



September 6, 2024

Proposal No. 609435-126585

ADDENDUM NO. 6

To Prospective Bidders and Others on:

PLYMPTON

Federal Aid Project No. STP(BR-OFF)-003S(740)X Bridge Replacement, P-14-001 (445), Winnetuxet Road Over Winnetuxet River

BIDS TO BE OPENED AND READ: TUESDAY, SEPTEMBER 17, 2024 at 2:00 P.M.

Transmitting changes to the Contract Documents as follows:

RESPONSES TO BIDDER'S QUESTIONS

2 pages

DAM INSPECTION REPORT

12 pages

DOCUMENT 00104

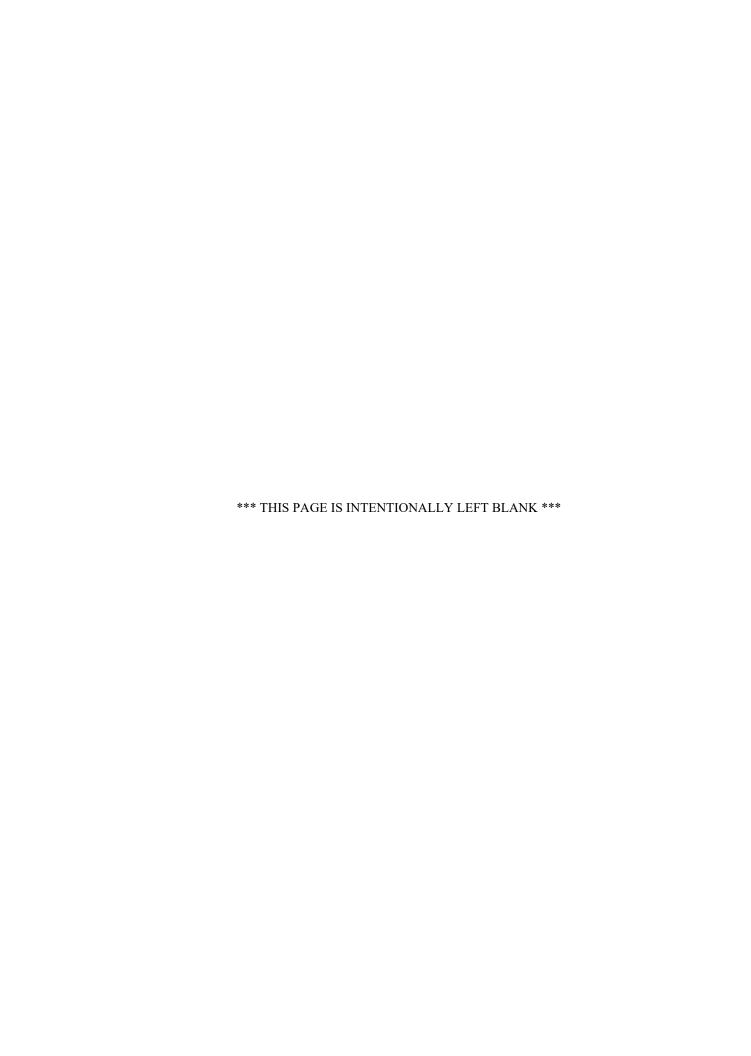
Revised page 3

Please take note of the above, substitute the revised page for the original and acknowledge Addendum No. 6 in your Expedite Proposal file before submitting your bid.

Very truly yours,

Eric M. Cardone, P.E. Construction Contracts Engineer

Jb cc H. Adolphe, Project Manager



RESPONSES TO BIDDER'S QUESTIONS

PLYMPTON

Federal Aid Project No. STP(BR-OFF)-003S(740)X Bridge Replacement, P-14-001 (445), Winnetuxet Road Over Winnetuxet River (609435-126585)

- **Question 5.)** Who owns the dam and will approval of the monitoring plan by the dam owner, or their engineer be required? Who is responsible for granting permission for working on their property?
- Response 5.) The Town of Plympton is the dam Owner. MassDOT has filed a Chapter 253 Permit Application Part A (see Document A00860) to receive permission to perform minor maintenance-related work on the dam.
- **Question 6.)** Please provide as —built drawings of the dam and spillway to permit assessment of the locations to potentially furnish and install instruments.
- Response 6.) As-built drawings of the dam are not available. A dam inspection was completed December 10, 2011. See the Inspection Report attached.

 Roadway cross sections showing the embankment geometry are provided in the Contract Documents.
- **Question 7.)** Where does MassDOT want the Inclinometers installed? Should they be drilled in through the dam or drilled in soil and rock adjacent to the dam?
- Response 7.) The Contractor's Geotechnical Monitoring Consultant shall determine the quantity, location, and depth of instruments necessary to adequately monitor the dam for the duration specified in Item 100.99 of the Special Provisions.
- Question 8.) How deep do the inclinometers need to extend to obtain fixity below the dam and spillway?
- Response 8.) See response to Question #7 above.

RESPONSES TO BIDDER'S QUESTIONS

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- **Question 9.)** To accomplish 'continuous' monitoring as implied by the specification, in-place inclinometers will be required to be installed inside the inclinometer casings. These systems require specific depths to manufacture and currently have relatively long lead times. Please provide estimated instrument lengths so we can obtain forward pricing and manufacturing lead times.
- Response 9.) See response to Question #7 above.
- **Question 10.)** How is MassDOT intending to evaluate the piezometer data to monitor slope stability? There are no threshold or limiting values included for pore-water pressure changes or groundwater level changes.
- Response 10.) Item 100.99 requires that a baseline report of the dam and spillway be prepared 30 days prior to the start of Construction.
- **Question 11.)** Are there minimum and maximum water level heights behind the dam that must be maintained?
- Response 11.) This question will be answered in the next addendum.
- **Question 12.)** The special provision references a "post-construction survey report" at the end of the project, is there a pre-construction survey report required by the Contractor, or has one been performed by MassDOT?
- Response 12.) A pre-construction survey of the dam and spillway has not been performed; however, a survey of the roadway and embankment was conducted to prepare the Contract Documents. A pre-construction survey of the dam and spillway is required.
- **Question 13.)** Please provide details on what information needs to be included in the post-construction report?
- Response 13.) The post-construction survey report shall include a survey of the dam and final instrumentation readings.

EXECUTIVE SUMMARY

Churchill Engineering, Inc. with the assistance of Dr. Michael W. Oakland inspected the Winnetuxet Road Dam located in Plympton, Massachusetts on December 10, 2011. A previous visual inspection was completed on August 26, 1987 by Lee Pare and Associates. A copy of the previous report was made available by the Office of Dam Safety to Churchill Engineering, Inc. prior to conducting the inspection.

The dam is in fair condition with no significant deficiencies to the spillway structure or the earth embankment. However, the upstream and downstream slopes of the embankments are covered with heavy wooded vegetation and numerous trees; signs of erosion exist on both the upstream and down stream slopes; the upstream face is not adequately protected against erosion. In addition, some wet areas were observed down stream of the embankment. It is not known whether the wet areas are the result of seepage or tailwater from downstream debris. The discharge of the auxiliary spillway is unprotected from both vehicular and pedestrian traffic on Winnetuxet Road resulting in a potential life safety issue. Debris has accumulated at the inlet of the auxiliary spillway and a fallen tree and several other large branches also exist across the channel to the main spillway. A four foot deep scour hole was found on the downstream side of the main spillway sluicegate.

Recommendations include removing vegetation from the upstream and downstream slopes of the embankment, removing vegetation to within 20 feet of the toe of the downstream embankment, straightening the alignment and regrading both embankments to a uniform slope, covering the downstream embankment slope and within 20 feet of the toe of the downstream embankment with suitable vegetation and placing rip-rap along the upstream face of the embankment. Repair of erosion damage at the bridge joints. The wet area downstream of the embankment should be monitored for possible seepage and observations of potential scour hole below the primary spillway made during seasonal low water. Recommendations to address potential life safety issues include providing protection to the discharge area of the auxiliary spillway from vehicular and pedestrian traffic along Winnetwet Road. Debris should be cleared from the inlets of both spillways. The scour hole should be monitored.

SECTION 1

1.0 DESCRIPTION OF PROJECT

1.1 General

1.1.1 Authority

The Town of Plympton has retained Churchill Engineering, Inc. to perform a visual inspection and develop a report of conditions for the dam at the Winnetuxet Pond in Plympton, Massachusetts. This inspection and report were performed in accordance with MGL Chapter 253, Sections 44-50 of the Massachusetts General Laws as amended by Chapter 330 of the Acts of 2002.

1.1.2 Purpose of Work

The purpose of this investigation is to inspect and evaluate the present condition of the dam and appurtenant structures in accordance with 302 CMR10.07 to provide information that will assist in both identifying dam repair needs and conducting maintenance and operation. In addition, this study will also assess the need for a further Phase II investigation of the dam.

The investigation is divided into four parts: 1) obtain and review available reports, investigations, and data previously submitted to the owner pertaining to the dam and appurtenant structures; 2) perform a visual inspection of the site; 3) evaluate the status of an emergency action plan for the site and; 4) prepare and submit a final report presenting the evaluation of the structure, including recommendations and remedial actions, and opinion of probable costs.

1.1.3 Definitions

To provide the reader with a better understanding of the report, definitions of commonly used terms associated with dams are provided in Appendix D. Many of these terms may be included in this report. The terms are presented under common categories associated with dams which include: 1) orientation; 2) dam components; 3) size classification; 4) hazard classification; and 5) miscellaneous.

1.2 Description of Project

1.2.1 Location

The dam is located at the western end of Mill Pond, within the Town of Plympton. The dam is accessed from Winnetuxet Road. The dam is at Latitude 41.9468 degrees and Longitude -

1.2.2 Owner/Operator

The owner of the dam is the Town of Plympton who can be contacted at 5 Palmer Road Plympton MA 02367. The dam is primarily operated by Mr. James Mulcahy, Highway Surveyor, and can be contacted at 23 Palmer Road Plympton, MA 02367.

	Dam Owner	Dam Caretaker
Name Mailing Address Town Daytime Phone Emergency	Town of Plympton 5 Palmer Road Plympton, MA (781) 585-2700 None Available	James Mulcahy 23 Palmer Road Plympton, MA (781) 585-3703 (781) 589-3310
Phone Email Address	selectman@town.plympton.ma.us	JMUL53@comcast.com

1.2.3 Purpose of the Dam

The date of construction of the dam is unknown. The structure appears to have been built to impound water to power a former mill as evidenced by the remains of the rubble masonry foundation located at the discharge of the auxiliary spillway. Currently, the dam is used to retain a recreational pond.

1.2.4 Description of the Dam and Appurtenances

Winnetuxet Road Dam is an earthen embankment approximately 230 feet long with a maximum height of 12 feet. The right embankment is approximately 200 feet in length and 28 feet wide with the upstream and downstream slopes covered with large trees and wooded vegetation. The upstream slope of the embankment is 2H: 1V where downstream slope of the embankment is 3H: 1V. There is also both a short rubble masonry and concrete wall along the downstream slope near the auxiliary spillway. The primary spillway forms the contact with the left abutment. Asphalt paving across the full width of the crest of the dam forms Winnetuxet Road.

The primary spillway is a concrete overflow drop structure approximately 28.5 feet in width and 8 feet in height. The spillway consists of a broad crested weir of approximately 24 feet in width and a sluiceway opening of 4.5 feet in width controlled by stop logs. A timber bridge spans the primary spillway.

The auxiliary spillway, located approximately 180 feet to the right (north) of the primary spillway, is a box culvert supporting Winnetuxet Road. The culvert is approximately 7.5 feet deep x 4.5 feet wide of a length of 46 feet.

1.2.5 Operations and Maintenance

James Mulcahy, Town Highway Surveyor, is responsible for operation and maintenance of the dam. Operation generally involves monitoring water levels and removing debris from the spillway to maintain water levels within the Pond. Maintenance includes monthly inspections by the caretaker and periodic maintenance activities under the caretaker's direction.

1.2.6 DCR Size Classification

The Winnetuxet Road Dam has a maximum height of approximately 12 ft. and a maximum storage capacity of about 10 acre-feet. Therefore, in accordance with Department of Conservation and Recreation Office of Dam Safety classification, under Commonwealth of Massachusetts dam

safety rules and regulations stated in 302 CMR 10.00 as amended by Chapter 330 of the Acts of 2002, Winnetuxet Road Dam is a **Small** size structure.

1.2.7 DCR Hazard Classification

Winnetuxet Road Dam is currently listed as having Significant Hazard. The dam supports Winnetuxet Road and utilities located along the alignment of the road. One home exists immediately downstream of the dam it appears to be located at approximately the same elevation as the crest of the dam. The downstream area appears to be sparsely populated with cranberry bogs and flood plain. Therefore, it appears that failure of Winnetuxet Road Dam at maximum pool will have nominal impact on downstream structures or the downstream area. Hence, such conditions may warrant reclassification of the hazard potential of this dam. However, a detailed topographic and hydraulic survey would be recommended prior to reclassification.

1.3 Pertinent Engineering Data

1.3.1 Drainage Area

The drainage area for Winnetuxet Road Dam is approximately 10 square miles and exists within the community of Plympton, MA. The drainage area is largely dominated by a series of cranberry bogs with their dammed water supply ponds, very small streams and wooded areas. Only one of the ponds, Muddy Pond, is substantial in size. The drainage area is relatively flat with considerable swampy areas.

1.3.2 Reservoir

	Length (feet)	Width (feet)	Surface Area (acres)	Volume (acre-feet)
Normal Pool	801	106	2	10
Maximum Pool	850	150	3	18
SDF Pool	Unknown	Unknown	Unknown	Unknown

1.3.3 Discharges at the Dam Site

No monitoring has been conducted and no discharge records exist.

1.3.4 General Elevations (feet)

A.	Top of Dam	Assumed El. 100
B.	Spillway Design Flood Pool	Unknown
C.	Normal Pool	Assumed El. 96.3
D.	Spillway Crest	Assumed El. 96
E.	Upstream Water at Time of Inspection	Assumed El. 96.3
F.	Streambed at Toe of the Dam	Assumed El. 88
G.	Low Point along Toe of the Dam	Assumed El. 88

1.3.5 Main Spillway

Type Broad Crested Weir/Sluice A. Length 28.5 ft. B. Assumed El. 96 C. Invert Elevation Upstream Channel Mill Pond D. E. Downstream Channel Unlined Channel F. Downstream Water Winnetuxet River

1.3.6 Auxiliary Spillway

Box Culvert / Drop Flume A. Type Length В. 5 ft C. Invert Elevation Assumed El. 90.5 D. **Upstream Channel** Mill Pond E. Downstream Channel Rock Lined Channel F. Downstream Water Winnetuxet River

1.3.7 Low Level Outlet None Observed

- 1.3.8 Design and Construction Records
 No records remain from the original design.
- 1.3.9 Operating Records None maintained.

SECTION 2

2.0 INSPECTION

2.1 Visual Inspection

The Winnetuxet Road Dam was inspected on December 10, 2011. At the time of the inspection, the weather was clear and in the 50's. No significant rainfall had occurred prior to the inspection. Photographs to document the current conditions of the dam were taken during the inspection and are included in Appendix A. The level of the impoundment was about 2 inches above the fixed crest of the spillway. Underwater areas were not inspected. A copy of the inspection checklist is included in Appendix B.

2.1.1 General Findings

In general, the Winnetuxet Road Dam was found to be in Fair condition with significant woody vegetation, numerous trees and minor erosion on the upstream and downstream slopes. The specific concerns are identified in more detail in the sections below:

2.1.2 Dam

- Abutments The abutments of the dam were in good condition with no seepage or signs of displacement.
- Upstream Face The upstream slope of the dam is unprotected from erosion and populated by woody vegetation and numerous trees on the right embankment. Some signs on minor erosion were noted near the auxiliary spillway. Misalignment of the upstream face was observed.
- Crest The crest of the right embankment, which forms the majority of the dam, is approximately 28 feet wide with pavement, gravel and grass. The crest of the dam supports Winnetuxet Road. Minor cracks and settlement were noted in the pavement, particularly at the bridge joints, indicating potential erosion behind the bridge seat. The elevation of the crest matches that of the spillway and fairly level along right embankment. Some sinkholes and animal burrows were observed on the crest.
- Downstream Face The downstream face is covered by woody brush and large trees. Some erosion was observed along the right embankment along with animal burrows. A concrete retaining wall, near the auxiliary spillway was observed to be rotated from the plumb position. A wet area was observed just beyond the toe of the downstream slope along the right embankment. It is not certain whether this is a result of seepage of residual from back up due to downstream tail water. No sloughs, slides or other signs of distress were observed.
- Drains None
- Instrumentation None

• Access Roads and Gates – The access to the dam is Winnetuxet Road which is a public way supported by the dam.

2.1.3 Appurtenant Structures

- Primary Spillway The broad crested concrete weir and sluiceway with stop logs, the spillway and stop logs appear to be in good condition with no evidence of significant deterioration or misalignment. The training walls of the spillway are abutments for the bridge above supporting Winnetuxet Road. The left training wall is concrete and considered to be of new construction at the time of the 1988 inspection. The right training wall is of mortared rubble masonry construction and considered to be considerably older the left training wall. Both training walls are considered to be in good condition. Some signs of seepage were noted at the top of both walls apparently due to runoff through the bridge joint. A scour hole was detected by probing, approximately 4 feet in depth, in the area immediately downstream of the sluiceway. A large fallen tree and other floating logs existed across the main spillway channel.
- Auxiliary Spillway- The auxiliary spillway is a concrete box culvert supporting Winnetuxet Road. Stop logs exist at both ends of the culvert with a concrete drop flume at the outlet. Dry laid rubble masonry walls exist at each side of the outlet and are assumed to be the foundation of a mill dating to the original construction of the dam. Similar rubble training walls also exist downstream of the outlet. According to the 1988 report's caretaker interview; the original culvert was masonry and lined with concrete following a collapse of Winnetuxet Road. Hence, based upon observations and the past reports, the culvert appears to have gone through numerous repairs through the years. However, the current condition of the culvert is considered in fair condition. However, the drop flume of the outlet is unprotected from vehicular and pedestrian traffic posing a potential life safety issue. The inlet for the auxiliary spillway was largely blocked by debris which had vegetation growing from the mass.

2.1.4 Downstream Area

The downstream area consists of a rock lined channel transitioning into an unlined stream which passes through wetlands along the Winnetuxet River.

- Main Spillway Downstream Channel The area immediately downstream of the main spillway has some boulders and vegetation growth within the discharge channel.
- Auxiliary Spillway Channel The area immediately downstream of the auxiliary spillway is a well maintained 10 foot wide channel with rubble masonry training walls.

2.1.5 Reservoir Area

The reservoir is almost entirely surrounded by forested land with some residential development. The slopes surrounding the reservoir are gentle, with no signs of sloughs or other instability.

2.2 Caretaker Interview

At the time of the inspection, the caretaker, James Mulchay, indicated the frequency of inspection, monitoring and maintenance conducted at the dam.

2.3 Operation and Maintenance Procedures

No Operations and Maintenance manual exists for this dam.

2.3.1 Operational Procedures

Operation of the dam consists of pulling stop logs at the primary and auxiliary spillways to control water levels. No other operational controls exist at this dam.

2.3.2 Maintenance of Dam and Operating Facilities

The primary maintenance conducted is occasional mowing of vegetation along the dam crest.

2.4 Emergency Warning System

No Emergency Action Plan exists for this dam and no warning devices are present.

2.5 Hydrologic/Hydraulic Data

Winnetuxet road dam is classified as small in size, significant hazard structure in accordance with current dam safety regulations, 302CMR10.00. Hence the spillway design flood (SDF) for this structure is the 100 year flood. However, no hydrologic or hydraulic analysis of the Winnetuxet Road Dam is available in the previous report of 1988. To assess the SDF, a preliminary evaluation was made for the 100 and 50 year storms using steady state flow resulting from design rainfalls over a 24 hour period. Based upon TP-40 for the South Shore of Massachusetts, the steady state rain fall for the 100 and 50 year storms is 7.0 inches and 6.2 inches respectively. For the 10 square mile drainage basin, under steady state conditions, design flows for these two cases are 113,000 and 100,000 cubic feet per minute.

The spillway capacity was considered as the combined cross sectional area of the weir and sluiceway of the primary spillway and the cross sectional area of the auxiliary spillway. A stream flow velocity of 15 cubic feet per second was considered to calculate the discharge capacity of the combined spillways. The spillway capacity was calculated as follows:

	Cross Sectional Area, SF	Discharge Capacity, CFM
Primary Spillway, Weir	85.5	76,950
Primary Spillway, Sluice	36	32,400
Auxiliary Spillway, Culvert	33.75	30,375
Total Discharge Capacity		139,725

Based upon these preliminary calculations, it appears that the dam has the adequate spillway capacity to meet the 100 year design storm in accordance with 302CMR10.14.

2.6 Structural Stability/Overtopping Potential

2.6.1 Structural Stability

Based upon the visual inspection only, the dam appeared to be structurally stable.

2.6.2 Overtopping Potential

No evidence of overtopping was observed during this inspection. Preliminary calculations indicate the spillway capacity is adequate for the anticipated inflow due to the SDF. Therefore, it appears that the potential for overtopping is considered low. A more detailed Hydrologic or Hydraulic analysis to confirm this opinion does not appear to be warrented at this time.

SECTION 3

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

In general, the Winnetuxet Road Dam is in Fair condition. Preliminary calculations indicate that the current spillway appears to have adequate capacity to conform to current regulations. Additionally, the conditions of the primary and auxiliary spillways were found to be in fair condition. The following is a summary of the deficiencies noted:

- 1. The upstream face of the right embankment is exposed and unprotected from erosion.
- 2. The upstream and downstream slopes of the embankment including 20 feet from the downstream toe are heavily vegetated with woody brush and numerous large trees. The alignment of both upstream and downstream slopes is irregular and has erosion and animal burrows.
- 3. Surface cracking, sinkholes and settlement of the pavement was observed at both bridge abutments. This condition is suspected to have resulted from minor erosion at the bridge joints.
- 4. The concrete retaining wall supporting the downstream slope is rotated from the plumb position.
- 5. A scour hole below the sluice of the primary spillway was detected and the downstream area beyond the primary spillway has some obstructing rocks and debris.
- 6. The auxiliary spillway inlet is obstructed with debris and vegetation and a fallen tree and other logs are within the channel for the main spillway.
- 7. The discharge of the auxiliary spillway is unprotected from both pedestrian and vehicular traffic.
- 8. A wet area was observed near the toe of the downstream slope of the embankment. This wet area is potentially resulting from seepage or may be due to residual tail water from the downstream channel.

The following recommendations and remedial measures generally describe the recommended approach to address current deficiencies at the dam. Prior to undertaking recommended maintenance, repairs and remedial measure, the applicability of environmental permits needs to be determined prior to undertaking activities that may occur within resource areas under the jurisdiction of local conservation commissions, MADEP, or other regulatory agencies.

3.2 Studies and Analyses

Based the observations contained within this report and the recommendations of the February 15, 1988 Visual Report no additional studies or analyses are recommended.

3.3 Recurrent Maintenance Recommendations

Following repair of the current condition of the embankment, the caretaker should institute with a program of periodically cutting brush and mowing the embankment of the dam.

3.4 Recommendations, Maintenance, and Minor Repairs

The following are maintenance and repair recommendations to correct the observed deficiencies:

- 1. Place 6" 8" rip rap along the upstream face of the dam at least 2 feet below the normal pool to the design flood level.
- 2. Clear all brush and trees from the crest, upstream and downstream faces of embankments of the dam and 20 feet beyond the downstream toe. Remove root balls of trees and establish a uniform cover of vegetation such as an appropriate grass upon the upstream face, not covered by rip rap, downstream face and 20 feet beyond the toe to the downstream embankment.
- 3. Regrade the upstream and downstream slopes to a uniform slope and alignment. Backfill should be placed against the concrete retaining wall along the downstream slope to stabilize.
- 4. Repair erosion damage at the bridge joints.
- 5. Clear all accumulated debris from spillway inlet and downstream channel.
- 6. A Follow up Inspection is recommended to observe wet area and scour hole during the seasonal low water period. Impoundment may be lowered below the primary spillway to visually assess the extent of the scour hole.
- 7. Provide protective measures to cover the open top of the discharge of the auxiliary spillway to avoid fall hazard to pedestrian and vehicular traffic.

3.5 Remedial Measures

Remedial measures beyond those recommended above do not appear required at this time. However, pending the observations of a Follow up Inspection concerning potential seepage and scour, additional recommendations may be made.

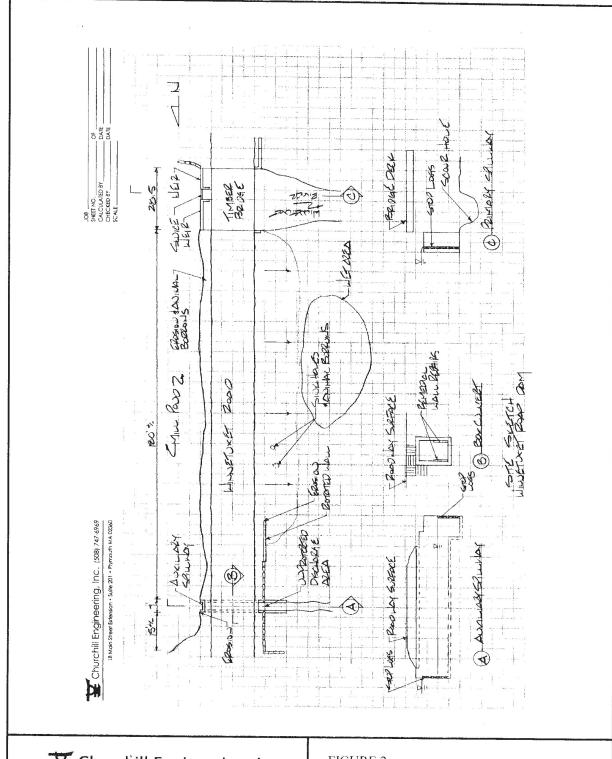
3.6 Alternatives

Cost effective alternatives to the remedial repair recommendations made above do not appear available.

3.7 Opinion of Probable Construction Costs

Below is schedule of recommendations and associated probable costs. These probable costs are based on recent similar work completed by Churchill Engineering, Inc. However, these costs shown herein are based on a limited investigation and provided for general information only.

Engineering & permitting Pedestrian and vehicular protection at discharge Clearing brush, stumps and trees Regrade slopes and crest Loam & seed crest and slope Furnishing and Installing Rip Rap Clear debris Erosion repairs at bridge joint Follow Up Inspection	\$ 13,000 \$ 12,914 \$ 9,536 \$ 18,645 \$ 9,224 \$ 5,116 \$ 1,500 \$ 2,500 \$ 2,500
Total Probable Cost	\$ 74,935



Churchill Engineering, Inc.

Consulting Engineers & Contractors

18 Main Street Extension Suite 202 Plymouth, Massachusetts 02360 FIGURE 2 Site Sketch Winnetuxet Road Dam Plympton, Massachusetts



©ADDENDUM NO. 6, SEPTEMBER 6, 2024 ③ADDENDUM NO. 3, AUGUST 16, 2024

①ADDENDUM NO. 1, JULY 26, 2024

NOTICE TO CONTRACTORS (Continued)

630 PRICE ADJUSTMENTS

This Contract contains price adjustments for hot mix asphalt and Portland cement mixtures, diesel fuel, and gasoline. For reference the base prices are as follows: liquid asphalt \$575.00 per ton, Portland cement \$425.53 per ton, diesel fuel \$2.713 per gallon, and gasoline \$2.666 per gallon, and Steel Base Price Index 415.9. MassDOT posts the Price Adjustments on their Highway Division's website at

https://www.mass.gov/massdot-contract-price-adjustments

This Contract contains Price Adjustments for steel. See Document 00813 - PRICE ADJUSTMENT FOR STRUCTURAL STEEL AND REINFORCING STEEL for their application and base prices.

MassDOT projects are subject to the rules and regulations of the Architectural Access Board (521 CMR 1.00 et seq.)

Prospective bidders and interested parties can access this information and more via the internet at WWW.COMMBUYS.COM.

BY: Monica G. Tibbits-Nutt, Secretary and CEO, MassDOT Jonathan L. Gulliver, Administrator, MassDOT Highway Division SATURDAY, JUNE 29, 2024