

RAIN WATER HARVESTING

Types of rainwater harvesting system

according to the type of catchment used and second based on type of collection system. Broadly there are two methods of rainwater harvesting system based on type of catchment:

(i) Roof top rainwater harvesting: It is a system of catching rainwater where it falls. In rooftop harvesting, the roof becomes the catchments, and the rainwater is collected from the roof of the house/building.

(ii) Surface runoff harvesting: In urban area rainwater flows away as surface runoff. This runoff could be caught and used for recharging aquifers by adopting appropriate methods.

For each type of catchment system **different type of collection systems** can be adopted. Rainwater harvesting system based on type of collection systems are:

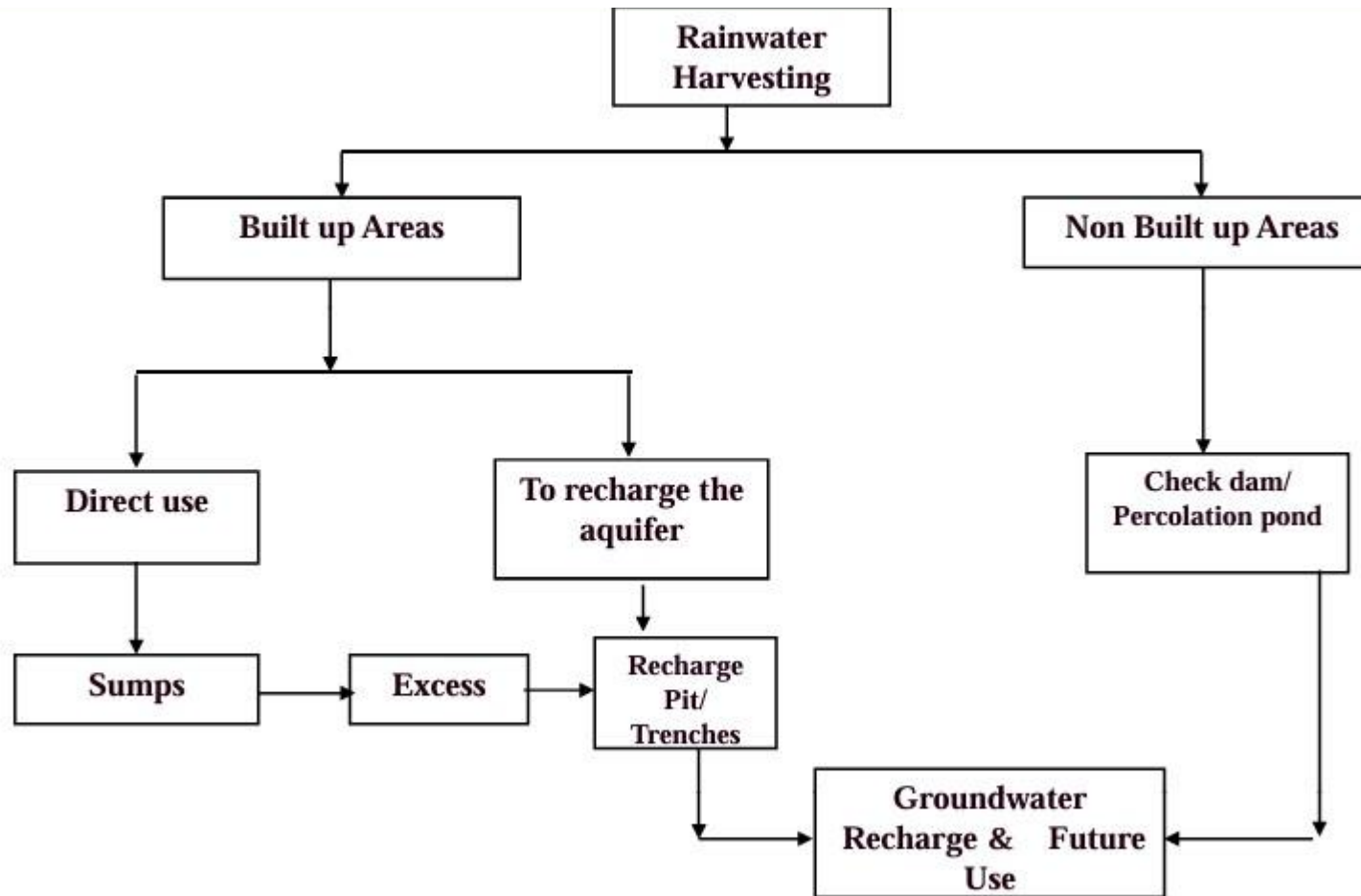
(i) Storage : Harvested rainwater can be stored in tanks or lakes and can be used for direct consumption

(ii) Storage and groundwater recharge: In this method rainwater is first stored in tanks or other system and surplus water is conveyed to recharge groundwater. Recharged groundwater can be used for consumption at later stage with hand pumps or tubewells.

(iii) Groundwater recharge only: In this method collected rainwater is directly conveyed to recharge groundwater without making any storage provision.

Eg: groundwater recharge through storm water drains or conveying water from road runoff to recharge pits.

FLOWCHART FOR INTEGRATED RWH IN AN AREA

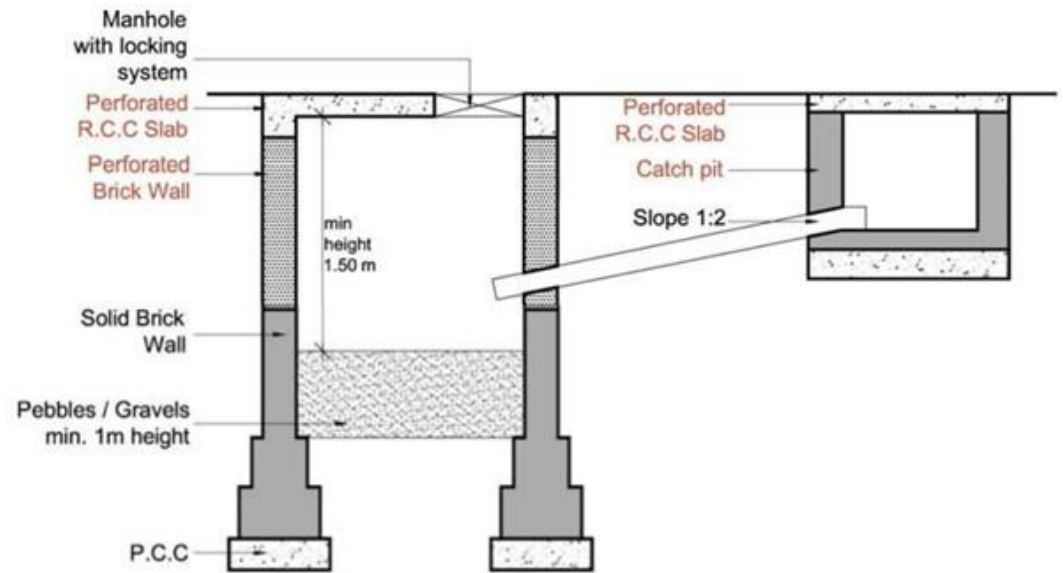


IN AHMEDABAD

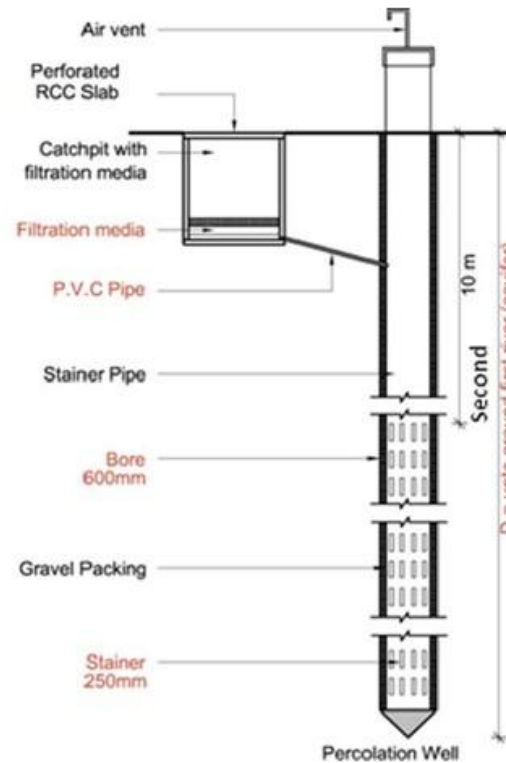
PERCOLATION WELLS

In the site margins

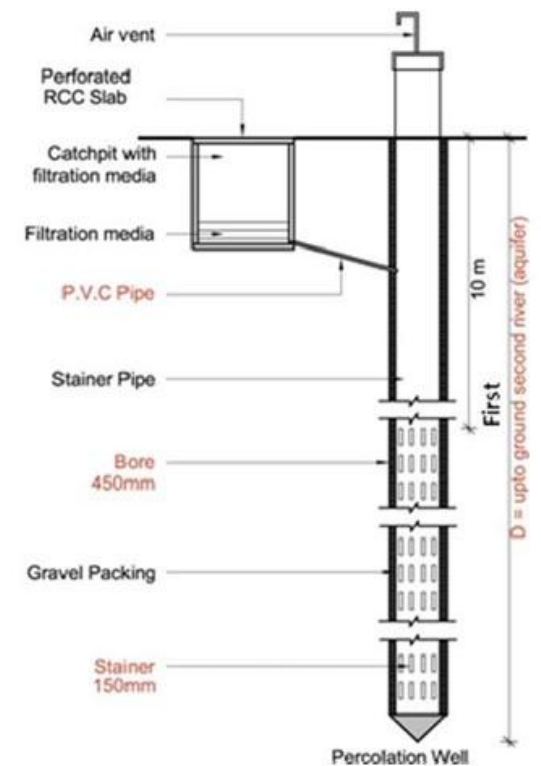
For Buildings with ground coverage above 80 sq.mt and below 500sq.mt:



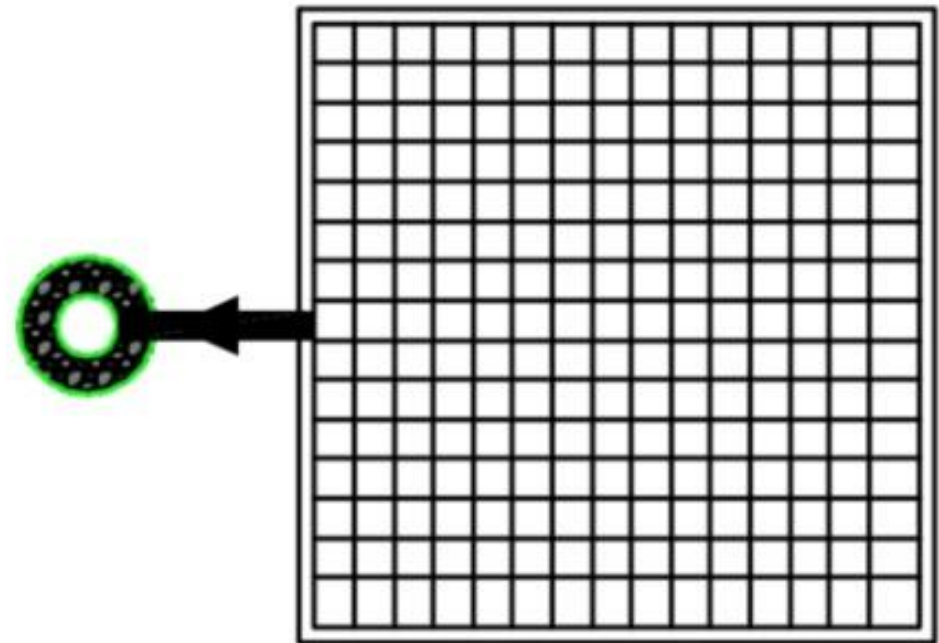
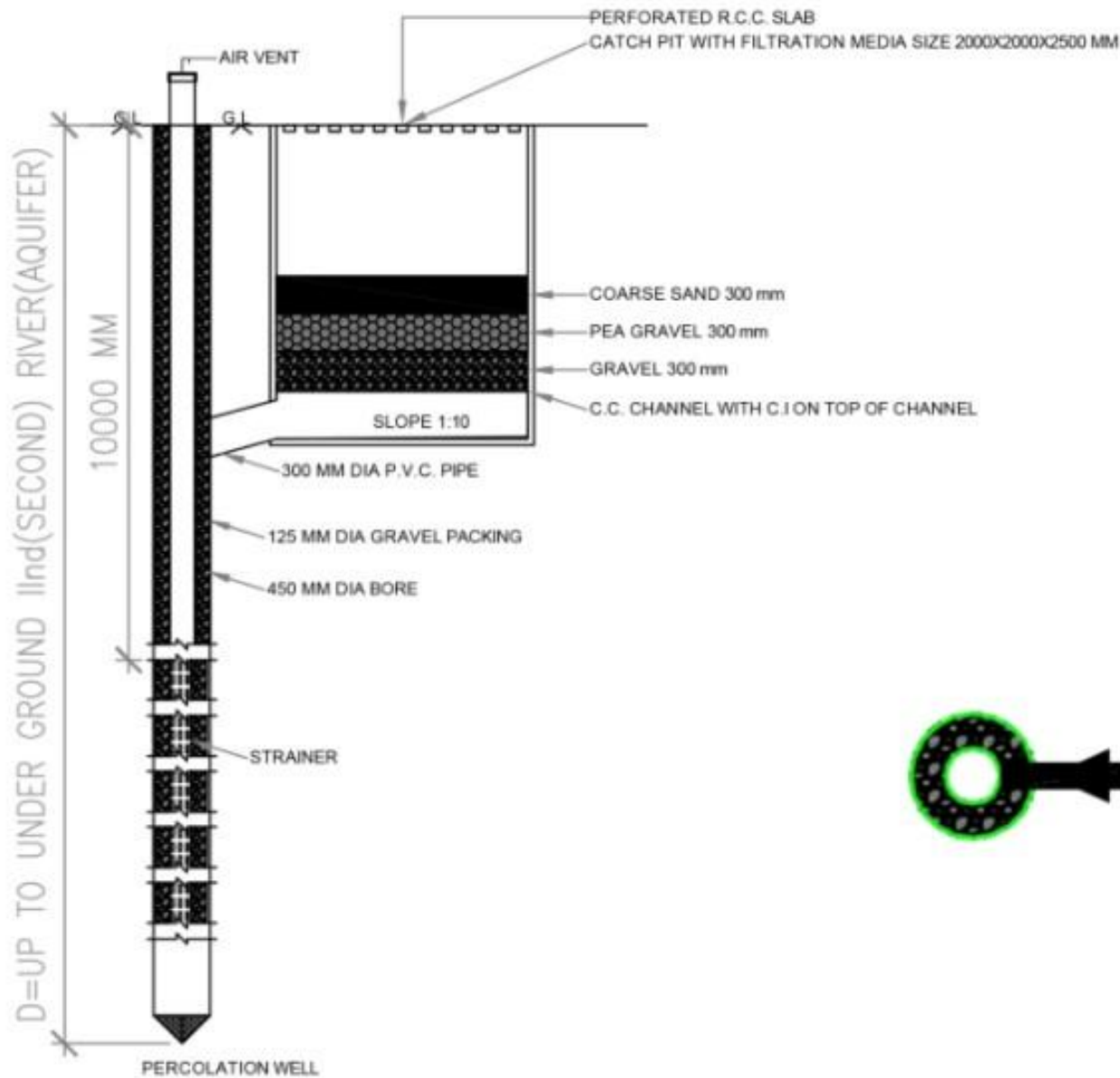
For Buildings with building-unit area above 500sq.mt and up to 1500 sq.mt:

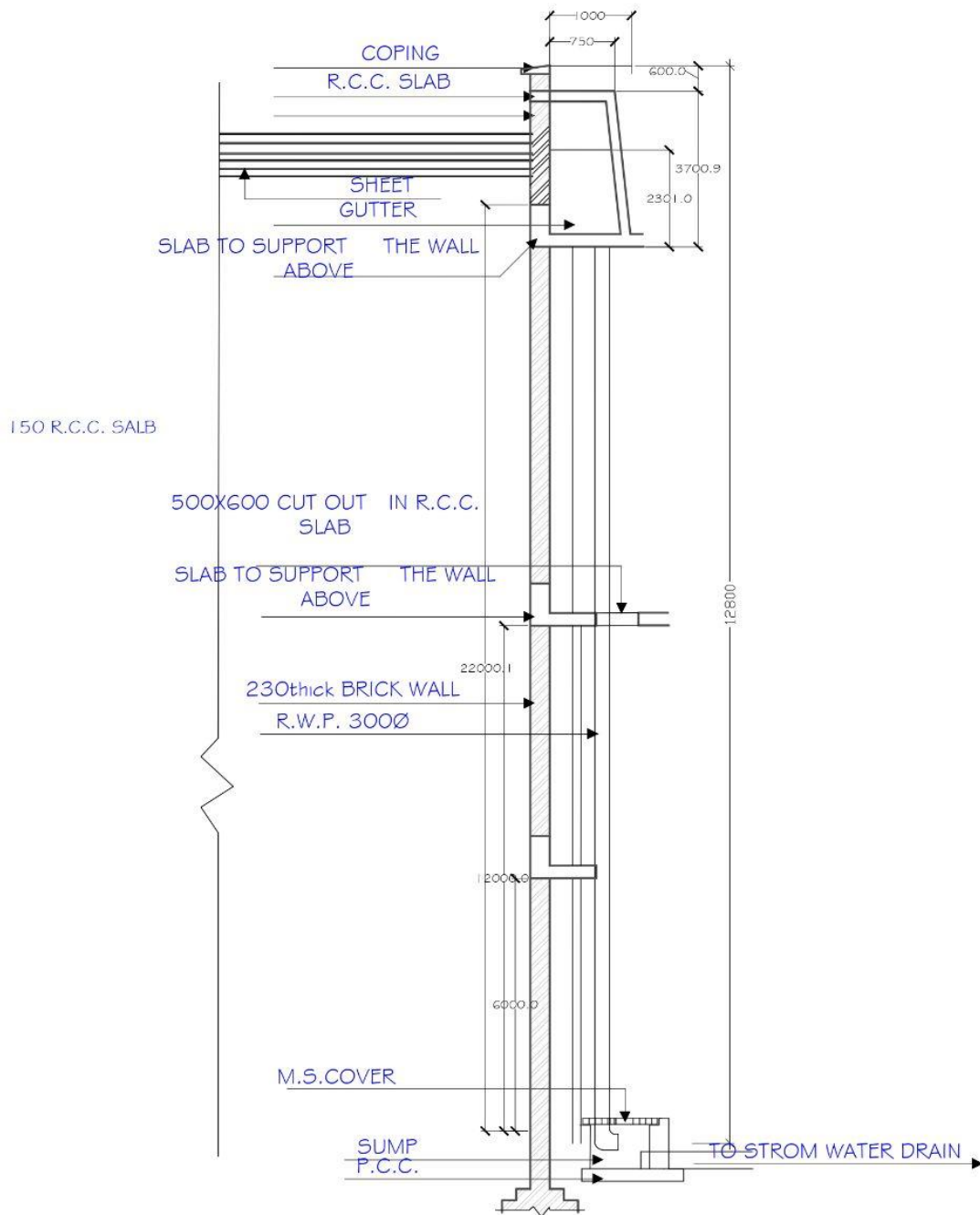


For Buildings with building-unit area above 1500 sq.mt and up to 4000 sq.mt

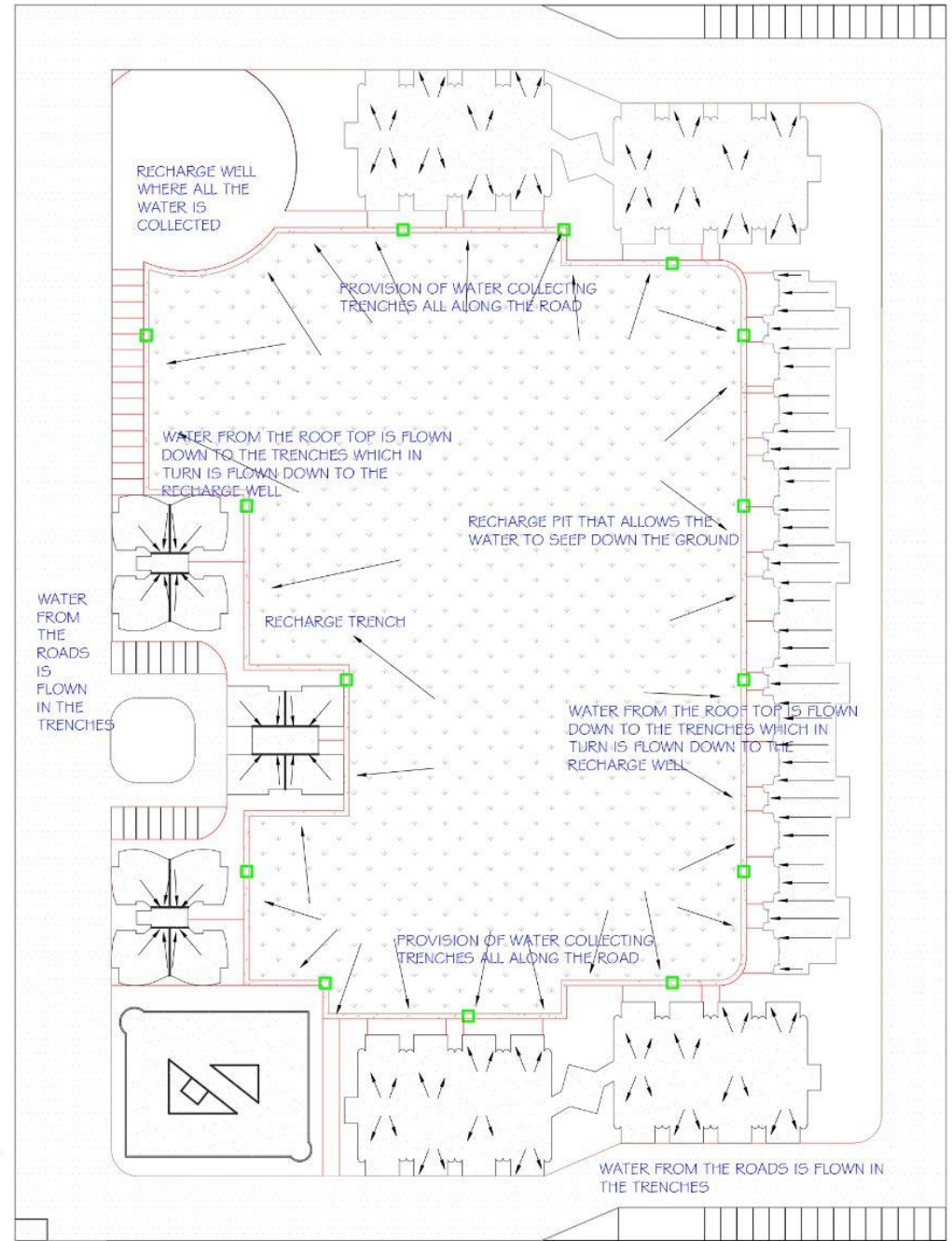


Rain Water Harvesting





SECTIONAL ELEVATION



SITE PLAN SHOWING THE RAIN WATER HARVESTING

RWH —Calculation

Consider a building with a flat terrace area of 100 sq. m.

The average annual rainfall be approximately 900 mm.

It means that if the terrace floor is assumed to be impermeable, and all the rain that falls on it is retained, then, in one year, there will be rainwater on the terrace floor to a height of 900 mm.

Area of plot = 100 sq. m.

Height of rainfall = 0.9 m (900 mm)

Volume of rainfall = Area of plot x Height of rainfall = 100 sq. m. x 0.9 m = 90 cu. m. (90,000 liters)

Assuming that only 70% of the total rainfall is effectively harvested, Volume of water harvested = 63,000 liters (90,000 litres x 0.7).

How Much Water Can be Collected

Collection Efficiency How efficiently the rainfall can be collected depends on several considerations.

Collection efficiencies of 80% several considerations. Collection efficiencies of 80% are often used depending on the specific design.

– Rainfall Reliability.

The main step is to determine how much water would be generated from the roof area. Average monsoon rainfall is used for this purpose.

– Formula:

Total quantity of water to be collected (cum) =

Rooftop Area (Sqm) to be collected (cu.m.) =

Rooftop Area (Sq.m.) x Average Monsoon Rainfall (m) x Collection efficiency

CASE STUDY IN AHMEDABAD

Project name: URBAN OASIS - Gated Community Living (Housing)

Architecture firm: THE GRID Architects

Location: Ahmedabad, Gujarat, India

The narrative and rainwater harvesting calculations indicate that impervious area of both roof and non-roof is 5,075 sq.m. The average rainfall of last five years is 30mm. The total runoff is 152 CuM.

The project has designed **rainwater harvesting pits each with volume of 61 CuM.**

Project has proposed three rainwater harvesting pits, hence total volume captured is 183 CuM

grey water recycling reconnects the urban residents to the natural water cycle and increases the productivity of the ecosystems. 100% of the grey water generated will be treated on-site. 100% of which will be treated on-site by a 50 KLD STP. that the quantity of treated wastewater available is adequate to fulfil 100% of the landscape watering requirement.

for both water and energy conservation rainwater harvesting system is integrated to capture 183 cum water which is self-reliant for the needs of residents. regulated flow cp fittings are installed to save in excess of 20% water. water meters are installed for measuring hot water consumption, landscape water consumption and the reuse of treated wastewater

