Conceptual Plan for Development of Data Center for Microsoft at HYD 01 Natco Site, Nandigama, Telangana

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Table of Contents

Conceptual Plan

1. Introduction

Microsoft Corporation (India) Private Limited is a software company with headquarters in Mumbai. It is planning to develop a new Data Center at HYD 01, located at Mekaguda village, Nandigama, Rangareddy district in Telangana. A Data Center is a facility that centralizes an organization's shared IT operations and equipment for the purpose of storing, processing, and disseminating data and applications.

The proposed project is a greenfield site involving construction of new buildings within a plot area of 87,412 Sq. m. The land-use of the proposed site is “Manufacturing Use Zone” under the jurisdiction of Hyderabad Metropolitan Development Authority (HMDA).

The Build-up area of the site is 63,016 Sq. m and as per the EIA notification dated 14th September 2006 as amended to date, the project having built-up area more than 20,000 Sq. m falls under Item 8(a): Building and Construction Projects and requires prior Environmental Clearance from State Environmental Impact Assessment Authority (SEIAA).

2. Project Location and Site Plan

The Site coordinate for the proposed Data Center at Mekaguda Village is 17°05'07.8"N (latitude), 78°16'41.6"E (longitude) while the boundary coordinates are 78°16'37.03"E 17° 5'14.86"N, 78°16'49.79"E 17° 5'14.05"N, 78°16'50.13"E 17° 5'11.16"N, 78°16'43.92"E 17° 5'11.05"N, 78°16'44.76"E 17° 5'9.11"N, 78°16'43.98"E 17° 5'8.71"N, 78°16'46.51"E 17° 5'2.37"N and 78°16'38.86"E 17° 5'3.28"N. The location of the Data Center (HYD01) is presented in Figure 1.

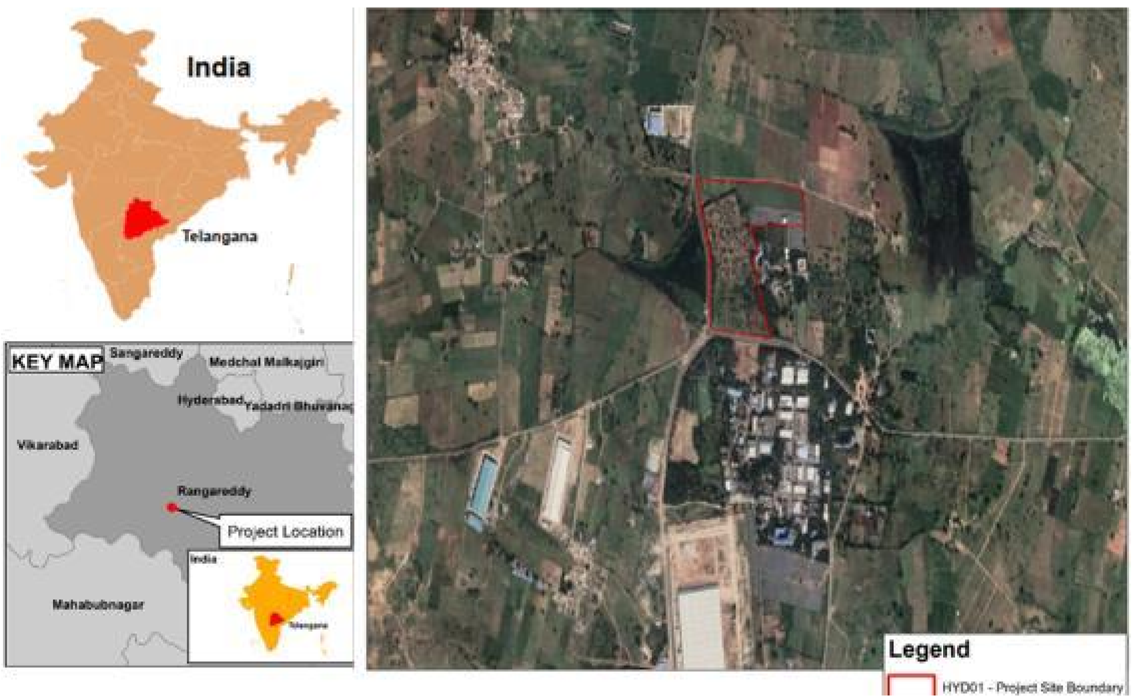

Figure 1. Location of the Data Center (HYD01)

The proposed Site is located on a relatively flat area, sloping gently to the west and is approximately 632 meters above mean sea level (msl). As per the Earthquake code IS 1893-2016, Telangana falls under Zone II Seismic Zone, i.e: Low Damage Risk Zone.

The proposed Site is well connected to the road and rail network with an approximately 15±20 mins driveway while Hyderabad City is approx. 30 km towards the Northern of the project Site. Proposed Site can be accessed from the Western and Southern through exiting road while as per the Master Plan of the area there is a third road proposed on the Northern side of Plot.

Roads: The Site is connected to NH 44 (Kurnool Road) through the road on the west of the plot.

Railway: The nearest railway stations is Kothur located 7 km to the North from the site boundary.

Airport: Rajiv Gandhi International Airport at Shamshabad is approximately 22 km from the project site on the North-Eastern side.

The proposed project Site is irregular L shaped plot (Figure 2). The main entrance to the Data Center is planned from the west of the plot while during construction phase the entry to the site is been planned from the southern side of the plot. It is planned with 2 building blocks of 48 MW. Driven by site geometry, the main building orientation is planned in north-south direction. The location of ancillary structures such as the substation, water tanks and the HSD yards are in line with the Microsoft requirement as well as local and national code requirements.

As per Clause 3.1.6 of Part-4 of National Building Code of India - 2016, the Data Center Building is classified under the Category of Business Building, Group E, Sub-division E3.

Figure 2. : View of Project Site with Plan overlapped on Google Imagery

The proposed site covers an area of 87,412 Sq. m (21.60 acres) with a built-up area of 63,016 Sq. m. It consists of two (2) blocks with G+4 ballard buildings with 48 MW each including a Tier II IDF network, Tier III RNG Network, and support buildings. The area statement for the site is tabulated in Table 1.

Table 1. Area Statement of the Proposed Data Center

Component	Details
Plot Area	87,412 Sq. m
Total Built Up Area	63,016 Sq.m
Green Belt	10,500 Sq.m
Road Area	14,250 Sq.m
DC building phase 1- Total= 29,855 sq.m	Ground Floor (6,332 Sq.m)
	1st floor (6,332 Sq.m)
	2nd floor (6,332 Sq.m)

	3rd floor (5,430 Sq.m)
	4th floor (5,209 Sq.m)
	Terrace (220 Sq.m)
DC building phase 2- 29,855 Sq.m	Ground Floor (6,332 Sq.m)
	1st floor (6,332 Sq.m)
	2nd floor (6,332 sq.m)
	3rd floor (5,430 Sq.m)
	4th floor (5,209 Sq.m)
	Terrace (220 Sq.m)
Guard Block	14 Sq.m
Water tank & Pump room	300 Sq.m
Rainwater tank and pump room	160 Sq.m
HSD Pump Room	20 Sq.m
Sewage Treatment Plant (STP)	32 Sq.m
220 KV Sub-station (G+1)	2,780 Sq.m
Parking Area	12,500 Sq.m

The green space would be 10,500 Sq. m which comprises of the open green cover (12% of plot should be the minimum requirement) and 2 m wide peripheral green strip. As proposed 885 trees would be planted within the green space.

The following are the utilities proposed in the design of the Data Center:

- 28 Nos. Diesel Generator (DG) Sets for Emergency backup;
- Sewage Treatment Plant (STP) of capacity 10 KLD for treatment of wastewater using Membrane Bioreactor Reactor;
- Rainwater harvesting structure with dedicated storm water management;
- Parking facility;
- Water tank and rainwater harvesting sump and tanks;
- 220 KV Sub-station

The Site development works shall be taken up in two phases. Planning of all the ancillary structures has been done considering their availability in Phase 1 itself. Site levelling and fencing work of entire site will be finished at phase 1 level to ensure the ease of construction and site safety during Phase 2 development.

Phase 1	HYD01 – 48 MW, along with Electrical substation, HSD yard, Water tank, Rainwater tank and STP.
Phase 2	HYD01 – 48 MW, along with HSD yard for Phase 2.

Phase 1 development has been limited to a gross built-up area of 28,000 Sq. m. This would result in a quicker start of operation as per the client's requirement, while the complete development of the campus would be under progress. Phase 2 construction area would be completely barricaded, this would allow for the independent operation of Phase 1 without any hindrance or obstruction. Independent secondary access for construction vehicles and other logistics to the site would be through the road on the western side road, without interfering with the Phase 1 operations.

3. Site Setting

Presently, the greenfield project site owned by Microsoft Corporation (India) Private Limited is a vacant land. The site is currently bounded on the four sides as follows:

North: Agricultural land, existing High-Tension Line and a 60 ft wide road is proposed along the site

East: Industrial land owned by Natco Pharma and used as quarters, on-going construction of the municipality water tank and the solar panels present on-site would be removed

West: Metal road and Water Body (man-made) for which the project proponent will be obtaining NOC from the Irrigation Department

South: Existing Metal road (60 ft wide) and NATCO Pharma Limited.

Environmental Setting: The environmental settings of the project site and its surroundings within 15 km radius has been studied. There is no protected area - National Park, Wildlife Sanctuary, Community Reserve or Conservation Reserve within 15 km radius of the project site.

Forest areas located within 15 km radius are Mysura Kammadhanam Reserve Forest is located at 5.5 km, SW of the site, Parandla Reserve Forest 10.5 km, SE, Santhepur Reserved Forest 14 km SE, Phulmamidi Reserved Forest 11 km, E and Golur Reserved Forest 14 km, NE.

The environmentally setting within 15 km radius of the project site is presented in Figure 33.

4. Land-Use of the Project Area

The proposed site is situated in Manufacturing Zone of Mekaguda Village of Rangareddy District in Telangana. The land falls in the Khasra Nos. of. 859, 862, 880, 881, 882, 883 and 892 covering an area of 21.60 acres. The land parcel is owned by Microsoft Corporation (India) Private Limited. The land use of project area consists of industrial area, agricultural land, settlements, and roads.

Land use within 500 metre radii of the site boundary is provided in Error! Reference source not found.10. The predominant land-use/land cover of the study area is agricultural land (69.4%) followed by industries (17.34%), vacant land (6.14%) and land covered with surface water body (5.54 %). The land use coverage details under various categories are provided in Table 2.

Table 2. Existing Land-Use Category within 500 metre Radius

Land-Use Categories	Area (Hectare)	Area (%)
Waterbodies	8.87	5.54
Vacant Land	9.80	6.12
Industries	27.74	17.34
Road	2.55	1.59
Agricultural Land	111.01	69.40
Total Area	159.96	100

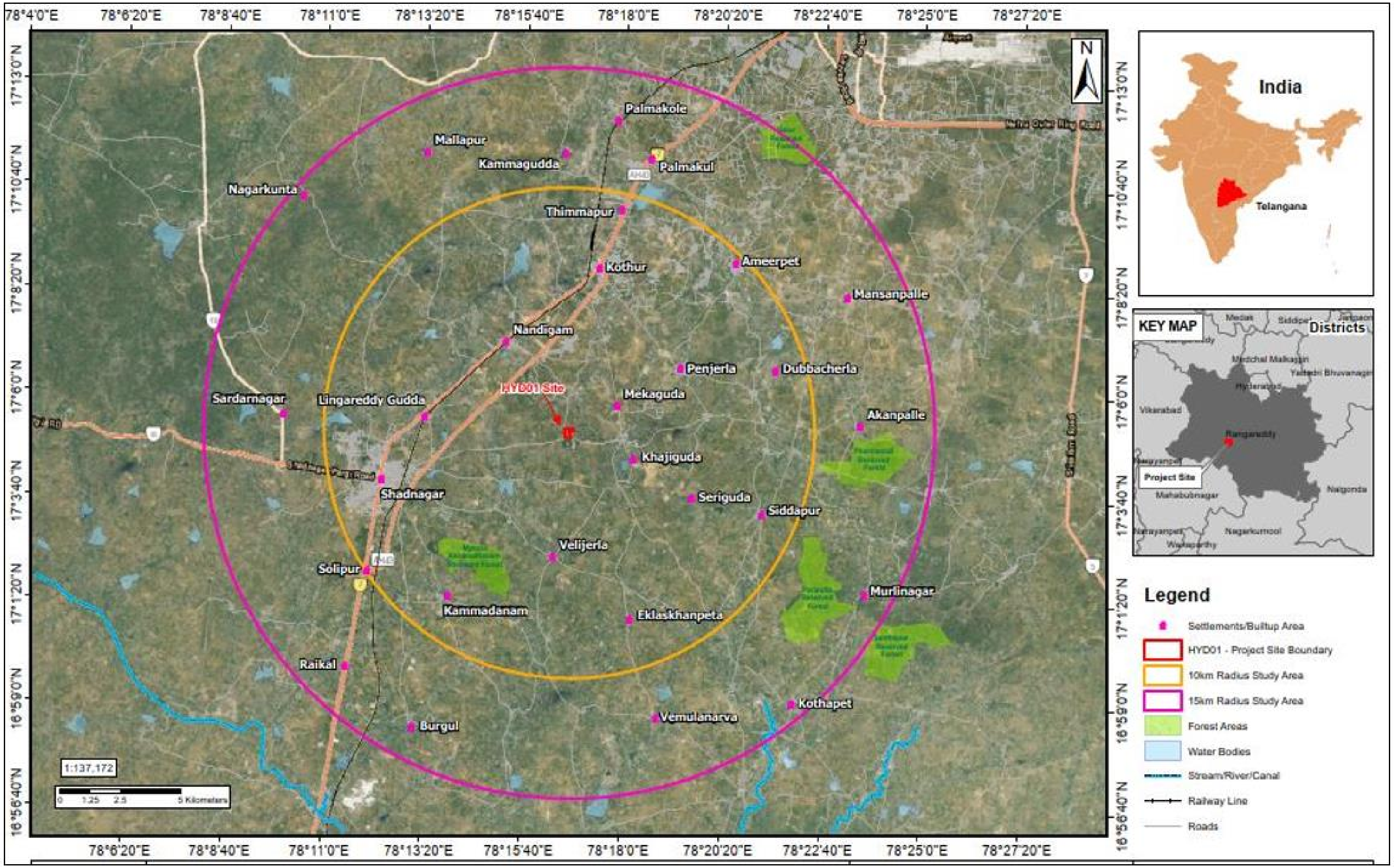

Figure 3. Environmental Sensitivity and Accessibility of the Proposed Project (15 km radius Map)

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5. Water Requirement and Waste-Water Management

Construction Phase

During the construction phase, about 500 KLD of water would be required to meet the domestic water demand of workers working at the Site. About 1,24,900 m^3 of water would be needed for construction activities during the construction period. Water during construction phase shall be sourced through tankers.

Operation Phase

The total water requirement during the operational phase of the project is 66 KLD. Potable water demand is estimated as 5 KLD which will be sourced from TSIIC. The gross non-potable water demand is 61 KLD (sourced through authorized tankers) of which 57 KLD would comprise of horticulture (53.5 KLD of non-potable water and 3.5 KLD recycled treated wastewater from STP) water demand and the remaining 4 KLD would be used in flushing. The potable water would be treated through multi grade filter, activated carbon filter, UV Steriliser and Softener would be used for chilled water to meet the drinking water standards.

The gross demand for non-monsoon and post-monsoon seasons would be 66 KLD (potable water: 5 KLD and Non-potable water: 61 KLD) and during monsoon season the demand is 9 KLD (potable water: 4 KLD and Non-potable water: 5 KLD).

6. Sewage Generation

Construction Phase:

Approximately 1,100 manpower would be employed at the Site during the peak construction time, generating about 450 KLD sewage. Sewage generated shall be vacuum-collected and treated in skid mounted on-site Modular STP.

Operation Phase

Sewage generated during the operation phase would be approximately 8 KLD which would be treated at the onsite Sewage Treatment Plant (STP) of 10 KLD capacity. The STP shall comprise of preliminary (coarse and fine screens), primary (oil & grease skimmer and equalization tank) secondary (aerobic biological treatment of sewage with Membrane Bioreactor Technology) and tertiary treatment unit with a high flow UV System. The treated effluent from the STP would be recycled and reused for flushing and landscaping requirement at the Data Center Complex. There would be no discharge of treated or untreated wastewater outside the premises during the operation phase.

The process flow diagram of the STP based on the Membrane Bioreactor Technology (MBR) is provided in Figure 4.

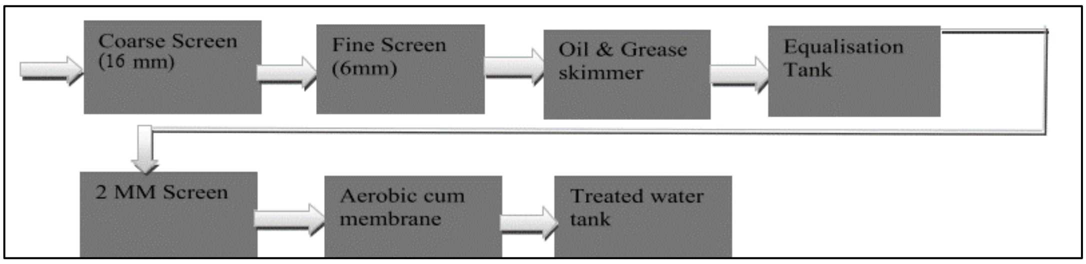


Figure 4. Process Flow Diagram of the STP

7. Waste Generation, Collection, Transport and Disposal

Construction Phase

About 120 kg/day Municipal Solid Waste (MSW) would be generated by the manpower working on-site during the construction phase.

The construction waste is envisaged to be 3000 MT comprising of scrapped metals, wood, concrete, drywall, brick, roofing, and others is provided tabulated below and the have been presented in the form of a pie-chart for improved representation.

Constituents	Waste Quantity (%)	Waste Quantity (MT)
Soil, Sand and Gravel	35	1050
Bricks and Masonry	30	900
Concrete	25	750
Metals	5	150
Bitumen	2	60
Wood	2	60
Others	1	30
Total Construction Waste		3000

The MSW would handover to or local vendors for disposal, recyclables would be sold to authorized recyclers and inert materials would be disposed as per local guidelines.

Construction Waste will be disposed as per the Construction and Demolition Waste Management Rules, 2016.

The Hazardous waste generated during the construction activities would be in the form of used oil or contaminated rugs. These would be stored temporarily in spill proof containers at Site and disposed through authorized vendors with necessary safety precautions as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

Operation Phase

The solid waste to be produced during the operational phase of the project would comprise of 40 kg/day of Kitchen Waste, 150 Ltr/ month Hazardous Waste (oil & lubricants) and 40 Kg/month E-Waste. All three categories of waste will be temporarily stored at Site. The kitchen waste shall be handed over to local vendors for disposal as per MSW Rules, 2016. The hazardous waste shall be disposed to CPCB/ TSPCB authorized recycler as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the records of waste generation and disposal will be maintained at the site. The E-Waste generated during the operational phase from the Data Center shall be collected and stored temporarily on-site and shall be handled and disposed by authorized vendors as per E-Waste (Management) Rules, 2016.

8. Power Requirement

Construction Phase

The power requirement during the construction phase would be 150 KW which would be supplied by the authorized agency. The arrangement for back-up power requirement would be supplied through the three (2) DG Sets of 50 KVA and one (01) 100 KVA capacity.

Operation Phase

The power during the operation phase of 78 MW, would be supplied through the Cheguru Sub-Station (13 km from the project site). The power would be transmitted to the sub-station by

Southern Power Distribution Company of Telangana Limited (TSSPDCL) and Transmission Corporation of Telangana Limited (TS Transco). The new 220 KV grid supply line is envisaged to meet the power requirement of Data Center during operation phase. The Data Center would be having an emergency power backup through twenty-seven (27) DG Sets of 3 MW and one (01) of 500 KW.

9. Storm Water Management and Rainwater Harvesting

Rainwater drainage system would be built to collect rainwater from the roof terrace levels and stored in tanks to be used for horticulture during the post-monsoon season. The rainwater harvesting system would comprise of rainwater sump and above ground tanks of capacity 50 KL and 345 KL respectively.

10. Parking Facilities

Parking facility will be provided at the site for vehicles of employees and visitors. As per the State By-Laws 44% of the Total BUA (Built up Area) of the building must be provided as parking area, either open to sky or covered. It is proposed to take waiver for parking needs, the parking space is reduced to 22% of BUA, which is 12,320 Sq.m. Data Centers are not typical IT service Centers and have very few numbers of employees (180 nos. in this project) and no significant visitors. The area proposed for this dedicated parking is 12,500 Sq.m.

11. Fire and Life Safety Protection Measures

Firefighting measures would be adopted as part of Emergency Preparedness plan for the project. The design and planning of Fire Detection & Suppression System would be as per the National Building Code 2016, By-Laws – Telangana, other relevant standards provided by Bureau of Indian Standard (BIS) and local fire authority requirements. The site would be equipped with fire suppression system including fire detection system, external fire hydrants, hose-reels system, automatic sprinkler system, fire main would be from the fire water storage tanks and fire pumps etc.

The proposed site would be having fire reservoir with sufficient supply as per NBC in the form of static storage tank with capacity specific for each building with arrangements of replenishment by main or alternative source of supply of 1000 Liters per minute. Double detector check valve assembly (DDCVA) on fire distribution system at points of connection would be provided. The Data Center would be having both underground and overhead tanks located within the proposed project site. The total capacity of the underground tank would be 400,000 Liters, which would be supplying 200,000 Liters of water to the fire hydrant system and 142,460 Litres for sprinkler system (as per the BIS: 15105). The overhead tank would be having a capacity of 20,000 Liters, to be designed in compliance with Table-7 of NBC-2016. The fire pump room for the operational phase would be installed with the following to meet the fire requirements.

Installations with capacity	Number of installations
Main Fire Pump for Sprinkler system (2850 lpm)	1
Main Fire Pump for Hydrant System (2850 lpm)	1
Jockey pumps for Sprinkler and Hydrant Systems (180 lpm)	2
Standby Diesel Engine Fire Pump for Sprinkler and hydrant System (2850 lpm)	2

The site would be having the provision of Nitrogen Injection System to protect the transformers. Enclosed DG sets would be provided with passive measures like – portable fire extinguishers, fire hydrants, steel structure stability design against overturning and sliding to avoid / minimize collapse during fire, IR Flame and Fixed temp cum ROR type heat detectors, etc. The HSD tanks being underground, no special automatic fire protection system would be required for HSD Tank, in compliance with NBC and Petroleum Act. The only measure would be the fixed manual water cum foam monitor to be installed with adequate coverage located diagonally opposite.

The building would be equipped with Double Interlock Pre-action Systems which would be designed for critical areas including data halls, electrical rooms, MMR, UPS/Battery rooms and panel rooms. The pre action sprinkler system would be zoned as per the issued plan. All non-critical areas like, office spaces, loading docks, storage rooms etc shall have automatic sprinkler system.

12. Manpower Requirement

Construction Phase

During the construction period approximately 1,100 workers including unskilled, semi-skilled, skilled manpower, engineers, foreman and supervisors. The labourers are anticipated to be migrants from neighbouring districts. The details of the manpower to be deployed by the project proponent during construction is as follows:

Manpower		Details (Numbers)
Skilled Manpower	Mason	60
	Carpenter	50
	Bar-bender/ Fitter	75
	Painter / Plumber / Mechanic	45
	Electric/Automation/Security/Fire Team	200
	Mechanical Team	150
	Equipment Operator	20
Semi-skilled		50
Unskilled Manpower		300
Housekeeping		30
Total of Skilled, Semi-skilled and Unskilled Manpower		980
Engineers		45
Foreman		10
Supervisors		20
Total Manpower during Construction		1055, say 1100

The site manpower deployment during peak construction shall be 1100 while the average worker deployment shall be 700.

Operation Phase

The total employees at the site will be about 180 comprising of 140 FTE Workforce and 40 Contractors. There would also be direct and indirect employment for people residing in the neighbouring area, to be engaged in various services opportunities.

13. Logistic Plan and Construction Schedule

The Logistic plan with the details of the utilities which would be present on-site during the construction phase of the project with details including the heavy vehicle entry point, assembly point, dedicated storage area, etc. is presented in Figure 5.

Project Construction Schedule

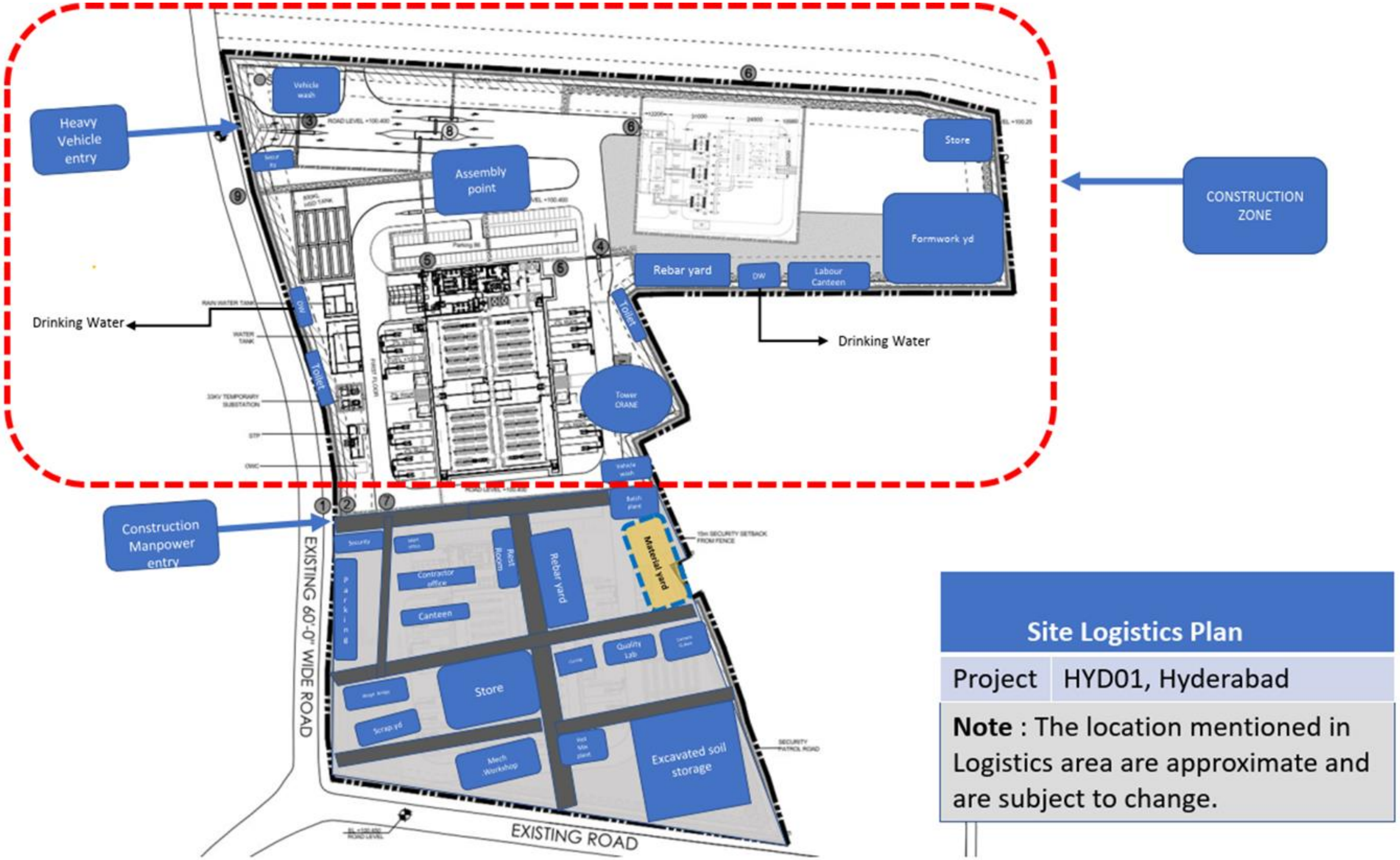
The construction period of the project is scheduled to be completed within 625 days (1.7 years). The construction period can be divided into the following components and the construction of each may overlap. The details of the schedule for the major construction phase are provided in Figure 6.

Component	No. of days taken for each Components
Earthwork	90 days

Construction of Foundation	504 days
Commencement of super-structure construction Beginning of Level 1 (Red Tag), Level 2 (Yellow Tag), and Level 3 (Gren Tag), Completion of Level 1 (All red tags), Level 2 (Yellow tag), Level 3 (Green tag), Level 4 (Blue tag) and Level 5 (White tag) Landscaping and Horticulture	453 days
Commissioning of Level 3	90 days
Commissioning of Level 4	30 days
Commissioning of Level 5	30 days

14. Estimated Project Cost:

The Project cost is estimated as INR 5,291 Crores i.e. five thousand, two hundred and ninety one crores only.

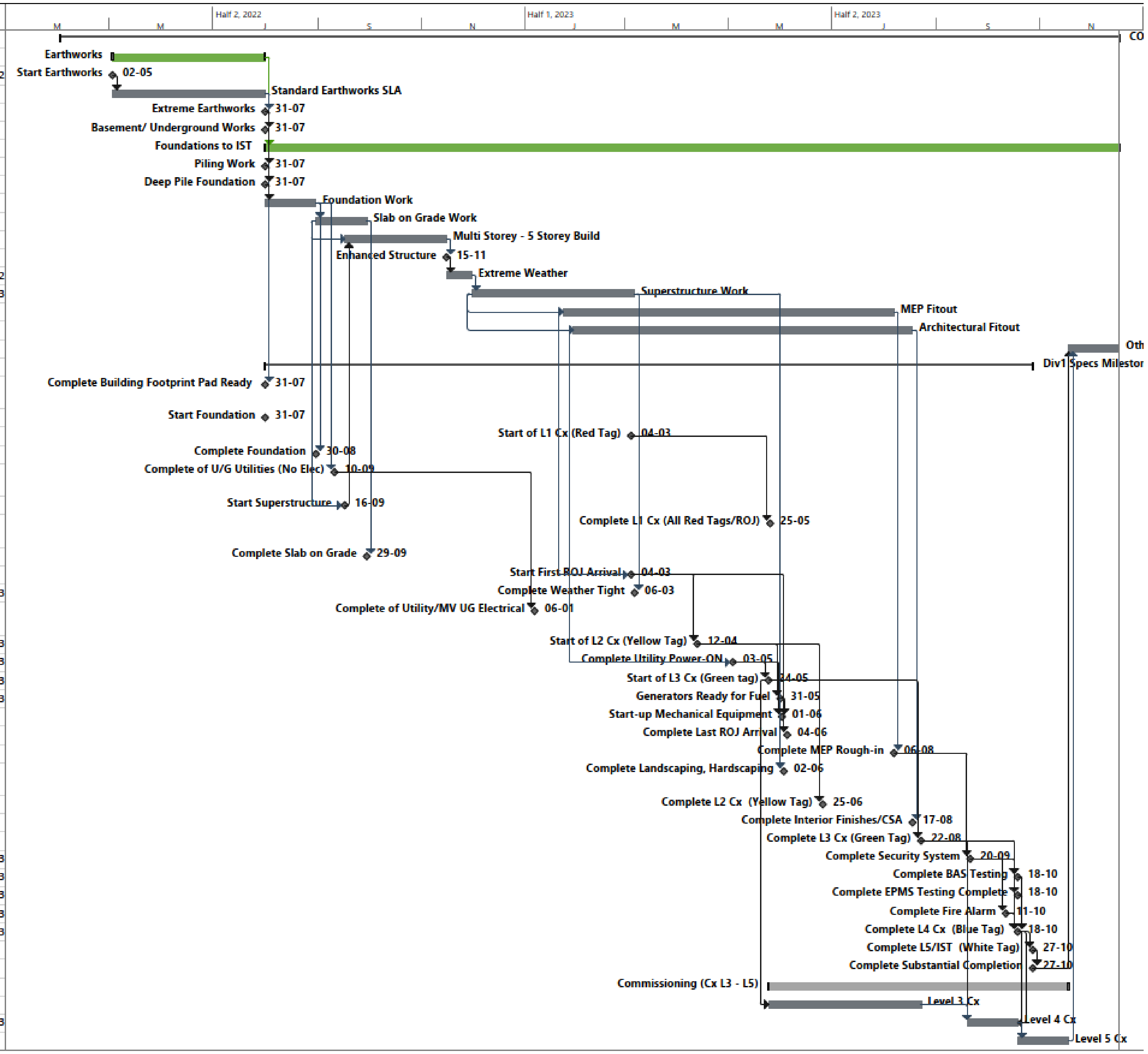


Site Logistics Plan	
Project	HYD01, Hyderabad
Note : The location mentioned in Logistics area are approximate and are subject to change.	

Figure 5. Logistic Plan of HYD01

HYD01 Construction Schedule

ID	Task Mode	Task Name	Duration	Start	Finish
64		CONSTRUCTION SCHEDULE	625 days	Fri 01-04-22	Sun 17-12-23
69		**Earthworks**	**90 days**	**Mon 02-05-22**	**Sun 31-07-22**
70		Start Earthworks	0 days	Mon 02-05-22	Mon 02-05-22
71		Standard Earthworks SLA	90 days	Tue 03-05-22	Sun 31-07-22
72		Extreme Earthworks	0 days	Sun 31-07-22	Sun 31-07-22
73		Basement/ Underground Works	0 days	Sun 31-07-22	Sun 31-07-22
74		**Foundations to IST**	**504 days**	**Sun 31-07-22**	**Sun 17-12-23**
75		Piling Work	0 days	Sun 31-07-22	Sun 31-07-22
76		Deep Pile Foundation	0 days	Sun 31-07-22	Sun 31-07-22
77		Foundation Work	30 days	Mon 01-08-22	Tue 30-08-22
78		Slab on Grade Work	30 days	Wed 31-08-22	Thu 29-09-22
79		Multi Storey - 5 Storey Build	60 days	Sat 17-09-22	Tue 15-11-22
80		Enhanced Structure	0 days	Tue 15-11-22	Tue 15-11-22
81		Extreme Weather	15 days	Wed 16-11-22	Wed 30-11-22
82		Superstructure Work	96 days	Thu 01-12-22	Mon 06-03-23
83		MEP Fitout	195 days	Tue 24-01-23	Sun 06-08-23
84		Architectural Fitout	200 days	Mon 30-01-23	Thu 17-08-23
85		Others - Xmas Shutdown/Election	30 days	Sat 18-11-23	Sun 17-12-23
86		**Div1 Specs Milestones**	**453 days**	**Sun 31-07-22**	**Fri 27-10-23**
87		Complete Building Footprint Pad Ready	0 days	Sun 31-07-22	Sun 31-07-22
88		Start Foundation	0 days	Sun 31-07-22	Sun 31-07-22
89		Start of L1 Cx (Red Tag)	0 days	Sat 04-03-23	Sat 04-03-23
90		Complete Foundation	0 days	Tue 30-08-22	Tue 30-08-22
91		Complete of U/G Utilities (No Elec)	0 days	Sat 10-09-22	Sat 10-09-22
92		Start Superstructure	0 days	Fri 16-09-22	Fri 16-09-22
93		Complete L1 Cx (All Red Tags/ROJ)	0 days	Thu 25-05-23	Thu 25-05-23
94		Complete Slab on Grade	0 days	Thu 29-09-22	Thu 29-09-22
95		Start First ROJ Arrival	0 days	Sat 04-03-23	Sat 04-03-23
96		Complete Weather Tight	0 days	Mon 06-03-23	Mon 06-03-23
97		Complete of Utility/MV UG Electrical	0 days	Fri 06-01-23	Fri 06-01-23
98		Start of L2 Cx (Yellow Tag)	0 days	Wed 12-04-23	Wed 12-04-23
99		Complete Utility Power-ON	0 days	Wed 03-05-23	Wed 03-05-23
100		Start of L3 Cx (Green tag)	0 days	Wed 24-05-23	Wed 24-05-23
101		Generators Ready for Fuel	0 days	Wed 31-05-23	Wed 31-05-23
102		Start-up Mechanical Equipment	0 days	Thu 01-06-23	Thu 01-06-23
103		Complete Last ROJ Arrival	0 days	Sun 04-06-23	Sun 04-06-23
104		Complete MEP Rough-in	0 days	Sun 06-08-23	Sun 06-08-23
105		Complete Landscaping, Hardscaping	0 days	Fri 02-06-23	Fri 02-06-23
106		Complete L2 Cx (Yellow Tag)	0 days	Sun 25-06-23	Sun 25-06-23
107		Complete Interior Finishes/CSA	0 days	Thu 17-08-23	Thu 17-08-23
108		Complete L3 Cx (Green Tag)	0 days	Tue 22-08-23	Tue 22-08-23
109		Complete Security System	0 days	Wed 20-09-23	Wed 20-09-23
110		Complete BAS Testing	0 days	Wed 18-10-23	Wed 18-10-23
111		Complete EPMS Testing Complete	0 days	Wed 18-10-23	Wed 18-10-23
112		Complete Fire Alarm	0 days	Wed 11-10-23	Wed 11-10-23
113		Complete L4 Cx (Blue Tag)	0 days	Wed 18-10-23	Wed 18-10-23
114		Complete L5/IST (White Tag)	0 days	Fri 27-10-23	Fri 27-10-23
115		Complete Substantial Completion	0 days	Fri 27-10-23	Fri 27-10-23
116		**Commissioning (Cx L3 - L5)**	**177 days**	**Thu 25-05-23**	**Fri 17-11-23**
117		Level 3 Cx	90 days	Thu 25-05-23	Tue 22-08-23
118		Level 4 Cx	30 days	Tue 19-09-23	Wed 18-10-23
119		Level 5 Cx	30 days	Thu 19-10-23	Fri 17-11-23



7 day program
1 month is approx 30 days
1 week is 7 days

Page 1

Figure 6. Construction Schedule of HYD01

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