1	43	7	200	1	0	208	5	8	4	4	21	1	220	9	0	230	502
04:45 PM	13	11	1	0	25	3	199	1	1	204	10	4	8	10	32	1	232	8	0	241	502
Total	65	52	9	2	128	17	825	6	2	850	31	25	24	25	105	5	952	31	4	992	2075
05:00 PM	30	24	2	0	56	4	265	1	0	270	4	10	3	2	19	0	278	8	0	286	631
05:15 PM	32	12	3	0	47	5	223	0	0	228	7	12	1	7	27	0	327	3	0	330	632
05:30 PM	18	20	2	2	42	4	191	1	0	196	4	8	3	7	22	1	261	4	0	266	526
05:45 PM	16	13	3	0	32	2	208	2	0	212	4	5	8	3	20	1	272	7	0	280	544
Total	96	69	10	2	177	15	887	4	0	906	19	35	15	19	88	2	1138	22	0	1162	2333
Grand Total	161	121	19	4	305	32	1712	10	2	1756	50	60	39	44	193	7	2090	53	4	2154	4408
Apprch %	52.8	39.7	6.2	1.3		1.8	97.5	0.6	0.1		25.9	31.1	20.2	22.8		0.3	97	2.5	0.2		
Total %	3.7	2.7	0.4	0.1	6.9	0.7	38.8	0.2	0	39.8	1.1	1.4	0.9	1	4.4	0.2	47.4	1.2	0.1	48.9	
cars	161	121	19	4	305	32	1681	10	2	1725	47	60	37	44	188	6	2065	49	4	2124	4342
% cars	100	100	100	100	100	100	98.2	100	100	98.2	94	100	94.9	100	97.4	85.7	98.8	92.5	100	98.6	98.5
HV	0	0	0	0	0	0	31	0	0	31	3	0	2	0	5	1	25	4	0	30	66
% HV	0	0	0	0	0	0	1.8	0	0	1.8	6	0	5.1	0	2.6	14.3	1.2	7.5	0	1.4	1.5

	Lowrys Lane Southbound				Lancaster Avenue Westbound				Lowrys Lane Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	30	**24**	2	**56**	4	**265**	1	**270**	4	10	3	17	0	278	**8**	286	**629**
05:15 PM	**32**	12	**3**	47	**5**	223	0	228	**7**	**12**	1	**20**	0	**327**	3	**330**	625
05:30 PM	18	20	2	40	4	191	1	196	4	8	3	15	**1**	261	4	266	517
05:45 PM	16	13	3	32	2	208	**2**	212	4	5	**8**	17	1	272	7	280	541
Total Volume	96	69	10	175	15	887	4	906	19	35	15	69	2	1138	22	1162	2312
% App. Total	54.9	39.4	5.7		1.7	97.9	0.4		27.5	50.7	21.7		0.2	97.9	1.9		
PHF	.750	.719	.833	.781	.750	.837	.500	.839	.679	.729	.469	.863	.500	.870	.688	.880	.919
cars	96	69	10	175	15	875	4	894	17	35	15	67	2	1128	20	1150	2286
% cars	100	100	100	100	100	98.6	100	98.7	89.5	100	100	97.1	100	99.1	90.9	99.0	98.9
HV	0	0	0	0	0	12	0	12	2	0	0	2	0	10	2	12	26
% HV	0	0	0	0	0	1.4	0	1.3	10.5	0	0	2.9	0	0.9	9.1	1.0	1.1

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Lowrys Lane

File Name : 03-30LowrPM
Site Code : 00000000
Start Date : 11/8/2012
Page No : 1

Groups Printed- HV

	Lowrys Lane Southbound					Lancaster Avenue Westbound					Lowrys Lane Northbound					Lancaster Avenue Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	6	0	0	6	1	0	1	0	2	0	1	1	0	2	10
04:15 PM	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	1	7	1	0	9	16
04:30 PM	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	0	2	0	0	2	5
04:45 PM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	9
Total	0	0	0	0	0	0	19	0	0	19	1	0	2	0	3	1	15	2	0	18	40
05:00 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	4
05:15 PM	0	0	0	0	0	0	3	0	0	3	2	0	0	0	2	0	3	0	0	3	8
05:30 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	2	1	0	3	6
05:45 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	4	1	0	5	8
Total	0	0	0	0	0	0	12	0	0	12	2	0	0	0	2	0	10	2	0	12	26
Grand Total	0	0	0	0	0	0	31	0	0	31	3	0	2	0	5	1	25	4	0	30	66
Apprch %	0	0	0	0		0	100	0	0		60	0	40	0		3.3	83.3	13.3	0		
Total %	0	0	0	0	0	0	47	0	0	47	4.5	0	3	0	7.6	1.5	37.9	6.1	0	45.5	

	Lowrys Lane Southbound				Lancaster Avenue Westbound				Lowrys Lane Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	**3**	0	**3**	0	0	0	0	0	1	0	1	4
05:15 PM	0	0	0	0	0	3	0	3	**2**	0	0	**2**	0	3	0	3	**8**
05:30 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	2	**1**	3	6
05:45 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	**4**	1	**5**	8
Total Volume	0	0	0	0	0	12	0	12	2	0	0	2	0	10	2	12	26
% App. Total	0	0	0		0	100	0		100	0	0		0	83.3	16.7		
PHF	.000	.000	.000	.000	.000	1.00	.000	1.00	.250	.000	.000	.250	.000	.625	.500	.600	.813

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Garrett Avenues

File Name : 04-30GarPM
Site Code : 21102772
Start Date : 11/8/2012
Page No : 1

Groups Printed- cars - HV

	Lancaster Avenue Westbound				Garrett Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	9	0	0	9	3	13	4	20	0	10	0	10	39
04:15 PM	14	0	0	14	0	4	7	11	0	10	0	10	35
04:30 PM	9	0	0	9	0	7	5	12	0	9	0	9	30
04:45 PM	11	0	0	11	1	8	8	17	0	6	0	6	34
Total	43	0	0	43	4	32	24	60	0	35	0	35	138
05:00 PM	10	0	0	10	2	17	3	22	0	11	0	11	43
05:15 PM	16	0	0	16	2	3	7	12	0	14	0	14	42
05:30 PM	16	0	0	16	2	9	2	13	0	12	0	12	41
05:45 PM	5	0	0	5	0	8	5	13	0	9	0	9	27
Total	47	0	0	47	6	37	17	60	0	46	0	46	153
Grand Total	90	0	0	90	10	69	41	120	0	81	0	81	291
Apprch %	100	0	0		8.3	57.5	34.2		0	100	0		
Total %	30.9	0	0	30.9	3.4	23.7	14.1	41.2	0	27.8	0	27.8	
cars	90	0	0	90	10	69	41	120	0	81	0	81	291
% cars	100	0	0	100	100	100	100	100	0	100	0	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0

	Lancaster Avenue Westbound			Garrett Avenue Northbound			Lancaster Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	10	0	10	**2**	**17**	**19**	0	11	11	**40**
05:15 PM	**16**	0	**16**	2	3	5	0	**14**	**14**	35
05:30 PM	16	0	16	2	9	11	0	12	12	39
05:45 PM	5	0	5	0	8	8	0	9	9	22
Total Volume	47	0	47	6	37	43	0	46	46	136
% App. Total	100	0		14	86		0	100		
PHF	.734	.000	.734	.750	.544	.566	.000	.821	.821	.850
cars	47	0	47	6	37	43	0	46	46	136
% cars	100	0	100	100	100	100	0	100	100	100
HV	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Garrett Avenues

File Name : 04-30GarPM
Site Code : 21102772
Start Date : 11/8/2012
Page No : 1

Groups Printed- HV

	Lancaster Avenue Westbound				Garrett Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		
Total %													

	Lancaster Avenue Westbound			Garrett Avenue Northbound			Lancaster Avenue Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Sproul & Conestoga Roads

File Name : 05-SprConPM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Spoul Road Southbound					Conestoga Road Westbound					Spoul Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	20	48	20	0	88	11	112	8	0	131	16	32	2	0	50	18	99	51	0	168	437
04:15 PM	9	67	19	0	95	6	140	10	0	156	30	33	4	0	67	24	115	40	0	179	497
04:30 PM	12	55	20	0	87	10	114	11	0	135	23	35	5	0	63	33	105	50	0	188	473
04:45 PM	9	88	23	0	120	13	124	10	0	147	37	54	4	0	95	24	130	67	0	221	583
Total	50	258	82	0	390	40	490	39	0	569	106	154	15	0	275	99	449	208	0	756	1990
05:00 PM	13	75	24	0	112	7	125	6	0	138	27	41	7	0	75	29	126	54	0	209	534
05:15 PM	11	72	25	0	108	11	155	11	0	177	19	36	9	0	64	32	136	58	0	226	575
05:30 PM	13	69	11	0	93	3	119	15	0	137	30	61	8	0	99	19	140	49	1	209	538
05:45 PM	13	71	21	0	105	6	115	14	0	135	27	44	3	0	74	23	139	53	0	215	529
Total	50	287	81	0	418	27	514	46	0	587	103	182	27	0	312	103	541	214	1	859	2176
Grand Total	100	545	163	0	808	67	1004	85	0	1156	209	336	42	0	587	202	990	422	1	1615	4166
Apprch %	12.4	67.5	20.2	0		5.8	86.9	7.4	0		35.6	57.2	7.2	0		12.5	61.3	26.1	0.1		
Total %	2.4	13.1	3.9	0	19.4	1.6	24.1	2	0	27.7	5	8.1	1	0	14.1	4.8	23.8	10.1	0	38.8	
cars	99	537	161	0	797	62	986	82	0	1130	205	330	41	0	576	197	984	420	1	1602	4105
% cars	99	98.5	98.8	0	98.6	92.5	98.2	96.5	0	97.8	98.1	98.2	97.6	0	98.1	97.5	99.4	99.5	100	99.2	98.5
HV	1	8	2	0	11	5	18	3	0	26	4	6	1	0	11	5	6	2	0	13	61
% HV	1	1.5	1.2	0	1.4	7.5	1.8	3.5	0	2.2	1.9	1.8	2.4	0	1.9	2.5	0.6	0.5	0	0.8	1.5

	Spoul Road Southbound				Conestoga Road Westbound				Spoul Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**13**	**75**	24	**112**	7	125	6	138	27	41	7	75	29	126	54	209	534
05:15 PM	11	72	**25**	108	**11**	**155**	11	**177**	19	36	**9**	64	**32**	136	**58**	**226**	**575**
05:30 PM	13	69	11	93	3	119	**15**	137	**30**	**61**	8	**99**	19	**140**	49	208	537
05:45 PM	13	71	21	105	6	115	14	135	27	44	3	74	23	139	53	215	529
Total Volume	50	287	81	418	27	514	46	587	103	182	27	312	103	541	214	858	2175
% App. Total	12	68.7	19.4		4.6	87.6	7.8		33	58.3	8.7		12	63.1	24.9		
PHF	.962	.957	.810	.933	.614	.829	.767	.829	.858	.746	.750	.788	.805	.966	.922	.949	.946
cars	50	284	80	414	24	510	45	579	102	179	27	308	102	538	213	853	2154
% cars	100	99.0	98.8	99.0	88.9	99.2	97.8	98.6	99.0	98.4	100	98.7	99.0	99.4	99.5	99.4	99.0
HV	0	3	1	4	3	4	1	8	1	3	0	4	1	3	1	5	21
% HV	0	1.0	1.2	1.0	11.1	0.8	2.2	1.4	1.0	1.6	0	1.3	1.0	0.6	0.5	0.6	1.0

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Sproul & Conestoga Roads

File Name : 05-SprConPM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Spoul Road Southbound					Conestoga Road Westbound					Spoul Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	1	1	0	0	2	1	9	1	0	11	0	1	0	0	1	2	2	0	0	4	18
04:15 PM	0	2	1	0	3	0	4	0	0	4	1	1	0	0	2	2	0	0	0	2	11
04:30 PM	0	0	0	0	0	0	1	1	0	2	2	0	0	0	2	0	1	1	0	2	6
04:45 PM	0	2	0	0	2	1	0	0	0	1	0	1	1	0	2	0	0	0	0	0	5
Total	1	5	1	0	7	2	14	2	0	18	3	3	1	0	7	4	3	1	0	8	40
05:00 PM	0	2	1	0	3	0	1	1	0	2	1	3	0	0	4	0	1	0	0	1	10
05:15 PM	0	1	0	0	1	2	2	0	0	4	0	0	0	0	0	0	1	0	0	1	6
05:30 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	1	0	1	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2
Total	0	3	1	0	4	3	4	1	0	8	1	3	0	0	4	1	3	1	0	5	21
Grand Total	1	8	2	0	11	5	18	3	0	26	4	6	1	0	11	5	6	2	0	13	61
Apprch %	9.1	72.7	18.2	0		19.2	69.2	11.5	0		36.4	54.5	9.1	0		38.5	46.2	15.4	0		
Total %	1.6	13.1	3.3	0	18	8.2	29.5	4.9	0	42.6	6.6	9.8	1.6	0	18	8.2	9.8	3.3	0	21.3	

	Spoul Road Southbound				Conestoga Road Westbound				Spoul Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**2**	**1**	**3**	0	1	**1**	2	**1**	**3**	0	**4**	0	**1**	0	1	**10**
05:15 PM	0	1	0	1	**2**	**2**	0	**4**	0	0	0	0	0	1	0	1	6
05:30 PM	0	0	0	0	1	1	0	2	0	0	0	0	0	0	**1**	1	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	**1**	1	0	**2**	2
Total Volume	0	3	1	4	3	4	1	8	1	3	0	4	1	3	1	5	21
% App. Total	0	75	25		37.5	50	12.5		25	75	0		20	60	20		
PHF	.000	.375	.250	.333	.375	.500	.250	.500	.250	.250	.000	.250	.250	.750	.250	.625	.525

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga & Spring Mill Roads

File Name : 06-ConSpMPM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Spring Mill Road Southbound				Conestoga Road Westbound				Conestoga Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
04:00 PM	5	3	0	8	165	1	0	166	1	122	0	123	297
04:15 PM	2	3	0	5	141	1	0	142	1	129	0	130	277
04:30 PM	2	6	0	8	141	2	0	143	3	128	0	131	282
04:45 PM	0	2	0	2	147	1	0	148	1	148	0	149	299
Total	9	14	0	23	594	5	0	599	6	527	0	533	1155
05:00 PM	3	1	0	4	142	0	0	142	2	151	0	153	299
05:15 PM	3	2	0	5	172	1	0	173	3	156	0	159	337
05:30 PM	5	5	0	10	144	0	0	144	4	173	0	177	331
05:45 PM	6	1	0	7	149	2	0	151	1	166	0	167	325
Total	17	9	0	26	607	3	0	610	10	646	0	656	1292
Grand Total	26	23	0	49	1201	8	0	1209	16	1173	0	1189	2447
Apprch %	53.1	46.9	0		99.3	0.7	0		1.3	98.7	0		
Total %	1.1	0.9	0	2	49.1	0.3	0	49.4	0.7	47.9	0	48.6	
cars	25	21	0	46	1174	8	0	1182	15	1163	0	1178	2406
% cars	96.2	91.3	0	93.9	97.8	100	0	97.8	93.8	99.1	0	99.1	98.3
HV	1	2	0	3	27	0	0	27	1	10	0	11	41
% HV	3.8	8.7	0	6.1	2.2	0	0	2.2	6.2	0.9	0	0.9	1.7

	Spring Mill Road Southbound			Conestoga Road Westbound			Conestoga Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	3	1	4	142	0	142	2	151	153	299
05:15 PM	3	2	5	**172**	1	**173**	3	156	159	**337**
05:30 PM	5	**5**	**10**	144	0	144	**4**	**173**	**177**	331
05:45 PM	**6**	1	7	149	**2**	151	1	166	167	325
Total Volume	17	9	26	607	3	610	10	646	656	1292
% App. Total	65.4	34.6		99.5	0.5		1.5	98.5		
PHF	.708	.450	.650	.882	.375	.882	.625	.934	.927	.958
cars	17	8	25	601	3	604	10	644	654	1283
% cars	100	88.9	96.2	99.0	100	99.0	100	99.7	99.7	99.3
HV	0	1	1	6	0	6	0	2	2	9
% HV	0	11.1	3.8	1.0	0	1.0	0	0.3	0.3	0.7

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga & Spring Mill Roads

File Name : 06-ConSpMPM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Spring Mill Road Southbound				Conestoga Road Westbound				Conestoga Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
04:00 PM	1	0	0	1	11	0	0	11	1	4	0	5	17
04:15 PM	0	0	0	0	6	0	0	6	0	0	0	0	6
04:30 PM	0	1	0	1	1	0	0	1	0	3	0	3	5
04:45 PM	0	0	0	0	3	0	0	3	0	1	0	1	4
Total	1	1	0	2	21	0	0	21	1	8	0	9	32
05:00 PM	0	0	0	0	2	0	0	2	0	1	0	1	3
05:15 PM	0	0	0	0	3	0	0	3	0	0	0	0	3
05:30 PM	0	1	0	1	1	0	0	1	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
Total	0	1	0	1	6	0	0	6	0	2	0	2	9
Grand Total	1	2	0	3	27	0	0	27	1	10	0	11	41
Apprch %	33.3	66.7	0		100	0	0		9.1	90.9	0		
Total %	2.4	4.9	0	7.3	65.9	0	0	65.9	2.4	24.4	0	26.8	

	Spring Mill Road Southbound			Conestoga Road Westbound			Conestoga Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	2	0	2	0	**1**	**1**	**3**
05:15 PM	0	0	0	**3**	0	**3**	0	0	0	3
05:30 PM	0	**1**	**1**	1	0	1	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	1	1	1
Total Volume	0	1	1	6	0	6	0	2	2	9
% App. Total	0	100		100	0		0	100		
PHF	.000	.250	.250	.500	.000	.500	.000	.500	.500	.750

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Ithan Avenue

File Name : 07-ConIthPM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound					Conestoga Road Westbound					Ithan Avenue Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	15	29	52	0	96	3	99	8	1	111	1	3	1	0	5	19	111	2	0	132	344
04:15 PM	13	18	43	1	75	2	111	9	1	123	0	7	2	0	9	16	101	1	0	118	325
04:30 PM	12	32	30	2	76	2	121	8	0	131	1	8	2	0	11	15	112	0	0	127	345
04:45 PM	8	23	36	0	67	2	107	12	0	121	2	5	0	0	7	27	105	2	0	134	329
Total	48	102	161	3	314	9	438	37	2	486	4	23	5	0	32	77	429	5	0	511	1343
05:00 PM	17	36	45	0	98	2	125	11	1	139	1	4	1	0	6	20	134	1	0	155	398
05:15 PM	9	27	24	0	60	2	118	9	1	130	3	6	1	0	10	14	119	0	2	135	335
05:30 PM	10	11	21	0	42	2	115	7	0	124	2	5	2	0	9	15	131	4	0	150	325
05:45 PM	16	12	44	0	72	5	104	12	0	121	1	3	2	0	6	14	128	2	0	144	343
Total	52	86	134	0	272	11	462	39	2	514	7	18	6	0	31	63	512	7	2	584	1401
Grand Total	100	188	295	3	586	20	900	76	4	1000	11	41	11	0	63	140	941	12	2	1095	2744
Apprch %	17.1	32.1	50.3	0.5		2	90	7.6	0.4		17.5	65.1	17.5	0		12.8	85.9	1.1	0.2		
Total %	3.6	6.9	10.8	0.1	21.4	0.7	32.8	2.8	0.1	36.4	0.4	1.5	0.4	0	2.3	5.1	34.3	0.4	0.1	39.9	
cars	100	187	285	3	575	20	885	73	4	982	9	40	11	0	60	138	931	12	2	1083	2700
% cars	100	99.5	96.6	100	98.1	100	98.3	96.1	100	98.2	81.8	97.6	100	0	95.2	98.6	98.9	100	100	98.9	98.4
HV	0	1	10	0	11	0	15	3	0	18	2	1	0	0	3	2	10	0	0	12	44
% HV	0	0.5	3.4	0	1.9	0	1.7	3.9	0	1.8	18.2	2.4	0	0	4.8	1.4	1.1	0	0	1.1	1.6

	Ithan Avenue Southbound				Conestoga Road Westbound				Ithan Avenue Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**17**	**36**	**45**	**98**	2	**125**	11	**138**	1	4	1	6	**20**	**134**	1	**155**	**397**
05:15 PM	9	27	24	60	2	118	9	129	**3**	**6**	1	**10**	14	119	0	133	332
05:30 PM	10	11	21	42	2	115	7	124	2	5	**2**	9	15	131	**4**	150	325
05:45 PM	16	12	44	72	**5**	104	**12**	121	1	3	2	6	14	128	2	144	343
Total Volume	52	86	134	272	11	462	39	512	7	18	6	31	63	512	7	582	1397
% App. Total	19.1	31.6	49.3		2.1	90.2	7.6		22.6	58.1	19.4		10.8	88	1.2		
PHF	.765	.597	.744	.694	.550	.924	.813	.928	.583	.750	.750	.775	.788	.955	.438	.939	.880
cars	52	86	129	267	11	462	38	511	5	18	6	29	63	510	7	580	1387
% cars	100	100	96.3	98.2	100	100	97.4	99.8	71.4	100	100	93.5	100	99.6	100	99.7	99.3
HV	0	0	5	5	0	0	1	1	2	0	0	2	0	2	0	2	10
% HV	0	0	3.7	1.8	0	0	2.6	0.2	28.6	0	0	6.5	0	0.4	0	0.3	0.7

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Ithan Avenue

File Name : 07-ConIthPM
Site Code : 00000000
Start Date : 11/14/2012
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Groups Printed- HV

	Ithan Avenue Southbound					Conestoga Road Westbound					Ithan Avenue Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	3	0	3	0	7	1	0	8	0	1	0	0	1	0	2	0	0	2	14
04:15 PM	0	0	1	0	1	0	5	1	0	6	0	0	0	0	0	0	2	0	0	2	9
04:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	4	0	0	5	6
04:45 PM	0	1	1	0	2	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	5
Total	0	1	5	0	6	0	15	2	0	17	0	1	0	0	1	2	8	0	0	10	34
05:00 PM	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3
05:15 PM	0	0	2	0	2	0	0	1	0	1	2	0	0	0	2	0	1	0	0	1	6
05:30 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	5	0	5	0	0	1	0	1	2	0	0	0	2	0	2	0	0	2	10
Grand Total	0	1	10	0	11	0	15	3	0	18	2	1	0	0	3	2	10	0	0	12	44
Apprch %	0	9.1	90.9	0		0	83.3	16.7	0		66.7	33.3	0	0		16.7	83.3	0	0		
Total %	0	2.3	22.7	0	25	0	34.1	6.8	0	40.9	4.5	2.3	0	0	6.8	4.5	22.7	0	0	27.3	

	Ithan Avenue Southbound				Conestoga Road Westbound				Ithan Avenue Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	**2**	**2**	0	0	0	0	0	0	0	0	0	**1**	0	**1**	3
05:15 PM	0	0	2	2	0	0	**1**	**1**	**2**	0	0	**2**	0	1	0	1	**6**
05:30 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	5	5	0	0	1	1	2	0	0	2	0	2	0	2	10
% App. Total	0	0	100		0	0	100		100	0	0		0	100	0		
PHF	.000	.000	.625	.625	.000	.000	.250	.250	.250	.000	.000	.250	.000	.500	.000	.500	.417

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Lowrys Lane/Strathmore Drive

File Name : 08-ConLowPM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Lowrys Lane Southbound					Conestoga Road Westbound					Strathmore Drive Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	3	7	13	2	25	6	115	5	0	126	2	5	5	0	12	15	101	2	0	118	281
04:15 PM	0	5	7	0	12	3	107	1	0	111	3	2	8	1	14	8	110	4	0	122	259
04:30 PM	4	7	18	0	29	2	108	4	1	115	9	4	5	0	18	12	111	4	0	127	289
04:45 PM	1	1	9	0	11	6	111	1	0	118	6	1	2	0	9	12	103	5	0	120	258
Total	8	20	47	2	77	17	441	11	1	470	20	12	20	1	53	47	425	15	0	487	1087
05:00 PM	3	4	17	0	24	4	131	3	0	138	1	5	4	0	10	9	115	2	0	126	298
05:15 PM	2	3	9	0	14	5	111	5	0	121	4	2	3	0	9	11	123	5	0	139	283
05:30 PM	3	3	11	0	17	3	109	3	0	115	2	1	6	0	9	8	119	5	1	133	274
05:45 PM	1	7	15	0	23	5	105	5	0	115	8	0	4	1	13	8	137	5	0	150	301
Total	9	17	52	0	78	17	456	16	0	489	15	8	17	1	41	36	494	17	1	548	1156
Grand Total	17	37	99	2	155	34	897	27	1	959	35	20	37	2	94	83	919	32	1	1035	2243
Apprch %	11	23.9	63.9	1.3		3.5	93.5	2.8	0.1		37.2	21.3	39.4	2.1		8	88.8	3.1	0.1		
Total %	0.8	1.6	4.4	0.1	6.9	1.5	40	1.2	0	42.8	1.6	0.9	1.6	0.1	4.2	3.7	41	1.4	0	46.1	
cars	16	33	98	2	149	32	883	26	1	942	35	20	35	2	92	82	907	31	1	1021	2204
% cars	94.1	89.2	99	100	96.1	94.1	98.4	96.3	100	98.2	100	100	94.6	100	97.9	98.8	98.7	96.9	100	98.6	98.3
HV	1	4	1	0	6	2	14	1	0	17	0	0	2	0	2	1	12	1	0	14	39
% HV	5.9	10.8	1	0	3.9	5.9	1.6	3.7	0	1.8	0	0	5.4	0	2.1	1.2	1.3	3.1	0	1.4	1.7

	Lowrys Lane Southbound				Conestoga Road Westbound				Strathmore Drive Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**3**	4	**17**	**24**	4	**131**	3	**138**	1	**5**	4	10	9	115	2	126	298
05:15 PM	2	3	9	14	**5**	111	**5**	121	4	2	3	9	**11**	123	**5**	139	283
05:30 PM	3	3	11	17	3	109	3	115	2	1	**6**	9	8	119	5	132	273
05:45 PM	1	**7**	15	23	5	105	5	115	**8**	0	4	**12**	8	**137**	5	**150**	**300**
Total Volume	9	17	52	78	17	456	16	489	15	8	17	40	36	494	17	547	1154
% App. Total	11.5	21.8	66.7		3.5	93.3	3.3		37.5	20	42.5		6.6	90.3	3.1		
PHF	.750	.607	.765	.813	.850	.870	.800	.886	.469	.400	.708	.833	.818	.901	.850	.912	.962
cars	9	15	52	76	16	455	16	487	15	8	17	40	36	491	17	544	1147
% cars	100	88.2	100	97.4	94.1	99.8	100	99.6	100	100	100	100	100	99.4	100	99.5	99.4
HV	0	2	0	2	1	1	0	2	0	0	0	0	0	3	0	3	7
% HV	0	11.8	0	2.6	5.9	0.2	0	0.4	0	0	0	0	0	0.6	0	0.5	0.6

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Lowrys Lane/Strathmore Drive

File Name : 08-ConLowPM
Site Code : 00000000
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Lowrys Lane Southbound					Conestoga Road Westbound					Strathmore Drive Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	1	0	1	0	2	0	5	1	0	6	0	0	1	0	1	1	2	0	0	3	12
04:15 PM	0	1	0	0	1	1	4	0	0	5	0	0	1	0	1	0	0	0	0	0	7
04:30 PM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6	8
04:45 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	1	1	0	2	5
Total	1	2	1	0	4	1	13	1	0	15	0	0	2	0	2	1	9	1	0	11	32
05:00 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	5
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	2	0	0	2	1	1	0	0	2	0	0	0	0	0	0	3	0	0	3	7
Grand Total	1	4	1	0	6	2	14	1	0	17	0	0	2	0	2	1	12	1	0	14	39
Apprch %	16.7	66.7	16.7	0		11.8	82.4	5.9	0		0	0	100	0		7.1	85.7	7.1	0		
Total %	2.6	10.3	2.6	0	15.4	5.1	35.9	2.6	0	43.6	0	0	5.1	0	5.1	2.6	30.8	2.6	0	35.9	

	Lowrys Lane Southbound				Conestoga Road Westbound				Strathmore Drive Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	1
05:15 PM	0	**2**	0	**2**	0	**1**	0	1	0	0	0	0	0	**2**	0	**2**	**5**
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	2	0	2	1	1	0	2	0	0	0	0	0	3	0	3	7
% App. Total	0	100	0		50	50	0		0	0	0		0	100	0		
PHF	.000	.250	.000	.250	.250	.250	.000	.500	.000	.000	.000	.000	.000	.375	.000	.375	.350

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Garrett Avenue/
Williams Road

File Name : 09-ConGarPM
Site Code : 21102702
Start Date : 11/14/2012
Page No : 1

Groups Printed- cars - HV

	Garrett Avenue Southbound					Conestoga Road Westbound					Williams Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	11	2	8	0	21	3	114	6	0	123	2	1	2	0	5	7	94	6	1	108	257
04:15 PM	3	6	15	1	25	5	107	1	0	113	1	1	5	3	10	8	116	1	1	126	274
04:30 PM	11	3	17	1	32	6	111	6	0	123	5	2	3	2	12	7	108	4	1	120	287
04:45 PM	9	7	13	0	29	1	104	3	1	109	4	2	2	0	8	12	91	3	0	106	252
Total	34	18	53	2	107	15	436	16	1	468	12	6	12	5	35	34	409	14	3	460	1070
05:00 PM	9	3	10	0	22	6	147	7	0	160	5	0	4	8	17	13	111	1	0	125	324
05:15 PM	6	2	16	0	24	2	118	4	0	124	3	0	1	4	8	4	135	0	0	139	295
05:30 PM	5	1	11	0	17	2	103	10	0	115	3	0	3	2	8	4	117	1	0	122	262
05:45 PM	7	6	14	0	27	2	118	7	2	129	5	1	3	3	12	5	125	7	0	137	305
Total	27	12	51	0	90	12	486	28	2	528	16	1	11	17	45	26	488	9	0	523	1186
Grand Total	61	30	104	2	197	27	922	44	3	996	28	7	23	22	80	60	897	23	3	983	2256
Apprch %	31	15.2	52.8	1		2.7	92.6	4.4	0.3		35	8.8	28.8	27.5		6.1	91.3	2.3	0.3		
Total %	2.7	1.3	4.6	0.1	8.7	1.2	40.9	2	0.1	44.1	1.2	0.3	1	1	3.5	2.7	39.8	1	0.1	43.6	
cars	61	30	104	2	197	27	922	44	3	996	28	7	23	22	80	60	897	23	3	983	2256
% cars	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Garrett Avenue Southbound				Conestoga Road Westbound				Williams Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**9**	3	10	22	**6**	**147**	7	**160**	**5**	0	**4**	**9**	**13**	111	1	125	**316**
05:15 PM	6	2	**16**	24	2	118	4	124	3	0	1	4	4	**135**	0	**139**	291
05:30 PM	5	1	11	17	2	103	**10**	115	3	0	3	6	4	117	1	122	260
05:45 PM	7	**6**	14	**27**	2	118	7	127	5	**1**	3	9	5	125	**7**	137	300
Total Volume	27	12	51	90	12	486	28	526	16	1	11	28	26	488	9	523	1167
% App. Total	30	13.3	56.7		2.3	92.4	5.3		57.1	3.6	39.3		5	93.3	1.7		
PHF	.750	.500	.797	.833	.500	.827	.700	.822	.800	.250	.688	.778	.500	.904	.321	.941	.923
cars	27	12	51	90	12	486	28	526	16	1	11	28	26	488	9	523	1167
% cars	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Garrett Avenue/
Williams Road

File Name : 09-ConGarPM
Site Code : 21102702
Start Date : 11/14/2012
Page No : 1

Groups Printed- HV

	Garrett Avenue Southbound					Conestoga Road Westbound					Williams Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

	Garrett Avenue Southbound				Conestoga Road Westbound				Williams Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Spring Mill and County Line Roads

File Name : 10-SpMCoLPM
Site Code : 00000000
Start Date : 11/13/2012
Page No : 1

Groups Printed- cars - HV

	County Line Road Southbound					Spring MIll Road Westbound					County Line Road Northbound					Spring MIll Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	13	54	13	0	80	9	59	10	0	78	13	46	9	0	68	15	55	20	6	96	322
04:15 PM	11	45	13	1	70	11	65	9	0	85	9	45	17	0	71	16	74	22	1	113	339
04:30 PM	10	61	10	0	81	11	52	12	0	75	18	40	12	0	70	17	80	16	6	119	345
04:45 PM	9	48	8	2	67	9	45	15	0	69	17	33	8	0	58	16	60	30	3	109	303
Total	43	208	44	3	298	40	221	46	0	307	57	164	46	0	267	64	269	88	16	437	1309
05:00 PM	21	100	11	0	132	4	65	8	0	77	15	57	10	0	82	15	76	27	8	126	417
05:15 PM	15	101	16	0	132	16	53	16	0	85	17	64	14	0	95	14	77	22	7	120	432
05:30 PM	17	79	8	0	104	19	53	20	0	92	17	40	7	0	64	22	83	22	4	131	391
05:45 PM	11	110	9	0	130	16	69	7	0	92	22	38	6	0	66	12	64	22	2	100	388
Total	64	390	44	0	498	55	240	51	0	346	71	199	37	0	307	63	300	93	21	477	1628
Grand Total	107	598	88	3	796	95	461	97	0	653	128	363	83	0	574	127	569	181	37	914	2937
Apprch %	13.4	75.1	11.1	0.4		14.5	70.6	14.9	0		22.3	63.2	14.5	0		13.9	62.3	19.8	4		
Total %	3.6	20.4	3	0.1	27.1	3.2	15.7	3.3	0	22.2	4.4	12.4	2.8	0	19.5	4.3	19.4	6.2	1.3	31.1	
cars	107	591	83	3	784	95	451	96	0	642	128	363	82	0	573	127	555	180	37	899	2898
% cars	100	98.8	94.3	100	98.5	100	97.8	99	0	98.3	100	100	98.8	0	99.8	100	97.5	99.4	100	98.4	98.7
HV	0	7	5	0	12	0	10	1	0	11	0	0	1	0	1	0	14	1	0	15	39
% HV	0	1.2	5.7	0	1.5	0	2.2	1	0	1.7	0	0	1.2	0	0.2	0	2.5	0.6	0	1.6	1.3

	County Line Road Southbound				Spring MIll Road Westbound				County Line Road Northbound				Spring MIll Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**21**	100	11	**132**	4	65	8	77	15	57	10	82	15	76	**27**	118	409
05:15 PM	15	101	**16**	132	16	53	16	85	17	**64**	**14**	**95**	14	77	22	113	**425**
05:30 PM	17	79	8	104	**19**	53	**20**	**92**	17	40	7	64	**22**	**83**	22	**127**	387
05:45 PM	11	**110**	9	130	16	**69**	7	92	**22**	38	6	66	12	64	22	98	386
Total Volume	64	390	44	498	55	240	51	346	71	199	37	307	63	300	93	456	1607
% App. Total	12.9	78.3	8.8		15.9	69.4	14.7		23.1	64.8	12.1		13.8	65.8	20.4		
PHF	.762	.886	.688	.943	.724	.870	.638	.940	.807	.777	.661	.808	.716	.904	.861	.898	.945
cars	64	386	41	491	55	234	51	340	71	199	37	307	63	296	93	452	1590
% cars	100	99.0	93.2	98.6	100	97.5	100	98.3	100	100	100	100	100	98.7	100	99.1	98.9
HV	0	4	3	7	0	6	0	6	0	0	0	0	0	4	0	4	17
% HV	0	1.0	6.8	1.4	0	2.5	0	1.7	0	0	0	0	0	1.3	0	0.9	1.1

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Spring Mill and County Line Roads

File Name : 10-SpMCoLPM
Site Code : 00000000
Start Date : 11/13/2012
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Groups Printed- HV

	County Line Road Southbound					Spring MIll Road Westbound					County Line Road Northbound					Spring MIll Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	1	1	0	2	0	1	1	0	2	0	0	0	0	0	0	2	0	0	2	6
04:15 PM	0	1	0	0	1	0	1	0	0	1	0	0	1	0	1	0	3	1	0	4	7
04:30 PM	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	4
04:45 PM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	5
Total	0	3	2	0	5	0	4	1	0	5	0	0	1	0	1	0	10	1	0	11	22
05:00 PM	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	3
05:15 PM	0	1	3	0	4	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	7
05:30 PM	0	1	0	0	1	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	6
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	4	3	0	7	0	6	0	0	6	0	0	0	0	0	0	4	0	0	4	17
Grand Total	0	7	5	0	12	0	10	1	0	11	0	0	1	0	1	0	14	1	0	15	39
Apprch %	0	58.3	41.7	0		0	90.9	9.1	0		0	0	100	0		0	93.3	6.7	0		
Total %	0	17.9	12.8	0	30.8	0	25.6	2.6	0	28.2	0	0	2.6	0	2.6	0	35.9	2.6	0	38.5	

	County Line Road Southbound				Spring MIll Road Westbound				County Line Road Northbound				Spring MIll Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**1**	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
05:15 PM	0	1	**3**	**4**	0	1	0	1	0	0	0	0	0	**2**	0	**2**	**7**
05:30 PM	0	1	0	1	0	**3**	0	**3**	0	0	0	0	0	2	0	2	6
05:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	4	3	7	0	6	0	6	0	0	0	0	0	4	0	4	17
% App. Total	0	57.1	42.9		0	100	0		0	0	0		0	100	0		
PHF	.000	1.00	.250	.438	.000	.500	.000	.500	.000	.000	.000	.000	.000	.500	.000	.500	.607

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan Avenue & County Line Road N

File Name : 11-IthCoLNPM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound				Ithan Avenue Northbound				County Line Road Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	24	19	1	44	89	31	0	120	28	81	0	109	273
04:15 PM	29	14	0	43	57	21	1	79	21	92	1	114	236
04:30 PM	28	15	0	43	58	23	0	81	33	90	0	123	247
04:45 PM	22	14	0	36	58	32	2	92	41	93	1	135	263
Total	103	62	1	166	262	107	3	372	123	356	2	481	1019
05:00 PM	42	14	0	56	86	26	0	112	38	96	0	134	302
05:15 PM	22	14	0	36	70	36	0	106	44	136	2	182	324
05:30 PM	20	13	0	33	45	29	0	74	46	131	0	177	284
05:45 PM	28	20	0	48	63	24	0	87	51	120	0	171	306
Total	112	61	0	173	264	115	0	379	179	483	2	664	1216
Grand Total	215	123	1	339	526	222	3	751	302	839	4	1145	2235
Apprch %	63.4	36.3	0.3		70	29.6	0.4		26.4	73.3	0.3		
Total %	9.6	5.5	0	15.2	23.5	9.9	0.1	33.6	13.5	37.5	0.2	51.2	
cars	213	122	1	336	521	220	3	744	301	825	4	1130	2210
% cars	99.1	99.2	100	99.1	99	99.1	100	99.1	99.7	98.3	100	98.7	98.9
HV	2	1	0	3	5	2	0	7	1	14	0	15	25
% HV	0.9	0.8	0	0.9	1	0.9	0	0.9	0.3	1.7	0	1.3	1.1

	Ithan Avenue Southbound			Ithan Avenue Northbound			County Line Road Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	**42**	14	**56**	**86**	26	**112**	38	96	134	302
05:15 PM	22	14	36	70	**36**	106	44	**136**	**180**	**322**
05:30 PM	20	13	33	45	29	74	46	131	177	284
05:45 PM	28	**20**	48	63	24	87	**51**	120	171	306
Total Volume	112	61	173	264	115	379	179	483	662	1214
% App. Total	64.7	35.3		69.7	30.3		27	73		
PHF	.667	.763	.772	.767	.799	.846	.877	.888	.919	.943
cars	111	61	172	260	114	374	179	478	657	1203
% cars	99.1	100	99.4	98.5	99.1	98.7	100	99.0	99.2	99.1
HV	1	0	1	4	1	5	0	5	5	11
% HV	0.9	0	0.6	1.5	0.9	1.3	0	1.0	0.8	0.9

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan Avenue & County Line Road N

File Name : 11-IthCoLNPM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound				Ithan Avenue Northbound				County Line Road Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	1	1	0	2	1	0	0	1	0	2	0	2	5
04:15 PM	0	0	0	0	0	0	0	0	1	2	0	3	3
04:30 PM	0	0	0	0	0	0	0	0	0	4	0	4	4
04:45 PM	0	0	0	0	0	1	0	1	0	1	0	1	2
Total	1	1	0	2	1	1	0	2	1	9	0	10	14
05:00 PM	0	0	0	0	2	0	0	2	0	2	0	2	4
05:15 PM	0	0	0	0	1	0	0	1	0	1	0	1	2
05:30 PM	1	0	0	1	1	1	0	2	0	2	0	2	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	1	4	1	0	5	0	5	0	5	11
Grand Total	2	1	0	3	5	2	0	7	1	14	0	15	25
Apprch %	66.7	33.3	0		71.4	28.6	0		6.7	93.3	0		
Total %	8	4	0	12	20	8	0	28	4	56	0	60	

	Ithan Avenue Southbound			Ithan Avenue Northbound			County Line Road Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	**2**	0	**2**	0	**2**	**2**	4
05:15 PM	0	0	0	1	0	1	0	1	1	2
05:30 PM	**1**	0	**1**	1	**1**	2	0	2	2	**5**
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	1	4	1	5	0	5	5	11
% App. Total	100	0		80	20		0	100		
PHF	.250	.000	.250	.500	.250	.625	.000	.625	.625	.550

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan Avenue & County Line Road S

File Name : 12-IthCoLSPM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound				County Line Road Westbound				Ithan Avenue Northbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	41	48	0	89	4	30	0	34	46	4	0	50	173
04:15 PM	60	63	0	123	4	36	0	40	34	7	0	41	204
04:30 PM	54	64	0	118	2	32	0	34	46	8	0	54	206
04:45 PM	64	59	1	124	6	45	0	51	45	8	0	53	228
Total	219	234	1	454	16	143	0	159	171	27	0	198	811
05:00 PM	60	80	0	140	3	58	0	61	59	14	0	73	274
05:15 PM	77	85	0	162	5	37	0	42	62	6	0	68	272
05:30 PM	74	73	2	149	8	27	0	35	46	8	0	54	238
05:45 PM	85	64	0	149	7	37	0	44	51	8	0	59	252
Total	296	302	2	600	23	159	0	182	218	36	0	254	1036
Grand Total	515	536	3	1054	39	302	0	341	389	63	0	452	1847
Apprch %	48.9	50.9	0.3		11.4	88.6	0		86.1	13.9	0		
Total %	27.9	29	0.2	57.1	2.1	16.4	0	18.5	21.1	3.4	0	24.5	
cars	511	524	3	1038	38	299	0	337	387	63	0	450	1825
% cars	99.2	97.8	100	98.5	97.4	99	0	98.8	99.5	100	0	99.6	98.8
HV	4	12	0	16	1	3	0	4	2	0	0	2	22
% HV	0.8	2.2	0	1.5	2.6	1	0	1.2	0.5	0	0	0.4	1.2

	Ithan Avenue Southbound			County Line Road Westbound			Ithan Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	60	80	140	3	**58**	**61**	59	**14**	**73**	**274**
05:15 PM	77	**85**	**162**	5	37	42	**62**	6	68	272
05:30 PM	74	73	147	**8**	27	35	46	8	54	236
05:45 PM	**85**	64	149	7	37	44	51	8	59	252
Total Volume	296	302	598	23	159	182	218	36	254	1034
% App. Total	49.5	50.5		12.6	87.4		85.8	14.2		
PHF	.871	.888	.923	.719	.685	.746	.879	.643	.870	.943
cars	295	297	592	23	156	179	217	36	253	1024
% cars	99.7	98.3	99.0	100	98.1	98.4	99.5	100	99.6	99.0
HV	1	5	6	0	3	3	1	0	1	10
% HV	0.3	1.7	1.0	0	1.9	1.6	0.5	0	0.4	1.0

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan Avenue & County Line Road S

File Name : 12-IthCoLSPM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound				County Line Road Westbound				Ithan Avenue Northbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	1	3	0	4	1	0	0	1	0	0	0	0	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	2	3	0	5	0	0	0	0	0	0	0	0	5
04:45 PM	0	1	0	1	0	0	0	0	1	0	0	1	2
Total	3	7	0	10	1	0	0	1	1	0	0	1	12
05:00 PM	0	2	0	2	0	2	0	2	0	0	0	0	4
05:15 PM	1	0	0	1	0	1	0	1	1	0	0	1	3
05:30 PM	0	3	0	3	0	0	0	0	0	0	0	0	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	5	0	6	0	3	0	3	1	0	0	1	10
Grand Total	4	12	0	16	1	3	0	4	2	0	0	2	22
Apprch %	25	75	0		25	75	0		100	0	0		
Total %	18.2	54.5	0	72.7	4.5	13.6	0	18.2	9.1	0	0	9.1	

	Ithan Avenue Southbound			County Line Road Westbound			Ithan Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	2	2	0	**2**	**2**	0	0	0	**4**
05:15 PM	**1**	0	1	0	1	1	**1**	0	**1**	3
05:30 PM	0	**3**	**3**	0	0	0	0	0	0	3
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	1	5	6	0	3	3	1	0	1	10
% App. Total	16.7	83.3		0	100		100	0		
PHF	.250	.417	.500	.000	.375	.375	.250	.000	.250	.625

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line Road & Lowrys Lane

File Name : 13-CoLLowPM
Site Code : 21102792
Start Date : 11/13/2012
Page No : 1

Groups Printed- cars - HV

	County Line Road Southbound				County Line Road Northbound				Lowrys Lane Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	42	27	1	70	7	42	0	49	7	3	3	13	132
04:15 PM	37	18	0	55	10	39	0	49	3	4	1	8	112
04:30 PM	50	22	2	74	8	41	0	49	7	8	1	16	139
04:45 PM	32	17	0	49	14	32	0	46	2	4	0	6	101
Total	161	84	3	248	39	154	0	193	19	19	5	43	484
05:00 PM	40	38	0	78	9	41	0	50	6	5	1	12	140
05:15 PM	33	33	0	66	20	49	0	69	2	4	4	10	145
05:30 PM	43	24	0	67	9	47	0	56	4	5	3	12	135
05:45 PM	37	27	1	65	13	42	0	55	4	4	0	8	128
Total	153	122	1	276	51	179	0	230	16	18	8	42	548
Grand Total	314	206	4	524	90	333	0	423	35	37	13	85	1032
Apprch %	59.9	39.3	0.8		21.3	78.7	0		41.2	43.5	15.3		
Total %	30.4	20	0.4	50.8	8.7	32.3	0	41	3.4	3.6	1.3	8.2	
cars	314	206	4	524	90	333	0	423	35	37	13	85	1032
% cars	100	100	100	100	100	100	0	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0

	County Line Road Southbound			County Line Road Northbound			Lowrys Lane Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	40	**38**	**78**	9	41	50	**6**	**5**	**11**	139
05:15 PM	33	33	66	**20**	**49**	**69**	2	4	6	**141**
05:30 PM	**43**	24	67	9	47	56	4	5	9	132
05:45 PM	37	27	64	13	42	55	4	4	8	127
Total Volume	153	122	275	51	179	230	16	18	34	539
% App. Total	55.6	44.4		22.2	77.8		47.1	52.9		
PHF	.890	.803	.881	.638	.913	.833	.667	.900	.773	.956
cars	153	122	275	51	179	230	16	18	34	539
% cars	100	100	100	100	100	100	100	100	100	100
HV	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line Road & Lowrys Lane

File Name : 13-CoLLowPM
Site Code : 21102792
Start Date : 11/13/2012
Page No : 1

Groups Printed- HV

	County Line Road Southbound				County Line Road Northbound				Lowrys Lane Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		
Total %													

	County Line Road Southbound			County Line Road Northbound			Lowrys Lane Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line & Airdale Roads

File Name : 14-CoLAirPM
Site Code : 00000000
Start Date : 11/13/2012
Page No : 1

Groups Printed- cars - HV

	County Line Road Southbound				Airdale Road Westbound				Airdale Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
04:00 PM	1	33	1	35	66	2	0	68	38	53	1	92	195
04:15 PM	0	34	1	35	69	1	0	70	40	54	1	95	200
04:30 PM	3	25	4	32	86	3	0	89	37	74	0	111	232
04:45 PM	6	27	1	34	91	3	1	95	31	42	0	73	202
Total	10	119	7	136	312	9	1	322	146	223	2	371	829
05:00 PM	2	33	7	42	84	2	0	86	36	51	0	87	215
05:15 PM	4	26	4	34	77	5	1	83	47	61	0	108	225
05:30 PM	5	31	5	41	87	6	0	93	43	48	0	91	225
05:45 PM	1	26	3	30	90	3	0	93	40	51	0	91	214
Total	12	116	19	147	338	16	1	355	166	211	0	377	879
Grand Total	22	235	26	283	650	25	2	677	312	434	2	748	1708
Apprch %	7.8	83	9.2		96	3.7	0.3		41.7	58	0.3		
Total %	1.3	13.8	1.5	16.6	38.1	1.5	0.1	39.6	18.3	25.4	0.1	43.8	
cars	22	234	26	282	644	25	2	671	310	430	2	742	1695
% cars	100	99.6	100	99.6	99.1	100	100	99.1	99.4	99.1	100	99.2	99.2
HV	0	1	0	1	6	0	0	6	2	4	0	6	13
% HV	0	0.4	0	0.4	0.9	0	0	0.9	0.6	0.9	0	0.8	0.8

	County Line Road Southbound			Airdale Road Westbound			Airdale Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	2	**33**	35	84	2	86	36	51	87	208
05:15 PM	4	26	30	77	5	82	**47**	**61**	**108**	**220**
05:30 PM	**5**	31	**36**	87	**6**	**93**	43	48	91	220
05:45 PM	1	26	27	**90**	3	93	40	51	91	211
Total Volume	12	116	128	338	16	354	166	211	377	859
% App. Total	9.4	90.6		95.5	4.5		44	56		
PHF	.600	.879	.889	.939	.667	.952	.883	.865	.873	.976
cars	12	116	128	337	16	353	165	210	375	856
% cars	100	100	100	99.7	100	99.7	99.4	99.5	99.5	99.7
HV	0	0	0	1	0	1	1	1	2	3
% HV	0	0	0	0.3	0	0.3	0.6	0.5	0.5	0.3

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line & Airdale Roads

File Name : 14-CoLAirPM
Site Code : 00000000
Start Date : 11/13/2012
Page No : 1

Groups Printed- HV

	County Line Road Southbound				Airdale Road Westbound				Airdale Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
04:00 PM	0	1	0	1	2	0	0	2	0	0	0	0	3
04:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	2
04:30 PM	0	0	0	0	1	0	0	1	0	1	0	1	2
04:45 PM	0	0	0	0	2	0	0	2	0	1	0	1	3
Total	0	1	0	1	5	0	0	5	1	3	0	4	10
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	0	0	1	0	0	1	1	1	0	2	3
Grand Total	0	1	0	1	6	0	0	6	2	4	0	6	13
Apprch %	0	100	0		100	0	0		33.3	66.7	0		
Total %	0	7.7	0	7.7	46.2	0	0	46.2	15.4	30.8	0	46.2	

	County Line Road Southbound			Airdale Road Westbound			Airdale Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	**1**	0	**1**	0	0	0	**1**
05:30 PM	0	0	0	0	0	0	0	**1**	**1**	1
05:45 PM	0	0	0	0	0	0	**1**	0	1	1
Total Volume	0	0	0	1	0	1	1	1	2	3
% App. Total	0	0		100	0		50	50		
PHF	.000	.000	.000	.250	.000	.250	.250	.250	.500	.750

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line & Roberts Roads

File Name : 15-CoLRobPM
Site Code : 00000000
Start Date : 11/13/2012
Page No : 1

Groups Printed- cars - HV

	County Line Road Southbound					Roberts Road Westbound					County Line Road Northbound					Roberts Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	3	160	20	3	186	0	4	5	2	11	0	124	6	0	130	7	6	6	0	19	346
04:15 PM	0	151	13	1	165	3	5	2	4	14	1	131	4	0	136	5	9	2	0	16	331
04:30 PM	1	145	12	2	160	2	5	0	2	9	0	119	6	0	125	10	8	1	1	20	314
04:45 PM	3	151	11	1	166	2	13	1	0	16	2	116	15	2	135	2	6	0	3	11	328
Total	7	607	56	7	677	7	27	8	8	50	3	490	31	2	526	24	29	9	4	66	1319
05:00 PM	3	147	16	2	168	1	8	4	0	13	0	111	4	0	115	9	4	1	1	15	311
05:15 PM	2	178	9	0	189	3	7	2	0	12	0	136	5	1	142	8	7	0	3	18	361
05:30 PM	3	178	18	0	199	0	8	2	1	11	4	117	10	0	131	8	6	0	2	16	357
05:45 PM	3	138	16	0	157	5	2	3	1	11	0	137	9	1	147	11	8	0	1	20	335
Total	11	641	59	2	713	9	25	11	2	47	4	501	28	2	535	36	25	1	7	69	1364
Grand Total	18	1248	115	9	1390	16	52	19	10	97	7	991	59	4	1061	60	54	10	11	135	2683
Apprch %	1.3	89.8	8.3	0.6		16.5	53.6	19.6	10.3		0.7	93.4	5.6	0.4		44.4	40	7.4	8.1		
Total %	0.7	46.5	4.3	0.3	51.8	0.6	1.9	0.7	0.4	3.6	0.3	36.9	2.2	0.1	39.5	2.2	2	0.4	0.4	5	
cars	18	1239	111	9	1377	16	52	19	10	97	7	973	58	4	1042	59	54	10	11	134	2650
% cars	100	99.3	96.5	100	99.1	100	100	100	100	100	100	98.2	98.3	100	98.2	98.3	100	100	100	99.3	98.8
HV	0	9	4	0	13	0	0	0	0	0	0	18	1	0	19	1	0	0	0	1	33
% HV	0	0.7	3.5	0	0.9	0	0	0	0	0	0	1.8	1.7	0	1.8	1.7	0	0	0	0.7	1.2

	County Line Road Southbound				Roberts Road Westbound				County Line Road Northbound				Roberts Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**3**	147	16	166	1	**8**	**4**	**13**	0	111	4	115	9	4	**1**	14	308
05:15 PM	2	**178**	9	189	3	7	2	12	0	136	5	141	8	7	0	15	**357**
05:30 PM	3	178	**18**	**199**	0	8	2	10	**4**	117	**10**	131	8	6	0	14	354
05:45 PM	3	138	16	157	**5**	2	3	10	0	**137**	9	**146**	**11**	**8**	0	**19**	332
Total Volume	11	641	59	711	9	25	11	45	4	501	28	533	36	25	1	62	1351
% App. Total	1.5	90.2	8.3		20	55.6	24.4		0.8	94	5.3		58.1	40.3	1.6		
PHF	.917	.900	.819	.893	.450	.781	.688	.865	.250	.914	.700	.913	.818	.781	.250	.816	.946
cars	11	640	56	707	9	25	11	45	4	495	28	527	35	25	1	61	1340
% cars	100	99.8	94.9	99.4	100	100	100	100	100	98.8	100	98.9	97.2	100	100	98.4	99.2
HV	0	1	3	4	0	0	0	0	0	6	0	6	1	0	0	1	11
% HV	0	0.2	5.1	0.6	0	0	0	0	0	1.2	0	1.1	2.8	0	0	1.6	0.8

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

County Line & Roberts Roads

File Name : 15-CoLRobPM
Site Code : 00000000
Start Date : 11/13/2012
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Groups Printed- HV

	County Line Road Southbound					Roberts Road Westbound					County Line Road Northbound					Roberts Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	2	1	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6
04:15 PM	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	5
04:45 PM	0	4	0	0	4	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	7
Total	0	8	1	0	9	0	0	0	0	0	0	12	1	0	13	0	0	0	0	0	22
05:00 PM	0	0	1	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
05:15 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3
05:45 PM	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	1	3	0	4	0	0	0	0	0	0	6	0	0	6	1	0	0	0	1	11
Grand Total	0	9	4	0	13	0	0	0	0	0	0	18	1	0	19	1	0	0	0	1	33
Apprch %	0	69.2	30.8	0		0	0	0	0		0	94.7	5.3	0		100	0	0	0		
Total %	0	27.3	12.1	0	39.4	0	0	0	0	0	0	54.5	3	0	57.6	3	0	0	0	3	

	County Line Road Southbound				Roberts Road Westbound				County Line Road Northbound				Roberts Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	1	1	0	0	0	0	0	2	0	2	0	0	0	0	**3**
05:15 PM	0	**1**	0	1	0	0	0	0	0	1	0	1	**1**	0	0	**1**	3
05:30 PM	0	0	0	0	0	0	0	0	0	**3**	0	**3**	0	0	0	0	3
05:45 PM	0	0	**2**	**2**	0	0	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	1	3	4	0	0	0	0	0	6	0	6	1	0	0	1	11
% App. Total	0	25	75		0	0	0		0	100	0		100	0	0		
PHF	.000	.250	.375	.500	.000	.000	.000	.000	.000	.500	.000	.500	.250	.000	.000	.250	.917

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan & Aldwyn Avenues

File Name : 16-IthAldPM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound					South Campus Westbound					Ithan Avenue Northbound					Aldwyn Lane Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	6	65	3	34	108	4	0	5	2	11	18	32	3	1	54	4	2	3	0	9	182
04:15 PM	7	60	1	13	81	1	2	4	6	13	6	23	1	4	34	3	0	9	0	12	140
04:30 PM	7	60	3	15	85	1	0	8	6	15	11	26	2	2	41	2	0	5	0	7	148
04:45 PM	13	62	3	16	94	1	1	10	3	15	8	23	0	1	32	1	0	3	0	4	145
Total	33	247	10	78	368	7	3	27	17	54	43	104	6	8	161	10	2	20	0	32	615
05:00 PM	8	71	2	31	112	3	1	9	5	18	9	34	0	0	43	0	0	2	0	2	175
05:15 PM	18	74	4	71	167	1	0	5	3	9	14	35	3	0	52	1	0	3	0	4	232
05:30 PM	17	71	7	30	125	2	1	10	1	14	6	28	0	0	34	1	0	3	2	6	179
05:45 PM	8	51	8	23	90	2	1	13	0	16	5	33	2	0	40	2	0	5	0	7	153
Total	51	267	21	155	494	8	3	37	9	57	34	130	5	0	169	4	0	13	2	19	739
Grand Total	84	514	31	233	862	15	6	64	26	111	77	234	11	8	330	14	2	33	2	51	1354
Apprch %	9.7	59.6	3.6	27		13.5	5.4	57.7	23.4		23.3	70.9	3.3	2.4		27.5	3.9	64.7	3.9		
Total %	6.2	38	2.3	17.2	63.7	1.1	0.4	4.7	1.9	8.2	5.7	17.3	0.8	0.6	24.4	1	0.1	2.4	0.1	3.8	
cars	79	508	31	233	851	15	6	59	26	106	71	230	11	8	320	14	2	31	2	49	1326
% cars	94	98.8	100	100	98.7	100	100	92.2	100	95.5	92.2	98.3	100	100	97	100	100	93.9	100	96.1	97.9
HV	5	6	0	0	11	0	0	5	0	5	6	4	0	0	10	0	0	2	0	2	28
% HV	6	1.2	0	0	1.3	0	0	7.8	0	4.5	7.8	1.7	0	0	3	0	0	6.1	0	3.9	2.1

	Ithan Avenue Southbound				South Campus Westbound				Ithan Avenue Northbound				Aldwyn Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	8	71	2	81	**3**	**1**	9	13	9	34	0	43	0	0	2	2	139
05:15 PM	**18**	**74**	4	**96**	1	0	5	6	**14**	**35**	**3**	**52**	1	0	3	4	**158**
05:30 PM	17	71	7	95	2	1	10	13	6	28	0	34	1	0	3	4	146
05:45 PM	8	51	**8**	67	2	1	**13**	**16**	5	33	2	40	**2**	0	**5**	**7**	130
Total Volume	51	267	21	339	8	3	37	48	34	130	5	169	4	0	13	17	573
% App. Total	15	78.8	6.2		16.7	6.2	77.1		20.1	76.9	3		23.5	0	76.5		
PHF	.708	.902	.656	.883	.667	.750	.712	.750	.607	.929	.417	.813	.500	.000	.650	.607	.907
cars	49	265	21	335	8	3	35	46	33	128	5	166	4	0	13	17	564
% cars	96.1	99.3	100	98.8	100	100	94.6	95.8	97.1	98.5	100	98.2	100	0	100	100	98.4
HV	2	2	0	4	0	0	2	2	1	2	0	3	0	0	0	0	9
% HV	3.9	0.7	0	1.2	0	0	5.4	4.2	2.9	1.5	0	1.8	0	0	0	0	1.6

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan & Aldwyn Avenues

File Name : 16-IthAldPM
Site Code : 00000000
Start Date : 11/15/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound					South Campus Westbound					Ithan Avenue Northbound					Aldwyn Lane Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	2	0	0	2	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	6
04:15 PM	2	1	0	0	3	0	0	1	0	1	1	2	0	0	3	0	0	0	0	0	7
04:30 PM	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	2	0	2	4
04:45 PM	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
Total	3	4	0	0	7	0	0	3	0	3	5	2	0	0	7	0	0	2	0	2	19
05:00 PM	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	2
05:30 PM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:45 PM	0	1	0	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	3
Total	2	2	0	0	4	0	0	2	0	2	1	2	0	0	3	0	0	0	0	0	9
Grand Total	5	6	0	0	11	0	0	5	0	5	6	4	0	0	10	0	0	2	0	2	28
Apprch %	45.5	54.5	0	0		0	0	100	0		60	40	0	0		0	0	100	0		
Total %	17.9	21.4	0	0	39.3	0	0	17.9	0	17.9	21.4	14.3	0	0	35.7	0	0	7.1	0	7.1	

	Ithan Avenue Southbound				South Campus Westbound				Ithan Avenue Northbound				Aldwyn Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**1**	0	0	1	0	0	0	0	**1**	0	0	**1**	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	**1**	**1**	0	**1**	0	1	0	0	0	0	2
05:30 PM	1	**1**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	2
05:45 PM	0	1	0	1	0	0	1	1	0	1	0	1	0	0	0	0	**3**
Total Volume	2	2	0	4	0	0	2	2	1	2	0	3	0	0	0	0	9
% App. Total	50	50	0		0	0	100		33.3	66.7	0		0	0	0		
PHF	.500	.500	.000	.500	.000	.000	.500	.500	.250	.500	.000	.750	.000	.000	.000	.000	.750

F. Tavani and Associates, Inc.

105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Spring Mill/Sproul Rd
& Kenilworth Rd/Aldwyn Ln

File Name : 01-30SproulEve
Site Code : 00000000
Start Date : 12/11/2012
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Groups Printed- cars - HV

	North Spring Mill Road Southbound							Lancaster Avenue Westbound							Aldwyn Lane Northwestbound							Sproul Road Northbound							Lancaster Avenue Eastbound							Kenilworth Road Southeastbound							
Start Time	L to Lanc	L to Ald					App. Total	L to Ald	L to Spr					App. Total	L to Spr	L to Lanc					App. Total	L to Lanc	L to Ken					App. Total	L to Ken	L to S Mill					App. Total	L to S Mill	L to Lanc					App. Total	Int. Total
06:00 PM	3	2	69	29	0	2	105	0	5	176	0	19	0	200	1	13	0	4	0	0	18	48	0	20	10	0	0	78	1	43	260	16	64	0	384	1	1	1	0	2	2	7	792
06:15 PM	8	7	41	41	0	2	99	1	4	192	0	9	0	206	7	9	1	2	0	0	19	41	0	31	9	3	0	84	0	54	323	21	55	0	453	0	0	0	0	2	2	4	865
06:30 PM	8	7	35	52	0	0	102	1	1	181	0	7	0	190	4	5	0	0	0	0	9	34	0	30	13	4	0	81	1	51	264	12	72	0	400	0	1	0	0	2	0	3	785
06:45 PM	5	3	35	52	0	2	97	0	1	168	1	2	0	172	0	6	0	0	2	0	8	30	0	15	9	0	0	54	2	59	295	18	47	0	421	0	0	0	1	1	2	4	756
Total	24	19	180	174	0	6	403	2	11	717	1	37	0	768	12	33	1	6	2	0	54	153	0	96	41	7	0	297	4	207	1142	67	238	0	1658	1	2	1	1	7	6	18	3198
07:00 PM	3	0	24	32	0	0	59	0	10	169	0	8	0	187	0	10	0	4	5	0	19	37	1	13	4	0	0	55	1	43	167	9	30	0	250	0	0	0	1	3	0	4	574
07:15 PM	1	0	17	35	0	0	53	0	5	170	0	0	0	175	0	6	0	4	2	0	12	32	0	16	4	1	0	53	3	48	160	7	29	0	247	0	0	0	0	2	0	2	542
07:30 PM	5	2	27	34	0	0	68	0	8	182	0	17	0	207	0	4	0	0	0	0	4	21	0	6	4	0	0	31	2	28	134	7	20	0	191	0	0	0	0	1	0	1	502
07:45 PM	4	0	14	33	0	2	53	0	5	188	0	7	1	201	0	3	0	0	1	0	4	21	0	8	2	1	0	32	1	30	120	14	36	0	201	1	0	0	0	2	2	5	496
Total	13	2	82	134	0	2	233	0	28	709	0	32	1	770	0	23	0	8	8	0	39	111	1	43	14	2	0	171	7	149	581	37	115	0	889	1	0	0	1	8	2	12	2114
Grand Total	37	21	262	308	0	8	636	2	39	1426	1	69	1	1538	12	56	1	14	10	0	93	264	1	139	55	9	0	468	11	356	1723	104	353	0	2547	2	2	1	2	15	8	30	5312
Apprch %	5.8	3.3	41.2	48.4	0	1.3		0.1	2.5	92.7	0.1	4.5	0.1		12.9	60.2	1.1	15.1	10.8	0		56.4	0.2	29.7	11.8	1.9	0		0.4	14	67.6	4.1	13.9	0		6.7	6.7	3.3	6.7	50	26.7		
Total %	0.7	0.4	4.9	5.8	0	0.2	12	0	0.7	26.8	0	1.3	0	29	0.2	1.1	0	0.3	0.2	0	1.8	5	0	2.6	1	0.2	0	8.8	0.2	6.7	32.4	2	6.6	0	47.9	0	0	0	0	0.3	0.2	0.6	
cars	36	21	259	299	0	8	623	2	39	1403	1	65	0	1510	12	53	1	14	9	0	89	262	1	138	55	9	0	465	11	353	1711	104	346	0	2525	2	2	1	2	15	8	30	5242
% cars	97.3	100	98.9	97.1	0	100	98	100	100	98.4	100	94.2	0	98.2	100	94.6	100	100	90	0	95.7	99.2	100	99.3	100	100	0	99.4	100	99.2	99.3	100	98	0	99.1	100	100	100	100	100	100	100	98.7
HV	1	0	3	9	0	0	13	0	0	23	0	4	1	28	0	3	0	0	1	0	4	2	0	1	0	0	0	3	0	3	12	0	7	0	22	0	0	0	0	0	0	0	70
% HV	2.7	0	1.1	2.9	0	0	2	0	0	1.6	0	5.8	100	1.8	0	5.4	0	0	10	0	4.3	0.8	0	0.7	0	0	0	0.6	0	0.8	0.7	0	2	0	0.9	0	0	0	0	0	0	0	1.3

	North Spring Mill Road Southbound						Lancaster Avenue Westbound						Aldwyn Lane Northwestbound						Sproul Road Northbound						Lancaster Avenue Eastbound						Kenilworth Road Southeastbound						
Start Time	L to Lanc	L to Ald	T to Spr	R to Lanc	R to Ken	App. Total	L to Ald	L to Spr	T to Lanc	R to Ken	R to S Mill	App. Total	L to Spr	L to Lanc	T to Ken	R to S Mill	R to Lanc	App. Total	L to Lanc	L to Ken	T to S Mill	R to Lanc	R to Ald	App. Total	L to Ken	L to S Mill	T to Lanc	R to Ald	R to Spr	App. Total	L to S Mill	L to Lanc	T to Ald	R to Spr	R to Lanc	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 06:45 PM - Peak 1 of 1																																					
Peak Hour for Entire Intersection Begins at 06:00 PM																																					
06:00 PM	3	2	**69**	29	0	**103**	0	**5**	176	0	**19**	200	1	**13**	**0**	**4**	0	18	**48**	**0**	20	10	0	78	1	43	260	16	64	384	**1**	**1**	**1**	0	**2**	**5**	788
06:15 PM	**8**	**7**	41	41	0	97	**1**	**4**	**192**	0	9	**206**	**7**	9	**1**	2	0	**19**	41	0	**31**	**9**	**3**	**84**	0	54	**323**	**21**	55	**453**	0	0	0	0	2	2	**861**
06:30 PM	8	7	35	**52**	**0**	102	1	1	181	0	7	190	4	5	0	0	0	9	34	0	30	**13**	**4**	81	1	51	264	12	**72**	400	0	1	0	0	2	3	785
06:45 PM	5	3	35	52	0	95	0	1	168	**1**	2	172	0	6	0	0	**2**	8	30	0	15	9	0	54	**2**	**59**	295	18	47	421	0	0	0	**1**	1	2	752
Total Volume	24	19	180	174	0	397	2	11	717	1	37	768	12	33	1	6	2	54	153	0	96	41	7	297	4	207	1142	67	238	1658	1	2	1	1	7	12	3186
% App. Total	6	4.8	45.3	43.8	0		0.3	1.4	93.4	0.1	4.8		22.2	61.1	1.9	11.1	3.7		51.5	0	32.3	13.8	2.4		0.2	12.5	68.9	4	14.4		8.3	16.7	8.3	8.3	58.3		
PHF	.750	.679	.652	.837	.000	.964	.500	.550	.934	.250	.487	.932	.429	.635	.250	.375	.250	.711	.797	.000	.774	.788	.438	.884	.500	.877	.884	.798	.826	.915	.250	.500	.250	.250	.875	.600	.925
cars	23	19	179	171	0	392	2	11	703	1	34	751	12	33	1	6	2	54	152	0	95	41	7	295	4	206	1132	67	231	1640	1	2	1	1	7	12	3144
% cars	95.8	100	99.4	98.3	0	98.7	100	100	98.0	100	91.9	97.8	100	100	100	100	100	100	99.3	0	99.0	100	100	99.3	100	99.5	99.1	100	97.1	98.9	100	100	100	100	100	100	98.7
HV	1	0	1	3	0	5	0	0	14	0	3	17	0	0	0	0	0	0	1	0	1	0	0	2	0	1	10	0	7	18	0	0	0	0	0	0	42
% HV	4.2		0.6	1.7		1.3			2.0		8.1	2.2							0.7		1.0			0.7		0.5	0.9		2.9	1.1							1.3

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Spring Mill/Sproul Rd
& Kenilworth Rd/Aldwyn Ln

File Name : 01-30SproulEve
Site Code : 00000000
Start Date : 12/11/2012
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Groups Printed- HV

	North Spring Mill Road Southbound							Lancaster Avenue Westbound							Aldwyn Lane Northwestbound							Sproul Road Northbound							Lancaster Avenue Eastbound							Kenilworth Road Southeastbound							
Start Time	L to Lanc	L to Ald					App. Total	L to Ald	L to Spr					App. Total	L to Spr	L to Lanc					App. Total	L to Lanc	L to Ken					App. Total	L to Ken	L to S Mill					App. Total	L to S Mill	L to Lanc					App. Total	Int. Total
06:00 PM	0	0	1	1	0	0	2	0	0	7	0	1	0	8	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2	0	5	0	7	0	0	0	0	0	0	0	18
06:15 PM	1	0	0	0	0	0	1	0	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	7
06:30 PM	0	0	0	0	0	0	0	0	0	2	0	1	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	2	0	4	0	0	0	0	0	0	0	8
06:45 PM	0	0	0	2	0	0	2	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	9
Total	1	0	1	3	0	0	5	0	0	14	0	3	0	17	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	1	10	0	7	0	18	0	0	0	0	0	0	0	42
07:00 PM	0	0	1	0	0	0	1	0	0	3	0	1	0	4	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
07:15 PM	0	0	0	1	0	0	1	0	0	2	0	0	0	2	0	2	0	0	0	0	2	1	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	7
07:30 PM	0	0	1	5	0	0	6	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0	0	0	0	0	0	0	12
07:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	3
Total	0	0	2	6	0	0	8	0	0	9	0	1	1	11	0	3	0	0	1	0	4	1	0	0	0	0	0	1	0	2	2	0	0	0	4	0	0	0	0	0	0	0	28
Grand Total	1	0	3	9	0	0	13	0	0	23	0	4	1	28	0	3	0	0	1	0	4	2	0	1	0	0	0	3	0	3	12	0	7	0	22	0	0	0	0	0	0	0	70
Apprch %	7.7	0	23.1	69.2	0	0		0	0	82.1	0	14.3	3.6		0	75	0	0	25	0		66.7	0	33.3	0	0	0		0	13.6	54.5	0	31.8	0		0	0	0	0	0	0		
Total %	1.4	0	4.3	12.9	0	0	18.6	0	0	32.9	0	5.7	1.4	40	0	4.3	0	0	1.4	0	5.7	2.9	0	1.4	0	0	0	4.3	0	4.3	17.1	0	10	0	31.4	0	0	0	0	0	0	0	

	North Spring Mill Road Southbound						Lancaster Avenue Westbound						Aldwyn Lane Northwestbound						Sproul Road Northbound						Lancaster Avenue Eastbound						Kenilworth Road Southeastbound						
Start Time	L to Lanc	L to Ald	T to Spr	R to Lanc	R to Ken	App. Total	L to Ald	L to Spr	T to Lanc	R to Ken	R to S Mill	App. Total	L to Spr	L to Lanc	T to Ken	R to S Mill	R to Lanc	App. Total	L to Lanc	L to Ken	T to S Mill	R to Lanc	R to Ald	App. Total	L to Ken	L to S Mill	T to Lanc	R to Ald	R to Spr	App. Total	L to S Mill	L to Lanc	T to Ald	R to Spr	R to Lanc	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 06:45 PM - Peak 1 of 1																																					
Peak Hour for Entire Intersection Begins at 06:00 PM																																					
06:00 PM	0	0	**1**	1	0	**2**	0	0	**7**	0	**1**	**8**	0	0	0	0	0	0	**1**	0	0	0	0	**1**	0	0	2	0	**5**	**7**	0	0	0	0	0	0	**18**
06:15 PM	**1**	0	0	0	0	1	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**	0	0	4	0	0	0	0	0	0	7
06:30 PM	0	0	0	0	0	0	0	0	2	0	1	3	0	0	0	0	0	0	0	0	**1**	0	0	1	0	**1**	1	0	2	4	0	0	0	0	0	0	8
06:45 PM	0	0	0	**2**	0	2	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	9
Total	1	0	1	3	0	5	0	0	14	0	3	17	0	0	0	0	0	0	1	0	1	0	0	2	0	1	10	0	7	18	0	0	0	0	0	0	42
Volume																																					
% App. Total	20	0	20	60	0		0	0	82.4	0	17.6		0	0	0	0	0		50	0	50	0	0		0	5.6	55.6	0	38.9		0	0	0	0	0		
PHF	.250	.000	.250	.375	.000	.625	.000	.000	.500	.000	.750	.531	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.500	.000	.250	.625	.000	.350	.643	.000	.000	.000	.000	.000	.000	.583

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Ithan Avenues

EB Peds = diag peds NE-SW
WB Peds = diag peds NW-SE

File Name : 02-30IthanEve
Site Code : 00000000
Start Date : 12/11/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound					Lancaster Avenue Westbound						Ithan Avenue Northbound					Lancaster Avenue Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NW-SE Peds	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NE-SW Peds	Peds	App. Total	Int. Total
06:00 PM	15	51	12	10	88	44	164	19	82	94	403	7	24	9	0	40	34	178	52	35	76	375	906
06:15 PM	11	44	12	37	104	62	144	14	78	151	449	14	26	10	4	54	27	176	49	47	92	391	998
06:30 PM	4	32	10	39	85	65	164	26	172	236	663	16	26	6	0	48	37	170	43	137	71	458	1254
06:45 PM	7	52	17	45	121	49	135	15	118	332	649	18	74	21	5	118	29	147	32	128	24	360	1248
Total	37	179	51	131	398	220	607	74	450	813	2164	55	150	46	9	260	127	671	176	347	263	1584	4406
07:00 PM	5	29	5	42	81	34	126	14	68	175	417	21	51	14	0	86	17	153	28	99	49	346	930
07:15 PM	4	13	12	15	44	29	152	9	76	98	364	32	37	24	0	93	23	133	18	38	57	269	770
07:30 PM	15	28	10	8	61	41	104	9	64	56	274	26	26	18	2	72	14	101	14	6	50	185	592
07:45 PM	5	28	10	0	43	21	106	13	85	93	318	18	16	18	0	52	6	115	6	2	43	172	585
Total	29	98	37	65	229	125	488	45	293	422	1373	97	130	74	2	303	60	502	66	145	199	972	2877
Grand Total	66	277	88	196	627	345	1095	119	743	1235	3537	152	280	120	11	563	187	1173	242	492	462	2556	7283
Apprch %	10.5	44.2	14	31.3		9.8	31	3.4	21	34.9		27	49.7	21.3	2		7.3	45.9	9.5	19.2	18.1		
Total %	0.9	3.8	1.2	2.7	8.6	4.7	15	1.6	10.2	17	48.6	2.1	3.8	1.6	0.2	7.7	2.6	16.1	3.3	6.8	6.3	35.1	
cars	65	273	85	196	619	345	1073	116	743	1235	3512	152	274	120	11	557	181	1164	241	492	462	2540	7228
% cars	98.5	98.6	96.6	100	98.7	100	98	97.5	100	100	99.3	100	97.9	100	100	98.9	96.8	99.2	99.6	100	100	99.4	99.2
HV	1	4	3	0	8	0	22	3	0	0	25	0	6	0	0	6	6	9	1	0	0	16	55
% HV	1.5	1.4	3.4	0	1.3	0	2	2.5	0	0	0.7	0	2.1	0	0	1.1	3.2	0.8	0.4	0	0	0.6	0.8

	Ithan Avenue Southbound				Lancaster Avenue Westbound				Ithan Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 07:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 PM																	
06:00 PM	**15**	51	12	**78**	44	**164**	19	227	7	24	9	40	34	**178**	**52**	**264**	**609**
06:15 PM	11	44	12	67	62	144	14	220	14	26	10	50	27	176	49	252	589
06:30 PM	4	32	10	46	**65**	164	**26**	**255**	16	26	6	48	**37**	170	43	250	599
06:45 PM	7	**52**	**17**	76	49	135	15	199	**18**	**74**	**21**	**113**	29	147	32	208	596
Total Volume	37	179	51	267	220	607	74	901	55	150	46	251	127	671	176	974	2393
% App. Total	13.9	67	19.1		24.4	67.4	8.2		21.9	59.8	18.3		13	68.9	18.1		
PHF	.617	.861	.750	.856	.846	.925	.712	.883	.764	.507	.548	.555	.858	.942	.846	.922	.982
cars	36	177	48	261	220	593	71	884	55	146	46	247	122	666	176	964	2356
% cars	97.3	98.9	94.1	97.8	100	97.7	95.9	98.1	100	97.3	100	98.4	96.1	99.3	100	99.0	98.5
HV	1	2	3	6	0	14	3	17	0	4	0	4	5	5	0	10	37
% HV	2.7	1.1	5.9	2.2	0	2.3	4.1	1.9	0	2.7	0	1.6	3.9	0.7	0	1.0	1.5

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster & Ithan Avenues

EB Peds = diag peds NE-SW
WB Peds = diag peds NW-SE

File Name : 02-30IthanEve
Site Code : 00000000
Start Date : 12/11/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound					Lancaster Avenue Westbound						Ithan Avenue Northbound					Lancaster Avenue Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NW-SE Peds	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NE-SW Peds	Peds	App. Total	Int. Total
06:00 PM	0	1	1	0	2	0	6	1	0	0	7	0	1	0	0	1	2	0	0	0	0	2	12
06:15 PM	1	1	1	0	3	0	2	2	0	0	4	0	0	0	0	0	1	3	0	0	0	4	11
06:30 PM	0	0	1	0	1	0	2	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	4
06:45 PM	0	0	0	0	0	0	4	0	0	0	4	0	3	0	0	3	1	2	0	0	0	3	10
Total	1	2	3	0	6	0	14	3	0	0	17	0	4	0	0	4	5	5	0	0	0	10	37
07:00 PM	0	1	0	0	1	0	2	0	0	0	2	0	0	0	0	0	1	1	0	0	0	2	5
07:15 PM	0	0	0	0	0	0	2	0	0	0	2	0	1	0	0	1	0	2	0	0	0	2	5
07:30 PM	0	1	0	0	1	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	5
07:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	2	3
Total	0	2	0	0	2	0	8	0	0	0	8	0	2	0	0	2	1	4	1	0	0	6	18
Grand Total	1	4	3	0	8	0	22	3	0	0	25	0	6	0	0	6	6	9	1	0	0	16	55
Apprch %	12.5	50	37.5	0		0	88	12	0	0		0	100	0	0		37.5	56.2	6.2	0	0		
Total %	1.8	7.3	5.5	0	14.5	0	40	5.5	0	0	45.5	0	10.9	0	0	10.9	10.9	16.4	1.8	0	0	29.1	

	Ithan Avenue Southbound				Lancaster Avenue Westbound				Ithan Avenue Northbound				Lancaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 PM																	
06:00 PM	0	**1**	**1**	2	0	**6**	1	**7**	0	1	0	1	**2**	0	0	2	**12**
06:15 PM	**1**	1	1	**3**	0	2	**2**	4	0	0	0	0	1	**3**	0	**4**	11
06:30 PM	0	0	1	1	0	2	0	2	0	0	0	0	1	0	0	1	4
06:45 PM	0	0	0	0	0	4	0	4	0	**3**	0	**3**	1	2	0	3	10
Total Volume	1	2	3	6	0	14	3	17	0	4	0	4	5	5	0	10	37
% App. Total	16.7	33.3	50		0	82.4	17.6		0	100	0		50	50	0		
PHF	.250	.500	.750	.500	.000	.583	.375	.607	.000	.333	.000	.333	.625	.417	.000	.625	.771

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Sproul & Conestoga Roads

File Name : 05-sprconeve
Site Code : 00000000
Start Date : 12/11/2012
Page No : 1

Groups Printed- cars - HV

	Sproul Road Southbound					Conestoga Road Westbound					Sproul Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 PM	17	61	17	1	96	6	74	10	0	90	35	37	7	0	79	24	172	44	0	240	505
06:15 PM	21	42	25	0	88	5	106	7	0	118	21	44	12	0	77	28	150	39	0	217	500
06:30 PM	29	40	18	0	87	9	72	10	0	91	22	32	8	0	62	27	150	60	0	237	477
06:45 PM	16	43	18	0	77	7	66	10	0	83	25	31	3	0	59	26	94	32	0	152	371
Total	83	186	78	1	348	27	318	37	0	382	103	144	30	0	277	105	566	175	0	846	1853
07:00 PM	9	31	15	0	55	8	75	14	0	97	21	22	4	0	47	17	82	42	0	141	340
07:15 PM	8	22	10	0	40	4	79	5	0	88	27	29	4	0	60	8	71	37	0	116	304
07:30 PM	6	29	7	0	42	3	60	3	0	66	14	18	7	0	39	11	47	31	0	89	236
07:45 PM	10	28	10	0	48	3	69	2	0	74	18	10	1	0	29	10	43	28	0	81	232
Total	33	110	42	0	185	18	283	24	0	325	80	79	16	0	175	46	243	138	0	427	1112
Grand Total	116	296	120	1	533	45	601	61	0	707	183	223	46	0	452	151	809	313	0	1273	2965
Apprch %	21.8	55.5	22.5	0.2		6.4	85	8.6	0		40.5	49.3	10.2	0		11.9	63.6	24.6	0		
Total %	3.9	10	4	0	18	1.5	20.3	2.1	0	23.8	6.2	7.5	1.6	0	15.2	5.1	27.3	10.6	0	42.9	
cars	116	295	119	1	531	43	597	61	0	701	183	221	45	0	449	151	809	312	0	1272	2953
% cars	100	99.7	99.2	100	99.6	95.6	99.3	100	0	99.2	100	99.1	97.8	0	99.3	100	100	99.7	0	99.9	99.6
HV	0	1	1	0	2	2	4	0	0	6	0	2	1	0	3	0	0	1	0	1	12
% HV	0	0.3	0.8	0	0.4	4.4	0.7	0	0	0.8	0	0.9	2.2	0	0.7	0	0	0.3	0	0.1	0.4

	Sproul Road Southbound				Conestoga Road Westbound				Sproul Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 07:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 PM																	
06:00 PM	17	**61**	17	**95**	6	74	**10**	90	**35**	37	7	**79**	24	**172**	44	**240**	**504**
06:15 PM	21	42	**25**	88	5	**106**	7	**118**	21	**44**	**12**	77	**28**	150	39	217	500
06:30 PM	**29**	40	18	87	**9**	72	10	91	22	32	8	62	27	150	**60**	237	477
06:45 PM	16	43	18	77	7	66	10	83	25	31	3	59	26	94	32	152	371
Total Volume	83	186	78	347	27	318	37	382	103	144	30	277	105	566	175	846	1852
% App. Total	23.9	53.6	22.5		7.1	83.2	9.7		37.2	52	10.8		12.4	66.9	20.7		
PHF	.716	.762	.780	.913	.750	.750	.925	.809	.736	.818	.625	.877	.938	.823	.729	.881	.919
cars	83	185	78	346	25	314	37	376	103	143	30	276	105	566	174	845	1843
% cars	100	99.5	100	99.7	92.6	98.7	100	98.4	100	99.3	100	99.6	100	100	99.4	99.9	99.5
HV	0	1	0	1	2	4	0	6	0	1	0	1	0	0	1	1	9
% HV	0	0.5	0	0.3	7.4	1.3	0	1.6	0	0.7	0	0.4	0	0	0.6	0.1	0.5

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Sproul & Conestoga Roads

File Name : 05-sprconeve
Site Code : 00000000
Start Date : 12/11/2012
Page No : 1

Groups Printed- HV

	Sproul Road Southbound					Conestoga Road Westbound					Sproul Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	2
06:15 PM	0	0	0	0	0	1	2	0	0	3	0	1	0	0	1	0	0	0	0	0	4
06:30 PM	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
06:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	0	1	2	4	0	0	6	0	1	0	0	1	0	0	1	0	1	9
07:00 PM	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
07:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
07:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	1	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	3
Grand Total	0	1	1	0	2	2	4	0	0	6	0	2	1	0	3	0	0	1	0	1	12
Apprch %	0	50	50	0		33.3	66.7	0	0		0	66.7	33.3	0		0	0	100	0		
Total %	0	8.3	8.3	0	16.7	16.7	33.3	0	0	50	0	16.7	8.3	0	25	0	0	8.3	0	8.3	

	Sproul Road Southbound				Conestoga Road Westbound				Sproul Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 PM																	
06:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	**1**	**1**	2
06:15 PM	0	0	0	0	**1**	**2**	0	**3**	0	**1**	0	**1**	0	0	0	0	**4**
06:30 PM	0	**1**	0	**1**	1	0	0	1	0	0	0	0	0	0	0	0	2
06:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	1	0	1	2	4	0	6	0	1	0	1	0	0	1	1	9
% App. Total	0	100	0		33.3	66.7	0		0	100	0		0	0	100		
PHF	.000	.250	.000	.250	.500	.500	.000	.500	.000	.250	.000	.250	.000	.000	.250	.250	.563

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga & Spring Mill Roads

File Name : 06-ConSpMEve
Site Code : 00000000
Start Date : 12/11/2012
Page No : 1

Groups Printed- cars - HV

	Spring Mill Road Southbound				Conestoga Road Westbound				Conestoga Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
06:00 PM	2	3	0	5	91	0	0	91	0	200	0	200	296
06:15 PM	2	1	0	3	120	0	0	120	0	187	0	187	310
06:30 PM	1	1	0	2	87	2	0	89	0	186	0	186	277
06:45 PM	1	0	0	1	83	0	0	83	1	112	0	113	197
Total	6	5	0	11	381	2	0	383	1	685	0	686	1080
07:00 PM	1	1	0	2	100	2	0	102	1	95	0	96	200
07:15 PM	0	1	0	1	88	0	0	88	2	80	0	82	171
07:30 PM	0	0	0	0	60	0	0	60	2	64	0	66	126
07:45 PM	2	0	0	2	79	0	0	79	0	51	0	51	132
Total	3	2	0	5	327	2	0	329	5	290	0	295	629
Grand Total	9	7	0	16	708	4	0	712	6	975	0	981	1709
Apprch %	56.2	43.8	0		99.4	0.6	0		0.6	99.4	0		
Total %	0.5	0.4	0	0.9	41.4	0.2	0	41.7	0.4	57.1	0	57.4	
cars	9	7	0	16	702	4	0	706	6	974	0	980	1702
% cars	100	100	0	100	99.2	100	0	99.2	100	99.9	0	99.9	99.6
HV	0	0	0	0	6	0	0	6	0	1	0	1	7
% HV	0	0	0	0	0.8	0	0	0.8	0	0.1	0	0.1	0.4

	Spring Mill Road Southbound			Conestoga Road Westbound			Conestoga Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 07:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 06:00 PM										
06:00 PM	**2**	**3**	**5**	91	0	91	0	**200**	**200**	296
06:15 PM	2	1	3	**120**	0	**120**	0	187	187	**310**
06:30 PM	1	1	2	87	**2**	89	0	186	186	277
06:45 PM	1	0	1	83	0	83	**1**	112	113	197
Total Volume	6	5	11	381	2	383	1	685	686	1080
% App. Total	54.5	45.5		99.5	0.5		0.1	99.9		
PHF	.750	.417	.550	.794	.250	.798	.250	.856	.858	.871
cars	6	5	11	375	2	377	1	685	686	1074
% cars	100	100	100	98.4	100	98.4	100	100	100	99.4
HV	0	0	0	6	0	6	0	0	0	6
% HV	0	0	0	1.6	0	1.6	0	0	0	0.6

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga & Spring Mill Roads

File Name : 06-ConSpMEve
Site Code : 00000000
Start Date : 12/11/2012
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Groups Printed- HV

	Spring Mill Road Southbound				Conestoga Road Westbound				Conestoga Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
06:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
06:15 PM	0	0	0	0	3	0	0	3	0	0	0	0	3
06:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
06:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
Total	0	0	0	0	6	0	0	6	0	0	0	0	6
07:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
07:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	1	0	1	1
Grand Total	0	0	0	0	6	0	0	6	0	1	0	1	7
Apprch %	0	0	0		100	0	0		0	100	0		
Total %	0	0	0	0	85.7	0	0	85.7	0	14.3	0	14.3	

	Spring Mill Road Southbound			Conestoga Road Westbound			Conestoga Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 06:00 PM										
06:00 PM	0	0	0	1	0	1	0	0	0	1
06:15 PM	0	0	0	**3**	0	**3**	0	0	0	**3**
06:30 PM	0	0	0	1	0	1	0	0	0	1
06:45 PM	0	0	0	1	0	1	0	0	0	1
Total Volume	0	0	0	6	0	6	0	0	0	6
% App. Total	0	0		100	0		0	0		
PHF	.000	.000	.000	.500	.000	.500	.000	.000	.000	.500

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Ithan Avenue

File Name : 07-conitheve
Site Code : 00000000
Start Date : 12/11/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound					Conestoga Road Westbound					Ithan Avenue Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 PM	9	9	13	0	31	3	72	11	0	86	0	13	4	0	17	31	126	2	0	159	293
06:15 PM	2	7	14	0	23	2	97	17	0	116	1	25	1	0	27	38	126	1	0	165	331
06:30 PM	7	1	11	0	19	3	76	25	0	104	0	22	3	0	25	49	124	1	0	174	322
06:45 PM	6	3	17	0	26	3	61	16	0	80	1	15	0	0	16	28	79	0	0	107	229
Total	24	20	55	0	99	11	306	69	0	386	2	75	8	0	85	146	455	4	0	605	1175
07:00 PM	9	4	21	0	34	0	69	6	0	75	1	7	0	0	8	11	74	1	0	86	203
07:15 PM	12	12	17	0	41	1	57	11	0	69	0	6	2	0	8	10	49	0	0	59	177
07:30 PM	2	4	6	0	12	0	55	6	0	61	0	2	0	0	2	8	45	1	0	54	129
07:45 PM	5	1	10	0	16	0	55	3	0	58	0	0	1	0	1	7	31	0	0	38	113
Total	28	21	54	0	103	1	236	26	0	263	1	15	3	0	19	36	199	2	0	237	622
Grand Total	52	41	109	0	202	12	542	95	0	649	3	90	11	0	104	182	654	6	0	842	1797
Apprch %	25.7	20.3	54	0		1.8	83.5	14.6	0		2.9	86.5	10.6	0		21.6	77.7	0.7	0		
Total %	2.9	2.3	6.1	0	11.2	0.7	30.2	5.3	0	36.1	0.2	5	0.6	0	5.8	10.1	36.4	0.3	0	46.9	
cars	52	41	106	0	199	12	540	95	0	647	3	90	11	0	104	180	654	6	0	840	1790
% cars	100	100	97.2	0	98.5	100	99.6	100	0	99.7	100	100	100	0	100	98.9	100	100	0	99.8	99.6
HV	0	0	3	0	3	0	2	0	0	2	0	0	0	0	0	2	0	0	0	2	7
% HV	0	0	2.8	0	1.5	0	0.4	0	0	0.3	0	0	0	0	0	1.1	0	0	0	0.2	0.4

	Ithan Avenue Southbound				Conestoga Road Westbound				Ithan Avenue Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 07:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 PM																	
06:00 PM	**9**	**9**	13	**31**	**3**	72	11	86	0	13	**4**	17	31	**126**	**2**	159	293
06:15 PM	2	7	14	23	2	**97**	17	**116**	**1**	**25**	1	**27**	38	126	1	165	**331**
06:30 PM	7	1	11	19	3	76	**25**	104	0	22	3	25	**49**	124	1	**174**	322
06:45 PM	6	3	**17**	26	3	61	16	80	1	15	0	16	28	79	0	107	229
Total Volume	24	20	55	99	11	306	69	386	2	75	8	85	146	455	4	605	1175
% App. Total	24.2	20.2	55.6		2.8	79.3	17.9		2.4	88.2	9.4		24.1	75.2	0.7		
PHF	.667	.556	.809	.798	.917	.789	.690	.832	.500	.750	.500	.787	.745	.903	.500	.869	.887
cars	24	20	52	96	11	304	69	384	2	75	8	85	145	455	4	604	1169
% cars	100	100	94.5	97.0	100	99.3	100	99.5	100	100	100	100	99.3	100	100	99.8	99.5
HV	0	0	3	3	0	2	0	2	0	0	0	0	1	0	0	1	6
% HV	0	0	5.5	3.0	0	0.7	0	0.5	0	0	0	0	0.7	0	0	0.2	0.5

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Conestoga Road & Ithan Avenue

File Name : 07-conitheve
Site Code : 00000000
Start Date : 12/11/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound					Conestoga Road Westbound					Ithan Avenue Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2
06:15 PM	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	3
06:30 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	3	0	3	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	6
07:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
07:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Grand Total	0	0	3	0	3	0	2	0	0	2	0	0	0	0	0	2	0	0	0	2	7
Apprch %	0	0	100	0		0	100	0	0		0	0	0	0		100	0	0	0		
Total %	0	0	42.9	0	42.9	0	28.6	0	0	28.6	0	0	0	0	0	28.6	0	0	0	28.6	

	Ithan Avenue Southbound				Conestoga Road Westbound				Ithan Avenue Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:00 PM																	
06:00 PM	0	0	**1**	**1**	0	0	0	0	0	0	0	0	**1**	0	0	**1**	2
06:15 PM	0	0	1	1	0	**2**	0	**2**	0	0	0	0	0	0	0	0	**3**
06:30 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	3	3	0	2	0	2	0	0	0	0	1	0	0	1	6
% App. Total	0	0	100		0	100	0		0	0	0		100	0	0		
PHF	.000	.000	.750	.750	.000	.250	.000	.250	.000	.000	.000	.000	.250	.000	.000	.250	.500

F. Tavani and Associates, Inc.

105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Spring Mill/Sproul Rd
& Kenilworth Rd/Aldwyn Ln
Homecoming

File Name : 30SproulSat
Site Code : 00000000
Start Date : 10/27/2012
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Groups Printed- cars - HV

	North Spring Mill Road Southbound							Lancaster Avenue Westbound							Aldwyn Lane Northwestbound							Sproul Road Northbound							Lancaster Avenue Eastbound							Kenilworth Road Southeastbound							
Start Time	Lt o Lanc	Lt o Ald					App. Total	Lt o Ald	Lt o Spr					App. Total	Lt o Spr	Lt o Lanc					App. Total	Lt o Lanc	Lt o Ken					App. Total	Lt o Ken	Lt o S Mill					App. Total	Lt o S Mill	Lt o Lanc					App. Total	Int. Total
12:00 PM	10	0	28	42	0	0	80	0	4	179	0	8	0	191	1	10	0	0	3	0	14	44	0	31	1	0	0	76	1	52	230	21	51	0	355	0	1	0	1	3	0	5	721
12:15 PM	5	0	24	54	0	0	83	0	1	204	0	16	0	221	0	13	0	1	0	0	14	46	1	25	8	1	0	81	0	60	207	19	30	0	316	0	0	0	1	1	0	2	717
12:30 PM	14	0	20	52	0	0	86	0	2	174	0	5	0	181	2	5	0	1	0	0	8	51	0	26	5	2	0	84	0	66	188	11	35	0	300	0	0	0	0	4	0	4	663
12:45 PM	11	0	18	40	0	11	80	0	2	155	0	9	0	166	1	13	0	2	1	3	20	54	0	16	4	0	0	74	1	64	239	14	38	0	356	0	0	0	1	1	0	2	698
Total	40	0	90	188	0	11	329	0	9	712	0	38	0	759	4	41	0	4	4	3	56	195	1	98	18	3	0	315	2	242	864	65	154	0	1327	0	1	0	3	9	0	13	2799
01:00 PM	11	0	24	50	0	2	87	0	7	182	0	9	0	198	0	6	0	2	0	0	8	32	0	23	7	0	0	62	1	53	177	10	37	0	278	0	0	0	0	4	0	4	637
01:15 PM	17	0	20	41	0	6	84	0	2	162	0	7	0	171	0	11	0	2	0	0	13	37	0	21	8	5	0	71	2	45	203	13	32	0	295	0	0	0	1	4	0	5	639
01:30 PM	15	0	15	66	0	0	96	0	4	206	0	6	0	216	0	6	0	0	1	3	10	27	0	16	4	1	0	48	2	44	194	13	39	0	292	1	0	0	0	1	0	2	664
01:45 PM	15	0	21	60	0	2	98	0	2	173	0	7	0	182	0	5	0	2	1	0	8	29	0	18	5	1	0	53	3	56	191	11	27	0	288	0	0	0	1	1	0	2	631
Total	58	0	80	217	0	10	365	0	15	723	0	29	0	767	0	28	0	6	2	3	39	125	0	78	24	7	0	234	8	198	765	47	135	0	1153	1	0	0	2	10	0	13	2571
02:00 PM	27	0	24	59	0	5	115	0	7	177	0	9	0	193	0	10	0	0	0	0	10	33	0	23	2	1	0	59	2	43	159	19	31	0	254	0	0	0	0	3	0	3	634
02:15 PM	10	0	27	57	0	3	97	0	4	176	0	11	0	191	2	6	0	0	1	0	9	26	0	17	3	1	0	47	0	37	152	9	27	0	225	1	0	0	1	1	0	3	572
02:30 PM	7	0	23	73	0	0	103	0	3	179	0	7	0	189	0	10	0	0	0	0	10	30	0	16	3	0	0	49	3	45	170	11	34	0	263	0	1	0	0	5	0	6	620
02:45 PM	7	0	19	61	0	4	91	0	3	183	0	4	0	190	0	14	0	0	1	0	15	26	0	18	5	2	0	51	1	51	142	13	35	0	242	0	0	0	0	1	0	1	590
Total	51	0	93	250	0	12	406	0	17	715	0	31	0	763	2	40	0	0	2	0	44	115	0	74	13	4	0	206	6	176	623	52	127	0	984	1	1	0	1	10	0	13	2416
Grand Total	149	0	263	655	0	33	1100	0	41	2150	0	98	0	2289	6	109	0	10	8	6	139	435	1	250	55	14	0	755	16	616	2252	164	416	0	3464	2	2	0	6	29	0	39	7786
Apprch %	13.5	0	23.9	59.5	0	3		0	1.8	93.9	0	4.3	0		4.3	78.4	0	7.2	5.8	4.3		57.6	0.1	33.1	7.3	1.9	0		0.5	17.8	65	4.7	12	0		5.1	5.1	0	15.4	74.4	0		
Total %	1.9	0	3.4	8.4	0	0.4	14.1	0	0.5	27.6	0	1.3	0	29.4	0.1	1.4	0	0.1	0.1	0.1	1.8	5.6	0	3.2	0.7	0.2	0	9.7	0.2	7.9	28.9	2.1	5.3	0	44.5	0	0	0	0.1	0.4	0	0.5	
cars	145	0	257	643	0	33	1078	0	41	2106	0	96	0	2243	6	109	0	10	7	6	138	426	1	243	51	14	0	735	16	612	2223	164	409	0	3424	2	2	0	5	29	0	38	7656
% cars	97.3	0	97.7	98.2	0	100	98	0	100	98	0	98	0	98	100	100	0	100	87.5	100	99.3	97.9	100	97.2	92.7	100	0	97.4	100	99.4	98.7	100	98.3	0	98.8	100	100	0	83.3	100	0	97.4	98.3
HV	4	0	6	12	0	0	22	0	0	44	0	2	0	46	0	0	0	0	1	0	1	9	0	7	4	0	0	20	0	4	29	0	7	0	40	0	0	0	1	0	0	1	130
% HV	2.7	0	2.3	1.8	0	0	2	0	0	2	0	2	0	2	0	0	0	0	12.5	0	0.7	2.1	0	2.8	7.3	0	0	2.6	0	0.6	1.3	0	1.7	0	1.2	0	0	0	16.7	0	0	2.6	1.7

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Lancaster Avenue & Spring Mill/Sproul Rd
& Kenilworth Rd/Aldwyn Ln
Homecoming

File Name : 30SproulSat
Site Code : 00000000
Start Date : 10/27/2012

	North Spring Mill Road Southbound						Lancaster Avenue Westbound						Aldwyn Lane Northwestbound						Sproul Road Northbound						Lancaster Avenue Eastbound						Kenilworth Road Southeastbound						
Start Time	L to Lanc	L to Ald	T to Spr	R to Lanc	R to Ken	App. Total	L to Ald	L to Spr	T to Lanc	R to Ken	R to S Mill	App. Total	L to Spr	L to Lanc	T to Ken	R to S Mill	R to Lanc	App. Total	L to Lanc	L to Ken	T to S Mill	R to Lanc	R to Ald	App. Total	L to Ken	L to S Mill	T to Lanc	R to Ald	R to Spr	App. Total	L to S Mill	L to Lanc	T to Ald	R to Spr	R to Lanc	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1																																					
Peak Hour for Entire Intersection Begins at 12:00 PM																																					
12:00 PM	10	0	**28**	42	0	80	0	**4**	179	0	8	191	1	10	0	0	**3**	14	44	0	**31**	**1**	**0**	**76**	**1**	52	230	**21**	**51**	355	0	**1**	0	**1**	3	**5**	**721**
12:15 PM	5	0	24	**54**	**0**	**83**	**0**	**1**	**204**	0	**16**	**221**	0	**13**	**0**	**1**	**0**	**14**	46	**1**	25	**8**	1	81	0	60	207	19	30	316	0	0	0	1	1	2	717
12:30 PM	**14**	**0**	20	52	0	**86**	0	2	174	0	5	181	**2**	5	0	1	0	8	51	0	26	5	**2**	**84**	0	**66**	188	11	35	300	0	0	0	0	**4**	4	663
12:45 PM	11	0	18	40	0	69	0	2	155	0	9	166	1	13	0	**2**	1	**17**	**54**	**0**	16	4	0	74	1	64	**239**	14	38	**356**	0	0	0	1	1	2	684
Total Volume	40	0	90	188	0	318	0	9	712	0	38	759	4	41	0	4	4	53	195	1	98	18	3	315	2	242	864	65	154	1327	0	1	0	3	9	13	2785
% App. Total	12.6	0	28.3	59.1	0		0	1.2	93.8	0	5		7.5	77.4	0	7.5	7.5		61.9	0.3	31.1	5.7	1		0.2	18.2	65.1	4.9	11.6		0	7.7	0	23.1	69.2		
PHF	.714	.000	.804	.870	.000	.924	.000	.563	.873	.000	.594	.859	.500	.788	.000	.500	.333	.779	.903	.250	.790	.563	.375	.938	.500	.917	.904	.774	.755	.932	.000	.250	.000	.750	.563	.650	.966
cars	40	0	88	182	0	310	0	9	699	0	37	745	4	41	0	4	4	53	190	1	95	17	3	306	2	240	852	65	153	1312	0	1	0	2	9	12	2738
% cars	100	0	97.8	96.8	0	97.5	0	100	98.2	0	97.4	98.2	100	100	0	100	100	100	97.4	100	96.9	94.4	100	97.1	100	99.2	98.6	100	99.4	98.9	0	100	0	66.7	100	92.3	98.3
HV	0	0	2	6	0	8	0	0	13	0	1	14	0	0	0	0	0	0	5	0	3	1	0	9	0	2	12	0	1	15	0	0	0	1	0	1	47
% HV	0	0	2.2	3.2		2.5			1.8		2.6	1.8							2.6		3.1	5.6		2.9		0.8	1.4		0.6	1.1				33.3	0	7.7	1.7

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Groups Printed- HV

	North Spring Mill Road Southbound							Lancaster Avenue Westbound							Aldwyn Lane Northwestbound							Sproul Road Northbound							Lancaster Avenue Eastbound							Kenilworth Road Southeastbound							
Start Time	Lt o Lanc	Lt o Ald					App. Total	Lt o Ald	Lt o Spr					App. Total	Lt o Spr	Lt o Lanc					App. Total	Lt o Lanc	Lt o Ken					App. Total	Lt o Ken	Lt o S Mill					App. Total	Lt o S Mill	Lt o Lanc					App. Total	Int. Total
12:00 PM	0	0	1	2	0	0	3	0	0	4	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	2	3	0	0	0	5	0	0	0	0	0	0	14
12:15 PM	0	0	0	1	0	0	1	0	0	3	0	1	0	4	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	0	1	0	1	0	2	0	0	0	1	0	0	1	10
12:30 PM	0	0	1	2	0	0	3	0	0	3	0	0	0	3	0	0	0	0	0	0	0	2	0	2	1	0	0	5	0	0	2	0	0	0	2	0	0	0	0	0	0	0	13
12:45 PM	0	0	0	1	0	0	1	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	0	0	0	0	0	0	0	10
Total	0	0	2	6	0	0	8	0	0	13	0	1	0	14	0	0	0	0	0	0	0	5	0	3	1	0	0	9	0	2	12	0	1	0	15	0	0	0	1	0	0	1	47
01:00 PM	0	0	0	2	0	0	2	0	0	6	0	0	0	6	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	3	0	1	0	5	0	0	0	0	0	0	0	14
01:15 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	1	0	3	1	0	0	5	0	0	2	0	1	0	3	0	0	0	0	0	0	0	11
01:30 PM	1	0	0	2	0	0	3	0	0	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	1	0	1	4	0	0	0	5	0	0	0	0	0	0	0	11
01:45 PM	0	0	2	1	0	0	3	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Total	1	0	2	5	0	0	8	0	0	15	0	0	0	15	0	0	0	0	1	0	1	2	0	4	2	0	0	8	0	2	9	0	2	0	13	0	0	0	0	0	0	0	45
02:00 PM	2	0	0	0	0	0	2	0	0	3	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	4	0	0	0	0	0	0	0	10
02:15 PM	0	0	1	0	0	0	1	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	6
02:30 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	7	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	4	0	2	0	6	0	0	0	0	0	0	0	15
02:45 PM	1	0	1	1	0	0	3	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	7
Total	3	0	2	1	0	0	6	0	0	16	0	1	0	17	0	0	0	0	0	0	0	2	0	0	1	0	0	3	0	0	8	0	4	0	12	0	0	0	0	0	0	0	38
Grand Total	4	0	6	12	0	0	22	0	0	44	0	2	0	46	0	0	0	0	1	0	1	9	0	7	4	0	0	20	0	4	29	0	7	0	40	0	0	0	1	0	0	1	130
Apprch %	18.2	0	27.3	54.5	0	0		0	0	95.7	0	4.3	0		0	0	0	0	100	0		45	0	35	20	0	0		0	10	72.5	0	17.5	0		0	0	0	100	0	0		
Total %	3.1	0	4.6	9.2	0	0	16.9	0	0	33.8	0	1.5	0	35.4	0	0	0	0	0.8	0	0.8	6.9	0	5.4	3.1	0	0	15.4	0	3.1	22.3	0	5.4	0	30.8	0	0	0	0.8	0	0	0.8	

	North Spring Mill Road Southbound						Lancaster Avenue Westbound						Aldwyn Lane Northwestbound						Sproul Road Northbound						Lancaster Avenue Eastbound						Kenilworth Road Southeastbound						
Start Time	L to Lanc	L to Ald	T to Spr	R to Lanc	R to Ken	App. Total	L to Ald	L to Spr	T to Lanc	R to Ken	R to S Mill	App. Total	L to Spr	L to Lanc	T to Ken	R to S Mill	R to Lanc	App. Total	L to Lanc	L to Ken	T to S Mill	R to Lanc	R to Ald	App. Total	L to Ken	L to S Mill	T to Lanc	R to Ald	R to Spr	App. Total	L to S Mill	L to Lanc	T to Ald	R to Spr	R to Lanc	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1																																					
Peak Hour for Entire Intersection Begins at 12:00 PM																																					
12:00 PM	0	0	**1**	**2**	0	**3**	0	0	**4**	0	0	**4**	0	0	0	0	0	0	**2**	0	0	0	0	2	0	**2**	3	0	0	5	0	0	0	0	0	0	**14**
12:15 PM	0	0	0	1	0	1	0	0	3	0	**1**	4	0	0	0	0	0	0	1	0	1	0	0	2	0	0	1	0	**1**	2	0	0	0	**1**	0	**1**	10
12:30 PM	0	0	1	2	0	3	0	0	3	0	0	3	0	0	0	0	0	0	2	0	**2**	**1**	0	**5**	0	0	2	0	0	2	0	0	0	0	0	0	13
12:45 PM	0	0	0	1	0	1	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**	0	0	**6**	0	0	0	0	0	0	10
Total	0	0	2	6	0	8	0	0	13	0	1	14	0	0	0	0	0	0	5	0	3	1	0	9	0	2	12	0	1	15	0	0	0	1	0	1	47
Volume																																					
% App. Total			25	75	0		0	0	92.9	0	7.1								55.6	0	33.3	11.1	0		0	13.3	80	0	6.7					100			
PHF	.000	.000	.500	.750	.000	.667	.000	.000	.813	.000	.250	.875	.000	.000	.000	.000	.000	.000	.625	.000	.375	.250	.000	.450	.000	.250	.500	.000	.250	.625	.000	.000	.000	.250	.000	.250	.839

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan and 30
Homecoming
EB Peds = diag peds NE-SW
WB Peds = diag peds NW-SE

File Name : 30IthanSAT
Site Code : 00111111
Start Date : 10/27/2012
Page No : 1

Groups Printed- cars - HV

	Ithan Avenue Southbound					Lacaster Avenue Westbound						Ithan Avenue Northbound					Lacaster Avenue Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NW-SE Peds	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NE-SW Peds	Peds	App. Total	Int. Total
12:00 PM	9	15	14	29	67	33	139	12	82	28	294	8	15	5	6	34	20	134	29	24	110	317	712
12:15 PM	18	29	18	37	102	23	173	16	93	44	349	16	19	13	19	67	23	132	43	4	139	341	859
12:30 PM	10	24	3	21	58	33	197	21	125	56	432	8	23	9	7	47	23	180	38	5	173	419	956
12:45 PM	12	29	18	16	75	37	192	13	202	32	476	15	19	14	6	54	29	187	56	39	143	454	1059
Total	49	97	53	103	302	126	701	62	502	160	1551	47	76	41	38	202	95	633	166	72	565	1531	3586
01:00 PM	4	31	22	35	92	32	140	7	189	45	413	5	22	12	11	50	16	166	28	31	134	375	930
01:15 PM	11	43	16	42	112	43	213	18	174	40	488	5	25	6	2	38	16	183	40	10	126	375	1013
01:30 PM	0	0	16	105	121	39	202	15	196	52	504	8	24	8	12	52	20	171	46	6	124	367	1044
01:45 PM	7	28	15	167	217	34	190	12	218	64	518	11	22	10	22	65	24	158	51	1	122	356	1156
Total	22	102	69	349	542	148	745	52	777	201	1923	29	93	36	47	205	76	678	165	48	506	1473	4143
02:00 PM	9	29	14	48	100	47	178	15	261	85	586	15	7	8	30	60	16	162	23	4	108	313	1059
02:15 PM	13	16	13	71	113	28	193	16	299	54	590	6	22	14	13	55	22	151	41	41	108	363	1121
02:30 PM	0	0	14	106	120	29	196	13	272	95	605	15	23	16	11	65	20	158	39	42	113	372	1162
02:45 PM	9	19	15	140	183	30	200	9	245	136	620	23	24	17	9	73	18	165	37	42	117	379	1255
Total	31	64	56	365	516	134	767	53	1077	370	2401	59	76	55	63	253	76	636	140	129	446	1427	4597
Grand Total	102	263	178	817	1360	408	2213	167	2356	731	5875	135	245	132	148	660	247	1947	471	249	1517	4431	12326
Apprch %	7.5	19.3	13.1	60.1		6.9	37.7	2.8	40.1	12.4		20.5	37.1	20	22.4		5.6	43.9	10.6	5.6	34.2		
Total %	0.8	2.1	1.4	6.6	11	3.3	18	1.4	19.1	5.9	47.7	1.1	2	1.1	1.2	5.4	2	15.8	3.8	2	12.3	35.9	
cars	93	263	173	817	1346	407	2167	163	2356	731	5824	133	245	131	148	657	241	1925	471	249	1517	4403	12230
% cars	91.2	100	97.2	100	99	99.8	97.9	97.6	100	100	99.1	98.5	100	99.2	100	99.5	97.6	98.9	100	100	100	99.4	99.2
HV	9	0	5	0	14	1	46	4	0	0	51	2	0	1	0	3	6	22	0	0	0	28	96
% HV	8.8	0	2.8	0	1	0.2	2.1	2.4	0	0	0.9	1.5	0	0.8	0	0.5	2.4	1.1	0	0	0	0.6	0.8

	Ithan Avenue Southbound				Lacaster Avenue Westbound				Ithan Avenue Northbound				Lacaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	9	15	14	38	33	139	12	184	8	15	5	28	20	134	29	183	433
12:15 PM	**18**	**29**	**18**	**65**	23	173	16	212	**16**	19	13	**48**	23	132	43	198	523
12:30 PM	10	24	3	37	33	**197**	**21**	**251**	8	**23**	9	40	23	180	38	241	569
12:45 PM	12	29	18	59	**37**	192	13	242	15	19	**14**	48	**29**	**187**	**56**	**272**	**621**
Total Volume	49	97	53	199	126	701	62	889	47	76	41	164	95	633	166	894	2146
% App. Total	24.6	48.7	26.6		14.2	78.9	7		28.7	46.3	25		10.6	70.8	18.6		
PHF	.681	.836	.736	.765	.851	.890	.738	.885	.734	.826	.732	.854	.819	.846	.741	.822	.864
cars	41	97	50	188	125	689	58	872	46	76	40	162	92	621	166	879	2101
% cars	83.7	100	94.3	94.5	99.2	98.3	93.5	98.1	97.9	100	97.6	98.8	96.8	98.1	100	98.3	97.9
HV	8	0	3	11	1	12	4	17	1	0	1	2	3	12	0	15	45
% HV	16.3	0	5.7	5.5	0.8	1.7	6.5	1.9	2.1	0	2.4	1.2	3.2	1.9	0	1.7	2.1

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Ithan and 30
Homecoming
EB Peds = diag peds NE-SW
WB Peds = diag peds NW-SE

File Name : 30IthanSAT
Site Code : 00111111
Start Date : 10/27/2012
Page No : 1

Groups Printed- HV

	Ithan Avenue Southbound					Lacaster Avenue Westbound						Ithan Avenue Northbound					Lacaster Avenue Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NW-SE Peds	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	NE-SW Peds	Peds	App. Total	Int. Total
12:00 PM	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	1	2	0	0	0	3	5
12:15 PM	7	0	0	0	7	0	3	0	0	0	3	1	0	1	0	2	1	2	0	0	0	3	15
12:30 PM	1	0	0	0	1	1	5	4	0	0	10	0	0	0	0	0	0	2	0	0	0	2	13
12:45 PM	0	0	3	0	3	0	2	0	0	0	2	0	0	0	0	0	1	6	0	0	0	7	12
Total	8	0	3	0	11	1	12	4	0	0	17	1	0	1	0	2	3	12	0	0	0	15	45
01:00 PM	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	3	0	0	0	3	7
01:15 PM	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	1	1	0	0	0	2	5
01:30 PM	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	1	0	0	0	1	5
01:45 PM	1	0	0	0	1	0	5	0	0	0	5	1	0	0	0	1	0	0	0	0	0	0	7
Total	1	0	0	0	1	0	16	0	0	0	16	1	0	0	0	1	1	5	0	0	0	6	24
02:00 PM	0	0	1	0	1	0	2	0	0	0	2	0	0	0	0	0	1	5	0	0	0	6	9
02:15 PM	0	0	1	0	1	0	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	8
02:30 PM	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	5
02:45 PM	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	1	0	0	0	0	1	5
Total	0	0	2	0	2	0	18	0	0	0	18	0	0	0	0	0	2	5	0	0	0	7	27
Grand Total	9	0	5	0	14	1	46	4	0	0	51	2	0	1	0	3	6	22	0	0	0	28	96
Apprch %	64.3	0	35.7	0		2	90.2	7.8	0	0		66.7	0	33.3	0		21.4	78.6	0	0	0		
Total %	9.4	0	5.2	0	14.6	1	47.9	4.2	0	0	53.1	2.1	0	1	0	3.1	6.2	22.9	0	0	0	29.2	

	Ithan Avenue Southbound				Lacaster Avenue Westbound				Ithan Avenue Northbound				Lacaster Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	0	0	0	0	2	0	2	0	0	0	0	**1**	2	0	3	5
12:15 PM	**7**	0	0	**7**	0	3	0	3	**1**	0	**1**	**2**	1	2	0	3	**15**
12:30 PM	1	0	0	1	**1**	**5**	**4**	**10**	0	0	0	0	0	2	0	2	13
12:45 PM	0	0	**3**	3	0	2	0	2	0	0	0	0	1	**6**	0	**7**	12
Total Volume	8	0	3	11	1	12	4	17	1	0	1	2	3	12	0	15	45
% App. Total	72.7	0	27.3		5.9	70.6	23.5		50	0	50		20	80	0		
PHF	.286	.000	.250	.393	.250	.600	.250	.425	.250	.000	.250	.250	.750	.500	.000	.536	.750

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

Sproul & Conestoga Roads
Homecoming

File Name : SprConSat
Site Code : 00000000
Start Date : 10/27/2012
Page No : 1

Groups Printed- cars - HV

	Sproul Road Southbound					Conestoga Road Westbound					Sproul Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
12:00 PM	15	37	18	0	70	8	85	13	0	106	23	33	6	1	63	22	58	33	0	113	352
12:15 PM	13	29	20	1	63	2	82	18	0	102	32	40	10	0	82	31	82	34	0	147	394
12:30 PM	11	23	15	0	49	0	81	12	0	93	32	31	12	0	75	34	99	34	0	167	384
12:45 PM	12	28	13	0	53	3	107	13	0	123	33	41	5	0	79	21	81	41	0	143	398
Total	51	117	66	1	235	13	355	56	0	424	120	145	33	1	299	108	320	142	0	570	1528
01:00 PM	11	27	15	3	56	3	100	8	0	111	27	31	8	0	66	17	74	41	1	133	366
01:15 PM	8	29	19	1	57	6	86	2	0	94	33	29	7	0	69	25	102	33	0	160	380
01:30 PM	8	30	6	0	44	7	88	11	0	106	26	27	9	0	62	14	94	41	1	150	362
01:45 PM	10	27	10	0	47	3	101	14	0	118	38	35	2	0	75	15	101	46	0	162	402
Total	37	113	50	4	204	19	375	35	0	429	124	122	26	0	272	71	371	161	2	605	1510
02:00 PM	12	28	17	0	57	4	75	14	0	93	32	31	4	1	68	25	76	40	0	141	359
02:15 PM	9	31	17	0	57	4	95	9	0	108	34	42	10	0	86	14	84	35	1	134	385
02:30 PM	14	31	17	0	62	4	64	14	0	82	29	19	5	1	54	14	85	43	0	142	340
02:45 PM	9	37	14	0	60	7	74	13	0	94	21	33	4	0	58	19	103	44	1	167	379
Total	44	127	65	0	236	19	308	50	0	377	116	125	23	2	266	72	348	162	2	584	1463
Grand Total	132	357	181	5	675	51	1038	141	0	1230	360	392	82	3	837	251	1039	465	4	1759	4501
Apprch %	19.6	52.9	26.8	0.7		4.1	84.4	11.5	0		43	46.8	9.8	0.4		14.3	59.1	26.4	0.2		
Total %	2.9	7.9	4	0.1	15	1.1	23.1	3.1	0	27.3	8	8.7	1.8	0.1	18.6	5.6	23.1	10.3	0.1	39.1	
cars	125	349	179	5	658	51	1031	133	0	1215	358	386	82	3	829	241	1030	463	4	1738	4440
% cars	94.7	97.8	98.9	100	97.5	100	99.3	94.3	0	98.8	99.4	98.5	100	100	99	96	99.1	99.6	100	98.8	98.6
HV	7	8	2	0	17	0	7	8	0	15	2	6	0	0	8	10	9	2	0	21	61
% HV	5.3	2.2	1.1	0	2.5	0	0.7	5.7	0	1.2	0.6	1.5	0	0	1	4	0.9	0.4	0	1.2	1.4

	Sproul Road Southbound				Conestoga Road Westbound				Sproul Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	**15**	**37**	18	**70**	**8**	85	13	106	23	33	6	62	22	58	33	113	351
12:15 PM	13	29	**20**	62	2	82	**18**	102	32	40	10	**82**	31	82	34	147	393
12:30 PM	11	23	15	49	0	81	12	93	32	31	**12**	75	**34**	**99**	34	**167**	384
12:45 PM	12	28	13	53	3	**107**	13	**123**	**33**	**41**	5	79	21	81	**41**	143	**398**
Total Volume	51	117	66	234	13	355	56	424	120	145	33	298	108	320	142	570	1526
% App. Total	21.8	50	28.2		3.1	83.7	13.2		40.3	48.7	11.1		18.9	56.1	24.9		
PHF	.850	.791	.825	.836	.406	.829	.778	.862	.909	.884	.688	.909	.794	.808	.866	.853	.959
cars	49	115	65	229	13	353	52	418	119	142	33	294	104	317	141	562	1503
% cars	96.1	98.3	98.5	97.9	100	99.4	92.9	98.6	99.2	97.9	100	98.7	96.3	99.1	99.3	98.6	98.5
HV	2	2	1	5	0	2	4	6	1	3	0	4	4	3	1	8	23
% HV	3.9	1.7	1.5	2.1	0	0.6	7.1	1.4	0.8	2.1	0	1.3	3.7	0.9	0.7	1.4	1.5

F. Tavani and Associates, Inc.
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Sproul & Conestoga Roads
Homecoming

File Name : SprConSat
Site Code : 00000000
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Groups Printed- HV

	Sproul Road Southbound					Conestoga Road Westbound					Sproul Road Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
12:00 PM	0	1	1	0	2	0	1	2	0	3	0	0	0	0	0	1	0	1	0	2	7
12:15 PM	0	1	0	0	1	0	0	2	0	2	1	2	0	0	3	0	3	0	0	3	9
12:30 PM	2	0	0	0	2	0	0	0	0	0	0	1	0	0	1	3	0	0	0	3	6
12:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	2	2	1	0	5	0	2	4	0	6	1	3	0	0	4	4	3	1	0	8	23
01:00 PM	0	1	0	0	1	0	0	1	0	1	0	1	0	0	1	0	1	0	0	1	4
01:15 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	3	1	0	0	4	6
01:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	2
01:45 PM	1	2	0	0	3	0	1	1	0	2	1	1	0	0	2	0	0	0	0	0	7
Total	1	4	0	0	5	0	2	2	0	4	1	3	0	0	4	4	2	0	0	6	19
02:00 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	3
02:15 PM	0	2	0	0	2	0	1	1	0	2	0	0	0	0	0	0	2	0	0	2	6
02:30 PM	1	0	1	0	2	0	2	1	0	3	0	0	0	0	0	1	2	0	0	3	8
02:45 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	4	2	1	0	7	0	3	2	0	5	0	0	0	0	0	2	4	1	0	7	19
Grand Total	7	8	2	0	17	0	7	8	0	15	2	6	0	0	8	10	9	2	0	21	61
Apprch %	41.2	47.1	11.8	0		0	46.7	53.3	0		25	75	0	0		47.6	42.9	9.5	0		
Total %	11.5	13.1	3.3	0	27.9	0	11.5	13.1	0	24.6	3.3	9.8	0	0	13.1	16.4	14.8	3.3	0	34.4	

	Sproul Road Southbound				Conestoga Road Westbound				Sproul Road Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	**1**	**1**	**2**	0	**1**	**2**	**3**	0	0	0	0	1	0	**1**	2	7
12:15 PM	0	1	0	1	0	0	2	2	**1**	**2**	0	**3**	0	**3**	0	**3**	**9**
12:30 PM	**2**	0	0	2	0	0	0	0	0	1	0	1	**3**	0	0	3	6
12:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	2	2	1	5	0	2	4	6	1	3	0	4	4	3	1	8	23
% App. Total	40	40	20		0	33.3	66.7		25	75	0		50	37.5	12.5		
PHF	.250	.500	.250	.625	.000	.500	.500	.500	.250	.375	.000	.333	.333	.250	.250	.667	.639

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	Spring Mill Road Southbound				Conestoga Road Westbound				Conestoga Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
12:00 PM	1	1	0	2	105	1	0	106	3	85	0	88	196
12:15 PM	1	3	0	4	100	3	0	103	0	110	0	110	217
12:30 PM	4	2	0	6	88	1	0	89	3	113	0	116	211
12:45 PM	5	5	0	10	120	0	0	120	0	94	0	94	224
Total	11	11	0	22	413	5	0	418	6	402	0	408	848
01:00 PM	1	9	0	10	104	0	0	104	1	86	0	87	201
01:15 PM	1	5	0	6	91	1	0	92	1	112	0	113	211
01:30 PM	0	3	0	3	103	1	0	104	3	109	0	112	219
01:45 PM	0	6	0	6	105	0	0	105	1	107	0	108	219
Total	2	23	0	25	403	2	0	405	6	414	0	420	850
02:00 PM	1	2	0	3	97	0	0	97	5	89	0	94	194
02:15 PM	2	0	0	2	102	0	0	102	3	104	0	107	211
02:30 PM	1	0	0	1	78	1	0	79	3	103	0	106	186
02:45 PM	0	5	0	5	90	0	0	90	2	115	0	117	212
Total	4	7	0	11	367	1	0	368	13	411	0	424	803
Grand Total	17	41	0	58	1183	8	0	1191	25	1227	0	1252	2501
Apprch %	29.3	70.7	0		99.3	0.7	0		2	98	0		
Total %	0.7	1.6	0	2.3	47.3	0.3	0	47.6	1	49.1	0	50.1	
cars	17	41	0	58	1180	8	0	1188	25	1224	0	1249	2495
% cars	100	100	0	100	99.7	100	0	99.7	100	99.8	0	99.8	99.8
HV	0	0	0	0	3	0	0	3	0	3	0	3	6
% HV	0	0	0	0	0.3	0	0	0.3	0	0.2	0	0.2	0.2

	Spring Mill Road Southbound			Conestoga Road Westbound			Conestoga Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:00 PM										
12:00 PM	1	1	2	105	1	106	**3**	85	88	196
12:15 PM	1	3	4	100	**3**	103	0	110	110	217
12:30 PM	4	2	6	88	1	89	3	**113**	**116**	211
12:45 PM	**5**	**5**	**10**	**120**	0	**120**	0	94	94	**224**
Total Volume	11	11	22	413	5	418	6	402	408	848
% App. Total	50	50		98.8	1.2		1.5	98.5		
PHF	.550	.550	.550	.860	.417	.871	.500	.889	.879	.946
cars	11	11	22	411	5	416	6	399	405	843
% cars	100	100	100	99.5	100	99.5	100	99.3	99.3	99.4
HV	0	0	0	2	0	2	0	3	3	5
% HV	0	0	0	0.5	0	0.5	0	0.7	0.7	0.6

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Groups Printed- HV

	Spring Mill Road Southbound				Conestoga Road Westbound				Conestoga Road Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
12:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
12:15 PM	0	0	0	0	1	0	0	1	0	2	0	2	3
12:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	2	0	0	2	0	3	0	3	5
01:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	1	0	0	0	0	1
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	3	0	0	3	0	3	0	3	6
Apprch %	0	0	0		100	0	0		0	100	0		
Total %	0	0	0	0	50	0	0	50	0	50	0	50	

	Spring Mill Road Southbound			Conestoga Road Westbound			Conestoga Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:00 PM										
12:00 PM	0	0	0	**1**	0	**1**	0	0	0	1
12:15 PM	0	0	0	1	0	1	0	**2**	**2**	**3**
12:30 PM	0	0	0	0	0	0	0	1	1	1
12:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	2	0	2	0	3	3	5
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.500	.000	.500	.000	.375	.375	.417

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Ithan & Conestoga Roads
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	Ithan Avenue Southbound					Conestoga Road Westbound					Ithan Avenue Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
12:00 PM	7	5	25	0	37	3	72	12	1	88	0	4	3	0	7	7	66	0	0	73	205
12:15 PM	3	2	13	0	18	1	71	8	1	81	2	11	1	0	14	18	77	0	2	97	210
12:30 PM	11	1	4	0	16	3	78	7	2	90	1	5	0	0	6	17	87	0	0	104	216
12:45 PM	1	2	10	1	14	10	80	9	2	101	0	6	1	0	7	12	74	0	1	87	209
Total	22	10	52	1	85	17	301	36	6	360	3	26	5	0	34	54	304	0	3	361	840
01:00 PM	4	3	13	0	20	1	87	7	0	95	0	5	0	0	5	10	73	0	0	83	203
01:15 PM	5	5	14	0	24	1	60	5	0	66	2	4	0	0	6	19	91	0	2	112	208
01:30 PM	6	4	14	1	25	0	81	8	1	90	1	4	1	0	6	17	85	0	0	102	223
01:45 PM	4	4	15	0	23	1	82	8	1	92	0	2	1	0	3	17	79	2	0	98	216
Total	19	16	56	1	92	3	310	28	2	343	3	15	2	0	20	63	328	2	2	395	850
02:00 PM	5	5	9	0	19	2	77	5	0	84	0	5	2	1	8	10	74	0	2	86	197
02:15 PM	8	3	13	0	24	3	81	3	0	87	1	2	0	0	3	24	66	0	0	90	204
02:30 PM	1	4	10	0	15	0	60	10	1	71	1	7	1	0	9	8	88	0	0	96	191
02:45 PM	7	1	20	0	28	0	62	7	1	70	2	3	0	1	6	9	80	1	0	90	194
Total	21	13	52	0	86	5	280	25	2	312	4	17	3	2	26	51	308	1	2	362	786
Grand Total	62	39	160	2	263	25	891	89	10	1015	10	58	10	2	80	168	940	3	7	1118	2476
Apprch %	23.6	14.8	60.8	0.8		2.5	87.8	8.8	1		12.5	72.5	12.5	2.5		15	84.1	0.3	0.6		
Total %	2.5	1.6	6.5	0.1	10.6	1	36	3.6	0.4	41	0.4	2.3	0.4	0.1	3.2	6.8	38	0.1	0.3	45.2	
cars	62	37	154	2	255	24	884	83	10	1001	10	58	10	2	80	164	928	3	7	1102	2438
% cars	100	94.9	96.2	100	97	96	99.2	93.3	100	98.6	100	100	100	100	100	97.6	98.7	100	100	98.6	98.5
HV	0	2	6	0	8	1	7	6	0	14	0	0	0	0	0	4	12	0	0	16	38
% HV	0	5.1	3.8	0	3	4	0.8	6.7	0	1.4	0	0	0	0	0	2.4	1.3	0	0	1.4	1.5

	Ithan Avenue Southbound				Conestoga Road Westbound				Ithan Avenue Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	7	**5**	**25**	**37**	3	72	**12**	87	0	4	**3**	7	7	66	0	73	204
12:15 PM	3	2	13	18	1	71	8	80	**2**	**11**	1	**14**	**18**	77	0	95	207
12:30 PM	**11**	1	4	16	3	78	7	88	1	5	0	6	17	**87**	0	**104**	**214**
12:45 PM	1	2	10	13	**10**	**80**	9	**99**	0	6	1	7	12	74	0	86	205
Total Volume	22	10	52	84	17	301	36	354	3	26	5	34	54	304	0	358	830
% App. Total	26.2	11.9	61.9		4.8	85	10.2		8.8	76.5	14.7		15.1	84.9	0		
PHF	.500	.500	.520	.568	.425	.941	.750	.894	.375	.591	.417	.607	.750	.874	.000	.861	.970
cars	22	8	51	81	16	299	35	350	3	26	5	34	52	300	0	352	817
% cars	100	80.0	98.1	96.4	94.1	99.3	97.2	98.9	100	100	100	100	96.3	98.7	0	98.3	98.4
HV	0	2	1	3	1	2	1	4	0	0	0	0	2	4	0	6	13
% HV	0	20.0	1.9	3.6	5.9	0.7	2.8	1.1	0	0	0	0	3.7	1.3	0	1.7	1.6

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	Ithan Avenue Southbound					Conestoga Road Westbound					Ithan Avenue Northbound					Conestoga Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
12:00 PM	0	1	1	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	3
12:15 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	1	1	0	0	2	4
12:30 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0	2	3
12:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3
Total	0	2	1	0	3	1	2	1	0	4	0	0	0	0	0	2	4	0	0	6	13
01:00 PM	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
01:30 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
01:45 PM	0	0	0	0	0	0	1	2	0	3	0	0	0	0	0	0	1	0	0	1	4
Total	0	0	2	0	2	0	2	3	0	5	0	0	0	0	0	0	3	0	0	3	10
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
02:15 PM	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	4
02:30 PM	0	0	2	0	2	0	1	2	0	3	0	0	0	0	0	1	2	0	0	3	8
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2
Total	0	0	3	0	3	0	3	2	0	5	0	0	0	0	0	2	5	0	0	7	15
Grand Total	0	2	6	0	8	1	7	6	0	14	0	0	0	0	0	4	12	0	0	16	38
Apprch %	0	25	75	0		7.1	50	42.9	0		0	0	0	0		25	75	0	0		
Total %	0	5.3	15.8	0	21.1	2.6	18.4	15.8	0	36.8	0	0	0	0	0	10.5	31.6	0	0	42.1	

	Ithan Avenue Southbound				Conestoga Road Westbound				Ithan Avenue Northbound				Conestoga Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	**1**	**1**	**2**	0	0	**1**	1	0	0	0	0	0	0	0	0	3
12:15 PM	0	0	0	0	0	**2**	0	**2**	0	0	0	0	**1**	1	0	**2**	**4**
12:30 PM	0	0	0	0	**1**	0	0	1	0	0	0	0	1	1	0	2	3
12:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	**2**	0	2	3
Total Volume	0	2	1	3	1	2	1	4	0	0	0	0	2	4	0	6	13
% App. Total	0	66.7	33.3		25	50	25		0	0	0		33.3	66.7	0		
PHF	.000	.500	.250	.375	.250	.250	.250	.500	.000	.000	.000	.000	.500	.500	.000	.750	.813

AM PEAK HOUR

Intersection	Unsignalized or Signalized?	Approach	Initial Unmet Demand				Excessive Unmet Demand			
			Queues			Findings / Summary	Queues			Findings / Summary
Route 30 and Route 320	Signalized	WB	1	0	2	A, B	2	0	3	A, B
	Signalized	EB	0	2	0		1	4	1	
	Signalized	NB	0	0	1		0	0	0	
	Signalized	SB	0	1	0		2	1	0	
Route 30 and Ithan Avenue	Signalized	WB	0	0	0	A, B, C	0	2	0	A, B
	Signalized	EB	0	0	0		1	1	1	
	Signalized	NB	0	0	0		1	3	0	
	Signalized	SB	0	0	0		1	0	2	
Route 320 and Conestoga Rd	Signalized	WB	0	0	0	A, B, C	1	0	1	A, B, C
	Signalized	EB	0	0	0		0	2	1	
	Signalized	NB	1	0	0		3	1	0	

AM PEAK HOUR

Intersection	Unsignalized or Signalized?	Approach	Initial Unmet Demand				Excessive Unmet Demand			
			Queues			Findings / Summary	Queues			Findings / Summary
Roberts Rd and County Line Rd	Unsignalized	NB	0	0	0	A, D	0	0	0	A, D
	Unsignalized	SB	0	0	0		0	0	0	
Airedale Rd and County Line Rd	Unsignalized	EB	0	0	0	E	0	0	0	E
	Unsignalized	SB	0	0	0		5+	5+	5+	

Purpose

The purpose of this table is to summarize observations which were made in the first week of December 2012 subsequent to establishing the peak hours of the 'ordinary traffic conditions' scenario. The township engineer requested that traffic volume inputs in the level of service models reflect traffic demand as well as traffic served, so FTA prepared this table to summarize whether the actual counts reflect proper volume inputs for the model or if there is a significantly oversaturated condition in which traffic demands consistently are unmet. In addition a related but slightly different notion -- ***initial*** unmet demand (IUD) -- was also documented per page 18-14 of the HCM 2010 edition. IUD is documented in the first columns of the above table and as shown 3 observations of unserved vehicles ("queues"), if any at the beginning of the subject peak hour were documented and then a determination was made whether to include a non-zero value in the IUD field of the software. ***Excessive*** unmet demand was determined by revisiting the subject intersection during the peak 15-minute period of the peak hour and taking data samples relative to excessive, unserved vehicles ("queues"), if any. If over-saturation appeared sustained for an extended time, it was noted (per the HCM), as were any other anomalies.

Note that, in all cases, only intersections having one or more approaches which were noted as possibly having operational issues by data collectors (during the traffic counts) were actually visited and documented above. Finally, some conclusions are similar in multiple locations, so rather than write the same text repeatedly, a key was prepared (below) and letters were used as appropriate to summarize the respective condition(s) / finding(s) which were observed / determined.

Summary Key

A. *Sustained,* unserved traffic demands are *not* present and so no adjustments were made.
B. LOS F ratings are a function of long cycle length and heavy demand but traffic is generally served in one given cycle (i.e., vehicles typically do not wait for 2nd cycle
C. Peak demands appear to be random, cycle-by-cycle fluctuations which are to be ignored (per HCM2010 18-14).
D. LOS F ratings at this unsignalized location are conservative as it appears the platooning / gap creating effects of adjacent signalized intersections are not reflected.
E. Queues at this unsignalized intersection are a function of an immediately adjacent signalized intersection which has a metering effect on the subject intersection. Queues are therefore not a function of unserved demand / oversaturation but rather other geometric factors unrelated to the subject intersection.

PM PEAK HOUR

Intersection	Unsignalized or Signalized?	Approach	Initial Unmet Demand				Excessive Unmet Demand			
			Queues			Findings / Summary	Queues			Findings / Summary
Route 30 and Route 320	Signalized	WB	2	0	0	A, B	3	4	1	A, B
	Signalized	EB	0	2	1		2	0	3	
	Signalized	NB	1	0	0		5	3	0	
	Signalized	SB	0	2	2		2	3	1	
Route 30 and Ithan Avenue	Signalized	WB	0	0	0	A, B	0	1	2	A, B
	Signalized	EB	0	0	0		3	2	0	
	Signalized	NB	0	0	0		3	0	4	
	Signalized	SB	0	0	0		3	0	2	
Route 320 and Conestoga Rd	Signalized	WB	0	1	0	A, B	0	2	1	A, B, C
	Signalized	EB	0	0	0		2	0	4	
	Signalized	SB	0	0	2		0	3	3	

PM PEAK HOUR

Intersection	Unsignalized or Signalized?	Approach	Initial Unmet Demand				Excessive Unmet Demand			
			Queues			Findings / Summary	Queues			Findings / Summary
Roberts Rd and County Line Rd	Unsignalized	NB	0	0	0	A, D	0	0	0	A, D
	Unsignalized	SB	0	0	0		0	0	0	
Airedale Rd and County Line Rd	Unsignalized	EB	0	0	0	E	0	0	0	E
	Unsignalized	SB	5+	5+	5+		5+	5+	5+	

Purpose

The purpose of this table is to summarize observations which were made in the first week of December 2012 subsequent to establishing the peak hours of the 'ordinary traffic conditions' scenario. The township engineer requested that traffic volume inputs in the level of service models reflect traffic demand as well as traffic served, so FTA prepared this table to summarize whether the actual counts reflect proper volume inputs for the model or if there is a significantly oversaturated condition in which traffic demands consistently are unmet. In addition a related but slightly different notion -- ***initial*** unmet demand (IUD) -- was also documented per page 18-14 of the HCM 2010 edition. IUD is documented in the first columns of the above table and as shown 3 observations of unserved vehicles ("queues"), if any at the beginning of the subject peak hour were documented and then a determination was made whether to include a non-zero value in the IUD field of the software. ***Excessive*** unmet demand was determined by revisiting the subject intersection during the peak 15-minute period of the peak hour and taking data samples relative to excessive, unserved vehicles ("queues"), if any. If over-saturation appeared sustained for an extended time, it was noted (per the HCM), as were any other anomalies.

Note that, in all cases, only intersections having one or more approaches which were noted as possibly having operational issues by data collectors (during the traffic counts) were actually visited and documented above. Finally, some conclusions are similar in multiple locations, so rather than write the same text repeatedly, a key was prepared (below) and letters were used as appropriate to summarize the respective condition(s) / finding(s) which were observed / determined.

Summary Key

A. *Sustained,* unserved traffic demands are *not* present and so no adjustments were made.
B. LOS F ratings are a function of long cycle length and heavy demand but traffic is generally served in one given cycle (i.e., vehicles typically do not wait for 2nd cycle)
C. Peak demands appear to be random, cycle-by-cycle fluctuations which are to be ignored (per HCM2010 18-14).
D. LOS F ratings at this unsignalized location are conservative as it appears the platooning / gap creating effects of adjacent signalized intersections are not reflected.
E. Queues at this unsignalized intersection are a function of an immediately adjacent signalized intersection which has a metering effect on the subject intersection. Queues are therefore not a function of unserved demand / oversaturation but rather other geometric factors unrelated to the subject intersection.

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure A

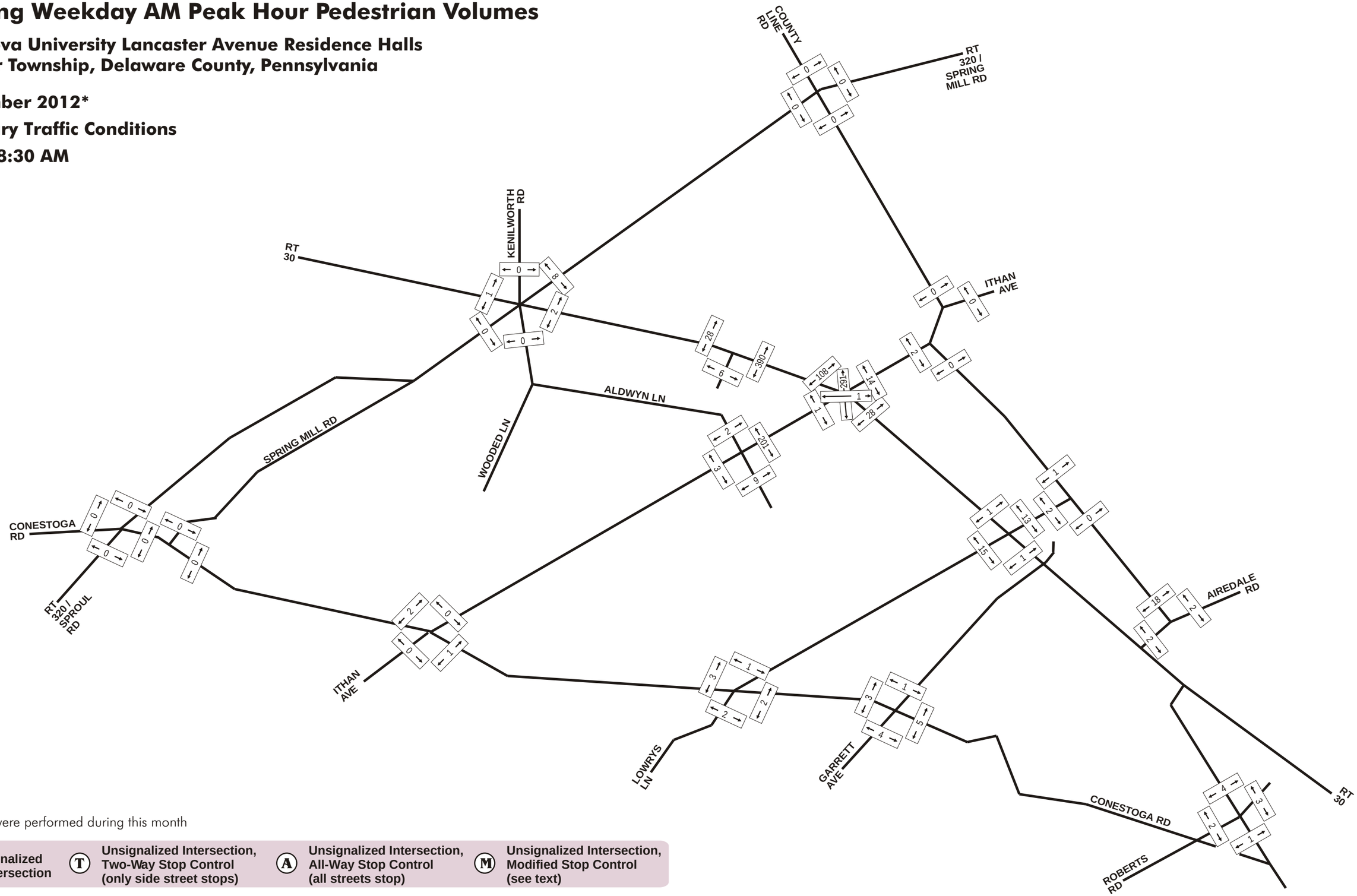
Existing Weekday AM Peak Hour Pedestrian Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

November 2012*

Ordinary Traffic Conditions

7:30 - 8:30 AM



* counts were performed during this month

Signalized Intersection	(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)	(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)	(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure B

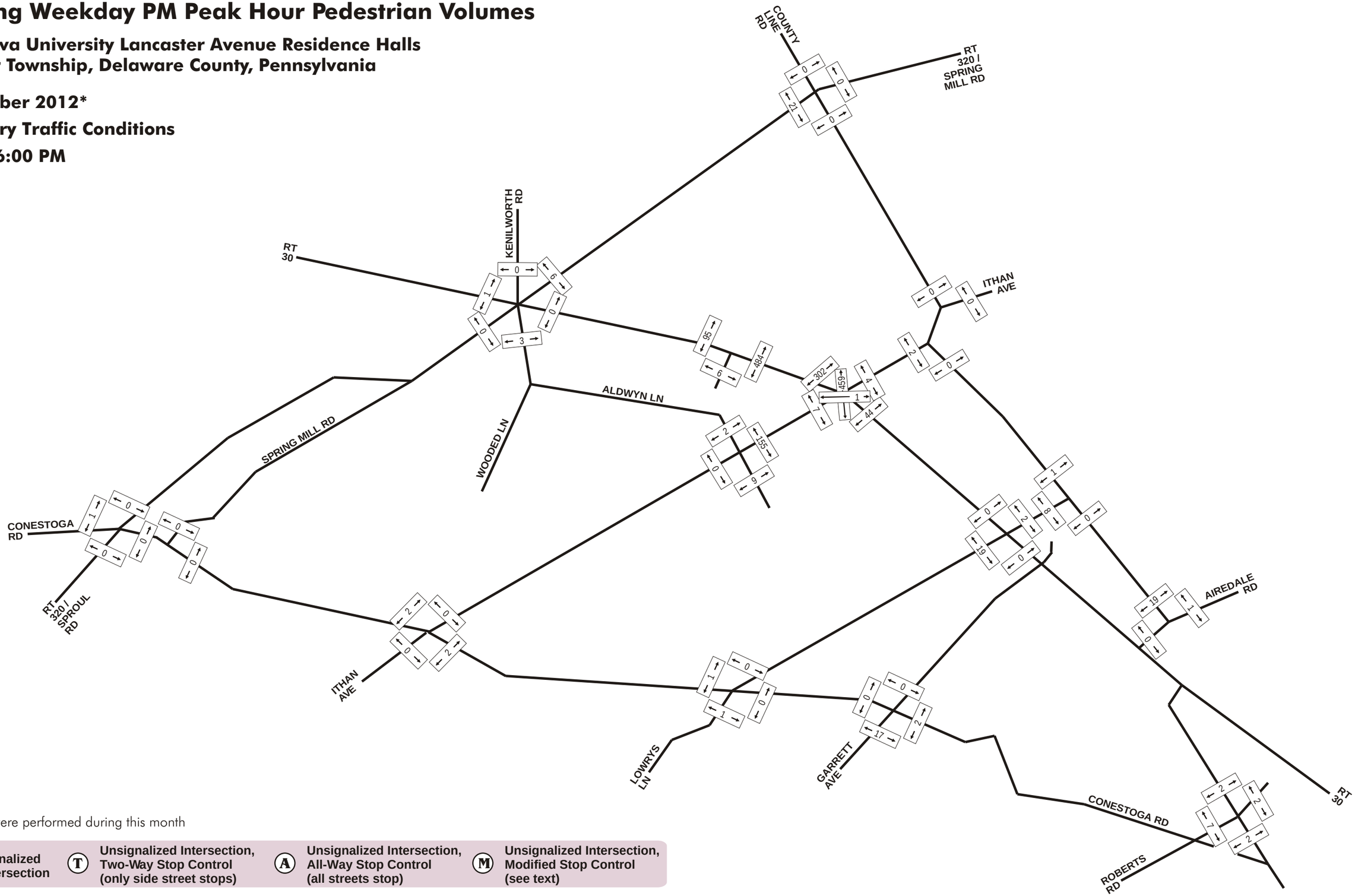
Existing Weekday PM Peak Hour Pedestrian Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

November 2012*

Ordinary Traffic Conditions

5:00 - 6:00 PM



* counts were performed during this month

Signalized Intersection	(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)	(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)	(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

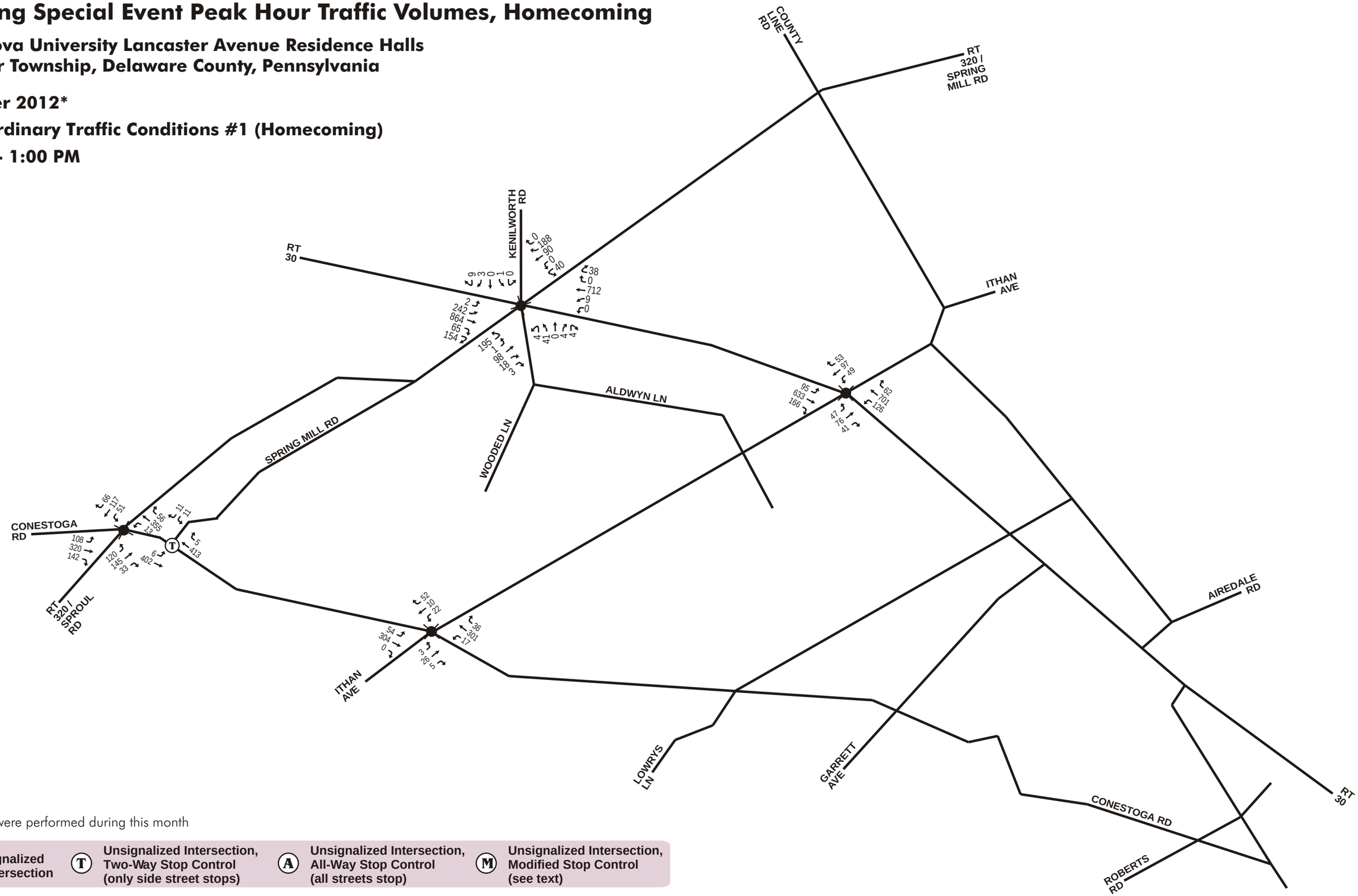
Existing Special Event Peak Hour Traffic Volumes, Homecoming

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

October 2012*

Extraordinary Traffic Conditions #1 (Homecoming)

12:00 - 1:00 PM



* counts were performed during this month

Signalized Intersection	(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)	(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)	(M) Unsignalized Intersection, Modified Stop Control (see text)

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

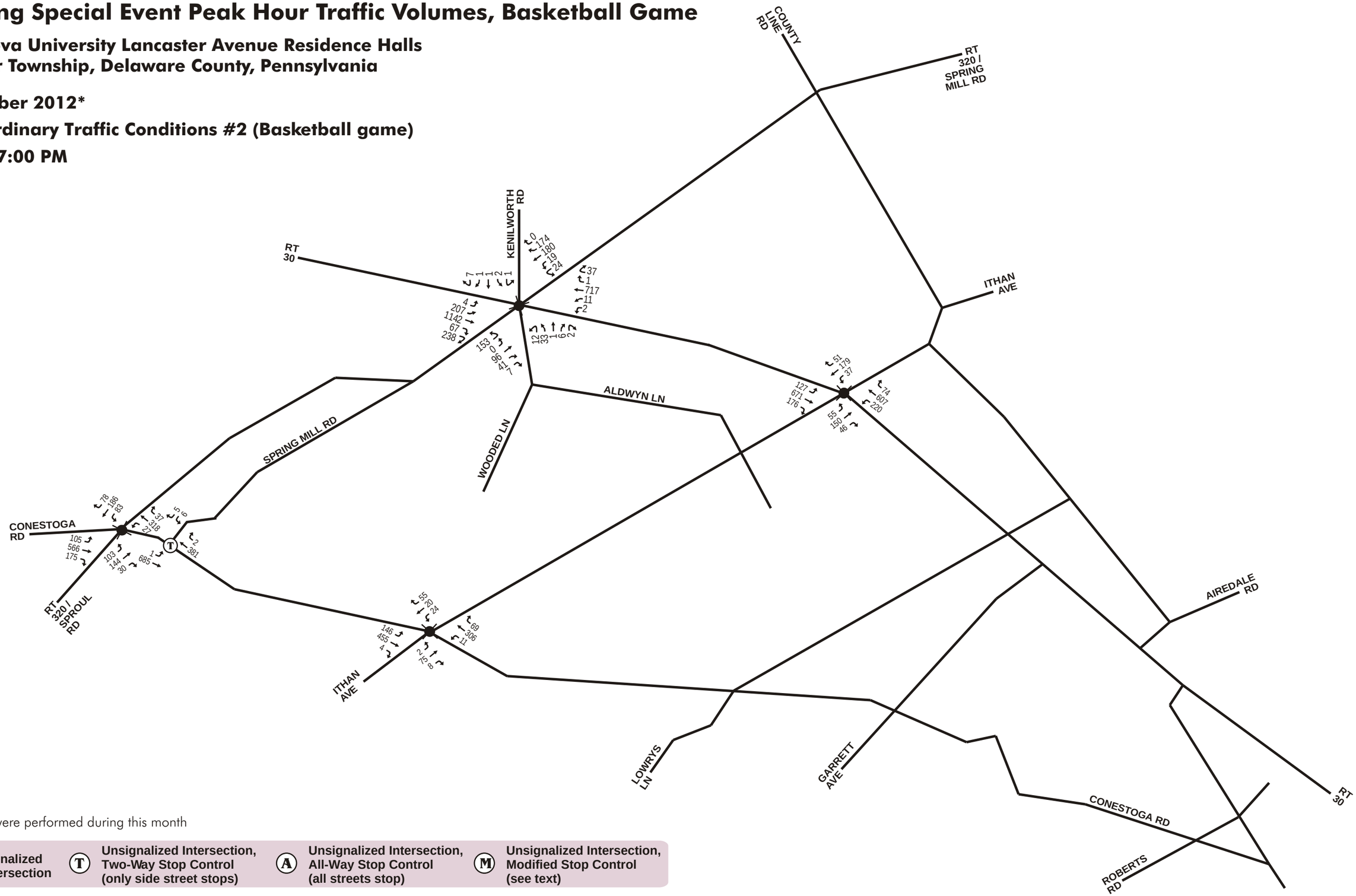
Existing Special Event Peak Hour Traffic Volumes, Basketball Game

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

December 2012*

Extraordinary Traffic Conditions #2 (Basketball game)

6:00 - 7:00 PM

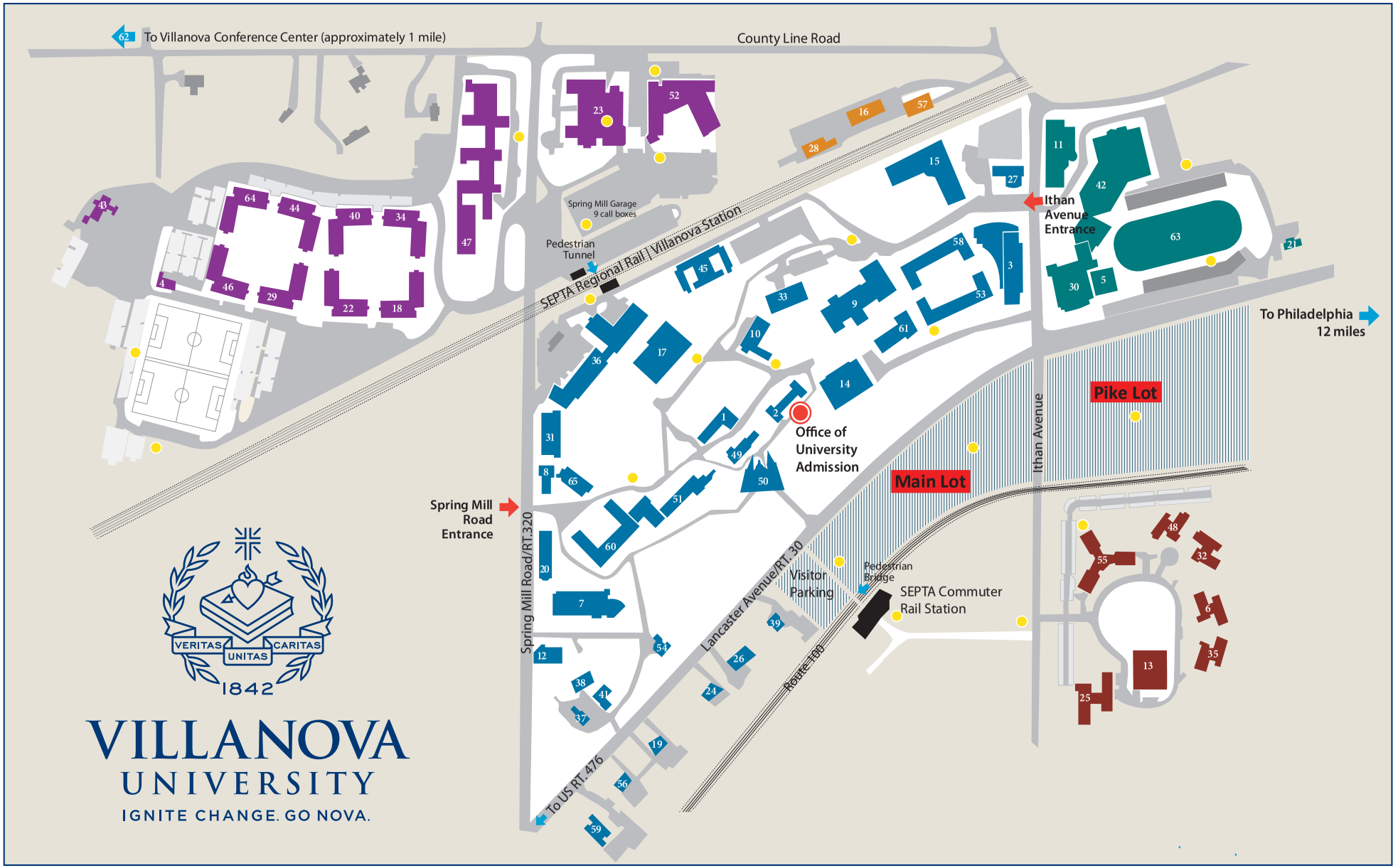


* counts were performed during this month

Signalized Intersection	(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)	(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)	(M) Unsignalized Intersection, Modified Stop Control (see text)

APPENDIX F

Campus Key Map


To Villanova Conference Center (approximately 1 mile)
County Line Road
Spring Mill Garage
9 call boxes
Pedestrian
Tunnel
SEPTA Regional Rail | Villanova Station
Ithan
Avenue
Entrance
To Philadelphia
12 miles
Pike Lot
Ithan Avenue
Office of
University
Admission
Main Lot
Spring Mill
Road
Entrance
Spring Mill Road/RT.320
Lancaster Avenue/RT. 30
Visitor
Parking
Pedestrian
Bridge
SEPTA Commuter
Rail Station
Route 100
To US RT. 476
VERITAS
UNITAS
CARITAS
1842
VILLANOVA
UNIVERSITY
IGNITE CHANGE. GO NOVA.

1. **ALUMNI HALL** ● (1849)
Residence hall, gymnasium for intramural athletics

2. **AUSTIN HALL** • ● (1924)
Office of University Admission, residence hall

3. **BARTLEY HALL** • ● (1958)
Villanova School of Business, Office of the Dean, administrative offices, faculty offices, Applied Finance Laboratory, classrooms, dining facilities, Graduate Business Programs, Print Center, ATM

4. **BURNS HALL** • (1978)
Augustinian residence

5. **BUTLER ANNEX** (1968)
Athletic facility

6. **CAUGHLIN HALL** • ● (1989)
Residence hall

7. **CEER: CENTER FOR ENGINEERING EDUCATION AND RESEARCH** • ● (1997)
College of Engineering, Office of the Dean, administrative offices, laboratories, conference rooms, auditorium, dining facility

8. **CHEMICAL ENGINEERING BUILDING** (1947)
Chemical Engineering offices,classrooms, laboratories

9. **CONNELLY CENTER** • (1980)
Auxiliary Services, Presidents' Lounge, International Student Advisor, Office of Human Services (students with disabilities), student lounges, cinema, meeting rooms, information desk, cyber lounge, dining facilities, convenience/video store, Art Gallery, ATM

10. **CORR HALL** • ● (1914)
Office for Mission and Ministry, Office of the Vice President for Mission and Ministry, Center for Faith and Learning, Center for Peace and Justice Education, residence hall, Greek Affairs, chapel

11. **DAVIS CENTER** • (2007)
Men's and women's basketball offices, men's and women's basketball practice facilities, Intramural/Recreation Department, fitness center

12. **DELUREY HALL** ● (1943)
Residence hall

13. **DONAHUE HALL** • (1985)
Dining facilities, convenience store, ATM

14. **DOUGHERTY HALL** • (1955)
Office of the Vice President for Student Life, Center for Multicultural Affairs, Office of the Dean of Students, Offices of Dining Services, Student Government office, Wildcard office, dining facilities, student organization offices, lounges, barber shop, bank, ATM

15. **DRISCOLL HALL** • ● (2008)
College of Nursing, Office of the Dean, administrative offices, faculty offices, Center for Nursing Research, Center for Global and Public Health, auditorium, lecture halls, seminar rooms, classrooms, Clinical Simulation Laboratories, chapel, reading room, dining facility

16. **FACILITIES MANAGEMENT BUILDING** • (1965)
Facilities Management main office, staff, shops

17. **FALVEY MEMORIAL LIBRARY** • ● (1949)
Library, University Communication: Creative Services, Learning Support Services *(moving from Vasey Hall in January 2012)*, Writing Center, Mathematics Center, Augustinian Institute, Augustinian Historical Institute, dining facility

18. **FARLEY HALL** • (2000)
Residence hall, fitness center

19. **FARRELL HALL** • ● (1960)
Office of Public Safety, parking office

20. **FEDIGAN HALL** • ● (1930)
Residence hall

21. **GALBERRY HALL** (1940)
University Graphic Services, Conference Services

22. **GALLEN HALL** • ● (2000)
Residence hall

23. **GAREY HALL** • (1958)
Alumni Center, University Advancement: Alumni Relations and Development, Department of Communication, Career Services office, Honors Program, IGIS: Institute for Global Interdisciplinary Studies, Custodial Services, classrooms

24. **GERAGHTY HALL** (1958)
Office of the Dean of Enrollment Management, University Communication: Media Relations, NHI: National Hispanic Institute

25. **GOOD COUNSEL HALL** ● (1969)
Residence hall

26. **GRIFFIN HALL** (1964)
University Communication: Constituent Publications, Marketing and University Advancement–Communication

27. **HEALTH SERVICES BUILDING** • (2002)
Counseling Center, Center for Health and Wellness Education, Health Center, VEMS: Villanova Emergency Medical Service

28. **HEATING PLANT** (1950)

29. **JACKSON HALL** • ● (2000)
Residence hall

30. **JAKE NEVIN FIELD HOUSE** • (1932)
Athletic Department offices, Director of Athletics, basketball court, other athletic facilities

31. **JOHN BARRY HALL** • (1947)
Naval R.O.T.C. headquarters, classrooms

32. **KATHARINE HALL** • ● (1986)
Residence hall

33. **KENNEDY HALL** • (1968)
University Shop, Office of Financial Assistance, Office of Residence Life, Bursar's Office, Mail Services, College of Liberal Arts and Sciences Office of Graduate Studies, Office of the Dean of Graduate Studies

34. **KLEKOTKA HALL** • ● (1994)
Residence hall

35. **MCGUIRE HALL** • ● (1989)
Residence hall

36. **MENDEL SCIENCE CENTER** • ● (1961)
Classrooms, lecture halls, laboratories, administrative offices, student public computing labs, observatory, greenhouse

37. **MIDDLETON HALL** (1943)
International Studies, Office of Research and Sponsored Projects

38. **MILITARY SCIENCES BUILDING** • (1949)
Army R.O.T.C. headquarters, classrooms

39. **MORIARTY HALL** ● (1963)
Residence hall

40. **MOULDEN HALL** • ● (1994)
Residence hall

41. **O'DWYER HALL** ● (1941)
Residence hall

42. **PAVILION** • (1985)
Basketball stadium, indoor sports complex, athletic offices, locker rooms, swimming pool, 200-meter indoor track, ATM

43. **PICOTTE HALL AT DUNDALE** • ● (1974)
Office of University Advancement, Office of the Vice President for University Advancement

44. **RUDOLPH HALL** • ● (1994)
Residence hall

45. **ST. AUGUSTINE CENTER FOR THE LIBERAL ARTS** • ● (1992)
College of Liberal Arts and Sciences, Office of the Dean, Catholic Relief Services, The Theology Institute, administrative offices, faculty offices, seminar rooms, dining facility

46. **ST. CLARE HALL** • ● (2000)
Residence hall

47. **ST. MARY HALL** • ● (1964)
Human Resources, Procurement, Payroll, Financial Affairs, Budget, OPIR: Office of Planning and Institutional Research, Graduate Programs in Human Resource Development, administrative offices, residence hall, dining facility, University Senate office, chapel, pool, gymnasium, Music Activities, Art Conservatory, student mail services, ATM

48. **ST. MONICA HALL** • ● (1986)
Residence hall

49. **ST. RITA HALL** ● (1913)
Residence hall, Campus Ministry offices

50. **ST. THOMAS OF VILLANOVA CHURCH** • (1887)
Parish church for local community and Villanova University students

51. **ST. THOMAS OF VILLANOVA MONASTERY** • (1901 & 1934)
Augustinian residence and care center, Augustinian Heritage Room, Augustinian Way of Life Center

52. **SCHOOL OF LAW** • (2009)
Office of the Dean, administrative offices, classrooms, lounges, Law Library, Moot Court, dining facility, ATM

53. **SHEEHAN HALL** • ● (1957)
Residence hall

54. **SIMPSON HALL** • ● (1948)
Residence hall

55. **STANFORD HALL** • ● (1971)
Residence hall, fitness center, Office of Continuing Studies

56. **STONE HALL** (1957)
Office of Environmental Health and Safety

57. **STRUCTURAL ENGINEERING TEACHING AND RESEARCH LABORATORY** • (2005)
Structural member and load testing facility, environmental room, wet room, material testing room

58. **SULLIVAN HALL** • ● (1953)
Residence hall

59. **TECHNOLOGY SERVICES BUILDING** • ● (1993)
General computing and technology information, administrative offices for UNIT: University Information Technologies, Office of the Vice President for Technology and Chief Information Officer, CIT: Center for Instructional Technologies main office, Network and Communications, University Information Systems, faculty/staff training facility

60. **TOLENTINE HALL** • (1929)
Office of the University President; Offices of the Vice President for Academic Affairs, Vice President for Administration and Finance, Vice President for University Communication, Vice President and General Counsel; College of Engineering offices; Registrar's Office; other administrative offices; classrooms; Department of Psychology (labs, offices); CIT: Center for Instructional Technologies; video/teleconference facility

61. **VASEY HALL** • (1931)
VITAL: Villanova Institute for Teaching and Learning, Office of Part-time Studies, Summer Sessions Program, Theatre Department, theatre, offices, classrooms, TechZone Computer Support Center, Learning Support Services *(moving to Falvey Library in January 2012)*

62. **VILLANOVA CONFERENCE CENTER** • (1998)
Hotel accommodations, meeting space, guest dining facility, special events catering, Office of Executive Programs, Executive M.B.A. Program, Executive Education

63. **VILLANOVA STADIUM** • (1927)
Stadium (playing field for varsity football, lacrosse, etc.), track, athletic weight room, Grounds Department

64. **WELSH HALL** • ● (1994)
Residence hall

65. **WHITE HALL** • (1974)
Chemical Engineering offices, classrooms, laboratories

• Handicap Accessible Parking Areas

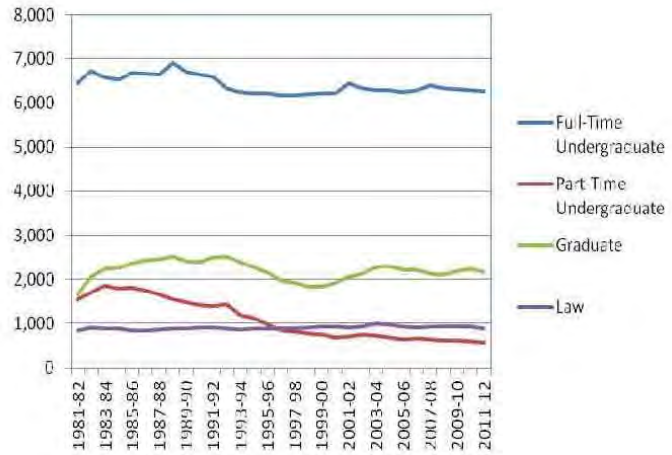
● Call Box indicator: Phones located at buildings with direct-dial to Public Safety are indicated on key; free-standing Call Boxes to Public Safety are indicated on map

APPENDIX G

Trip Generation

TRIP GENERATION

Trip generation at a university or college is principally a function of the student body. Student population at Villanova has remained consistent and flat for the last 20+ years as depicted in the following chart:



The project is principally aimed at addressing currently-unmet student desires, namely more on-campus housing for existing undergraduate upperclassmen (juniors and seniors). At present there are 1,779 of the 2,982 full-time undergraduate juniors and seniors living off campus[1] and so they currently commute to classes, often during weekday commuter peak periods. Thus, if the project is constructed, the majority of these commuters will be living on campus and as a result peak hour traffic both at site driveways *and* in the study area generally will be reduced as a result of the project.

It should be noted that students who once lived off-campus in rental housing will likely be replaced by new tenants. Those tenants may be students of Villanova (or other institutions) or may not be students at all, but in any event it is unlikely that all the new tenants will be other Villanova students. Even if they are, they will probably be Villanova students who live more remotely, and thus the net impact to the study area and the campus will be the same (i.e., a net reduction in total commuting traffic). Even so, there is no practical way to *remove* peak hour traffic associated with the currently-commuting undergraduate students from the existing counts at the intersections in the study area, and so for this reason future peak hour traffic estimates are doubly conservative – *not only are driveway volumes not adjusted (reduced) to reflect students who will be living on campus but also the intersections in the study area are also not adjusted (reduced) to reflect students who will be living on campus*.

SITE-DERIVED TRIP GENERATION

Traffic counts were not conducted at every driveway to every parking facility on the entire campus nor were students polled to determine mass transit usage, but some measure of site-specific trip generation can still be derived from collected data.

There are 1,783 parking spaces found on the Main Lot, the Pike Lot, and the Visitor's Lot (combined). These spaces represent 34.7% of total parking supply. Determining the traffic activity

[1] Fall 2012 semester data.

(i.e., entering and exiting traffic) of these parking lots and dividing by the parking supply factor (34.7%) will yield approximate campus-wide trip generation activity which can then be compared with the number of students currently attending Villanova (10,127) so that a trip generation rate per student can be derived. This rate can then be compared with ITE rates, as an added back-check.

TRIP GENERATION TRAFFIC COUNTS

Turning Movement (manual) and Automatic Traffic Recorder (ATR) traffic counts were conducted at every driveway serving the Main and Pike Lots in Fall 2011. The trip generation activity gathered from the turning movement counts is summarized in Table 1:

Table 1 – Main Lot + Pike Lot + Visitor Lot Traffic Activity, All Driveways

Source/Date	AM Peak Hour[6]			PM Peak Hour[7]		
	IN	OUT	TOTAL	IN	OUT	TOTAL
09/2011, TM counts	405	50	455	352	404	756

The potential use of this data as a building block for forecasting trip generation arising from the project is a critical element of study and so was validated a few different ways. The focus of the validation effort was placed on the four driveways along Ithan Avenue which, collectively, process the majority of traffic to and from the parking lots.

Table 2 summarizes the gathered traffic count data with the first row being a repeat of the trip generation numbers contained in Table 1 (but as a subset of just Ithan Avenue driveways). Note that an 8th column is introduced in Table 2, namely the sum of AM and PM peak hour total entering/exiting activity. It is this value which can be used as a metric to gauge the validity of the 2011 turning movement data. Note that additional turning movement counts were conducted in 2013 as well, as shown in the table below.

Table 2 – Main Lot + Pike Lot + Visitor Lot Traffic Activity, Ithan Avenue Driveways

Source/Date	AM Peak Hour[2]			PM Peak Hour[3]			AM + PM
	IN	OUT	TOTAL	IN	OUT	TOTAL	TOTAL
09/2011, TM counts (Thursday)	299	7	306	210	236	446	752
02/2013, TM counts (Thursday)	307	13	320	211	220	431	751
10/2011, ATR counts (Thursday)	251	11	262	218	222	440	702
10/2011, ATR counts (Tuesday)	257	17	274	229	213	442	716

Review of the gathered data confirms that the 09/2011 turning movement traffic counts continues to be valid as the basis of trip generation for the project. Raw count data is provided in the appendix of this deliverable.

[2] 7:45-8:45 AM from 2011 turning movement counts (8:00 to 9:00 used for ATR data).

[3] 5:00-6:00 PM from 2011 turning movement counts (same hour used for ATR data).

VILLANOVA TRIP GENERATION vs PUBLISHED TRIP GENERATION

Similar to the parking demand exercise, the gathered traffic counts can be used to generate a University-specific trip generation rate. This rate can be compared with rates published by the Institute of Transportation Engineers (ITE) in its publication, Trip Generation. Trip Generation is a collection of empirical data which has been combined, reviewed, and statistically analyzed to generate parking rates to be used as a guide in planning new facilities. Trip Generation includes dozens of different land use categories including Land Use Code 550: University/College.

To generate a parking demand *rate*, traffic count data must be correlated with a variable. Trip Generation incorporates the use of two variables for University/College land uses, namely "students" and "employees". The student-based dataset is larger and appears to be the more appropriate variable.

As mentioned earlier, the current student population totals 10,127 students. AM peak hour traffic activity totals 455 trips and PM peak hour traffic totals 756 trips (see Table 1). Villanova-specific trip generation rates derived from school population and comparison with ITE's LUC 550 category rates follows in Table 3 and Table 4:

Table 3: Trip Generation Rate Derivation

TIME PERIOD	TOTAL TRIPS	PARKING SUPPLY FACTOR APPLIED	DIVIDED BY STUDENT BODY
AM Peak Hour	455	1311	0.129
PM Peak Hour	756	2179	0.215

Table 4: Trip Generation Rate Comparison

DATA SOURCE	TRIP GENERATION RATE (PER STUDENT)		
	AM Peak Hour	PM Peak Hour	AM + PM Combined
Villanova	0.129	0.215	0.344
ITE	0.170	0.170	0.340

Villanova-specific rates are reasonably well-correlated with ITE data. Note this exercise does not specifically address the influence of mass transit, though whatever patronage of mass transit currently exists is reflected in collected traffic count data. More importantly, this exercise was merely just that – an exercise – since the project does not include any new students and in fact is expected to result in a reduction of class day peak period traffic to and from the site since currently-commuting juniors and seniors will now be living in the new housing of the site. The project does, however, feature an increase in parking spaces and as previously mentioned and agreed, this study examines the potential traffic associated with that increase in parking spaces by applying site-specific trip generation rates (using parking spaces as a variable) to the proposed increase in parking supply (a total net increase of 19 spaces). The trip generation rates to be used are summarized in Tables 5 through 8:

Table 5: Project Trip Generation Rate Derivation

TIME PERIOD	TOTAL TRIPS	PARKING SPACES SERVED	TRIP GENERATION RATE PER SPACE
AM Peak Hour	455	1783	0.255
PM Peak Hour	756	1783	0.424

Table 6 – Trip Generation Directional Split Derivation

09/2011, TM counts	AM Peak Hour			PM Peak Hour		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Volumes	405	50	455	352	404	756
Percentages	89%	11%	100%	47%	53%	100%

Table 7 – Project Trip Generation Rates

Trip Generation Rate (Trips per Parking Space)	AM Peak Hour			PM Peak Hour		
	IN	OUT	TOTAL	IN	OUT	TOTAL
	0.227	0.028	0.255	0.199	0.225	0.424

The project affects (i.e., increases or decreases) parking supply (and therefore traffic activity) at the HSB and SAC garages as well as at Pike Lot, Main Lot, and the several small lots west of Church Walk. The main exercise of the study is to reassign associated traffic demands to reflect parking supply increases and decreases with existing turning movement volumes at existing driveways scaled proportionately to the proposed increase or decrease in spaces. Likewise, subsequent downstream/upstream 'feeder' turning movements are also modified proportionately.

TRIP GENERATION – RETAIL SPACE

The project includes approximately 15,000 SF of retail space. The exact users of the space are not yet defined. The CICD ordinance allows "retail subordinate" uses of varying types, including restaurant, clothing store, bookstore, ice cream shop, etc. The majority of patrons of the stores are expected to be Villanova students, faculty, staff, employees, visitors, and related individuals who have already made a trip to or from the campus and thus the retail subordinate trip will be an internalized or captured trip, meaning a trip which is not a new external vehicular trip exclusively made for purposes of visiting the retail establishment. Quantification of "majority of patrons" is appropriate.

ITE TRIP GENERATION

ITE trip generation rates are not appropriate in the context of "retail subordinate" uses since the land use codes contained in Trip Generation Manual are chiefly derived from free-standing establishments which are often considerably larger than the ~3KSF to ~9 KSF building space which may be associated with an individual user in the LAH. More importantly, they are not subordinate to a larger institutional use, such as the case here. The best predictor of possible trip generation activity for the uses at Villanova are other comparable existing uses at other universities in the Delaware Valley.

ST JOE's 54th STREET TRIP GENERATION

In 2004, St. Joe's broke ground on a new parking garage which has a footprint of approximately 20,000 SF and three ground-floor retailers. The project is located along 54th Street, immediately south of City Avenue. Accounting for garage ramps, dumpster locations, common hallways, elevators, staircases, and the garage management office, it appears the three retail uses total about 15,000 SF of leaseable area – similar to the Villanova proposal. In addition, three uses are featured: the St. Joe's Bookstore, a restaurant/bistro, and a Starbucks. The bookstore is the largest tenant and appears to occupy about 8 KSF with the remainder going to the remaining two uses with the restaurant being about twice the size of the Starbucks. The bookstore has a relatively small 'book' component – most (more than 50%) of the floor area is St. Joe's branded apparel and related items and about 25% is a small convenience store having a broad range of products, similar to a small CVS/Wawa hybrid.

Since the exact users and SFage of each of Villanova's site are not yet known, the total existing trip generation and capture rate of St. Joe's is a good predictor of the potential combined sum of retail subordinate activity at Villanova.

St. Joe's traffic activity was polled on several occasions during the weekday AM and PM peak hours defined in the September 2014 TIS (7:30 to 8:30 AM and 5:00 to 6:00 PM). Patrons (people) entering and exiting each storefront were tabulated and a select number of patrons were interviewed to determine if they were St. Joe's students, faculty, staff, or employees. Additionally, the general manager of the bookstore and the restaurant were interviewed. The following table summarizes what was learned.

Table 8 – Retail Interviews and Visitor Counts

DAY/DATE	INTERVIEWS		AM PEAK HOUR (7:30-8:30)				PM PEAK HOUR (5:00-6:00)			
	TOTAL	YES(a)	USE	IN	OUT	TOTAL	USE	IN	OUT	TOTAL
FRIDAY 09/05/14	30	27	SBUX	38	30	68	SBUX	51	48	99
	LOCATION: STARBUCKS		BOOK	*Book opens 9 AM*			BOOK	30	33	63
			BISTRO	*Bistro opens 11 AM*			BISTRO	44	29	73
	TIME:	AM PK	*TOTAL*	38	30	68	*TOTAL*	125	110	235
TUESDAY 09/09/14	30	23	SBUX	42	44	86	SBUX	39	41	80
	LOCATION: STARBUCKS		BOOK				BOOK	44	46	90
			BISTRO				BISTRO	42	20	62
	TIME:	PM PK	*TOTAL*	42	44	86	*TOTAL*	125	107	232
THURSDAY 09/11/14	30	24	SBUX	40	35	75	SBUX	47	49	96
	LOCATION: BOOKSTORE		BOOK				BOOK	48	46	94
			BISTRO				BISTRO	40	25	65
	TIME:	PM PK	*TOTAL*	40	35	75	*TOTAL*	135	120	255

(a) Number who answered "yes" to being a St. Joe's student, faculty, staff, or employee.

As shown in the above table, interviews were based on a sample of 30 random patrons on 3 different days and ranged from a low of 76% to a high of 90% of users answering "yes" to being a St. Joe's student, faculty, staff, or employee (i.e., a captured trip). Chris Silenzi, manager of the restaurant, stated that the "St. Joe's" patronage varies with day of the week and as well as with the season, but was also quick to point out that during breaks/summer months, while the St. Joe's patronage percentage decreases, so also does total sales (and, therefore, total traffic). He stated that during most school days the percentage is "probably 80-90%". David Towne, manager of the bookstore stated that he believed "less than 10% of my traffic is from outside the campus community". Based on all this, using an estimate of 75% for 'captured' trips at Villanova seems conservative. Taking the highest data point for each peak hour from the above table and applying a 75% capture credit yield the following estimate of new vehicular based trips which could be generated by the retail space at Villanova:

Table 9 – Net New Vehicular Trips
Retail Subordinate Uses at Villanova (Total)

AM PEAK HOUR			PM PEAK HOUR		
IN	OUT	TOTAL	IN	OUT	TOTAL
11	11	22	34	30	64

Note that the numbers above assume each patron translates to a single-occupant vehicular trip, which is conservative.

Even though the township traffic engineer's July 2014 letter did not explicitly state to include this traffic in the TIS (and even though the PennDOT review letter didn't mention the subject at all), these traffic estimates *were* included in the Projected Conditions of the September 2014 TIS for Villanova's project.

APPENDIX H

Site Volume Development Worksheets

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure _

Redistribution Worksheet #A1, RETAIL

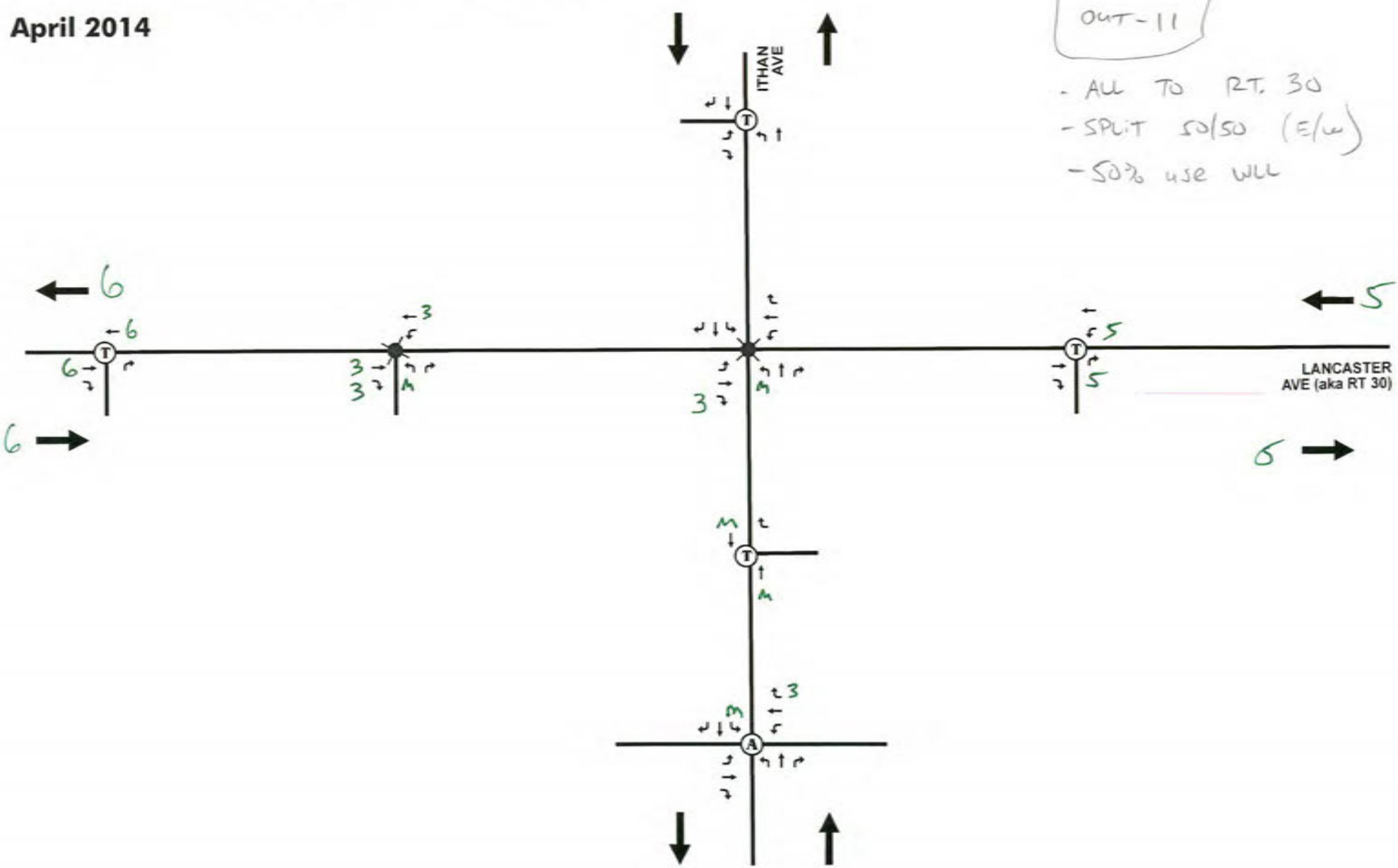
AM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014

IN - 11
OUT - 11

- ALL TO RT. 30
- SPLIT 50/50 (E/W)
- 50% USE WLL



F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure __

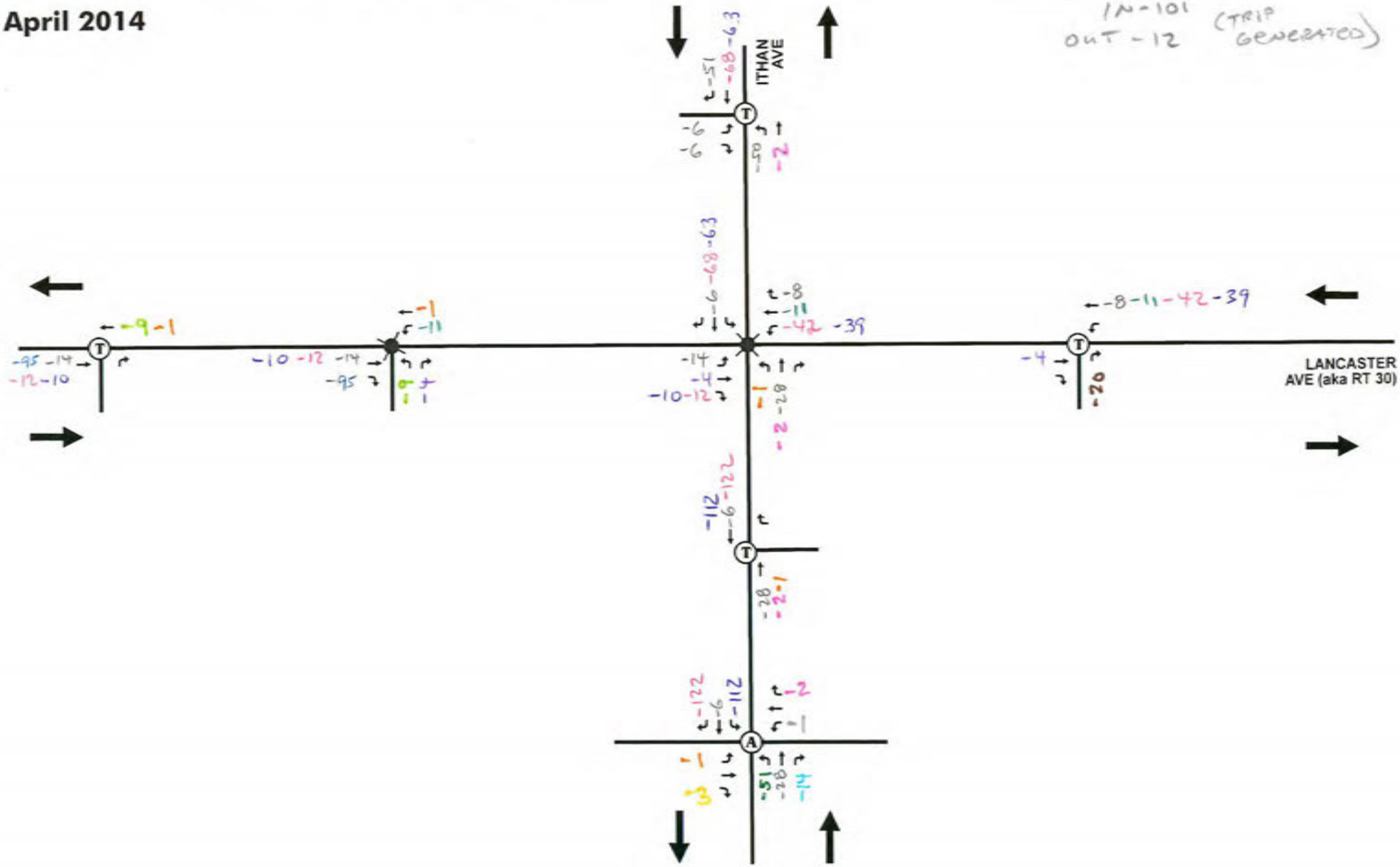
Redistribution Worksheet #__, EXISTING VOLUME REMOVAL - ALL - WORKSHEET

AM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

HSB/SAE NOTES
IN - 101
OUT - 12 (TRIP GENERATED)

April 2014



F. Tavani and Associates, Inc.
Traffic Engineering and Planning

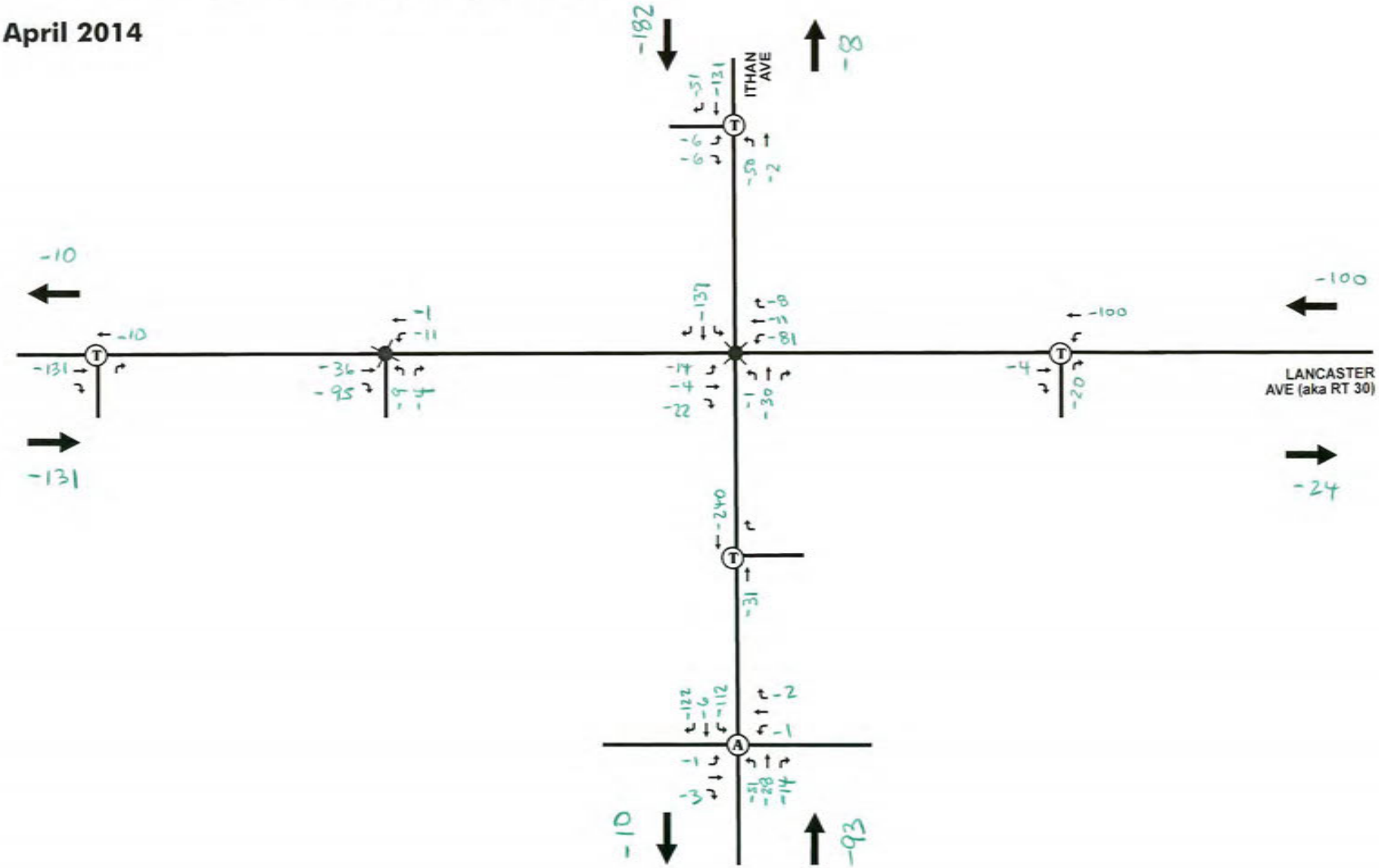
Figure _

Redistribution Worksheet #1A, EXISTING VOLUME REMOVAL, ALL, SUMMARY

AM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure _

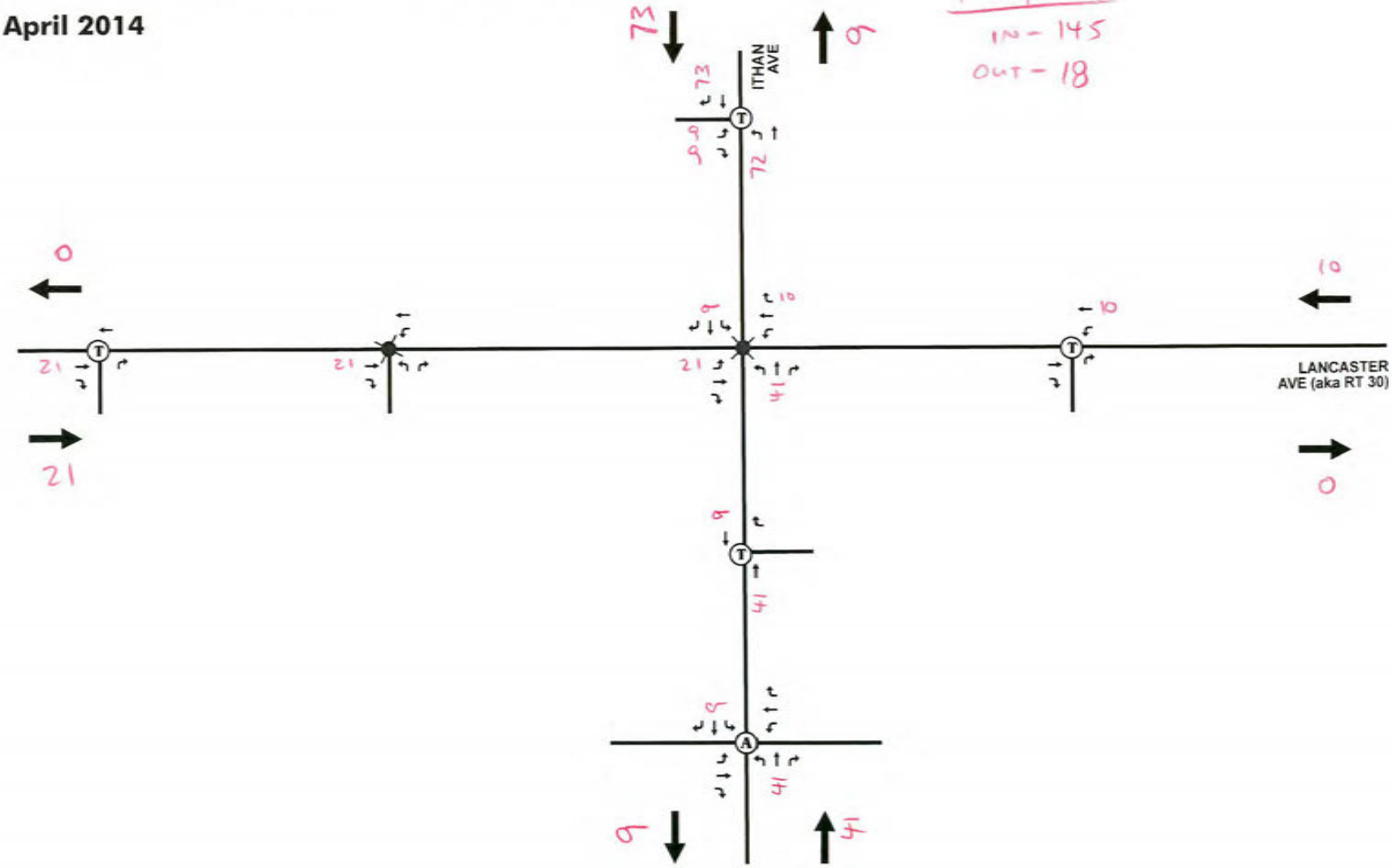
Redistribution Worksheet #2, HSB/SAC ADD

AM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014

HSB/SAC
IN - 145
OUT - 18



F. Tavani and Associates, Inc.
Traffic Engineering and Planning

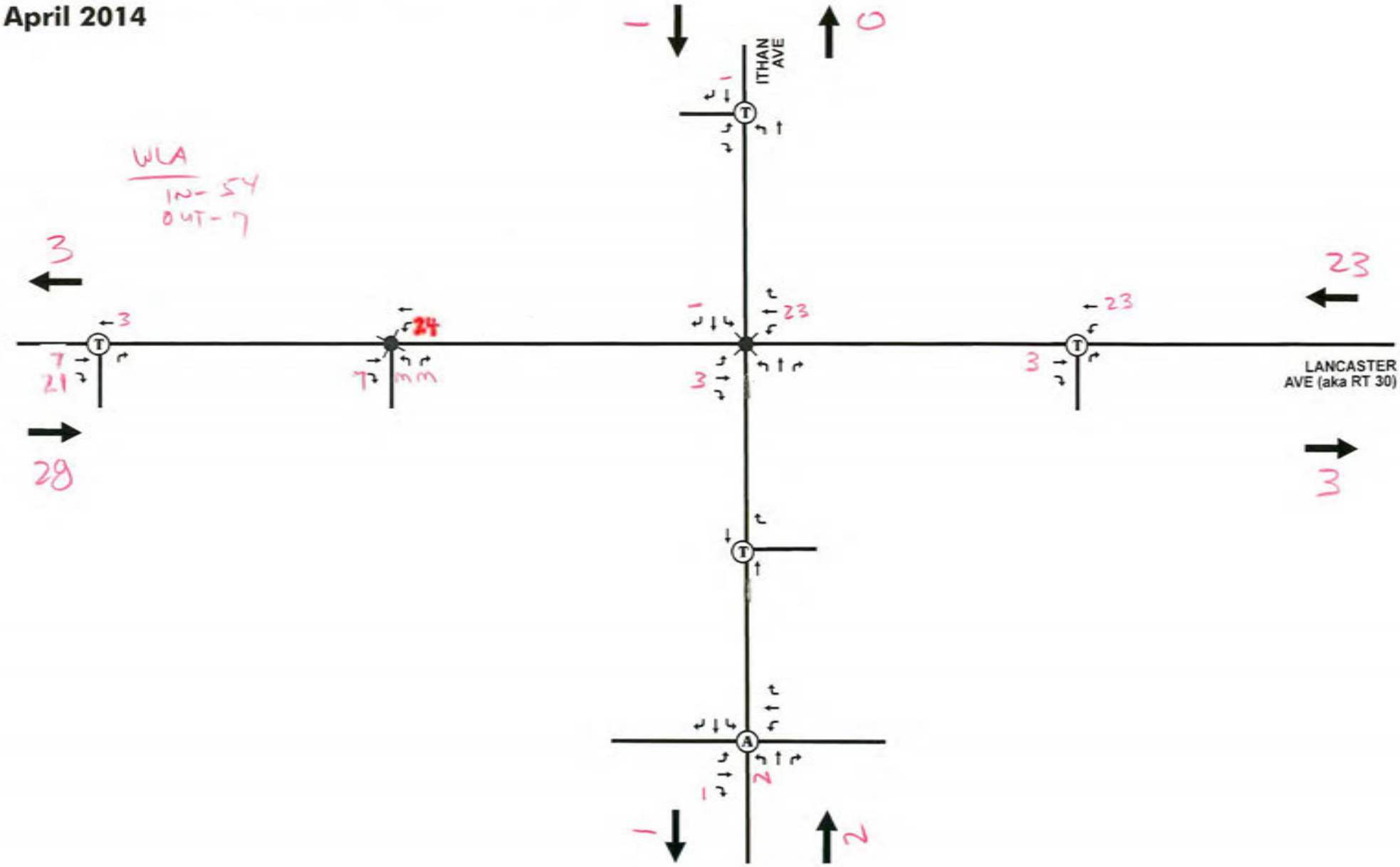
Figure _

Redistribution Worksheet #3, WLA ADD

AM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



F. Tavani and Associates, Inc.
Traffic Engineering and Planning

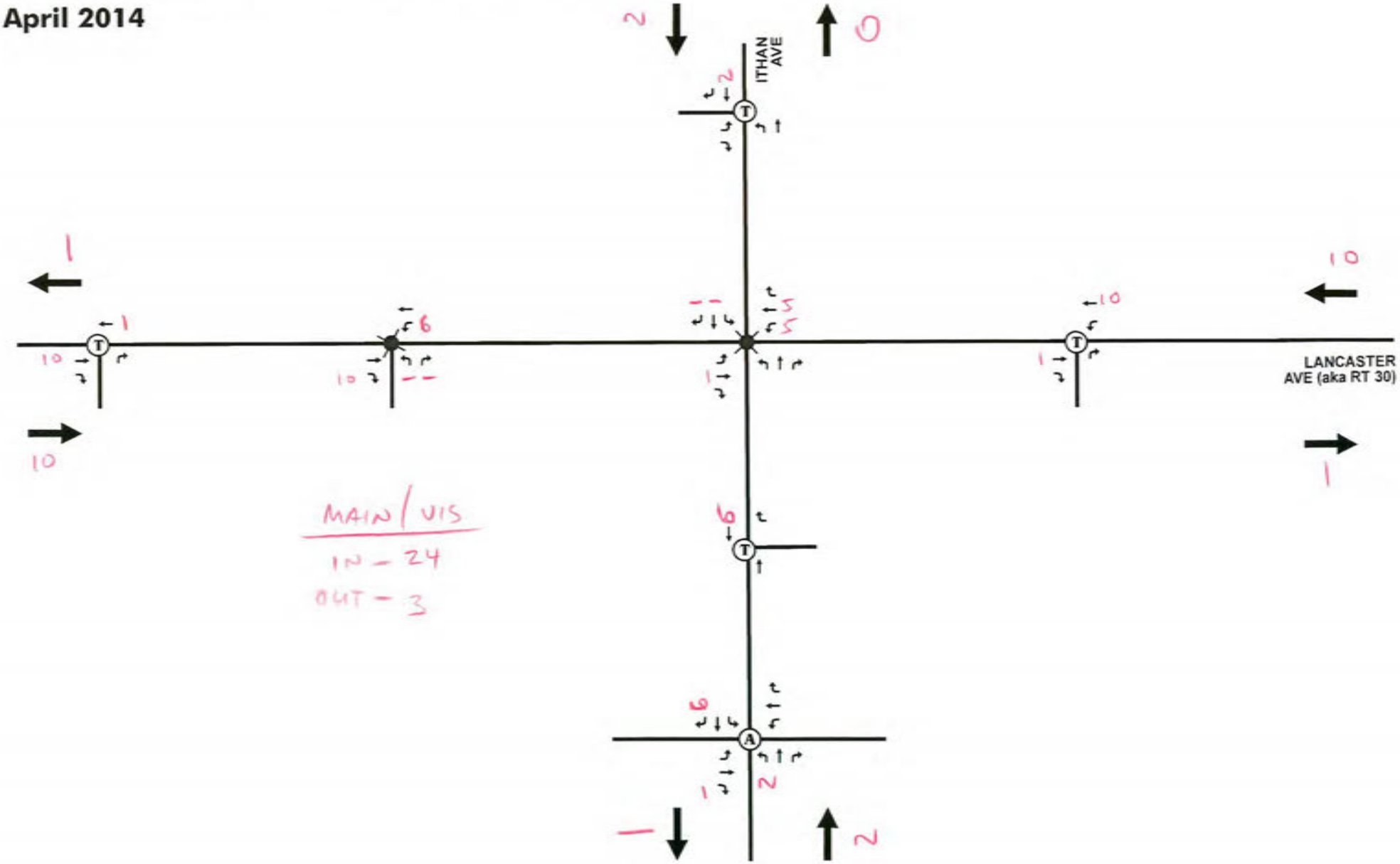
Figure __

Redistribution Worksheet #4, MAIN/VIS ADD

AM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



MAIN/VIS
IN - 24
OUT - 3

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

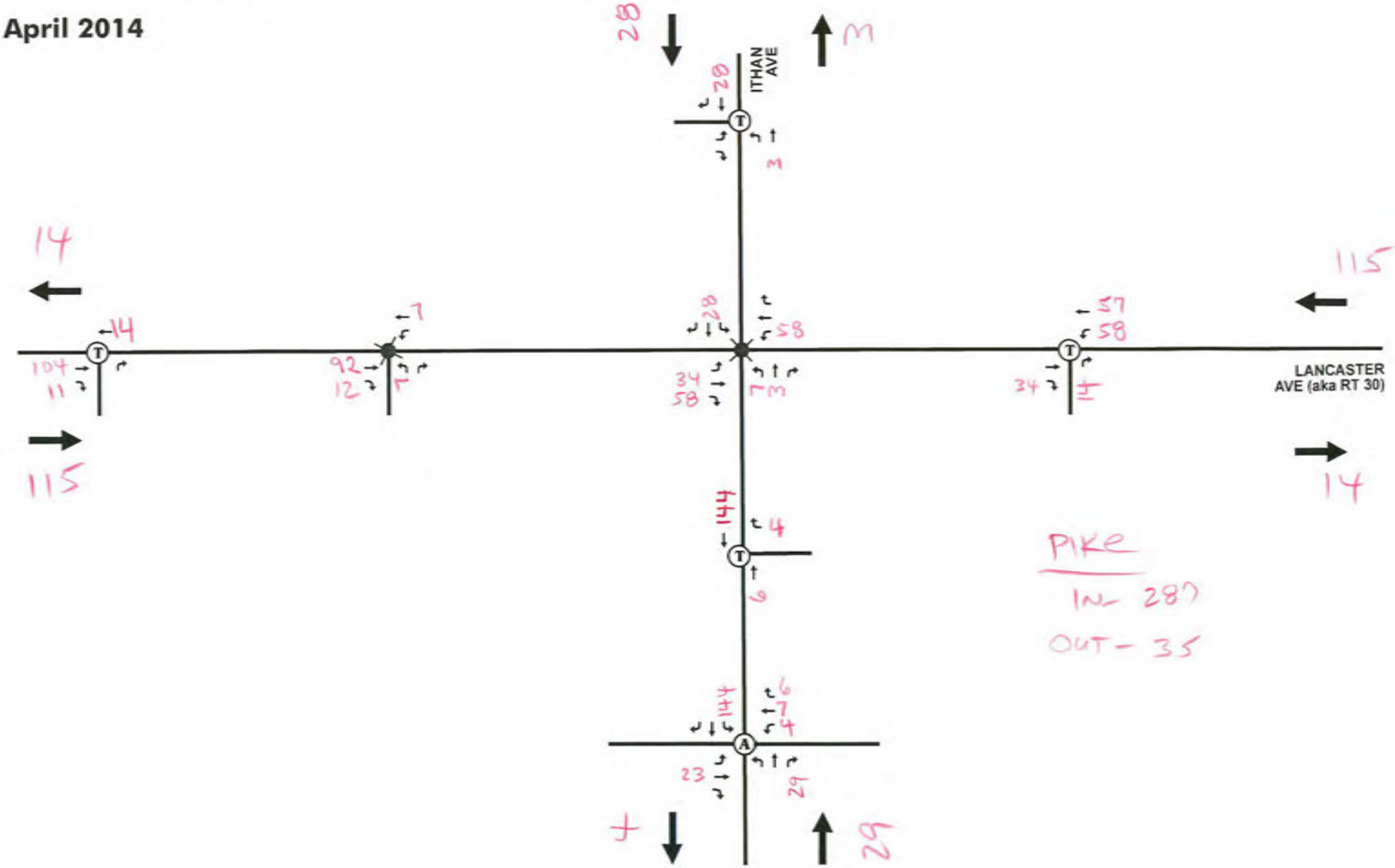
Figure _

Redistribution Worksheet #5, Pike ADD

AM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



F. Tavani and Associates, Inc.
Traffic Engineering and Planning

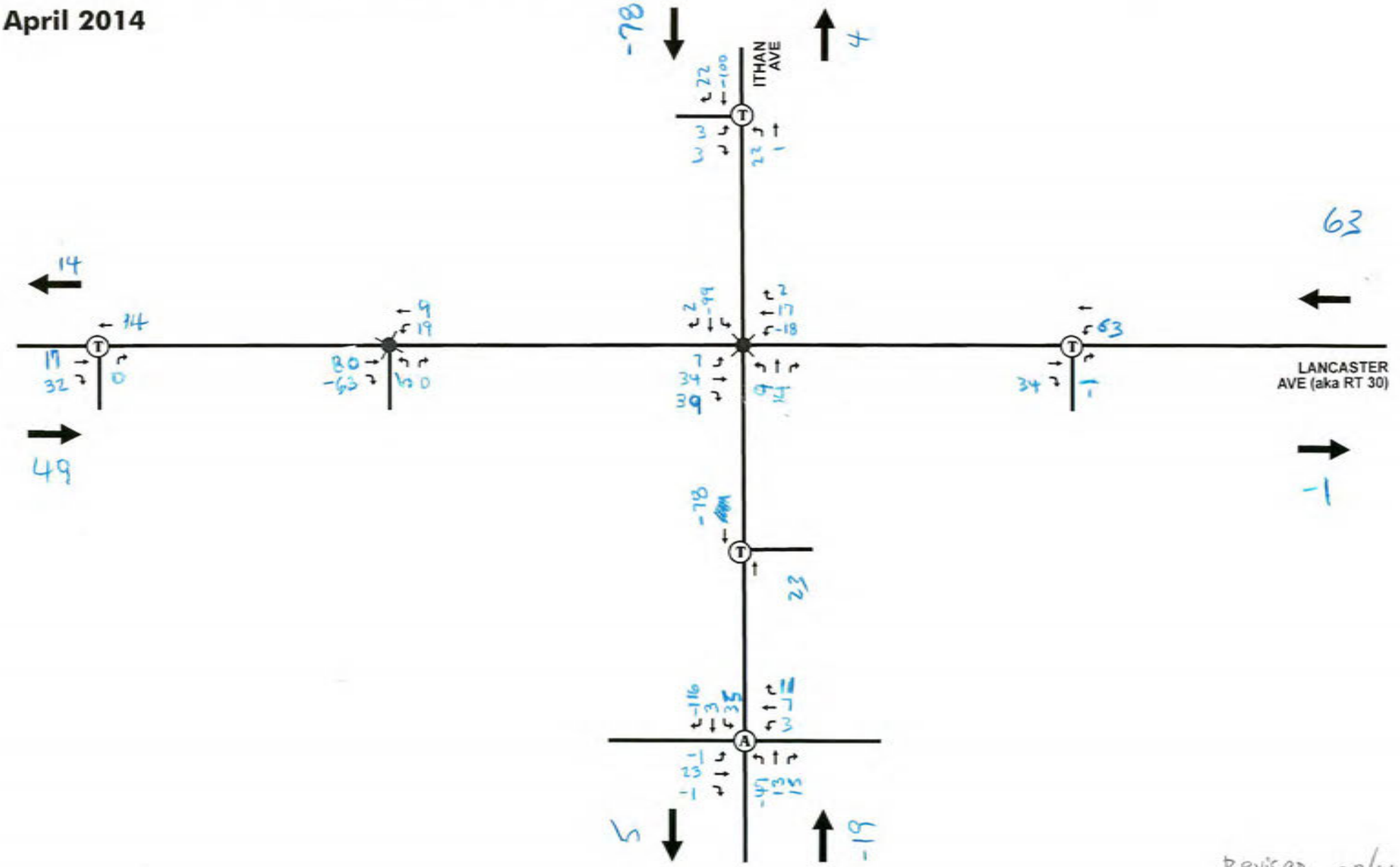
Figure _

Redistribution Worksheet #6, AM TOTAL

AM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



Revised 09/14

F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure _

Redistribution Worksheet #A7, RETAIL

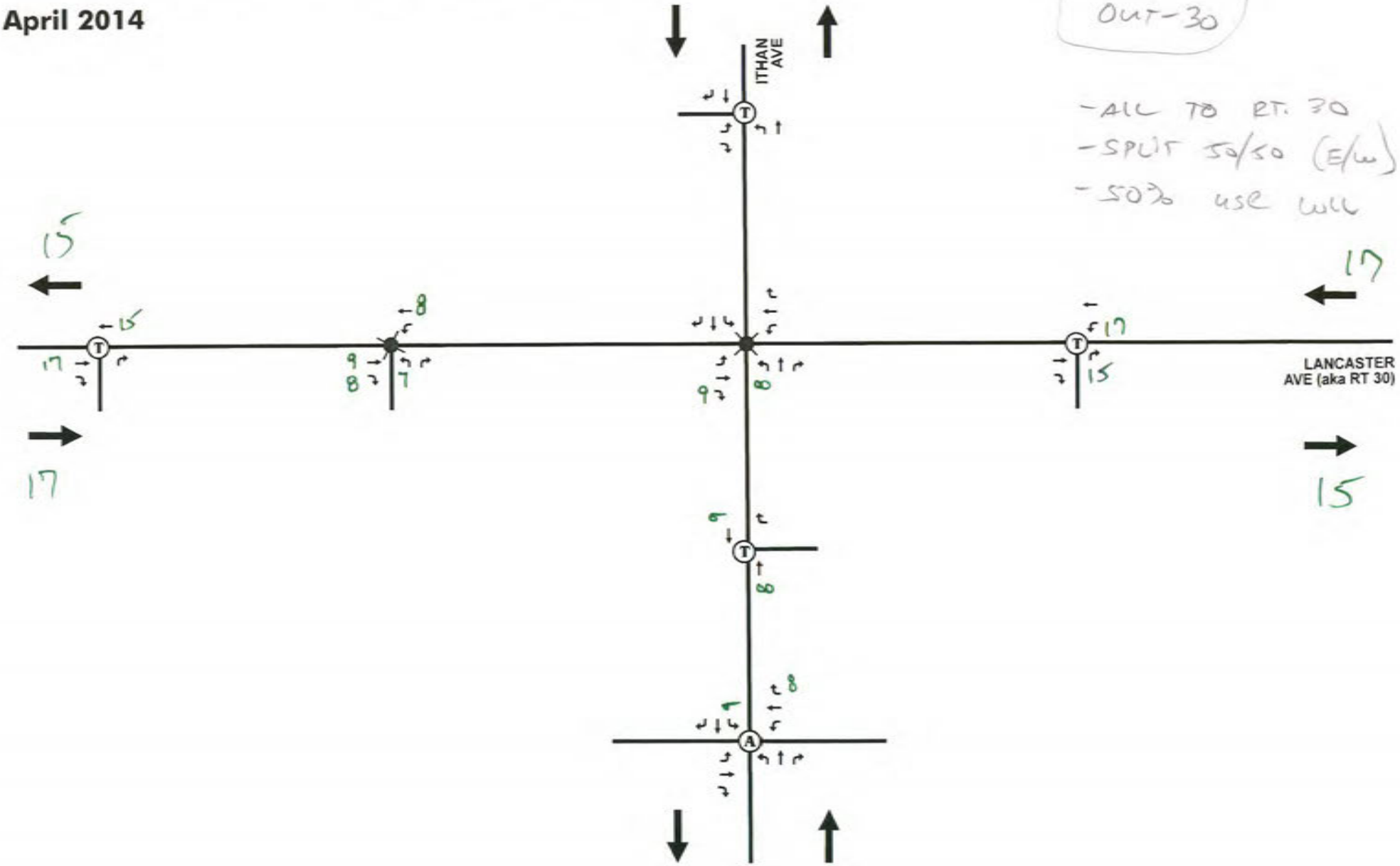
PM

IN - 34
OUT - 30

- ALL TO RT. 30
- SPLIT 50/50 (E/W)
- 50% USE WILL

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure _

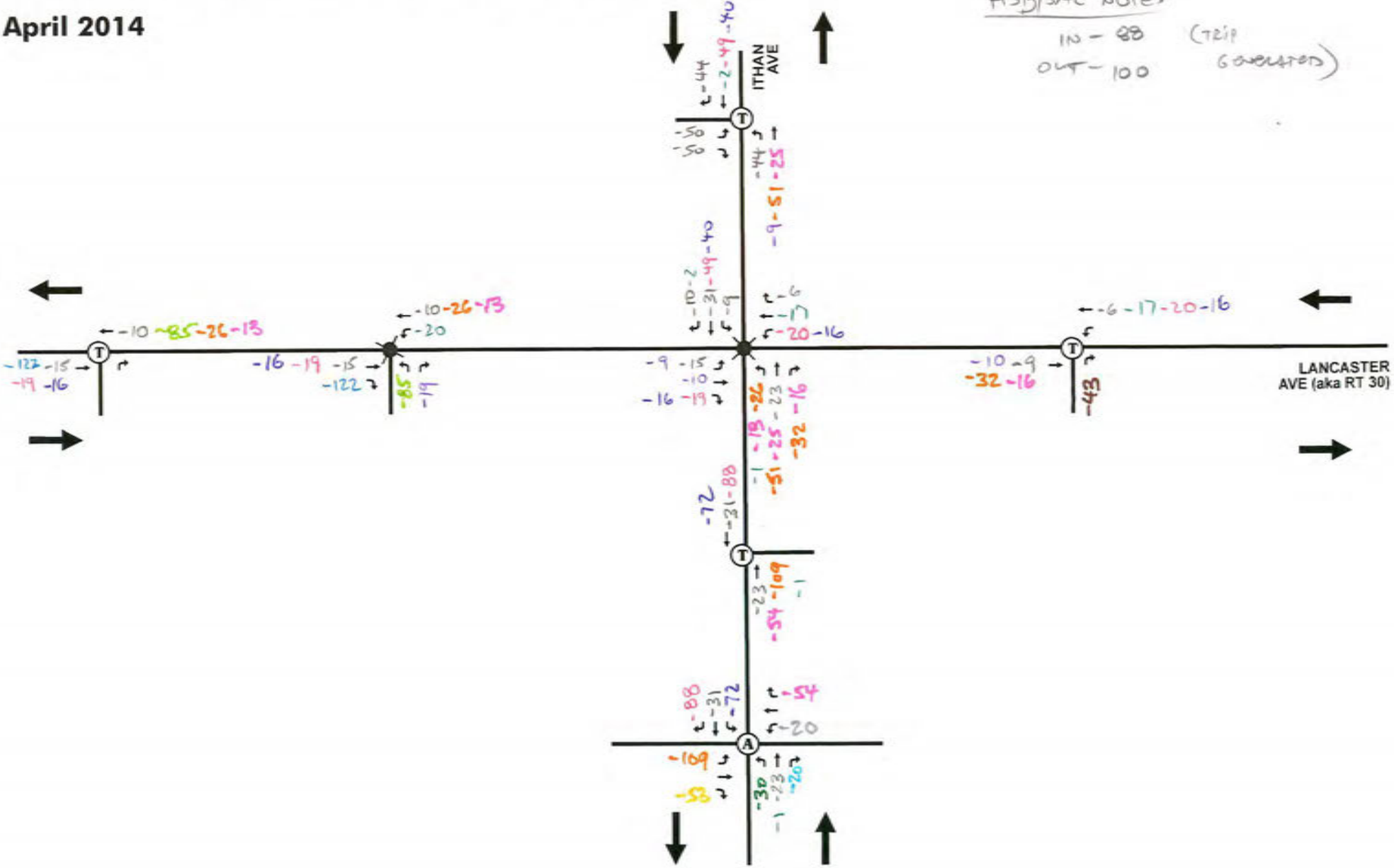
Redistribution Worksheet #7, EXISTING VOLUME REMASTER, ALL, WRKSHT

PM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014

HSB/SAC NOTES
IN - 88 (TRIP GENERATED)
OUT - 100

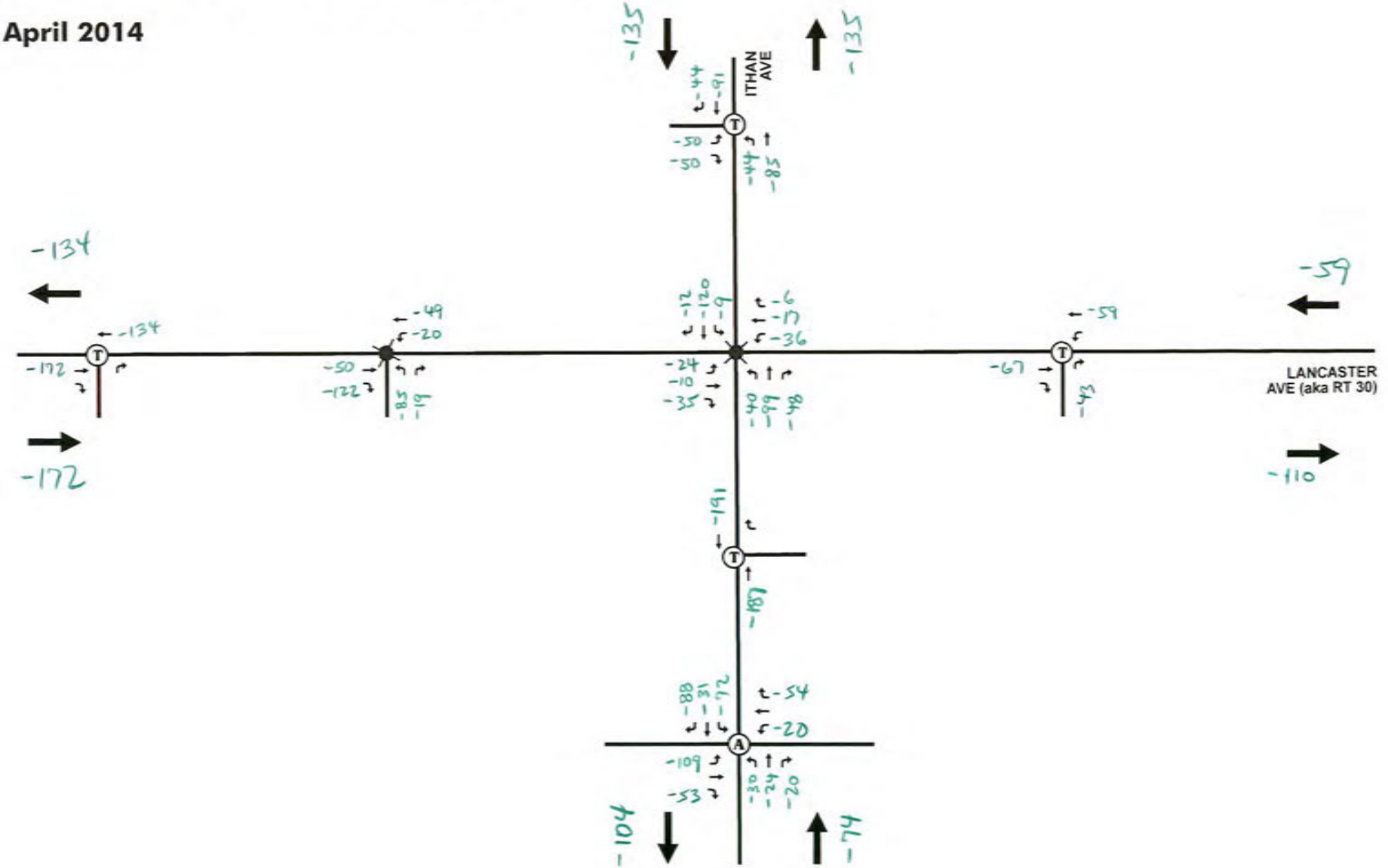


Redistribution Worksheet #7A, EXISTING VOLUME REMOVAL, ALL, SUMMARY

PM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



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Traffic Engineering and Planning

Figure __

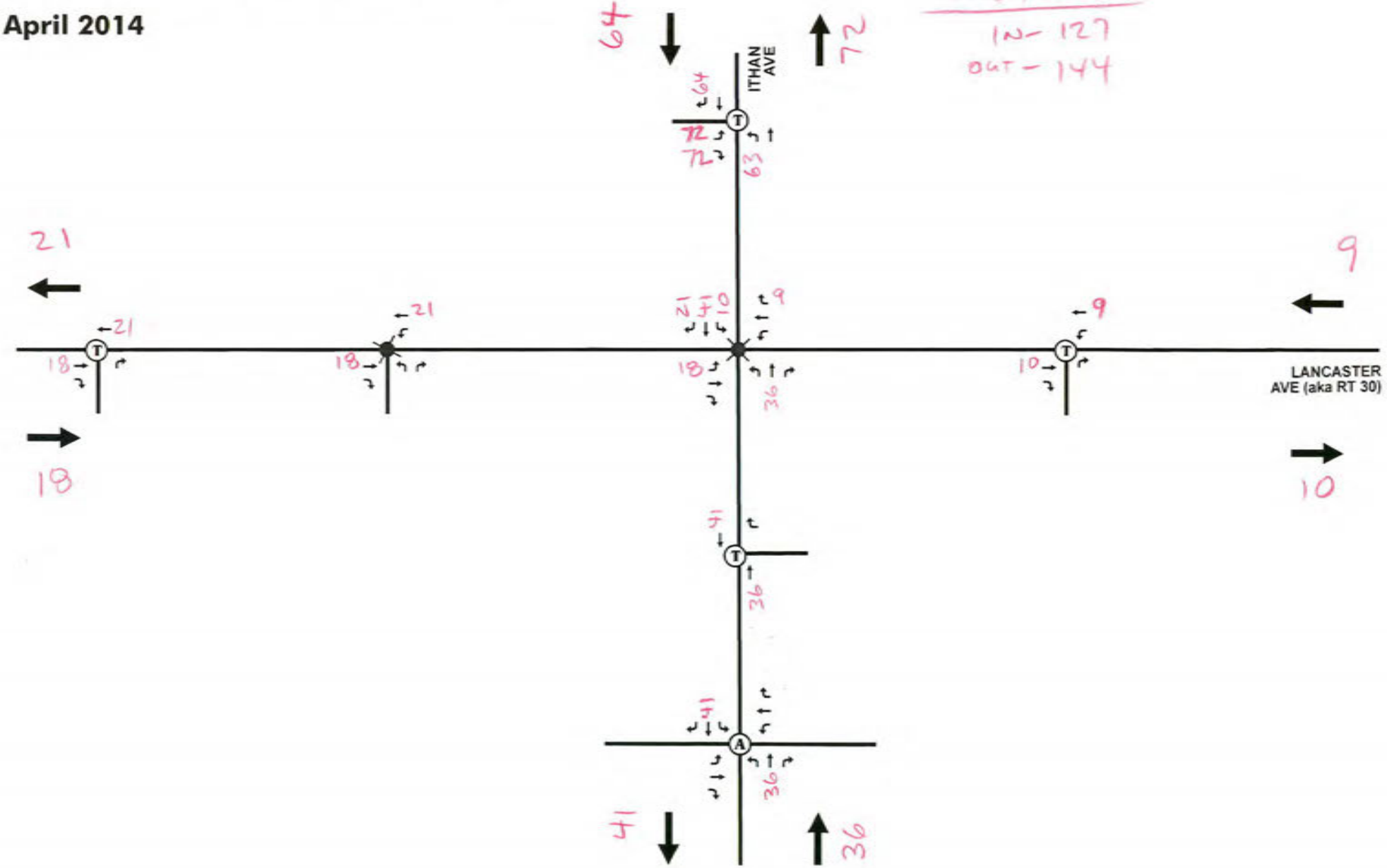
Redistribution Worksheet #8, HSB/SAC ADD

PM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014

HSB/SAC
IN - 127
OUT - 144



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Traffic Engineering and Planning

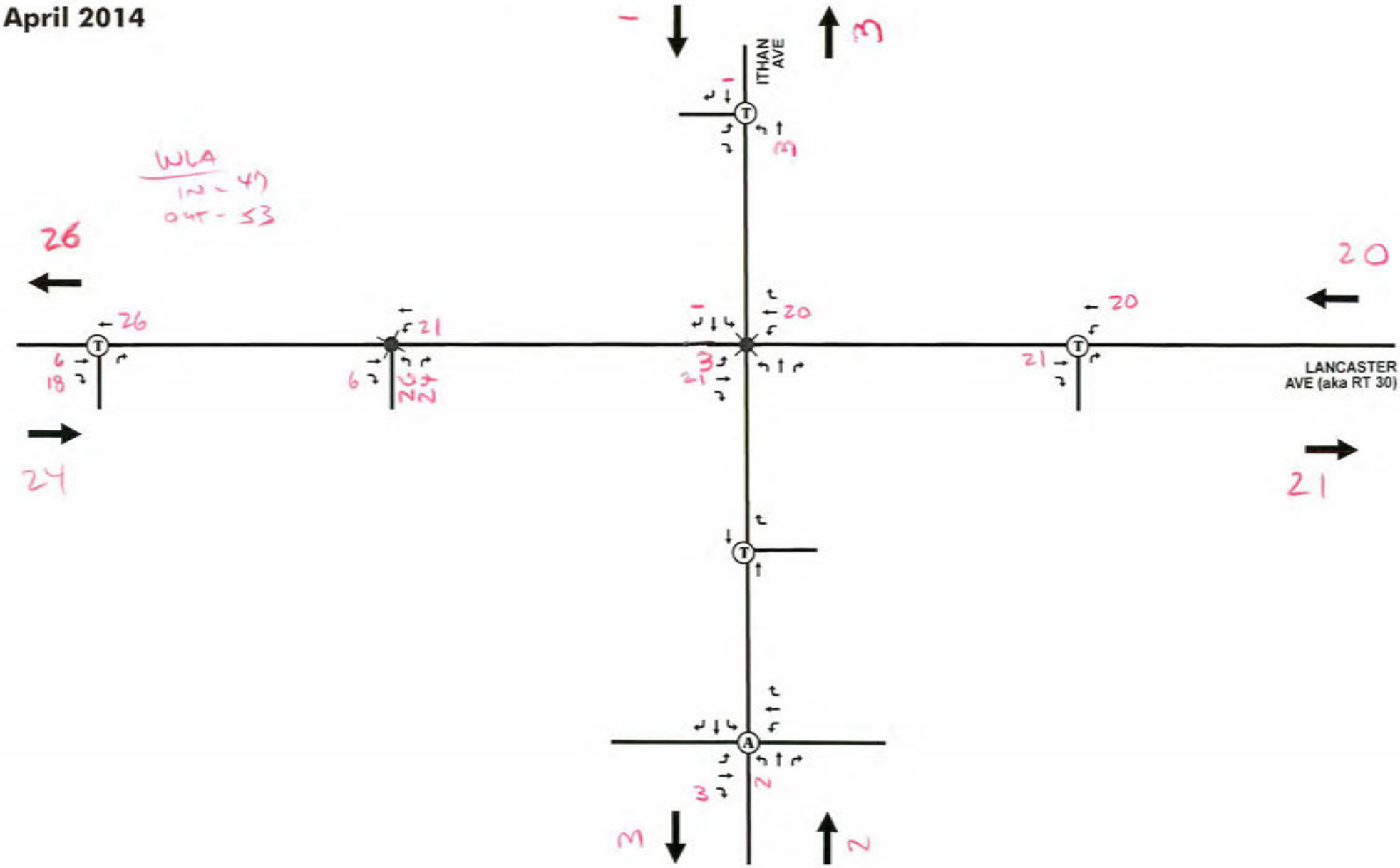
Figure _

Redistribution Worksheet #9, WLA ADD

PM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



F. Tavani and Associates, Inc.
Traffic Engineering and Planning

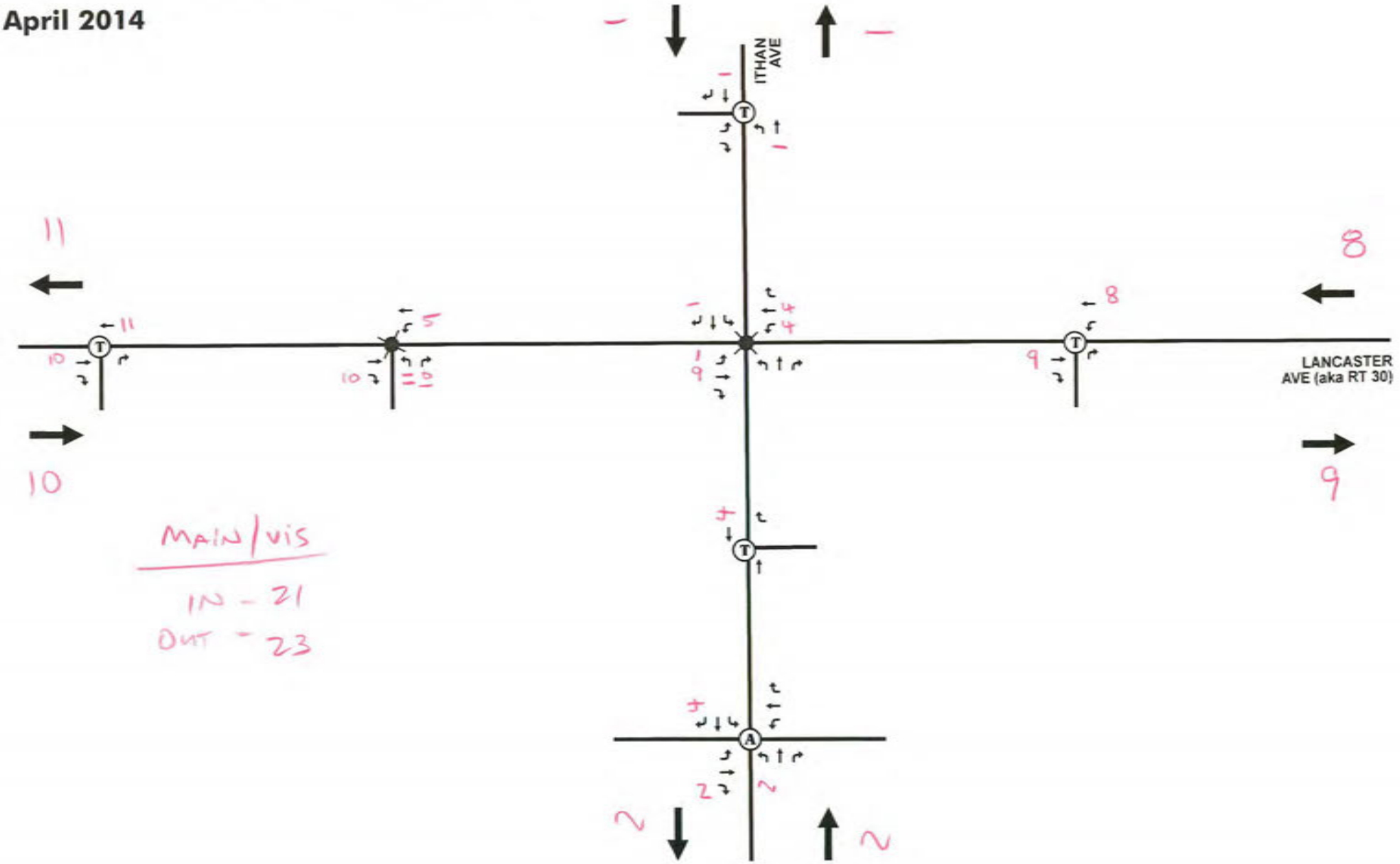
Figure __

Redistribution Worksheet #10, MAIN/VIS ADD

PM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



MAIN/VIS

IN - 21
OUT - 23

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Traffic Engineering and Planning

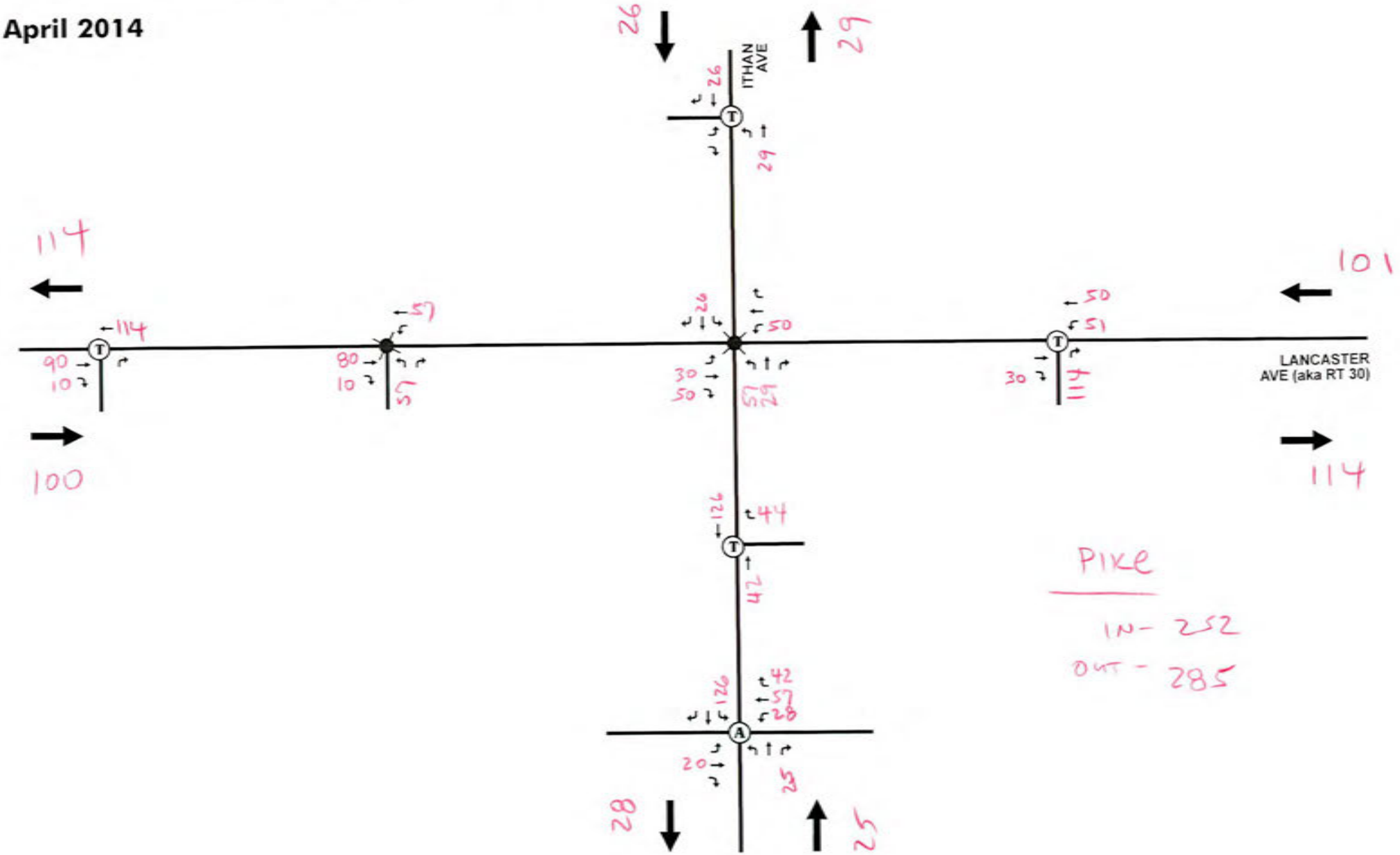
Figure __

Redistribution Worksheet #11, PIKE ADD

PM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



PIKE

IN - 252
OUT - 285

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Traffic Engineering and Planning

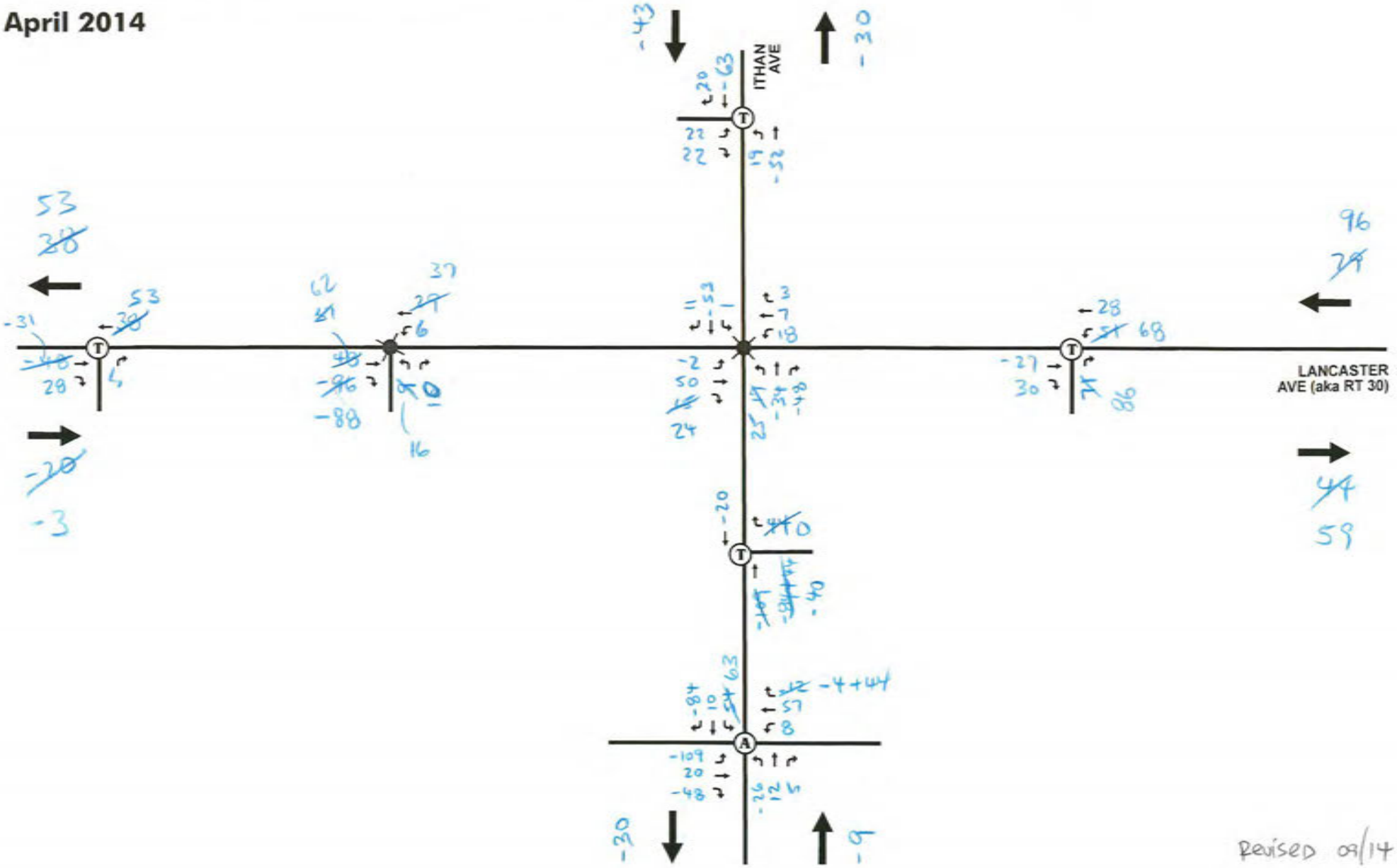
Figure _

Redistribution Worksheet #12, PM TOTAL

PM

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

April 2014



Revised 09/14

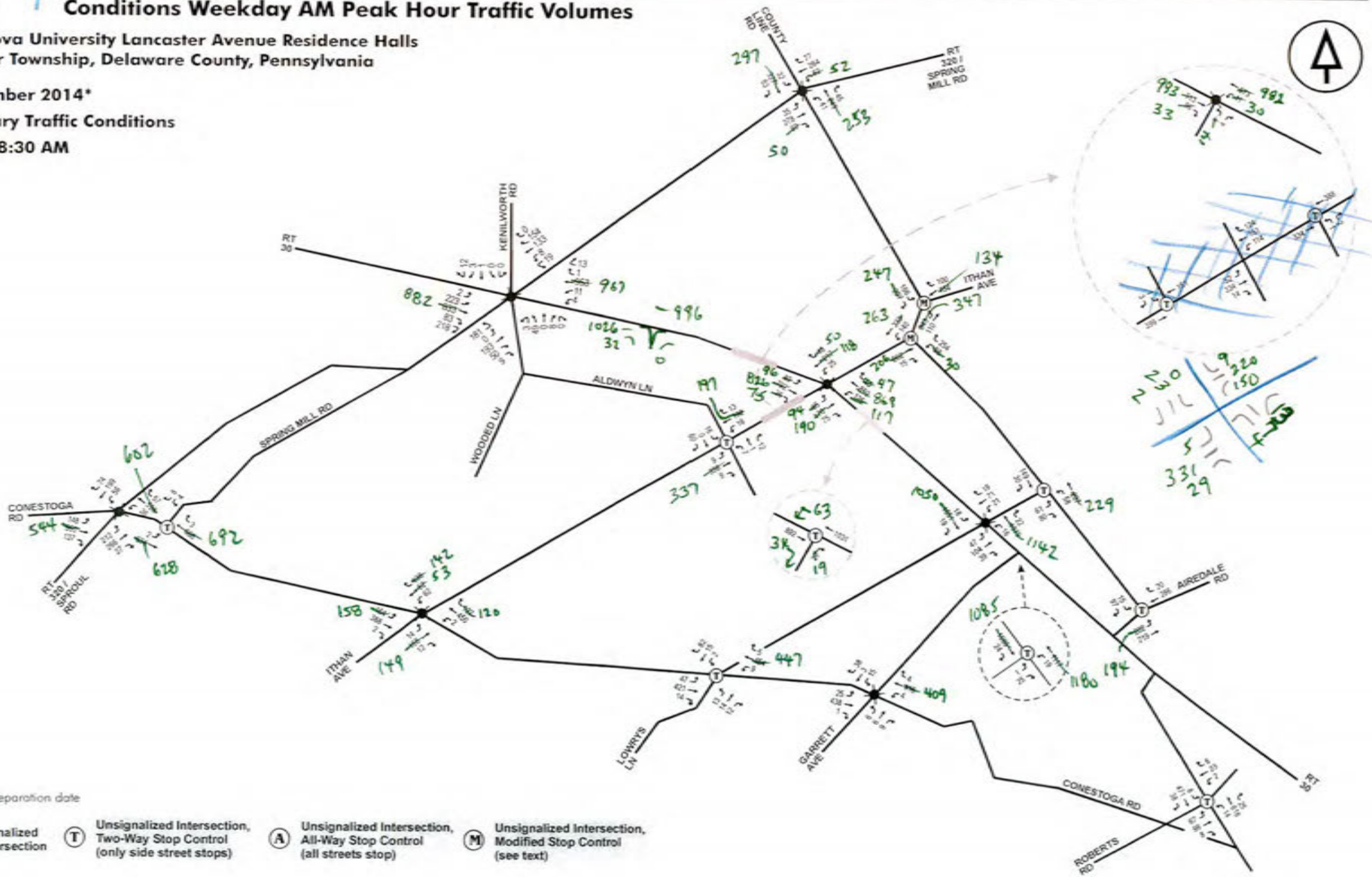
F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure 5

2018 Conditions Weekday AM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*
Ordinary Traffic Conditions
7:30 - 8:30 AM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

PROJECTED

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Traffic Engineering and Planning

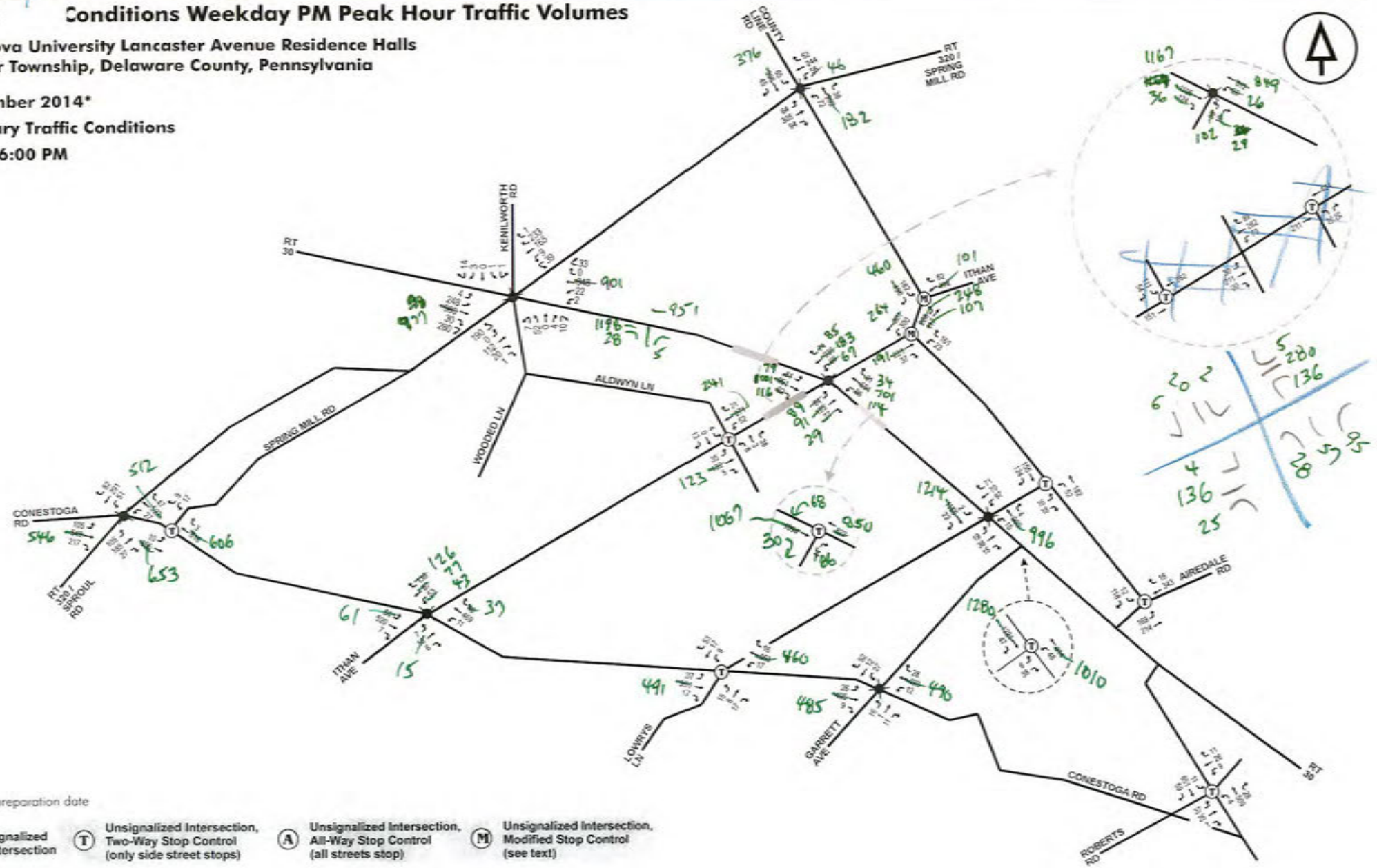
12W

Figure 6

2018 Conditions Weekday PM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*
Ordinary Traffic Conditions
5:00 - 6:00 PM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

PROJECTED

130

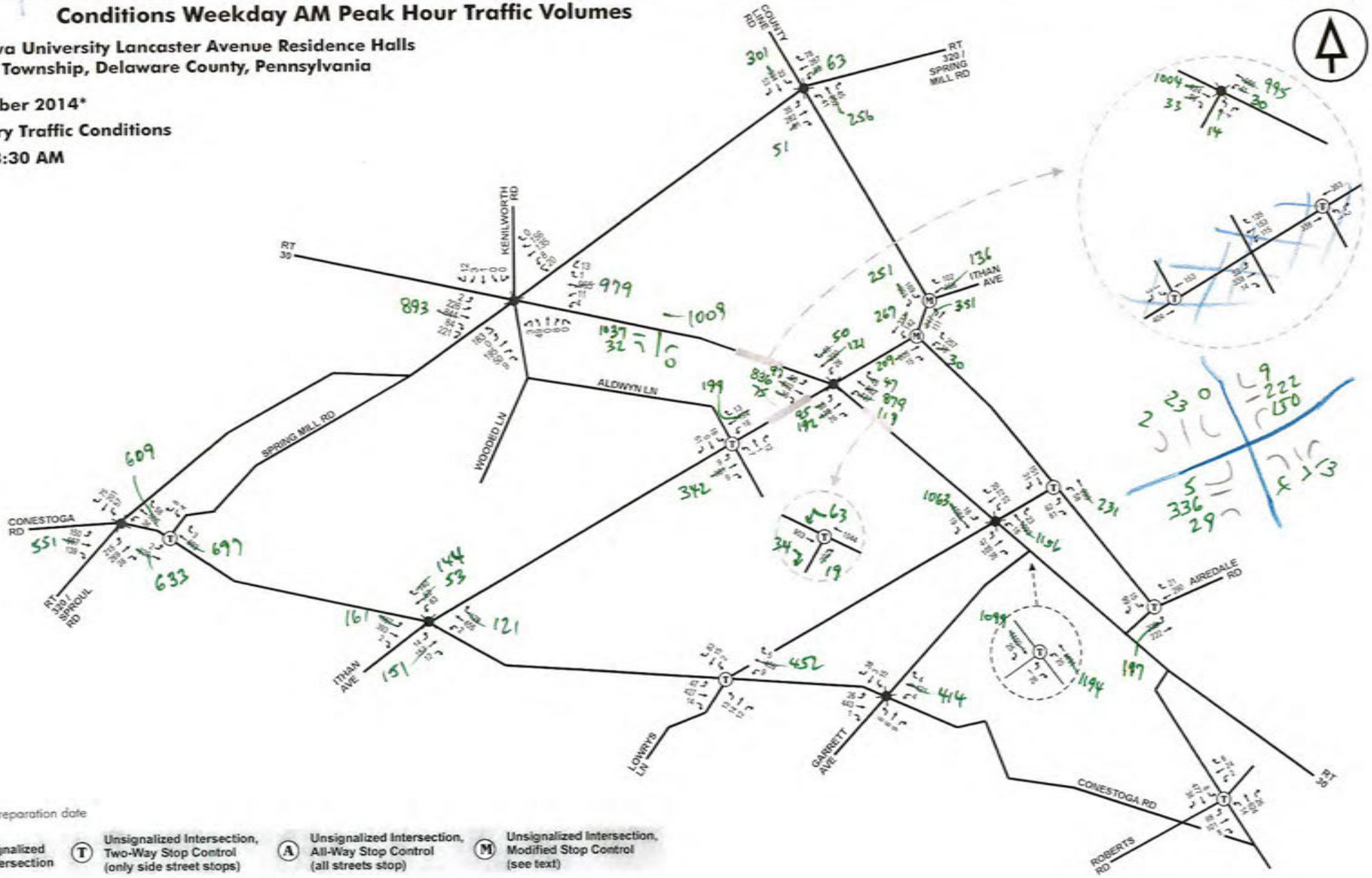
F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure 7

2023 Conditions Weekday AM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*
Ordinary Traffic Conditions
7:30 - 8:30 AM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

PROJECTED

14W

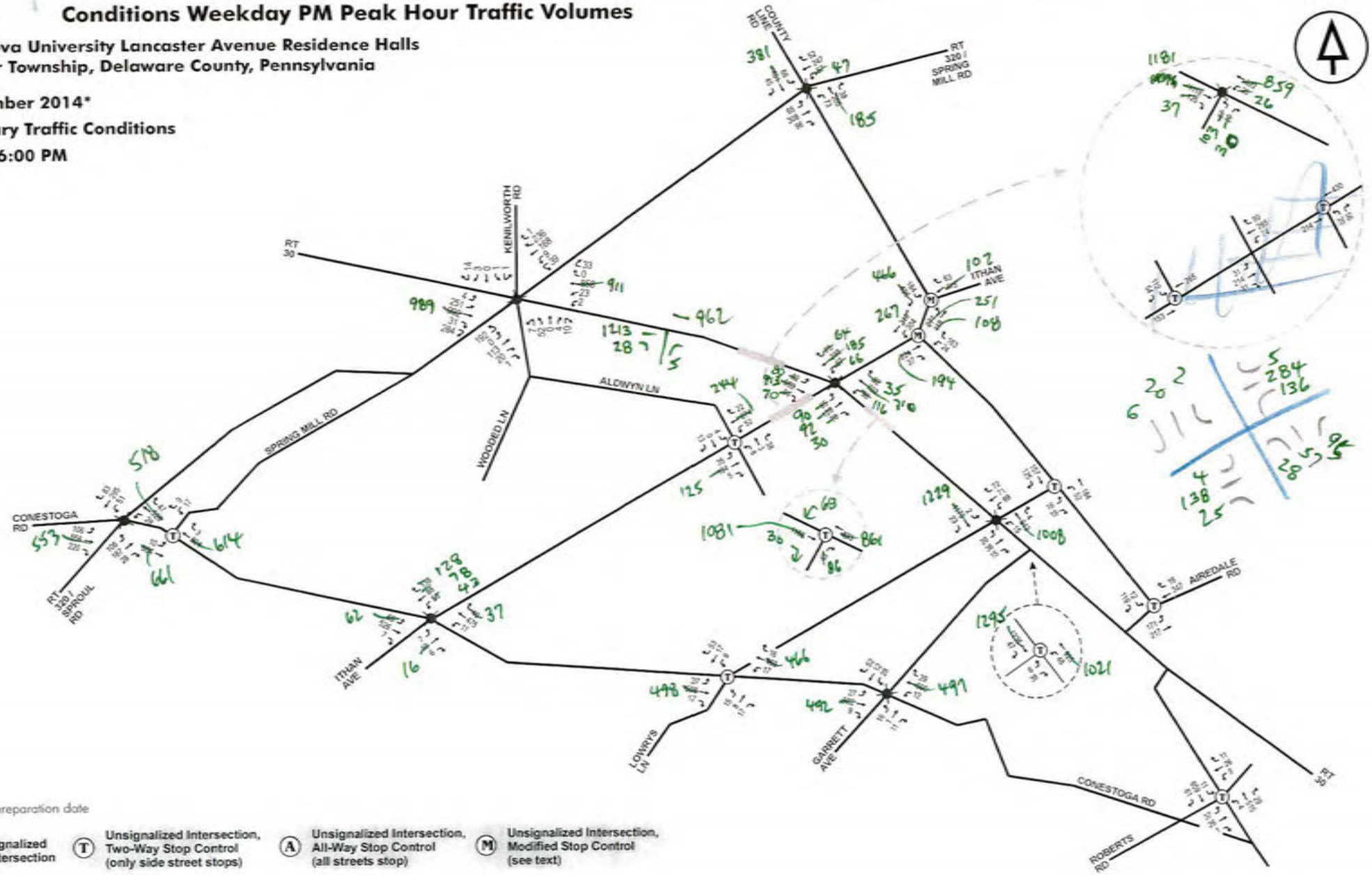
F. Tavani and Associates, Inc.
Traffic Engineering and Planning

Figure 8

2023 Conditions Weekday PM Peak Hour Traffic Volumes

Villanova University Lancaster Avenue Residence Halls
Radnor Township, Delaware County, Pennsylvania

September 2014*
Ordinary Traffic Conditions
5:00 - 6:00 PM



* figure preparation date

Signalized Intersection

(T) Unsignalized Intersection, Two-Way Stop Control (only side street stops)

(A) Unsignalized Intersection, All-Way Stop Control (all streets stop)

(M) Unsignalized Intersection, Modified Stop Control (see text)

APPENDIX I

Capacity Analyses

CAPACITY ANALYSES

The TIS includes an unusually large number of intersections in the study area, as requested by the Township. Additionally, some intersections are not eligible for HCM 2010 analysis. Some intersections were examined using more than one lane configuration or traffic control treatment. All of these factors combine to create a printed capacity analysis output which is large and difficult to navigate.

Synchro files for the AM and PM peak hours of the five scenarios examined (Existing, 2018 Base, 2018 Projected, 2023 Base, and 2023 Projected) are available upon request and provide an more navigable alternative to inspect the LOS results. When examining level of service results and comparing with Table I, the following must be considered:

For signalized intersections:

- Synchro node numbers 7, 11, and 27 are ineligible for HCM 2010 analysis and the results utilized were based upon Percentile Delay (i.e., *Synchro*) results.
- When examining the impact of adding a EB right-turn lane at the intersection of Lancaster Avenue and Ithan Avenue (node 27), 3 additional seconds must be added to Phase 9 to account for the added crosswalk length (12 feet). The cycle length is held constant and Phase 2+6 is reduced accordingly.

For unsignalized intersections:

- Synchro node numbers 2 and 38 are ineligible for HCM 2010 analysis and the results utilized were based upon Percentile Delay (i.e., *Synchro*) results with overall delay assumed to be a midpoint of the LOS letter grade category determined in the results. Changes in delay estimates, if any, between scenarios were based in part on relative ICU ratio changes.

Other notes:

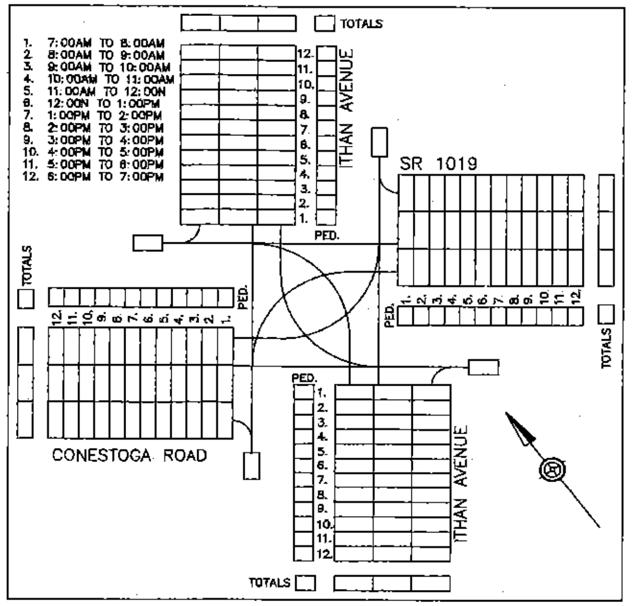
- Ped calls were observed at the intersection of Lancaster Avenue and Ithan Avenue (node 27) and found to be at least once per cycle (30/hr) but was increased by 50% in the analysis (45 calls) to account for potential added activity and provide a measure of conservativeness.
- Ped calls at the intersection of Lancaster Avenue and Ithan Avenue were kept constant in all five scenarios to add further conservativeness to the analysis. The likely outcome of the project will be to reduce ped activity at the intersection of Lancaster Avenue and Ithan Avenue which in turn should reduce ped calls, but this potential was ignored.

APPENDIX J

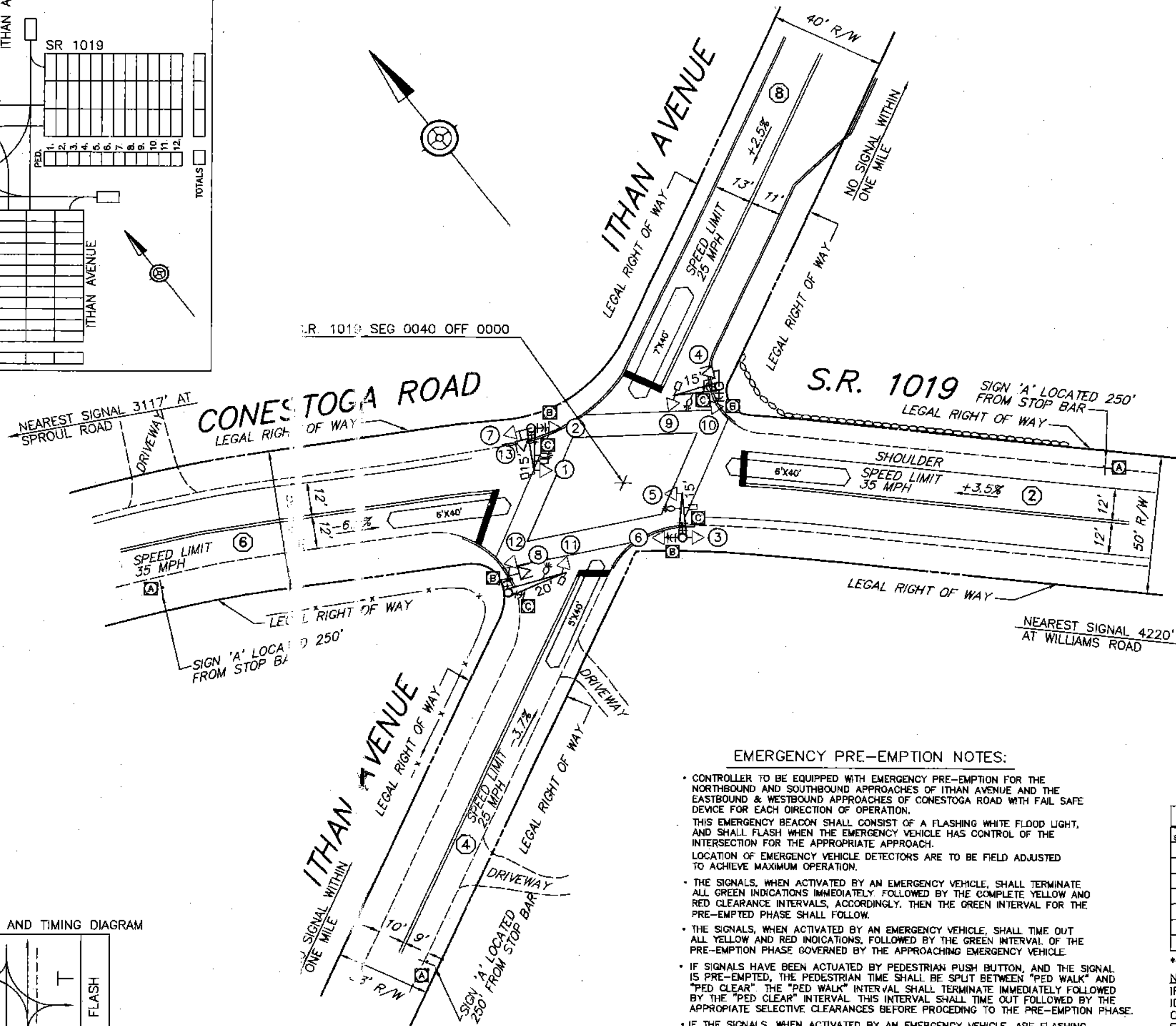
Signal Plans

Radnor

File # 0009



SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	W3-3	36X36	SIGNAL AHEAD
B	R10-3(L)	9X12	PUSH BUTTON FOR GREEN LIGHT ⟵
C	R10-3(R)	9X12	PUSH BUTTON FOR GREEN LIGHT ⟶



GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 68.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 187, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE DECEMBER 19, 1996.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND AND SOUTHBOUND APPROACHES OF ITHAN AVENUE AND THE EASTBOUND & WESTBOUND APPROACHES OF CONESTOGA ROAD WITH FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
  LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSH BUTTON, AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN "PED WALK" AND "PED CLEAR". THE "PED WALK" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "PED CLEAR" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPIATE SELECTIVE CLEARANCES BEFORE PROCEDING TO THE PRE-EMPTION PHASE.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 1 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2				4				6				8			
SIGNALS \ INTERVAL	7	8	9		10	11	12		13	14	15		16	17	18	
1,2,3	G	Y ⓐ	R ⓐ		R	R	R		R	R	R		R	R	R	
4,8	R	R	R		R	R	R		R	R	R		R	R	R	
5,6,7	R	R	R		R	R	R		G	Y ⓐ	R ⓐ		R	R	R	
9,10	R	R	R		G	Y	R		R	R	R		R	R	R	
11,12	R	R	R		R	R	R		R	R	R		G	Y	R	
13	R	R	R		R	R	R		R	R	R		R	R	R	
FIXED	**	4	2		**	4	2		**	4	2		**	4	2	

** FOR DURATION OF PRE-EMPTION

NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

ⓐ G WHEN RETURNING TO NORMAL OPERATION

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2+6				4+8				FLASH
SIGNALS \ INTERVAL	1	2	3		4	5	6		
1,2,3	G	Y	R		R	R	R		Y
4,8	G	Y	R		R	R	R		OFF
5,6,7	G	Y	R		R	R	R		Y
9,10	R	R	R		G	Y	R		R
11,12	R	R	R		G	Y	R		R
13	R	R	R		G	Y	R		OFF

FIXED		4	2			4	2	
MINIMUM	3				3			
PASSAGE	3				3			
MAX. 1	30				20			
PEDESTRIAN*	11				11			
MEMORY	NL				NL			

* UPON PEDESTRIAN ACTUATION ONLY.

SIGNAL INDICATIONS

12" LENS: R, Y, G — 1,5,9,11
8" LENS: R, Y, G — 2,3,4, 6,7,8, 10,12,13

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS 4,8,13

SCALE 25 0 25

LEGEND

- 20' MAST ARM/ IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER
- 12'x6' LOOP SENSOR/SIZE
- MICROWAVE PRESENCE DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- EMERGENCY PRE-EMPTION DEVICE
- C.R. CURB RAMP
- UTILITY POLE
- PHASE NUMBER
- INLET

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: CONESTOGA ROAD (S.R. 1019) AND ITHAN AVENUE

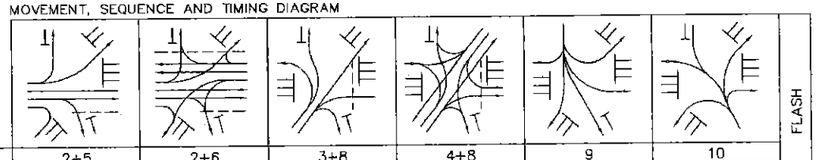
REVIEWED: ______ DATE
MUNICIPAL OFFICIAL ______ DATE
RECOMMENDED: [signature] 5/11/5

FRANK SEIBOTH 11/15/71
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	NEW PLAN, ADDED PRE-EMPTION	MCM	5/1/5	MLK	5/1/5	RCB	5/1/5
2							
3							
4							
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 63-0009 | FILE # 0009

MOVEMENT, SEQUENCE AND TIMING DIAGRAM



PHASE	2+5				2+6				3+8				4+8				9			10			FLASH
INTERVAL / SIGNALS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1	R	R	R	R	R	R	R	R	G/⊘	G/⊘	Y①	R②	G	G	Y	R	R	R	R	R	R	R	R
2	R	R	R	R	R	R	R	R	G	G	Y②	R②	G	G	Y	R	R	R	R	R	R	R	R
3,4	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R
5,6	R	R	R	R	R	R	R	R	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R
7	G/⊘	G/⊘	Y③	R④	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
8	G	G	Y④	R④	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
9,10	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R
11,12	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
13,14*	H	H	H	H	M	FH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	OFF
15,16*	H	H	H	H	M	FH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	OFF
17,18*	M	FH⑤	H⑤	H⑤	M	FH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	OFF
19,20*	H	H	H	H	H	H	H	H	M	FH⑦	H⑦	H⑦	M	FH	H	H	H	H	H	H	H	H	OFF

			3	3			3	3		4	2			4	2		3	3			3	3	
FIXED																							
MINIMUM	3				15				3				3				3			3			
PASSAGE	3				5				3				3				3			3			
MAXIMUM 1	13				35				25				28				10			10			
MAXIMUM 2	16				72				21				45				37			37			
PEDESTRIAN*	⑥				7	20			⑧				7	25									
MEMORY	NL				MN				NL				NL				NL			NL			

*MAN SYMBOL UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE HAND SYMBOL AT ALL TIMES.

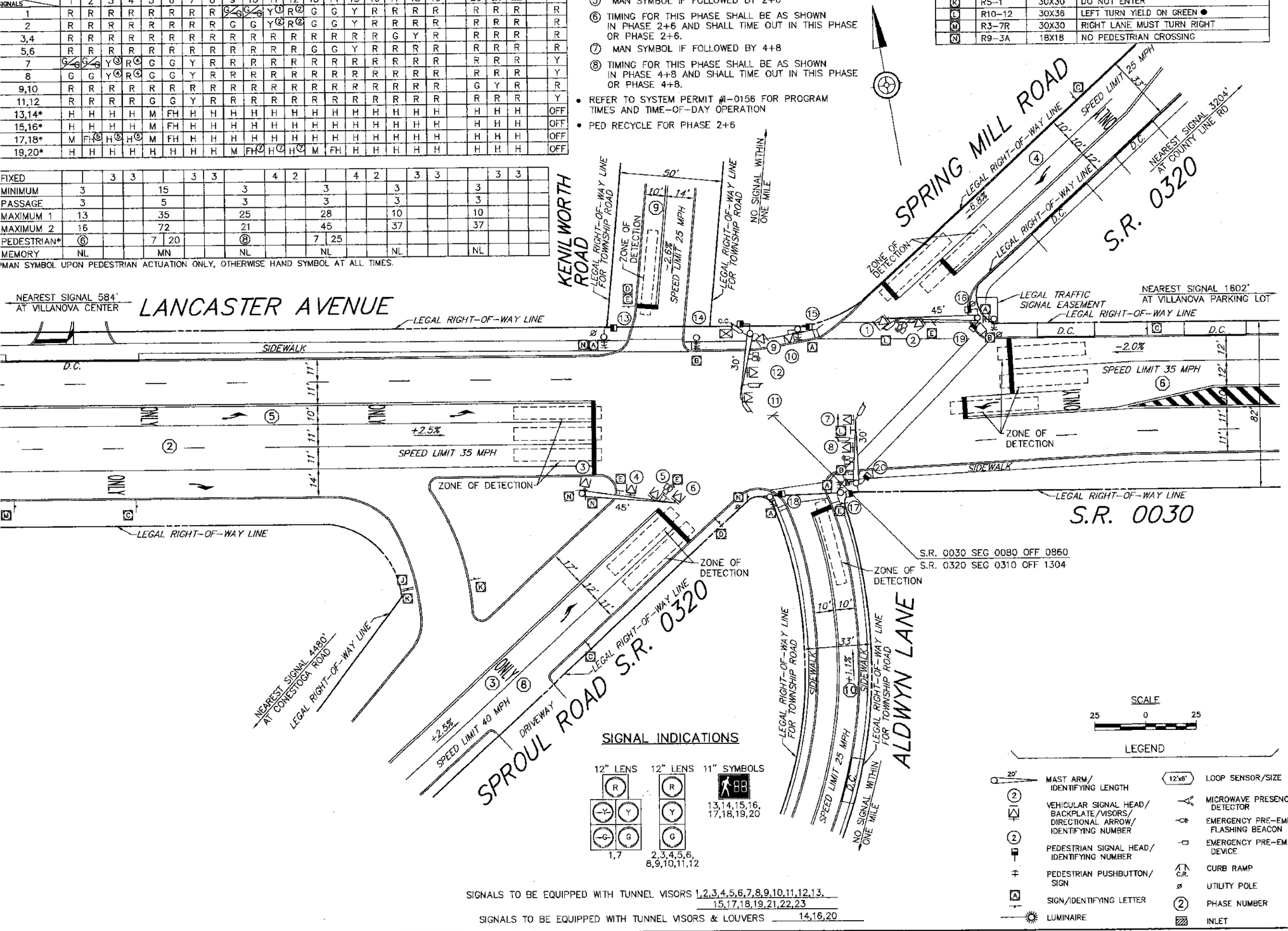
OPERATION NOTES:

① G/→ IF FOLLOWED BY 4+8
② G IF FOLLOWED BY 4+8
③ G/→ IF FOLLOWED BY 2+6
④ G IF FOLLOWED BY 2+6
⑤ MAN SYMBOL IF FOLLOWED BY 2+6
⑥ TIMING FOR THIS PHASE SHALL BE AS SHOWN IN PHASE 2+6 AND SHALL TIME OUT IN THIS PHASE OR PHASE 2+6.
⑦ MAN SYMBOL IF FOLLOWED BY 4+8
⑧ TIMING FOR THIS PHASE SHALL BE AS SHOWN IN PHASE 4+8 AND SHALL TIME OUT IN THIS PHASE OR PHASE 4+8.

- REFER TO SYSTEM PERMIT #1-0156 FOR PROGRAM TIMES AND TIME-OF-DAY OPERATION
- PED RECYCLE FOR PHASE 2+6

SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10-3E(R)	9X15	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
B	R10-3E(L)	9X15	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
C	R3-7L	30X30	LEFT LANE MUST TURN LEFT
D	R10-6L	24X30	STOP HERE ON RED
E	R10-11	30X36	NO TURN ON RED
F	R10-11	24X30	NO TURN ON RED
J	R1-2	36X36	YIELD
K	R5-1	30X30	DO NOT ENTER
L	R10-12	30X36	LEFT TURN YIELD ON GREEN ●
M	R3-7R	30X30	RIGHT LANE MUST TURN RIGHT
N	R9-3A	18X18	NO PEDESTRIAN CROSSING



SIGNAL INDICATIONS

12" LENS 12" LENS 11" SYMBOLS

1,7 2,3,4,5,6, 8,9,10,11,12 13,14,15,16, 17,18,19,20

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 1,2,3,4,5,6,7,8,9,10,11,12,13, 15,17,18,19,21,22,23

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS 14,16,20

LEGEND

- 20' MAST ARM/ IDENTIFYING LENGTH
- (2) VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- (2) PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- (A) SIGN/IDENTIFYING LETTER
- LUMINAIRE
- 12'x6' LOOP SENSOR/SIZE
- MICROWAVE PRESENCE DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- EMERGENCY PRE-EMPTION DEVICE
- C.R. CURB RAMP
- UTILITY POLE
- (2) PHASE NUMBER
- INLET

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 5 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT #1-0156

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

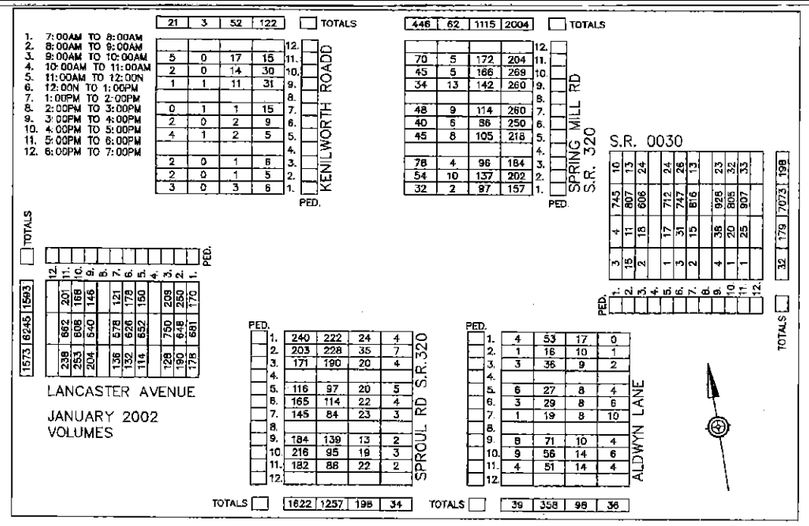
COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) & SPROUL ROAD/SPRING MILL ROAD (S.R. 0320)

REVIEWED:
DATE
MUNICIPAL OFFICIAL DATE

RECOMMENDED:
PAUL M. LUTZ 11/24/08
LOUIS R. BELMONTE, P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

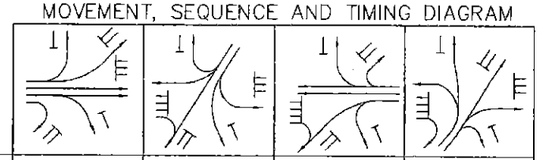
NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	McM	3/5/12	WJE	3/12/12	JRB	3/11/12
2							
3							
4							
5							
6							
7							
8							

SHEET 2 OF 3 PERMIT # 63-0226 FILE # 0226



EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM



PHASE	2			4			6			8		
INTERVAL / SIGNALS	23	24	25	26	27	28	29	30	31	32	33	34
1	R	R	R	R	R	R	R	R	R	G/ⓐ	Y	R
2	R	R	R	R	R	R	R	R	R	G	Y	R
3,4	R	R	R	R	R	R	R	R	R	R	R	R
5,6	R	R	R	G	Y	R	R	R	R	R	R	R
7	G/ⓐ	Yⓐ	Rⓑ	R	R	R	R	R	R	R	R	R
8	G	Yⓑ	Rⓑ	R	R	R	R	R	R	R	R	R
9,10	R	R	R	R	R	R	R	R	R	R	R	R
11,12	R	R	R	R	R	R	G	Yⓑ	Rⓑ	R	R	R
13,14	H	H	H	H	H	H	H	H	H	H	H	H
15,16	H	H	H	H	H	H	H	H	H	H	H	H
17,18	H	H	H	H	H	H	H	H	H	H	H	H
19,20	H	H	H	H	H	H	H	H	H	H	H	H
FIXED	**	3	3	**	4	2	**	3	3	**	4	2

** FOR DURATION OF PRE-EMPTION

NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

ⓐ G/~~A~~ WHEN RETURNING TO NORMAL OPERATION
ⓑ G WHEN RETURNING TO NORMAL OPERATION

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND & SOUTHBOUND APPROACHES OF SPROUL ROAD AND THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVENUE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED DURING THE "MAN" INTERVAL, THE "MAN" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "FLASHING HAND" INDICATION IN ITS ENTIRETY, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING INTO THE PRE-EMPTION PHASE.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING, ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

SCALE
25 0 25

LEGEND

- 20' — MAST ARM/ IDENTIFYING LENGTH
- (2) — VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- (2) — PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER
- 12'x8' — LOOP SENSOR/SIZE
- MICROWAVE PRESENCE DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- EMERGENCY PRE-EMPTION DEVICE
- C.R. — CURB RAMP
- UTILITY POLE
- (2) — PHASE NUMBER
- INLET

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SYSTEM PERMIT #1-0156

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) & SPROUL ROAD/SPRING MILL ROAD (S.R. 0320)

REVIEWED:

DATE

MUNICIPAL OFFICIAL DATE

RECOMMENDED:

PAUL M. LUTZ 11/24/08

LOUIS R. BELMONTE, P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	MGM	3/5/12	[illegible]	3/12/12	[illegible]	3/19/12
2							
3							
4							
5							
6							
7							
8							

SHEET 3 OF 3 PERMIT # 63-0226 FILE # 0226

RADNOR

#780

SIGN TABULATION

SIGN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10–11	24"x30"	NO TURN ON RED
B	R3–7L	30"x30"	LEFT LANE MUST TURN LEFT
C	R10–3B	9"x12"	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
D	R10–11	30"x36"	NO TURN ON RED
G	R10–12	30"x36"	LEFT TURN YIELD ON GREEN ●

EMERGENCY PRE–EMPTION PHASING
MOVEMENT, SEQUENCE AND TIMING DIAGRAM

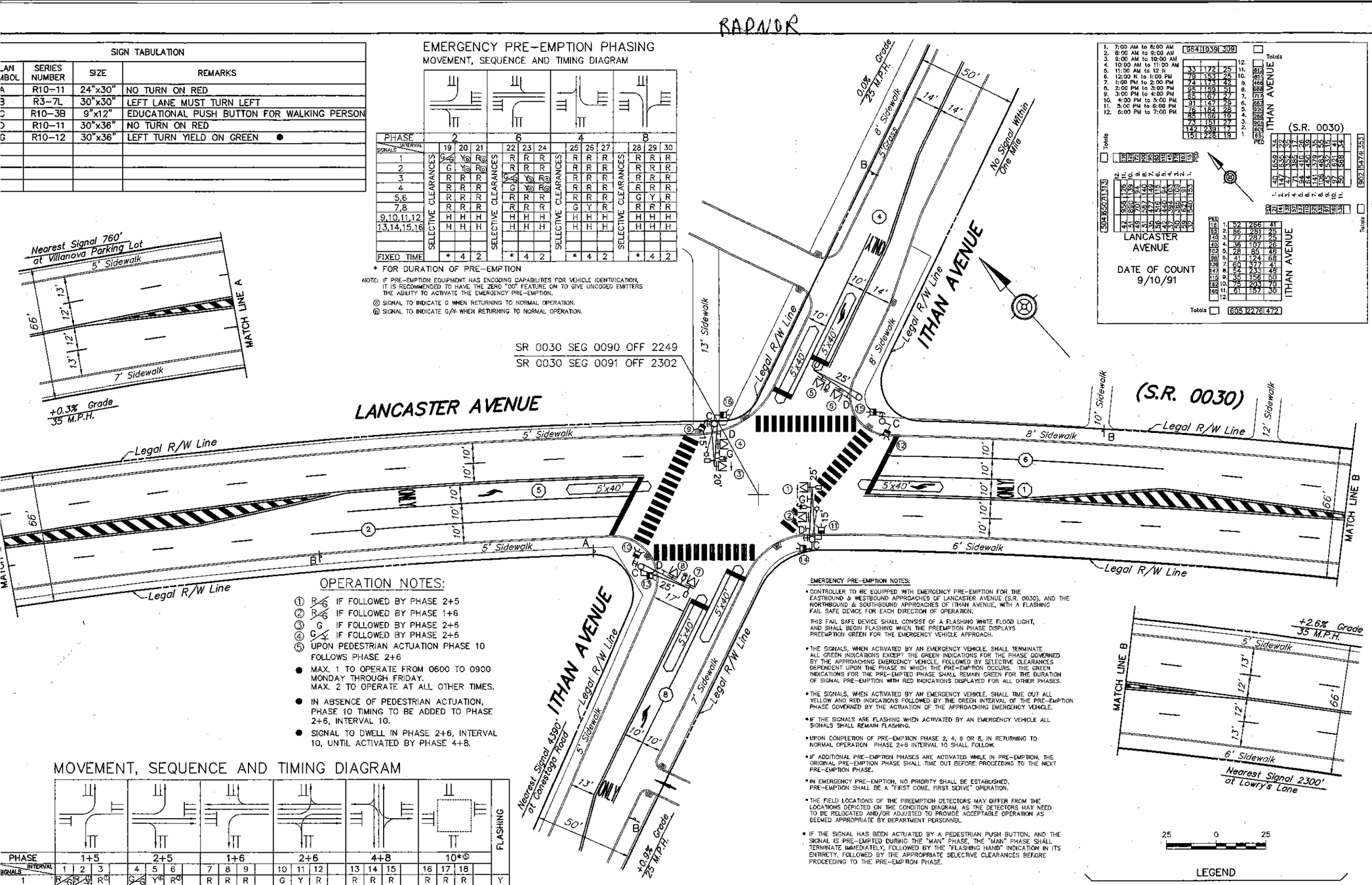
PHASE		2			6			4			8		
INTERVAL / SIGNALS		19	20	21	22	23	24	25	26	27	28	29	30
1	SELECTIVE CLEARANCES	Ⓨ	Ⓡ	Ⓡ	R	R	R	R	R	R	R	R	R
2		G	Ⓨ	Ⓡ	R	R	R	R	R	R	R	R	R
3		R	R	R	Ⓨ	Ⓡ	Ⓡ	R	R	R	R	R	R
4		R	R	R	G	Ⓨ	Ⓡ	R	R	R	R	R	R
5,6		R	R	R	R	R	R	R	R	R	G	Y	R
7,8		R	R	R	R	R	R	G	Y	R	R	R	R
9,10,11,12		H	H	H	H	H	H	H	H	H	H	H	H
13,14,15,16		H	H	H	H	H	H	H	H	H	H	H	H
FIXED TIME		*	4	2	*	4	2	*	4	2	*	4	2

* FOR DURATION OF PRE–EMPTION

NOTE: IF PRE–EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE–EMPTION.

Ⓒ SIGNAL TO INDICATE C WHEN RETURNING TO NORMAL OPERATION.

Ⓖ SIGNAL TO INDICATE G/Y WHEN RETURNING TO NORMAL OPERATION.



OPERATION NOTES:

① B–G IF FOLLOWED BY PHASE 2+5
② B–G IF FOLLOWED BY PHASE 1+6
③ G IF FOLLOWED BY PHASE 2+6
④ G–Y IF FOLLOWED BY PHASE 2+6
⑤ UPON PEDESTRIAN ACTUATION PHASE 10 FOLLOWS PHASE 2+6

- MAX. 1 TO OPERATE FROM 0600 TO 0900 MONDAY THROUGH FRIDAY. MAX. 2 TO OPERATE AT ALL OTHER TIMES.
- IN ABSENCE OF PEDESTRIAN ACTUATION, PHASE 10 TIMING TO BE ADDED TO PHASE 2+6, INTERVAL 10.
- SIGNAL TO DWELL IN PHASE 2+6, INTERVAL 10, UNTIL ACTIVATED BY PHASE 4+8.

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1+5			2+5			1+6			2+6			4+8			10*Ⓒ			FLASHING
INTERVAL / SIGNALS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	R–Ⓖ	R–Ⓨ	R Ⓒ	G–Ⓖ	Y–Ⓨ	R Ⓒ	R	R	R	G	Y	R	R	R	R	R	R	R	Y
2	R	R	R	G	Y Ⓒ	R Ⓒ	R	R	R	G	Y	R	R	R	R	R	R	R	Y
3	R–Ⓖ	R–Ⓨ	R Ⓒ	R	R	R	G–Ⓖ	Y–Ⓨ	R Ⓒ	G	Y	R	R	R	R	R	R	R	Y
4	R	R	R	R	R	R	G	Y Ⓒ	R Ⓒ	G	Y	R	R	R	R	R	R	R	Y
5,6,7,8	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R
9,10,11,12	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	FH	H	OUT
13,14,15,16	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	FH	H	OUT
FIXED		4	2		4	2		4	2		4	2		4	2				
MINIMUM	7			7			7			24			3						
PASSAGE	3			3			3						3						
MAXIMUM 1	7			7			7			24			27						
MAXIMUM 2	7			7			7			34			17						
PEDESTRIAN*																9	15	2	
MEMORY	NL			NL			NL			MR			NL						

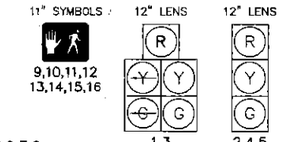
* UPON PEDESTRIAN ACTUATION ONLY.

EMERGENCY PRE–EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE–EMPTION FOR THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVENUE (S.R. 0030), AND THE NORTHBOUND & SOUTHBOUND APPROACHES OF ITHAN AVENUE, WITH A FLASHING FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.

  THIS FAIL SAFE DEVICE SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL BEGIN FLASHING WHEN THE PREEMPTION PHASE DISPLAYS PREEMPTION GREEN FOR THE EMERGENCY VEHICLE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS EXCEPT THE GREEN INDICATIONS FOR THE PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE, FOLLOWED BY SELECTIVE CLEARANCES DEPENDENT UPON THE PHASE IN WHICH THE PRE–EMPTION OCCURS. THE GREEN INDICATIONS FOR THE PRE–EMPTED PHASE SHALL REMAIN GREEN FOR THE DURATION OF SIGNAL PRE–EMPTION WITH RED INDICATIONS DISPLAYED FOR ALL OTHER PHASES.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS FOLLOWED BY THE GREEN INTERVAL OF THE PRE–EMPTION PHASE GOVERNED BY THE ACTUATION OF THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNALS ARE FLASHING WHEN ACTIVATED BY AN EMERGENCY VEHICLE ALL SIGNALS SHALL REMAIN FLASHING.
- UPON COMPLETION OF PRE–EMPTION PHASE 2, 4, 6 OR 8, IN RETURNING TO NORMAL OPERATION PHASE 2+6 INTERVAL 10 SHALL FOLLOW.
- IF ADDITIONAL PRE–EMPTION PHASES ARE ACTIVATED WHILE IN PRE–EMPTION, THE ORIGINAL PRE–EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE–EMPTION PHASE.
- IN EMERGENCY PRE–EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE–EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.
- THE FIELD LOCATIONS OF THE PREEMPTION DETECTORS MAY DIFFER FROM THE LOCATIONS DEPICTED ON THE CONDITION DIAGRAM, AS THE DETECTORS MAY NEED TO BE RELOCATED AND/OR ADJUSTED TO PROVIDE ACCEPTABLE OPERATION AS DEEMED APPROPRIATE BY DEPARTMENT PERSONNEL.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON, AND THE SIGNAL IS PRE–EMPTED DURING THE "MAN" PHASE, THE "MAN" PHASE SHALL TERMINATE IMMEDIATELY, FOLLOWED BY THE "FLASHING HAND" INDICATION IN ITS ENTIRETY, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING TO THE PRE–EMPTION PHASE.

SIGNAL INDICATIONS



SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 1,2,3,4,5,6,7,8

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS _____

LEGEND

- 20' MAST ARM/IDENTIFYING LENGTH
- ② VEHICULAR SIGNAL HEAD/BACKPLATE/VISORS/DIRECTIONAL ARROW/IDENTIFYING NUMBER
- ② PEDESTRIAN SIGNAL HEAD/IDENTIFYING NUMBER
- ② AUDIBLE PEDESTRIAN SIGNAL/IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/SIGN
- A SIGN/IDENTIFYING LETTER
- 20' LUMINAIRE/IDENTIFYING LENGTH
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION BEACON
- EMERGENCY PREEMPTION DETECTOR
- CURB CUT RAMP
- UTILITY POLE
- (2) PHASE NUMBER
- INLET
- LOOP SENSOR/SIZE 12'x6'

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 68.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 187, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE DECEMBER 19, 1996.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC–7800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6–0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) AND ITHAN AVENUE

REVIEWED: _____ DATE
MUNICIPAL OFFICIAL DATE

RECOMMENDED:
Mark Kray 8/5/92 DATE
Douglas May 8/13/92 DATE
DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	Modernization, New Drawing	NV	8/5/92	MK	8/5/92		
2	Changed M/A length, Mvd Ped. Sig., Controller	BRK	8/7/92	MK	8/11/92	MK	8/13/92
3	Added Pre–Emption, Sign "C"	PAI	4/04/01	MK	8/13/01	WJE	8/19/01
4	Added Hand/Man Indications	PAI	7/16/02	MK	8/16/02	WJE	8/19/02
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 63–0780 | FILE # 0780

PNDT 9903/30 FILE 0780 07/16/02

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1+5			2+5			1+6			2+6			9*			4+8			FLASH
SIGNALS \ INTERVAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	27	18	
1	R/←G	R/←Y ①	R ①	G/←G	Y ③	R ④	R	R	R	G	Y	R	R	R	R	R	R	R	Y
2	R	R	R	G	Y ④	R ④	R	R	R	G	Y	R	R	R	R	R	R	R	Y
3	R/←G	R/←Y ②	R ②	R	R	R	G/←G	Y ③	R ④	G	Y	R	R	R	R	R	R	R	Y
4	R	R	R	R	R	R	G	Y ④	R ④	G	Y	R	R	R	R	R	R	R	Y
5,6,7,8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R
9,10,11,12*	H	H	H	H	H	H	H	H	H	H	H	H	M	FH	H	H	H	H	OFF
13,14,15,16*	H	H	H	H	H	H	H	H	H	H	H	H	M	FH	H	H	H	H	OFF

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	27	18
FIXED		4	2		4	2		4	2		4	2					4	2
MINIMUM	3			3			3			34						3		
PASSAGE	3			3			3									3		
MAXIMUM 1	7			7			7			34						27		
MAXIMUM 2	14			7			7			48						35		
PEDESTRIAN*													9	15	2			
MEMORY	NL			NL			NL			MN						NL		

*UPON PEDESTRIAN ACTUATION ONLY.

OPERATION NOTES:

① R/←G IF FOLLOWED BY 2+5

② R/←G IF FOLLOWED BY 1+6

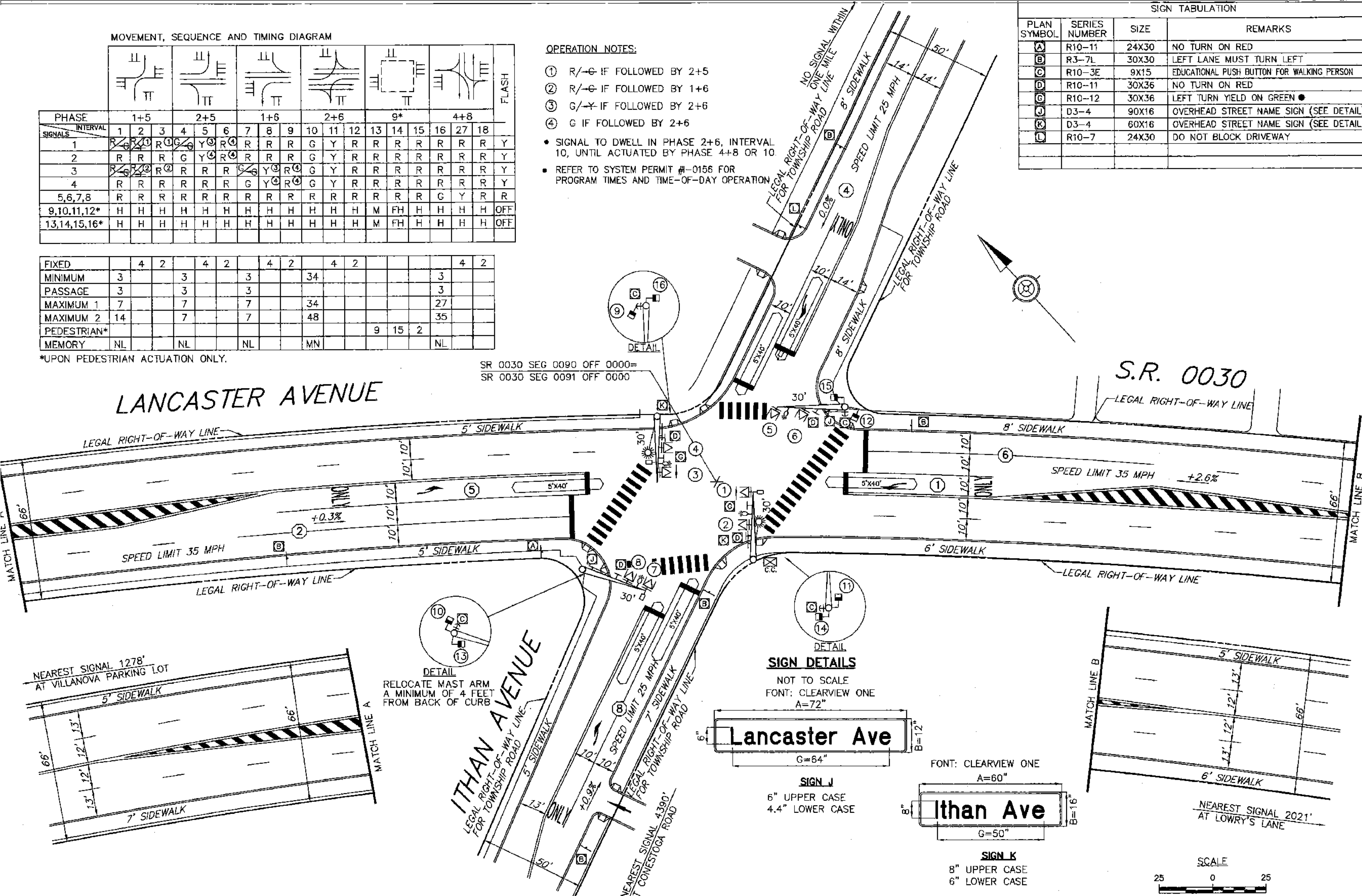
③ G/←Y IF FOLLOWED BY 2+6

④ G IF FOLLOWED BY 2+6

- SIGNAL TO DWELL IN PHASE 2+6, INTERVAL 10, UNTIL ACTUATED BY PHASE 4+8 OR 10.
- REFER TO SYSTEM PERMIT #-0156 FOR PROGRAM TIMES AND TIME-OF-DAY OPERATION

SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10-11	24X30	NO TURN ON RED
B	R3-7L	30X30	LEFT LANE MUST TURN LEFT
C	R10-3E	9X15	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
D	R10-11	30X36	NO TURN ON RED
G	R10-12	30X36	LEFT TURN YIELD ON GREEN ●
J	D3-4	90X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
K	D3-4	60X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
L	R10-7	24X30	DO NOT BLOCK DRIVEWAY



SIGN DETAILS

NOT TO SCALE
FONT: CLEARVIEW ONE

A=72"
Lancaster Ave
G=64"
6" B=12"

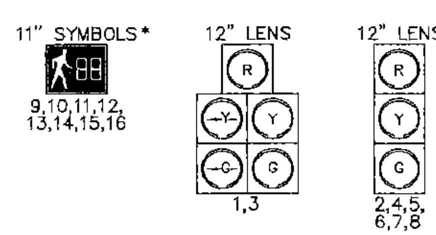
SIGN J
6" UPPER CASE
4.4" LOWER CASE

FONT: CLEARVIEW ONE
A=60"
Ithan Ave
G=50"
8" B=16"

SIGN K
8" UPPER CASE
6" LOWER CASE

SCALE
25 0 25

SIGNAL INDICATIONS



SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 1,2,3,4,5,6,7,8
*AUDIBLE PEDESTRIAN SIGNAL HEADS

LEGEND

- MAST ARM/ IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER
- LUMINAIRE
- LOOP SENSOR/SIZE (12'x6')
- MICROWAVE PRESENCE DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- EMERGENCY PRE-EMPTION DEVICE
- CURB RAMP
- UTILITY POLE
- PHASE NUMBER
- INLET

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ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

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SYSTEM PERMIT #-0156

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

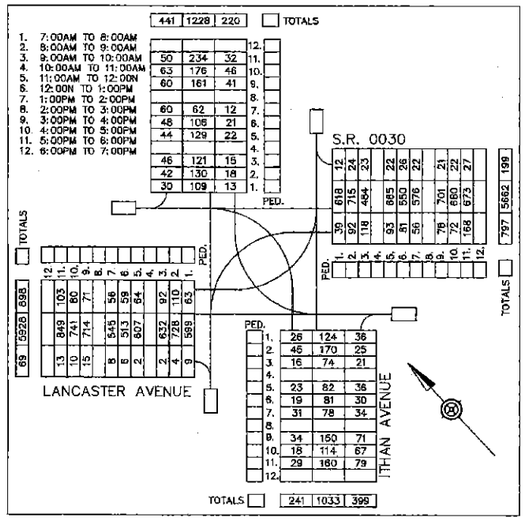
COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) AND ITHAN AVENUE

REVIEWED:
DATE
MUNICIPAL OFFICIAL DATE

RECOMMENDED:
PAUL M. LUTZ 11/24/08
LOUIS R. BELMONTE, P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

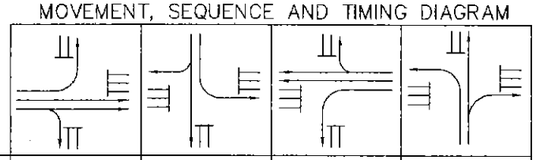
NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	McM	3/5/12	[illegible]	5/12/12	[illegible]	5/14/12
2							
3							
4							
5							
6							
7							
8							

SHEET 2 OF 3 PERMIT # 63-0780 FILE # 0780



EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM



PHASE	2				4				6				8			
INTERVAL / SIGNALS	19	20	21		22	23	24		25	26	27		28	29	30	
1	G/⊖	Y ⓞ	R ⓑ		R	R	R		R	R	R		R	R	R	
2	G	Y ⓑ	R ⓑ		R	R	R		R	R	R		R	R	R	
3	R	R	R		R	R	R		G/⊖	Y ⓞ	R ⓑ		R	R	R	
4	R	R	R		R	R	R		G	Y ⓑ	R ⓑ		R	R	R	
5,6	R	R	R		R	R	R		R	R	R		G	Y	R	
7,8	R	R	R		G	Y	R		R	R	R		R	R	R	
9,10,11,12	H	H	H		H	H	H		H	H	H		H	H	H	
13,14,15,16	H	H	H		H	H	H		H	H	H		H	H	H	
FIXED	**	4	2		**	4	2		**	4	2		**	4	2	

** FOR DURATION OF PRE-EMPTION

NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

ⓐ G/⊖ WHEN RETURNING TO NORMAL OPERATION
ⓑ G WHEN RETURNING TO NORMAL OPERATION

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND & SOUTHBOUND APPROACHES OF ITHAN AVENUE AND THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVENUE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS. ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED DURING THE "MAN" INTERVAL, THE "MAN" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "FLASHING HAND" INDICATION IN ITS ENTIRETY, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING INTO THE PRE-EMPTION PHASE.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING, ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 10 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED. PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

SCALE
25 0 25

LEGEND

- 20' — MAST ARM/ IDENTIFYING LENGTH
- (2) — VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- (2) — PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- (A) — SIGN/IDENTIFYING LETTER
- 12'x6' — LOOP SENSOR/SIZE
- MICROWAVE PRESENCE DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- EMERGENCY PRE-EMPTION DEVICE
- C.R. — CURB RAMP
- UTILITY POLE
- (2) — PHASE NUMBER
- INLET

GENERAL NOTES

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POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT #1-0156

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) AND ITHAN AVENUE

REVIEWED:
DATE
MUNICIPAL OFFICIAL DATE

RECOMMENDED:
PAUL M. LUTZ 11/24/08
LOUIS R. BELMONTE, P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	McM	3/5/12		3/12/12		3/14/12
2							
3							
4							
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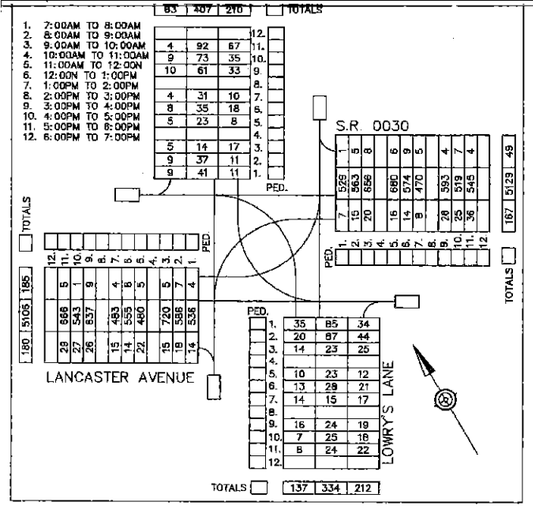
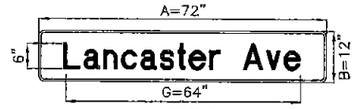
7							
8							

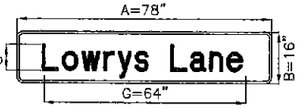
SHEET 3 OF 3 | PERMIT # 63-0780 | FILE # 0780



NOT TO SCALE
FONT: CLEARVIEW ONE



SIGN C
6" UPPER CASE
4.4" LOWER CASE



SIGN D
8" UPPER CASE
6" LOWER CASE

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10-3E(L)	9X12	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
B	R10-3E(R)	9X12	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
C	D3-4	90X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
D	D3-4	78X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
E	R9-3A	18X18	NO PEDESTRIAN CROSSING
F	R10-11	30X36	NO TURN ON RED

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

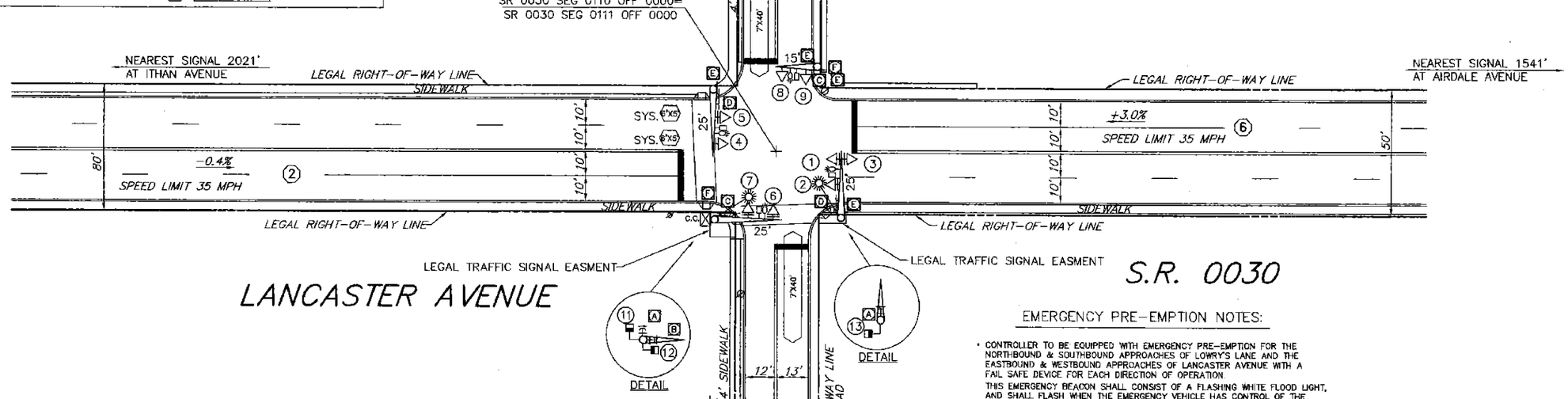
PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.



MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2+6				4+8				FLASH
INTERVAL / SIGNALS	1	2	3	4	5	6	7	8	
1,2	G	G	Y	R	R	R	R	R	Y
3,4,5	G	G	Y	R	R	R	R	R	Y
6,7	R	R	R	R	G	G	Y	R	R
8,9	R	R	R	R	G	G	Y	R	R
10,11	H	H	H	H	M	FH	H	H	OFF
12,13	M	FH	H	H	H	H	H	H	OFF

FIXED			4	2		3	2
MINIMUM	10				3		
PASSAGE					3		
MAXIMUM 1	30				15		
MAXIMUM 2	49				15		
PEDESTRIAN	7	8			7	12	
MEMORY	MN				NL		

* MAN SYMBOL UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE HAND SYMBOL AT ALL TIMES

EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2			4			6			8		
INTERVAL / SIGNALS	9	10	11	12	13	14	15	16	17	18	19	20
1,2	G	Y	R	R	R	R	R	R	R	R	R	R
3,4,5	R	R	R	R	R	R	G	Y	R	R	R	R
6,7	R	R	R	G	Y	R	R	R	R	R	R	R
8,9	R	R	R	R	R	R	R	R	R	G	Y	R
10,11	H	H	H	H	H	H	H	H	H	H	H	H
12,13	H	H	H	H	H	H	H	H	H	H	H	H
FIXED	**	4	2	**	3	2	**	4	2	**	3	2

** FOR DURATION OF PRE-EMPTION

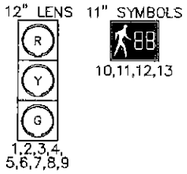
NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

ⓒ G WHEN RETURNING TO NORMAL OPERATION

- REFER TO SYSTEM PERMIT #-0156 FOR PROGRAM TIMES AND TIME-OF-DAY OPERATION
- PED RECYCLE FOR PHASE 2+6

SIGNAL INDICATIONS

12" LENS 11" SYMBOLS



EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND & SOUTHBOUND APPROACHES OF LOWRY'S LANE AND THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVENUE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN "PED WALK" AND "PED CLEAR". THE "PED WALK" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "PED CLEAR" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PRE-EMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 1 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

SCALE
25 0 25

LEGEND

- MAST ARM/ IDENTIFYING LENGTH (20')
- VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER (2)
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER (2)
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER (A)
- LUMINAIRE
- LOOP SENSOR/SIZE (12'x6')
- MICROWAVE PRESENCE DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- EMERGENCY PRE-EMPTION DEVICE
- CURB RAMP
- UTILITY POLE
- PHASE NUMBER (2)
- INLET

SYSTEM PERMIT #-0156

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) AND LOWRY'S LANE

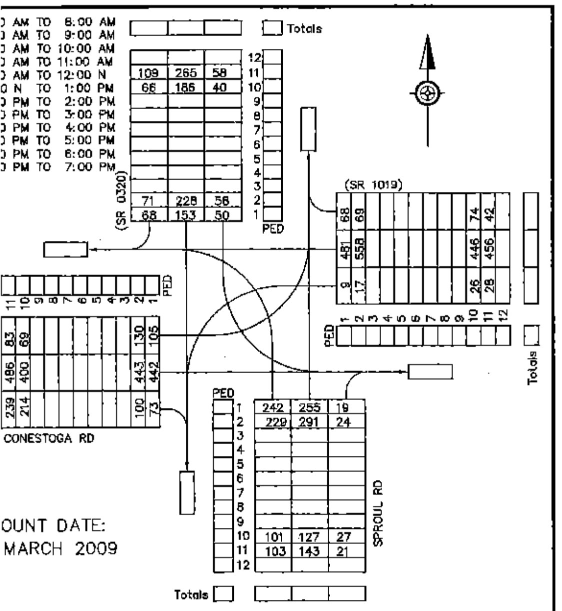
REVIEWED:
DATE
MUNICIPAL OFFICIAL DATE

RECOMMENDED:
PAUL M. LUTZ 11/24/08
LOUIS R. BELMONTE, P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	MCM	3/5/12	[illegible]	5/12/12	[illegible]	5/14/12
2							
3							
4							
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 63-0781 | FILE # 0781

Radnor Twp #0886



EMERGENCY PRE-EMPTION:

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

SIGNALS \ INTERVAL	6			2			4			8		
	13	14	15	16	17	18	19	20	21	22	23	24
1,5	G	Y	R	R	R	R	R	R	R	R	R	R
6	G/G	Y	R	R	R	R	R	R	R	R	R	R
3,8,10	R	R	R	G	Y	R	R	R	R	R	R	R
2	R	R	R	R	R	R	G	Y®	R®	R	R	R
4	R	R	R	R	R	R	G/G	Y®	R®	R	R	R
7,9,11	R	R	R	R	R	R	R	R	R	G	Y	R
FIXED TIME	*	3.5	2	*	3.5	2	*	3	2	*	3	2

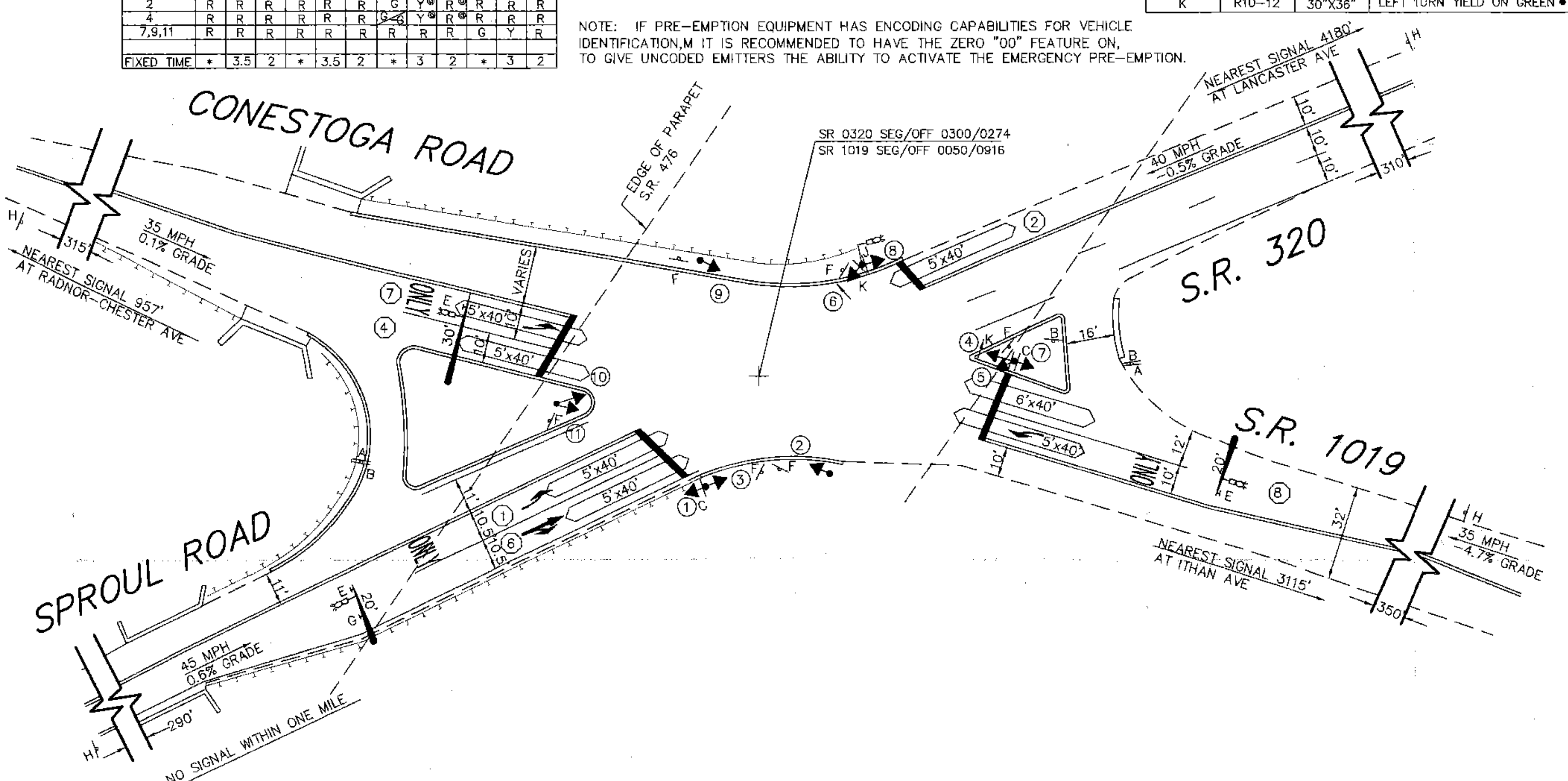
* FOR DURATION OF OPTICAL PRE-EMPTION

Ⓐ G WHEN RETURNING TO NORMAL OPERATION.

Ⓑ G/↰ WHEN RETURNING TO NORMAL OPERATION.

NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION,M IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R1-2	36"X36"	YIELD
B	R5-1	36"X36"	DO NOT ENTER
C	R3-7L	30"X30"	LEFT LANE MUST TURN LEFT
E	R3-5L	30"X36"	LEFT TURN SIGN
F	R3-9	18"X18"	NO PEDESTRIAN CROSSING
G	R3-6SR	30"X36"	OPTIONAL RIGHT TURN SIGN
H	W3-3	36"X36"	SIGNAL AHEAD SIGN
J	R10-11	24"X30"	NO TURN ON RED
K	R10-12	30"X36"	LEFT TURN YIELD ON GREEN ●



WEEKLY PROGRAM CHART					
EVENT	DAY*	TIME	CYCLE	PROGRAM	REMARKS
1	1-5	0600	90	1	AM PEAK
2	1-5	1000	80	2	MID DAY
3	1-5	1600	80	3	PM PEAK
4	1-5	1900	–	MAX.	FREE
5	6,7	0800	80	2	WEEKEND
6	6,7	2000	–	MAX.	FREE

* DAY 1 = MONDAY

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POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

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CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1+6				2+6				4+7				4+8				FLASHING
SIGNALS \ INTERVAL	1	2	3		4	5	6		7	8	9		10	11	12		
1,5	G	Y②	R②		G	Y	R		R	R	R		R	R	R		R
6	G/G	Y①	R②		G	Y	R		R	R	R		R	R	R		R
3,8,10	R	R	R		G	Y	R		R	R	R		R	R	R		R
2	R	R	R		R	R	R		G	Y④	R④		G	Y	R		Y
4	R	R	R		R	R	R		G/G	Y③	R④		G	Y	R		Y
7,9,11	R	R	R		R	R	R		R	R	R		G	Y	R		Y
FIXED		3.5	2			3.5	2			3.0	2			3.0	2		
MINIMUM	3				5				3				10				
PASSAGE	3				3				3				4				
MAXIMUM	7				15				7				20				
PEDESTRIAN																	
MEMORY	NL				NL				NL				MN				
PROGRAM 1	7	3.5	2		26	3.5	2		7	3	2		29≠	3	2		
PROGRAM 2	7	3.5	2		20	3.5	2		7	3	2		25≠	3	2		
PROGRAM 3	7	3.5	2		21	3.5	2		7	3	2		24≠	3	2		

PROGRAM 1: 90 SEC
PROGRAM 2: 80 SEC
PROGRAM 3: 80 SEC

● SIGNAL TO DWELL IN PHASE 4+8 UNTIL ACTUATED BY PHASE 1,2 OR 6.

① G/↰ IF FOLLOWED BY 2+6
② G IF FOLLOWED BY 2+6
③ G/↰ IF FOLLOWED BY 4+8
④ G IF FOLLOWED BY 4+8

≠ MINIMUM TIME. ACTUAL GREEN TIME DETERMINED BY CYCLE LENGTH.

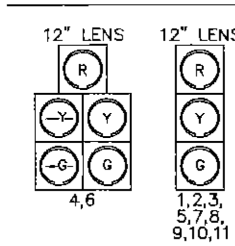
EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND & SOUTHBOUND APPROACHES OF SPROUL ROAD AND THE EASTBOUND & WESTBOUND APPROACHES OF CONESTOGA ROAD WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.

  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.

  LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.
- THE SIGNALS SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, WHEN ACTIVATED BY EMERGENCY VEHICLE, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNALS ARE FLASHING WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 4+8 INTERVAL 10 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

SIGNAL INDICATIONS



SCALE 1"=25'

SIGNALS TO BE EQUIPPED WITH LOUVERS 5,9,10,11

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 1-11

ALL SIGNAL HEADS SHALL BE SIDE MOUNTED

LEGEND

- MAST ARM/ IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER
- LOOP SENSOR/SIZE
- MICROWAVE DETECTOR
- FLASHING BEACON
- DETECTOR
- CURB CUT RAMP
- PHASE NUMBER

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

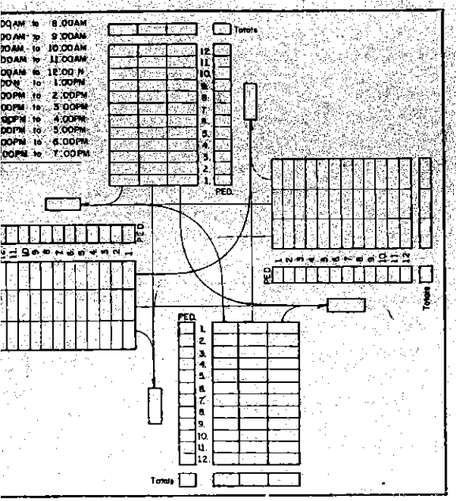
COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: SPROUL ROAD (S.R. 320) AND CONESTOGA ROAD (S.R. 1019)

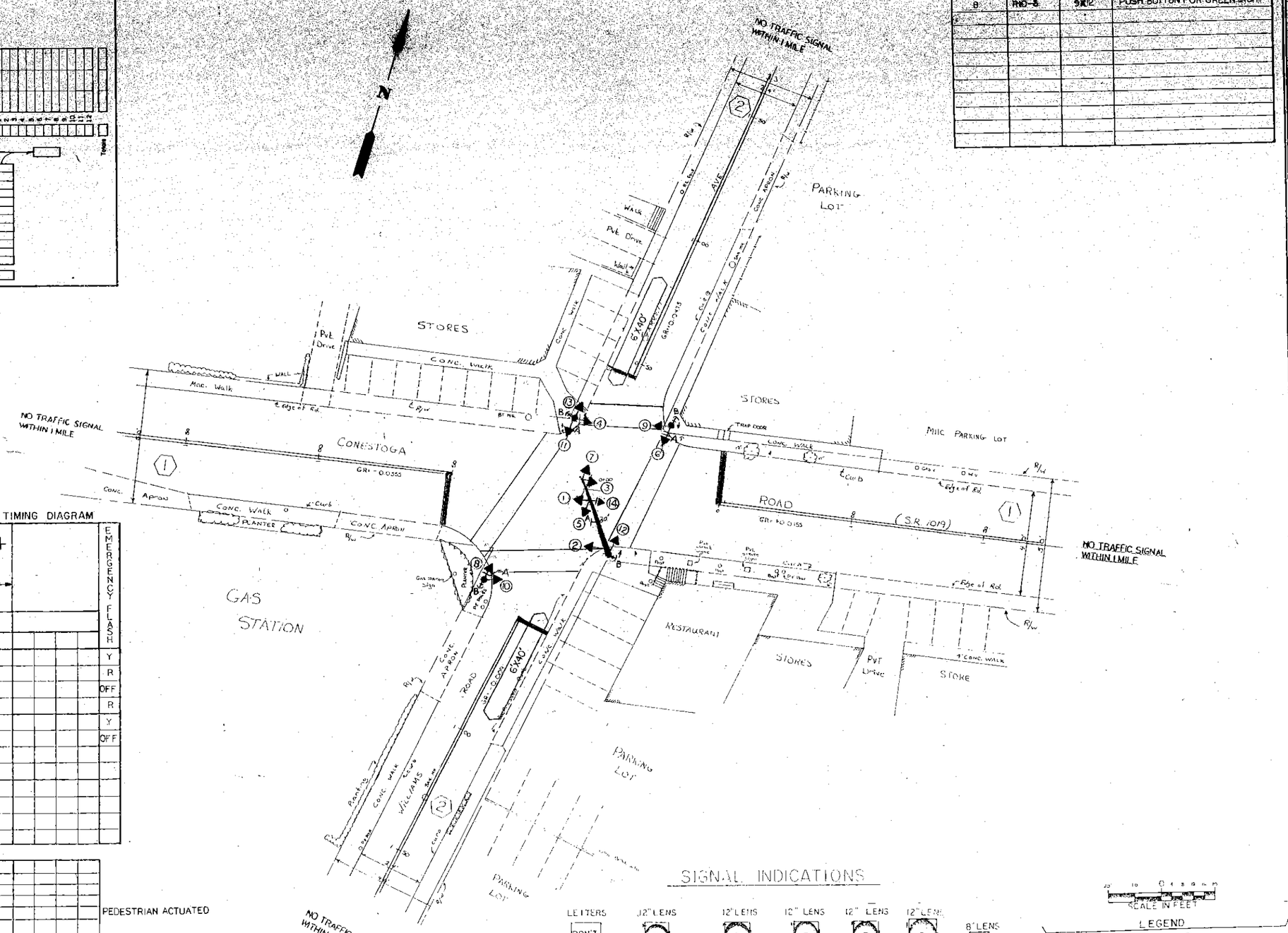
REVIEWED: ______ DATE
MUNICIPAL OFFICIAL ______ DATE

RECOMMENDED:
MUNICIPAL SIGNALS ENGINEER ______ DATE
WERNER J. EICHORN 5/17/87
DISTRICT TRAFFIC ENGINEER ______ DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	ADDED PRE-EMPTION	CEC/RMC	9/9/04	MLK	9/13/04	LRB	9/20/04
2	ADD EB LT PHASE, RETIMING	MCM	5/4/09	[illegible]	5/4/09	[illegible]	5/4/09
3							
4							
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 63-0886 | FILE # 0886





SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10-11	30X36	NO TURN ON RED
B	R10-3	9X12	PUSH BUTTUN FOR GREEN LIGHT

PERMIT NO. 4055 SHEET 1 OF 1
DATE ISSUED ______ FILE # 887

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION N° 68.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT GRADE.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

IN ADDITION TO THIS SIGNAL PERMIT THE PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT PRIOR TO ANY OPENINGS BEING MADE IN OR UNDER ANY PORTION OF A STATE HIGHWAY.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE APRIL 10,1975.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE	1				2								EMERGENCY FLASH
INTERVALS	1	2	3		4	5	6						
3	G	Y	R		R	R	R						Y
-7-8	R	R	R		G	Y	R						R
-4	G	Y	R		R	R	R						OFF
	R	R	R		G	Y	R						R
	G	Y	R		R	R	R						Y
	R	R	R		G	Y	R						OFF

		4	2			4	2					
UM	40				5							
AGE					4							
					20							
STRIAN					20*							
RY	MR				NL							

PEDESTRIAN ACTUATED

SIGNAL INDICATIONS

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS

LEGEND

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY : DELAWARE COUNTY
MUNICIPALITY : RADNOR TOWNSHIP
INTERSECTION : CONESTOGA ROAD (1019)
AND GARRETT AVENUE

REVIEWED :

MUNICIPAL OFFICIAL DATE

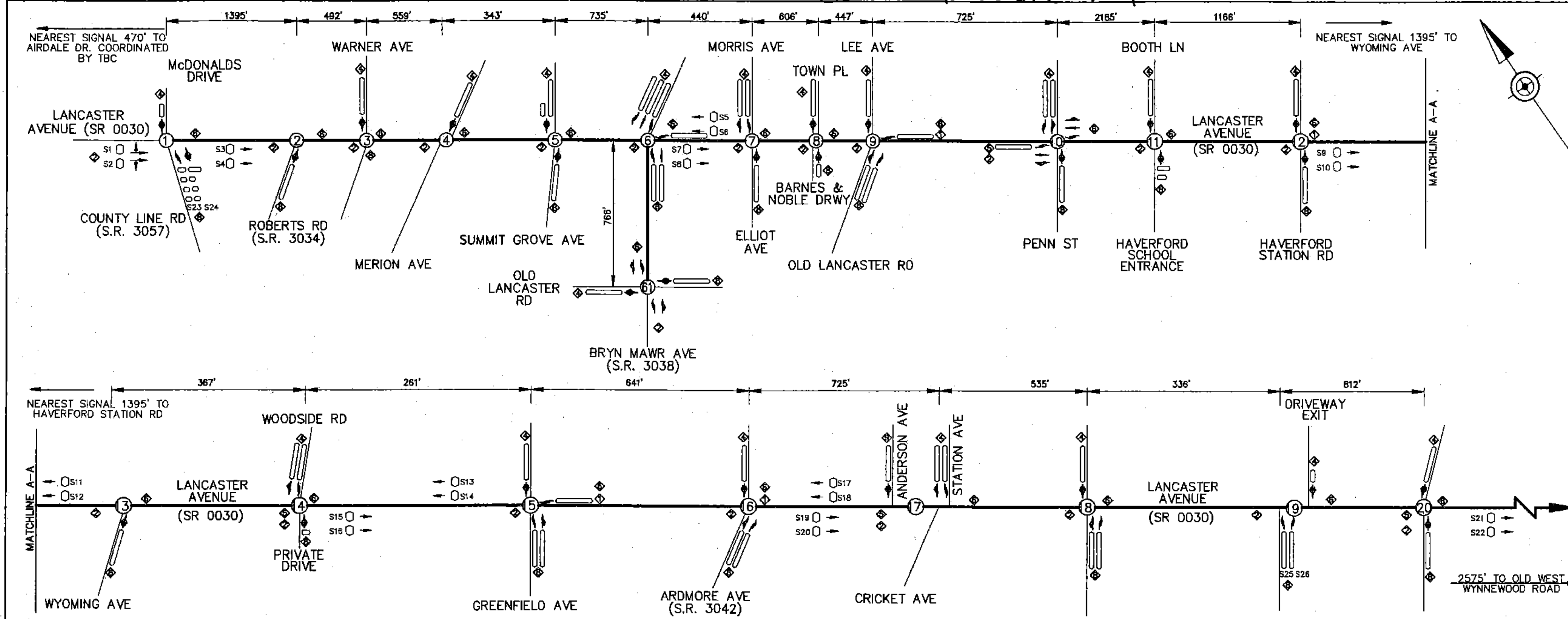
RECOMMENDED : Mark E. Kraft 10-22-96

DISTRICT TRAFFIC ENGINEER DATE

Revised [illegible] mk [illegible]
Revised MOVE SIGNAL HEAD 14 FOR WEST BOUND 3-15-91 mk AND CHANGE HEAD 4 FROM 12" TO 8" DWM 3/22/91
Revised INSTALLED LOOP DETECTOR & P/B cpe mk DWM 5/18/92
Revised INTERVAL 1 MIN. INCREASED: 20→40 cpe mk DWM 6/17/92

Lower Merion twp.

1-0065



SEE SYSTEM PERMIT# 10066 FOR SYSTEM 2 INTERCONNECTED SIGNALS

CYCLE / SPLIT / OFFSET

ADDRESS	PROGRAM 1= INTERSECTIONS	FILE NUMBER	PHASE 1	2	3	4	5	6	7	8	CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
	SEE SYSTEM PERMIT #0066 FOR COORDINATION OF SIGNALS ALONG LANCASTER AVENUE BETWEEN OLD WEST WYNNEWOOD ROAD & LANKENAU HOSPITAL DRIVE													
61	OLD LANCASTER RD & BRYN MAWR AVE	1044									Δ	FREE		
20	LANCASTER AVE & CHURCH RD	0466		57		33	13 (LEAD)	44		33	90	10		
19	LANCASTER AVE & ARGYLE RD/DRIVEWAY EXIT	0465		40		24(SPLIT)		40		28(SPLIT)	90	54		
18	LANCASTER AVE & RITTENHOUSE PLACE	0464		53		37		53		37	90	43		
17	LANCASTER AVE & STATION AVE / CRICKET AVE	0463		61		29**	15 (LEAD)	46			90	44		
16	LANCASTER AVE & ARDMORE AVE	0462	13 (LEAD)	38		21(SPLIT)		48		21(SPLIT)	90	48		
15	LANCASTER AVE & GREENFIELD AVE	0461	16 (LEAD)	42		30		60		30	90	49		
14	LANCASTER AVE & WOODSIDE RD	0460		48		42	19 (LEAD)	29		42	90	87		
13	LANCASTER AVE & WYOMING AVE	0421		53				53		37	90	83		
12	LANCASTER AVE & HAVERFORD STATION RD	0458	15 (LEAD)	41		34		56		34	90	87		
11	LANCASTER AVE & BOOTH LANE	0457		65		25		65		25	90	60		
10	LANCASTER AVE & PENN ST	0837		61		28	12 (LEAD)	49		29	90	4		
9	LANCASTER AVE & OLD LANCASTER AVE / LEE AVE	0829	13 (LEAD)	38		21		69		21	90	0		
8	LANCASTER AVE & TOWN PL/BARNES & NOBLE DRWY	3342		46		22(SPLIT)		46		22(SPLIT)	90	22		
7	LANCASTER AVE & MORRIS AVE / ELLIOT AVE	0456		59		31		59		31	90	0		
6	LANCASTER AVE & BRYN MAWR AVE	0455	13 (LEAD)	27	28 (PED)	24		40		24	90	86		
5	LANCASTER AVE & SUMMIT GROVE AVE	0454		65		25		65		25	90	2		
4	LANCASTER AVE & MERION AVE	0453		65		35		55			90	1		
3	LANCASTER AVE & WARNER AVE	1507		36	23 (PED)	31		36		31	90	75		
2	LANCASTER AVE & ROBERTS RD	0318		62				62		28	90	60		
1	LANCASTER AVE & COUNTY LINE RD	0452		42		21(SPLIT)		42		17(SPLIT)	80	0*		

ADDRESS	PROGRAM 2= INTERSECTIONS	FILE NUMBER	PHASE 1	2	3	4	5	6	7	8	CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
	SEE SYSTEM PERMIT #0066 FOR COORDINATION OF SIGNALS ALONG LANCASTER AVENUE BETWEEN OLD WEST WYNNEWOOD ROAD & LANKENAU HOSPITAL DRIVE													
61	OLD LANCASTER RD & BRYN MAWR AVE	1044									Δ	FREE		
20	LANCASTER AVE & CHURCH RD	0466		46		32	13 (LEAD)	35		32	80	22		
19	LANCASTER AVE & ARGYLE RD/DRIVEWAY EXIT	0465		34		23(SPLIT)		34		23(SPLIT)	80	32		
18	LANCASTER AVE & RITTENHOUSE PLACE	0464		48		32		48		32	80	29		
17	LANCASTER AVE & STATION AVE / CRICKET AVE	0463		59		21**	13 (LEAD)	46			80	48		
16	LANCASTER AVE & ARDMORE AVE	0462	13 (LEAD)	25		21(SPLIT)		38		21(SPLIT)	80	57		
15	LANCASTER AVE & GREENFIELD AVE	0461	15 (LEAD)	34		31		49		31	80	79		
14	LANCASTER AVE & WOODSIDE RD	0460		49		31	13 (LEAD)	36		31	80	78		
13	LANCASTER AVE & WYOMING AVE	0421		47				47		33	80	10		
12	LANCASTER AVE & HAVERFORD STATION RD	0458	15 (LEAD)	41		24		66		24	80	14		
11	LANCASTER AVE & BOOTH LANE	0457		50		30		50		30	80	0		
10	LANCASTER AVE & PENN ST	0837		53		27	12 (LEAD)	41		27	80	27		
9	LANCASTER AVE & OLD LANCASTER AVE / LEE AVE	0829	18 (LEAD)	37		25		55		25	80	1		
8	LANCASTER AVE & TOWN PL/BARNES & NOBLE DRWY	3342		38		21(SPLIT)		38		21(SPLIT)	80	8		
7	LANCASTER AVE & MORRIS AVE / ELLIOT AVE	0456		51		29		51		29	80	0		
6	LANCASTER AVE & BRYN MAWR AVE	0455	13 (LEAD)	20	26 (PED)	21		33		21	80	50		
5	LANCASTER AVE & SUMMIT GROVE AVE	0454		45		35		45		35	80	52		
4	LANCASTER AVE & MERION AVE	0453		47		33		47			80	11		
3	LANCASTER AVE & WARNER AVE	1507		34	23 (PED)	23		34		23	80	17		
2	LANCASTER AVE & ROBERTS RD	0318		55				55		25	80	7		
1	LANCASTER AVE & COUNTY LINE RD	0452		42		21(SPLIT)		42		17(SPLIT)	80	0*		

ADDRESS	PROGRAM 3= INTERSECTIONS	FILE NUMBER	PHASE 1	2	3	4	5	6	7	8	CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
	SEE SYSTEM PERMIT #0066 FOR COORDINATION OF SIGNALS ALONG LANCASTER AVENUE BETWEEN OLD WEST WYNNEWOOD ROAD & LANKENAU HOSPITAL DRIVE													
61	OLD LANCASTER RD & BRYN MAWR AVE	1044									Δ	FREE		
20	LANCASTER AVE & CHURCH RD	0466		61		39	13 (LEAD)	48		39	100	88		
19	LANCASTER AVE & ARGYLE RD/DRIVEWAY EXIT	0465		51		23(SPLIT)		51		28(SPLIT)	100	23		
18	LANCASTER AVE & RITTENHOUSE PLACE	0464		66		34		66		34	100	88		
17	LANCASTER AVE & STATION AVE / CRICKET AVE	0463		73		27**	15 (LEAD)	58			100	67		
16	LANCASTER AVE & ARDMORE AVE	0462	13 (LEAD)	40		21(SPLIT)		53		26(SPLIT)	100	74		
15	LANCASTER AVE & GREENFIELD AVE	0461	16 (LEAD)	56		28		72		28	100	40		
14	LANCASTER AVE & WOODSIDE RD	0460		67		33	14 (LEAD)	53		33	100	58		
13	LANCASTER AVE & WYOMING AVE	0421		64				64		36	100	73		
12	LANCASTER AVE & HAVERFORD STATION RD	0458	13 (LEAD)	52		35		65		35	100	94		
11	LANCASTER AVE & BOOTH LANE	0457		67		33		67		33	100	81		
10	LANCASTER AVE & PENN ST	0837		62		38	12 (LEAD)	50		38	100	11		
9	LANCASTER AVE & OLD LANCASTER AVE / LEE AVE	0829	13 (LEAD)	63		24		76		24	100	27		
8	LANCASTER AVE & TOWN PL/BARNES & NOBLE DRWY	3342		58		21(SPLIT)		58		21(SPLIT)	100	31		
7	LANCASTER AVE & MORRIS AVE / ELLIOT AVE	0456		65		35		65		35	100	0		
6	LANCASTER AVE & BRYN MAWR AVE	0455	15 (LEAD)	32	26 (PED)	27		47		27	100	26		
5	LANCASTER AVE & SUMMIT GROVE AVE	0454		58		42		58		42	100	42		
4	LANCASTER AVE & MERION AVE	0453		59		41		59			100	40		
3	LANCASTER AVE & WARNER AVE	1507		48	23 (PED)	29		48		29	100	21		
2	LANCASTER AVE & ROBERTS RD	0318		75				75		25	100	5		
1	LANCASTER AVE & COUNTY LINE RD	0452		42		21(SPLIT)		42		17(SPLIT)	80	0*		

Notes:
- ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
- REFER TO SIGNAL PERMIT PLAN FOR MAX 1, MAX 2 AND CLEARANCE AND PED TIMES.

ΔREFER TO SIGNAL PERMIT PLAN FOR WEEKLY PROGRAM SCHEDULE.
*COORDINATED WITH AIRDALE DR AND LANCASTER AVENUE
**INCLUDES PHASE 9 AS SHOWN ON PERMIT PLAN

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3/17/2011 5:38:38 PM eforley
Traffic Planning and Design, Inc.

SYSTEM NOTES

1. PROGRAM TO BE SELECTED BY CLOSED LOOP SYSTEM (TIME OF DAY) OR TBC BACKUP.
2. OFFSETS ARE REFERENCED TO NEMA TS2 1ST GREEN, ON LANCASTER AVENUE.
3. SYSTEM LIMITS:
   LANCASTER AVENUE – FROM COUNTY LINE ROAD TO CHURCH ROAD.
   BRYN MAWR AVENUE – FROM LANCASTER AVENUE TO OLD LANCASTER AVENUE.
   MASTER CONTROLLER:
   RADIO TOWER AT TOWNSHIP BUILDING NEAR LANCASTER AVENUE & ARGYLE ROAD.
4. PRIMARY COORDINATION: CLOSED LOOP SYSTEM – SPREAD SPECTRUM RADIO COMMUNICATION .
   SECONDARY COORDINATION: TBC (DEFAULT TO BACKUP TBC).
5. SYSTEM IS DESIGNED FOR THE SYSTEM SOFTWARE: MARC NX.
6. CYCLES, SPLITS & OFFSETS ARE IN SECONDS.

WEEKLY PROGRAM CHART

EVENT	ΔDAY	TIME	PROGRAM*	REMARKS
1	1–5	0000	–––	FLASH
2	1–5	0600	1	AM PEAK
3	1–5	0900	2	MD PEAK
4	1–5	1500	3	PM PEAK
5	1–5	2000	–––	FREE
6	6,7	0000	–––	FLASH
7	6,7	0600	2	MD PEAK
8	6,7	1900	–––	FREE

Δ – DAY 1=MONDAY
* – MAX/FREE WHERE NOTED IN CYCLCE/SPLIT/OFFSET MATRIX

LEGEND

④ INTERSECTION ADDRESS
S## SYSTEM LOOP/ IDENTIFYING NUMBER
LOOP SENSOR
◈ PHASE NUMBER

NOT TO SCALE

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

REFER TO TRAFFIC SIGNAL PERMIT DRAWING FOR INDIVIDUAL INTERSECTION OPERATION, GEOMETRY, PHASING AND CRITICAL TIMES.

FOR CONSTRUCTION AND INSPECTION THE SYSTEM PERMIT SHOULD ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.

TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUBSYSTEM LEVEL MASTER CONTROLLER LEVEL AND PERSONAL COMPUTER REMOTE DIAL UP LEVEL.

GATHER THE SYSTEM FAILURE CRITICAL ALARMS REPORT AND ARCHIVE THEM WHERE APPLICABLE.

SET UP PENNDOT DISTRICT 6-0 COMPUTER WITH THE SYSTEM DATABASE AND GRAPHICS. MODIFY THE DATABASE AND GRAPHICS FOR SYSTEMS REVISIONS.

ASSIGN LOOP DETECTORS AND PROGRAM THE CONTROLLERS TO GATHER TRAFFIC VOLUMES IN 15 MINUTE INTERVAL, WHERE APPLICABLE.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

OBTAIN POLE ATTACHMENT PERMIT FOR AERIAL FIBER OPTIC INSTALLATION.

MAINTAIN MASTER CONTROLLER COMMUNICATION SUCH AS PHONE DROPS.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY
MUNICIPALITY: LOWER MERION TOWNSHIP
INTERSECTION: LANCASTER AVENUE (SR 0030) CORRIDOR BETWEEN COUNTY LINE RD TO CHURCH RD

REVIEWED:
MUNICIPAL OFFICIAL — DATE 4/6/11

RECOMMENDED:
A B PATEL — 03/05/04
L R BELMONTE — 03/08/04
DISTRICT TRAFFIC ENGINEER — DATE

NO	REVISION	DES/REVW	DATE	REVW	DATE	RECOM	DATE
1	ADD OLD LANCASTER RD & OLD BRYN MAWR AVE	TPD		DLA	02/27/09	ABP	02/27/09
2	ADD RT LANE TO SB & ADD LT LANES TO EB & WB AT INT #10	TPD	4/4/11		4/19/11		4/19/11
3							
4							
5							
6							
7							
8							

SYSTEM PERMIT # I-0065

Delaware County - Radnor Twp

System # I-0156 p 4/4

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	DELAWARE	0030	CLR-T	4 OF 4
RADNOR TOWNSHIP				

REVISION NUMBER	REVISIONS	DATE	BY

TRAFFIC SIGNAL SYSTEM PERMIT PLAN

WEEKLY PROGRAM CHART						
EVENT	DAY	TIME	CYCLE	OFFSET	PROGRAM	REMARKS
1	1-7	20:00	–	–	MAX. 1	FREE
2	1-5	06:00	VARIES	VARIES	1	AM PEAK
3	1-5	10:00	VARIES	VARIES	2	OFF PEAK
4	1-5	15:00	VARIES	VARIES	3	PM PEAK
5	6,7	08:00	VARIES	VARIES	2	OFF PEAK

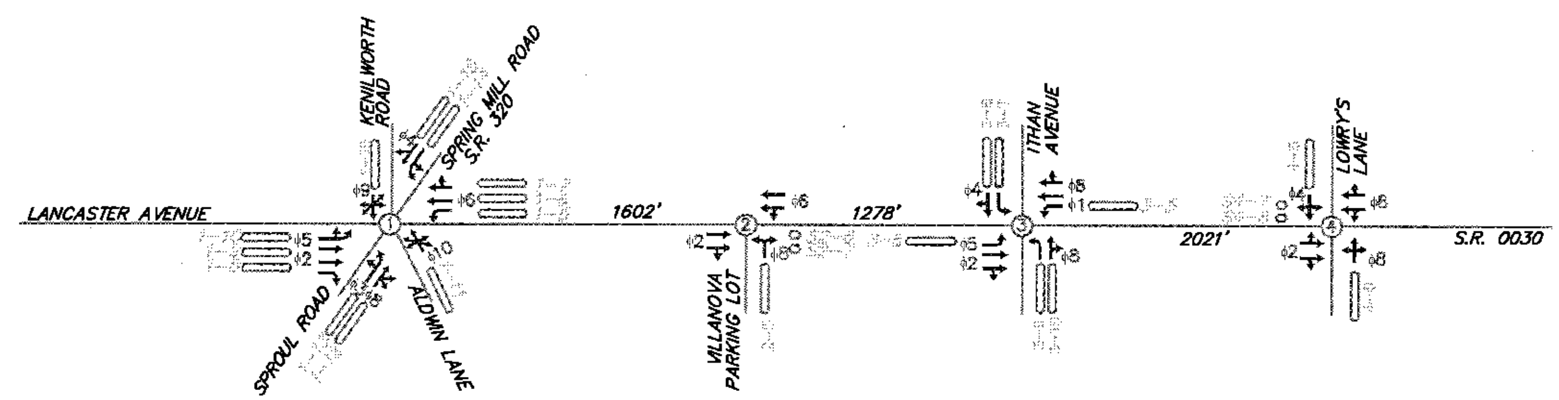
MONDAY = DAY 1
OFFSET IN SECONDS

OFFSET REFERENCED TO START OF YELLOW ON LANCASTER AVE.

NOTES: – ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
– REFER TO SIGNAL PERMIT PLAN FOR MAX 1, MAX 2, CLEARANCE AND RED TIMES.

SYSTEM NOTES

1. PROGRAMS TO BE SELECTED BY CLOSED LOOP SYSTEM (TIME OF DAY) OR TBC BACKUP.
2. OFFSETS ARE REFERENCED TO THE BEGINNING OF YELLOW ON LANCASTER AVENUE.
3. SYSTEM LIMITS : LANCASTER AVENUE (4 INTERSECTIONS) FROM SPROUL RD TO LOWRY'S LANE
MASTER: RADNOR MAINTENANCE BUILDING
4. PRIMARY COORDINATION: FIBER OPTIC CABLE.
SECONDARY COORDINATION: TBC (DEFAULT TO BACKUP TBC).



CYCLE/SPLIT/OFFSET

Program 1 =				Phase										Cycle	Offset
	Intersections	File #	Master	1	2	3	4	5	6	7	8	9	10		
1	LANCASTER AVE & SPROUL ROAD	0226			55	15 (LEAD)	26	16 (LEAD)	39		41	32 (SPLIT)	32 (SPLIT)	160	FREE
2	LANCASTER AVE & VILLANOVA PARKING LOT	0779			29				29		31			60	24
3	LANCASTER AVE & ITHAN AVE	0780		15 (LEAD)	44		35	13 (LEAD)	46		35	26 (PED)		120	0
4	LANCASTER AVE & LOWRY'S LANE	0781			33		27		33		27			60	25

CYCLE/SPLIT/OFFSET

Program 2 =				Phase										Cycle	Offset
	Intersections	File #	Master	1	2	3	4	5	6	7	8	9	10		
1	LANCASTER AVE & SPROUL ROAD	0226			49	13 (LEAD)	24	13 (LEAD)	39		37	32 (SPLIT)	32 (SPLIT)	150	FREE
2	LANCASTER AVE & VILLANOVA PARKING LOT	0779			29				29		31			60	24
3	LANCASTER AVE & ITHAN AVE	0780		19 (LEAD)	42		33	13 (LEAD)	48		33	26 (PED)		120	0
4	LANCASTER AVE & LOWRY'S LANE	0781			33		27		33		27			60	25

CYCLE/SPLIT/OFFSET

Program 3 =				Phase										Cycle	Offset
	Intersections	File #	Master	1	2	3	4	5	6	7	8	9	10		
1	LANCASTER AVE & SPROUL ROAD	0226			50	13 (LEAD)	23	14 (LEAD)	36		36	32 (SPLIT)	32 (SPLIT)	150	FREE
2	LANCASTER AVE & VILLANOVA PARKING LOT	0779			29				29		31			60	26
3	LANCASTER AVE & ITHAN AVE	0780		16 (LEAD)	46		32	15 (LEAD)	47		32	26 (PED)		120	0
4	LANCASTER AVE & LOWRY'S LANE	0781			33		27		33		27			60	27

LEGEND

SYSTEM DETECTOR, INTERSECTION X – LOOP NO. Y

DETECTOR, INTERSECTION X – LOOP NO. Y

PHASE

SCALE: NOT TO SCALE

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

REFER TO TRAFFIC SIGNAL PERMIT DRAWING FOR INDIVIDUAL INTERSECTION OPERATION, GEOMETRY, PHASING AND CRITICAL TIMES.

FOR CONSTRUCTION AND INSPECTION THE SYSTEM PERMIT SHOULD ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.

TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUBSYSTEM LEVEL MASTER CONTROLLER LEVEL AND PERSONAL COMPUTER REMOTE DIAL UP LEVEL.

GATHER THE SYSTEM FAILURE CRITICAL ALARMS REPORT AND ARCHIVE THEM WHERE APPLICABLE.

SET UP PENNDOT DISTRICT 6-0 COMPUTER WITH THE SYSTEM DATABASE AND GRAPHICS. MODIFY THE DATABASE AND GRAPHICS FOR SYSTEMS REVISIONS.

ASSIGN LOOP DETECTORS AND PROGRAM THE CONTROLLERS TO GATHER TRAFFIC VOLUMES IN 15 MINUTE INTERVAL, WHERE APPLICABLE.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

OBTAIN POLE ATTACHMENT PERMIT FOR AERIAL FIBER OPTIC INSTALLATION.

MAINTAIN MASTER CONTROLLER COMMUNICATION SUCH AS PHONE DROPS.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 181, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES EFFECTIVE DATE MARCH 29, 2007.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE

MUNICIPALITY: RADNOR TOWNSHIP

INTERSECTION: TRAFFIC SIGNAL SYSTEM

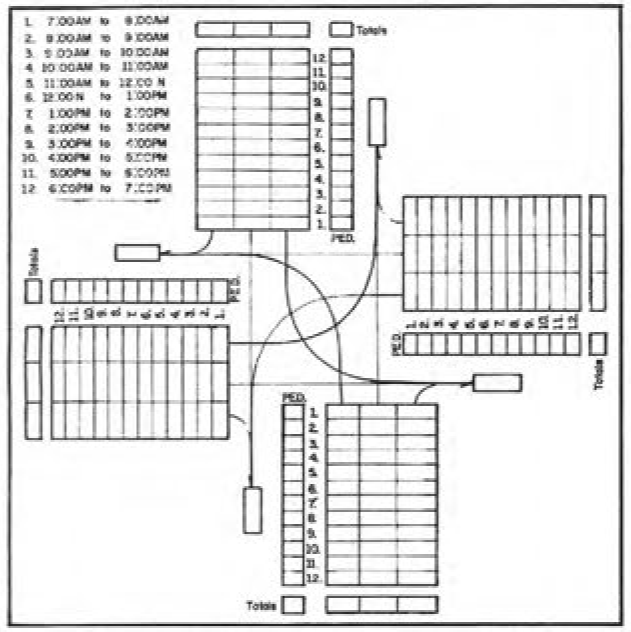
REVIEWED:

RECOMMENDED:

INTERCONNECT PERMIT #I-0156 | SHEET 1 OF 1

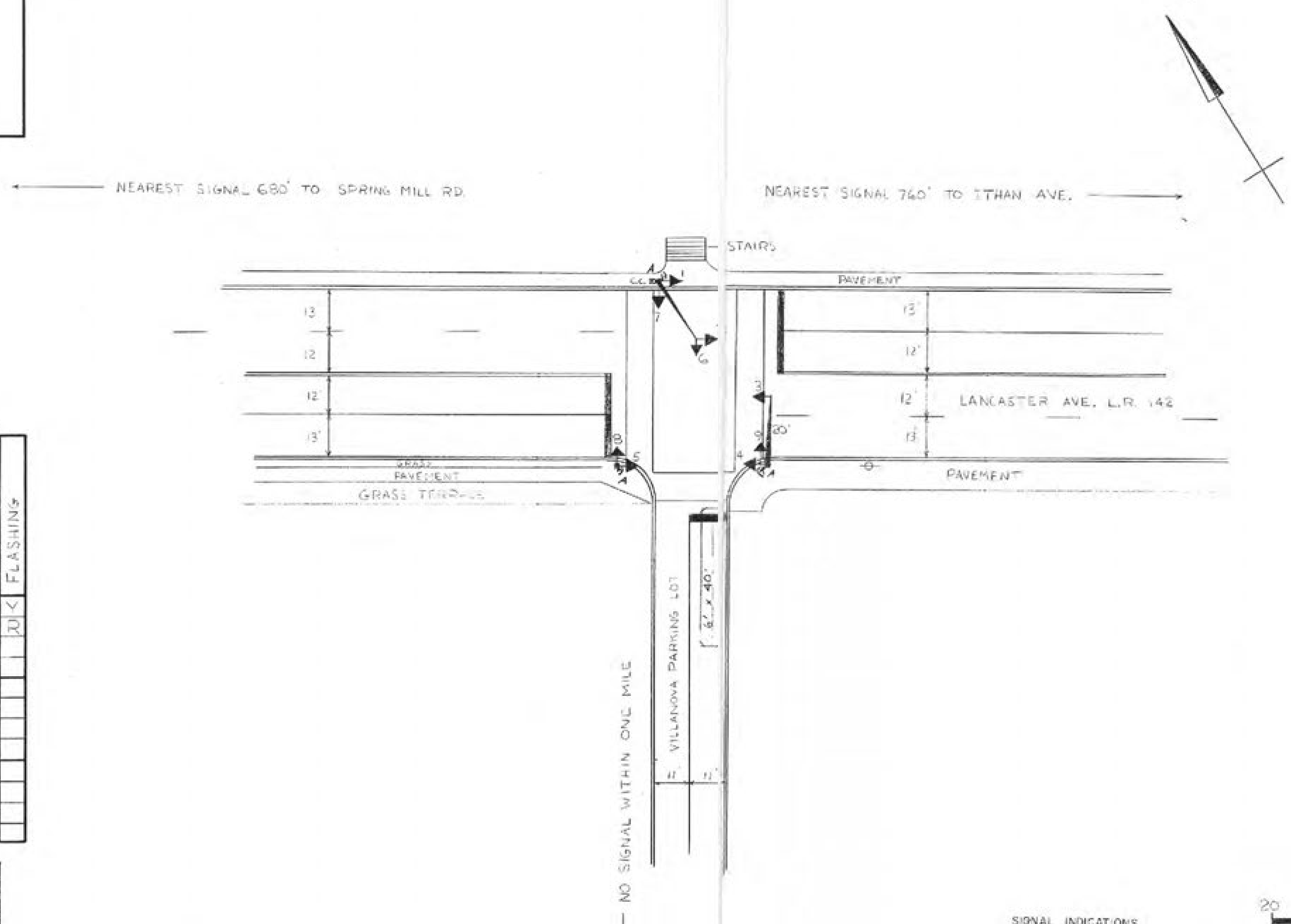
PERMIT NO. 1808	SHEET 2 OF 2
DATE ISSUED 5-24-48	DATE REVISED

77



SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10-3	9 x 12	PUSH BUTTON FOR GREEN



GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION N° 68.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT GRADE.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

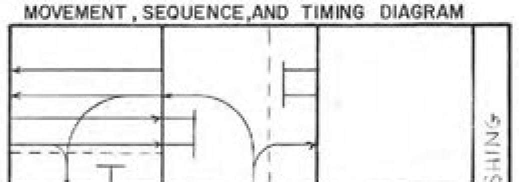
PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

IN ADDITION TO THIS SIGNAL PERMIT THE PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT PRIOR TO ANY OPENINGS BEING MADE IN OR UNDER ANY PORTION OF A STATE HIGHWAY.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE APRIL 10, 1975.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 40 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM



PHASE	A				B								FLASHING
INTERVAL / SIGNALS	1	2	3		4	5	6						
1-2-3-4-5	G	Y	R		R	R	R						Y
6-7-8-9	R	R	R		G	Y	R						R

FIXED TIME	25*	3	2			3	2					
INITIAL					4							
VEHICLE EXT					4							
MAXIMUM					20							
PEDESTRIAN					*20							

* UPON ACTUATION ONLY

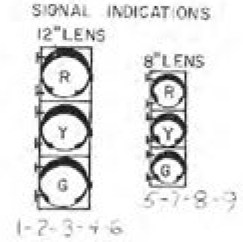
	RELEASE	OFFSET **
DIAL 1 80 SEC		9.5 SEC
DIAL 2 70 SEC		8.5 SEC
DIAL 3 FLASH		

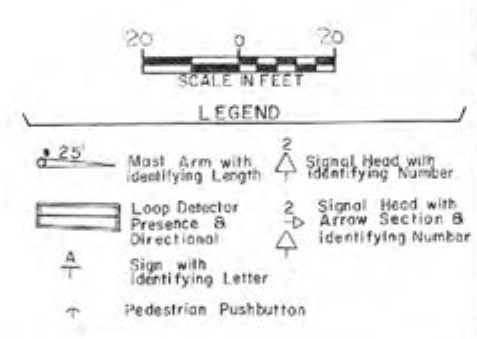
DIAL	DAY	OPERATION
1	MON - SUN	6:00AM - 6:00PM
2	MON - SUN	6:00PM - 12MID
3	MON - SUN	12MID - 600AM - FLASH

* MINIMUM GREEN TIME; ACTUAL GREEN TIME TO BE DETERMINED BY CYCLE LENGTH AND T.S.L.

** OFFSET REFERENCED TO START OF INTERVAL N° 2

SIGNAL INDICATIONS





ENGINEERING DISTRICT 6-0

INTERSECTION LANCASTER AVE. AND VILLANOVA PARKING LOT

COUNTY DELAWARE MUNICIPALITY RADNOR

Drawn by RAYMOND M. LABADIE Date 7-17-8

Checked by [signature] Date 7-18-8

Approved by [signature] Date 7-19-
DISTRICT TRAFFIC ENGR.

FILE 77

REVISED New Drawing, added TBC 2-18-8

REVISED OFFSET 3/88 C. BROWN

TURN LANE WARRANT ANALYSIS

The project includes providing new auxiliary left- and right-turn lanes along Route 30 and Ithan Avenue. There are, however, certain locations where either left-or right-turn auxiliary lanes are *not* suggested. In one case this is because of a suggested prohibition:

- Route 30 WLL driveway, no WB left turn lane is suggested since the movement is prohibited.

In other cases it is because the lanes are not warranted:

- Route 30 PAC driveway, no EB right turn lane is suggested since it is not warranted.
- Ithan Ave LAH/Garage driveways, no NB/SB right turn lanes are suggested since they are not warranted.

Thus the turn lane warrant analysis focuses on the three instances mentioned directly above, to demonstrate the lack of need. Such evidence is provided on the following pages and is based on SOL 470-08-4 as well as PennDOT *Publication 46* Chapter 11 page 11-46 Turn Lane Warrants.

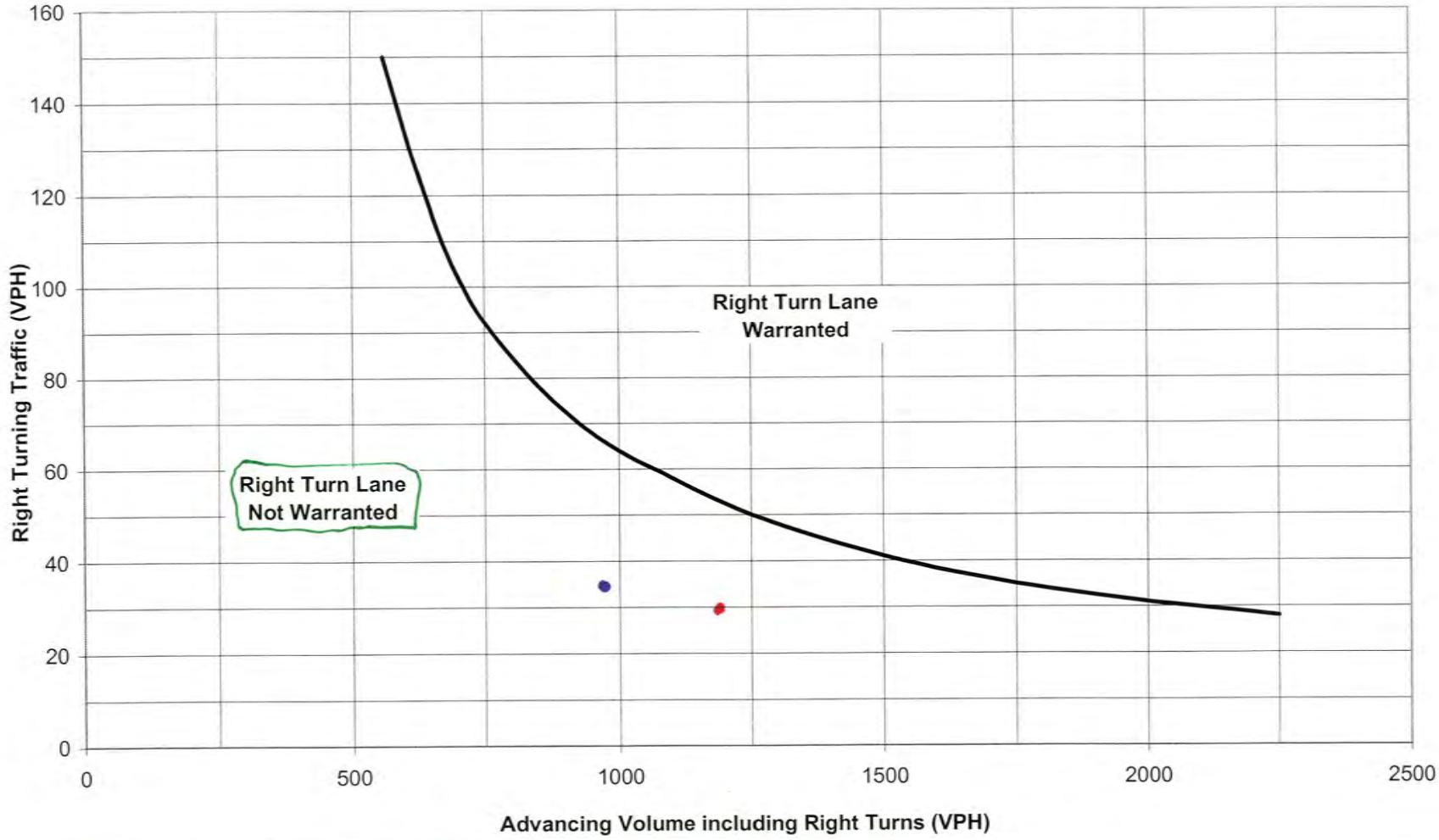
Note that the Queue Analysis (based on Synchro results) demonstrates adequate storage lengths for the site access auxiliary lanes and other key locations. Even so, an alternative to predicting necessary auxiliary lane storage length is provided in SOL 470-08-4, and this analysis is also provided. Note that using Chapter 11 guidelines, the site is Level terrain (truck adjustment factor) and is Traffic Control Condition "A" (using either posted speed limits of 25 mph or a design speed of 35 mph). To simplify calculations and add conservative measure, a Pt value of 10% was used which results in a T factor of 1.05 to be applied to subject volumes (2023 Projected Condition scenario volumes). The following table summarizes SOL 470-08-4 storage need predictions and compares with that which is provided.

DWY	DIR	CYC/HR	ADJ'D SUBJ VOL (AM/PM)	AVG VEH/CYC	SUG'D EXH 11-8 LENGTH (FT)	PROVIDED LENGTH (STOR+TAP)	OK?
WLL	EB R	60	34 / 29	1 / 1	75	125+75	OK
CW	EB R	60	35 / 39	1 / 1	75	125+75	OK
	WB L	60	32 / 27	1 / 1	75	100+75	OK
PAC	WB L	60	66 / 71	1 / 1	75	100+75	OK
LAH/GAR	NB L	60	5 / 4	<1 /< 1	75	50+50	OK (W/ TAPER)
	SB L	60	158 / 143	2 / 2	100	100+75	OK

Recall that the entire Projected Condition analysis of the TIS is based on **ALL** parking spaces treated as peak-hour moving traffic.

PAC
DWY

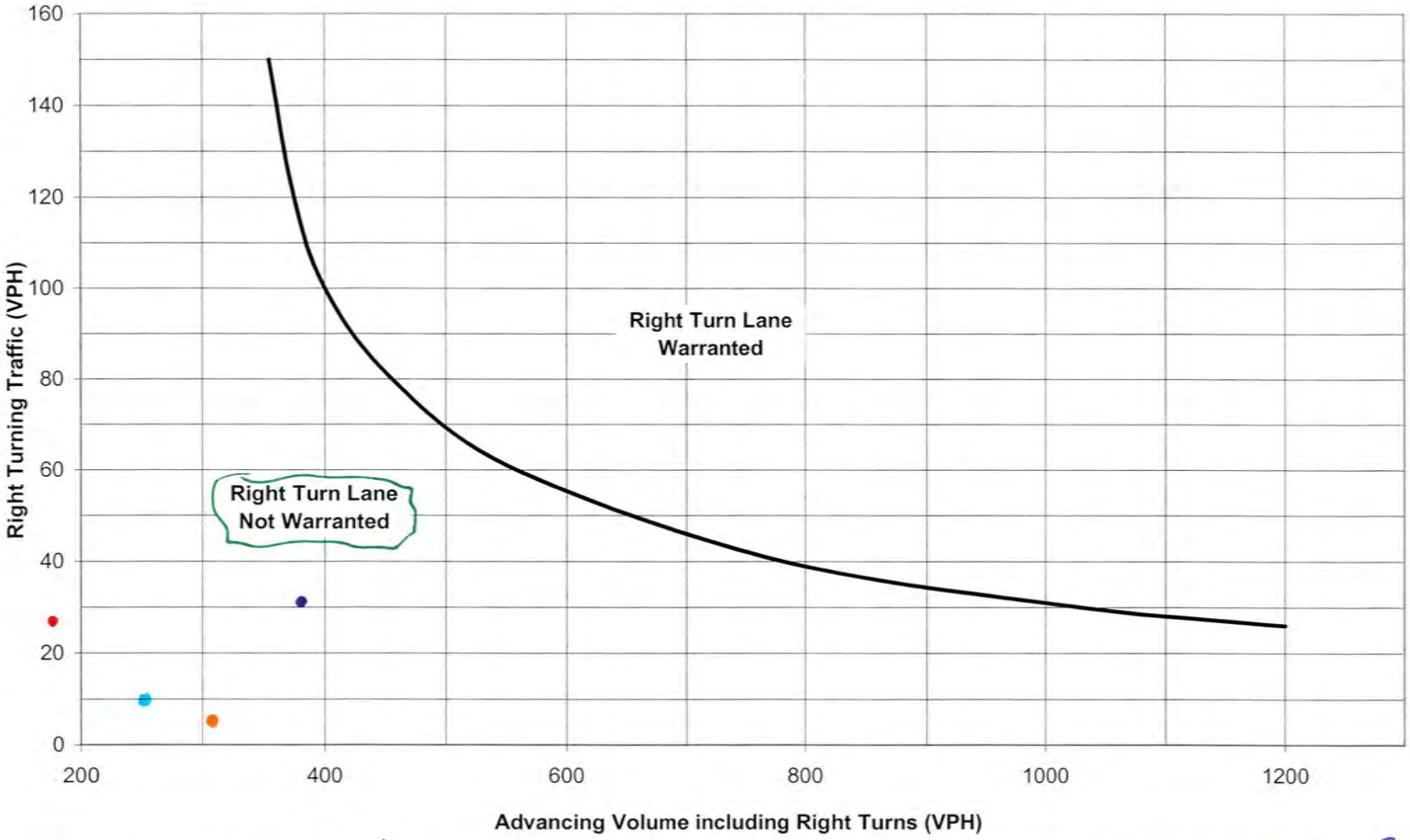
Figure 11. Warrant for right turn lanes on four-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



- 36,984 PAC EB RT 2023 AM
- 32,1167 " " " " PM

ITHAN DWY'S

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



- 31,384 LAH/GAR NB RT 2023 AM
- 27,172 ... ... PM
- 10,243 ... SB RT 2023 AM
- 6,304 ... ... PM

T Factor	1.05						
Location	PAC EB Rt		ITHAN NB Rt		ITHAN SB Rt		
Time	AM	PM	AM	PM	AM	PM	
			5	4	150	136	
	903	1081	336	138	222	284	
	34	30	29	25	9	5	
	937	1111	365	163	231	289	
	983.85	1166.55	383.25	171.15	242.55	303.45	
V advance	984	1167	384	172	243	304	
V right	36	32	31	27	10	6	

APPENDIX L

Parking

Villanova University Parking Lot Inventory - Class Days

Lot Name	# of Spaces	Date	11/5/2012		11/6/2012		11/7/2012		11/8/2012		11/9/2012		10/4/2011		10/6/2011		10/18/2011		10/20/2011		11/1/2011	11/2/2011	11/3/2011
		Time	10:00 AM	12:00 PM	10:00 AM	12:00 PM	10:00 AM	12:00 PM	10:00 AM	12:00 PM	10:00 AM	12:00 PM	10:00 AM	12:00 PM	10:00 AM	12:00 PM	10:00 AM	12:00 PM	10:00 AM	12:00 PM	1:30PM	1:30PM	1:30PM
			Spaces Available																				
Alumni House	14		7	7	8	7	8	8	8	8	7	7	2	1	1	4	2	3	4	4	4	3	2
CEER	79		16	18	18	18	17	15	12	12	8	6	31	27	55	28	23	18	34	28	10	12	17
Campus Corner	14		2	1	3	2	1	0	1	1	2	1	0	2	1	2	1	2	2	1	0	0	0
Connelly	6		1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0
Dougherty Drive	22		0	0	0	0	0	0	0	0	0	0	0	1	3	0	1	0	5	1	0	0	0
Dundale	39		10	10	8	14	8	9	13	12	18	17	8	12	15	13	7	12	13	10	10	9	11
Farrell Hall	27		0	0	0	0	6	6	5	5	5	5	2	1	2	2	3	0	4	4	0	2	6
Fieldhouse	48		7	5	7	7	6	6	4	3	7	7	5	6	6	2	8	0	23	4	5	4	4
Galberry	10		5	5	0	0	4	4	5	5	7	7	1	3	2	0	2	2	2	2	2	1	1
Garey	**109**		**14**	**7**	**2**	**5**	**14**	**5**	**13**	**11**	**20**	**15**	**0**	**4**	**6**	**8**	**4**	**15**	**4**	**6**	**13**	**9**	**12**
Geraghty	7		5	5	6	4	6	6	6	6	4	4	2	1	2	3	1	0	1	1	1	2	0
HSB Upper	84		29	29	31	27	29	8	6	6	21	19	18	6	27	16	30	24	36	22	7	3	6
HSB Lower	89		21	20	22	22	7	8	0	0	19	21	9	4	21	8	23	15	22	14	9	13	9
Kennedy	20		1	0	0	0	0	6	0	6	6	0	0	0	0	1	0	0	0	0	0	0	0
Geraghty B	13		6	4	6	6	6	6	5	6	6	7	0	0	0	0	0	0	0	0	9	4	0
Law Lot Upper	**147**		**166**	**98**	**161**	**114**	**164**	**95**	**164**	**139**	**174**	**171**	**110**	**96**	**115**	**102**	**109**	**81**	**105**	**79**	**71**	**80**	**73**
Law Lot Middle	**199**		**30**	**1**	**15**	**11**	**26**	**4**	**22**	**7**	**116**	**83**	**43**	**41**	**66**	**70**	**104**	**34**	**74**	**28**	**32**	**58**	**36**
Law Lot Lower	**197**		**0**	**0**	**1**	**10**	**2**	**8**	**7**	**6**	**37**	**50**	**4**	**5**	**14**	**10**	**37**	**5**	**8**	**10**	**2**	**22**	**14**
Law Lot Bottom	**64**		**3**	**0**	**15**	**0**	**8**	**4**	**32**	**12**	**52**	**46**	**8**	**10**	**17**	**21**	**33**	**13**	**23**	**16**	**1**	**17**	**9**
Law Surface Lot	**113**		**8**	**3**	**13**	**9**	**15**	**4**	**11**	**7**	**23**	**14**	**10**	**6**	**7**	**6**	**23**	**12**	**4**	**1**	**13**	**8**	**10**
Main Lot East	577		335	158	194	0	239	135	239	89	306	213	132	0	213	32	157	75	272	20	0	113	74
Main Lot West	1,126		327	71	138	0	170	99	170	113	251	228	317	0	302	46	229	30	308	30	0	62	82
Main Visitor Lot	80		55	44	43	0	76	66	76	69	0	22	69	0	76	67	48	65	63	39	60	75	60
Mendel	109		22	19	27	15	24	17	13	7	31	11	23	12	33	22	23	18	26	10	4	15	7
Monastery	25		1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0
Moriarity	15		0	3	2	0	5	0	1	0	0	0	4	2	7	1	0	0	3	1	0	0	4
Pavillion	222		104	84	88	85	103	107	94	92	120	126	83	94	122	80	125	84	123	79	83	75	78
St. Ritas	9		0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	1	0	1	1
SAC Upper	136		6	8	7	7	10	10	6	2	17	9	6	1	32	0	1	5	6	1	2	5	0
SAC Lower	135		75	79	81	45	44	25	66	36	75	65	48	28	61	37	30	29	71	41	23	33	25
SAC Roadway	58		24	26	31	32	30	20	21	17	35	29	22	20	24	20	25	20	30	21	12	10	13
South Campus	281		141	132	152	135	145	137	146	136	131	145	151	168	176	178	176	181	191	182	142	143	160
Steam Plant	122		16	10	18	25	19	16	18	10	27	17	24	17	18	17	19	17	8	8	13	21	12
St. Mary's	98		19	17	19	16	20	27	22	24	29	20	18	15	29	25	22	22	20	19	29	20	22
Stone Hall	16		3	4	2	2	7	2	2	2	7	2	0	1	1	1	0	0	2	1	1	0	1
TSB	57		2	11	3	12	7	15	4	8	9	7	12	4	10	6	14	10	11	10	0	0	0
Tolentine	88		18	16	19	12	21	21	24	19	11	23	0	3	0	2	0	0	0	0	1	3	2
John Barry	10		2	1	0	5	5	4	2	3	4	4	3	0	1	2	1	0	2	1	2	3	3
Stadium	50		41	41	20	32	44	37	27	35	43	45	8	2	23	22	19	17	25	19	22	25	15
Football offices	19		1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Campus	596		164	171	212	197	191	192	199	190	185	180	184	170	182	190	165	178	169	151	165	175	169
Total Spaces	5,130		1,687	1,110	1,374	876	1,489	1,132	1,446	1,104	1,815	1,626	1,359	764	1,673	1,044	1,469	987	1,696	865	748	1,026	938

Upon further review of Public Safety data, it is unclear if certain '0' entries for Main Lot observations (conducted on 11/6/12, 10/4/2011, and 11/1/12) are in fact times when the Main Lot was 100% full or if the lots simply were not surveyed due to time constraints, calls, or other factors. This spreadsheet incorporates the '0' entries thereby giving the most conservative (i.e., highest demand) interpretation of the data.

Campus Wide Parking Demand Summary Spreadsheet - Class Days

Villanova University Selected Parking Lot Inventory - Basketball Event Parking

	Date	1/17/2013		2/7/2012		1/18/2012	
	Time	5:30PM	7:30PM	7:30PM	8:30PM	6:30 PM	7:30 PM
Lot Name	# of Spaces	Empty Parking Spaces					
HSB Upper	84	38	2	27	4	13	5
HSB Lower	89	13	7	34	4	22	2
Law Lot Upper	147	102	116	147	162	171	159
Law Lot Middle	199	104	136	97	135	82	142
Law Lot Lower	197	44	71	28	46	25	121
Law Lot Bottom	64	45	43	31	34	30	10
Law Surface	113	50	38	50	62	51	65
Main East	577	164	23	147	81	200	41
Main West	1,126	385	76	171	204	382	52
Main Visitors	80	42	10	21	22	47	2
Mendel	109	68	78	64	77	0	66
Moriarity	15	12	1	12	11	0	7
SAC Upper	136	83	33	89	49	78	52
SAC Lower	135	109	81	102	79	182	80
SAC Roadway	58	25	30	50	58	28	37
South Campus	281	147	0	0	0	0	0
Garey Hall	109	33	32	0	0	0	45
Total Spaces	3,519	1,464	777	1,070	1,028	1,311	886
Pavilion seat capacity	6,500	Attendance = 6,300		Attendance = 4,332		Attendance = 5,794	

Parking Demand Summary Spreadsheet - Basketball Events

West Campus Parking Turnover Investigation

This spreadsheet provides data regarding traffic counts as well as a table summarizing a sample of 30 vehicles which were randomly selected throughout the West Campus (WC) on-street parking areas and parking lots surrounding the resident housing (vehicles displaying West Campus Resident parking permits). The 30 vehicles were evenly spaced throughout the parking areas to achieve a broad sample. The traffic counts were conducted at the gate house which is the only point of vehicular entry to the campus for WC student residents.

The traffic counts and parked vehicle survey were conducted on Tuesday, 30 April 2013 which was a regular school day for Villanova's campus. The counts were conducted midday as requested by the township traffic engineer. Data collection began at 10:00 AM and ended at 12:00 PM. Although all vehicles entering and exiting were counted at the gate house, only those displaying WR hang tags (West Campus Resident Students) were counted and are shown in the summary of count activity table below. Note the peak hour of the traffic counts was 11:00 AM to 12:00 PM.

The purpose of the study was to investigate parking turnover and so the vehicle survey included documenting license plate prefixes (i.e., the first three characters of a vehicle's license plate) and state (if other than PA) and then monitoring the parknig space associated with each individual vehicle over the two-hour count period to see if there was turnover of the space as requested by the township. A key next to the table explains how this was documented. A summary below the key tabulates the turnover activity. A summary below the table provides data from the traffic counts near the gate house. More information (raw data) from the counts are provided on the next page.

NUMBER	**PREFIX**	*(PA if blank)* **STATE**	**10:00**	*SEE KEY TO LEFT* **10:30**	**11:00**	**11:30**	**12:00**	TURNOVER?
1	196	MA		***V***	***V***	74S		Yes, 1 in
2	HJA							
3	PR3	IL						
4	W11	NJ						
5	456	CT						
6	024	MD						
7	NLE	NJ						
8	DND	NY						
9	AHE	NY						
10	ERB	NY						
11	YCL	NJ						
12	JBS							
13	YBU	NJ						
14	ZRB	NJ			***V***	HGK	***V***	Yes, 1 in 2 out
15	ERT							
16	807	CT						
17	HGC							
18	X10	NJ						
19	HZD							
20	14K	MA						
21	XSS	VA						
22	BHO	TX						
23	GTE							
24	572	MA						
25	JCG							
26	9AT	MD						
27	1DD	MA						
28	GPH			***V***				
29	HTX							
30	YRY	NC						

KEY

1) If vehicle did not move during the count period, cell was left blank. 2) If vehicle left and no vehicle arrived to occupy the vacant space "***V***", is shown. 3) If vehicle left and a different vehicle arrived and occupied the vacant space, the new vehicle's prefix was entered.

SUMMARY

During the peak hour (11:00 - 12:00), there were 2 exiting vehicles and 2 arriving vehicles

PK HR TURNOVER	
IN	*OUT*
2	*2*

The traffic counts at the gate shown the following student resident turnover activity during the peak hour:

IN	*OUT*
30	*23*

F. Tavani and Associates, Inc.
105 Kenilworth Street
Philadelphia, PA 19147

pass given includes those given
access but no phyiscal paper pass

File Name : West Lot_MID
Site Code : 00000003
Start Date : 4/30/2013
Page No : 1

Groups Printed- WR hang tag - VU hang tag - Main hang tag - St Mary/Dundale/Gary hang - pass given - no hang - FH hang tag

	Southbound			
Start Time	ins	outs	App. Total	Int. Total
10:00 AM	10	4	14	14
10:15 AM	8	9	17	17
10:30 AM	7	7	14	14
10:45 AM	5	6	11	11
Total	30	26	56	56
11:00 AM	13	6	19	19
11:15 AM	14	10	24	24
11:30 AM	8	7	15	15
11:45 AM	8	9	17	17
Total	43	32	75	75
Grand Total	73	58	131	131
Apprch %	55.7	44.3		
Total %	55.7	44.3	100	
WR hang tag	50	41	91	91
% WR hang tag	68.5	70.7	69.5	69.5
VU hang tag	1	4	5	5
% VU hang tag	1.4	6.9	3.8	3.8
Main hang tag	5	0	5	5
% Main hang tag	6.8	0	3.8	3.8
St Mary/Dundale/Gary hang	5	0	5	5
% St Mary/Dundale/Gary hang	6.8	0	3.8	3.8
pass given	12	0	12	12
% pass given	16.4	0	9.2	9.2
no hang	0	12	12	12
% no hang	0	20.7	9.2	9.2
FH hang tag	0	1	1	1
% FH hang tag	0	1.7	0.8	0.8

	Southbound			
Start Time	ins	outs	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 11:45 AM - Peak 1 of 1				
Peak Hour for Entire Intersection Begins at 11:00 AM				
11:00 AM	13	6	19	19
11:15 AM	**14**	**10**	**24**	**24**
11:30 AM	8	7	15	15
11:45 AM	8	9	17	17
Total Volume	43	32	75	75
% App. Total	57.3	42.7		
PHF	.768	.800	.781	.781
WR hang tag	30	23	53	53
% WR hang tag	69.8	71.9	70.7	70.7
VU hang tag	1	2	3	3
% VU hang tag	2.3	6.3	4.0	4.0
Main hang tag	2	0	2	2
% Main hang tag	4.7	0	2.7	2.7
St Mary/Dundale/Gary hang	2	0	2	2
% St Mary/Dundale/Gary hang	4.7	0	2.7	2.7
pass given	8	0	8	8
% pass given	18.6	0	10.7	10.7
no hang	0	6	6	6
% no hang	0	18.8	8.0	8.0
FH hang tag	0	1	1	1
% FH hang tag	0	3.1	1.3	1.3