9th SOUTHERN ASIA PORTS , LOGISTICS AND SHIPPING 2014, INDIA

PROJECT SHOWCASE

DEEPENING AND WIDENING OF MUMBAI HARBOUR CHANNEL AND JN PORT CHANNEL – PHASE I

28 – 11 - 2014

PRESENTATION BY

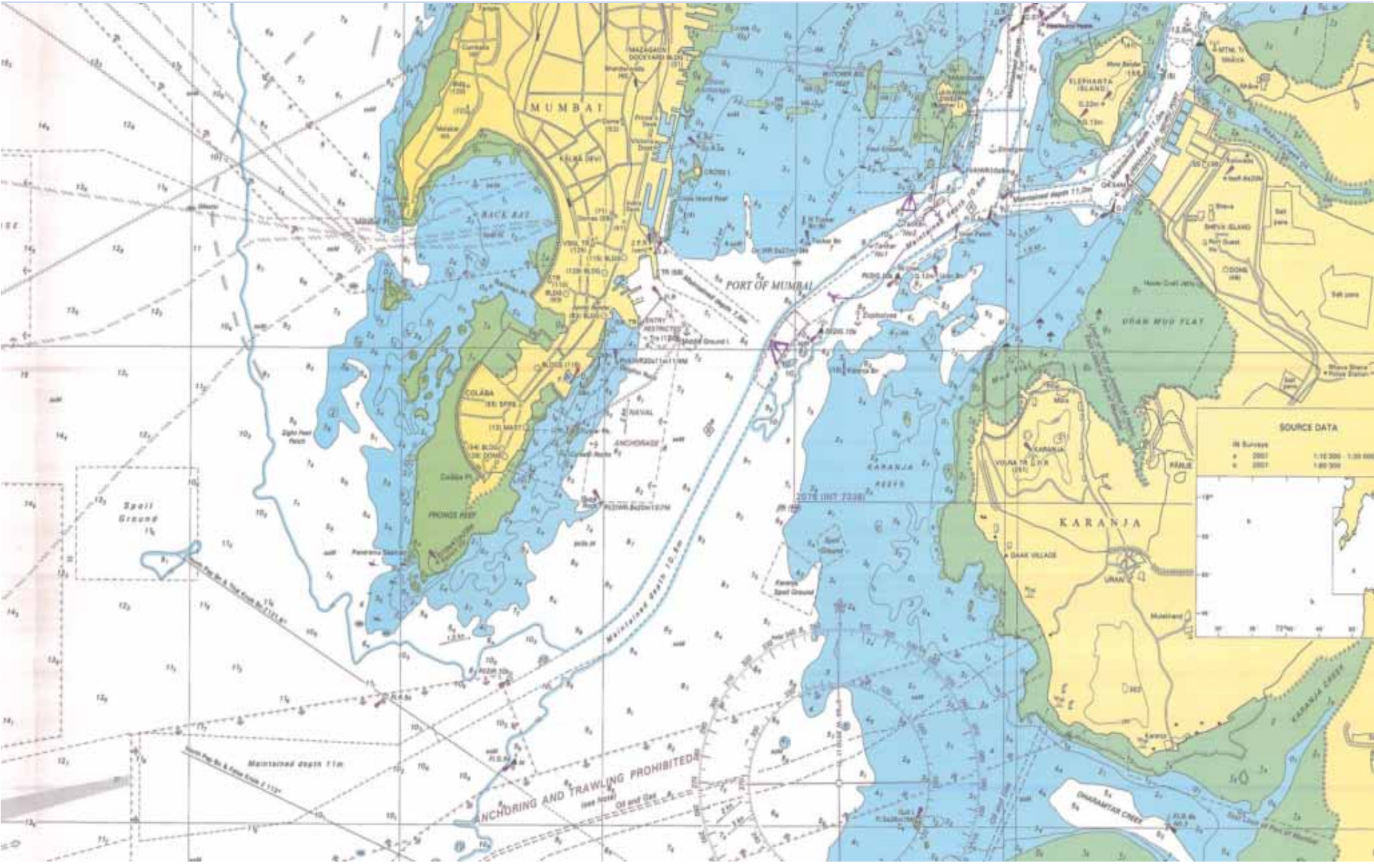
Devdatta Bose – Group Sector Head, Ports & Harbours

TATA Consulting Engineers

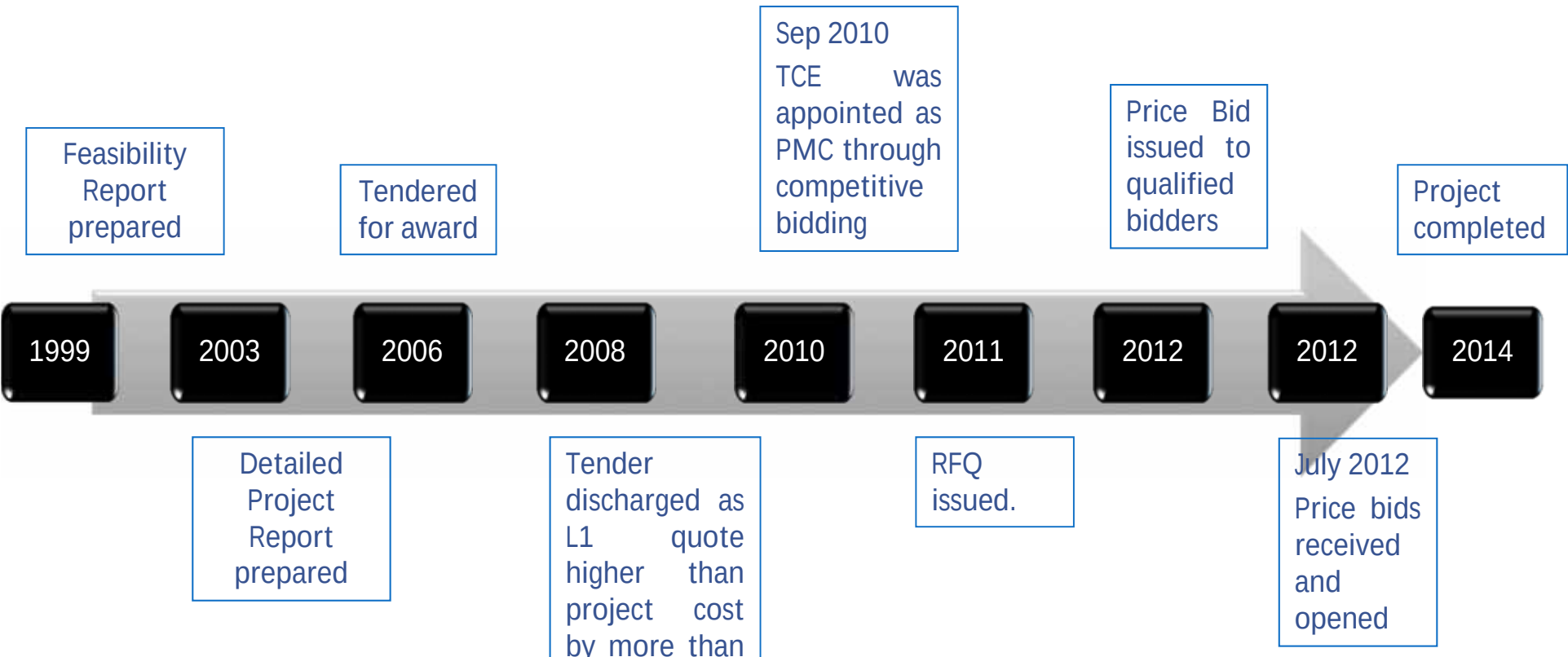
4th Floor, Tower A, 247 Park, LBS Marg, Vikhroli (West), Mumbai 400 083

CONTENTS

Existing Channel Layout

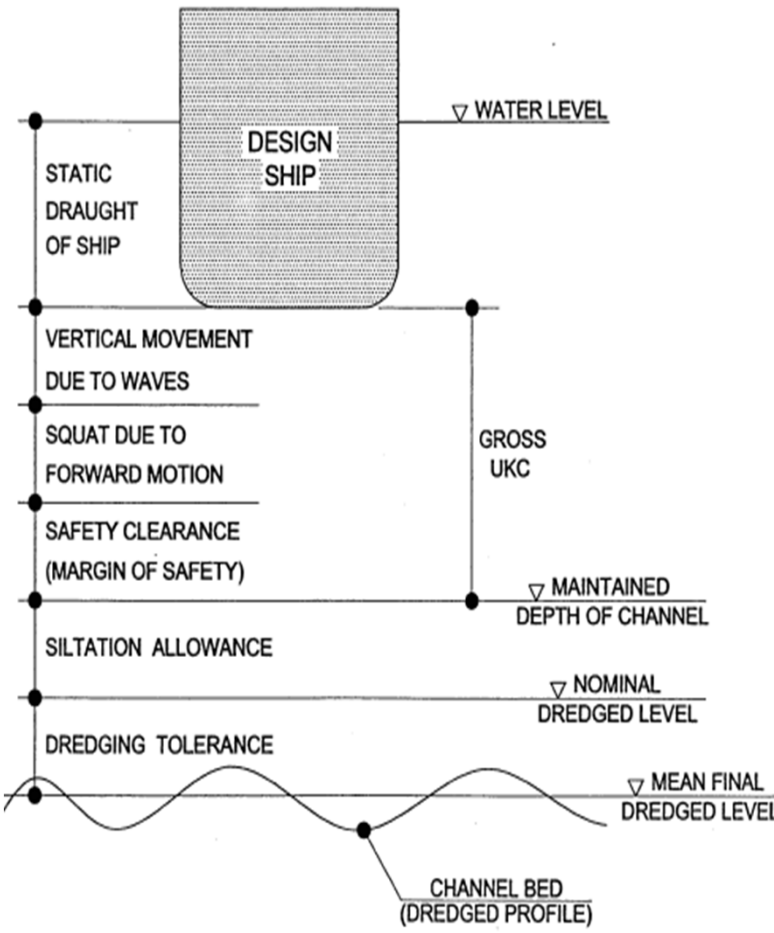


Project Background



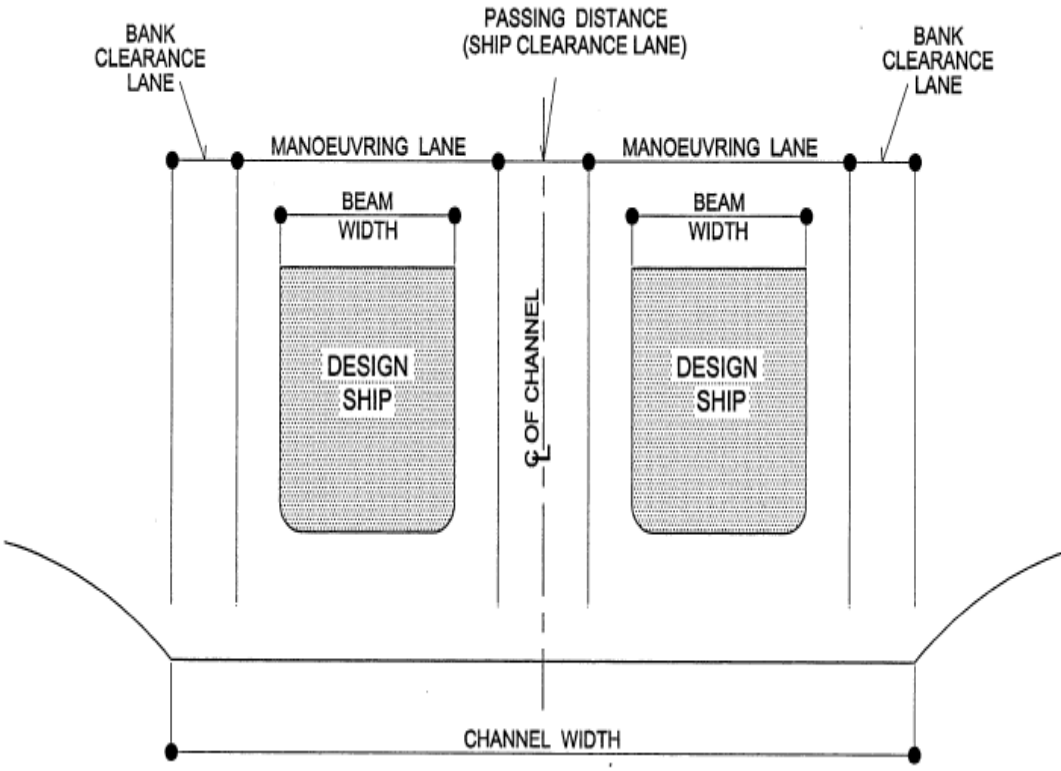
Channel Depth and Width Design

Sr. No	PARAMETERS	DESIGN VESSEL = 6000 TEU				
		A-B	B-C	C-D	D-E	E-F
1	Static Draft(m)	14.0	14.0	14.0	14.0	14.0
2	Vertical Movement induced by waves (m)	+1.0	+1.0	+0.8	+0.3	+0.3
3	Squat Allowance (m)	+0.6	+0.6	+0.6	+0.3	+0.2
4	Margin of Safety (m)	+0.5	+0.5	+0.5	+0.5	+0.5
5	Net channel depth (m)	16.1	16.1	15.9	15.1	15.0
6	Siltation Allowance (m)	0.3	0.3	0.3	0.3	0.3
7	Tidal Window (m)	-2.2	-2.2	-2.2	-2.2	-2.2
Design Dredge Depth (m CD)		**14.2**	**14.2**	**14.0**	**13.2**	**13.1**



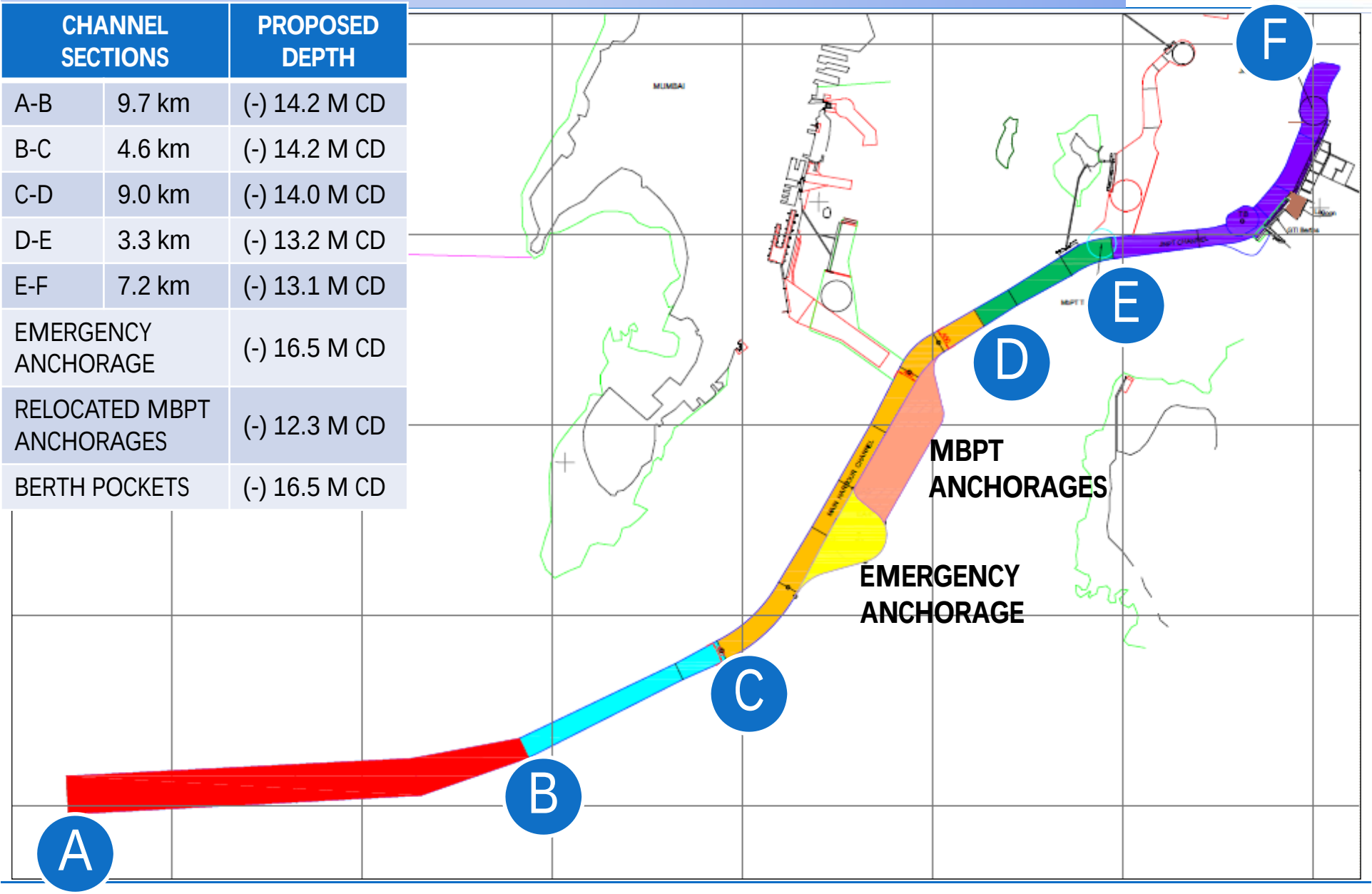
Channel Depth and Width Design

Sl. No	Allowances given	Magnitude
1	Maneuvering Lanes	3.0 B
2	Ship clearance lane	1.8 B
3	Bank Clearance	1.0 B
4	Ship speed	0
5	Cross Wind	0.8 B
6	Cross current	1.4 B
7	Longitudinal current	0
8	Wave action	0
9	Quality of navigational aids	0.2 B
10	Nature of the seabed at channel	0.2 B
11	Water way depth	0.4 B
12	Nature of cargo	0
	Total	8.6 B = 370m

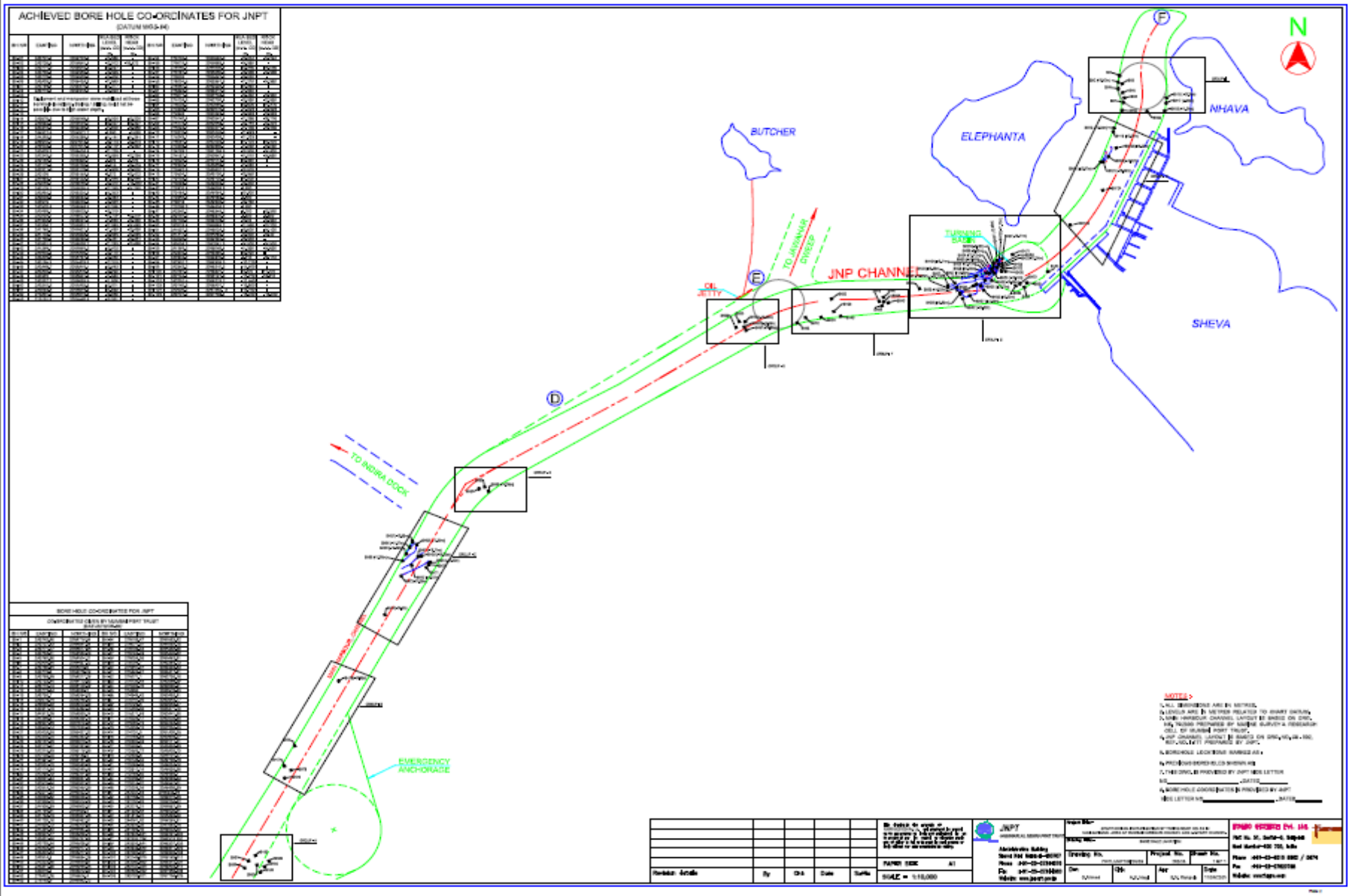


Proposed Channel Layout

CHANNEL SECTIONS		PROPOSED DEPTH
A-B	9.7 km	(-) 14.2 M CD
B-C	4.6 km	(-) 14.2 M CD
C-D	9.0 km	(-) 14.0 M CD
D-E	3.3 km	(-) 13.2 M CD
E-F	7.2 km	(-) 13.1 M CD
EMERGENCY ANCHORAGE		(-) 16.5 M CD
RELOCATED MBPT ANCHORAGES		(-) 12.3 M CD
BERTH POCKETS		(-) 16.5 M CD



Estimation of Dredging Quantities



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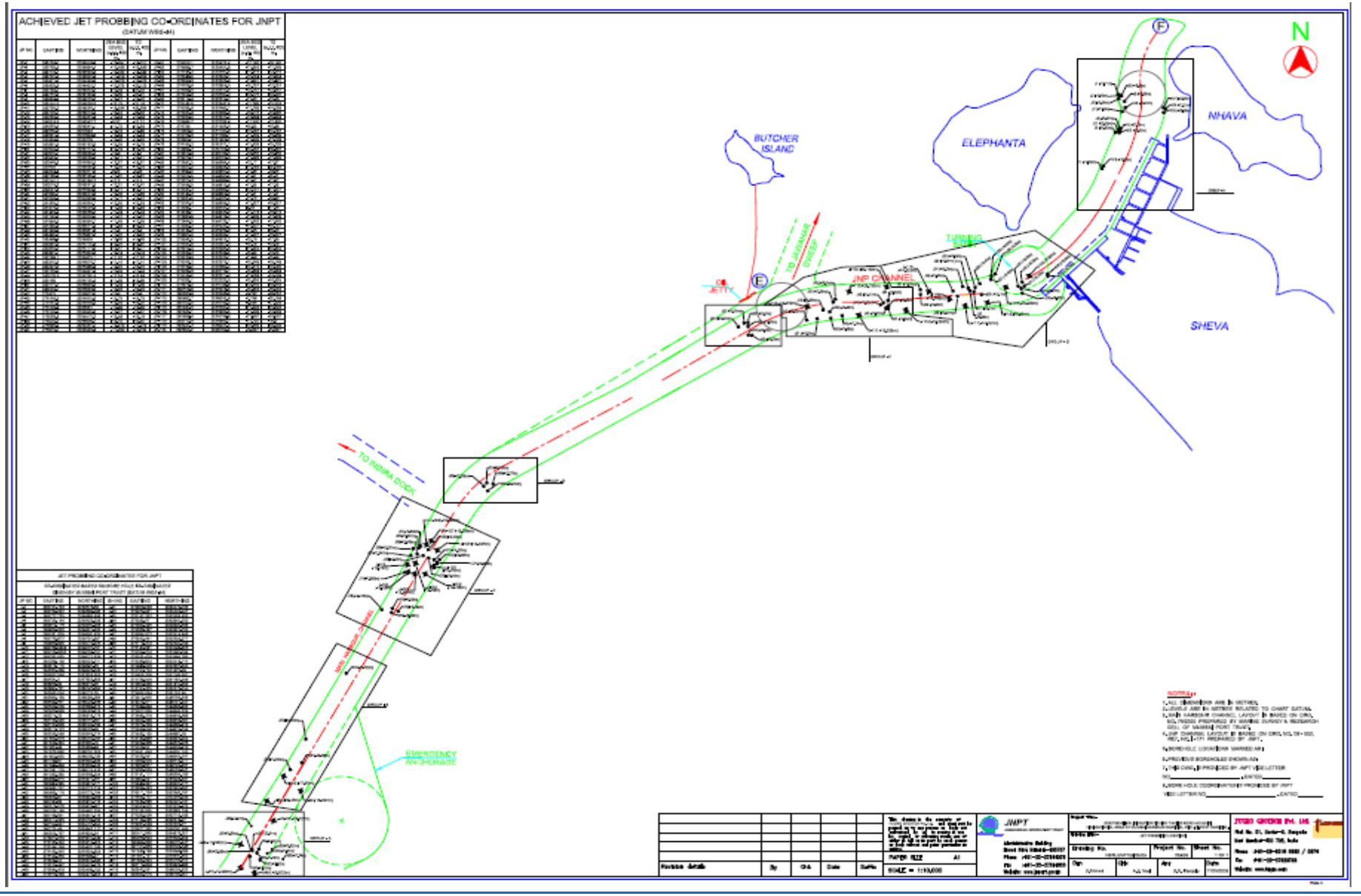

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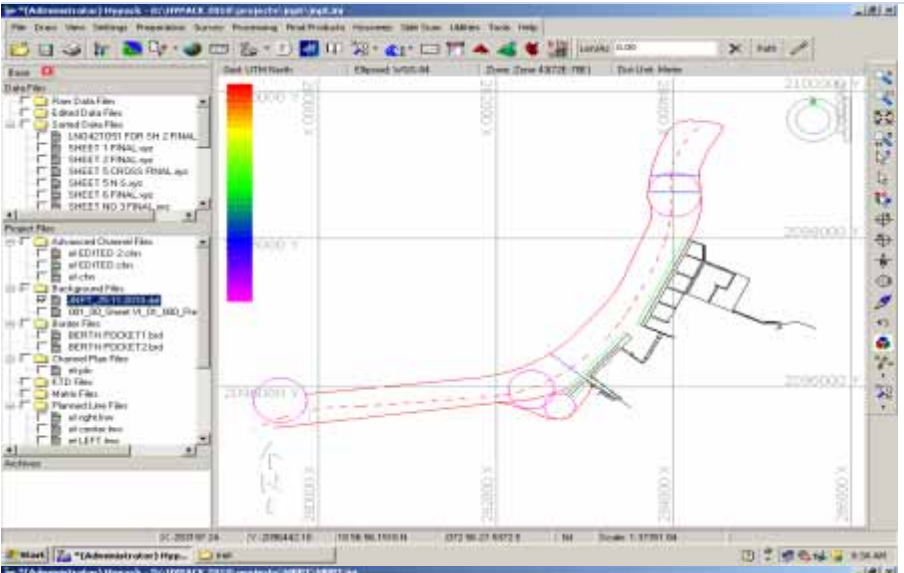
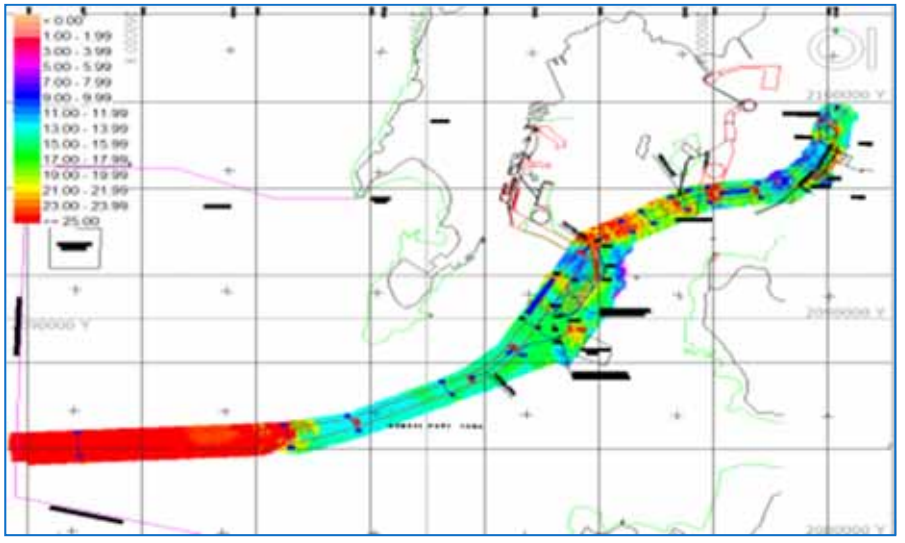
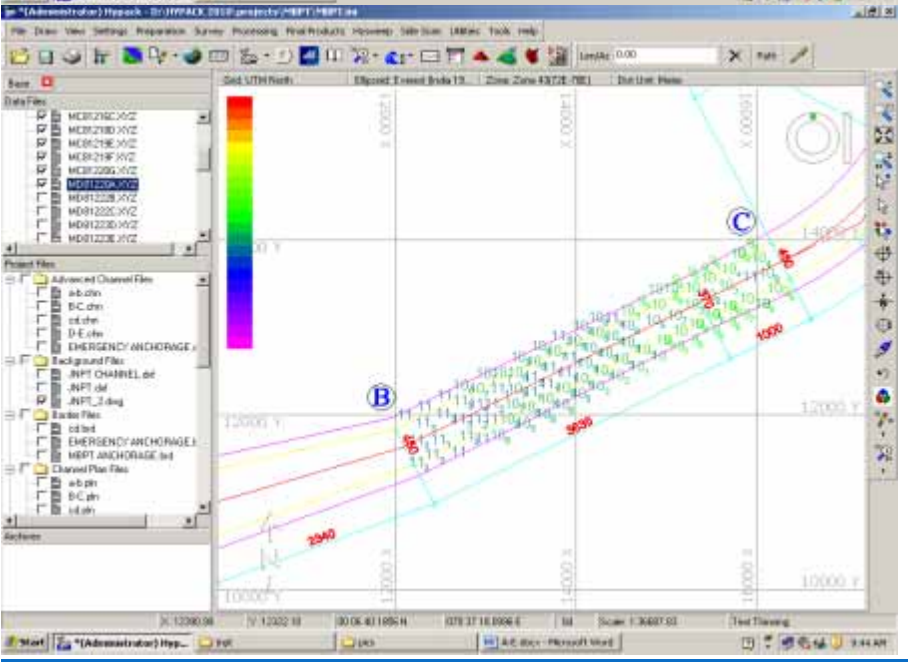
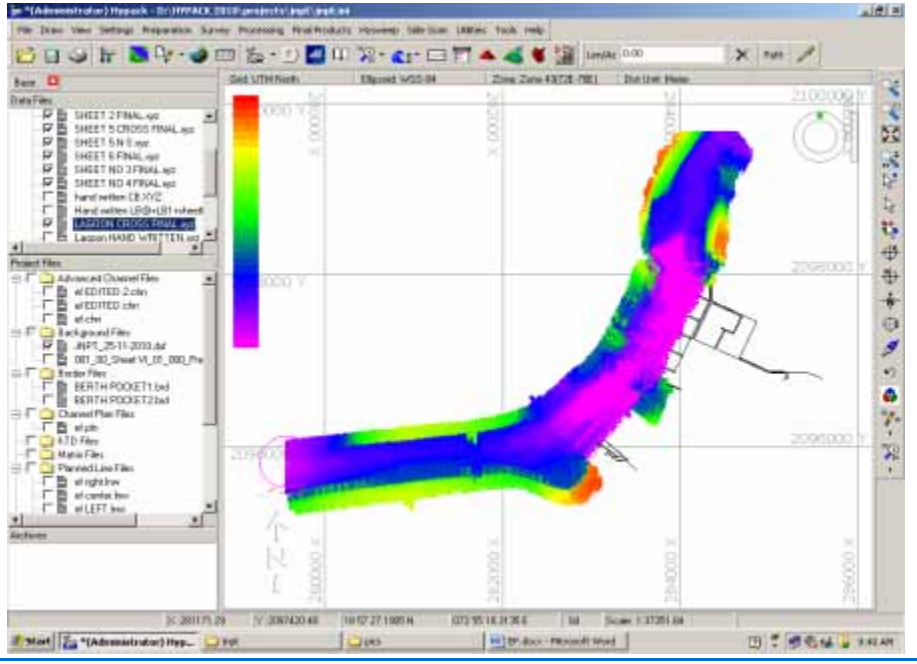
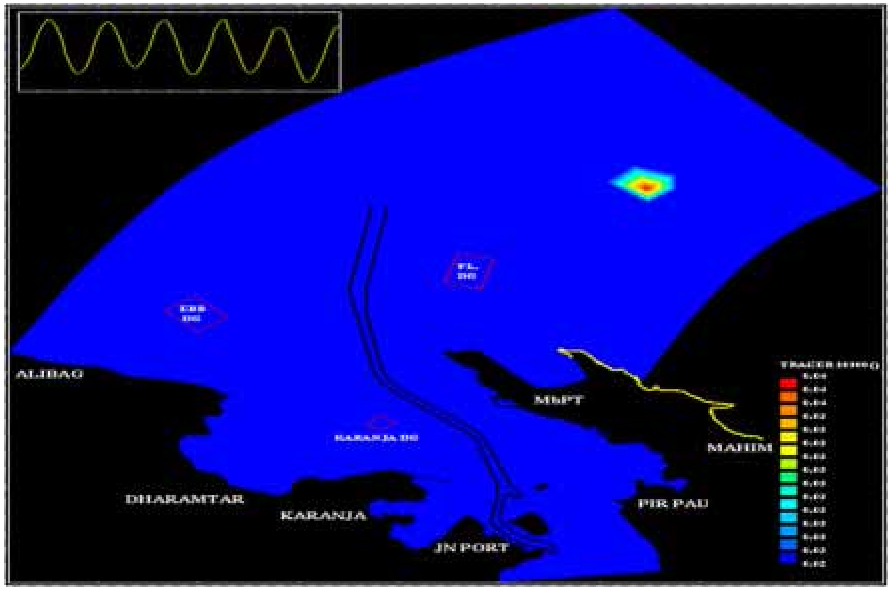


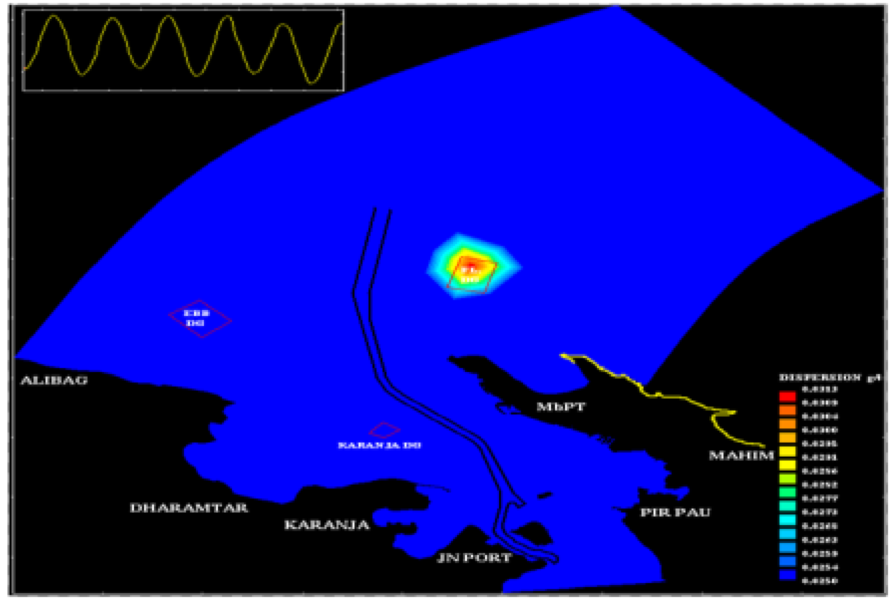


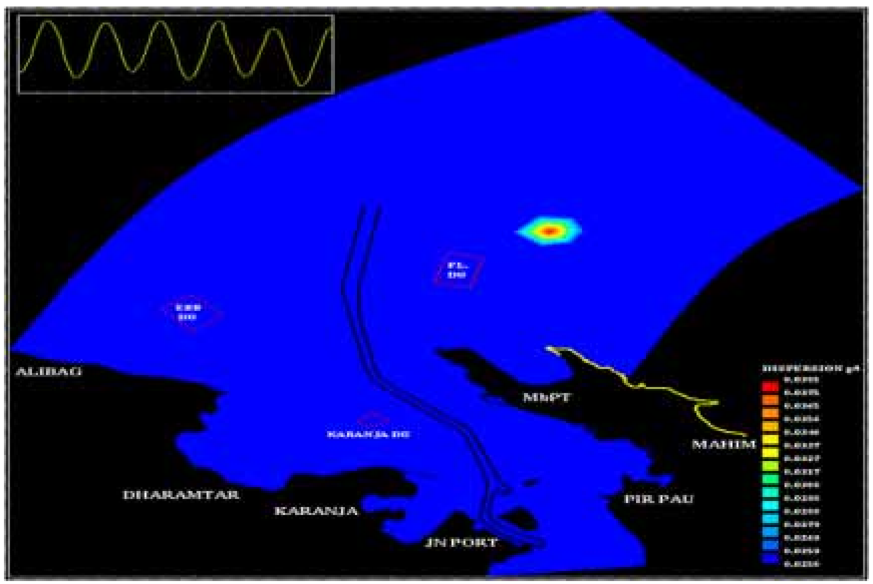


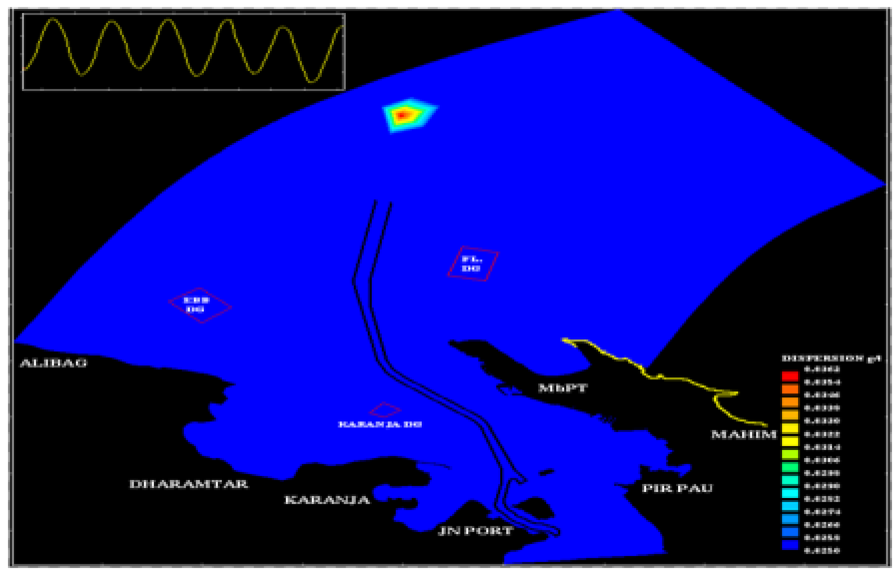


Identification of Disposal Ground









Costing of Dredging Works

Cost standards indexation 2013

Guide to cost standards for dredging equipment indexation 2013.

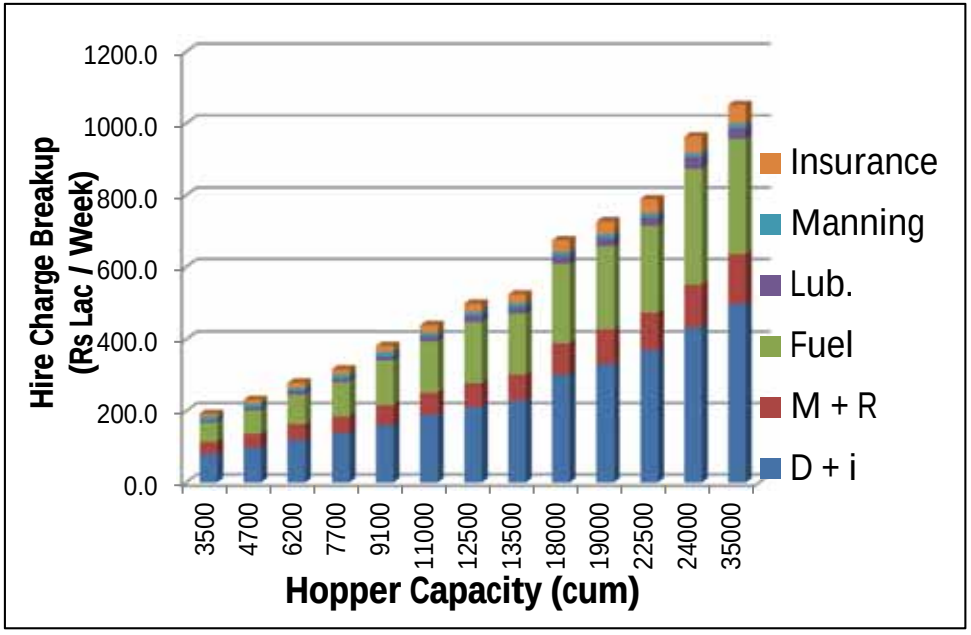
CIRIA Publication C684 A guide to cost standards for dredging equipment 2009 gives the replacement value ex-works, yard or importer and exclusive of VAT, in Europe on 1 January 2009 for several types of dredging equipment. The values given in this publication have now been indexed as per 1 January 2013.

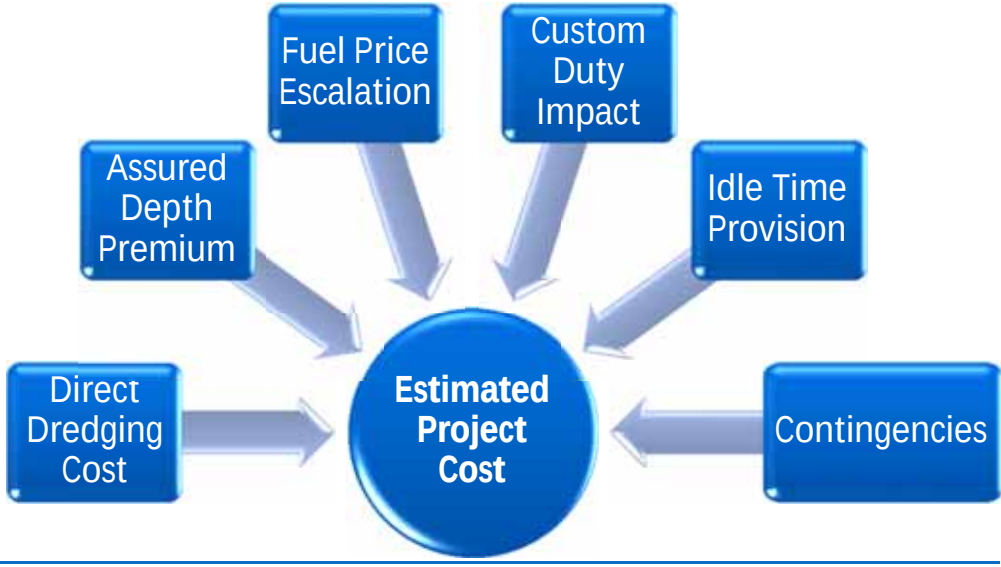
Since there is no specific European index for ship building and/or hull structures available, IADC has assessed the indexation 2013 using the following Eurostat indices:

- C2511 (Manufacture of metal structures and part of structures) for hull steel
- C 242 (Manufacture of tubes, pipes, hollow profiles and related fittings, of steel) for steel pipelines
- C2211 (Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres) for rubber pipelines and pressure hoses
- C2811 (Manufacture of engines and turbines, except aircraft, vehicle and cycle engines)
- C2813 (Manufacture of other pumps and compressors)

The assessed indices that are shown in the table are all based on the appropriate weighted combinations of last years' Eurostat indices.

Group	CIRIA Category	Description	Index 1-1-2013
a	100; 101; 610; 620; 630	Trailing suction hopper dredgers; Side stone-dumping vessels; Inland, self-propelled hopper vessels (with suction or trailing pipe); Sea-going, self-propelled dumping barges	104
b	200; 201; 202; 310; 320; 330	Cutter suction dredgers; Suction dredgers; Barge-loading suction dredgers; Barge-unloading dredgers	105
c	400; 401	Boosters	107
d	710; 711	Jack-ups	103
e	510; 511; 520; 521; 530; 621; 631; 632; 633	Backhoe dredgers; Pontoon with excavators on tracks; Grab dredgers; Pontoons with cable cranes on tracks; Bucket dredgers; Inland, self-propelled hopper vessels (without suction or trailing pipe); Dumping barges (not sea-going)	103
f	622; 810; 850	Inland hopper barges; Pontoons; Derrick barges	101
g	820; 821; 822; 830; 831; 832; 840	Multi-purpose pontoons; Tugboats; High speed crew and survey launches	105
h	920; 931; 941; 91x	Steel Pipelines	102
i	930; 942	Self-floating rubber pipelines; Pressure hoses	105





Global Tendering

SALIENT FEATURES

- Assured Depth Lump sum Contract
- Project Duration 25 months
- No defects liability after Taking Over Certificate
- No variation contract – Provision of cost and time variation to the contract limited only to unforeseen obstructions
- Payment milestones based on achievement of interim depths and not dependent on quantity of material dredged
- 5% bonus for early completion – incentive for early completion by a maximum of 100 days
- Removal of natural and artificial obstructions smaller than 2.5m x 1.5m x 1m and weight less than 2.5 tonnes is within the scope of the contract

Award of Work and Project Timelines

AWARD OF WORK

01ST AUGUST 2012

- RFQ floated on July 2011
- RFP floated on May 2012
- Four Price Bids opened on 18th July 2012
- Three bidders quoted within 5% of Estimated Project Cost
- L1 bidder - M/s Boskalis International quoted 0.89% less than Estimated Project Cost

PROJECT EXECUTION

25 MONTHS

- 62 million cum soil dredging
- 0.5 million cum rock dredging
- Relocation of existing and installation of new navigational aids
  - ➢ 21 Channel marker buoys
  - ➢ 8 pairs of Leading Lights
- 14 member team of TCE – DS Consortium stationed at site for project management and monitoring

PROJECT COMPLETION

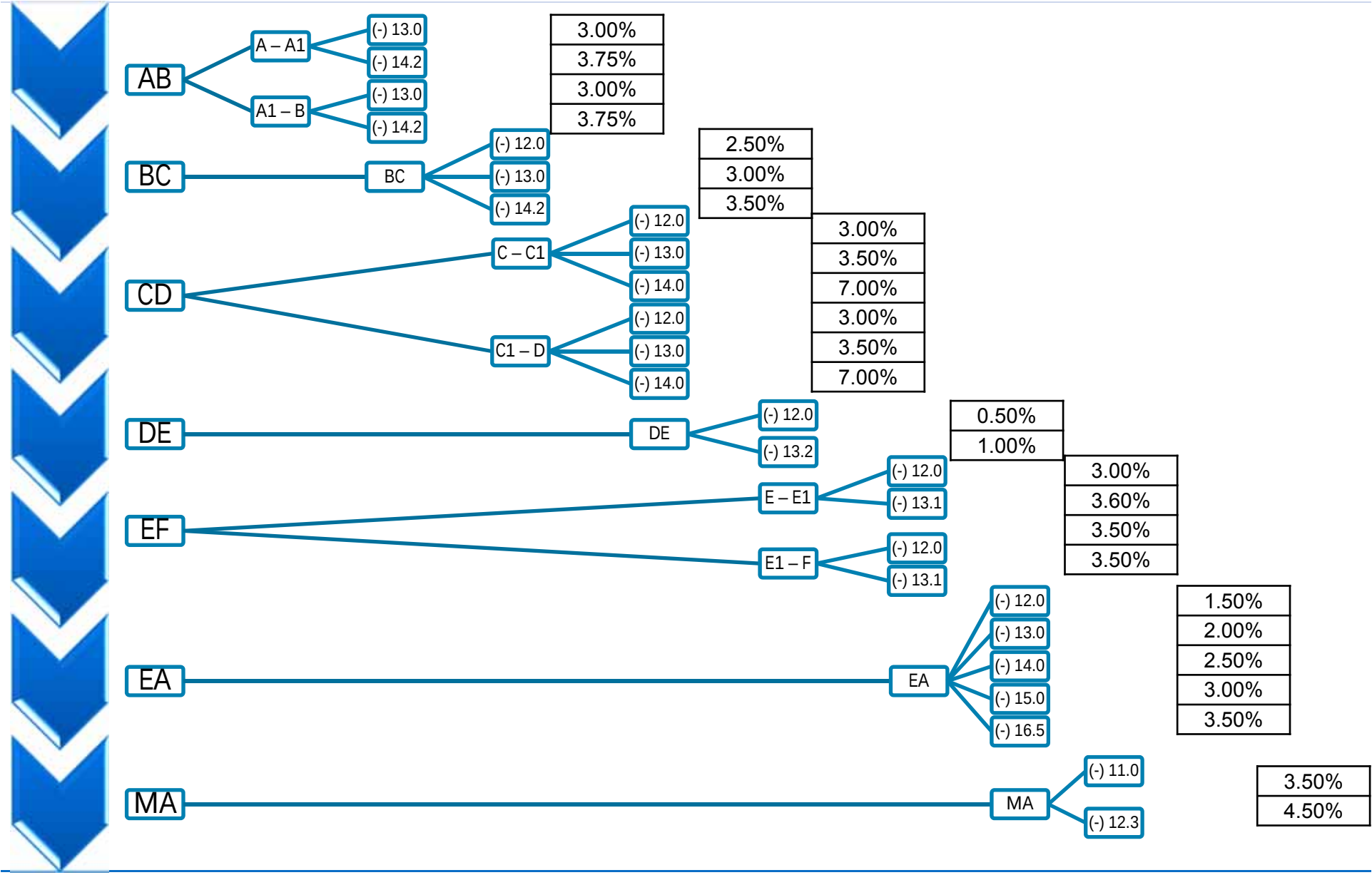
STIPULATED 01TH SEPTEMBER 2014

- Achievement of Design Depths in all channel sections, anchorages and berth pockets
- Installation and Commissioning of nav aids
- Final Soundings by third party (MPSO)

ACTUAL COMPLETION 28TH APRIL 2014

•Navigational buoy deployment completed on September 2014

Payment Milestones

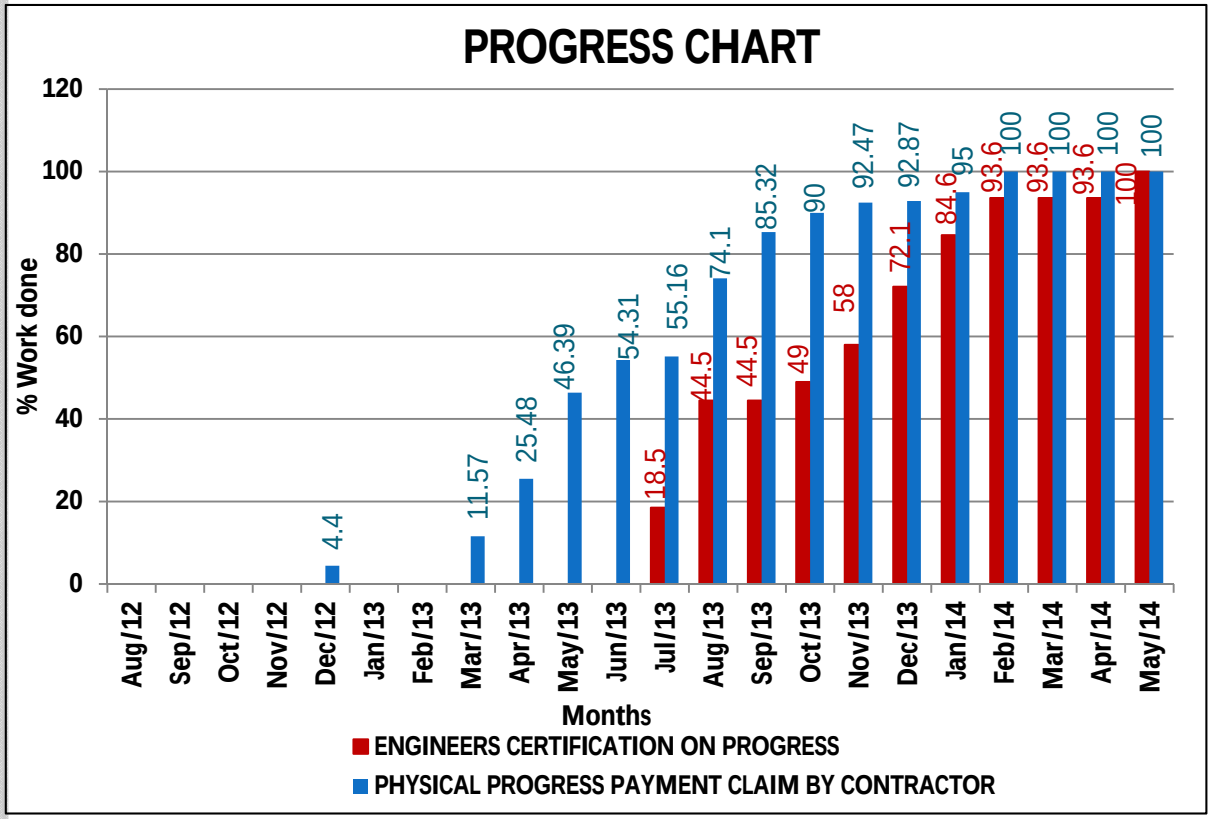


Project Progress

PROJECT PROGRESS

- Project completed in April 2014, four months ahead of schedule
- Difference in Physical Project Progress and Certifiable Progress as per Contract milestones was mainly due to choice of contract type

Hence Lumpsum Assured Depth type contract needs to be used with caution in dredging projects specially when heterogeneous material is expected to be encountered



Dredging Fleet Deployed

TSHD ORANJE

HOPPER CAPACITY 15,961 M^3

TSHD PRINS-DER-NEDERLANDS

HOPPER CAPACITY 15,961 M^3

TSHD QUEEN OF THE NETHERLANDS

HOPPER CAPACITY 35,500 M^3

TSHD HAM 318

HOPPER CAPACITY 35,500 M^3

CSD PHOENIX

CUTTER OUTPUT 3300 kW

BHD BALDUR

BUCKET CAPACITY 24 M^3

Challenges

Challenges

Challenges

Key Learning from the Project

- Thorough site investigations are a must before embarking on a dredging project
  - Bathymetry Survey – single beam / multi beam
  - Side Scan Sonar Survey
  - Seismic Sub Bottom Profiler Survey
  - Geotechnical Investigations – Marine Boreholes (adequate number)
  - Detailed hydrodynamic modelling, sediment transport, siltation studies etc
  - Dredger Plume Study
  - Magnetometer Survey
- Choice of appropriate type of contract with optimum risk sharing between the contractor and client
- Appointment of a professional PMC to manage large dredging projects
- Using international best practices in estimation and design as highlighted in CIRIA and PIANC publications
- Using standard FIDIC documents for preparing tenders

Other Projects Executed by TCE

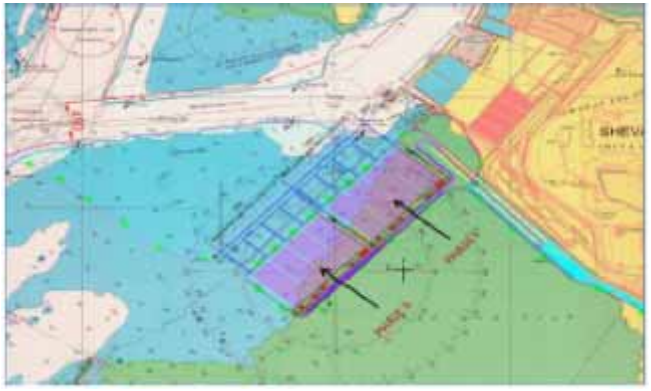
Cochin Shipyard Limited
Development of International ship repair facility at Cochin Port Trust

Angre Ports infrastructure limited
Ship repair facility and cargo terminal at Jaigad

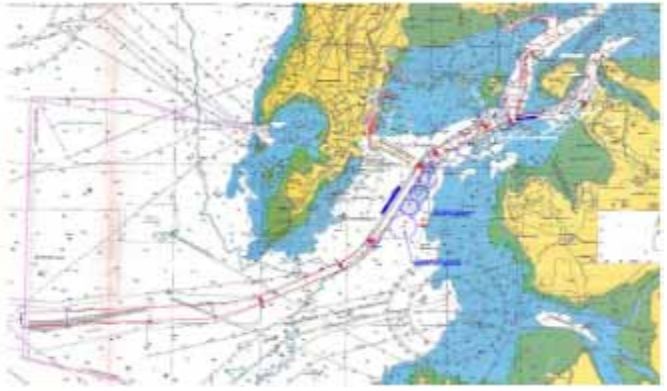
Mazagon Dock Limited-**Repairs and rehabilitation of slipway**

Republic of Seychelles Ship repairs complex
-**Port Victoria**

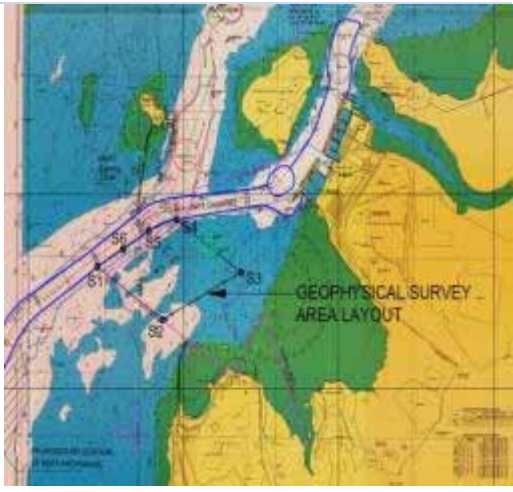
Other Projects Executed by TCE



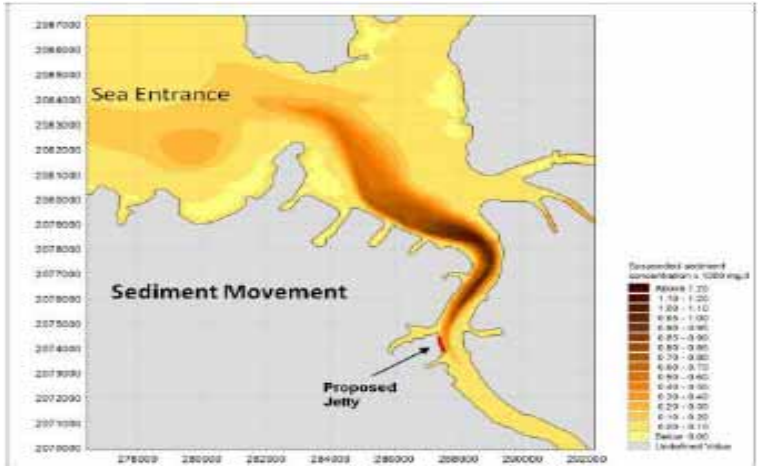
Review of feasibility report for Development of Fourth Container Terminal at JNPT



Consultancy Services for deepening and widening of Mumbai Harbour Channel and JN port Channel – Phase II



Tata power company limited
Feasibility study for dedicated anchorage at JNPT



CES for sediment model study for development of Coal jetty for Dehrand Power Project

DPR for 'development of mechanized coal handling facility at Port of Mumbai under PPP mode

Other Projects Executed by TCE

Madras Atomic Power Project
Intake structure and submarine tunnel at Kalpakkam

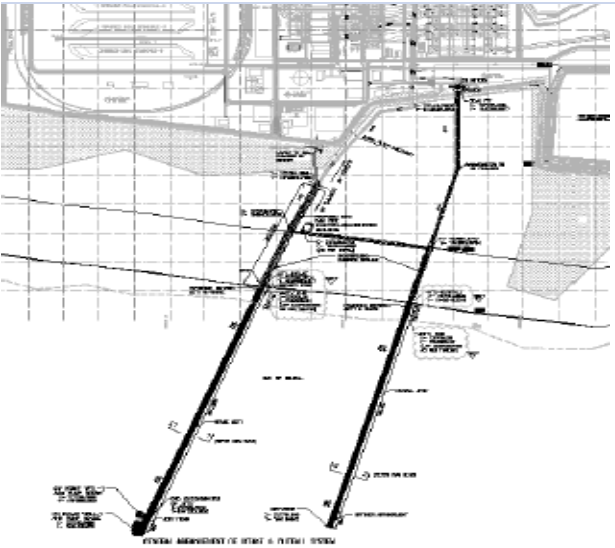
Garden reach ship builders & engineers limited -**Modernisation of hull shop – II (phase I)**

IDBI Bank Limited - **Expansion of container terminal project of Gujarat Pipavav Port Ltd.**

Gujarat integrated maritime complex Limited / ILFS proposed shipyard and a multipurpose port

Garden reach ship builders & Engineers Limited
Modernisation of hull shop –II (Phase II)

Other Projects Executed by TCE



Gammon India Limited - **Sea water intake And outfall system for 1040 MW Thermal Power Plant at Vizag**

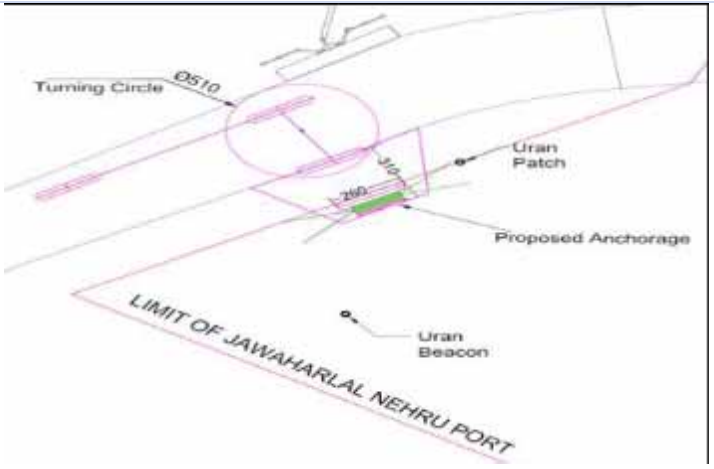
Jawaharlal Nehru Port Trust- **advisory services to develop a Port based SEZ Phase-I at JNPT Mumbai**

Tata Power Company Limited- **Caisson & piled jetty for Trombay units 5 & 6**

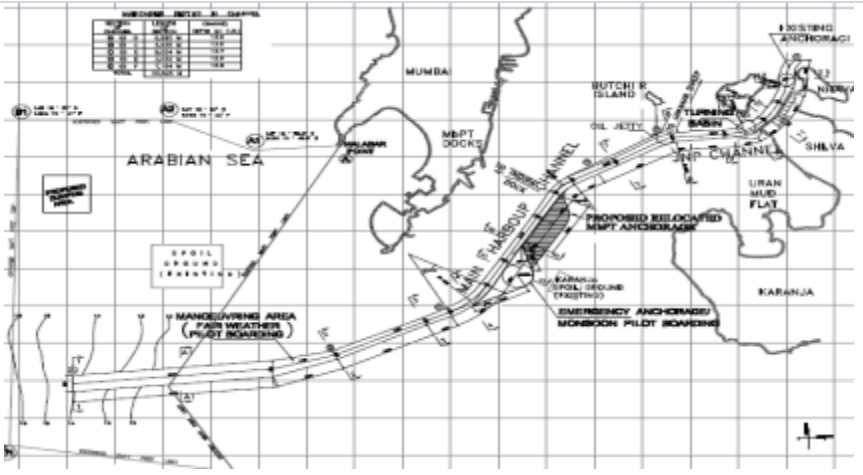
Ennore Port Limited - **Capital dredging phase II**

Industrial development Bank of India / Gujarat Pipavav Port Limited - **Container Terminal**

Other Projects Executed by TCE



JNPT-Consultancy Services for creation of New Anchorage At southern side of JNP approach Channel



Deepening and widening of Mumbai Harbour channel
& Jawaharlal Nehru Port Channel – Phase I

JITF waterways limited / NTPC – Farakka super thermal power project
3 MTPA coal handling plant and jetty

Tata Reality and Infrastructure Limited -
Passenger water transport along the West coast of Mumbai

Other Projects Executed by TCE

Tamilnadu Electricity Board
Cooling water (CW) intake and coal handling facility for Tuticorin thermal power project Station III stage extension - units no. 4 & 5

National Electricity Board, Malaysia
oil jetty for Pasir Gudang Power Project

Brihanmumbai Municipal Corporation - **Shore protection work under Bombay Sewage disposal project**

Mumbai Port Trust - **New berth at Pir Pau for POL and bulk liquid chemicals**

Ministry of National Economy, Sultanate of Oman - **Breakwater & shore protection works under sea water intake pumping scheme & outfall for Sohar Industrial Port Company (SIPC) area**

THANK YOU

devdattab@tce.co.in