

Background

In 2016, Allan Myers began the Central Avenue Streetscape and Harbor Point Connector Bridge Project in Baltimore, providing much needed infrastructure upgrades to the area. Project restrictions mandated that all roadways must remain open during construction, which lengthened the project timeline and made the construction area unsafe for pedestrians. Now that the project has concluded, Allan Myers has asked our group to develop a Maintenance of Traffic (MOT) plan centered around the Fleet Street intersection that permits road closures, and conduct a value engineering proposal on our findings. Our group defined value as improving safety while saving time and money, which meet the needs of Allan Myers, the City of Baltimore, and the public.

Site Map (Pre-Construction)



- ❖ **PROPOSED:** Exeter Street temporarily converted to two-way street with both northbound and southbound traffic.
- ❖ **PROPOSED:** stop controlled intersections on Exeter Street become signalized using temporary signal heads. Eden Street intersections will remain unsignalized.

- EXISTING**
- ❖ Eastern, Fleet, Aliceanna: East/West one lane roads with turning lanes provided at signalized intersections.
 - ❖ Central, Caroline: North/South two lane roads with turning lanes at signalized intersections
 - ❖ Eden: North/South one lane roadway
 - ❖ Exeter - one way street running Northbound

Value Engineering

- ❖ Keeping roadways open during construction made storefronts inaccessible for longer while jeopardizing pedestrian safety.
- ❖ Condensing the project timeline provides the most value to project stakeholders by reducing cost and disruption.
- ❖ Full closures allow for construction segments to finish earlier
- ❖ According to our project mentor, total cost was approximately \$4,000 per day.
- ❖ The main areas of improvement we identified were the roadway segments of Central Avenue between Aliceanna and Eastern, as well as the Fleet Street buried bridge.
- ❖ Similar Tasks were combined. For example, removing asphalt took two days for the left, center, and right portion of the street, and now takes two days total, saving four days. A comparison of various scheduling related variables is shown below.

Segment	Full Closure			Two-Phase Approach		
	Aliceanna-Fleet	Fleet-Eastern	Fleet Street Bridge	Aliceanna-Fleet	Fleet-Eastern	Fleet Street Bridge
Days Consolidated ¹	96	99	21	96	99	21
New Schedule Duration ²	126	113	92	126	113	92
Time Saved Overall ³	96	113	0	96	99	0
Project Duration ⁴	126 Days			239 Days		
Total Savings (Time Saved Overall * \$4,000)	\$836,000.00			\$780,000.00		

1. Number of days consolidated for a particular task.
2. Number of days the task will take when account for consolidated days.
3. Number of days eliminated as a result of changing schedules or consolidated tasks.
4. New task length, accounting for shorter schedule and tasks occurring simultaneously.

Community Outreach

- ❖ Reaching out to community members, they voiced that they often felt blindsided by construction updates, and that most did not know of the phone line or website.
- ❖ Locals most preferred when the project team talked to them directly in-person about updates and progress.
- ❖ An easily accessible, up to date website would alleviate many questions and concerns and provide a more accessible line of communication between the project team and local community.
- ❖ The project team will deliver in-person updates while addressing community concerns.
- ❖ The sign shown to the right will be posted throughout the workzone, making it easier to find information.

Central Avenue Bridge Construction

The Central Avenue Streetscape and Harbor Point Connector Bridge Project connecting Harbor East and Harbor Point will begin construction in January 2017.

The project will affect areas from Eastern Avenue to Aliceanna St, and Exeter St to Caroline St. As these phases of the project commence, local areas will be notified in advance of construction affecting them.

For more information and updates, please visit central.ave.project.com
For questions or concerns, feel free to contact the project team at (443) 984-4095

MOT Simulation Results

This table shows the maximum delay (in seconds) and maximum queue length (in # of vehicles) at each intersection for each MOT alternative. The worst delay results are shown in red, while the best queue length results are shown in green.

Intersection	Pre Construction		No Closure		NB Closure		SB Closure		Full Closure	
	Delay (s)	Queue Length (veh)	Delay	Queue Length	Delay	Queue Length	Delay	Queue Length	Delay	Queue Length
Eastern Exeter	0.14	1	3.6	16	2.32	7	2.32	7	4.2	11
Eastern Central	5.33	1	6.39	36	2.15	36	10	13	13.4	36
Eastern Caroline	10.22	2	15.86	11	15.96	33	16	33	25.13	38
Fleet Exeter	2.32	1	8.85	20	2.32	16	8.7	16	15.64	10
Fleet Central	12.17	3	33.9	36	12.17	36	9.1	36		
Fleet Caroline	10.33	2	16.01	10	10.33	18	16.26	18	35.07	21
Aliceanna Exeter	0.24	0	7.05	14	0.24	7	8.64	7	5.55	2
Aliceanna Central	14.06	3	6.32	6	14.06	7	12.68	7	0.41	31
Aliceanna Caroline	14.62	2	17.37	14	14.62	11	14	11	17.49	21

Maintenance of Traffic Plan

- ❖ Original Allan Myers MOT done in four phases, one corner at a time
- ❖ Full closure and two phase (North leg/South leg) closure considered
- ❖ Recreated all three options in PTV Vissim to simulate queue length and delay. One hundred simulations were run with the outcome shown in the results section.
- ❖ Traffic primarily redirected to Caroline, Aliceanna and Eastern, with two-way Exeter Street being used only when necessary.
- ❖ Dynamic Queueing: Uses camera sensors/navigation apps to send signals to Dynamic Messaging Signs (DMS) when congestion is high enough.
- ❖ All streets will remain open throughout, the recommended route will change based on information sent to the DMS.



Example of DMS with different messages, as well as permanent signage where detours remain unchanged.



Example of a Temporary Traffic Signal

Conclusion

Based on our analysis of the Fleet Street intersection, a full closure of all roadways would provide the most value to stakeholders. Our traffic simulation results show that congestion will not be significantly worse than Allan Myers' approach, while allowing a much swifter construction timeline. This approach saves the most money for Allan Myers and the City of Baltimore while allowing businesses to operate as usual as quickly as possible. Our community outreach plan will facilitate access to project information, and is based on direct conversations with those affected by construction and creating a better means of communication between the project team and community. The positives from a full closure outweigh the negatives more than in any other approach.