



**Pre-Feasibility for  
Proposed MMLP at  
Jogighopa**

**FINAL REPORT**



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# EXECUTIVE SUMMARY



# Executive Summary

The North-Eastern region of the country is well connected via rail and road. Based on primary interactions with stakeholders it is understood that significant improvement is required in terms of augmenting the existing logistics infrastructure. At present, ~ 80 Million Tonnes Per Annum (MTPA) of cargo moves into, outwards and within the region. They are handled either at godsheds managed by Indian Railways which are fraught with infrastructural issues or on trucks moving on roads.

The National Waterway-2 or the stretch from Dhubri to Sadiya of River Brahmaputra flows across the state of Assam. It is directly connected to important ports like Haldia and Kolkata on the eastern coast via Indo-Bangladesh Protocol route. The protocol route is important as it reduces the distance between the states located along the eastern coast of the country with those like Tripura, Manipur and Nagaland. Owing to the connectivity facilitated by waterways, it could possibly be used as an alternative to existing modes of transport. To assess the same, overall market size of the region were estimated by way of primary interactions and secondary research. Post identification of key origin-destination pairs, assessment of logistics supply chain cost and other value added services; the cargo streams suitable for IWT were identified. It is perceived that of the overall market, ~ 6 MTPA of cargo like foodgrains, tar coal/bitumen, coal, edible oil, PoL products, fertilizers & FRM, automobiles etc. can be potentially moved using waterways to North-east in light of certain value added services.

To augment the existing logistics infrastructure in the region, there is a generic need for consolidating cargo, provide modal exchange points, value added services like warehousing, specialized handling for certain commodities like fly ash, tinning facilities etc. In such a scenario it is pertinent that terminals along National Waterway-2 network be developed as inter-modal or multi-modal terminals for becoming focal points for cargo centric services. As a part of the study conducted by the team two locations, namely Jogighopa and Silchar are identified potentially develop as multi or inter modal terminals (linked with IWT terminal). The same is validated through interactions with the Authority and state officials.

Jogighopa, owing to its geographical location within the state, holds the potential to serve the hinterlands of Upper Assam, Arunachal Pradesh, Meghalaya, Nagaland and Bhutan. Based on primary interactions with stakeholders, it is understood that stone chips originating from Bhutan could also be potentially transported using waterways to Bhutan via the proposed facility. Preliminary estimates based on market study conducted by the team reveals that ~ 6 MTPA of cargo and 12,000-13,000 units of automobiles could be the potential market catered to by the terminal.

Pre-feasibility of the proposed terminal is conducted based on reports shared by the Authority (DPR of Haldia, Dhubri, Garden Reach), industry benchmarks, primary interactions and internal studies conducted by the team. The two key stakeholders involved in the project are IWT terminal operator (Authority) and Logistics Park operator. While the former is responsible for construction and handling cargo at the terminal, latter is responsible for the same in Logistics Park. For the project, a landlord model set up is envisaged wherein the Authority develops the land for the logistics park, provides utilities (like water, sanitation, sewerage, electricity distribution system) and provides connectivity (internal roads, approach road etc). The developed land is leased out to the Operator who would be in charge of operating the Logistics Park. The operator further leases out warehouses to the cargo owners/shippers (end users) who will construct on build to suit basis.

A land requirement of ~ 112 acres is anticipated for development of the facility. The calculation is based on broad estimates of warehousing area estimates. The equipment requirement is governed by the cargo streams. Details of capital cost estimation, revenue and operating costs for the overall project and its individual components are summarised as follows:

<i>All Units in INR Crores</i>						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
<i>Project IRR</i>						
Project Revenue	19.9	29.1	43.1	63.5	97.1	135.6
Project Operating Cost	26.5	35.2	44.3	56.4	72.1	88.3

All Units in INR Crores						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
Cashflow	(6.6)	(6.2)	(1.3)	7.1	24.9	47.3
<b><u>IWT Terminal IRR</u></b>						
Terminal Revenue	18.0	26.4	38.8	57.6	87.1	122.9
Operating Cost	25.7	34.1	43.1	55.0	70.5	86.5
Cashflow	(7.7)	(7.7)	(4.4)	2.7	16.6	36.4
<b><u>Logistics Park IRR</u></b>						
Terminal Revenue	1.9	2.7	4.3	5.9	10.0	12.7
Operating Cost	0.8	1.1	1.2	1.4	1.6	1.8
Cashflow	1.1	1.5	3.1	4.5	8.4	10.9
<b><u>Economic IRR</u></b>						
Economic Cost	(26.5)	(35.3)	(44.4)	(56.4)	(72.2)	(88.3)
Economic Revenue	43.5	57.1	77.2	106.6	153.2	206.6
Net Cashflow	17.0	21.8	32.9	50.2	81.1	118.2

The results of financial pre-feasibility are as follows:

- ▶ The project IRR is computed to be ~ (0.9%) (IWT Terminal and Logistics Park).
- ▶ The IWT terminal IRR is negative owing to the subsidized scale of rates offered by the Authority.
- ▶ Logistics Park IRR is ~ 6.59%.
- ▶ The economic IRR of the project is 14.62%. Essentially due to the savings incurred on account of modal shift of cargo from existing modes of transport (rail and road) to IWT leading to low emission costs, reduction in pollution and inclusion of social costs like employment generation.



# Introduction

The North-Eastern region of the country is connected via rail and road. Commodities moved by rail are unloaded at goodsheds managed by Indian Railways which are fraught with infrastructural constraints like unavailability of round the clock services, no warehousing facilities and issues pertaining to safety and security of cargo. On the other hand, cargo moved through road is directly sent to the warehouses or distribution units in the region from other parts of the country. The cargo is moved to North-East through two entry points in Assam; Srerampore and Buxirhat which are fraught with delays in clearances. These issues lead to high transit time and increased logistics cost thereby indicating the need of robust infrastructural interventions.

The National Waterway-2 or the stretch from Dhubri to Sadiya of River Brahmaputra flows across the state of Assam. It is directly connected to important ports like Haldia and Kolkata on the eastern coast via the Indo-Bangladesh Protocol route. The protocol route is important as it reduces the distance between the states located in the eastern coast of the country with those like Tripura, Manipur and Nagaland. In order to make use of this potential, Government of India has signed Dredging MoU with Government of Bangladesh. As per the understanding, dredging is to be undertaken along Sirajganj-Daikhowa and Zakiganj-Karimganj stretch to ensure navigability throughout the year. In terms of cost sharing, 80% of the cost would be borne by the Government of India and the remaining by the Bangladesh counterparts.

With the robust connectivity facilitated by waterways, it could also be used as an alternative to existing modes of transport. To assess the same, overall market size of North-eastern region were estimated by way of primary interactions and secondary research. Post identification of key origin-destination pairs, assessment of logistics supply chain cost and other value added services the cargo streams suitable for IWT were identified. It is perceived that ~ 6 MTPA (FY 2017) of cargo like foodgrains, tar coal/bitumen, coal, edible oil, PoL products, fertilizers & FRM, automobiles etc. which currently moving into the region via the Chicken's Neck Corridor could be potentially diverted to waterways for serving the region.

There is a generic need in the region for consolidating cargo, provide modal exchange points, value added services like warehousing, specialized handling for certain commodities like fly ash, tinning facilities etc. In such a scenario it is pertinent that terminals along the National Waterway-2 network be developed as inter-modal or multi-modal terminals for becoming focal points for cargo centric services.

Based on the study of assessment of modal shift of cargo to IWT and further interactions with state authorities and officials at IWAI, it is understood that locations like Jogighopa and Silchar in Assam could be used for developing multi-modal logistics park (MMLP). Jogighopa is located in Upper Assam on the banks of River Brahmaputra. Silchar is located on the banks of river Barak (National Waterway-16). Owing to their strategic locations, the two terminals could possibly cater to demands of the region and provide alternate routes for connectivity.

The cargo that could potentially get diverted to waterways is distributed amongst the two terminals based on the hinterland they would serve. The consumption pattern and industrial profiling govern the cargo market the terminals cater to. Accordingly, the bouquet of services required to serve the commodities would be obtained. The locations and their influence areas are presented in the map below:



As can be seen from the figure above, proposed terminals at Jogighopa and Silchar hold the potential to serve the region:

- ▶ Jogighopa: parts of Upper Assam, Arunachal Pradesh, Meghalaya, Nagaland and Bhutan
- ▶ Silchar: Southern Assam (Barak Valley), Tripura, Manipur and Mizoram

These terminals could facilitate transit storage facility for stone chips cargo originating from Bhutan and moving towards Bangladesh via the Jogighopa terminal. Various other facilities like consolidation, packaging/re-packaging, tinning facility for edible oil etc. could be facilitated at these terminals. At present, Guwahati is the hub from where cargo is distributed to the region. These terminals could possibly become the distribution centers catering to their respective catchment areas leading to reduction in transit times and costs.

With the 'Look East Policy' of the government there is increased focus to augment the logistics infrastructure in the North-East by providing alternative routes of connectivity and logistics parks. In line with the same, pre-feasibility assessment for a multi-modal logistics park linked to an IWT terminal at Jogighopa is conducted.

# 1 Market Analysis

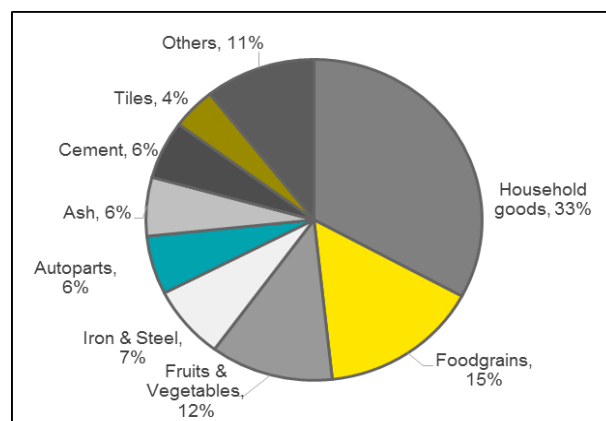
One of the pre requisites for pre-feasibility analysis is robust understanding of the market. For the proposed terminal at Jogighopa, the activity is carried out based on the insights collected from a combination of secondary research, earlier studies conducted by the consultants and primary interactions with stakeholders like IWAI, cargo owners and shippers. Based on the information gathered, the divertible cargo to IWT is identified<sup>1</sup> based on logistics cost assessment, identification of O-D pairs and value added services required to attract the cargo. Post the identification of divertible cargo, the volume likely to get attracted to the proposed terminal facility is arrived at based on their catchment areas.

The chapter provides an insight of the cargo market of North-east, potential volume which could be diverted to waterways and thereafter onto the proposed MMLP at Jogighopa.

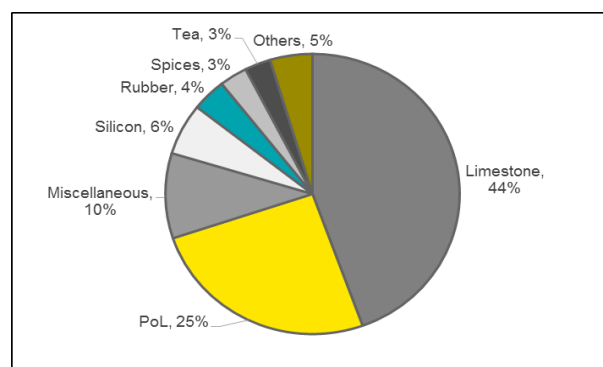
## 1.1 Overview of North-East Cargo Market

Based on the information gathered through a series of interactions and information gathered through secondary sources, the overall cargo market of the North-Eastern Region is estimated to be ~ 80 MTPA. Of which:

**Movement into North-east:** ~25 MTPA of cargo related to infrastructure development and household consumption moves into the PIA through Chicken's Neck Corridor from various origin points across the country. Commodities like household goods (including FMCG products and electronics like television, fridge etc.), foodgrains, fruits & vegetables, fly ash, tiles etc move into the PIA from various states like West Bengal, Chhattisgarh, Maharashtra, Rajasthan, Delhi, Haryana, and Madhya Pradesh amongst various other states. The pie chart below represents the key commodities that are moved into the PIA and their respective contribution to the overall market.



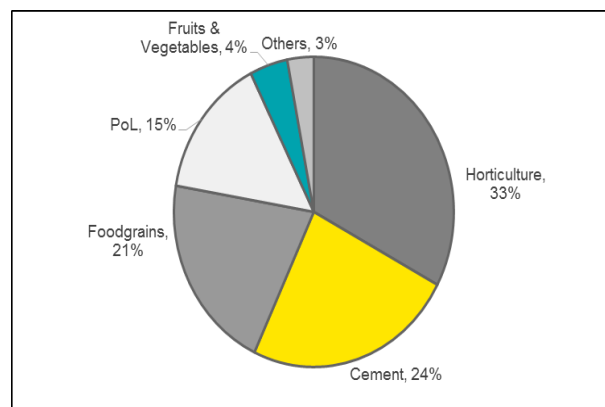
► **Movement outside of North-east:** ~24 MTPA of cargo is moved out from North-East. This is essentially dominated by limestone movement from Meghalaya to Bangladesh via the Dawki border and agricultural commodities like cashew nuts, beetlenut leaves, jute, tea, crude, petroleum products amongst various other commodities. The pie chart below represents the key commodities that are moved into the PIA and their respective contribution to the overall market.



<sup>1</sup> Details are presented in the “Study of modal shift of cargo passing through Siliguri Chicken’s Neck Corridor destined for North-East and neighbouring countries to IWT”



- ***Movement within North-east:*** Apart from the commodities moving into and outside the PIA, ~ 30 MTPA moves within the PIA. This mostly comprises of horticulture produce, foodgrains, cement and petroleum and other liquid products. The pie chart below represents the key commodities that are moved into the PIA and their respective contribution to the overall market.



The cargo streams based on their nature of movement are summarized in the table below:

Commodity	Volume (in MTPA)	Origin	Destination
<b><i>Movement into North-East</i></b>			
Household Goods	~ 7-8.0	Delhi, Gujarat, West Bengal, Maharashtra	Assam as the distribution center (Guwahati, Jorhat, Tinsukia). Further distributed to other parts of North-East
Foodgrains	~ 3-4.0	Punjab, Delhi, West Bengal, Madhya Pradesh, Karnataka, Bihar, Chhattisgarh, Uttarakhand, Maharashtra	Unloaded at FCI sidings and godsheds across North-East and moved to warehouses.
Horticulture	~ 2.5- 3.0	Uttar Pradesh, Maharashtra, West Bengal,	Across North-Eastern states
Iron & Steel	~1.8- 2.0	Chhattisgarh, Karnataka, Odisha, Jharkhand, West Bengal	Guwahati cluster; further distributed to other parts of North-East
Cement & Clinker	~ 1- 1.5	Chhattisgarh, Gujarat, Jharkhand, Maharashtra, West Bengal	Assam (Guwahati cluster)
Fly Ash	~ 1- 1.5	Power Plants in Bihar, West Bengal, Jharkhand	Guwahati cluster; further moved to serve cement & clinker plants in central Assam and Meghalaya
PoL & Crude	~ 1.0	Delhi, Gujarat, West Bengal, Bihar, Uttar Pradesh	Refineries in Assam (Bongaigaon, Guwahati, Dibrugarh cluster)
Ballast	~ 0.7	Jharkhand, West Bengal	Bongaigaon, Guwahati and Dibrugarh cluster
Pharmaceuticals	~ 0.5	Uttarakhand, Himachal Pradesh, Gujarat	Guwahati as the main hub; further distributed to other North-eastern states
Autoparts	~ 0.5	Haryana, Maharashtra, Delhi, Punjab	Guwahati as the main hub; further distributed to other North-eastern states



Commodity	Volume (in MTPA)	Origin	Destination
Fertilizers & FRM	~ 0.4- 0.5	Andhra Pradesh, West Bengal, Uttar Pradesh, Odisha	Guwahati and Dibrugarh cluster
Containers	~ 0.4	Jharkhand, Odisha, Punjab, Rajasthan West Bengal	CONCOR facility at Amingaon (Guwahati cluster)
Edible Oil	~ 0.3	West Bengal	Guwahati as the main hub; further distributed to other North-eastern states
Tar Coal/Bitumen	~ 0.2	Maharashtra, West Bengal	Guwahati cluster
Imported Coal	~ 0.1	West Bengal	Guwahati cluster; further moved to serve cement & clinker plants in central Assam and Meghalaya
Miscellaneous (forest products, chemical products, military items, stone amongst various other commodities moved in small parcel sizes)	~ 4-5	Andhra Pradesh, Delhi, Gujarat, Maharashtra, West Bengal	Across North-Eastern states
Automobiles	~ 120,000- 130,000 units	Maharashtra, Haryana, Tamil Nadu, Rajasthan, Uttarakhand, Andhra Pradesh	Guwahati cluster
<b>TOTAL</b>	<b>~ 25 MTPA + Automobile units</b>		
<b><i>Movement outside North-East</i></b>			
Limestone	~ 10- 11	Shillong cluster	Bangladesh
PoL & Crude	~ 6	Dibrugarh, Guwahati, Bongaigaon cluster	Bihar and West Bengal
Horticulture	~ 2- 2.5	Across North-Eastern states	Distributed across the country
Cement & Clinker	~ 0.2- 0.3	Shillong & Guwahati cluster	Bihar, West Bengal
Fertilizers & FRM	~ 0.3- 0.4	Dibrugarh cluster	Bihar, West Bengal
Silicon	~ 1- 1.5	Shillong cluster	Distributed across the country
Tea	~ 0.6- 0.7	Dibrugarh, Guwahati, Shillong cluster	Auctioneers in West Bengal and across the country
Ballast	~ 0.2	Bongaigaon cluster	West Bengal
Miscellaneous (containers, military items, seasonal agricultural commodities)	~ 4- 5	Across North-eastern states	Distributed across the country



Commodity	Volume (in MTPA)	Origin	Destination
TOTAL	~ 24 MTPA		
<b>Movement within North-East</b>			
Horticulture	~ 11	Across North-East	Utilized for self-consumption and surplus sold in nearby markets
Cement & Clinker	~ 8- 9	Guwahati and Shillong cluster	Across North-East
Foodgrains	~ 6- 7	Across North-East	Utilized for self-consumption and surplus sold in nearby markets
PoL & Crude	~ 4- 5	Guwahati, Bongaigaon, Dibrugarh cluster	Across North-east
Fertilizers & FRM	~ 0.3 0.4	Dibrugarh cluster	Across North-East
Ballast	~ 0.4- 0.5	Guwahati, Bongaigaon, Dibrugarh cluster	Guwahati, Bongaigaon, Dibrugarh cluster
Coal	~ 0.05-1	Dibrugarh cluster (coal fields in upper Assam)	Guwahati cluster
TOTAL	~ 30 MTPA		

*Table 1: Summary of North-East Market Analysis*

## 1.2 International Cargo

The Chicken's Neck Corridor acts as a link to facilitate trade between Bhutan and Bangladesh. Phuentsholing in Bhutan is the gateway from which trade is facilitated. The cargo is moved into Bangladesh from Changrabandha located in West Bengal (Burimari is the corresponding Bangladeshi point). On entering Bangladesh, the trucks are unloaded and loaded to the Bangladeshi trucks in order to serve the local hinterland. As understood based on primary interaction with State Trading Corporation and Export Promotion Council of Bhutan, the potential demand of stone chips is as high as **3-4 MTPA**, however owing to congestion issues, lack of availability of truck and increased expenses incurred in terms of road transportation, only **10-20% of the trade is realized**.

## 1.3 Potential for Waterways

Post the identification of market, suitability of cargo streams for IWT is assessed. The assessment is based on:

- ▶ Identification of O-D pairs of cargo,
- ▶ Analyzing logistics cost of existing supply chain of the commodity in terms of commercials involved in the movement of cargo
- ▶ Identifying key logistics determinants which drive the supply chain.

The costs involved in various steps are gathered from railway freight tables, interactions with port officials, interactions with IWT officials, logistics players and good sheds. It is then compared to the transport supply chain with IWT incorporated into it. The handling terminals are considered to be the nearest IWT terminal from the origination/destination point of the cargo.

It is essential to note that in order to divert the cargo from their existing modes, various value added services like warehousing, specialized handling, packaging etc would need to be provided. The table below summarizes the potential streams that could be diverted to IWT:

Target Stream	Volume (MTPA)	Key Logistics Driver	Value Proposition
Food grains	~ 1.5	<ul style="list-style-type: none"> <li>▶ Bulk commodity</li> <li>▶ Total logistics cost</li> <li>▶ Warehousing facilities</li> </ul>	<ul style="list-style-type: none"> <li>▶ The cargo originating from Haldia Dock Complex is diverted to IWT</li> <li>▶ Transit warehousing facility at proposed Haldia multi-modal terminal for FCI</li> <li>▶ Point of aggregating cargo for local 'mandi' players</li> <li>▶ Dedicated warehousing at destination IWT terminal. By way of silo storage (Encouraging private players by way of FCI's Private Entrepreneur Guarantee Scheme) or Covered warehousing space</li> </ul>
Tar Coal/ Bitumen	~ 0.6	<ul style="list-style-type: none"> <li>▶ Bulk Commodity</li> <li>▶ Total logistics cost</li> </ul>	<ul style="list-style-type: none"> <li>▶ The cargo originating from Haldia Dock Complex is diverted to IWT</li> <li>▶ Transit warehousing facility at proposed Haldia multi-modal terminal for IOCL</li> <li>▶ Movement of bitumen could be facilitated in bulk form and tinning facilities to be provided at destination terminal as a value add service</li> </ul>
Fertilizers & FRM	~ 0.35	<ul style="list-style-type: none"> <li>▶ Bulk Commodity</li> <li>▶ Total logistics cost</li> <li>▶ Warehousing facilities</li> </ul>	<ul style="list-style-type: none"> <li>▶ The FRM imported at Haldia Dock Complex is diverted to IWT</li> <li>▶ Transit warehousing facility at proposed Haldia multi-modal terminal</li> <li>▶ Storage facility at destination terminal.</li> </ul>
Edible Oil	~ 0.3	<ul style="list-style-type: none"> <li>▶ Bulk Commodity</li> <li>▶ Total logistics cost</li> <li>▶ Warehousing facilities</li> </ul>	<ul style="list-style-type: none"> <li>▶ The cargo originating from Haldia Dock Complex is diverted to IWT</li> <li>▶ Transit warehousing facility at proposed Haldia multi-modal terminal for dealers; terminal would also act as a cargo aggregating facility</li> <li>▶ Movement of edible oil could be facilitated in bulk form and tinning facilities to be provided at destination terminal as a value add service</li> </ul>
PoL products	~ 0.15	<ul style="list-style-type: none"> <li>▶ Bulk Commodity</li> <li>▶ Total logistics cost</li> <li>▶ Warehousing facilities</li> </ul>	<ul style="list-style-type: none"> <li>▶ The cargo originating from Haldia Dock Complex is diverted to IWT (motor spirit and superior kerosene oil)</li> <li>▶ Transit warehousing facility at proposed Haldia multi-modal terminal</li> <li>▶ Storage facilities at destination IWT terminal</li> </ul>
Imported Coal	~ 0.05	<ul style="list-style-type: none"> <li>▶ Bulk commodity</li> <li>▶ Total logistics cost</li> </ul>	<ul style="list-style-type: none"> <li>▶ The cargo originating from Haldia Dock Complex is diverted to IWT (motor spirit and superior kerosene oil)</li> <li>▶ Transit warehousing facility at proposed Haldia multi-modal terminal</li> </ul>
Stone Chips	~ 3 MTPA	<ul style="list-style-type: none"> <li>▶ Bulk Commodity</li> <li>▶ Total logistics cost</li> <li>▶ Specialized handling</li> </ul>	<ul style="list-style-type: none"> <li>▶ Movement from Bhutan to hinterlands of Bangladesh (mostly Dhaka)</li> <li>▶ Transit storage facility at Jogighopa terminal</li> <li>▶ Adequate handling requirement to handle specified cargo</li> </ul>

Target Stream	Volume (MTPA)	Key Logistics Driver	Value Proposition
			► Specific terminal design
Cement & Clinker	~ 1 MTPA	<ul style="list-style-type: none"> <li>► Bulk commodity</li> <li>► Total logistics cost</li> <li>► Warehousing facility</li> </ul>	<ul style="list-style-type: none"> <li>► Outward movement from North-East towards Bangladesh</li> <li>► Policy intervention by way of relaxing export duties</li> </ul>
Fly Ash	~ 1 MTPA	<ul style="list-style-type: none"> <li>► Bulk Commodity</li> <li>► Total logistics cost</li> <li>► Specialized handling</li> </ul>	<ul style="list-style-type: none"> <li>► Integration of NW-2 with NW-1 via Indo-Bangladesh Protocol Route</li> <li>► Freight incentives on IWT</li> <li>► Specialized handling at terminals</li> </ul>
Automobiles	~ 15,000-18,000 units	<ul style="list-style-type: none"> <li>► Safety and security of cargo</li> <li>► Total logistics cost</li> </ul>	<ul style="list-style-type: none"> <li>► Policy intervention by way of freight incentives on coastal movement of automobiles</li> <li>► Freight incentives on IWT</li> <li>► Parking facility at destination terminal</li> <li>► Development of IWT as a local distribution hub for North-East</li> </ul>

Table 2: Market Development Plan for IWT

## 1.4 Potential for MMLP at Jogighopa

Jogighopa is located on western side of Assam, on the Northern banks of river Brahmaputra. It is a notified terminal by IWAI and is pre-dominantly used for handling project cargo like turbines and heavy machineries. The terminal is marked by the presence of a floating pontoon. It is connected to major ports like Haldia and Kolkata via the Indo-Bangladesh Protocol Route (Kolkata- Mongla- Sirajganj- Daikhowa route). It is 1330 kms away from Haldia Port.

Jogighopa is well placed in terms of its connectivity to other parts of Assam and the nearby industrial area. The IOCL refinery at Bongaigaon, also the largest in the region is in the vicinity of the terminal. As understood, the proposed terminal would serve the hinterlands of Upper Assam, Arunachal Pradesh, Nagaland and Bhutan. The terminal could be developed as a hub for cargo with the provision of value added services. It could potentially act as a transshipment terminal from where the cargo is further distributed to serve the hinterland via inter-modal terminals along the waterway network. The last mile connectivity to the destination being facilitated on road.

The table below elaborates the hinterland that could be potentially served by Jogighopa and the corresponding IWT terminals for catering to the needs of vicinity. For instance, to serve the districts of Sibsagar, Jorhat, Golaghat and Lakhimpur collectively defined as Upper Assam; IWT terminal at Neamati could be used. The details are presented as follows:

Inter-Modal/Multi-Modal Terminal Location	State/District	Nearest IWT terminal
Jogighopa	Upper Assam- Dhubri, Barpeta, Goalpara, Kokrajhar, Udalgiri, Nalbari, Bongaigaon, Chirang	Jogighopa
	Upper Assam- Sibsagar, Jorhat, Golaghat, Lakhimpur	Neamati
	Upper Assam- Kamrup, Kamrup Metro, Marigaon, Baksa, Darrang	Pandu
	Upper Assam- Dibrugarh, Tinsukia, Dhemaji	Sengajan/Dibrugarh
	Upper Assam- Nagaon, Sonitpur, Karbi Anglong	Silghat

Inter-Modal/Multi-Modal Terminal Location	State/District	Nearest IWT terminal
	Meghalaya	Pandu
	Nagaland	Neamati
	Arunachal Pradesh	Tezpur
	Bhutan (along Rangiya border where the stone crushing units are present)	Jogighopa

*Table 3: Jogighopa- Influence Area of the proposed facility*

The potential cargo market for the two terminals is based on key demand drivers of the respective streams. As most are consumption driven, it is based on the consumption pattern. Whereas streams like fertilizers & FRM, PoL products, fly ash are based on industrial profile of the catchment area.

Based on the drivers for each commodity, the potential volume that could be attracted to Jogighopa (FY 2018) is presented in the table below:

Commodity	Volumes (in MTPA)	Value Added Services
Foodgrains	~ 1.12	Warehousing/ Provision for Silo facility and then further distribution to hinterlands via waterways or road.
Fertilizers & FRM	~ 0.37	Transit warehousing at Jogighopa and then further movement to Dibrugarh terminal
Tar Coal/ Bitumen	~ 0.54	Warehousing facility
PoL & Crude	~ 0.11	Specialized handling & storage in tanker form (Leasing out land to the corresponding player who would built is as per requirement)
Edible Oil	~ 0.23	Tinning facility in case of bulk movement otherwise warehousing facility. Jogighopa could potentially act as a distribution facility
Fly Ash	~ 0.75	Specialized handling and storage
Imported Coal	~ 0.05	Separate berth would be needed for handling coal. Warehousing facilities
Stone Chips	~ 2-3	Transit Storage facilities
Automobiles	~ 12,000-13,000 units	Car park area. Jogighopa could potentially act as a distribution centre to cater to the PIA for the MMLP
<b>TOTAL</b>	<b>~ 6 MTPA + Automobile Units</b>	

*Table 4: Jogighopa- Preliminary Analysis (Potential Market)*

For assessing the pre-feasibility, it is considered that the construction of the facility would begin in FY 2019. Assuming a construction period of three years, it would be operational in FY 2022. In terms of attractable cargo volumes, it is estimated that of the overall potential, the facility would attract:



- **Outbound traffic-** Moving out from the terminal. Around 30-35% of stone chips originating from the crushing units along Southern Bhutan using transit warehousing facility at the terminal for movement towards Bangladesh.
- **Inbound traffic-** Moving into the region via the waterway terminal. Around 15-20% of the remaining cargo streams (for instance foodgrains, fertilizers & FRM, imported coal, PoL products, automobiles, edible oil etc) originating from Haldia.

Attractable volumes for the terminal are presented as follows:

<i>All figures in MTPA</i>						
Commodity	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
Foodgrains	0.34	0.35	0.35	0.36	0.37	0.37
Fertilizers & FRM	0.14	0.16	0.19	0.22	0.27	0.31
Tar Coal/ Bitumen	0.29	0.46	0.74	1.18	1.89	2.74
PoL & Crude	0.04	0.04	0.05	0.05	0.05	0.06
Edible Oil	-	0.09	0.09	0.10	0.12	0.12
Fly Ash	0.25	0.27	0.29	0.31	0.33	0.35
Imported Coal	0.02	0.02	0.02	0.02	0.02	0.02
Stone Chips	1.04	1.21	1.40	1.62	1.88	2.12
<b>TOTAL</b>	<b>2.11</b>	<b>2.59</b>	<b>3.12</b>	<b>3.87</b>	<b>4.92</b>	<b>6.10</b>
Automobile Units	5,565	5,995	6,459	6,958	7,496	7,956

*Table 5: Jogighopa- Attractable Cargo market*

The proposed terminal at Jogighopa would not only act as a warehousing centre but also a distribution hub for movement of cargo within the region. The distribution could be facilitated on various modes of transport viz rail, road, waterways.

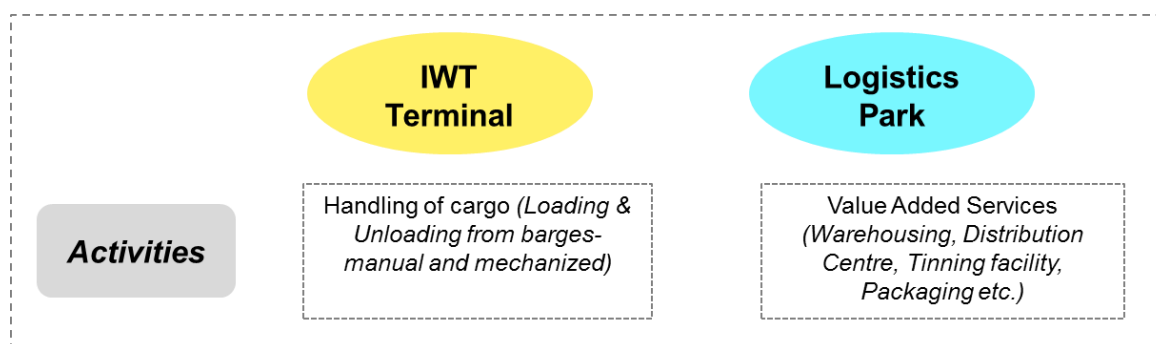
As mentioned, for the purpose of distribution of cargo to the hinterlands- rail, road and waterways could be used. However, it is to be noted that railway is likely to be commercially unviable for short lead. As revealed in interactions, road freight for internal distribution of commodities is INR 7-9/tn-km (end to end with two handlings). In case of rail, the freight is INR- 1.8- 2.5/tn-km which excludes last mile movement on road, multiple handling (unloading at terminal, loading on trucks and another set of handling at destination point). The cumulative cost of handling and transportation in case of railways would be INR 11-12.5/tn-km. Thus, railways becomes more expensive than that of road, making it unattractive. Hence, for pre-feasibility only road and IWT mode is considered.

Based on the estimated cargo volumes and nature of cargo, the pre-feasibility assessment is carried out with the assumption of 3 berths at the IWT terminal. 1 berth specifically for clean cargo ie foodgrains, fertilizers & FRM and 2 berths for stone chips, coal and fly ash. For PoL, edible oil and tar coal/bitumen it is proposed that the land would be leased out to the end user who would then built the terminal (build to suit).

## 2 Infrastructure Assessment

The proposed facility at Jogighopa (termed as project) has two components: IWT terminal and Logistics Park. Pre-feasibility assessment is carried out for the overall project. The cargo moved inwards and outwards from the facility would be handled at the IWT terminal. The logistics park would augment the locational advantage of the facility by acting as warehousing center for cargo, transit warehousing facility, value added services like tinning facility for edible oil, packaging, re-packaging etc and distribution center.

Two key stakeholders are envisaged in the project: IWT terminal operator and facility operator (who would operate the logistics park). The responsibility of the former is handling cargo at the terminal moved in/out through barges, whilst that of latter is handling of cargo in the logistics park. The key activities undertaken by them are summarized in the figure:



Based on the cargo profiling and the value added services identified in the previous chapter, this chapter details out the infrastructure required to handle the same- land requirement for the proposed facility and equipments required.

### 2.1 Warehousing Area Requirement

The type of storage facility required by a commodity is dependent on various factors like nature of commodity, average dwell time, storage area required per tonne of cargo. The area required for storage is warehousing area. The type of warehousing/storage requirement for various commodities likely to be attracted to the proposed facility are as follows:

- ▶ Foodgrains & Fertilizers: Covered warehousing area
- ▶ Stone chips: Open space required for warehousing
- ▶ Imported coal: Open warehousing space (transit warehousing facility)
- ▶ PoL products, bitumen & edible oil: tank based storage

Warehousing area requirement for each commodity is calculated based on maximum annual area requirement over a period of 25 years. For calculating the same, peaking factor of 20% is considered on total annual volumes that require storage. The mathematical formula for calculating warehousing area requirement for each commodity is present below:

$$\begin{aligned} \text{Warehousing area (sq metre)} &= \text{Max \{Commodity volume handled}_t \text{ (tonnes) * \% of volume requiring warehousing} \\ &\quad * (1 + \text{Peaking factor}) * \text{Average dwell time of commodity} - 365 \\ &\quad * \text{Storage area required (sq metre) per tonne of cargo} \end{aligned}$$

The determinant variables for commodities are as follows:

Commodity	Maximum Annual Volume (MTPA)	% Volume requiring warehousing	Avg. Dwell time (days)	Storage Area (sq. metre/tonne)	Warehousing Area (sq. metre)
Foodgrains	0.34	50%	30	1.25	22,961
Fertilizers & FRM	0.14	50%	15	1.25	9,421

Commodity	Maximum Annual Volume (MTPA)	% Volume requiring warehousing	Avg. Dwell time (days)	Storage Area (sq. metre/tonne)	Warehousing Area (sq. metre)
PoL products+ Tar Coal/Bitumen+ Edible Oil	2.92	100%	15	0.42	60,187
Imported Coal	0.02	30%	15	1	333
Stone Chips	1.04	30%	1.5	1.09	18,868
<b>TOTAL</b>	<b>4.46</b>				<b>1,11,770</b>
<b>Maximum Annual Volume in Units</b>					
Automobiles Units	5,565	100%	3	20.24	1,588

Table 6: Warehousing Area Requirement- Key Determinants

Based on the calculations and assumptions discussed in the above tables, total warehousing requirement is estimated at 113,358 square metre, roughly 28.00 acre.

## 2.2 Facility Area Requirement

Storage area of the facility is a function of warehousing area requirement. This includes warehousing area and additional area required for movement of equipments within the warehouse unit, open spaces for providing value added services like packaging/re-packaging, labelling, space in between cargo stacks for movement etc. Thus, taking cognizance of these elements and as per industry benchmarks, total storage area is assumed to be two times warehousing area. For the proposed terminal at Jogighopa the total storage area requirement of 226,716 square metre, roughly 56.00 acre.

Overall facility area includes area for building other infrastructure and facilities like internal roads, administration building, loading and dispatch yard, truck parking facility, fuel station and other ancillary infrastructure. Thus, owing to these factors the overall area required for the facility is assumed to be two times that of the warehousing area. For the proposed terminal it is estimated to be 453,430 square metre or ~ 112 acres.

## 2.3 Handling Equipments

The equipments required to handle various cargo streams in the facility depend upon the nature of the cargo, quantum to be handled and specialized handling needs (if required). To estimate the equipment's required at Jogighopa terminal, the way each commodity is likely to be handled is presented as follows:

Commodity	Handling of Commodity
Coal	<ul style="list-style-type: none"> <li>▶ It is anticipated that the incoming coal cargo would be manually handled at the facility.</li> <li>▶ The barges loaded with coal from Haldia, would be manually unloaded from the barges and dumped on the wharf.</li> <li>▶ Thereafter, directly delivered to the consigner on trucks.</li> </ul>
Fertilizers & FRM	<ul style="list-style-type: none"> <li>▶ It is anticipated that the incoming fertilizer &amp; FRM would be manually handled at the facility.</li> <li>▶ The barges loaded with FRM from Haldia, would be manually unloaded from the barges and dumped on the wharf.</li> <li>▶ They are then loaded onto the Internal Transfer Vehicles (ITV) and moved to the terminal facility for warehousing.</li> </ul> <p>The terminal facilitates as a distribution center from where the cargo is transferred across the state either through waterways or any other mode of transport.</p>

Commodity	Handling of Commodity
Foodgrains	<ul style="list-style-type: none"> <li>It is anticipated that the incoming foodgrains would be manually handled at the facility.</li> <li>The barges loaded with foodgrains from Haldia, would be manually unloaded from the barges and dumped on the wharf.</li> <li>They are then loaded onto the Internal Transfer Vehicles (ITV) and moved to the terminal facility for warehousing.</li> </ul> <p>The terminal facilitates as a distribution center from where the cargo is transferred across the state either through waterways or any other mode of transport.</p>
Fly Ash	<ul style="list-style-type: none"> <li>It is a dirty cargo, polluting in nature and is mechanically handled.</li> <li>The barges loaded with fly ash from Farakka would be transferred to the silos pneumatically by pumps.</li> <li>The silos would be placed at the terminal facility, providing lease rental to the logistics park operator.</li> </ul>
Stone Chips	<ul style="list-style-type: none"> <li>The commodity is moved outwards from the facility to Bangladesh and is mechanically handled.</li> <li>Stone chips are moved into the facility from Bhutan on trucks and unloaded on to the ground.</li> <li>The heaps are loaded on to the conveyer systems using front end loader and thereon loaded on to the barges using a fixed barge loader.</li> </ul>
PoL Products & Bitumen	<p>The PoL products are currently imported at Haldia Port in tanker vessels. It is then moved to the refineries/facilities through pipelines and stored in tanks. The domestic transfer is then facilitated in tins and moved across the country through rail or road. A similar arrangement is proposed for the facility at Jogighopa.</p> <ul style="list-style-type: none"> <li>The inland vessels loaded with cargo would be handled at the IWT terminal. Owing to the specialized nature of handling, the operator would be drawing lease rental wherein the facilities would be built to suit by the consigner.</li> </ul>
Edible Oil	<p>The cargo is currently imported at Haldia Port in tanker vessels. It is then moved to the refineries/facilities through pipelines and stored in tanks. The domestic transfer is then facilitated in tins and moved across the country through rail or road. A similar arrangement is proposed for the facility at Jogighopa.</p> <ul style="list-style-type: none"> <li>The inland vessels loaded with cargo would be handled at the IWT terminal. Owing to the specialized nature of handling, the operator would be drawing lease rental wherein the facilities would be built to suit by the consigner.</li> </ul>
Automobiles	Ro-Ro arrangement from the terminal to the parking area within the facility


*Table 7: Method of Handling cargo at the facility*

Based on the above, the handling equipment's required along with their corresponding costs<sup>2</sup> at the facility (IWT terminal and MMLP) are summarized in the following table<sup>3</sup>:

Equipments	Units (in numbers)	Cost (INR Crore/unit)	Total Cost (INR Crore)
Stone chips conveyer	1	15.0	15.0

<sup>2</sup> Reference: Costs taken from Haldia DPR as shared by the Authority

<sup>3</sup> Note: the equipment estimate is based on preliminary estimates made by the team. The number and equipment type may vary based on detailed estimates prepared in DPR stage



Equipments	Units (in numbers)	Cost (INR Crore/unit)	Total Cost (INR Crore)
Fixed Barge Loader	1	5.0	5.0
Road Weigh Bridge	2	0.2	0.4
Internal Transfer Vehicles (ITV)	10	0.5	5.0
Front End Loader	2	0.8	1.6
Dumper Trucks	6	0.5	3.0
Silo for Fly Ash	1	3.0	3.0
<b>TOTAL COST (INR Crores)</b>			<b>33.0</b>

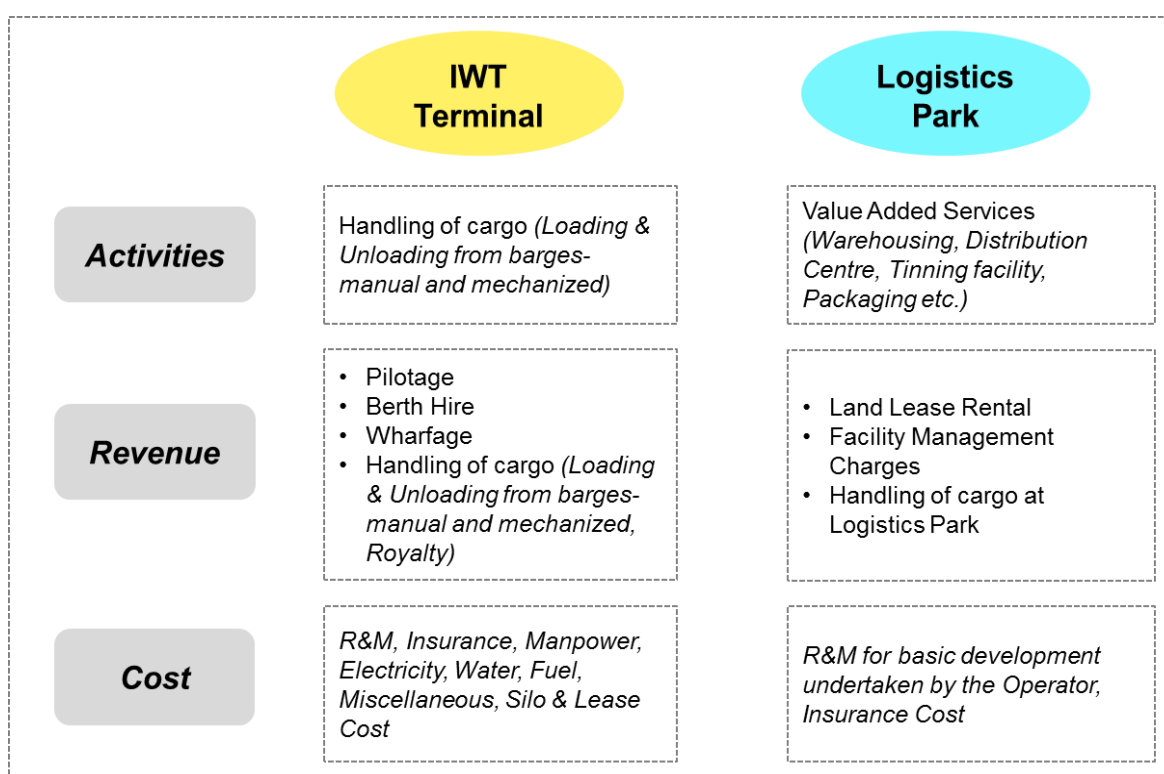
*Table 8: Equipment Estimates*

Post the estimation of land and equipment requirement, financial assessment is conducted for computing IRR estimates.

### 3 Financial Assessment

As discussed in the previous section, the two key stakeholders involved in the project are IWT terminal operator (Authority) and Logistics Park operator. While the former is responsible for handling cargo at the terminal, the latter is responsible for the same in Logistics Park. For the project, a landlord model set up is envisaged wherein the Authority develops the land, provides utilities (like water, sanitation, sewerage, electricity distribution system) and provides connectivity (internal roads, approach road etc). The developed land is leased out to the Operator who would be in charge of operating the Logistics Park and the warehouses are used by the end user on build to suit basis.

As discussed in the previous chapter, the land requirement for the facility is ~110 acre and the overall cost of handling equipments is INR 33 crore. Based on these estimates, the capital cost for the IWT terminal and Logistics Park is estimated. The revenue estimates are based on the revenue streams likely to emerge from the project. The same is summarized in the figure below:



#### 3.1 Capital Cost Estimates

Capital cost is estimated for IWT terminal and the proposed MMLP facility. The estimates are based on preliminary assessment made by the team, DPRs of similar terminals shared by the Authority and studies conducted by the Consultant on similar project. The estimates are summarized as follows:

Capital Cost Particulars	Cost (INR Crore/unit)
<b>TERMINAL CAPEX</b>	
<b>Land &amp; Site Development</b>	<b>11.6</b>
Berths	111.0
Conveyor Gallery	12.0
<b>Jetty</b>	<b>123.0</b>
Terminal Administration Building	2.6
Workers Amenity Building	0.3
Security Office	0.1
Weigh Bridge Control Room	0.1

Capital Cost Particulars	Cost (INR Crore/unit)
RIO room for ash handling	0.1
Gate house complex	2.0
Storage shed	5.5
<b>Building &amp; Shed</b>	<b>10.7</b>
<b>Roads</b>	<b>18.0</b>
Water supply & Distribution	1.5
Drainage work	2.0
Sewerage system	0.5
Electrical distribution & IT system	14.0
Firefighting system	0.1
<b>Utilities &amp; Others</b>	<b>18.1</b>
<b>Equipments</b>	<b>33.0</b>
<b>TOTAL TERMINAL CAPEX (I)</b>	<b>214.3</b>
<b>BASIC DEVELOPMENT COST FOR LOGISTICS PARK</b>	
Construction of internal roads	20.0
Construction of building works	0.93
Electrical sub-station & area lighting	2.5
Compound wall	4.0
Construction of elevated storage reservoir	1.5
Construction of sewage treatment plant	1.25
Levelling & Consolidation- cutting & filling of plots	2.0
Construction of firefighting station	1.0
Construction of entry/exit gates	0.2
Contingency @ 10%	3.34
<b>Trunk Infrastructure (II)</b>	<b>36.71</b>
<b>TOTAL CAPEX (I + II)</b>	<b>252.0</b>

*Table 9: Capital Cost Estimates*

## 3.2 Operating Cost Estimates

Operating costs are estimated for IWT terminal and the proposed MMLP facility. The estimates are based on the DPRs of similar terminals shared by the Authority and studies conducted by the Consultant on similar project. The key components and the assumptions pertaining to them are as follows:

- ▶ **Repair & Maintenance Cost (R&M):** The total terminal capex of INR 214.3 is divided into civil and others. Civil terminal capex is INR 151.3 crore whilst the latter is INR 63.1 crore. Similarly, for basic development cost of Logistics Park is divided into civil (INR 29.8 crore) and other assets (INR 6.9 crore). The R&M of civil assets is assumed to be 1% of gross civil assets (INR 151.3 crore and INR 29.8 crore) which is as per industry benchmarks. For others it is assumed to be 2.5% of other assets (INR 63.1 crore and INR 6.9 crore) for first three years (FY 2022- FY 2024) and 5% thereof for subsequent years.
- ▶ **Insurance Cost:** Based on TAMP Guidelines it is assumed to be 1% of capital cost. An escalation of 5% is applied for subsequent years.
- ▶ **Manpower Cost:** broad estimates based on DPRs of similar terminals (Haldia and Dhubri) shared by the Authority are used for the assessment. An escalation of 7% is applied for subsequent years.
- ▶ **Electricity Cost:** broad estimates based on DPRs of similar terminals (Haldia and Dhubri) shared by the Authority are used for the assessment. An escalation of 5% is applied for subsequent years.
- ▶ **Water Cost:** broad estimates based on DPRs of similar terminals (Haldia and Dhubri) shared by the Authority are used for the assessment. An escalation of 5% is applied for subsequent years.



- ▶ **Fuel Cost:** broad estimates based on DPRs of similar terminals (Haldia and Dhubri) shared by the Authority are used for the assessment. An escalation of 5% is applied for subsequent years.
- ▶ **Miscellaneous Cost:** this also includes administrative costs. Broad estimates based on DPRs of similar terminals (Haldia and Dhubri) shared by the Authority are used for the assessment. An escalation of 5% is applied for subsequent years.
- ▶ **Silo & Lease Cost:** the silo placed in the facility area is operated by the terminal operator. Thus, it appears as a cost for the IWT terminal operator.

The operating cost schedule is summarized in the table below:

All Units in INR Crores						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
<b>Operating Cost for IWT Terminal Operator</b>						
R&M Cost	3.1	4.7	4.7	4.7	4.7	4.7
Insurance Cost	2.1	2.7	3.5	4.5	5.7	6.9
Manpower Cost	4.8	6.8	9.5	13.3	18.6	24.4
Electricity Cost	6.5	8.4	10.7	13.6	17.4	21.1
Water Cost	0.3	0.3	0.4	0.6	0.7	0.9
Fuel Cost	3.1	4.0	5.1	6.5	8.3	10.1
Miscellaneous Cost	5.6	7.2	9.2	11.7	14.9	18.2
Silo & lease Cost	0.1	0.1	0.1	0.2	0.2	0.3
<b>TOTAL</b>	<b>25.7</b>	<b>34.1</b>	<b>43.1</b>	<b>55.0</b>	<b>70.5</b>	<b>86.5</b>
<b>Operating Cost for Logistics Park</b>						
R&M Cost	0.5	0.6	0.6	0.6	0.6	0.6
Insurance Cost	0.3	0.5	0.6	0.8	1.0	1.2
<b>TOTAL</b>	<b>0.8</b>	<b>1.1</b>	<b>1.2</b>	<b>1.4</b>	<b>1.6</b>	<b>1.8</b>

Table 10: Operating Cost Estimates

### 3.3 Revenue Estimates

The revenue estimates for the project are calculated based on the tariff schedule of IWAI, industry benchmarks and interactions with key stakeholders. The key revenue streams are as follows:

Revenue Stream	Description
Pilotage	<ul style="list-style-type: none"> <li>▶ Vessel related charge.</li> <li>▶ Source: IWAI Tariff schedule. Current tariffs are INR 750/ pilot/24 hours.</li> <li>▶ For pre-feasibility assessment, pilotage is computed based on the assumption that the vessel turnaround time for a 1500 tonne inland vessel in 36 hours; formula for the same is as follows:  <math display="block">\text{Pilotage charge (INR per tonne)} = \frac{\text{Pilotage charge (INR per day)}}{\text{Vessel turnaround time (days) / Average Vessel Size (tonnes)}}</math> </li> </ul>
Berth Hire Charges	<ul style="list-style-type: none"> <li>▶ Vessel related charge.</li> <li>▶ Source: IWAI Tariff schedule. Current tariffs are INR 500/24 hours.</li> <li>▶ For the pre-feasibility assessment, pilotage is computed based on the assumption that the vessel turnaround time for a 1500 tonne inland vessel in 36 hours; formula for the same is as follows-</li> </ul>


Revenue Stream	Description
	$\text{Berthing charge (INR per tonne – hour)}$ $= \text{Berthing charge (INR per day)}$ $* \text{Vessel turnaround time days/ Average Vessel Size ((tonnes))}$ $/ \text{Vessel turnaround time (hours)}$
Wharfage Charges	<ul style="list-style-type: none"> <li>▶ Cargo related charge- levied on the cargo when it is placed on the wharf post unloading from the vessel.</li> <li>▶ Source: IWA tariff Schedule. Current tariffs are INR 1/ tonne. However, for automobiles, it is estimated to be INR 432/unit based on the rational of tariffs provided in tariff schedule of Kolkata Port Trust. Formula for computation is as follows- <math display="block">\text{Wharfage charge per four – wheeler unit (INR per unit)}</math> <math display="block">= \text{Wharfage charge for a car unloaded from a foreign vessel (INR per unit)}</math> <math display="block">* (1 - \text{Discount for domestic movement}) \text{ i.e. } (1 - 60\%) * (1 - \text{Discount for coastal transportation of vehicles}) \text{ i.e. } (1 - 80\%)</math> </li> </ul>
Cargo Handling Charges	<ul style="list-style-type: none"> <li>▶ Loading and unloading charges for cargo, both manual and mechanical handling</li> <li>▶ Source: Prevalent charges as revealed in interactions with stakeholders and industry benchmarks.</li> <li>▶ For automobiles: Total handling charge for a four wheeler on foreign vessel in INR 45/unit based on tariffs specified in Kolkata Port Trust tariff schedule. Discount of 60% levied on foreign vessel for domestic movement and a further discount of 80% for coastal movement. It is computed to be INR 5.40/unit based on the formula- <math display="block">\text{THC per four – wheeler unit (INR per unit)}</math> <math display="block">= \text{THC for a car on a foreign vessel (INR per unit)}</math> <math display="block">* (1 - \text{Discount for domestic movement}) \text{ i.e. } (1 - 60\%) * (1 - \text{Discount for coastal transportation of vehicles}) \text{ i.e. } (1 - 80\%)</math> </li> </ul>
Royalty	<ul style="list-style-type: none"> <li>▶ Relevant for PoL, bitumen and edible oil</li> <li>▶ Source: Cochin Port Trust tariff schedule, charges are INR 25/tonne</li> </ul>
Lease Rental	<ul style="list-style-type: none"> <li>▶ Rental charges are based on actuals prevalent in the region as revealed in interactions with stakeholders.</li> <li>▶ INR 100,000 is assumed for 1,340 sq metre.</li> <li>▶ Charges are escalated at 5% for subsequent years.</li> </ul>
Facility Management	<ul style="list-style-type: none"> <li>▶ Charges are assumed to be 10% of the land lease rental revenue and escalated at 5% thereon.</li> </ul>

*Table 11: Revenue Streams*

The monetized units are presented in the following table<sup>4</sup>:

All Units in INR Crores						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
Revenue for IWT Terminal Operator						
Pilotage	0.2	0.4	0.7	1.1	2.0	3.3
Berth Hire	0.1	0.2	0.3	0.6	1.1	1.8
Wharfage	0.6	0.8	1.1	1.5	2.2	2.9
Cargo Handling charges	16.3	23.2	33.1	47.5	68.2	91.3
Royalty charges	0.8	1.9	3.6	6.9	13.6	23.6

<sup>4</sup> Note: details in Annexure



All Units in INR Crores						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
<b>TOTAL</b>	<b>18.0</b>	<b>26.4</b>	<b>38.8</b>	<b>57.6</b>	<b>87.1</b>	<b>122.9</b>
Revenue for Logistics Park						
Cargo handling at MMLP	0.8	1.2	1.8	2.7	4.0	5.5
Land lease rental	1.0	1.3	2.2	2.9	5.4	6.6
Facility management charges	0.1	0.1	0.2	0.3	0.5	0.7
<b>TOTAL</b>	<b>1.9</b>	<b>2.7</b>	<b>4.3</b>	<b>5.9</b>	<b>10.0</b>	<b>12.7</b>

*Table 12: Revenue Estimates*



## 4 Financial Pre-feasibility

The preceding chapters outline the various revenue and cost streams for the project. Based on the estimates, the economic IRR for the project, IRR for IWT terminal and Logistics Park are computed and presented in the subsequent sub-sections.

### 4.1 Economic IRR

The shifting of cargo from existing modes of rail and road to waterways is not only expected to lower transportation cost but has other latent benefits as well. For instance:

- ▶ Savings on account of energy consumption, vehicle operating cost, pollution, reduction in number of accidents and low levels of emission of greenhouse gases are anticipated.
- ▶ Building of infrastructure, creates opportunities for employment which provides direct economic benefits to the local population and overall social benefits to the society.

Based on these parameters, the economic IRR (EIRR) is computed for the project.

The underlying assumptions for the computation of EIRR as shared by the Authority are presented as follows:

All Units in INR/tonne-km				
Parameters	Waterway	Rail	Road	Source
Energy Consumption	0.2900	1.8800	0.5300	11 <sup>th</sup> Working Group Report Shipping & IWT, Planning Commission
Vehicle operating cost	0.8400	1.1700	1.0090	Planning Commission- TTS Study 2014
Air Pollution	0.0300	0.2020	0.0366	Planning Commission- TTS Study 2014
Noise Pollution	-	0.0032	0.0012	PIANC <sup>5</sup> Report
Soil & water Pollution	-	0.0050	-	PIANC Report
Accidents	-	0.0620	0.0010	Planning Commission- TTS Study 2014
Surface Occupation	-	0.0002	0.0001	PIANC Report
Emission of GHG's	0.0006	0.0031	0.0006	12 <sup>th</sup> Five Year Plan, Planning Commission

*Table 13: EIRR Determinants*

The net cashflow on account of the proposed project is presented as follows. Detailed statement is presented in the annexures:

All Units in INR Crores						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
Economic Cost	(26.5)	(35.3)	(44.4)	(56.4)	(72.2)	(88.3)
Economic Revenue	43.5	57.1	77.2	106.6	153.2	206.6
Net Cashflow	17.0	21.8	32.9	50.2	81.1	118.2

*Table 14: Project EIRR*

**The Economic IRR for the proposed project is ~ 14.69%.**

<sup>5</sup> PIANC- Permanent International Association of Navigation Congresses



## 4.2 Project IRR

The revenue, costs and cashflows for the project (IWT terminal along with Logistics Park) are presented as follows:

All Units in INR Crores						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
Vessel Related Revenue (A1)	0.3	0.6	1.0	1.7	3.1	5.1
Cargo Related Revenue (B1)	19.6	28.5	42.1	61.8	94.0	130.5
Total Revenue (A1 + B1)	19.9	29.1	43.1	63.5	97.1	135.6
Operating Cost-Terminal Operator (A2)	25.7	34.1	43.1	55.0	70.5	86.5
Operating Cost-MMLP Operator (A2)	0.8	1.1	1.2	1.4	1.6	1.8
Total Operating Cost (A2 + B2)	26.5	35.2	44.3	56.4	72.1	88.3
Cashflow	(6.6)	(6.2)	(1.3)	7.1	24.9	47.3

Table 15: Project IRR

The Project IRR for the proposed project is (0.9)%.

## 4.3 IWT Terminal IRR

The revenue, costs and cashflows for the IWT terminal are presented as follows:

All Units in INR Crores						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
Terminal Revenue	18.0	26.4	38.8	57.6	87.1	122.9
Operating Cost	25.7	34.1	43.1	55.0	70.5	86.5
Cashflow	(7.7)	(7.7)	(4.4)	2.7	16.6	36.4

Table 16: IWT Terminal IRR

The IRR for IWT terminal is negative, this is essentially owing to the subsidized rates in the tariff schedule. For instance,

- Wharfage in case of inland vessels is INR 1/tonne as per the published tariff schedule. However, in case of ports it is INR 30-50/tonne (Kolkata Port Trust Tariff schedule).
- Similarly, Pilotage in case of inland vessels is INR 750/pilot/day as per the published tariff schedule. However, in case of ports it is INR 7.92/tonne (Kolkata Port Trust Tariff schedule)<sup>6</sup>.
- Berth hire charges in case of inland vessels is INR 500/day as per the published tariff schedule. However, in case of ports it is minimum INR 90/hour (Kolkata Port Trust Tariff schedule) in case of coastal vessels.

<sup>6</sup> Note: Minimum charge as per KoPt schedule. Relates to vessel plying in Andaman circuit.



## 4.4 Logistics Park IRR

The revenue, costs and cashflows for the MMLP are presented as follows:

All Units in INR Crores						
Particulars	FY 2022	FY 2027	FY 2032	FY 2037	FY 2042	FY 2046
Terminal Revenue	1.9	2.7	4.3	5.9	10.0	12.7
Operating Cost	0.8	1.1	1.2	1.4	1.6	1.8
Cashflow	1.1	1.5	3.1	4.5	8.4	10.9

*Table 17: MMLP IRR*

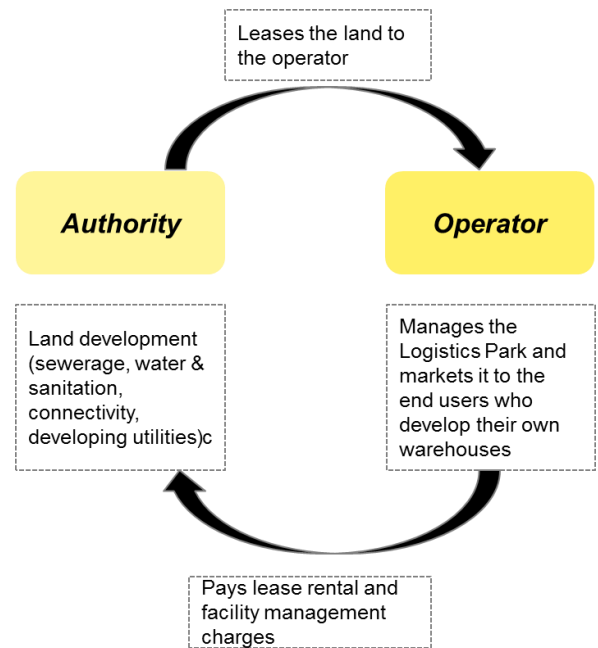
*The IRR for Logistics park is 6.59%.*

## 5 Summary

For the proposed facility, following activities are envisaged:

- ▶ Warehousing facility
- ▶ Transit warehousing
- ▶ Distribution center (cars, foodgrains, fertilizers & FRM)
- ▶ Specialized warehousing (PoL, bitumen, coal)
- ▶ Value added services (instance, tinning facility in case of edible oil)

The landlord model is envisaged for the proposed facility. In this set up it is proposed that the land be developed by the Authority. They are responsible for developing utilities, developing basic infrastructure in terms of sewerage, approach roads, water & sanitation and electricity distribution systems. The land is leased to the operator responsible for Logistics Park. The operator leases it out further to the end users (cargo owners/shippers/distributors etc). They are responsible for building their own warehouses as per requirements. The key responsibilities are summarized in the adjacent figure.



In summary, the key elements of the pre-feasibility analysis are as follows:

PROJECT: IRR is (0.9%); EIRR is 14.59%		
	IWT Terminal	Logistics Park
<b>Activities</b>	Handling of cargo (Loading & Unloading from barges- manual and mechanized)	Value Added Services (Warehousing, Distribution Centre, Tinning facility, Packaging etc.)
<b>Revenue</b>	<ul style="list-style-type: none"> <li>Pilotage</li> <li>Berth Hire</li> <li>Wharfage</li> <li>Handling of cargo</li> </ul>	<ul style="list-style-type: none"> <li>Land Lease Rental</li> <li>Facility Management Charges</li> <li>Handling of cargo at Logistics Park</li> </ul>
<b>Cost</b>	R&M, Insurance, Manpower, Electricity, Water, Fuel, Miscellaneous, Silo & Lease Cost	R&M for basic development undertaken by the Operator, Insurance Cost
<b>IRR</b>	Negative	6.59%



## 6 TOR for DPR (Proposed)

The contours of DPR of the proposed facility are as follows:

### 6.1 Site Assessment

The Consultant shall conduct a broad location appraisal and catchment analysis and assess the overall competitive profile in the segment; analyze the opportunities and concerns by way of assessing market responsiveness; Benchmark the location with respect to similar successful projects in India etc.

### 6.2 Title Clear Report

The Consultant shall prepare a drawing showing the survey numbers and provide area calculation with respective survey numbers. The consultant shall also check 7/12 extracts with the revenue authorities certifying the Title Clear report.

### 6.3 Sub-soil Investigations

Carry out boreholes (max. 6 numbers) at the proposed locations of the Logistics Park. Laboratory field tests shall be conducted as required.

### 6.4 Topographic Survey

Carry out topographic survey using total station in the identified area to collect information on the to collect the information on the location permanent structures, roads and drains, railway network, buildings etc, and to submit survey data with drawings in soft and hard copies(sets) incorporating the Co-ordinates with latitude and longitude.

### 6.5 Demand Assessment

The feasibility of the Logistics Park is to be undertaken in detail including analysis of data regarding the goods expected to be exported and imported through the proposed Logistics Park, their volumes per annum in terms of number of containers of various sizes, tonnage weight, and their monetary value.

The consultant shall estimate capacity of Logistics Park for handling EXIM cargo; conduct a market survey and needs assessment of the Logistics Park ; estimate equipment requirement such as Reach Stackers /RTGCs /Forklifts/ Straddle carriers and tractor trailers for cargo handling and weigh bridge facility ; estimate provision for handling domestic cargo in addition to customs bounded area for Logistics Park etc

### 6.6 Stakeholder Consultation

Undertake consultation with stakeholders and trade representatives on potential demand for the proposed Logistics Park, facilities required in the Logistics Park, area requirement for processing / industrial land etc. Such stakeholder consultation may be required at different stage including demand assessment, representing finding of draft report and before the tender process. Such consultation will be limited to a maximum of 5 nos.

### 6.7 Detailed Engineering

Detailed engineering of the following components of the Logistics Park, so as to arrive at +- 10% cost estimates:

- a. Earth Works (Site Levelling and Cutting)
- b. Containers Freight Stations/ Warehouses/ Cold Storage/ Truck Terminals
- c. Railway Connectivity/ Railway siding requirements
- d. Power Supply Network
- e. Water Supply Network



f. Internal Road network

## 6.8 Detailed Layout Plan and Engineering Design & Drawing

Detailed layout plan, engineering design & drawings, preparing specifications, bill of quantities, cost estimates with basis & justification of rates for the components.

## 6.9 Local Resources

The existing and proposed resources shall be identified for the proposed facilities including the Water and power for the proposed facilities and construction purpose. The details of earth works along with the sources of material and its quality and quantity may be indicated.

## 6.10 Construction Schedule

Preparation of realistic construction schedule and estimated cost of development and O&M for the Logistics Park facilities indicating the sequence of activities duly considering the site conditions.

## 6.11 Estimated Cost

Estimated cost of development should be realistic and based on local schedule of rates/market rate and their basis/documentary proof should be included in the DPR with necessary details.

## 6.12 Cost Benefits Analysis

Workout Cost Benefit analysis, Financial Internal Rate of Return (FIRR) and Economic Internal Rate of Return (EIRR) based on current Indian /International norms, with sufficient backup calculations, basis, assumptions their source, justification etc.

## 6.13 Financial Structuring of the Project

The consultants shall do the financial modelling for the project. The financial modeling can be one of the following two models:

(a) The project can be developed fully through PPP mode by identifying a private promotor. The PPP Operator could hold certain percentage of the equity, while the rest would be distributed between Government of India and Maharashtra Government.

(b) The Government owned SPV would develop the basic infrastructure such as site and road network, power and water provisions etc. Subsequently, the internal units and industries would be developed on PPP basis.

The consultant shall study other aspects like community oriented business plan, applicable regulations including safety regulations and compliances associated with handling of various cargo and other facilities.

## 6.14 Submission of Detailed Project report

Preparation & submission of a Detailed Project Report (DPR) with all the necessary details including demand assessment, project facilities, proposed connectivity, project costing, project engineering and other details as required as per the scope of work.

## 6.15 Preparation of Draft Tender Document

(i) Preparation of tender document for selection of the contractor(s) for development of the basic infrastructure on site

(ii) Preparation of contract/tender document for selecting O&M operator(s) for the proposed Logistics Park

The consultant shall be responsible for preparation for the bid process management. This shall include recommendation on the optimum structuring approach, bidding parameter, key commercial terms and conditions of the Concession Agreement, Roles and responsibilities of the Implementing Agency and other



government bodies and stakeholders. The Consultant shall be responsible for preparation of Concession Agreement, RFQ / RFP document, Notice Inviting Tender and other bid documents.

## 6.16 Bid Process Management

The consultant shall undertake the Bid Process management for selection of contractor/developer/units. The consultant shall undertake marketing of the project among the potential bidders, provide assistance during the pre-bid meeting, assist the Authority in preparation of reply to queries; undertake bid evaluation and provide assistance in issuance of Letter of Award.

## 6.17 Setting up of a Project Management Unit

The consultant shall also be required to set up a project management unit with two full time resources with the relevant experience at the Authority's office in designated location in order to assist the authority in the following.

- (i) Preparation of applications for submission to various government authorities for receiving the approval for the proposed Logistics Park
- (ii) Preparation of file notes, board items, letters to various government agencies
- (iii) Assistance for issuance of the notification for the Logistics Park from the Department of Commerce
- (iv) Assistance in marketing the project to the prospective bidders and unit holders
- (v) Assistance in allocation of the units to various industries
- (vi) Assistance during the bidding process for the selection of Developer
- (vii) Follow up with the Development Commissioner and Ministry of Commerce and Industry for getting the notification issued for the Logistics Park
- (viii) Preparation of the tender document and assistance during the selection of Agency for obtaining an Environmental Clearance for the project
- (ix) Appointment of Project Management Consultant (PMC), if required, for supervision of any civil work
- (x) Co-ordination with the agency for Environmental Clearance and also with the project management consultants.

The project management unit shall be set up within 2 weeks from the submission of the draft report and shall remain till the time of completion of 12 months from the date of setting up of the same.



## 7 Comparative Analysis

As discussed during the final presentation made by the Consultant in December, a comparative assessment needs to be drawn between the cargo report submitted by EY and subsequently by the other party. It is pertinent to understand that the studies were conducted independent of each other with two different objectives.

The study conducted by the team focusses on assessment of divertible traffic to waterways which currently passes through the Siliguri Chicken's Neck Corridor. Thus, the project influence area (PIA) is the entire region with emphasis of the areas lying in the immediate catchment of National Waterway-2 and Barak. However, as perceived from the report submitted by the *other party*, the focus is essentially on the traffic originating from the Sunderbans area with secondary catchment area being North-East. The Kolkata-Karimganj notified route is the Primary catchment mandate and Kolkata-Silghat is the secondary catchment mandate, as defined in the report. The key data point used for the preparation of the report is DGCI&S publication. The same has not been attached for reference.

In terms of cargo, streams like wheat, sugar, limestone, tea and bamboo have been taken into consideration by the other party. Based on the assessment carried by EY, the commodities have not been considered for the following reasons:

- ▶ Wheat: predominantly moves into the North-East from the states of Punjab and Haryana. With an average lead of 2,000-2,500 km the existing movement is facilitated primarily on rail (by FCI). The movement is rendered economically unviable on waterways due to multiple handlings and long distance in comparison to rail/road route.
- ▶ Limestone: as understood based on interactions with local players and the data available through secondary research, the limestone reserves in the North-East cater to the local cement plants in Meghalaya and are exported to plants located in Bangladesh along the Meghalaya-North Bangladesh border. The movement is facilitated primarily on road through the Dawki border (and conveyer belts installed by big units.)
- ▶ Tea: the commodity is moved to auctioneers located in Guwahati and Kolkata. The commodity is moved mostly on road. Divertibility to waterways would require daily feeder services during the season as it is driven by demand.
- ▶ Sugar: moved into the region primarily from states of Uttar Pradesh and Haryana. The average lead is 1,500-2,000 km and the movement is facilitated on both rail and road (skewed towards road). The stream is unviable for movement on waterways owing to multiple handling and long distance in comparison to rail and road.



# Annexures

## Annexure I: Cargo Projections

All units in MTPA except Automobiles (Units)															
Cargo Streams	Potential Volume (FY 2022)	Attractable %age	Attractable Volume												
			FY 2022	FY 2024	FY 2026	FY 2028	FY 2030	FY 2032	FY 2034	FY 2036	FY 2038	FY 2040	FY 2042	FY 2044	FY 2046
Foodgrains	1.14	30%	0.34	0.34	0.35	0.35	0.35	0.35	0.36	0.36	0.36	0.36	0.37	0.37	0.37
Fertilizer & FRM	0.45	30%	0.14	0.14	0.15	0.17	0.18	0.19	0.20	0.22	0.23	0.25	0.27	0.29	0.31
Tar Coal/Bitumen	0.96	30%	0.29	0.35	0.42	0.51	0.61	0.74	0.89	1.07	1.30	1.56	1.89	2.27	2.74
PoL & Crude	0.13	30%	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06
Edible Oil	0.26	30%	-	-	-	0.09	0.09	0.09	0.10	0.10	0.11	0.11	0.12	0.12	0.12
Fly Ash	0.82	30%	0.25	0.25	0.26	0.27	0.28	0.29	0.29	0.30	0.31	0.32	0.33	0.34	0.35
Imported Coal	0.05	30%	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stone Chips	5.78	18%	1.04	1.10	1.17	1.24	1.32	1.40	1.48	1.57	1.67	1.77	1.88	1.99	2.12
Automobiles	18,551	30%	5,565	5,649	5,902	6,085	6,269	6,459	6,654	6,855	7,062	7,276	7,496	7,722	7,956



## Annexure II: Revenue Projections

Cargo Streams	Handling	All Units in INR Million												
		FY 2022	FY 2024	FY 2026	FY 2028	FY 2030	FY 2032	FY 2034	FY 2036	FY 2038	FY 2040	FY 2042	FY 2044	FY 2046
Pilotage- Vessel Related														
Foodgrains	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.23	0.25	0.28	0.31	0.35	0.39	0.43	0.48	0.53	0.59	0.65	0.72	0.80
Fertilizer & FRM	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.09	0.11	0.13	0.15	0.18	0.21	0.24	0.29	0.34	0.40	0.47	0.52	0.66
Tar Coal/Bitumen	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.77	1.03	1.37	1.82	2.42	3.22	4.28	5.7	7.58	10.08	13.41	17.83	23.72
PoL & Crude	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.15	0.18	0.20	0.23	0.26	0.30	0.34	0.39	0.44	0.50	0.58	0.66	0.75
Edible Oil	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	-	-		0.35	0.41	0.47	0.53	0.61	0.70	0.81	0.92	1.06	1.22
Fly Ash	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.25	0.28	0.32	0.36	0.44	0.50	0.57	0.64	0.73	0.78	0.88	1.00	1.14
Imported Coal	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.06
Stone Chips	Loading	0.70	0.82	0.95	1.12	1.31	1.53	1.79	2.09	2.44	2.86	3.34	3.91	4.57
	Unloading	-	-	-	-	-	-	-	-	-	-	-	-	-
Automobiles	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Berth Hire Charges- Vessel Related														
Foodgrains	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.04	0.05	0.05	0.06	0.07	0.08	0.08	0.09	0.10	0.11	0.13	0.14	0.16
Fertilizer & FRM	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.02	0.02	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.11	0.13
Tar Coal/Bitumen	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.51	0.68	0.90	1.20	1.59	2.12	2.82	3.75	4.99	6.63	8.82	11.73	15.61
PoL & Crude	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.07	0.08	0.09	0.10	0.12	0.13	0.15	0.17	0.20	0.23	0.26	0.29	0.34
Edible Oil	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	-	-	-	0.21	0.24	0.27	0.31	0.36	0.41	0.47	0.54	0.62	0.71
Fly Ash	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.07	0.08	0.09	0.09	0.10
Imported Coal	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	-	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stone Chips	Loading	0.16	0.19	0.23	0.26	0.31	0.36	0.42	0.49	0.58	0.67	0.79	0.92	1.08

Cargo Streams	Handling	All Units in INR Million												
		FY 2022	FY 2024	FY 2026	FY 2028	FY 2030	FY 2032	FY 2034	FY 2036	FY 2038	FY 2040	FY 2042	FY 2044	FY 2046
	Unloading	-	-	-	-	-	-	-	-	-	-	-	-	-
Automobiles	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02
Wharfage- Cargo Related Charge														
Foodgrains	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.46	0.51	0.56	0.63	0.70	0.77	0.86	0.95	1.06	1.18	1.31	1.45	1.61
Fertilizer & FRM	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.18	0.21	0.25	0.30	0.35	0.41	0.49	0.58	0.68	0.80	0.95	1.12	1.32
Fly Ash	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.33	0.37	0.43	0.48	0.55	0.62	0.71	0.80	0.91	1.04	1.18	1.34	1.52
Imported Coal	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.05	0.06	0.07	0.08	0.09	0.10
Stone Chips	Loading	1.39	1.63	1.91	2.23	2.61	3.05	3.57	4.18	4.89	5.72	6.68	7.82	9.15
	Unloading	-	-	-	-	-	-	-	-	-	-	-	-	-
Automobiles	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	3.22	3.66	4.16	4.72	5.36	6.09	6.92	7.86	8.92	10.14	11.51	13.08	14.85
Cargo Handling at IWT Terminal														
Foodgrains	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	45.72	50.78	56.39	62.63	69.56	77.25	85.79	95.28	105.28	117.52	130.52	144.95	160.98
Fertilizer & FRM	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	18.09	21.35	25.20	29.74	35.10	41.42	48.89	57.70	68.09	80.36	94.84	111.93	132.10
Fly Ash	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	13.19	14.98	17.01	19.32	21.95	24.93	28.32	32.16	36.53	41.49	47.13	53.53	60.80
Imported Coal	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	2.37	2.69	3.05	3.46	3.92	4.44	5.04	5.71	6.48	7.35	8.33	9.44	10.71
Stone Chips	Loading	83.69	97.89	114.50	133.92	156.64	183.22	214.30	250.65	293.17	342.19	401.08	469.12	548.70
	Unloading	-	-	-	-	-	-	-	-	-	-	-	-	-
Automobiles	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.04	0.05	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.16	0.19
Cargo Handling at Logistics Park														
Stone Chips	Loading	8.36	9.79	11.45	13.39	15.66	18.32	21.43	25.07	29.32	34.29	40.11	46.91	54.87
	Unloading	-	-	-	-	-	-	-	-	-	-	-	-	-
Royalty Charges														
Tar Coal/Bitumen	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	7.22	9.60	12.77	16.98	22.59	30.05	39.96	53.15	70.70	94.03	125.07	166.35	221.25
PoL Products	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unloading	0.95	1.09	1.24	1.42	1.62	1.85	2.11	2.41	2.75	3.14	3.58	4.09	4.67
Edible Oil	Loading	-	-	-	-	-	-	-	-	-	-	-	-	-

Cargo Streams	Handling	All Units in INR Million												
		FY 2022	FY 2024	FY 2026	FY 2028	FY 2030	FY 2032	FY 2034	FY 2036	FY 2038	FY 2040	FY 2042	FY 2044	FY 2046
	Unloading	-	-	-	2.93	3.36	3.86	4.42	5.08	5.82	6.68	7.66	8.79	10.08
<i>Lease Rental Revenue</i>														
Covered Warehousing		6	6	7	7	9	10	11	12	14	16	17	19	21
Tank Warehousing		3	3	4	4	9	10	11	12	20	22	32	35	39
Open Warehousing		1	1	1	1	1	1	1	1	2	2	2	2	2
Paved Area		0	0	0	0	1	1	1	1	1	1	1	1	1
Silo		1	1	1	1	1	1	1	2	2	2	2	2	3
Facility Management Charges		1	1	1	1	2	2	2	3	4	4	5	6	7

## Annexure III: EIRR Computation

Cargo Streams	All Units in Million Tonne- Kms												
	FY 2022	FY 2024	FY 2026	FY 2028	FY 2030	FY 2032	FY 2034	FY 2036	FY 2038	FY 2040	FY 2042	FY 2044	FY 2046
<i>Cargo Tonne-Km (Railways)</i>													
Foodgrains	38	38	38	38	39	39	39	40	40	40	40	41	41
Fertilizer & FRM	149	159	170	182	195	209	223	239	256	274	293	314	336
Tar Coal/Bitumen	159	192	231	279	336	406	490	591	713	860	1,037	1,251	1,509
PoL & Crude	42	43	45	47	48	50	52	54	55	57	59	61	64
Edible Oil	-	-	-	77	80	83	87	90	94	98	102	106	110
Fly Ash	221	228	235	242	249	257	265	273	281	289	298	307	317
Imported Coal	18	18	19	19	20	20	21	21	22	23	23	24	25
Stone Chips	-	-	-	-	-	-	-	-	-	-	-	-	-
Automobiles	1	1	1	2	2	2	2	2	2	2	2	2	2
<i>Cargo Tonne-Km (Road)</i>													
Foodgrains	338	340	343	345	348	350	353	356	358	361	363	366	369
Fertilizer & FRM	-	-	-	-	-	-	-	-	-	-	-	-	-
Tar Coal/Bitumen	159	192	231	279	336	406	490	591	713	860	1,037	1,251	1,509
PoL & Crude	-	-	-	-	-	-	-	-	-	-	-	-	-
Edible Oil	-	-	-	19	20	20	22	23	23	24	25	26	27
Fly Ash	-	-	-	-	-	-	-	-	-	-	-	-	-
Imported Coal	-	-	-	-	-	-	-	-	-	-	-	-	-
Stone Chips	520	552	586	621	659	699	742	787	835	886	940	997	1,058
Automobiles	13	13	13	14	14	15	15	15	16	16	17	17	18
<i>Cargo Tonne-Km (Waterway)</i>													
Foodgrains	444	447	450	453	457	460	463	467	470	474	477	481	484
Fertilizer & FRM	176	188	201	215	230	247	264	283	303	324	347	371	397
Tar Coal/Bitumen	375	453	546	659	795	959	1,157	1,396	1,684	2,032	2,451	2,957	3,567
PoL & Crude	50	51	53	55	57	59	61	63	65	68	70	73	75
Edible Oil	-	-	-	114	118	123	128	133	139	144	150	156	162
Fly Ash	501	516	531	547	564	581	599	617	635	655	674	695	716
Imported Coal	21	22	22	23	23	24	25	25	26	27	28	28	29
Stone Chips	677	718	762	808	857	909	965	1,023	1,086	1,152	1,222	1,296	1,375
Automobiles	16	17	17	18	18	19	19	20	21	21	22	23	23

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