JadeWeserPort: a deepwater container terminal in Wilhelmshaven

JadeWeserPort, Wilhelmshaven

The State of Lower Saxony and the Hanseatic City of Bremen joined forces in June 2002 to realise one of the largest infrastructure projects seen in North Germany in the last 50 years: JadeWeserPort at Wilhelmshaven will be Germany's only deepwater terminal for super-large container ships. Operations are scheduled to start in 2011.

A terminal for next generation container ships

The JadeWeserPort deepwater container terminal is to be constructed on the west bank of the Inner Jade – part of the Jade estuary of the North Sea – approximately 9 km northeast of centre of Wilhelmshaven. Its location east of Voslapper Groden, between the 'Niedersachsenbrücke' (coal terminal) in the South and the WRG Pier facility to the North will make it an integral part of the port facilities of Wilhelmshaven. The average distance to the WRG Pier and jetties to the North is around 2,200 m.

The ideal location of the port was confirmed by nautical simulations. With a short approach channel of a length of 23 nm, the next generation of super-large vessels of well above 10,000 TEU with dimensions of up to 430 m in length, 58 m width and drafts of up to 16.5 m will be able to call the port with a tide-independent access. A planned quay length of 1,725 m guarantees that four large container vessels together with feeder ships will be simultaneously served by way of 16 container bridges.

After completion, JadeWeserPort will be the most easterly deepwater port of the European North Range between Le Havre and Hamburg. Its annual turnover is predicted to be approximately 2.7 million TEU. It is anticipated that around 60 per cent of the overseas container turnover via the Wilhelmshaven main hub will comprise sea transit shipments within European distribution traffic to Scandinavian, EU Baltic state and Russian seaports. JadeWeserPort will be an essential key component of the trans-European 'Motorways of the Seas'.

The terminal area of 130 ha is complemented by another 160 ha for logistics and port-oriented services, with a freight village also in the planning. Both, road and rail networks will offer a high capacity access; for road traffic, the German A 29 motorway ends at the port gates. The overall investment volume amounts to Euro 950 million. The EUROGATE group as port operator will invest □350 million into the port superstructure.

Current planning status

The realisation of the JadeWeserPort project has involved planning approval procedures in accordance with the German Waterway Act (WaStrG) and the German Mining Act (BBergG). Final approval was granted in accordance with the German Mining Act in September 2006 with immediate execution granted, effective November 2007. The plan approval order in accordance with the German Waterway Act was pronounced with immediate execution rights in March 2007.

The JadeWeserPort construction project as applied for in accordance with the German Waterway Act includes the following measures:

- Creation of a new terminal area:
  - land reclamation with embankments
  - construct quay, return and embankment walls
- Quayside transport connection:
  - realign the Jade channel
  - construct terminal access channels
  - relocation of a leading light
- Landside transport connection:
  - construct road access
  - construct rail access
- securing the 'Niedersachsenbrücke'

Tenders for the construction works for the terminal land areas including the quay and embankment walls were invited according to a European pre-qualification procedure in early January 2006.

Bids received from approved bidding consortia were opened on 4 May 2006. The five approved consortia submitted not only their principle proposals but offered also 400 specific proposals.

Construction of new terminal area

The central component of the proposed project is the establishment of a new port area extending into the Jade. The required land area of 360 ha for the port overall is subdivided into the following sections:

- Terminal area with quay
- Hafengroden (logistics zone)
- Traffic areas for road and rail
- River embankments

Terminal area and quay

The terminal area will have a quay length of 1,725 m and an overall width of 650 m. These dimensions represent the surface area required to accommodate the predicted container volumes with consideration of expected changes in ship size and capacity.

The fundamental quay design is to be safe at high water with a ground level of 7.50 m above mean sea level. With the harbour seabed specified at – 20.10 m below mean sea level, the quay covers a height difference between harbour seabed and surface of at least 27.60 m. Adding on a safety margin for excavation tolerance and possible erosion of 3 m determines the maximum pile length for the proposed combined sheet pile walls to be around 43 m. The quay walls will ultimately be of a height almost without parallel in the world. The new port area including embankments is to be constructed by sand fill creating an overall surface area of approximately 360 ha. The landfill will require approximately 43 million m^3 of sand.

Required sand quantities will be obtained from dredging works connected with the new fairway and access areas including moorings, as well as from two sand extractions pits located north and south of the future port area. Excavation will extend down to 35 m below mean sea level. The approval for sand removal (general operating plan) from the two sand pits was granted consequent to the planning approval procedures in accordance with the German Mining Act (BBergG).

The approximate 160 ha area located to the west of the terminal area, known as Hafengroden will be used for port-

When completed JadeWeserPort will be Germany's only deep-water terminal able to handle the largest container ships.

related industries and services. The area will be enclosed to the north, east and south by traffic areas. To the west the terminal area is bordered by the new Voslapper sea dyke.

The embankments planned around the new land areas will offer protection against wave action and erosion, also during the landfill phase. The extension of these dykes will involve laying between 500,000 to 600,000 tonnes of water building blocks – representing an extreme challenge to both engineering and logistics. Last but not least, the embankments also provide protection against high water levels and flooding for the terminal and the logistics areas. To the east the port is bordered by the quay structure. Preparatory calculations, taking storm water levels and tidal actions into account, have confirmed that a quay height of + 7.50 m above sea level is adequate to provide the necessary high water protection.

The northern embankment is approximately 1,950 m long; the heavy bank protection of the seaside slope will be compliant with standard dyke construction rules and regulations. A height of + 8.50 m above sea level is planned here to cope with North Sea waves.

The 'Niedersachsenbrücke' will be integrated in the approx. 1,100 m long southern embankment. The lower slope directly south of the 'Niedersachsenbrücke' (access road) will have a concrete cover. The upper slopes will be covered in their lower sections with Lauenburg clay topped with bran. The surface height here is specified at + 7.50 m above sea level reflecting its protected location behind the JadeWeserPort.

Quayside transport connection

The Jade estuary is a federal waterway. The fairway width is 300 m. The Jade range is suitable for ships with drafts of up to 16.5 m irrespective of the stage of tide. Ships with drafts of between 16.5 m and 20.0 m may use the Jade approach under suitable tidal conditions. One aspect of the project is the relocation of the Jade channel up to the new quay. This is necessary for nautical and hydrographical reasons between 7 km and 15 km.

Execution of construction works

The order to build the terminal area and construct the quays (construction phase 1) was granted to a consortium under the management of the Bunte Group, based in Papenburg in Emsland, on 26 September 2007.

Germany's largest marine construction site currently employs around 300 people. Approximately 19 million cubic metres of sand of the planned total volume of approximately 43 million has already been brought into the construction site since land reclamation started at the end of March 2008 with four dredgers. Piling of the sheet pile walls began in August last year. Five ram pontoons are currently piling simultaneously on the main quay and the northern and southern return walls. More than 1,200 bearing piles and diagonal piles have already been rammed into position to anchor the quay. The status of the onshore transport connections to the port: the road to the main dyke has been finished, and most of the engineering and dyke building work for the railway track has been completed.

ABOUT THE ORGANISATION

On handover of the Official Project Approval, the State of Lower Saxony and the Free Hanseatic State of Bremen founded in April 2003 the **JadeWeserPort Realisation Company**.

The main tasks of the JadeWeserPort Realisation Company include:

- Tendering and awarding of the terminal operator concession
- Managing of the infrastructure construction for the deep water port project
- Administration, technical advice and economic employment of the infrastructure following the provision of a terminal operator

ENQUIRIES

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