

Status of progress and procurement 9th September 2021

Christian Lundhus & Hakim Naceur



Joint Venture Set-up



Joint Venture Set-up

Joint Venture – an International Team

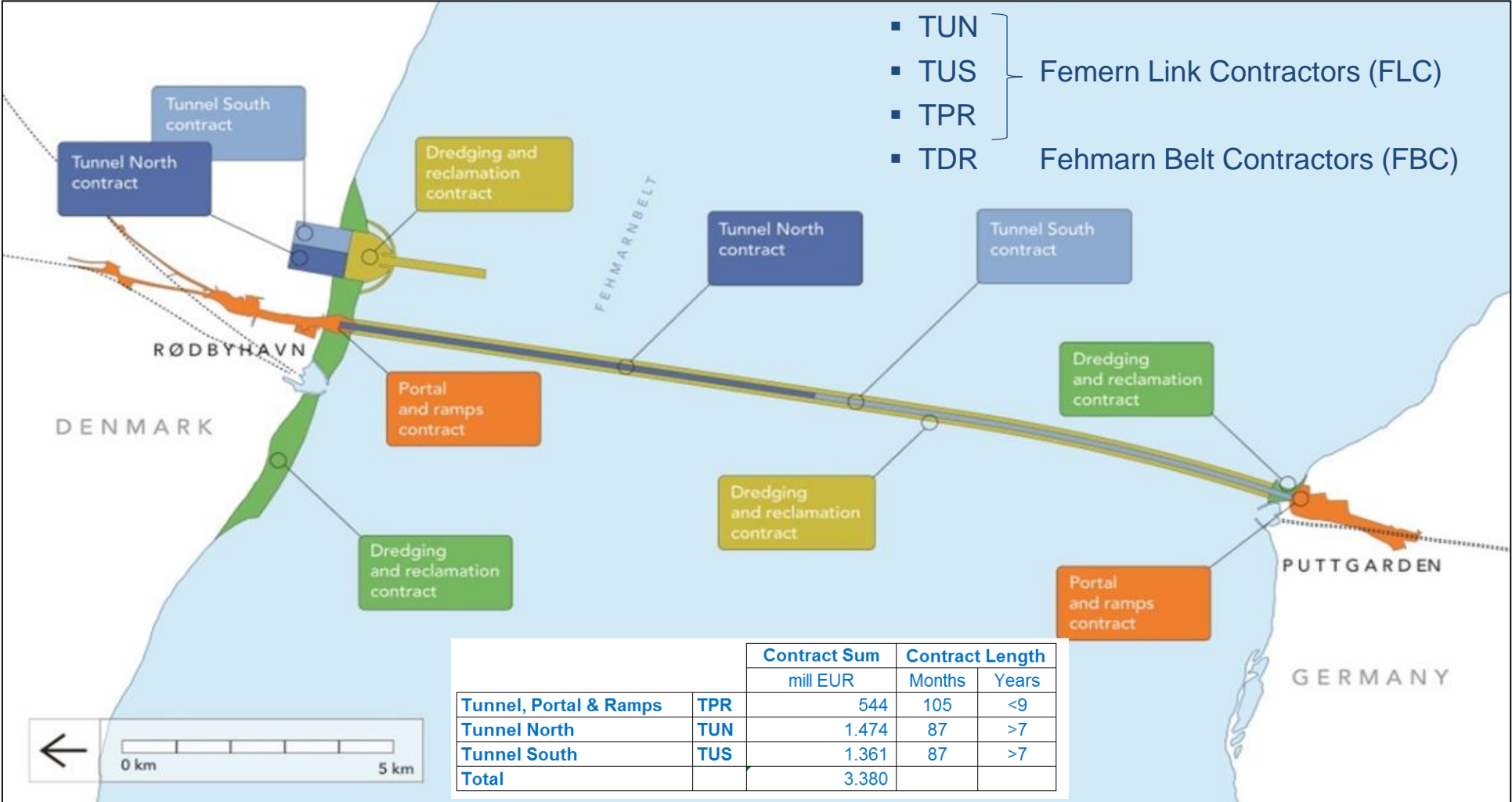


Project Overview



Project Overview

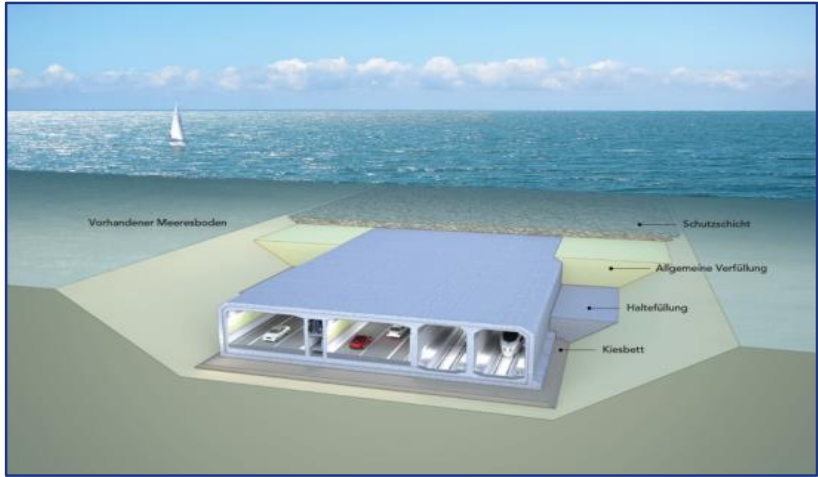
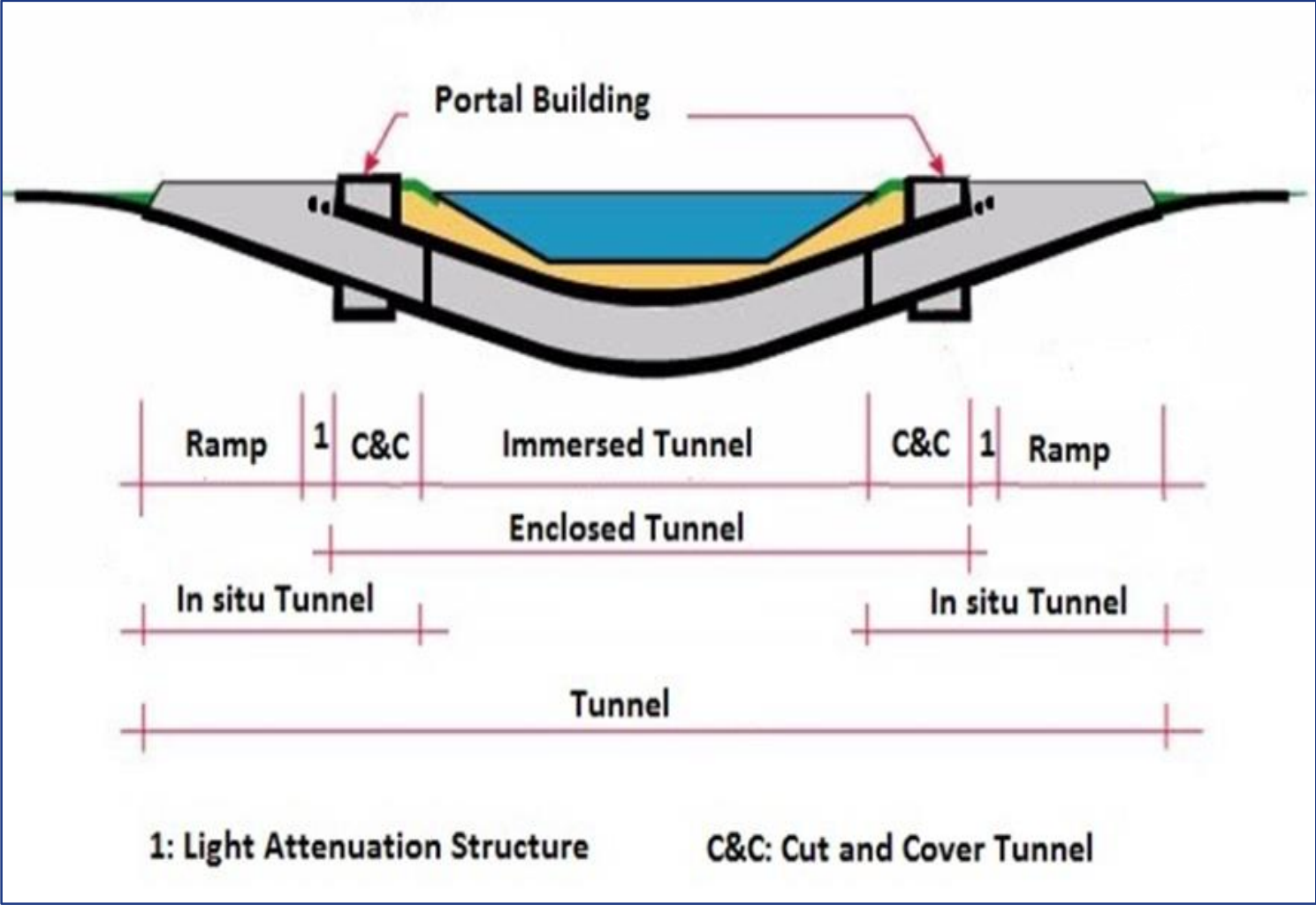
Main Contracts awarded by Femern AS



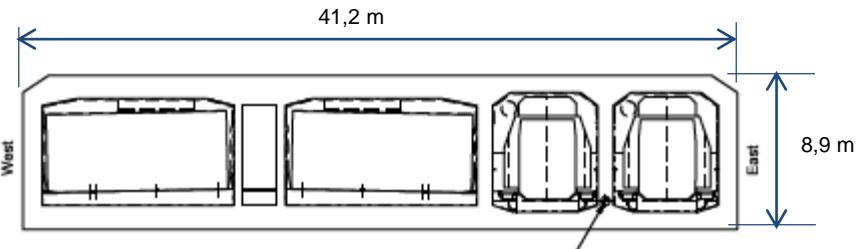
Scope of Work TUN & TUS



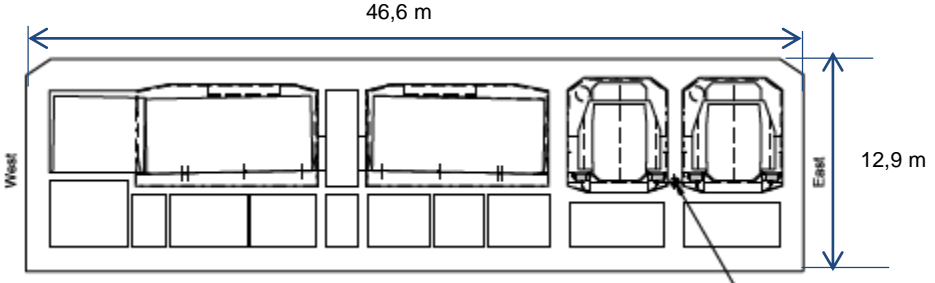
Scope of Work - TPR



Scope of Works - TUX

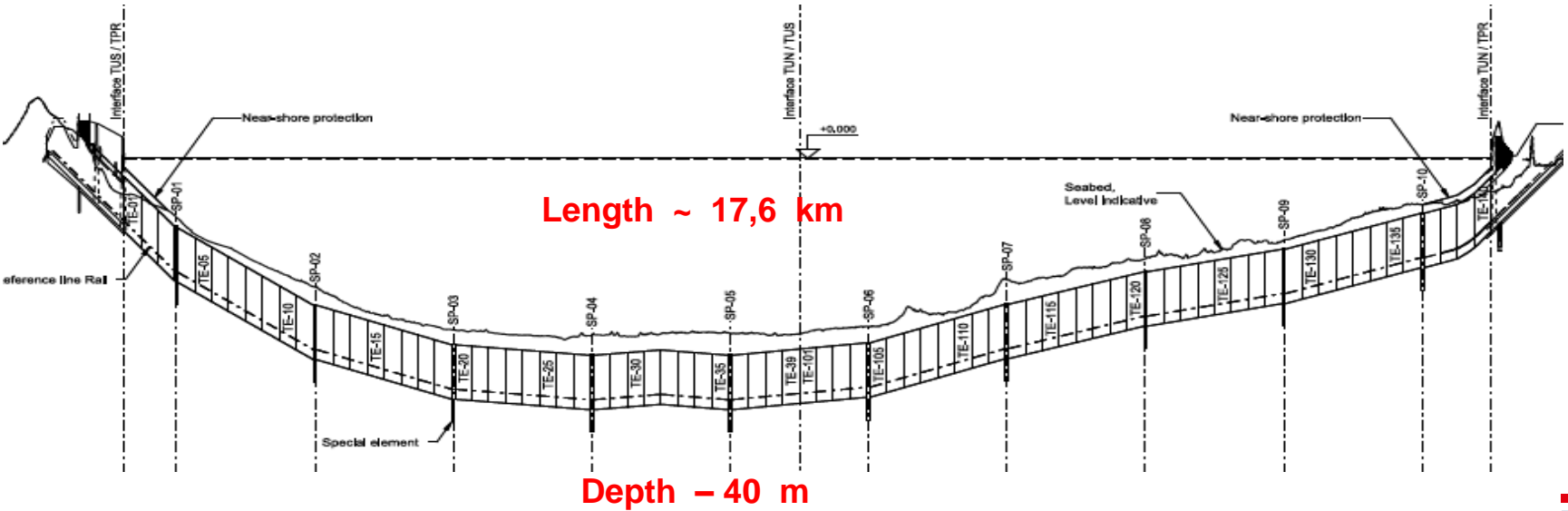


Standard elements (217 m): 79 units

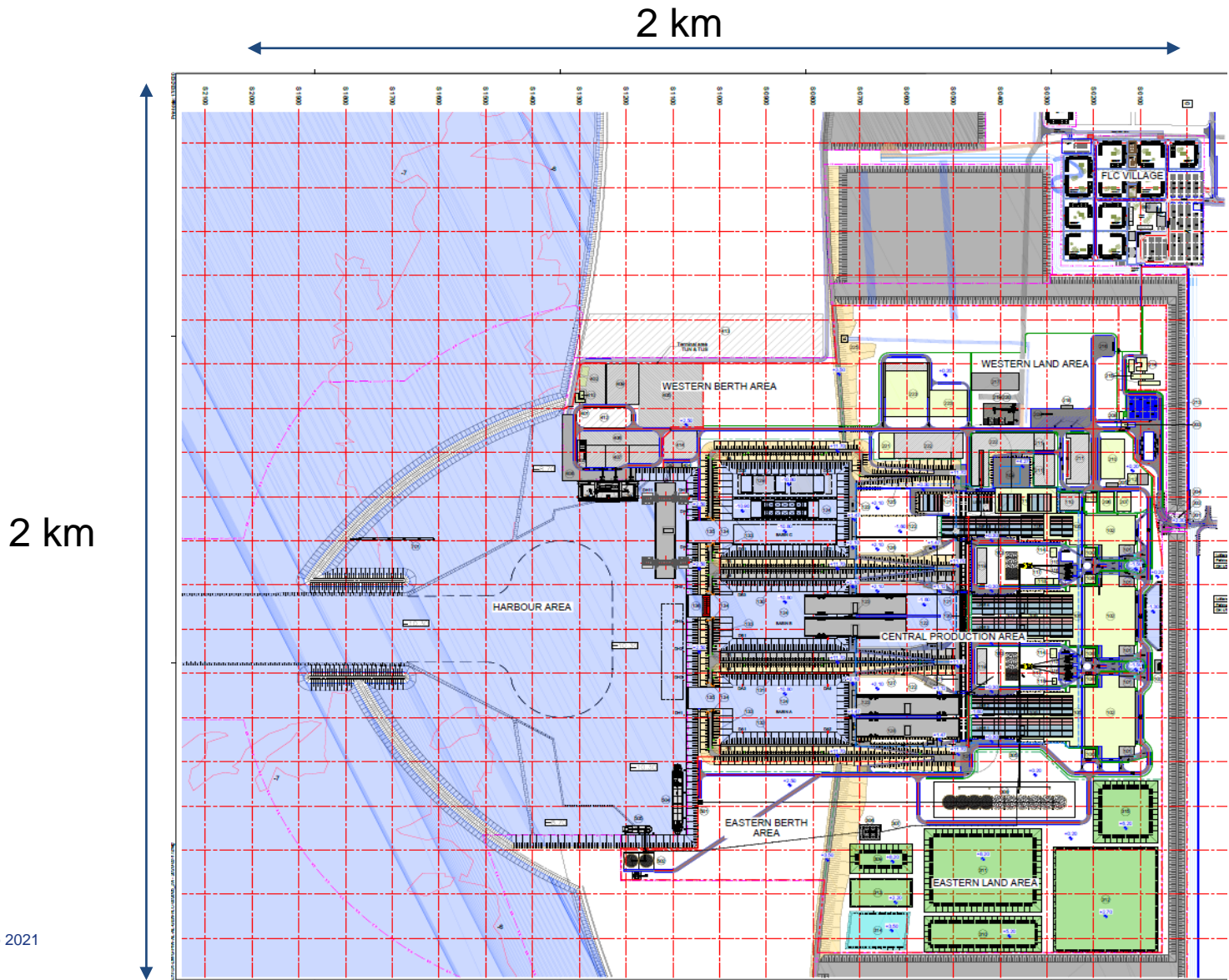


Spécial element (39 m) : 10 units

Weight : 73.000 tons



Scope of Works - TUX



Village - 1300 persons

Main Office - 200 persons

1 Production line Special elements

5 Production lines Standard elements

3 Production halls - 80.000 m2

6 batching plants

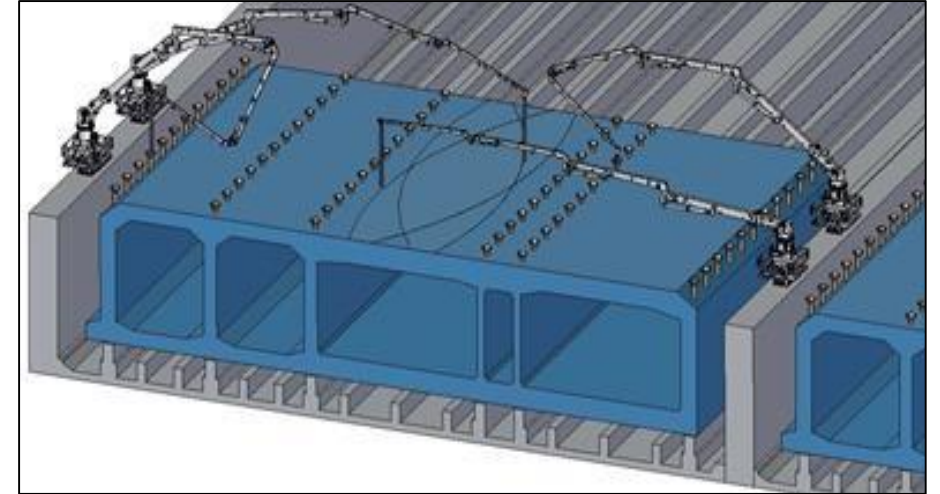
Scope of Works - TUX

Concrete works

- Concrete production on site (aggregates, sand, cement,...)
- Reinforcement
- Assembling (on site and/or prefabricated parts)

Outfitting works

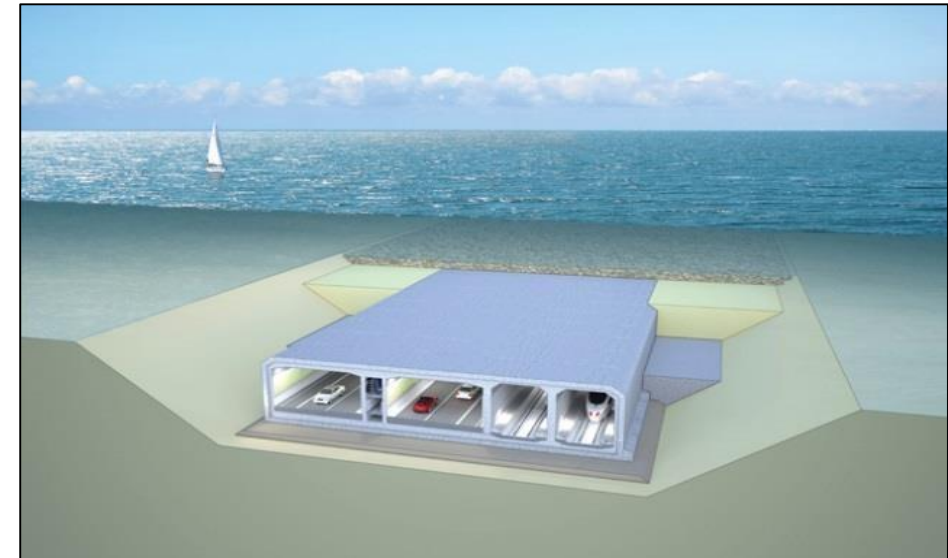
- Prestressing
- Fire protection
- End frame
- Gina joint
- Bulkhead installation
- Ballast tank installation



Scope of Works - TUX

Marine Works

- Towing & immersion of Tunnel elements
- Maintenance dredging of the harbour/access channel
- Trench cleaning (before immersion)
- Tunnel foundation installation
- Backfill on side of tunnel elements
- Protection layer (armour stones) on top and beside tunnel element roof



Scope of Works - TUX

Activities inside the tunnel

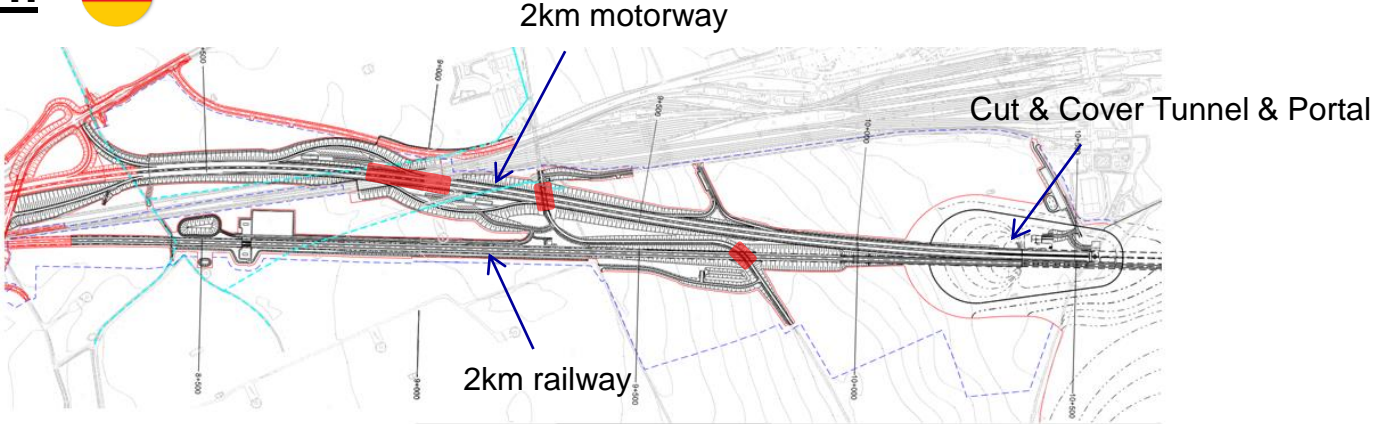
- Alignment of the tunnel element following immersion
- Drainage and ballast concrete
- Removal of ballast tank
- Railway walkway
- Immersion joints between tunnel elements
- Removal of bulkheads
- Other finishing works (cut prestressing, fire protection, joints injection ...)
- Closure joint of the tunnel

Scope of Work TPR

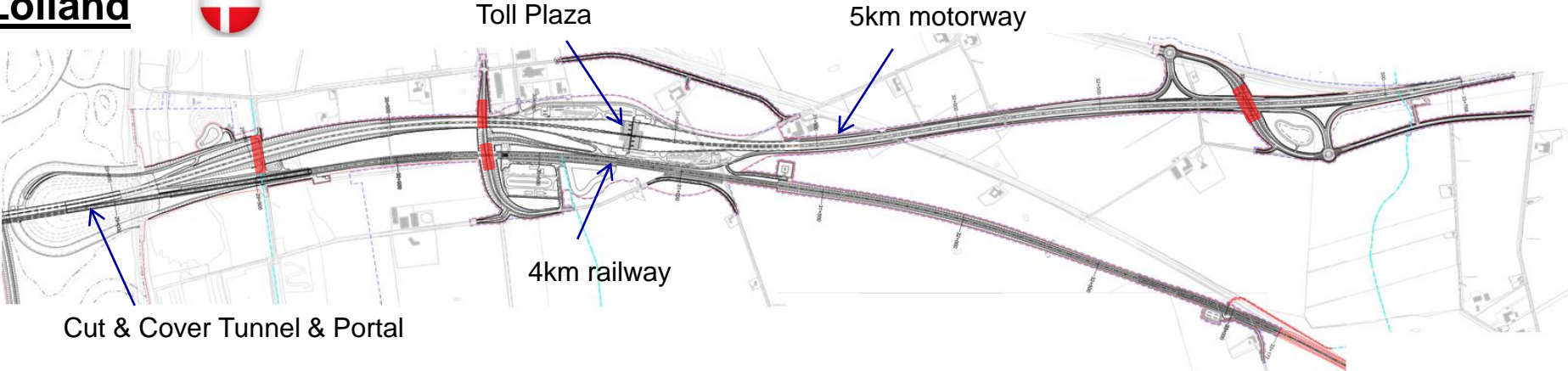


Scope of Work - TPR

Fehmarn



Lolland



Scope of Work - TPR

Lolland



Tunnel

- Cut-and-cover tunnel – 160m
- Attenuation structure – 100m
- Road Ramp – 190m
- Rail Ramp – 860m
- Portal Building
- Sea-cut off structure

Other Structures

- Fauna passages – 2 nos
- Bridges – 4 nos
- Culverts – 2 nos
- Gantries for signs etc. – 25 nos
- Substation platform and flood wall

Fehmarn

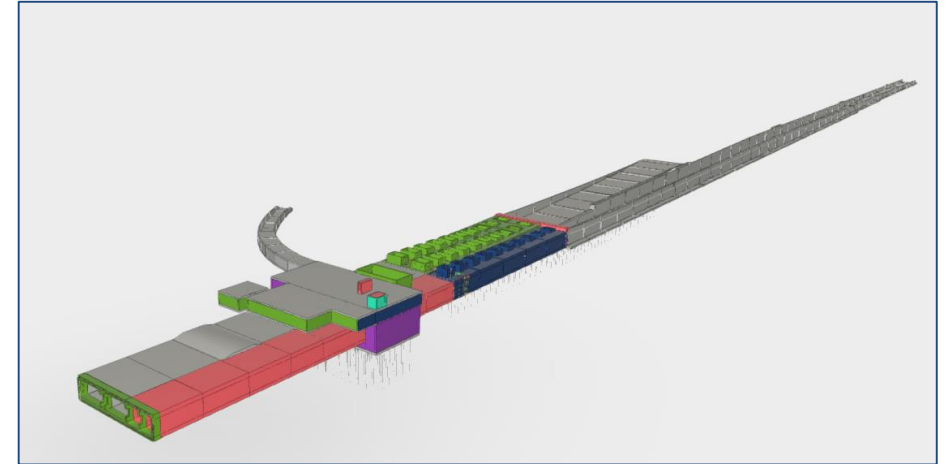


Tunnel

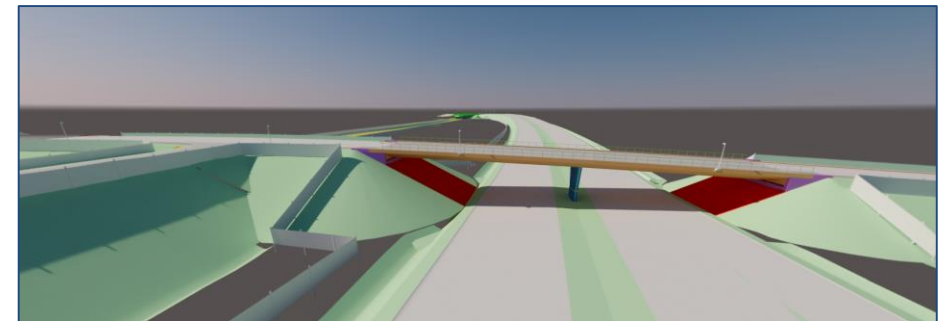
- Cut-and-cover tunnel – 450m
- Attenuation structure – 150m
- Road Ramp – 80m
- Rail Ramp – 390m
- Portal Building
- Sea-cut off structure

Other Structures

- Fauna passages – 1 nos
- Bridges – 3 nos
- Gantries for signs etc. – 13 nos



IST, Portal and Ramp Lolland



DB2 - Lolland

Scope of Work - TPR

Lolland



Buildings

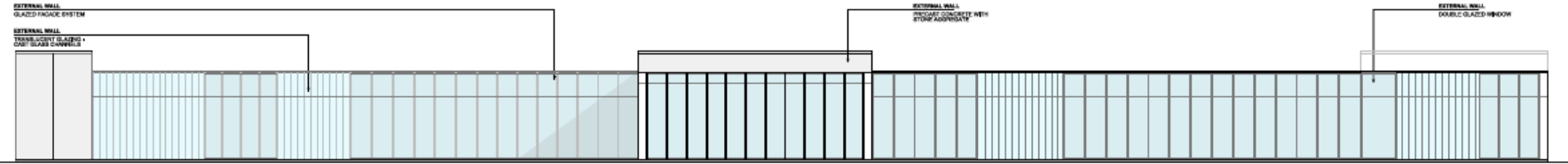
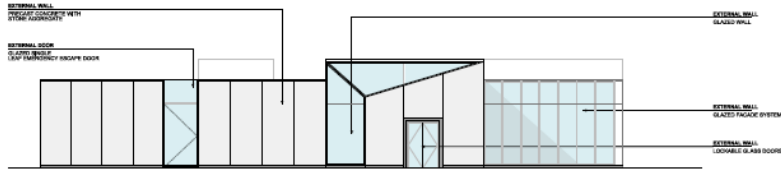
- Link Control Center – 1300m2
- Toll Administration Building – 1000m2
- Authorities Building East – 1100m2
- Authorities Building West – 1100m2

Fehmarn



Buildings

- Welfare Building – 90m2
- Welfare Building – 90m2



Scope of Work - TPR

Lolland



Roads / Pavement Areas

- Fixed Link Highway – 4.8km
- Ottelundevej Interchange – 1.9km
- Sideroads – 3.6km
- Access Road – 4.8km
- Parking at Operations area
- Heli Pad

Fehmarn



Roads / Pavement Areas

- Fixed Link Highway – 2.0km
- Exit/Entry ramps – 0.6km
- Sideroads – 1.6km
- Access Road – 2.3km
- Parking areas at welfare buildings

Scope of Work - TPR

Lolland



Earthworks

- for landside roads
- for railway – 4.2km
- for bowl portal area
- Permanent mound to protect tunnel
- Temporary dyke

Landscaping

- Topsoil, plants, grass, green roofs

Fencing

- Livestock, wildlife, amphibian fencing
- Security fencing & gates

Fehmarn



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Scope of Work - TPR

Tunnel Interior Works

- Concrete barriers
- Fire protection cladding
- Road pavement – 19 km



Parallel Works

- Install temp. gas detection, fire alarm, CCTV, comms, radio
- Install temp. power and ventilation systems
- Site security
- First aid facility & Fire Brigade
- Traffic control
- Manage other Contractors Inside tunnel



Status of Work



Status of Work

Production Site Lolland



- Geotechnical Investigations (also Germany)
- Earthworks
- Roads
- Utilities
- Drainage
- Fencing
- Casting Foundations
- Paving
- Sheetpiling

Status of Work

Production Site Lolland



- Earthworks
- Roads
- Utilities
- Drainage
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- Casting Foundations
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- Sheetpiling

Status of Work

Production Site Lolland



- The first of 6 batching plants erected
- Testing of concrete mix on-going

Site Facilities – Temporary offices



- Temporary office established

06/2021

Site Facilities – Main offices



- Main office being erected

07/2021

Site Facilities - Village



Village - 09/2021

- Village modules being erected

Site Facilities - Village



- Village modules being erected

Mock-up / FSTC - area



- Full Scale Trial Cast / Mock-up

07/2021

Batching plant – Concrete production



08/2021

- Concrete Foundations for Hall

Sheetpiles



- Sheetpiling for basins

08/2021

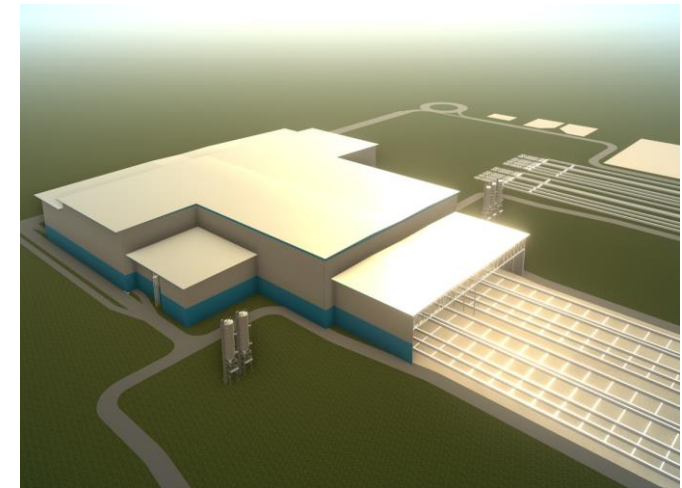
Procurement Status



Procurement & Contracts - TUX

Production facilities & buildings Lolland - contracts

- 3 production halls - 80.000 m2 - Give Steel (DK)
- 29 overhead cranes - Give Steel (DK)
- 6 Batching Plants - 1 delivered - SBM (A)
- Forms for standard elements - Peri (D/DK)
- Hydraulic Jacks - skidding of elements - Hebetec (CH)
- Temporary office - CP (DK)
- Main office - CMT(Metrobyggeri) / CP
- Village - Adopteo (S)



Procurement & Contracts - TUX

Site Installation Lolland

- Fill materials (earthworks)
 - Concrete Aggregates
 - Cement/flyash
 - Site Power
 - PE welding
 - Fences and gates- part I
 - Security og gate control
 - Cameras etc
- Ejgil Jensen
 - Dansk Natursten
 - Aalborg Portland
 - Aktiv El
 - Johnny's VVS
 - PIT Hegn
 - LF Vagt
 - Smart Guard



Procurement & Contracts - TUX

Production facilities Lolland - contracts

- Concrete pumps - Putzmeister(D)
- Form - special elements - Meva (D)
- 4 nos. tent halls - OB Wiik (N)
- Air pressure setup - Atlas Copco (DK)
- Pumps - Grundfoss (DK)
- Conveyor System for materials - under negotiation
- Water cleanig system - under negotiation
- Access control - under negotiation
- Cement silos - under tender



Procurement & Contracts - TUX

Machines, cranes etc

- 5 tower cranes - JMM / Normas / Liebherr (DK/D)
- 2 mobile cranes og 1 crawler crane - Liebherr (D/DK)
- 4 concrete mixer trucks - Stetter/Mercedes (D)

Pipeline:

- Telescope lifts
- Fork lifts
- Trucks w. Crane
- Trailers
- Mobile concrete pumps



Procurement & Contracts - TUX

Materials & deliverables for the Tunnel

- Tunnel Joints (Gina/Omega) - Trelleborg (S / NL)
- Prestressing - under negotiation
- Fireprotection (1.000.000 m²) - under negotiation
- Membrane – Special elements - under negotiation

Pipeline - concrete:

- Cement - Flyash - Slag
- Aggregates - coarse and sand

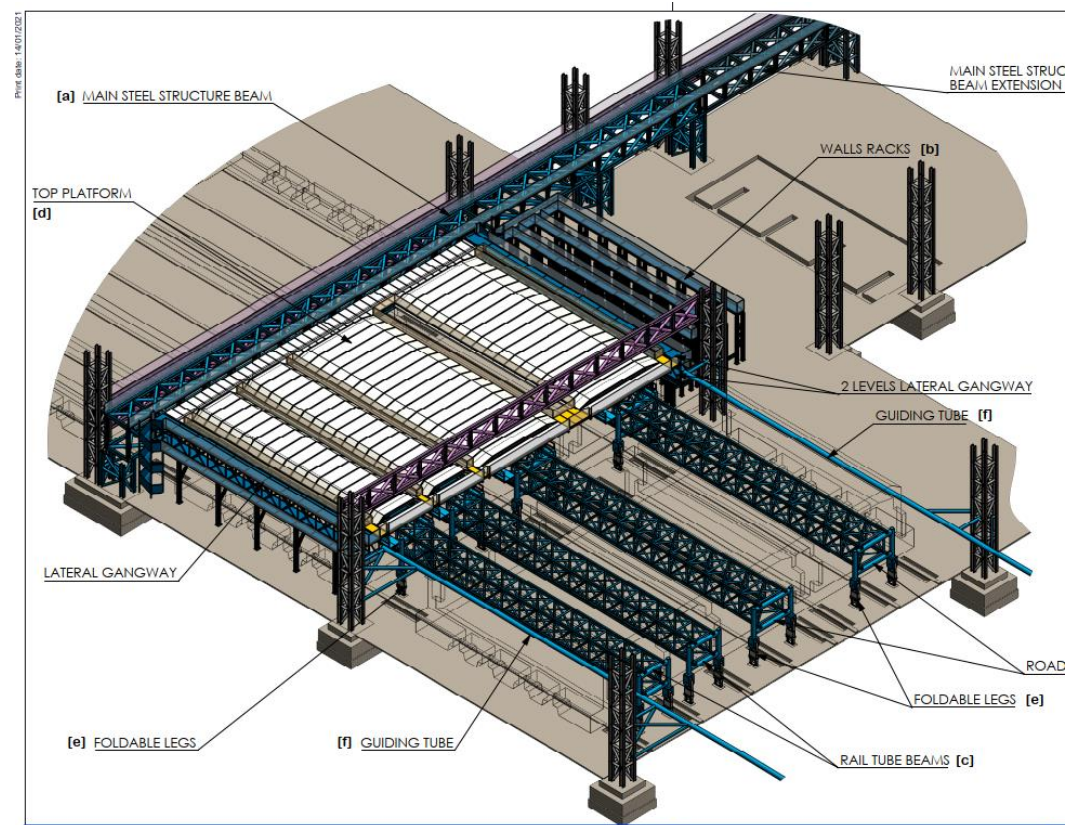
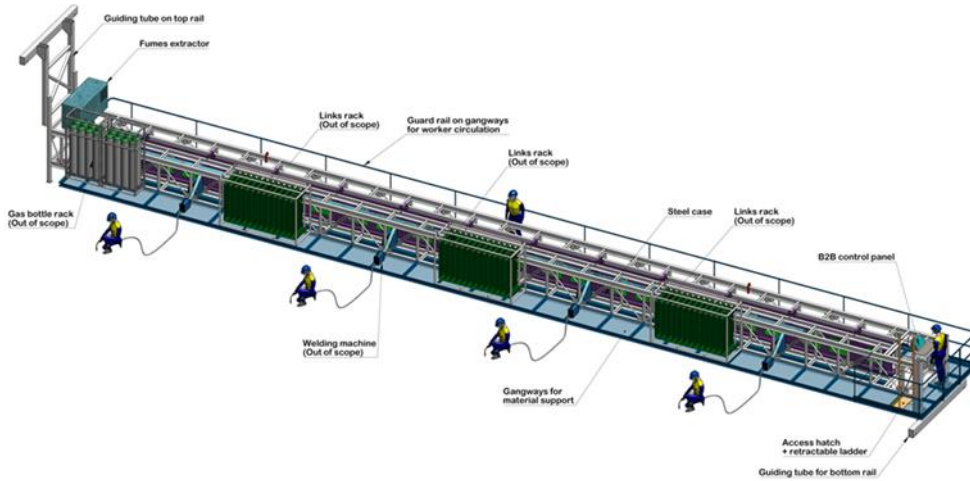
3.000.000 m³



Rebar equipment

Specifically designed

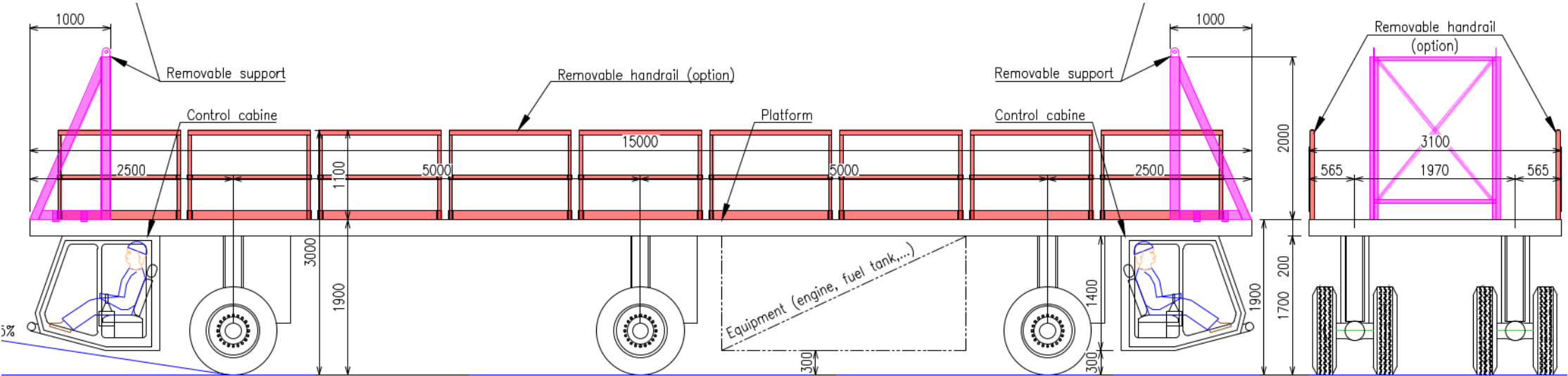
- Lasca - contract - NRS(N)
- B2B - under negotiation



Rebar Equipment

Specifically designed

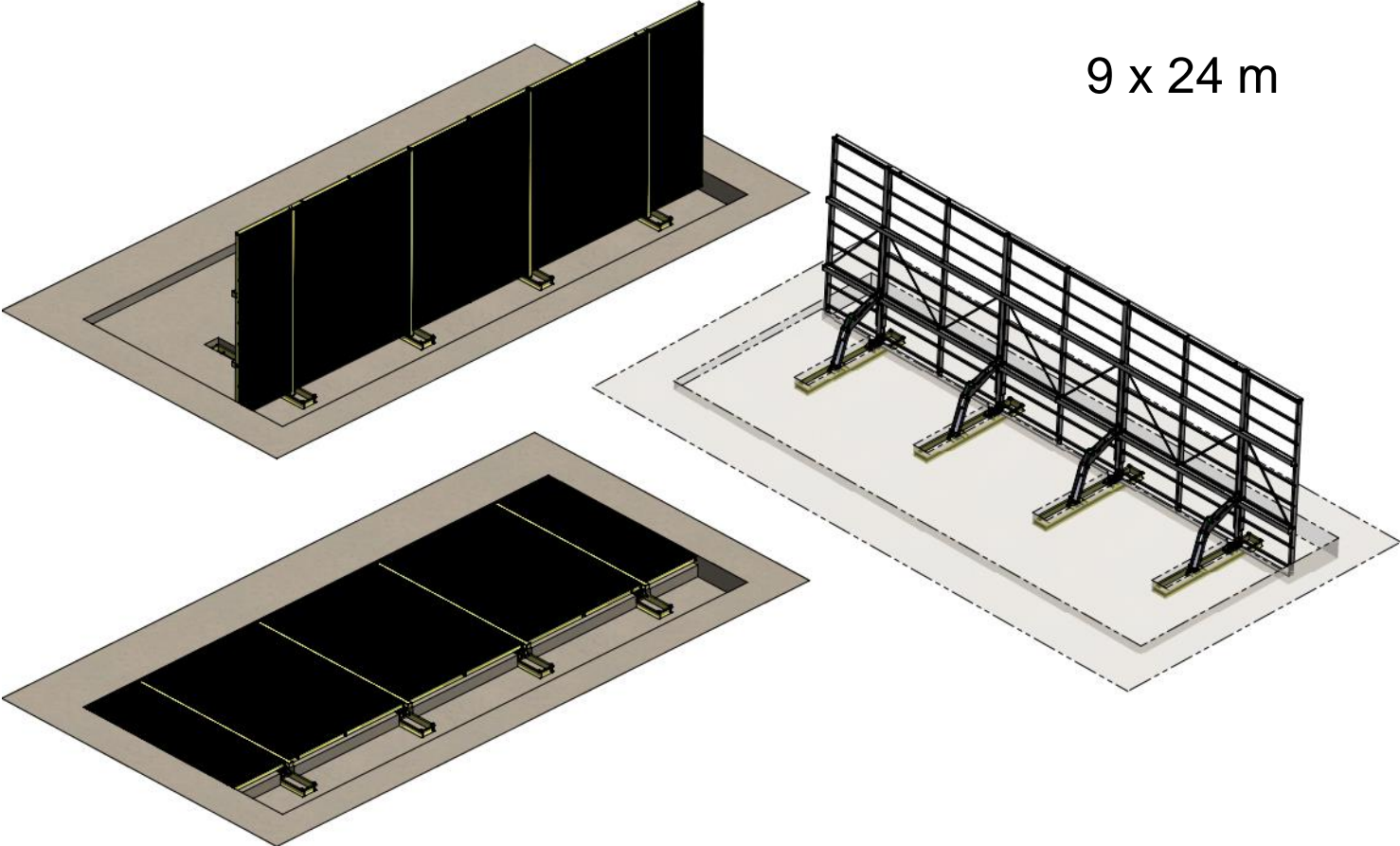
- Smart trailers – concept design



Rebar Equipment

Specifically designed

- Tilting frames – concept design



Rebar Equipment

Specifically designed

- Transfer tables - approx 750 m

Transfer table length	Plan view
1m	
9m	
12m	
18m	

Table 3 : Transfer table lengths

Rebar Equipment

Specifically designed

Cut & Bend equipment

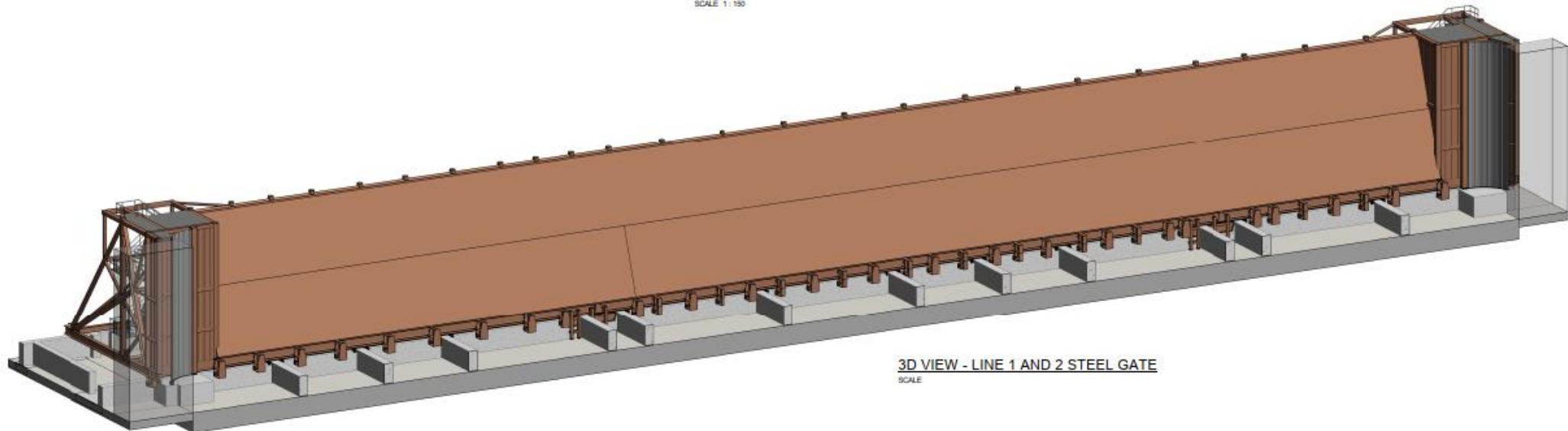
- Steel selves
- Lifting gear
- Fixtures
- etc



Ongoing & upcoming tenders - TUX

- Pump system for basins - design on going
- Bulkheads - design on going
- Sliding gate for basins (110x10x10m) Steel - in tender

SCALE 1:150



3D VIEW - LINE 1 AND 2 STEEL GATE
SCALE

Framework agreements

Day to day business – agreements made

- Tools - AO
- Building materials etc. - Stark
- Lifting gear - Carl Stahl
- Working cloths (PPE) - Veltuff
- Safety equipment - ICM
- Fixings - special tools - Hilti
- Machine rental - GSV
- Office modules - CP
- Container waste - Marius Pedersen
- Concrete accessories - Haucon

Framework agreement out for tender regularly

Suppliers shall provide a high service level

Coming Up

Service agreements

- Bus services
- Catering
- Cleaning
- Washing of clothing
- Extended Security Services
- Housing
- Ambulance/health service
- etc



Safety – highest priority

FLC requirements to Suppliers



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