



श्यामा प्रसाद मुखर्जी पोर्ट, कोलकाता  
**Syamaprasad Mookerjee Port, Kolkata**  
सिविल इंजीनियारिंग विभाग / **Civil Engineering Department**  
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No. SMPK/KDS/CIV/T/2804

dated: 11<sup>th</sup> January, 2024

**CORRIGENDUM-1**

**Sub: Reconstruction of berth No. 8 and Mechanization of 7 & 8 NSD, KDS at Syamaprasad Mookerjee Port, Kolkata on DBFOT basis through PPP mode – RFQ - Reg.**

Ref: RFQ / Tender No. SMPK/KDS/CIV/T/2804/76, dated 14.12.2023

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In connection with RFQ under reference cited, as per the request of bidders, the following are submitted for necessary action:

- 1) **Pre-application conference** will be convened through VC also apart from physical meeting at **15.00hrs on 17<sup>th</sup> January 2024** (Wednesday) duly following the provisions of Clause 5.1 of RFQ.

**VC link is as follows:**

Topic: Pre application conference: 7/8 NSD PPP

Time: Jan 17, 2024 03:00 PM India

Join Zoom Meeting

<https://us06web.zoom.us/j/86025118192?pwd=TwMRE1Yyz1IXv1vycvQBFUYNfY496p.1>

Meeting ID: 860 2511 8192

Passcode: 4DDYTH

- 2) **Executive Summary** of the techno economic feasibility report for the project is attached.
- 3) **Site visit** to project area is arranged at **10.00am on 17<sup>th</sup> January 2024**. Interested bidders can participate duly assembling at Subhash Bhavan, # 40, CGR road, Kolkata at 10.00am with proper authorization and ID card (Aadhar).

Bidders are requested to upload this '**CORRIGENDUM-1**' including attachments duly signed under office seal along with RFQ as an acknowledgement and acceptance.

This shall form part of the tender document.

All other terms & conditions and clauses will remain same as per original.

Superintending Engineer (Contracts)  
For CHIEF ENGINEER

Copy to: OSD to Chairperson for kind information of Chairperson please.  
Copy to: PS to Dy. Chairperson (KDS) for kind information of Dy. Chairperson please.  
Copy to: TM / CME / Secretary (i/c) / DMD) / FA&CAO for information and necessary action please.

## **EXECUTIVE SUMMARY**

### **1. BACKGROUND**

Kolkata Port Trust (KoPT), officially known as Syama Prasad Mookerjee Port Trust, Kolkata (SMPK), located in the city of Kolkata, West Bengal, India. The Port has two distinct dock systems namely “Kolkata Dock System (KDS)” located at Kolkata and “Haldia Dock Complex (HDC)” located at Haldia. The Total traffic handled by SMPK is about 65.66 MMT in the year 2022-23 (HDC 48.61 MMT and KDS 17.05 MMT).

SMPK has conducted various traffic assessment/ demand forecast studies in the recent days for HDC and KDS. From these studies, it has become evident that, there will be an increase in demand for EXIM trade from the hinterland of KDS and HDC. In-order to cater to the increasing traffic demand and also as per the policy from Ministry of Ports, Shipping & Waterways (MoPSW) under “Sagarmala initiative”, SMPK has intended to develop an effective and efficient infrastructure for faster and environment friendly cargo handling operations on a priority basis. Accordingly, SMPK has identified Eight (8) Projects in HDC and KDS and entrusted M/s Voyants Solutions Pvt Limited (the Consultant) to carryout Techno-Economic Feasibility Studies for mechanisation of the existing cargo handling systems and to amend additional berthing/cargo handling facilities at KDS and HDC.

Strengthening and Mechanization of NSD berth 7 and 8 (Project No.5) at KDS is one amongst the eight Projects identified by SMPK”.

### **2. Need of the Project:**

The primary cargo commodity handled by KDS is containers. At KDS, presently NSD berths 3,4,5, 7 and 8 handle containers. The container operations at these five berths are being handled through 3 MHCs.

The traffic demand with respect to container cargo is following an encouraging trend and would require further mechanisation and associated facilities to increase container handling capacity drastically. The increased mechanization will also help in improving the key performance indicators like output per ship berth days, turnaround time, waiting time etc. for the port.

Therefore, considering all the above factors, KDS has envisaged to study the feasibility of mechanization of cargo handling facilities at berth no 7 & 8 NSD. This development will benefit KDS and Stakeholders in terms of meeting the incremental

demand and thereby serving the hinterland better, improvement in the cargo throughput, reduction in the ship waiting time, and faster evacuation of EXIM cargo, leading to win-win situation for KDS and stakeholders.

### **3. PROJECT OBJECTIVE:**

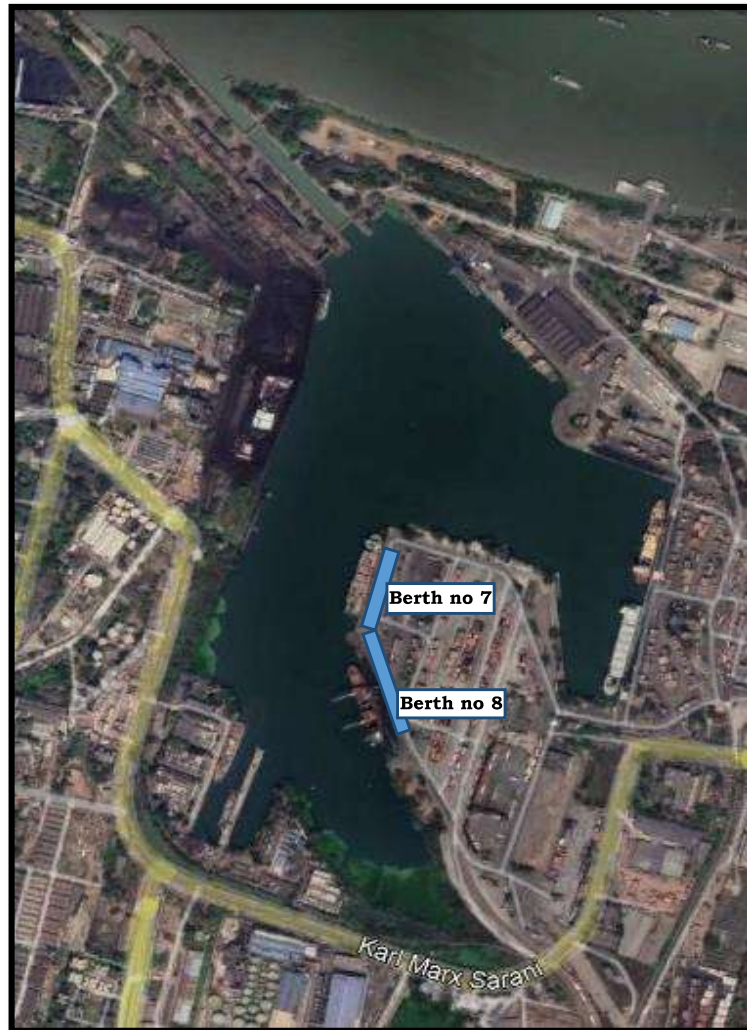
The primary objective of this Project is to prepare a Techno-Economic Feasibility Report and a specific time-bound development plan under PPP structuring mode for" Project: 5 Mechanization of NSD berth no.7 and 8. The Project shall be planned with an effective, efficient, quick and environment friendly cargo handling systems by means of mechanisation, or by other means of augmentation of berth and thus improve the cargo handling capacity of the terminal.

### **4. PROJECT LOCATION, EXISTING FACILITIES AND CONNECTIVITY**

The Netaji Subhas dock (NSD), KDS is located at Latitude 22° 32' 30.4" N and Longitude 88° 18' 7.68" E about 223 km upstream of Sandheads at river mouth.

Berth no.7 and 8 are located inside the NSD dock and are presented in picture below. Both the berths are operated with help of MHC to handle containers. Berth no 7 has length of 182.2m and Berth no 8 has length of 225m. Currently, Berth no.7 is under construction and will be completed during 4<sup>th</sup> quarter of 2023-24.

KDS is connected to National Highway network via NH 16. It is also connected to Indian Railways Network at Majerhat railway station. NSD being located on Hooghly River, it also has easy accesses to Inland waterways NW-1.



*Location of Berth 7 and 8 inside NSD.*

## **5. TRAFFIC FORECAST/ DEMAND ASSESSMENT**

The container demand assessment and traffic forecast is conducted for 30 years perspective (2023 to 2052). EXIM (dry, empty containers & reefer) cargo is considered under the traffic study. The assessment / forecast assessment is based on the historical trend analysis, supply demand gap assessment, hinterland demand assessment / catchment analysis and cargo profiling, commodity profiling, stakeholder's interaction and competition from the existing Ports (Paradip, Vishakhapatnam, Gopalpur) and upcoming ports (Tajpur port, Subernarekha), etc.

The traffic forecast is prepared under three scenarios i.e., optimistic, realistic/ most likely, pessimistic scenarios. However, for all planning and design, the realistic case is considered. The total potential for KDS under realistic scenario for

next 30 years is about 2.00 MTEUs. The summary of the container traffic forecast for KDS is presented in the below table.

Scenario	FY-23	FY-25	FY-30	FY-35	FY-40	FY-45	FY-50	FY-52	CAGR
KDS-Most Likely Case	0.85	0.93	1.42	1.47	1.63	1.75	1.86	2.00	2.99%
Optimistic Case	0.86	1.07	1.48	1.59	1.80	1.98	2.17	2.33	3.49%
Pessimistic Case	0.85	0.93	1.33	1.34	1.47	1.60	1.71	1.84	2.69%

However, the traffic distribution for berth no 7 & 8 is worked out to 0.448 MTEUs (6.1 MTPA) by due consideration given to vessel size limitations and associated berth capacity (taking into account berth occupancy and equipment capacity).

## 6. VESSEL SIZE ANALYSIS:

The historic and the future trend of vessels was analysed. However, with respect to the KDS, the water depths in approach channel and Lock gates at NSD restricts the size of the vessels to be called at the berths. It is to be noted that, even though the lock gates can accommodate vessels up to 172m LoA, the draft will be restricted to 7m. Accordingly, the design vessel proposed for container berth 7 & 8 is presented in below table. However, the berth (s) can handle vessels up to 172 m LoA with partially loaded draft of 7m and below.

Vessel	LoA (m)	Beam (m)	Draft (m)	DWT (Tons)	Capacity (TEUs)
1 <sup>st</sup> Generation container vessel (As per PIANC guidelines) (Average Vessel Size/ Design vessel Size)	152	23.7	8.5*	15,000	1,100
<i>Maximum Vessel Size</i>	172	25	8.5*	17,000	1,100

*\*Only Partially loaded vessels with draft of 7m and below can be permitted.*

## 7. FACILITY REQUIREMENTS

In order to cater to the Project traffic volume of 0.448 MTEUs (6.1 MTPA), following are the various major facilities envisaged:

- Marine Side Facilities: Existing facilities like approach channel, turning circle, berth length, berth pocket, berth furniture, to handle the design vessel are assessed. However, further adequacy of berthing structure



depends on the type of Cargo handling equipment which are further discussed in section 9.

- Land Side Facilities: Backup area for container storage (in terms of filled, empty containers and reefers), railway loading/unloading area, admin / operational building, custom building, substation, radio communication tower, utilities (water, power & firefighting), vehicle parking, roads, rail sidings, landscaping etc are provided.
- Equipment: Rail mounted Quay cranes (RMQC) is proposed on the berth. Berth no.7 and 8 are to be reconstructed to cater to RMQC loads. In the yard rubber tyre gantry crane (RTG), reach stacker, and tractor trailers are proposed.

## **8. MECHANIZATION SCHEME, ALTERNATIVE LAYOUTS**

The schemes / layouts are prepared based on the understanding of the site conditions, existing scenario (conditions, challenges and bottlenecks of the port and berth), existing equipment, facility required for catering the anticipated container cargo traffic / demand, berth capacity and cargo handling equipment etc.

The mechanization schemes are proposed as combinations of Yard equipment (RTG/SC/RS) and Quay equipment (MHC/RMQC). The study was carried out in two parts.

- a) Selection of Quay Equipment
- b) Selection of Yard Equipment

### Selection of Quay Equipment

As for quay equipment, both Mobile Harbour Cranes (MHC) and Rail mounted Quay cranes (RMQC) were explored. Both the equipment were compared on basis of Handling rates, Automation, Versatility, Reliability, Life and Operations. After detailed evaluation and discussions, RMQC is proposed as quay equipment.

However, for deployment of 3 RMQC's as quay equipment, the present setting of berth no. 7&8 is operationally not feasible. Hence, the pros and cons of both the options was extensively discussed (i.e., Existing Quay option and Straight Quay option) with SMPK. It was finally decided that, 3 RMQC's with straight quay option shall be most ideal for effective handling of the cargo and the same is recommended.

### Selection of Yard Equipment

Three mechanization schemes were evaluated with respect to Yard equipment. The discussed options is summarised as below:

Sl. No.	Mechanization Schemes	Description
1.	Alternative 1	RTG + Reach Stackers + Tractor Trailer
2.	Alternative 2	Straddle carriers + Reach Stackers
3.	Alternative 3	Reach Stackers + Tractor Trailer

Based on the number of the ground slots for each equipment type as per the layout of the three mechanization schemes, it is observed that Alternative 1, i.e., operations with RTG, has maximum number of ground slots. A brief comparison table of ground slots available for various layout alternative is provided in table below.

Equipment	RTG	SC	RS (Dry filled)	RTG (Empty)	RS (Empty)	RS (Reefer)	Total
Alternative 1	1778	NA	NA	175	NA	137	2090
Alternative 2	NA	1088	NA	NA	155	137	1380
Alternative 3	NA	NA	1020	NA	155	137	1312

The highest stacking of containers is possible with RTG, which will result in higher capacity of container yard when compared with Alternative 2 and Alternative 3.

Hence the Development plan for mechanization of NSD berth 7 and 8 will be based on container handling with help of RTGs and Reach Stackers at the container stackyard.

## **9. DEVELOPMENTAL PLAN**

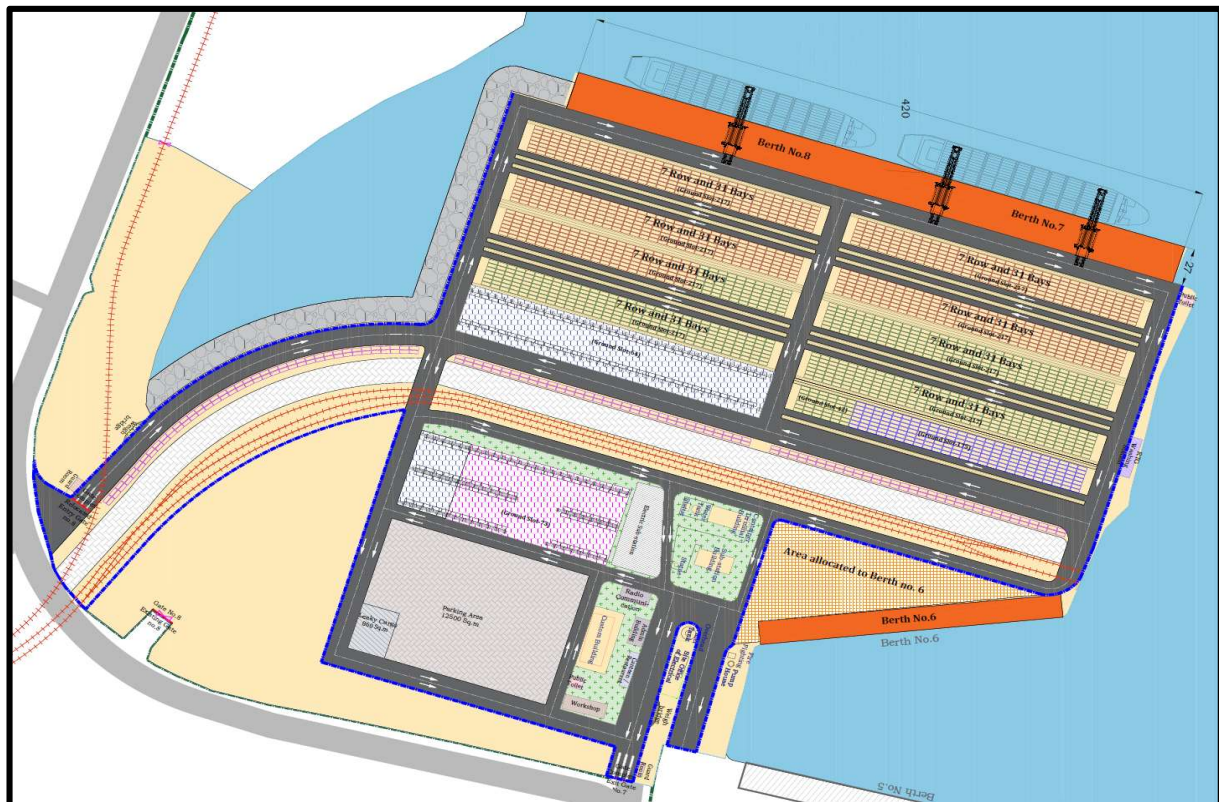
The development plan, system description, utility requirements, buildings and supporting infrastructure required for realisation of RMQC as quay equipment for the recommended scheme in phased manner was determined.

As recommended in Chapter 6, Mechanization Scheme with RMQC at Berth and RTGs along with Reach stacker for stacking is selected.

The layout for development of container terminal is presented below. However, it is to be noted that, as existing berthing structures cannot accommodate RMQC, thus reconstruction of berths will be required. The realignment of berth no.8 involves reclamation and revetment along the backup area of berth no.8 and dredging has

to be carried out at the berth pocket to cater the required draft for design vessel at the berth.

Full rake rail operations are proposed. One loading line and one escape line is proposed. Dedicated rail loading yard/bay is proposed along with immediate storage yard for rail operations. It is proposed that, the existing railway line shall be used for the railway operations. It is envisaged that, the rail loading yard/bay to be developed and operated by the concessionaire



### Development Plan for Berth 7 & 8

The envisaged phase wise facilities for development (to be developed by the concessionaire) of berth no 7 & 8 is provided in the table below:

Sl. No.	Particulars Details/Description	Unit	Value	Remarks
<b>A</b>	<b>Civil</b>			
<b>A1</b>	<b>Construction of New Berths</b>			
A1.1	Construction of new berth (Berth No.7)	m	182	At present Berth No. 7 is under construction from KDS/SMPK. The construction of berth no.7 is expected to ready by March 2024.



Sl. No.	Particulars Details/Description	Unit	Value	Remarks
				Hence, Berth No. 7 will be handed over to the Concessionaire after award of work for free of cost to in Stage-I.
A1.2	Construction of new berth no.8 (Dismantling of old berth and construction new berth as straight quay)	m	238	Concessionaire to develop under stage-II
<b>A2</b>	<b>Yard Development Area</b>			
A2.1	Reefer Access Platform with electric Connections	Nos.	137	Concessionaire to develop under Stage-I or in stage-II
A2.2	New Pavement for container stacking area development	Sqm	11,100	Concessionaire to develop under Stage-I or in stage-II
A2.3	Improvement of Existing pavement	Sqm	48,100	Concessionaire to develop under Stage-I or in stage-II
A2.4	Improvement of Existing Internal Roads	Sqm	43,403	Concessionaire to develop under Stage-I or in stage-II
A2.5	New Internal Roads	Sqm	15,200	Concessionaire to develop under Stage-I or in stage-II
A2.6	Improvement of Existing Parking Area	Sqm	9,700	Concessionaire to develop under Stage-I or in stage-II
A2.7	New Parking Area	Sqm	4,860	Concessionaire to develop under Stage-I or in stage-II
A2.8	Admin Building	Sqm	200	Concessionaire to develop under Stage-I
A2.9	Operational Building	Sqm	200	SMPK/ KDS to provide this free of cost to Concessionaire in Stage-I
A2.10	Radio communication tower	Sqm	200	Concessionaire to develop under Stage-I
A2.11	RTG washing station	Sqm	200	Concessionaire to develop under Stage-I or in stage-II
A2.12	Workshop	Sqm	300	Concessionaire to develop under Stage-I
A2.13	Canteen	sqm	160	Concessionaire to develop under Stage-I
A2.14	Public toilet (2 nos of 70 sqm each)	sqm	140	Concessionaire to develop under Stage-I
A2.15	Weighbridge (for truck & wagons)	Nos.	2	Concessionaire to develop under Stage-I or/ and in Stage-II

Sl. No.	Particulars Details/Description	Unit	Value	Remarks
A2.16	Security/ Guard House (2 nos of 50 sqm each)	sqm	100	Concessionaire to develop under Stage-I
A2.17	Gate complex	Nos.	2	Concessionaire to develop under Stage-I
A2.18	Storm water drain	Rm	7,000	Concessionaire to develop under Stage-I or/ and in Stage-II
A2.19	Landscaping/Greenery	Sqm	2,000	Concessionaire to develop under Stage-I or in stage-II
A2.20	Civil works for 11 KV Electrical feeder station	Sqm	300	SMPK/ KDS to provide this free of cost to Concessionaire in Stage-I
<b>A3</b>	<b>Dredging, Reclamation and Stone Pitching</b>			Concessionaire to develop under Stage-I or in stage-II
A3.1	Dredging	Cum	3,000	Concessionaire to develop under Stage-I or in stage-II
A3.2	Earth filling and compaction	Cum	2,85,300	Concessionaire to develop under Stage-I or in stage-II
A3.3	Stone Pitching	Sqm	7,360	Concessionaire to develop under Stage-I or in stage-II
<b>A4</b>	<b>Development of Railway Track and Yard</b>			
A4.1	Improvement of existing railway yard	Sqm	17,650	Concessionaire to develop under Stage-I or in stage-II
A4.2	Development of new railway yard		3,100	Concessionaire to develop under Stage-I or in stage-II
A4.3	Utilization of existing railway track	m	730	SMPK/ KDS to provide this free of cost to Concessionaire in Stage-I
<b>B</b>	<b>Mechanical</b>			
<b>B1</b>	<b>Berth equipment</b>			
B1.1	Procurement and installation of Rail Mounted Quay Crane with 40 m outreach	Nos	3	Concessionaire to develop under Stage-I or in stage-II
<b>B2</b>	<b>Yard Equipment</b>			
B2.1	Procurement and installation of Rubber Tyre Gantry Cranes (width -7+1)	Nos	12	Concessionaire to develop under Stage-I or in stage-II

Sl. No.	Particulars Details/Description	Unit	Value	Remarks
B2.2	Reach Stackers	Nos	1	Concessionaire to develop under Stage-I or in stage-II
B2.3	Tractor Trailers	Nos	31	Concessionaire to develop under Stage-I or in stage-II
<b>B3</b>	<b>Railway Yard Equipment</b>			This can be on hire/rental also depending on the operational model of Concessionaire
B3.1	Reach Stackers	Nos	3	Concessionaire to develop under Stage-I or in stage-II.
B3.2	Tractor Trailers	Nos	5	Concessionaire to develop under Stage-I or in stage-II.
<b>C</b>	<b>Electrical Works</b>			
C1	Power Distribution, Switchgear, Transformers, Cables up to substation near berth, Lighting, Control System, Public Address & Telephone System	LS	1.0	Concessionaire to develop under Stage-I or/and in stage-II
C2	Illumination with high mast towers and lighting system	LS	As per requirement	Concessionaire to develop under Stage-I or/and in stage-II
C3	Firefighting & Fire hydrants		As per requirement	Concessionaire to develop under Stage-I or/and in stage-II
C4	IT Infrastructure and Terminal Operation	LS	As per requirement	Concessionaire to develop under Stage-I or/and in stage-II

## 10. Implementation Schedule

The Project is envisaged to be implemented in single phase. Pre-development works (like Project feasibility study, tariff structuring, PPPAC application, preparation of model concession agreement, selection of contractors, award of works and condition precedent including financial closure) would take about 20 months (from March 2023 to December-2024). Therefore, the proposed Project is expected to be awarded by December-2024 and operations are expected to be started by December-2026 considering 24 months as construction and commissioning period.

The project Is envisaged to be implemented in single phase (0 to 24 months). However, considering the fact that, the berth operations (operations of berth no.7)

cannot be abandoned till the project is fully commissioned, it is envisaged to provide the flexibility for the operator to start with semi mechanisation in stage-I which later can be converted to full mechanization. Hence, the project is envisaged to be implemented in two stages. However, the concessionaire, based on his operational model may choose to start the partial operations in stage-I or full-fledged operations after completion of stage-II.

- Stage-I: (0 to 12 months), This stage shall consist of commissioning of berth no. 7 (which is currently under construction by KDS), installation of quay equipment, development of required back-up yard, installation of yard equipment, utilities and associated facilities as required. The equipment required during stage-I and up to stage-II may be procured or can be installed on hire basis temporarily till the completion and commissioning of the project. With this, the PPP operator has the flexibility to kickstart the semi mechanised operations. It is to be noted that, semi-mechanization starts one year after the implementation schedule starts
- Stage-II: (0 to 24 months) This stage shall be termed as full mechanisation and commissioning stage, wherein, the PPP operator shall develop all the facilities required for full mechanisation like construction of berth no.8, dredging, reclamation, stone pitching, installation of RMQC's as quay equipment, yard equipment as RTG, Reach Stackers and Tractor trailers, development of railway siding, utilities, associated buildings and the like.

#### **11. ENVIRONMENTAL ASPECTS:**

Currently, KDS is an operating port with a valid consent to operate (CTO) from West Bengal Pollution Control Board (WBPCB). CTO has been provided for the berth & jetties of the KDS. Further, in line with berth no. 7 development (under construction), the proposed berth no.8 (re-alignment and re-development) may not require fresh environmental clearance.

It is to be also noted that, with proposed advanced mechanized system, cargo will be handled with lesser environmental pollution with help of more efficient and modern equipment. Therefore, less pollution is envisaged in comparison to current cargo handling scenario.

## 12. COST ESTIMATE

Based on the facilities required & development plan towards the recommended container handling schemes and layouts the CAPEX towards the Project is given below.

<b>Cost Summary of Berth no. 7 &amp; 8</b>			
<b>Sl. No.</b>	<b>Particulars</b>	<b>Unit</b>	<b>Cost</b>
1	Civil	INR Cr.	241.57
		% of total project	29.85%
2	Mechanical	INR Cr.	478.09
		% of total project	59.08%
3	Electrical	INR Cr.	17.89
		% of total project	2.21%
4	IT and Misc	INR Cr.	71.63
		% of total project	8.9%
5	<b>Total Block Cost</b>	INR Cr.	<b>809.18</b>

## 13. FINANCIAL & ECONOMIC ANALYSIS:

Based on the capital costs, traffic forecast, and other financial assumptions taken for the financial analysis, the Project is expected to fetch private operator, a Post-Tax project IRR of 22.07%.

Further, regarding the economic analysis the Project is expected to directly fetch an economic IRR of 35.38%. Besides, direct benefit, the economy will get substantial indirect benefit in the form of reduction in carbon emission, logistics cost & accidents and generation of employment.

## 14. CONCLUSION

Based on the outcome of the study, the following conclusions are drawn:

1. The container cargo handling facilities are designed for handling 0.448 million TEUs (6.1 MTPA) EXIM with two berths
2. Various mechanization schemes such as MHC and RMQC were evaluated and cargo handling operations by means of RMQC were chosen.



3. As existing berthing structures cannot accommodate RMQC's, it is proposed to replace existing berth by construction of new berth(s).
4. Realignment of existing quay of berth no.8 i.e., straight quay of berth no. 7 & 8 has been proposed to have effective and optimised operations using 3 RMQC's.
5. With respect to back-up area operations, RTGs, Reach Stackers and Tractor trailers are recommended for container cargo handling operations.
6. Full rake rail operations along with rail loading bay is proposed.
7. The CAPEX for the proposed development is: INR 809.18 Crores
8. The financial IRR and Economic IRR is summarised below.
  - a. Post-Tax Project IRR : 22.07%
  - b. Economic IRR : 35.38%