TOWN OF WARREN

Beach Maintenance and Lakefront Best Management Practices

August 24, 2017

The Town of Warren Inland Wetlands Commission gratefully acknowledges the work of Todd Parsons, PE, Lenard Engineering, Inc. and the Inland Wetlands Commissions of the Town of New Hartford and the Town of Goshen, which formed the basis of these guidelines.

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BACKGROUND STATEMENT

One of the first desires of a lakefront property owner can often be the creation or maintenance of a sand beach area at their lakefront. However, sand beaches are usually not a naturally occurring feature of inland lakes in Connecticut. Creating and maintaining a sandy beach where one did not naturally exist can adversely affect water quality. Man-made beaches typically require periodic sand replenishment, as over time sand drifts into a water body. While the sand is then gone from view, it has not left the lake. Beach sand contributes to the sediment load in a lake, filling the lake in over time. In addition, beach sand deposits can lead to decreased water clarity, increased weed growth, and can negatively impact lake wildlife all along the food chain.

GENERAL INFORMATION

This document is intended to serve as a general guide for the Town of Warren and private owners of *existing* sand beaches. The purpose is to provide these parties with guidelines for maintaining their beaches in a manner that will allow for the enjoyment and safety of the users and the protection of the environment in a cost-effective manner. It is the responsibility of users of this document to determine which, if any, environmental permits are required before engaging in any of the activities described herein.

CREATION OF NEW SAND BEACHES

This document should not be construed to endorse the creation of new inland sand beaches. For the reasons enumerated in the ***Background Statement*** above, creation of new sand beaches is not encouraged by the Town of Warren Inland Wetlands Commission, and it is likely that any proposal to create a new sand beach will be determined by the Commission to be a significant activity. A significant activity requires a public hearing and submission of information regarding alternatives which would cause less or no environmental impact to wetlands or watercourses as well as why the alternative set forth in the application was chosen and other alternatives were considered neither feasible nor prudent.

MAINTENANCE OF EXISTING SAND BEACHES

Prior to maintenance of existing sand beach areas, the owner should contact the Town of Warren Inland Wetlands Enforcement Officer for a site inspection. The purpose of the inspection is to determine if any other actions need to be undertaken prior to maintenance of the beach area. Other actions may include resolving ongoing erosion problems, revegetation, or general cleanup. Owners of property on Lake Waramaug are also encouraged to contact the Lake Waramaug Taskforce for their input and suggestions.

Sand Reclamation:

The Town of Warren Inland Wetlands Commission prefers that owners of properties with existing sand beaches reclaim from the lakebed any sand that had previously been installed on the property. Reclamation may take place only after all applicable permits are obtained.

Reclamation shall only be undertaken during a drawdown of the water body and shall only extend to the edge of the water body at the time the work is performed. Reclamation should be performed with hand tools. Reclaimed material should be spread over the beach area in accordance with the ***Sand Replenishment*** section of this document below. A silt barrier should be placed at the toe of the beach area immediately after reclamation to contain any fine sediments that may wash out of the spoils. The fine sediments and any other deleterious materials that result from the reclamation process should be removed from the site and properly disposed of.

Sand Replenishment:

The Town of Warren Inland Wetlands Commission recognizes that there may be rare instances when sand replenishment, in addition to or instead of, sand reclamation is considered necessary. As deposition of sand at the lakefront is a regulated activity per the Inland Wetlands regulations, a permit is required from the Inland Wetlands Commission. All applications for sand replenishment should incorporate the design concepts listed in the ***Practices to Prevent Erosion of Sand Beaches*** section of this document below.

Replenishment should typically take place during the springtime. The volume of sand shall not exceed the volume required to cover the existing beach area with an average of four inches of sand. This equates to 1.2 cubic yards of sand for every 100 square feet of beach area.

Do not place sand below the normal waterline of the beach or outside of the existing beach limits. No expansion of the beach is allowed during placement of sand.

Rake the sand to provide a smooth gradual transition from the uphill side to the edge of water. Fill in any holes or eroded areas. Raking may be accomplished by hand or with mechanized equipment. When using mechanized equipment, a spill prevention kit must be maintained onsite during the raking and replenishing operations. Delivery vehicles should be kept as far from the shoreline as practical.

Sand Specifications:
If sand replenishment is permitted by the Inland Wetlands Commission, the sand to be used at the existing sand beach area shall meet the following specifications:

1. Material shall be considered predominately sand according to the Unified Soils Classification System.

2. Sand shall consist of clean fine aggregate, free of contamination, vegetation, masses of roots, or other deleterious matter. Sand shall be substantially free of loam and other organic matter. To minimize the opportunity for accidental transportation of contaminated soil, sand should not be procured from areas of known or suspected contamination, urban areas, or previously developed sites.

3. Material shall meet the requirements of Fine Aggregate in accordance with the *State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816*, as amended, Article M.03.01.

4. Material shall be prepared as a "washed" product. Gradation shall meet the following requirements:

Sieve Size	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200
% Passing By Weight	100	95-100	80-100	50-85	25-60	10-30	2-10	<3

ALTERNATIVE TO SAND BEACHES
As an alternative to maintenance of an existing sand beach, the beach owner may replace the sand with stone pebbles. Under this alternative, the sand shall be removed and up to eight inches of stone pebbles may be deposited across the existing beach area or portion of the beach area. Do not place pebbles below the normal waterline of the beach or outside of the existing beach limits. No expansion of the beach is allowed during placement of the stone pebbles. Stone pebbles shall be 3/8" double washed native stone.

Rake the pebbles to provide a smooth gradual transition from the uphill side to the edge of water. Fill in any holes or eroded areas. Raking may be accomplished by hand or with mechanized equipment. When using mechanized equipment, a spill prevention kit must be maintained onsite during the raking and installation operations. Delivery vehicles should be kept as far from the shoreline as practical.

Prior to placing stone pebbles on any beach area, the owner shall contact the Warren Inland Wetlands Enforcement Officer for a site inspection. The purpose of the inspection is to determine if any other actions need to be undertaken prior to placement of material. Other actions may include resolving ongoing erosion problems, revegetation, or general cleanup.

PRACTICES TO PREVENT EROSION OF SAND BEACHES

Wherever practical, areas upstream of the beach area should be graded to divert runoff away from the sand beach area. This work may require a permit from the Town of Warren Inland Wetlands Commission and such diversion shall be designed in a manner that does not encourage erosion in another area of the property or discharge sediment-laden runoff to the water body. The diversion shall also be designed in a manner that does not improperly discharge runoff onto adjacent properties.

Maintain walking paths in a manner that prohibits rutting, trampling of vegetation, or erosion. Maintain areas outside of the sand beach or walking paths with healthy native vegetation. Discourage walking across these areas by fencing, dense vegetation, or other means.

ROUTINE CONTROLS

Rake the beach on a routine basis to maintain an even surface. Raking has several positive benefits, including:

1. Making the surface easier to walk on.

2. Cleaning up trash and debris, especially dangerous objects such as metal or glass fragments.

3. Exposing the sand to the sun and air, which may reduce bacteria contamination.

4. Filling in depressions to eliminate standing water, which may also reduce bacteria contamination.

Removal of pond weeds, goose droppings, and algae accumulations should be performed in a manner protective of the water body. Raking can be performed by hand or mechanically. All of the debris should be properly deposed of offsite. Smaller amounts can be disposed of via weekly trash collection; larger amounts can by prior arrangement be brought to the Town of Warren Public Works Department. Debris should not be stockpiled on the property and should not be pushed back into the water.

SEASONAL CONTROLS

Install a silt barrier such as silt fence at the toe of the beach, just above the waterline, at the end of the swimming season. The silt barrier will reduce the potential for sand migration into the water. The sand buildup against the barrier can be pulled back and re-spread on the beach prior to the next swimming season.

OTHER CONTROLS

At the discretion of the beach owner, additional controls, including the following, may be implemented:

1. Installation of a retractable fence across the edge of the waterline. The fence can be deployed during non-swimming periods to discourage geese from wading ashore.

2. Installation of a barrier of tall native plantings at the shoreline to discourage geese from wading ashore. This practice can be applied outside of the sand beach area and is primarily intended for areas where a lawn extends directly to the shoreline.

3. Installation of additional silt barriers perpendicular to the prevailing winds to trap windborne sand.

DREDGING

Dredging is the operation of removing sand from below the normal waterline and placing it back on the beach area. Dredging may require permits from the Warren Inland Wetlands Commission, the Connecticut Department of Energy and Environmental Protection, and the US Army Corps of Engineers. Beach owners should assume that local, state, and federal environmental permits are required for dredging unless confirmed otherwise in writing. Dredging may take place only after all applicable permits are obtained.

SHORELINE STABILIZATION

The Town of Warren Inland Wetlands Commission suggests that in planning a shoreline stabilization project the property owner consult the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (CT E&S Guidelines) as amended. Page 5-5-11 of the Guidelines, Drawing RR-4 (see attached), is one way to handle shoreline stabilization, but each location should be reviewed and designed accordingly. One of the most important aspects of that detail is that the riprap be properly toed in. If it is not, the riprap could eventually roll or slide downhill. Below is the link to the CT E&S Guidelines:

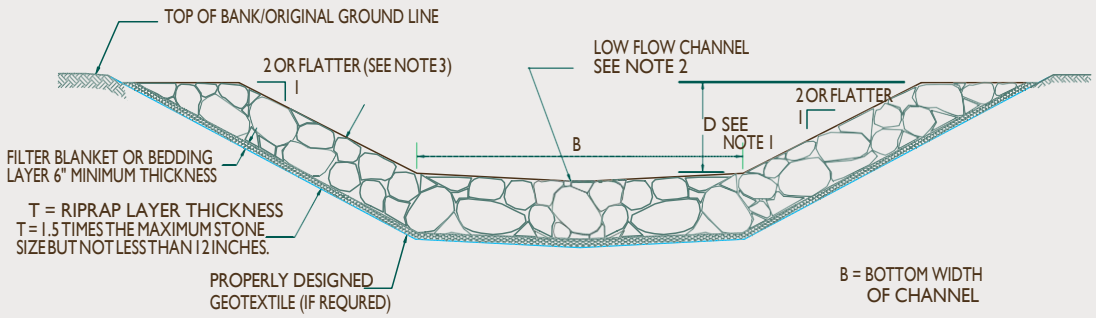
http://www.ct.gov/deep/lib/deep/water_inland/sesc/secs_chapter_1_5.pdf

While a lakeshore does not have the complications of a stream bank, it may not be appropriate to assume that one detail will work for all areas. The U.S. Department of Agriculture, National Resource Conservation Service (NRCS) Engineering Field Handbook, Chapter 16, includes several alternate methods for shoreline stabilization. Below is the link to the NRCS Handbook Chapter 16:

http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17553.wba

The Commission recommends that the applicant refer to both the CT E&S Guidelines and NRCS Chapter 16 when designing a shoreline stabilization project.

Figure RR-5 Riprap for Armored Channel Stabilization



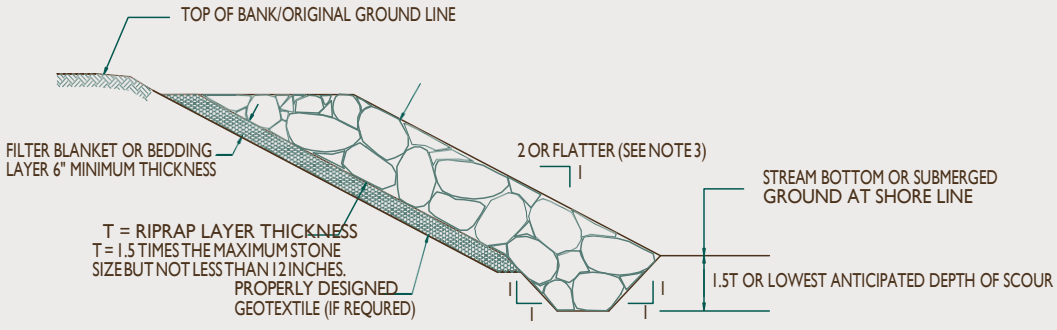
TYPICAL CROSS-SECTION OF RIPRAP LINED CHANNEL

(NOT TO SCALE)

NOTE:

1. THE TOTAL HEIGHT OF RIPRAP LINING IS DEPENDENT UPON THE DESIGN DEPTH OF FLOW PLUS RUNUP DUE TO CHANNEL CURVATURE, PLUS FREEBOARD.
2. IN CHANNELS WITH SIGNIFICANT BOTTOM WIDTHS, LOW FLOW CHANNELS MAY BE INCORPORATED IN THE TEMPLATE.
3. SIDE SLOPES STEEPER THAN 2:1 WILL REQUIRE ADDITIONAL ANALYSIS.

Figure RR-4 Riprap for Channel and Shoreline Stabilization



NOTES:

FOR A CHANNEL OR RIVER APPLICATION THE TOTAL HEIGHT OF RIPRAP REVETMENT IS DEPENDENT UPON THE DESIGN DEPTH OF FLOW PLUS FREEBOARD.
FOR A SHORELINE APPLICATION THE TOTAL HEIGHT OF RIPRAP REVETMENT IS DEPENDENT UPON THE DESIGNED WAVE HEIGHT PLUS FREEBOARD.
SIDE SLOPES STEEPER THAN 2:1 WILL REQUIRE ADDITIONAL ANALYSIS.

TYPICAL CROSS-SECTION OF RIPRAP REVETMENT

(NOT TO SCALE)