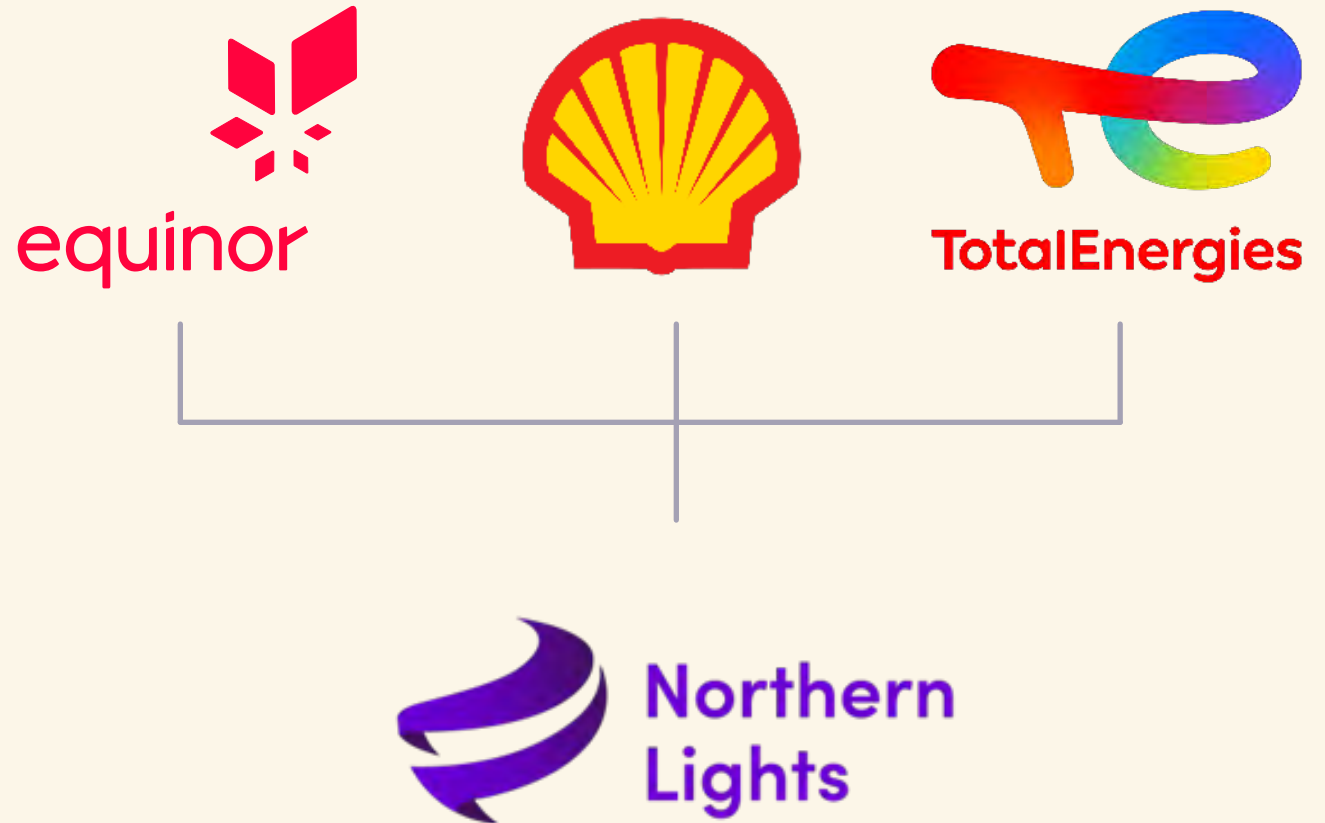


Northern Lights Subsea Installations

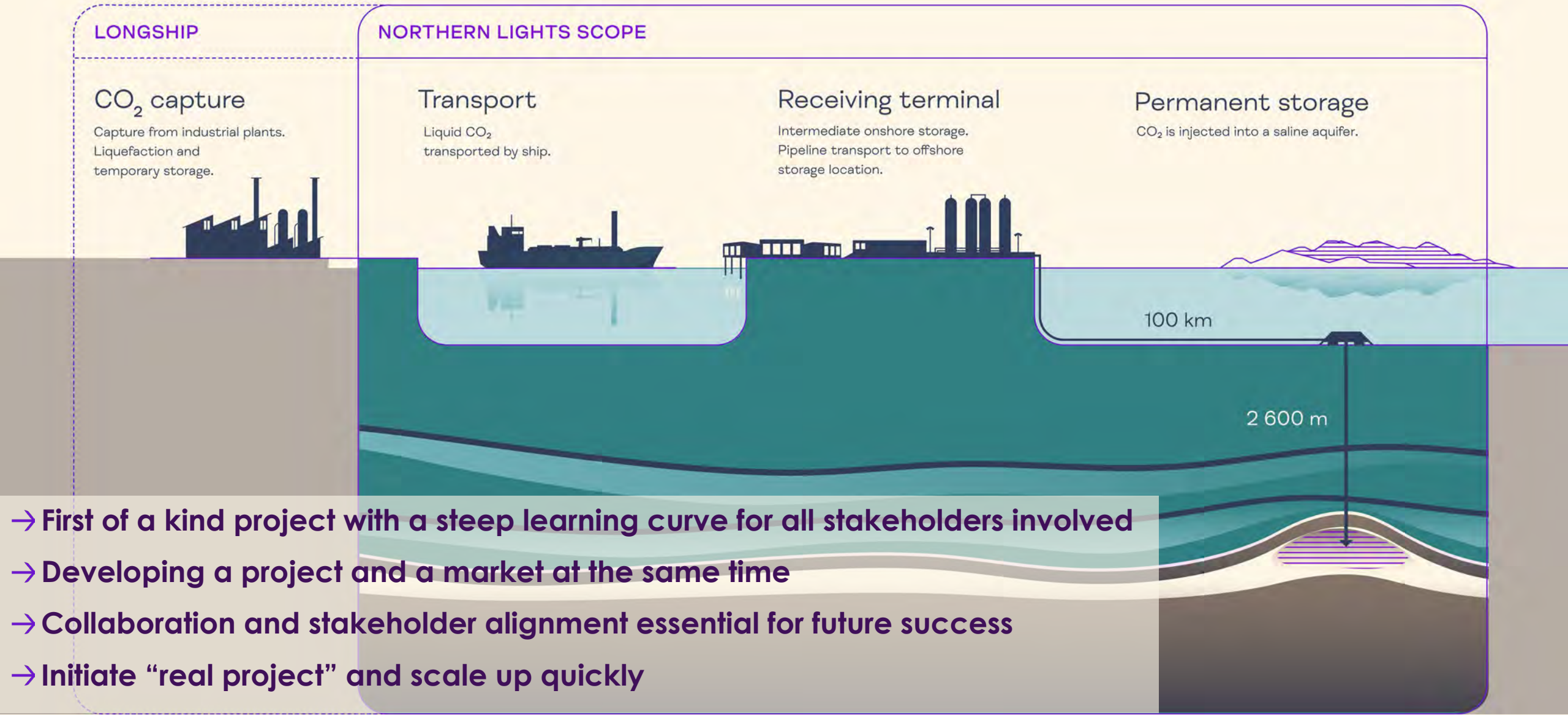
Lars Gunnar Karlsen, Subsea Operations Conference 9th & 10th of August 2023

Northern Lights Joint Venture

- June 7th 2021 the Northern Lights JV was formally established (incorporated)
- The JV is equally owned by Equinor, Shell and TotalEnergies
- **Northern Lights delivers CO2 transport and storage as a service**

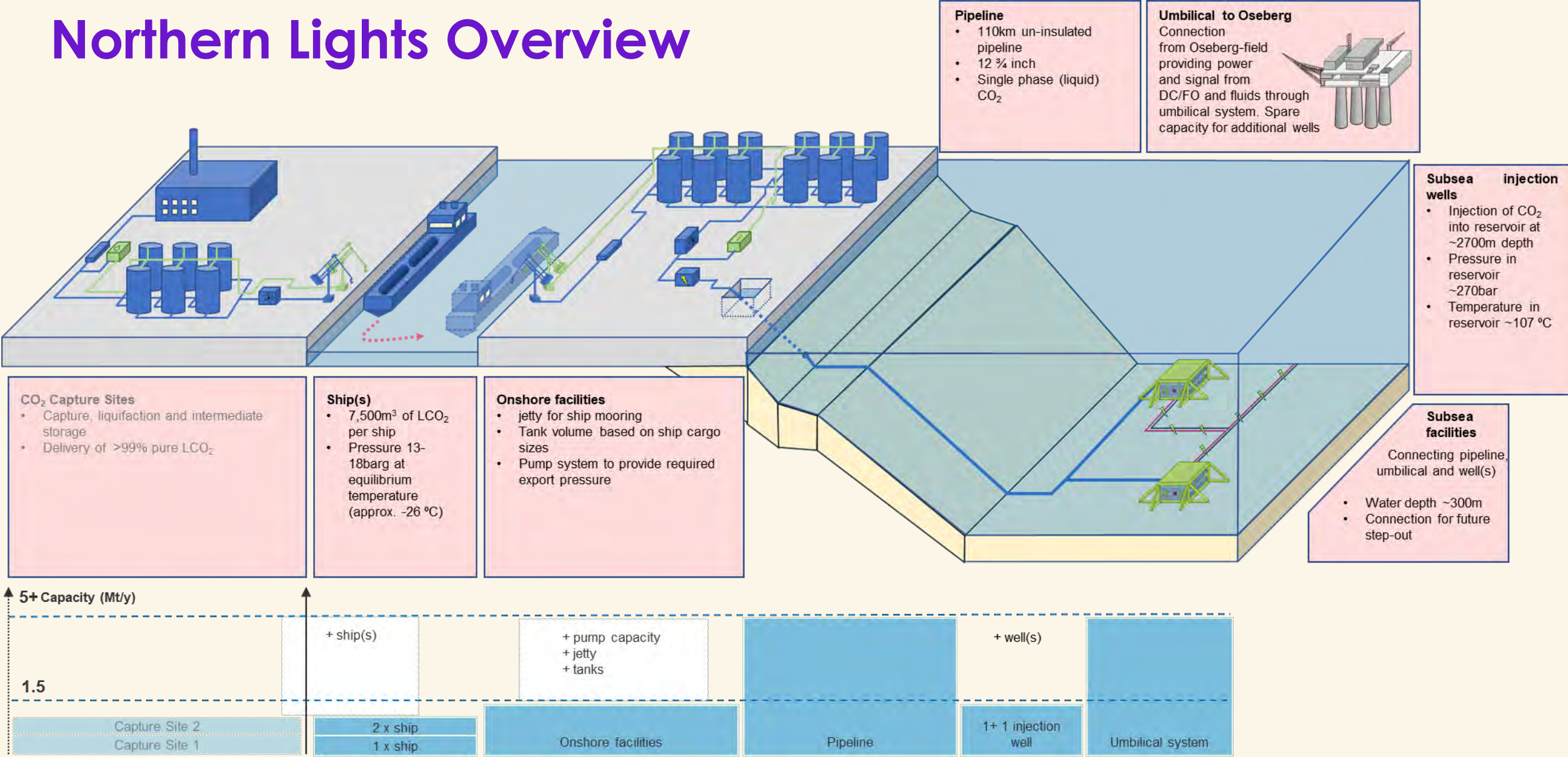


Longship value chain



- First of a kind project with a steep learning curve for all stakeholders involved
- Developing a project and a market at the same time
- Collaboration and stakeholder alignment essential for future success
- Initiate “real project” and scale up quickly

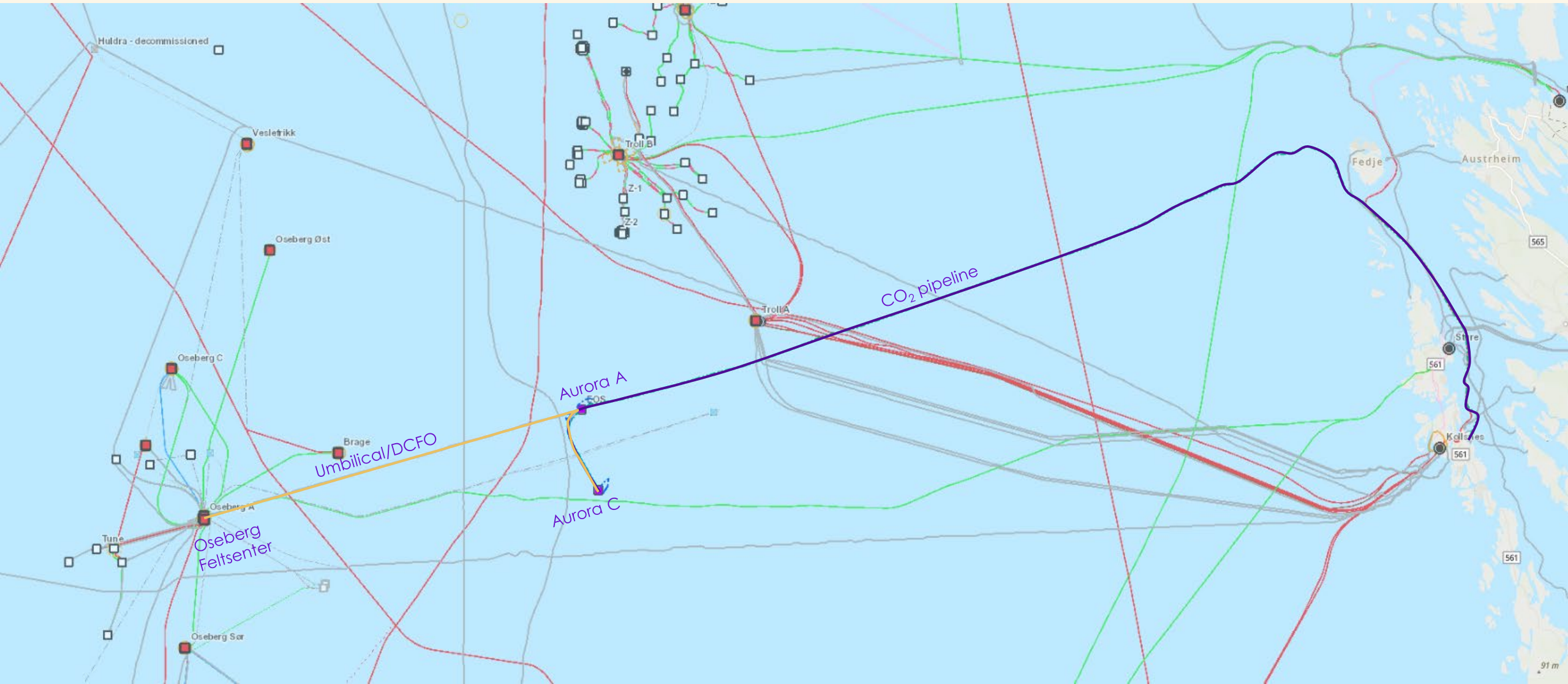
Northern Lights Overview



Onshore plant



Northern Lights field layout



Subsea system main contractors



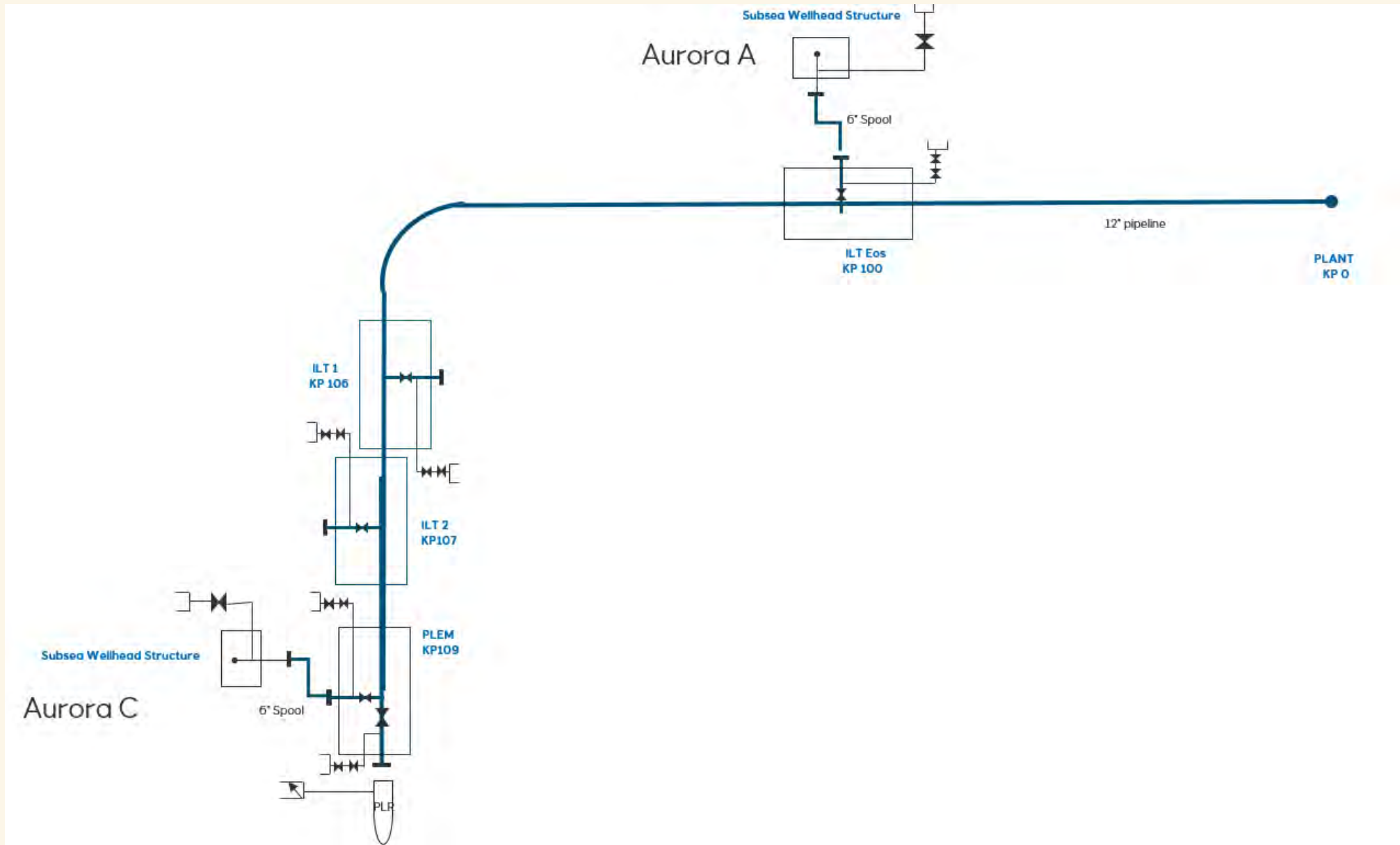
DCFO cables



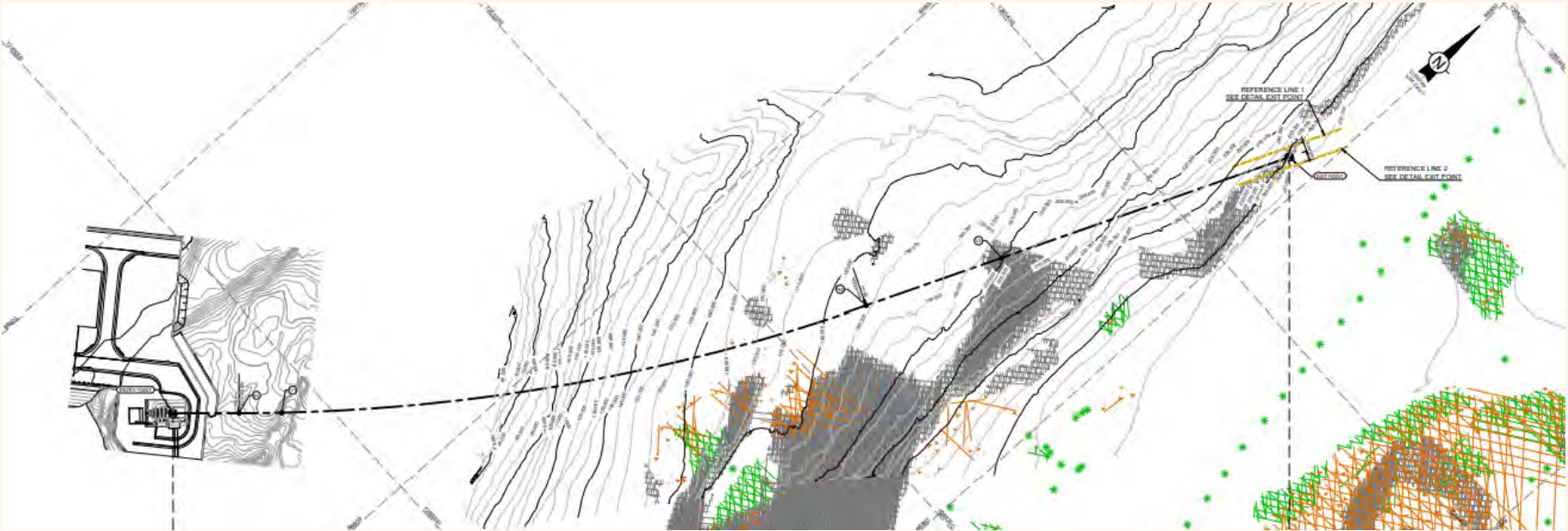
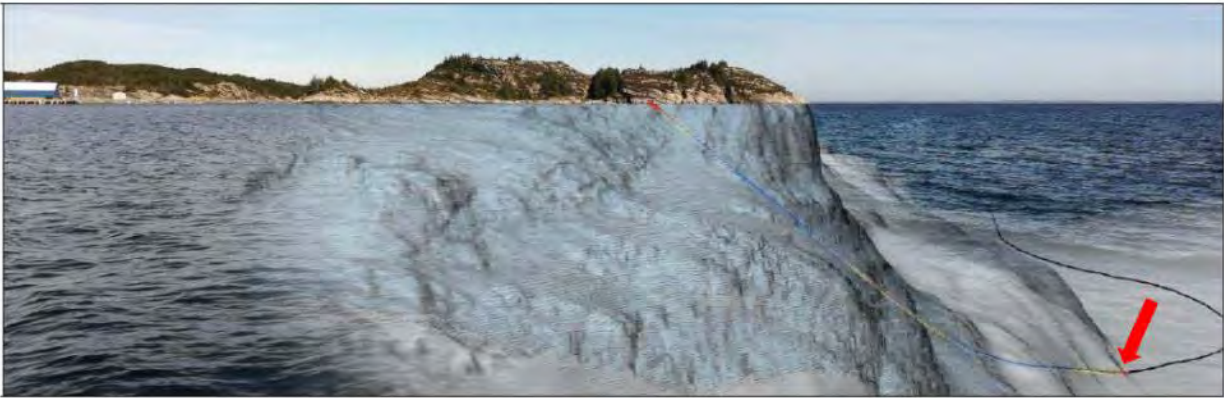
Basis for subsea system design

- **Petroleum Safety Authority - CO₂ Safety Regulation**
- **Northern Lights CO₂ specification**
- **Design Basis Northern Lights project**
- **Design Basis Northern Lights CO₂ Pipeline**
- **Equinor requirements as per standard practice for an oil and gas project**

Pipeline system



Landfall

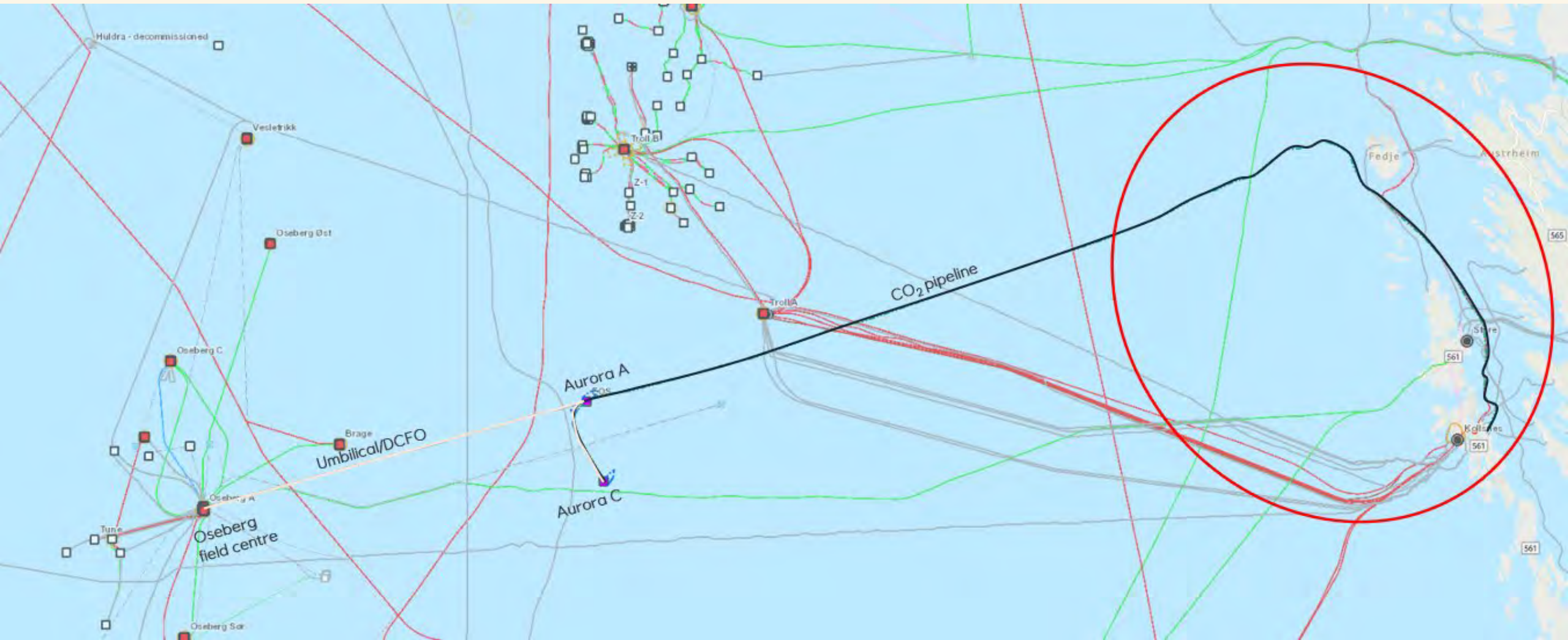


Status August 2023

- 2019
Aurora A-satellite
- 2022
Aurora C-satellite
Pre-lay rock
Umbilical-DCFO installed
Umbilical-DCFO trenched and post-lay rock
- 2023
Pipeline installed KP 52.3 – KP 108
VXTs and flowbases installed
Hydraulic flying leads connected
Pipeline flooded, cleaned and gauged
Topside commissioning subsea control system
Pipeline trenched



Scope in 2024



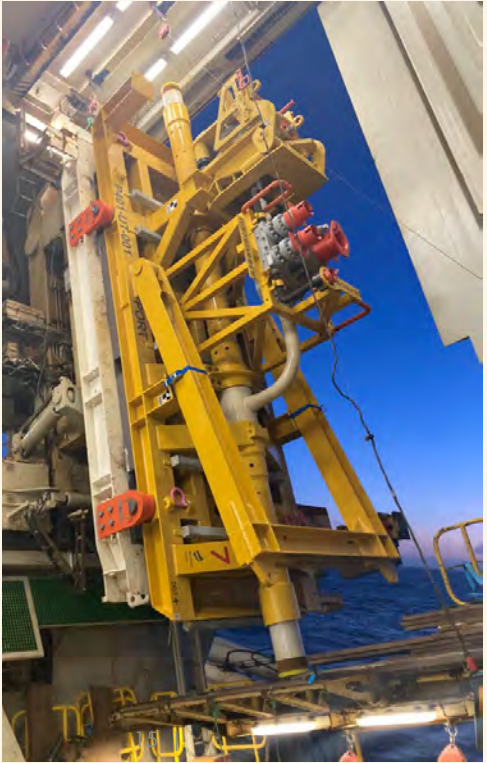
Satellite structures, umbilical & DCFO



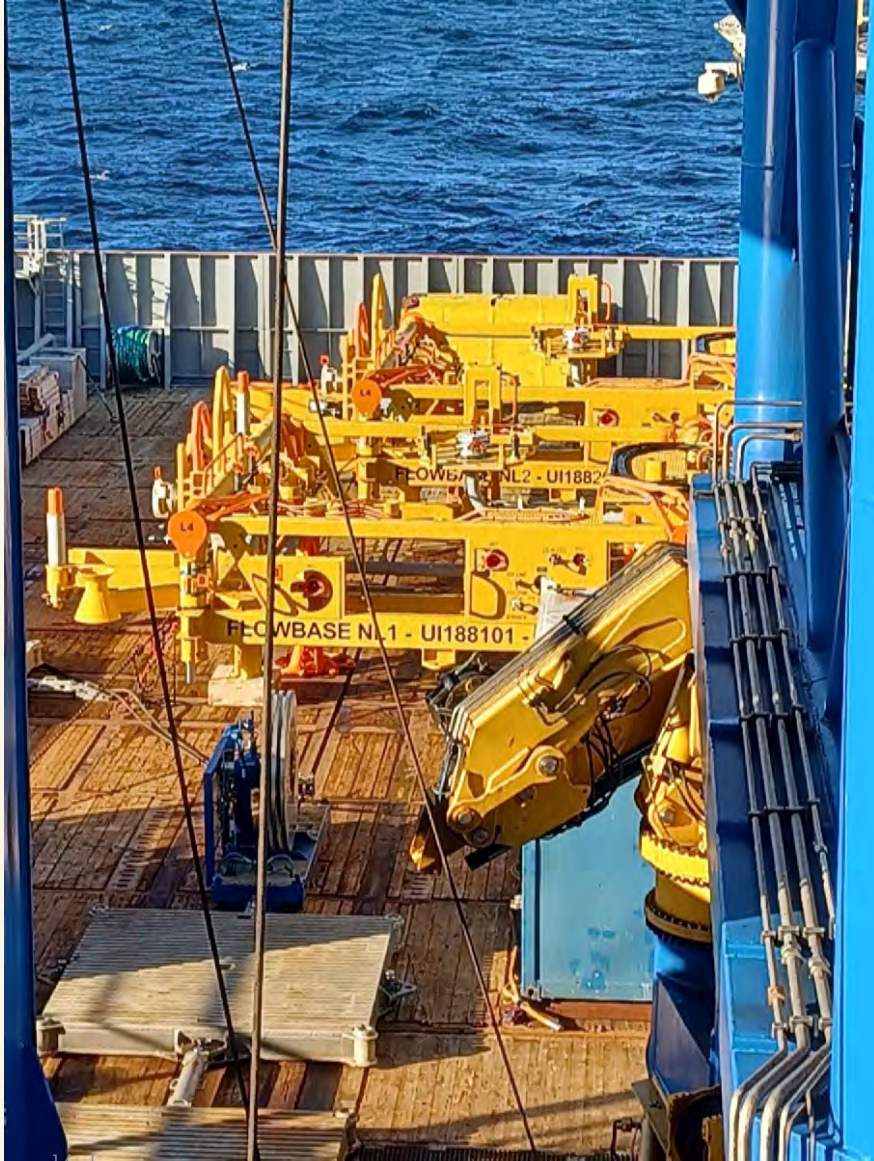


Photo: Subsea7

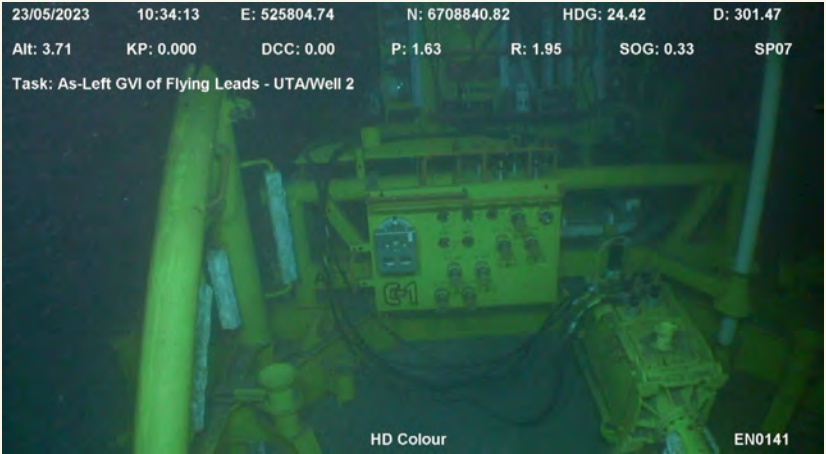
Pipeline fabrication & pipelay



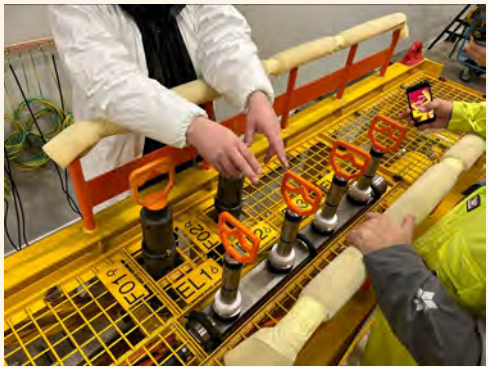
Installation of VXTs and flowbases



Hydraulic flying leads, pipeline flood, clean and gauge, spool metrology , cover installation



DCFO splice and node installation





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