

THE EVOLUTION OF JOBSITE SEDIMENT CONTROL TECHNOLOGY



JOBSITE SEDIMENT CONTROL TECHNOLOGY

- ❑ TECHNOLOGY WAS VIRTUALLY NON-EXISTENT JUST A FEW DECADES AGO**
- ❑ EARLY SOLUTIONS INVOLVED CREATIVE USE OF EXISTING MATERIALS**
- ❑ NEW JOB SPECIFIC TECHNOLOGY IS NOW AVAILABLE**
- ❑ THERE IS MORE TO COME!**

SEDIMENT

**SEDIMENT IS MATTER
DEPOSITED BY SOME
NATURAL PROCESS**

SEDIMENT PROBLEMS

- **DEPOSITION ONTO ADJACENT PROPERTY**
- **CLOGGING OF DRAINAGE SYSTEMS**
- **DEPOSITION INTO WATERWAYS**
- **TRACKING ONTO ROADWAYS**



SEDIMENT CONTROL



- TEMPORARY MEASURES OR STRUCTURES DESIGNED TO CONTAIN SEDIMENT

SEDIMENT CONTROL VS. EROSION CONTROL

SEDIMENT CONTROL

- COSTLY
- UNATTRACTIVE
- TEMPORARY
- HIGH MAINTENANCE
- SHOULD BE ELIMINATED AS SOON AS POSSIBLE

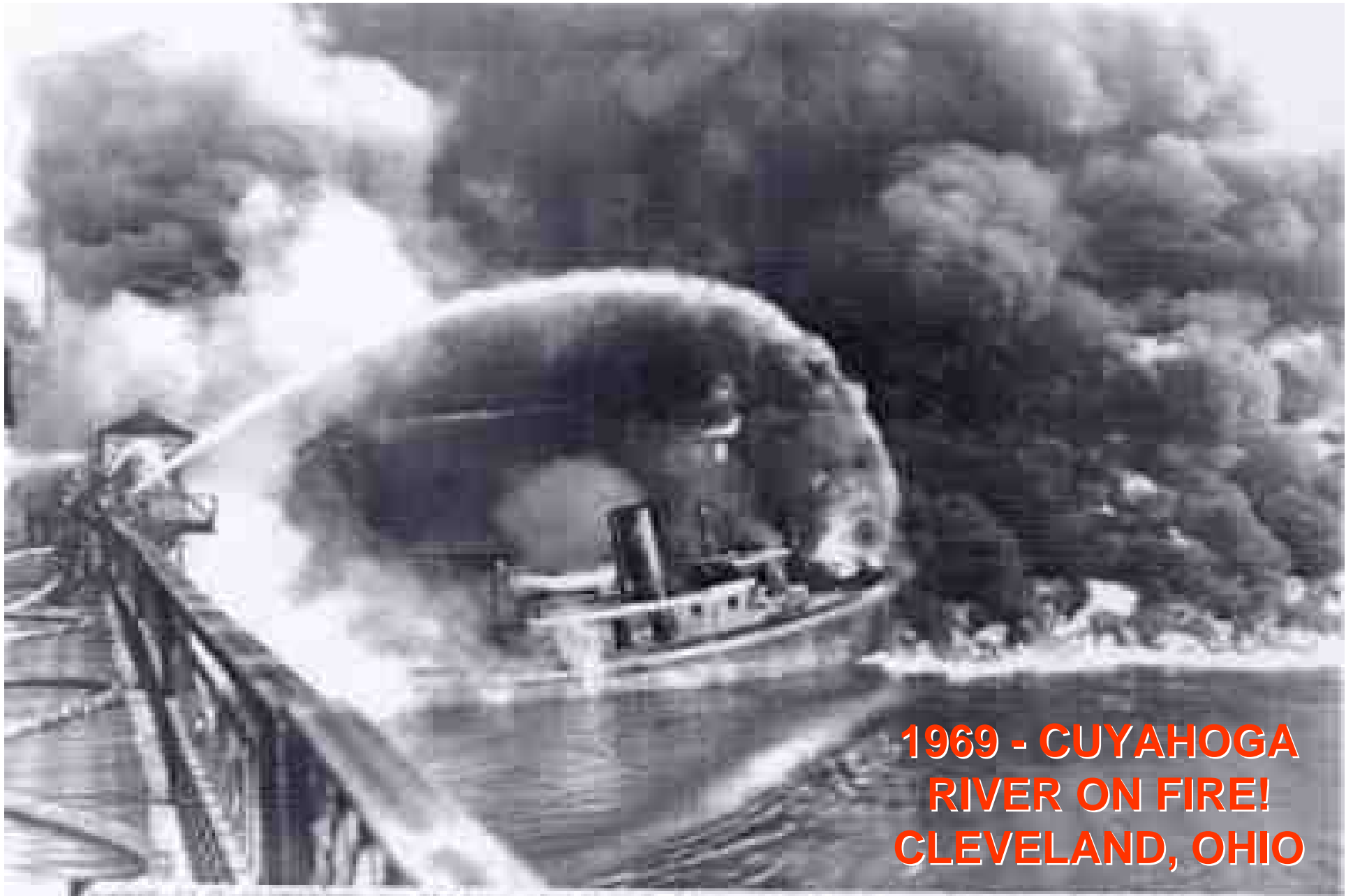
EROSION CONTROL

- COST EFFECTIVE
- ATTRACTIVE
- PERMANENT
- MINIMAL MAINTENANCE
- SHOULD BE IMPLEMENTED AS SOON AS POSSIBLE

RACHEL CARSON

- HER BOOK, *SILENT SPRING*, RELEASED IN 1962, BROUGHT WIDESPREAD ATTENTION TO THE ENVIRONMENTAL MOVEMENT
- EPA WAS FORMED IN 1970





**1969 - CUYAHOGA
RIVER ON FIRE!
CLEVELAND, OHIO**

On November 19, 1969, a fire broke out on the Cuyahoga River in Cleveland, Ohio. The fire was caused by a combination of factors, including a lightning strike on a storage tank, a leak of oil from a ship, and a fire in a nearby industrial facility. The fire burned for several days, and the smoke and soot from the fire were visible from miles away. The fire was a major environmental disaster and led to the passage of the Clean Air Act in 1970.

THE CLEAN WATER ACT

- **THE DRIVING FORCE BEHIND A RAPIDLY GROWING INDUSTRY**
- **ENFORCED NATIONALLY BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA)**



NPDES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

- PHASE I ENACTED IN 1972
- ALL PROJECTS OF FIVE ACRES OR MORE WERE IMPACTED
- HAS CREATED A STRONG DEMAND FOR COST EFFECTIVE SOLUTIONS

SEDIMENT

CONTROL

TECHNOLOGY

SEDIMENT CONTROL

- **COSTLY BUT NECESSARY**
- **MUST BE INSTALLED PROPERLY**
- **MUST BE MAINTAINED**
- **MUST BE REMOVED ON A TIMELY BASIS**



SEDIMENT CONTROL TIPS



- I. MINIMUM AMOUNT OF SOIL SHOULD BE EXPOSED AT ANY GIVEN TIME
- II. DISTURBED AREAS SHOULD ALSO BE KEPT TO A MINIMUM
- III. PERMANENT EROSION CONTROL MEASURES SHOULD BE INSTALLED AS QUICKLY AS POSSIBLE!

JOBSITE BASICS



MUST PROTECT:

- ADJACENT PROPERTY
- NEARBY STREAMS AND WATERWAYS
 - ROADWAYS
- STORM WATER INLETS

PROBLEMS



MORE PROBLEMS



SAY IT'S NOT TRUE



PERIMETER PROTECTION

- **SILT FENCE MOST COMMONLY USED**
- **SHOULD BE INSTALLED ANYWHERE WHERE SEDIMENT COULD LEAVE PROPERTY**
- **THE BE EFFECTIVE IT MUST BE INSTALLED CORRECTLY AND MAINTAINED PROPERLY**



SILT FENCE INSTALLATION

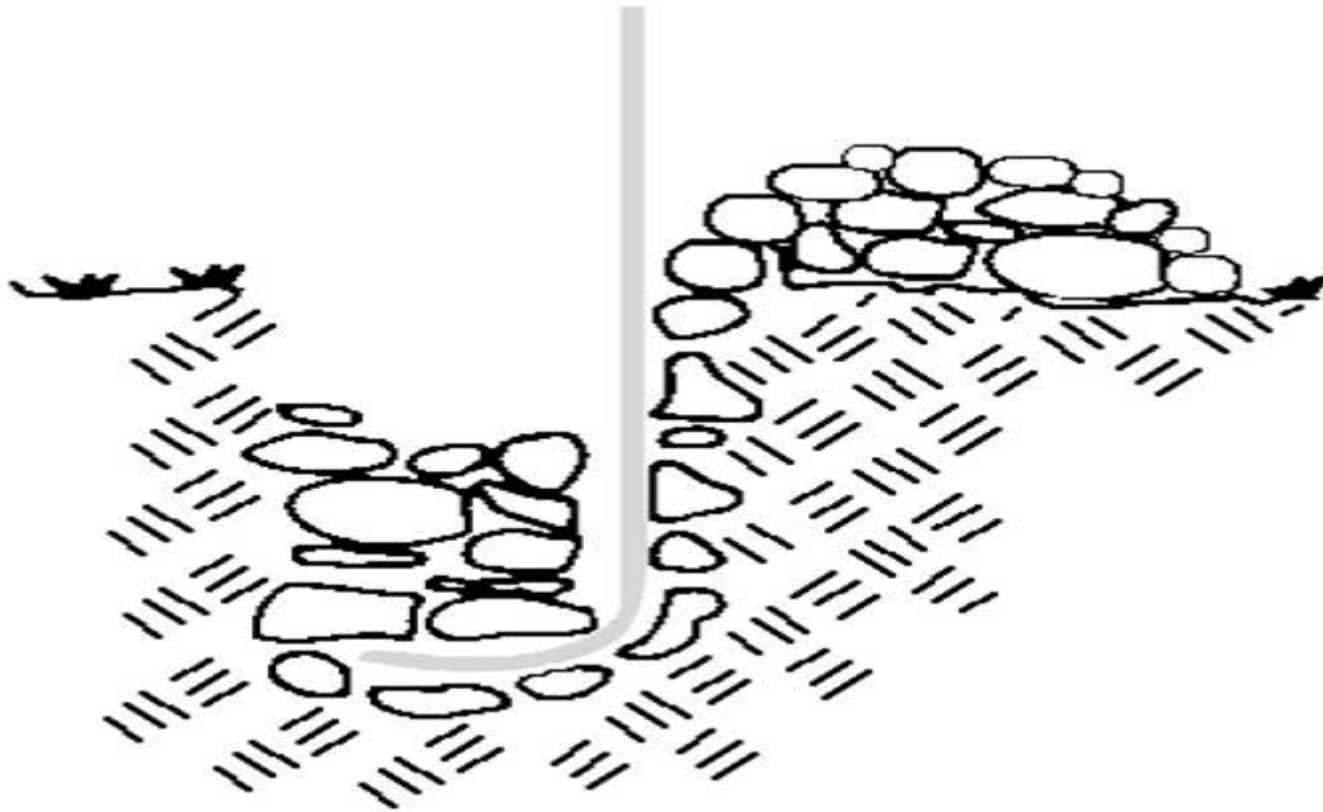


- **MUST BE TRENCHED IN TO BE EFFECTIVE**
- **MACHINE INSTALLATION COMBINES INCREASED SPEED WITH SLICING METHODOLOGY**



**Half the spoil
is unavailable
for backfill**

Trenching Method



Half the backfill is unavailable.
Washouts are common.

SILT FENCE NOTES

- **POSTS CAN BE WOOD OR STEEL**
- **POST QUALITY & SPACING & FABRIC QUALITY ARE CRITICAL COMPONENTS**
- **WIRE BACK SILT FENCE SOMETIMES SPECIFIED**
- **FABRIC WIDTHS VARY**
- **D. O. T. REQUIREMENTS VARY STATE TO STATE**
- **THERE IS A LOT OF POOR QUALITY SILT FENCE AROUND**

THREE KEYS TO SILT FENCE PERFORMANCE



- ❑ **POST QUALITY AND THICKNESS**
- ❑ **FABRIC QUALITY**
- ❑ **POST SPACING**

OTHER PERIMETER PROTECTION TOOLS



- **STRAW WATTLES**
- **EXCELSIOR LOGS**
- **COMPOST SOCKS**
- **ROLLED UP
SEDIMENT
BARRIERS**

STRAW WATTLES

- 8" TO 20" DIAMETER
- AVAILABLE WITH PHOTODEGRADABLE NETTING
- EASY TO INSTALL
- A VERSATILE SEDIMENT CONTROL TOOL



ASPEN FIBER LOGS



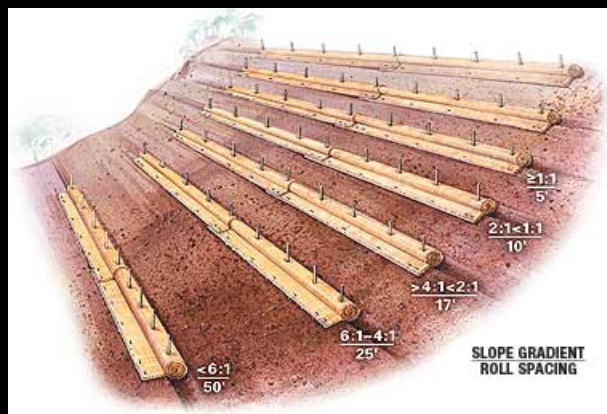
- **ASPEN WOOD FIBER LOGS**
- **EASY INSTALLATION**
- **VARIED USES**
- **TYPICALLY 8" – 20" IN DIAMETER**

COMPOST SOCKS

- **GEOSYNTHETIC TUBE FILLED WITH COMPOSTED MATERIAL**
- **DESIGNED FOR BOTH SEDIMENT COLLECTION AND FILTRATION OF RUN OFF**



ROLLED UP SEDIMENT BARRIERS



- UNROLLED LENGTHWISE IN THE FIELD, THEN ROLLED UP WIDTH WISE
- NATIVE MATERIAL SUCH AS LEAVES, GRASS CLIPPINGS, ETC. CAN BE ROLLED UP TO INCREASE DIAMETER

PERIMETER PROTECTION NOTEBOOK

- ALL MUST BE MAINTAINED
- GEOSYNTHETIC PRODUCTS MUST BE REMOVED AND DISPOSED OF PROPERLY
- STUDY YOUR OPTIONS!



PERIMETER PROTECTION TRENDS

- SPECIFICATIONS ARE BECOMING TIGHTER AND MORE JOB SPECIFIC
- MORE PAY ITEMS AND LESS “LUMP SUM” SPECIFICATIONS



CONCENTRATED FLOWS

DRAINAGE SWALES

- THE IDEA IS TO SLOW DOWN FLOWS AND COLLECT SEDIMENT
- HAY BALES AND SILT FENCE SHOULD NOT BE USED IN DRAINAGE SWALES



ILLINOIS DEPARTMENT OF TRANSPORTATION



- **EFFECTIVE 1-1-07
THE USE OF EITHER
HAY BALES OR SILT
FENCE IN
CONCENTRATED
FLOW AREAS WAS
FORBIDDEN ON ALL
I-DOT PROJECTS**



**OUR LUNCH,
NOT YOUR
SEDIMENT
CONTROL!**

NOT FOR CONCENTRATED FLOWS!

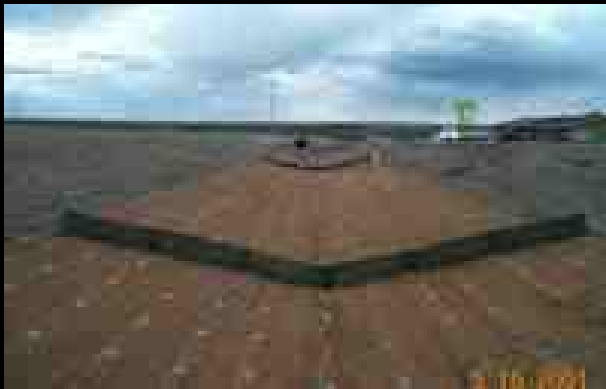


HAY BALES!!



**FOR LACK
OF A
BETTER
TOOL!**

TEMPORARY DRAINAGE SWALE PROTECTION

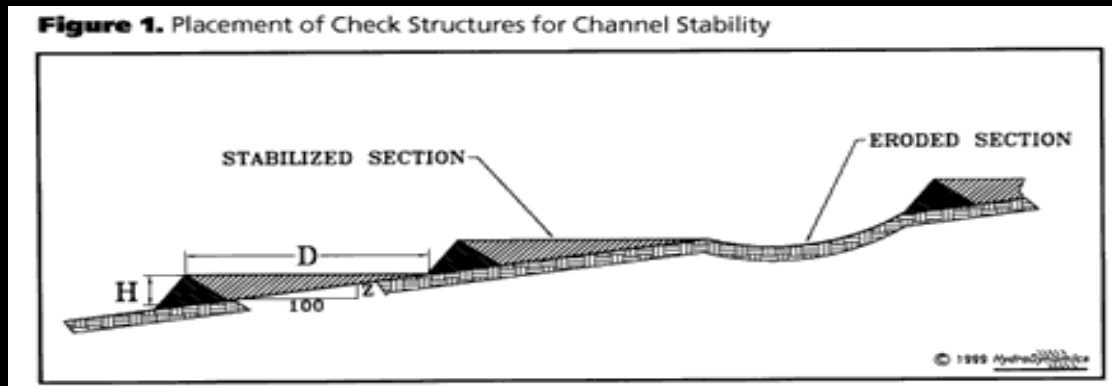


- **THE TOP PERFORMING PRODUCTS ON THE MARKET ARE DESIGNED FOR THIS SPECIFIC PURPOSE**
- **ACCEPTABLE PRODUCTS INCLUDE STRAW WATTLES AND EXCELSIOR LOGS**

DRAINAGE SWALE TEMPORARY PROTECTION BASICS

- **DESIGNED TO SLOW DOWN FLOW AND COLLECT SEDIMENT**
- **STRUCTURES MUST BE MAINTAINED**
- **MUST BE DESIGNED TO BE OVERTOPPED**
- **INSTALLATION MUST NOT ALLOW FOR STRUCTURES TO BE BYPASSED**

DITCH CHECK NOTES



PRESCRIBED SPACING—BOTTOM OF UPHILL STRUCTURE LEVEL WITH TOP OF DOWNHILL DITCH CHECK

MANUFACTURED DITCH CHECKS



■ **TECHNOLOGY IS NOW
AVAILABLE TO DEAL WITH
CONCENTRATED FLOWS!**

MANUFACTURED DITCH CHECK I

- **Constructed of UV stabilized HDPE or Biodegradable plastic**
- **Lightweight**
- **Reusable**
- **Length: 1 m (3.3 ft)**
- **Height: 230 mm (9 in)**
- **Width: 270 mm (11 in)**
- **Weight: 1 kg (2 lbs)**



MANUFACTURED DITCH CHECK II

KEY FEATURES

- **FRONT APRON**
- **BARRIER SECTION**
- **SPLASH APRON**
- **OVERLAP AT BOTH ENDS**
- **7-FOOT SECTIONS**



WATTLES AND SOCKS

- **VERSATILE AND EASY TO INSTALL**
- **TYPICALLY 8" TO 20" PROFILE**
- **SOME ARE TOTALLY BIODEGRADABLE**



ROCK DITCH CHECKS

- A TRADITIONAL PRACTICE—WITH BOTH PROS AND CONS
- CAN BE LEFT IN PLACE PERMANENTLY



DITCH CHECK SUMMARY

- **CONCENTRATED FLOWS ON ACTIVE JOBSITES CREATE A UNIQUE PROBLEM**
- **THE MOST EFFECTIVE SOLUTIONS...**
 - ...SLOW DOWN FLOW RATES**
 - ...OVERTOP BY DESIGN**
 - ...COLLECT SETTLING SEDIMENT**

WATERWAY PROTECTION

- DEWATERING BAGS
- WATER INFLATED DAMS
- TURBIDITY CURTAINS



DEWATERING BAGS

- FILTER FABRIC BAG WITH SIZED INTAKE
- DESIGNED TO FILL WITH SEDIMENT & RELEASE WATER THROUGH FILTER FABRIC WALLS
- SHOULD NOT BE INSTALLED OVER DISTURBED SOILS
- DISPOSED OF AFTER FILLING WITH SEDIMENT
- SIZED TO FIT JOB REQUIREMENTS



WATER INFLATED DAMS

- ISOLATE AREAS THAT MUST BE DISTURBED ALONG WATER WAYS
- CUSTOM DESIGNED AND INSTALLED ACCORDING TO JOBSITE REQUIREMENTS

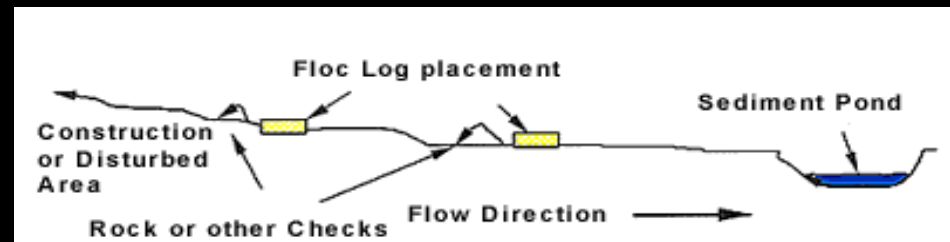


TURBIDITY CURTAINS



- **ALTERNATIVE TO WATER INFLATED DAMS**
- **INCORPORATE CABLES AND WEIGHTS TO SECURE CURTAINS IN PLACE**

POLYMERS

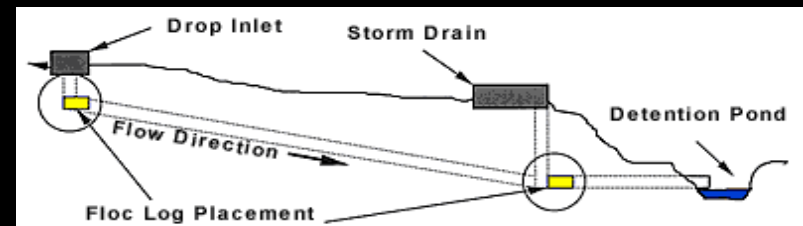


SEDIMENT CONTROL TOOL BOX

- FLOC LOGS
- POWDER
- EMULSION



FLOC LOGS



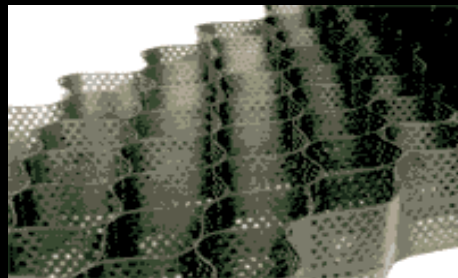
- **SOIL PARTICLE REMOVAL**
- **USE WHERE TURBID FLOWS OCCUR**
- **SOIL TESTING IS ESSENTIAL**

STABILIZED CONSTRUCTION ENTRANCES



- **PREVENT TRACKING OF JOBSITE SEDIMENT ONTO ADJACENT STREETS**
- **SIZED ROCK AND GEOTEXTILES OR CELLULAR CONFINEMENT OFTEN USED**

STABILIZED ENTRANCES



- **NON-WOVEN
GEOTEXILES MOST
OFTEN USED FOR
SEPARATION &
FILTRATION**
- **CELLAR
CONFINEMENT GRID
FOR LOAD
SUPPORT &
DISTRIBUTION**

TRACK OUT DEVICE



WHEEL WASH STATIONS



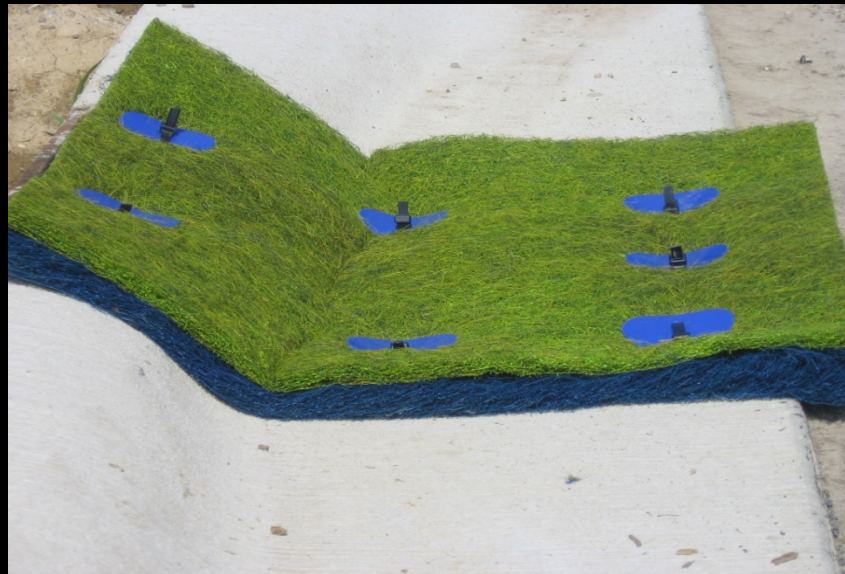
ADJACENT ROADWAY PROTECTION NOTES

- **FOR PRACTICAL PURPOSES,
TEMPORARY ENTRANCE CAN OFTEN
BE CONVERTED TO PERMANENT
ENTRANCE**
- **PROJECT SCOPE AND SITE SPECIFICS
WILL VARY WIDELY**
- **KNOW YOUR OPTIONS!**

INLET PROTECTION

**DESIGNED TO
PREVENT
SEDIMENT FROM
ENTERING
DRAINAGE
SYSTEMS**

- **MUST BE
MAINTAINED!**



INLET PROTECTION TYPES

EXTERNAL

- DESIGNED TO INTERCEPT SEDIMENT BEFORE IT ENTERS THE STORM DRAIN STRUCTURE

INTERNAL

- DESIGNED TO FILTER STORM WATER AFTER IT ENTERS THE STRUCTURE

INLET PROTECTION TOOLS

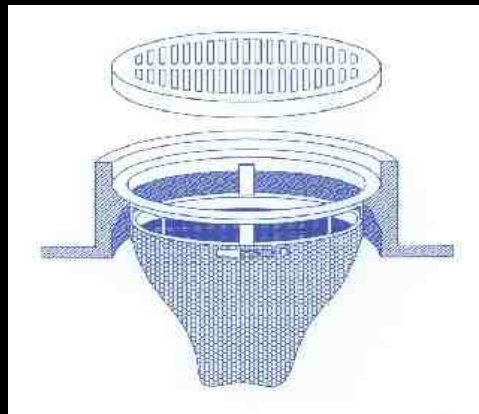
- **WOOD FIBER LOG INLET PROTECTION**



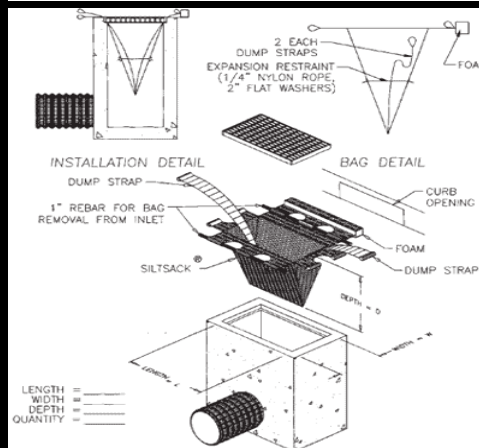
- **MANUFACTURED GEOTEXTILE INLET FILTERS**



INLET PROTECTION TOOLS



- **INLET FILTER—
METAL FRAME;
GEOTEXTILE
FILTER**



- **SILT BAG—
INTERNAL
FILTRATION
DEVICE**

EVOLUTION OF EXTERNAL INLET PROTECTION PRODUCTS

- I. SILT FENCE, HAY BALES, WATTLES, SAND BAGS, ETC.**
- II. MONOFILAMENT GEOTEXTILES**
- III. MONOFILAMENT GEOTEXTILE MANUFACTURED PRODUCTS**
- IV. THREE DIMENSIONAL MANUFACTURED PRODUCTS**

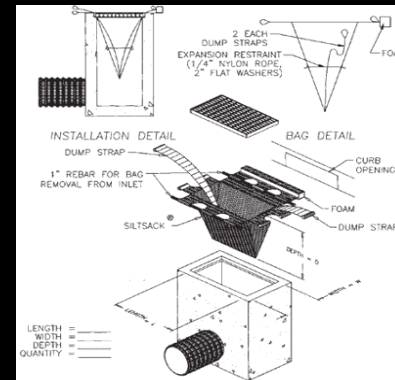
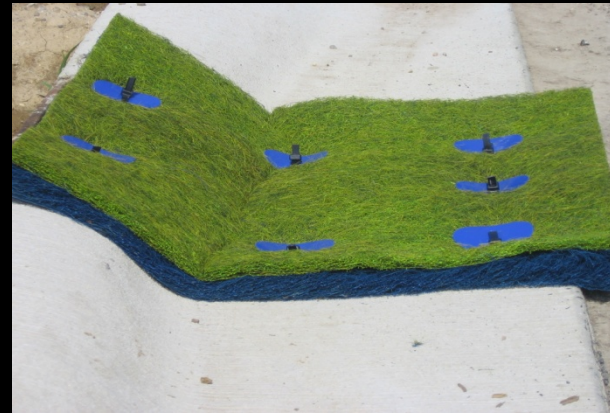
EXTERNAL INLET PROTECTION



INLET PROTECTION BOTTOM LINE

ASK TOUGH
QUESTIONS!

- LONGEVITY
- DURABILITY
- FLOWABILITY
- SEDIMENT
REMOVAL
CAPABILITIES



OTHER TOOLS

- ❑ **TEMPORARY DIVERSION CHANNELS**
- ❑ **SEDIMENT TRAPS**
- ❑ **TEMPORARY BASINS**



KEY POINTS

- **SEDIMENT CONTROL IS TEMPORARY AND VERY EXPENSIVE**
- **EROSION CONTROL PROVIDES PERMANENT SOLUTIONS**

THEREFORE: MINIMIZE DISTURBANCE IN
TERMS OF BOTH TIME AND AREA AND
INSTALL PERMANENT
EROSION CONTROL AS SOON AS POSSIBLE!

SPECIFICATIONS

- SHOULD INCLUDE PAY
ITEMS—FOR
ACCOUNTABILITY SAKE!

LUMP SUM = NO SUM

REMEMBER!

**WHEN WE SEND
WATER WE SEND THE
WORKS! -- INCLUDING
SEDIMENT AND
POLLUTANTS!!**