– *MILL WOODS PARK POND DAM* –

VISUAL INSPECTION REPORT

Dam Name: Mill Woods Park Pond Dam

CTDEEP ID#: 15903

Owner: Town of Wethersfield

Town: Wethersfield, Connecticut

Consultant: GZA GeoEnvironmental, Inc.

Date of Inspection: September 27, 2016

GZA
Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

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July 27, 2017
GZA File No. 05.0045906.00

Mr. Derrick Gregor, P.E.
Town Engineer, Town of Wethersfield
505 Silas Deane Highway
Wethersfield, Connecticut 06109

Re: Visual Inspection Report
Mill Woods Park Pond Dam
CTDEEP # 15903

Dear Mr. Gregor:

In accordance with our proposal dated August 28, 2015 and our Notice to Proceed dated July 21, 2016 attached to the Town of Wethersfield Purchase Order Number: 20166877-000, GZA GeoEnvironmental, Inc. (GZA) has completed a visual inspection of the Mill Woods Park Pond Dam located in Wethersfield, Connecticut.

Our site visit was performed on September 27, 2016 by Matthew A. Taylor, P.E., David M. Barstow, P.E., and Anthony Trani of GZA GeoEnvironmental, Inc. (GZA) as well as Don Moisa of Town of Wethersfield. At the time of the inspection, the weather was cloudy with a temperature of approximately 65° Fahrenheit.

The purpose of our efforts was to assess the current condition of the dam and to prepare an updated, formal Regulatory Inspection of the dam in accordance with the State of Connecticut Department of Energy and Environmental Protection (CTDEEP) Dam Safety Regulation 22a-409, pertaining to inspection frequency. Our services and report are subject to the Limitations found in **Appendix D**.

Based on our visual inspection, the dam was found to be in **FAIR** condition. Refer to **Appendix A** for the condition rating definitions as per the Connecticut Dam Safety regulations. The deficiencies at the dam observed during the visual inspection include but are not limited to:

1. Erosion around spillway training walls, possibly due to overtopping;
2. Undercutting on the upstream toe of the embankment;
3. Unknown operability of the low-level outlet gate valve;
4. Brush growth and mature trees on the upstream and downstream slopes of the dam;
5. Erosion along the left and right training walls;
6. Animal burrows on the dam embankment crest left of the spillway; and
7. Possible need to increase the CT DEEP Hazard Classification for the dam.

Mill Woods Park Pond Dam is currently classified by the CTDEEP as **Class A (Low) Hazard Potential**. However, Bell Pond Dam, which is a **Class BB (Moderate) Hazard Potential** dam, is located about 1,850 feet downstream from Mill Woods Park Pond Dam. According to the State of Connecticut Regulation of the Department of Environmental Protection concerning Dam Safety Inspection and Classification (Section 22a-409-2):

"Where a dam is so located that its failure would likely cause a downstream dam to fail, the hazard classification of such dam shall be at least as great as that of the downstream dam".

Based on a limited review of aerial photography and regional topographic information, it appears that a potential failure of Mill Woods Park Pond Dam could potentially result in the "domino" failure of Bell Pond Dam. As such, it appears that Mill Woods Park Pond Dam may need to be reclassified as a **Class BB (Moderate) Hazard Potential** dam. Further hydrologic and hydraulic analyses, including a dam breach analysis, are recommended herein to determine if the change in hazard class is warranted.

It should be noted that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. Impoundment levels greater than or lower than the time of inspection may create conditions which were undetectable during this visual inspection. The condition of the dam reported herein is based on observations of field conditions at the time of inspection and the data available to the inspection team. 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 unsafe conditions be detected.

A further discussion of our evaluation and recommended actions are presented in the Inspection Report. The report includes: (a) CTDEEP Dam Inspection Form; (b) Limitations; and (c) Photo Log and Photo Location Plan.

GZA GeoEnvironmental, Inc. will submit one bound color copy of the final inspection report to the Inland Water Resources Division of CTDEEP. An electronic copy of the complete report in unlocked, searchable PDF format, using the latest CTDEEP prescribed format will also be sent to the CTDEEP.

We are happy to have been able to assist you with this inspection. Please contact the undersigned if you have any questions or comments regarding the content of this Inspection Report.

Sincerely,

GZA GeoEnvironmental, Inc.

David M. Barstow, P.E.
Sr. Project Manager

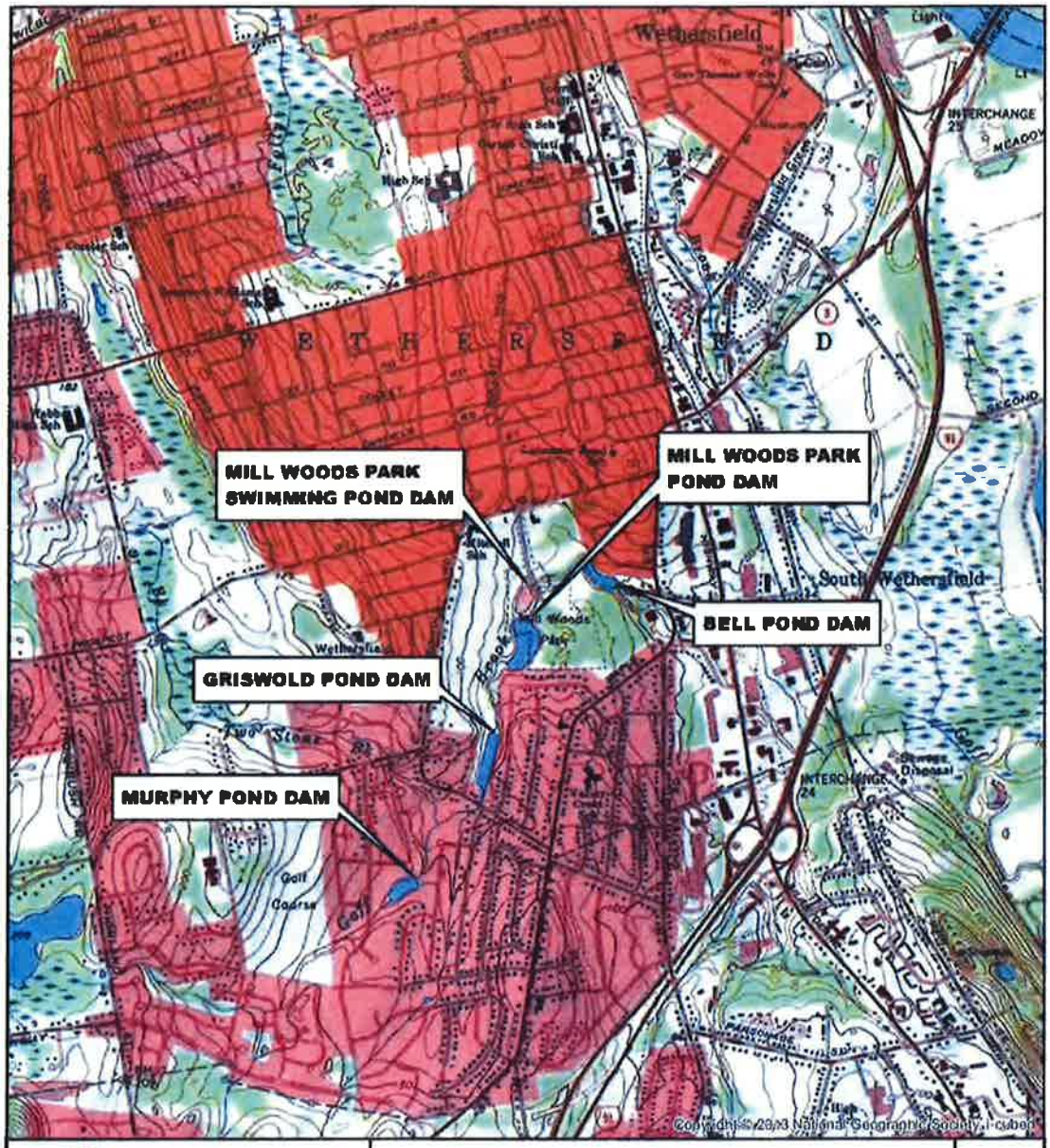
Peter H. Baril, P.E.
Consultant/Reviewer

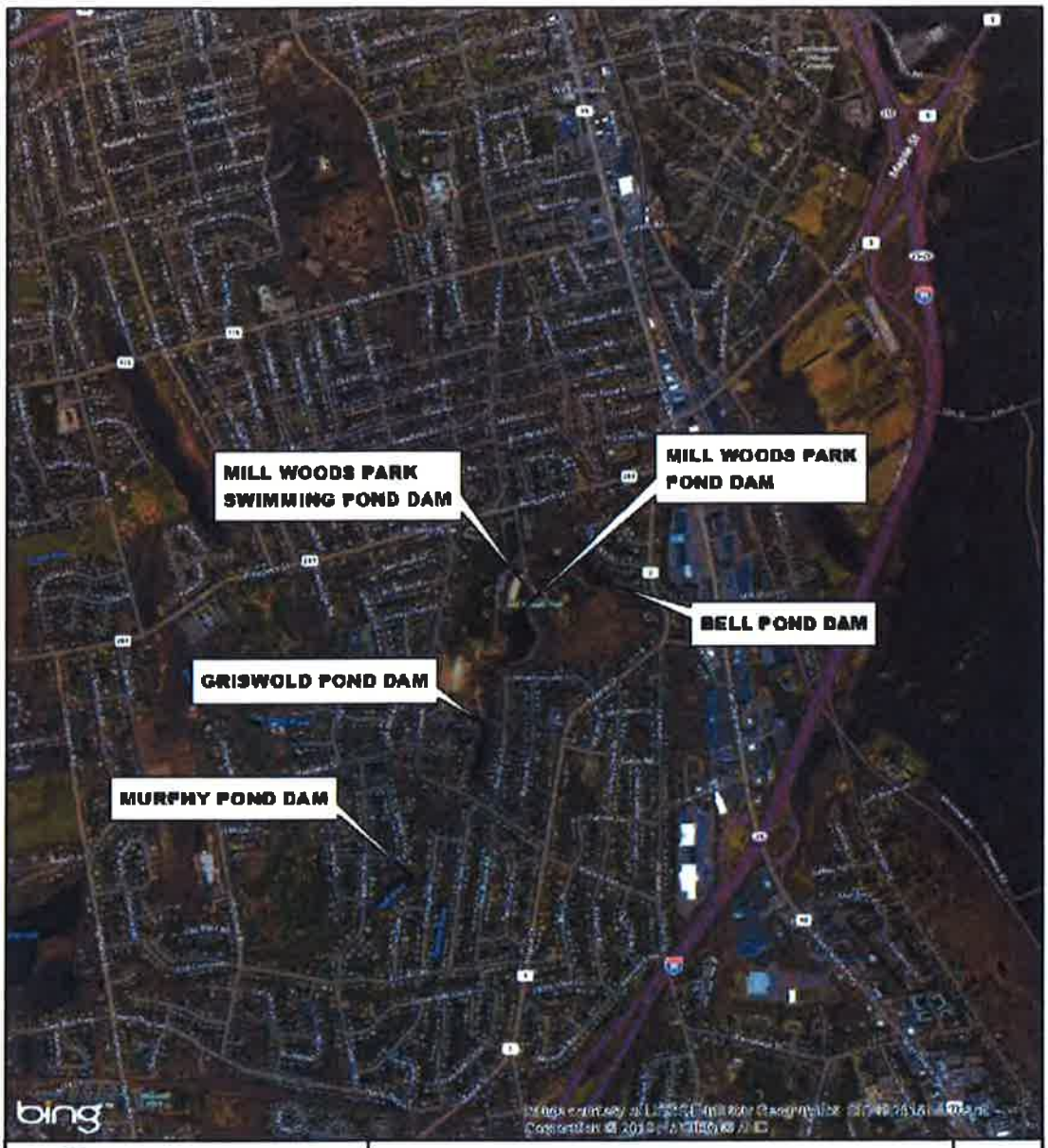
Matthew A. Taylor, P.E.
Principal-in-Charge

Enclosures: CTDEEP Dam Inspection Report Form
Appendices

A. Overall Dam Condition Selection Standards
B. Hazard Classification of Dams
C. Photo Location Plan and Photo Log with Site Sketch
D. Limitations
E. Historic Drawings

Part III: Aerial Photo/Location Map





GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

MILL WOODS PARK POND DAM
AERIAL PHOTOGRAPH

WETHERSFIELD, CONNECTICUT

Source: Imagery provided by arcgisonline.com.

PROJ MGR: DMB	REVIEWED BY: MAT	PROJECT NO. 05.0045908.00
DESIGNED BY: AJT	DRAWN BY: MJS	DATE: SEPTEMBER 2016

THIS MAP HAS BEEN COMPILED FROM OTHER MAPS AND/OR SOURCES OF INFORMATION.
THIS MAP SHOULD NOT BE CONSTRUED AS A PROPERTY SURVEY, NOR USED FOR CONSTRUCTION PURPOSES

0 1,000 2,000 4,000 6,000 8,000
Scale In Feet

N

FIGURE 2

Connecticut Department of
Energy & Environmental Protection
Bureau of Water Protection & Land Reuse
Inland Water Resources Division

DAM SAFETY PROGRAM
DAM INSPECTION REPORT FORM – FOR REGULATORY INSPECTION

Please complete this form in accordance with the instructions (DEEP-DAM-INST-002).

Part I: Summary of Dam Inspection

Dam Name:	**Mill Woods Park Pond Dam**	Inspection Date(s):	**9/27/2016**
Alternate Dam Name(s):	**Mill Woods Dam #2**	CT Dam ID #:	**15903**
Location (Municipality):	**Wethersfield**	Temperature / Weather:	**~65°F /Cloudy**
Registered?: Yes or No If yes, provide the 9 digit registration number found on the notification letter.	**Yes – Number Unknown**	Pool Level: See Instructions	**0.2 feet above primary spillway**
Emergency Action Plan?: Yes or No If Yes, see instructions	**No**	Impoundment Use: use options listed in instructions	**Recreation**
Hydraulic and Hydrologic Analysis?: Yes or No If Yes, see instructions	**No**	Stability Analysis?: Yes or No If Yes, see instructions	**No**
Overall Condition: (refer to Appendix A located at the end of this form) **Fair**			

Persons present at the inspection *(select the tab button in the last cell to the right to create another row)*		
Name	**Title/Position**	**Representing**
Matthew Taylor. P.E.	**Associate Principal**	**GZA GeoEnvironmental, Inc.**
David Barstow, P.E.	**Project Manager**	**GZA GeoEnvironmental, Inc.**
Anthony Trani	**Assistant Project Manager**	**GZA GeoEnvironmental, Inc.**
Don Moisa	**Operations Coordinator**	**Town of Wethersfield**

Owners and Operators: If there is more than one owner or operator, copy the empty table below for each owner or operator and paste right below the previous table, then complete the information for each

*By providing this e-mail address you are agreeing to receive official correspondence from DEEP, at this electronic address, concerning the subject report. Please remember to check your security settings to be sure you can receive e-mails from "ct.gov" addresses. Also, please notify DEEP if your e-mail address changes by email via deep.damsafety@ct.gov.

Indicate if Owner or Operator: Owner

Name: **Town of Wethersfield (Contact: Jeff Bridges, Town Manager)**

Mailing Address: **505 Silas Deane Highway**

City/Town: **Wethersfield** State: **CT** Zip Code: **06109**

Phone: **(860) 721-2801** ext.: **---**

Emergency Phone: **---**

*E-mail: **jeff.bridges@wethersfieldct.gov**

Part II: General Dam Information

General Description: Mill Woods Park Pond Dam is an earthen embankment dam with a maximum height of about 6.2 feet and a total length of approximately 250 feet. Existing topography serve as the abutments for the dam. The crest of the dam is about 4 to 6 feet wide and is covered with maintained grass. The upstream embankment slope is generally about 3 horizontal to 1 vertical (3H:1V) and the downstream embankment slope ranges from an approximate 2H:1V slope near the spillway to 3H:1V slope elsewhere.

The spillway is a 32-foot long, reinforced concrete, broad-crested weir with two notched bays. The spillway is located near the right abutment. The spillway has 8-foot long upstream and downstream training walls which form an abutment for a future bridge. A 12-inch diameter ductile iron (DI) low level outlet pipe with a gate valve is located near the center of the spillway. The is no auxiliary spillway.

Mill Woods Park Swimming Pond impoundment is located on the downstream toe of embankment of the Mill Woods Pond Dam. The downstream channel of Mill Woods Park Pond Dam is separated from Mill Woods Park Swimming Pond by an earth embankment / dike (refer to Figure 3). The downstream channel enters a 60-inch diameter, reinforced concrete culvert which passes under a Mill Woods Park access road. The culvert discharges into Goff Brook. The impoundment (Mill Woods Park Pond) is used for recreation.

Hazard Classification:	A	**Dam Height (ft):** 6.2	
Dam Length (ft):	Approx. 250	**Spillway Length (ft):**	32
Spillway Type:	Broad crested weir with two notched bays	**Normal Freeboard (ft):**	2
Drainage Area (square miles):	4.69	**Impoundment Area (at principal spillway crest, in acres):**	5.3
Watercourse(s): The downstream channel passes through a 60-inch diameter, reinforced concrete culvert under a Mill Woods Park access road. The culvert discharges to Goff Brook.			

OTHER INFORMATION:

The information presented in the table above is based on a CTDEEP Dam Registration Form, a Spillway Construction Plan Set dated July 2001, and from GZA's direct observation. Elevations included in this inspection report reference the Compass Geodetic Services datum (CGS).

Based on these plans, the dam and spillway were rebuilt sometime after July 2001 and currently consist of a broad crested weir with two notched bays. Prior to 2001, the spillway consisted of a broad crested weir with three notched bays. The top of spillway was at about El. 67.40 feet and stop logs were used to increase the top of spillway to El. 68.78 feet. The current spillway is in the same location and orientation as the previous spillway.

An earth embankment / dike separates Mill Woods Park Swimming Pond from the downstream channel of Mill Woods Park Pond Dam. The embankment is approximately 4-feet high and 260-feet long and runs approximately southwest to northeast. The embankment connects to the Mill Woods Park Pond Dam on the southern end and connects to the Mill Woods Park Swimming Pond Dam right abutment on the northern end. Based on the 2001 Construction Plan Set, the embankment crest is at about El. 74 feet and the 100-year flood is listed at El. 74 feet.

A series of six (6) dams are located on the upper watershed of Goff Brook. The dams, listed in descending order from upstream to downstream, are: 1860 Reservoir Dam (Hazard Class A), Murphy Pond Dam (Hazard Class A), Griswold Pond Dam (Hazard Class A), Mill Woods Park Pond Dam (Hazard Class A), Mill Woods Swimming Pond Dam #1 (Hazard Class A) and Bell Pond Dam (Hazard Class BB). The Town of Wethersfield is the owner/operator for each of these dams.

References

"Topographic Survey, Millwoods Park Spillway, Wethersfield, Connecticut", by DeCarlo & Doll, Inc., dated July 13, 2001, Sheet No. SD-1

"Spillway Construction, Millwoods Park Spillway, Wethersfield, Connecticut", by DeCarlo & Doll, Inc., dated July 13, 2001, Sheet No. SD-2

Part IV: Dam/Embankment/Dike Information

Number of Dam/Embankments/Dikes: (1) One

Dam/Embankment/Dike Name (see instructions): Mill Woods Park Pond Dam
General Description: The approximately 250-foot-long earthen embankment dam has a broad-crested spillway located near the right abutment contact. The embankment length to the right of the spillway is about 18-feet long and the embankment length to the left of the spillway is about 200-feet long. The embankment crest width ranges from about 4- to 6-feet wide. Existing topography functions as the left and right abutments. The upstream embankment slope ranges from about 3 horizontal to 1 vertical (3H:1V) near the spillway contact to about 6H:1V near the abutment contact. The downstream embankment slope ranges from an approximately 2H:1V to 3H:1V slope.
General Condition: Good
Concrete Condition: N/A
Stone Masonry: N/A
Settlement/Alignment/Movement: None observed
Seepage/Foundation Drainage: None observed.
Riprap: Riprap was observed along the toe of the downstream slope.
Erosion/Burrows: A cluster of 6-inch deep and 4-inch diameter animal burrows were observed within a 6-foot by 6-foot area on the dam crest left of the spillway. Undercutting was observed on the upstream toe of the embankment.
Vegetative Cover: The upstream and downstream embankment slopes were covered with thick brush. Several trees (diameters up to 18-inch) were observed on the upstream slope near the embankment contacts. The crest of the dam to the left of the spillway is maintained grass.
Other: Exposed tree roots were observed on the embankment crest. The downstream channel is separated from Mill Woods Park Swimming Pond by an earthen embankment. The embankment is approximately 4- to 6-feet high and 260-feet long and the southern end connects to the Mill Woods Park Pond Dam embankment to the left of the spillway. According to Mr. Don Moisa (Wethersfield Operations Coordinator), the Mill Woods Swimming Pond and downstream channel of the Mill Woods Park Pond Dam overtops the road near 60-inch diameter RCP pipe during heavy rain events.
Photos/Graphics/Sketches: See Parts XIII and XIV below.

Part V: Principal Spillway, Training Walls, Apron

Number of Principal Spillways: (1) One

Spillway Type (see instructions): Broad crested weir with two notched bays
General Description: The reinforced-concrete spillway is 32-feet long, 2-feet wide and contains two notched bays. Each bay is 10-inches deep and 10-feet long. The bays are symmetrically spaced to create three (3), 4-foot long spillway sections. The top of spillway is at about El. 70.6 feet and the top of each bay is at El. 69.8 feet.

There are symmetrical upstream and downstream training walls located to both the left and right side of the spillway. Each training wall forms a "U"-shape with the central area backfilled with soil to the top of the wall. The training walls are constructed of reinforced concrete and are 8-feet long parallel to the spillway and 6-feet long perpendicular to the spillway. The top of the training walls is at about El. 72.2 feet. We understand the structures may be used as an abutment for a future pedestrian bridge over the spillway.

The 2001 Construction Plan Set indicates a 12-inch diameter, ductile iron (DI) pipe with a gate valve is located in the middle of the dam between the two notches and serves as a low-level outlet. The plans also indicate that there is a modified riprap low-flow sediment trap on the upstream side of the spillway. The low-level outlet and upstream low-flow sediment trap were submerged at the time of the inspection and were not observed.
General Condition: Good
Concrete Condition: Good
Stone Masonry: N/A

Settlement/Alignment/Movement: None observed in the spillway structure; however, the backfill behind the training walls has either settled or been eroded.
Cracks: None observed
Scouring/Undermining: Submerged, none observed
Seepage/Foundation Drainage: Submerged, none observed
Other: Erosion was observed behind the left and right training wall contacts with the embankment. The erosion appears to be from spillway flow overtopping the training walls. The 2001 Construction Plan Set indicates that the 100-year flood is at El. 74.0 feet, which is about 1.8 feet above the top of the training walls. Two trees (8-inch-diameter) were observed in the left training wall.
Photos/Graphics/Sketches: See Parts XIII and XIV below.

Part VI: Auxiliary Spillway, Training Walls, Apron

Number of Auxiliary Spillways: (0) None)

Part VII: Downstream Channel

Number of Downstream Channels: (1) One

Channel Name (see instructions), include Watercourse Name: Goff Brook
General Description: The downstream channel is a manmade, riprap lined channel which flows from the Mill Woods Park Pond towards Bell Pond. The left side of the channel is an embankment that separates the channel flow from the Swimming Pond. Approximately 270-feet downstream of the dam, the channel passes through a 100-foot long, 60-inch diameter, reinforced concrete pipe (RCP) which passes under a Mill Woods Park access road. The RCP pipe discharges to the natural channel of Goff Brook.
General Condition: Good
Scouring: None observed
Debris: None observed
Riprap: Riprap between 6 and 24-inches was observed within the downstream channel
Other: N/A
Photos/Graphics/Sketches: See Parts XIII and XIV below.

Part VIII: Intake Structure(s)

Number of Intake Structures: (1) One

Intake Structure Type (see instructions): Upstream Intake Structure
General Description: The intake structure consists of a 12-inch diameter, ductile iron pipe with a gate valve located at the center of the spillway. The gate valve has a removable handle to control the flow. The intake structure discharges into the downstream channel at the bottom of the spillway.
General Condition: At the time of inspection, water was flowing over the spillway and the intake structure could not be observed.
Concrete Condition: N/A
Stone Masonry: N/A
Settlement/Alignment/Movement: At the time of inspection, water was flowing over the spillway and the intake structure could not be observed.
Cracks: At the time of inspection, water was flowing over the spillway and the intake structure could not be observed.
Other: N/A
Photos/Graphics/Sketches: refer to Appendix E – Historic Drawings for the 2001 Construction Plans Set.

Part IX: Outlet Structure(s)

Number of Outlet Structures: None

Outlet Structure Type (see instructions): N/A
General Description: N/A.
General Condition: N/A.
Concrete Condition: N/A
Stone Masonry: N/A
Settlement/Alignment/Movement: N/A
Scouring/Undermining: N/A
Other: N/A
Photos/Graphics/Sketches: N/A

Part X: Miscellaneous Features

List miscellaneous features: Mill Woods Park Pond Dam is located in Mill Woods Park which is on the south side of Prospect Street. The dam is accessed via an access road to the park on the north side of Mill Woods Pond. The dam impounds Goff Brook to form Mill Woods Park Pond.

Photos/Graphics/Sketches: See Parts XIII and XIV below.

Part XI: Downstream Hazard Classification Reassessment

Downstream Hazard Classification: *(provide recommendation for the hazard class based on the Dam Safety regulation. See Instructions and Appendix B.)*

Mill Woods Park Pond Dam is currently classified by the Connecticut Department of Energy and Environmental Protection (CTDEEP) as **Class A (Low) Hazard Potential**. However, Bell Pond Dam, which is a **Class BB (Moderate) Hazard Potential** dam, is located about 1,850 feet downstream from Mill Woods Park Pond Dam. According to the State of Connecticut Regulation of the Department of Environmental Protection concerning Dam Safety Inspection and Classification (Section 22a-409-2):

"*Where a dam is so located that its failure would likely cause a downstream dam to fail, the hazard classification of such dam shall be at least as great as that of the downstream dam*".

Based on a limited review of aerial photography and regional topographic information, it appears that a potential failure of Mill Woods Park Pond Dam could potentially result in the "domino" failure of Bell Pond Dam. As such, it appears that Mill Woods Park Pond Dam may need to be reclassified as a **Class BB (Moderate) Hazard Potential** dam. Further hydrologic and hydraulic analyses are recommended herein to determine if the change in hazard class is warranted.

Part XII: Recommendations *(See instructions for identifying recommendations)*

Recommendations: The following recommendations and remedial measures generally describe the recommended approach to address the current deficiencies at the dam. Prior to undertaking any maintenance, repairs or remedial measures, the applicability of dam safety and environmental permits should be considered.

1. Perform a hydrologic and hydraulic (H&H) analysis to determine the appropriate spillway design flood, evaluate spillway capacity, and evaluate anticipated overtopping depths. Based on our observations that the flow appears to have overtopped the training walls and the Town has observed overtopping of the road near the 60-inch diameter pipe (culvert) in the past, evaluate options to either: increase hydraulic capacity of the spillway and culvert, harden the embankment to withstand overtopping, or develop an operations procedure that includes draining the impoundment prior to flooding events to mitigate overtopping potential.

2. Perform a dam breach analysis to determine if the failure of Mill Woods Park Pond Dam would result in the overtopping and failure of the downstream Bell Pond Dam. Adjust the hazard class of Mill Woods Park Pond Dam accordingly.

3. Conduct investigations into the operability and accessibility of the low-level outlet gate valve located on the upstream side of the spillway; make repairs/replacements as necessary.

Recurrent Maintenance Recommendations:

GZA recommends the following recurrent maintenance-level activities that can be undertaken by Owner and do not require engineering design or a dam safety permit.

1. Cut and maintain the vegetation/brush on the embankment (upstream and downstream slopes) and remove trees smaller than 3-inch diameter.
2. Continue to maintain the grass on the embankment crest and slopes.
3. Restore the area containing animal burrows and exterminate burrowing animals.
4. Execute animal trapping program.
5. Fill in eroded areas, reseed and maintain the grass around the left and right spillway training walls.

Dam Repairs

GZA recommends the following repairs that can be undertaken by the Owner and requires Professional Engineer oversight and a dam safety permit.

1. Remove trees greater than 3-inch diameter, including root balls, on the embankments and within 25 feet of the dam. Fill, compact, seed and maintain grass upon completion.

Part XIII: Photographs/Graphics *(see instructions and Appendix C)*

Refer to Appendix C for Photographic Log

Part XIV: Sketches

Refer to Appendix C for a Site Sketch

Part XV: Professional Engineer Certification

The following certification must be signed by a Professional Engineer

"I hereby certify that the information provided in this report has been examined by me and found to be true and correct in my professional judgment."

7/27/17

Signature of Professional Engineer — Date

Matthew A. Taylor	Associate Principal	26480
Printed Name of Professional Engineer	Title	CT P.E. Number

GZA GeoEnvironmental, Inc
Name of Firm

Affix P.E. Stamp Here

7/27/17

Part XVI: Owner Signature

The following statement must be signed by the Owner(s) of the subject Dam.

"The information provided in this report has been examined by me."

Signature of Owner	7/13/2017 Date
Jeff Bridges (Town of Wethersfield) Name of Owner (print or type)	**Town Manager** Title (if applicable)
Signature of Owner	Date
Name of Owner (print or type)	Title (if applicable)
Signature of Owner	Date
Name of Owner (print or type)	Title (if applicable)
Signature of Owner	Date
Name of Owner (print or type)	Title (if applicable)

Note: Mail the completed inspection report to:

DAM SAFETY PROGRAM
INLAND WATER RESOURCES DIVISION
CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106

In addition, please send this completed report converted to Adobe portable document format (pdf) including a scan of the signature page via email to: DEEP.DamSafety@ct.gov

APPENDIX A

OVERALL DAM CONDITIONS SELECTION STANDARDS

Appendix A: Overall Dam Condition Selection Standards

Condition	Definition
Good	Through file research and after a thorough visual inspection it has been determined that the dam is well maintained and no existing dam safety deficiencies are recognized. Only continued routine maintenance is required.
Satisfactory	Through file research and after a thorough visual inspection it has been determined that no significant deficiencies are recognized. Only minor maintenance is required and only minor flaws are noted.
Fair	Through file research and after a thorough visual inspection it has been determined that there are no critical deficiencies with the dam that would require engineering analysis with the following exception: the engineer may recommend that a hydrologic and hydraulic analysis be conducted due to the lack of adequate freeboard and/or the lack of spillway capacity documentation. A condition exists at the dam that may require some sort of additional monitoring.
Poor	Through file research and after a thorough visual inspection it has been determined that deficiencies are recognized that require engineering analysis and/or remedial action.
Unsatisfactory	Through file research and after a thorough visual inspection it has been determined that a deficiency is recognized that requires immediate or emergency action. Administrative/Enforcement action may be required as determined by the Dam Safety Program. Reservoir level restrictions may be necessary until the problem is resolved.

APPENDIX B

HAZARDOUS CLASSIFICATION OF DAMS

Appendix B - Hazard Classification of Dams

I. A Class AA dam is a negligible hazard potential dam which, if it were to fail, would result in the following:

(i) no measurable damage to roadways;
(ii) no measurable damage to land and structures;
(iii) negligible economic loss.

II. A Class A dam is a low hazard potential dam which, if it were to fail, would result in any of the following:

(i) damage to agricultural land;
(ii) damage to unimproved roadways (less than 100 ADT);
(iii) minimal economic loss.

III. A Class BB dam is a moderate hazard potential dam which, if it were to fail, would result in any of the following:

(i) damage to normally unoccupied storage structures;
(ii) damage to low volume roadways (less than 500 ADT);
(iii) moderate economic loss.

IV. A Class B dam is a significant hazard potential dam which, if it were to fail, would result in any of the following:

(i) possible loss of life;
(ii) minor damage to habitable structures, residences, hospitals, convalescent homes, schools, etc;
(iii) damage to or interruption of the use of service of utilities;
(iv) damage to primary roadways (less than 1500 ADT) and railroads;
(v) significant economic loss.

V. A Class C dam is a high hazard potential dam which, if it were to fail, would result in any of the following:

(i) probable loss of life;
(ii) major damage to habitable structures, residences, hospitals, convalescent homes, schools, etc;
(iii) damage to main highways (greater than 1500 ADT);
(iv) great economic loss.

APPENDIX C

PHOTO LOCATION PLAN AND PHOTO LOG WITH SITE SKETCH

NOTES:

1. AERIAL VIEW AND BASEMAP CREATED USING IMAGERY OBTAINED FROM BING MAPS ON MARCH 29, 2017.
2. DAM INSPECTION PERFORMED BY GZA PERSONNEL ON SEPTEMBER 27, 2016

N

0 20 40 80

1" = 40'

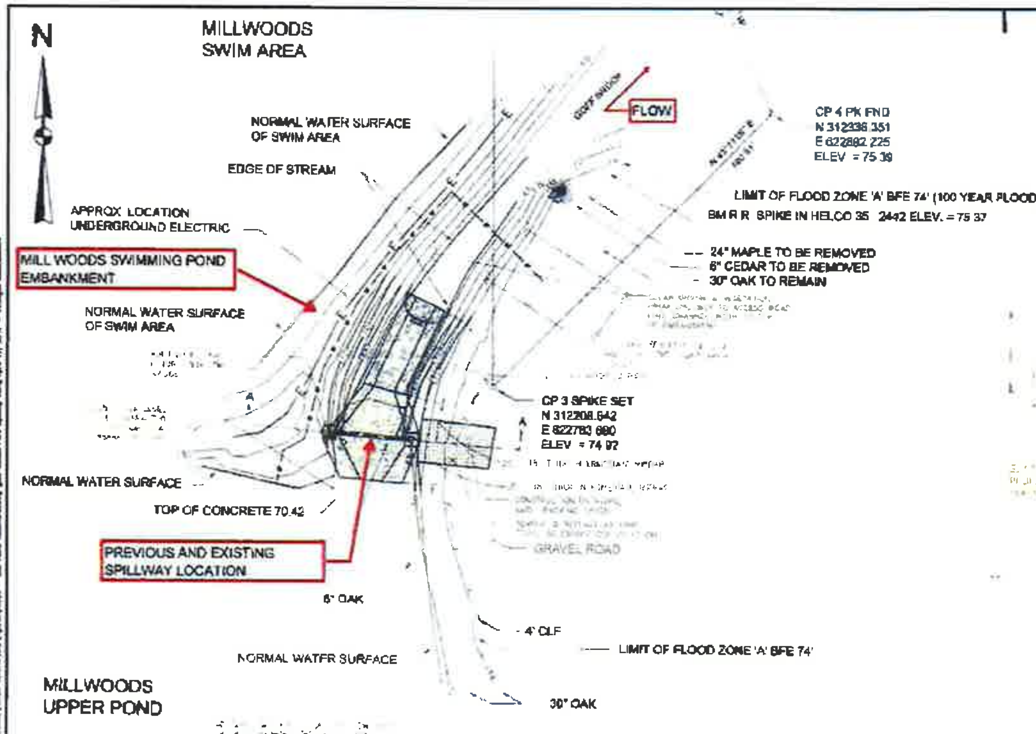
MILL WOODS PARK POND DAM
MILL WOODS PARK
WETHERSFIELD, CONNECTICUT

SITE SKETCH

GZA GeoEnvironmental, Inc. Engineers and Scientists

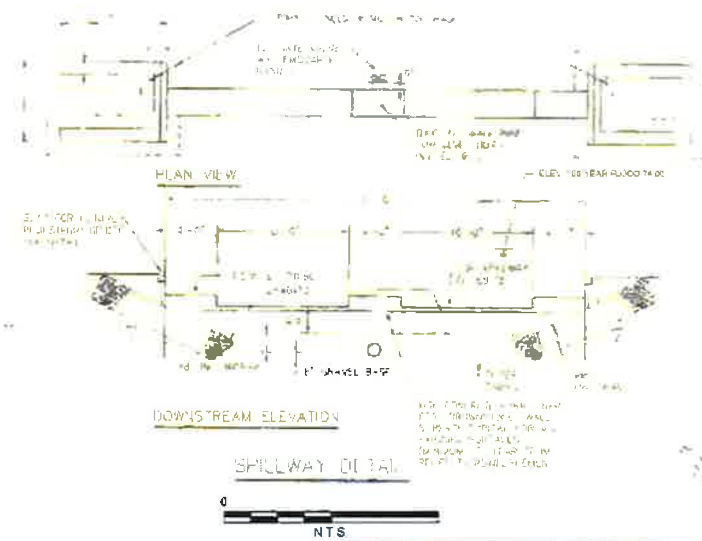
PREPARED FOR TOWN OF WETHERSFIELD ENGINEERING DIVISION WETHERSFIELD, CONNECTICUT

PROJ. MGR.	DMB	REVIEWED BY	DMB	CHECKED BY	MAT
DESIGNED BY	LSC	DRAWN BY	LSC	SCALE	1" = 30'
DATE		PROJECT NO.		FIGURE NO.	
SEPTEMBER 2016		05.0045906.00			3



PRECONSTRUCTION TOPOGRAPHIC SURVEY FOR SPILLWAY REPLACEMENT
JULY 2001

2017 EXISITNG SPILLWAY DETAIL



NOTES

1. BASE MAP DEVELOPED FROM A PLAN ENTITLED "TOPOGRAPHIC SURVEY, MILL WOODS PARK SPILLWAY, WETHERSFIELD, CONNECTICUT" SHEET NO SD-1, DATED JULY13, 2001 BY DECARLO & DOLL, INC
2. SPILLWAY DETAIL DEVELOPED FROM A PLAN ENTITLED, "SPILLWAY CONSTRUCTION, MILLWOODS PARK SPILLWAY, WETHERSFIELD, CONNECTICUT", DATED JULY 13, 2001, SHEET NO SD-2, BY DECARLO & DOLL, INC.
3. DAM INSPECTION PERFORMED BY GZA PERSONNEL ON SEPTEMBER 27, 2016

MILL WOODS PARK POND DAM
MILL WOODS PARK
WETHERSFIELD, CONNECTICUT

TOPOGRAPHIC SURVEY AND SPILLWAY SECTION

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com

PREPARED FOR: TOWN OF WETHERSFIELD ENGINEERING DIVISION WETHERSFIELD, CONNECTICUT

PROJ MGR:	DMB	REVIEWED BY:	DMB	CHECKED BY:	MAT	FIGURE
DESIGNED BY:	LBC	DRAWN BY:	LBC	SCALE:	1" = 30'	4
DATE: SEPTEMBER 2016		PROJECT NO. 05.0045505.00		REVISION NO.		SHEET NO.

GZA GeoEnvironmental, Inc.	PHOTOGRAPHIC LOG	
Client Name: Town of Wethersfield	**Site Location:** Mill Woods Park Pond Dam, Wethersfield, CT	**Project No.:** 05.0045906.00

Photo No.: 01	**Date:** 9/27/16

Direction Photo Taken: Southeasterly

Photographer: D. Barstow

Description:

Overview of dam and spillway from downstream.

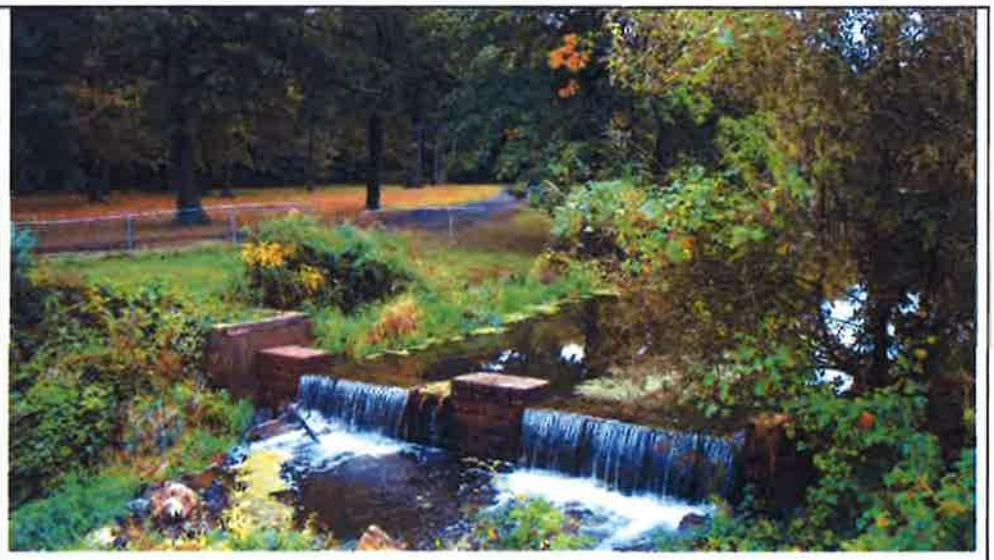


Photo No.: 02	**Date:** 9/27/16

Direction Photo Taken: Southeasterly

Photographer: D. Barstow

Description:

Overview of the upstream face of the embankment looking from the right abutment towards upstream. Note the thick brush and vegetation.

GZA GeoEnvironmental, Inc.	PHOTOGRAPHIC LOG	
Client Name: Town of Wethersfield	**Site Location:** Mill Woods Park Pond Dam, Wethersfield, CT	**Project No.:** 05.0045906.00

Photo No.: 03	**Date:** 9/27/16

Direction Photo Taken: Westerly

Photographer: D. Barstow

Description:

Overview of the upstream and downstream face of the embankment looking from the right abutment towards the spillway. Note thick brush and vegetation on upstream and downstream slope.

Photo No.: 04	**Date:** 9/27/16

Direction Photo Taken: Westerly

Photographer: D. Barstow

Description:

Overview of the dam crest, spillway and training walls looking from the right abutment. Note vegetation on upstream and downstream slope.

GZA GeoEnvironmental, Inc.	PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Town of Wethersfield	Mill Woods Park Pond Dam, Wethersfield, CT	05.0045906.00

Photo No.:	Date:
05	9/27/16

Direction Photo Taken:
Easterly

Photographer:
D. Barstow

Description:

Overview of the dam crest, spillway and training walls looking from the embankment crest left of the spillway. Note the trees and brush.

Approximate location of spillway

Photo No.:	Date:
06	9/27/16

Direction Photo Taken:
Southeasterly

Photographer:
D. Barstow

Description:

Overview of the downstream face of the embankment looking from the downstream slope left of the spillway. Note the thick brush and vegetation.

GZA GeoEnvironmental, Inc.	PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Town of Wethersfield	Mill Woods Park Pond Dam, Wethersfield, CT	05.0045906.00

Photo No.:	Date:
07	9/27/16

Direction Photo Taken:
Northeasterly

Photographer:
D. Barstow

Description:

Overview of spillway looking from the embankment crest left of the spillway. Note trees and brush on top of left training wall and upstream embankment slope.

Photo No.:	Date:
08	9/27/16

Direction Photo Taken:
Northeasterly

Photographer:
D. Barstow

Description:

Overview of right training wall looking from left training walls.

GZA GeoEnvironmental, Inc.		PHOTOGRAPHIC LOG
Client Name: Town of Wethersfield	**Site Location:** Mill Woods Park Pond Dam, Wethersfield, CT	**Project No.:** 05.0045906.00

Photo No.: 09	**Date:** 9/27/16

Direction Photo Taken:
Northerly
Photographer:
D. Barstow

Description:

Overview of the downstream channel looking from the spillway.

Photo No.: 10	**Date:** 9/27/16

Direction Photo Taken:
Southerly
Photographer:
D. Barstow

Description:

Overview of reservoir area looking from the embankment left of the spillway.

GZA GeoEnvironmental, Inc.	PHOTOGRAPHIC LOG	
Client Name: Town of Wethersfield	**Site Location:** Mill Woods Park Pond Dam, Wethersfield, CT	**Project No.:** 05.0045906.00

Photo No.: 11	**Date:** 9/27/16

Direction Photo Taken: Northerly

Photographer: D. Barstow

Description:

Overview of downstream channel approximately 380-feet downstream of the dam. The 60-inch-diameter, reinforced concrete pipe passes under the access road to Mill Woods Park and discharges to Goff Brook.

Photo No.: 12	**Date:** 9/27/16

Direction Photo Taken: Easterly

Photographer: D. Barstow

Description:

Tree growing in the left training wall and heavy brush on upstream and downstream embankment slopes.

GZA GeoEnvironmental, Inc.		PHOTOGRAPHIC LOG
Client Name: Town of Wethersfield	**Site Location:** Mill Woods Park Pond Dam, Wethersfield, CT	**Project No.:** 05.0045906.00

Photo No.: 13	Date: 9/27/16

Direction Photo Taken: Southerly

Photographer: D. Barstow

Description:

Overview of left side of spillway showing an area of potential overtopping.

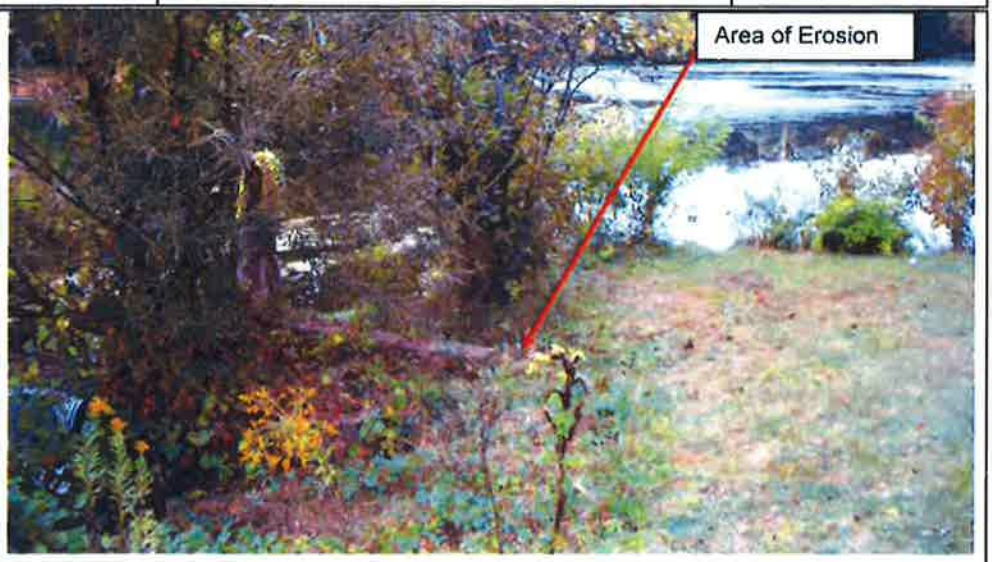
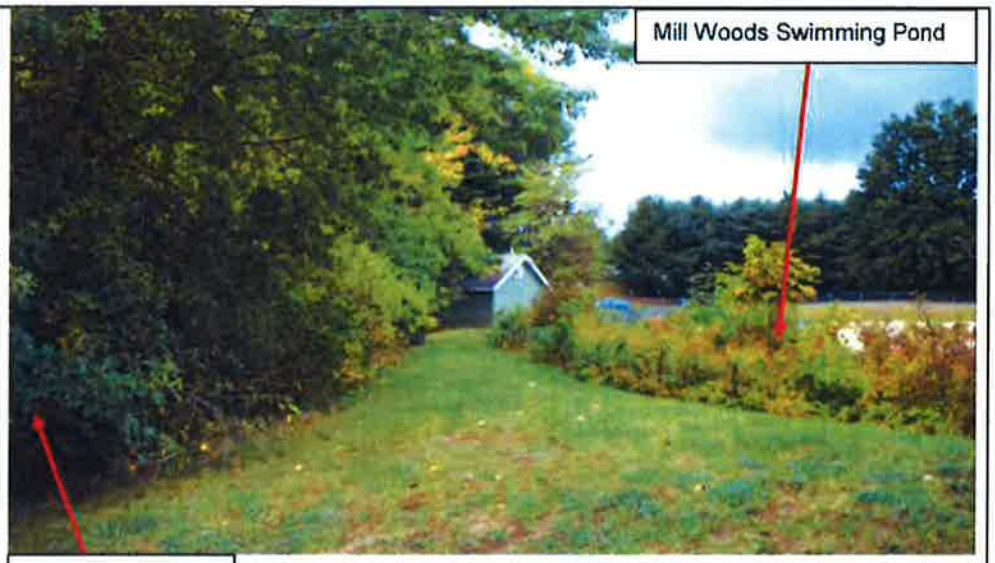


Photo No.: 14	Date: 9/27/16

Direction Photo Taken: Westerly

Photographer: D. Barstow

Description:
Overview of the dam embankment looking from the spillway contact to the left abutment. Note: mature trees and thick brush on the upstream embankment slope and thick brush on the downstream embankment slope.



GZA GeoEnvironmental, Inc. — PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Town of Wethersfield	Mill Woods Park Pond Dam, Wethersfield, CT	05.0045906.00

Photo No.:	Date:
15	9/27/16

Direction Photo Taken:
Easterly

Photographer:
D. Barstow

Description:
Overview of the dam embankment looking from the left abutment. Note: mature trees and thick brush on the upstream embankment slope and thick brush on the downstream embankment slope.

Photo No.:	Date:
16	9/27/16

Direction Photo Taken:
Westerly

Photographer:
D. Barstow

Description:

One of the cluster of 6-inch deep animal burrows located on the dam crest, left of the spillway.

GZA GeoEnvironmental, Inc.	PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Town of Wethersfield	Mill Woods Park Pond Dam, Wethersfield, CT	05.0045906.00

Photo No.:	Date:
17	9/27/16

Direction Photo Taken:
Westerly

Photographer:
D. Barstow

Description:

Exposed tree roots on dam crest, left of the spillway.

Photo No.:	Date:
18	9/27/16

Direction Photo Taken:
Southeasterly

Photographer:
D. Barstow

Description: Mature trees (up to 24-inch diameter) and thick brush on the upstream embankment slope and at water line.

APPENDIX D

LIMITATIONS

USE OF REPORT

1. GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of the Town of Wethersfield (Client) for Mill Woods Park Pond Dam and for the stated purpose(s) and location(s) identified in the Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. Our findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. Our services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

SUBSURFACE CONDITIONS

4. If presented, the generalized soil profile(s) and description, along with the conclusions and recommendations provided in our Report, are based in part on widely-spaced subsurface explorations by GZA and/or others, with a limited number of soil and/or rock samples and groundwater /piezometers data and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then appear evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

5. Water level readings have been made in test holes (as described in the Report), monitoring wells and piezometers, at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the groundwater and piezometer levels, however, occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, reservoir and tailwater levels, the presence of subsurface utilities, and/or natural or artificially induced perturbations.

GENERAL

6. The observations described in this report were made under the conditions stated therein. The conclusions presented 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 the Client.

7. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein available to GZA at the time of the evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

8. Any GZA hydrologic analysis presented herein is for the rainfall volumes and distributions stated herein. For storm conditions other than those analyzed, the response of the site's spillway, impoundment, and drainage network has not been evaluated.

9. Observations were made of the site and of structures on the site as indicated within the report. Where access to portions of the structure or site, or to structures on the site was unavailable or limited, GZA renders no opinion as to the condition of that portion of the site or structure. In particular, it is noted that water levels in the impoundment and elsewhere and/or flow over the spillway may have limited GZA's ability to make observations of underwater portions of the structure. Excessive vegetation, when present, also inhibits observations.

10. 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. 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 inspection and care can there be any chance that unsafe conditions be detected.

COMPLIANCE WITH CODES AND REGULATIONS

11. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

12. This scope of work does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

COST ESTIMATES

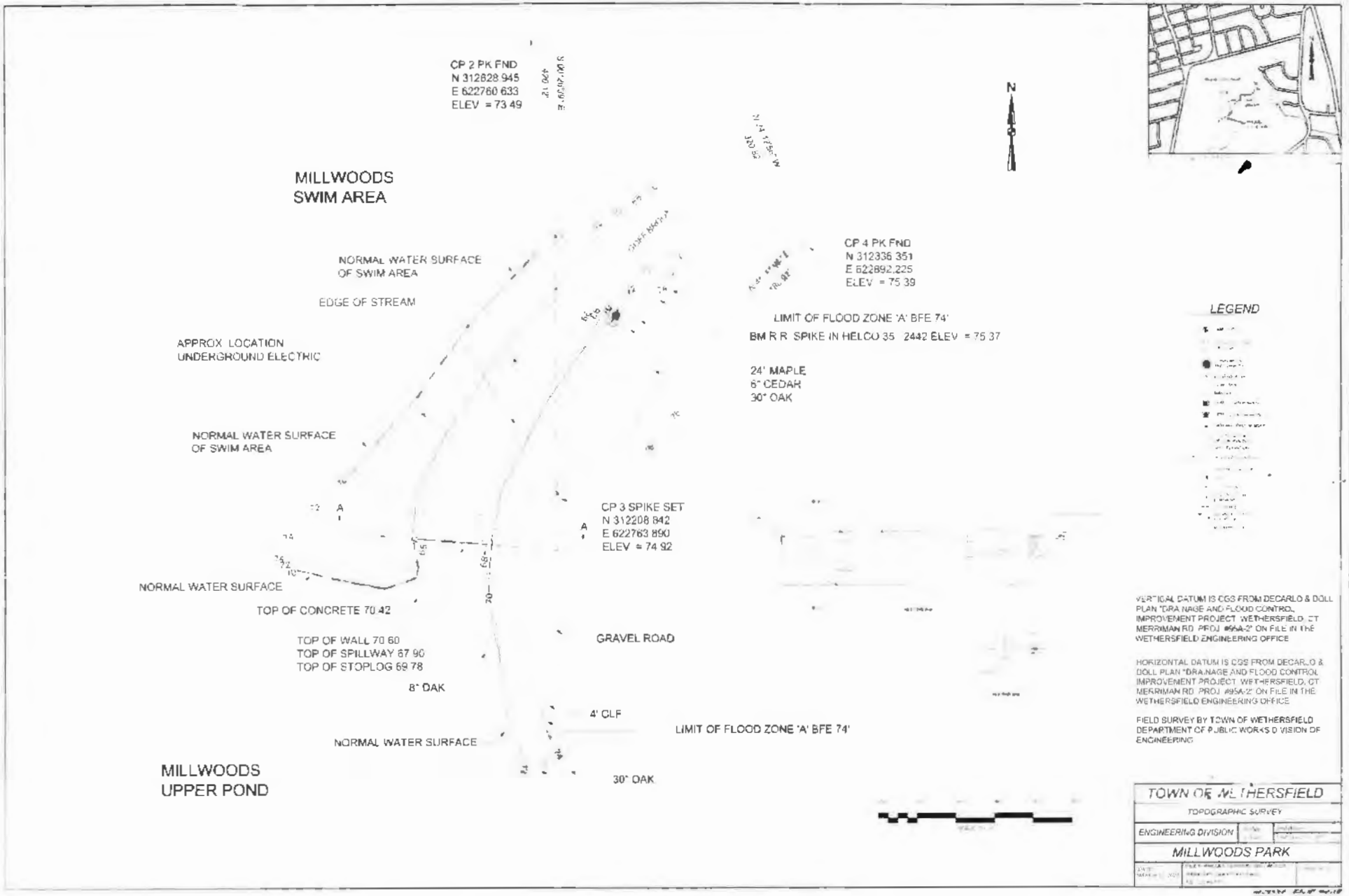
13. Unless otherwise stated, our cost estimates are for comparative, or general planning purposes. These estimates may involve approximate quantity evaluations and may not be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over the labor and material costs required to plan and execute the anticipated work, our estimates were made using our experience and readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

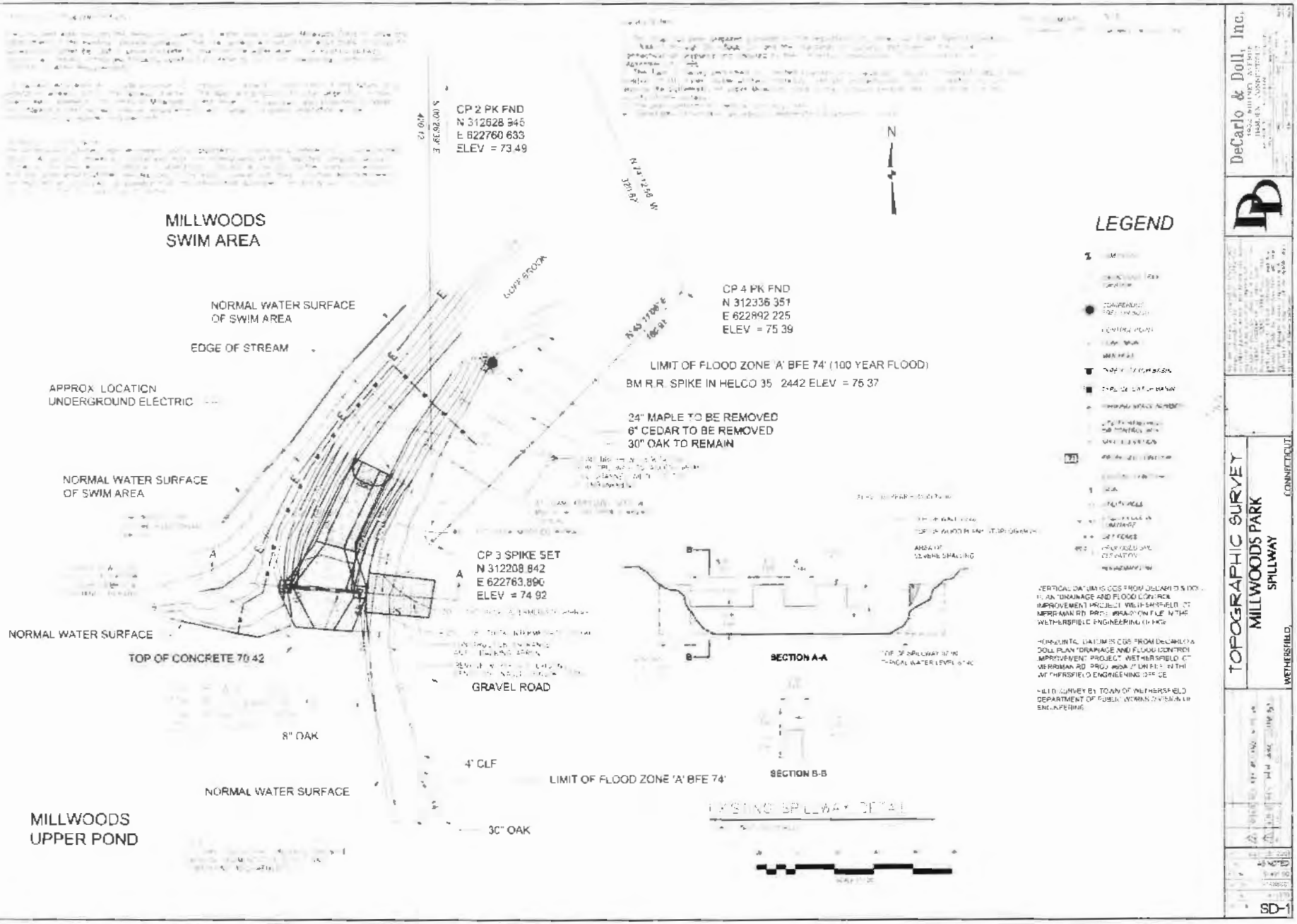
ADDITIONAL SERVICES

14. It is recommended that GZA be retained to provide services during any future: site observations, explorations, evaluations, design, implementation activities, construction and/or implementation of remedial measures recommended in this Report. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX E

HISTORIC DRAWINGS


CP 2 PK FND
N 312828 945
E 622760 633
ELEV = 73 49
MILLWOODS
SWIM AREA
NORMAL WATER SURFACE
OF SWIM AREA
EDGE OF STREAM
APPROX LOCATION
UNDERGROUND ELECTRIC
NORMAL WATER SURFACE
OF SWIM AREA
CP 3 SPIKE SET
N 312208 842
E 622763 890
ELEV = 74 92
NORMAL WATER SURFACE
TOP OF CONCRETE 70 42
TOP OF WALL 70 60
TOP OF SPILLWAY 67 90
TOP OF STOPLOG 69 78
8" OAK
GRAVEL ROAD
4' CLF
NORMAL WATER SURFACE
30" OAK
MILLWOODS
UPPER POND
CP 4 PK FND
N 312336 351
E 622892 225
ELEV = 75 39
LIMIT OF FLOOD ZONE 'A' BFE 74'
BM R R SPIKE IN HELCO 35 2442 ELEV = 75 37
24" MAPLE
6" CEDAR
30" OAK
LIMIT OF FLOOD ZONE 'A' BFE 74'
N
LEGEND
VERTICAL DATUM IS CGS FROM DECARLO & DOLL PLAN "DRAINAGE AND FLOOD CONTROL IMPROVEMENT PROJECT WETHERSFIELD, CT MERRIMAN RD PROJ #95A-2" ON FILE IN THE WETHERSFIELD ENGINEERING OFFICE
HORIZONTAL DATUM IS CGS FROM DECARLO & DOLL PLAN "DRAINAGE AND FLOOD CONTROL IMPROVEMENT PROJECT WETHERSFIELD, CT MERRIMAN RD PROJ #95A-2" ON FILE IN THE WETHERSFIELD ENGINEERING OFFICE
FIELD SURVEY BY TOWN OF WETHERSFIELD DEPARTMENT OF PUBLIC WORKS DIVISION OF ENGINEERING
TOWN OF WETHERSFIELD
TOPOGRAPHIC SURVEY
ENGINEERING DIVISION
MILLWOODS PARK


MILLWOODS
SWIM AREA
CP 2 PK END
N 312628 946
E 622760 633
ELEV = 73 49
N
LEGEND
CP 4 PK END
N 312336 351
E 622892 225
ELEV = 75 39
NORMAL WATER SURFACE
OF SWIM AREA
EDGE OF STREAM
APPROX LOCATION
UNDERGROUND ELECTRIC
LIMIT OF FLOOD ZONE 'A' BFE 74' (100 YEAR FLOOD)
BM R R SPIKE IN HELCO 35 2442 ELEV = 75 37
24" MAPLE TO BE REMOVED
6" CEDAR TO BE REMOVED
30" OAK TO REMAIN
NORMAL WATER SURFACE
OF SWIM AREA
CP 3 SPIKE SET
N 312208 842
E 622763 890
ELEV = 74 92
NORMAL WATER SURFACE
TOP OF CONCRETE 70 42
GRAVEL ROAD
SECTION A-A
8" OAK
4" CLF
LIMIT OF FLOOD ZONE 'A' BFE 74'
SECTION B-B
NORMAL WATER SURFACE
30" OAK
MILLWOODS
UPPER POND
EXISTING SPILLWAY DETAIL
VERTICAL DATUM IS CGS FROM DECARLO & DOLL PLAN "DRAINAGE AND FLOOD CONTROL IMPROVEMENT PROJECT WETHERSFIELD, CT MERRIMAN RD. PROJ #93A" ON FILE IN THE WETHERSFIELD ENGINEERING OFFICE
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FIELD SURVEY BY TOWN OF WETHERSFIELD DEPARTMENT OF PUBLIC WORKS DIVISION OF ENGINEERING
DeCarlo & Doll, Inc.
TOPOGRAPHIC SURVEY
MILLWOODS PARK
SPILLWAY
WETHERSFIELD
CONNECTICUT
SD-1

SD-2

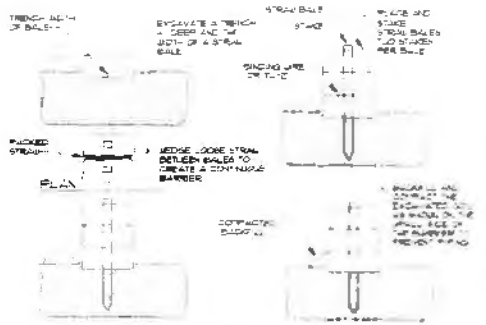
SPILLWAY CONSTRUCTION

MILLWOODS PARK

SPILLWAY

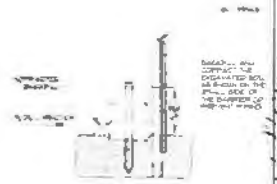
WETHERSFIELD, CONNECTICUT

DeCarlo & Doll, Inc.

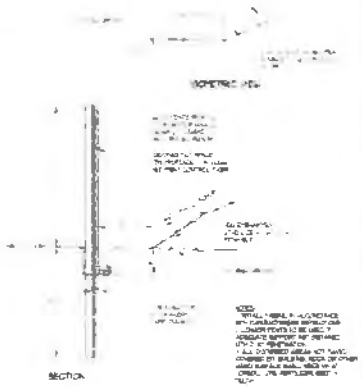


HAY BALE STAKING DETAIL

CONSTRUCTION ENTRANCE



SILT FENCE W/ HAY BALES



SILT FENCE

DeCarlo & Doll, Inc.

EROSION CONTROL DETAILS & NOTES

MILLWOODS PARK

SPILLWAY

SWITHERSFIELD CONNECTICUT

SD-3