

BEFORE THE NATIONAL GREEN TRIBUNAL**PRINCIPAL BENCH NEW DELHI**

Execution Application no. 04/2023

In

Original Application 147/2021

IN THE MATTER OF

Mahesh Chandra Saxena

... Applicant

Versus

Chief secretary Govt of NCT of Delhi

... Respondents

ADDITIONAL SUBMISSIONS ON BEHALF OF THE APPLICANT**MOST RESPECTFULLY SHOWETH**

1. That The Delhi government has admitted in its report the groundwater of Dwarka is polluted and has recommended for imposition of environmental penalty.
2. It is therefore requested that this recommendation of the Delhi government should be accepted by the Hon'ble tribunal. That the Hon'ble Tribunal in OA No. 217 of 2016 has imposed penalty on all the schools colleges for not maintaining proper functional RWH.
3. It is submitted that to save the groundwater of Delhi it is necessary to impose penalty to ensure compliance and because of the fear of compliance around 4000 schools colleges institutes has installed RWH systems. In this matter the Hon'ble Tribunal has imposed penalty of 11 crores upon Delhi Government and MCD. The case is now pending with Hon'ble Supreme Court.
4. It is submitted Govt. of India came out with a programme to save the groundwater through RWH System on the recommendation of the Supreme Court. And CGWA was established in 1994. It is submitted that CGWA is responsible for the management and development of groundwater. And even before this the government of India in 1970 has established CGWB despite the fact that all over India there was no scarcity of groundwater and the availability of the groundwater in the form of mineral water was sufficient. The CGWB was established with a future vision to

prevent pollution of groundwater. CGWB had scientist from geology, hydrology and qualified engineers. Their task was to collect data and check the quality of groundwater.

5. However from 1980 the water level of Delhi government started falling down and by 1995 the water level of Delhi NCR region started falling rapidly and nearby states also were facing shortage of groundwater. It is submitted that the design prescribed by the CGWB is the correct design which has scientific basis and should be made applicable to all over Delhi NCR region with respect to Roof Top Rainwater Harvesting and the officers having sufficient experience in the groundwater management should monitor the RWS system. The design by the CGWB is annexed as **ANNEXURE A-1**
6. It is submitted that in year 2000 the Ground Water level of Delhi NCR region has fallen up to 40 metre and by 2010 it has reached below 65 metre because of the rampant coming up of illegal colonies and illegal construction and therefore in view of the falling groundwater level the central government in 2001 has issued a notification that construction with more than 100 metres square area should be having rainwater harvesting system and for this CGWB has issued a standard rooftop rain water harvesting design in which only the rain water from the roof top should reach the rainwater harvesting pit. It is submitted that this design has been prepared in a very scientific manner based on the study of RWHS working. It is submitted that as per the design in areas where water level is above 15 metre the design does not include recharge bore well and area where the groundwater level is below 15 metre the recharge bore well was included in the design and the recharge depth of recharge bore well was made 3-5 above the groundwater level.
7. It is submitted that the standard roof top rainwater harvesting design issued by CGWB contains Filter media. This filter media in CGWB design included the natural boulders, gravel and coarse sand which is found in the river. Further the life of these boulders and gravels is more than 50 years. Contrary to this the filter media used by DJB design is not natural but a manufactured one

whose life is 1 year only and requires replacement every year and the manufacturing of this filter media causes air pollution.

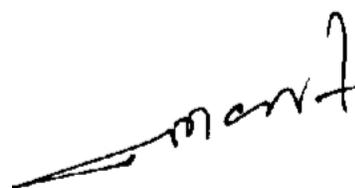
8. It is submitted that till 2013 the groundwater authority for Delhi region was CGWB and from 2013 Delhi Jal Board was made the rain water harvesting authority. The then Lieutenant Governor of Delhi has constituted DJB as the authority for RWH. The DJB was tasked with responsibility to provide rainwater harvesting system design free of cost and also help in construction of RWH and then after inspection will provide adequacy certificate. DJB RWH cell was also shouldered with the task of ensuring that no individual or institution should pollute the groundwater. However it is submitted that the Delhi Jal Board was not having scientists, geologist and Borwell Engineers unlike the CGWB. The officials of DJB has never surveyed and researched the RWS systems and never researched on the geological aspect and functionality of the RWH. Further no officer is having any experience or degree in groundwater management.
9. It is submitted that Delhi Jal Board was adopting the design by CGWB till 2016 however from 2017 in an arbitrary manner the DJB has adopted the design without recharge borewell uniformly and despite the water level going below 60 metre that is the DJB is providing the same non functional without recharge borewell design which is contrary to the design by the CGWB where in cases where the level of groundwater is below 15 metre the recharge bore well is mandatory to be installed. And for this CGWB design mentions that the DIA of recharge borewell must be 156 mm and the casing pipe DIA must be 100MM. It is submitted that the recharge borewell design prescribed by CGWB is correct and is proper functional rooftop standard design.
10. It is submitted that it is to be inquired into as how the groundwater in the Dwarka region and in other societies of Delhi area became polluted and who is responsible for this pollution. It is submitted back in 15 years period ranging from 2001 to 2013 the CGWB has provided the design for Rain Water Harvesting System in the Dwarka region and has constituted a panel of contractors, however training was not provided to these contractors and these

contractors has connected these rainwater harvest system with the storm water drain. It is submitted that storm water contains large amount of waste water as well as sewage water. These contractors has used drilling machine and has installed recharge bore wells below the depth of water level and thus the roof of rain water mixed with waste water from the storm water drain and gets polluted.

11. It is submitted that because of the negligence of the CGWB and the DJB officers, the construction of this rainwater harvesting systems was never inspected and without inspection the certificates was issued. It is submitted that the recharge borewell designed by the CGWB has clearly mentioned that the rain water harvesting pit should receive only rooftop rainwater and this pipe of rooftop rain water should open directly in RWH pit without any leakage and the overflow from the rainwater harvesting pit should reach storm water drain and not the vice versa and these contractors architect and the consultant has never studied the design and never monitored the functioning of this RWH System and neither the members of the managing committee of the Societies have studied the designing guidelines by the CGWB.
12. Thus it is submitted that the groundwater pollution of the Dwarka region is because of the negligence of DJB contractor and the managing committee members.
13. As submitted earlier, the DJB has adopted the CGWB design till 2016 and discontinued it from 2017 and issued the design without recharge borewell and since then the same is being prescribed by the DJB for construction in Delhi region it submitted that this design by this DJB is non functional.
14. It is submitted that during the joint inspection of these 358 societies in Dwarka there was hardly a single society where the rooftop rainwater was being harvested exclusively through the rainwater harvesting system. The inspection team has recommended that only rooftop rain water should reach the harvesting system. In OA no. 147 of 2021, the Hon'ble Tribunal

has passed the order that Rain Water Harvesting system should receive only rooftop rain water for harvesting.

15. It is submitted that the groundwater quality of the Dwarka region could only improve by connecting only the rooftop rainwater with rainwater harvesting system as per the design provided by CGWB and the continuous monitoring and maintenance of these RWHS.



Applicant

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Dated. 12.10.2023



**STANDARD DESIGNS
FOR
ADOPTION OF ROOF TOP RAINWATER HARVESTING
IN DELHI**

**CENTRAL GROUND WATER BOARD
STATE UNIT OFFICE
NEW DELHI**

INTRODUCTION

National Capital Territory (NCT) Delhi covers an area of 1483 Sq. Km. The Ground Water available in the territory is controlled by the hydrogeological situation characterized by occurrence of alluvial formation and hard rocks such as quartzite. The hydrogeological set up and the following distinct physiographic units further influence the ground water occurrence: (1) Older Alluvial Plain on the eastern and western side of the ridge. (2) Yamuna Flood Plain deposits. (3) Isolated and nearly closed Chattarpur alluvial basin. (4) NNE-SSW trending Quartzite Ridge.

The high rate of population growth and high level of urbanization in NCT Delhi has resulted in over development of ground water resources. Thus in about 75% area of NCT Delhi ground water levels are declining at an alarming rate of 0.40 m per annum. In South and Southwest district the decline is high varying from 1 to 2 m/Yr. The annual replenishable ground water resources of the State is 0.31 bcm with a net annual ground water availability of 0.29 bcm. Ground water draft (as on 31st March 2009) is 0.40 bcm with a stage of ground water development of 138%. Out of the 27 assessment units (Tehsils) in the State, 20 have been categorized as over exploited, 05 semi critical and 02 have been categorized as safe from ground water development point of view.

In view of high state of ground water development, and depletion of ground water levels due to its over development Central Ground Water Authority (CGWA) had notified South and South-West district vide Public Notice No. 6 of 2000 dated 15.08.2000 and imposed prohibition and restriction for construction and installation of any structure for abstraction of ground water resources to avoid further depletion and deterioration of ground water quality. Subsequently the Hon'ble Lieutenant Governor had declared the whole NCT Delhi as notified on 31.03.2009 vide order No. F8 (348)/EA/Env/09/14433.

The normal annual rainfall of NCT Delhi is 611.8 mm out of which 81% of the annual rainfall is received during the monsoon months July, August and September. The rest of the annual rainfall is received as winter rain and as thunderstorm rain in the pre and post monsoon months.

In order to increase the natural ground water resource rain water harvesting and artificial recharge to ground water has become increasingly important in ground water management. The subsurface geology, post monsoon depth to water level and declining ground water level conditions of the State indicate that the area is suitable for artificial recharge. The favorable aquifer zones down to depth of ground water level which is lying unsaturated presently may be suitable recharged through rain water harvesting.

For the convenience of general public standard designs of Rainwater Harvesting have been prepared and placed on CGWB website.

Permission to install various Artificial Recharge Structures and Recharge wells is governed by the prevailing rules and laws in the area.

Tehsil wise Rain Water Harvesting Structures in NCT Delhi

Sl No.	Tehsil	Recommended harvesting structures	Depth of recharge well (meter)	Remarks
	District: New Delhi			
1	Chanakyapuri	Trench with bore	18	
2	Connaught place	Only Trench	-	
3	Parliament Street	Trench with bore	18	
	District: North West			
4	Model Town	Only Trench	-	
5	Narela	Only Trench	-	
6	SaraswatiVihar	Only Trench	-	
	District: West			
7	Patel Nagar	Trench with bore	15	
8	Punjabi Bagh	Only Trench	-	
9	Rajouri Garden	Trench with bore	18	
	District: South West			
10	Delhi Cantt.	Trench with bore	25	
11	Najafgarh	Trench with bore	15	
12	VasantVihar	Trench with bore	35	
	District: North East			
13	Seelampur (North)	Only Trench*		
	Seelampur (South)	Only Trench	-	
14	Seemapuri	Only Trench	-	
15	Shahdara	Only Trench	-	
	District: East			
16	Gandhi Nagar	Only Trench*		
17	PreetVihar (East)	Trench with bore	15	
	PreetVihar (West)	Only Trench	-	
18	VivekVihar (East)	Trench with bore	15	
	VivekVihar (West)	Only Trench	-	
	District: North			
19	Civil Lines (North)	Only Trench*		
	Civil Lines (South)	Only Trench	-	
20	Kotwali	No Structure		
21	Sadar Bazar	No Structure		
	District: Central			
22	Daryaganj	Only Trench*		
23	Karolbagh (East)	Only Trench	-	
	Karolbagh (West)	Trench with bore	15	
24	Paharganj	Only Trench	-	
	District: South			
25	Defence Colony	Trench with bore	15-35	
26	HauzKhas	Trench with bore	50	
27	Kalkaji	Trench with bore	15-45	

* Feasible where water level is more than 5 meter below ground level.

Technical design of Roof Top Rain Water Harvesting and Artificial Recharge to Ground Water

A. Trench without Recharge well

Roof Top Area (Sq. m)	Highest Rainfall intensity (mtr/ hourly)	Run-off Coefficient	Runoff/hr (cu. m)	Annual Runoff (cu. m)	Size of recharge Structure (mtr)
a	b	c	d(aXbXc)	e(aX0.54Xc)	LXBXH
100	0.025	0.8	2.0	43.20	1.2X1.2X1.4
200	0.025	0.8	4.0	86.40	1.8X1.5X1.5
300	0.025	0.8	6.0	129.6	2.4X1.8X1.4
400	0.025	0.8	8.0	172.8	2.7X2.1X1.4
500	0.025	0.8	10.0	216	3.3X2.1X1.5

Note: Normal rainfall in Delhi: 611 mm,

Normal monsoon rainfall: 540 mm

Points to be taken into consideration for implementation of the above structures:

1. Valid for buildings without basements (Cellar) and for areas for alluvial formation where ground water level is more than 5 meter upto 15 meter below ground level. Buildings with basements should adopt rain water harvesting through storage tank.
2. Only the rain water from the roof top area has to be diverted to recharge structure through connection of down pipe.
3. Before the onset of the monsoon all the catchment area (roof top) considered for recharge is to be cleaned. The recharge structures are to be in operation during the monsoon season only so as to avoid any contamination.
4. A mesh should be provided at the roof so that leaves or any other solid waste/debris is prevented from entering the pit. By-pass arrangement be provided before the collection chamber to reject the first showers.
5. The depth of the inlet pipe should be within 10 cm below ground level for easy overflow through outlet pipe that has to be connected to storm water drain.
6. Based on site condition length and breadth of the recharge chamber may be altered keeping its volumetric capacity the same.
7. RCC slab thickness and reinforcement shall be dependent on structural loads. Access manhole frame and covers to be provided.
8. Filter media of 1.0 meter thick will be in three layers comprising of 0.4 meter thick layer of boulders (5-20cm) at the bottom, 0.3 meter thick layer of gravels (5-10cm) in the middle and 0.3 meter thick layer of coarse sand (1.5-2.0mm) at the top so that the silt content that will come with runoff will be deposited on the top and can easily be removed.
9. A 10 cm thick layer of pea gravels will be provided over the coarse sand layer of the filter media.

10. Prior to monsoon season the top most sand layer in the pit may be scrapped and replaces with the fresh and cleaned coarse sand.

11. Recharge chambers shall be checked and cleaned at 7 days interval or more frequently during rainy season.

B. Trench with Recharge well

Roof Area (m)	Top (Sq. m)	Highest Rainfall intensity (mtr/ hourly)	Run-off Coefficient	Runoff/hr (cu. m)	Annual Runoff (cu. m)	Size of recharge Structure (mtr)
a		b	c	d(aXbXc)	e(aX0.54Xc)	LXBXH
100		0.025	0.8	2.0	43.20	1.0X0.5X0.5
200		0.025	0.8	4.0	86.40	1.0X1.0X1.0
300		0.025	0.8	6.0	129.6	1.0X1.0X1.0
400		0.025	0.8	8.0	172.8	1.0X1.0X1.0
500		0.025	0.8	10.0	216	2.0X1.5X1.0

Points to be taken into consideration for implementation of the above structures:

1. Valid for all buildings and for both alluvial and hard rock formation where ground water level is more than 15 meter below ground level.
2. Only the rain water from the roof top area has to be diverted to recharge structure through connection of down pipe.
3. Before the onset of the monsoon all the catchment area (roof top) considered for recharge is to be cleaned. The recharge structures are to be in operation during the monsoon season only so as to avoid any contamination.
4. A mesh should be provided at the roof so that leaves or any other solid waste/debris is prevented from entering the pit. By-pass arrangement be provided before the collection chamber to reject the first showers.
5. The depth of the inlet pipe should be within 10 cm below ground level for easy overflow through outlet pipe that has to be connected to storm water drain.
6. Based on site condition length and breadth of the recharge chamber may be altered keeping its volumetric capacity the same.
7. RCC slab thickness and reinforcement shall be dependent on structural loads. Access manhole frame and covers to be provided.
8. Filter media of 1.0 meter thick will be in three layers comprising of 0.4 meter thick layer of boulders (5-20cm) at the bottom, 0.3 meter thick layer of gravels (5-10cm) in the middle and 0.3 meter thick layer of coarse sand (1.5-2.0mm) at the top so that the silt content that will come with runoff will be deposited on the top and can easily be removed.
9. A 10 cm thick layer of pea gravels will be provided over the coarse sand layer of the filter media.

10. Prior to monsoon season the top most sand layer in the pit may be scrapped and replaces with the fresh and cleaned coarse sand.

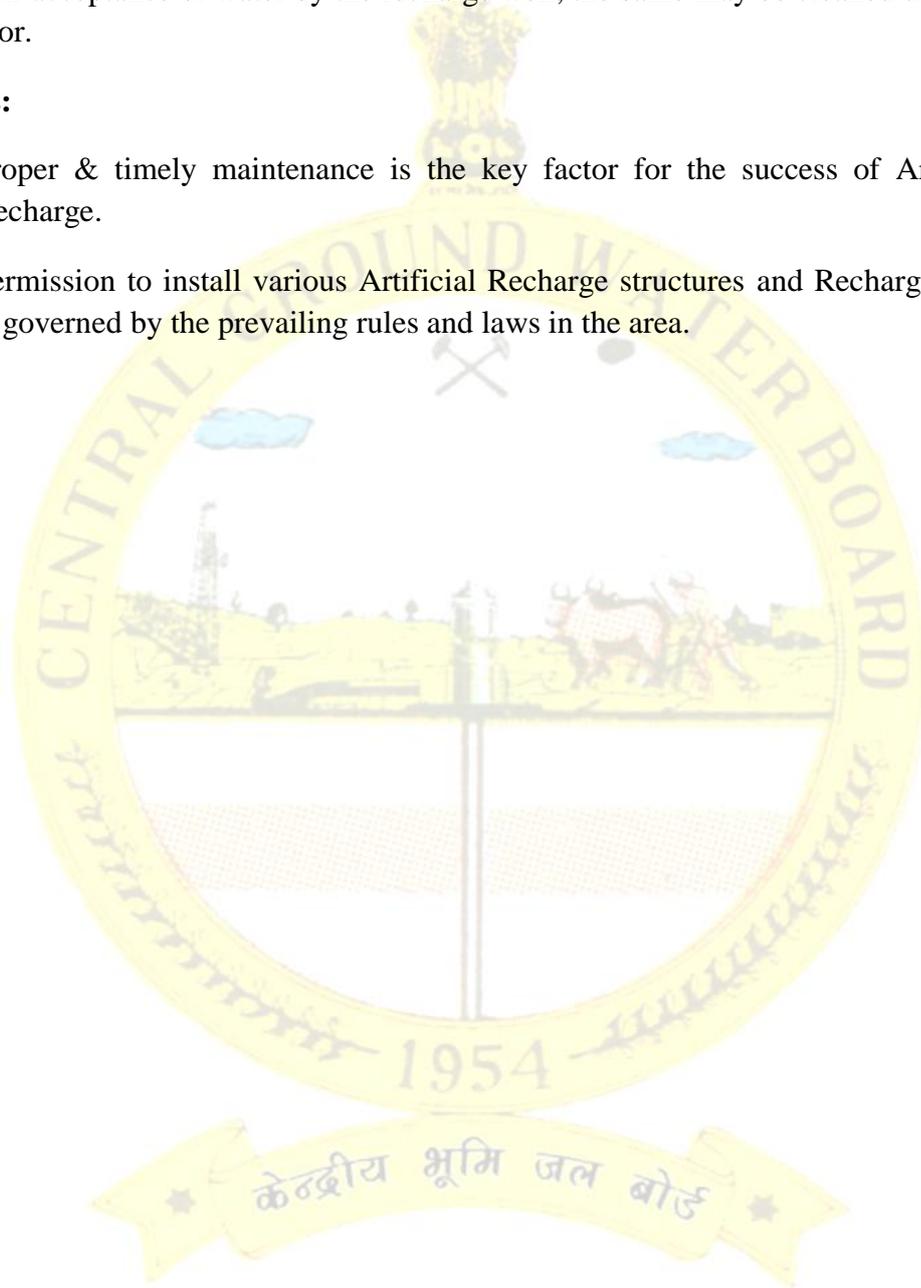
11. Recharge chambers shall be checked and cleaned at 7 days interval or more frequently during rainy season.

12. Depth of the recharge wells should be kept 2to 3 meter above post monsoon water level and the slotted pipe must be placed against the granular (Sandy of Fracture) zone.

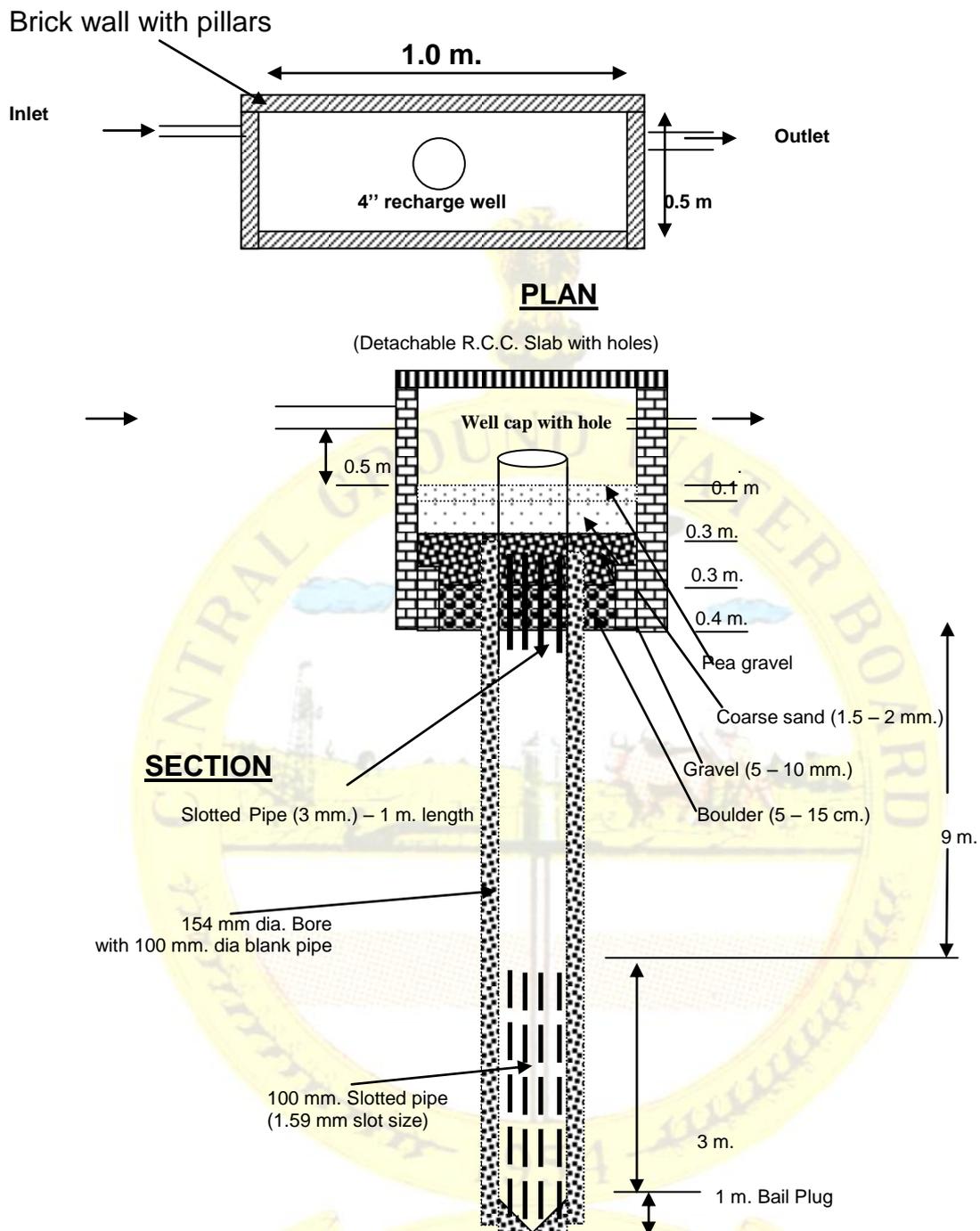
13. On non-acceptance of water by the recharge well, the same may be cleaned using air compressor.

Remarks:

1. Proper & timely maintenance is the key factor for the success of Artificial Recharge.
2. Permission to install various Artificial Recharge structures and Recharge wells is governed by the prevailing rules and laws in the area.



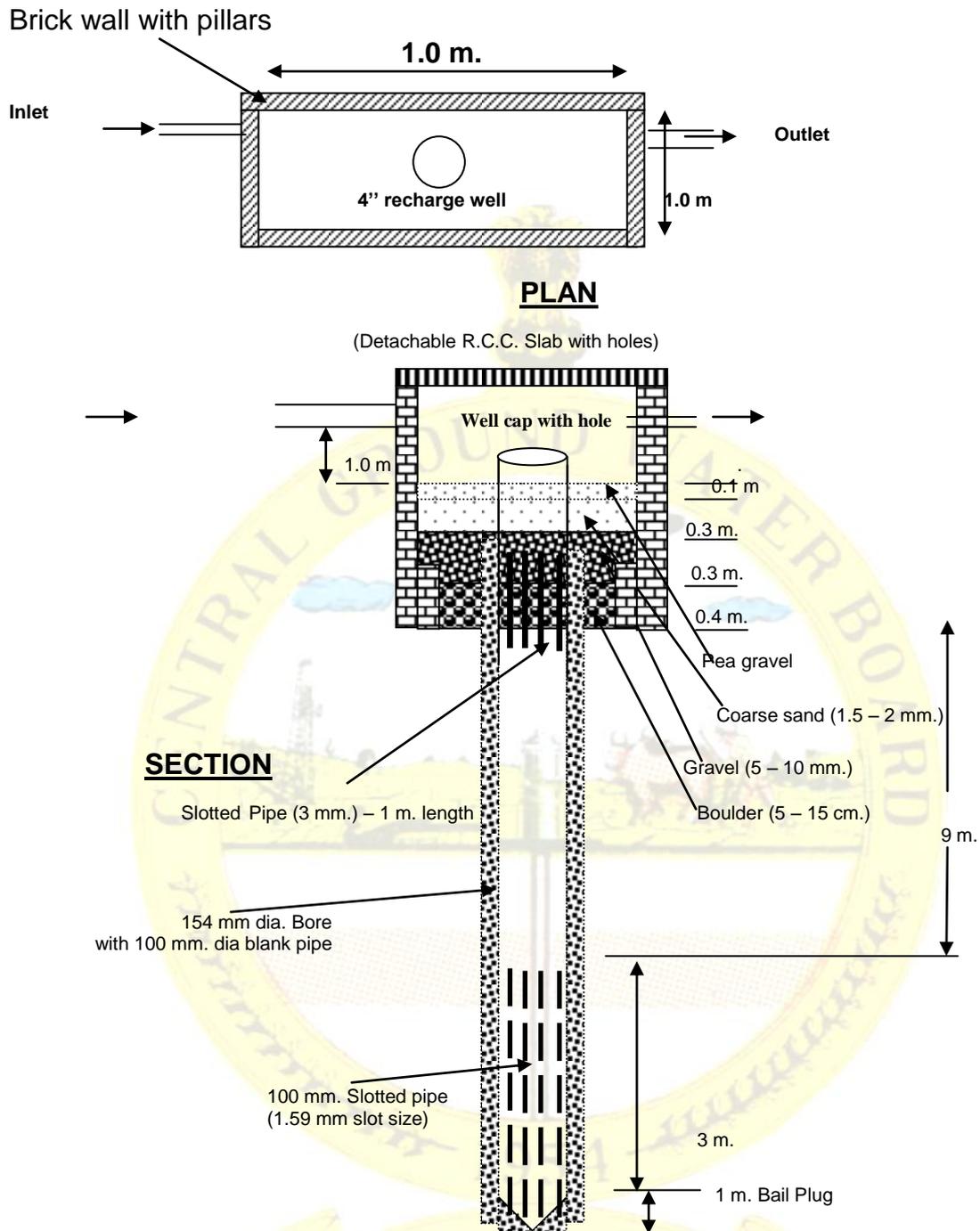
Trench with Recharge well (Roof top area upto 100 sq. m)



Note:

1. Based on post monsoon depth to water level, the recharge well depth will change and should be kept 2 to 3 meter above post monsoon water level.
2. The design is indicative; the actual design depends on site condition.

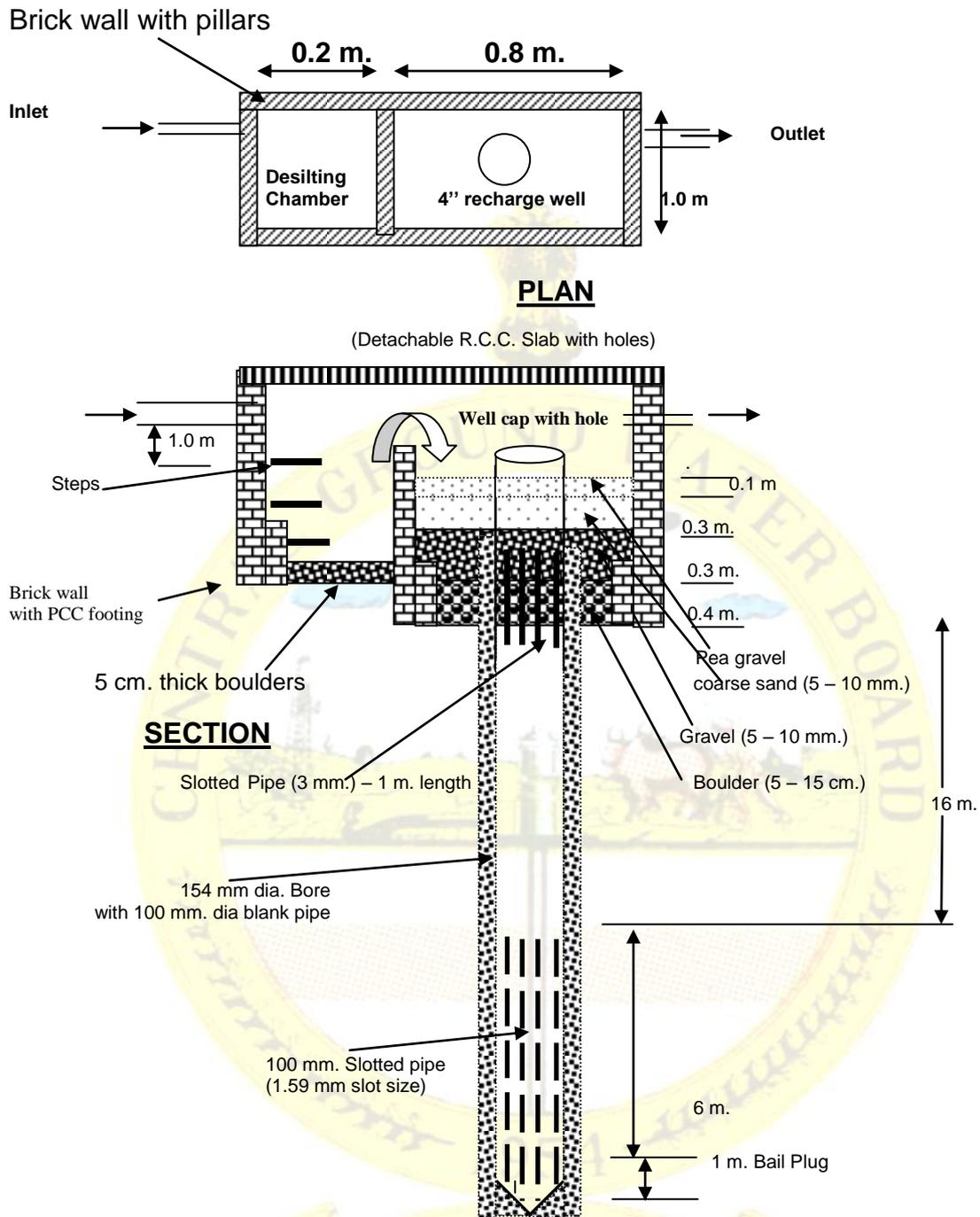
Trench with Recharge well (Roof top area 200-300 sq. m)



Note:

1. Based on post monsoon depth to water level, the recharge well depth will change and should be kept 2 to 3 meter above post monsoon water level.
2. The design is indicative; the actual design depends on site condition

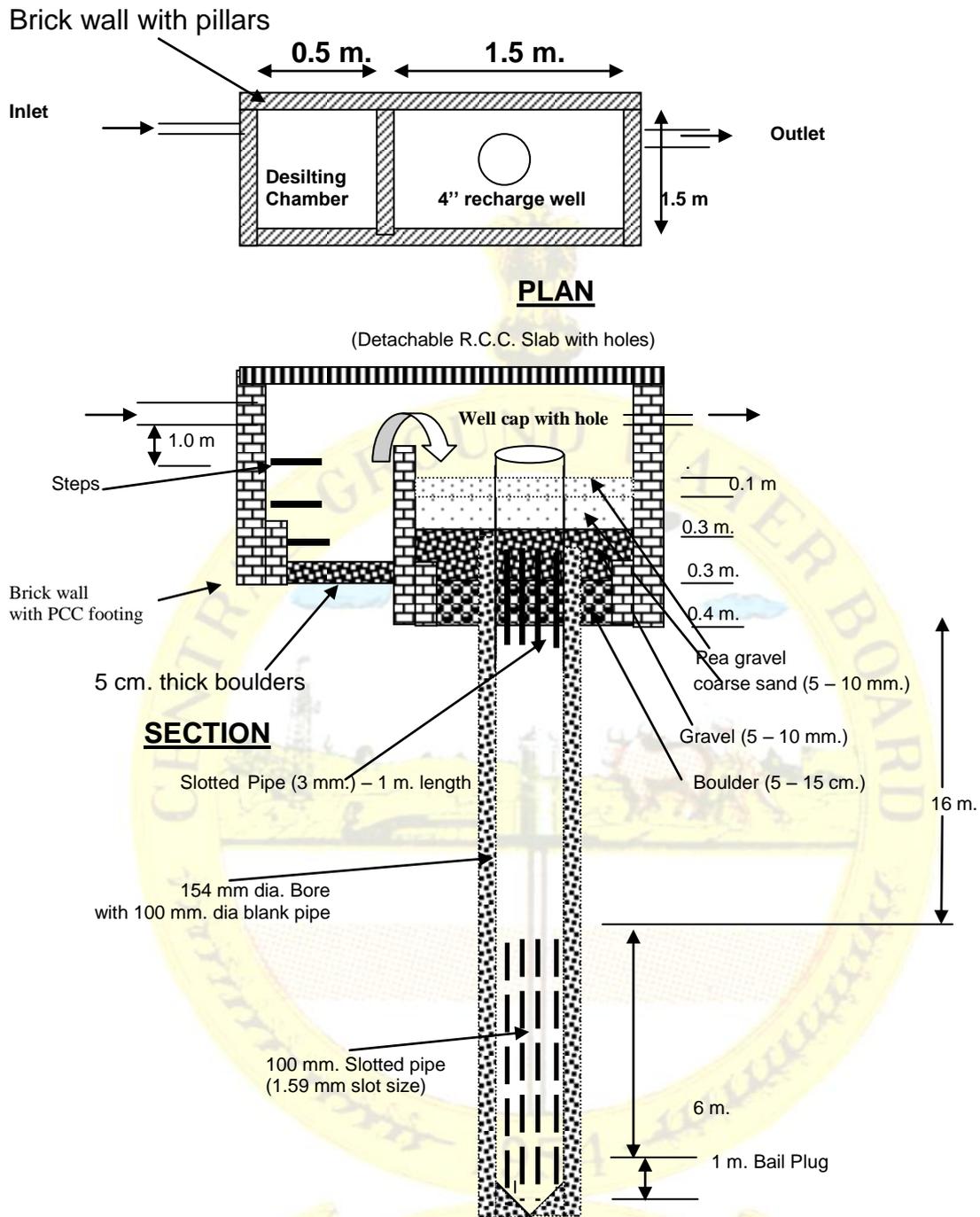
Trench with Recharge well & De-silting Chamber (Roof top area 300-400 sq. m)



Note:

1. Based on post monsoon depth to water level, the recharge well depth will change and should be kept 2 to 3 meter above post monsoon water level.
2. The design is indicative; the actual design depends on site condition

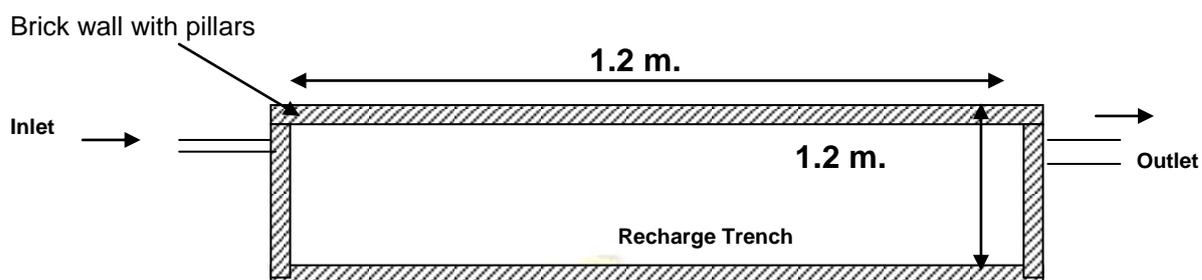
Trench with Recharge well & De-silting Chamber (Roof top area 400-500 sq. m)



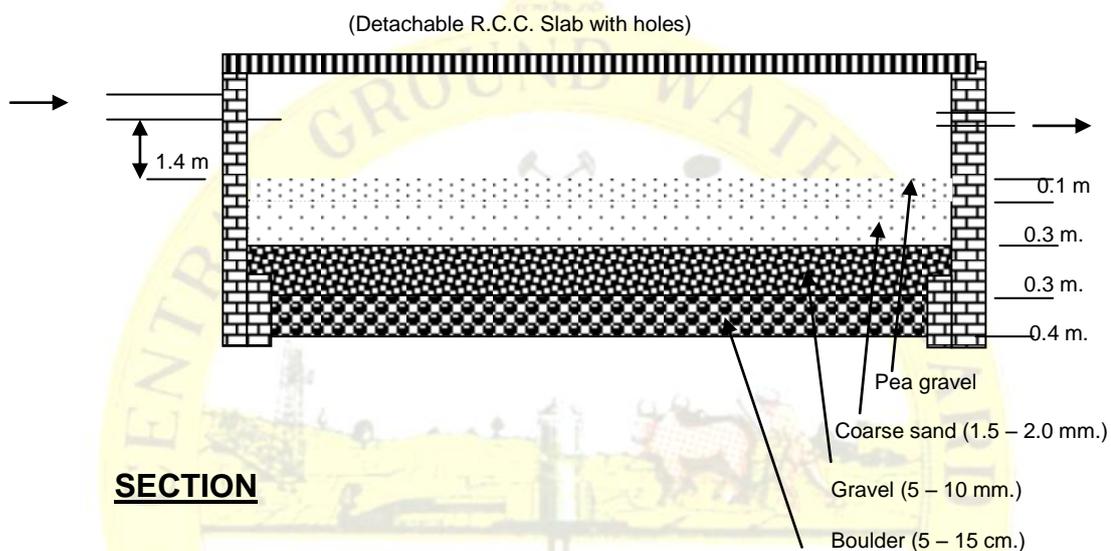
Note:

1. Based on post monsoon depth to water level, the recharge well depth will change and should be kept 2 to 3 meter above post monsoon water level.
2. The design is indicative; the actual design depends on site condition

Recharge Trench (Roof Top area upto 100 sq. m.)



PLAN



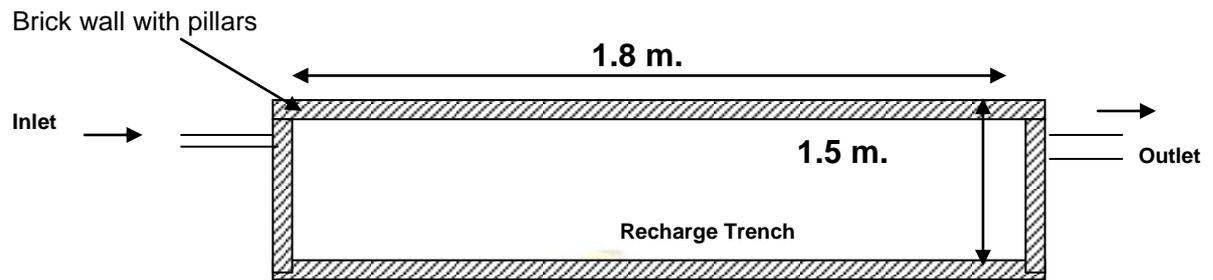
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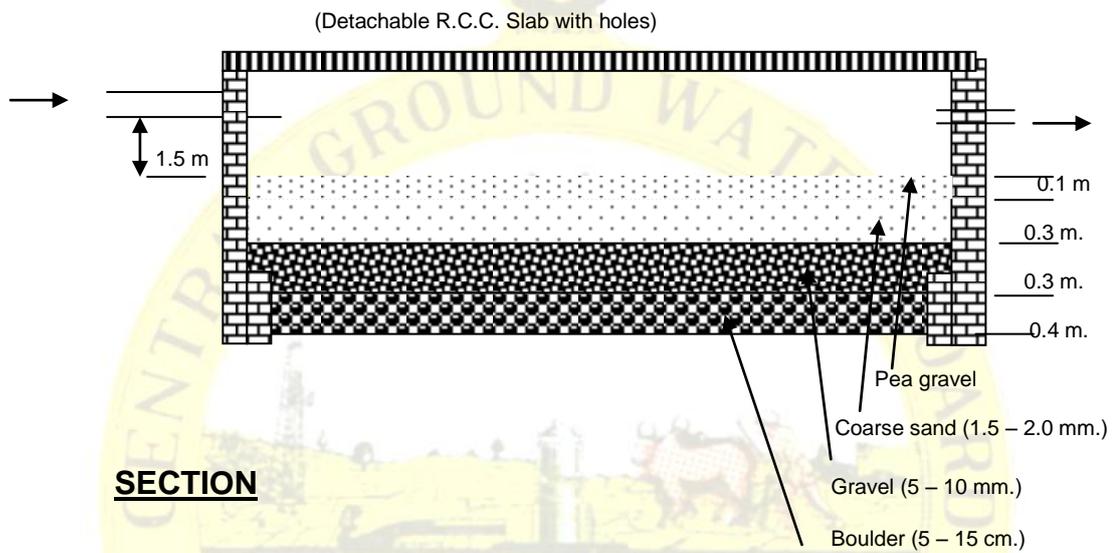
1. The design is indicative; the actual design depends on site condition

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Recharge Trench (Roof Top area 100-200 sq. m.)



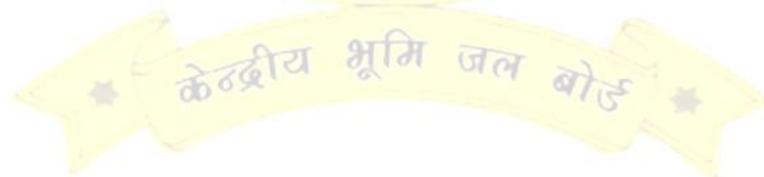
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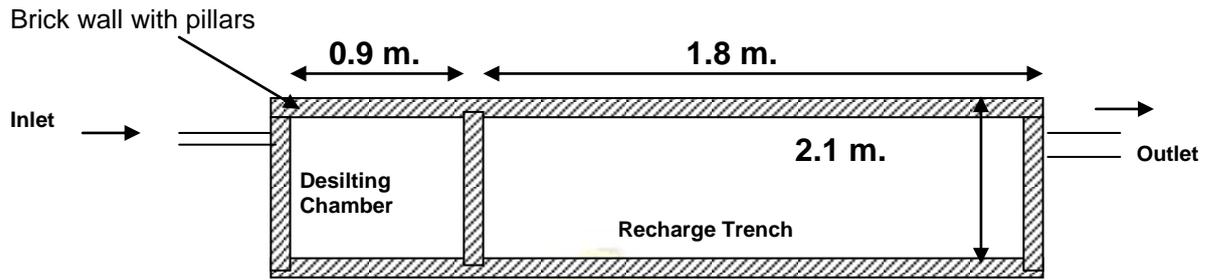
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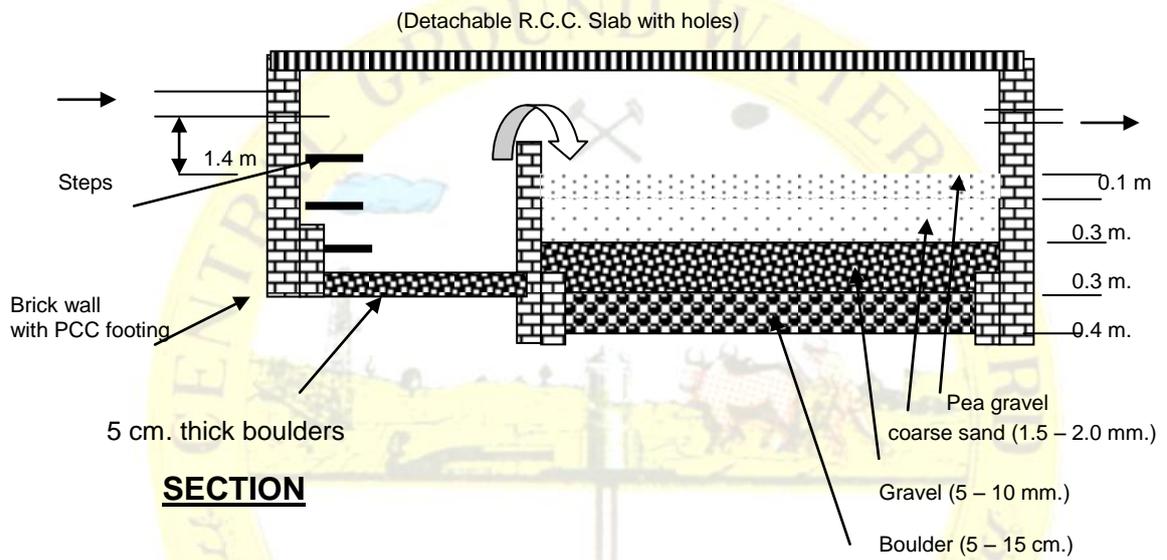
1. The design is indicative; the actual design depends on site condition



Recharge Trench with Desilting Chamber (Roof Top area 300-400 sq. m.)



PLAN



SECTION

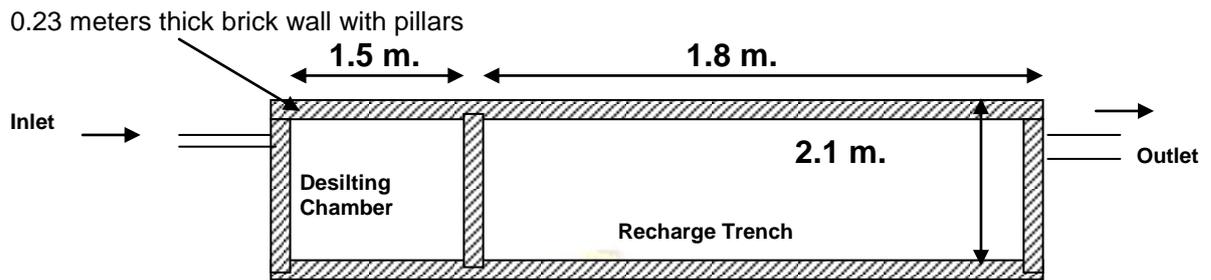
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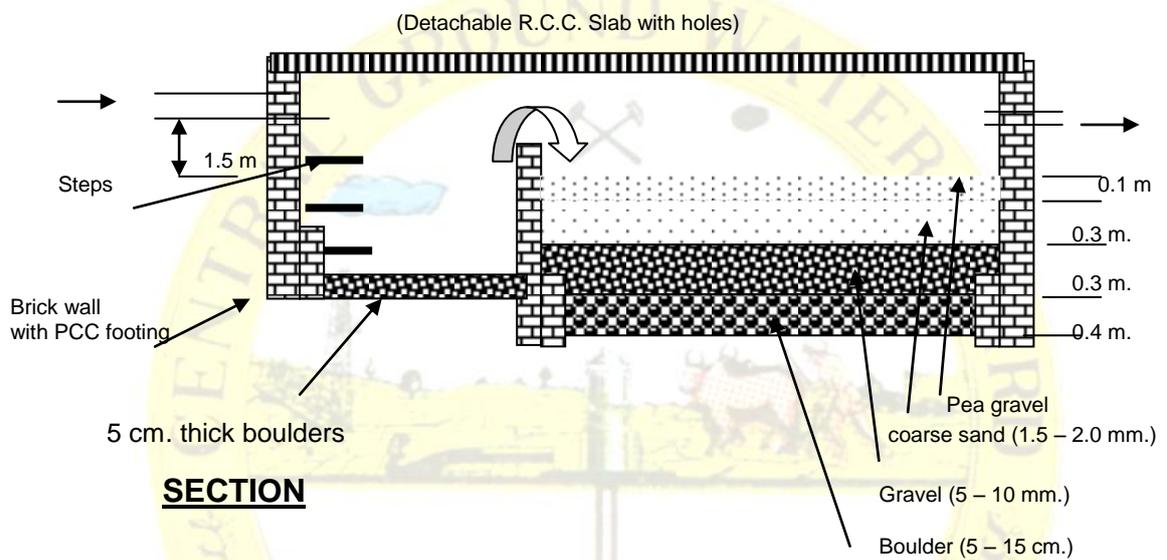
1. The design is indicative; the actual design depends on site condition.

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Recharge Trench with Desilting Chamber (Roof Top area 400-500 sq. m.)



PLAN



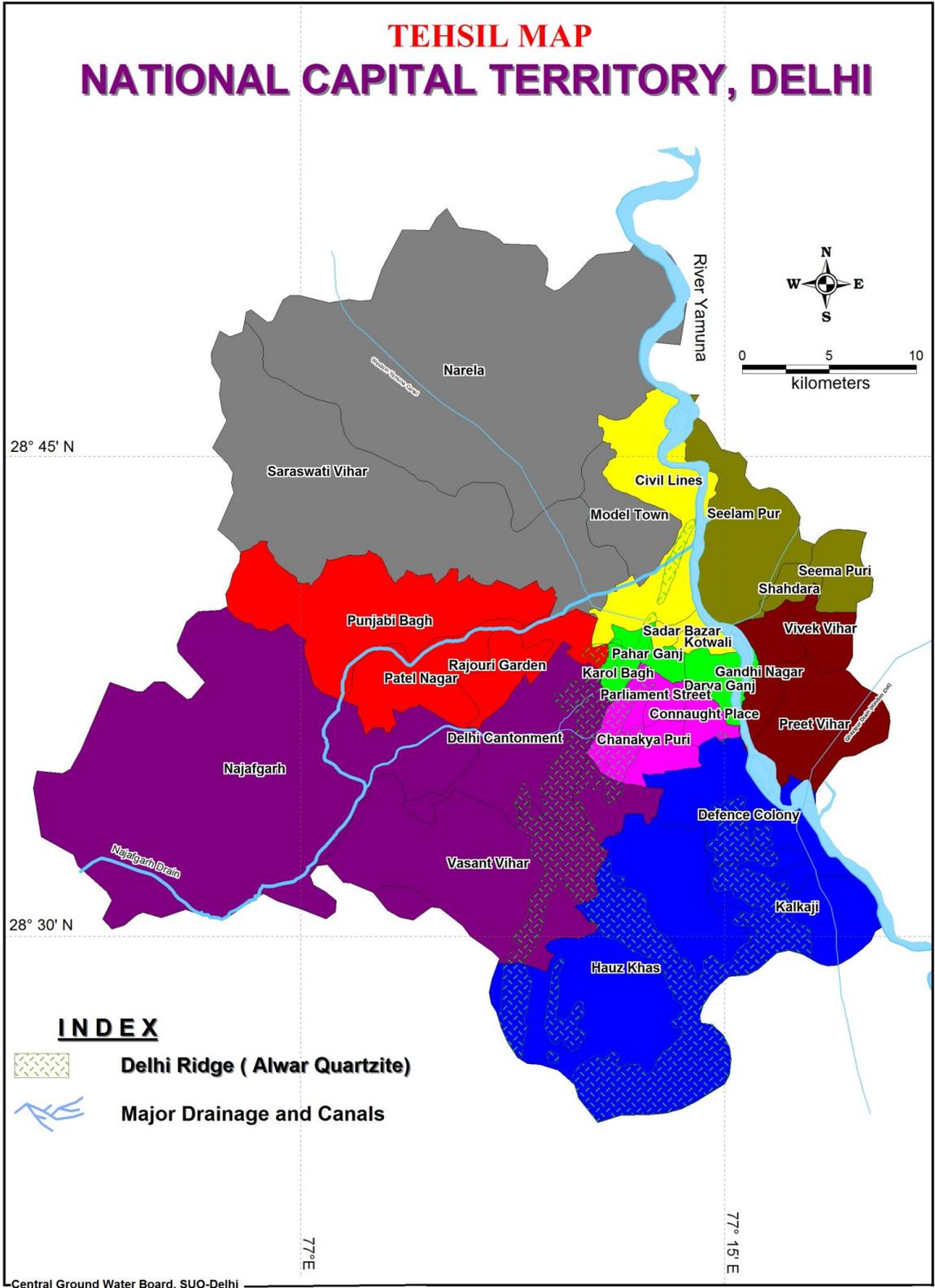
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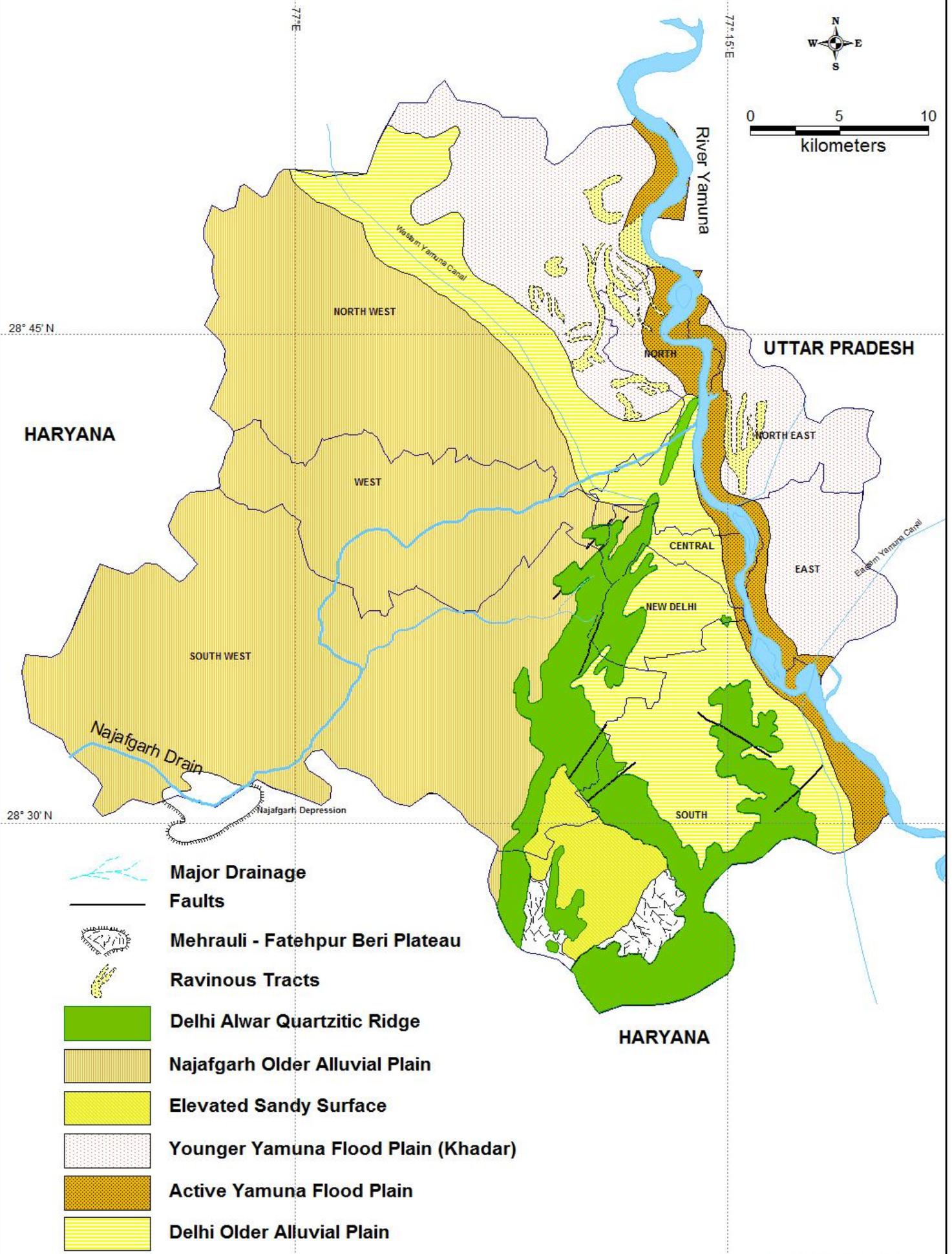
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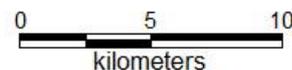


332 GEOLOGY AND GEOMORPHOLOGICAL MAP OF NCT DELHI 23



DEPTH TO WATER LEVEL MAP FOR RAIN WATER HARVESTING STRUCTURES

NATIONAL CAPITAL TERRITORY, DELHI



28° 45' N

28° 30' N

77° E

77° 15' E

INDEX

Delhi Ridge (Alwar Quartzite)

Depth to Water Level (bgl)

- < 5 m
- 5-10 m
- 10-20 m
- 20-30 m
- 30-40 m
- 40-50 m
- > 50 m

