

EMERGENCY OPERATIONS PLAN

HIDDEN LAKE DAM [DEP #06107]

HIDDEN LAKE ROAD
HADDAM, CONNECTICUT



PREPARED FOR:
HIDDEN LAKE ASSOCIATION

DECEMBER 2014

**AS SUBMITTED
TO THE "DEEP"
JAN. 2015**

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1. Introduction

The Emergency Operations Plan (EOP) for Hidden Lake Dam is intended to provide guidance for proper monitoring of the dam during severe weather situations and for responding with appropriate emergency measures in the event of a potential failure of the spillway and / or the earth embankment section of the dam, or any other hazard that could endanger the general public downstream of this structure. Monitoring should be scheduled on a routine basis throughout the year and performed on a more intensive basis just prior to and during severe weather situations.

Hidden Lake Dam is currently in good condition. Modifications to the dam were constructed in the 1960's, the 1970's and in 1990. Subsequently, a full replacement of the spillway was completed in 1993 – 1994. The spillway of the dam is capable of passing both a 100-year storm event and the flow from a Probable Maximum Storm (PMS). It should be noted, however, that passage of the PMS flow is only possible due to the emergency overflow provided by a section of Hidden Lake Road lying just east of the dam. The dam is listed by the DEEP as having a hazard rating of “B”, having a significant hazard potential due to the presence of a house and road directly downstream of the dam (see attached hazard classifications for Connecticut dams, with accompanying explanations). This necessitates a design storm for the dam of a ½ PMF¹ to Full PMF.

Due to variations in forecasting of potential rainfall storm events, monitoring of the dam should be undertaken for storms of lesser magnitude than the design storm noted above. Uncertainties in predicting intense cells of storm activity should be considered in order to avoid potential problems associated with the hazard of an intense and localized storm event.

¹ PMF – Probable Maximum Flood

The Emergency Operations Plan must be distributed to the Owner (the Hidden Lake Association), the Owner's local representative² (if appropriate), the Connecticut Department of Energy & Environmental Protection / Inland Water Resources Division and to municipal administrative and emergency personnel (see attached contact list). The purpose of the EOP and its details should be explained to appropriate municipal staff (e.g., police, fire and civil defense representatives) in order to prepare for the eventuality of an emergency at this facility. It is prudent and essential that the EOP be exercised on a periodic basis to assure that emergency measures will proceed smoothly during an urgent situation. Because there are a number of dams in the Town of Haddam, it may be practical for municipal personnel to carry out a comprehensive annual exercise that would include Hidden Lake Dam. The Owner and / or the Owner's representative must adhere to a rigorous annual schedule of periodic inspections and keep in touch with municipal emergency personnel for continuous and coordinated contact.

The Emergency Operations Plan should be reviewed on an annual basis and modified for any change in conditions at the dam, any change in the availability of personnel or equipment by the Owner and local contact information (particularly phone numbers). Changes in watershed characteristics (i.e., for the dam, the lake and the road overflow area) should be monitored, as should construction activity or new facilities constructed in close proximity to stream bank areas downstream of the dam. Any changes or updates to the Emergency Operations Plan should be redistributed to emergency response personnel and to the DEEP Inland Water Resources Division, as previously noted.

2. Hidden Lake Dam & Watershed

Hidden Lake Dam is an earth embankment dam, approximately 100 feet long and varying in top width from 22 – 30 feet. The spillway opening is a broad crested concrete

² The Owner's local representative in this case would be an individual assigned to represent the owner's interest during normal maintenance or emergency situations.

weir, 14 feet wide, 3 feet high, with concrete training walls, a sloped spillway discharge channel and a grouted riprap apron at the downstream discharge toe of the embankment. The spillway is situated near the right side of the dam, in line with the discharge channel.

The dam is located at the south end of Hidden Lake and approximately 145 feet north of Hidden Lake Road, as measured along the outlet stream. From its lowest point near the discharge of the spillway to the stream, the dam embankment rises 15 feet to the crest of the dam. Access to the dam is along a short access road or driveway along the left (or easterly) side of the dam, from the Town road (Hidden Lake Road).

The watershed area for Hidden Lake is 1.18 square miles, with a pond area of about 38 acres. The combined spillway and road overflow area have a full capacity (at the top of dam level) of about 2,900 cfs, which is approximately 100% of the full PMF flow. The 100-year event will pass through the dam and over the road to the east with a peak outflow of about 460 cfs, with a freeboard of approximately 1.5 feet below the top crest level of the dam embankment, but about 0.5 feet above the road to the east of the dam.

3. Scheduled Inspections

The Owner or the Owner's representative (i.e., designee) is to maintain routine inspections on a weekly basis, with a more detailed assessment once every three months. For a Class B dam, inspections are required every 5 years (see attached classification of dams and related information). Needless to say, if there appear to be problems or other safety issues that are of concern to the Owner or the Owner's representative, then an engineer should be consulted on a more frequent basis or to address an immediate issue. The engineer, on a regular schedule, will perform a more detailed and intensive examination of the facility and review reports and observations made during the year(s) by the Owner or the Owner's representative. During the engineer's inspection, the Owner or a representative of the Owner should accompany the engineer; or, the Owner should be

apprised of the results subsequent to the inspection to review any necessary maintenance or dam modifications resulting therefrom.

A typical DEEP checklist for examination of the dam has been attached to this plan. For weekly and quarterly inspections by the Owner or the Owner's representative, it should be used as a guideline for the areas to be observed for problems or deficiencies. For the engineering inspections, it must be completely filled out and, if certain portions do not pertain to this particular dam, "not applicable" should be noted.

4. Emergency Situations

An emergency condition at Hidden Lake Dam may be caused by a:

- Severe storm event (typically caused by excessive precipitation)
- Failure due to seepage or leakage through the embankments
- Structural failure due to weakness or deterioration of walls
- Earthquake (Hidden Lake is in Seismic Zone 2)³
- Hurricane
- Vandalism or sabotage

Note that the emergency could also consist of a combination of any of these events, or that a failure could occur independent of a severe weather condition. Dam failures have been known to occur on a "sunny" day without any forewarning that would normally be accompanied by severe weather forecasts by media outlets. These types of events can only be detected by consistent and steadfast vigilance during routine inspections.

Whatever the cause of the failure, the emergency situation is predicated on the assumption that it will be accompanied by a substantial and sudden release of flow of

³ Although the probability of an earthquake is relatively low, should one occur, the dam should be inspected immediately after its occurrence – no matter the flows occurring at the time of the event.

water stored in the lake upstream of the dam. Subsequent to the release of this flow, a dynamic wave will move downstream inundating overbank areas that may include roadways. A frequent consequence of the sudden impact of a dynamic wave is the collection and downstream movement of debris which may become lodged in normally open waterways, culverts and bridge openings. Such an occurrence must be considered and may, in many cases, be more severe than the flow of water without debris.

The limits of potential flooding due to a dam failure have been shown on the attached plan(s). It should be noted that much of this area may be inundated in a severe storm event not necessarily associated with a dam failure. The difference is that severe storms would normally result in flows rising at an observable and consistent rate. The dynamic wave accompanying a dam failure will typically result in a rapid and unanticipated rise of water levels throughout the affected stream belt. Hence the need to determine a potential evacuation area or, at a minimum, an area where residents need to be notified of a potential threat to life and property.

5. Storm Alert Conditions

Emergency operation monitoring by the dam Owner (or its designee) should commence when a "Flood Watch" alert is issued by the National Weather Service for the Haddam area, or when heavy runoff conditions are experienced at the dam site⁴. The inspection steps outlined herein should be undertaken at once and at three hour intervals thereafter, unless the "Flood Watch" is upgraded to a "Flood Warning" at which time the dam should be inspected hourly.

6. Storm Monitoring Procedures

⁴ In other words, one should not necessarily await the decision of an outside agency if on-site conditions warrant more decisive action by the Owner.

Inspections during severe events must include, but are not necessarily limited to, the following items and / or procedures.

- Keep a record of the rainfall (maintain a gauge at the site) during the storm event and the water level in the impoundment, measured just off the edge of the spillway.
- The crest of the dam should be walked to determine if any cracking, settlement, movement or sloughing of the embankments has occurred or if there are any signs that they may potentially occur.
- The toe of the dam embankment and the abutment contact areas should be inspected and all areas of seepage, soft spots, and boils must be noted. Boils are areas of concentrated seepage under pressure which have the ability to remove or "float" away the soil material through which it flows. (The process of soil removal is also referred to as piping). Their location should be recorded, as well as an estimate of the quantity of the seepage flow, and clarity of the water flowing from any seep. Muddy water flowing from a seep indicates that piping (the internal erosion of soil particles within an embankment) is occurring.
- The spillway and low level outlet structure should be checked for accumulation of debris which should be removed as necessary, particularly on the upstream side of the spillway and the intake area for the low level outlet.
- Structural elements, such as concrete walls, should be examined for cracks, points of weakness or deterioration and movement or tilt.

The above emergency operation observations must be performed and a written record of the same must be maintained. In addition, if the emergency occurs in the dark, adequate lighting must be made available to allow for viewing of the dam at night. The

Owner or the Owner's representative shall have available (or have access⁵ to) the following equipment:

Backhoe and / or excavator
Dump truck
Bulldozer
Sand and sandbags
Communications equipment (radio or cellular phone)

7. Early Warnings

If during an inspection any of the following conditions are observed, the Owner or the Owner's representative shall notify the appropriate local emergency services and executive officials, as well as the DEEP Flood Emergency Operations Center in Hartford, for an early warning declaration:

1. A marked increase in seepage through an embankment, particularly if evidence of boiling (seepage under pressure which tends to "float" away material through which it flows) is observed.
2. An increase in the rate of rise of the impoundment such that the dam would be overtopped within three hours.

An early warning is intended to inform local authorities that conditions at the dam site exist which may require the evacuation of downstream residents within several hours to avoid loss of life in the event of a failure. Local authorities have the responsibility of alerting the threatened dwellings' occupants within the impact area (as specified by the flood inundation map), of the possibility that evacuation may become necessary. Furthermore, should evacuation of downstream residents become necessary, only local

⁵ Access to equipment means having a contractor either on call or available to assist. Such arrangements are best set up long before a potential emergency situation arises.

officials, i.e., chief administrative official, local police, or emergency management official, have the authority to order an evacuation. It must be stressed that the early warning notice and/or actual evacuation of downstream residents should be performed according to a pre-arranged plan prepared by local authorities. Local officials may utilize the Emergency Broadcast System to disseminate warnings regarding impending dam failures over the various electronic media available. The dam owner, however, does not have the authority to initiate any such broadcast.

8. Flood Warnings

The Owner or the Owner's representative shall institute on-site inspections whenever a flood warning is issued by the National Weather Service. Regardless of the level in the lake, the Owner or a responsible representative of the Owner shall be stationed at the dam whenever a storm rainfall in excess of 6 inches is predicted for the local area.

- Functional radio and / or cellular phone equipment must be verified at the outset of the storm. The Owner or the Owner's representative shall also have access to a portable radio and / or other reliable communication equipment in order to receive vital weather information from the National Weather Service or its affiliates.
- When water level in the spillway approach area is one (1) foot above spillway crest (just prior to which overflow of the road will occur), the Owner or the Owner's representative shall contact emergency services to indicate that a severe storm is impending at the site of the dam. He shall also ask that the Town Public Works and / or emergency services maintain a watch at the stream bridge crossing just below the dam and at the overflow area to the east of the dam on Hidden Lake Road. As previously noted, at this point, it is anticipated that water level will imminently start

to overflow the low point in Hidden Lake Road, potentially necessitating a shutdown of the road.

- As the level surpasses the 1-foot mark, continues to move toward the 1.5-foot level, and the low point of Hidden Lake Road begins to overtop, the Owner or the Owner's representative shall inform the emergency services that there is a possibility of an evacuation notice to be issued to the immediate downstream property and, potentially, to those properties between the bridge and the low point in the road. During this time, the Owner or the Owner's representative shall continuously review records of the rate of rise of the water level and shall estimate the amount of time remaining prior to the rise to the 1.5-foot level. Emergency services shall be notified as to the anticipated time to reach this level of concern (i.e., the 1.5-foot level). This is, in fact, an early warning notice. Although it is anticipated that the level of flooding at this time will be severe enough to have already impacted these properties and that residents will already be on alert, emergency services should be prepared to respond.

When spillway level is at 1.5 feet, it is anticipated that Hidden Lake Road east of the dam will be inundated by approximately 0.4 feet and that the road should be closed in order to prevent any serious impact to local transportation⁶. In addition, at this time, it is highly likely that water will begin to crest over the road just downstream of the dam (i.e., at the bridge) and, as a result, evacuations in this area must commence as well. First, the house just left of the downstream embankment (on the east side of the stream and spillway) must be evacuated to avoid the possibility of isolating the structure due to flows across its front yard and driveway area. It must be noted at this point that, while houses between these two inundation points may not be impacted by flood waters from a breach of

⁶ The road bed may start to erode and any vehicles attempting to cross may be stranded due to deep flow or washed out areas of the pavement or base materials.

the dam, residents at approximately 50 dwellings between these two points could be stranded should both areas of the road be inundated simultaneously. Strong consideration must be given to the fact that at this time, should there be an emergency in this area, residents may not have access to emergency services.

- When water level reaches 2.0 feet and shows continuing signs of rising, the Owner or the Owner's representative shall notify emergency services that the dam may be overtopped and that a full evacuation of downstream residences must be initiated and / or continue. At that time, emergency services shall initiate final warning for full evacuation of those areas identified on the attached plan. This should include, at a minimum, all residents along Hidden Lake Road situated between the bridge and the low point to the east. As previously noted, it is anticipated that at this time, Hidden Lake Road will be closed down due to overtopping at the these two locations.

- Conditions which indicate failure is imminent include:
 1. A dramatic increase in seepage flow (or a pre-existing boil), particularly if piping is occurring.
 2. Cracking, settlement, or movement of the concrete spillway, training walls, or other structures.
 3. A water level within 0.5 foot of the top of dam and rising at a rate which would overtop the dam within one half hour.
 4. Substantial erosion or sloughing of the dam embankments.
 5. Any other condition which may result in rapid (30 minutes or less) failure of the dam.

When issuing either an early or final warning notice, the dam Owner or the Owner's representative should only be responsible for one call to the local warning point (i.e., an office manned on a 24 hour basis or an

appropriate dispatch center, local emergency management office, or police department, for example). Local officials bear the responsibility for fanning the warning out to other local and state agencies. The dam owner must consult the town on the selection of an appropriate warning point. If more than one town is potentially affected, the other town(s) must be consulted on this point also. It is up to the town, not the dam owner, to determine how and where the warning message should be conveyed.

- During overtopping of the dam, it is unsafe for the Owner, the Owner's representative or anyone else to be on the embankment. Since high ground is available for an overview of the dam on both sides of the dam and lake, it is recommended that continued surveillance be conducted for any signs of heavy erosion and potential embankment failure from a safe vantage point.
- Note: Should an early warning or final warning/evacuation notice be issued, an all clear notice shall be issued after the flood emergency at the dam site has abated, so residents may return to their dwellings. The all clear notice is to be issued by a professional engineer and / or the DEEP Inland Water Resources Division in conjunction with emergency services personnel.

9. Impact Area

The attached plans show (on a detailed map of the bridge area and a USGS map) the anticipated stream belt areas which may be impacted during a severe storm event or dam failure emanating from Hidden Lake Dam. The first affected area will be the road overflow area to the east of the dam, followed by overtopping of the road at the culvert or bridge crossing approximately 140 feet downstream of the dam. At the road overflow to

the east, the road will be inundated prior to reaching 100-year storm flow levels⁷, most likely resulting in a closure of the road. Between this area and the crossing just below the dam, there is a dead end road, several houses along Hidden Lake Road and many houses along Shore Drive and White Birch Trail. If and when the road at the bridge is overtopped, these residential areas may be isolated, potentially requiring an evacuation even though they may not be inundated by flood waters. Therefore, as noted above, strong consideration must be given to evacuation of these areas to avoid isolating residents from emergency services.

The house just below and left of the spillway is located adjacent to the flood runoff and will have to be evacuated. The house to the right of the spillway, although not in the direct path of the inundation may be isolated due to overtopping of its lower driveway, thus necessitating an evacuation as well.

10. Annual Review

The Emergency Operations Plan must be reviewed at least annually to update personnel assignments, changes in local elected officials, phone numbers, etc. In addition, any activity downstream of the dam which has occurred that may have changed the dam's potential hazard classification should be noted, i.e. construction (or removal) of dwellings, highways, bridges, flood control projects, industrial development, etc.

⁷ See Appendix for stage – discharge curve detailing elevations of dam and road, as well as flood levels.

APPENDIX

HADDAM EMERGENCY CONTACT INFORMATION

Melissa J. Schlag, First Selectman

Alice Zanelli, Administrative Assistant to First Selectman

Town Office Building
30 Field Park Drive
Haddam, CT 06438
Phone: 860-345-8531 [Ext. 204]
FAX: 860-345-3730
E-Mail (First Selectman): mschlag@haddam.org
E-Mail (Assistant): selectasst@haddam.org

Town of Haddam Resident State Trooper's Office

Trooper Enrico Milardo / E-Mail: CSP1025@aol.com
30 Field Park Drive
Haddam, CT 06438
Phone: 860-345-2769

Connecticut State Police - Troop F

315 Spencer Plains Road
Westbrook, CT 06498
Phone: 860-399-2100
Phone: 800-256-5761

Connecticut State Office of Emergency Management

Main Office: 860-256-0800 / 800-397-8876
FAX: 860-256-0815
Emergency Management (Armory): 860-566-3180
Emergency Management / Natural Hazards: 860-566-3377
Emergency Management / Operations: 860-566-3313

KILLINGWORTH EMERGENCY CONTACT INFORMATION

Catherine Iino, First Selectman

Town Office Building
323 Route 81
Killingworth, CT 06419
Phone: 860-663-1765 [Ext. 501]
FAX: 860-663-3305
E-Mail: ciino@townofkillingworth.com

DEPARTMENT OF ENVIRONMENTAL PROTECTION
EMERGENCY CONTACT INFORMATION

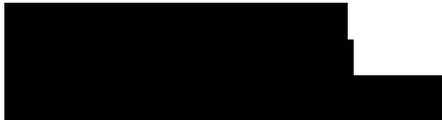
DEP / Inland Water Resources Division's Flood Emergency Operations Center at 860-424-3706. (Note: DEP Communications Center at 860-424-3333 should be contacted in the event that the DEP Flood Emergency Center has not been activated after normal business hours).

OWNER'S EMERGENCY CONTACT INFORMATION

Laura Jenner, President:
42 Shore Drive
Higganum, CT 06441



Lloyd Pearson, Board Member
342 Hidden Lake Road
Higganum, CT 06441

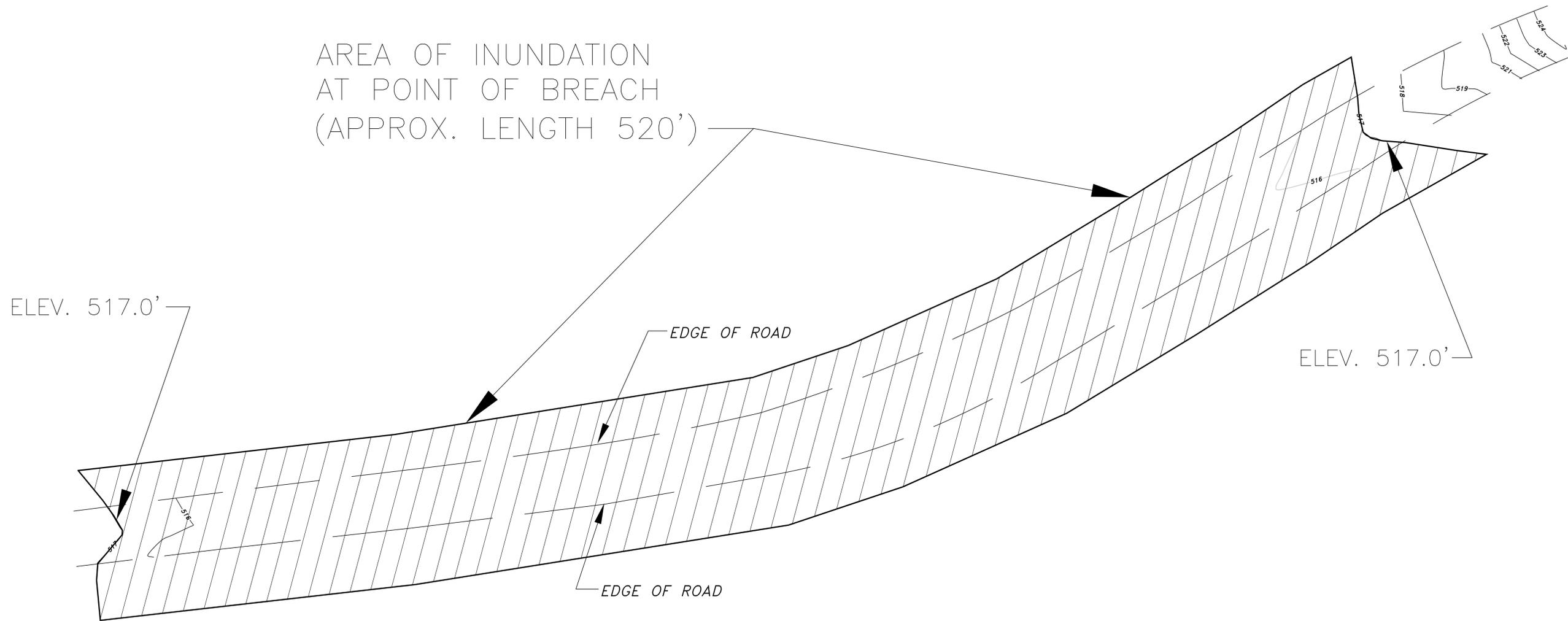


OWNERS' REPRESENTATIVE(S) EMERGENCY CONTACT INFORMATION

Contractor for Emergency Repairs, Equipment & Maintenance:

Peter Santoro Construction, LLC
369 Brainard Hill Road
Higganum, CT 06441





ROAD INUNDATION AREA DURING BREACH & STORM EVENT

SCALE: 1" = 20'

INUNDATION MAPPING FOR
 DAM BREACH AT
 HIDDEN LAKE DAM
 HADDAM, CONNECTICUT



DOWNSTREAM INUNDATION AREA DURING DAM BREACH & STORM EVENT

SCALE: 1" = 200'

**INUNDATION MAPPING FOR
DAM BREACH AT
HIDDEN LAKE DAM
HADDAM, CONNECTICUT**



Figure 1 – View of Hidden Lake Dam, looking north and showing the breach inundation area below the spillway and dam.



Figure 2 – Breach inundation area looking in a southerly (downstream) direction from the pond and dam.



Figure 3 – A view looking northerly toward the pond and showing the breach inundation area on the left and the Hidden Lake Road overflow area to the right. With rising water levels under current conditions, the houses between these two points could potentially be isolated due to road overflow.

WATERSHED

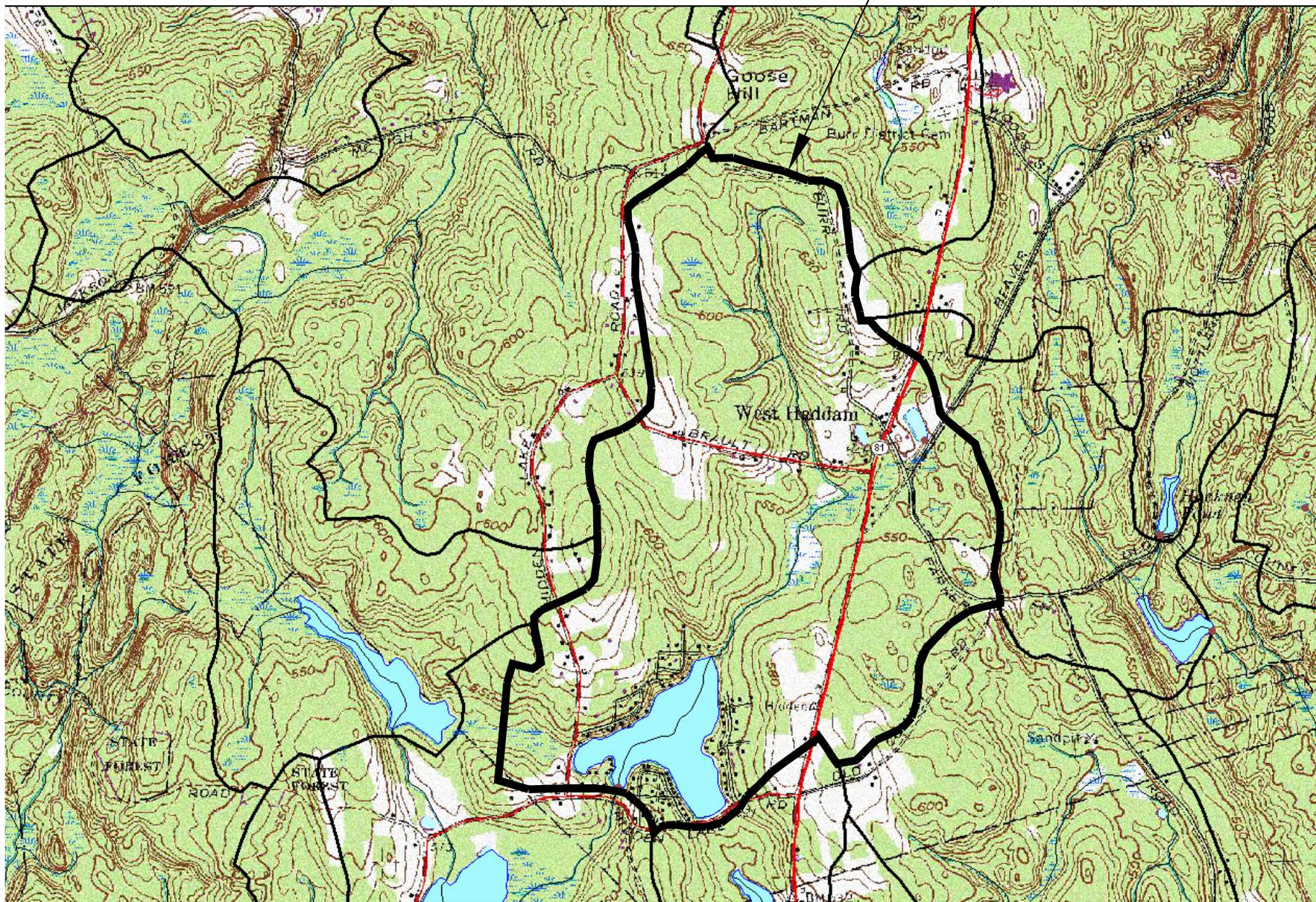


FIGURE 4 - HIDDEN LAKE WATERSHED



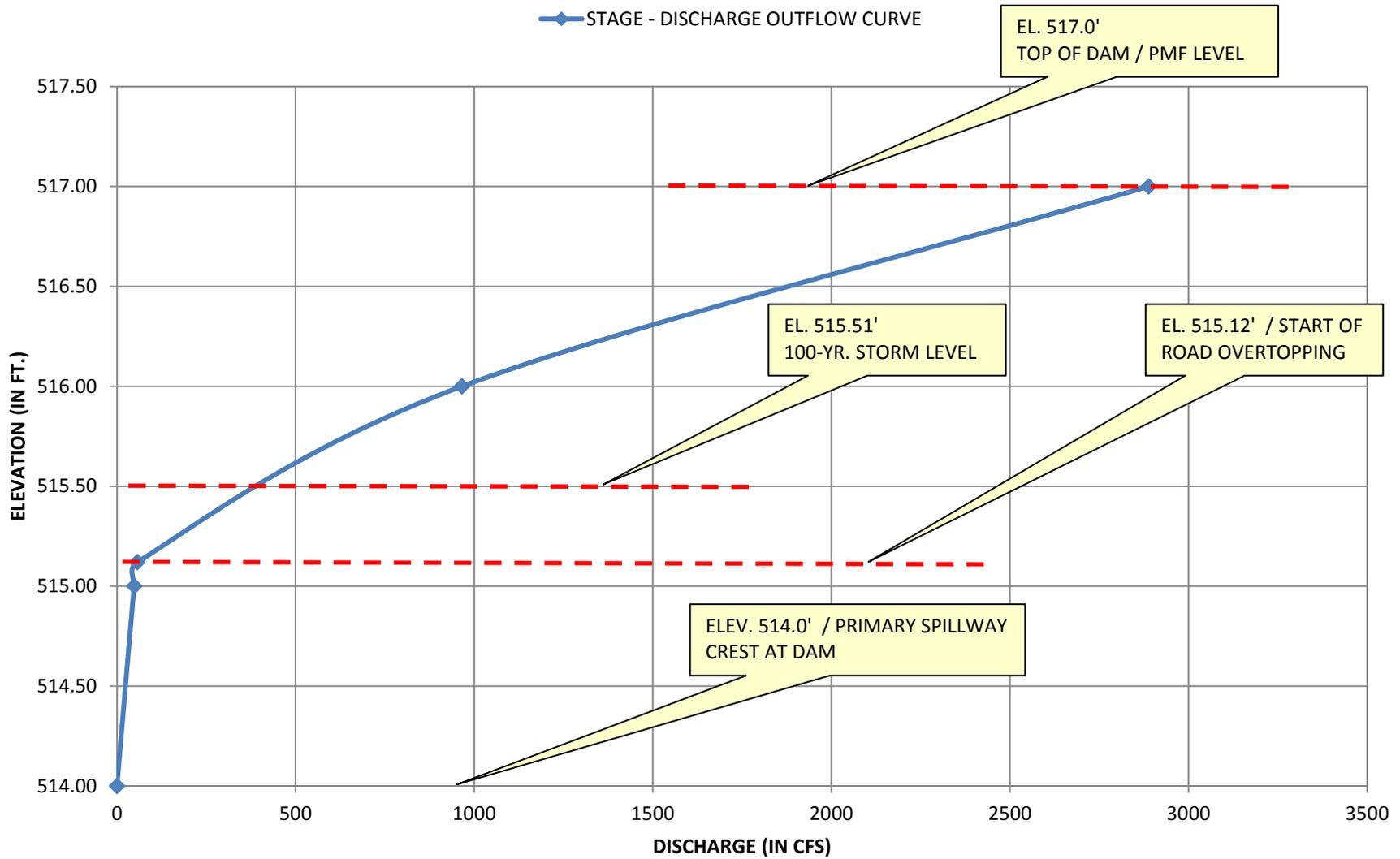
PROPERTIES IMPACTED BY SEVERE STORM EVENTS

The following is a list of properties that could become inaccessible or isolated in the event of a closure of Hidden Lake Road due to flood overflow at the bridge below the spillway of Hidden Lake Dam and flood overflow along the low section of Hidden Lake Road to the east of the dam. In the event of an evacuation notice, this list represents those owners who would be impacted by direct flood flows and / or those who could be isolated between overtopped sections of road.

- | | |
|----------------------|----------------------|
| 378 Hidden Lake Road | 112 Shore Drive |
| 380 Hidden Lake Road | 115 Shore Drive |
| 386 Hidden Lake Road | 127 Shore Drive |
| 387 Hidden Lake Road | 132 Shore Drive |
| 391 Hidden Lake Road | |
| 400 Hidden Lake Road | |
| 404 Hidden Lake Road | 17 White Birch Trail |
| 405 Hidden Lake Road | 18 White Birch Trail |
| 412 Hidden Lake Road | 22 White Birch Trail |
| 415 Hidden Lake Road | 29 White Birch Trail |
| 417 Hidden Lake Road | 32 White Birch Trail |
| 419 Hidden Lake Road | 41 White Birch Trail |
| 420 Hidden Lake Road | |
| 427 Hidden Lake Road | |
| | 3 Hickory Lane |
| | 9 Hickory Lane |
| 2 Shore Drive | 15 Hickory Lane |
| 12 Shore Drive | 17 Hickory Lane |
| 20 Shore Drive | 22 Hickory Lane |
| 24 Shore Drive | 39 Hickory Lane |
| 25 Shore Drive | 40 Hickory Lane |
| 28 Shore Drive | |
| 32 Shore Drive | |
| 37 Shore Drive | |
| 41 Shore Drive | |
| 42 Shore Drive | |
| 50 Shore Drive | |
| 54 Shore Drive | |
| 58 Shore Drive | |
| 65 Shore Drive | |
| 74 Shore Drive | |
| 75 Shore Drive | |
| 78 Shore Drive | |
| 82 Shore Drive | |
| 92 Shore Drive | |
| 93 Shore Drive | |
| 100 Shore Drive | |
| 101 Shore Drive | |

SPILLWAY					ROAD				TOTAL
Elev.	H	C	L	Q		Elev.	Q		Σ (Q)
514.00	0.00	3.0	16.0	0.0			0		0.0
515.00	1.00	3.0	16.0	48.0			0		48.0
515.12	1.12	3.0	16.0	56.9		515.12	0		56.9
516.00	2.00	3.0	16.0	135.8		516.00	0		135.8
517.00	3.00	3.0	16.0	249.4		517.00	1281.4		1530.8

HIDDEN LAKE DAM / OUTFLOW / STAGE - DISCHARGE



DEP / INLAND WATER RESOURCES DIVISION

INSPECTION CHECK LIST

DAM NAME & NUMBER:

INSPECTION DATE:

IMPOUNDMENT AREA:

POOL LEVEL:

WEATHER CONDITIONS:

INSPECTOR(S):

ACTION TAKEN:

DAM / EMBANKMENTS

GENERAL CONDITION:

VEGETATIVE COVER:

EROSION / BURROWS:

SETTLEMENT / ALIGNMENT / MOVEMENT:

SEEPAGE / FOUNDATION DRAINAGE:

RIPRAP:

STONE MASONRY:

CONCRETE CONDITION:

CRACKS:

OTHER:

SPILLWAY / TRAINING WALLS / APRON

GENERAL CONDITION:

SETTLEMENT / ALIGNMENT / MOVEMENT:

STONE MASONRY:

CONCRETE CONDITION:

CRACKS:

SCOURING / UNDERMINING:

OTHER:

DOWNSTREAM CHANNEL

SCOURING:

DEBRIS:

RIPRAP:

EMERGENCY SPILLWAY

CONCRETE CONDITION:

STONE MASONRY:

VEGETATIVE COVER:

RIPRAP:

OTHER:

INTAKE STRUCTURE(S)

GENERAL CONDITION:

CONCRETE CONDITION:

SETTLEMENT / ALIGNMENT / MOVEMENT:

STONE MASONRY:

CRACKS:

OTHER:

OUTLET STRUCTURE

GENERAL CONDITION:

CONCRETE CONDITION:

SETTLEMENT / ALIGNMENT / MOVEMENT:

SCOURING / UNDERMINING:

STONE MASONRY:

OTHER:

MISCELLANEOUS FEATURES

ACCESS - ROADS, BRIDGES, ETC.:

SAFETY - FENCING, RAILING, ETC.:

DOWNSTREAM HAZARD REASSESSMENT:

RECOMMENDATIONS

1.

CLASSIFICATION OF DAMS
CONNECTICUT DEP / INLAND WATER RESOURCES DIVISION
DAM SAFETY SECTION

CLASS AA¹ 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.

CLASS A 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.

CLASS BB 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.

CLASS B 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 structure, residences, hospitals, convalescent homes, schools, etc.

¹ The information for these classes is taken from Section 22a-409-1 of the Regulations of Connecticut State Agencies.

**CLASSIFICATION OF DAMS
CONNECTICUT DEP / INLAND WATER RESOURCES DIVISION
DAM SAFETY SECTION**

- (iii) Damage to or interruption of the use of service utilities;
- (iv) Damage to primary roadways (less than 1500 ADT) and railroads;
- (v) Significant economic loss.

CLASS C 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.

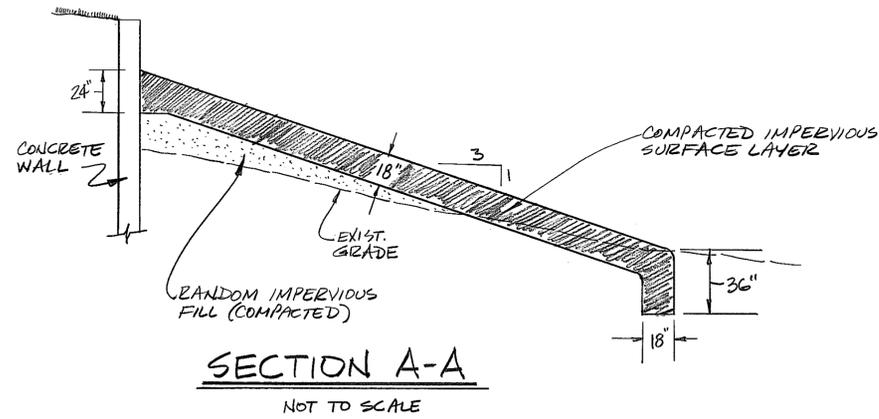
HAZARD CLASSIFICATION

INSPECTION FREQUENCY

Class AA (Negligible)	No Requirement
Class A (Low)	10 Years
Class BB (Moderate)	7 Years
Class B (Significant)	5 Years
Class C (High)	2 Years

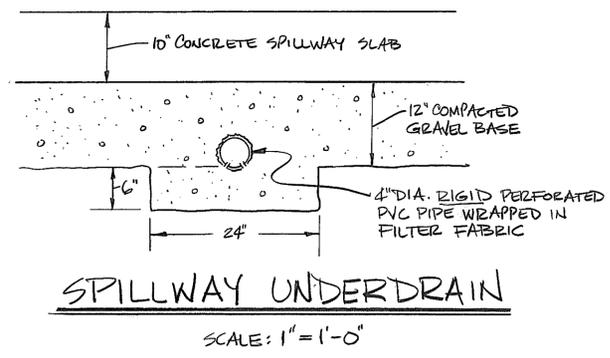
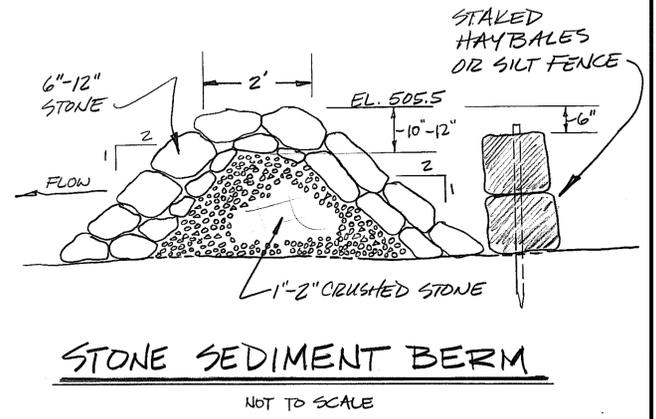
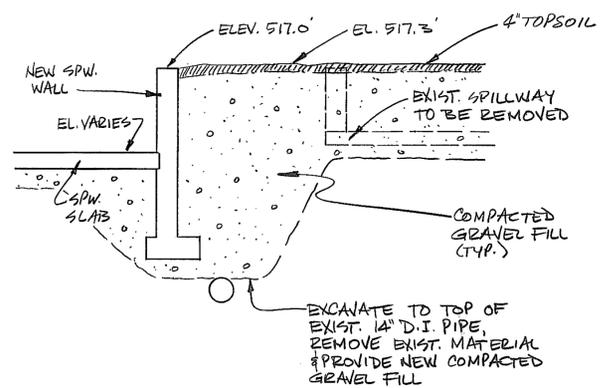
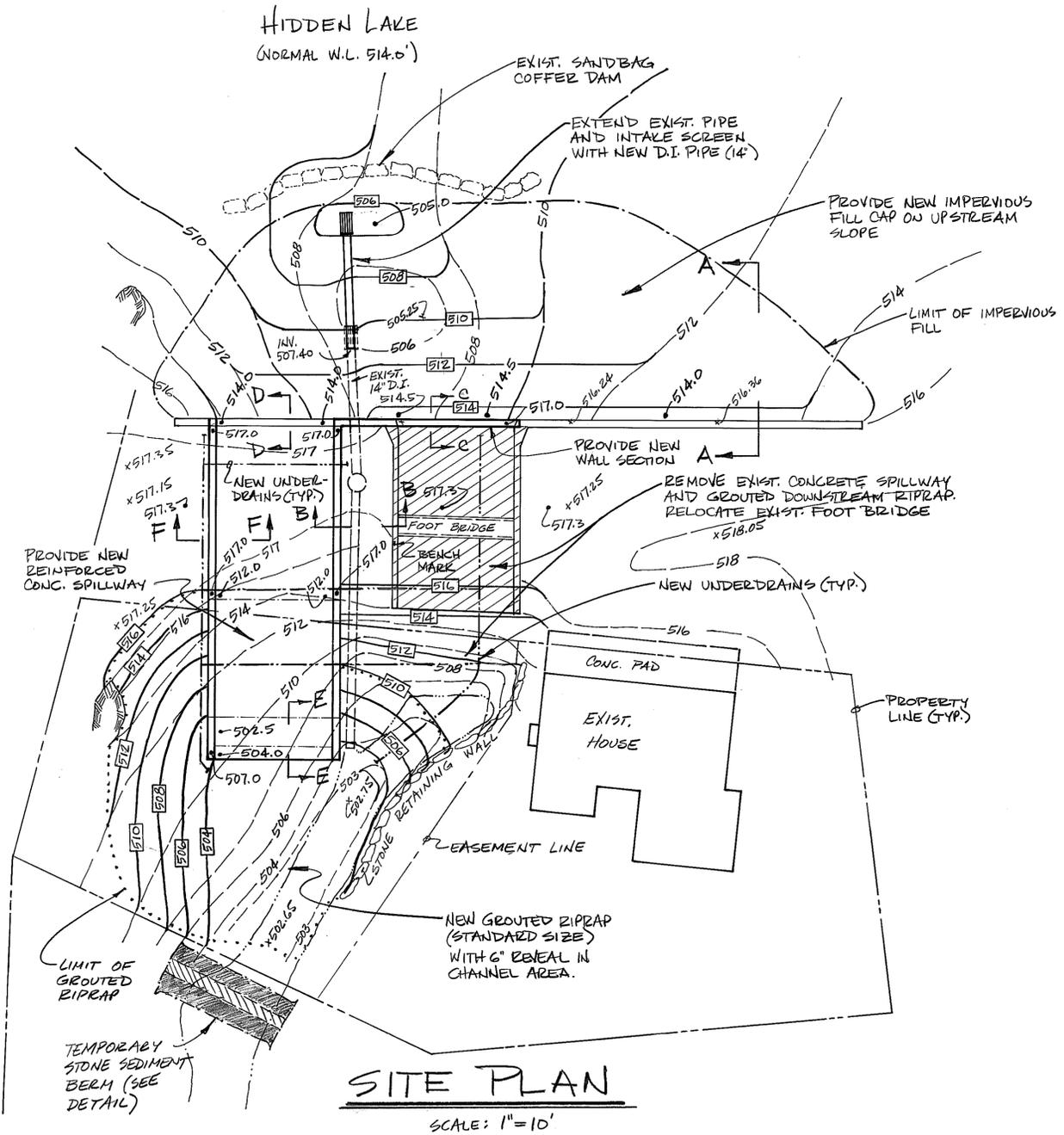
LEGEND

- 512 ——— EXISTING CONTOUR
- 512 ——— PROPOSED CONTOUR
- x517.15 EXISTING SPOT ELEVATION
- 517.0 NEW SPOT ELEVATION
- EDGE OF STREAM
- NEW UNDERDRAIN
- PROPERTY LINE



GENERAL NOTES

1. Elevations, as shown hereon, are based upon a topographic plan provided by the Hidden Lake Association entitled: TOPOGRAPHY - ELEVATIONS, DAM SITE, HIDDEN LAKE ASSOCIATION, TOWN OF HADDAM, CONNECTICUT, MAY 1992, 1"=10'.
2. Contact "Call Before You Dig" at 1-800-922-4455 prior to making any excavations on this site.
3. All areas within and outside the construction limits noted hereon, disturbed by construction vehicles and other activity and not otherwise noted, shall be loamed, seeded and stabilized after completion of work at the dam.
4. The Contractor shall place sedimentation and erosion controls as agreed upon with the Engineer after the preconstruction conference and after a schedule of operations has been submitted. Sedimentation and erosion controls may consist of haybales, sedimentation fencing and/or stone berms in locations necessitated by construction activity. These controls shall be maintained during the course of construction activities and reestablished if any control barriers are damaged. Siltation fencing may be adjusted, at the direction of the Engineer, to suit field conditions, water flows and construction activities.



REPAIRS AND IMPROVEMENTS

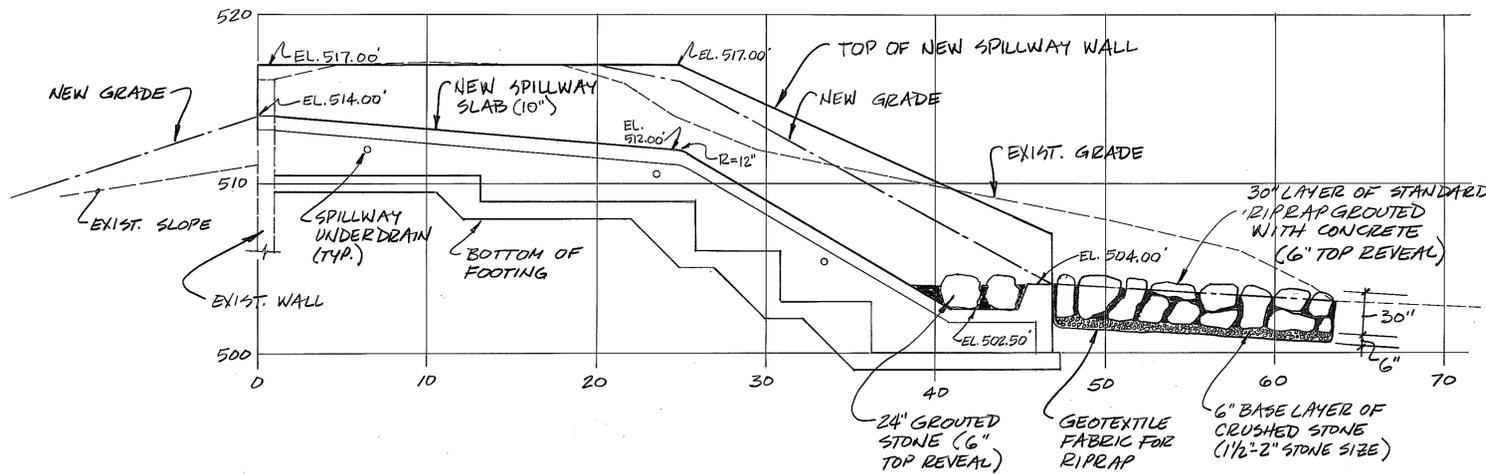
AT THE
HIDDEN LAKE DAM
 HADDAM, CONNECTICUT
HIDDEN LAKE ASSOCIATION
 OCTOBER 1993 Drawing No. 1

Karl F. Acimovic, P.E. & L.S.
 Consulting Engineer
 588 Stonehouse Road
 Coventry, Connecticut 06238

NOTES

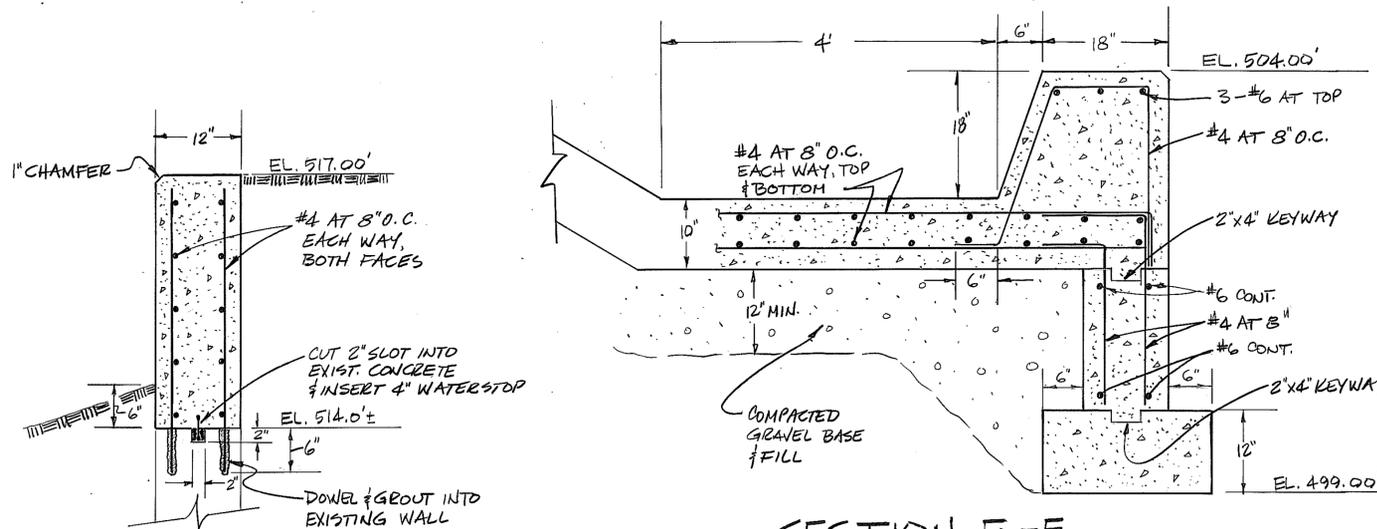
Special Notes for Concrete Work:

- > Concrete shall be normal weight with a 28 day compressive strength of 4000 psi.
- > Rebar shall be grade 60 and lapped a minimum of 45 diameters at all splices. All rebar shall be detailed according to ACI 315, "Details and Detailing of Concrete Reinforcement".
- > Minimum concrete cover for reinforcing:
Concrete placed against earth.....3"
- Concrete placed in forms, but exposed to earth or weather
 - a. Bars #5 and smaller.....1.5"
 - b. Bars larger than #5.....2"
- > Check bottom of footings with final site grading plan. Footings shall be carried a minimum of 3'-6" below finish grade, but to sound ground in any case.
- > The Contractor shall notify the Engineer of any deviations or changes in conditions prior to setting forms and pouring concrete.
- > Proportion and design concrete mixes to result in a slump of not more than 4 inches and not less than 2 inches at the point of placement.



PROFILE - NEW SPILLWAY

SCALE: 1" = 5'

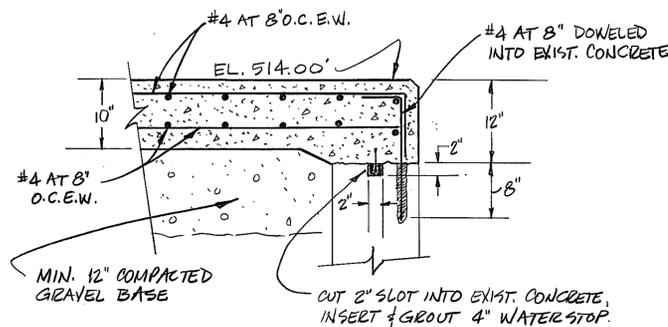


SECTION E-E

SCALE: 1" = 1'-0"

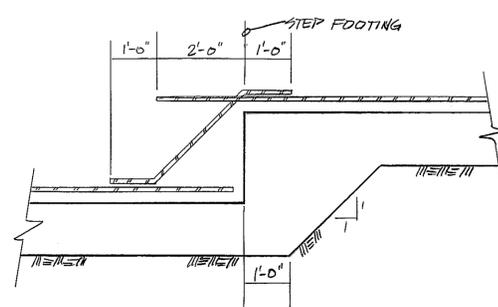
SECTION C-C

SCALE: 1" = 1'-0"



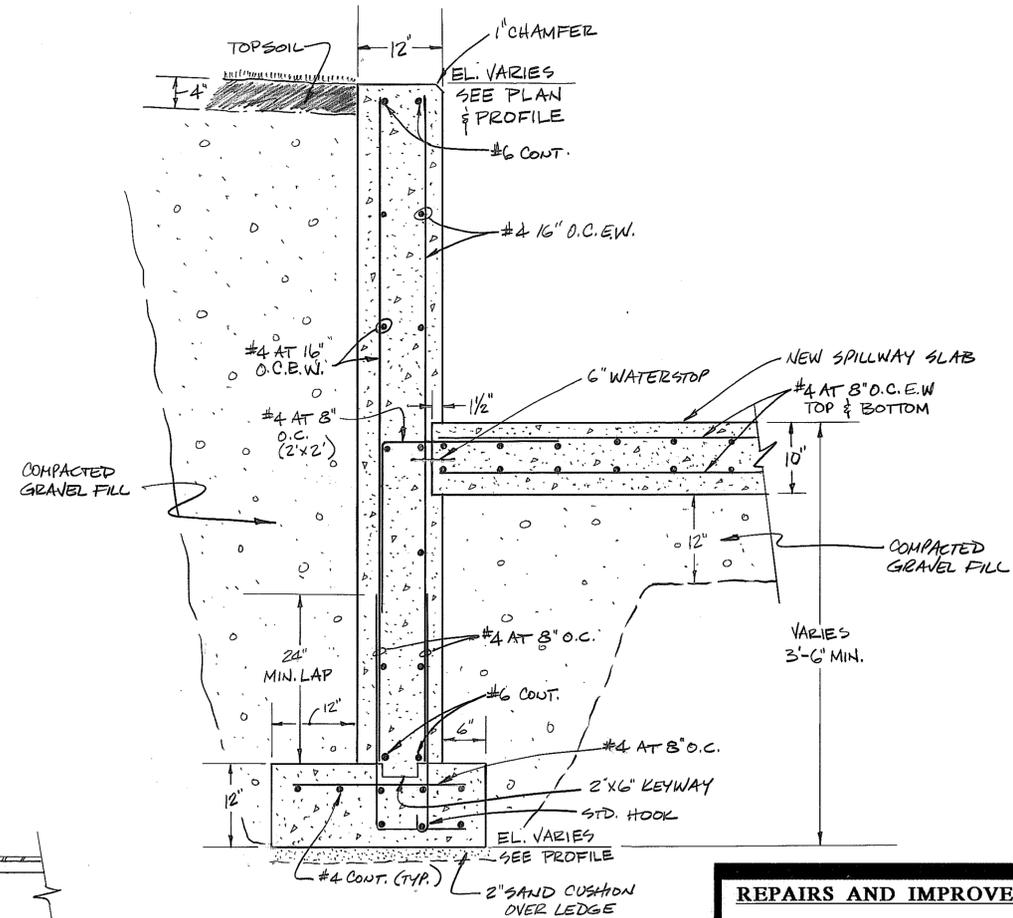
SECTION D-D

SCALE: 1" = 1'-0"



STEP FOOTING DETAIL

NOT TO SCALE



SECTION F-F

SCALE: 1" = 1'-0"

REPAIRS AND IMPROVEMENTS

AT THE

HIDDEN LAKE DAM

HADDAM, CONNECTICUT

HIDDEN LAKE ASSOCIATION

OCTOBER 1993

Drawing No. 2

Karl F. Acimovic, P.E. & L.S.

Consulting Engineer
588 Stonehouse Road
Coventry, Connecticut 06238

REV. #1 - 10/05/93

HIDDEN LAKE

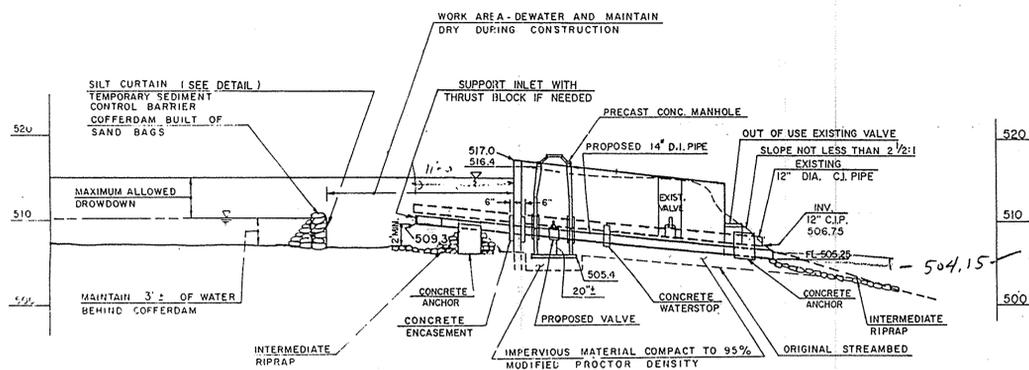
PLACE INTERMEDIATE RIPRAP TO STABILIZE BOTTOM AT INLET AND SUPPORT CONCRETE ANCHOR

WORK AREA; DEWATER AND MAINTAIN DRY DURING CONSTRUCTION
SUPPORT INLET WITH THRUST BLOCK IF NEEDED

COFFERDAM BUILT OF SAND BAGS
SILT CURTAIN TEMPORARY SEDIMENT CONTROL BARRIER

PLAN

Scale 1"=10'



ELEVATION

Scale 1"=10'

NOTE: AFTER COMPLETION OF CONSTRUCTION ON UPSTREAM (LAKE) SIDE, CLEAN SEDIMENT CONTROL BARRIER AND ENTIRE WORK AREA OF ALL DEBRIS AND ANY MATERIAL NOT USED UP ENTIRELY IN CONSTRUCTION. REMOVE PROTECTIVE COVER FROM INTAKE FILTER, REMOVE SILT CURTAIN AND SAND BAGS, KEEP VALVE CLOSED UNTIL WATER LEVEL HAS BEEN RESTORED TO DESIRED NORMAL ELEVATION.

CERTIFIED SUBSTANTIALLY CORRECT.

P.E. & L.S. # 3744

PROVIDE FOR SEDIMENTATION BASIN THIS AREA, TO REMOVE SEDIMENTS FROM WATER PUMPED DURING DEWATERING OF WORK AREA

DRY RUBBLE MASONRY REMOVE TREES (APPROX. LOC.) SPILLWAY SIDEWALL

HOUSE

STONEWALL

CREATE OUTLET CHANNEL, USE INTERMEDIATE RIPRAP

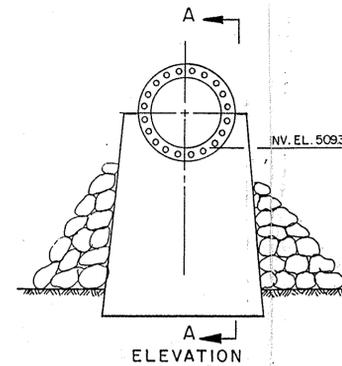
PROPOSED VALVE PRECAST CONCRETE MANHOLE PROPOSED 14" D.I. PIPE

LOAM AND SEED TOP AND FACE OF DAM

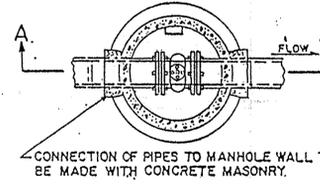
REMOVE TREES AND BRUSH FROM ENTIRE AREA TO THIS LINE TO BACKFILL VOIDS OF TRUNKS AND ROOTS, OVER 1" SIZE PROVIDE CLAY AND GRAVEL (10% FINE)

As built

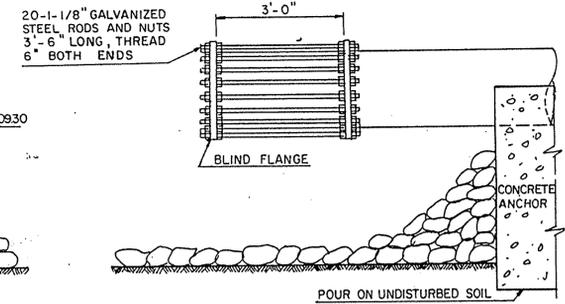
As built



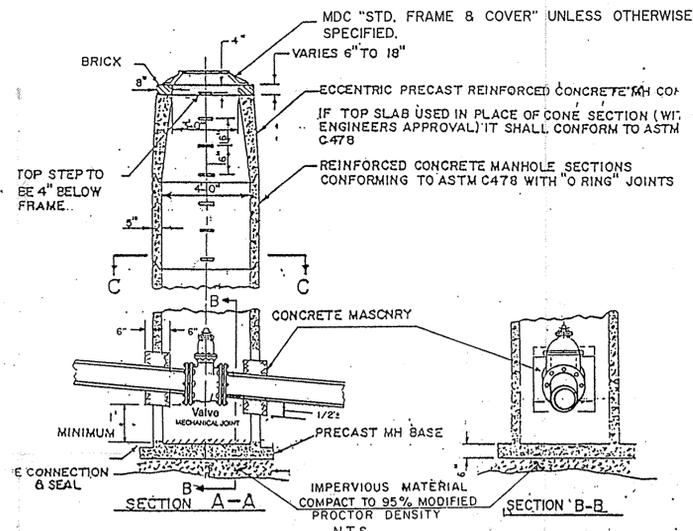
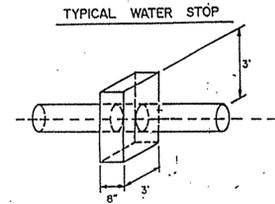
TYPE II MANHOLE
TYPICAL PRECAST MANHOLE
(MDC. STANDARDS)



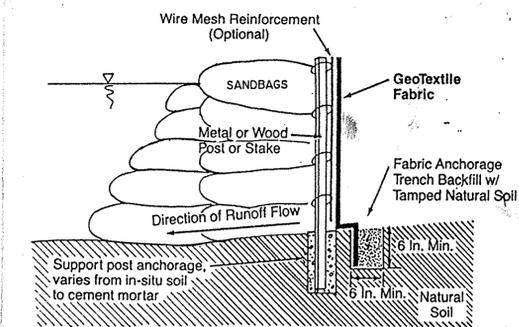
SECTION C-C
N.T.S.



INTAKE FILTER DETAIL
NOT TO SCALE



MAXIMUM SIZE OF PIPE TO BE INSTALLED IN A TYPE II MANHOLE TO BE 18"
MAXIMUM DEPTH OF R.C. PIPE MANHOLES WITH 5" THICK WALL IS 30 FT.
RUBBER GASKETS USED FOR "O-RING" JOINTS SHALL CONFORM TO ASTM SPEC. C443
ALL PRECAST MANHOLE BASES SHALL COMPLY WITH THE "MINIMUM REQUIREMENTS FC 48" DIAMETER PRECAST MANHOLE BASE"



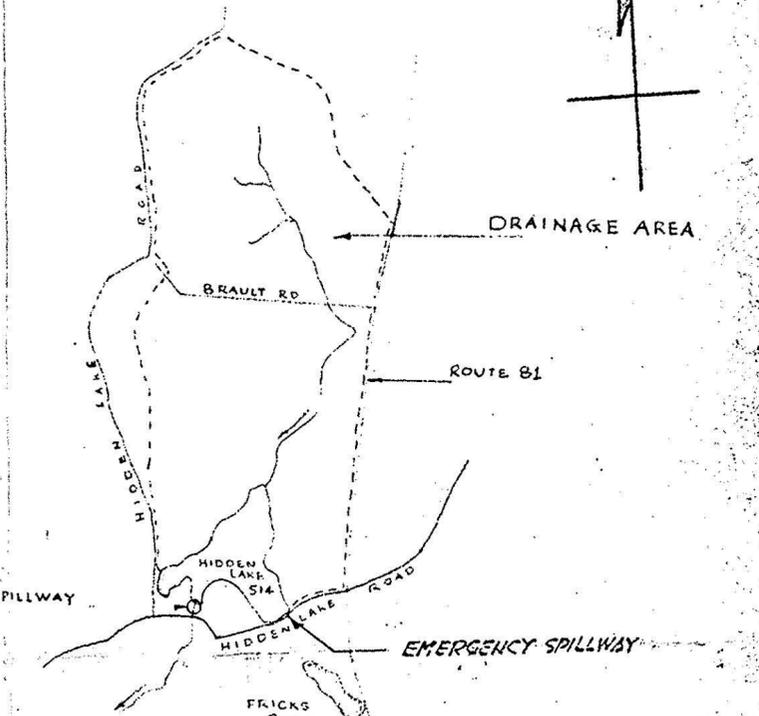
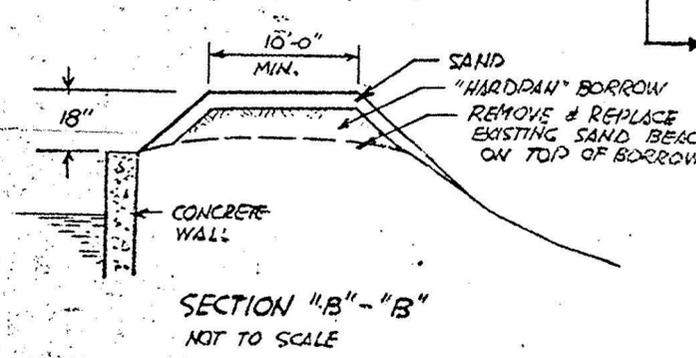
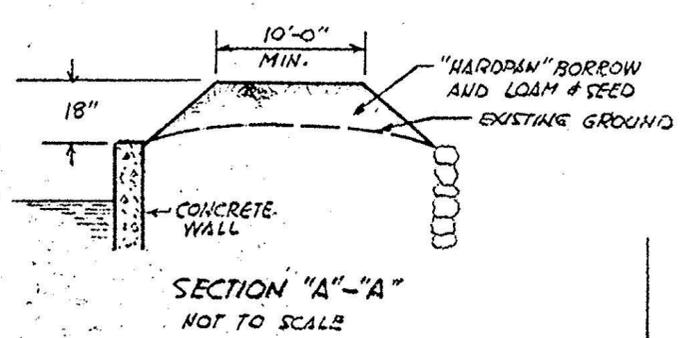
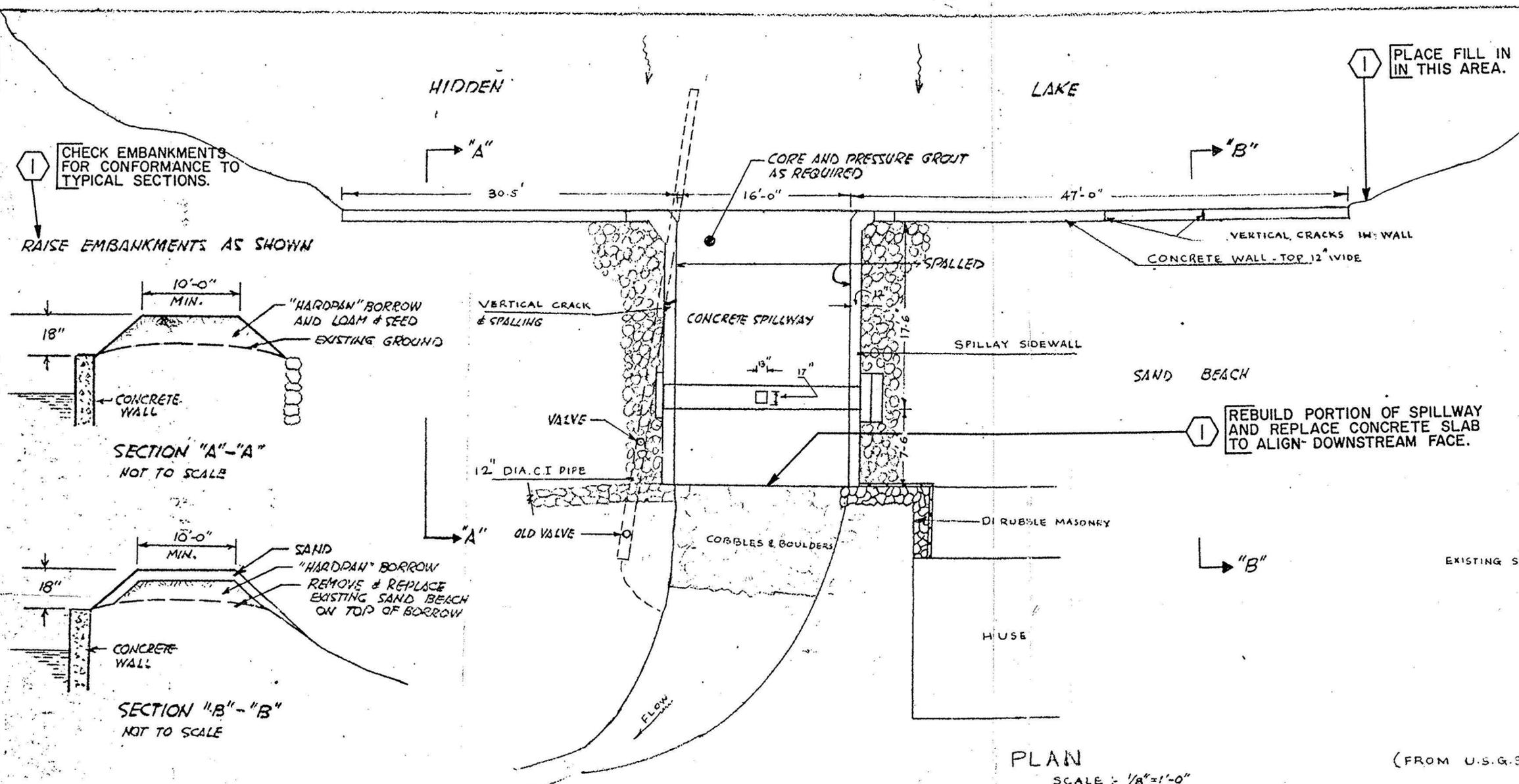
Typical Details for Silt Fence Construction

INSTALLATION OF NEW DRAW - DOWN PIPE AT HIDDEN LAKE DAM

Prepared for
BOARD OF GOVERNORS
HIDDEN LAKE ASSOCIATION
Higganum, Connecticut

REVISED: 6 / 12 / 90

LUCHS & BECKERMAN
CIVIL ENGINEERS - PLANNERS - LAND SURVEYORS
GLASTONBURY, CONN.
A 89-62
SCALE 1"=10' DATE 4/27/90



APPROVED
 STATE OF CONNECTICUT
 DEPT. OF ENVIRONMENTAL PROTECTION
 BY ORDER DATED 10/16/79
Stanley J. Pace

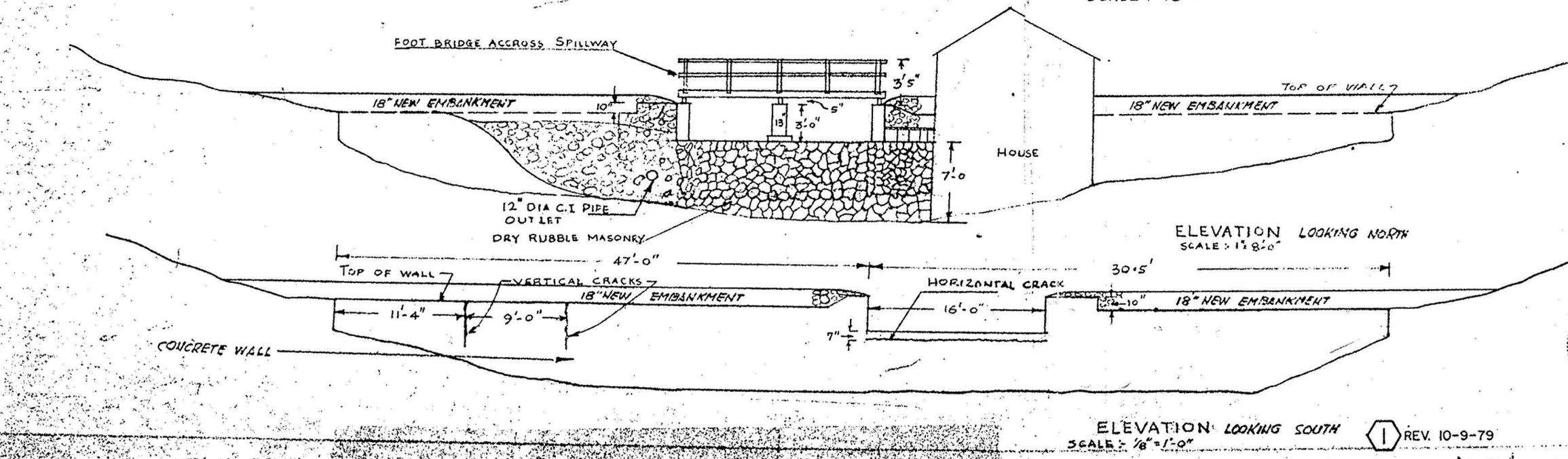
LOCATION PLAN
 SCALE 1" = 2000'FT
 (FROM U.S.G.S QUADRANGLE - HADDAM)

HYDRAULIC DATA
 DRAINAGE AREA = 0.89 SQ. MI.
 LAKE AREA = 40 ACRES
 SPILLWAY LENGTH = 16'-0"
 TOP OF CONCRETE WALL = 2'-2" ABOVE CREST
 100 YEAR STORM RAIN = 5.1"
 MAXI. WATER LEVEL IN LAKE = 1'-8" ABOVE CREST (DURING 100 YEAR STORM)

HIDDEN LAKE PLAN
 PREPARED FOR
HIDDEN LAKE ASSOCIATION



REV. 8-9-68: SECTION "B"- "B" ADDED.
 REV. 5-3-67: GENERAL REVISION.
JOHN J. MOZZOCHI, & ASSOCIATES
 CIVIL ENGINEERS
 GLASTONBURY, CONN.
C-68-126
 SCALE AS NOTED DATE FEB 12, 1969



ELEVATION LOOKING SOUTH
 SCALE: 1/8" = 1'-0"
 REV. 10-9-79