Dewatering Structure - DW

DEFINITION

A temporary structure for settling and/or filtering sediment-laden water that is discharged from dewatering activities.

PURPOSE

To settle and filter sediment-laden water prior to the water being discharged off-site.

CONDITIONS

Wherever sediment-laden water must be removed from a construction activity by means of pumping.

PLANNING CONSIDERATIONS

Water that is pumped from a construction site usually contains a large amount of sediment. A dewatering structure is typically needed to remove the sediment before water is released off-site.

One of several types of dewatering structures may be constructed depending upon site conditions and type of operation. A well stabilized, onsite, vegetated area may serve as a dewatering device if the area is stabilized so that it can filter sediment and at the same time withstand the velocity of the discharged water without eroding. The discharge of sediment-laden water onto a vegetated area should not pose a threat to the survival of the existing vegetative stand through smothering by sedimentation. A minimum filtering length of **75 feet** must be available in order for such a method to be feasible.

DESIGN CRITERIA

Formal design is not required. The following information should be considered:

A dewatering structure must be sized (and operated) to allow pumped water to flow through the filtering device **without overtopping** the structure. An excavated basin may be lined with geotextile to help reduce scour and to prevent the inclusion of

soil from within the structure. Types of dewatering devices are shown in Figures 1 and 2.

CONSTRUCTION SPECIFICATIONS

Portable Sediment Tank (see Figure 1)

Materials: The sediment tank may be constructed with steel drums, sturdy wood or other material suitable for handling the pressure exerted by the volume of water. The structure should have a minimum depth of two feet.

Location: The location for the sediment tank should be chosen for easy clean-out and disposal of the trapped sediment, and to minimize the interference with construction activities.

Storage Volume: The following formula should be used to determine the storage volume of the sediment tank:

Pump discharge (gpm) x 16 = cubic feet of storage required

Operation: Once the water level nears the top of the tank, **the pump must be shut off** while the tank drains and additional capacity is made available. The tank should be designed to allow for emergency flow over the top of the tank. Clean-out of the tank is required once one-third of the original capacity is depleted due to sediment accumulation. The tank should be clearly marked showing the clean-out point.

Straw Bale /Silt Fence Pit (see Figure 2)

Materials: The straw bale/silt fence pit should consist of straw bales, silt fence, a stone outlet (a combination of TDOT Class A-1 Riprap and TDOT #1 Aggregate) and an excavated wet storage pit.

Storage Volume: The following formula should be used to determine the storage volume of the straw bale/silt fence pit:

Pump discharge (gpm) x 16 = cubic feet of storage required

In calculating the capacity, one should include the volume available from the floor of the excavation to the crest of the stone weir. In any case, the excavated area should be a minimum of 3 feet below the base of the perimeter measures (straw bales or silt fence). The perimeter measures must be installed according to the specification **Silt Fence- SF**.

Operation: Once the water level nears the crest of the stone weir (emergency overflow), **the pump must be shut off** while the structure drains down to the elevation of the excavated area. The remaining water may be removed only after a minimum of 6 hours of sediment settling time. This effluent should be pumped across an area with established vegetation or through a silt fence prior to entering a watercourse. When the excavated area becomes filled to one-half of the excavated depth, accumulated sediment should be removed and properly disposed of.

Sediment Filter Bag (see Photograph)

Materials: The filter bag should be constructed of non-woven geotextile material that will provide adequate filtering ability to capture the larger soil particles from the pumped water. The bag should be constructed so that there is an inlet neck that may be clamped around the dewatering pump discharge hose so that all of the pumped water passes through the bag.

Location: The filter bag should be used in combination with a straw bale/silt fence pit when located within 50 feet of a stream. When the distance to a stream is greater than 50 feet, the bag may be placed on well-established grass, or on an aggregate pad constructed of TDOT # 57 stone at a minimum depth of 6 inches. The bag should never be placed on bare soil.

Storage Volume: The capacity of the sediment filter bag should be adequate to handle the dewatering pump discharge, and should be based on the bag manufacturer's recommendation.

Operation: When used in conjunction with a straw bale/silt fence pit, a filter bag may be operated until the water in the pit reaches the crest of the emergency overflow. **The pump must be shut off** at this point.

When placed on either a stone pad or well-established grass, the pad may be operated until such time the discharge from the bag reaches a stream. Unless the discharge is at least as clear as the receiving water, **the pump must be shut off** at this point.

Disposal: When the bag has been completely filled with sediment it should be cut open, regraded in place, and immediately stabilized with either sod or erosion control blanket. Refer to specifications **Disturbed Area Stabilization (with Sod) – SO**, or **Erosion Control Blanket/Matting – MA**, respectively.

MAINTENANCE

The filtering devices must be inspected frequently and repaired or replaced once the sediment build-up prevents the structure from functioning as designed.

The accumulated sediment which is removed from a dewatering device must be spread on-site and stabilized or disposed of at an approved disposal site as per the SWPPP.

Portable Sediment Tank

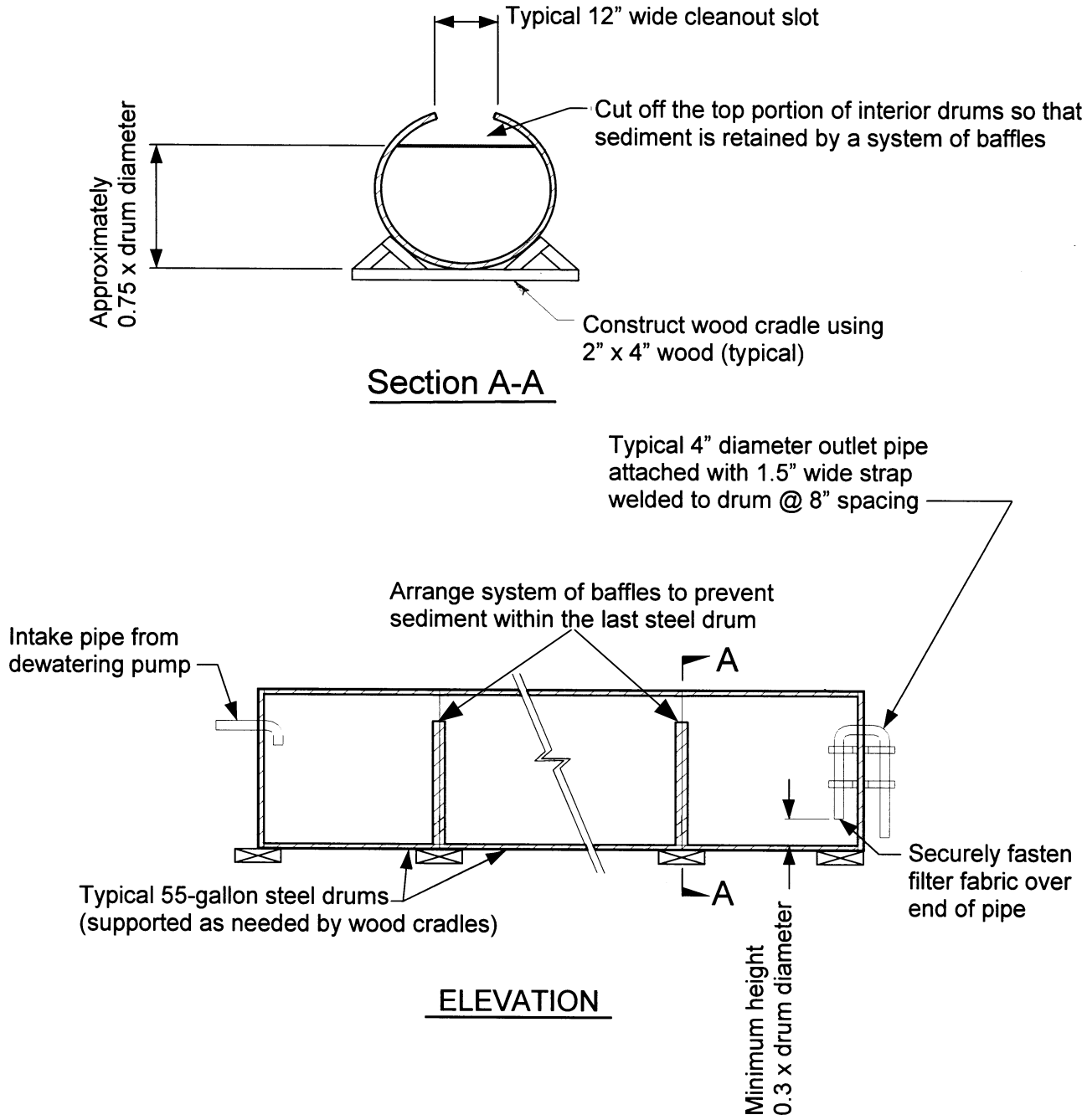
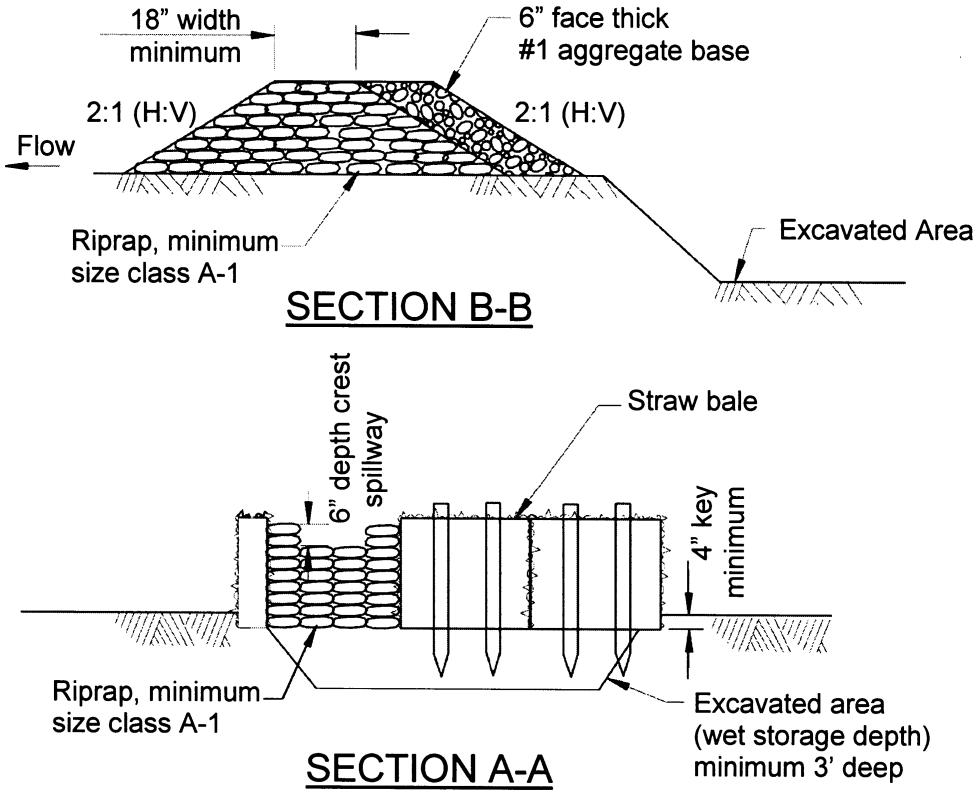


Figure 1

Source: Knoxville Engineering Department

Straw Bale/Silt Fence Pit



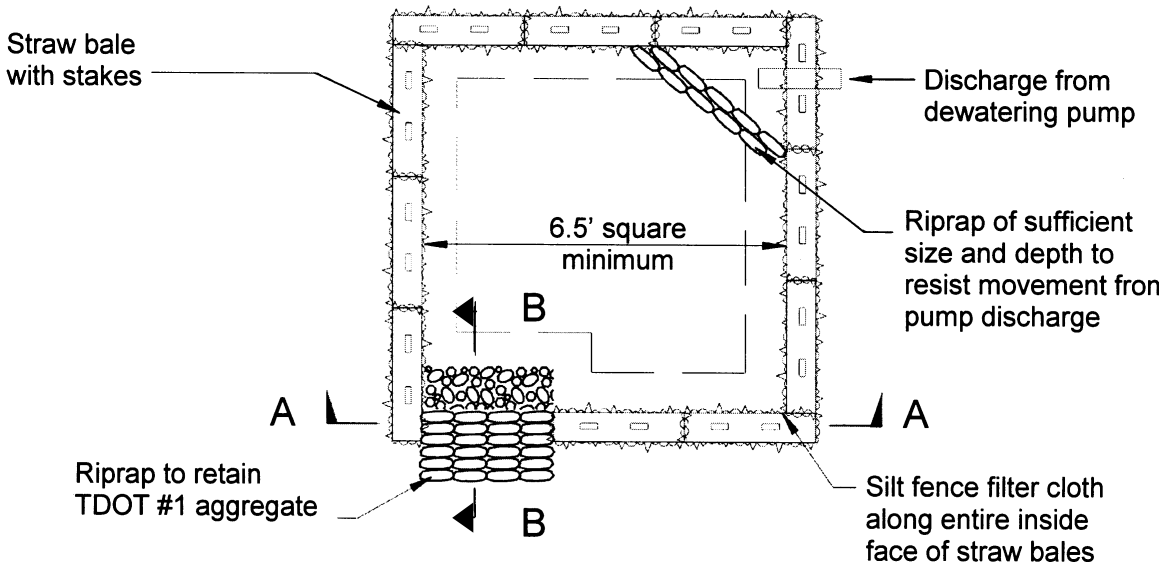


Figure 2

Source: Knoxville Engineering Department