

TATA CONSULTING ENGINEERS LIMITED

ecofirst
sustainable by design
A **TATA** Enterprise



Your safety
in mind

COVID-19 Response

INDIA'S WAR AGAINST COVID-19

A detailed 3D rendering of a COVID-19 virus particle, showing a grey, textured spherical core with numerous red, crown-like spikes protruding from its surface. A yellow circle with a black DNA double helix is positioned over the virus.

COVID-19

Its important to first understand the difference between Isolation and Quarantine

ISOLATION

For people who are sick

Isolation is used to **separate ill persons** who have a communicable disease from those who are healthy.

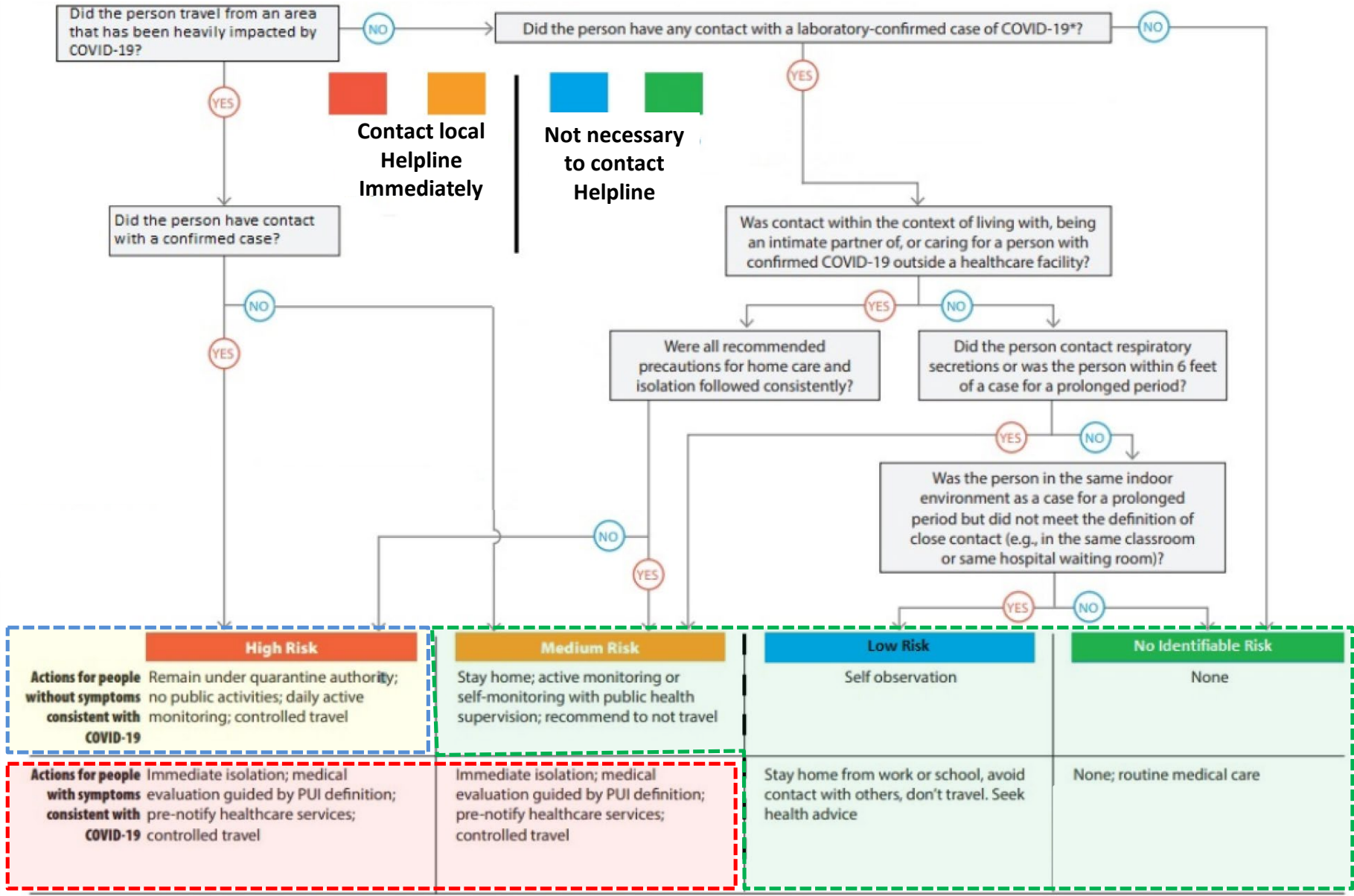
QUARANTINE

For people who were exposed but are not sick

Quarantine is used to **separate and restrict the movement of well persons** who may have been exposed to a communicable disease to see if they become ill.

Humans Are By Nature Social Animals

Socially **isolated** people are less able to deal with stressful situations. They're also more likely to feel depressed and may have problems processing information. This in turn can lead to difficulties with decision-making and memory storage and recall. **People who are lonely are also more susceptible to illness.**



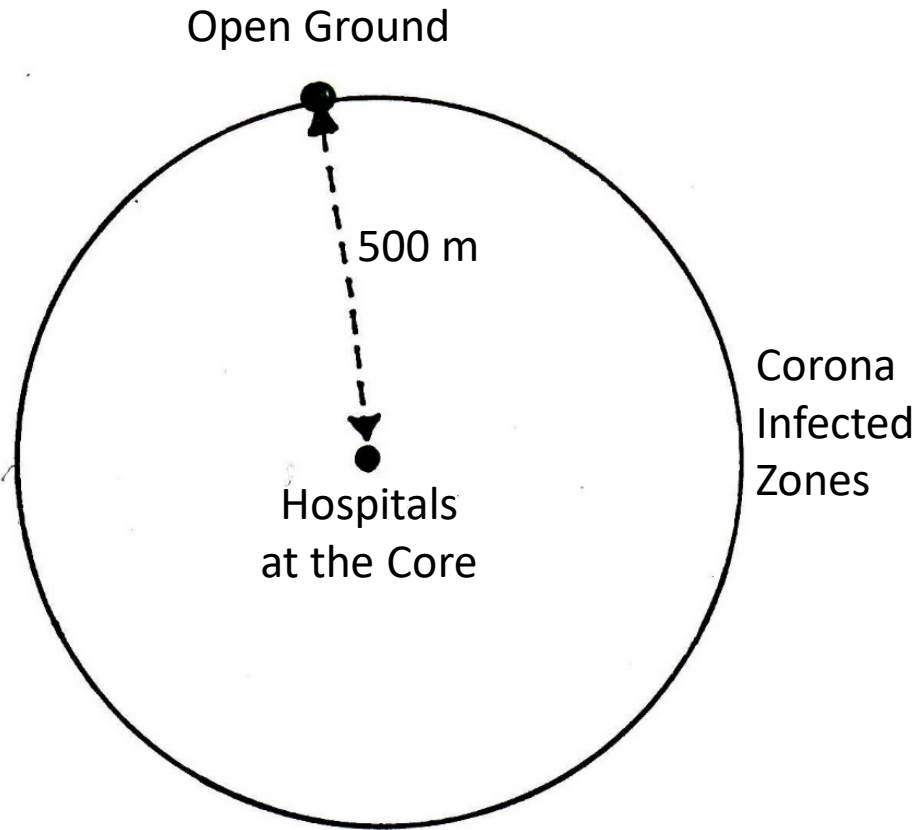
QUARANTINE

ISOLATION

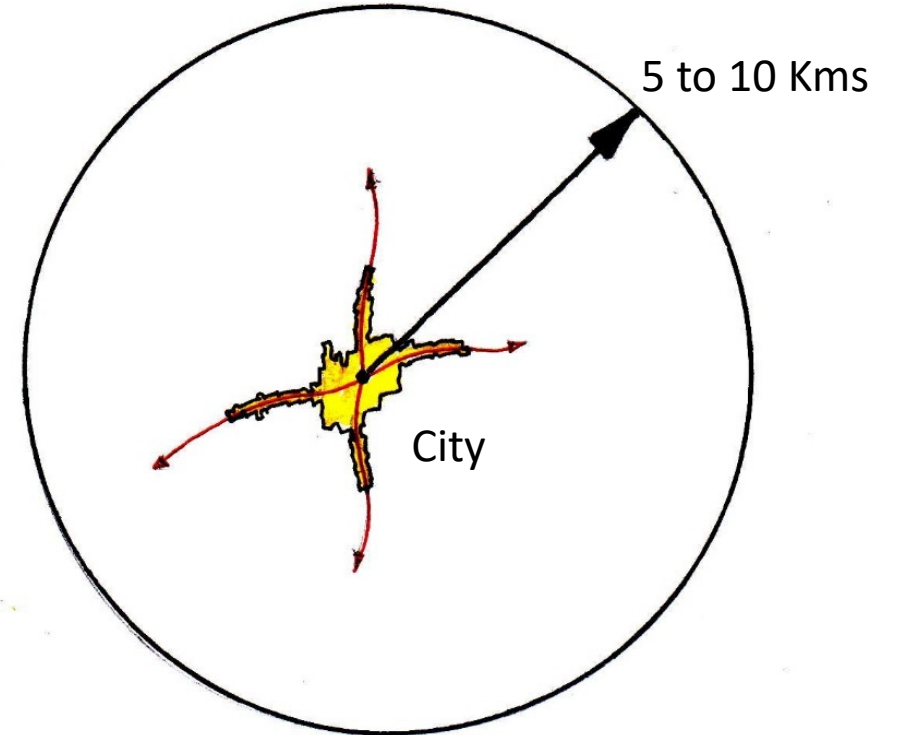
HOME
QUARANTINE

Approach		Suitability			ICU Requirement	Analysis				
		High RISK Quarantine - Precaution	Isolation - Confirmed	Negative Pressure Possible		Time for Setup	Cost / Bed	Cost Remark	Complexity	Recommendation
1	Conversion of Rooms in Existing Buildings	YES	NO	NO	NO	5-20 days	Max 0.5 to 1 lacs/Bed	Existing building cost not incurred	LOW	Only for Quarantine
2	GREENFIELD APPROACH Modular Unit (STA)	YES	YES	YES	NO	1 to 2 day	3 Lacs/Bed (5 bed module)	Cost includes new module	LOW	Best Suited for all
3	GREENFIELD APPROACH With STA – Larger Cluster with Hospital Setup	YES	YES	YES	YES (20%)	15-30 days	3 lacs/Bed	Full Hospital Setup with min 100 Beds - 5 BED each ROOM	HIGH	Best Suited for all
4	GREENFIELD APPROACH - PFB Large Scale Sheds	YES	NO	NO	YES (20%)	30-45 days	2-2.5 Lacs/Bed	50 Bed setup - ALL TOGETHER	LOW	Only for Quarantine

Standard Tata Unit (STA)



Brownfield Planning



Greenfield Planning location

1

DESIGN SOLUTIONS

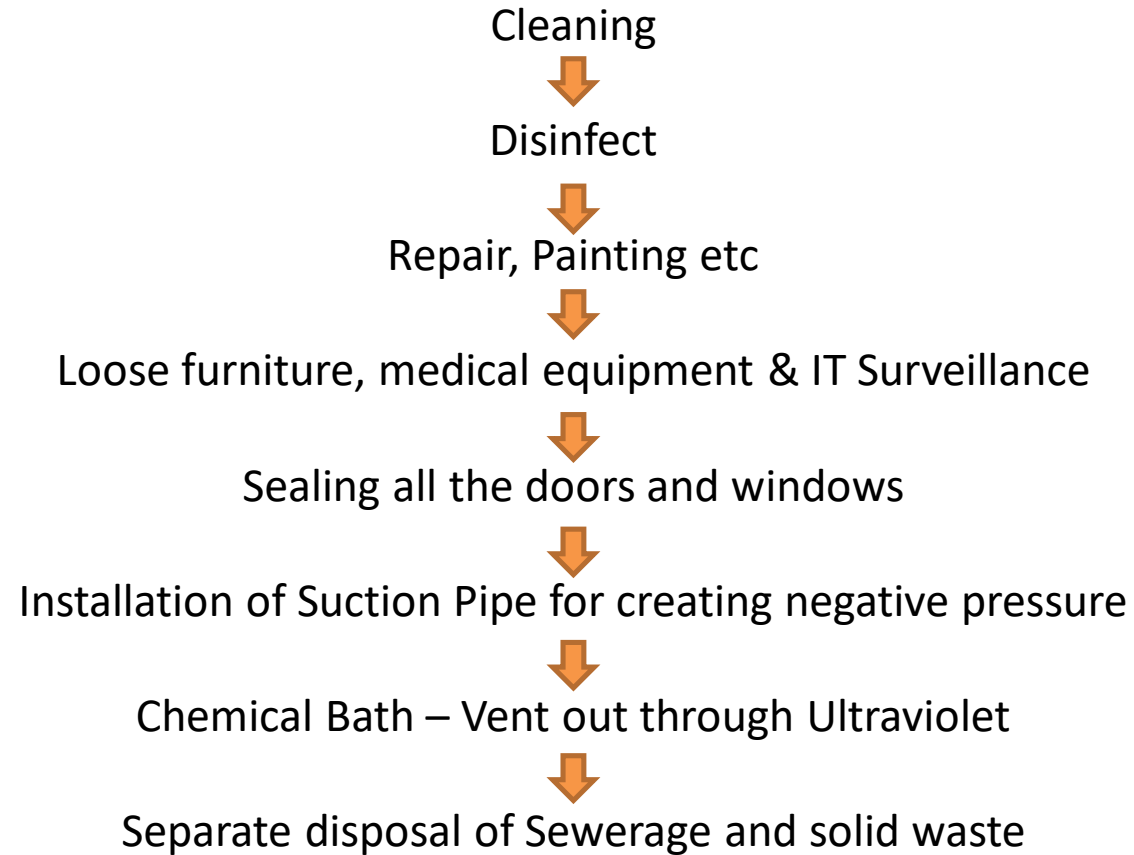
Conversion of Rooms in Existing Buildings

Will take between 5-20 days based on
building condition / material logistics



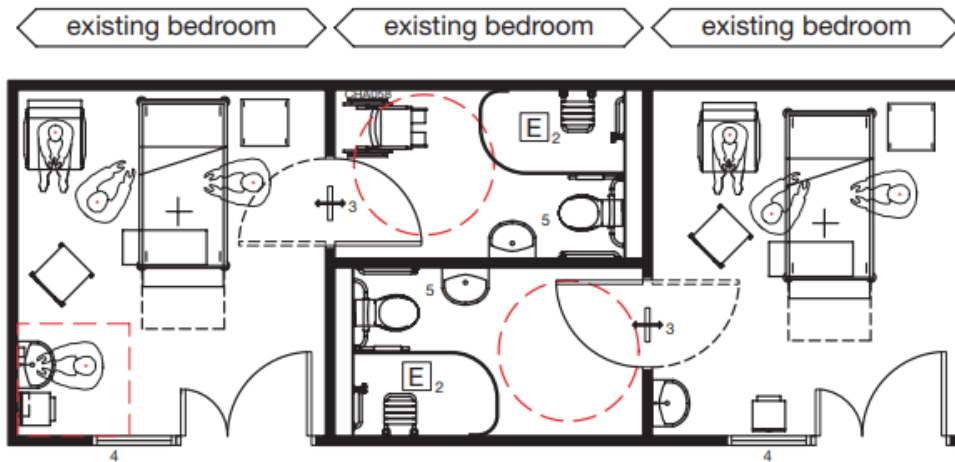
BROWNFIELD PLANNING PROCESS (SOP)

For Any
existing
building like
Hostel,
government
building, new
residential etc



Converting an en-suite single-bed room

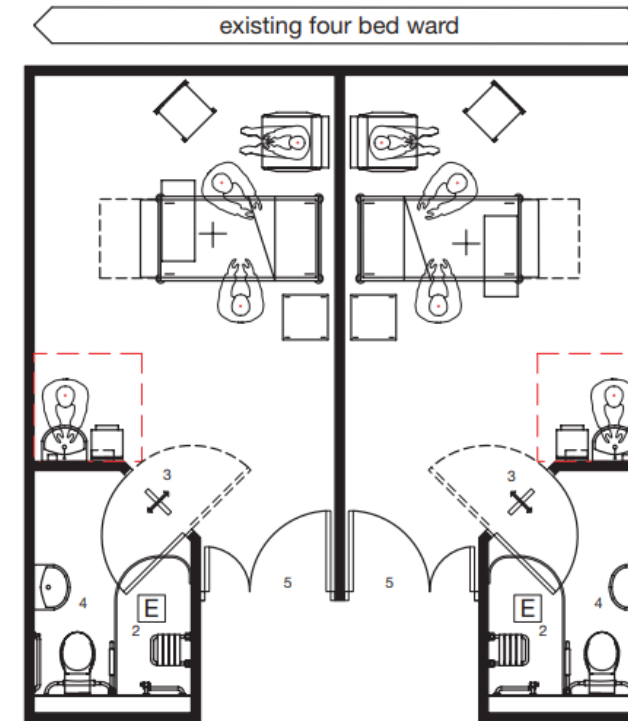
A typical layout for converting an existing en-suite single-bed room is shown in example Layout below:



Minimum requirements to upgrade existing facilities

1. Add clinical wash-hand basin
2. Provide suitable extract fan
3. Install transfer grille to en-suite door
4. Observation window in corridor wall with integral privacy blinds to allow for staff observation and patient views out
5. En-suite facility

Converting a multi-bed bay existing four-bed bay may be converted to provide two en-suite single-bed rooms. In this configuration it is not possible to provide a normal observation window. As observation is critical, however, one option would be to provide fully-glazed lobby and bedroom doors, with integral privacy blinds, to enable observation from the corridor.



Minimum requirements

1. Clinical wash-hand basin
2. Provide suitable extract fan
3. Transfer grille to en-suite door
4. En-suite facility
5. Doors to be fully glazed, with integral privacy blinds, to allow staff observation and patients views out

BOQ List – Conversion of Existing Buildings into QUARANTINE Wards

MEP LIST
1. PIR DUCTS / fabric ducts / flex ducts
2. GSS_ duct material 18 guage
1. 3. Manual opposed blade Damper 400mm x 400mm
4a . Wet Scrubber Unit with Starter panel and VFD (50 mm ESP ; unit 5000 cfm & 10000 CFM). W/O Hepa
4b. Wet Scrubber Unit with Starter panel and VFD (100 mm ESP ; unit 5000 cfm & 10000 CFM). W Hepa
5. SISW & DIDW fans with casing and starter panel and VFD 2500 & 5000 cfm
6. Sintex - 1000 ltr & 500ltr, 100ltr
6.1 UPVC pipes 100mm, 80mm , 20, 15 , 50 mm Nominal Dia
7. Plastic Air Curtains
8. Plastic sheets / Tarpaulins / Canvass
9. line testers / Multi testers
10. Cables
3.5Cx35 sqmm AL Arm. Cable
3.5Cx25 sqmm AL Arm. Cable
4Cx16 sqmm AL Arm. Cable
3Cx4 sqmm Cu flexible cable

11. Single compression Glands
3.5Cx35 sqmm AL Arm. Cable
3.5Cx25 sqmm AL Arm. Cable
4Cx16 sqmm AL Arm. Cable
3Cx4 sqmm Cu flexible cable
12. AL/Cu Lugs
35 sqmm AL Lug
25 sqmm AL Lug
16 sqmm AL Lug
4 sqmm Cu Lug

13. Switch Sockets
6A one gang one way switch
16A one gang one way switch
25 one gang one way switch
6A Socket outlet
16A Socket outlet
25A Socket outlet
Angle/Batten Holder
14. Conduits
25mm dia PVC Conduits
25mm dia GI Conduits
25mm wide casing patti
15. Wires
1.5 sqmm cu stranded flexible wire
2.5 sqmm cu stranded flexible wire
4 sqmm cu stranded flexible wire
6 sqmm cu stranded flexible wire
8/12 swg bare GI wire for earthing
16. Light Fixtures
10/14/18/28W Surface mounted LED lighting fixture
5/7/10w LED Bulbs
14/28/45/65 W Outdoor type LED lighting fixture
17. Fans
600 mm dia ceiling fan
1200 mm dia ceiling fan
300 mm dia exhaust fan
600 mm dia exhaust fan
18. DISTRIBUTION BOARDS
8 way SPN distribution board with 40A DP RCBO, 30mA as incomer and 4 Nos. 10A, 10kA SP MCBs as outgoing.
12 way SPN distribution board with 40A DP RCBO, 30mA as incomer and 8 Nos. 10A, 10kA SP MCBs as outgoing.
16 way SPN distribution board with 40A DP RCBO, 30mA as incomer and 12 Nos. 10A, 10kA SP MCBs as outgoing.
4 way TPN distribution board with 40A FP RCBO, 30mA as incomer and 4 Nos. 10A, 10kA TP MCBs as outgoing.
6 way TPN distribution board with 40A FP RCBO, 30mA as incomer and 6 Nos. 10A, 10kA TP MCBs as outgoing.
8 way TPN distribution board with 40A FP RCBO, 30mA as incomer and 8 Nos. 10A, 10kA TP MCBs as outgoing.
12 way TPN distribution board with 63A FP RCBO, 30mA as incomer and 12 Nos. 10A, 16kA TP MCBs as outgoing.
16 way TPN distribution board with 63A FP RCBO, 30mA as incomer and 16 Nos. 10A, 16kA TP MCBs as outgoing.
17. UPVC surface mounted switch socket mounting box.

ARCHITECTURAL/ CIVIL/ Interior	MEDICAL
1. Flooring – Tactical Flooring - Ex- The HexaDeck® system tiles snap together without the use of tools. Tiles are hexagonal and only 26 inches (66 cm) at the widest point with each tile weighing 6 lbs. (2.72 kg).	Patient Kit to have the following
2. Walls - Assuming we will not get plastered wall – we will need prefab sheets like Bison Bard to nail directly on the wall or in Lauminum channels (we should get it ready-made so no painting or finishing is done on-site)	
3. Antiskid tiles to be fixed with adhesives to make the process fast in toilets	
4. Lighting fixtures – LED tubes for all areas	
5. External wall to be sealed with arecon panels if we get it open	
6. Windows-based on design should be in aluminum channels but should be standardise based on market needs – Fabrication should be avoided , Windows should be used only for light and avoid using for ventilation	
7. Garbage bins to be added with disinfected liners	
8. Ceilings should be quick gypsum sheet directly nailed on aluminum profiles – again avoid painting on site. If need be to add wallpaper to it for quick ascetics or just leave as it is	
9. Door – Pre Fabricated doors	
10. Curtains	
Loose Furniture/Items	On Admission
9. Single Bed	10. Wash Basin with Soap and Running water
11. Bedside locker, wooden	12. Disposable Towels
13. Cabinet for drug	14. IV Stands with Oxygen if needed
15. Cabinet for Linin	16. Patient Bed with Masks
17. Conference table	
18. Clothing lockers, metal	PPE Equipment during Care for Health Worker :
19. Cupboard	
20. Desk, single pedestal with 3 drawers	21. Shoes
22. Chairs	23. Mask
24. Examination Stools	25. Cap
26. Wall clock	27. Goggles
28. Examination couch metal/wooden	29. Disposable Gloves
30. Trolley, general-purpose	31. Protection of air entry to nose mouth eyes to minimum in the above environment to care for wellbeing of Health worker
32. Commode chair	
33. Trolley, linen	For Disinfection :
34. Trolley, medicine/drug	
35. Trolley, patient, stretcher	36. Fogging Machine
37. Shoe Racks	38. For equipment 0.5% Sodium Hypochlorite
	39. For floor 1% Sodium Hypochlorite Cleaning solution

2

GREENFIELD APPROACH

2.1 Modular

(Railway Yards, Hospital Vicinity – Parking Lot, Foot Paths, Shopping Mall, Residential Colonies, Slums)

Turn Around Time – 5 Bed Module Isolation Ward – Installation in 1 day post supply (15 days supply)

2.2 Cluster

(Large Tract of Land, Remote Locations) Turn Around Time 45- 50 Days



2.1

GREENFIELD APPROACH

2.1 Modular

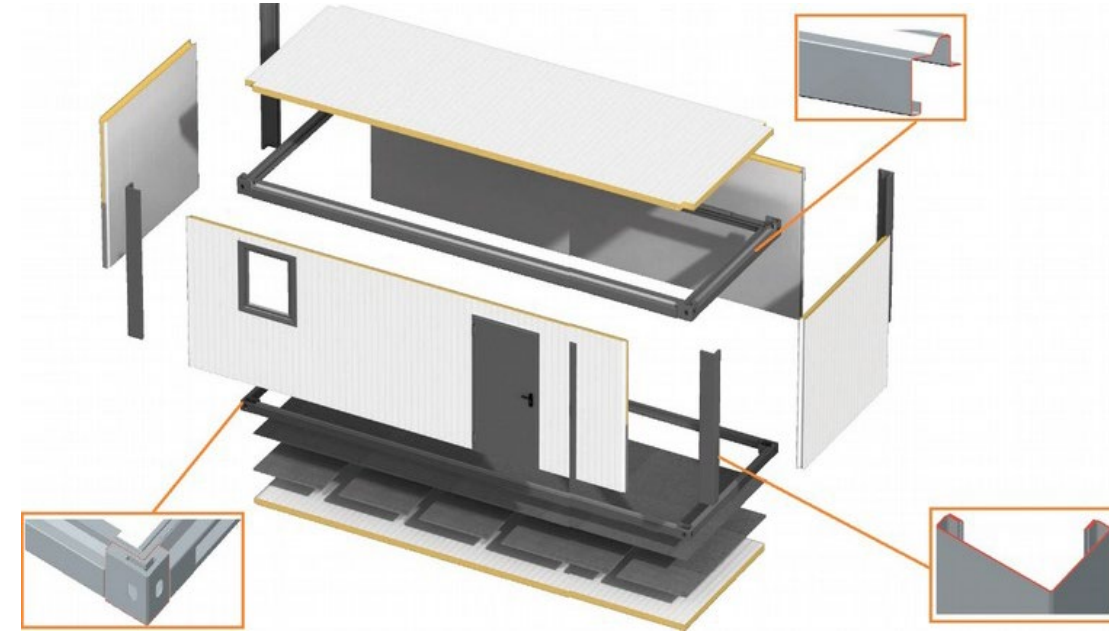
(Railway Yards, Hospital Vicinity – Parking Lot, Foot Paths, Shopping Mall, Residential Colonies, Slums)

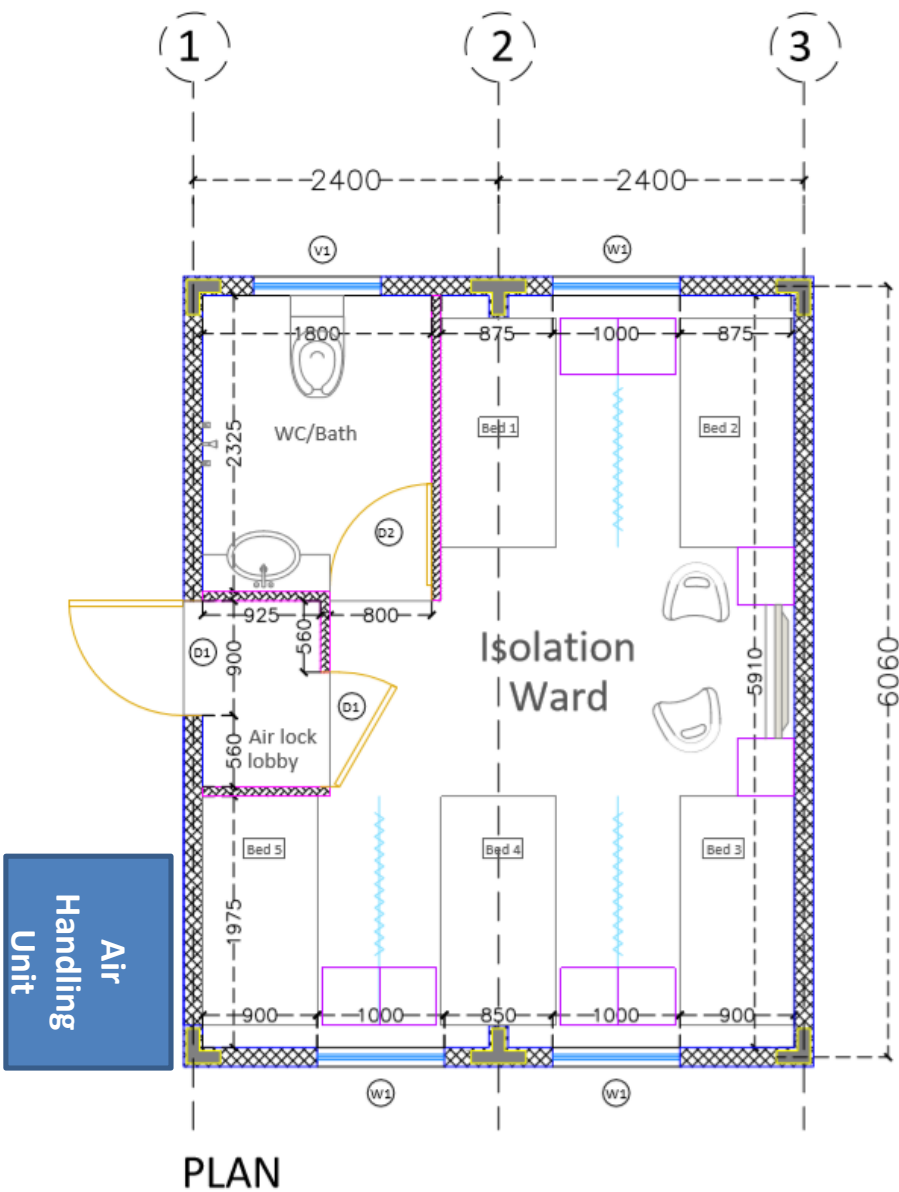
Turn Around Time – 5 Bed Module Isolation Ward – Installation 1 DAY



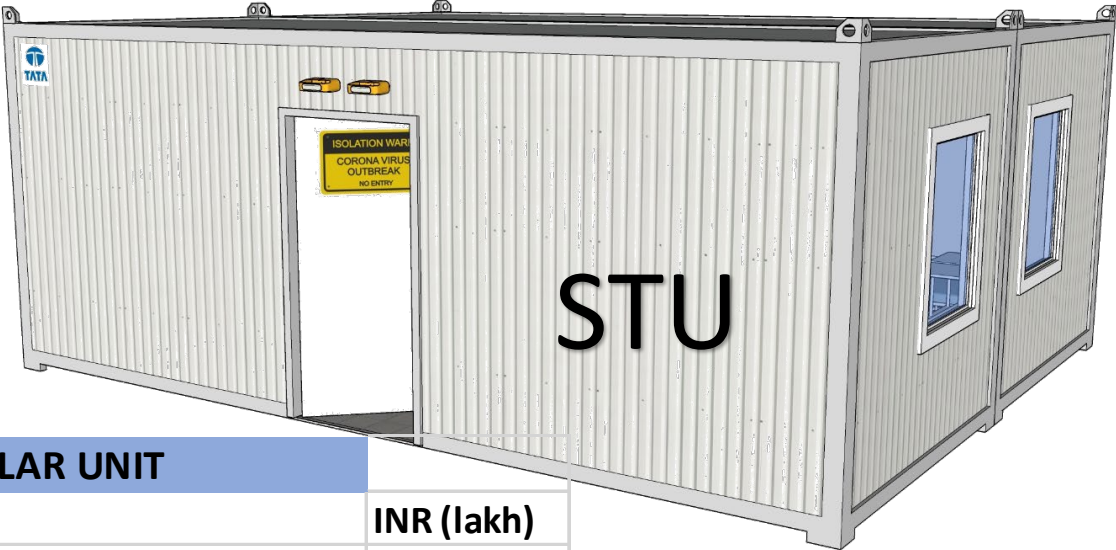
Clock container 6055 x 2435 x 2591 mm, Weight max: 2000 kg

- Roof/ceiling galvanized steel sandwich panel 40-80 mm thickness. Specific load: 150 kg/sq.m
- Walls: galvanized steel sandwich panel 40-80 mm thickness
- Floor: PVC flooring, cement board 18mm, Specific load: 150 kg/sq.m
- Door: double leaf glazed door, 1100x2050mm
- Sanitary engineering: shower tray, basin, toilet bowl, plumbing
- Electric equipment: cable, channel for cable, power socket- 2 pcs, connection box, fuse protector
- -3 pcs. 10 A (1 pcs.) and 16A (2 pcs.), earthing, 2 lights, light switch





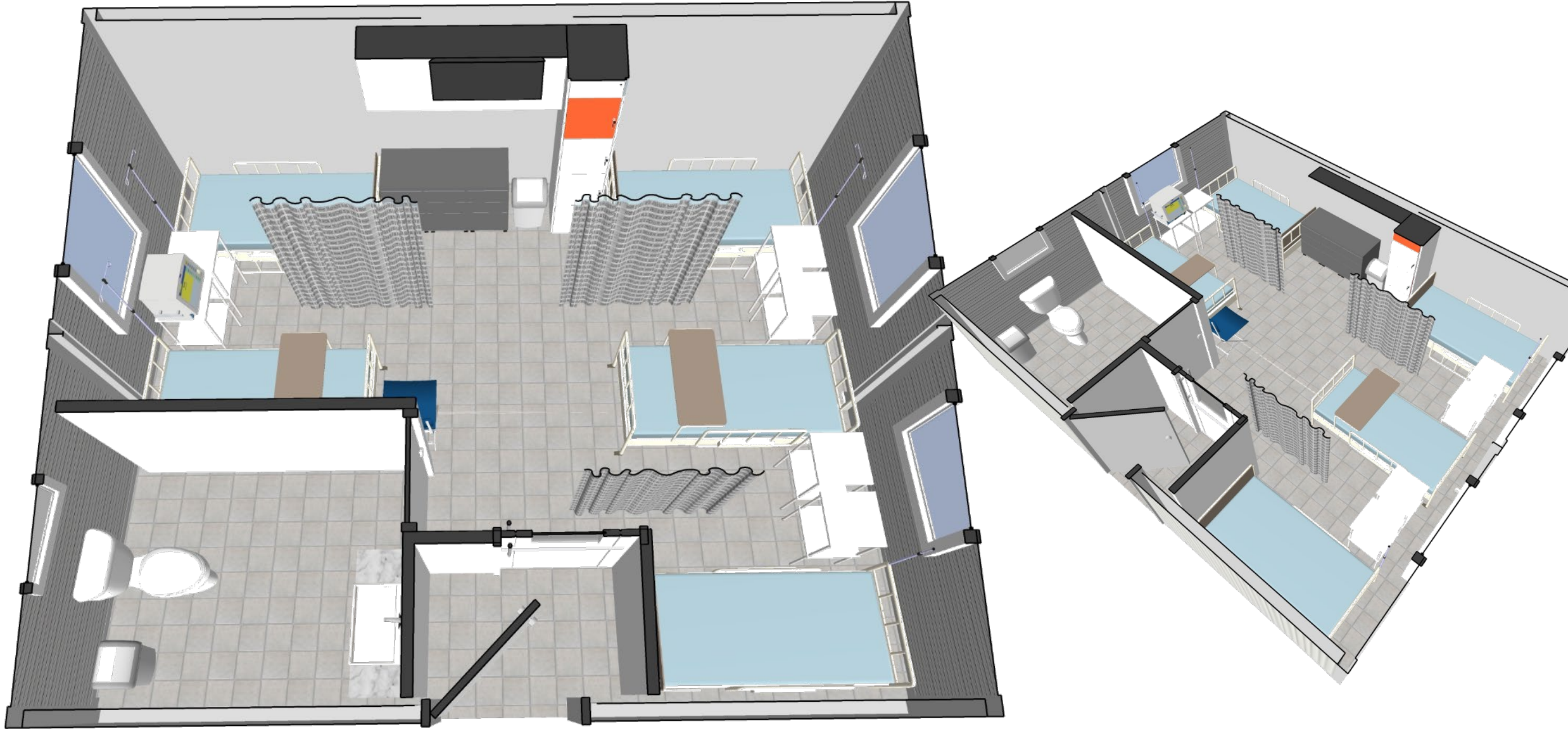
STU = STANDARD TATA UNIT

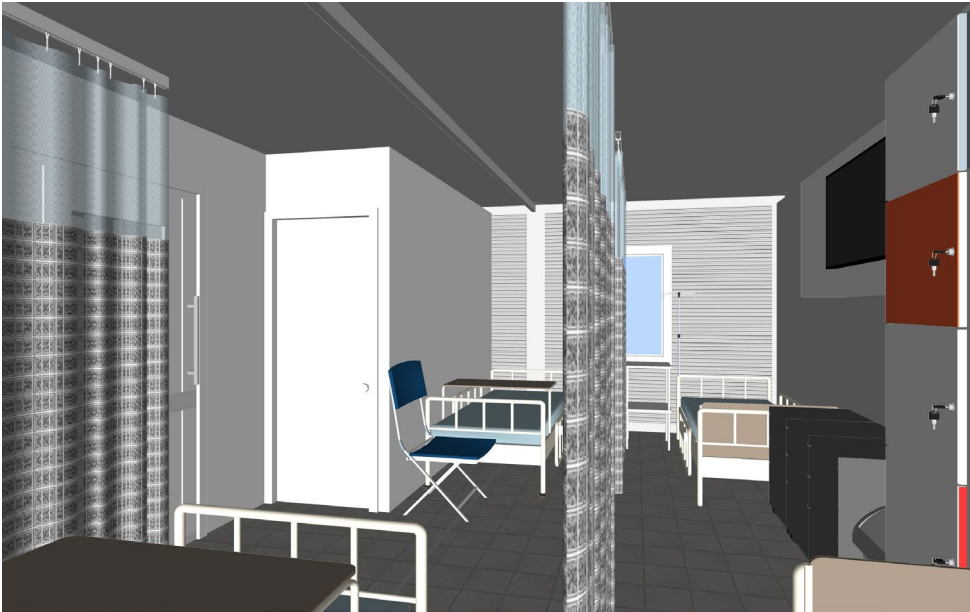
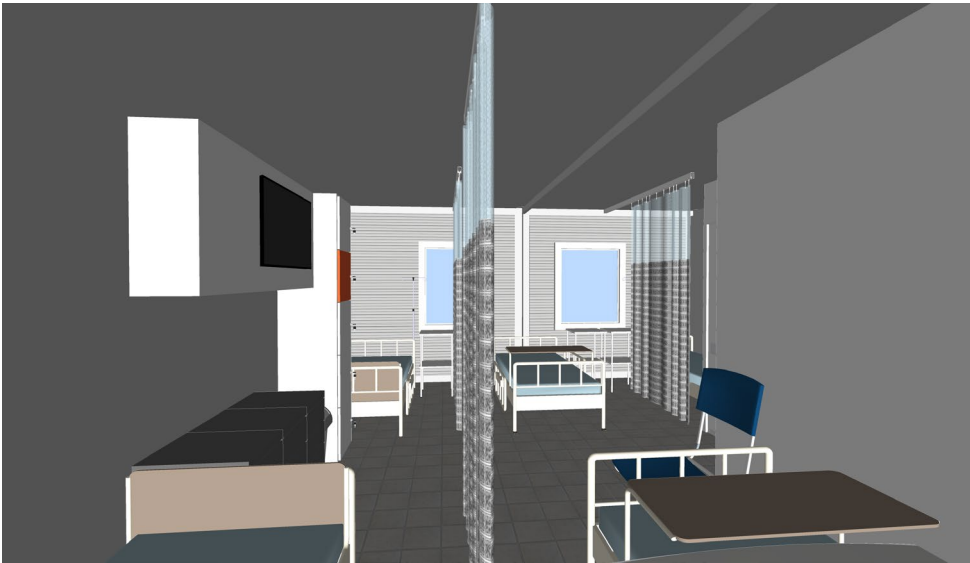


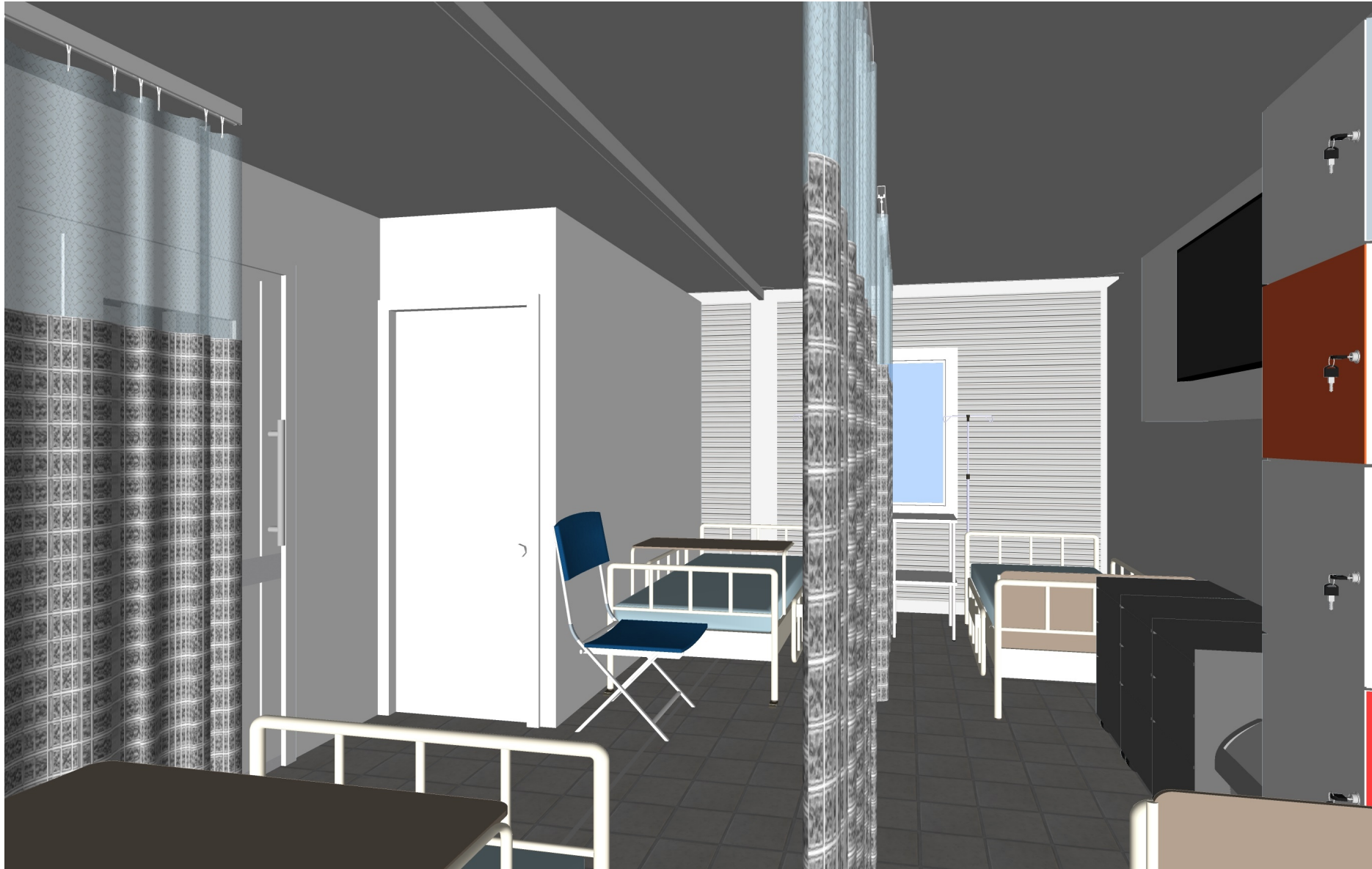
COST Model for MODULAR UNIT

Item	INR (lakh)
5 Bed Standard Module:	8.85
Air Handling/HVAC and Other services:	2.9
Water & Waste Water Handling (optional):	0.3
Furniture (Bed, accessories, TV etc):	0.85
Medical Supplies	0.25
	13.15
Transportation, installation & Misc (7.5%)	0.99
Grand Total	14.14
Total No of bed	5
Per unit cost	2.83

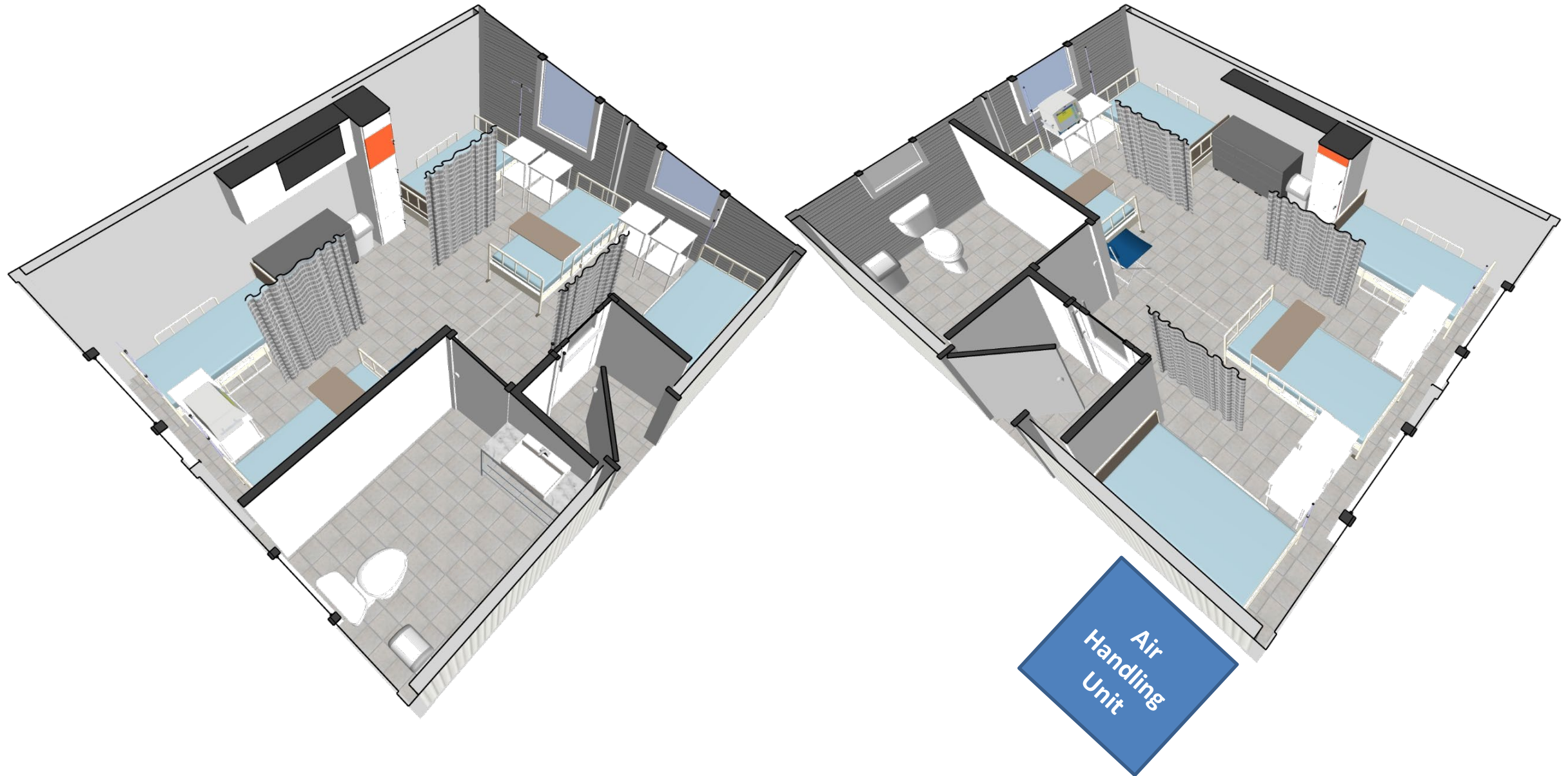
2.1 WARD LAYOUTS – ISOLATION MODULAR UNIT (STU)







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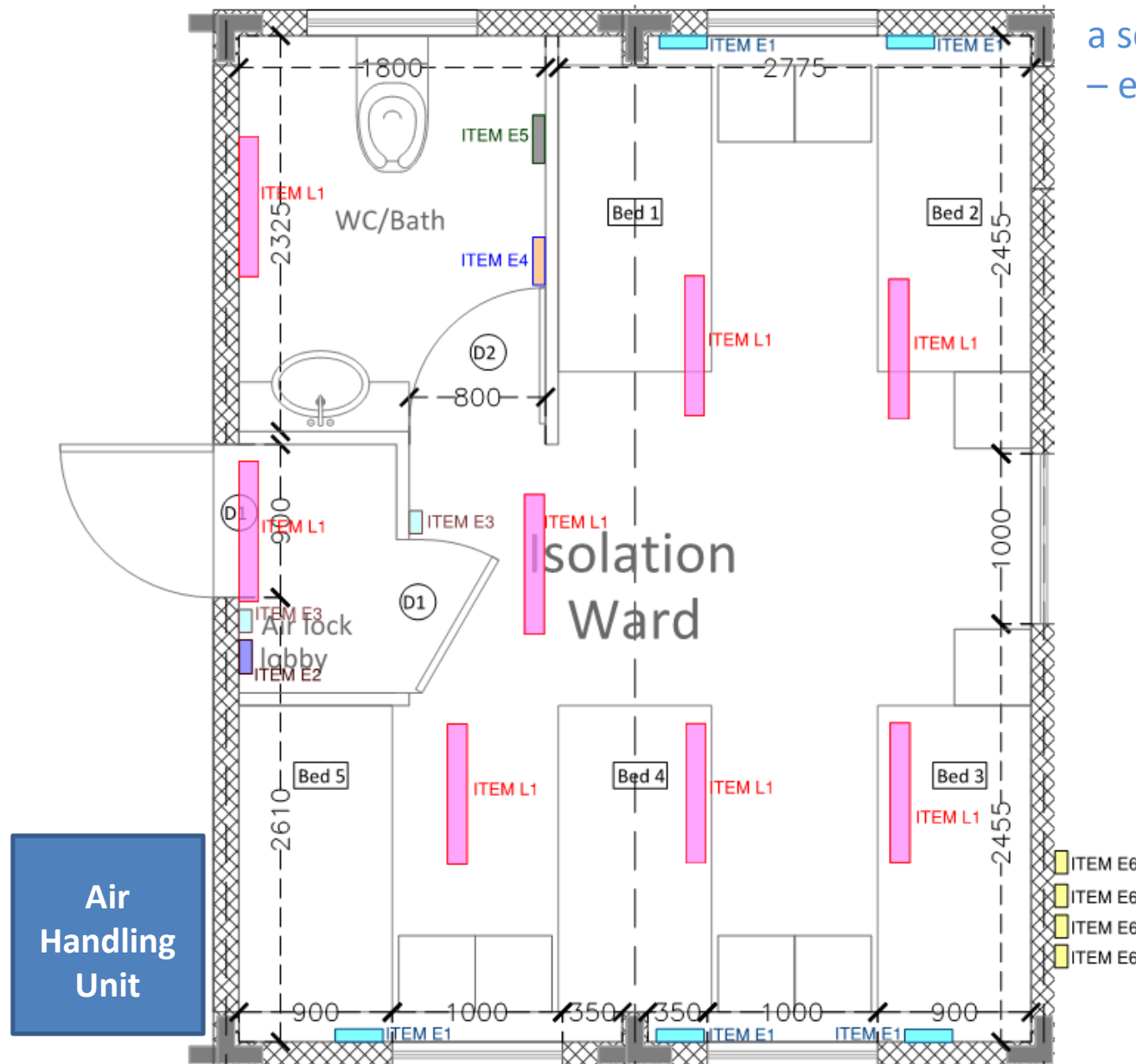
a scalable and rapid mass manufacture modular approach
– erection in 1 day.

Modular standalone Isolation WARD

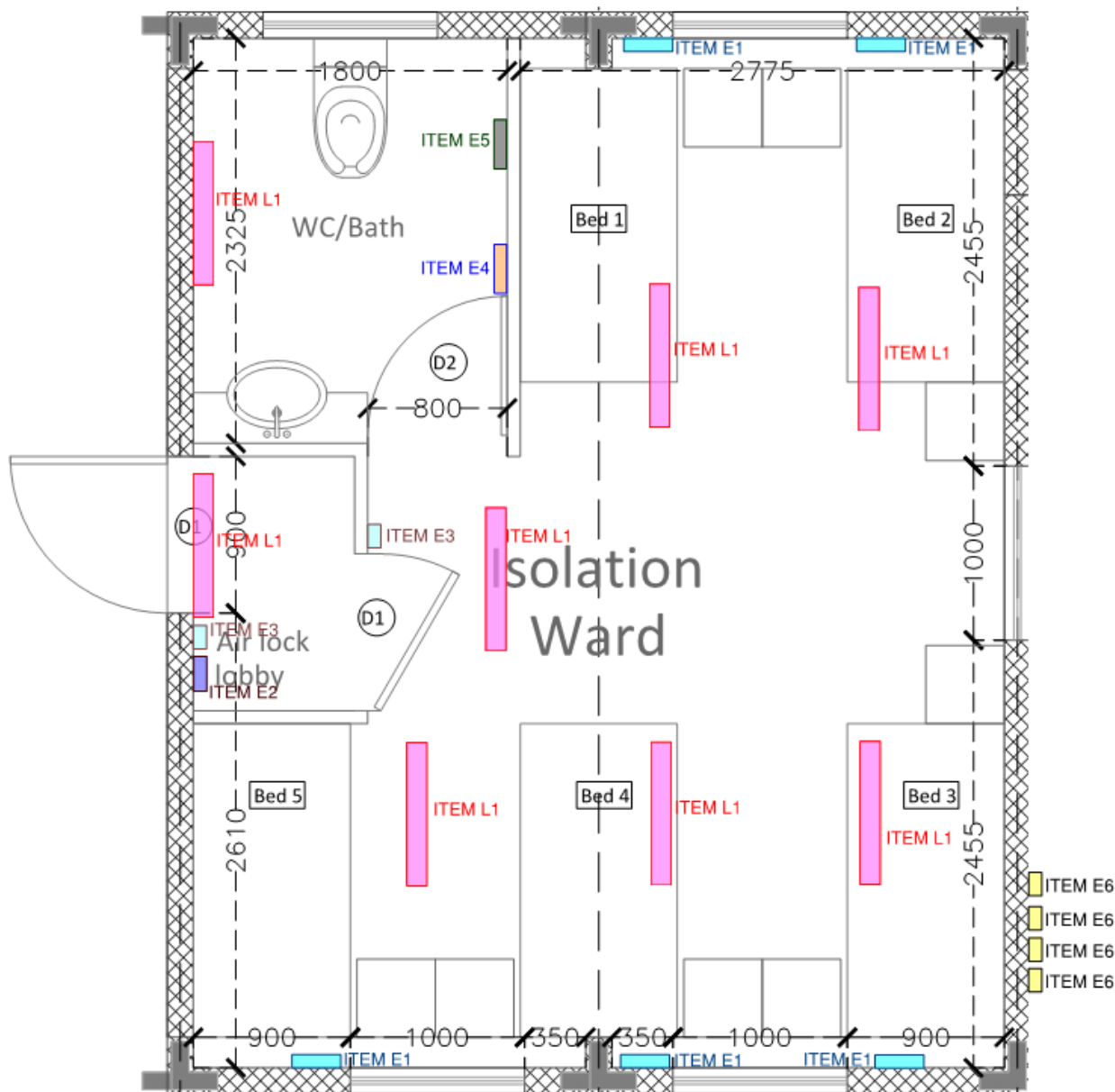
1. 5 Bed (36"x72") with 1 Toilet
2. 6 Light, 10 electrical sockets
3. Air Lock Lobby
4. Unit to have NEGATIVE PRESSURE
5. Maintain internal ambient temperature between 27-28 degree
6. Space for Water provision, TV, etc

External Air Handling Unit

1. Maintain internal temperature between 27-28 Degree
2. Maintain Negative Pressure inside the Isolation ward
3. Treat extracted air with high temperature and UV to destroy COVID



SINGLE MODULE of STU (Standard Tata Unit) – Electrical fittings



Legends

Item : E1
Electric Switch Sockets
2 Switch Socket 16A, 1-Ø, 230V, 50Hz
2 Switch Socket 6A, 1-Ø, 230V, 50Hz

Item : E2
Distribution Board and MCBs
10 Way TPN 10kA Distribution Board
63A 10kA MCCB Incomer
5 32A TPN 10kA MCB Outgoing
14 16A SPN 10kA MCB Outgoing
1 20A SPN 10kA MCB Outgoing

Item : E3
1 Switch Socket 16A, 1-Ø, 230V, 50Hz
1 Light switch 6A, 1-Ø, 230V, 50Hz

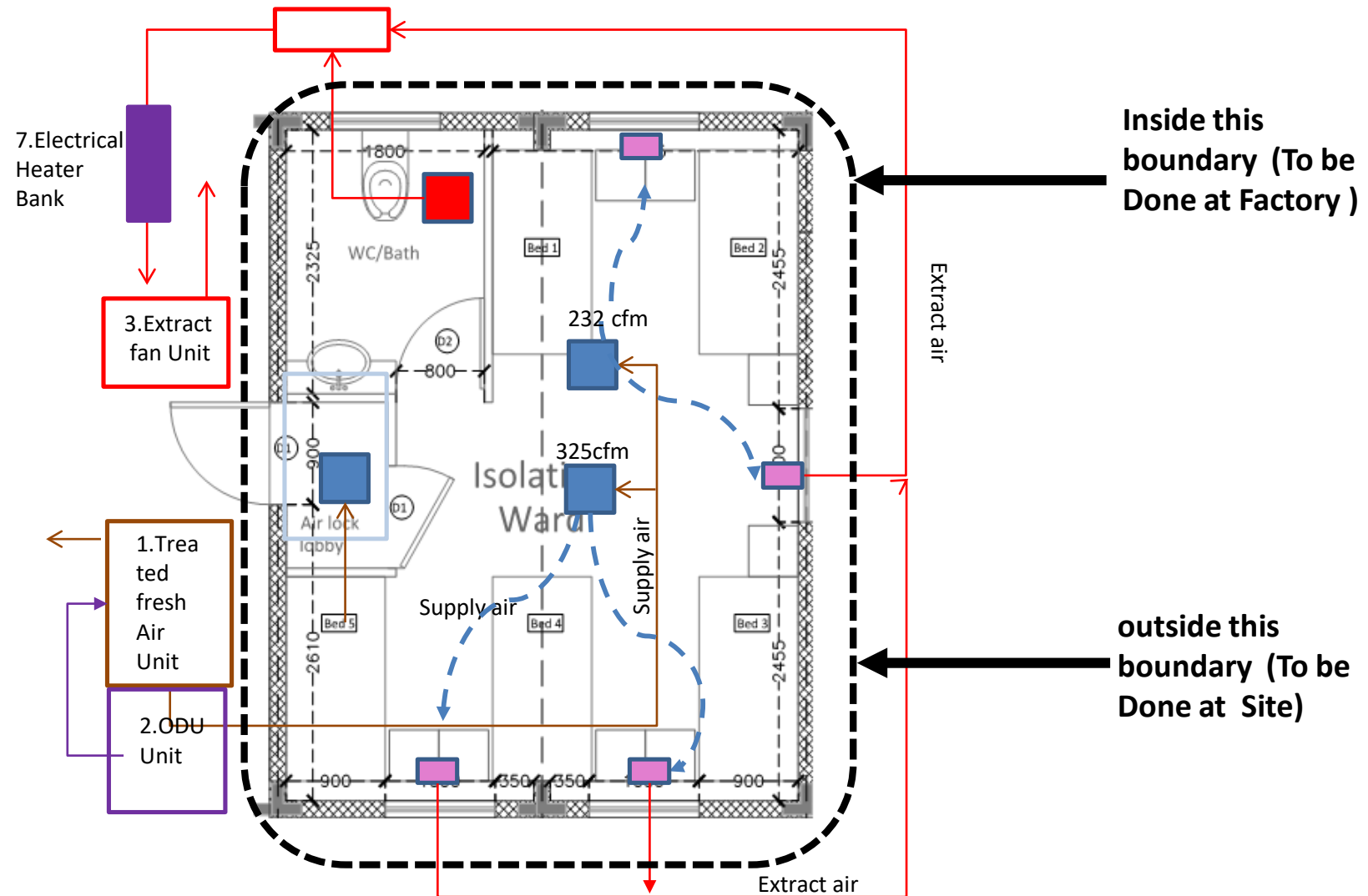
Item : E4
1 Switch 20A, 1-Ø, 230V, 50Hz
1 Light switch 6A, 1-Ø, 230V, 50Hz

Item : E5
1 Socket 20A, 1-Ø, 230V, 50Hz

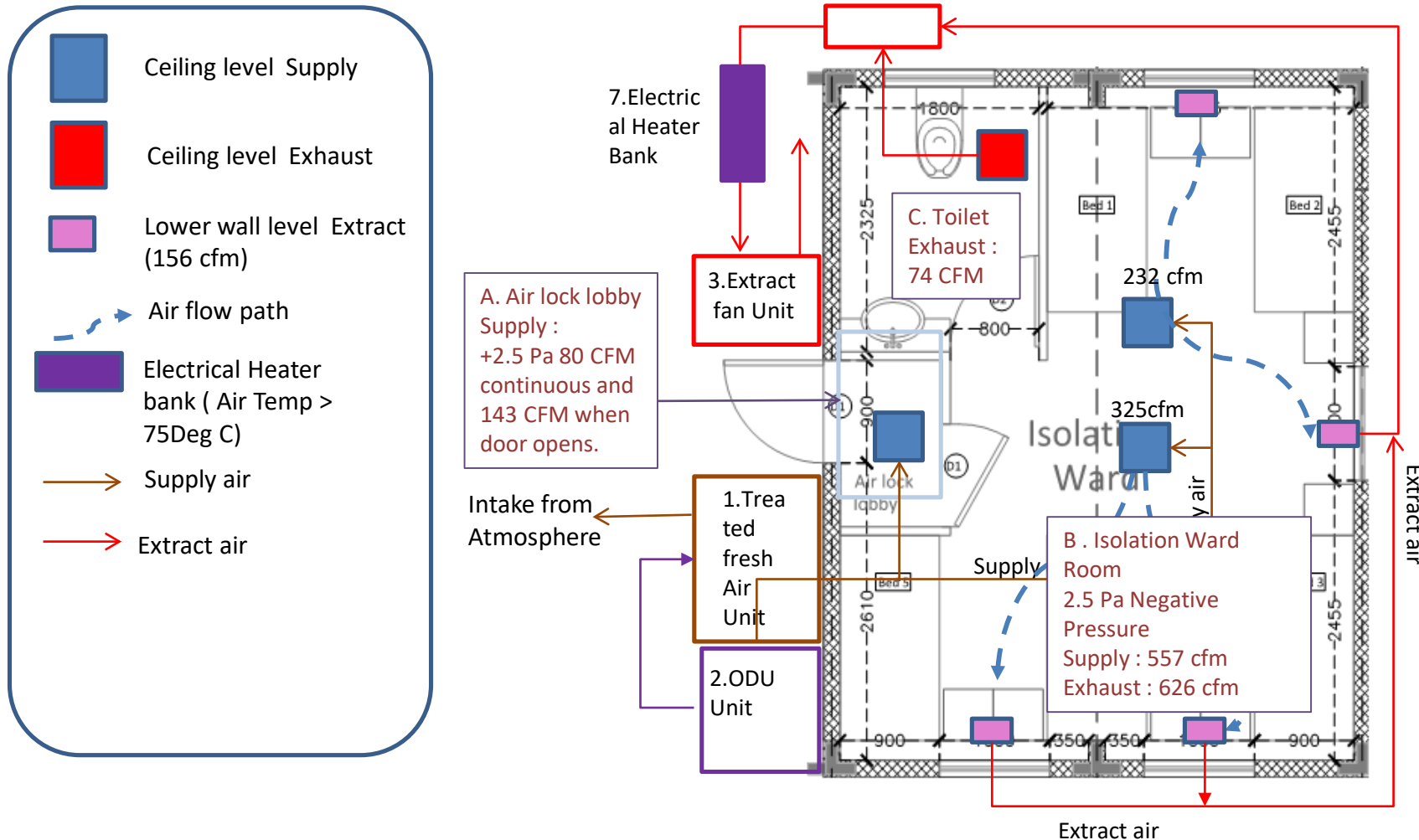
Item : E6
4 32A TPN 10kA MCB Outgoing for further distribution of VRV, TFA, Duct Heater, Scrubber Exhaust Fan

Item : L1
22W T5 Led Light

HVAC Scope Categorization



Air Flow Diagram and Scheme



HVAC Features

1. SAME UNIT CAN BE MADE NON AIR CONDITIONED FOR NON HUMID AREAS AND NON CRITICAL CARE.
2. Maintain internal temperature between 26-28 Degree . With 12 Air changes per hour.
3. Maintain Negative Pressure inside the Isolation ward.
4. Positive Pressurized Air Lock to keep Outside air from entering.
5. Treat extracted air with high temperature and UV to destroy COVID

Legends

Item : E1
Electric Switch Sockets
2 Switch Socket 16A, 1-Ø, 230V, 50Hz
2 Switch Socket 6A, 1-Ø, 230V, 50Hz

Item : E2
Distribution Board and MCBs
10 Way TPN 10kA Distribution Board
63A 10kA MCCB Incomer
5 32A TPN 10kA MCB Outgoing
14 16A SPN 10kA MCB Outgoing
1 20A SPN 10kA MCB Outgoing

Item : E3
1 Switch Socket 16A, 1-Ø, 230V, 50Hz
1 Light switch 6A, 1-Ø, 230V, 50Hz

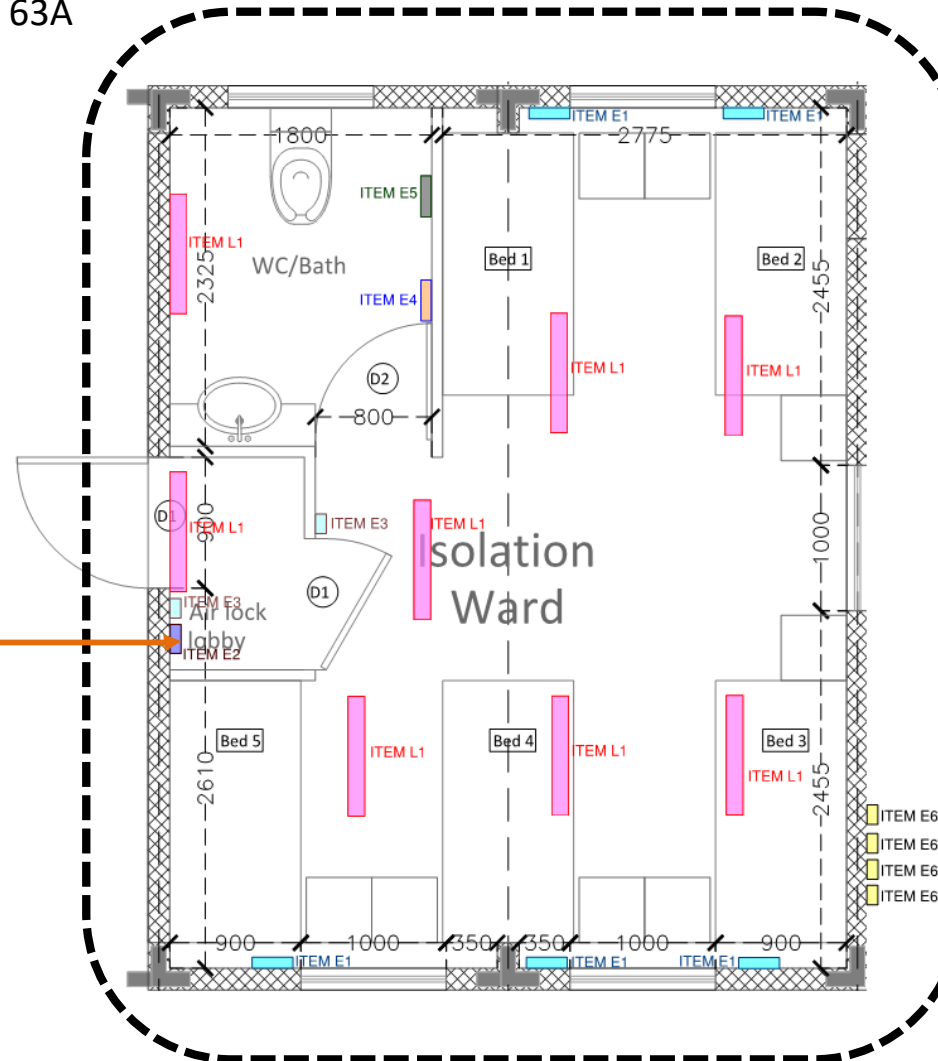
Item : E4
1 Switch 20A, 1-Ø, 230V, 50Hz
1 Light switch 6A, 1-Ø, 230V, 50Hz

Item : E5
1 Socket 20A, 1-Ø, 230V, 50Hz

Item : E6
4 32A TPN 10kA MCB Outgoing for further distribution of VRV, TFA, Duct Heater, Scrubber Exhaust Fan

Item : L1
22W T5 Led Light

Incoming Power ,
415V , 50Hz, 63A

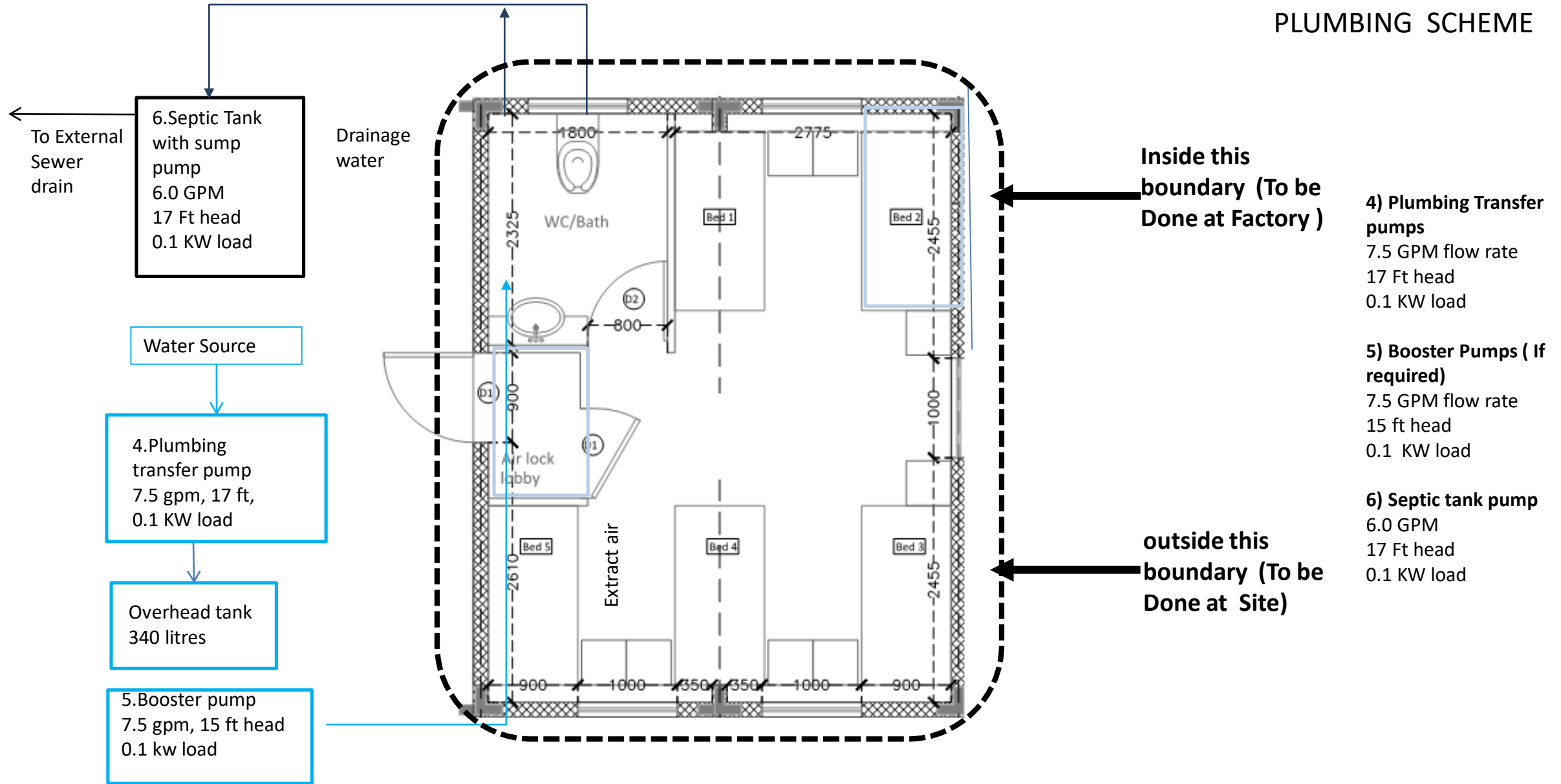


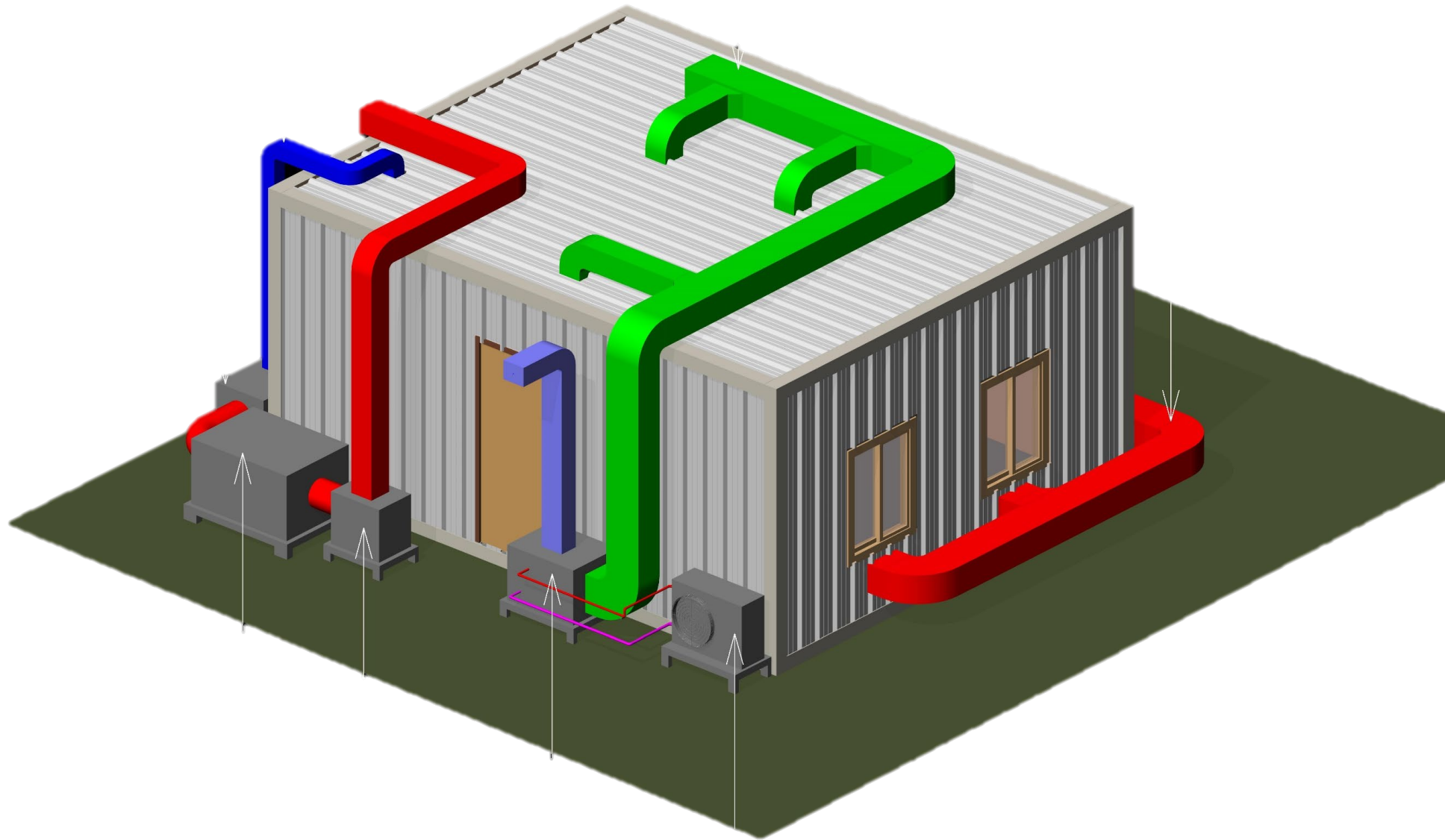
ELECTRICAL SCHEME

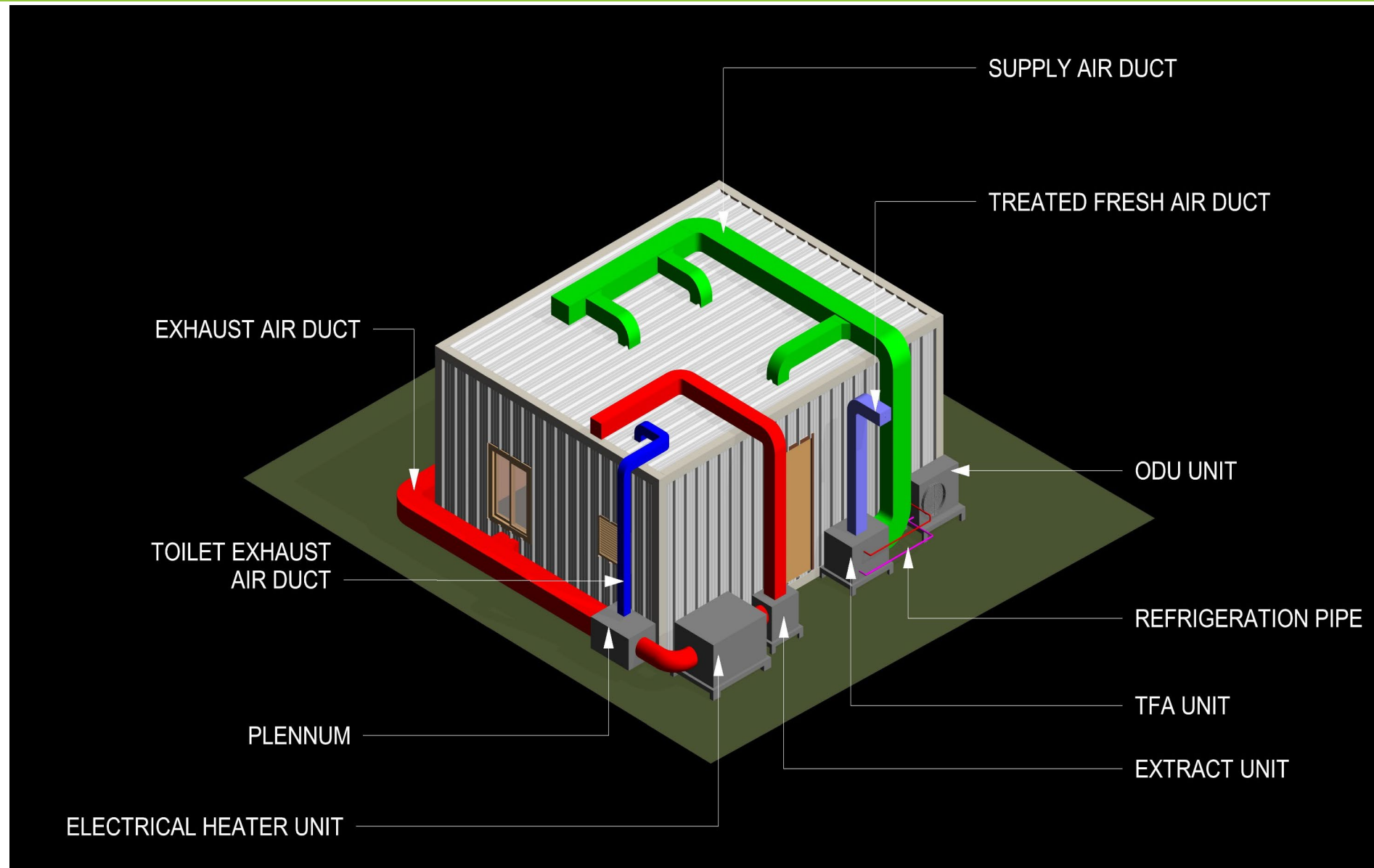
Inside this
boundary (To be
Done at Factory)

outside this
boundary (To be
Done at Site)

PLUMBING SCHEME

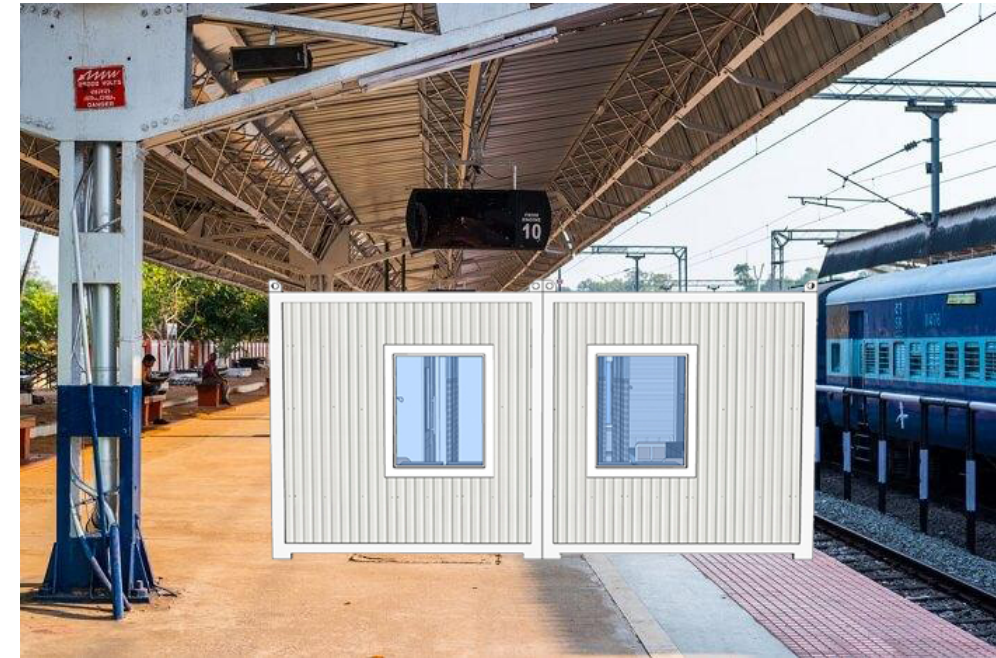


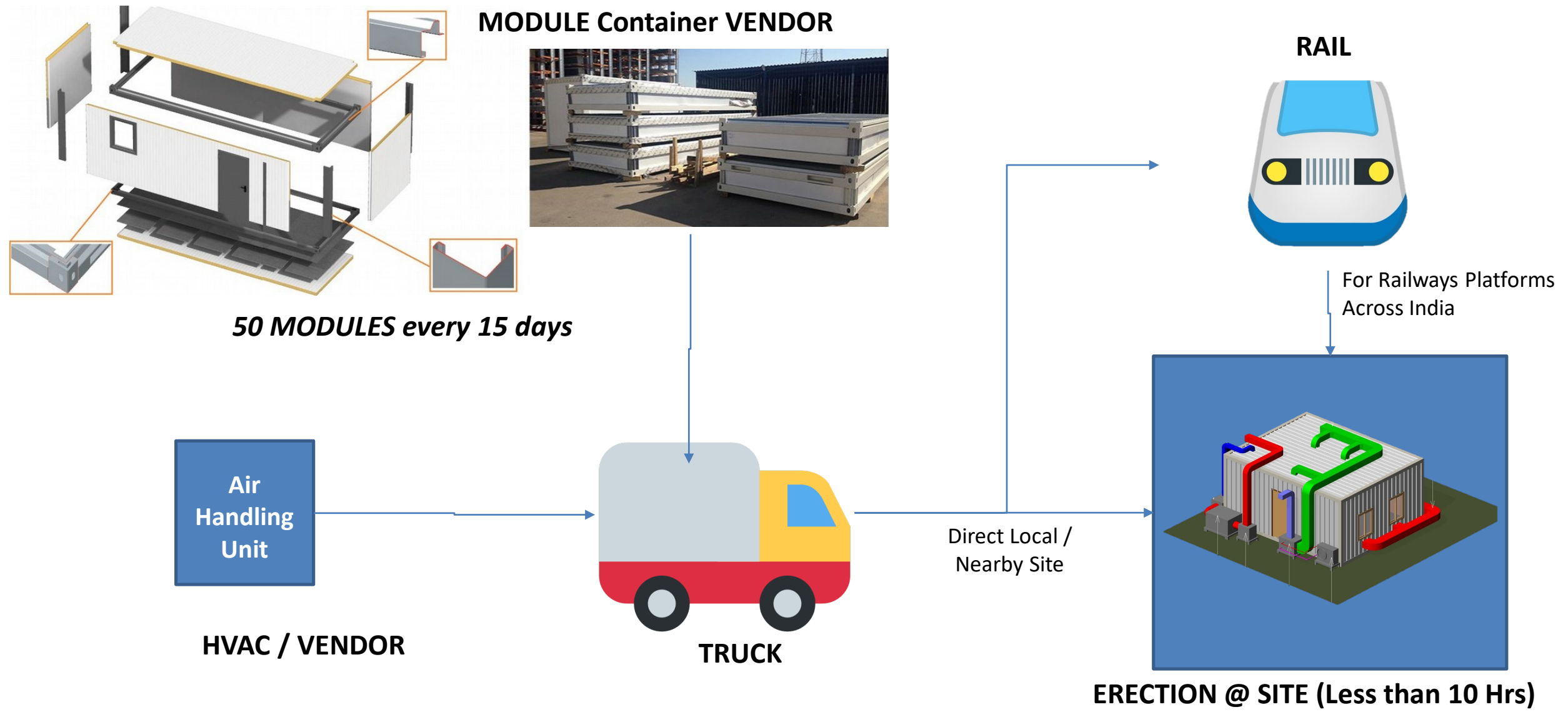


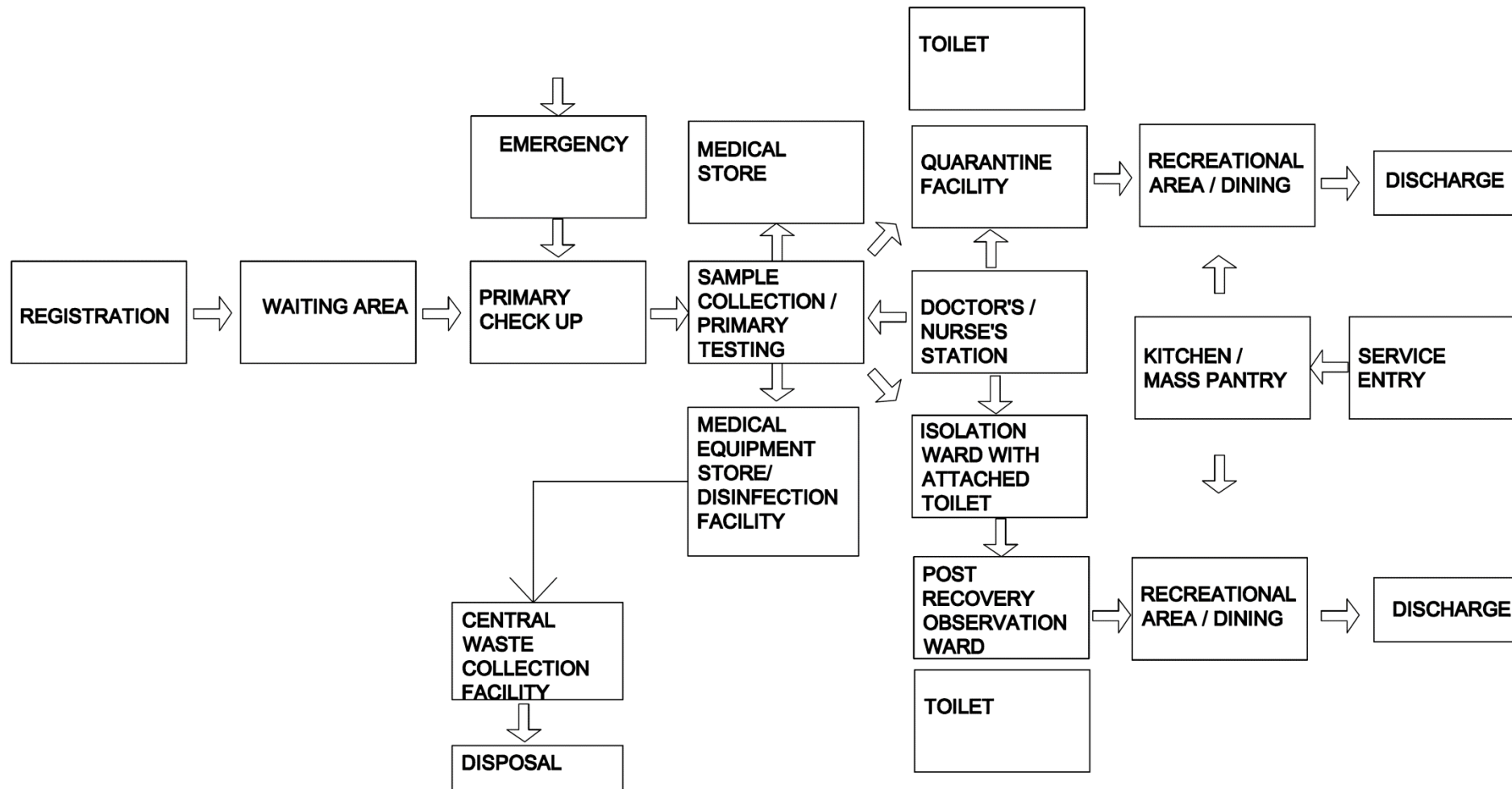


COST Model for MODULAR UNIT	
Item	INR (lakh)
5 Bed Standard Module:	8.85
Air Handling/HVAC and Other services:	3
Water & Waste Water Handling (optional):	0.3
Furniture (Bed, accessories, TV etc):	0.85
Medical Supplies	0.25
Total Buy Cost	13.25
Per unit cost - Installed	2.65
Transportation, installation & Misc (10%)	1.33
Grand Total	14.58
Total No of bed	5
Per unit cost - Installed	2.92

2.1 EXAMPLE – PLATFORM ERECTION









2

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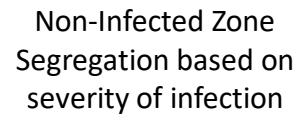


GREENFIELD APPROACH

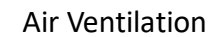
2.2 Cluster

(Large Tract of Land, Remote Locations)

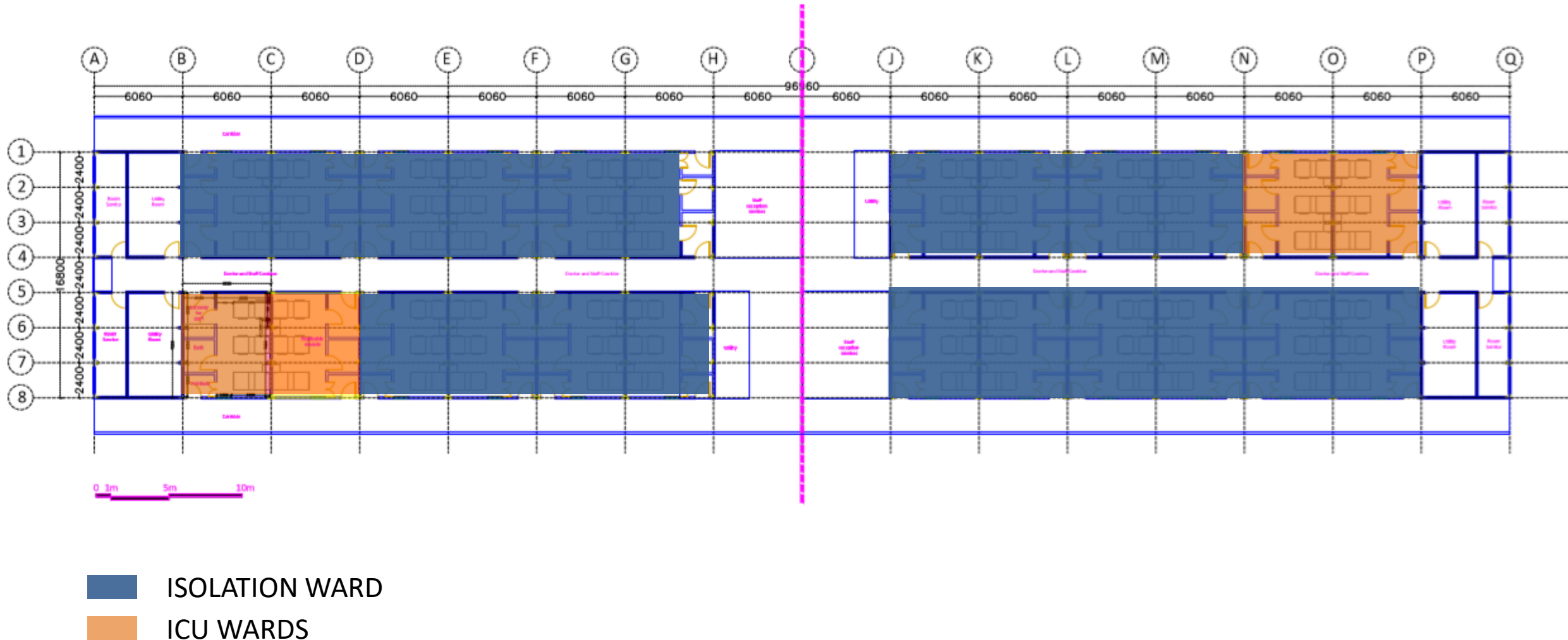
Turn Around Time 45- 50 Days

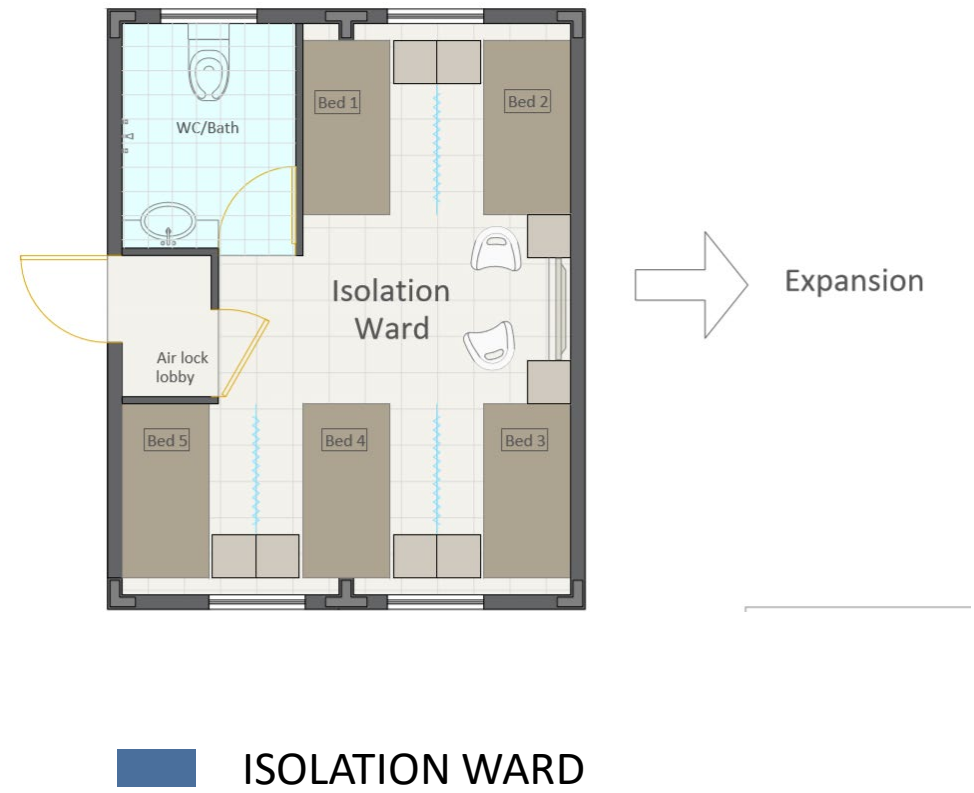
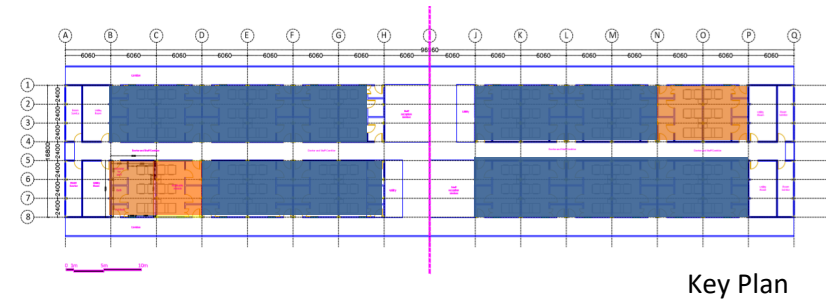
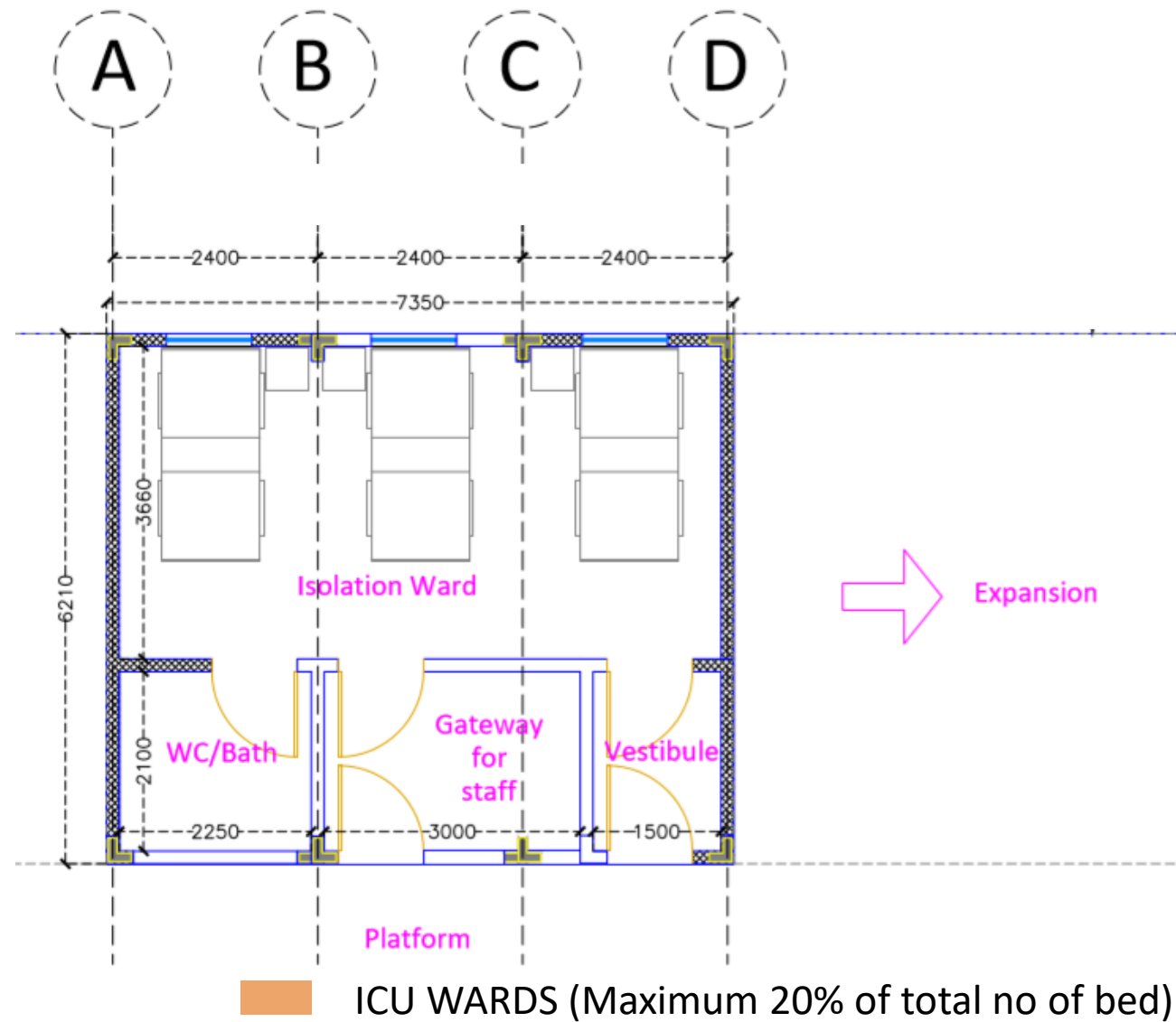


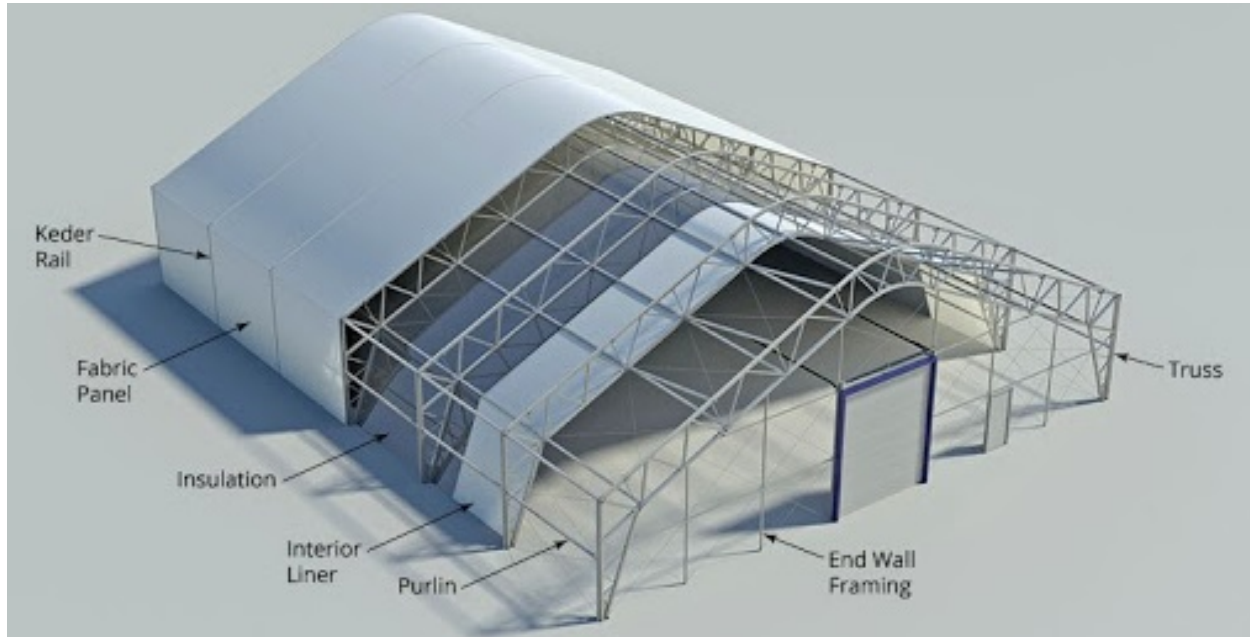
* Design Ideation might occur in further consultation with Medical Experts



Each cluster would need around 20% provision for ICU Modules





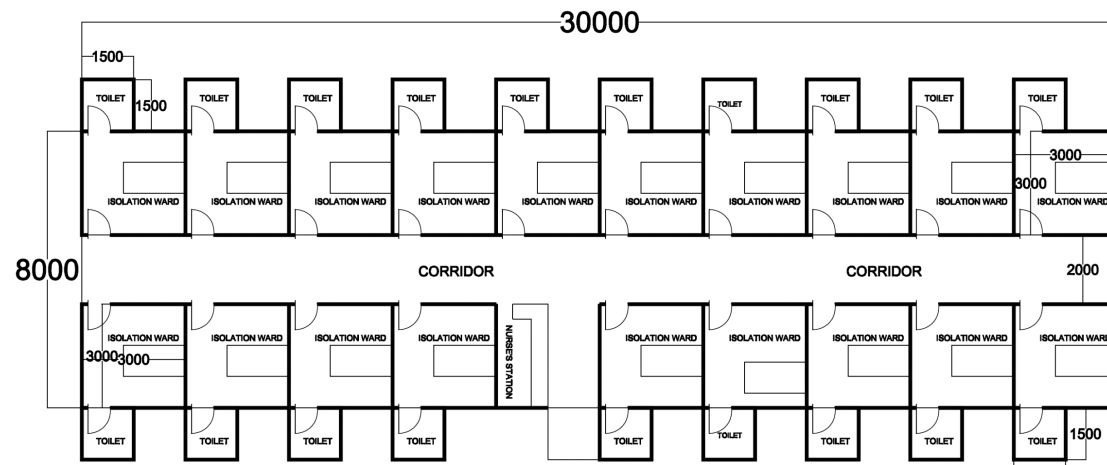


Tensile structure

- Fast and Easy construction
- Can be constructed in remote areas
- No specialized skill required



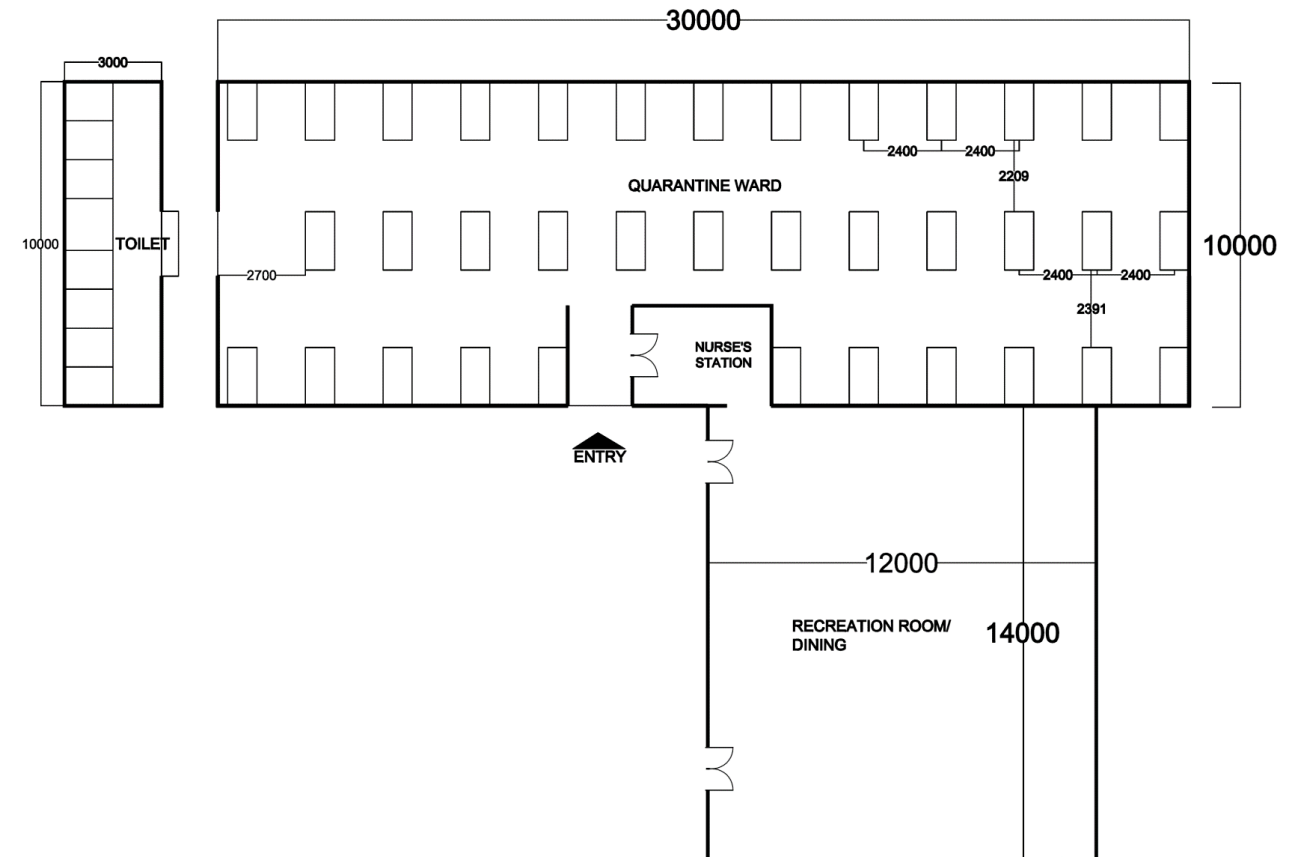
ISOLATION WARD



Typical layout plan -isolation ward

Can be divided into 15 m x 8 m / 5m x 15 m module

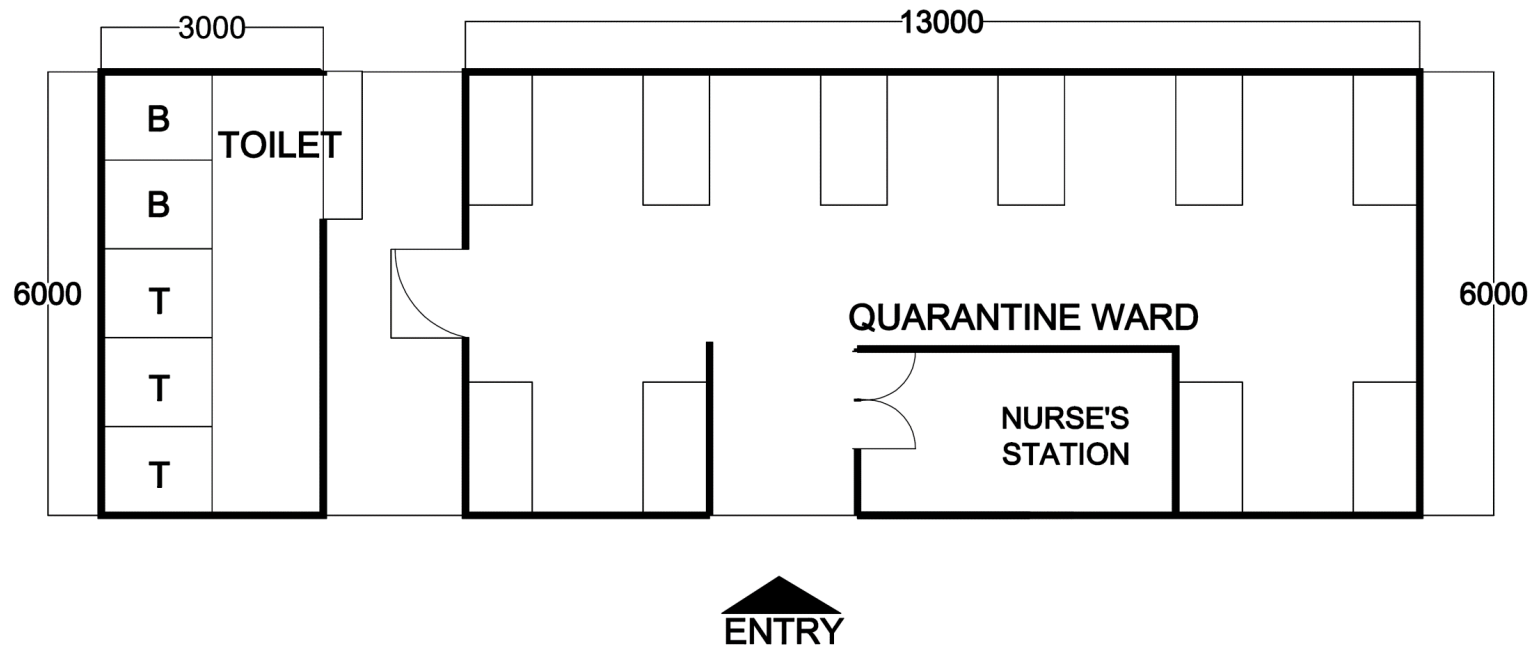
QUARANTINE WARD



Typical layout plan – quarantine ward

* Design Ideation might occur in further consultation with Medical Experts

10 PAX MODULE



TYPICAL LAYOUT PLAN -QUARANTINE WARD

GREENFIELD APPROACH

POTENTIAL SITES

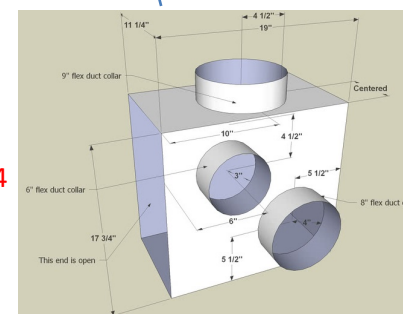
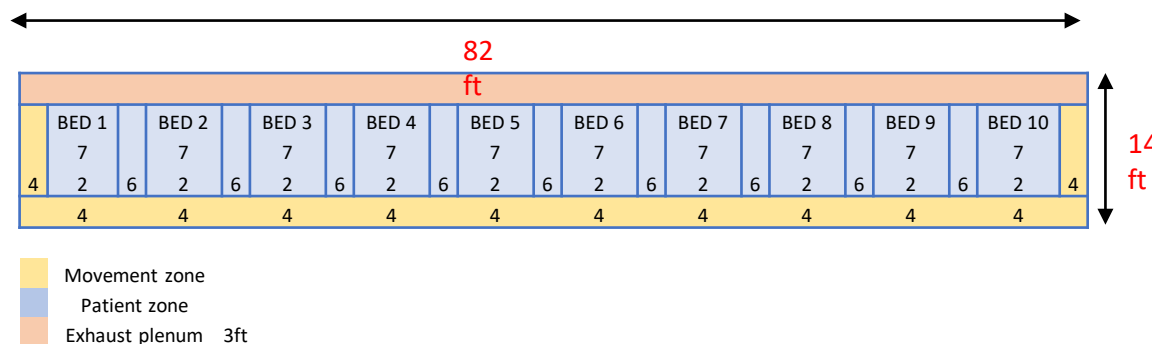
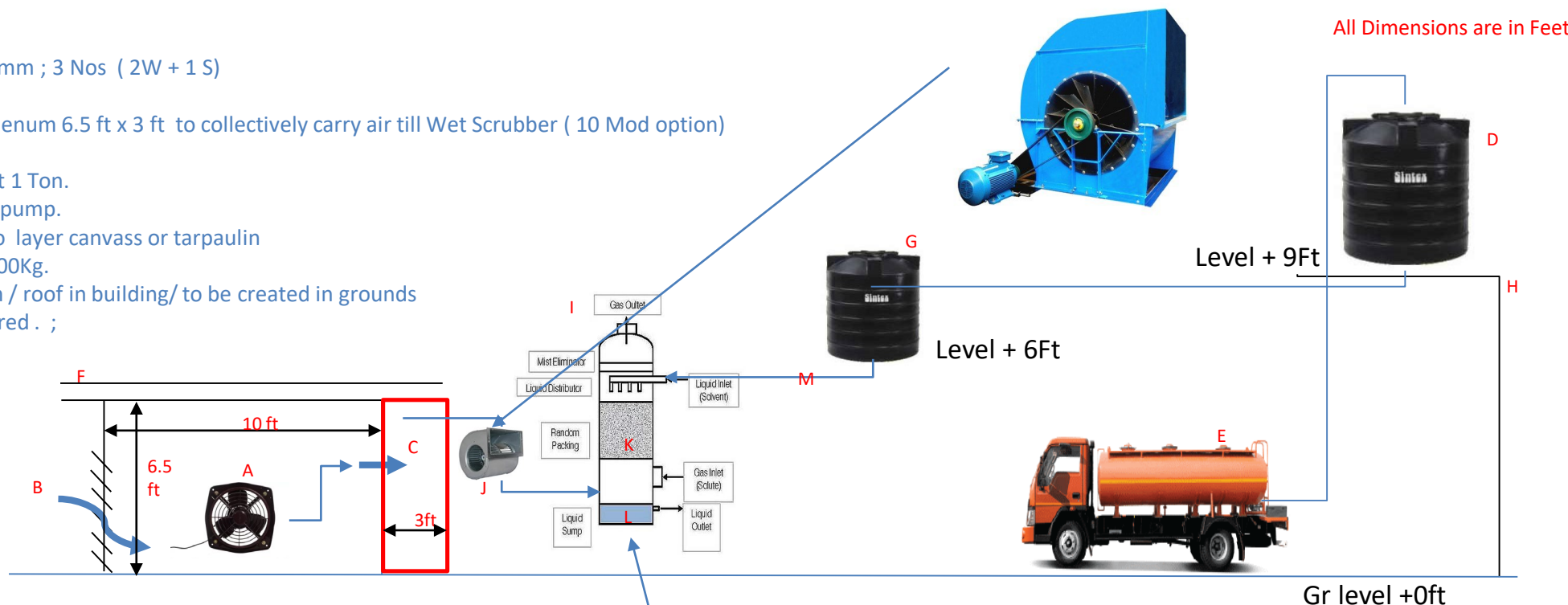
1. COMMUNITY GROUNDS
2. SCHOOL PLAYGROUNDS
3. STADIUMS
4. EMPTY LAND / FIELDS (RURAL)

Note: We would also prefer to use Indian Army and MOH layouts which are already as per standards and ready for implementation.

MEP CHECKLIST _ARRANGEMENT FOR A OPEN GROUND

Air conditioning is not Mandatory

- A. Industrial exhaust fan : 230mm x 230mm ; 3 Nos (2W + 1 S)
- B. General ventilation Opening
- C. Walkable washable UVC lit Exhaust Plenum 6.5 ft x 3 ft to collectively carry air till Wet Scrubber (10 Mod option)
UVC- GI lit if effective
- D. Elevated water tank (1000 Liters) Wt 1 Ton.
- E. Water tanker refill with submersible pump.
- F. Double ventilated roof : Material two layer canvass or tarpaulin
- G. Soap solution tank (500 liters) Wt 500Kg.
- H. Elevated platform / Stands in stadium / roof in building/ to be created in grounds
- I. Washed air outlet May be HEPA filtered . ;
- J. Blower to carry air to get disinfected before release to environment
- K. Wet Bands
- L. Liquid soap solution to be collected and discharged. To ETP
- M. Soap water to wet scrubber

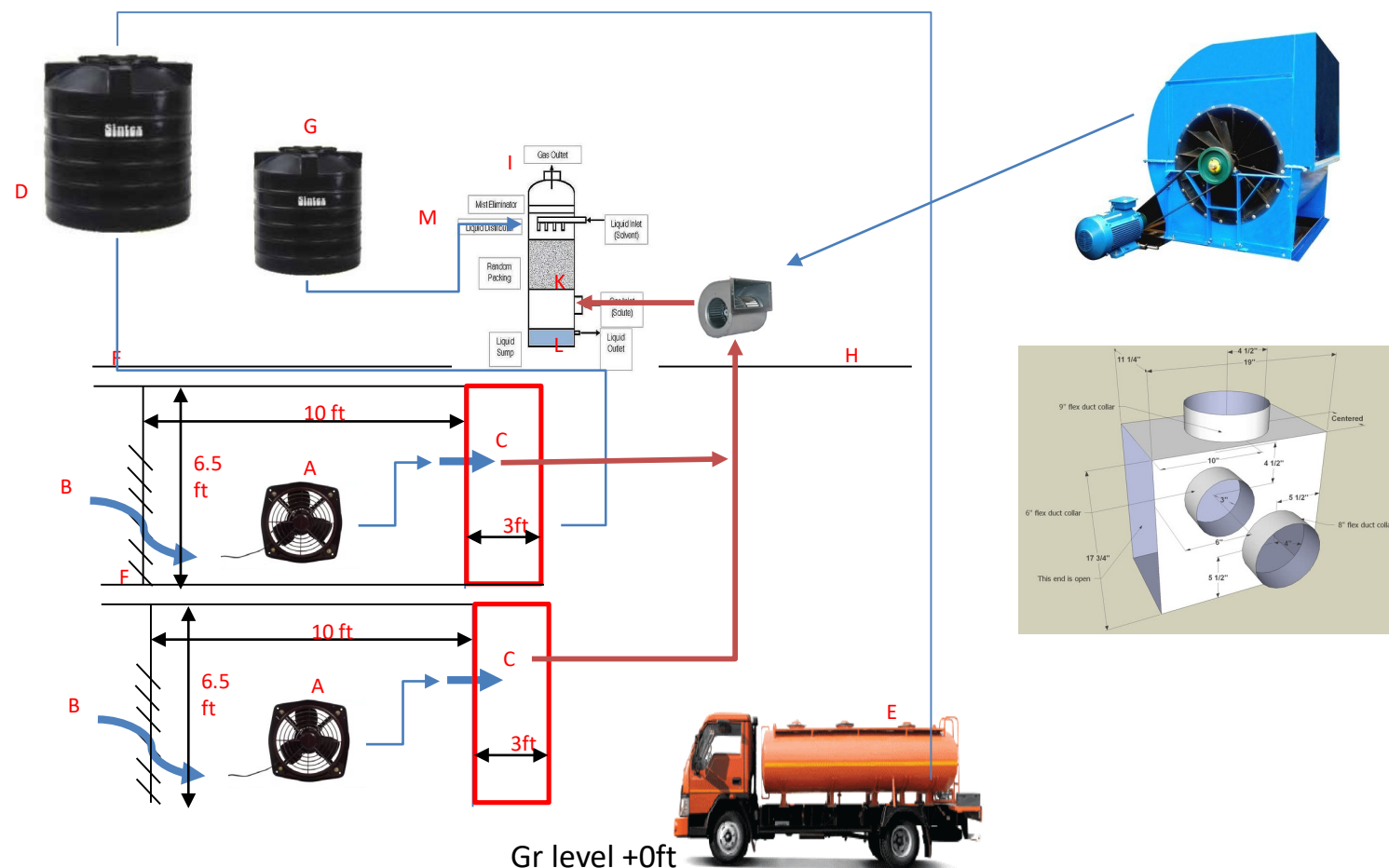


	10 Bed Module				Single Bed room		
	Length	82	ft		Length	6	ft
	Width	11	ft		Width	11	ft
	Height	6.5	ft		Height	6.5	ft
	Area	902			Area	66	
	Volume	5863			Volume	429	
	ACPH	15			ACPH	15	
J	CFM	1465.75			CFM	107.25	
B	Ventilation Opening			B	Ventilation Opening		
	Area	23			Area	2	
	Height	1	ft		Height	1	ft
	Distributed Width	23	ft		Width	2	ft

Air conditioning is not Mandatory

- A. Industrial exhaust fan : 230mm x 230mm ; 3 Nos (2W + 1 S)
- B. General ventilation Opening
- C. Walkable washable UV lit Exhaust Plenum 6.5 ft x 3 ft to collectively carry air till Wet Scrubber (10 Mod option) UV lit if effective
- D. Elevated water tank (1000 Liters) Wt. 1 Ton.
- E. Water tanker refill with submersible pump.
- F. Double ventilated roof : Material two layer canvass or tarpaulin
- G. Soap solution tank (500 liters) Wt. 500Kg.
- H. Elevated platform / Stands in stadium / roof in building/ to be created in grounds
- I. Washed air outlet May be HEPA filtered . ;
- J. Blower to carry air to get disinfected before release to environment
- K. Wet Bands
- L. Liquid soap solution to be collected and discharged. To ETP
- M. Soap water to wet scrubber

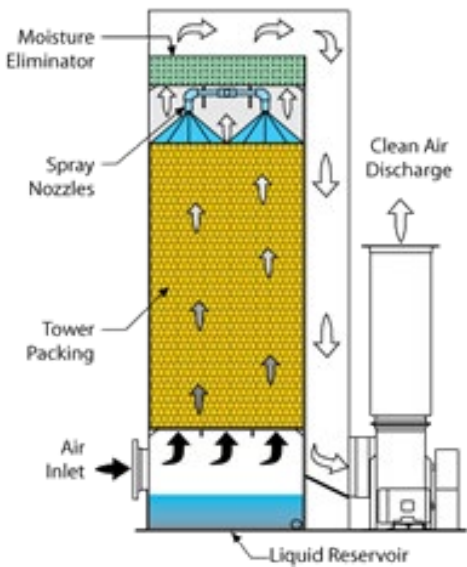
All Dimensions are in Feet



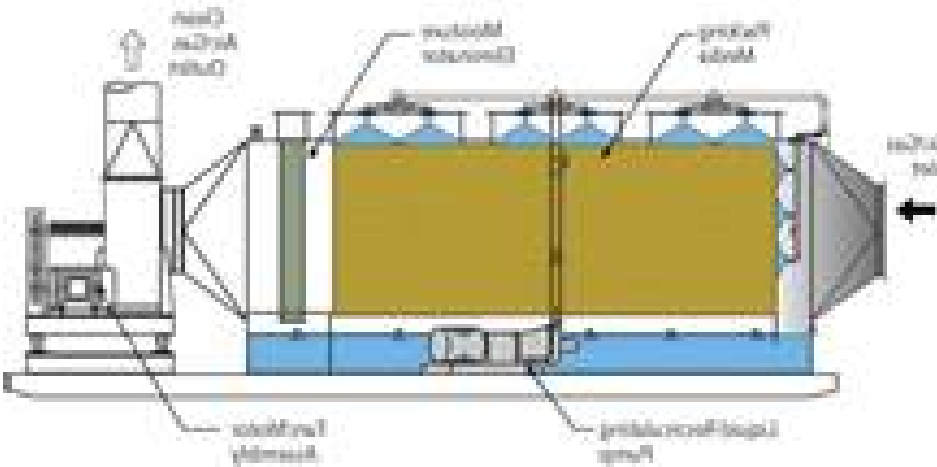
	10 Bed Module			Single Bed room		
	Length	82	ft	Length	6	ft
	Width	11	ft	Width	11	ft
	Height	6.5	ft	Height	6.5	ft
	Area	902		Area	66	
	Volume	5863		Volume	429	
	ACPH	15		ACPH	15	
J	CFM	1465.75		CFM	107.25	
B	Ventilation Opening		B	Ventilation Opening		
	Area	23		Area	2	
	Height	1	ft	Height	1	ft
	Distributed Width	23	ft	Width	2	ft

A detailed procurement list is attached for three g=categories:

- 1. MEP procurement
- 2. Civil work procurement
- 3. Medical procurements



Wet scrubber
type Industrial:



Wet scrubber
type commercial:

MEP LIST	ARCHITECTURAL/ CIVIL/ Interior	MEDICAL
1. PIR DUCTS / fabric ducts / flex ducts	1. Flooring –Tactical Flooring - Ex- The HexaDeck® system tiles snap together without the use of tools. Tiles are hexagonal and only 26 inches (66 cm) at the widest point with each tile weighing 6 lbs. (2.72 kg).	Patient Kit to have the following
2. GSS_duct material 18 guage	2. Walls - Assuming we will not get plastered wall – we will need prefab sheets like Bison Bard to nail directly on the wall or in Luminum channels (we should get it ready-made so no painting or finishing is done on-site)	1. Buckets 1 per bed for discarding Linen
3. Manual oppsed blade Damper 400mm x 400mm	3. Antiskid tiles to be fixed with adhesives to make the process fast in toilets	2. Medicine Carton Box 9 X 12 inches to discard Cotton Balls/Gauze Pieces etc
4a . Wet Scrubber Unit with Starter panel and VFD (50 mm ESP ; unit: 5000 cfm & 10000 CFM). W/O Hepa	4. Lighting fixtures – LED tubes for all areas	3. Sputum Container 1 per Bed
4b. Wet Scrubber Unit with Starter panel and VFD (100 mm ESP ; unit: 5000 cfm & 10000 CFM). W Hepa	5. External wall to be sealed with arecon panels if we get it open	4. Full sleeved Gowns (For patients)
5. SISW & DIDW fans with casing and starter panel and VFD 2500 & 5000 cfm	6. Windows-based on design should be in aluminum channels but should be standardise based on market needs – Fabrication should be avoided , Windows should be used only for light and avoid using for ventilation	5. Surgical Masks N 95 (Many dozens)
6. Sintex - 1000 ltr & 500ltr, 100ltr	7. Garbage bins to be added with disinfected liners	6. Surgical Caps (Many Dozens)
6.1 UPVC pipes 100mm, 80mm , 20, 15 , 50 mm Nominal Dia	8. Ceilings should be quick gypsum sheet directly nailed on aluminum profiles – again avoid painting on site. If need be to add wall paper to it for quick ascetics or just leave as it is	7. Infra Thermometer Touchless (Many Dozens)
7. Plastic Air Curtains	9. Door – Pre Fabricated doors	8. Hand Rubs
8. Plastic sheets / Tarpaulins / Canvass	10. Curtains	On Admission
9. line testers / Multi testers	Loose Furniture/Items	10. Wash Basin with Soap and Running water
10. Cables	9. Single Bed	12. Disposable Towels
3.5Cx35 sqmm AL Arm. Cable	11. Bedside locker, wooden	14. IV Stands with Oxygen if needed
3.5Cx25 sqmm AL Arm. Cable	13. Cabinet for drug	16. Patient Bed with Masks
4Cx16 sqmm AL Arm. Cable	15. Cabinet for Linin	PPE Equipment during Care for Health Worker :
3Cx4 sqmm Cu flexible cable	17. Conference table	21. Shoes
11. Single compression Glands	18. Clothing lockers, metal	23. Mask
3.5Cx35 sqmm AL Arm. Cable	19. Cupboard	25. Cap
3.5Cx25 sqmm AL Arm. Cable	20. Desk, single pedestal with 3 drawers	27. Goggles
4Cx16 sqmm AL Arm. Cable	22. Chairs	29. Disposable Gloves
3Cx4 sqmm Cu flexible cable	24. Examination Stools	31. Protection of air entry to nose mouth eyes to minimum in the above environment to care for wellbeing of Health worker
12. AL/Cu Lugs	26. Wall clock	For Disinfection :
35 sqmm AL Lug	28. Examination couch metal/wooden	36. Fogging Machine
25 sqmm AL Lug	30. Trolley, general-purpose	38. For equipment 0.5% Sodium Hypochlorite
16 sqmm AL Lug	32. Commode chair	39. For floor 1% Sodium Hypochlorite Cleaning solution
4 sqmm Cu Lug	33. Trolley, linen	
13. Switch Sockets	34. Trolley, medicine/drug	
6A one gang one way switch	35. Trolley, patient, stretcher	
16A one gang one way switch	37. Shoe Racks	
25 one gang one way switch		
6A Socket outlet		
16A Socket outlet		
25A Socket outlet		
Angle/Batten Holder		
14. Conduits		
25mm dia PVC Conduits		
25mm dia GI Conduits		
25mm wide casing patti		
15. Wires		

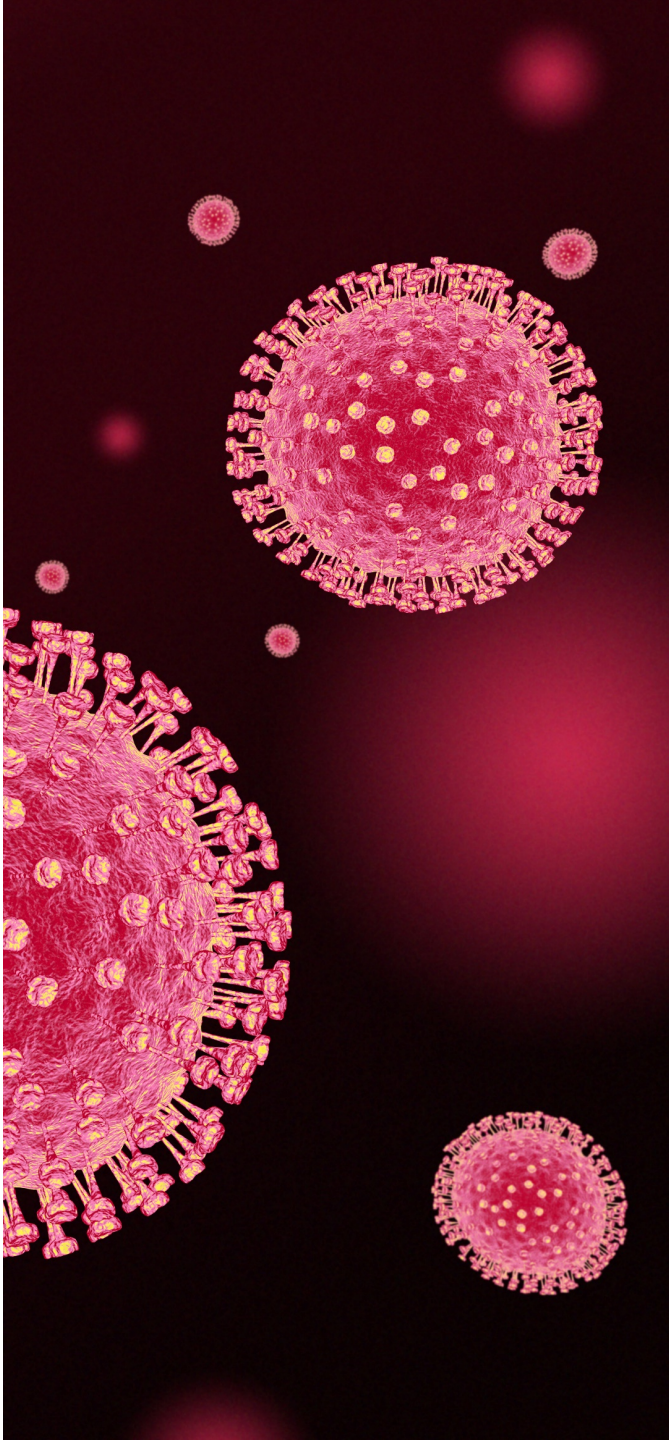
Double click on list to see the details

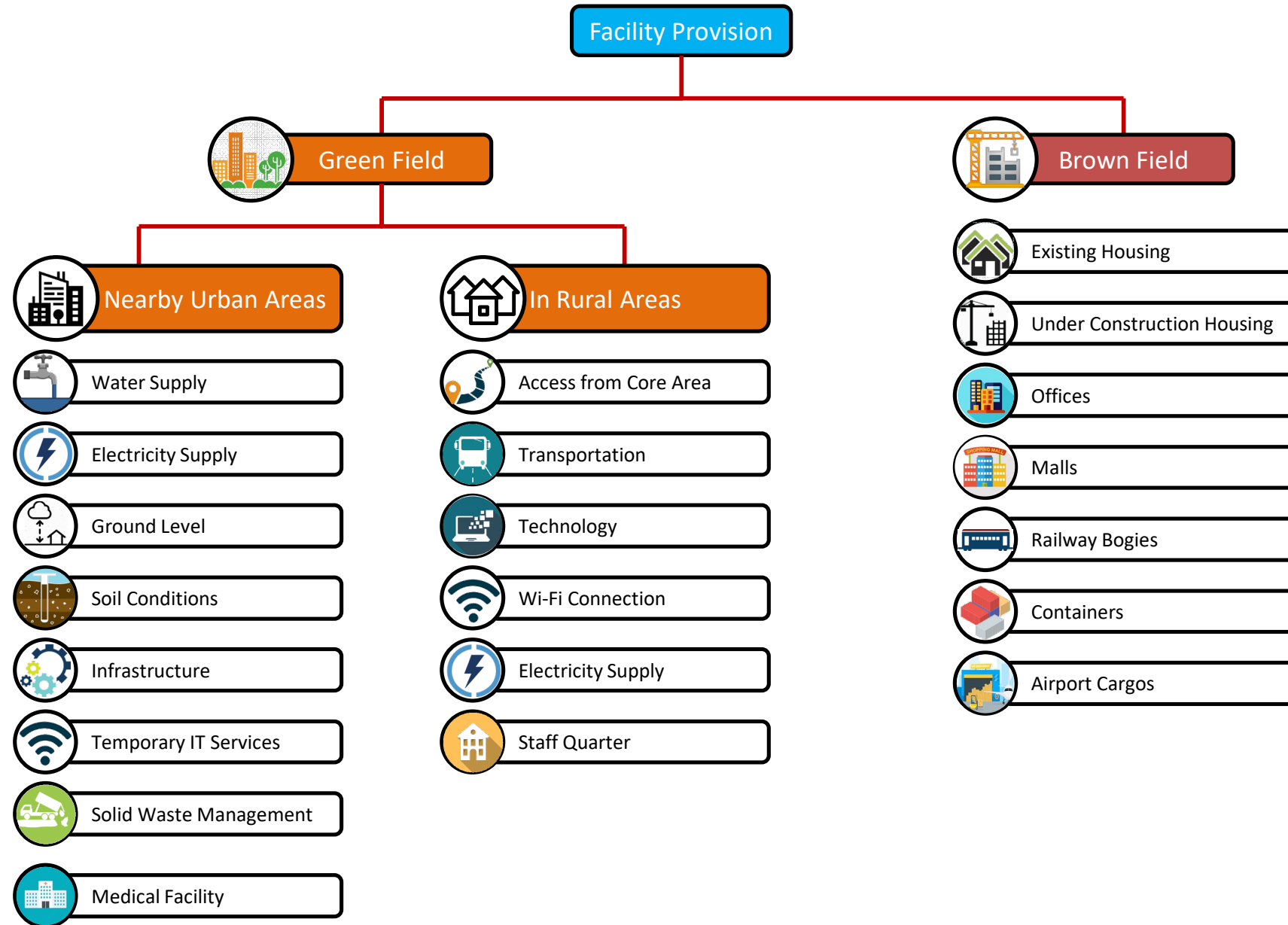
3

QUICK GUIDES AND CHECKLISTS

- 3.1 Design Checklist
- 3.2 Engineering Checklist
- 3.3 Emergency response infrastructure
- 3.4 Guidelines
- 3.5 Approach and Methodology

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Process for existing facilities

Site Assessment

Guidelines applicability

Possible Design

BOQ

Implementation

Process for existing facilities



Site Assessment



Guidelines applicability



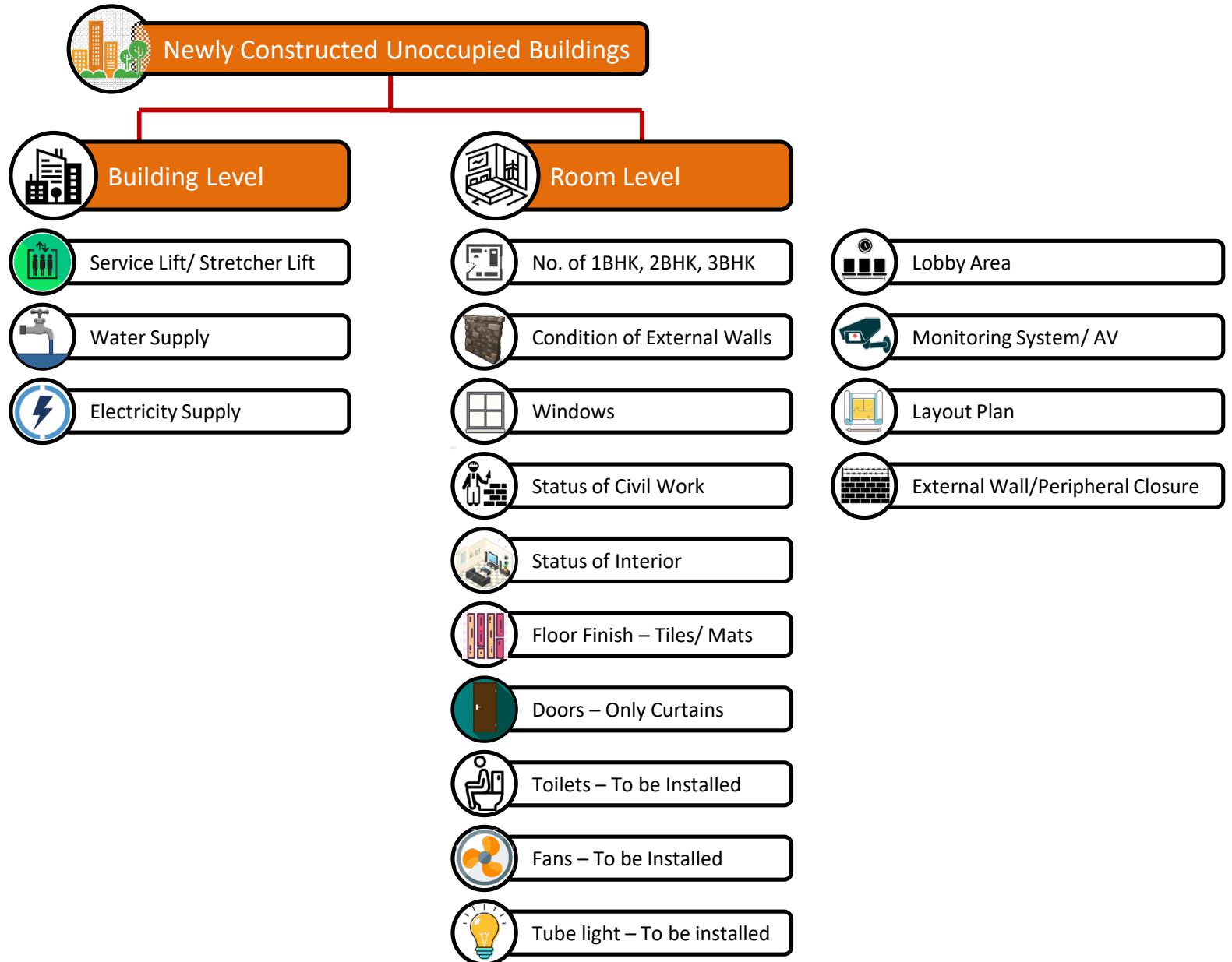
Possible Design



BOQ



Implementation



Electrical :

Building Level

1. DG Permanent
2. DG Temporary
3. Main Utility Power
4. Till Flat Cabling completed

Flat level

1. Lights installed
2. Inside Flat Cabling completed
3. Minimum 3 6A switch in room
4. Minimum 2 15A switch in room
5. All points to be checked for polarity and continuity

Plumbing:

Building Level

1. Water Supply to building
2. Tanks should be cleaned and disinfected
3. Drainage to Sewer
4. Municipal Sewer connected
5. STP tertiary filter will require treat excess soap in discharge.
6. ETP facility

Flat level

1. Plumbing fixtures installed
2. Water supply should be potable , else other diseases may happen

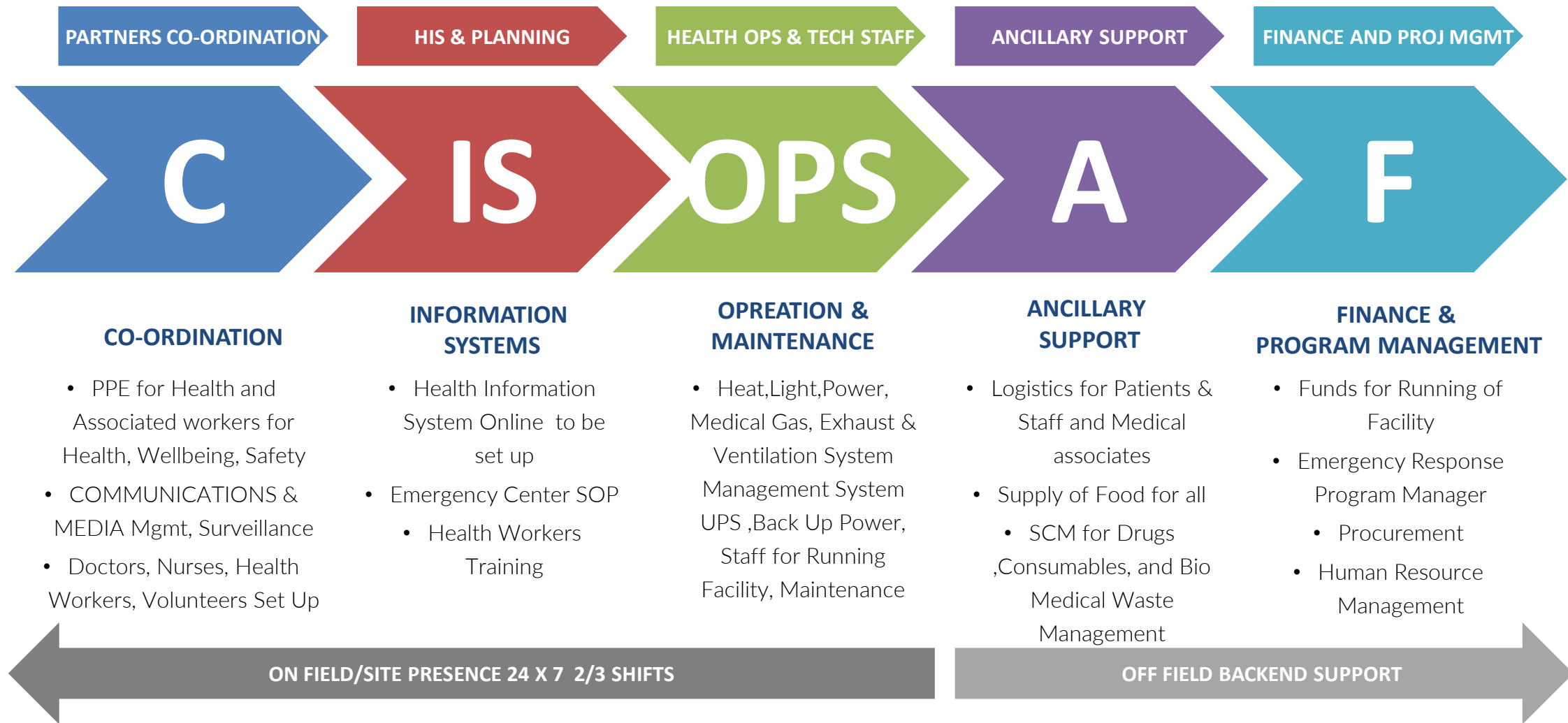
Ventilation :

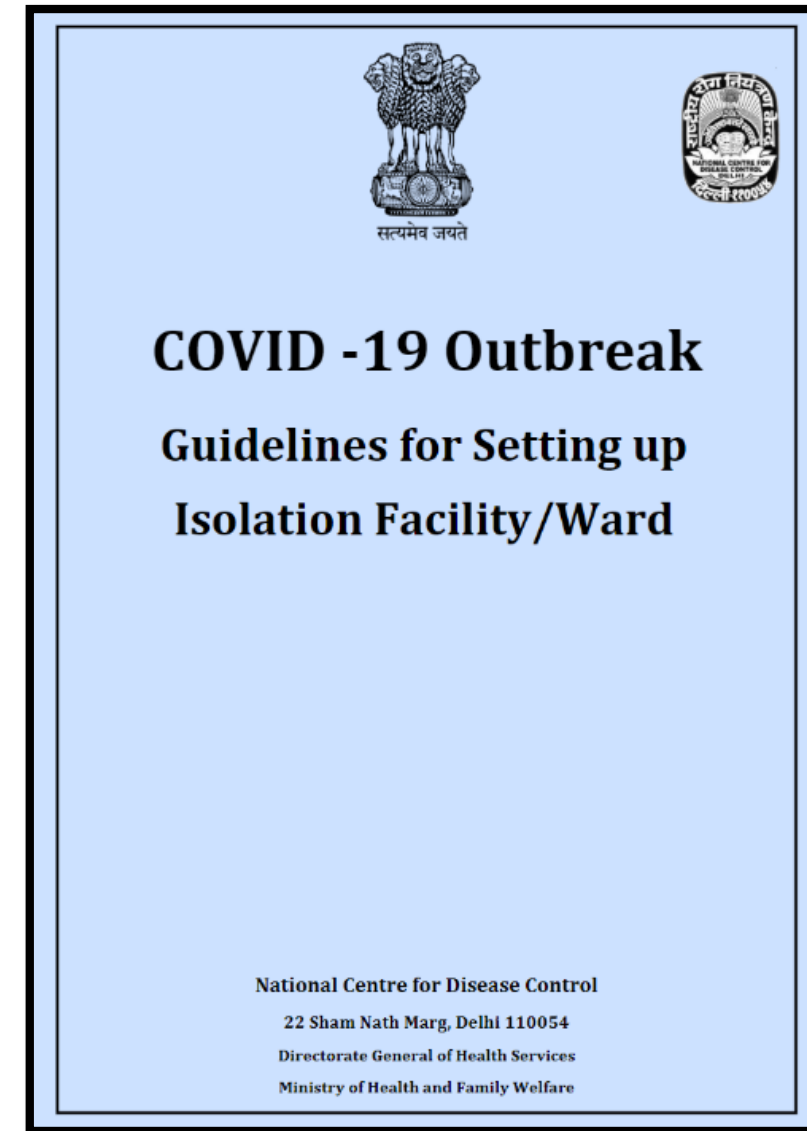
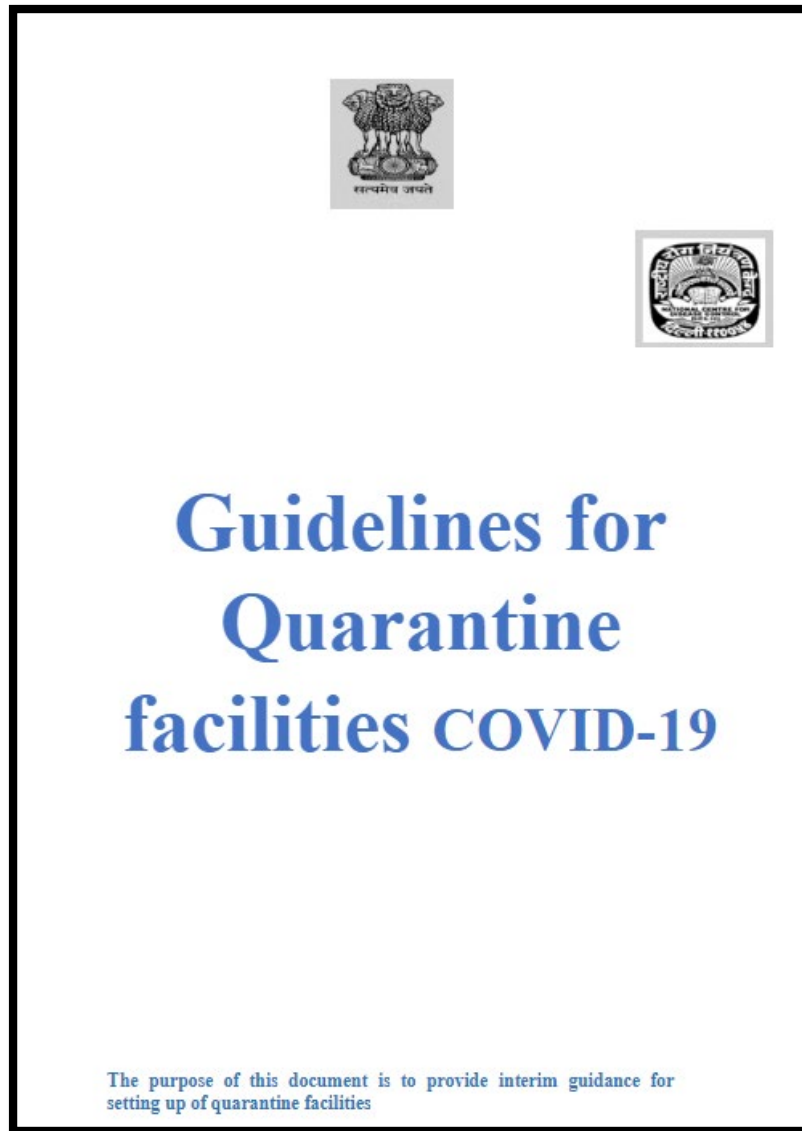
Building Level

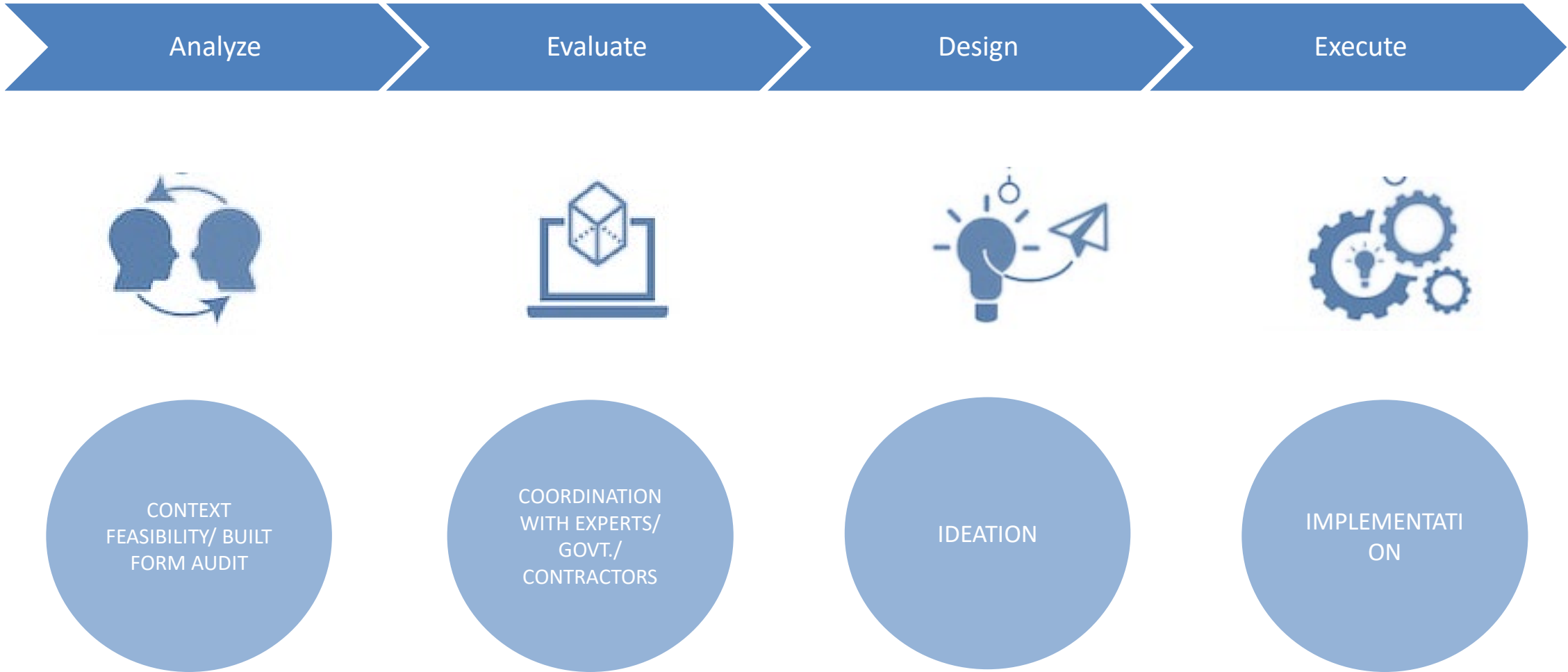
1. HEPA filtration & Wet scrubber

Flat level

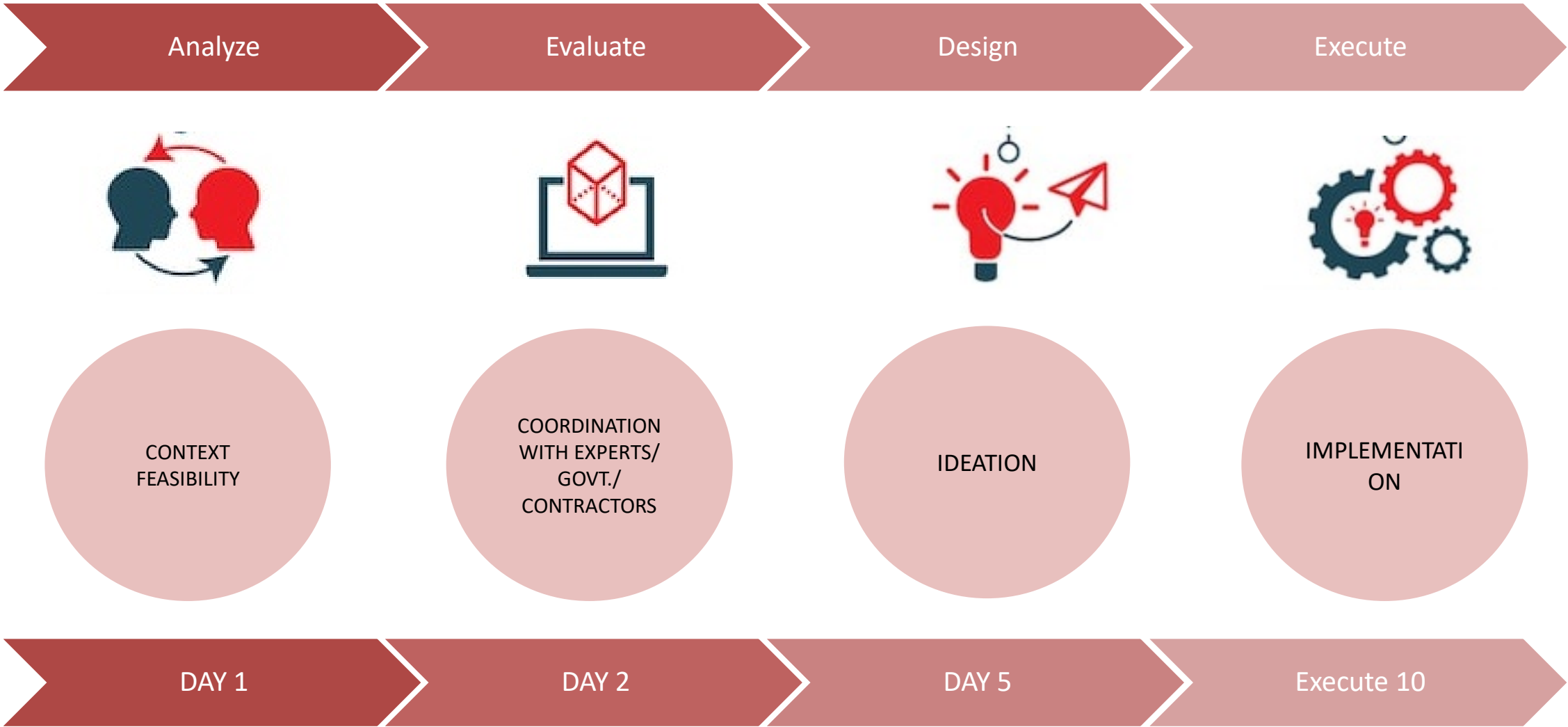
1. Exhaust fan : Minimum 3 Fans _ 250x 250
2. Fan in room
3. Door with opening
4. HEPA filtration fan at window level
5. UV portable disinfectant (WITHOUT Patient) If required



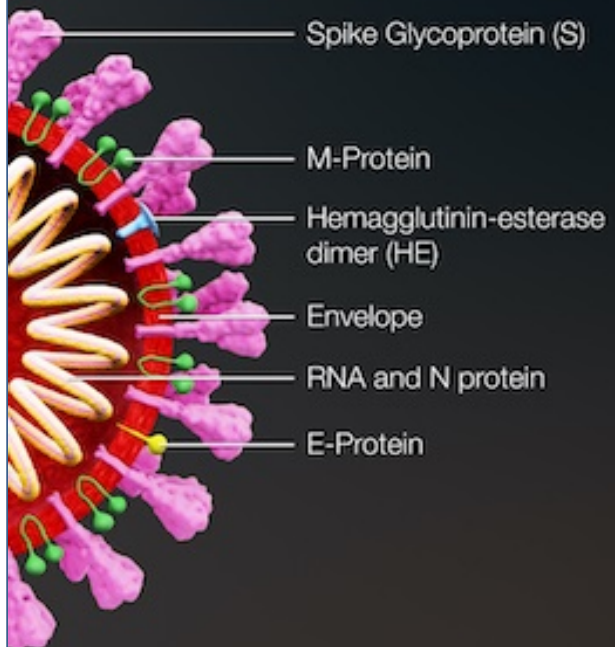




*Brown field - Denoting or relating to sites having previous development on them



*Green field - Denoting or relating to previously undeveloped sites



4

CASE STUDIES

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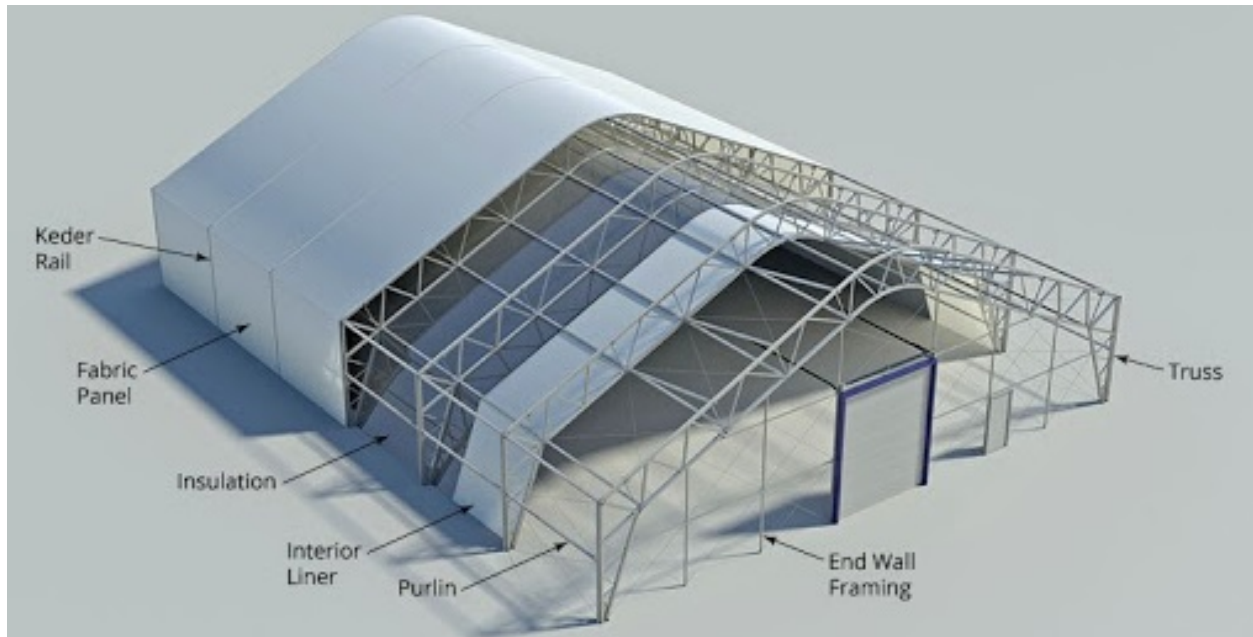
	TYPES	DESCRIPTION	IMAGES
1	Family Tents	Different shapes, sizes and varieties: both small and large families	
2	Swiss Cottage Tents	High Strength, Luxury, in various sizes, bedroom + bathroom	
3	General Service Tents	General Camping, overnight stays, relief purpose	

- 1 - Maintenance Office + Tent Stacks
- 2 - DG Stack + Substation
- 3 - Emergency Vehicle Parking
- 4 - Information Centre
- 5 - Food Court+ Book Shops+ Laddu counter
- 6 - Multipurpose Open Area
- 7 - Overhead Water Tank
- 8 - Security guards
- C - Camping Tent Grounds
- T - Public Conveniences
- Internal Road Layout
- W- Water Tanks

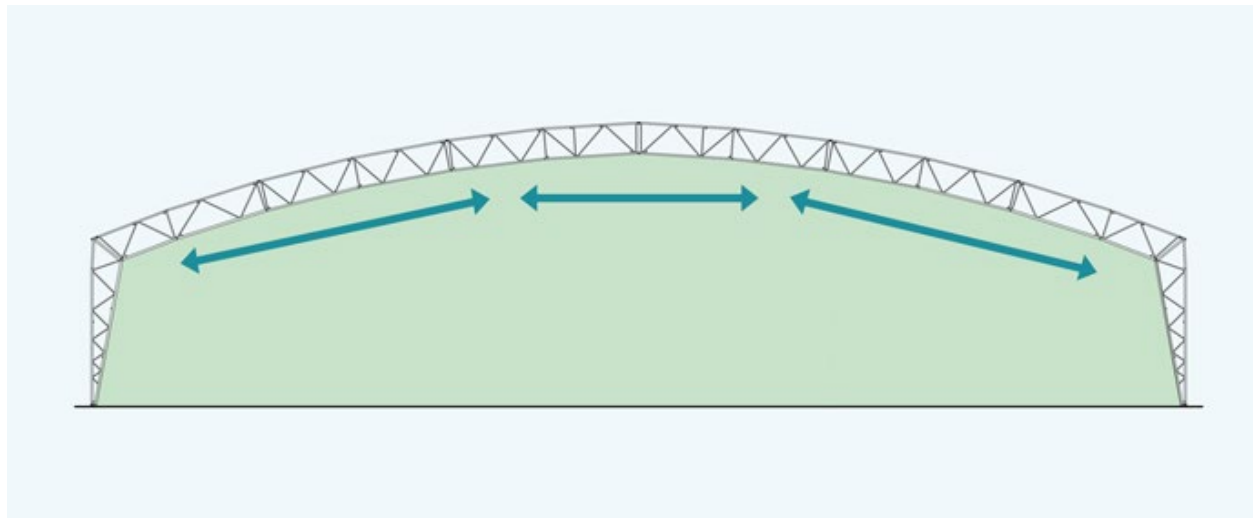
	Toilets Type	Images
1	Mobile Toilets	
2	Temporary Installed Toilets	
3	Prefabricated Toilets	
4	Individual Toilet in Tents	

HIS (13904 people – 2/3 rd occupancy)				Hers (6952 people – 2/3 rd occupancy)		
Urinals	WC	Wash basin	Shower	WC	Wash basin	Shower
278	58	58	58	70	70	70

Total Area	= 115872 sqm
Total available area for camping (10% subtracted for utilities etc)	= 104285 sqm
Occupancy (5sqm/person)	= 20857
Proposed Toilet Area	= 7%
Proposed Green & Multipurpose Open Area	= 18.5%
Proposed Camps Area	= 55%
Proposed Information Centre + Food Court+ Book Shops+ Laddu counter	= 2.5%
Maintenance Office + Tent Stacks	= 2%
Circulation	= 15%



- Fast and easy to construct
- Diffused light in interior energy-efficient
- Better portability – feasible in remote areas
- Modular truss and fabric panel design – scalable
- Shallow and flexibility in foundation design - fast to implement
- HDPE fabric membrane -Durable



Feet operated Basins





Tensile structure

- Fast and Easy construction
- Can be constructed in remote areas
- No specialized skill required



Container- toilet complex

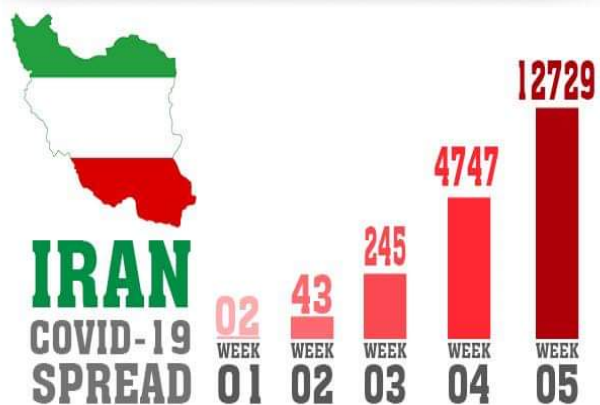
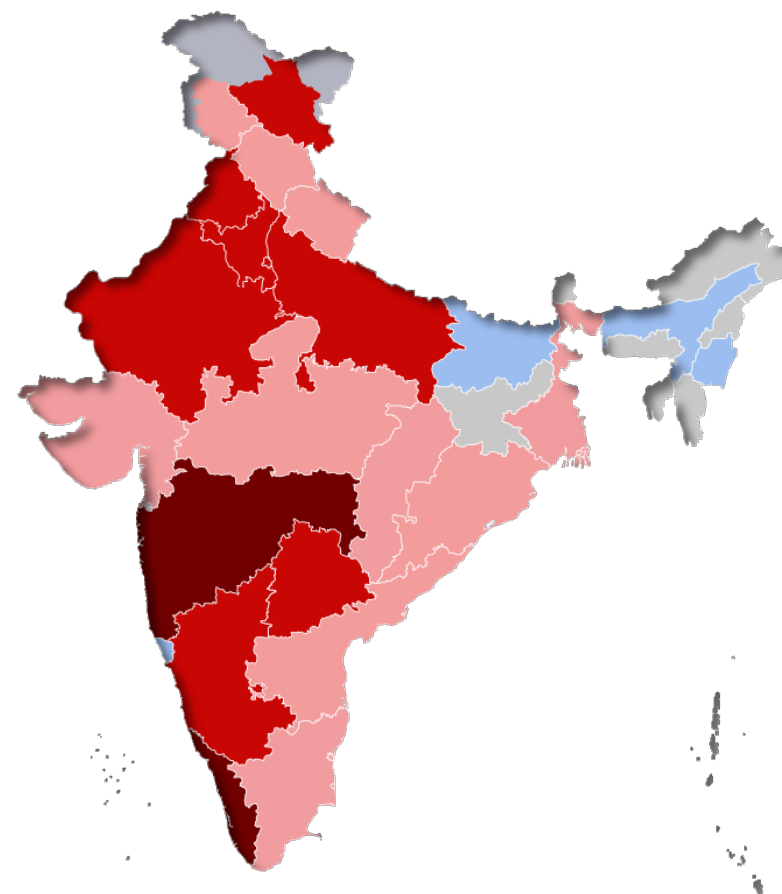
- Plug and play arrangement
- Modular , hence scalable



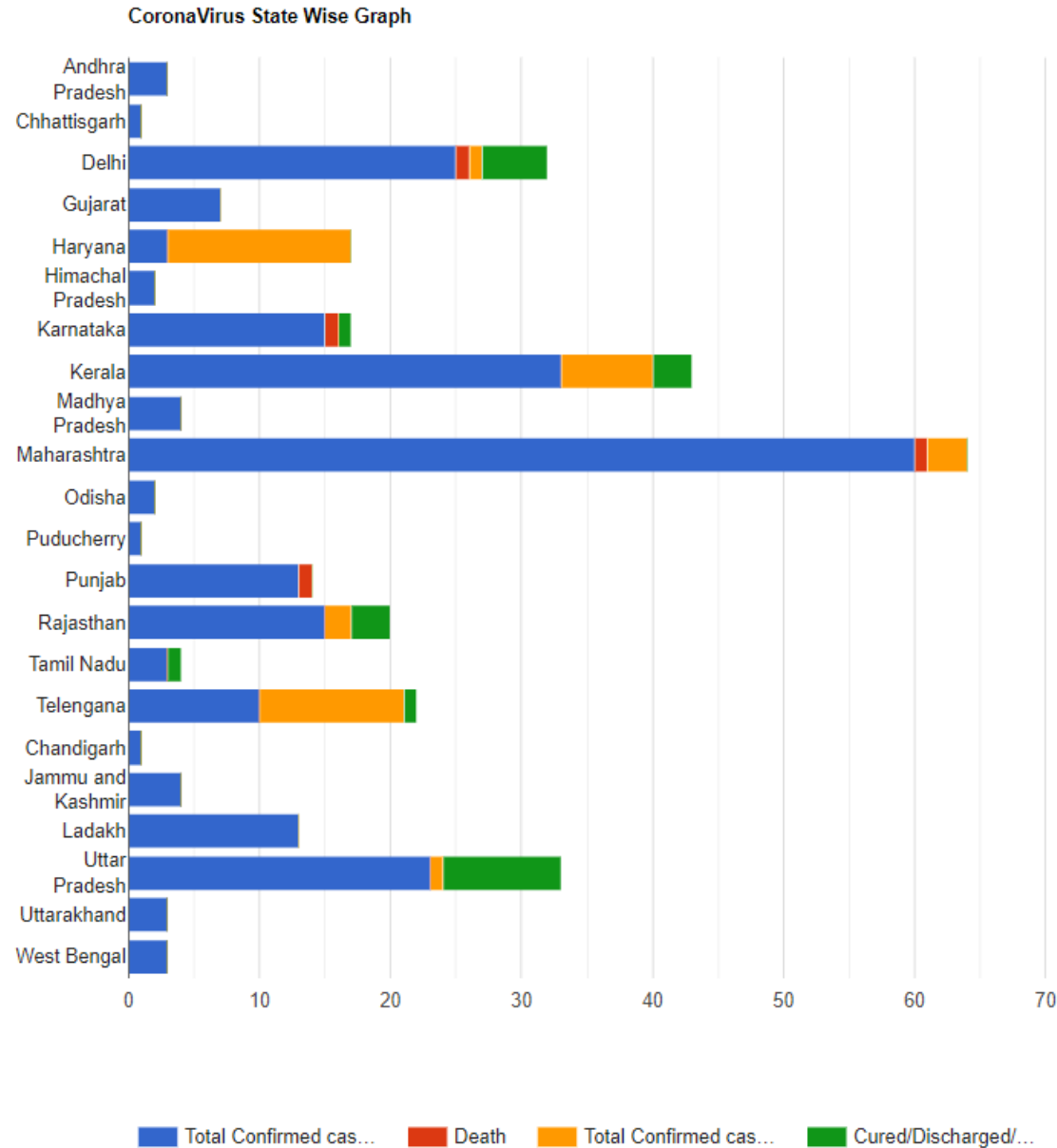
Container- toilet complex

TRENDS SHOW THAT

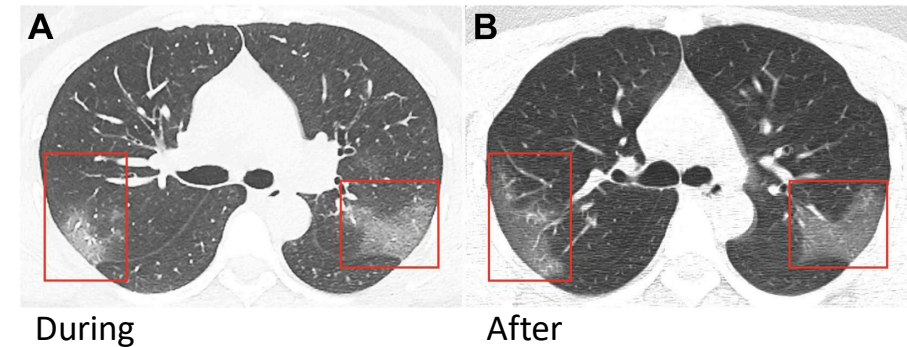
ITS TIME WE PREPARE AND ACT FOR THE WORST
EVEN IF IT MEANS OVERDOING WE SHOULD DO IT.



COVID-19



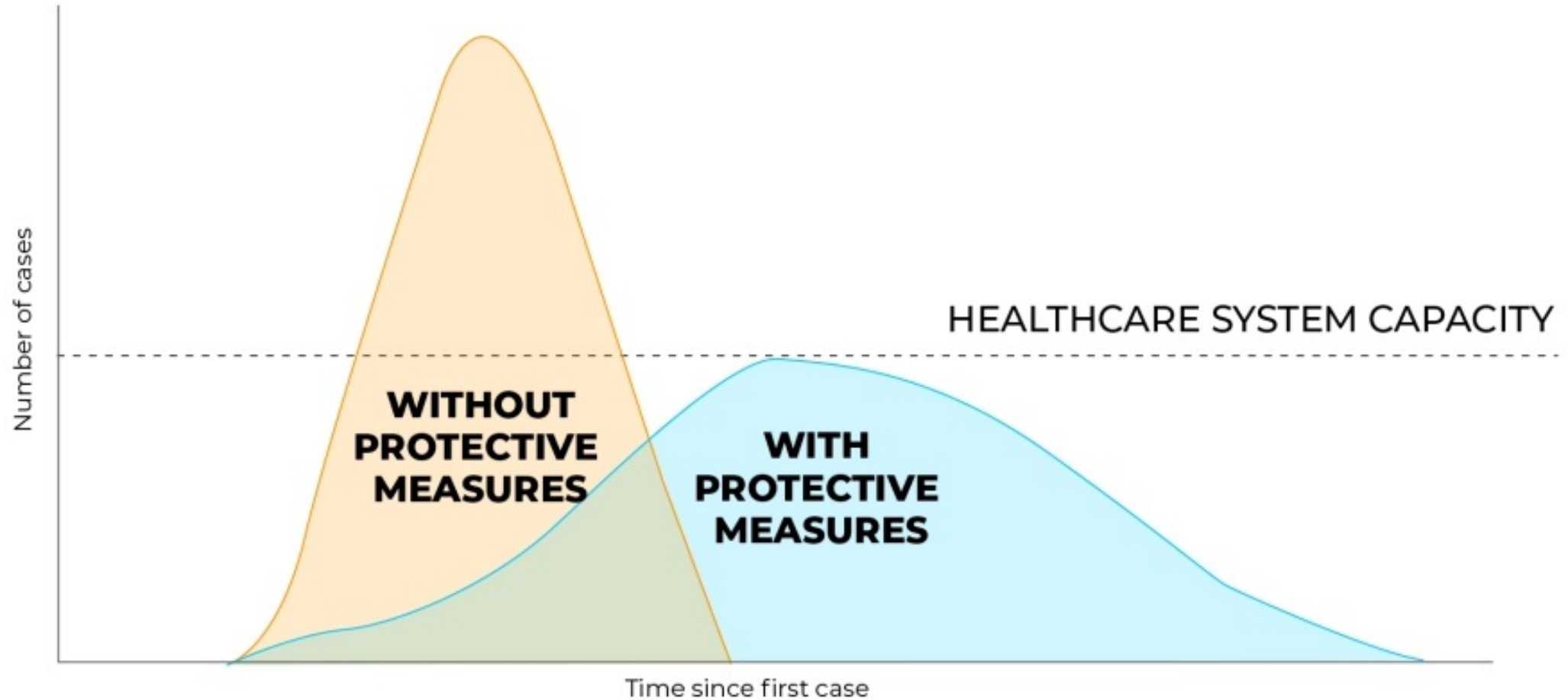
Those Who Recover From Coronavirus Can Be Left With Reduced Lung Function, Say Doctors



A small study out of China suggests that the new coronavirus can persist in the body for at least **two weeks after symptoms of the disease clear up.**

Isolation facility should cater for post isolation as well!

Flattening the curve



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For Additional Details Call

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