City of Newton
Ruthanne Fuller
Mayor

DEPARTMENT OF PUBLIC WORKS

OFFICE OF THE COMMISSIONER
1000 Commonwealth Avenue
Newton Centre, MA 02459-1449

April 7, 2023

To: Jonathan Yeo, Chief Operating Officer

From: James McGonagle, Commissioner

Subject: Elliot Street Traffic Calming

The Department of Public Works (DPW) is proposing a significant traffic calming project on Elliot Street. The portion of Elliot Street that is included as part of this traffic calming effort is between Linden Street and Wetherell Street, with the focus being the sharp curve at the Mechanic Street intersection. The goals of this project include:

- Improved safety for all users;
- Reduced vehicular speed on Elliot Street;
- Improved pedestrian accessibility and connectivity;
- Maintain and improve space for bicyclists riding along Elliot Street

DPW utilized an engineering consultant to develop and evaluate conceptual options and make a recommendation for a preferred alternative. Our consultant evaluated two different alternatives in the Linden Street area, six alternatives in the Mechanic Street area, and three alternatives in the Cottage St / Wetherell St area. Our consultant then created 12 different "packages" with various combinations of the alternatives in each area of the project. Each of the conceptual alternatives were reviewed and discussed in detail with City staff and the City's Complete Streets Working Group (comprised of City staff from DPW, Planning, Newton Police, Newton Fire, Parks & Rec, Schools, the Transportation Advisory Group (TAG), and Safe Routes to School (SRTS)). The complete conceptual evaluation is detailed in the attached memorandum from BETA Group, Inc., dated February 20, 2023.

Based on the work completed to date, the preferred alternative is "Package 11" and includes:

- Elliot Street and Linden Street Alternative 2. The preferred alternative provides a new crosswalk across Elliot Street, with pedestrian-actuated Rectangular Rapid Flashing Beacons (RRFB's)
- Elliot Street and Mechanic Street Alternative 3A. The preferred option for the Mechanic Street intersection proposes to:
    - Realign Mechanic Street to create a more typical intersection. The simpler intersection will reduce driver confusion and will provide clear guidance to all users to safely travel through the intersection.
    - Reduce roadway width in immediate vicinity of the intersection to reduce vehicle speeds.
    - Creates sidewalk level bike lanes.
    - Reduces pedestrian/vehicle conflicts, with only one short crosswalk across Mechanic Street, approximately 20-24 ft long. Pedestrians crossing Mechanic Street today must cross two roadway openings and are in conflict with vehicles for a total of 50 ft)
- Cottage Street Alternative 1. The preferred option provides:
    - A new crosswalk across Elliot Street between Cottage Street and Wetherell Street

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IMPROVING COMMUNITIES TOGETHER

MEMORANDUM

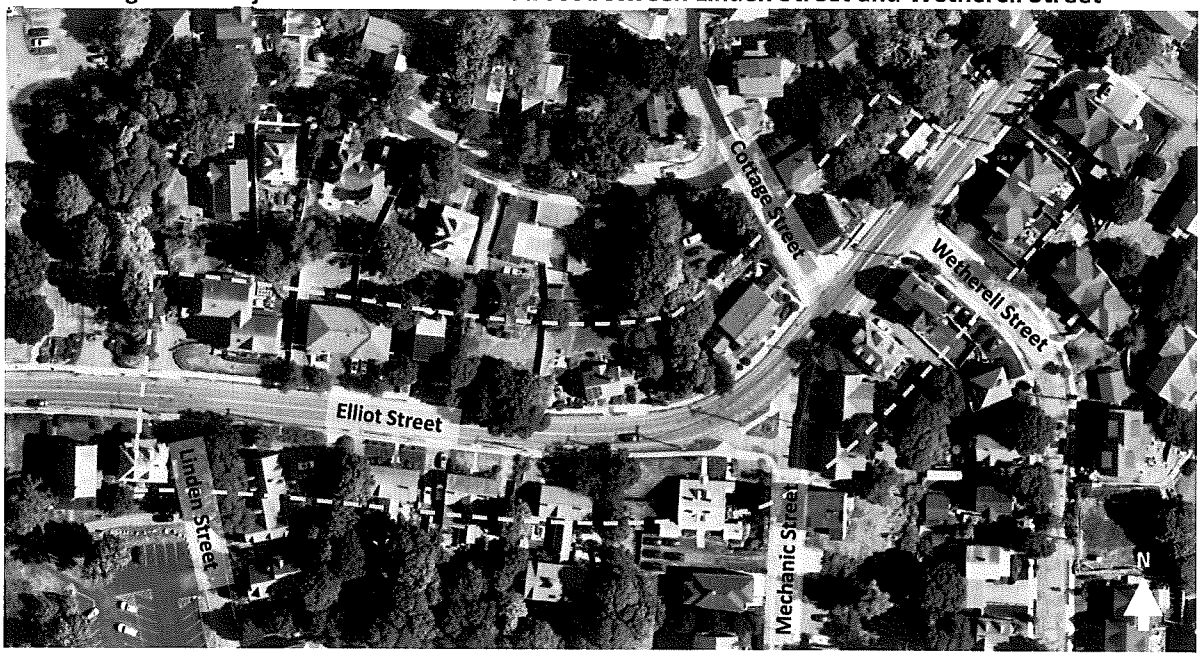
Date:	February 20, 2023	Job No.:	10482
To:	Jason Sobel, P.E, PTOE, Department of Public Works		
Cc:	Complete Streets Working Group		
From:	Jeff Maxtutis, Senior Associate and Anna Sangree, Transportation Planner		
Subject:	**Elliot Street Traffic Calming Concepts Development**		

BETA Group, Inc. (BETA) was contracted by the City of Newton to develop concept plans for traffic calming measures on Elliot Street between Linden Street and Wetherell Street. This memorandum describes project priorities, existing conditions, concepts developed by BETA, feedback received from the City of Newton Complete Streets Working Group and identifies a preferred concept.

1.0 PROJECT LOCATION

The project location is an approximately 700-foot-long segment of roadway including the sharp curve on Elliot Street in Newton between Linden Street and Wetherell Street. The segment of Elliot Street is located in the Upper Falls neighborhood in western-central Newton and generally follows a southwest to northeast alignment through the neighborhood, connecting on the west to Central Avenue in Needham at the Charles River and on the northeast to Route 9 in Newton.

Figure 1: Project Location on Elliot Street between Linden Street and Wetherell Street



Within the project area, Elliot Street intersects with Linden Street, Mechanic Street, Cottage Street and Wetherell Street as unsignalized T-intersections. All four intersecting streets are classified as local roadways and under City jurisdiction. Linden Street intersects Elliot Street from the south to form a three-way unsignalized intersection, stop controlled at the Linden Street northbound approach. Linden Street is 20 feet wide and provides one lane in each direction, but no centerline is marked. At the intersection with Elliot Street, Linden Street has sidewalks on both sides. Linden Street follows a north-south alignment, connecting to the Upper Falls Greenway to the south.

Mechanic Street intersects Elliot Street from the south. Mechanic Street follows a north-south alignment connecting to the Upper Falls Greenway to the south. At the Elliot Street intersection, Mechanic Street splits, creating two separate intersections, separated by a triangular landscaped traffic island. The Mechanic Street approaches are stop controlled. Mechanic Street provides one lane in each direction, but no centerline is marked. Sidewalks are provided on both sides of the roadway. **Figure 2** shows the current configuration of the intersection.

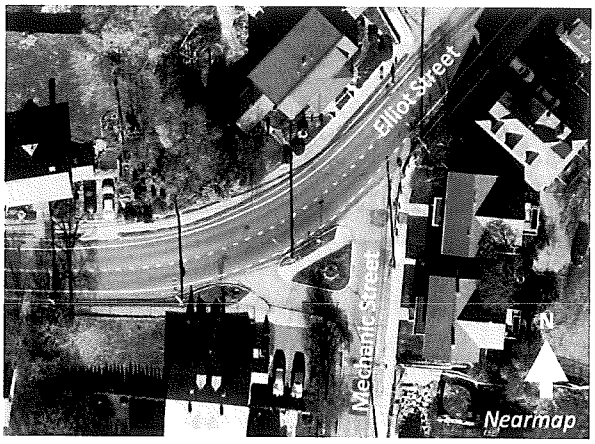


Figure 2: Mechanic Street and Linden Street

Cottage Street intersects Elliot Street from the north to form a three-way unsignalized intersection, stop controlled at the Cottage Street southbound approach. Cottage Street follows a north-south alignment and connects Elliot Street to the residential neighborhoods to the north. At the intersection, Cottage Street provides one lane in each direction, but no centerline is marked. Sidewalks are provided on both sides of the roadway. At the Elliot Street intersection, Cottage Street has a steep downward grade towards the intersection.

Wetherell Street intersects Elliot Street from the southeast to form a three-way unsignalized intersection, stop controlled at the Wetherell Street approach. Wetherell Street connects with Mechanic Street to the west. The road provides one lane in each direction, but no centerline is marked. Sidewalks are provided on both sides of the roadway.

On-street parking is permitted on Mechanic Street, Cottage Street, Wetherell Street and Linden Street, but "No Parking here to the Corner" signs exist on all the side streets prohibiting parking close to the Elliot Street intersections.

3.3 CRASHES

MassDOT reported eight crashes in the study area on Elliot Street between 2015 and 2022, averaging one crash per year. Of the crashes, three crashes were single vehicle crashes, involving a vehicle colliding with a tree, and two crashes were rear end crashes. Two of the reported crashes resulted in a suspected injury. No crashes were reported involving pedestrians or bicyclists. A crash summary is provided in **Table 1**.

4.0 Concept Alternatives

4.1 Alternatives Description

In order to develop concept alternatives reflecting the City of Newton priorities, BETA evaluated the best practices in traffic calming facility types, examined the feasibility of different facilities within the project corridor, created concept alternatives for each project intersection, developed cost estimates for the concepts, considered how traffic calming alternatives could be combined toward maximizing safety while minimizing cost, and worked with the City's Complete Streets Working Group to identify a preferred concept.

Facilities considered during the conceptual design process included street level bicycle lanes separated from traffic by vertical flex posts or bollards, grade separated (e.g., sidewalk-level) bicycle lanes, curb extensions, rapid rectangular flashing beacons (RRFBs), curb ramps with detectable warning panels, raised crosswalks, narrowed travel lanes, intersection realignment, and speed feedback radar signs.

One concept was developed for the crossing of Elliot Street at Wetherell Street, two concepts were developed for the crossing at Elliot Street and Cottage Street, two concepts were developed for the crossing at Elliot Street and Linden Street, and six concepts were developed for the curved section of the corridor at Mechanic Street. The preliminary project concepts were presented to the Complete Streets Working Group on August 11, 2022, and revised concepts on December 1, 2022. The concept alternatives are summarized in **Table 2**.

Table 2: Summary of Concept Alternatives

Elliot Street at Linden Street	
Alternative 1	Separated bike lanes, a new crosswalk, curb extensions, RRFB, and upgraded curb ramps.
Alternative 2	A new crosswalk, RRFB, and upgraded curb ramps.
Elliot Street at Mechanic Street	
Alternative 1A	Narrowed travel lanes, a north side bollard separated bike lane, and south side curb separated bike lane through the existing traffic island.
Alternative 1B	Same as 1A with shortened crossing distance.
Alternative 2A	Narrowed travel lanes, a north side sidewalk level bike lane, and a south side bollard separated bike lane.
Alternative 2B	Narrowed travel lanes, a north side sidewalk level bike lane, and a south side curb separated bike lane through the existing traffic island.
Alternative 3A	Intersection realignment, narrowed travel lanes, a north side and south side sidewalk separated bike lane, shortened crossing distances, and additional landscaped areas.
Alternative 3B	Same as 3A with raised crosswalk on side street.

Elliot Street at Mechanic Street

At the intersection of Elliot Street and Mechanic Street, the project team examined multiple alternatives. The alternatives differed in the type of protection utilized for the bike facilities, the location of crosswalks, the utilization of raised crosswalks vs. traditional crosswalks, and the location of the bike lanes. The bike treatments considered included both street level and grade-separated (or sidewalk-level) bike lanes. The bike lane on the south side of the intersection either stayed in the roadway or moved south into the existing traffic island through widening of the existing sidewalk area. The utility pole on the island was considered in all alternatives and no concept is expected to require the relocation of the pole. All bike lanes at sidewalk level required bike ramps to get cyclists from the existing shoulder bike facility to the raised facility. The concepts include lower and higher cost and maintenance alternatives.

Figure 5 and **Figure 6** show **Alternatives 1A and 1B** for the Mechanic Street intersection. Alternative 1A and 1B both include a vertical flex-post or bollard protected bike lane on the north side of the intersection and a bike lane on the south side through the existing traffic island. Neither alternative moves the curb on Elliot Street or the existing guardrail on the southeast side of the intersection. The introduction of the flex-posts/bollards narrows the roadway to reduce vehicle speeds and creates a more comfortable space for bicyclists separated from traffic. The only difference between these two alternatives is the location of the crosswalk on the south side of the intersection. Alternative 1A extends the crosswalk to the existing gap in the guardrail, and Alternative 1B shortens the crosswalk by moving the crosswalk to meet the sidewalk south of the guardrail.

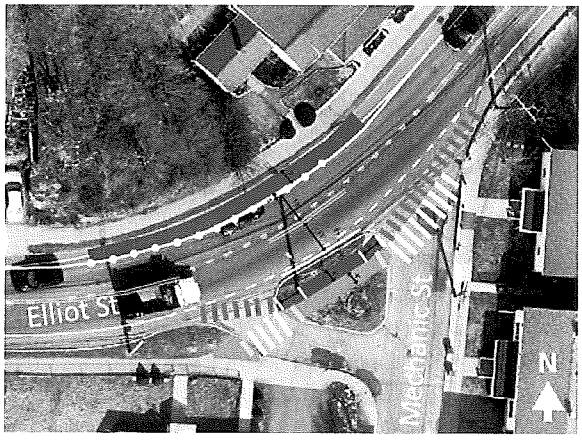


Figure 5: Mechanic Street Alternative 1A

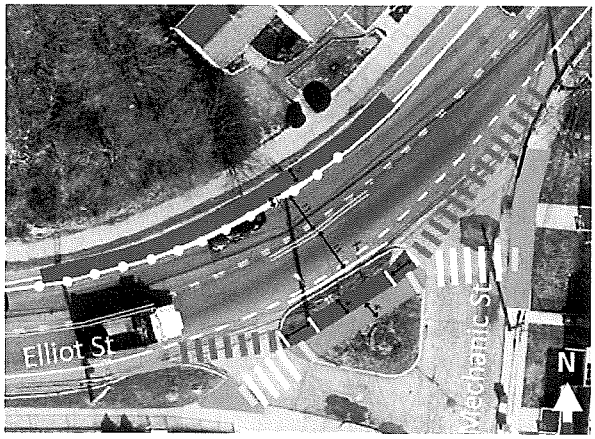


Figure 6: Mechanic Street Alternative 1B

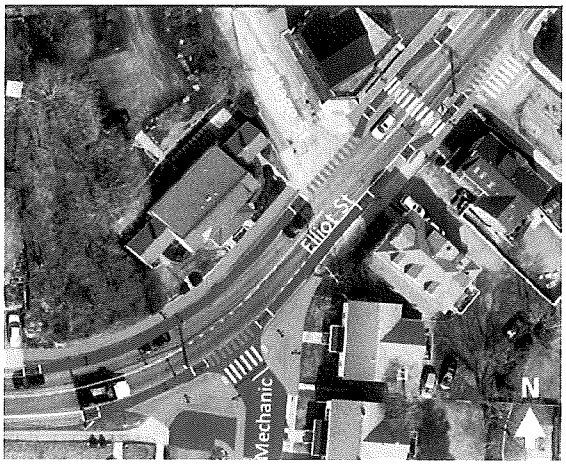


Figure 9: Mechanic Street Alternative 3A

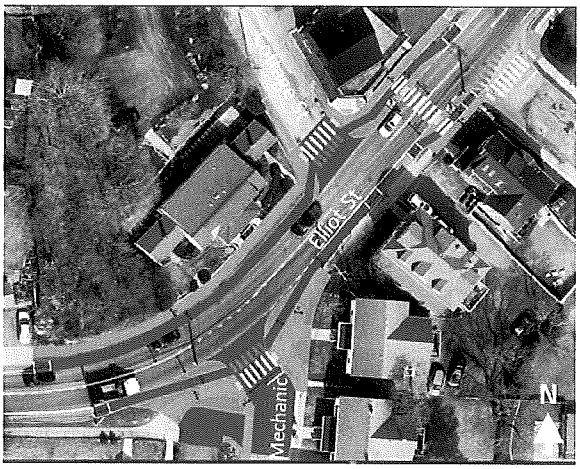


Figure 10: Mechanic Street Alternative 3B

Elliot Street at Wetherell Street

The final concept in **Figure 11** shows a crosswalk across Elliot Street at Wetherell Street, an alternative to the Cottage Street crossing shown in **Figures 9 and 10.** The stopping sight distance to a potential new crosswalk on Elliot Street at Wetherell Street is longer (340 feet) than the sight distance to a potential new crosswalk at the Cottage Street intersection (250 feet), providing more time for vehicles traveling eastbound on Elliot Street to stop. The alternative again mimics the design of Alternative 1 at the Linden Street and Elliot Street crossing including a new crosswalk, RRFB, curb extensions, and bike lanes in back of the accessible ramps. The concept requires the removal of a mature large tree on the north side of Elliot Street and does not provide crossing at the existing pedestrian desire line.

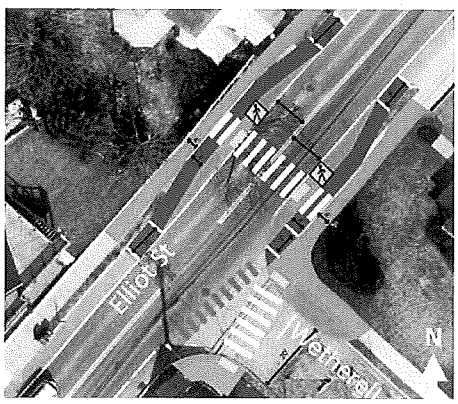


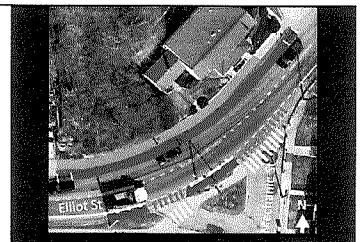
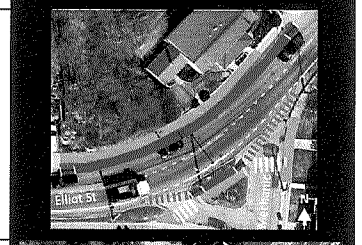
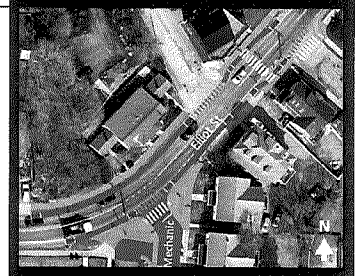
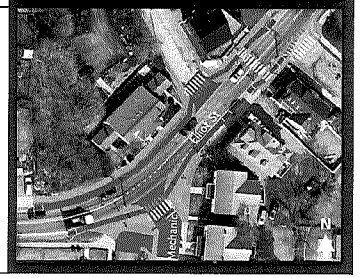
Figure 11: Elliot Street and Wetherell Street

4.2 Alternatives Evaluation

To decide which alternatives to include in the final package of preferred corridor improvements, BETA evaluated the advantages and disadvantages of each alternative, created cost estimates for each alternative, and conducted a discussion with the Complete Streets Working Group and the City of Newton to determine the package of improvements that best advances the project goals within the limits of the project budget.

Table 3 summarizes the advantages and disadvantages of each concept alternative as identified by the BETA project team, City staff, and members of the Complete Streets Working Group.

Table 3: Evaluation of Advantages and Disadvantages and Cost Estimate (2022) of Each Alternative (continued)

2A	• Creates permanent vertically separated bicycle accommodation on the north side of the curve • Narrows travel lanes • Formalizes bike lanes on south side of the curve	• Flex-posts/bollards require on-going maintenance • Wintertime flex-post/bollard removal seasonally eliminates benefit of bollards	$128,000	
2B	• Creates permanent vertically separated bicycle accommodation on both sides of curve • Narrows travel lanes	• More expensive than 2A	$135,000	
3A	• Creates permanent vertically separated bicycle accommodation on both sides of curve • Narrows travel lanes • Shortens crossing distances, reducing conflicts, and improves vehicle sight lines • May allow for removal of the guardrail	• Expensive	$211,000	
3B	• Creates permanent vertically separated bicycle accommodation on both sides of curve • Narrows travel lanes • Shortens crossing distances, reducing conflicts, and improves vehicle sight lines • Adds raised crossings across side street • May allow for removal of the guardrail	• Expensive	$235,000	

Following the initial evaluation of the concept alternatives, BETA created 12 packages of improvements (shown in **Table 4**), combining the alternatives. The advantages and disadvantages, costs, and trade-offs of each package were discussed with the Complete Streets Working Group and City staff on December 1, 2022. During the conversation, the Complete Streets Working Group and the City expressed the importance of prioritizing packages that included alternatives 3A or 3B with the realignment of the Mechanic Street intersection which provide a significant pedestrian and bicycle improvement. The Working Group noted the importance of shortened pedestrian crossing distances, increased green space, improved sight lines, and sidewalk level bike lanes at the curve at this location. The Working Group also noted the importance of reducing ongoing maintenance costs associated with the alternatives that included flex posts/bollards. This led the Working Group to narrow the packages down to #5, #6, #11, and #12.

Table 4. Considered Packages of Improvements with 2022 Cost Estimates

#	Packages	Cost (2022)
1	Linden 1 + Mechanic 1A + Wetherell (or Cottage 1)	$333,000
2	Linden 1 + Mechanic 1B + Wetherell (or Cottage 1)	$348,000
3	Linden 1 + Mechanic 2A + Wetherell (or Cottage 1)	$403,000
4	Linden 1 + Mechanic 2B + Wetherell (or Cottage 1)	$410,000
5	Linden 1 + Mechanic 3A/Cottage 1	$480,000
6	Linden 1 + Mechanic 3B/Cottage 2	$514,000
7	Linden 2 + Mechanic 1A + Wetherell (or Cottage 1)	$243,000
8	Linden 2 + Mechanic 1B + Wetherell (or Cottage 1)	$258,000
9	Linden 2 + Mechanic 2A + Wetherell (or Cottage 1)	$313,000
10	Linden 2 + Mechanic 2B + Wetherell (or Cottage 1)	$320,000
11	Linden 2 + Mechanic 3A/Cottage 1	$390,000
12	Linden 2 + Mechanic 3B/Cottage 2	$424,000

APPENDIX

A. COMPLETE STREETS WORKING GROUP MEETINGS

During the conceptual design process, the BETA project team met with the Newton Complete Streets Working Group two times; August 11, 2022, and December 1, 2022, to discuss the alternative concepts.

Concept Review on August 11, 2022

At this meeting, BETA presented preliminary concepts for the intersection of Linden Street and Elliot Street, the intersections of Mechanic Street and Cottage Street, and the intersection of Wetherell Street and Elliot Street. During the conversation, we received the following feedback.

- If the level landing area for the curb ramp is in the bike lane, consider where people will activate the RRFB.
- The roadway width is narrow to accommodate all of the amenities planned.
- Consider tactile separation between bike lane and sidewalk for people with limited vision.
- Consider pavement markings like shark teeth and signage as a visual cue to drivers to slow down on both sides of the gateway.
- If speeds are reduced, removing the guardrail would be preferred.
- Snow removal should be considered when deciding on the type of bike lane separation. Sidewalk level bike lanes would allow for plowing of sidewalks and bike lanes at the same time.
- The Cottage Street crosswalk alternatives would require moving the bus stop.
- Raised devices should be considered on the side streets but not on Elliot Street, as these receive scrutiny by the fire department.
- General consensus was in favor of Alternative 3B with the Linden and Cottage Streets curb extensions.

Concept Review on December 1, 2022

At this meeting, BETA presented updated concepts, cost estimates and a cost benefit analysis to the Complete Streets Working Group for comment. During the conversation, BETA received the following feedback:

- Consider the pros and cons of each of the alternatives, as this will assist with the public process.
- Consider the cost of maintenance when evaluating alternative concepts, and generally, any means of lowering maintenance is preferred.
- When considering tradeoffs, a more significant investment at Mechanic Street and Cottage Street is more important than a higher investment at Linden Street.
- Desire to remove the guardrail if possible.
- Consider the width of any grass strips, for ease of maintenance.
- Alternatives that increase green space are more desirable.
- Importance of engaging the public and local stakeholders early in the process.
- General preference for Mechanic Street Alternative 3A, Alternative 1 for Cottage Street, and Alternative 2 for Linden Street.