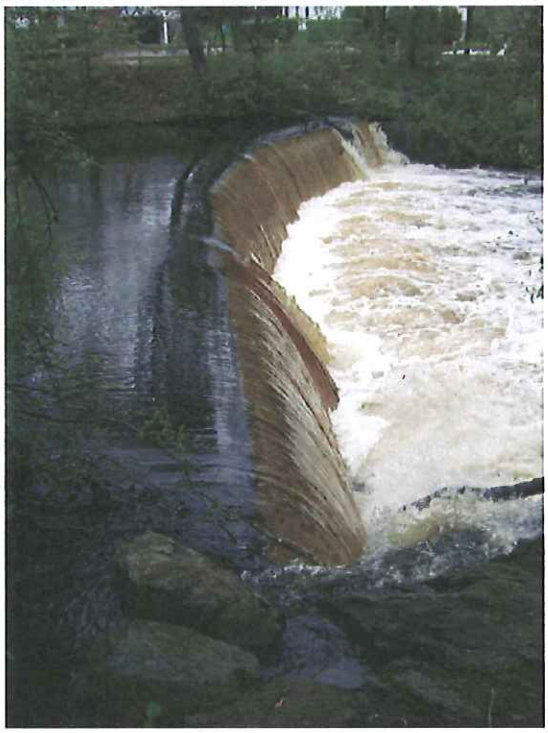
-- COLBURN STREET DAM --

INSPECTION / EVALUATION REPORT



Dam Name:	Colburn Street Dam
State Dam ID#:	6-11-73-2
NID ID#:	MA02571
Owner:	Department of Conservation and Recreation
Owner Type:	Commonwealth of Massachusetts
Town:	Dedham
Consultant:	Weston & Sampson
Date of Inspection:	May 23, 2006

EXECUTIVE SUMMARY

This report documents observations and evaluation of the Colburn Street Dam located in Dedham, Massachusetts based on a visual dam safety inspection of the dam conducted by Weston & Sampson of Peabody, Massachusetts on May 23, 2006. Colburn Street Dam is a stone masonry run-of-the-river dam and is classified as a **SMALL** size, **LOW** hazard potential structure. The dam is in **SATISFACTORY** condition overall with no major dam safety deficiencies noted based on our inspection. However, several minor issues were identified that should be addressed to preserve the integrity and functionality of the dam:

- Woody vegetation on the abutments should be cut to ground surface, then a healthy stand of grass should be developed on those areas and maintained in that condition.

- Currently, heavy brush on the left embankment restricts access to the dam. The right abutment area is directly accessible from Condon Park, which is utilized by families with small children. Consideration should be given to installing and maintain fencing or other means to prevent access to the dam for purposes of public safety.

Section 3 of this report provides additional detail related to the recommended actions.

Dam Evaluation Summary Detail Sheet

1. NID ID: MA02571	**2. Dam Name:** Colburn Street Dam	**3. Dam Location:** Dedham, MA
4. Inspection Date: May 23, 2006	**5. Last Insp. Date:** Unknown	**6. Next Inspection:** NA
7. Inspector: Mark P. Mitsch, PE	**8. Consultant:** Weston & Sampson	
9. Hazard Code: Low (Class III)	**10. Insp. Frequency:** 10-Year	**11. Insp. Condition:** Satisfactory

E1. Design Methodology:	1	**E7. Low-Level Discharge Capacity:**	N/A
E2. Level of Maintenance:	1	**E8. Low-Level Outlet Physical Condition:**	N/A
E3. Emergency Action Plan:	1	**E9. Spillway Design Flood Capacity:**	N/D
E4. Embankment Seepage:	N/A	**E10. Overall Physical Condition of the Dam:**	4
E5. Embankment Condition:	N/A	**E11. Estimated Repair Cost** (in thousand $):	12 to 18
E6. Concrete Condition:	N/A	**N/A – Not Applicable; N/D – Not Determined**	

Evaluation Description

E1: DESIGN METHODOLOGY
1. Unknown Design – no design records available
3. Some standard design features
5. State of the art design – design records available

E2: LEVEL OF MAINTENANCE
1. No evidence of maintenance, no O&M manual
2. Very little maintenance, no O&M manual
3. Some level of maintenance and standard procedures
4. Adequate level of maintenance and standard procedures
5. Detailed maintenance plan that is executed

E3: EMERGENCY ACTION PLAN
1. No plan or idea of what to do in the event of an emergency
2. Some idea but no written plan
3. No formal plan but well thought out
4. Available written plan that needs updating
5. Detailed, updated written plan available and filed with MADCR

E4: EMBANKMENT SEEPAGE
1. Severe piping and/or seepage with no monitoring
2. Evidence of monitored piping and seepage
3. No piping but uncontrolled seepage
4. Controlled seepage
5. No seepage or piping

E5: EMBANKMENT CONDITION
1. Severe erosion and/or large trees
2. Significant erosion or significant woody vegetation
3. Brush and exposed embankment soils, or moderate erosion
4. Unmaintained grass, rodent activity and maintainable erosion
5. Well maintained healthy uniform grass cover

E6: CONCRETE CONDITION
1. Major cracks, misalignment, discontinuities causing leaks, seepage or stability concerns
2. Cracks with misalignment inclusive of transverse cracks with no misalignment
3. Significant longitudinal cracking and minor transverse cracking
4. Spalling and minor surface cracking
5. No apparent deficiencies

E7: LOW LEVEL OUTLET DISCHARGE CAPACITY
1. No low level outlet
2. Outlet with insufficient drawdown capacity
3. Inoperable gate with potentially sufficient drawdown capacity
4. Operable gate with sufficient drawdown capacity
5. Operable gate with capacity greater than necessary

E8: LOW LEVEL OUTLET PHYSICAL CONDITION
1. Outlet inoperative needs replacement, non-existent or inaccessible
2. Outlet inoperative needs repair
3. Outlet operable but needs repair
4. Outlet operable but needs maintenance
5. Outlet and operator operable and well maintained

E9: SPILLWAY DESIGN FLOOD CAPACITY
1. 0 - 20% of the SDF
2. 21 - 40% of the SDF
3. 41 - 60% of the SDF
4. 61 - 80% of the SDF
5. 81 - 100% of the SDF

E10: OVERALL PHYSICAL CONDITION OF THE DAM
1. *UNSAFE* – Major structural, operational, and maintenance deficiencies exist under normal operating conditions
2. *POOR* - Significant structural, operation and maintenance deficiencies are clearly recognized under normal loading conditions
3. *FAIR* - Significant operational and maintenance deficiencies, no structural deficiencies. Potential deficiencies exist under unusual loading conditions that may realistically occur. Can be used when uncertainties exist as to. critical parameters
4. *SATISFACTORY* - Minor operational and maintenance deficiencies. Infrequent hydrologic events would probably result In deficiencies.
5. *GOOD* - No existing or potential deficiencies recognized. Safe performance is expected under all loading including SDF

E11: ESTIMATED REPAIR COST

Estimation of the total cost to address all identified structural, operational, maintenance deficiencies. Cost shall be developed utilizing standard estimating guides and procedures

Changes/Deviations to Database Information since last inspection

PREFACE

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

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. 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.

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.

Mark P. Mitsch, PE
Massachusetts License No.: 46681
Associate
Weston & Sampson

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SECTION 1

1.0 DESCRIPTION OF PROJECT

1.1 General

1.1.1 Authority

Commonwealth of Massachusetts, Department of Conservation and Recreation, Office of Dam Safety (ODS) has retained Weston & Sampson of Peabody, Massachusetts to perform a visual inspection and develop a report of conditions for the Colburn Street dam on Mother Brook in Dedham, 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 prioritizing dam repair needs and planning/conducting maintenance and operation.

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. Refer to 302 CMR 10.03 for a comprehensive listing of definitions.

1.2 Description of Project

1.2.1 Location

The Colburn Street Dam is located in Norfolk County in the town of Dedham, Massachusetts. The dam is located on the Norwood USGS Quadrangle at approximately the following NAD 1983 coordinates:

Latitude: 42.2490 N
Longitude: 71.1598 W

To access the dam from MA-128, take Exit 15A toward Route-1A/Dedham for 0.2 miles. Merge onto Providence Highway for 1.3 miles. Turn slight left onto Eastern Avenue for 0.1 miles. Turn right onto High Street for 0.1 miles. Turn right to stay on High Street for 0.5 miles. Turn left onto Maverick Street then right onto Colburn Street. Follow Colburn Street to the intersection with Milton

Street. To access the dam turn right onto Milton Street and park in the Condon Park parking are on the left. The dam is toward Colburn Street next to the park. Refer to Figure 1, Locus Map.

1.2.2 Owner/Operator

	Dam Owner	Dam Caretaker
Name	Commonwealth of MA, DCR Mr. William Salomaa	William A. Gode-von Aesch
Mailing Address	251 Causeway Street, Suite 800	250 Warren Avenue
Town	Boston, MA 02114-2014	Charlestown, MA 02129
Daytime Phone	(617) 626-1410	(617) 727-0488 x200
Emergency Phone	(617) 719-1942	(617) 828-1629
Email Address	william.salomaa@state.ma.us	bill.gode@state.ma.us

1.2.3 Purpose of the Dam

The purpose of the dam is recreation.

1.2.4 Description of the Dam and Appurtenances

The dam is a run-of-the-river dam with a stone masonry spillway spanning the brook. High flow in the river prevented a thorough inspection. However, the dam is approximately 100 ft. in length with a slightly arched (bowed upstream) configuration. The height of the dam is approximately 6 ft. The abutments appear to be bedrock outcrops at the shore of the brook. An untitled and undated page from what appears to be a hydroelectric feasibility study of Mother Brook provided to Weston & Sampson by DCR (source unknown) indicates that water passes through an approximately 2 ft. deep by 4 ft. wide notch in the dam under low flow conditions. A 1973 report titled "Mother Brook Flood Control Feasibility Study," prepared by Anderson-Nichols & Company for the MDC indicates there was once a sluice gate in the dam. It is possible that the notch and the sluice gate opening are the same element of the dam. However, flow conditions at the time of inspection prevented confirmation. See photos 1-3.

1.2.5 Operations and Maintenance

The Massachusetts DCR owns and operates the dam. The dam caretaker, Mr. Gode, indicated there are no formal operation or maintenance procedures for this structure.

1.2.6 DCR Size Classification

Colburn Street Dam is a run-of-the-river dam with a structural height of approximately 6 ft. The impoundment behind the dam is approximately five acres in size. Accordingly, the normal storage capacity is on the order of 25 to 30 acre-feet. Therefore, in accordance with Department of Conservation and Recreation Office of Dam Safety classification procedures, 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, Colburn Street Dam is a **SMALL** size structure.

1.2.7 DCR Hazard Classification

Colburn Street Dam is located upstream of the impoundment created by the United Waste Company Dam. It appears that a failure of the dam at maximum pool would present only limited risk of property damage or loss of life. Therefore, in accordance with Department of Conservation and Recreation classification procedures, 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, Colburn Street Dam is classified as a **LOW** (Class III) hazard potential dam.

1.3 Pertinent Engineering Data

1.3.1 Drainage Area

The direct drainage area for Colburn Street Dam extends up the Mother Brook to the confluence with the Charles River and is entirely within the Town of Dedham. However, flow through the Mother Brook Dam at Charles River contributes significantly to the flow over Colburn Street Dam. We have not conducted a thorough evaluation of the drainage area for this report. This should be conducted as part of a detailed hydrologic/hydraulic study for the structure.

1.3.2 Reservoir

	Length (feet)	Width (feet)	Surface Area (acres)	Storage Volume (acre-feet)
Normal Pool	1350	200	5	25
Maximum Pool	1350	250	5.5	30
SDF Pool		Not	Determined	

1.3.3 Discharges at the Dam Site

Records of discharges at the site are not available.

1.3.4 General Elevations (feet)

Elevations listed below are based on an estimate of the Normal Pool elevation (assumed to be the spillway crest elevation) and field measurements taken during this inspection. The estimated Normal Pool elevation was made from the USGS topographic map for the area. The listed elevations are in feet and are approximately referenced to the National Geodetic Vertical Datum (Mean Sea Level of 1929). However, the elevations are only as accurate as the method of determination implies.

A.	Top of Dam	El. 76
B.	Spillway Design Flood Pool	Not Determined
C.	Normal Pool	El. 76
D.	Spillway Crest	El. 76
F.	Upstream Water at Time of Inspection	El. 76.8
G.	Streambed at Toe of the Dam	El. 70

1.3.5 Ancillary Structures

The primary spillway is a 100 ft. long stone masonry broad crested weir with no spillway controls. The structure is a run-of-the-river dam on the Mother Brook. There are no other facilities associated with this dam.

1.3.6 Design and Construction Records

No data are available regarding design and construction of Colburn Street Dam.

1.3.7 Operating Records

No operational records are known to exist for Colburn Street Dam.

SECTION 2

2.0 INSPECTION

2.1 Visual Inspection

Colburn Street Dam was inspected on May 23, 2006. At the time of the inspection, the weather was 54 degrees F and overcast. Significant spring rainfall in the area resulted in higher than normal water conditions in the Mother Brook River system during this 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 approximately nine inches above normal pool elevation during the inspection. Underwater areas were not inspected. A copy of the inspection checklist is included in Appendix B.

2.1.1 General Findings

In general, Colburn Street Dam was found to be in **SATISFACTORY** condition. The dam is a simple structure consisting of an approximately 100 ft. long run-of-the-river stone masonry spillway. Specific conditions are identified below:

2.1.2 Dam

- *Abutments*

The abutment contacts consist of the stone masonry weir against bedrock and appeared to be sound. See photos 1 and 3.

- *Spillway*

The spillway could not be thoroughly observed due to high flow conditions. However, the vertical and horizontal alignment and condition of flow over the spillway suggests the structure is in sound stable condition. We observed a depression in the stone masonry weir approximately 20 ft. from the right abutment. It is possible that this is the notch or sluice gate opening mentioned above in Section 1.2.4. See photo 1.

We observed several moderate sized tree limbs caught in the flow over the weir. However, these did not appear to affect the flow. The shores of the brook are vegetated with brush and small trees. However, these do not appear to interfere with flow over the weir. The plunge pool immediately downstream of the spillway appeared to be clear of obstructions. See photo 1.

- *Drains*

No drains were identified during the inspection.

- *Instrumentation*

This dam has no instrumentation

- *Access Roads and Gates*

Access to the dam is from local roads as described above in Section 1.2.1. There are no fences or other security restrictions to public access at the site.

2.1.3 Appurtenant Structures

As indicated above, we are not aware of any appurtenant structures associated with this this dam.

2.1.4 Downstream Area

The downstream area is the Mother Brook channel, which opens into the impoundment formed by the former United Waste Company Dam approximately 1,500 feet downstream. The channel banks are moderate to steeply graded and heavily vegetated but essentially free of restrictions to flow.

2.1.5 Reservoir Area

The reservoir behind the Colburn Street Dam to the upstream end at Maverick Street is approximately 1,350 ft. long and ranges in width from about 150 ft. to 350 ft. The axis of the reservoir is oriented approximately southwest to northeast. The shoreline is moderate to steep and is wooded. The crest of the reservoir banks are developed primarily as residential and commercial property. It does not appear the reservoir slopes are subject to slides or sloughing that would impact the dam.

2.2 Caretaker Interview

William Gode-von Aesch of DCR was present at the Colburn Street Dam during the May 23, 2006 inspection of the structure. Mr. Gode indicated that he has no formal records or information concerning this dam.

2.3 Operation and Maintenance Procedures

2.3.1 Operational Procedures

There are no operational procedures for this dam.

2.3.2 Maintenance of Dam

There is no regular maintenance conducted for this dam.

2.4 Emergency Warning System

There is no formal Emergency Warning System for this dam.

2.5 Hydrologic/Hydraulic Data

We did not conduct a hydrologic/hydraulic evaluation for this study. However, the 1973 Anderson-Nichols & Company flood control feasibility study report indicates the design flow used for improvements to upstream reaches of Mother Brook was 1,275 cfs. We estimated the capacity of the Colburn Street Dam spillway to be approximately 1,375 cfs with three feet of water depth passing over the spillway for comparison.

2.6 Structural Stability/Overtopping Potential

2.6.1 Structural Stability

We did not observe signs of instability under the high flow conditions at the time of the inspection. No previous stability analyses are available for this structure. Stability evaluations in accordance with 302 CMR 10.14 should be conducted including collecting the necessary data for the analyses.

2.6.2 Overtopping Potential

Overtopping potential has not been evaluated as part of this study. However, the dam is a run-of-the-river structure that is designed for continuous overtopping. Nonetheless, overtopping and its potential impacts to the abutment areas should be evaluated as part of a detailed hydrologic/hydraulic study.

SECTION 3

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

In general, the overall condition of Colburn Street Dam is **SATISFACTORY**. The dam appears to be functioning appropriately. The flow conditions were high during the inspection so much of the dam structure could not be observed. The current condition of the structure does not appear to be significantly different from the conditions indicated by the limited available information on previous inspections identified in Section 1.2.4, above.

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

It is recommended that DCR engage the services of a Registered Professional Engineer as defined in 302 CMR 10.03 to complete the following studies and analyses in accordance with current dam safety regulations:

- Site topographic survey including upstream and downstream bathymetry to properly document existing conditions and for future use in evaluating the structure and designing repairs that may become necessary to bring the structure into compliance with dam safety regulations.

- Detailed hydrologic/hydraulic analysis of the drainage area, impoundment and dam along with confirmation of the downstream hazard condition to verify that the spillway is properly sized.

- Monitor the condition of the stone masonry spillway at low flow conditions for foundation seepage or unusual displacement of the spillway structure.

3.3 Routine Maintenance Recommendations

It is recommended that the owner/caretaker conduct the following routine observation and maintenance activities:

- Observe the condition of the dam for changes from those identified in this report. Observations should be made at least quarterly, as well as during and following rainfall events that exceed the 25-year, 24-hour storm (approximately 5 inches of rain in 24 hours).

3.4 Recommendations for Minor Repairs

It is recommended that the owner/caretaker conduct the following minor repair activities as soon as practicable to limit the risk of dam failure until appropriate dam rehabilitation is designed and constructed. These activities may require design by a Registered Professional Engineer and/or permit application filing with the local conservation commission and/or DEP:

- Woody vegetation on the abutments should be cut to ground surface, then a healthy stand of grass should be developed on those areas and maintained in that condition.

- Currently, heavy brush on the left embankment restricts access to the dam. The right abutment area is directly accessible from Condon Park, which is utilized by families with small children. Consideration should be given to installing and maintain fencing or other means to prevent access to the dam for purposes of public safety.

3.5 Remedial Measures

No remedial measures have been identified from this inspection. However, a more detailed inspection at low flow conditions may reveal the need for remedial measures.

3.6 Alternatives

There are no practicable alternatives to the measures listed above assuming the structure is to continue functioning as a dam.

3.7 Opinion of Probable Construction Costs

Our estimate of the probable ranges of costs to implement the recommendations listed in 3.2 through 3.6, above are as follows. These estimates are based on limited information and are not intended as a basis for capital improvement budgeting.

- Studies and Analyses

  $8,000 to $12,000

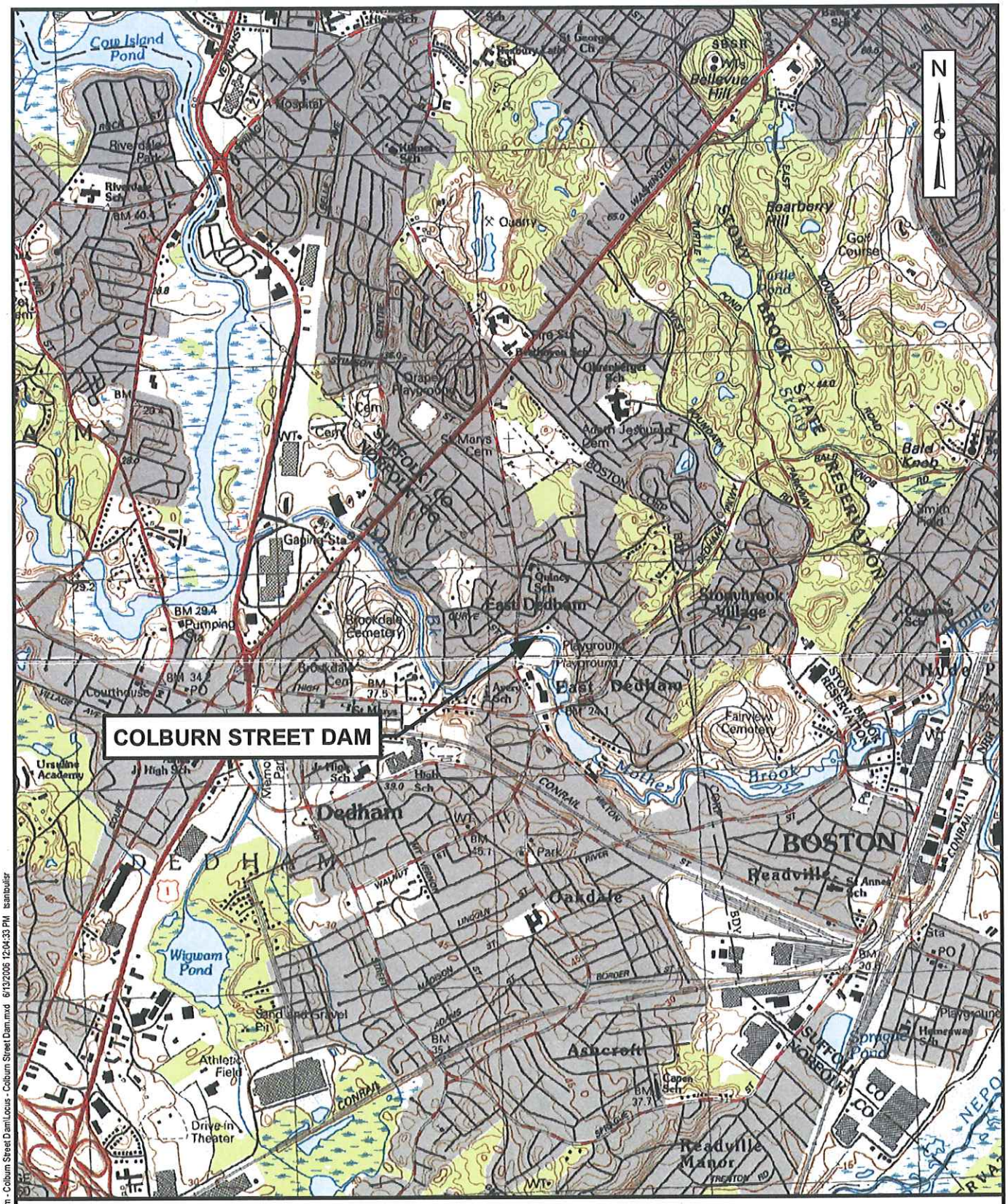
- Routine Maintenance Recommendations

  $800 to $1,500 annually

- Recommendations for Minor Repairs

  $3,000 to $5,000

FIGURES



DAM LOCATION

MASSACHUSETTS

FIGURE 1
DEDHAM, MA
COLBURN STREET DAM - MA02571
USGS QUAD: NEWTON

LOCUS MAP

SCALE 1:25000
SOURCE: USGS

Weston & Sampson
ENGINEERS, INC.

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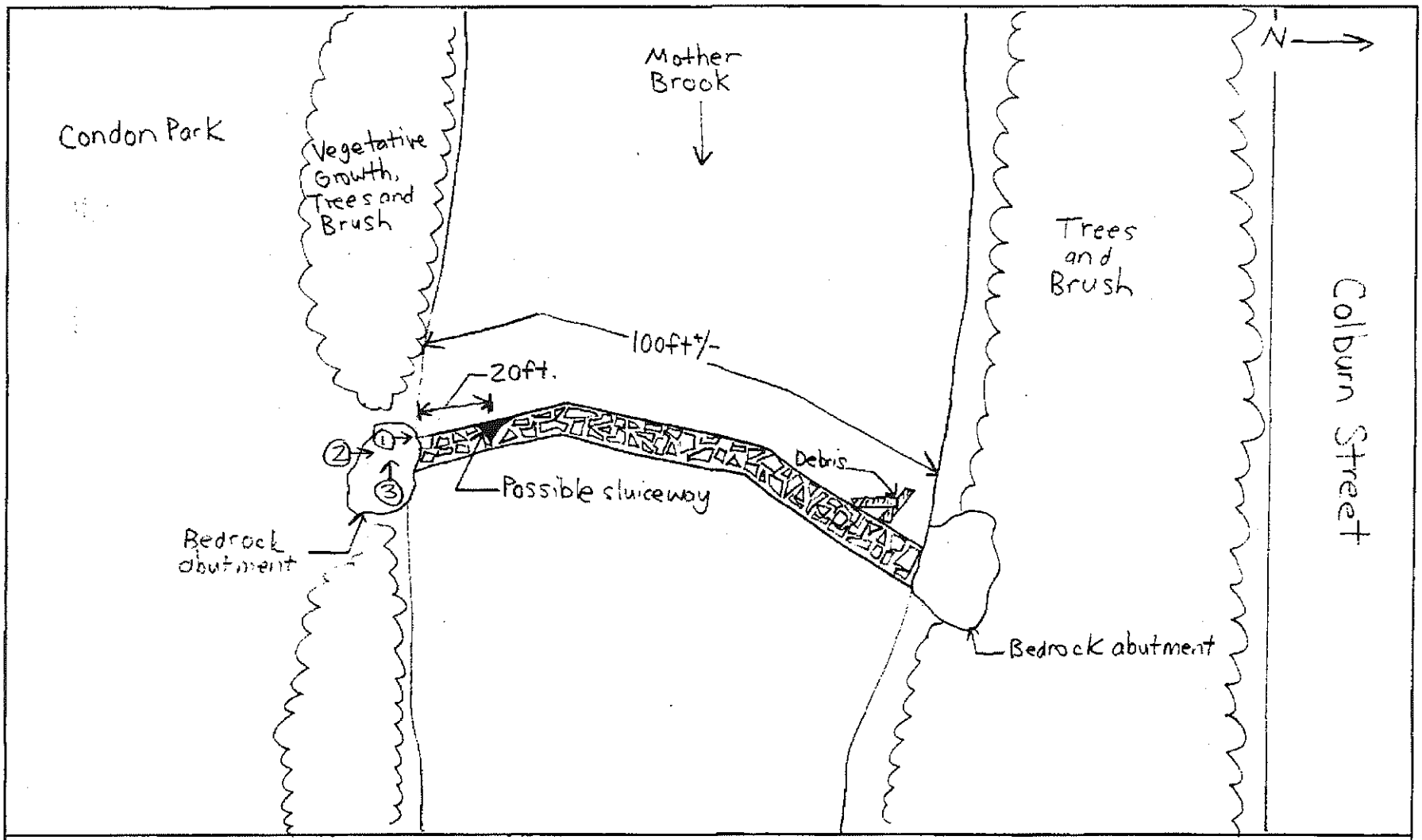


Legend:

① Photo number and photographer location

↗ Photo orientation

FIGURE 2

DEDHAM, MASSACHUSETTS

COLBURN STREET DAM - MA02571

SITE PLAN

NOT TO SCALE

Weston & Sampson Engineers, Inc.

APPENDIX A
Photographs

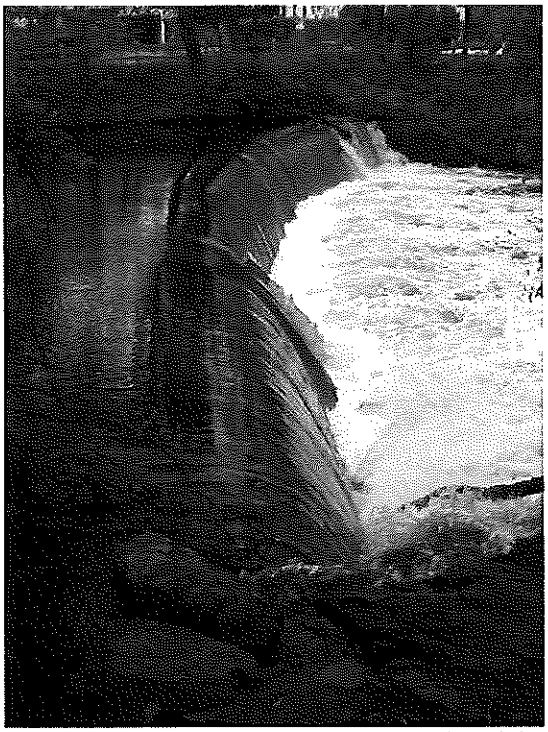


Photo 1 - Colburn Street Dam from the right abutment. Note bedrock abutments, debris on weir, notch or sluice in weir at location of darkened flow.

Photo 2 - Left abutment of the dam. Note bedrock abutment and debris.

Photo 3 - Right abutment looking upstream. Bedrock abutment at high flow.

APPENDIX B
Inspection Checklist

DAM SAFETY INSPECTION CHECKLIST

NAME OF DAM:	Colburn Street Dam	STATE ID #:	6-11-73-2
REGISTERED:	☐ YES ☐ NO	NID ID #:	MA02571
STATE SIZE CLASSIFICATION:	Small	STATE HAZARD CLASSIFICATION:	Low

LOCATION INFORMATION

CITY/TOWN:	Dedham	COUNTY:	Norfolk
DAM LOCATION:	Dedham	AKA NAME:	NA
USGS QUAD.:	Norwood	LAT.: 42.2490 N	LONG.: 71.1598 W
DRAINAGE BASIN:	19	RIVER:	Mother Brook
IMPOUNDMENT NAME(S):	Mother Brook		

GENERAL DAM INFORMATION

TYPE OF DAM:	Run-of-the-River	OVERALL LENGTH (FT):	100
PURPOSE OF DAM:	Recreation	NORMAL POOL STORAGE (ACRE-FT):	25
YEAR BUILT:	Not Known	MAXIMUM POOL STORAGE (ACRE-FT):	30
STRUCTURAL HEIGHT (FT):	6	EL. NORMAL POOL (FT):	76
HYDRAULIC HEIGHT (FT):	6	EL. MAXIMUM POOL (FT):	78

FOR INTERNAL MADCR USE ONLY

FOLLOW-UP INSPECTION REQUIRED: ☐ YES ☐ NO CONDITIONAL LETTER: ☐ YES ☐ NO

NAME OF DAM:	Colburn Street Dam	STATE ID #:	6-11-73-2
		NID ID #:	MA02571

INSPECTION SUMMARY

DATE OF INSPECTION:	May 23, 2006	DATE OF PREVIOUS INSPECTION:	N/A
TEMPERATURE/WEATHER:	54 degrees F/Overcast	ARMY CORP PHASE I:	☐ YES ☑ NO If YES, date
CONSULTANT:	Weston & Sampson	PREVIOUS DCR PHASE I:	☐ YES ☑ NO If YES, date
BENCHMARK/DATUM:	Not Available		
OVERALL CONDITION:	SATISFACTORY	DATE OF LAST REHABILITATION:	Not Known
EL. POOL DURING INSP.:	76.8	EL. TAILWATER DURING INSP.:	73 +/-

PERSONS PRESENT AT INSPECTION

NAME	TITLE/POSITION	REPRESENTING
Mark P. Mitsch	Project Manager	Weston & Sampson
Benjamin T. Green	Geotechnical Engineer	Weston & Sampson
William Gode-von Aesch	Flood Control Director	DCR- Flood Control

EVALUATION INFORMATION

E1) TYPE OF DESIGN	SATISFACTORY	E8) LOW-LEVEL OUTLET COND.	NOT APPLICABLE
E2) LEVEL OF MAINTENANCE	FAIR	E9) SPILLWAY DESIGN FLOOD	NOT DETERMINED
E3) EMERGENCY ACTION PLAN	NOT APPLICABLE	E10) GENERAL CONDITIONS	SATISFACTORY
E4) EMBANKMENT SEEPAGE	NOT APPLICABLE	E11) ESTIMATED REPAIR COST ($000)	$12.000 to $18.000
E5) EMBANKMENT CONDITION	NOT APPLICABLE	ROADWAY OVER CREST	☐ YES ☑ NO
E6) CONCRETE CONDITION	NOT APPLICABLE	BRIDGE NEAR DAM	☑ YES ☐ NO
E7) LOW-LEVEL OUTLET CAP	NOT APPLICABLE		

SIGNATURE OF INSPECTING ENGINEER:

NAME OF DAM:	Colburn Street Dam	STATE ID #:	6-11-73-2
INSPECTION DATE:	May 23, 2006	NID ID #:	MA02571

OWNER:		CARETAKER:	
ORGANIZATION	State of Massachusetts	ORGANIZATION	State of Massachusetts-DCR
NAME/TITLE	Mr. William Salomaa, DCR	NAME/TITLE	William A. Gode-von Aesch
STREET	251 Causeway Street, Suite 800	STREET	250 Warren Avenue
TOWN, STATE, ZIP	Boston, MA 02114-2014	TOWN, STATE, ZIP	Charlestown, MA 02129
PHONE	(617) 626-1410	PHONE	617-727-0488 X200
FAX	(617) 626-1455	FAX	617-523-1793
EMAIL	william.salomaa@state.ma.us	EMAIL	bill.gode@state.ma.us
OWNER TYPE	State		

PRIMARY SPILLWAY TYPE	Stone masonry run-of-the-river		
SPILLWAY LENGTH (FT)	100	SPILLWAY CAPACITY (CFS)	1375
AUXILIARY SPILLWAY TYPE	N/A	AUX. SPILLWAY CAPACITY (CFS)	N/A
NUMBER OF OUTLETS	0	OUTLET(S) CAPACITY (CFS)	N/A
TYPE OF OUTLETS	N/A	TOTAL DISCHARGE CAPACITY (CFS)	1375
DRAINAGE AREA (SQ MI)		SPILLWAY DESIGN FLOOD (PERIOD/CFS)	100-year/1,275 (est.)
HAS DAM BEEN BREACHED OR OVERTOPPED	☐ YES ☑ NO	IF YES, PROVIDE DATE(S)	Dam designed for continuous overtopping.
FISH LADDER (LIST TYPE IF PRESENT)	N/A		
DOES CREST SUPPORT PUBLIC ROAD?	☐ YES ☑ NO	IF YES, ROAD NAME:	
PUBLIC BRIDGE WITHIN 50' OF DAM?	☐ YES ☑ NO	IF YES, ROAD/BRIDGE NAME:	

NAME OF DAM: Colburn Street Dam STATE ID #: 6-11-73-2

INSPECTION DATE: May 23, 2006 NID ID #: MA02571

DOWNSTREAM AREA

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
D/S AREA	ABUTMENT LEAKAGE	Not observed due to high flow.		X	
	FOUNDATION SEEPAGE	Not observed due to high flow.			
	SLIDE,SLOUGH,SCARP				
	WEIRS	No.			
	DRAINAGE SYSTEM	No.			
	INSTRUMENTATION	No.			
	VEGETATION	Brush and trees on banks.		X	X
	ACCESSIBILITY	Good. Paved roads to Condon Park.			
	DOWNSTREAM HAZARD DESCRIPTION				
	DATE OF LAST EAP UPDATE				

ADDITIONAL COMMENTS:

NAME OF DAM: Colburn Street Dam STATE ID #: 6-11-73-2

INSPECTION DATE: May 23, 2006 NID ID #: MA02571

MISCELLANEOUS

AREA INSPECTED	CONDITION	OBSERVATIONS		
MISC.	RESERVOIR DEPTH (AVG)	Mother Brook impoundment to Maverick Street. Not measured.		
	RESERVOIR SHORELINE	Earth slopes with trees and brush.		
	RESERVOIR SLOPES	Mild to Moderate.		
	ACCESS ROADS	Paved.		
	SECURITY DEVICES	None.		
	VANDALISM OR TRESPASS	YES: ☐	NO: ☑	WHAT:
	AVAILABILITY OF PLANS	YES: ☐	NO: ☑	DATE:
	AVAILABILITY OF DESIGN CALCS	YES: ☐	NO: ☑	DATE:
	AVAILABILITY OF EAP/LAST UPDATE	YES: ☐	NO: ☑	DATE:
	AVAILABILITY OF O&M MANUAL	YES: ☐	NO: ☑	DATE:
	CARETAKER/OWNER AVAILABLE	YES: ☑	NO: ☐	DATE: May 23, 2006
	CONFINED SPACE ENTRY REQUIRED	YES: ☐	NO: ☑	PURPOSE:

ADDITIONAL COMMENTS:

NAME OF DAM: Colburn Street Dam STATE ID #: 6-11-73-2

INSPECTION DATE: May 23, 2006 NID ID #: MA02571

PRIMARY SPILLWAY

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
SPILLWAY	SPILLWAY TYPE	Run-of-the-river stone masonry			
	WEIR TYPE	broad crested			
	SPILLWAY CONDITION	good horiz and vert alignment except one gap approx 20 ft. from rt abutment.		X	
	TRAINING WALLS	bedrock, good conditon.			
	SPILLWAY CONTROLS AND CONDITION	None.			
	UNUSUAL MOVEMENT	None observed.			
	APPROACH AREA	Clear with vegeated banks.			
	DISCHARGE AREA	Clear with vegetated banks.			
	DEBRIS	A few tree limbs/branches caught on spillway.			X
	WATER LEVEL AT TIME OF INSPECTION	Nine inches over spillway.			

ADDITIONAL COMMENTS:

APPENDIX C
Previous Reports and References

PREVIOUS REPORTS AND REFERENCES

The following is a list of reports that were located during the file review, or were referenced in previous reports.

1. Department of Conservation and Recreation DAM Detail, Colburn Street Dam, Last updated August 24, 2005 .

2. Mother Brook Flood Control Feasibility Study, Anderson-Nichols & Company, Inc., Boston, MA, February, 1973. (Applicable sections only)

3. Colburn Street Dam, A-2, Summary of a Hydroelectric Feasibility Study, Date Unknown.

Department of Conservation and Recreation DAM Detail

National ID: MA02571
Dam Location: Dedham
Dam Name: Colburn St. Dam
AKA Name:
District#: 6 County#: 11
Town#: 73 DAM#: 2
River: Mother Brook
IMP Name Mother Brook
AKA Name
Basin: 19 Compliance:
Grant:
Grant Date:
Fish Ladder:

Size Class: 0
Dam Type:
Purpose:
Year Comp: 0
Struct Height (ft): 0
Hydro Height (ft): 0
Drain Area (mi2): 0
Nml. Impoundment (ac-ft) 0
Max Impoundment (ac-ft): 0
Crest Length (ft): 0
Spill Type:
Spill Length (ft): 0
Spill Capacity (cfs): 0

USGA Quad: 31C - 34A
Inspection Reg: D
Conditional Letter:
Army Phase1 RPT: N
DCR Phase 1 RPT: N
Latitude: 42.24902571
Longitude: -71.1597786
Ferc lic:
253 Permit Date:
Crest Public Road:
Crest Public Bridge:
Registered: N

Owner: Comm of MA - DCR
Street: 251 Causeway St.
Town: Boston, MA 02114-2104
Phone: (617) 626-1250
Owner type: 30
FAX: (617) 626-1351
EMail:

Caretaker: DCR Director of Dam Safety
Street: 251 Causeway St.
Care. Town: Boston, MA 02114-2104
Phone: (617) 626-1250
FAX: 6176261351
Email:

Comment:

Last_date_Changed: 8/24/2005

Department of Conservation and Recreation DAM Detail

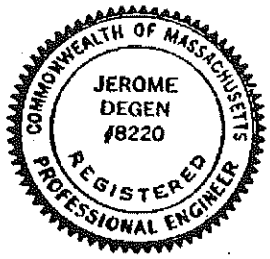
National ID: MA02571

Inspection Date	01/01/1975				
Last Inspection Date	01/01/1975	Next Inspection		Hazard code	
DCR Inspector	JP	Consultant		Consultant Date	
Inspection Frequency	0	Inspection cond			
Design			Lowlevel Capacity		
Maint. Level			Lowlevel Outlet		
Emerg Plan			% Capacity		
Embankment			DAM Condition		
Concrete Cond.			Repair Cost	$0.00	
Comments					

COMMONWEALTH OF MASSACHUSETTS
METROPOLITAN DISTRICT COMMISSION

MOTHER BROOK
FLOOD CONTROL
FEASIBILITY STUDY

FEBRUARY 1973



Anderson-Nichols & Company Inc.
Boston, Mass.

SUMMARY

The Metropolitan District Commission, recognizing the need for the development of a sound flood control plan for Mother Brook, retained the consulting engineering firm of Anderson-Nichols & Company, Inc., to assist them. Because of the increased pressure to develop the broad, privately owned floodplains and wetlands adjacent to the brook, consideration was given to preserving these areas for open-space/ recreational purposes. The major effort of this study was centered on the area extending from the Neponset River in Boston to Maverick Street in Dedham, a distance of approximately 2.7 miles.

The results of this study indicated that potential for flooding does, in fact, exist along Mother Brook, though a feasible solution to reducing this potential is possible while preserving the character of the open space land adjacent to the brook.

Most of the flow within Mother Brook is the result of a diversion of the Charles River. For this reason, the design discharge (1275 cfs) was determined from historic flood data gathered both on Mother Brook and the Charles River. Computer analysis of Mother Brook used the design discharge, both under present channel and structural conditions, and those conditions prevailing once the proposed improvements are completed. Recommendations for existing channel, overbank and structural improvements were determined in light of the knowledge that certain areas would not benefit from improvements designed to preclude overbank

Restoration and extension of the Mill Pond Dam will create a pool suitable for recreation. The River Street Bridge is recommended to be replaced by a new structure. The recommendations also include 2000 feet of improved trapezoidal channel at specific locations between the River Street Bridge and the United Waste Company Dam.

It is recommended that a sluice gate be installed in the Colburn Street Dam, and that the United Waste Co. Dam be restored.

The Bussey Street Bridge should be replaced by a structure capable of passing the design discharge.

The estimated cost for the proposed Plan is $1,203,000. This figure does not include costs for field investigations, engineering design, supervision of construction, administration, and land acquisition.

Below are listed the estimated costs associated with recommended improvements by specific river reach:

ESTIMATED CONSTRUCTION COST SUMMARY BY REACHES

Reach 1 (Neponset River to Mill Pond Dam)	$517,000.
Reach 2A (Mill Pond Dam to United Waste Company Dam)	$479,000.
Reach 2B (United Waste Company Dam to Colburn Street Dam)	$ 14,000.
Reach 2C (Colburn Street Dam to Maverick Street)	$193,000.
TOTAL	$1,203,000.

study was undertaken and improvements recommended in this study for the reach from the Charles River to Maverick Street, Dedham, were completed in 1959. The Commission, recognizing the desirability of further flood control improvements and consideration of open space development, retained the firm of Anderson-Nichols & Co., Inc., on April 28, 1972, to study and make recommendations for that portion of Mother Brook from Maverick Street to the Neponset River.

C. Area Description - The Mother Brook basin, located in eastern Massachusetts, encompasses 2.40 square miles. This is a primarily urbanized area within the political boundaries of the Town of Dedham (Norfolk County) and the City of Boston (Suffolk County). The location of the Mother Brook basin is shown on Figure 1.

Major vehicular travel routes to the area include U.S. Route 1, Hyde Park Avenue, and Washington Street, which connect the area to nearby communities and points beyond.

Existing land use varies greatly and includes residential, industrial, commercial, and institutional development. In the study area is the Bussey Street Project, a completed example of urban renewal by the Dedham Housing Authority.

F. Study Area - Because of differing physical characteristics within the study area, detailed analysis was facilitated by initially dividing the study area into three main reaches. These reaches are:

Reach 1 - From the confluence of Mother Brook and the Neponset River to immediately downstream of the Mill Pond Dam in Boston; station 0+00 to station 40+90.*

Reach 2 - From the Mill Pond Dam to Maverick Street in Dedham; station 40+90 to station 141+20.

Reach 3 - From Maverick Street in Dedham to the junction of Mother Brook and the Charles River; station 141+20 to approximately station 190+20.

Within Reach 2, diverse hydraulic and topographic characteristics necessitated further division for purposes of analysis. These divisions, hereafter called sub-reaches are comprised of the following:

Sub-reach 2A - From the Mill Pond Dam to the United Waste Company Dam; station 40+90 to station 99+60.

Sub-reach 2B - From the United Waste Company Dam to the Colburn Street Dam; station 99+60 to station 124+25.

Sub-reach 2C - From the Colburn Street Dam to Maverick Street in Dedham; station 124+25 to station 141+20.

The study area, delimiting reaches and sub-reaches, is shown on Figure 2.

* Stationing given in distance above confluence of Mother Brook and the Neponset River in 100-foot increments (40+90 = 4,090 feet).

G. Scope of Work - While the three reaches described above in Paragraph F. comprise the study area, only Reaches 1 and 2 were included for purposes of detailed analysis. Reach 3 is considered only for the assurance of a compatible relationship between existing flood control measures and any improvements to be proposed for the downstream reaches. Reach 3 encompasses channel improvement work completed during the late 1950's, and for that reason was not considered for detailed analysis.

Climatogical data presented below is based on the Walpole, Massachusetts Weather Station, located approximately seven miles southwest of the Mother Brook basin. However, the location of the weather station within the Charles River Basin makes its use most appropriate.

For the period of record (October 1948 to May 1971), the mean annual temperature of the Mother Brook basin is 44.7° Fahrenheit (°F). A wide range of monthly averages do occur, varying from 26.3°F in January to 70.2°F in July. Extreme temperatures have been -19°F and 100°F. These data are tabulated and presented below in Table 1.

TABLE 1

TEMPERATURE

WALPOLE, MASSACHUSETTS
(October 1948-May 1971)

(Degrees Fahrenheit)

Month	Mean Monthly	Maximum Daily	Minimum Daily
January	26.3	69 (1950)	-19 (1957)
February	28.3	70 (1957)	-19 (1967)
March	35.2	77 (1949)	-13 (1967)
April	46.1	90 (1962)	10 (1954)
May	55.8	92 (1949)	22 (1966)
June	65.1	95 (1956)	33 (1964)
July	70.2	100 (1949)	39 (1965)
August	68.4	98 (1949)	32 (1965)
September	60.7	100 (1953)	26 (1962)
October	50.8	88 (1954)	15 (1966)
November	40.9	82 (1950)	7 (1951)
December	29.7	68 (1966)	-11 (1963)

C. History of Floods - The watershed experiences two types of storm disturbances: cyclonic storms and coastal storms. Low barometric pressure readings characteristic of the cyclonic variety are usually accompanied by periods of unsettled weather, though severe storms from this cause are infrequent. Storms causing high rates of damage have usually had a marine trajectory, and this type includes the "Northeasters" of the colder season and the tropical storms of late summer and fall. The coastal, or tropical storm, usually the more damaging, travels rapidly up the Atlantic Coast and strikes coastal areas with relatively little warning.

Four major storms resulting in heavy flood damage have occurred within the Mother Brook watershed during the period of record; in March 1936, July 1938, August 1955, and March 1968. These storms are tabulated with the associated peak discharges in Table 3. Records indicate that rainfall from the Hurricane Diane storm of August 17-20, 1955 (most severe storm during the period of record), ranged from 10 to 15 inches. Although the storm of March 1968 contributed much less rainfall than than of August 1955, the large volume of melted snow was sufficient to cause a flood of the same magnitude.

CHAPTER III

CRITERIA

A. General - The following paragraphs outline the criteria used in this study. It is significant that this brook is not a completely natural stream, but rather depends on a controlled diversion from the Charles River to supply most of its flow. Also, it should be noted that certain criteria may be influenced by the importance placed on the recreational and environmental potential of Mother Brook and its floodplains.

B. Design Discharge - Determination of the design discharge was based on the historic records of flooding, both on Mother Brook and the Charles River. One-third of the flow of the Charles River at Mother Brook is, by agreement, diverted to Mother Brook. Therefore, an analysis of the flow at the Charles River Village gage just upstream of the junction, and at the Mother Brook gage upstream of Washington Street was performed. The floods of record on Mother Brook occurred in August 1955 and March 1968, both producing a peak discharge of 1040 cubic feet per second (cfs). The design discharge selected approximates the 50-year flood (that flood which has a 2 percent chance of occurring in any single year) as determined by analysis of the Charles River Village gage.*

* The flow at the Mother Brook gage is regulated, therefore a statistical frequency analysis was not considered meaningful.

Charles River water artificially added to the natural flow of Mother Brook. The highly developed character of the small local area would have a relatively short time of concentration and runoff. Its peak would normally occur well in advance of the flood peak associated with the Charles River diversion. Thus, it was considered that this local drainage area within the study limits would not contribute significantly to the peak runoff from the Charles River. Therefore, the 1275 cfs flow was adopted as the design discharge for flood protection in all reaches of the study area.

C. Starting Water Surface - The Neponset River's backwater effect on Mother Brook was the controlling factor for determining the starting water surface associated with the design discharge. The 50-year flood produces a water surface elevation of 44.66 feet Boston City Base (BCB) at the junction with Mother Brook, based on information developed in the report entitled "Neponset River Basin Floodplain and Wetland Encroachment Study," prepared by Anderson-Nichols & Co., Inc., for the Massachusetts Water Resources Commission, Division of Water Resources, dated April 1971.

This latter report revealed heretofore unknown storage characteristics of the upland wetland areas bordering the Neponset River. Based on this new information, and the assumption (differing from all previous studies) that the MDC dam at the Tileston and Hollingsworth Company (T&H Co.) site would have fully operational bascule gates to help control flood flows, the starting water surface of 44.66 feet BCB was chosen for design purposes.

side slopes of 1.5 to 1, and a channel bottom elevation of 78.0 feet BCB be constructed. This new structure will result in a lowering of the design water surface by approximately 2.5 feet upstream of the bridge, and allow the flow to pass entirely beneath the low chord elevation of 88.0 feet BCB. Because of the increased width of the new bridge, channel widening immediately downstream of the structure will be required. This widening of the channel will necessitate the construction of a retaining wall adjacent to an existing playground. Construction of this wall can be accomplished in such a manner as to enhance the usefullness as well as the aesthetic appearance of the playground, if properly landscaped.

Preliminary analysis of the Colburn Street Dam, also owned by the Town of Dedham, reveals the structure to be in good condition. The missing sluice gate, however, greatly reduces the effectiveness of the dam in controlling river flow. It is recommended that a new sluice gate be installed. Some minor modifications to the existing gateway may be desirable, though final design was outside the scope of this study.

E. Opportunities for Open Space/Recreation - Reach 3 is dominated by a pool approximately 1,350 feet in length, which is bordered by two narrow wooded strips of land. The overbanks are steep, with exposed rock crops. Bordered by Colburn Street to the north, the Bussey Street Bridge to the northeast, and Maverick Street to

side slopes of 1.5 to 1, and a channel bottom elevation of 78.0 feet BCB be constructed. This new structure will result in a lowering of the design water surface by approximately 2.5 feet upstream of the bridge, and allow the flow to pass entirely beneath the low chord elevation of 88.0 feet BCB. Because of the increased width of the new bridge, channel widening immediately downstream of the structure will be required. This widening of the channel will necessitate the construction of a retaining wall adjacent to an existing playground. Construction of this wall can be accomplished in such a manner as to enhance the usefullness as well as the aesthetic appearance of the playground, if properly landscaped.

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COLBURN STREET DAM

Colburn Street Dam is located on Mother Brook, a stream which conveys water from the Charles River to the Neponset River. The dam is located adjacent to a park, and the major use of the reservoir appears to be recreational.

RECORDS. The dam is not listed in the dams data base of the Corps of Engineers or in the FERC records of retired hydroelectric facilities. A U.S.G.S. gaging station is located approximately one half mile upstream.

FACILITIES. The dam is a small, masonry structure in which the north and south abutments are anchored into rock. The overflow section is approximately 100 feet in length and appears to be in good condition. The height of the dam is six feet. During periods of low flow, water passes through a notch, approximately 2 feet deep and 4 feet wide.

The reservoir formed by the dam is approximately 5 acres in areal extent and has a water surface elevation of 76 feet above mean sea level.

The nearest electrical distribution line is approximately 30 feet from the dam. The dam is easily accessible by a roadway adjacent to the north abutment.

FLOW. Based upon an analysis of the records of an upstream U.S.G.S. gaging station, Mother Brook at Dedham, MA - 01104000, the flow which is equalled or exceeded 25 percent of the time is 94.6 cfs. An analysis of the flow duration data indicates that the plant factor is 0.42 for a flow of 94.6 cfs.

SUMMARY AND OBSERVATIONS. It is not feasible to develop small scale hydroelectric power at a dam with a height of 6 feet and a flow of 95 cfs. This dam should be eliminated from further consideration as a site for hydroelectric power.

APPENDIX D
Definitions

COMMON DAM SAFETY DEFINITIONS

For a comprehensive list of dam engineering terminology and definitions refer to 302 CMR10.00 Dam Safety, or other reference published by FERC, Dept. of the Interior Bureau of Reclamation, or FEMA. Please note should discrepancies between definitions exits, those definitions included within 302 CMR 10.00 govern for dams located within the Commonwealth of Massachusetts.

Orientation

Upstream – Shall mean the side of the dam that borders the impoundment.

Downstream – Shall mean the high side of the dam, the side opposite the upstream side.

Right – Shall mean the area to the right when looking in the downstream direction.

Left – Shall mean the area to the left when looking in the downstream direction.

Dam Components

Dam – Shall mean any artificial barrier, including appurtenant works, which impounds or diverts water.

Embankment – Shall mean the fill material, usually earth or rock, placed with sloping sides, such that it forms a permanent barrier that impounds water.

Crest – Shall mean the top of the dam, usually provides a road or path across the dam.

Abutment – Shall mean that part of a valley side against which a dam is constructed. An artificial abutment is sometimes constructed as a concrete gravity section, to take the thrust of an arch dam where there is no suitable natural abutment.

Appurtenant Works – Shall mean structures, either in dams or separate therefrom. including but not be limited to, spillways; reservoirs and their rims;low level outlet works; and water conduits including tunnels, pipelines, or penstocks, either through the dams or their abutments.

Spillway – Shall mean a structure over or through which water flows are discharged. If the flow is controlled by gates or boards, it is a controlled spillway; if the fixed elevation of the spillway crest controls the level of the impoundment, it is an uncontrolled spillway.

Size Classification

(as listed in Commonwealth of Massachusetts, 302 CMR 10.00 *Dam Safety*)

Large – structure with a height greater than 40 feet or a storage capacity greater than 1,000 acre-feet.

Intermediate – structure with a height between 15 and 40 feet or a storage capacity of 50 to 1,000 acre-feet.

Small – structure with a height between 6 and 15 feet and a storage capacity of 15 to 50 acre-feet.

Non-Jurisdictional – structure less than 6 feet in height or having a storage capacity of less than 15 acre-feet.

Hazard Classification

(as listed in Commonwealth of Massachusetts, 302 CMR 10.00 *Dam Safety*)

High Hazard (Class I) – Shall mean dams located where failure 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) – Shall mean dams located where failure may cause loss of life and damage to home(s), industrial or commercial facilities, secondary highway(s) or railroad(s), or cause the interruption of the use or service of relatively important facilities.

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

General

EAP – Emergency Action Plan - Shall mean a predetermined plan of action to be taken to reduce the potential for property damage and/or loss of life in an area affected by an impending dam break.

O&M Manual – Operations and Maintenance Manual; Document identifying routine maintenance and operational procedures under normal and storm conditions.

Normal Pool – Shall mean the elevation of the impoundment during normal operating conditions.

Acre-foot – Shall mean a unit of volumetric measure that would cover one acre to a depth of one foot. It is equal to 43,560 cubic feet. On million U.S. gallons = 3.068 acre feet

Height of Dam – Shall mean 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.

Spillway Design Flood (SDF) – Shall mean 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.

Condition Rating

Unsafe - Major structural, operational, and maintenance deficiencies exist under normal operating conditions.

Poor - Significant structural, operation and maintenance deficiencies are clearly recognized for normal loading conditions.

Fair - Significant operational and maintenance deficiencies, no structural deficiencies. Potential deficiencies exist under unusual loading conditions that may realistically occur. Can be used when uncertainties exist as to critical parameters.

Satisfactory - Minor operational and maintenance deficiencies. Infrequent hydrologic events would probably result in deficiencies.

Good - No existing or potential deficiencies recognized. Safe performance is expected under all loading including SDF.