

***Chestnut Street over Ipswich River
Bridge Replacement Project
PLPA – Alternatives Analysis***

North Reading, Massachusetts

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Public Lands Preservation Act (PLPA) – Alternatives Analysis:

In accordance with the Executive Office of Energy and Environmental Affairs (EEA) and the Guidance on Public Lands Preservation Act (PLPA) Implementation issued in February 2023, the Town of North Reading issues the following alternatives analysis as required by the PLPA for the change of use of land related to the proposed bridge replacement project at the Chestnut Street bridge over the Ipswich River in North Reading. The purpose of the alternatives analysis is to demonstrate that no feasible or substantially equivalent alternative exists that avoids or further minimizes impacts to the public land adjacent to the project site subject to Article 97 of the Massachusetts Constitution.

(i) Explain the Proposed Article 97 Action and Identify the Public Purpose that it will Serve

The bridge carrying Chestnut Street over the Ipswich River failed in May 2023, resulting in sinkholes in the road surface. As such, Chestnut Street has been closed to vehicular and pedestrian traffic in an effort to preserve safety for all roadway users. Chestnut Street provides direct access to residences, the Town DPW complex, businesses (including a lumber yard/delivery service), and a public park.

The Town of North Reading has procured engineering design and permitting services for the replacement of the existing bridge. The existing bridge (comprised of twin CMP plate arches) will be replaced with a single span precast concrete bridge structure. According to MassMapper, there is land subject to Article 97 on the southwest side of the bridge within the proposed project limits.

The proposed Article 97 action involves the permanent physical change of approximately 533 square feet of land within the Chestnut Street Conservation Area. In its current state, this land is conservation land located mostly in a flagged wetland. The proposed construction will result in the permanent physical change of the land to be a sloped riprap embankment in front of a proposed wingwall. To accommodate the proposed bridge structure, Chestnut Street will be raised by approximately 9"-12". The proposed wingwall is required to accommodate the grading changes associated with raising the roadway. The sloped embankment in front of the wingwalls is structurally necessary for the design of the wall.

In addition to the permanent impacts described above, there will also be a temporary construction impact of approximately 3,645 square feet on the same parcel of land. These temporary impacts are a byproduct of installing the proposed structures and temporarily relocating utility poles during construction. All temporary impacts will be restored to their pre-construction condition and will not experience a permanent physical change in use.

(ii) Identify the Alternatives Considered

The following alternatives were considered and evaluated:

- A) Replace failed Chestnut Street bridge with a Box Culvert
- B) Replace failed Chestnut Street bridge with a CMP (Corrugated Metal Pipe) Culvert
- C) Replace failed Chestnut Street bridge with a Single Span Precast Concrete Bridge
- D) No-build at the failed Chestnut Street bridge and permanently close the bridge/roadway

(iii) Describe Why Each Alternative Not Selected is Not Feasible or Substantially Equivalent to the Proposed Article 97 Action

- A) The Box Culvert replacement alternative was determined to be not feasible because it does not meet the MassDEP Stream Crossing Standards (SCS). This alternative would not allow for a proposed span that meets the 1.2x bankfull width requirement and would not satisfy the required openness ratio of 0.82. A Box Culvert typically does not exceed a 30-ft span meaning

multiple cells would be required which is not preferred by many environmental permitting agencies. Additionally, this alternative would likely result in a more significant environmental impact compared to the other options as it would need to be embedded into the existing streambed by a minimum of 2-feet. This would require additional streambed dredging/restoration which is more intrusive to environmentally sensitive areas.

- B) The CMP replacement alternative (replace in kind) was determined to be not feasible because it does not meet the MassDEP Stream Crossing Standards (SCS). For the same reasons as Alternative A, this alternative also would not allow for a proposed span that meets the 1.2x bankfull width requirement and would not satisfy the required openness ratio of 0.82. Additionally, MassDOT does not recommend this structure type over water crossings as steel is extremely prone to deterioration at the water line, which results in permanent, irreparable deterioration.
- C) The Single Span Precast Concrete Bridge meets all the MassDEP Stream Crossing Standards (SCS) and is the preferred structure type from MassDOT for spans of this length. Similarly, early in the design process, the Town coordinated with various stakeholders in the area (such as the Ipswich River Watershed Association) who strongly supported this structure type over the other alternatives presented.
- D) The no-build option is not feasible for this project, as it would result in the permanent closure of Chestnut Street at the bridge location. The bridge is located on an Urban Collector roadway with an Average Daily Traffic (ADT) of 5200. Permanently closing this bridge and stretch of Chestnut Street would re-route traffic to other roads in Town that may not be able to handle the additional traffic volumes. Chestnut Street provides a critical link for the Town, residences, and park users. Leaving Chestnut Street closed due to the failed bridge is not a feasible solution.

Regarding Article 97 land, Alternatives A, B, and C would have a similar impacts to the Article 97 land.

The Town respectfully requests that the Secretary consider a waiver for the replacement land and the "Funding in Lieu" requirements of the PLPA. The Town believes that the areas within the parcel being permanently changed (approximately 533 square feet) are not of significant natural resource or recreational value. Generally, the land in question is overgrown brush on the side of the roadway that is almost never occupied by the public.

The project serves a significant public interest in that it will re-open a vital transportation link for roadway users along Chestnut Street.