

LODHA GROUP- PAREL(KEM)
SALE TOWER

SCHEMATIC DESIGN SET

12TH July 2016

KAPADIA ASSOCIATES
DESIGN LLP

BUILDING SERVICES CONSULTANT AECOM

STRUCTURAL CONSULTANT RAMBOLL

CLIENT: LODHA GROUP
PROJECT INCHARGE – MR RAJIV NAHAR

LODHA
BUILDING A BETTER LIFE

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LODHA PAREL
SALE TOWER

DBR _ ARCHITECTURAL

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12-07-16

PROJECT NAME : LODHA PAREL (KEM)

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Date: 12-07-16

INTRODUCTION:

NAME OF THE COMPANY / OWNER	Lodha Group
NAME OF THE PROPERTY TO BE DEVELOPED	Plot next to Maharashtra Shasan Hostel, Survey No. 137/74
TYPE OF DEVELOPMENT	Residential

LOCATION MAP



SITE ADDRESS : Next to Maharashtra Shasan Hostel, Ai Mai Mervanji Road, Opposite KEM Hospital, Parel (East), Mumbai - 400012

NAME OF THE BUILDING	Lodha Parel (KEM)

INTRODUCTION
Plot area - 4298.53 sqm.
BUA- 19582 SQM.
FSI Target - 3.995
Sale Tower - 2 Basements + Ground Floor + Club Level + 27 habitable Floors + 1 Fire Break + 1 Terrace

PROJECT TEAM

DESIGN ARCHITECT	Kapadia Associates Design LLP, Mumbai
APPROVAL ARCHITECT	SpaceAge Consultants Mumbai
STRUCTURAL CONSULTANT	Ramboll, Mumbai
MEP CONSULTANT	Aecom, Mumbai
LANDSCAPE CONSULTANT	Site Tectonix Pte. Ltd., Singapore

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CLIENT BRIEF :

1) Type of Project: Residential - Sale Tower

2) Land area : 46,269 Sq. Ft.

3) Total Build-able Area : 19,582 sqm

4) Amenity area on Ground - 430 sqm. R.G.- 127 sqm. + 332 sqm.

5) Setback regulation - West 9 mts., South 7.5 mts, North - Clear 6 mts between Sale & Rehab, East - 1.5 mts between Sale & Amenity space

- Basement South 4.5 mts, West 1.5 mts. East - 1.5 mts between Sale & Amenity space

6) Maximum 2 Basements + U.G.T Level.

7) 1.2 mts Swimming Pool projection in 9 mts open space on West side.

8) Refuge Terrace to start from the nearest floor after 24 mts. i.e.at 5th, 12th, 19th & 26th floor

8) No of aprtments : 18 Maruti apartment 2BHK + 30 Sale 2BHK+ 44 3BHK +2 Jodi Apartments + 2 Pent Houses

9) Sizes of apartments : 2 BHK 670 sft / 3 BHK 1014 sft

10) Amenities / Club Program : Swimming Pool, Deck Area, Gymnasium, Indoor Games, Multipurpose Lawn

11) Parking required - (No of Bed Rooms -1) + 10% Visitors Parking - 154 + 15 = 169 Nos.

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ARCHITECTURAL BRIEF :

. Sale Tower is a combination of 2 bkk & 3 bhk (Option to combine preferable)

. Club level with Swimming Pool & Gym facility.

. Height above 100 mts. & basements for parking provision & MEP reqirements.

. 8% R.G. & existing temple to be preserved.

DESIGN PARAMETERS :

1) **Site Planning:**

. Site is surrounded by roads on all 3 sides. Located opposite KEM hospital & next to Maharashtra Shasan Hostel.

2) **Building Orientation and Climatic Response :**

. Rehab Tower is located on North side for Retail access.

. Sale Tower is on South Side with apartments facing East & West direction for good views.

. Staircase block to face Rehab Towe to maintain privacy.

3) **Concept :**

. Column free structure around the core to allow driveway in parking level & clean lobby - columns pushed to periphery

. Bold expression of verical structure in facade.

. Shape of skyline-stepped roof form.

. Projecting glass cubes on South facade create sense of movement & playfullness.

. Roof top garden terrace.

. Simple contemporary Gray & White colour palatte.

. Textures expressed to create unique personality for the tower among the neighbouring housing projects.

ARCHITECTURE PROGRAM :

A. BASEMENT PLAN

B. GROUND FLOOR PLAN

C. PODIUM LEVEL PLANS

D. TYPICAL LEVEL FLOOR PLANS

E. NON TYPICAL LEVEL FLOOR PLAN

F. MEP LEVEL PLAN

G. FB LEVEL PLAN

H. ROOF LEVEL PLAN

I. LMR PLAN

J. SECTION

K. ELEVATION

STAGES OF DESIGN :

1. PRE -CONCEPT AND CONCEPT

2. SCHEMATIC DESIGN

3. DESIGN DEVELOPMENT

4.WORKING DRAWINGS BASIC AND FINISHING

5.AS BUILT AND DOCUMENTATION

6.INTERIOR DRAWINGS

DATE: 12-07-2016

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AREA STATEMENT : SALE TOWER

PLOT AREA	46,269.37 SQ. FTS
FSI @ 3.995	1,84,846.13 SQ. FTS
TOTAL BUA OF SUPERSTRUCTURE	1,66,467 SQ. FTS
TOTAL BUA OF SUBSTRUCTURE	44,311 SQ. FTS
TOTAL BUA	2,10,778 SQ. FTS
NO. OF BUILDING	1
NO. OF FLOORS	2 BASEMENTS + LOBBY LVL+CLUB LVL+27 RESIDENTIAL FLOORS+1 FIRE BREAK+TERRACE

APARTMENT MATRIX

TOWER	FLOORS	2 BHK		3 BHK	TOWER CA	TOWER SA
		MARUTI [REDVP]	LODHA SALE			(CA X 1.65)
					(SFT.)	(SFT.)
SALE (4 TO CORE)	GROUND + CLUB + 27 RESIDENTIAL	18	36	50	90966.5	145091.6
TOTAL		**54**		**50**	**90966.5**	**145091.6**

NOTE: ON UPPER FLOORS POSSIBILITY OF COMBINING FLATS TO HAVE 4 BHK AS JODI APARTMENT & PENT HOUSE TYPOLOGY.

AREA CALCULATIONS (SQ FTS) -/ FLOOR [TYPICAL FLOOR]

TOWER	CA/ FLR	BUA	SA	FSI	NON FSI	SA / CA	BUA / CA	BUA / SA	SA / FSI
SALE [4 TO CORE]	3369.1	5066.8	5373.7	3819.7	1247.1	1.595	1.504	0.943	1.407

SR.NO	ITEM DESCRIPITION	SPECIFICATIONS
1	Type of Building	Residential
	a. No. of Habitable floors	Only Habitable - 23 + Habitable With refuge -4 + Club Level - 1 + Any Future Extension Provision - At Least 1
	b. No of Parking floors	2
	C. No of Fire Check floors	1
	d. No of Service floors	0
	e. Structure /Outrigger	0
2	Slab to Slab height	Habitable Floors - 3.3 Mts. Parking Floors - 2.75 Mts
3	External Lobby	Height and false ceiling height - 7.2 Mts. & 5.0 Mts.
4	Floor Lobbies	Height and false ceiling height - 3.3 Mts.
5	External Façade	1. Unitized curtain wall (Laminated Glass) 2. Aluminium Cladding on certail locations on South facade 3. Windows 4. Perforated Metal Screen 5. Aluminium Fins / Trellis 6. Stone Cladding 7. Texture Paint 8. Textured RCC formliner incorporated in Mivan type - 25 mm / 35 mm thk.
6	Main Entrance Lobby	Italian Marble as per architectural design
7	Staircases	Nos. of staircase shall be provided as per CFO Norms. - 2 Only 1 stairacse goes till Basement. Stairacse Riser on Typical Floor - 150mm Fire Break Floor - 175 mm Precast Concrete Tiles as finishing material Width of staircase shall be provided as per CFO Norms. - 4.0 Mts. Fire doors shall be propritery make and shall confirm to applicable local fire regulation code (Two hour fire dated) or national Building Code with push bars integrated with fire alarm system.
8	Elevators	4 Nos of Passenger Elevators & 1 no of Service Elevator which will be Stretcher Elevator. Speed shall be 4m/s. All elevators travel till Basement level. No transfer elevators provided. Lodha team to check Fire Lift .
9	Power Back Up	Entire common utilities will have backup and 100% backup for lighting load of flat to be provided. Backup for ELV system to be provided. 10% battery charging points in parking area. Client/ MEP to confirm if A/C load is on DG or not.
10	BMS	Common Control Room. MEP Team to confirm.
11	CCTV	CCTV cameras shall be provided at the common rae such as entry, exit, parking in/out, along with coverage of all service areas, DG yard. PTZ cameras for boundary areas. VDP to be provided for each apartment. Central command and control cabin shall have monitors for viewing everything recorded by the CCTVs. Records shall be maintained as per rge advice of experts. (this will be kept in BMS room. Separate monitor for CCTV Central command) Emergency power to CCTV central system to be provided.
12	Staircase & Lift Lobby Pressurization	Shall be provided as local norms.
13	Car Park Ventilation	Ventilaizaton system for basement car park to be provided. This shall be integrated with fire alarm system.
14	External Paint	Anti-Alage and Weather proof texture paint (with min. 5 years warranty)
15	Sanitary Fixtures	To be provided as per Client policy - Dual Flush water saving type recommended.
16	Garbage Collection	Manual. No provision for garbage chute.
17	Home Automation	Not planned. Client to advise.
18	Security & Access Control	Resident's cars will be provided with cards which will operate the RFID type Boom Barrier at the entry to the parking. Boom barriers will have manual override for authorized guests. Video door phone system shall be 'Apartment Type' where the resident can view the guest in the entrance lobby from their VDP's and also at the door if required. Client to confirm.
19	IBS (In Building Solution) - Telephony, data, Cellular Booster.	Lodha to advise.
20	Gas Detector System	LPG / PNG leak detector shall be provided in all kitchens on standalone basis with interface compatibility to control alarm system.
21	Car Wash System	No
22	Closing fire, Plumbing, Electrical shaft with fire rated material	Every shaft slab to be closed at all levels with 2hours fire rated system
23	Indoor Air Quality and Toilet Exhaust	fresh air shal be provided as per IAQ or green building norms. (i.e. 5cfm per person and 0.06cfm per sft and 30% more than this)
		MEP / Client to advise
24	Air Conditioning	Apartments will be air conditioned using Spilt systems (wall) VRV for Entrance Lobbies and A/c not provided for Typical floor lobbies
25	Space provision for service providers	For LV services like Dta, Sound and will be in the LV shaft. Space for common dish antennae can be put on the terrace so that individual dishes do not stick out of balconies of the flats.

CHECKLIST FOR STRUCTURE CONSULTANT DBR		
1	Structure	Refer attached schematic structural set
2	Floor Loading	Refer attached schematic structural set
3	Material Specs (Concrete Mix, Steel)	Refer attached schematic structural set

CHECKLIST FOR SERVICES CONSULTANT DBR		
1	Elevators	Refer attached schematic MEP set
2	Service Elevators	Refer attached schematic MEP set
3	Power Back Up	Refer attached schematic MEP set
4	Fire Fighting	Refer attached schematic MEP set
5	BMS	Refer attached schematic MEP set
6	CCTV	Refer attached schematic MEP set
7	Staircase & Lift Lobby pressurization.	Refer attached schematic MEP set
8	Car Park Ventilization	Refer attached schematic MEP set
9	Sanitary Fixtures	Refer attached schematic MEP set
10	Garbage Collection	Refer attached schematic MEP set
11	Home Automation	Refer attached schematic MEP set
12	Security & Access Control	Refer attached schematic MEP set
13	IBS (In Building Solution) - Telephony, data, cellular booster.	Refer attached schematic MEP set
14	Gas Detector System	Refer attached schematic MEP set
15	Car Wash System	Refer attached schematic MEP set
16	Closing fire, plumbing, electrical shaft with fire rated material.	Refer attached schematic MEP set
17	Indoor air quality and toilet exhaust.	Refer attached schematic MEP set
18	Air - Conditioning	Refer attached schematic MEP set
19	Space provision for service providers	Refer attached schematic MEP set
20	Infra structure Specs - DG, STP, Sub Station	Refer attached schematic MEP set

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Annexure 'A'

S.NO	LOCATION	FLOORING PAVING															REMARKS
		Non Skid Granite	Artificial Marble	Kota Stone	Green Marble	Italian Marble	laminated Flooring	30 / 20mm thk Flammed Granite	Granite	Vitrified Tiles	H.Vitrified Tiles	Ceramic Tiles	65mm IPS / Tremix	Wooden Decking	China mosaic	Precast concrete tiles	
1	Living Room					x											
2	Dinning					x											
3	Ent.Lobby / Passage					x											
4	~~Study Room~~																
5	Kitchen			x						x							
6	Bedroom 1					x											
7	Bedroom 2					x											
8	Bedroom 3					x											
9	Bedroom - Master					x											
10	Floor Lobbies					x											
11	Toilet 1								x	x							
12	Toilet 2								x	x							
13	Toilet 3								x	x							
14	Toilet - Master								x	x							
15	~~Powder Toilet~~																
16	Servant Room																
17	Servant Toilet									x							
18	Attached Balcony/Deck													x			
19	Entrance Lobby					x											
20	Entrance Steps					x											
21	Wheel Chair Access Ramp					x											
22	LMR									x							
23	Parking Areas												x				
24	Pump Room												x				
25	~~Sump Room~~																
26	Electrical Room												x				
27	Ducts/Shafts with access doors												x				
28	Service Lift Lobby									x							
29	Staircase (Tower & basement to gr Flr.)															x	
30	Vehicular Ramps												x				
31	Drop-off Area					x											
32	Podium					x											
33	Store/Security Room						x										
34	Building Terrace												x		x		
35	Security rooms												x				
36	Handicap toilets																
37	Service Floor												x				
38	Fire Check Floor												x				
39	~~Hot Wate System lvl.~~																
40	Refuge Areas									x							
41	~~MTNL room~~																
42	D.G Set /Substation									x							
43	~~Letter box room~~																

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Annexure 'B'

S.NO	LOCATION	WALLS								SKIRTING / DADO							REMARKS
		Acrylic paint	White Wash	Oil paint	Plastic Emulsion	OBD	Cement Paint	Textured Paint	Luster paint	Vitrified Tiles	20mm Thk Kota Stone	Ceramic	Granite	Italian marble / Artificial Marble	laminated		
1	Living Room				x									x			
2	Dinning				x									x			
3	Ent.Lobby / Passage				x									x			
4	~~Study Room~~																
5	Kitchen											x					
6	Bedroom 1				x												
7	Bedroom 2				x												
8	Bedroom 3				x												
9	Bedroom - Master				x												
10	Floor Lobbies													x			
11	Toilet 1									x							
12	Toilet 2									x							
13	Toilet 3									x							
14	Toilet - Master									x							
15	~~Powder Toilet~~																
16	Servant Room				x					x							
17	Servant Toilet									x							
18	Attached Balcony/Deck							x		x					x		
19	Entrance Lobby												x	x			
20	Entrance Steps												x				
21	Wheel Chair Access Ramp												x				
22	LMR					x				x							
23	Parking Areas								x	x							
24	Pump Room									x							
25	~~Sump Room~~																
26	Electrical Room					x				x							
27	Ducts/Shafts with access doors					x				x							
28	Service Lift Lobby				x					x							
29	Staircase (Tower & basement to gr Flr.)					x				x							
30	Vehicular Ramps					x											
31	Drop-off Area							x					x				
32	Podium																
33	Store/Security Room								x	x							
34	Building Terrace											x					
35	Security rooms					x				x							
36	Handicap toilets									x							
37	Service Floor		x														
38	Fire Check Floor		x														
39	~~Hot Wate System lvl.~~																
40	Refuge Areas	x	x							x							
41	~~MTNL ROOM~~																
42	D.G Set /Substation		x														
43	~~Letter box room~~																

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Annexure 'C'

S.NO	LOCATION	CEILING												REMARKS
		Acrylic Emulsion Paint	Cement paint / White Wash	Synthetic Enamel	OBD	Form Finish	Calcium Silicate + Moisture Resistant	Aluco	Metal board	Gyp. Board False Ceiling + Acrylic Emulsion Paint	Gyp. Board False Ceiling + Acrylic Emulsion Paint + Cove Lighting + Recessed lighting	Gyp. Board False Ceiling + Acrylic Emulsion Paint + Recessed lighting		
1	Living Room	x			x									
2	Dinning													
3	Ent.Lobby / Passage			x						x				
4	Study Room													
5	Kitchen			x						x				
6	Bedroom 1													
7	Bedroom 2		x			x								
8	Bedroom 3													
9	Bedroom - Master													
10	Floor Lobbies													
11	Toilet 1			x									x	
12	Toilet 2													
13	Toilet 3	x			x									
14	Toilet - Master													
15	~~Powder Toilet~~													
16	Servant Room													
17	Servant Toilet			x									x	
18	Attached Balcony/Deck													
19	Entrance Lobby			x									x	
20	Entrance Steps													
21	Wheel Chair Access Ramp			x									x	
22	LMR													
23	Parking Areas	x			x									
24	Pump Room													
25	~~Sump Room~~													
26	Electrical Room													
27	Ducts/Shafts with access doors			x									x	
28	Service Lift Lobby													
29	Staircase (Tower & basement to gr Flr.)			x									x	
30	Vehicular Ramps													
31	Drop-off Area			x									x	
32	Podium													
33	Store/Security Room	x			x									
34	Building Terrace													
35	Security rooms			x									x	
36	Handicap toilets													
37	Service Floor			x									x	
38	Fire Check Floor													
39	~~Hot Wate System lvl.~~													
40	Refuge Areas			x									x	
41	~~MTNL ROOM~~													
42	D.G Set /Substation													
43	Letter box room													

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Annexure 'D' (Doors /Windows)

S.No	Specification / Type	DOORS				
Location		Main Door	Bedroom Door	Balcony Door	Service Door	Terrace Door
1	Shutter	Flush Door	Flush Door	Flush Door	Glass +Aluminium	Flush Door
2	Frame / Moulding	RM + T	RM + T	RM + T	RM + T	RM + T
3	Hardware	GQ	GQ	GQ	GQ	GQ

(RM + T) = red Merinti + Teak
GQ = good Quality
HE = High End

S.No	Specification / Type	WINDOWS				
Location		Living Room	Bedroom	Kitchen	Toilet	Society room
1	Finish	GQ	GQ	GQ	GQ	GQ
2	Mosquito Provision	NONE	NONE	NONE	NONE	NONE
3	Hardware Accessories	GQ	GQ	GQ	GQ	GQ
4	Glass	GQ	GQ	GQ	GQ	GQ
5	Railing	GQ	GQ	GQ	GQ	GQ

GQ = Good Quality
HE = High End

All Windows / Deck Will have safety railing upto 1.2m height. Decks will have laminated glass railing.

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Annexure 'E' (CP, Sanitary Fittings)

S.No	Specification / Type	Toilets						
Location		Powder Toilet	Master Bedroom	Bedroom	Servant' Toilet	Driver's Toilet	Kitchen	Utility / Wet Kitchen
1	W. C. with soft closing cover & Chair brackets		x					
2	Concealed Cistern - Inwall tank + Dual Flush Actuator		x					
3	Wash Basin		x					
4	Basin Tap		x					
5	Waste Coupling 32mm Size Full Thread With 80mm Height -		x					
6	Bottle Trap with drain in polished chrome		x					
7	Angular Stop Cock / Angle valve		x					
8	Health Faucet		x					
9	Bath Tub / Jacuzzi							
10	Shower Filler							
11	Head Shower		x					
12	Bath Spout		x					
13	Shower Mixer		x					
14	Robe Hook		x					
15	Toilet Paper holder		x					
16	Towel Rack With Single Rod		x					
17	Soap Dispenser							
18	Soap Dish holder							
19	Napkin Holder							
20	Nahni Trap Jali - Chilly		x					
21	HORIZONTAL GEYSER 15 Ltr- Manual 5 STAR RATED - conceled in False ceiling		x					
	KITCHEN							
23	Sink - Nirali **OLYMPIA** - Size - 950 X 510 MM						x	
24	Waste Coupling 32mm Size Full Thread With 80mm Height		x					
25	Angular Stop Cock with Wall Flange		x					
26	Instant Boiler							
27	Nahni Trap Jali - Chilly		x					
28	Exhaust Fan		x					

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Annexure 'F' (Electrical Fittings)

S.No	Specification / Type	Electrical Fittings					
Location		Basement	Podium	Flat Interiors	Ent Lobby	Canopy and semi enclosed areas	Back of Areas / Shafts
1	Regular						
2	Medium	x	x				x
3	High End			x	x		
4	High End (Exterior Grade)					x	

S.No	Specification / Type	HVAC					
Location		Apartment	Toilets	Staircase	Kitchen	Ent Lobby	Floor Lobby
1	Air Conditioning	x				x	
2	Exhaust		x		x		
3	Pressurization			x			
				only in basement			

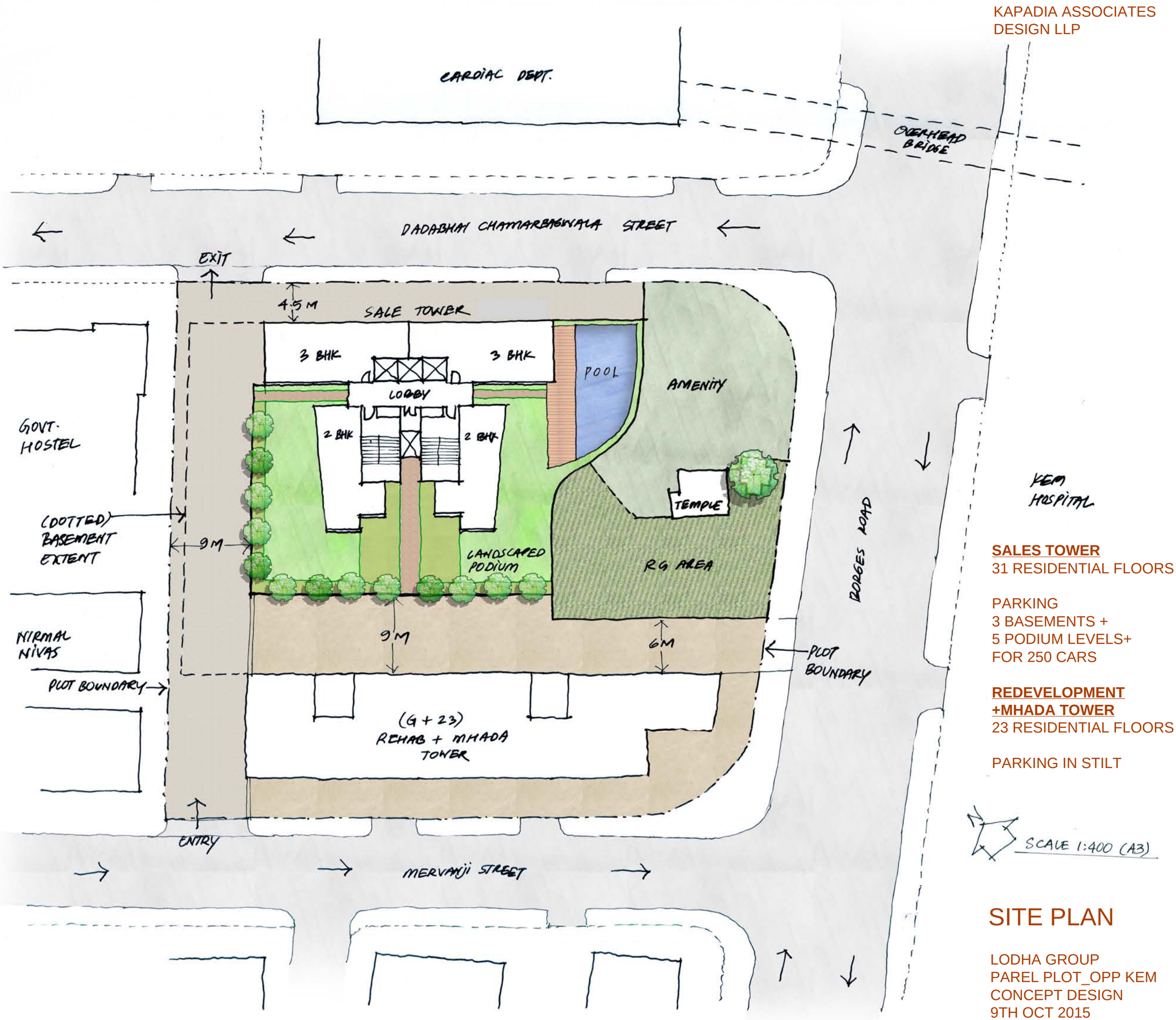
LODHA PAREL
SALE TOWER

CONCEPT STAGE - 2015

MONTH_OCTOBER

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12-07-16

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SALES TOWER
31 RESIDENTIAL FLOORS

PARKING
3 BASEMENTS +
5 PODIUM LEVELS+
FOR 250 CARS

REDEVELOPMENT
+MHADA TOWER
23 RESIDENTIAL FLOORS

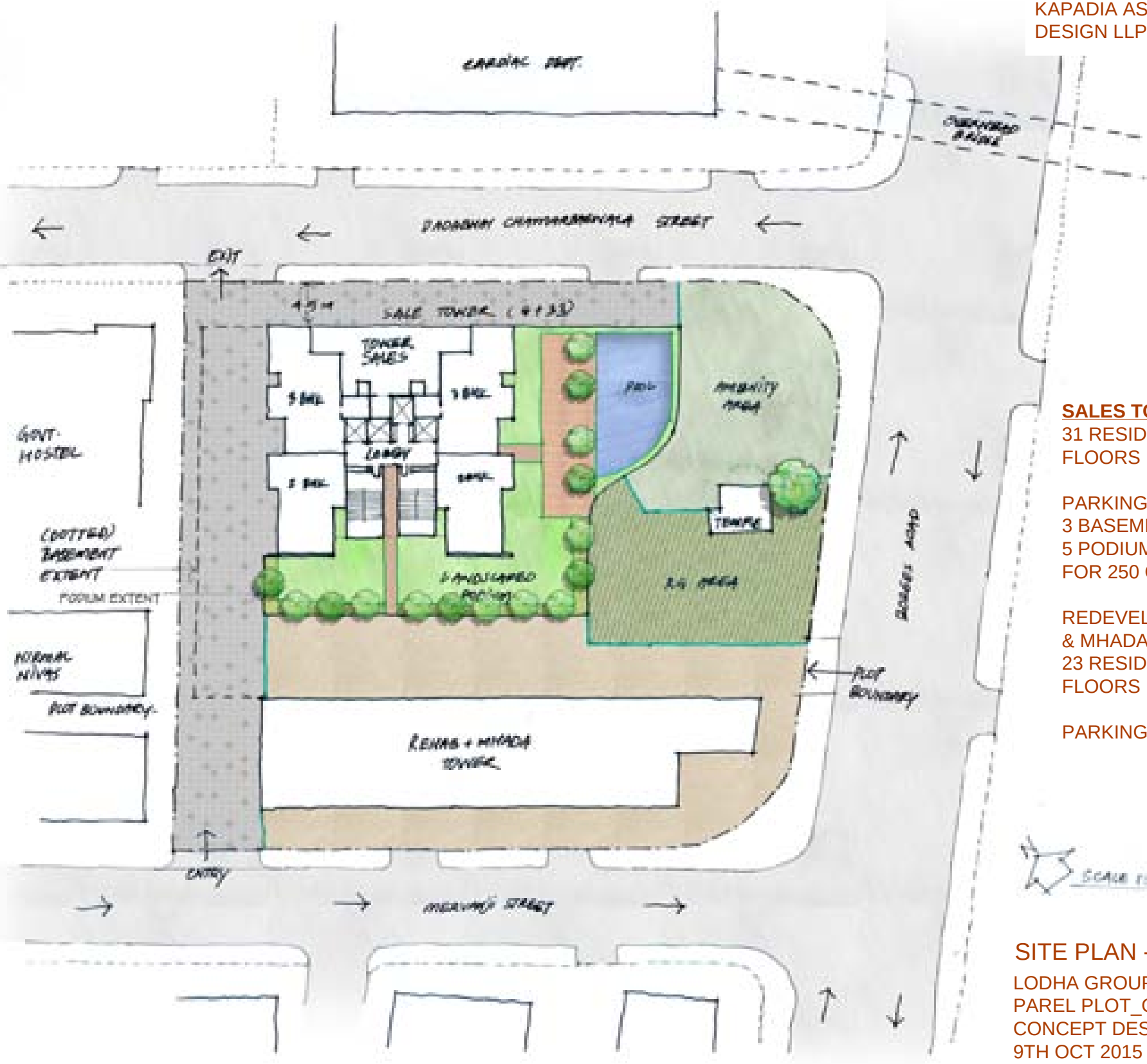
PARKING IN STILT

SCALE 1:400 (A3)

SITE PLAN

LODHA GROUP
PAREL PLOT_OPP KEM
CONCEPT DESIGN
9TH OCT 2015

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SALES TOWER
31 RESIDENTIAL FLOORS

PARKING
3 BASEMENTS+
5 PODIUM LEVELS
FOR 250 CARS

REDEVELOPMENT
& MHADA TOWER
23 RESIDENTIAL
FLOORS

PARKING IN STILT

SITE PLAN - 2

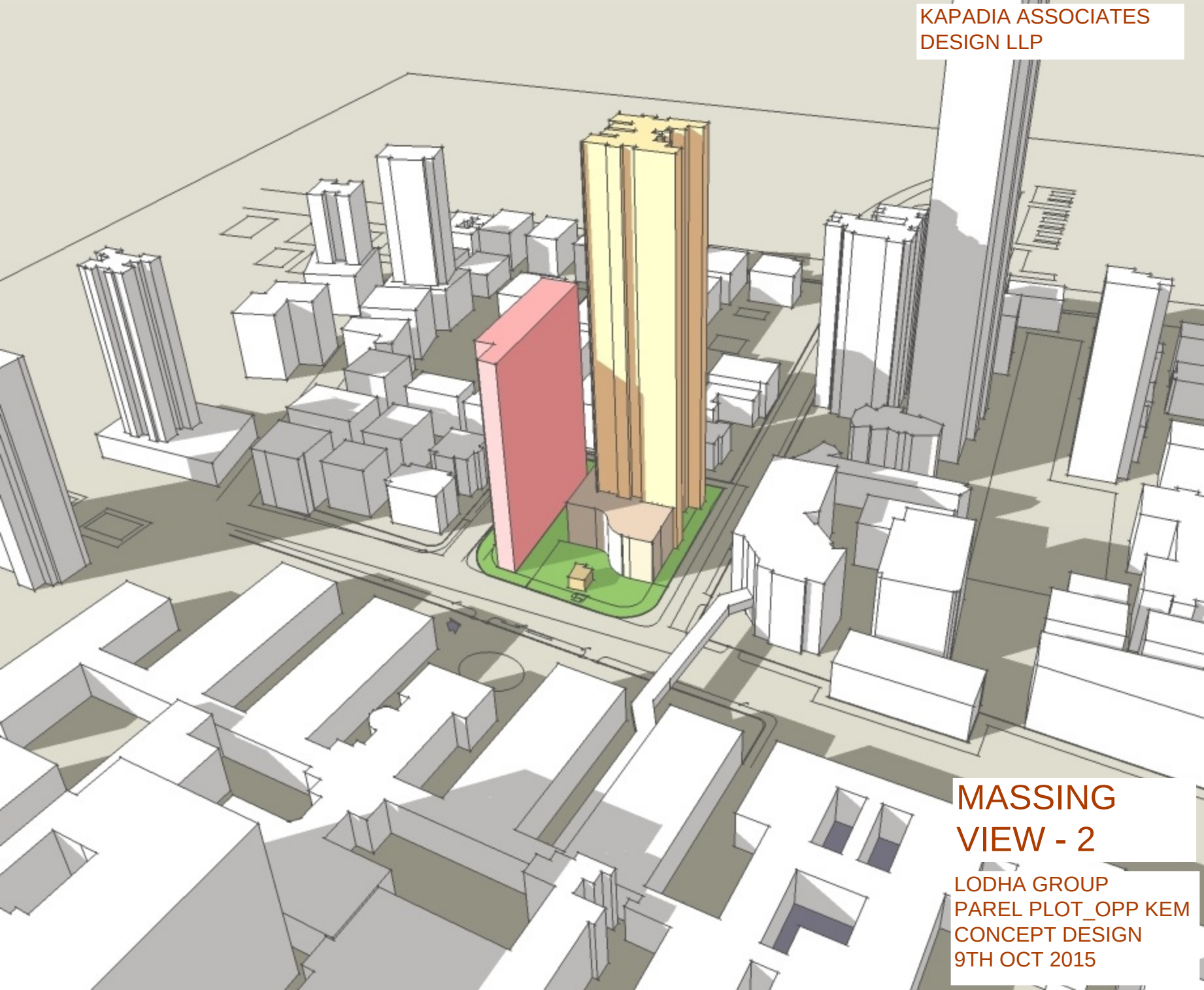
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PAREL PLOT_OPP KEM
CONCEPT DESIGN
9TH OCT 2015

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MASSING
VIEW - 1

LODHA GROUP
PAREL PLOT_OPP KEM
CONCEPT DESIGN
9TH OCT 2015

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MASSING VIEW - 2

LODHA GROUP
PAREL PLOT_OPP KEM
CONCEPT DESIGN
9TH OCT 2015

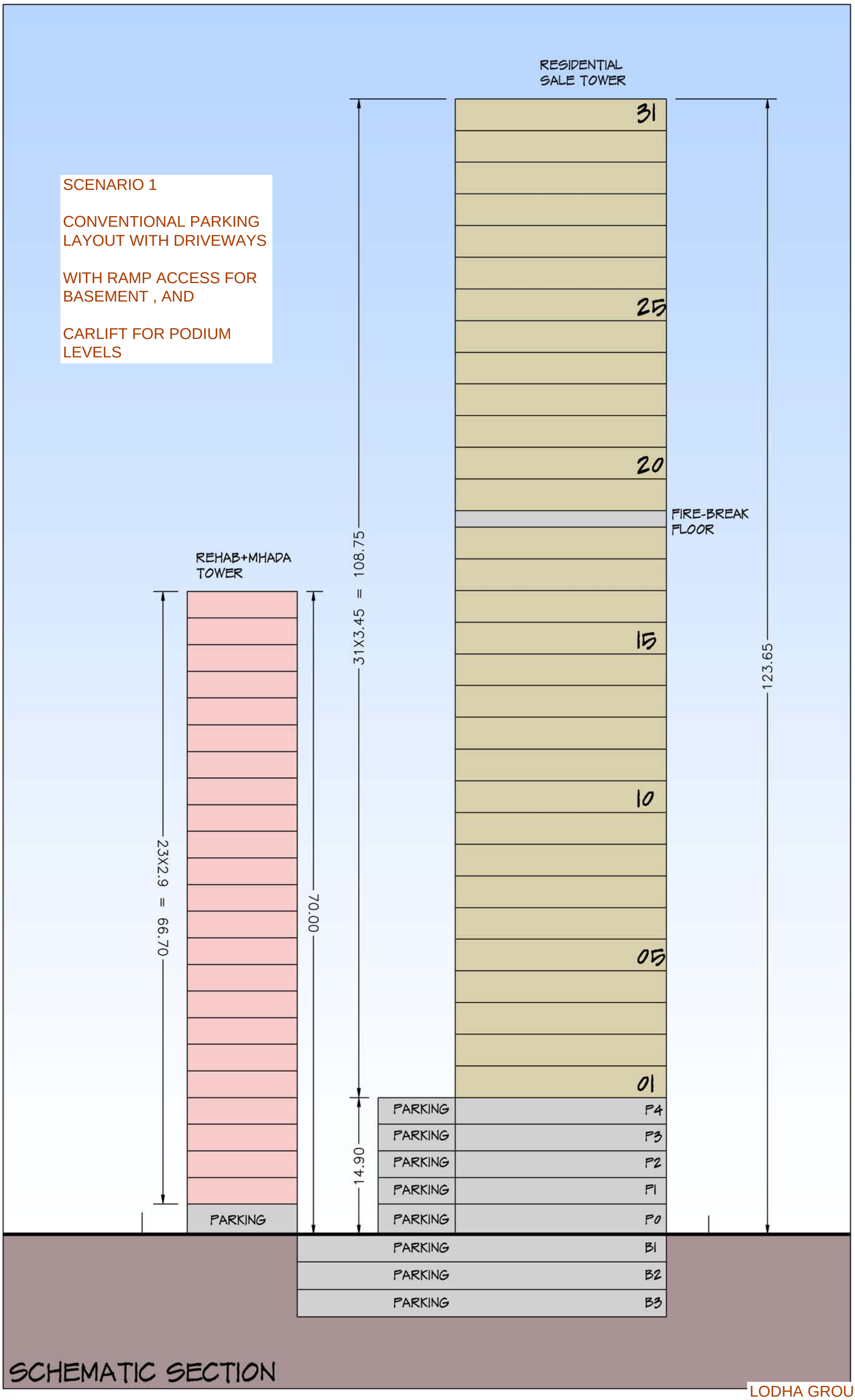
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SCENARIO 1

CONVENTIONAL PARKING LAYOUT WITH DRIVEWAYS

WITH RAMP ACCESS FOR BASEMENT , AND

CARLIFT FOR PODIUM LEVELS



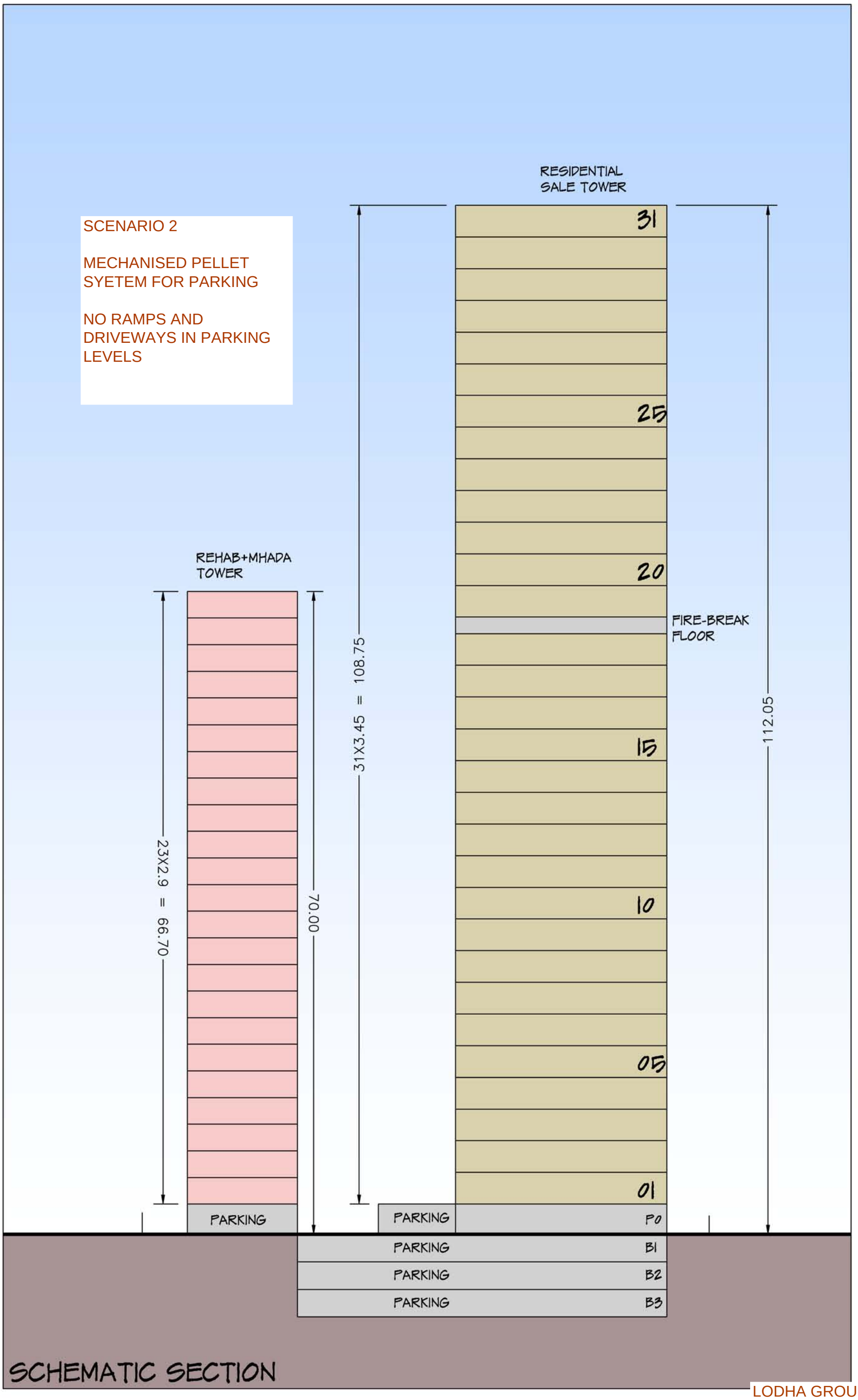
SCHEMATIC SECTION

LODHA GROUP
PAREL PLOT_OPP KEM
CONCEPT DESIGN
9TH OCT 2015

SCENARIO 2

MECHANISED PELLET SYETEM FOR PARKING

NO RAMPS AND DRIVEWAYS IN PARKING LEVELS



SITE PLAN - 1
T SHAPED RESIDENTIAL BLOCK



King Edward Memorial Hospital

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SITE PLAN - 2
H SHAPED RESIDENTIAL BLOCK



King Edward Memorial Hospital

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LODHA PAREL
SALE TOWER

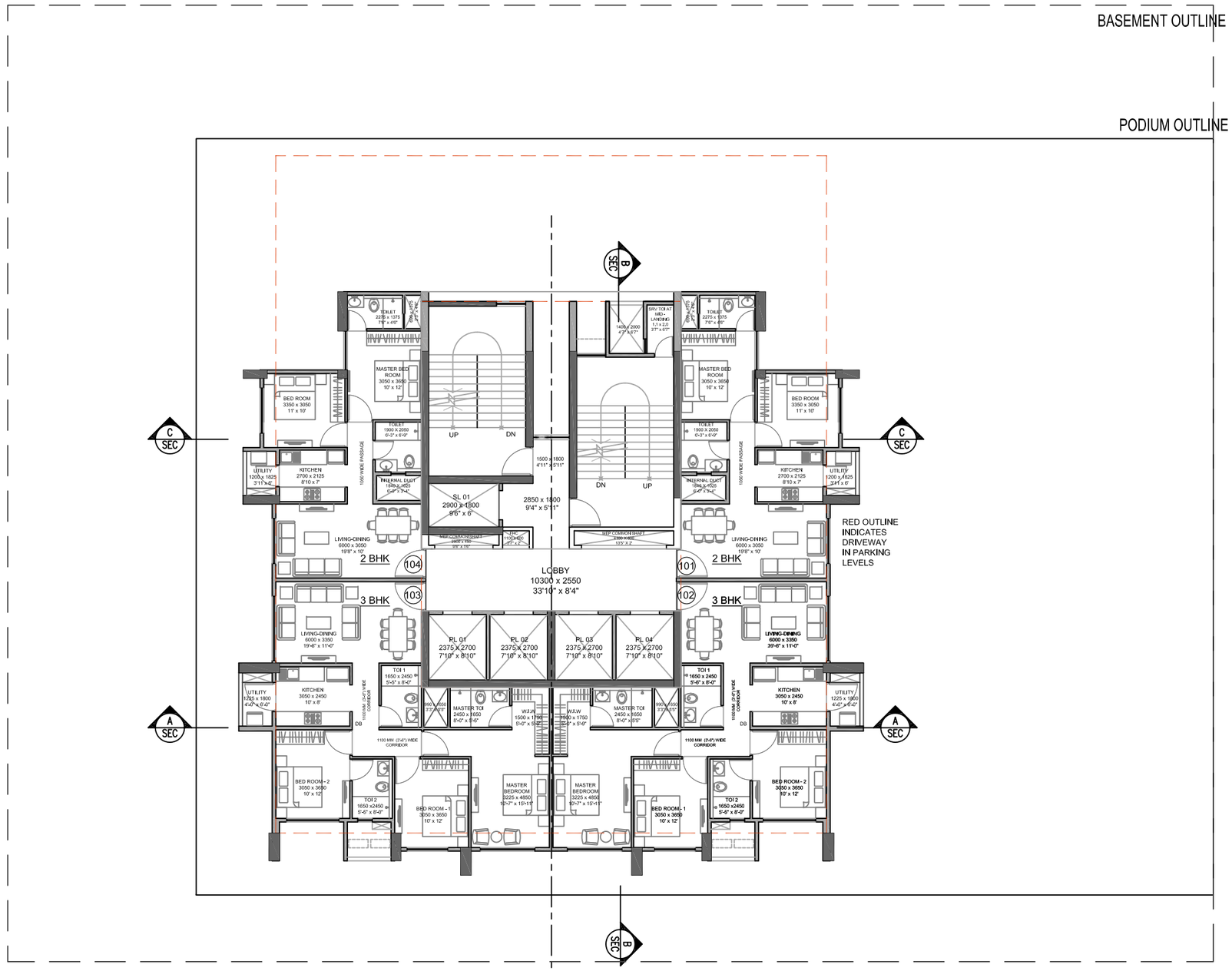
CONCEPT STAGE - 2016

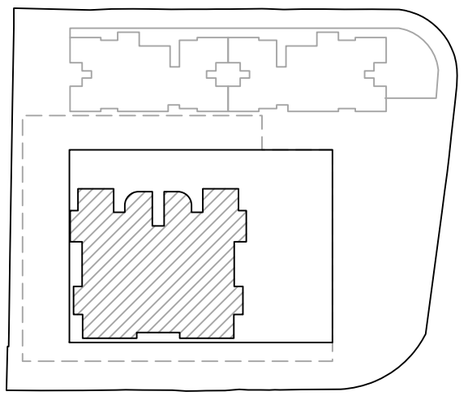
MONTH_FEBRUARY

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12-07-16

LODHA PAREL
RESIDENTIAL TOWER

TYPICAL PLAN
SCALE 1:200 (A3)



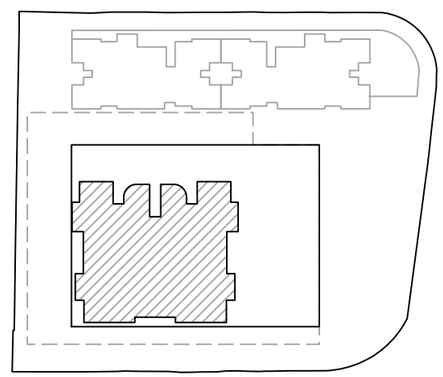


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17-02-16

LODHA PAREL
RESIDENTIAL TOWER

GROUND FLOOR PLAN
SCALE 1:200 (A3)

1510
BASEMENT OUTLINE
9339
BASEMENT OUTLINE
6 M WIDE DRIVEWAY TO STILT PARKING
+ 300
SPACE FOR MEP ABOVE RAMP
PODIUM OUTLINE
EXHAUST CUT-OUT AS PER MEP
3 SQM [B3]
2.3 SQM [B2]
3 SQM [B1]
DN TO B1
6 MTS WIDE RAMP [1:10]
6000
23180
UP FROM B1
SUB STATION 169 SQ. M.
+ 600
9200
POOL ABOVE
RG ARE
127 SQ
E SEC
+ 300
LOADING BAY
3025
2250
+ 600
+ 450
TOILET ON P0 LEVEL
INTERNAL STAIRCASE TO STP BELOW
UP FRM B1
+ 300
C SEC
TL 01 1500 x 1500 4'11" x 4'11"
TL 02 1500 x 1500 4'11" x 4'11"
UP TO P1
TRANSFER LOBBY
1500 x 1800 4'11" x 5'11"
SL 01 2900 x 1800 9'6" x 6'
2850 x 1800 9'4" x 5'11"
UP TO P1
STP 111 SQ. M.
+ 600
5150
7.0 M WIDE EXTERNAL DRIVEWAY
CANOPY ABOVE
TOWER ENTRANCE
ENTRANCE LOBBY [87 SQM 936 SFT]
+ 600
LOBBY 10300 x 2550 33'10" x 8'4"
MEP ROOM 115 SQ. M.
+ 600
7450
AMEN
430 S
FL 01 2375 x 2700 7'10" x 8'10"
FL 02 2375 x 2700 7'10" x 8'10"
FL 03 2375 x 2700 7'10" x 8'10"
FL 04 2375 x 2700 7'10" x 8'10"
D.G. 96 SQ. M.
+ 600
A SEC
FA DUCT
CLUB PROGRAM / PARTY AREA [295 SQM 3175 SFT]
+ 600
6000
7000
1150
PODIUM OUTLINE
PODIUM OUTLINE
2327
BASEMENT OUTLINE
+ 300
7316 [varies]
4616 [varies]
RG AREA-1 331.5 SQM.
+ 450
RESI TOWER ENTRY
+/- 0



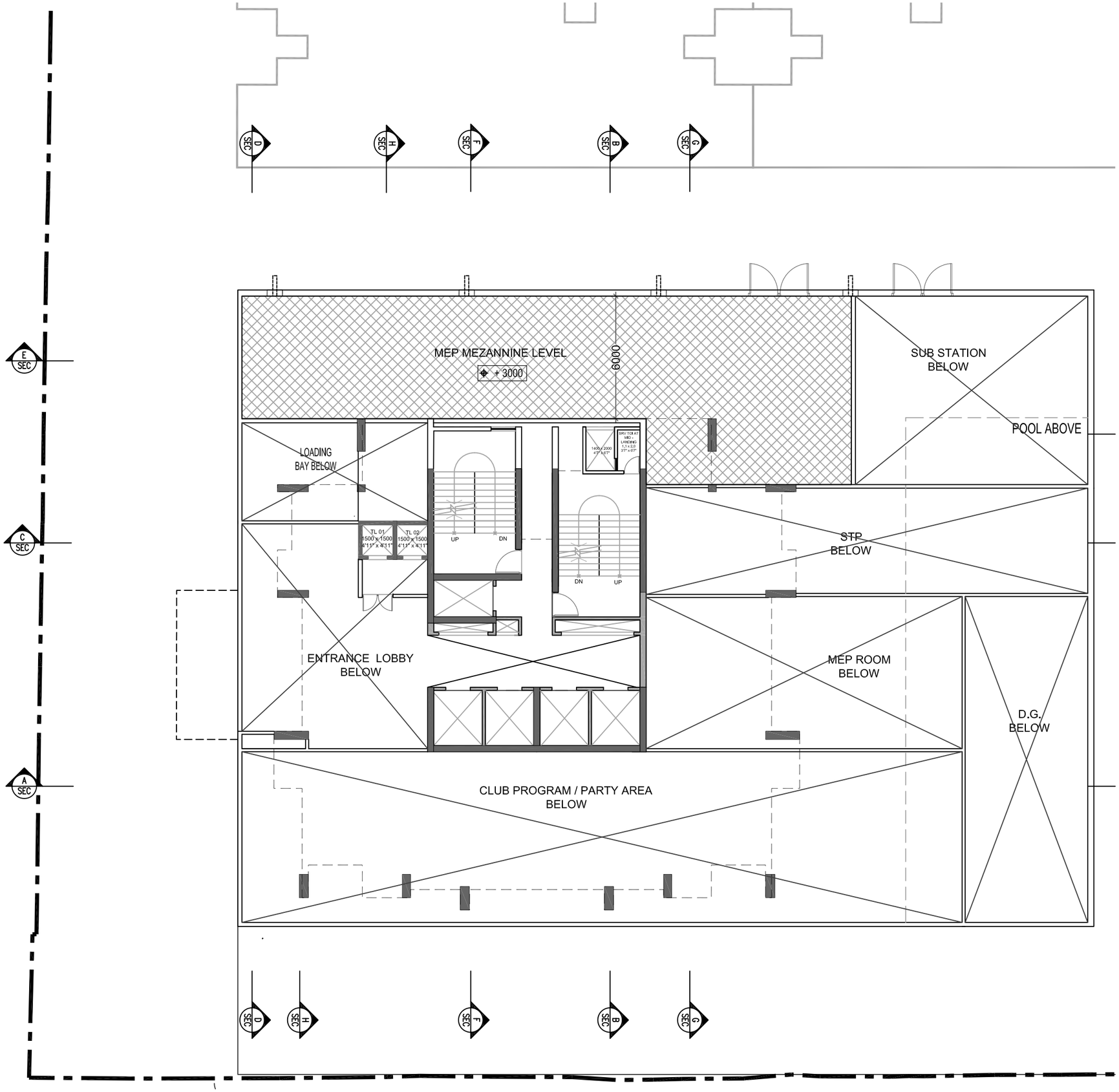
FLOOR PLAN: GROUND / P0

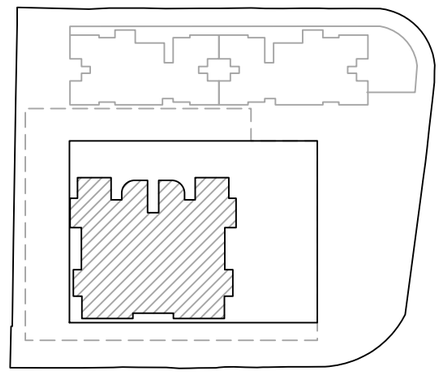
TOTAL CAR PARKING -
63+64+83 = 210 NOS

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LODHA PAREL
RESIDENTIAL TOWER

MEZZANINE LEVEL PLAN
SCALE 1:200 (A3)

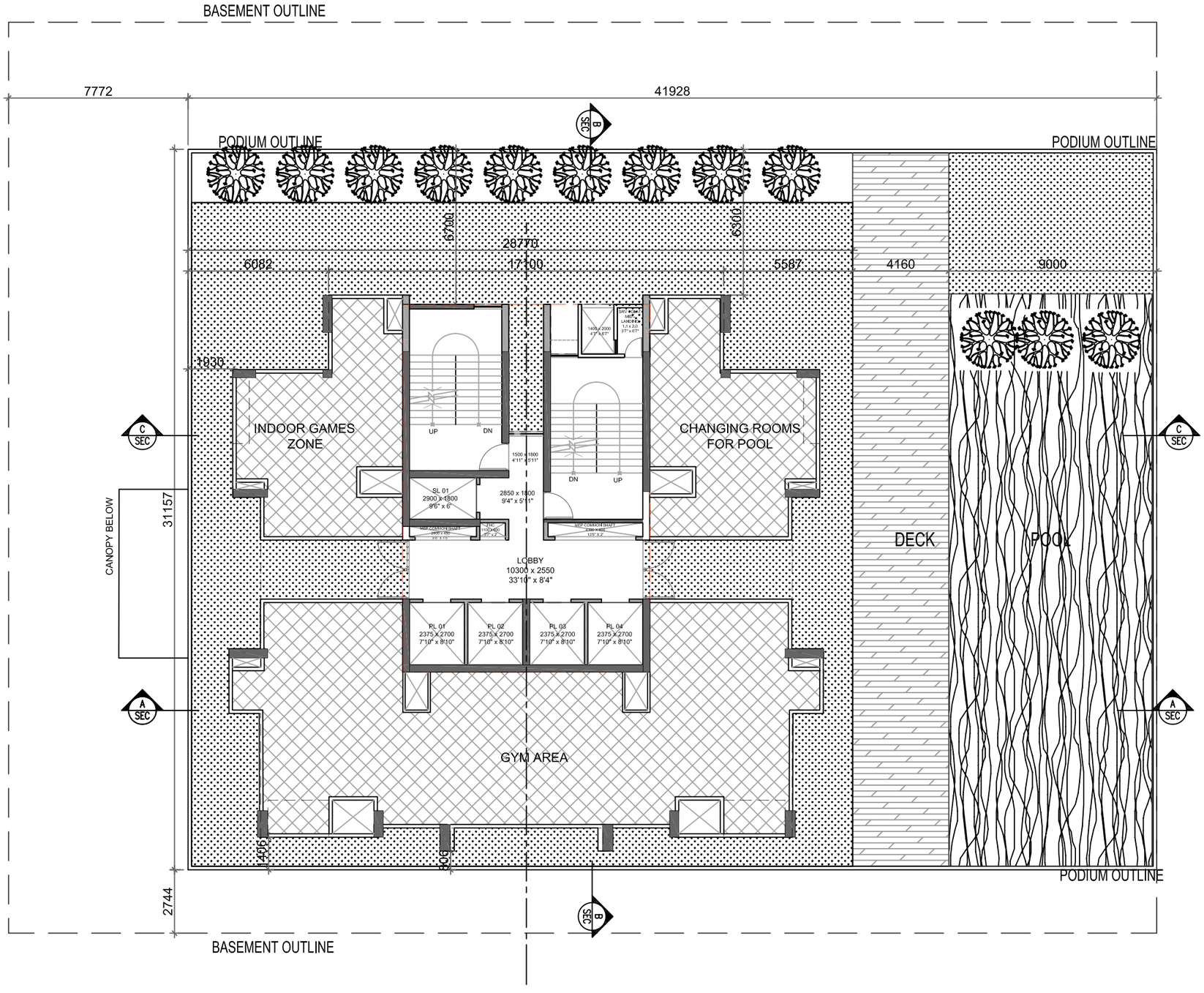


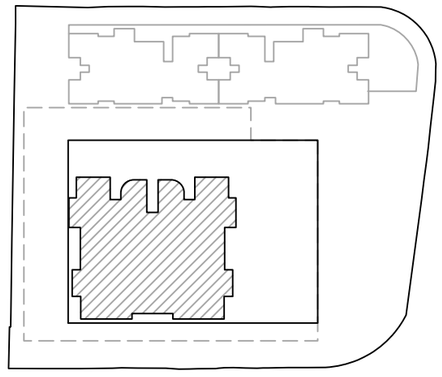


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RESIDENTIAL TOWER

PODIUM TOP PLAN
SCALE 1:200 (A3)

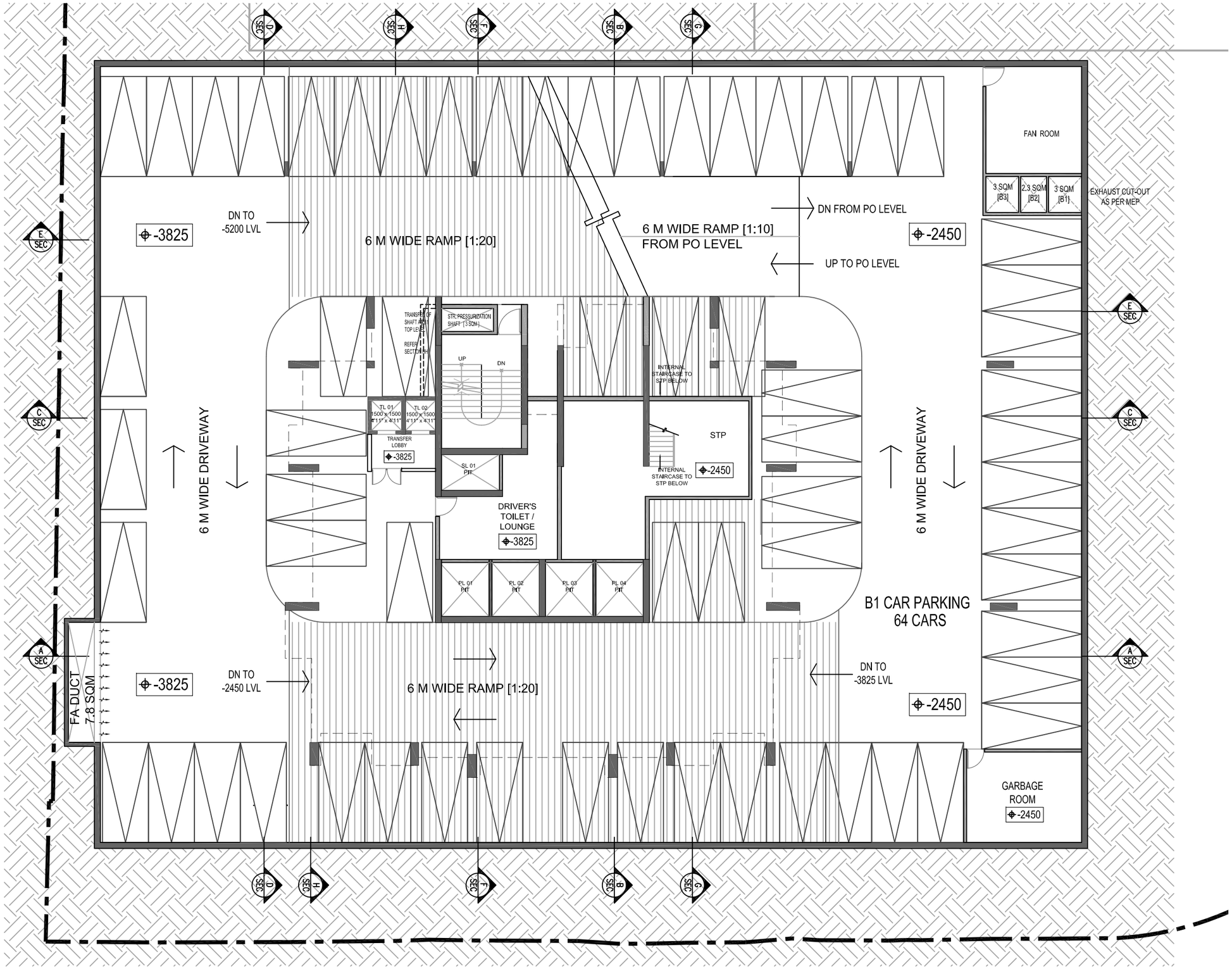


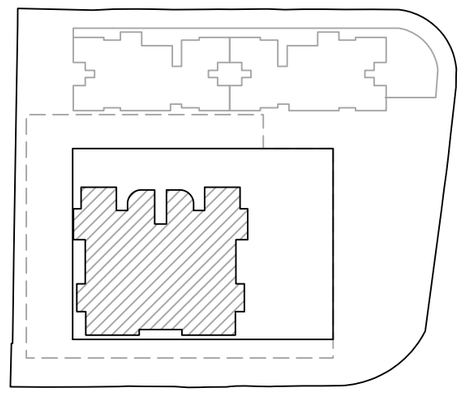


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LODHA PAREL
RESIDENTIAL TOWER

BASEMENT B1 PLAN
SCALE 1:200 (A3)





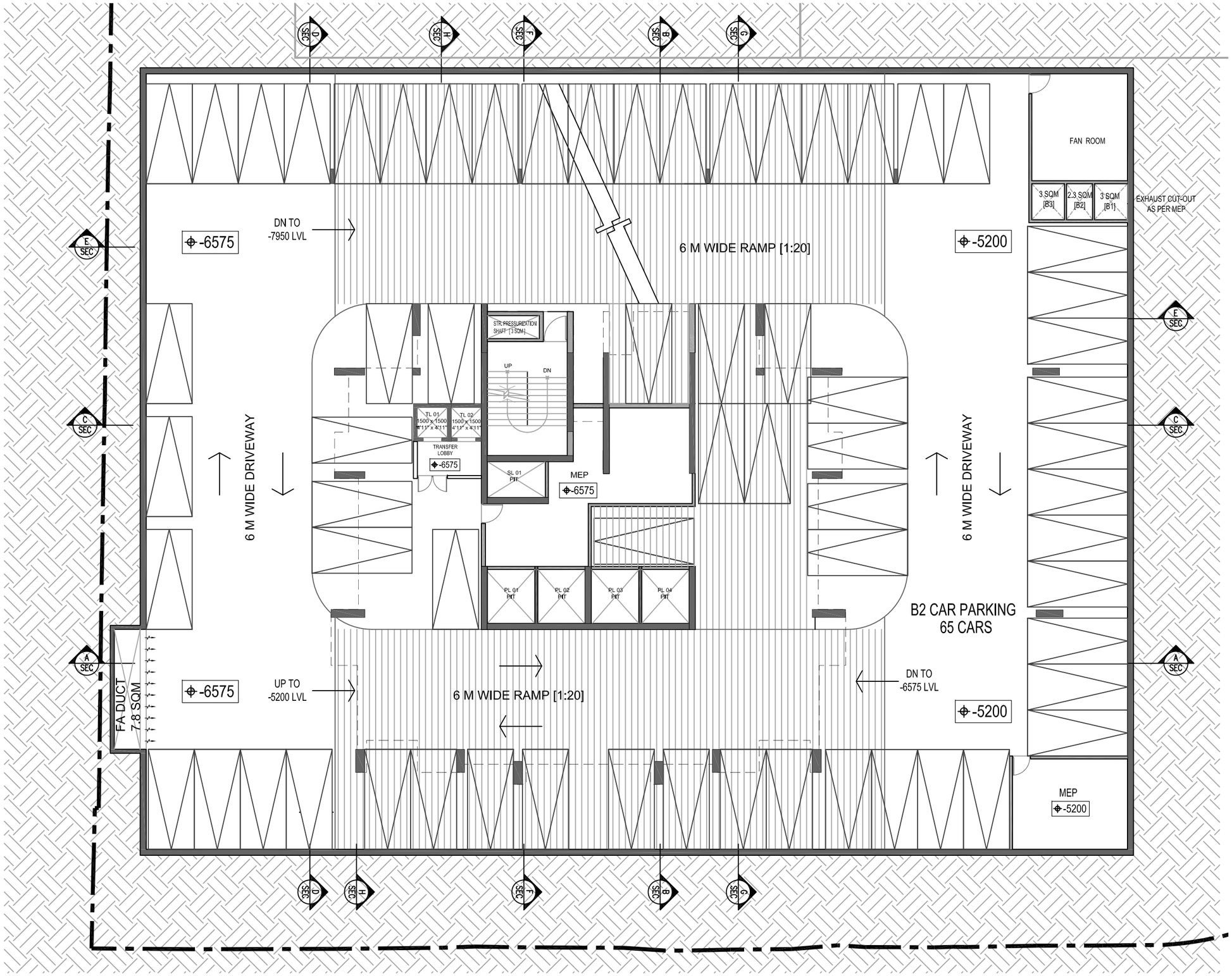
FLOOR PLAN: BASEMENT B1

CAR PARKING - 63 NOS

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LODHA PAREL
RESIDENTIAL TOWER

BASEMENT B2 PLAN
SCALE 1:200 (A3)



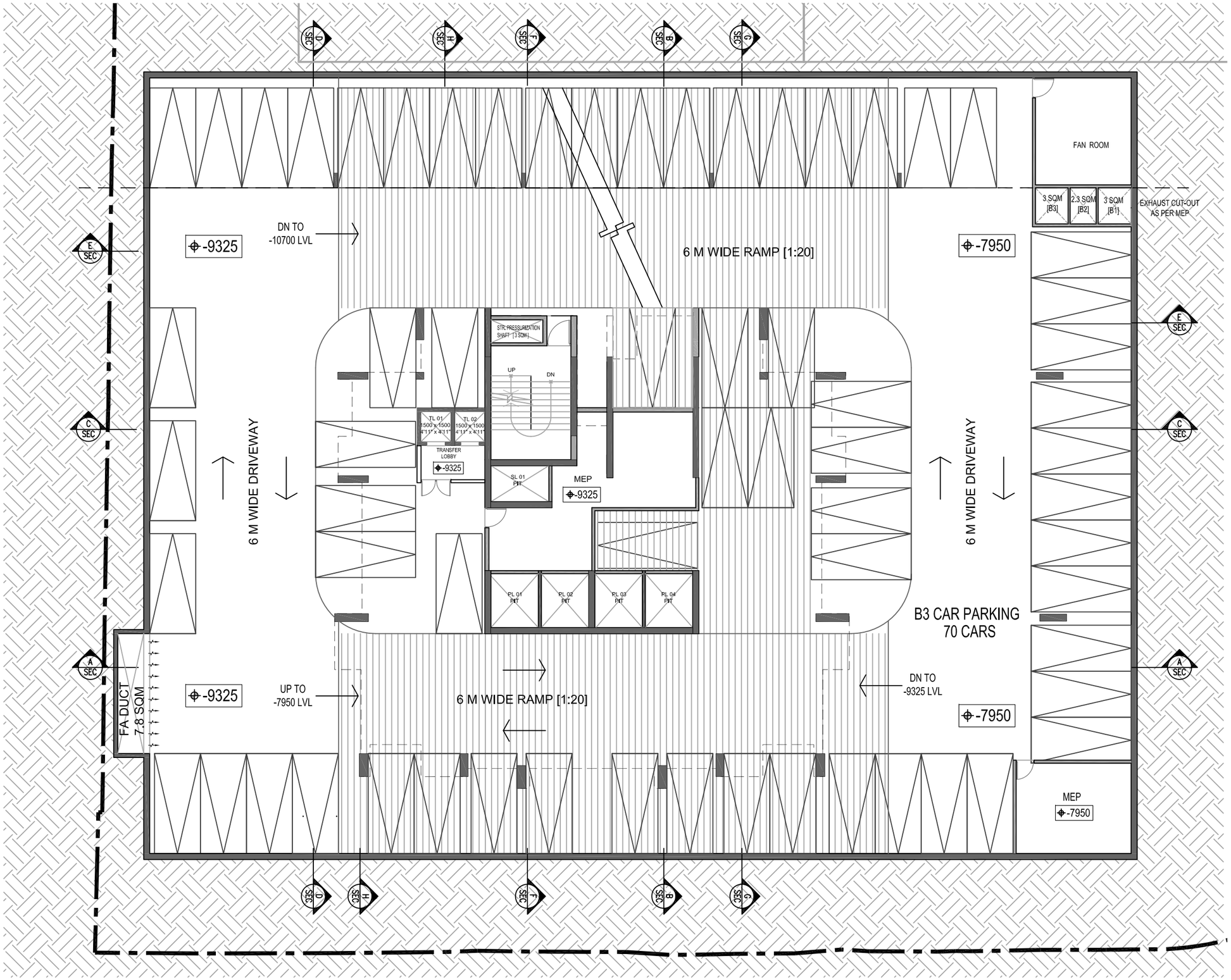
FLOOR PLAN: BASEMENT B2

CAR PARKING - 64 NOS

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RESIDENTIAL TOWER

BASEMENT B3 PLAN
SCALE 1:200 (A3)



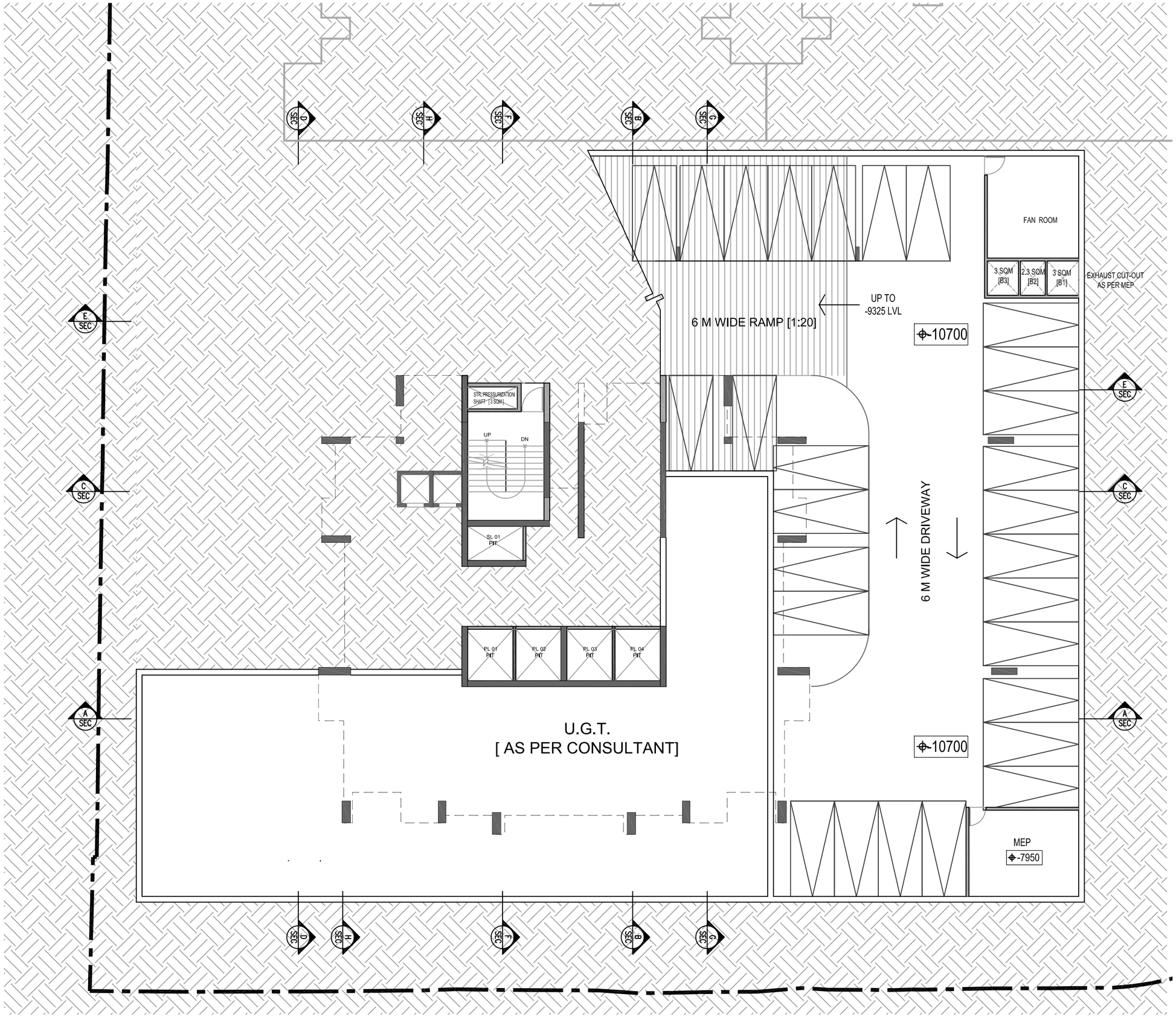
FLOOR PLAN: BASEMENT B3

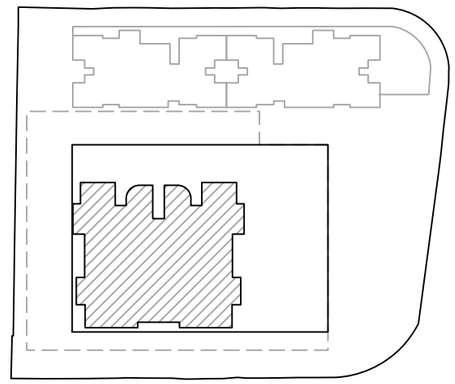
CAR PARKING - 64+19 = 83 NOS

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LODHA PAREL
RESIDENTIAL TOWER

UGT LEVEL PLAN
SCALE 1:200 (A3)

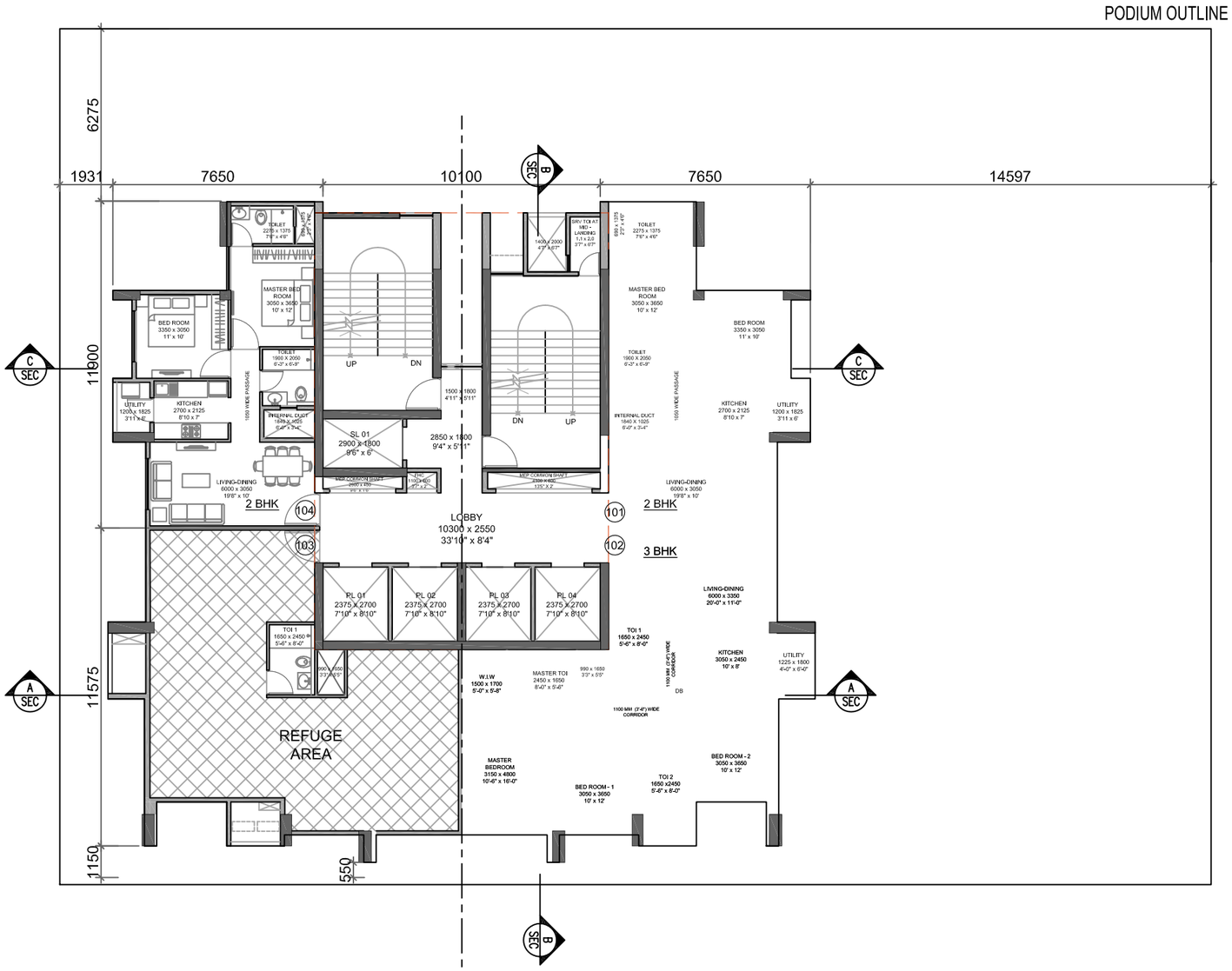




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LODHA PAREL
RESIDENTIAL TOWER

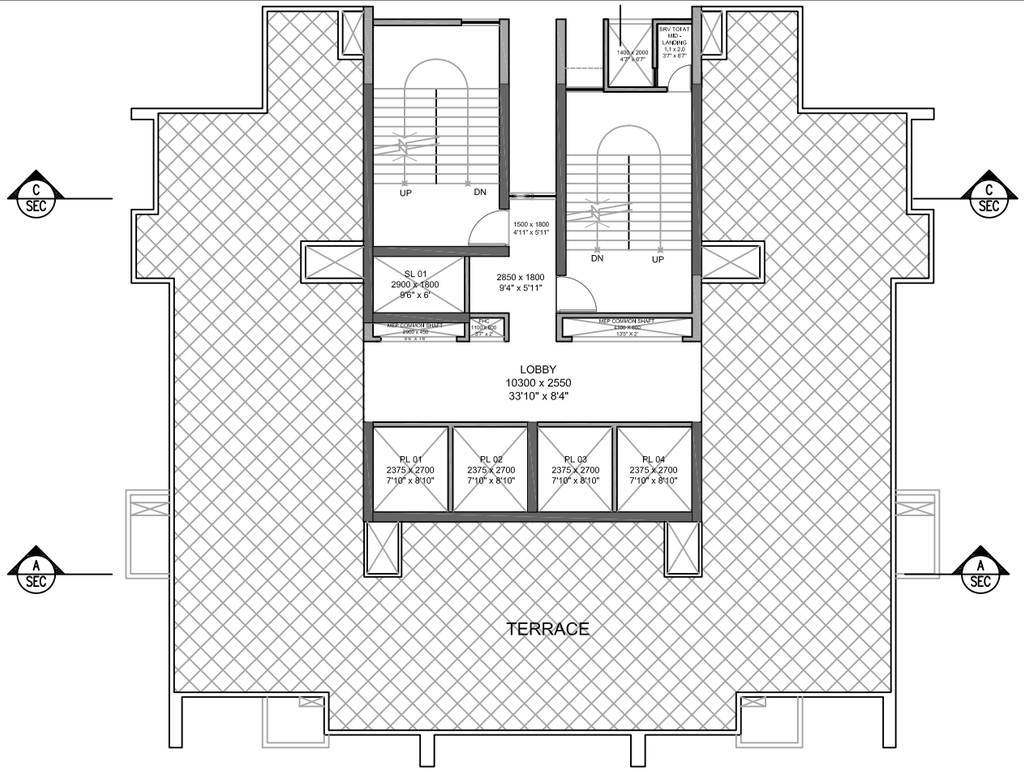
OPTION G
REFUGE FLOOR PLAN
SCALE 1:200 (A3)



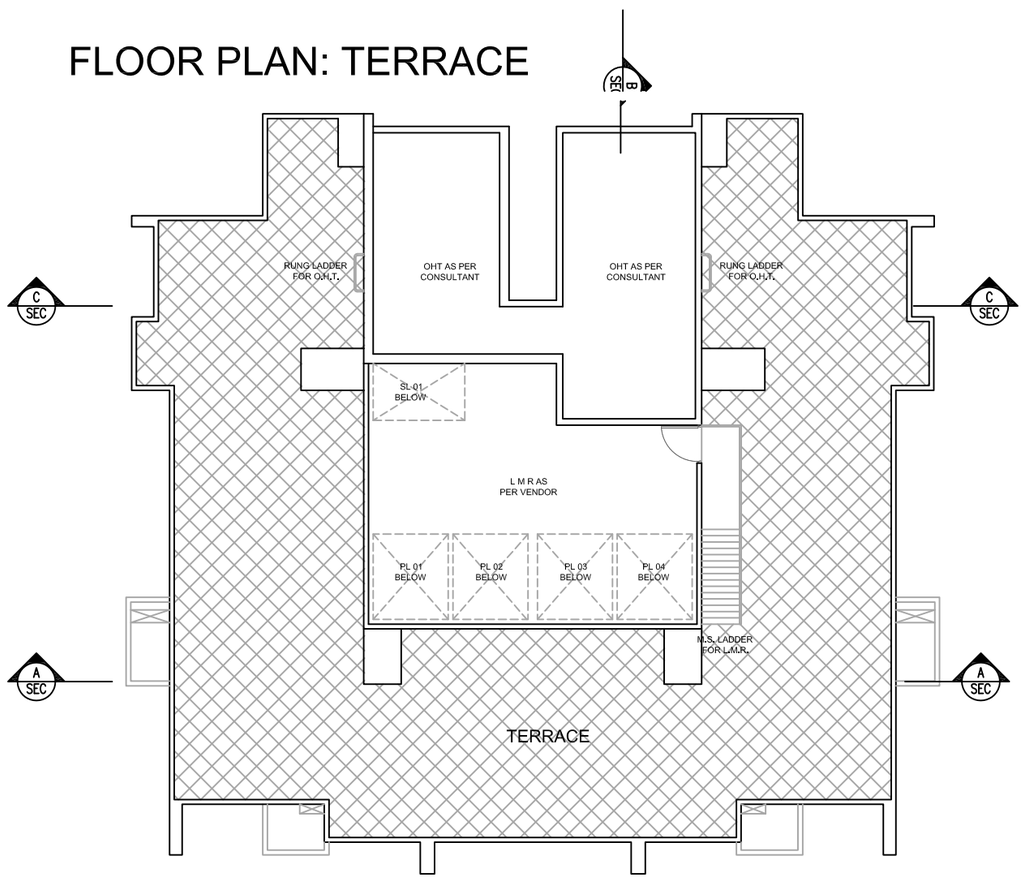
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27-01-16

LODHA PAREL
RESIDENTIAL TOWER

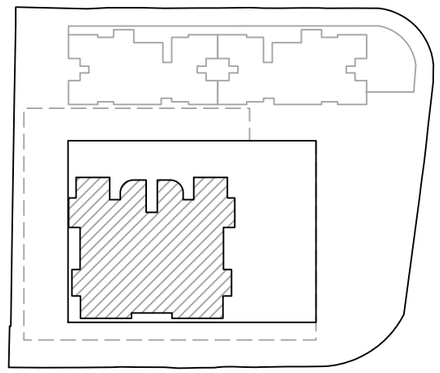
OPTION G
TERRACE PLAN
SCALE 1:200 (A3)



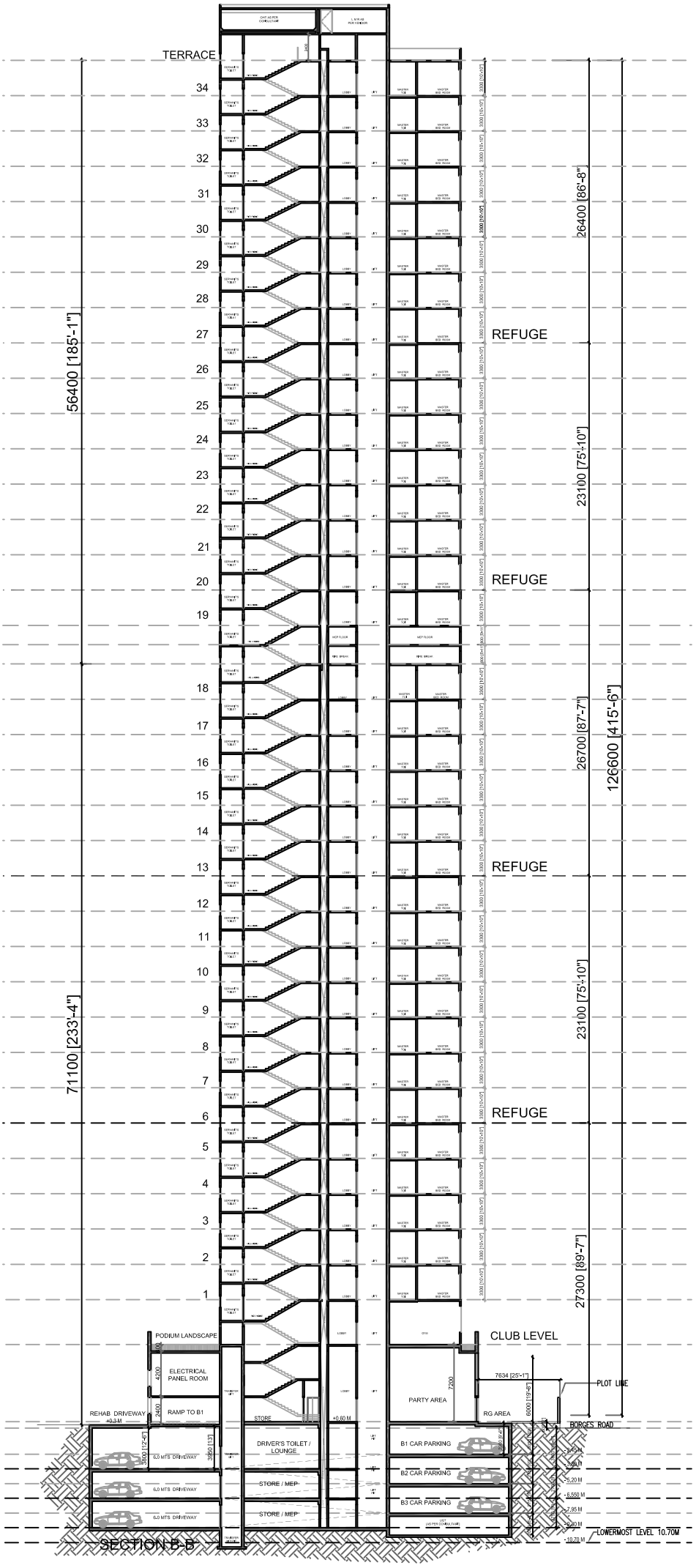
FLOOR PLAN: TERRACE



FLOOR PLAN:
MACHINE ROOM



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27-01-16


TERRACE
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
REFUGE
REFUGE
REFUGE
REFUGE
56400 [185'-1"]
71100 [233'-4"]
26400 [86'-8"]
23100 [75'-10"]
26700 [87'-7"]
23100 [75'-10"]
27300 [89'-7"]
126600 [415'-6"]
PODIUM LANDSCAPE
ELECTRICAL PANEL ROOM
RAMP TO B1
REHAB DRIVEWAY
+0.3 M
STORE
+0.60 M
DRIVER'S TOILET / LOUNGE
STORE / MEP
STORE / MEP
6.0 MTS DRIVEWAY
6.0 MTS DRIVEWAY
6.0 MTS DRIVEWAY
CLUB LEVEL
PARTY AREA
RG AREA
B1 CAR PARKING
B2 CAR PARKING
B3 CAR PARKING
7634 [25'-1"]
PLOT LINE
BORGES ROAD
-3.45 M
-5.00 M
-75.20 M
-6.550 M
-7.95 M
-9.20 M
-10.70 M
LOWERMOST LEVEL 10.70M
SECTION B-B

LODHA PAREL
SALE TOWER

CONCEPT STAGE - 2016

MONTH_MAY

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RESIDENTIAL TOWER

TYPICAL PLAN
1ST-8TH FLOOR
SCALE 1:100 (A3)

) [9'-10"]

25750 [84'-6"]

11951 [39'-3"]

12225 [40'-1"]

8"]

D SEC

B SEC

C SEC

A SEC

MASTER BED ROOM 3650 x 3050 12' x 10'

SPACE FOR O.D.U. 1500 x 1200

1050 x 900

BED ROOM 3200 x 3050 10'6' x 10'

TOILET 1550 X 2400 5'1" x 8'

DUCT 1550 X 1075 5'1" x 3'6"

TOILET 1550 X 2400 5'1"- x 8'

KITCHEN 3200 x 2275 10'-6" x 7'-6"

1050MM (3'-5") WIDE CORRIDOR

UP

DN

LOWERING DEVICE 1500 x 2000

SL 01 2800 x 1800 9'2" x 6'

2850 x 1800 9'4" x 6'

MEP COMMON SHAFT 2950 x 450 9'8" x 1'6"

FHC 1200 x 600 4' x 2'

LIVING-DINING 6000 x 3050 19'8" x 10'

2 BHK

104

3 BHK

103

LOBBY 10100 x 2550 33'2" x 8'4"

LIVING-DINING 6000 x 3350 19'-8" x 11'-0"

PL 01 2375 x 2700 7'10" x 8'10"

PL 02 2375 x 2700 7'10" x 8'10"

PL 03 2375 x 2700 7'10" x 8'10"

PL 04 2375 x 2700 7'10" x 8'10"

UTILITY 1225 x 2050 4'-0" x 6'-9"

KITCHEN 3250 x 2550 10'-8" x 8'-4"

1050 MM (3'-5") WIDE CORRIDOR

TOI 1 1500 x 2550 5' x 8'-4"

DUCT 900 x 1650 3' x 5'5"

MASTER TOI 2450 x 1650 8'-0" x 5'-5"

W.I.W 1525 x 1750 5'-0" x 5'-9"

1100 MM (3'-7") WIDE CORRIDOR

BED ROOM - 2 3050 x 4400 10' x 14'-5"

TOI 2 1650 x2450 5'-5" x 8'-0"

SPACE FOR O.D.U. 1600 x 1500 5'3" x 5'

BED ROOM - 1 3050 x 3650 10' x 12'

MASTER BEDROOM 3225 x 4400 10'-7" x 14'-5"

670

SRV TOI AT MID - LANDING 1.1M x 1.28M

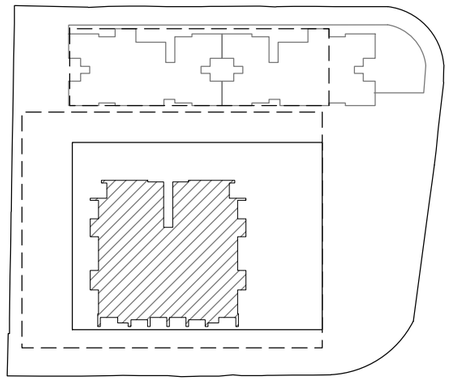
SPACE FOR O.D.U. 1500 x 2100

101

2 BHK

102

3 BHK



CARPET AREA

- 2BHK - 59.7 SQ M - 640.4 SQ FT
- 3BHK - 92.2 SQ M - 992.8 SQ FT

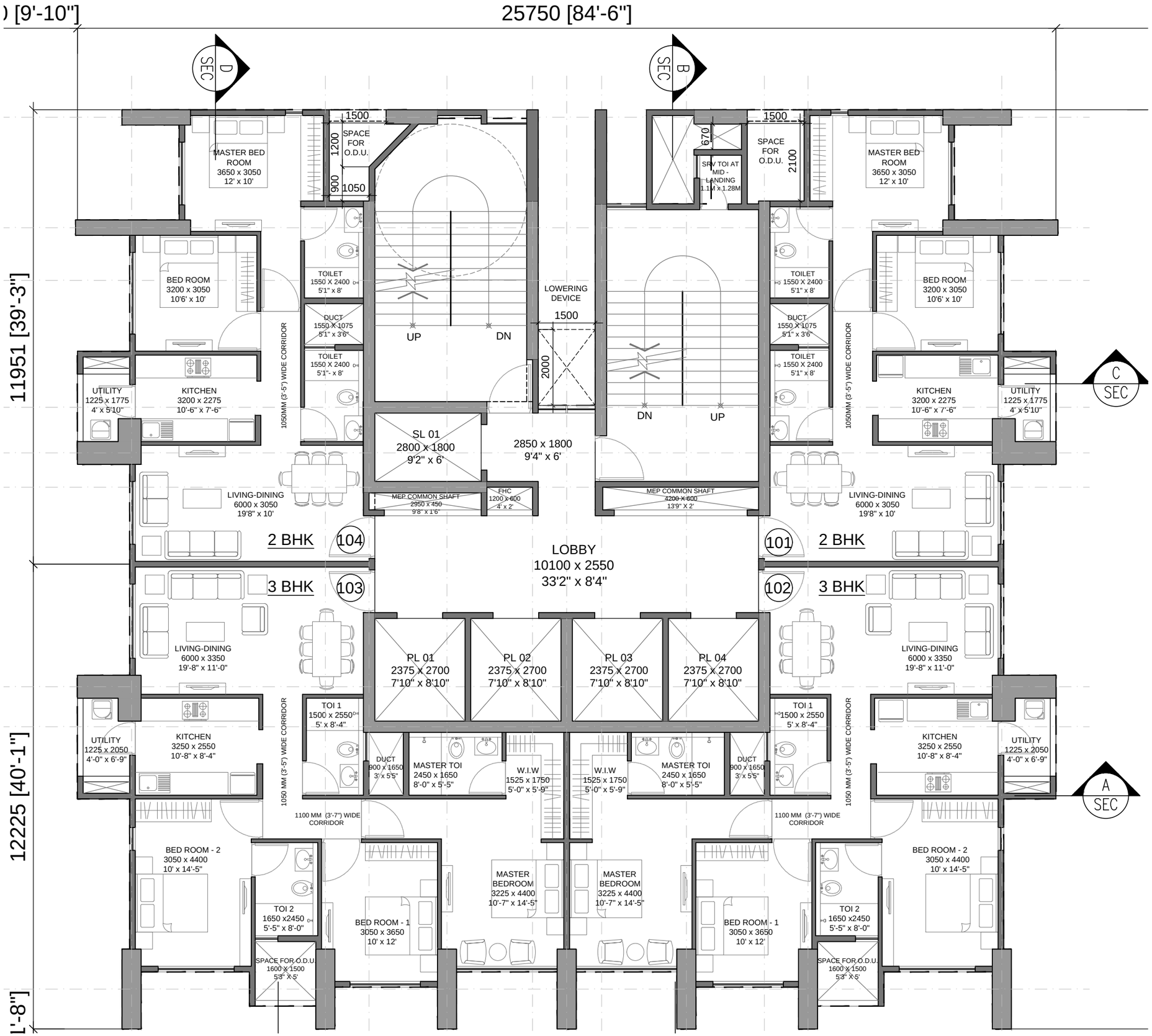
TOTAL FLOOR CARPET AREA
303.8 SQ M - 3270.1 SQ FT

SALEABLE AREA (1.65 LOADING)
- 2BHK - 1056.66 SQ FT
- 3BHK - 1638.12 SQ FT

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RESIDENTIAL TOWER

TYPICAL PLAN
9TH FLOOR & ABOVE
SCALE 1:100 (A3)



CARPET AREA

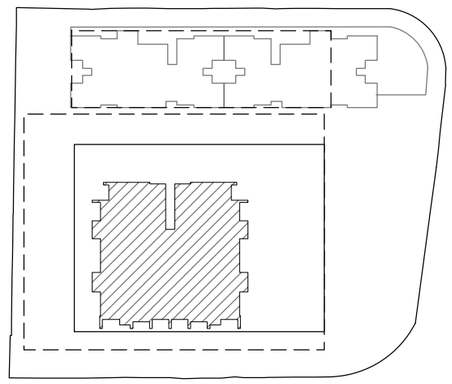
- 2BHK - 61.9 SQ M - 666.4 SQ FT
- 3BHK - 92.2 SQ M - 992.8 SQ FT

TOTAL FLOOR CARPET AREA
308.2 SQ M - 3317.4 SQ FT

SALEABLE AREA (1.65 LOADING)
- 2BHK - 1099.56 SQ FT
- 3BHK - 1638.12 SQ FT

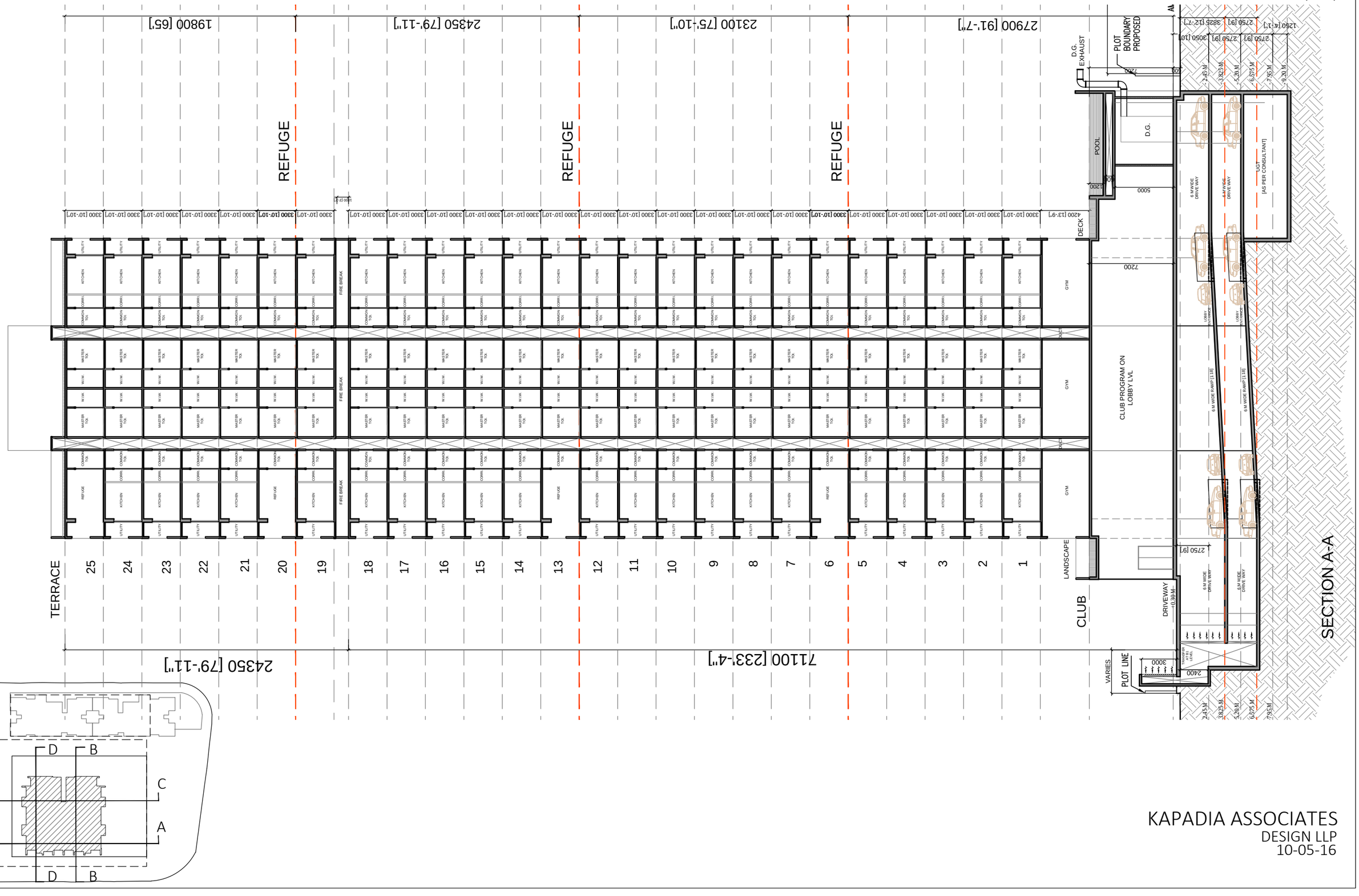
TOTAL FLOOR BUILT UP AREA
=474.9 SMT = 5112.4 SFT

TOTAL FLOOR FSI AREA
= 359.7 SMT = 3871.8 SFT



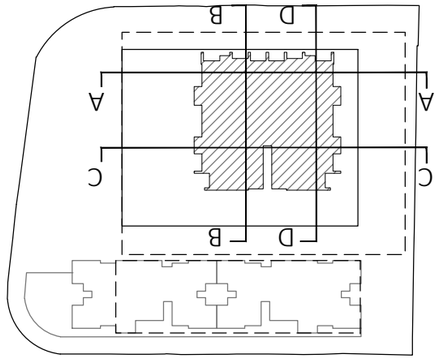
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LODHA PAREL
RESIDENTIAL TOWER
SECTIONS
SCALE 1:300 (A3)

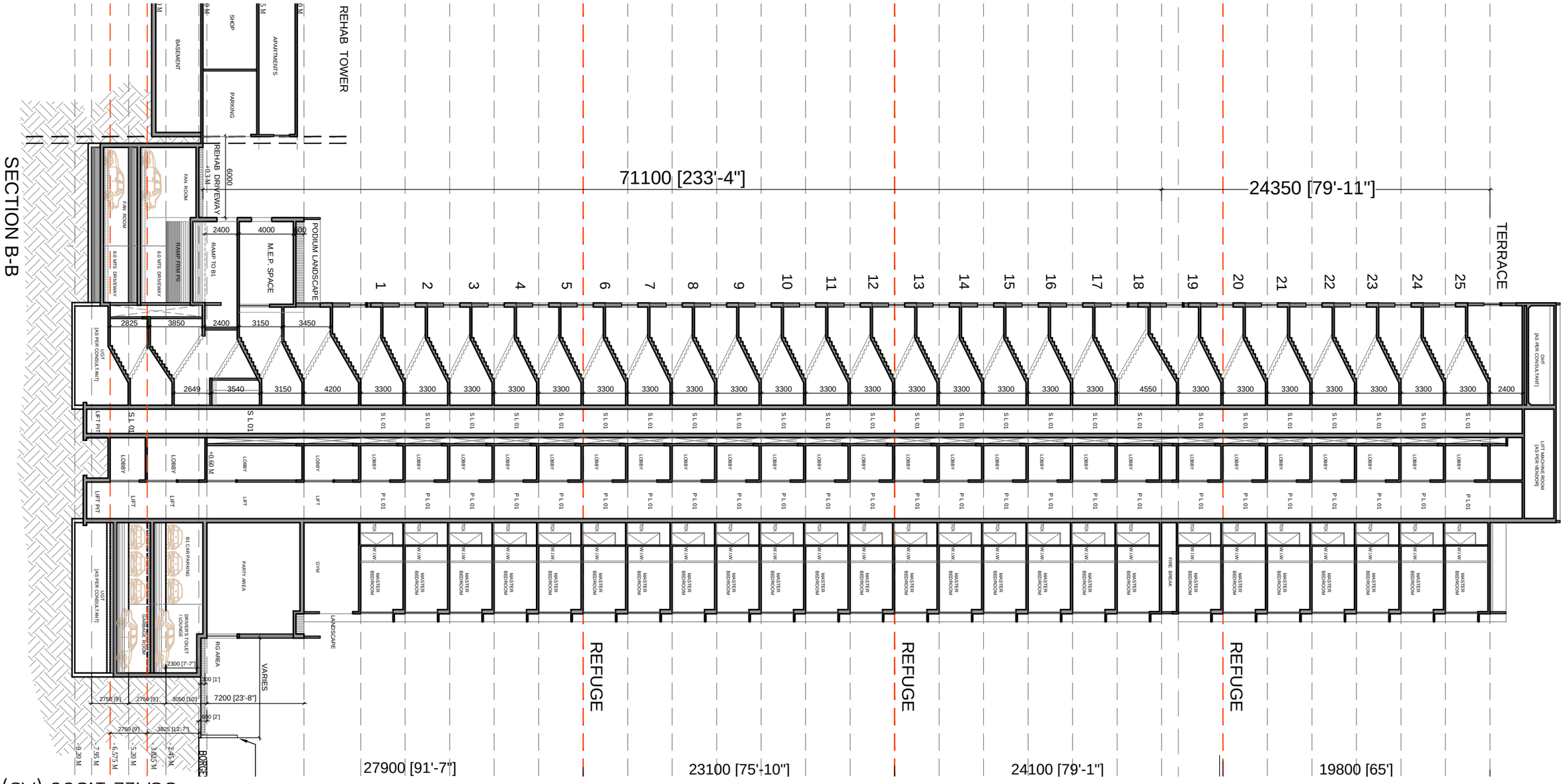


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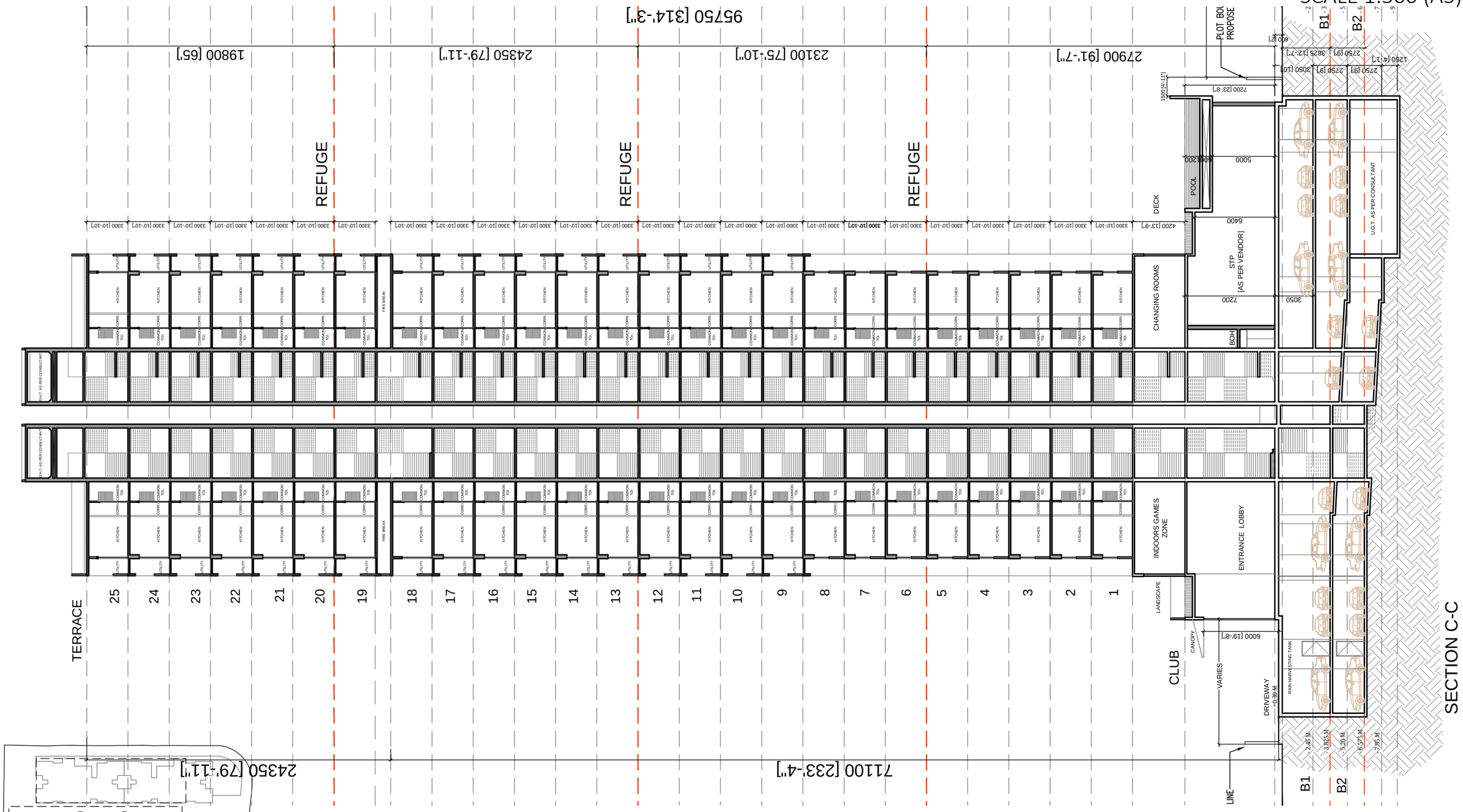
SECTION B-B

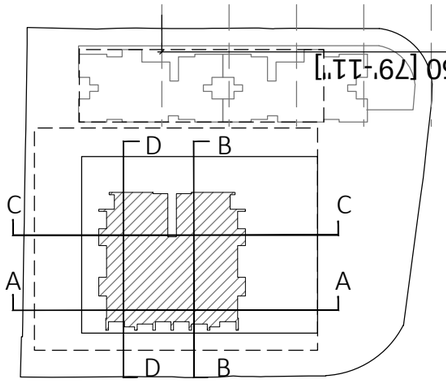


SCALE 1:300 (A3)

LODHA PAREL
RESIDENTIAL TOWER
SECTIONS

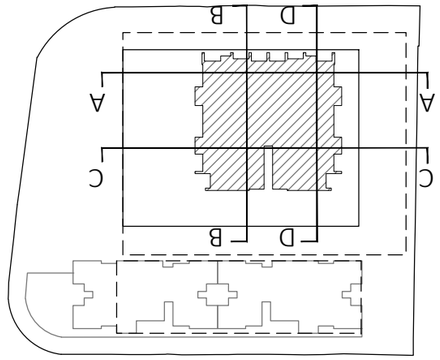
LODHA PAREL
RESIDENTIAL TOWER
SECTIONS
SCALE 1:300 (A3)

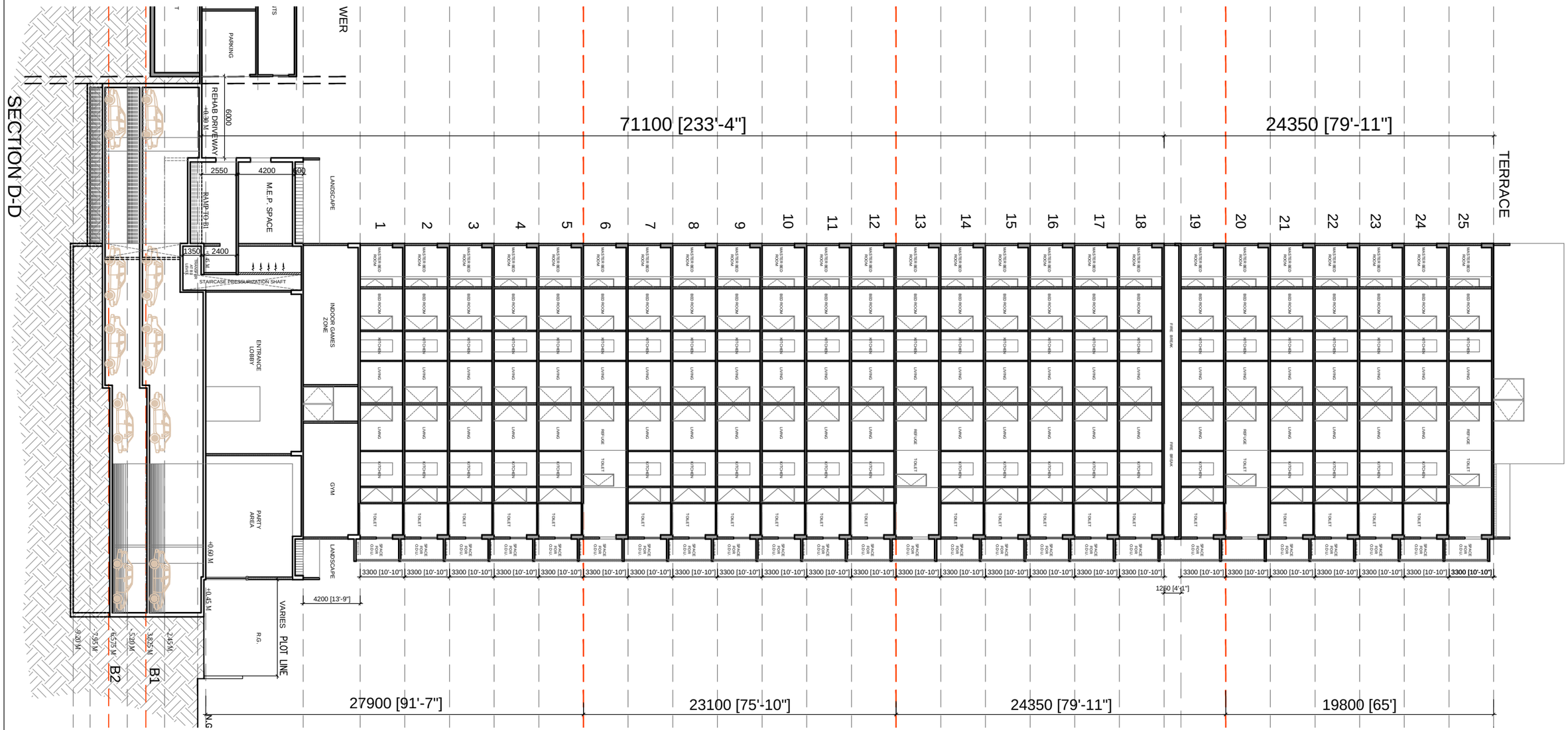




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10-05-16





LODHA PAREL
RESIDENTIAL TOWER
SECTIONS
SCALE 1:300 (A3)

Supriya

From: Puneet
Sent: 25/05/2016 AM 10:22
To: 'Rajiv Nahar'; 'Hemali Gokani'
Cc: Dayanand; Supriya
Subject: RE: Parel_Discussion this evening

Hi Rajiv / Hemali,
Based on our discussion yesterday we will start drawing up the scheme for the Sale tower. Summary of major points

1. 2 basements – target 145 cars
2. No podium / carlift option
3. Maximum depth of excavation including raft not to exceed -8M
4. Lift well pit also to be managed within -8M depth of excavation
5. UGT – manage in -8 m depth or shift to North east corner on west of Rehab Basement
6. Podium top Pool – cantilever beyond the podium edge towards west side to achieve pool width of 4.2 M as per revised landscape intent received from STX
7. No cantilevers from podium into 6 M firetender pathway on North of podium
8. No steel canopy supported on columns in West setback. Manage as cantilever from tower to maximum extent possible

For the Tenant (Rehab) building

9. Maximum depth of excavation including raft not to exceed -4 M
10. Increase footprint of basement below the East edge (Curved shop) to make up for depth loss in tanks
11. Lodha MEP team to confirm STP technology MBBR or SAFF
12. Lodha to confirm 2 shops deletion from ground. This is critical to manage STP in the revised scenario
13. Lodha to confirm additional resi apartments. This has a impact on Gym/Society room location

Please do come back to us on points 12 and 13 within this week for us to update the dwg set

regards,
puneet anand
KAPADIA ASSOCIATES DESIGN LLP I www.kapl.in I 022-6660-2838 I 022-241-92500 (D)

From: Puneet
Sent: Tuesday, May 24, 2016 1:05 PM
To: Rajiv Nahar <Rajiv.Nahar@lodhagroup.com>; 'Hemali Gokani' <hemali.gokani@lodhagroup.com>
Cc: Dayanand <dayanand@kapl.in>; Supriya <supriya@kapl.in>
Subject: Parel_Discussion this evening

Hi Rajiv,

- Dayanand updated me about your telephonic discussion with him w.r.t. parel sale tower.
- Me and Supriya will come down at 5 pm this evening to your office to understand the wayforward and discuss strategy for basement services.

regards,
puneet anand
KAPADIA ASSOCIATES DESIGN LLP I www.kapl.in I 022-6660-2838 I 022-241-92500 (D)

LODHA PAREL
SALE TOWER

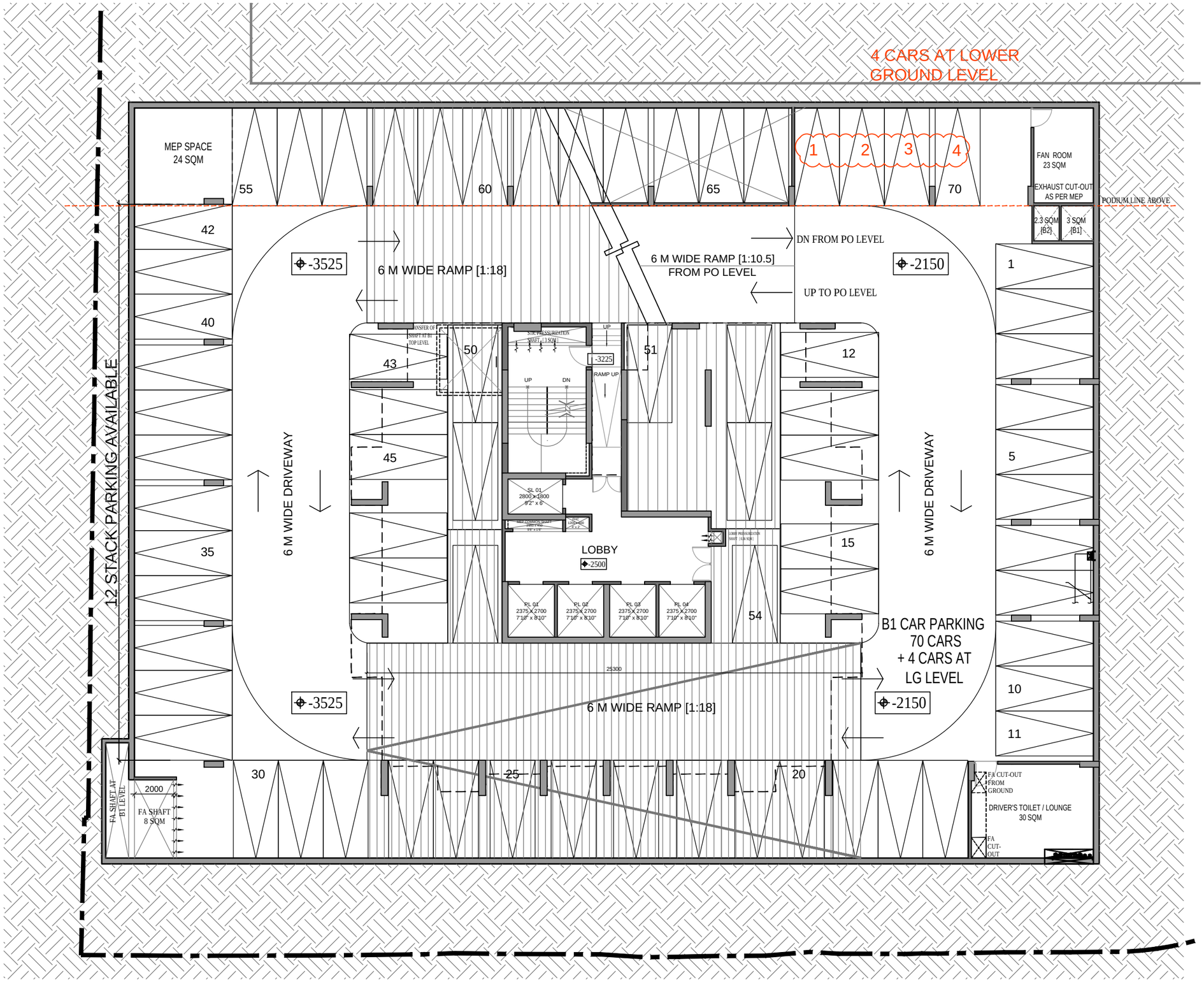
CONCEPT STAGE - 2016

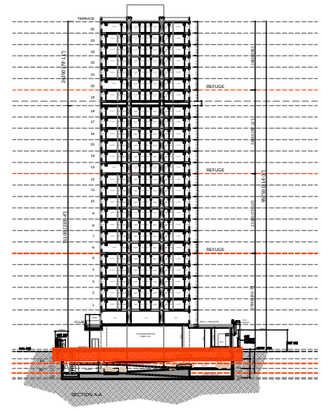
MONTH_JUNE

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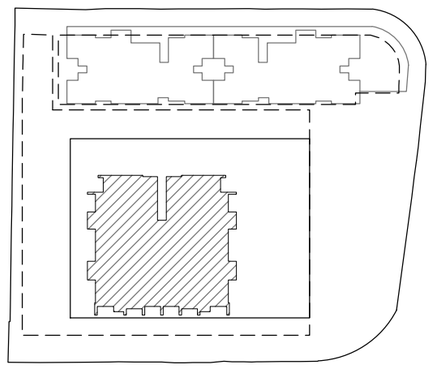
LODHA PAREL
RESIDENTIAL TOWER

BASEMENT B1 PLAN
SCALE 1:200 (A3)





KEY SECTION



KEY PLAN

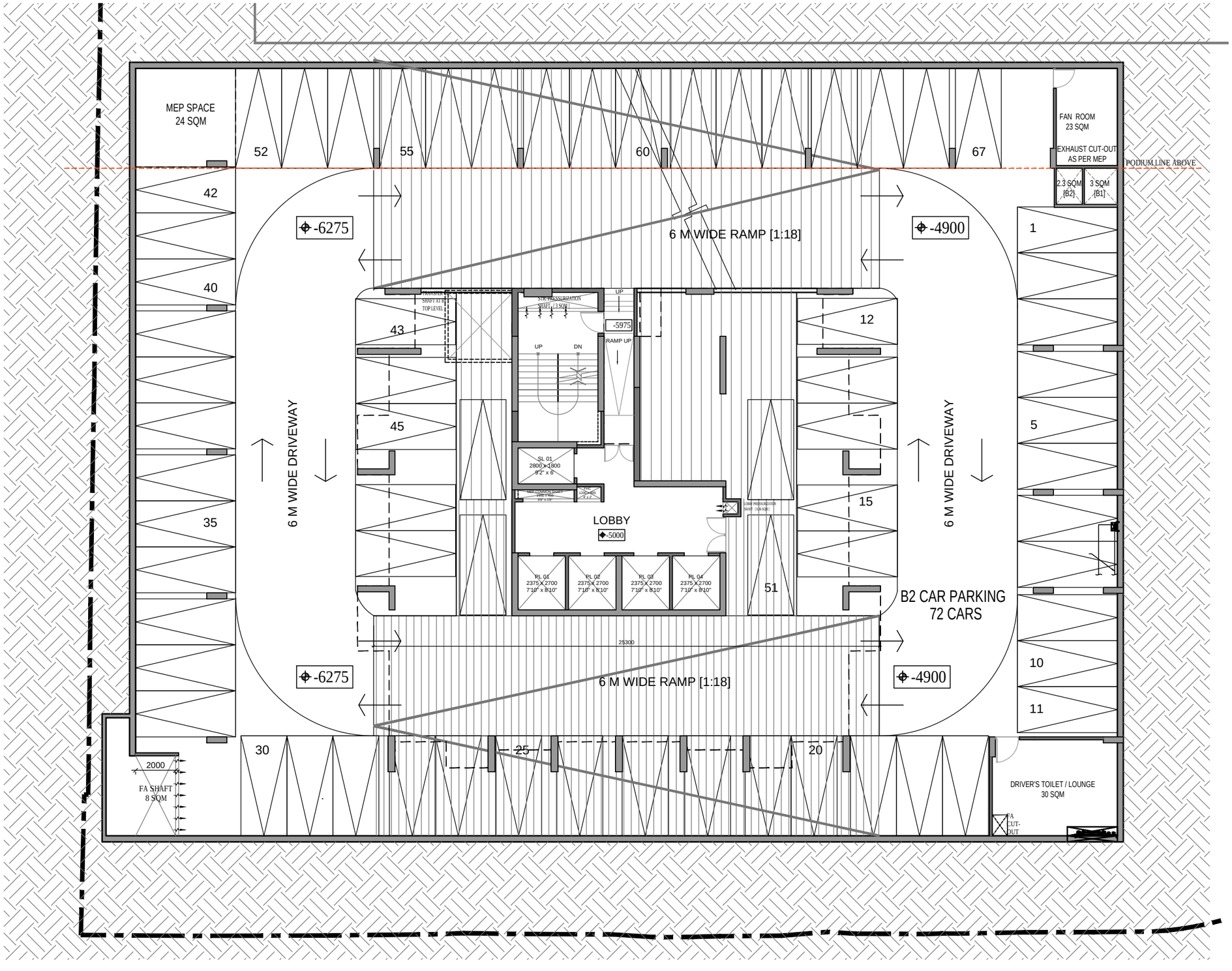
FLOOR PLAN: BASEMENT B1

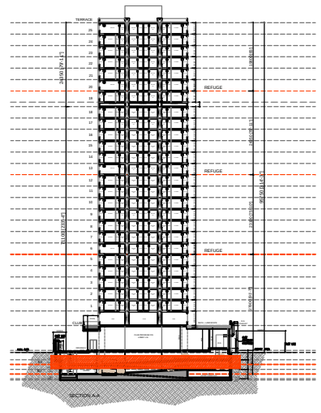
CAR PARKING - 70+4 [LG LVL] = 74 CARS

KAPADIA ASSOCIATES
DESIGN LLP
16-06-16

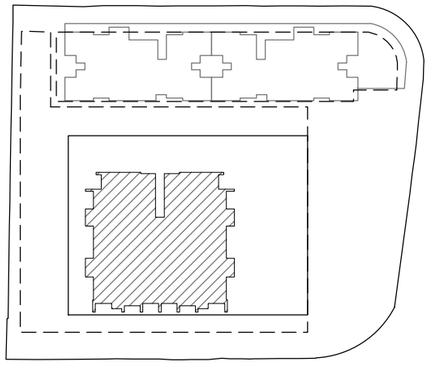
LODHA PAREL
RESIDENTIAL TOWER

BASEMENT B2 PLAN
SCALE 1:200 (A3)





KEY SECTION



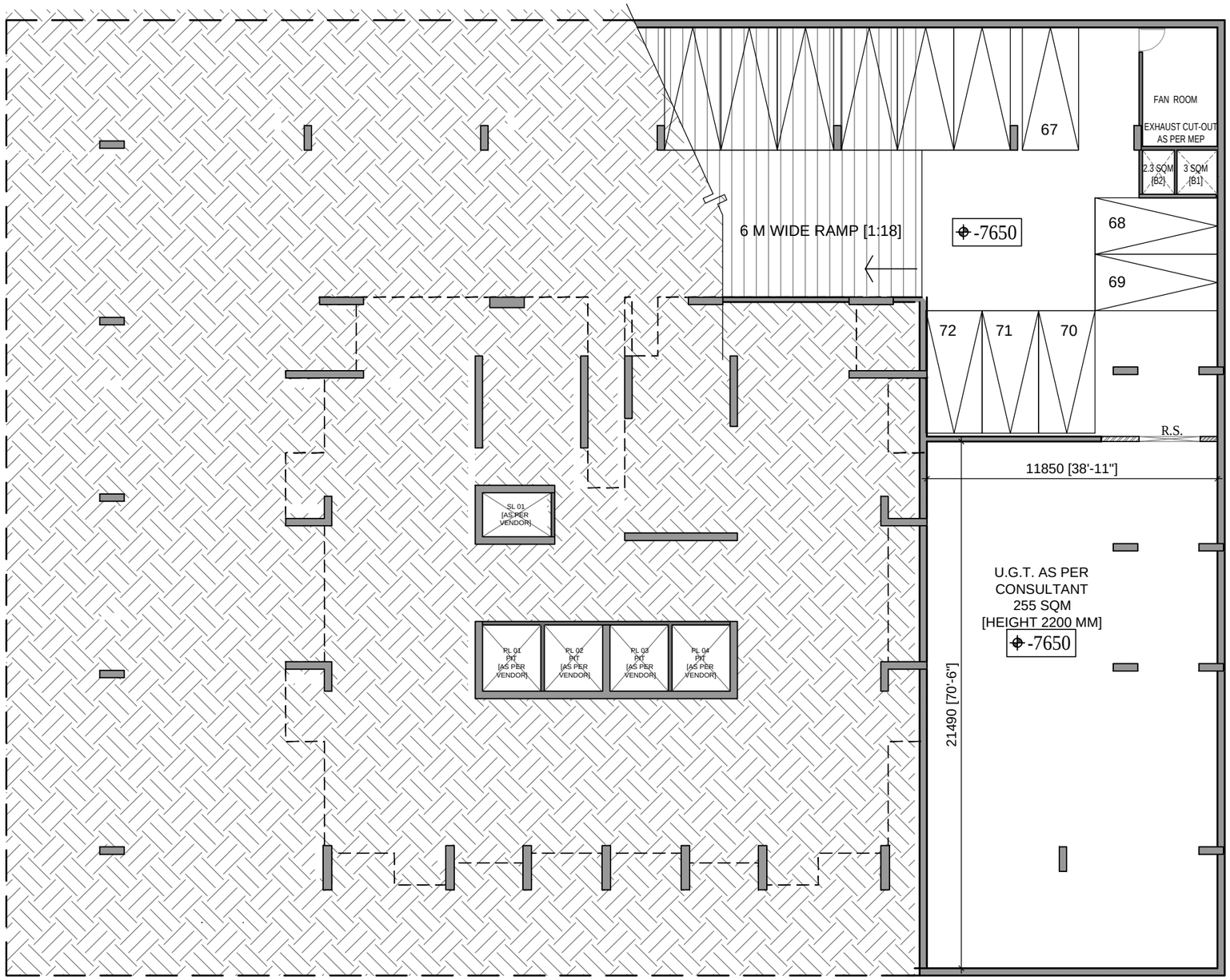
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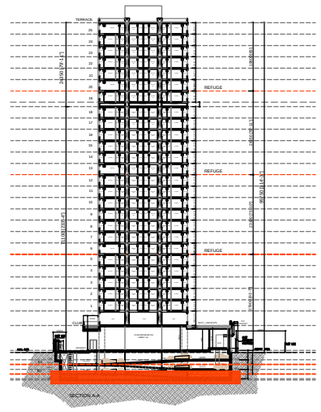
FLOOR PLAN: BASEMENT B2
CAR PARKING - 72 CARS

KAPADIA ASSOCIATES
DESIGN LLP
16-06-16

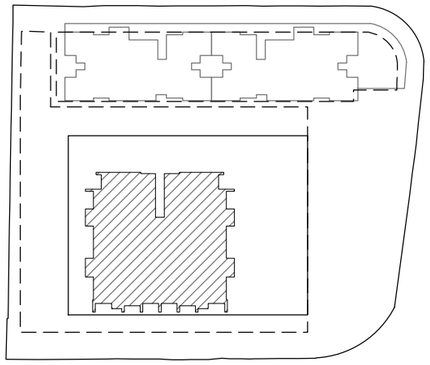
LODHA PAREL
RESIDENTIAL TOWER

UGT LEVEL PLAN
SCALE 1:200 (A3)





KEY SECTION



KEY PLAN

FLOOR PLAN: UGT LEVEL

KAPADIA ASSOCIATES
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16-06-16

TOWER

BASEMENT OUTLINE

6 M WIDE DRIVEWAY TO STILT PARKING

+ 450

SPACE FOR MEP ABOVE RAMP

PODIUM OUTLINE

EXHAUST CUT-OUT AS PER MEP

R.S. R.S. R.S.

2.3 SQM [B2]

3 SQM [B1]

DN TO B1

6 MTS WIDE RAMP [1:10.8]

UP TO MEZZANINE

SUB STATION 153 SQM

+ 1200

RG AREA 127 SQM.

+ 300

UP FROM B1

METER ROOM 3 SQM

LOADING BAY

+ 450

STR. PRESSURIZATION SHAFT

+ 600

TOILET AT P0 LEVEL

UP FRM B1

UP TO P1

STP 102 SQM

+ 1200

+ 900

SL 01 2800 x 1800 9'2" x 6'

2850 x 1800 9'4" x 6'

UP TO P1

ENTRANCE LOBBY [128 SQM]

LOBBY PRESSURIZATION SHAFT 0.36 SQM

TOWER ENTRANCE

+ 600

LOBBY 10300 x 2550 33'10" x 8'4"

BOH AREA 106 SQM

+ 600

AMENIT 430 SQ.

RL 01 2375 X 2700 7'10" x 8'10"

RL 02 2375 X 2700 7'10" x 8'10"

RL 03 2375 X 2700 7'10" x 8'10"

RL 04 2375 X 2700 7'10" x 8'10"

D.G. 80 SQM

+ 1200

7.5 M WIDE EXTERNAL DRIVEWAY

CLUB PROGRAM / PARTY AREA [285 SQM]

+ 600

PODIUM OUTLINE

FA DUCT

POOL ABOVE

FA LOUVERS

BASEMENT OUTLINE

+ 300

RG AREA-1 331.5 SQM.

+ 450

RESI TOWER ENTRY

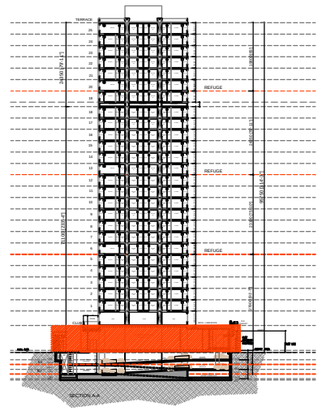
+/- 0

FLOOR PLAN: GROUND / P0

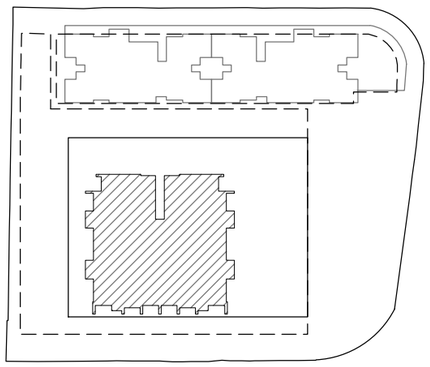
TOTAL CAR PARKING -
4+70+12[STACK]+72 = 158 NOS [4 TANDEM CARS]

LODHA PAREL
RESIDENTIAL TOWER

GROUND FLOOR PLAN
SCALE 1:200 (A3)



KEY SECTION

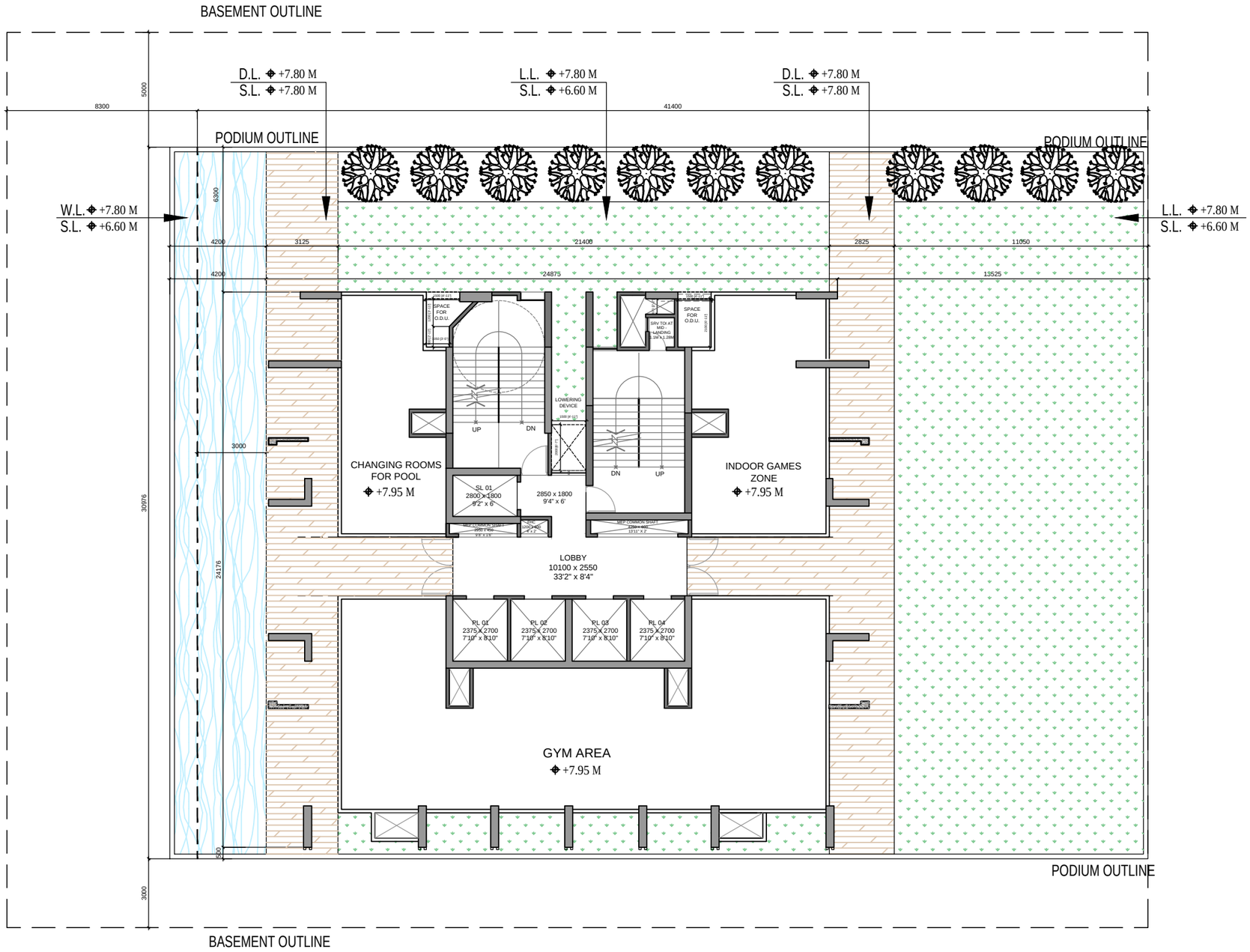


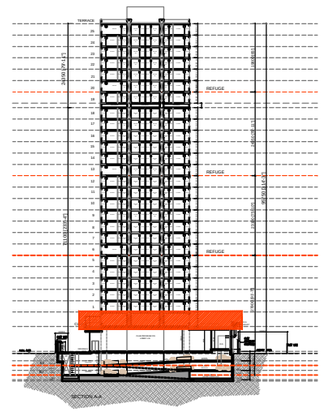
KEY PLAN

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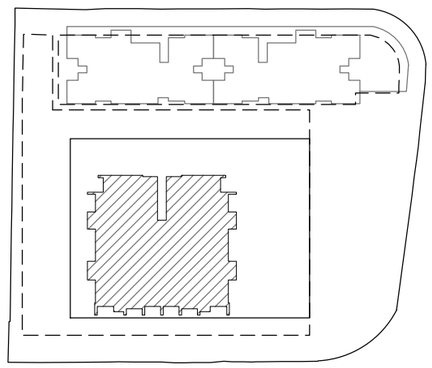
LODHA PAREL
RESIDENTIAL TOWER

PODIUM TOP PLAN
SCALE 1:200 (A3)





KEY SECTION



KEY PLAN

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LODHA PAREL
RESIDENTIAL TOWER
JODI PLAN
SCALE 1:100 (A3)

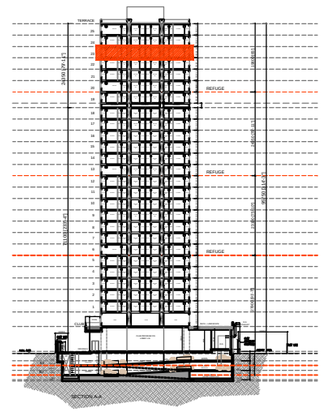


CARPET AREA

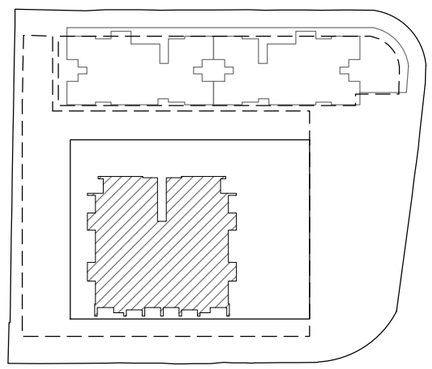
- APARTMENT 01 - 179.6 SQ M - 1933.21 SQ FT
- APARTMENT 02 - 179.6 SQ M - 1933.21 SQ FT

TOTAL FLOOR CARPET AREA
359.2 SQ M - 3866.42 SQ FT

SALEABLE AREA (1.595 LOADING)
- APARTMENT 01 - 3083.47 SQ FT
- APARTMENT 02 - 3083.47 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
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LODHA PAREL
RESIDENTIAL TOWER
PENT HOUSE LOWER PLAN
SCALE 1:100 (A3)

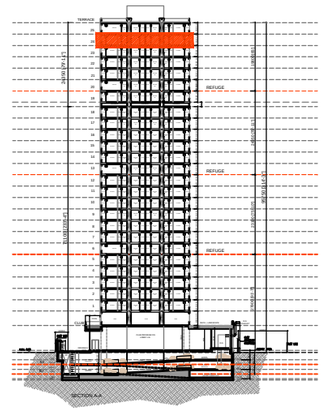


CARPET AREA

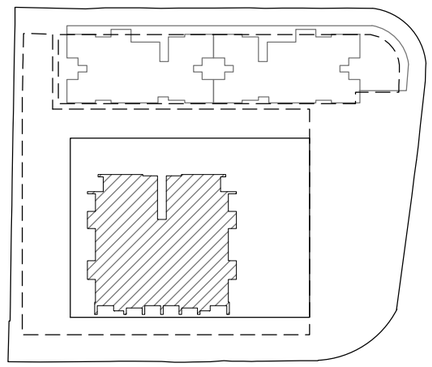
- APARTMENT 01 - 140.6 SQ M - 1513.41 SQ FT
- APARTMENT 02 - 140.6 SQ M - 1513.41 SQ FT

TOTAL FLOOR CARPET AREA
281.2 SQ M - 3026.83 SQ FT

SALEABLE AREA (1.595 LOADING)
- APARTMENT 01 - 2413.8 SQ FT
- APARTMENT 02 - 2413.8 SQ FT



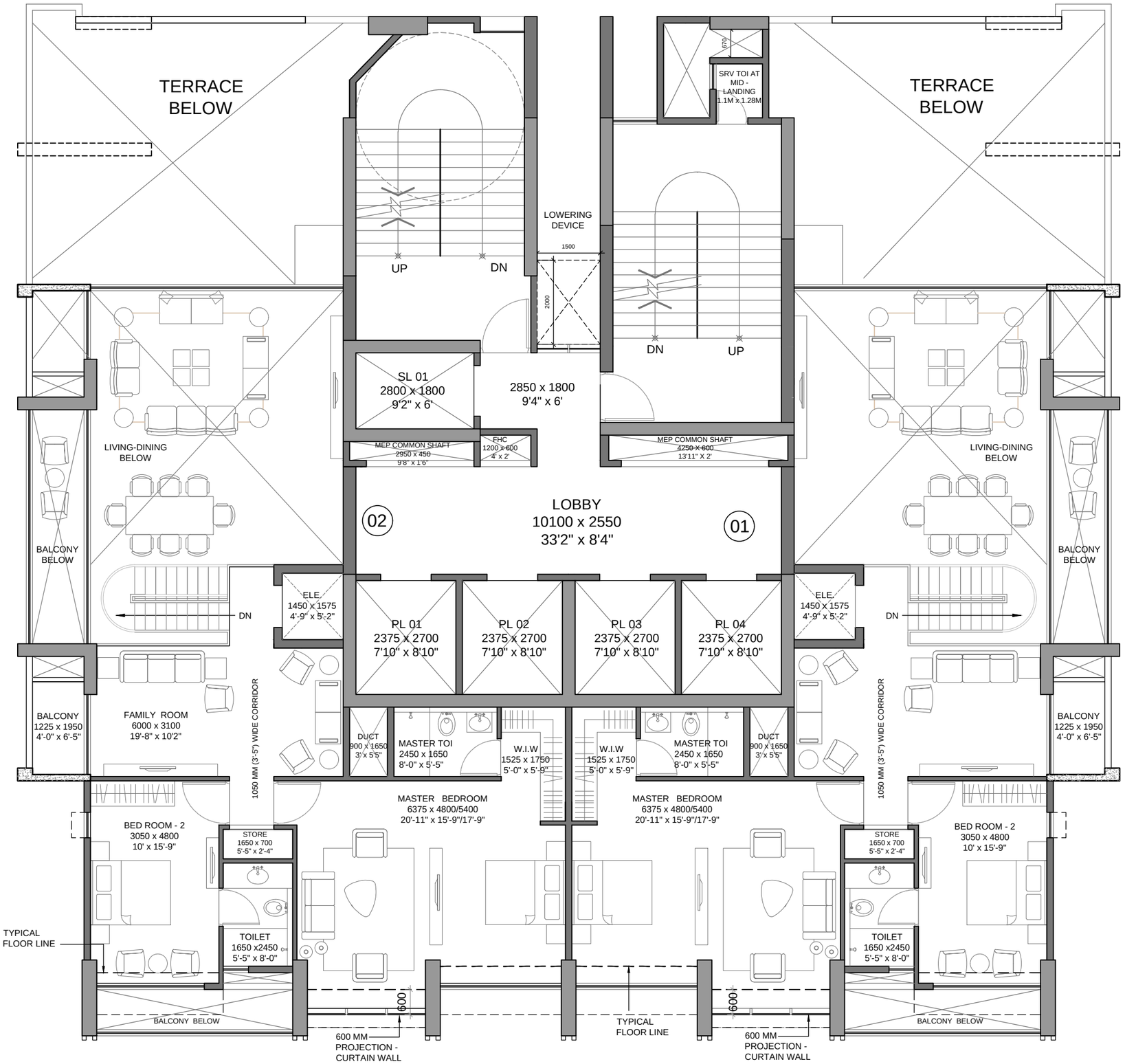
KEY SECTION



KEY PLAN

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LODHA PAREL
RESIDENTIAL TOWER
PENT HOUSE UPPER PLAN
SCALE 1:100 (A3)



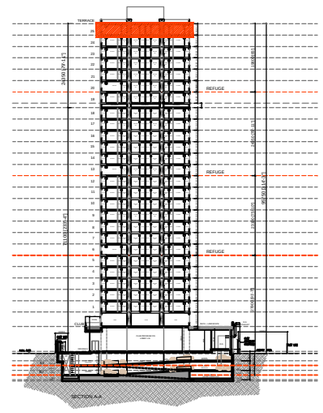
CARPET AREA

- APARTMENT O1 - 84.12 SQ M - 905.4 SQ FT
- APARTMENT O2 - 84.12 SQ M - 905.4 SQ FT

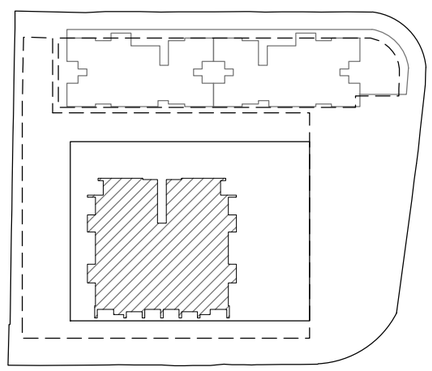
TOTAL FLOOR CARPET AREA
168.2 SQ M - 1810.93 SQ FT

SALEABLE AREA (1.595 LOADING)

- APARTMENT O1 - 1444.1 SQ FT
- APARTMENT O2 - 1444.1 SQ FT



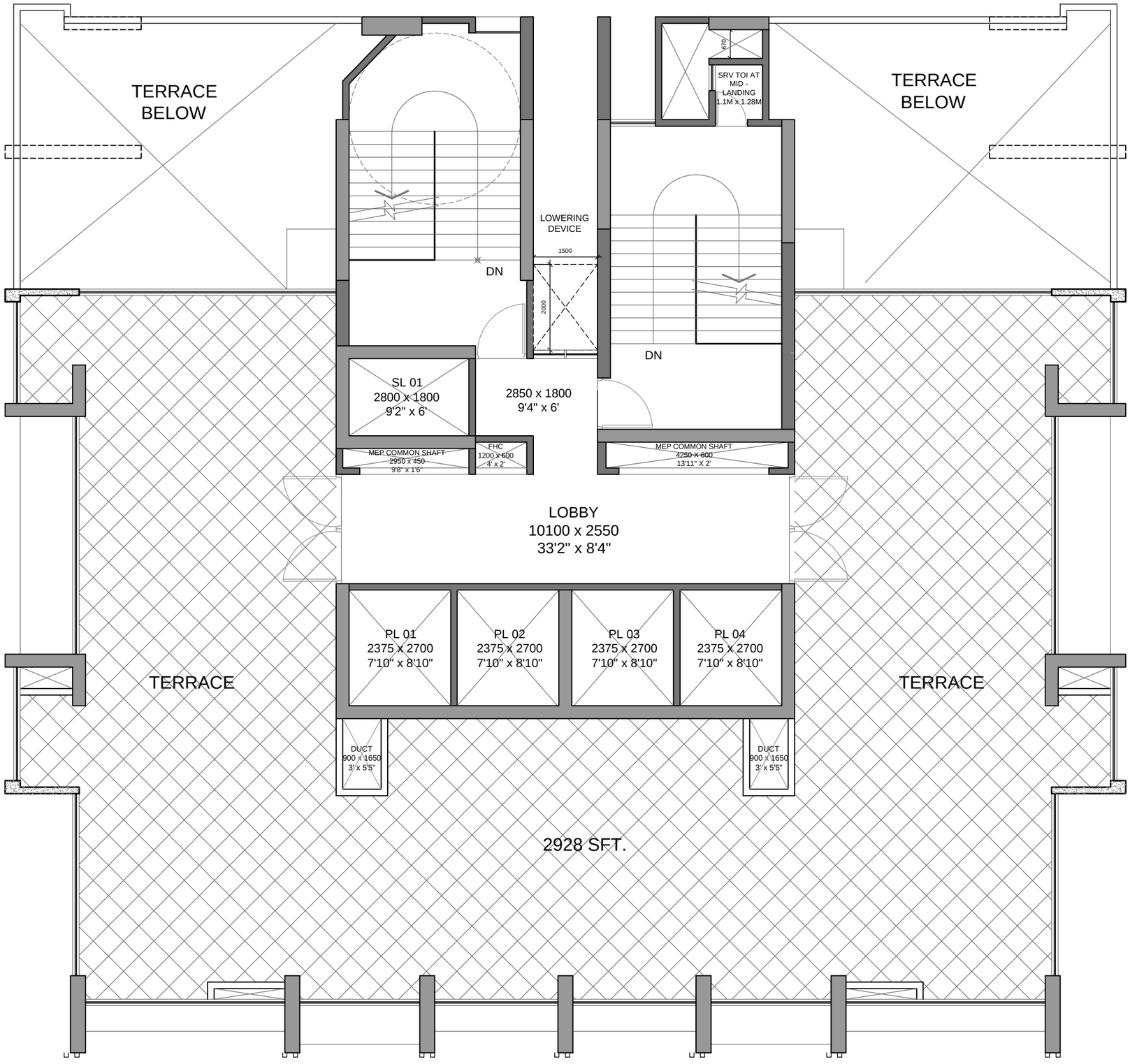
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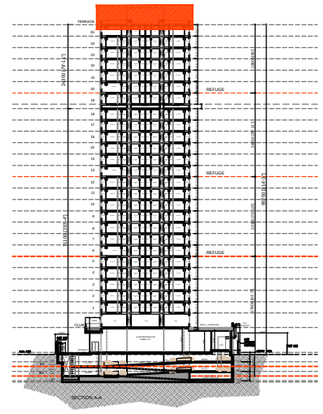


KEY PLAN

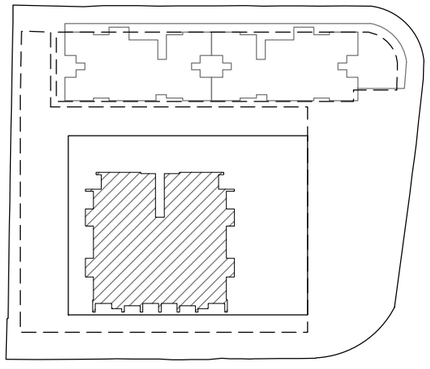
KAPADIA ASSOCIATES
DESIGN LLP
16-06-16

LODHA PAREL
RESIDENTIAL TOWER
PENT HOUSE UPPER PLAN
SCALE 1:100 (A3)





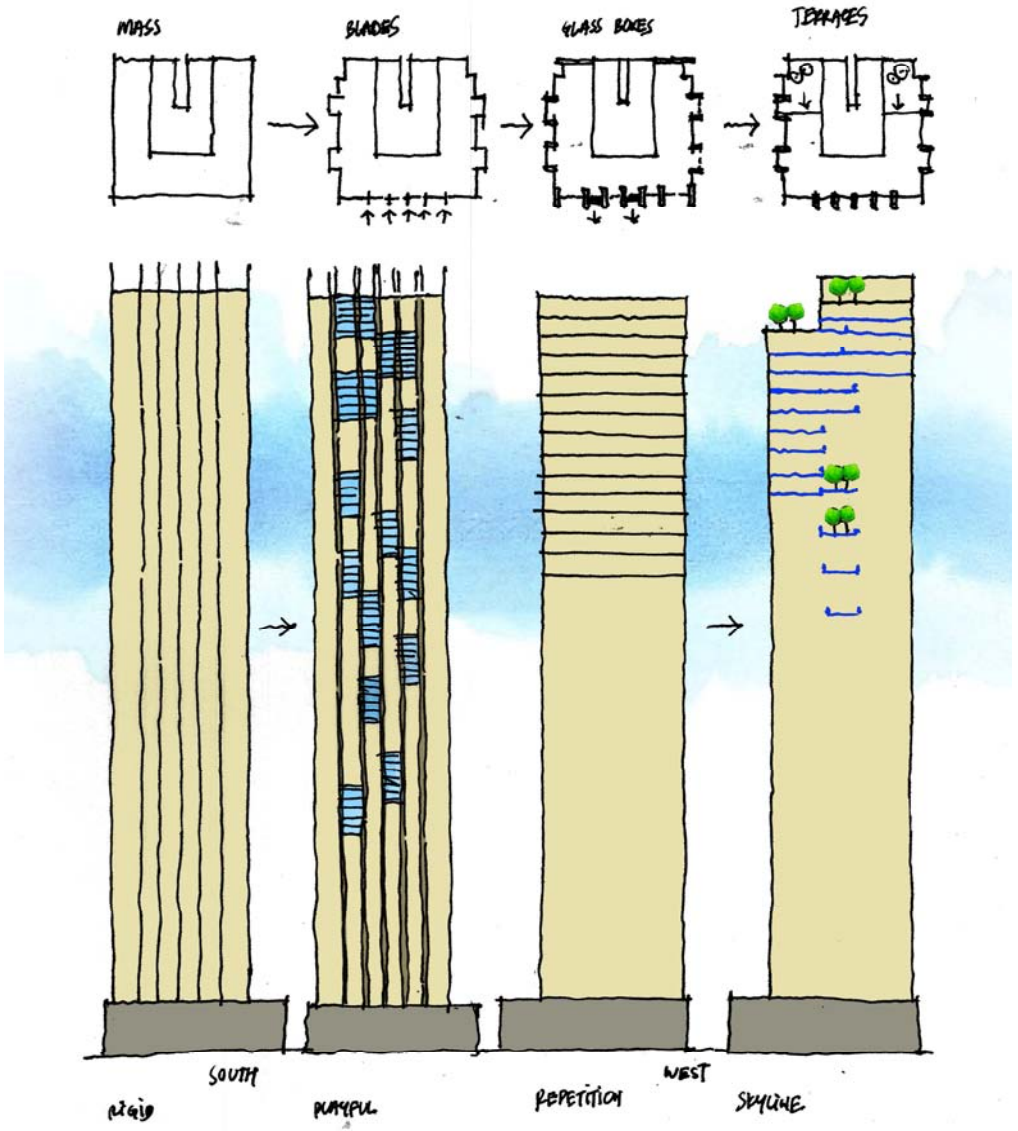
KEY SECTION



KEY PLAN

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PLAN ARTICULATION



FAÇADE MASSING

- COLUMN FREE STRUCTURE AROUND THE CORE TO ALLOW DRIVEWAY IN PARKING LEVEL AND CLEAN LOBBY – COLUMNS PUSHED TO PERIPHERY
- BOLD EXPRESSION OF VERTICAL STRUCTURE IN FAÇADE
- SHAPE THE SKYLINE -STEPPED ROOF FORM
- PROJECTING GLASS CUBES ALONG SOUTH FAÇADE CREATE SENSE OF MOVEMENT AND PLAYFULNESS
- ROOF TOP GARDEN TERRACE
- SIMPLE CONTEMPORARY GREY AND WHITE COLOR PALATTE
- TEXTURES EXPRESSED TO CREATE UNIQUE PERSONALITY FOR THE TOWER AMONG OTHER NEIGHBOURING HOUSING PROJECTS







ARCHITECTURAL DWG LIST:

1. FLOOR PLANS
   - BASEMENT LEVEL
   - GROUND LEVEL
   - MEZZANINE LEVEL
   - CLUB LEVEL
   - TYPICAL FLOOR LEVEL
   - REFUGE LEVEL
   - SPECIAL FLOORS
   - TERRACE & LMR LEVEL

2. SECTIONS

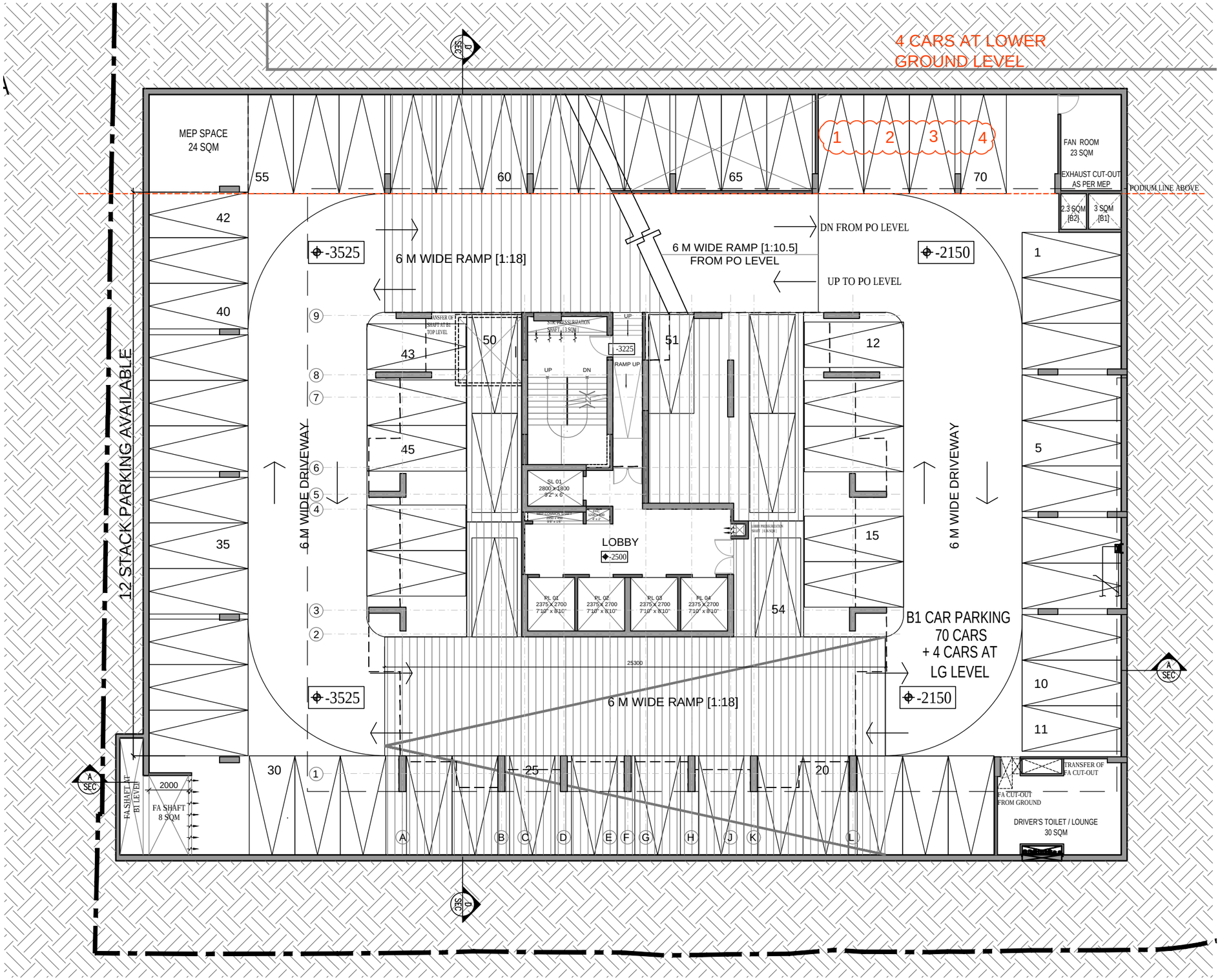
3. WALL SECTIONS

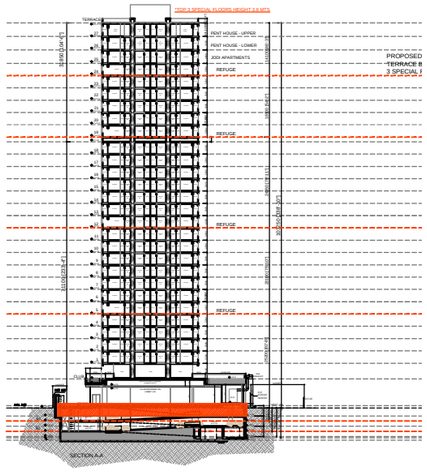
4. ELEVATIONS

5. ARCHITECTURAL DBR

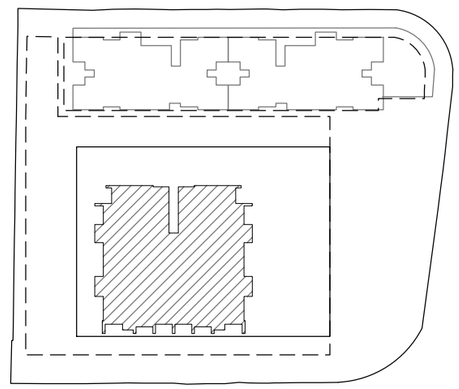
LODHA PAREL
RESIDENTIAL TOWER

BASEMENT B1 PLAN
SCALE 1:200 (A3)





KEY SECTION



KEY PLAN

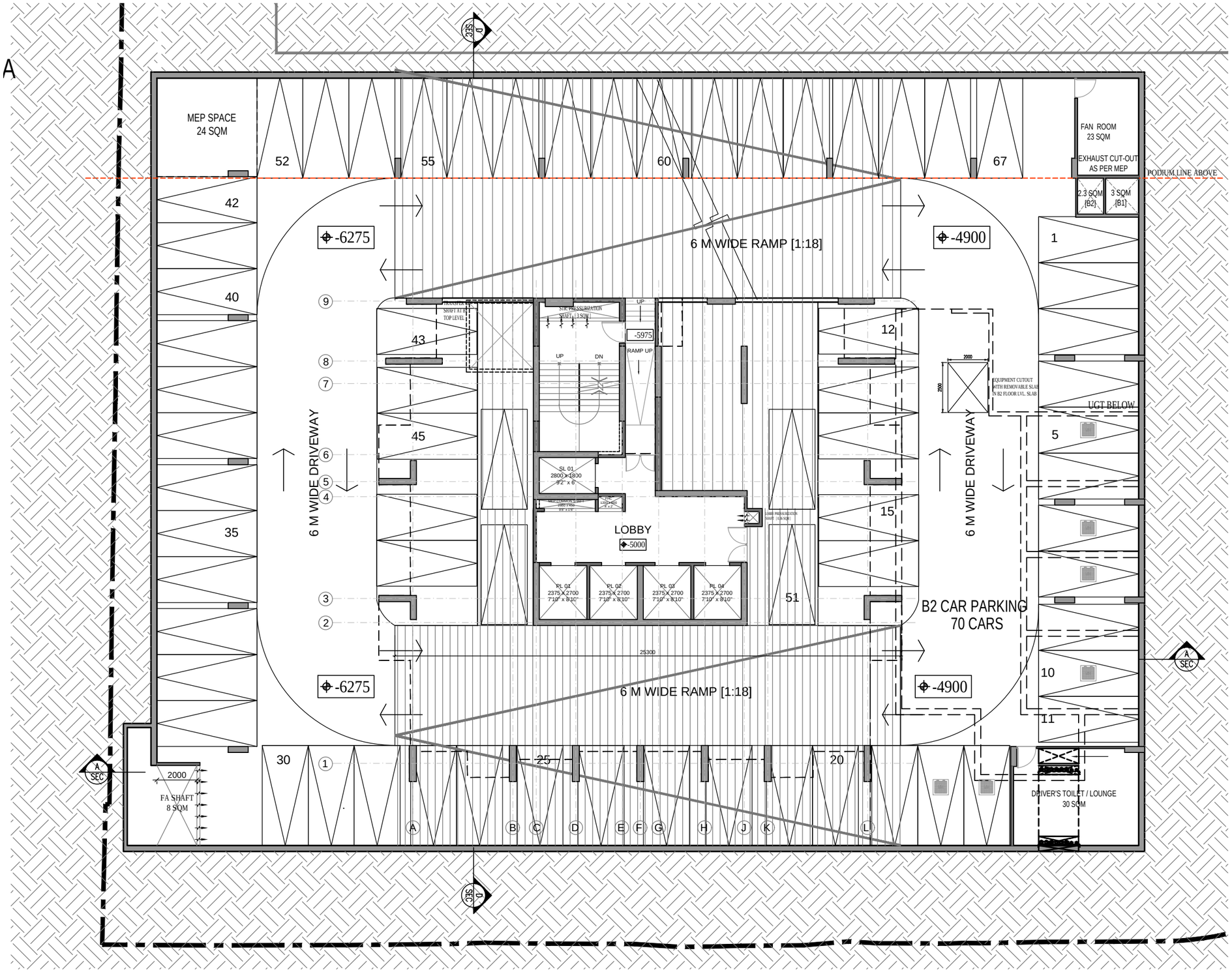
FLOOR PLAN: BASEMENT B1

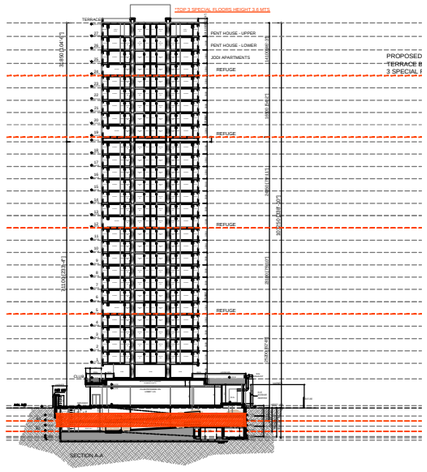
CAR PARKING - 70+4 [LG LVL] = 74 CARS

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DESIGN LLP
06-07-16

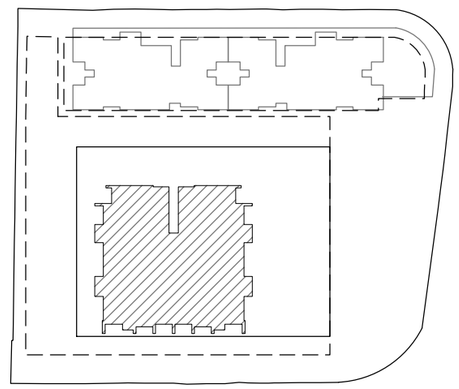
LODHA PAREL
RESIDENTIAL TOWER

BASEMENT B2 PLAN
SCALE 1:200 (A3)





KEY SECTION



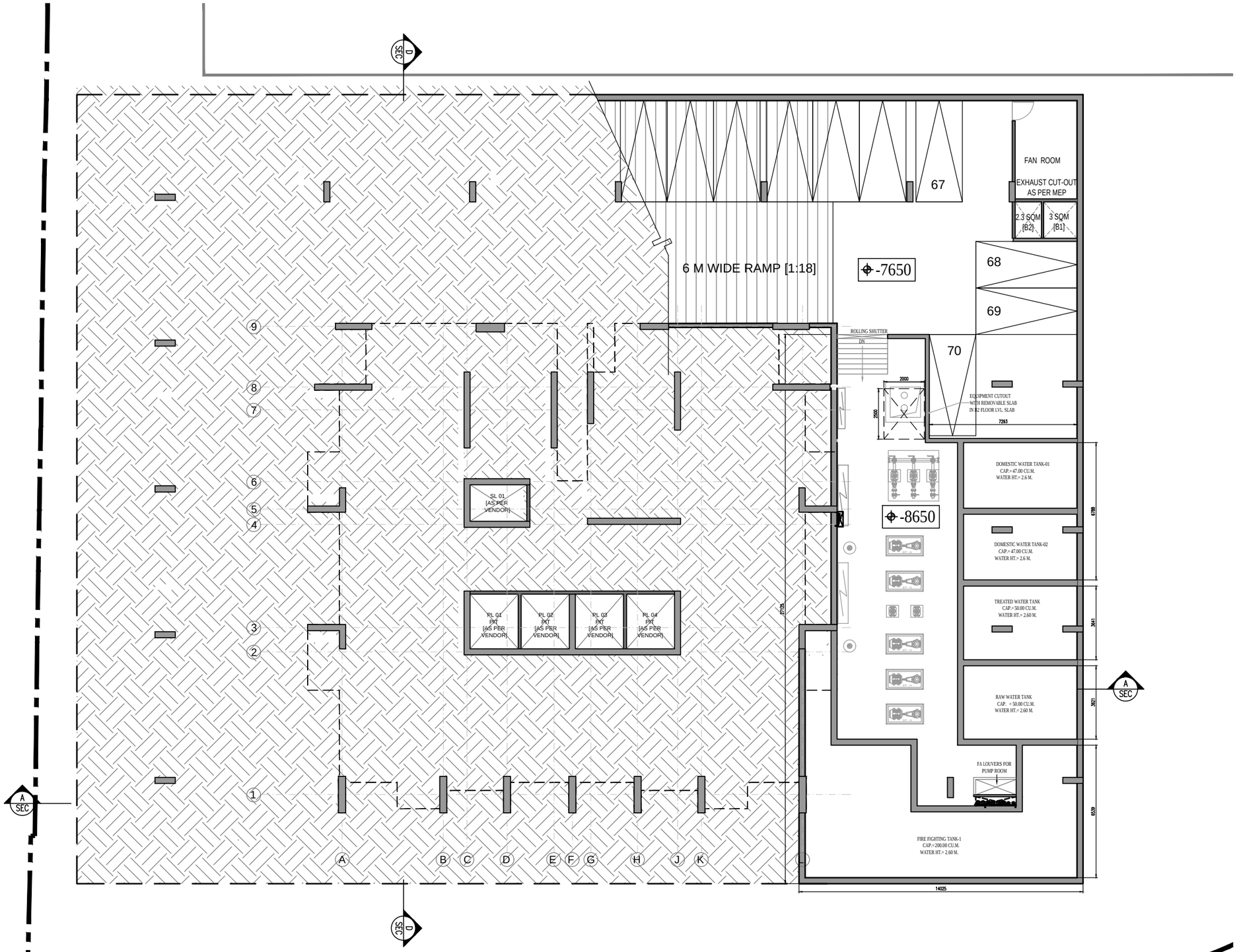
KEY PLAN

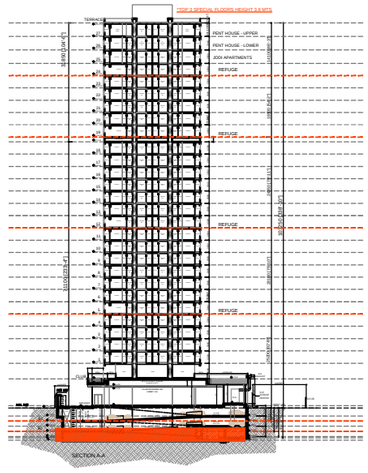
FLOOR PLAN: BASEMENT B2
CAR PARKING - 70 CARS

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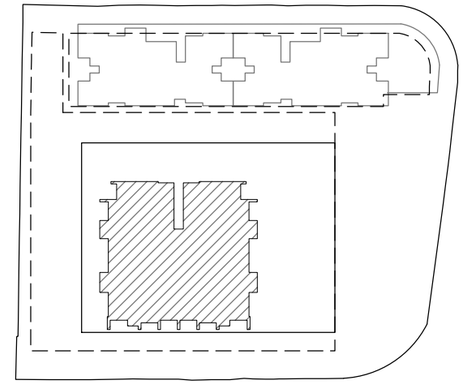
LODHA PAREL
RESIDENTIAL TOWER

UGT LEVEL PLAN
SCALE 1:200 (A3)





KEY SECTION



KEY PLAN

FLOOR PLAN: UGT LEVEL

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06-07-16

LODHA PAREL
RESIDENTIAL TOWER

GROUND FLOOR PLAN
SCALE 1:200 (A3)

TOWER

BASEMENT OUTLINE

6 M WIDE DRIVEWAY TO STILT PARKING

+ 450

SPACE FOR MEP ABOVE RAMP

PODIUM OUTLINE

DN TO B1

6 MTS WIDE RAMP
[1:10.8]

UP TO MEZZANINE

R.S. R.S. R.S.

EXHAUST CUT-OUT AS PER MEP

2.3 SQM [B2]

3 SQM [B1]

RG AREA
127 SQM

+ 300

UP FROM B1

METER ROOM 3 SQM

SUB STATION
153 SQM
+ 1200

LOADING BAY
+ 450

STR. PRESSURIZATION SHAFT

+ 600

TOILET AT P0 LEVEL

UP FRM B1

UP TO P1

STP
102 SQM
+ 1200

+ 900

SL 01
2800 x 1800
9'2" x 6'

2850 x 1800
9'4" x 6'

UP TO P1

7.5 M WIDE EXTERNAL DRIVEWAY

ENTRANCE LOBBY
[127 SQM]
+ 600

LOBBY
10300 x 2550
33'10" x 8'4"

LOBBY PRESSURIZATION SHAFT 0.36 SQM

AMENITY AREA
430 SQ. M.

BOH AREA
106 SQM
+ 600

TOWER ENTRANCE

RL 01 2375 X 2700 7'10" x 8'10"

RL 02 2375 X 2700 7'10" x 8'10"

RL 03 2375 X 2700 7'10" x 8'10"

RL 04 2375 X 2700 7'10" x 8'10"

D.G.
80 SQM
+ 1200

CLUB PROGRAM / PARTY AREA
[285 SQM]
+ 600

PODIUM OUTLINE

FA LOUVERS

POOL ABOVE

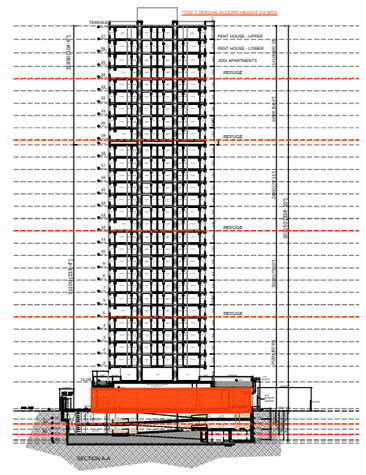
FA DUCT

BASEMENT OUTLINE

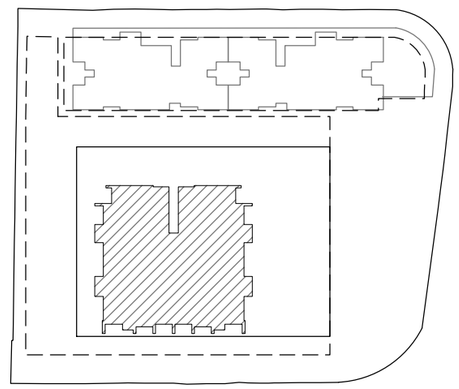
+ 300

RG AREA-1
331.5 SQM.
+ 450

RESI TOWER ENTRY
+/- 0



KEY SECTION



KEY PLAN

FLOOR PLAN: GROUND / P0

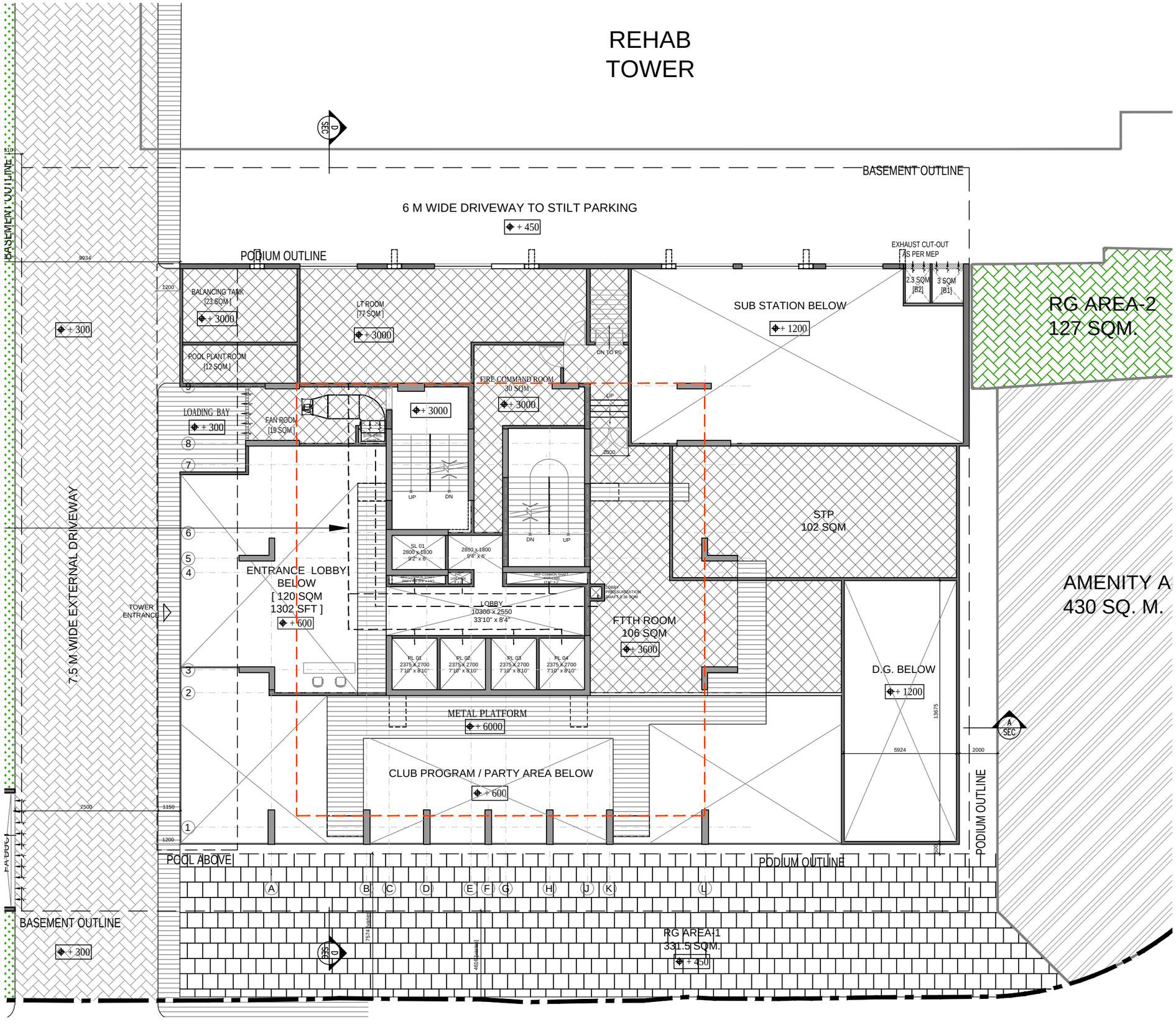
TOTAL CAR PARKING -
4+70+12[STACK]+70 = 156 NOS [4 TANDEM CARS]

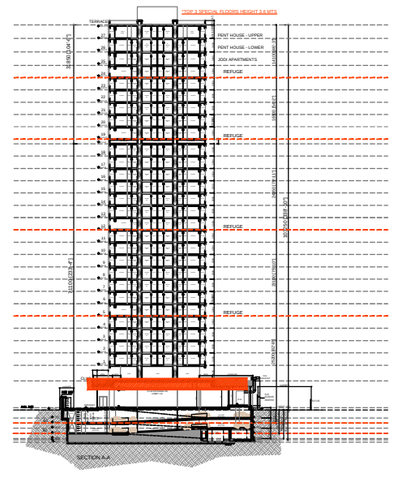
KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

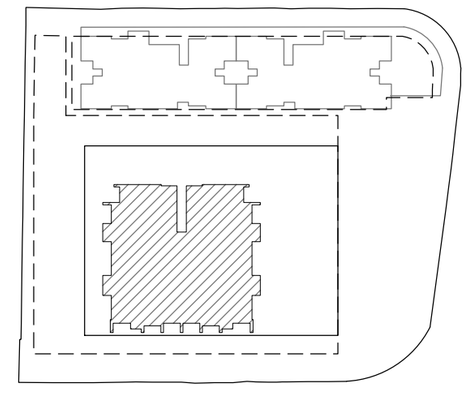
REHAB TOWER

LODHA PAREL
RESIDENTIAL TOWER

MEZZANINE LEVEL PLAN
SCALE 1:200 (A3)



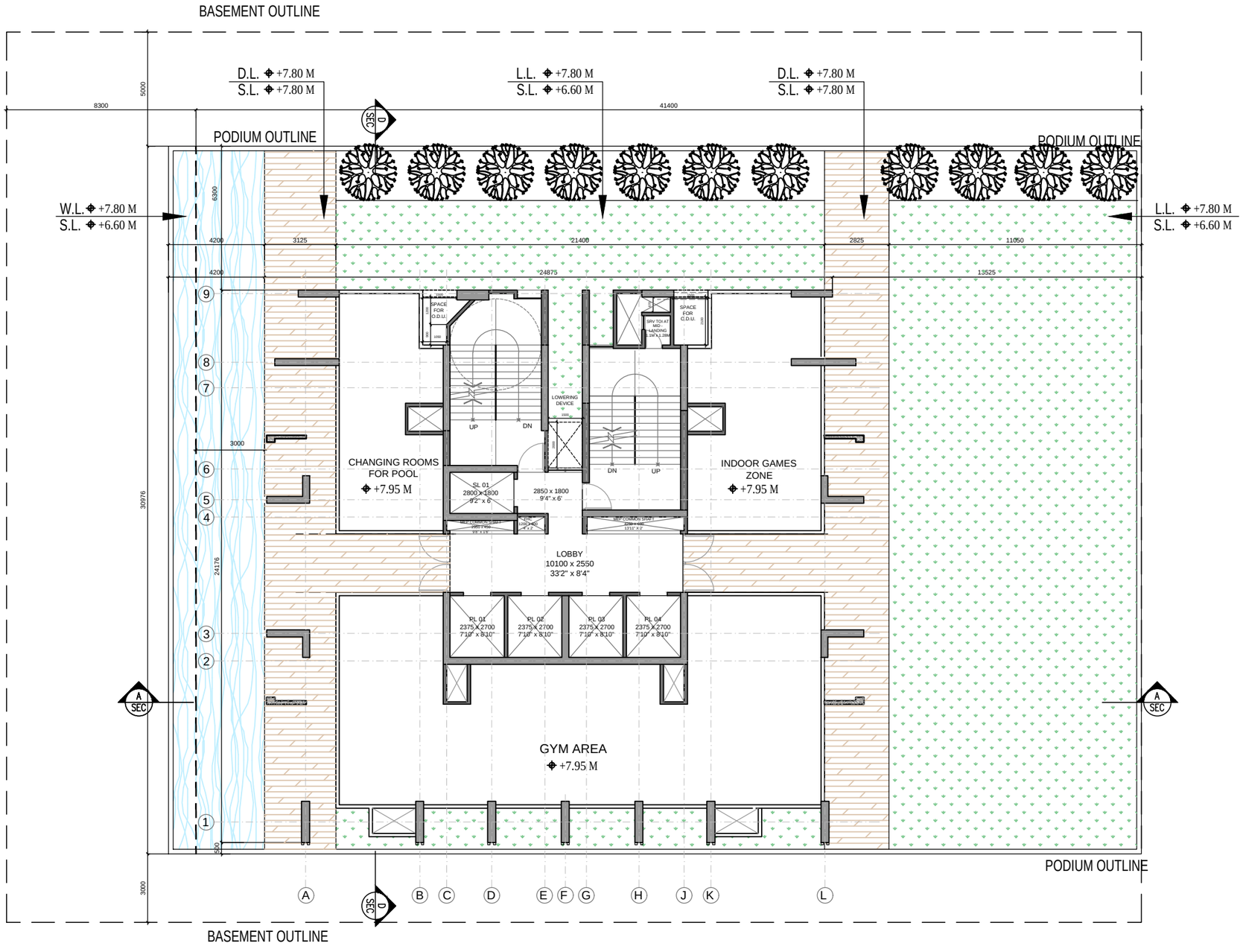




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DESIGN LLP
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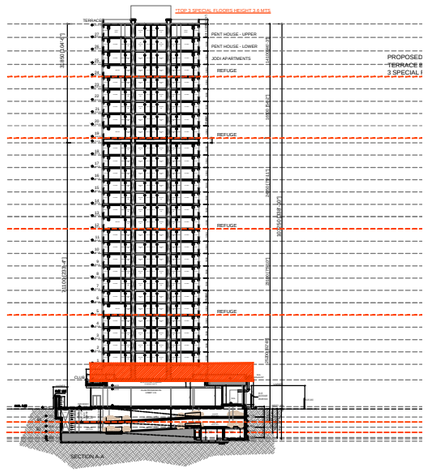
LODHA PAREL
RESIDENTIAL TOWER

PODIUM TOP PLAN
SCALE 1:200 (A3)

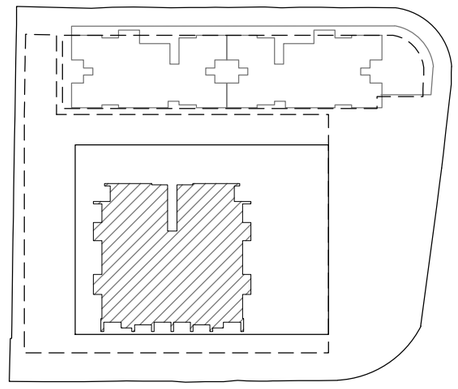


TOTAL FLOOR BUILT-UP AREA
400.3 SQ M - 4308.8 SQ FT

FSI AREA
286.03 SQ M - 3078.8 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
1ST-7TH FLOOR PLAN
SCALE 1:100 (A3)



CARPET AREA

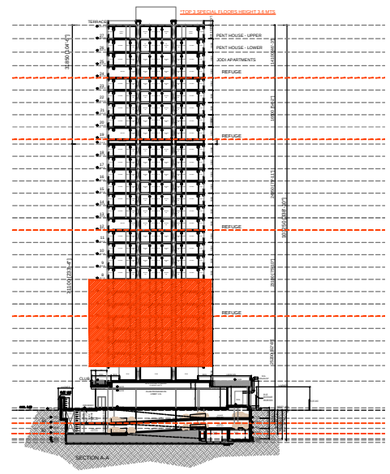
- 2BHK - 59.8 SQ M - 644.1 SQ FT
- 3BHK - 95 SQ M - 1022.6 SQ FT

TOTAL FLOOR CARPET AREA
309.6 SQ M - 3332.5 SQ FT

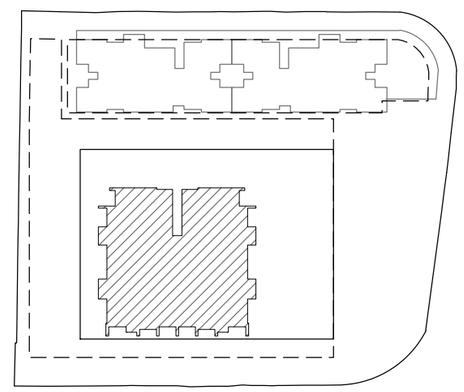
SALEABLE AREA (1.595 LOADING)
- 2BHK - 1027.33 SQ FT
- 3BHK - 1631.04 SQ FT

TOTAL FLOOR BUILT-UP AREA
465.8 SQ M - 5013.8 SQ FT

FSI AREA
350.95 SQ M - 3777.6 SQ FT



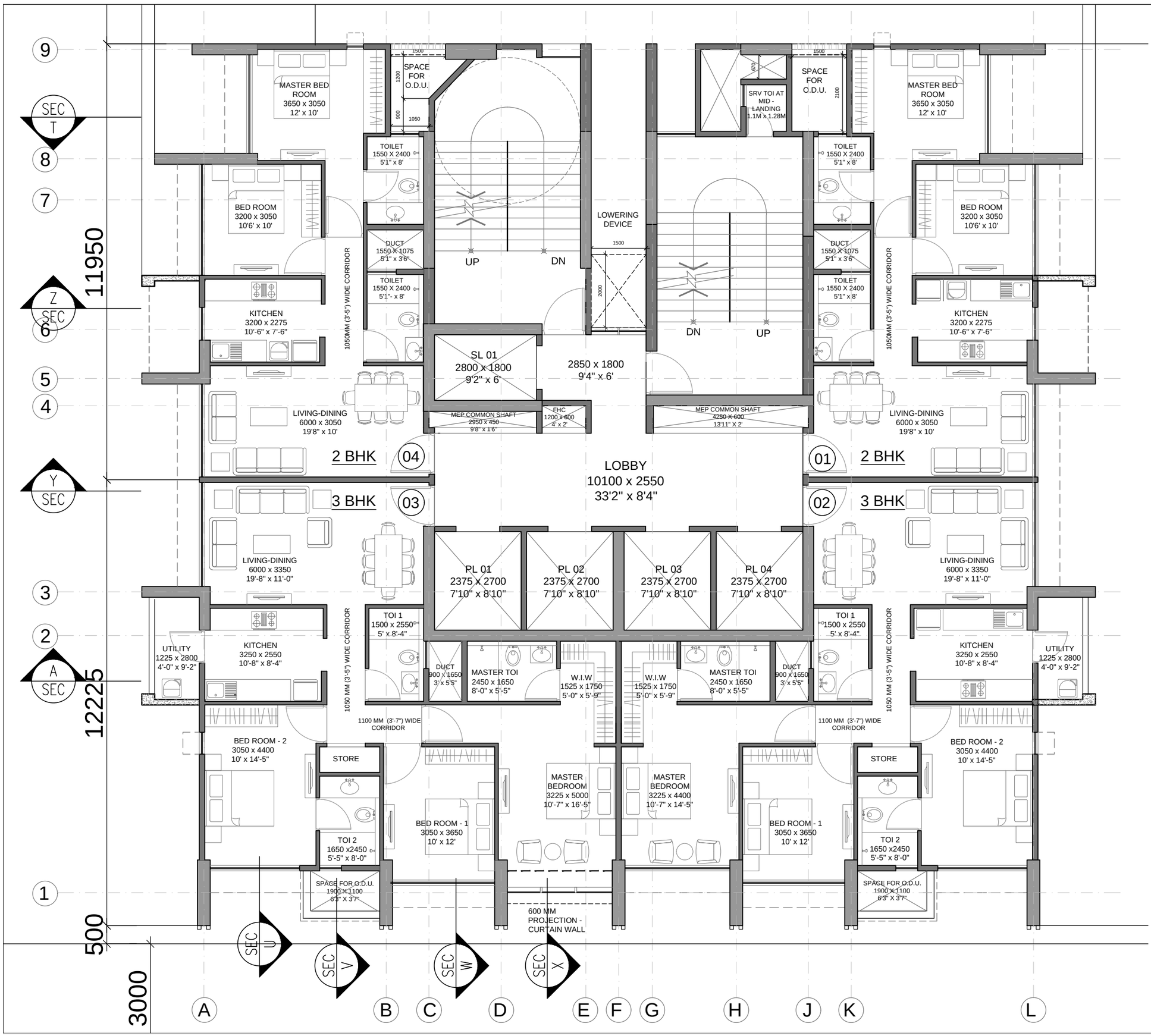
KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
8TH & 9TH FLOOR PLAN
SCALE 1:100 (A3)



CARPET AREA

- 2BHK - 59.8 SQ M - 643.6 SQ FT
- 3BHK [small] - 95 SQ M - 1022.6 SQ I
- 3BHK [large] - 96.7 SQ M - 1040.8 SQ

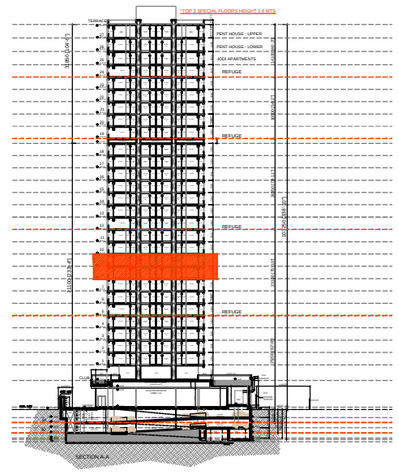
TOTAL FLOOR CARPET AREA
311.3 SQ M - 3350.8 SQ FT

SALEABLE AREA (1.595 LOADING)

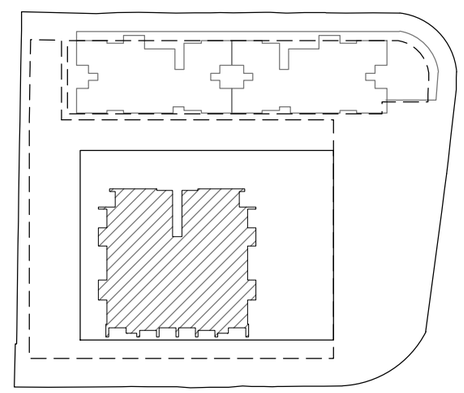
- 2BHK - 1026.54 SQ FT
- 3BHK [small] - 1631.04 SQ FT
- 3BHK [large] - 1660.07 SQ FT

TOTAL FLOOR BUILT-UP AREA
467.6 SQ M - 5034.3 SQ FT

FSI AREA
353.2 SQ M - 3801.8 SQ FT



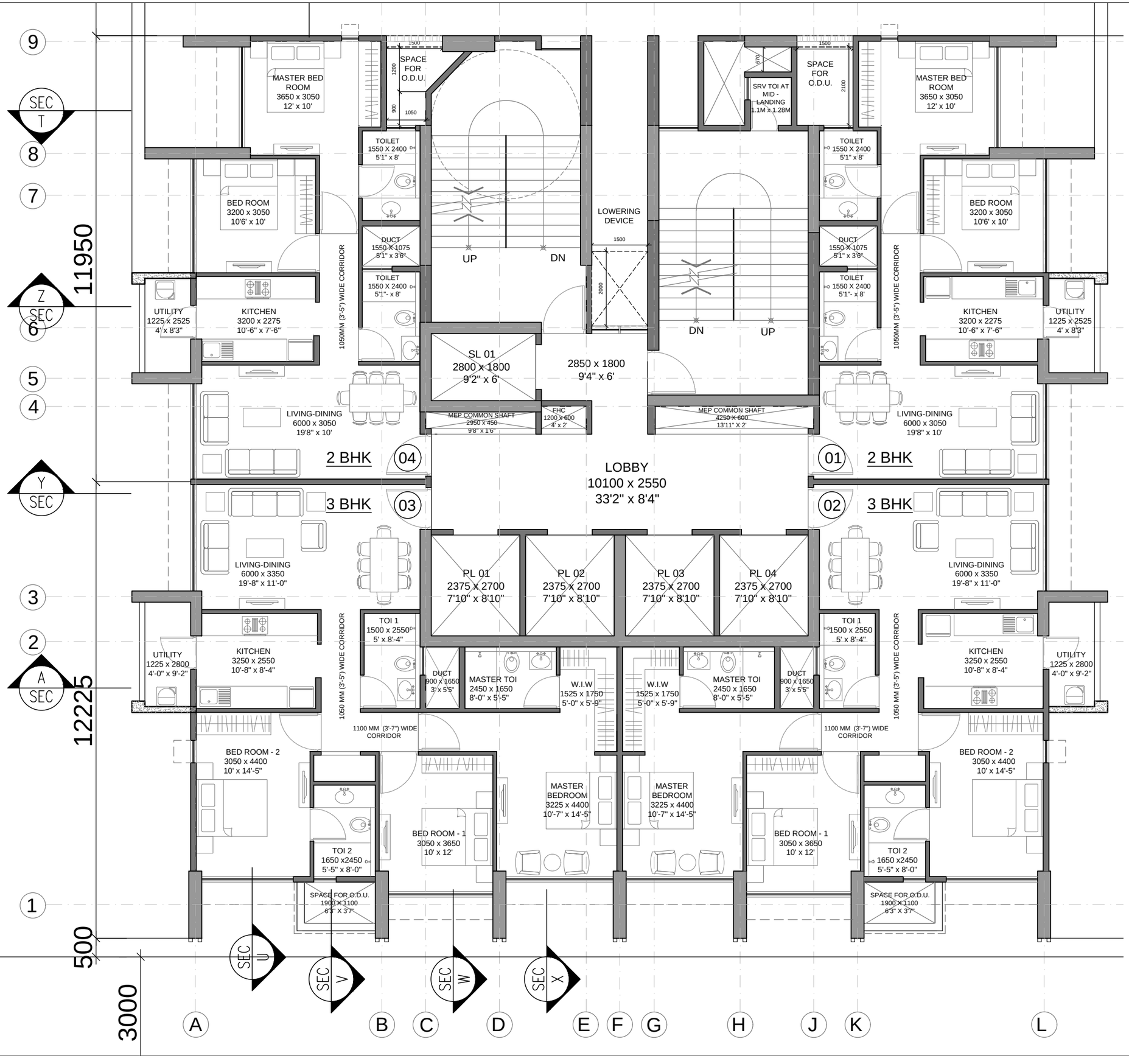
KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
10TH,13TH,16TH & 22ND FLR PLAN
SCALE 1:100 (A3)



CARPET AREA

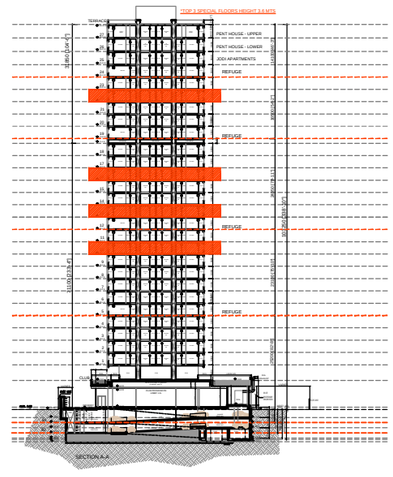
- 2BHK - 63.07 SQ M - 678.8 SQ FT
- 3BHK - 95 SQ M - 1022.6 SQ FT

TOTAL FLOOR CARPET AREA
316.4 SQ M - 3402.9 SQ FT

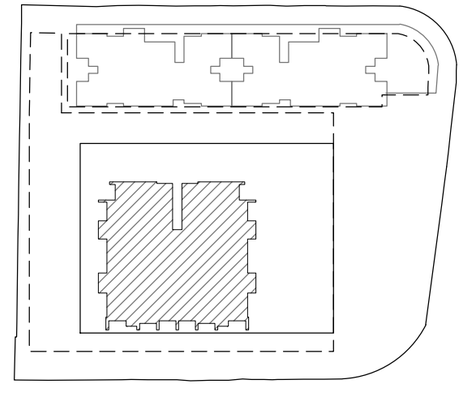
SALEABLE AREA (1.595 LOADING)
- 2BHK - 1082.6 SQ FT
- 3BHK - 1631.04 SQ FT

TOTAL FLOOR BUILT-UP AREA
472.7 SQ M - 6164.5 SQ FT

FSI AREA
358.4 SQ M - 3857.8 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
11TH,17TH,18TH & 23RD FLR PLAN
SCALE 1:100 (A3)



CARPET AREA

- 2BHK - 63.07 SQ M - 678.8 SQ FT
- 3BHK [small] - 95 SQ M - 1022.6 SQ F
- 3BHK [large] - 96.7 SQ M - 1040.8 SQ F

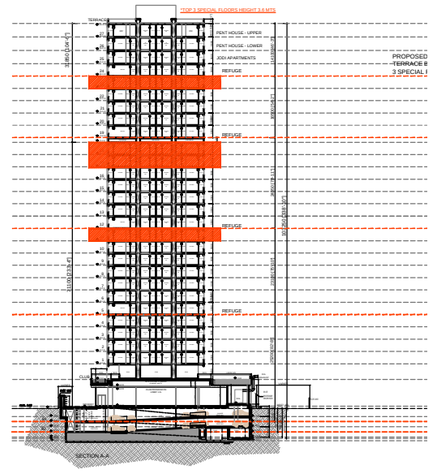
TOTAL FLOOR CARPET AREA
314.7 SQ M - 3421.2 SQ FT

SALEABLE AREA (1.595 LOADING)

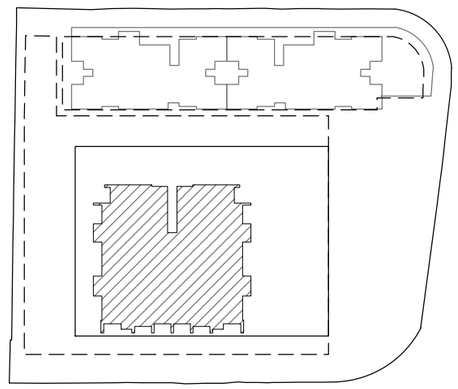
- 2BHK - 1082.6 SQ FT
- 3BHK [small] - 1631.04 SQ FT
- 3BHK [large] - 1660.07 SQ FT

TOTAL FLOOR BUILT-UP AREA
474.5 SQ M - 5107.5 SQ FT

FSI AREA
360.1 SQ M - 3876.1 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
14TH & 15TH FLR PLAN
SCALE 1:100 (A3)

CARPET AREA

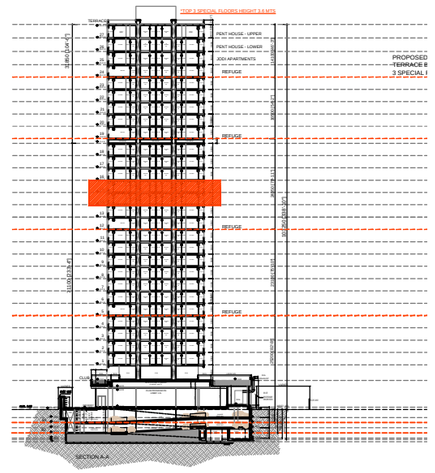
- 2BHK - 63.07 SQ M - 678.8 SQ FT
- 3BHK - 96.7 SQ M - 1040.8 SQ FT

TOTAL FLOOR CARPET AREA
319.5 SQ M - 3439.5 SQ FT

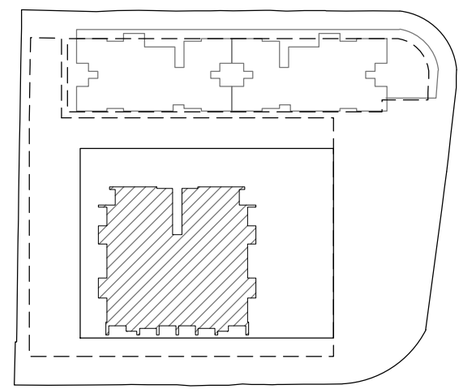
SALEABLE AREA (1.595 LOADING)
- 2BHK - 1080.6 SQ FT
- 3BHK - 1660.07 SQ FT

TOTAL FLOOR BUILT-UP AREA
475.5 SQ M - 5118.2 SQ FT

FSI AREA
361.2 SQ M - 3887.9 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
20TH & 21ST FLR PLAN
SCALE 1:100 (A3)



CARPET AREA

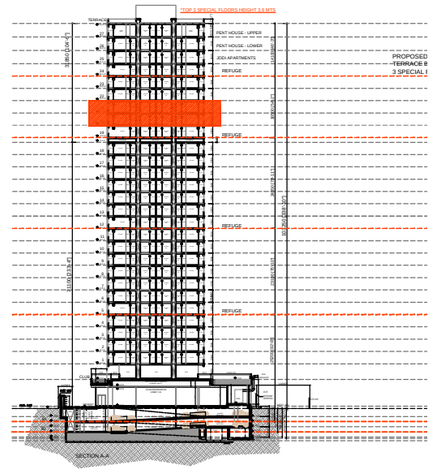
- 2BHK - 63.07 SQ M - 678.8 SQ FT
- 3BHK - 96.7 SQ M - 1040.8 SQ FT

TOTAL FLOOR CARPET AREA
319.5 SQ M - 3439.5 SQ FT

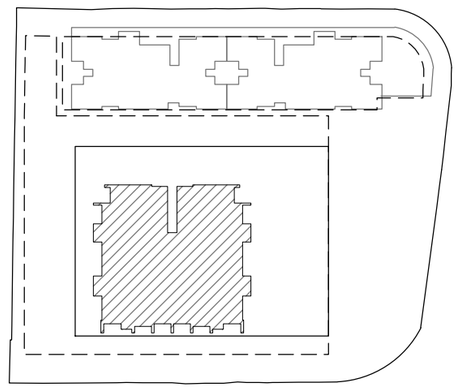
SALEABLE AREA (1.595 LOADING)
- 2BHK - 1080.6 SQ FT
- 3BHK - 1660.07 SQ FT

TOTAL FLOOR BUILT-UP AREA
476.1 SQ M - 5124.7 SQ FT

FSI AREA
361.8 SQ M - 3894.4 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
5TH FLR PLAN
SCALE 1:100 (A3)

CARPET AREA

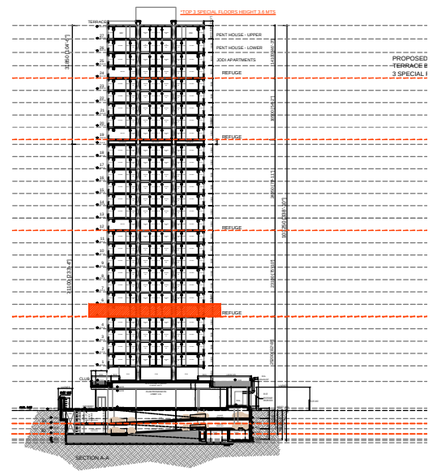
- 2BHK - 59.8 SQ M - 643.6 SQ FT
- 3BHK - 95 SQ M - 1022.6 SQ FT

TOTAL FLOOR CARPET AREA
214.6 SQ M - 2309.9 SQ FT

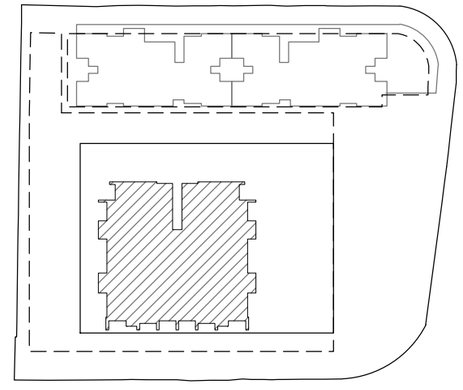
SALEABLE AREA (1.595 LOADING)
- 2BHK - 1026.54 SQ FT
- 3BHK - 1631.04 SQ FT

TOTAL FLOOR BUILT-UP AREA
464.1 SQ M - 4995.5 SQ FT

FSI AREA
255.8 SQ M - 2753.4 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
12TH FLR PLAN
SCALE 1:100 (A3)



CARPET AREA

- 2BHK - 63.07 SQ M - 678.8 SQ FT
- 3BHK - 96.7 SQ M - 1040.8 SQ FT

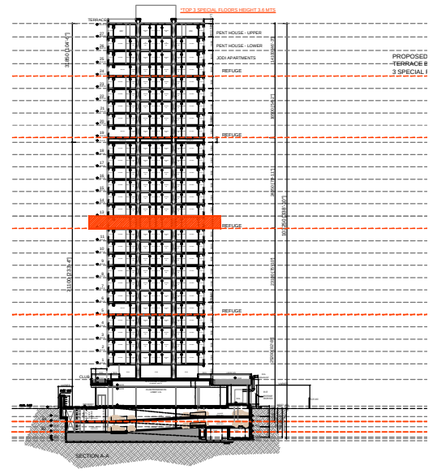
TOTAL FLOOR CARPET AREA
222.8 SQ M - 2398.6 SQ FT

SALEABLE AREA (1.595 LOADING)

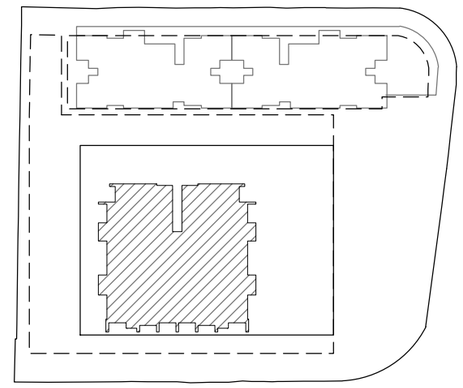
- 2BHK - 1082.6 SQ FT
- 3BHK - 1660.07 SQ FT

TOTAL FLOOR BUILT-UP AREA
470.4 SQ M - 5063.3 SQ FT

FSI AREA
262.1 SQ M - 2821.2 SQ FT



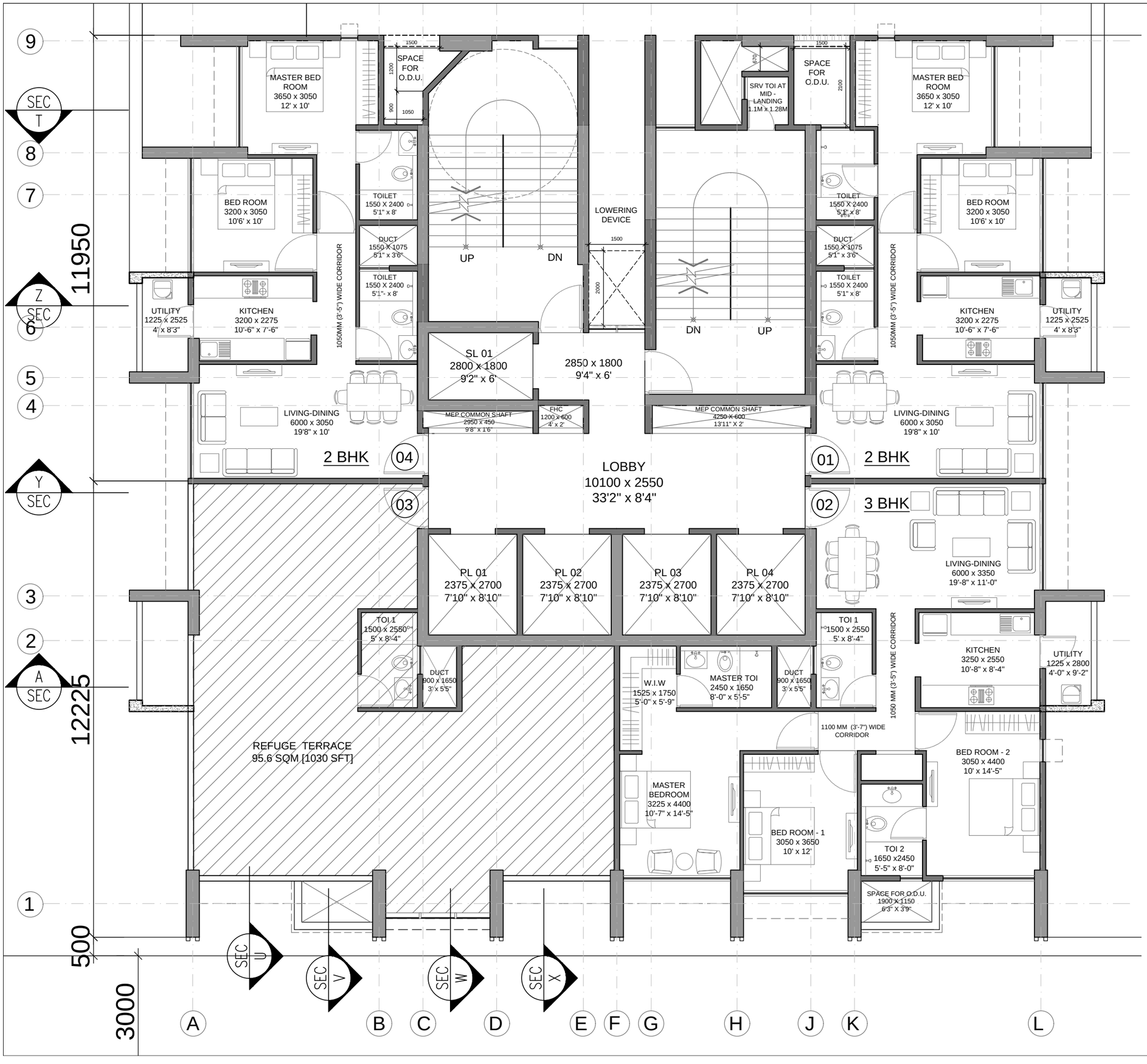
KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
19TH FLR PLAN
SCALE 1:100 (A3)



CARPET AREA

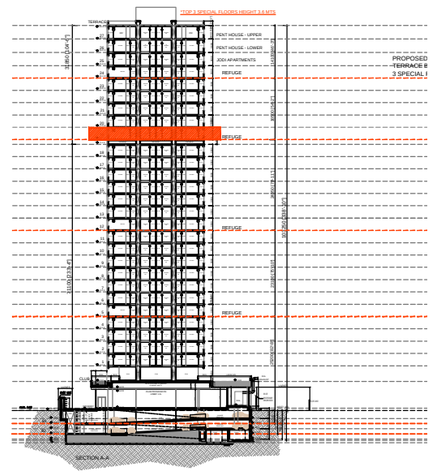
- 2BHK - 63.07 SQ M - 678.8 SQ FT
- 3BHK - 95 SQ M - 1022.6 SQ FT

TOTAL FLOOR CARPET AREA
221.4 SQ M - 2380.3 SQ FT

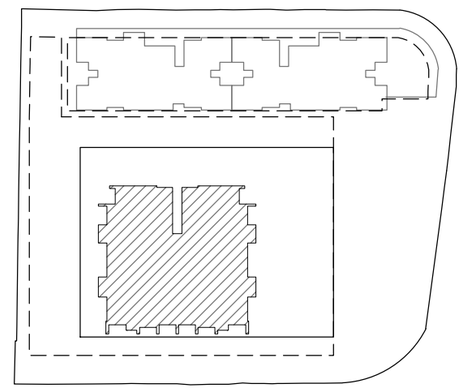
SALEABLE AREA (1.595 LOADING)
- 2BHK - 1082.6 SQ FT
- 3BHK - 1631.04 SQ FT

TOTAL FLOOR BUILT-UP AREA
471.03 SQ M - 5070.1 SQ FT

FSI AREA
261.03 SQ M - 2809.7 SQ FT



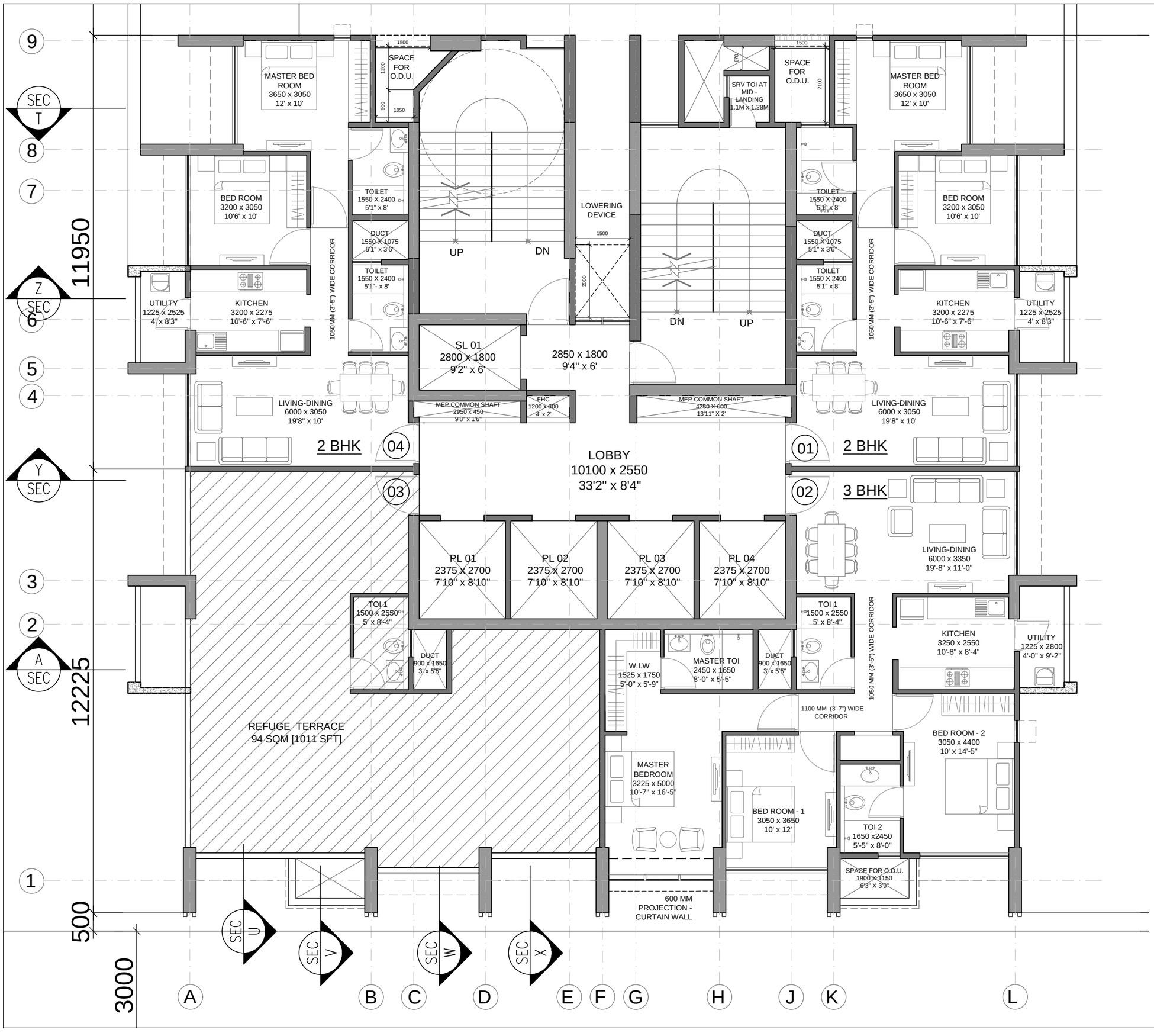
KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
24TH FLR PLAN
SCALE 1:100 (A3)



CARPET AREA

- 2BHK - 63.07 SQ M - 678.8 SQ FT
- 3BHK - 96.7 SQ M - 1040.8 SQ FT

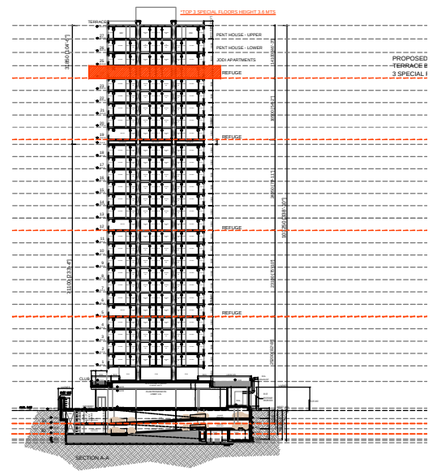
TOTAL FLOOR CARPET AREA
222.8 SQ M - 2398.6 SQ FT

SALEABLE AREA (1.595 LOADING)

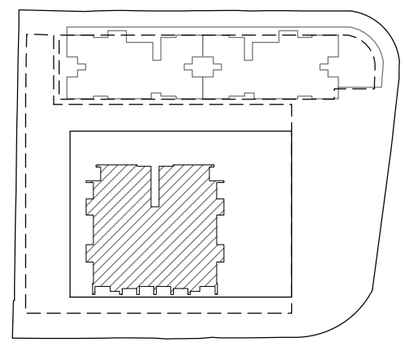
- 2BHK - 1082.6 SQ FT
- 3BHK - 1660.07 SQ FT

TOTAL FLOOR BUILT-UP AREA
469.7 SQ M - 5056.3 SQ FT

FSI AREA
261.4 SQ M - 2813.7 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
25TH FLOOR - JODI PLAN
SCALE 1:100 (A3)



CARPET AREA

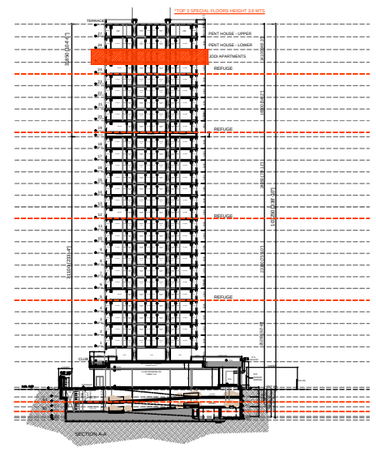
- APARTMENT O1 - 180 SQ M - 1937.5 SQ FT
- APARTMENT O2 - 180 SQ M - 1937.5 SQ FT

TOTAL FLOOR CARPET AREA
360 SQ M - 3875.04 SQ FT

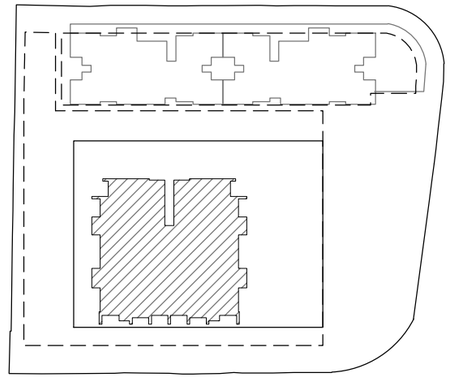
SALEABLE AREA (1.595 LOADING)
- APARTMENT O1 - 3090.3 SQ FT
- APARTMENT O2 - 3090.3 SQ FT

TOTAL FLOOR BUILT-UP AREA
511.7 SQ M - 5507.9 SQ FT

FSI AREA
399 SQ M - 4294.8 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL RESIDENTIAL TOWER 26TH FLOOR- PENT HOUSE LOWER PLAN SCALE 1:100 (A3)

CARPET AREA

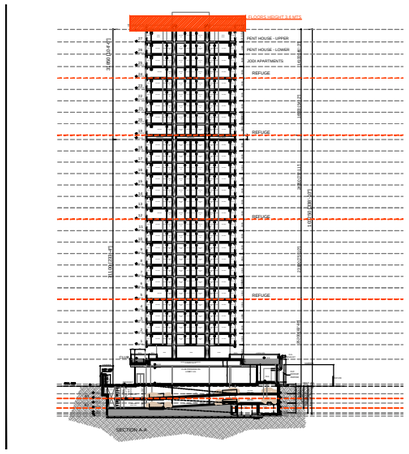
- APARTMENT 01 - 143.7 SQ M - 1546.7 SQ FT
- APARTMENT 02 - 143.7 SQ M - 1546.7 SQ FT
- DOUBLE HEIGHT AREA - 39.3 SQ M - 423.02 SQ FT

TOTAL FLOOR CARPET AREA
287.4 SQ M - 3093.5 SQ FT

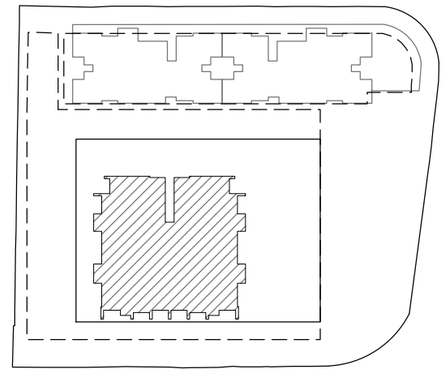
SALEABLE AREA (1.595 LOADING)
- APARTMENT 01 - 2466.9 SQ FT
- APARTMENT 02 - 2466.9 SQ FT

TOTAL FLOOR BUILT-UP AREA
530.7 SQ M - 5712.4 SQ FT

FSI AREA
416.4 SQ M - 4482.1 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
PENT HOUSE UPPER PLAN
SCALE 1:100 (A3)

CARPET AREA

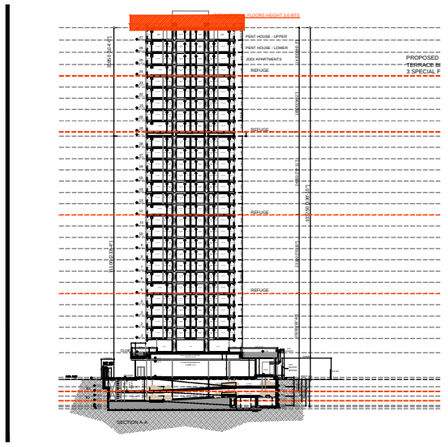
- APARTMENT O1 - 90.7 SQ M - 976.2 SQ FT
- APARTMENT O2 - 90.7 SQ M - 976.2 SQ FT
- DOUBLE HEIGHT AREA - 39.3 SQ M - 423.02 SQ FT

TOTAL FLOOR CARPET AREA
181.4 SQ M - 1952.5 SQ FT

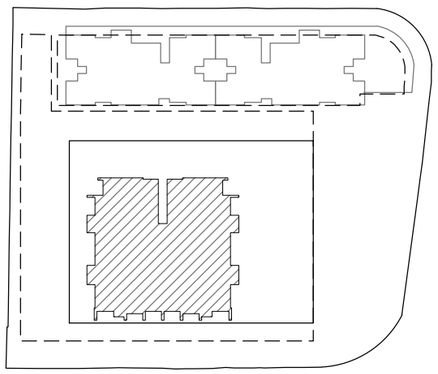
SALEABLE AREA (1.595 LOADING)
- APARTMENT O1 - 1557.03 SQ FT
- APARTMENT O2 - 1557.03 SQ FT

TOTAL FLOOR BUILT-UP AREA
336.1 SQ M - 3617.7 SQ FT

FSI AREA
219.7 SQ M - 2364.8 SQ FT



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
TERRACE PLAN
SCALE 1:100 (A3)

TERRACE BELOW

TERRACE BELOW

SRV RM.
1.25 x 2.25 M

SRV TOI.
1.0 x 1.5 M

950

450

LOWERING DEVICE

1500

2000

DN

DN

SL 01
2800 x 1800
9'2" x 6'

2850 x 1800
9'4" x 6'

RUNG LADDER TO OHT

RUNG LADDER TO OHT

MEP COMMON SHAFT
2950 x 450
9'8" x 1'6"

FHC
1200 x 600
4' x 2'

MEP COMMON SHAFT
4250 X 600
13'11" X 2'

LOBBY
10100 x 2550
33'2" x 8'4"

PL 01
2375 X 2700
7'10" x 8'10"

PL 02
2375 X 2700
7'10" x 8'10"

PL 03
2375 X 2700
7'10" x 8'10"

PL 04
2375 X 2700
7'10" x 8'10"

TERRACE

TERRACE

DUCT
900 x 1650
3' x 5'5"

DUCT
900 x 1650
3' x 5'5"

M S LADDER TO LMR

2928 SFT.

SEC T

SEC Z

SEC Y

SEC A

SEC U

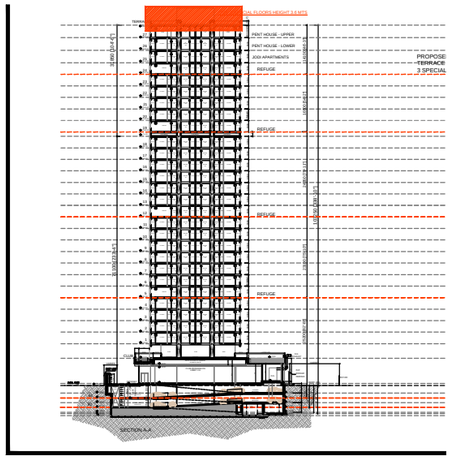
SEC V

SEC W

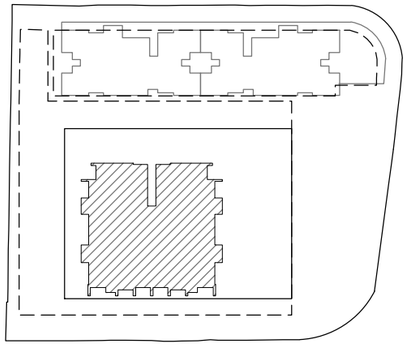
SEC X

9 8 7 6 5 4 3 2 1

A B C D E F G H J K L



KEY SECTION



KEY PLAN

KAPADIA ASSOCIATES
DESIGN LLP
06-07-16

LODHA PAREL
RESIDENTIAL TOWER
LMR LEVEL PLAN
SCALE 1:100 (A3)

TERRACE BELOW

RUNG LADDER TO OHT

OHT AS PER CONSULTANT

OHT AS PER CONSULTANT

TERRACE BELOW

RUNG LADDER TO OHT

SL 01 BELOW

L M R AS PER VENDOR

PL 01 BELOW

PL 02 BELOW

PL 03 BELOW

PL 04 BELOW

TERRACE

TERRACE

DUCT 900 x 1650 3' x 5'5"

DUCT 900 x 1650 3' x 5'5"

M S LADDER TO LMR

2928 SFT.

SEC T

Z SEC

Y SEC

A SEC

A SEC

SEC U

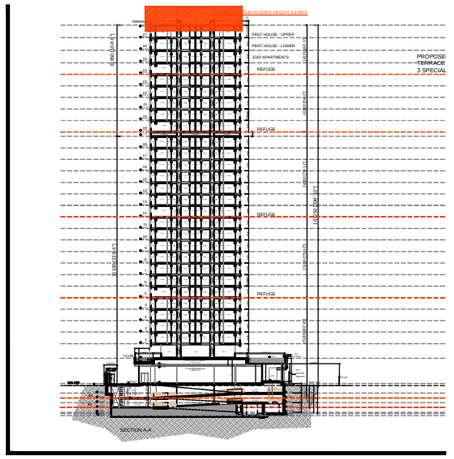
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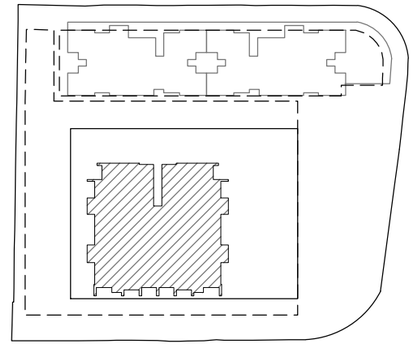
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KEY SECTION

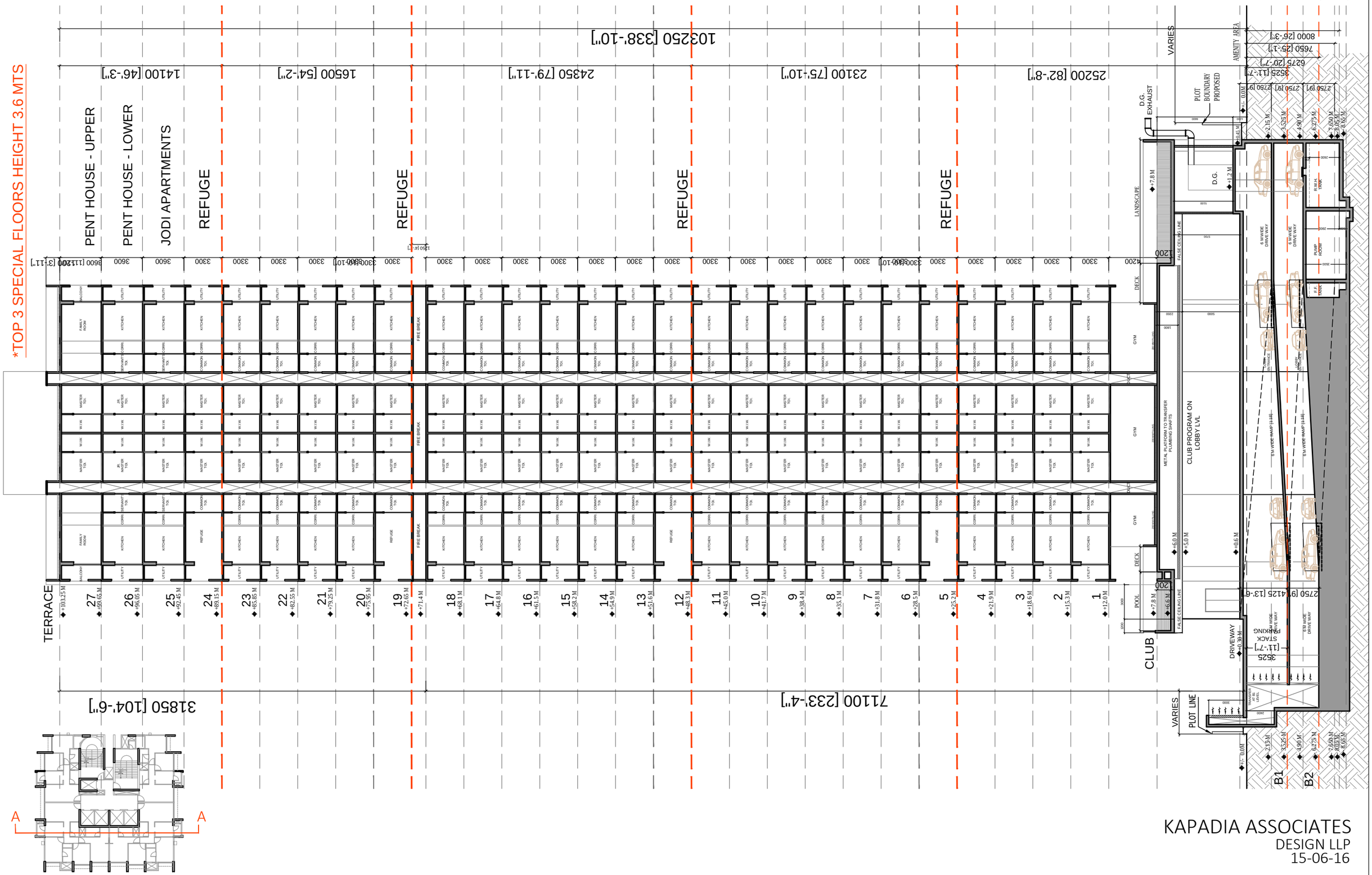


KEY PLAN

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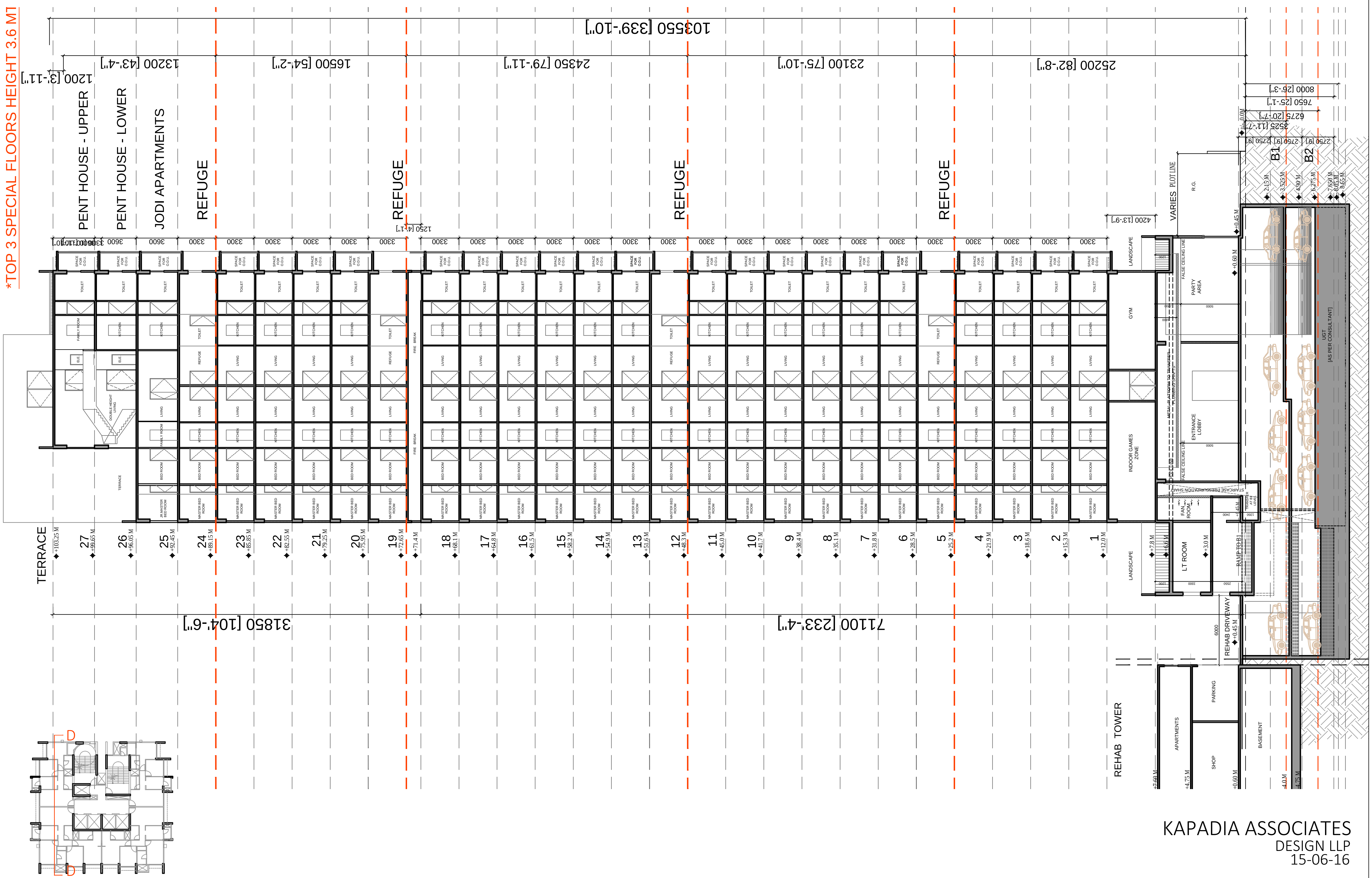
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RESIDENTIAL TOWER
SECTIONS
SCALE 1:300 (A3)

*TOP 3 SPECIAL FLOORS HEIGHT 3.6 MTS



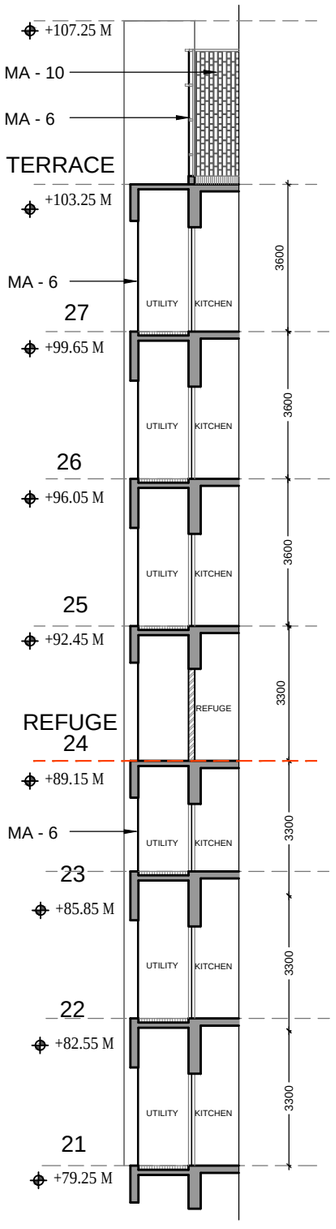
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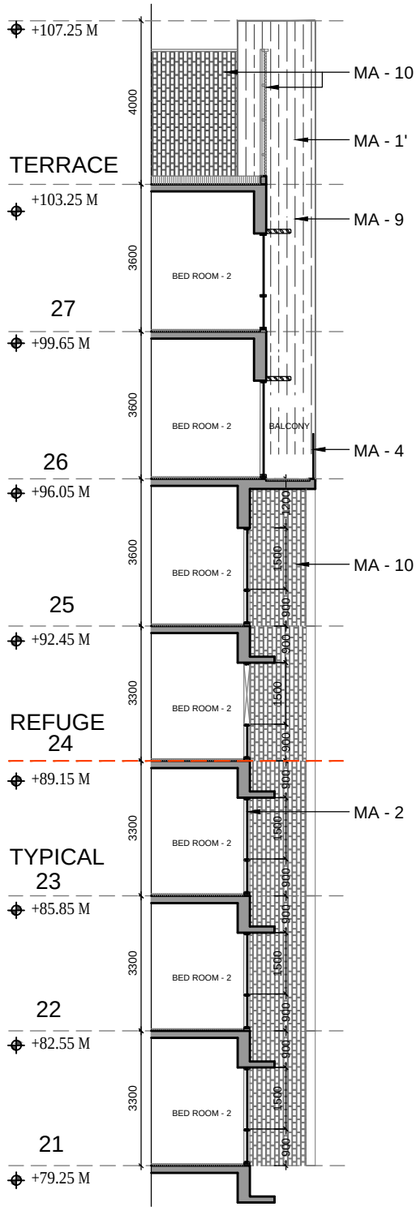


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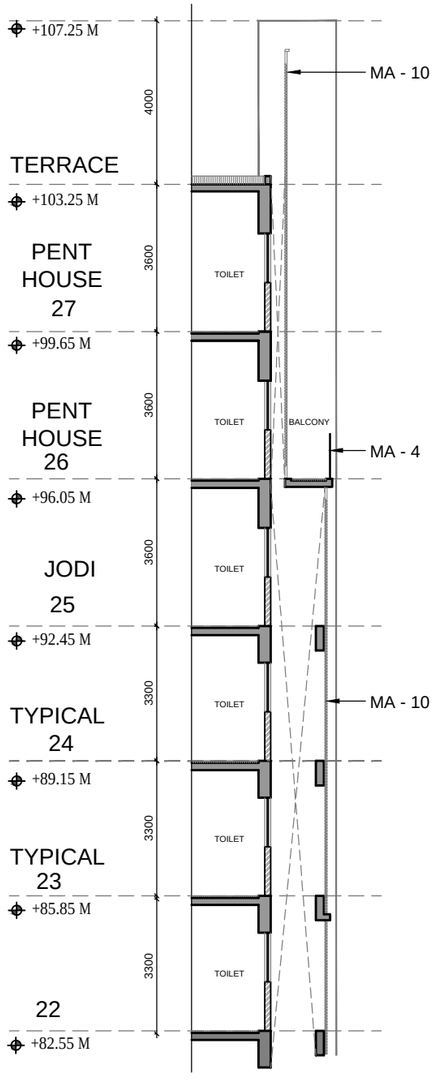
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WALL SECTIONS
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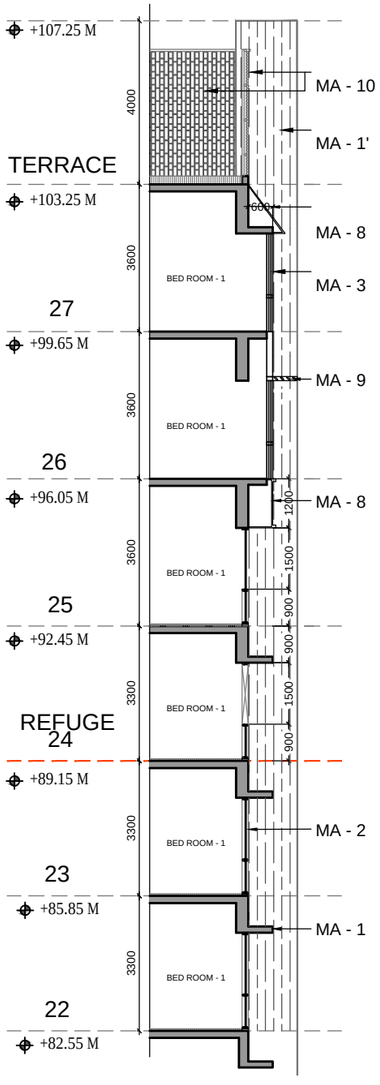
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SECTION UU

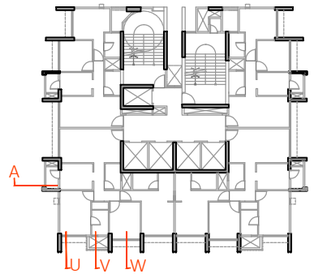


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SECTION WW

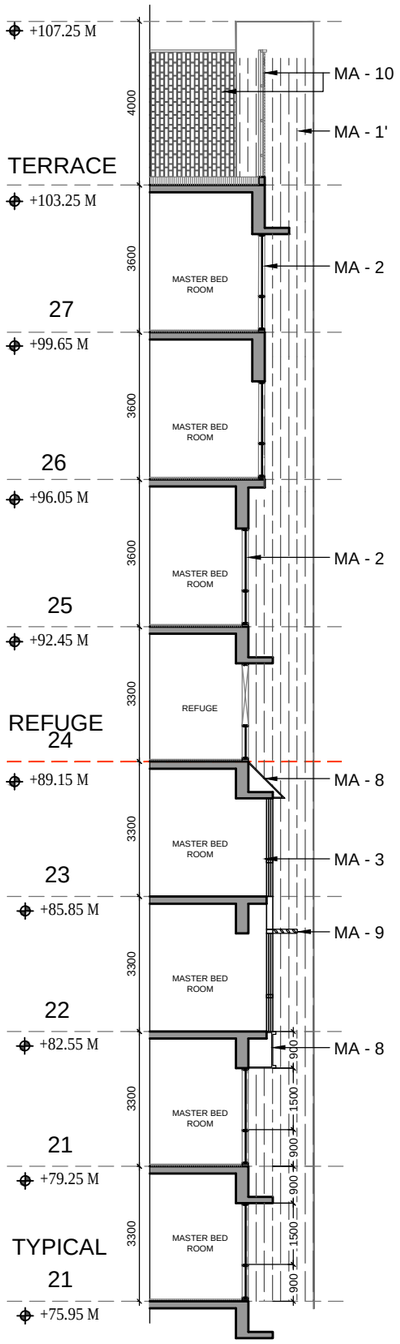
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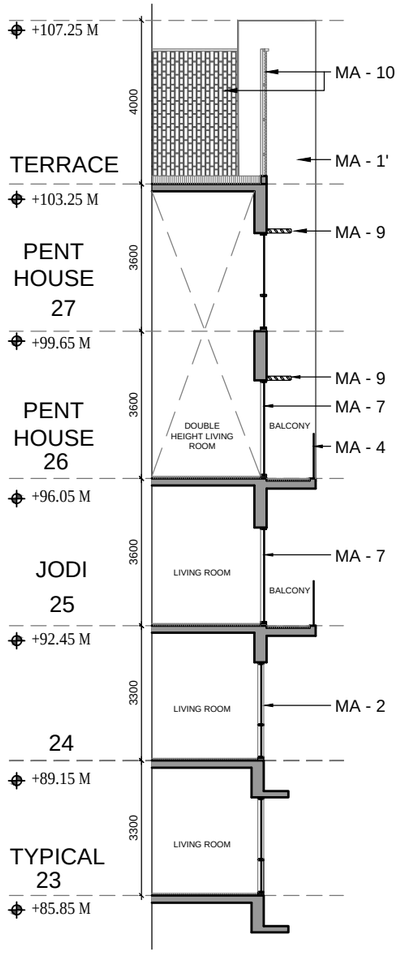
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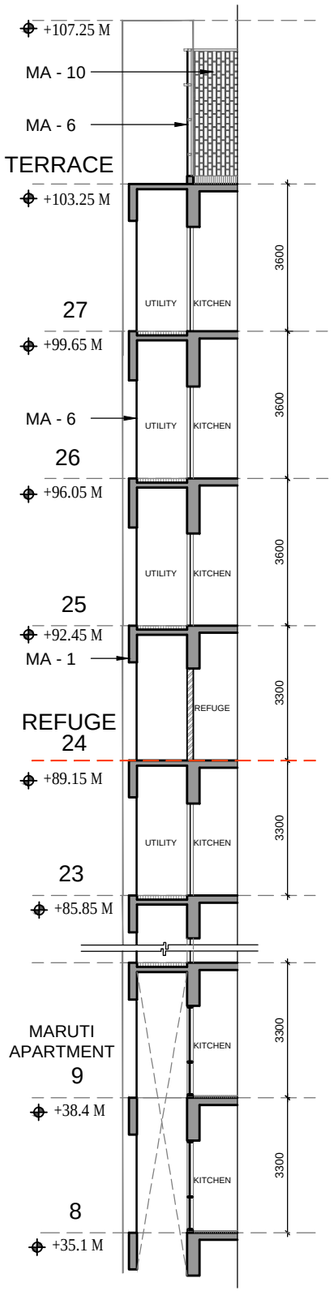
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WALL SECTIONS
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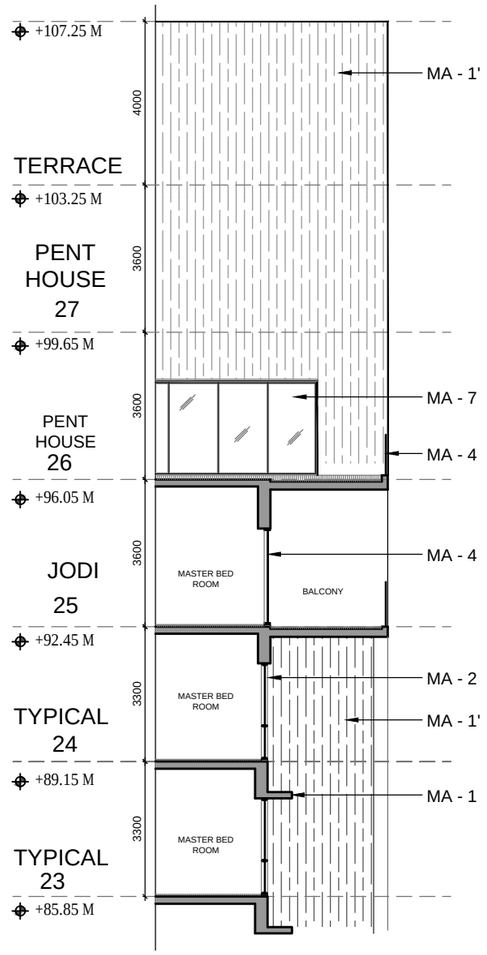
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SECTION YY

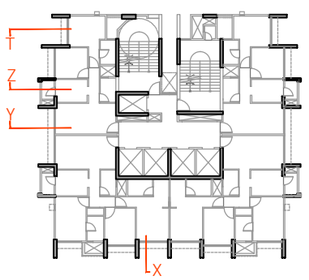


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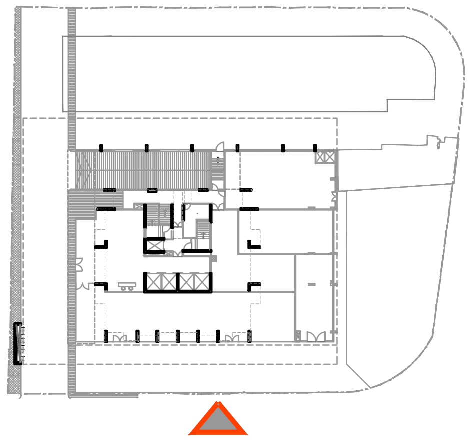
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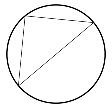
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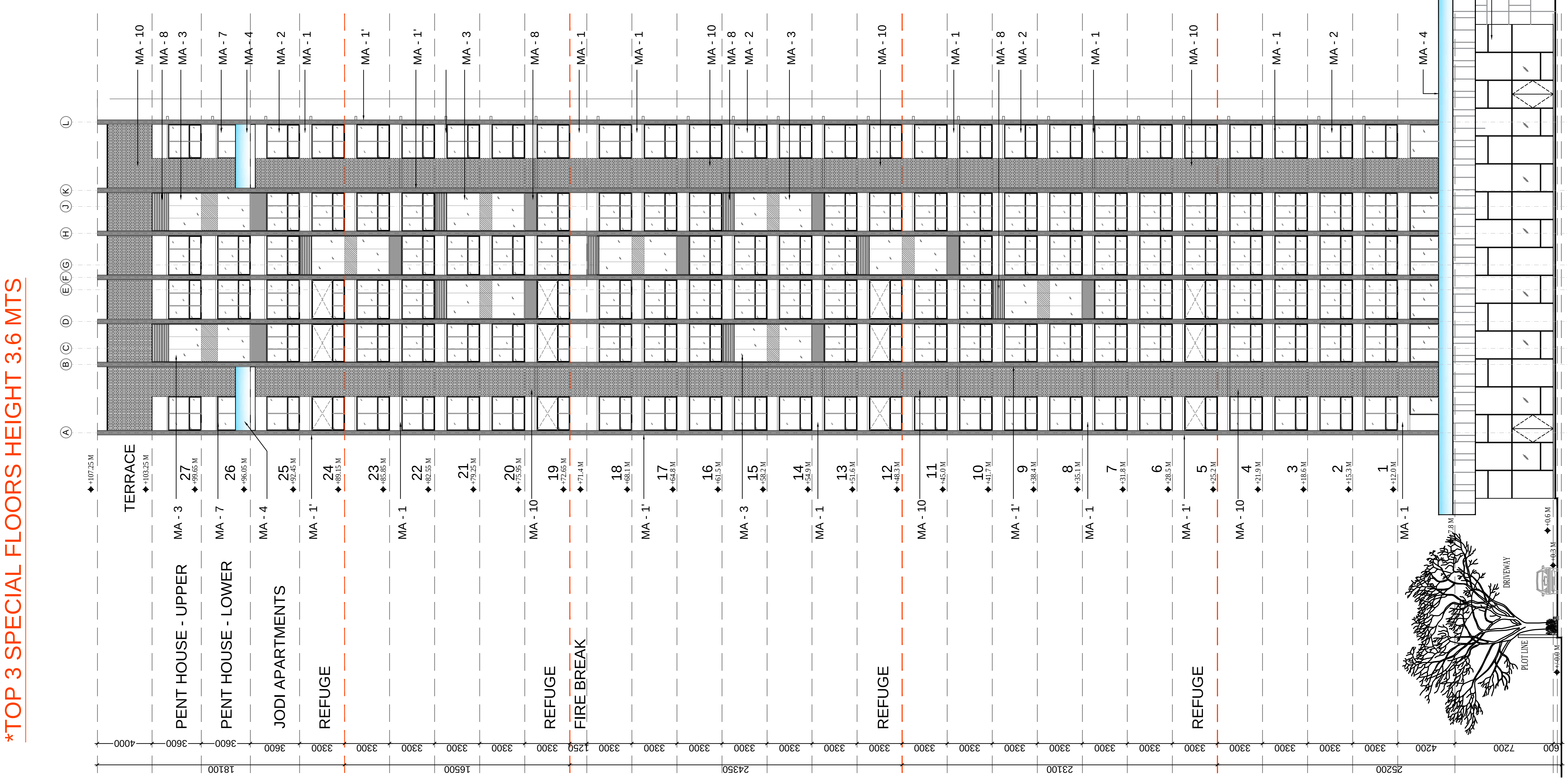
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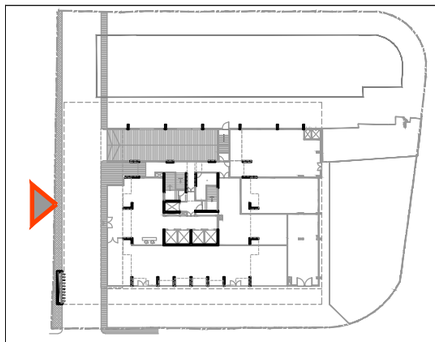
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MA 11	STONE CLADDING

LODHA PAREL
RESIDENTIAL TOWER
SOUTH SIDE ELEVATION
SCALE 1:300 (A3)



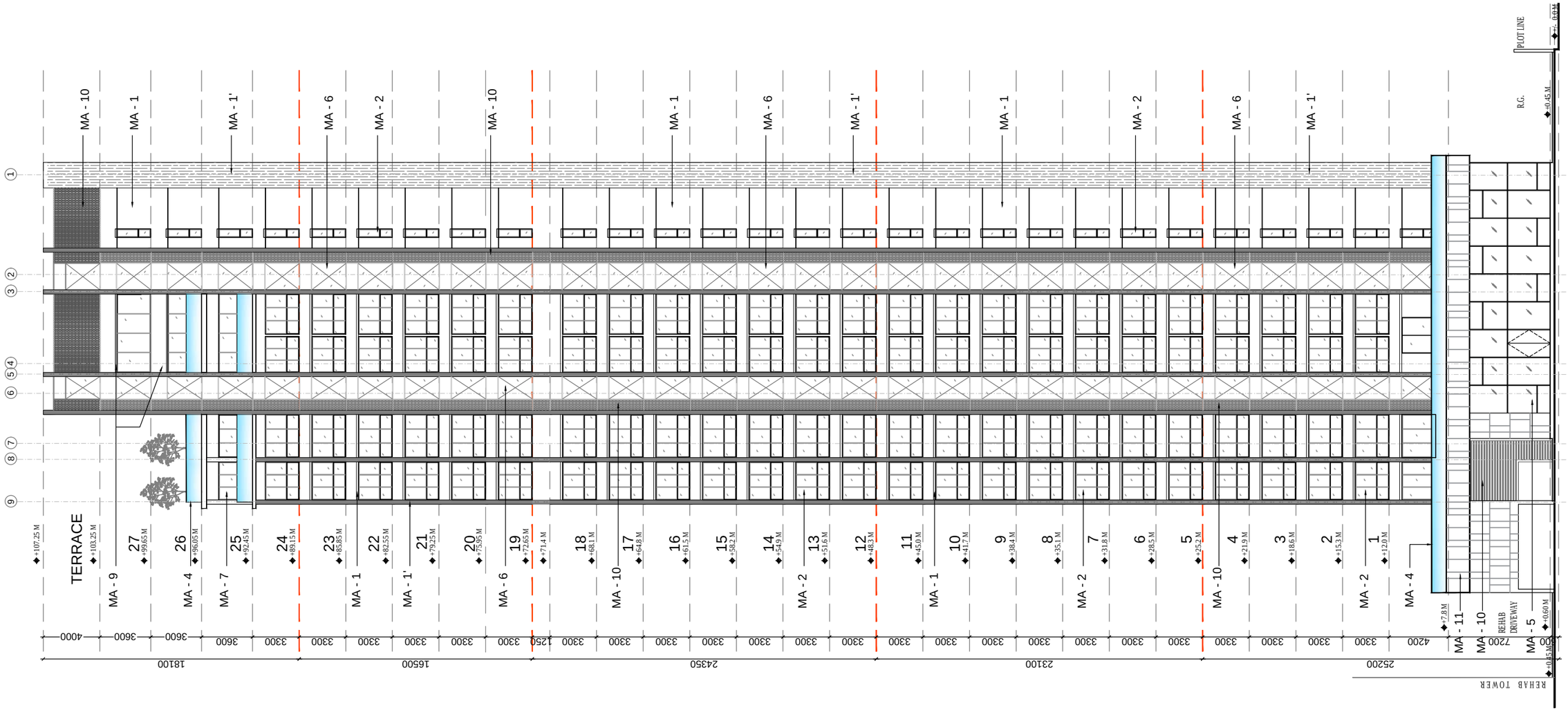
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LODHA PAREL
RESIDENTIAL TOWER
EAST SIDE ELEVATION
SCALE 1:300 (A3)

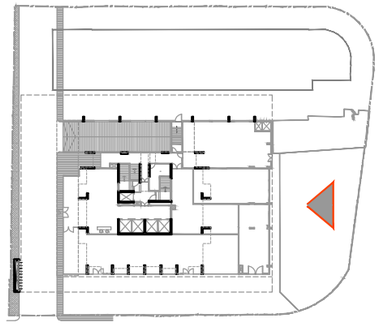


LEGEND	
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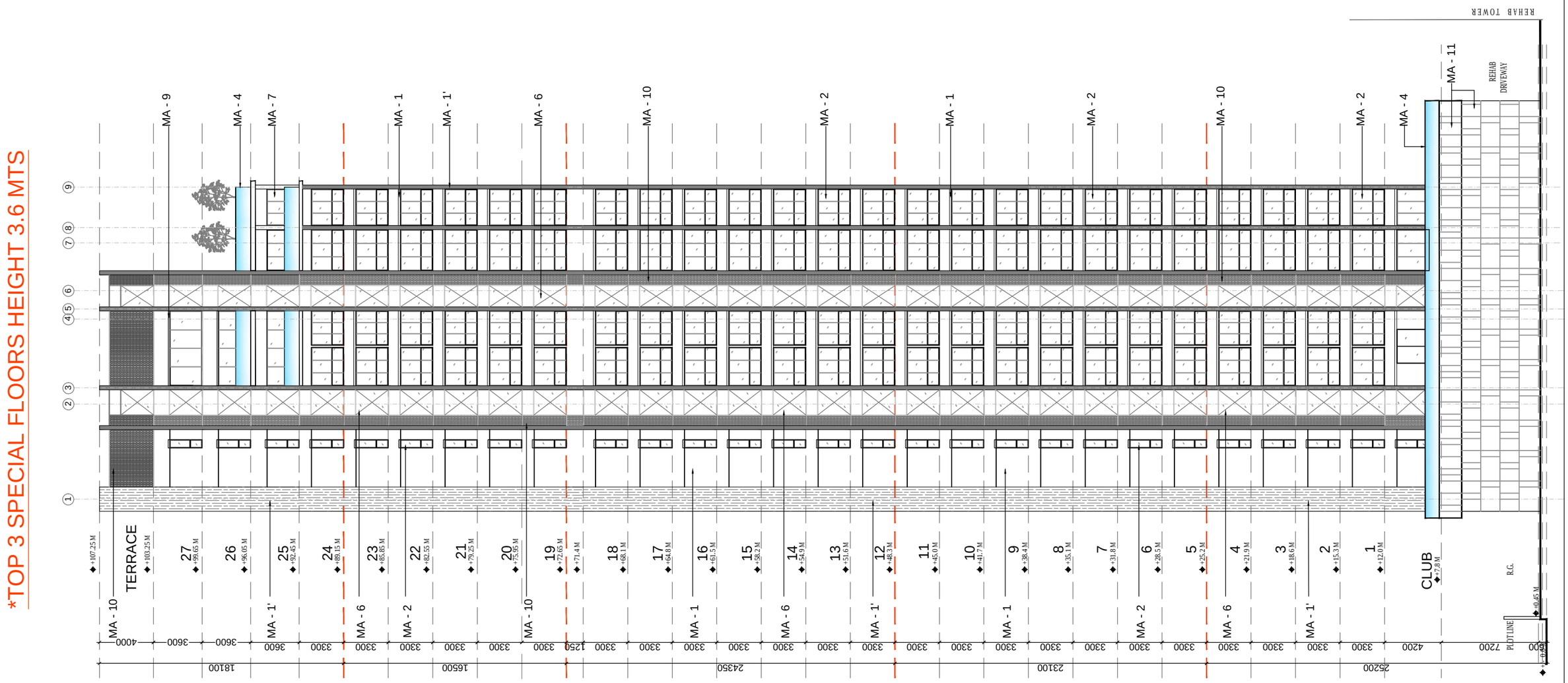


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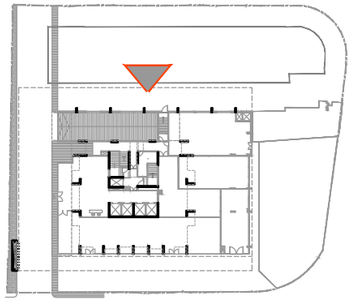
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RESIDENTIAL TOWER
WEST SIDE ELEVATION
SCALE 1:300 (A3)



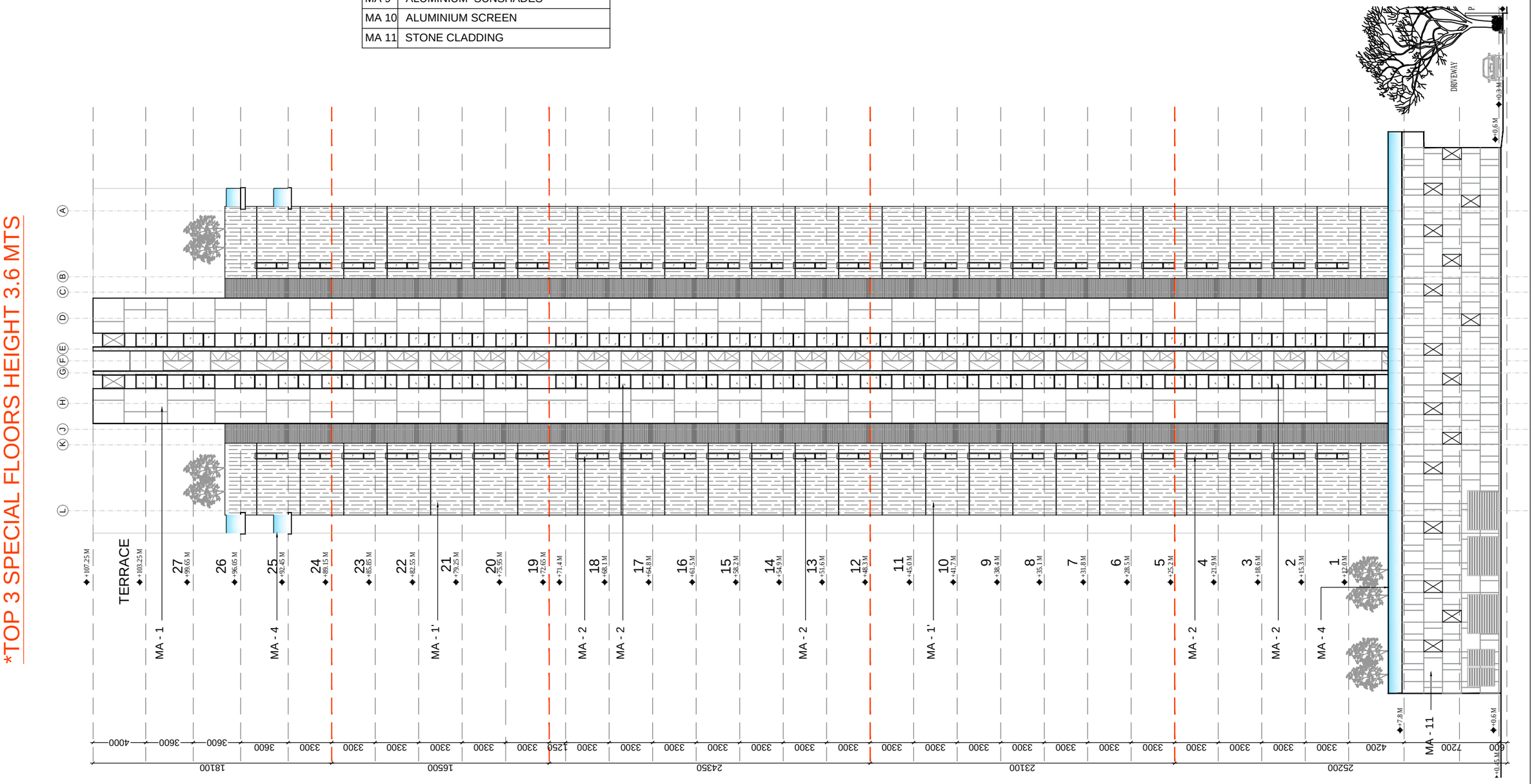
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LODHA PAREL
RESIDENTIAL TOWER
NORTH SIDE ELEVATION
SCALE 1:300 (A3)



LEGEND	
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LODHA PAREL
SALE TOWER

DBR _ STRUCTURAL

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12-07-16

DESIGN BASIS REPORT (SALE TOWER)

Proposed Building at LOWER PAREL

FOR

LODHA HOME DEVELOPERS PRIVATE LIMITED

Structural Consultants:

Ramboll India Pvt. Ltd.

REVISION	DATE	DESCRIPTION	PREPAIRED BY	REVIEWED BY	APPROVED BY
R0	18/01/2016	FIRST ISSUE	SHRIRANG	HARIHARAN IYER	Dr. MANIYAR
R1	02/02/2016	SECOND ISSUE	SHRIRANG	HARIHARAN IYER	Dr. MANIYAR
R2	13/07/16	Third Issue	SHRIRANG	HARIHARAN IYER	Mr.MUKESH

Architects:

KAPADIA ASSOCIATES PVT. LTD.

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O. TORSIONAL IRREGULARITY (ALONG X-DIRECTION). Terrace level
P. TORSIONAL IRREGULARITY (ALONG Y-DIRECTION). Terrace level
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R. CLOSURE REPORT

A. FOREWORD

Ramboll India Pvt. Ltd. has been appointed as Structural Engineers by Lodha Home Developers Pvt. Ltd to develop structural schemes and design for proposed construction of Residential building (Sale tower) at Lower Parel - Mumbai, India.

The objectives of these reports are stated as follows:

- Define the engineering strategy and parameters in relation to the building structure and Architectural concept.
- Identify and record all input requirements, Analysis and design criteria.
- Develop structural scheme compatible with Architectural vision, services requirements and client's needs.
- Prepare structural design that will aim to actual structural durability and integrity.
- Desirable structural performance under characteristic services load.
- Fast-track construction and cost effectiveness

B. DESCRIPTION OF BUILDING

Project comprises of Sale Tower comprising of 2 Basements + Ground + Podium + 27 floors + 1 fire check floor + Terrace. Total Height of Building = 102.35m above ground level.

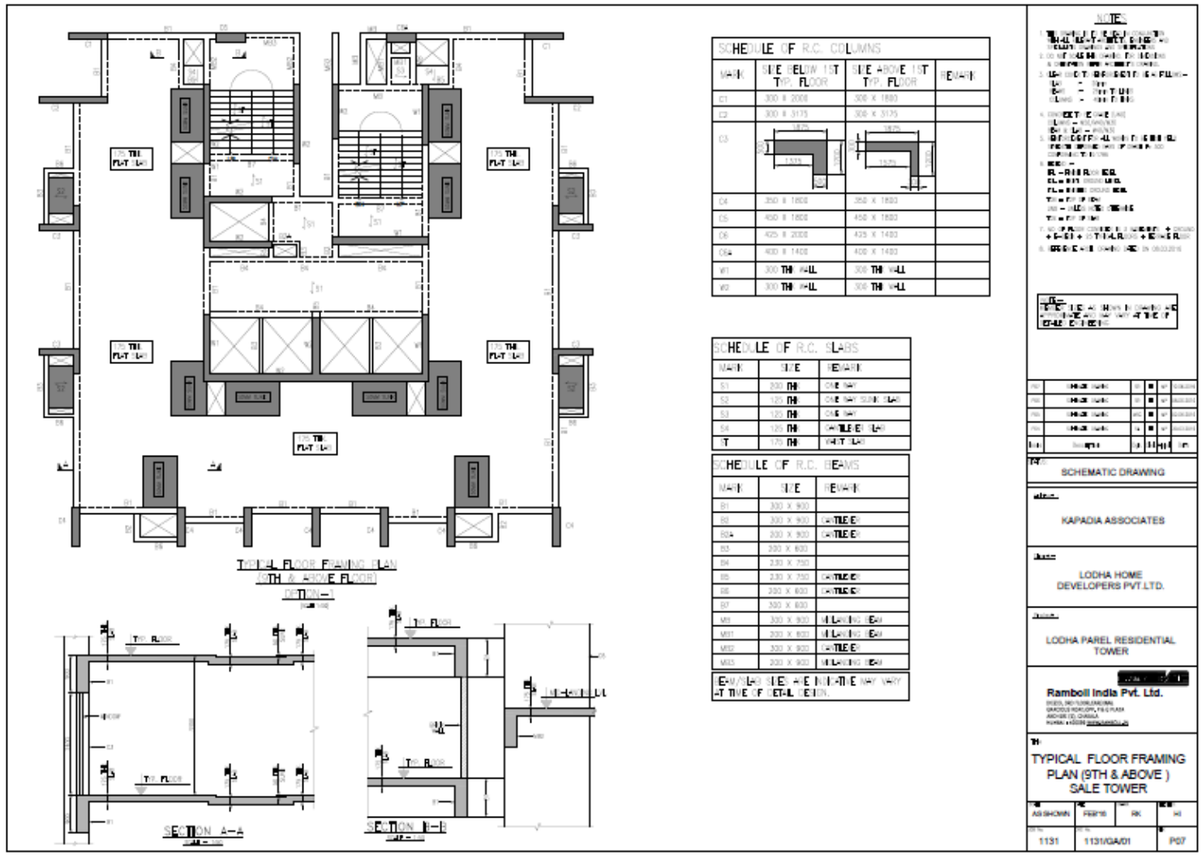
Structural form should contribute to the building character and identity, while being efficient, cost effective and simple to construct. The buildings will be primarily R.C. framed structure with Flat Plate having central core of RC Shear wall. Care will be taken to provide columns/ walls in such a way that minimum obstructions are developed to space utility and architect vision.

The columns will be connected to each other with a flat plate acting as in-plane rigid diaphragms for each of the floors. Shear walls will be provided in such a way to control deflections and resists lateral forces.

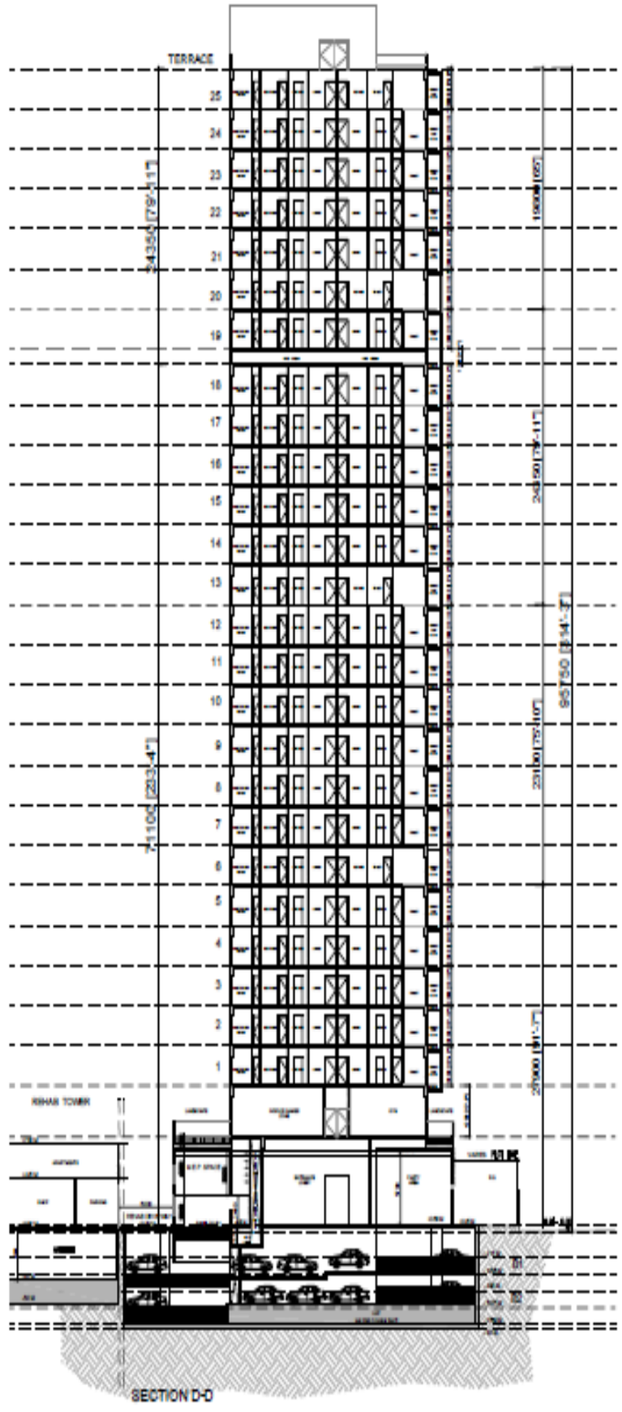
Design Life Period = 50 years.

Floor Heights

Basement Height	: 2.75m
Ground Floor to Podium	: 7.2m
Podium to 1st Floor	: 4.2m
Typical Floors	: 3.3m
Fire Check	: 1.25m



Typical Floor Plan



Architectural – Section

C. LIST OF CODES

Following Indian and British codes will be used for detailed design wherever applicable.

a. Indian Codes

i. Loading

IS 875:	Code of practice for design loads for buildings and structures Part 1 – Dead Loads Part 2 - Imposed Loads Part 3 - Wind Loads Part 5 - Special loads and load combinations

ii. Design for Earthquake Resistance

IS 1893:2002	Criteria for earthquake resistance design of structures
IS 4326:1993	Earthquake Resistant Design and Construction of Buildings – Code of Practice.
IS 13920:1993	Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces - Code of Practice.
SP 22	Explanatory handbook on codes for earthquake Engineering, IS 1893 & IS 4326

iii. Design of Concrete Elements

IS 269: 1989	Specification for ordinary Portland cement 33 grade
IS 383: 1970	Specification for coarse and fine aggregates from Natural sources for concrete
IS 432: 1982	Specification for mild steel and medium tensile steel Bars and hard-drawn steel wire for concrete reinforcement.
IS 456:2000	Plain and Reinforced Concrete – Code of practice
IS 1786: 1985	Specification for high strength deformed steel bars and wires for concrete reinforcement
IS 2502: 1963	Code of practice for bending and fixing of bars for concrete reinforcement
IS 8112: 1989	Specification for 43 grade ordinary Portland cement
IS 9103	Specification for admixtures for concrete
IS 10262	Recommended guidelines for concrete mix design
SP 16	Design aids for reinforced concrete to IS 456
SP 24	Explanatory handbook on Indian Standard Code for plain and reinforced concrete- IS 456
SP 34	Handbook on concrete reinforcement and detailing

iv. Structural Steel Elements

IS 800 : 1984	Use of steel in construction – Code of practice
IS 2062	Steel for general structural purposes
IS 11384: 1985	Code of Practice for Composite construction in structural steel and concrete

v. Earthwork

IS 3764	Code of safety for excavation work

vi. Soil and Foundation

IS 1080	Code of practice for design and construction of Spread Foundations
IS 1904	Code of practice for design and construction of Foundations in soils
IS 2950	Code of practice for design and construction of raft Foundation (Part – 1)
IS 2911	Code of practice for design and construction of pile foundations

b. British Codes

i. Dead / Imposed Loads:

BS 6399-1	Code of Practice for dead and imposed loads
BS 6399-3	Code of Practice for imposed roof loads
BS 648	Schedule of weights of building

ii. Concrete Design:

BS 8110	Structural use of Concrete
UBC 97	Design and Detailing of Shear Wall and Coupling Beams

D. Loading Parameters

a. Self-Weights

Self-weight of the structural members will be considered on the basis of the following properties.

Density of reinforced concrete	25 kN/cum
Density of plain concrete	24 kN/cum.
Density of floor finishes / plasters	20 kN/cum
Density of soil	18 kN/cum.
Density of light weight block work	10 kN/cum.
Density of Solid Block Wall	18 kN/cum.
Density of Dry Partitions	8 kN/cum.

b. Imposed Gravity Loads

The following are the imposed gravity loads which will be adopted in addition to the self-weight of the structure.

(Self-weight of slab / beam / columns will be as per the dimensions adopted in the respective drawings.

Floor finishes of 50 mm thickness will be considered on all floors.)

Open Terraces

Load Component	Thickness (mm)	UDL (kN/m²)
Water-Proofing + floor finish	150+50	4.00
Live Load		3.00

Typical Floor

Load Component	Thickness (mm)	UDL (kN/m²)
Finishes	50	1.00
False Ceiling		0.3
Live Load		2.00

Toilets / Kitchen

Load Component	Thickness (mm)	UDL (kN/m²)
Filling (Light weight)	75	0.75
Finish	50	1.00
False Ceiling		0.3
Live Load		2.00

Corridors, Lobbies and Balconies

Load Component	Thickness (mm)	UDL (kN/m²)
Finishes	50	1.00
Live Load		3.00

Staircases

Load Component	Thickness (mm)	UDL (kN/m²)
Steps	150 (Riser) / 300 (Tread)	1.875
Finishes	50	1.50
Live Load		3.00

Refuge Areas

Load Component	Thickness (mm)	UDL (kN/m²)
Waterproofing + Finishes	150+50	4.00
Live Load		3.00

Lift Machine Rooms, Water tanks.

Load Component	Thickness (mm)	UDL (kN/m²)
Finishes	50	1.00
Services(Lift machine		7.50

Parking Load.

Load Component	Thickness (mm)	UDL (kN/m²)
Finishes	50	1.00
Services		0.50
Live Load		2.50

E-Deck Load (as per Architectural section – To be updated later)

Load Component	Thickness (mm)	UDL (kN/m²)
Filling	1000mm	18

Services		0.50
Live Load		3

Swimming Pool Area (as per Architectural section – To be updated later)

Load Component	Thickness (mm)	UDL (kN/m²)
Water	1200	12
Finishes	150mm	3
Services		1

c. MEP Loads

Fire Tender Load of 20 kN/m² on fire tender driveway will be considered wherever applicable.

Specific loads given by vendors will be adopted wherever applicable.

OHT Loads will be updated later after confirmation from Architect

Self - Weight of Different Finished Walls

All Peripheral Walls are 150mm Mivan walls & Internal Walls are Dry Partitions.

Type of wall	Thickness of Wall (mm)	Solid Block Work - Load Intensity KN/m2	Dry Partitions - Load Intensity KN/m2
100 Thk.	100	2.40	--
150 Thk.	150	3.30	--
200 Thk.	200	4.20	--
230 Thk.	230	4.72	--
150 Thk. Mivan Walls	150	--	--

Modifiers used in analysis are as follows: -

	Service	Design
Beams (J, I2 I3)	0.50	0.35
Columns (J, I2, I3)	1.00	0.70
Wall Piers (m11, m22, m12)	1.00	0.70
Wall Spandrels (f22, f12, m11, m22, m12)	0.50	0.35
Floor Slabs (m11, m22, m12)	0.36	0.25

d. Wind loads (To be updated later)

Wind loads will be calculated in accordance with IS 875: Part 3.

Design wind speed V_z = $V_b \times k_1 \times k_2 \times k_{3x} K4$

$V_b \longrightarrow$ Basic wind velocity for Mumbai = 44 m/s

$k_1 \longrightarrow$ Risk coefficient for all general buildings (For a design life of 50 years) = 1

$k_2 \longrightarrow$ Terrain category 2, for 102.35 m height = *1.242*

$k_3 \longrightarrow$ Topography factor = 1

$k4 \longrightarrow$ Importance factor = 1

Based on the above,

Max. Design wind speed (V_Z = m/s

Max Design wind pressure Pz = 0.6 x Vz^2

= 1792 N /m²

Further to Design Wind Pressure (P_Z) appropriate pressure coefficient has been used as applicable. Gust wind analysis as per clause 8 of IS: 875 (Part 3)-2015 has also been carried out.

(As Per IS 875 – III)

a) **Category of building= 2**

b) **Force coefficient**

Along X Cf= 1.326

Along Y Cf= 1.328

c) Wind base shear in horizontal x direction = 5885.61 KN

d) Wind base shear in horizontal y direction = 6809.13 KN

e) Gust factor

G = gust factor = (peak load) / (mean load), and is given by

$G = 1 + [g_f r[SQRT (B (1 + Ø)2 + (S E) / β)]]$

G = 2.24

f) Pressure at Terrace level:

P = 3.02 KN/M^2

g) Max. Deflection at roof level

CASE	Deflection in mm	Point no. in model	Near column
WINDX	121.83		
WINDY	132.59		

h) Max. Inter story drift

CASE	Story drift	Point no. in model	At Story
WINDX	0.0015		
WINDY	0.0016		

e. Seismic Loads

The seismic load calculations have been carried out in accordance with IS 1893: 2002.

As per this code, Mumbai lies in Zone III with zone factor Z = 0.16

The Design Base Shear is given by $V_b = [(Z*I* S_a) / (2*R*g)]*W$

As the proposed building is a Residential building, the Importance factor I will be taken as 1.0. The Response reduction factor R will be taken as 4 as the structure is Ductile shear wall & Detailing will be as per IS 13920

Sa / g is the normalized Response Spectrum value for the structure which is the function of the fundamental time period of vibration of the structure and the type of the founding soil.

W is the Seismic Weight of the building, which is calculated in accordance with the relevant clause in the IS1893: 2002.

Since the structure is a R.C.C. structure a damping value of 5% is considered

Space frame analysis of the structure has been carried out using response spectrum method.

Time period in X direction $= \frac{0.09H}{\sqrt{(Dx)}}$

$= \frac{0.09 \times H}{\sqrt{(Dx)}}$

= 1.8

Time period in Y direction $= \frac{0.09H}{\sqrt{(Dy)}}$

$= \frac{0.09 \times H}{\sqrt{(Dy)}}$

= 1.88

Considering Hard Soil for foundation,

Sa/g for X direction for time period 0.40<T<4.0 =1.0/T = 0.55

Sa/g for Y direction for time period 0.40<T<4.0 =1.0/T = 0.53

Design Horizontal seismic co-efficient Ah in X direction $= \frac{0.16 * 1.0 * 0.55}{2 * 4}$

= (1.11 %)

Base Shear in X-dir = 4011 kN

Scale factor for Spec X = 2.808

Design Horizontal seismic co-efficient Ah in Y direction $= \frac{0.16 * 1.0 * .53}{2 * 4}$

= (1.06%)

Base Shear in Y-dir = 3841 kN

Scale factor for Spec X = 2531

Deflection Criteria:

i) Max deflection at Terrace level

Case	Deflection in mm	Point no. in model	Near column
EQX	144.5		
EQY	129.2		

j) Max inter story drift

Case	Story drift	Point no. in model	At Story
EQX	0.0018		
EQY	0.0016		

E. CLEAR COVER TO REINFORCEMENT

Covers to reinforcement has been in accordance with IS: 456:2000 corresponding to moderate exposure conditions for the super-structure or severe exposure conditions for the sub-structure and to satisfy a fire rating of 2 hrs.

For various structural elements cover to Reinforcement shall be as given in the table below

Structural Element	Minimum concrete cover (mm)
Column / Shear Wall	40mm to links
Beams	30mm to Stirrups
Slabs	25mm
Footing / Raft	75mm

F. GRADE OF CONCRETE

Following grades of concrete are proposed for the project

Structural Element	Concrete Grade
Footing	M40
Column / Shear Wall	M50/M40/M30
Beams	M40/M30
Slabs	M40M/30

G. GRADE OF STEEL

Grade of reinforced steel is Fe 550

H. EXPOSURE CONDITION

Moderate exposure conditions for the super-structure and severe exposure conditions for the sub-structure.

Minimum cement content as per IS 456-2000 Clause number 8.2.4.1.

I. CONSTRUCTION SEQUENCE AND LOADING PARAMETER

Since building has basement and it is proposed to complete basement floor first and consecutively further, parking floors, E deck floor, transfer floors and typical floors

J. PROPOSED APPROACH TO STRUCTURAL ANALYSIS & DESIGNS

Following flooring systems have been proposed at the various floors.

Podiums: Flat slab arrangement

Typical floors: Flat slab arrangement

After sizing of the various structural members, a computer model of the structural frame of the building was generated to assess the effects of vertical and lateral loads, imposed on the structure.

The entire building structure was analyzed for Gravity, Seismic and Wind loads using ETABS (Non Linear version 15.1.0) software. We have used the following software for design of individual elements

R.C.Beams - RCDC

R.C.Slabs - SAFE

Columns - RCDC

Shear Wall - RCDC

Foundation - SAFE

Based on the soil investigation report, Solid raft shall be used for the foundations.

K. LOAD COMBINATIONS

The results obtained from the computer analysis in the form of member forces and reactions has been used for design the structural members. Following load combinations of the member forces has been considered for arriving at the design forces while designing.

Load combinations for Design:

Comb No.	Load Combination	Load Factors						
		D.L.	S.D.L	L.L.	WX	WY	SpecX	SpecY
1	DL+ SDL + LL	1.5	1.5	1.5	-	-	-	-
2	DL+ SDL + LL + SPECX	1.2	1.2	1.2	-	-	1.2	-
3	DL+ SDL + LL + SPECY	1.2	1.2	1.2	-	-	-	1.2
4	DL+ SDL + SPECX	1.5	1.5	-	-	-	1.5	-
5	DL+ SDL + SPECY	1.5	1.5	-	-	-	-	1.5
6	DL+ SDL + LL + WLX	1.2	1.2	1.2	1.2	-	-	-
7	DL+ SDL + LL - WLX	1.2	1.2	1.2	-1.2	-	-	-
8	DL+ SDL + LL + WLY	1.2	1.2	1.2	-	1.2	-	-
9	DL+ SDL + LL - WLY	1.2	1.2	1.2	-	-1.2	-	-
10	DL+ SDL + WLX	1.5	1.5	-	1.5	-	-	-
11	DL+ SDL - WLX	1.5	1.5	-	-1.5	-	-	-
12	DL+ SDL + WLY	1.5	1.5	-	-	1.5	-	-
13	DL+ SDL - WLY	1.5	1.5	-	-	-1.5	-	-
14	DL+ SDL + SPECX	0.9	0.9	-	-	-	1.5	-
15	DL+ SDL + SPECY	0.9	0.9	-	-	-	-	1.5
16	DL+SDL +WLX	0.9	0.9	-	1.5	-	-	-
17	DL + SDL - WLX	0.9	0.9	-	-1.5	-	-	-
18	DL+SDL +WLY	0.9	0.9	-	-	1.5	-	-
19	DL + SDL - WLY	0.9	0.9	-	-	-1.5	-	-

Load combinations for Serviceability:

Comb No.	Load Combination	Load Factors						
		D.L.	S.D.L	L.L.	WX	WY	SpecX	SpecY
1	DL+ SDL + LL	1.5	1.5	1.5	-	-	-	-
2	DL+ SDL + LL + SPECX	1.2	1.2	1.2	-	-	1.2	-
3	DL+ SDL + LL + SPECY	1.2	1.2	1.2	-	-	-	1.2
4	DL+ SDL + SPECX	1.5	1.5	-	-	-	1.5	-
5	DL+ SDL + SPECY	1.5	1.5	-	-	-	-	1.5
6	DL+ SDL + LL + WLX	1.2	1.2	1.2	1.2	-	-	-
7	DL+ SDL + LL - WLX	1.2	1.2	1.2	-1.2	-	-	-
8	DL+ SDL + LL + WLY	1.2	1.2	1.2	-	1.2	-	-
9	DL+ SDL + LL - WLY	1.2	1.2	1.2	-	-1.2	-	-
10	DL+ SDL + WLX	1.5	1.5	-	1.5	-	-	-
11	DL+ SDL - WLX	1.5	1.5	-	-1.5	-	-	-
12	DL+ SDL + WLY	1.5	1.5	-	-	1.5	-	-
13	DL+ SDL - WLY	1.5	1.5	-	-	-1.5	-	-
14	DL+ SDL + SPECX	0.9	0.9	-	-	-	0.8	-
15	DL+ SDL + SPECY	0.9	0.9	-	-	-	-	0.8
16	DL+SDL +WLX	0.9	0.9	-	0.8	-	-	-
17	DL + SDL - WLX	0.9	0.9	-	-0.8	-	-	-
18	DL+SDL +WLY	0.9	0.9	-	-	0.8	-	-
19	DL + SDL - WLY	0.9	0.9	-	-	-0.8	-	-

Suffixes X and Y in the above table indicate the direction in which the force is applied.

Members will be designed for the worst combination of the design forces obtained with consideration for reversibility of forces (Wind and Earthquake).

L. SUB-SOIL PROFILE (Will be updated as per Soil Investigation Report)

As per soil investigation report bore hole no 1, 2 and 3 are near SALE tower. As per soil report recommendation Hard Rock is encountered at 2 and 4 m depth. Net Safe Bearing Capacity to be considered as 270 t/m2 on HR as per Geo-con soil report dated 6.5.2016.

M. Dynamic analysis data

MODE NUMBER	PERIOD (TIME)	UX % MASS	UY % MASS	RZ % MASS	SUM UX	SUM UY	SUM RZ
Mode 1	1	3.718	0.3061	0.0129	0	0.0883	0.0099
Mode 2	2	3.554	0.05	0.457	0	0.0045	0.4278
Mode 3	3	2.722	0.1425	0.0585	0	0.2365	0.4821
Mode 4	4	1.087	0.0287	0.0201	0	0.0215	0.5015
Mode 5	5	0.955	0.0236	0.0878	0	0.0022	0.5791
Mode 6	6	0.703	0.0679	0.0047	0	0.0428	0.5833
Mode 7	7	0.597	0.0144	0.0085	0	0.0164	0.5886
Mode 8	8	0.482	0.0061	0.0393	0	0.0008	0.6135
Mode 9	9	0.387	0.0064	0.007	0	0.0368	0.6205
Mode 10	10	0.324	0.0399	0.0009	0	0.0184	0.6212
Mode 11	11	0.301	0.0026	0.0343	0	0.0001	0.6549
Mode 12	12	0.282	0.0114	0.0034	0	0.0429	0.6583
Mode 13	13	0.224	0.0012	0.0048	0	0.0257	0.6634
Mode 14	14	0.209	0.0011	0.0214	0	0.0038	0.6844
Mode 15	15	0.193	0.0355	0	0	0.0061	0.6844
Mode 16	16	0.175	0.005	0.0012	0	0.0069	0.6857
Mode 17	17	0.159	0.0011	0.018	0	0.0016	0.7057
Mode 18	18	0.137	0.0085	0.0002	0	0.0059	0.706
Mode 19	19	0.131	0.0233	0.0001	0	7.347E-07	0.7061
Mode 20	20	0.124	0.0003	0.016	0	0.001	0.724
Mode 21	21	0.109	0.0005	0.0001	0	0.0022	0.7241
Mode 22	22	0.103	0.0212	0.00000648	0	0.0004	0.7241
Mode 23	23	0.097	0.000008672	0.0113	0	0.0004	0.7378
Mode 24	24	0.09	0.0001	0.00004596	0	0.0013	0.7379
Mode 25	25	0.083	0.0152	6.577E-07	0	0.0002	0.7379
Mode 26	26	0.08	0.0001	0.008	0	0.0002	0.7477
Mode 27	27	0.074	0.0004	0.0001	0	0.001	0.7478
Mode 28	28	0.068	0.0087	0.0008	0	0.00000996	0.7489
Mode 29	29	0.067	0.0011	0.0098	0	0.00001833	0.7614
Mode 30	30	0.063	0.0005	0.0001	0	0.0008	0.7615
Mode 31	31	0.057	0.0076	0.0002	0	0.0001	0.7618
Mode 32	32	0.056	0	0.0232	0	0.0006	0.7921
Mode 33	33	0.055	0.0005	0.0002	0	0.0011	0.7924
Mode 34	34	0.05	0.0113	0.0098	0	0.0026	0.8054
Mode 35	35	0.05	0.0007	0.0666	0	0.0048	0.8941
Mode 36	36	0.047	0.0027	0.000008122	0	0.0035	0.8941
Mode 37	37	0.046	0.0001	0.039	0	0.0063	0.9466
Mode 38	38	0.044	0.0453	0.0008	0	0.0068	0.9477
Mode 39	39	0.042	0.0011	0.0003	0	0.003	0.9481
Mode 40	40	0.041	0.0134	0.0034	0	0.0117	0.9527

N. LATERAL DEFLECTION AT TERRACE LEVEL

Load case	Dx-max.(mm)	H/dx (H=102.35m)	Dy-max	H/dy (H=102.35m)
EQX	144.5	708.3		
EQY			129.2	792.18
WX	121.83	840.1		
WY			132.59	771.93

O. TORSIONAL IRREGULARITY (ALONG X-DIRECTION). Terrace level

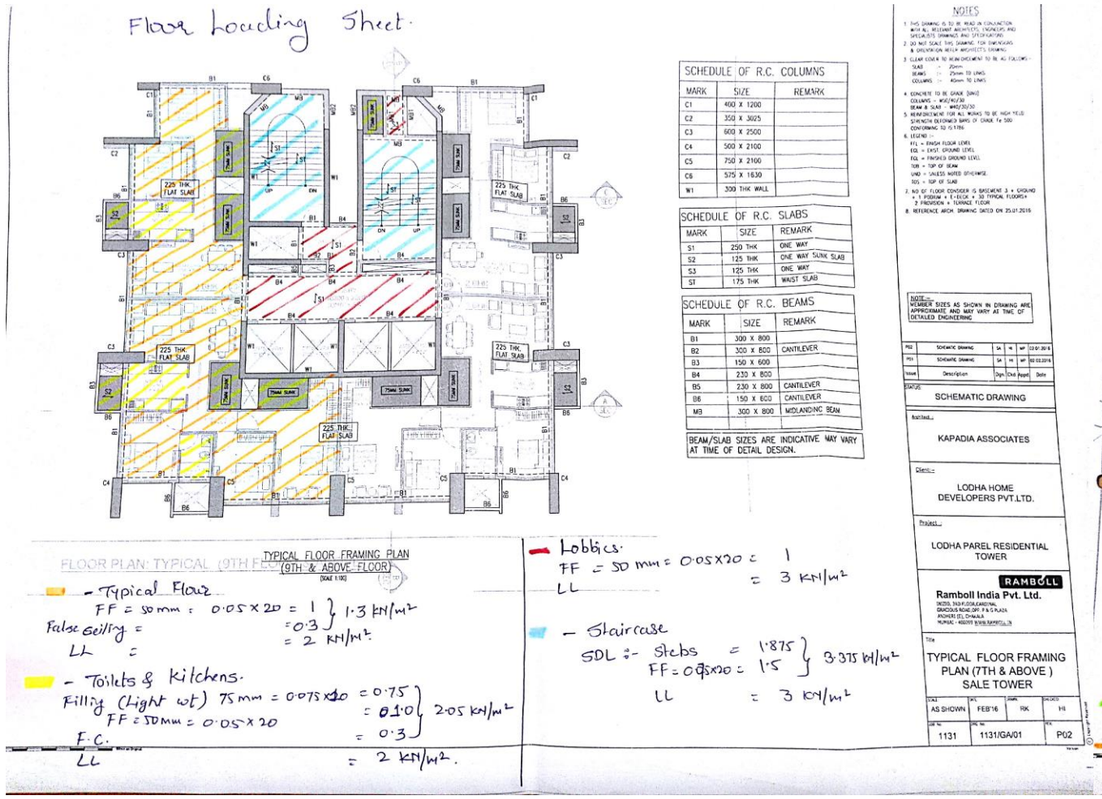
Load Case	Corner- 1	Corner-2	Corner-3	Corner-4	Avg-x	% Max./Avg.
Eq-X	144.5	144.5	79.2	79.2	111.85	1.29
Wl-X	98.3	98.3	65.8	65.8	82.05	1.2

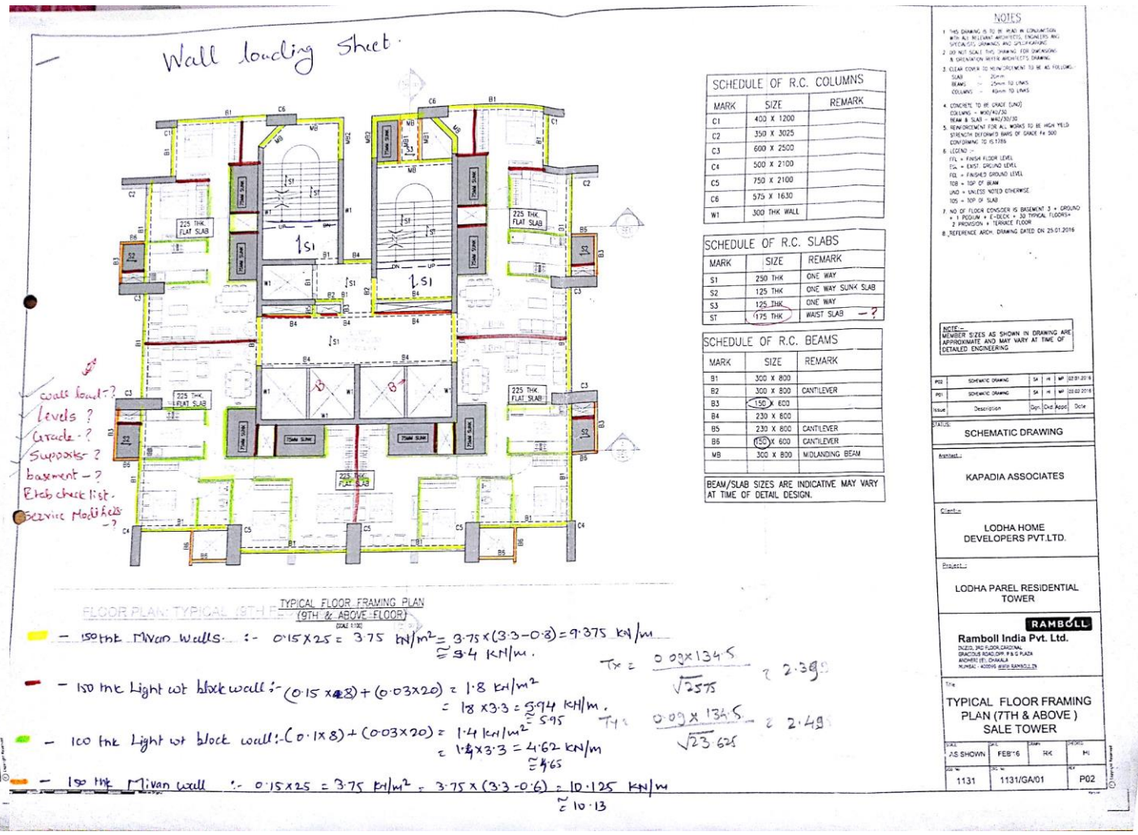
P. TORSIONAL IRREGULARITY (ALONG Y-DIRECTION). Terrace level

Load Case	Corner- 1	Corner-2	Corner-3	Corner-4	Avg-z	% Max./Avg.
Eq-Y	68.2	79.4	67.3	80.3	73.8	1.09
Wl-Y	59.7	61.6	59.6	61.7	60.65	1.02

Q. LOADING SHEET

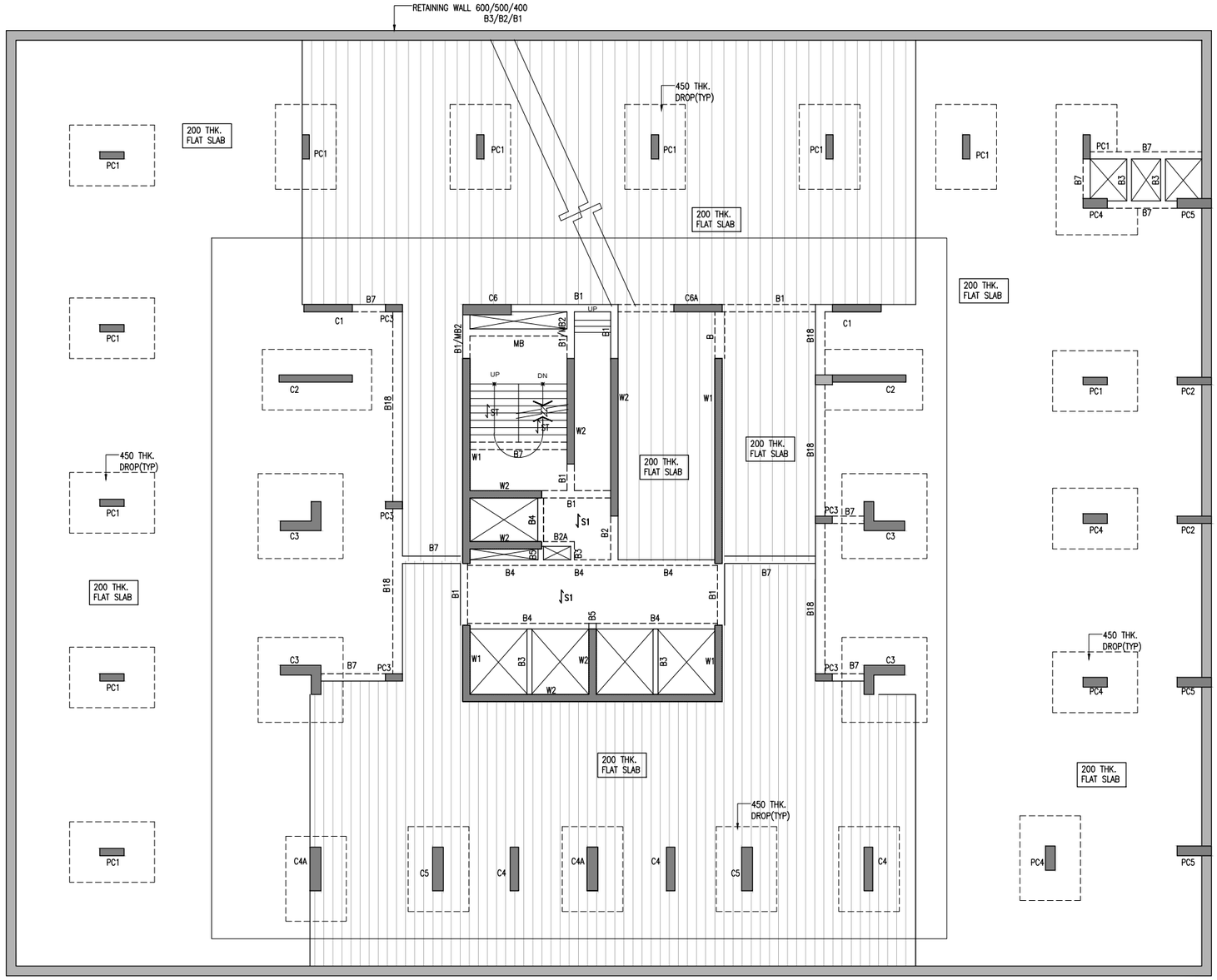
TYPICAL FLOOR



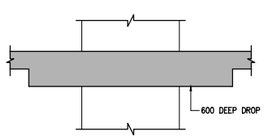


STRUCTURAL DWG LIST:

1. FLOOR PLANS
   - BASEMENT LEVEL
   - GROUND LEVEL
   - MEZZANINE LEVEL
   - CLUB LEVEL
   - TYPICAL FLOOR LEVEL



BASEMENT FLOOR FRAMING PLAN
(SCALE 1:100)



(TYP. SECTION OF DROP)
SCALE - 1:50

100mm on Original

SCHEDULE OF R.C. COLUMNS			
MARK	SIZE BELOW 1ST TYP. FLOOR	SIZE ABOVE 1ST TYP. FLOOR	REMARK
C1	400 X 2000	400 X 2000	
C2	400 X 3025	400 X 3025	
C3	1675, 600, 1075, 1200, 600	1675, 600, 1075, 1200, 600	
C4	500 X 1800	500 X 1800	
C5	600 X 1800	500 X 2450	
C6	425 X 2000	425 X 2000	
PC1	300 X 1000		
PC2	300 X 900		
PC3	300 X 700		
PC4	400 X 1000		
PC5	400 X 900		
FC	300 X 750		
FC1	300 X 300		
W1	400 THK WALL	300 THK WALL	
W2	300 THK WALL	300 THK WALL	
W3	230 THK WALL		

SCHEDULE OF R.C. BEAMS		
MARK	SIZE	REMARK
B1	300 X 900	
B2	300 X 900	CANTILEVER
B2A	200 X 900	CANTILEVER
B3	200 X 600	
B4	230 X 750	
B5	230 X 750	CANTILEVER
B6	200 X 600	CANTILEVER
B7	300 X 600	
B8	400 X 900	
B9	300 X 1200	
B10	300 X 1000	
B10A	300 X 1600	
B11	300 X 1000	CANTILEVER
B12	400 X 1600/1000	STEP BEAM
B13	300 X 950	
B14	300 X 1600	CANTILEVER
B15	200 X 900	
B16	400 X 1050	
B17	400 X 1050	CANTILEVER
B18	400 X 600	
RB1	300 X 750	SLOPING BEAM
MB	300 X 900	MIDLANDING BEAM
MB1	200 X 600	
MB2	300 X 900	CANTILEVER

BEAM/SLAB SIZES ARE INDICATIVE MAY VARY AT TIME OF DETAIL DESIGN.

SCHEDULE OF R.C. SLABS		
MARK	SIZE	REMARK
S1	250 THK	ONE WAY
S2	125 THK	ONE WAY SUNK SLAB
S3	125 THK	ONE WAY
S4	200 THK	ONE WAY SUNK SLAB
S5	150 THK	ONE WAY
S6	200 THK	ONE WAY
RS1	250 THK	ONE WAY (SLOPING SLAB)
ST	175 THK	WAIST SLAB

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS
2. DO NOT SCALE THIS DRAWING. FOR DIMENSIONS & ORIENTATION REFER ARCHITECT'S DRAWING.
3. CLEAR COVER TO REINFORCEMENT TO BE AS FOLLOWS:-
   SLAB :- 20mm
   BEAMS :- 25mm TO LINKS
   COLUMNS :- 40mm TO LINKS
4. CONCRETE TO BE GRADE (UNO)
   COLUMNS - M50/40/30
   BEAM & SLAB - M40/30/30
5. REINFORCEMENT FOR ALL WORKS TO BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE Fe 500 CONFORMING TO IS:1786
6. LEGEND :-
   FFL = FINISH FLOOR LEVEL
   EGL = EXIST. GROUND LEVEL
   FGL = FINISHED GROUND LEVEL
   TOB = TOP OF BEAM
   UNO = UNLESS NOTED OTHERWISE.
   TOS = TOP OF SLAB
7. NO OF FLOOR CONSIDER IS BASEMENT 3 + GROUND + E-DECK + 34 TYPICAL FLOORS + TERRACE FLOOR
8. REFERENCE ARCH. DRAWING DATED ON 08.03.2016

NOTE:-
MEMBER SIZES AS SHOWN IN DRAWING ARE APPROXIMATE AND MAY VARY AT TIME OF DETAILED ENGINEERING

Issue	Description	Dgn.	Ckd.	Appd.	Date
P03	SCHEMATIC DRAWING	MSG	HI	MP	02.06.2016
P02	SCHEMATIC DRAWING	SA	HI	MP	29.03.2016
P01	SCHEMATIC DRAWING	SA	HI	MP	18.03.2016

STATUS:
SCHEMATIC DRAWING

Architect :
KAPADIA ASSOCIATES

Client:-
LODHA HOME
DEVELOPERS PVT.LTD.

Project :
LODHA PAREL RESIDENTIAL TOWER

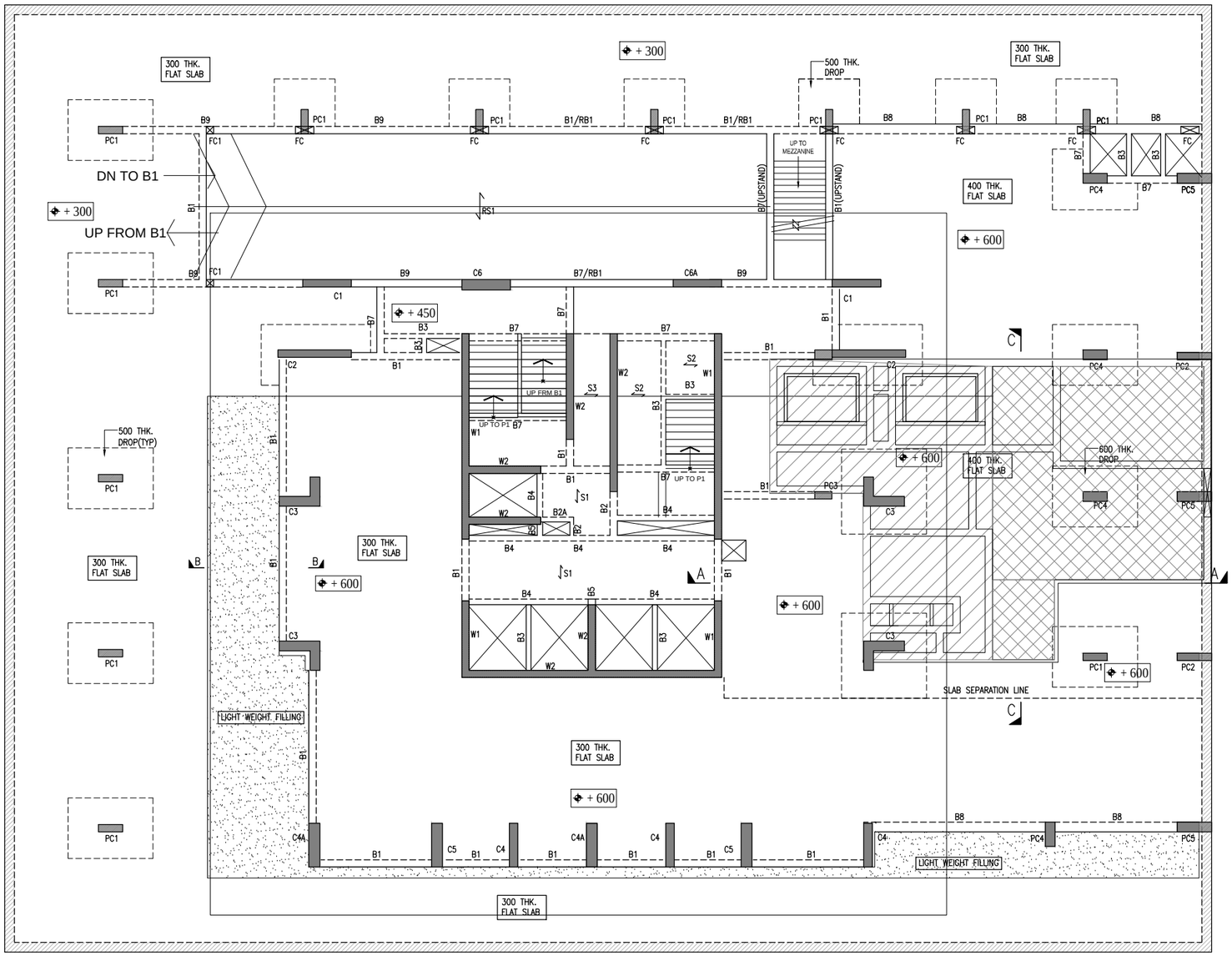
RAMBOLL
Ramboll India Pvt. Ltd.
INIZIO, 3RD FLOOR,CARDINAL
GRACIOUS ROAD,OPP. P & G PLAZA
ANDHERI (E), CHAKALA
MUMBAI - 400099 WWW.RAMBOLL.IN

Title
BASEMENT FLOOR FRAMING PLAN SALE TOWER

SCALE:	DATE:	DRAWN:	CHECKED:
AS SHOWN	FEB'16	RK	HI
JOB No:	DRG No:		REV:
1131	1131/GA/05		P03

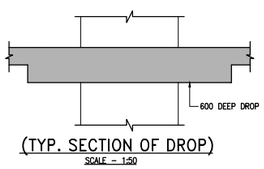
Version:

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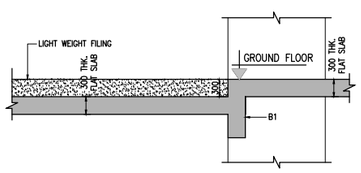


COLUMNS / WALLS STOP HATCH

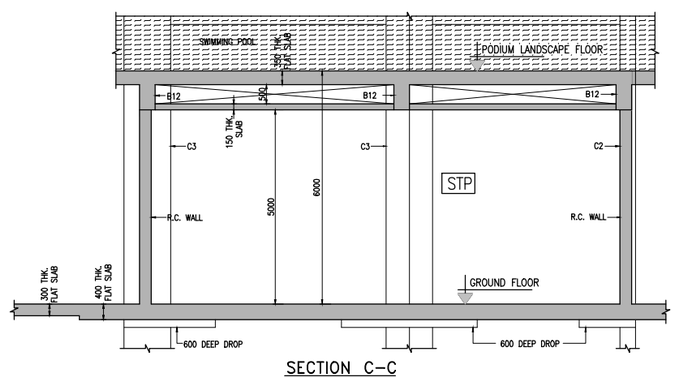
GROUND FLOOR FRAMING PLAN
(SCALE 1:100)



(TYP. SECTION OF DROP)
SCALE - 1:50



SECTION B-B
SCALE - 1:50



SECTION C-C
SCALE - 1:75

SCHEDULE OF R.C. COLUMNS

MARK	SIZE BELOW 1ST TYP. FLOOR	SIZE ABOVE 1ST TYP. FLOOR	REMARK
C1	400 X 2000	400 X 2000	
C2	400 X 3025	400 X 3025	
C3	1675, 600, 1075, 1200, 600	1675, 600, 1075, 1200, 600	
C4	500 X 1800	500 X 1800	
C5	600 X 1800	500 X 2450	
C6	425 X 2000	425 X 2000	
PC1	300 X 1000		
PC2	300 X 900		
PC3	300 X 700		
PC4	400 X 1000		
PC5	400 X 900		
FC	300 X 750		
FC1	300 X 300		
W1	400 THK WALL	300 THK WALL	
W2	300 THK WALL	300 THK WALL	
W3	230 THK WALL		

SCHEDULE OF R.C. BEAMS

MARK	SIZE	REMARK
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B2A	200 X 900	CANTILEVER
B3	200 X 600	
B4	230 X 750	
B5	230 X 750	CANTILEVER
B6	200 X 600	CANTILEVER
B7	300 X 600	
B8	400 X 900	
B9	300 X 1200	
B10	300 X 1000	
B10A	300 X 1600	
B11	300 X 1000	CANTILEVER
B12	400 X 1600/1000	STEP BEAM
B13	300 X 950	
B14	300 X 1600	CANTILEVER
B15	200 X 900	
B16	400 X 1050	
B17	400 X 1050	CANTILEVER
B18	400 X 600	
RB1	300 X 750	SLOPING BEAM
MB	300 X 900	MIDLANDING BEAM
MB1	200 X 600	
MB2	300 X 900	CANTILEVER

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SCHEDULE OF R.C. SLABS

MARK	SIZE	REMARK
S1	250 THK	ONE WAY
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S5	150 THK	ONE WAY
S6	200 THK	ONE WAY
RS1	250 THK	ONE WAY (SLOPING SLAB)
ST	175 THK	WAIST SLAB

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   COLUMNS :- 40mm TO LINKS
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   COLUMNS - M50/40/30
   BEAM & SLAB - M40/30/30
5. REINFORCEMENT FOR ALL WORKS TO BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE Fe 500 CONFORMING TO IS:1786
6. LEGEND :-
   FFL = FINISH FLOOR LEVEL
   EGL = EXIST. GROUND LEVEL
   FGL = FINISHED GROUND LEVEL
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   UNO = UNLESS NOTED OTHERWISE.
   TOS = TOP OF SLAB
7. NO OF FLOOR CONSIDER IS BASEMENT 3 + GROUND + E-DECK + 34 TYPICAL FLOORS + TERRACE FLOOR
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Architect :
KAPADIA ASSOCIATES

Client:-
LODHA HOME DEVELOPERS PVT.LTD.

Project :
LODHA PAREL RESIDENTIAL TOWER

RAMBOLL
Ramboll India Pvt. Ltd.
INIZIO, 3RD FLOOR,CARDINAL
GRACIOUS ROAD,OPP. P & G PLAZA
ANDHERI (E), CHAKALA
MUMBAI - 400099 WWW.RAMBOLL.IN

Title
GROUND FLOOR FRAMING PLAN SALE TOWER

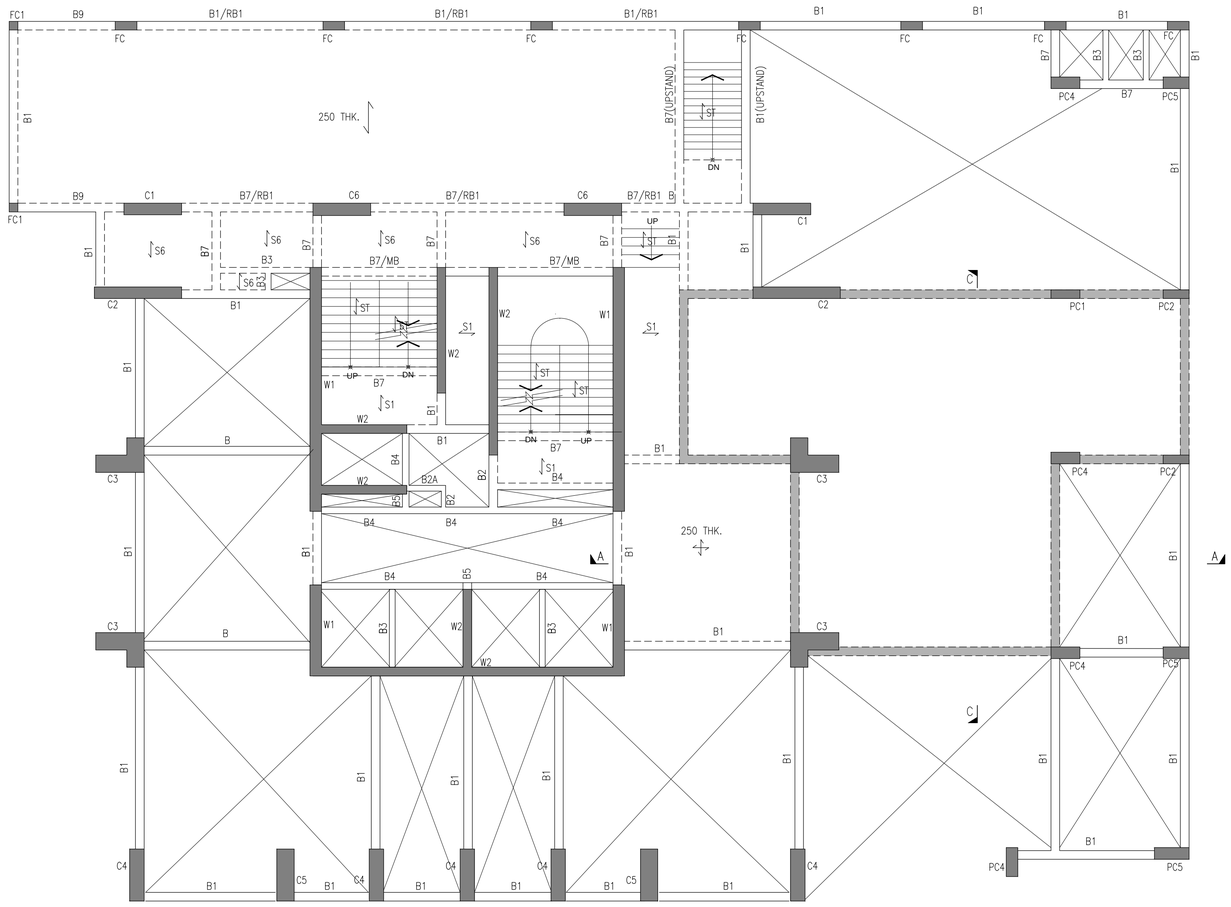
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JOB No:	DRG No:	REV:
1131	1131/GA/04	P03

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MEZZANINE FLOOR FRAMING PLAN

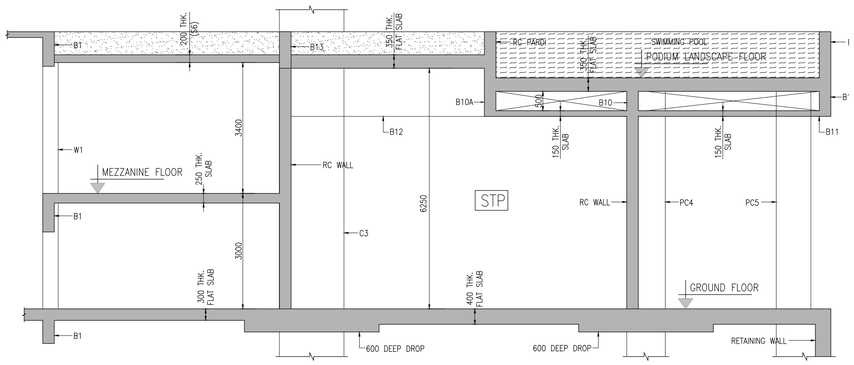
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SCHEDULE OF R.C. COLUMNS			
MARK	SIZE BELOW 1ST TYP. FLOOR	SIZE ABOVE 1ST TYP. FLOOR	REMARK
C1	400 X 2000	400 X 2000	
C2	400 X 3025	400 X 3025	
C3	1675, 600, 1075, 1200, 600	1675, 600, 1075, 1200, 600	
C4	500 X 1800	500 X 1800	
C5	600 X 1800	500 X 2450	
C6	425 X 2000	425 X 2000	
PC1	300 X 1000		
PC2	300 X 900		
PC3	300 X 700		
PC4	400 X 1000		
PC5	400 X 900		
FC	300 X 750		
FC1	300 X 300		
W1	400 THK WALL	300 THK WALL	
W2	300 THK WALL	300 THK WALL	
W3	230 THK WALL		

SCHEDULE OF R.C. BEAMS		
MARK	SIZE	REMARK
B1	300 X 900	
B2	300 X 900	CANTILEVER
B2A	200 X 900	CANTILEVER
B3	200 X 600	
B4	230 X 750	
B5	230 X 750	CANTILEVER
B6	200 X 600	CANTILEVER
B7	300 X 600	
B8	400 X 900	
B9	300 X 1200	
B10	300 X 1000	
B10A	300 X 1600	
B11	300 X 1000	CANTILEVER
B12	400 X 1600/1000	STEP BEAM
B13	300 X 950	
B14	300 X 1600	CANTILEVER
B15	200 X 900	
B16	400 X 1050	
B17	400 X 1050	CANTILEVER
B18	400 X 600	
RB1	300 X 750	SLOPING BEAM
MB	300 X 900	MIDLANDING BEAM
MB1	200 X 600	
MB2	300 X 900	CANTILEVER

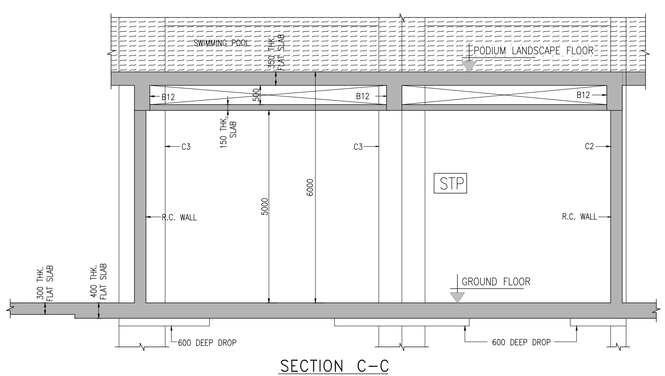
BEAM/SLAB SIZES ARE INDICATIVE MAY VARY AT TIME OF DETAIL DESIGN.

SCHEDULE OF R.C. SLABS		
MARK	SIZE	REMARK
S1	250 THK	ONE WAY
S2	125 THK	ONE WAY SUNK SLAB
S3	125 THK	ONE WAY
S4	200 THK	ONE WAY SUNK SLAB
S5	150 THK	ONE WAY
S6	200 THK	ONE WAY
RS1	250 THK	ONE WAY (SLOPING SLAB)
ST	175 THK	WAIST SLAB



SECTION A–A

SCALE – 1:75



SECTION C–C

SCALE – 1:75

NOTES

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3. CLEAR COVER TO REINFORCEMENT TO BE AS FOLLOWS:–
   SLAB :– 20mm
   BEAMS :– 25mm TO LINKS
   COLUMNS :– 40mm TO LINKS
4. CONCRETE TO BE GRADE (UNO)
   COLUMNS – M50/40/30
   BEAM & SLAB – M40/30/30
5. REINFORCEMENT FOR ALL WORKS TO BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE Fe 500 CONFORMING TO IS:1786
6. LEGEND :–
   FFL = FINISH FLOOR LEVEL
   EGL = EXIST. GROUND LEVEL
   FGL = FINISHED GROUND LEVEL
   TOB = TOP OF BEAM
   UNO = UNLESS NOTED OTHERWISE.
   TOS = TOP OF SLAB
7. NO OF FLOOR CONSIDER IS BASEMENT 3 + GROUND + E–DECK + 34 TYPICAL FLOORS + TERRACE FLOOR
8. REFERENCE ARCH. DRAWING DATED ON 08.03.2016

NOTE:–
MEMBER SIZES AS SHOWN IN DRAWING ARE APPROXIMATE AND MAY VARY AT TIME OF DETAILED ENGINEERING

Issue	Description	Dgn.	Ckd.	Appd.	Date
P01	SCHEMATIC DRAWING	SA	HI	MP	29.03.2016

STATUS:
SCHEMATIC DRAWING

Architect :
KAPADIA ASSOCIATES

Client:–
LODHA HOME
DEVELOPERS PVT.LTD.

Project :
LODHA PAREL RESIDENTIAL TOWER

RAMBOLL
Ramboll India Pvt. Ltd.
INIZIO, 3RD FLOOR,CARDINAL
GRACIOUS ROAD,OPP. P & G PLAZA
ANDHERI (E), CHAKALA
MUMBAI - 400099 WWW.RAMBOLL.IN

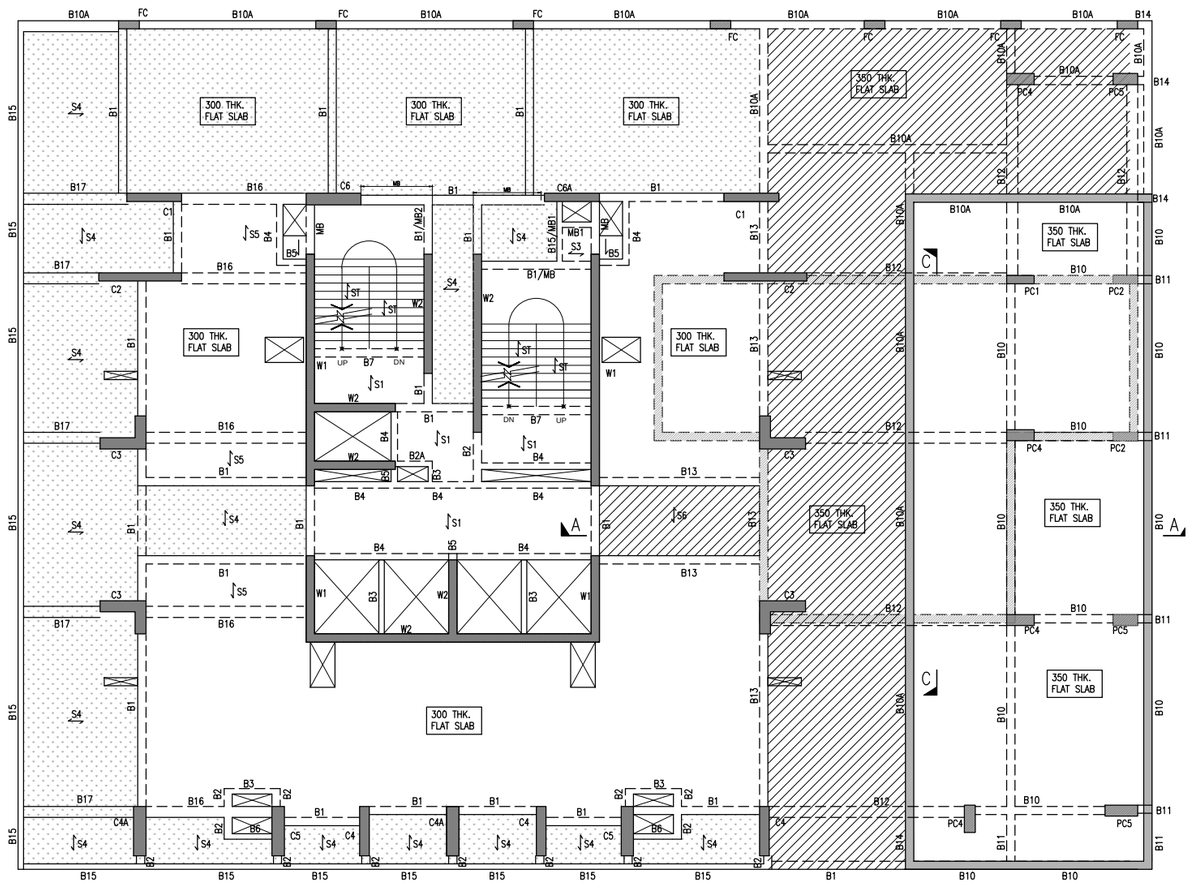
Title
MEZZANINE FLOOR FRAMING PLAN SALE TOWER

SCALE:	DATE:	DRAWN:	CHECKED:
AS SHOWN	MAR'16	MSG	HI
JOB No:	DRG No:		REV:
1131	1131/GA/06		P01

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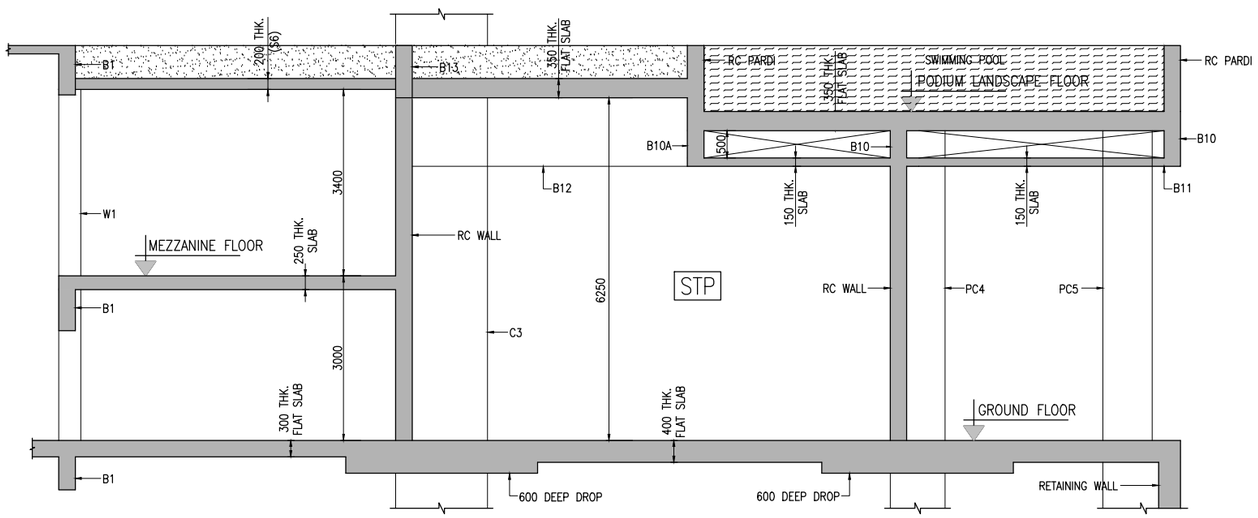
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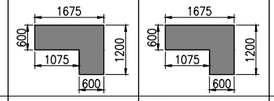
PODIUM LANDSCAPE FLOOR FRAMING PLAN
(SCALE 1:100)

600 SUNK
600 SUNK



SECTION A–A
SCALE – 1:75

SCHEDULE OF R.C. COLUMNS

MARK	SIZE BELOW 1ST TYP. FLOOR	SIZE ABOVE 1ST TYP. FLOOR	REMARK
C1	400 X 2000	400 X 2000	
C2	400 X 3025	400 X 3025	
C3			
C4	500 X 1800	500 X 1800	
C5	600 X 1800	500 X 2450	
C6	425 X 2000	425 X 2000	
PC1	300 X 1000		
PC2	300 X 900		
PC3	300 X 700		
PC4	400 X 1000		
PC5	400 X 900		
FC	300 X 750		
FC1	300 X 300		
W1	400 THK WALL	300 THK WALL	
W2	300 THK WALL	300 THK WALL	
W3	230 THK WALL		

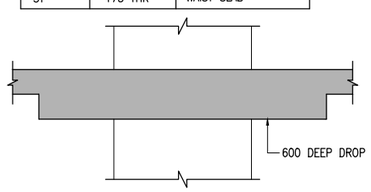
SCHEDULE OF R.C. BEAMS

MARK	SIZE	REMARK
B1	300 X 900	
B2	300 X 900	CANTILEVER
B2A	200 X 900	CANTILEVER
B3	200 X 600	
B4	230 X 750	
B5	230 X 750	CANTILEVER
B6	200 X 600	CANTILEVER
B7	300 X 600	
B8	400 X 900	
B9	300 X 1200	
B10	300 X 1000	
B10A	300 X 1600	
B11	300 X 1000	CANTILEVER
B12	400 X 1600/1000	STEP BEAM
B13	300 X 950	
B14	300 X 1600	CANTILEVER
B15	200 X 900	
B16	400 X 1050	
B17	400 X 1050	CANTILEVER
B18	400 X 600	
RB1	300 X 750	SLOPING BEAM
MB	300 X 900	MIDLANDING BEAM
MB1	200 X 600	
MB2	300 X 900	CANTILEVER

BEAM/SLAB SIZES ARE INDICATIVE MAY VARY AT TIME OF DETAIL DESIGN.

SCHEDULE OF R.C. SLABS

MARK	SIZE	REMARK
S1	250 THK	ONE WAY
S2	125 THK	ONE WAY SUNK SLAB
S3	125 THK	ONE WAY
S4	200 THK	ONE WAY SUNK SLAB
S5	150 THK	ONE WAY
S6	200 THK	ONE WAY
RS1	250 THK	ONE WAY (SLOPING SLAB)
ST	175 THK	WAIST SLAB



(TYP. SECTION OF DROP)
SCALE – 1:50

NOTES

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   COLUMNS :– 40mm TO LINKS
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   BEAM & SLAB – M40/30/30
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   EGL = EXIST. GROUND LEVEL
   FGL = FINISHED GROUND LEVEL
   TOB = TOP OF BEAM
   UNO = UNLESS NOTED OTHERWISE.
   TOS = TOP OF SLAB
7. NO OF FLOOR CONSIDER IS BASEMENT 3 + GROUND + E–DECK + 34 TYPICAL FLOORS + TERRACE FLOOR
8. REFERENCE ARCH. DRAWING DATED ON 08.03.2016

NOTE:–
MEMBER SIZES AS SHOWN IN DRAWING ARE APPROXIMATE AND MAY VARY AT TIME OF DETAILED ENGINEERING

Issue	Description	Dgn.	Ckd.	Appd.	Date
P03	SCHEMATIC DRAWING	MSG	HI	MP	02.06.2016
P02	SCHEMATIC DRAWING	SA	HI	MP	29.03.2016
P01	SCHEMATIC DRAWING	SA	HI	MP	18.03.2016

STATUS:
SCHEMATIC DRAWING

Architect :
KAPADIA ASSOCIATES

Client:–
LODHA HOME DEVELOPERS PVT.LTD.

Project :
LODHA PAREL RESIDENTIAL TOWER

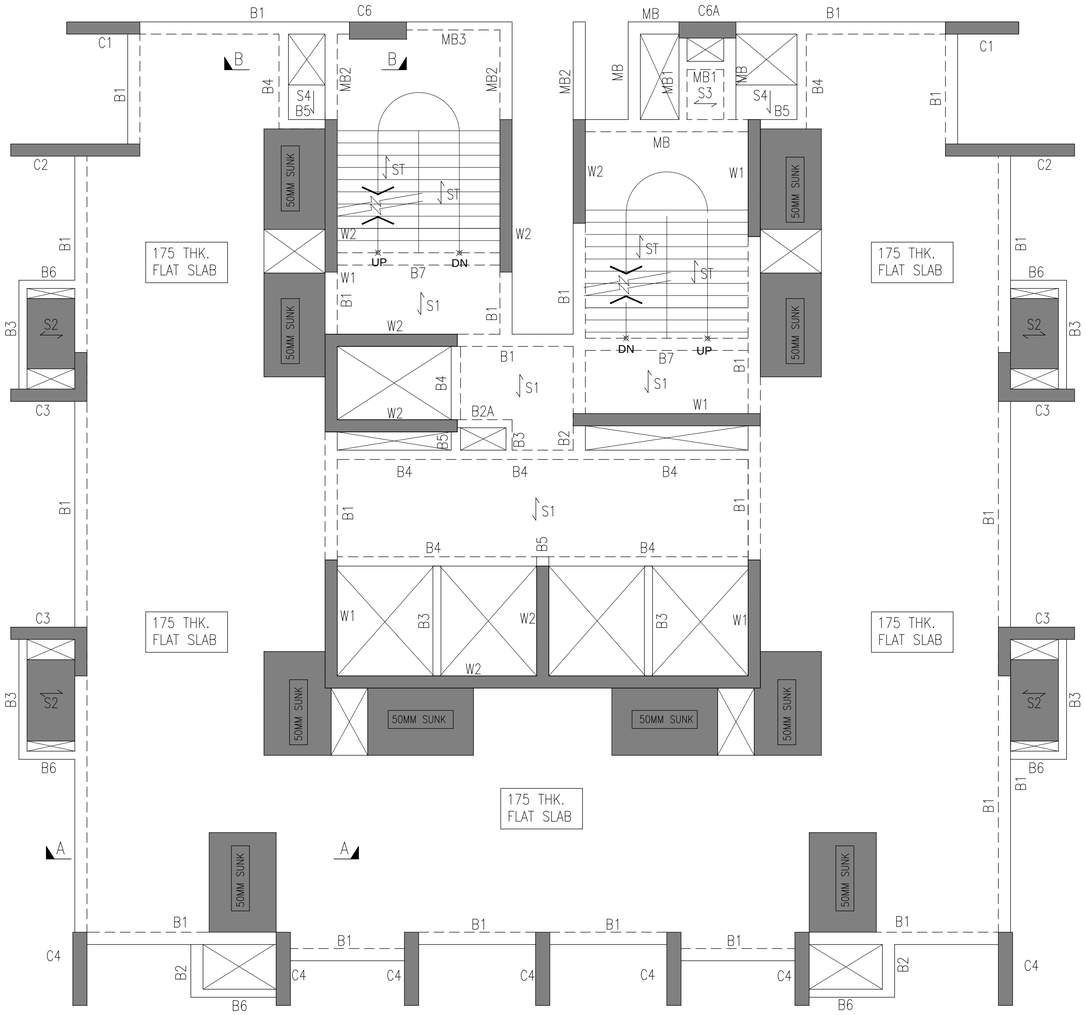
RAMBOLL
Ramboll India Pvt. Ltd.
INIZIO, 3RD FLOOR,CARDINAL
GRACIOUS ROAD,OPP.,P & G PLAZA
ANDHERI (E), CHAKALA
MUMBAI - 400099 WWW.RAMBOLL.IN

Title
PODIUM LANDSCAPE FLOOR FRAMING PLAN SALE TOWER

SCALE:	DATE:	DRAWN:	CHECKED:
AS SHOWN	FEB'16	RK	HI
JOB No:	DRG No:		REV:
1131	1131/GA/03		P03

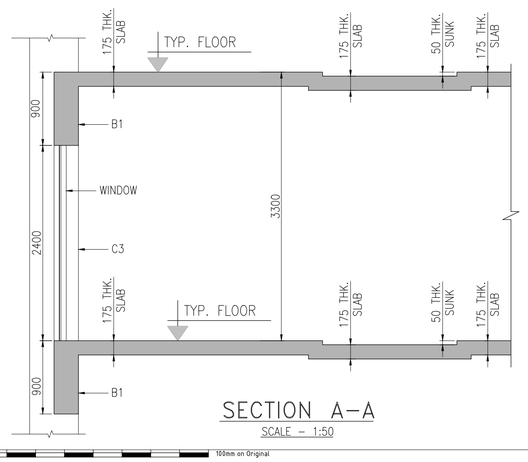
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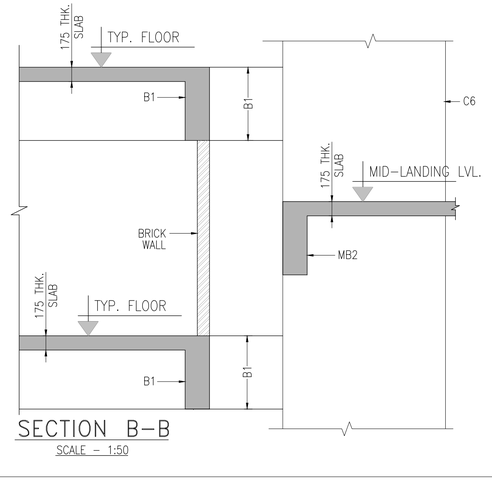
TYPICAL FLOOR FRAMING PLAN
(9TH & ABOVE FLOOR)
OPTION–1

(SCALE 1:100)



SECTION A–A

SCALE – 1:50

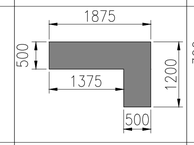
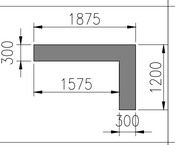


SECTION B–B

SCALE – 1:50

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SCHEDULE OF R.C. COLUMNS

MARK	SIZE BELOW 1ST TYP. FLOOR	SIZE ABOVE 1ST TYP. FLOOR	REMARK
C1	300 X 2000	300 X 1800	
C2	300 X 3175	300 X 3175	
C3			
C4	350 X 1800	350 X 1800	
C5	450 X 1800	450 X 1800	
C6	425 X 2000	425 X 1400	
C6A	400 X 1400	400 X 1400	
W1	300 THK WALL	300 THK WALL	
W2	300 THK WALL	300 THK WALL	

SCHEDULE OF R.C. SLABS

MARK	SIZE	REMARK
S1	200 THK	ONE WAY
S2	125 THK	ONE WAY SUNK SLAB
S3	125 THK	ONE WAY
S4	125 THK	CANTILEVER SLAB
ST	175 THK	WAIST SLAB

SCHEDULE OF R.C. BEAMS

MARK	SIZE	REMARK
B1	300 X 900	
B2	300 X 900	CANTILEVER
B2A	200 X 900	CANTILEVER
B3	200 X 600	
B4	230 X 750	
B5	230 X 750	CANTILEVER
B6	200 X 600	CANTILEVER
B7	300 X 600	
MB	300 X 900	MIDLANDING BEAM
MB1	200 X 600	MIDLANDING BEAM
MB2	300 X 900	CANTILEVER
MB3	200 X 900	MIDLANDING BEAM

BEAM/SLAB SIZES ARE INDICATIVE MAY VARY AT TIME OF DETAIL DESIGN.

NOTES

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   BEAMS :– 25mm TO LINKS
   COLUMNS :– 40mm TO LINKS
4. CONCRETE TO BE GRADE (UNO)
   COLUMNS – M50/M40/M30
   BEAM & SLAB – M40/M30
5. REINFORCEMENT FOR ALL WORKS TO BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE Fe 500 CONFORMING TO IS:1786
6. LEGEND :–
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   EGL = EXIST. GROUND LEVEL
   FGL = FINISHED GROUND LEVEL
   TOB = TOP OF BEAM
   UNO = UNLESS NOTED OTHERWISE.
   TOS = TOP OF SLAB
7. NO OF FLOOR CONSIDER IS 3 BASEMENTS + GROUND + E–DECK + 25 TYPICAL FLOORS + TERRACE FLOOR
8. REFERENCE ARCH. DRAWING DATED ON 08.03.2016

NOTE:–
MEMBER SIZES AS SHOWN IN DRAWING ARE APPROXIMATE AND MAY VARY AT TIME OF DETAILED ENGINEERING

Issue	Description	Dgn.	Ckd.	Appd.	Date
P07	SCHEMATIC DRAWING	SR	HI	MP	10.06.2016
P06	SCHEMATIC DRAWING	SR	HI	MP	08.06.2016
P05	SCHEMATIC DRAWING	MSG	HI	MP	02.06.2016
P04	SCHEMATIC DRAWING	SA	HI	MP	30.03.2016

STATUS:
SCHEMATIC DRAWING

Architect :
KAPADIA ASSOCIATES

Client:–
LODHA HOME DEVELOPERS PVT.LTD.

Project :
LODHA PAREL RESIDENTIAL TOWER

RAMBOLL
Ramboll India Pvt. Ltd.
INIZIO, 3RD FLOOR,CARDINAL
GRACIOUS ROAD,OPP. P & G PLAZA
ANDHERI (E), CHAKALA
MUMBAI - 400099 WWW.RAMBOLL.IN

Title
TYPICAL FLOOR FRAMING PLAN (9TH & ABOVE) SALE TOWER

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AS SHOWN	FEB'16	RK	HI
JOB No:	DRG No:		REV:
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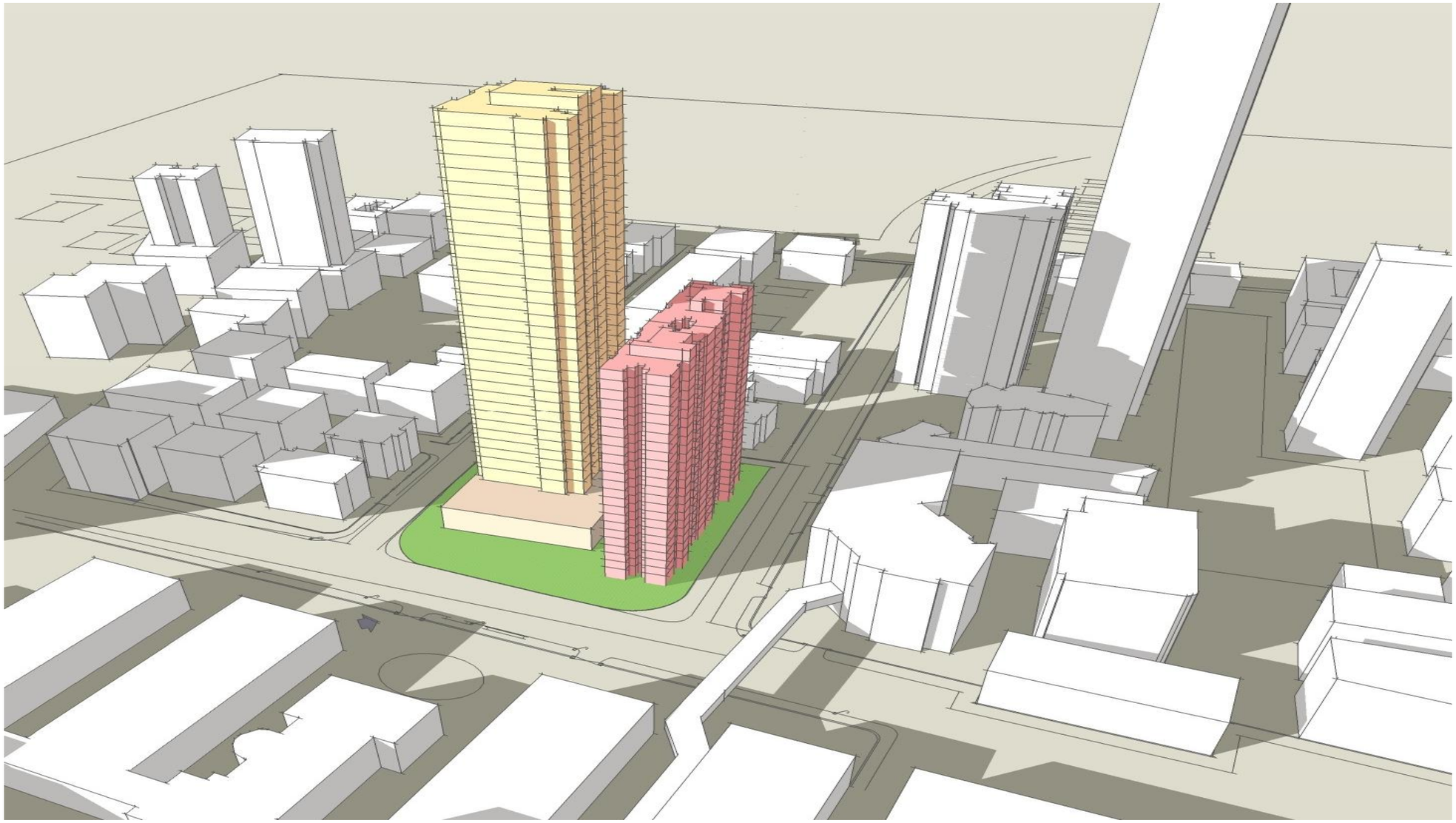
LODHA PAREL
SALE TOWER

DBR _ MEP

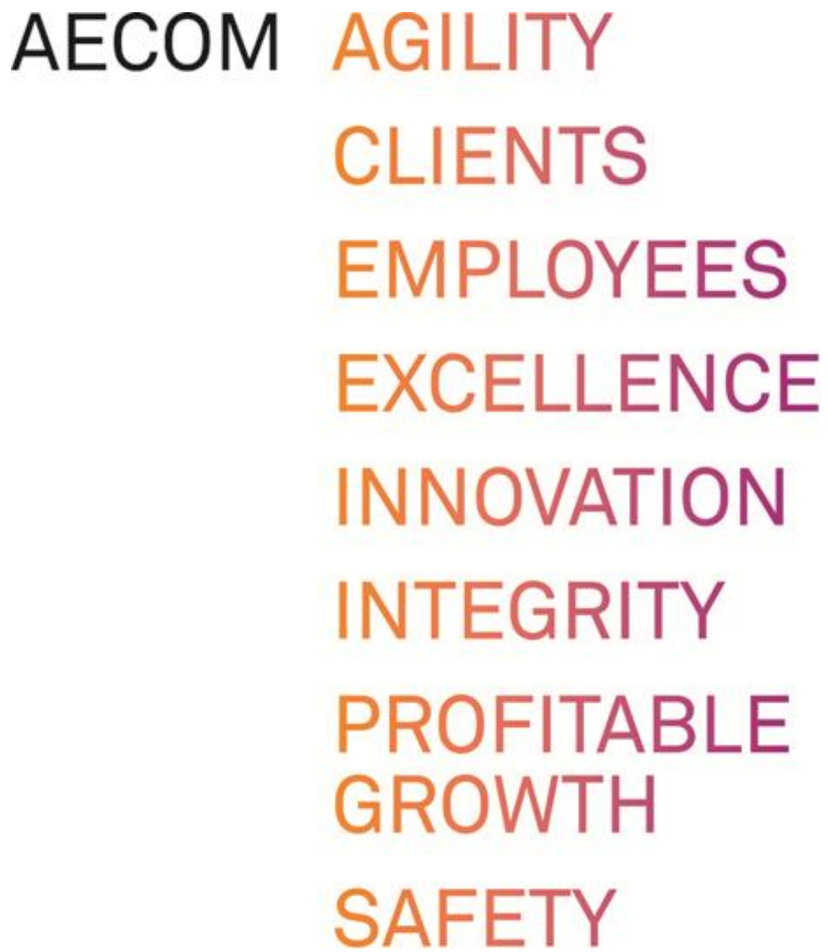
KAPADIA ASSOCIATES
DESIGN LLP
12-07-16

LODHA'S RESIDENTIAL TOWER AT MERWANJI CHAWL, PAREL, MUMBAI

MEP DESIGN BASIS REPORT- PART 2- SALE TOWER



DESIGN BASIS REPORT - LODHA - RESIDENTIAL TOWER AT MERWANJI CHAWL, PAREL, MUMBAI



Prepared for
Lodha Developes Pvt. Ltd.
Project No:- PUND16016

Prepared by

AECOM India Pvt Ltd (Formerly Spectral)

Building Engineering
203 ' Pride Portal" Bldg
Behind Int. Convention Centre,
Off. Senapati Bapat Rd., Sr.No.:103,
Bahirat Wadi, Shivajinagar,
Pune - 411 016 India.

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Quality Information

Document	DESIGN BASIS REPORT – LODHA – RESIDENTIAL TOWER AT MERWANJI CHAWL, PAREL, MUMBAI		
Ref	PUND16016- MEP-01-R0	Date	23rd March 2016
Prepared by	Usha Yemul, Prasad Gujar, Rohit Avchat	Reviewed by	Usha Yemul

For Review

Revision History

Revision	Revision Date	Details	Authorized Name / Position	Signature
R0	23rd March, 2016	Design Report – R0	Usha Yemul / PM	
R1 (Only For Sale tower)	17th June , 2016	Design Report – R1	Usha Yemul / PM	
R2 (Only For Sale tower)	7th July , 2016	Design Report – R2	Usha Yemul / PM	

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3. ELECTRICAL SYSTEM....8

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7. EXCLUSIONS:....24

8. ANNEXURES 24

1. PREAMBLE

1.1 Scope of Work –

The objective of this report is to give an overview of services designed by AECOM India Pvt. Ltd for the proposed residential tower at Merwanji Chawl, located at Parel, Mumbai. The designs of Engineering Services undertaken by AECOM includes following:

a. Air Conditioning and Ventilation
b. External and Internal Electrical distribution systems including substation (Power, Lighting, Earthing, UPS, Inverters etc.) and Emergency power generation
c. Extra Low Voltage System comprising of Fire Detection & Alarm, Infrastructure for telecom, TV, Data & CCTV systems.
d. Elevators
e. Plumbing System (Water Supply and Treatment, Sewer drainage ,Sewage Treatment, Storm water drainage)
f. Fire Fighting System

The project comprises of One sale residential tower and one rehabilitation towers.

This DBR provided only for Sale tower.

Sale tower will be comprising 2 Basements + G + Podium and 27 residential floors. It is understood that the apartments in the sale towers will be under High End Type of apartments. The MEP services will be designed for the same accordingly.

No. of Units in the project are as below.

Sale Tower – 2 BHK = 54 Nos

3 BHK = 50 Nos.

1.2 Executive Summary:

Air–conditioning System:

Sale tower contains two levels underground car parking. All two basements shall be provided with the mechanical ventilation system as per Lodha Guidelines. Individual flats shall be with split type air-conditioners for all Bedrooms and Living rooms. Toilets and Kitchens shall be provided with propeller type exhaust fans. The toilets which are in the core and having no wall facing to exterior shall be provided with inline exhaust fans. Entrance lobby and club house shall be air-conditioned with DX system. Gym, Indoor Games shall be provided with ductable type split AC system. The one fire lift well shall be provided with pressurization system. The staircase going from ground to basement level shall be pressurized and lift lobbies below ground levels shall be pressurized. The staircases and lobbies above ground floor and provided with 0.5 sq.mtr opening on each landing and on top therefore pressurization shall not be required. STP, Pump Room, Electrical rooms and plant rooms shall be provided with ventilation system. LMR shall be air-conditioned, provided with split DX units.

Electrical: The electrical Demand load for the entire project is estimated as **1252 KW.** It is understood that the incoming supply will be provided by TATA power at 22KV. It is proposed to have one common substation for sale & rehab Tower. Substations are planned with Dry type transformers located at ground floor**. 2 # 1000 kVA** capacity transformers are proposed in substation for sale tower. The entire Common Area Services is provided with 100% backup through radiator cooled D.G sets.

Low Voltage System: An addressable fire alarm & detection system and public address (FAPA) system is proposed for the sale & Rehab tower. Security system consisting of CCTV with central monitoring is proposed for external & internal common areas.

The fire alarm system will be Analogue addressable type to meet the requirements as per provisional fire NOC for residential building. Each building will have its own main Control and Monitoring panel located in the control room at ground level.

Each building will have a public address system integrated with the fire alarm system for distribution of voice evacuation message in common areas on each floor of the building.

Telephone, Internet and Television:
Sale Tower **-** The telephone and internet services will be provided through the consolidation panel for the FTTH (Fiber to the home) system. A consolidation panel will be installed in each apartment receiving data through a fiber optic cable and delivering data to each service outlet for Telephone and Internet Cat 6 cables.
For Cable TV system, all the required the provision will be made for DTH operators till the each apartments.

Video Door Phones for Sale Tower: All video door phones units will be linked to the remote station at the welcome desk through the main data fiber backbone.

Plumbing/Fire Fighting:

The estimated water requirement for the project shall be as follows:

Domestic Water Requirement for Sale Tower 87 KLD

Flushing Water Requirement for Sale Tower 37 KLD

Source of water for domestic purpose shall be municipal supply. The complex shall have hot and cold water requirement, Individual Sewage Treatment Plants (STP) are proposed for the Sale towers which will cater to the requirement of Flushing & landscape irrigation etc. Tanker Water supply can be considered in case of non-availability of municipal water supply. Tanker water shall be treated in Water Treatment Plant (WTP) to meet the drinking water quality standards. Space provision for the same has been done in plumbing plant room.

The project has been designed with Fire Tank, Sprinkler system, Hydrant System, hand held extinguishers as NBC-2005 & amendment no.2 dated 29th Sept. 2015. Drencher/Water Curtain system is also provided at periphery of Fire Break Floor of Sale Tower. However, the final provisions for firefighting shall be as per CFO NOC.

2. HVAC SYSTEM

2.1 Reference Standards:

Following standard & guidelines will be adopted while designing the HVAC system.

2.1.1 National Building Code of India (NBC) 2005

2.1.2 Energy Conservation Building Code (updated ECBC 2011)

2.1.3 ASHRAE Hand Books

- Refrigeration 2014
- Fundamentals 2013
- HVAC Systems and Equipment 2012
- HVAC Applications 2015

2.1.4 Duct construction standards as per relevant SMACNA standards

2.1.5 Air filters as per ASHRAE 52.1-1992 and 52.2-2010

2.1.6 Indoor Air Quality as per ASHRAE 62.1-2013

2.1.7 ANSI/ASHRAE/IESNA standard 90.1-2013: Energy standard for buildings except low rise residential buildings.

2.1.8 ASHRAE Standard 55: Thermal comfort

2.1.9 Smoke & Heat Control System BS-EN-12101-6:2005

In addition to above to mentioned standards & codes, following policies prepared by client are also referred for design as per instructions from client :-
Lodha Guidelines – MEP-04_Unit HVAC Guidelines for Residential Projects.

2.2 Basis of Design:

2.2.1 Site Location : Mumbai (Maharashtra)

2.2.2 Geographic location : 19.7 deg. N

2.2.3 Altitude : 14 M above mean sea level.

2.2.4 Outdoor Design Conditions :

Indian Weather Data (ISHRAE 2014) will be referred for creating year round air-conditioning profile to size the equipment. Specific checks shall be carried out for the total air-conditioning load considering following peak ambient conditions corresponding to 1% annual cumulative frequency of occurrence:

Summer
Dry Bulb Temperature : 34.9 °C (94.82 °F)
Mean Coincident Wet Bulb Temperature : 23.1 °C (73.58 °F)

Monsoon
Wet Bulb Temperature : 27.4 °C (81.32 °F)
Mean Coincident Dry Bulb Temperature : 30.9 °C (87.62 °F)

Winter
Dry Bulb Temperature : 18.0 °C (64.4 °F)

2.3 Indoor Design Conditions

Following indoor design conditions for centrally air conditioned spaces are proposed

Residential Apartments : 23 ± 1^0 C with relative humidity not more than 60 %
Entrance Lobby : 23 ± 1^0 C with relative humidity not more than 60 %
Club House : 23 ± 1^0 C with relative humidity not more than 60 %

2.3.1 Mechanical Ventilation

a	Mechanical plant room	Ventilation @20 ACPH.
b	STP	Ventilation @ 30 ACPH
c	Toilet Exhaust	Exhaust @ 50CFM / toilet.
d	Electrical Rooms	Ventilation @ 20 ACPH
e	Basement Ventilation (As per Lodha guidelines)	Normal Mode @ 7.5 ACPH Fire Mode @ 15 ACPH.

Emergency air systems (as per NBC-2005)

Stairwell pressurisation: One staircase from ground to the basement-2 level shall be provided with pressurization as per NBC-2005 maintain 50 Pa w.r.t outside. The Other shall be provided with 0.5 sq.mtr opening on each landing and on top therefore pressurization shall not be provided.

Lift lobby pressurisation: Ground to basement-2 lift lobby shall be provided with pressurization system as per NBC-2005. As lift lobby and staircase lobby happens to be same, 45 Pa w.r.t outside is maintained. As such lift lobby requires 25-30 Pa. The upper lift lobbies in sales tower shall be provided with 0.5 sq.mtr opening therefore pressurization shall not be provided.

Lift well Pressurisation: Only one fire lift well shall be provided with mechanical pressurization system as per NBC-2005. Lift wells are pressurised to maintain 50 Pa w.r.t outside.

2.3.2 Building Construction Data
U Values are considered as below:

- **For Glass**
  - Shading Coefficient – 0.56
  - Transmission – 1.13 Btu/hr/ft^2^{o}F
- **Wall** "U" Value : 0.31 Btu/hr/ft^2^{o}F
- **Roof** "U" Value : 0.45 Btu/hr/ft^2^{o}F (without Insulation)

The above values shall be fine-tuned based on the actual selection of Glass / Fenestration by Architect or Client. Need confirmation on above values.

2.4 Design Parameters

Unitary DX A/C System

Performance rating of machine shall be based on the following design Parameters:

Max face velocity across pre-filters	500 FPM
Max face velocity across cooling coils	500 FPM
Max fan outlet velocity	1800 FPM
Max fan speed for fans upto 300 mm dia	1450 RPM
Refrigerant	R22 / R134a / R410a/ R407C
Type of Compressor	Scroll
Outdoor design condition	96.6°F

Design parameter for Duct design shall be:

Maximum flow velocity in ducts for air conditioning	1500 fpm
Maximum flow velocity in ducts for ventilation in plant room, STP , toilet exhaust & Pressurization.	1500 – 2500 FPM
Maximum friction	0.1 inch WG/100 ft run

Ventilation fans:

Maximum fan outlet velocity up to 450 mm impeller dia : 1800 FPM

Maximum fan outlet velocity above 450 mm impeller dia : 2300 FPM

Maximum fan speed for fan up to 450 mm impeller dia : 1450 RPM

Maximum fan speed for fan above 450 mm impeller dia : 1000 RPM

2.5 System Description

2.5.1 Sales Tower - Residential Apartments :

All apartments shall be provided with split type air conditioning system in Living rooms and bedrooms. As per the lodha directive for luxurious brand apartments, Carrier make split ac to be provided. Each room (Living& dining, Bedroom and master bedroom) shall have its own indoor and outdoor unit. Indoor units shall consist of fan section, coil section, filter section, and drain pan. Outdoor unit shall consist of condenser coil, fan & compressor. The outdoor unit is connected to indoor unit by refrigerant piping and power and control cable. The indoor units shall be wall mounted types for flats. The condensate drain of indoor unit shall be connected to nearest toilet drain. All refrigerant and condensate drain piping shall be insulated. Each air conditioning unit shall be provided with wireless remote controller to control temperature and volume of flow of conditioned air. The outdoor unit propose to keep in adjacent shaft or utility balcony where sufficient space is available for installation and maintenance of unit.
(Please Refer Annexure-ME-01 for Heat load summery and unit selection.)

Mechanical ventilation shall be provided for Kitchen and toilet exhaust to maintain indoor air quality. For the toilets which are in the core of the building shall be provided with inline fan. The toilets having exterior window/wall facing shall be provided with 150mm diameter (100cfm each) propeller type exhaust fans as per the lodha guidelines. Wall mounted propeller exhaust fans of appropriate size are proposed at individual kitchen.

2.5.2 Entrance Lobby and Club House :

For Entrance lobby and club house area (double height), VRF type air conditioning system shall be provided. Variable refrigerant flow (VRF) is an air-condition system configuration where there is one outdoor condensing unit and multiple indoor units.

The main entrance lobby and club area shall be provided with ductable type indoor units and connected to the common outdoor unit planned on the loft on the mezzanine level. The detail heat load to be carried out after receipt of the architectural and interior layout of the same.

2.5.3 Gym and Indoor Game Room :

For Gym and Indoor game room on podium level, ductable type split air conditioning system shall be provided. Each gym and indoor game room shall have its dedicated indoor and outdoor unit.

The gym and indoor game room shall be provided with ductable type ceiling suspended indoor units and connected to individual outdoor unit planned on the podium level. The detail heat load to be carried out after receipt of the architectural and interior layout of the same.

2.5.4 Lift Machine Room.

Lift machines room for sale tower shall be air conditioned. LMR shall be provided with the DX type air conditioners.

2.5.5 Car Park (Ductless ventilation system)

Sale tower is having 2 car park basements, as per the Lodha Guidelines and with reference latest amendment in NBC, mechanical ventilation for car parking shall be designed to permit 7.5 ACPH for normal ventilation and 15 ACPH in case of fire or distress call. The two basements shall be with axial type exhaust fans with individual exhaust shaft. The make-up air shall be taken from make-up air axial fans connected to common fresh air shaft. The system shall comprise of ductless ventilation system i.e. multiple ceiling hung jet induction fans keeping in view the following :

- Avoid low level ducting to maximize car parking spaces and avoid damage to services by Vehicles.
- Prevent build-up of exhaust emission from vehicles by providing adequate ventilation
- Good air movement to ensure good environment.
- Smoke control in the event of a fire.
- Reduced operating costs by using CO-sensors so that fans are operated as and when required.

The mechanical ventilation system shall comprise of axial fans for exhaust and fresh air, multiple ceiling hung jet-induction fans which shall be provided to assist with the direction of the flow of air and to propel air towards main exhaust fans, CO sensors and PLC Panel. Jet induction fans shall be with two speed operation. During normal mode, these fans will run on lower speed. During high CO level / fire conditions, fans shall run on higher speed. Exhaust & Fresh air fan shall be Axial flow fans. Main ventilation fans designed for 15 ACPH shall be with duel speed motor. In normal mode these fans will run on 7.5 ACPH flow and in fire mode these fans will run on full speed to cater 15 ACPH requirements. The shaft receiving the exhaust from fans shall be sized for 15 ACPH.

2.5.6 Plant Rooms:

Underground plumbing plant room shall be provided with mechanical ventilation system. The exhaust of the plant room is connected to the exhaust shaft. The make-up air for plant room shall be taken naturally from the dedicated fresh air shaft which is upto ground (P0) level.

STP on ground floor shall be provided with mechanical ventilation system. The axial ceiling suspended exhaust fan is shall be provided and make-up air shall be taken naturally by means of louvers provided on the walls.

The Electrical Transfmormer Room, Panel Room shall be mechanically ventilation by means of industrial type wall mounted propeller fans for exhaust and for make-up air. The fire control room and FTTH room shall be air conditioned. Split DX AC shall be provided in LV room.

2.5.7 Pressurization scheme

There are two methods for preventing smoke entering to the escape route.

1. Staircase, lifts well & lift lobby at the core of the building needs to be pressurized. The details will be as mentioned below.

2. Fire escape staircases on periphery shall be provided with area opening of 0.5 square meter (as per NBC) on each landing and on TOP to avoid pressurization system as per National Building Code.

Pressurization Basic:
Fire induced forces create pressure difference across doors, which allows smoke to flow through the gaps. By altering these pressure differences we can control movement of the smokeflow.

Objective of Staircase Pressurization:

The main objective of the staircase pressurization is to keep the smoke out of staircase route long enough to allow to escape the occupants to a safe refuge.

Staircase Pressurization System:

The staircase above ground level shall be provided with 0.5 sq.mtr opening on each landing and on the top. The same staircase is break on the ground floor and separate staircase from ground to basement-2 level. The staircase going from ground floor to the basement-2 shall be provided with pressurization system, consisting of supply air fans installed on loft on the mezzanine floor. This fan will be connected to supply air ducts installed in vertical risers for supplying air at each staircase landing from basement-1 to basement-2, for achieving effective pressurization. Fans will be sized for fire escape stairwell, and/or to maintain minimum positive pressure of 50 pa across the door. Supply air fans serving stairwell will be provided with motorized damper at fan discharge to prevent humid fresh air entering into staircase well. These dampers will be interlocked with fan motor and will open upon getting signal from the smoke sensor.

Calculation methodology for air flow rate is adopted from BS EN 12101-6:2005 and crack geometry is adopted from BS5588-4:1998.

Note: in design process it is assumed that two doors are open. Egress velocity of 0.75 m/s is considered as per EN 12101-6:2005. Rest landings are considered with leakage volume as per BS 5588-4.

Operations: in the event of fire or smoke detection, the pressurization fans will start automatically. Manual overrides for the fans are to be provided in the control panel, so that the fans can be operated manually as well.

Note:
The Fans Operating In Fire Mode Are To Be Provided With Electrical Supply From Reliable Source I.E. Source In Operation During Fire Mode.

Lift Shaft Pressurization System

Only fire lift well will also be provided with pressurization by supplying the air through supply air fans installed on roof top. The pressurization fans will get activated upon sensing of smoke in corridors/common passengers/ lift lobby. Pressure of 50 Pa will be maintained as per recommendation of NBC 2005.

Objective of Lift Shaft Pressurization

The main objective of the lift shaft pressurization is to avoid transfer of smoke from one floor to another floor, through lift shafts.

Pressurization System:

Lift wells provide chimney effect and easy pathway for smoke to travel from fire floor to other healthy floors. This puts life of other occupants in risk due to reduced visibility & oxygen level. NBC-2005 requires that lift shaft to be maintained at 50 Pa during fire.

Tube axial type fans (motor at 415v±10%) are selected for this duty. Motor starter will have NO/NC contact, which will be done by IBMS contractor up to starter panel.

As soon as there is a signal for fire in any floor; fans will start and maintain a pressure of 50 Pa.

Calculation methodology for air flow rate is adopted from BS EN 12101-6:2005 and crack geometry is adopted from BS5588-4:1998.
Note: in design process it is assumed that all doors are closed and in fire condition the lifts by default lands on the ground floor.

Operations: in the event of fire or smoke detection, the pressurization fan will start automatically. Manual overrides for the fans are to be provided in the control panel, so that the fans can be operated manually. Note the fans to be maintained periodically.

Note:
The fans operating in fire mode are to be provided with electrical supply from reliable source i.e. source in operating during fire mode.

Lift Lobby Pressurization:
The lift lobby from mezzanine floor to the top floor shall be provided with 0.5 sq.meter opening. Therefore pressurization shall not be required for the same. The underground lift lobbies shall be pressurized to 45 pa as per recommendations of NBC 2005 and pressurization air will be supplied through dedicated vertical shafts. Fans for the same will be kept on Podium level.

Objective of Lift Lobby Pressurization:
The main objective of the lift lobby pressurization is to keep the smoke out of lobby route long enough to allow to escape the occupants to a safe refuge.

Pressurization System:
For lift lobby pressurization the zoning and working is same as that for the lift well system. The only difference is that of working pressure, upon signals of fire in any zone, fan will start and maintain pressure of 45 Pa.

Calculation methodology for air flow rate is adopted from BS EN 12101-6:2005 and crack geometry is adopted from BS5588-4:1998 clause 6.2.2. All doors will be closed for pressure level of 45 Pa.

Operations: in the event of fire or smoke detection, the pressurization fan will start automatically. Manual overrides for the fans are to be provided in the control panel, so that the fans can be operated manually.

Note:
The fans operating in fire mode will be provided with electrical supply from reliable source which will supply power during fire emergency also.

3. ELECTRICAL SYSTEM

3.1 Reference Standards

The following standards and codes shall be followed/ referred during detailed design of the services:

- Local By – laws
- National Building Code of India – 2005
- Energy Conservation Building Codes 2011
- Relevant codes of National fire Codes
- Relevant codes of Bureau of Indian Standards
- Institute of Electrical & Electronic Engineers (Design Hand Book)
- Illuminating Engineering Society of North America (Design Hand Book)
- NEC – NFPA 70, National Electric Code
- NFPA 101, Life safety code
- NEC, National Electric Code of India

In addition to above to mentioned standards & codes, following policies prepared by client are also referred for design as per instructions from client.

- Lodha Guidelines – MEP-07_Electrical Network Design
- Lodha Guidelines – MEP-10_Guidelines for Design of Power Back-up Systems

3.2 Design Calculations

Estimated Electrical Power requirement for project is tabulated as under.

Sr. No.	Description	Building Load + Common Load		
		Connected Load in kW	Demand Load in kW	Demand Load in kVA (0.9)
I	Sales Tower	4241	1252	1565

Note- For detail Calculation refer Annexure-EL-01_Sale

Typical Apartment loads:

Sr. No.	Apartment type	Connected Load (KW)	Demand. Load (KW)
1	2 BHK – Sale Tower	24.8	19.8
2	3 BHK – Sale Tower	30.6	24.5

3.3 Sources of Power Supply

It is understood that the electrical power for the project will be supplied from the TATA electricity supply company. Considering residential application, power back up on DG set is provided only for common area loads including life safety services & critical loads including lifts.

3.3.1 State Electricity Supply

The electrical load for sale building in the project is estimated at **1252 KW.**

It is assumed that power shall be available from the TATA electricity supply company at 22 KV for entire development.

This shall be further stepped down to 22 kV / 433 V by dry type transformers to cater Apartment loads. It is proposed to install **2 # 1000 kVA** capacity transformers for sale tower.

Three/Single phase LT meter shall be provided for each apartment and the meters shall be located in the Meter room at ground floor.

3.3.2 Emergency Power Supply

Considering criticality and also as per governing codes it is proposed to install **1# 1010 KVA** DG set for sale tower as a backup for common area loads.

For proposed configuration of DG sets, please refer load calculation Annexure-EL 01_Sale.

AMF panel will switch the loads onto DG supply within 10 – 12 seconds. In case of repair/ maintenance or operational difficulty with any DG set, DG sets shall be manually interchangeable to cater only to the critical loads.

DG set shall be acoustically enclosed canopy in order to limit the noise and to minimize disturbance to occupants. Engine cooling will be achieved through radiator mounted on the engine.

Residential silencer shall be provided for each DG set. Independent flue pipe from DG set shall be discharged outdoors at 11 meters height from the ground floor as per Lodha guidelines (MEP-10_Guidelines for Design of Power Back-up Systems).

3.3.3 INVERTER Power

Inverter shall be combined for three or four floor common area loads & same will be confirmed during detail design stage . Inverter will be supplied power to support critical services such as 25% emergency lighting, 100% Staircase lighting and common infrastructure services like FAS, PA, MATV, Security system & Building automation system etc. Storage batteries will be sealed maintenance free type. Battery backup will be 15 Min. as per lodha Guidelines.

3.4 HT Power distribution Scheme

It is understood that the electrical installation will be handed over to TATA supply company for life time operation & maintenance purpose. So, all the rules & regulations of TATA supply company will be followed for design of distribution scheme.

One combined electrical substations is proposed which will fed power to sale & rehab tower and will be located at ground floor. Substation will receive power at 22 kV from TATA supply company. One combined HT Isolator and RMU panel with set of dry type transformers are proposed.

Underground HT cable shall be laid from TATA supply company's nearest HT feeder pillar to HT Isolator & RMU which will feed to the transformers.

All Transformers shall be copper wound and connections shall be delta on high voltage side and star on low voltage side, with neutral terminal brought out for solid earthing (grounding) corresponding to the vector symbol Dyn-11.

Off-load tap change on HV side shall be provided for affective voltage regulation. Taping for variation (+) 5% to (-) 10% in steps of 1.25% each in order to capture large fluctuations in incoming power supply shall be provided. Magnetic core shall be made up of cold rolled grain oriented low loss steel stampings.

Transformers shall be designed with latest technology which shall have more efficiency with low losses. These losses shall be as per ECBC 2007 (revised version May 2008).

Prior approval shall be taken by Client's from electrical inspectorate before installing sub-station equipment.

HV & LT switchgear protection and tripping system shall have 24 volts DC power supply through dedicated sealed maintenance free battery pack with battery charger.

3.5 LT Power Distribution Scheme

LT power at 415 Volt from transformers shall be brought to each feeder pillars/Isolator placed inside the transformer room. All the feeder pillars will be designed according to the TATA supply company's local by laws.

Each feeder pillar will supply to 1] Sub Distribution Panels – for apartment load and 2] Main LT panel- For common area load.
Sub-distribution panels will be located inside the transformer rooms and Main LT panels will located inside Electrical LT panel room at mezzanine floor.
Sub-distribution panels will supply power to each floor through XLPE insulated Aluminium cables which will run through a dedicated electrical shaft. At each floor, the TATA meters of each apartments will be installed inside this shaft with isolator. Meter board panels will be designed according to TATA electricity supply company local bylaws & space provision inside the shaft will be done accordingly. Installation of Energy meters inside shaft will be scope of developers with the help of liasioning agency.

For Common area amenities load, It is proposed to have separate common area panel to feed supply to different common area amenities. There will be Change over switches for common area panels which will receive power from MAIN LT Panel & DG panel.
Power from LT feeder pillars & DG panels to Main LT panel and further to common area panels will be supplied by XLPE insulated Aluminium cables.

At least 20% spare capacity on sub-mains and rising mains shall be provided. Sub-main protection shall be by circuit breakers, which shall discriminate with upstream protective devices. All switch boards shall be Form 3b construction and switching of incoming & outgoing circuits up to 630 amps shall be moulded case circuit breakers and above 800 amps shall be air circuit breakers. Aluminium bus bar shall be provided for all power distribution panels.

Fire survival cables (FS PH120) of appropriate size shall be provided for life safety systems including emergency lighting, lift, smoke ventilation fans, firefighting pumps etc. Care shall be taken in design of distribution system to achieve voltage drop of not exceeding 5% from transformer to the farthest cable termination.

The following shall be used for carrying wires / cable to the loads from the electrical panels.

a. Heavy duty PVC conduit wherever the conduit is buried in slab at the time of casting.

b. MS conduits wherever the conduit runs exposed in ceiling or chased in wall.

c. GI construction cable trays (perforated or cable ladders) for carrying multi-conductor cables.

The fire partition penetrated by cable trays shall be protected by approved sealing methods maintaining the same fire resistance rating as the partition.

All cable trays shall have 10% spare space for further expansion.
All riser shafts/ openings at each floor and all floor wall penetration shall be sealed by using fire sealant as a fire protection measure.

Main Distribution Boards and Sub-distribution Boards shall incorporate moulded case circuit breakers. Final distribution boards shall incorporate miniature circuit breakers of 10 KA minimum interrupting capacity (MCB) & residual current circuit inside electrical breaker of 30 mA (RCCB).

Distribution boards shall be located in accessible positions inside electrical room to suit the area of each floor within the building.

Sub Distribution Boards (SDB's) shall be located on area basis including metering system. Final Distribution Boards (Construction form 2) shall be fed from these MDB's & SDB's by means of either PVC insulated aluminium armoured cables or PVC insulated copper wires in appropriately sized MS/ PVC conduits.

Note- Please refer Annexure-EL 02, for typical schematic of electrical distribution.

3.6 Measurement & Verification

Three phase energy meters shall be provided for the apartments and various common services as per the distribution adopted. Metering by the TATA electricity supply company shall be carried out at each floor level inside the dedicated electrical shaft.

Briefly the LT Metering will be as follows:

Apartments	-	1 Meter for each apartment.
Common Services	-	1 meter
STP	-	1 meter
Plumbing	-	1 meter
Fire Fighting	-	1 meter

The proposed metering arrangements may be modified as the design development proceeds.
In this case, entire substation i.e. installation up to the LT meters shall be handed over to the TATA electricity supply company for the life time maintenance. All the Maintenance will be carried out by Supply Company.

3.7 Power Factor Improvement

Automatic power factor compensating multiple capacitor units shall be provided for common area loads to maintenance of average power factor of 0.95 to unity to have effective savings in energy cost.

Power factor improvement system for apartment distribution network shall be in the scope of utility company.

3.8 System Earthing

Considering the space constraints at site, under raft earthing system shall be designed in accordance with IS3043/BS7430/ ANSI/ UL467. Dedicated earthing pits shall be provided for neutral earthing of major substation equipment like Transformers & D G sets. Interconnected Earthing pits shall be provided for body earthing of major substation equipments like HT Panel, transformers, D G sets, MV panel etc. Distribution earthing shall be carried all along the MV distribution system, and effectively bonding the equipment.

Maintenance free chemical earthing shall be proposed depending upon soil condition at site.

GI stripes & earthing electrode will be used for Body earthing. Neutral earthing will be copper or GI.

Earthing for light and power points shall be carried out with PVC insulated copper earth wire running throughout the length of the circuit and shall be terminated at equipment, fixtures, etc. with effective bonding to main earthing grid.

Separate and distinct earth stations with insulated electrode shall be provided for the following system :

- Main LV panels
- MV Panels
- ELV system
- Elevators
- Neutral of transformers
- Neutral of D G Sets
- Lightning Protection System.

All the pits and main earthing bars are to be connected to each other to make a common earthing electrode grid. If the resistivity of the soil is very high then, earthing calculations shall be done to ensure that the conductivity is maintained at less than 1 Ω.

3.9 Recommended Illumination Levels for Apartments / Common Areas.

The general lighting of various spaces shall be planned by the Interior Designer/ Lighting Consultant. The recommended illumination levels as per National Building Code are given below for general guidance:

	Space		Recommended Type of Lamps		Illumination Level Lux
1	Corridors		Fluorescent/ CFL /LED		50 – 100
2	Lobby		Fluorescent / CFL/LED		(As per Interior Lighting Design)
3	Car Parking (Basements)		Fluorescent/LED		30 - 50
4	Plant room/service areas		Fluorescent /LED		150 – 200
5	Staircase		Fluorescent /LED		70 – 100
6	Inside Flat		(As per interior Lighting Design)		

General lighting will be through energy efficient compact fluorescent lamps or LED lights..

The following general light fitting will be provided:

- Bare batten fluorescent fittings for plant Rooms.
- IP 54 rated lighting for car park areas
- T5, CFL or LED lighting of common area shall be considered during detail design as provided by architect/ID.

The switching arrangement of lighting will be as follows:

- Plant rooms – localized switching by means of 6 Amp switch.
- Carpark by time switch with manual by pass switch.
- Staircase lighting & Lobby by occupancy sensors.

3.10 Perimeter and Security Lighting

General exterior lighting will be specified and provided by Landscape Consultant for all external areas. Perimeter/security lighting must be provided as per minimum physical security and fire safety requirements employing vandal resistant light fittings.

3.11 Emergency Lighting Installation

Emergency lights will be provided to achieve the following minimum coverage.

100% Stairways and 25% percentage lighting in circulation space, corridor, lift lobby, indoor car parking, and plant room area as per NBC will be provided through Inverter supply.

Self-illuminated Exit Signs.

3.12 System of Wiring

The system of wiring shall consist of PVC insulated copper conductor stranded flexible FRLS wires of 1100 volts grade of insulation, in PVC conduits for all exposed or concealed wiring. Minimum size of copper conductor shall be 1.5 sq. mm for lighting and 2.5 sq.mm for power outlets except for Geyser and air conditioners. Geyser & air conditioners shall be wired with 4 sq. mm copper conductor. Ceiling fan point will be provided in each room.

Colour code shall be maintained for the entire wiring installation that is Red, Yellow and Blue for the three phases, Black for neutral and Green with Yellow band for earthing. Besides provision of ferruling, number coding shall also be provided for easy identification for maintenance purposes.

3.13 Switching Arrangement

Switching arrangement at various locations shall be planned keeping in view the ease with which isolation can be achieved and also the level of fault protection desired at the particular current rating. Main distribution panels and sub-distribution panels shall incorporate moulded case circuit breakers. Final distribution panels shall incorporate miniature circuit breakers and earth leakage circuit breakers.

Every area shall have localized switching for convenience and operational purposes.

Generally Light points for interior lighting will be decided by the Architects

Air circuits breakers (ACB) moulded case circuit breakers (MCCB) and miniature circuit breakers (MCB) in all breaker of main panel & incoming of all panels shall be of 4 pole for 3 phase power distribution with advance neutral feature for safety, which shall ensure connecting first and breaking last of the neutral contact and avoiding high voltage in the single phase circuits.

3.14 Lightning Protection System

Option 1 – Preferred
Lightning Protection System shall be strictly in accordance with IEC: 62305: 2010.
Please note- IS: 2309-1989 has been now replaced with IEC: 62305: 2011.

There are three methods for designing the system: -
01. Rolling Sphere Method
02. Protective Angle Method
03. Mesh Method.

Suitable method among these three will be adopted for the project, as per the risk analysis performed.

3.15 Elevator

Elevator equipment shall be supplied and installed in accordance with ANSI/ ASME including latest supplement and local code requirements, whichever is more stringent. No degradation of ANSI/ ASME/ JIS/ IE/ CBS requirement shall be allowed simply on the basis of local code requirement.

Interiors of all passenger elevators shall be as per architect's specifications and 20 mm for recess stone plate flooring, unless otherwise specified. All Elevators will have machine rooms.
All elevators shall connect to normal and to emergency power supply. One elevator from each bank of elevators in each group shall be key operated to be used as fireman's lift as per code. All elevators shall be provided with short duration emergency lights in each cabin supported by local dry cell rechargeable battery and necessary relays to

give minimum 50 Lux at the floor level of the elevator & ventilation fans. Automatic self-levelling feature shall be provided to bring the elevator car level within + 3 mm of the landing floor regardless of load or direction of travel.

Car and Hoistway Door Operation: For each elevator door, an electric door operator shall be provided to simultaneously open the car and the hoistway door when the car is at a landing, and also close both the doors simultaneously before the car leaves landing after a predetermined time interval has lapsed.
Photo Electric Monitor: Photo electric device shall be installed on each elevator. This device will monitor traffic across the threshold of the door and shall initiate door closing two seconds after last beam interruption thus overriding door open period.

Over Load Features: All elevators shall be provided with the load weighing feature to illuminate "Over Load" fixture and defeat car's operating circuits when car load reaches 110% or more than the rated load. Car platform may require stiffening to minimize margin of error resulting from excessive deflection.
Car Position Indicator: Alpha numeric/ digital car position indicator shall be provided above each car operating panel.

Hall Buttons: At each terminal landing a single micro movement push button shall be provided, that is on the top most and the lowest floor landings; two micro movement buttons on a single plate shall be provided at each intermediate floor landing. When a hall call is registered by momentary pressure on a landing button, that button will become illuminated and will remain illuminated until the call is answered.

Lighting: Lift car manufacturer shall make all provisions for installation of lighting fixtures specified by the interior designer, including integration of emergency lighting fixture. Necessary wiring shall be included in the car travelling cable for lighting and communication system.

Noise Levels: Noise from all stationary equipment shall not intrude into adjoining areas by more than 15 dB. Noise from moving equipment including door operation, car motion, fan, wind etc. shall not intrude into adjoining corridors by more than 20 dB.

Noise level inside the car shall not exceed 50 dB, without lift fan running. Noise level inside the car shall not exceed 55 dB, during door opening / closing.

Architraves & Doors: Doors, threshold, door hangers and electro mechanical locks as a system shall be fire rated for not less than 2 hours.

Control: AC variable voltage and variable frequency control system shall be provided for all elevators.

3.16 Energy Conservation Strategies for Electrical & LV Systems

a. Copper conductor cables will be specified for sizes of 16 sq. mm and below to reduce losses and improve reliability.

a. All lifts will be provided with AC variable voltage, variable frequency drives (ACVVF).

b. Power factor for common areas will be maintained 0.95 or higher to reduce electrical power distribution losses in the installation.

c. Timers and photo-electric sensors will be used to switch ON / OFF external landscape and facade lighting.

d. Energy efficient Compact Fluorescent Lamp (CFL) with high frequency ballast OR LED lights will be used for common areas.

e. All cables will be suitably de rated to avoid heating during use.

3.17 Telecommunication, Data and Cable TV Transmission System

Necessary infrastructure will be planned for below mentioned points:

- All voice & data points inside Apartments and in various Service/Common areas.
- All Intercom points inside Apartments
- All cable TV points inside Apartments

Sale Tower-
The data transmission for sale tower will be through a main fiber backbone. The fiber backbone will carry the data for the following systems:

- Telephone
- Internet
- Intercom

Provision will be made for receiving incoming lines for the project. A dedicated LV room shall be planned at ground mezzanine floor for installing the necessary equipments of telecommunication & data system.

The following will be used for carrying wires / cables.

a. GI conduits wherever the conduit runs exposed in ceiling or chased in wall. PVC conduit will be used for concealed wiring.

b. GI cable trays or cable ladders for carrying multi-conductor cables.

3.17.1FTTH system for Telephone, Internet and Intercom:

This is applicable only for sale tower.
Cabling: FTTH is 100 % deployment of optical fiber in the access network. It is commonly deployed in two specific configurations as given below.
a) Point to point (P2P) network: One fiber is dedicated to each user in the access network.
b) Passive optical network (PON): One fiber is shared (via a power splitter) amongst a set of users

In FTTH, the main Service provider will come and terminate their cable in the ONT (Optical Network Terminal). The Service provider will be ISP provider, Cable TV provider, Telephone provider. From ONT, termination happens to OLT (Optical Line Terminal) which will be located in the shaft of each floor. From OLT, 2 core fiber cables will be laid till each Apartment and terminated in LIU (Light Interface unit) which will convert the digital Signal to the Analogue output. From LIU, copper cabling is done till each outlet that needs to be utilized.

In FTTH multiple operators can terminate in single bandwidth, whereas in the conventional system all the service providers have to use their own facilities for offering their services.

FTTH has very simple Architectural system compared to conventional system, thereby reducing maintenance to great extension. Also this system has latest technologies which are going to stay longer in the future. FTTH also reduces installation time to large extent. However it is costly than Conventional system. But continuous development in FTTH technology & increasing popularity may reduce its cost in near future.

3.17.2MATV system:

The objective shall be to provide centralized MATV System by providing Direct to Home service (DTH). All active components shall be planned & specified by the service provider as identified by the developer. Passive part shall be planned by electrical contractor as per service provider guide lines.

It is recommended that developer shall invite cable service provider who in turn will provide the guide line to electrical contractor. Splitters and tap-off shall be provided for distributing the signal.

TV outlet point shall be provided as per developer brief each TV shall be directly connect to control box located in LV shaft base on latest technology.

4. PLUMBING / SANITARY SYSTEMS (WATER SUPPLY & DRAINAGE)

4.1 Reference Standards

National Building Code of India	Part IX September 2005
Relevant BIS Codes	
Codes & Design Guidelines :	
i. American Society of Plumbing Engineers(ASPE)	Design Data Book Volume I to IV
ii. Uniform Plumbing Code of India	2008 Edition
iii. MCGM water Supply Regulations.	
iv. Energy Conservation Building Code	2011 Edition
v. Energy Policy Act 1992	

In addition to above to mentioned standards & codes, following policies prepared by client are also referred for design as per instructions from client.

- Lodha guidelines – MEP-08_Guidlines for Plumbing
- Lodha guidelines – MEP-12_Hot Water System Policy
- Lodha guidelines – MEP-18_Policy for Services in Toilets
- Lodha guidelines – MEP-09_Servant's Toilet (common)

4.2 Design principles

The Plumbing services for the project shall be designed keeping in view the following:

4.2.1 Requirement of adequate flow and pressure of cold water in toilets, kitchen / pantry and other designated areas. Cold water makeup supply to water bodies shall also be ensured.

4.2.2 The water storage tank capacity shall be adequate to ensure availability of water required for each building.

4.2.3 Recycling of treated waste water (from sewage treatment plant) for flushing & irrigation water use.

4.2.4 Implementation of requirements of MoEF relating to rain water harvesting, water conservation, solar hot water system etc.

4.2.5 Levels of roads / pavements and other services in the area.

4.2.6 Drainage and water supply provision for Irrigation.

4.2.7 Water conservation using low flow fixtures.

4.2.8 Energy conservation measures.

4.3 System Requirements

4.3.1 As informed by Client, the principal source of water will be municipal water supply. However, in case the same is not available in sufficient quantity to fulfil the project's requirement, alternate source such as tanker / bore well water needs to be considered. Water Treatment Plants (WTP) shall be provided to ensure that the chemical and bacteriological parameters of water supply in the Residential Buildings are in accordance with Indian Standard for potable water supply (IS:10500). However, WTP system design shall be verified for suitability prior to installation in accordance with water quality analysis report.

4.3.2 Overhead storage facility for Fire, Domestic and flushing water.

4.3.3 Sewage and sullage collection & conveyance system based on NBC/Indian Standards and applicable guidelines by ASPE wherever required.

4.3.4 Storm / rain water drainage from the top terrace of the building shall be collected separately in a Rain Water Harvesting System Network. It shall be stored in rain water harvesting tank at basement-1 level and reused after required treatment for flushing & landscape irrigation usage inside the building. Overflow of the rain water tank shall be connected to external storm water network which shall also catch the storm water from roads and open areas. The drain will ultimately be connected to external municipal storm water line.

4.3.5 Sewage treatment plant for treatment of sewage & sullage waste. The plant shall comprise of preliminary, primary, secondary (chemical & biological) and tertiary treatment units. The treated effluent shall be recycled and reused for flushing and irrigation requirement of the Buildings. It is proposed to have an independent STP for Sale Tower.

4.4 Design Calculations

4.4.1 Water requirement - Domestic & Flushing Water demand shall be as per Lodha Guidlines for residential development. Kindly refer Annexure – PL 01 A for domestic & flushing water requirements of Sale Tower.

4.4.2 Water Storage and transfer –

4.4.2.1 Water will be stored in underground tanks (1 day's requirement) and overhead tanks (half day's requirement).

4.4.2.2 Water transfer from UG tanks to OH tanks will take place by means of transfer pumps. The pumps will operate automatically based on water level in the OH tanks.

4.4.2.3 Pump flow rate shall be decided based on 3 hours of water transfer for daily requirement of the building. Based on the same, pipes will be designed as per Hazen-Williams formula to limit friction loss & velocity of flow in pipes to acceptable values.

4.4.3 Water distribution –

4.4.3.1 Water from overhead tanks will be distributed to various parts of the building by means of gravity feed.

4.4.3.2 Water supply piping will be designed as per Hazen-Williams formula based on the available gravitational head. Min. pressure of 1.5 kgf/cm2 shall be provided at every toilet connection.

4.4.3.3 Pressure zones will be created by using pressure reducing valves to limit pressure at any floor within 4 kgf/cm2 as per Lodha Guidelines.

4.4.3.4 For top floors of the building (top 3 floors for flushing & top 5 floors for domestic), booster pumps shall be provided to ensure sufficient pressure availability at fixtures.

4.4.4 Drainage system – Drainage pipe sizing shall be based on NBC according to no. of fixtures and building height.

4.5 External drainage – External drainage network shall be designed based on the number of fixture units connected, available gradient, connection level at external municipal chamber etc. Pipes shall be sized as per Manning's formula.

4.6 Storm water:

4.6.1 Terrace storm water down take piping shall be sized for gravity flow. Design intensity of rainfall shall be 100 mm/hr as confirmed by Lodha Design Team.

4.6.2 External storm water & rain water harvesting network shall be designed as per run off generated from respective catchment areas. Pipe sizing shall be as per Manning's formula.

Irrigation- We have considered 6lit/sq. Meter/day water demand for irrigation as per Lodha Design Team's suggestion. Area for irrigation is provided by Client including the gardens at podium level.

4.7 Source, Storage, Type and Treatment of Water

4.5.1 Source of Water

As informed by Client, the daily potable domestic water requirement for the Project will be met through MCGM water supply. The water shall be directly used for domestic use if quality of water is as specified in the Indian Standards

for potable water supply (IS: 10500). However, if the quality of water is not found suitable for domestic & drinking use after analysis, it shall be treated in WTP before using for domestic requirement.

Water supply for flushing and irrigation shall be met through recycled water from Sewage treatment plants. Tanker water shall be used to fill fire tanks in case of short fall of MCGM water supply.

Water shall be used in the following manner:

a. MCGM water : For bathing, drinking and health faucets..
b. Recycled water from S.T.P : For Flushing and Irrigation.
c. Tanker water : In case of shortfall in MCGM water supply for Domestic use.
d. Rain water (only monsoon Season) : For Flushing & Irrigation Uses after required treatment.

4.5.2 Water Storage & Tank Sizing

It is proposed to provide 1.5 day's water storage capacity based on ultimate requirement (1 day storage in UGT + 0.5 day in OHT). Please refer Annexure PL-02A & PL-03A for water balance diagram for non-rainy and Rainy seasons respectively.

The incoming main from MCGM water supply line shall be led into fire reserve tanks and from there it shall be allowed to overflow in domestic water tanks to avoid water stagnancy in fire tank. Proposed water storage capacities are tabulated as under:

Under Ground Water Storage Tanks for Sale Tower

Sr. No.	Ph-2	Fire Hydrant & Sprinkler (cum)	Fire Drencher (cum)	Domestic (cum)	Flushing (cum)	Irrigation (Cum)	RWH (cum)
1	Sale Tower – Lodha Guidelines	200	100	87	37	8.5	50
2	Sale Tower – MCGM Norms	200	100	67	31	8.5	50

Note-
1) For firefighting storage tank capacity, refer firefighting section.
2) RWH tank capacity is as per calculation provided for MOEF submission.

Overhead Water Storage Tanks for Residential Towers-

Sr. No.	Tower Type	Fire (cum)	Domestic (cum)	Flushing (cum)
1	Sale Tower – Lodha Guidelines	10	40	18.5
2	Sale Tower – MCGM Norms	10	30	15.5

Note- Fire OHT tank capacities are based on amendment no.2 of NBC 2005; same shall be confirmed after receiving revised fire NOC, if required.

4.5.3 Water Type & Treatment

Water treatment is proposed for raw water received from tanker & Rain water collected from building terrace. On analysis of incoming water quality, necessary treatment will be provided to achieve potable water quality.

4.8 Water Supply & Distribution

4.8.1 Supply System:

Residential buildings-

Underground water storage will be independent for Sale Tower. There will be 2 separate tanks with aggregate capacity to store water required for one day. From underground tanks, water shall be transferred to overhead tanks located above staircase through transfer pump system (2W+1S). Pump sets will be operated in auto mode with level switches in OH tanks.

Landscape-
Water for irrigation shall be sourced from recycled treated water from STP. Irrigation tank of 8.5m3 capacity has been proposed in the STP area. The landscape water supply system comprising of pumping, piping, water supply nozzles and control equipment shall be designed and built by the appointed irrigation water supply vendor.

4.8.2 Distribution System:

Water for Domestic and Flushing use shall be distributed by Gravity from Overhead tanks. Booster Pumps shall be provided for upper 3 floors for flushing water & upper 5 floors for domestic cold and hot water to have required pressure. Pressure zones will be created by using pressure reducing valves to limit pressure at any floor within 4 kgf/cm2 as per Lodha Guidelines.

4.9 Drainage System

4.9.1 Sewage and Sullage

The soil and waste shall be carried down separately in independent down take pipes. Two pipe drainage systems shall be adopted as per NBC standards. The sanitary, waste & vent system shall be water tight and gas tight designed to prevent escape of foul gas and odour from various fixtures.

Vent system shall be designed to facilitate escape of gases and odour from all parts of sanitary and waste system to the atmosphere at a point above the building and to allow admittance of air to all part of the system, so that siphon, aspiration or back pressure conditions do not cause loss of seal at traps and entry of foul gases inside habitable areas.
As informed by Client, the soil & waste piping shall be under-slung (in the ceiling of floor below) and the horizontal header shall be subsequently connected to the vertical stack located inside the associated pipe shaft which shall be coordinated carefully with other services and in consultation with Architect. Care shall be taken to avoid pipe runs in electrical switch rooms and other critical areas.
Provision for cleaning and Rodding eyes shall be made at strategic locations to allow the system maintenance.

Cast Iron pipes shall be used for ceiling suspended pipe diversions. The external network shall be connected to the STP. By-pass/excess treated water & overflow of STP shall be connected to the municipal drainage line.

4.10 External Drainage

The following parameters/ site conditions shall be kept in mind when designing the sewage, sullage and storm water drainage system:

- HFL of nearest discharge point /Nalla.
- Peak rainfall intensity of 100mm/hr
- Natural slope of the area;
- Layout of different facility in the building ;

- Sub-soil water table;
- Soil condition;
- Provision of Sewage lifting station;
- Provision of venting arrangement for manholes;
- Construction of manholes & laying of pipes considering ground condition;
- Termination of vent cowl at terrace level;
- Provision of adequate slope for horizontal header in the under slung pipes especially for toilets

4.10.1Design Criteria

The system shall be designed as per following design criteria stipulated in the "Manual for Sewerage & Treatment" published by the Central Public Health and Environment Engineering Organization, Ministry of Urban Development, Govt. of India, IS-SP/35(S&T)-1987 and National and International practices on the subject.

a.	Flow of sewage	:	Up to 85% of domestic water supply (Average daily) Up to 95% of flushing water supply (Average daily)
b.	Peak flow	:	3 times average flow
c.	Min. diameter of pipe	:	150 mm dia
d.	Min. velocity in pipe	:	0.75 m/s
e.	Max. velocity in pipe	:	Less than 2.4 m/s
f.	Flow conditions in pipes: Pipes up to 400 mm dia Pipes larger than 400 mm dia	 : :	 0.50 full running 0.67 full running
g.	Min. depth of pipe below ground level: For branches For other	 : :	 0.6 m 1.0 m
h.	Formula for calculation and design of sewer lines	:	Manning's Formula

4.10.2 Rain & Storm Water Drainage

Rain Water Drainage -
Rain water from top terrace shall be collected by means of vertical pipes. The downtake pipe system for rain water shall be conventional gravity based system. Rain water pipes entering the podium gym/club area shall be diverted from ceiling level before connecting to external network. Cast Iron pipes shall be used for ceiling suspended pipe diversions. The external network shall be connected to the rain water harvesting tank through first flush & filtration arrangement which shall be as per rain water harvesting consultant's details.

Car parking floor & podiums shall be provided with car park drains and all the drain down takes shall be taken down to the ground level and joined to outside storm water drain with oil or grease separator. For basement floors, drain pipes shall be connected to dewatering sump at Basement-2 level from where water shall be pumped to external storm water network.

Storm Water Drainage -
Storm water drainage system for the project shall be designed for rainfall intensity of 100 mm/hr as confirmed by Lodha Design Team. External storm water from roads and open areas shall be collected by means of catch-pits with gratings on top. The pipe & chamber network shall ultimately connect to external municipal storm water chamber.

4.8.2.1 **Design Criteria**

The system shall be designed as per following design criteria:

a.	Intensity of Rainfall (as per Lodha Guidelines)	:	100 mm/hr
b.	For hard surface Run off coefficient	:	0.95 (As per MoEF Manual)
c.	For soft surface Run off coefficient	:	0.1 to 0.5 (As per MoEF Manual)
d.	Min. velocity in pipe	:	0.75 m/s
e.	Max. velocity in pipe	:	2.4 m/s
f.	Open drain starting width	:	300 mm
g.	Open drain starting depth	:	200 mm
h.	Slope	:	1:400 to 200
i.	Hydraulic calculation	:	Manning's Formula & Rational formula for calculating Run Off

4.11 Rain Water Harvesting-

Rain water Storage- Rain water from terraces shall be collected into Centralized storage tanks of capacity 50 cu.m. for Sale Tower separately. Sale Tower's RWH tank is proposed at B-1 floor in order to connect overflow to external SWD.
The RWH tank shall be used as raw water tank during Non-rainy seasons.

Recharge Pits- Ground water recharge pits are not proposed.

4.12 Sewage Treatment Plant

Independent sewage treatment plant is proposed for Sale Tower.
Capacity of the plant shall be 100 cum/day.
As suggested by Client, MBBR type treatment shall be proposed.

Moving Bed Bio Reactor (MBBR)

We shall provide sewage treatment plants for treatment of sewage & sullage water. The treated effluent shall be used for Flushing & Landscape Irrigation. However, an arrangement for disposal of Sewage is made for by-passing the Sewage during Maintenance of STPs. The By-pass sewer line shall connect to the Municipal Sewerage.

Following parameters shall be adopted for the design of sewage treatment plant.

Parameter	**Value**	
	Before Treatment	**After Treatment**
pH	7 – 8.5	6.0 – 8.5
BOD	250 – 400 Mg / L	Less than 10 Mg / L
Suspended Solids	200 – 450 Mg / L	Less than 10 Mg / L
COD	600 – 800 Mg / L	Less than 30 Mg / L
Oil & Grease	50 Mg / L	Less than 5 Mg / L
Detergents	50 – 100 Mg / L	Less than 10 Mg / L

Sewage Generation Source
The main sources of incoming sewage to STP shall be Toilets in apartment's, Kitchen, and backwash drain from Plant rooms.

4.12.1 Design basis

- Nature of effluent : Domestic and Kitchen waste.
- Mode of Application of treated water : Flushing, Irrigation
- Capacity : a. Sale Tower: 170 CU.M/DAY
  : b. Rehab Tower: 145 CU.M./DAY

4.12.2 Technology Brief

Process Description

In order to conserve water, sewage treatment plant shall be designed to ensure that treated effluent (water) characteristics are well below the permissible limits, even under varying flow conditions which are typical for such systems. This implies that the selected process shall be able to withstand shock load situations.

STP design shall be for compact activated sludge system working on the principle of Moving Bed Bio reactor (MBBR). This has the following advantages:

- The process has long retention time and can absorb shock load situation.
- The process produces a well oxidized sludge in small quantities only, which can be discharged to municipal tankers by sludge transfer pump.

The sewage treatment plant shall be designed for a capacity to handle soil and waste water from the all buildings. Soil & Waste water from the Building shall flow into a grit chamber to remove settling grit. Over flow from the grit chamber shall come to a sump chamber constructed as an integral part of the package sewage treatment plant.

A bar screen shall be provided at the inlet point in the sump and the waste water will flow through this bar screen into the sump.
The bar screen shall be so designed that it can be cleaned manually from the top of the sump. Two submersible solid handling pumps shall be provided in the sump to pump the collected waste water to the aeration chamber. These pumps shall have the capability to handle effluent with solids upto 40 mm size. A flow regulator box shall be provided to regulate the flow in the aeration tank. Automatic level controller shall be provided in the sump to turn the pump off at the low water level in the sump and to automatically start the pump when water level is high. In case the water level in the sump continues to increase (pump out of order), the stand by pump will start and a high level alarm shall come on, indicating pump problem. Submerged air diffusers shall also be provided in the sump to keep the suspended solids in suspension and to prevent the sewage from turning septic.

Waste water from the flow regulating box shall flow into the moving bed Bio reactor tank, where it shall be mixed with activated sludge (Mixed Liquor Suspended Solids).

From the MBBR tank, this mixed liquid shall pass into the secondary clarifier. Through the use of baffles the liquid in the clarified tank shall be maintained in a quiescent condition which shall allow the solids to settle to the bottom for collection. The accumulating solids known as "Sludge" shall be constantly pumped from the clarifier tank bottom to the MBBR tank. This return sludge shall undergo further digestion in the MBBR tank and shall also provide the active organisms needed to digest the incoming raw sewage.

A skimmer system shall be provided at the surface of the secondary classifier to continuously skim the surface and to pump the skimming back into MBBR tank. The `clarifier shall also have an adjustable overflow weir to collect the treated effluent and a scum baffle shall keep any floating matter from passing out with the final treated water.

Treated water from the secondary clarifier shall over flow into adjoining mixing tank where alum shall be added. Mixing shall be provided by air diffusion. From the mixing tank water shall flow by gravity into an adjoining baffled treated water tank shall have volume sufficient to store treated waste water for one day storage.

The treated, disinfected water shall then be passed through a multigrade filter and UV unit then stored and reused as makeup water for cooling towers for air-conditioning for flushing and for external horticulture.

Excess sludge from the bottom of the clarifier shall be passed into an adjoining aerobic digester cum thickener tank. In this tank, sludge shall be aerated. Air shall be shut off periodically and separated water shall be pumped back into the MBBR tank. This way the sludge shall be thickened and its volume reduced. The sludge digester cum thickener tank shall be sized to hold excess sludge production of atleast three months. Submersible solids handling pump with flexible hose connection shall be supplied to pump the sludge out into municipal tanker on required basis. Filter press shall be provided for sludge treatment.

4.13 Hot Water Supply-

Hot Water for the apartments shall be catered by individual geysers. However, to comply with MOEF requirement, top 5 floors shall be provided hot water generated through solar hot water system as per Lodha guidelines. Capacity of the system required is 875 lit for Sale Tower. Refer Annexure PL-04A for the calculation.

Note – Option of Gas geyser system an alternative to electrical geysers for hot water for all apartments will be explored during DD stage.

4.14 Material of Construction of Piping

Materials for piping proposed are as per Lodha Guidelines:

4.14.1 Water Supply and Distribution

- Transfer pipe from U.G. Tank to Overhead Tank---G.I. "C" Class
- Down take pipe in shafts --- cPVC
- Inside Toilet- cPVC
- Hot Water Supply Inside shaft & terrace loops- cPVC with Nitrile Rubber Insulation
- Hot Water Supply concealed in wall chases - cPVC (Without Insulation)

4.14.2 Drainage

- External Sewage up to STP – RCC NP3 Class Pipes
- Soil & Waste Down take in shafts – uPVC Class-III as per IS-4985
- Horizontal suspended soil and waste pipes – C.I. "LA" Class
- Waste Pipes Inside toilet – uPVC SWR Class "B".
- Soil Pipes inside toilet – Low noise uPVC or PP pipes
- Vent Stacks inside shafts – uPVC SWR Class "A"
- External Storm water pipes – RCC NP-3 Class
- Rainwater down take in shafts - uPVC Class-III as per IS-4985 .
- MS/CI/RCC/ cover with frame for entire length of trench with openable panel for access at specific intervals.

5. FIRE FIGHTING & FIRE PROTECTION SYSTEM

5.1 Reference Standards

The design and planning of Fire Protection System shall be done keeping in view the following criteria:

- National Building Code Sept 2005: Part IV for Fire Protection & amendment no. 2 dated 29th Sept. 2015
- Local Bylaws.
- Relevant BIS codes: IS: 2190, IS: 3844, IS: 13039, IS: 15105.
- NFPA – 13 & 14
- CFO NOC

In addition to above to mentioned standards & codes, following policies prepared by client are also referred for design as per instructions from client.

- Lodha guidelines – MEP-05_Fire fighting and Fire Alarm Norms
- Lodha guidelines – MEP-14_Policy for Selection of Fire Fighting Materials

5.2 Basis/ Concept of Design

The building falls under Group-A4 of residential buildings (apartment houses) as per NBC. The same comes under light hazard category. The fire fighting arrangement shall be designed as per the requirement of local guidelines & engineering design standards.

The entire fire safety installation shall be compliant with the most stringent codes / standard for the entire Building to ensure the highest safety standard and uniformity of system. Further, before property is opened to public, the fire protection shall be fully operated and tested under simulated conditions to demonstrate compliance with the most stringent standards, codes and guidelines.

Following functional system shall be provided; strictly in compliance with the listed reference standards:

a.	Piping System	:	Piping system confirming to IS: 1239
b.	Fire water static Storage	:	Fire water static storage has been provided in accordance to NBC requirement.
c.	Fire Pumping system	:	Pumping system comprising of independent pumps for hydrant, sprinkler & jockey application has been provided.
d.	Hydrant system	:	External & internal hydrant complete with hose reel.
e.	Sprinkler system	:	Sprinkler system in the buildings including sprinklers inside each apartment.
f.	Hand held fire Extinguishers	:	Strategically placed at designated areas.

5.3 System Description

5.3.1 Fire Water Storage

Firefighting provisions are proposed as per requirements of the National Building Code Sept 2005: Part IV for Fire Protection & amendment no. 2 dated 29th Sept. 2015 and Lodha guidelines. However, the firefighting provisions need to be confirmed after receipt of provisional CFO NOC for the project. Hence, keeping in view the requirements of Total static storage for firefighting in underground tanks, following tank capacities are proposed:

a. Underground Storage: 200 m3 for Hydrant & Sprinkler Systems with additional 100m3 for Drencher System.

Separate pump sets shall be provided for Sale Tower as specified below in 4.3.2.

Additionally, 10 cu-m water storage with booster pumps shall also be provided at terrace level of the building exclusively for firefighting.

Fire department connection shall also be provided on the external wall of the property near the main entrance. These shall comprise of 4 Nos. 63 mm dia. male outlets capable of directly feeding the ring mains and external hydrant system through non return valves or directly filling the static fire storage tanks. These shall be mounted in specially identified boxes. A draw-out connection shall also be provided to draw water from the static storage tanks if required.

5.3.2 Fire Pumping System

Water shall be drawn from underground fire reserve tanks by electrically driven jockey pumps, fire pumps and sprinkler pumps. All pumps shall have separate suction line from the fire suction header and delivery shall be connected to the system. For sprinkler system, installation control valve with hydraulically operated alarm gong shall be provided at appropriate places. The function of pumps shall be to maintain 3.5 Kg/Sq.cm at the top most hydrant. Electrically driven stand-by fire pump shall be of the same capacity and shall back up the electrically operated main fire hydrant & sprinkler pumps, as per fire regulations. The stand-by pump shall be fed power from a separate source and shall be operated in case of main power source failure or main pump failure. Independent jockey pumps (for hydrant and sprinkler line both) shall operate intermittently in order to take care of hydraulic losses in the system and shall maintain the system pressure in wet risers & sprinkler system. One additional pump of capacity same as that of the sprinkler pump is proposed to take care of the Drencher system's flow requirement.

Multistage horizontal centrifugal pumps shall be used for firefighting application. To limit the pressures at lower levels, multi-outlet pumps may be considered for Sale Tower.

Fire pumps' rating / duty are designed as per NBC.

Fire Pumps Required for Sale Tower:

Sale Tower	Description	HEAD	LPM	QUANTITY
1	Fire Hydrant pump	175	2850	1
2	Sprinkler & Drencher pump	175	2400	2
3	Hydrant Jockey pump	175	180	1
4	Sprinkler Jockey pump	175	180	1
5	Booster pump	35	900	1
6	Stand-By Electric Pump	175	2850	1

Electrical pump shall provide adequate flow for catering requirement of hydrant system. Jockey pumps shall compensate for pressure drop and line leakage in the hydrant and sprinkler installation. Due to height of the buildings, multistage & multi outlet pumps are proposed to restrict pressure on lower floors.

Individual suction lines shall be drawn from the fire reserve tanks below lower parking level and connected to independent fire suction header. The electric fire pumps and the jockey pumps shall all draw from this suction header.

Delivery lines from various pumps shall also be connected to a common header in order to ensure that maximum standby capacity is available. The sprinkler pump shall be isolated from the main discharge header by a non-return

valve so that the hydrant pump can also act as standby for the sprinkler system. The ring main shall remain pressurized at all times and Jockey pumps shall make up for minor line losses. Automation required to make the system fully functional shall be provided.

5.3.3 Fire Hydrant System

Internal and external standpipe fire hydrant system shall be provided with landing valve, hose reel, first aid hose reels, complete with instantaneous pattern short gunmetal branch pipe in the building.

The internal diameter of inlet connection shall be at least 100 mm for double outlet hydrant valves used inside buildings. And the internal diameter of inlet connection shall be at least 80 mm for single outlet hydrant valves used in external courtyards. The outlet shall be of instant spring lock type gunmetal ferrule coupling of 63 mm dia. for connecting to hose pipe.

Recessed cupboard / fire hydrant cabinet shall be strategically located for firefighting requirement. Location of cabinets shall be easily accessible as per plan and shall be planned in consultation with the Architect. Provision of fire man's axe shall be made for internal hydrant.

External hydrant shall be located within 2 m to 15 m from the building line to be protected such that they are accessible and may not be damaged by vehicle movement. Spacing between two hydrants shall not be more than 45m. However, the same needs to be confirmed once the CFO NOC is received.

5.3.4 Sprinkler System

As per NBC requirements, it is required to provide sprinklers in the Car parking, apartments and lobby etc. area. However, as per Lodha guidelines, inside apartments, sprinklers are proposed in kitchens & living rooms. For bedrooms, only provision shall be made to install sprinklers if required by CFO at a later stage. However, the system shall be finalized after receiving CFO NOC for the project.

The sprinkler system shall be provided with control valves, flow and tamper switches at suitable location and shall be connected to control module of the fire alarm system for its monitoring.

Sprinkler type along with its bulb rating shall be selected based on the requirement of the space and shall be specified accordingly. Inspector's test valve assembly with sight glass shall be provided at remote end with discharge piped to drain outlet / pipe.

5.3.5 Drencher System

As per requirements of the Development Control Rules of MCGM, a fire break floor is required at 70m height and the same is to be provided with a drencher system at periphery. As per NBC amendment no. 2 dated 29th Sept. 2015, water requirement of the drencher system for 60 min. operation needs to be added to Hydrant & Sprinkler Systems' water requirement. Also, a separate pump needs to be provided for drencher system with riser pipe up to nozzles.

However, as instructed by Client, sprinkler and drencher system has been provided with a common piping system with total flow rate as per requirements of Sprinkler & Drencher systems. Water supply design density of 37 lit/min/lineal m is considered in accordance with requirements of NFPA-13, however half of the perimeter of fire break floor has been considered to evaluate flow rate required for Drencher System.

Drencher system will be provided with a deluge valves & open nozzles to create water curtain at periphery of the break floor.

5.3.6 Hand Held Fire Extinguishers

Portable fire extinguishers of dry powder (ABC type), water (gas pressure), Carbon-di-oxide and foam type shall be provided as first aid fire extinguishing appliances. These extinguishers shall be suitably distributed in the entire areas in accordance with IS 2190 & provision mentioned in CFO fire NOC. These shall be placed or hanged on wall in a group on several suitable places.

Classification of extinguishers shall be as per the following table:

Class of Fire	Description	Suitable Type of Appliances
a.	Fire in ordinary combustibles (wood, fibres, rubber plastics, paper and the like) (Class A)	Gas Expelled Water Type or Dry Powder ABC Type
b.	Fires in flammable liquids, paints, grease, solvents etc. (Class B)	Chemical extinguishers of carbon dioxide, dry powder ABC type, mechanical foam type and sand buckets.
c.	Fire in gaseous substances under pressure including liquefied gases and related with electrical equipment (Class C)	Chemical extinguishers of carbon dioxide and dry powder ABC type or clean agent type

5.4 Check List:

Building Classification

As per clause 3.1.2 of National building Code (NBC) the proposed high end residential project can be classified under group A; Residential buildings with subdivision A-4 which represents building or structure in which living quarters are provided for three or more families, living independently of each other and with independent cooking facilities.

S. No.	Fire Safety Topic	Code Reference	Description	Check Point	Compliance
1	Fire Extinguishers	NBC-2005, Table-23 BIS: 2190	Type & Qty	The type and Qty of fire extinguishers shall be in accordance with, Annexure B of BIS:2190 where Multi stories buildings are classified under MH Class A Fire while small kitchens with LPG connections are categories under LH Class C	Yes
2	Internal & External Hydrant System	NBC-2005, Table-23 BIS: 13039 (External) BIS: 3844 (Internal)			
			Location of Internal Hydrant landing valve	In lobby at each floor.	Yes
			Spacing between external hydrants	Maximum 45 Meters as per BIS: 13039. However, the same will be finalized after receiving the CFO NOC.	Yes
			Min System Pressure	Minimum Residual Pressure - 3.5 Kg / Sq cm	Yes
			Number of Risers	One per 1000 Sq Mtr floor area (Table-1 of 3844)	Yes
			Size of Risers	Minimum 150 mm (Table-2 of 3844)	Yes
			Flow Rate	2850 LPM as per NBC amendment-2 (Sept. 2015)	Yes
			Piping for wet Risers	GI Heavy class as per BIS:1239	Yes
			Piping for external hydrants	GI Heavy class as per BIS:1239 with Anti Corrosive pypkote coating	Yes
3	Automatic Sprinkler System	NBC-2005, Table-23 BIS: 15105	Occupancy	Moderate for Basement Car Parking and light for upper floors.	Yes
			Min Pressure of system	0.5 Kg / Sq cm	Yes
			Design density of system	5 L/M/Sq mtr for Ordinary Hazard & 2.25 L/M/Sq mtr for Light Hazard	Yes
			Assumed max area of operation (AMAO)	360 Sq M for Ordinary Hazard & 84 Sq M for Light Hazard	Yes
			Coverage area of Sprinkler	Max 12 Sq Mtrs for Ordinary Hazard (9m2 for sidewall sprinklers) & 21 Sq M for Light Hazard (17m2 for sidewall sprinklers)	Yes
			Spacing between sprinklers	Max 4 mtrs (4.5m for light hazard) and Min 2.0 mtrs	Yes
			Piping Material.	GI Heavy Class	Yes
			Above false ceiling	To be provided if void is 800mm or more.	Yes
4	Drencher System	D.C. Regulations of M.C.G.M.	Provided at periphery of fire check floor	Design density of 37 lit/min/m considered as per NFPA-13	Yes
5	Water Reservoir	NBC amendment-2 (Sept 2015), Table-23BIS: 3844 BIS: 15105	Underground storage capacity.400000 Liters	300000 liters capacity provided as per Lodha Design Team's instructions.	Yes
6	Fire Pump Room	NBC-2005, Part-4 BIS: 12469	Located below basement-03 level	Preferable to have fire pump room inside the building.	Yes

6. EXTRA LOW VOLTAGE SYSTEM

6.1 **The following systems shall be included in the ELV system:-**

- Fire Detection and Alarm System (FAS) including emergency Public Address System (PA), emergency voice alarm, emergency telephone and smoke control system
- Security Systems which includes following
  - CCTV- IP Based
  - Boom Barrier with RFID Tag System

6.2 Fire Detection And Alarm System Including Emergency Paging And Voice Alarm, Emergency Telephone And Smoke Control System

6.2.1 General

Fire detection shall be network fire detection system with distributed voice evacuation system. The network fire alarm system shall consist of all necessary hardware equipment and software programming to perform the following functions.

- Fire alarm and detection operation
- Control and monitoring of smoke control equipment, door hold open devices, fire suppression system, emergency call system etc.
- Two-way supervised fire fighter's phone operations.
- One-way supervised automatic voice alarm operations

Network fire alarm control panel shall include all features for standalone FACP's and shall have network communication capabilities.
The material appliances equipments and devices shall be listed by UL 864/FM/EN/54 as part of projected premises signalling system and smoke control system.

Codes & Listing:
The equipment and installation shall comply with the current and latest edition of the following codes and listing :

A) National Fire Protection Association (NFPA) - USA:

NFPA 2001	Clean Agent Extinguishing Systems
NFPA 72	National Fire Alarm Code
NFPA 76	Telecommunication Facilities
NFPA 101	Life Safety Code
NFPA 90A	Air conditioning & ventilation system

Listed

B) Underwriters Laboratories Inc. (UL) - USA:

UL 268	Smoke Detectors for Fire Protective Signaling Systems
UL 864	Control Units for Fire Protective Signaling Systems **9th Edition**
UL 268A	Smoke Detectors for Duct Applications
UL 521	Heat Detectors for Fire Protective Signaling Systems
UL 464	Audible Signaling Appliances
UL 38	Manually Actuated Signaling Boxes
UL 346	Water flow Indicators for Fire Protective Signaling Systems
UL 1971	Visual Notification Appliances
UL 228	Door Holders
UL 1481	Power Supply for fire protective signaling system.
UL 1711	Amplifiers for Fire Protective Signaling Systems.
UL 1635	Digital Alarm Communicator System Units

Factory Mutual (FM) Approval

ADDENDUMS thereafter in
UL Code for Fire Detection (2007).
UL 9th Schedule Certification
International Standards Organization (ISO)
ISO-9000
ISO-9001
European Union (EU)
EMC Directive 89/336/ EEC
Electromagnetic Compatibility Requirements

C) LOCAL CODES
NATIONAL BUILDING CODES
IS-2189

D). European Standards
EN54

E). German Standards
VDS

In addition to above, Lodha Guidelines - MEP-05_Fire fighting and Fire Alarm Norms and MEP-20_Security Design Guidelines shall also be referred for the designing.

6.2.2 Fire Detection and Alarm System

The fire detection and alarm system control panel shall monitor and display the activation of each device in the system, such as heat detector, smoke detector, multi-criteria detector, manual pull unit, basement ventilation fans, sprinkler water flow switch and sprinkler valve tamper switch or any other input device which may be required.

The system shall be of the addressable analog multiplexed type, completely supervised, such that a break in any wire (loop) shall not prevent any device from operating, with multiplexing cabinets installed in appropriate approved locations. The system shall be of the type such that each device connected to the system shall be provided with unique address and separately identified at the Main control panel (MCP).

The Fire Detection & Alarm System is proposed for following area in entire premises:

- Common Area such as Lift Lobby, Staircase at each floor level shall be with smoke Detectors & set of Manual Call Point, Hooter Cum Strobe & Telephone Jacks.
- Common Service Areas at every floor levels such as Lift Machin rooms, Electrical Rooms, Substation Plumbing plant room etc. will have Multi-criteria Detectors.
- Fixed heat detector shall be provided in every apartment kitchen area and smoke detector will be provided bedrooms& living rooms of each apartment. Both will be integrated with Building fire alarm system.
- Gas leak Detector shall be provided in kitchen in each apartment.
- Control Module for tripping equipment's such as Access doors, Ventilation & Exhaust fans etc. in case of fire.

- The monitor module shall be provided for interfacing of sprinkler flow switch, tamper switch on each level.
- Fixed type Heat Detectors to be proposed here for whole Car Park area.
- Each Tower will have Separate Fire Alarm Control Panel (FACP) monitored at ground floor Fire control room & viewing station at main common Security room.
- Networkable Repeater Panel (NRP) for Fire alarm system will be kept at main Entrances & reception lobby at Ground floor & at main common Security room.

6.2.3 Emergency Public Address System for Emergency Evacuation and Voice Alarm

This system shall permit one-way communication in the form of emergency announcement from the main control panel to any floor or group of floors simultaneously. The system shall be capable of manual operation or automatic operation initiated by the fire alarm system. Speakers shall be located as required to achieve acceptable audibility in all areas of the building. Communication loops will be supervised "Style 7" (Class "A") and therefore return to the control panel.

6.2.4 Emergency Telephone

The emergency telephone system shall provide two way communications capability between the main control panel and jacks for emergency telephone. The emergency telephone shall be furnished as part of the overall system.

6.2.5 Equipment

The **Main control panel** shall be located in the Main Control Room in a location at Ground Floor. Main Control Room approved by the Architect/ owner/ operator. The location should preferably be in an area readily accessible from the outside, for easy access for fire rescue team. The most preferred location in the main entrance lobby. The exact location shall be approved by the appropriate authorities.

The control panel(s) shall be a multi-processor based networked system designed specifically for fire, one-way and two-way emergency audio communications, smoke control, extinguishing agent releasing system if necessitated, with integration modules for BMS or any third party control/annunciation. The control panel shall be UL/FM/EN 54 listed The control panel shall include all required hardware, software and site specific system programming to provide a complete and operational system. The control panel(s) shall be designed such that interactions between any applications can be configured, and modified. The control panel(s) operational priority shall assure that life safety takes precedence among the activities coordinated by the control panel.

- The control panel shall include the following capacities:
- Support up to minimum 125 detectors / 125 Devices per Loop
- Support up to minimum 2500 analog/addressable points per panel
- Support network connections up to minimum 64 or other control panels and annunciator.
- Support multiple digital dialers and modems
- Support multiple communication ports and protocols
- Support up to a minimum of 1740 chronological events.
- The network of control panels shall include the following features:
- Ability to download all network applications and firmware from the configuration computer from the configuration computer from a single location on the system.
- Provide electronic addressing of analog/addressable devices.
- Provide an operator interface control/display that shall annunciate command and control system functions.
- Provide an internal audible signal with different programmable patters to distinguish between alarm, supervisory, trouble and monitor conditions.
- Provide a discreet system control switch provided for reset, alarm silence, panel silence, drill switch, previous message switch, next message switch and details switch.
- Provide system reports that provide detailed description of the status of system parameters for corrective action or for preventative maintenance programs. Reports shall be displayed by the operator interface or capable of being printed on a printer.
- Provide an authorized operator with the ability to operate or modify system functions like system time, date, passwords, holiday dates, restart the system and clear control panel event history file.
- Provide an authorized operator to perform test functions within the installed system.
- The control panel shall contain a standby power supply that automatically supplies electrical energy to the system upon primary power supply failure. The system shall include a charging circuit to automatically maintain the electrical charge of the battery.
- The control panel shall be provided with all hardware and software compatibility devices for integration with other third party systems on open platform required for safe functioning and ease operability for the infrastructure.
- A remote repeater panel (RRP)ie Fire graphics/fire workstation shall be installed in main control room or security control room of building, clearly visible to the operators and in an engineering or security area manned 24 hours per day. This remote unit shall repeat all alarm functions displayed at the main control panel. The silencing circuit shall be automatically reset when the fire alarm system is reset.
- Ceiling(Below False Ceiling) mounted smoke detectors shall be provided in all areas of the building. Smoke detectors are selected to detect smoke from smouldering fires, slow burning fires, for most of the areas where principal fire hazard is not from presence of flammable liquids. Fire involving wood, paper, textile,etc in earlier stages.
- Heat detectors (Fixed) shall be installed in basement floor,pantry,kitchen for activation of alarm. Heat detectors are selected for fire that evolves heat rapidly and with very little smoke. Clean burning fire fires, such as those involving certain flammable liquids. Area subject to smoke, steam, dust or dirt during normal use.

Multi-criteria detectors shall be provided above false ceiling where space between the false ceiling and the slab is 800 mm and more as per IS code. These detectors are selected for smoldering and fast flaming fires, dense smoke.

Response Indicator shall be provided for above false ceiling detector to know status of detector and shall be located on false ceiling and at every exit of enclosed cabin.

Addressable Manual Pull stations (manual fire alarm stations) shall be located on the occupied side of the door to each exit stair and at intermediate locations as required (Maximum distance between pull stations shall not exceed 60 m). Where available, double action break-glass stations shall be provided.

Addressable Hooters with visual alarm signalling devices (Xenon strobe lights) shall be located throughout the building. Lights shall be comprised of a xenon flashtube and be entirely solid-state. These devices shall be UL listed and be capable of either ceiling or wall mounting. The lexan lens shall be pyramidal in shape to allow better visibility. Visual units shall be rated at 110 candela minimum and Hooters audible range shall be added of 80-110 dB.

Sprinkler water flow switch and valve tamper switch shall be provided at each sprinkler system valve location (the flow and tamper switches shall be furnished and mounted by the sprinkler system installer and wired by the fire detection alarm system installer).

Magnetic hold open devices shall be provided where required for the automatic release of smoke/ fire doors.

Emergency telephone jacks will be provided in lift machine rooms, fire / sprinkler pumps rooms, plantrooms, electrical switchboard rooms, standby generator rooms, escape stair lobbies, etc.

Emergency stair and exit doors shall be provided with magnetic door devices, if required for security reasons.

Fault Isolators Modules shall provide in every loop for every 20 devices/detectors.

Addressable Control Module shall provide to activate/deactivate life safety equipments. The Control Relay Module shall provide one dry relay contact rated at 2 amps @ 24 Vdc to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems.

Addressable Monitor Module shall provide to get inputs for system.The Monitor Module shall be factory set to support one (1) supervised Normally-Open Active Non-Latching Monitor circuit.

Single Input Module: The Single Input Module shall provide one (1) supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. . The single input module shall support the following circuit types:

- Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
- Normally-Open Alarm Delayed Latching (Water flow Switches)
- Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
- Normally-Open Active Latching (Supervisory, Tamper Switches)

Auto Dialler shall provide at near to FACP, for communication to Fire Brigade station.

6.2.6 Emergency Telephone System

All remote emergency telephones will communicate with the emergency telephone control panel at the MCP as follows:

- The insertion of any telephone handset into its jack will cause the appropriate phone location indicator to flash and a distinctive audible pulsing sound to be heard in the fire command centre. The subsequent picking-up of the master phone and operation of that phone selector switch will silence the pulsing tone, cause the phone location.

- Indicator to stop flashing and remain on and complete the coupling of the remote telephone to the master telephone to provide direct and private communications.

- Any subsequent insertion of another telephone into its jack on the same circuit will not cause the pulsing tone to reactive if any two-way communication has already been established. Any new telephone handset circuit will, though, cause its discreet indicator to flash until acknowledged by the master telephone or the handset is replaced.

- The emergency telephone system will provide the capacity to handle simultaneous use of multiple remote phones. All phone jacks will be annunciate and monitored against fault or tampering (i.e. supervised).

- The removal of all remote telephone handsets from their jacks will cause the restoration of all normal supervisory functions.

- If any remote phone is not removed, then the appropriate phone zone indicator will flash and the pulsing tone will resume in the fire command centre.

- Telephone operation and telephone system faults will be stored in system memory and it will be possible to print out these operations on demand.

6.2.7 Battery Backup

Standby batteries (and inverter if required) will be provided to operate the entire Life Safety System in its normal supervisory mode for a period 48 hours normal working and then be capable of operating the system for 30 Minutes during an emergency condition

All wire and cable used for the Fire detection & Alarm system shall be approved for use in fire alarm systems for prolonged use during fire conditions. The insulation shall be listed for this use by a recognized testing agency. FS/PH120 armoured cable shall be used for fire detection and alarm system.

6.2.8 Coordination With Other Systems

The fire detection and alarms system shall have interface with other building systems, which are described under other sections of the report, as follows:

Sprinkler / Pumps system

The life safety system is required to monitor fire hydrant / sprinkler pump status. The pump controllers shall have the necessary volt free output signals available.

Fire sprinkler pump installations have multiple valves in the immediate vicinity of the pump set. Isolation valves are also envisaged to be provided on sprinkler system (zone isolation) and wet riser of hydrant system. Each of these valves shall be provided with a tamper switch. The life safety system shall have provisions for wiring the correct number of tamper switches. The tamper switches at any one-pump location shall be arranged to appear as one trouble alarm at the MCP.

Basement Ventilation & pressurization System
The fan control sequences during alarm conditions will be determined in conjunction with the air-conditioning system design.

Elevator System
The life safety system is required to monitor lift status. The Lift will come at Ground floor level in case of emergency.

Security System
The life safety system is required to open Access Control Door in case of fire if any.

6.2.9 FAS Cables

FAS cable shall be 2 core x 1.5 sq. mm Annealed Tinned copper conductor Armoured LSZH Cables. The cable should be selected as per BS 5308 standard. The outer Sheath of cable should be RED in colour.

6.3 Public Address System

The Public Address system shall essentially comprise of the following components:

- Head-end Equipment
- Distribution Equipment
- Reception Equipment

The Public Address system components shall have sufficient capacity to ensure distribution of voice to various areas of the building with equal clarity.

- 6 watt Speaker Celling/Wall mounted shall be provided at Apartment area and Common Area such as Lift Lobbies, Electrical Room, Toilets, and Staircase at each floor level.

- 20 watt PA wall mounted weather proof Projector speaker to be proposed here for whole Car Park area.

- Separate PA system for each Tower & Same will be kept in the each tower Fire control room.

6.3.1 Head End Equipment

Head end equipment shall be divided into two elements – source and amplification.

Source equipment shall be microphones for public address. Additionally message / alarm tone generators shall be used for emergency calls / evacuation.

The microphones shall be professional grade offering superior performance characterized by high sensitivity, minimum noise distortion and low sensitivity to feed back. These shall be connectable to zone selection consoles, each with its own selectable priority, from which each operator shall send announcement to specific audio zones.

6.3.2 Distribution Equipment

The distribution equipment shall primarily comprise line attenuators equipped with line transformers and rotary / digital controls for selecting the output power of a line speaker.

6.3.3 Reception Equipment

The reception equipment shall comprise primarily of speakers of varying types depending upon area allocation / usage. Wherever false ceiling exists, the speakers shall be of concealed mounting type with a wide bandwidth. Where false ceiling does not exist the speakers shall be surface mountable.
All speakers shall have the inbuilt facility of selectivity of the sound power produced.
The P A rack with announcement will be located in the Security office at ground floor level.

PA Cable
PA cable shall be 2 core x 1.5 sq. mm Shielded Annealed Tinned copper conductor Armoured LSZH Cables. The cable should be selected as per BS 5308 standard. The outer Sheath of cable should be RED in colour.

6.4 SECURITY SYSTEM SYSTEMS – Applicable only for Sale tower

The requirements of security system vary as per the requirement of the building along with its geographical location.

An integrated security system provided in this building covers the following aspects.

1. **Closed Circuit TV System**
2. **Controlled access to the Building –Manual/Automatic Operated Boom Barrier System.**

Every intricate security system pertaining to terrorist attack etc. shall be designed by security specialist.

6.4.1 Closed Circuit TV System

Following spaces shall be provided with cameras:

- Building Reception area
- Entrances& Exits at Each floor
- Main Lobby entrances
- Staff Entry's/Exits
- Inside the Lifts
- Escape stairs from floors (all floors) including roof
- Lift lobby on each floor
- Main HT/LT Electrical Rooms
- Main Security Command Centre(MSCC)
- Fire Control room
- PTZ & Fixed Box type Cameras for Perimeter Monitoring

The security console shall be located in the main control room at ground floor .This room shall have no windows. Ample space shall be provided to view monitors. Analog CCTV system will help in internal surveillance such that images to be stored for 30 days backup in any number. This will gives monitoring team flexibility in viewing the images from multiple locations.
Care shall be taken to ensure that the number of displays per screen is limited so that "individuals" can be recognized when viewing the display in all areas.
For image recording following procedure shall be adopted:

- CCTV recording method shall be DVR Based
- Memory to maintain a record of one month minimum, unless local laws require a longer storage time.
- Administration functions for user access and system auto recovery as required.
- Real time monitoring of all images as required.
- On screen display function as a standard requirement

6.4.1.1 Digital Network Video Recording System

All the outputs of the camera (visual live image) are in analogue form. Digital encoders convert them into digital form and send it to Network Video Recoder through LAN. The Digital Network Video Recorder Server has a Hard Disk of a high capacity which stores the images in a special format which cannot be altered / modified without being detected. It is password protected and hence does not allow unauthorized access to personnel. Storage capacity of NVR will be for 7 days. The control stations shall consist of work station fitted with 32" TFT flat screen monitor.

6.4.1.2 CCTV Cameras

Dome & Box Type Vari focal Camera:-

1 The camera shall be Analog Verifocal Indoor & Boxtype Outdoor
2 The camera shall be wide dynamic range of 60 db.
3 The Out door Box camera shall be housed in weather proof housing.
4 The camera shall be in PAL format. The varifocal lens shall be 2.8 to 10 mm.
5 The camera shall operate from 12VDC or Power
6 The camera shall maintain 30fps NTSC/ 25fps PAL video at 4CIF (704 x 570) digital video resolution (704x480 NTSC/ 704x576 PAL)
7 The camera shall digitize and compress the video using the latest in video compression technology and shall utilize MPEG-4 / H.264 video compression

8 The digital video shall provide dual encoded video streams to allow simultaneous and independent viewing and recording of live video at different frame rates and/or quality.
9 The camera shall provide the option to set each stream at a frame rate between 1-30 NTSC /1-25 PAL Cameras shall have wide dynamic range feature 60 db.
   a. The camera shall provide the option to set each stream at three (3) video resolutions:
      (i) CIF (352x240 NTSC/ 352x288 PAL)
      (ii) 2CIF (704x240 NTSC/ 704x288 PAL)
      (iii) 4CIF (704x480 NTSC/ 704x576 PAL)
      (iv) 0.5 (800 x 600 PAL)
10 The camera should be able to take lenses using the standard C / CS mounts.
11 The camera should support Day / Night Operation. The minimum illumination at 40 IRE, F1.2 should be 0.5 for day and 0.03 for night.
12 The camera scanning system should be at least 625 TVL.
13 The camera should be fitted with Veri-focal, manual iris, CS mount, 1/3" 5 – 50 mm lens.
14 The camera shall be comprise of a camera block "driver" which consist of a 1/3" CMOS
15 The camera shall maintain operation at temperature of 32° - 122° F (0°-50° C) in normal operation
16 The camera shall support SSL security protocol.

6.4.1.3 Installation Requirements

Cameras located at parking Main Entry shall be capable of clearly recording all vehicle license plate numbers and type of vehicles.
CCTV cameras and monitors shall be used in locations where this is perceived as having a particular advantage based on "local" conditions or requirements. However, vehicle monitoring shall utilize colour cameras at all times.
Picture quality of all cameras shall have a horizontal resolution of 480 lines minimum.
Camera locations shall insure that picture "glare" is not present at the CCTV monitors in the control room.
Cameras located at entry, lift lobbies, shall be capable of recording an identifiable image of all persons entering the area. For public areas, CCTV cameras shall normally be concealed in a dome shape enclosure. Some cameras shall have special protection (Cameras exposed to weatherproof shall be for exterior areas, vandal proof, etc.) depending on their locations.

6.4.2 Boom Barrier with RFID Tag System

The boom barrier shall be either 3m or 4.5 m or 6 m as per site, with opening time of not more than 2-4 seconds, with loop controllers, Sensors, boom controller, weatherproof exteriors armed manual override switch for VIP movement. The boom shall be operated on RFID Reader with Controllers and the car should have the TAGS for operating the automatic IN/OUT movements.

These shall be located at entrance gate and parking area.
Function:
Electromechanical drive with end position cushioning of the barrier boom via a sinusoidal motion sequence.

6 EXCLUSIONS:

The following items and activities have been excluded from the scope:

1. Civil work for foundations for fans, pumps, WTP, STP, cutting and finishing for openings in walls & slabs (Civil).
2. Civil works for Electrical Substation/Cable trenches etc. (Civil).
3. Floor water proofing (Civil).
4. Trenches with cover, sumps, drain channels, gratings, boom gates, sumps with cover, rain water harvesting wells (Civil).
5. False ceiling, boxing, supply & fixing of frames for mounting of grilles / diffusers, and all types of interior works (Interiors).
6. Supply & installation of head end equipment for Cable TV, Telephone Handsets, Computer/ Servers & related active networking components (Owner).
7. Sanitary fixtures and CP fittings (Owner).
8. Supply & Installation of electrical lighting fixtures inside apartments (Owner).
9. Supply installation of irrigation system, drainage of percolated water from terrace gardens & landscape areas. (Owner / Landscape).
10. Any kind of Liasioning work with Authorities (Liasioning contractor).
11. Temporary Construction Power etc. (Owner).
12. Deposit & Charges for Power Connections, TV & Telephone Connection, etc. (Owner).
13. Receipted charges for Pollution Control Board NOC, CFO approval for Fire detection system and approval of electrical installation by the Electrical Inspectorate, Deposits & fee for water supply connection, sewage connection and for storm water disposal connection (Owner).

7 ANNEXURES:

Sr. No.	Annexure No.	Description
		AIR CONDITIONING
1	ME-01_Sale	AC Calculation For Sale Tower Apartments
		ELECTRICAL
1	EL-01_Sale	Electrical Load Calculations
		PLUMBING & FIRE FIGHTING
1	PL-01_A	Water Demand Calculations for Sale Tower
2	PL-02_A	Water Balance Diagram for Non-Rainy Season for Sale Tower
3	PL-03_A	Water Balance Diagram for Rainy Season for Sale Tower
4	PL-04	MBBR STP Schematic
5	PL-05_A	Solar Hot Water System Capacity for Sale Tower
6	PL-06_A	RWH tank Capacity calculations for Sale Tower

END OF THE REPORT

To enhance and sustain the world's built, natural and social environments

S.NO.	DESCRIPTION	No. of Apartments	Builtup area sqft	Lighting W/Sq Ft.	Raw Power W/Sq Ft.	TCL of one apartment (kW)	Unit Diversity	Deamnd Load of one apartment	TCL of all Apartments	TDL of all apartments	Basbar Diversity	MD Load (kW)	DG Load (kW)	No of LT Meters
	Sale Tower - Apartment Load													
1	3 BHK	50.00	538.20			30.6	0.8	24.5	1531.5	1225.20	0.4	490.1	0.0	50
2	2 BHK	54.00	581.26			24.8	0.8	19.8	1337.6	1070.06	0.4	428.0	0.0	54
		104.00				55.4		44.3						
		TCL of Apartment loads of Sales Tower				**2869.1**								
		MDL of Apartment loads of Sales Tower				**918.1**								
	Common Area Load Details													

S.NO.	DESCRIPTION	TCL in(kW)	Demand Factor	MDL in (KW)	DG Load in (KW) Normal case - Power failure	DG Load in (KW) Fire case	Remarks	
1	All Floor Lift Lobby + Entrance lobby Lighting load	30	0.6	18	18	5.4	Considering approx. No. of light fixtures	100% Lighting & power Loads only will be provided with DG back-up in case of mainsfailure
2	Staircase Lihgitng load	20	0.6	12	12	12	Considering approx. No. of light fixtures	
3	Refuge Area + Fire break area Lighting load	10	0.6	6	6	6	Considering approx. No. of light fixtures	
4	Basement Lighting & Power Load	28.3	0.6	17.0	17.0	3.4	Lighitng - 0.2 watt /sq.ft. / Power - 0.5 watt/sq.ft.	
5	Plumbing + STP Load	121		74.00	74.0	-	Please refer separate Sheet for load back up.	
6	Fire Fighting load	654.0		54.0	54.0	486.0		
7	Solid Waste Management	20.00	0.6	12.00	12.0	-	Lump-Sum	
9	Counter lowering Device for Fire	15.0	0.6	9.00	9.0	9.0	Lump-Sum	
10	External Lighting + Façade+RG area	40	0.6	24	24	-		
11	Passenger Lifts(30kW x 4 Nos)	120	0.8	96	96	-		
12	Service lifts (1 Nos.)	30	0.8	24	24	30		
13	Club house - Lighting +Power load	35.0	0.8	28	28.0	5.6	Lump-Sum	
14	Club house - AC load	60	0.6	36.0	36.0	-	Please refer separate Sheet for load back up.	
15	Ventilation load - Basement + Pressurisation	89	0	35	35	84		
16	MISCELLANEOUS	100	0.6	60	60.0			
	Total Equipment Loads	**1371.8**		**505.0**	**505.0**	**641.4**		

Total Load Summary		
Tower TCL	**4240.9**	**kW**
Tower MDL	**1423.1**	**kW**
building Diversified load with 0.8 Overall Diversity	**1138.5**	**kW**
10% Additional load captured for future requirement in MDL	**1252.4**	**kW**
Transformer Load in kVA @ 0.8 PF	**1565**	**kVA**
Transformer Capacity with 85 % loading	**1842**	**kVA**

TRANSFORMER CAPACITY SELECTION : - 2 # 1000 kVA

DG Load for common area	**Normal Case**	**Fire Case**	
DG Load in Kw	**505.0**	**641.4**	**kW**
DG Load in kVA @ 0.8 PF	**631.3**	**801.7**	**kVA**
DG Capacity with 110 % loading- As per lodha policy	**694.4**	**881.9**	**kVA**

DG SET CAPACITY SELECTION : - 1 # 1010 kVA

Project Code :- PUND16016
Project : - Proposed Residential project near KEM, Parel
Apartment Load Sheet - Sale Tower (High End/Luxury)

Power Requirement for typical 3 BHK Apartment - (High End/Luxury)

		NO. OF POINTS																					Load in Watts																					Total Connected Load
SR. NO.	LOCATION	LIGHT POINT	STRIP LIGHT	WALL BRACKET LIGHT	CEILING FAN	EXHUST FAN	GENERAL 6A POINT	WATER PURIFIER	HOB	HOOD	DISH WASHER	FRIDGE	GEYSER	OVEN	MICROWAVE	WASHING MACHINE	AC POINT	TEL	TV POINT	INTERCOM	VDP	BELL PUSH	MOTION SENSER	LIGHT POINT	STRIP LIGHT	WALL BRACKET LIGHT	CEILING FAN	EXHUST FAN	GENERAL 6A POINT	WATER PURIFIER	HOB	HOOD	DISH WASHER	FRIDGE	GEYSER	OVEN	MICROWAVE	WASHING MACHINE	AC POINT	TEL	TV POINT	INTERCOM	VDP	BELL PUSH	MOTION SENSER	
																								60	10	60	60	60	200	100	100	500	1500	600	2000	2000	1000	1500	1500	0	0	0	0	0	0	
1	Living + Dining Room	6	0	3	2	0	5	0	0	0	0	0	0	0	0	0	2	1	1	0	1	0	0	360	0	180	120	0	1000	0	0	0	0	0	0	0	0	0	3000	0	0	0	0	0	0	4660
2	Passage	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180
3	Puja	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	260
4	Kitchen	2	3	0	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	120	30	0	60	60	400	100	100	500	1500	600	2000	2000	1000	0	0	0	0	0	0	0	0	8470
5	Utility	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	1500	0	0	0	0	0	0	0	1560
6	Store	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	260
7	Common Toilet	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	60	0	60	0	60	0	0	0	0	0	0	2000	0	0	0	0	0	0	0	0	0	0	2180
8	Bedroom 1	2	0	2	1	0	4	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	120	0	120	60	0	800	0	0	0	0	0	0	0	0	0	1500	0	0	0	0	0	0	2600
9	Bedroom 1 Toilet	1	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	60	0	60	0	60	200	0	0	0	0	0	2000	0	0	0	0	0	0	0	0	0	0	2380
10	Master Bedroom	3	0	2	1	0	4	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	180	0	120	60	0	800	0	0	0	0	0	0	0	0	0	1500	0	0	0	0	0	0	2660
11	Mater Bedroom Toilet	2	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	120	0	60	0	60	200	0	0	0	0	0	2000	0	0	0	0	0	0	0	0	0	0	2440
12	Bedroom 2	3	0	2	1	0	4	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	180	0	120	60	0	800	0	0	0	0	0	0	0	0	0	1500	0	0	0	0	0	0	2660
13	Walk in Wardrobe	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320
TOTAL No. of points /		**28**	**3**	**12**	**6**	**4**	**24**	**1**	**1**	**1**	**1**	**1**	**4**	**1**	**1**	**1**	**5**	**4**	**4**	**1**	**1**	**1**	**3**	**1680**	**30**	**720**	**360**	**240**	**4800**	**100**	**100**	**500**	**1500**	**600**	**8000**	**2000**	**1000**	**1500**	**7500**	**0**	**0**	**0**	**0**	**0**	**0**	**30630**

Power Requirement for typical 2 BHK Apartment - (High End/Luxury)

		NO. OF POINTS																					Load in Watts																					Total Connected Load
SR. NO.	LOCATION	LIGHT POINT	STRIP LIGHT	WALL BRACKET LIGHT	CEILING FAN	EXHUST FAN	GENERAL 6A POINT	WATER PURIFIER	HOB	HOOD	DISH WASHER	FRIDGE	GEYSER	OVEN	MICROWAVE	WASHING MACHINE	AC POINT	TEL	TV POINT	INTERCOM	VDP	BELL PUSH	MOTION SENSER	LIGHT POINT	STRIP LIGHT	WALL BRACKET LIGHT	CEILING FAN	EXHUST FAN	GENERAL 6A POINT	WATER PURIFIER	HOB	HOOD	DISH WASHER	FRIDGE	GEYSER	OVEN	MICROWAVE	WASHING MACHINE	AC POINT	TEL	TV POINT	INTERCOM	VDP	BELL PUSH	MOTION SENSER	
																								60	10	60	60	60	200	100	100	500	1500	600	2000	2000	1000	1500	1500	0	0	0	0	0	0	
1	Living + Dining Room	4	0	2	2	0	4	0	0	0	0	0	0	0	0	0	2	1	1	0	1	0	0	240	0	120	120	0	800	0	0	0	0	0	0	0	0	0	3000	0	0	0	0	0	0	4280
2	Passage	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120
3	Puja	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	260
4	Kitchen	1	3	0	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	60	30	0	60	60	400	100	100	500	1500	600	2000	2000	1000	0	0	0	0	0	0	0	0	8410
5	Utility	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	1500	0	0	0	0	0	0	0	1560
6	Store	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	260
7	Common Toilet	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	60	0	60	0	60	0	0	0	0	0	0	2000	0	0	0	0	0	0	0	0	0	0	2180
8	Bedroom 1	2	0	2	1	0	4	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	120	0	120	60	0	800	0	0	0	0	0	0	0	0	0	1500	0	0	0	0	0	0	2600
10	Master Bedroom	3	0	2	1	0	4	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	180	0	120	60	0	800	0	0	0	0	0	0	0	0	0	1500	0	0	0	0	0	0	2660
11	Mater Bedroom Toilet	2	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	120	0	60	0	60	200	0	0	0	0	0	2000	0	0	0	0	0	0	0	0	0	0	2440
TOTAL No. of points /		**18**	**3**	**8**	**5**	**3**	**17**	**1**	**1**	**1**	**1**	**1**	**3**	**1**	**1**	**1**	**4**	**3**	**3**	**1**	**1**	**1**	**2**	**1080**	**30**	**480**	**300**	**180**	**3400**	**100**	**100**	**500**	**1500**	**600**	**6000**	**2000**	**1000**	**1500**	**6000**	**0**	**0**	**0**	**0**	**0**	**0**	**24770**

LODHA KEM PAREL - RESIDENTIAL TOWER					
SR.NO.	AREA	Normal Mode		Fire Mode	
		Demand Load (KW)	Connected Load (KW)	Demand Load (KW)	Connected Load (KW)
1	Basement-2	13	35	34	35
2	Basement-1	13	35	34	35
3	Staircase Pressurization	0	0	2.99	3.5
4	Lift Well Pressurization	0	0	12.1	15.0
5	Lobby Pressurization	0	0	0.99	1.1
6	PLANT ROOM VENTILATION	8.62	13.05	0	0
	TOTAL LOAD (KW)	35	82	84	89

CLUB HOUSE - ASSUMED AC LOAD									
SR. NO.	FLOOR	TOTAL AREA (SQ.MTR)	TONNAGE (APPROX)	CFM (400CFM/TR)	SELECTED DUCTABLE UNIT			TOTAL	
					TR	CFM	QTY.	TR	CFM
1	CLUB / PROGRAM	298.0	21.4	8554	8.2	2542.0	4.0	32.8	10168
	ENTRANCE LOBBY	160.0	11.5	4593	8.2	2542.0	2.0	16.4	5084
	GYM	175.0	10.8	4306	8.2	2542.0	2.0	16.4	5084
	INDOOR GAME	57.0	3.5	1402	8.2	2542.0	1.0	8.2	2542
TOTAL			47					74	
								56.8	
OUTDOOR UNIT SELECTED								72	HP
Total Connected LOAD								60	KW

Project:-Lodha KEM Tower, Parel

Sub:- Electrcial Load sheet for PHE (Sale Tower)

Date:- 15-06-2016

Rev. 6

Sr. No	Equipment Description	Duty		Power (kw)	Working Pump	Total Pump	Electrical Demand load (kw)	Electrical Connected load (kw)	Location
		lpm	Head						
1	Filter Feed Pumps (Rain Water) (1W +1S)	150	30	1.2	1	2	1.50	3.00	Plumbing Plant Room
2	Domestic Transfer Pump to OHT (2W+1S)	260	135	9.6	2	3	18.00	27.00	Plumbing Plant Room
3	Flushing Transfer Pump to OHT (1W+1S)	203	125	6.9	1	2	7.50	15.00	Plumbing Plant Room
4	Terrace Booster Pump for Domestic (1W+1S)	240	15	1.0	1	2	1.10	2.20	Terrace Floor
5	Flushing Terrace Booster Pump (2W+1S)	190	15	0.8	2	3	2.20	3.30	Terrace Floor
6	Plumbing Plant Room Sump Pump (1W+1S)	180	20	2.5	1	2	3.00	6.00	Plumbing Plant Room
7	Irrigation Transfer Pump (1W+1S) (Approx.)						1.10	2.20	STP Plant Room
8	Terrace Booster Pump for Hot water (1W+1S)	220	15	0.9	1	2	1.10	2.20	Terrace Floor
9	Swimming pool & water bodies (Approx.)						15.00	20.00	Swimming Pool Plant Room
10	Swimming pool make-up water pump (1W+1S)	65	15	0.3	1.0	2	0.50	1.00	Swimming Pool Plant Room
11	STP (Approx.)						15.00	25.00	STP Plant Room
12	Lift Pit Sump Pump [(1W+1S)*2 Sets]	180	20	2.5	2	4	6.00	12.00	Lift Pits
13	Oil separator						2.00	2.00	At basement-3 car parking
	TOTAL LOAD						**74.0**	**120.9**	
						Rounded Off Value	**74**	**121**	

Project:-Lodha KEM Tower, Parel

Date:- 15-06-2016

Sub:- Electrcial Load sheet for FF (Sale Tower)

Rev. 5

Sr. No	Equipment Description	Duty		Power (kw)	Working Pump	Total Pump	Electrical Demand load (kw)	Electrical Connected load (kw)	Location
		lpm	Head						
1	Electrical Operated Hydrant Pump (1W)	2850	175	135.9	1	1	150.0	150.0	Fire Plant Room
2	Electrical Operated Sprinkler Pump (1W)	2850	175	135.9	2	2	300.0	300.0	Fire Plant Room
3	Electrical Operated Stand-By Pump (1No.)	2850	175	135.9	0	1	0.0	150.0	Fire Plant Room
4	Hydrant Jockey Pump (1W)	180	175	8.6	1	1	9.0	9.0	Fire Plant Room
5	Sprinkler Jockey Pump (1W)	180	175	8.6	1	1	9.0	9.0	Fire Plant Room
6	Booster Pump (1W+1S)	900	35	8.6	2	4	18.0	36.0	Terrace Floor & Fire Check Floor
	TOTAL LOAD						**486**	**654**	

Building Height	*Pressure Difference*	
	Reduced Operation (Stage 1 of a 2-Stage System)	Emergency Operation (Stage 2 of a 2-Stage System or Single Stage System)
	(Pa)	(Pa)
Less than 15 m	8	50
15 m or above	15	50

If possible, the same levels shall be used for lobbies and corridors, but levels slightly lower may be used for these spaces if desired. The difference in pressurization levels between staircase and lobbies (or corridors) shall not be greater than 5 Pa.

4.10.4 Pressurization system may be of two types:

a) Single-stage, designed for operation only in the event of an emergency, and

b) Two-stage, where normally a level of pressurization is maintained in the protected escape routes and an increased level of pressurization can be brought into operation in an emergency.

4.10.5 The normal air-conditioning system and the pressurization system shall be treated as an integral one, especially for a two-stage system. When the emergency pressurization is brought into action, the following changes in the normal air-conditioning system shall be effected:

a) Any re-circulation of air shall be stopped and all exhaust air vented to atmosphere;

b) Any air supply to the spaces/areas other than escape routes shall be stopped;

c) The exhaust system may be continued provided:

1) the positions of the extraction grills permit a general air flow away from the protected escape route entry;

2) the construction of the ductwork and fans is such that, it will not be rendered inoperable by hot gases and smoke; and

3) there is no danger of spread of smoke to other floors by the path of the extraction system which can be ensured by keeping the extraction fans running.

4.10.6 The pressurization system can be interconnected with the automatic/manual fire alarm system for actuation.

4.10.7 It will be desirable to have all the staircases in a building pressurized, if pressurization system is to be resorted to. The use of pressurized and naturally ventilated staircases in the same building may introduce difficulties and hence shall be avoided. Under no circumstances shall a pressurized staircase be connected by a corridor or lobby to an un-pressurized staircase. Wherever pressurized staircase is to be connected to un-pressurized area, the two areas shall be segregated.

4.11 External Stairs

An external staircase is desirable to be provided for high rise buildings.

External stairs, when provided shall comply the following:

4.11.1 External stairs shall always be kept in sound operable conditions.

4.11.2 All external stairs shall be directly connected to the ground.

4.11.3 Entrance to the external stairs shall be separate and remote from the internal staircase.

4.11.4 Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs.

4.11.5 The route to the external stairs shall be free of obstructions at all times.

4.11.6 The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance.

4.11.7 No external staircase, used as a fire escape, shall be inclined at an angle greater than 45° from the horizontal.

4.11.8 External stairs shall have straight flight not less than 1 250 mm wide with 250 mm treads and risers not more than 190 mm. The number of risers shall be limited to 15 per flight.

4.11.9 Handrails shall be of a height not less than 1 000 mm and not exceeding 1 200 mm. There shall be provisions of balusters with maximum gap of 150 mm.

4.11.10 The use of spiral staircase shall be limited to low occupant load and to a building not exceeding 9 m in height.

A spiral stair case shall be not less than 1 500 mm in diameter and shall be designed to give adequate headroom.

4.11.11 Unprotected steel frame staircase will not be accepted as means of escape. However, steel staircase in an enclosed fire rated compartment of 2 h will be accepted as means of escape.

Project	Lodha KEM Tower at Parel			Job ref.	
Title	WATER DEMAND			-	
				Annexure No	Rev. no.
Calc. by	Date	Check by	Date	-	R8-B
R.A.	16-Jun-16	U.Y.	16-Jun-16		

WATER DEMAND CALCULATIONS FOR SALE TOWER

SR. No.	DESCRIPTION	POPULATION PER UNIT	TOTAL POPULATION (APPROX.)	FLUSHING (A)		DOMESTIC (B)		TOTAL COLD WATER REQUIRE-MENT (A + B)	%AGE FLOW TO SEWER		TOTAL FLOW TO SEWER
				LPCD	LPD	LPCD	LPD	LPD	FLUSHING 80%	DOMESTIC 80%	
A	**SALE TOWER**										
1	**2BHK** (54 Apartments)	5	270	45	12150	90	24300	36450	9720	19440	29160
2	**3BHK** (50 Apartments)	5	250	45	11250	90	22500	33750	9000	18000	27000
3	**Visitors** (10% of population)		52	10	520	5	260	780	416	208	624
4	**Servants**	1	96	15	1440	30	2880	4320	1152	2304	3456
5	**Drivers** (25 for every 100 car parks)		36	10	363	5	181	544	290	145	435
6	PREMISES STAFF	L.S.	5	15	75	30	150	225	60	120	180
7	FILTER BACKWASH (Swimming Pool)	L.S.					4000	4000	0	3200	3200
8	**Club House** (1.5sqm/person)	311	208	10	2080	5	1040	3120	1664	832	2496
9	**Gym** (1.5sqm/person)	175	117	25	2925	20	2340	5265	2340	1872	4212
10	**Swimming Pool Make up (6% of Pool Capacity)**	L.S.					8807	8807	0	7046	0
	TOTAL				30803		66458		24642	53167	70763
	TOTAL ROUND UP				**31**		**67**		**25**	**54**	**71**

IRRIGATION WATER DEMAND CALCUALITON

As informed by Lodha (MOM dated 06-01-16)	1400	Sqm
Irrigation water demand	6	lit/sqm/day
Total irrigation water demand	8400	lit/day

Assumption

a	Gross water LPCD	135 ltrs/person
b	Gross water LPCD Club House	15 ltrs/staff
c	Gross water LPCD for Drivers & Visitors	15 ltrs/person
d	Gross water LPCD for Servants	45 ltrs/person
e	Irrigation water for demand	6 lit/sqm/day

UGT CAPACITY (DAILY WATER REQUIREMENT)	CUM	CUM SAY	Remarks
DOMESTIC	67.00	67	
FLUSHING	31.00	31	
IRRIGATION	8.40	8.5	1 day's requirement
STP	71.00	75	
Rain Water Tank	49.77	50	
Fire fighting	300.00	300	a.200m3 for Hydrant & Sprinkler b. 100m3 for Drencher

OHT CAPACITY (50% OF DAILY WATER REQUIREMENT)	CUM	CUM SAY	Remarks
DOMESTIC	29.10	30	
FLUSHING	15.50	15.5	
Fire fighting	10.00	10	(As per NBC-Amendment 2015)

Project	Lodha KEM Tower at Parel			Job ref.	
Title	WATER DEMAND			-	
				Annexure No	Rev. no.
Calc. by	Date	Check by	Date	-	R8-A
R.A.	16-Jun-16	U.Y.	16-Jun-16		

WATER DEMAND CALCULATIONS FOR SALE TOWER

SR. No.	DESCRIPTION	POPULATION PER UNIT	TOTAL POPULATION (APPROX.)	FLUSHING (A)		DOMESTIC (B)		TOTAL COLD WATER REQUIRE-MENT (A + B)	%AGE FLOW TO SEWER		TOTAL FLOW TO SEWER
				LPCD	LPD	LPCD	LPD	LPD	FLUSHING 95%	DOMESTIC 85%	
A	**SALE TOWER**										
1	**2BHK** (54 Apartments)	5	216	75	16200	165	35640	51840	15390	30294	45684
2	**3BHK** (50 Apartments)	5	200	75	15000	165	33000	48000	14250	28050	42300
3	**Visitors** (10% of population)		42	10	416	5	208	624	395	177	572
4	**Servants**	1	96	15	1440	30	2880	4320	1368	2448	3816
5	**Drivers** (25 for every 100 car parks)		36	10	363	5	181	544	344	154	498
6	PREMISES STAFF	L.S.	5	15	75	30	150	225	71	128	199
7	FILTER BACKWASH (Swimming Pool)	L.S.					4000	4000	0	0	0
8	**Club House** (2.5sqm/person)	311	125	10	1250	5	625	1875	1188	531	1719
9	**Gym** (2.5sqm/person)	175	70	25	1750	20	1400	3150	1663	1190	2853
10	**Swimming Pool Make up (6% of Pool Capacity)**	L.S.					8807	8807	0	0	0
	TOTAL				36494		86891		34669	62972	97640
	TOTAL ROUND UP				**37**		**87**		**35**	**63**	**98**

IRRIGATION WATER DEMAND CALCUALITON

As informed by Lodha (MOM dated 06-01-16)	1400	Sqm
Irrigation water demand	6	lit/sqm/day
Total irrigation water demand	8400	lit/day

Assumption

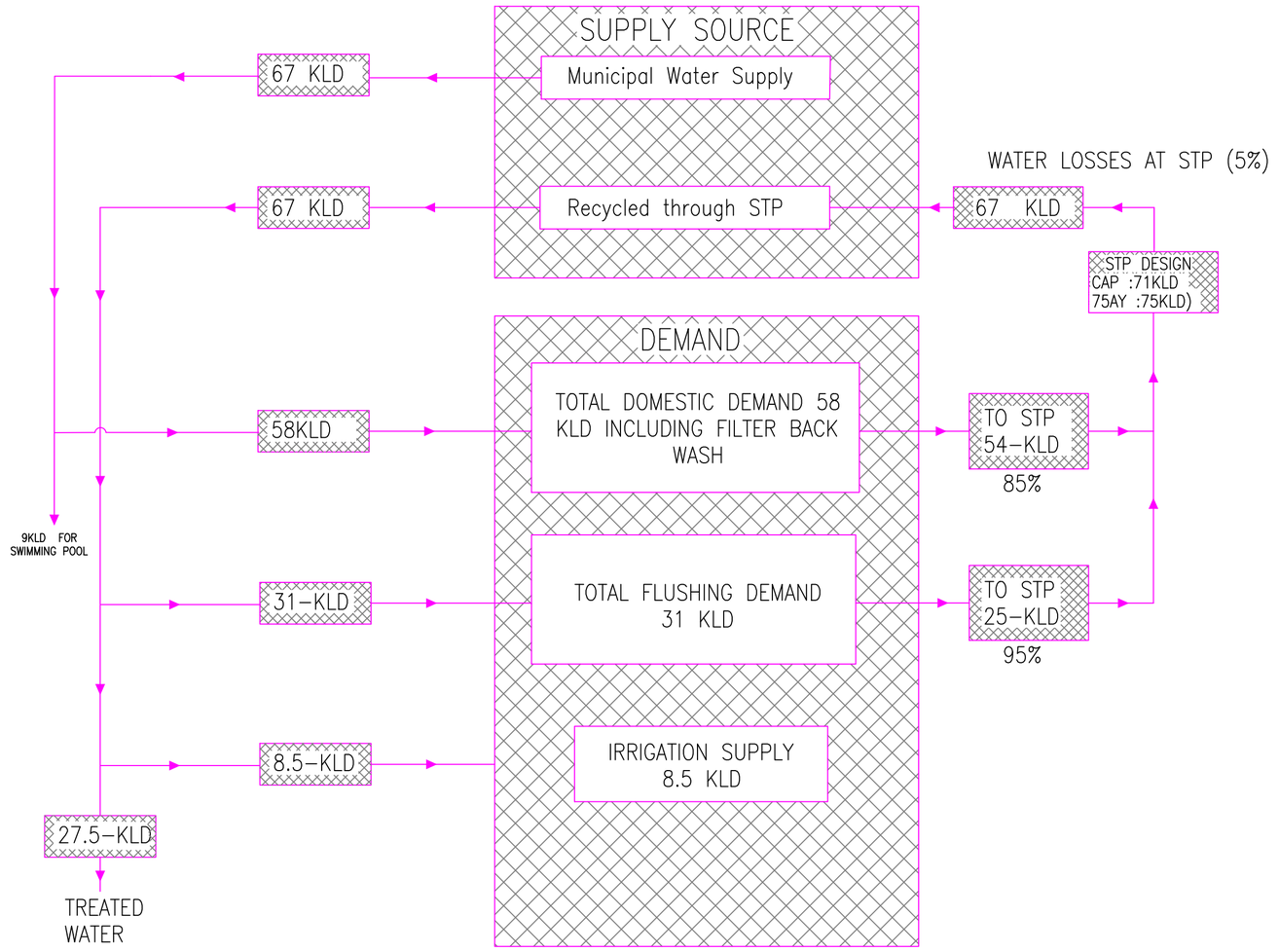
a	Gross water LPCD	240 ltrs/person
b	Gross water LPCD Club House	15 ltrs/staff
c	Gross water LPCD for Drivers & Visitors	15 ltrs/person
d	Gross water LPCD for Servants	45 ltrs/person
e	Irrigation water for demand	6 lit/sqm/day

UGT CAPACITY (DAILY WATER REQUIREMENT)	CUM	CUM SAY	Remarks
DOMESTIC	87.00	87	
FLUSHING	37.00	37	
IRRIGATION	8.40	8.5	1 day's requirement
STP	98.00	100	
Rain Water Tank	49.77	50	
Fire fighting	300.00	300	a.200m3 for Hydrant & Sprinkler b. 100m3 for Drencher

OHT CAPACITY (50% OF DAILY WATER REQUIREMENT)	CUM	CUM SAY	Remarks
DOMESTIC	39.10	40.0	
FLUSHING	18.50	18.5	
Fire fighting	10.00	10.0	(As per NBC-Amendment 2015)

WATER BALANCE DIAGRAM FOR PROPOSED USES
NON–RAINY SEASON (MCGM NORMS)

LODHA KEM SALE TOWER
PAREL, MUMBAI



KEY PLAN:

NORTH :

XX.XX.XX	XXXX	XX	XXXX
XX.XX.XX	XXXX	XX	XXXX
RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE

BACKGROUND DRAWING / REFERENCE DRAWING LIST

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REV.	DATE	DESCRIPTION	DRN.	CKD	APD.

REVISION

ARCHITECT:

Kapadia Associates Pvt.Ltd.
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CLIENT:

LODHA GROUP
Lodha Pavalion, Apollo Mills Compound,
N.M. Joshi Marg, Mahalaxmi, Mumbai - 4000011
Tel :- 0222302449 Fax :- 02223020693

PROJECT:

LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:

WATER BALANCING DIAGRAM
OF NON RAINY SEASON
FOR REHAB TOWER

CONSULTANTS:

AECOM
203,'Pride Portal' Bldg, Behind Int. Convention Centre,Off. Senapati Bapat Rd. Sr. No. 103, Bahiratwadi, Shivajinagar, Pune-411016 Maharashtra, INDIA
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DRAWING STATUS	CONCEPT DESIGN	SCHEMATIC DESIGN	DETAILED DESIGN	TENDER DRAWING
	☐	☐	☐	☐

SCALE:	N.T.S.	DESIGNED BY:	ROHIT
DATE:	14/03/2016	CHECKED BY:	USHA
DRAWN BY:	RA	APPROVED BY:	USHA

DRG. NO:

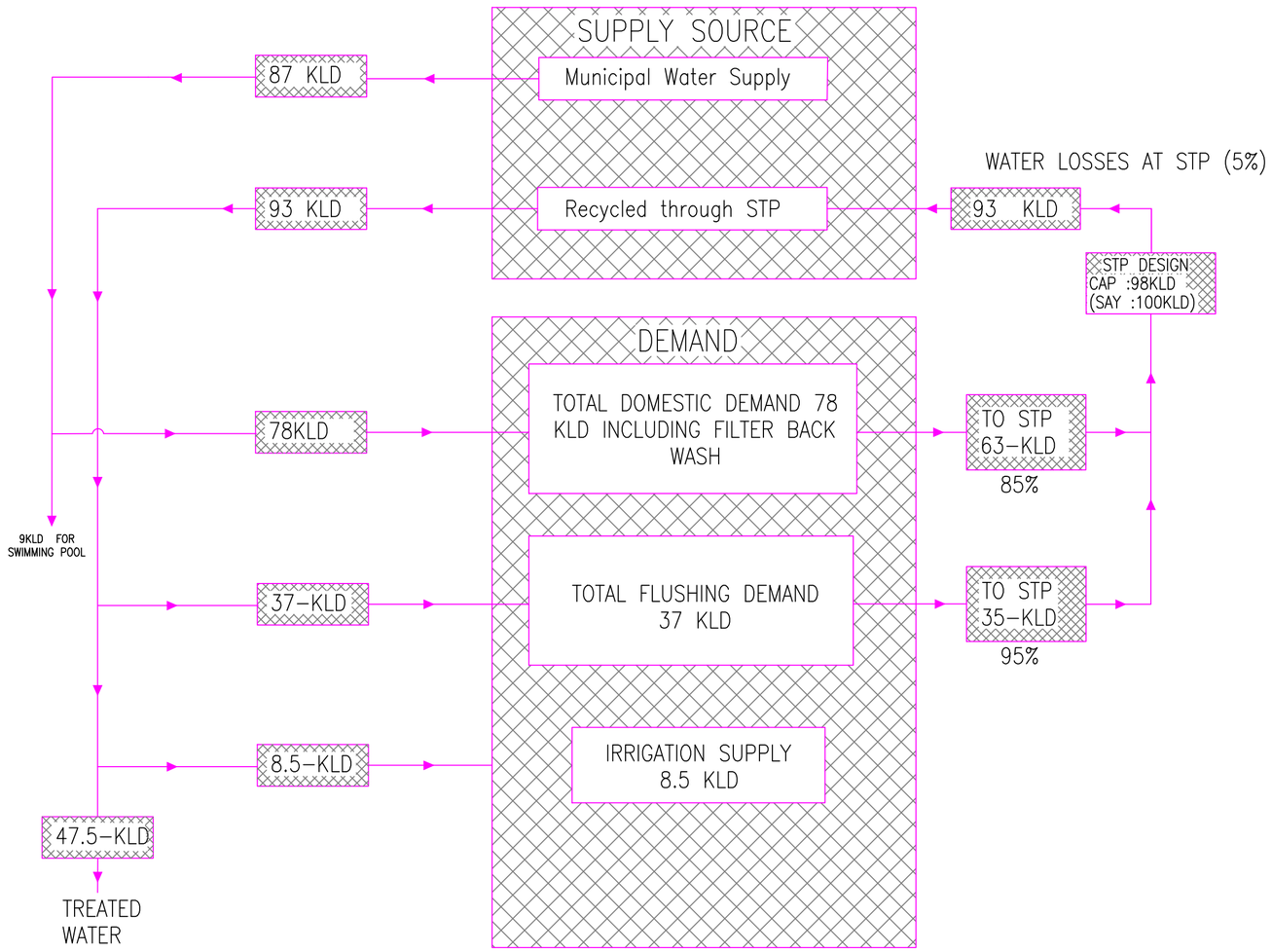
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SHT. NO.	NO.OF SHT.
1	4

WATER BALANCE DIAGRAM FOR PROPOSED USES
NON–RAINY SEASON (LODHA POLICY)

LODHA KEM SALE TOWER
PAREL, MUMBAI



KEY PLAN:

NORTH :

XX.XX.XX	XXXX	XX	XXXX
XX.XX.XX	XXXX	XX	XXXX
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Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:
WATER BALANCING DIAGRAM
OF NON RAINY SEASON
FOR SALE TOWER

CONSULTANTS:
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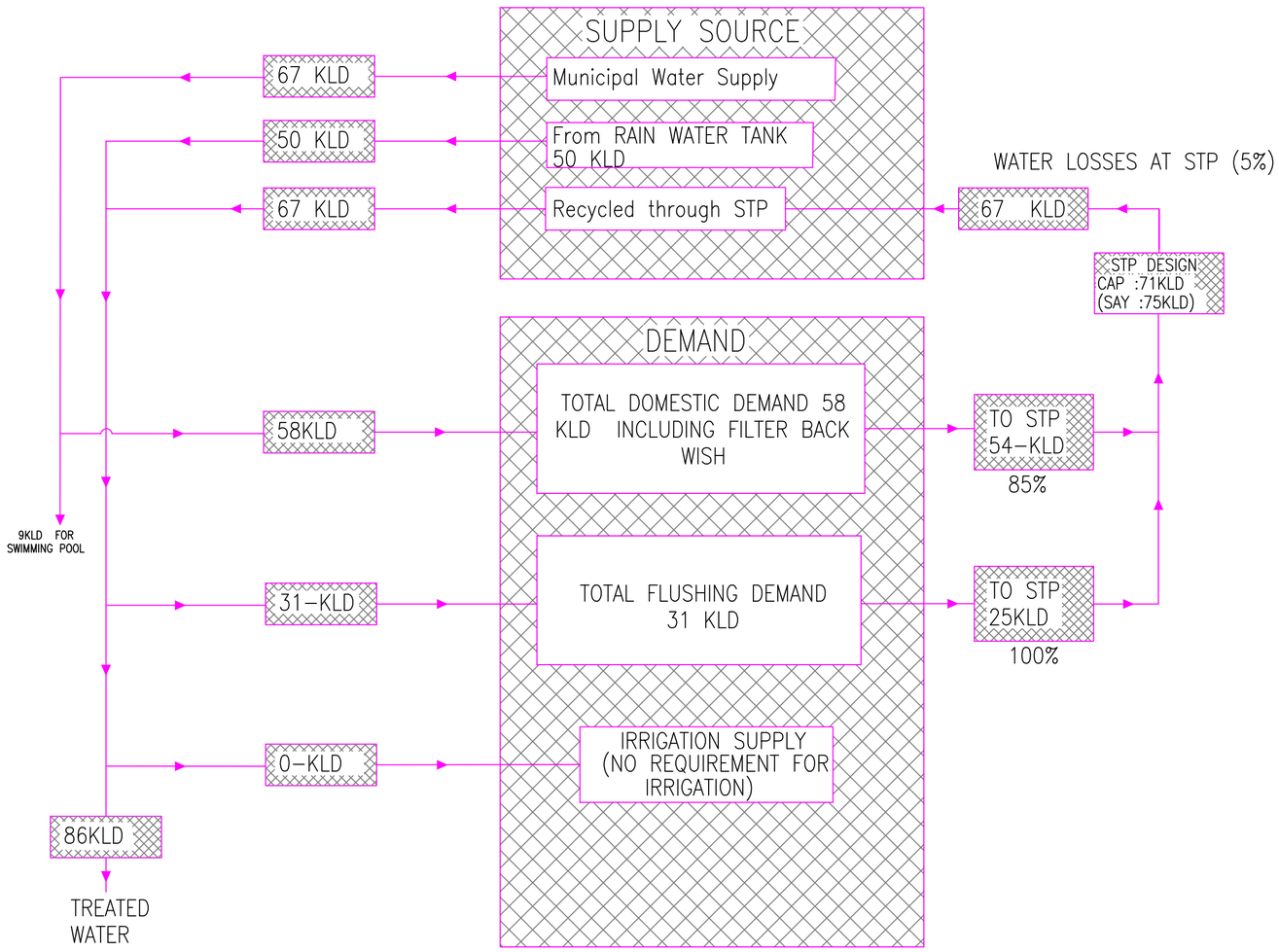
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SHT. NO.	NO.OF SHT.
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WATER BALANCE DIAGRAM FOR PROPOSED USES
RAINY SEASON (MCGM NORMS)

LODHA KEM SALE TOWER
PAREL, MUMBAI



KEY PLAN:

NORTH :

XX.XX.XX	XXXX	XX	XXXX
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RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE

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PROJECT:
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RESIDENTIAL TOWER

DRAWING TITLE:
WATER BALANCING DIAGRAM
OF RAINY SEASON
FOR REHAB TOWER

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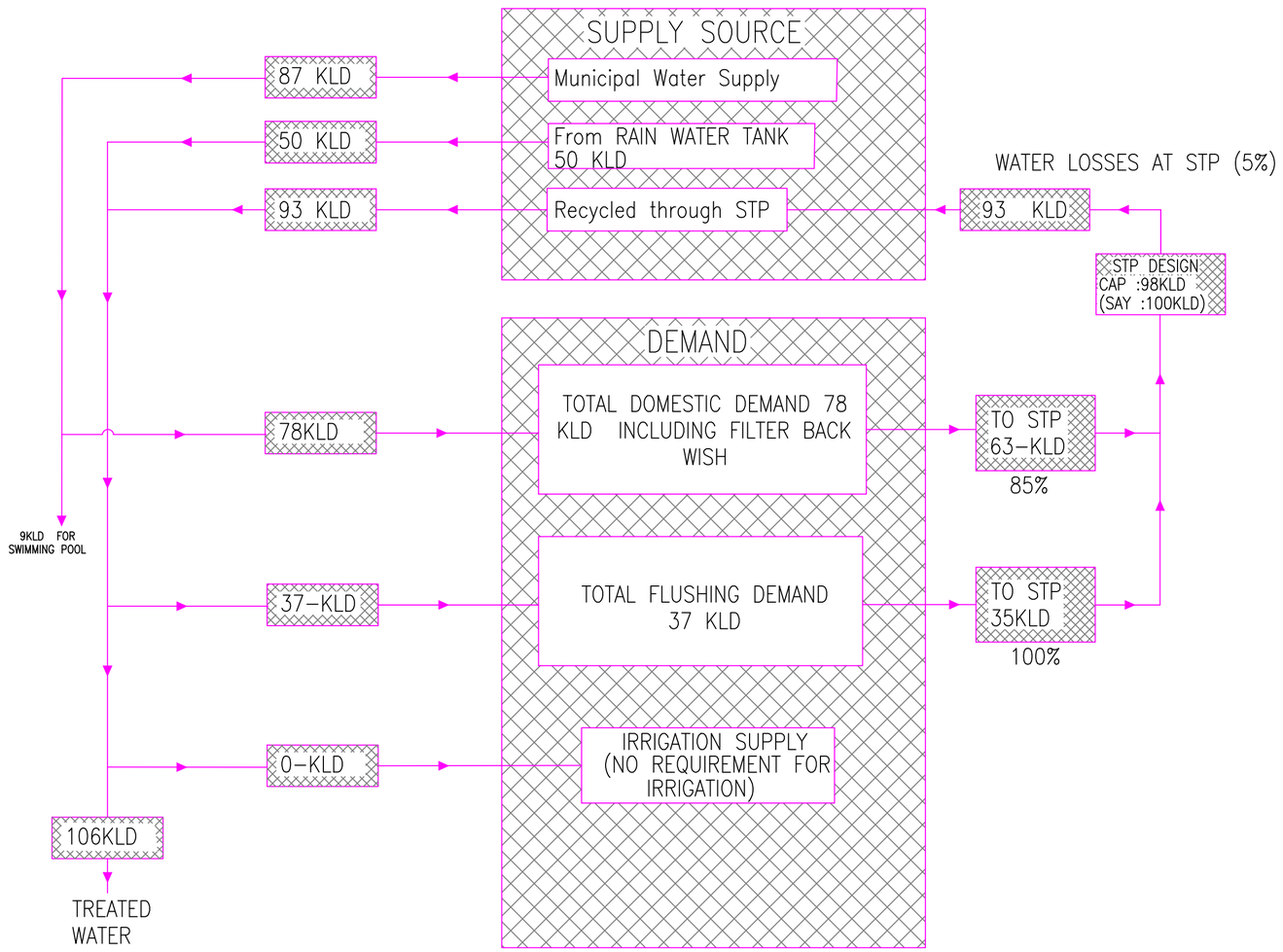
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2	4

WATER BALANCE DIAGRAM FOR PROPOSED USES
RAINY SEASON (LODHA POLICY)

LODHA KEM SALE TOWER
PAREL, MUMBAI



KEY PLAN:

NORTH :

XX.XX.XX	XXXX	XX	XXXX
XX.XX.XX	XXXX	XX	XXXX
RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE

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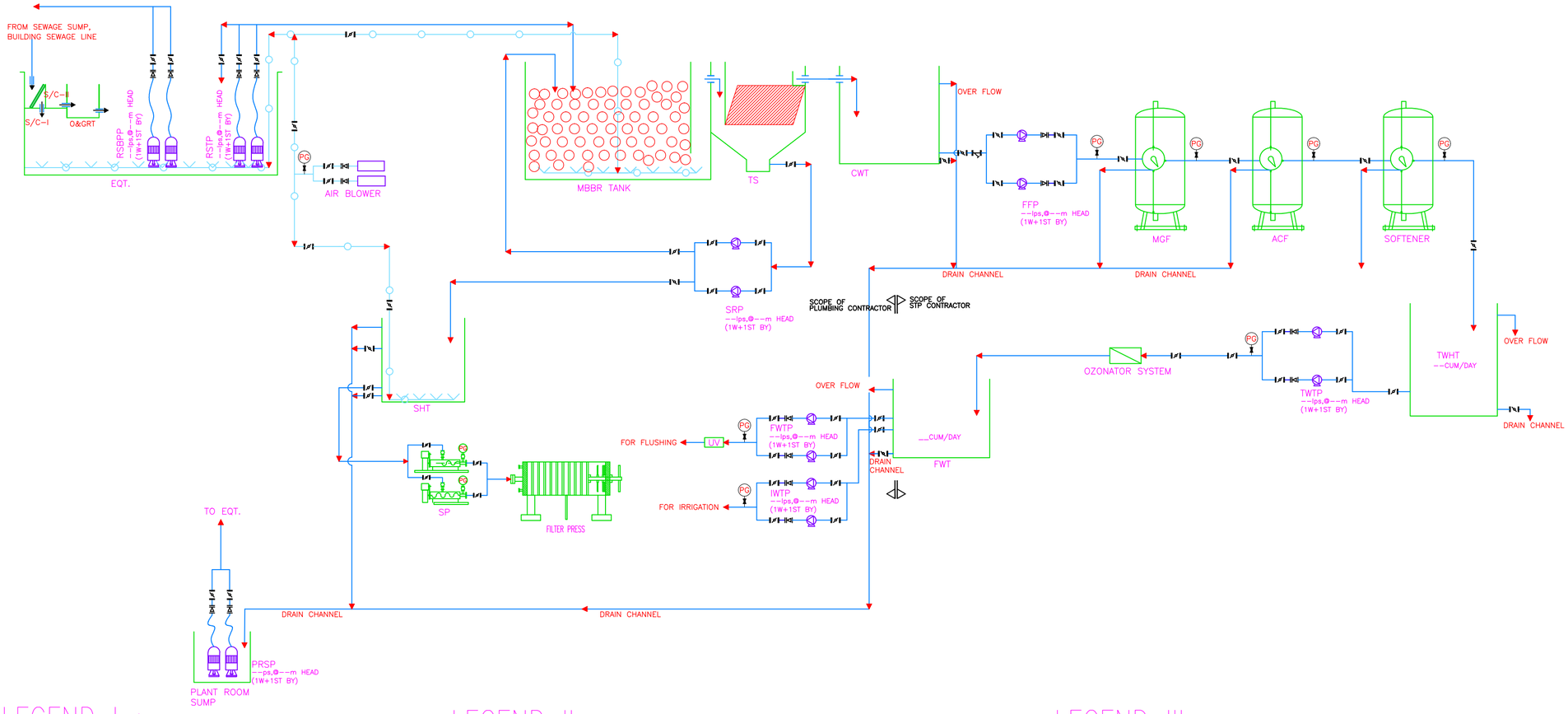
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DRAWN BY:	RA	APPROVED BY:	USHA

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LEGEND I :–

SYMBOL	DECRIPTION
S/C–I	SCREEN CHAMBER–I
S/C–II	SCREEN CHAMBER–II
O&GRT	OIL & GREASE REMOVAL TANK
EQT.	EQUALIZATION TANK
MBBR	MBBR TANK
TS	TUBE SETTLER
SHT	SLUDGE HOLDING TANK
F/I WT	FLUSHING/IRRIGATION WATER TANK

LEGEND II:–

S.NO	SYMBOL	DESCRIPTION
1	RSBPP	RAW SEWAGE BY PASS PUMP
2	RSTP	RAW SEWAGE TRANSFER PUMP
3	SRP	SLUDGE RECIRCULATION PUMP
4	FFP	FILTER FEED PUMP
5	IWTP	IRRIGATION WATER TRANSFER PUMP
6	FWTP	FLUSHING WATER TRANSFER PUMP
7	SP	SCREW PUMP
8	PRSP	PLANT ROOM SUMP PUMP
9	MGF	MULTI GRADE FILTER
10	ACF	ACTIVATED CARBON FILTER

LEGEND III–

SYMBOL	DECRIPTION
	FLANGE WITH BUTTERFLY VALVE
	BALL VALVE
	PUMP
	NON RETURN VALVE
	PRESSURE GAUGE
	Y TYPE STRAINER
	FLEXIBLE

KEY PLAN:

XXX	XXXX	XX	XXXX
RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE

BACKGROUND DRAWING

XXX	XXX	XXXX	XXX	XXX
REV.	DATE	DESCRIPTION	DRN.	CKD.

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N.M. Joshi Marg, Mahalaxmi, Mumbai - 4000011
Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL RESIDENTIAL TOWER

DRAWING TITLE:
FLOW DIAGRAM FOR STP
MOVING BED BIO REACTOR (MBBR)

AECOM
Unit No. 2, 8th Floor, Times Square, Wing A,
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Marol, Andheri (East), Mumbai - 400 059
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STATUS:	SCHEMATIC	NORTH :
SCALE:	NTS	
DATE:		
DESIGNED BY:		
DRAWN BY:	DRG. NO: PL-STP-01	
CHECKED BY:	PROJECT CODE :	
APPROVED BY:	SHT. NO. 01 / NO.OF SHT. 01 / REVISION NO. --	

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Project:	**KEM**		
Area of Project:	**SALE**		
Description:	**Hot water Capacity**		
		Date:	**17-Jun-16**

Building Type = Apartment (Top 5 floors)

	°F	°C
Inlet Water Temp (IWT)	59	15
Heater Discharge Temp (HDT)	140	60
Demand Factor	0.3	0.3
Storage Factor	1.25	1.25

Fixture	Quantity	GPH	Total GPH	Total LPH
Shower	19	30	570	2157.45
Maximum demand			570	2157.45

ASPE Plumbing engineering design handbook-volume 2, Table 6-1

Probable peak demand	647.2	LPH
Total storage required	809.0	Litres
Storage provided	0	Litres
Heat energy available	0	KW
Incoming Water	850.0	Litres
Heater to be sized for	**850.0**	**LPH**

500+375 LPD

Hot Water Genrated per panel **125 LPD**

Total No. of Solar Panel Required **7 Nos.**

Project	Lodha KEM Tower at Parel			Job ref.	
Title	RWH Tank Sizing			-	
				Annexure No	Rev. no.
Calc. by	Date	Check by	Date	-	R0
R.A.	12-Jan-16	U.Y.	12-Jan-16		

RAIN WATER HARVESTING TANK CALCULATION - SALE TOWER

As per average daily rainfall

Sr. No.	Description	Quantity	Unit
1	Annual rainfall	2.4	m
2	No. of rainy days	80	no.
3	Average daily rainfall	0.03	m/day
4	Terrace area for catchment	553	m2
5	Run off coefficient	0.9	-
6	Tank capacity as per daily run off generated	**15**	m3

As per peak hourly rainfall

Sr. No.	Description	Quantity	Unit
1	Intensity of peak rainfall	0.1	m/hr
2	Terrace area for catchment	553	m2
3	Run off coefficient	0.9	-
4	Tank capacity as per hourly run off generated	**50**	m3

Selected value - Higher of the 2; i.e. 50m3

LODHA PAREL : SALE TOWER DBR COMPLIANCE STATEMENT.						
SR. NO.	SYSTEM	DBR SECTION	LODHA COMMENT dt. 24th May & dt. 11th June 2016	AECOM COMPLIANCE (submission dated. 17th June 2016)	LODHA COMMENT dt. 28th June 2016	AECOM COMPLIANCE (submission dated. 7th July 2016)
1	Introduction	Preamble	Update no. of floors & no. of apartments as per latest arch. plans	COMPLIED. UPDATED IN DBR.	Delete the line with 23 floor of sale tower.	COMPLIED. UPDATED IN DBR.
2			Submit separate DBR for rehab & sale tower	Complied. Separate DBR is submitted for sale & Rehab tower.	Entrance lobby & Clubhouse shall be airconditions with DX system instead of VEF system.	COMPLIED. UPDATED IN DBR
3			Replace the word "Lodha Policy" with "Lodha guidelines "everywhere in the DBR	COMPLIED. UPDATED IN DBR	Mention RWH & STP & treamtment Capacity.	This has been mentioned in the separate section of plumbing system.
4			Sale Tower flats are High end type apartments.	COMPLIED. UPDATED IN DBR	Water Demand calculations.	Annexures of calculations are already submitted.
5					Clean agenet system.	Deleted.
1	HVAC	EXECUTIVE SUMMERY	SEPARATE DBR FOR SALE TOWER TO BE PROVIDED.	COMPLIED. SEPARATE DBR IS PROVIDED FOR REHAB AND SALE TOWER.	Toilet Exhaust - 50 CFM per toilet.	Please eloborate the comment.
2			SALE TOWER CONTAINS TWO BASEMENT	COMPLIED. UPDATED IN DBR	Why 45 PA considered, need to clarify.	NBC cutsheet is already submitted to Rupesh with clarification. Attached with mail again for ready reference.
3			CENTRALIZE EXHAUST FOR TOILETS IN CORE TO BE REVISED TO LOCALIZED EXHAUST WITH INLINE FAN	COMPLIED. UPDATED IN DBR WITH INLINE FAN AND CIRCULAR DUCTING.		
4			ENTRANCE LOBBY AND CLUB HOUSE AC SYSTEM TO CHANGE TO DX TYPE.	DRAWING COMMENTS REFERS VRF TYPE AC SYSTEM FOR ENTRANCE LOBBY AND CLUB AREA. WHEREAS FOR GYM AND INDOOR GAME ROOM DX TYPE SYSTEM IS PROPOSED.		
5			ONLY FIRE LIFT WELL TO BE PROVIDED WITH PRESSURIZATION SYSTEM.	COMPLIED. UPDATED IN DBR.		
6		DBR SECTION	CENTRALIZED EXHAUST SYSTEM FOR TOILETS SHOULD NOT BE CONSIDERED.	COMPLIED. UPDATED IN DBR.		
7			WHY 45PA IS CONSIDERED FOR LIFT LOBBY PRESSURIZATION	NBC CUTSHEET IS PROVIDED SEPARATELY AS BACK UP CALCULATIONS.		
8			VENTILATION SHALL BE PROPOSED TO DG ROOM AND SUBSTATION.	COMPLIED. LOUVERS ARE SHOWN FOR DG ROOM AND EXHAUST PROPELLER FAN FOR SUBSTATION ROOM.		
9			HEAT LOAD CALCULATION SHALL BE SUBMITTED TO ANNEXURE TO DBR.	COMPLIED. ANNEXURE ME-01 IS PROVIDED ALONG WITH DBR SHOWING COMPARISON OF TONNAGE FOR HAP HLC VS LODHA POLICY. SUGGESTED AC UNIT TONNAGE IS ALSO PROVIDED IN THE SAME.		
10			BASEMENT CAR PARK VENTILATION - AS PER LODHA POLICY AND LATEST AMENDMENT IN THE NBC.	COMPLIED. UPDATED IN DBR.		
11			SINGLE SPEED JET FAN INSTEAD OF DUAL SPEED JET FANS.	NOT Complied. TWO SPEED JET FANS ARE PROPOSED FOR ENERGY SAVING.		
12			BASEMENT PLUMBING PLANT ROOM SHALL HAVE DEDICATED EXHAUST SYSTEM.	COMPLIED. DEDICATED EXHAUST SHAFT AND FRESH AIR SHAFT PROPOSED FOR BASEMENT PLUMBING PLANT ROOM.		
13			ONLY FIRE LIFT WELL TO BE PROVIDED WITH PRESSURIZATION SYSTEM.	COMPLIED. UPDATED IN DBR.		
14			THERE IS NOT SERVICE FLOOR FOR FAN MOUNTING.	REVISED. TEXT EDITED.		
15			NO LIFT LOBBY PRESSURIZATION FOR TYPICAL FLOORS.	COMPLIED. ONLY LIFT LOBBIES IN THE BASEMENTS ARE PROPOSED WITH PRESSURIZATION SYSTEM.		
1	Electrical	DBR SECTION	Transformer rating TO BE UPDATED AS 1000 KVA.	COMPLIED. UPDATED IN DBR.		
2			Only inverter to be considered & 25% emergency lighting & 100% staircase lighting to be considered on inverter back up.	COMPLIED. UPDATED IN DBR.		
3			No bus duct to be proposed as per lodha policy for building below 125m height.	Complied. Description of distribution system is updated in DBR.		
4			FS/PH120 cables to be considered for fire survival cables.	COMPLIED. UPDATED IN DBR.		
5			Final DB & control panels will be of form 2	COMPLIED. UPDATED IN DBR.		
6			Up to 800A rating breakers will be MCCB.	COMPLIED. UPDATED IN DBR.		
7			All cable trays will have 10% spare space instead of 25%	COMPLIED. UPDATED IN DBR.		
8			Separate meter for STP to be proposed.	COMPLIED. UPDATED IN DBR.		
9			No. of earth pits to be indicated & earth pit schedule to be prepared.	Will be provided separately.		
10			Add IS 3043 code in earthing section	COMPLIED. UPDATED IN DBR.		
11			Neutral earthing cable be copper or GI	COMPLIED. UPDATED IN DBR.		
12			Copper earth wire for PVC insulated YG wire to be used.	COMPLIED. UPDATED IN DBR.		
13			25% of common area lighting to be considered as emergency lighting.	COMPLIED. UPDATED IN DBR.		
14			PVC conduits to be considered for concealed wiring.	COMPLIED. UPDATED IN DBR.		
			Early streamer type lightning protection to be removed.	COMPLIED. Deleted from DBR.		
		Calculations	Transformer & DG set not to be loaded beyond 85% as per lodha policy	COMPLIED. UPDATED IN DBR.		
			Diversity to be considered as per lodha policy	COMPLIED. UPDATED IN DBR.		
			25% of common area lighting & 100% staircase lighting to be considered as emergency lighting.	COMPLIED. UPDATED IN DBR.		
			Overall Diversity Factor to be 0.8	COMPLIED. UPDATED IN DBR.		
15			Power factor =0.8 & 85% loading on transformer	COMPLIED. UPDATED IN DBR.		
1	Plumbing	EXECUTIVE SUMMERY	Mention RWH tank & STP Capacity & Treatment type	Mention in the separate section of DBR.		
2			Update capacities as per latest arch. dwgs.	COMPLIED. UPDATED IN DBR.		
3			Clean agent system not required.	COMPLIED. UPDATED IN DBR.		
4		DBR SECTION	DO not mention lodha policies as a reference.	As these being very important documents referred for all the calculations & space planning. These has to be mentioned for future reference. We suggest to keep the same as it is.		
5			Add hot water in design principles.	COMPLIED. UPDATED IN DBR.		
6			Strom & rain water system to be described in simple language.	COMPLIED. UPDATED IN DBR.		
7			Provide calculation/ reference for RWH tank capacity.	COMPLIED. UPDATED IN DBR.		
8			Mention about all the calculations like pump flow, head etc.	COMPLIED. UPDATED IN DBR. MENTIONED CALCULATION BASIS & FORMULAE FOR WATER DISTRIBUTION SYSTEM.		
9			HOT water calculations to be provided for top 5 floors	COMPLIED. UPDATED IN DBR.		
10			Check & correct the annexure nos.	COMPLIED. UPDATED IN DBR.		
11			Irrigation water requirement to be considered as 6 lit/sq.m of green area	COMPLIED. REVISED IN WATER DEMAND CALCULATION AND UPDATED IN DBR.		
12			Update all calculations as per revised no. of floors.	COMPLIED. UPDATED IN DBR.		
13			Domestic water tanks to be divided into two compartments to store one day water demand.	COMPLIED. UPDATED IN DBR.		
14			Mention about location & capacity of irrigation tank	COMPLIED. MENTIONED IN DBR.		
15			Mention about PRV requirement in water supply distribution system	COMPLIED. UPDATED IN DBR.		
16			Mention about storm water drainage. Horizontal transfer of pipes (if any). Describe sump & pumps.	STROM WATER DRAINAGE ELABORATED IN RESPECTIVE SECTION.		
17			Correct the intensity of rainfall (100mm.hr)	COMPLIED. UPDATED IN DBR.		
18			Provide back for coefficient & velocity considered.	COMPLIED. REFERENCE DOCUMENTS MENTIONED IN DBR.		
19			Provide calculations for 50 Cu.m capacity.	COMPLIED. UPDATED IN DBR.		
20			Provide separate list of MOC for rehab & sale.	Complied. Updated in separate DBR.		
21			Specify insulation material for hot water supply pipes.	COMPLIED. UPDATED IN DBR.		
1	Fire Fighting	DBR section	Mention occupancy type of rehab & sale building	COMPLIED. MENTIONED IN DBR.		
2			Mention about tank feeling & draw out connection as well.	COMPLIED. UPDATED IN DBR.		
3			Do not provide diesel pump as mentioned in lodha policy.	COMPLIED. UPDATED IN DBR.		
4			Mention about type of pumps.	COMPLIED. MENTIONED IN DBR.		
5			Provide calculations for pump head for low & high zones.	These will be provided in DD stage of the project.		
6			There are no compartment in fire hydrant cabinet. Please check.	Complied & corrected in DBR.		
7			Do not provide drencher system.	As discussed on phone with Lodha MEP Team, Drencher system to be considered.		
8			Sprinkler system description	COMPLIED. DESCRIPTION FOR SPRINKLER SYSTEM CHANGED AS PER LODHA GUIDELINES.		
1	Extra Low voltage system	DBR SECTION	Use Smoke detector instead of multi-criteria detectors.	COMPLIED. UPDATED IN DBR.		
2			Heat detectors will be fixed type.	COMPLIED. UPDATED IN DBR.		
3			Only inverter will be used as a back up. UPS not be used.	COMPLIED. UPDATED IN DBR.		
4			FS/PH120 cables to be used instead of FRLS armoured cables.	COMPLIED. UPDATED IN DBR.		
5			CCTV camera type should be analogue.	COMPLIED. UPDATED IN DBR.		

MEP DWG LIST:

1. FLOOR PLANS
   - BASEMENT LEVEL
   - GROUND LEVEL
   - MEZZANINE LEVEL
   - CLUB LEVEL
   - TYPICAL FLOOR LEVEL
   - REFUGE LEVEL
   - SPECIAL FLOORS

4 CARS AT LOWER GROUND LEVEL

SPACE FOR RAIN WATER TREATMENT PLANT & RWH TANK CAP.=50.00 KLD. WT. HT.=5.20M.

MEP SPACE 24 SQM

PUMP ROOM BELOW

4850

2000

1000

2438

12 STACK PARKING AVAILABLE

6 M WIDE DRIVEWAY

6 M WIDE RAMP [1:10.5] FROM PO LEVEL

DN FROM PO LEVEL

UP TO PO LEVEL

-3525

-3225

-2500

-2150

6 M WIDE RAMP [1:18]

B1 CAR PARKING 70 CARS + 4 CARS AT LG LEVEL

FAN ROOM 23 SQM

EXHAUST CUT-OUT 1800 PER MEPO

EXHAUST TUNNEL DOWNTO TERRACE

PODIUM LINE ABOVE

2.9 SQM (B2)

3 SQM (B1)

1800

1

2

3

4

ø1400MM DUAL SPEED SMOKE SPILL AXIAL FAN 18700 CFM AT NORMAL SPEED &: 37400 CFM AT FULL SPEED FOR BASEMENT EXHAUST (OPERATING WEIGHT – 900KG. APPROX)

FULL HEIGHT OPENING / WIRE MESH / LOUVERS REQUIRED FOR EXHAUST AIR.

1800 X 1800 (3.24 SQ.MTR) CUTOUT FOR BASEMENT-1 VENTILATION.

VELOCITY IN NORMAL MODE : 536 FPM

VELOCITY IN FIRE MODE : 1072 FPM

VELOCITY @ 30ACPH EXHAUST : 2144 FPM

1450 x 1450 PRESSURIZATION SHAFT (2.1SQM)

1200x600 DUCT FOR STAIRCASE PRESSURIZATION. ~ 4400 CFM

SHAFT FOR STAIRCASE PRESSURIZATION. (MASONRY SHAFT SHALL BE USED AS DUCT FOR PRESSURIZATION)

TRANSFER OF SHAFT AT B1 TOP LEVEL

UP

DN

RAMP UP

SEWER SUMP

1000 x 1000

SL 01 2800 x 2800 9'2" x 9'2"

1525

1275

450

FIRE FIGHTING SHAFT

LOBBY

LV SHAFT ELECTRICAL SHAFT B1-COMMON AREA-LPDB

1200 PRESSURIZATION SHAFT (1.8 SQM)

RL 01 2375 x 2700 7'10" x 8'10"

600X600 SHAFT FOR LOBBY PRESSURIZATION. (MASONRY SHAFT SHALL BE USED AS DUCT FOR PRESSURIZATION)

1535

2075

FWS RISING MAIN PIPE

DWS RISING MAIN PIPE

FA CUT-OUT FROM GROUND

1050X750 SHAFT FOR PUMP ROOM MAKE-UP AIR UP TO PO LEVEL

DRIVER'S TOILET / LOUNGE 30 SQM

2500

FA CUT-OUT

2000

FA SHAFT 6.3SQM

FA SHAFT 8.1SQM

FA FAN CONTROL PANEL

#1400MM DUAL SPEED FRESH AIR FAN. 18700 CFM AT NORMAL SPEED & 37400 CFM AT FULL SPEED FOR BASEMENT & PUMP ROOM MAKE-UP AIR. (OPERATING WEIGHT – 900KG. APPROX)

VERTICAL CONC. PEDT. DUCT

PLANT ROOM DRAINAGE SUMP PIPE

EXTERNAL FIRE HYDRANT PIPE

FIRE BRIGADE BREACHING INLET

TANKER WATER INLET

FIRE BRIGADE DRAW OUT/ ADDITION CONNECTION

FIRE BRIGADE BREACHING INLET FOR SPRINKLER & BUILDING HYDRANT

MUNICIPAL INLET

+0.3m LVL.

WATER LEVEL

RWH TANK 30 SQ.M

1100

1900

-3.0m LVL.

-3.825m LVL. (B1)

WATER LEVEL

RWH PLANT ROOM 30 SQ.M

3325

-6.575m LVL. (B2)

5760

SECTION THROUGH RWH TANK

FLOOR PLAN: BASEMENT B1

CAR PARKING - 70+4 [LG LVL] = 74 CARS

KEY PLAN:

NORTH :

NOTES / LEGEND:

10.05.16	20160510_SALE TOWER_25 FLOORS		XX		ARCH.
26.02.16	20160226_SALE TOWER & PARKING		XX		ARCH.
RECEIVED DATE	DRAWING No.		REV.		DISCIPLINE

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REVISION

ARCHITECT:
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CLIENT:
LODHA GROUP
Lodha Pavalion, Apollo Mills Compound, N.M. Joshi Marg, Mahalaxmi, Mumbai - 40000011
Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN OF BASEMENT-B1 LEVEL FOR SALE BUILDING

CONSULTANTS:
AECOM
203,'Pride Portal' Bldg, Behind Int. Convention Centre,Off. Senapati Bapat Rd. Sr. No. 103, Bahiratwadi, Shivajinagar, Pune-411016 Maharashtra, INDIA
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F: +91 20 25630064
www.aecom.com

DRAWING STATUS	CONCEPT DESIGN	SCHEMATIC DESIGN	DETAILED DESIGN	TENDER DRAWING
	■	□	□	□

SCALE:	1:100	DESIGNED BY:	ROHIT
DATE:	29.01.2016	CHECKED BY:	ROHIT
DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

DRG. NO:
DWG-10-SALE-MEP-BF01-0003

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SHT. NO. | NO.OF SHT.

SPACE FOR RAIN WATER TREATMENT PLANT & RWH TANK CAP.=50.00 KLD. WT. HT.=5.20M.

MEP SPACE 24 SQM

PUMP ROOM

RWHP CONTROL PANEL

ROLLING SHUTTER

4850 2000 2400 2885 1500

52 55 60

42 40 43 45 35

-6275

6 M WIDE RAMP [1:18]

1200X600 GRILLE FOR STAIRCASE PRESSURIZATION - 4400 CFM

SHAFT FOR STAIRCASE PRESSURIZATION (MASONRY SHAFT SHALL BE USED AS DUCT FOR PRESSURIZATION)

1450

STAIR PRESSURIZATION SHAFT (3SQM)

TRANSFER OF SHAFT AT B1 TOP LEVEL

UP

-5975

RAMP UP

UP DN

SL 01 2800 x 1800 9'2" x 6'

1825 1275 450

FIRE FIGHTING SHAFT

LV, SHAFT ELECTRICAL SHAFT B2+COMMON AREA=LPDB

LOBBY

-5000

RL 01 2375 x 2700 7'10" x 8'10"

RL 02 2375 x 2700 7'10" x 8'10"

RL 03 2375 x 2700 7'10" x 8'10"

RL 04 2375 x 2700 7'10" x 8'10"

1200X600 SHAFT FOR LOBBY PRESSURIZATION (MASONRY SHAFT SHALL BE USED AS DUCT FOR PRESSURIZATION)

LOBBY PRESSURIZATION SHAFT (3.00 SQM)

6 M WIDE DRIVEWAY

6 M WIDE DRIVEWAY

12 15 51

B2 CAR PARKING 72 CARS

-4900

-6275

6 M WIDE RAMP [1:18]

-4900

-2300

10 11 30 25 20

FAN ROOM 23 SQM

EXHAUST FAN CONTROL PANEL

EL.-CUT OUT FOR PLUMBING PLANT ROOM CABLES

EXHAUST CUT-OUT OVER MEP

SODIUM LINE ABOVE

Ø1400MM DUAL SPEED SMOKE SPILL AXIAL FAN 18700 CFM AT NORMAL SPEED & 37400 CFM AT FULL SPEED FOR BASEMENT EXHAUST. (OPERATING WEIGHT - 800KG. APPROX)

2.5 SQM [2A] 3 SQM [3]

FULL HEIGHT OPENING / FIRE MESH / LOUVERS REQUIRED FOR EXHAUST AIR.

1800 X 1800 (3.24 SQ.MTR) CUTOUT FOR BASEMENT-2 VENTILATION.

VELOCITY IN NORMAL MODE : 536 FPM

VELOCITY IN FIRE MODE : 1072 FPM

VELOCITY @ 30ACPH EXHAUST : 2144 FPM

EQUIPMENT CUTOUT WITH REMOVABLE SLAB IN B3 FLOOR LVL. SLAB

2000

1 5

MUNICIPAL INLET

FIRE BRIGADE BREACHING INLET FOR SPRINKLER & BUILDING HYDRANT

FIRE BRIGADE HEAVY DUTY HOOPER CONNECTION

TANKER WATER INLET

FIRE BRIGADE BREACHING INLET

EXTERNAL FIRE HYDRANT PIPE

FIRE RISING MAIN PIPE

PLANT ROOM DRAINAGE SUMP PIPE

2000 450 450 2000

1200X600 SHAFT FOR PUMP ROOM MAKE-UP AIR UP TO PA LEVEL

DRIVER'S TOILET / LOUNGE 30 SQM

FA CUT-OUT

FWS RISING MAIN PIPE

DWC RISING MAIN PIPE

SEC A

SEC B

SEC C

SEC A

2000

FA SHAFT 2.5SQM

FA FAN CONTROL PANEL

Ø1400MM DUAL SPEED FRESH AIR FAN, 18700 CFM AT MORNING SPEED & 37400 CFM AT FULL SPEED FOR BASEMENT & PUMP ROOM MAKE-UP AIR. (OPERATING WEIGHT - 800KG. APPROX)

MOTOR COIL PROTECT

FLOOR PLAN: BASEMENT B2

CAR PARKING - 72 CARS

KEY PLAN:

NORTH :

NOTES / LEGEND:

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CLIENT:
LODHA GROUP
Lodha Pavalion, Apollo Mills Compound, N.M. Joshi Marg, Mahalaxmi, Mumbai - 4000011
Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN OF BASEMENT-B2 LEVEL FOR SALE BUILDING

CONSULTANTS:
AECOM
203,'Pride Portal' Bldg, Behind Int. Convention Centre,Off. Senapati Bapat Rd. Sr. No. 103, Bahiratwadi, Shivajinagar, Pune-411016 Maharashtra, INDIA
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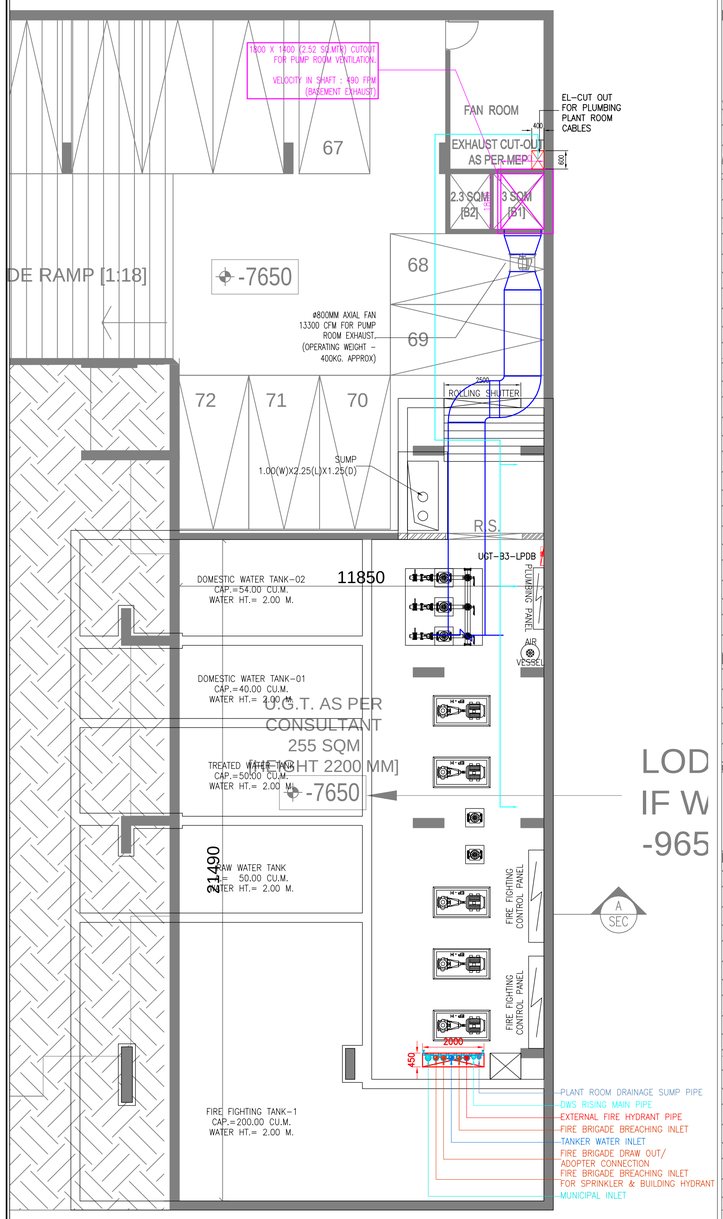
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SCALE:	1:100	DESIGNED BY:	ROHIT
DATE:	29.01.2016	CHECKED BY:	ROHIT
DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

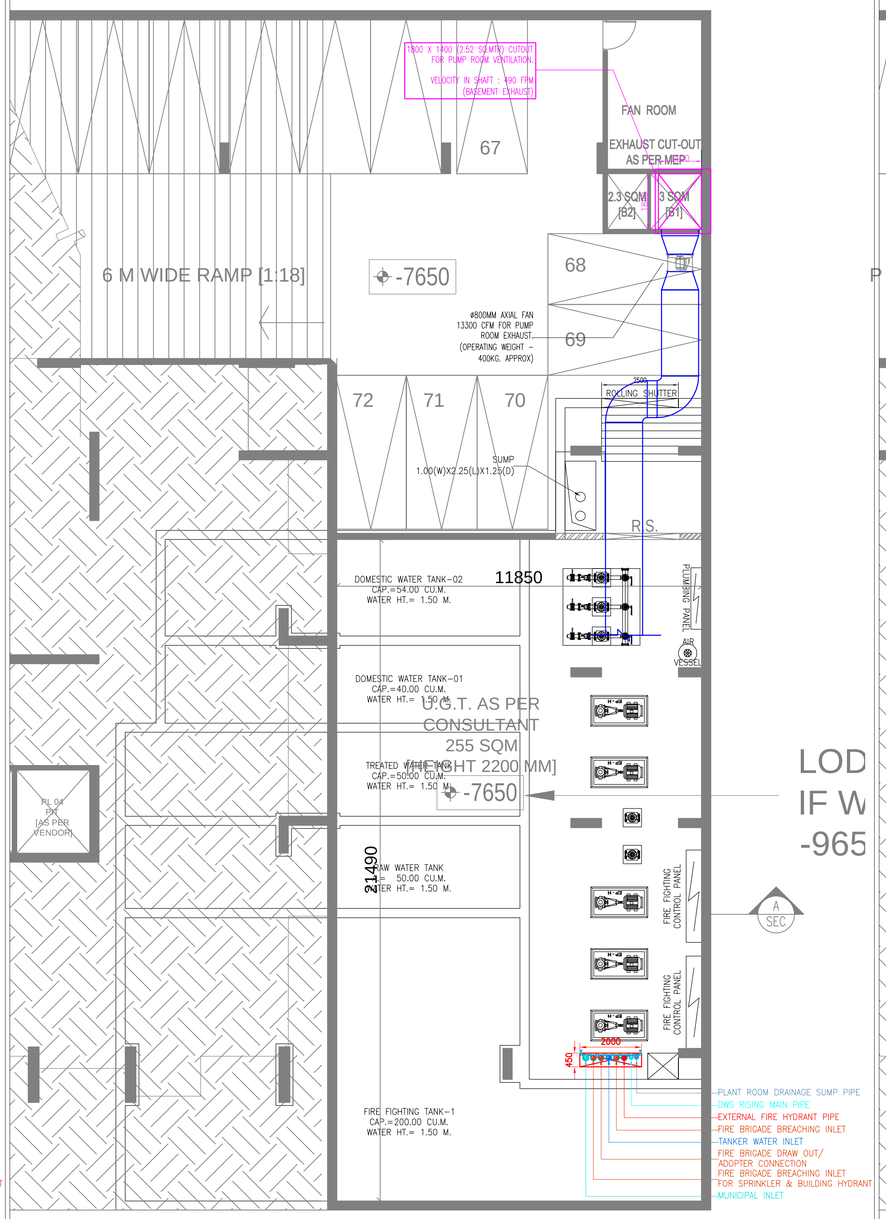
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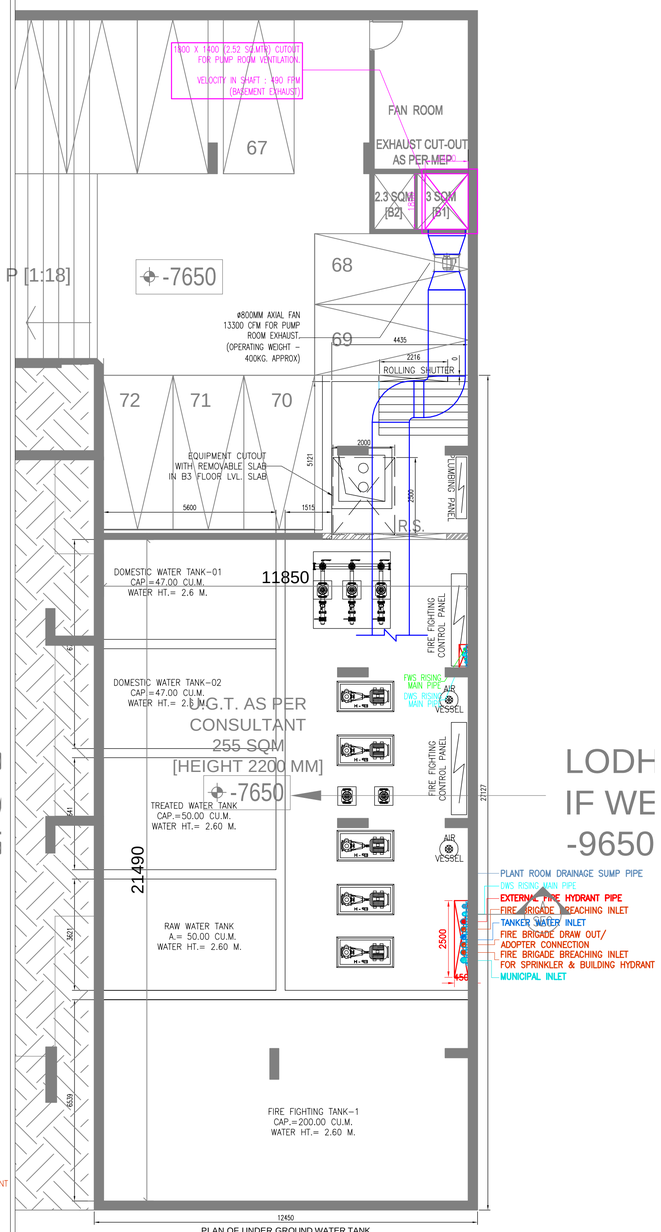
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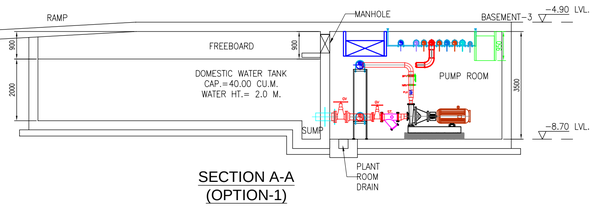
PLAN OF UNDER GROUND WATER TANK
(OPTION-1)



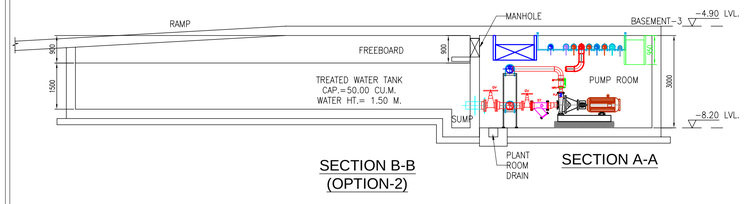
PLAN OF UNDER GROUND WATER TANK
(OPTION-2)



PLAN OF UNDER GROUND WATER TANK
(OPTION-3)

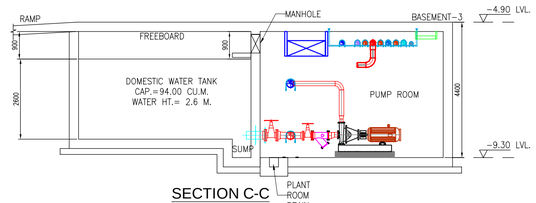


SECTION A-A
(OPTION-1)



SECTION B-B
(OPTION-2)

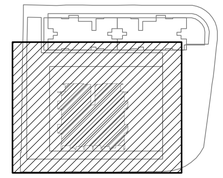
SECTION A-A



SECTION C-C
(OPTION-3)

KEY PLAN:

NORTH :



NOTES / LEGEND:

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Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN
OF BASEMENT-B3 LEVEL (UGT LEVEL)
FOR SALE BUILDING

CONSULTANTS:
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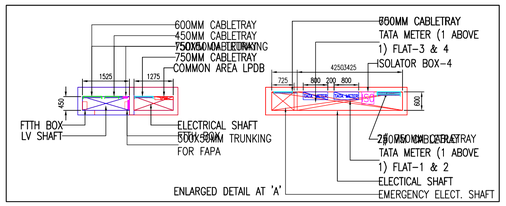
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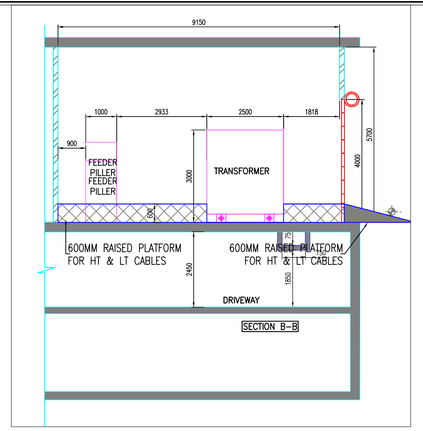
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DATE:	29.01.2016	CHECKED BY:	ROHIT
DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

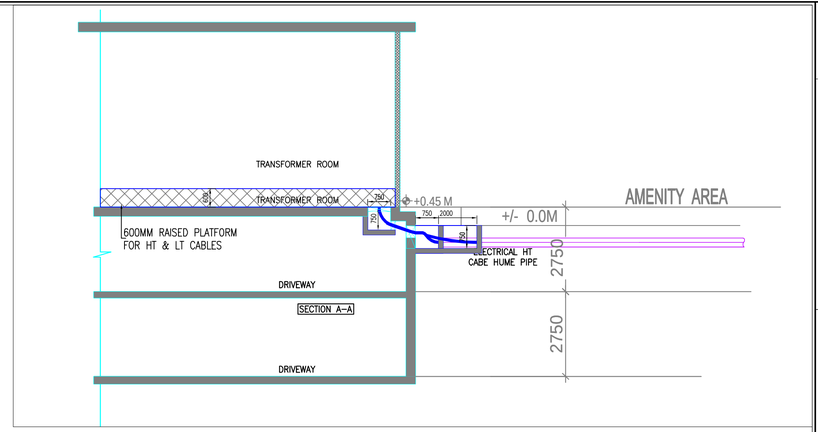
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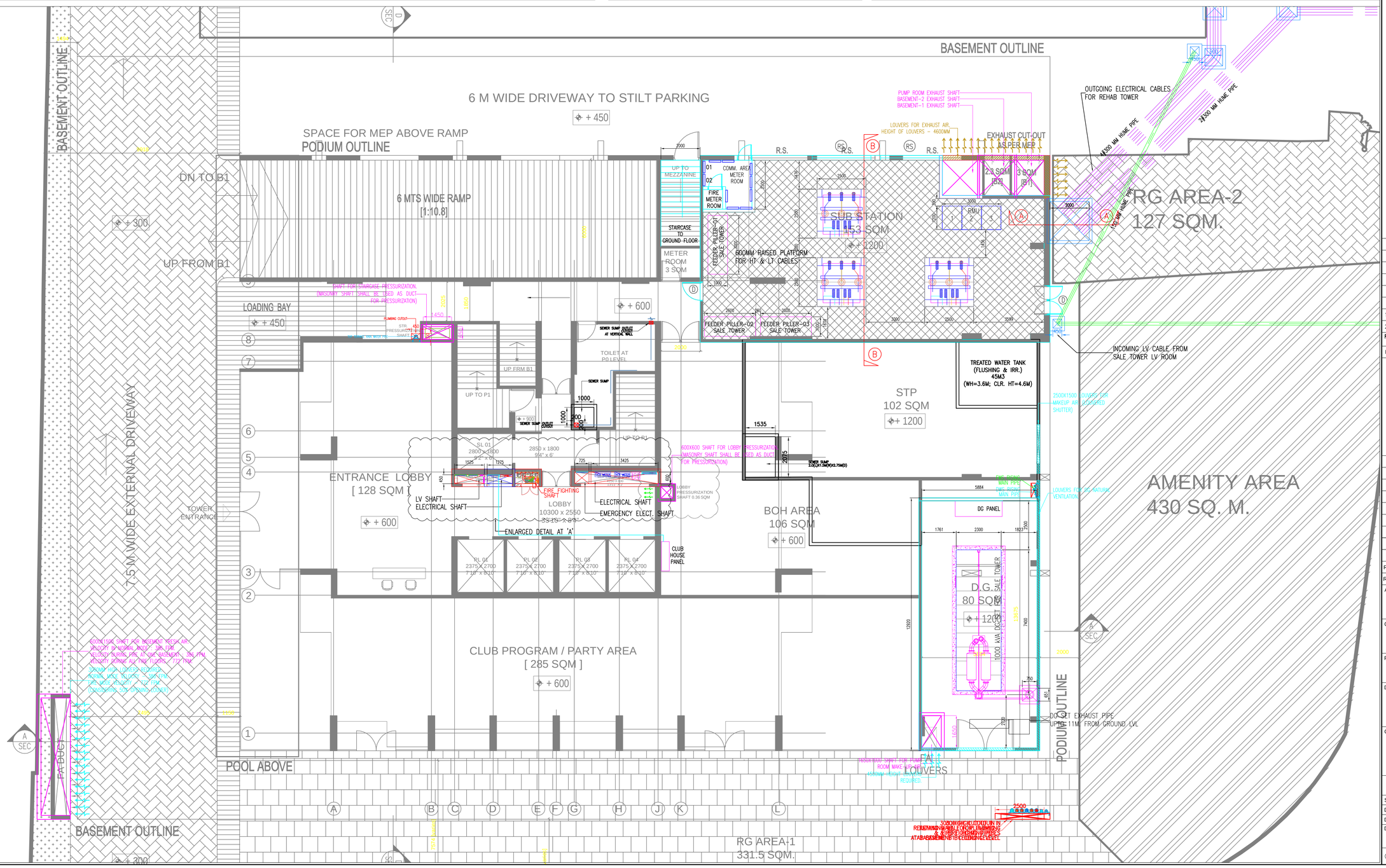
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SHT. NO.	NO.OF SHT.
01	02



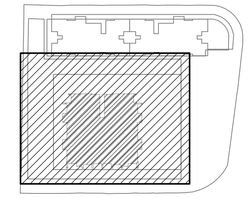






KEY PLAN:

NORTH :



NOTES / LEGEND:

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26.02.16	20160226_SALE TOWER & PARKING	XX	ARCH.
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CLIENT:
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Lodha Pavalion, Apollo Mills Compound,
N.M. Joshi Marg, Mahalaxmi, Mumbai - 4000011
Tel :- 0223302449 Fax :- 02223020693

PROJECT:
LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN
OF GROUND FLOOR LEVEL
FOR SALE BUILDING

CONSULTANTS:
AECOM
203,'Pride Portal' Bldg, Behind Int. Convention Centre,Off. Senapati Bapat Rd. Sr. No. 103, Bahiratwadi, Shivajinagar, Pune-411016 Maharashtra, INDIA
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DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

DRG. NO:
DWG-10-SALE-MEP-GRFP-0004

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01	02

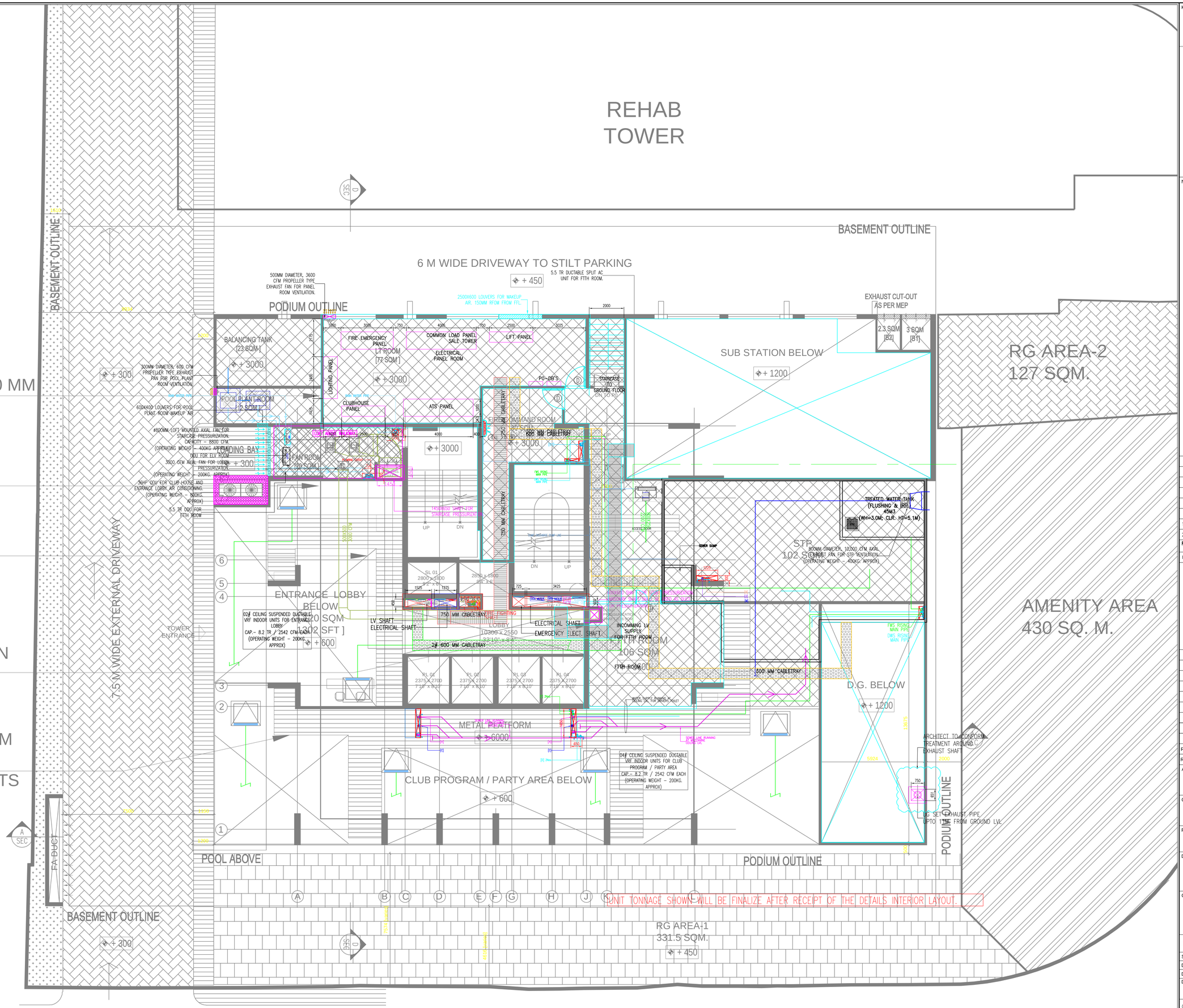
R HEIGHT
W PODIUM
SCAPE 3300 MM

R HEIGHT
W TOWER
M

E ROUTING
R MEP

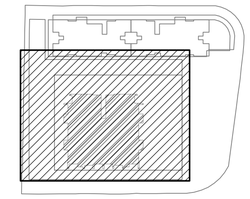
ERRED
TION OF
SURIZATION
T

L PLATFORM
ANSFER
BING SHAFTS



KEY PLAN:

NORTH :



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10.05.16	20160510_SALE TOWER_25 FLOORS	XX	ARCH.	
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RESIDENTIAL TOWER

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OF MEZZANINE FLOOR LEVEL
FOR SALE BUILDING

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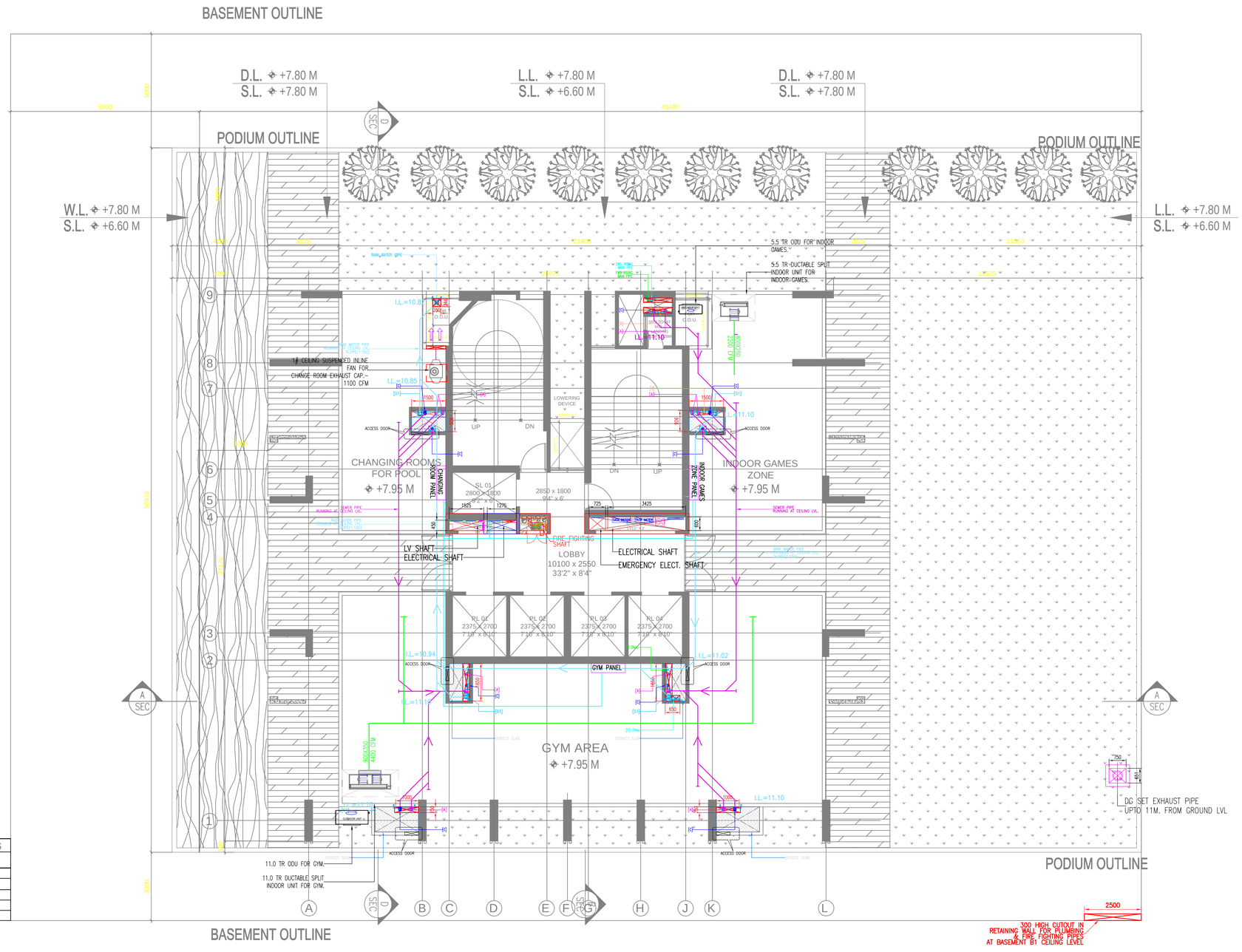
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DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

DRG. NO:
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02	02

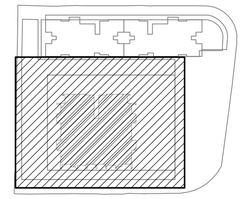


DUCTABLE – SPLIT INDOOR & OUTDOOR UNITS SIZES			
SR.NO	TR	INDOOR UNIT (IDU) W x D x H (mm)	OUTDOOR UNIT (ODU) W x D x H (mm)
01	3.0	950x585x380	1020x406x686
02	5.5	1220x650x450	1020x406x954
03	8.3	1525x650x450	1360x550x856
04	8.75	1525x650x450	1435x550x945
05	11.0	1830x650x450	1435x620x945

FLOOR PLAN: PODIUM LANDSCAPE

KEY PLAN:

NORTH :



NOTES / LEGEND:

REV.	DATE	DESCRIPTION	DRN.	CKD	APD
R6	05.07.16	REVISED AS PER CLIENT COMMENTS.	SBR	UY	UY
R5	17.06.16	REVISED AS PER ARCHITECTURAL DRAWING.	SJ	UY	UY
R4	25.05.16	REVISED AS PER ARCHITECTURAL DRAWING.	SBR	UY	UY
R3	29.02.16	REVISED AS PER ARCHITECTURAL DRAWING.	SBR	UY	UY
R2	24.02.16	REVISED AS PER COMMENTS DATED 18.02.16	SBR	UY	UY
R1	11.02.16	REVISED AS PER ARCHITECTURAL DRAWINGS.	SBR	UY	UY
R0	29.01.16	FIRST TIME ISSUED	SBR	UY	UY

RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE
10.05.16	20160510_SALE TOWER_25 FLOORS	XX	ARCH.
26.02.16	20160226_SALE TOWER & PARKING	XX	ARCH.

BACKGROUND DRAWING / REFERENCE DRAWING LIST

REVISION

ARCHITECT:
Kapadia Associates Pvt.Ltd.
112-114, PENINSULA CENTER, DR. S.S. RAO ROAD,
OFF. AMBEDKAR ROAD, PAREL, EAST,MUMBAI - 400.012.
TEL.+91 2266602838, 66602839 FAX- +91 2226602844.

CLIENT:
LODHA GROUP
Lodha Pavalion, Apollo Mills Compound,
N.M. Joshi Marg, Mahalaxmi, Mumbai - 4000011
Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN
OF PODIUM LEVEL
FOR SALE BUILDING

CONSULTANTS:
AECOM
203,'Pride Portal' Bldg, Behind Int. Convention Centre,Off. Senapati Bapat Rd. Sr. No. 103, Bahiratwadi, Shivajinagar, Pune-411016 Maharashtra, INDIA
T: +91 20 25630061/2/3
F: +91 20 25630064
www.aecom.com

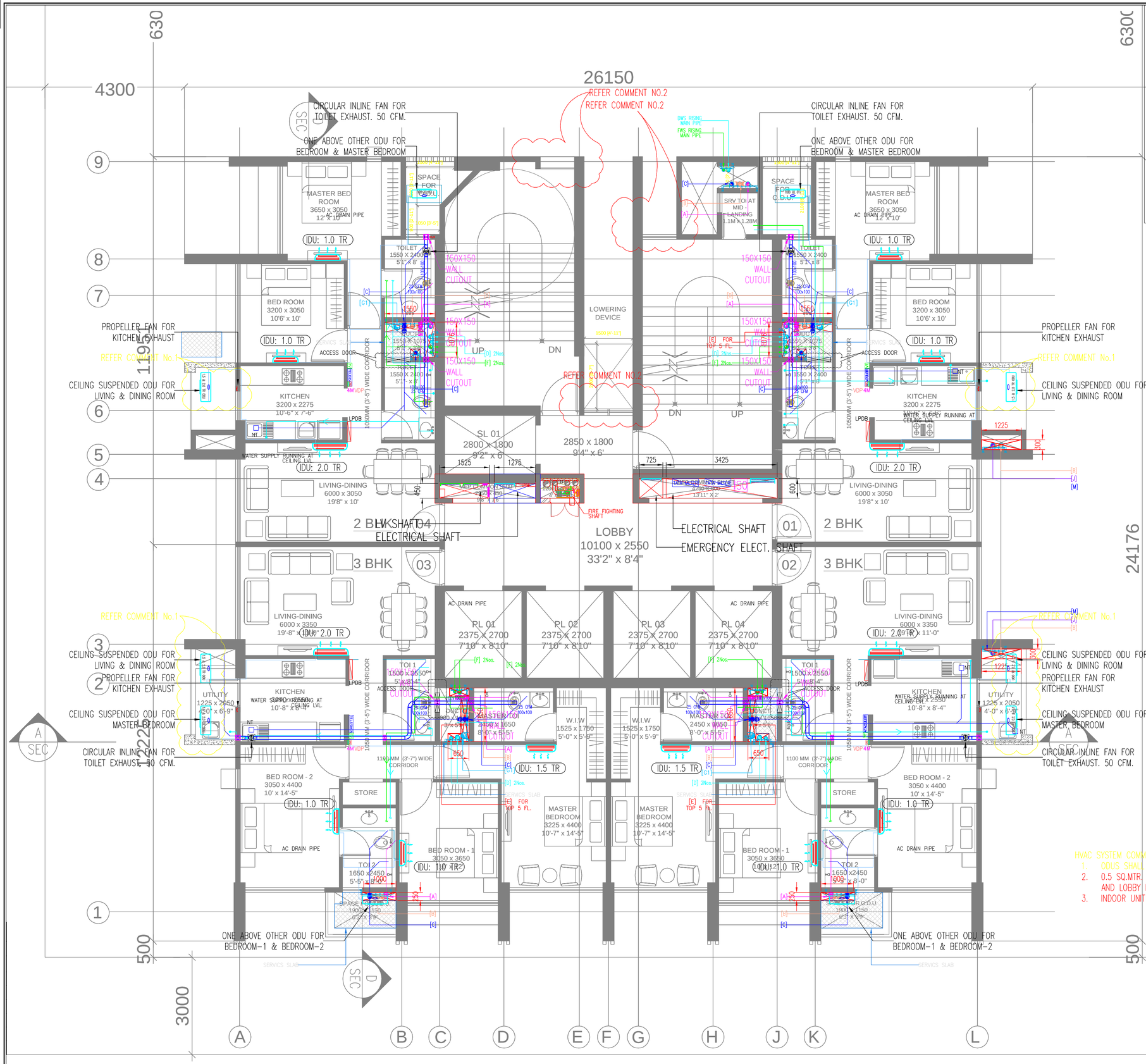
DRAWING STATUS	CONCEPT DESIGN	SCHEMATIC DESIGN	DETAILED DESIGN	TENDER DRAWING
	■	□	□	□

SCALE:	1:100	DESIGNED BY:	ROHIT
DATE:	29.01.2016	CHECKED BY:	ROHIT
DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

DRG. NO:
DWG-10-SALE-MEP-POFP-0006

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SHT. NO.	NO.OF SHT.



ABERRATION FOR PLUMBING SERVICES

- [A] = 110ø SOIL PIPE (VERTICAL)
- [B] = 110ø ANTISIPHONE PIPE (VERTICAL)
- [B1] = 75ø ANTISIPHONE PIPE (VERTICAL)
- [C] = 110ø WASTE PIPE (VERTICAL)
- [D] = DOMESTIC WATER SUPPLY PIPE (VERTICAL)
- [E] = HOT WATER SUPPLY PIPE (VERTICAL)
- [F] = FLUSHING WATER SUPPLY PIPE (VERTICAL)
- [G] = PART TERRACE RAIN WATER PIPE (VERTICAL)
- [G1] =TOP TERRACE RAIN WATER PIPE (VERTICAL)
- [H] = FLOWER BED DRAIN PIPE (VERTICAL)
- [J] = 110ø KITCHEN WASTE PIPE (VERTICAL)
- [K] = DOMESTIC WATER RISING MAIN PIPE (VER.)
- [L] = FLUSHING WATER RISING MAIN PIPE (VER.)

NOTE:
1) ALL MEP SHAFT DOORS SIZES NEED TO BE CONFIRMED BY ARCHITECT TO CONSULTANT BEFORE RELEASING VEC DRAWING FROM ARCHITECT.
2) LOCATION OF SLEEVE FOR AC INDOOR UNIT REFRIGERANT PIPING TO BE FINALIZED AT SITE WITH RESPECT TO ID/OUTLET PIPE LOCATION.

LEGEND FOR PLUMBING SERVICES

- 110ø LOW NOISE PP SOIL PIPE
- 75ø UPVC WASTE PIPE
- 75ø UPVC KITCHEN WASTE PIPE
- 75ø UPVC FLOWER BED DRAIN PIPE
- 75ø UPVC BALCONY DRAIN PIPE
- 50ø UPVC WASTE WATER PIPE
- 40ø UPVC WASTE WATER PIPE
- DWS- DOMESTIC WATER SUPPLY PIPE
- FWS- FLUSHING WATER SUPPLY PIPE
- HWS- HOT WATER SUPPLY PIPE
- HWS (SOLAR)- SOLAR HOT WATER SUPPLY PIPE
- HWR- HOT WATER RETURN PIPE
- MULTINAHANI TRAP
- NAHANI TRAP/HORIZONTAL JALI
- 'P' TRAP WITH HOPPER
- 230 THK. LEDGE WALL
- 150 THK. LEDGE WALL
- 100 THK. LEDGE WALL
- 75 THK. LEDGE WALL
- 50 THK. LEDGE WALL
- 160ø SLEEVE IN FLOOR SLAB
- 75ø SLEEVE IN FLOOR SLAB
- 110ø SLEEVE IN FLOOR SLAB
- S1- 75ø SLEEVE IN SHARE WALL
- S2- 110ø SLEEVE IN SHARE WALL
- S3- 160ø SLEEVE IN SHARE WALL
- SERVICE SLAB
- BALL VALVE/ISOLATION VALVE
- NON RETURN VALVE

KEY PLAN:

NORTH :

NOTES / LEGEND:

HVAC SYSTEM COMMENTS:
1. ODUS SHALL BE VISIBLE FROM OUTSIDE. ODU CLASHING WITH DOOR OPENING.
2. 0.5 SQ.MTR. OPENING REQUIRED ON EACH LANDING AND ON TOP TO AVOID STAIRCASE AND LOBBY PRESSURIZATION.
3. INDOOR UNIT LOCATIONS SHOWN ARE TENTATIVE, ARCHITECT TO CONFIRM THE SAME.

RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE
10.05.16	20160510_SALE TOWER_25 FLOORS	XX	ARCH.
26.02.16	20160226_SALE TOWER & PARKING	XX	ARCH.

BACKGROUND DRAWING / REFERENCE DRAWING LIST

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R0	29.01.16	FIRST TIME ISSUED	SBR	UY	UY

REVISION

ARCHITECT:
Kapadia Associates Pvt.Ltd.
112-114, PENINSULA CENTER, DR. S.S. RAO ROAD,
OFF. AMBEDKAR ROAD, PAREL, EAST,MUMBAI - 400 012.
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CLIENT:
LODHA GROUP
Lodha Pavalion, Apollo Mills Compound,
N.M. Joshi Marg, Mahalaxmi, Mumbai - 4000011
Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN
OF TYPICAL FLOOR LEVEL (1ST-9TH FLOOR)
FOR SALE BUILDING

CONSULTANTS:
AECOM
203,'Pride Portal' Bldg, Behind Int. Convention Centre,Off. Senapati Bapat Rd. Sr. No. 103, Bahiratwadi, Shivajinagar, Pune-411016 Maharashtra, INDIA
T: +91 20 25630061/2/3
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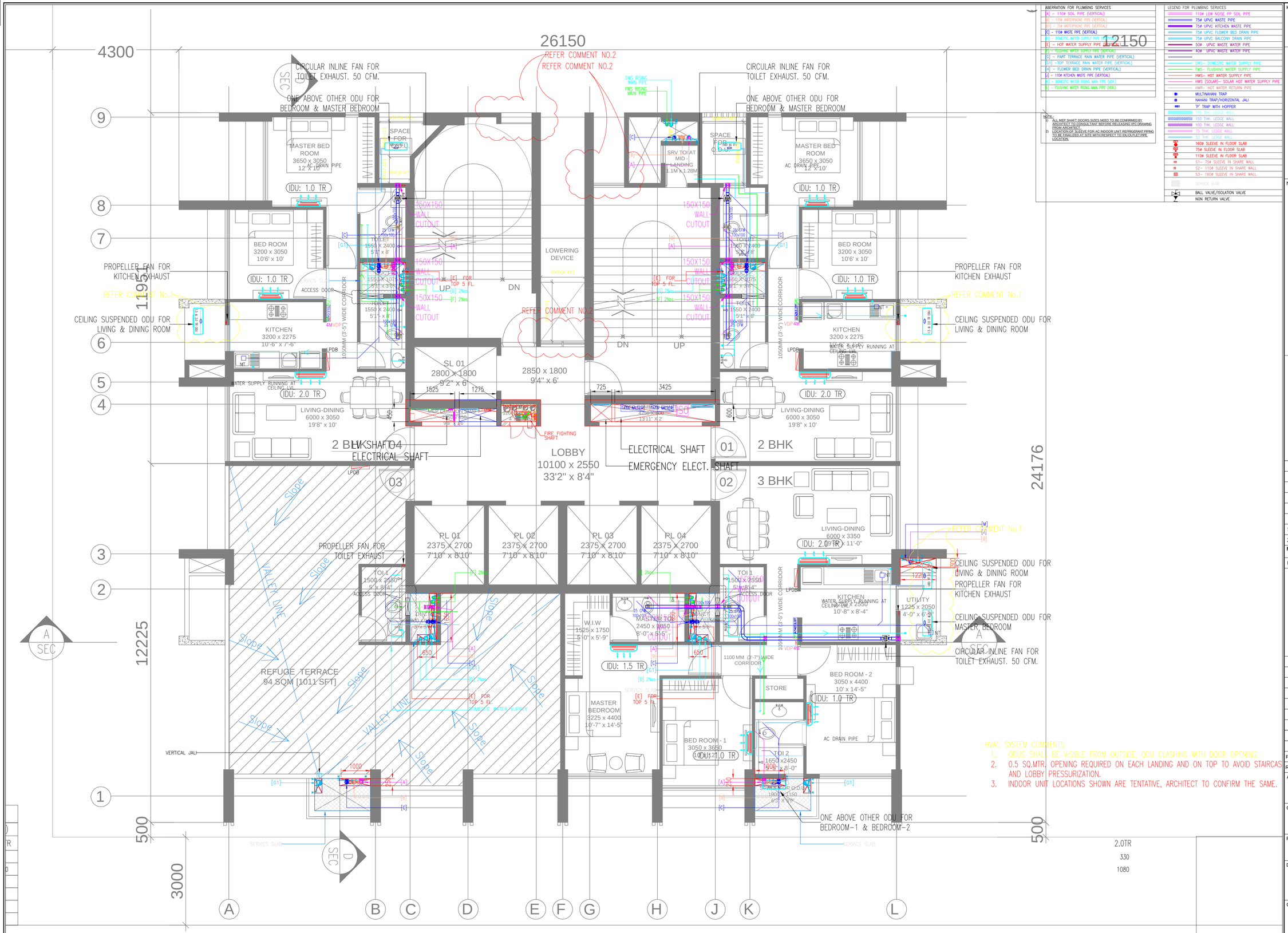
DRAWING STATUS	CONCEPT DESIGN	SCHEMATIC DESIGN	DETAILED DESIGN	TENDER DRAWING
	■	□	□	□

SCALE:	1:60	DESIGNED BY:	ROHIT
DATE:	29.01.2016	CHECKED BY:	ROHIT
DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

DRG. NO:
DWG-10-SALE-MEP-TYFP-0007

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SHT. NO.	NO.OF SHT.
01	02



ABERRATION FOR PLUMBING SERVICES

- [A] – 110ø SOIL PIPE (VERTICAL)
- [B] – 110ø ANTISIPHONE PIPE (VERTICAL)
- [B1] – 75ø ANTISIPHONE PIPE (VERTICAL)
- [C] – 110ø WASTE PIPE (VERTICAL)
- [C1] – DOMESTIC WATER SUPPLY PIPE (VERTICAL)
- [E] – HOT WATER SUPPLY PIPE (VERTICAL)
- [F] – FLUSHING WATER SUPPLY PIPE (VERTICAL)
- [G] – PART TERRACE RAIN WATER PIPE (VERTICAL)
- [G1] –TOP TERRACE RAIN WATER PIPE (VERTICAL)
- [H] – FLOWER BED DRAIN PIPE (VERTICAL)
- [J] – 110ø KITCHEN WASTE PIPE (VERTICAL)
- [K] – DOMESTIC WATER RISING MAIN PIPE (VER.)
- [L] – FLUSHING WATER RISING MAIN PIPE (VER.)

LEGEND FOR PLUMBING SERVICES

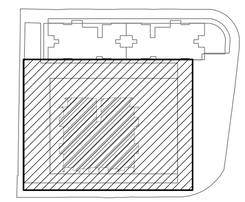
- 110ø LOW NOISE PP SOIL PIPE
- 75ø UPVC WASTE PIPE
- 75ø UPVC KITCHEN WASTE PIPE
- 75ø UPVC FLOWER BED DRAIN PIPE
- 75ø UPVC BALCONY DRAIN PIPE
- 50ø UPVC WASTE WATER PIPE
- 40ø UPVC WASTE WATER PIPE
- CWS:- DOMESTIC WATER SUPPLY PIPE
- FWS:- FLUSHING WATER SUPPLY PIPE
- HWS:- HOT WATER SUPPLY PIPE
- HWS (SOLAR):- SOLAR HOT WATER SUPPLY PIPE
- HWR:- HOT WATER RETURN PIPE
- MULTINAHANI TRAP
- NAHANI TRAP/HORIZONTAL JALI
- 'P' TRAP WITH HOPPER
- 230 THK. LEDGE WALL
- 150 THK. LEDGE WALL
- 100 THK. LEDGE WALL
- 75 THK. LEDGE WALL
- 40 THK. LEDGE WALL
- 160ø SLEEVE IN FLOOR SLAB
- 75ø SLEEVE IN FLOOR SLAB
- 110ø SLEEVE IN FLOOR SLAB
- S1:- 75ø SLEEVE IN SHARE WALL
- S2:- 110ø SLEEVE IN SHARE WALL
- S3:- 160ø SLEEVE IN SHARE WALL
- SERVICE SLAB
- BALL VALVE/ISOLATION VALVE
- NON RETURN VALVE

NOTE:
1) ALL MEP SHAFT DOORS SIZES NEED TO BE CONFIRMED BY ARCHITECT TO CONSULTANT BEFORE RELEASING VFC DRAWING FROM ARCHITECT.
2) LOCATION OF SLEEVE FOR AC INDOOR UNIT REFRIGERANT PIPING TO BE FINALIZED AT SITE WITH RESPECT TO ID/OUTLET PIPE LOCATION.

HVAC SYSTEM COMMENTS:
1. ODUS SHALL BE VISIBLE FROM OUTSIDE. ODU CLASHING WITH DOOR OPENING.
2. 0.5 SQ.MTR. OPENING REQUIRED ON EACH LANDING AND ON TOP TO AVOID STAIRCASE AND LOBBY PRESSURIZATION.
3. INDOOR UNIT LOCATIONS SHOWN ARE TENTATIVE, ARCHITECT TO CONFIRM THE SAME.

FLOOR PLAN: REFUGE (6th FLOOR)

KEY PLAN:



NORTH :

NOTES / LEGEND:

REV.	DATE	DESCRIPTION	DRN.	CKD	APD
R6	05.07.16	REVISED AS PER CLIENT COMMENTS.	SBR	UY	UY
R5	17.06.16	REVISED AS PER ARCHITECTURAL DRAWING.	SJ	UY	UY
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R2	24.02.16	REVISED AS PER COMMENTS DATED 18.02.16	SBR	UY	UY
R1	11.02.16	REVISED AS PER ARCHITECTURAL DRAWINGS.	SBR	UY	UY
R0	29.01.16	FIRST TIME ISSUED	SBR	UY	UY

RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE
10.05.16	20160510_SALE TOWER_25 FLOORS	XX	ARCH.
26.02.16	20160226_SALE TOWER & PARKING	XX	ARCH.

BACKGROUND DRAWING / REFERENCE DRAWING LIST

REVISION

ARCHITECT:
Kapadia Associates Pvt.Ltd.
112-114, PENINSULA CENTER, DR. S.S. RAO ROAD,
OFF. AMBEDKAR ROAD, PAREL, EAST,MUMBAI - 400 012.
TEL.+91 2266602838, 66602839 FAX- +91 2226602844.

CLIENT:
LODHA GROUP
Lodha Pavalion, Apollo Mills Compound.
N.M. Joshi Marg, Mahalaxmi, Mumbai - 4000011
Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN
OF REFUGE FLOOR LEVEL (6TH FLOOR)
FOR SALE BUILDING

CONSULTANTS:
AECOM
203,'Pride Portal' Bldg, Behind Int. Convention Centre,Off. Senapati Bapat Rd. Sr. No. 103, Bahiratwadi, Shivajinagar, Pune-411016 Maharashtra, INDIA
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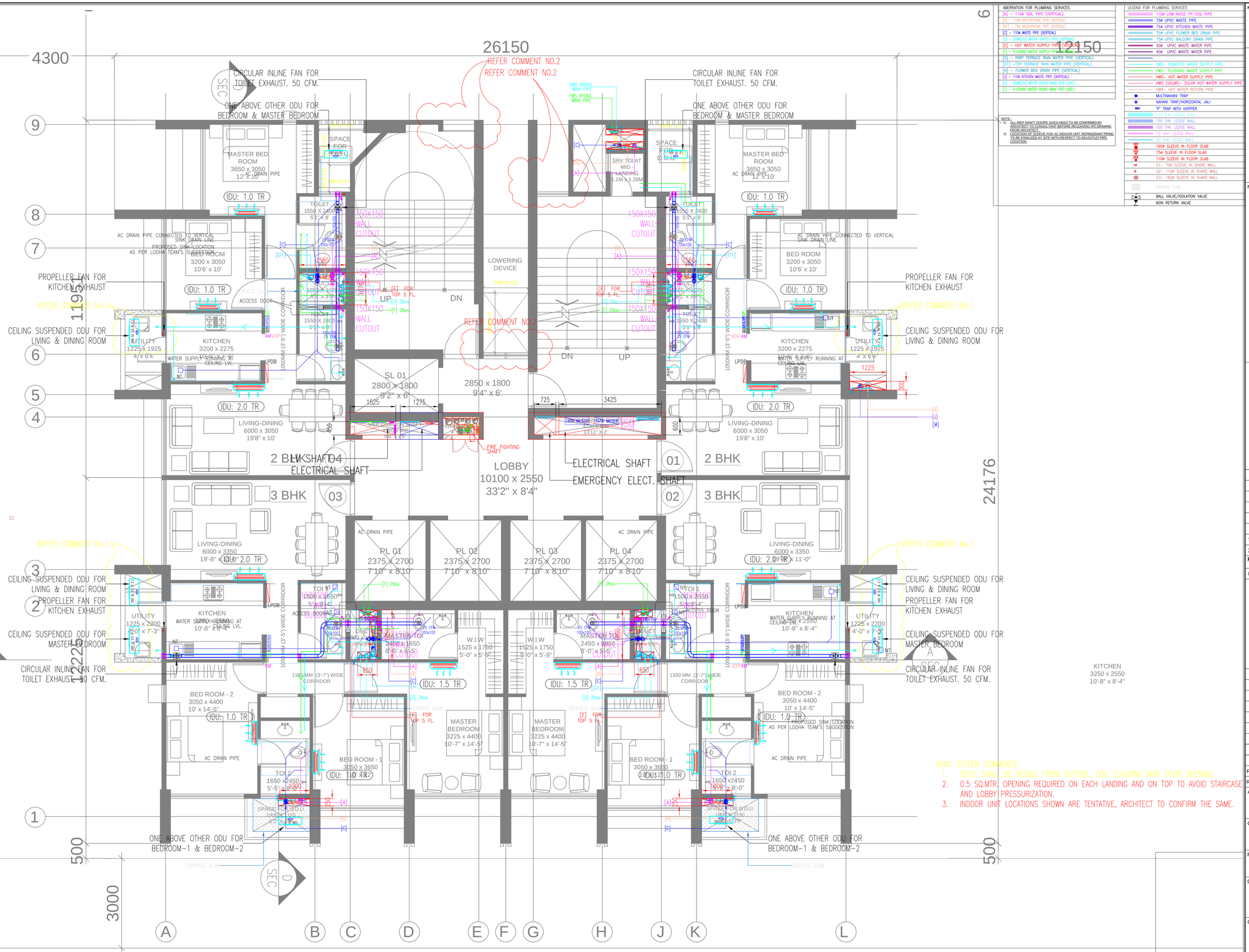
DRAWING STATUS	CONCEPT DESIGN	SCHEMATIC DESIGN	DETAILED DESIGN	TENDER DRAWING
	■	□	□	□

SCALE:	1:60	DESIGNED BY:	ROHIT
DATE:	29.01.2016	CHECKED BY:	ROHIT
DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

DRG. NO:
DWG-10-SALE-MEP-REFP-0009

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SHT. NO.	NO.OF SHT.
01	01

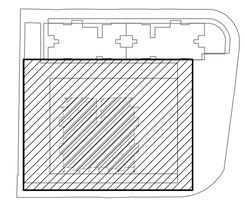


ABERRATION FOR PLUMBING SERVICES
[A] – 110ø SOIL PIPE (VERTICAL)
[B] – 110ø ANTIPHONE PIPE (VERTICAL)
[B1] – 75ø ANTIPHONE PIPE (VERTICAL)
[C] – 110ø WASTE PIPE (VERTICAL)
[D] – DOMESTIC WATER SUPPLY PIPE (VERTICAL)
[E] – HOT WATER SUPPLY PIPE (VERTICAL)
[F] – FLUSHING WATER SUPPLY PIPE (VERTICAL)
[G] – PART TERRACE RAIN WATER PIPE (VERTICAL)
[G1] – TOP TERRACE RAIN WATER PIPE (VERTICAL)
[H] – FLOWER BED DRAIN PIPE (VERTICAL)
[J] – 110ø KITCHEN WASTE PIPE (VERTICAL)
[K] – DOMESTIC WATER RISING MAIN PIPE (VER.)
[L] – FLUSHING WATER RISING MAIN PIPE (VER.)

NOTE:
1) ALL MEP SHAFT DOORS SIZES NEED TO BE CONFIRMED BY ARCHITECT TO CONSULTANT BEFORE RELEASING VFC DRAWING FROM ARCHITECT.
2) LOCATION OF SLEEVE FOR AC INDOOR UNIT REFRIGERANT PIPING TO BE FINALIZED AT SITE WITH RESPECT TO ODU OUTLET PIPE LOCATION.

LEGEND FOR PLUMBING SERVICES
110ø LOW NOISE PIP SOIL PIPE
75ø UPVC WASTE PIPE
75ø UPVC KITCHEN WASTE PIPE
75ø UPVC FLOWER BED DRAIN PIPE
75ø UPVC BALCONY DRAIN PIPE
50ø UPVC WASTE WATER PIPE
40ø UPVC WASTE WATER PIPE
DWS:- DOMESTIC WATER SUPPLY PIPE
FWS:- FLUSHING WATER SUPPLY PIPE
HWS:- HOT WATER SUPPLY PIPE
HWS (SOLAR):- SOLAR HOT WATER SUPPLY PIPE
HWR:- HOT WATER RETURN PIPE
MULTINAHANI TRAP
NAHANI TRAP/HORIZONTAL JALI
"P" TRAP WITH HOPPER
100 THK. LEDGE WALL
150 THK. LEDGE WALL
100 THK. LEDGE WALL
75 THK. LEDGE WALL
150 THK. LEDGE WALL
160ø SLEEVE IN FLOOR SLAB
75ø SLEEVE IN FLOOR SLAB
110ø SLEEVE IN FLOOR SLAB
51– 75ø SLEEVE IN SHARE WALL
52– 110ø SLEEVE IN SHARE WALL
53– 160ø SLEEVE IN SHARE WALL
SERVICE SLAB
BALL VALVE/ISOLATION VALVE
NON RETURN VALVE

KEY PLAN:



NORTH :

NOTES / LEGEND:

REV.	DATE	DESCRIPTION	DRN.	CKD	APD
R6	05.07.16	REVISED AS PER CLIENT COMMENTS.	SBR	UY	UY
R5	17.06.16	REVISED AS PER ARCHITECTURAL DRAWING.	SJ	UY	UY
R4	25.05.16	REVISED AS PER ARCHITECTURAL DRAWING.	SBR	UY	UY
R3	29.02.16	REVISED AS PER ARCHITECTURAL DRAWING.	SBR	UY	UY
R2	24.02.16	REVISED AS PER COMMENTS DATED 18.02.16	SBR	UY	UY
R1	11.02.16	REVISED AS PER ARCHITECTURAL DRAWINGS.	SBR	UY	UY
R0	29.01.16	FIRST TIME ISSUED	SBR	UY	UY

RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE
10.05.16	20160510_SALE TOWER_25 FLOORS	XX	ARCH.
26.02.16	20160226_SALE TOWER & PARKING	XX	ARCH.

BACKGROUND DRAWING / REFERENCE DRAWING LIST

REVISION

HVAC SYSTEM COMMENTS:
1. ODUS SHALL BE VISIBLE FROM OUTSIDE. ODU CLASHING WITH DOOR OPENING.
2. 0.5 SQ.MTR. OPENING REQUIRED ON EACH LANDING AND ON TOP TO AVOID STAIRCASE AND LOBBY PRESSURIZATION.
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CLIENT:
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N.M. Joshi Marg, Mahalaxmi, Mumbai - 4000011
Tel :- 0222302449 Fax :- 02223020693

PROJECT:
LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN
OF TYPICAL FLOOR LEVEL (10TH-ABOVE FLOOR)
FOR SALE BUILDING

CONSULTANTS:
AECOM
203,'Pride Portal' Bldg, Behind Int. Convention Centre,Off. Senapati Bapat Rd. Sr. No. 103, Bahiratwadi, Shivajinagar, Pune-411016 Maharashtra, INDIA
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DRAWING STATUS	CONCEPT DESIGN	SCHEMATIC DESIGN	DETAILED DESIGN	TENDER DRAWING
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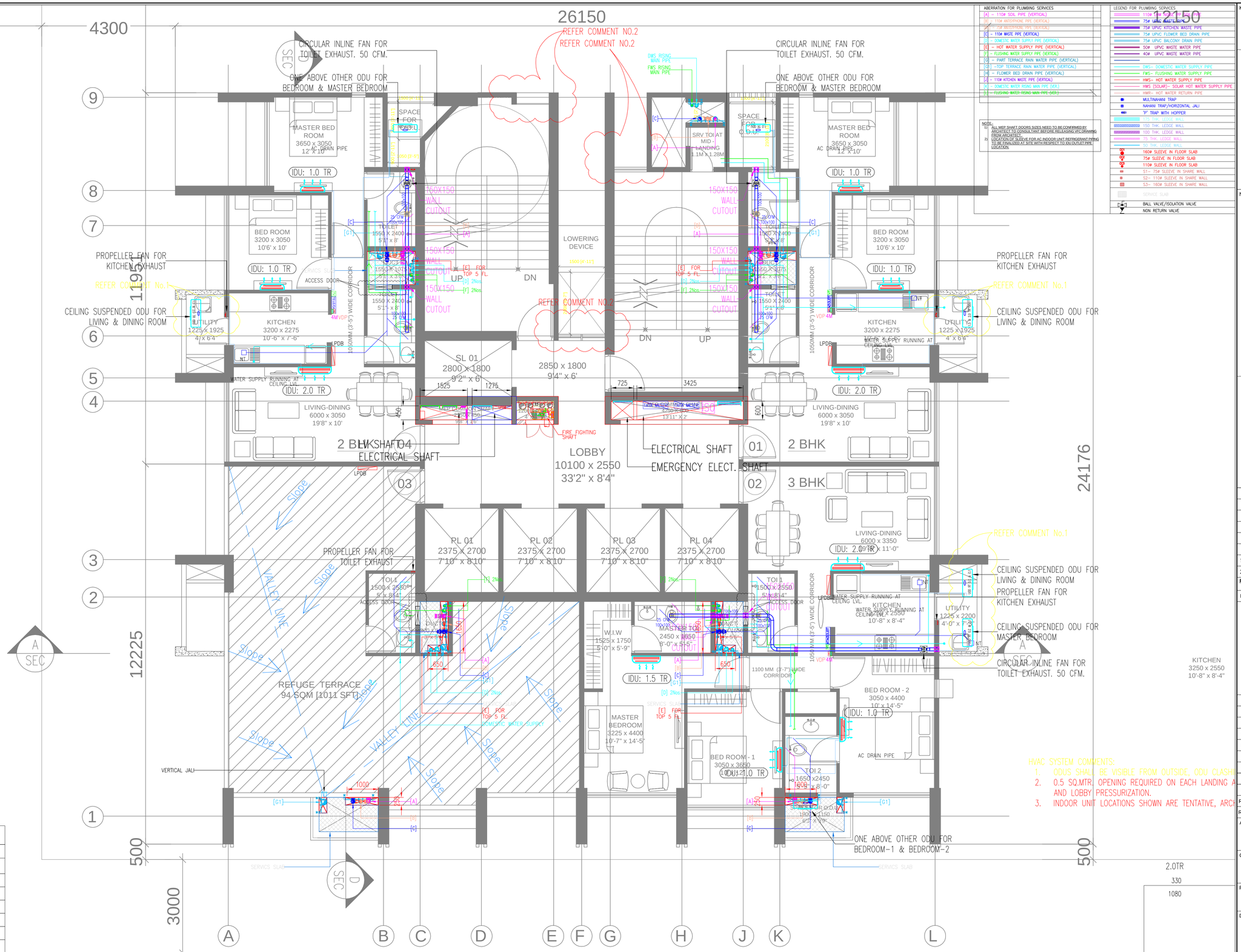
SCALE:	1:60	DESIGNED BY:	ROHIT
DATE:	29.01.2016	CHECKED BY:	ROHIT
DRAWN BY:	SUDARSHAN	APPROVED BY:	USHA

DRG. NO:
DWG-10-SALE-MEP-TYFP-0008

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SHT. NO.	NO.OF SHT.
01	01

FLOOR PLAN: TYPICAL (10TH FLOOR & ABOVE)



ABERRATION FOR PLUMBING SERVICES

- [A] – 110ø SOIL PIPE (VERTICAL)
- [B] – 110ø ANTISIPHONE PIPE (VERTICAL)
- [C] – 110ø WASTE PIPE (VERTICAL)
- [D] – DOMESTIC WATER SUPPLY PIPE (VERTICAL)
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- [F] – FLUSHING WATER SUPPLY PIPE (VERTICAL)
- [G] – PART TERRACE RAIN WATER PIPE (VERTICAL)
- [G1] – TOP TERRACE RAIN WATER PIPE (VERTICAL)
- [H] – FLOWER BED DRAIN PIPE (VERTICAL)
- [J] – 110ø KITCHEN WASTE PIPE (VERTICAL)
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- [L] – FLUSHING WATER RISING MAIN PIPE (VER.)

NOTE:
1) ALL MEP SHAFT DOORS SIZES NEED TO BE CONFIRMED BY ARCHITECT TO CONSULTANT BEFORE RELEASING VFC DRAWING FROM ARCHITECT.
2) LOCATION OF SLEEVE FOR AC INDOOR UNIT REFRIGERANT PIPING TO BE FINALIZED AT SITE WITH RESPECT TO ID/OUTLET PIPE LOCATION.

LEGEND FOR PLUMBING SERVICES

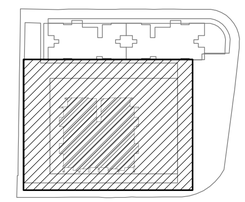
- 110ø SOIL PIPE
- 75ø UPVC WASTE PIPE
- 75ø UPVC KITCHEN WASTE PIPE
- 75ø UPVC FLOWER BED DRAIN PIPE
- 75ø UPVC BALCONY DRAIN PIPE
- 50ø UPVC WASTE WATER PIPE
- 40ø UPVC WASTE WATER PIPE
- DWS– DOMESTIC WATER SUPPLY PIPE
- FWS– FLUSHING WATER SUPPLY PIPE
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- MULTINAHANI TRAP
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- 'P' TRAP WITH HOPPER
- 150 THK. LEDGE WALL
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- 100 THK. LEDGE WALL
- 75 THK. LEDGE WALL
- 50 THK. LEDGE WALL
- 160ø SLEEVE IN FLOOR SLAB
- 75ø SLEEVE IN FLOOR SLAB
- 110ø SLEEVE IN FLOOR SLAB
- S1– 75ø SLEEVE IN SHARE WALL
- S2– 110ø SLEEVE IN SHARE WALL
- S3– 160ø SLEEVE IN SHARE WALL
- SERVICE SLAB
- BALL VALVE/ISOLATION VALVE
- NON RETURN VALVE

DETAILS:–

	EQUIPMENT SIZES (MM)		
	1.0TR	1.5TR	2.0TR
T)	265	292	330
)	790	920	1080
)	195	225	225
HT)	540	690	690
H)	780	900	900
TH)	250	320	320

FLOOR PLAN: REFUGE (13th, 20th & 27th FLOOR)

KEY PLAN:



NORTH

NOTES / LEGEND:

RECEIVED DATE	DRAWING No.	REV.	DISCIPLINE
10.05.16	20160510_SALE TOWER_25 FLOORS	XX	ARCH.
26.02.16	20160226_SALE TOWER & PARKING	XX	ARCH.

BACKGROUND DRAWING / REFERENCE DRAWING LIST

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R1	11.02.16	REVISED AS PER ARCHITECTURAL DRAWINGS.	SBR	UY	UY
R0	29.01.16	FIRST TIME ISSUED	SBR	UY	UY
REV.	DATE	DESCRIPTION	DRN.	CKD	APD

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PROJECT:
LODHA PAREL
RESIDENTIAL TOWER

DRAWING TITLE:
MEP CO-ORDINATED SERVICES SPACE PLAN OF REFUGE FLOOR LEVEL (13TH 20TH & 27TH FLOOR) FOR SALE BUILDING

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DRAWING STATUS	CONCEPT DESIGN	SCHEMATIC DESIGN	DETAILED DESIGN	TENDER DRAWING
	■	□	□	□

SCALE:	1:60	DESIGNED BY:	ROHIT
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