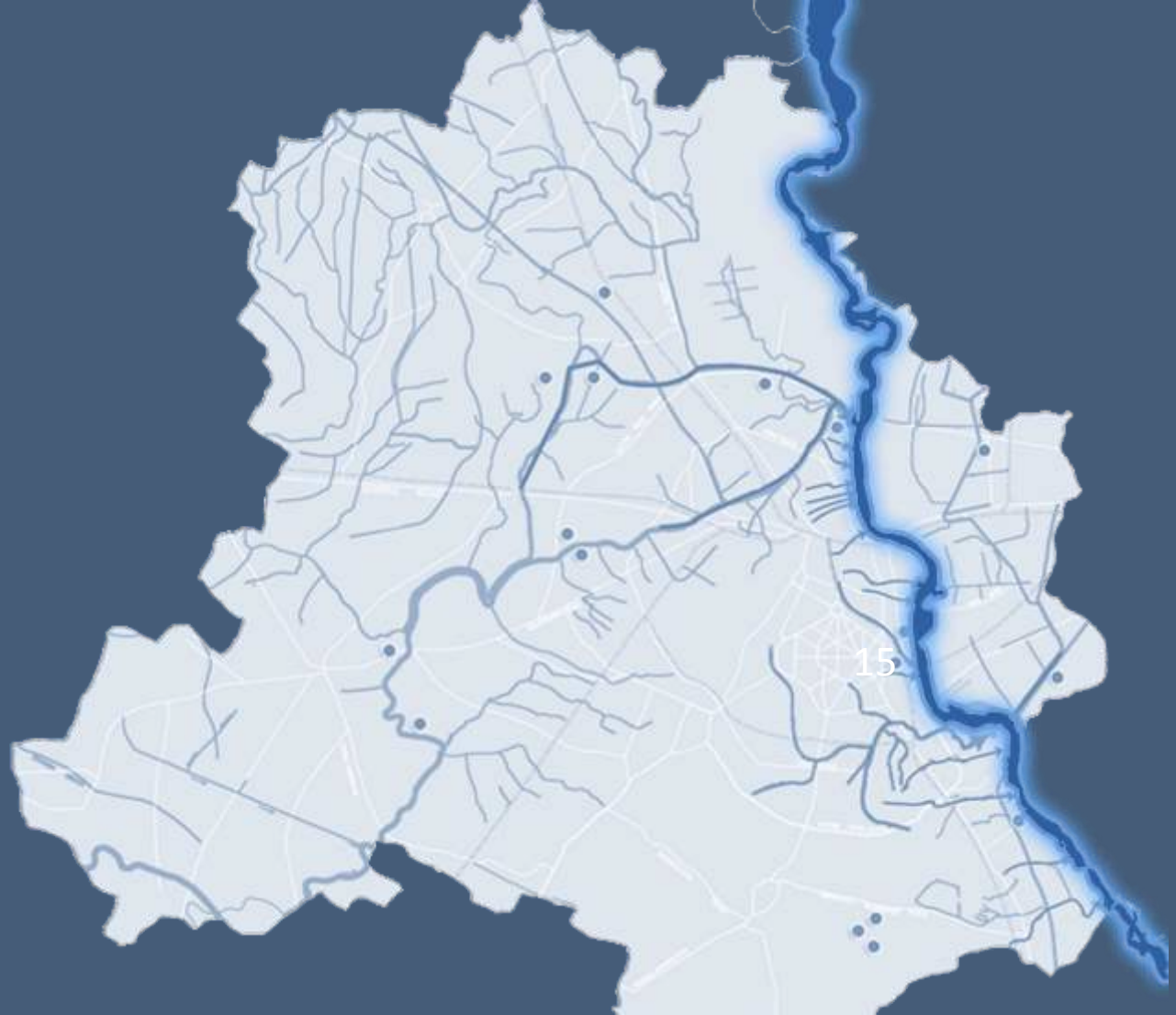
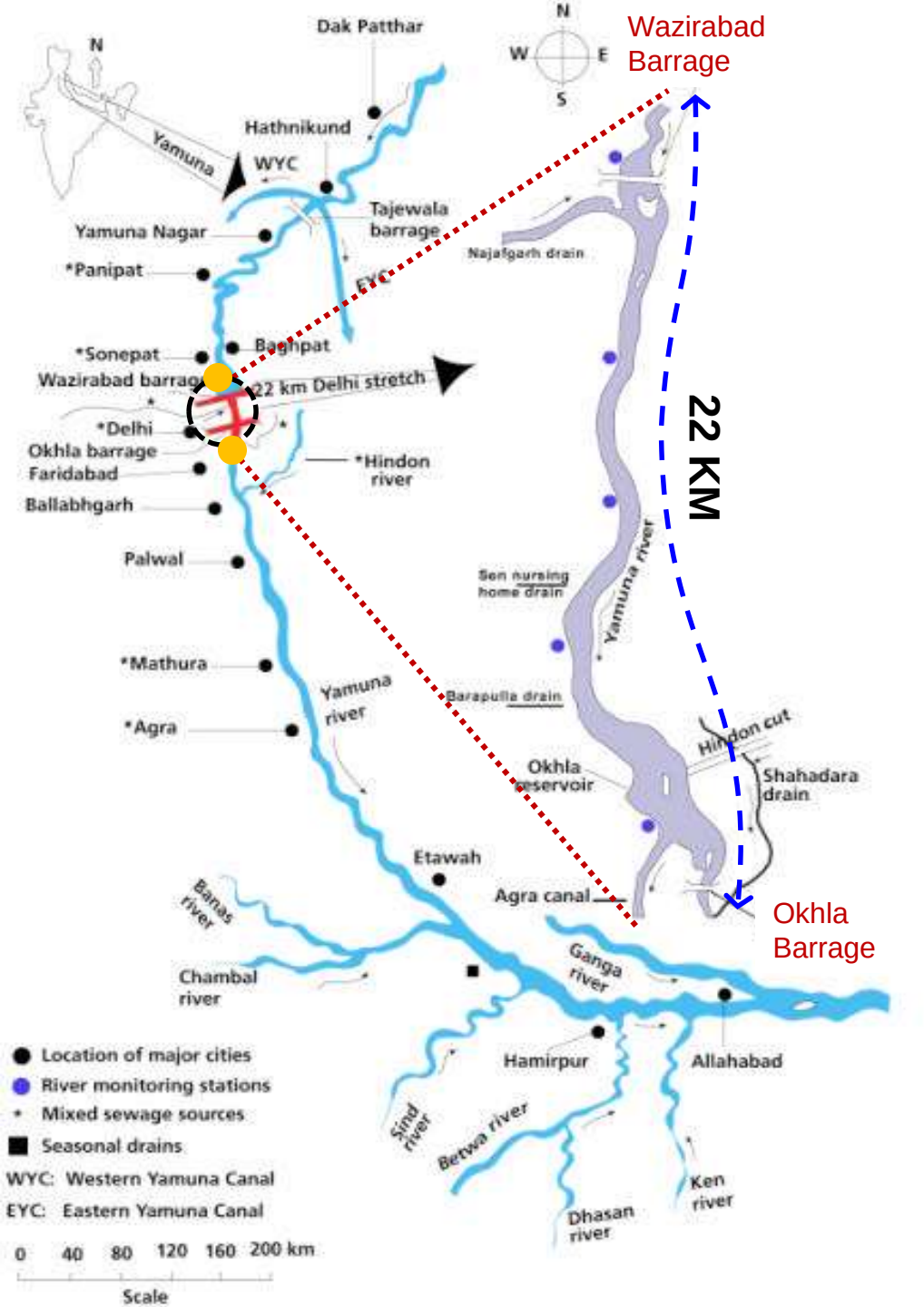


ACTION PLAN FOR CLEANING THE RIVER YAMUNA

DELHI JAL BOARD
(GOVT. OF N C T OF DELHI)

15-02-2016



Yamuna river enters Delhi near Palla, traverses about 48 kms.

YAMUNA IN DELHI:

22 Km stretch from Wazirabad to

Okhla

2% OF RIVER LENGTH in Delhi

BUT

70 % of total pollution loaded in

Yamuna in DELHI

(BOD:>40; Coliform: 24Millions)


MAIN SOURCE OF
POLLUTION IN
YAMUNA

1st MAJOR REASONS FOR POLLUTION IN YAMUNA

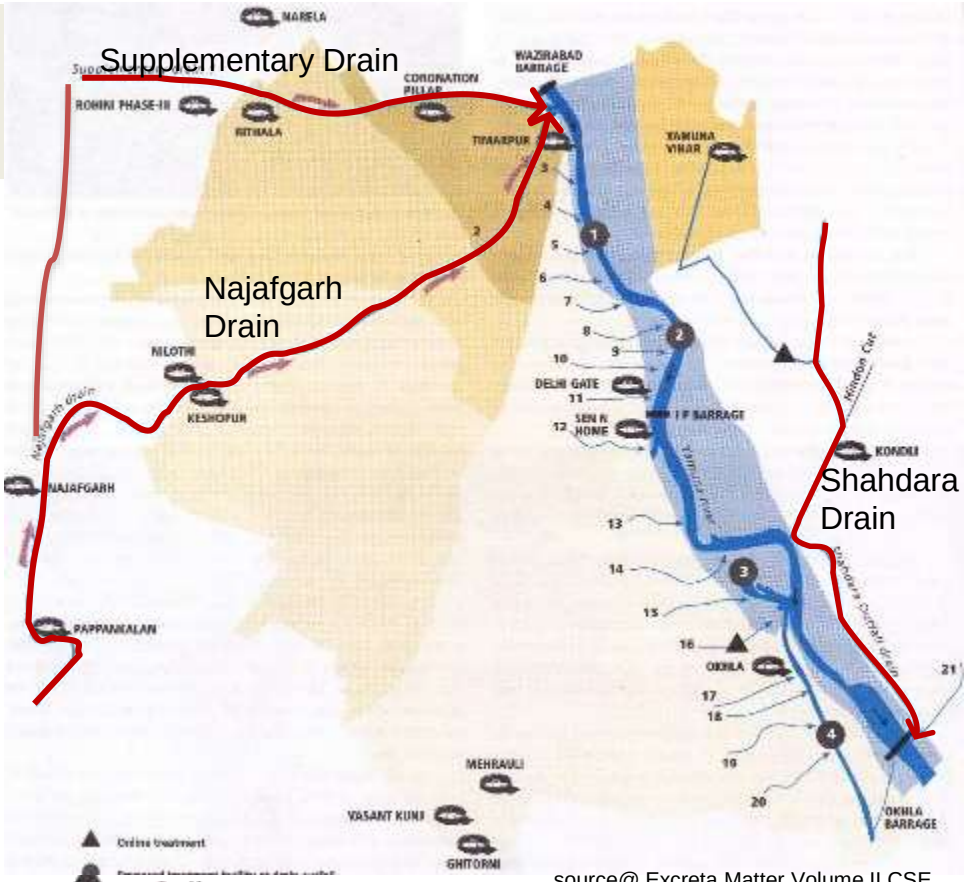
22 drains
directly flowing
into the river

source@ Excreta Matter Volume II,CSE

2nd MAJOR REASONS FOR POLLUTION IN YAMUNA

Of which **three main drains** are key contributors to pollution:

1. NAJAFGARH DRAIN
2. SUPPLEMENTARY DRAIN
3. SHAHDARA DRAIN



source@ Excreta Matter Volume II,CSE

Water color & quality changes in YAMUNA, due to NALA outfall

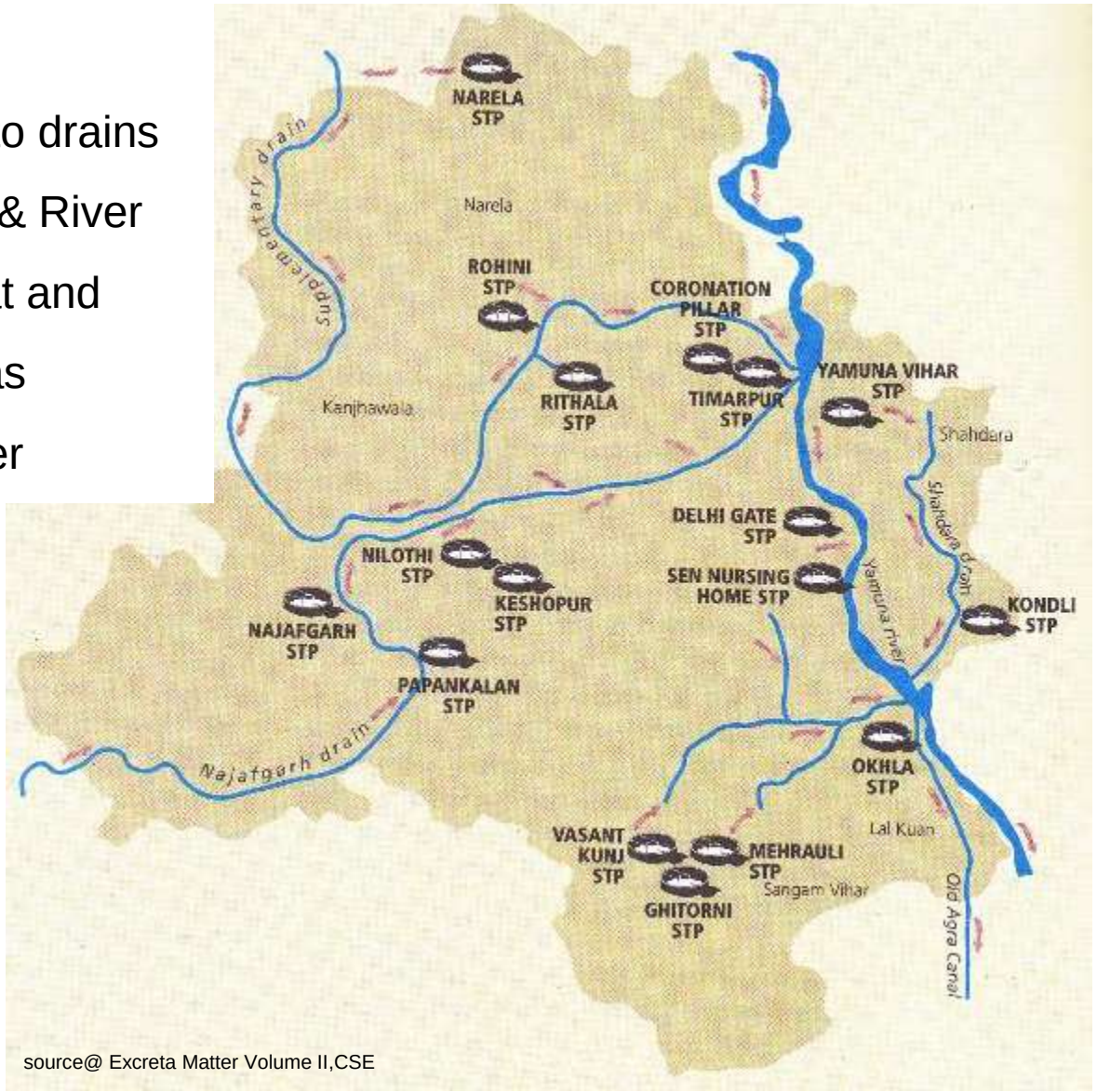
3rd MAJOR REASONS FOR POLLUTION IN YAMUNA

- About 45% of the area having population about 40-50 lacs is un-sewered.
- Sewage of the area is being released into the open storm water ditches / drains, which finally find its way into river Yamuna.

Drain behind ITO

5th MAJOR REASONS FOR POLLUTION IN YAMUNA

1. 45% Delhi is unsewered
2. Industrial effluent outfalls into drains
3. Dumping of solids in drains & River
4. U/A slaughtering/Dhobi Ghat and industries in residential areas
5. U/A slums in the bed of River



source@ Excreta Matter Volume II,CSE

ACTION PLAN

7 STEPS to clean Yamuna

1. Cleaning 3 major drains Najafgarh, Supplementary & Shahadra- Interceptor Sewer Project
2. Cleaning all tributary drains of Najafgarh, Supplementary & Shahadra drain – NGT Order-Setting up of decentralized sewage treatment plants and allied works
3. Trapping/ cleaning of remaining 15 drains directly falling into River Yamuna- Bela Road, Ring Road sewer Project
4. Dredging of major drains and 22 Km stretch of Yamuna bed
5. Laying of sewerage system in unsewered areas- Master Plan 2031.
6. Rehabilitation & up-gradation of old sewerage infrastructure- Yamuna Action Plan- III
7. Immediate action for Bio remediation & development of public space along all three major drains

1 Cleaning **3 MAJOR** drains Najafgarh, Supplementary & Shahadra

PRIMARY DRAIN

22 drains

Mainly 3 MAIN DRAINS

- Tapping Water entering the Primary Drain through Tributary Drain
- Augmenting Existing STPs - *at the mouth of Delhi Gate drain and Dr. Sen Nursing Home Drain.*
- Construction of NEW STPs after utilization of Existing STP

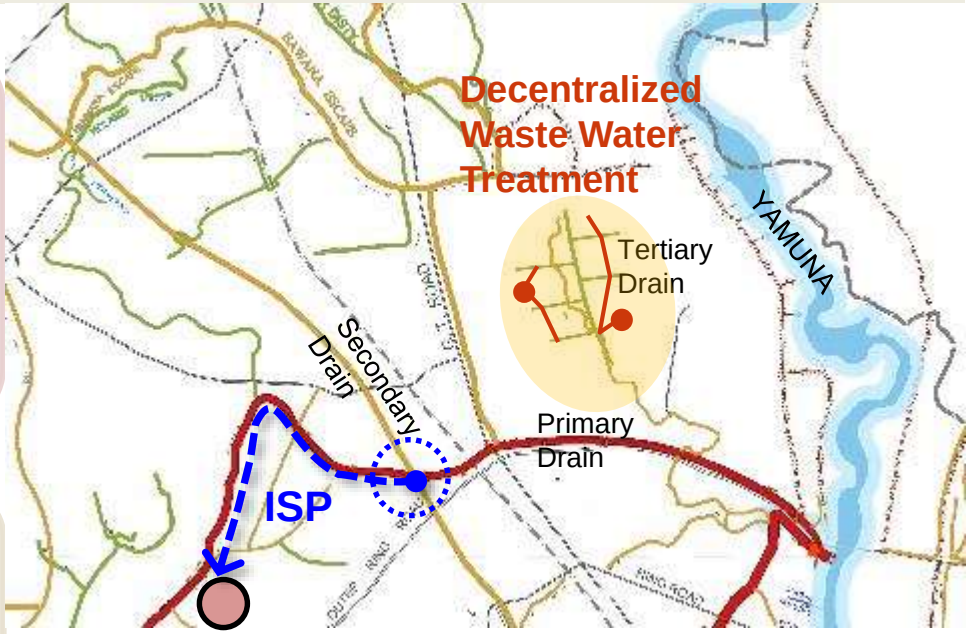
SECONDARY DRAIN

Tributary drains

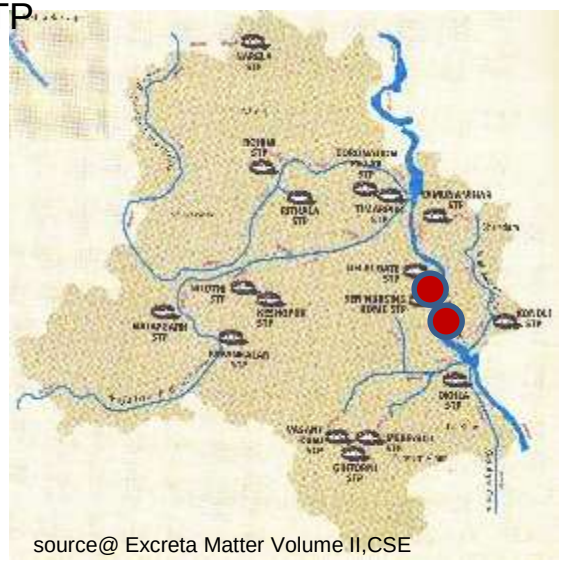
- **Interceptor Sewer Project (ISP)** to tap water and divert it to nearest STP for PRIMARY TREATMENT

TERTIARY DRAIN

- Tapping water at source/ locally and treating it with small **WASTE WATER TREATMENT UNITS - JJPY**



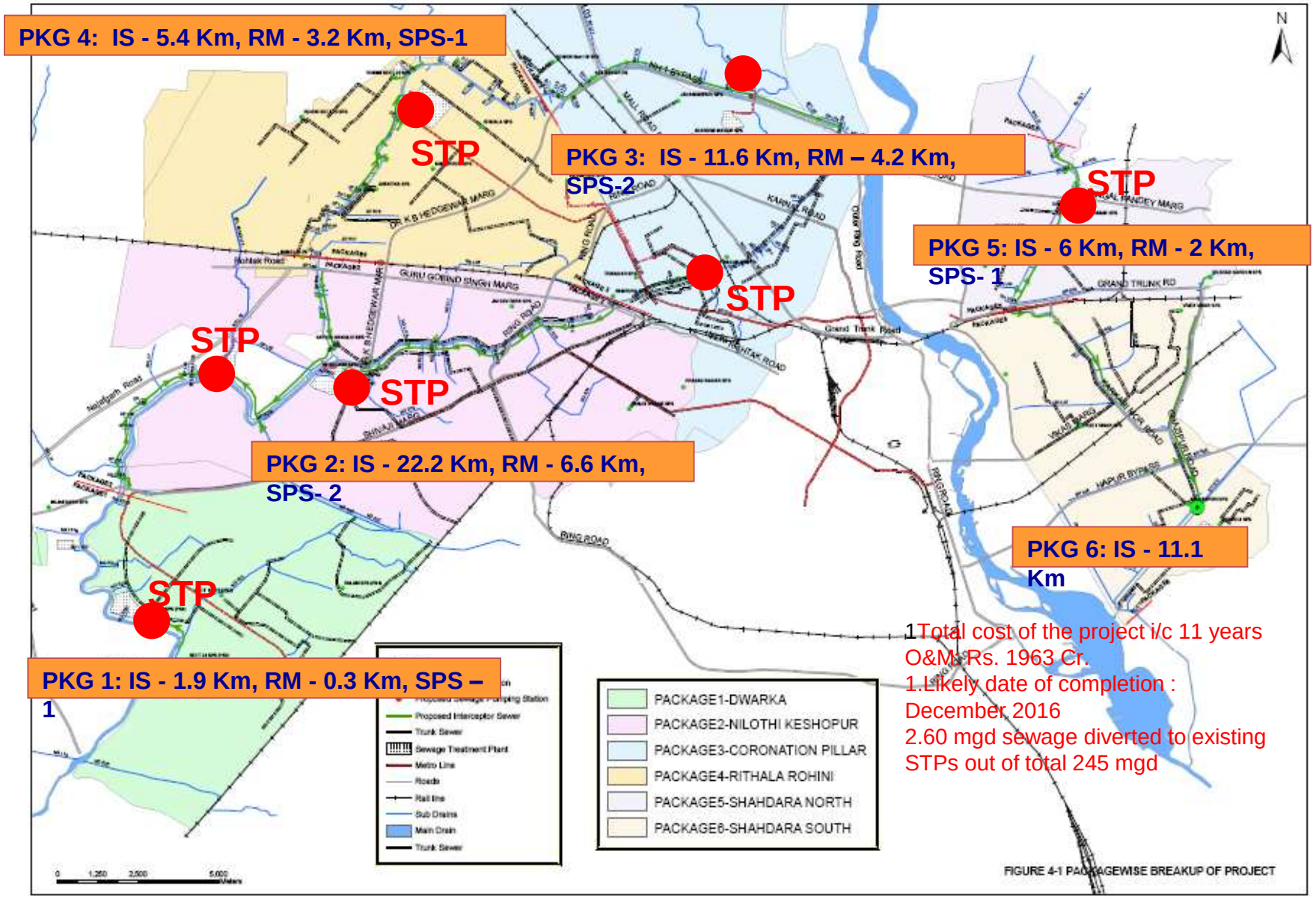
Augmenting Existing STPs -*at the mouth of Delhi Gate drain and Dr. Sen Nursing Home Drain.*



source@ Excreta Matter Volume II,CSE

1

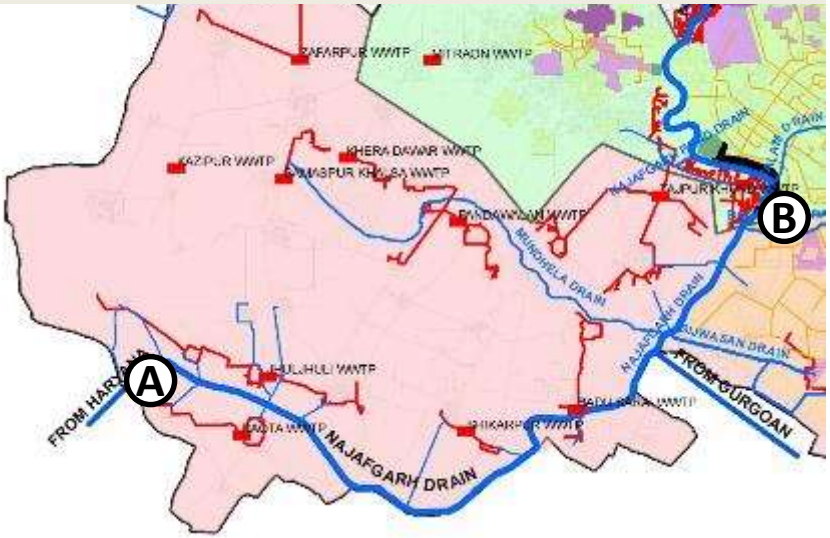
PROJECT DETAIL:
INTERCEPTOR SEWER PROJECT (ISP) PROJECT



1Total cost of the project i/c 11 years O&M: Rs. 1963 Cr.
1.Likely date of completion : December 2016
2.60 mgd sewage diverted to existing STPs out of total 245 mgd

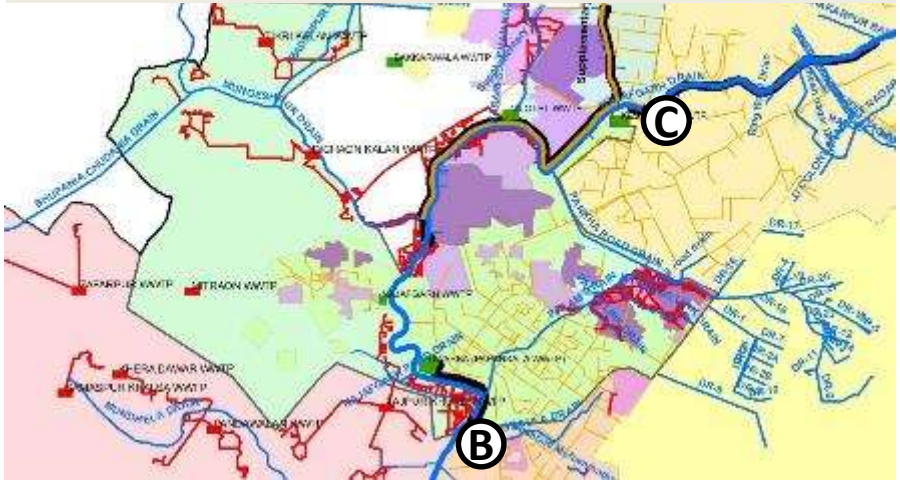
2 DECENTRALIZED **SEWAGE TREATMENT PLANT (STP)** TO TREAT SUB- DRAINS

Plan for Segment A to B (Dhansa to Goyla)

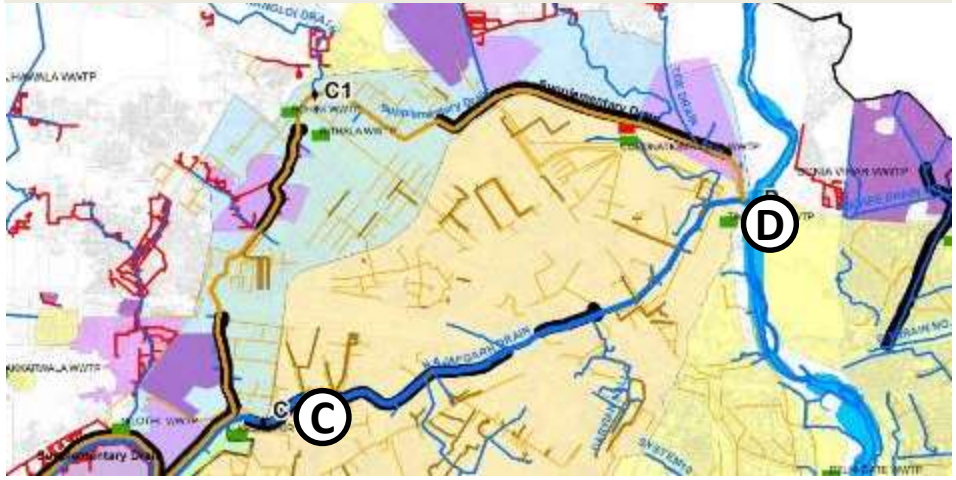


Plan for Segment C to D (Keshopur – Rithala- Wazirabad)

Plan for Segment B to C (Goyla to Keshopur)



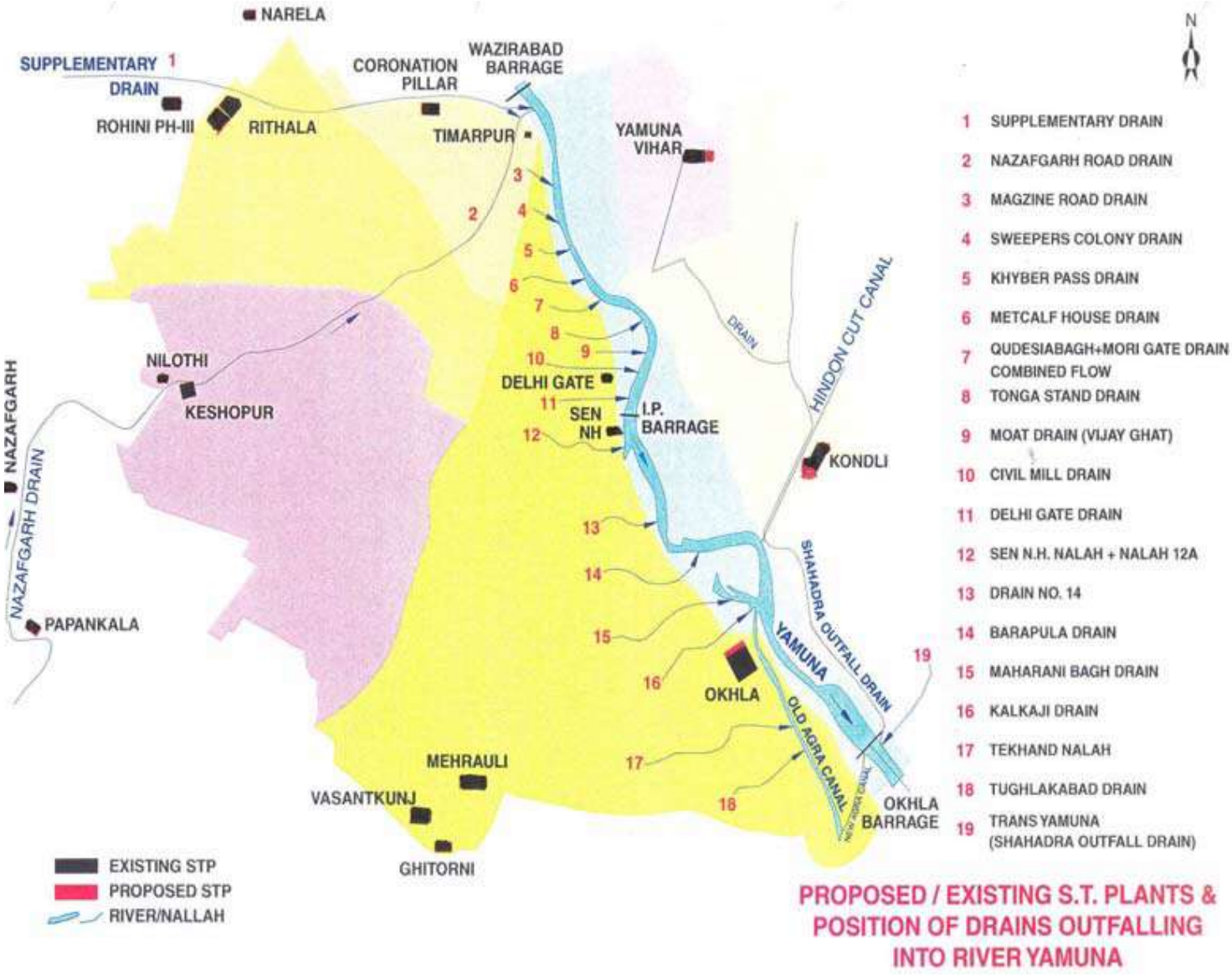
Plan for Segment C to C-1 to D



2 Projects Prioritized For Implementation Of NGT Orders Concerning Najafgarh And Supplementary

Sr. No.	Name of Scheme	Cost Rs in Cr
1	Construction of 9 STPs & 1 SPS & connected peripheral sewer lines 103 kms.	412
2	Construction of 5 STPs & 2 Sewage P/Stns & connected sewer lines 55kms.	364
3	Construction of 70 MGD STP at Coronation Pillar.	539
4	Peripheral sewers to traps waste flows of u/a colonies in the command of Nilothi, Pappankalan, Keshopur STPs.	51
5	Rehabilitation of Peripheral sewer-4	232
	Total	1598 ($235 million)

3 Trapping/ cleaning of remaining 15 drains directly falling into River Yamuna.



3 Action Plan For Individual Drains

- INTERCEPTOR SEWER for **Khyber Pass, sweeper Colony & Magazine Road drain** has been made functional.
- The discharge intercepted from these drains shall **be pumped to Nigam Bodh SPS** and ultimately will be taken to existing **Okhla STP** having treatment capacity of 170 MGD.

- **METCALF HOUSE** has been intercepted into Bela Road Trunk sewer.
- **QUDESIA DRAIN** has been diverted and **TONGA STAND DRAINS** shall be trapped into Bela Road Trunk Sewer.

3 Action Plan For Individual Drains

- After **rehabilitation of Subhash marg peripheral sewer & Ring Road trunk sewer**, sewage in **CIVIL MILL DRAIN** near Shanti Van has been reduced. However, remaining sewage has been trapped into Ring Road trunk sewer.

- The capacity of **STP AT THE MOUTH OF DELHI GATE DRAIN HAS BEEN AUGMENTED** from existing 2.2 to 17.2 MGD by constructing addition 15 MGD STP.

3 ACTION PLAN FOR INDIVIDUAL DRAINS

- The **STP** of 2.2 MGD at the mouth of Dr **Sen Nursing Home drain** was established under YAP-I.
- The surplus sewage has been trapped into Ring Road trunk sewer near WHO, Ring Road. The discharge can be regulated in this trapping according to quantity of sewage.
- **Drain No. 12** a is being trapped into Ring Road Trunk sewer.

3 Action Plan For Individual Drains
(Barapula Drain)

Carries 30 to 40 MGD sewage

Action Plan:

- **Short Term**: 6 to 8 MGD sewage has been trapped into Andrews Ganj SPS & 10 mgd at Maharani Bagh which are going to existing Okhla STP.

- **Medium Term**: All the defective sewer lines in the catchment of Barapulla drain are being repaired. Around 15 to 20 MGD sewage shall be diverted to the regular sewerage system.

- **Long Term**: All the unsewered areas in the catchment of Barapulla drain and its tributaries shall be provided with sewerage system.

4 Dredging of major drains and 22 Km stretch of Yamuna bed

5 Laying of sewerage system in unsewered areas.

The **SEWERAGE MASTER PLAN 2031** has been finalized for unsewered areas of Delhi. The salient features are:

1. The Plan is for horizon **year 2031** and to be implemented in **four phases**
2. Total length of sewer line to be laid **: 9800 Km**
3. Nos. of decentralized Sewage Treatment Plants **: 75**
4. Total Capacity of the STPs **: 375 mgd**
5. Cost of projects under SMP-2031 if implemented by 2027: Rs.19500 Cr .($ 2879 MILLION)

6 KEY FEATURES YAP-III

Yamuna Action Plan – Phase III

$ 245 Million

1. Sewers (Rehabilitation)

- Kondli Catchment - Total Length for rehabilitation– 15 Km
- Rithala Catchment - Total Length for rehabilitation – 5 Km

2. Rising Mains (Rehabilitation)

- Kondli Catchment - Total Length – 9.3 Km
- Rithala Catchment - Total Length – 12.4 Km

3. Tertiary Treatment Plants

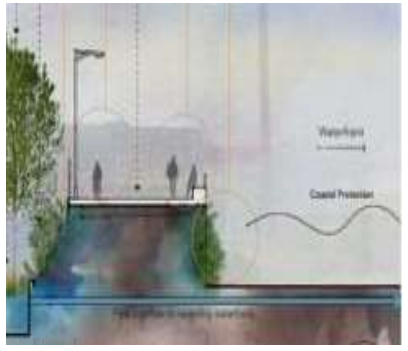
Kondli Catchment – 204 MLD (45MGD)

Okhla Catchment – 428 MLD (95MGD)

Rithala Catchment – 182 MLD (40 MGD)

8 Immediate action for Bio remediation & development of public space along all three major drains

- CLEANING THE RIVER Sahibi and Najafgarh Nalla through biological system of a) on channel floating wetlands b) wetland parks along and around it
- RECONECTING PEOPLE AND PLACES through alternative movement system – with non polluting NMV, Cycle tracks and pedestrian pathways
- URBAN WASTE MANAGEMENT – Reducing and cleaning urban solid waste that feeds into river Sahibi and Najafgarh Nalla from the adjoining neighbourhoods.



8 BIO – REMEDIATION TECHNIQUES

1

Tertiary sewage treatment

2

Storm water management & Rain water harvesting

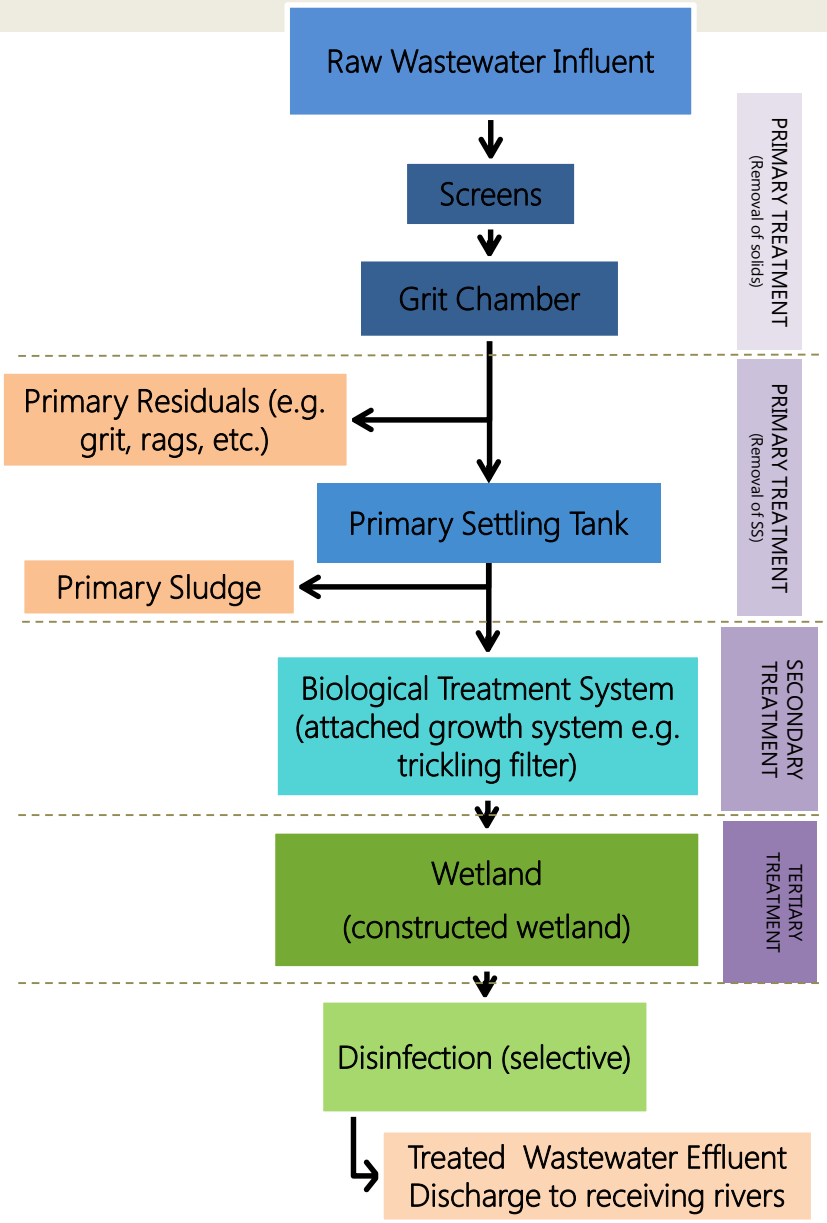
3

Aquatic bio-diversity Wetlands

4

Slope stabilization to prevent siltation

8 AN OVERVIEW OF SEWAGE TREATMENT STRATEGY



TERTIARY SEWAGE TREATMENT
FLOATING ISLANDS

Floating islands are buoyant mats, planted like a garden and launched onto a waterway. They are made from a matrix of fibers which look like a pot-scrub or loofah.

ADVANTAGES

1. **They remove pollutants from a waterway**, including nitrates, phosphates, ammonia and heavy metals
2. **They provide critical riparian edge habitat** - in fact, new land mass for use by all kinds of creatures, from microbes to humans
3. **They sequester carbon and other greenhouse gases**
4. **They provide wave mitigation and erosion control**
5. They beautify a waterscape

SLOPE STABILIZATION TO PREVENT SILTATION

Geo – grid method for soil stabilization of the existing nallah slopes

Planting the slopes with grasses and other plant material prevents erosion on shallow slopes.

Image Source: oasis designs Inc.

CASE STUDIES

1

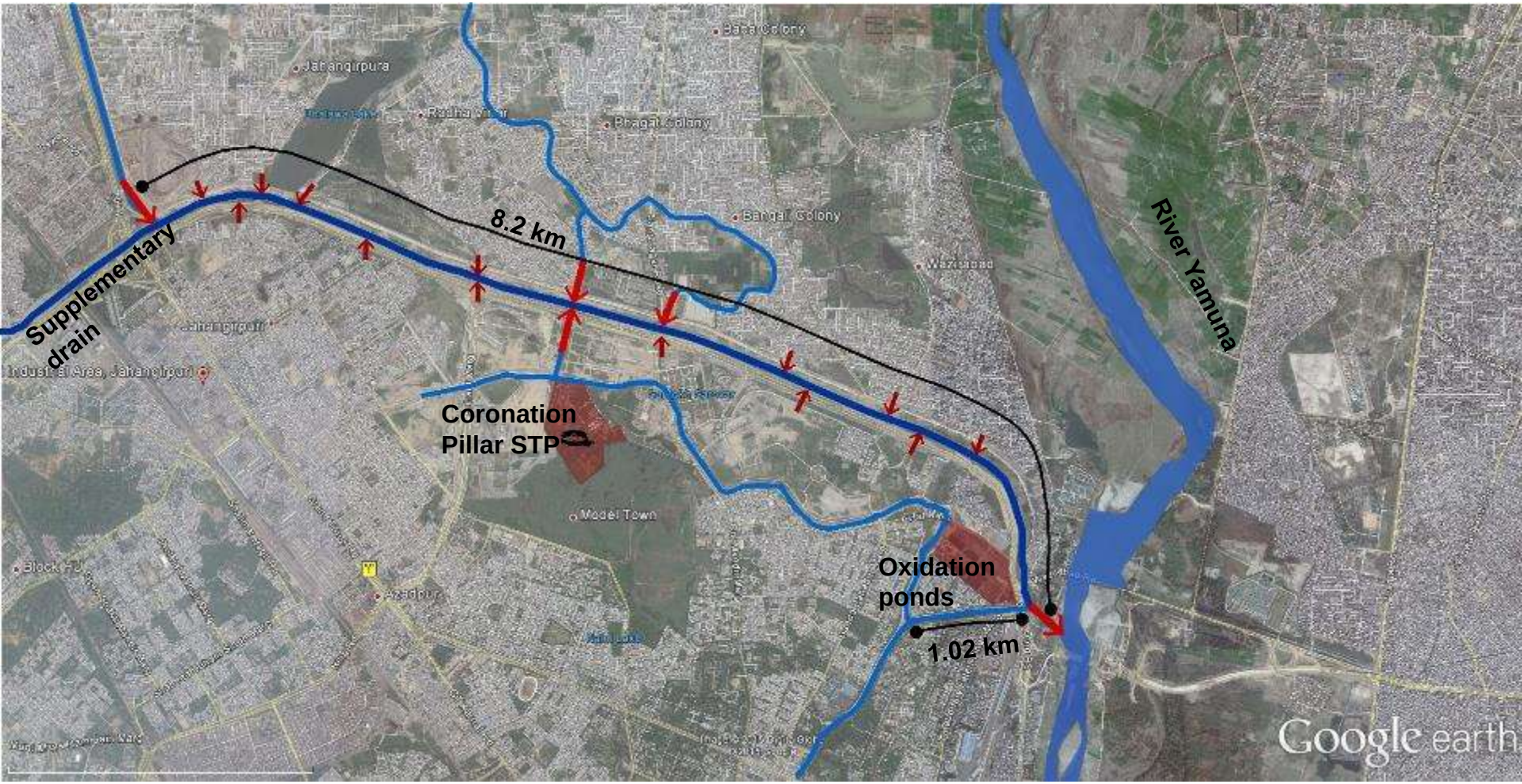
Tertiary Sewage treatment

OSHO PARK, PUNE, INDIA

3 HOUTAN PARK, SHANGHAI, CHINA By Turenscape

PILOT PROJECT DEMONSTRATION

PILOT PROJECT PROPOSAL FOR SUPPLEMENTARY DRAIN
EXISTING CONDITION

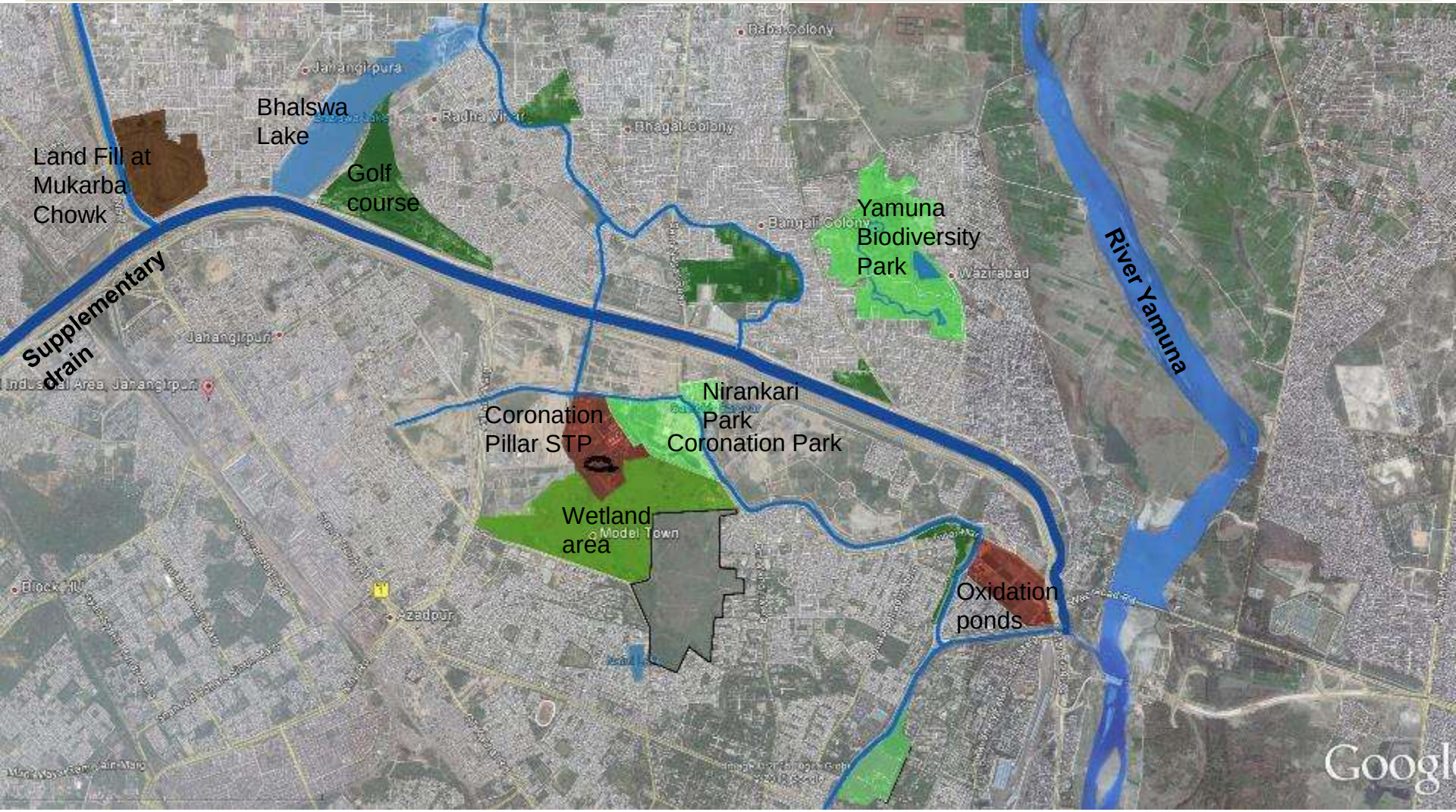


Tributary drains draining to the supplementary drain

Storm water directly entering the supplementary drain

Existing waste water treatment facilities

PILOT PROJECT PROPOSAL FOR SUPPLEMENTARY DRAIN
SURROUNDING GREEN AREAS



- Wetland area
- Public and semi public area
- Existing Parks
- Govt land- use undecided
- Surrounding Green Landuse that can be connected
- Existing Lake
- Existing waste water treatment facilities
- Tributary drains draining into supplementary drain

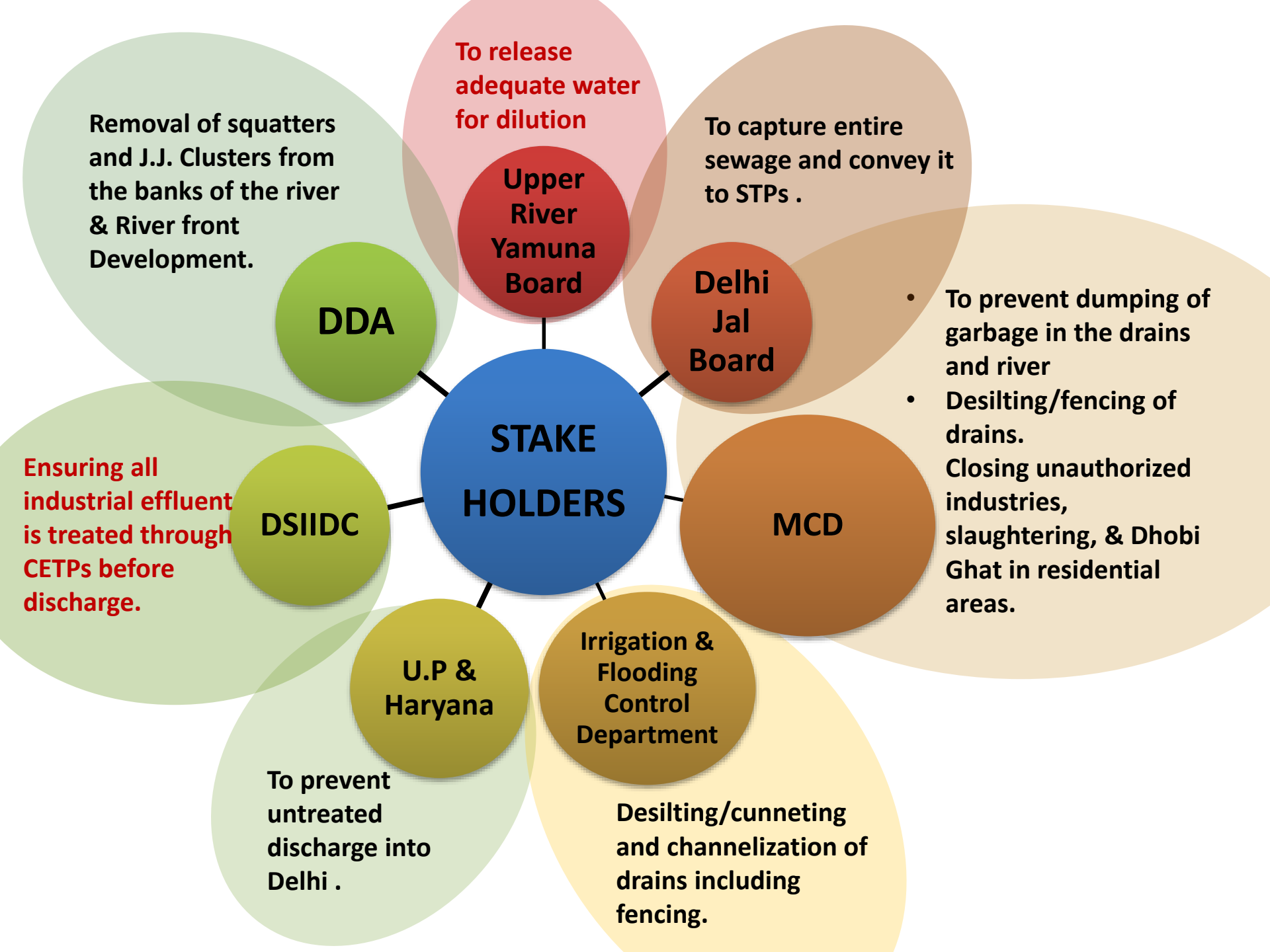

Before


After


Before


After

STAKEHOLDER


STAKE HOLDERS
Upper River Yamuna Board
To release adequate water for dilution
Delhi Jal Board
To capture entire sewage and convey it to STPs .
MCD
To prevent dumping of garbage in the drains and river
Desilting/fencing of drains.
Closing unauthorized industries, slaughtering, & Dhobi Ghat in residential areas.
Irrigation & Flooding Control Department
Desilting/cunneting and channelization of drains including fencing.
U.P & Haryana
To prevent untreated discharge into Delhi .
DSIIDC
Ensuring all industrial effluent is treated through CETPs before discharge.
DDA
Removal of squatters and J.J. Clusters from the banks of the river & River front Development.

FUNDING

Source of FUNDING

S.No	Component	Cost Rs in Cr	Source of Fund
1.	Cleaning all tributary drains of Najafgarh & Supplementary drain (natural drains)	1600	NMCG
2.	Cleaning 3 major drains Najafgarh, Supplementary & Shahadra	1963	Jn NURM/ Delhi Govt.
3.	Trapping/ cleaning of remaining 15 drains directly falling into River Yamuna.	3	Delhi Govt.
4.	Dredging of major drains and 22 Km stretch of Yamuna bed	No estimation done	To be decided
5.	Laying of sewerage system in unsewered areas.	20,000	To be decided
6.	Setting up of decentralized sewage treatment plants and allied works.		
7.	Rehabilitation & up gradation of old sewerage infrastructures	1656	YAP-III
8.	Immediate action for Bio remediation & development of public space along all three major drains	50	To be decided

Year wise Funds Disbursement

S. No.	Year wise	Funds from NMCG Rs in Cr	Funds from YAP-III Rs in Cr
1.	2015-16	100	Nil
2.	2016-17	600	500
3.	2017-18	600	550
4.	2018-19	300	600
	Total	1600	1650 ($ 245 million)

R S TYAGI MEMBER (WS):
memberwsdjb@gmail.com
mrwater.djb@nic.in

Thank you

DELHI JAL BOARD
(GOVT. OF N C T OF DELHI)

06-01-2016

REUSE OF TREATED WATER

OPTIONS FOR REUSE OF TREATED EFFLUENT

PRESENTLY USE OF TREATED EFFLUENT: 142.40 MGD

1. Keshopure for irrigation deptt. : 20.0 MGD
2. Okhla for CPWD & Irrigation deptt. : 42.0 MGD
3. Coronation Pillar : 35.0 MGD
4. Delhi Gate (PPCL) : 2.2 MGD
5. Sen Nursing Home (PPCL) : 2.2 MGD
6. Rithala STP for DDA Japanese Park, Bawana Power Plant & NDPL : 32.0 MGD
7. Water bodies under DDA : 8.0 MGD
8. Commonwealth Games Village : 1.0 MGD

PROPOSAL FOR USING TREATED EFFLUENT: 69.20 MGD

1. Pappan Kalan By DDA : 20.0 MGD
2. Okhla Industrial Area : 2.2 MGD
3. Power Plant at Bamnoli : 16.0 MGD
4. Delhi Cantt. : 8.0 MGD
5. MCD for parks : 3.0 MGD
6. CPWD (ADDITIONAL) : 20.0 MGD

OPTIONS FOR REUSE OF TREATED EFFLUENT

IRRIGATION: PARKS & FOREST

DDA is responsible for **4,451 hectt. of open spaces**, all of which are irrigated via tubewells.

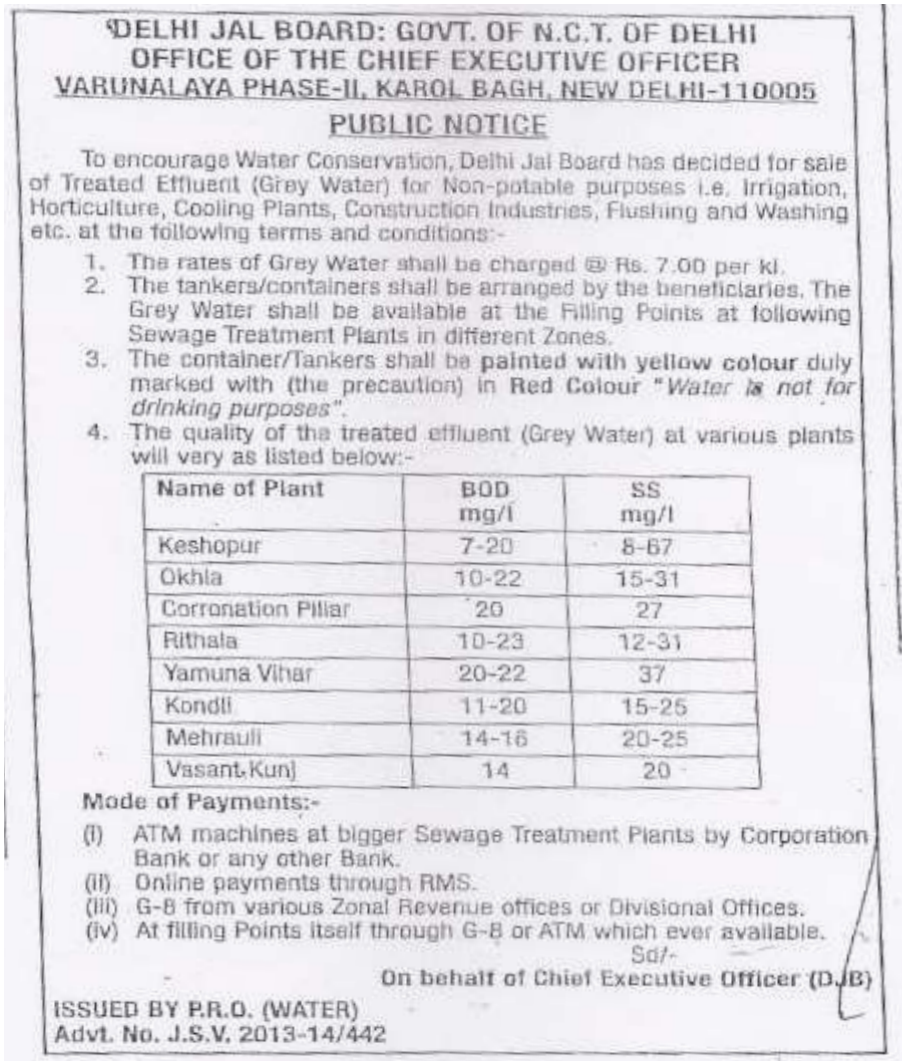
There is also irrigation of MCD open spaces, central government properties, private parks and properties, road verges, sports stadiums, etc.

The details of the green areas (In Hectare) being maintained by the various agencies are as under:

NDMC	: 445
MCD	: 2,428
DDA	: 4,451
CPWD	: 2,200
FOREST Department	: 11,000
Total	: 20,524

OPTIONS FOR REUSE OF TREATED EFFLUENT

NOTIFICATION REG. USE OF TREATED EFFLUENT
@ RS. 7.00 PER KL FROM STPS (Jan. 2014)



DELHI JAL BOARD: GOVT. OF N.C.T. OF DELHI
OFFICE OF THE CHIEF EXECUTIVE OFFICER
VARUNALAYA PHASE-II, KAROL BAGH, NEW DELHI-110005

PUBLIC NOTICE

To encourage Water Conservation, Delhi Jal Board has decided for sale of Treated Effluent (Grey Water) for Non-potable purposes i.e. Irrigation, Horticulture, Cooling Plants, Construction Industries, Flushing and Washing etc. at the following terms and conditions:-

1. The rates of Grey Water shall be charged @ Rs. 7.00 per kl.
2. The tankers/containers shall be arranged by the beneficiaries. The Grey Water shall be available at the Filling Points at following Sewage Treatment Plants in different Zones.
3. The container/Tankers shall be **painted with yellow colour** duly marked with (the precaution) in **Red Colour** *"Water is not for drinking purposes"*.
4. The quality of the treated effluent (Grey Water) at various plants will very as listed below:-

Name of Plant	BOD mg/l	SS mg/l
Keshopur	7-20	8-67
Okhla	10-22	15-31
Corronation Pillar	20	27
Rithala	10-23	12-31
Yamuna Vihar	20-22	37
Kondli	11-20	15-25
Mehrauli	14-16	20-25
Vasant Kunj	14	20

Mode of Payments:-

(i) ATM machines at bigger Sewage Treatment Plants by Corporation Bank or any other Bank.
(ii) Online payments through RMS.
(iii) G-8 from various Zonal Revenue offices or Divisional Offices.
(iv) At filling Points itself through G-8 or ATM which ever available.

Sd/-
On behalf of Chief Executive Officer (D.J.B)

ISSUED BY P.R.O. (WATER)
Advt. No. J.S.V. 2013-14/442