

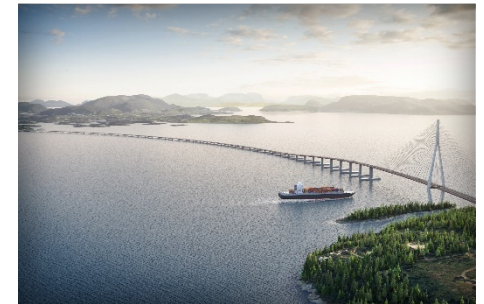


Norwegian Public Roads Administration 2020

The future is just down the road



Statens vegvesen
Norwegian Public Roads
Administration





Goals in the National Transport Plan 2022-2033

An efficient, safe and environmentally friendly transport system in 2050

Easier everyday
mobility
and increased
competitiveness
for business and
industry

More value for
money

Efficient use of
new technology

Vision Zero: No
fatalities or
serious injuries

Contribute to
achieving
Norway's
climate and
environment
goals

Five strategic components to achieve these goals



Facilitate the development of future transport systems



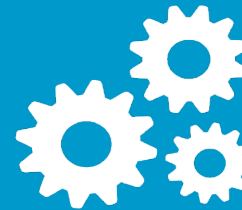
Develop and maintain the road network competently and professionally



Contribute to the safety of road users and vehicles

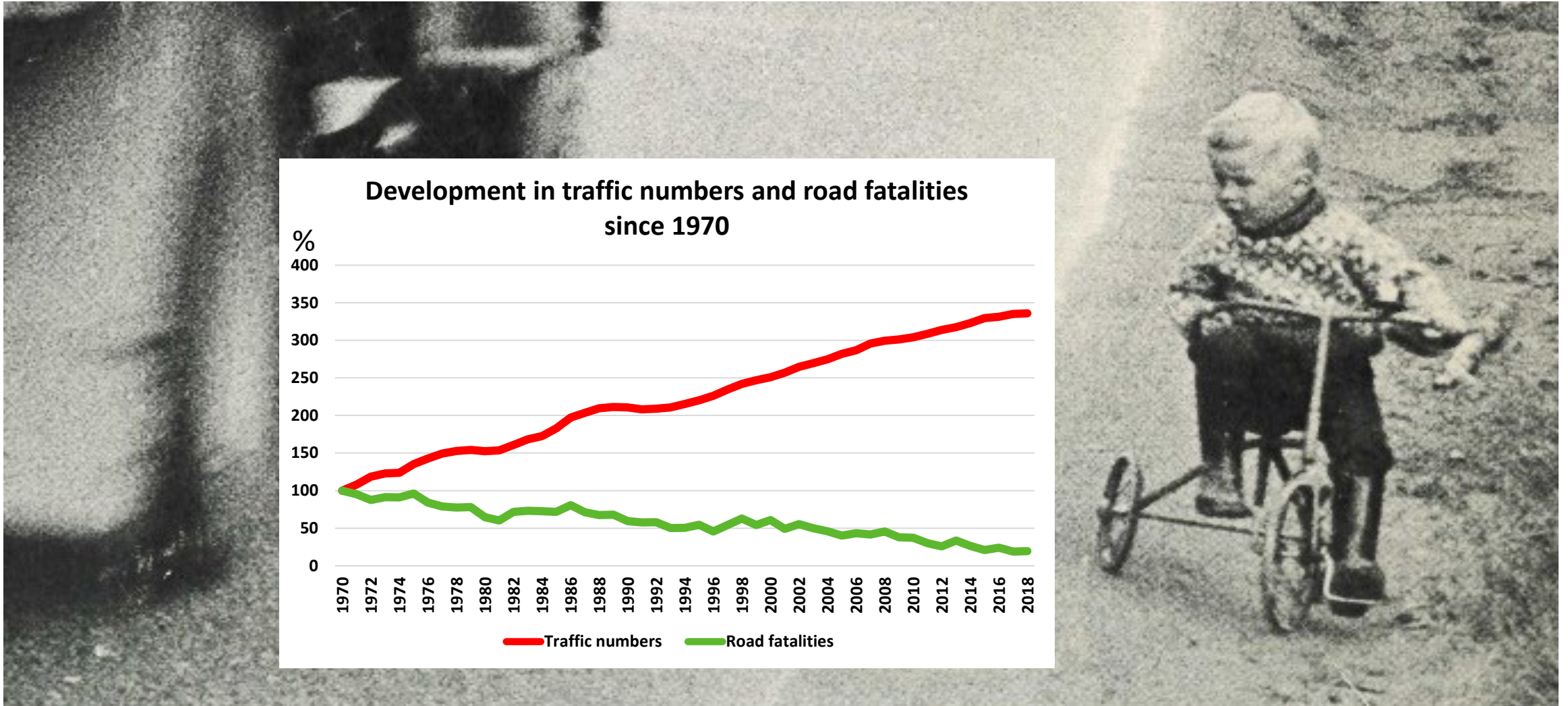


Promote sustainability and reduce greenhouse gas emissions



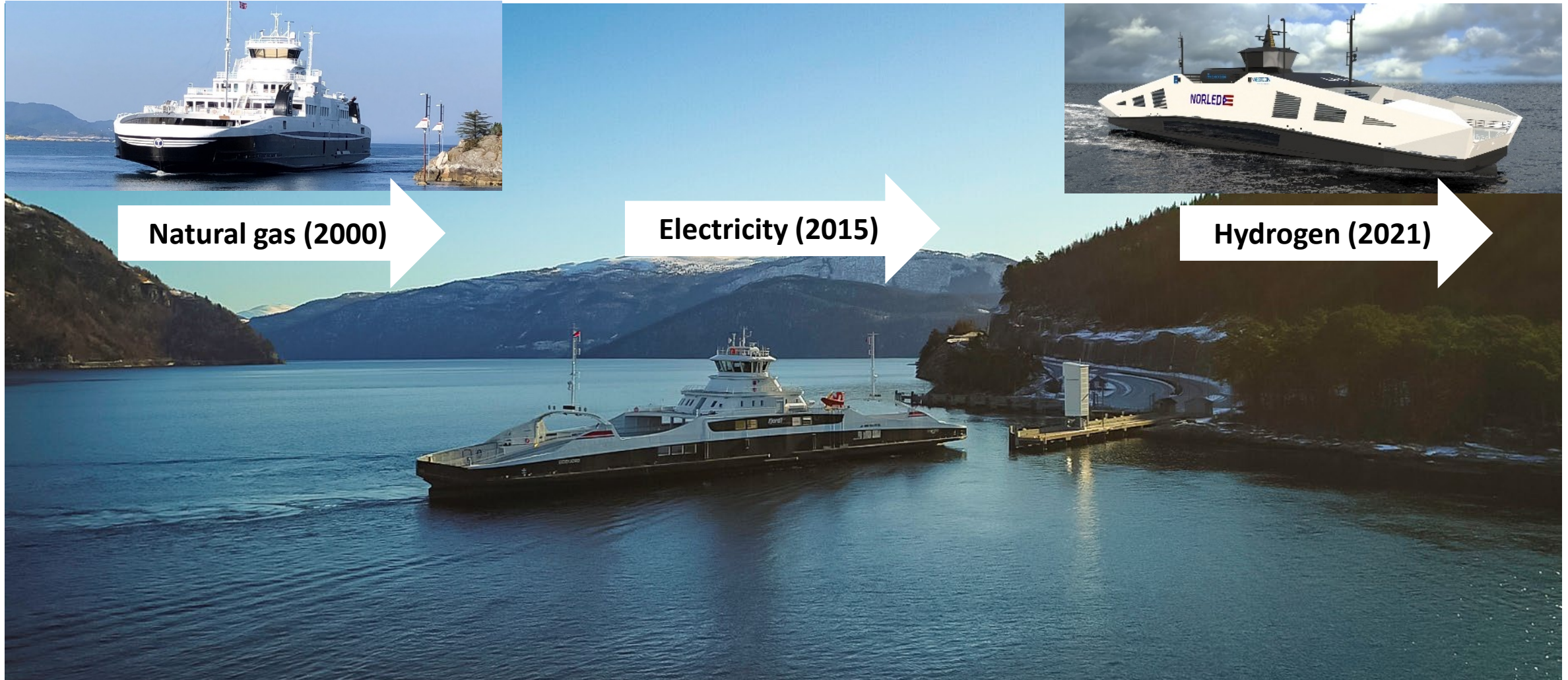
Increase our implementation capacity

We strive to ensure the safety of road users and vehicles





The world is looking to Norway: Leading the way with a climate-friendly ferry fleet



Nature as a competitive advantage (tourist routes)



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Bjørsvika project

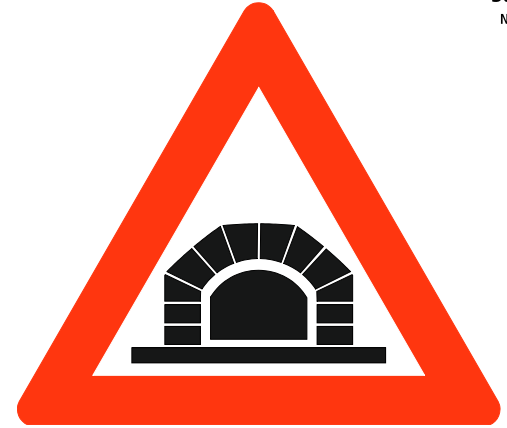
Immersed Road Tunnel in Concrete – Norway's first

Dr Ian Markey

Norwegian Public Roads Administration

Tunnels in Norway 2009 /2020

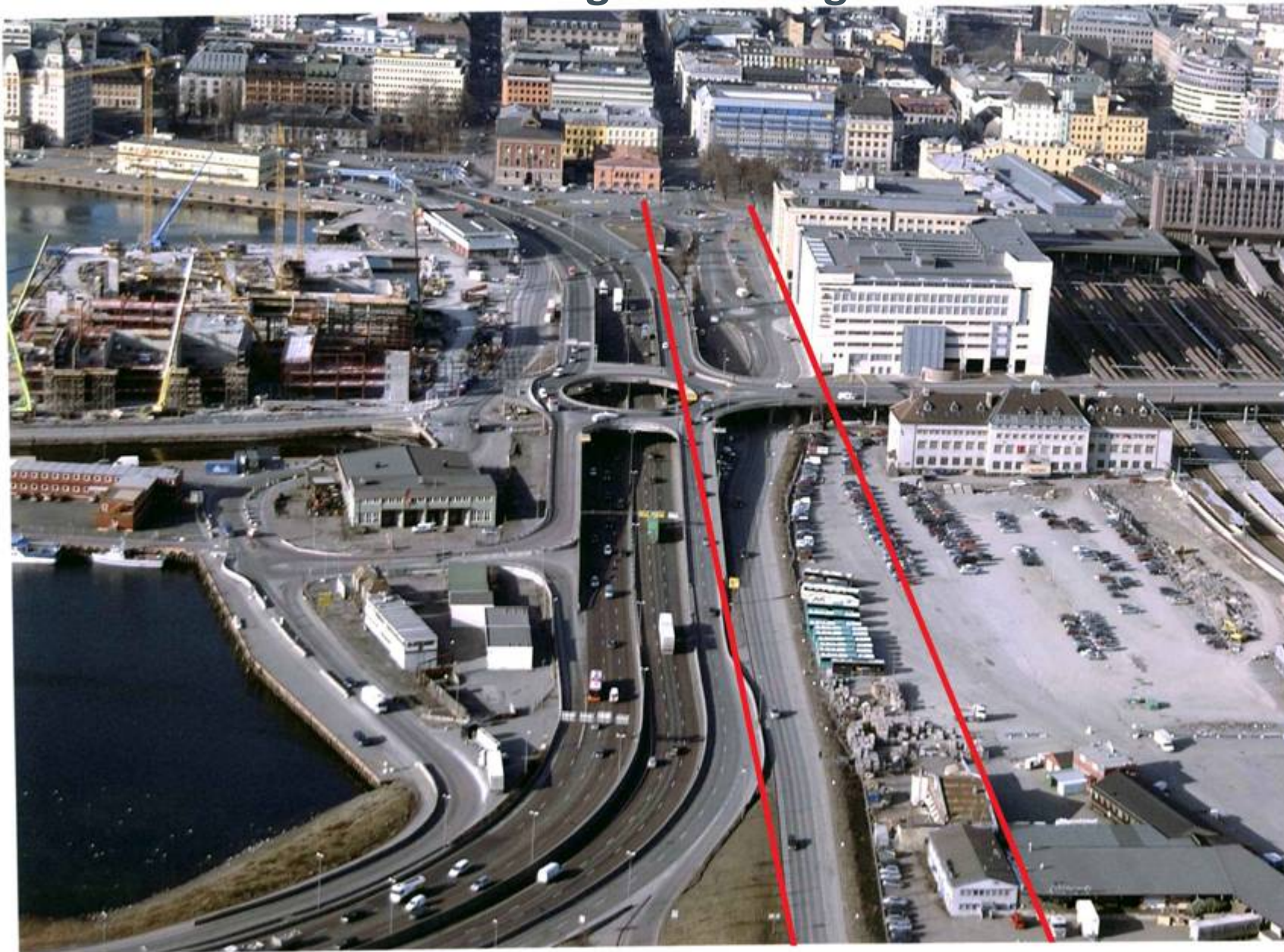
- 950/1400 road tunnels (mostly rock tunnels)
- Total length > 950/1250 km
- Mostly short tunnels: < 1 km,
- 220 tunnels longer than one kilometre. Worlds longest road tunnel: 24,5 km
- 28/35 sub-sea tunnels
- Average 30 km/year



Primary road system in Oslo



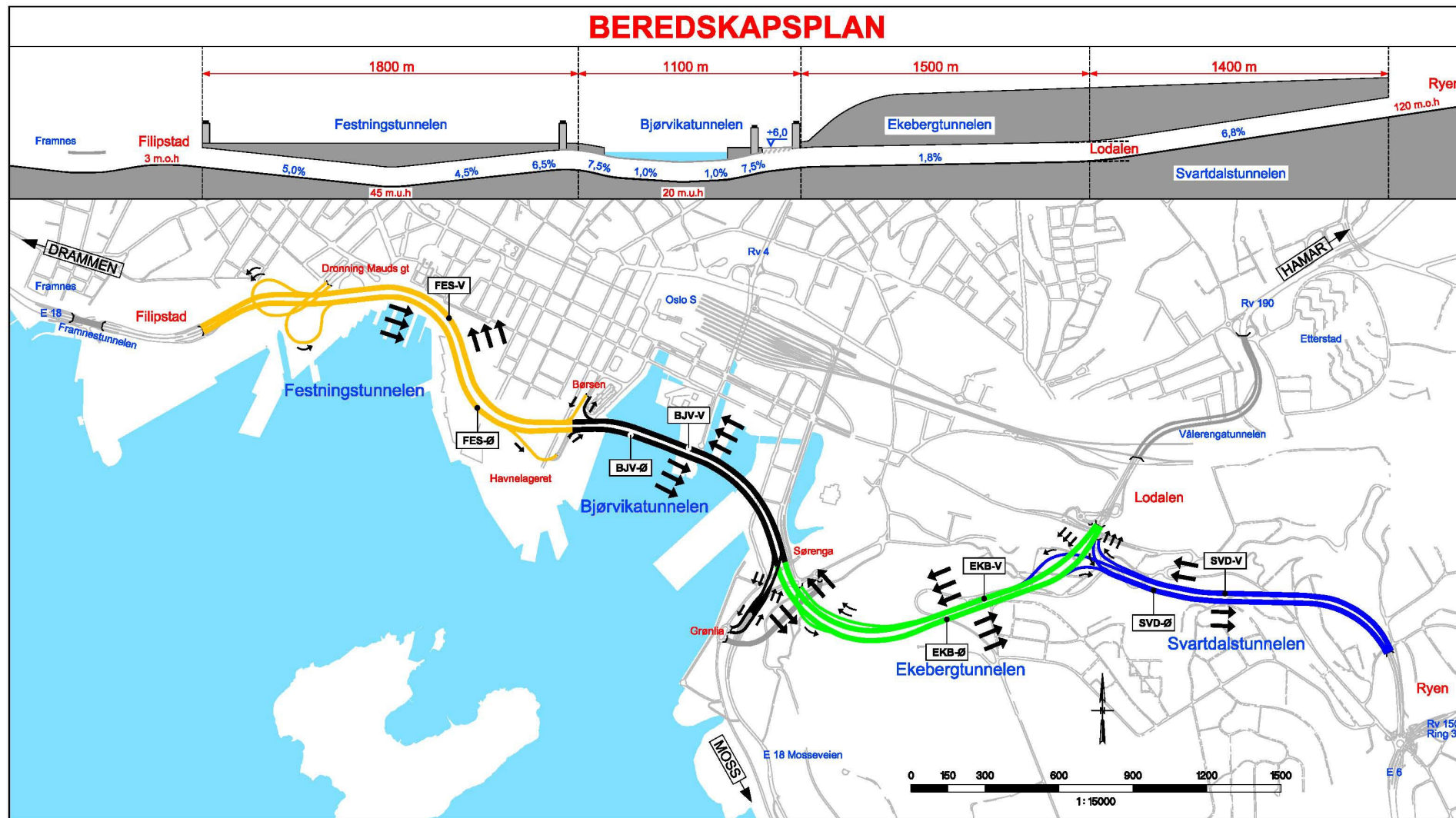
New main street Dronning Eufemias gate





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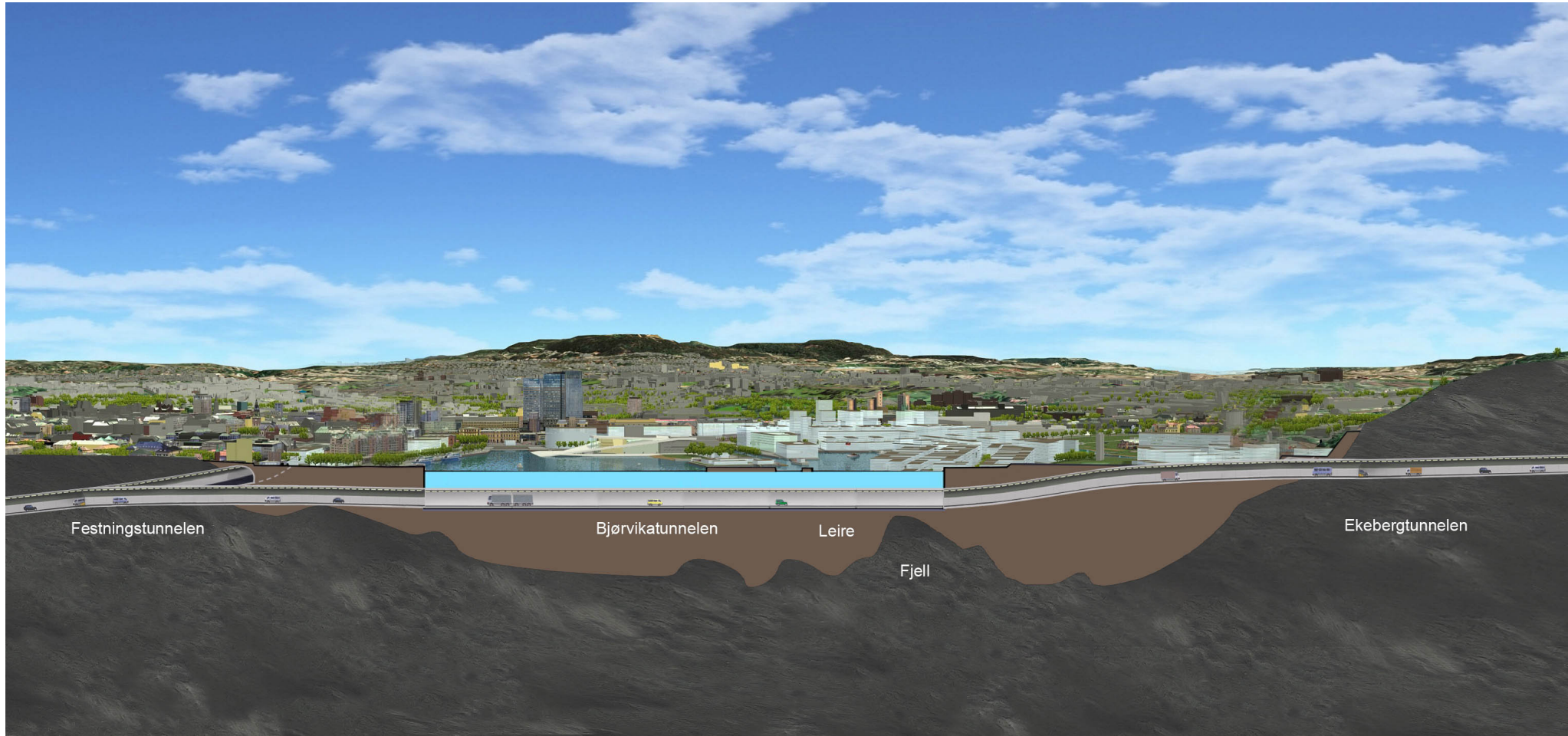
Opened 1990

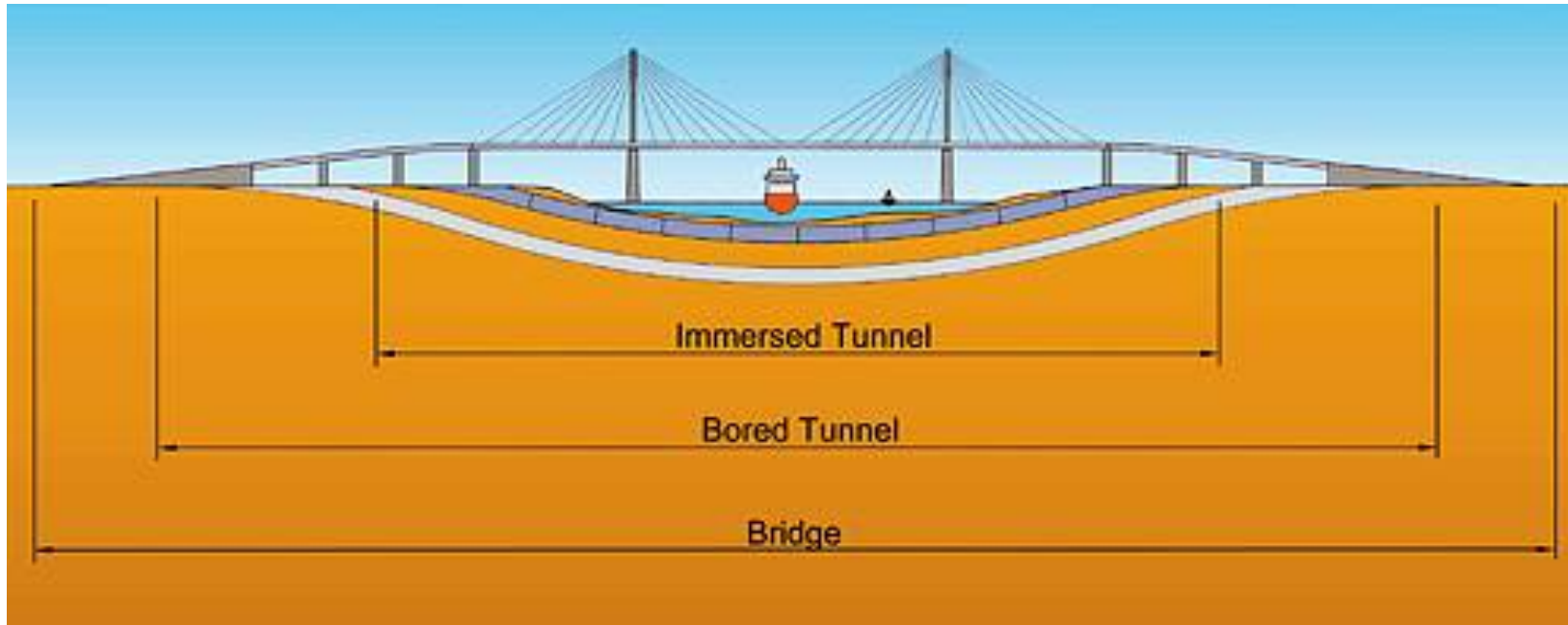
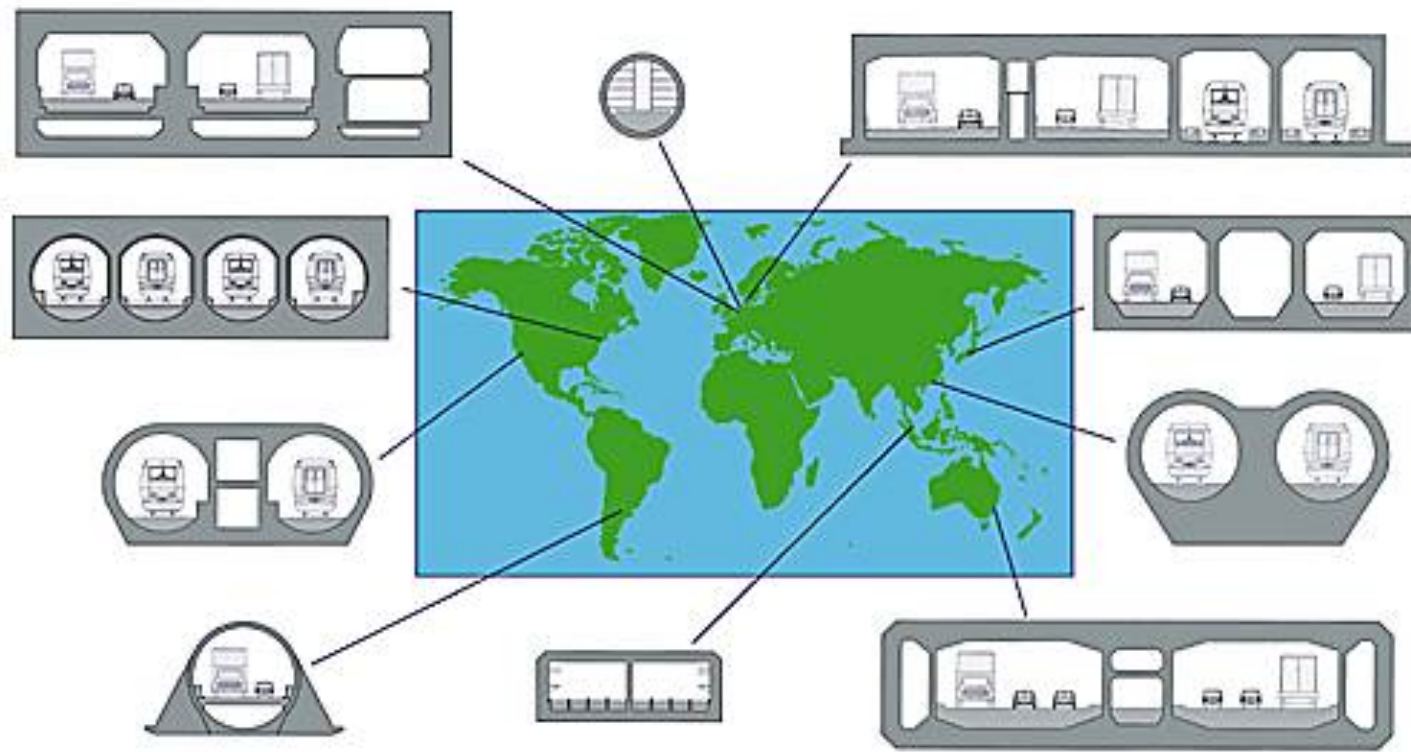
2010

1995

2001

Longitudinal profile - Bjørvika Tunnel





Bjørvika immersed tunnel – Norway's first

- 675,5 m immersed tunnel (~ 1 km tunnel in total)
- 6 tunnel elements, length 112,5 m
- Width 28 – 35 (43) m (6 lanes + ramps)
- Top of tunnel 8 -11 m under mean water level

Technical Equipment

- Automatic incident detection
- Automatic speed control
- Fire extinguishers every 50 m
- Break down area every 500 m
- Escape route/fire hydrant every ~125 m in Bjørvika tunnel, 250/300 m in adjacent tunnels
- Emergency telephones every ~125 m.
- Double/ring power supply/sectioned – emergency power
- Longitudinal ventilation
- Variable signs, deviations – barriers
- Pump/sump room

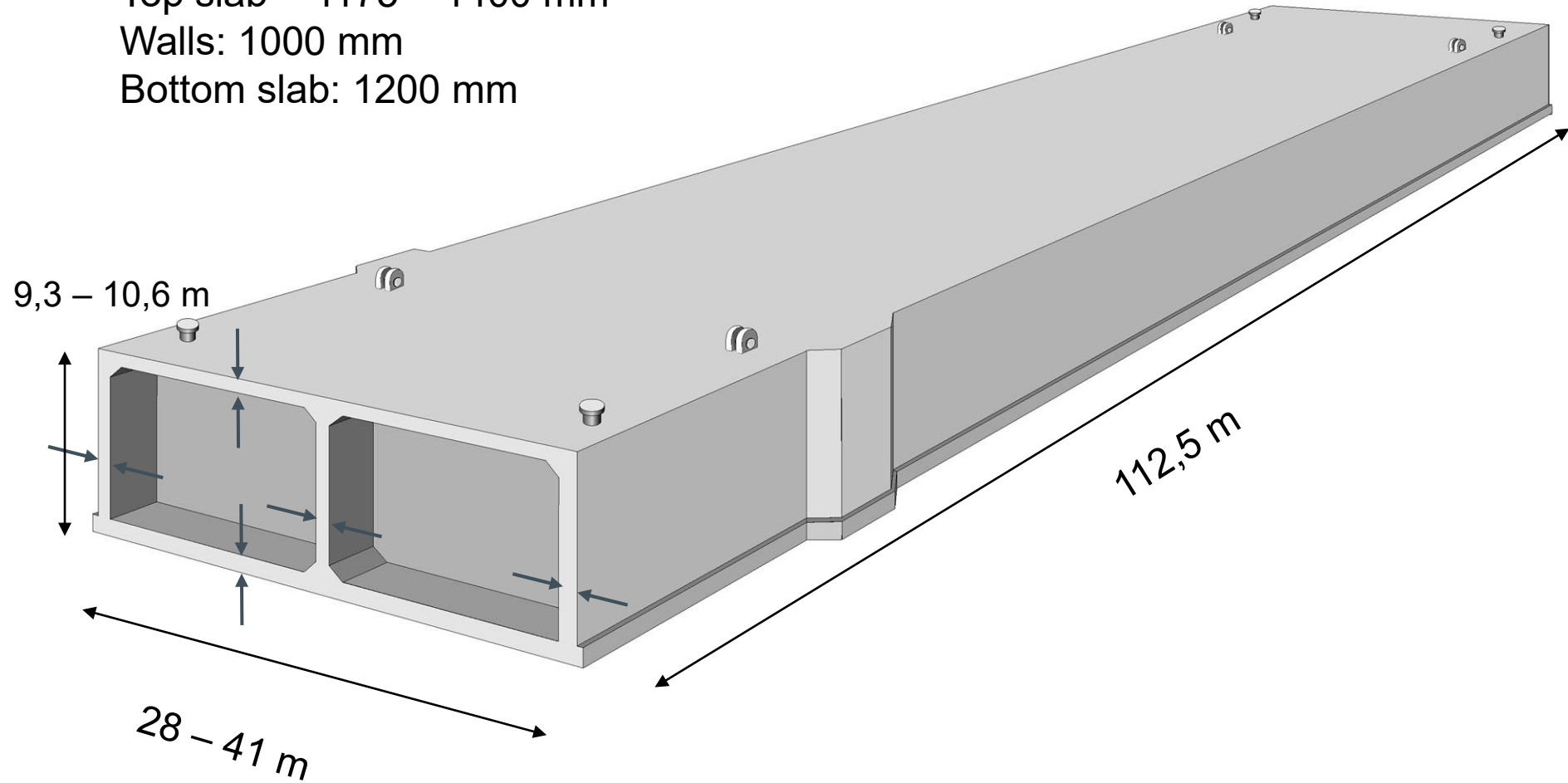


Dimensions

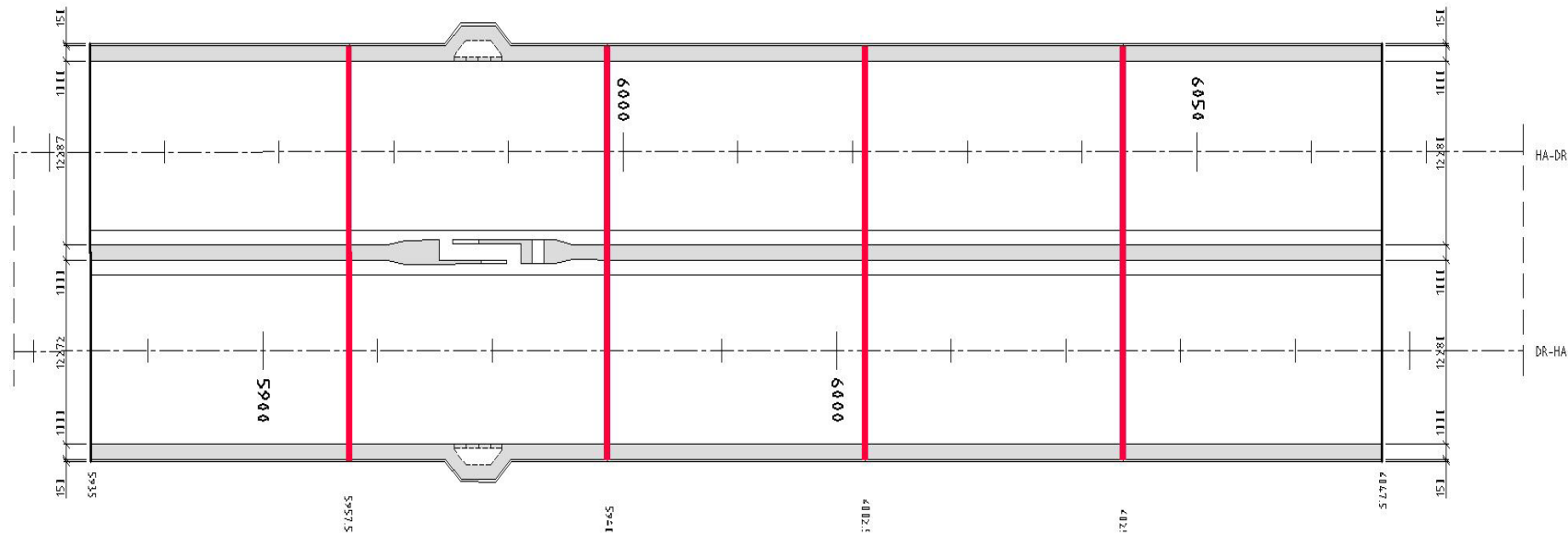
Top slab = 1175 – 1400 mm

Walls: 1000 mm

Bottom slab: 1200 mm



Element Construction



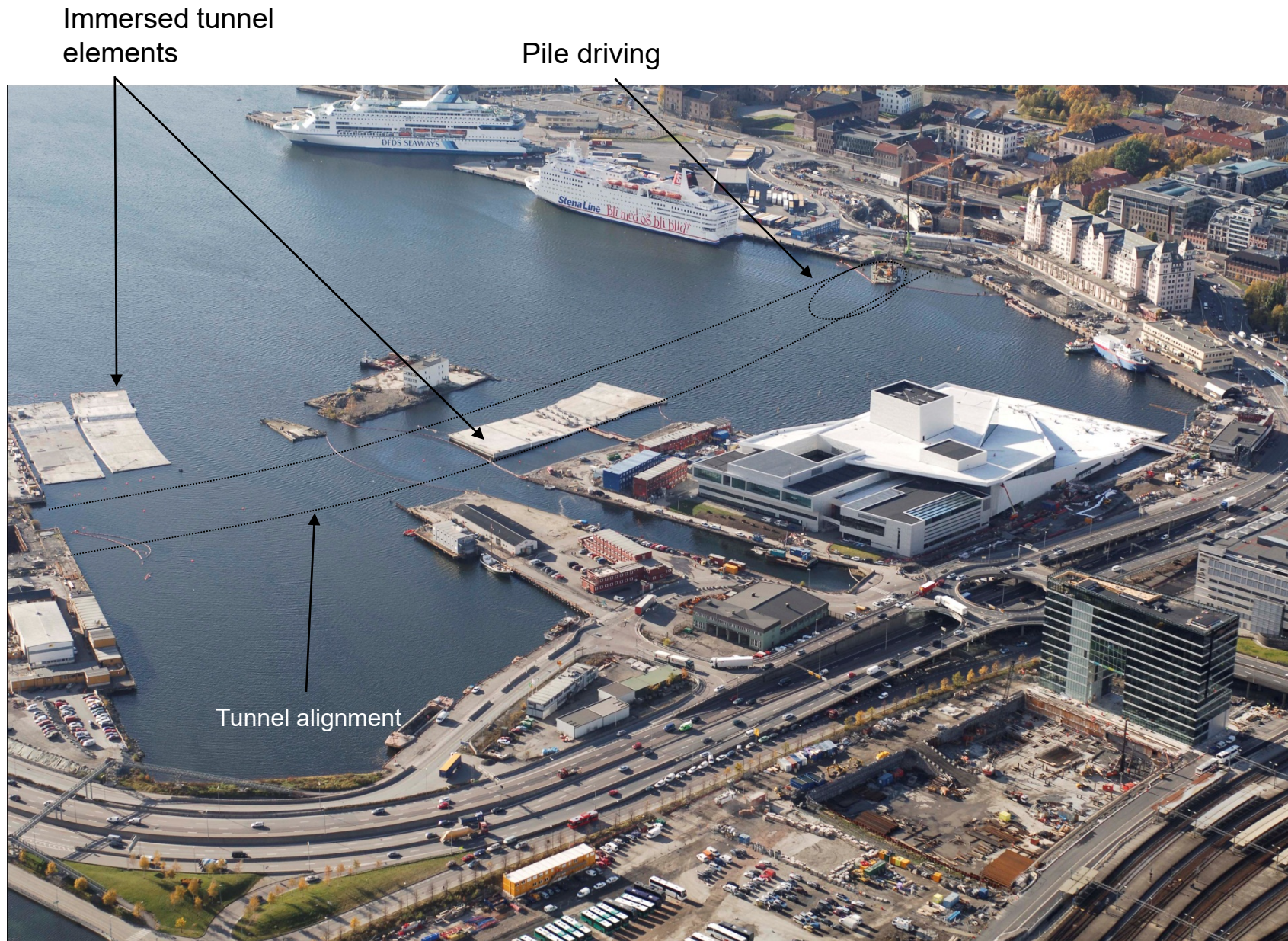
- 5 segments: each 22.5 meter ($\Sigma = 112.5\text{m}$)
- Expansion joint between each segment
- Temporary pre-stressing for transportation creates a stiff element







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Hanøytangen dry dock

3 dock settings - 2 elements produced each time





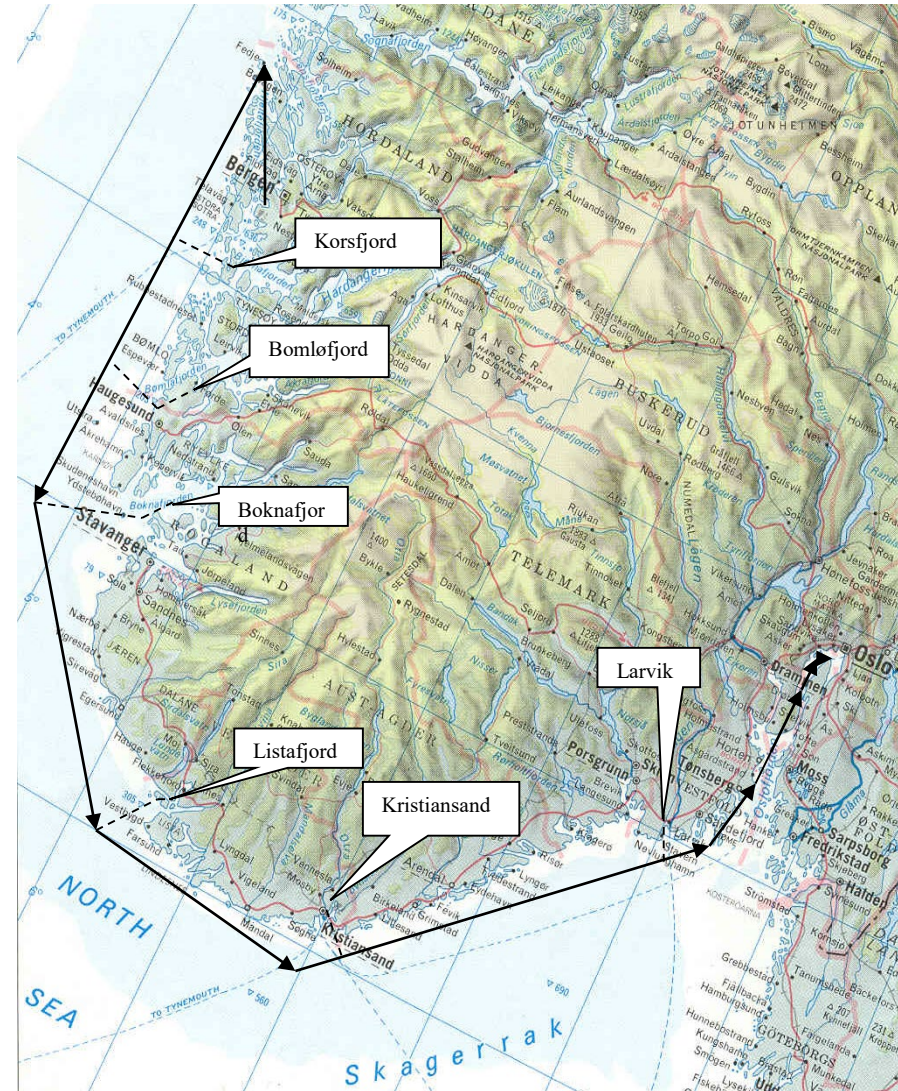


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Transport route





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Element transport



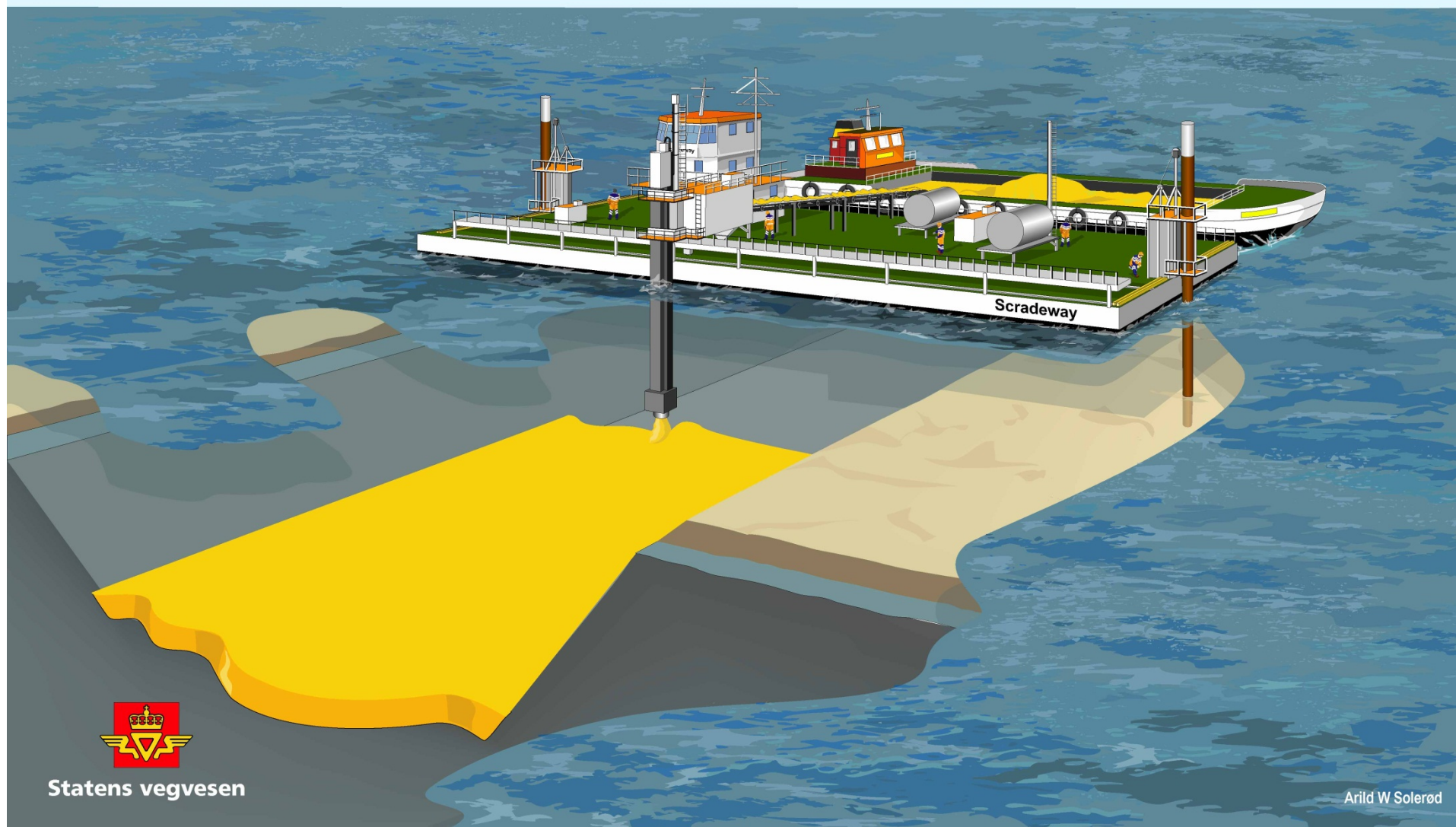
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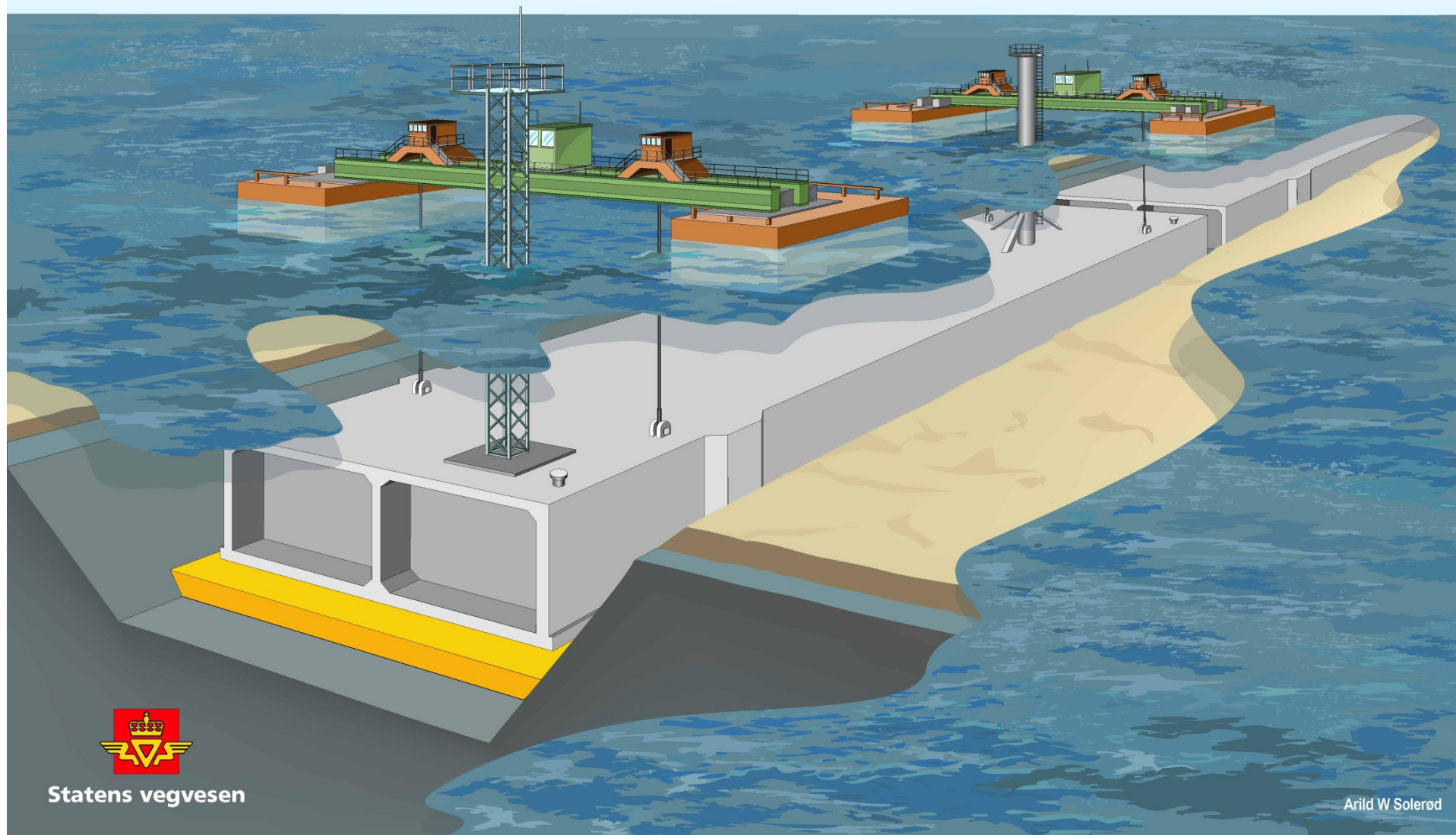


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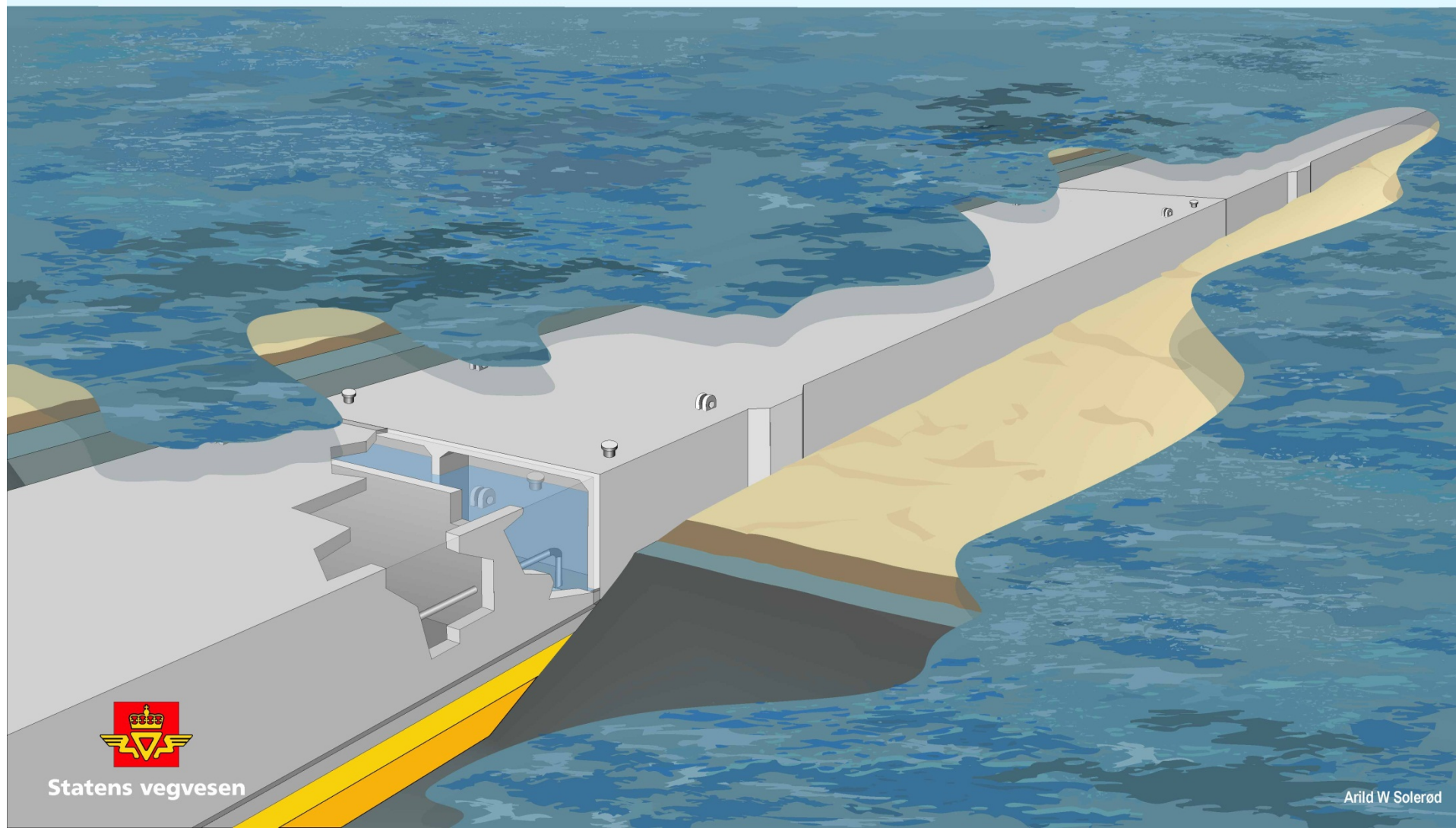
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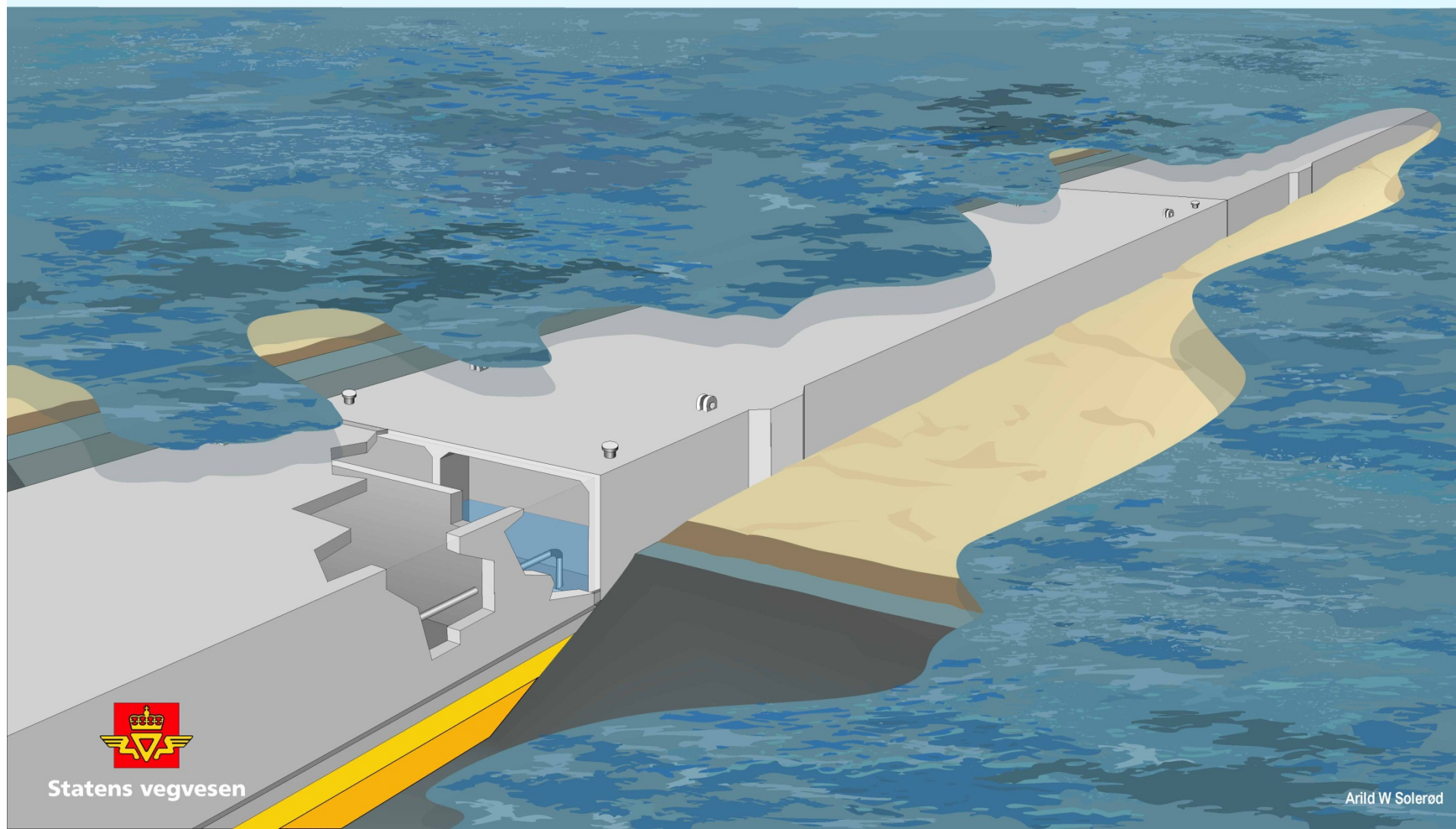


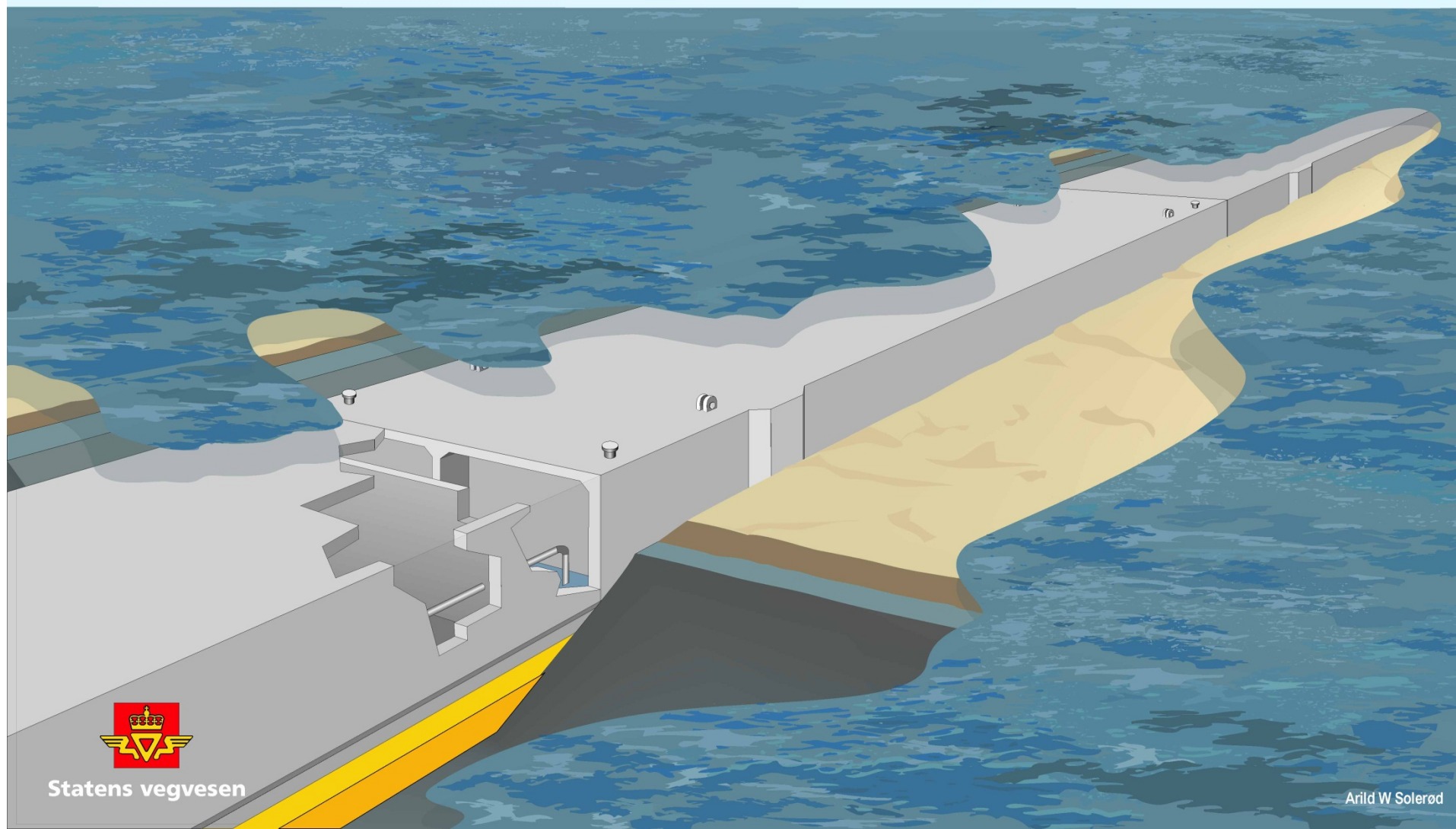




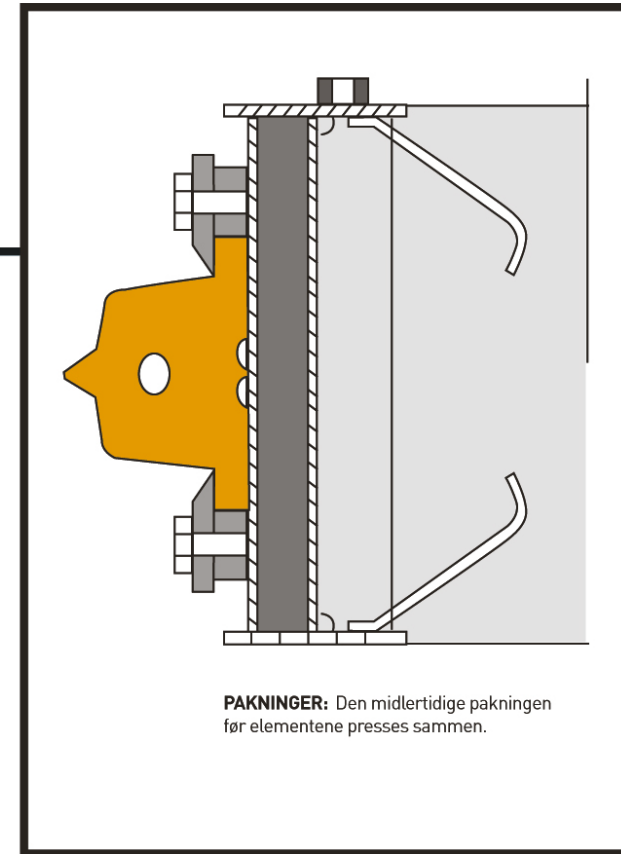
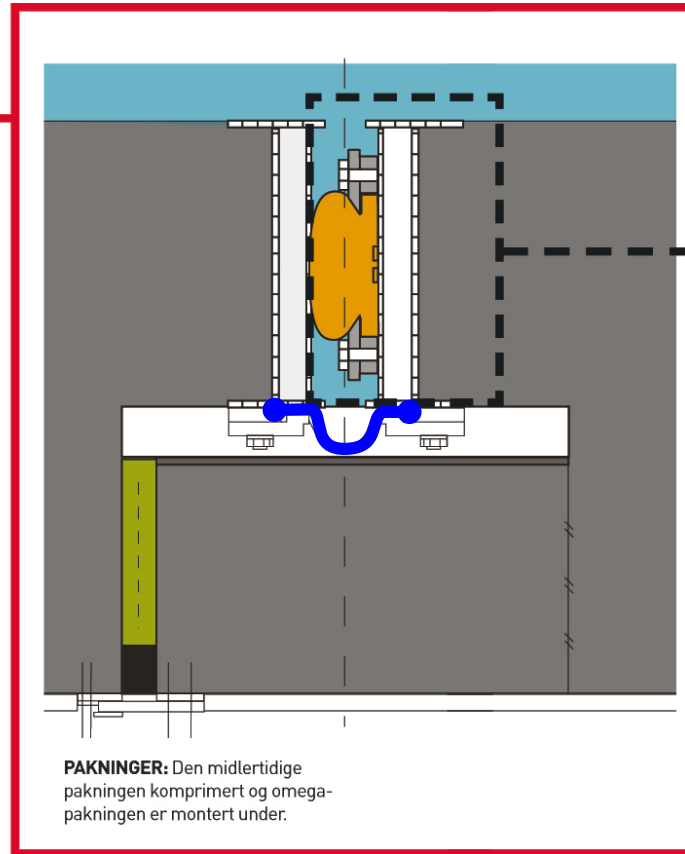
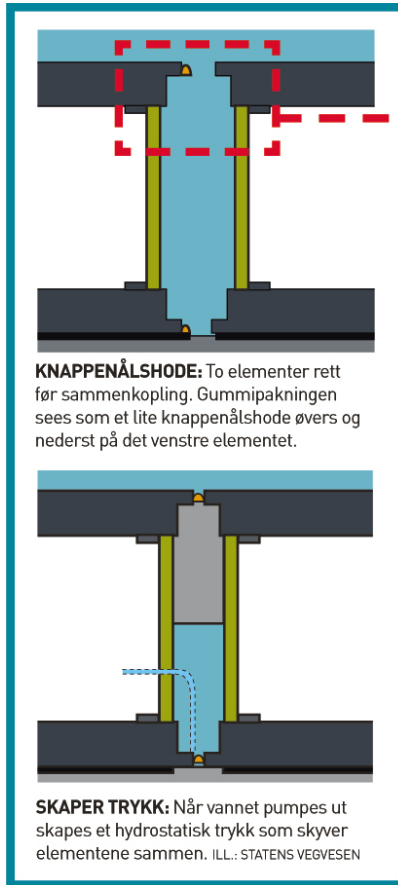
Element no 1





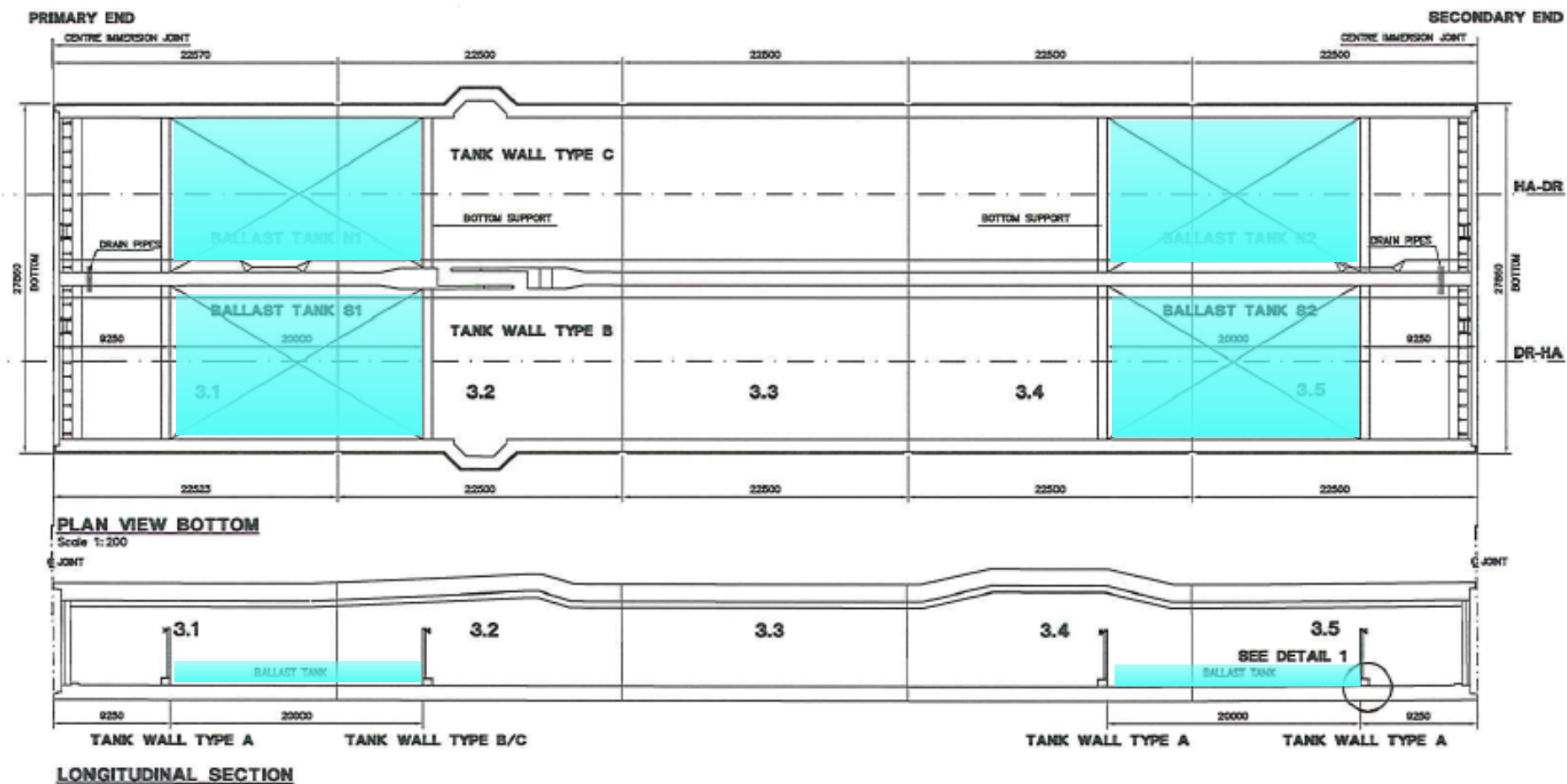


Immersion joint (Gina & Omega seals)

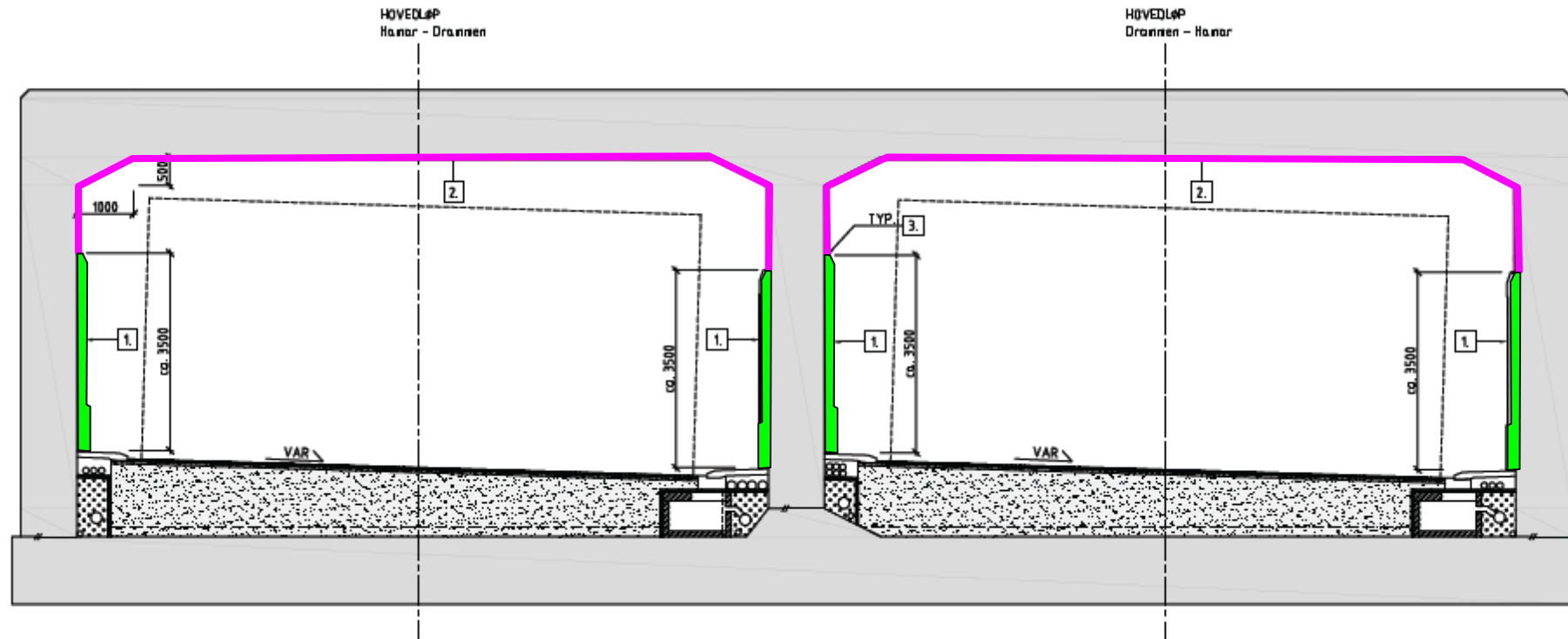




Ballast tanks



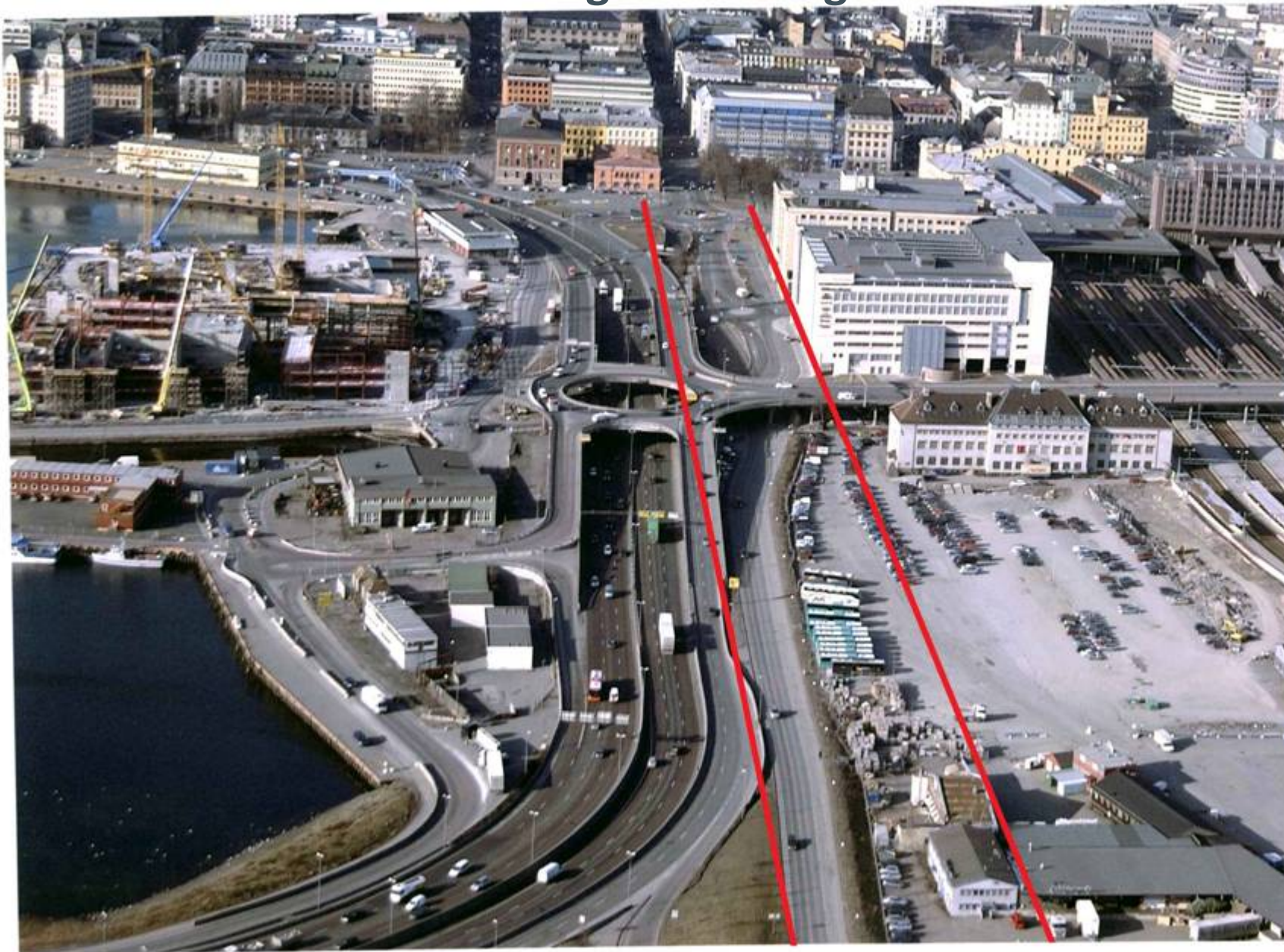
Fire protection roof & wall



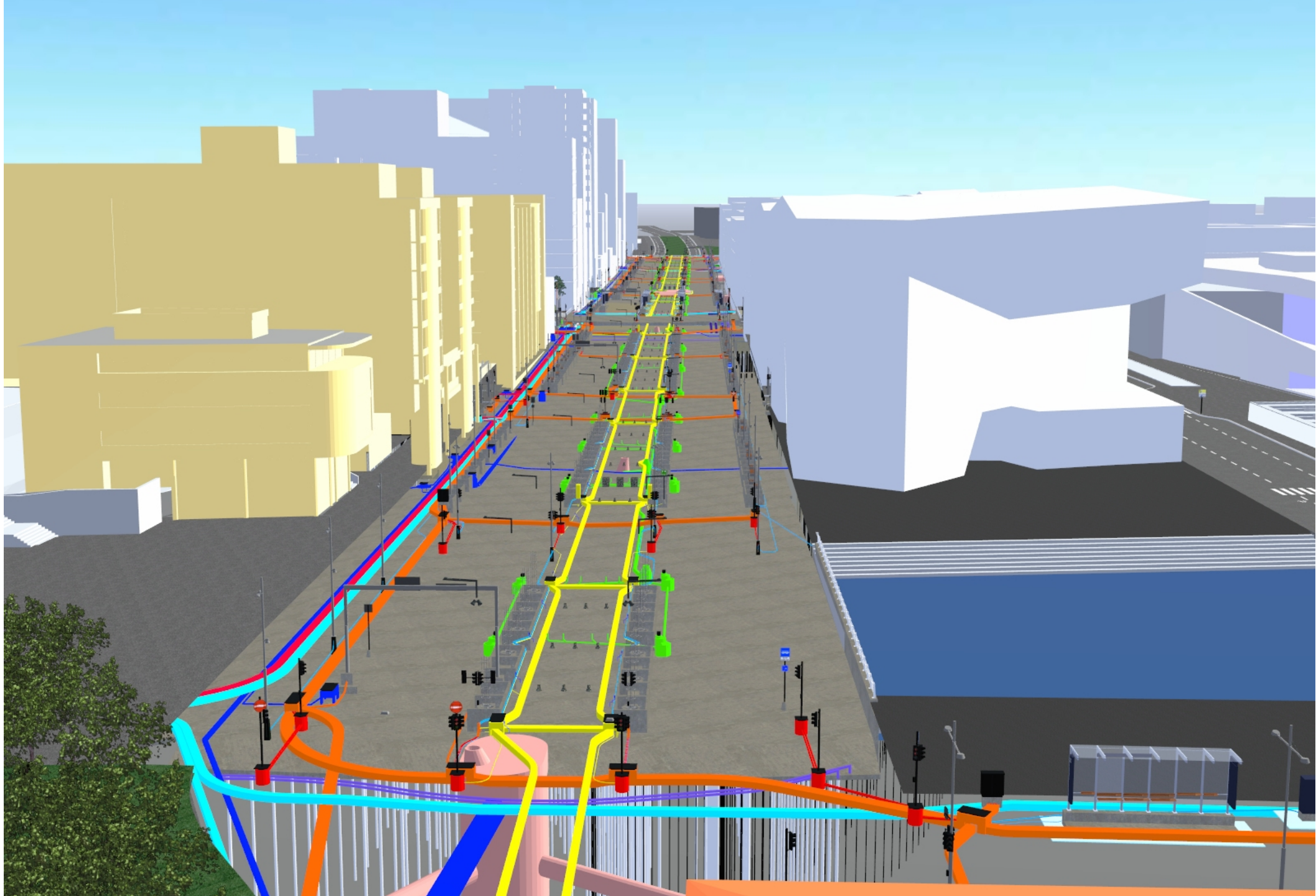




New main street Dronning Eufemias gate









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Thank you for your attention

