Earthizenz Eco Friendly Systems

REDUCING THE FOOTPRINT & INCREASING THE HANDPRINT
Through
Positive Interventions with The Vetiver System

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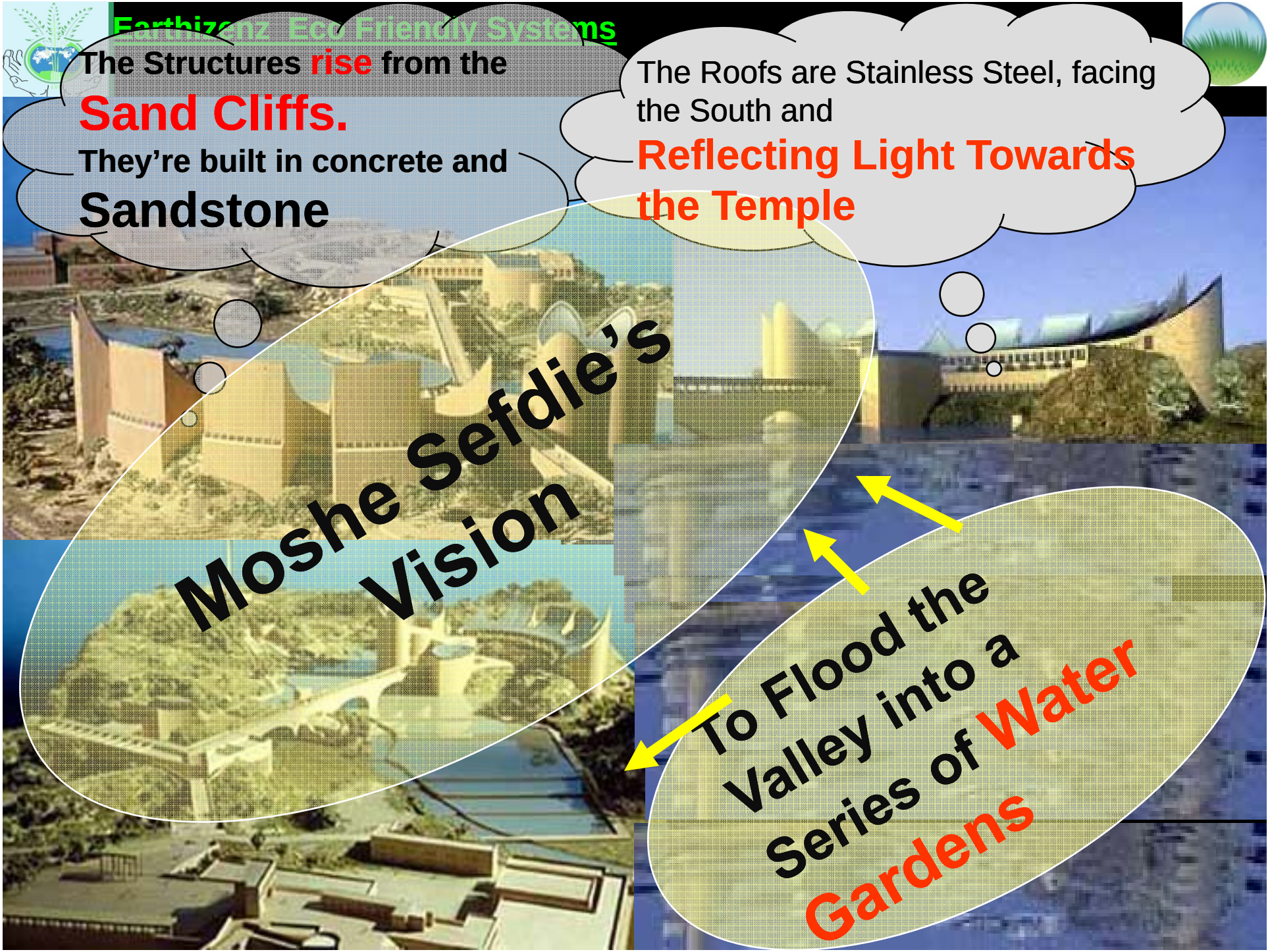
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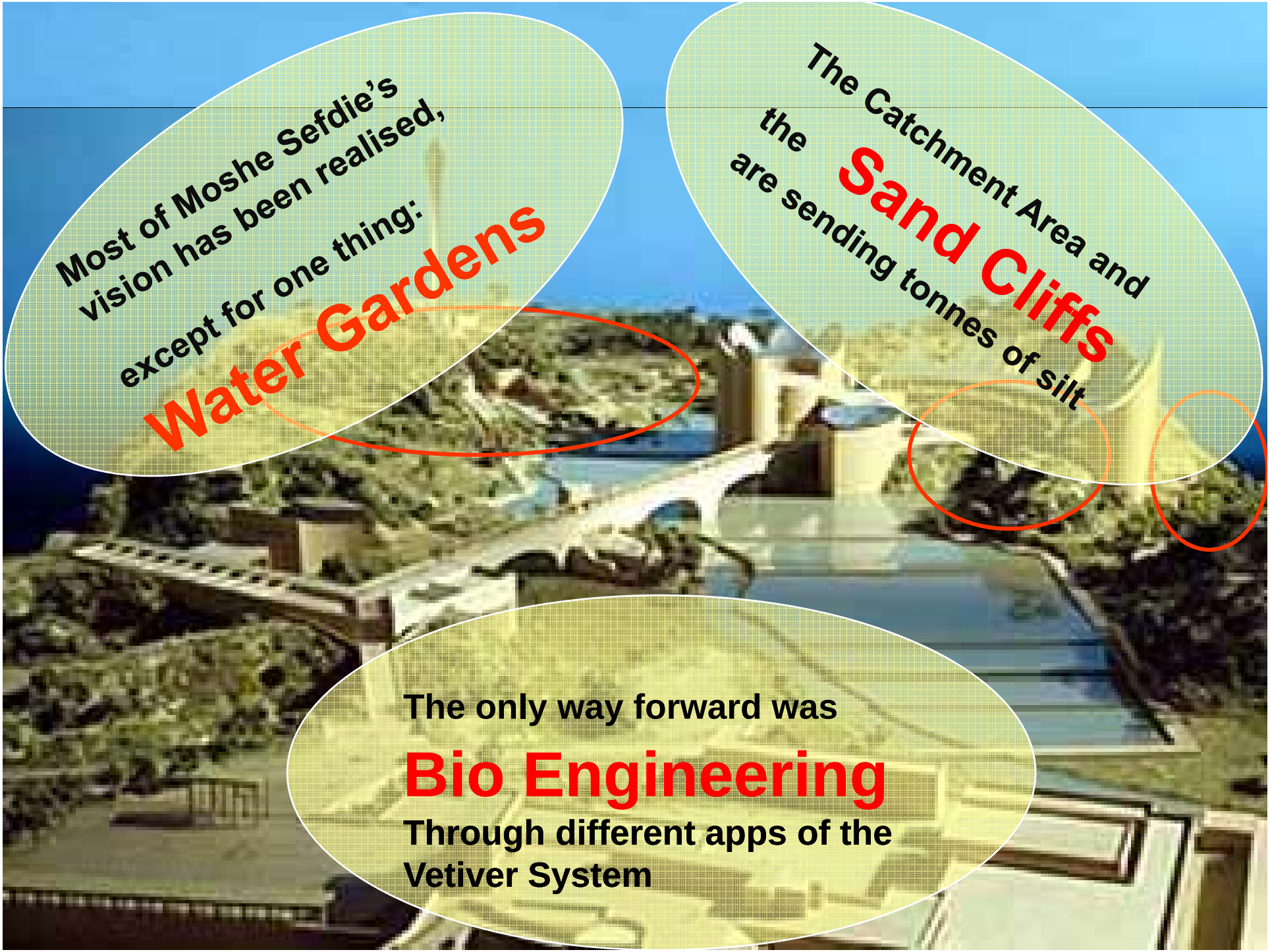
The Structures rise from the
Sand Cliffs.
They're built in concrete and
Sandstone
The Roofs are Stainless Steel, facing the South and
Reflecting Light Towards the Temple
Moshe Sefdie's Vision
To Flood the Valley into a Series of Water Gardens


Most of Moshe Sefdie's vision has been realised, except for one thing:
Water Gardens
The Catchment Area and the Sand Cliffs are sending tonnes of silt
The only way forward was
Bio Engineering
Through different apps of the Vetiver System

Applications of VS used at Anandpur Sahib

- Revegitation and Possible Reforestation
- Prevention of Soil Erosion and its migration
- Steep Filled up Slope Stabilization (Road Batter)
- Silt Control in water body (Planting in the Catchment Area)

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Vetiver application for Revegitation & Reforestation at Anandpur Sahib, Punjab (Hillock Slopes)

Before
&
After


BEFORE
This hill has soil saver on it
Road Batter
02 07 2009 14:46


AFTER
The hill with the soil saver
Road Batter
07.10.2010 11:22

BEFORE


AFTER
Present View of the same spot from another Angle
07.10.2010 11:21


BEFORE
02 07 2009 14 40


AFTER
07.10.2010 11:24


BEFORE
02 07 2009 14:41


AFTER
07.10.2010 11:24


BEFORE
02.07.2009 15:27


AFTER
07.10.2010 11:57


BEFORE
02.07.2009 15:27


AFTER
07.10.2010 11:59

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Vetiver application for

Prevention of Soil Erosion & its

Migration

Before
&
After


BEFORE

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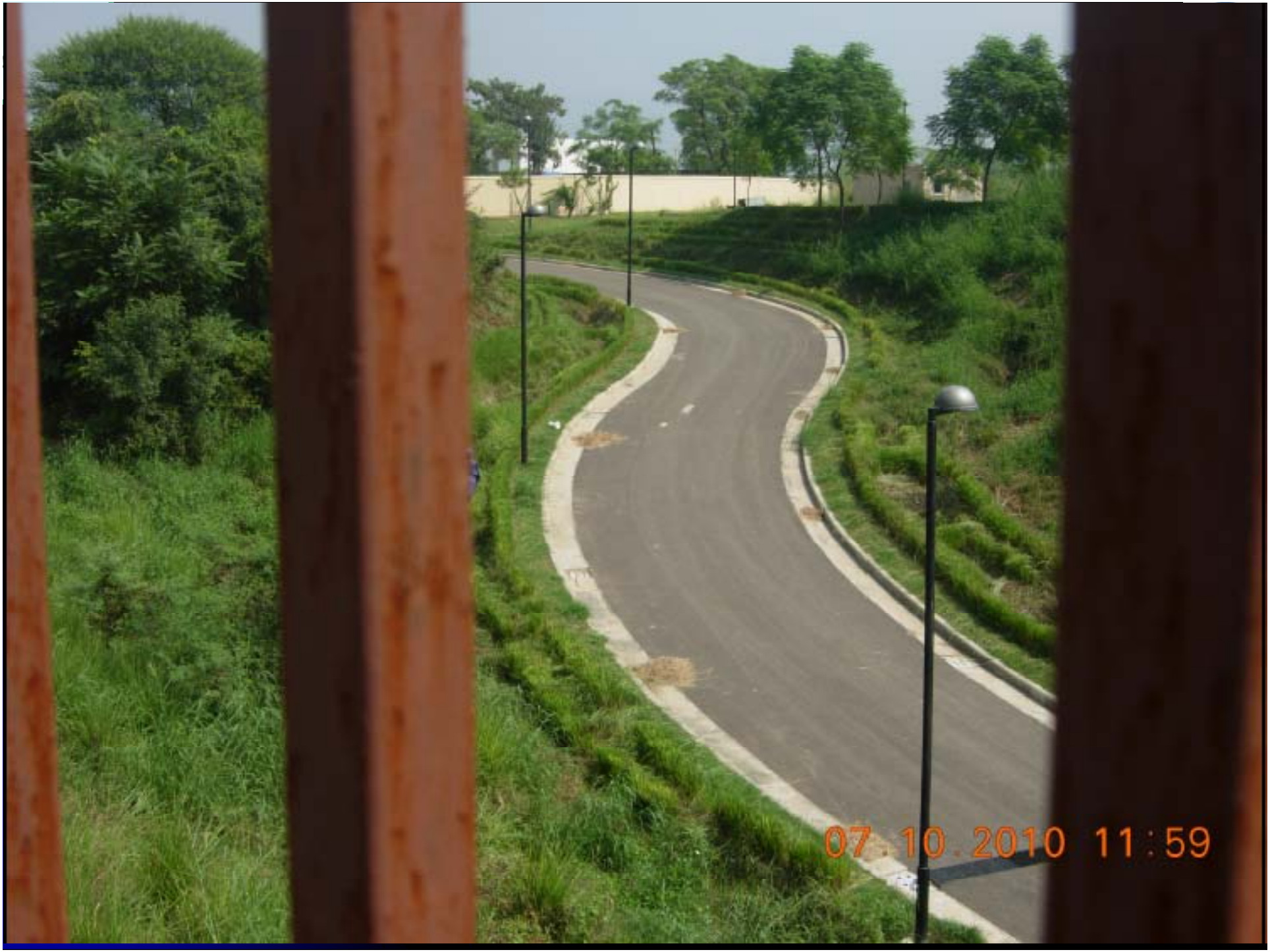
Slope Protected with Vetiver
Swale Protected with Vetiver
07.10.2010 11:21


Road Batter
Swale
Rows of Vetiver on hillok
07.10.2010 11:22


Road Batter
Swale
Swale
Rows of Vetiver on hillok
07.10.2010 11:22


Vetiver Stopping Erosion from Hillok and cutting down Velocity of flow in swale
07 10 2010 11:30


07 10.2010 11:59


07 10 2010 11:59


07 10 2010 11 59

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ZERO SOIL
MIGRATION DESPITE
RECORD RAIN
07.10.2010 13:09


ZERO SOIL
MIGRATION DESPITE
RECORD RAIN
07.10.2010 13:10

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Vetiver application for Steep Filled up Slope Stabilisation (Road Batter) Before & After


BEFORE
The rains did this. Maybe the road drainage system collapsed


BEFORE
Total Washout
31.07.2009 15:16

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AFTER
Vetiver has stabilized the entire slope
07.10.2010 11:22


AFTER
07.10.2010 11:22


AFTER
07.10.2010 11:23


AFTER
Not a single breach along the entire length despite heaviest rains in recent times
07 10 2010 11:23


AFTER
This Slope is Over
60 degrees steep
07.10.2010 11:24


AFTER
07.10.2010 11:24


AFTER
07 10 2010 11 25


AFTER
Vetiver has
retained moisture
within the slope
enabling other
vegetation to grow.
07.10.2010 11:25

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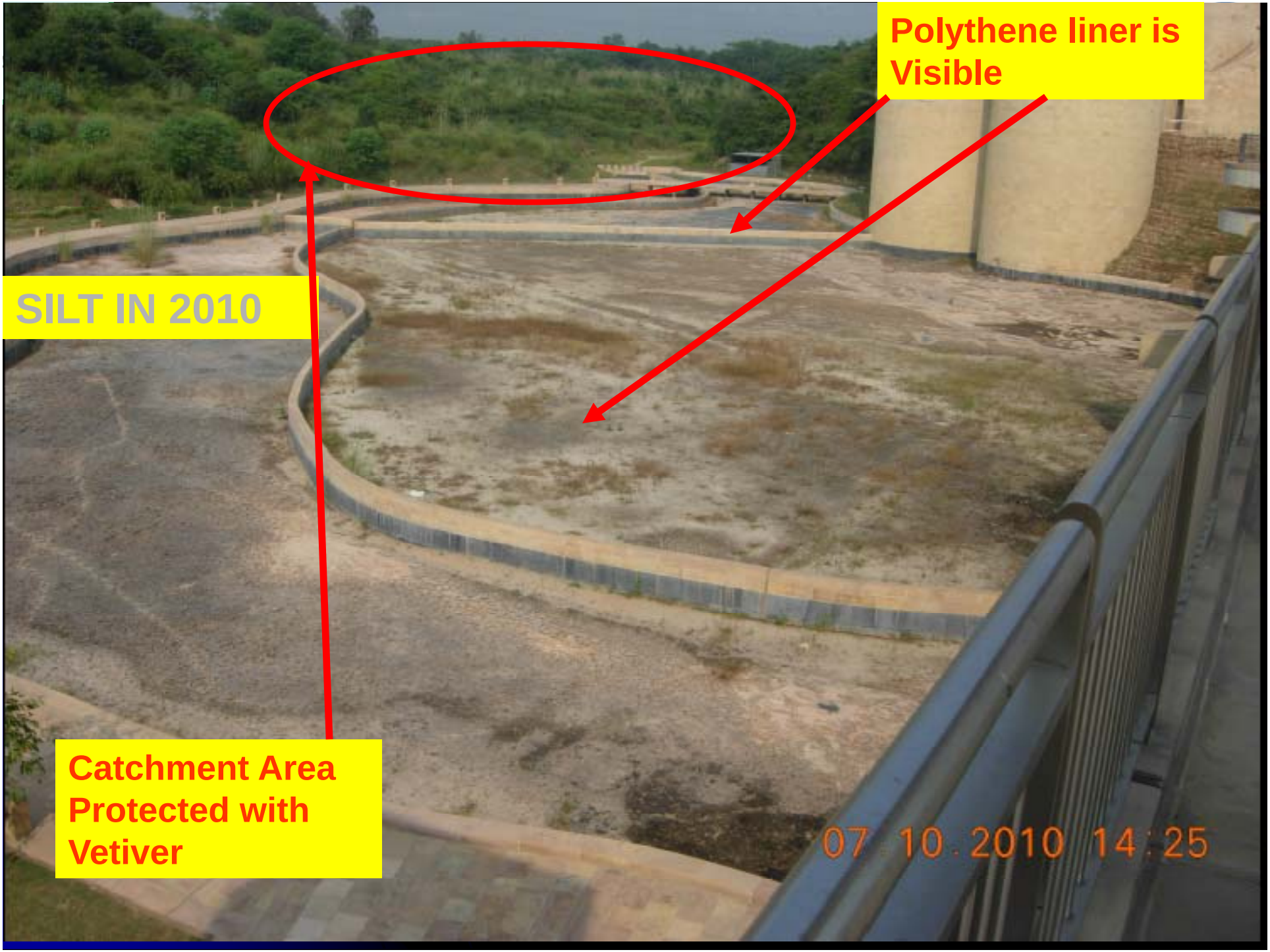
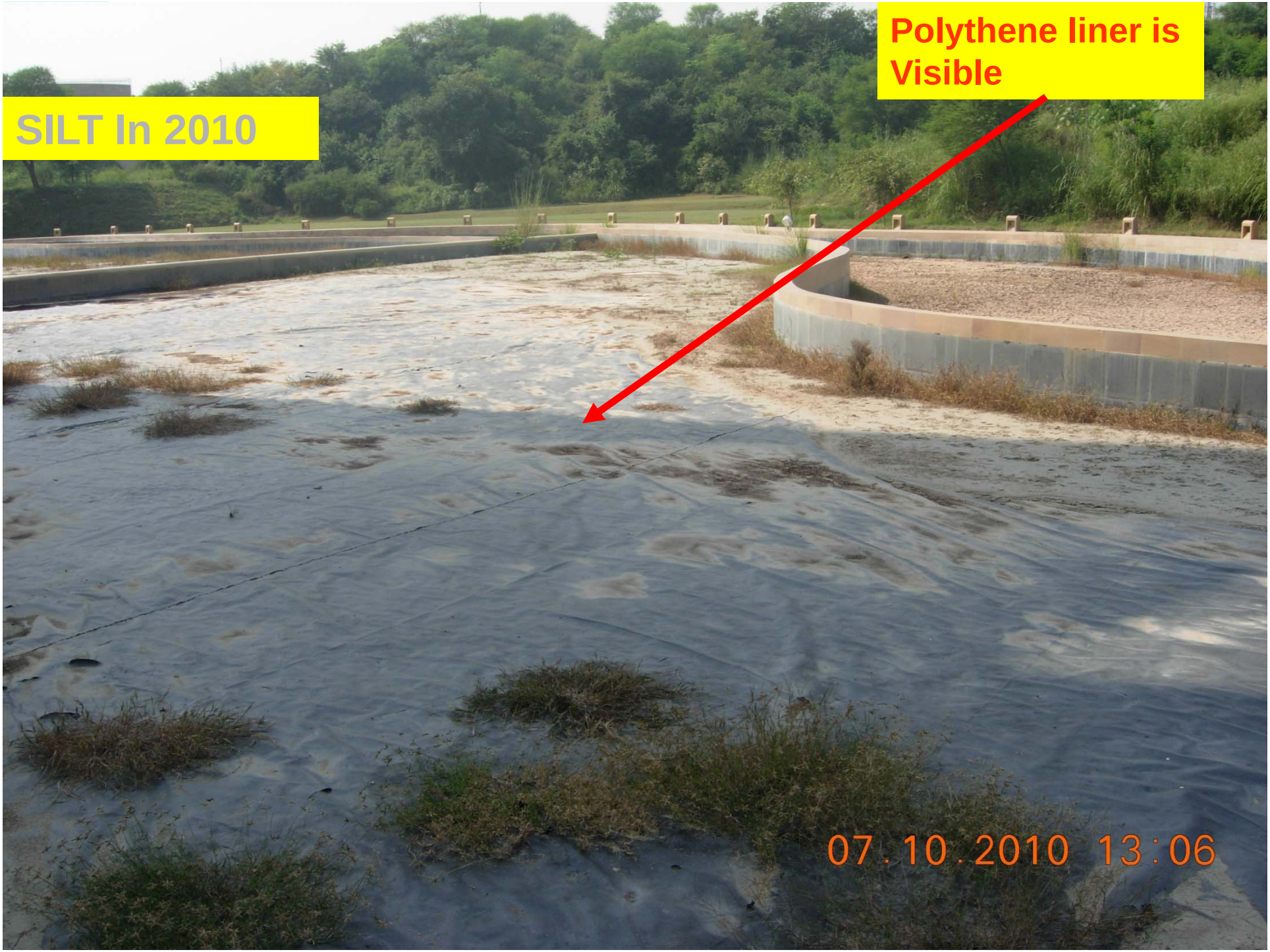
Vetiver application for Silt Control in water body (Planting in the Catchment Area) & Silt Before V/s Silt After


SILT IN OCT 2009


Polythene liner is Visible
SILT IN 2010
Catchment Area Protected with Vetiver
07 10.2010 14:25


SILT IN OCT 2009


SILT In 2010
Polythene liner is Visible
07.10.2010 13:06


SILT IN OCT 2009


SILT IN 2010
First Cell:
Zero Silt
07.10.2010 12:14


SILT IN OCT 2009


SILT IN 2010
07.10.2010 12:15

Our Intervention: Clumps of Vetver strategically Planted in the rain to Prevent Silt Carried by the same rain to the Water Body.

The Silt was reduced by 99% at the end of the same monsoon as planting


Location ‘V’
(Behind Drop off)
Part of Catchment area (Z)


Location ‘V’
Rain Cuts & Gullies

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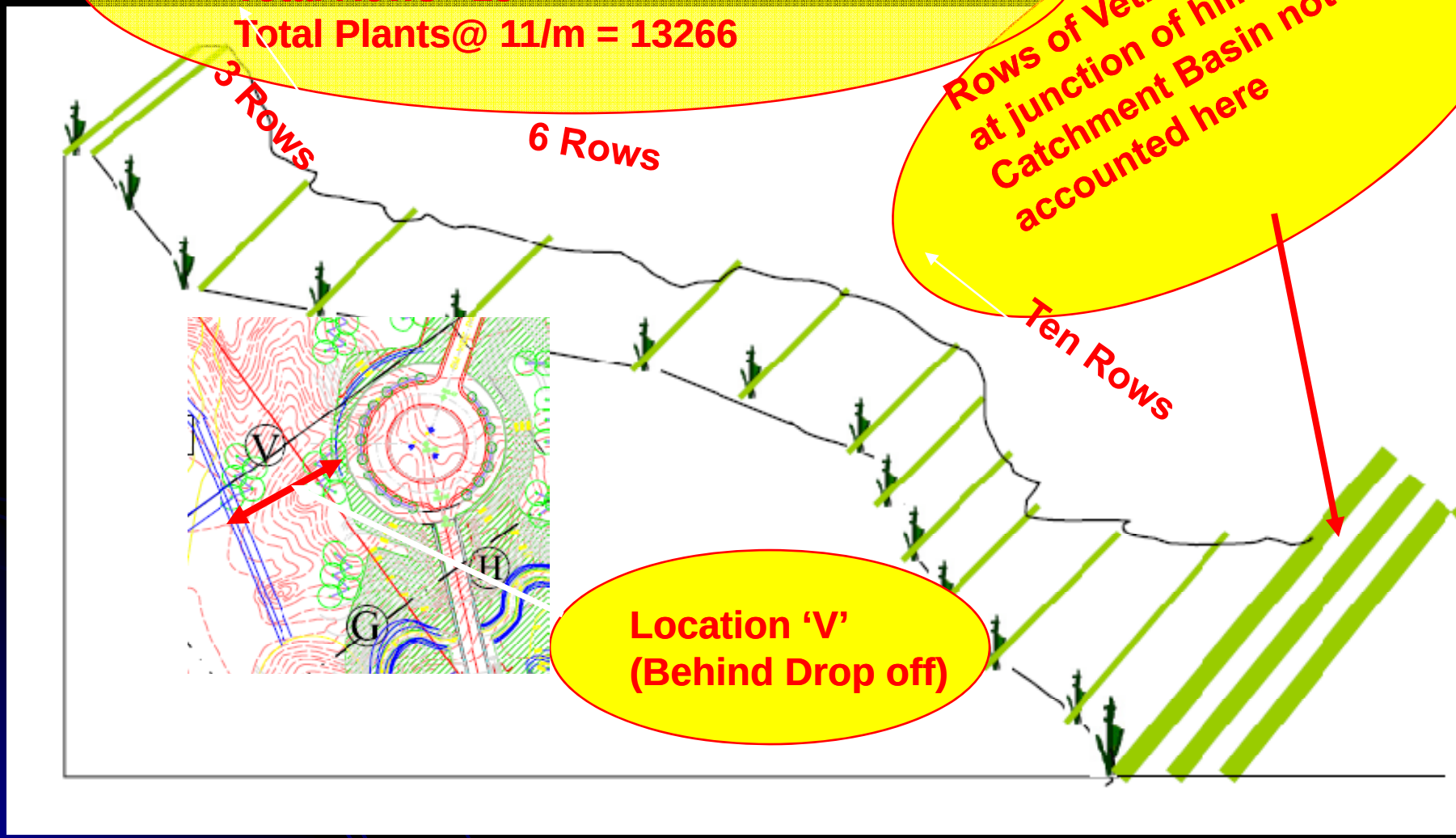
Total Length as per measurement of KHC staff= 67 meters
Total Rows= 18
Total Plants@ 11/m = 13266




Location ‘V’
(Behind Drop off)
Water Body
Gully/ Rain Cut
Area Z
29.04.2010 13:06

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Gully Control by Dr. Paul Truong, Australia

- The Gully was reshaped and bags were placed the same has **has been done here**
- The bags were filled with 1/3 to 1/2 of soil+ N&P fertilizers for fast growth
- and 1/2 sand to make it heavy to sit firm on the surface.


2 11 2009


Note that the vertical interval is only one sand bag thick.
3 11 2009


In just Two months!
Fertilizer and soil has made the difference
7 1 2010

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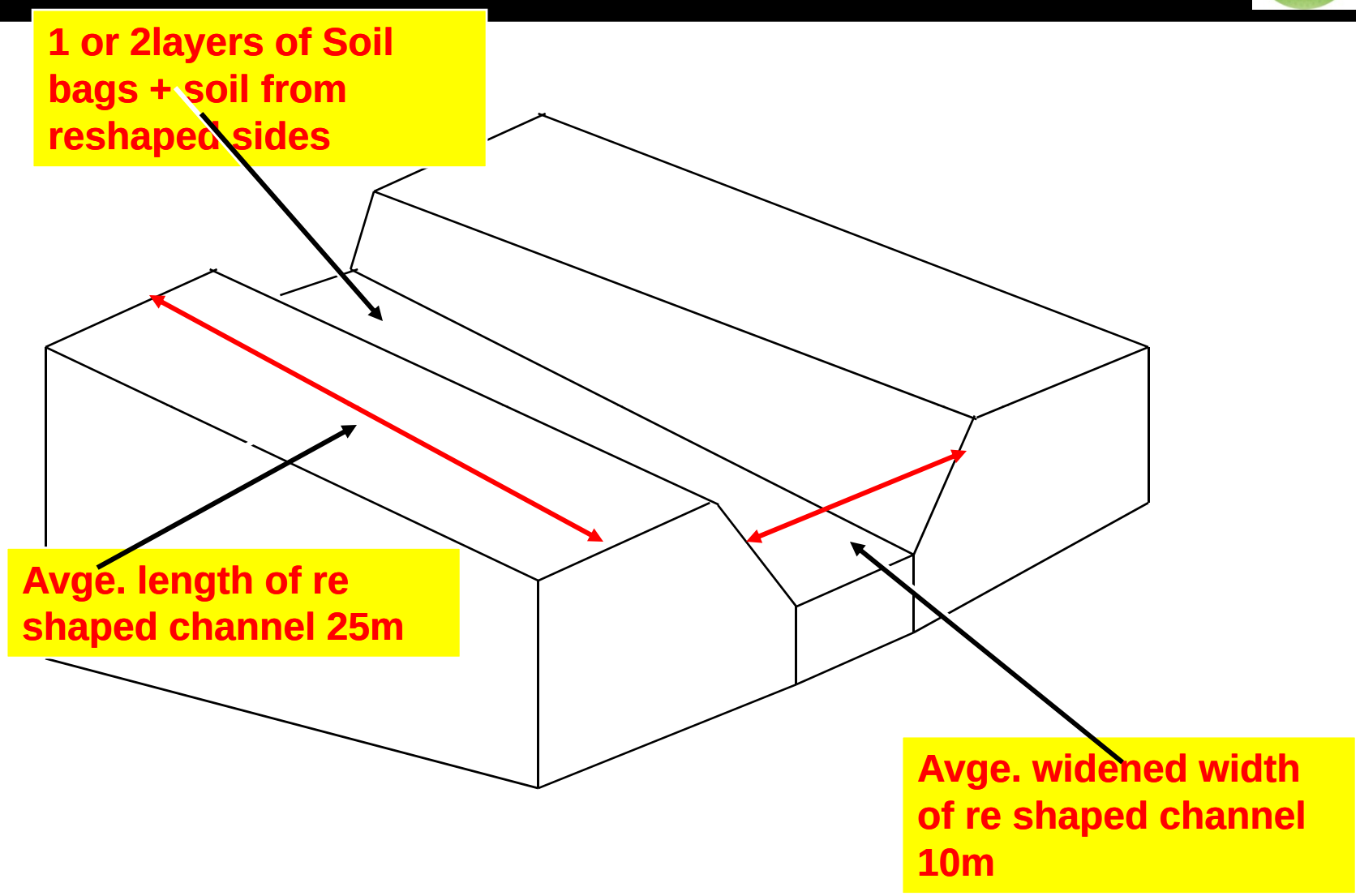
AT KHC

The dangerous **Rain Cuts and Gullies Behind Drop off** and some other Gullies in the Catchment area of the water Body, need the same treatment


1 or 2layers of Soil bags + soil from reshaped sides
Avge. length of re shaped channel 25m
Avge. widened width of re shaped channel 10m

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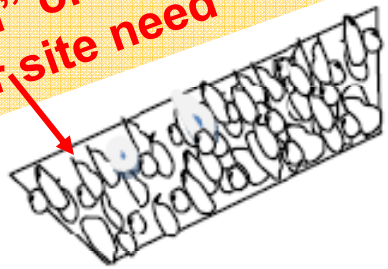
Average 5 rows running across reshaped slopes.

Total rows per raincut (average) =5+5=10

Total length of rows/raincut = 10X25=250m

Total length/ raincut in addition to the rows running across hill= 250+50= 300mtrs

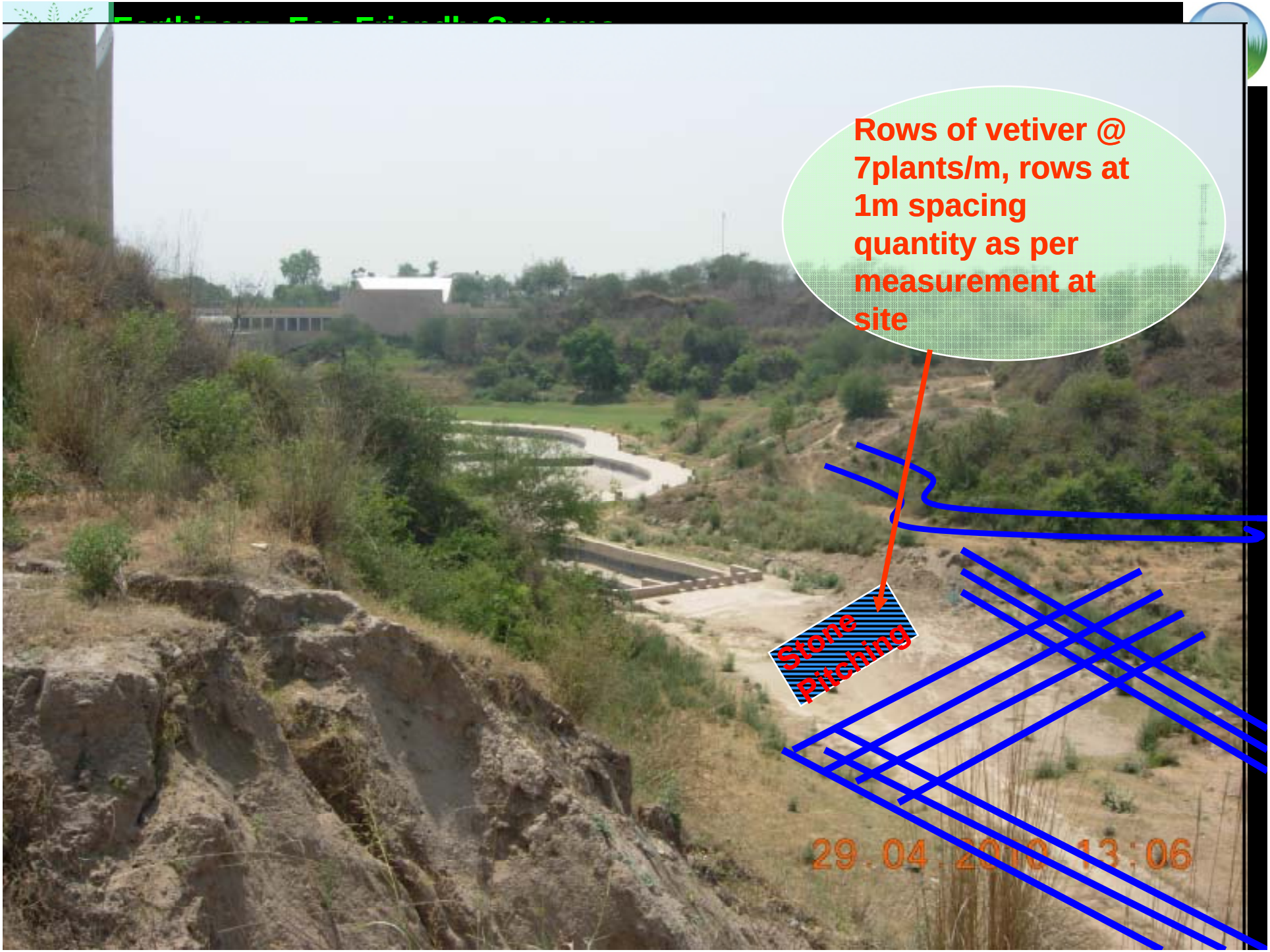
Trapezoidal "porous wall" one or two as per site need



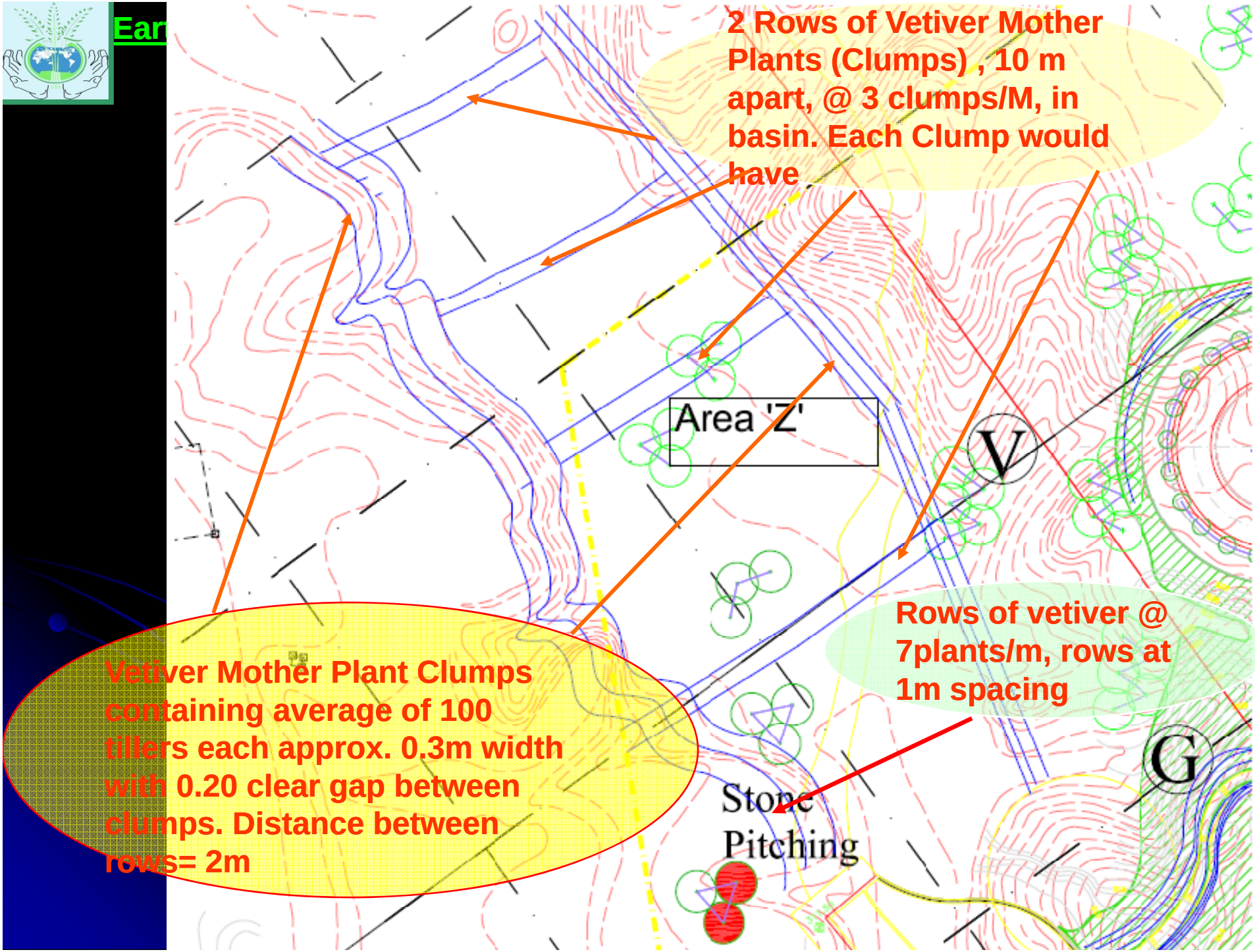
Vetiver rows running across hill, already accounted for

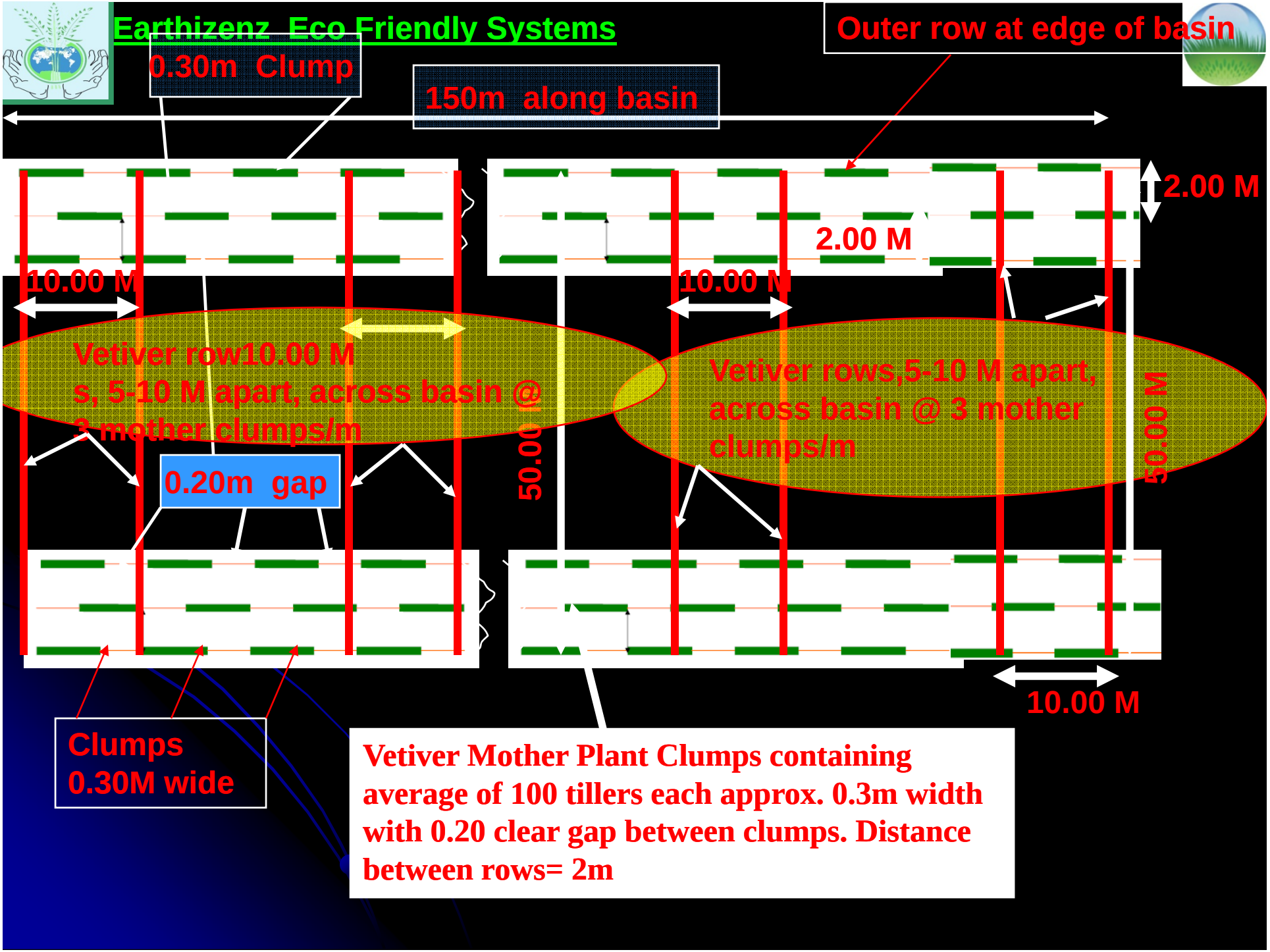
Assume 5 additional rows at the bottom of the cannel, total lenfth=5X10=50m/ raincut


29.04.2010 13:30


Rows of vetiver @ 7plants/m, rows at 1m spacing quantity as per measurement at site
Stone Pitching
29.04.2010 13:06


29.04.2010 13:07


2 Rows of Vetiver Mother Plants (Clumps) , 10 m apart, @ 3 clumps/M, in basin. Each Clump would have
Area 'Z'
V
Rows of vetiver @ 7plants/m, rows at 1m spacing
G
Stone Pitching
Vetiver Mother Plant Clumps containing average of 100 tillers each approx. 0.3m width with 0.20 clear gap between clumps. Distance between rows= 2m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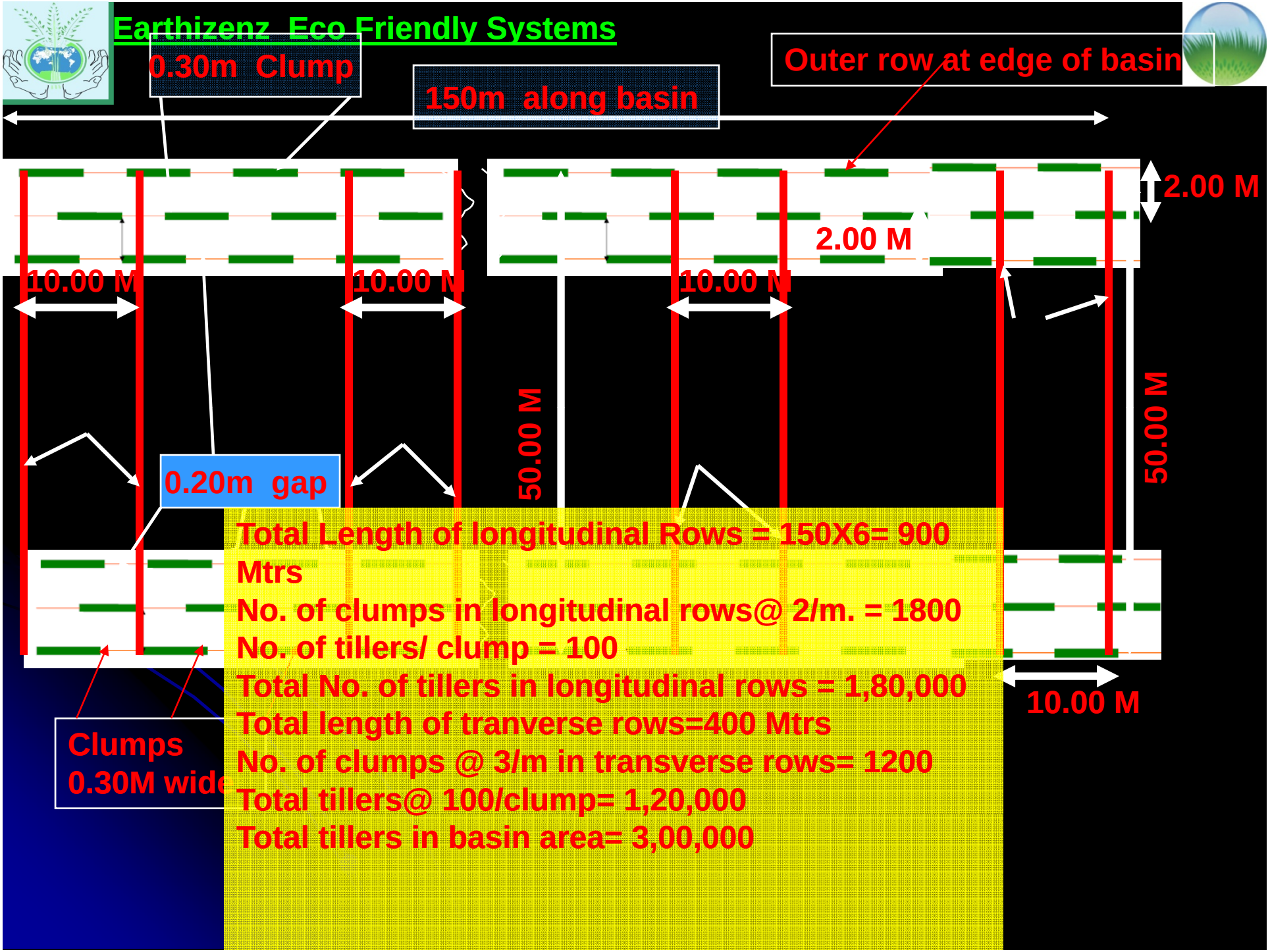
0.30m Clump
150m along basin
Outer row at edge of basin
2.00 M
2.00 M
10.00 M
10.00 M
Vetiver row10.00 M
s, 5-10 M apart, across basin @
3 mother clumps/m
0.20m gap
50.00 M
Vetiver rows,5-10 M apart,
across basin @ 3 mother
clumps/m
50.00 M
10.00 M
Clumps
0.30M wide
Vetiver Mother Plant Clumps containing average of 100 tillers each approx. 0.3m width with 0.20 clear gap between clumps. Distance between rows= 2m


Earthizenz Eco Friendly Systems
0.30m Clump
150m along basin
Outer row at edge of basin
2.00 M
2.00 M
10.00 M
10.00 M
10.00 M
50.00 M
50.00 M
0.20m gap
Total Length of longitudinal Rows = 150X6= 900 Mtrs
No. of clumps in longitudinal rows@ 2/m. = 1800
No. of tillers/ clump = 100
Total No. of tillers in longitudinal rows = 1,80,000
Total length of tranverse rows=400 Mtrs
No. of clumps @ 3/m in transverse rows= 1200
Total tillers@ 100/clump= 1,20,000
Total tillers in basin area= 3,00,000
10.00 M
Clumps
0.30M wide

Thank You