

### Construction Dewatering Treatment Technologies

Managing Construction Site Dewatering Operations for Sediment and Turbidity Control



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### Objectives

- Introduce Construction Dewatering Treatment Technologies
- Evaluate Selection of Treatment Technologies
- Explore Basic Design Components of Treatment Technologies
- Consider Treatment Technology Operations

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### Topics

- Construction Dewatering Treatment Technology Defined
- Overview of Dewatering Treatment Technologies
- Introduction to Treatment Technology Selection
- Introduction to Treatment Technology Design
- Introduction to Treatment Technology Operations

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### Construction Dewatering Technology Operations

- Removal and discharge of waters, other than stormwater and accumulated runoff water, from a construction site activity in a method that manages turbidity.
  - May include groundwater or base flow from
    - Excavations/Rim Ditching
    - Drilling operations
    - Cofferdams
    - Pipe or culvert work zones




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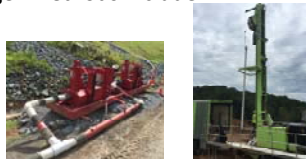
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### Construction Dewatering Techniques

- This module does not cover the details of the various methods and techniques for dewatering
- Sump pumping is the primary construction site dewatering technique
- Other “pre-drainage” methods include:
  - Deep Wells
  - Well Points
  - Eductors
  - Vacuum Wells
  - Horizontal Wells




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### Overview of Dewatering Treatment Practices

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| <p><b>Treatment Technologies</b></p> <ul style="list-style-type: none"> <li>• Sediment Traps</li> <li>• Sediment Basins</li> <li>• Weir Tanks</li> <li>• Dewatering Tanks</li> <li>• Gravity Bag Filters</li> </ul> | <p><b>Treatment Technologies</b></p> <ul style="list-style-type: none"> <li>• Sand Media Filters</li> <li>• Pressurized Bag Filters</li> <li>• Pressurized Cartridge Filters</li> <li>• Chemical Treatment-Continuous</li> <li>• Chemical Treatment-Batch</li> </ul> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
- Discharge clarity measured in NTU's (nephelometric turbidity units)
  - Consult with regulatory agencies for permitting or requirements prior to construction

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### Sediment Traps

- A temporary trap or pit that is excavated or constructed from embankment
- Provide storage and treatment of suspended sediments from a dewatering operation
- Discharges via a stone or sediment barrier-lined outlet



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### Sediment Basins

- A temporary basin that is excavated or constructed from embankment
- Contains a dewatering structure (floating skimmer/rigid or flashboard riser) to slowly discharge water that may be pumped from a dewatering operation
- Sediment basins are larger than sediment traps.



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### Weir Tanks

- Separates water and pollutants by using weirs.
- Configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the pollutant to be removed from the water, such as sediment, oil, and grease.



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### Dewatering Tanks

- Removes sediment and debris
- Flow enters the tank through the top, passes through a geotextile fabric, and discharges via an outlet located on or near the tank bottom
- The fabric separates the solids from the liquid effluent



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### Gravity Bag Filters

- Square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, and silt
- Various shapes and sizes; includes sleeve
- Effluent seeps through the bottom and sides



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### Gravity Bag Filters

- Also made from woven geotextile fabric
- Accommodates large volume dewatering operations



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### Sand Media Filters

- Canisters or tanks or pods filled with sand that allow effluent to be pumped through for removal of suspended sediments and pollutants
- Considered a secondary treatment after some other type of pretreatment method has been used



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### Pressurized Bag Filters

- Unit composed of single filter bags made from polyester felt material
- Pretreated effluent flows through unit and removes large sediments
- Provided in a variety of configurations
- Bag filters combined with cartridge filters for pollutant removal



Credit: Mike Haley; Rain for Rent  
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### Pressurized Cartridge Filters

- Provide a higher level of pollutant removal through the use of individual cartridges
- Used as a secondary or polishing treatment for removal of sediment & particulates
- Cartridge filters often with bag filters effluent treatment



Credit: Mike Haley; Rain for Rent  
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### Chemical Treatment (Active Treatment Systems)

- Involves the application of chemicals
  - Polymers (e.g. PAM or polyacrylamide, chitosan)
  - Alum
  - Other flocculants
- Aids in the reduction of fine sediment particles
- Pumped effluent is generally pretreated with a flocculant, allowed to settle, treated with another flocculant, pumped through sand media filters, monitored for turbidity levels, then discharged



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### Chemical Treatment Continuous and Batch

- Chemical treatment
  - Continuous
  - Batch
- Continuous: non-stop, 24 hours per day
  - for moderate to high turbidity levels
- Batch: Treat, stop, and settle
  - for extremely high turbidity levels



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### Chemical/flocculant use for Treatment Technologies

- Eligible to use on practices previously noted
- Industry vendors are a good resource for products
- Consult with state regulatory agencies for any specific requirements

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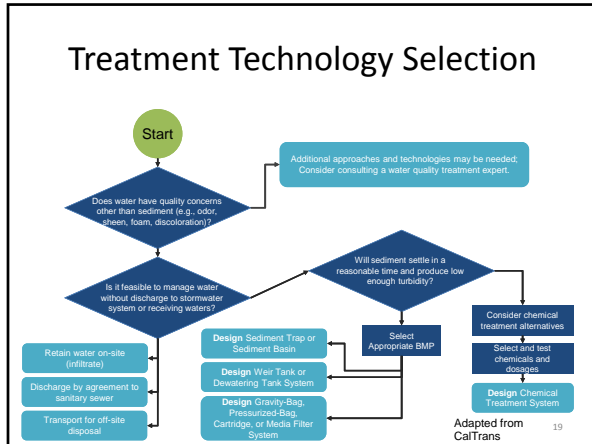
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### Evaluate Water Quality Parameter(s) of Concern

Does water have quality concerns other than sediment (e.g., odor, sheen, foam, discoloration)?

- Other Pollutants
  - Metals
  - Oil & Grease
  - BOD
  - Hydrocarbons
- Consult a water quality treatment expert

Additional approaches and technologies may be needed. Consider consulting a water quality treatment expert.

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### Evaluate Water Quality Parameter(s) of Concern

Is it feasible to manage water without discharge to stormwater system or receiving waters?

- Sediment
  - Manage onsite without discharge to MS4s or waters of the state
  - Manage onsite with structural BMP treatment technologies, if settleable
  - Manage onsite with chemical treatment systems, if not settleable

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### Treatment Technology Design

Treatment Technology Group	Treatment Technology	Pollutant Treated	Design Flow (gpm)
Sediment Traps & Sediment Basins	Sediment Traps	Sediment	25 to 500
	Sediment Basins	Sediment	25 to 500
Weir Tanks & Dewatering Tanks	Weir Tanks	Sediment, Metals, Oil & Grease	25 to 500
	Dewatering Tanks	Sediment, Metals, Oil & Grease	Varies
Filters	Gravity Bag Filter	Sediment and Metals	300 to 800
	Sand Media Filter	Sediment, Metals, BOD	80 to 1,000
	Pressurized Bag and Cartridge Filters	Sediment, Metals, BOD, and Hydrocarbons	50 to 1,000
Chemical Treatment	Continuous Chemical Treatment	Sediment, Metals	Varies
	Batch Chemical Treatment	Sediment, Metals	Varies

Adapted from CalTrans 22

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### Design Onsite Green Infrastructure Options

- Infiltration
  - Adjacent wooded or vegetated areas
  - Diffuse flow needed
- Reuse
  - Dust control
  - Irrigation
  - Hydroseeding



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### Design/Develop Discharge Agreements to MS4s

- Develop agreement to dewater into:
  - Sanitary storm sewer systems
  - Post construction BMP impoundments
    - Monitor and manage effluent turbidity levels



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### Design/Develop Plan to Transport for off-site disposal

- Dewater and transport off-site
- Dewatering via pre-drainage “wells” may be a more economical option, depending on duration

Transport for off-site disposal



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### Design Appropriate BMPs

- Traps/Basins
  - Smaller footprint to construct
  - Limited storage volume and flow rate
- Tanks
  - Generally requires mobilization by tank vendor
  - Accommodates and treats larger volume and flow rate
- Filters
  - Design configuration depends on flow rate
  - Designed in conjunction with some type of pretreatment for solids removal



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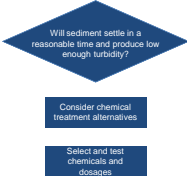
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### Design Chemical Treatment System

- When the sediment fraction will not settle in a reasonable period of time, consider chemical alternatives
- Select and test chemical and dosages
- Implement a pump and chemical treatment system for dewatered effluent



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### Treatment Technology Operations

- Treatment Limitations
- Implementation Considerations
- Inspection and Maintenance

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### Summary

- Continue to explore treatment technologies as science expands and advances.
- Use the selection matrix to identify the preferred treatment technology system for managing dewatering operations.
- Strive to protect and preserve water quality on all dewatering operations.

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### Questions?



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