

*For Office Use Only*  
 Executive Office of Environmental Affairs

EOEA No.: **12797**  
 MEPA Analyst: **Bill Gage**  
 Phone: 617-626-**1025**

# ENF Environmental Notification Form

The information requested on this form must be completed to begin MEPA Review in accordance with the provisions of the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: <b>Tuxbury Pond Dam Improvement</b>		
Street: <b>Newton Road</b>		
Municipality: <b>Amesbury</b>	Watershed: <b>Merrimack</b>	
Universal Transverse Mercator Coordinates:	Latitude: <b>42° 51' 44" N</b> Longitude: <b>70° 59' 02" W</b>	
Estimated commencement date: <b>Fall 2002</b>	Estimated completion date: <b>Winter 2002</b>	
Approximate cost: <b>\$700,000</b>	Status of project design: %complete <b>90%</b>	
Proponent: <b>Town of Amesbury</b>		
Street: <b>62 Friend Street</b>		
Municipality: <b>Amesbury</b>	State: <b>MA</b>	Zip Code: <b>01913</b>
Name of Contact Person From Whom Copies of this ENF May Be Obtained: <b>Mr. J. Matthew Bellisle, P.E.</b>		
Firm/Agency: <b>Pare Engineering Corporation</b>	Street: <b>49 Walpole Street, Suite 2</b>	
Municipality: <b>Norwood</b>	State: <b>MA</b>	Zip Code: <b>02062</b>
Phone: <b>(781)762-1442</b>	Fax: <b>(781)762-4780</b>	E-mail: <b>mbellisle@parecorp.com</b>

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?  
 Yes  No

Has this project been filed with MEPA before?  
 Yes (EOEA No. \_\_\_\_\_)  No

Has any project on this site been filed with MEPA before?  
 Yes (EOEA No. \_\_\_\_\_)  No

Is this an Expanded ENF (see 301 CMR 11.05(7)) requesting:

a Single EIR? (see 301 CMR 11.06(8))	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
a Special Review Procedure? (see 301CMR 11.09)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
a Waiver of mandatory EIR? (see 301 CMR 11.11)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
a Phase I Waiver? (see 301 CMR 11.11)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Identify any financial assistance or land transfer from an agency of the Commonwealth, including the agency name and the amount of funding or land area (in acres): \_\_\_\_\_

Are you requesting coordinated review with any other federal, state, regional, or local agency?  
 Yes (Specify \_\_\_\_\_)  No

List Local or Federal Permits and Approvals:  
Amesbury Conservation Commission NOI, ACOE PGP, MADEM Chp. 253

Which ENF or EIR review threshold(s) does the project meet or exceed (see 301 CMR 11.03):

- |                                 |                                       |  |
|---------------------------------|---------------------------------------|--|
| <input type="checkbox"/> Land   | <input type="checkbox"/> Rare Species | <input checked="" type="checkbox"/> Wetlands, Waterways, & Tidelands |
| <input type="checkbox"/> Water  | <input type="checkbox"/> Wastewater   | <input type="checkbox"/> Transportation                              |
| <input type="checkbox"/> Energy | <input type="checkbox"/> Air          | <input type="checkbox"/> Solid & Hazardous Waste                     |
| <input type="checkbox"/> ACEC   | <input type="checkbox"/> Regulations  | <input type="checkbox"/> Historical & Archaeological Resources       |

Summary of Project Size & Environmental Impacts	Existing	Change	Total	State Permits & Approvals
<b>LAND</b>				<input type="checkbox"/> Order of Conditions <input type="checkbox"/> Superceding Order of Conditions <input type="checkbox"/> Chapter 91 License <input type="checkbox"/> 401 Water Quality Certification <input type="checkbox"/> MHD or MDC Access Permit <input type="checkbox"/> Water Management Act Permit <input type="checkbox"/> New Source Approval <input type="checkbox"/> DEP or MWRA Sewer Connection/ Extension Permit <input checked="" type="checkbox"/> Other Permits <i>(including Legislative Approvals) – Specify:</i>  <u>ACOE PGP</u>  <u>MADEM Ch. 253</u>
Total site acreage	1.2			
New acres of land altered		0		
Acres of impervious area		0		
Square feet of new bordering vegetated wetlands alteration		0		
Square feet of new other wetland alteration				
Acres of new non-water dependent use of tidelands or waterways				
<b>STRUCTURES</b>				
Gross square footage				
Number of housing units				
Maximum height (in feet)				
<b>TRANSPORTATION</b>				
Vehicle trips per day				
Parking spaces				
<b>WATER/WASTEWATER</b>				
Gallons/day (GPD) of water use				
GPD water withdrawal				
GPD wastewater generation/ treatment				
Length of water/sewer mains (in miles)				

**CONSERVATION LAND:** Will the project involve the conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97?

Yes (Specify \_\_\_\_\_)  No

Will it involve the release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction?

Yes (Specify \_\_\_\_\_)  No

**RARE SPECIES:** Does the project site include Estimated Habitat of Rare Species, Vernal Pools, Priority Sites of Rare Species, or Exemplary Natural Communities?

Yes (Specify \_\_\_\_\_ )  No

**HISTORICAL /ARCHAEOLOGICAL RESOURCES:** Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?

Yes (Specify \_\_\_\_\_ )  No

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources?

Yes (Specify \_\_\_\_\_ )  No

**AREAS OF CRITICAL ENVIRONMENTAL CONCERN:** Is the project in or adjacent to an Area of Critical Environmental Concern?

Yes (Specify \_\_\_\_\_ )  No

**PROJECT DESCRIPTION:** The project description should include **(a)** a description of the project site, **(b)** a description of both on-site and off-site alternatives and the impacts associated with each alternative, and **(c)** potential on-site and off-site mitigation measures for each alternative (*You may attach one additional page, if necessary.*)

**SEE ATTACHED NARRATIVE**



Environmental Notification Form  
Tuxbury Pond Dam Improvements  
Amesbury, Massachusetts

a) **DESCRIPTION OF PROJECT:**

The Town of Amesbury proposes to improve the spillway at Tuxbury Pond Dam to repair current deficiencies and meet current discharge capacity, stability and design criteria as required by the Massachusetts Department of Environmental Management (MADEM) Office of Dam Safety under authority of M.G.L. Chapter 253 §§44-47. The deficiencies include severe deterioration of the low level outlet area, insufficient capacity and stability of the spillway system to pass the design flood, inadequate upstream slope protection, tree growth along the downstream left slope, and minor embankment stability and erosion concerns.

This structure is an intermediate sized, significant hazard structure that is a critical component within the drinking water supply system for the Town of Amesbury. As a part of this work, repair activities will also be performed at the Arch Brook Culvert in order to allow this structure to be used as a diversion structure during the progression of the work at Tuxbury Pond Dam. The proposed activities will occur within Riverfront Area, Bordering Vegetated Wetland (BVW), Buffer Zone, Bank, Land Under Waterbodies (LUW), and Bordering Land Subject to Flooding (BLSF).

**Proposed Work**

The work associated with the project will affect outstanding resource waters, as Tuxbury Pond serves as a significant source of drinking water for the Town of Amesbury. The project will alter 10,210 sf of outstanding resource waters. Of this area, 1,910 sf is Bordering vegetated wetlands and 8,300 sf is Land Underwater (5,090 sf of which is temporary). The proposed activities are described in the sections below

**Rationale**

In 1998, Tuxbury Pond Dam was inspected during the MADEM Office of Dam Safety inspection program. The Phase I inspection report<sup>1</sup> generated from that inspection indicated that Tuxbury Pond Dam was found to be in **Fair to Poor** condition. The hydraulic adequacy of the spillway was in question and there were several structural deficiencies noted at the site. The structural deficiencies included the deteriorated low-level outlet structure, severe scour at the base of the low-level outlet and spillway, severe seepage/leakage (possible piping concerns) through the downstream stone masonry retaining wall located to the right of the low level outlet structure, leaking at the low level outlet structure, deteriorated timber stop logs, and a failed stop log support at the right side of the principal spillway. To further evaluate the finding of the Phase I Report and evaluate repair alternatives, a Phase II evaluation was completed and a report was prepared for the dam in May 2000 by Pare Engineering. In addition to confirming the visually observed deficiencies, the hydrologic/hydraulic and stability analyses performed as a part of that report indicated that the spillway did not meet current state stability requirements and was hydraulically undersized. The embankment also lacked proper embankment slope protection.

In order to comply with state requirements for hydraulic capacity and factors of safety for stability, as well as address the other visually observed deficiencies, improvements to the dam embankment and spillway need to be implemented. These actions will minimize the risk to the downstream facilities, inhabitants and

<sup>1</sup> "Department of Environmental Management Office of Dam Safety Inspection/Evaluation Report of Tuxbury Pond Dam - 1998" prepared for MADEM Office of Dam Safety by Pare Engineering Corporation



Environmental Notification Form  
Tuxbury Pond Dam Improvements  
Amesbury, Massachusetts

the resource areas located both upstream and downstream of the structure. Additionally, the repairs enable proper and safe regulation and control of the Town's primary drinking water supply.

## Description of Work

### Preliminary Site Work and Temporary Work

Several activities need to be undertaken at the dam site in order to perform the work while maintaining near normal operating conditions and prevent off-site disturbances by the proposed activities. The items included in the scope of this section will be completely removed and returned to pre-construction condition at the completion of the project. The scope of work includes:

Installation of a temporary cofferdam to maintain the impoundment and divert flows while performing the work in the dry.

Diversion pipes will be installed in the embankment left of the spillway, designed to provide additional discharge capacity to pass storms flows. Pipe intakes and outlets will be protected with stone riprap.

Downstream sedimentation basin and diversion will be constructed to capture dewatering water and induce sediment removal before being discharged downstream.

Installation of hay bales and silt fences to control site runoff.

Establishing an equipment staging area maintained away from the resource areas.

### Spillway Work

The spillway work is being performed to address the deterioration of the low level outlet, stoplog controlled spillway, and scour pad, to increase the hydraulic capacity to pass the design flood, and to meet current stability requirements. The scope of work to address these concerns includes:

Remove and dispose the low-level outlet, primary spillway, overflow spillway, timber scour pad and training walls in their entirety.

- Install a steel sheet pile cutoff wall below the proposed spillway and for a minimum of 15 feet on either side of the spillway.

Construct a new concrete spillway and appurtenant training walls.

Construct a scour protection system at the downstream toe of the spillway to prevent future undermining of the spillway. This will include a reinforced concrete apron immediately downstream of the spillway and a stone riprap transition area farther downstream.

### Embankment Work

The embankment work is being undertaken to address deficiencies noted in the 1998 Phase I inspection report and quantified by PARE during the Phase II Investigation performed in 2000. The scope of work to address the deficiencies includes:

Remove and stockpile existing riprap, partially regrade, and install stone riprap protection along the upstream slope of the earth embankment.

Clear and grub all trees, brush, and stumps from the embankment.



Environmental Notification Form  
Tuxbury Pond Dam Improvements  
Amesbury, Massachusetts

Clear and grub all trees, brush, and roots from the downstream area for a distance of 10-feet beyond the downstream toe of the dam.

Regrade dam crest and downstream slope to uniform elevations and slopes.

### **Arch Brook Culvert Work**

The work at the Arch Brook Culvert is being performed to address the displaced stone and roots along the length of the culvert to allow for the structure to be used as a diversion structure during the course of the work at Tuxbury Pond Dam. The work at Arch Brook Culvert will be completed prior to the commencement of work at Tuxbury Pond Dam and includes:

Installation of haybales and silt fence as environmental controls.

Excavation and removal of the displaced stone blocking the culvert.

Reconstruction of the culvert roof, in the area of the observed damage, with cast in place concrete.

Trimming of roots and removal of accumulated debris along the length of the culvert.

Reseeding of excavated area to establish grass cover.

## **b.) ALTERNATIVES ANALYSIS**

There are three main components to the project; the spillway work; the embankment work; and the work at Arch Brook Culvert. The alternatives for each component are discussed below.

### **Spillway Work**

#### **No Work Alternative**

Due to the extent of the deterioration of the low level outlet and stop log controls at Tuxbury Pond Dam, significant loss of water through the structure, is occurring and structure has the potential to fail during periods of high flow. Additionally, the spillway does not meet required factors of safety for stability and is incapable of passing the required design storm flows. A failure of any portion of the spillway would result in the loss of public drinking water, downstream flooding, deposition of sediment in the downstream resource areas, and negative impacts to the upstream resource areas.

Therefore, due to the extensive negative impacts, this alternative was not selected.

#### **Spillway Repair Alternative**

The replacement of the spillway at Tuxbury Pond Dam is required to provide a safe, stable structure designed to pass higher flows associated with the design flood. A new structure will help prevent failure of the dam, protect the Town's drinking water and limit damage downstream caused by flooding.

Several alternative repair options were considered during the design of repairs to Tuxbury Pond Dam:

Alternative 1 included complete removal of the existing spillway and replacement with a new stop log controlled spillway and downstream scour pad. Several variations of this alternative were analyzed to investigate possible configurations of the spillway while considering spillway capacity, ease of operation,



Environmental Notification Form  
Tuxbury Pond Dam Improvements  
Amesbury, Massachusetts

and total cost. Included in these variations were different number and lengths of overflow gravity sections, stop log controlled bays, and gates.

Alternative 2 included improving the stability of the existing spillway structure with the use of rock anchors and a downstream scour pad and replacing the low level outlet structure. To address spillway capacity concerns, this alternative considered providing overtopping protection in the form of articulated concrete blocks on the left portion of the embankment, allowing storm flows to pass over the embankment. However, installing the protection system and allowing the embankment to overtop during a storm event would result in extensive damage to the downstream resource areas. Additionally, the condition of the existing dam would still be an issue and could lead to frequent repairs which would require additional impact to the resource areas.

Alternative 3 also included the installation of rock anchors to increase the stability of the concrete spillway and the addition of a downstream scour pad. To address spillway capacity concerns, this alternative recommended replacing the existing low level outlet and right abutment section with stop log controlled sluiceways. However, negative aspects of this alternative include the age and condition of the existing overflow and stop log controlled sections of the spillway, which could lead to the need for additional repairs in the near future. Additionally, this alternative would require changes in the channel to accommodate the geometry of the new sluiceways.

The proposed spillway design (Alternative 1) was selected due to the ease of operation of the gated bays, the total capacity provided by the spillway structure, and the total project cost. The repairs were designed to remain within the footprint of the existing structure to whatever extents possible and minimize disturbances to the surrounding upland and resource areas.

## **Embankment Work**

### **No Work Alternative**

If the slope stability, slope protection, and tree/brush growth along the embankment portions of the dam are not addressed, there is the potential that the structure could fail. Lack of proper stone riprap protection on the upstream slope of the embankment would allow erosion of the embankment during storm conditions, which could progress to a failure of the embankment, resulting in extensive downstream damage, deposition of sediment in the downstream area and the loss of Tuxbury Pond, which provides drinking water for the Town of Amesbury.

Trees and brush growing on dams present a number of hazards. Should a tree be uprooted during a storm, a section of the dam will be removed by the rootball. This could be sufficient to lower the crest in a localized area or weaken the embankment that could lead to a failure of the structure by overtopping or breaching. Roots that are in the embankment and along the toe of the slope provide potential conduits for seepage, which can lead to a failure by internal erosion or piping.

Therefore, due to the extensive negative impacts, this alternative was not selected.

### **Limited Maintenance Alternative**

Perform limited maintenance on the embankment including cutting of trees and clearing of small brush. However, this alternative would not address the issue of the root systems on the embankment. These root



Environmental Notification Form  
Tuxbury Pond Dam Improvements  
Amesbury, Massachusetts

systems, as they decayed in the embankment, would provide a path for water to follow and could lead to a piping type failure of the embankment.

As indicated above, a failure would have extensive negative impacts. Therefore, this alternative was not selected.

### **Embankment Repair Alternative**

The embankment repair complies with the MADEM Office of Dam Safety requirements for earth embankments. The repairs will provide a stable structure that will safely impound Tuxbury Pond, protect the inhabitants of the Town of Amesbury, protect the Town's drinking water supply, maintain resource areas upstream of the dam, and protect downstream resource areas from flooding or siltation that would occur if the dam were to breach.

Since the structure is a critical component within the Town's drinking water supply system, there is a public safety concern, and a potential for negative environmental impact if the embankment breaches, this option has been selected.

### **Arch Brook Culvert Work**

#### **No Work Alternative**

Due to the displaced stone, roots, and accumulated debris in the culvert at Arch Brook, the capacity of the culvert is a concern with increased flows through the culvert. Not using the culvert at Arch Brook as a means of diverting flows past Tuxbury Pond Dam in order to provide constant flow to the treatment plant and provide storm flow capacity would result in the need for a substantial diversion structure at Tuxbury Pond Dam which would have greater impacts to the resource areas and existing dam structure around the dam.

Therefore, due to the extensive negative impacts, this alternative was not selected.

#### **Tuxbury Pond Drawdown Alternative**

Draw down the pond to provide storage for storm flows. This drawdown would impact the upstream resource areas and impact the water supply, therefore this alternative was not selected.

#### **Arch Brook Culvert Repair Alternative**

Repairing the culvert at Arch Brook would result in a reliable means of diverting flows around the work at Tuxbury Pond Dam to ensure proper operation of the Town's water treatment plant, located downstream of the dam and of the Arch Brook Culvert. As an added benefit this repair will address a condition the results in emergency clearing of the culvert on a yearly basis to address upstream flooding concerns.

Due to the obvious benefits of the repair and mitigation work to the operation of the culvert, and the decrease in environmental impacts this option has been selected.





Environmental Notification Form  
Tuxbury Pond Dam Improvements  
Amesbury, Massachusetts

c) **MITIGATION MEASURES**

The design of the repairs to the embankment and spillway minimizes the impact to the resource areas while providing a stable structure that meets current dam safety criteria in accordance with 302 CMR 10.00. Additionally, to mitigate future impact, structures have been designed to limit the potential for a failure occurring, and to reduce the potential for a dam breach that would impact upstream and downstream resource areas.

Embankment work, including clearing and grubbing of the downstream slope, will be performed only to the extent necessary to provide a safe and stable earth embankment section in accordance with good dam safety engineering practice. In general the location of the toe of the slope has been designed to stay within the existing footprint of the dam.

Design of the spillway, scour pad, and downstream riprap was performed in a manner to produce a new spillway footprint similar in size and location to that of the original spillway and minimize the environmental impact area. The proposed scour protection system is a reinforced concrete pad adjacent to the spillway transitioning to a stone riprap section. The scour protection will replace the former timber scour protection system, which is severely deteriorated and is apparently allowing several scour areas to develop at the downstream toe of the spillway. The scour protection system will extend approximately 25 feet downstream from the spillway. The existing riverbed in the area of the scour protection will be pre-excavated to accommodate the full thickness of the scour protection without raising the apparent original surface elevation of the channel. The proposed scour protection system will be installed across the entire length of the spillway channel.

The upstream riprap has been designed to provide sufficient protection with the minimal possible disturbance to the impoundment. In accordance with good engineering practice for a structure this size, riprap extends at least 4 feet below the normal pool elevation to provide protection during periods of low water. This provides sufficient erosion protection during periods of low water, but does not require that the riprap extend any further than necessary into the impoundment.

In addition to addressing deficiencies noted at the Arch Brook Culvert and to provide a reliable means of diverting water past Tuxbury Pond Dam, the Arch Brook Culvert is also being utilized in order to reduce to environmental impacts associated with the work, and minimize drawdowns that may otherwise be necessary. By repairing the culvert, the level of the draw down required to safely perform the work at Tuxbury Pond Dam will be reduced, therefore allowing the work to be performed as closely as possible to normal operating conditions.

In addition, erosion and sediment controls will be implemented during the progression of the work. As indicated previously, haybales and silt fence will be installed at both the dam and culvert sites, a sedimentation basin will be utilized for all pumped waters before being discharged downstream, and riprap approach and discharge pads will be installed at the diversion structure. Further the project specifications limit equipment staging, storage, and refueling operations to the area of the existing parking lot in an effort to limit the potential for releases into the water bodies.