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December 9, 2020

Mr. Paul Marinelli
Department of Conservation and Recreation
Office of Dam Safety
251 Causeway Street, Suite 800
Boston, MA 02114

Re: **Follow-Up Inspection – December 2020**
Danielson Mill Dam (MA03351)
Medfield, Massachusetts
(PARE Project No.: 19126.02)

Dear Mr. Marinelli:

On behalf of Town of Medfield (Owner), Pare Corporation (Pare) completed a follow-up inspection of the Danielson Mill Dam located in Medfield, Massachusetts on December 3, 2020. Based upon the observed conditions, the dam appears to remain in ***Poor*** condition with deficiencies similar in nature and extent as those observed during previous inspections.

While the general condition of the dam is similar to that previously noted, a high water event as a result of significant rainfall on November 30, 2020 appears to have resulting in the progression of previously noted deficiencies. The significant rainfall (roughly 3-inches overnight) resulted in the pool level raising above the level of the left training wall; however, the dam crest was not overtopped. High water level combined with poor mortar condition in the upstream wall right of the spillway appears to have progressed previously noted leakage through the right side of the spillway, resulting in the development of sinkholes behind the right training wall along the spillway crest and high flow through the stone masonry training wall near the center line of the embankment and near the downstream end of the masonry wall section.

In response to the high water and observed leakage, the Town implemented a drawdown of the pond. At the time of the inspection, the level of the pond was approximately 1-foot below normal operating level. At this elevation, it appears that the leakage through the embankment right of the spillway has stopped. The Town intends to continue drawing down the pond to a level that exposes the upstream wall to the mudline. At this time, efforts will be made to seal the joints in the upstream wall and backfill areas of voids that have developed behind the upstream wall and along the right training wall.

Since the date of the previous inspection, the Town has completed the development of an EAP for the dam. The Town is currently finalizing a plan to undertake additional evaluations and designs to develop a repair approach.

Danielson Mill Dam consists of a roughly 225-foot earthen embankment dam with a 4-foot wide stop log controlled spillway channel. The dam has a hydraulic height of approximately 6 feet and a maximum structural height of approximately 7 feet. Danielson Mill Dam is currently classified as a **Small** sized, **Significant** (Class II) hazard potential dam. As indicated within the June 2020 Phase I Inspection Report, the dam was found to be in Poor condition and to have the following deficiencies:

1. Overgrown vegetation, including large leaning trees, along the upstream and downstream slopes, and along abutment slopes
2. Cracked mortar, slight stone separation, settling, and voids along the upstream masonry walls
3. Bare areas along the crest
4. Unprotected section of the upstream slope with scarping up to 12-inches deep
5. Areas of previously reported seepage along the downstream toe and downstream area
6. Failed sections of the right downstream masonry wall
7. Voids, up to 48-inches deep, within the downstream left stone wall
8. Significant deterioration of the stone training walls including voids, potential bulge, previously reported leakage, and subsidence of soils behind walls
9. Significant deterioration of the concrete training walls including potential movement, significant deterioration of the timber, and subsidence of soils behind walls
10. No EAP (draft under review by the Town)
11. Insufficient capacity to pass the SDF
12. No O&M Manual
13. Additional maintenance deficiencies and potential dam safety concerns, as identified herein.

It is critical to note that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future.

We trust that the attached Follow-up Inspection Form meets the requirements of the follow up inspection for the Danielson Mill Dam. Should you have any questions please feel free to contact me at 508.543.1755 or via email at aorsi@parecorp.com.

Sincerely,

PARE CORPORATION

Allen R. Orsi, P.E.
Vice President

Attachment: Poor Condition Dam Follow-Up Inspection Form (with attachments)

Commonwealth of Massachusetts
Department of Conservation and Recreation
Office of Dam Safety Poor Condition Dam Follow-up Inspection Form

Dam Name: Danielson Mill Dam
Dam Owner: Town of Medfield
Nat. ID Number: MA03351
Hazard Potential: Significant (Class II)
Location of Dam (town): Medfield
Coordinate location (lat,long): 42.17054ºN/71.29507ºW
Date of Inspection: December 3, 2020
Weather: 35ºF, Clear

Consultant Inspector(s): Pare Corporation, Allen R. Orsi, P.E.

Others in Attendance at Field Inspection: Joe Gorman (Medfield DPW)
Bobby Kennedy (Medfield DPW)

Attachments: Figure 1: Locus Plan
Figure 2: Aerial Plan
Figure 3: Site Sketch
Photographs
Inspection Limitations

I. Previous Inspection date/Overall Condition:

- June 30, 2020 Phase I Inspection (Pare Corporation) / Poor
- February 28, 2020 Poor Condition Follow-Up Inspection (Pare Corporation) / Poor
- August 23, 2019 Poor Condition Follow-Up Inspection (Pare Corporation) / Poor
- October 18, 2017 Poor Condition Follow-Up Inspection (Tighe & Bond, Inc) / Poor
- November 25, 2014 Phase I Inspection (Polaris Consultants, LLC) / Poor

II. Previous Inspection Deficiencies:

1. Overgrown vegetation, including large leaning trees, along the upstream and downstream slopes, and along abutment slopes
2. Cracked mortar, slight stone separation, settling, and voids along the upstream masonry walls
3. Bare areas along the crest
4. Unprotected section of the upstream slope with scarping up to 12-inches deep
5. Areas of previously reported seepage along the downstream toe and downstream area
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10. No EAP (draft under review by the Town)
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12. No O&M Manual
13. Additional maintenance deficiencies and potential dam safety concerns, as identified herein

III. Overall Condition of Dam at the Time of the Current Follow-up Inspection:

a. State the current condition: Poor

b. Have conditions changed since the previous inspection? No

IV. Comparison of Current Conditions to Condition Listed in Previous Phase I Inspection Report:

a. Have any of the deficiencies listed in the previous Phase I Inspection Report worsened? Yes

b. If yes, list the changes.

i. High water event resulted in progression of voids and leakage right of the spillway

c. Are there any additional deficiencies that have been identified in the current inspection? Yes

d. If yes, list the deficiencies and describe.

i. New sinkhole along the backside of the upstream wall right of the spillway

ii. New void/sinkhole behind the right training wall near the centerline of the crest right of the spillway

V. Dam Safety Orders:

- Certificate of Non-Compliance and Dam Safety Order – November 9, 2015

VI. Maintenance:

1. **Indicate if there exists an operation and maintenance plan for the dam.** No formal operations and maintenance plan is known to exist.
2. **Indicate if it appears the dam is being maintained.** The Owner maintains vegetation along the crest and performs a general cleanup of the site including debris from the spillway. The Owner also performs routine inspections after significant rain events.

VII. Recommendations:

In response to the conditions observed as a result of the recent high water, Pare recommends that the Town:

1. Continue to lower the level of the impoundment to a level of at least 1-foot below the elevation at which leakage no longer is flowing through the right training wall; maintain the drawdown until appropriate repair/stabilization is completed.
2. Repoint the upstream masonry walls to eliminate the apparent source of leakage.
3. Over excavate and backfill areas of voids, including along the upstream wall and the right training wall, that have been impacted by leakage through the embankment.

Based on the visual observations during this Follow-Up Inspection and previous Phase I Inspection, Pare recommends the following be completed at the dam:

i. Studies and Analyses

a) Prepare an Operations and Maintenance (O&M) Manual
b) Develop/implement monitoring plan for sinkholes in area of the spillway
c) Finalize the EAP
d) Evaluate seepage and saturation along the downstream side of the dam.
e) Complete a stability analysis for the embankment and gravity walls.

ii. Recurring Monitoring and Maintenance

a) Perform routine monitoring and inspections to check for indications of increasing and/or new deficiencies at the dam. Continue the 6-month poor condition follow up inspections (Next Required: June 2021. Complete a Phase I Inspection (Next required June 2025).
b) Perform routine maintenance activities.
c) Review and Update the EAP (once issued)

iii. Repairs

a) Remove the irregular downstream boulder wall and replace with an earthen slope.
b) Clear and grub areas of unwanted vegetation. Fill resulting holes.
c) Provide riprap slope protection along the upstream slope.

iv. Remedial Measures

a) Modify the dam to accommodate the 100-year SDF.
b) Pending result of the seepage evaluation, develop and install a seepage mitigation system at the dam to address the seepage concerns along the downstream side of the dam.
c) Rehabilitate / reconstruct the spillway system to address the noted concerns.

VIII. Other Comments or Observations:

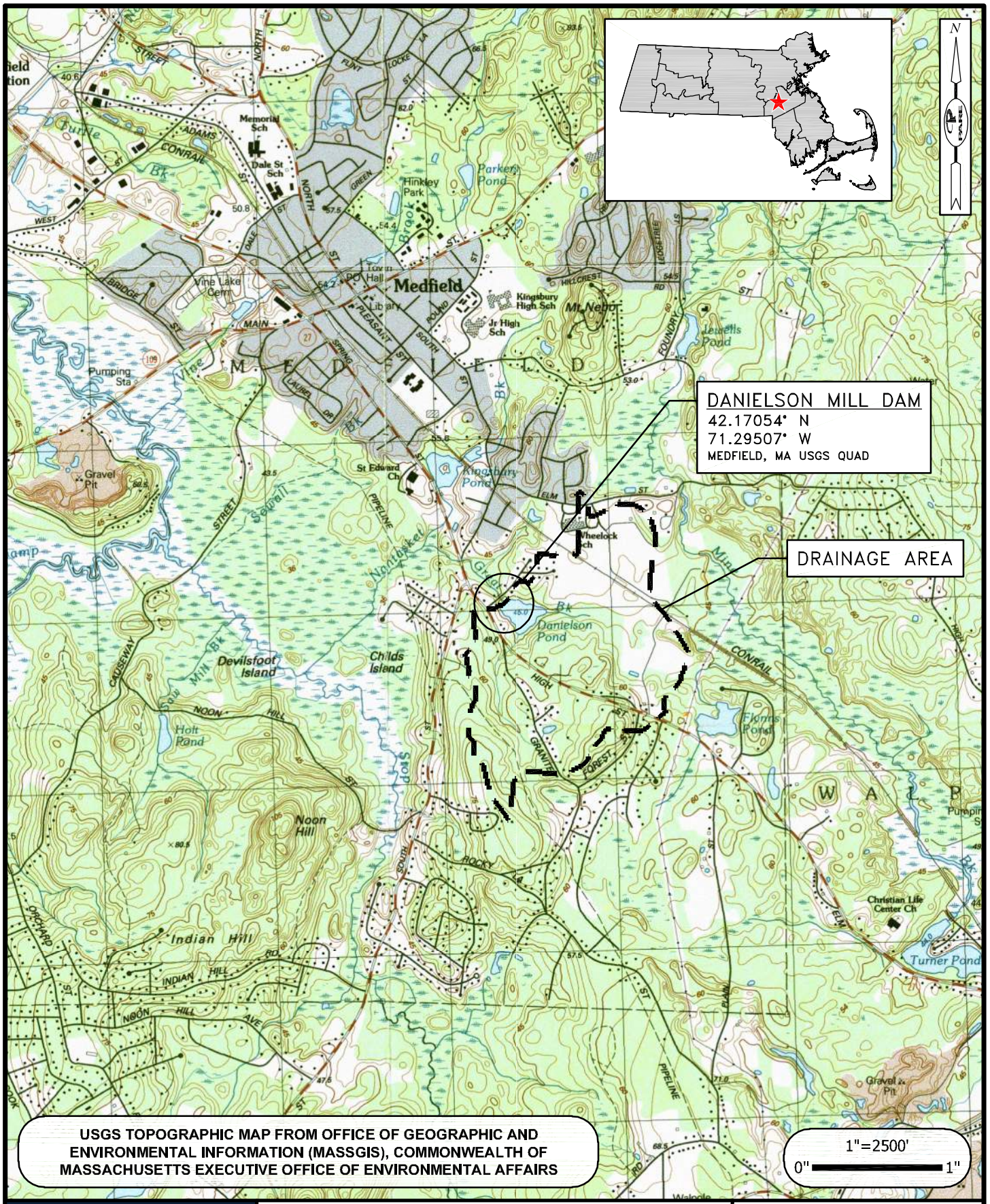
a. The following voids were identified:
   i. Behind upstream right return wall – approximately 15 inches deep; probed to right training wall of spillway (2.8 feet) and to the right of the sinkhole (2.4 feet)
   ii. Behind right training wall, centerline embankment – probed to 2.4 feet deep; horizontal extent not clear
   iii. Behind right training wall downstream of the downstream fenceline – probed to 2 feet deep; horizontal extent not clear

IX. Updated Site Sketch with Photo Locations: Attached

X. Updated Photos: Attached

XI. Copy of Locus Map from Phase I Report: Figure 1: Locus Plan attached

XII. Other applicable attachment: Figure 2: Aerial Plan, Inspection Limitations



PARE CORPORATION

DANIELSON MILL DAM

MA03351

MEDFIELD, MASSACHUSETTS

OWNER : TOWN OF MEDFIELD

LOCUS PLAN

JUNE 2020

FIGURE 1

PARE CORPORATION

DANIELSON MILL DAM

MA03351

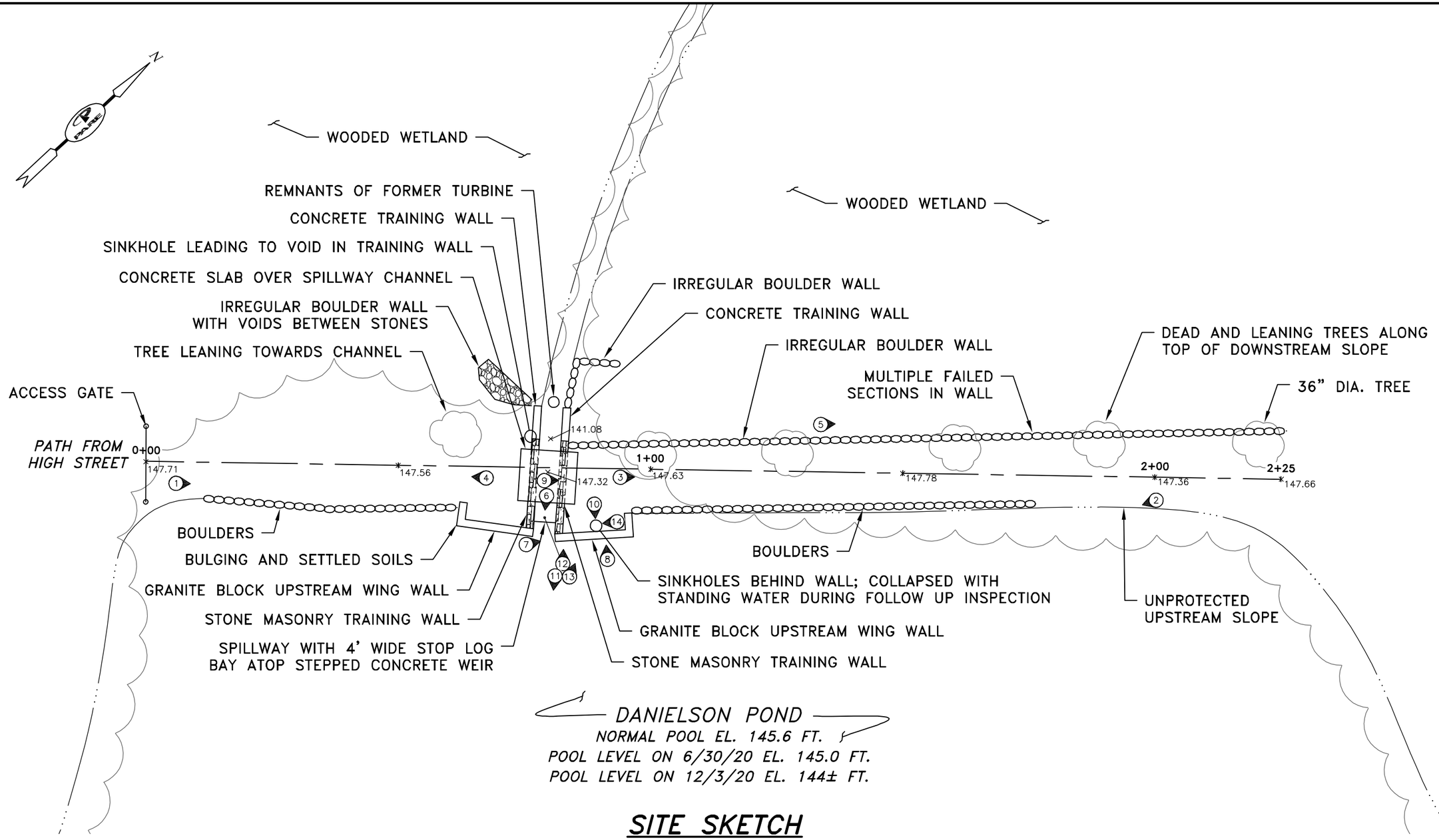
MEDFIELD, MASSACHUSETTS

OWNER : TOWN OF MEDFIELD

AERIAL PLAN

JUNE 2020

FIGURE 2



SITE SKETCH

SCALE: 1"=20'±

NOTES AND LEGEND

1. PLAN DEVELOPED FROM NOTES TAKEN DURING THE INSPECTION, PREVIOUS SITE SKETCHES FROM PREVIOUS INSPECTION REPORTS, AND AVAILABLE AERIAL IMAGERY FROM MASSGIS. INFORMATION IS PROVIDED FOR REFERENCE PURPOSES ONLY.

× 125.00 — SPOT ELEVATION AS DETERMINED BY RELATIVE ELEVATION SURVEY COMPLETED BY PARE DURING THE 2020 PHASE I INSPECTION.

(#) — DENOTES APPROXIMATE LOCATION AND DIRECTION OF PHOTOGRAPH.

1+00 — BASELINE AND STATIONING

PARE
PARE CORPORATION
ENGINEERS • SCIENTISTS • PLANNERS
10 LINCOLN ROAD, SUITE 210
FOXBORO, MA 02035
508-543-1755

SCALE ADJUSTMENT GUIDE

0" 1"

BAR IS ONE INCH ON ORIGINAL DRAWING.

DANIELSON MILL DAM
MA03351
MEDFIELD, MASSACHUSETTS
OWNER : TOWN OF MEDFIELD

REVISIONS:		
1	12.03.20	DEC FUI

PROJECT NO.:	19126.02
DATE:	JUNE 2020
SCALE:	AS NOTED
DESIGNED BY:	HMS
CHECKED BY:	CCH
DRAWN BY:	LMC
APPROVED BY:	ARO

SITE SKETCH

FIGURE NO.: 3

Photo No. 1: Overview of the upstream side of the dam.

Photo No. 2: Upstream slope from the right abutment.

Photo No. 3: Crest right of the spillway.

Photo No. 4: Crest left of the spillway.

Photo No. 5: Typical downstream slope conditions.

Photo No. 6: Overview of the spillway.

Photo No. 7: Right side of the spillway. Note sinkhole behind upstream wall.

Photo No. 8: Typical upstream wall joint condition right of the spillway.

Photo No. 9: Sinkhole behind right training wall probed to 2.4 feet.

Photo No. 10: Sinkhole behind upstream right wall probed to 2.6 feet left of the sinkhole.

Photo No. 11: Downstream side of spillway (Note: Stoplog installed to stop flow and allow for inspection).

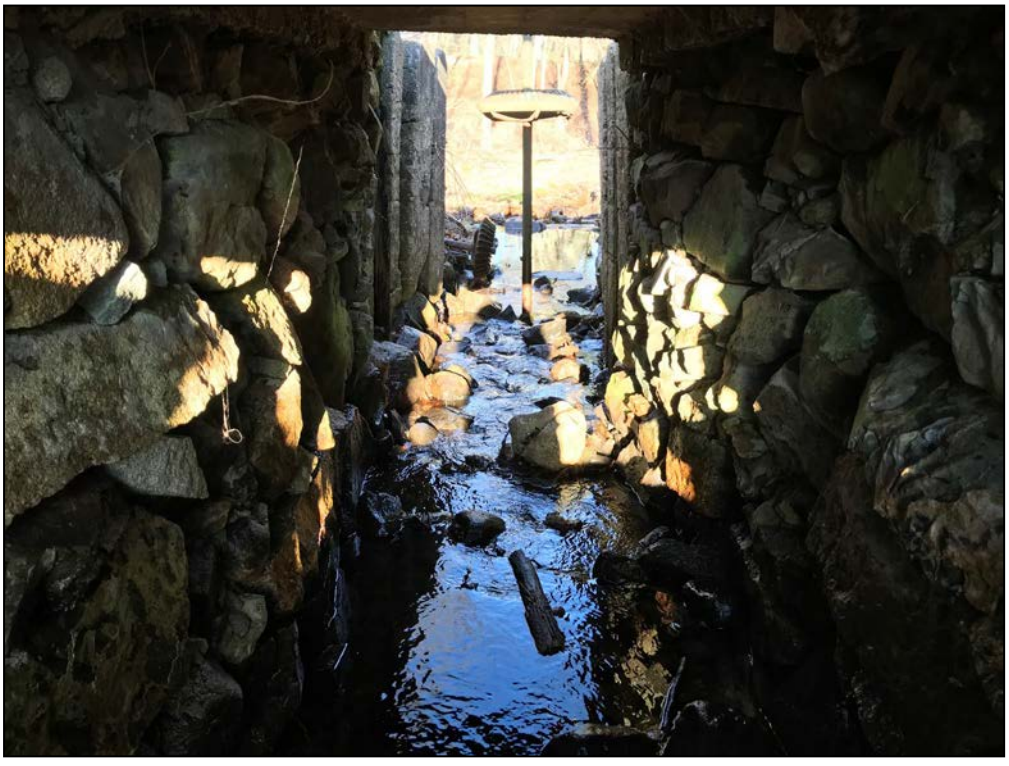


Photo No. 12: Channel and training walls downstream of the spillway (Note: Stoplog installed to stop flow and allow for inspection).

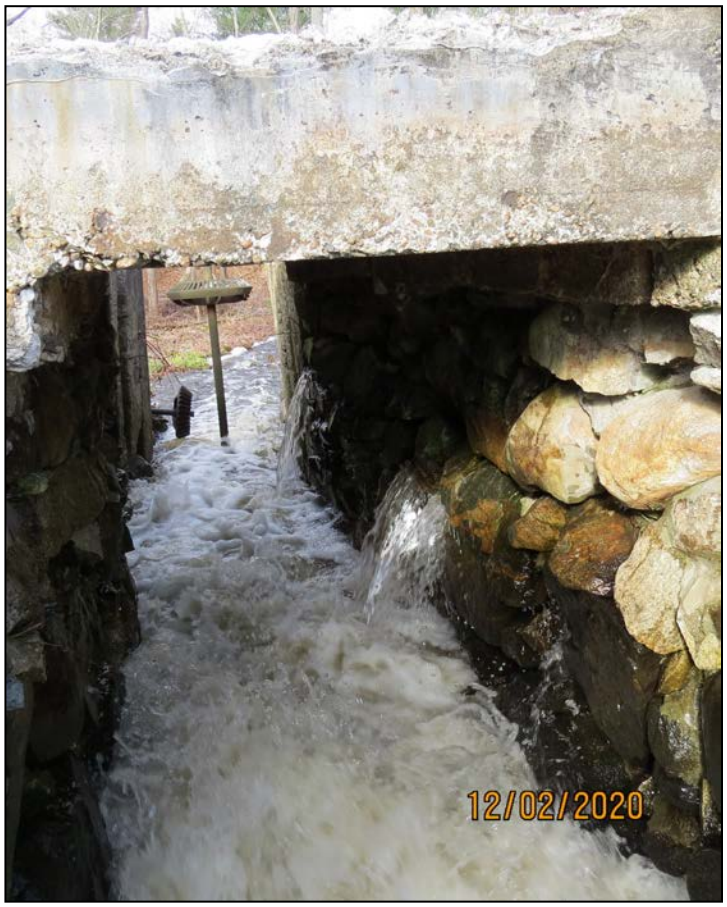


Photo No. 13: Flow through right training wall (Taken on 12/2; provided by Town).

Photo No. 14: Flow overtopping training walls (Taken on 12/1; provided by Town).

VISUAL DAM INSPECTION
LIMITATIONS

Visual Inspection

1. The assessment of the general condition of the dam is based upon available data and abbreviated visual inspections completed as part of the follow up inspection. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of this report.

2. In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection, along with data available to the inspection team.

3. In cases where an impoundment is lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions, which might otherwise be detectable if inspected under the normal operating environment of the structure.

4. It is critical to note that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Use of Report

1. The applicability of other environmental permits (ie., NOI, PGP, Water Quality Certificate, etc.) needs to be determined prior to undertaking maintenance activities that may occur within resource areas under the jurisdiction of MADEP, the local conservation commission or other regulatory agency.

2. This report has been prepared for the exclusive use of the Town of Medfield for specific application to the Danielson Mill Dam in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made.

3. This report has been prepared for this project by Pare. This report is for preliminary evaluation purposes only and is not necessarily sufficient to support design or repairs or recommendations or to prepare an accurate bid.