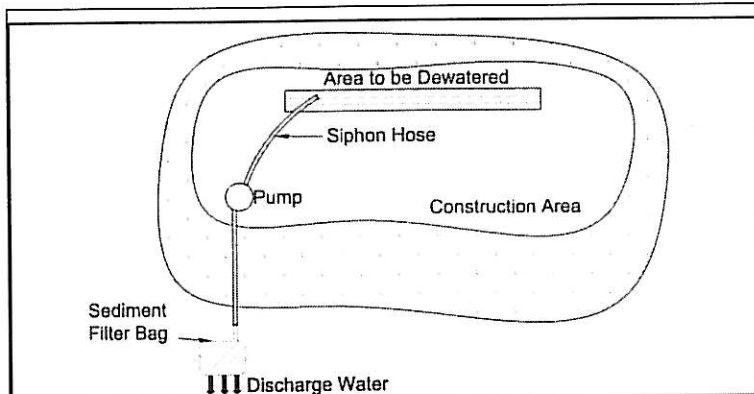


3.3 Dewatering Controls

Sediment Control



Description: Dewatering controls consist of methods and devices to remove suspended soil in water that is pumped or otherwise discharged from foundations, trenches, excavations, and other low areas. The controls may be the sediment controls already onsite (e.g. silt fence, organic filters tubes) or dedicated dewatering devices such as sediment tanks and sediment filter bags.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Discharge of pumped water is prohibited unless controlled for the removal of suspended soil
- Select controls based on dewatering flow rate and duration and available space
- Dewatering discharge points must be protected for high velocities

ADVANTAGES / BENEFITS:

- Removes suspended soil and some pollutants from pumped water
- Works well with passive treatment systems for removal of clay soil particles
- Water may be applied to other onsite uses

DISADVANTAGES / LIMITATIONS:

- Requires frequent maintenance

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Monitor for erosion, control failure and unauthorized discharges frequently while pumping
- Clean and replace controls as they are filled with sediment

TARGETED POLLUTANTS

- Sediment
- Nutrients & Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Construction Wastes

APPLICATIONS

- Perimeter Control
- Slope Protection
- Sediment Barrier**
- Channel Protection
- Temporary Stabilization
- Final Stabilization
- Waste Management
- Housekeeping Practices

Fe=0.50-0.75

(Depends on soil type)

IMPLEMENTATION CONSIDERATIONS

- Capital Costs
- Maintenance
- Training
- Suitability for Slopes > 5%

Other Considerations:

- None

3.3.1 Primary Use

Dewatering controls are used to remove suspended soil in water that is pumped or otherwise discharged from foundations, trenches, excavations, and other low areas. Some dewatering controls, such as the temporary sediment tank, may also be useful in removing other pollutants.

3.3.2 Applications

Dewatering controls are applicable whenever water must be pumped from a low area on a construction site before construction can continue in that area. Pumping of foundations, excavated trenches, and utility vaults are common on development projects.

Dewatering controls may also apply when a temporary cofferdam has been constructed to dewater a normally wet area for construction, such as road crossings of creeks and bank stabilization projects. Water pumped from these areas must flow through a control before it is discharged back to the water body.

3.3.3 Design Criteria

General

- Construction plan notes shall prohibit the discharge of water from dewatering activities into public streets, flumes, storm drains, creeks or other drainage ways unless controlled to remove suspended soil or other pollutants.
- The designer shall determine whether dewatering will be a batch operation after storm events or a continuous operation due to high groundwater and specify controls accordingly. Controls for continuous dewatering need to provide effective removal of sediment over long periods. Controls that clog easily are not appropriate for controlling long-term dewatering operations.
- Pumped water that has sheen or other evidence of pollutants shall be collected and sampled before it is discharged. State or local discharge permit requirements may exist for the pollutant(s) suspected of being in the water.
- Regulations or effluent criteria that apply to stormwater discharges from a construction activity typically also apply to water discharged from dewatering activities.
- The dewatering controls in this section are most effective with sands and coarse silts. Dewatering controls may be combined with a passive treatment system to provide higher sediment removal rates for fine silt and clay soil particles. Liquid polymers injected at the pump or solid and gel forms installed at the discharge generally work well to promote floc growth and settling of clay soil. Design criteria are contained in *Section 3.7 Passive Treatment System*.

Conventional Controls

- Discharges from dewatering are typically concentrated and have relatively high flow rates and velocities. If conventional controls are used, velocity dissipaters and/or flow spreaders or levelers are required before the control to prevent the discharge from causing erosion and damaging the control.
- The best control for pumped water is to discharge it to a vegetated area.
- Pumped water should be sprayed through a nozzle on the end of a discharge hose or directed to a device that dissipates velocity and disperses flow before the water enters the vegetated area.
- The vegetated area must be large enough to detain the volume being dewatered. The size of area needed is dependent on type of vegetation (interception storage and water uptake capacity) and soil type (infiltration rate) and condition (wet or dry). Vegetation may not be a feasible option if dewatering is due to a large or prolonged storm event and the vegetated area is saturated or if the soil has high clay content.

- If a vegetated area is not available or feasible, the discharge from dewatering may be directed to a conventional sediment barrier, such silt fence, organic filter tubes, sediment basin, or stone outlet sediment trap.
- Opportunities for using the water onsite should be considered, particularly where groundwater intrusion results in frequent or continuous dewatering. The water may be collected in a temporary, onsite storage container or holding pit and used to water vegetation for stabilization, applied for dust control, or used for pavement subgrade preparation. If any of these water needs are present at the time of dewatering, the water may be applied directly to this use without sediment controls, since no discharge occurs.

Sediment Filter Bag

- Sediment filter bags are specifically designed to control pumped water and connect directly to the pump discharge line.
- Show location of the filter bag on the drawings. The bag installed where its discharge will flow away from the disturbed area and onto vegetation or into a swale or drainage ditch with erosion and sediment controls.
- Bags should be placed on a level, stable surface that is prepared with mulch, straw, small aggregate, or other material as recommended by the manufacturer. In some cases, the bag may be placed directly on vegetation or well graded soil. The key is to have a surface without rocks or other protrusions that could puncture the bag.
- The bag should be made of a non-woven, needle-punched, geotextile that meets the following minimum criteria:
 - 205 lbs minimum tensile strength using ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - 130 lbs minimum puncture strength using ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 - 400 psi minimum Mullen burst strength using ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.
 - Minimum 70 percent at 500 hours ultraviolet resistance using ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.
 - 85 to 110 gpm/ft² water flow rate using ASTM D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- Apparent opening size using ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile should be specified based on the type of soil that will be in the discharge. A size that is too large will not trap the sediment; however, a size that is too small will create an unnecessary head for the dewatering pump to work against.
- The smallest apparent opening size currently available is 70 microns. This size will not capture fine silt and clay particles. A passive treatment system will be necessary with the bag to capture these soils.
- Bags are available in sizes ranging from 6 feet x 6 feet to 15 feet x 25 feet. The size of the bag should be specified based on availability of space, flow rates, and duration of use. If space is available, larger bags will last longer between replacements and may have a lower price per square foot. However, larger bags are heavier when sediment-laden. Equipment must be available to lift and remove the bag from the site for disposal.
- Bags are not reusable. Make sure they are installed at a location where equipment has access to the bags for lifting and removal without causing erosion or damaging other erosion and sediment controls.

Temporary Sediment Tank

- A temporary sediment tank is a compartmented container through which sediment-laden water is pumped to trap and retain sediment before discharging the water to drainage ways, adjoining properties, and rights-of-way below the sediment tank site.
- A temporary sediment tank is typically used at construction sites in urban areas where conventional methods of sediment removal are not practical. It is also used on sites where excavations are deep and space is limited, such as urban construction, where direct discharge of sediment-laden water to streams and storm drainage systems should be avoided.
- The location of temporary sediment tanks should facilitate easy cleanout and disposal of the trapped sediment to minimize interference with construction activities and pedestrian traffic. The tank size should be determined according to the storage volume of the sediment tank, with 1 cubic foot of storage for each gallon per minute of pump discharge capacity.
- A temporary sediment tank can be used as either a sedimentation or filtration device. If an oil sheen is present in the runoff, an underflow baffle may be used in the tank to remove it. However, local and state discharge regulations and permits may apply and should be checked before discharging.
- For use as a small scale sedimentation basin, de-watering discharge is directed into the temporary sediment tank to a level below the tank midpoint and held for a minimum of 2 hours to allow settlement of a majority of the suspended particles. This detention time is insufficient for removal of fine silt and clay soil particles. Passive treatment systems should be combined with the tank if these soil particles will be present.
- The tank should be designed for a controlled release when the contents of the tank reach a level higher than the midpoint.
- As a filtration device, a temporary sediment tank is used for collecting de-watering discharge and passing it through a filtered opening at the outlet of the tank to reduce suspended sediment volume. The filter opening in the temporary sediment tank should have an Apparent Opening Size (AOS) (see *Section 3.10 Silt Fence*) of 70 or smaller.
- The trapped sediment and stormwater must be disposed of properly.

3.3.4 Design Guidance and Specifications

No specification for dewatering controls is currently available in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments.

3.3.5 Inspection and Maintenance Requirements

Dewatering controls should be inspected regularly (at least as often as required by the TPDES Construction Permit). Dewatering discharge points should be checked for erosion. Eroded areas should be repaired, and erosion controls should be installed to prevent future erosion.

Dewatering pumps and sediment controls should be monitored frequently, at least hourly, while pumps are in operation to prevent unauthorized discharges and to catch erosion problems or control failure.

Conventional sediment controls should be inspected at least weekly when used for continuous dewatering, because they will become overcome with sediment more quickly than when used to control runoff from storm events. The controls shall be maintained according to the criteria in their respective sections. They should be replaced when they no longer provide the necessary level of sediment removal.

Sediment filter bags should be checked to determine if they need replacing. The bags cannot be cleaned or reused. They should be used until they reach the manufacturer's recommended capacity. The entire bag with sediment can be disposed of as solid waste. If a controlled location onsite or a spoil site is available, the bag can be cut open and the sediment spread on the ground. Only the bag is waste in this case.

Sediment tanks should be cleaned when they become 1/3 full of sediment. To facilitate maintenance, the tanks need to be located with easy access for regular pump out. The rate at which a tank is pumped depends on site-specific considerations such as rainfall and sediment loads to the system. Regular inspections will help determine pump out frequency and prevent overloading and failure of the system.

3.3.6 *Example Schematics*

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.

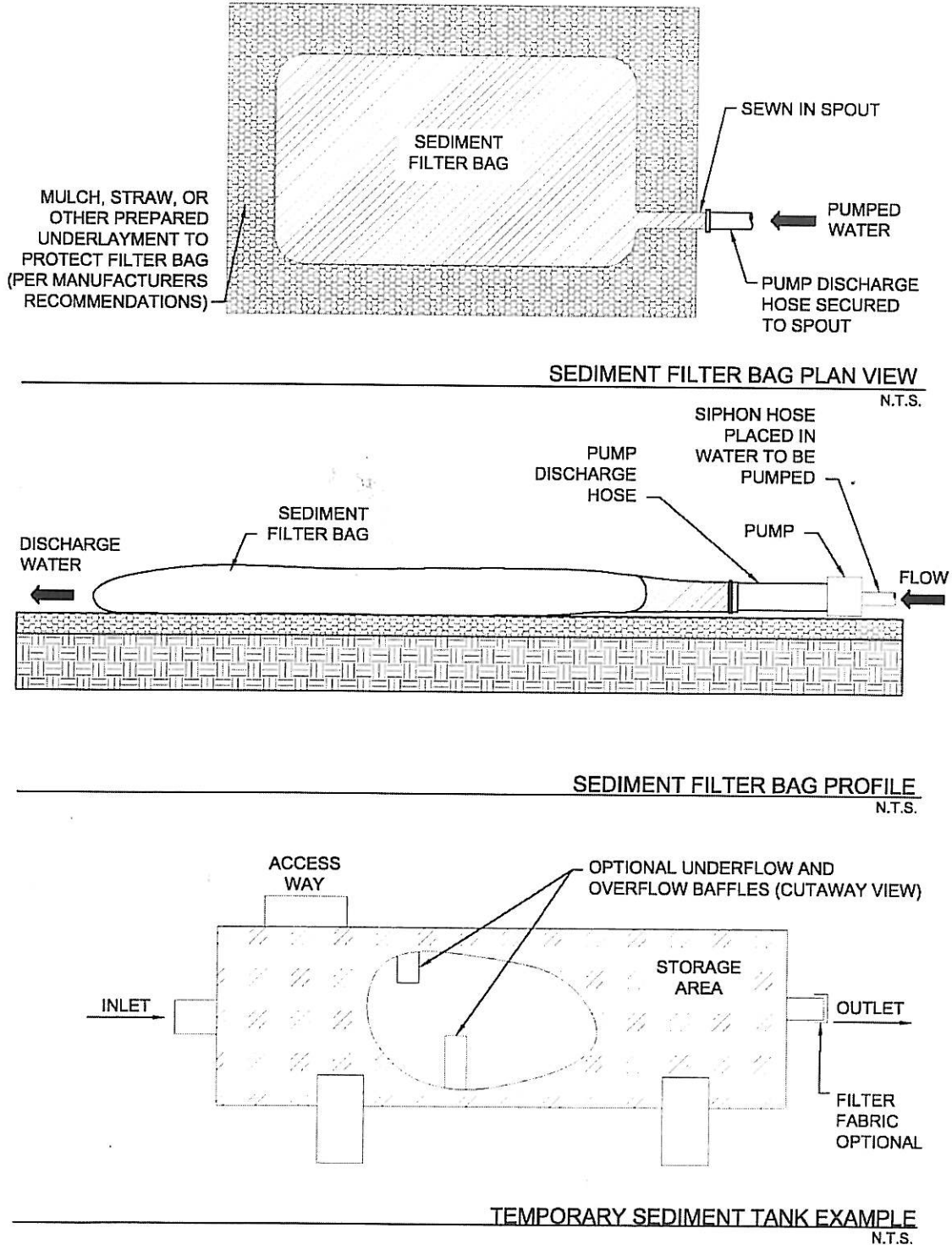


Figure 3.4 Schematics of Dewatering Controls