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Site Studies New Search Areas for Offshore Wind Development

Expert Support Soil Characterisation

Annex 5a

Scope of Work

Colophon

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Introduction

Scope document

This document details the Scope of Work (SoW) for soil expert support services for the Various Sites (VS) that will be investigated for the development of Offshore Wind.

Background

The Ministry of Economic Affairs and Climate policy is responsible for the legislative framework for the development of offshore wind farms in the Netherlands. Within this framework (a) (concession) tender(s) for construction and operation of (a) wind farm(s) will be organised. As part of the tender documentation, the participants will receive an information package in which detailed information on the offshore site is included. Detailed information about soil and wind & water conditions at the site will be part of this information package. The Contracting Authority for this assignment is the Netherlands Enterprise Agency (Rijksdienst voor Ondernemend Nederland - RVO), sometimes also referred to as Contracting Authority.

Objective

RVO has been requested to prepare and collect all site data required for commercial developers to prepare a competitive bid. In order to achieve the highest results from the site characterisation, RVO intends to contract high quality experts who can support RVO in managing the site characterisation. The objective of this tender is to conclude an agreement with Contractors who can support RVO on the different site characterisations regarding contracting, quality control and operational support.

RVO is looking for an expert support Contractor who can support RVO with managing the site characterisations and the interfaces between the site characterisations. RVO is specifically looking for expertise in the field of soil characterisation (Lot 1) and wind & water characterisation (Lot 2).

This SoW is part of Lot 1: expert support services for soil characterisation.

Site Description

Within the Dutch Shelf of the North Sea several areas have been selected with potential for the development of offshore wind. Within the selected areas possibilities for Wind Farm Sites are investigated. At the moment four (4) sites are considered for site characterisation by RVO.

The Various Sites (VS) that are currently selected for site characterisation are:

- VS1
- VS2
- VS5E
- VS5D

Expert support services shall be performed (but not limited to) the sites presented.

The expert services will not consider the full characterisation of all the listed areas but will contain a selection of works. This selection can be adjusted during the course of the execution of the WORK to the needs and priorities as set by the Contracting Authority.

Section below will provide some information about the four (4) sites.

Various site 1 (VS1)

VS1 is located in the west of the Dutch Shelf in the North Sea. A shipping corridor is planned to divide the wind farm zone in 2 areas. In total it is expected that this site can accommodate a maximum of 6 GW of offshore wind divided over multiple sites. Figure 1 below presents the location VS1.



Figure 1: Location VS1.

Various site 2 (VS2)

VS2 is located to the North-West of the Netherlands. The site is located north of the IJmuiden Ver Wind Farm Zone. In total it is expected that this site can accommodate a maximum of 4 GW of offshore wind divided over multiple sites. Figure 2 below presents the location VS2.



Figure 2: Location VS2.

Various Site 5 East (VS5E)

VS5E is located to the North-East border of the Dutch shelf of the North Sea. The site is located North of the Ten noorden van de Waddeneilanden Wind Farm Zone. In total it is expected that this site can accommodate a maximum of 4 GW of offshore wind divided over multiple sites. Figure 3 below presents the location VS5E.

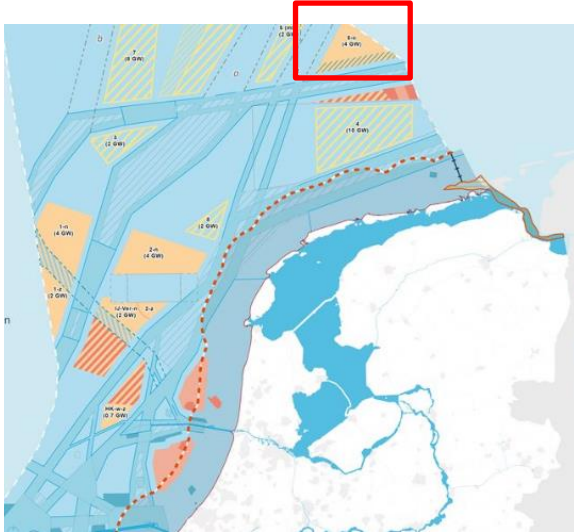


Figure 3: Location VS5E

Various Site - Demonstration site (VSDS)

As part of the Energy transition to renewable energy there is an intention to set-up a VSDS for the purpose of offshore wind development. Expectations are that the VSDS will be suitable for a maximum of 500 MW of offshore wind. Site characterisation shall be performed to reduce the risks for developers participating in the permit tender. The tender details (planning) and location of the site are not yet defined. Site characterisation will be adjusted to suit the tender planning when this becomes available.

The Expert support works can be conducted (but not limited) to the sites described above. The content of the WORKS and the required expertise is detailed in the Scope of Work section below.

Scope of Work

The Contracting Authority intends to conclude the contract with one Contractor, in order to manage the interfaces regarding the studies below adequately.

The scope of lot 1 – Soil includes the expert support to the following works*:

- 1) Geological Desk studies for VS1, VS2 and VS5E.
- 2) Site characterisation of an area of approximately 4GW, expected to be located in VS1 including;
 - 1 Geophysical survey
 - 1 Geotechnical survey
 - Ground model (s)
 - Morphodynamical assessment (s)
- 3) Site characterisation for VSDS, expected to contain:
 - 1 Geophysical survey
 - 1 Geotechnical survey
 - Ground model
- 4) **Optional** (Non-specified) 1000 hours of expert support for works on VS other than specified in scope 1,2 and 3. Expert support will aid RVO with :
 - Geophysical campaign
 - Geotechnical campaign
 - Ground model works
 - Morphodynamical assessment

The content of the site characterisation for the VSDS, will be based on forthcoming political decisions. This may result in the fact that Contracting Authority and expert support will have to take a pragmatic approach to the investigations within the VSDS.

Contracting Authority foresees that site characterisation surveys between the above mentioned items 2,3 and/or 4 might be combined, or run simultaneously.

*works can be shifted between sites and scopes within a site, based on developments within the Netherlands, which are determined by the ministry of Economic Affairs and Climate policy.

The SoW is divided in 3 sections;

1. Project set-up
2. Roles and responsibilities
3. Schedule and key dates

1. Project set-up

The NA125E Soil package will contain the site characterisation studies as indicated in Figure 4.

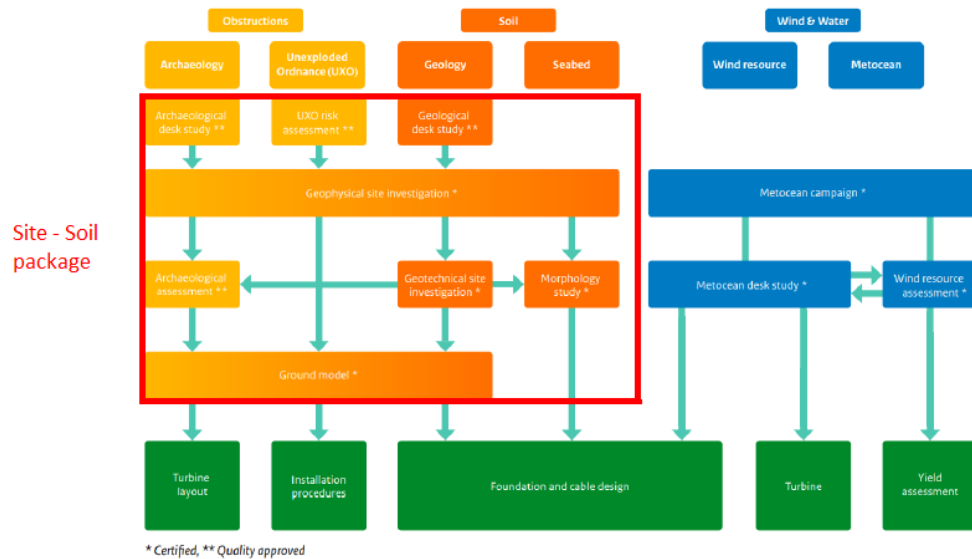


Figure 4: Soil site characterisation package

RVO will manage the soil site characterisations, hereafter called PROJECT. Expert support will be required to assist the RVO team with in-depth knowledge during:

- 1) Drafting of the procurement documents for site study Contractors to execute the studies
- 2) Review process of Contractor bids
- 3) Developments during execution of studies
- 4) Quality and completeness review of Contractor documents
- 5) Operational support during execution of field works

To visualize the PROJECT team set up an organization chart is presented in Figure 5.

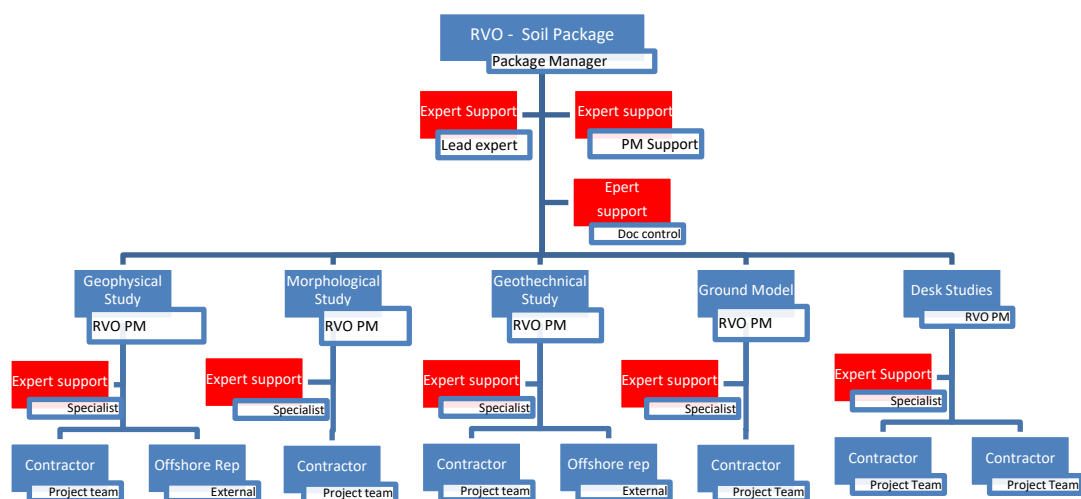


Figure 5: Organization chart soil site characterisation

Items marked in red present the areas where in-depth knowledge support by external experts is requested by means of this SOW.

The PROJECT organization will be built under supervision of a package manager from RVO. The package manager will be responsible for the interfaces between studies, overall planning and overall budget.

In addition to the package manager from RVO there will be multiple RVO project managers assigned to the PROJECT to manage the individual studies. A single RVO project manager can be assigned to multiple studies and can change during the duration of the PROJECT.

The expert support contractor is expected to supply lead expert(s) and specialists. The lead expert will need overall knowledge to participate into the different studies and to advise the RVO package manager where necessary. The main task of the lead expert will consist of interfacing between the studies. For in-depth discussions, reviews and support throughout the PROJECT the lead expert (and the RVO project managers) can call in the specialist experts. For detailed roles and responsibilities of the requested expert support reference is made to section 2 of this SOW.

The aim of the project set up as described is to optimize the interfaces and optimize the use of the specialist knowledge.

During the execution of the PROJECT all communication between the different parties as described above and the site study Contractors will be managed by the RVO project manager. The communication lines are visualized in Figure 6.

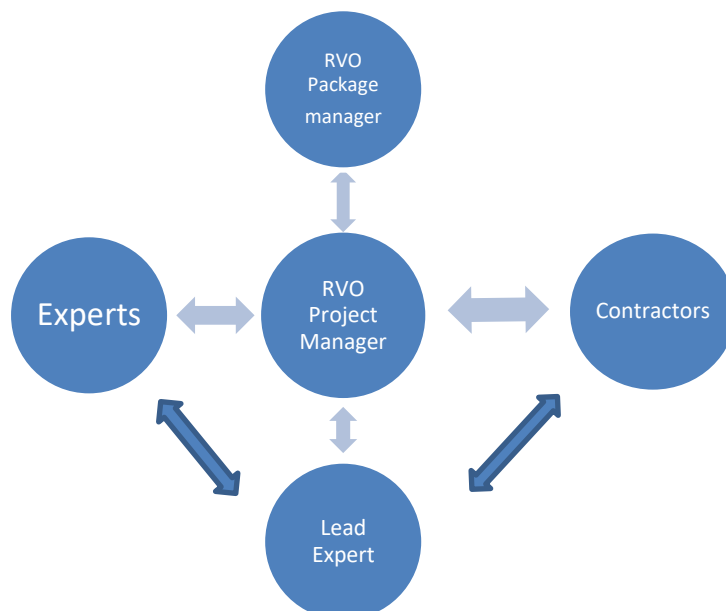


Figure 6: Communication lines

Note: If required during the PROJECT, direct communication lines can be established between the Experts and site study Contractors upon discretion of the RVO project manager(s).

2. Roles and Responsibilities

This section describes the roles and responsibilities for the expert support during the PROJECT.

The following hour estimation is made

- Base scope 13.500 hours for SoW items 1, 2 and 3.
- **Optional scope** 1000 hours SoW item 4.

Table 1: Scope of Work, hours for main and optional scope per expert(s).

Role	Hours main scope (13.500 hours)	Hours optional scope (1.000 hours)
Lead expert	2.500	1000
Geophysical Specialist Expert	1.500	
Geotechnical Specialist Expert	3.500	
Ground model Specialist Expert	3.500	
Morphological Specialist Expert	750	
PM support	1.750	-
Total amount	14.500	

The split between expertise and hour estimation under work package 1,2, and 3 is presented below (total of 13.500 hours), the optimal scope of 1000 hours under work package 4 can be assigned to a single or multiple experts roles.

Lead Expert (2500 hours in main scope)

This expert must have Geophysical, Geotechnical and Morphological knowledge. The lead expert will be the interface during progress meetings with RVO and the site study Contractors. The lead expert shall be capable to participate during the calls as representative of all specialist experts. The lead expert should be able to answer questions related to the studies or be able to capture the essence and transfer them to the experts to arrange follow up.

To improve interfaces and consistency it is important that a single lead expert will supervise and participate in all studies together with the RVO project managers.

If required a deputy (temporary) lead expert can be assigned to support the lead expert during absence or when workload requires.

Required know-how: the lead expert will need to have general knowledge regarding geotechnics, geophysics, morphology and ground models of the North Sea. For detailed in-depth knowledge the lead expert can consult the specialist experts in the team, but the lead expert will need the following required know-how:

- a. Project management and interface skills;
- b. The general site conditions, especially the shallow geology till 100 metres BSF, in the North Sea;
- c. Interpretation of geophysical results for post processing into the ground model, morphological study, archaeological study and geotechnical site characterisation;
- d. Interpretation of geotechnical results for wind turbine foundation and infield cable design purposes;
- e. State-of-the-art methods and equipment for the geophysical surveys (e.g. hydrographical and geophysical methods);
- f. State-of-the-art lab tests (standard and cyclic; MIC).

Activities and responsibilities (but not limited to)

- Participate in meetings related to the geophysical study, geotechnical study, morphological study, ground model and vessel calls during project execution;
- During the meetings it is expected that the lead expert can represent the expert group and participate in discussions;
- Manage interfaces between studies, experts and RVO;
- The lead expert will have to share information between the teams so that all experts have all the required information. When questions arise the lead expert will arrange follow up with the correct party;
- Quality assurance and quality control;
- Participate in webinars;
- Drafting the SoW for contractors to execute the studies;
- Assessing the contractor's bids.

Expert support contractors are requested to offer **one** senior expert for the lead expert position. Additional experts offered will be assessed as backup experts.

Geophysical Specialist Expert(s) (1500 hours in main scope)

These expert(s) must be geophysicist(s) with experience in geophysical soil characterisation and operations for wind farm / foundation / infield cable design for projects in the North Sea. Experience in other geographical areas with similar conditions to the North Sea is also considered relevant.

Required know-how (the experts together must cover the required know-how)

- a. The general site conditions, especially the shallow geology till 100 metres BSF, in the North Sea;
- b. Relevant state of the art research, data acquisition and analysis methodologies of geophysical campaigns for wind farm / foundation / infield cable design projects;
- c. State of the art equipment (vessels, hydrographical and geophysical (in particular seismic survey equipment)).

Activities (but not limited to):

- Preparation of the procurement documents for the geophysical survey tender;
- Review and evaluate proposals of the geophysical survey tender;
- Support in managing the geophysical survey: check the planning, assist in document control (including check on required actions from progress meetings);
- Onshore QC of data samples during project execution in co-operation with the on-board Client Representative;
- Review of deliverables (for example reports, hydrographical data, geophysical data);
- Support in transferring results of the geophysical survey to the geotechnical survey and the ground model;
- Support in disclosing deliverables (check of content offshorewind.rvo.nl and HDD (Hard Disk Drive), webinars, PSD (Project Site Descriptions), etc.).

Expert contractors are requested to offer **two** available experts. One of them should be a senior expert and one should be a medior or junior expert. Additional experts offered will be assessed as backup experts.

Geotechnical Specialist Expert(s) (3500 hours in main scope)

These experts must have geotechnical engineering skills with experience in operations for wind farm / foundation / infield cable design for projects in the North Sea. Experience in other geographical areas with similar conditions to the North Sea is also considered relevant.

Required know-how (the experts together must cover the required know-how)

- a. The general site conditions, especially the shallow geology till 100 metres BSF, in the North Sea;
- b. State-of-the-art methods and equipment for the in situ tests (e.g. PCPTs, SCPTs, sampling with bore holes and vibro cores, seismic tests, MIC testing);
- c. State-of-the-art lab tests (standard and cyclic, MIC);
- d. Interpretation of results for wind turbine foundation and infield cable design purposes;
- e. State-of-the-art design methods for wind turbine foundations;
- f. Reviewing ground models.

Activities (but not limited to):

- Drafting Scope of Work for the geotechnical campaign tender;
- Review and evaluate proposals (e.g. project documentation, suitability vessels and equipment, equipment set up, project execution plan, line plan), in some cases providing a second opinion;
- Contribute to defining a CPT and borehole plan;
- Contribute in defining a lab testing programme (standard and cyclic);
- Onshore QC of results during project execution in co-operation with the on-board Client REP;
- Review of deliverables (for example reports and geotechnical data);
- Support in disclosing deliverables (check of content offshorewind.rvo.nl and HDD, webinars, PSD, etc.).

Expert contractors are requested to offer **two** available experts. One of them should be a senior expert and one should be a medior or junior expert. Additional experts offered will be assessed as backup experts.

Ground model Specialist Expert(s) (3500 hours in main scope)

These experts must have ground model engineering skills with experience for wind farm / foundation / infield cable design for projects in the North Sea. Experience in other geographical areas with similar conditions to the North Sea is also considered relevant.

Required knowhow

- a. The general site conditions, especially the shallow geology till 100 metres BSF, in the North Sea;
- b. Interpretation of geotechnical and geophysical results for wind turbine foundation and infield cable design purposes;
- c. State-of-the-art design methods for wind turbine foundations;
- d. Compiling or reviewing ground models;
- e. Working with Kingdom© software or other ground model software (software must be available, will not be supplied by CLIENT).

Activities (but not limited to):

- Drafting procurement documents for the ground model tender;
- Review and evaluate proposals (e.g. project documentation, suitability vessels and equipment, equipment set up, project execution plan, line plan), in some cases providing a second opinion;
- Contribute to defining a CPT and borehole plan;

- Contribute in defining a lab testing programme (standard and cyclic);
- Review of deliverables (for example reports and geoscience data);
- Support in disclosing deliverables (check of content offshorewind.rvo.nl and HDD, webinars, PSD, etc.);

Expert contractors are requested to offer **two** available experts. One of them should be a senior expert and one should be a medior or junior expert. Additional experts offered will be assessed as backup experts.

Morphological Specialist Expert(s) (750 hours in main scope)

These experts must be morphodynamic experts, preferably with experience with seabed conditions and morphodynamics for wind farm / foundation / infield cable design for projects in the (Dutch sector of the) North Sea.

Required know-how:

- a. Experience with assessment of morphodynamical desk studies ((morpho)dynamics, physics) for offshore wind farms or cable lay-out;
- b. The general seabed conditions in the (Dutch sector of the) North Sea;
- c. Experienced in seabed morphodynamics, sand waves and bedform migration, morphodynamical analysis.

Activities (but not limited to):

- Drafting procurement documents for the morphodynamical assessment tender;
- Review and evaluate proposals of the morphodynamical assessment tender;
- Review of the (draft) reports of the morphodynamical assessment;
- Review of the data;
- Reporting and document control, e.g. during review of deliverables;
- Participate in expert meetings;
- Disclosure of information to the market (publication at offshorewind.rvo.nl, contribution to the PSD, market questions, webinars, etc.)

Expert contractors are requested to offer **two** available experts. One of the experts should be a senior expert and one should be a medior or junior expert. Additional experts offered will be assessed as backup experts.

PM support (1750 h in main scope)

The PM expert support will work alongside the RVO project managers of the different site studies for site characterisation. The PM expert will support in managing interfaces.

Required know-how:

- a. Procurement and (contract) management of geophysical and / or geotechnical surveys;
- b. General understanding of geophysical and geotechnical surveys;

Activities (but not limited to):

- Interface management;
- Prepare Minutes of Meeting;
- Manage document review procedures;
- Support contract management.

Expert support contractors are requested to offer one available person for each requested position. Additional experts offered will be assessed as backup experts.

Table 2: Required experts per position for soil Scope of Work.

Role	Senior expert	Medior/junior expert
Lead expert	1	-
Geophysical campaign	1	1
Geotechnical campaign	1	1
Ground Model	1	1
Morphological study	1	1
PM support*	1	-

*These persons will not be assessed

It should be clear in the project plan who the above-mentioned main persons per position are and which persons are offered as backup per position.

It is envisaged that no more than 3 persons from the expert group will participate in the weekly meetings with the site study Contractors in order to make sure the meetings stay effective. Other experts can be consulted outside of these meetings when necessary. The participation of the specialist experts in meetings is to be agreed at the start of the project. In this way the interfaces can be kept to a minimum and no information is lost throughout studies and within the core team.

Outside of the experts as requested in table 2 the Tenderer is expected to have sufficient backup available in the event one of the experts become unavailable. Additional it might occur that multiple packages will run simultaneously (e.g. Site characterisation of VS1 and VSDS). In the event that multiple campaigns run simultaneously a flexible pool of backup experts is required to be able to assist if workload requires.

3. Schedule of Key Dates

At this moment the Contracting Authority anticipates that the geophysical and geotechnical surveys will be executed covering a Wind Farm Site(s) suitable for 4GW. Best estimation for the planning of the main scope and the VSDS are presented below.

Planning Desk Studies (VS 1, 2 and 5-East) :

Tender Geological desk studies	Q2 2022
Completion Geological desk studies	Q4 2022

Planning Site characterisation 4 GW scope (Expectation within VS1):

Geophysical campaign	
Tender	Q3-Q4 2022
Offshore Campaign	Q1-Q2 2023
Reporting	Q2-Q4 2023

Geotechnical campaign	
Tender	Q2-Q3 2023
Offshore Campaign	Q1-Q2 2024 Q2-Q3 2024
- CPT & VC campaign - BH campaign	
Lab program & Reporting	Q3 2024 - Q2 2025

Ground model	
Tender	Q1 2023

Ground Modelling	Q4 2023 -Q4 - 2025
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Morphological assessment	
Tender	Q4 2023
Reporting	Q1-Q3 2024

Planning Site characterisation Demonstration site

The planning for the VSDS is not yet known. Based on the Permit Tender of the VSDS the content of the site characterisation will be adjusted.

Pending on the schedule of the VSDS it might be possible that the field surveys will be included in the survey scope of the other areas. But the field works of the VSDS can also be a stand-alone campaign.

Planning below is the best estimation based on the available information.

Geophysical campaign	Tender 2022 Execution 2023
Geotechnical campaign	Tender 2023 Execution 2023 or 2024
Ground modelling	Tender 2023 Execution 2023 - 2025
Morphological assessment	Tender 2023 Execution 2024