

July 2011

PROJECT REPORT FOR

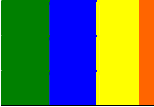


DELHI



CONTENTS

	Page No.
1. Executive Summary	3
2. Project Partners	4
3. Background Note	5
4. Importance of revival of water bodies	6
5. Project Details	7
6. Reviving the Roshanara Lake	9
7. Lake Revival System – Layout	10
8. Channelization Network	11
9. Dimensions & Specifications of Collection System	13
10. Precautions & Maintenance	
11. Chronolgy of Execution with pictures	17
12. Conclusion & Thank You	19
13. Annexures	20



EXECUTIVE SUMMARY

REVIVAL OF POND THROUGH RAINWATER HARVESTING AT ROSHANARA GARDEN,

Project Partners: MCD (Dept. of Horticulture, Sadar Pahadgunj zone), Moon Beverages Ltd, Coca-Cola Foundation, Forum For Organised Resource Conservation and Enhancement (FORCE)

STARTED ON	March, 2011	COMPLETED ON	July, 2011
------------	-------------	--------------	------------

INAUGURATED ON	March 31, 2011
CHIEF - GUEST	Sh. A.J. Kurien (Additional Commissioner, MCD)
GUESTS OF HONOUR	Smt. Renu K. Jagdev (Dy. Commissioner, MCD) Sh S.S. Khandpal (Director, Horticulture, MCD)

SITE DETAILS

LOCATION	Roshanara Garden, Near Ghantaghar, Old Delhi	SITES	Inside the garden & road adjoining to the garden
----------	---	-------	---

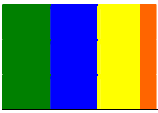
PROJECT RELATED OFFICE BEARERS

Designation	Name	Tel. No.
Director, Horticulture, MCD	Sh S.S. Khandpal	9717787516
Deputy Director, Horticulture, MCD	Dr. Ashish Priyadarshi	9717787547

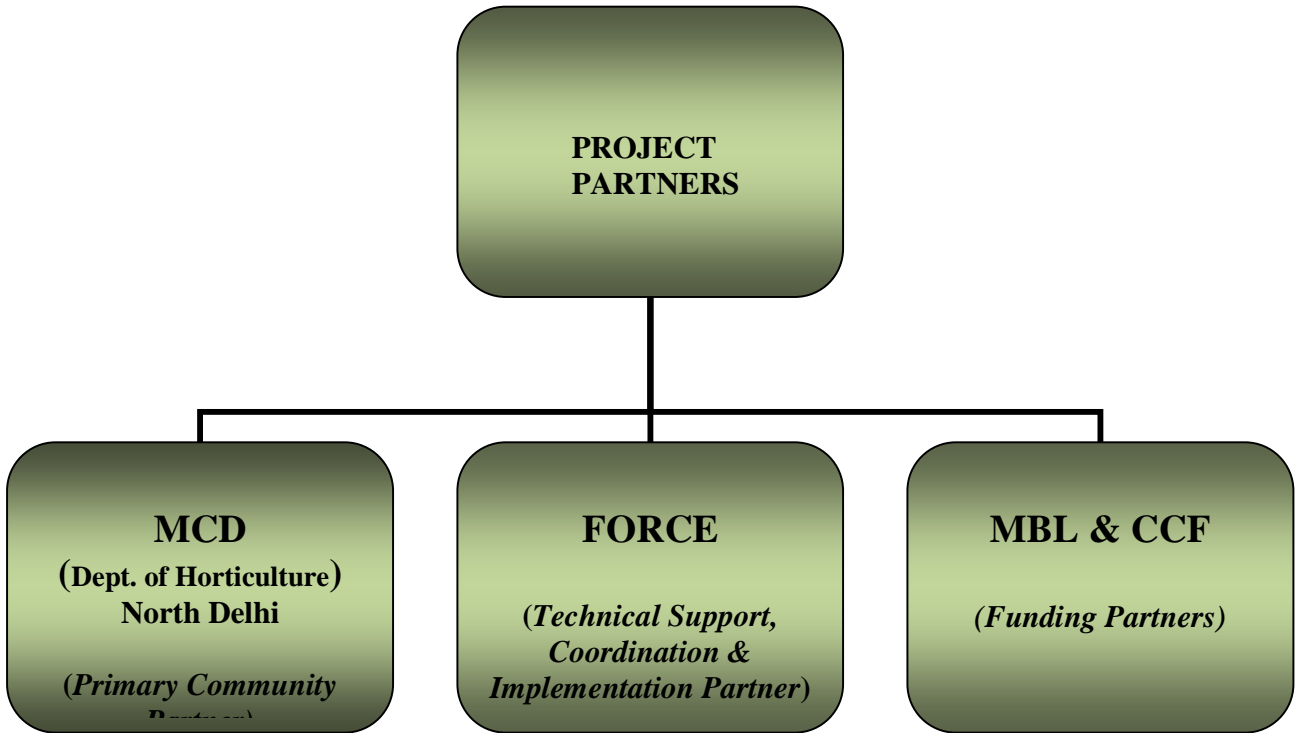
RWH PROJECT DETAILS

Total Rainwater Harvesting Potential	Approx. 2,93,60,000 litres / yr
Total cost of project	Rs 14,94,500/-
MBL contribution	Rs 7,83,375/-
RWH Pattern	Revival of pond through RWH
Area considered for recharge	58.4 Acres (57.9 Acre Garden + 0.5 Acre Road)
Contractor for project	DV Water Harvesters; Ph: 995316059

Collection Chambers	Size of each collection chamber	Special observations
93 nos.	1.5m*1m*1m with 952m channelization	Runoff collected from surface & road area



PROJECT PARTNERS



Municipal Corporation of Delhi (Deptt. of Horticulture, North Delhi) – The Roshanara Park and Pond are owned and maintained by the MCD. MCD will be responsible for the maintenance of the Rainwater Harvesting system and also for obtaining permissions and installation of a new tubewell.

Forum for Organised Resource Conservation & Enhancement (FORCE) – FORCE provided the necessary technical support, project plan, cost estimates and also undertook the implementation of the Rainwater Harvesting for revival of the Roshanara Pond. FORCE also arranged for funds for implementation of Rainwater Harvesting.

Moon Beverages Ltd. (MBL), Bottler of Coca – Cola India and Coca – Cola Foundation (CCF) – As a part of their Corporate Social Responsibility, MBL & CCF are the funding partners for rainwater harvesting project for the lake. No return benefit is expected by these funding agencies. However they have requested for permission to install 2-3 signboards of size 2ft X 3ft near the lake.



BACKGROUND NOTE

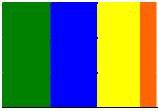
Introduction

Water resources are sources of water that are useful or potentially useful to humans. Uses of water include agricultural, industrial, household, recreational and environmental activities. Virtually all of these human uses require fresh water. 97% of water on the Earth is salt water, leaving only 3% as fresh water of which slightly over two thirds is frozen in glaciers and polar ice caps. The remaining unfrozen freshwater is mainly found as groundwater, with only a small fraction present above ground or in the air.

Fresh water is a renewable resource, yet the world's supply of clean, fresh water is steadily decreasing. Water demand already exceeds supply in many parts of the world and as the world population continues to rise, so too does the water demand. Awareness of the global importance of preserving water for ecosystem services has only recently emerged as, during the 20th century, more than half the world's wetlands have been lost along with their valuable environmental services. Biodiversity-rich freshwater ecosystems are currently declining faster than marine or land ecosystems. The framework for allocating water resources to water users (where such a framework exists) is known as water rights. Surface water is water in a river, lake or fresh water wetland. Surface water is naturally replenished by precipitation and naturally lost through discharge to the oceans, evaporation, and sub-surface seepage.

Although the only natural input to any surface water system is precipitation within its watershed, the total quantity of water in that system at any given time is also dependent on many other factors. These factors include storage capacity in lakes, wetlands and artificial reservoirs, the permeability of the soil beneath these storage bodies, the runoff characteristics of the land in the watershed, the timing of the precipitation and local evaporation rates. All of these factors also affect the proportions of water lost. Uses of fresh water can be categorized as consumptive and non-consumptive (sometimes called "renewable"). A use of water is consumptive if that water is not immediately available for another use. Losses to sub-surface seepage and evaporation are considered consumptive, as is water incorporated into a product (such as farm produce). Water that can be treated and returned as surface water, such as sewage, is generally considered non-consumptive if that water can be put to additional use.

Over the next 20 years, the average supply of water world-wide per person is expected to drop by a third. If present consumption patterns continue, two out of every three persons on the earth will



have to live in water-stressed conditions by the year 2025. The poor continue to be the worst affected with 50 per cent of the population in the developing countries exposed to polluted water sources. The per capita water supply decreased by a third between 1970 and 1990. Water demand, on the other hand, has almost doubled in the last 50 years. What's worse, the water quality continues to worsen. The developed countries consume 30 to 50 times of the water resources as compared to the developing world.

India has only 2.45% of World Land Area (329 M ha) but is home to 17% of the world Population (1.13 Billion people). We have 4% of the World Water Resources (1869 BCM). Though geographically well endowed with water resources, they are not sufficient given the size of our population. 1/6th of our area i.e. 53 M ha is drought prone and 1/8th of our area i.e. 40 M ha is flood prone area. At present, the Water availability is 1820 cum/Person. However, by 2050 this is expected to drop to 1140 cum/Person which means that we will be a 'Water Stressed' country. The scarcity of can be reduced can be reduced / averted with the principle of 3 R-Reuse, reduce, Recycle

Importance of reviving water bodies

Reviving of water existing water bodies and wetlands is very essential. It helps us in many ways in maintaining ecological balance. Water is such an essential resource without which no living organisms can survive. It is also a very good solvent. Conserving the wetlands helps in maintaining ground water level and at the same time develops biodiversity.



PROJECT DETAILS

About Roshanara Garden

Roshanara garden is among the best Mughal gardens in India although it has lost much of its past grandeur. Princess Roshanara, daughter of emperor Shah Jahan, laid this garden in the year 1650. The most important part of the Roshanara Park is Baradari or the Tomb of Roshanara. This is situated in the very middle of the garden and can be accessed from all the sides. Four pathways approach the main pavilion, one from each side. Though the tomb is in dilapidated condition at present, it looked grand in the past. The structure is roofless and has Mughal Naqqashi and Jaali work on every facet, though most of it has withered away in time. The interior of the hall was beautifully decorated with paintings, some of which can be seen even today on the ceilings of the hall. The courtyard was opened from one side only and had separate apartments built, possibly for guards. Mughal style fountains from each side surround the main building. In 1923, a club was established on the Victorian format to serve the Anglo-Saxon elite of the city. Still considered one of the most prestigious clubs in Delhi, Roshanara club has a very beautiful cricket ground in its campus.

Location

Roshanara garden is located opposite to Roshanara club, near Ghanta Ghar, Kamla market Old Delhi. It is located at a distance of 4 km from Delhi University Metro Station.

Objectives

The general objective is to make a water security zone where there will be availability of water for maintaining the park. Also having a water body inside the park helps to create greenery and attracts birds and animals. This will in turn help to create a biodiversity zone in Delhi at Roshanara garden.

The specific objectives of this project are as follows:

- A. Reviving of lake to have water throughout the year by
 - Rainwater Harvesting
 - Making tubewell for supplementing harvested rainwater

- B. To implement the project in partnership among Community, NGO & Corporates.



Salient features of the Park

A. Total Area of the Roshanara Bagh: 57.29 Acre

- Area of Lake: 4 Acre
- Area of Nursery: 8.16 Acre
- Area of T.T Park: 2.06 Acre
- Area of Baradari: 0.51 Acre
- Area under Road and Pahwas: 3.05 Acre
- Area under (Horti), Office, Shelter: 0.63 Acre

B. Approx area of different pockets of park

- Kapil Dev Park: 3 acre
- Baradari Park: 2 acre
- Pahari wala Park: 2 acre
- Children's park: 2.5 acre
- Kenduwala Park: 4 acre
- Japanese park: 4 acre
- Nursery ke samne wala park: 3 acre
- Lamba Tukda park: 2.5 acre
- Traffic Training Park: 3.5 acre
- Gate No. 3 wala park: 1 acre
- Park behind the Office: 4 acre
- Burji wala park: 1.5 acre
- Baradari gate wala park: 2.5 acre



REVIVING THE ROSHANARA LAKE

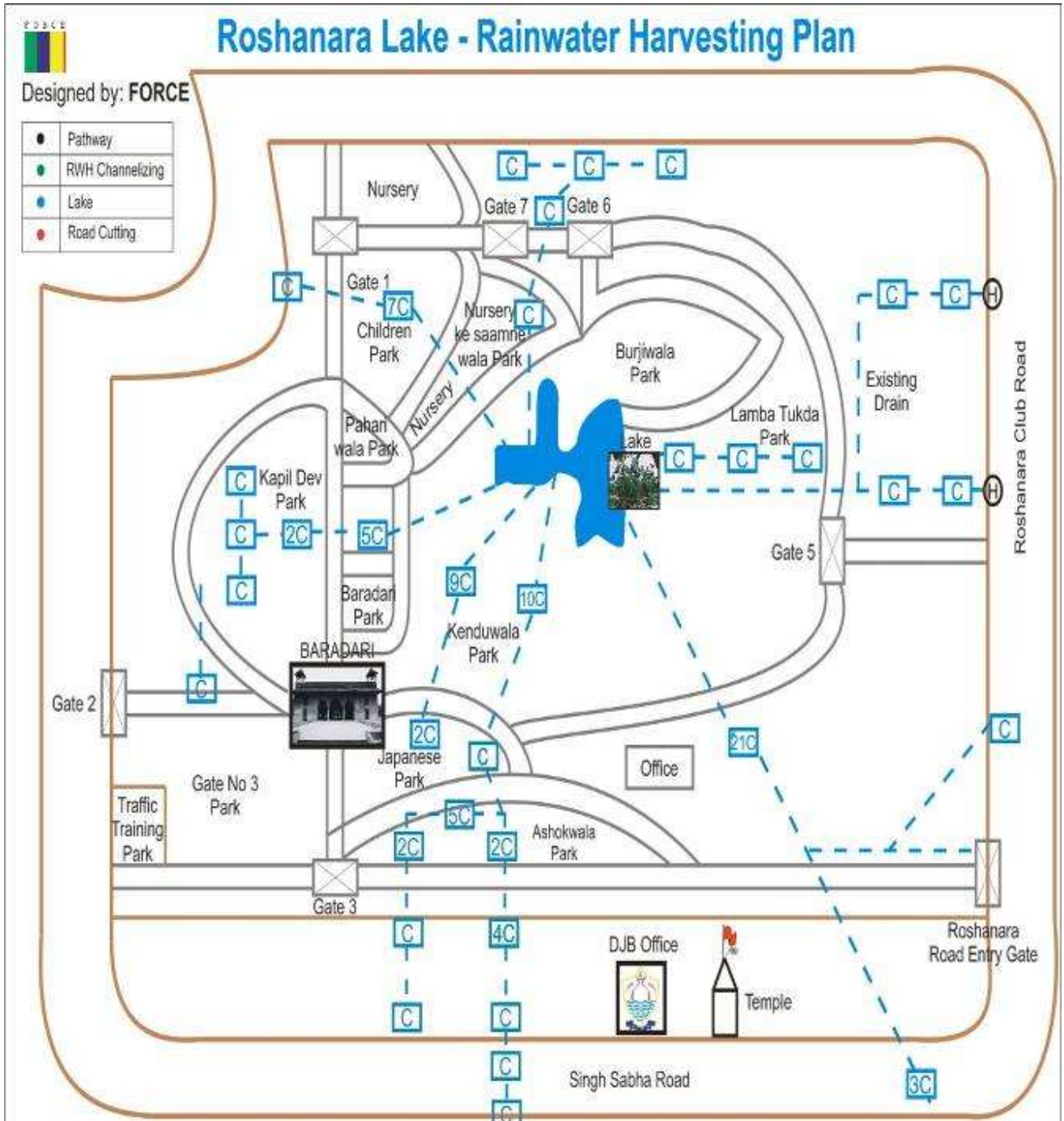
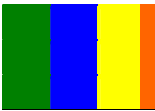
Lake Revival - Methodology

Water from different parts of the park and from the roads is collected at the water logging point through water collection chamber at different points. Water collection chamber is having two chambers- Desilting chamber and filtration chamber. The coarse materials and sediments coming along the runoff will be settled in the desilting chamber. Then through baffle wall, water will move to filtration chamber. Filtration chamber is composed of filter media (pebble and gravel). Water from the filtration chamber will move in gradient through RCC pipes which then be channelised to lake. Manholes are created after every 6 meter collection of water and also help in cleaning the choked pipes. A network of channels is created around the lake so that every drop of water could be diverted to the lake.

- A.**
1. Size of RCC pipe: 6 /8 / 10/ 12 inch dia
 2. Size of collection chamber: 1.5m X 1m X1m
 3. 9-12 mm holes on the cover of desilting chamber
- B.**
1. Total Channelization: 952 metre
 2. Total Manholes: 93
 3. Layout and design attached
- C.**
1. Average annual rainfall: 611 mm
 2. Land use type: Green area (with parks and lawns)
 3. Total catchment area: 57.9 acre plus road area outside the park
 4. Road/ paved area considered outside the park: 2000 sq m
 5. Water logging at Singh Sabha Road: 1.5 - 2 feet level
 6. Water logging at Gate no. (1): 1 feet level
 5. Amount of water available for reviving the lake: **2,93,60,000 litres annually (approx).**
- D.** Time frame for execution of the project: March 31st, 2011 – July 7th, 2011.
- E.** The maintenance for the Rainwater Harvesting Project at Roshanara Garden will be the sole responsibility of MCD.

LAKE REVIVAL SYSTEM

LAYOUT

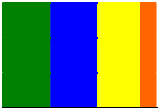




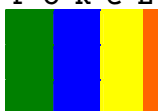
CHANNELISATION NETWORK

Table: Network of channelization to drain water in the lake from the park and the adjoining road

S.No.	From (Water collection chamber)	To	Length of Channelisation (m)	Size of RCC pipe (dia in inches)	No. of Collection chamber	Dimension of collection chamber (cu m)	Remark
*1	Near DJB Office at Gate No. 3	Ashok wala Park	32	6	14	1.5*1*1	There is high water logging in the singh sabha road from where water can be channelised to lake as – Road (3 CC) -- Inside DJB Office (4 CC) – Ashokwala Park (7CC) – Japanese Park (1CC) – Kenduwala Park (10 CC) -- Lake
	Ashok wala Park	Japanese Park	120	8	1	1.5*1*1	
	Japanese Park	Kenduwala Park	60	10	10		
	Kenduwala Park	Lake	12	12			
2	Near Gate No. 3	Ashokwala Park	42	6	4		This is parallel line to *1 with 2CC near road & 2 inside Ashokwala Park
3	Japanese Park - Channelisation within Japanese park to collect water	within the park	52	6	2	1.5*1*1	At the centre of this park is hillock (elevation) from where water flows and gets logged. Japanese Park (2 CC) – Kenduwala Park (9 CC) -- Lake
	Channelisation within the Kenduwala Park	Within the park upto lake	50	8	9		



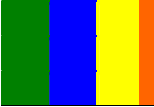
S.No.	From (Water collection chamber)	To	Length of Channelisation (m)	Size of RCC pipe (dia in inches)	No. of Collection chamber	Dimension of collection chamber (cu m)	Remark
4	Channelisation within Kapil Dev park to collect water	Within the park	48	6	5	1.5*1*1	Channelisation within the park is done to collect water in a single point by making manholes. Kapil Dev Park (5 CC) – Road (5 CC) -- Lake
	Kapil Dev Park	Through road cutting to lake	60 18	8 10	5		
5	Near Baradari Water Reservoir in front of Gate No. 2	Towards Kapil Dev Park	6	6	1		Water from this single manhole is channelized towards Kapil Dev Park & left open to the surface of the park
6	Outside gate no. 1	Children's Park	32	6	1	1.5*1*1	There is high water logging near gate 1 which finds its way to Childrens park. Channelisation within the park is done to collect water in a single point by making manholes
	Channelisation within Children's Park	Nursery ke samnewala park	175 22	8 10	7		Road (1 CC) – Children's Park (7 CC) – Nursery Park -- Lake
	Nursery ke samnewala park	Lake	8	12			
7	Roshanara Club Road	Towards existing flow of water channel creating holes in the wall	20	6	4	1.5*1*1	Water from Roshanara Club Road is received through creating holes (2 nos) & collected through channelisation & its flow is made towards the existing channel which then enter towards the lake



S.No.	From (Water collection chamber)	To	Length of Channelization (m)	Size of RCC pipe (dia in inches)	No. of Collection chamber	Dimension of collection chamber (cu m)	Remark
8	Channelization within the Lamba Tukda Park	To Lake	22	6	3	1.5*1*1	Water at Lamba Tukda park is collected and channelised to the lake
*9	Near Roshanara Entry Gate though Road Cutting	Lake	119	8	21		Water from stormwater drain running opp to the road is channelized upto the lake
10	Near Roshanara Road Entry Gate	Park behind DDH Office	20	10	1		This is parallel line with *9
11	Near Gate No. 6 & 7	Lake via Nursery ke samnewala park	34	8	5		
	Total		952		93		

Note: Water collection chambers are constructed as per gradient so that there will be continuous flow of water from upstream towards lake.

DIMENSIONS AND SPECIFICATIONS OF COLLECTION SYSTEM



A. Details of Collection System including Pipes & Collection Chambers

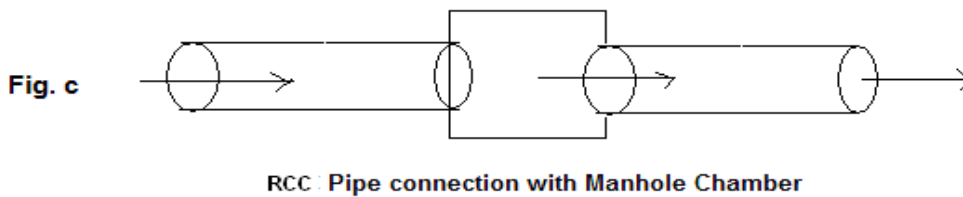
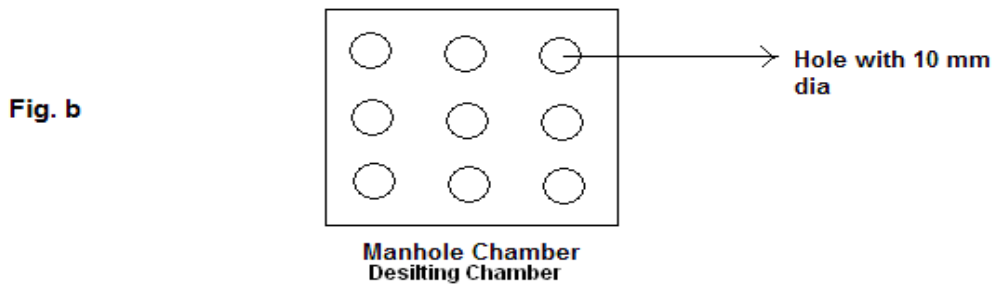
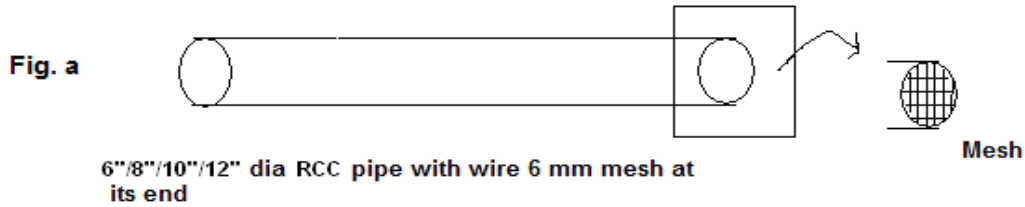
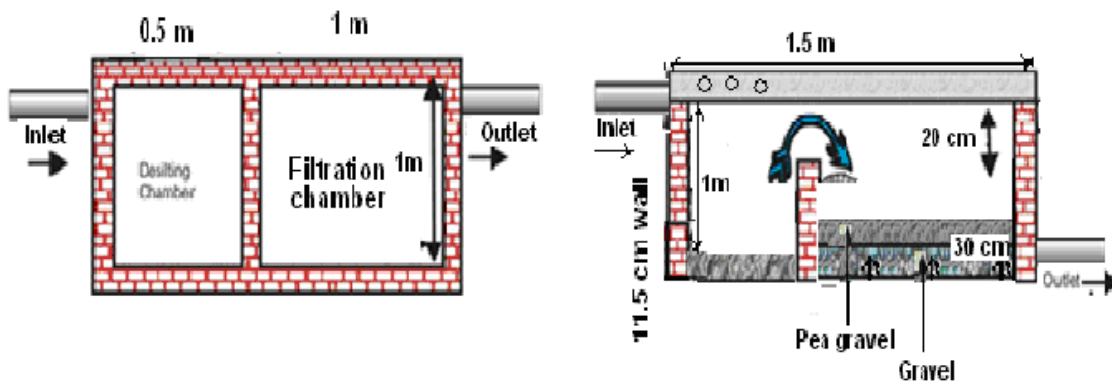


Fig. d Design of Collection Chamber



PRECAUTIONS AND MAINTENANCE



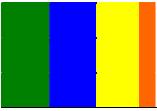
The cleaning and maintenance is an essential part of the rainwater harvesting system for its long life and efficient functioning. In the absence of regular maintenance, even the best designed structures fail to function effectively.

The precautions and maintenance measures listed below ***must be followed*** to get the desired results from the system in the long run:

1. All the storm water drains (or rainwater downspouts) are to be cleaned. Necessary repair of the drains (or rainwater downspouts) needs to be carried out whenever required.
2. No contaminated water to be diverted into the storm water drains (or rainwater downspouts) e.g. sewage, oils, chemicals etc.
3. Before the onset of the monsoon all the catchments area considered for recharge is to be cleaned.
4. Collection manholes on the roadside to be cleaned after every rain.
5. Collection chambers in the park to be cleaned after every alternate month.
6. No change in the existing storm water flow path.
7. Mesh provided on the mouth of the inlet to be cleaned regularly to discard the debris/ other wastes entering into the recharge pit.
8. A hygienic condition in and around the Roshanara Garden is required after implementation of artificial recharge system, as the recharged water would augment the water level in the pond.
9. Depth of retaining capacity of the manholes (as per the enclosed designs) is below the existing inlet pipes.
10. The entire stretch of the existing storm water drain (or rainwater downspouts) is to be maintained and each manhole cover provided to be kept clean to avoid clogging.

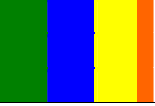
ADDITIONAL RECOMMENDATION

Installation of Tubewell



As Roshanara garden is very big (57.29 acres), it is recommended to install one tube well (30m deep with 12" dia) at upstream of lake so that there will be availability of water in the lake even during peak summers. Water from this source can be channelised to the pond through the pipeline established for catching rain water. The tubewell should not run for more than 2 -3 hours a day otherwise it will affect the water table to a great extent. This will make the availability of water throughout the year.

** However, for installing new tubewell, the Horticulture department needs to take permission from MCD. The tubewell drilling will be financed and implemented by MCD itself.*



CHRONOLOGY OF EXECUTION WITH PICTURES



Inauguration Site



Kalash Ceremony

Seen in the picture: (From left to right)

Smt. Renu K. Jagdev (Dy. Commissioner, MCD)

Smt Jyoti Sharma (President, FORCE)

Sh Praveen Aggarwal (Coca - Cola)

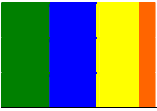
Dr Ashish Priyadarshi (DDH, MCD)

Sh Rakesh Raman (Moon Beverages Ltd)

Sh S.S. Khandpal (Director, Horticulture, MCD)



Coconut Breaking Ceremony



Digging & Laying of Pipes





CONCLUSION AND THANK YOU

It was a great experience making the Rainwater Harvesting Plans for Roshanara Garden, Delhi. Rainwater harvesting in Roshanara can be a real success.

Because of the support and continued inputs from the Deputy Director, Horticulture at the Roshanara Garden and the Director, Horticulture, we have been able to design an optimal Rainwater Harvesting Plan which can be easily understood and can be directly worked upon.

We are grateful to the officers and staff looking after Roshanara Garden, for having given us this opportunity. A nation that has such dynamic officers will surely be able to overcome any problems that it encounters on its rapid march to global standards.

Thank you

JYOTI SHARMA

President, FORCE

Ph: 9899812888,

jyoti@force.org.in**RAJNEE CHOURASIYA**

Research & Design Coordinator

Ph: 9873931576

rajnee@force.org.in**ARUN RAJ**

Project Coordinator

Ph: 9873626045

arun.raj@force.org.in

F O R C E

