



SECTION 3

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

In general, the overall condition of Saw Mill Pond Dam is **Poor**. A Poor condition dam is one “with major structural, operational, maintenance, and flood routing capability deficiencies.” A Fair condition assessment requires that there be no structural deficiencies. This Dam was found to have the following deficiencies:

1. Ability of spillway to pass the design (100-year) flood is unknown.
2. The low level outlet gate requires manual lifting by a hoist or equipment. Lifting the gate would require someone to attach a hoist to the gate in the water. During an emergency in flood conditions, this may not be feasible.
3. Deterioration of the visible portion of the low-level outlet pipe.
4. Dense vegetation, steep slopes, and evidence of sloughing on the downstream face of the dam.
5. Severely deteriorated downstream stone masonry wall, including formation of cracks and undermining of the toe.
6. Vegetation growing from cracks in the upstream stone masonry walls.
7. Sinkhole on the crest of the Dam in the vicinity of the upstream stone masonry walls where a road-drainage CMP has collapsed.
8. Undulations along portions of the downstream side of the dam crest.
9. Minor down stream toe seepage; seepage through weep holes in the bridge abutment.

No previous Phase I inspections were available for review; therefore, there are no previously identified deficiencies and major recommendations.

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

3.2 Studies, Analyses, and Manuals

The following studies or analyses are recommended to evaluate concerns and comply with current regulations.

1. A hydrologic and hydraulic (H&H) study should be completed to determine inflows and outflows associated with the spillway design flood (SDF) and assess the hydraulic adequacy of the Dam.
2. A detailed structural stability analysis should be performed for the embankment and non-embankment portions of this Dam.



3. Design a new operable low-level outlet.
4. An Operations & Maintenance Manual should be prepared for the dam.

3.3 Recurrent Maintenance Recommendations

The activities presented below should be undertaken on a regular or yearly basis by the dam owner/caretaker to improve the safety, maintenance, and operation of the dam. Typically these activities do not require engineering design.

1. Remove woody vegetation from dam embankment and the downstream area within 20 feet of the dam toe.
2. Remove trees and vegetation from upstream stone masonry walls. This should be done in conjunction with the recommended stability assessment and may require a Part A dam safety permit.
3. Re-grade portions of the embankment crest where undulations are present.
4. Establish and maintain a healthy vegetative cover. Grass or other vegetation should be mowed periodically and kept to a height of 3 to 12 inches.
5. Perform regular monitoring and inspection of the dam.
6. Remove woody debris from the dam crest, downstream channel, and areas within 20 feet of the downstream toe.
7. Keep discharge structures and channels clear of debris.
8. Monitor seepage at the down stream right toe of the dam for increases in flow rate.
9. Monitor the weep holes under the bridge for evidence of soil being transported from the dam embankment.

3.4 Minor Repair Recommendations

The following recommendations are intended to improve the overall condition of the Dam but do not alter the current design of the Dam. The recommendations may require design by a professional engineer and construction by a contractor experienced in dam construction or repair. A Chapter 253 permit may be required.

1. Remove all trees on the Dam and within 20 feet of toe. Remove stumps and roots, fill and compact voids, and establish vegetative cover.
2. Re-grade steep portions of the downstream face to a slope of 3H:1V or less.
3. Repair or replace the downstream stone masonry wall.
4. Remove CMPs from the dam embankment, repair the sinkhole.

Tree roots can provide conduits for seepage through dams that can ultimately lead to dam failure. Trees blown down in storms can remove a significant portion of a dam along with the root system, also potentially leading to dam failure. The presence of large trees (greater than 4 inches in diameter) on dams and within 20 feet of dam surfaces and abutments is cause for a dam to be rated in Poor condition.



3.5 Remedial Modifications Recommendations

Recommendations provided in this section pertain to modifications to the Dam that would **alter** the current dam design. These recommendations would require design by a professional engineer and construction by a contractor experienced in dam construction or repair, and require a Chapter 253 permit from the MADCR.

Based upon the information available at the date of the inspection, the following are recommended remedial modifications. It should be noted that additional remedial modifications may be necessary pending the results of a more detailed investigation.

- If the hydraulic capacity of the spillway is found to be inadequate, replace or enlarge the spillway
- Design and install a new low-level outlet with an accessible operator.

3.6 Alternatives

Prior to any redesign or sizeable capital investment in the dam and appurtenances, the Town should undertake a conceptual evaluation of alternatives to explore options for addressing the deficiencies identified in this inspection report. This work could be required by a Dam Safety Order due to the Poor condition of the dam. For purposes of estimating costs in Section 3.7, it was assumed a Dam Safety Order requiring a Phase II Investigation would be issued.

No alternatives to the repair recommendations presented above are included in this report. Dam removal was not considered as an alternative based on the pond's importance as a possible recreational resource, and its use as a potential water supply for fire fighting. If the dam is not needed as a recreational resource and alternate water supply for fire fighting is available, the Town may wish to consider removal of the dam to eliminate the maintenance, inspection and repair costs associated with the dam.

3.7 Opinion of Probable Construction Costs

Prior to commencing construction of repairs or maintenance activities, the owner/caretaker should contact the Office of Dam Safety and the local Conservation Commission to determine whether a permit is required. Consultation with a professional engineer familiar with the dam safety regulatory process is recommended to determine which other federal, state, and local permits may apply. Historically, Poor condition dams have been required by MADCR to perform a Phase II Investigation, which includes all the analyses and document preparation recommended in Section 3.1 above.

The following conceptual order-of-magnitude opinions of cost have been developed for the recommendations and remedial measures noted above. The costs shown herein are based on a limited investigation and are provided for general information only. They should not be considered an engineer's estimate, as construction costs may be less or considerably more than indicated.

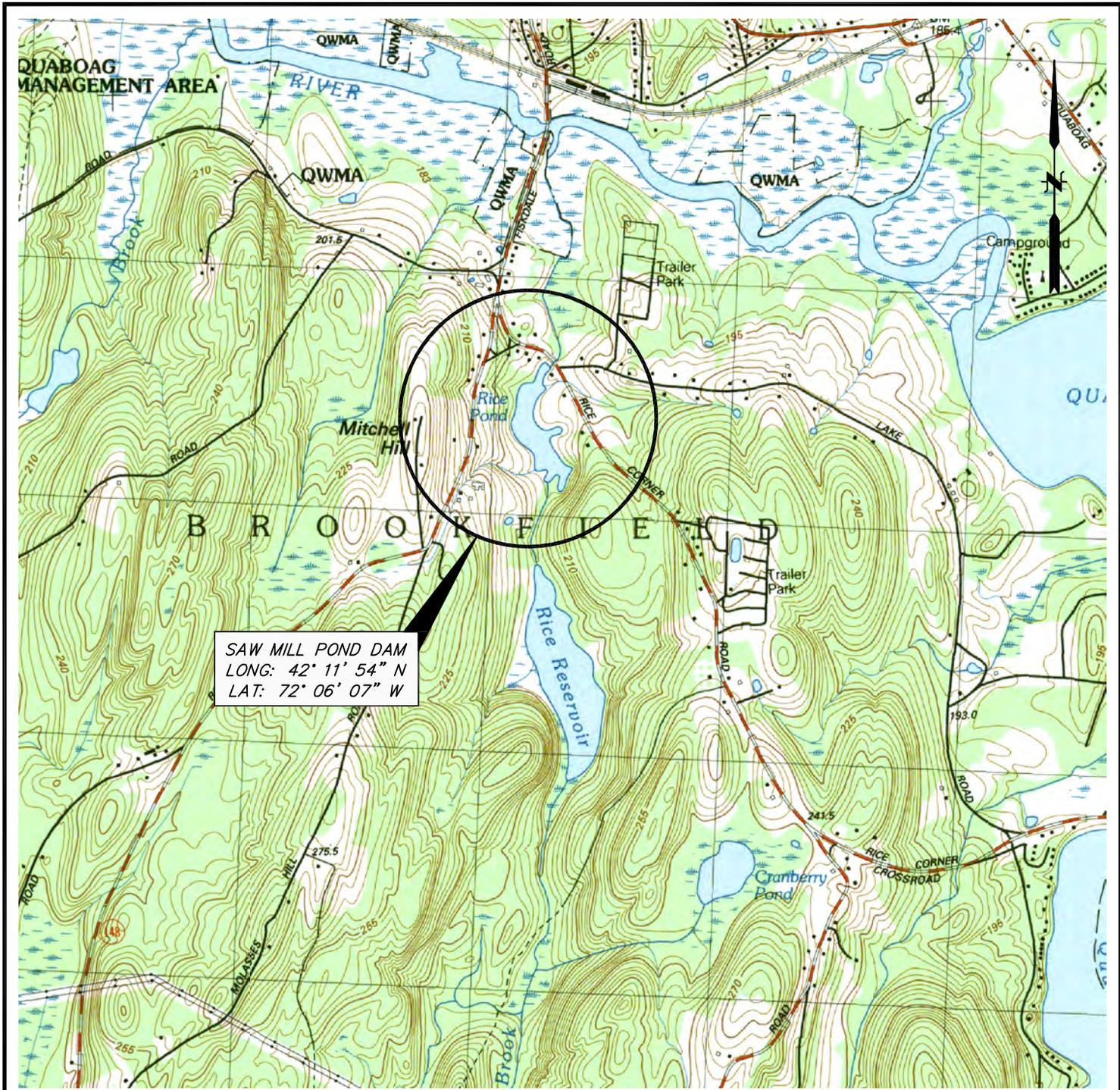


Studies/Analyses/Manuals	Low	to	High
1 Phase II Investigation	\$30,000	-	\$50,000
Minor Repairs			
1 Remove trees and woody vegetation on dam and within 20 feet of toe and abutments	\$30,000	-	\$50,000
2 Repair upstream embankment wall and sinkhole	\$10,000	-	\$25,000
3 Regrade down stream slopes to 3H:1V or less	\$15,000	-	\$30,000
4 Repair/replace downstream spillway training walls	\$20,000	-	\$40,000
Potential Remedial Modifications			
1 Construct a low-level outlet structure	\$20,000	-	\$50,000
2 Construct spillway capable of accommodating SDF (if necessary)	\$70,000	-	\$150,000
Engineering Design and Permitting			
	\$45,000	-	\$85,000
<hr/>			
Total	\$240,000	-	\$480,000
10% Contingency	\$24,000	-	\$48,000
TOTAL	<u>\$264,000</u>	-	<u>\$528,000</u>



FIGURES

- | | |
|------------------|--------------------------------|
| Figure 1: | Locus Plan |
| Figure 2: | Aerial Photograph |
| Figure 3: | Drainage Area |
| Figure 4: | Dam and Downstream Area |
| Figure 5: | Site Sketch |
| Figure 6: | Site Sketch |



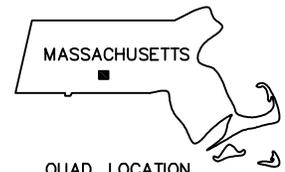
SAW MILL POND DAM
 LONG: 42° 11' 54" N
 LAT: 72° 06' 07" W

IMAGE REFERENCE:

THIS MAP WAS PREPARED FROM USGS TOPOGRAPHIC MAPPING OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS.

TOPOGRAPHIC 7.5 X 15 MIN. SERIES, EAST BROOKFIELD, MA QUADRANGLE, 1979

CONTOUR INTERVAL: 3 METERS



SCALE:	HORZ.: 1" = 2000'
	VERT.:
DATUM:	HORZ.: NGVD
	VERT.: NGVD
GRAPHIC SCALE	

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TOWN OF BROOKFIELD
 LOCUS PLAN
 SAW MILL POND DAM (NAT. ID # MA00098)

BROOKFIELD MASSACHUSETTS

PROJ. No.: 20100674.A10
 DATE: JULY 2010

FIG 1

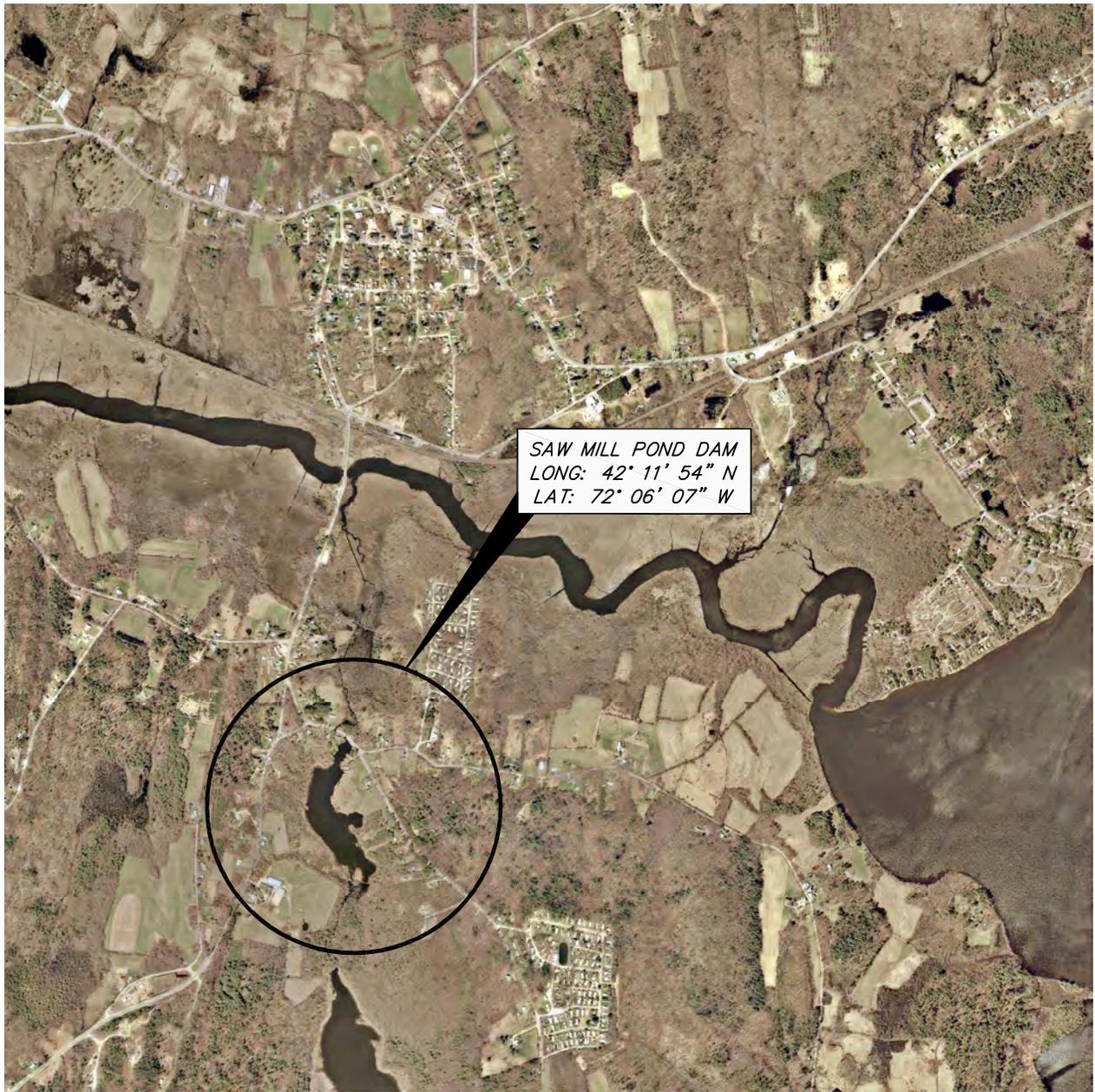
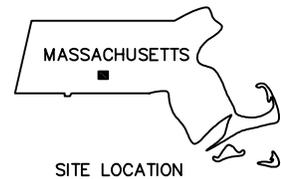


IMAGE REFERENCE:

AERIAL PHOTOGRAPHY OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS. DATE: 2003.



SCALE:	HORZ.: 1" = 2000'
	VERT.:
DATUM:	HORZ.:
	VERT.: NGVD
GRAPHIC SCALE	

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TOWN OF BROOKFIELD
AERIAL PHOTOGRAPH
SAW MILL POND DAM (NAT. ID # MA00098)

BROOKFIELD MASSACHUSETTS

PROJ. No.: 20100674.A10
DATE: JULY 2010

FIG 2

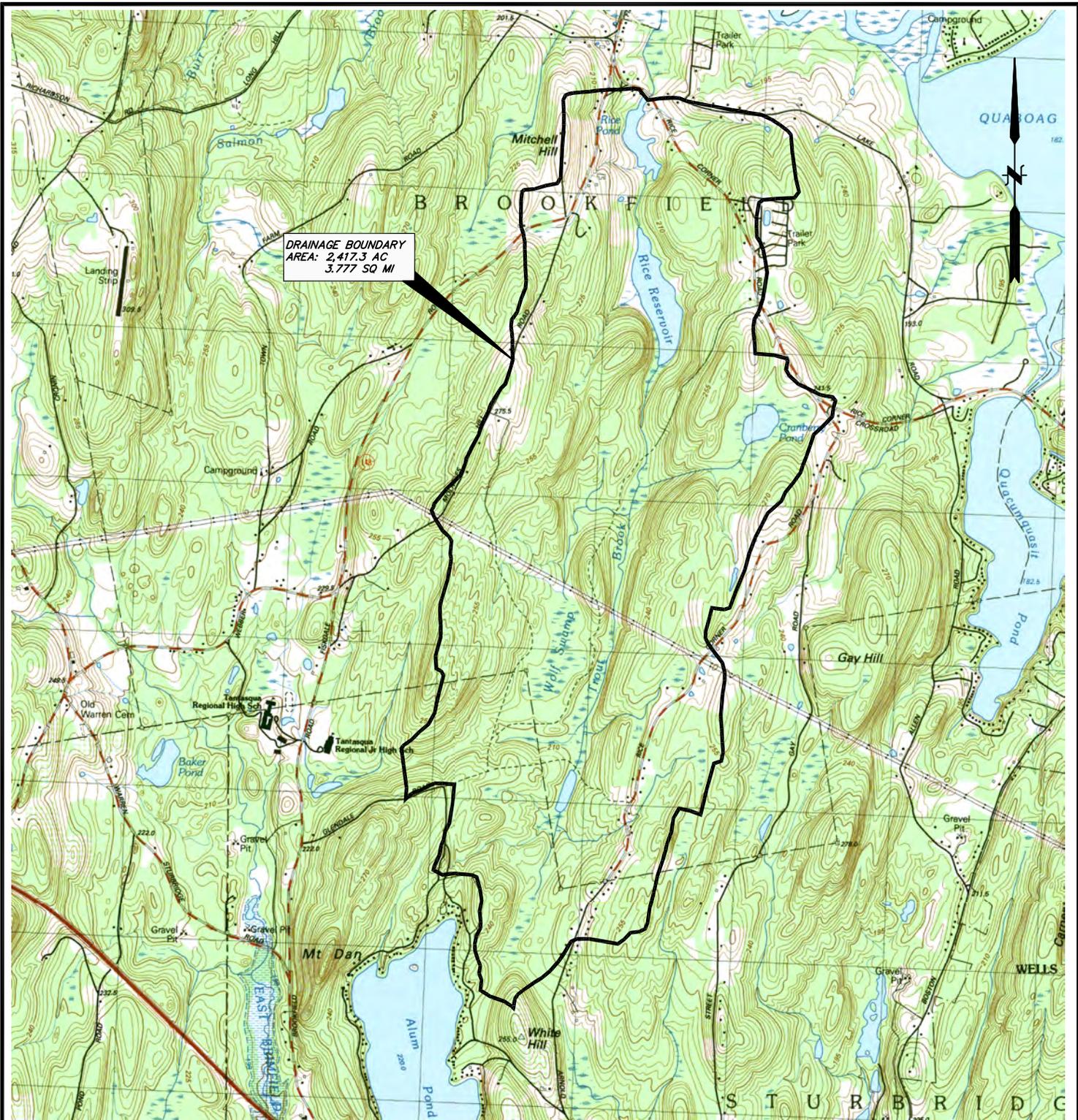
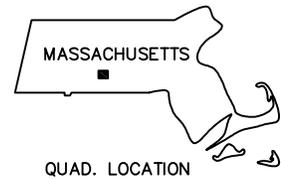


IMAGE REFERENCE:

THIS MAP WAS PREPARED FROM USGS TOPOGRAPHIC MAPPING OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS.

TOPOGRAPHIC 7.5 X 15 MIN. SERIES, EAST BROOKFIELD, MA QUADRANGLE, 1979

CONTOUR INTERVAL: 3 METERS



SCALE:	
HORIZ.:	1" = 3000'
VERT.:	
DATUM:	
HORIZ.:	NGVD
VERT.:	NGVD
GRAPHIC SCALE	



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TOWN OF BROOKFIELD
DRAINAGE AREA
SAW MILL POND DAM (NAT. ID # MA00098)
BROOKFIELD MASSACHUSETTS

PROJ. No.: 20100674.A10
DATE: JULY 2010

FIG 3

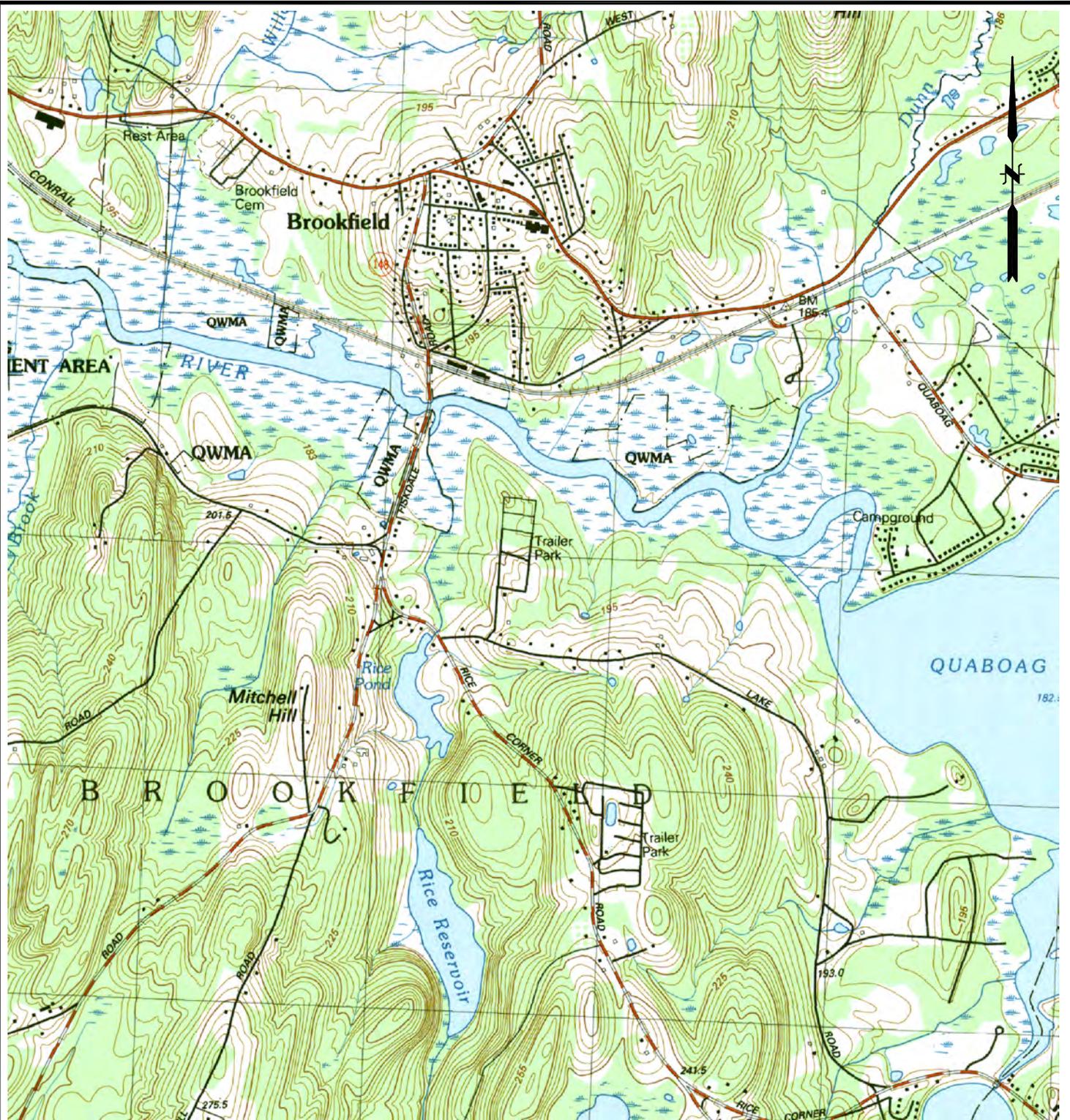
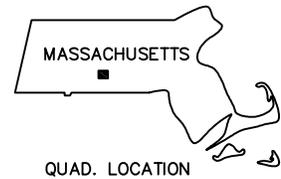


IMAGE REFERENCE:

THIS MAP WAS PREPARED FROM USGS TOPOGRAPHIC MAPPING OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS.

TOPOGRAPHIC 7.5 X 15 MIN. SERIES, EAST BROOKFIELD, MA QUADRANGLE, 1979

CONTOUR INTERVAL: 3 METERS



QUAD. LOCATION

SCALE:	HORZ.: 1" = 2000'
	VERT.:
DATUM:	HORZ.:
	VERT.: NGVD
GRAPHIC SCALE	



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TOWN OF BROOKFIELD
DOWNSTREAM AREA
SAW MILL POND DAM (NAT. ID # MA00098)
BROOKFIELD MASSACHUSETTS

PROJ. No.: 20100674.A10
DATE: JULY 2010

FIG 4

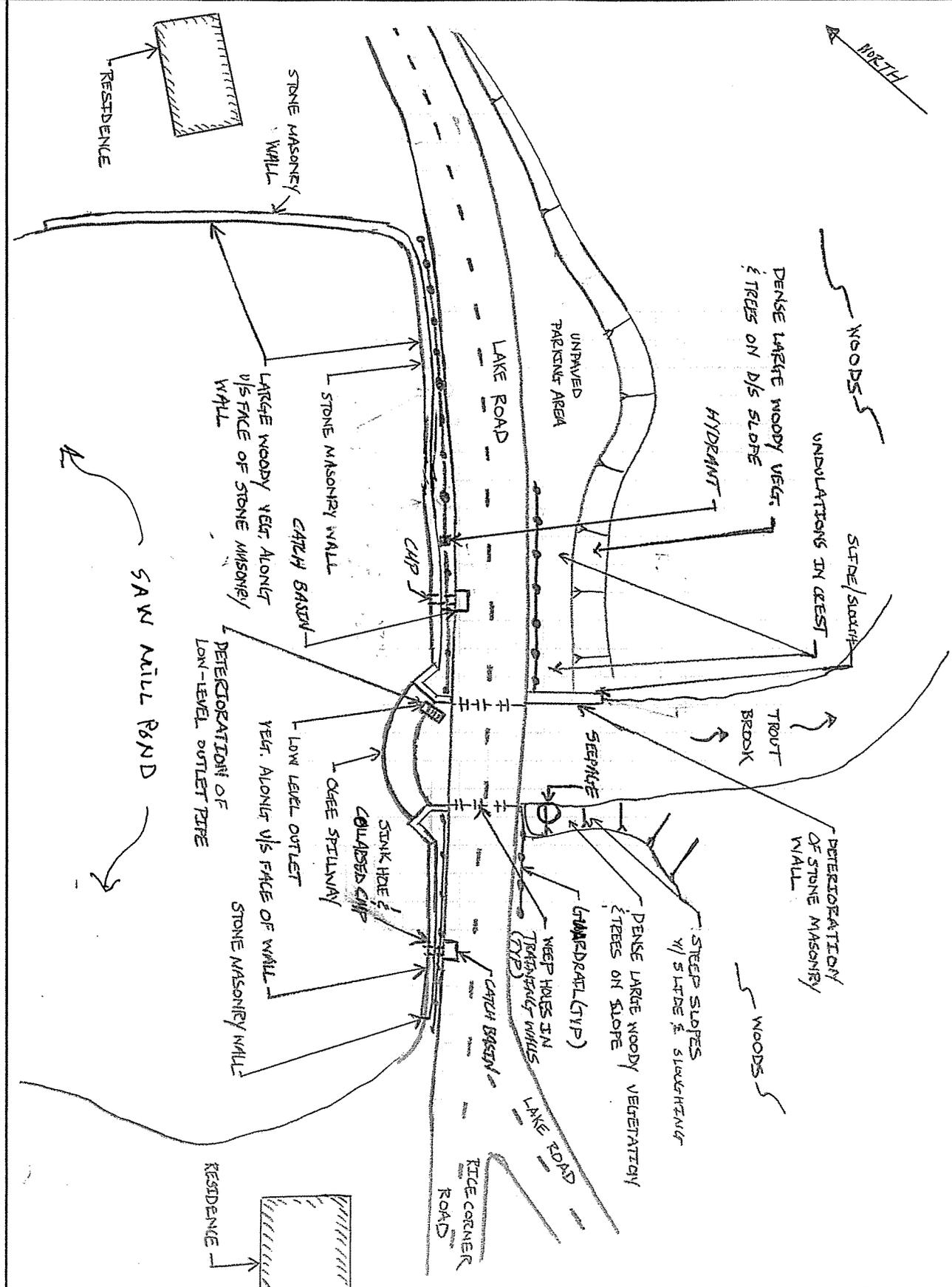


PREPARED BY KCM	DATE 7/26/2010	CHECKED BY CJC	DATE 8/9/10	PROJECT NO. 20100674.A10
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FIG 5A

SHEET NO.
1 of 1

SAW MILL POND DAM - PHASE I INSPECTION REPORT - SITE SKETCH





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7/26/2010

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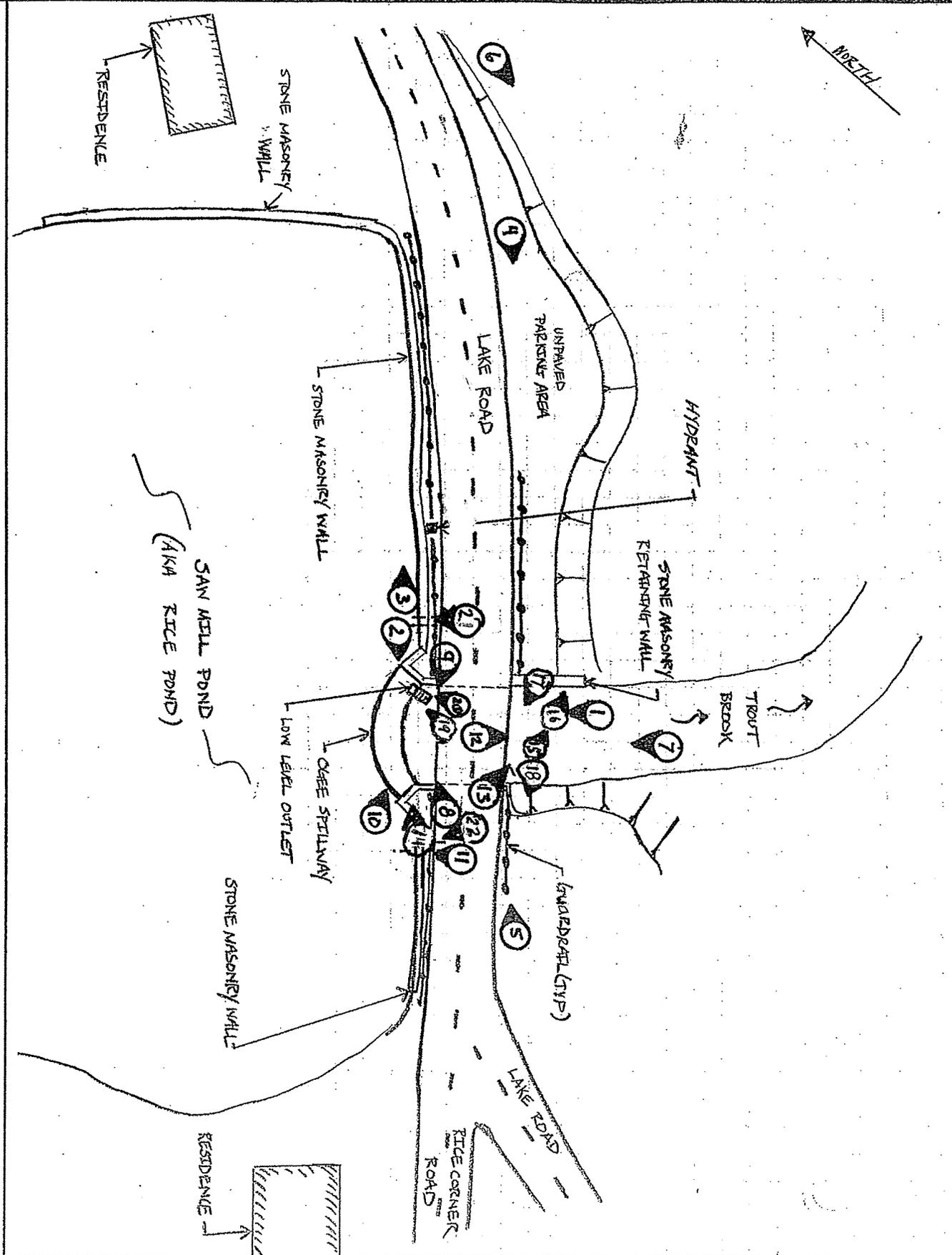
DATE
8/9/10

PROJECT NO.
20100674.A1C

FIG 5B

SHEET NO.
1 of 1

SAW MILL POND DAM - PHASE I INSPECTION REPORT - PHOTO LOCATIONS





APPENDIX A

Photographs



Photo 1: Overview of dam & spillway from downstream channel



Photo 2: Overview of upstream face from left spillway training wall (facing south)



Photo 3: Overview of upstream face from left spillway training wall (facing north)



Photo 4: Overview of dam crest from left abutment



Photo 5: Overview of dam crest from right abutment



Photo 6: Overview of downstream face from left abutment