PM GatiShakti
National Master Plan for Multi-Modal Connectivity

DETAILED PROJECT REPORT

FOR

SETTING UP OF ICD AT RAFALESHWAR NEAR MORBI

G-RIDE
(A JV of Govt. of Gujarat & Ministry of Railways)

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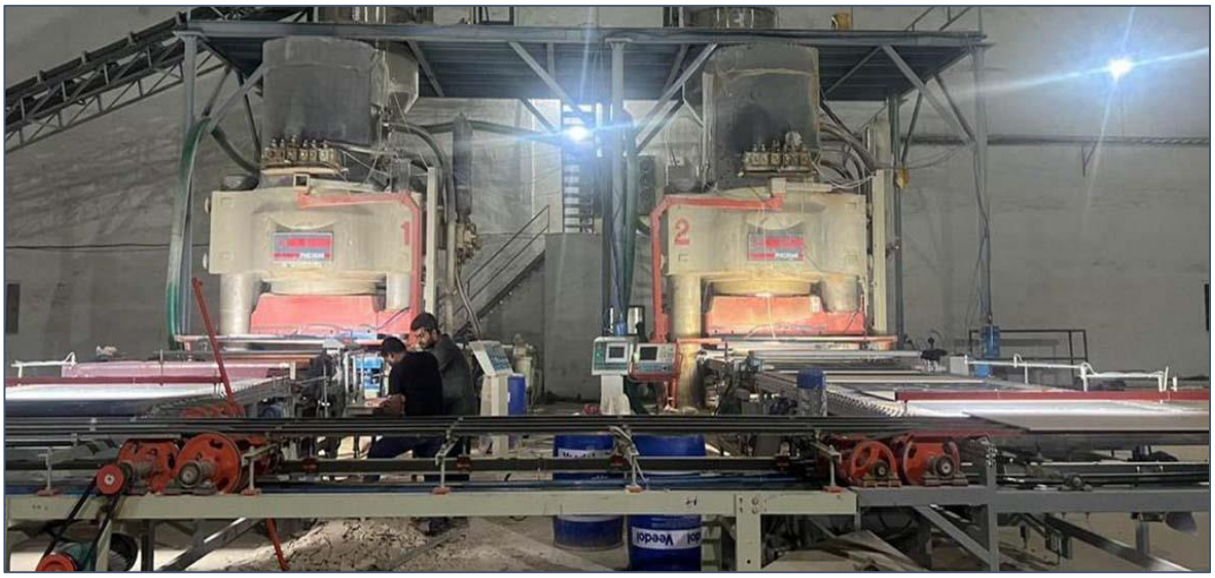
1.1. Capacity creation and Capital Outlay

Morbi produces more than 90% of the ceramic product in India and caters to 13% of the global demand for ceramic products. With a large production capacity, Morbi cluster ranked second in the World. Morbi being a major tile exporter that serves customer across the globe like Europe, Northern America, Middle East, Gulf Cooperation Council and Far East countries.

Ceramic Industry is an impressive example of a city transitioning from a traditional tile producer to a modern ceramics manufacturer. The availability of skilled labour, the presence of a large pool of labour from neighbouring states, and the ease of access to raw materials have all helped build a huge community of ceramic tile suppliers in Morbi India.

Figure 1: Pictorial image of Morbi Ceramic Unit

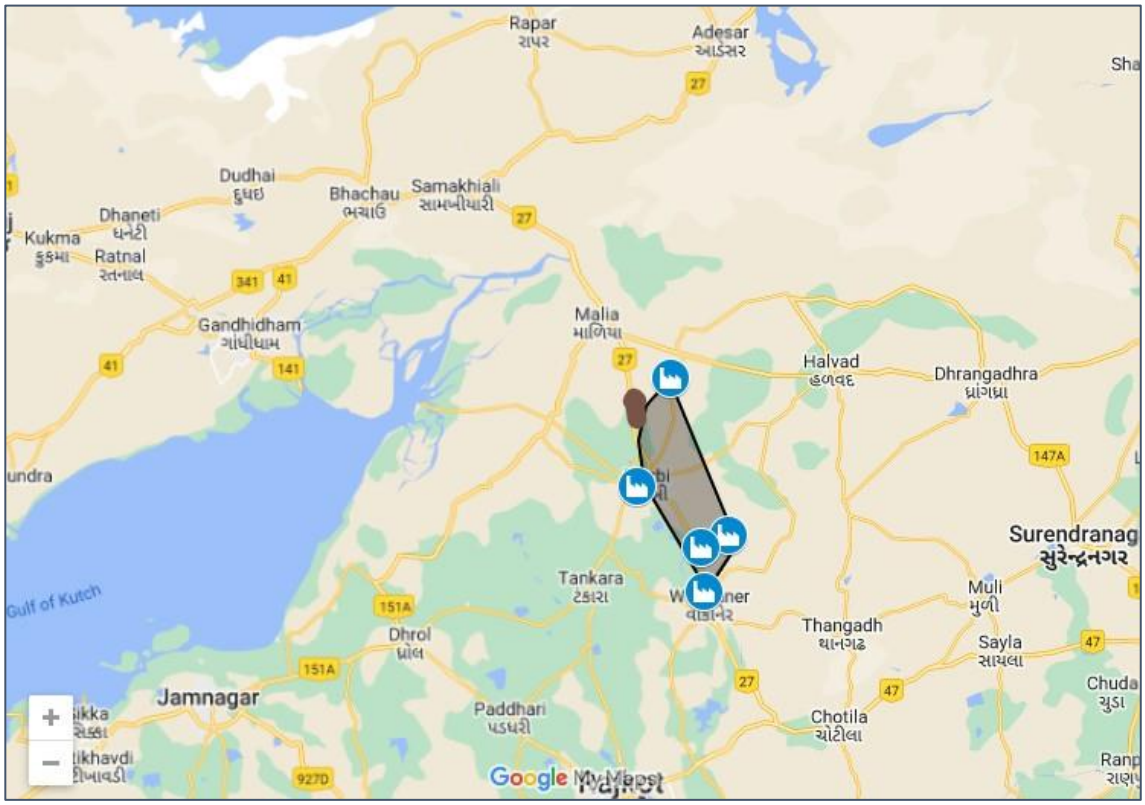


Source: Decorcera

The cluster of Ceramic industries in this region is spread over a stretch of 10 Kms on the Morbi-Dhuva Highway. The major areas are on Morbi 8-A, National Highway, Lalpar, Old Ghuntu road, Lakhdhirpur road, Dhuva Road & Jambudiya area. It consists of 800 units in total with investment of INR 15Cr. To 150 Cr in each unit. The cluster uses latest technologies and equipment's imported from all over the world. The region employs around 3.5 lakhs directly and around 10 lakhs indirectly.

The annual turnover for Morbi cluster is around 50,000 Crores. For its ceramic industry, the city has its certification of TEE (Town of Export Excellence) issued by the Indian Ministry of Commerce. Morbi, one of Gujarat's three Towns of Export Excellence (TEE), holds an annual export turnover of over INR 15,000 crores.

Figure 2: Area covered by Morbi Tile Industry



Source: Google Maps

State government allocated 1500 acres land on the outskirts of Morbi for the establishment of new ceramics and ancillary unit. Once completed the new park shall attract fresh investment of INR 15,000 to 20,000 Crores.

Further Government of Gujarat is planning to develop a Special Investment Region (SIR) aligned to Navlakhi Port in the Saurashtra region. It is planned to develop Navlakhi SIR over 182 Sq. Km which shall attract industries like Ceramic, Engineering & Automobiles, food processing, Electronics, Textile, Chemical and Petrochemicals[1]

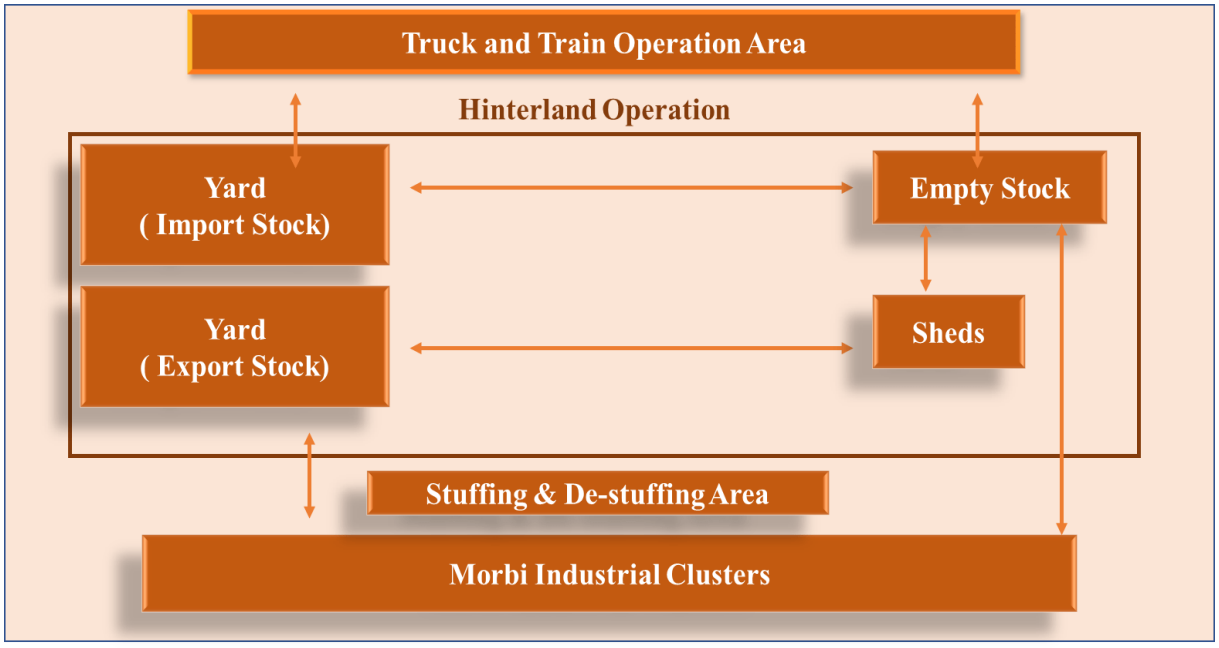
The India ceramic tiles market size was valued at $3,720.2 million in 2019 and is projected to reach $7,144.7 million by 2027, growing at a CAGR of 8.6% from 2020 to 2027. With urbanization in place, the demand for residential and commercial construction is expected to grow in the country. Consequently, the ceramic industry is expected to receive a rapid boost over the coming years. Countries like China and Turkey are the main competitors for the Morbi Ceramic cluster which offers lucrative price range for ceramic products.

[1] GIDC

1.2. Techn010U& Automation proposed for cargo/ container handling and IT systems.

Inland Container Depots (ICDs) occupy an increasingly significant part in modern logistics space. These strategically located hubs, serve as vital mediators between seaports and hinterlands, facilitating cargo flow and contributing to effective supply chain management. As global trade demands continue to rise, the automation of inland container depots has emerged as a critical necessity, ushering in a new era of increased efficiency, accuracy, and sustainability. ICSs are critical in regulating cargo flow, decongesting seaports terminals, and enhancing overall supply chain efficiency. The purpose of bringing automation to ports and terminals is to introduce a whole new level of consistency when handling cargo, and at reduced lab or costs and carbon emissions compared to manually operated terminals.

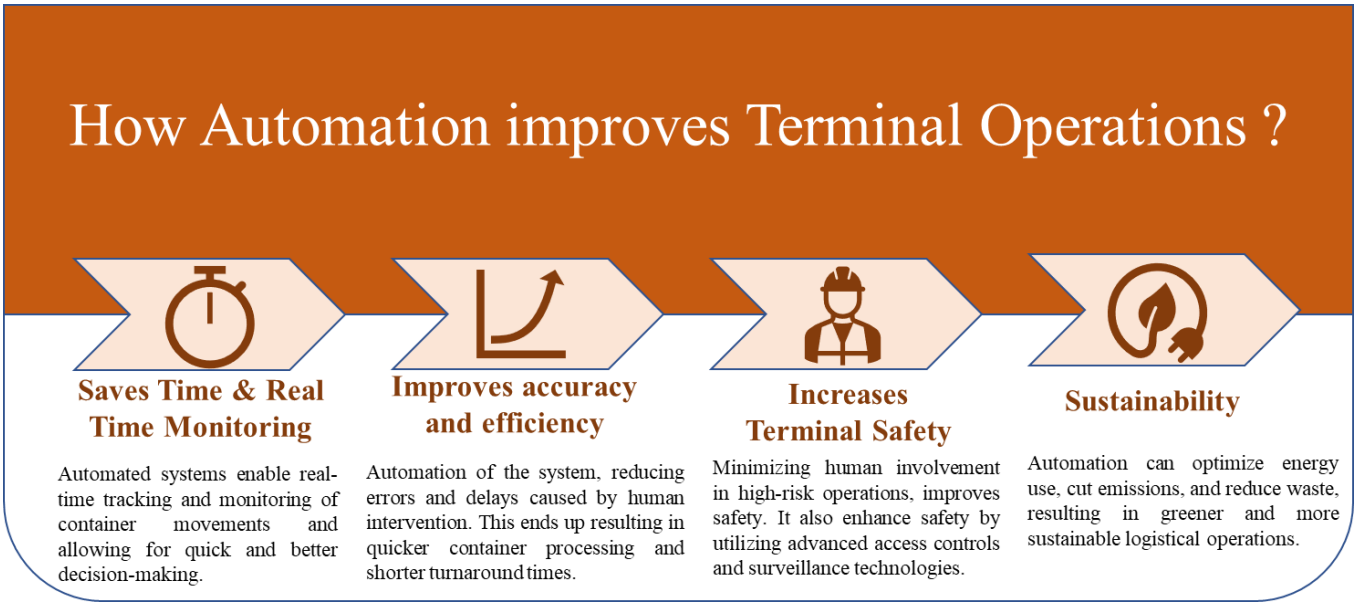
Inefficiencies with port and carriers cost the industry as much as $17 billion a year billion a year



Automated terminal not only increases the handling efficiency, but also reduces carbon emissions by up to 10 per cent

Role of ICD is crucial to connect maritime transport to other modes of transport such as truck and trains. They enable cargo to be shipped by end-consumers, and act as an important distribution node. From this node, goods can be moved via rail and to their final destination.

Why automation - The advantages of ICDs can be enhanced further through digitization, which entails combining technology and advanced systems to optimise operations. Here are the key reasons for ICDs require automation:



Rail Mounted Gantry Cranes:

- Rail mounted gantry cranes are now gaining traction in the terminal world and it been proposed for automatic rail mounted gantry for the ICD to achieve maximum efficiency.
- The large cranes, called automatic stacking cranes (ASC), are typically 80 feet high and 110 feet wide and have been developed to handle up to 10 rows of containers. Two ASCs share a pair of rails, moving up and down the rails carrying containers, continually stacking, and unstacking them.
- Innovative crane engineering allows the cranes to perform their work without any operators. This significant advancement has been brought about by sophisticated optical systems on the cranes which recognize the containers, and new scheduling software in the port management supervisory computer.
- The complete system provides a huge improvement in terminal productivity, and also in the reliability of the container handling. Sophisticated sensors are mounted on the crane to detect the position of the moving parts, the load, and target destination.
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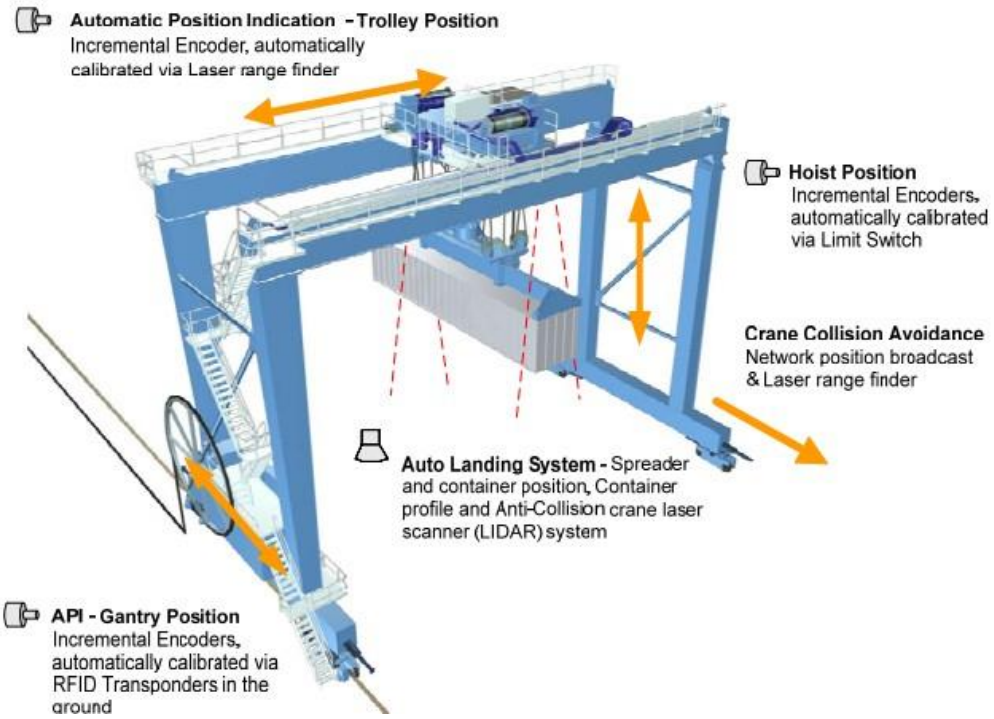
  These sensing systems include encoders and scanning laser rangefinders as shown in the diagram below:

Figure 3: Rail Mounted Gantry Crane for Automatic Container Stacking



Source: TMEIC

The automatic position indication system makes direct measurements of the gantry, trolley, and hoist position via laser rangefinders, unaffected by factors such as rope stretch and wheel slippage. The automatic landing system uses laser scanners on the trolley to measure the position of the spreader (the container pickup assembly) relative to the container below. Gantry position along the rails is determined using an antenna which picks up signals from transponders embedded in the surface.

There is a remote-control room in the operations building with operator stations and video screens to allow the crane to be switched to manual control if unexpected conditions occur. Currently, human control is used when the automated crane interfaces with a manned over-the-road truck at the delivery gate. Safety is paramount for automated ASCs and as such a wide variety of systems and controls are in place to assure that automated ASCs and people never have an unfortunate moment.

Programmable Logic Controller: Variable frequency drives power the motors providing the hoist, trolley, and gantry functions. The drives run off DC power supplied by a common regenerative central converter, and independent inverters provide three phase AC, pulse width modulated power to the motors. The main functions of the PLC are:

- Sequence control for unmanned container handling
- Absolute measurement of gantry, trolley, and hoist position
- Spreader sway control in the gantry and trolley directions
- Collision avoidance with the other crane in the same block

- Interface to the terminal operating system and remote operator station over fibre optic Ethernet

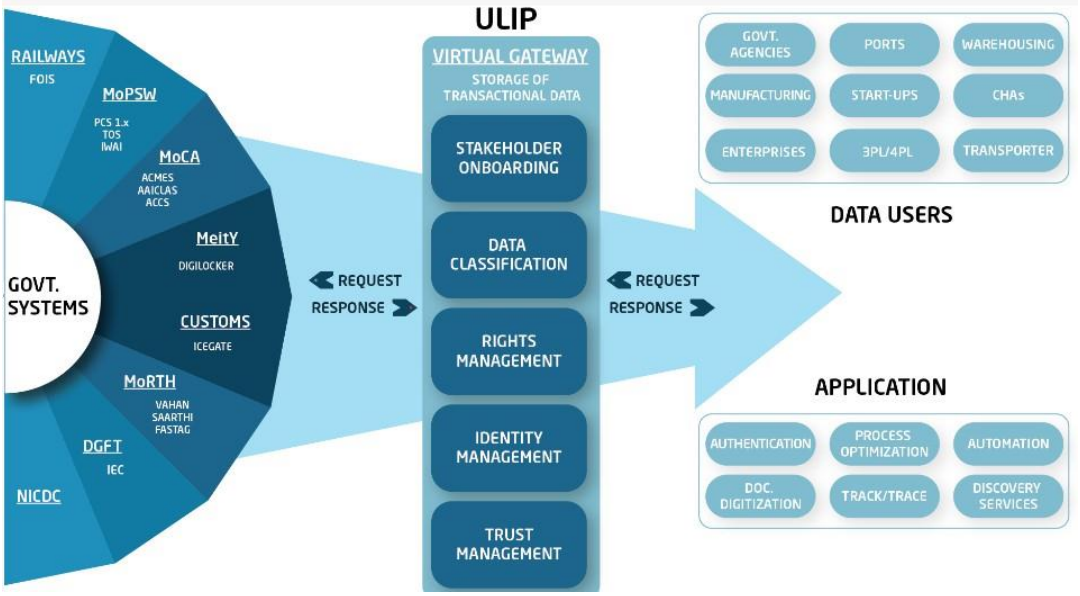
Implementation of Internet of Things:

It enables to monitor and visualise asset performance in real time, detect operational exceptions as they occur, and provide standardised tools and processes to respond to these can greatly improve the integration process. These technologies ensure real-time data sharing & predictive analytics, thereby ensuring that the entire process is safe and transparent. In order to build advance and futuristic ICD infrastructure advance technologies like RFID scanner is pertinent for the smooth due diligence and transparency of the containers on the real time basis with the operational ability of 24*7.

Integration with Logistics Data Bank and Unified Logistics Interface Platform

It is proposed that the IT system of the ICD Rafaleshwar to be integrated with various platform like EDI, ICEGATE, FOIS, PCS and LDB, thus it shall be beneficial to be onboard on ULIP platform to get secure access to the data related to logistics and resources available with various ministries.

Figure 4: Integrated Architecture of ULIP



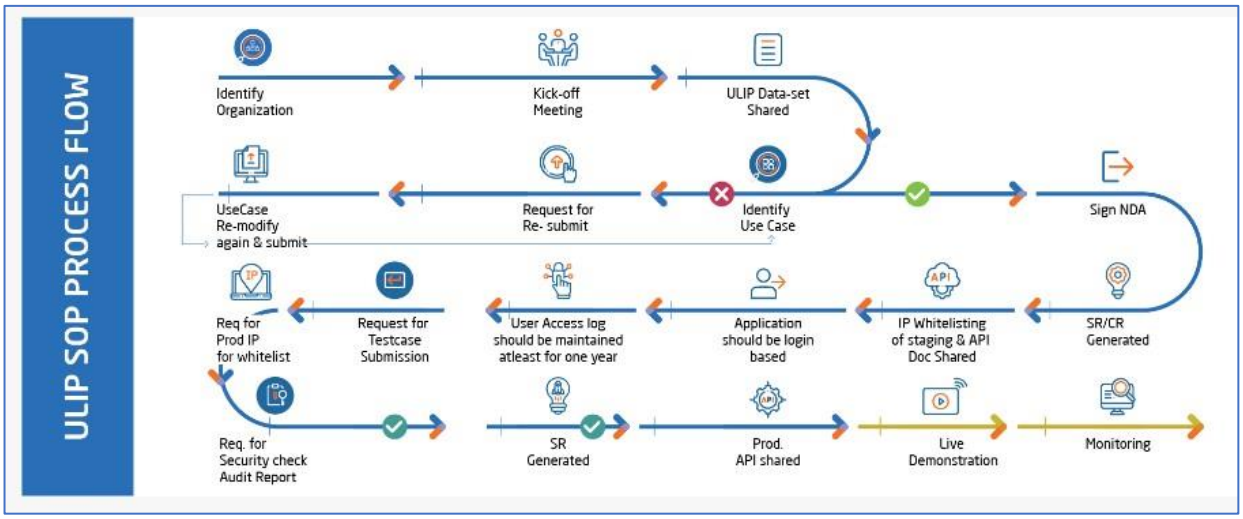
Source: goulip.in

Currently, 32 systems such as FOIS, LDB, ICEGATE, etc., of seven minis-tries including the Ministry of Roads, Trans-port and Highways, Ministry of Civil Aviation, and the Ministry of Ports, Shipping and Water-ways, etc., are integrated through more than 100 application programming interfaces (APIs), en-abling over 1,600 data fields for consumption by industry players.

The SPV which shall be formed for the execution of the ICD Rafaleshwar shall develop their use-cases which will be beneficial to all the industry users and stakeholders. Proposed ICD with API based integration can utilise the data for various activities and services like multi-modal track and trace, people and vehicle authentication, document digitisation, process automation at yards and

gates, discovery services etc, which shall lead to reduction of overall operational cost of logistics and save time.

Figure 5: ULIP SOP Process Flow



Source: goulip.in

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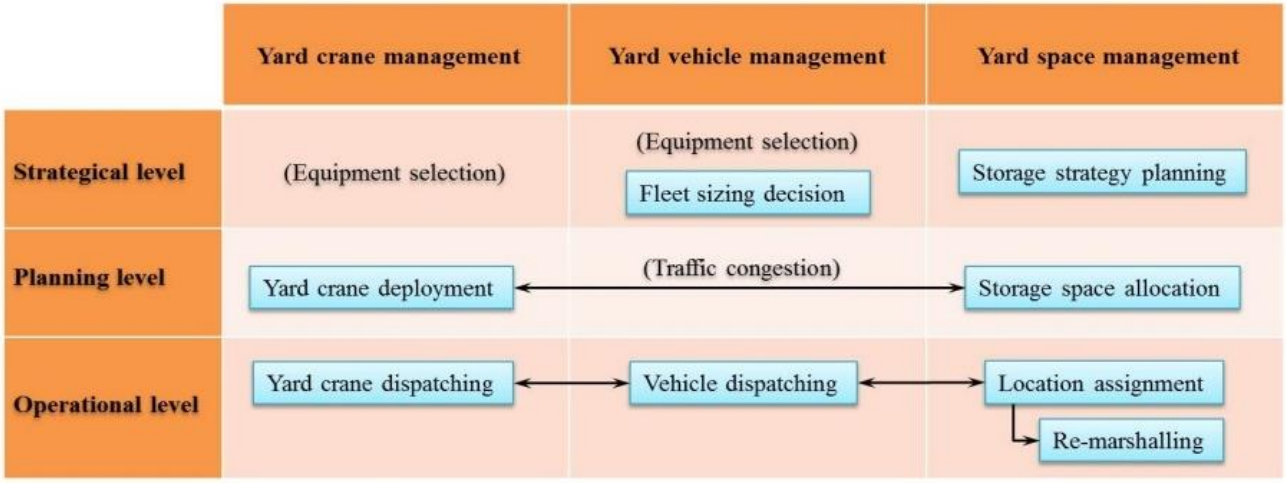
Yard Management

The operation of a marine container depot involves a well-coordinated process comprising several stages including arrival of containers, loading & unloading process, storage at yard and transportation by train. Thus, it is pertinent mange the yard effectively and optimally with minimum availability of resources. For an efficient and effective yard management, it is important to search areas where focus needs to be provided and take the decision strategically.

Figure 6: Yard management Area of focus and Planning



Source: G-RIDE

The acceleration of globalization and regional economic integration leads to the rapidly increasing of trades. Due to high volume of EXIM containers, it is important for terminal to improve handling efficiency by adoption of automation technologies at Container Yard.

Advanced intelligent automatous technology can greatly reduce the terminal operation and maintenance costs. Therefore, they are globally widely used and play an important role in the field of modern logistics. With the development of artificial intelligence, automated terminal management strategies are formulated to improve the yard space utilization and operation efficiency.

For ICD Rafaleshwar, it is intended to handle large volume with minimum congestion wherein a novel yard allocation policy shall be framed to reduce the possible congestions. As a more systematic way to capture the operation of ACT, simulation is always applied to analyse the performance of yard management for different facilities, cranes, and layout. Below mentioned factors increases the efficiency of Morbi ICD.

a) Yard Space Management

Yard space management on automated container terminals optimizing the yard space.

b) Yard Layout

The yard layout is the foundation for handling organizing and equipment scheduling. Reasonable and optimal yard layout is not only important for improving the yard space utilization but also efficient for improving the cooperation among different sub-systems.

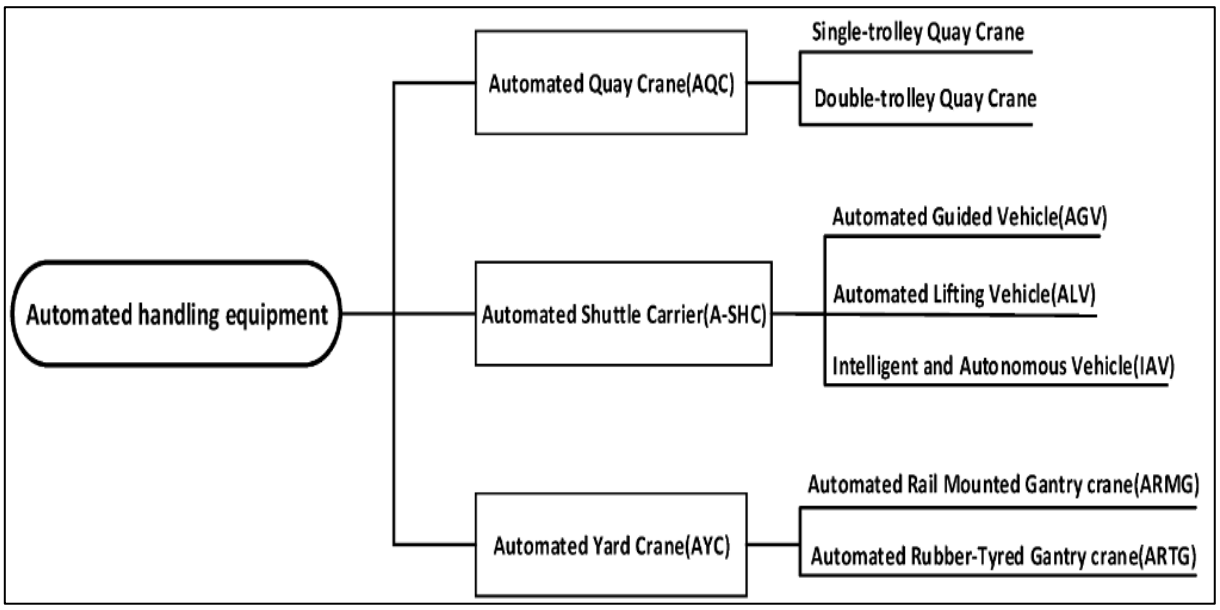
c) Storage Strategy Planning

The storage strategy is a series of rules to manage the yard space, where the allocation of every export (import) container is determined by considering the following operations of all related equipment. The yard space management shall capture the interaction between yard and different equipment. To established both a linear mixed integer programming (MIP) and a non-linear mixed

integer programming (NLMIP) model to coordinate the scheduling of different equipment and the storage strategy.

d) Automated Handling Equipment Management

All the handling equipment of automated container terminal in operations can be mainly divided into three categories: Automated Quay Crane (AQC), Automated Shuttle Carrier (A-SHC), and Automated Yard Crane (AYC). Where the Automated Quay Crane is equipped with different types of trolleys to load and unload the container.

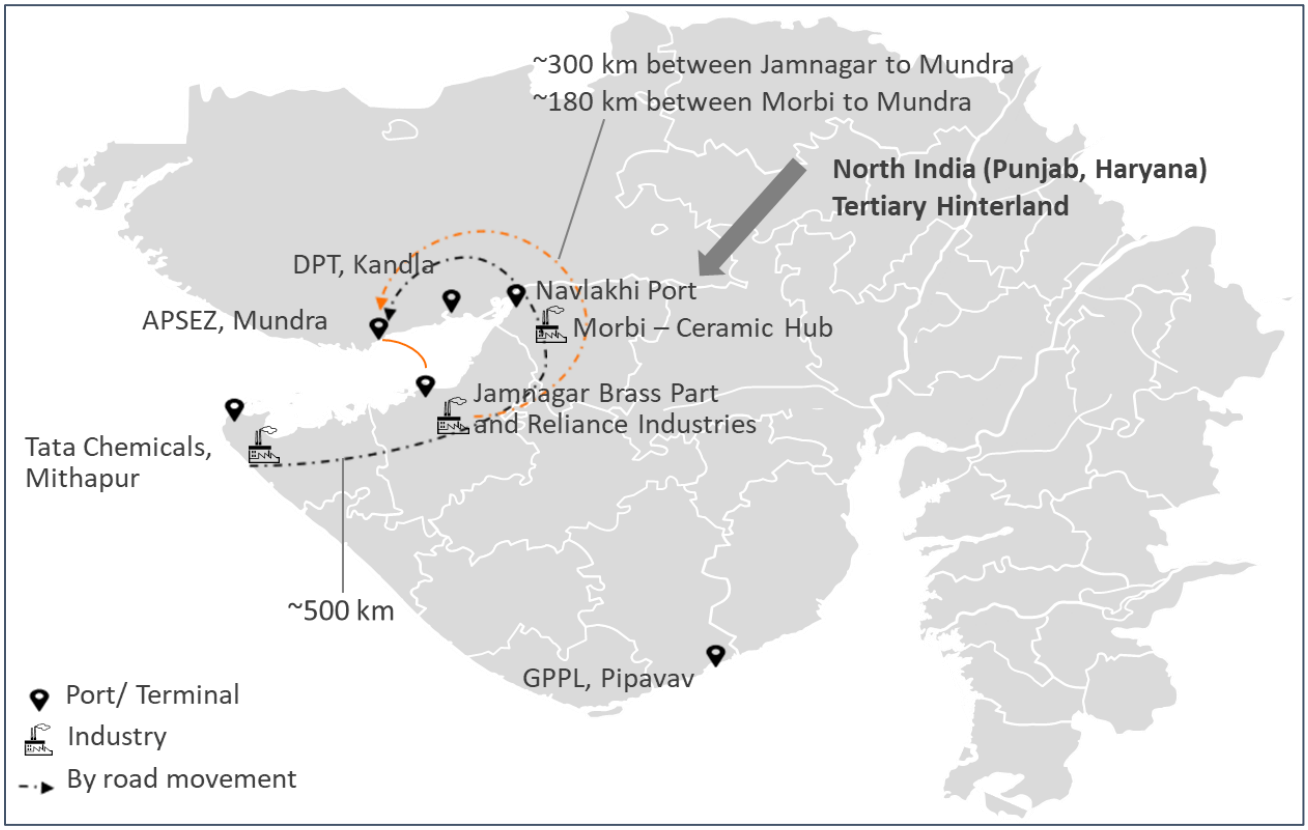


Source: https://www.mdpi.com

1.3. Target Hinterland /trade generating location

The proposed Container Terminal located in the Jambudiya and Jodhapar Nadi village of Morbi Taluka of Gujarat. It shall lie on Wankaner- Morbi rail line section in Rajkot division of Western Railway. The terminal hinterland is bifurcated into three: primary, secondary, and tertiary regions. While the primary hinterland includes Morbi cluster and the upcoming Navlakhi SIR, the secondary hinterland includes Jamnagar and Rajkot region. The tertiary hinterland includes North Indian states like Punjab, Haryana, and NCR region.

Figure 7: Hinterland for the Proposed ICD at Rafaleshwar



Source: G-RIDE analysis

As mentioned above the proposed ICD terminal shall be in the vicinity of the Ceramic cluster of Morbi region which shall be the main ignition for the operation of the proposed container terminal. Due to the growing aspects of the ceramic industry, the proposed ICD shall act as catalyst for the industry growth and for the export oriented ceramic products. Further the proposed ICD might cater to the growing demand export-based units in Jamnagar and Okha regions due to well connectivity of rail line.

Figure 8: Rail Connectivity of the Proposed ICD at Rafaleshwar

Source: G-RIDE analysis

The proposed ICD is well connected with the primary, secondary as well as tertiary hinterland. Due to the proposed facility, the ceramic products can be transported to Mundra, Kandla as well as to Pipavav Port by rail. Further the ICD shall be connected with DFC line via Malia-Viramgam-Sanand and shall also cater to the cargo coming up from Jamnagar and Rajkot region.

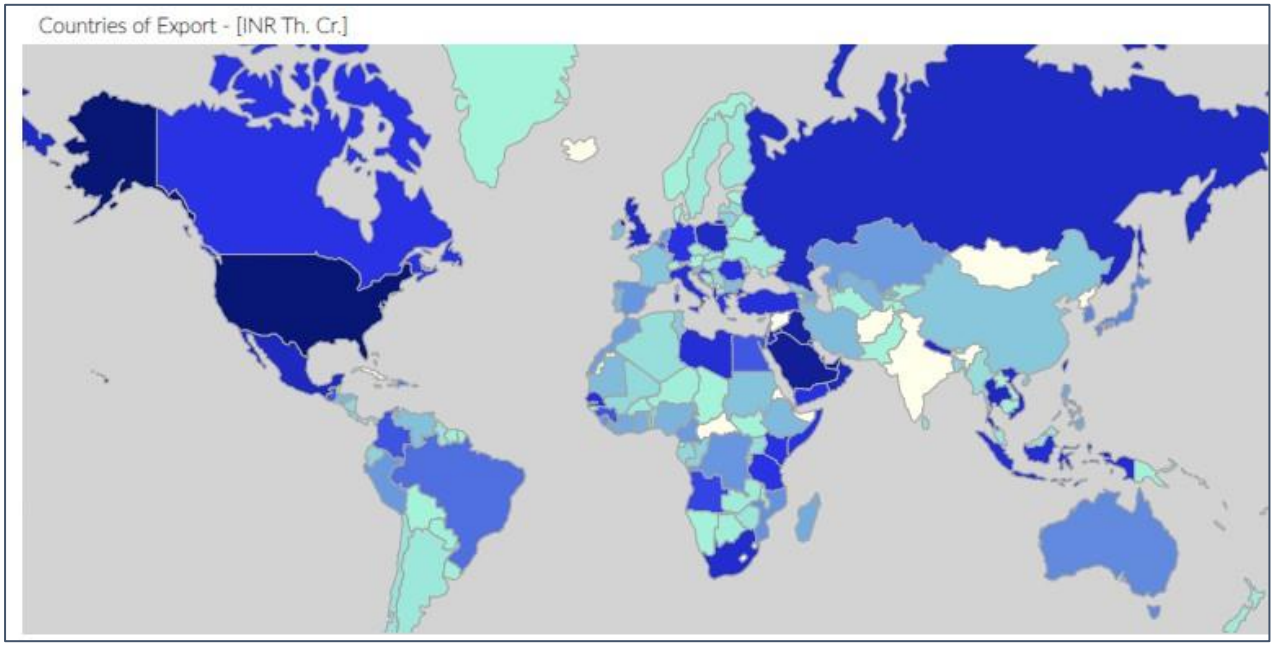
Railway Ministry has approved 129 Km South Haryana Economic Rail Corridor, post execution of corridor Haryana and NCR will have direct rail connectivity with four ports of Gujarat namely Kandla, Mundra, Navalakhi and Jakhau. Post implementation of the rail corridor, the proposed ICD can cater container traffic from NCR Region.

Further 4-lane Greenfield Highway from Maliya to Pipaliya (missing link of Amritsar-Jamnagar Economic Corridor) and Morbi to Navlakhi Port (connectivity for Navlakhi Port) is under implementation. Thus, the proposed container terminal will act as facilitator the cargo movement from the Punjab Region.

1.4. Market Segment Proposed Target Hinterland /trade generating location

As mentioned in above section, the proposed ICD shall majorly cater to the ceramic products for exports and whereas import based products shall be paper products. Value of ceramic products exported from the region have increased from INR 6200 Crore in FY 19 to INR 17,000 Crore in FY 23 with a CAGR of 29% in a value terms.

Figure 9: Countries of Export for Ceramic Products



Source: DGCIS

Region exports to more than 125 countries and top destinations are Saudi Arabia, United States, Mexico, Kuwait, United Arab Emirates, Iraq, Oman, Indonesia, United Kingdom, and Poland. New markets, like Russia and Latin American Countries, have also been added.

Further proposed ICD shall cater to the imports of paper for packaging purposes. There are around 30 mills of kraft in Morbi importing mainly from China, USA, Middle East and Europe. Morbi have packaging capacity of around 1.5 million tonne capacity, a producer of mainly recycle-based kraft paper and duplex board.

Apart from ceramic product and paper, the region imports machinery tools like abrasives, calibration roller, diamond squaring wheels mainly from China and Germany.

1.5. Business Activities & Specific Services Offered

An Inland Container Depot is a substantial part of the logistics and shipping industry. They are important to businesses exporting and importing goods because they function as a warehouse for storing goods in transit before loading and after unloading.

An Inland Container Depot is a transport hub that acts as a temporary storage location for containers with goods for loading and empty containers that have been unloaded. This location is supervised by the Customs department and other similar agencies. The goods from an ICD are sent to the mother port, the seaport located closest to the depot.

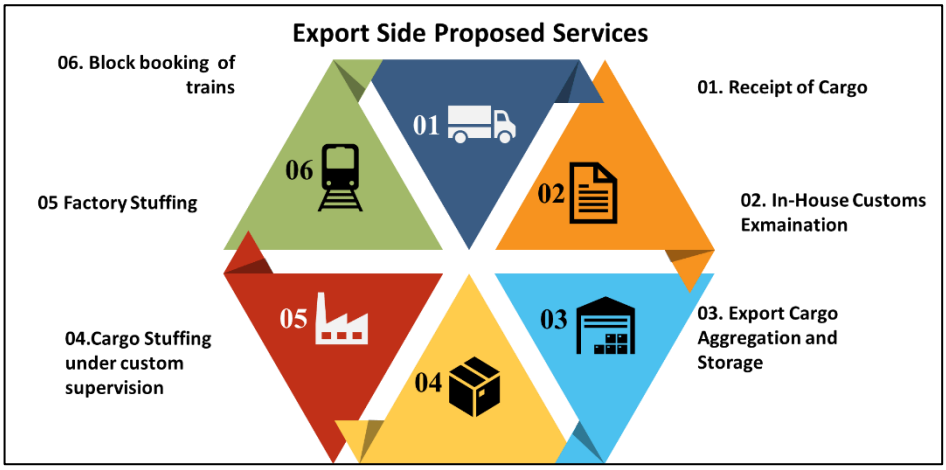
According to Ministry of Commerce (MoC) guidelines, the meaning of inland container depot is "*A common user facility with public authority status equipped with fixed installations and offering services for handling and temporary storage of import/export laden and empty containers carried under Customs and other agencies competent to clear goods for home use, warehousing, temporary admissions, re-export, temporary storage for onward transit and outright export. Transhipment of cargo can also take place from such stations.*"

Primary function of the proposed ICD at Rafaleshwar is as follows:

▪ Receipt and dispatch/ delivery of cargo. ▪ Stuffing and stripping of containers ▪ Transit operations by rail/road to and from serving ports. ▪ Custom Clearance	▪ Consolidation and desegregation of LCL cargo. ▪ Temporary Storage of Cargo and Containers ▪ Maintenance and Repair of container units.

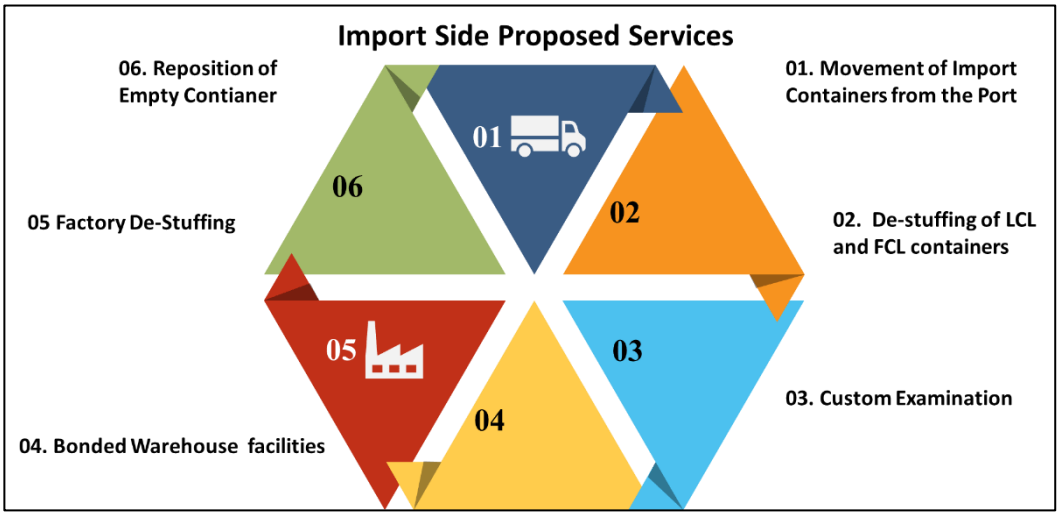
Following business activities and specific services offered:

Figure 10: Services Proposed for Export



Source: G-RIDE Analysis, Primary Interaction

Figure 11: Services Proposed for Import



Source: G-RIDE Analysis, Primary Interaction

Further with the operation of ICD Rafaleshwar, it is proposed to take following innovative and value-added steps for smooth and seamless EXIM business:

- Multi-tier stacking in bonded warehouse
- Centralised/Regional and Local PDA facility
- Fully air-conditioned lounge/lobby for CHAs
- Installation of CCTV cameras at all vital points of ICD
- Exim Cell and Customer care cell for seamless services and information
- Separate stack for high value cargo
- Online preparation of EJO & LCL carting order
- Interfacing of EDI with Customs
- Touch screen kiosks for container enquiries at EXIM cell and CHA lobby
- Door to Door stacking of import loaded containers in stack
- Shifting of containers BOE-wise
- Special cages / security for high value cargoes

2. Write up on how the proposed project enhance the export import logistics Infrastructure in country.

Exports are important drivers of growth as they allow a country to move beyond their domestic markets and tap into larger markets and access new opportunities. As per the report published by The Brainy Insights, the global ceramics market is expected to grow from USD 227.60 billion in 2022 to USD 369.93 billion by 2030, at a CAGR of 6.26% during the forecast period 2022-2030. The growth of the building & construction industry where ceramics is extensively used in tiles, sanitary ware, and bricks is expected to drive the market over the coming years. Asia Pacific region emerged as the largest market for the global ceramics market, with a 39.45% share of the market revenue in 2022. 2 Thus, there is immense potential for the exports from the Morbi Cluster adjacent to the proposed ICD.

Ceramic industries are characterized by limited margins on account of gas prices and tough competition from Chinese and European industries. Exports have been impacted due to rising gas prices and industries' profit eaten up due to inability of increase in finished products. Thus, it is pertinent that Morbi Cluster require to lower the total CIF of the finished product to be competitive in the global markets.

- **India's high average lead freight distance (500 km) indicates a strategic misalignment of manufacturing centres and consumption/ aggregation centers.**
- **Despite having one-thirds the geographical area, compared to the US, India has 37.5% more lead freight distance. This significantly increases India's manufacturing cost and reduces the export potential**

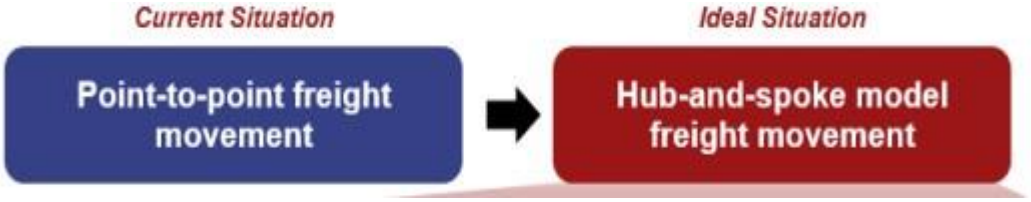
ICD Rafaleshwar shall boost the exports of Morbi ceramic cluster as it shall facilitator to reduce the logistics costs. In fact, ICD Rafaleshwar shall offer premium world class facilities, trained professionals who have extensive experience handling different types of cargo, and the opportunity to explore first and last-mile logistics.

Addition of the Greenfield ICD will play a catalyst for the industries as it shall enhance the exports of ceramic tile due to the cost effectiveness and shall also increase imports of raw material for packaging purposes. Further the proposed ICD shall enhance exports from Jamnagar and Okha region due to proximity of custom facilities and direct rail connectivity with the export based industrial units. In future this ICD might cater the tertiary hinterland states like Haryana and Punjab with the commercialisation of container terminal at Navlakhi Port. With the export-based drivers like Self Reliant energy security, China Plus Strategy, Production Linked Scheme, National

[2] Ceramics Industry Report

Logistics Portal etc. industries in the hinterland are prone to grow and compete globally on terms of quality and quantity-based EXIM products. With such growing demand of EXIM cargo, timely increase in infrastructure facilities like Inland Container Depot Area Coverage are mandatory parameter from export preparedness perspective and to fuel the ignition for economic booster.

Figure 12: Proposed Logistic Movement for Morbi Ceramic Cluster



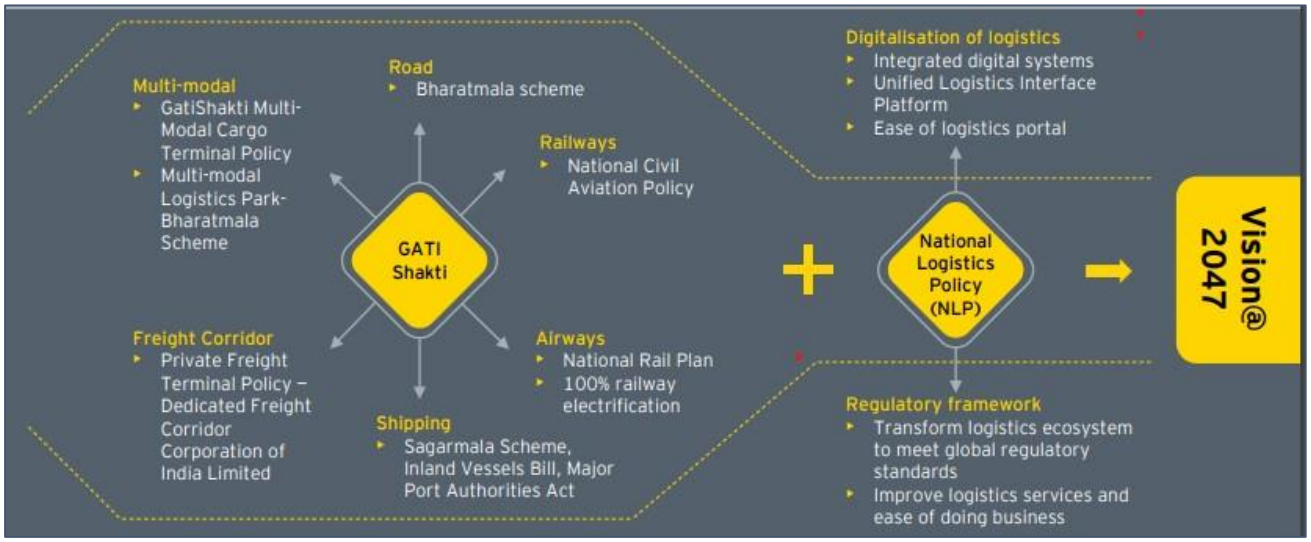
Source: G-RIDE Analysis, Note on MMLP

Yard examination facilities and ICD play a key role to handle the upcoming wagon traffic. To improve the rail share in logistics sector has a very strong justification on the grounds of cost effectiveness, reliability, faster transit time and environmental factors such as carbon emission etc. India being a large subcontinent, efficient and low-cost transportation of minerals, food grains, industrial goods, Exim consignments etc. to hinterland is vital for its healthy, evenly spread and balanced economic growth.

> India aims to reduce logistics cost from 13% to 14% of GDP, to 8% to 10% of GDP, by 2030. It is estimated that a 10% reduction in indirect logistics cost will result in 5% to 8% rise in exports.

PM Gati Shakti National Master plan will enable fast tracking development of large-scale infrastructure. ICD Rafaleshwar also a part of PM Gati Shakti and the vision is to provide an infrastructure for smooth containers handling and provision of storage without congestion at ports. Proposed ICD under the ambit of PM Gati Shakti - National Master Plan for Multi-modal Connectivity aims to strengthen local manufacturing, push exports, and raise possibilities of new futuristic economic zones, thereby making Morbi and Gujarat a hub for world-class logistics infrastructure. Furthermore, the multi-modal connectivity plan aims to increase cargo handling capacity and reduce the turnaround time across all the transport modes.

Figure 13: Inter- Ministerial Integration under PM Gati Shakti



Source: Image extracted from EY Report: Envisioning the future of Indian logistics @ 2047

- **Captive logistics infrastructure is a deterrent to inter-connect them with nationwide logistics infrastructure.**
- **Transition to hub and spoke model requires development of ICD.**
- **ICD/ Railway Yard play's critical role for the availability of empty container and repositioning by rail between ICD and Ports. Such facilities enhance the value of ICD during shortages of empty container as occurred post pandemic and during Red Sea Crisis.**

3. Write up on how project aims to lower cost of logistics for target location.

Inland Container Depot shall bring integrate movement of traffic between road and rail, the two most important transport modes comprising ~90% of the country's cargo movement. Over last seven decades (from 1950-51 to 2021-22), India's logistics market has grown from 86.5 million tonnes to approximately 4500-5000 million tonnes, i.e., by almost 55 times. In comparison, Rail Cargo has grown only 20 times from 73.2 million tonnes to 1418 million tonnes, which amplifies a significant rail market share declining from 85% in 1951 to current 27%. Government of India aims to increase the rail share from current 27% to 45% over the next 10 years. Higher rail share will result in significant logistic cost savings for manufacturing companies. **In addition, infrastructure like Inland Container Depot along with in-rail siding and cargo aggregation in the proximity of production centers can boost the industrial cluster as it reduces turnaround time as well as logistics cost. Further Inland Container depot facility near the Railway terminal shall eliminate one additional leg of Logistics and can directly Gate in the port side.**

Proposed Rail linked ICD at Rafaleshwar near Morbi shall reduce the logistics cost and overall cost for the product in following manner:

- The rail cost of per km is less than the cost of road transportation.
- It reduces the transit time for cargo due to lesser congestion. Thus, lesser cost to be paid for the storage purpose.
- Due to the increase in rail share, carbon emission shall be reduced. Due to such reduction in carbon emissions, in future industries association or individual units can engage in carbon trading and thus overall cost of the product can be decreased further.
- **Due to presence of ICD near Production hub, third leg of Logistics movement like shorter distance truck movement from CFS to port shall be eliminated. Such elimination expected to lower logistics costs as short-term distance truck freight are high.**

Logistics Cost Comparison – Road Vs Rail:

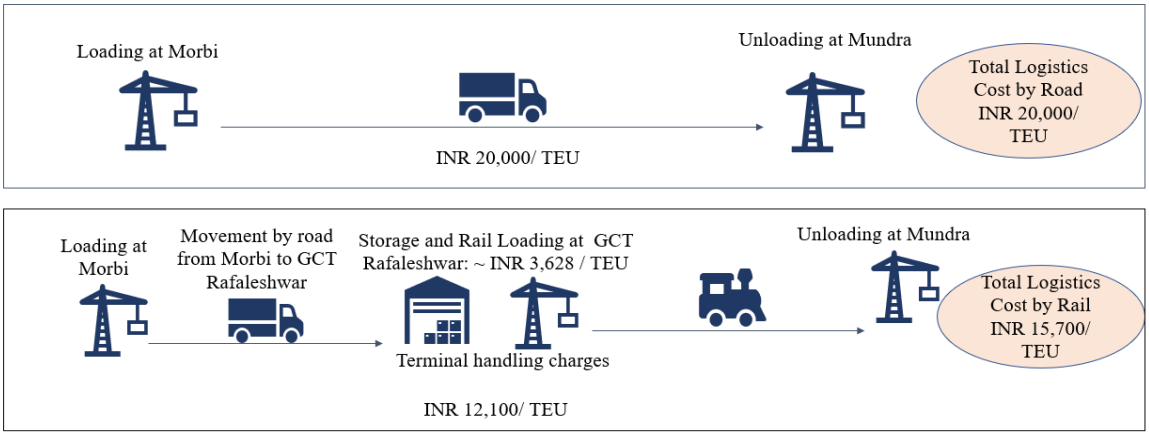
- To identify the suitability of rail logistics and container freight terminals in Morbi, a comparison of current road transport costs and potential transport costs via ICD on the rail was compared. The analysis is summarized below.

Container Export **Morbi to Mundra (Export tiles/ceramic-ware)**		
Rail Transport cost through ICD		Road Transport Cost from Morbi to Mundra
Rail Distance	218 Km	

<table>
<tr><td colspan="3">Container Export
Morbi to Mundra (Export tiles/ceramic-ware)</td></tr>
<tr><td colspan="2">Rail Transport cost through ICD</td><td>Road Transport Cost from Morbi to Mundra</td></tr>
<tr><td>Rail Haulage Charge (Loaded Container)</td><td>4873 ₹/TEU</td><td rowspan="4">Current Road Transport Cost, Morbi to Mundra (176 Km):
~18,000 to 20,000 ₹/TEU*</td></tr>
<tr><td>Rail Haulage Charge (Empty container)</td><td>2,767 ₹/TEU</td></tr>
<tr><td>CTO/ICD Mark-up on loaded container dispatch</td><td>~75%**</td></tr>
<tr><td>Total Cost from ICD (without ICD Terminal handling charges)</td><td>12,100 ₹/TEU</td></tr>
<tr><td>Estimated Terminal Handling charges</td><td>3,628# ₹/TEU</td><td rowspan="2">Logistics Cost savings resulting due to rail dispatch via proposed container terminal
~2,000 to 4,000+ ₹/TEU</td></tr>
<tr><td>The total cost of Rail transport</td><td>~15,700 ₹/TEU</td></tr>
<tr><td colspan="3">** - Estimated based on comparison of rail haulage and container rail transport charges of container terminals in Gujarat.</td></tr>
<tr><td colspan="3">#-Including Terminal Access Charges and Terminal Cost</td></tr>
<tr><td colspan="3">* - Based on inputs received from industries in Morbi</td></tr>
</table>

The above analysis confirms that the proposed rail terminal can generate transport cost savings of at least 2000 Rs per TEU for Tiles manufacturers of Morbi.

Figure 14: Logistics comparison between Road and Rail for Morbi Cluster

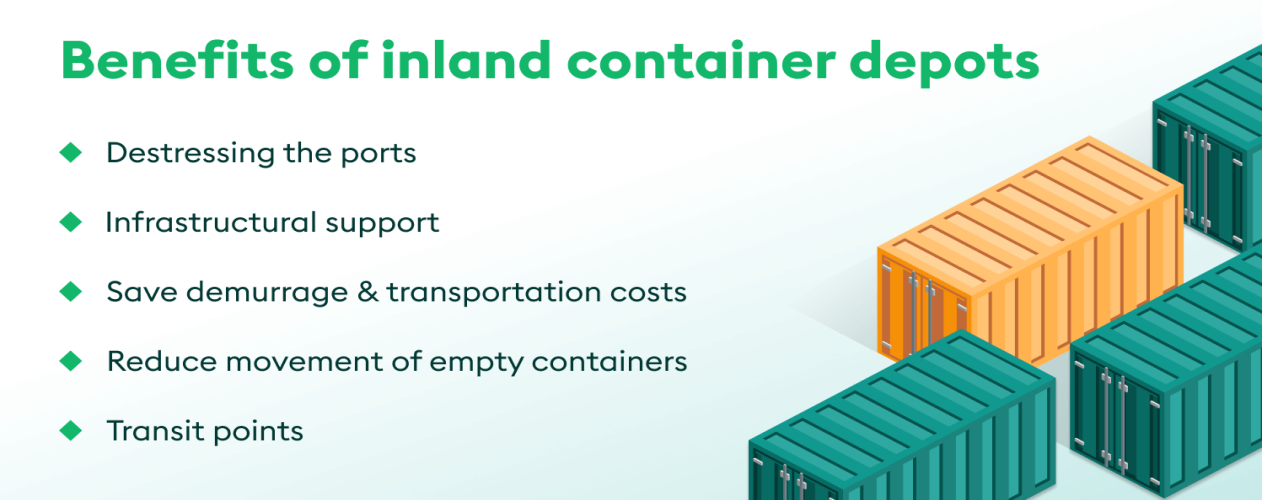


In line with National Logistics Policy Targets to reduce logistics cost and improve logistics performance index ranking

4. Write up on how the proposed project plans reduction of dwell time of containers in its premises.

Port congestion can cause delays which ultimately disrupt the entire supply chain. The more popular a port is, the more likely it will become congested due to the increase in container volume. One way of decongesting the ports is to use inland container depots. They can provide space for empty containers that otherwise clutter the main ports. Mundra port which handles majority of the EXIM cargo of Morbi cluster is quite significant port not only for Gujarat but also for India. With the prospects of growing economy, containerisation movement shall further increase and shall increase the congestion at Ports like Mundra & Kandla. Such Proposed Inland container depot shall reduce the transit and dwell time for the prominent ports.

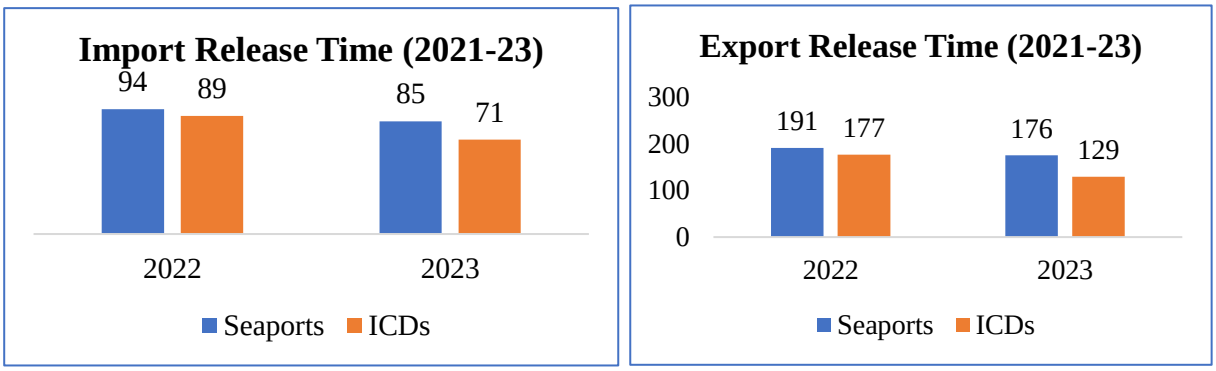
Figure 15: Benefits of Inland Container Deport



Source: Container Xchange

Freight Forwarders and shippers have to pay hefty charges for demurrage and detention charges due to congestion at Ports. With the availability of ICD, shippers can plan movement in efficient way and reduce chances of custom related hold up at the port.

Figure 16: Import and Export Release time for Customs (ICD &CFS)



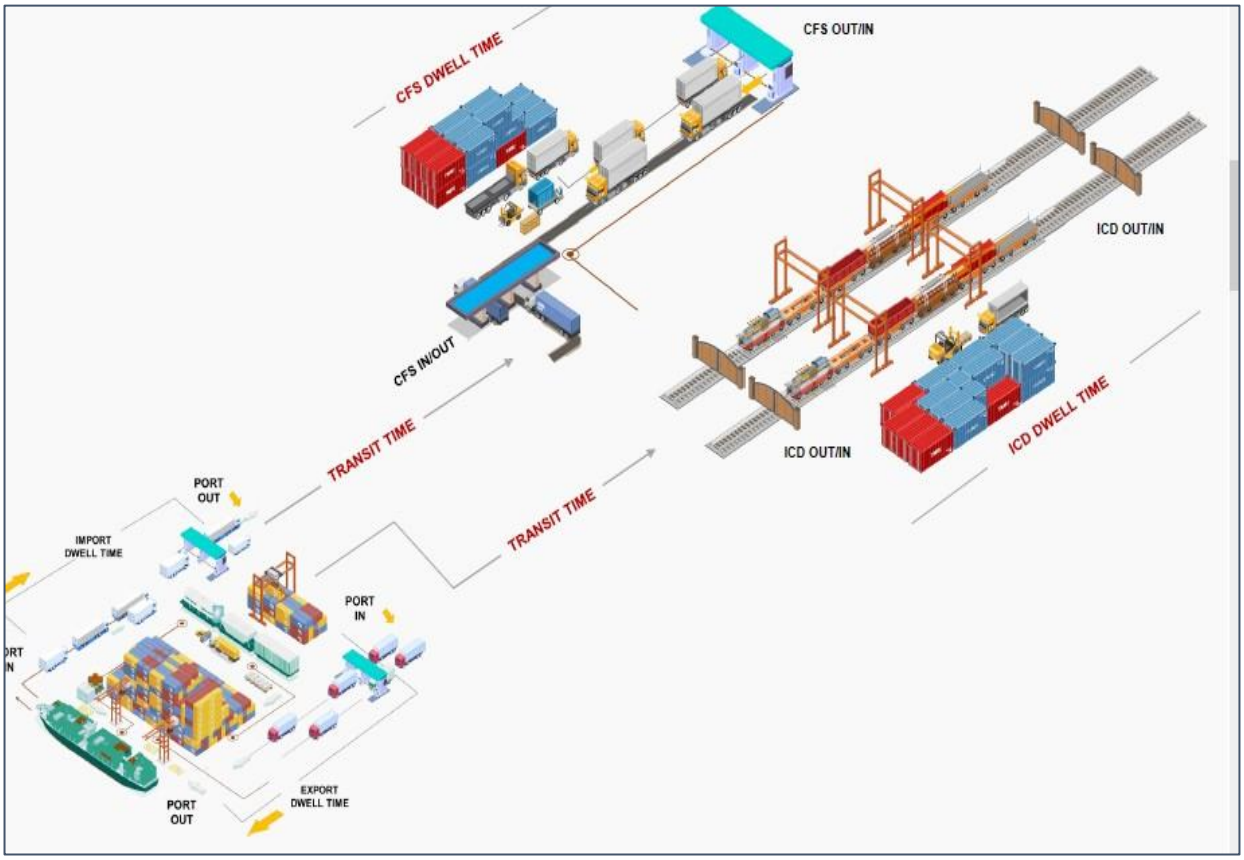
Source: CBIC

As per data released by CBIC published in National Time Release Study, 2023, it is evident that seaports are quite congested in comparison to ICD. With the growing demand, the congestion at the port shall further increase due to increase in traffic congestion. As per above data, Import Release time is 5 to 14 hours lesser in comparison to Seaports whereas export release time is 14 to 46 hours lesser for ICD in comparison to Seaports. Thus, to cater the future demand and for decongestion of the seaports, provision of ICD near Morbi shall facilitate smoothen logistics movement.

For container owners, the movement of empty containers has a substantial economic downside. Every year, it costs the shipping industry more than $20 billion. To reduce this, inland container depots provide consolidation facilities for LCL shipments in the hinterland and provide an affordable storage space for empty containers.

ICDs can function as major hubs for not only consolidating cargo but also for shipments via rail or road. So, the shipment that needs to be transported somewhere far from a port, ICDs can offer the right equipment and personnel to handle the cargo efficiently.

Figure 17: Schematic Diagram of Dwell Time for ICD and CFS

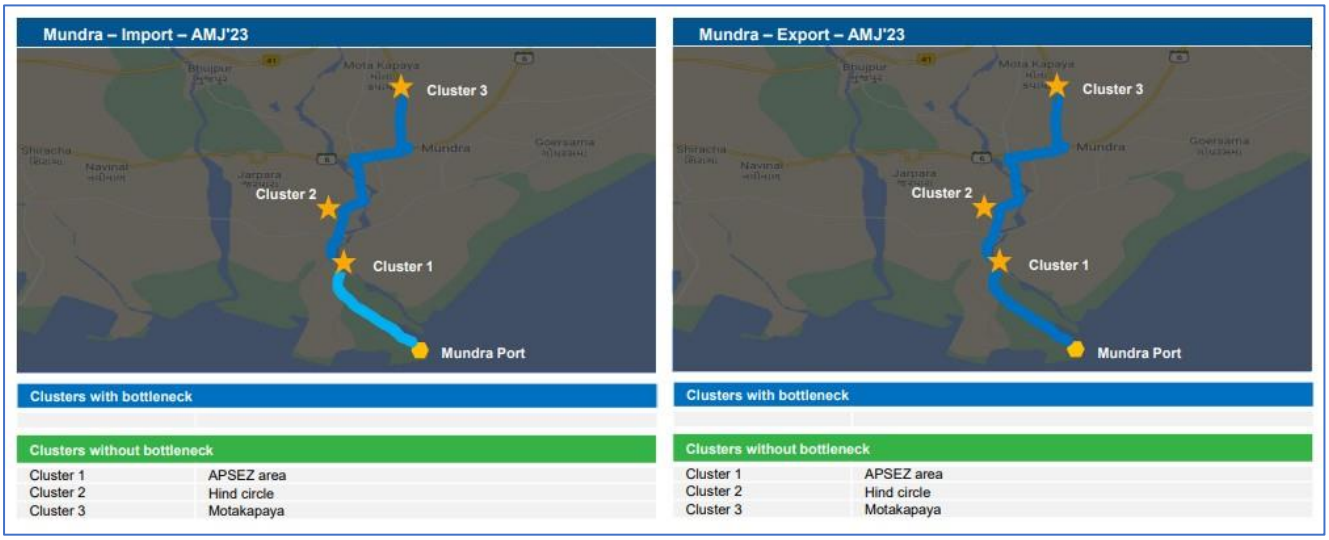


Source: LDB

Currently the movement of EXIM cargo from Morbi cluster to Mundra/ Kandla are carried out only by road. With the proposed ICD, the rail share movement shall increase and thus transit time shall reduce drastically. Further due to road movement, there is adverse impact on the overall dwell

time of EXIM cargo at the terminal/ ports thereby increasing the logistics cost. Rail linked ICD is the fastest and most effective way of transporting cargo to / from ports to hinterland.

Figure 18: Congestion at Road Benefits of Inland Container Deport



Source: LDB

5. Stakeholder analysis

As a part of the study, G-RIDE interacted with various stakeholders across the logistics ecosystem to understand the perception and the requirements of Inland Container Depot near Morbi. G-RIDE team had focussed discussion with prominent 15 Players across the value chain. Primary interaction was categorized into following groups:

- Exporters (Large players of Morbi Ceramic units)
- Importers (Paper Industry near Morbi)
- Freight Forwarders/ Container Train Operator
- Rajkot Division, Western Railway
- Jamnagar Brass Association

Key Important Queries discussed during Focused Group Interview with stakeholders:

A. Industrial Association/ Exporters/ Importers/ Jamnagar Brass Association

a) What is the current production of the unit/ cluster?
b) Current Product Mix
c) Current bifurcation between exports and domestic production
d) Raw materials imported and quantity
e) Port of call for exports and imports
f) Mode of Freight movement
g) Total Logistics Cost for EXIM cargo
h) Total Logistics Cost for domestic cargo
i) Challenges in current freight movement
j) Expected industrial growth with the current scenario
k) Global Competitiveness of Morbi Cluster
l) Major Competitors / Threat to the industries
m) Incentives / Government support expected

B. Freight Forwarders/ Container Train Operator

a) Transit Time for movement of containers via Road
b) Challenges in handling of container at Port Side
c) Overview on congestion for the approach road connecting Mundra/ Kandla Port
d) Requirement of Rail linked terminal
e) How the proposed rail linked GCT Terminal shall impact mitigate the challenges
f) Requirement of Custom facility adjacent to Morbi Cluster
g) Incentives / Government support expected
h) Prospects of connecting Morbi with Rail Linked terminal
i) Facilities expected by CTO player to boost traffic growth and for smooth operation.
j) Challenges in handling container train operations.

C. Rajkot Division, Western Railway

a) Beneficial of Gati Shakti Multi-Modal Cargo Terminal Policy
b) Support to be provided by Western Railway for faster execution of the Project

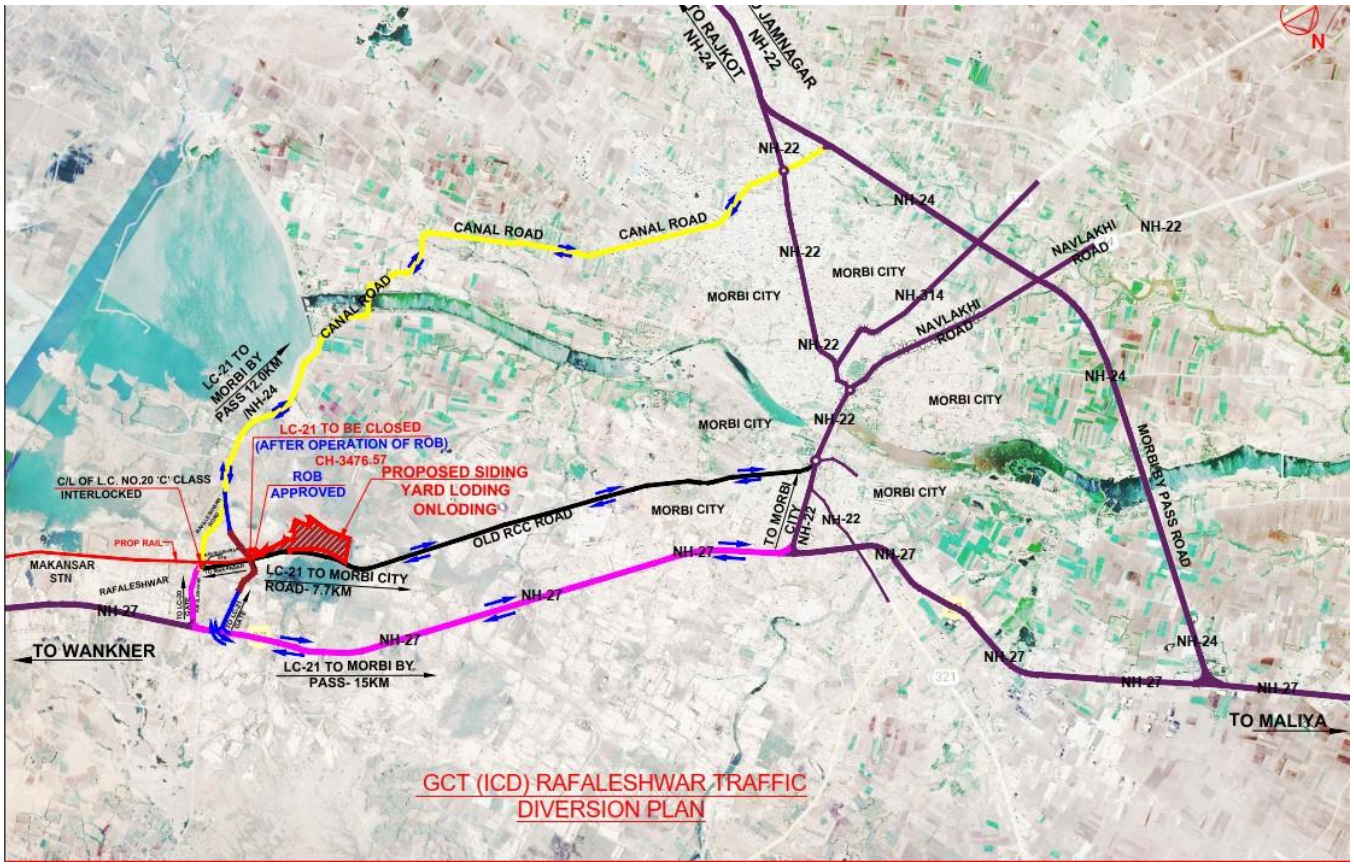
6. Plan for traffic management and decongestion of approach roads for ICD/CFS/AFS.

The Traffic Management Plan is required to ensure traffic movements are optimized in a safe, controlled, and efficient manner across the proposed site as a whole. Traffic Management refers to the combination of measures that serve to preserve traffic capacity and improve the security, safety and reliability of the overall road transport system. The emergence of ITS in the field of traffic control has enabled a number of new concepts to be applied in the framework of innovative operational systems. In order to achieve overall balance of traffic between routes that serve a common set of destinations involves balancing demand through signal control and pro-active use of driver information, coupled with traffic diversions in some cases.

ICD Rafaleshwar connected to National Highways & State Highways which creates an operational synergy equipped with the modern infrastructure.

- For loading/unloading of container, truckers shall connect to National Highway NH-27 and NH-24 lying on the North & West of the proposed ICD respectively.
- NH-27 will be connected through LC (Level crossing gate 21) towards west direction of the ICD. Further this NH-27 will connect to Morbi in north direction and towards south direction for connectivity to Maliya. For smoother traffic movement without any halt, it is proposed to construct ROB at level crossing gate 21 for which Government of Gujarat issued in-principal approval.
- Morbi city is 7.7 Km far away from proposed ICD towards north direction through old RCC road and 8.7 Km from LC-21. Further proposed ICD to crossing of NH-24 and NH-27 is 15Km far away.
- A canal road of 7.5m is near to the proposed ICD towards west direction and this road connected to NH-22 and NH-24. Further this canal road in west direction connects to secondary hinterland like Jamnagar and Rajkot.
- The traffic from both highways NH-27 and NH-24 will connect to Jamnagar-Amritsar proposed expressway.
- For alternate route LC gate No.20 also connecting to GCT in case of congestion at LC 21 road with NH-27.
- In view of increasing of traffic present road infrastructure can be developed by Six or eight lanes according to requirement.

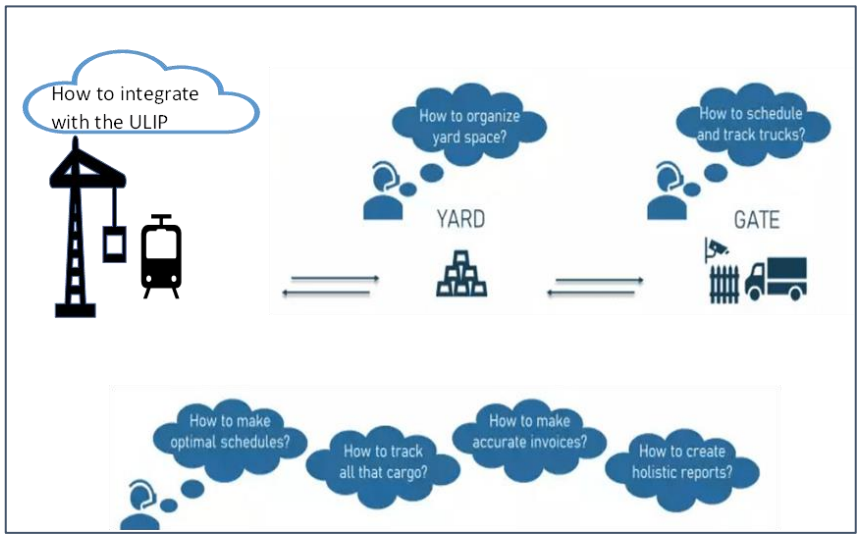
Figure 19: Traffic Management Plan for Approach Roads



Source: G-RIDE

In order to manage the movement of trucks efficiently, adoption of system like Terminal Operating System is proposed to be installed at the proposed ICD. The system is a key part of the supply chain and primarily aims to control the movement and storage of various types of cargo in and around an ICD. TOS help coordinate all the terminal logistics elements (including Rail, trucks, cranes, trains, and Terminal staff), track cargo movement, optimize asset usage, and analyse data to support decision-making. The TOS contains all the information for the inward and outward freight movement and can automatically coordinate with the available equipment, staff, and space according to the cargo requirements and type of operation.

Figure 20: Cargo Terminal Challenges



Source: G-RIDE Analysis, Primary Interaction

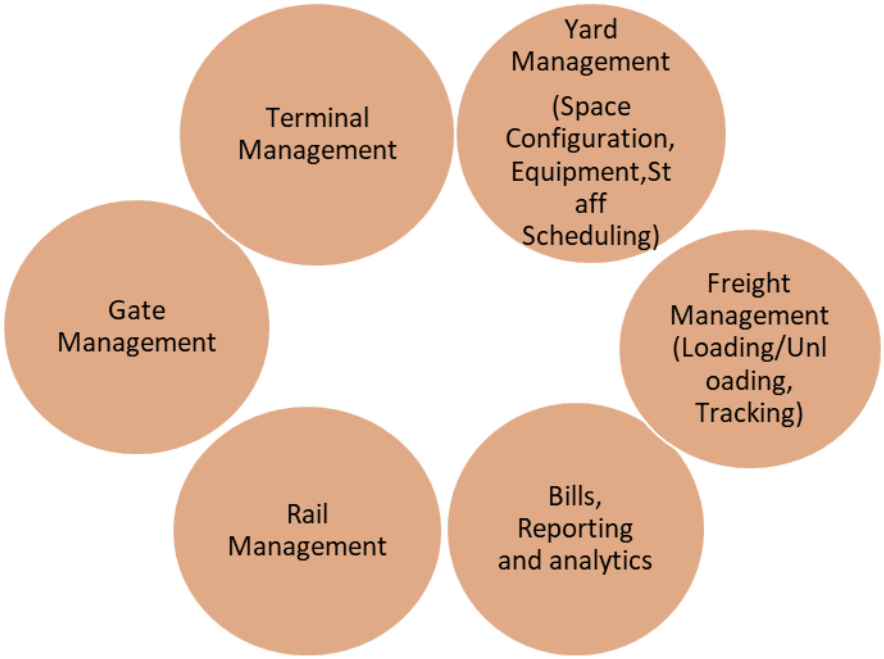
Another important terminal workflow is gate management. Incoming and outgoing vehicles have to be carefully monitored. Access permission can only be granted to authorized vehicles and according to the associated cargo details, which then has to be verified at the gate. But performing all the checks manually is too lengthy and error prone. And when hundreds of trucks come in and out to deliver or pick up freight, it can easily cause bottlenecks, so this flow has to be properly arranged.

A gate management module helps terminal operators coordinate and monitor all the incoming and outgoing vehicles. The vehicle booking feature allows carriers to choose a convenient appointment slot as well as register vehicle, driver, and freight details. So, upon arrival, all the required information is already in the system and the verification process is as fast and easy as can be. Besides, a well-built, automated gate management system ensures ISPS (International Ship and Port Facility Security Code) compliance mandatory for ports.

Automating gate operations typically involves creating an infrastructure of interconnected elements that include:

a) Self Service Driver Kiosks: For paperless self-verification process and access code entry.
b) OCR Cameras: to identify and register vehicles, license/number plates, containers, and seals.
c) RFID scanners: to identify the passing cargo and assist with inventory management.
d) Automated security barriers – to control vehicle access.
e) Intercom devices – to enable communication with terminal staff.
f) Information displays – to receive instructions and other important information; and so on.

Figure 21: Terminal Operating System Key Modules



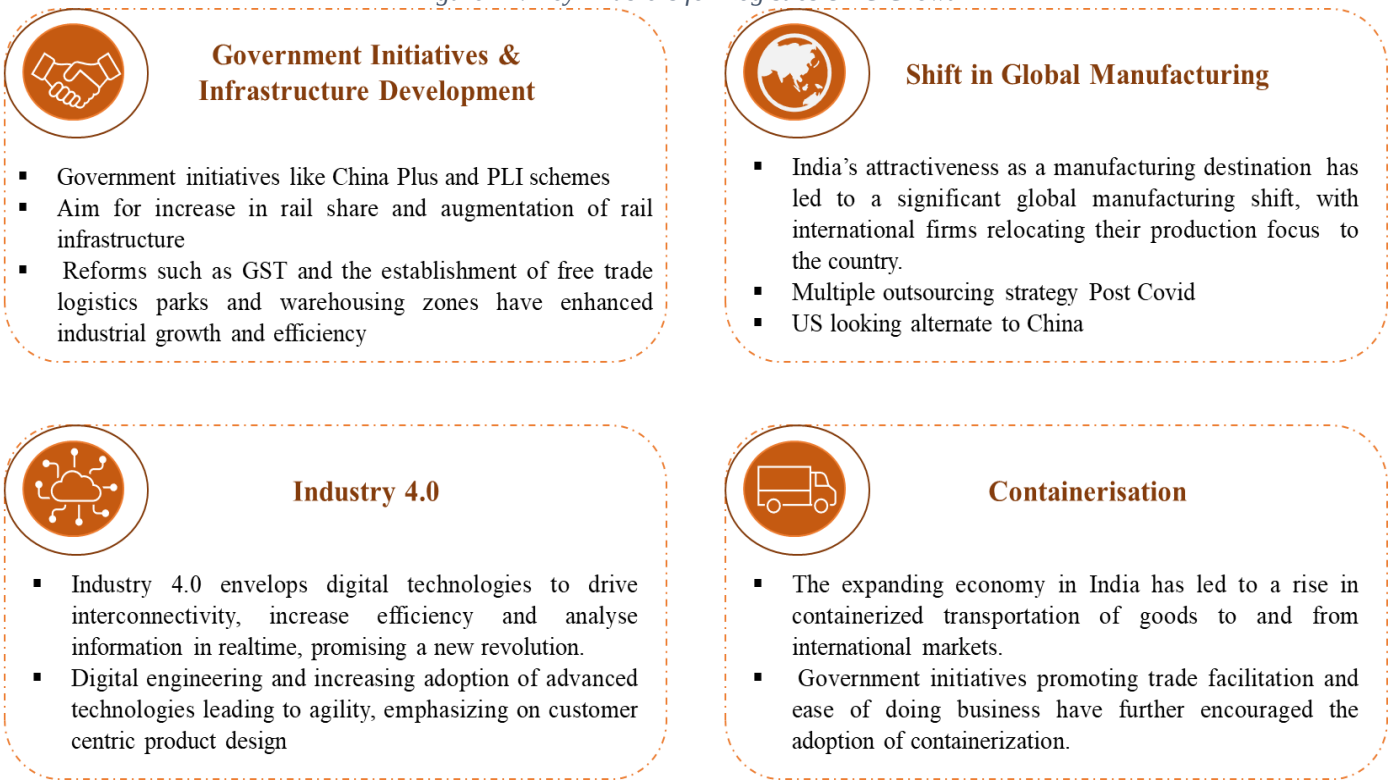
Source: Altexsoft, Primary Interactions

7. Overview of Business Landscape

The logistics industry in India is witnessing significant growth and is projected to reach USD 380 billion by 2025, growing at a healthy rate of 10%–12% year-on-year. The logistics industry serves as the backbone of numerous industries and plays a vital role in ensuring the efficient movement of products and services domestically and in global markets. Logistics encompasses a wide range of activities, including transportation, storage, packaging, inventory management, order processing and distribution, ensuring a smooth flow of goods and services from the point of origin to the final destination.

As per data maintained by CBEC, it is noted that Gujarat possess only 11 ICD as of December 2022, which is quite insignificant considering the volumes and industrial hub to be created within the Gujarat state in next two decades. Gujarat contributes 8.3% of India's GDP (at Current Prices), 18% to industrial output and possesses around 33% share in India's total exports in value terms. Gujarat is determined to play a major role in making the country a $ 5 Trillion economy and the state aims to become a $1Trillion economy by 2030. Thus, to cater such larger economy, it is crucial to enable infrastructure for smooth facilitation of the EXIM cargo movement. Following are the key drivers that shall propel the logistic sector's growth story:

Figure 22: Key Enablers for Logistics & IC Growth



Source: IBEF, Vibrant Gujarat 2024, G-RIDE Analysis,

National Logistics Policy (NLP) launched in September 2022 after extensive consultations, the NLP considers both the supply and demand aspects of the sector. It is a policy that emphasises process re-engineering, digitisation, and multi-modal transport. The aim of this policy is to address the high logistics cost, which negatively affects the competitiveness of domestic goods in the global market. It aims to reduce the current logistics cost to be close to the global benchmark.

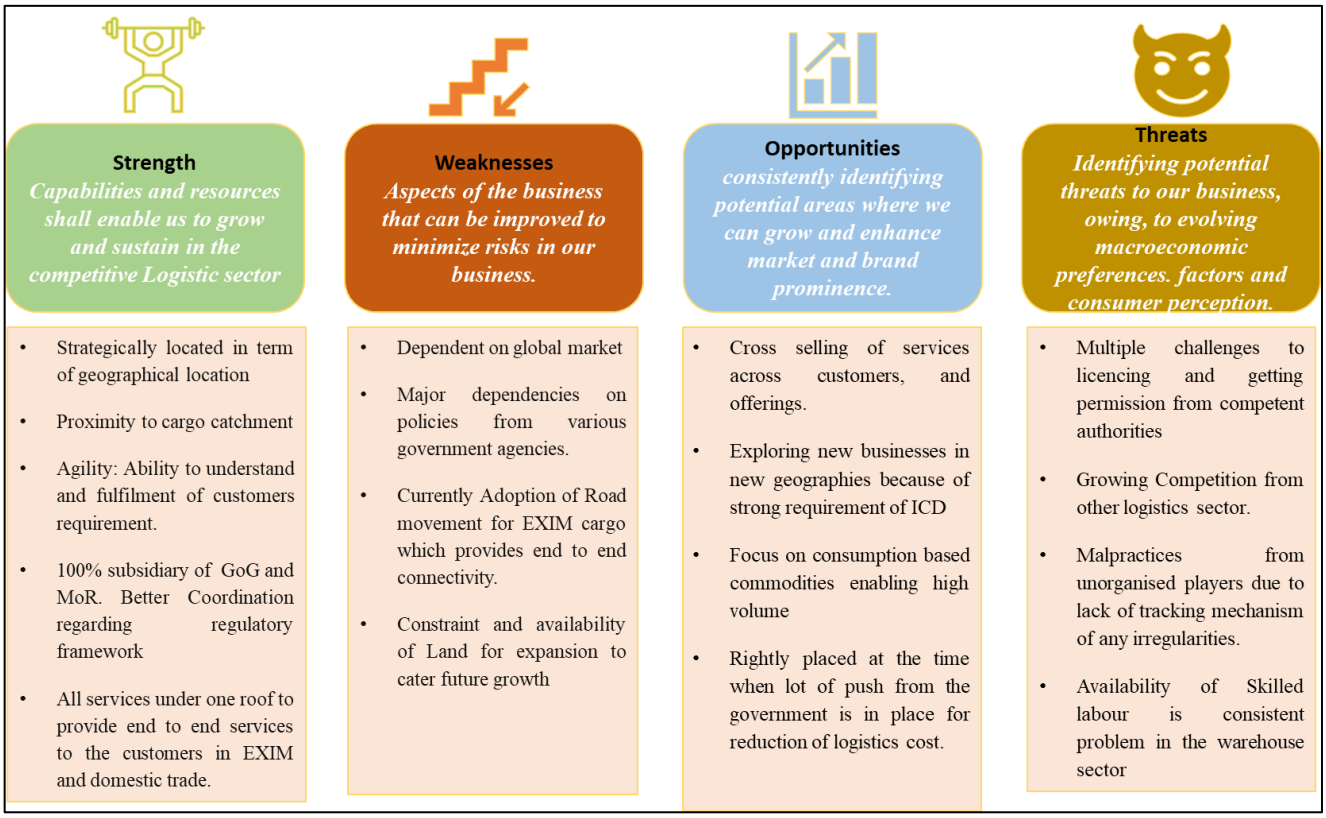
The policy talks about data-driven decision support mechanism for an efficient logistics ecosystem. It acts as an umbrella offering under which various initiatives are planned. The NLP introduces the Comprehensive Logistics Action Plan (CLAP), which encompasses eight focal areas ranging from digital integration to the facilitation of logistics park development. The key initiatives discussed align with the principles of the PM Gati Shakti (PMGS) National Master Plan (NMP)14, emphasising the importance of convergence and collective efforts for success. The PMGS aims to eliminate barriers between different departments and ministries at the state and union territory levels by integrating relevant data into a National Master Plan and respective State Master Plans (portals). A similar framework has been considered for logistics planning, recognising the federal structure of administration and the need to adopt an approach that encompasses both the unit and the whole. Therefore, state and city-level logistics plans play a vital role in enhancing the country's logistics infrastructure.

Figure 23: Comprehensive Logistics Action Plan Framework

Source: National Logistics Policy, Report prepared by FICCI

Due to fierce competition and surging interests in the logistics sector, it is crucial to assesses SWOT analysis and PESTLE Analysis to understand the moat and going concern of the project.

Figure 24: SWOT Analysis



Source: G-RIDE Analysis

Figure 25: Porter Fiver Forces applicable for ICD Rafaleshwar

Source: G-RIDE Analysis

8. Traffic Assessment

The ceramic cluster of Morbi is not only a national hub of Ceramic tiles but a renowned global center for ceramic production. Morbi Ceramic Association is the local industrial body, which represents the ceramic manufacturers of the Morbi region. Based on the inputs received from Morbi Ceramic Association and other inputs from the industry, G-RIDE has derived the current potential of potential containerised cargo volumes that can be catered at the proposed terminal.

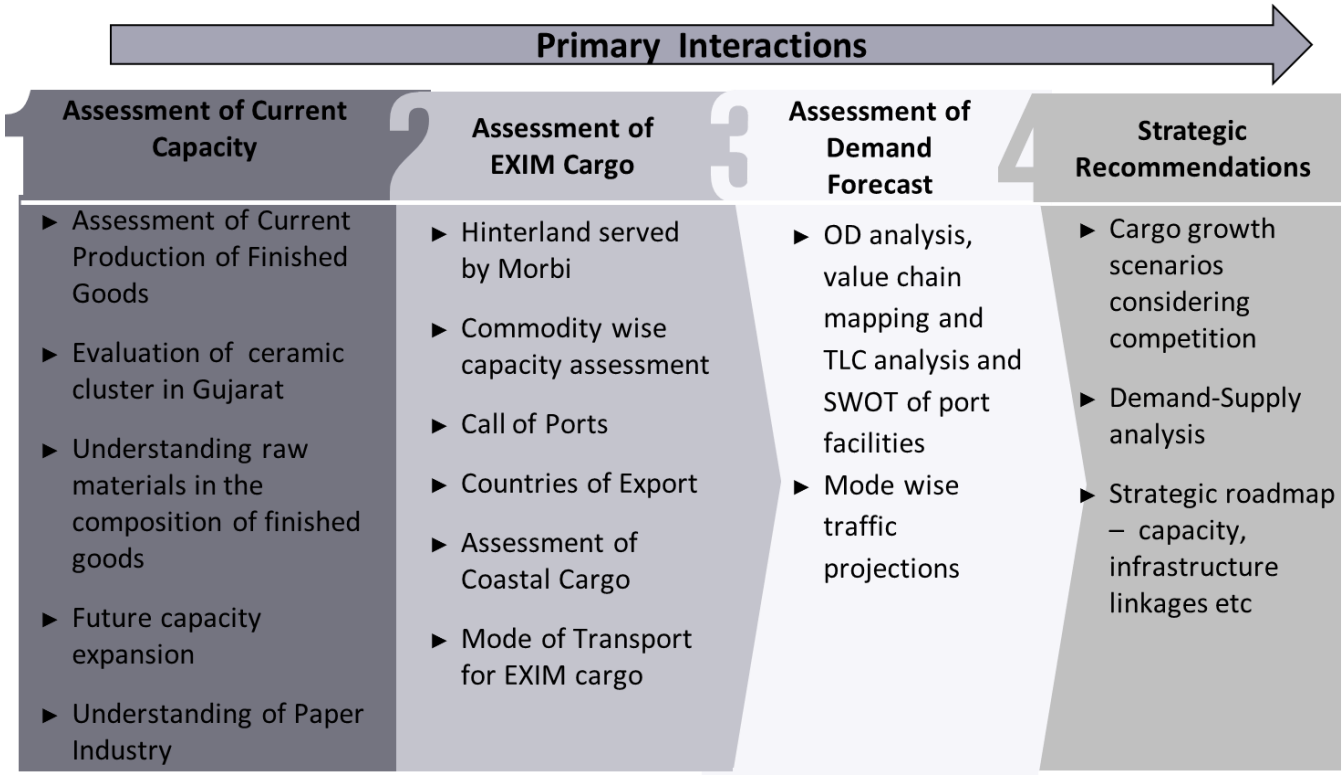
The proposed ICD located in the Jambudiya and Jodhapar Nadi village of Morbi Taluka of Gujarat. It shall lie on Wankaner- Morbi rail line section in Rajkot division of Western Railway. As mentioned in above chapters the proposed ICD terminal shall be in the vicinity of the Ceramic cluster of Morbi region which shall be the main ignition for the operation of the proposed container terminal. Due to the growing aspects of the ceramic industry, the proposed ICD shall act as catalyst for the industry growth and for the export oriented ceramic products.

Figure 26: Rail Connectivity of the Proposed ICD at Rafaleshwar

Source: G-RIDE analysis

Following methodology have been considered for the assessment of traffic forecast for next 25 years. Since the proposed ICD shall execute Gati Shakti Multimodal Cargo Terminal Agreement with Western Railway, the tenor for traffic forecast have been envisaged same duration.

Figure 27: Methodology for Traffic Assessment



Source: G-RIDE analysis

As discussed in previous chapter, primary interactions have been carried out with 15 diverse stakeholders to assess traffic for the proposed ICD.

Table 1: Approach for traffic Assessment

Step No.	Activity	Rationale
Step-1	As-Is Status	Morbi's Current production capacity is pegged at ~170,000 to 200,000 TEUs per month, which translates to ~2,220,000 TEUs per annum
Step-2	Current Dispatch profile and attractiveness of rail	The assessment of the current dispatch profile confirms that more than 210,000 TEUs of finished goods are dispatched annually from Morbi to Mundra currently (by road) and around 109,000 TEUs from Morbi serve distant markets in Karnataka, Maharashtra, Haryana, Punjab, and Telangana – currently through road which can be easily and efficiently served through rail. In addition to Finished products, Paper is one of the key ingredients of the tiles industry – primarily for packaging purposes. The Export and Import of paper for Morbi is primarily handled by Mundra and these volumes are currently pegged at ~49,200 TEUs per annum
Step-3	Rail share	Based on the Origin-Destination wise inputs received from Ceramic Manufacturer's association, and synthesis of Step-1 and Step-2, Railways has

Step No.	Activity	Rationale
		the potential to cater to ~17% of total containerised cargo originating from/destined to Morbi. This leads to a potential volume of ~368,400 TEUs per annum.
Step-4	Forecast Demand	Based on forecasted upcoming capacity in Morbi, Ceramic Manufacturers Association has shared estimates of additional capacities in the Morbi cluster in TEUs as: 2024-25 – 120,000 to 130,000 TEUs 2026-27 – 100,000 to 110,000 TEUs 2029-30 – 125,000 to 140,000 TEUs Synthesis of this data reveals that by 2030, approximately 372,000 TEUs of new production capacity are likely to be added in the Morbi Ceramic cluster.
Step-5	Traffic projections based on the Market share of the Proposed terminal	Conservative estimates indicate that in the first year of operation, the proposed terminal can attract at least 40% of the rail-able container volumes. The proposed terminal will be functional by 2024-25 and with an installed capacity of Morbi industry to grow to ~2,354,500 TEUs by 2024-25; the potential volume that the proposed ICD will handle is: 2,354,500 x 17% (potential rail share) x 40% (ICD's share) = 1,56,288 TEUs per year = 1,56,288 x 75%[3] (Operations adjustment factor) TEUs per year = 3.57 Rakes per day (Total TEUs / 365 days / 90 TEUs per rake) Owing to the proximity to industrial cluster, the attractiveness of rail terminal will improve – which will translate to increased market share of the Morbi terminal from 40% in FY25 to 55% by FY28

The inputs from the stakeholders were used to derive the forecasted demand and revenue for the proposed rail-linked container terminal. Conservative approach adopted for determining the current and forecast demand of containers at the proposed facility. Based on the above analysis, the potential traffic for the proposed terminal is derived as follows:

[3] The Terminal is expected to commence operations from July 2024 so for first year of operations only 75% of this volume will be catered by ICD

Year	2025-26	2027-28	2029-30	2031-32	2033-34
Market share of ICD Rafaleshwar	30%	40%	50%	55%	55%*
Traffic (TEUs)	1,10,993	1,47,991	1,95,360	2,24,480	2,36,573
Traffic (Rakes/Day)	**3.38**	**4.50**	**5.94**	**6.83**	**7.20**
Notes	*: Market share to remain constant; however overall market will grow with upcoming industrial Capacity; hence higher volumes. Further post F 2034, the rail capacity of the ICD shall reach maximum thus no further growth considered for the project				

The Consolidated traffic projections considering the overall traffic assessment from various sources such as captive traffic, induced traffic and competitive traffic have been summed up to arrive at a consolidated traffic projections for the project and to arrive at number of rakes per day. Consultant further has performed an analysis based on sensitivity assessment to arrive at consolidated traffic.

Table 2:Base Scenarios Traffic forecast

Base Scenario Traffic Forecast (in TEU's)

Year	FY 25	FY 35	FY 45	FY 55	FY 60
Total Production (Million TEU)	23,95,380	37,24,918	40,12,795	50,16,925	54,04,653
Total Ceramic Product Exports (TEUs) Forecast	2,39,538	4,46,990	5,18,750	6,02,031	6,48,558
Paper Export (In TEU's)	26,400	32,825	32,825	32,825	32,825
Paper Import (In TEU's)	22,800	28,349	34,557	42,125	46,509
Total EXIM Cargo (In TEU's)	**2,88,738**	**5,08,164**	**5,86,132**	**6,76,981**	**7,27,892**
Rail Volume to be catered (Considering rail share to increase to 45%) in TEU's	1,29,932	2,28,674	2,63,759	3,04,641	3,27,551

Rail Volume to be catered by ICD Morbi (EXIM Cargo) in TEU's	**71,463**	**1,25,771**	**1,45,067**	**1,67,553**	**1,80,153**
Total Traffic to be catered by ICD Morbi (EXIM + Domestic) in TEU's	**1,10,993**	**1,95,360**	**2,36,573***	**2,36,573***	**2,36,573***

Source: G-RIDE Analysis

Note: ICD reaching to the maximum optimum capacity. Further expansion required to be planned

Table 3:Pessimistic Scenario Traffic Forecast with 20% downside in EXIM and domestic traffic (In TEU's)

Year	FY 25	FY 35	FY 45	FY 55	FY 60
Total Production (Million TEU)	19,16,304	29,79,934	32,10,236	40,13,540	43,23,722
Total Ceramic Product Exports (TEUs) Forecast	1,91,630	3,57,592	4,15,000	4,81,625	5,18,846
Paper Export (In TEU's)	21,120	26,260	26,260	26,260	26,260
Paper Import (In TEU's)	18,240	22,679	27,646	33,700	37,207
Total EXIM Cargo (In TEU's)	**2,30,990**	**4,06,531**	**4,68,906**	**5,41,585**	**5,82,314**
Rail Volume to be catered (Considering rail share to increase to 45%) in TEU's	1,03,946	1,82,939	2,11,008	2,43,713	2,62,041
Rail Volume to be catered by ICD Morbi (EXIM Cargo) in TEU's	**57,170**	**1,00,616**	**1,16,054**	**1,34,042**	**1,44,123**
Total Traffic to be catered by ICD Morbi (EXIM + Domestic) in TEU's	**97,128**	**1,70,946**	**2,01,220**	**2,19,209**	**2,29,289**

Source: G-RIDE Analysis

Table 4:Optimistic Scenario Traffic Forecast with 20% downside in EXIM and domestic traffic (In TEU's)

Year	FY 25	FY 35	FY 45	FY 55	FY 60
Total Production (Million TEU)	28,74,456	44,69,902	48,15,354	60,20,310	64,85,584
Total Ceramic Product Exports (TEUs) Forecast	2,87,446	5,36,388	6,22,500	7,22,437	7,78,270
Paper Export (In TEU's)	31,680	39,390	39,390	39,390	39,390
Paper Import (In TEU's)	27,360	34,019	41,468	50,550	55,811
Total EXIM Cargo (In TEU's)	**3,46,486**	**6,09,797**	**7,03,358**	**8,12,377**	**8,73,470**
Rail Volume to be catered (Considering rail share to increase to 45%) in TEU's	1,55,919	2,74,409	3,16,511	3,65,570	3,93,062
Rail Volume to be catered by ICD Morbi (EXIM Cargo) in TEU's	**85,755**	**1,50,925**	**1,74,081**	**2,01,063**	**2,16,184**
Total Traffic to be catered by ICD Morbi (EXIM + Domestic) in TEU's	**1,45,691**	**2,36,573**	**2,36,573**	**2,36,573**	**2,36,573**

Source: G-RIDE Analysis

Note: ICD reaching to the maximum optimum capacity. Further expansion required to be planned

It is observed from the above scenarios, even projection of 20% upside or downside won't have significant impact to the proposed ICD Rafaleshwar due to constraint in the capacity. It is evident from the above that traffic is quite significant even in the presence of any competitive logistics parks/ ICD in the hinterland. Thus, it is pertinent to implement such crucial project with custom facility to increase the rail share and cater the growing industry demand.

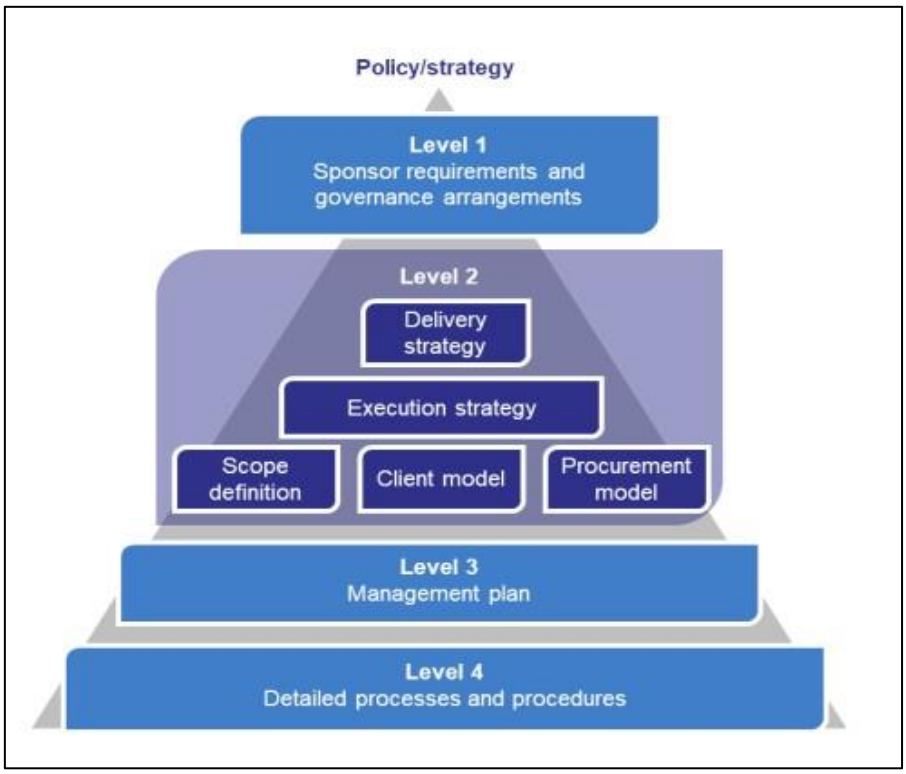
9. Project Execution/Implementation strategy Infrastructure Execution Strategy

9.1. Infrastructure Execution Strategy Plan

The execution strategy sets out how the project is organised to fulfil the sponsor's requirements, adhere to the governance framework, and manage risk. It sets out the overall approach from which the client team's management plan and subsidiary processes and procedures can be cascaded.

The execution strategy is part of a hierarchy of documents, as shown in this diagram:

Figure 28: Implementation Framework Strategy



Source: Government's Project Initiation Routemap, G-RIDE Analysis

It is first important to understand what the project delivery strategy is, then it can be understood how the execution strategy relates to it. Execution Strategy sets out the key programme milestones including the transition points and handover through the project's life. An effective execution strategy provides clear direction for the project team by making sure the delivery activities are aligned with the project objectives, adhere to the governance framework and appropriately manage risk.

Three components of effective execution strategy for Infrastructure Projects:

Pillar 1: Alignment

Ensuring that management strategies and plans are:
- aligned with the overarching rationale and governance framework, and
- based on an assessment of risk and opportunity.

Pillar 2: Performance

- Providing a clear link between the rationale and the approach to managing performance, target setting and measurement.

Pillar 3: Delivery

- Clarifying the organisational responsibilities for your delivery approach and identifying the required capabilities.
- Making sure your management strategies and plans are well thought out and complete.

The objective of the strategic infrastructure planning agencies and processes examined in this report is to enhance the quality, affordability and sustainability of infrastructure services.

Strategic infrastructure planning should consider options that address both the supply of and demand for infrastructure services. It necessarily has a long-term focus, typically reflecting a minimum 10–15-year time horizon and, in some cases, extending as far as 30 or 40 years. It covers both the policy framework governing infrastructure development and operation and the identification and prioritisation of investments. Developing a more strategic approach to planning usually involves significant reform of processes for project identification, assessment and appraisal and ensuring that they are applied consistently. An important aim of strategic infrastructure plans (SIPs) is to build consensus around the goals that infrastructure investment and operation are intended to achieve and to identify evidence-based strategies to achieve them.

Proposed ICD Rafaleshwar infrastructure aims to implement strategic investment planning with a focus on ensuring sound policy frameworks and associated regulatory strategies to underpin the efficient private provision of infrastructure services. For the timely execution of ICD Rafaleshwar in compliance with applicable laws phase wise planning shall be approached:

Land & Site Development Plan

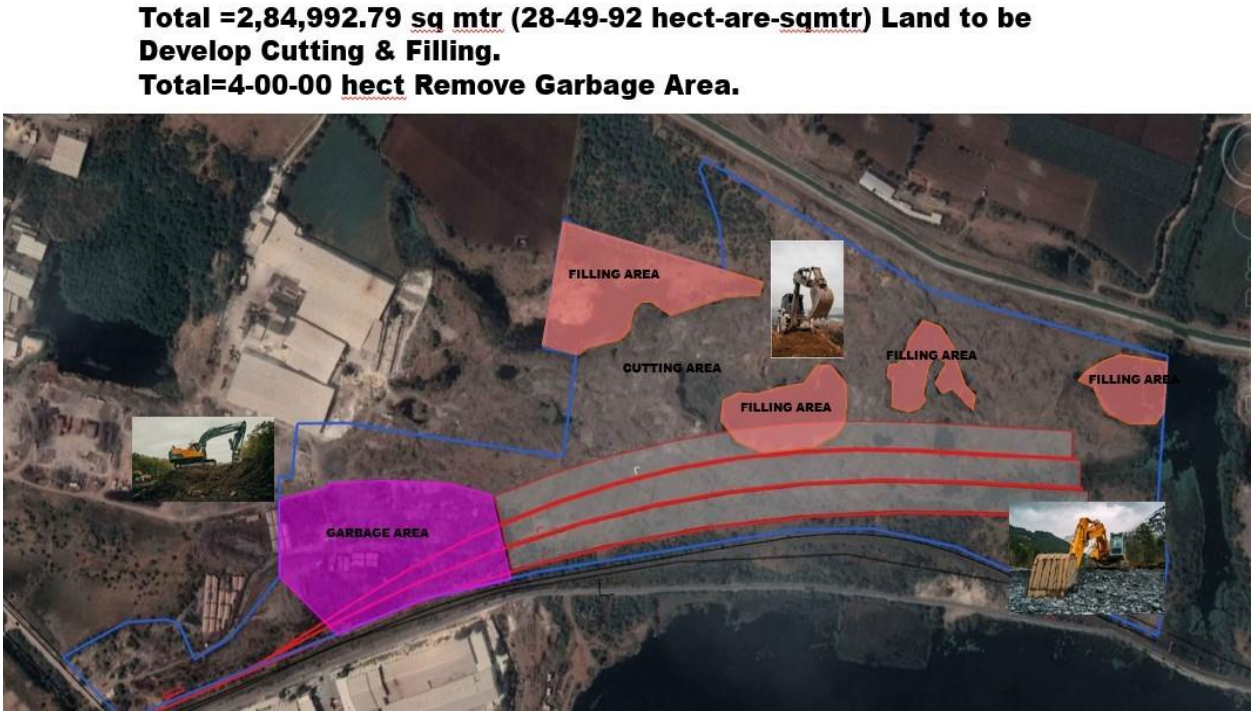
Land for ICD Rafaleshwar is to be acquired and the same shall be funded as grant contribution from the Government of Gujarat. The land (approx. 428109 sqm.) shall be acquired by the Project SPV, 100% subsidiary of Government of Gujarat.

The Government land (Sarkari Padtar) is located in the vicinity of the ceramic industry. Owing to the scale of industrial development in the vicinity, the proposed land has been heavily excavated

for minerals and is an extremely undulated parcel of the land. The identified land parcel is in the Morbi district and falls between Jambodiya and Jodhpar Nadi Village.

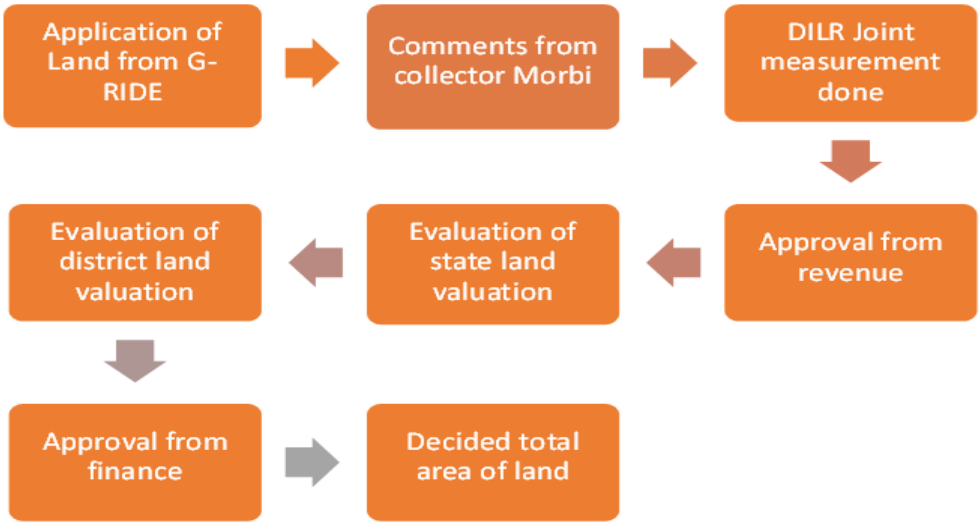
The North-West Corner of the proposed site comprises a lake that has formed over a period of time due to mining and the natural profile of being a low-lying area. The drain of this lake merges with Machu River 5 Km downstream. The elevation at the proposed site is 61 m and the elevation at Machu River is 39 m. There is a 22m drop in elevation over a distance of 5 Km. Thus, the land site requires cutting and filling while preparing the land for developing any project in the proposed site.

Figure 29: Land Site Development Plan



Source: G-RIDE Analysis

G-RIDE on behalf of Project SPV have initiated land process. Following steps have been undertaken to initiate the assessment and acquisition of the land:



Execution Phase:

Project Management Execution Phase is the most critical stage in life cycle as it requires careful project planning and management to ensure all tasks are completed on time, within budget and with quality standards maintained throughout. It involves planning, organizing, allocating resources, implementing the project, and monitoring and evaluating progress to ensure successful completion. Following activities have been planned for the ICD Rafaleshwar:

- Cleaning and grabbing of the ICD yard and related areas.
- Cutting/Filling wherever require
- Construction of ICD Siding including but not limited to buildings for operating engineering, mechanical, electrical departments etc.
- Construction of loading and unloading platforms including development of stacking area for the containers.
- Deploying machineries using for loading and unloading of the containers.
- For proper functioning of yard electrical lighting arrangements will be made by GRIDE.
- For proper functioning of loading unloading operation in yard, entire system will be OHE (Over Head Equipment) Zone except Loading and unloading area.
- All the electrical crossings will be underground for ICD.
- 1*12000 slope will be maintained at sight as height is 5mtr and it will disrupt the operations.
- 4 hectare of garbage area will be removed and shifting to new garbage area decided as per under approval.
- Cutting of land by Pok-Land machine as filling of land by trucks and JCB's as require.

- 3 platform will get establish of the length 900m as per rail level for loading and unloading of wagons.
- Retained wall of 1100mtr as well as compound wall construct to mitigate the technical as well as security issues.
- Drainage system to be establish as per the standard.
- Road connectivity inside the ICD Rafaleshwar.
- Proper Fencing around the ICD for security purpose.
- For the smoother execution of the project, Primavera shall be used which shall assist the stakeholders for timely management of the project. Primavera is helpful based on engineering perspective for creating strategies, controlled the delay of project and determines the optimum use of resources. Primavera is used to complete the project within specified time and cost. It is the application of skills, tools and techniques to project activities in order to fulfil the demand of the owner. Primavera program is used to scheduling, controlling, and estimating all types of projects.
- Steps involved in monitoring and control the project:
- Make schedule: -To make a schedule for any project, first of all collect data available for the project. Subsequently the following steps can be followed in Primavera.
- Enterprise project structure (EPS): -Make the structure of the company with its branches, which is executing the project. This is known as Enterprise project structure (EPS).
- Organizational breakdown structure (OBS): - After the EPS, OBS is made which is a hierarchical shape structure, that shows the persons responsible for the projects in the enterprise.
- Create a new project: - A project is a collection of activities and associated information that constitutes a plan for creating a product or service. The project is made under the respective divisions in Enterprise Project Structure. And allocate the person in charge from Organization Breakdown Structure to it. Planned start and must finish dates can be given to project. The project is allocating a calendar which can be global, resource or project calendar.
- Work breakdown structure (WBS): - WBS is a hierarchical structure of work that must be able to complete a project. Each project has its own WBS hierarchical structure. Each WBS element may include more detailed WBS levels, activities, or both
- Determining activities: - Activities are the fundamental work elements of a project and, are the smallest part of a project. An activity has mainly the following characteristics such as activity ID, name, start and finish dates, activity calendar, activity type, activity codes, constraints, expenses, predecessor and successor relationships, resources, roles etc.
- Relations between activities: - To from a network, the activities should be linked other, which is done by allocating preceding and succeeding activities with significant relationship to the activities.
- Finish to finish (FF) relationship.
- Finish to start (FS) relationship.
- Start to start (SS) relationship.

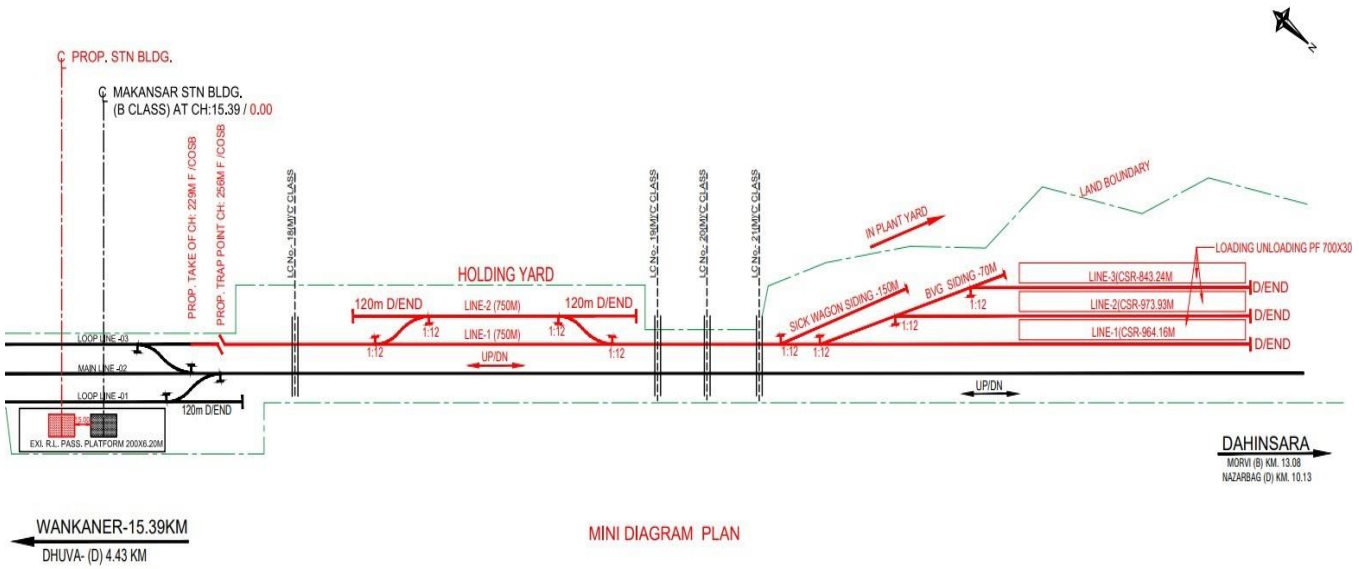
- Start to finish (SF) relationship.
- Finding activity duration: - When the planning the work is done, the duration is entered in the original duration field. The actual duration can only be filled for the activities, which are completed.
- Activity dates: - The following are the types of activity dates which are available in the primavera; actual start, actual finish, planned start, Planned finish.
- Activity cost: - The activity cost is the addition of all the cost incurred to finish the activity.
- Make baselines: - A simple baseline plan is a finished copy of the original schedule which provide a goal against which a project's performance is tracked.
- Update Schedule:
- If the project is progressing like plan, then only required to estimate progress.
- If the project is not progressing like plan many activities are begins out- of-sequence, actual resource use is proceeded planned use, and then update should be done for activities and resources one by one.
- Most projects may include few activities that progress as planned and some which do not, on the case, the best method is to join the two-updating method.
- Tracking: -Tracking window is utilised for monitoring a projects progress by using different categories of layout such as labour cost, Project cost, Resource forecasting etc.

9.2. Planned Railway Connectivity

The below points will give the detail plan for the railway connectivity for the proposed ICD Rafaleshwar.

- Makansar Railway station of Indian Railways is take-off point towards GCT Rafaleshwar
- Holding line is laying down for engine rolling and to pass another train on the track.
- Handling yard, loading-unloading yard along with sick wagon siding to hold sick wagon and one BVG siding for reversal of BVG will be establish for the smooth functioning of railway connectivity.
- In motion electronic way-bridge is providing just before loading and unloading area for weighment of loading rakes.
- 3 lines with 900m length will be construct for loading and unloading the wagons.
- Traffic from and to GCT will connect to Indian railways through Makansar railway station and further this traffic will connect to DFCC line through Morbi station towards north direction from where existing feeder track to DFCC has been provided and this will connect to Navlakhi port also.
- In the south direction from Makansar station it will connect to Wakaner to provide connectivity to ports area like Jamnagar, Porbandar, Okha, Bhavnagar etc.

Figure 30: Diagram Plan for the rail connectivity



Source: G-RIDE Analysis

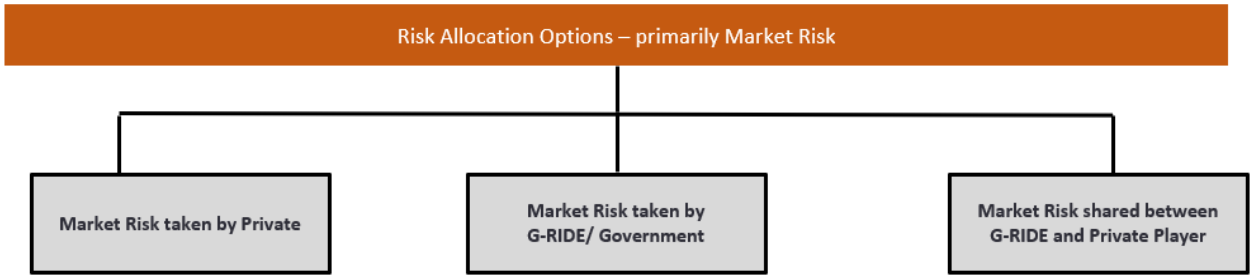
9.3. Project management framework and philosophy

The Proposed ICD to be executed under comprehensive single EPC contract. It is proposed that the Operation & Maintenance shall be carried out by competent private player on PPP basis.

- The project is proposed to be implemented under the Gati Shakti Multi Modal Cargo Terminal (GCT) Policy
- G-RIDE shall incorporate a project SPV with 100% equity shareholding
- O&M shall be contracted to the private operator with revenue sharing arrangement

Following structuring options have been assessed in detail to mitigate the risk among the private player & Government entity:

Figure 31: Risk Allocation Options

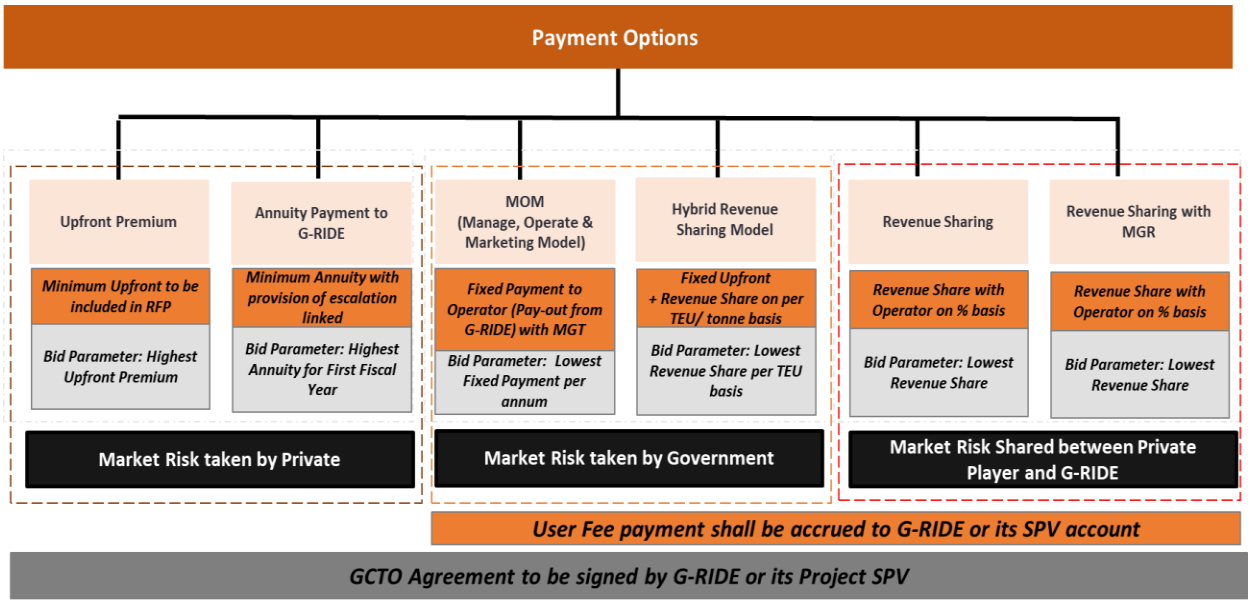


Source: G-RIDE Analysis

- **Market risk taken by Private Player:** In this proposal, there no downside risk for G-RIDE but there is a limited growth potential. There is a flexibility for the private player to set the tariff and Project might receive good response from private player.
- **Market risk taken by G-RIDE:** Majority of risk borne by G-RIDE but no upside potential for private player. Project might receive less response from private players
- **Market risk share between Private player and G-RIDE**: Market risk and upside potential shared equally with G-RIDE and private player. Such arrangement provides more flexibility for the private player to set tariff and offer bulk discount to specific customers. In this approach project might receive good response from private player as the risk is mitigated in balanced proportion.

Further, G-RIDE had assessed various payment mechanism option among various project structuring options. Following are the various payment options for the O&M PPP Player:

Figure 32: Payment Options among PPP structuring options

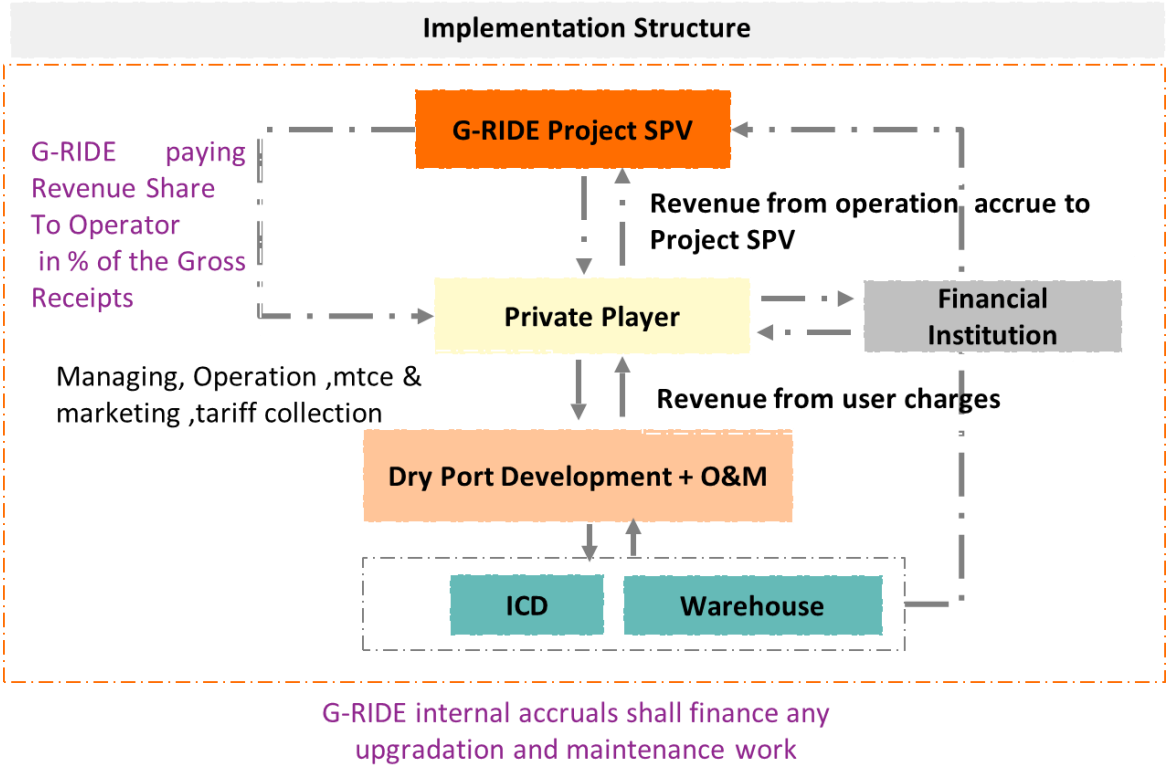


Source: G-RIDE Analysis

As discused above, it is suggested that Market Risk like revenue potential risk to be shared among private player and Government entity. Since the project is funded by Government of Gujarat and Government of India, upside revenue potential cannot be taken only by private player. Further to bring private player expertise and efficiency to the proposed ICD, it is suggested to incentivize private player to enhance the economic value of the infrastructure.

As discussed in above chapters, the proposed ICD shall serve various services including container handling, stacking, stuffing/de-stuffing, thus revenue shall be accrued from mutliple sources.It is proposed that the subidiary of G-RIDE shall sign Gati Shakti Multi- Modal Cargo Agreement,and all the revenue to be accrued by the Project SPV. The below implementaion structure clarify the framework and the strategy towards the long term value creation of the proposed ICD rafaleshwar.

Figure 33: Implementation structure for the proposed ICD



Source: G-RIDE Analysis

Table 5: Obligations of respective Party in PPP contract

GRIDE Project SPV Obligations	➢ **Private Obligations**
• Land acquisition • GCT construction • Support infra like power, water, compound wall • Approach Road • Land ownership lies with G-RIDE • Asset ownership with G-RIDE • Financing of Upgradation and Major maintenance • Asset Maintenance will be financed by GRIDE • Execution of GCT Agreement	▪ Manage, Operate and Marketing ▪ Planning of ICD - (Warehouse, Custom Yard, Processing Area, Empty Container Yard, Truck Terminus, Weigh Bridge, etc.) ▪ Procure/Lease Equipment - (Reach Stacker, Forklift, Mobile Scanner, Container trailer etc.) ▪ Deployment of EDI and necessary digital infrastructure financed by Operator ▪ Maintenance of Plant and Machinery ▪ Operation of GCT ▪ Marketing activities and right to collect Tariff ▪ Coordination with freight ecosystem ▪ Tariff Setting as per market values

➢ **Market Perspective:**

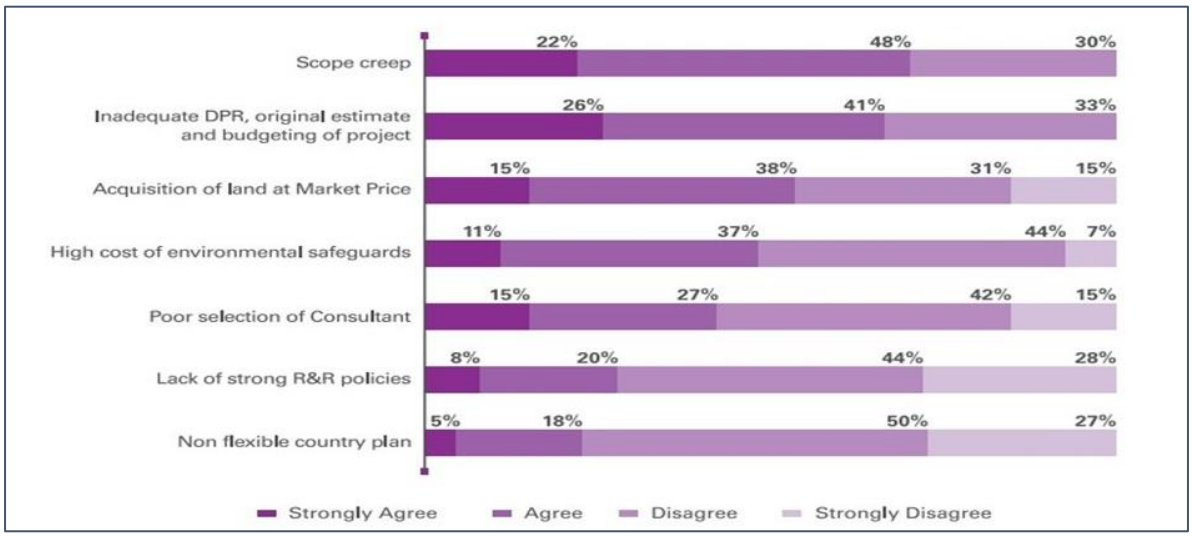
- O&M operator can bring operational efficiency and shall be incentivised to increase the revenue stream
- Light Asset Model for Private Player
- Better Risk Mitigation between G-RIDE and private player

9.4. Cost & Time overrun contingency measures

The 2012 report on 'Study on project schedule and cost overruns', incorporated observations from interactions with senior personnel from 25 public sector projects and leading companies in Power, Petroleum, Coal, Steel, Railways, Roads and Highways, Civil Aviation, Ports and Shipping, and Telecom sectors. In the same report, reasons for the cost and time overruns for infrastructure projects were categorized into external and internal factors. External factors are beyond the control of implementing agencies, but internal factors can be curtailed to an extent by the implementing agencies. Some of the key issues highlighted in the report are listed below:

Below are the probability and reasons for the cost overun in the pre-execution phase :

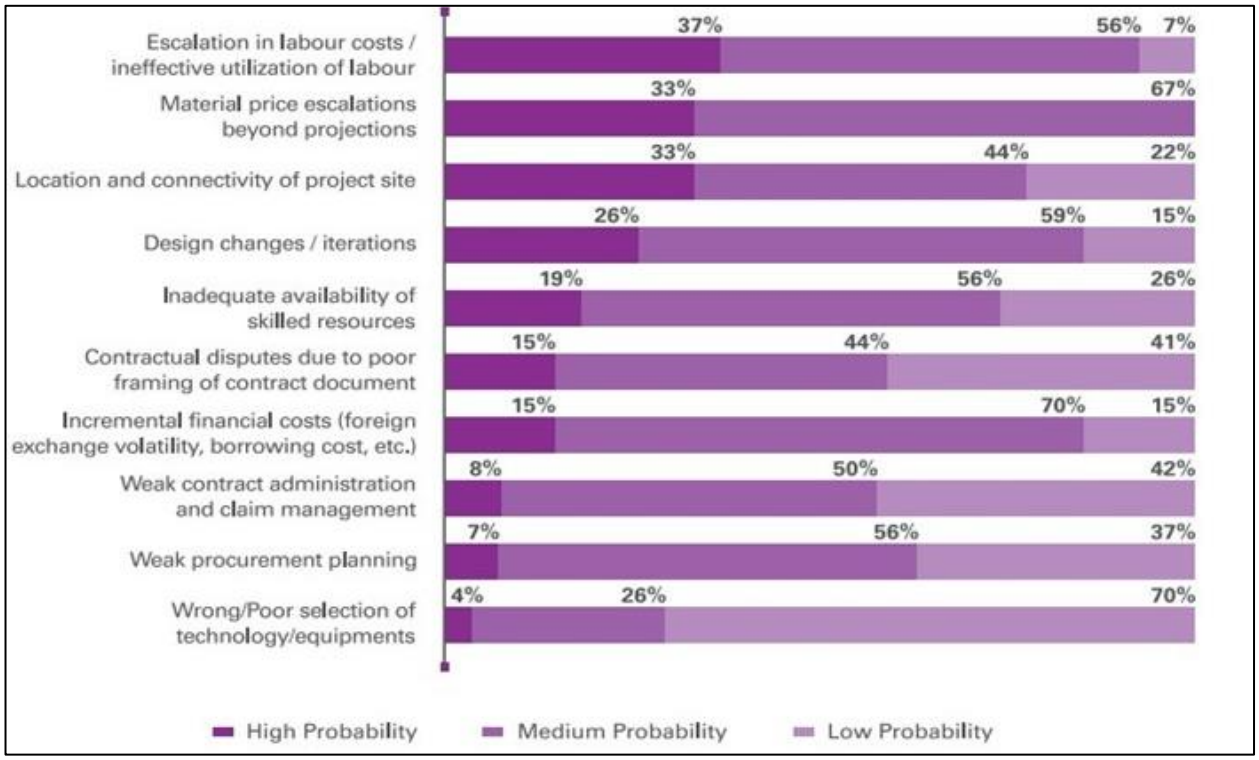
Figure 34: Reasons for the Cost Over-Run



Source: PMI Survey

Based on above survey carried out by PMI , 70% of the respondent highlighted that Scope creep is one of the top reasons for the cost-overrun before the execution of the phase. Scope creep in project management is continuous or uncontrolled growth in a project's scope, at any point after the project begins. This can occur when the scope of a project is not properly defined, documented, or controlled. Scope creep happens when stakeholders add more deliverables or push back deadlines.

Figure 35: Reasons for the Cost Over-Run during Execution Phase



Source: PMI Survey

Measures to mitigate Cost & Time overrun contingency:

- **Prepare Risk Register:** A risk register is an instrument used for giving project risks discourse and report risk all through the execution phase of the project. Risk register records the greater part of the known risks together with any arranged reactions. Extra data including risks classes and subjective and quantitative examination information ought to be incorporated as well. Subjective information covers the likelihood and effect of each risk.

- **Assessing Risk Probabilities**: The appraisal of risks likelihood enhances the comprehension of each hazard, permitting suitable prioritization, better reaction determination, upgraded chance administration viability, and solid accomplishment of task goals.

- **Assessing Risk Impact:** An impact of risks during project completion is generally easy to assess, compared to the likelihood of the risk happening. This involves a straightforward exercise on envisioning the circumstance where the risks are to occur. The straightforward procedure is stated by the project team in order to determine the risks impact range.

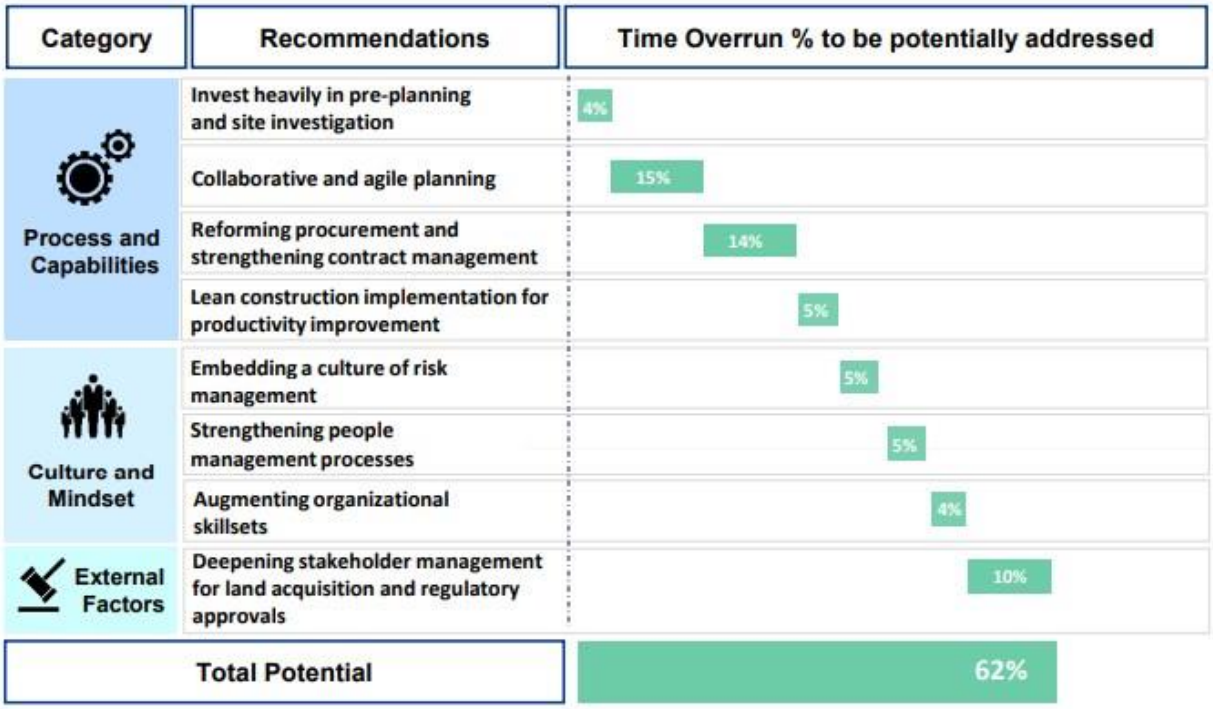
- **Use of the Risk Factors Perspective for Modelling Project Risk:** Introduces the factors of risks modelling for the utilization and influencing activities on a project. Activities are sorted out by using a "Work Breakdown Structure". The factors of the risk are then determined for each activity with how it can influence the project work.

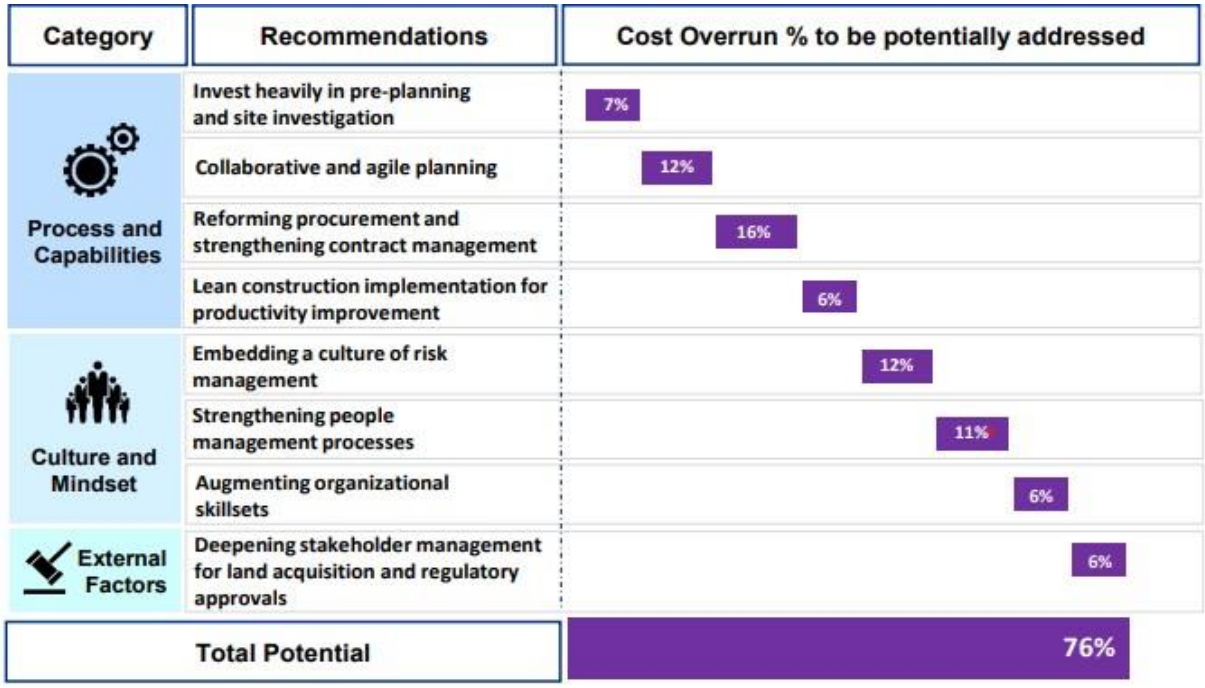
- **Acquire Project Cost Estimates and Schedules:** An initial phase during a project risks administration and cost contingencies appraisal, confirmed that the cost should be expressed showing the total project value and presented together with the programme of work mostly done using "CPM" plan. This is then arranged by an estimator or project manager while the project team determines the value of cost contingency to be added to the project cost.

- **Prioritize Risks and Choose Risk Mitigation Actions:** Asserted that the procedures of prioritization involve recognition of the common critical risks and carefully distinguishing the risk that has the highest effect. At that point, the investigator looks into the rest of the risks to see which of those is next most-vital, etc. However, added that eliminating one essential risk may uncover different risks that at that point become critical which were not critical when the main risk still exists. In light of restricted duration of the time accessible for risks appraisal in the tendering procedure, the contract administrator shall analyse risks based on their level of severity, think about alternative risk mitigating actions, and choose which mitigation moves to make.

  The implementation of suggested recommendations can lead to debottlenecking of infrastructure projects by incrementally addressing the root causes of time and cost overruns. The percentage indicates the relative importance of recommendations for implementation through the effort's levels of organisations:

Figure 36: Recommendations for Addressing Overruns





Source: PMI Survey, G-RIDE Analysis

9.5. Selection of Cargo Handling Equipment

Cargo-handling equipment (CHE) plays a vital role in maintaining the efficiency of a highly worked container terminal. A container terminal relies on an array of **intermodal equipment** to perform its operations, including straddle carriers, gantry cranes etc. The choice of equipment and its mix is related to a number of factors in terms of capital investment, volume, stacking density, and productivity. In the proposed ICD Rafaleshwar, all the equipment which provide smooth function shall be deployed as per below.

Forklift: It can be considered the most basic piece of intermodal equipment but has limitations and can handle only loaded 20-foot containers or empty containers of other dimensions.

Straddle carrier: It is a flexible piece of equipment that can be used for all intermodal operations, such as loading/loading railcars and trucks and stacking containers up to three in height, depending on whether the straddle carrier is a 3-high or 4-high. So, depending on the straddle carrier type, the stacking density may vary between 500 and 700 TEU per hectare. Straddle carriers are often used to move containers from piers to stacks.

Front-end loader: It is a more restricted piece of equipment that can reach stacks of up to three full containers and can be used for double-stack intermodal rail operations. It can also be used to manage empty stacks by reaching up to eight empty containers in height.

Reach stacker (also known as a side loader): It is also a flexible piece of truck equipment performing intermodal operations for rail and trucks as well as the stacking of containers. Since reach stackers are limited to stacks of three full containers (four or five empty), they can support a stacking density of 500 TEU per hectare. They are often used in intermodal rail terminals and in maritime terminals for specialized moves.

Rubber-tired gantry (RTG): It is a fixed intermodal piece of equipment that is used for loading and unloading railcars from trucks in high-density terminals as it can span over up to four rail tracks or six containers. It is also used for stacking operations to manage densities of up to 1,000 TEU per hectare with stacks of up to four full containers or five empty containers. It can service eight to nine trucks per hour, which involves 30-40 container movements since containers need to be reshuffled within their stacks. The RTG has higher acquisition costs but lower operational costs and fits well into regular container yard operations. RTG cranes have long been the most common mode of operating worldwide in a container yard. As the name implies, these machines operate on rubber tires and can roam anywhere in the container yard. They typically run on reinforced concrete runways to minimize the rutting that can take place along the RTG travel paths.

Rail-mounted gantry (RMG): Loading / Unloading of containers on rakes will be done by Rail Mounted Gantry Cranes (RMGCs). They move on a straight rail track slightly longer than the length of the rake. This equipment has cantilevers at both end through which the containers are lifted from trailers and then loaded to wagons and vice versa.

Unmanned RTG or automated stacking crane (ASC): There are two types of ASCs: cantilever (side-loaded) cranes, where container transfer in and out of the stack is made alongside the gantry; and end-loaded ASCs, where the containers are loaded in and out of the stack from the short side of the container blocks.

Overhead Bridge crane: An overhead bridge crane almost always has a hoist which will move left or right. A lot of times these cranes will also run on a track, so the whole system can move forward or backwards through the building. Bridge cranes come in two common variations: single girder and double girder.

Straddle carrier manned and unmanned: A straddle carrier or straddle truck is a freight-carrying vehicle that carries its load underneath by "straddling" it, rather than carrying it on top like a conventional truck. The advantage of the straddle carrier is its ability to load and unload without the assistance of cranes or forklifts. The lifting apparatus under the carrier is operated by the driver without any outside assistance and without leaving the driver's seat.

9.6. Project Phasing (Quarterly activity plan supported by detailed Gantt Charts) including major milestones.

Construction of the proposed ICD have been initiated and LOA have been awarded to JV of S P Infracon – P.R. Patel on April 2023. Construction have been initiated and currently monitored by G-RIDE. It is proposed for the timely execution of the project within 1.5 years and project is expected to be completed by December 2025. Activity wise planning of project have been detailed out in the Gantt chart below:

Figure 37: Quarterly activity plan supported by detailed Gantt Charts

Sr No	Name	Duration (Days	Start	Finish	Q1 FY 24	Q2 FY 24			Q3 FY 24		
					Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
	Construction Programme of Proposed Rafakeshwar ICD	540	23-06-2023	14-12-2024							
1	Obligations and Statutory Clearance prior to commencement of Works	121	23-06-2023	22-10-2023							
2	Design, Engineering, Procurement of the Site	144	23-06-2023	14-11-2023							
3	Verifying & Relocating Coordinates of Bench Mark	25	25-06-2023	20-07-2023							
4	Deployment of Key Personnel	15	25-06-2023	10-07-2023							
5	CIVIL WORK UP TO FORMATION LEVEL	276	05-07-2023	06-04-2024							
6	MINOR BRIDGE - BR 01	30	05-07-2023	04-08-2023							
7	MINOR BRIDGE - BR 02	30	05-07-2023	04-08-2023							
8	Major Bridge - BR 03	45	05-07-2023	19-08-2023							
9	P-WAY WORKS & TRACK LINKING	90	28-12-2023	27-03-2024							
10	Level Crossing (LC - 1X)	30	05-07-2023	04-08-2023							
11	Goods Platform	237	06-04-2024	29-11-2024							
12	Retaining wall & Road work	315	05-07-2023	15-05-2024							
13	Station Building Work	215	04-08-2023	06-03-2024							
14	Signalling & Telecommunication Work	388	05-07-2023	27-07-2024							
15	OHE & General Electrical Work	240	05-07-2023	01-03-2024							
16	Testing , Commissioning and other Misc. Work	15	29-11-2024	14-12-2024							

Sr No	Name	Duration (Days	Start	Finish	Q4 FY 24			Q1 FY 25		
					Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24
	Construction Programme of Proposed Rafakeshwar ICD	540	23-06-2023	14-12-2024						
1	Obligations and Statutory Clearance prior to commencement of Works	121	23-06-2023	22-10-2023						
2	Design, Engineering, Procurement of the Site	144	23-06-2023	14-11-2023						
3	Verifying & Relocating Coordinates of Bench Mark	25	25-06-2023	20-07-2023						
4	Deployment of Key Personnel	15	25-06-2023	10-07-2023						
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15	OHE & General Electrical Work	240	05-07-2023	01-03-2024						
16	Testing , Commissioning and other Misc. Work	15	29-11-2024	14-12-2024						

Source: G-RIDE Analysis

Sr No	Name	Duration (Days	Start	Finish	Q2 FY 25			Q3 FY 25		
					Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
	Construction Programme of Proposed Rafakeshwar ICD	540	23-06-2023	14-12-2024						
1	Obligations and Statutory Clearance prior to commencement of Works	121	23-06-2023	22-10-2023						
2	Design, Engineering, Procurement of the Site	144	23-06-2023	14-11-2023						
3	Verifying & Relocating Coordinates of Bench Mark	25	25-06-2023	20-07-2023						
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15	OHE & General Electrical Work	240	05-07-2023	01-03-2024						
16	Testing , Commissioning and other Misc. Work	15	29-11-2024	14-12-2024						

Source: G-RIDE Analysis

9.7. Details of permissions, clearances, and fulfilment of other statutory requirements for the projects

For the execution of the project, G-RIDE had initiated permission and clearance for following requirements:

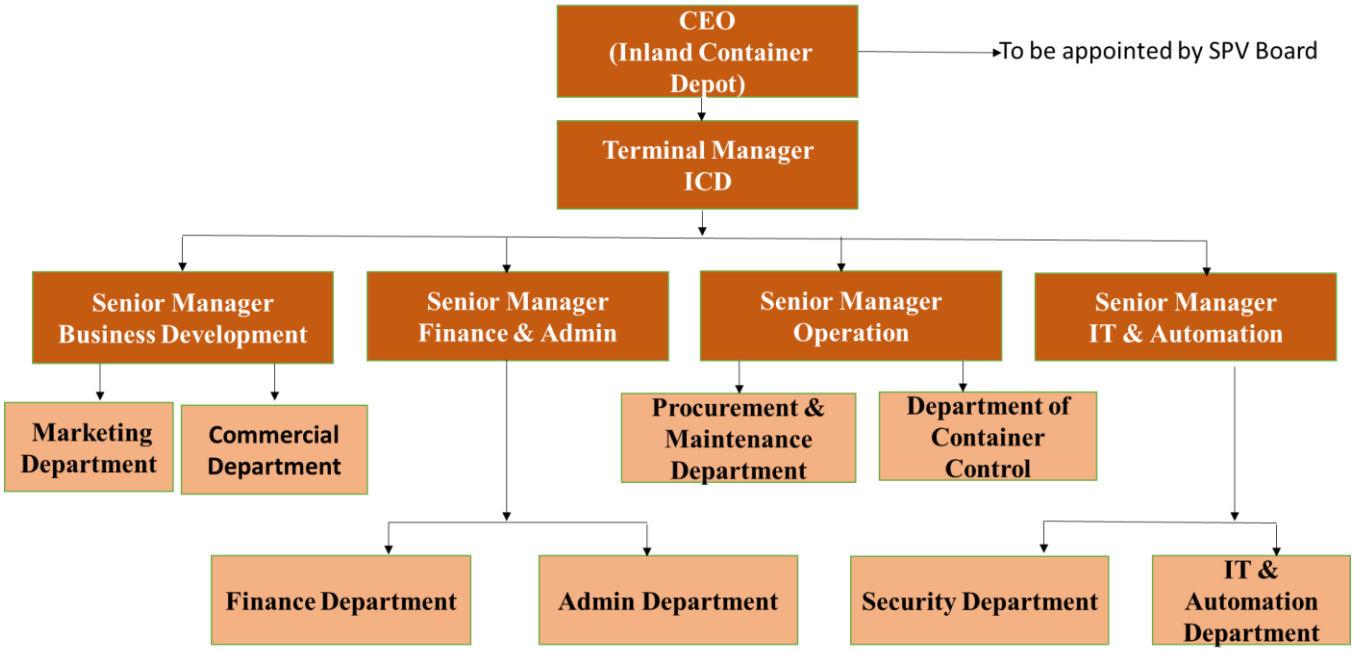
a) Shifting work of U/C 66 KV S/C Lalpar (220 KV) – Lilapar line partly on D/C + 220 KV D/C tower with panther conductor & partly with 66 KV 1 C x 630 SQ MM (3+1) U/G cable under KISHAN SURYODAY YOJNA, passing through proposed railway track, near Village: - Rafaleshwar, Taluka: - Morbi, Dist.: - Morbi under option- I.

b) Relocation of 11 KV HT electrical poles at Rafaleshwar Yard & behind police headquarters.
   i. PGVCL 11 KV HT line is known as Bajrang feeder, starting from in between pole no 14 & 15 to pole No-65 is length 1250m (approximately).
   ii. PGVCL 11 KV HT line is known as a Patidar feeder, starting from underground railway crossing termination DP located behind police headquarters to DP located near samasan is length 1300m (approximately).

9.8. Organization Structure proposed

The organizational structure of a container base is not as complex as that of a container terminal. A container base is very similar to a container terminal, nonetheless, in its distribution of space, because the area must be divided into areas for dirty, empty containers and clean, empty containers; for FCL and LCL export containers; for FCL and LCL import containers; containers to be repaired; a container repair workshop, and storage facilities for break-bulk cargo. With relation to the administrative structure, the container base must have a container control department, an inspection department, and a technical department. The base must also have customs facilities in order to ease the workload of customs officers in the container terminal. Following figure represents organisation structure:

Figure 38: Proposed Hierarchy for the Organisation structure



Source: G-RIDE Analysis

The Project SPV will be responsible for implementation of the project, and its day-to-day operations. Overall Corporate Governance in order to safeguard the long-term interests of the shareholders and sustainable operations of the Project SPV, shall be a responsibility of the Board of Directors. The proposed departments for the functioning of the operations, and the proposed workforce for the same is as follows:

a) **Engineering & Works Department:** This department will be responsible for construction and maintenance of all the physical assets of the project line. This department will also identify opportunities for enhancing and extending the assets of the Project SPV. It shall ensure that all the assets created are maintained appropriately and as per the Indian Railway guidelines. All monitoring and supervision work will be undertaken by this department.

b) **General Admin Department:** This department will look into all General administration, HR and Finance related matters. It will be responsible for generating and maintaining the financial statements and its audit. It will also be responsible for preparation of the company's budget, after considering requirements of the various departments. All approvals required for financial transactions will be provided by this department. This department will also undertake the recruitment, selection, and promotion process of the employees. It will also ensure seamless on boarding of employees, along with provision of appropriate facilities. This department will also carry out the required procedures for employee benefits, retirement, PF, etc.

c) **The Department of Container Control:** The role of this department is to control the reception of the loaded containers for import and the break-bulk cargo to be stuffed in empty containers for export. For the reception of import containers, it may be necessary to unload the cargo at the base itself if the containers are LCL or if the importers do not have the facilities at their industries or distribution centres for unstuffing. This department is responsible for the inspection of the containers; the filing of the Container Interchange Report, the international document which reports on the condition of the container upon its arrival at the base; the verification that the containers meet the specific requirements for cleanliness of the cargo which is to be stuffed in it, and the verification that the standards established by both national and international regulations are upheld.

d) **Admin Department:** This department is responsible for the employment, or the contracting of personnel needed for the execution of various jobs held by, for example, mechanics, inspectors, stevedores, drivers. Maintains office services by organizing office operations and procedures, preparing payroll, controlling correspondence, designing filing systems, reviewing, and approving supply requisitions, and assigning and monitoring clerical functions.

e) **Marketing Department:** This department shall interact with the customers to understand their end-to-end logistics requirement for the EXIM as well as domestic cargo. Single point of contact will be deployed with each customer for better two-way communication. Further this department shall interact with new potential customers and discuss with them how the facilitation of the proposed ICD shall provide ease for their logistics movements.

f) **Commercial Department:** This department shall assist SPV in providing flexible tariff to various customers including bulk customers post evaluation of the margins. It shall also frame various proposals pertaining to the bulk discounts and free storage time specific to the customer requirement. This department shall evaluate traffic projection for next 5 years and shall create strategy to enhance the traffic. The department shall connect with the Marketing Department to keep in track of the target traffic.

g) **Finance Department:** The department controls the income and expenditure in addition to ensuring effective business running with minimum disruptions. The role of the finance department is often limited to monitoring costs, supervising accounting, and creating reports, which are not always used to draw up concrete action plans.

h) **IT & Automation:** The department shall look out for the automated solutions for software processes to improve efficiency, boost performance and maintain systems. The department shall

look out various IT related contracts and manages software licenses required for the operation. The department shall undertake management of networks, hardware, and software of all the systems to be implemented.

The Board of Directors shall be responsible for formulating the HR Policy, which would cover the procedure for recruitment and selection of all employees across all posts. The Board is also suggested to create a Selection Committee, which shall undertake the selection and recruitment of the employees, for the proposed posts. The Committee will compile the required qualifications and the number of employees required, in consultation with the respective departments.

It is also recommended that the Project SPV to have an adequate Learning and Development Policy in place. This policy is envisaged to cover employees across all cadres and departments. It shall focus on imparting periodic learnings to the employees, as and when necessary.

10. Project Financials

In order to assess the financial viability of the proposed ICD, for a project horizon period of 35 years have considered in line with the Gati Shakti Cargo Terminal Multi- Modal Policy. In this regard, a financial model has been formulated for the period FY 25 to FY 60. Prior to discussing the key outcomes of the financial analysis undertaken for assessing the viability of this rail line, it would be pertinent to discuss the assumptions that form a basis for all the outcomes. The same are detailed out below:

10.1. Summary of Cost Estimate

The Cost Estimate of all components of works envisaged to be taken up for implementation has been prepared. The overall capital cost for GCT at Rafaleshwar for G-RIDE including land cost is as follows:

Table 6: Detailed Project Cost

Detailed Project Cost			
S.No.	**Description**	**Percentages**	**Cost (Rs) in Crores**
II	Civil Works		184.43
III	S&T		8.12
IV	Genl Electrification (Incl. Overhead Crossing)		1.81
V	TRD		6.62
VI	Mechanical Works		0.50
A	**Basic Cost:**		**201.48**
VII	Preliminary expenses **@ 0.5 % of Total Project Cost Including Land**	0.2%	1.01
VIII	Escalation during Construction @ **5%** over **70%** of Basic cost for 1 year (Excluding Land Acquisition)	5%	6.44
IX	PMC @ **10%** over Basic Cost (Excluding Land Acquisition)	10%	18.41
X	SPV registration/Administration Charges Lumpsum @**1%** (Excluding Land Acquisition)	1%	1.84
XI	Legal and Insurance Charges @ **0.5%** percentage on Basic Cost (Excluding Land Acquisition)	0.5%	0.920
XII	Contingency @ **1%**	1%	1.84
B	**Total Cost Rounded Off:**		**232.00**

Detailed Project Cost			
S.No.	**Description**	**Percentages**	**Cost (Rs) in Crores**
C	**Operator Cost**		**48.00**
	Total Project Cost (B+C)		**280.00**

10.2. Revenue & Opex Assumptions

- Export and Import Based Terminal Handling Charges: As per Below table – Benchmarking with CONCOR ICD
- Terminal Charges is considered @ Rs. 20 per tonne on both inward and outward traffic for all commodities (excluding container traffic) as per Railway Board Circular No. TCR1078/2018/17 dated December 27, 2018
- A nominal 2.5% escalation in base tariff of terminals per annum to comprehend the financial performance of project from a conservative viewpoint
- Revenue projections have been carried out for next 35 years.
- Based on benchmarking with Container Terminal operator like CONCOR, BDRCL and GATI, it is assumed that EBITDA margin at 20%.

Further following additional revenue can be accrued by the proposed ICD Rafaleshwar by offering various allied services and customer satisfaction. Since such allied services are offered on real time basis and as per the requirement of customer, such additional revenue source has not been considered in Financial Analysis:

Table 7: Tariff Rates for various services

S. No	EXPORT CYCLE	Tariff (in `)	
		20'	40'
1.	**Terminal Stuffing – On Wheel Stuffing – for light weight cargo i.e., up to 12MTfor 20' and up to 20MT for 40' either manual or mechanical** (Unloading of cargo from truck to Warehouse by manual or mechanical mode, arranging customs examination, stuffing customs cleared cargo sealing the loaded containers with nominated seals)	**5720/-**	**8320/-**
2.	**Terminal Stuffing – On Wheel Stuffing – for cargo weight above 12MT for 20'and above 20MT for 40' either manual or mechanical** (Unloading of cargo from truck to Warehouse by manual or mechanical mode, arranging customs examination, stuffing customs cleared cargo sealing the loaded containers with nominated seals)	**5920/-**	**8520/-**
3.	**Terminal Stuffing – Through Warehouse or Open Area (Stuffing on Ground) (**Unloading of cargo by manual or mechanical mode, arranging customsexamination, unloading/positioning of empty container, stuffing of customscleared cargo and sealing the loaded containers with nominated seals, Lift on loaded container onto the road trailer)	**8220/-**	**12570/-**
4.	**Factory Stuffing (On wheel Inspection Up to 10% Examination). (**This activity consists of customs seal checking/examination/ including de-stuffing of cargo up to 10% and stuffing back to container).	**860/-**	**1090/-**
5.	**Factory Stuffing (On wheel Inspection above 10% and up to 25% Examination). (**This activity consists of customs seal checking/examination/ including de-	**920/-**	**1170/-**

	stuffing of cargo above 10% & up to 25% and stuffing back to container).		
6.	**Export Container arriving to CFS on Customer arranged trailer for On-wheelInspection / Seal Cutting only (Without Cargo Handling)**	**500/-**	**600/-**
	IMPORT CYCLE	**20'**	**40'**
1	**Terminal De-Stuffing –Through Open Area or Warehouse.** **(**Unloading of loaded import container, positioning it in the nominated area; de-stuffing and stacking of cargo to Warehouse or open area, loading of Customs cleared cargo into truck)	**10420/-**	**16520/-**
2	**Factory De-Stuffing (Ground Inspection up to 25%)** (Lifting of load container from road trailer on arrival to CFS for stacking, positioning of the container for custom examination which may include de-stuffing of cargo up to 25%, stuffing back the cargo into container, resealing and loading of the import container onto road trailer from stacking area)	**4570/-**	**7320/-**
3	**Factory De-Stuffing- Direct** (Lifting of loaded containers from road trailer; stacking in the nominated area, for certain containers the seal may be cut, and doors may be opened and closedwithout cargo handling, loading of the import container onto road trailer from stacking area)	**3895/-**	**6420/-**
4	**Factory De-stuffing (On-wheel Inspection Up to 10% Examination)**	**1470/-**	**2270/-**
5	**Factory De-stuffing (On-wheel Inspection above 10% and up to 25% Examination)**	**1545/-**	**2370/-**
6	**Import Container Movement from Port to CFS on Customer Arranged trailer for On-wheel Inspection/Seal Cutting only (Without Cargo Handling)**	**1070/-**	**1670/-**
7	**Terminal De-stuffing – Through On wheel De-stuffing of cargo from container to warehouse or open area by manual or mechanical mode, arranging customs examination, loading of the customs cleared cargo into truck / trailer.**	**6020/-**	**8620/-**
8	**Terminal De-stuffing (On Ground) using privately owned equipment/labour**	**8090/-**	**13110/-**
9	**Terminal De-stuffing (On-Wheel) using privately owned equipment/labour**	**2720/-**	**3210/-**

Source: CONCOR

❖ Terminal Storage Charge (TSC) after free time

Loaded TSC per TEU per day after free time (In `)	Empty TSC per day after free time (In `)
750/-	**375/-**

Note: Free Time (Including the arrival date): 1-10 Days

❖ **Penal TSC:**

It is applicable, in addition to normal TSC mentioned, on all such import containers which have been placed for customs examination but the contents of which have not been removed (Either in container itself or in break bulk) within 3 working days including the date of shifting at the examination area.

Within 3 working days (Including date of shifting)

- 4^{th}-5^{th} working day – Rs.400 per day per TEU
- 6^{th}-8^{th} working day – Rs.1100 per day per TEU
- 9^{th} working day onwards – Rs.1600 per day per TEU

10.3. Project Structure and Financial Results

- The project is proposed to be implemented under the Gati Shakti Multi Modal Cargo Terminal (GCT) Policy
- G-RIDE shall incorporate a project SPV with 100% equity shareholding
- Project SPV shall develop PFT under Gati Shakti Cargo Terminal Policy, 2022 under full equity model
- O&M shall be contracted to the private operator with revenue sharing arrangement

The summarized financial results for the proposed Railway Yard GCT at the north-side of Bhavnagar Port near Bhavnagar Concrete Jetty are as below:

Table 8: Financial Performance of the Project

Financial Performance of the project (base case):	
Project IRR (Post Tax)	12.2%
Net Op. Cash Flow (30 Yrs.)	INR 2,733 Crore
NPV of Op Cash flow @12% Hurdle rate	INR 250.1 Crore

Source: G-RIDE Analysis

Following table provides Financial Status for the respective year:

Table 9: Financial Statement of the Project

Financial Statement (INR Crore)	**FY 2030**	**FY 2035**	**FY 2040**	**FY 2045**	**FY 2050**
Revenue for Project	**126**	**180**	**213**	**253**	**300**
OPEX	100	135	160	190	225
EBITDA	27	54	72	96	125
PAT	**15**	**37**	**53**	**72**	**96**

Source: G-RIDE Analysis

Note: Above Revenue is only pertaining to THC and additional revenue can be generated based on storage charges, leasing, licensing of the GCT facilities.

Further based on Traffic Assessment Chapter, it is observed that traffic to be catered at the proposed ICD shall have minimum variation even after considering various market scenarios. Thus, no further financial impact has been carried out for the pessimistic and optimistic scenario.

11. Business Sustainability Plan

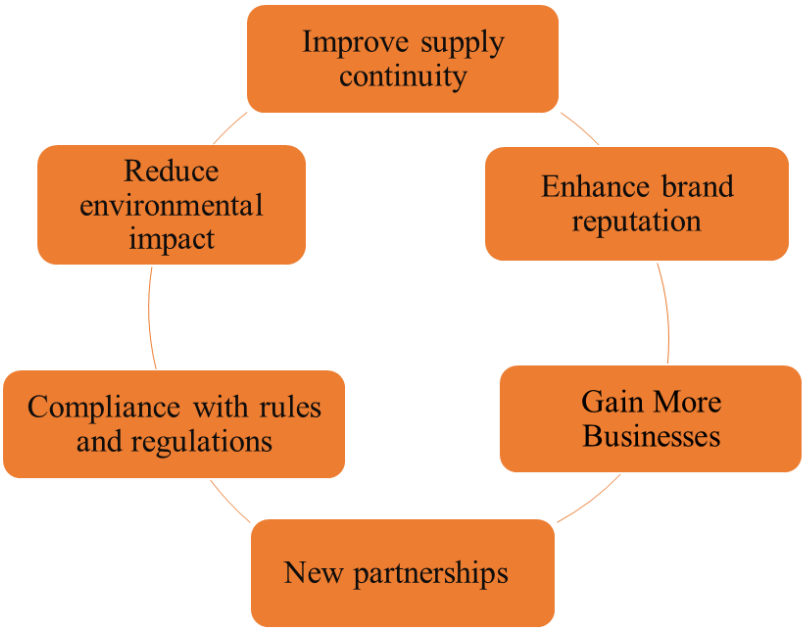
An Inland container depot is a logistic hub located inland -often far from coastal ports-but with strong connectivity with seaports through multiple transportation modes. ICD often rely on rail network, roads to facilitates goods movement, custom clearance, warehousing. As our new greenfield ICD infrastructure aim to cater the Morbi and the data reveals that by 2030, approximately 372,000 TEUs of new production capacity are likely to be added in the Morbi Ceramic cluster. Conservative estimates indicate that in the first year of operation, the proposed terminal can attract at least 40% of the rail-able container volumes. The proposed terminal will be functional by 2024-25 and with an installed capacity of Morbi industry to grow to ~2,354,500 TEUs by 2024-25. Owing to the proximity to industrial cluster, the attractiveness of rail terminal will improve – which will translate to increased market share of the Morbi terminal from 40% in FY25 to 55% by FY28. Every business sustainability plan depends on three elements and ICD Morbi fulfil the same as per below:

Social responsibility: Socially sustainable practices promote the well-being of an individual or a society. It ensures that every individual within the supply chain network is treated fairly and agrees with human rights and labour laws.

Environmental responsibility: It entails protecting the environment from the potential damage caused by a business's working, operations, suppliers, and partners. Environmentally sustainable practices are those that cause no harmful impact on the environment in the long run so the ultimate purpose of Morbi ICD is to divert the road traffic towards rail to reduce the CO2 emission and decongestion at ports.

Financial responsibility: Economically sustainable practices focus on long-term economic goals. It involves addressing the business's financial needs, from shareholders, employees and customers to business partners and financial organizations. As per the above-mentioned figures says that in future the economic activities get increase in the ceramic cluster and the figures are very optimistic which signifies that the upcoming ICD will create the operational and financial synergy for the ceramic and paper industries.

11.1. Benefits of the business sustainable supply chain



ICD Morbi is a purpose-driven greenfield infrastructure. Increasing complexity in global supply chains drives the need for integrated logistics. We aim to fulfil that need by sustainably and responsibly delivering better, simpler, and more reliable outcomes for our customers.

Strategic pilots for decarbonised inland logistics solutions: - Given the rapidly growing needs of our customers for end-to-end logistics solutions and the importance of sustainable supply chains, addressing our Logistics and Services value chain emissions is a key focus for new ICD's. Logistics facilities and landside transportation depend heavily on local infrastructure, investment needs into infrastructure, regulatory support, and willingness of suppliers to engage. Logistics facilities benefit from new initiatives like Inland container terminals, existing technology improvement and using renewable options to sustain the business in long run. In ICD Morbi we will use renewable energy to run the terminal in optimal manner.

Regulatory drivers of progress: -Regulation remains a critical lever in the decarbonisation of our industry.

A stable and future-proof regulatory framework not only ensures that ICD Rafaleshwar competes on a level playing field, but also rewards and encourages much-needed investments for the value addition for the long-term sustainability.

Standards and due diligence support responsible growth: - Proposed ICD Rafaleshwar will work continuously to monitor our impacts, transparently report our performance, equip our teams with the right processes, training, and resources, and actively engage and collaborate with stakeholders. The SPV shall remain focused on strengthening environmental standards and frameworks to support growth as well as ongoing operations with a structured environmental and social framework that helps us to 'design-out' impact and issues and maximise positive effects.

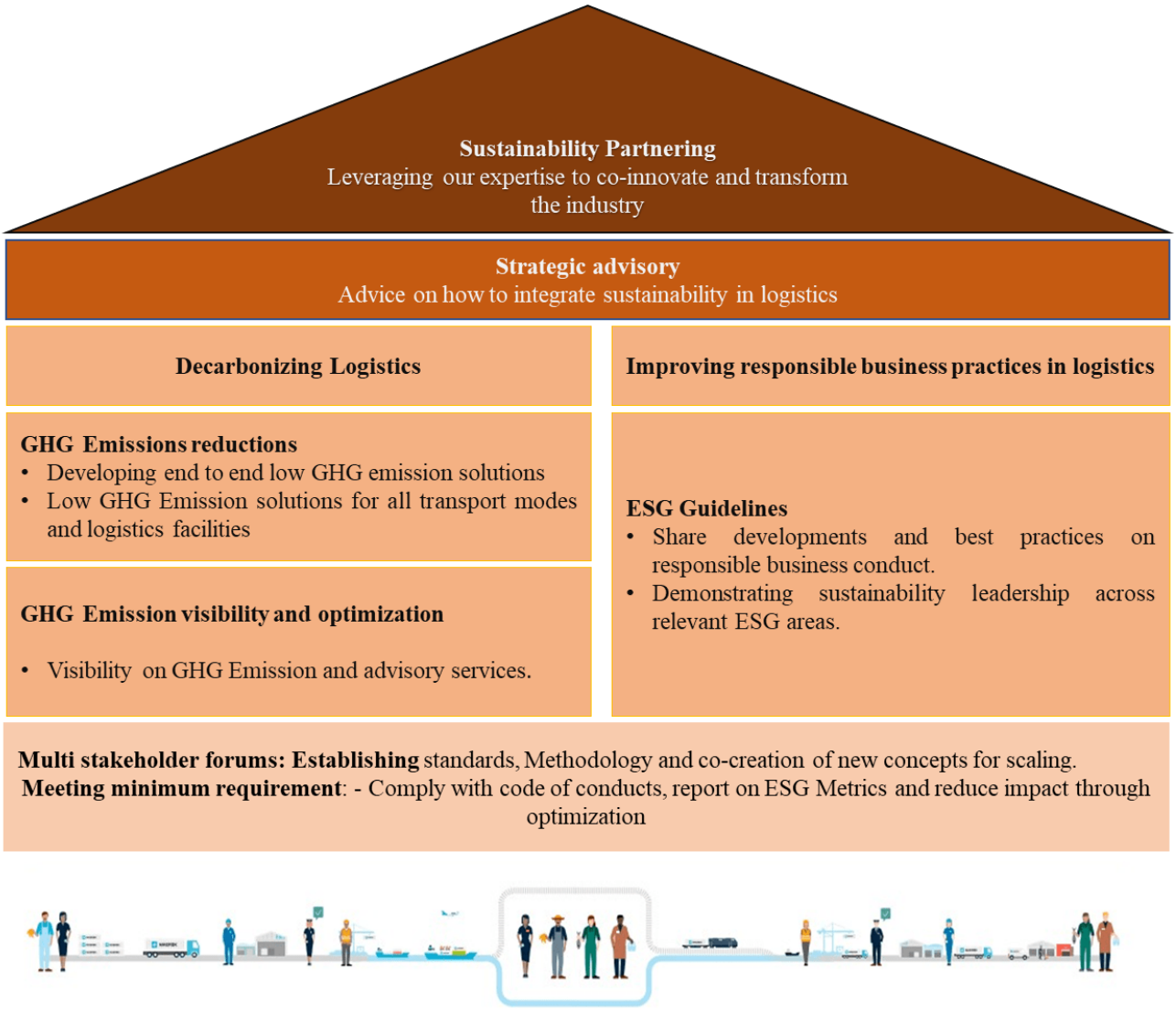
Improving waste management: - Proposed ICD Rafaleshwar shall commission a global waste audit to provide further details on the waste to be produced and how it is being managed, so that the SPV can strengthen our waste policies and enable target-setting. Further the SPV shall incorporate global waste management requirements in our growing landside footprint of warehouses, distribution centres and over truck and rail networks.

Transitioning the transparency initiative: - It's a modern infrastructure and by applying new technologies will create an environment of maximum transparency for at terminal for every stakeholder of the project.

Enhancing safety, mitigating risk: - It is proposed to develop industry-leading standards and a strong safety and secure culture in our terminal businesses. To keep our employees and partners safe from severe and fatal injury, we are strengthening our risk assessments, confirming that critical safeguards are in place and accelerating the implementation of our global safety and security standards.

Below is the diagram of sustainability solutions based on the customer needs and sustainablity ambitions for the long term.

Figure 39: Sustainability Partnering framework to be adopted by ICD Rafaleshwar



Source: APM Terminal

12. Environmental Impact Assessment

12.1 Environment impact assessment including Mitigation, Monitoring, and Risk Assessment

In the proposed ICD Rafaleshwar, majorly it is going to deal with the India's largest ceramic industry. Thus, development works, and operation has notable linkage to environment in the proximity of the site. Therefore, requires an integrated and collaborative approach to the work planning to ensure minimum conflicts and impact on environment. The key environmental and ecological aspects likely to be affected by the project work during pre-construction phase, construction phase and operation phase have been detailed out in the chapter. Further the chapter discusses the mitigation plan for minimizing the environmental impact. Some of the key environmental impacts are as follows:

- Disruption of surface drainage system.
- Waste disposal during construction
- Sharing of services and amenities with neighbouring communities including water, power, road during construction period and post construction phases.
- Conflict at the construction material sources (Damages top road access, Road safety, dust generation, Noise and vibration, Land degradation.
- Noise and vibration during operation and maintenance.

Below section discusses on the phase's wise environment impact and their possible mitigation measures.

A. Pre-Construction/Design and Construction Stage:

Typical impact associated with land environment component during design and construction stage of implementation of proposed civil interventions are listed below

- Change in land use& Loss of agricultural land and/or fertile agricultural soil
- Land acquisition
- Change in topography
- Soil quality deterioration due to spillage of fuel/paint, disposal of muck or soil contamination with other construction material.

Measures for Avoidance and Mitigation of Impacts:

- Both, excavation, and filling tasks shall be carried out as a parallel activity to minimize the soil erosion. Unusable debris material should be suitably disposed at predesignated disposal locations, with approval of the concerned authority.
- Well-designed water sprinkling to be carried out for dust suppression.
- Remaining excavated soil should be used for filling purpose and left over shall be stored in covered conditions for use in future for construction.
- Arrangement shall be made for segregation of municipal solid waste into recyclable and non-recyclable waste.

- Construction waste generated shall be segregated at site into recyclable, reusable & rejected fraction. Recyclable waste can be sold to authorized vendor; reusable waste shall be stored at site for usage and rejected fraction shall be disposed at designated sites authorised by the municipal authority.
- Septic tank or mobile toilets fitted with anaerobic treatment facility shall be provided at construction camp.
- Provision of side drain shall be made in access road if required to prevent water logging.

B. Construction phase:

Impact during design and construction phase can be co-related with the increased CO2 emission and noise pollution due to the associated activities. CO2 emissions increase is also associated with various other project activities such as burning of fossil fuels in the vehicles, DG sets and construction equipment & machinery and cutting of existing vegetation. CO2 being one of the most potential GHG will contribute the most and associated with the increased average temperature/climate change phenomenon.

Measures for Avoidance and Mitigation of Impacts: -

- Project design should incorporate usage of low embodied energy building & construction material, energy efficient electric equipment, water conservation fixture, and rainwater harvesting measures to make project energy efficient and sustainable and to minimize the associated emissions and discharges.
- All terminal buildings should have energy efficient design. It should follow GRIHA guidelines and aim for highest ratings under GRIHA. Minimizing the resource requirement and waste generation through best management practices like re-use, reduce, recycle, and recover.

Operation Phase: -

Impacts During Operation phase will not have any significant impact on climate change drivers or climate change. However, GHG emissions are expected due to transportation of material to & from terminal site, material handling within the terminal sites, operation of the machinery/equipment/pumps and operation of DG sets. Though these emissions will not be significant enough however these may increase in a situation like traffic congestions if to and from or on terminal traffic is not managed effectively. The Inland transportation will result in overall GHG emission will be down due to model shift from road to rail.

Measures for Avoidance and Mitigation of Impacts

- Management of the traffic carrying cargo to be received at the terminal by fixing the hours of operation and route of transportation.
- Development of adequate road/rail infrastructure for transportation of material to & from terminal/jetty site to minimize the emission generation due to traffic congestion.
- Usage of low sulphur diesel/CNG based vehicles to transport the material.

- Adoption of energy efficient machinery for material handling & barge loading to minimize energy consumption.
- Ensuring survivability of the plantation within site and at other locations.

As this infrastructure is environment friendly and ultimate purpose is to reduce the carbon emission generated due to road transportation through large trucks from ceramic cluster to port gate. Being a responsible partner of greenfield infrastructure, follow below measures shall be undertaken:

Table 10: Recommended mitigation/enhancement measures for environment impact

Potential Impacts	**Mitigation/Benefit Enhancement Measures**
Impact on surface water quality	Dispose all domestic wastewater through septic tank. Surface drainage should be disposed through an interceptor. Waste holding points are far from surface storm water drains. Providing temporary drainage channels for runoff management within and around project site.
Impact on solid waste	Collect all solid wastes properly, recycle where possible and dispose in proper place. Follow national 3R strategy Waste rugs and waste air filters are collected properly and disposed to the landfill. Spoil should be disposed of appropriately to avoid environment conflicts.
Impact on Air Quality	Collect dust if any from the container and container land properly with dust collector machine
Impact on health and safety	Set up warning signs, signals and provide helmets for workers in accordance with relevant accident prevention and work safety procedure. Restrict access to plan site. Supply good quality drinking water to the workers. Provide well-planed sanitary facilities. Provide regular health inspection among workers. Promote health education campaign among workers. Provision of PPEs to all workers and strict adherence to their use. Providing necessary safety signage and information as well as isolation barriers at section with high population and vulnerable groups
Noise/vibration hazard	Proper acoustic design should be made for the powerhouse building and silencer in the exhaust of each engine.

	Provide sufficient buffer strip around the project site Noise guidelines to be follow as per the Noise Pollution Control Rule, 2000 under The Environment Protection Act, 1996
Traffic congestion	Avoid carrying of materials in peak hour of road traffic
Impact on employment & family finance	Employ local people wherever possible

Source: G-RIDE Analysis

12.2 Rainwater Harvesting Infrastructure Plan

It is proposed to implement rainwater harvesting technologies at ICD Morbi to reduce the scarcity of water for day to day and future uses. Below are the technologies will use for this purpose:

- **Insitu** - The in-situ technology is a method where the storage of collected rainwater in a direct way is utilized immediately. the storage for the maximum amount of rainwater during the wet season is made for use later when rain is low during the dry season
- **Surface water** - Surface water is water on the surface found on wetlands that is non saline and is replenished by one of the processes in the hydrologic cycle—precipitation. The surface water supports the replenishment of groundwater aquifer supply if it is channeled efficiently. In most urban areas, the surface water is wasted and polluted. The wasting can be mitigated with proper utilization of surface water from rain via rainwater harvesting and storing it into the aquifer.
- **Ground water recharge** - Groundwater recharge is a process where groundwater is supported by several techniques to add or bring back the health of the groundwater for sustainability.

12.3 Implementation for Renewable Energy

With reference to renewable energy, it is proposed for the installation of solar panels over buildings, warehouse for which G-RIDE intends required to do the detail analysis for the Power Management. It is proposed to install latest technology N-type (IBC) monocrystalline silicon cells over the whole feasible area for generating more power wherein panel conversion efficiency has increased from 15% to over 22%.

In addition to the policies and procedures as per environment board, it is intended to propose that vehicles and machinery used for the transportation of waste shall be cleaned on regular basis. Cleaning and disinfection shall be conducted in a standardized manner or by automated means that will guarantee an adequate level of cleanliness. A standard operating procedure for cleaning and sustainability shall be prepared. In addition, a schedule for routine and preventive maintenance shall be conducted for all the machinery and system. In order to provide service at global level, ICD Rafaleshwar shall opt for certification for ISO 9001-2008. world's most widely recognized Quality Management standard which demonstrates our longstanding commitment to quality & client's satisfaction.