MEMORANDUM

TO: Melissa Miguel, P.E., Supervising Engineer, City of Cambridge DPW

FROM: Brian Montejunas, KLF; Hilary Holmes, Hatch

DATE : March 25, 2021

SUBJECT: Chestnut Street Drainage and Traffic Calming Concerns

CC:

Chestnut Street Project Scope:

The Chestnut Street Project will reconstruct the street and sidewalks; provide accessible sidewalks and safe crossing opportunities for pedestrians; incorporate traffic calming elements; plant additional street trees; implement green infrastructure; install additional catch basins to address localized ponding; and upgrade the water main and replace any lead water services with copper services. The project is estimated to cost approximately $2,500,000.

The Chestnut Street reconstruction project is being implemented through the City's Complete Streets Program and the Five Year Sidewalk and Street Reconstruction Plan (5 Year Plan) (www.cambridgema.gov/fiveyearplan).

Traffic Calming (Plans Presented at January 21, 2021 Community Meeting):

Traffic calming tools are being incorporated into the Chestnut Street design to improve safety for pedestrians and reduce vehicular speeds.

- A raised intersection at the intersection of Magazine Street will prioritize the pedestrian crossings at this critical pedestrian crossing.
- Raised crosswalks for pedestrians walking along Chestnut Street at Whitney St, Newton St, Acorn St, will prioritize the pedestrian crossings and improve stop sign compliance for drivers.
- Raised crosswalks for pedestrians crossing Chestnut Street at Pleasant St. Hastings Sq and Brookline St. will prioritize the pedestrian crossing and improve stop sign compliance for drivers.
- Curb extensions at Newton St and Brookline St will reduce the crossing distance for pedestrians and improve sight lines for motorists and bicyclists exiting Newton Street onto Chestnut Street.
- These traffic calming elements will complement the existing raised intersection at Chestnut St and Pearl St that was constructed as part of a previous project.

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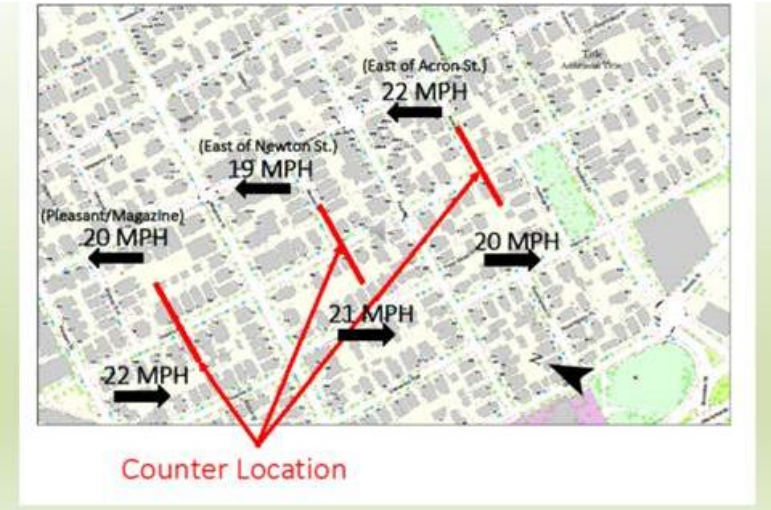
The 85th percentile speeds are used in traffic engineering and represent the **speed** at or below which **85 percent** of all vehicles are observed to travel under free-flowing conditions. Speed data was collected on May 15 and May 16, 2019 at 3 locations along Chestnut Street. The 85th percentile speeds on Chestnut St ranged from 19 mph to 22 mph. These are under the 25 mph speed limit. The traffic calming elements will reinforce keeping speeds low and improve pedestrian safety. At the last community meeting, there was a request to obtain additional traffic data to ensure updated data is consistent with the 2019 data. This additional data collection will be scheduled in May.

Figure 1 – Speed Data from May 15th and 16th, 2019



Green Infrastructure:

The design incorporates bioretention basins and infiltration trenches to improve water quality before it goes into the drainage system and ultimately to the Charles River. As part of the City's EPA and MassDEP permitting, the City is required to make improvements in the quality of water that is discharged to the Charles River. Below is a description of the City's overall program from the City's Budget that provides some context for these improvements and the long-term benefits. While each individual improvement has a relatively small impact, a lot of small interventions makes a significant improvement in water quality.

> Twenty-five years of major investment in sewer and stormwater infrastructure and maintenance has had a significant, positive impact on improving the water quality of discharges to the Charles River, the Little River, the Alewife Brook, the Mystic River and the Boston Harbor.

Investment in infrastructure over a long period of time also provides a more reliable system that better serves residents, who experience fewer backups, reduced flooding, and fewer emergency repairs.

The **amount of Combined Sewer Overflows to the Charles River** and Alewife Brook have **significantly decreased** over the past two decades: **Charles River by 98%,** Alewife Brook by 85%. The amount of the city with combined sewers has decreased from 55% to 45% The city has converted over 75,000 square feet of impervious area to pervious area in last 3 years, through projects such as the Toomey Park, depaving projects and rain gardens. Over 270 illicit connections have been removed, reducing this sewage going untreated to the river. **Overall water quality in the Lower Charles has improved from a grade of D to a B. This is a significant accomplishment, but the work is not done to reach the goal of a swimmable Charles River.**

Figure 2 is a photo rendering that depicts the proposed conditions of the bioretention basins and the raised crossing at the intersection of Newton Street and Chestnut Street. These green infrastructure systems are designed to collect, treat, and infiltrate stormwater runoff from "first flush", which is the most contaminated stormwater. In addition to improving water quality, green infrastructure also reduces the amount of stormwater that enters the drainage system.

Figure 2 – Photo Rendering of Chestnut Street at Newton St

Additional Drainage Improvements:
Additional catch basins are being installed to address localized ponding issues and the raised crossing across Chestnut Street at Magazine Street intersection will reduce the amount of stormwater that reaches the low point on Chestnut Street. Stormwater that currently flows from Magazine to Chestnut St will be directed to the drain line on Magazine Street. These improvements will provide a benefit to not only traffic calming and water quality but will also reduce the amount of stormwater that reaches the low point of Chestnut Street.

Modifications to Design Following January 21, 2021 Community Meeting:
Based on the feedback from the January 21, 2021 community meeting, we are working to modify the design at Chestnut Street and Newton Street to shorten the curb extensions by 10 feet east and 18 feet west of the intersection. This will continue to support the sightline improvements at the intersection and provide green infrastructure for water quality, while retaining an additional two parking spots.

Flooding in Cambridge:
Various areas in Cambridge have historically been vulnerable to flooding and will be more so in the future, with climate change and projected increases in precipitation. As part of the City's work on climate change, www.cambridgema.gov/climateprep, the City has undertaken significant modelling efforts to understand the existing and future risk to flooding in various areas of the City.

The City is committed to investing in our infrastructure to provide high quality sewer and drainage service and reduce the risk of flooding, but no infrastructure can fully protect at risk areas and we have to prioritize our investment in the areas that are most at risk of flooding. See below for information on the City's Ten Year Sewer and Drain Infrastructure Plan (10 Year Plan) www.cambridgema.gov/theworks/tenyearplan

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So, while city investment is critical, it is equally important that property owners take steps to protect their property, particularly properties that are in low lying areas of the City with any basement improvements. The City's Flood Viewer, https://www.cambridgema.gov/Services/floodmap, shows the projected flood elevations for various storm events for each property in the City. The Flooding: Is Your Property Protected Brochure provides concrete steps residents can take to make their property more resilient to flooding.

This project is a roadway and sidewalk improvements project. Significant stormwater holding tanks are not part of this project. Those types of facilities cost between $15M and $30M, depending on the size and complexity of the facilities.

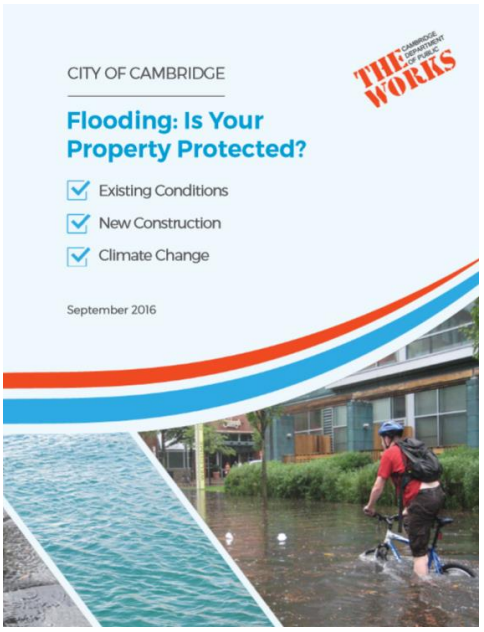

Figure 3 – Precipitation Flooding – Present Day, 10-Year Storm

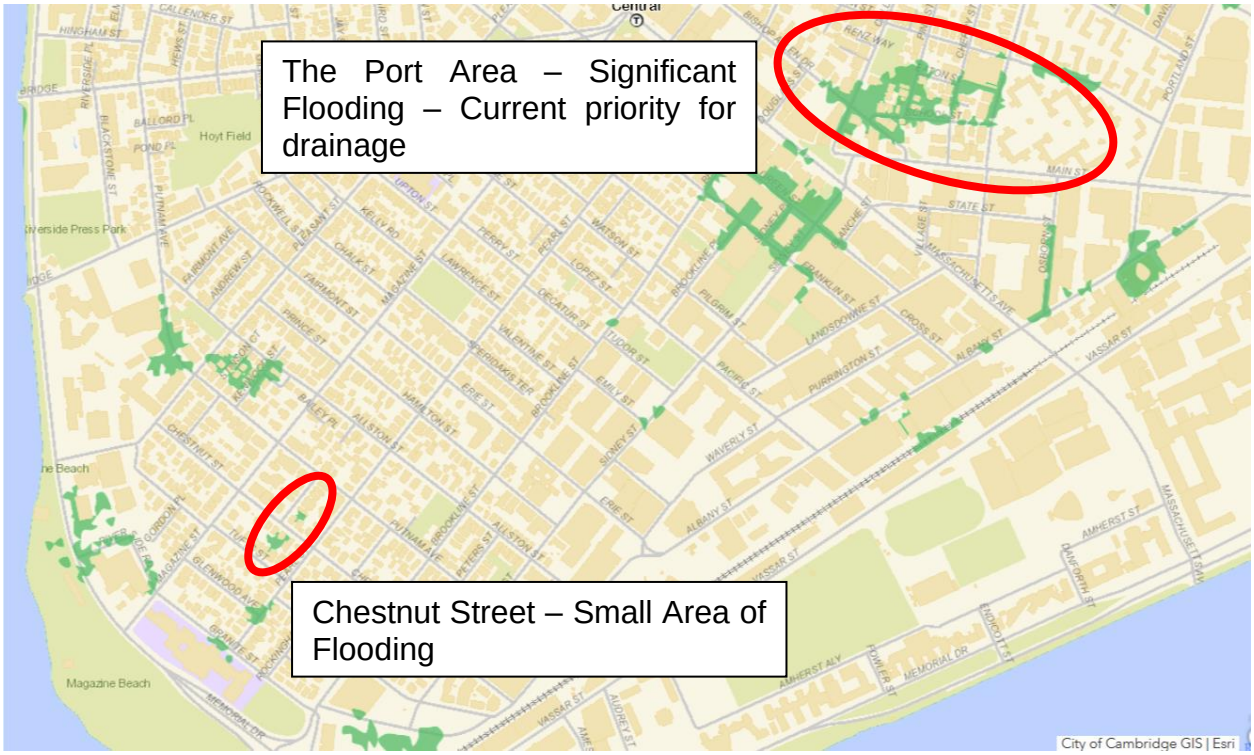

Figure 4 – Precipitation Flooding – Present Day, 10-Year Storm with Contours

Figure 3 – Precipitation Flooding – Present Day, 10-Year Storm with Contours, Port Area

5 Year and 10 Year Plan:

The 5 Year Sidewalk and Street Plan (5 Year Plan) identifies the streets and sidewalks to be reconstructed over the next 5 years. Projects are prioritized based on the condition of the streets and sidewalks; proximity to parks, major squares, libraries, schools, youth centers, senior housing, senior centers, and bus routes; locations identified by the Commission for Persons with Disabilities; and locations on the Bicycle Plan's Network Vision. Projects are designed though a community process with an emphasis on Complete Streets, Vision Zero, stormwater quality improvements, and the City's recently completed Urban Forestry Master Plan.

The City also has a Ten Year Sewer and Drain Infrastructure Plan (10 Year Plan) www.cambridgema.gov/theworks/tenyearplan. The goal of this plan is to maintain sewer and drain infrastructure, remove stormwater from the sewer system, eliminate sanitary sewer overflows, manage stormwater quality and quantity, reduce flooding, and prioritize

operation and maintenance activities. Some of the current projects being undertaken through this program are in the Port neighborhood, which experiences significant flooding; River Street; a new stormwater outfall near Talbot Street; and a new stormwater outfall near Willard St.

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