

Summary of Visual Dam Inspection: Lake Singletary Dam Millbury, Massachusetts

August 26, 2005



Prepared for:

Town of Millbury Department of Public Works
127 Elm Street
Millbury, Massachusetts 01527

Prepared by:

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Norwood, Massachusetts 02062
File No. 18604



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LAKE SINGLETARY DAM

Town of Millbury, Massachusetts

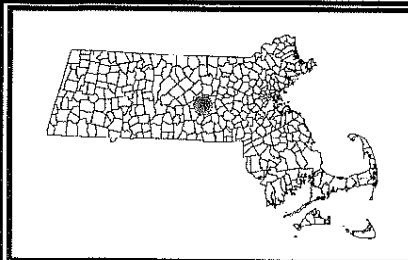
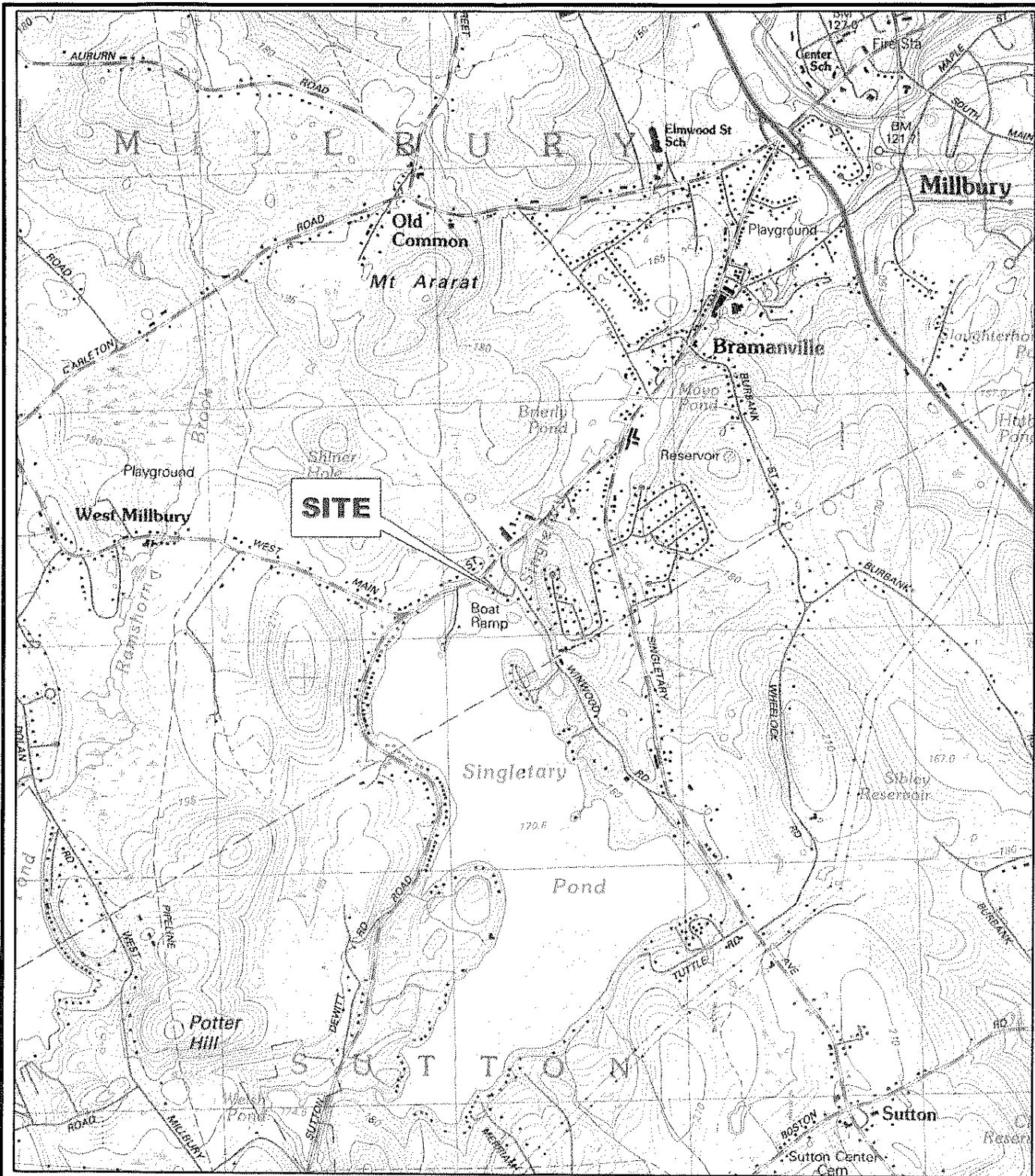
Millbury, Massachusetts

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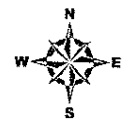
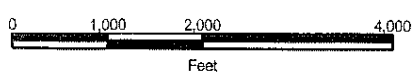
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SOURCE : SCANNED USGS TOPOGRAPHIC QUADRANGLES
 SCANNED BY THE MASSACHUSETTS EXECUTIVE OFFICE OF
 ENVIRONMENTAL AFFAIRS, MASSGIS. DISTRIBUTED JUNE, 2001.

Data Supplied by :



PROJ. MGR.: DML
 DESIGNED BY: DML
 REVIEWED BY: PHB
 OPERATOR: DML
 DATE: 07/20/05

SITE LOCATION MAP

**LAKE SINGLETARY DAM
 MILLBURY, MASSACHUSETTS**

JOB NO.
 18548

FIGURE NO.
1

**Town of Millbury
Millbury, Massachusetts**

DAM INSPECTION REPORT

LAKE SINGLETARY DAM

MA STATE ID NO.:	3-14-18646
ARMY CORPS NO.:	MA00144
NAME OF DAM:	Lake Singletary Dam
TOWN:	Millbury
COUNTY:	Worcester
STATE:	Massachusetts
STREAM:	Singletary Brook Blackstone River Watershed

1.0 DESCRIPTION OF PROJECT

1.1 GENERAL

1.1.1 AUTHORITY

GZA GeoEnvironmental, Inc. (GZA) was retained to perform a dam safety inspection by the Town of Millbury as per our proposal dated November 8, 2004. The Lake Singletary Dam is regulated by the Massachusetts DCR Office of Dam Safety.

1.1.2 PURPOSE OF WORK

GZA has undertaken a visual inspection of the Lake Singletary Dam in Millbury, Massachusetts. The primary objective was to observe existing surficial conditions at the dam, and render an opinion concerning maintenance measures, repairs, improvements, monitoring and/or investigations judged necessary to address deficiencies identified during the inspection. This report is subject to the Limitations in **Appendix A**.

Note that this abbreviated inspection report relies heavily upon previous reports for basic information about the dam. This information was generally not re-confirmed by GZA.

1.1.3 DEFINITIONS

Definitions of commonly used terms associated with dams are presented in **Appendix B**.

1.2 DESCRIPTION OF PROJECT

1.2.1 LOCATION

Lake Singletary Dam is located on the Singletary Brook in Millbury, Massachusetts and impounds Lake Singletary. Please refer to Figure 1, Locus Plan. The Dam is located at the north end of Singletary Pond, which straddles the Millbury-Sutton town line. The Dam is shown on the USGS Worcester South, MA quadrangle map. Map coordinates are as show below:

Longitude: 71.7815° W
Latitude: 42.1697° N

1.2.2 OWNER/OPERATOR

The Lake Singletary Dam is owned by the Town of Millbury. The dam is operated and maintained by personnel from the Millbury Public Works Department and the Lake Singletary Association. The Department Director is Mr. Joseph Chase and the dam caretaker is Mr. David Ridge, who also serves as the Fire Chief for the Town of Millbury in addition to being a member of the Lake Singletary Association.

1.2.3 PURPOSE OF DAM

The purpose of the dam is recreational.

1.2.4 DESCRIPTION OF DAM AND APPURTENANCES

The dam consists of a poorly defined earth embankment, approximately 50 feet long, with a maximum height of approximately 17 feet at the upstream gatehouse outlet works. Several private homes are located on or adjacent to the dam crest, which is traversed by a gravel roadway. The primary outlet from the dam is through a low level outlet pipe controlled by a 36- X 36-inch wooden slide gate. The gate is controlled from a wooden gatehouse, which is located on the upstream edge of the dam crest. A concrete channel, with provisions for stoplogs leads to a bar rack at the entrance to the upstream gate house. A second wooden gatehouse, located on the downstream slope of the dam contains a 24- X 30-inch sluice gate which is no longer used and kept in the open position.

An overflow spillway which discharges to a concrete flume is located above the outlet pipe, and was used to control the maximum water level in the pond if the second gate is set in a closed position. A 48-inch RCP box culvert connects the two gatehouses.

A second emergency outlet structure is located on the right portion of the dam. This outlet consists of a modified concrete utility box structure which forms an 8-ft long weir. The discharge is conveyed downstream by two 24-inch-diameter reinforced concrete pipe (RCP) culverts. The outlet was constructed in 1992.

1.2.5 OPERATION AND MAINTENANCE

The dam is operated and maintained by personnel from the Millbury Public Works Department and the Lake Singletary Association. The dam caretaker, Mr. Ridge, has his private residence at the dam. There is no formal operations plan. The main method of controlling the Lake elevation is via the upstream gatehouse. The outlet is reportedly operated frequently to: a) provide water for downstream ponds; b) in anticipation of heavy rainfall; and c) in the fall for seasonal drawdown. Reportedly, raising the gate such that it is open 10-inches results in a drawdown of 1 to 2 inches in a 5-day period.

Repairs to the upstream gate stem / connecting bolts were made in 2004. Several sections of the 48-inch box culvert were also replaced (R.H. White, contractor) in the recent past. The trash rack on the upstream gatehouse is slated for replacement in the next year.

1.2.6 SIZE CLASSIFICATION

The Lake Singletary Dam is classified as a **Large** size dam under Massachusetts Dam Safety Regulations (302 CMR 10.06) based on its maximum impoundment volume being greater than 1,000 acre-feet (about 2,660 acre-feet).

1.2.7 HAZARD CLASSIFICATION

The Lake Singletary Dam is considered by the Massachusetts Office of Dam Safety to have a **Significant Hazard** potential. The Office of Dam Safety defines Significant hazard as: *“Dams located where failure or misoperation may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities.”*

1.3 PERTINENT ENGINEERING DATA

This data is as reported in previous reports and was not reconfirmed by GZA.

Dam

Type	Earth embankment
Length	50 feet (Approx.)
Height	17 feet (Approx.)
Top Width	80 feet (Approx.)
Drainage Area	4.0 Square Miles

Elevation (feet above MSL)

Normal Pool	557.0
Spillway Crest	557.0 (at downstream gatehouse) 559.0 (approx., at emergency spillway)
Top of Dam	560.75

Storage (Acre-feet)

Normal pool	1,340 (Approx.)
Top of Dam	2,660

Low-Level Outlet

Type	48-inch box
Control	Upstream and downstream slide gates with overflow spillway at downstream gatehouse.

Spillway (At Downstream Gatehouse)

Type	Concrete weir
Length of Weir	3.6 feet
Crest Elevation	557.0

Spillway (Near Right Abutment)

Type	Concrete weir
Length of Weir	8 feet
Crest Elevation	559.0 (approx.)

2.0 VISUAL INSPECTION

2.1 GENERAL FINDINGS

GZA representatives Peter H. Baril, P.E., and David M. Leone, P.E. visited the site on June 9, 2005 to visually inspect the dam. The lake level during the inspection was approximately 2.85 feet below the top of the concrete headwall at the upstream gatehouse and 21-inches below the pin on the concrete gatehouse wall used by the Town to gauge the Lake level. According to previous GZA inspections, the pin has an approximate elevation of 559.7 feet.

Based on the results of the visual inspection, the dam was considered to be in **FAIR condition**. The dam and its appurtenant structures appear to be well maintained, with the exception of the vegetative growth throughout the embankment. Photographs taken during the site visit are included in **Appendix C**. The results of the visual inspection are summarized on the checklist in **Appendix D**.

2.1.1 DAM EMBANKMENT

The embankment appeared to be in fair condition. Brush, trees, and poison ivy are located throughout the downstream portion of the embankment. The crest of the dam and gravel access roadway was uneven in places, and quite wide. Several homes are located on the dam crest. Previous inspection reports noted standing water at the downstream toe of the dam, which could not be verified due to the overgrown vegetation. Generally, the downstream area appeared to be dominated by wetland growth.

2.1.2 PRIMARY OUTLET WORKS

The upstream gatehouse structure appeared to be in good condition. The trash rack appeared to exhibit some rusting. The wooden gate itself was not visible. The gate is reportedly exercised regularly and in working condition, but should be inspected at the time of the next lake drawdown when it is visible. The gate houses are kept locked.

The immediate downstream gatehouse appeared to be in good condition. The downstream gate is no longer in use, as it had historically had problems with leakage. The concrete overflow and channel appeared to be in fair condition. The stone masonry at the channel was in fair condition—some minor repointing and clearing of vegetation is required.

2.1.3 EMERGENCY SPILLWAY

The emergency spillway appeared to be in good condition. The RCP culverts and utility box were in good condition. The downstream channel was overgrown with vegetation and should be cleared of debris.

2.1.4 DOWNSTREAM AREA

The immediate downstream area at the dam site was found to be overgrown with vegetation. The vegetation at the downstream embankment and spillway channel obscures visual inspection and it should be removed with approval from the Conservation Commission.

2.1.4 IMPOUNDMENT / UPSTREAM AREA

No unusual conditions were observed upstream of the dam.

2.2 OPERATOR INTERVIEW

The caretakers of the dam could not recall an instance of overtopping, though the Lake is occasionally lowered prior to forecasted heavy rainfall (1 inch of rainfall results in a reported 3 inch rise in lake level). Reportedly, the crest elevation of the emergency spillway has been lowered since it was first installed 8 to 10 years ago, and may have replaced another spillway which was originally installed in the circa 1930s.

2.3 OPERATION AND MAINTENANCE

2.3.1 MOWING

The DPW ceased clearing of the embankment as a result of concerns by the Conservation Commission and abutting property owners. As a result, the embankment is overgrown with vegetation.

2.3.2 WATER LEVEL CONTROL

The Town reportedly controls the lake level via the upstream slide gate as described previously.

2.3.3 EMERGENCY ACTION PLAN

The dam is a Significant Hazard and does not have an EAP.

2.3.4 INSTRUMENTATION

There is no instrumentation on the dam.

2.4 PREVIOUS INSPECTION REPORTS

Previous inspections of the dam were reviewed by GZA. There do not appear to have been significant changes to the condition of the dam from those noted in the most recent previous inspection reports (GZA, 1998). The operations of the dam have changed since the last inspection, as the upstream gate is utilized to control the water level in the impoundment in lieu of the downstream gate, which is no longer operated.

3.0 HYDRAULICS AND HYDROLOGY

GZA has undertaken a preliminary hydrologic and hydraulic analysis and evaluation of the dam's outlet works and spillway. As per the Commonwealth's dam safety regulations, the spillway design flood for the large size, significant hazard structure is the 500-year flood.

GZA developed a rainfall-runoff model for the watershed and Lake using the U.S. Army Corps of Engineers' (COE) HEC-HMS software program and SCS unit hydrograph methodology. The contributory watershed area to Lake Singletary is about 3.52 square-miles (independent of the Lake's 0.52 square-mile surface area, which was also incorporated into the model). The model assumed the Lake started at an elevation of 557 ft, which is coincident with the reported normal pool from past inspections and the concrete overflow weir at the downstream gatehouse. A rating curve (i.e., elevation vs. discharge) for the outlet structures was taken from the COE Phase I Dam Inspection report and a rating curve for the emergency spillway was developed by GZA.

The results indicate that the 500-year flood, which corresponds to about 8 inches of rainfall in 24-hours (SCS Type III distribution), overtops the dam. The peak inflow to the Lake is estimated at 3,290 cfs. The significant storage in the Lake attenuates the flood considerably, to about 200 cfs. The capacity of the outlet works and emergency spillway is estimated to be about 60 cfs, or about 30-percent of the design flood. The spillway and outlet works, therefore, are judged to be inadequate to safely pass the spillway design flood.

4.0 STRUCTURAL STABILITY

Computational analysis of the structural stability of the embankments or ancillary structures is beyond the scope of this inspection. The embankment slopes are within the ranges typically considered to be stable based on generic US Bureau of Reclamation guidelines.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 RECOMMENDED MAINTENANCE & REPAIR MEASURES

GZA recommends that the owner implement the following maintenance and repair measures to correct minor issues noted at the dam. Most actions could likely be performed by the Town's own forces. Routine monitoring may be done by authorized personnel familiar with the dam. If changes in the condition of these areas/structures is noted, a qualified registered professional engineer experienced in dam safety should be notified for additional investigation.

5.1.1 MINOR MAINTENANCE ITEMS

1. Remove brush, trees, and major root systems from downstream slope, and establish and maintain a grass cover.
2. Remove trees in downstream emergency spillway channel, debris, forest litter, and downed tree limbs, and establish riprap channel protection at pipe outlet.

3. Clear sediment and debris from the gate and spillway approach area as needed.
4. Monitor observed potential seepage for changes in volume, and/or color. Record observations.

5.1.2 REPAIR / IMPROVEMENT ITEMS

1. Repoint stone work in channel downstream of outlet gatehouse. Remove vines and other vegetation from channel walls.
2. Replace trash rack as planned. Continue to monitor the condition of the existing trash rack to determine schedule for repair or replacement.

5.2 RECOMMENDATIONS FOR FURTHER INVESTIGATION

GZA recommends that the following areas/structures be further investigated:

1. Conduct a detailed hydrologic and hydraulic investigation of the existing spillway and outlet structures and design and construct spillway repairs for additional spillway capacity, as required.
2. Establish a formal, written operations and maintenance plan.
3. Re-inspect gate and gate stem at upstream gatehouse when the lake is drawndown.

5.3 MAINTENANCE PROGRAM COST ESTIMATE

It is assumed that the Millbury Highway Department can accomplish the minor maintenance and monitoring items with its own forces. An approximate conceptual estimate of the costs of the repair / improvement items is as follows:

1. Repoint Stone Work:	\$2,000
2. Replace Trash Rack:	<u>\$1,000</u>
Total:	\$3,000

The cost for investigative measures and associated implementation of remedial actions will vary depending on the results of the investigation. The costs provided below should therefore be considered to be very approximate, and do not include costs for constructing spillway improvements, permitting, etc.:

1. Detailed H/H analysis and concept design:	\$10,000
2. O&M Plan:	\$2,000
3. Re-inspect gate:	<u>\$1,000</u>
Total:	\$13,000

APPENDIX A
LIMITATIONS

APPENDIX A

LIMITATIONS

1. The observations described in this report were made under the conditions stated herein. The conclusions presented in the report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services or the time and budgetary constraints imposed by Client.
2. In preparing this report, GZA GeoEnvironmental, Inc. (GZA) has relied on certain information provided by state and local officials and other parties referenced therein, and on information contained in the files of state and/or local agencies available to GZA at the time of the site evaluation. Although there may have been some degree of overlap in the information provided by these various sources, GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this work.
3. In preparing this report, GZA may have relied upon topographic survey data prepared by others and soil classifications assigned by the U.S. Department of Agriculture. GZA did not independently verify the accuracy of that data.
4. GZA based the hydrologic analysis of existing conditions on the site plans made available to GZA as of the date of this report. In the event that any changes in the nature, design or location of the outlet structures at the Dam are planned, the conclusions and recommendations contained in this Report shall not be considered valid unless the changes are reviewed and conclusions of this Report modified or verified by GZA.
5. The analysis presented is for the rainfall volumes and distributions stated herein. For storm conditions other than those analyzed, the response of the sites drainage network has not been evaluated.
6. In reviewing this Report, it should be realized that the reported condition of the dam is based on observations of field conditions during the course of this study along with data made available to GZA.
7. It is important to note that the condition of a 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 may be detected.
8. This Report has been prepared for the exclusive use of the Town of Millbury for specific application to the Brierly Pond Dam, Dorothy Pond Dam, Ramshorn Pond Dam, or Singletary Lake Dam located in Millbury, Massachusetts, in accordance with generally accepted soil and foundation engineering and wetland evaluation practices. No other warranty, express or implied, is made.

APPENDIX B
DEFINITIONS

DEFINITIONS

Right and Left are defined with respect to an observer looking *downstream*.

DAM COMPONENTS:

Abutment: Area that borders either end of the dam.

Appurtenant works: Ancillary features of a dam, such as the outlet, spillway, powerhouse, tunnels, etc.

Crest: Often used to refer to the top of the dam (or the top of the spillway as in “spillway crest”).

Dam: A barrier built across a watercourse for impounding or diverting the flow of water.

Embankment: A slope of fill material, usually earth or rock, placed with sloping slides which provide a permanent barrier which impounds water.

Riprap: A layer of large uncoursed stones, broken rock, or precast blocks placed in random fashion on the slope of an embankment, reservoir, or channel to protect against wave and ice action.

Spillway: A structure over or through which flood flows are discharged.

Toe: The junction of the face of the dam with the ground surface.

SIZE CLASSIFICATION:

The classification for size may be determined by either storage or height, whichever gives the largest size classification.

Large: Dam with a height greater than or equal to 40 feet and/or a storage capacity greater than or equal to 1,000 acre-feet.

Intermediate: Dam with a height greater than or equal to 15 feet and less than forty feet and/or a storage capacity greater than or equal to 50 acre-feet and less than 1,000 acre-feet.

Small: Dam with a height greater than or equal to 6 feet and less than 15 feet and/or a storage capacity greater than or equal to 15 acre-feet and less than 50 acre-feet.

HAZARD CLASSIFICATION:

The hazards pertain to potential loss of human life or property damage in the event of failure or improper operation of the dam or appurtenant works. Probable future development of the area downstream from the dam that would be affected by its failure shall be considered in determining the classification.

High Hazard (Class I): Dams located where failure or misoperation will likely cause loss of life and serious damage to home(s), industrial or commercial facilities, important public utilities, main highway(s) or railroad(s).

Significant Hazard (Class II): Dams located where failure or misoperation may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption or use of service of relatively important facilities.

Low Hazard (Class III): Dams located where failure or misoperation may cause minimal property damage to others. Loss of life is not expected.

GENERAL:

Acre-foot: A unit volume equal to 43,560 cubic feet or 325,853 gallons (one foot depth over one acre).

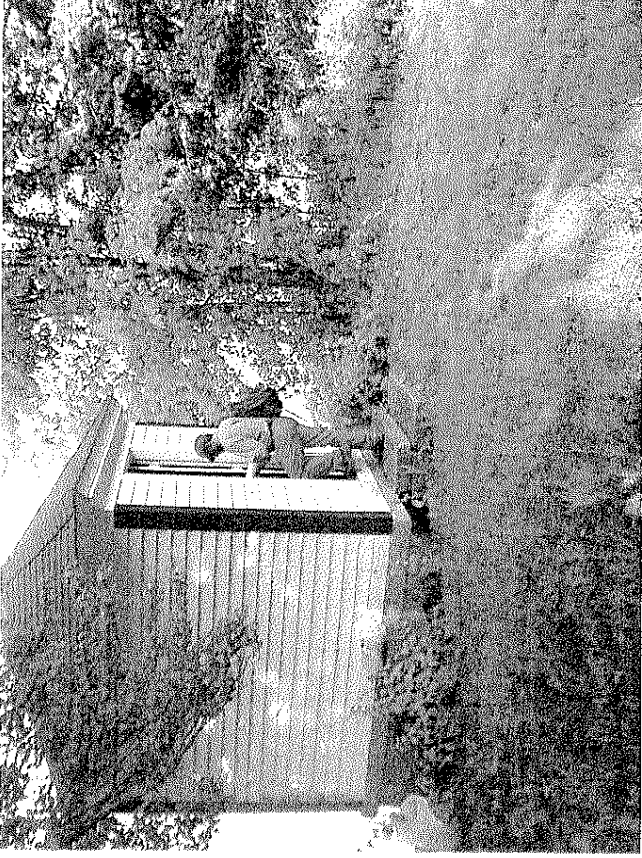
Cubic foot per Second (cfs): Flow rate (volume per time) equivalent to 448.8 gallons per minute or 0.646 Million Gallons per Day.

Height of dam: The vertical distance from the lowest elevation of the dam crest to the lowest point of natural ground, including any stream channel, along the downstream toe of the dam.

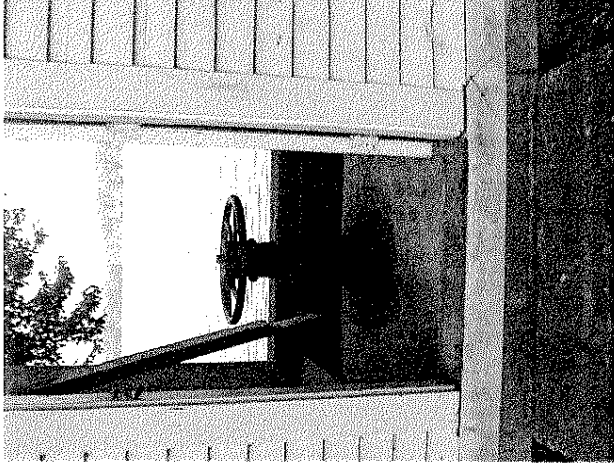
Reservoir: Area which contains the body of water impounded by a dam.

Spillway Design Flood (SDF): The flood used in the design of a dam and its appurtenant works particularly for sizing the spillway and outlet works, and for determining maximum temporary storage and height of dam requirements.

APPENDIX C
SITE PHOTOS



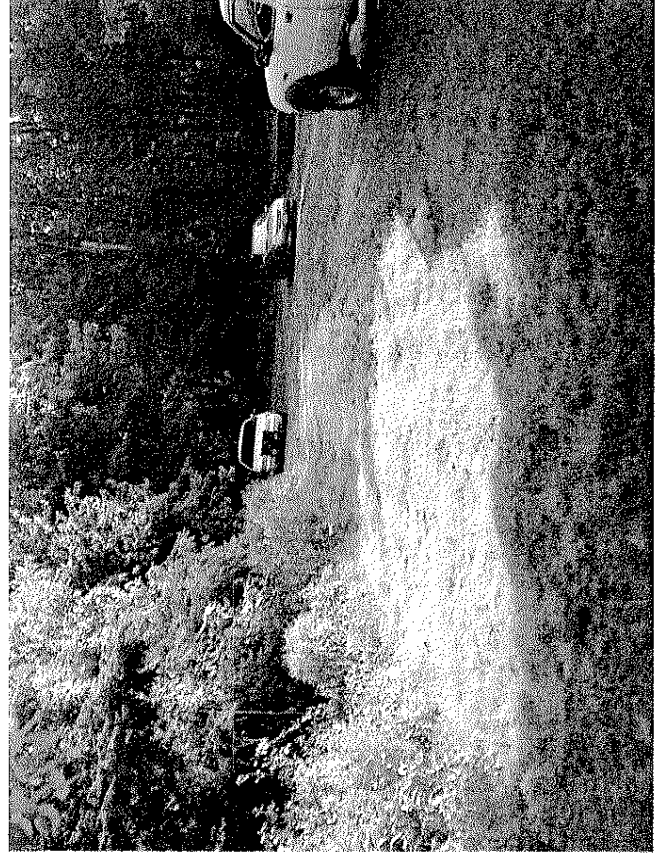
Description: Upstream gatehouse.



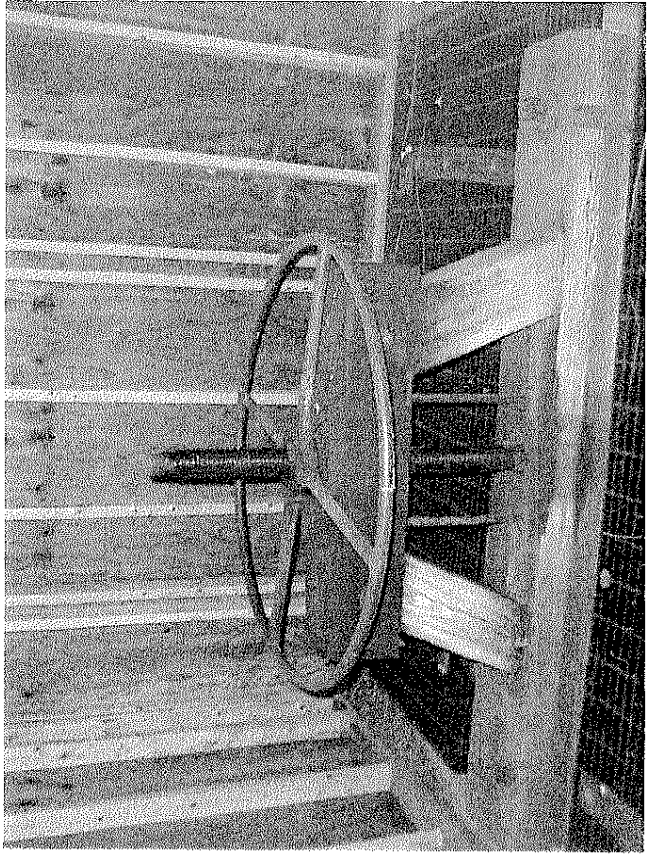
Description: Gate control at upstream gatehouse, with Lake Singletary in the background.



Description: Overview of "dam" from right abutment.



Description: Overview of "dam." from left abutment.



Description: Gate control at downstream gatehouse (not used).



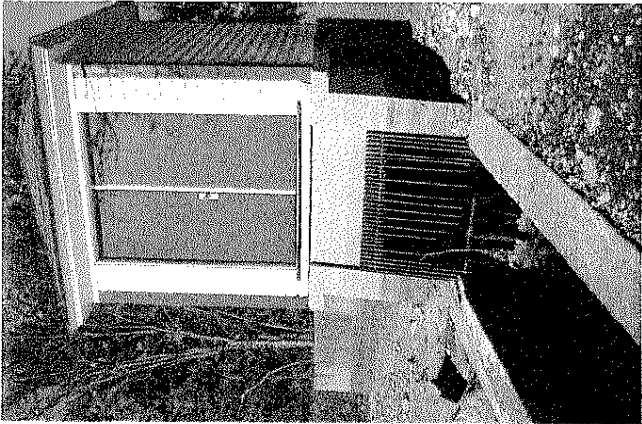
Description: Floor grate and weir at downstream gatehouse.



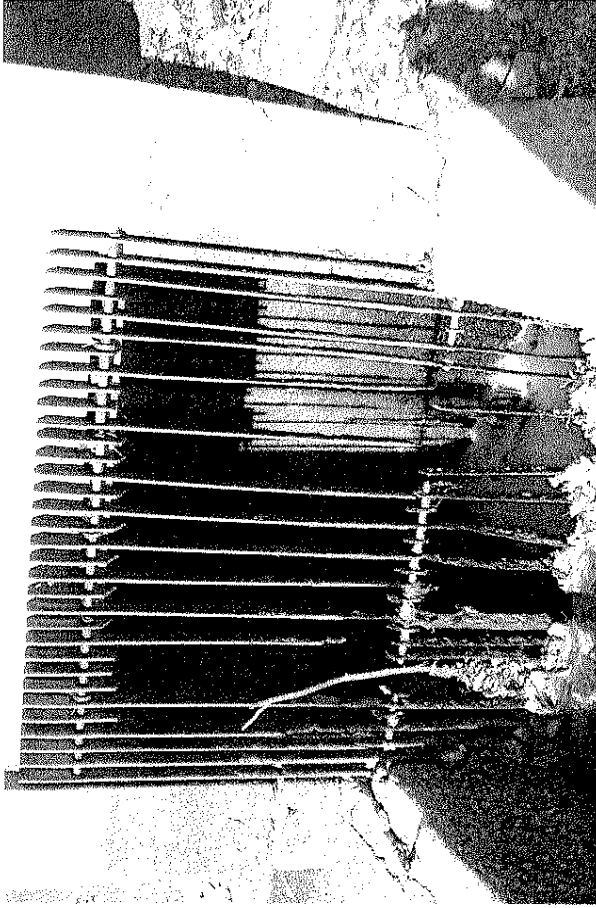
Description: Emergency spillway culverts.



Description: Downstream channel for emergency spillway.



Description: From November, 2004: Inlet to upstream gatehouse.



Description: From November, 2004: Upstream trash rack and inlet.



Description: From November, 2004: Drawdown lake from upstream gatehouse.



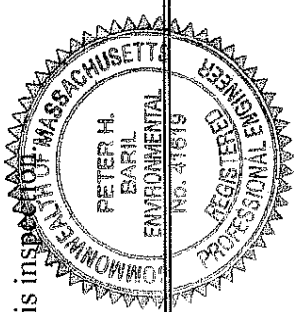
Description: From November, 2004: Emergency spillway structure.

APPENDIX D

VISUAL INSPECTION CHECKLIST

DAM INSPECTION CHECKLIST

SINGLETARY POND DAM

Name of Dam:	Lake Singletary Dam	DEM I.D. No.:	3-14-186-16
Location:	Millbury Town	Army Corp I.D.:	MA 00144 Worcester County
DEM Classification Data:	Large Size	Significant Hazard	
PHYSICAL DATA:	Earth Embankment	17 feet (approx.)	1,340 Acre-feet (approx.)
	Type of Dam	Height of Dam	Normal Pool Storage Capacity
		21" below top of pin-gatehouse	
ELEVATIONS:	557	1" below emergency spillway crest	N/A
	Normal Pool	Pool at Inspection	Tailwater at Inspection
Name	Title/Position	Representing	
Peter H. Baril, P.E.	Associate Principal	GZA GeoEnvironmental, Inc.	
David M. Leone, P.E.	Project Manager	GZA GeoEnvironmental, Inc.	
Joseph Chase	Director of Public Works	Town of Millbury	
Bob Murray	Dept. of Public Works	Town of Millbury	
Dave Ridge	Fire Chief / Dam Caretaker	Town of Millbury/Lake Singletary Assoc.	
DATE OF INSPECTION:	June 9, 2005	TEMPERATURE:	70
WEATHER:	Clear		
This is to certify that the above dam has been inspected and the following are the results of this inspection:			
			
			SIGNATURE OF INSPECTING ENGINEER

AREA INSPECTED	EMBANKMENT 1 of 2		OBSERVATIONS	CHECK () ACTION NEEDED		
	ITEM NO.	CONDITION		MONITOR	INVESTIGAT	REPAIR
CREST	1	Surface Cracking	Asphalt in poor condition.			✓
	2	Sinkhole, Animal Burrow	None observed.			
	3	Low Area(s)	Crest uneven & built upon.	✓		
	4	Horizontal Alignment	Good			
	5	Ruts and/or Puddles	None observed.			
	6	Vegetation Condition	Trees throughout.			
UPSTREAM SLOPE	7					
	8					
	9	Slide, Slough, Scarp	None observed.			
	10	Slope Protection	Concrete box, good shape.			
	11	Sinkhole, Animal Burrow	None observed.			
	12	Emb.-Abut. Contact	Blends into natural ground.			
	13	Erosion	None observed.			
	14	Vegetation Condition	Grassed. No erosion.			
	15					
	16					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Note: Lake is basically a natural containment. Only piece which could be called a dam embankment is driveway over emergency spillway pipes. Embankment is about 2 feet high upstream, 4-6 feet high downstream, and 25 to 38 feet wide by 30 to 40 feet long.

AREA INSPECTED	EMBANKMENT 2 of 2		OBSERVATIONS	CHECK () ACTION NEEDED		
	ITEM NO.	CONDITION		MONITOR	INVESTIGAT	REPAIR
DOWNSTREAM SLOPE	17	Wet Area(s) (No Flow)	None observed.			
	18	Seepage	Standing water observed approximately 50 feet right of d/s gate house.	√		
	19	Slide, Slough, Scarp	Irregular slopes, but no sloughs.		√	
	20	Emb.-Abut. Contact	Blends into natural ground.			
	21	Sinkhole, Animal Burrow	None observed.			
	22	Erosion	None observed.			
	23	Unusual Movement	None observed.			
	24	Vegetation Control	No control. Brush and grass, several 12 to 18 inch diameter trees.			
	25					
	26					
INSTRUMENTATION	27	Piezometers/Observ. Wells	None Observed.			
	28	Staff Gauge and Recorder	Pin (arbitrary) at gatehouse used to monitor elevations.			
	29	Weirs	None Observed.			
	30	Survey Monuments	None Observed.			
	31	Drains	None Observed.			
	32	Frequency of Readings	N/A			
	33	Location of Records	N/A			
	34					
	35					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

18. Observed wet area is roughly within poorly defined outlet channel for emergency spillway. It is unclear whether seepage is occurring through the dam, or if the wet area is indicative of recent flow or ponded surface runoff.

22. Recommend riprap protection below outlets for emergency spillway. Expect severe erosion if pipes are flowing near capacity.

AREA INSPECTED	DOWNSTREAM AREA AND MISC. 1 of 1		CHECK () ACTION NEEDED			
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVESTIGATE	REPAIR
DOWNSTREAM AREA	36	Abutment Leakage	N/A			
	37	Foundation Seepage	N/A			
	38	Slide, Slough, Scarp	None Observed.			
	39	Drainage System	Spillway discharge channel meets outlet discharge channel u/s of road.			
	40					
	41					
MISCELLANEOUS	42	Downstream Hazard Description	Road downstream of lower gate house. Small pond beyond, followed further downstream by mixed residential and commercial areas.			
	43	Date of Last Update of Emergency Plan	None.			
	44	Reservoir Slopes	Good condition. Residential lots.			
	45	Access Roads	Driveways provide access to the outlet works, and spillway.			
	46	Security Devices	Gatehouses are securely locked.			
	47					
	48					
	49					
	50					
	ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE					

AREA INSPECTED	SPILLWAYS 1 of 1		OBSERVATIONS	CHECK () ACTION NEEDED		
	ITEM NO.	CONDITION		MONITOR	INVESTIGAT	REPAIR
ERODIBLE CHANNEL	51	Slide, Slough, Scarp	None Observed.			
	52	Erosion	None Observed.			
	53	Vegetation Condition	Trees in channel d/s of spillway outlets should be removed.			✓
	54	Debris	Garbage, forest litter, tree limbs should be removed.			✓
	55	Channel Definition	Poorly defined. Likely that ponding occurs d/s of RCP outlets due to rise in channel grade. D/s channel should be regraded.			✓
	56					
NON-ERODIBLE CHANNEL	57	Sidewalls	Stone masonry sidewalls @ d/s channel-some stones displaced	✓		
	58	Channel Floor	N/A			
	59	Unusual Movement	None observed.			
	60	Approach Area	Shallow area, overgrown with dense weeds and grass, some debris.			✓
	61	Weir or Control	Concrete utility box used as overflow weir (8-ft wide).		✓	
	62	Discharge Area	Two 24-inch RCP convey flow d/s under driveway to nat. channel.			
DROP INLET	63					
	64					
	65	Intake Structure	N/A			
	66	Trashrack	N/A			
	67	Stilling Basin	N/A			
68						
69						
ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE						
61. About 2.5 feet of freeboard from spillway crest to top of roadway (dam).						

AREA INSPECTED	OUTLET WORKS I of I		OBSERVATIONS	CHECK () ACTION NEEDED		
	ITEM NO.	CONDITION		MONITOR	INVESTIGAT	REPAIR
OUTLET WORKS	70	Intake Structure	Submerged concrete channel-16' deep.			
	71	Trashrack	At upper gate house-fair condition (to be replaced next yr)			
	72	Stilling Basin	None			
	73	Primary Closure	Slide gate at upper gate house (approx. 36-inch X 36-inch).			
	74	Secondary Closure	Wooden sluice gate (24 X 30-in.) and sump with conc. channel overflow.			
	75	Control Mechanism	Both gates are controlled by wheels inside secure wooden gatehouses.			
	76	Outlet Pipe	48-inch RCP from second gatehouse to stone masonry channel.			√
	77	Outlet Tower	Wood-shingled gatehouse on concrete foundation.			
	78	Erosion Along Dam Toe	None observed.			
	79	Seepage	Could not observe. Gates open.			
	80	Unusual Movement	None observed.			
	81					
	82					
83						

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

- 73. 2004: gate stem repairs and connecting bolts replaced. Gate opened after Columbus Day.
- 74. Concrete overflow spillway channel is in good condition. Fenced at drop (13 feet) to stone channel. Secondary closure is no longer in use (gate is left open) due to historic gate leakage issues. Lake Assoc is considering replacing the gate.
- 76. RH White replaced several sections of the 48" x 48" RCP culvert between the u/s and d/s gatehouse. Downstream: stone masonry channel in good condition. Some minor rethinking, and clearing of vines/vegetation is recommended. Releases are typically made to downstream ponds (Brierly Pond).