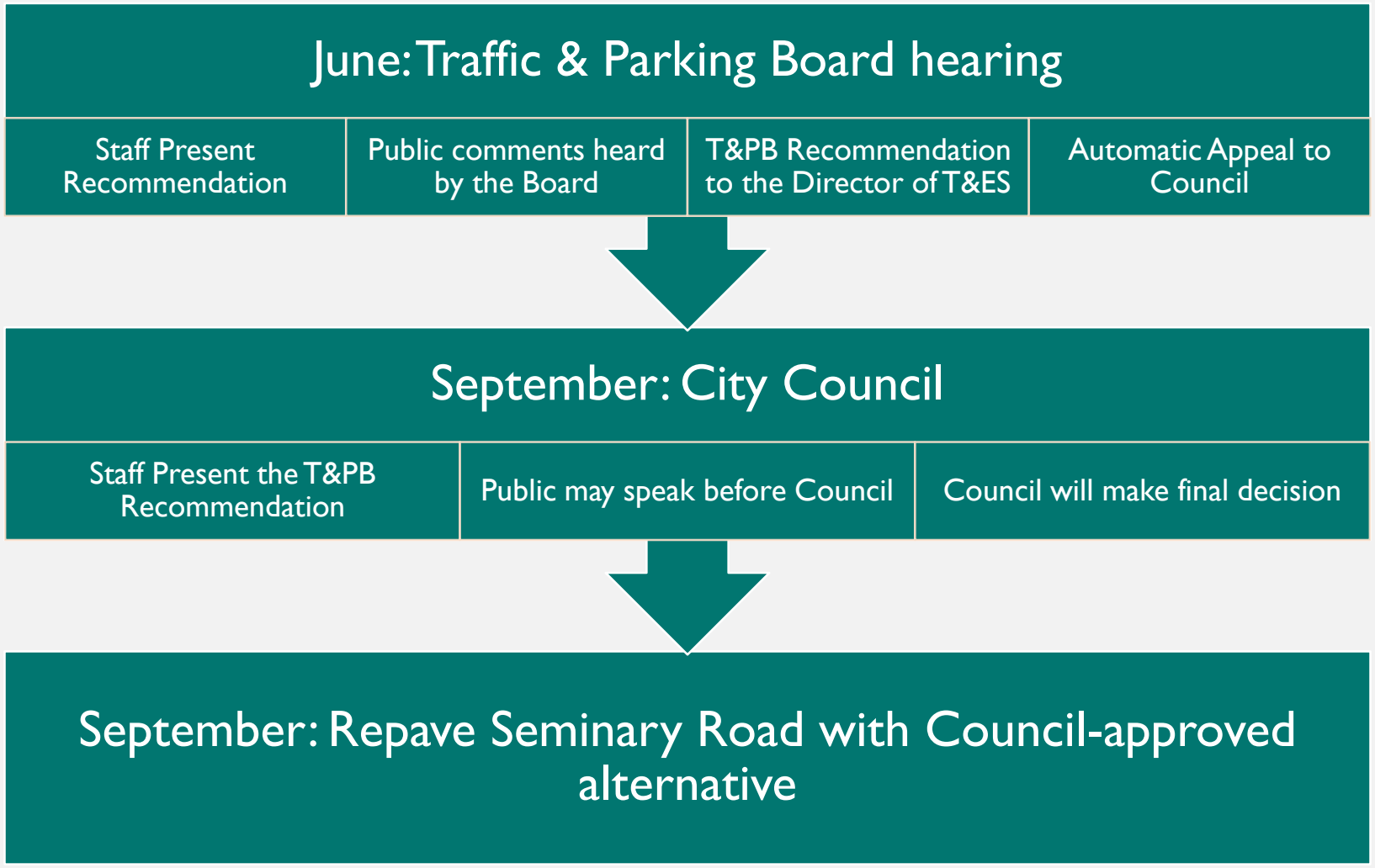
Seminary Road
Complete Streets Project

T&PB PROJECT REVIEW/RECOMMENDATION

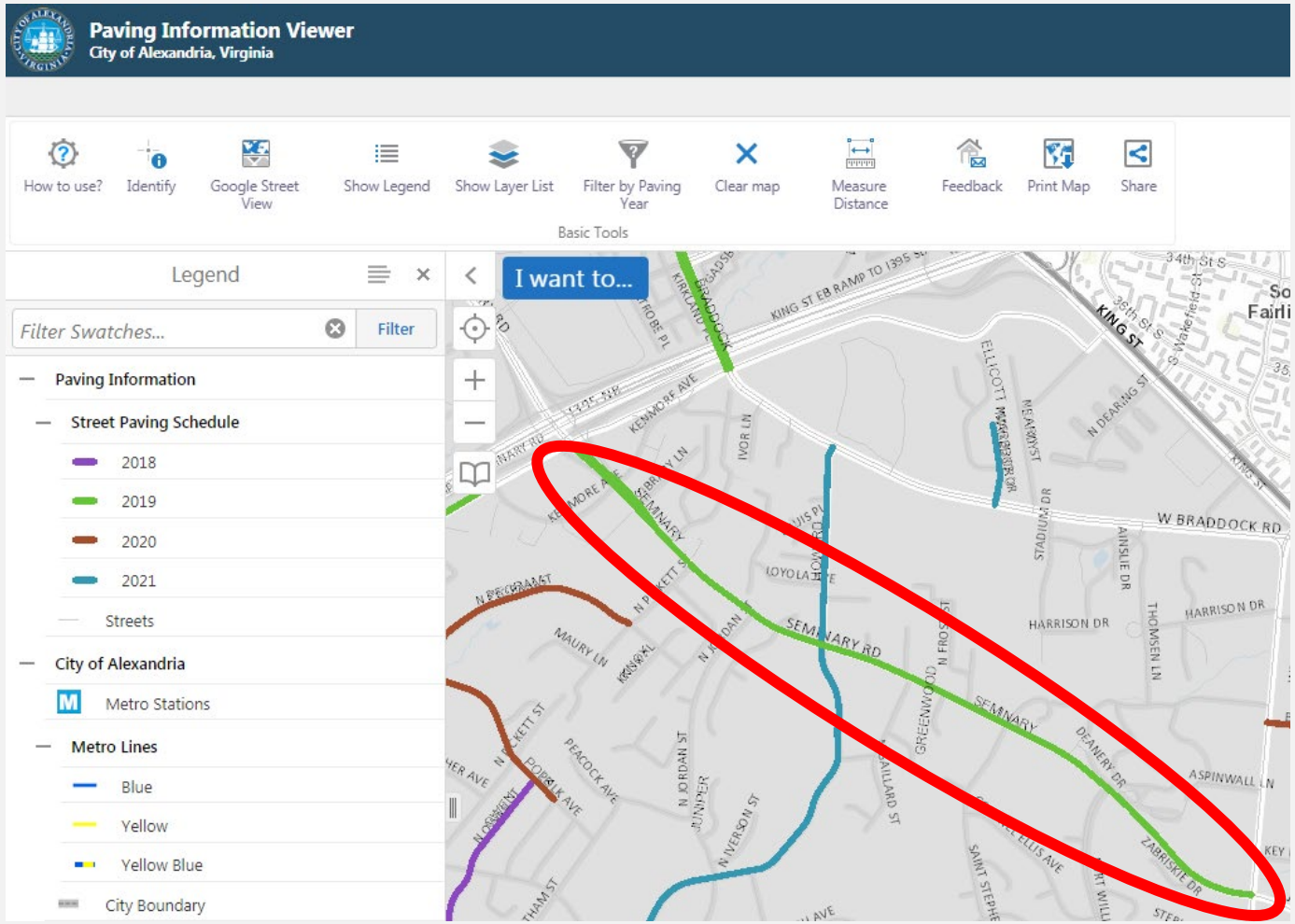
- Review Staff Recommendation concept, data analysis, and traffic modeling result
  - Staff seeking approval for:
    - Lane reduction for sidewalk segment
    - HAWK Signals at two crossings

- Technical recommendation to the Director of T&ES reflecting Board's Charter and Council-adopted plans and policies
  - Sec. 5-8-2 - Purpose—Generally. The *traffic and parking board* shall consider matters concerning substantial changes to *traffic and* on-street *parking* regulations, *and* taxicabs. When reviewing these matters, the *board* shall prioritize safety of all users when making recommendations.
- Director of T&ES waives the appeal process for an automatic appeal to Council

PROJECT PROCESS: TODAY THROUGH IMPLEMENTATION



PROJECT PURPOSE



- 2019 resurfacing schedule
  - City's Complete Streets Policy:
    - Opportunity to evaluate roadway design changes in coordination with repaving
- Consider improvements at minimal cost
- Potential pedestrian and bicycle facilities identified in Pedestrian & Bicycle Master Plan
- Neighborhood requests for better walking conditions

PROJECT OBJECTIVES

Reduce crashes on the corridor

Improve mobility, safety, and access for all roadway users

Provide continuous, safe, and comfortable places for people to walk

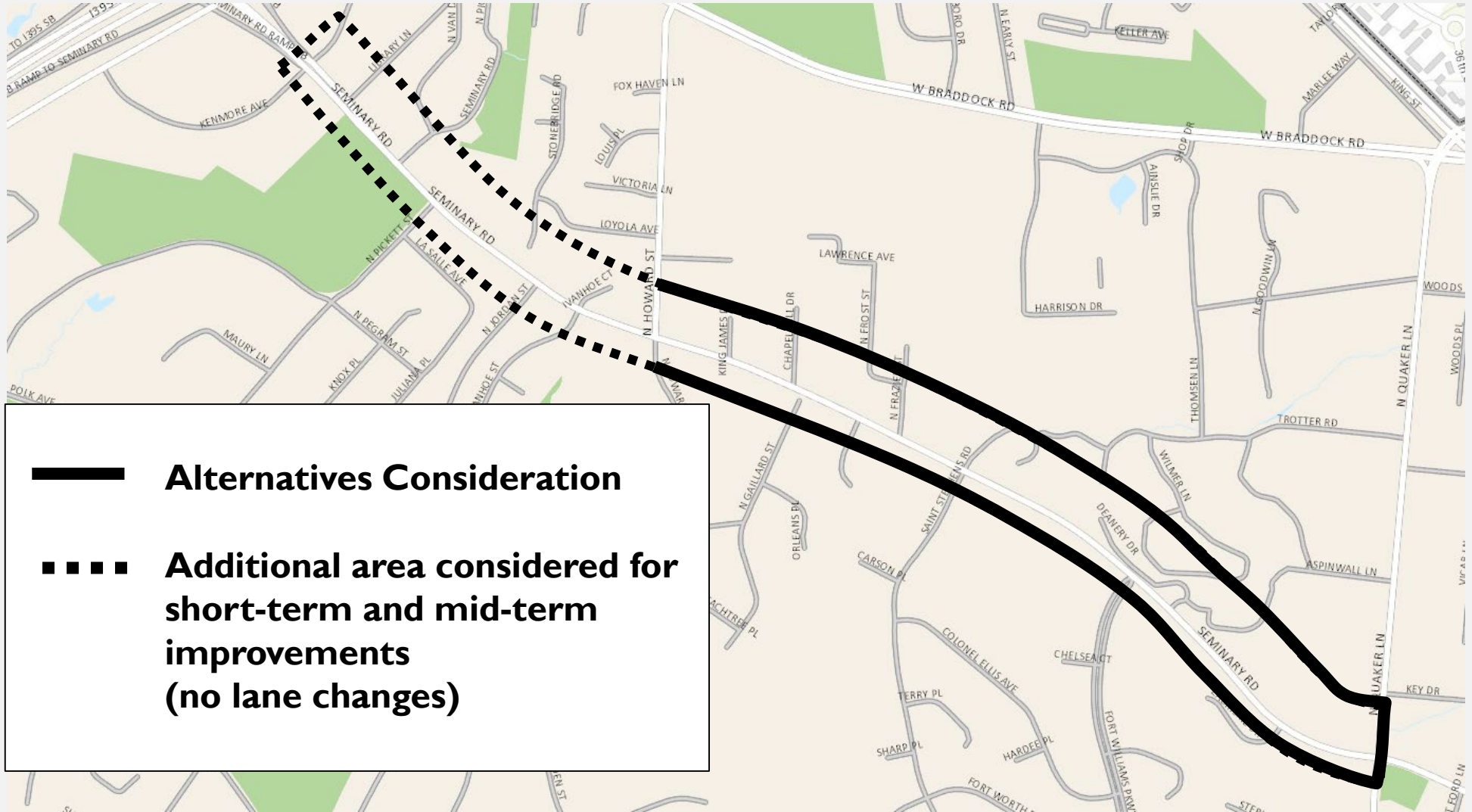
Provide more frequent and safer crossing opportunities along the corridor

Minimize delay at intersections, and encourage speed limit compliance

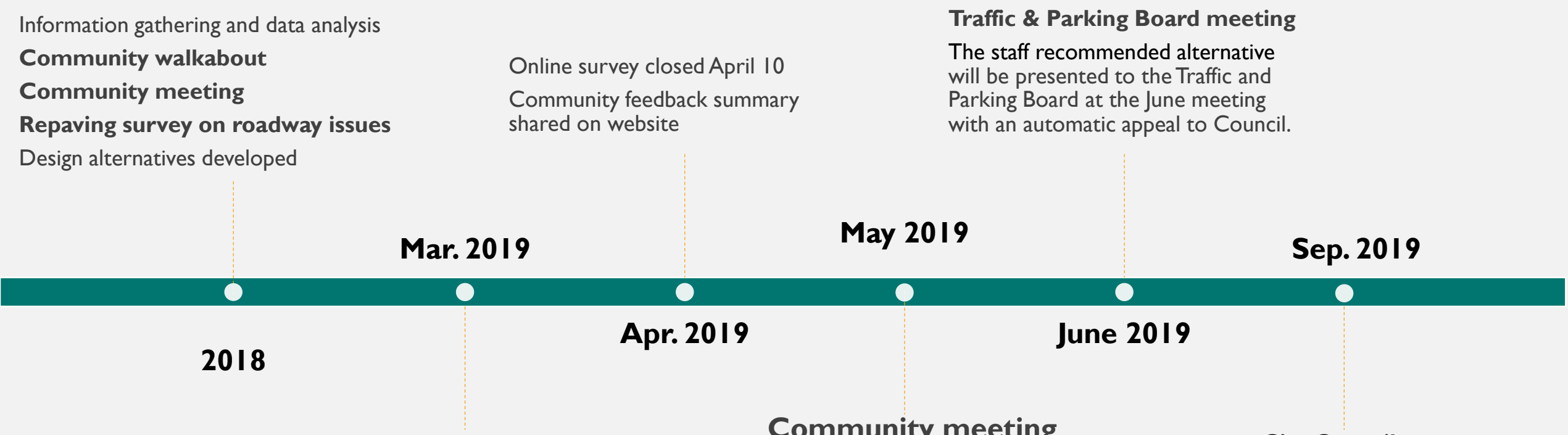
Where excess roadway capacity exists, explore opportunities to reconfigure the corridor to better serve all modes

- Developed as a result of:
  - Public input
  - Plans
  - Policies
  - Data

STUDY AREA


SEMINARY RD
W BRADDOCK RD
KENMORE AVE
FOX HAVEN LN
VICTORIA LN
LOYOLA AVE
LAWRENCE AVE
HARRISON DR
N HOWARD ST
N FROST ST
N QUAKER LN
TROTTER RD
DEANERY DR
ASPINWALL LN
CHELSEA CT
COLONEL ELLIS AVE
TERRY PL
SHARP PL
HARDEE PL
KEY DR
WOODS PL
THOMSEN LN
WILMER LN
N GAILLARD ST
ORLEANS PL
CARSON PL
MAURY LN
POLK AVE
KNOX PL
N PEGRAM ST
N PICKETT ST
LA SALLE AVE
IVANHOE CT
STONEBRIDGE RD
AIRLIE DR
KING ST
MARLEE WAY
KELLER AVE
Alternatives Consideration
Additional area considered for short-term and mid-term improvements
(no lane changes)

PROJECT PROCESS



INFORMATION GATHERING – MAY 2018

- Gathered and synthesized comments from other recent outreach
  - (Repaving Survey, CATS, Vision Zero Safety Map, Pedestrian Bike Master Plan Wikimap)
- Gathered data on corridor safety, speeds, volumes, etc.
- Determined draft project objectives
- Corridor walk in Early May
- Public meeting May 29, 2018
  - Information and data showing existing conditions and recent history of data and comments
  - Presented potential improvement ideas and asked for others

INFORMATION TO ALTERNATIVES

- October 2018
  - Prepared for Public Meeting in October 2018,
    - On hold because of I-395 HOT lane project
  - Alternatives and preliminary information posted on webpage
- January 2019
  - Need to pave, decision to restart, and reduction of scope
- **March 2019**
  - **Public Meeting - three alternatives with minor changes and scope reduction**

ALTERNATIVE 1

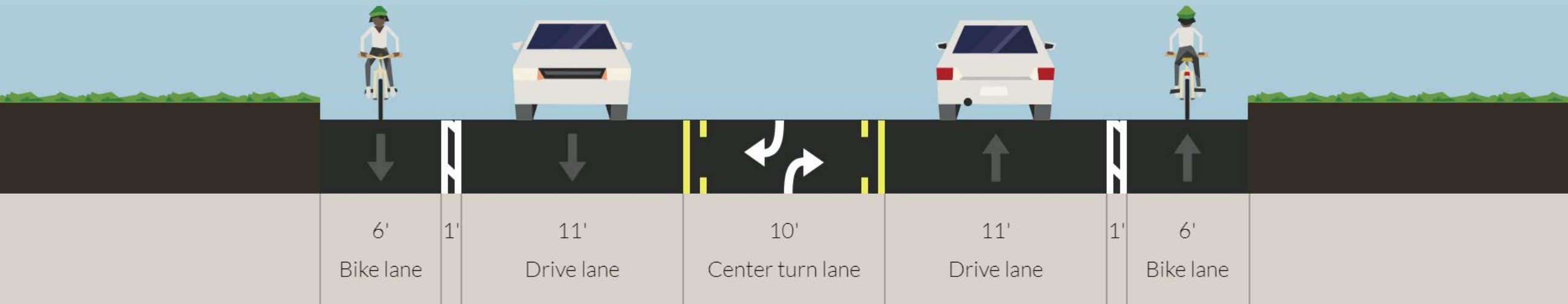
- Maintain two through-lanes in each direction
- Upgrade and add new crosswalks where feasible
- Narrow lanes slightly to discourage speeding

ALTERNATIVE 2

- Maintain two through-lanes in the heavier westbound direction
- Install some new crosswalks where safe and feasible
- Bike lanes or sidewalk buffer possible

ALTERNATIVE 3

- One through-lane in each direction
- Center turn lanes for intersections and driveways
- Install new crosswalks with planted median islands
- Buffered bike lanes



WHY CONSIDER A ROAD DIET?

- Federal guidance gives criteria for whether road diets are possible in certain circumstances, recognizing where they are and are not possible:
  - https://safety.fhwa.dot.gov/road_diets/guidance/info_guide/
- Reducing the number of lanes and introducing a buffer for the sidewalk improves conditions for people walking and trying to cross the roadway

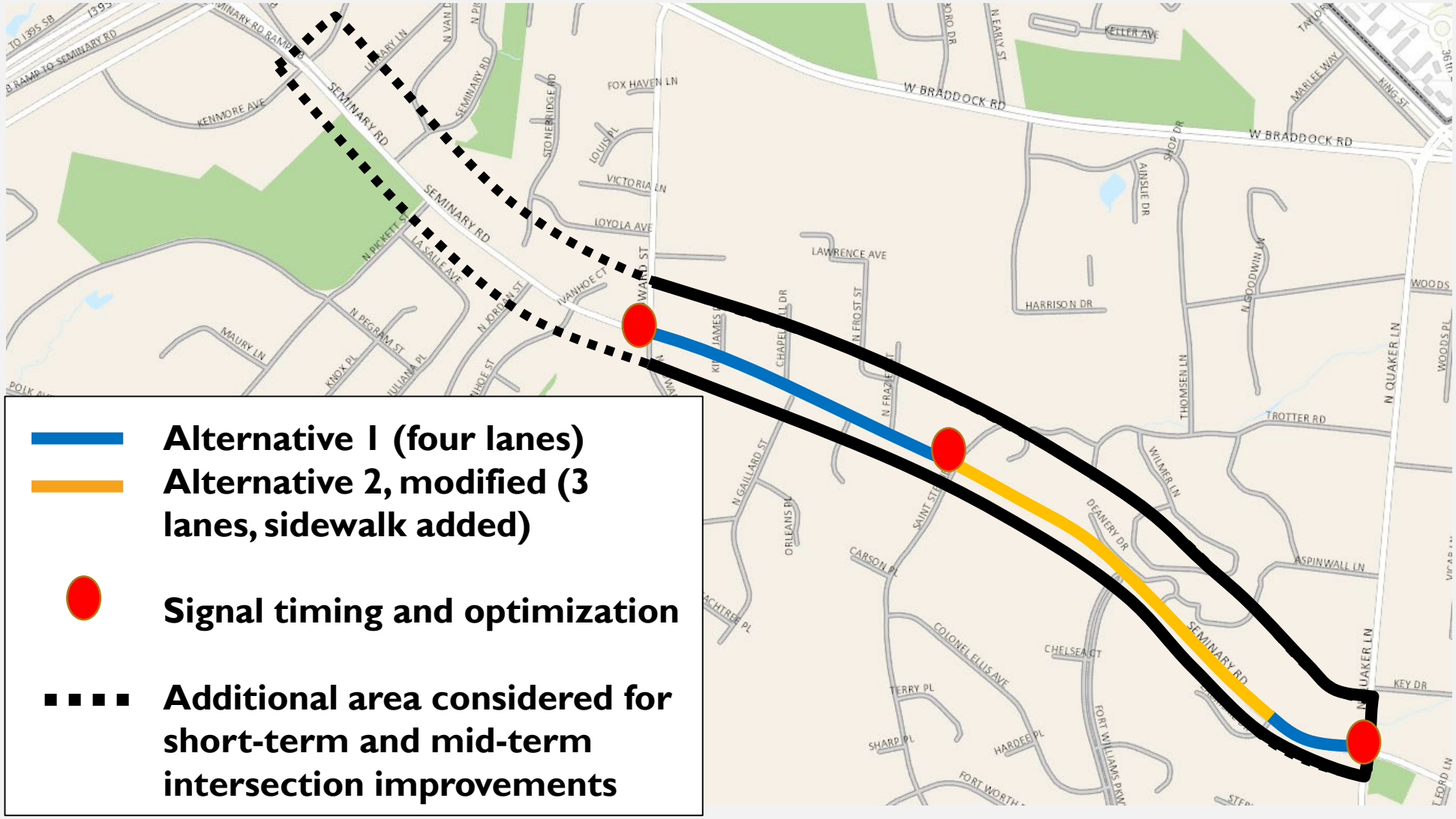
< 10,000 Average Daily Traffic (ADT)	10,000-15,000 ADT	15,000-20,000 ADT	>20,000 ADT
Great candidate for Road Diets in most instances. Capacity will most likely not be affected.	Good candidate for Road Diets in many instances. Agencies should conduct intersection analysis and consider signal retiming to determine any effect on capacity.	Good candidate for Road Diets in some instances. Agencies should conduct a corridor analysis. Capacity may be affected at this volume depending on the "before" condition.	Agencies should complete a feasibility study to determine whether this is a good location for a Road Diet. There are several examples across the country where Road Diets have been successful with ADTs as high as 26,000. Capacity may be affected at this volume.

Seminary Road
(from Quaker to Howard)
15,900-18,600 ADT

ALTERNATIVES TO STAFF RECOMMENDATION

- March/April 2019
  - Two-week comment period on alternatives
  - Online content, narrated presentation, online feedback
  - Main feedback:
    - Strong opinions for Alternatives 1 and 3
    - Crossing
    - Sidewalk Gap
    - Speeding
- April/May 2019
  - Follow-up stakeholder meetings with civic associations, institutional stakeholders, and residents
  - Sketched/showed potential ideas and discussed their ideas

STAFF RECOMMENDATION



Alternative 1 (four lanes)

Alternative 2, modified (3 lanes, sidewalk added)

Signal timing and optimization

Additional area considered for short-term and mid-term intersection improvements

HOWARD TO ST. STEPHENS RD

- Maintain two through-lanes in the areas of heavier traffic (ADT is 18,600)
- Install crossing at Chapel Hill/Galliard
  - HAWK signal for bus stops
- Shared curbside lanes - people biking can take the lane

HOWARD TO ST. STEPHENS DATA

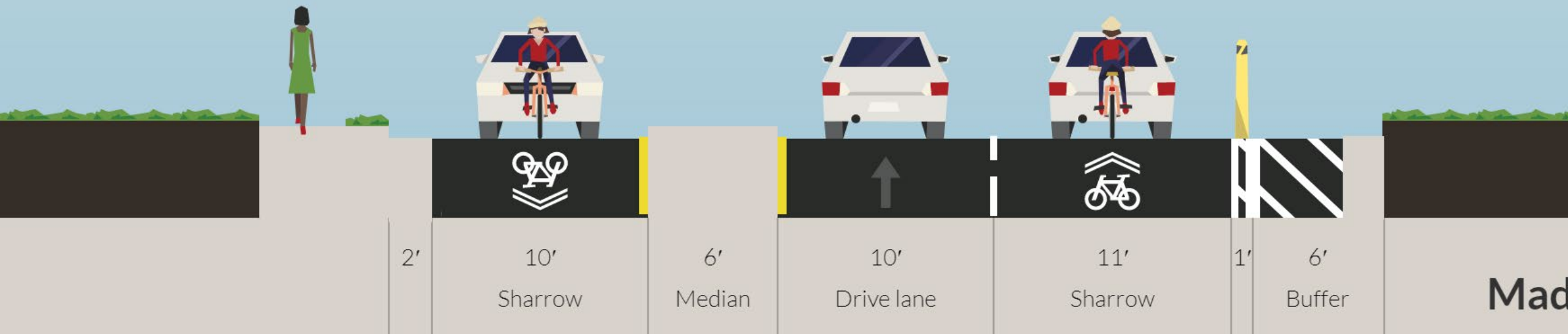
		EXISTING	Staff Recommendation	
Intersection	**Time of Day**	**Delay (sec)**	**Delay (sec)**	**Change (sec)**
N Howard St & Seminary Rd	AM	28.6	*30*	**+1.4**
	PM	28.8	*29.5*	**+0.7**
St. Stephens Rd & Seminary Rd	AM	8.2	*8.6*	**+0.4**
	PM	6.3	*5.3*	**-1**

ST. STEPHENS TO ZABRISKIE

- Two westbound lanes to accommodate peak direction, peak period traffic volumes. (WB in AM peak hour St. Stephens to Howard sees 1,104 vehicles)
- Install new crosswalks with median islands at bus stops
- Buffer on north side to fill sidewalk gap
- Buffer on south side for pedestrians, occasional event parking
- Shared curbside lanes – people biking can take the lane

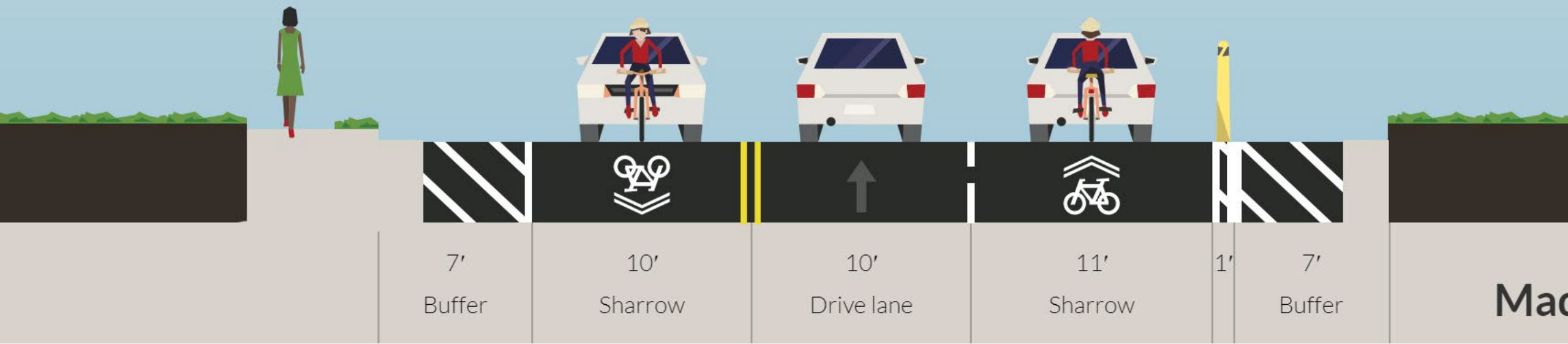
ST. STEPHENS TO ZABRISKIE - CROSSING

- Same lane configuration
- Median proposed with Rectangular Rapid Flash Beacons (RRFBs)
- Buffer on north side to fill sidewalk gap
- Shared curbside lanes- people biking can take the lane



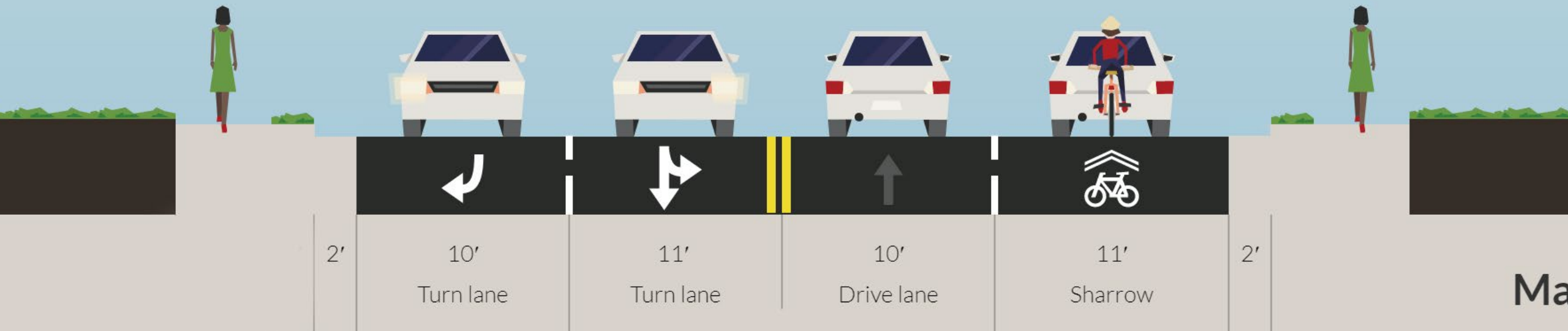
ST. STEPHENS TO ZABRISKIE DATA

		EXISTING	Staff Recommendation	
Intersection	**Time of Day**	**Delay (sec)**	**Delay (sec)**	**Change (sec)**
St. Stephens Rd & Seminary Rd	AM	8.2	8.6	**+0.4**
	PM	6.3	5.3	**-1**
N Quaker Ln & Seminary Rd	AM	76.5	62.3	**-14.2**
	PM	57.6	43.2	**-14.4**



ZABRISKIE TO QUAKER

- Maintain four travel lanes
- Convert eastbound lanes
  - Through/right and left-only to right-only and through/left
- All-walk phase converted to LPI and No Turn on Red



SIDEWALK INFORMATION

- Short term – 1-3 years
  - Painted sidewalk with separation
    - Flexposts, bumpers, etc.
  - Opportunity to watch change over time

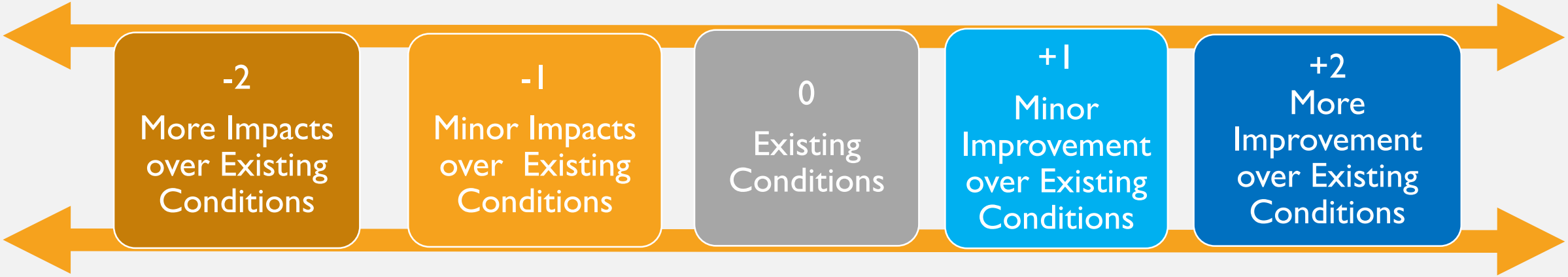
- Long Term – 3-5 years*
  - Seek grant funding now to build sidewalk
  - Cost could be up to $1.5 Million

* Dependent on funding

SIGNAL TIMING IMPROVEMENTS

- Coordinate all signals along the corridor to mitigate queuing concerns
  - St. Stephens Road signal to be coordinated with Quaker and Howard
- Optimize signals
  - Adjust timing to mitigate queueing
- Implement LPIs and No Turn on Red Restrictions at Quaker Lane and Howard Street

SCORING



Scores were determined both with qualitative and quantitative considerations dependent on the project objective category. For example, scoring for vehicular delay broke down as follows:

"Existing conditions" was considered to be within + or – 5 seconds overall alternative delay

"Minor improvement" was considered to be an overall reduction in intersection delay on the corridor between 5-15 seconds

"More improvement" were considered as greater than an overall reduction in delay on the corridor over 15 seconds

"Minor impacts" was considered as 5-15 seconds more of overall intersection delay

"More impacts" was considered as over 15 seconds of overall intersection delay across the corridor

For quantitative scores like pedestrian safety and comfort, staff determined the level of protection over or under existing conditions that each alternative presented with alternatives featuring more protection or buffer from vehicles scoring better than those without. Other scores are described below in detail.

DESIGN ALTERNATIVES

PERFORMANCE INDICATORS

	ALTERNATIVE 1 (4 lanes with minor changes)	ALTERNATIVE 2 (1 eastbound, 2 westbound lanes)	ALTERNATIVE 3 (1 eastbound, 1 westbound, 1 turn lane)	STAFF RECOMMENDATION
PEDESTRIAN SAFETY/COMFORT	0	+1	+2	+1
FILLING THE SIDEWALK GAP	0	+1	+1	+2
CONTROLLING SPEED	0	+1	+2	0
PREVENTING CRASHES	0	+1	+2	+1
MINIMIZING VEHICLE DELAY	+2	+1	+1	+2
ACCOMMODATING VEHICLE VOLUMES	+2	0	0	+2
ADJACENT RESIDENT LIVABILITY	0	+1	+1	+1
BICYCLIST SAFETY/COMFORT	0	+1	+2	0
Totals (max score +16, min score -16	+4	+7	+11	+9

DELAY COMPARISON OF ALTERNATIVES

The numbers below are the traffic model's results showing the average seconds of delay and changes under each alternative for the average day in **worst 15 minutes in the peak periods** (morning and evening rush).

		EXISTING	Alternative 1	Alternative 2	Alternative 3	Staff Recommendation
Intersection	**Peak Time**	**Delay (sec)**	**Change (sec)**	**Change (sec)**	**Change (sec)**	**Change (sec)**
N Howard St & Seminary Rd	AM	28.6	*0.0*	**+3.9**	**+6**	**+1.4**
	PM	28.8	*0.0*	**-2**	**-3.4**	**+0.7**
St. Stephens Rd & Seminary Rd	AM	8.2	*0.0*	**+4.6**	**+7.6**	**+0.4**
	PM	6.3	*0.0*	**-0.5**	**-0.3**	**-1**
N Quaker Ln & Seminary Rd	AM	76.5	*0.0*	**-11.4**	**-14.5**	**-14.2**
	PM	57.6	*0.0*	**-19.5**	**-13.4**	**-14.4**

Note: Adjustments were made to the traffic model to optimize the signals and coordinate them across the corridor segment for all alternatives. This allows traffic to flow better and to reduce delays at intersections with north-south streets.

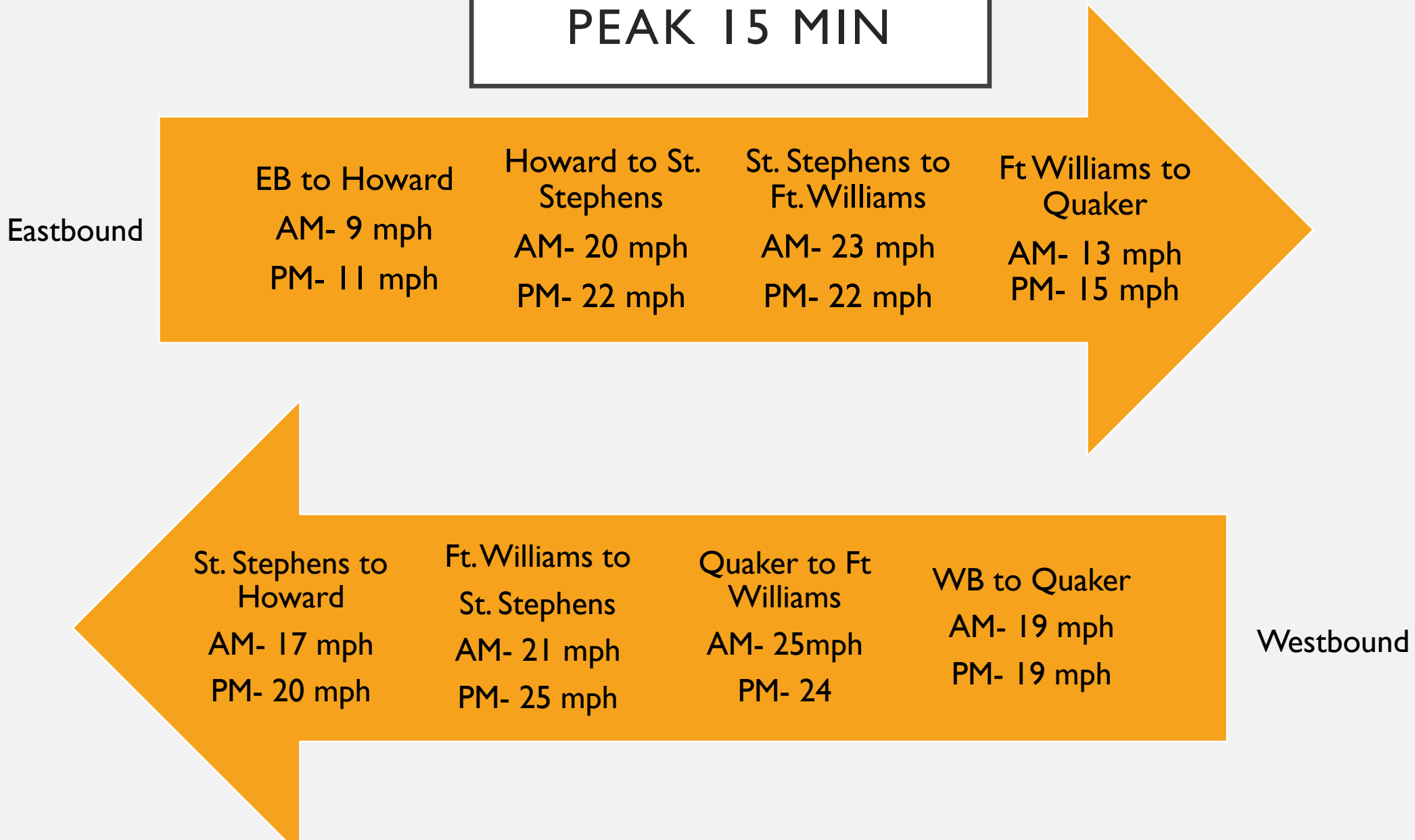
QUEUE LENGTHS IN PEAK 15 MIN

What you're seeing here:

- Average queue length (in car lengths) for the **worst 15 minutes** of morning rush hour **with a 2% growth factor**
- One car length is assumed as 20' including the vehicle itself and the stopping distance between vehicles.

		Alternative 1		Alternative 2		Alternative 3		Staff Recommendation	
Intersection	Peak Time	Distance (Car Lengths)		Distance (Car Lengths)		Distance (Car Lengths)		Distance (Car Lengths)	
	Direction	*EB*	*WB*	*EB*	*WB*	*EB*	*WB*	*EB*	*WB*
N Howard St & Seminary Rd	AM	12	11	15	11	34	50	10	12
	PM	16	5	16	4	18	12	17	5
St. Stephens Rd & Seminary Rd	AM	4	4	13	7	11	11	6	5
	PM	5	2	5	2	4	4	3	2
N Quaker Ln & Seminary Rd	AM	14	6	12	7	9	6	11	6
	PM	21	6	35	6	19	6	13	5

AVERAGE SPEEDS PEAK 15 MIN



PROJECT EVALUATION

- Evaluation 18 months after implementation
  - Speeds
  - Volumes
    - Pedestrian
    - Bicycle
    - Vehicles
  - Crashes
  - Travel times

WHY THIS RECOMMENDATION?

- Public input (we listened)
- Data
- Close a major sidewalk gap
- More ways to safely cross
- Advances many City policies, plans and commitments
  - Improve safety and mobility for all road users

INITIAL PUBLIC INPUT – MAY 2018

Vehicle Issues

- Difficult to turn into side streets and driveways, and back out of driveways onto Seminary Road
- Speeding is common along the entire corridor
- Mixed opinions on function and character of Seminary Road

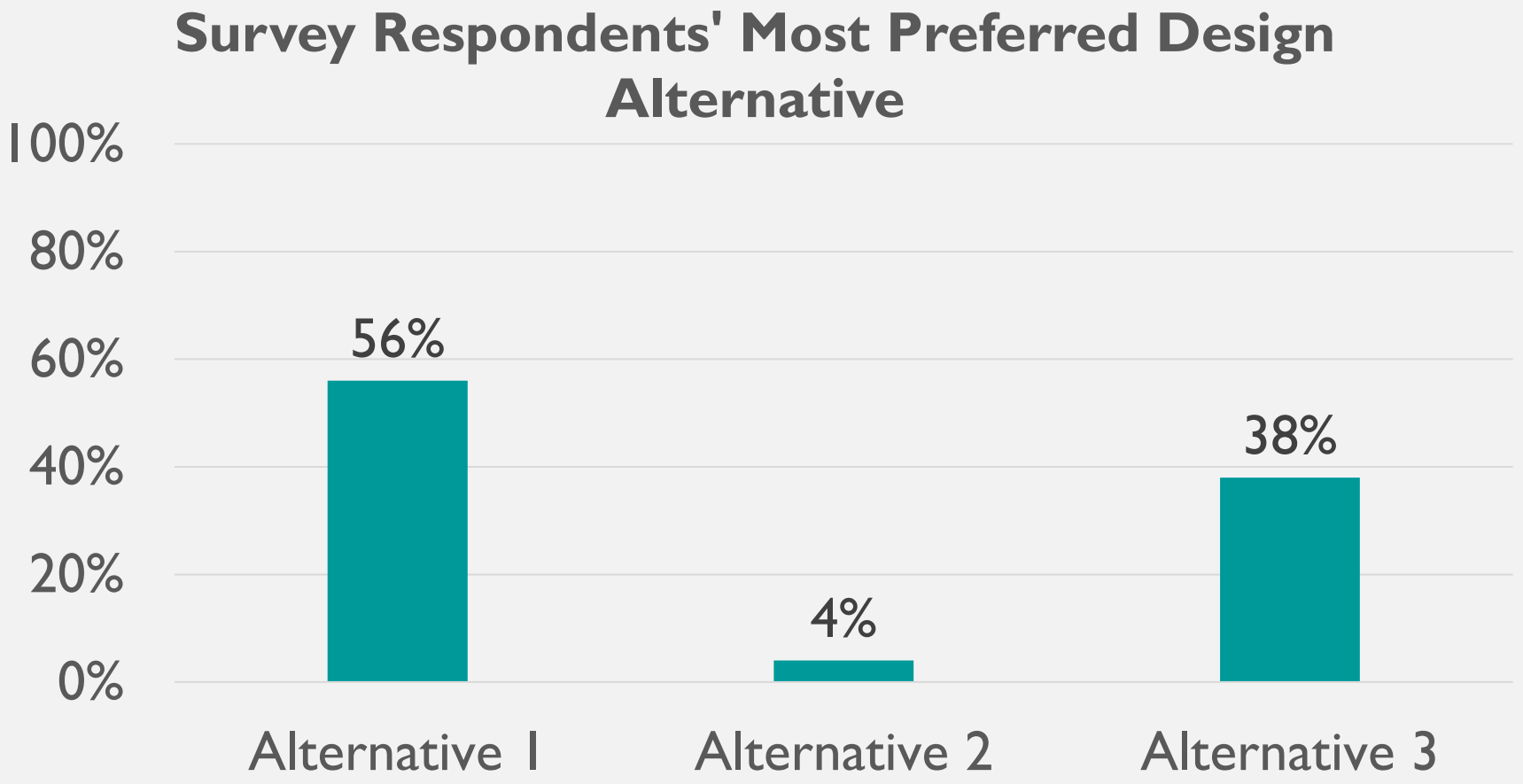
Pedestrian Issues

- Sidewalks should be wider, continuous, and buffered from moving traffic
- The distance between safe crossings is too great
- People walking must cross 4 lanes of traffic on Seminary Road without safety measures

Alternatives

- Mixed opinions on reducing travel lanes

ALTERNATIVES PUBLIC COMMENT SUMMARY – MARCH 2019



71%
of respondents chose **Alternative 2 as their second choice**

ALTERNATIVES INPUT – TOP 4 PRIORITIES FOR THE PROJECT – MARCH 2019

70-80% of respondents noted these four items and their top priorities for the project:

- Maintain Comparable Travel times
- Reduce Speeding
- Provide Safer Crossings
- Improve/adding sidewalks

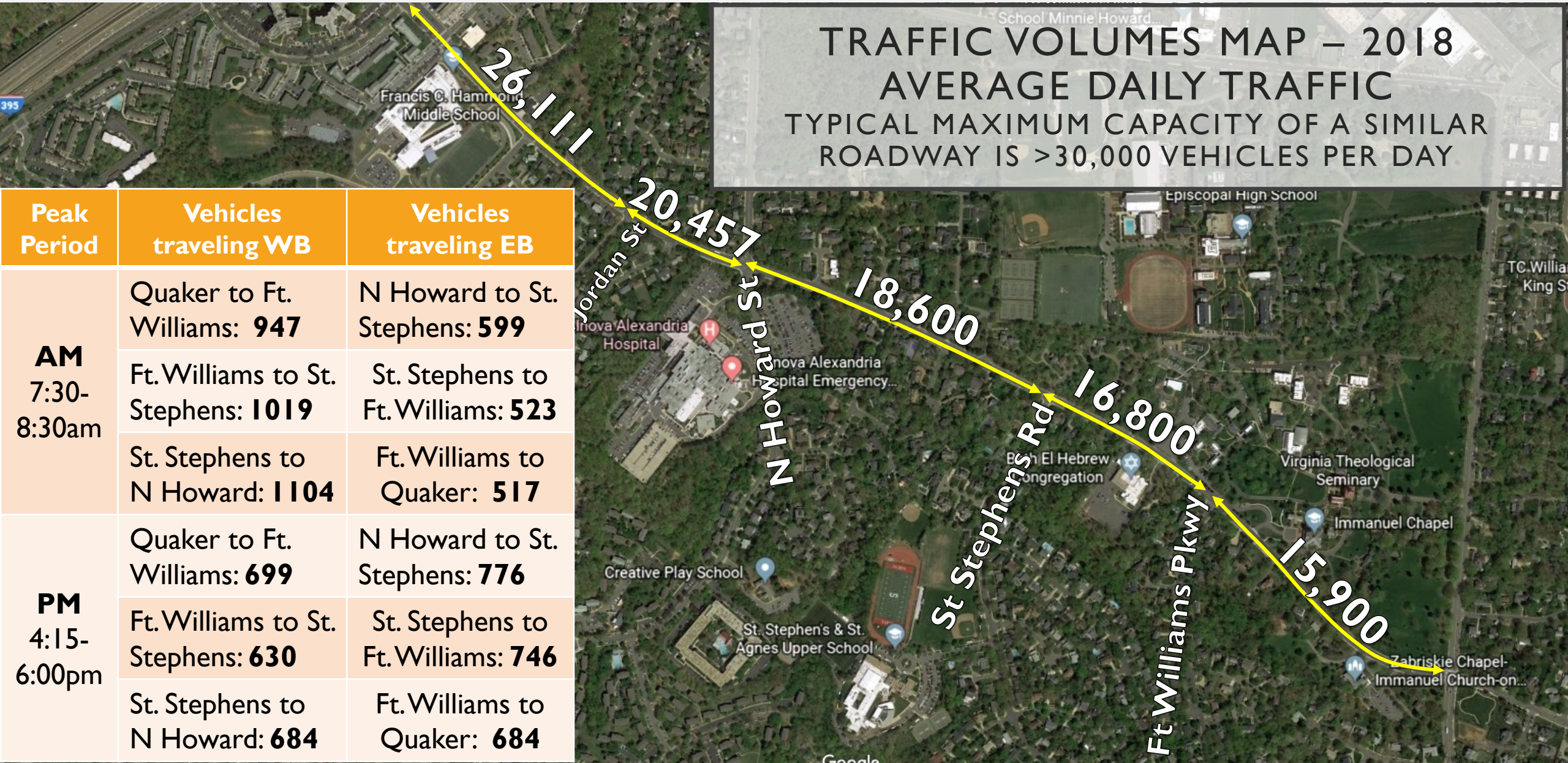
- *Somewhat conflicting goals*
  - *Speed vs. Safety*
- *Staff must balance competing objectives*

PUBLIC INPUT ON STAFF RECOMMENDATION- MAY 2019

- 501 responses to feedback form
- New crosswalks:
  - 173 people expressed support
  - 58 expressed opposition
  - 85 indicated that the proposed crossings are insufficient
- Open Comments (numbers are counts of people giving the comment)
  - 182 - retain four lanes
  - 164 – staff recommendation is insufficient, Alternative 3 is preferred
  - 146 - desire for better bicycle accommodations
  - 123 - support for more pedestrian safety improvements
  - 95 - concern about traffic congestion
  - 95 - speeding as a problem, either currently or as part of the staff recommendation
  - 42 - oppose LPIs and No Turn on Red restrictions; 12 – support LPIs and No Turn on Red restrictions
  - 38 - safer access to transit
  - 30 - concern about cut-through traffic
  - 25 - desire for a center left-turn lane
  - 10 - concern about emergency vehicle response times
  - 10 - filling the sidewalk gap is unnecessary

Public Input | Traffic Volumes | Safety & Best Practice | City Plans and Policies

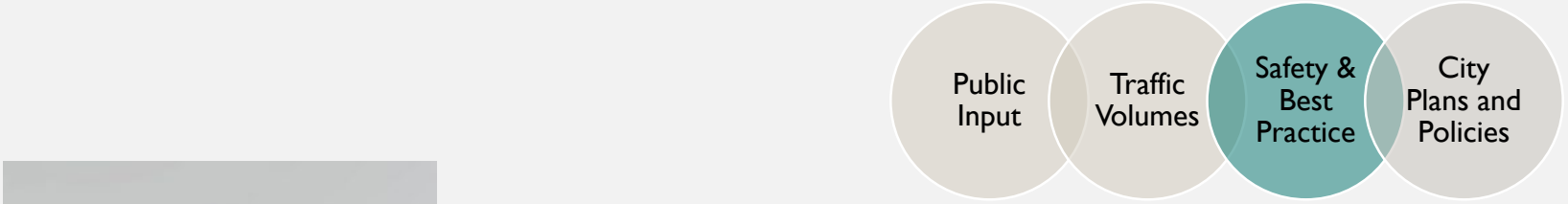
TRAFFIC VOLUMES MAP – 2018
AVERAGE DAILY TRAFFIC
TYPICAL MAXIMUM CAPACITY OF A SIMILAR ROADWAY IS >30,000 VEHICLES PER DAY



Peak Period	Vehicles traveling WB	Vehicles traveling EB
AM 7:30-8:30am	Quaker to Ft. Williams: **947**	N Howard to St. Stephens: **599**
	Ft. Williams to St. Stephens: **1019**	St. Stephens to Ft. Williams: **523**
	St. Stephens to N Howard: **1104**	Ft. Williams to Quaker: **517**
PM 4:15-6:00pm	Quaker to Ft. Williams: **699**	N Howard to St. Stephens: **776**
	Ft. Williams to St. Stephens: **630**	St. Stephens to Ft. Williams: **746**
	St. Stephens to N Howard: **684**	Ft. Williams to Quaker: **684**

WHY CROSSINGS WITH HAWK SIGNALS?

"Multi-lane, high-volume, high-speed roadways are barriers to pedestrian mobility. **Some pedestrians may choose not to make a trip that involves crossing a busy roadway, and these roads pose additional safety and mobility issues for children and people with disabilities**…On multi-lane undivided roadways, pedestrians must judge gaps in multiple streams of traffic to successfully complete a crossing. On higher speed roadways motorists are less inclined (or less able) to stop for pedestrians in crosswalks — some communities have yielding rates of less than 2 percent at marked and signed mid-block crosswalks."
- FHWA Pedestrian Hybrid Beacon Guide, https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa14014/



HAWK SIGNAL VS. RRFB

- Driver Yield Rate at unsignalized crossings and visibility
  - RRFB's on average show a 70-85% yield rate, but can vary[1] and can reduce pedestrian crashes by 47%
  - HAWK signals show a >90% yield rate[2] and reduce pedestrian crash rates by 55%
    - A full signal at an average of 98% yield rate[2]
- Traffic volumes
  - HAWKs recommended for roads with an ADT over 9,000 (Seminary between Howard and Quaker is 18,600- 15,900)

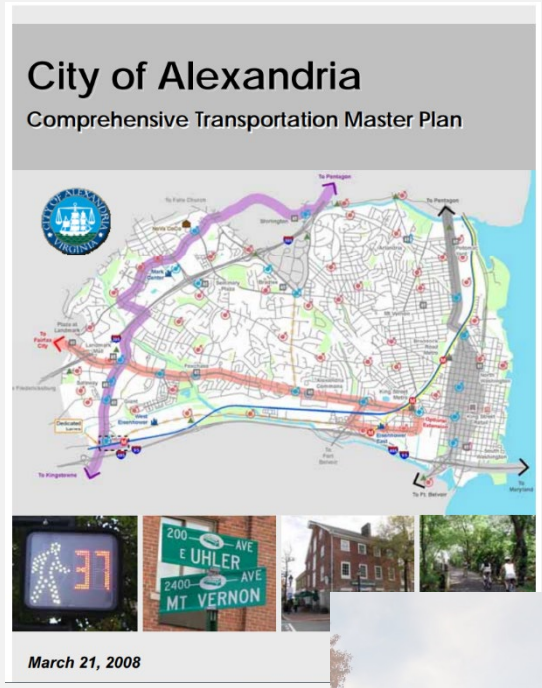
1. https://www.fhwa.dot.gov/publications/research/safety/pedbike/11039/003.cfm
2. Journal of Traffic and Transportation Engineering https://doi.org/10.1016/j.jtte.2016.01.007

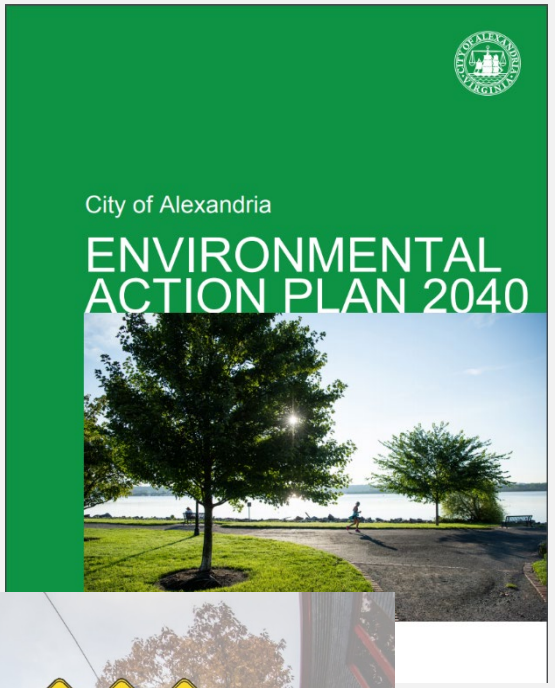
PLANS AND POLICIES

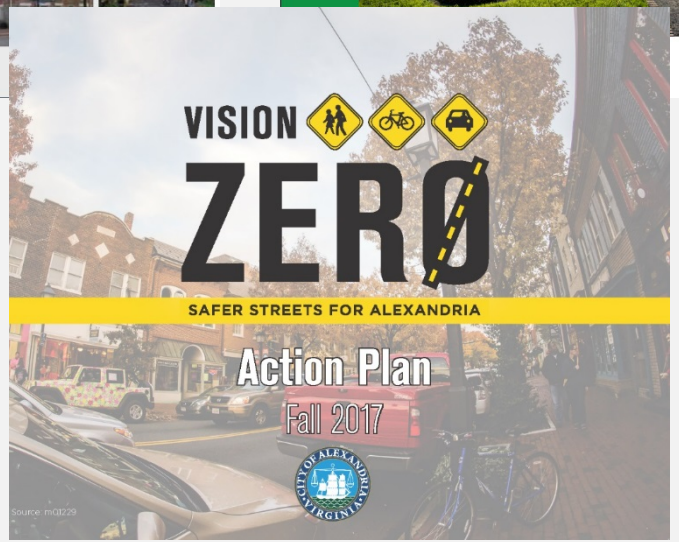
- Advances many City Council-adopted policies, plans and commitments
  - Improve safety & mobility for all roadway users
  - Top 10 priority sidewalk projects

Public Input | Traffic Volumes | Safety & Best Practice | City Plans and Policies

COUNCIL-ADOPTED PLANS AND POLICIES







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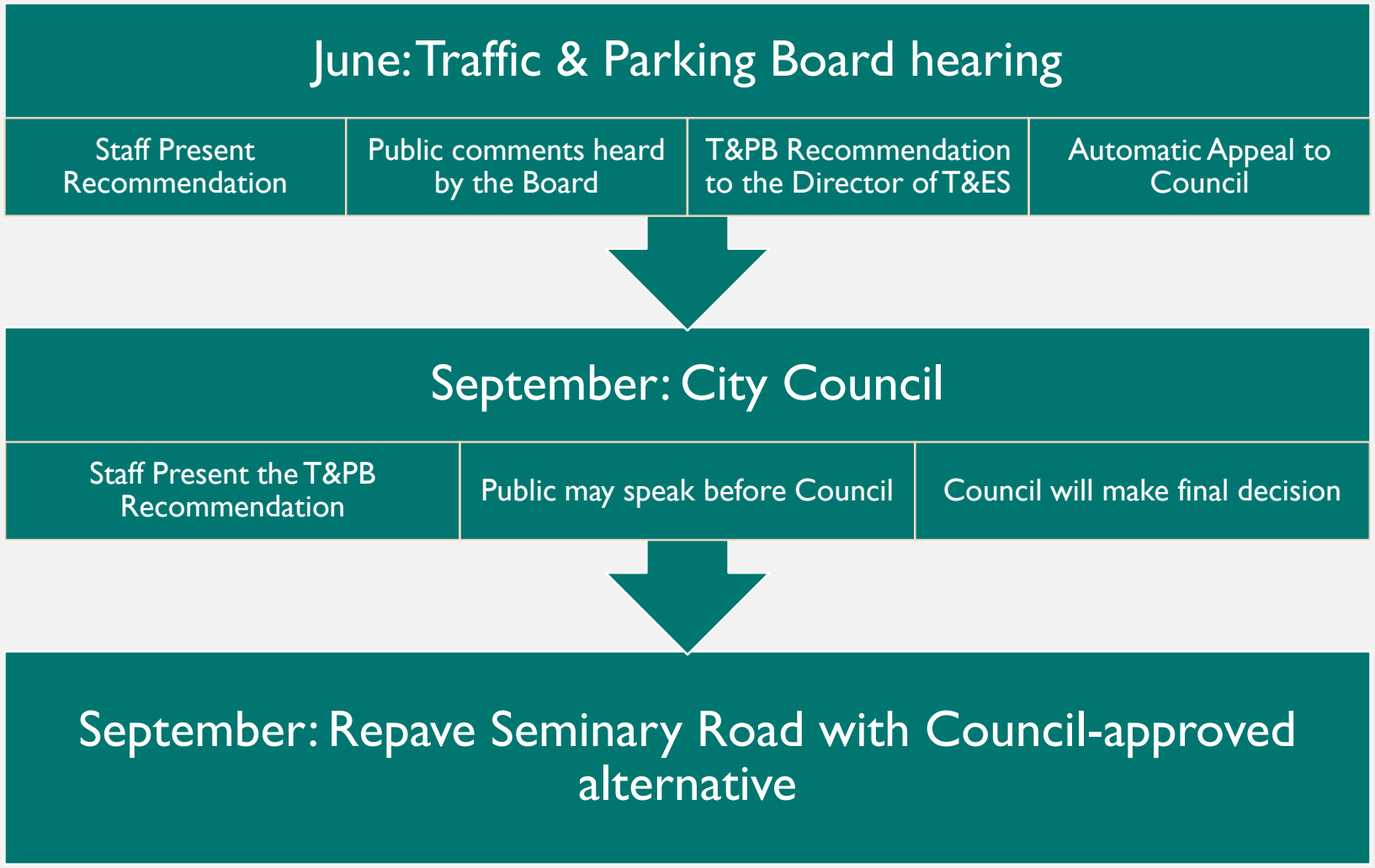


QUESTIONS?

FAQS

- Patrick Henry/MacArthur Swing Space
  - ACPS and T&ES are coordinating closely and ACPS is completing a traffic study to determine the impacts. Policy recommendations like staggered school hours and others are being considered to mitigate any potential traffic issues
- Transit Vision Study
  - Buses will still be available on Seminary Road the Alexandria Transit Vision Study is determining policy level decisions now that may affect service on this corridor and others.
- Emergency Vehicle Access (Fire/EMS/Hospital)
  - Department leaders of Fire and EMS have signed off on our Complete Street Design Guidelines, which is being used to develop these alternatives and the staff recommendation.
- Cut-through traffic
  - Signal optimization and synchronization, as well as recommended timing changes improves delay in many cases and is not expected to add cut-through traffic on adjacent streets
  - Maximum capacity of the roadway is over 30,000 Average Daily Traffic, current counts (18,600/16,800/15,900 ADT) indicate the roadway is well under capacity

HAS A STUDY BEEN DONE OF CAUSES OF CRASHES ON SEMINARY FROM HOWARD TO QUAKER?

Yes, from January 2013 to July 2018, there were 31 crashes on Seminary Road between St. Stephens Road and North Quaker Lane. Of those 31 crashes, 11 involved an injury, and 2 involved a severe injury. (DMV TREDS data)

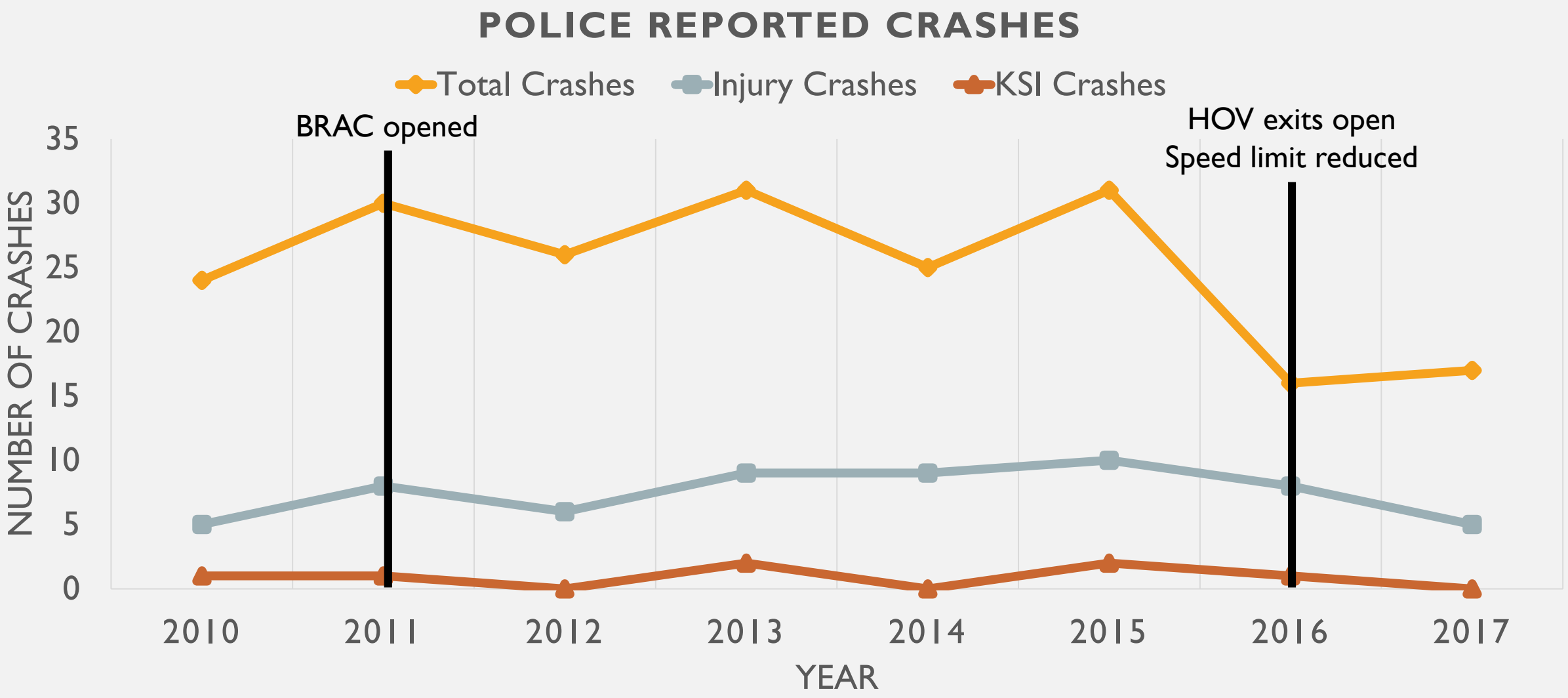
The following is a breakdown of the crash types:

Crash Type	Number
Rear End	10
Angle	10
Fixed Object – Off Road	6
Fixed Object – In Road	2
Head On	1
Deer	1
Other (Bicycle)	1

- While the speed limit reduction helped reduce injury crashes, speeds and general number of crashes have stayed consistent.

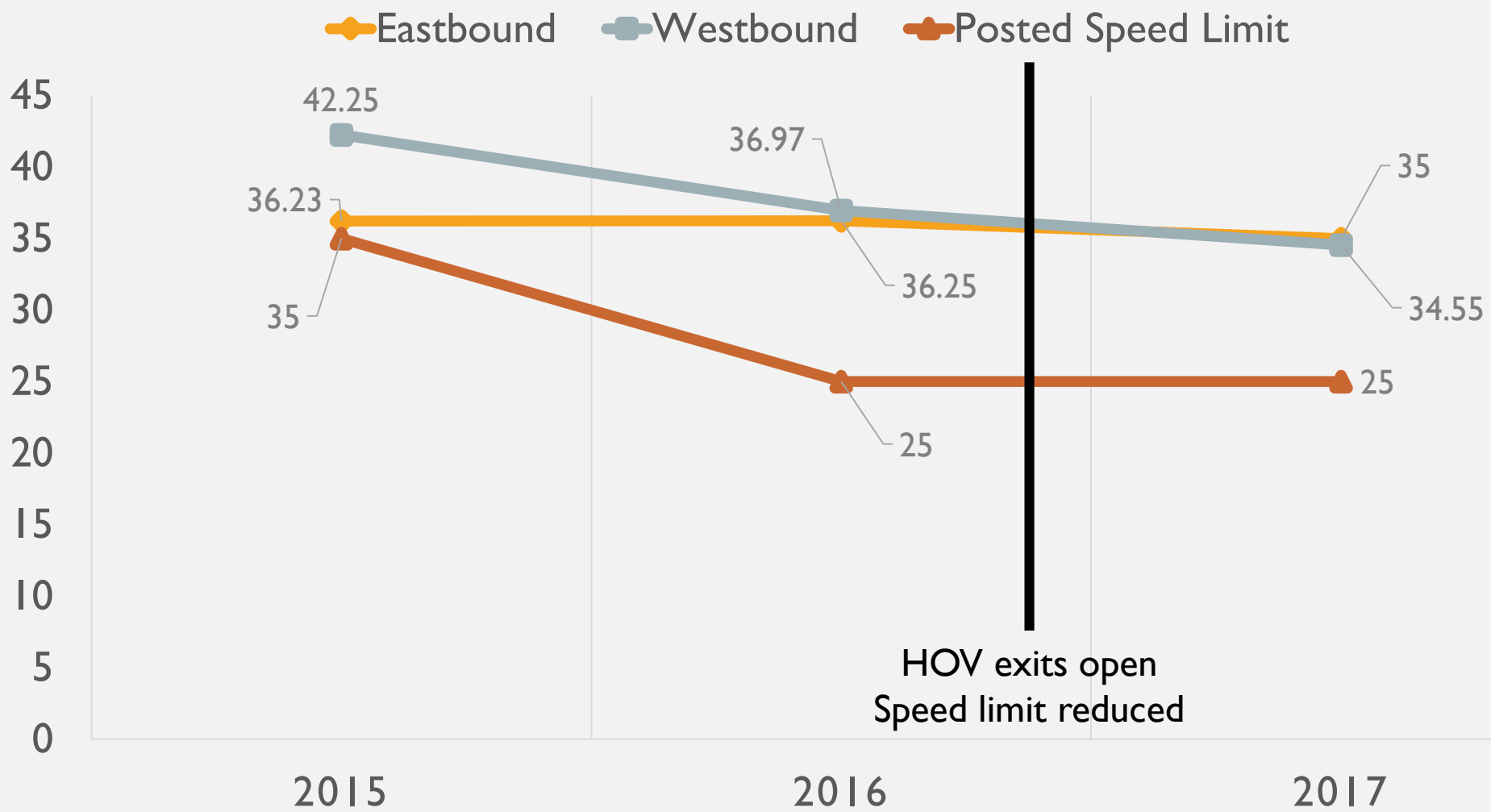
TRAVEL TIMES

CRASH HISTORY- KENMORE TO QUAKER



SPEED DATA

85TH PERCENTILE SPEEDS

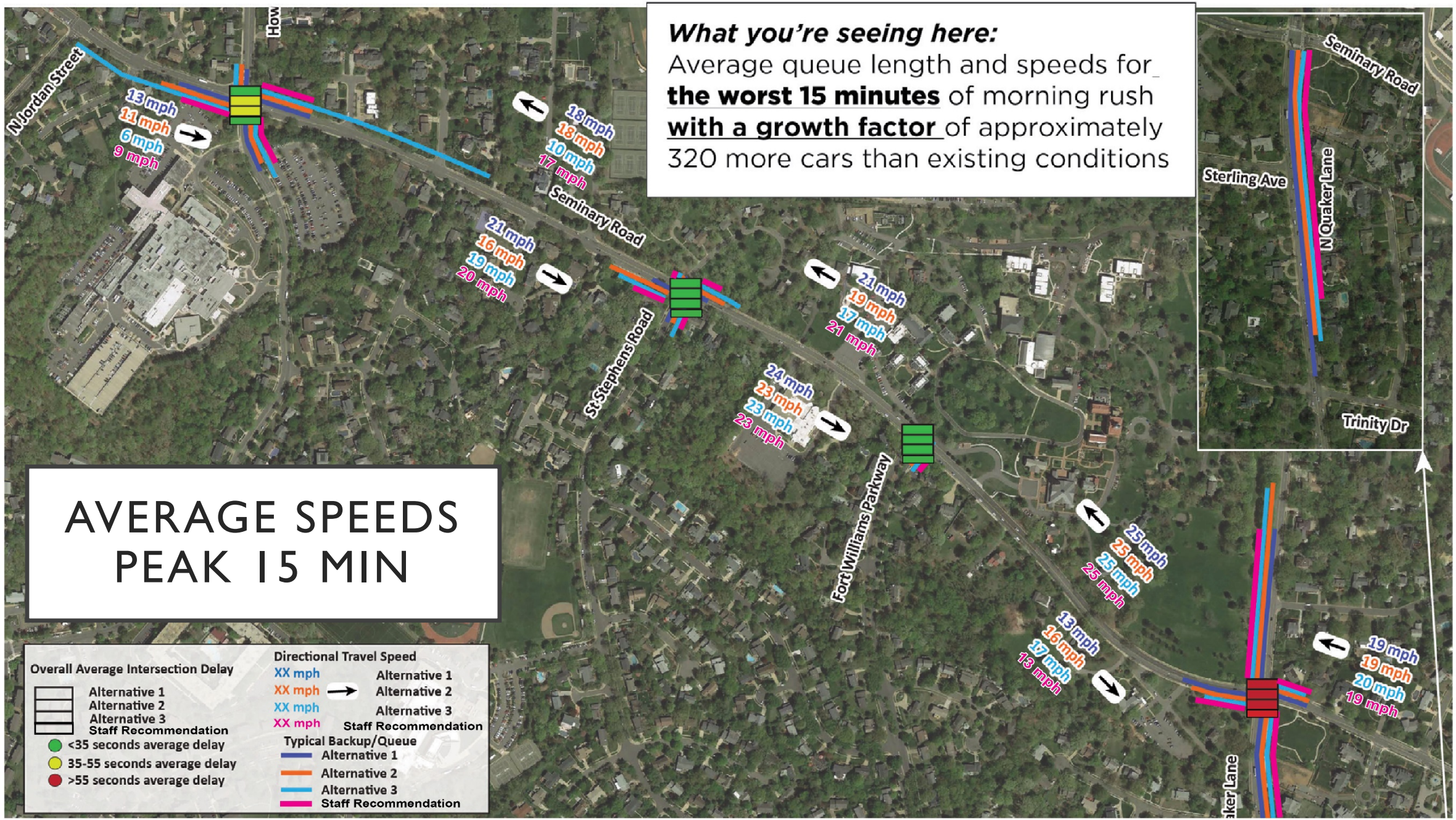


May 2017 count- 85th percentile:
EB- 34.9 mph
WB- 34.55 mph

95th Percentile:
EB- 38.9 mph
WB- 38.3 mph

On average excessive speeding:
EB-130 drivers per day going over 40 mph
WB- 155 drivers per day going over 40 mph

Morning Rush Hour- Worst 15 Minutes



Evening Rush Hour- Worst 15 Minutes