PRINCETON COMMUNITY TRAFFIC STUDY

Task Force Meeting # 4

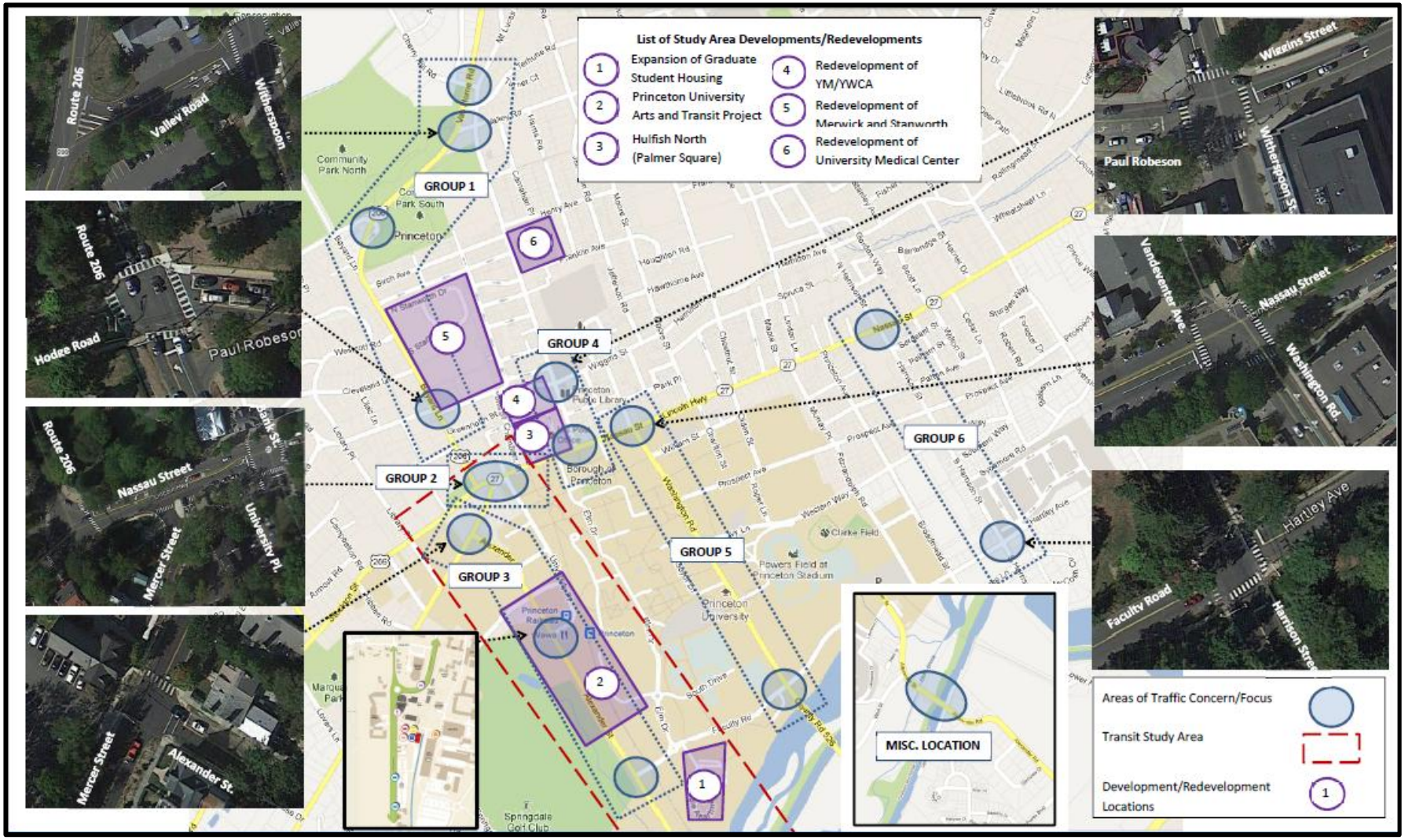
Wednesday, September 25th, 2013

AECOM Agenda

- Brief Overview of Analysis To-Date
- Responses to Task Force Questions
- Basic Traffic Performance Review
- Next Steps

Brief Overview of Scenarios and Analysis To-Date

Locations of Proposed Developments & Traffic Focus Areas



Overview of Travel Demand Modeling Scenarios

Modeled Scenario	= Base Model	+ Network Updates	+ Land Use Updates
1. **2012 Base Condition**	2006 Base Model	• Available 2012 Traffic Count Data • Any roadway improvement projects completed since 2006	• Relocation of the University Medical Center

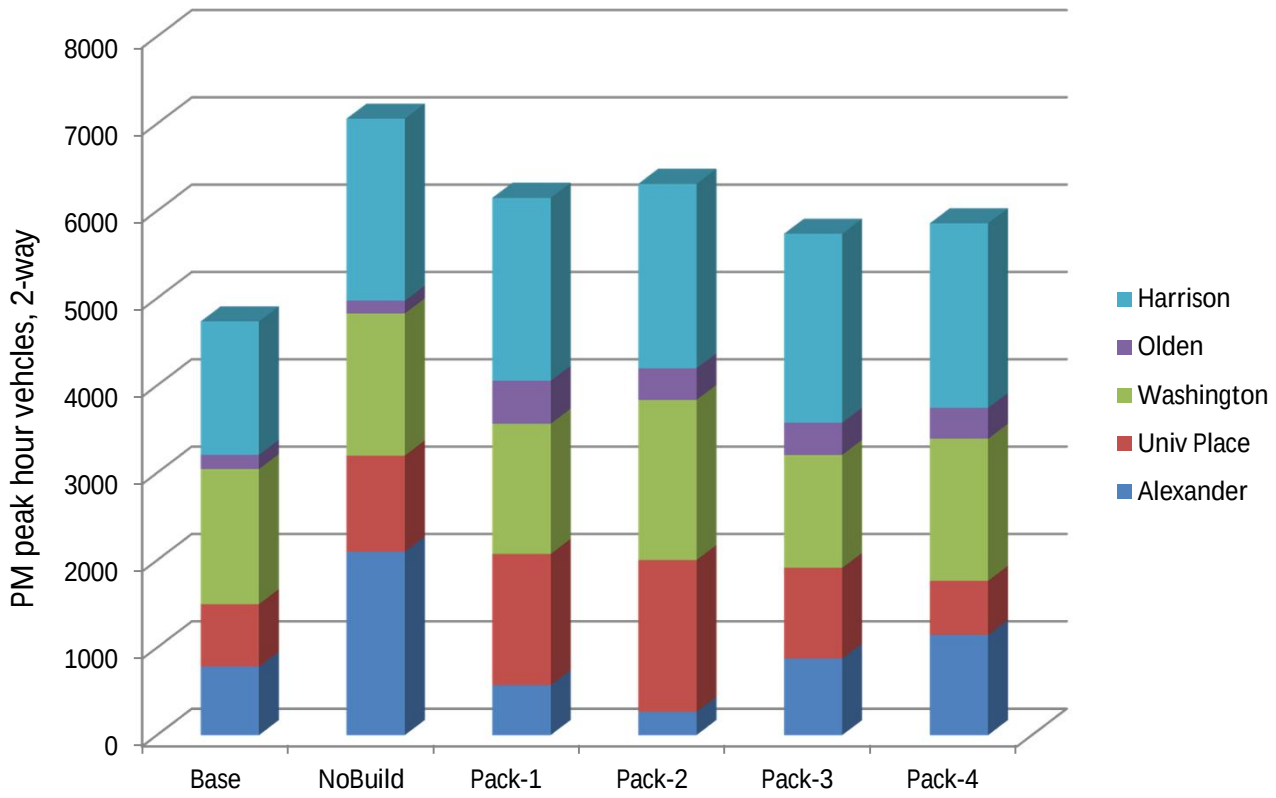
2. **2027 No-Build Condition**	2012 Base Condition	• Roadway improvements related to the Princeton University Arts and Transit Project	• All new developments/redevelopments identified in the RFP
			  ○ Expansion of Graduate Hosing (Hibben-Magie)
			  ○ Princeton University Arts and Transit Project
			  ○ Hulfish North (Palmer Square) Redevelopment
			  ○ Redevelopment of YM/YWCA
			  ○ Redevelopment of Merwick and Stanworth
			  ○ Redevelopment of University Medical Center

3. **Improvement Package 1: Street Closures**	2027 No-Build Condition	• Mercer Street closed in both directions between Alexander Street and Nassau Street • Witherspoon Street closed in both directions between Nassau Street and Spring Street • Left turn from Nassau Street onto Bank Street prohibited	• None: same as in 2027 No-Build Condition
4. **Improvement Package 2: One-way Loop in Clockwise Direction**	2027 No-Build Condition	• Mercer Street one-way in eastbound direction from Alexander Street to Nassau Street • University Place one-way in southbound direction from Nassau Street to Alexander Street • Alexander Street one-way in northbound direction from University Place to Mercer Street • Left turns from Nassau Street on to Bank Street prohibited • Witherspoon Street one-way in northbound direction from Nassau Street to Spring Street • Signal at Nassau Street and Witherspoon Street converted to pedestrian signal only	• None: same as in 2027 No-Build Condition
5. **Improvement Package 3: One-way Loop in Counterclockwise Direction**	2027 No-Build Condition	• Mercer Street one-way in westbound direction from Nassau Street to Alexander Street • University Place one-way in northbound direction from Alexander Street to Nassau Street • Alexander Street one-way in southbound direction from Mercer Street to University Place • Left turns from Nassau Street on to Bank Street prohibited • Witherspoon Street one-way in northbound direction from Nassau Street to Spring Street • Signal at Nassau Street and Witherspoon Street converted to pedestrian signal only	• None: same as in 2027 No-Build Condition

6. **Stand-alone Improvement Run: Either Clockwise or Counterclockwise One-Way Loop**	Either Improvement Package 2 or Improvement Package 3	• Same actions as in either Package 2 or Package 3 except:
		  ○ Replace Witherspoon Street one-way conversion with current two-way operation
		  ○ Fully functional traffic signal at Nassau Street and Witherspoon Street intersection
			• None: same as in 2027 No-Build Condition

TASK FORCE RECOMMENDED AGAINST THIS SCENARIO

Traffic Volume* on North/South Streets at Nassau Street



* PM peak hour vehicles, 2-way

Responses to Task Force Questions

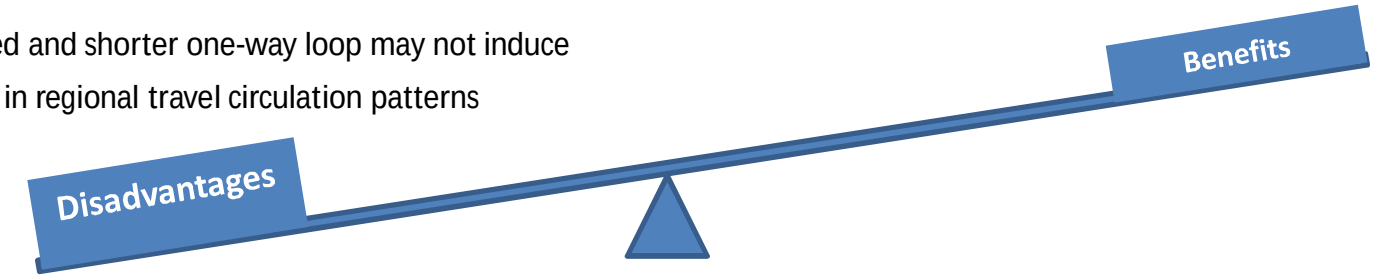
Question # 1: Can one-way loop be modified to use College Road or Dickinson Street?

Disadvantages

- Expected traffic circulation improvements within the core area (Nassau Street between Bayard Lane and University Place) can not be achieved
- Expected performance improvement for the intersection of Mercer Street & Alexander Street can not be achieved
- Potential for a dedicated transit lane on University place is diminished
- Potential for multimodal opportunities is diminished
- May add significant confusion and traffic circling for unfamiliar drivers
- Modified and shorter one-way loop may not induce change in regional travel circulation patterns

Benefits

- Mercer Street remains two-way
- Current access is maintained for parts of Alexander Street and University Place
- No additional traffic volumes on streets connecting Mercer Street and Rt. 206



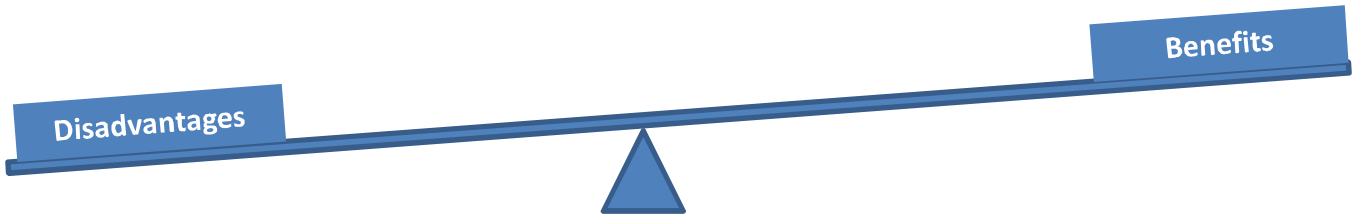
Question # 2: Can two-way traffic be maintained on Mercer Street with one-way loop schemes?

Disadvantages

- Expected traffic circulation improvements within the core area (Nassau Street between Bayard Lane and University Place) are significantly minimized
- Expected performance improvement for the intersection of Mercer Street & Alexander Street can not be achieved
- Potential for multimodal opportunities is diminished

Benefits

- Mercer Street remains two-way
- No additional traffic volumes on streets connecting Mercer Street and Rt. 206



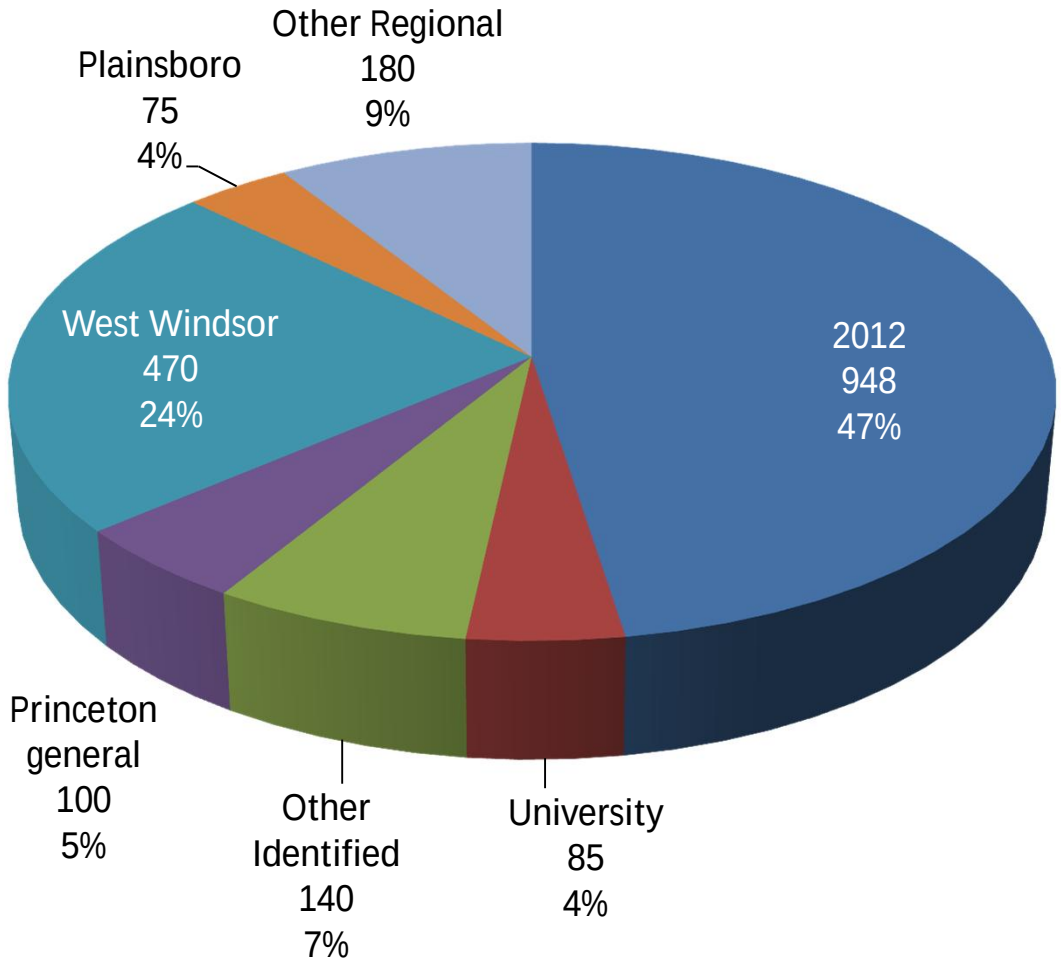
Question # 3: Can one-way loop be reversed in the AM & PM?

- NOT RECOMMENDED
  - Very difficult to implement and enforce
  - Will require complex striping and signing schemes, which will result in driver confusion
  - Will necessitate major signal architecture changes for Nassau Street and University Place intersection
  - Not recommended due to traffic safety issues

Question # 4: Is there a difference between AM and PM peak? Why was PM peak chosen?

- Both peaks were analyzed, only one was presented to simplify the discussion
- PM peak contains more retail and university trips
- AM and PM peaks show similar directional traffic variations

Question # 5: Can the estimated change in traffic volumes be separated into two components – local vs. regional?



All numbers are PM Peak Hour, 2-directional volume on Alexander, north of Faculty Road

-- "2012" is the base year count

-- Other numbers are "No-Build" growth to the year 2027

Question # 6: Would counter-clockwise loop make traffic circulation easier?

Clockwise Loop Benefits and Disadvantages

- Significant traffic performance improvement potential for the core area (Nassau Street between Bayard Lane and University Place)
- Potential for multimodal opportunities
- Opportunity for dedicated transit lane
- All right turn movements – easier from circulation point of view
- Better circulation benefits during PM peak vs. AM peak
- Significant performance deterioration likely at the proposed new roundabout at University & Alexander
- Reduces redundancy (conversion of 2 two-way streets into single one-way loop)

Counter-Clockwise Loop Benefits and Disadvantages

- Significant traffic performance improvement at the proposed new roundabout at University Place and Alexander Street
- Potential for multimodal opportunities
- Opportunity for dedicated transit lane
- All left turn movements – need to yield to major opposing flows on Nassau Street
- Better circulation benefits during AM peak vs. PM peak
- Significant performance impact on Nassau Street core area (between Bayard Lane and University Place)
- Reduces redundancy (conversion of 2 two-way streets into single one-way loop)

Question # 7: What will be the impacts of future transit options on peak hour traffic?

- Not Assessed as a part of this study
  - Depends on the type of transit option selected
  - Depends on the capacity of the selected transit option
  - Depends on the final alignment for the selected transit option
  - Depends on the frequency and schedule of operation
  - Depends on the overall travel time and attractiveness of transit option
  - Depends on the proportion of local traffic (which may use transit) vs. regional traffic (will not use local transit)

  - *However the experience is, unless a transit option is connecting very high density and complementary generation-attraction nodes, the likely mode share for transit will not have significant impacts on vehicular traffic mode and performance*

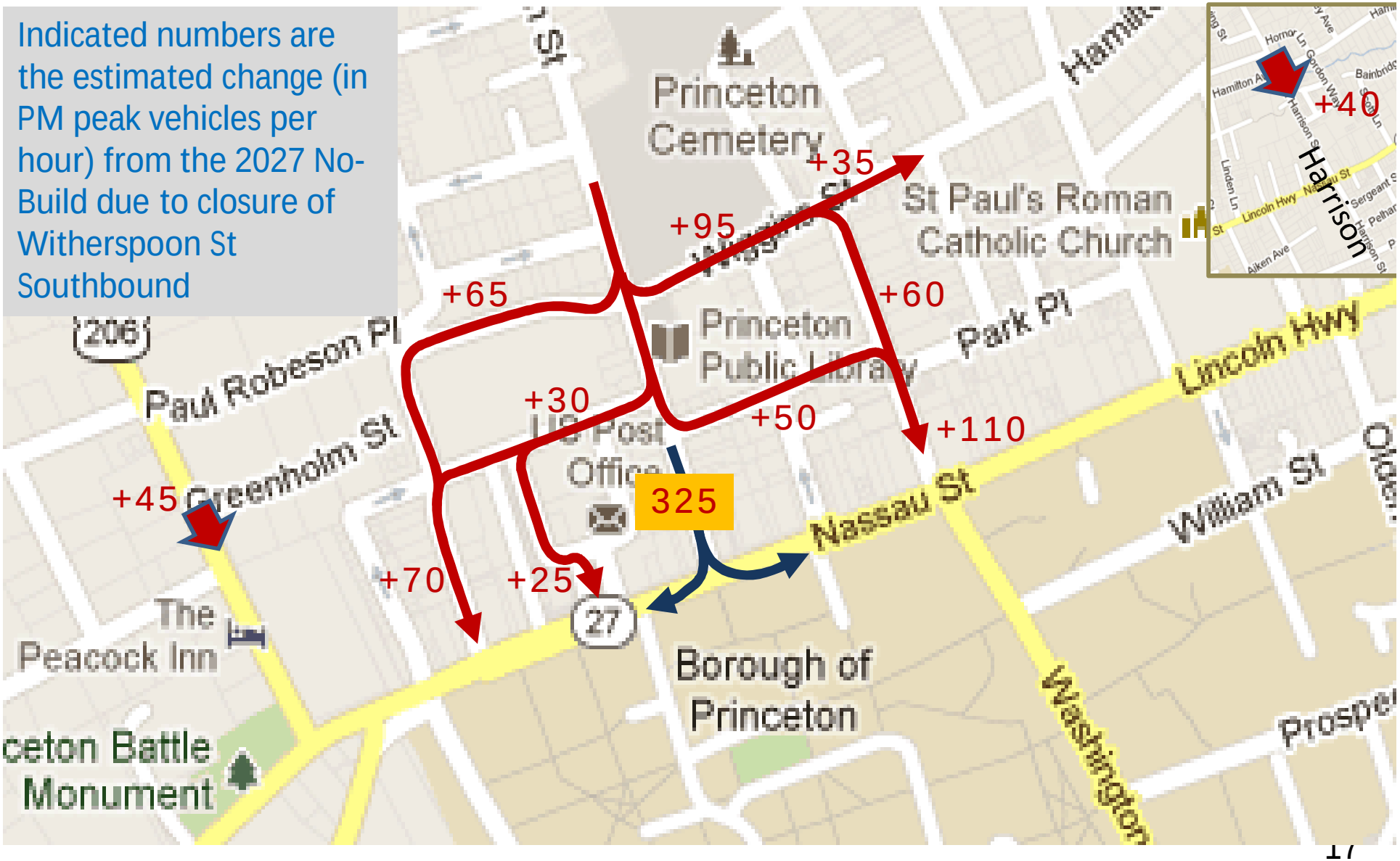
Witherspoon Street
Basic One-way Circulation Review

TRAFFIC VOLUME CHANGE: Close Witherspoon Southbound (AM)

Indicated numbers are the estimated change (in AM peak vehicles per hour) from the 2027 No-Build due to closure of Witherspoon St Southbound

TRAFFIC VOLUME CHANGE: Close Witherspoon Southbound (PM)

Indicated numbers are the estimated change (in PM peak vehicles per hour) from the 2027 No-Build due to closure of Witherspoon St Southbound



Basic Traffic Performance Review

Updated Land Use and Development Assumptions

- At the June 19 Task Force meeting, land use assumptions were adjusted slightly for the YM/YWCA and the Merwick Stanworth sites. Net traffic volume differences were minimal:

				AM		PM	
	TAZ			In	Out	In	Out
Hulfish North (Palmer Square)	747	97	TH	9	41	41	22
University Med Center Redevelopment	716	280	apt	26	118	118	64
YM/YWCA Redevelopment							
Prior (6/19/13)	749	150	TH	14	63	63	34
Revised (9/3/13)	749						
- YMCA remains				10	10	50	50
- Child care remains				30	30	20	20
- Residential @ 14 du/ac @ 10 acres		140	TH	13	59	59	32
Merewick / Stanworth Graduate Housing							
Prior (6/19/13)	706	326	apt	30	138	138	74
Revised (9/3/13)	706						
- Existing to remain		154	apt	(14)	(65)	(65)	(35)
- Additional units (to 326 total)		172	apt	16	73	73	39
Hibben Magie Graduate Housing	610	329	du	23	12	21	21
University Arts & Transit							
Relocated Employees (West Garage)	600			24	0	0	20
New Employees (Lots 32, 33)	694	55	Spaces	25	2	2	23
Restaurant / Café	601	10	ksf	79	82	31	31
ORIGINAL				230	456	415	288
REVISED				255	427	415	321
Difference				-5		33	

Negligible Change

Basic Traffic Performance Analysis

- What? – AM and PM Peak hour key intersection performance using baseline traffic count, geometry and intersection control information from the Princeton Arts and Transit project model
- Why? – To understand intersection operation and queue length impacts related to various proposed improvement packages
- How? – Using Synchro and SimTraffic simulation modeling

AM Peak Hour – LOS and Delay Comparisons (Note: Effects of queuing not reflected)

		AM Peak Hour											
Intersection	Control	2017 Baseline Analysis		2017 Mercer Closed Analysis		2017 Alexander & University Clockwise One-way Loop Analysis		2017 Alexander & University Clockwise One-way Loop Updated* Analysis		2017 Alexander & University Counterclockwise One-way Loop Analysis		2017 Alexander & University Counterclockwise One-way Loop Updated** Analysis	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
NASSAU CORE AREA													
Nassau & Bayard	Signal	D	49.6	C	27.1	C	28.7	C	29.0	D	39.5	D	39.5
Nassau & Mercer	Stop	F	80.5	-	-	F	216.3	C	24.9	C	19.4	C	15.5
Nassau & University	Signal	C	21.7	B	14.5	A	8.4	C	24.6	C	20.5	B	12.8
ALEXANDER CORRIDOR													
Alexander & Mercer	Stop	F	434.9	A	-	D	34.4	D	34.4	A	-	A	-
Alexander & College	Stop	D	34.6	C	17.8	B	11.8	B	11.8	E	39.9	E	39.9
Alexander & University	Roundabout	C	-	D	-	F	-	F	-	A	-	A	-

*Signal shifted from Nassau/University to Nassau/Mercer

** University Place to Mercer Street flows bypass Nassau Street

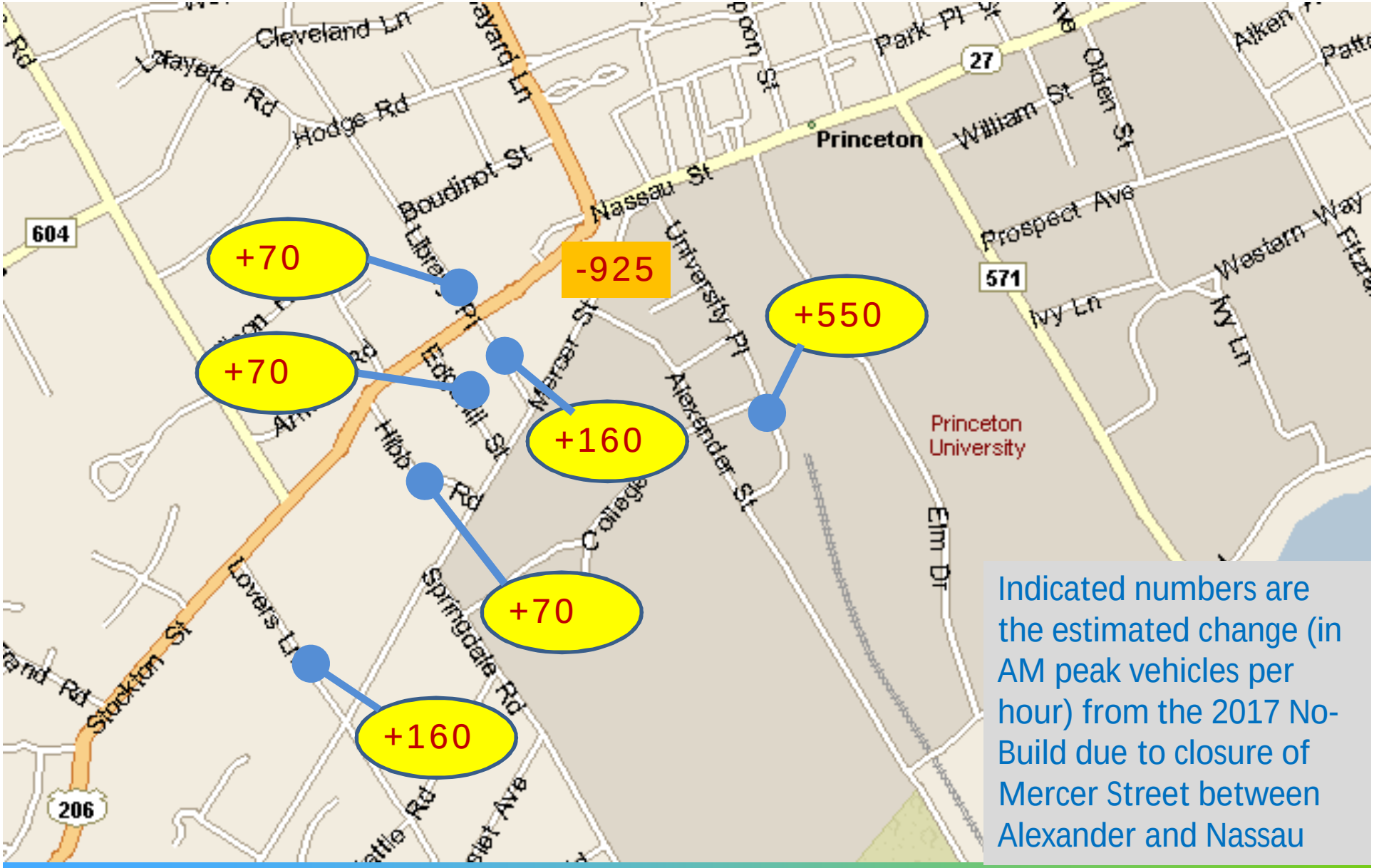
PM Peak Hour – LOS and Delay Comparisons (Note: Effects of queuing not reflected)

		PM Peak Hour													
Intersection	Control	2017 Baseline Analysis			2017 Mercer Closed Analysis			2017 Alexander & University Clockwise One-way Loop Analysis		2017 Alexander & University Clockwise One-way Loop Updated* Analysis			2017 Alexander & University Counterclockwise One-way Loop Analysis		2017 Alexander & University Counterclockwise One-way Loop Updated** Analysis	
		LOS	Delay		LOS	Delay		LOS	Delay	LOS	Delay		LOS	Delay	LOS	Delay
NASSAU CORE AREA																
Nassau & Bayard	Signal	C	28.2		C	28.8		C	20.2	B	17.6		C	32	C	32
Nassau & Mercer	Stop	F	1031.3		-	-		C	20.1	B	14		D	30.3	C	16.3
Nassau & University	Signal	B	15.4		B	18.4		A	3.2	B	12.5		C	27.1	C	28.1
ALEXANDER CORRIDOR																
Alexander & Mercer	Stop	F	600.4		A	-		C	16.4	C	16.4		A	-	A	-
Alexander & College	Stop	E	36.6		C	22.9		E	45.7	E	45.7		D	30.5	D	30.5
Alexander & University	Roundabout	B	-		C	-		D	-	D	-		A	-	A	-

*Signal shifted from Nassau/University to Nassau/Mercer

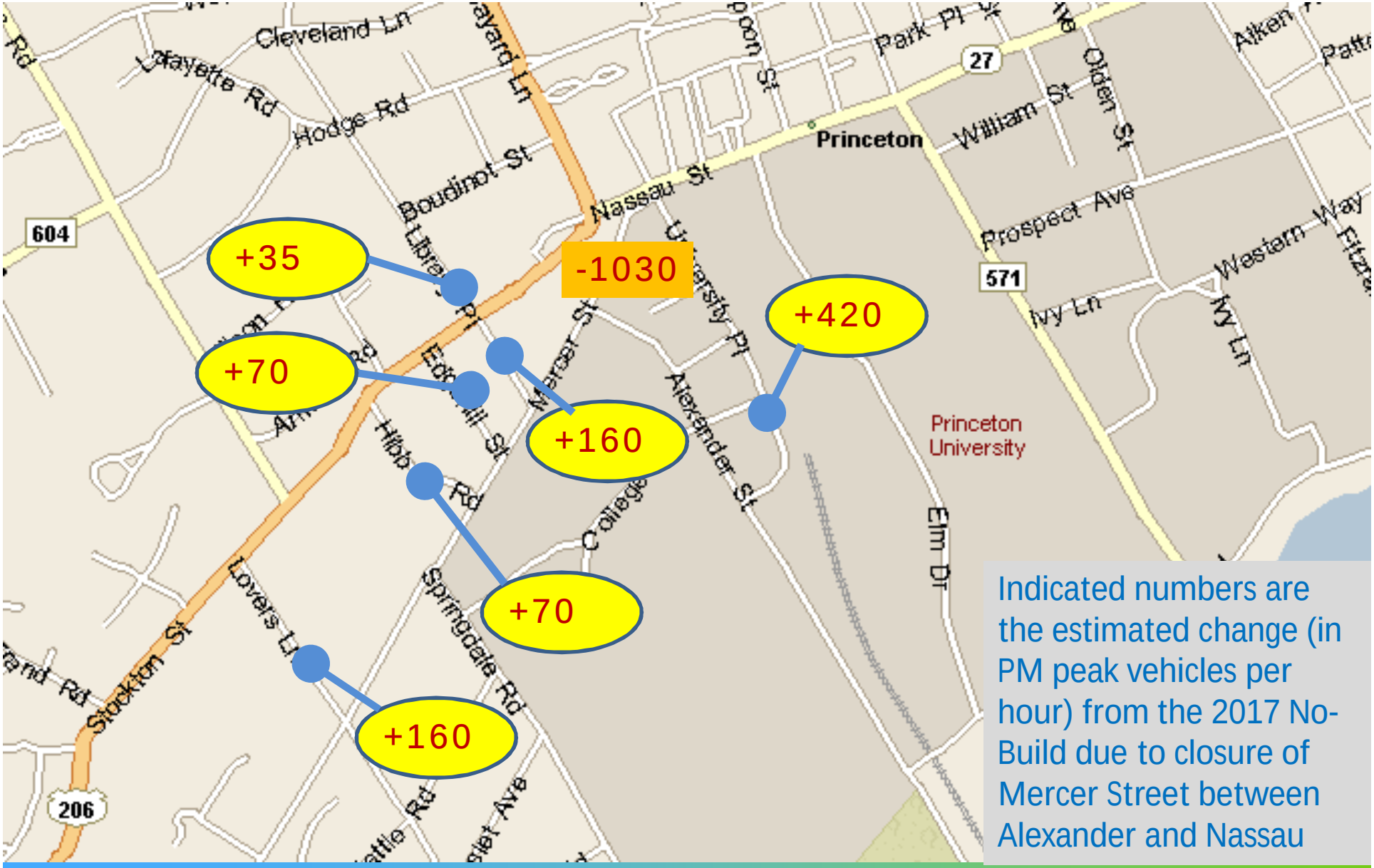
** University Place to Mercer Street flows bypass Nassau Street

TRAFFIC VOLUME CHANGE: Close Mercer Street (AM)



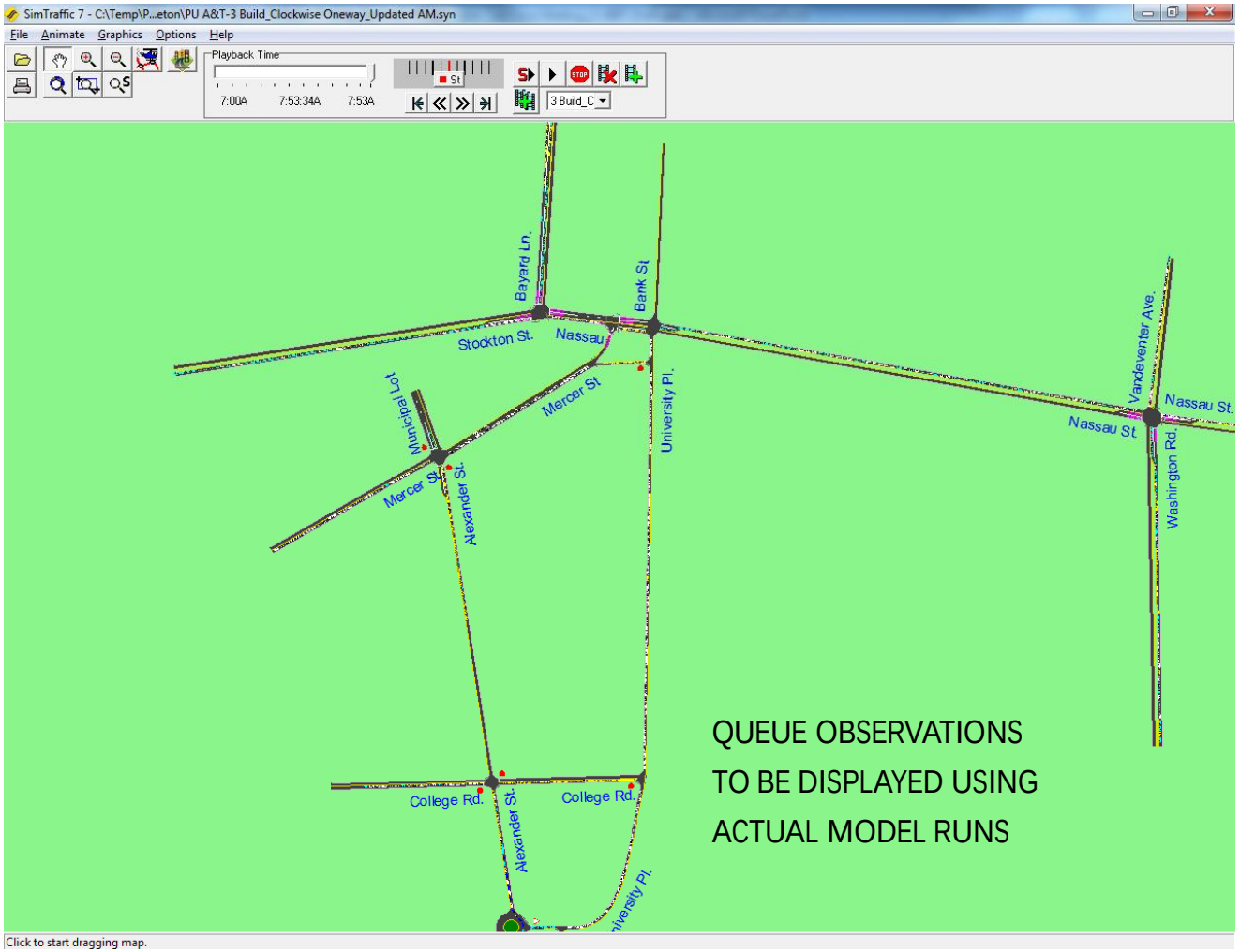
Indicated numbers are the estimated change (in AM peak vehicles per hour) from the 2017 No-Build due to closure of Mercer Street between Alexander and Nassau

TRAFFIC VOLUME CHANGE: Close Mercer Street (PM)



Indicated numbers are the estimated change (in PM peak vehicles per hour) from the 2017 No-Build due to closure of Mercer Street between Alexander and Nassau

AM & PM Peak Hour – SimTraffic Queue Observations



Discussion/Questions