

BMP 19.00. Silt Curtain

DESIGN CONSIDERATIONS

Objectives

Silt Curtains are used to isolate work areas within or adjacent to water bodies. When properly installed silt curtains function as a floating silt fence and retain sediment within their boundaries limiting the sediment discharged to the water body.

Description

Silt Curtains are barriers constructed of geotextile fabric of varying length and fabricated with floats sufficient to maintain buoyancy, and weights to keep the fabric skirt held in place below the water level. The floats are encased in or attached to the geotextile or membrane material. The skirt may be manufactured to any depth sufficient to provide the desired barrier for the work area. As the length of material is increased, the depth of isolation increases; however, the float sizing and weights must be increased accordingly. Typically the weight is constructed of metal anchor chain sewn into the bottom of the skirt. The anchor chain must be heavy enough to resist displacement by tides and flowing water. Anchor points to secure the curtain in place are usually necessary.

Other Names

Flotation Silt Curtain, Turbidity Curtain.

Applicability

Silt Curtains can be used to isolate in-water work by surrounding work areas or water intake structures. They are most common for shoreline work that will involve the disturbance of soil down to or below the waterline. When installed from bank to bank along a water body and properly anchored, a Silt Curtain will reduce the release of sediments from the permitted work area.

Selection Considerations

- When designing for work area isolation, the required depth must first be considered. If the required depth and 0.5 feet of freeboard can be attained with Silt Fence, Silt Fence may be used.
- The anchor weight or chain, if in contact with the water body bottom, may cause damage to near shore habitat. Wave action, tidal influences,

and wind can create motion of the weights or chain impacting areas that should be protected.

- With the desired depth selected, the float sizing and appropriate weight can then be designed to keep the Silt Curtain in a vertical position with regard to the installation location. The standard drawing does not specify the gap dimension, so the designer needs to add it. The designer should also specify the anchor chain length.
- Anchor positions to secure the Silt Curtain may be designated when the desired installation location is identified.
- Silt Curtains should not be placed across the flow as this will reduce the effectiveness of the barrier. The floats can be pulled down below the surface or the weights can be pushed aside by the flow and result in the release of sediments to the water body.
- If the area within the Silt Curtain boundary is also habitat for plants and animals, the concentration of sediment in these areas could cause negative impacts. Consider permit conditions and environmental commitments in the design.

Design

Designers must specify the depth, length, and location of the curtain to allow for the effective retention of sediment and completion of the work. Designers must also specify whether the curtain fabric must be pervious or impervious.

In determining the depth of the Silt Curtain, consider whether the water body is still water or subject to tide, wave, or wake disturbance or fluctuating river levels, as well as the substrate and nature of the aquatic habitat. Based on these considerations, specify a gap dimension for the distance between the bottom of the Silt Curtain and the sea floor or water body bottom to reduce damage to the floor or bottom and to near shore habitat.

The fabric may be specified to allow for more or less flow to pass through the fabric. Membrane material may be used in the construction to create an impermeable barrier that will isolate an area completely.

Floats should have high visibility color markings.

Relationship to Other Erosion and Sediment Control Measures

Silt Curtains can complement dewatering activities and in-water work activities.

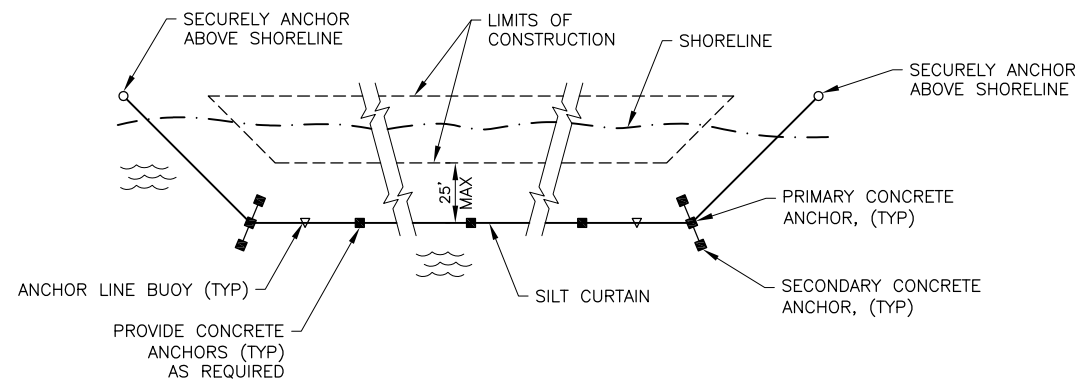
SPECIFICATIONS

Standard Specification

- 680 – Silt Curtain

Drawing

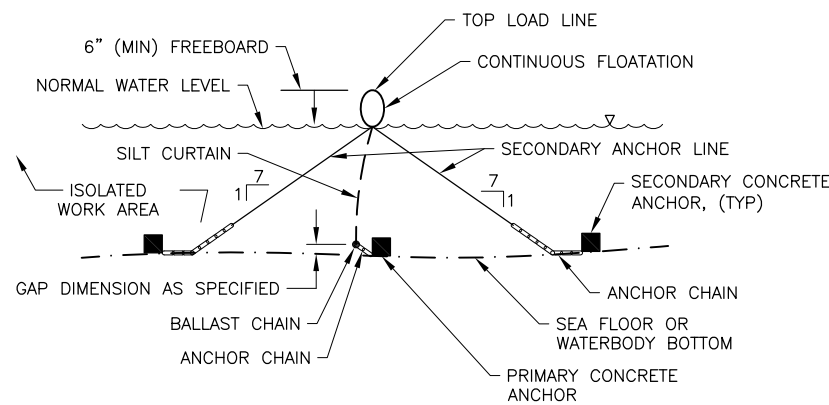
- BMP-19.00 Silt Curtain



PLAN

NOTES:

1. ALL EXPOSED AND DISTURBED SHORELINE SHALL BE ENCLOSED WITH SILT CURTAIN.
2. SECONDARY ANCHORS SHALL BE PLACED ON ALL CORNERS AS REQUIRED TO SECURE SILT CURTAIN IN PLACE.



SECTION

TYPICAL SILT CURTAIN
NOT TO SCALE

SILT CURTAIN NOTES:
MATERIALS

FLOTATION SILT CURTAIN:

1. PROVIDE COMMERCIAL MANUFACTURED SILT CURTAIN, WITH DEMONSTRATED ABILITY TO TRAP AND HOLD SEDIMENT AND DEBRIS WITHIN THE DEFINED WORK AREA, AND WITH ANCHOR LINES, BALLAST, AND FLOATS THAT ARE ATTACHED TO THE SILT CURTAIN AT REINFORCED ATTACHMENT POINTS PROVIDED BY THE MANUFACTURER.
2. OBTAIN APPROVAL OF PROPOSED FLOTATION SILT CURTAIN PRIOR TO SHIPMENT TO THE PROJECT SITE. PROVIDE SUBMITTALS THAT INCLUDE CERTIFICATES OF MATERIALS TESTING, MANUFACTURER'S PRINTED INSTRUCTIONS AND/OR SHOP DRAWINGS, AND PROPOSED INSTALLATION/REMOVAL PROCEDURES.
3. CURTAIN FABRIC SHALL BE PERVIOUS GEOTEXTILE MEETING AASHTO M 288 FOR TEMPORARY SILT FENCE OR IMPERVIOUS COATED FABRIC SUCH AS NYLON REINFORCED POLYVINYL CHLORIDE, TREATED POLYPROPYLENE/POLYESTER FABRIC, OR APPROVED EQUAL, SEE CONTRACT.
4. PROVIDE A CURTAIN TALL ENOUGH TO EXTEND FROM THE BOTTOM OF THE WATER COLUMN TO THE WATER SURFACE, LESS THE GAP DIMENSION SPECIFIED IN THE PLANS. CONSIDER THE PREDICTED TIDE FLUCTUATIONS OR RIVER FLOWS WHEN DETERMINING THE HEIGHT OF THE CURTAIN.

FLOTATION:

1. PROVIDE FLOTATION CONSISTING OF RIGID, CLOSED CELL EXPANDED POLYSTYRENE, ETHAFOAM, OR POLYETHYLENE FLOATS ATTACHED TO THE TOP OF THE SILT CURTAIN ALONG ITS ENTIRE LENGTH. PROVIDE FLOTATION MATERIAL WITH PROTECTION FROM MECHANICAL DAMAGE AND DETERIORATION THAT WOULD CAUSE POLLUTION.
2. EMPLOY FLOTATION THAT PROVIDES THE CURTAIN WITH A MINIMUM OF FREEBOARD WITHOUT GAPS. ENSURE THAT THE BUOYANCY RATIO (WEIGHT OF DISPLACED FLUID TO BARRIER WEIGHT) IS GREATER THAN 3:1.
3. PROVIDE HIGH VISIBILITY COLOR MARKING FOR THE FLOTATION DEVICES.
4. PROVIDE MANUFACTURER-INSTALLED GROMMETS OR EQUIVALENT TO REINFORCE STRESS POINTS AND PROVIDE ATTACHMENT POINTS TO ENSURE PROPER ANCHORING.

LINES: PROVIDE ANCHOR LINES AND TOP AND BOTTOM LOAD LINES, AS REQUIRED, THAT ARE MINIMUM 1/2-INCH DIAMETER NYLON ROPE.

ANCHORS: PROVIDE CONCRETE ANCHORS IN THE SIZE AND NUMBER REQUIRED TO MAINTAIN THE CURTAIN IN POSITION FOR PROPER AND CONTINUOUS OPERATION ONCE DEPLOYED.

BALLAST: PROVIDE BALLAST CHAIN OF MINIMUM 1/2-INCH DIAMETER GALVANIZED STEEL WITH BALLAST CHAIN SEWN INTO A HEM AT THE BOTTOM OF THE CURTAIN AND SECURED TO THE MATERIAL OF THE HEM TO PREVENT SHIFTING OR ACCIDENTAL REMOVAL.

HANDLING AND INSTALLATION

1. SILT CURTAIN PLAN:
 - a. SUBMIT A SILT CURTAIN PLAN FOR DEPARTMENT REVIEW AND APPROVAL.
 - b. THE SILT CURTAIN PLAN MUST USE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
 - c. THE SILT CURTAIN MUST BE ANCHORED AND SECURED SUFFICIENTLY TO WITHSTAND WIND, WAVES, PROPELLER WASH, RIVERINE FLOW, AND TIDAL FORCES REASONABLY EXPECTED AT THE SITE.
2. JOINING PANELS/SECTIONS:
 - a. CONNECT OR SEW INDIVIDUAL PANELS/SECTIONS OR SEW TOGETHER IN THE FIELD, FOR EASE OF HANDLING AND TRANSPORTATION.
 - b. DO NOT USE HEAT WELDING METHODS TO JOIN PANELS.
 - c. JOIN THE PANELS IN A MANNER THAT WILL PREVENT SILT, SEDIMENT, DEBRIS, OR TURBIDITY TO MIGRATE FROM THE WORK AREA.
 - d. IF JOINTS ARE SEWN TOGETHER, USE POLYESTER TWINE THREAD HAVING A TENSILE STRENGTH OF 350 LBS, AS DETERMINED BY ASTM 4268, TO MAKE DOUBLE ROW OF STITCHES THAT WILL NOT UNRAVEL IF BROKEN.
3. INSTALL SILT CURTAIN PRIOR TO STARTING IN-WATER WORK AS SPECIFIED IN THE ENVIRONMENTAL PERMITS.
4. ENSURE THAT THE FLOTATION IS SECURED TO THE BOOM TO PREVENT SHIFTING OR SLIPPING OF THE CURTAIN.
5. WEIGHT THE BASE OF THE CURTAIN WITH BALLAST SO THAT IT WILL REMAIN IN A VERTICAL POSITION.
6. PROVIDE ANCHORS IN THE SIZE AND NUMBER REQUIRED TO MAINTAIN THE CURTAIN IN POSITION FOR PROPER AND CONTINUOUS OPERATION ONCE DEPLOYED.
7. ATTACH ANCHOR CHAINS BETWEEN THE ANCHOR LINE AND ANCHOR TO PREVENT LINE FOULING, TO LOWER THE ANGLE OF LOAD PULLING ON THE ANCHOR, AND TO ACT AS A SHOCK ABSORBER.
8. EMPLOY ANCHOR LINE BUOYS TO HELP PREVENT LINE ENTANGLEMENT AND STRESS ON THE BOOM, IF NEEDED.

INSPECTION

1. INSPECT FOR VISIBILITY ABOVE THE WATER SURFACE ALONG THE ENTIRE LENGTH OF THE SILT CURTAIN.
2. INSPECT FOR 0.5 FEET OF FREEBOARD ABOVE THE WATER SURFACE DURING CALM CONDITIONS.

MAINTENANCE

1. MAINTAIN THE SILT CURTAIN AS REQUIRED IN THE INSTALLATION NOTES.
2. ADJUST FLOTATION TO MAINTAIN VISIBILITY AND FREEBOARD ABOVE WATER SURFACE.

REMOVAL

1. THE ENGINEER MUST APPROVE REMOVAL.
2. PREVENT RE-SUSPENSION OF SEDIMENT INTO THE WATER WHEN REMOVING THE CURTAIN. CONDUCT THE REMOVAL DURING PERIODS OF CALM WEATHER. REMOVE THE CURTAIN CAREFULLY TO MINIMIZE THE RELEASE OF TRAPPED SEDIMENT AND DEBRIS. DO NOT DRAG THE CURTAIN WHILE IN CONTACT WITH THE SEA FLOOR OR WATERBODY BOTTOM.

REVISIONS		
Date	Description	By

State of Alaska DOT&PF

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Date 12/2015 X/XX/XX