morphogenesis.

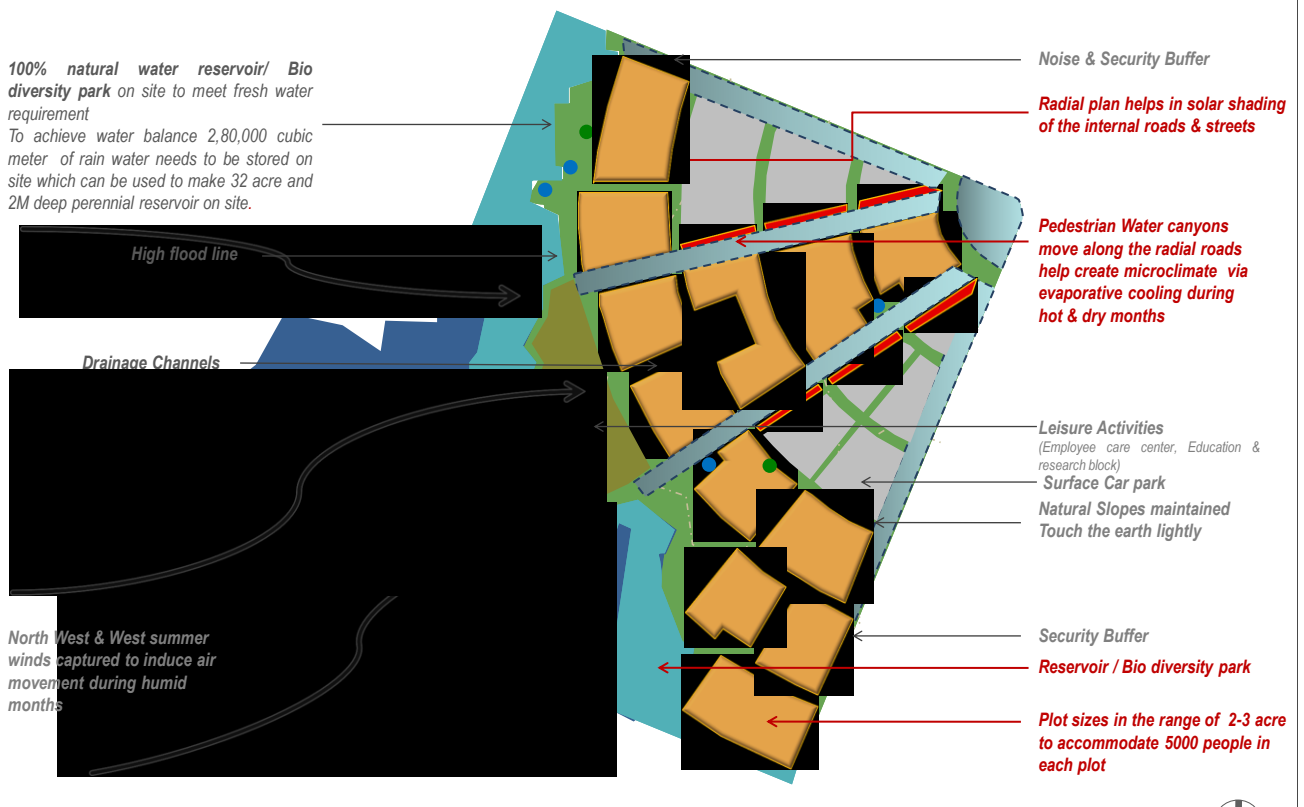
delhi : n-85b, panchsheel park, new delhi-110017 I tel: +91 11 41828070 I fax: +91 11 26490351
email studio@morphogenesis.org I www.morphogenesis.org

fact file ::

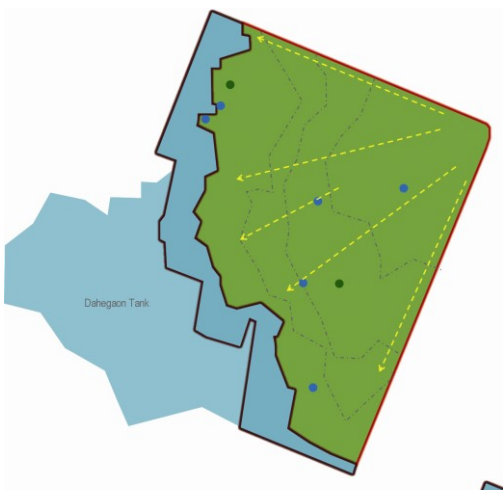
Area :: 142 Acres
Climate :: Composite
Client :: Infosys Ltd
Year of Completion :: In progress

Campus for Infosys Ltd.
Mihan, Nagpur

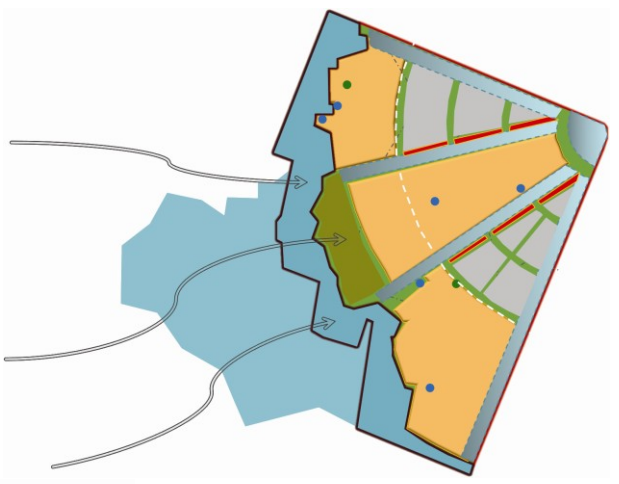
Masterplan: Schematic land use master plan



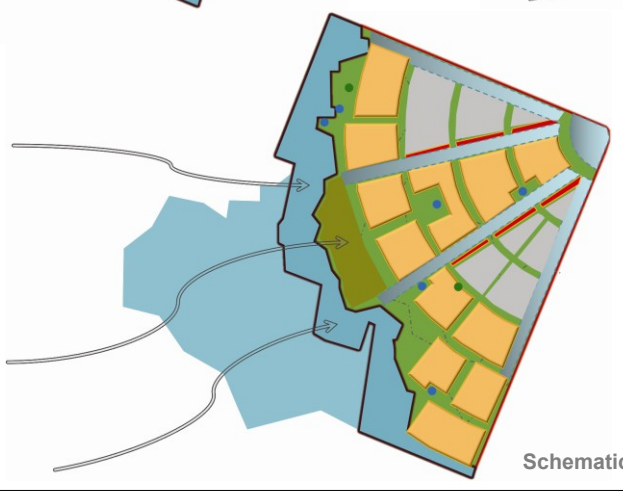
Concept: Masterplan



Natural Drainage



Wind Movement



Schematic land-use plan

Design Proposal: Masterplan

Targets achieved

Target Population = **60000 minimum**

Ground coverage **< 40%**

Site area under native trees on site **> 33%**

Total tree cover on site (including roads) **> 60%**

Energy Performance Index (EPI) **< 80 KWh / sq. m / Year**

Maximum Solar heat gain: **< 1.1 W / sq. ft. of BUA**

90 % building floor plate is day -lit, uniformity ratio **> 0.6,** glare free office space

Office Floor efficiency **< 100 sq.ft per person of built up area**

Tree plantation along the plot boundaries

Shaded 8M fire – driveway abuts all sides of buildings on site

Buildings placed strategically to create wind-tunnel effects and street shading

External services integrated with roads and open spaces

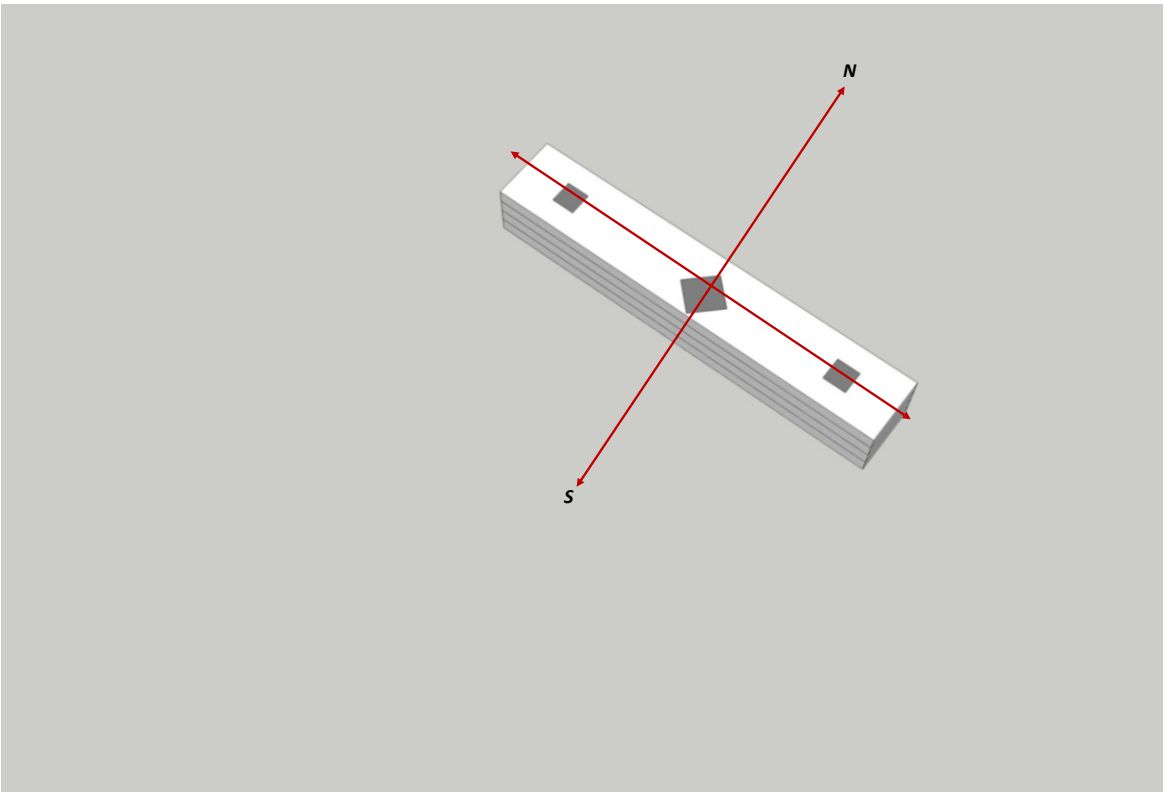
No workstations abut the external wall; Workstations oriented perpendicular to the external wall with monitors facing away from the windows.

Envelope optimization

LAND ALLOCATION SUMMARY	
Water reservoir:	***32 acre***
12 SDB plots:	***36 acre***
Surface parking:	***16 acre***
Multilevel parking:	***16 acre***
Road & Forest	***42 acre***
TOTAL:	***142 acre***

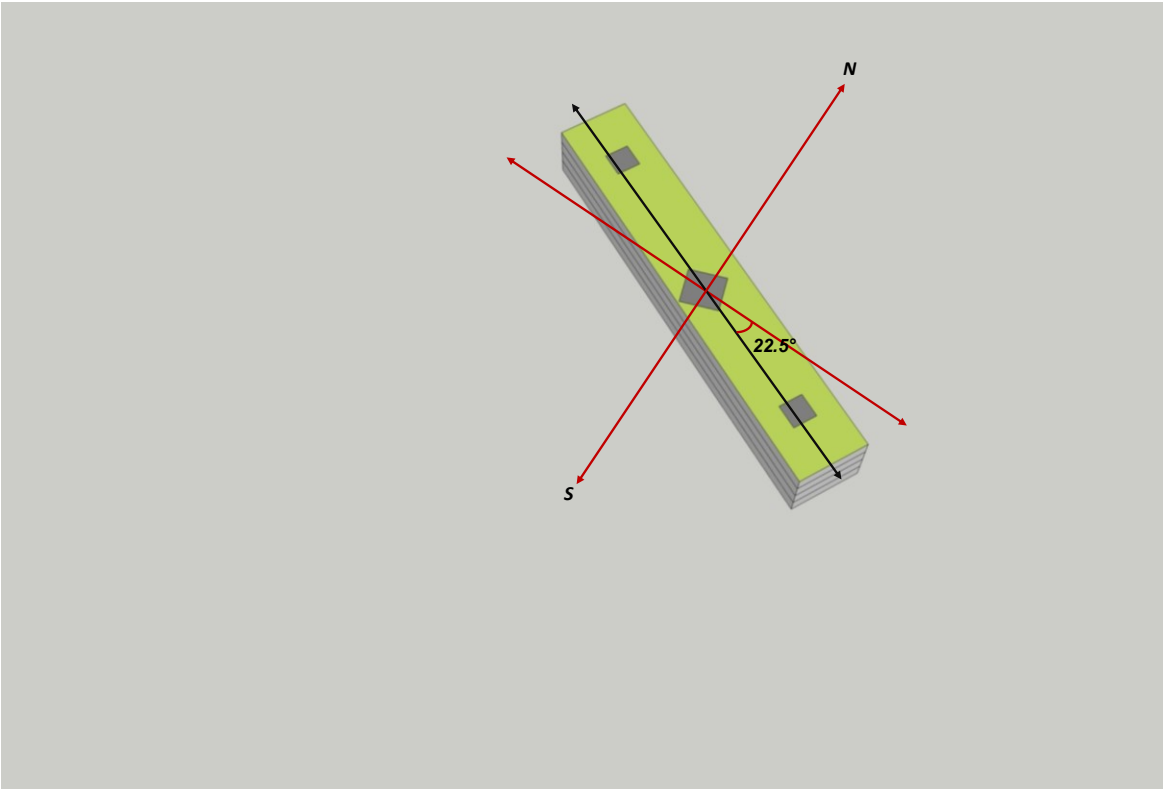
Concept: Building Strategy

Morphology



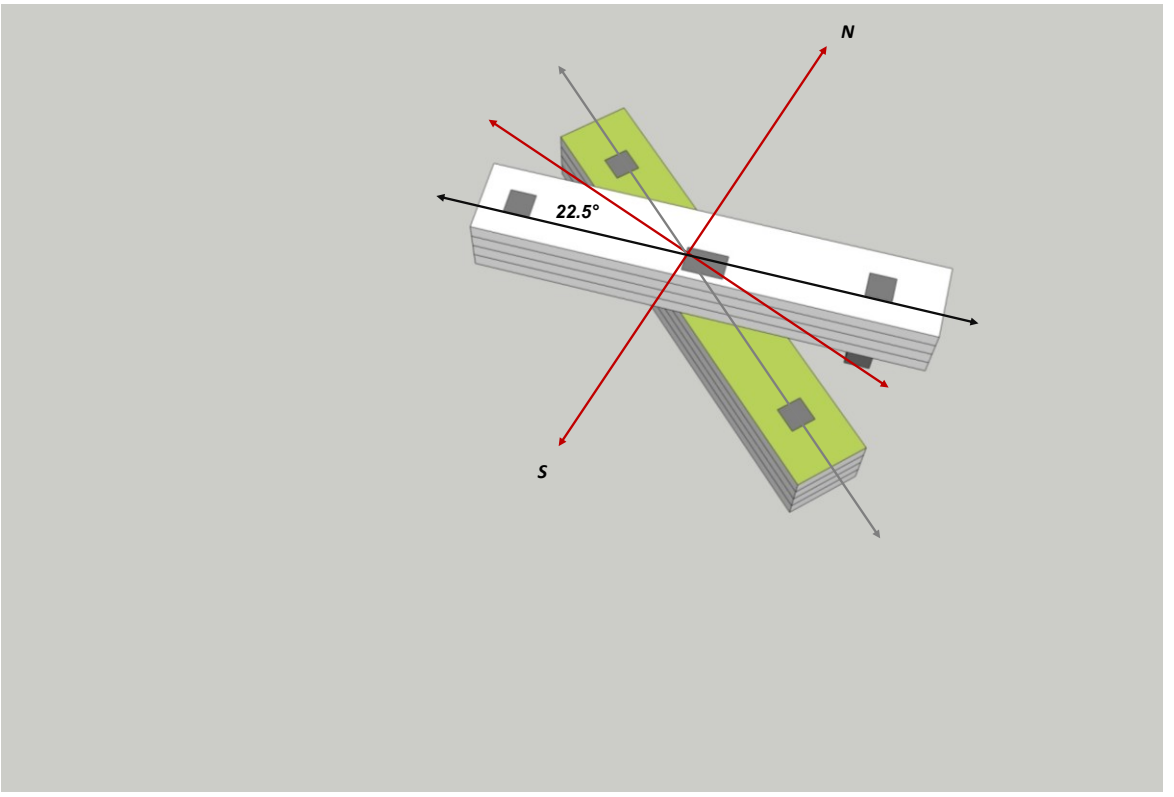
Concept: Building Strategy

Morphology



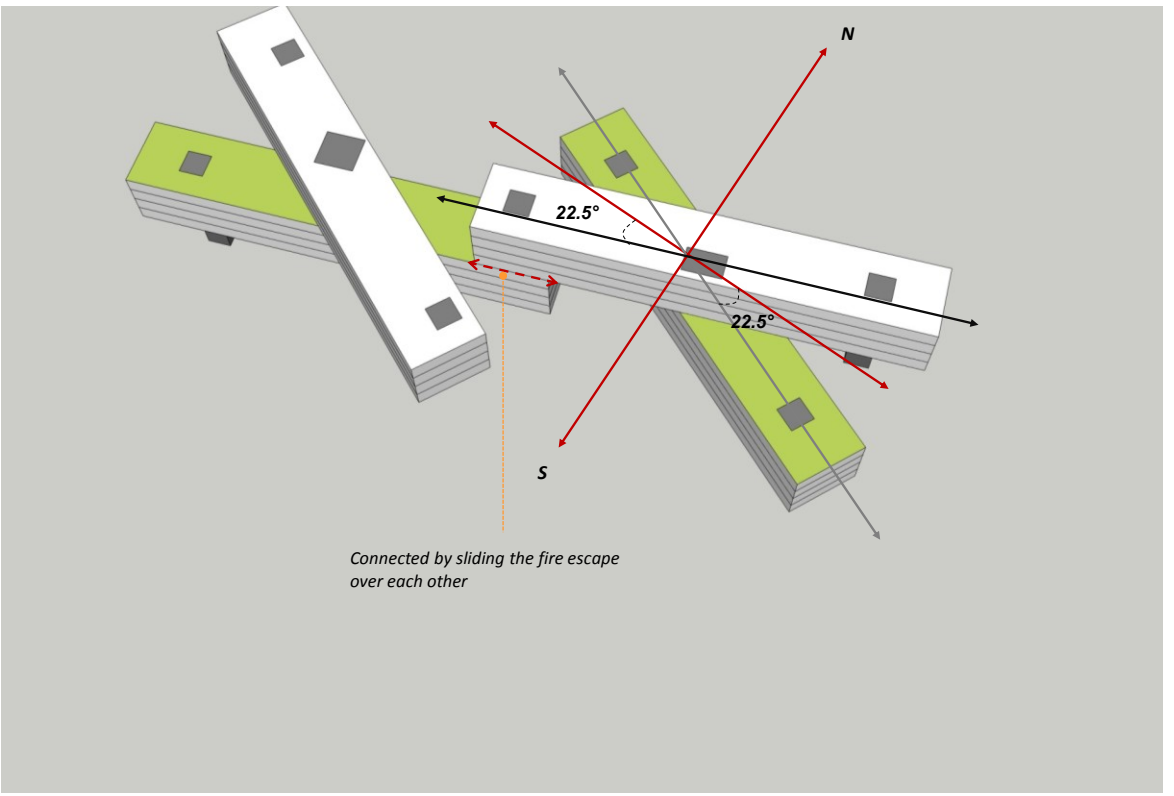
Concept: Building Strategy

Morphology



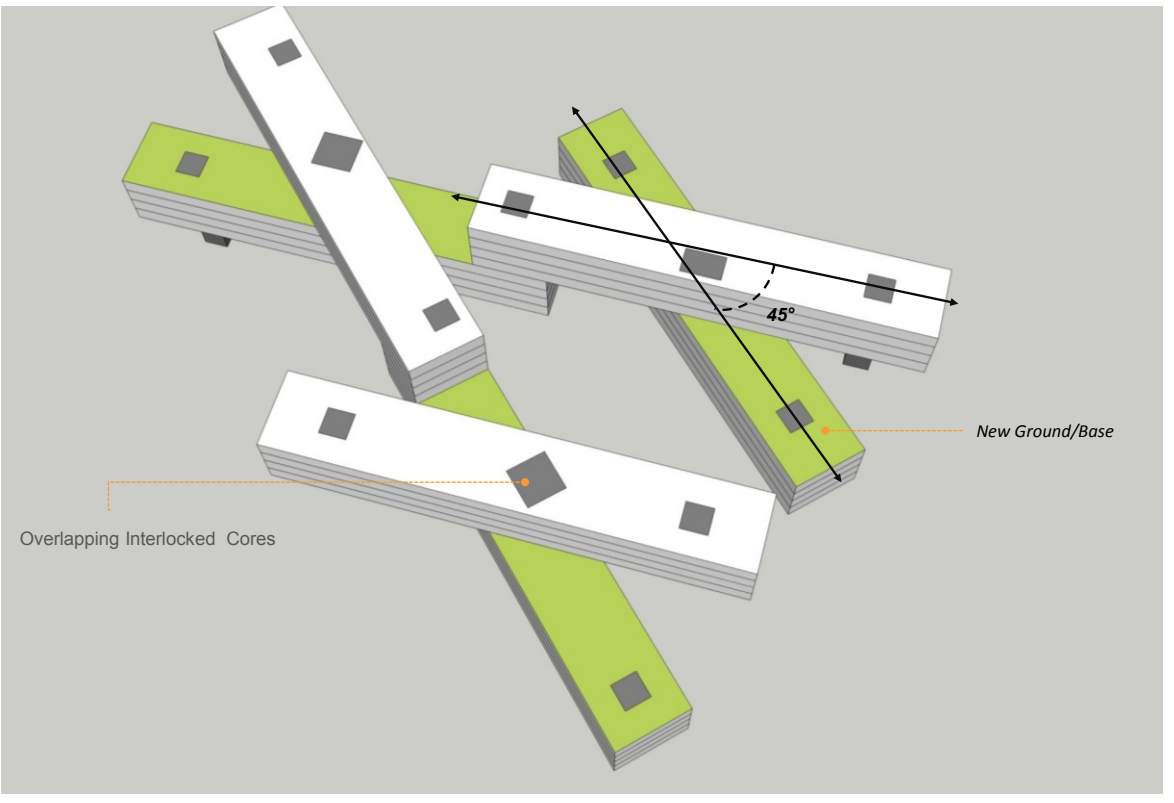
Concept: Building Strategy

Morphology



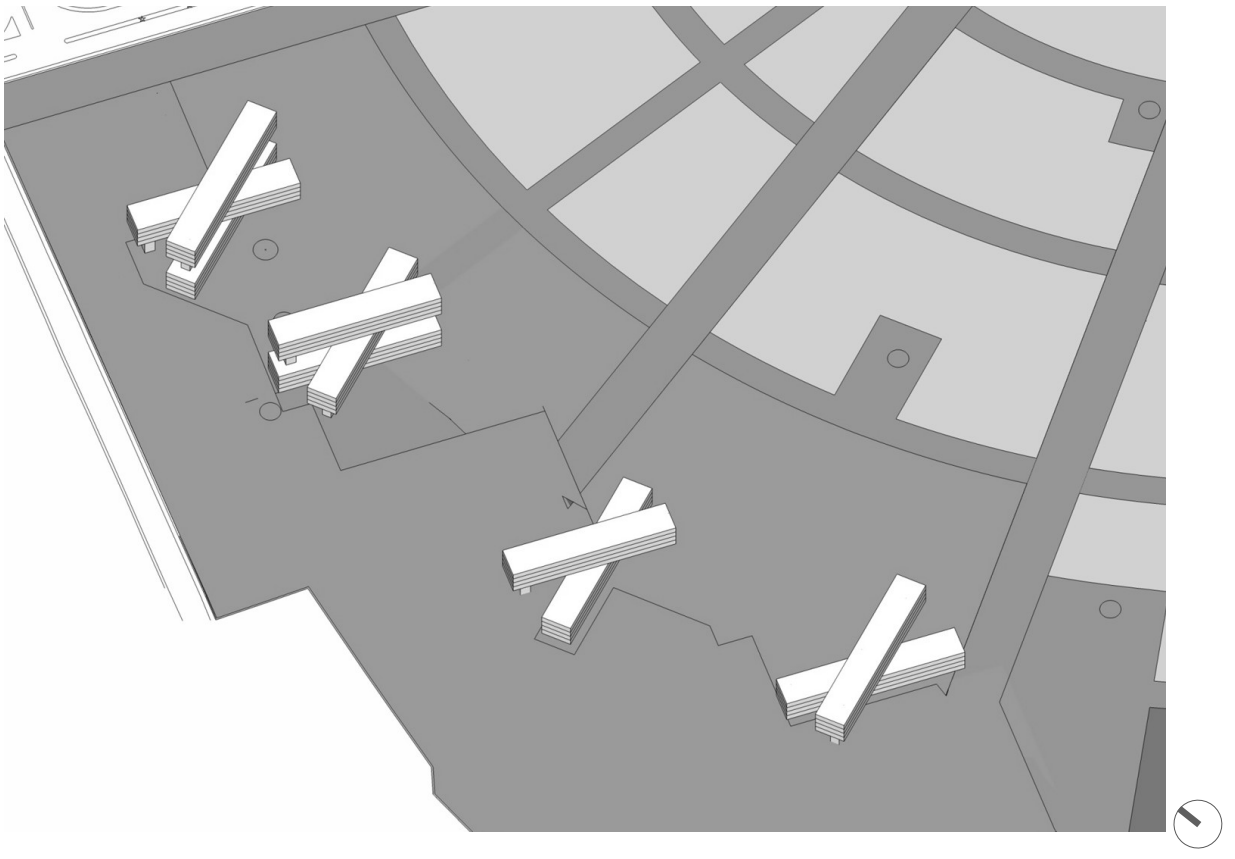
Concept: Building Strategy

Morphology



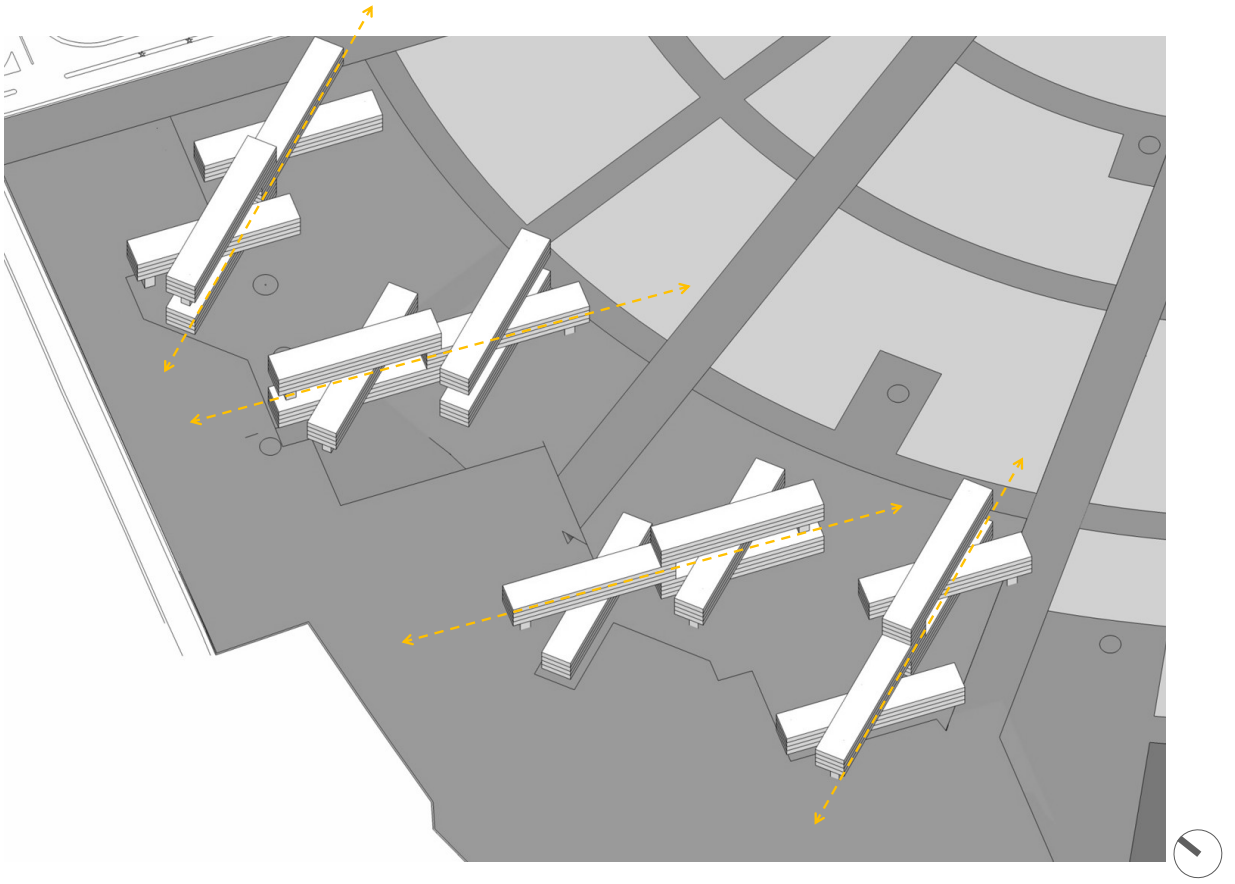
Concept: Building Strategy

Phase I and Phase II configuration



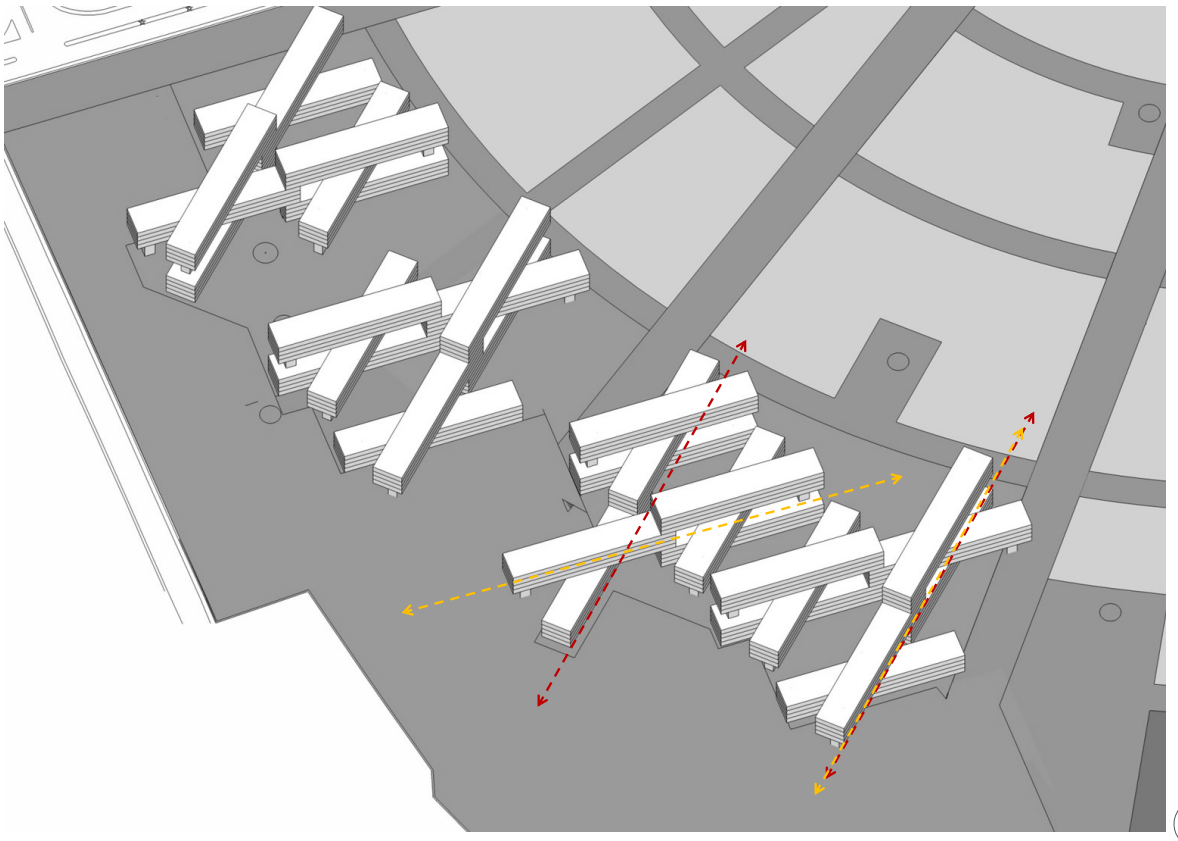
Concept: Building Strategy

Phase I and Phase II configuration



Concept: Building Strategy

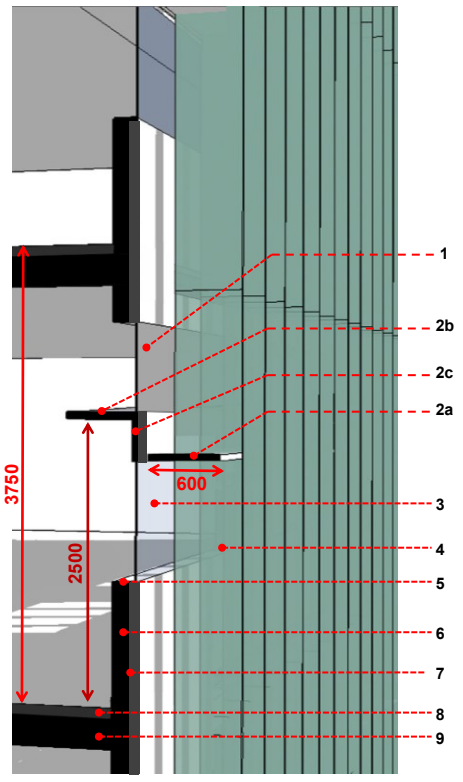
Phase I and Phase II configuration



Shading System: South façade (SSW,SSE)

Façade system with vertical fins for shading

600 deep vertical fins @ 600 c/c and 600 deep horizontal fin @ 2100



Legend

1. Daylight Window
(SKN: 154, frosted, LT: 40% (unobstructed floorplates), 50% (obstructed floorplates)

2a. 600mm deep solar shade@2100

2b. 600mm deep internal light shelf @2500

2c. 400mm Opaque panel (75mm THK insulated)

3. Vision Window (SKN: 154)

4. Vertical shading device 600mm deep @ 600mm c/c

5. RCC sill (To be detailed)

6. Concrete block single wall (200mm THK)

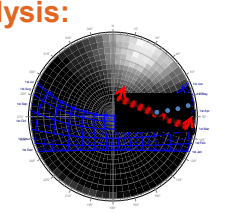
7. 100mm THK exterior insulation + plaster + paint

8. 75mm floor finish (including 12mm vitrified tile, screed and raceways

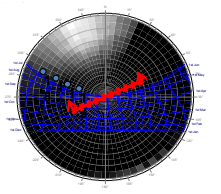
9. RCC slab– 250 mm thickness assumed (to be confirmed by LERA)

Shading Analysis:

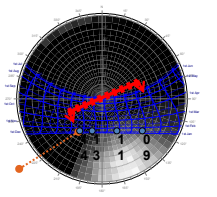
Total shading effect



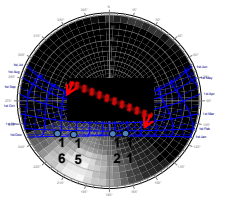
NNE Facade



NNW Facade



SSE Facade



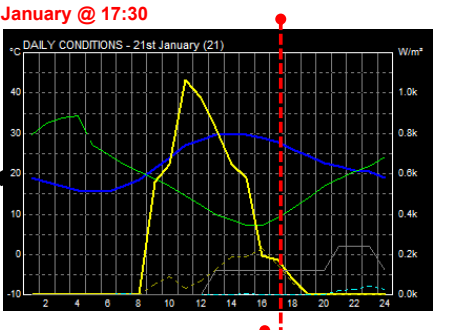
SSW Facade

Glare Analysis: Summary

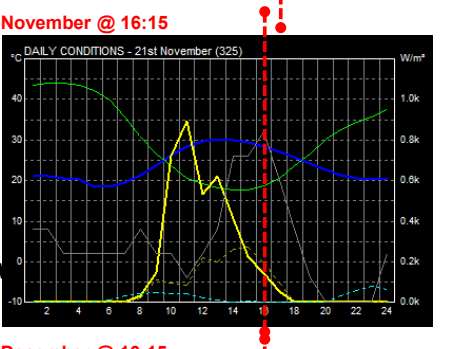
The intensity of direct solar radiation during times of GLARE is very low

Applicable Months	Average Temp (Max and Min)	N, NE +157.5	N, NW -157.5	S,SE +22.5	S,SW -22.5
Jan		-	-	-	17:00 to 17:30
Feb		-	-	-	-
March		-	-	-	-
April		-	-	-	-
May		-	-	-	-
June		-	-	-	-
July		-	-	-	-
August		-	-	-	-
September		-	-	-	-
October		-	-	-	-
November		-	-	-	16:15 to 17:30
December		-	-	-	16:15 to 17:30

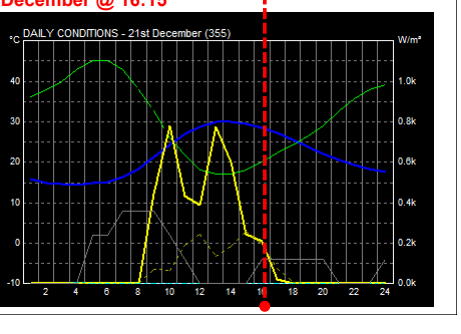
January @ 17:30

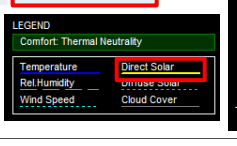


November @ 16:15



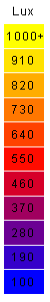
December @ 16:15

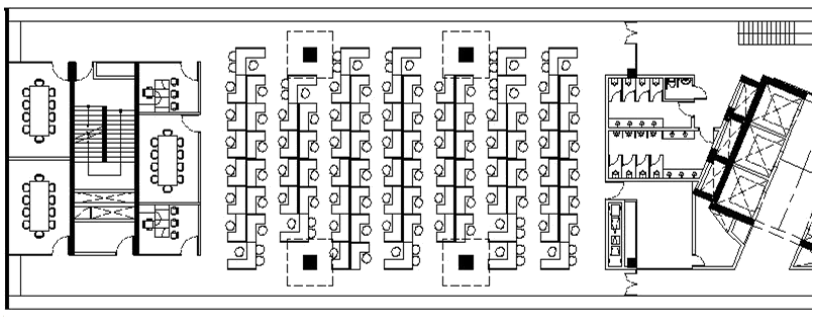




Day-lighting Analysis: Top Floor _ NNE-SSW

Using Ecotect with Radiance

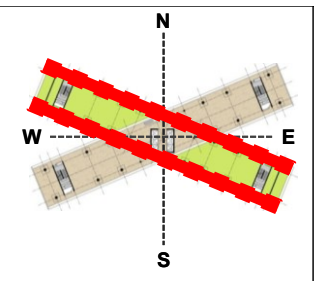


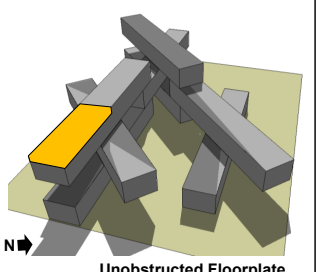


Sep 21st 0900hrs

External surface reflectance : 0.70
Terrace reflectance : 0.90
Ground reflectance : 0.75

Contour Band	Within		Above	
(from-to)	Pts	(%)	Pts	(%)
130-200	0	0.00	558	100.00
200-270	0	0.00	558	100.00
270-340	28	5.02	558	100.00
340-410	146	26.16	530	94.98
410-480	91	16.31	384	68.82
480-550	70	12.54	293	52.51
550-620	50	8.96	223	39.96
620-690	32	5.73	173	31.00
690-760	31	5.56	141	25.27
760-830	22	3.94	110	19.71
830-900	17	3.05	88	15.77
900-970	18	3.23	71	12.72
970-1040	13	2.33	53	9.50





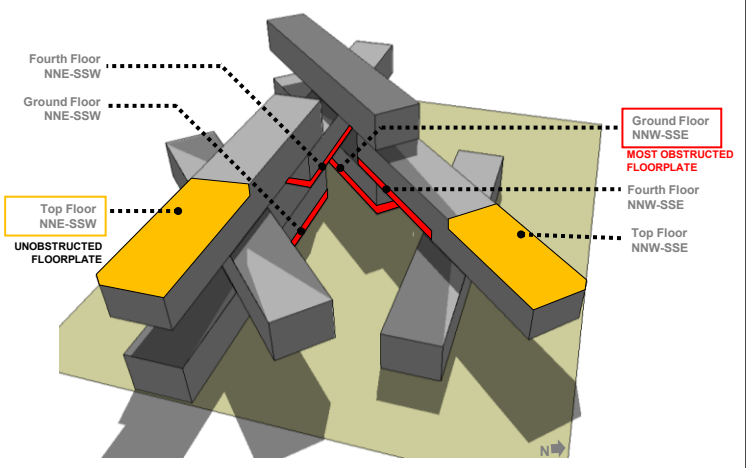
Unobstructed Floorplate

Range
100% of space between 270lux & 5400lux

Day-lighting Analysis: Summary

Overall Daylight Availability

Floor	Orientation	Time	% above 200 lux	% above 270 lux
Ground Floor	NNE-SSW	9:00	100.0	100.0
		15:00	100.0	100.0
	NNW-SSE	9:00	95.7	67.4
		15:00	98.8	76.0
Fourth Floor	NNE-SSW	9:00	100.0	94.6
		15:00	100.0	96.2
	NNW-SSE	9:00	100.0	86.4
		15:00	100.0	73.6
Top Floor	NNE-SSW	9:00	100.0	100.0
		15:00	100.0	100.0
	NNW-SSE	9:00	99.2	99.2
		15:00	100.0	99.2
Average Illuminance across the Building			99.5%	91.1%



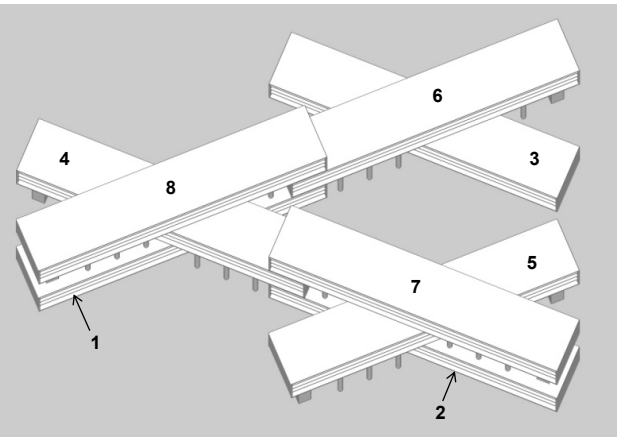
Thermal Efficiency Analysis

Heat Gain Calculations

Date: 23rd May (Hottest day of the year) : insolation values @ 3pm		
External Temperature		45 °C
Internal (Operative) Temperature		23 °C

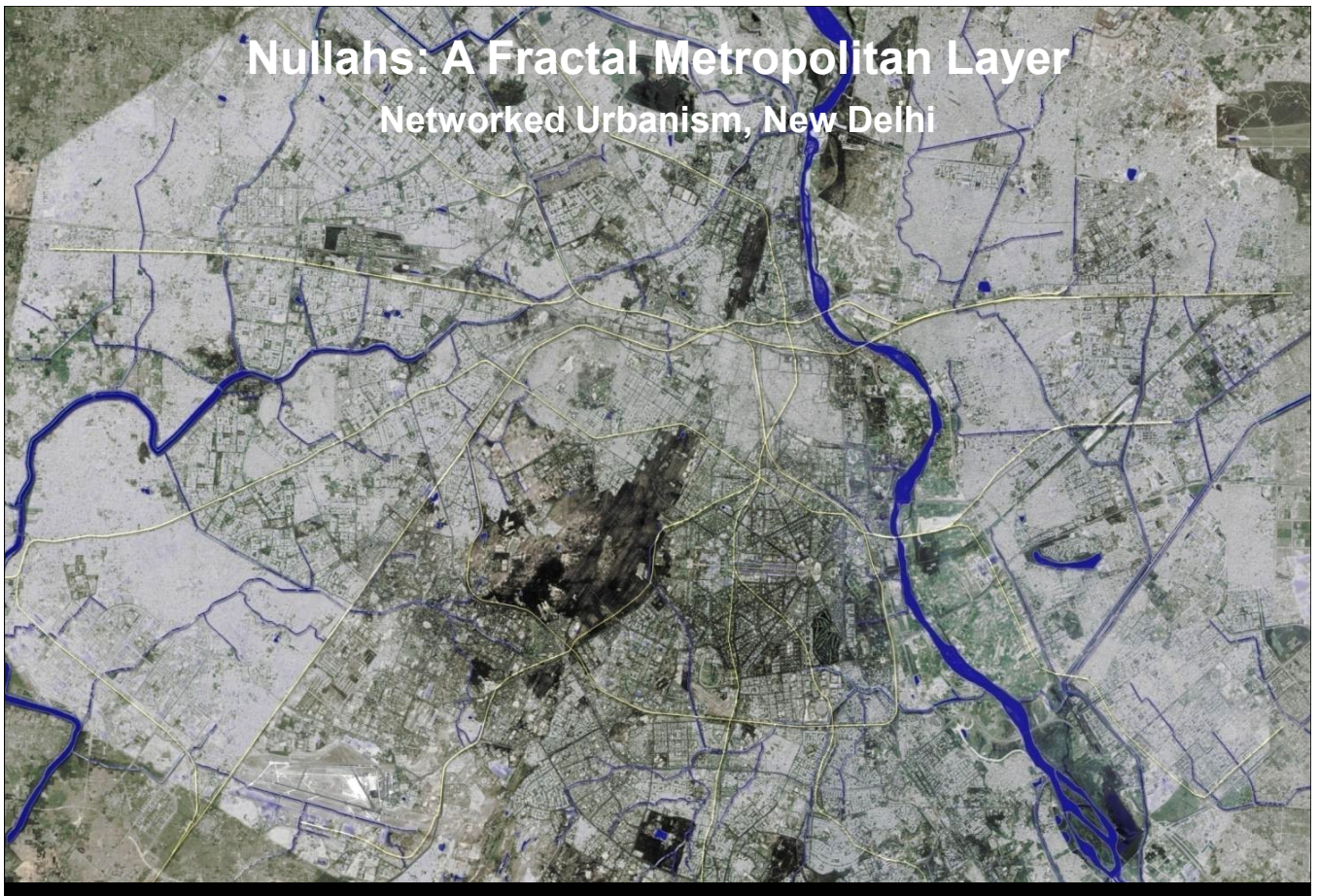
Dimensions of single floor-plate		
Length		105.6 m
Width		18.35 m
Height		3.75 m
wall area (shorter)		68.8 m2
wall area (longer)		396.0 m2
Roof Area		1937.8 m2
Floorplate (without cores)		1192.0 m2

Glazing details		
Area of daylight panel		1.4 m2
Area of vision panel	(north)	3.5 m2
	(south)	2.5
Area of window	(north)	4.9 m2
	(south)	4.0
no. of windows on one façade		24.0
Glazing area on north façade		118.1 m2
Glazing area on south façade		95.0 m2
WWR (north)		**25.4%**
WWR (south)		**20.4%**



Summary-Peak Load Calculation (W/sq.ft.)

Level	Block No.	Orientation	Bottom floor	Lower mid flr.	Upper mid flr.	Top floor	Average Efficiency
Top Level (3 blocks)	8	NNW / SSE	0.96	0.60	0.60	1.22	**0.85** W/sq.ft
	7	NNE / SSW	0.99	0.64	0.64	1.25	**0.88** W/sq.ft
	6	NNW / SSE	0.94	0.58	0.58	1.06	**0.79** W/sq.ft
Mid Level (2 blocks)	5	NNW / SSE	0.92	0.56	0.56	0.95	**0.75** W/sq.ft
	4	NNE / SSW	0.95	0.60	0.60	0.98	**0.78** W/sq.ft
Gd. Lvl. (3 blocks)	3	NNE / SSW	0.96	0.61	0.61	0.99	**0.79** W/sq.ft
	2	NNE / SSW	0.94	0.58	0.58	0.96	**0.76** W/sq.ft
	1	NNW / SSE	0.92	0.56	0.56	0.94	**0.74** W/sq.ft
						Average efficiency of SDB (8 blocks) =	**0.79 W/sq.ft**


Nullahs: A Fractal Metropolitan Layer
Networked Urbanism, New Delhi
Transform Delhi's 350km of contiguous drainage network into a sustainable urban blueprint
© morphogenesis

Traffic and Transportation

1,100 new vehicles are added to the roads each day and that number is only predicted to increase with the arrival of the Nano car.[12]

Due to heavy rush hour traffic jams the average velocity of cars is less than 30km/hr [13]

85 Private cars per 1000 people (Car Density is 10 times the national average) [14]

Pollution (Air and Noise)

Delhi was ranked 2nd most polluted city in the world in 2004 despite a complete shift to clean fuel for buses and taxis. [15]

The share of vehicular pollution has increased from 64% to 72% in the last decade.[16]

Although stringent permissible noise level regulation has been set by the CPCB, noise levels exceed limits almost everywhere in the city. [17]

Pedestrian Accessibility

Due to poor planning there has been a sharp decline in pedestrian accessibility over 415 traffic intersections in the Capital do not have zebra crossings [18]

Children and elderly are most affected by the unsafe roads and in 2008 more than 980 pedestrians were killed by traffic. [19]

The invasion of cars has also meant a 60% reduction in bicycles[6] on the road in less than 20 years. [20]

The last Mile problem still remains unresolved.

Water

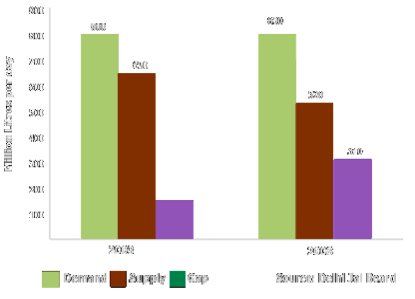
In many areas of the city the groundwater table
is depleted up to 20 –30 m. [25]

On average there is a shortage of 1290 million
liters of water per day. [26]

18 main nullahs with over 15,000 branches constructed 7 centuries ago by the Tughlaks for irrigation and drainage now lie filled with sewage from illegal inhabitations [27]

Delhi's loses about 45% of its total water production through leakages in pipes. [28]

Most of the 916 lakes, ponds, and reservoirs reported to have existed in the city have been depleted. [29]



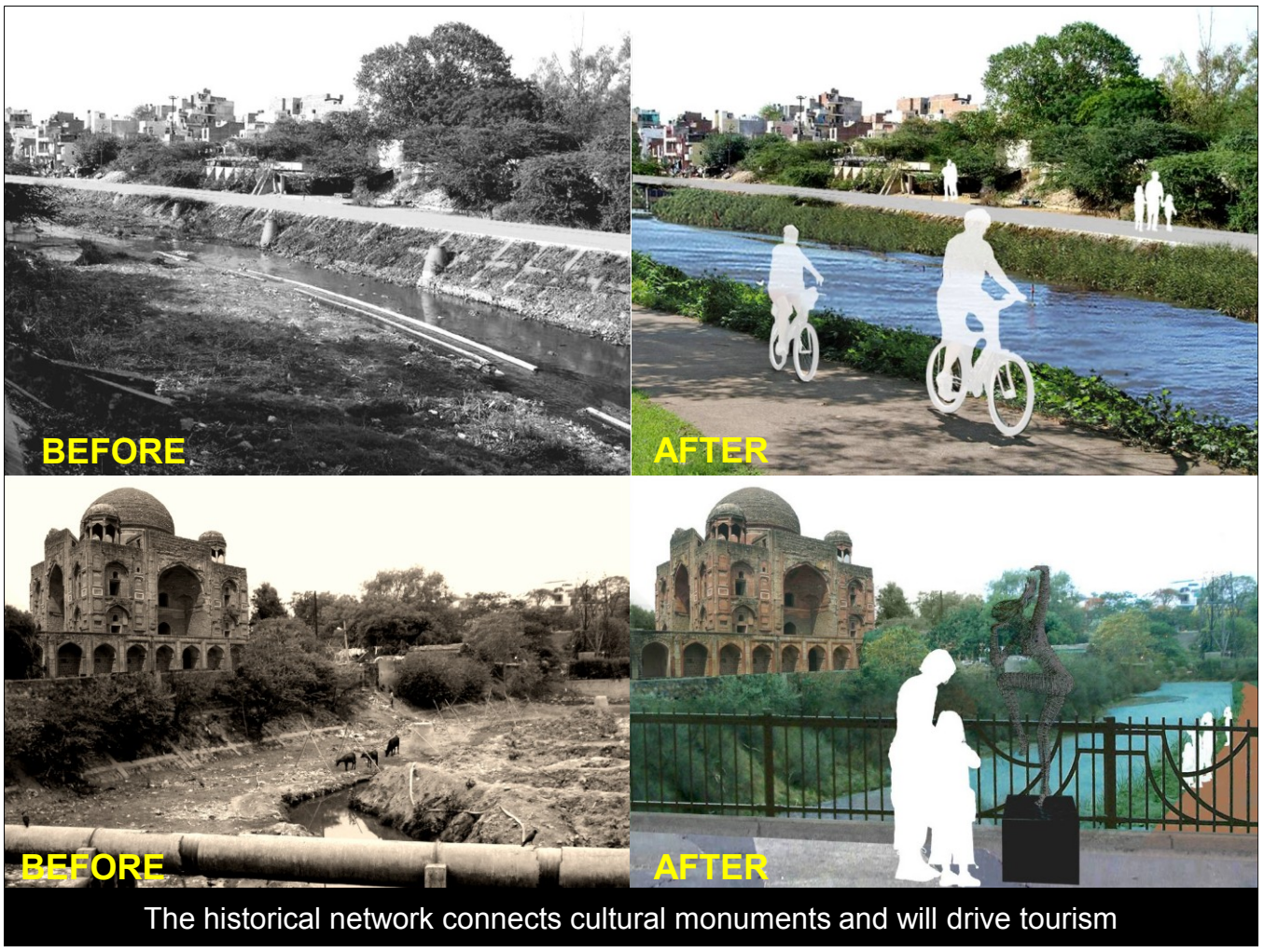
Sewage

17 sewage drains empty into the Yamuna river untreated. [21]

A report by the CPCB indicates that about 73 per cent of Delhi's STPs are functioning below design capacity. [22]

Almost 50 per cent of Delhi generates 'illegal' sewage because most illegal colonies do not have a sewage system.[23]

Out of the 48 embankments, baolis, and tanks constructed in the Tughlaq era, none are being used for recharging water. [24]



The historical network connects cultural monuments and will drive tourism

It’s time to claim it back and use it to develop a better city

ALL THAT MATTERS

SUNDAY TIMES OF INDIA, NEW DELHI
MAY 31, 2009

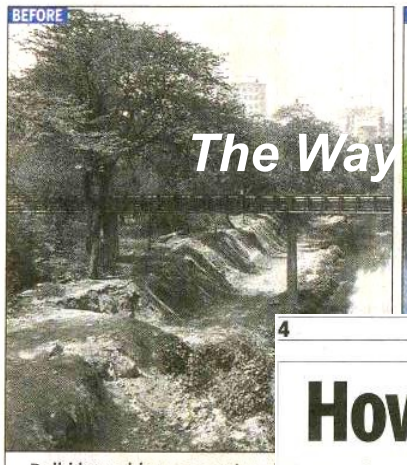
Delhi's nullahs: Way to go for India

COMMON CAUSE

MANIT RASTOGI

Delhi needs change. As inhabitants, we demand it. We need to claim our city back and be stakeholders. We live in one of the largest metropolises in the world today but probably have the most limited sphere of engagement with our city compared to anywhere else. Decades of mindless growth have made Delhi a primarily vehicular city. Attempts to provide for pedestrians or cyclists are usually aimed at forcing them to move on the margins of the smoke-spewing traffic, usually on broken or non-existent pavements. Delhi has nearly six million cars today — more than the other three metros put together. Yet, the national capital continues to add more than 1,000 cars to its roads every day. In 1985, cyclists were 60% of the traffic flow; today they are just 4%. Nearly 2,000 pedestrians die every year on the roads of Delhi. Most of them are children.

This is why it is time we claimed the forgotten and derelict lands of Delhi to create green lungs that would create an alternative ecologically sustainable Delhi. Typically, these lands are *nullahs*, miles of garbage-covered embankments, back alleys, setbacks and buffer zones. Paradoxically, Delhi has a big green network of forests and parks and 18 main *nullahs* with



Delhi has a big green networ
15,000 branches, which were
drainage. These *nullahs*

These *nullahs* now lie useless, filled with sewage from illegal colonies. Similarly, Delhi's embankments have become dumping grounds and breeding sites for disease.

The government's solution is to cover the *nullah* with concrete slabs, chop down the magnificent trees around embankments and install Rs 1,500-crore worth of massive sewage treatment plants on the Yamuna riv-

The Way Forward

social, cultural, natural and historical heritage of the city. This includes thousands of monuments that now sit pathetically vandalized, neglected and like islands in parts of the city.

- Immediately stop slabbing over *nullahs*. Today, the Commonwealth Games are being used as an excuse to create more parking by slabbing over these nullahs or to simply hide the mess, literally. Instead, we should be restoring and cleaning the *nullahs* to turn them into a key tourist attraction — a safe pedestrian network across Delhi, linking key socio-cultural sites and revealing a side

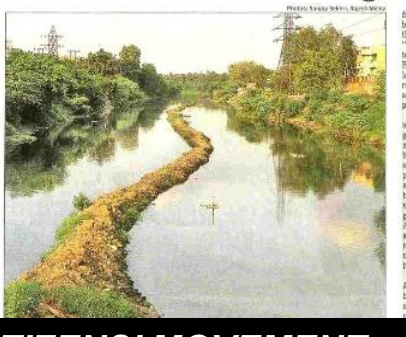
4 TIMES CITY

How drains can yield twin

A group of NGOs says that by treating waste locally, the city can make its drains clean as well as cut down pollution in Yamuna by 80%

Rumu Banerjee | TNN

It could turn out to be the perfect solution for the Yamuna's increasing pollution whilst providing the capital with a sustainable urban development strategy



fone. Says Anupam Yog of Urban Habitat Forum, an arm of the India Habitat Centre, "There have been several attempts to clean the Yamuna. But this time, we have tried to look at a holistic solution, rather than just aiming for an aesthetic or beautification project."

Yog admits that a lot needs to be done before the project can get off the ground. "A physical mapping of the drains, followed by a feasibility report is needed before we can have a detailed project report," adds Yog. That's why the group is hoping that both the government and private enterprises can get together to launch the project. Adds Rastogi, "We have started a public petition as a public outreach programme. Once this is underway, there should be positive response to the project."

The advantages are many. As per the proposal, the cleaning of the nullahs is only a part of the plan. Thereafter, native

Shower
water o

Ruhi Bhasin | TNN

New Delhi: The idea was to co
eyesores that are Delhi's drain
the recent rain almost washed
such ambitions. The ongoing
covering Kushak and Sunheri n
led to flooding in Lodhi Colony
pura etc. Similarly, the Defence
nullah — which is also being
— overflowed.

MCD is constructing perki
cilities for 700 buses for the
monwealth Games by co
Kushak and Sunheri nullahs a
of Rs 8.25 crore. This stretch h
used as a road after that.

There are around 18 storm
drains in the city and MCD spe
50 crore cleaning them. Accord
urban planners, these drains we
lier water channels leading fr
Ridge in the east. Urban villa

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A PROFESSIONAL CITIZENS' MOVEMENT

Delhi Nullahs- The Success Story Today

4 TIMES CITY

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OPEN DRAINS TO MAKE WAY FOR ECO CORRIDORS

Non-Motorized Transportation Project To Develop Areas Along Drains As Recreational Public Spaces & Special Corridors For Cycling And Walking

Neha Lalchandani | TNN

New Delhi: Think of the drain behind your house, the eyesore of the colony which is usually lined with garbage, stray cattle and dogs, and stinks so much that one would not venture near it. Now imagine a tree- lined canal, an open public space that has people walking and cycling along the gently gushing water. The idea may sound ambitious but the Delhi government has plans to convert several of the city's larger drains into eco-corridors: areas that will be used extensively as non-motorized stretches and connect colonies to the BRT corridor, Metro stations and bus stops.

The non-motorized transportation (NMT) eco-corridor project will be incorporated into DDA's master plan and has been prepared by UTTIPEC. The project has two components — developing areas along drains as recreational public spaces and developing a road network that includes special corridors for cycling and walking. "We have to shift focus from traffic planning to mobility planning. However, the development of recreational areas is entirely dependent on the cleaning of the drains. The project has been around for ages but if it has to work the government needs to take a holistic view of it and carry out all works together," said an official.

The project aims to tackle open drains and bring down traffic congestion, which is the prime reason for Delhi's rising pollution problems. "Among the proposals we have already mulled are connecting Nizamuddin Railway Station and ISBT to Jungpura Metro Station. The existing open drain behind Nizamuddin that passes by Jungpura is an ideal location to develop NMT. The other stretch is from Sheikh Sarai to Moolchand Metro station. This will also provide connectivity from the Saket malls to GK-I. The project along the Barapullah drain is the most extensive and will provide an interface with existing modes of public transport," said UTTIPEC director Ashok Bhattacharjee.

The UTTIPEC project aims to tackle open drains and bring down traffic congestion: a prime reason for rising pollution in Delhi

"We have a cycle sharing system along the BRT corridor but one reason it failed was the insufficient number of stations to park. Development of sufficient infrastructure is a priority. A sizeable number of cycle parking points, convenient hiring systems, accessible locations and dedicated paths even along the main roads need to be put in place. The cycle tracks need to become transit routes, between colonies, within colonies and between colonies and public transport points," said a source.

The environment department, too, has been promoting the project. "By encouraging walking and cycling, we will be able to tackle congestion, bring down pollution, create open public spaces and deal with the problem of untreated sewage," said an environment department official.

Successful Models Around The World

Paris Velibs are self-service bikes available 24/7. It was launched in 2007 and has 16,000 bicycles

Toronto Pedicabs are bicycle-drawn carriages that don't get stuck in traffic due to their compact size

Japan Kyoto was the first city to run Velocabs, which first made their appearance in Germany in the 1990s

For Non-Motorized Transportation

- The Barapullah drain corridor could be a candidate for a new NMT corridor for the city
- The SDG project already has provisions of a walking and cycling track which could be upgraded to a proper NMT corridor
- The cycle-on-hire concept has cycle on hire already been incorporated in SDG and the various access facilities have bike stations
- The 'Solecykshaw' concept could be incorporated on the lines of the free to rideVelo taxi ride Velo-taxi
- Both these models have already been demonstrated as being economically sustainable

Interface with the existing public transportation systems

Pedestrian Trail connections to metro stations: Pragati Maidan, AIIMS, Saket, Lodhi Colony, J N Stadium, Moolchand, Kailash Colony, Nehru Place & Qutab Minar

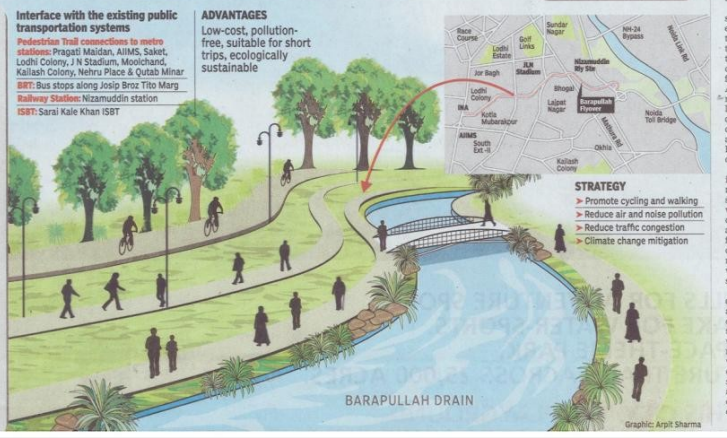
BRT: Bus stops along Josip Broz Tito Marg

Railway Station: Nizamuddin station

ISBT: Sarai Kale Khan ISBT

ADVANTAGES

Low-cost, pollution-free, suitable for short trips, ecologically sustainable



STRATEGY

- Promote cycling and walking
- Reduce air and noise pollution
- Reduce traffic congestion
- Climate change mitigation

'Covering drains is a worse move'

UTTIPEC Says It Would Stop Natural Treatment Of Sewage

Neha Lalchandani | TNN

New Delhi: DDA has been on a drain covering spree, but UTTIPEC says space utilization has been the worst. Instead, developing it aesthetically, treating the sewage and creating cycling and walking paths along the drains would be a much better approach.

"Covering drains opens up some space and covers up an eyesore, but a better utilization would actually happen if the sewage was treated. Once the drain is covered up, the civic agencies are likely to forget about the problem. Also, sewage undergoes natural treatment through sunlight and aeration in an open drain. Once it is covered, the chances of it raising a stink actually go up," said UTTIPEC director Ashok Bhattacharjee.

UTTIPEC's Non-Motorized Transportation Eco Corridor plan says, "Concrete slab effectively stops groundwater recharge and the slab cover over the nullah shall aggravate the 'heat island' effect." Water has a natural cooling effect on its surroundings: an advantage that will be lost during Delhi's searing summer.

The project also says desilting the drains once they are covered would become an expensive and cumbersome task. Such cleaning, it says, will "require super suction machines" since cranes etc would no longer be able to access the sewage. "The sewage shall be deprived of sunlight and oxygen, creating septic conditions, increase the river's pollution load," it adds.

Officials suggest the sewage should be treated and the channel reused as a parkway. "Instead of making everything into a concrete jungle, the area could be developed as a green belt and a linking route for NMT users from one public transport point to another," said a source.

The Defence Colony drain, on which work is still on, has left residents quite unhappy. "Since work on covering the drain has started, sewage has started backflowing in our bathrooms. The stench has also increased," said AP Singh, a resident.

Implications of covering drains

1. Environmentally bad decision as the problem gets 'out of sight out of mind' and situation worsens
2. The concrete slab effectively stops groundwater recharge
3. The slab cover over the nullah shall aggravate the 'heat island' effect
4. The siltation in the drain shall become difficult and more expensive to manage and would require specialized super suction machines
5. The sewage being carried by the drain shall be deprived of sunlight and oxygen, creating septic conditions and effectively increase the pollution load on the river

THE FRACTAL METROPILITAN LAYER. ART+DESIGN Exhibition. Stainless Gallery, New Delhi, India.