BANBASA LAND PORT

2025 DESIGN COMPETITION

Land Ports Authority of India
Department of Border Management
Ministry of Home Affairs

Council of Architecture

Conducted by Council of Architecture

INDEX

Land Ports Authority of India

A. LPAI genesis&evolution

Government of India, through Ministry of Home Affairs, established Land Ports Authority of India (LPAI) as a statutory body under the Land Ports Authority of India Act, 2010. It is mandated under LPAI Act, to develop, sanitize, operate and manage the state-of-the art-facilities (Land Ports) for cross-border movement of passengers and goods at designated points along the international borders of India. The development of state-of-the-art facilities at the remote but strategically important passenger and trade transit locations is undertaken by the Land Ports Authority of India.

Land Ports provide enabling infrastructure to bring all stakeholders under one roof, including but not limited to, Customs, Immigration, Border Guarding Forces (BGFs), Plant and Animal Quarantine, Land Port Health Units and Food safety and standards Authority of India (FSSAI).

Since its inception in 2012, LPAI has been undertaking large scale development for establishing 89 land ports located at Bangladesh, Nepal, Bhutan, Myanmar and Pakistan border. The development of 89 land ports has been structured in three phases. Phase-1 comprises of 26 land ports out of which 15 are currently operational, 3 are under construction.

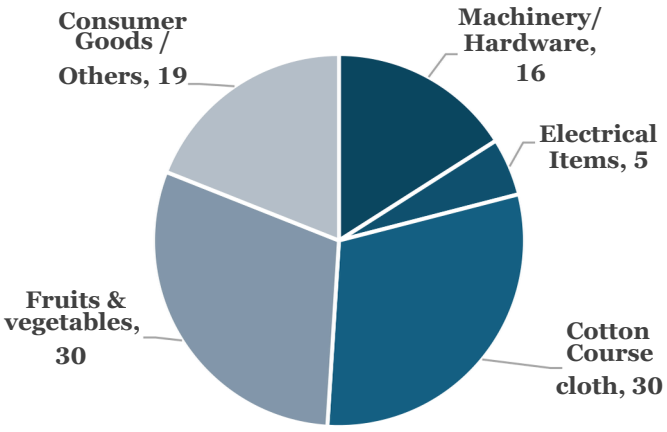
B. Banbasa Land Port

i. **Design site regional context** Banbasa, a census town in Champawat district of Uttarakhand, is situated approximately 238 km from Dehradun. The state shares international borders with China (Tibet) in the north and Nepal in the east. It is strategically located near key districts such as Udham Singh Nagar, Pithoragarh, and Almora in Uttarakhand, as well as Bareilly and Pilibhit in Uttar Pradesh. The surrounding has two ICDs and Warehouse.

ii. **Location:** The Land Port is in the Champawat District in Uttarakhand, near to the zero line, and is pre-dominantly used by the international travellers for entering into Nepal. LPAI has prepared Detailed Project Report and identified 0.41 hectare of land for development of Land Port Banbasa. The identified site is rectangular in shape. It has been selected keeping in mind the proximity to Asian Highway 2 and on the other side, the Government of Nepal has also selected mirror land port location for development of land-port. Forest clearance has been obtained and mutation is underway. Refer Annexure 1 & 2 for site location and Site image and KMZ file uploaded as Map 1.

iii. **Regional Economic Activity**: Pharma & Medical cluster are located in the Udham Singh Nagar, Nainital, Almora and Philibhit districts of Uttarakhand and Uttar Pradesh. Further, under one district one product scheme, Champavat Nainital and

Udham Singh Nagar District have identified tej patta & spices, fruits juice, and fruits & vegetables as their product. Hence, it may form some of the major components of export in the future.



Banbasa LCS Export

Some of the major export items include Fresh Fruits, Green Vegetables, Potatoes, Stationary, Male goats, Onions, Fabrics, Footwear, Machine & Machinery parts, Hardware goods, Automobile parts, Agricultural machine & tools, Tractor trolley, E-rickshaws. Imports items include Handicrafts, Essential Oils, Nepali Jari –Boti, soapstone powder. Refer Annexure 3 & for regional economic activity detail and Annexure 4 for cargo & passenger movement detail.

C. Design competition detail

i. **Design Context:** For secured and ease of traffic movement land ports are essentially located on zero Line of the country border and close to the mirror land port of other country. Banbasa town has forest spread across its area and the land port falls within the forest land. LPAI in order to protect eco – sensitive area invites innovative design ideas for Banbasa Land Port to enhance land port functionality with regional cultural identity keeping its natural environment intact.

ii. **Design Competition Objective:** It seeks to recognize and promote creative, context-sensitive, sustainable and implementable design solutions that contribute to the city's visual appeal and usability.

iii. **Design Requirement:** Concept Design of the following

a. Overall Land Port Master Plan with broad circulation plan
b. Sustainable building design incorporating region-specific cultural elements
- Passenger Terminal cum Administrative building,
- Cargo Terminal cum plant quarantine building
- Passenger entrance gate
- Cargo entrance gate

The design to include sustainability principals and use environment friendly material and try to preserve the area as far as possible.

iv. **Design Component for the Master Plan**: Land Ports to have following components:

Sr. no	Description	Nos.	Remarks
1	Passenger Terminal Building (PTB)	1	Passenger amenities and regulatory Government Agencies
2	Cargo Terminal Building (CTB)	1	Driver amenities and regulatory Government Agencies
3	Administrative Building	1	For offices of all Partnering Government Agencies, Control room, Server room, Conference room, etc.
4	Import/Export Sheds/Seizure Shed & Unbonded Warehouse	1	
5	Trans-shipment Yards	1	
6	Fire Station	1	Designs to be as per National Disaster Management Authority (NDMA) & MES guidelines
7	Weigh Bridge	2	
8	Rummaging Shed	1	
9	Plant and Animal Quarantine Labs	1	
10	Accommodation		Includes Accommodation for BGF and other stakeholders as per deployment
11	Service Block		Electrical Substation, Sewage Treatment Plant (STP), Water Treatment Plant (WTP), Pump House, Heating Ventilation & Air Conditioning (HVAC), Rainwater Harvesting, Internal & external lighting, Smart Garbage disposal systems, Public Health Engineering and Drainage
12	Hazardous Material Storage area	1	Area will be determined as per traded goods.
13	Parking Areas		Separate for Import side vehicle movement and Export side vehicle movement, Covered parking, Vehicle parking, roads,

Sr. no	Description	Nos.	Remarks
			dead spaces and walkways
14	Watch Towers (G+1)	4	As per site requirement
15	Full Body Truck Scanner	1	
16	Fumigation Shed	1	Taken under Miscellaneous components
17	Open Storage Area	1	As per Site requirement
18	Land Port Health Unit	1	Part of PTB
19	Solar Panels/Plants	1	As per Ministry of Non- Renewable Energy (MNRE) Guidelines
20	Landscaped area		As per Town and country planning norms
21	Security Wall		As per security requirement
22	Open spaces		As per NBC guidelines
23	Setbacks		As per NBC Guidelines

The design to incorporate the norms for the development of Infrastructure & facilities in Land Ports published by Land Ports Authority of India enclosed at **Annexure – 5.**

a. **Banbasa land Port overall area design (Master Plan)**

Component	Total Area
i. Total Land Port Area	84 Acres
ii. Green Cover	10 Acres

b. **Concept design of building**

Component	Area
i. Passenger Terminal cum Administrative building (ground +first floor)	4500 sqm
ii. Cargo Terminal cum plant quarantine building (ground +first floor)	4500 sqm
iii. Passenger entrance gate (ground +first floor) (2 nos/ 226 sqm each floor	904 Sqm
iv. Cargo entrance gate (ground +first floor) (2 nos/ 226 sqm each floor	904 Sqm

A. **Design Scope**: The land port design plan to be prepared keeping that it should cater to traffic and passenger upto 2070 hence design horizon year is 2070. The participants are required to submit following documents, drawings & estimates as part of their submission.

- Detailed site analysis report.
- Concept plan of environmentally sustainable design principals and regional architectural. Concept Designs to be represented through 3D videos.
- Prepare sketches, diagrams to explain the concept and possible two design options.
- Prepare design briefs and area plan. 03 nos. each A2 sized drawings (42 x 59.4) in Landscape format (Plans, Elevations, Sections, or any other detail to explain design concept and softcopy in PDF format).
- Undertake preliminary selection of materials and finishes. Documentation in support of usage of eco-friendly, recyclable or locally available materials along with usage of local traditional and architectural style.
- Preliminary cost estimate based on the concept plan.

D. Design competition guideline

Submissions should be original, feasible, and responsive to the site context, while aligning with LPAI's broader development vision.

i. Eligibility

a. Participation eligibility

- **Student**: final year architectural / planning students or students who have passed college in last 5 years or architects who may have taken break may also apply as students. If applying as students, then students must be registered with CoA. Students can apply as individual or team.
- **Architecture / Planning colleges** comprising a team having a combination of faculty member and students.

o Director / Dean of the college/ department to endorse the participation of the team.

o One college one team policy will be followed.

o Project Experience: team member to have experience of 1 of the following is desirable:

- Taken GRIHA/ LEED/ IGBC certified highest rating (desirable)
- Experience with respect to development of transportation hub like land ports / Interstate Bus terminal / multi- modal logistic

hub / airport.

- Experience with respect to development of urban project like district centre / shopping mall / convention center / sports complex.

• Architectural firms registered and practising can also participate.

o Registration certificate may be provided.

o Project Experience: Firm to have experience of 1 of the following is desirable not mandatory:

- Taken GRIHA/ LEED/ IGBC certified highest rating for project (desirable)
- Experience with respect to development of transportation hub like land ports / Interstate Bus terminal / multi- modal logistic hub / airport.
- Experience with respect to development of urban project like district centre / shopping mall / convention center / sports complex.

b. Team Size

• Team to have maximum 5 participants in total and it is desirable to have following expertise

- Team Leader be an Architect
- Construction Expert should be Civil Engineer.
- Team should have Transport Planning and Environment Planner expert.

ii. Design Competition schedule

Sr. No.	Detail	Dates
1	Launch of Design Competition	19th September 2025, 07:00 pm
2	Registration Start Date	16th September 2025, 07:00 pm
3	Registration Open till	17th November 2025, 07:00 pm
4	Seeking Clarification	15th October 2025
5	Clarification on Design Competition	20th October 2025
6	Online submission of concept design	17th November 2025
7	Round 1: a. Qualification screening Evaluation of technical details of firms based on eligible criteria (to be carried out by LPAI/associated organization)	25th November 2025

Sr. No.	Detail	Dates
8	Round 1: b. Design Shortlisting Evaluation of Designs submitted by teams (to be carried out by Jury members)	27th November 2025
9	Announcement of shortlisted teams for round 2	28th November 2025
10	Round 2: Presentation of shortlisted teams Presentation time: 15 min Question & Answers: 15 Min This is to be carried out in offline mode in Delhi NCR. Qualifying team to make their own travel arrangements	5th December 2025
11	Announcement of Winner & Award Evening	9th December 2025

iii. Design Evaluation

- Design team qualification to be confirmed by LPAI based on proof submitted by the team.
- The jury may comprise of maximum 05 members from the fields/ institutions/ ministries to select the best award.
- Jury member to form evaluation criteria for round 1 and round 2.

iv. Jury Composition

- The Jury member may consist of a combination of Academic and industry experts having experience in logistic designing, transport planning, architect, environment planning, construction, finance, infrastructure planner & management. Total number of Jury member to be minimum 3 and maximum 5 depending on the number of entries received.

v. Submission detail

- All entries are to be in English only. The anonymity of the entrants is to be
- ensured. The architect's name or participant's name should not be mentioned in any of the submission documents, else the entry shall be summarily rejected.
- Each document to mention the reference code received during registration on the bottom right corner.
- Submission can be done in PDF only along with Concept Note

vi. Prize & Award:

Particular	Prize Money
Winner prize money	Rs. 5,00,000/-
Runner Up Prize money	Rs. 3,00,000/-

- Winners will also be handed over trophies and certificates
- Winning entries will feature in LPAI website, publications and social media handles.

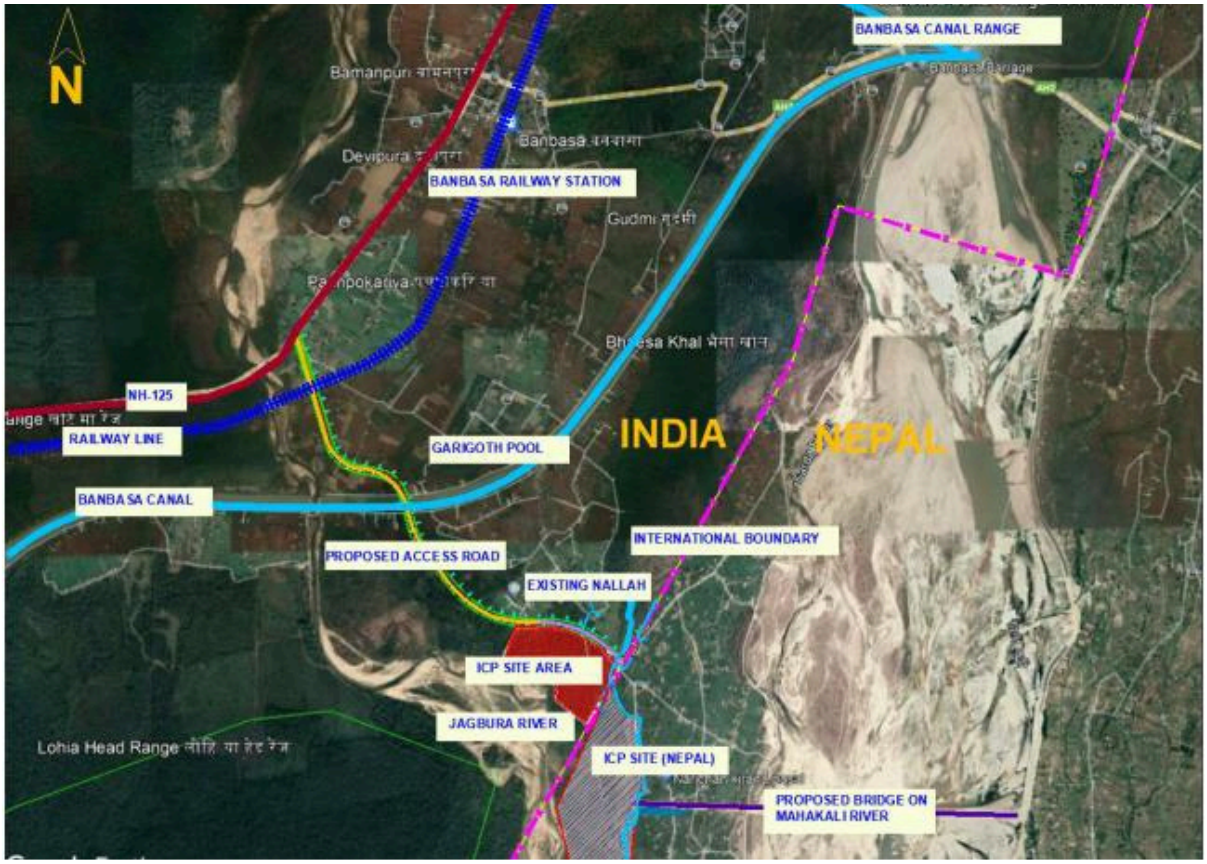
vii. Intellectual Property Rights and Confidentiality

- The Intellectual Property Rights of the ideas / concepts and thesubmitted design shall vest with the author, however, LPAI shall have the rightto use the ideas / concepts and the submitted design(s) by the winners, with orwithout modifications as deemed fit by LPAI, in part or full.
- The participants shall treat all the information provided by LPAI for the purpose of this design competition to be confidential and shall not disclose the same with anybody without taking prior written permission of LPAI. LPAI obligations will remain
- valid during the tenure and even after the completion of the said Competition.
- LPAI has rights to cancel, extend/reject the Design Competition without any reason at any appropriate time.

viii. Disclaimers

- LPAI shall not be responsible or liable for any erroneous, damaged, destroyed, lost, late, incomplete, illegible and misdirected Entries, or any damage or loss arising from, connected with, or relating to the Competition, the submission of Entries to the Competition, participation in the Competition, regardless of the cause or any fault by the Organizer or the Jury Panel or any person concerned for whom any of the above mentioned are responsible, and notwithstanding that any of those persons may have been advised of damage being incurred.
- LPAI may at its discretion cancel, modify or suspend the Competition. The participants shall not be entitled to any compensation because of such cancellation, modification or suspension of the Competition.
- LPAI employees / advisors / representatives or consultants make no representation or warranty and shall have no liability for any of the participants under any law, statute, rules or regulations for any loss, damage, cost or expense which may arise from or be incurred or suffered on account of anything contained in this Competition Document.

Annexure 1: Site location

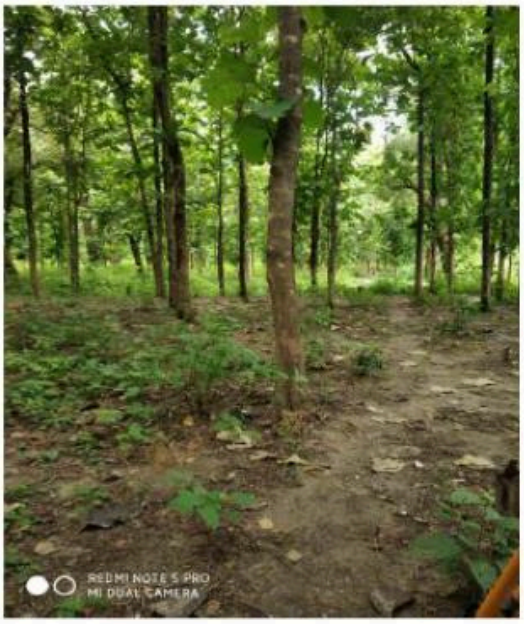


Site KMZ File

https://drive.google.com/drive/folders/1gucH-tELd3lZFrrjLvxJtQLZT_6Us4Ma?usp=sharing

Annexure 2: Site Image

KACCHA ROAD



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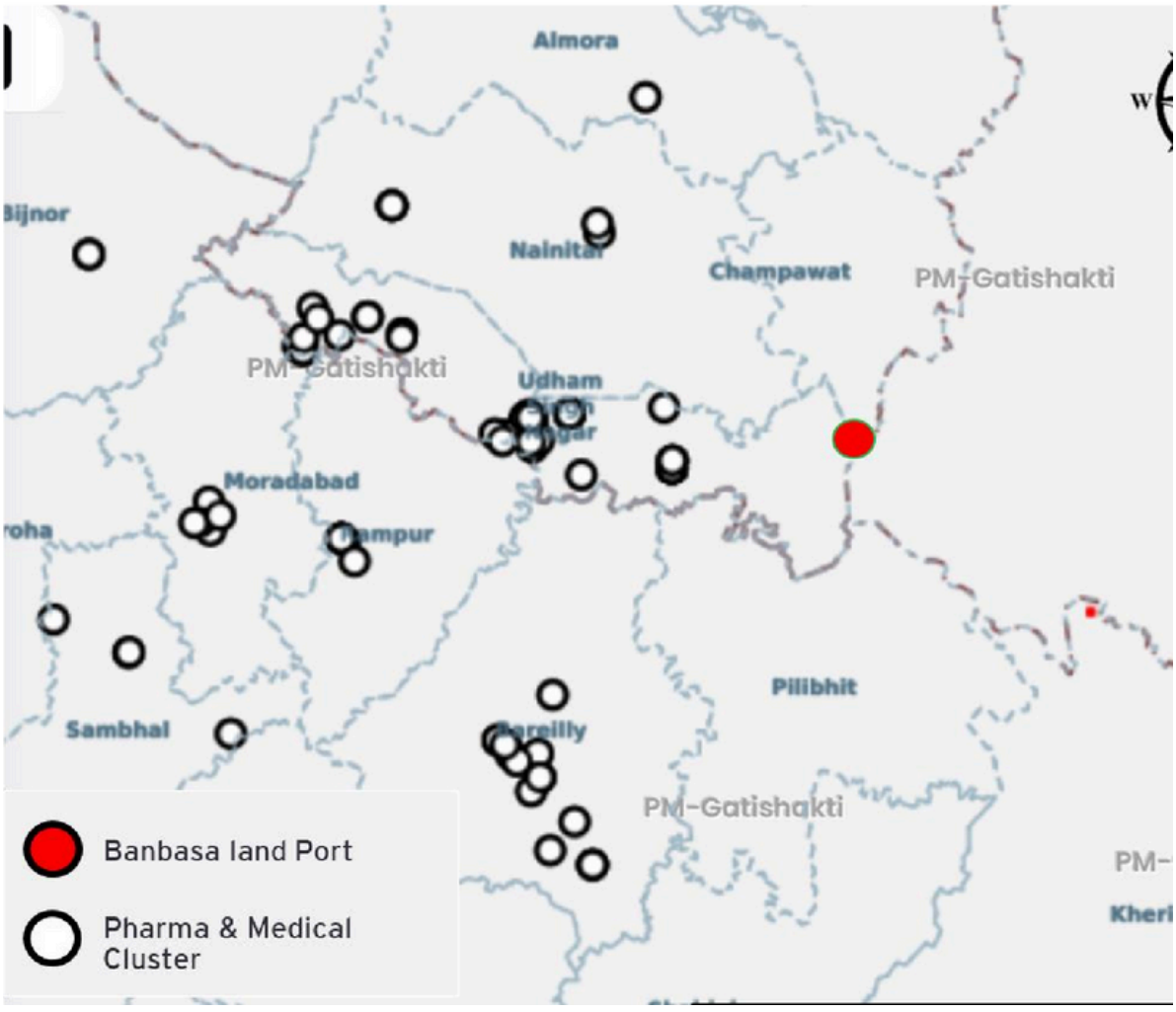
Annexure 3: Regional Economic Activity Maps



Annexure 4: Cargo and Passenger Movement

Passenger Movement		
Year	**Daily Pass**	**Annual Pass**
2030	2200	4500
2035	2475	5717
2040	3011	8712
2045	3663	11767
2050	4457	14451
2055	5964	24350
2060	8364	41031
2065	11730	52367
2070	17235	66835

Cargo Movement				
Year	Daily Export Traffic	Daily Import Traffic	Daily Transhipment	Daily Total
2030	12	1	-	13
2035	16	1	46	63
2040	23	2	76	101
2045	31	3	84	118
2050	39	3	92	134
2055	49	5	102	156
2060	62	5	112	179
2065	79	6	123	208
2070	100	6	135	241

Annexure 5 :

Norms for the Development of Infrastructure & Facilities in Land Ports

Published by

Land Ports Authority of India, New Delhi

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List of Annexures:

Standardization of Land Ports

1.0 Background

1.1 India shares over 15,000 kms long international land border with seven countries in South Asia, namely Afghanistan, Bangladesh, Bhutan, China, Myanmar, Nepal and Pakistan. There are several designated entry and exit points for cross-border movement of persons, goods and vehicles. For several years, inadequate infrastructure at designated border checkpoints has often been one of the major hindrances to regional trade, impeding the movement of both goods and passenger moving in and out of neighbouring countries. Support facilities like warehouses, parking lots, banks, hotels, etc., have been either inadequate or absent. All regulatory and support functions were also generally not available in single location. Even where located in close proximity, there was no single agency responsible for coordinated functioning of various Government authorities and service providers.

1.2 Concerned about the inadequate infrastructure at border checkpoints and the lack of a single coordinating body responsible for facilitating cross-border trade and passenger movement across India's land borders, the Committee of Secretaries in 2003 recommended setting up of Integrated Check Posts that would house all regulatory agencies in a single sanitized complex and provide complete state of the art infrastructure facilities such as warehouses, examination sheds, parking bays, weighbridges etc. for cross border movement of passengers and goods at all designated transit locations along India's international border.

1.3 Established as a statutory body under the Department of Border Management, Ministry of Home Affairs, the Land Ports Authority of India is entrusted with the task of building Land Ports on India's borders and provide state of the art infrastructure facilities to facilitate seamless and efficient movement of cargo and passengers with an overall objective of reducing dwell time and trade transaction costs, promote regional trade and people-to-people contact and imbibe the best international practices.

1.4 LPAI is mandated inter-alia to plan, develop, construct, manage and maintain Land Ports, coordinate and regulate functions of various agencies working within Land Ports without interfering into the functioning of respective regulatory agencies in their domain.

1.5 Initially, Cabinet Committee on Security (CCS) had approved, in – principle, the setting up of 13 Land Ports along Bangladesh, Pakistan, Nepal, Bhutan and Myanmar Border out of which seven were to be developed in Phase I and remaining 06 in Phase II.

1.6 **Present Status -** There are currently fifteen Land Ports functional in India at Attari, Agartala, Dawki, Petrapole, Raxual, Rupediah, Jogbani, Moreh, Sutarkandi, Srimantapur, Sabroom, Dera Baba Nanak, Darrangha, Mankachar and Golakganj whereas eleven additional landports are under various stages of development.

2.0 Emerging issues

2.1 The Exim trade and passenger movement across the international borders is increasing due to globalization and growth in economies of the countries in this region. To facilitate and manage the trade and international travel thorough planning of development of infrastructure at Land Ports is essential. Other than being of commercial and strategic interest these land ports are also projected as symbols of national pride and regional harmony.

2.2 The purpose of this Land Port facility analysis is to identify the current trends which have an impact on facility development, identify what those impacts are, and recommend changes to the standards for developing facilities. Many of the changes may result in the demand for additional land, which is a scarce commodity at many border locations. Further, there is also a scope for developing techniques for better utilization of existing land areas and address operational and capacity management issues relating to facility development.

2.3 With 11 new Land Ports under various stages of development and DPRs being prepared for 26 more land ports, a need has been felt to standardize various infrastructure elements to ensure uniformity across all upcoming facilities. Based on the experience of LPAI, with previously built Land Ports, and feedback with respect to the stakeholders' requirements, as well as inputs from multiple studies carried out to analyse Land Ports' efficiency, the required infrastructure have been broadly categorised into the following five groups for the development of future Land Ports. An effort has been made to directly correlate the size pf infrastructure to two major variables i.e. daily peak passenger traffic and daily cargo vehicle traffic crossing from the proposed Land Ports:

a) Passenger Oriented Zones
b) Trade Oriented Zones
c) Administrative Zones
d) Accommodation
e) Common utilities and Facilities.

2.4 Based on the guidelines of Airports planning data for forecasting and the GoI's decision to move towards "Amritkal" LPAI has decided to take 2047 as the horizon year for projecting figures for passengers and trade.

3.0 Objective of Standardization:

3.1 *With new facilities being planned by LPAI across various land borders, and LPAI in the process of creating 34 Detailed Project Reports (DPR's) for land ports, it is experienced that each individual consultant making these DPRs has a unique understanding of various components of a Land Port. Therefore, to streamline the entire process and establish a benchmark for individual components of the infrastructure, a series of norms are proposed to be adopted from already existing standards prevalent amongst various other Government agencies. Some norms have also been objectively assessed based on the past experience of LPAI in establishing various Land Ports and operating them for more than a decade now.*

4.0. Traffic Volume: -

4.1 The traffic movement of passengers and cargo has been taken as the prime variable to determine the size of the infrastructure to be established. Both these variables play a major role in determining the load factor of a land port. The peak hour traffic data as well as maximum traffic volume on a peak day will determine the requirement of infrastructure for any land port. Projection of traffic volumes are based on trends of growth of trade, growth of trading economies and any other special factor particular to that corridor.

5.0 International Norms and Guidelines

5.1 While planning the norms, a study has been carried out to understand the other countries land ports operations. One such example referred here for better understanding the entire movements in and out is of the land ports is of the port of entry of the United States of America. The Design guidelines for USA Land Ports is attached in **Annexure - 1.**

6.0 Formulation of Norms

6.1 for defining many of the standards with respect to the requirement of spaces for specific purpose we are referring to the norms established by many of the Govt agencies which have been operating for longer durations in similar spaces. Various guidelines/orders issued and published by GoI and its various govt agencies have been taken into considerations as these have been already established after due diligence and have undergone the test of time. After detailed

deliberations 24 essential components have been identified under the broad 5 categories defined below, for each land port. The specific norms defining each are presented in the table below.

Sl. No	Description	DGCA /IATA	MoHUA-CPWD	NBC	MES	Other Similar Norms*	Remarks
1	Passenger Oriented Zones	Yes	Yes	Yes	Yes	Yes	For Office Space/Public Health Engineering (PHE) requirements
2	Trade Oriented Zones	-	Yes	Yes	Yes	Yes	For Office Space/PHE requirements
3	Administrative Zone	-	Yes	Yes	Yes	Yes	
4	Accommodation	-	-	Yes	Yes	Yes	
5	Centralized utilities & Facilities.	-	Yes	Yes	Yes	-	

**Note – Other Similar Norms refers to scales established by Indian Customs, Bureau of Immigration, BSF, SSB etc.*

DGCA – Directorate General of Civil Aviation

IATA – International Air Transport Association

MoHUA – Ministry of Housing & Urban Affairs

CPWD – Central Public Works Department

NBC – National Building Code

MES – Military Engineering Services

6.2 **Type of buildings and their features**: - These are divided into the following categories: -

Sl. No	**Description**	**Nos.**	**Fixed/Variable Component**	**Remarks**
1	Passenger Terminal Building (PTB)	1	Variable	Passenger amenities and regulatory Government Agencies
2	Cargo Terminal Building (CTB)	1	Variable	Driver amenities and regulatory Government Agencies
3	Administrative Building	1	Variable	For offices of all Partnering Government Agencies, Control

Sl. No	Description	Nos.	Fixed/Variable Component	Remarks
				room, Server room, Conference room, etc.
4	Import/Export Sheds/Seizure Shed & Unbonded Warehouse	1	Variable	
5	Trans-shipment Yards	1	Fixed	
6	Fire Station	1	Fixed	Designs to be as per National Disaster Management Authority (NDMA) & MES guidelines
7	Weigh Bridge	2	Fixed	
8	Rummaging Shed	1	Fixed	
9	Plant and Animal Quarantine Labs	1	Fixed	
10	Accommodation		Variable	Includes Accommodation for BGF and other stakeholders as per deployment
11	Service Block		Variable	Electrical Substation, Sewage Treatment Plant (STP), Water Treatment Plant (WTP), Pump House, Heating Ventilation & Air Conditioning (HVAC), Rainwater Harvesting, Internal & external lighting, Smart Garbage disposal systems, Public Health Engineering and Drainage
12	Hazardous Material Storage area	1	Variable	Area will be determined as per goods traded.
13	Parking Areas		Variable	Separate for Import side vehicle movement and Export side vehicle movement, Covered parking, Vehicle parking, roads, dead spaces and walkways
15	Watch Towers (G+1)	4	Fixed	As per site requirement
16	Full Body Truck Scanner	1	Fixed	
17	Fumigation Shed	1	Fixed	Taken under Miscellaneous components

Sl. No	Description	Nos.	Fixed/Variable Component	Remarks
18	Open Storage Area	1	Variable	As per Site requirement
19	Land Port Health Unit	1	Fixed	Part of PTB
20	Solar Panels/Plants	1	Variable	As per Ministry of Non-Renewable Energy (MNRE) Guidelines
21	Landscaped area		Variable	As per Town and country planning norms
22	Security Wall		Variable	As per security requirement
23	Open spaces		Variable	As per NBC guidelines
24	Setbacks		Variable	As per NBC Guidelines

7.0. **Passenger Oriented Zone**

7.1 This document attempts to provide a thorough understanding of all the issues to consider while undertaking the planning and design of terminal facilities in an ever-evolving environment. To plan / design a passenger terminal appropriately it is important to base the plan on a sound quantitative program of functional requirements that are linked to future forecasts of land ports passengers.

7.2 The factors on which PTB is designed are listed below: -

- Passenger flow.
- Terminal counters.
- Processing times.
- Waiting halls.
- Circulations area inside.
- Functionally neutral space.
- Washrooms.
- Check in areas.
- Furniture arrangements inside.
- Dwell time of passengers in PTB.
- Higher level of special services.
- Ease of way finding.

7.3. Basic assumptions adopted for the Passenger Terminal Building (PTB) are as mentioned: -.

(a) **Peak Hour Ratio**:

Post various surveys conducted across various Indian Airports and land ports with varying traffic levels the following ratios were arrived at for domestic terminals for Peak Hours (PH) during Peak Days (PD) and Average Days (AD):

For estimation purposes, LPAI is adopting / considering a PH/PD ratio of **0.3** for Land Port's based on the following data from IATA guidelines:

Sl. No	**Domestic Terminals Traffic in MPPA***	**Ratio (PH/PD) for Domestic Terminals**	**Remarks**
1	Less than 0.5	0.45	
2	0.5 – 1.0	0.35	
3	1.0 – 5.0	0.25	

*Refer **Annexure- 2**

MPPA – Million Passengers Per Annum

(b) **Level of Service (LOS):**

LOS performance standards provide a method of sizing passenger circulation elements that respond to the demands of pedestrian behaviour. For arriving at levels of service, we have considered the following data from IATA manual.

The following parameters have been considered by IATA for design of airport terminals. All domestic airports, as per Ministry of Civil Aviation directions, are designed considering optimum LOS (Previously LOS level C) for all upcoming terminals.

Terminal Area	**Allocated Sq. M per Person**					
LOS	A	B	C	D	E	F
Check In Queue	1.71	1.53	1.35	1.17	0.99	System Breakdown
Wait/ Circulate	2.61	2.25	1.8	1.44	0.99	
Hold Room	1.35	1.17	0.99	0.81	0.54	
			4.14			

Based on passenger volumes LPAI proposes to similarly adopt the IATA norms based on LOS norm C as they are optimal for our passenger terminals with similar functionality.

For purpose of calculations of PTB area, as per the above norms, we are assuming 1000 peak hour passengers (500 each for arrival and departure side).

Thus, the Passenger Oriented Zone shall include the following components:

I. **Passenger Terminal Building:**

Therefore, LPAI is considering **4.15 Sq. m** per Passenger which corresponds to LOS service C. A total carpet area of **4,150 Sq. m or built-up area of 4,611.11** is required for both Arrival

and Departure terminal combined for all passenger facilities for 1000 passengers as per peak hour passenger projections.

II. **Internal Roads:**

An area of approximately **1046.91 Sq. m** is required for development of internal roads for PTB areas from the main collector roads which include PTB building, Smart Gate and 50% area of Mandatory open spaces. The detailed calculations are as enclosed (**Annexure- 2).**

*The road width planned for main roads are 20 mtr. Carriage way in and out with all amenities as per collector streets and Local streets mentioned in IRC norms (Refer **Annexure - 4**).*

*Internal road width to be provided are minimum 12 mtr. as per IRC norms (Refer **Annexure - 4**). The single way road width along the perimeter to be considered 6.5 mtr. wide. The main roads to be designed based on MoRTH specifications with sufficient load bearing capacity due to movement of large Passenger Vehicles.*

III. **Mandatory Open Spaces:**

An area of **2,428.113 Sq.m** is considered for Mandatory open Spaces as per NBC norms.

IV. **Parking Areas for Passenger Oriented Zone:**

An area of **1,470.0Sq. m** is taken for off-road parking which caters to staff as well as visitors parking for the Passenger Terminal Building as per the guidelines laid down in Indian Road Congress Special Publication (IRC-SP)-12, 2015.

Size planned for each vehicle is as follows: -

Sl.No	Parking Space	Area (In Sq.M)	Remarks
1	Car	20 – 36	IRC SP-12,2015
2	Buses	55 - 60	IRC SP-12,2015
3	Trucks	55 - 60	IRC SP-12,2015
4	Three Wheelers	10 - 50	IRC SP-12,2015

As parking norms are prescribed in terms of ECS, following factors shall be used to convert other vehicles into equivalent car units.

Sl.No	Parking Space	Area (In Sq.M)	Remarks
1	Car/Taxi	1.0	IRC SP-12,2015
2	Two-Wheeler	0.25	IRC SP-12,2015
3	Auto Rickshaw	0.50	IRC SP-12,2015
4	Bicycle	0.1	IRC SP-12,2015
5	Trucks/Buses	2.50	IRC SP-12,2015
6	Emergency Vehicles	2.50	IRC SP-12,2015
7	Cycle Rickshaw	0.80	IRC SP-12,2015

Assuming a total of 30 cars (**900 Sq.m**), 60 two wheelers (**450.0 Sq.m**) and 40 bicycles (**120 Sq.m**) the total area required is **1470.0** sqm as per IRC SP 012 (2015) norms listed above.

(Assuming **30 Sq.m per car**. This area includes parking as well as circulation spaces)

V. **Building Setbacks:**

For Building setbacks an area of **1216.46 Sq.m** is required

VI. **Ancillary Spaces:**

For other ancillary spaces such as Taxi parking, EV charging ports etc **1,000 Sq. m** area has been considered

VII. **Landscaping:**

As per URDPFI (Urban and Regional Development Plans Formulation and Implementation Guidelines) (2015) & Urban Green Guidelines (2014) a minimum area of **3** Sq meter (as per NBC) and a desirable area of **10** Sq. meter per person is to be considered as landscaped area.

Basis on the calculations for water supply the number of persons arrived at is approximately 3000, therefore we assume 1000 persons for Passenger Service Areas hence an area of approx. **10,000 Sq.m** is required.

VIII. **Smart Gate for Passenger Oriented Zones:**

An approximate area of **1,120.0 Sq.m** is being considered for the design of a smart gate based on existing designs across various land ports

The above hence can be summarized as below:

Sl. No	Description	Area Ratio	Area (in Sq.m)	Remarks
1	Passenger Terminal Building	4.15	**4,611.11**	
2	Internal Roads		**1,046.91**	
3	Mandatory open spaces	0.4 Ha/1000	**2,428.11**	50% of **4,856.23** (total area as per NBC norms)
4	Parking for Passenger Oriented Zone		**1,470.0**	
5	Building setbacks		**1,216.46**	
6	Other Ancillary spaces		**1000.00**	
7	Landscaping	10	**10,000**	
8	Smart Gate		**1,120.0**	One Number proposed
	Total		**22,892.59**	

*The above areas are Built up Areas inclusive of Circulation spaces

Basis on the above calculations, space required for planning Passenger Oriented Zones for 1000 peak hour passenger traffic is approximately **22,892.59 Sq.m** (**22.89** Sq.m/Passenger)

8.0 Trade Oriented Zone:

For purpose of calculations of area as per the norms we are creating norms assuming a traffic of 500 trucks per day.

Thus, the Trade Oriented Services shall include the following components:

I. **Cargo Terminal Building:**

Approximately **1.17 Sq.m** per truck is arrived at for calculating the area required for the Cargo Terminal Building. Therefore, a total carpet area of **585 Sq.m** or built-up area of **650 Sq.m** is required. For detailed calculations refer Annexure – 3

II. **Internal Road Area:**

An area of approximately **1,668.08 Sq. m** is required for development of internal roads for connecting the various facilities of the Trade Oriented Zone with the main collector roads (**Annexure- 3).**

*The road width planned for main roads are 20 mtr. Carriage way in and out with all amenities as per collector streets and Local streets mentioned in IRC norms (Refer **Annexure - 4**).*

*Internal road width to be provided are minimum 12 mtr. as per IRC norms (Refer **Annexure - 4**). The single way road width along the perimeter to be considered 6.5 mtr. wide. The main roads to be designed based on MoRTH specifications with sufficient load bearing capacity due to movement of heavy Cargo Vehicles.*

III. **Mandatory Open Spaces:**

An area of **2,428.113 Sq.m** is considered for Mandatory open Spaces as per NBC Norms

IV. **Building Setbacks:**

For Building setbacks an area of **5,192.87 Sq.m** is required. The buildings considered are Cargo Terminal Buildings, Warehouses, Transshipment yards, Open Storage area, weigh bridge, Full body truck scanner, Rummaging pit, Fumigation Shed, Porter rest area & Plant & animal Quarantine building

V. **Truck Parking areas:**

An approximate area of **153.608** Sq. m per truck was arrived at as per the calculations below following the guidelines laid down in Indian Road Congress Special Publication (IRC-SP)-12,2015.

The truck sizes were assumed as 12m L x 2.57 m W

Sl. No	Description of component	Area (In Sq.m)	Remarks
1	Area Required for a single truck parking	100.11	**Including Parking & Circulation area**
2	Collector street area per truck	28	Road area, assuming a 7m wide road as per IRC 86(2018)
3	Frontage Zone Area	2	Design for Pavement as per IRC 118 (2018)
4	Footpath Area	7.2	Design for Pavement as per IRC 118 (2018)
5	Verge Area	9.32	Design for Pavement as per IRC 118 (2018)
6	Dead Spaces & Turning areas	6.978	Assuming 15% of area of roads & pavements as dead spaces & Turning areas
	Total	**153.608**	

The above components can be explained in detail as follows:

a. Collector Street – A street for collecting & distributing traffic from local streets
b. Frontage Zone – An area adjacent to property line where transitions to & fro from the street to the building occur.
c. Footpath Area: Footpath intended for use by pedestrians
d. Verge Area – A strip of green cover located between the road & footpath. These can be utilized for laying underground services such as drains, sewerage, telephone cables etc. The same can also be used for installation of street furniture as well.
e. Dead Spaces – Non utilizable areas due to site conditions

Therefore, for 500 trucks an approximate parking area of **76,804 Sq. m** is required. The detailed calculations are mentioned in **Annexure-4.**

VI. **Warehouses:**

Based on the volume of cargo movement across various locations, it is planned to base total Warehousing capacity for the Land Port to be 25% of Daily Exim Tonnage volume. Assuming 500 trucks with each having a legally permitted Gross Vehicle Mass (GVM) capacity of 42 Tons & approx. kerb weight of 29.400 Tons the total cargo movement per day would be as follows:

$$\text{Total Daily} = Number\ of\ Trucks\ X\ (GVM - Kerb\ Weight)$$

Therefore, multiplying 500 X 12.6 equals **6300 Tons.** Separate Warehouses for Import, Export, Unbounded and Seizure items along with adequate cold storage facilities as required. The minimum area for the above-mentioned warehouses is as follows:

Sl. No	Description	Area (in Sq.m)	Remarks
1	Export Warehouse	1,965.6	For a capacity of 1,260 Tons
2	Import Warehouse	3,931.2	For a capacity of 2,520 Tons
3	Unbonded Warehouse	2,457	For a capacity of 1,575 Tons
4	Seizure Warehouse	1474.2	For a capacity of 945 Tons

Area Calculations as per **Annexure - 6**

Therefore, approximately a total area of **9,828 Sq. m (Carpet Area) or 10,920 Sq.m (Built up Area)** for warehouses is to be provided.

VII. **Open Storage Area:**

In addition to the above, an open area provision for storage of loose cargo **1,500 Sq.m** to be provided.

VIII. **Weigh Bridges:**

Dedicated and separate for Export/ Imports having min 120 MT, capacity weighbridges are to be considered. Area required is **150 Sq.m** for each inclusive of weighbridges, operator room & approach & exit ramps. Therefore, an area of **300 Sq.m** (Carpet Area) or **333.33 Sq.m** (Built up Area) considered for two weigh bridges.

IX. **Plant and Animal Quarantine Block:**

Plant and Animal Quarantine Block is planned with spaces for the technicians, laboratory and storage need to be catered for as per the essential requirement. Minimum Area is **500 Sq.m** (Carpet Area) **or 555.55 Sq.m** (Built up Area)

X. **Porters Rest Area:**

Rest area for porters is to be designed based on the peak hour traffic and at an average of approx. **75 sqm** (minimum) for workers engaged at the cargo dock. Therefore, an area of 150 Sq.m (Carpet Area) or **166.66 Sq.m** (Built up Area) has been considered.

XI. **Rummaging Shed:**

In cargo areas rummaging sheds are used for the efficient searching of cargo trucks for any possibility of smuggling of contraband goods. This is an essential security requirement. The

scale/ norms are to be adopted @ 250 sqm / shed. or **500 Sq.m** (Carpet Area) for 2 Nos or **555.55 Sq.m** (Built up Area)

XII. **Fumigation Shed:**

Fumigation sheds are specialized facilities used in cargo areas to ensure the safe and effective treatment of goods and cargo against pests and contaminants. These sheds are essential for maintaining hygiene standards and protecting the integrity of goods, particularly those that are sensitive or require strict quarantine measures. The scale/ norms are to be adopted @ 200 sqm It as per functional requirements. Considering **222.22 Sq.m** (Built up Area)

XIII. **Full Body Truck Scanner:**

For this an area 500 Sqm (Carpet Area) or 555.55 Sq. (Built up Area) considered. Though this may change as per actual sizes of machine.

XIV **Landscaping:**

As per URDPFI (Urban and Regional Development Plans Formulation and Implementation Guidelines) (2015) & Urban Green Guidelines (2014) a minimum area of **3** Sq meter (as per NBC) and a desirable area of **10** Sq. meter per person is to be considered as landscaped area.

Basis on the calculations for water supply the number of persons arrived at is approximately 3000, therefore we assume **1,704** persons for Cargo Service Zone hence an area of approx. **17,040 Sq.m** is required.

XV. **Hazardous Material Storage**

An area of **100 Sq.m** (Carpet) or **111.11 Sq.m (Built up)** can be considered for Hazardous Materials Storage. This is a notional area, and actual area may vary as per various norms and guidelines in force for storing various materials e.g. Petroleum, fertilizers, caustic soda, etc.

XVI. **Drivers Dormitory:**

For the Land Port an area of **180.70 Sq.m** (Built up) is proposed for 30 drivers with washroom facilities as per NBC norms.

XVII. **Parking Area for stakeholders' vehicles:**

Catering to the Cargo Terminal Building, a parking area of **975.0 Sq. m** is taken for Parking which caters to staff, CHAs, as well as porters parking for the Cargo Terminal Building as per the guidelines laid down in Indian Road Congress Special Publication (IRC-SP)-12,2015.

The above caters to a total of 20 cars (**600 Sq.m**), 30 two wheelers (**225.0 Sq.m**) & 50 bicycles (**150 Sq.m**)

XVIII. **Smart Gate:**

An approximate area of **2240.0 Sq.m** is being considered for the design of two smart gates for Trade Oriented Zones based on existing designs across various land ports

XIX. **Transhipment Yard:**

An approximate area of **222.22 Sq.m** is calculated for two numbers Transshipment Yards

Thus, the Cargo & Trade Oriented Services can be summarized as below:

Sl. No	Description	Area Ratio	Area (in Sq.m)	Remarks
1	Cargo Terminal Building	1.10	650.00	
2	Internal Roads		1668.08	
3	Mandatory open spaces	0.4 Ha/1000	2,428.113	50% of **4,856.23** (total area as per NBC norms)
4	Building setbacks		5192.87	
5	Truck Parking	153.608	76,804	
6	Warehouses		10,920	
7	Open Storage Area		1,573.03	
8	Weigh Bridges		333.33	Fixed components
9	Plant & Animal Quarantine block		555.55	
10	Porters Rest Area		166.66	
11	Rummaging Shed		555.55	
12	Fumigation Shed		222.22	
13	Full Body Truck Scanner		555.55	
14	Landscaping		17,040.0	
15	Hazardous Material Storage		111	
16	Dormitory for Drivers		180.70	
17	Parking Area for Cargo Terminal Building		975.00	
18	Smart Gate		2240.0	2 Numbers proposed
19	Transhipment Yard		222.22	2 Numbers proposed
	Total		1,22,394.02	

***Built up Areas Considered**

Basis on the above calculations, space required for planning Trade Oriented Zones for 500 trucks is approximately **1,22,394.02 Sq.m** (**244.78** Sq.m/Truck)

9.0 Administrative Zone

9.1 The Administrative Building stands as the central hub of organizational operations, embodying efficiency and functionality. Designed with a focus on streamlined workflows and professional environments, it supports various administrative functions including management, human resources, finance, and strategic planning. It covers spacious offices, conference rooms, control room and other collaborative workspaces. Equipped with the latest technology, the building enhances productivity and facilitates smooth communication across all stakeholders operating from Land Port.

The Details are as covered in **Annexure - 5**

I. Administrative Building:

For purpose of calculations of area as per the norms we are assuming 1000 Passengers and 500 Trucks per day.

a. An area of **1.282 Sq.m** per passenger or (carpet area) of **1282.0** Sq.m or **1,424.44** Sq.m (Built up Area) is required to cater to 1000 passengers

b. Similarly, an area of **0.67** Sq.m per passenger or (carpet area) of **335.0** Sq.m or **372.22** Sq.m (Built up Area) is required.

Therefore, Administrative building area can roughly be assumed as **1,617.0 Sq.m** (Carpet Area) or **1,796.66** Sq.m (Built up Area)

II. Internal Road:

An area of approximately **491.26 Sq. m** is required for development of internal roads for Administrative Building areas from the main collector roads which include Administrative Building.

*The road width planned for main roads are 20 mtr. Carriage way in and out with all amenities as per collector streets & Local streets mentioned in IRC norms (Refer **Annexure - 4**).*

*Internal road width to be provided are minimum 12 mtr. as per IRC norms (Refer **Annexure - 4**). The single way road width along the perimeter to be considered 6.5 mtr. wide. The main roads to be designed based on MoRTH specifications.*

III. Mandatory Setbacks:

An area of approximately **684.41 Sq. m** is required for setbacks for Administrative Building.

IV. Parking for Administrative Zone:

An area of approximately **1050.0 Sq. m** is required for setbacks for Administrative Building.

The above caters to a total of 20 cars (**600 Sq.m**), 50 two wheelers (**375.0 Sq.m**) & 25 bicycles (**90 Sq.m**)

Thus, the Administrative Building Area can be summarized as below:

Sl. No	Description	Area Ratio	Area (in Sq.m)	Remarks
1	Administrative Building		1,796.66	
2	Internal Roads		491.26	
3	Mandatory Setbacks		684.41	
4	Parking for Administrative Zone		1050.00	
	Total		4,022.35	

***Built up areas considered**

Basis on the above calculations, space required for planning Administrative Zones for 1000 Passengers & 500 trucks is approximately **4,022.35 Sq.m**

10.0 Stakeholders' Accommodation

10.1 The Land ports are in remote border locations. Thus, there is need to provide the PGA staff with single living accommodation as per the authorised strength and scales defined by MHA. All the stakeholders execute their duties as per their charters and the port working hours may start early in the morning and go till late in the night.

For planning of the accommodation norms for a standard Land Port accommodation for Land Port Manager, LPAI Staff, Customs, Immigration, other PGAs and two Companies of BGF has been considered. The scale is based on single living accommodations for all ranks as per MES/BGF Guidelines. These accommodations will be divided into Jawans Barracks, Sub-ordinate Officers accommodations, Mahila Barrack and Officer accommodation separately in this campus along with other facilities as applicable. The scale being considered is given in **Annexure -7**

Therefore, the Residential blocks shall comprise of the following components:

I. Residential Areas:

Sl. No	Description	Mess Area (Including 20% circulation space)	Area Per Person (Carpet)	Number of persons	Total Area
1	Port Manager	0	150	1	166.66
2	Officers	164.54	108	5	782.82
3	Subordinate	136.5	69.03	30	2542.66
4	Jawan	288	15.69	210	4064.33
5	Mahila	213	15.69	30	759.66
6	Stakeholder	0	15.69	20	348.66
	Total			296	**8,574.82**

***Built up areas considered**

II. Internal Roads:

A total area of **1,073.24 Sq.m** is required for internal roads.

III. Mandatory Setbacks:

A total area of **1,111.20 Sq.m** is required for mandatory setbacks for all of the above buildings.

IV. Landscaped Area:

A total area of **2960.00 Sq.m** is required for mandatory setbacks for all of the above buildings.

V. Parking for Stakeholder Accomodation:

A total area of **615.00 Sq.m** is required for parking for all of the above buildings.

The above caters to a total of 10 cars (**300 Sq.m**), 30 two wheelers (**225.0 Sq.m**) & 30 bicycles (**90 Sq.m**)

Thus, the above can be summarized as:

Sl. No	Description	Area Ratio	Area (in Sq.m)	Remarks
1	Accommodation		**8,574.82**	
2	Internal Roads		**1,073.24**	
3	Mandatory Setbacks		**1,111.20**	
4	Landscaped Area		**2960.0**	
5	Parking		**615.00**	
	Total		**14,334.26**	

***Built up areas considered**

Basis on the above calculations, space required for planning accommodation for Land Port Manager, LPAI Staff, Customs, Immigration and two Companies of BGF is approximately **14,334.26 Sq.m**.

11.0 Common Utilities & Services:

The following are covered under the common utilities & services:

I. Security Wall

Security Walls height shall be taken as 3.0 meter for construction purpose as per MES norms. The norms to be adopted are based on to cover the entire Land Port campus along the periphery with adequate boundary height and security fencing. Minimum height of 3.0 Meter to be provided. The top plinth level beam is to be having angle Iron brackets with concertina coil and barbed wire having 6-7 rows all along to provide additional 0.8-meter min height. The security wall shall be accessible through perimeter road all along for quick responses in case of any threat.

II. Security Watch Towers

Watch Towers to be provided on the guidelines of security forces requirements with adequate inter-visibility distances between all the Watch Towers. The watch towers will be self-sufficient for a guard of one NCO, 4 Other Ranks along with washroom and toilets. G+I type watch towers all along the periphery of Land Port Campus on visible distance to be considered. Each watch tower area will be approx. **100 Sq.m.** A minimum of 4 watch towers are envisaged in each land port.

III. Sewage treatment Plant

The sewage treatment plant facility will be designed to process and treat wastewater and sewage from the Land Port. Minimum area required for STP is **200 sqm**. (Carpet Area) or **222.22 Sq.m** (Built up)

IV. Rain Water Harvesting & Drainage System

Rain Water Harvesting and Drainage system will be designed to manage the flow and removal of excess water and effluents from various surfaces and areas inside the Land Port. The area required for the same is assumed as 10% of overall plot area or **15,224.4 Sq.m**

V. Electricity requirements: -

As per NBC norms, a 11 KVa Sub Station is to be provided with minimum area of **500** sqm (Carpet Area) or **555.55** (Built up Area) (Refer **Annexure - 9**)

VI. Water Supply: -Pump Station to be provided to cater for complete requirement. The size of Pump House to be **200** sqm. and one sump UG of minimum capacity 100 KL and Over Head Tank capacity of 100 KL. Total area to be planned is approx. **400** sqm. for all facility of Pump House and UG and OHTs.

For detailed water calculations (Refer **Annexure -11**)

VII. HVAC and Air Condition System.

This will be as per norms and other components such as local climate passenger load etc.,

For detailed calculations for this particular case (Refer **Annexure - 12**)

VIII. Fire station and SWT

For a single Tender Fire station an approximate area of **746.66 sqm**. along with one SWT of capacity 50 KL to be provided.

For detailed area calculations refer **Annexure - 14**.

IX. Solar Plant/Panels.

Basis the design, either a separate solar farm can be planned or the panels can be installed on the rooftops

X. Mandatory Setbacks:

For Building setbacks an area of **1,337.51 Sq.m** is required. The buildings considered are Fire Station, SWT, STP, Sub-Station, Pump House, OHT, Rainwater Harvesting and Drainage

XI. Internal Roads:

For Internal roads an area of **1,587.16 Sq.m** is required.

Thus, the above can be summarized as follows:

Sl. No	Description	Area Ratio	Area (in Sq.m)	Remarks
1	Sewage Treatment Plant		222.22	
2	Rain Water Harvesting & Drainage		15224.44	
3	Sub Station		555.56	
4	Pump House		222.22	
5	Over Head Tank		444.44	
6	Fire Station		580.00	
7	SWT		166.67	
8	Internal Roads		1587.16	
9	Mandatory Setbacks		1337.51	
	Total		**20,340.22**	

***Built up areas considered**

Basis the above calculations, space required for planning Common Utilities & Services is approximately **20,340.22 Sq.m** for 1000 Passengers and 500 Trucks.

12.0 Conclusion

The above Five components can be summarized as below to arrive at the total area required for setting up of a Land Port for 1000 Passengers and 500 Trucks:

Sl. No	Description	Area (in Sq.m)	Remarks
1	Passenger Oriented Zone	**22,892.59**	
2	Trade Oriented Zone	**1,22,394.02**	
3	Administrative Zone	**4,022.35**	
4	Accommodation	**14,334.26**	
5	Common Utilities & Services	**20,340.22**	
	Total	**1,83,983.44**	

Therefore, a total approximate area of **1,83,983.44 Sq.m or 45.46 Acres** is required for setting up a Land Port for the abovementioned capacity. Based on Trade and Traffic volumes up to 46 Acres may be requested.

******

Note:

1. *This document to be reviewed every five years for changes in norms or substitution of elements for abovementioned facilities or as deemed suitable by competent authorities.*

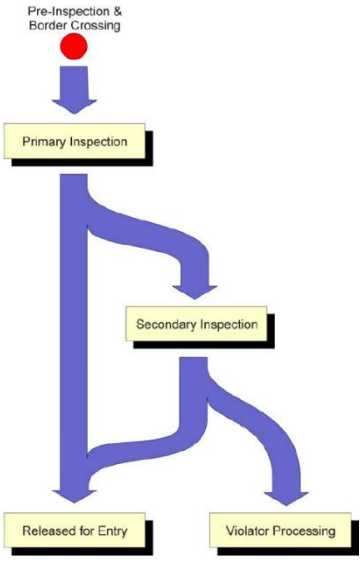
Annexure – 1

US LAND PORT OF ENTRY – DESIGN GUIDELINES

UNITED STATES LAND PORT OF ENTRY DESIGN GUIDE (0-4d.org)

CASESTUDIES ON PEDESTRIAN & VEHICLUAR MOVEMENT

While all land ports have certain common features, no universally applicable design solution will be applicable. As with any other building design program, the planning and design solution should be such that responds to the specific needs and constraints defined for the Port under consideration. The "United States Land Port of Entry Design Guide" to understand spatial planning is covered in succeeding paras.



Action on Entry: -

1. **Inspection Sequence**:
    a. Primary: Initial Screening of Vehicles & Passengers to determine Citizenship, purpose of entering etc along with visual scan of vehicles.

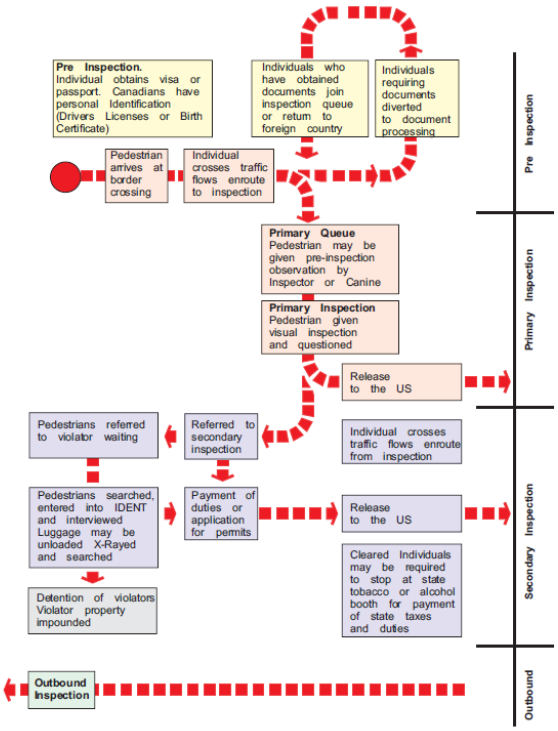
b. Secondary: This includes an inspection of the entire vehicle and all containers within it, an interview with the individual to determine status and the appropriate actions required to allow entrance into the U.S. and a verification of identity and validity of documents. Individuals with items to declare pay duties and tariffs during secondary inspection.

Individuals violating laws are detained for processing as per law.

2. Pedestrians:

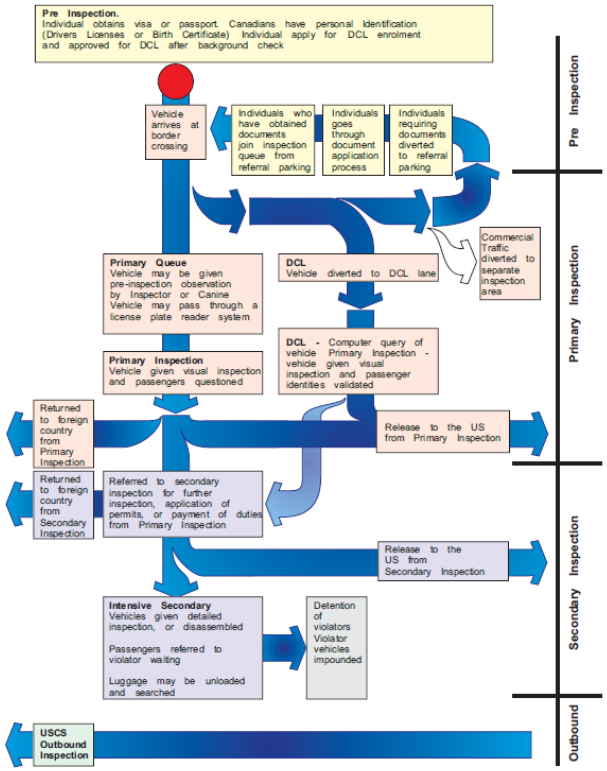
A Port receives pedestrians intending to immigrate, to shop or conduct other business, to work legally in the United States, those with business at the Port who do not intend to cross the border, and tourists.

Most pedestrian traffic typically occurs at ports located in municipal areas. Some ports located in rural areas may have light pedestrian loads from bicycle tours that are processed as pedestrians.

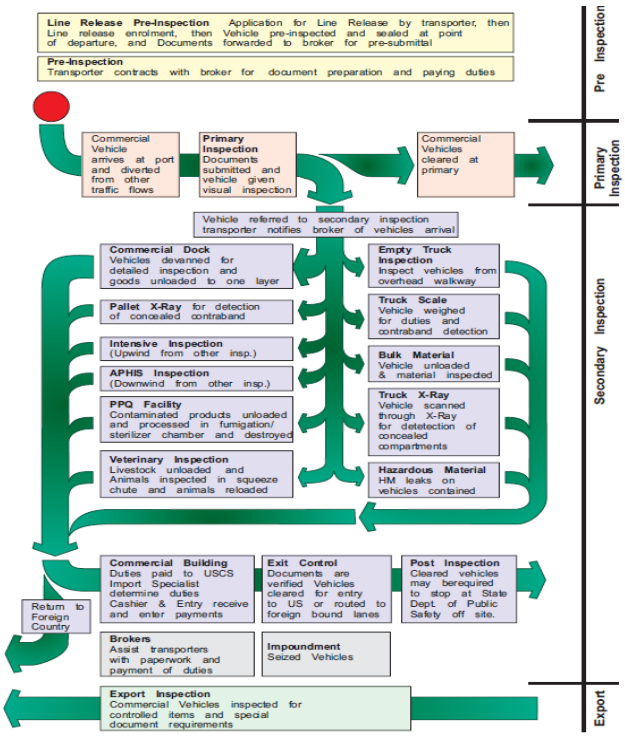


3. Non-Commercial Traffic Flow:

(a) Non-commercial refers to vehicle traffic not carrying materials for resale or use in manufacturing. This includes passenger cars, motorcycles, vans, recreational vehicles, vehicles towing trailers, boats, and any other vehicles not carrying cargo for resale. Buses that provide commercial transport services are treated as a separate traffic category because they require a different inspection sequence. All non-commercial traffic entering the U.S. must pass through the non-commercial inspection area. The route must be unmistakable and unavoidable. The traffic must first pass through the primary inspection facilities. The Secondary Inspection area is located following the Primary Inspection area, along the flow of traffic. Traffic admitted directly from the Primary Inspection area must be able to bypass the Secondary Inspection area and enter the U.S. Any traffic not admitted after Primary Inspection will be directed to Secondary Inspection for further inspection or will be turned back to the foreign country. Non-commercial vehicles that turn back must have a return lane that joins traffic leaving the U.S. The return route must be visible from the primary inspection booths and must not join a route where normal traffic enters the United States.



4. Commercial Traffic:



(a) Commercial traffic carries goods and cargo for resale or use in manufacturing. This is normally large trucks but can be automobiles and other small vehicles carrying goods for resale. Commercial vehicles also include large transport vehicles returning empty across the border. USCS performs all primary and many of the secondary inspection activities, including collection of duties and searching for contraband or restricted commercial goods. APHIS PPQ performs secondary inspection for any agricultural products. APHIS VS may have an inspection facility located at or near the main Port for inspection of livestock. FDA and USFW may provide secondary inspection at some locations, typically at larger commercial operations.

Customs brokers, are the one engaged to prepare the proper documents and submit them to the USCS on behalf of the shipper, are an integral part of the commercial inspection process. The broker arranges, through private contractors, to have the commercial vehicles unloaded at the dock, making the goods available for inspection. Commercial vehicles enrolled in National Customs Automation Program (NCAP) may use remote filing and post import reconciliation of entries, with electronic transfer of commercial data and payment of duties on monthly statement cycles. USCS uses a computer-based information system called Automated Commercial System (ACS) to process commercial entries, fines, penalties and forfeitures, as well as administrative functions.

Generally, commercial traffic will be segregated and diverted promptly from other traffic and routed through controlled lanes to the Commercial Inspection area. Commercial vehicles will pass through a Primary Inspection facility. Vehicles may be released for entry into the U.S. directly from primary inspection as part of the Border Release Advanced Selectivity System. These vehicles should be able proceed directly to the U.S. via a separate roadway which by-passes the dock area.

Vehicles not released directly from primary inspection will be inspected at the dock or at one of the specialized inspection facilities. Upon completion of inspection, the trucks must have a clear path re-joining other traffic entering the U.S. Trucks not cleared for entry into the United States must be diverted back to the foreign country.

Types of inspection performed by USCS can include any of the following:

1. Initial screening and processing of paperwork. This is normally performed at the primary inspection booth.
2. Devanning and inspection of goods. This involves unloading goods for inspection, visual inspection of the inside of the cargo bays, and thorough visual inspection of goods on the dock.
3. X-ray or Gamma ray inspection, including VACIS radiographic scans of cargo vehicles through a vehicle x-ray machine and radiographic scans of goods through a pallet x-ray machine.
4. Bulk cargo inspection, including off-loading of bulk cargo into bins

Annexure – 2

IATA had proposed the following ratios for determination of peak hour passenger calculations for Airports a LOS (Level of Service) C.

TABLE 1: TRAFFIC RATIOS AT INTERNATIONAL & DOMESTIC AIRPORTS IN INDIA

Sl. No	Traffic (in million passengers per annum)	Ratios for International Terminal		Ratios for Domestic Terminal	
		PD/AD	PH/PD	PD/AD	PH/PD
1	10.0 and above	1.15	0.15	1.10	0.10
2	5.0-10.0	1.20	0.20	1.15	0.15
3	1.0 -5.0	1.30	0.30	1.25	0.25
4	0.50 - 1.0	1.35	0.35	1.35	0.35
5	Less than 0.5	1.45	0.45	1.45	0.45

Traffic Ratios as per IATA Norms, published in the Interministerial Group report on "Norms & Standards for determining the Capacity of Airport Terminals, Ministry of Civil Aviation, GoI.

Previous norms:

Terminal Area	**Allocated Sq.M per Person**					
LOS	A	B	C	D	E	F
Check In Queue	1.71	1.53	1.35	1.17	0.99	System Breakdown
Wait/ Circulate	2.61	2.25	1.8	1.44	0.99	
Hold Room	1.35	1.17	0.99	0.81	0.54	
			4.14			

Assuming LOS C, a total of 4.15 Sq.m per passenger has been recommended.

Revised IATA Norms, where LOS C has been considered as Optimum Level of Service.

LoS Guidelines		SPACE GUIDELINES [sqm/PAX]			MAXIMUM WAITING TIME GUIDELINES Economy Class [minutes]			MAXIMUM WAITING TIME GUIDELINES Business Class / First Class / Fast Track [minutes]			OTHER GUIDELINES & REMARKS		
LoS Parameter:		Over-Design	Optimum	Sub-Optimum	Over-Design	Optimum	Sub-Optimum	Over-Design	Optimum	Sub-Optimum	Over-Design	Optimum	Sub-Optimum
Public Departure Hall		> 2.3	2.0 - 2.3	< 2.0	n/a			n/a			Optimum proportion of seated occupants: 15 - 20%*		
Check-In	Self-Service Kiosk (Boarding Pass / Bag Tagging)	> 1.8	1.3 - 1.8	< 1.3	< 1	1 - 2	> 2	< 1	1 - 2	> 2			
	Bag Drop Desk (queue width 1.4 - 1.6m)	> 1.8	1.3 - 1.8	< 1.3	< 1	1 - 5	> 5	< 1	1 - 3	> 3			
	Check-in Desk (queue width: 1.4 - 1.6m)	> 1.8	1.3 - 1.8	< 1.3	< 10	10 - 20	> 20	< 3	Business Class 3 - 5	> 5			
								< 1	First Class 1 - 3	> 3			
Security Control (queue width: 1.2m)		> 1.2	1.0 - 1.2	< 1.0	< 5	5 - 10	> 10	< 1	Fast Track 1 - 3	> 3			
Emigration Control (Outbound Passport Control) (queue width: 1.2m)	Staffed Emigration Desk	> 1.2	1.0 - 1.2	< 1.0	< 5	5 - 10	> 10	< 1	Fast Track 1 - 3	> 3			
	Automatic Border Control	> 1.2	1.0 - 1.2	< 1.0	< 1	1 - 5	> 5	n/a					
Gate Holdrooms ***	Seating	> 2.2	1.8 - 2.2	< 1.8	n/a			n/a			Optimum proportion of seated occupants: 50 - 70%*		
	Standing	> 1.5	1.2 - 1.5	< 1.2									
Immigration Control (Inbound Passport Control) (queue width: 1.2m)	Staffed Immigration Desk	> 1.2	1.0 - 1.2	< 1.0	< 5	5 - 10	> 10	< 1	Fast Track 1 - 5	> 5			
	Automatic Border Control	> 1.2	1.0 - 1.2	< 1.0	< 1	1 - 5	> 5	n/a					
Baggage Reclaim	Narrow Body Aircraft	> 1.7	1.5 - 1.7	< 1.5	< 0	0 / 15	> 15	< 0	0 / 15	> 15	The first waiting time value relates to "first passenger to first bag". The second waiting time value relates to "last bag on belt" (counting from the first bag delivery).**		
	Wide Body Aircraft	> 1.7	1.5 - 1.7	< 1.5	< 0	0 / 25	> 25						
Customs Control		> 1.8	1.3 - 1.8	< 1.3	< 1	1 - 5	> 5	< 1	1 - 5	> 5	Waiting times refer to a procedure when 100% of the passengers are being checked by Customs		
Public Arrival Hall		> 2.3	2.0 - 2.3	< 2.0	n/a			n/a			Optimum proportion of seated occupants: 15 - 20%*		

PASSENGER TERMINAL BUILDING

PASSENGER TERMINAL BUILDING ARRIVAL TERMINAL					
PASSENGER FACILITIES					
Sl. No		Total	Space/Passenger	Number of Passengers	Remarks
1	Pick & Drop Zone	100	0.2		Assumed 50 sq.m for entry & exit areas
2	Entrance	75	0.15	30	
3	Reception	28	0.056	5	
4	Concourse	100	0.2	50	
5	Waiting Area for Baggage Scanners	81.6	0.1632	60	
6	Baggage Scanner	125.04	0.25008	12	
7	Waiting Area for Immigration	186	0.372	100	

PASSENGER TERMINAL BUILDING ARRIVAL TERMINAL					
PASSENGER FACILITIES					
Sl. No		Total	Space/Passenger	Number of Passengers	Remarks
8	Immigration Counter	153.9	0.3078	70	
9	Customs Waiting	55.4	0.1108	15	
10	Customs	37.44	0.07488	12	
11	Cafeteria	162.905	0.32581	88	
12	Duty Free Shops	151.1	0.3022	30	
13	Washrooms	69.15	0.1383		As per NBC Norms
14	VIP Visitors Lounge	35	0.07	10	
15	VIP Visitors Pantry	6	0.012		
16	Visitors Toilet	16.64	0.03328		
17	Staircase	46	0.092		
18	Lift	4.3	0.0086		
19	Feeding Room	20	0.04	10	
20	Electrical room	50	0.1		

PASSENGER TERMINAL BUILDING ARRIVAL TERMINAL					
PASSENGER FACILITIES					
Sl. No		Total	Space/Passenger	Number of Passengers	Remarks
21	Currency Exchange	30.6	0.0612	6	
22	ATM	15	0.03		
23	Janitor Store	20	0.04		
24	Water Cooler	15.225	0.03045		
25	Cloak Room	50	0.1		
26	Medical Room	27.875	0.05575	2	
	SUB-TOTAL	1662.175	3.32435		
27	Adding 25% for Circulation Spaces	415.5438	0.831088		
	TOTAL	2077.719	4.155438	500	

Therefore, a total area of **4,150 Sq.m** (Carpet Area) is required for Passenger Terminal Arrival & Departure Terminals or **4,611.11 Sq.m** (Built up Area)

For Calculating Internal Roads:

Sl. No	Description	Area (In Sq.m)	
1	Passenger Terminal Building	4,6,11.11	
2	Mandatory Open Spaces	2,428.11	Taking 50% of Mandatory open Spaces
3	Smart Gate	1120	
		8,159.0	

*Built up area considered

Taking Square root of 8,159 (to obtain length of building) & multiplying it by 11.59 (Factor for 1m Internal Road as derived in Annexure 4) equals **1,046.44 Sq.m**

ANNEX A

(*Clauses* 10.1 *and* 10.4)

OFF-STREET PARKING SPACES

A-1 The off-street parking spaces shall be as given in Table 9.

Table 9 Norms for Off-Street Parking Spaces

(*Clause* A-1)

Sl No.	Occupancy	One Car Parking Space for Every				
		Population Less than 50 000	Population Between 50 000 and 200 000	Population Between 200 000 and 1 000 000	Population Between 1 000 000 and 5 000 000	Population Above 5 000 000
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Residential a) Multi-family	—	—	a) 2 tenements having built-up area 101 to 200 m^2	1 tenement of 100 m^2 built-up area	a) 1 tenement of 75 m^2 built-up area
				b) 1 tenement of built-up area above 200 m^2		b) ½ tenement of built-up area above75 m^2
	b) Lodging establishments, tourist homes and hotels, with lodging accommodation	12 guest rooms	8 guest rooms	4 guest rooms	3 guest rooms	2 guest rooms
ii)	Educational (*see* Note 1)	—	—	70 m^2 area or fraction thereof of the administrative office area and public service areas	50 m^2 area or fraction thereof of the administrative office area and public service areas	35 m^2 area or fraction thereof of the administrative office area and public service areas
iii)	Institutional (Medical)	20 beds (Private) 30 beds (Public)	15 beds (Private) 25 beds (Public)	10 beds (Private) 15 beds (Public)	5 beds (Private) 10 beds (Public)	2 beds (Private) 5 beds (Public)
iv)	a) Assembly halls, cinema theatres	120 seats	80 seats	25 seats	15 seats	10 seats
	b) Restaurants	60 seats	40 seats	20 seats	10 seats	5 seats
	c) Marriage halls, community halls	600 m^2 plot area	400 m^2 plot area	200 m^2 plot area	50 m^2 plot area	25 m^2 plot area
	d) Stadia and exhibition centre	240 seats	160 seats	50 seats	30 seats	20 seats
	e) Sport complex (without stadium), parks and multipurpose open spaces	—	—	1 000 m^2 plot area	500 m^2 plot area	250 m^2 plot area
v)	a) Business offices and firms for private business	300 m^2 area or fraction thereof	200 m^2 area or fraction thereof	100 m^2 area or fraction thereof	50 m^2 area or fraction thereof	25 m^2 area or fraction thereof
	b) Public or semi-public offices	500 m^2 area or fraction thereof	300 m^2 area or fraction thereof	200 m^2 area or fraction thereof	100 m^2 area or fraction thereof	50 m^2 area or fraction thereof
vi)	Mercantile (*see* Note 2)	300 m^2 area or fraction thereof	200 m^2 area or fraction thereof	100 m^2 area or fraction thereof	50 m^2 area or fraction thereof	25 m^2 area or fraction thereof
vii)	Industrial	400 m^2 area or fraction thereof	300 m^2 area or fraction thereof	200 m^2 area or fraction thereof	100 m^2 area or fraction thereof	50 m^2 area or fraction thereof
viii)	Storage	—	—	500 m^2 floor area or part thereof	250 m^2 area or fraction thereof	125 m^2 area or fraction thereof

NOTES

1 In the case of auditoria for educational buildings, parking space shall be provided as per Sl No. (iv).
2 For plots up to 50 m^2, as in the case of shops, parking spaces need not be insisted upon.
3 For other institutions, transport/communication centre, parking space requirement shall be assessed based on the proposed building.
4 In case of permitted mixed residential-commercial or mixed residential-industrial areas the parking requirements shall be double the number for residential use.
5 The requirements specified in this table shall not be applicable for buildings meant for parking alone, including the multi-level car parking buildings which shall be as decided by the Authority.
6 Designated accessible parking spaces shall be provided in accordance with **B-3** for the occupancies specified in **13**.

Annexure – 3

CARGO TERMINAL BUILDING

CARGO TERMINAL BUILDING				
Sl. No	Description	Total	Space/Truck	Remarks
1	Entrance	25	0.05	
2	Reception	26	0.052	
3	Waiting Area for Drivers	38.7	0.0774	
4	Currency Exchange	18.7	0.0374	
5	ATM	10	0.02	
6	Water Cooler	9.975	0.01995	
7	Cafeteria	100.27	0.20054	
8	Staircase	46	0.092	
9	Washroom	24.22	0.04844	
10	CHA Office room	37	0.074	

CARGO TERMINAL BUILDING				
Sl. No	Description	Total	Space/Truck	Remarks
11	Documentation & Record Customs	20	0.04	
12	Data Entry Operators	37	0.074	
13	Documentation & Record Store	20	0.04	
14	Customs Room (Superintendents)	37	0.074	
	SUBTOTAL	449.865	0.89973	
15	Adding 30% for Circulation Spaces	134.9595	0.269919	
	TOTAL	584.824	1.169649	

Therefore, approximately a total area of **584.824** Sq. m (Carpet Area) or **650.0** Sq.m (Built up Area) is required for Cargo Terminal Building.

Therefore, the approximate area per truck for the Cargo Terminal Building is **1.17** Sq.m.

DRIVERS DORMITORY:

DRIVERS DORMITORY				
Sl. No	Description	Total	Space/Truck	Remarks
1	Dormitory	74.7	2.49	Assumed for 30 Drivers
2	Washroom	24.22	0.807333	
3	Terrace/Utility	26.18	0.872667	
	Subtotal	125.1	4.17	
	Adding 30% for Circulation Spaces	37.53	1.251	

DRIVERS DORMITORY				
Sl. No	Description	Total	Space/Truck	Remarks
	Total	162.63	5.421	

Therefore, for drivers Dormitory a total area of 162.63 Sq.m (Carpet Area) or 180.7 Sq.m (Built up Area) is required.

For Calculating Internal Roads:

Sl. No	Description	Area (In Sq.m)	Remarks
1	Cargo Terminal Building	650.00	
2	Warehouses	10920.00	
3	Open Storage Space	1573.03	
4	Weigh Bridge	333.33	2 Nos.
5	Full Body truck Scanner	555.56	
6	Rummaging Pit	555.55	
7	Fumigation Shed	222.22	
8	Mandatory Open Areas	2428.11	Taking 50% of Mandatory open Spaces
9	Porter Rest Area	166.67	
10	Plant & Animal Quarantine	555.55	
11	Hazardous Material Storage	111.11	
12	Drivers Dormitory	**180.70**	
13	Smart Gate	2240	
14	Transhipment Yard	222	
	Total	20,713.83	

*Built up area considered

Taking Square root of **20,713.83** (to obtain length of building) & multiplying it by 11.59 (Factor for 1m Internal Road as derived in Annexure 4) equals **1,668.08 Sq.m**

Annexure – 4

Roads & Parking Area Requirements:

The parking areas can be divided into two components:

a. Roads
b. Parking Areas

As per IRC -69 (1977) & IRC 86(2018) the streets can be classified into the following broad categories:

a. Expressways: The function of an expressway is to cater for movement of heavy volumes of motor traffic at high speeds. They connect major points of traffic generation & are intended to serve trips of medium to long lengths between large residential areas, industrial or commercial concentrations and the central business district.
b. Arterial Streets: Significant intra urban travel such as between business districts & outlying residential areas or between major suburban centres takes place on this system.
c. Sub – Arterial Streets: These are similar to arterial streets but somewhat lower level of traffic mobility.
d. Collector Streets: The function of collector streets is to collect traffic from local streets & feed them to Sub-Arterial & Arterial streets. These may be located in Residential neighbourhoods, business areas & industrial areas. Normally full access is allowed on these streets from abutting properties.
e. Local Streets: These are intended to provide access to abutting properties & do not carry large volumes of traffic. Local streets may be residential, commercial, or industrial depending on the predominant use of adjacent land.

Thus, the overall land width required for different road categories shall depend on various factors such as present & anticipated traffic, land use patterns, future developments & predominant means of travel.

For our ICP's the road network can be classified into the following two street systems:

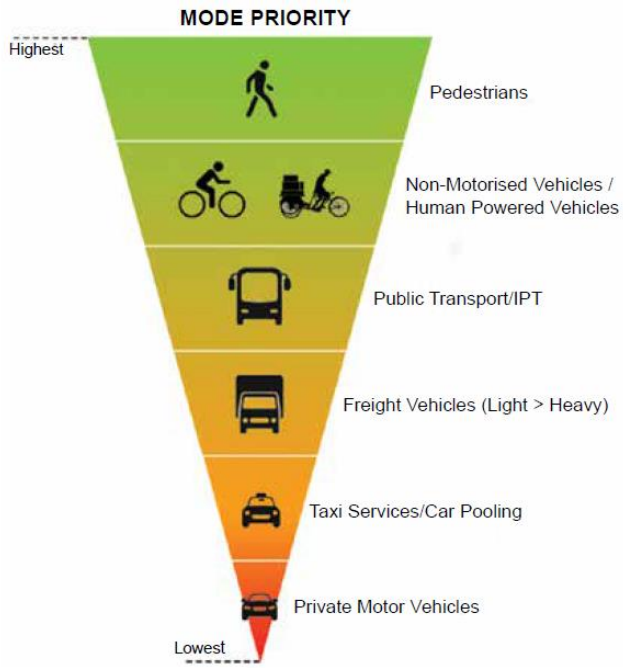
a. Collector Streets: Main Thoroughfares.
b. Local Streets: Internal roads connecting to adjacent buildings.

Below are the typical land width requirements for the above-mentioned categories of roads:

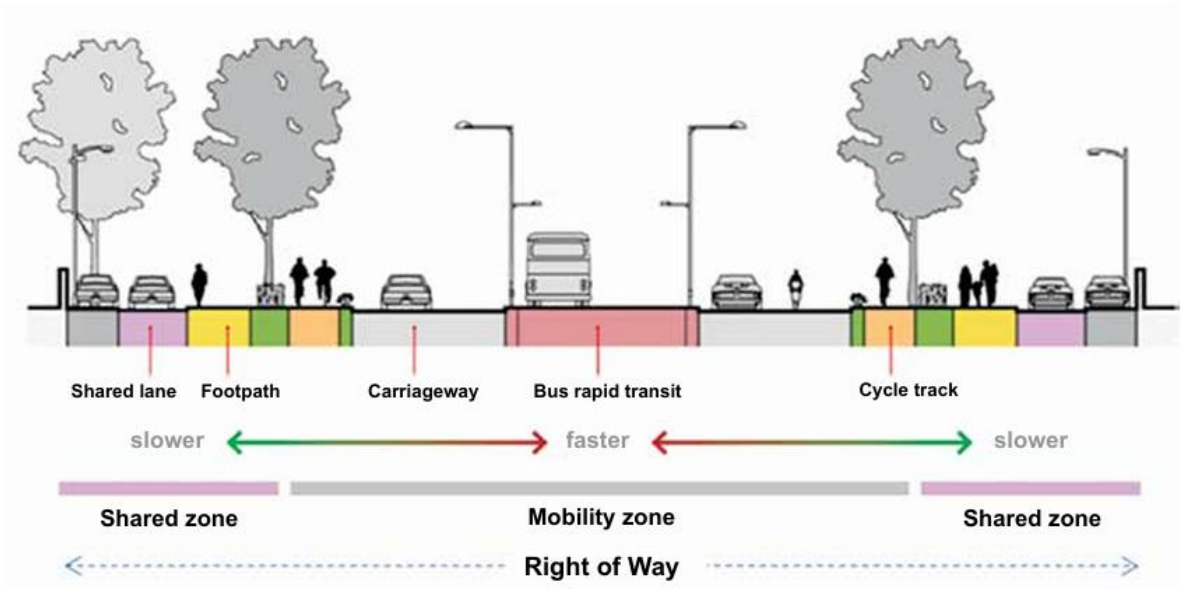
Sl. No	Category of Street	Recommended Land Width & Type of Terrain (In Meters)		
		Plain	Rolling	Hilly
1	Expressways	47-75	35-60	30-50
2	Arterial Streets	45-60	35-50	25-40
3	Sub Arterial Streets	30-45	25-35	20-30

Sl. No	Category of Street	Recommended Land Width & Type of Terrain (In Meters)		
		Plain	Rolling	Hilly
4	Collector Streets	15-30	12-25	10-20
5	Local Streets	10-15	10-15	10-15

As per IRC SP: 118 – 2018 (Manual for planning & Development of Urban roads & Streets), while designing urban roads the following priority matrix to be considered.



Basis the above, an ideal Urban Road cross section would comprise of the following:



Therefore, for designing of the internal road networks for a typical ICP, the following in addition to parking zones, we would take into consideration the following:

a. Pedestrian footpaths
b. Green areas for plantations & other urban landscape elements such as street furniture
c. Space for drains & other amenities. (Underground Services)
d. Main carriage ways
e. Spaces for installation of service elements such as Streetlights, hydrants etc.

Thus, we can divide the basic requirements of the abovementioned elements as below:

PEDESTRIAN FOOTPATHS:

As per IRC SP-103 & IRC 86 (2018) a typical footpath should cater to level of Service B & under situations of constraint only should Level C be adopted.

Sl. No	Design flow in number of persons per hour			
	In both directions		All in one direction	
	LOS B	LOS C	LOS B	LOS C
1	1350	1890	2025	2835
2	1800	2520	2700	3780
3	2250	3150	3375	4725
4	2700	3780	4050	5670
5	3150	4410	4725	6615
6	3600	5040	5400	7650

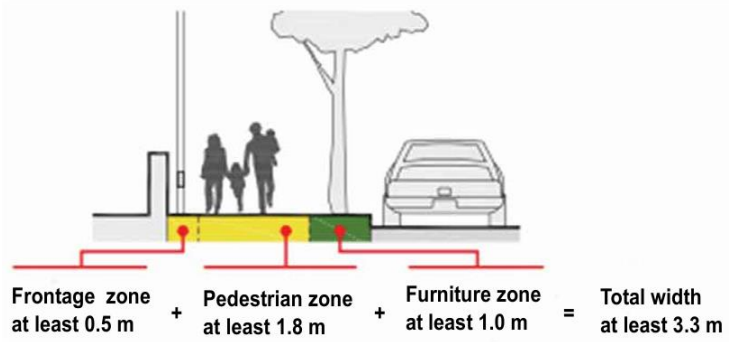
Similarly, as per NBC (2016) the following minimum sizes should be taken while designing a pedestrian footpath:

Table 3 Required Width of Footpath as per Adjacent Land Use

(*Clause* 4.3.2.1.1)

Sl No.	Description	Width m
(1)	(2)	(3)
i)	Minimum free walkway width and residential/mixed use areas	1.8
ii)	Commercial/Mixed use areas	2.5
iii)	Shopping frontages	3.5 to 4.5
iv)	Bus stops	3
v)	High intensity commercial areas	4

Thus, a typical pedestrian footpath (IRC 118) comprises of the below mentioned components with the bare min area requirements:



Frontage zone: This refers to the part of the pathway which acts as an extension of the building through doors or sidewalk cafes. The frontage zone consists of both the structure and the facade of the building fronting the street, as well as the space immediately adjacent to the building. This should be a minimum of 0.5mts

Pedestrian Walking Zone: Minimum pedestrian walking zone of at least 1.8 mts which corresponds to the minimum requirements laid down under NBC 2016, Volume I

Verge/Street Furniture Zone: A collective term for objects and pieces of equipment installed along streets and roads for various purposes. It includes benches, traffic barriers, bollards, streetlamps, etc. A minimum area of **1.0mts** is required for the same.

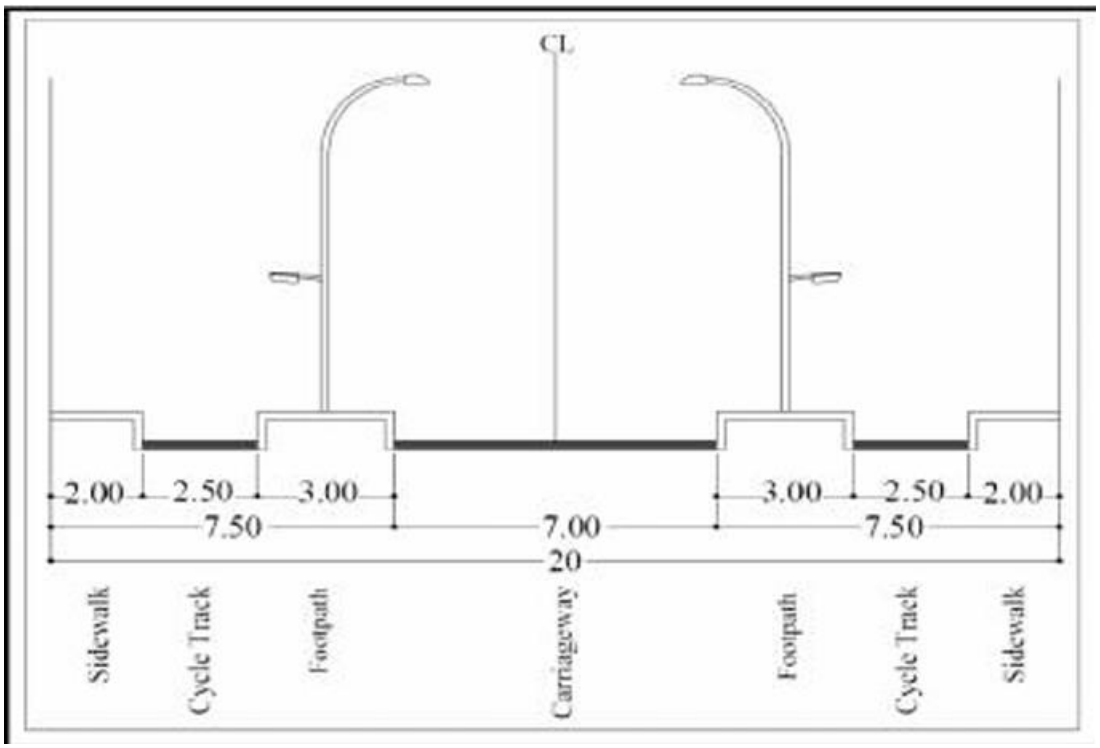
Underground Spaces:

As per the guidelines laid down under the IRC - 98 (2011) (Guidelines on accommodation of Utility Services on roads in urban areas)

INTERNAL ROADS

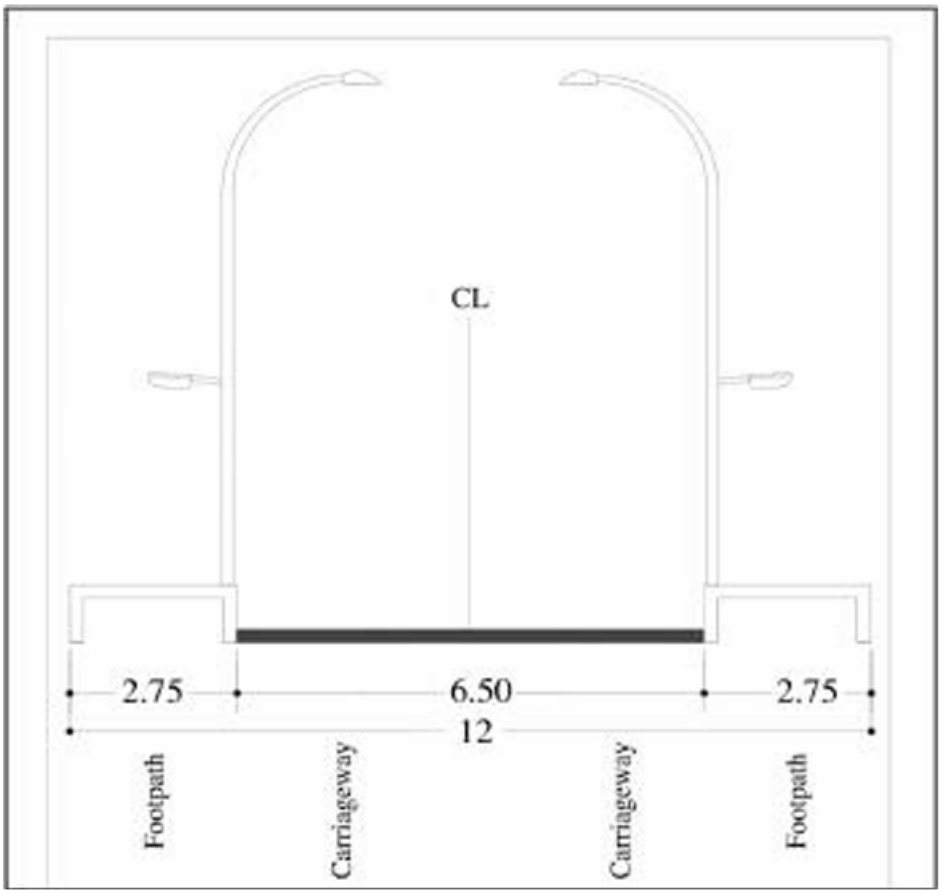
Based on the above parameters the typical road sections as per IRC 86 (2018) are as below:

FOR COLLECTOR STREETS:



*Assuming a 2 Lane Undivided Street, Plain & Rolling Terrain

FOR LOCAL STREETS



*Assuming Plain & Rolling Terrain

LIGHTING REQUIREMENTS:

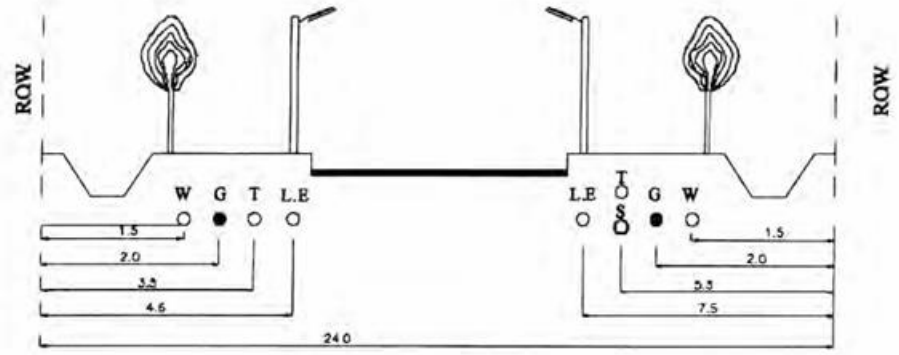
Streetlighting shall be provided in line with norms laid down in IRC 86 (2018):

Table 5.6 Pole Height and Spacing Metrics

S.No.	Street Type	Pole height (m)	Spacing (m)
1	Footpath or cycle track (< 5 m width)	4.5-6.0	12-16
2	Streets with ROW of 9 m or less	8-10	25-27
3	Streets with ROW of more than 9 m	10-12	30-33

UTILITIES:

The minimum requirements for utilities laid down under IRC 98 (2011) is as below:



(b) LOCAL STREET (DOUBLE LANE)

Note:

1. All dimensions are in meters
2. The locations of the services are suggestive only and will depend on number, size and type of services to be accommodated, space available for services, etc.
3. Open drains shown for storm water drainage may be replaced by closed drains/pipes as per situation
4. Depth would be in accordance with para 3.3.3.

Legend:

L-Lighting cable
E-Electricity cable
W-Water supply line
T-Telecom cable
S-Sewer
G-Gas line

Fig.4 Suggested Locations for Utility Services Along Local Streets

The roads to be designed based on MoRTH specifications with sufficient load bearing capacity due to movement of heavy Cargo Vehicles.

Two types parking areas are planned. While planning for commercial trucks, the vehicle dimensions as well as its turning radius will be the main consideration so that it is easier for manoeuvrability of trucks inside the parking areas.

1- Covered Shed – For staff and other vehicles – Minimum for 5-10 vehicles of all types. Size planned for each vehicle 2.5X5.0 Mtrs with height 3.0m (covered parking with tensile fabric/as per design)

2- Open Areas – For cargo carrying trucks as per volume assessment @ - Open parking suggested in large scale trade route and keeping in mind the anticipated future growth after development of ICPs. The open area will be designed in such a way that each truck of largest dimensions as per Indian truck standards can have a proper turning radius without interfering

the activities of other trucks parked in that area. The norms of turning radius are detailed in IS 12222, “Automotive Vehicles – Turning Circle & Manoeuvrability requirements”.

In addition to IRC SP-12,2015 the minimum parking requirement for a truck are as below:

Sl.No	Parking Space	Area (In Sq.M)	Remarks
1	Car	20 – 36	IRC SP-12,2015
2	Buses	55 - 60	IRC SP-12,2015
3	Trucks	55 - 60	IRC SP-12,2015
4	Three Wheelers	10 - 50	IRC SP-12,2015

The above truck parking area is for a single truck parking bay of dimensions **7.5m X 3.75m** based on standard truck sizes of **7.1m X 2.65 m.**

Therefore, for vehicle standing area of 18.815 Sqm we are providing a parking bay of 28.125 sqm.

Using the above data, we can deduce the following:

$$\text{Ratio of Parking per Sq. m of Vehicle} = \frac{28.125}{18.815} = \mathbf{1.5}$$

As per the latest Morth Guidelines below the following are the legally permissible Gross Vehicle Mass permitted for various vehicles.

No. RT11028/11/2017-MVL **Annexure- "B'**

Government of India

Ministry of Road Transport & Highways

(Transport Division)

Transport Bhawan, 1, Parliament Street, New Delhi - 110001

Revised Safe Axle Load limits for Transport Vehicles

Sr No	Type of Vehicle	Axle Combination on Tractor	Axle Combination on Trailer	No of Axles	Single Axles	Tandem Axle	Dual Axles	Tridem Axle	Permissible GVW	Remarks
1	Two Axle Rigid Truck	Two tyres on front axle and four tyres on rear axle	-	2	1	0	1	0	19	
2	Three Axle Rigid Truck	Two tyres on front axle and eight tyres on rear tandem (two) axle	-	3	1	1	0	0	28.5	
3	Four Axle Rigid Truck	Two tyres each on two axles and eight tyres on one tandem (two) axle	-	4	2	1	0	0	36	
4	Five Axle Rigid Truck	Two tyres each on three axles and eight tyres on one tandem (two) axle	-	5	3	1	0	0	43.5	
5	Five Axle Rigid Truck	Two tyres each on two axles, four tyres on one axle and eight tyres on one tandem (two) axle	-	5	2	1	1	0	47.5	
6	Six Axle Rigid Truck	Two tyres each on four axles and eight tyres on one tandem (two) axle	-	6	4	1	0	0	49	To be capped at 49 tonnes.
7	Tractor - semi articulated trailers	Two tyres on front axle and four tyres on rear axle	Four tyres on single axle	3	1	0	2	0	30.5	
8	Tractor - semi articulated trailers	Two tyres on front axle and four tyres on rear axle	Eight tyres on tandem (two) axle	4	1	1	1	0	40	
9	Tractor - semi articulated trailers	Two tyres on front axle and four tyres on rear axle	Twelve tyres on a tridem (three) axle	5	1	0	1	1	46	
10	Tractor - semi articulated trailers	Two tyres on front axle and eight tyres on rear tandem (two) axle	Four tyres on single axle	4	1	1	1	0	40	
11	Tractor - semi articulated trailers	Two tyres on front axle and eight tyres on rear tandem (two) axle	Eight tyres on tandem (two) axle	5	1	2	0	0	49.5	
12	Tractor - semi articulated trailers	Two tyres on front axle and eight tyres on rear tandem (two) axle	Twelve tyres on a tridem (three) axle	6	1	1	0	1	55	To be capped at 55 tonnes

As per the ground level data provided by LPAI, average truck arriving at the ICP terminals is approximately 40 Tons. Based on the following below are a few trucks from various leading truck manufacturers which conform to the abovementioned legally permissible load categories.

TRUCKS WITH 42 Tons GVM Capacity					
Sl. No	Description	Manufacturer	Length	Width	Remarks
1	LPT 4225 -Tag	Tata	9.144	2.54	Tipper
2	AL 4220	Ashok Leyland	9.8	2.570	This model has 3 wheelbase sizes
3	**AL 4225**	Ashok Leyland	11.96	2.570	
4	**Bharat Benz 4228R**	Bharat Benz	11.792	2.49	
5	**Eicher Pro 6042**	Eicher Motors	10.180	2.51	
6	**Blazo X 42**	Mahindra	9.753	2.5	

In India, truck Length is capped at 12.0m and hence we do not have vehicles longer than **12 mts.**

Therefore, assuming the maximum length of a truck to be **12.0m X 2.57m** we would need to provide the following:

For a vehicle standing area of **30.84** Sq.m we would need to provide a bay of **46.26** Sq.m or approximately **47** Sq.m. **(Multiplying the vehicle area by a factor of 1.5)**

Now for total area required for parking the trucks we can bifurcate the area components laid down by IRC as follows:

Sl.No	Overall Area	Vehicle Parking	Circulation Space	%parking	% Circulation
1	60	28.125	31.875	46	54

So if for **28.125** Sq.m area of Truck Parking we need a circulation space of **31.875** Sq.m we can deduce the following:

$$\text{Ratio of Circulation Area per Sq. m of Vehicle Parking} = \frac{31.875}{28.125} = \mathbf{1.13}$$

Therefore, for a parking area of **47 Sq.m**

Sl.No	Vehicle Parking (Sq.m)	Circulation Space (Sq.m)	Area Arrived (Sq.m)	%parking	% Circulation
1	47	53.11	**100.11**	46	54

Thus, for a single truck the overall area requirement breakup is as follows:

Sl. No	Description of component	Area (In Sq.m)	Remarks
1	Area Required for a single truck parking	100.11	Including Parking & Circulation area
2	Collector street area per truck	28	Road area, assuming a 7m wide road as per IRC 86(2018)
3	Frontage Zone Area	2	Design for Pavement as per IRC 118 (2018)
4	Footpath Area	7.2	Design for Pavement as per IRC 118 (2018)
5	Verge Area	9.32	Design for Pavement as per IRC 118 (2018)
6	Dead Spaces & Turning areas	6.978	Assuming 15% of area of roads & pavements as dead spaces & Turning areas

Sl. No	Description of component	Area (In Sq.m)	Remarks
	TOTAL	**153.608**	

PARKING NORMS FOR OTHER VEHICLES:

As parking norms are generally prescribed in terms of ECS, following factors shall be used

to convert other vehicles into equivalent car units.

Sl.No	Parking Space	Area (In Sq.M)	Remarks
1	Car/Taxi	1.0	IRC SP-12,2015
2	Two-Wheeler	0.25	IRC SP-12,2015
3	Auto Rickshaw	0.50	IRC SP-12,2015
4	Bicycle	0.1	IRC SP-12,2015
5	Trucks/Buses	2.50	IRC SP-12,2015
6	Emergency Vehicles	2.50	IRC SP-12,2015
7	Cycle Rickshaw	0.80	IRC SP-12,2015

This is inclusive of all internal roads, turning areas etc.

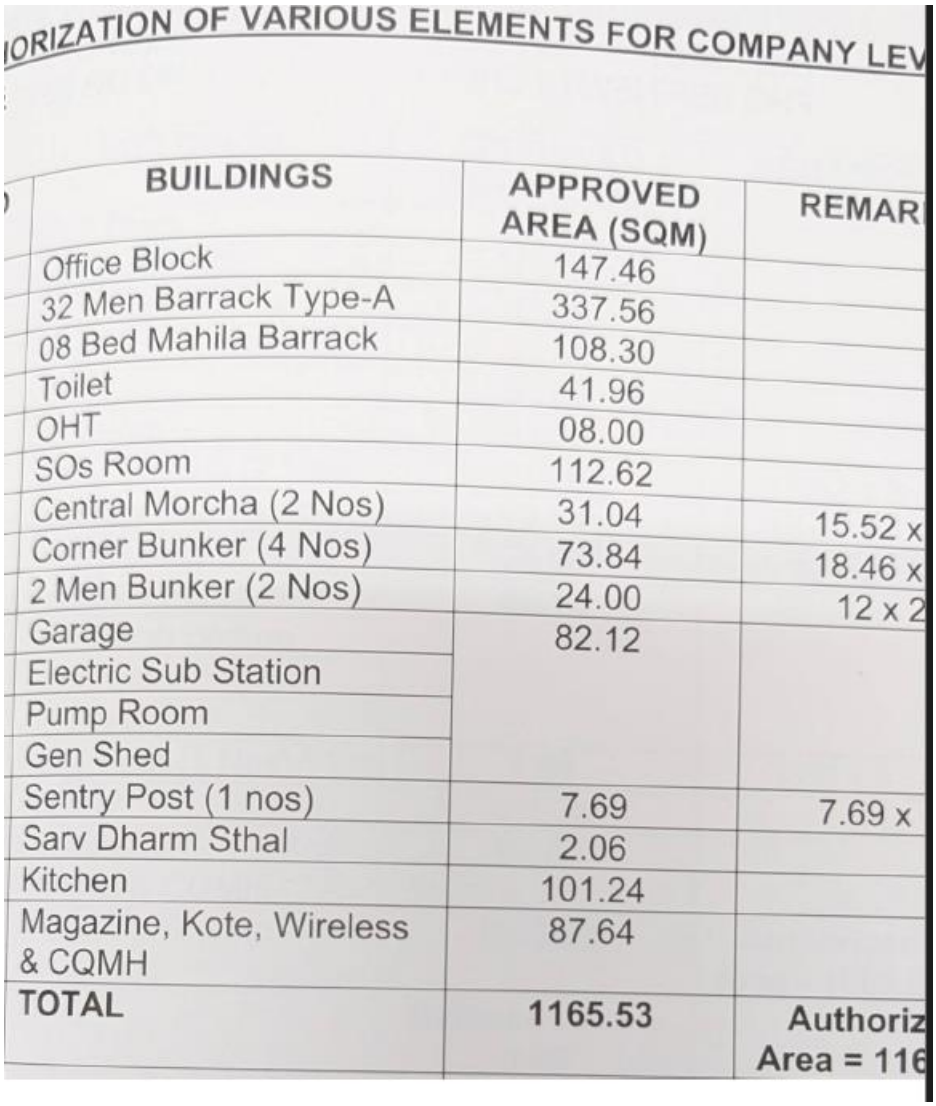
Similar calculations for local roads abutting buildings can be calculated as below:

Sl. No	Description of component	Area (in Sq.m)	Remarks
1	Assuming a building of length of 20m		
2	Local Street area	130	Road area, assuming a 6.5m wide road as per IRC 86(2018)
3	Frontage Zone Area	10	Design for Pavement as per IRC 118 (2018)
4	Footpath Area	36	Design for Pavement as per IRC 118 (2018)
5	Verge Area	46.5	Design for Pavement as per IRC 118 (2018)
6	Dead Spaces & Turning areas	9.32	Assuming 15% of area of roads & pavements as dead spaces & Turning areas
		231.92	

Therefore, dividing the overall road area by 20 we get an area of **11.59 Sq.m** of road per 1m of plinth area.

Annexure – 5 Administrative Zone

As per the guidelines laid down by BSF for their operational needs, the following are the minimum requirements laid down.



IORIZATION OF VARIOUS ELEMENTS FOR COMPANY LEV

BUILDINGS	APPROVED AREA (SQM)	REMAR
Office Block	147.46	
32 Men Barrack Type-A	337.56	
08 Bed Mahila Barrack	108.30	
Toilet	41.96	
OHT	08.00	
SOs Room	112.62	
Central Morcha (2 Nos)	31.04	15.52 x
Corner Bunker (4 Nos)	73.84	18.46 x
2 Men Bunker (2 Nos)	24.00	12 x 2
Garage	82.12	
Electric Sub Station		
Pump Room		
Gen Shed		
Sentry Post (1 nos)	7.69	7.69 x
Sarv Dharm Sthal	2.06	
Kitchen	101.24	
Magazine, Kote, Wireless & CQMH	87.64	
TOTAL	**1165.53**	**Authoriz Area = 116**

Fig.1

As per MES guidelines, following areas are specified.

Table 7.IV

OFFICE AND ADMINISTRATIVE ACCOMMODATION

Ser No	Description of Items	Floor Area (Sqm)/ Scale	Special Facilities	Planning Notes
1.	General Officers and Equivalent	33	(a) Air-conditioning (Hot and Cold). (b) Window blinds.	(a) For Offices of Officers of Armed Forces at Command HQ and Service HQ, the scales against Ser No 1 & 2 are for guidance purpose only. The areas shall be suitably reduced while planning to ensure provision of functional offices keeping area of individual office room to the minimum. (b) Attached toilet.
2.	Brig/ Cmde/ Air Cmde	30	Window blinds.	Attached toilet (where feasible).
3.	Col/ Capt/ Gp Capt and COs of Major & Minor units	22	Window blinds.	Attached toilet for Indep Appts (COs/ OCs & II I/Cs).
4.	Lt Col/ Maj/ Lt Cdr/ Sqn Ldr	14.5	Window blinds.	---
5.	Other Officers	14.5	---	---
6.	Office cum Rest Room for Duty Officer	18	Air-conditioning based on Stations at Appendix B.	(a) Shall be provided for formation and station HQ and establishments required to maintain duty officers and clerks outside office hours. (b) Attached toilet.
7.	Technical Personnel			
	(a)Draftsman and Surveyor	07 each	---	Minimum size of office shall be 9.3 Sqm.
	(b) Technical Staff	5.5 each	---	
8.	General Duty Appointments			
	(a) Sub Major and equivalent	10	---	---

Fig.1 Office areas for officers

Ser No	Description of Items	Floor Area (Sqm)/ Scale	Special Facilities	Planning Notes
	(b) Other JCOs and equivalent	04	---	---
9.	Ministerial Staff			
	(a) JCO clerks and SPAs	5.5 each	---	(a) Separate room for Head Clerk may be provided if required. (b) An additional area @ 10% be provided for current records. (c) Office accommodation for store man shall be in addition to scale provided for stores. (d) Office accommodation for senior NCOs on specific administrative appointments viz Havildar Major, QMH or equivalent in units or sub units and PAs shall be provided as per scale of 3.5 Sqm each. (e) In case of a single office minimum size of 9.3 Sqm shall be provided.
	(b) Other ministerial staff and store man.	3.5 each	---	
10.	Stationery Room			
	(a) Large unit	11	Built in shelves.	Additional area as required for formation headquarters.
	(b) Independent small unit	09	Built in shelves.	
11.	Planning-cum-Briefing Room	32	Air conditioning with heating arrangement.	Authorised for large units only.
12.	Visitors Room	20	---	To be provided for all formation headquarters of brigade, division, area and sub area, Naval shore establishments, Air Force stations, MES units, depots and all units dealing with civilians.
13.	Kitchenette	7.5	(a) Cooking platform. (b) Stainless Steel Sink with double	Authorised for large units and formation headquarters where separate cafeteria is not authorised.

Fig.2 Office areas for JCO's.

Ser No	Description of Items	Floor Area (Sqm)/ Scale	Special Facilities	Planning Notes
			bowl and double drain board. (c) Power point. (d) Cupboard small.	
14.	Parking Space (a) Cars (b) Cycle-cum-Scooters	As required	---	Open sheds shall be provided.
15.	Sanitary Annexe (WC's, WHB and Urinals)		---	2% additional WC's for female staff for offices with establishments below 30 subject to minimum of one WC in each office for females.
	(a) Officers (separate for women and men)	3% each	---	
	(b) Ladies	3% each	---	
	(c) JCOs & OR	3% each	---	
	(d) Janitor Closet	04 Sqm/ each	---	
16.	Old Records			
	(a) Large Units	20	Compactors storage system/ wall to wall cabinets with locking arrangements.	---
	(b) Formation HQ and other units.	One for 220 recorded files		
17.	Special Requirements on Merits			
	(a) Conference Room	As required	(a) Vitrified tile. (b) Air conditioning with heating arrangement.	Subject to a minimum of 22 Sqm and maximum of 44 Sqm.
	(b) Telephone Exchange	As required	---	
	(c) Canteen and Tiffin Room	0.09/ person	---	The scale is inclusive of kitchen and dining hall. One per unit. A separate Ladies lunch room for civilian employees may be provided where required.

Fig.3

Ser No	Description of Items	Floor Area (Sqm)/ Scale	Special Facilities	Planning Notes
	(d) Library	01 SF for 25 books or 01 Sqm for 275 books	(a) Vitrified tile (b) Air conditioning in Reading room	(a) Subject to maximum of 44 Sqm. (b) Room for visitors at gate.
	(e) Class Room	As required		
	(f) Reception and Security Staff	16		Attached toilet with WC.
18.	Staircase/ ramp for D/S Building and above			Suitable size and numbers as per National Building Code.

Notes.

1. Incinerators be provided as required.
2. Following percentage cut shall be imposed for record offices and ordnance depots: -
   (a) Upto 2700 Sqm - 10%.
   (b) More than 2700 Sqm - 15%.

Administrative areas are a part of both the Passenger Terminal Building as well as the Cargo Terminal Building. Below are the approximate area requirements for both the components.

a. PASSENGER TERMINAL BUILDING:

ADMINISTRATIVE AREA				
Sl. No	Description	Total	Space/Passenger	Remarks
1	BSG Company Commandant	50	0.05	
2	Company 2IC	36	0.036	
2	Assistant Commissioner (Customs)	18	0.018	
3	Assistant Superintendent (Immigration)	14.5	0.0145	
4	Network Engineer	7.4	0.0074	
5	Land Port Manager	44	0.044	
6	Assistant Port Manager	15	0.015	

ADMINISTRATIVE AREA				
Sl. No	Description	Total	Space/Passenger	Remarks
7	JE Civil	15	0.015	
8	JE Electrical	15	0.015	
9	Local Police Liason	11	0.011	
10	Holding Room (Gents)	20	0.02	
11	Interrogation Room	15	0.015	
12	Constables Room	28	0.028	
13	Health Department	20	0.02	
14	PIU	11	0.011	
15	Server Room Customs	40	0.04	
16	Server Room Immigration	40	0.04	
17	Server Room LPAI	20	0.02	
18	Conference Room	147.5	0.1475	
19	Executive Dining Room	100	0.1	
20	Security Control Room	144	0.144	
21	Documentation & Record Customs	50	0.05	
22	Documentation & Record Immigration	50	0.05	
23	Documentation & Record LPAI	30	0.03	
24	Waiting Area Visitors	25	0.025	
25	Pantry	20	0.02	2 Pantry's
	SUB TOTAL	986.4	0.9864	
	Adding 30% for circulation space	295.92	0.29592	
	TOTAL	1282.32	1.28232	

Therefore, approximately a total area of **1,282.32** Sq. m (Carpet Area) or **1,424.1Sq.m** (Built up Area) is required for administrative areas for servicing both Arrival & Departure terminals.

The Approximate area per passenger is **1.282 Sq.m.**

b. CARGO TERMINAL BUILDING

ADMINISTRATIVE AREA				
CARGO TERMINAL BUILDING				
Sl. No	Description	Total	Space/truck	Remarks
1	Office Space BSG Company Commandant	25	0.05	
2	Office Space Inspector	18	0.036	
3	Server Room Customs	12	0.024	
4	Conference Room	12.625	0.02525	
5	Dining Room for Staff	60.27	0.12054	
6	CHA Office room	37	0.074	
11	Customs Room (Inspectors)	50	0.1	
12	Washroom for Staff	16.47	0.03294	
13	Electrical Room	15	0.03	
14	Pantry	10	0.02	
	Total	256.365	0.51	
	Adding 20% for circulation space	51.273	0.1587	
		307.638	0.67	

Therefore, approximately a total area of **307.638 Sq. m** (Carpet Area) or **341.82 Sqm** (Built up Area) is required for administrative areas for servicing the Cargo Terminal building.

The Approximate area per truck being **0.67 Sq.m.**

For Calculating Internal Roads:

Sl. No	Description	Area (In Sq.m)	Remarks
1	Area for Administrative Block	1796.67	
		1796.67	

*Built up area considered

Taking Square root of **1796.67 Sq.m** (to obtain length of building) & multiplying it by 11.59 (Factor for 1m internal Road as derived in Annexure 4) equals **491.26 Sq.m**

Annexure – 6 Warehouses & Transshipment Yard

Warehouses & Transhipment Areas

IMPORT/EXPORT WAREHOUSE:

Assuming a total of 500 trucks for both export & import we can take the following factors for consideration for load calculations.

Assuming each truck to be carrying a cargo of 12,600 Kgs or 12.6 Tons. (GMV 42 Tons, deducting Kerb weight/Self weight of truck)

Thus, total Storage Shed capacity required can be approximated as below:

Assuming 25% of all Exim cargo would need to be stored on site, 6300 Tons would need to be catered for. The warehouse capacities are calculated as per the below mentioned norms.

Sl. No	Description	Capacity (in Tons)	Remarks
1	Export Warehouse	1,260	20% of 6,300 Tons
2	Import Warehouse	2,520	40% of 6,300 Tons
3	Seizure Shed	945	15% of 6,300 Tons
4	Unbonded Warehouse	1,575	25% of 6,300 Tons
		6,300	

For calculation of minimum size required of warehouse the following considerations are taken:

a. At least 1m space around each stack, with a central gangway of around 4m in large warehouses
b. At least 1m of free space between the roof & top of the stack.
c. The stacking height to not exceed safety limits to prevent goods from toppling.

In addition, the following assumptions are made for purposes of preliminary calculations.

1. Volume of 1Stack of (6mX8mX4m) of 50kg Grains: 1.5 m^3/Metric Ton
2. Maximum stacking height: 4mts

50Sq.m of space accommodates 32 MT of grains, (with a height of 2m as per guideline document), therefore for 1T = 50Sq.m/32MT or **1.56 Sq.m**

Sl. No	Description	Area (in Sq.m)	Remarks
1	Export Warehouse	1,965.6	For a capacity of 1,260 Tons
2	Import Warehouse	3,931.2	For a capacity of 2,520 Tons
3	Unbonded Warehouse	2,457	For a capacity of 1,575 Tons
4	Seizure Warehouse	1474.2	For a capacity of 945 Tons

Therefore, approximate carpet areas for warehouses is calculated as **9,828 Sq. m or 10,920 Sq.m (Built up Area)**

Transhipment Yard:

Transhipment is the shifting of goods or materials to an intermediate destination prior to the destination of the goods. This may be required due to a variety of factors such as:

1. Change the means of transport (i.e. from Road to Rail etc. also known as transloading)
2. Consolidation of smaller shipments to form a large consignment or vice versa.
3. International Transhipment (movement of goods across countries)

For purposes of transhipments, two methods are proposed:

1 Open area for loose materials such as stone, sand etc.

2 Covered shed for goods such as edible grains, fabrics etc.

The space requirements for can be calculated for each as below:

Assuming a total of 100 trucks are carrying stone (Each as per field level data provided by LPAI has a GMV of 40 tons each) would unload cargo within premises the total tonnage of stone would be **1,2600 Tons**

As per IS 4082 (1996), stones & aggregates should not be stacked more than 1m in height, with suggested stacks of size 5m(length) X 2m(Breadth) X 0.5m(height). For calculation of mass the following assumptions are made for crushed stone.

(a) Density: 1602 Kg/ m^3

Therefore, using the following formula:

$$\textbf{\textit{Mass}} = Density\ X\ Volume$$

Thus, a single pile of dimensions of 5mX2mx.5m would hold 8000 Kgs or approximately 8 Tons. Therefore for 1260 tons we would require 786.51Cubic meters or **1,575.03**Sq.m area.

For covered transhipment yards, the following assumptions are made:

Sl. No	Description	Area (in Sq.m)	Remarks
1	Un-loading dock	10	2. Assuming a minimum of 3 trucks unloading materials simultaneously with a minimum distance of 1.5m between each truck. (A six wheel truck dimensions are 5.33(L)X2.13(W)X2.13(H)
2	Interim storage	42.75	3. Assuming capacity of each truck is 19 tons, and calculations for warehouses above with a stack height of 2mts
3	Loading dock	10	4. Assuming a minimum of 3 trucks unloading materials simultaneously with a minimum distance of 1.5m between each truck. (A six-wheel truck dimensions are 5.33(L)X2.13(W)X2.13(H)
4	Additional circulation space	18.825	5. 30% of overall area

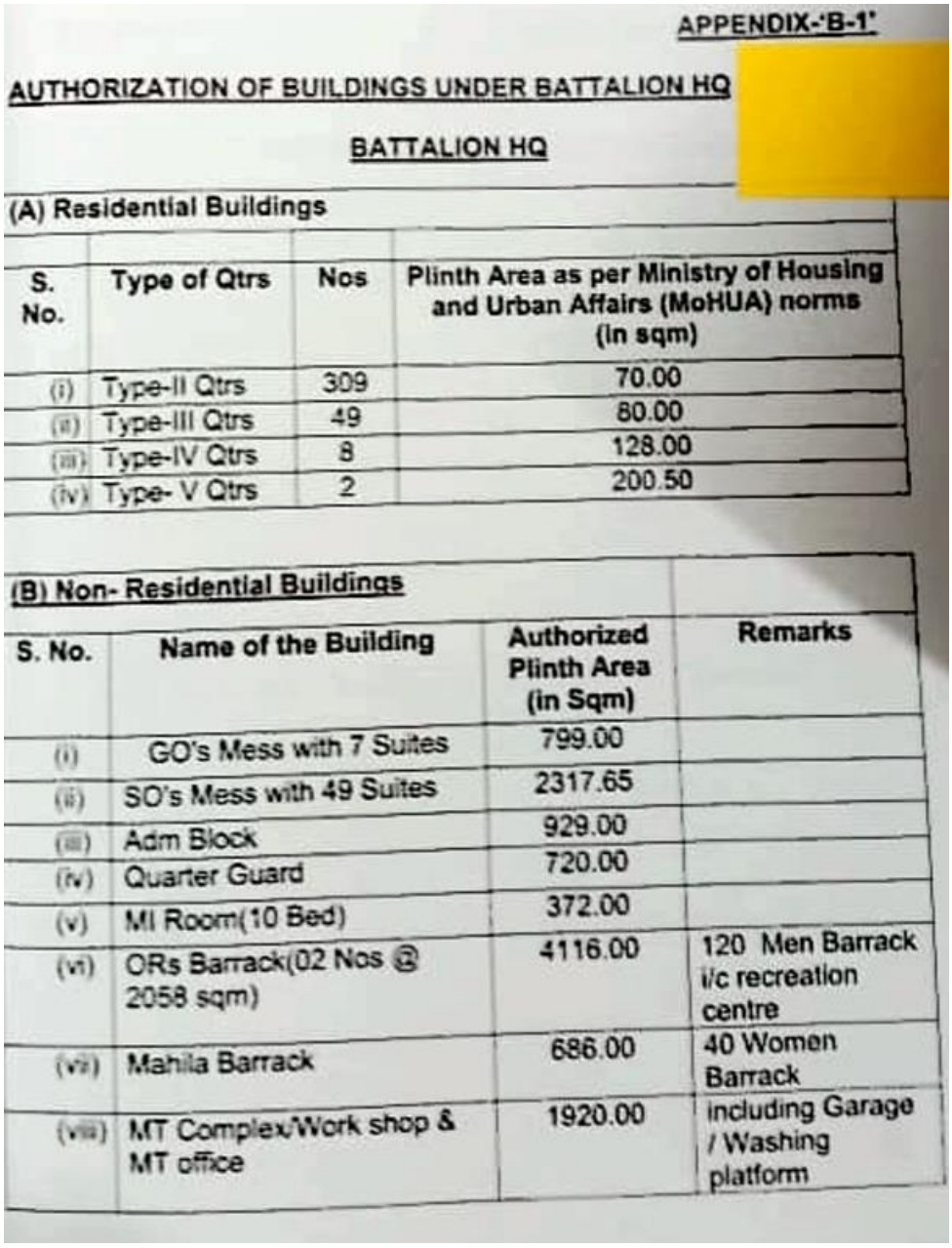
Therefore, the approximate space requirements for a transhipment shed is approximately 85 Sq.m. Adding an additional 15 Sq.m for Roads we can assume an area of 100 Sq.m.

For Internal Roads, Areas considered in Annexure 2

Annexure – 7

Accommodation

As per BSF guidelines following are the minimum requirements prescribed for accommodations.



APPENDIX-'B-1'

AUTHORIZATION OF BUILDINGS UNDER BATTALION HQ

BATTALION HQ

(A) Residential Buildings

S. No.	Type of Qtrs	Nos	Plinth Area as per Ministry of Housing and Urban Affairs (MoHUA) norms (in sqm)
(i)	Type-II Qtrs	309	70.00
(ii)	Type-III Qtrs	49	80.00
(iii)	Type-IV Qtrs	8	128.00
(iv)	Type- V Qtrs	2	200.50

(B) Non- Residential Buildings

S. No.	Name of the Building	Authorized Plinth Area (in Sqm)	Remarks
(i)	GO's Mess with 7 Suites	799.00	
(ii)	SO's Mess with 49 Suites	2317.65	
(iii)	Adm Block	929.00	
(iv)	Quarter Guard	720.00	
(v)	MI Room(10 Bed)	372.00	
(vi)	ORs Barrack(02 Nos @ 2058 sqm)	4116.00	120 Men Barrack i/c recreation centre
(vii)	Mahila Barrack	686.00	40 Women Barrack
(viii)	MT Complex/Work shop & MT office	1920.00	including Garage / Washing platform

Fig.1

Similar guidelines have been laid out as per Scale of Accommodations (2022). Using them the scales for Accommodation have been calculated as per the MES Norms below:

a. Officers Accommodations:

31

TABLE 5.I

SINGLE LIVING ACCOMMODATION FOR SERVICE OFFICERS AND NURSING OFFICERS

Ser No	Description of Items	Plinth Area (Sqm)/ Scale	Special Facilities	Planning Notes
1.	**Main Unit of Accommodation**			(a) Staircase of 5.02 Sqm to be provided for double or multi-storey construction. (b) Sleeping out balcony of 8.0 Sqm area may be provided for all officers. (c) Box room and orderlies room @ 1.0 Sqm FA per officer.
	(a) Major and above and equivalents	66		
	(b) Lt/ Captain and equivalents	56		
2.	**Servant Quarters**			
	(a) Major and above and equivalents	18.58		Staircase of 4.65 Sqm to be provided for double or multi-storey construction. To be provided at 75% for Major and above and equivalents.
	(b) Lt/ Captain and equivalents	18.58		To be provided at 50% for Lt/ Captain and equivalents.
3.	**Garages/ Parking**			(may be provided as stilt/ basement parking
	(a) Major and above and equivalents	21		To be provided at 100%.
	(b) Captain and equivalents	21		To be provided at 100% as open common shed.
	(c) Lieutenant and equivalent.	21		To be provided at 100% as open common shed.

Note. The scales of staircase given above are on the basis of one brick wall construction. If stone masonry construction is adopted 16% additional plinth area will be allowed. For 1½ brick wall construction the plinth area may be increased by 12.5%.

b. Officers Mess:

TABLE 6.I

MESSES FOR SERVICE OFFICERS AND NURSING OFFICERS

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of Officers				Special Facilities	Planning Notes
		5-10	11-18	19-28	29-40		
Main Rooms							
1.	Mess Room	32.00	40.00	58.00	70.00	(a) Ceiling height may be increased by 01m. (b) Air Conditioning may be provided in stations listed at Appendix B.	The mess room should preferably be planned adjoining the ante room and separated by sliding or folding doors.
2.	Ante Room	44.00	49.00	52.00	55.00	(a) Air-conditioning may be provided in stations listed at Appendix B. (b) Display and other shelves.	Includes bar with counter for 5-10 officers.
3.	Bar	---	14.00	16.00	18.00	(a) Air-conditioning may be provided in stations listed at Appendix B. (b) Bar counter with lockable sliding shutter to be provided.	
4.	Library	---	18.00	26.00	30.00	(a) Air-conditioning in Reading room may be provided in stations listed at Appendix B. (b) Cupboard and book racks.	
5.	Indoor Gymnasium	---	20.00	24.00	28.00	Electrical points for Gymnasium equipment.	
6.	Dining Hall	---	18.00	20.00	22.00	Air-conditioning may be provided in stations listed at Appendix B.	
7.	Card Room	---	16.00	16.00	24.00	Cupboard.	
8.	Billiards and Indoor Games Room	---	46.50	46.50	46.50	Cupboard.	

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of Officers				Special Facilities	Planning Notes
		5-10	11-18	19-28	29-40		
9.	Kitchen, Preparatory Pantry, Servery and Scullery	35.00	45.00	56.00	66.00	(a) Modular kitchen having sink with double bowl and double drain board, cooking platform and with electrical chimney. (b) Cupboards, racks (c) Glazed ceramic tile dado upto lintel level. (d) Towel rail. (e) Hot closet and serving counter. (f) Hot water provision.	
10.	Larder and Store	10.00	12.00	14.00	16.00	Meat hooks and rail, cabinets/ shelves.	---
11.	Havildar and equivalent Room	10.20	10.20	10.20	10.20	---	---
12.	Cook's Room	6.50	6.50	6.50	6.50	---	---
Other Rooms							
13.	Secretary's Office	---	---	11.00	11.00	---	---
14.	Mess Office	9.00	11.00	11.00	11.00	---	---
15.	Silver Room	---	---	8.00	8.00	---	---
16.	Cloak Room	14.00	16.00	18.00	20.00	(a) Hat and coat pegs. (b) WHB, WC, urinals, mirror and towel rails. (c) Obscured or frosted glass to be used for window panes.	---
17.	Guest Room(s)	---	26.00	34.00	60.00	---	With attached toilets
18.	Wine Store	9.00	9.00	9.00	9.00	---	---
19.	Plate Room	9.00	11.00	15.00	18.00	---	---
20.	Fuel Store	4.00	5.50	6.00	6.00	---	---
21.	Bearer Room	6.50	7.50	7.50	8.50	---	---

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of Officers				Special Facilities	Planning Notes
		5-10	11-18	19-28	29-40		
22.	WC and Bath for Havildar and equivalent	01 No each	01 No each	01 No each	01 No each	---	---
23.	WC for Mess Staff	01 No	01 No	01 No	01 No	---	---
24.	Urinal for Mess staff	01 No	01 No	01 No	02 Nos	---	---
Servants Quarters, Covered Facility and Paved Areas							
25.	Servants Quarters	05 Nos	09 Nos	11 Nos	14 Nos	---	---
26.	Car Garages with Apron	02 Nos	04 Nos	06 Nos	08 Nos	---	Open shed
27.	Hard standing for Cars	01 No	01 No	02 Nos	03 Nos	---	Each hard standing to be of 40 Sqm.
28.	Open Paved Area	---	---	---	50	(a) Suitable lighting arrangement. (b) Chequered tiles/ Interlocking PCC tiles.	Suitable area to be found for band stand without Chequered tiles/ Interlocking PCC tiles finish.

c. Junior Commissioned Officers Accommodation:

TABLE 5.III

SINGLE LIVING ACCOMMODATION FOR JCOs, NCOs, OR AND THEIR EQUIVALENTS IN OTHER SERVICES AND NCs(E) OF IAF

Ser No	Description of Items	Floor Area (Sqm)/ Scale	Special Facilities	Planning Notes
Single Living Accommodation per JCO				
1.	Living Accommodation	41.2 (Plinth Area)	Desert Cooler in hot climate @ one per JCO.	Staircase of 5.02 Sqm to be provided for double or multi-storey construction.
2.	Scooter Shed	6 (Plinth Area)		To be provided @ 50% as open common shed.
3.	Car Parking	12 (Plinth Area)		50% be provided as open common shed.
Single Living Accommodation Havildars/ OR and NCs(E) of IAF				
4.	Living Accommodation per Havildar	13	(a) Notice board in entrance hall or verandah. (b) Full length mirror in verandah. (c) Clothes lines for hanging clothes outside the barracks and retractable ceiling pulley clothing line in verandah for wet weather drying. (d) A writing shelf with chair and in-built book shelf – one per two ORs. (e) Lines for mosquito nets may be provided as required. (f) Desert Cooler in hot climate in stations at Appendix A at the rate of one per six ORs. (g) One fan for two individual.	
5.	Living Accommodation per OR and NCs(E) of IAF	10		
6.	Common Room	0.50 Sqm per man	Pelmet with curtain rods or curtain runners.	To be provided at company or equivalent level.

Ser No	Description of Items	Floor Area (Sqm)/ Scale	Special Facilities	Planning Notes
7.	Study Room	0.25 per man	Pelmet with curtain rods with required accessories or curtain runners.	To be provided at company or equivalent level.
8.	Store Room	0.25 per man	Cabinets/ shelves. Facility for installation of washing machine.	
9.	Verandah	2.4m wide		To be provided on one side. May be provided on both sides at stations where at certain times of the year it is preferable for troops to sleep outside.
10.	Sanitary Block			
	(a) Baths	25% of authorised strength	(a) Glazed ceramic tile dado upto ceiling level. (b) Counter with stone slab with single/ multiple oval type/ WHB and single large mirror with border covering entire width of slab. (c) Hot water supply in each bath. (d) Storage tank of capacity as per NBC 2005. Provision of separate tank for WC.	Minimum 03 Nos
	(b) WCs	33% of authorised strength		Minimum 04 Nos
	(c) Trough type WHB	33% of authorised strength		Minimum 03 Nos
	(d) Urinals	12.5% of authorised strength		Minimum 02 Nos
11.	Car Sheds	12 Sqm (Plinth Area)		To be provided @ 20% as open common shed.
12.	Scooter Shed	06 Sqm (Plinth Area)		80% be provided as open common shed.

Note.

1. The scales of staircase given above are on the basis of one brick wall construction. If stone masonry construction is adopted 16% additional plinth area will be allowed. For 1½ brick wall construction the plinth area may be increased by 12.5%.

2. Covered parking may be provided in lieu of Scooter sheds, if required.

d. Messes for Junior Commissioned Officers:

TABLE 6.III

MESSES AND CLUBS FOR JCOs AND THEIR EQUIVALENTS

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of JCOs and Equivalents					Special Facilities	Planning Notes
		5-10	11-15	16-20	21-40	41-60		
1.	Mess Room	20	25	30	44	60		Provision of Air-conditioning/ Central Space Heating System as per climatic conditions at stations as per Appendices B or E.
2.	Club Room	20	25	37	40	50	Display or other shelving and racks.	(a) Provision of Air-conditioning/ Central Space Heating System as per climatic conditions at stations as per Appendices B or E. (b) Club room should adjoin the mess room so that combined use of these rooms is available. (c) Club room to include bar.

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of JCOs and Equivalents					Special Facilities	Planning Notes
		5-10	11-15	16-20	21-40	41-60		
3.	Kitchen	13	13	13	15.6	20	(a) Cup boards, racks. (b) Serving platform with locking arrangements. (c) Towel rails. (d) Glazed ceramic tile dado upto lintel level. (e) Sink with double bowl and double drain board, cooking platform and with electrical chimney. (f) Provision of Separate tank as per requirement of dual flushing system. (g) Hot water supply.	
4.	Store	11	11	13	13	13	(a) Cupboard. (b) Meat hooks on rail.	Suitable partition may be provided for storage of fuel.
5.	Servery and Pantry	---	---	09	09	11	(a) Hot closet and serving counter. (b) Towel rail. (c) Plumbing for Water Purifier.	---
6.	Pan Wash	05	05	05	05	6.5	(a) Sink. (b) Towel rail.	---
7.	Cooks Room	6.5	6.5	6.5	08	08	(a) Cupboard. (b) Pegs set.	---
8.	Recreation and TV Room	---	20	20	20	28	(a) Provision of Air-conditioning/ Central Space Heating System as per climatic conditions at stations as per Appendices B or E. (b) Drapery Rods. (c) Cupboards.	---
9.	Family Room	---	---	12	15	18		---
10.	Card Room	---	---	12	12	15		---

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of JCOs and Equivalents					Special Facilities	Planning Notes
		5-10	11-15	16-20	21-40	41-60		
11.	Office	---	---	---	09	09	(a) Drapery Rods/ Venetian Blinds. (b) Cupboards.	---

e. Accommodations for Other Ranks

TABLE 5.III

SINGLE LIVING ACCOMMODATION FOR JCOs, NCOs, OR AND THEIR EQUIVALENTS IN OTHER SERVICES AND NCs(E) OF IAF

Ser No	Description of Items	Floor Area (Sqm)/ Scale	Special Facilities	Planning Notes
Single Living Accommodation per JCO				
1.	Living Accommodation	41.2 (Plinth Area)	Desert Cooler in hot climate @ one per JCO.	Staircase of 5.02 Sqm to be provided for double or multi-storey construction.
2.	Scooter Shed	6 (Plinth Area)		To be provided @ 50% as open common shed.
3.	Car Parking	12 (Plinth Area)		50% be provided as open common shed.
Single Living Accommodation Havildars/ OR and NCs(E) of IAF				
4.	Living Accommodation per Havildar	13	(a) Notice board in entrance hall or verandah. (b) Full length mirror in verandah. (c) Clothes lines for hanging clothes outside the barracks and retractable ceiling pulley clothing line in verandah for wet weather drying. (d) A writing shelf with chair and in-built book shelf – one per two ORs. (e) Lines for mosquito nets may be provided as required. (f) Desert Cooler in hot climate in stations at Appendix A at the rate of one per six ORs. (g) One fan for two individual.	
5.	Living Accommodation per OR and NCs(E) of IAF	10		
6.	Common Room	0.50 Sqm per man	Pelmet with curtain rods or curtain runners.	To be provided at company or equivalent level.

Ser No	Description of Items	Floor Area (Sqm)/ Scale	Special Facilities	Planning Notes
7.	Study Room	0.25 per man	Pelmet with curtain rods with required accessories or curtain runners.	To be provided at company or equivalent level.
8.	Store Room	0.25 per man	Cabinets/ shelves. Facility for installation of washing machine.	
9.	Verandah	2.4m wide		To be provided on one side. May be provided on both sides at stations where at certain times of the year it is preferable for troops to sleep outside.
10.	Sanitary Block			
	(a) Baths	25% of authorised strength	(a) Glazed ceramic tile dado upto ceiling level. (b) Counter with stone slab with single/ multiple oval type/ WHB and single large mirror with border covering entire width of slab. (c) Hot water supply in each bath. (d) Storage tank of capacity as per NBC 2005. Provision of separate tank for WC.	Minimum 03 Nos
	(b) WCs	33% of authorised strength		Minimum 04 Nos
	(c) Trough type WHB	33% of authorised strength		Minimum 03 Nos
	(d) Urinals	12.5% of authorised strength		Minimum 02 Nos
11.	Car Sheds	12 Sqm (Plinth Area)		To be provided @ 20% as open common shed.
12.	Scooter Shed	06 Sqm (Plinth Area)		80% be provided as open common shed.

Note.

1. The scales of staircase given above are on the basis of one brick wall construction. If stone masonry construction is adopted 16% additional plinth area will be allowed. For 1½ brick wall construction the plinth area may be increased by 12.5%.

2. Covered parking may be provided in lieu of Scooter sheds, if required.

f. Dining Hall facility for Other Ranks:

TABLE 6.IV

DINING HALLS AND COOK HOUSES FOR HAVILDARS/ OR AND THEIR EQUIVALENTS AND NCs(E) OF IAF

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of Havildar/ ORs and Equivalents and NCs(E) of IAF						Special Facilities	Planning Notes
		upto 20	21-50	51-75	76-100	101-150	151-250		
1.	Dining Hall	0.83 Sqm per man						(a) Curtain rods with required accessories or rails to be provided. (b) Notice and menu boards – two per dining hall. (c) Hat and coat pegs in verandah. (d) One in-built shelf per dining hall. (e) One mirror over each trough WHB subjects to maximum of two per dining hall. (f) Colour washable distemper upto ceiling level – one coat in every year or two coats in every two years. (g) White glazed ceramic tiles lining of trough WHB. (h) Glazed ceramic tiles dado near trough WHB upto lintel height. (j)Easy Chairs 10 per dining hall in a mess of at least 100 OR. (k) Pre-polished Kota stone flooring.	(a) Scale includes floor area for passage. (b) Provision of Air-conditioning/ Central Space Heating System as per climatic conditions at stations as per Appendices B or E. (c) Dining area for NCs(E) of AF shall be provided similar to Dining Hall of OR.
2.	Club/ Ante Room	35	50	60	70	90	115		Provision of Air-conditioning/ Central Space Heating System as per climatic

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of Havildar/ ORs and Equivalents and NCs(E) of IAF						Special Facilities	Planning Notes
		upto 20	21-50	51-75	76-100	101-150	151-250		
									conditions at stations as per Appendices B or E.
	Cook Houses								
3.	Kitchen	18.5	18.5	30.5	39	39	55	(a) Cooking range for soft coke and challah where required. (b) Trough type WHB with white glazed ceramic tiles inside lining. (c) Tank for warming water by flue gases with requisite pipes and outlet connections. (d) Double sink and electrical chimney.	(a) Glazed tiles dado up to lintel level. (b) Where cooking is carried out exclusively by the use of cooking gas. (c) Five or additional as required Power points for modern cooking equipment. (d) Suitable cooking platform to be provided. (e) Suitable separate covered and secure enclosure for gas cylinders.
4.	Meat Preparation and Meat Store	---	07	07	07	10	10	(a) White glazed ceramic tiles lining inside Trough type WHB. (b) Meat hooks on rail.	Glazed tiles dado upto lintel level.
5.	Dry Store	08	08	08	08	10	12	(a) Shelving. (b) Cupboards.	Suitably partitioned for storage of fuel if required.

Ser No	Description of Items	Floor Area (Sqm)/ Scale Strength of Havildar/ ORs and Equivalents and NCs(E) of IAF						Special Facilities	Planning Notes
		upto 20	21-50	51-75	76-100	101-150	151-250		
6.	Fresh Store and Larder	14	14	14	14	14	14		---
7.	Fuel Store	---	---	---	07	10	12	---	---
8.	Pan Wash	10	10	10	10	10	12	(a) Water tap alongwith Hot water supply. (b) Shelving. (c) Cupboards. (d) Kota stone flooring.	Glazed tiles dado upto lintel level.
9.	Servery	07	09	12	13	18	26	Combined hot closet and serving counter as required.	---
10.	Cooks Room	07	07	07	07	10	12	(a) Peg set. (b) Towel rail.	---

Note. Continued provision of common mess for MWOs/ WOs, JWO's & Sgt at JCOs Scale for all categories at Air Force stations is in existence vide MoD No Air HQ/375/1/165/W(P&C)/AF/3435/D (Air II) dated 2/18 June 1986.

Based on the above following are the calculations for Residential Units:

a. Officers Residences Area Calculations:

S.No.	Scale for Living	Area (In Sqm Mts.)	Remarks
1	Area Allotment for Single officer	50	Dividing 66Sq.m by 1.3 to convert to Carpet Area
2	Guest Room	26	
3	Servant Quarter	14	

S.No.	Scale for Living	Area (In Sqm Mts.)	Remarks
	Adding 20% for Circulation areas	18	
		108	

Therefore for 4 Officers a total area of 432 Sq.m is provided. In addition to accommodation, the officers are entitled to mess facilities. For the same an additional area of 164.54 Sq. m (Including 20% for Circulation area to be added).

For Calculation of Mess Area, area requirements for 5 officers considered as per norms above factoring only:

1. Mess Room
2. Ante Room
3. Kitchen, Preparation, Pantry, Servery
4. Larder & Store
5. Havildar or Equivalent Room
6. Cook Room

Thus the total area for Officers Accommodation is **596.54** or approximately 600 Sq.m

b. Scale of Accommodations for Subordinate Officers as Per MES: (Ref: Table 6.3 for Mess & Table 5.3 For Single Living Accommodations for JCOs & ORs)

S.No.	Scale for Living	Area (In Sqm Mts.)	Remarks
1	Area Allotment for Single JCO	36.9	Multiplying 41 by 0.9 to convert to carpet area
2	Parking Area	16.2	Multiplying 18 by 0.9 to convert

S.No.	Scale for Living	Area (In Sqm Mts.)	Remarks
			plinth area to carpet area
	Adding 30% for Circulation areas	15.93	
		69.03	

Therefore for 15 JCO's a total area of **1035.45** Sq.m is provided. In addition to accommodation, the JCO's are entitled to mess facilities. For the same an additional area of 136.5 Sq. m (Including 20% for Circulation area to be added). Therefore, total area for 15 JCO's is **1,171.95 Sq.m.**

For Calculation of Mess Area, area requirements for 5-10 JCO's is considered as per norms above factoring only:

1. Mess Room
2. Club Room
3. Kitchen
4. Store
5. Pan Wash
6. Cook Room

Thus, the total area for JCO's Accommodation is 609.5 Sq.m

c. Scale of Accommodations for OR's as Per MES: (Ref: Table 5.3 For Single Living Accommodations for JCOs & ORs)

S.No.	Scale for Living	Area (In Sqm Mts.)	Remarks
1	Area Allotment for Single OR	10	As per MES
2	Common Room Area	0.5	Per OR

S.No.	Scale for Living	Area (In Sqm Mts.)	Remarks
3	Study Area	0.25	
4	Store Area	0.25	
5	Toilets	1.07	As per MES Norms
	Adding 30% for Circulation areas	3.62	
		15.69	

Therefore for 105 OR's a total area of **1647** Sq.m is provided. In addition to accommodation, the ORs are entitled to Dining Hall facilities. For the same adding an additional area of 288 Sq. m for Dining Hall & **75 Sq.m** for Laundry, weapons & armoury.

Thus, the total area for OR's Accommodation is **2010.45 Sq.m**

Similarly, accommodation for 20 Stakeholders on similar lines as above amounts to **314.0 Sq.m**

Scale of Accommodations for Mahila BGF personnel as Per MES: (Ref: Table 6.3 for Mess & Table 5.3 For Single Living Accommodations for JCOs & ORs)

S.No.	Scale for Living	Area (In Sqm Mts.)	Remarks
1	Area Allotment for Single OR	10	As per MES
2	Common Room Area	0.5	Per Mahila Personnel
3	Study Area	0.25	Per Mahila Personnel

S.No.	Scale for Living	Area (In Sqm Mts.)	Remarks
4	Store Area	0.25	Per Mahila Personnel
5	Toilets	0.975	As per MES Norms
	Adding 30% for Circulation areas	3.59	
		15.56	

Therefore for 15 OR's a total area of 235.0 Sq.m is provided. In addition to accommodation, the ORs are entitled to Dining Hall facilities. For the same an additional area of 213 Sq. m

Thus, the total area for OR's Accommodation is **448. 0Sq.m**

Therefore, the above can be summarized as:

S.No.	Description	Area (In Sqm Mts.)	Nos.	Remarks
1	**Land Port Manager Residence**	**166.67**	**1**	
2	**Accommodation for Officers**	**782.82**	5	For Residences of 2 BGF commandants, officers from Customs, Immigration Messing facilities included.
3	Subordinate Officers Accommodation	2,542.67	30	Messing facilities included.
4	Jawan Barracks	4064.33	210	Including Dining Hall

S.No.	Description	Area (In Sqm Mts.)	Nos.	Remarks
5	Stakeholders Accommodation	348.67	20	Dining Hall Shared with Sepoy Barracks
6	Mahila Barracks	759.66	30	Including Dining Hall
	Total	4691.09		

**Lifts provided in all the residential units except Land Port Managers Residence*

Therefore, approximate areas for residential areas have been calculated as **7,717.34** Sq. m (Carpet Area) or **8,574.82** Sq.m (Built up Area)

For Calculating Internal Roads:

Sl. No	Description	Area (In Sq.m)	Remarks
1	Area for Accommodation	8,574.82	
		1073.24	

*Built up area considered

Taking Square root of **8574.82 Sq.m** (to obtain length of building) & multiplying it by 11.59 (Factor for 1m internal Road as derived in Annexure 4) equals **1073.24 Sq.m**

Annexure – 8 & 11

Water Calculations:

S.No.	Description	Person	Total Water Requirement		
			LPCD	LPD	kl/day
1	Passenger Terminal Cum Admin Building				
1.1	Employees	20	45	900	0.90
1.2	Visitors	3	15	45	0.05
1.3	passengers	1000	15	15000	15.00
	Total for Domestic use				15.95
2	Cargo Terminal Building				
2.1	Employees	10	45	450	0.45
2.1	Drivers	200	15	3000	3.00
2.3	CHA staff	15	15	225	0.23
	Total for Domestic use				3.68
3	Plant Quarantine Building				
3.1	Employees	10	45	450	0.45
3.2	Visitors	3	15	75	0.08
3.3	Misc.			100	0.10
	Total for Domestic use				0.63
4	Inspection Export				
4.1	Employees	10	45	450	4.50
4.2	Visitors	3	15	75	0.08
4.3	Misc.			100	0.10
	Total for Domestic use				4.68
5	Warehouse Import				
5.1	Employees	10	45	450	0.45
5.2	Visitors	3	15	45	0.05
5.3	Misc.			100	0.10
	Total for Domestic use				0.60
6	Driver/ Porter Rest Area Export/parking area				
6.1	Visitors	50	15	750	0.75
7	Driver/ Porter Rest Area Import				
7.1	Visitors	50	15	750	0.75
8	Motor Workshop				
8.1	Visitors	3	15	45	0.05

S.No.	Description	Person	Total Water Requirement		
			LPCD	LPD	kl/day
8.2	Misc.			100	0.10
	Total for Domestic use				0.15
9	Jawan Barrack				
9.1	Bed	100	135	13500	13.50
9.2	Visitors	3	15	45	0.05
9.3	Permanent Employees	5	135	675	0.68
	Total for Domestic use				14.22
10	Barrack for officer				
10.1	Bed	10	135	1350	1.35
10.2	Visitors	2	15	75	0.08
10.3	Permanent Employees	5	135	675	0.68
	Total for Domestic use				2.11
11	Barrack For Subordinate Officer				
11.1	Bed	10	135	2160	2.16
11.2	Visitors	2	15	75	0.08
11.3	Permanent Employees	5	135	675	6.75
	Total for Domestic use				8.99
12	Mahila Barrack				
12.1	Bed	10	135	1350	1.35
12.2	Visitors	3	15	45	0.05
12.3	Permanent Employees	5	135	675	0.68
	Total for Domestic use				2.07
13	LPAI & Stakeholder quarters 3 nos.				
13.1	Residence	50	135	6750	6.75
14	Toilet Block (Export) 4 nos.	340 person each block			
	Visitors	1000	45	45000	45.00
15	Toilet Block (Import) 1 nos.	400 person each block			
	Visitors	200	45	9000	9.00
16	Toilet Block with Restroom (Import)				
	Visitors	200	45	9000	9.00
	Total	3000			124.30

S.No	Description	Person	Total Water Requirement		
			LPCD	LPD	kl/day
17	**Miscellaneous**				**40.00**
	Total Water requirement				**164.30**
			Say 165 KL/ Day		

Waste Water & Reuse:

Waste Water Calculation (in KLD)		
1	Total Water Requirement	165
2	Fresh	165
3	Waste Water Generated (80%)	132
4	STP Capacity	Say 150 KLD

Water Balance Data (in KL/Day)

S. No.	Description	Round-off
A.	Domestic Water	
1	Domestic Water Requirement	165
2	Domestic water Requirement per day for Filter back wash (LS)	5
	Total Domestic water	170
B.	Recycled Water Reuse from STP	
1	Gardening and Landscape @ 2 Liters per day per sqm for 40000 sqm.	80
2	Recycle water Requirement per day for Paved area- Mopping & washing (LS)	5
	TOTAL	85
	Reclaimed Water from S.T.P @80% of Waste Water Generated	120
	Flow to external drain after treatment	30

Underground Storage:

Underground Storage		
S.No.	**Description**	**Capacity in cum**
(i)	U.G Tanks(Fire Fighting, Raw, Domestic)	
	UG Fire Static Tank Capacity	50
	UG Domestic water Tank Capacity	170
	Total UG TANK Capacity	220

Annexure – 9

Electrical Sub Station Requirements as per NBC

5.5.10 *Electrical Sub-Station*

	Land Area Required, Min
a) *11 kV sub-station — 1 for 15 000 population*	
Area	500 m^2
b) *66 kV sub-station — 2 for 100 000 population*	
Area for each sub-station	6 000 m^2 (that is, 60 m × 100 m)
c) *220 kV sub-station — 1 for 500 000 population*	
Area	4.00 ha

Annexure – 10

Water Requirement:

a) **Residential Buildings:**

Sl. No	Accommodations	Population
1	1 Bedroom dwelling unit	4
2	2 Bedroom dwelling unit	5
3	3 Bedroom dwelling unit	6
4	4 Bedroom dwelling unit and above	7

Notes:

1) The above figures consider a domestic household including support personnel, wherever applicable.
2) For plotted development, the population may be arrived at after due consideration of the expected number and type of domestic household units.
3) Dwelling unit under EWS category shall have population requirement of 4 and studio apartment shall have population requirement of 2.

As a general rule the following rates per capita per day may be considered for domestic and non-domestic needs:

a) For communities with populations up to 20,000:

1)	Water supply through stand post :	40 lphd (Min)
2)	Water supply through house service: connection	70 to 100 lphd

b) For communities with: 100 to 135 lphd population 20,000 to 100,00 together with full flushing system

c) For communities with population: 150 to 200 lphd above 100,000 together with full flushing system

Note—The value of water supply given as 150 to 200 liter per head per day may be reduced to

135 liter per head per day for houses for Medium Income Group (MIG) and Lowe Income Groups (LIG) and Economically Weaker Section of Society (EWS), depending upon prevailing conditions and availability of water.

Out of the 150 to 200 liter per head per day, 45 litre per head per day may be taken for flushing requirements and the remaining quantity for other domestic purposes.

Sl No.	Type of Building	Domestic liters per head/ day	Flushing Liters per head/ day	Total Consumption Liters per head/ day
1.	Factories including canteen where bath rooms are required to be provided	30	15	45
2.	Factories including canteen where no bath rooms are required to be provided	20	10	30
3.	Hospital (excluding laundry and kitchen): a) Number of beds not exceeding 100	230	110	340
	b) Number of beds exceeding 100	300	150	450
	c) Out Patient Department (OPD)	10	5	15
4.	Nurses' homes and medical quarters	90	45	135
5.	Hostels	90	45	135
6.	Hotels (up to 3 star) excluding laundry, kitchen, staff and water bodies	120	60	180
7.	Hotels (4 star and above) excluding laundry, kitchen, staff and water bodies	260	60	320
8.	Offices (including canteen)	25	20	45
9.	Restaurants and food court including water requirement for kitchen: a) Restaurants	55 per seat	15 per seat	70 per seat
	b) Food Court	25 per seat	10 per seat	35 per seat
10.	Clubhouse	25	20	45
11.	Stadiums	4	6	10
12.	Cinemas, concert halls and theatres and multiplex	5 per seat	10 per seat	15 per seat
13.	Schools/Educational institutions: a) Without boarding facilities b) With boarding facilities	25	20	45

Sl No.	Type of Building	Domestic liters per head/ day	Flushing Liters per head/ day	Total Consumption Liters per head/ day
		90	45	135

Annexure – 12 AC tonnage Requirements:

AC tonnage calculator						
Sl. No	Description	Height	Built up Area	British thermal unit (BTU)	Ton of refrigeration (TR)	Mechanical Horsepower (HP)
1	Passenger terminal Building (Passenger Side facilities)	8	4611.111111	1350000	112.5	537.9287625
2	Cargo terminal Building (Driver Side facilities)	8	650	264000	22	105.194958
3	Administrative Area Passenger Terminal	8	1424.444444	558000	46.5	222.3438885
4	Administrative Area Cargo Terminal	8	372.2222222	198000	16.5	78.8962185
5	Import Warehouse	7.5	4368	24000	2	9.563178
6	Export Warehouse	7.5	2184	24000	2	9.563178
7	Seizure Warehouse	7.5	1638	24000	2	9.563178
8	Unbonded Warehouse	7.5	2730	24000	2	9.563178
9	Open Storage Spaces		1573.033708			
10	Weigh Bridge (2 Nos)		333.3333333	24000	2	9.563178
11	Full Body Truck Scanner		555.5555556			
12	Rummaging Pit (2 Nos)		555.5555556			
13	Fumigation Shed		222.2222222			
14	Fire Station		580	120000	10	47.81589
15	SWT		166.6666667			
16	Sewage Treatment Plant		222.2222222			
17	Sub Station		555.5555556	24000	2	9.563178
18	Pump House		222.2222222			
19	OHT & Pump		444.4444444			
20	Commercial Cargo Road & Parking Area		-			
21	Internal Roads Commercial Cargo		-			
22	Internal Roads Passenger Terminal Area		-			
23	Internal Roads Residential Areas		-			
25	Open Areas		4856.226			
26	Landscaped Areas		30000			
27	Porter rest Area		166.6666667			

AC tonnage calculator						
Sl. No	Description	Height	Built up Area	British thermal unit (BTU)	Ton of refrigeration (TR)	Mechanical Horsepower (HP)
28	Plant & Animal Quarantine		555.5555556	24000	2	9.563178
29	Off Road Parking		1470			
30	Mandatory Setbacks		9542.465688			
31	Rainwater Harvesting		15224.44			
32	Residential Areas		8574.822222	1320000	110	525.97479
33	Additional Spaces for Ancilliary Facilities for Passenger Terminal Area		1000			
34	Internal road areas fixed components		-			
35	Internal road areas for common Services		-			
36	Internal road areas for Administration Building		-			
38	Dormitory for Drivers Dormitory		180.7			
39	Internal Road Area for Dormitory					
40	Parking Area for Cargo Terminal		975			
41	Parking Area for Admin Area		1050			
42	Parking Area for Residential		615			
43	Smart Gate for Passenger Oriented Zone		1120			
44	Road for Passenger Smart Gate					
45	Smart Gate for Cargo Oriented Zone		2240			
46	Road for Cargo Smart Gate					
47	Transhipment Yard		222.2222222			
48	Hazardous Material Storage	7.5	111.1111111			
Total				3978000	331.5	1585.096754

Note: - 1). This calculation only for the case of 1000 passengers and 500 trucks.

2). HVAC calculations are based on various factors such as local climate, occupancy, volume of space etc., actual calculation can be different for each separate case.

Annexure – 13

For Provision of Lifts:

TABLE 61.I

LIFTS

Ser No	Type of accommodation	4, 5 and 6 Storeys		7 and 10 storeys		11 and 12 Storeys		Above 12 storeys	
		No of Lifts	Capacity (Passenger)	No of Lifts	Capacity (Passenger)	No of Lifts	Capacity (Passenger)	No of Lifts	Capacity (Passenger)
1.	Single Living Accommodation	01	08	02	08	02	08	02	08
2.	Admin Accommodation								
	(a) upto 50 personnel per floor	02	13	03	13	03	13	04	13
	(b) 51 to 100 personnel	03	13	04	13	04	13	04	13
3.	Married Accommodation	01	13	02	1 x 8 1 x 13	02	1 x 8 1 x 13	03	2 x 8 1 x 13

Annexure – 14

As per the guidelines proposed by NDMA, the following have been used to arrive at areas.

Annexure – 1B

BASIC REQUIREMENT FOR SETTING UP A FIRE STATION

Following minimum dimensions were recommended for each of the requirements of Fire Stations: -

Sr.No	Type of Accommodation	One appliance Station	Two Appliance Station	Three Appliance Station	Four Appliance Station	Five Appliances & Over Station.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Appliance room with doors according to local requirements,(Height will depend on the type of ladders/overall height of appliance in us but will not be less than 12')	30'10'X14'High	The floor area should be double of the one appliance station	The floor area given under one appliance station should multiplied by 3	The floor area given under one appliance should be multiplied by 4	Multiply the floor area given under appliance station by the number of pumps.
2.	Office	120 sq.ft	120 sq.ft	180 sq.ft	180 sq ft	240 sq.ft.
3	Watch Room	120 sq.ft	120 sq.ft	120 sq.ft	120 sq.ft	180 sq. ft
4.	Store	180 sq ft	180 sq ft	200 sq.ft	200 sq.ft	300 sq.ft
5.	Work Room (for minor repairs)	150 sq.ft	200 sq.ft	200 sq.ft	250 sq.ft	300 sq.ft
6	Rest Room/Recreation Room (Appliance means all Fire Service Vehicles including ambulances.)	200 sq.ft	200 sq.ft	250 sq.ft	300 sq.ft	300 sq.ft
7	Drill Tower-cum-Hose Drying Tower	15'X15'X40' High	15'X15'X40' High	15'X15'X40' High	15'X15'X40' High	15'X15'X40' High
8	Petrol Store (According to existing petroleum Regulations)					

Sr.No	Type of Accommodation	One appliance Station	Two Appliance Station	Three Appliance Station	Four Appliance Station	Five Appliances & Over Station.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
9	Petrol Store	5000 gallons capacity with parapet wall not exceeding 3'and a depth not less than 3; with a sump of 2'X2'X2'		10000 gallons capacity with parapet wall not exceeding 3'and a depth not less than 3; with a sump of 2'X2'X2'		Two tanks of same capacity as for one pump station.
10	Hoe Washing Through	40'X3'X2' deep	40'X3'X2'deep	40'X3'X 2'deep	40'X3'X 2'deep	40'X3'X2' Deep
11	Smoke Chamber	8'X8'X8' high	8'X8'X8' high	8'X8'X8' high	8'X8'X8' high	8'X8'X8' High
12	Hydrants	One of each type	One of each type	One of each type	One of each type	One of each type
13	Record Room	Nil	Nil	150 sq.ft	150 sq.ft	180 sq.ft
14	Class Room	Nil	Nil	225 sq.ft	225 sq.ft	300 sq.ft
15	Drill Ground	200'X50'	200'X50'	200'X50'	200'X50'	200'X50'

16. **An area of 10 ft & 5 ft per person for the total number of person on duty at a time.
17. Sanitary Facilities To be provided at a scale of one lavatory and one bathroom for each 5 person on duty at any time subject to a minimum of 1 set .
18. Residential Accommodation
    (a) At Training Centre- Single accommodation, messing facility and other connected services for 100 persons should be provided as close as possible to the Aerodrome.
    (b) At all Station – Residential Accommodation for all Fire Service Staff should be provided as close to the Aerodrome as possible.

* *The watch room should be on top of the station.*
** *In case of upper floors, separate sliding poles should be fitted between each floor.*

FIRE STATION AND SWT: -

As per NDMA guidelines (2012) for Scaling, Type of Equipment & Training of Fire stations the following recommendations have been laid down:

Sl. NO	Recommendations Laid Down
1	As per the rural area response codes, the Fire Station must serve all areas of the ICP within 20 minutes.
2	Fire Fighting Tender provision to confirm to: a. 50,000 People - 1 No. b. 1,00,000 People - 2 No. c. 3,00,000 People - 6 No. d. Additional 1,00,000 Thereof - 1 No. Additional light rescue tender/ Multipurpose tender can be provided
3	Minimum 500 kgs of foam compound to be stored at designated fire station
4	Total minimum manpower requirement of 6 personnel for a Single tender fire station & the staff to be stationed at the Fire station.

SCALES LAID DOWN: (For One Appliance/Tender Station):

Sl No	Description	NDMA	MES	Remarks
1	Appliance Room	40.21 Sqm	As per Scale	For Single Large Tender
2	Office	11.14Sqm	23 Sqm	Includes Accommodation
3	Watch Room	11.14 Sqm	-	For MES Area Included in Office above
4	Store	16.72 Sqm	14.5 Sqm	
5	Work Room	13.93 Sqm	As Per Scale	For Maintenance
6	Rest Room/Recreation Room	18.58 Sqm	36.30 Sqm	MES: For Six Persons
7	Drill Tower/ Hose Drying Tower	20.09 Sqm	21.0	40 Feet/12.1 Mtr High (NDMA)
8	Drill Ground	300 Sqm	-	
9	Space for On Duty Personnel	0.9 Sqm/Person	-	

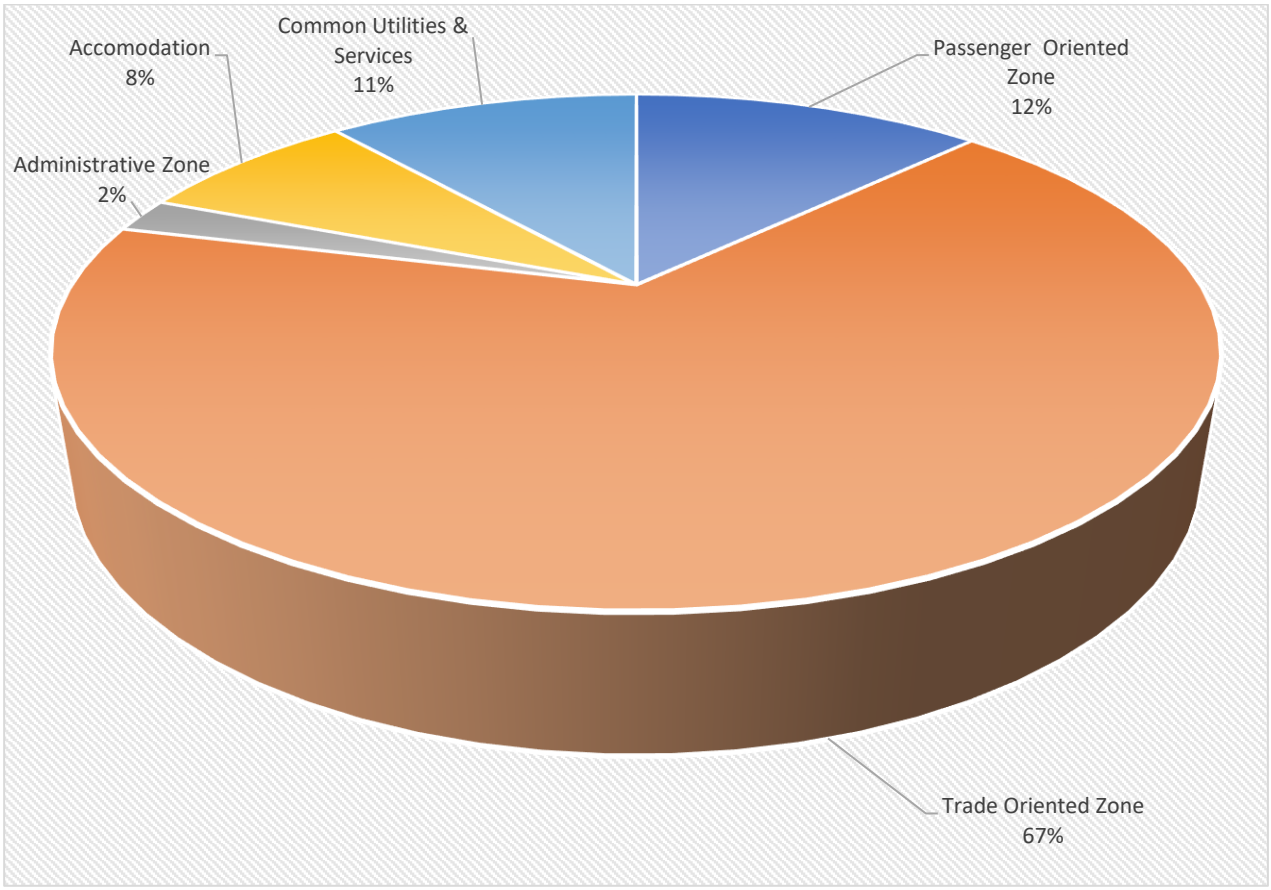
Sl No	Description	NDMA	MES	Remarks
10	Residential Accommodation	Single Living Quarters		For Minimum 6 Staff members for a single tender station
11	Toilets	1 Lavatory+1Bath room for every 5 persons	WC – 2Nos WHB – 2Nos Urinal – 2Nos Bath – 2Nos	
12	Static Water Tank		70KL	Other Store Holding
	Hydrants	One of Each Type		

One fire station with minimum 2 No. bays for firefighting tenders and office as per norms to be catered being an independent campus away from main city. SWT of capacity 50 KL to be provided.

Therefore, approximate area for fire station is around 522 Sq. Mts with separate provision for static Water tank. (Approx 150 Sqm. As per MES Scales)

Annexure – 15

Overall, Area Utilization can be depicted as follows:



Council of Architecture
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Scan to Register

For clarifications reach out to :

exen-civil21@lpai.gov.in

Land Ports Authority of India
Department of Border management
Ministry of Home Affairs

Lok Nayak Bhawan

New Delhi 110003