STATE LEVEL WORKSHOP

ON

WATER CONSERVATION AND WASTE WATER RECYCLE & REUSE IN RAJASTHAN ISSUES AND CHALLENGES

ON

February 07, 2013

SUPPORTED BY

CCCB NURM, Ministry of Urban Development, Government of India

AND

Department of Urban Development , RUFIDCO & HCM RIPA, Government of Rajasthan

PRESENTATION

ON

WATER EFFICIENCY IN BUILDINGS

N.S. RATHORE, ARCHITECT-PLANNER, PROFESSOR AND DEAN ACADEMICS

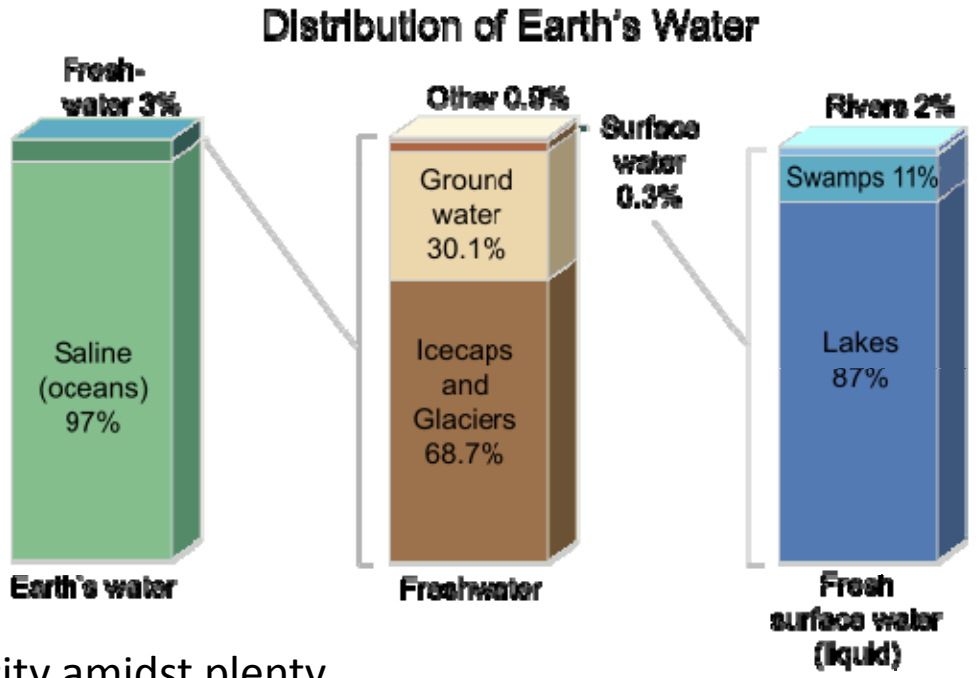
AAYOJAN SCHOOL OF ARCHITECTURE, JAIPUR

WATER GLOBAL PERSPECTIVE

Global Future Determinants

Energy And **Land** For Development

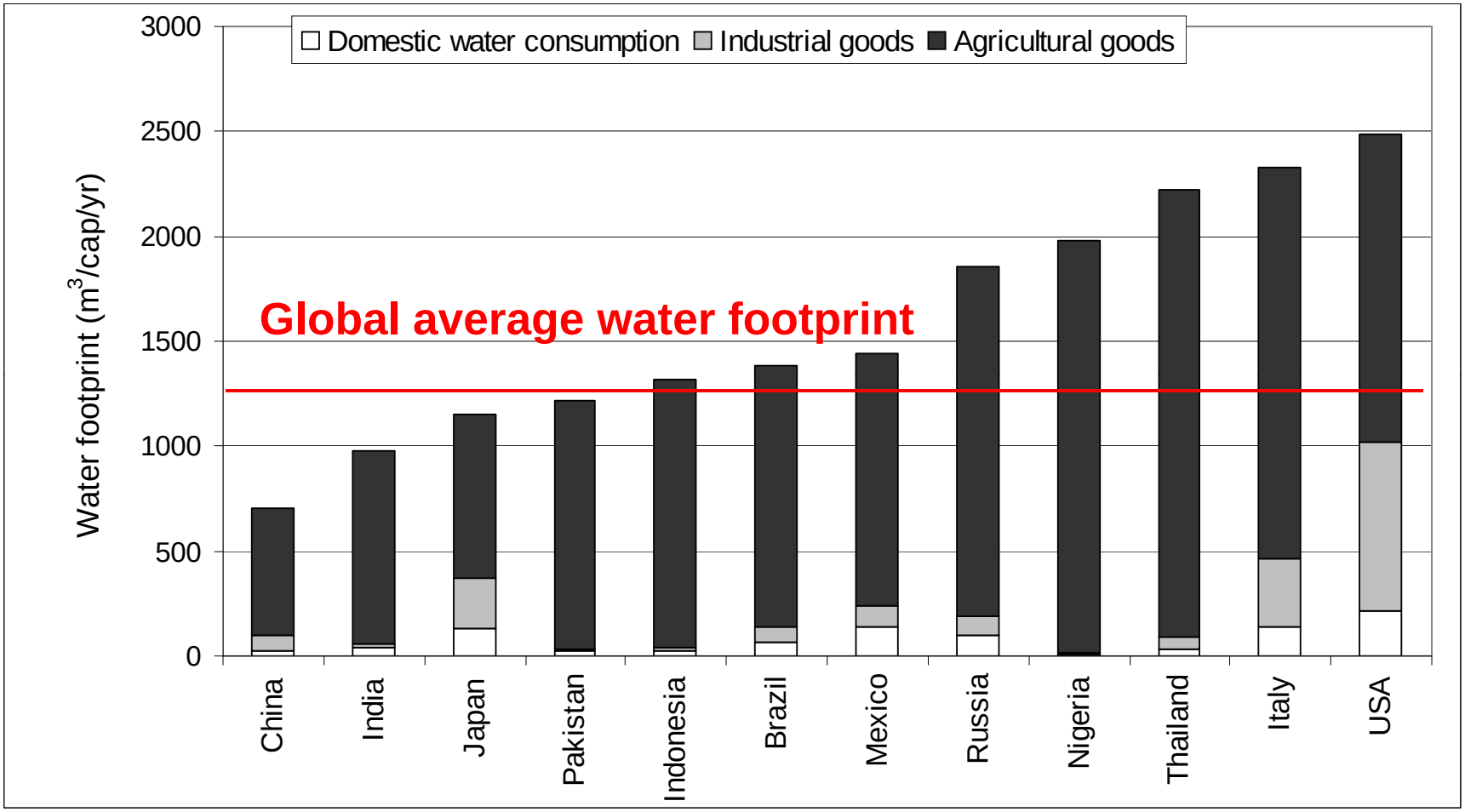
Water For Survival



ISSUES

- Scarcity amidst plenty
- Inequitable distribution
- Pollution

WATER GLOBAL PRESPECTIVE - FOOT PRINT



ISSUES

- Developed countries have high consumption of water in all sectors
- Agriculture sector is the major consumer of water

WATER RAJASTHAN PERSPECTIVE

	INDIA	% of World	RAJASTHAN	% of India
POPULATION	1,210,193,422	(17.4%)	6,86,21,012	(5.7%)
LAND AREA	3,287,240 Km^2	(0.6%)	342,240 Km^2	(10.4%)
FRESH WATER	1.4 million Km^3	(4%)	0.02 million Km^3	(1.2%)

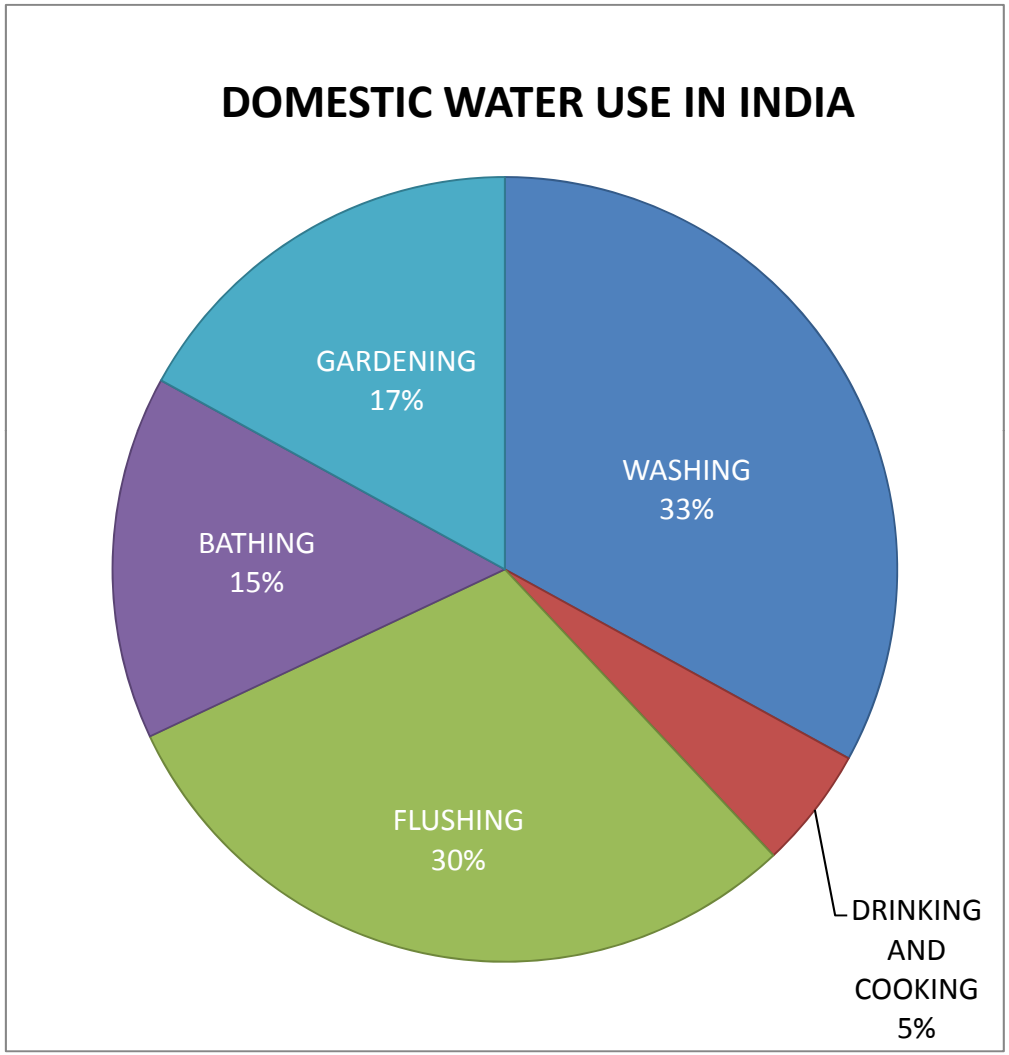
ISSUES
- Acute shortage of fresh water
- Availability of water/capita/day is among the lowest in country

WATER JAIPUR PERSPECTIVE

WATER SOURCES	Bisalpur 50 mld + Ground water 300 mld
WATER REQUIREMENT	445 mld @ 135 ltr./cap/day
WATER AVAILABLE	350 mld @ 114 ltr./cap/day
WATER SHORTAGE	95 mld

ISSUES
- Over exploitation of ground water resulting in depletion @2m/year
- High content of fluoride and nitrite in ground water
- Salinity

WATER USE IN BUILDINGS



ISSUES

- Buildings Consume 10% of total Fresh water
- Availability of water is fixed, so efficiency in use is the only way to mitigate the ever increasing demand.
- Portable water is used in flushing and gardening.

END RESULT OF WATER

N.S. RATHORE, ARCHITECT-PLANNER, PROFESSOR AND DEAN ACADEMICS
AAYOJAN SCHOOL OF ARCHITECTURE, JAIPUR

WATER EFFICIENCY MEASURES

Reduction in losses

- Checking Leakages
- Water metering

Reduction in consumption

- Using water efficient domestic appliances
- Using water efficient faucets in toilets

Water conservation in landscape

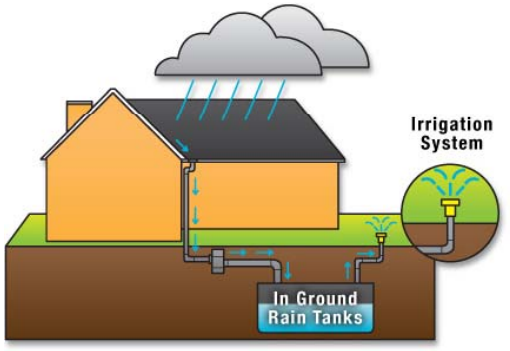
- Native plant species
- Efficient irrigation systems
- Schedule for watering

Water reuse and conservation

- Reduce use of portable water for non portable applications
- Install duel plumbing line for fresh and treated water
- Harvest rain water

Leakage in supply lines

Drip irrigation



Rain Water Harvesting

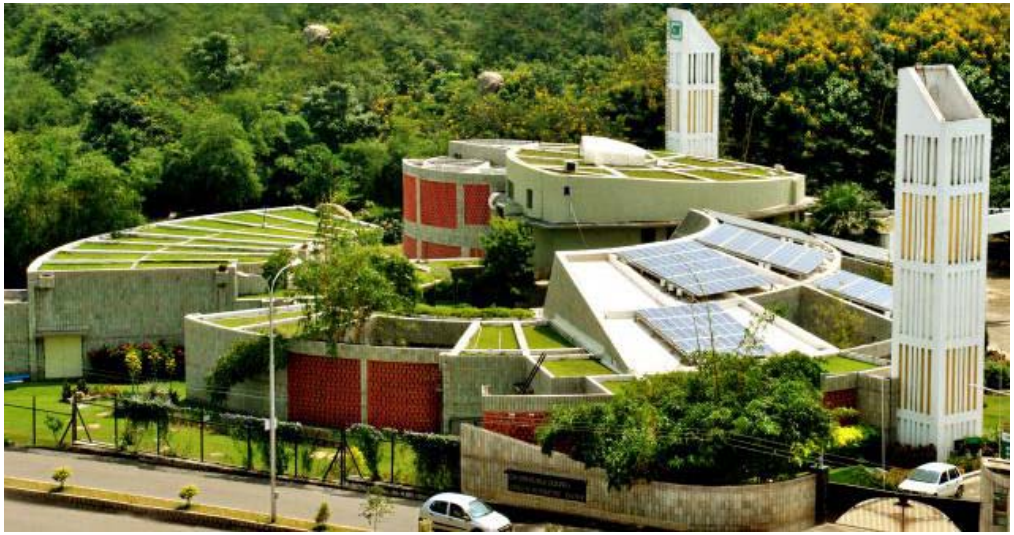
WATER EFFICIENCY MEASURES

Category	Consumption (lpcd)	Reduced Consumption (lpcd)			Reduction in Fresh Water Demand
		Total	Fresh	**Recycled**	
Drinking & cooking	7	7	7		
Bathing	20	20	20		
Flushing	45	21		21	53%
Washing	40	15	15		62%
Gardening	23	23	13	10	
Total	*135*	***86***	*55*	***31***	*60%*

GREEN BUILDING CHARACTERSTICS

CONVENTIONAL V/S GREEN BUILDINGS

- Same in functionality and appearance
- Different in concern for resource conservation and human productivity.
- Little costlier in construction cost , But, economical considering social and environmental cost.
- Saves energy up to 50% and water up to 35%
- Human productivity improves up to 10% due to improved day lighting, views and air quality



CII GODREJ,HYDRABAD, LEED INDIA PLATANIM RATED GREEN BUILDING

IIT ,KANPUR, GRIHA 5 STAR RATED GREEN BUILDING

GREEN BUILDING RATING SYSTEMS – LEED INDIA (IGBC)

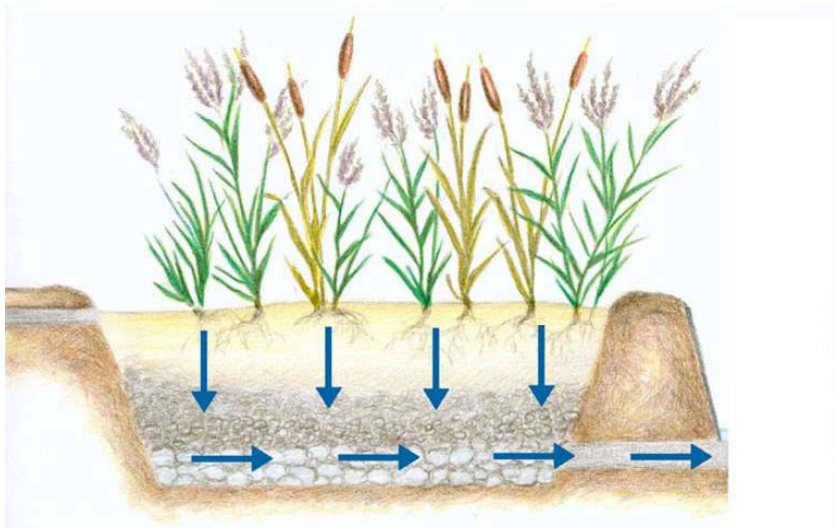
LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN

S.no.	Credits	NC (new construction)
1.	SUSTAINABLE SITES	14
2.	**WATER EFFICIENCY**	**5**
3.	ENERGY AND ATMOSTPHERE	17
4.	MATERIALS AND RESOURCES	13
5.	INDOOR ENVIRONMENT QUALITY	15
6.	INNOVATION	5
	TOTAL	**69**

CERTIFIED	26-32	SILVER	33-38
GOLD	39-51	PLATINUM	52- 69

WATER EFFICIENCY

CREDITS	DESCRIPTION	POINTS
CREDIT 10	WATER EFFICIENT LANDSCAPING	2
CREDIT 2	INNOVATIVE WASTEWATER TECHNOLOGIES	1
CREDIT 3	WATER USE REDUCTION	2



ROOT ZONE TREATMENT SYSTEM

GREEN BUILDING – RATING SYSTEMS - GRIHA (TERI)

GREEN RATING FOR INTEGRATED HABITAT ASSESMENT

S.no.	CRITERIA	POINTS
1.	SUSTAINABLE SITE PLANNING	24
2.	BUILDING DESIGN OPTIMIZATION	8
3.	ENERGY PERFROMANCE OPTIMIZATION	16
4.	RENUABLE ENERGY UTILIZATION	8
5.	**WATER,WASTE WATER AND SOLID WASTE MANAGEMENT**	**18**
6.	LOW ENERGY BUILDING MATERIAL ANS COSNSTRUCTION TECHNOLOGY	14
7.	HEALTH,WELL BEING & ENVIRONMENT QUALITY	12
8.	INNOVATION (BEYOND 100)	4
	TOTAL	**104**

51-60★ 61-70 ★★ 71-80 ★★★ 81-90 ★★★★ 91-100 ★★★★★

GREEN BUILDING – RATING SYSTEMS - GRIHA (TERI)

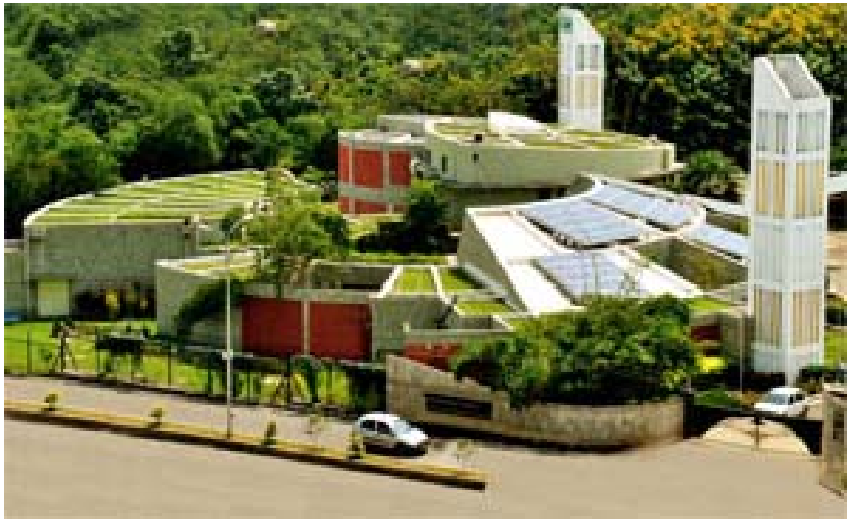
WATER,WASTE WATER MANAGEMENT

Criteria	Description	POINTS
Criteria 10	Reduce landscape water requirement	3
Criteria 11	Reduce building water use	2
Criteria 12	Efficient water use during construction	1
Criteria 20	Waste water treatment	2
Criteria 21	Water recycle and reuse (including rain water)	5

CII SOHRABJI GREEN BUSINESS CENTRE, HYDRABAD

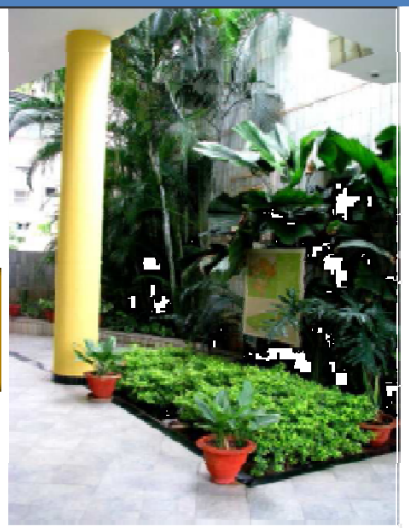
BUILDING TYPE	Office
BUILTUP AREA	1858 sq.mt.
CLIMATE	Warm & Humid
ARCHITECT	Karan Grover
BUILDING FOOTPRINT	9.2% of the site

First LEED platinum rated green building in India



GREEN BUILDING – CASE STUDIES

The outside brought in -COURTYARDS



Influences microclimate and hence human comfort

Contributes colour and is a visual delight

Defines and articulates space

Greenery and Landscape is proven to be therapeutic and a stress buster

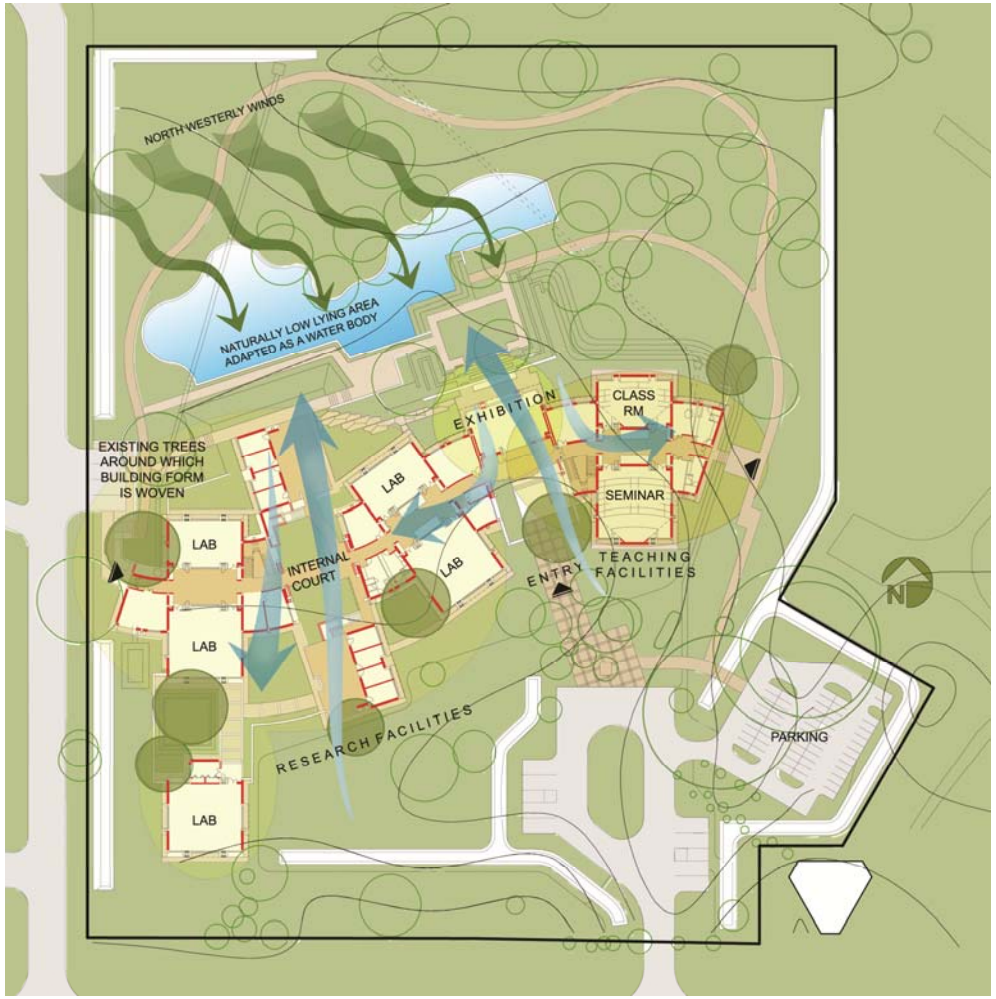
WATER EFFICIENCY MEASURES

1) Root Zone Treatment Of Waste Water
2) Rain water harvesting
3) Water-less urinals in men's restroom
4) Water-efficient fixtures: ultra low and low-flow flush fixtures
5) Water-cooled scroll chiller
6) Secondary chilled water pumps with variable frequency drives
7) Swales for storm water collection

WATER EFFICIENCY FEATURES

1) Zero Discharge Building
2) 35% reduction in potable water consumption

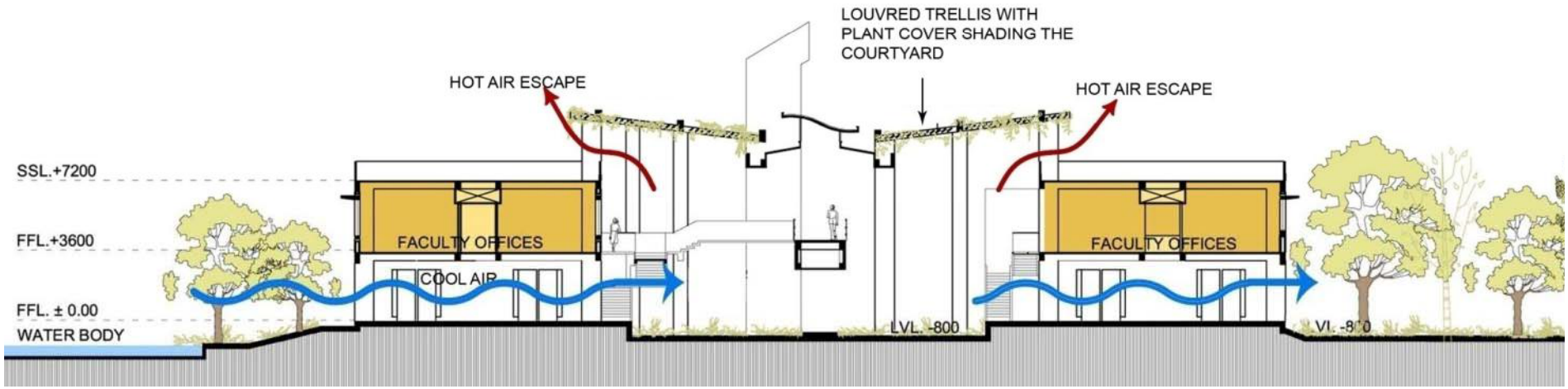
2. CENTRE FOR ENVIRONMENTAL SCIENCE & ENGINEERING , IIT KANPUR



BUILDING TYPE	Educational
BUILTUP AREA	4240 sq.mt.
CLIMATE	Composite
ARCHITECT	Kanvinde rai & Chowdhury

First GRIHA 5 star green rated building in India

GREEN BUILDING – CASE STUDIES



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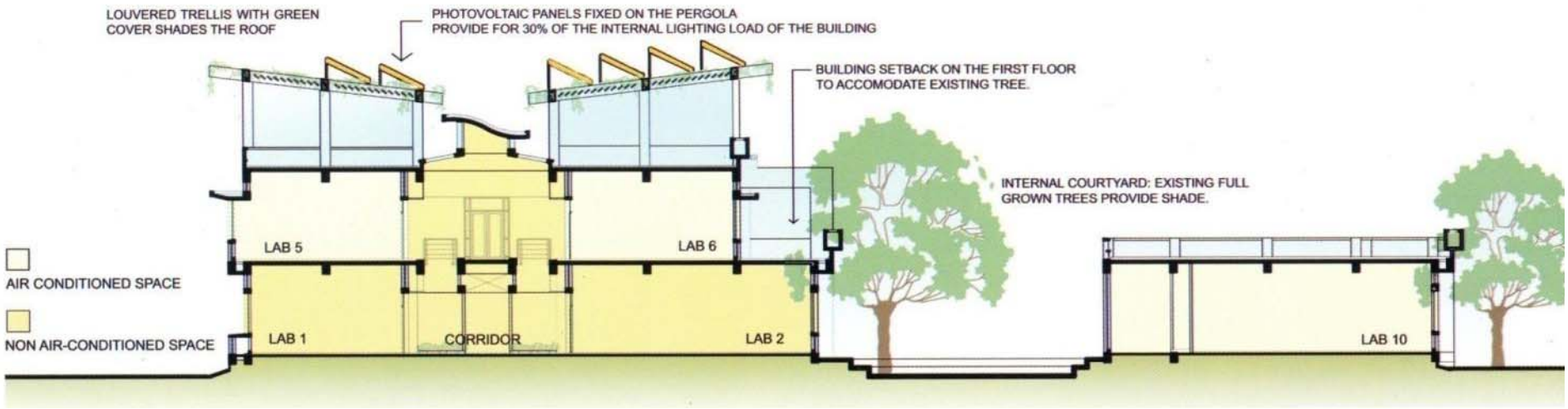
GREEN BUILDING – CASE STUDIES



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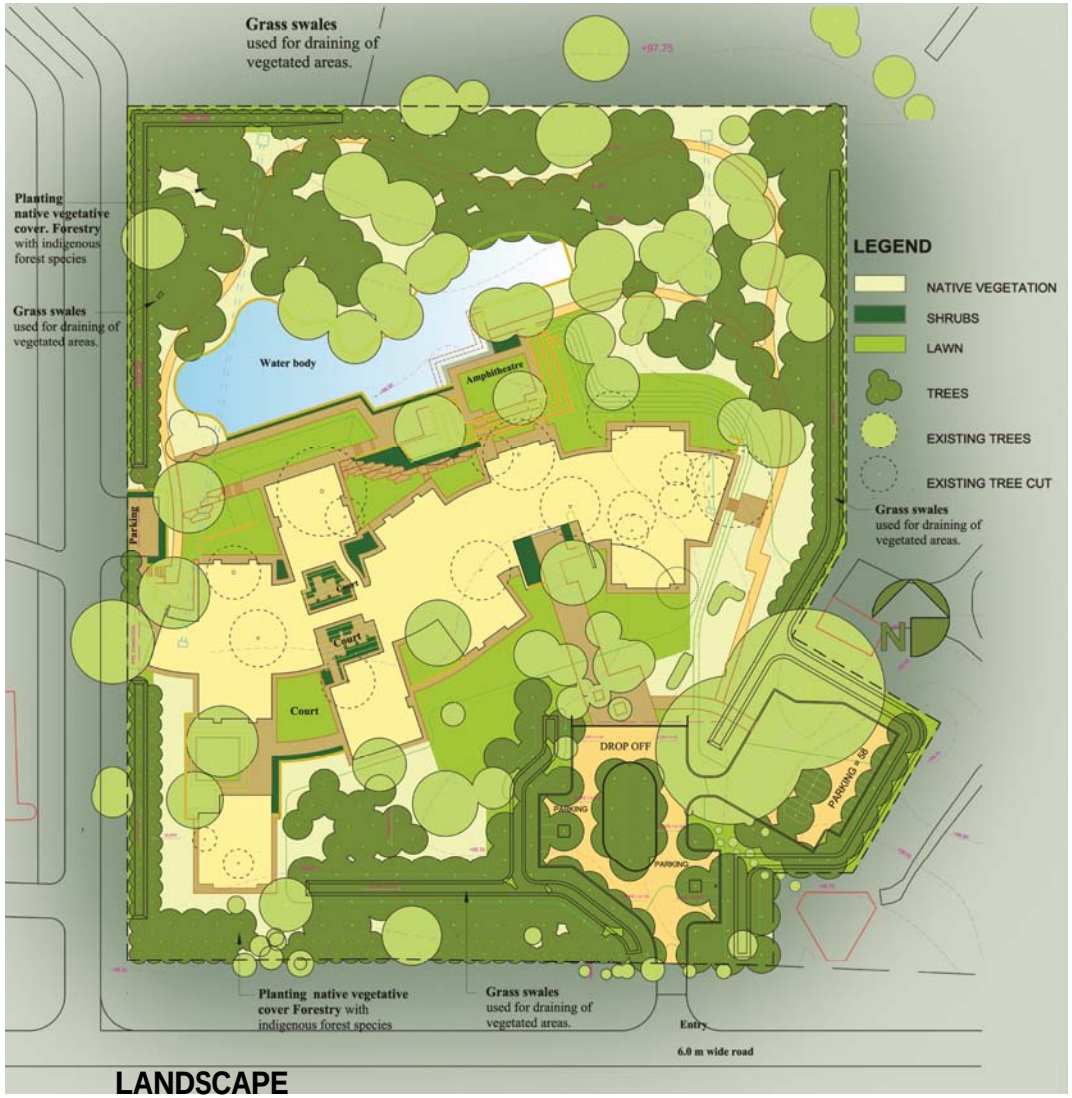

LANDSCAPE

Grass swales for natural drainage

Pervious paving

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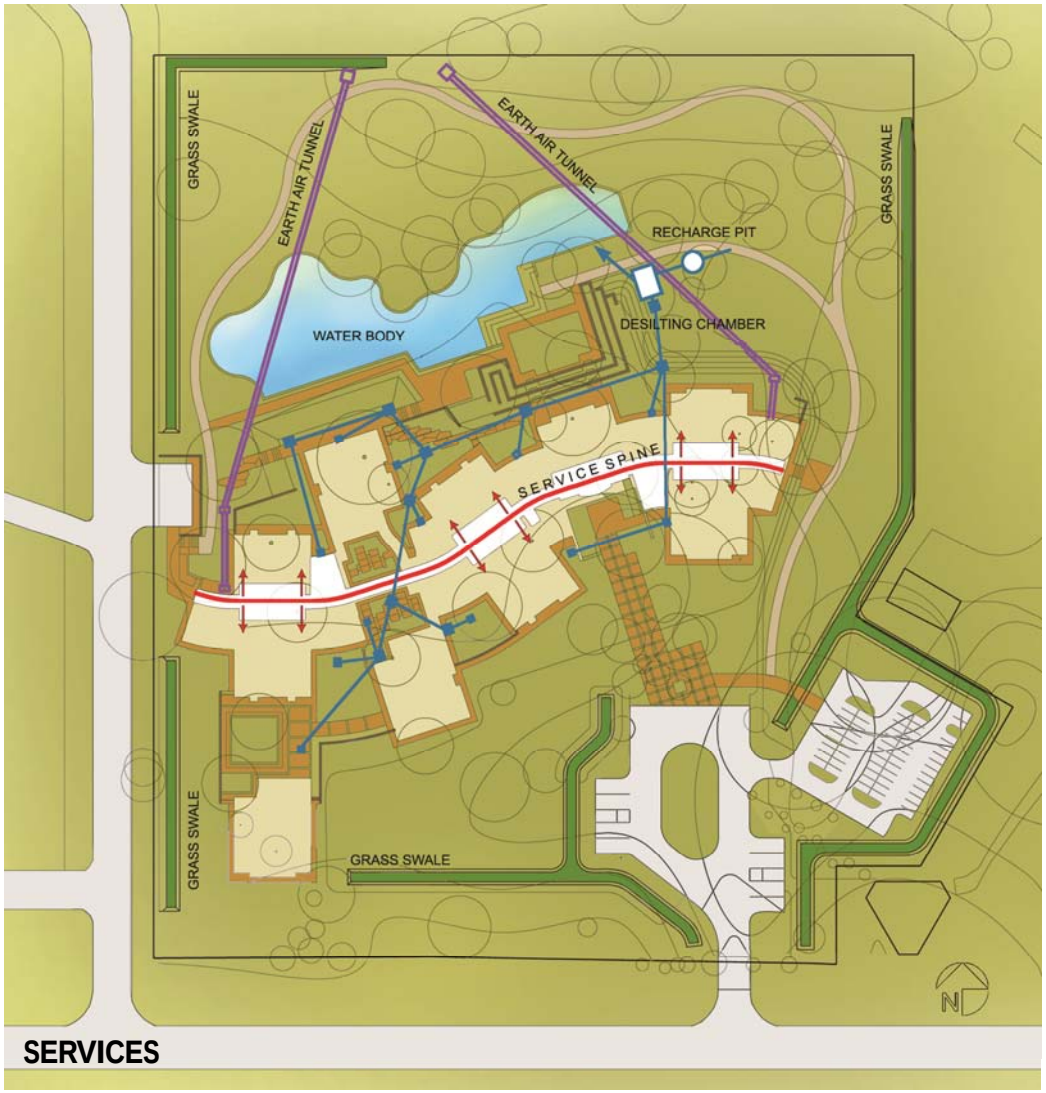
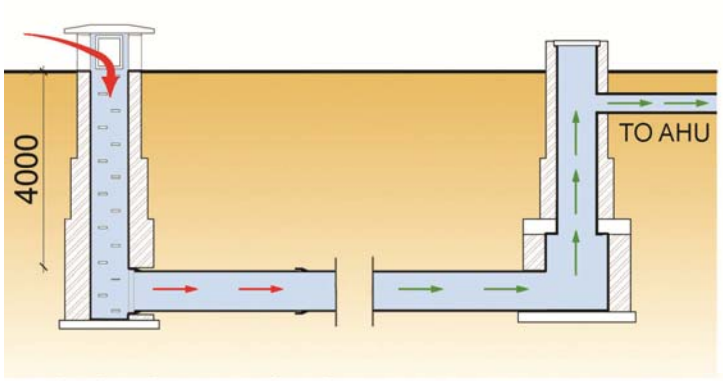
GREEN BUILDING – CASE STUDIES



SERVICES



SECTION THROUGH EARTH AIR TUNNEL

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WATER EFFICIENCY MEASURES

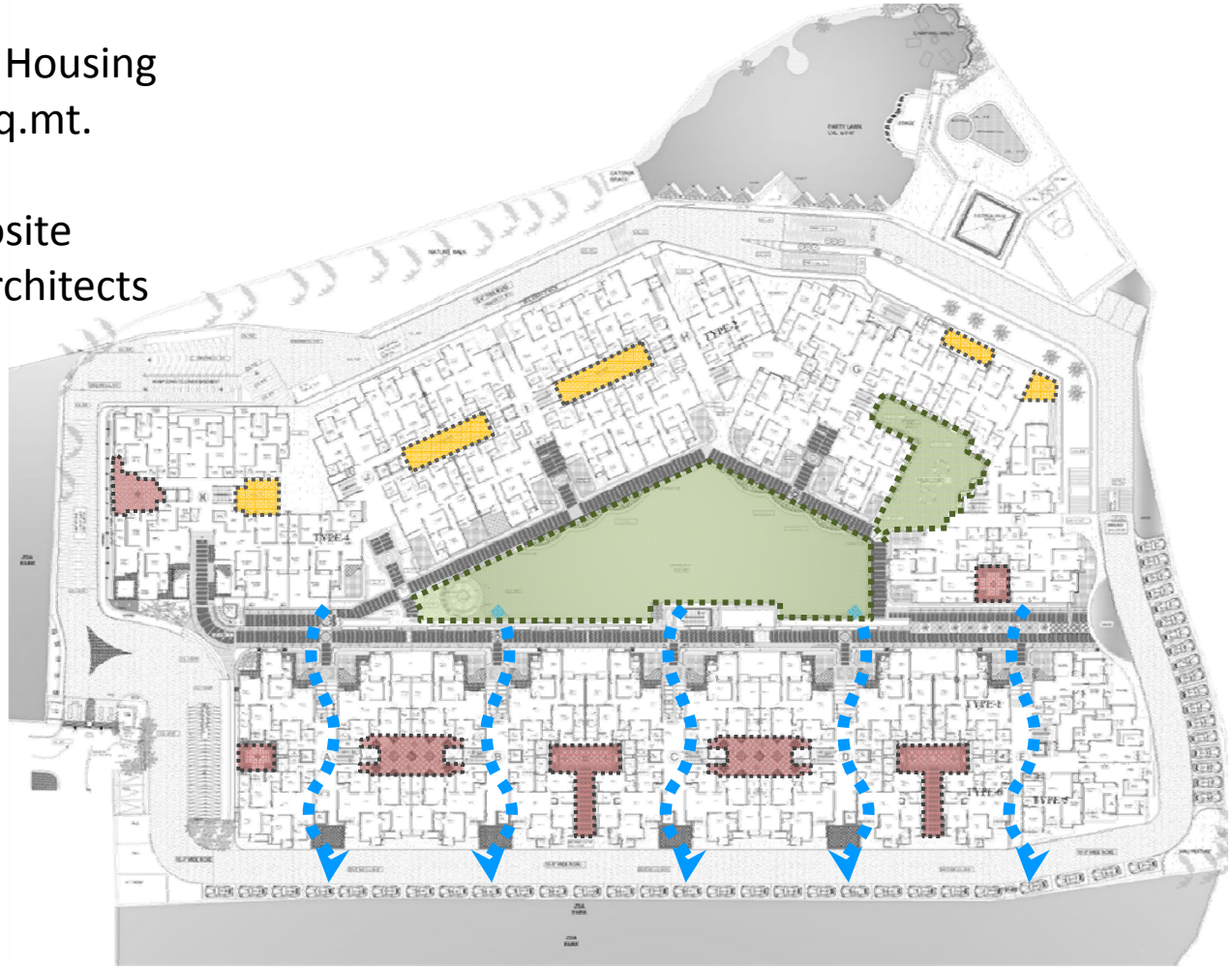
1) Reduced landscape water requirement
2) Reduced building water use
3) Efficient water use during construction
4) Waste water treatment
5) Water recycle and reuse

WATER EFFICIENCY FEATURES

1) Effective use of existing water body by North-South Building orientation.
2) 30% reduction in potable water consumption.

3. PEARL GREEN ACRES, JAIUR

BUILDING TYPE	Group Housing
BUILTUP AREA	5750 sq.mt.
Dwelling Units	250
CLIMATE	Composite
ARCHITECT	M A Architects



GREEN BUILDING – CASE STUDIES

WATER EFFICIENCY MEASURES

STP for water recycling, reused for irrigation and flushing.

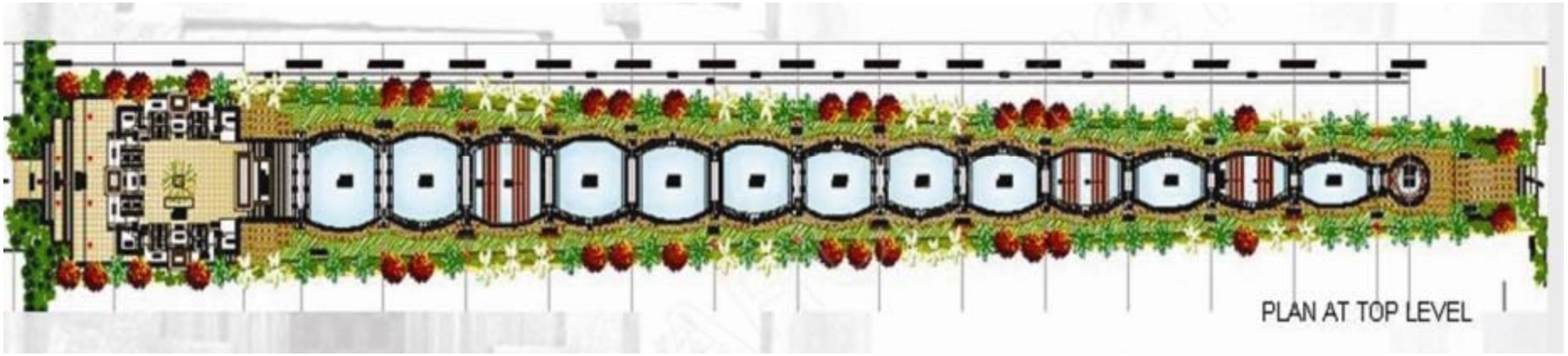
Rain water harvesting.

4. BIRKHA BAWARI, JODHPUR

BUILDING TYPE	Rain water harvesting structure
BUILTUP AREA	5750 sq.mt.
CLIMATE	Hot & Dry
ARCHITECT	Anu Mridul
COST	8 Cr. (2009)

First contemporary subterranean rain water harvesting structure.

GREEN BUILDING – CASE STUDIES



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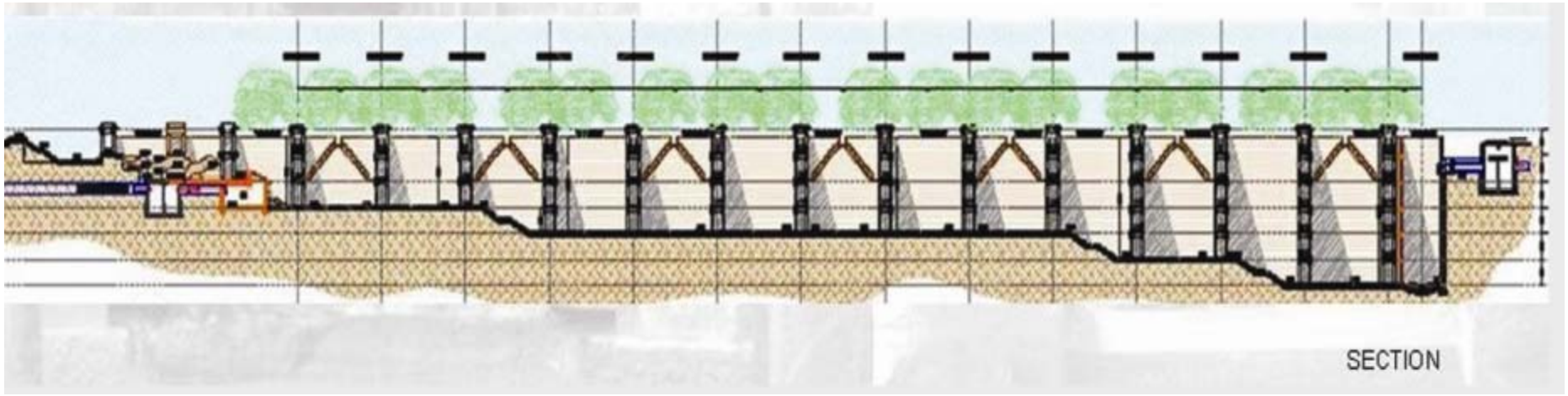

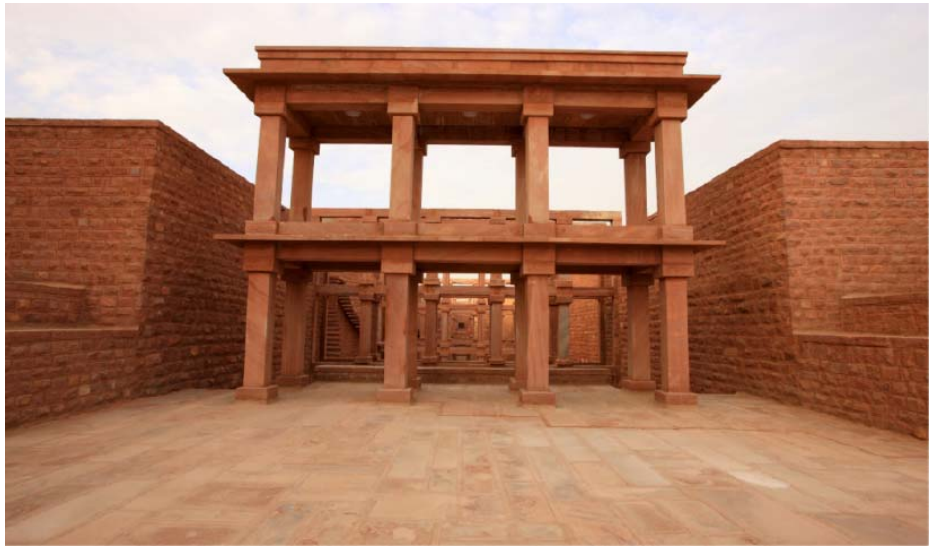

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DESIGN FEATURES

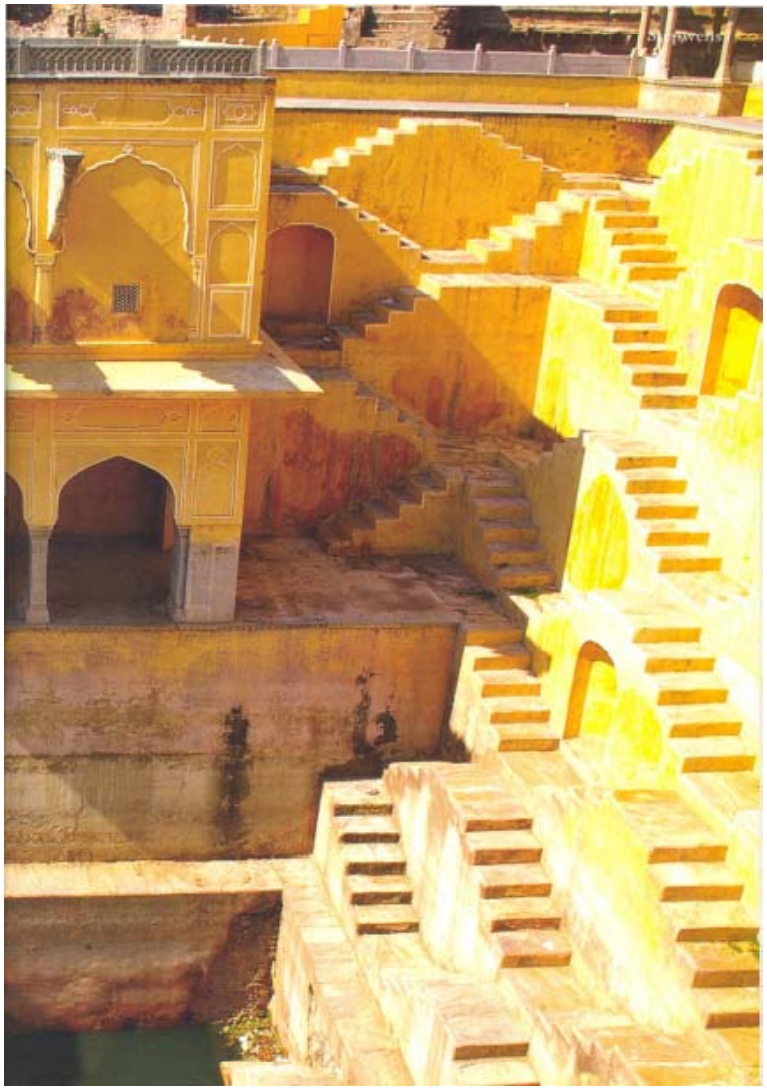
- Designed for umaid heritage housing township at foothills of umaid bhawan palace.
- Designed for a catchment area of 110 acres.
- Design to hold 150 million liters harvested rain water

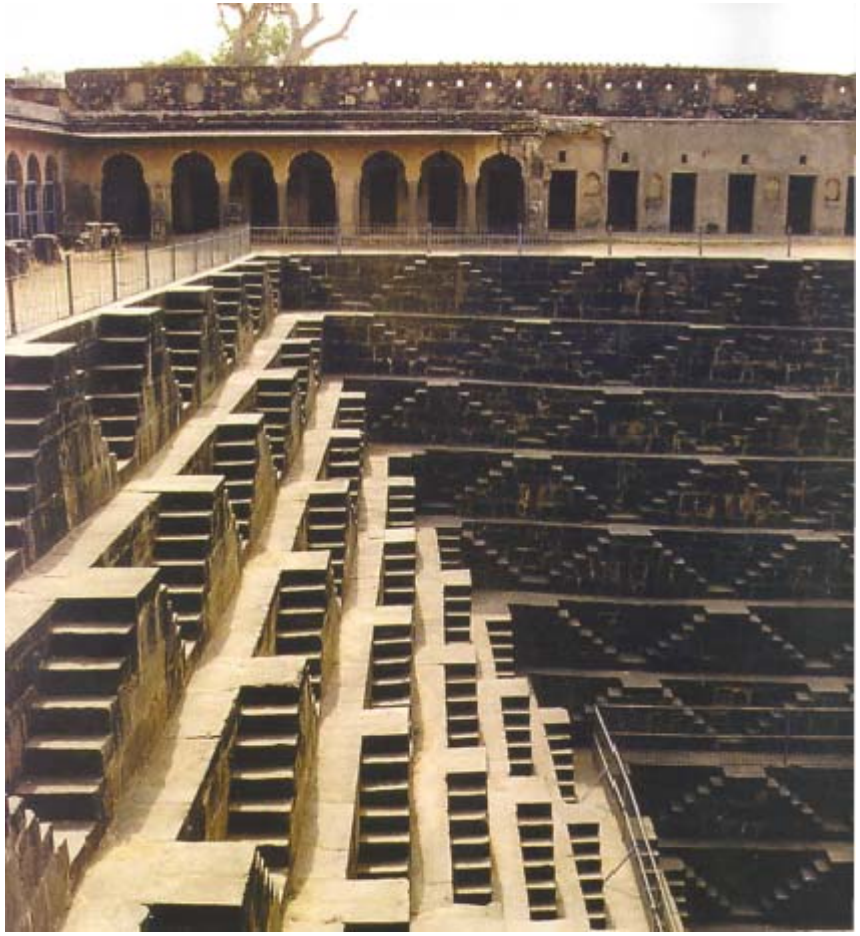
ARCHITECTURAL STRUCTURE

LENGTH	224 M
WIDTH	10.5 M
AVG. DEPTH	11 M (FROM GL)
MAX DEPTH	18 M
AVG. WATER DEPTH	7 M
WALL THICKNESS	0.7 M

STRUCTURAL SYSTEM

BARREL VAULTED TRABEATED STRUCTURE.





STEP BACK IN TIME

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