

# Applications Using Turbidity Reducing Polymers in Florida

Controlling turbid water has been an ongoing struggle for contractors within the state of Florida. Whether dealing with a rim ditch or holding pond, an existing lake or a stream, a canal or river running through the property, turbidity is an issue. With an annual average rainfall of 65 inches, our summer rains can be devastating to the contractor, engineer and owner trying to stay on time, under budget and in compliance.

The introduction of APS Anionic polymers to Florida in 2000 was a huge step forward in the battle against turbid water. Applied Polymer Systems (APS) manufactures a line of safe to the environment turbidity reducing polymers. APS produces these polymers in various forms including Floc Logs, powders and emulsions. When used in conjunction with other available products, such as Link Manifolds, dewatering bags, floating turbidity barriers and jute, they are a valuable tool to contractors in Florida.

Using polymers is now a standard practice with Water Management Districts, US Army Corps of Engineers, FDOT and FDEP all recognizing their necessity. However, they are still technical products that need to be applied correctly in the field in order to work properly. The correct APS polymer for each application should be determined through a water test. Once the correct polymer has been chosen, the next step is setting up your site. This guide has been put together to help you choose the best application to fit your project needs.

APS Floc logs consist of semi-hydrated, polyacrylamide blended blocks that are used to reduce turbidity through flocculation. The polymer from the log interacts with fine sediments and soil particles that have become suspended within the water. The logs are soil-specific and require testing of interaction between the log and the turbid water. Testing can be performed at our facility at no charge to determine the type of log needed, estimated polymer reaction time, as well as determining proper dosage rates. It should be noted that time consuming, confusing residual testing that is required when using chitosan and dual polymer systems is not required with the use of APS Floc logs. The logs have been designed to allow a slow release of polymer as water flows over and around them. The key elements to an efficient system are turbulent water flows to aid in mixing, proper dosage of logs to volume of water being pumped, and making sure the proper amount of reaction time is achieved. Most of these are aided through the use of the Link Manifold system, which takes much of the guess work out of the system. Although the Link Manifold has been one of the easiest and more compact ways of treating turbid water, the Floc logs can also be incorporated into a simple ditch check system. The ditch check system is explained below.

Ditch check systems can be one of the most inexpensive ways to treat turbid water. The system usually consists of shallow open ditches cut into the existing area and lined. The liner material can be something as temporary as 6 mil construction film. The ditch is cut at a grade that will allow a shallow flow of water at a depth of 12" or less flowing at a rate of roughly 3 FPS. The flow should be adequate enough to create turbulence within the ditch to aid in proper mixing, but not so fast that the required reaction time is not achieved. In most

cases, it is recommended for the flow to be regulated through the use of a pump. After the ditch is constructed, ditch checks consisting of material such as sand bags, cinder blocks or gravel berms are placed within the ditch to break up the water flow and create turbulence. Floc logs are then added to the ditch spaced in intervals of 5' to 10' apart. After the ditch and ditch checks are created, an area referred to at times as a dispersion field or settling area is created. This is explained below.

Dispersion fields should be used with all systems containing APS Floc logs. The dispersion field generally consists of a lined area, with jute matting laid over top of it and cinder blocks or similar placed on the edges of the jute matting to hold it in place. The purpose of this area is to capture the particles that were flocculated in the newly created ditch check area. An APS 712 powder should be applied to the jute matting before pumping begins by lightly dusting it to further polish the water for discharge. The powder acts as a bonding agent between the jute matting and the flocculated particles that are now separating from the cleaned water. The jute matting and the powder should be considered disposable filters. At the start-up of pumping, the jute matting will look fibrous, with individual strands of the jute fibers being clearly seen. Once the jute is full of sediment it will look muddy and the individual strands of the jute will appear to be coated. Once the jute looks coated, the newly flocculated particles will not attach and it should be changed out so that particles upstream can be captured. Other filters, such as straw wattles and hay bales can also be added to the dispersion field to aid in the collection of particles.

We also have a portable, rentable option for particle collection. The Floc Pit is a system that can be set up on nearly any site in less than an hour. The system is in modular 6 foot sections with intake and outlet pipes and changeable filters that can be tailored to various turbid water conditions and flocculated particle sizes to facilitate efficient capture. With a connected dimension of 8 by 28 feet, the system allows for enough residual time in most applications for flocculated particles to drop out of suspension being collected by the filters. Dewatering bags can be attached at the outlets for additional polishing and water disbursement. Link Manifolds (described in the following), used in conjunction with the Floc Pit, make for a completely portable turbid water discharge treatment system that can be hauled in a utility trailer and utilized on jobsites with limited dispersion areas.

One of the best devices available for introducing the polymers into the flow of water during the pumping process is the Link Manifold. The Link Manifold system is designed to eliminate the need for open dewatering ditches and to allow the turbid water to be treated inline. Once treated, the water is discharged into a filter area for collection of flocculated particles. The collection area can be comprised of many types of filters, natural and/or synthetic. The purpose of the filter area is to capture the larger particles created during the mixing process. Capture of the particles is an essential step and should not be eliminated from the field set up. Components of the Link Manifold system are described below.

The Link Manifold is a pipe system with an offset pattern and a custom static mixing module and is available in 4 and 6 inch pipe diameter size. The addition of this essential mixer

facilitates maximum turbulence and mixing required with polymers, while eliminating problems associated with laminar flows which create very little turbulence in comparison. Custom-sized APS Link Logs are inserted into the manifold at 2 locations, just before and just after the static mixer, with the distance between the logs making use of the full length of the manifold. The manifold connections are standard 4" aluminum camlock fittings, so that the system can easily be incorporated into most pumping operations. Generally, a system would consist of 50' of discharge hose from the pump with a Link Manifold coupled in line and then another 25' to 50' of hose with a second Link Manifold, followed by a minimum of 25' of hose attached to a third Link Manifold to create enough back pressure to prevent the premature dissolving of the Link logs. The number of manifolds required will vary based on the reaction achieved during bench testing of the turbid water. The maximum pumping rate should not exceed 500 GPM for the 4" manifold and 1100 GPM for the 6". These will need to be split with a wye or another manifold and each discharge line should be set up as previously described. Applications for the Link Manifold system include direct discharge after filtering and also recirculation within a closed system for clarification within a water body. Sizing the system to the discharge rate or volume of the water to be treated is required to achieve expected results.

We hope that the information provided helps give you some ideas and guidance on how to better deal with the turbid water issues you will encounter. R. H. Moore & Associates, Inc. offers free water testing at our Tampa facility and has field technicians that are available to visit your site and give suggestions on how to set up the proper polymer system for your project.

Thank you,

R. H. Moore & Associates, Inc.  
7834 Depot Lane, Tampa, FL 33637  
Office: (813) 988-0200 | Fax: (813) 985-4533  
Email: [info@rhmooreassociates.com](mailto:info@rhmooreassociates.com)  
[www.rhmooreassociates.com](http://www.rhmooreassociates.com)

**APS Floc**

**Logs**

**FLOC LOG (12"X 3.5"X 6.5")**



**4" LINK LOG BLUE NET (4 LINKS) OVERALL LENGTH 4'8" LINK SIZE (8.5"X 2.5"X 2")**



**6" LINK LOG YELLOW NET (5 LINKS) OVERALL LENGTH 5' LINK SIZE (5.5"X 4"X 3")**





# APPLIED POLYMER SYSTEMS, INC.

## 700 SERIES FLOC LOGS



**706b**



**703d**



**703d#3**



**730b**

The Applied Polymer Systems, Inc. 700 Series Floc Logs<sup>®</sup> are a group of semi-hydrated polyacrylamide blended logs that when placed in the flow of turbid water remove fine particles and reduce turbidity, metals and nutrient values. Each Floc Log<sup>®</sup> is formulated for the soil and water chemistry of the geographical area where the placement and usage are intended.

### Primary Applications

- Mine Tailings and Waste Pile ditches
- Newly cleared Construction or Building Sites drainage
- Road and Highway construction runoff ditches
- Ditch placement for all forms of highly turbid waters
- Dredging operations as a flocculator

### Features and Benefits

- Removes solubilized soils and clay from water
- Prevents colloidal solutions in water within ditch systems
- Binds cationic metals within water, reducing solubilization
- Reduces pesticide and fertilizer loss during rain events from runoff
- Increases soil permeability and water penetration to shallow plants in ditches
- Reduces operational and cleanup costs
- Reduces environmental risk and helps meet compliance

### Specifications / Compliances

- ANSI/NSF Standard 60 Drinking water treatment chemical additives
- 48h or 96h Acute Toxicity Tests (*D. magna* or *O. mykiss*)
- 7 Day Chronic Toxicity Tests (*P. promelas* or *C. dubia*)

Floc Logs are packaged 4 per box.

144 Floc Logs (36 boxes) per skid, mixed skids are permitted

| Item Number | Description         | Wt.     | Dimensions    |
|-------------|---------------------|---------|---------------|
| 703d        | APS 703d Floc Log   | ~ 9 lbs | 12" x 4" x 8" |
| 703d#3      | APS 703d#3 Floc Log | ~ 9 lbs | 12" x 4" x 8" |
| 706b        | APS 706b Floc Log   | ~ 9 lbs | 12" x 4" x 8" |
| 707a        | APS 707a Floc Log   | ~ 9 lbs | 12" x 4" x 8" |
| 708x        | APS 708x Floc Log   | ~ 9 lbs | 12" x 4" x 8" |
| 730b        | APS 730b Floc Log   | ~ 9 lbs | 12" x 4" x 8" |



Build a channel from straw bales, line with plastic and matting; install Floc Logs



The last half to two-thirds of the channel should be wider to collect particles



Dirty water from the pond is pumped down the channel



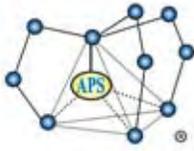
The dirty water passes over the logs, allowing flocculation to begin



The flocculated particles are captured on the matting



Clear water is discharged from the site



# APPLIED POLYMER SYSTEMS, INC.

## 700 SERIES FLOC LOGS

### Placement

Each Floc log is designed for placement within a ditch averaging three feet wide by two feet deep. Floc log placement is based on gallon per minute flow rates. Note: actual GPM or dosage will vary based on site criteria and soil/water testing. In general one Floc Log for every 50-70 GPM of flow rate.

### Directions For Use

#### *Mixing of water and Floc Log is most important*

APS 700 Series Floc Log should be placed within the upper third to half of a ditch system or as close to the source of the turbid water possible. Simply anchor a stake onto the center of the ditch system as far up slope as possible. Place the attachment loop over the stake and lay the Floc Log into the center of the ditch.

APS 700 Series Floc Logs can easily be moved to different locations as site conditions change. The addition of soft armor covered ditch checks below the Floc Log will greatly improve water clarity.

Additional mixing can be necessary when dealing with low flow rates. Blocks, sand bags, wattles or rocks can be added to create additional mixing and turbulence.

### Cleanup

Use soap and water to wash hands after handling. Plastic or rubber gloves are recommended during movement after usage.

### Precautions / Limitations

- APS 700 Series Floc Logs will become extremely slippery when wet.
- Clean up spills quickly, Do Not use water unless necessary, extremely slippery conditions will result.
- APS Floc Log will remain viable for up to 1 year.
- APS 700 Series Floc Log has been specifically tailored to specific soil types.

Soil types in varying geographical areas may require testing. If proper performance of this product is not satisfactory, contact Applied Polymer Systems.



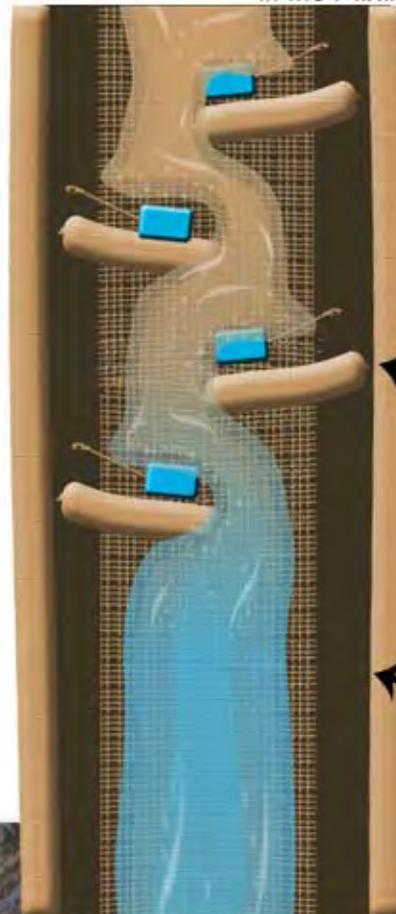
Floc Logs can be used in a variety of different applications to include:

- Split Pipes
- Stormdrains
- Dewatering ditches/channels
- Tank Systems

No matter what application method is being used it is essential that the system have a Mixing Zone and a Particle Collection Zone.

The Mixing Zone is upper one third to half of the channel where the water is most turbulent and the Floc Logs are installed. The turbulence in the Mixing Zone allows the Floc

Log to dissolve releasing the blend of polymers into the water. The suspended particles are then bound together to make larger ones that can be captured or allowed to settle.

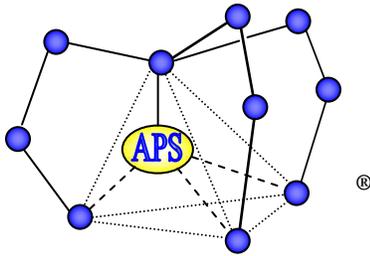


**Mixing Zone**

**Particle Collection Zone**

The Particle Collection Zone, is the remaining half to two-thirds of the system where the flocculated material is captured.

Optional: line the entire channel with a natural fiber matting (i.e. jute, hemp, burlap, coconut) and treat with 700 Silt Stop Powder to charge the system.



## Applied Polymer Systems, Inc.

519 Industrial Drive  
Woodstock, GA 30189  
678-494-5998  
[www.siltstop.com](http://www.siltstop.com)

# Silt Stop<sup>®</sup> and Floc Log<sup>®</sup> Applications – Construction Sites

## SEDIMENT CONTROL

### Storm Water Clarification Using Floc Log<sup>®</sup> Technology

**Floc Logs<sup>®</sup>** are co-polymer blended blocks that provide a convenient method to introduce environmentally safe polymers into continuous or intermittent concentrated flows – such as ditches, inlets, storm drain systems and pump discharges. Each **Floc Log<sup>®</sup>** type is produced to work with specific soil lithologies and/or site water chemistries. Once introduced, **Floc Log<sup>®</sup>** polymers transform elevated levels of fine suspended particles, including colloidal clays, into soil masses easily removed from moving water. Therefore, all construction site storm water can be clarified prior to discharge onto adjacent land or into receiving waters.



### Storm Water Clarification Using Baffle Grids

A **Baffle Grid** is a series of permeable panels that removes and reduces suspended soil masses, previously generated by the **Floc Log<sup>®</sup>**, within a continuous or intermittent storm water flow. They are sized to meet the needs of specific flow rates. **Baffle Grids** may not be required if the **Floc Log<sup>®</sup>** generated soil masses settle readily and a low-energy water flow can be generated prior to discharge.



### Storm Water Clarification Using Particle Curtains

A **Particle Curtain** is similar to a single **Baffle Grid** panel and is used for deep-water discharge locations. More than one **Particle Curtain** may be used in a series to achieve better water clarity. Turbidity particles adhere to the curtain after reaction with the **Floc Logs<sup>®</sup>** installed in the drainage system feeding sediment traps, catch basins and detention ponds.



## EROSION CONTROL

### SILT STOP® Powders and Emulsions

**Silt Stop®** is a family of co-polymer PAM blends, each formulated to work with specific soil lithologies and/or site water chemistries. **Silt Stop®** blends are available in powders and/or emulsions. The application of **Silt Stop®** to soil surfaces will reduce mass erosion, reduce or eliminate fine soil particle suspension, reduce or eliminate colloidal turbidity in runoff, increase soil infiltration rates, decrease runoff quantities and improve vegetation establishment. **Silt Stop®** provides superior tackifying characteristics.

Emulsions may be applied using hydraulic seeder/mulchers or water trucks. Powders may be applied using hydraulic seeder/mulchers, tow-behind or hand held spreaders or pneumatic blowing equipment.

**Silt Stop®** PAM may be used by itself or in conjunction with hydraulically, mechanically or pneumatically applied mulches, to temporarily control or reduce erosion of non-stabilized soil surfaces.

When used in conjunction with sufficient hydraulic mulch and organic reinforcement fibers, **Silt Stop®** binds the mulch, fiber, seed, fertilizer and soil into a strong, durable bonded fiber matrix.

When high erosive stresses are anticipated [steep slopes, long slopes, ditches, swales, pavement edges, etc.], **Silt Stop®** assists in establishing vegetation by binding concurrently-applied seed and fertilizer to a previously placed organic reinforcing grid [burlap, jute, or coconut fiber]. This soft-armoring technique is effective regardless as to whether the **Silt Stop®**, seed and fertilizer are dry-applied or slurry-sprayed.



## WET SOIL SOLIDIFICATION

Mixed with saturated soils, such as mechanical or hydraulic dredge spoils, **Silt Stop®** solidifies the soil particles, enabling on-site disposal or off-site transportation and disposal without liquid spills or dripping. The increase in ease of handling the material will save time, lower costs and increase productivity.



**Silt Stop®** and **Floc Log®** products are made with NSF Standard 60 Drinking Water Additives and have undergone EPA/600/4-90/027F Acute 48-hr. and EPA/600/4-91/002 7 day Chronic testing.



The Link Manifold system facilitates the use of APS Floc logs in-line with standard dewatering pumping operations. The manifold is designed to eliminate the need for open, dewatering ditches and to allow for water treatment in-line. The system uses customized floc logs and incorporates a static, mixing module connected between polymer input ports. The mixer helps to prevent problems that typically occur with laminar non-turbulent flows in pipe systems. The mixer generates turbulence of water flow to assure proper interaction with the floc logs so as to provide maximum efficiency of the dissolved polymers.



The Link Manifold can be used in a variety of applications that include recirculation to clean turbid water within ponds and for direct discharge when using the appropriate filters to collect flocculated particles created by the manifold system.



The Link Manifold is available in 4 and 6 inch pipe diameter size. Generally, this system is set up in-line on the discharge side of the pump with lay flat hoses between manifolds. Basic set up consists of 50' of discharge line, with a manifold coupled in-line and 50' of hose between each manifold. Water turbidity levels, pumping rates and other jobsite variables will determine the number of manifolds and the amount of hose required. The appropriate system can be selected once water testing has been performed and floc log types and reaction times have been established. R. H. Moore & Associates, Inc. provides testing of water samples free of charge at our facility in Tampa, Florida.



**R. H. Moore & Associates**  
Soil Stabilization & Erosion Control

# FLOC PIT SYSTEM

The Floc Pit is a system that can be set up on nearly any site in less than an hour. The system consists of modular 6-foot sections with intake and outlet pipes and changeable filters that can be tailored to various turbid water conditions and flocculated particle sizes to facilitate efficient capture. With a connected dimension of 8 by 28 feet, the system allows enough residual time, in most applications, for flocculated particles to drop out of suspension for collection by the filters. Dewatering bags can be attached at the outlets for additional polishing and water disbursement. The Link Manifold pipe system, used in conjunction with the Floc Pit, make for a completely portable turbid water discharge treatment system that can be hauled in a utility trailer and utilized on jobsites with limited dispersion areas.



**THE FLOC PIT SYSTEM IS A PORTABLE, RENTABLE OPTION FOR PARTICLE COLLECTION**



**R. H. Moore & Associates**  
Soil Stabilization & Erosion Control

# **Ditch Check Systems**

# R. H. MOORE ASSOCIATES, INC. - APS DITCH CHECK SYSTEM CONSTRUCTION GUIDELINE

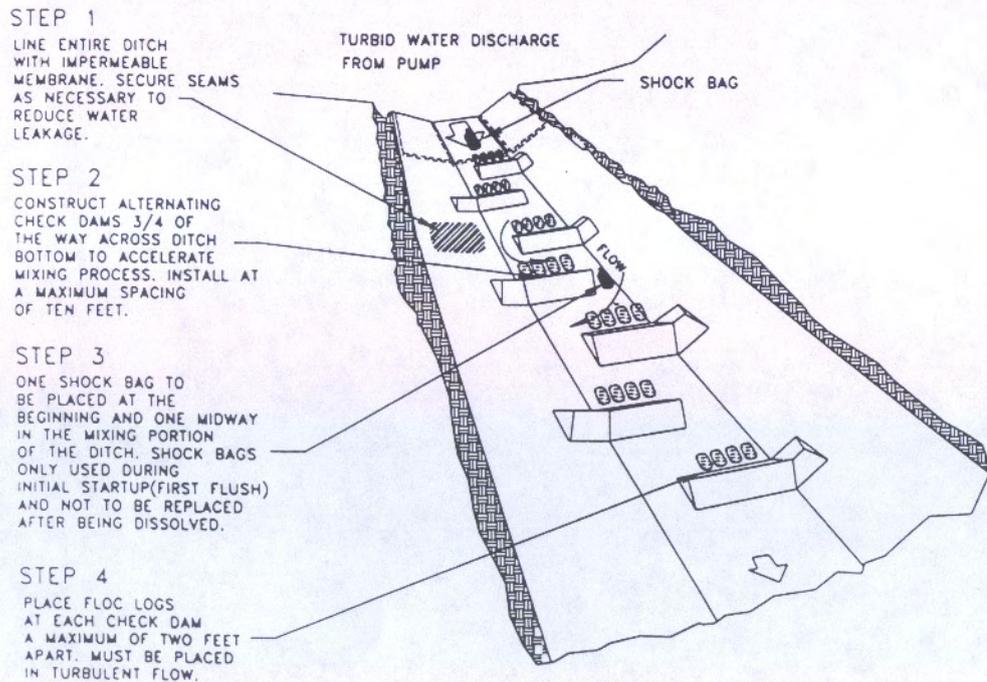
8917 Maislin Drive, Building E - Tampa, FL 33637 - Phone: 813-988-0200 - Fax: - 813-985-4533

| PUMPING RATES   |                       | DITCH BOTTOM      | VELOCITIES  | 30 SECOND MIXING TIME REQUIRED   |  |                                   |                                  | 45 SECOND MIXING TIME REQUIRED   |  |                                   |                                  | 60 SECOND MIXING TIME REQUIRED   |  |                                   |                                  |
|-----------------|-----------------------|-------------------|---|----------------------------------|--|-----------------------------------|----------------------------------|----------------------------------|--|-----------------------------------|----------------------------------|----------------------------------|--|-----------------------------------|----------------------------------|
| GALLONS PER MIN | CUBIC FEET PER SECOND | WIDTH IN FEET (1) | 4" DEEP FLOW VELOCITIES EXPECTED IN FEET PER SECOND | LENGTH OF MIXING PORTION IN FEET | LENGTH OF SETTLING PORTION IN FEET (2) | TOTAL LENGTH OF DITCH IN FEET (3) | NUMBER OF FLOC LOGS REQUIRED (4) | LENGTH OF MIXING PORTION IN FEET | LENGTH OF SETTLING PORTION IN FEET (2) | TOTAL LENGTH OF DITCH IN FEET (3) | NUMBER OF FLOC LOGS REQUIRED (4) | LENGTH OF MIXING PORTION IN FEET | LENGTH OF SETTLING PORTION IN FEET (2) | TOTAL LENGTH OF DITCH IN FEET (3) | NUMBER OF FLOC LOGS REQUIRED (4) |
| 100-1000        | .23-2.23              | 3                 | 1.82  | 55                               | 55-220                                 | 110-275                           | 10                               | 82                               | 82-328                                 | 164-410                           | 16                               | 110                              | 110-440                                | 220-550                           | 22                               |
| 1000-2000       | 2.23-4.46             | 6                 | 1.99  | 60                               | 60-240                                 | 120-280                           | 18                               | 90                               | 90-360                                 | 180-450                           | 27                               | 120                              | 120-480                                | 240-600                           | 36                               |
| 2000-3000       | 4.46-6.69             | 8                 | 2.12  | 64                               | 64-256                                 | 128-320                           | 24                               | 96                               | 96-384                                 | 192-480                           | 40                               | 128                              | 128-512                                | 256-638                           | 52                               |
| 3000-4000       | 6.69-8.92             | 11                | 2.15  | 65                               | 65-260                                 | 130-325                           | 35                               | 97                               | 97-388                                 | 194-485                           | 50                               | 129                              | 129-516                                | 258-645                           | 65                               |
| 4000-5000       | 8.92-11.15            | 14                | 2.16  | 65                               | 65-260                                 | 130-325                           | 49                               | 98                               | 98-392                                 | 196-588                           | 70                               | 130                              | 130-520                                | 260-650                           | 91                               |

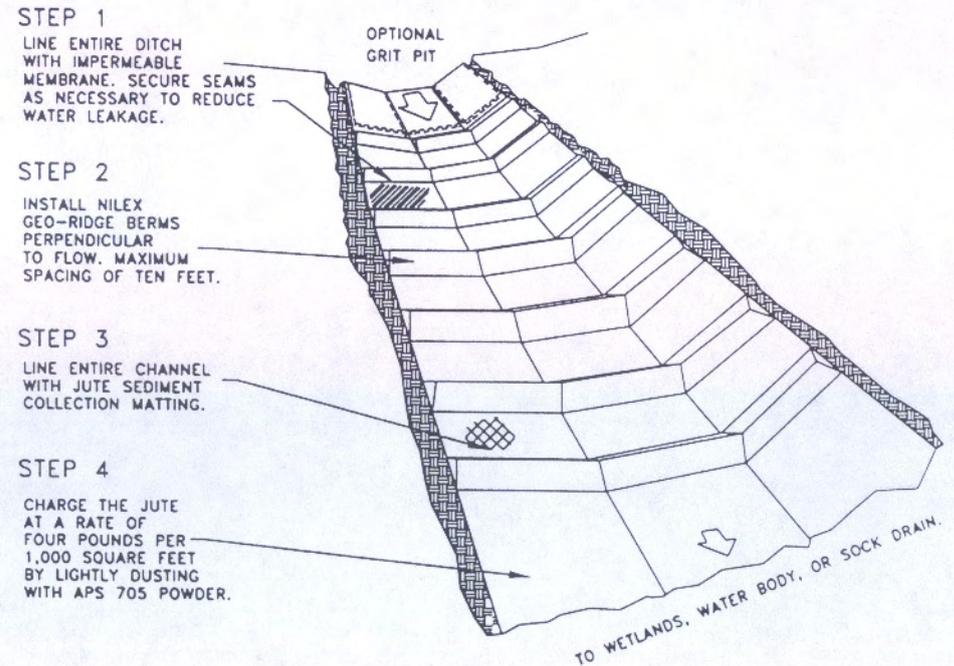
- (1) This chart is based on each ditch check system being constructed at a 1% gradient, 3 feet deep with 3H:1V side slopes.
- (2) Length of settling portion can range from 1 to 4 times mixing portion of ditch. Length determined by available area and frequency of maintenance required.
- (3) Varies based on length of settling area chosen for construction.
- (4) Number required based on Floc Logs being placed a maximum of 2' apart at each check dam within the mixing portion of the ditch. In addition, 2 shock bags should be used during initial startup (see detail below)

This chart is intended for use as a construction guideline and may require modifications to fit the various conditions of each site. All ditch check systems require maintenance with some modification in the field to achieve optimum results.

## MIXING PORTION OF DITCH CHECK SYSTEM



## SETTLING PORTION OF DITCH CHECK SYSTEM









## Polymer Enhanced Stormwater Treatment Ditch Polymer Enhanced Dewatering Application

Polymer Enhanced Stormwater Treatment Ditches are used as a passive continuous flow chemical treatment system to introduce non-toxic site-specific Silt Stop polymers and Floc Logs to turbid waters in such a manner to facilitate mixing and reaction between the Silt Stop powder and Floc Logs and the suspended particles. Collection of the flocculated particulate greatly reduces turbidity in stormwater.



A ditch is built, using straw or hay bales, running downhill. The bales are staked down to hold them in place. The far end of the ditch is built wider; this is where the particle collection will occur



The ditch is lined with plastic sheeting to prevent erosion to the soil due to the high velocity flow expected.



The site-specific Floc Logs are secured in the upper end of the treatment ditch.

The logs are placed in a series running down the ditch, to ensure the required mixing is achieved.



The lower part of the ditch is where the particle collection will take place. This is built wider than the mixing portion, to allow the water to slow its velocity.

Jute matting is secured in place, and is applied with the site-specific Silt Stop powder to aid in particle collection.



The pump is set up so that the feed is only pulling turbid water into the treatment ditch.

The turbidity in the pond is about 700 NTU.



The pump was turned on, starting the flow down the treatment ditch.

The flow rate was 650-700 GPM with a 6" 300 ft line with approx. 20-22 ft head.



The water as it flowed off of the end of the jute field had a turbidity of 11 NTU.



The water flowed down a grassy swale and over a silt fence before exiting the site. The turbidity as it exited the site was 2.1 NTU.



RH Moore & Associates

7834 Depot Lane

813-988-0200

Tampa, FL 33637

800-330-2333 (FL toll free)

[www.rhmooreassociates.com](http://www.rhmooreassociates.com)

# Innovations

In Stormwater Treatment

## Bonnie Mine Road Project Summer 2006

In the summer of 2006, Moretrench of Riverview was working on the Bonnie Mine road project in Bartow Florida when heavy seasonal rains threatened to delay the project. Excess water on the site had already been a problem, and dewatering operations were being used to manage the water onsite. With all the rains the retention ponds were near capacity and the water needed to be removed to continue operations on site. The pumping operations would have to be increased to accommodate the high volumes of added stormwater.



The rains had carried excess sediment into the retention ponds, causing turbidity problems. The excess water needed to be removed quickly, which did not allow time for the sediment to settle out of the stormwater. In fact the dewatering operations would stir up the sediment, causing elevated turbidity in the ponds and in the water to be discharged.

The turbidity created by the pumping operations and rainfall posed a challenge for the project to stay in compliance. Turbidity readings at the site were over 800 NTU, well above the allowable limits for discharge. Environmental impacts from turbidity plumes, avoiding fines for discharging out of compliance water, and potential project delays were the main focus for project managers on site.



Moretrench contacted R. H. Moore and Associates, Inc. of Tampa to evaluate the turbidity issues and find a feasible solution. After going to the site and reviewing the operation it was determined that a continuous flow-through stormwater treatment ditch check system with APS Floc Logs would be the least intrusive and most cost-effective solution available, while allowing for a quick set-up and easy relocation as needed.

Samples were taken of the turbid stormwater and sent for site-specific testing to find the best Floc Log to use with the soil type present. It was found that the APS 703d and 703d#3 Floc Logs worked best on the site, along with the APS 705 Silt Stop powder. The testing results provided site-specific performance information, and showed that a duplex system would be required to drop the NTU levels and bring the project within compliance.



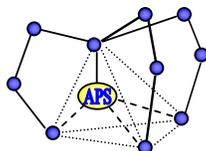
With this information, the stormwater treatment ditch could be designed. A long treatment ditch was created and lined with geotextile fabric to protect the underlying soil from erosion. Wire mesh checks were installed in the first portion of the ditch to facilitate mixing around the Floc Logs. The 703d and 703d#3 Floc Logs were placed around the checks where the turbid water would flow over and around them. The Floc Logs dissolve into the turbid water and react with the suspended sediment causing flocculation to occur.



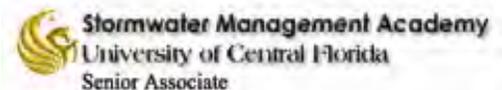
Jute matting was installed at the end of the treatment ditch system and applied with the APS 705 Silt Stop powder. The jute matting provided a surface for the flocculated particles to adhere to and the 705 powder helped capture the fines still in suspension.

The stormwater treatment ditch with APS Floc Logs and powder allowed for continuous pumping and direct discharge off-site by dropping the NTU levels below 17, well within regulatory agency limits.

For Technical Information  
or questions please contact:



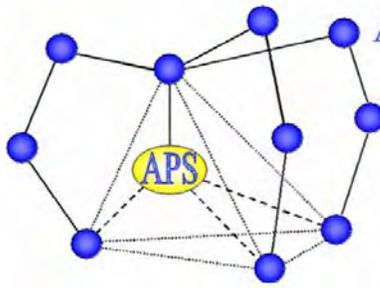
Applied Polymer Systems, Inc.  
519 Industrial Drive  
Woodstock, GA 30189  
678-494-5998



**APS Mud**

**Removal**

**Polymers**



Applied Polymer Systems, Inc.

519 Industrial Drive  
Woodstock, GA 30189  
[www.siltstop.com](http://www.siltstop.com)

## Polymer Enhanced Mud/Sediment Removal

Highly saturated soils can be messy and difficult to remove without spills or dripping. Adding a soil-specific polymer to the soil and mixing it in will bind the soil together, thickening the soil and making it easier to remove.

- i. Application rate: 50 pounds of Silt Stop powder/ 100-200 cubic yards. This application rate will vary with soil type and content.
- ii. Pump off the water from the pond, leaving the wet sediment behind. Note that there can be **no standing water**.
- iii. Apply the site-specific Silt Stop powder **evenly** to the surface of the sediment, and use the bucket of the removal equipment to **stir it into the soil** to a maximum of 3 feet deep/ application. **DO NOT** dump the Silt Stop into a pile!
- iv. Allow 10-20 minutes while mixing for the polymer to react with the soil, the more mixing you do, the less time this will take.
- v. The polymer will cause the sediment to thicken, making it easier to remove without liquid spills or dripping.
- vi. The thickened sediment can then be used as a topsoil amendment to improve vegetation establishment, especially in areas prone to erosion. This material is not suitable for use as structural fill.

## Step-by-Step Polymer Enhanced Mud Removal



### Step 1: Remove Standing Water.

Pump the standing water off or dig a sump and allow the water to drain off of the working area.

The polymer will not react properly if there is standing water covering the sediment.



### Step 2: Apply Silt Stop powder.

Apply the site-specific Silt Stop powder evenly to the surface of the wet sediment.

In this photo a leaf blower has been modified (small funnel added to the nose) to apply the granular Silt Stop powder.



### Step 3: Mix the Silt Stop powder into the soil.

Using the excavation equipment, stir the powder into the mud to a depth of three feet. While mixing, the sediment should bind together and thicken.

If the sediment is deeper than three feet, the mixing and removal will have to be done in layers.



#### Step 4: Removal

Allow 15-20 minutes of mixing for the Silt Stop powder to react with the sediment, thickening it up. There should be a noticeable change in the texture of the sediment. Once the reaction is complete, the sediment can be removed in full bucket-loads just like normal dirt.

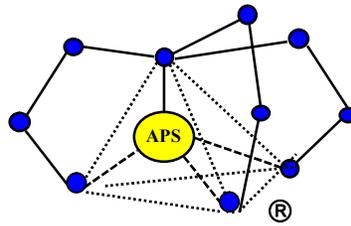


Thickened sediment can be used as a topsoil amendment, especially in areas prone to erosion, to improve vegetation establishment though it is not suitable for use as a structural fill material.

# **Supplemental Products**

## **Applied Polymer Systems, Inc.**

519 Industrial Drive  
Woodstock, GA 30189  
678-494-5998  
678-494-5298 Fax  
[www.siltstop.com](http://www.siltstop.com)



# **APS 712 Water Clarification Applications**

APS 712 powder may be applied directly to turbid water or mixed into a hydroseeder and spray applied to turbid water. (Mixing of the 712 and turbid water must be performed for adequate results.)

## **Direct Water Application:**

Apply the 712 powder evenly to the water surface. Mix as well as possible for best results. Dosage rate should be 25 pounds of 712 powder per acre foot of water. (325,000 gallons)

## **Hydraulic Application:**

Mix 25 pounds of APS 712 powder into 3000 gallons of water into a hydroseeder. Add the powder slowly with the mixer running. (DO NOT ADD THE POWDER ALL AT ONCE)

Spray the mixture over the surface of the water. (A jet nozzle sprayed with force into the water will aid in mixing)

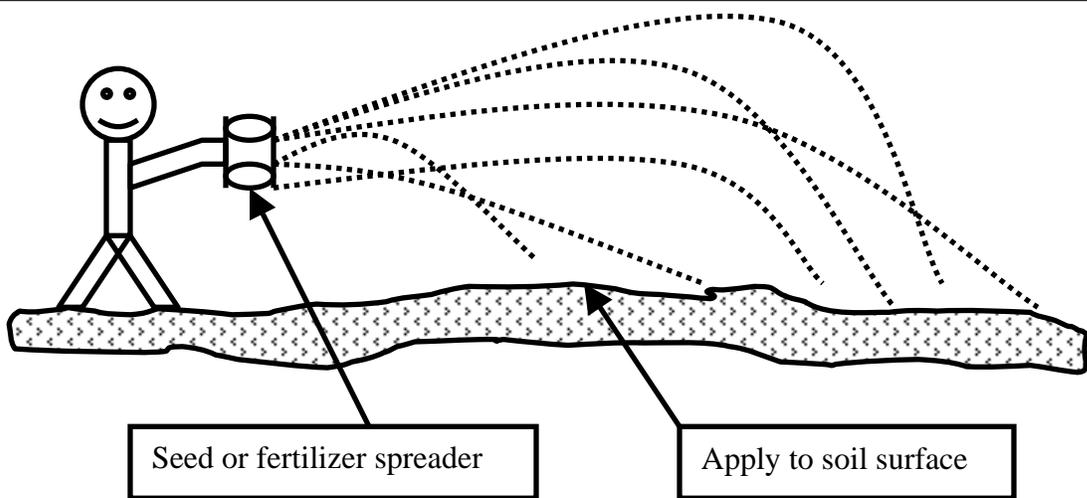
One load will treat one acre-foot of turbid water. Additional mixing may be required for best results.

**Note:** Additional mixing is best performed by using a pumping system. Draw the water from one side of the pond and discharge to the opposite side. Ponds containing less than 5 acre-feet of water will result in good clarity. Consult your local APS distributor for performance testing and best procedures.

**Note:** For additional clarity 1/20 normal dosage (only) of aluminum sulfate liquid (Alum) may be added. Caution must be used as this will lower water pH values.



## PM (Dry Silt Stop Form)



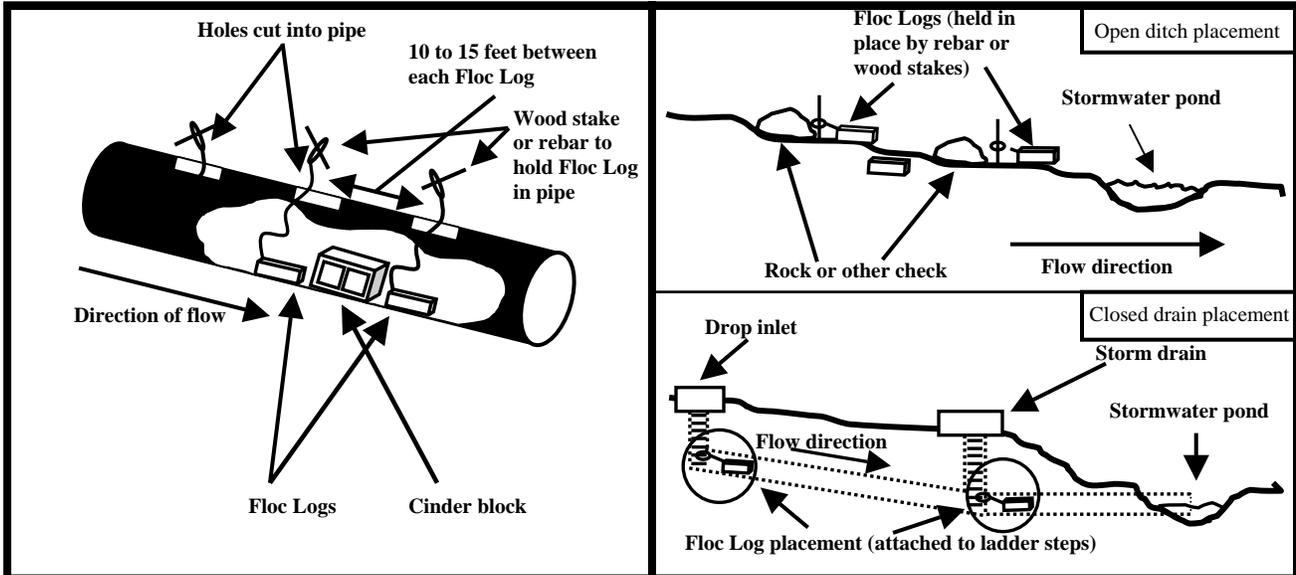
### Notes:

- 1) Dry Silt Stop shall be applied using a seed or fertilizer spreader or may be mixed with other dry spread additives.
- 2) Dry Silt Stop shall be covered with straw, mulch, matting or jute.
- 3) Application rate shall be 10 pounds/acre but not greater than 25 pounds/acre.
- 4) For use on all slope conditions.

(All Silt Stop shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

# PM-F

## (Floc Log placement for pipes, ditch and storm drains)



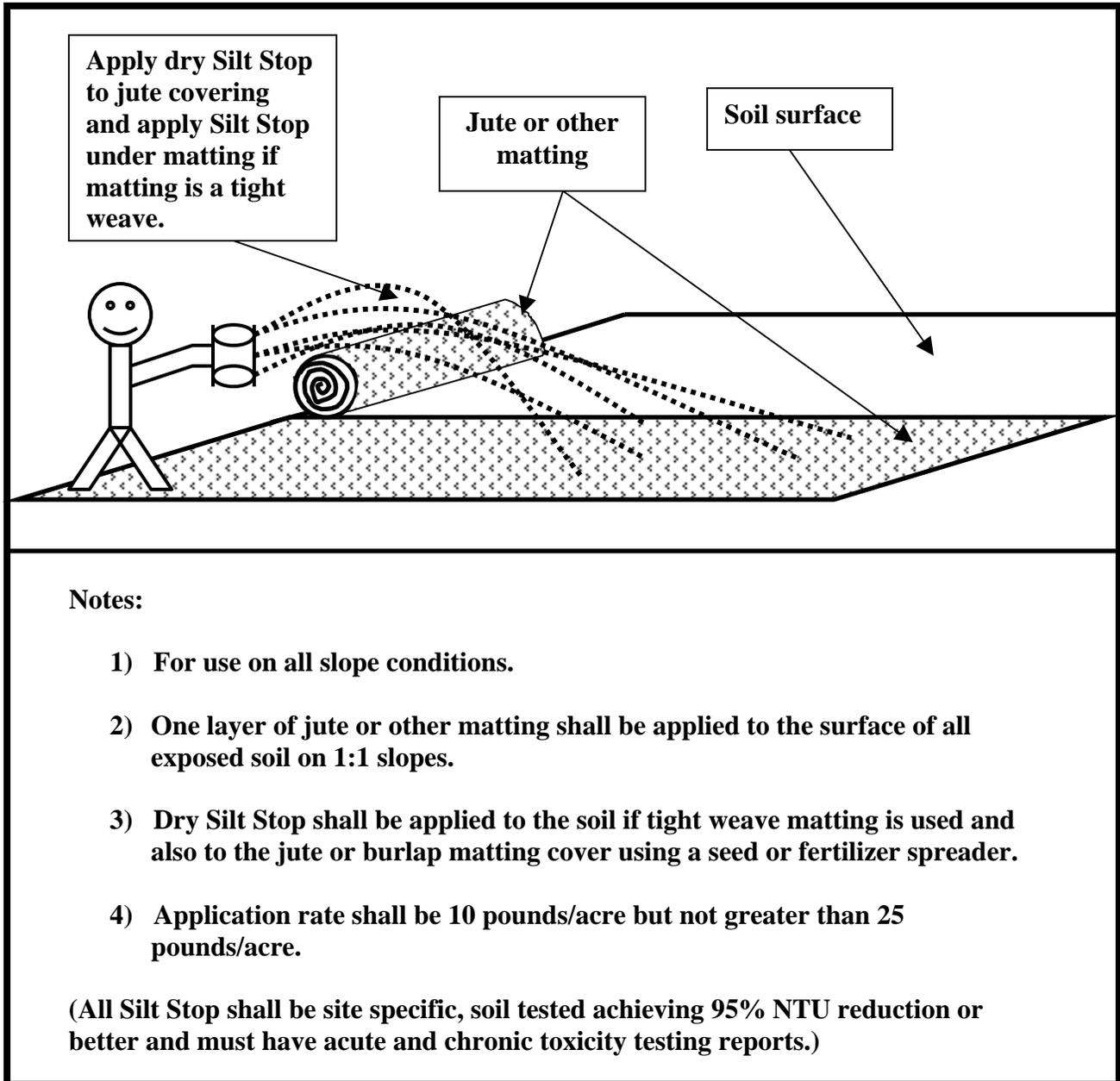
### Notes:

- 1) Place Floc Logs far enough upstream in turbid flows to allow adequate mixing time. (Mixing time and Floc Log type are determined from the sample analysis.)
- 2) Floc Logs should be placed 10 to 15 feet apart in a row or at points of highest water velocity; whichever is most convenient.
- 3) The number of Floc Logs placed on the site is based on results from the sample analysis. Floc Logs shall be placed in all catch basins and after all downsides of rock checks.

(All Floc Logs shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

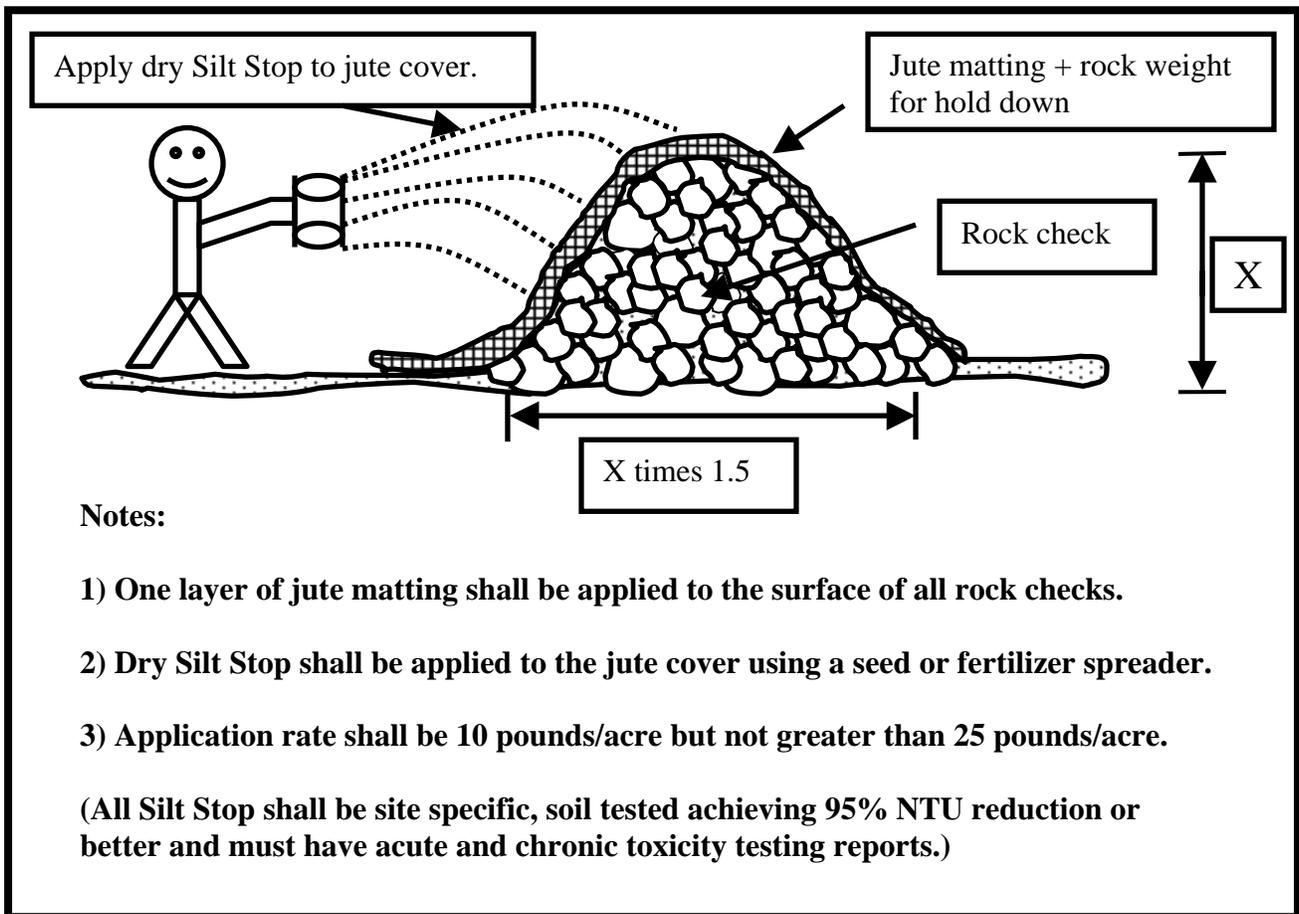


## (Dry Silt Stop Form Soft Armoring Technique for Matting)





## PM (Dry Silt Stop Form Rock Check Application)



### Notes:

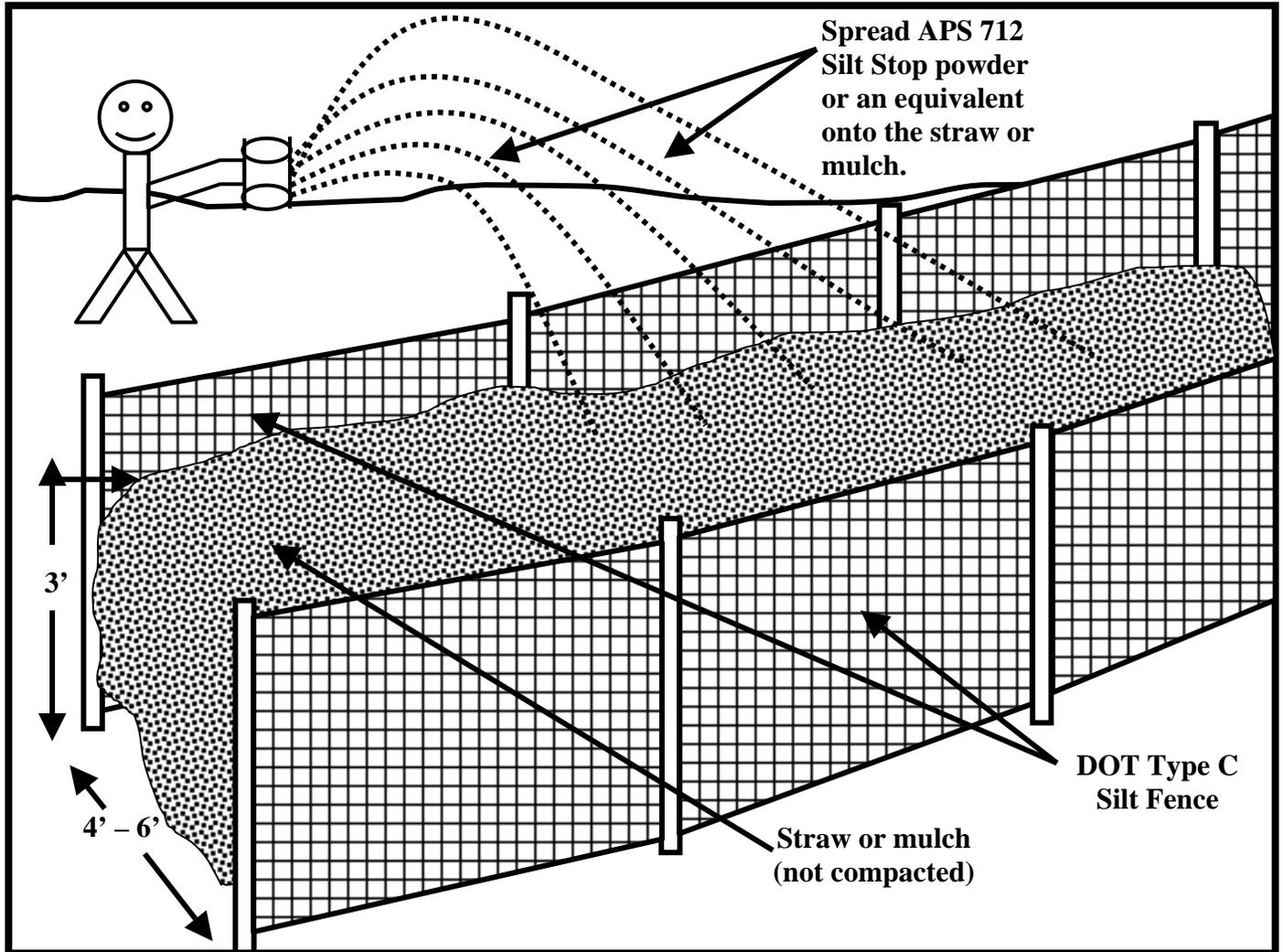
- 1) One layer of jute matting shall be applied to the surface of all rock checks.
- 2) Dry Silt Stop shall be applied to the jute cover using a seed or fertilizer spreader.
- 3) Application rate shall be 10 pounds/acre but not greater than 25 pounds/acre.

(All Silt Stop shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

# SRB

## (SRB) Sediment Retention Barrier

Use for fine sediment retention between silt fences. Install at low areas during grading.



- 1) Use in all low areas during the grading phase.
- 2) Place 2 rows of DOT type C silt fence 4 to 6 feet apart. Place straw or mulch 3 feet deep between the silt fences.
- 3) Dry Silt Stop powder or an equivalent should be spread throughout the straw or mulch using a seed or fertilizer spreader.

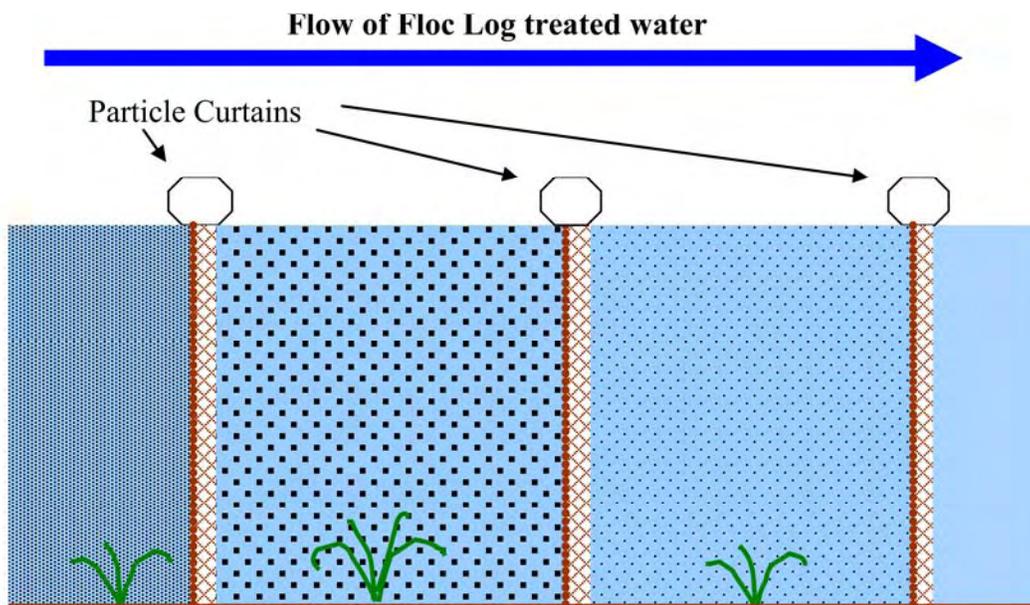
(All Silt Stop shall be site specific, soil tested achieving 95% NTU reduction or better and must have acute and chronic toxicity testing reports.)

## Particle Collection

### Particle Curtains

Polymer enhanced particle curtains are a series of curtains made of jute and coconut fabrics attached to floats to be used in wet ponds and flowing waterways to collect fine particles from turbid water after polymer reaction. Particle curtains are to be used in conjunction with site-specific Floc Log polymers upstream of the curtains.

- i. This BMP is intended for particle collection only. It is not intended to be a stand-alone BMP, as it is not adequate sediment control by itself. This BMP should be used with one of the stormwater treatment systems as outlined in the previous section.
- ii. Install the particle curtains in lines perpendicular to the flow across the sediment pond or waterway.
- iii. The particle curtains will float.
- iv. Inspect and repair or replace the particle curtains as required.





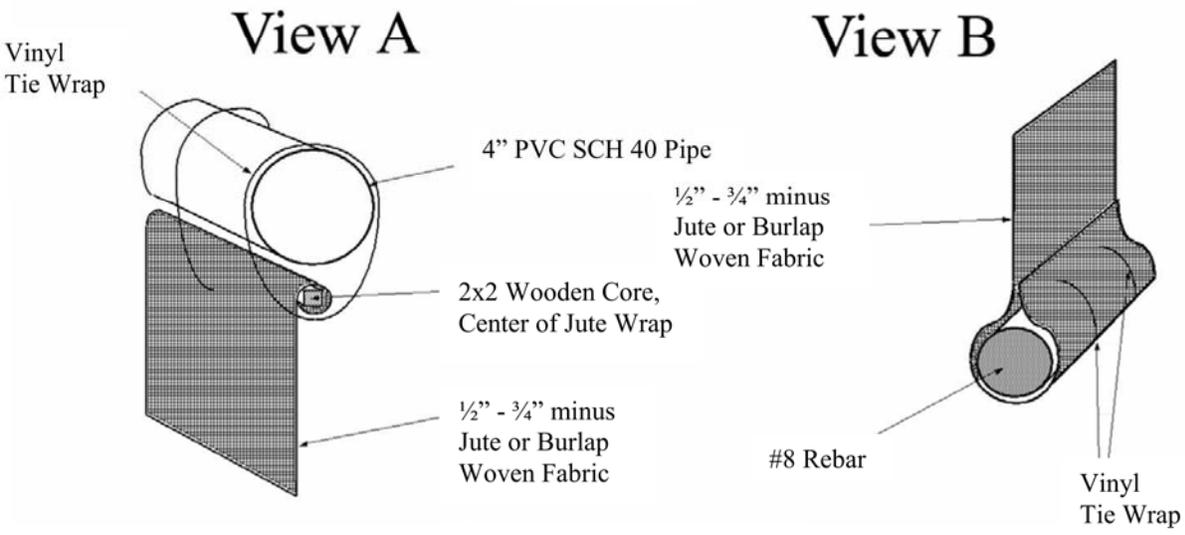
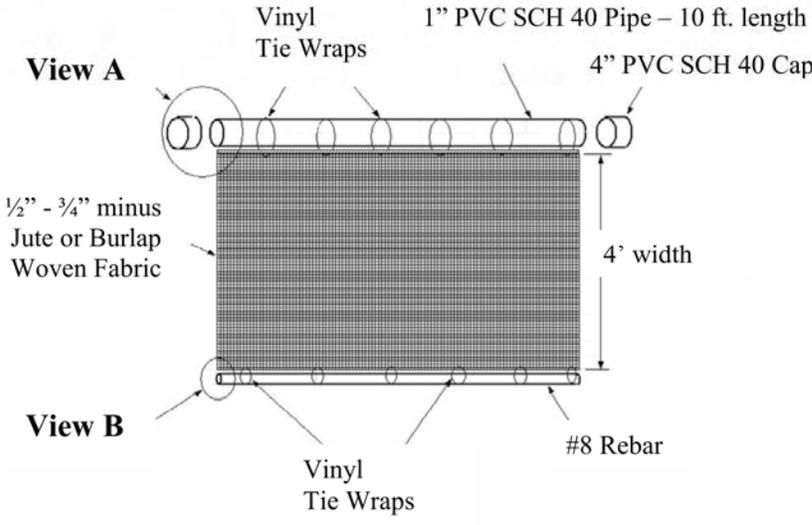
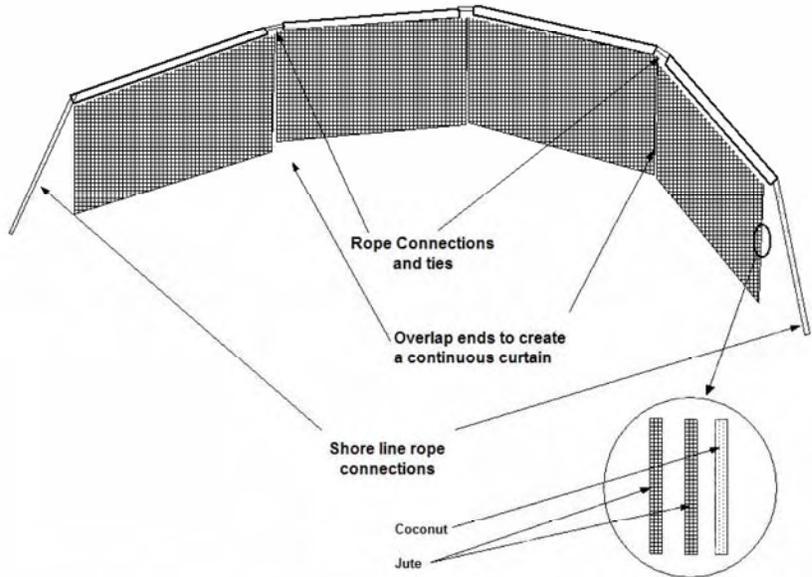
(Left) The particle curtain being lowered into the stream and secured along the banks.

(Right) The particle curtain floating in the stream. Note the other particle curtains in place further down stream in the background.



(Left) A series of particle curtains collect suspended flocculated material resulting in progressively clearer water.

**Example Construction of a Particle Curtain,  
Measurements must fit site conditions!**



# High-Strength Permeable Dewatering Bags



- Dewatering bags are effective in collecting sediment from dewatering operations. Sediment-laden water is pumped into the bag and filtered through the nonwoven geotextile.
- Dewatering bags should be placed on a level area before filling to assure that they are stable. Insert pump's discharge hose into the bag and secure the connection with a clamp or tie wire.
- Dewatering bags can handle most applications utilizing a 2" to 4" discharge hose.

These high-strength permeable bags are made from 8oz. nonwoven needle-punched geotextile with an AOS of 70 US sieve and 100 gpm/ft<sup>2</sup> water flow.

Caution should be used when filling, as high pumping rates and high sediment loads can cause the bag to burst.



**R H Moore & Associates**  
Soil Stabilization & Erosion Control



# Biodegradable Jute Erosion Control Matting

## Stop Erosion Damage Naturally

This coarse open mesh fabric keeps the soil in place until the plant material takes root.

### Your #1 Solution to Meet the Challenges of Erosion Control

- Helps establish vegetation on steep slopes
- Holds seed and soil in place
- Excellent coverage in all types of terrain
- Easy to apply/reposition
- Conforms to difficult surfaces
- Biodegradable, 100% natural
- Acts as a soil nutrient
- Used to collect sediment in ditch check systems



### Specifications - Jute Matting

|                  |                                 |
|------------------|---------------------------------|
| Structure:       | Woven                           |
| Yarn:            | Jute, undyed, unbleached        |
| Fabric Width:    | 48 inches                       |
| Fabric Length:   | 225 feet                        |
| Square Yards:    | 100                             |
| Weight:          | .92 pounds per square yard      |
| Roll Weight:     | 92 pounds                       |
| Yarn Count-Warp: | 78 per width, minimum           |
| Weft:            | 42 per linear yard, minimum     |
| Absorption:      | >450% of fabric weight          |
| Open Area:       | 60 to 65%                       |
| Life:            | 1 to 2 years                    |
| Coverage:        | 50 rolls per acre (approximate) |

### Sod Staples also available

U-shaped, 500 per box, Usage: 200 staples per roll  
Type: 10 inch, 11 gauge, 35 pounds per box  
(other lengths available)



**R H Moore & Associates**  
Soil Stabilization & Erosion Control

# R. H. Moore & Associates, Inc. is Currently Stocking Alum

Aluminum Sulfate (Alum) is a widely-used and versatile industrial chemical. When applied properly, it can be an inexpensive and effective method for treating a broad range of problems. Alum can act as a coagulant and flocculant to reduce turbidity and other associated pollutants.

Turbidity is difficult to control if fine particles are suspended in dewatering discharges from a construction site. Holding ponds are effective at removing larger matter by gravity settling, but are ineffective at removing smaller particulates such as clay and fine silt. Alum treatment may be used to decrease the turbidity of water, which could allow for offsite discharge.

Alum can also be used in conjunction with Applied Polymer Systems polyacrylamides. There are certain situations where Alum can help enhance the final result of the APS polymers.



**R. H. Moore & Associates**  
Soil Stabilization & Erosion Control

7834 Depot Lane, Tampa Florida 33637  
**Toll Free: (800) 330-2333 Fax: (813) 985-4533**  
www.rhmooreassociates.com E-mail: info@rhmooreassociates.com