DECENTRALIZED WASTEWATER TREATMENT : EXAMPLES OF THE BIO-REMEDIATION PROCESS IN PRACTISE

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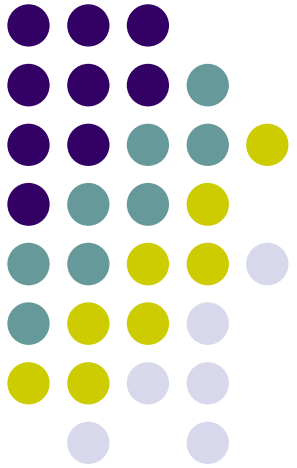
BIOREMEDIATION

The process of Removal of Pollutants from Polluted Water (basically organic in nature) with the help of Biological Products

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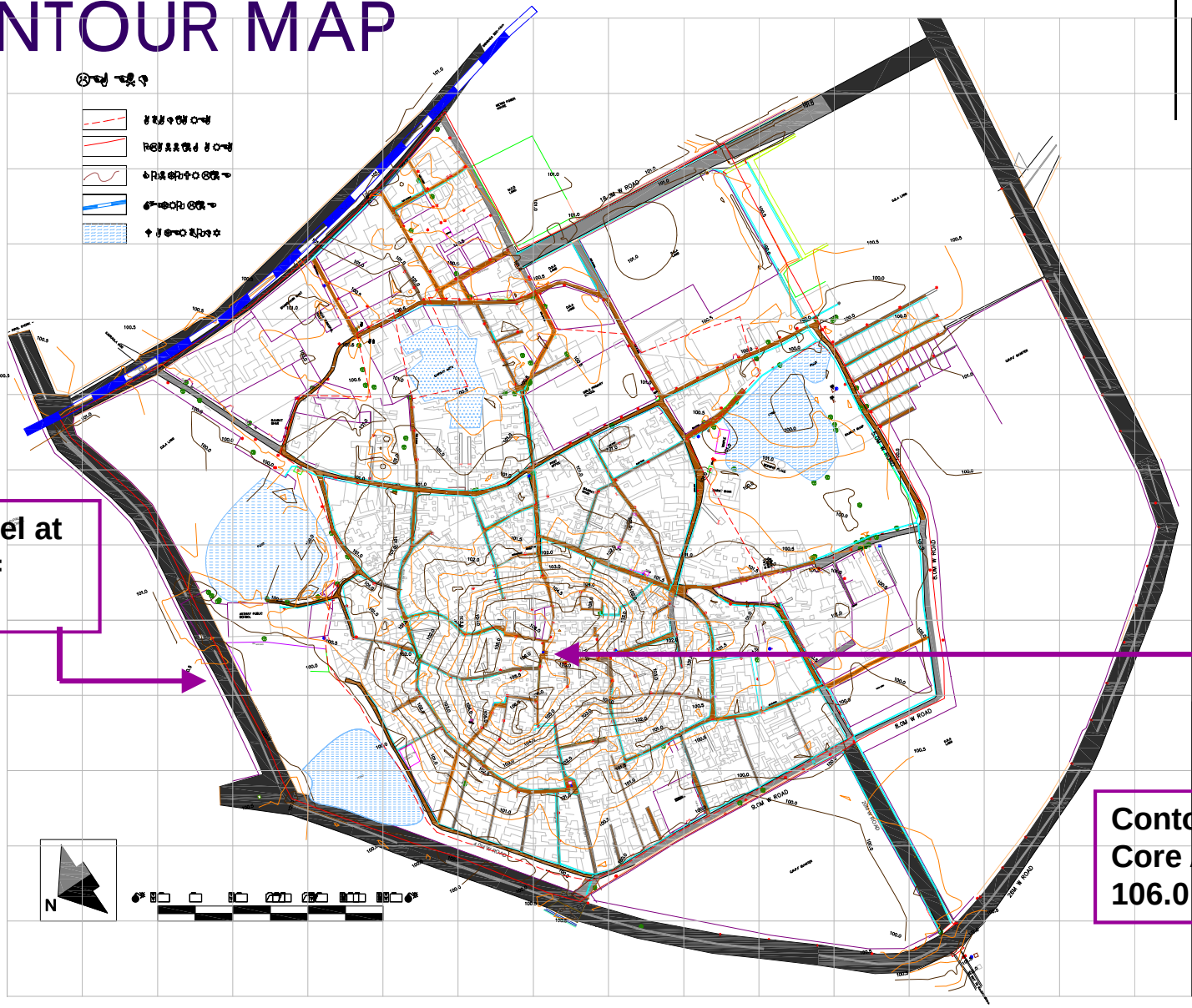
CONTOUR MAP



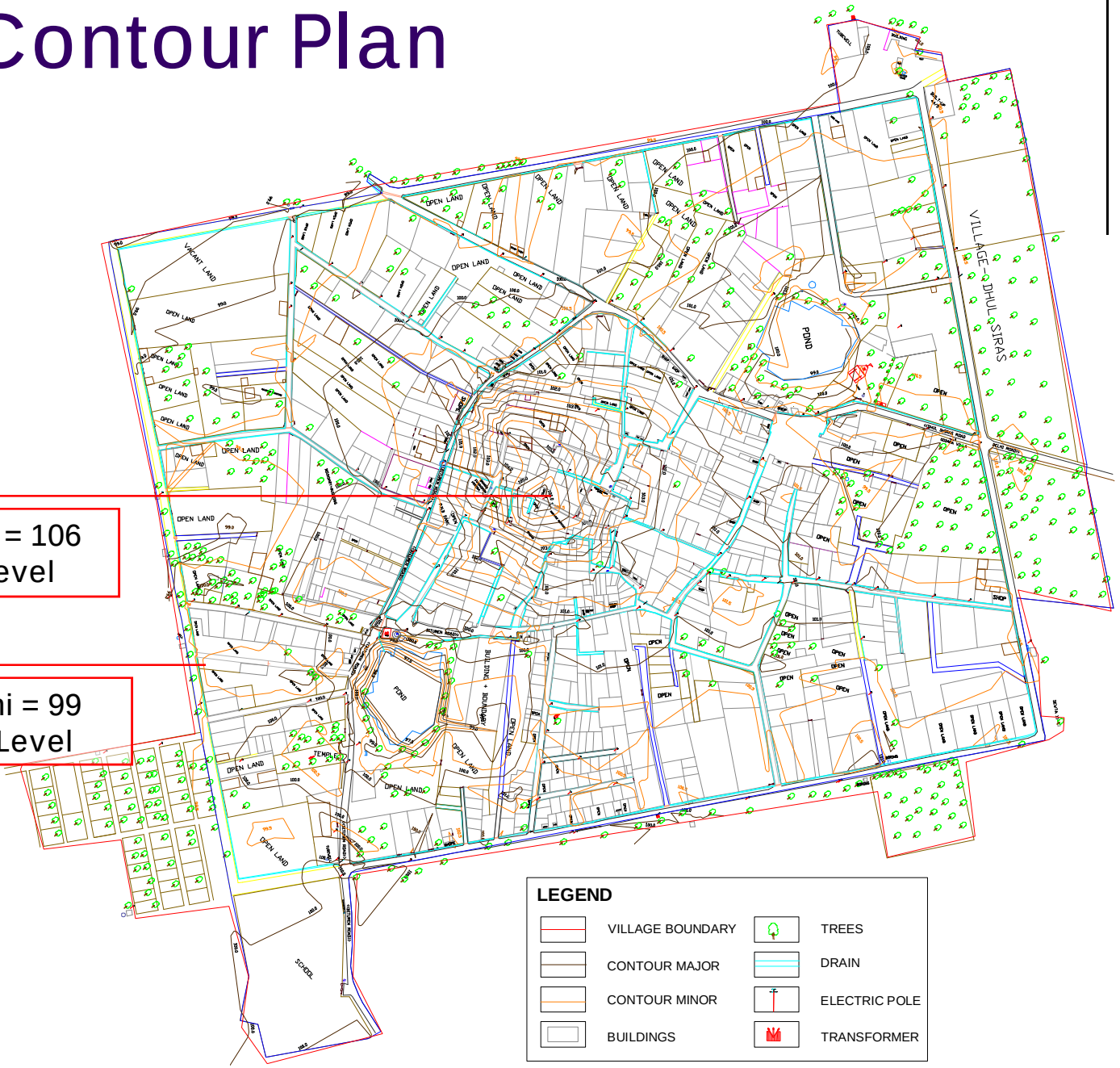
Contour Level at Outer road = 100.1

Contour Level in Core Area = 106.0

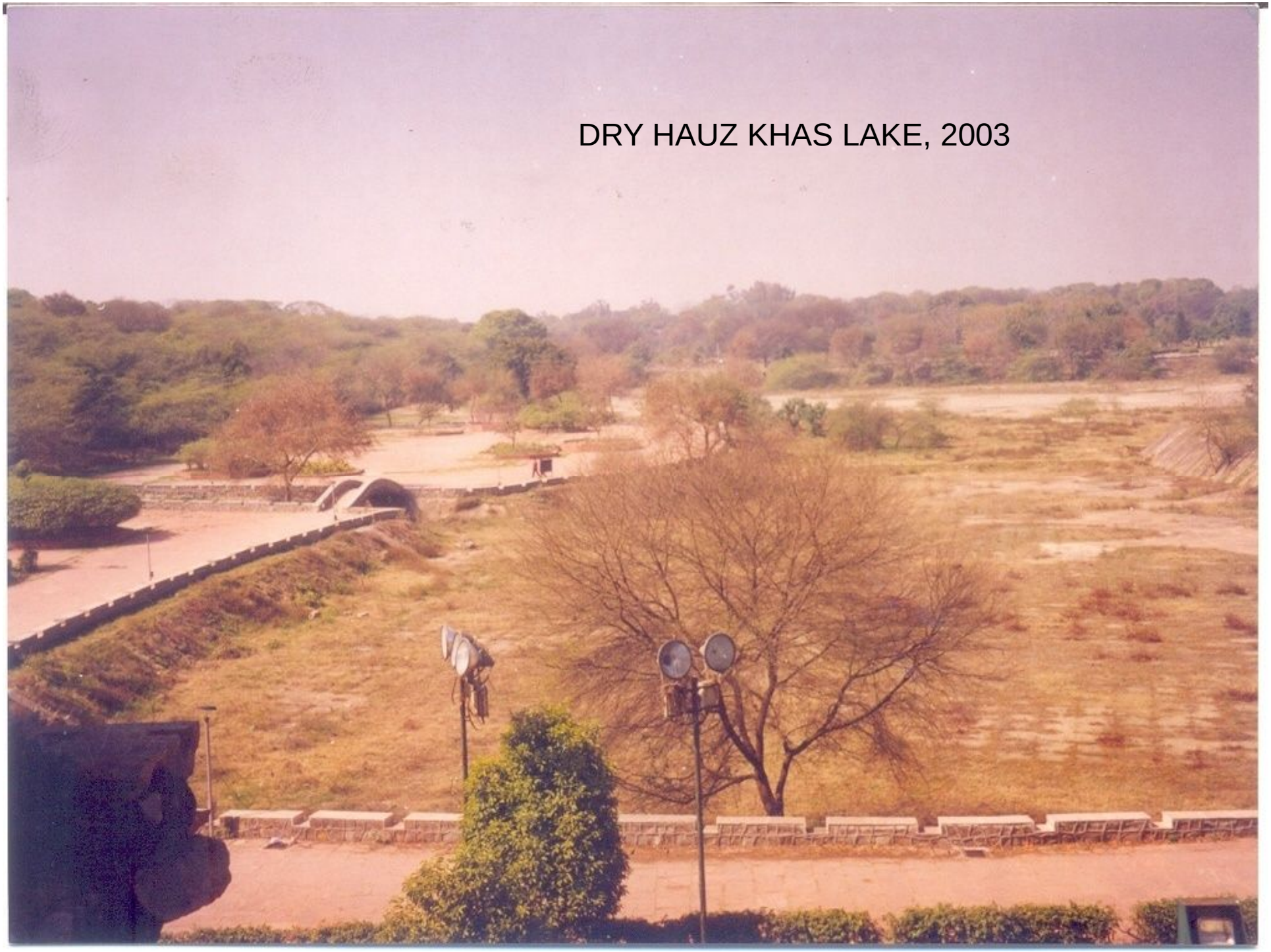
Contour Plan

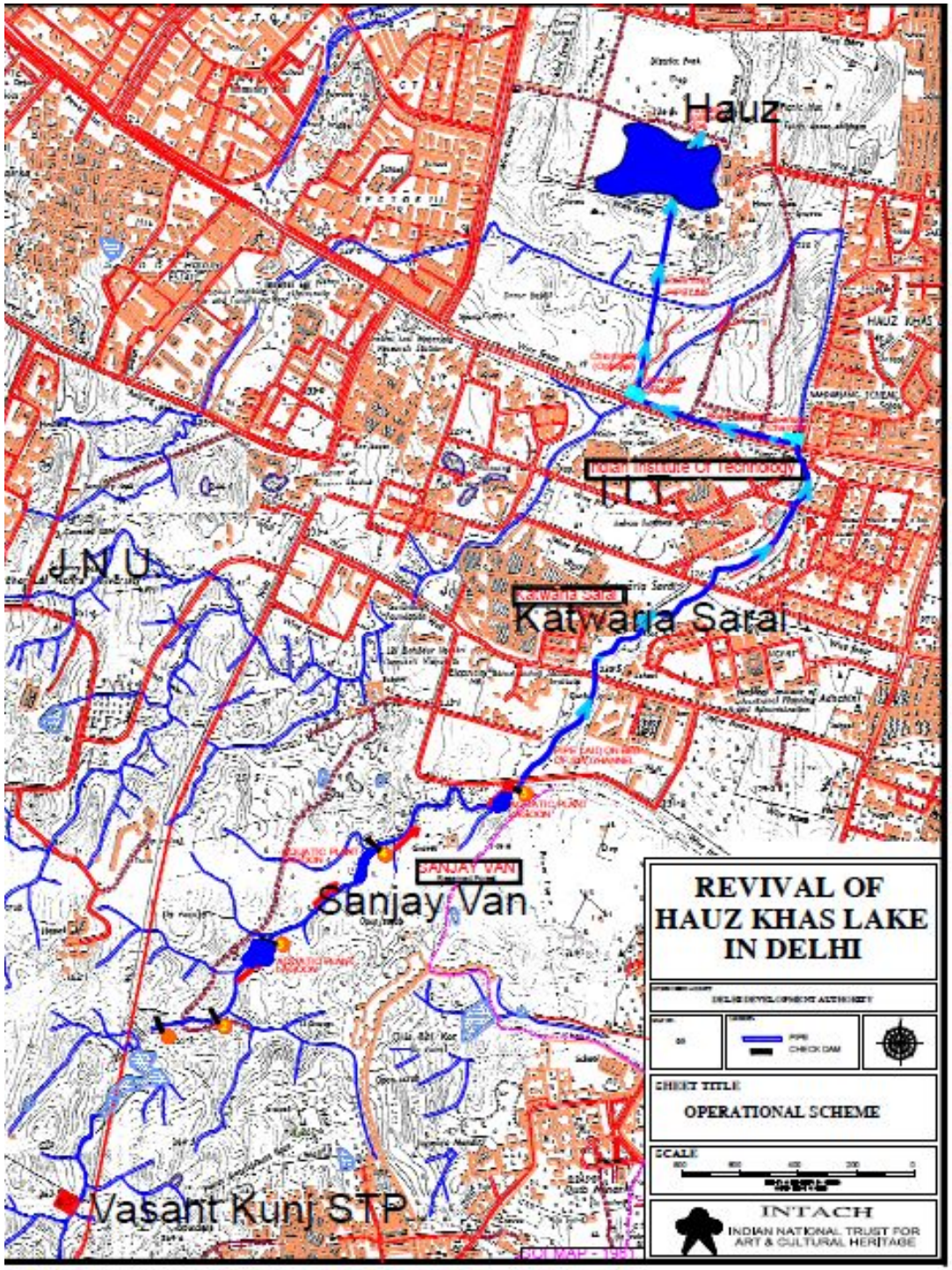
Core Abadi = 106
Contour Level

New Phirni = 99
Contour Level



Eutrophication of Lake during summers – Water Hyacinth blooms


DRY HAUZ KHAS LAKE, 2003



Operational Scheme

- Storm Water From 175 Ha Catchment
- Treated Effluent From Vasant Kunj STP
- Directed to Hauz Through Series of 5 Check Dams in Sanjay Van
- From Last Check Dam 3 Km Pipeline (600 mm Dia. PSC) Laid in SW Nala To Hauz
- Gravity Flow Ensured Hence-No Energy Consumption.

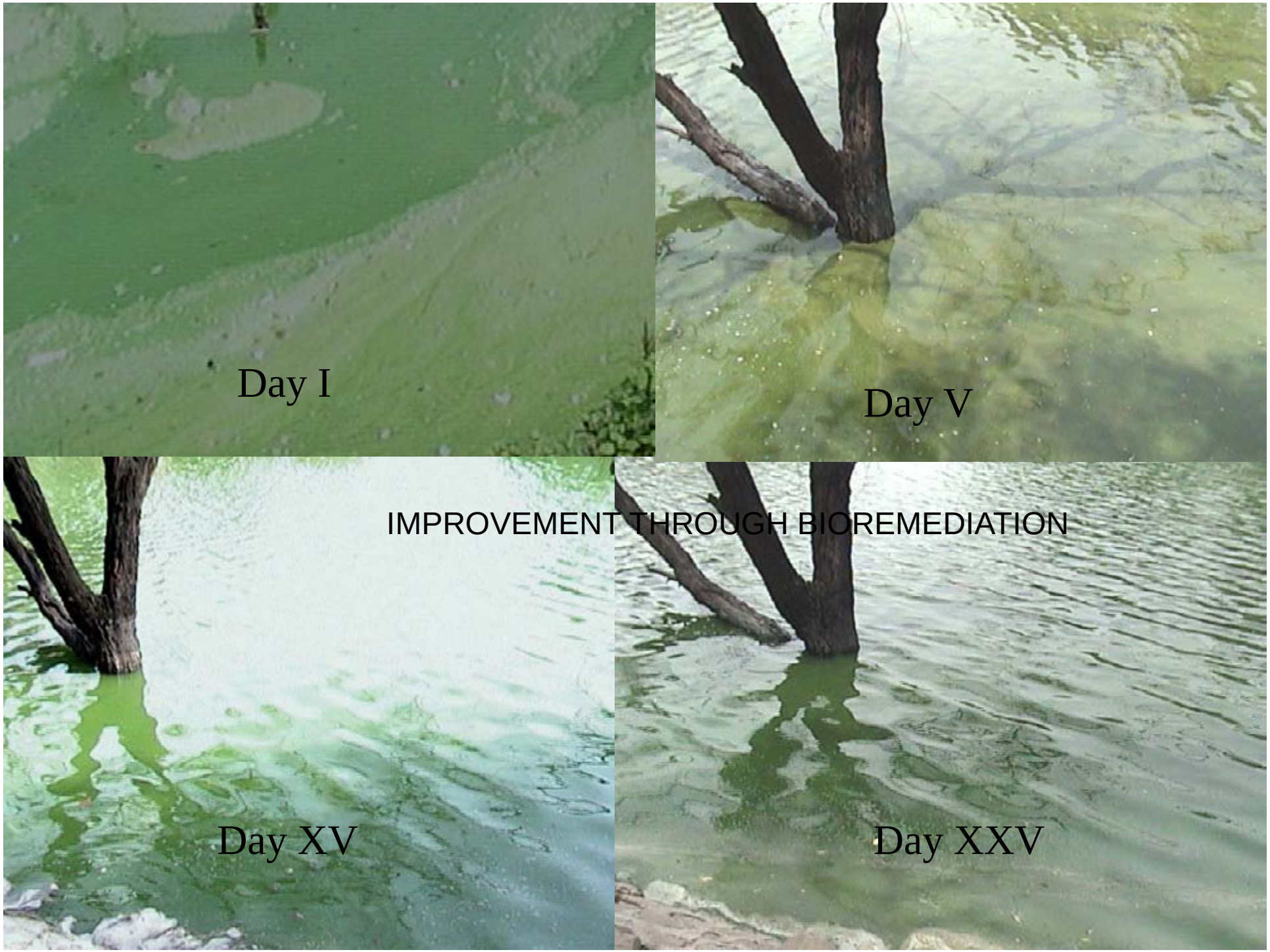

Aquatic Weed Treatment On Inflow


REVIVED LAKE - 2007


Return of Biodiversity

Hauz Khas Lake Polluted Through Mismanagement


BIOREMEDIATION USING ANAEROBIC & FACULTATIVE BACTERIA STRAINS
BoD Reduced from 18 mg/l to 10 mg/l
Bottom DO Increased from 1.5 mg/l to 5 mg/l


Day I
Day V
IMPROVEMENT THROUGH BIOREMEDIATION
Day XV
Day XXV

Quality of Lake Water Before & After ABR Treatment

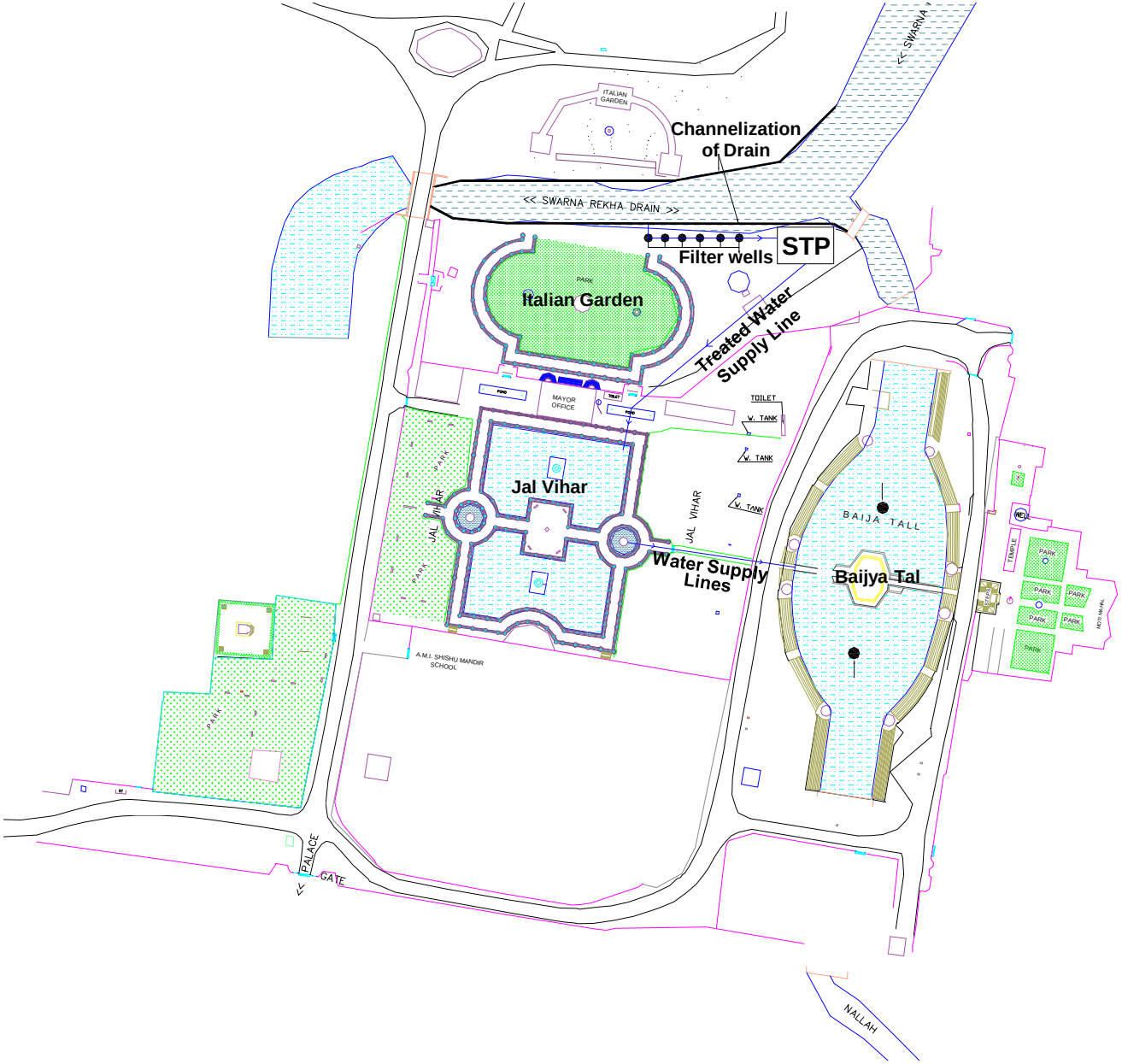
Period	pH		Turbidity (NTU)		Conductivity (µS/cm)		BOD (mg/l)	
Week	Spot 1	Spot 2	Spot 1	Spot 2	Spot 1	Spot 2	Spot 1	Spot 2
First	9.5	9.2	102	174	800	797	50	70
Second	9.0	9.1	59	158	787	787	17	34
Third	8.8	9.0	50	131	761	748	15	28
Forth	8.8	9.7	77	61	680	681	14	21

Before ABR Treatment	After 1 week	After 2 weeks	After 3 weeks	After 4 weeks


Temple Tank, Nagercoil


Ongoing Treatment

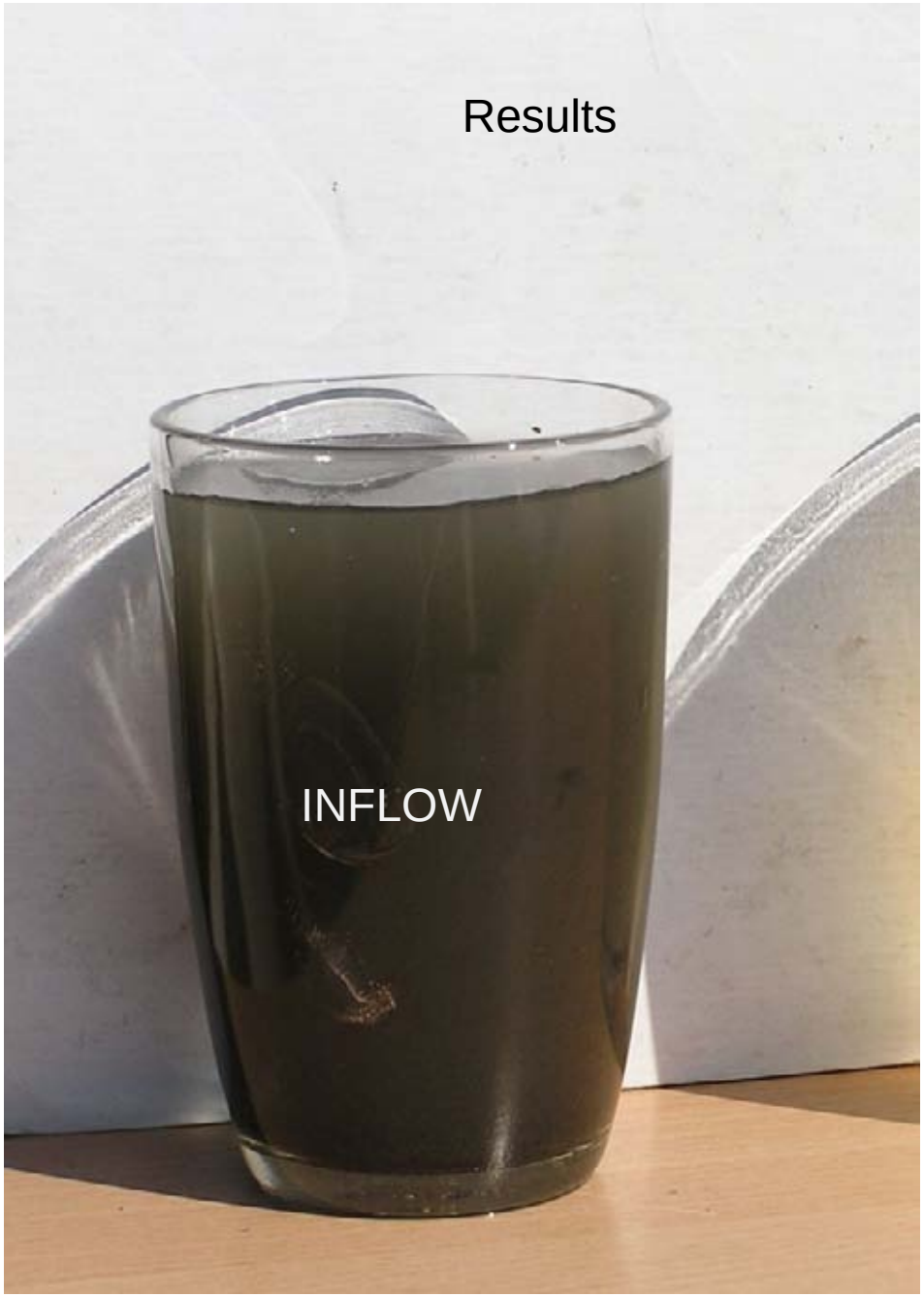
Waterscape of Baija Tal & Italian Garden - Gwalior




BAIJA TAL IN 2007


Raw Sewage Being Bioremediated

Results




Revived Baija Tal

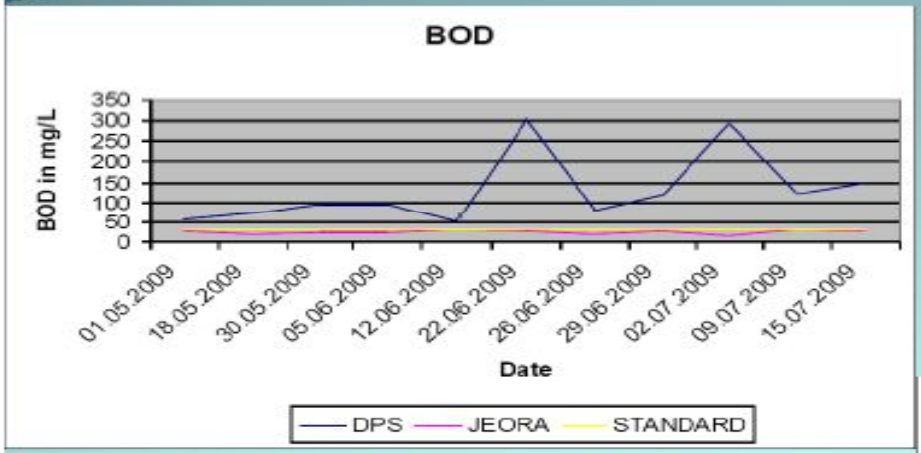

Drain At Kanpur
GANGA RIVER
NRI CITY
osing Point 1
Dosing Point 2
Kesapur Nagar
Azadnagar
Vishnu Puri
RANI GHAT
Machhuwanagar
Old Kanpur
Nawabganj


Monitoring Point
A
Bacteria Dozing


INFLOW

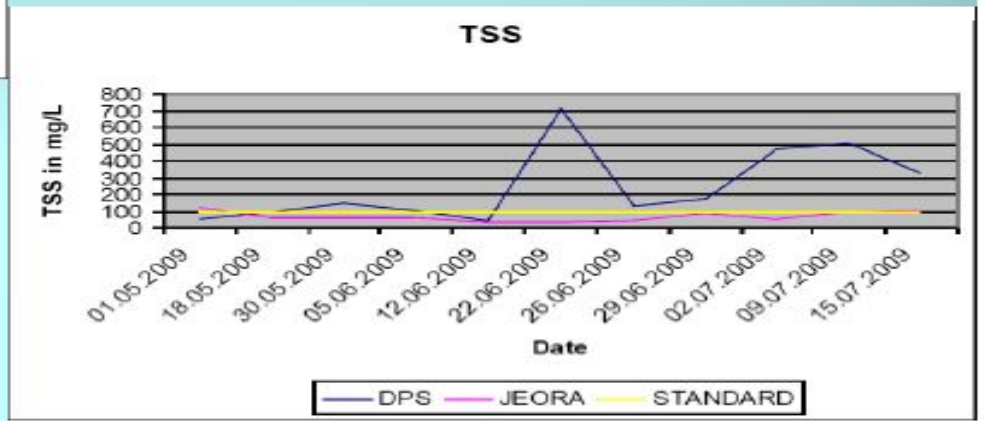

OUTFLOW AFTER TREATMENT

Scientific Observations



Analyzed by IIT, Kanpur, UPPCB, UP Jal Nigam & a Private Lab

Always within Standard Limits

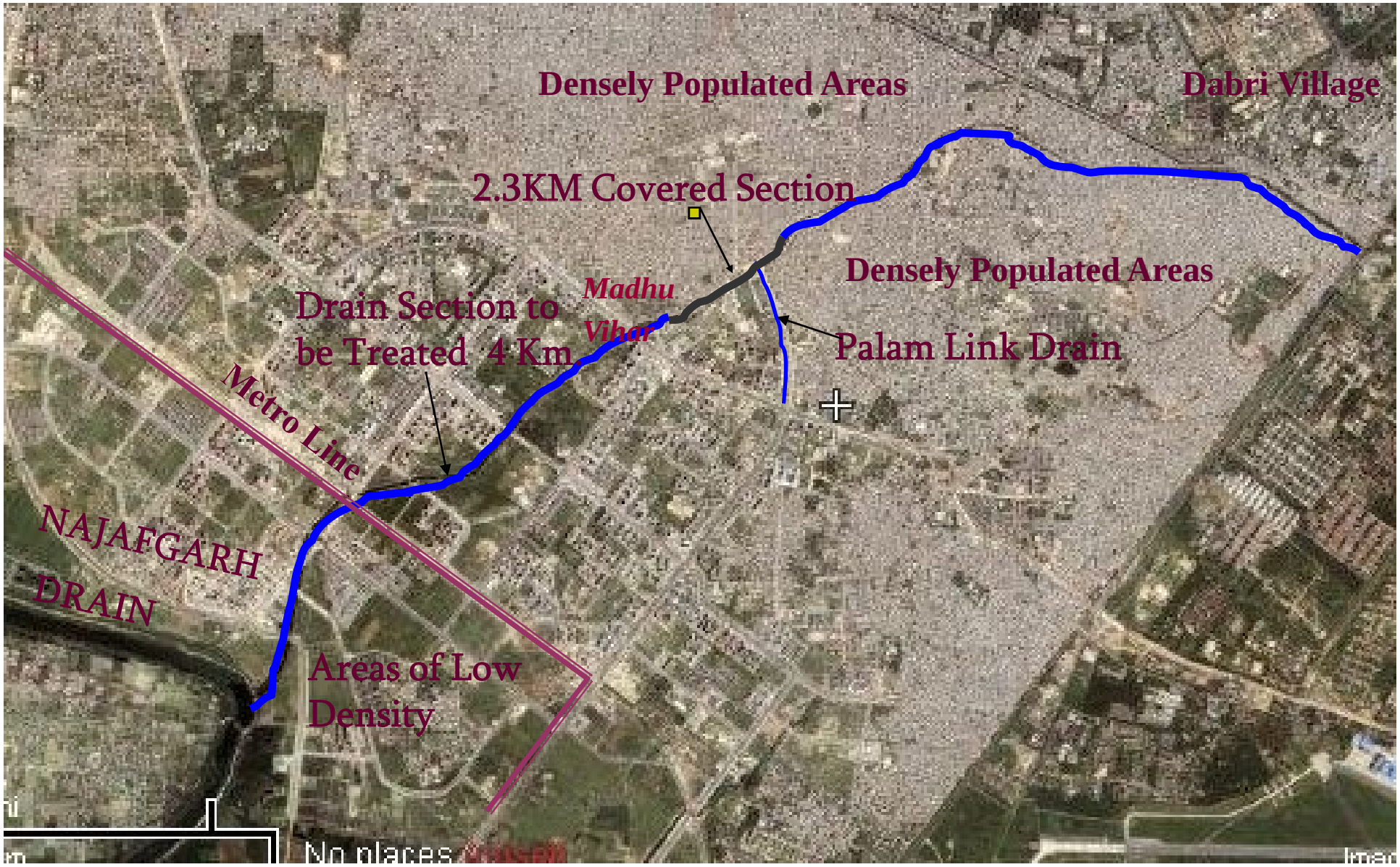


Central Ridge Drainage, Delhi

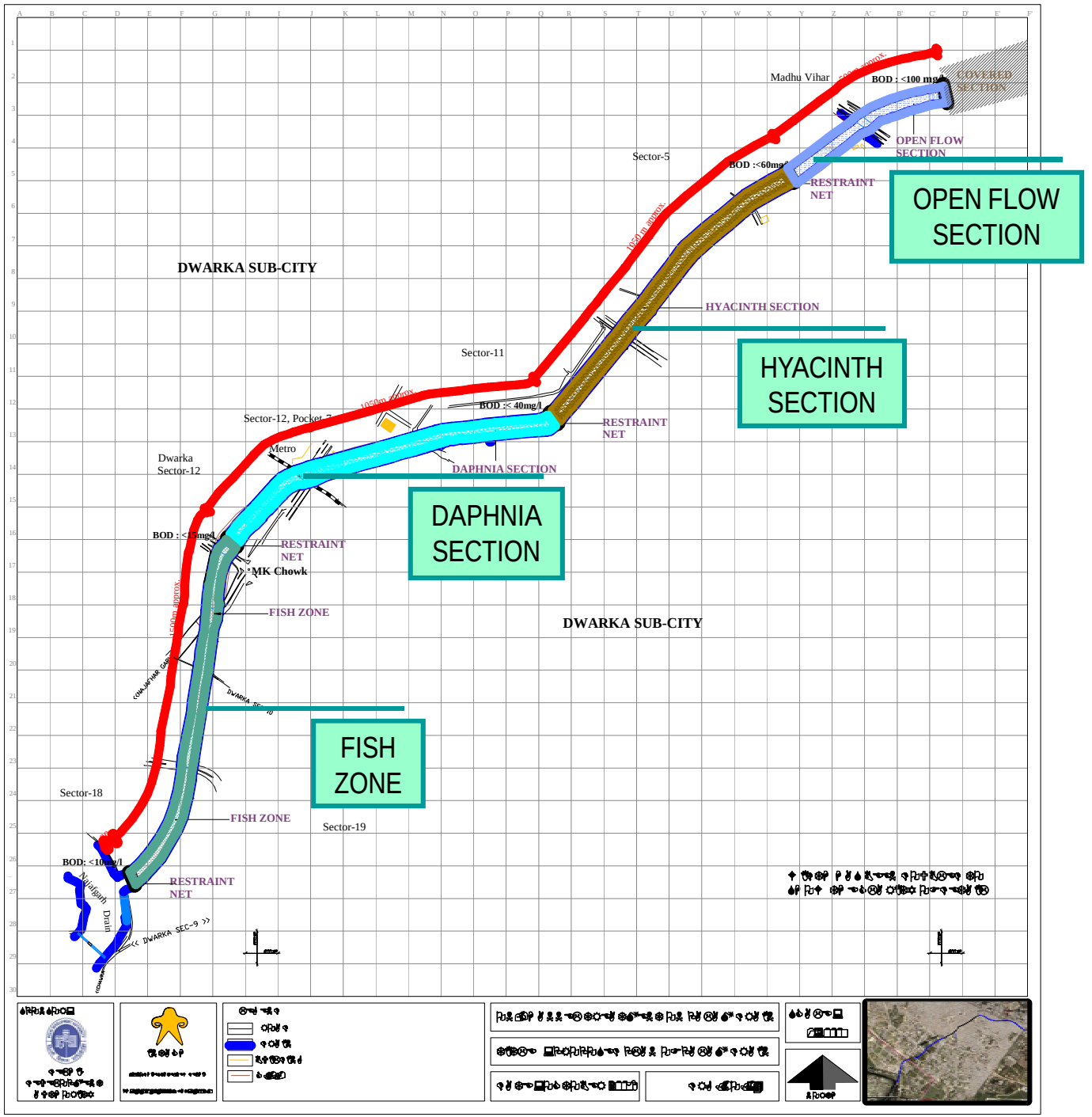
- Kushak Nala Part of Natural Drainage Channel of Delhi's Ridge
- Stretch S.P.Marg-Satya Sadan 3 Km.L
- Catchment Area 12 Sq.Km

  Runoff- 2.20 MCM
- Gradient 1 in 600 or 5m overall


2009/12/14



Satellite Image Of Palam Drain


Madhu Vihar
BOD : <100 mg/l
COVERED SECTION
OPEN FLOW SECTION
Sector-5
BOD :<60mg/l
RESTRAINT NET
OPEN FLOW SECTION
DWARKA SUB-CITY
HYACINTH SECTION
HYACINTH SECTION
Sector-11
BOD :< 40mg/l
Sector-12, Pocket 7
RESTRAINT NET
Metro
Dwarka Sector-12
DAPHNIA SECTION
DAPHNIA SECTION
BOD : <15mg/l
RESTRAINT NET
MK Chowk
FISH ZONE
DWARKA SUB-CITY
FISH ZONE
Sector-18
Sector-19
FISH ZONE
BOD: <10mg/l
RESTRAINT NET
Najafgarh Drain
<< DWARKA SEC-9 >>


SHARP

Duckweed Treatment System

TREATMENT PERFORMANCE

Parameter	Raw Sewage	Inlet of Duckweed Pond	Outlet of Duckweed Pond
TSS (mg/L)	195 – 198	40 – 480	10 – 90
BOD (mg/L)	120 – 237	80 – 110	16 – 27
COD (mg/L)	370 – 650	160 – 245	55 – 80
Phosphate (mg/L)	1.1 – 3.9	0.2 – 3.6	0.1 – 2.5
Nitrogen (mg/L)	16.5 - 79	11.7 - 46	10 - 25

SOURCE: Guidelines for Duckweed Based Wastewater Treatment System, CPCB, 2001


Daphnia : This Zooplanckton Will Be Cultured At Site In Tar
And Large No. Of Daphnids Will Be Released In This Sectio
Organism Grazes On Microscopic Plants Removing Nutrien
The Water Thereafter Being Consumed By Larger Organism


Madhu Vihar
9.10.12

Table 5 : Cost Comparison Between Conventional Treatment [ASP] & ABR Treatment on Polluted Drain Per MLD

S.N.	Cost Head	Conventional STP [Rs. Lakhs]	Cost for ABR on Drain	Remarks
1	Land acquisition	10.00 [for 0.2 ha]	Nil	No land needs to be acquired for ABR
2	Cost of Plant & Machinery	45.0	Nil	ABR requires very basic equipment like drums and pipes.
3	O&M (Annual)	3.60	1.75*	Energy consumption 200 kwh/MLD in ASP - ABR does not have a carbon footprint * Includes bacteria as well as manpower. ABR is 48% of cost of ASP on O & M count
4	**TOTAL**	**58.60**	**1.75**	
5	Conveyance Infrastructure	90.00	Nil	
6	Grand Total	148.60	1.75	

Estimated Treatment Costs For 140 MLD Flow

	Proposed Unconventional System	*Conventional System [ASP]*	*Notes*
Capital Costs	*Rs. 12.0 Cr*	*Rs. 90.00 Cr* [+ land cost x 30 ha]*	*Land availability ?*
O & M Cost	*Rs. 3.0 Cr* *Revenue incl. potential for carbon credit trading + enhanced land values – no energy/no equipment/ immediate results*	*Rs. 9.0 Cr***	*** High Energy Needs 10 million kwh annually*

Covering of 4 Km. of Drain Requires Rs. 160 Cr @ Rs. 60 Cr/km with an O & M Cost of Rs. 1 Cr annually

Thank You

Indian National Trust for Art and Cultural Heritage

FEEDBACK INFRA

Making Infrastructure Happen