

March __, 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 – February 2020**
Danielson Mill Dam (MA03351)
Medfield, Massachusetts
(PARE Project No.: 19126.00)

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 February 28, 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.

Since the date of the previous follow-up inspection, the Town has coordinated the completion of detailed hydrologic and hydraulic studies to evaluate the capacity of the dam to accommodate the spillway design flood as well as completed dam break studies to verify the hazard potential classification. The Town is currently seeking funding to advance additional phases of the project to address the poor condition rating.

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 November 2014 Phase I Inspection Report and the August 2019 Follow Up Inspection Report, the dam was found to be in Poor condition and to have the following deficiencies:

November 2014 Phase I Inspection/Evaluation Report

1. Trees growing on the top of the downstream embankment threaten the long term stability of the dam. One large pine tree has fallen and requires removal. Several smaller hardwoods had fallen into the downstream spillway. The trunks have been removed.
2. The downstream stone retaining wall requires repair.
3. The spillway concrete walls require monitoring.
4. A minor area of erosion on the dam crest next to the spillway requires repair.

August Follow Up Inspection Report

1. Significant deterioration of the spillway system with the following noted:
2. Leakage through the stone masonry channel training walls with apparent subsidence of embankment soils behind the walls



Mr. Paul Marinelli

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March ___, 2020

3. Significant deterioration of the concrete portion of the channel training walls with apparent wall movement, significant deterioration of the timbers between wall sections, as well as noted erosion and potential sloughing of the embankment behind sections of the walls.
4. Potential bulge/movement of downstream portion of right stone masonry channel training wall.
5. Cracked mortar with slight stone separation at the ends of both of the mortared stone masonry upstream wing walls.
6. Irregular downstream boulder/stone wall with apparent failed/displaced sections
7. Unwanted vegetation in areas of the dam including:
8. Tree and brush growth along the downstream side and downstream area including large tree growth along the top of the downstream wall.
9. Weeds and brush along the upstream slope.
10. Areas of previously reported seepage along the downstream toe and within the downstream area (Majority of downstream area is soft and saturated with wetland vegetation).
11. Scarping along the waterline of the upstream slope.
12. Unknown ability to accommodate the spillway design flood (SDF)
13. Additional areas of deterioration and dam safety concerns.

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

David M. Matheson, P.E.
Senior Project Engineer

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): 42.17054°N/71.29507°W

Date of Inspection: February 28, 2020

Weather: 35°F, Mostly Clear

Consultant Inspector(s): Pare Corporation, David Matheson, P.E.

Others in Attendance at Field Inspection: None

Attachments: Figure 1: Locus Plan

Figure 2: Aerial Plan

Figure 3: Site Sketch

Photographs

Inspection Limitations

I. Previous Inspection date/Overall Condition:

- 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:

November 2014 Phase I Inspection/Evaluation Report

1. Trees growing on the top of the downstream embankment threaten the long term stability of the dam. One large pine tree has fallen and requires removal. Several smaller hardwoods had fallen into the downstream spillway. The trunks have been removed.
2. The downstream stone retaining wall requires repair.
3. The spillway concrete walls require monitoring.
4. A minor area of erosion on the dam crest next to the spillway requires repair.

August 2019 Follow Up Inspection Report

1. Significant deterioration of the spillway system with the following noted:
2. Leakage through the stone masonry channel training walls with apparent subsidence of embankment soils behind the walls
3. Significant deterioration of the concrete portion of the channel training walls with apparent wall movement, significant deterioration of the timbers between wall sections, as well as noted erosion and potential sloughing of the embankment behind sections of the walls.
4. Potential bulge/movement of downstream portion of right stone masonry channel training wall.



5. Cracked mortar with slight stone separation at the ends of both of the mortared stone masonry upstream wing walls.
6. Irregular downstream boulder/stone wall with apparent failed/displaced sections
7. Unwanted vegetation in areas of the dam including:
8. Tree and brush growth along the downstream side and downstream area including large tree growth along the top of the downstream wall.
9. Weeds and brush along the upstream slope.
10. Areas of previously reported seepage along the downstream toe and within the downstream area (Majority of downstream area is soft and saturated with wetland vegetation).
11. Scarping up to 12 inches deep along the waterline of the upstream slope.
12. Unknown ability to accommodate the spillway design flood (SDF)
13. Additional areas of deterioration and dam safety concerns.

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. Dead standing trees continue to decay.
 - ii. Continued advancement of spillway concrete deterioration.
- c. **Are there any additional deficiencies that have been identified in the current inspection?** No
- d. **If yes, list the deficiencies and describe.** Not Applicable

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.** Per the 2014 Phase I Report, 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:

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

- i. **Studies and Analyses**
 - a) Complete a hazard classification assessment to determine if the dam warrants reclassification to Low Hazard. (*Completed; dam appropriately classified as Significant*)
 - b) Complete an H&H analyses for the dam to assess its ability to accommodate the SDF. (*Completed; Dam overtops during the 100-year SDF event*)



- c) Further evaluate the seepage and saturation along the downstream side of the dam.
- d) Develop an Emergency Action Plan (EAP).
- e) Prepare an Operations and Maintenance (O&M) Manual.

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. Complete a Phase I Inspection. For a significant Hazard Potential Dam, Phase I Inspections should be completed every 5 years. Since the previous Phase I Inspection was completed on November 25, 2014, the inspection is considered past due.
- b) Perform routine maintenance activities.

iii. Repairs

- a) Rehabilitate / reconstruct the spillway system to address the noted concerns.
- b) Remove the irregular downstream boulder wall and replace with an earthen slope.
- c) Clear and grub areas of unwanted vegetation. Fill resulting holes.
- d) Develop and install a seepage mitigation system at the dam to address the seepage concerns along the downstream side of the dam.
- e) Provide riprap slope protection along the upstream slope.

iv. Remedial Measures

- a) Modify the dam to accommodate the 100-year SDF.

VIII. Other Comments or Observations:

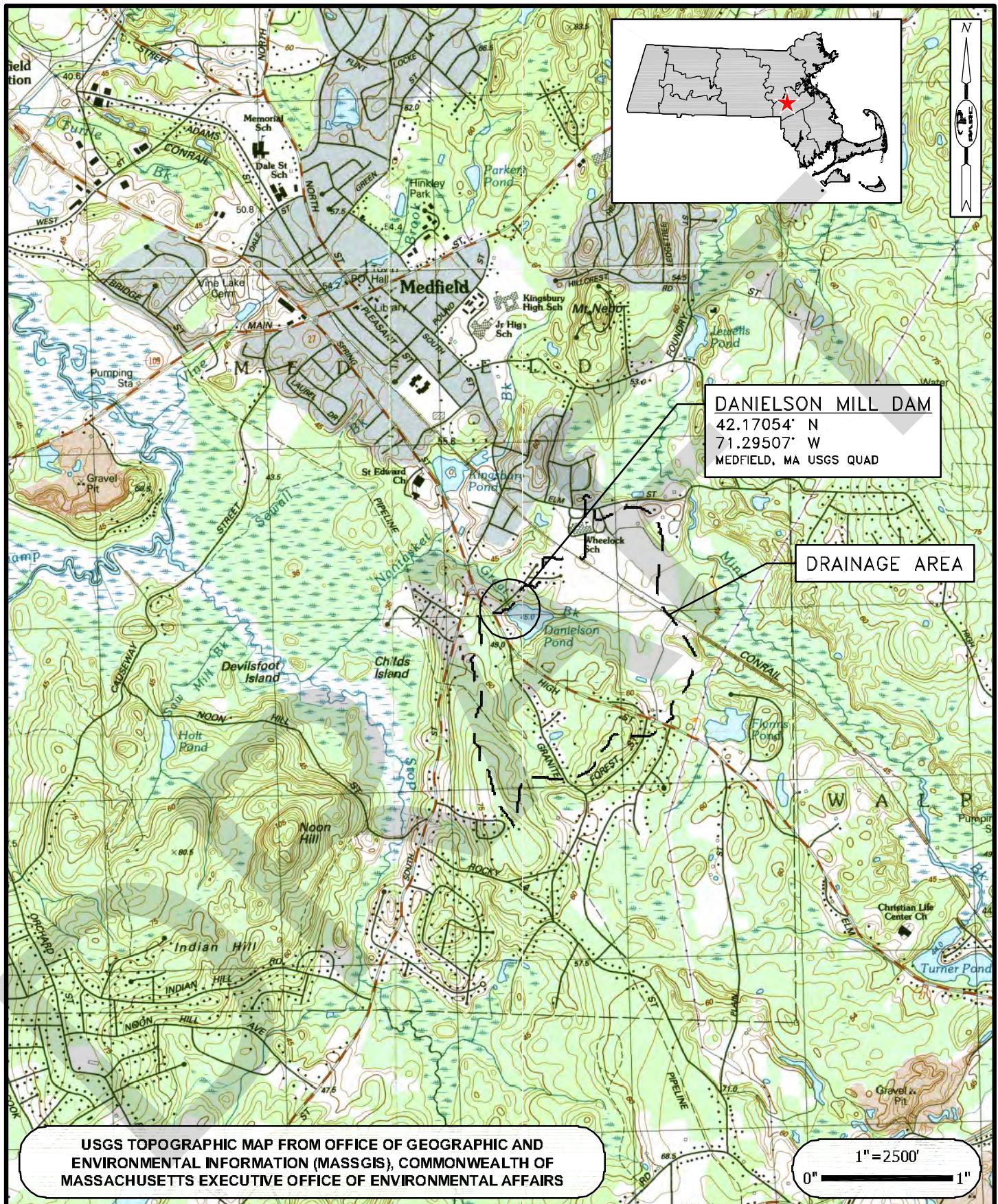
- a. Voids within the downstream stone masonry wall left of the spillway were probed up to 42 inches.
- b. Most of the immediate downstream surface areas, within 20 feet of the downstream wall, is saturated and soft with areas of standing water. The source of the water is likely from the dam as the ground surface pitches down from the dam. This condition was typical from approximately right of the primary spillway to the right abutment.

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



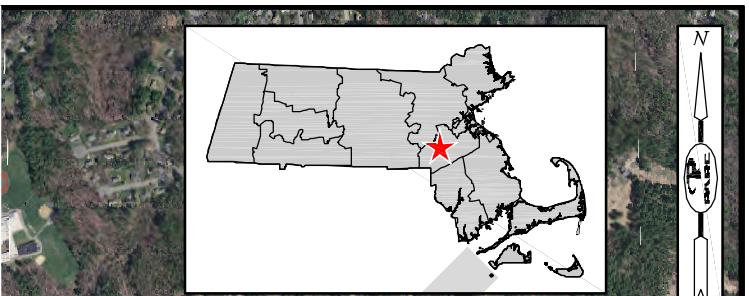
DANIELSON MILL DAM
MA03351
MEDFIELD, MASSACHUSETTS
OWNER : TOWN OF MEDFIELD

LOCUS PLAN

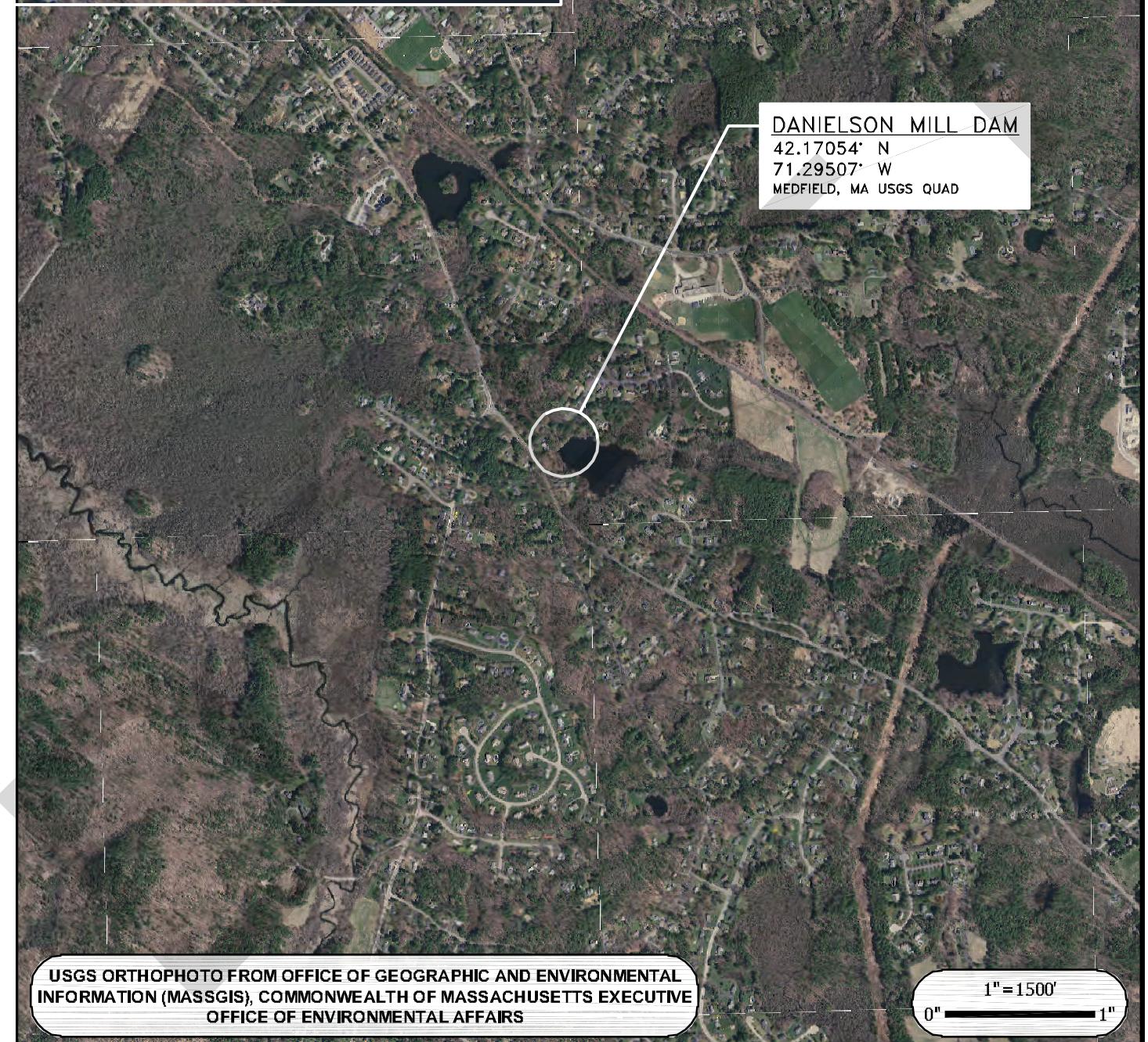
AUGUST 2019

FIGURE 1





DANIELSON MILL DAM
42.17054° N
71.29507° W
MEDFIELD, MA USGS QUAD



USGS ORTHOPHOTO FROM OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL
INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE
OFFICE OF ENVIRONMENTAL AFFAIRS

1"=1500'
0" 1"



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

AERIAL PLAN

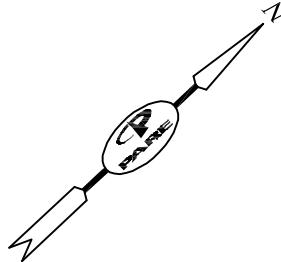
AUGUST 2019

FIGURE 2

NOTES AND LEGEND

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

④ DENOTES APPROXIMATE LOCATION AND DIRECTION OF PHOTOGRAPH.



HOMESTEAD DRIVE

48" RCP

WOODED WETLAND

REMNANTS OF FORMER TURBINE

CONCRETE TRAINING WALL

CONCRETE SLAB OVER SPILLWAY CHANNEL

IRREGULAR BOULDER WALL WITH
VOIDS UP TO 42 INCHES DEEP

PATH FROM
HIGH STREET

BOULDERS

GRANITE BLOCK UPSTREAM WING WALL

STONE MASONRY TRAINING WALL

SPILLWAY WITH 4' WIDE STOP LOG
BAY ATOP STEPPED CONCRETE WEIR

DANIELSON POND

SITE SKETCH
SCALE: 1"=20'



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:

PROJECT NO.: 19126.00/202
DATE: FEBRUARY 2020
SCALE: AS NOTED
DESIGNED BY: ARO/DMM
CHECKED BY: ARO
DRAWN BY: LMC
APPROVED BY: ARO

**SITE
SKETCH**

FIGURE NO.:

3



Photo No. 1: Overview of the upstream side of the dam as viewed from the left shoreline.



Photo No. 2: Upstream side of the dam as viewed from the left abutment looking right.



Photo No. 3: The upstream side of the dam as viewed from the primary spillway looking right. Note the sinkholes forming behind the spillway right return wall and the irregular shoreline beyond.



Photo No. 4: Overview of the upstream side of the dam as viewed from the right abutment looking left. Note the irregular shoreline due to scarping, and brush growth.



Photo No. 5: Crest as viewed from near the primary spillway looking right. Note the large trees along the downstream edge.



Photo No. 6: Downstream slope as viewed from near the primary spillway looking right. Note the overgrowth of trees, brush, vines, and briars.



Photo No. 7: Downstream slope as viewed from the downstream area about 25 feet right of the primary spillway looking upstream and slightly right. The ground surface in this area is predominantly soft and saturated.



Photo No. 8: Downstream slope as viewed from the downstream area near the right abutment looking left and slightly upstream. The ground surface in this area is wet and soft.



Photo No. 9: Downstream wall as viewed from the right abutment looking left.



Photo No. 10: The primary spillway as viewed from the crest looking right.



Photo No. 11: Primary spillway stop log section.



Photo No. 12: Primary spillway right training wall downstream of stop logs.
Note seepage/leakage.



Photo No. 13: Primary spillway culvert looking upstream.



Photo No. 14: Overview of the primary spillway discharge and downstream walls. The left wall has at least two voids up to 42 inches deep.



Photo No. 15: Primary spillway downstream channel.



Photo No. 16: Impoundment as viewed from the right abutment.



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.