

# **Wind farm zone Borssele**

## **Project and Site Description**

### **15<sup>th</sup> December 2014**

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This presentation aims at providing insight in the progress of the site investigations that are carried out for the Borssele wind farm zone

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# Energy Agreement: deployment of 3,500 MW new offshore wind. First wind farm sites will be tendered at the Borssele wind farm zone.

## 1. Introduction

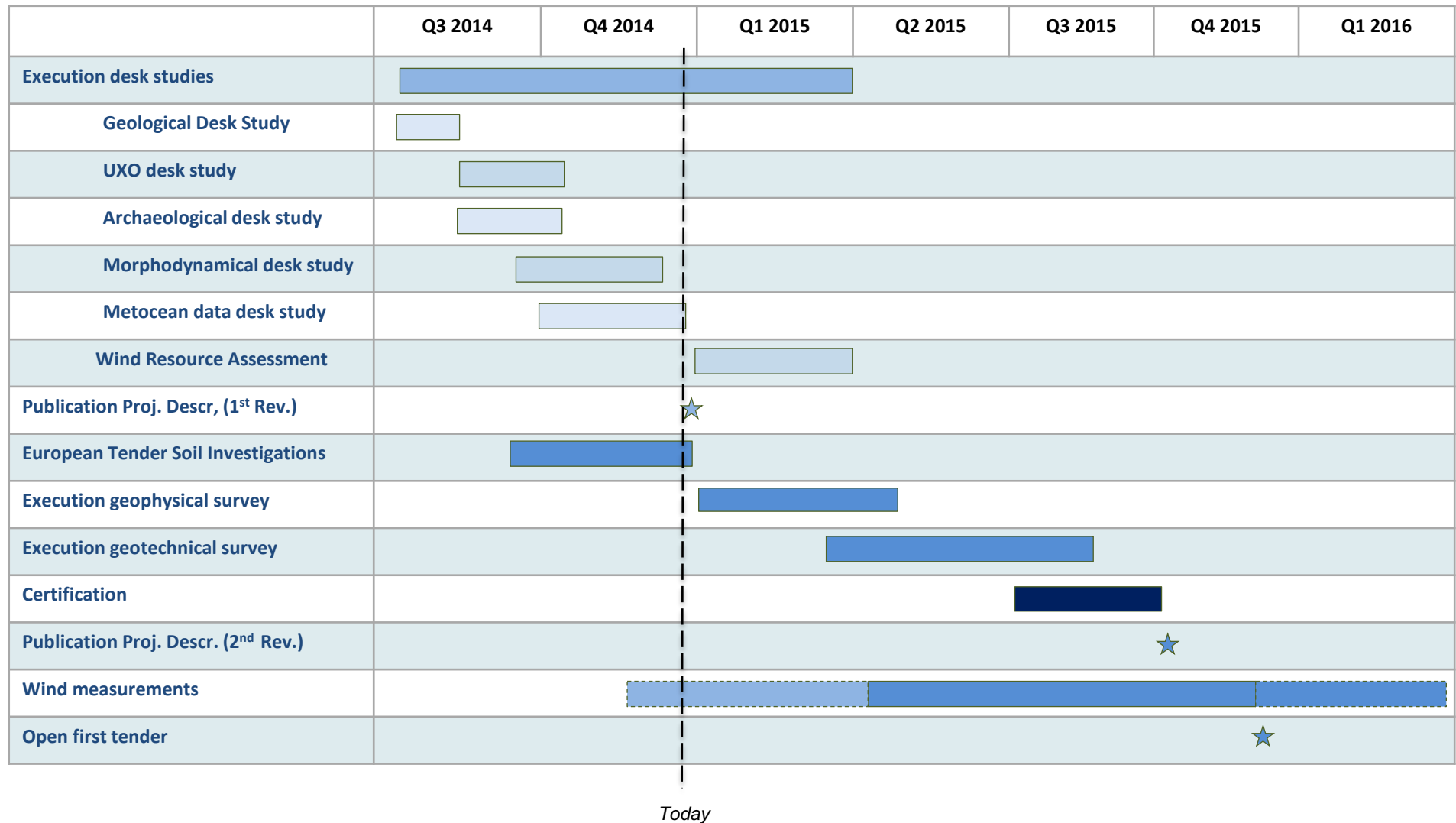


- 3 Wind farm zones
  - First tenders: Borssele – 1,400 MW in 4 sites
  - 2015: 2 x 350 MW / 2016: 2 x 350 MW
  - Government provides site data and consent.
  - TenneT (TSO) provides grid connection with substations in the wind farm zone
- Objectives site data:
    - Provide developers and other interested parties with information regarding the conditions of the Borssele wind farm zone.
    - Provide information required for EIA and Wind farm site decisions.



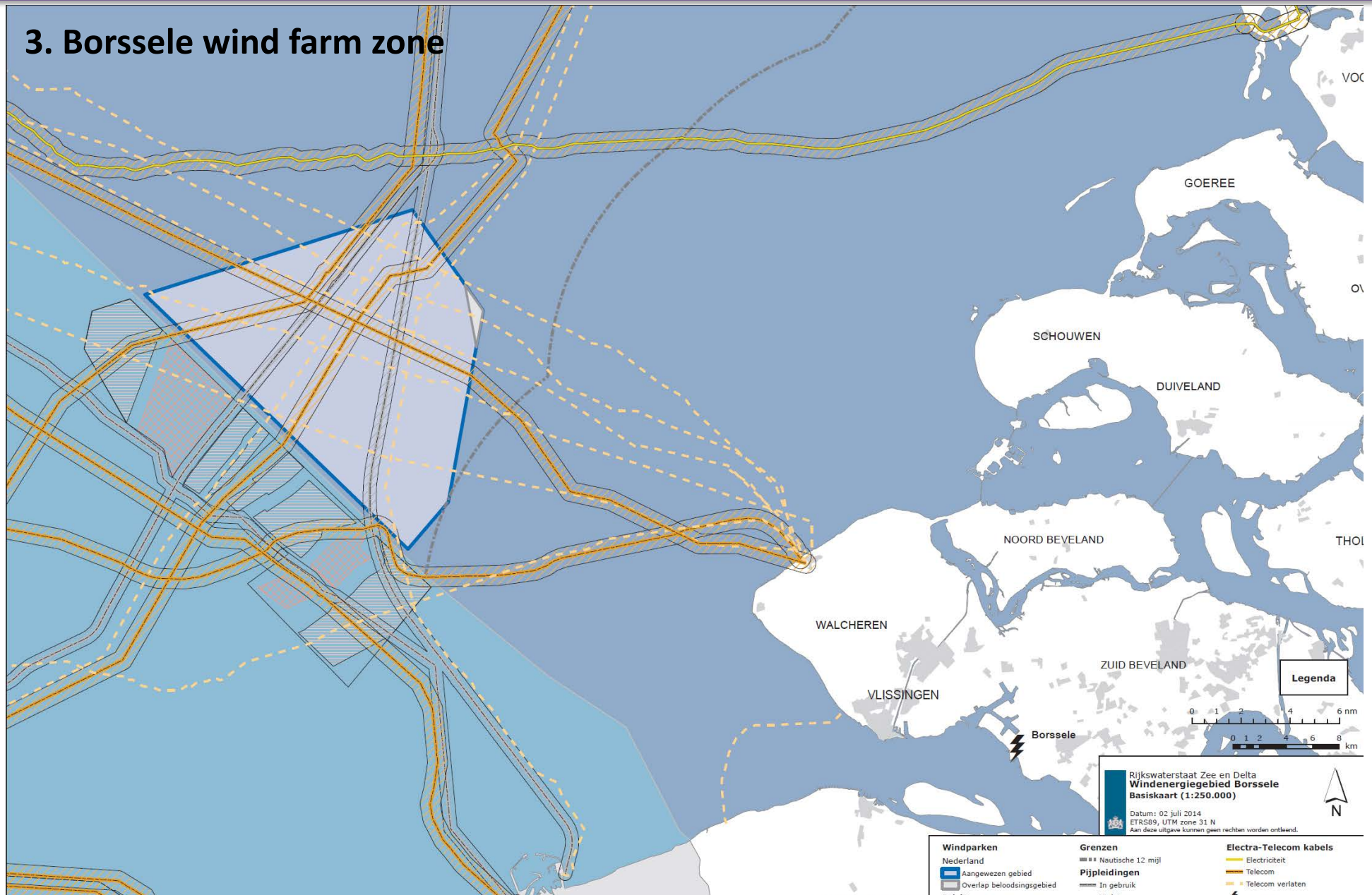
The progress of the studies and investigations is on target for the delivery of the information package for first tender in Q4 2015

## 2. Planning and progress



Several pipelines and cables cross the Borssele wind farm zone, these exclusion zones determine the shape of the wind farm sites

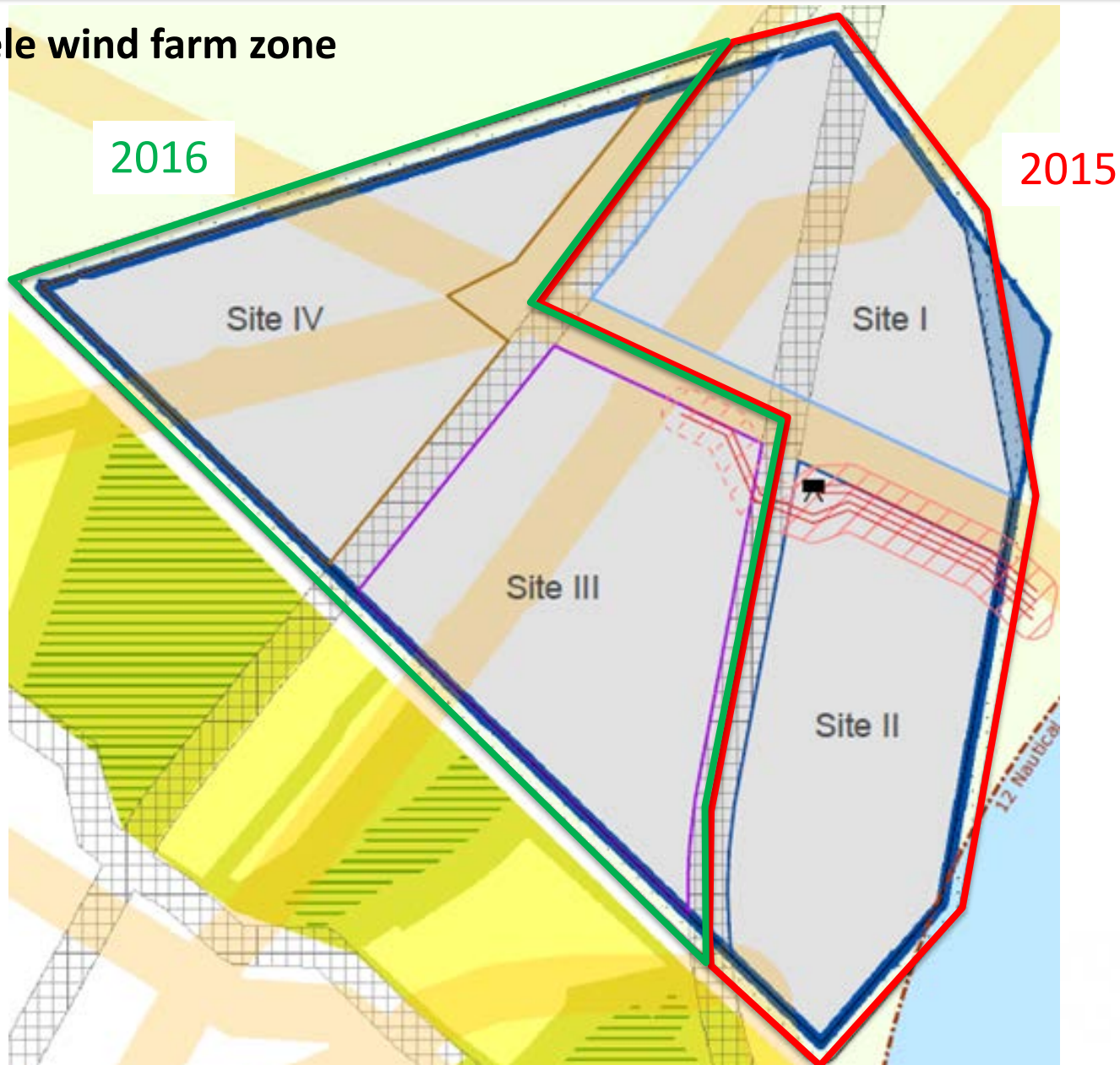
### 3. Borssele wind farm zone





The Borssele wind farm zone will be divided into four wind farm sites.  
Site I and II will be tendered in 2015, sites III and IV in 2016

### 3. Borssele wind farm zone



Desk studies that have been carried out, indicate that there are no specific constraints for developing offshore wind farms

#### 4. Desk Studies carried out

##### Desk studies

- Geology and Geomorphology (CRUX)
- UXO (REASeuro)
- Archeology (Vestigia)
- Morphodynamics (Deltares)
- Metocean (Deltares)

##### Supporting studies

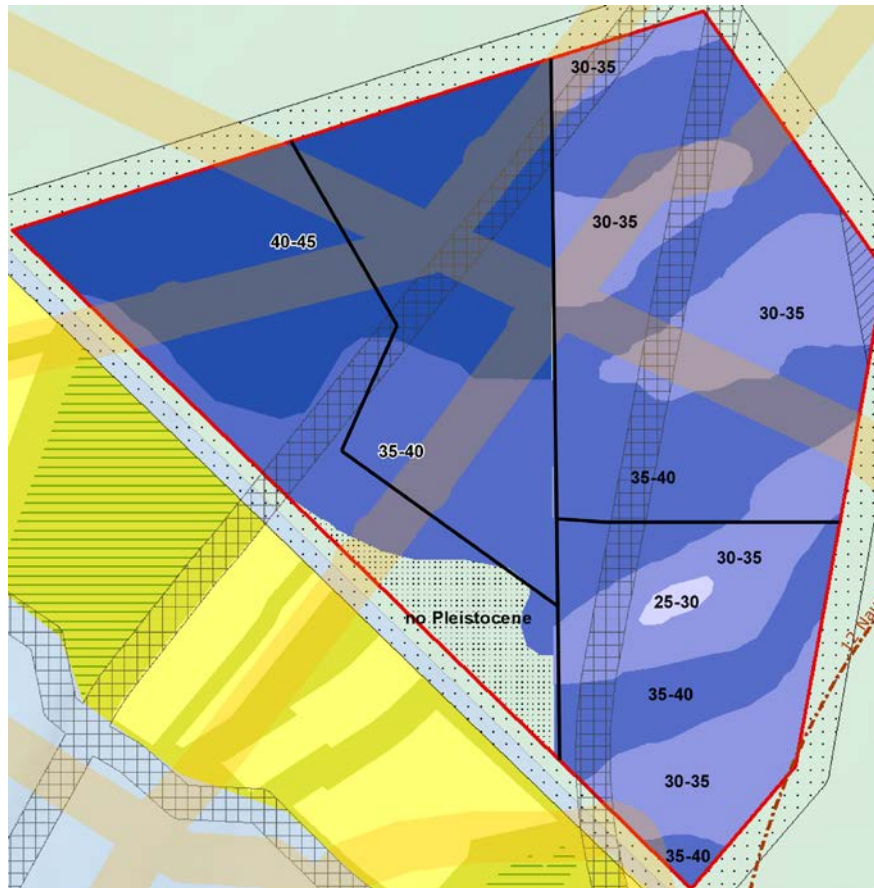
- Wind Measurement Program Assessment (DNV-GL)
- Certification (DNV-GL)



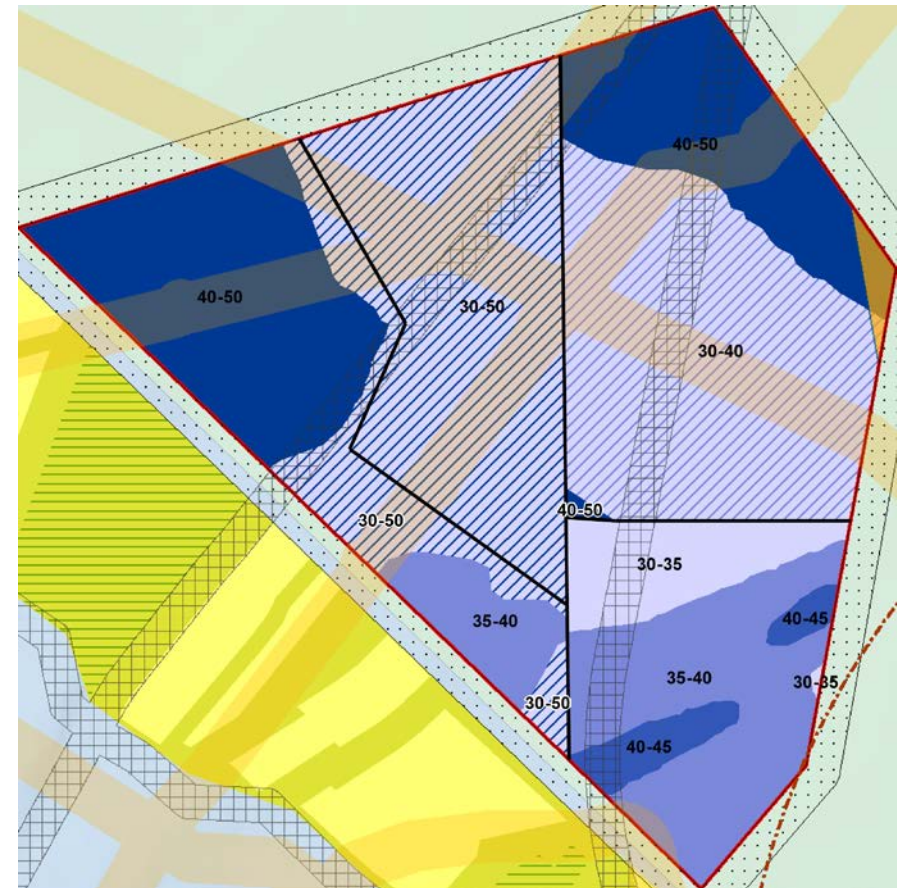
Information on the overall stratification and the soil conditions at the wind farm zone is scarce, no specific constraints identified so far

## 4.1 Geology and Geomorphology (CRUX)

Top of the Pleistocene



Top of Tertiar





The Borssele wind farm zone can be considered an UXO risk area. When proper UXO management is implemented, risks are not critical

## 4.2 Unexploded Ordnance (UXO) (REASeuro)

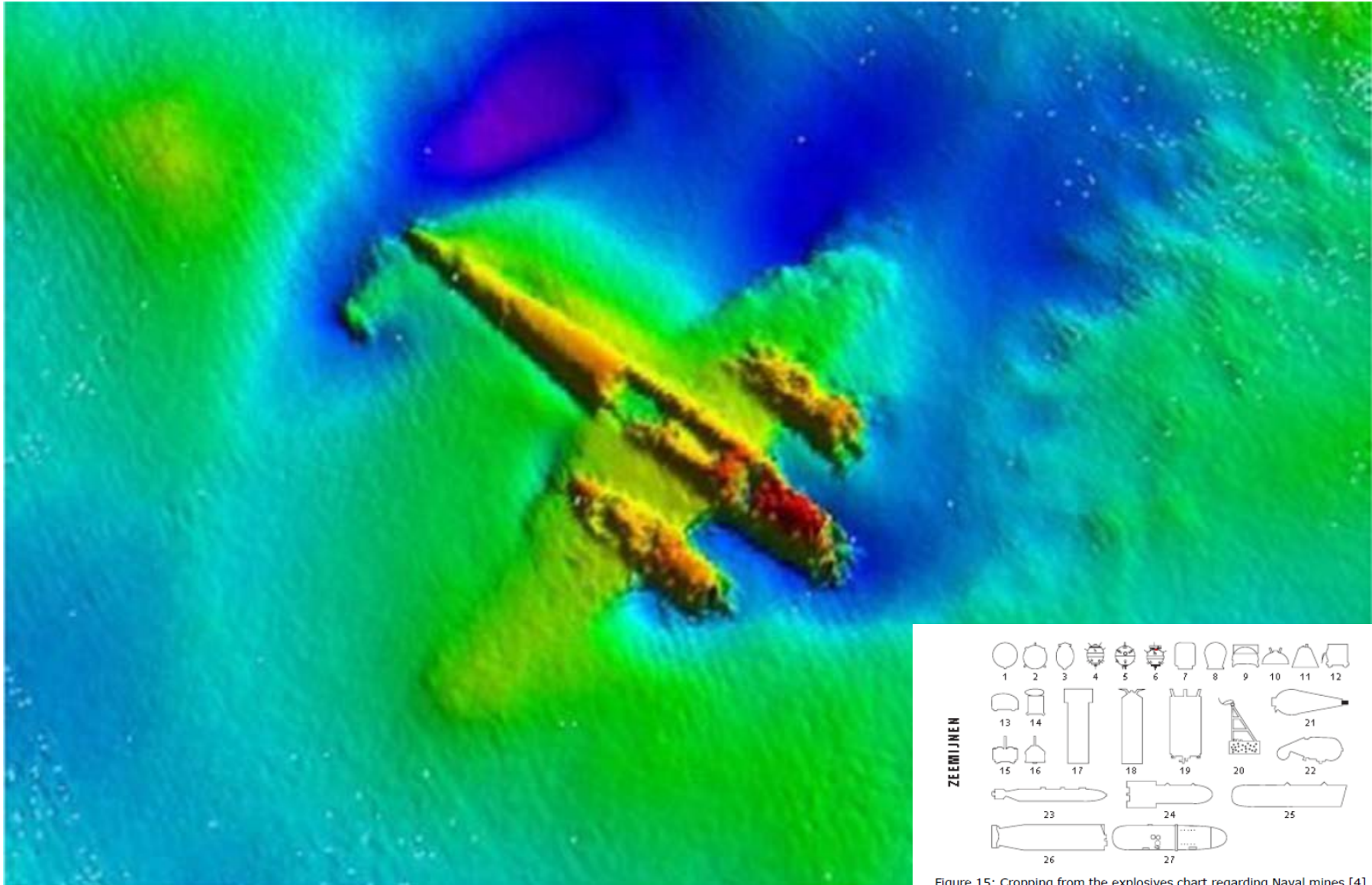


Figure 15: Cropping from the explosives chart regarding Naval mines [4]

Prehistoric sites are not likely to be found. Historic wrecks could be present within the wind farm zone

#### 4.3 Archaeological desk study (Vestigia)

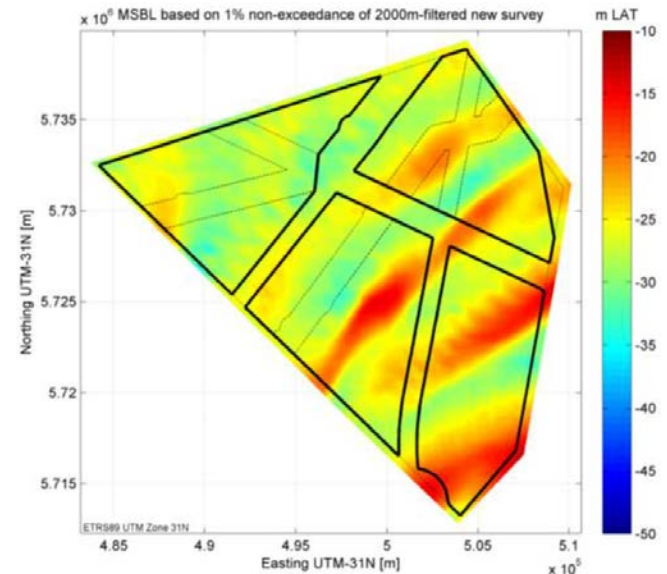
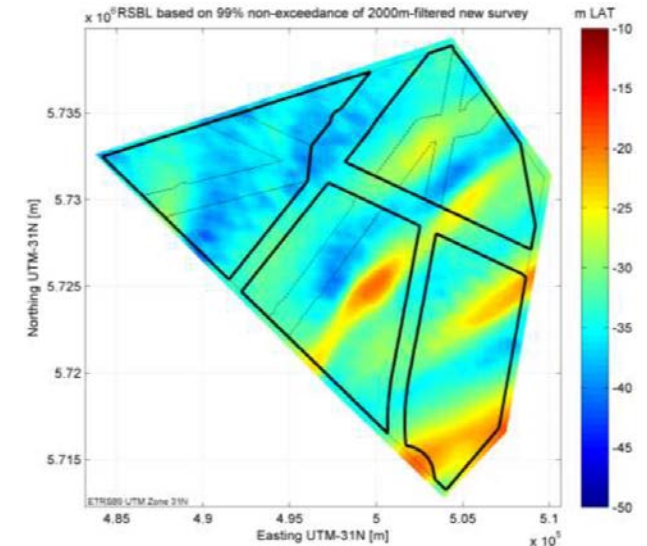
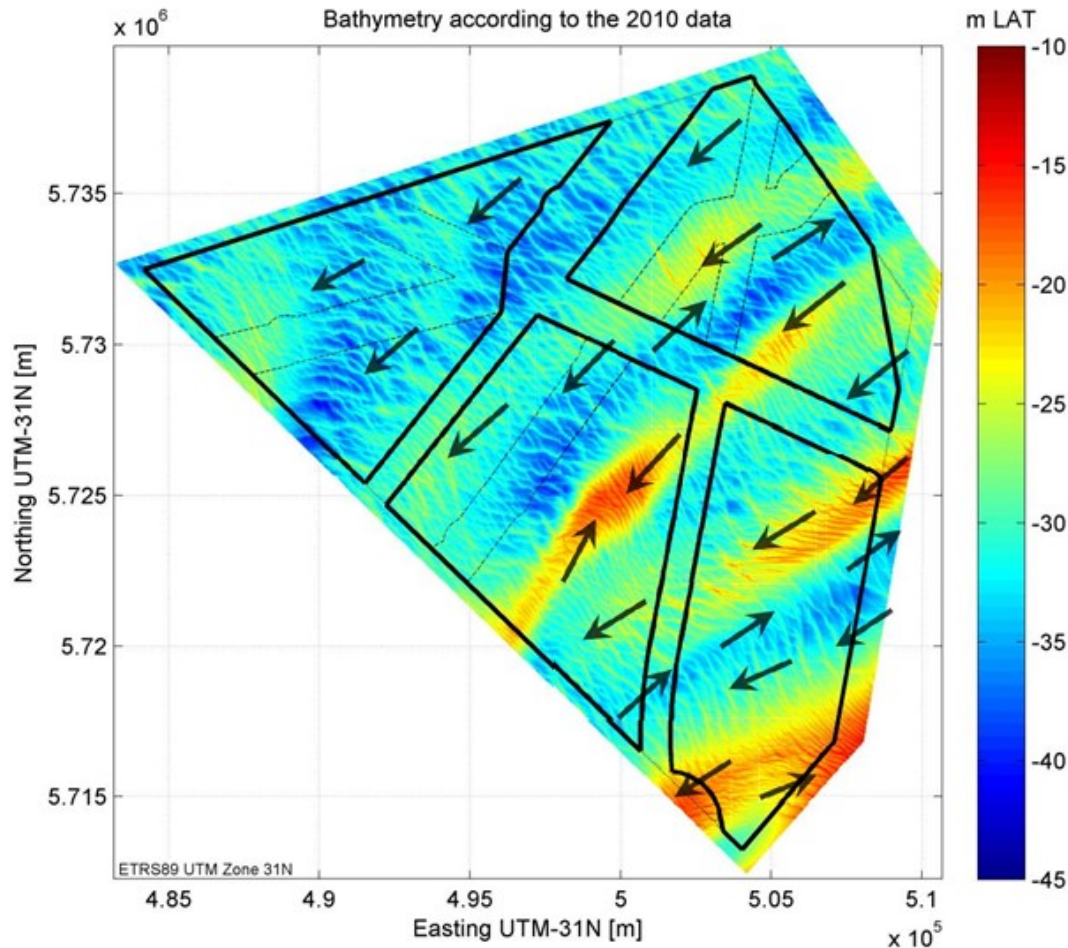


Figure 6 Part of a chart from the Spiegel der Zeevaerdt by Lucas Janszoon Waghenaer from 1588 with the north in the left bottom corner (Biblioteca Digital Hispánica - Biblioteca Nacional de España), wind farm zone not indicated due to inaccuracy of the chart



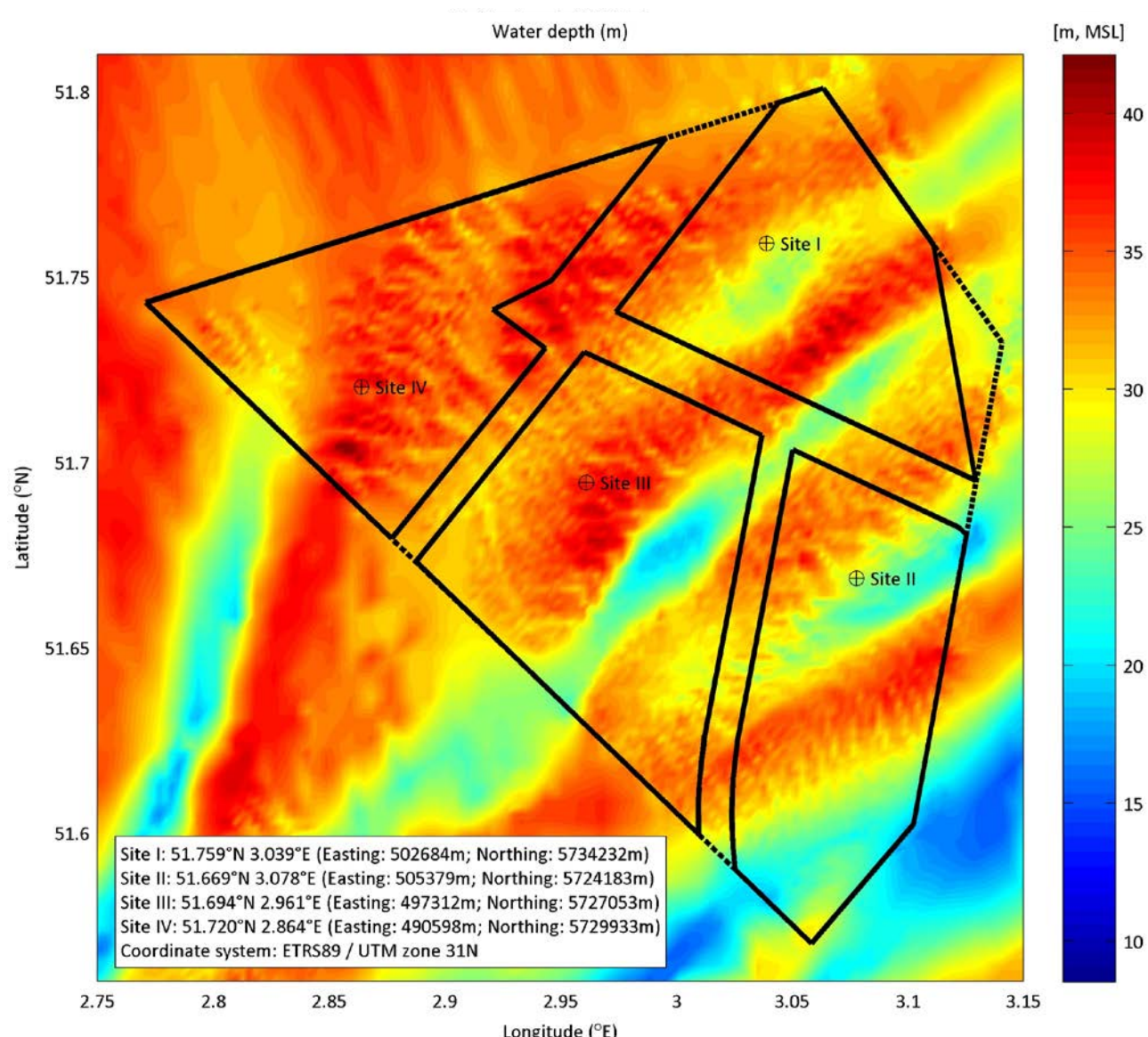
The soil morphology at the site is highly dynamic, this should be taken into account when designing foundations and cable layouts

## 4.4 Morphodynamics (Deltares)



Meteorological and environmental parameters have been specifically determined for each wind farm site, taking into account local variances

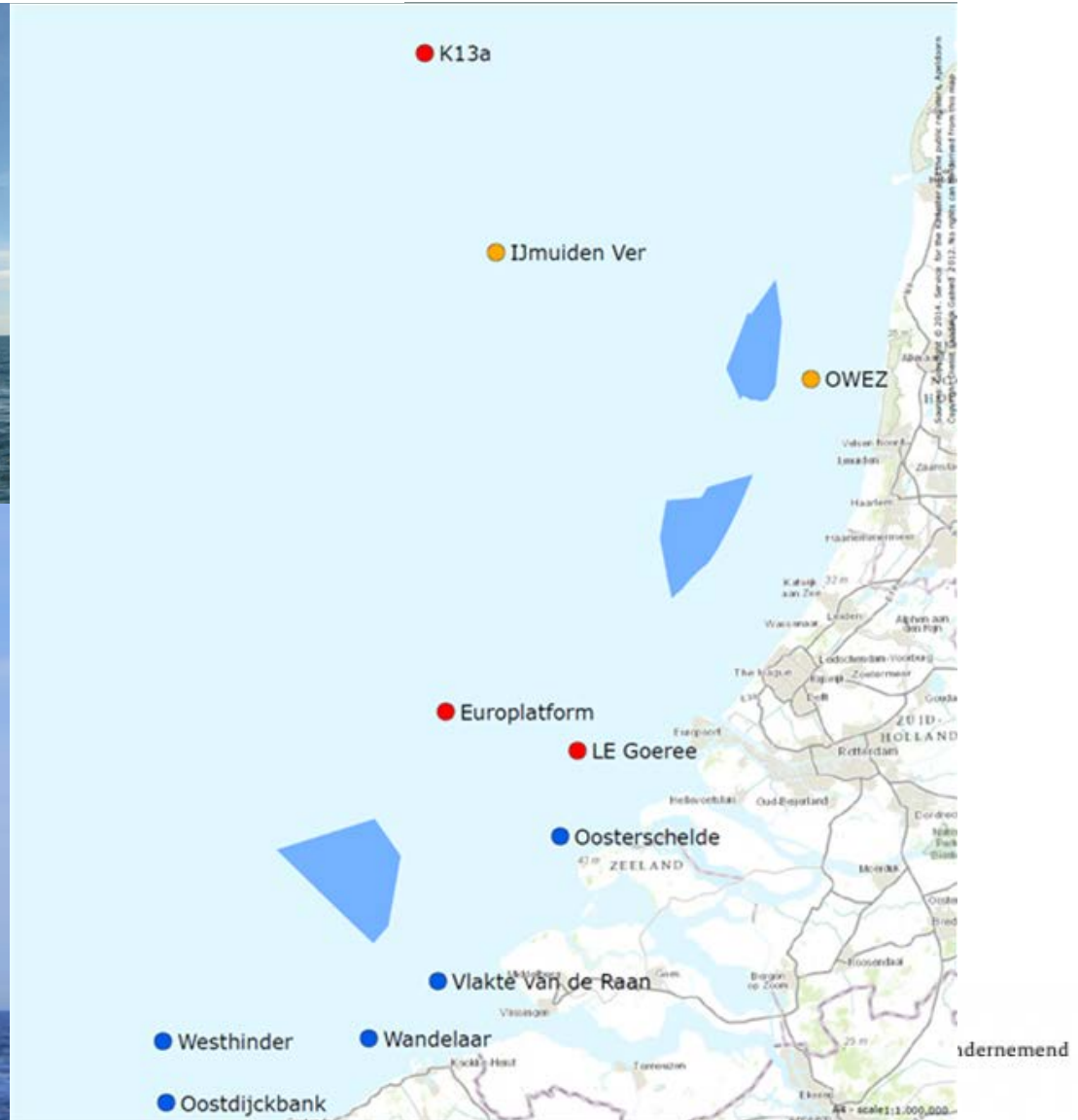
## 4.5 Metocean (Deltares)





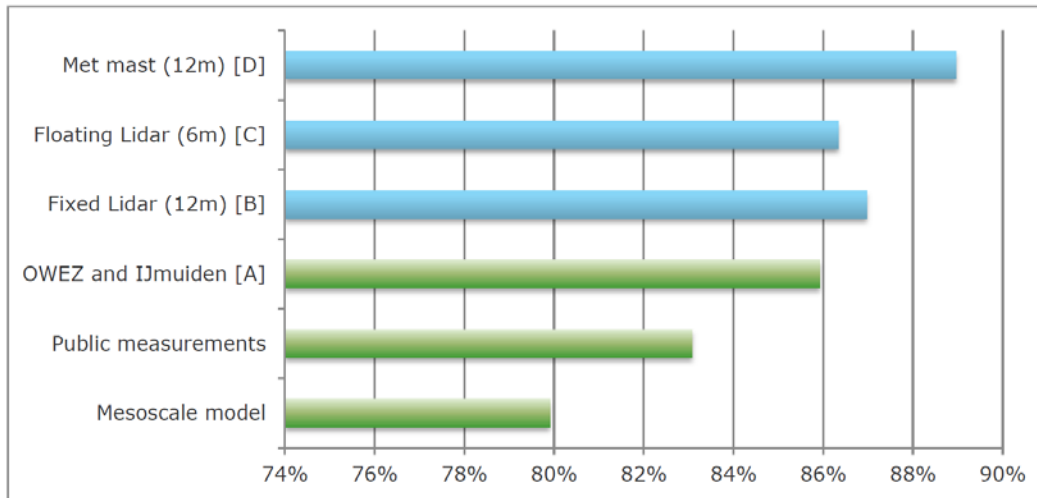
There are several measurement stations that can be used for the determination of wind resources at the Borssele wind farm zone

#### 4.6 Wind measurement program assessment (DNV-GL)

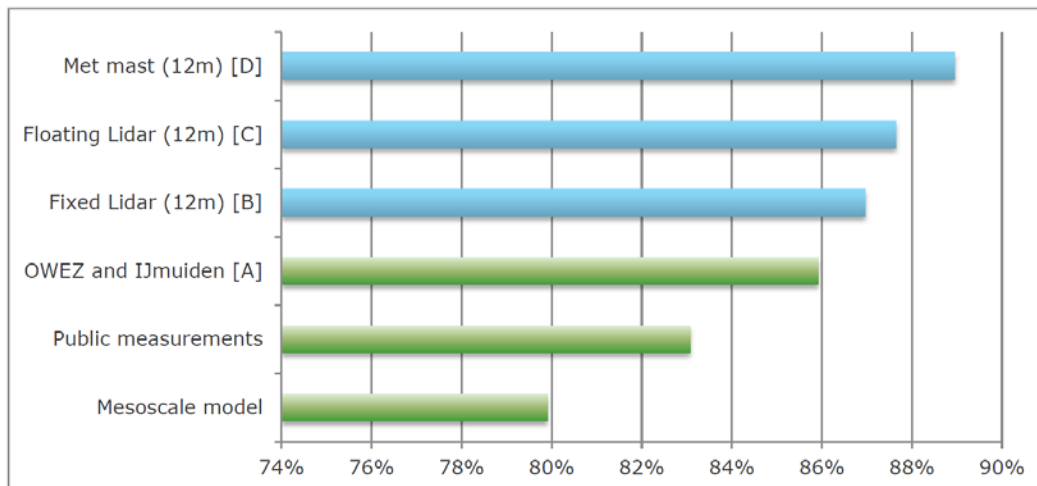


# Carrying out measurements with a floating LIDAR contributes to bringing down the uncertainty bandwidth of wind resource calculations

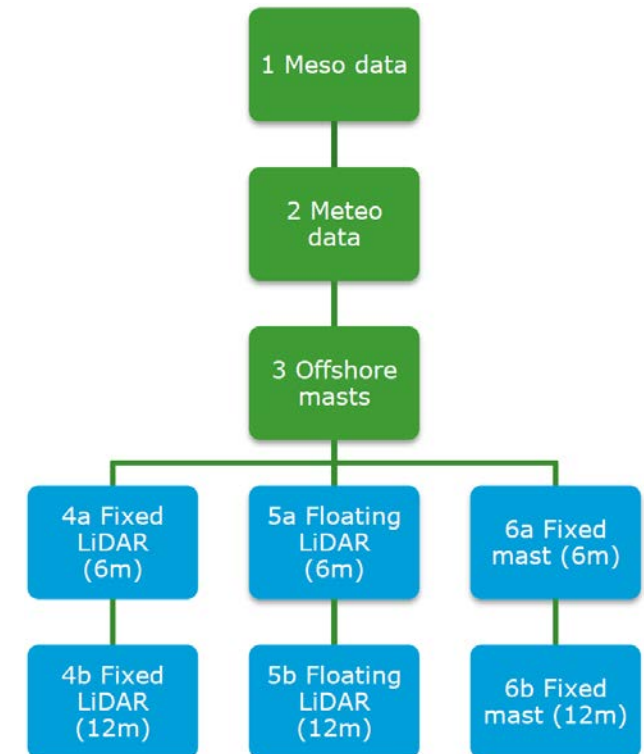
## 4.6 Wind measurement program assessment (DNV-GL)



**Figure 4-3** P90/P50 values for Borssele 1 location. Blue indicates new measurement campaigns.



**Figure 4-4** P90/P50 values for Borssele location. Blue indicates new data.



# The site investigations that are carried out offshore are all in the European public procurement process

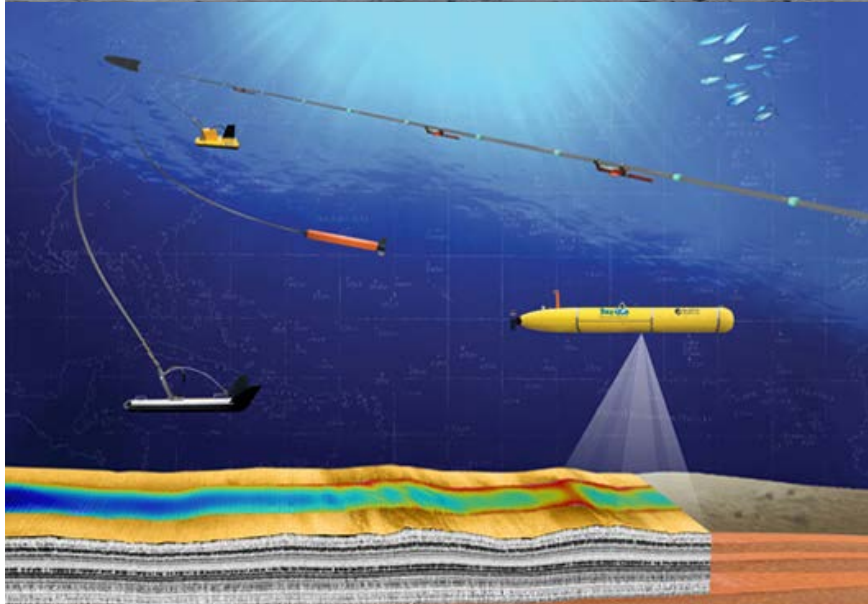
## 5. Site Investigations ongoing / preparation

- Geophysical site investigation
- Geotechnical site investigation
- Wind & Metocean Measurements



Four framework contracts are about to be signed this month. Execution of the investigation to start January / February 2015

## 5.1 Geophysical site investigation





Four framework contracts are about to be signed this month. Execution of the investigation to start March / April 2015

## 5.2 Geotechnical site investigation



The tender for the wind measurements is planned to be published this month, the measurement campaign is planned to start Q1 2015

### 5.3 Wind measurements



Source: offshorebizz.com

Several quality checks have been implemented in order to provide a complete and reliable information package

## 6. Process and Quality Assurance

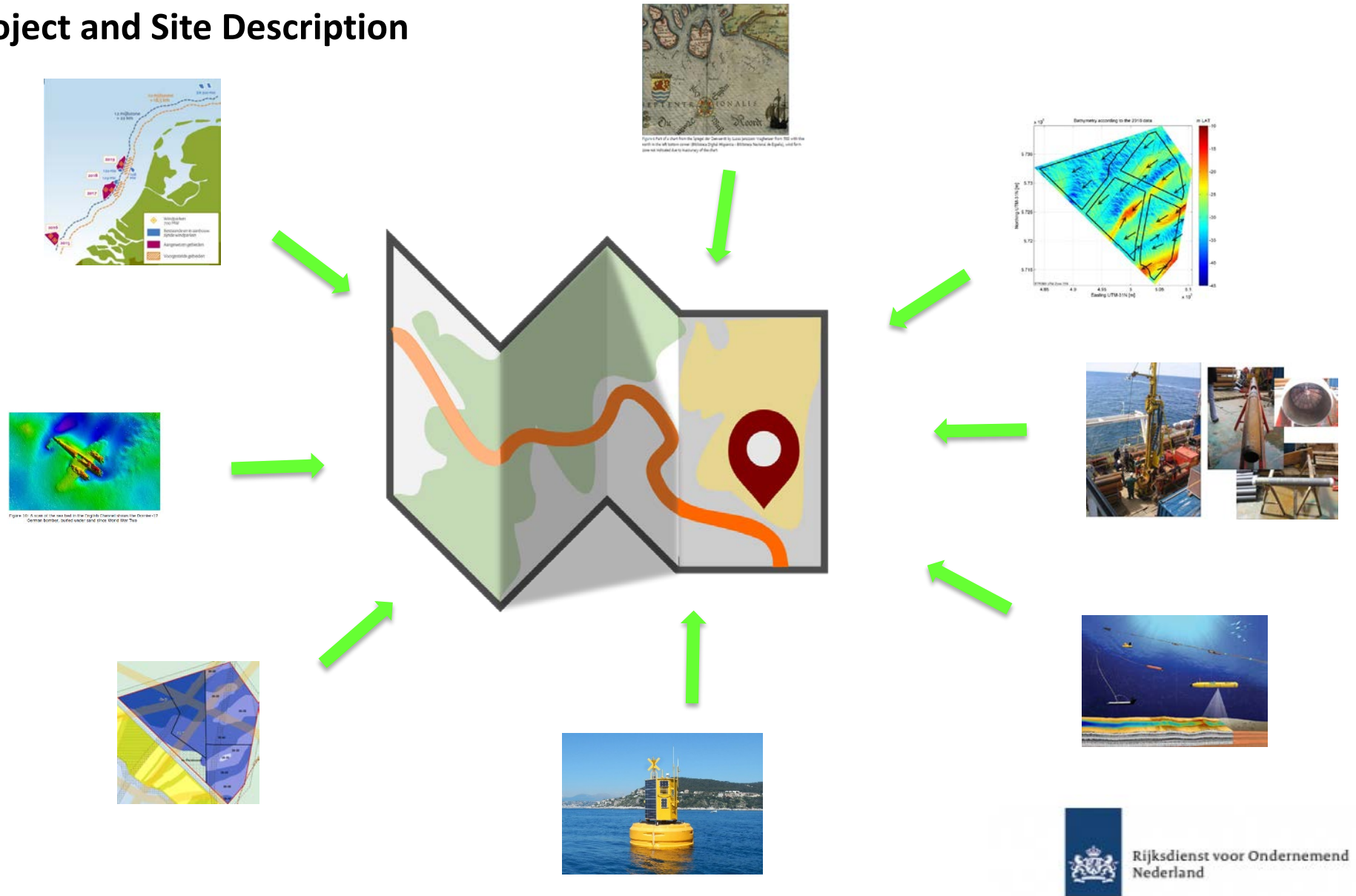
- Project management: RVO & BLIX
- Market consultations and workshops
- Review of scope descriptions by internal and external experts
- Verification of scopes by certifying body
- Review of results by project team and experts
- Statement of compliance by certifying body





The project and site description document includes an introduction to the regulatory framework and an overview of all results obtained so far

## 7. Project and Site Description





The coming months the offshore site investigations will start. The results of these investigations will be used for updating studies

## 8. Next steps

- Execution geophysical site investigation
- Procurement & execution geotechnical site investigation
- Procurement & execution wind resource assessment
- Update morphodynamical desk study
- Create Geological Model
- Procurement & execution wind measurements
- Update wind resource assessment
- Update project & Site description



The market is invited to provide feedback on the work that has been carried out and to inform RVO.nl on preferred information updates

## 9. Questions for the market

A. I. Are there subjects missing?

II. Procedure: e-mail remarks until January 2015. RVO will decide whether to ...

B. Which next consultations do you prefer? Our milestones of 2015:

I. Results geophysical survey and scope of geotechnical survey

II. Results of the geotechnical surveys and scope of updates

III. Publication of the updates.

C. Would market parties prefer dedicated 0,5 or full day workshop(s) of specific subjects where the authors give extensive presentation about the report and how to use the info i.e. FEED?

If so: which subjects? Morphodynamics, archaeological etc.

