MILL POND DAM

PHASE I

INSPECTION / EVALUATION REPORT

Dam Name: MILL POND DAM
State Dam ID #: 7-4-327-1
NID #: MA02480
Owner: Town of West Tisbury
Owner Type: Municipal
Town: West Tisbury, Mass.
Consultant: Kent A. Healy PE
Date of Inspection: August 30, 2006 - October 30, 2006

Executive Summary

The Mill Pond Dam in West Tisbury was inspected between August 30, 2006 and October 30, 2006 by Kent A. Healy PE. Dr. Healy is a civil engineer, a resident of West Tisbury, and has 30 years of dam engineering experience.

The Mill Pond Dam was originally constructed as an earth embankment across The Mill Brook in the seventeen hundreds. A concrete culvert bypass to Factory Brook and a main concrete sluiceway with timber plank stop logs was constructed in the 1940's, and the West Tisbury-Edgartown road along the dam crest was paved. The dam is in good condition. There is minor erosion due to road runoff at several areas on the downstream face that should be armored. The water level and stream flow have been continuously monitored since 1993 and the vegetation on the upstream face has been cut yearly. A phase 1 inspection of the dam was completed by GZA in 1995. In 2002, The Office of Dam Safety carried out a hydrologic analysis of the Mill Brook water shed for an evaluation of Priester's Pond Dam, upstream of Mill Pond. A study of the Mill Brook water shed was completed by Kent A. Healy in 2005 and additional field measurements of the elevations of the dam crest and west bank of the pond were done for this Phase 1 hydrologic analysis of Mill Pond Dam.

Measurement of rain on the water shed and monitoring of the water levels and stream flow should continue, the areas of erosion should be armored and the brush on the downstream face should be cut to facilitate inspection.

Dam Evaluation Summary Detail Sheet

1. NID ID: MA02480	**2. Dam Name:** MILL POND DAM	**3. Dam Location:** WEST TISBURY
4. Inspection Date: 8/30/06-10/30/06	**5. Last Insp. Date:** 1995	**6. Next Inspection:** 2011
7. Inspector: Kent A. Healy	**8. Consultant:** Kent A. Healy, PE	
9. Hazard Code: Significant (Class 2)	**10. Insp. Frequency:** Significant-5 Yrs.	**11. Insp. Condition:** Satisfactory

E1. Design Methodology:	1	**E7. Low-Level Discharge Capacity:**	3
E2. Level of Maintenance:	2	**E8. Low-Level Outlet Physical Condition:**	4
E3. Emergency Action Plan:	2	**E9. Spillway Design Flood Capacity:**	5
E4. Embankment Seepage:	5	**E10. Overall Physical Condition of the Dam:**	4
E5. Embankment Condition:	5	**E11. Estimated Repair Cost** (In thousand $):	
E6. Concrete Condition:	5		

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 structu deficiencies. Potential deficiencies exist under unusual loading conditic 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 performa 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

1. Measured 100 year rainfall event, reduced SDF from 1800 cfs to 150 cfs
2. Reevaluation of watershed, reduced area from 6.7 sq. mi. to 3.1 sq. mi.
3. Field measurments reduced dam height from 6' to 5.5' and storage from 60 ac.ft. to 30 ac.ft.
4. Spillway capacity was estimated in 1995 to be 75 cfs. Measured spillway flow indicated capacity to be 270 cfs.

PREFACE

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

The reported condition of the dam is based on observations of field conditions during the inspection, along with data available to the inspection team.

The safety of the dam depends on numerous and constantly changing internal and external conditions. It would be incorrect to assume that the present condition of the dam will continue. Only through continued care and inspections can unsafe conditions be detected.

Kent A. Healy ScD, PE Mass. #28498

Kent A. Healy PE

TABLE OF CONTENTS

Page No.

EXECUTIVE SUMMARY

DAM EVALUATION SUMMARY DETAIL SHEET

PREFACE

TABLE OF CONTENTS

SECTION 1

1.0 Description of Project 1

1.1 General 1
- 1.1.1 Authority
- 1.1.2 Purpose of Work
- 1.1.3 Definitions

1.2 Description of Project 1
- 1.2.1 Location
- 1.2.2 Owner/Operator
- 1.2.3 Purpose of Dam
- 1.2.4 Description of Dam and Appurtenances
- 1.2.5 Operation and Maintenance
- 1.2.6 DCR Size Classification
- 1.2.7 DCR Hazard Classification

1.3 Pertinent Engineering Data 3
- 1.3.1 Drainage Area
- 1.3.2 Reservoir
- 1.3.3 Discharges at the Dam Site
- 1.3.4 General Elevations
- 1.3.5 Main Spillway
- 1.3.6 Bypass Culvert
- 1.3.7 Design and Construction Records
- 1.3.8 Operating Records

SECTION 2 4
2.0 Inspection
2.1 Visual Inspection
2.1.1 General Findings
2.1.2 Dam
2.1.3 Appurtenant Structures
2.1.4 Downstream Area
2.1.5 Reservoir Area
2.2 Caretaker Interview 5
2.3 Operation and Maintenance Procedures 5
2.3.1 Operation Procedures
2.3.2 Maintenance of Dam and Operation Facilities
Emergency Warning System 5
2.4 Hydraulic/Hydrologic Data 6
2.5 Structural Stability/Overtopping Potential 6
2.5.1 Structural Stability
2.5.2 Overtopping Potential
SECTION 3
3.0 Assessments and Recommendations 7
3.1 Assessments
3.2 Studies and Analyses
3.3 Yearly Recommendations 8
3.4 Recommendations, Maintenance, and Minor Repairs
3.5 Remedial Measures
3.6 Alternatives
3.7 Opinion of Probable Construction Cost

FIGURES

1. GIS Locus Plan 1" = 800"
2. Site Plan 1" = 60"
3. Main Spillway 1" = 10'
4. Embankment Cross Sections
5. Mill Brook Water Shed

APPENDICES

A Photos
B Previous Reports and References
C Common Definitions

ATTACHMENTS

Inspection Check List (Inspectionchecklist Mill Pond Dam 2006-11-14.xls)

SECTION 1

1.0 DESCRIPTION OF PROJECT

1.1 General

1.1.1 Authority

The Town of West Tisbury has retained Kent A, Healy PE to perform a visual inspection and develop a report of conditions of The Mill Pond Dam on Mill Brook in West Tisbury, 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 the Work

The purpose of this investigation is to inspect and evaluate the present condition of the dam and appurtenant structures in accordance with 302 CMR 10.07, to provide information that will assist in prioritizing dam repairs and planning/maintenance.

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) visually inspect the site; 3) evaluate the status of an emergency action plan and; 4) prepare a final report with an evaluation of the structure, recommendations for remedial actions, and an estimate of costs of those actions.

1.1.3 Definitions

Definitions of commonly used terms associated with dams are provided in Appendix D under common categories associated with dams which include 1) orientation; 2) dam components; 3) size classification ; and 4) hazard classification

1.2 Description of Project

1.2.1 Location

The Mill Pond Dam is at North 41 degrees-22.95 minutes and West 70 degrees- 40.30 to 40.40 minutes, about 500 feet east of intersection of South Road and the West Tisbury-Edgartown Road which runs along the crest of the dam. The dam impounds the water of Mill Brook to form Mill Pond.

1.2.2 Owner/ Operator

The West Tisbury Board of Selectmen, PO Box 278, West Tisbury, Mass. 02575, is responsible for the operation and maintenance of the dam. The daytime phone of the board is 1-508-696-0102.

1.2.3 Purpose of the Dam

The dam forms Mill Pond which is used for recreation.

1.2.4 Description of the Dam and Appurtenances

Mill Pond Dam is an earth embankment approximately 280 feet long, 5 ½ feet high and 50 feet wide with a paved roadway, the West Tisbury-Edgartown Road along it's crest. The main spillway is a double concrete sluiceway with timber stoplogs and concrete training walls that was constructed about 50 years ago upstream of the double stone culvert when the road was widened. The dam has a small spillway located near the right abutment with the water entering a 16" diameter corrugated plastic pipe feeding Factory Brook and a fire pond.

1.2.5 Operation and Maintenance

The West Tisbury Board of Selectmen is responsible for the operation and maintenance of the dam.
The spillways are left alone except for replacement of stoplogs as needed. The brush is cut yearly on the upstream face.

1.2.6 DCR Size Classification

Mill Pond Dam has a maximum structural height of approximately 5 ½ feet, as measured during this inspection, and a maximum storage capacity of 13.5 acre-feet, based on water depths measured during this inspection. Therefore, in accordance with The Department of Conservation and Recreation Office of Dam Safety classification, under Commonwealth of Massachusetts dam safety rules and regulations stated in CMR 10.00, as amended by Chapter 330 of the Acts of 2002, Mill Pond Dam is a Non Jurisdictional size structure.

1.2.7 DCR Hazard Classification

Mill Pond Dam is located upstream of Tisbury Great Pond. It appears that a failure of the dam at maximum pool may damage the West Tisbury-Edgartown Road, 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, Mill Pond Dam is classified as a significant hazard.

1.3 Pertinent Engineering Data

1.3.1 Drainage Area

The drainage area for the Mill Brook down to Mill Pond is approximately 3.1 square miles and extends through the communities of West Tisbury and Chilmark. The Author has, since 1990, studied the surface water and ground water contributions to Tisbury Great Pond as part of a continuing study, with The Martha's Vineyard Commission, of the hydrology of the Pond. This study involved continuous measurement of the flow of the Tiasquam River and the Mill Brook, and test holes to determine the elevation and flow direction of groundwater and ground characteristics of the water sheds. The surface water sheds and ground water sheds are shown in figure 5. As Mill Brook flows from Priester's Pond to Mill Pond across the sand and gravel outwash plain, water leaks from the brook down into the ground water and rain that falls on this area does not contribute to stream flow, no matter the antecedent weather. The stream flow derives from rain that falls on the approximately 1980 acres (3.1 square miles) upstream of Priester's Pond. This area is largely wooded with a significant portion in conservation. As a result, the runoff coefficient, as measured during the last 15 years, is quite low.

1.3.2 Reservoir

Normal Pool; Length - 460 feet; Width - 240 feet; Surface elevation - +12.2 USGS Datum;
Average depth – 2.0 feet; Area –2.5 acres; Storage Volume – 5.0 acre feet.

Maximum Pool; Length – 1000 feet; Width – 300 feet; Surface Elevation - +14.7 USGS Datum;
Average depth – 4.5 feet; Area – 7.0 acres; Storage Volume – 31.5 acre feet.

1.3.3 Discharges at the Dam Site

The largest stream flow during the last 20 years (1986 to 2006) occurred at about 7 AM June 14, 1998 after about 7 inches of rain fell on the Mill Brook water shed from 4 to 9 PM June 13, 1998. The peak flood flow of (main spillway 110 cfs and the Factory Brook spillway 20 cfs) about 130 cfs occurred at a pond surface elevation of +13.9 USGS Datum.

1.3.4 General Elevations (feet) USGS Datum.

A. Top of Dam +14.6 to +15. 7
B. Spillway Design Flood Pool –
C. Normal Pool +12.2
D. Spillway Crest +12.0
E. Upstream water at Time of Inspection +12.2
F. Streambed at Toe of the Dam +9.3
G. Low Point along the Toe of the Dam + 10

1.3.5 Main Spillway

A. Type; Double Concrete Sluiceway with 2" thick plank stop logs
B. Length; two 5 feet = 10 feet
C. Invert Elevation; +10.0 USGS
D. Upstream Channel; +10.0
E. Downstream Channel; +9.3
F. Downstream Water; +9.5

1.3.6 Secondary Outlet

The secondary outlet to Factory Brook is a board weir across a 16" diameter culvert pipe with the crest at +12.0

1.3.7 Design and Construction Records

There are no construction records for the dam.

1.3.8 Operating Records

The pond surface elevation has been recorded continuously since 1993 by Kent A. Healy PE of West Tisbury, but there are no other records available.

SECTION 2

2.0 INSPECTION

2.1 Visual Inspection

The Mill Pond Dam was inspected in October and November of 2006. During that time the weather was generally fair with no extreme weather events. Photographs were taken and are included in Appendix A.

2.1.1 General Findings

The Mill Pond Dam was found to be in satisfactory condition.

2.1.2 Dam

The upstream slope is covered with rip rap at the normal pool elevation and low brush which provide protection from ice and wave damage. A walking path between the rip rap and the highway guard rail is without grass cover but is stable. The crest of the dam is a 24' wide asphalt pavement in good condition. The downstream slope has a good grass cover. The downstream slope adjacent to the main spill way channel and the Factory Brook channel is overgrown with brush making inspection difficult. The old mill building in the middle of the downstream slope is in good condition with stable stone and brick foundation and concrete slab.

2.1.3 Appurtenant Structures

The main Spillway is a double concrete sluiceway with slots for wood plank spillways that was constructed more than 50 years ago up stream of the double stone culverts. The concrete and stone are in good condition and have sustained heavy traffic with no sign of distress. The secondary outlet to Factory Brook was repaired in 2000 with a new 16" plastic culvert pipe and wood spillway structure leading to the 4' diameter concrete pipe which is in good condition. The down stream channel is overgrown with brush,
The dike along the west side of the pond was constructed when the pond was dredged in the 40's and 50's and is about 30 feet wide with the top of the dike at about elevation +14.5. The top of the dike is mowed for recreation and is stable with small trees growing along the sides.

2.1.4 Downstream Area

The discharge channel for the main spillway is the original stream bed that meanders down through one thousand feet of wetland into Town Cove at the head of Tisbury Great Pond. The area 50 to 100 feet downstream of the dam is kept clear by The MV Garden Club and is a stable grassed area about one foot above the stream bottom. The sluice way for the under shot water wheel in the mill building was filled in many years ago and a concrete slab cast in the building floor. There are several drain pipes coming from under the building that flow to the down stream channel but there is no sign of piping or erosion. Factory Brook flows in to Maley's Pond that serves as a fire pond, then out to the Town Cove.

2.1.5 Reservoir Area

Mill Pond is formed by the roadway embankment across the southern end, a stable 30 foot wide berm along the western side, a 1 on 3 upslope along the eastern side and a wetland at the northern end. The pond was never very deep to start with and now has about 2 feet of water surrounded by wetland vegetation along the edges. Scotchmans Lane, a paved town road across the wetland north of the pond, is a about elevation +20, well above the pond.

2.2 Caretaker Interview

There is no assigned caretaker

2.3 There are no operation or maintenance procedures.

2.4 There is no emergency action plan

2.5 Hydrologic/Hydraulic Data

The Mill Pond Dam is 5 ½ feet high with a flood storage volume of about 32 acre feet and is non-jurisdictional in the CMR Size Classification Table. However because a secondary roadway runs along the crest of the dam and failure of the dam would interrupt roadway use, the Mill Pond Dam is significant hazard in the CMR Hazard Potential Classification Table and the spillway should carry a 100 year flood flow.
The 100 year flood flow was calculated in the 1987 and 1995 inspection reports by multiplying a drainage area taken from a USGS Quadrangle map and multiplying that area (6.7 square miles) times a preliminary guidance quantity of 1350 CFS/ square mile giving a probable maximum flood (PMF) flow of 9000 CFS. The 100 year flood flow was taken as 1/5 of the PMF. This calculation gave too large a 100 year flow for two reasons. The actual water shed area is only 3.1 square miles because of the out wash deposits, and the actual runoff is much less than 1350 CFS/square mile because of the large area of wetland and woodland in the water shed, see figure 5.
The 100 year rain fall, per the updated 1993 report from the Northeast Regional Climate Center at Cornell University, is 9.0 inches in 24 hours. A 6 hour, 100 year rainfall would be about 6.0 inches. The later would be more appropriate given the approximately 12 hour time of concentration of the Mill Pond watershed. On June 13, 1998 from 4 to 9 PM, about 6 inches of rain fell on the Mill Pond watershed, as measured by a rain gauge in Chilmark and the authors rain gauge in West Tisbury, resulting in a peak flow at 7 AM, June 14 of 110 CFS over the main spillway and 20 CFS through the Factory Brook outlet, both as measured by the author with flow velocity meter. The elevation of the pond surface a peak flow was +13.9 ft USGS datum. That flow therefore represents the 100 year flow and the existing spillway capacity is sufficient for the design flood. A photograph of the flow is shown in Appendix B. The capacity of the main spill way at a pond elevation of the lowest elevation of the dam crest (+14.6) would probably be about 250 CFS. A storm water modeling and hydrologic analysis of Mill Brook at Priester's Pond, by David Clark 1/10/02, of The DEM, indicated that the 100 year flood flow would be 164 CFS, much closer to the flow measured 6/14/98 than the 1987 and 1995 estimates.

2.6 Structural Stability/Overtopping Potential

2.6.1 Structural Stability

The low height to base width ratio (5: 50) and the flat 1:3 slope of the downstream face results in a static factor of safety of more than 5 . The long term use of this roadway by heavy trucks and equipment has vibrated the embankment enough to preclude the possibility of liquefaction. Failure of the dam would occur only from several days of overtopping and the resulting erosion of the crest.

2.6.2 Overtopping Potential

A significantly greater rainfall than a 100 year storm would result in overtopping of the dam at the west end near the Factory Brook outlet. At a pond elevation of +15.5, the overtopping flow would be about 100 feet x one foot of overtopping x 5 feet per second or about 500 CFS, about 4 times the 100 year flood flow or close to the maximum possible. The overtopping while certainly causing some erosion on the downstream face it would not washout the road and would not damage the old mill building.

SECTION 3

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

In general the overall condition of the Mill Pond Dam is satisfactory. This is in agreement with the 1995 report rating the Mill Pond Dam in fair to good condition. The outlet to Factory Brook was repaired in 2000 and the upstream dam face has been brush cut more frequently. The foundation of the old mill building is in excellent condition and the road along the crest has been repaved.
The recommendations from the 1995 report are discussed as follows.

1. An operation and maintenance manual has not been developed but should be.
2. A seismic stability analysis has not been done but a simple one could be done using a lateral acceleration of 0.1.
3. The author thinks that the minor seepage under the old mill building is from drains that were installed when the concrete slab was constructed and the very low piping ratio of 2 feet of head over 50 feet of base width precludes failure from internal erosion.
4. The 100 year rainfall in 1998 showed that the existing spillway is adequate for that flow. Careful measurement of the dam crest show that a flow five times the 100 year flood would cause overtopping at the west end of the dam where a natural emergency spillway occurs and that only minor erosion would occur because of the flat and well vegetated downstream slope.
5. An emergency action plan showing an alternate travel route in case of flooding would be appropriate. No other downstream damage is anticipated within the extensive wetland at the head of Tisbury Great Pond.

The major recommendation of this report is that the high brush all along the downstream face of the dam be cut to allow inspection and that the areas of potential erosion from road runoff be protected with asphalt aprons. A perennial maintenance permit should be obtained from the West Tisbury Conservation Commission for this work.

3.2 Studies and Analysis

This report recommends that 1) A simple static and seismic stability analysis of the dam be done. 2) An operation and maintenance manual be developed and 3) An emergency action plan for an alternate travel route be prepared by The West Tisbury Emergency Planning Group. The engineering stability analysis would cost about $5000.

3.3 Yearly Recommendation

The brush on the upstream and downstream faces should be cut yearly and the condition of the spillway planks be determined and replaced if necessary. The annual cost would be about $2000.

3.4 Recommendations, Maintenance and Minor Repairs

There are no recommendations to improve the overall condition of the dam.

3.5 Remedial Measures

There are no recommendations for modification of the dam.

3.6 Probable Construction Costs

The annual cost of recommended analyses and maintenance would be $3000.

FIGURE 1.
GIS Locus Plan

MILL POND, WEST TISBURY, MASS.
1" = 800' ± 20'

FIGURE 2
Site Plan
MILL POND, WEST TISBURY, MASS.

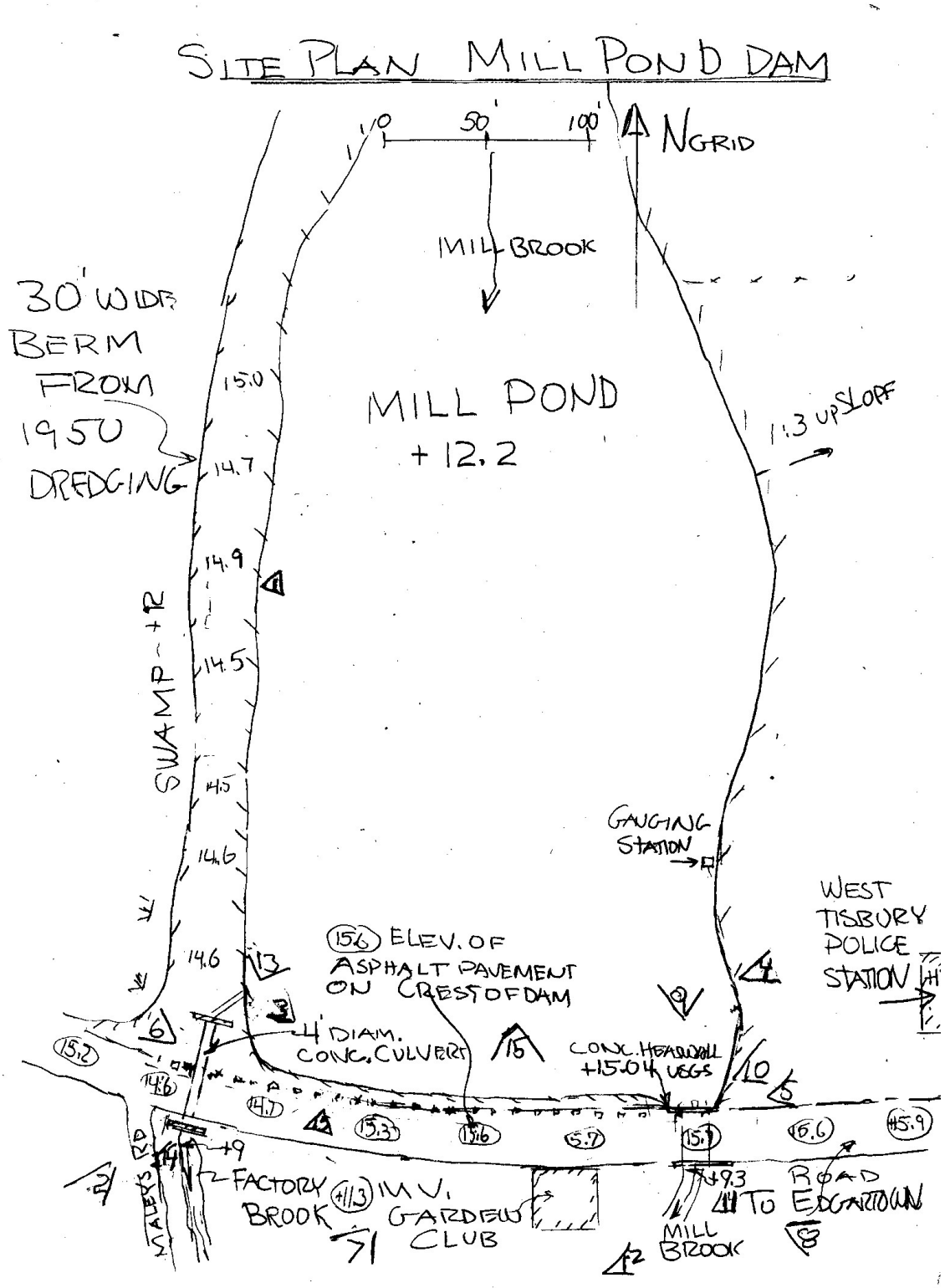

FIGURE 3
MAIN SPILLWAY, MILL POND, WEST TISBURY, MASS.

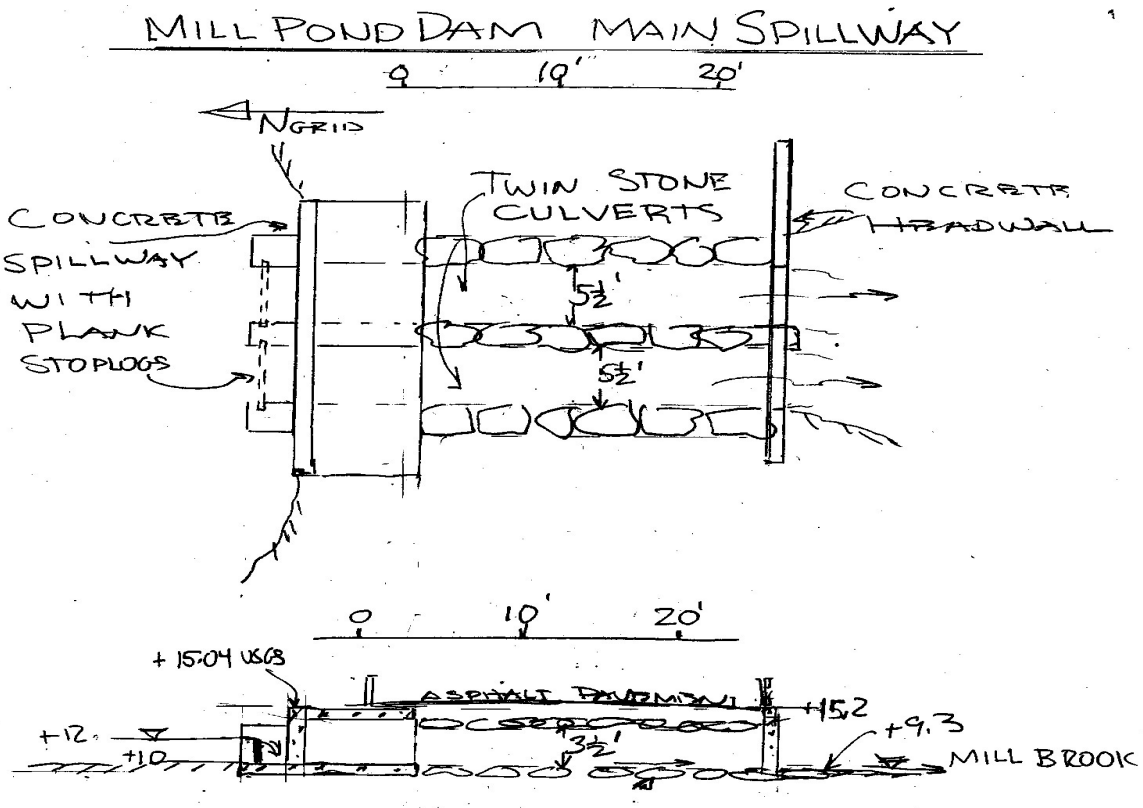

FIGURE 4
EMBANKMENT CROSS SECTIONS, MILL POND, WEST TISBURY, MASS

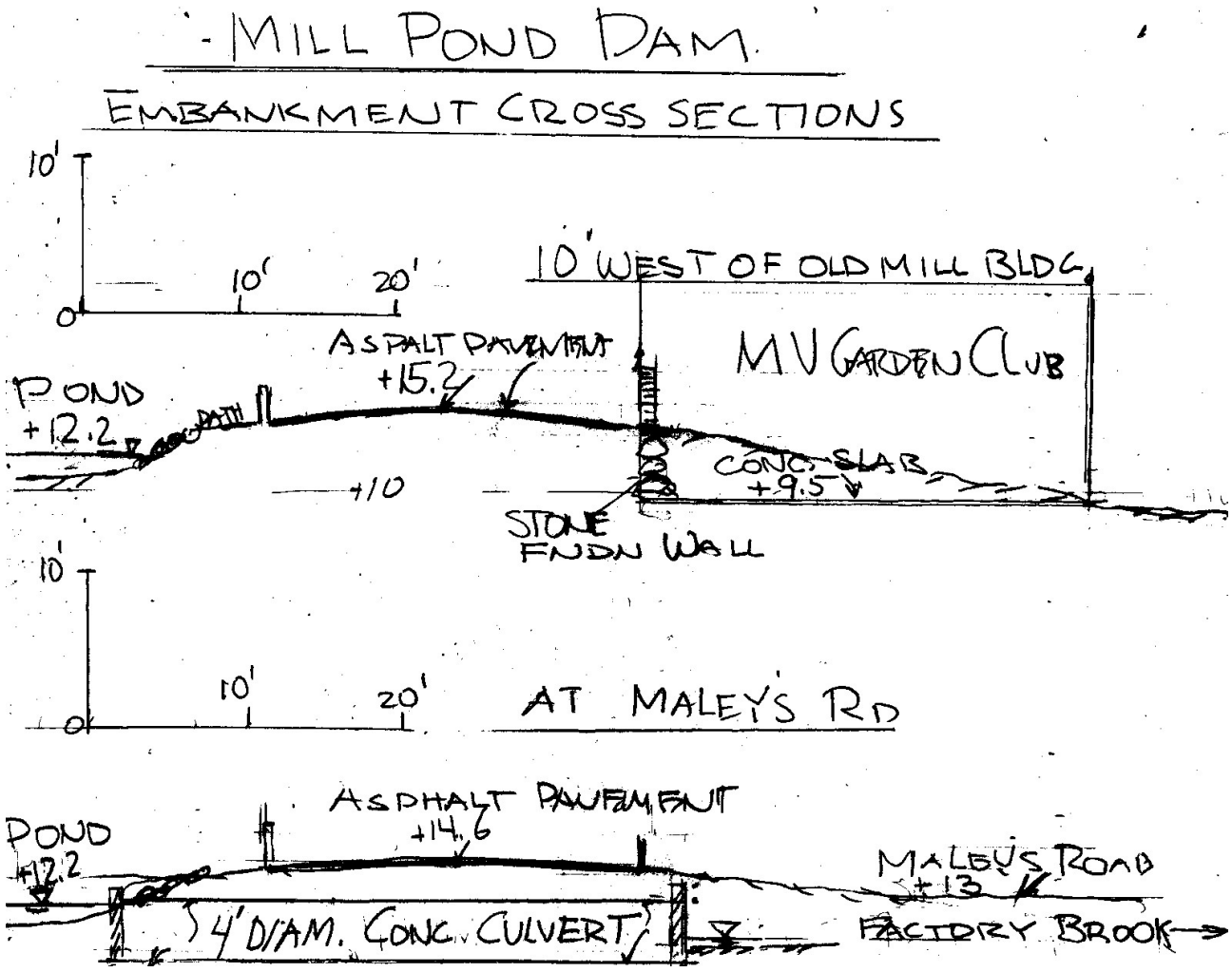

FIGURE 5
MILL BROOK WATERSHED, WEST TISBURY, MASS

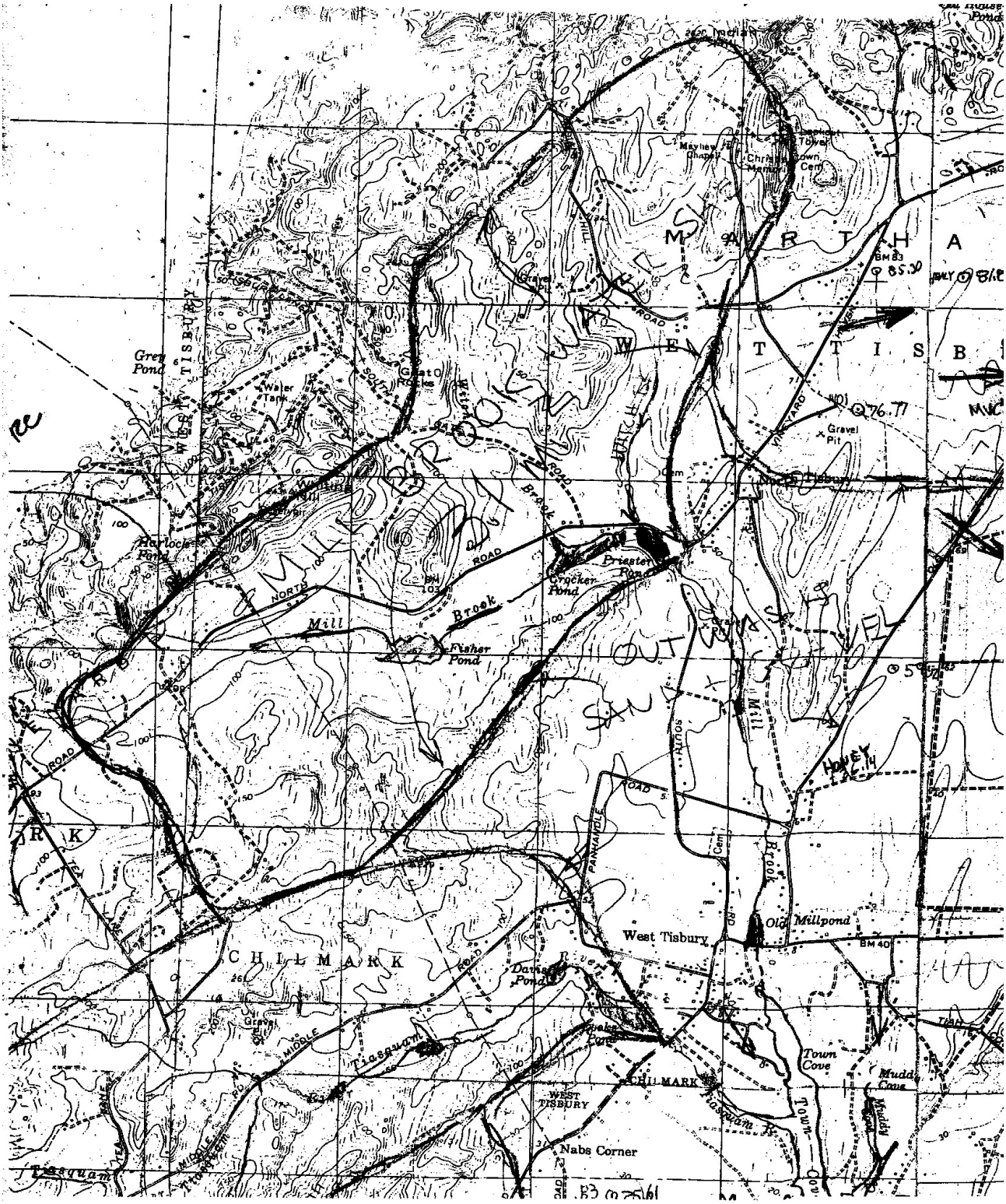

PHOTO 1 Overview of Dam from Upstream

PHOTO 2 Overview of Dam from Downstream

PHOTO 3 Overview of upstream Face from Right Abutment

PHOTO 4 Overview of up stream Face from Left Abutment

PHOTO 5 Overview of Dam Crest from Right Abutment

PHOTO 6 Overview of Dam Crest from Left Abutment

PHOTO 7 Overview of downstream Face from Right Abutment

PHOTO 8 Overview of downstream face from Left Abutment

PHOTO 9 Overview of Spillway

PHOTO 10 Overview of Weir

PHOTO 11 Overview of downstream Channel

PHOTO 12 Overview of downstream Channel

PHOTO 13 Inlet (Factory Brook)

PHOTO 14 Discharge to Factory Brook

PHOTO 15 Overview of Reservoir

PHOTO 16 June 14, 1998 Flow at 110 cfs.

PREVIOUS REPORTS AND REFERENCES

Inspection Report, Richard H. Slade, September 1977

Department of Environmental Management, Office of Dam Safety.
Mill Pond Dam Inspection /Evaluation Report, Prepared by Lee Pare & Assoc. 1987

Department of Environmental Management, Office of Dam Safety
Mill Pond Dam Inspection/Evaluation Report, Prepared by GZA, 1995

Department of Environmental Management, Office of Dam Safety
Priester's Pond Dam Inspection/ Evaluation Report, Prepared by DEM Office of Dam Safety
01/10/02

Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada
Cornell University, Ithaca, New York, September 1993

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 acreto a depth of one foot. It is equal to
Height of Dam – Shall mean the vertical distance from the lowest portion of the natural ground, including any stream channel, along the downstream toe of the dam to the crest 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.