



# TOWN OF TRURO

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Department of Public Works

## Mill Pond Q&A

March 2023

**1. What alternatives have been modeled and show the greatest environmental restoration?**

8'x 8' culvert

8'x 10' culvert

95' wide opening with 10' wide channel breach

65' wide opening with 15' bottom wide channel breach

**2. What environmental considerations have the town's consultants included in their analysis?**

Using the model that the Woods Hole Group developed for Massachusetts we can understand specific and far-reaching flood scenarios for Mill Pond. The state flood risk model looks at both current and future storm risks with sea level rise for the entire Massachusetts coastline, and this includes the 100-year storm event and larger storm events both with and without sea level rise.

**3. As part of the final design for all alternatives would mitigation measures be incorporated into the final design to address impacts to the Depot Road embankment and adjacent properties to protect those areas from coastal storm events?**

The Depot Road embankment and adjacent properties overlooking Mill Pond will require the embankment to be armored with stone, coir rolls, and plantings as needed. Drainage structures will also need to be added to contain stormwater runoff in the Depot Road embankment, and a traffic study for Depot Road will be conducted to determine the best traffic calming measures for Depot Road. Additionally, if the breach is selected, the redesign of the Old County Road and Depot Road intersection will be done to accommodate trailered boats traveling on Old County Road.

**4. As we did with Eagle Neck Creek as part of the final design will accommodations be made to direct abutters to address safe/accessible access to their personal property if the breach alternative is chosen?**

Yes. Chief Collins has recommended widening the access to 20 Mill Pond Road to accommodate emergency vehicles. The properties of 31 and 40 Mill Pond Road will also be able to access their driveway as they do today. Chief Calise and Chief Collins submitted memos which can be found on the DPW website: [Mill Pond Salt Marsh Restoration Project](#).

**5. What is the lifespan of a new culvert?**

70 to 100 years with proper maintenance.

**6. Is Town Meeting action required to permanently close a road?**

No.

**7. Have any traffic studies been completed around Depot Road?**

Yes. Please visit the DPW website for a complete listing of town traffic counts and studies: [Mill Pond Salt Marsh Restoration Project](#).

**8. What are the environmental benefits the larger breach offers?**

Based on the modeling results, all alternatives present very similar environmental benefits. The larger breach is not expected to provide significantly more benefits to salt marsh and intertidal habitat than a culvert option since tidal ranges and elevations will be very similar. The large breach would create a new salt marsh platform where there is a roadway now which would be more beneficial in creating an additional area of shellfish habitat. Without high vehicle use and by removing the asphalt and associated drainage structures this would be a net reduction in pollutant loading into the salt marsh and estuary.

**9. Will any of the alternatives promote sediment travel upstream towards Pamet Harbor that would result in a negative impact on shellfish or the established mooring field and harbor?**

A significant amount of sand has already migrated upstream into Mill Pond with prior culvert repairs/replacements. Some additional sand may be deposited upstream in Mill Pond and is likely a benefit to the intertidal and shellfish habitat. Some fine material may be scoured, mobilized, and moved out of Mill Pond and downstream into Pamet Harbor, however, the amount is likely minimal and could be deposited in the salt marsh platform, which could act to nourish the salt marsh. I do not believe that there will be a large plume generated that will cause water quality or turbidity issues in Pamet Harbor. The fine material in the pond is cohesive and unlikely to be mobilized by additional tidal flow. Additionally, the modeling for all the alternatives does not show Mill Pond completely emptying out at low tide.

**10. If we do not raise Mill Pond Road and just install the culvert, when does the road overtop?**

The road would be overtopped in the present day with a 10-year storm event, and more frequently with 2' of sea level rise in 2070.

**13. If the town raises the road two feet and installs the culvert when would the road overtop?**

Raising the road two feet today will provide protection against the 100-year storm event in present day. In 2070, raising the road two feet will only provide protection from a 10-year storm event.

**14. What other options does the town have besides permanent roadway closure, and installing a breach?**

- Do nothing and continue to provide maintenance above mean high water and continue to protect the roadway and culvert area from undermining – for as long as possible.
- Install a new culvert and raise the road at a later date.
- Install a new culvert and raise the road two feet.

**15. Have the public safety officials weighed in on emergency access to Pamet Harbor?**

Yes. Both public safety officials, Chief Collins, and Chief Calise, have submitted written opinions and are posted on the DPW website: [Mill Pond Salt Marsh Restoration Project](#).

**16. What effect does permanent roadway closure have on the water quality around Mill Pond?**

The breach option will provide a reduction in stormwater runoff from the paved surface which will translate into a reduction in pathogens, organic nutrients, hydrocarbons, and heavy metals.

**17. What impact does continue vehicle travel have over Mill Pond Road regarding water quality?**

Mill Pond Road water quality is controlled by tidal exchange with Pamet Harbor. Both the culvert and breach alternatives restore full tidal exchange and flushing to Mill Pond. Mill Pond water quality is impaired by the undersized culvert under the road which reduces tidal flushing in poor mixing, sedimentation, and nutrient retention. Roadway removal and its associated stormwater drainage will reduce the pollutant loading into the salt marsh and estuary.

**18. Which committees and/or boards should have oversight or interest in this project?**

- The Board of Health for water quality concerns, location of septic systems and well locations.
- The Conservation Commission has jurisdiction over the project due to the close proximity to a wetland.
- The Climate Action Committee is charged with assessing the town's vulnerabilities to the consequences of climate change.
- The Shellfish Committee's interest would be the impact of tidal flushing on shellfish propagation.
- The Harbor Commission's concerns would be emergency access/egress to Pamet Harbor and traffic increases on Depot Road.

**19. What is the cost of obtaining easements?**

Any parcel that is permanently physically impacted by construction would require a permanent easement for maintenance. Any parcel temporarily impacted by construction would also require a temporary easement for construction purposes only. Historically, easements have been funded by operational funds through town manager approval.

**20. The roads listed in the table shown on the Cape Cod Commission's Low-Lying Roads Study (click here to view) are only the roads that scored the highest in terms of both their flooding vulnerability and criticality score. Why was Mill Pond identified as a vulnerable road but had a low criticality score?**

- Low volume rural road.
- Road doesn't support an Environmental Justice Community (it now does)
- No critical facilities present (Pamet Harbor is one but linked to Depot Road)
- Does not support emergency critical facilities.
- Does not support physical businesses.
- There are alternative routes for access for property owners, through traffic, and emergency vehicles.

Mill Pond Road did not make the top priority list because it is not considered a high-priority asset. This sort of analysis does not consider people's emotional feelings toward the road. But as a reminder, the basis for this project is a culvert replacement project to enhance estuarine habitat & storm drainage and that road closure was an enhancement of one set of replacement alternatives (breach).

**21. Will Mill Pond Road remain open to the public for vehicular travel?**

Yes. Apart from the pedestrian bridge to be installed, Mill Pond Road will remain open to the public for vehicular travel.

**22. Will the town continue to maintain Mill Pond Road for vehicular travel?**

Yes. The town will continue to maintain Mill Pond Road for vehicular travel, apart from the pedestrian bridge to be installed. The town will maintain the pedestrian bridge for recreational use. The road will not be abandoned or permanently closed.

**23. Is the town abandoning Mill Pond Road?**

No. The town is not abandoning any portion of Mill Pond Road.

**24. Is the town discontinuing Mill Pond Road?**

No. The town is not discontinuing any portion of Mill Pond Road.

**25. Is Town Meeting approval required for the construction of the pedestrian bridge or for the exclusion of vehicles from the bridge?**

No. Town Meeting approval is not required.

**26. Why not a bridge?**

The culvert alternatives serve the same purpose and offer very similar environmental benefits as a causeway or a traditional bridge. Funding for something larger than the proposed culverts would need to be funded by the taxpayers as grant funding would not be easily awarded for this scenario. The Select Board will need to consider which low-lying roads identified in previous studies are essential low-lying roads and worthy of taxpayer investment.

## Mill Pond Alternatives

Objective: Restore tidal flow to Mill Pond by replacing the undersized, damaged culvert.

Benefits: Restore degraded salt marshes, Water quality improvements, improved drainage/runoff

Option	Size	Comments	Cost Estimate	Funding source
Large Culvert 1	10.5 x 8'	Town cost share is \$605,000.	\$2.42 million	USDA 75%
Small Culvert 2	8 x 8.5'	Like Eagle Neck Creek Town cost share is \$550,000.	\$2.2 million	USDA 75%
Smaller Breach 1	65' breach with 15' channel at bottom	Town cost share is \$275,000.	\$1.1 million	USDA 75%
Larger Breach 2	95' breach with 10' channel at bottom	Sides stepped down ("benches") Town cost share is \$370,000.	\$1.48 million	USDA 75%
Raising of road	NA	Difficult to permit as would need to be wider on each side	\$1.6 – 1.8 million	Unsure of availability

Note: The cost estimates carry a high dollar contingency based on the current market price and anticipated construction date of approximately three years from now. The Town would be the funding source for raising the road unless there is another outside funding source found.

## 27. What are the environmental benefits the larger breach offers?

Based on the modeling results, all four alternatives will provide a similar level of tide and salinity restoration to Mill Pond. This will promote tidal flushing that will improve the overall water quality and enhance salt marsh habitat for associated flora (e.g. *S. alterniflorus*) and fauna (e.g. fish, shellfish, wading birds, crustaceans, etc.).

However, the two (2) open channel (breach) alternatives provide additional environmental benefits over the box culvert alternatives including:

- Existing anthropogenic hard structures (concrete, asphalt, etc.) and features (guardrails, etc.) will be removed and replaced with natural materials such as stone, compatible sediment, and vegetation plantings that will provide additional habitat for salt marsh organisms.
- The use of Mill Pond Road will eliminate vehicular traffic and associated pollution and be limited to bikers and walkers.
- Removing the asphalt and associated drainage structures would result in a net reduction in pollutant loading from stormwater runoff into the salt marsh and estuary (great for shellfish).

Furthermore, Alternative 4, the large open channel breach, has the added benefit of removing additional anthropogenic features and converting the existing roadway directly into a salt marsh by creating salt marsh benches. These would be constructed by excavating the roadway berm elevation to the elevation of the existing salt marsh platforms in Pamet Harbor and Mill Pond, which would then be planted with salt marsh vegetation. The toe of the salt marsh bench would be reinforced using natural stone to retain the material. Alternative 4 would provide increased habitat connectivity by extending the existing salt marsh platform from Pamet Harbor through the open channel and into Mill Pond.

### **Excerpt from opinion letter by Water Resource Consultant, Scott Horsley -**

*“I concur with the recommended alternative (breach channel with a 95-foot top). In my opinion, this is the best long-term solution and will provide the best water quality and ecological restoration results. With climate change and sea level rise in mind, this solution will also provide the most resilience to these changing conditions. The removal of the road and its associated stormwater drainage will be a net reduction in pollutant loading to the salt marsh and estuary.”*

# Alternatives Comparison & Evaluation

- A decision analysis matrix was prepared to help rank each alternatives to aid the decision process for the Town (top table):
  - Criteria included: environmental impacts, property impacts, ecology, emergency response, recreation, construction cost & duration, O&M, & resiliency.
  - Alternative 4 the large open channel (breach) was the highest ranked alternative.
  - Culvert alternatives are more expensive than the open channel breach alternatives because of the structural elements, materials, and labor/construction costs.
  - Open channel (breach) alternatives have greater habitat value and plan for future resiliency.
- The MA DER Blue Carbon Calculator was used to estimate potential project restoration benefits in terms of emissions reductions (bottom table).
  - Restored marshes sequester carbon & reduce CH4 emissions.
  - The reduction in Greenhouse Gases (GHG) is equivalent to 589 gallons of gas saved in a year, which is cumulative over future years.

Alt. #	Alternative	Order of Magnitude Opinion of Cost*	Unweighted Evaluation Matrix Score	Weighted Evaluation Matrix Score
1	8' Wx8.5' H Culvert	\$2.20M	2.67	2.66
2	10' Wx8.5' H Culvert	\$2.42M	2.67	2.69
3	65' Breach / 15' Bottom	\$1.13M	3.78	3.80
4	95' Breach / 10' Bottom	\$1.48M	3.67	3.74

\*Order-of-magnitude opinions of probable construction costs that do not include final design, permitting, outreach, monitoring, etc.

Cumulative Emissions/Reductions	Years Post Project					
	1	10	20	30	40	50
CO2-C (tons CO2-C)	-1	-14	-28	-43	-57	-71
GHG (tons CO2e)	-5	-52	-104	-156	-208	-261
GHG (gallons of gas equivalent)	-589	-5,888	-11,777	-17,665	-23,554	-29,442



## Other Alternatives/Considerations

Raising the road to keep pace with sea level rise:

- Roadway would need to be raised at least 2-feet over a ~1,600 foot length to provided necessarily resiliency.
- Roadway embankment would expand by 6-feet on either side that would pose significant regulatory implications for wetlands. Therefore, a vertical concrete wall would be needed to reduce wetland impacts.
- The additional cost to raise the roadway by 2-ft in conjunction with culvert replacement is approximately \$1.6-1.8M, which would not be covered by current or other available grant programs.
- Mill Pond Road was evaluated under the Low-Lying Road Study but ranked low. While the road was identified as being vulnerable, it had a low criticality score since alternative routes are available and it does not support any businesses, community or emergency services (among other factors).

Bridge or Causeway over an open channel (breach)?

- A bridge over an open channel does not provide any additional benefits over the large box culvert since
  - The box culverts restore full tidal range already
  - Provides sufficient headspace for small watercraft.
- Adds significant cost that would not be eligible for available grant funding sources.
- Would require the bridge to be redesigned/reconstructed in the future if the roadway is raised.



## Summary

- ❖ Town is holding this meeting to engage the public and receive feedback regarding the conceptual alternatives.
- ❖ Four alternatives have been developed including a two box culverts that maintains Mill Pond Road and two open channels (breaches) where the roadway is removed.
- ❖ All four alternatives provides a similar level of tidal restoration.
  - ❖ Alternative 4 creates additional salt marsh habitat with potential additional water quality benefits.
- ❖ Open Channel (breach) alternatives rank higher than box culverts in decision matrix due to less cost, less impacts, and increased ecological benefits.
- ❖ Additional engineering studies and design will be needed once a preferred alternative has been selected.
- ❖ Engage Agencies and develop the Environmental Permitting Path for selected alternative. Permitting path will likely require 6 different permits and take 18 months. This will provide further opportunity for public comment.
- ❖ Working to secure additional grant funding to advance the project.

Thanks to Project Partners:



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