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Doordewind Investigation Area – Integrated Groundmodel

Annex 5

Starting Points and Assumptions

Colophon

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Author	P. Lebbink
Reviewed	H. Swane
Approved	M. Brijder

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1 Introduction

This document provides the starting points and assumptions for all Wind Farm Zones.

The starting points and assumptions are to be used by contractors when executing investigations, studies or likewise, for the development of any Dutch offshore Wind Farm Zone and commissioned by one of the following organizations:

- The Ministry of Economic Affairs and Climate Policy
- Netherlands Enterprise Agency (RVO)

This document is part of the QA/QC process for these studies.

Please note:

- This is a living document; before use check if you have the latest version available (to be confirmed by the Contracting Authority)

If you have any queries please contact the Contracting Authority.

2 General introduction to the offshore wind energy in the Netherlands

2.1 Existing offshore wind farms

The Netherlands' existing, operational offshore wind farms have a combined capacity of approximately 4.7 GW.

Table 1 Wind Farms in the Dutch North Sea (operational or under construction)

Windfarm	Sites	Distance off the coast	Year of commissioning	Turbines	Winner concession tender
Offshore Wind Farm Egmond aan Zee (OWEZ)		10-18 km	2008	36 Vestas 3 MW	Noordzeewind (NUON/ Vattenfall, Shell)
Prinses Amaliawindpark		23 km (12 NM)	2009	60 Vestas 2 MW	Eneco
Luchterduinen		23 km (12 NM)	2015	43 Vestas 3 MW	Eneco, Mitsubishi
Gemini		85 km	2017	150 Siemens 4 MW	Northland Power, Siemens, Van Oord, HVC
Borssele	I - II	22 km	2020	94 Siemens 8 MW	Ørsted
	III - IV		2020	77 Vestas 9,5 MW	Blauwwind (Partners Group, Shell, Diamond Generation, Eneco, Van Oord)
	V		2021	2 Vestas 9,5 MW	Two Towers (Van Oord, Investri Offshore and Green Giraffe)
Hollandse Kust (zuid)	I - IV	18 km	2023	139 Siemens 11 MW	Chinook (Vattenfall)
Hollandse Kust (noord)	V	18,5 km	2023	69 Siemens 11 MW	Crosswind (Shell, Eneco)
Hollandse Kust (west)	VI	53 km	In preparation	52 × Vestas 15MW	Ecowende (Shell, Eneco)
	VII		In preparation		Oranje Wind Power II (RWE)

2.2 The roadmap 2030 & 2030+ towards 21 GW offshore wind power

The Dutch government has created the offshore wind roadmaps 2030+ to set out a schedule of tenders for wind farm permits (see Figure 1). In the beginning of 2022 the Dutch Government announced in the roadmap 2030+ three new Wind Farm Zones called Lagelander, Nederwiek (Nederwiek zuid site I and Nederwiek noord sites II and III) and Doordewind. The development of the southern part (HKWWFS VIII) of the Hollandse Kust (west) Wind Farm Zone and the IJmuiden Ver Wind Farm Site Gamma in the IJmuiden Ver Wind Farm Zone were also confirmed. The total capacity of offshore wind energy around 2030 will then be 21 GW and around 90 TWh of power production. This equals around 75% of the current Dutch electricity consumption.

The wind farms will be built in designated Wind Farm Zones. Wind farms outside these Wind Farm Zones are prohibited. Within the designated Wind Farm Zones, the government defines the specific sites where wind farms can be constructed using a so-called Wind Farm Site Decision ('Kavelbesluit').

This Wind Farm Site Decision contains all conditions for building and operating a wind farm on that specific site.

Developers can apply in tenders for the permits to build and operate a wind farm according to a Wind Farm Site Decision. Winners of these permit tenders will be granted a permit and a grid connection to the main land.

The Dutch Government provides comprehensive site data and Dutch transmission system operator TenneT is responsible for grid connection. RVO is responsible for the site data, which can be used for the preparation of bids for these tenders.

Table 2 Wind Farm Zones in the Dutch North Sea

Wind Farm Zones in the Dutch North Sea				
Wind Farm Zone	**Wind Farm Site**	**Tender**	**Capacity**	**Operator**
Borssele	I and II	2015	752 MW	Ørsted
	III and IV	2016	731 MW	Blauwwind II
	V	2016	19 MW	Two Towers
Hollandse Kust (zuid)	I and II	2017	740 MW	Chinook
	III and IV	2018	760 MW	Vattenfall
Hollandse Kust (noord)	V	2019	759 MW	Crosswind
Hollandse Kust (west)	VI	2022	≥700 MW	Ecowende
	VII	2022	≥700MW	Oranje Wind Power II
IJmuiden Ver	Alpha	Q1 2024	≥2 GW	t.b.d.
	Beta	Q1 2024	≥2 GW	t.b.d.
	Gamma	Q2 2025	≥2 GW	t.b.d.
Nederwiek	I	Q2 2025	≥2 GW	t.b.d.
	II	2026	≥2 GW	t.b.d.
	III	2026	≥2 GW	t.b.d.
Hollandse Kust (west)	VIII	2026/2027	≥700 MW	t.b.d.
Ten noorden van de Waddeneilanden	I	2026/2027	≥700 MW	t.b.d.
Doordewind	I	2027	≥2 GW	t.b.d.
	II	2027	≥2 GW	t.b.d.

An overview of the Roadmap for 2030+ is provided in Figure 1.

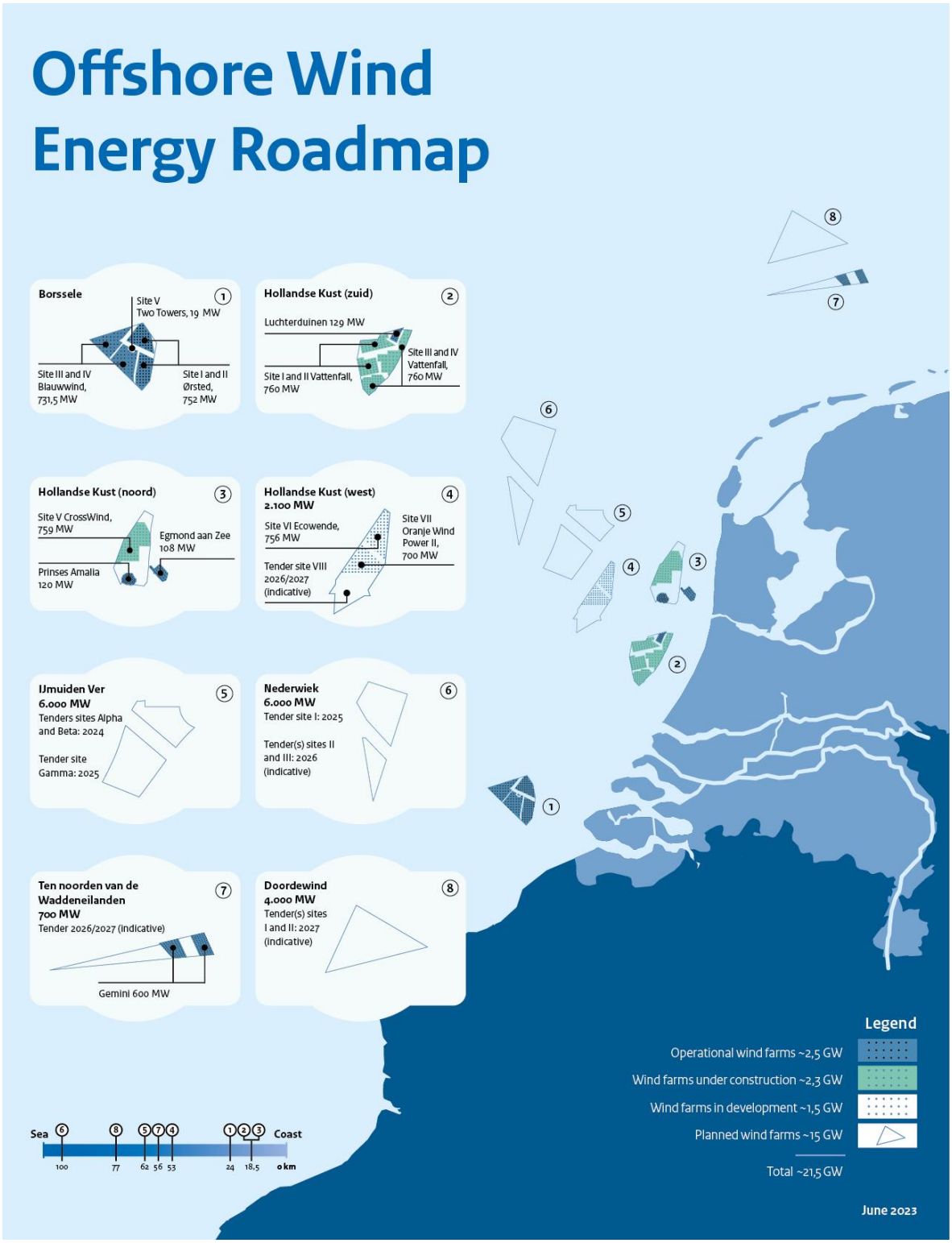


Figure 1 Dutch Offshore Wind Farm Zones overview for road map 2030+

3 General introduction Doordewind Wind Farm Zone

3.1 Layout & coordinates

The Doordewind Wind Farm Zone (DDW WFZ) is located approximately 77 kilometers north off the Dutch Wadden Isles. General characteristics of the DDW WFZ Table 3. Table 4 shows the coordinates of the Doordewind Wind Farm Zone.

The DDW WFZ is planned to contain a total capacity of 4 GW divided over 2 sites of 2 GW each. The wind farm permit tender is currently scheduled for 2027.

Table 3 Characteristics of the Doordewind Wind Farm Zone

Characteristics	
Water depth	Approximately 35.4m – 43.6m LAT
Distance from shore	Approximately 77 km
Total Wind Farm Zone area	Approximately 580 km^2

Table 4 Coordinates of the Doordewind Wind Farm Zone

Doordewind Wind Farm Zone coordinates		
Point No.	**Easting**	**Northing**
WFZ_01	655159.0	6036270.0
WFZ_02	663962.0	6030204.0
WFZ_03	648113.0	6006322.0
WFZ_04	651378.0	6006915.0
WFZ_05	688081.0	6013583.0
WFZ_06	692054.0	6010845.0
WFZ_07	649883.0	6002686.0
Coordinate system: ETRS_1989_UTM_Zone_31N		
WKID: 25831 Authority: EPSG		

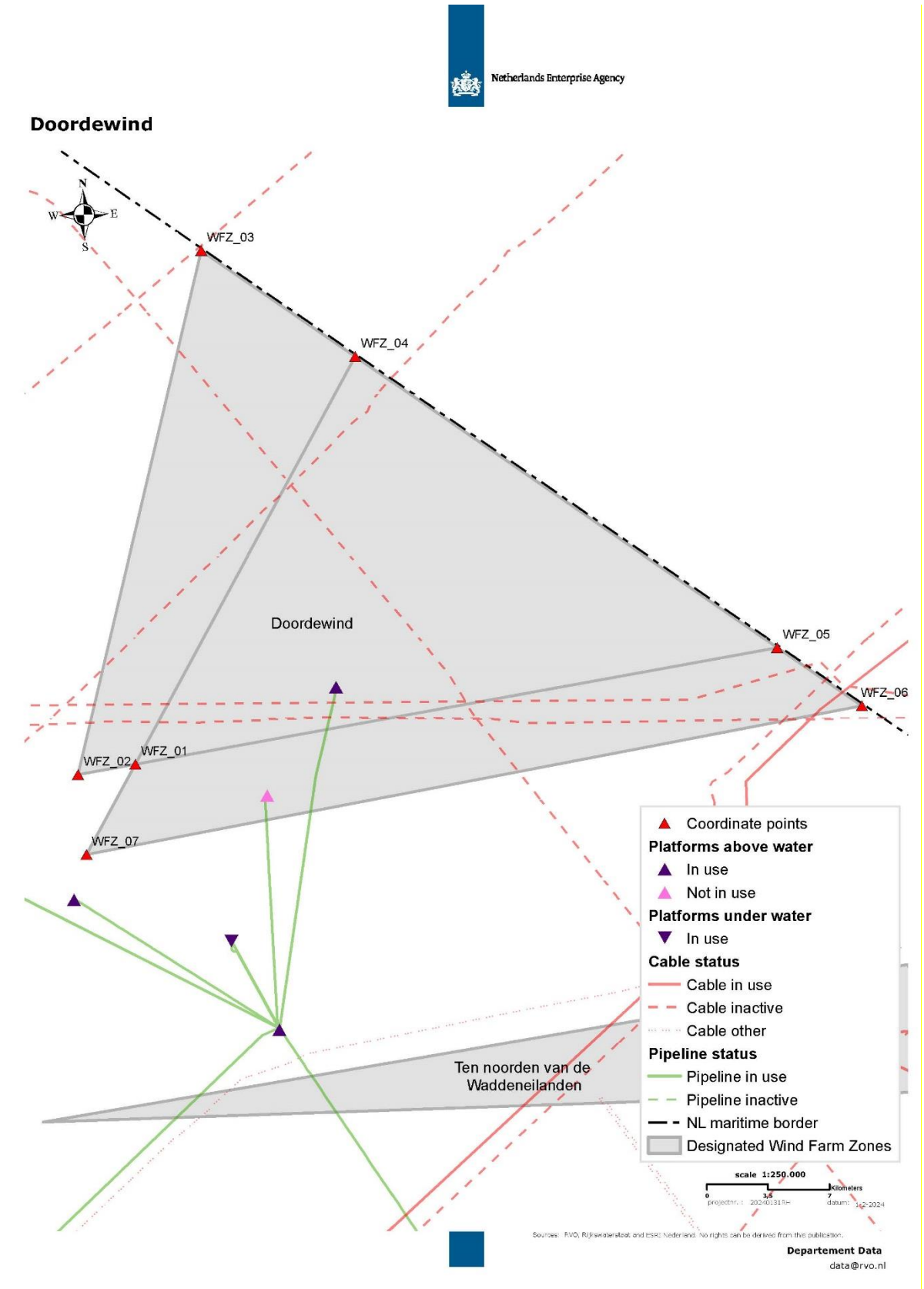


Figure 2 Map of the Doordewind Wind Farm Zone

3.2 Cables and pipelines within the Wind Farm Zone

Several operational and abandoned cables and pipelines cross the Wind Farm Zone, as shown in Table 5 and Figure 2.

Table 5 Characteristics of cables in the Doordewind Wind Farm Zone

Cables and pipelines					
Name	Operator	Routing	Diameter [in]	Type	Status
PL0195_PR	Neptune Energy B.V.	G14-B to G17d-AP	14	Pipe	Active
PL0214_PR	Neptune Energy B.V.	G14-B to G17d-AP	12	Pipe	Abandoned
PL0171_HS	Neptune Energy B.V.	G14-A to G17d-AP	2	Pipe	Active
PL0171_PR	Neptune Energy B.V.	G14-A to G17d-AP	12	Pipe	Active
UK – Germany 4	-	Winterton (GB) to Spiekeroog (D)	n/a	Cable	Abandoned
UK – Germany 6	British Telecom	Scarborough (GB) to Norddeich (D)	n/a	Cable	Abandoned
UK – DK 3	-	Winterton (GB) to Romo (DK)	n/a	Cable	Abandoned
Tycom-cable	Eu Networks B.V.	Eemshaven (NL) to England	n/a	Cable	Abandoned
ODIN 1	TDC A/S	Egmond (NL) to Fano/Maade (DK)	n/a	Cable	Abandoned
Atlantic Crossing 1 Segment B2	Global Crossing	Castricum (NL) to Sylt (DK)	n/a	Cable	Active

3.3 Units

SI units (ISO/IEC 8000) are applicable for any activities carried out at the Doordewind windfarm Zone.

3.4 Vertical and horizontal datum

The chart datum is Lowest Astronomical Tide (LAT).

All positioning data shall be collected in the European Terrestrial Reference System 1989 (ETRS89) and projected using ETRS89 Transverse Mercator Coordinate Reference System (UTM Zone 31N). The reference for this system is EPSG Projection code 25831 - ETRS89 / UTM zone 31N.

4 Quality requirements

This chapter describes quality requirements including data model and GIS data deliveries. During the process and delivery of the data you can always contact RVO for further information or explanation.

As RVO will make this data publicly available, the metadata needs to be in line with the General Data Protection Regulation (GDPR) (in Dutch: AVG) requirements.

4.1 Spatial data

All created data in the study must be delivered by the supplier in GIS format. The supplier must comply with the data requirements set out by RVO and provide an inventory list of the deliverables supplied if the data is delivered in the form of a hard drive or webservice. The inventory should include the project name; the name of the contractor's organization and the person within the organization responsible for the data delivery; the survey date (only relevant for offshore campaigns); and overview of the folder structure and a description of the data's contents.

- All the data is required to be delivered in the geodetic system European Terrestrial Reference System 1989 (ETRS89) ETRS89 UTM ZONE 31 N - EPSG code: 25831 http://www.epsg-registry.org/.
- The data should be delivered in one or more of the following formats: Value / Parameter Encoded Raster, TIFF and ESRI Shapefile (*.shp), ESRI File Geodatabase, or Geopackage (*.gpkg) . Should another format be used, this can only be delivered after consulting with RVO.
- Data is preferably collected in a file geodatabase created in ArcGIS Pro or as a Geopackage. In order to prevent backwards compatibility problems, the file geodatabase may not be made in a higher version of ArcGIS Pro than that used by RVO. At time of writing this is ArcGIS Pro 3.1.2. Please confirm the version of ArcGIS Pro currently in use by WOZ at RVO at the start of the project.
- Both input data and interpreted data along with any relevant GIS packages (*.ppkx/*.mpkx/*.gpkg) are required and should also include any associated reports and charts.
- All GIS data shall be provided with Metadata describing specific details and origin regarding the spatial data. The requirements regarding the metadata are included in Appendix A.

4.2 Taxonomy

All contractors must use the taxonomy as presented in the taxonomy list, which is available online at https://offshorewind.rvo.nl/files/view/dff880d4-9494-4e6d-b398-8fd1f097957e/162642502520210714_taxonomy%20list%20offshore%20wind%20energy_dutch-english.xlsx

4.3 GIS Metadata requirements

The requirements for GIS metadata which all Contractors shall comply with is shown in Appendix A of this document.

4.4 Mandatory data delivery BRO

RVO as a government agency is obligated by law to provide subsurface data to the central 'subsurface reqister' in the Netherlands. The specifics on the mandatory delivery to the "Basisregistratie Ondergrond (BRO)" is provided in the Scope of Work document whenever applicable.

4.5 Document control requirements

The naming of the documents shall be standardized in order to facilitate the document control during the whole project. The following naming code is required for all documents produced within the project:

DDW_Date_Organization_Name document_Author_Version_Status

- DDW: Doordewind
- Date: yyyymmdd, e.g. 20250713.
- Study: GM
- Organization: Name of the organization e.g.
  - "RVO" for all internal and general documents produced by the Netherlands Enterprise Agency (RVO).
  - Consultant or Contractor name (shortened).
- Name document: Make sure the name clearly explains the content, include here the original name if from external party.
- Author: Abbreviation of the author if an internal document. Author shall be removed for final documents.
- Version: Revision number or date, respectively V01 till V0x_D or 20200101_F.
- Status: (D) for draft documents, (F) for signed and approved documents.

4.6 Standards, formats, templates

All reports will be written in English and include an English summary.

Contractors provide for each completed study a publishable summary for the Project and Site description. Maximum 2 A4 including some The creative commons license 4.0 apply to this material. (including a Creative Commons logo and hyperlink to the relevant Creative Commons website page: https://creativecommons.org/licenses/by/4.0/)
high-resolution pictures or graphs.

Contractors are generally requested to present the results of the study during a webinar in due time for the permit tender.

Reports and deliverables will be delivered by contractors in pdf and original, regular, formats (docx; xlsx; pptx; etc).
Final reports will have a cover according to the corporate identity of the Netherlands Enterprise Agency, with the following text:

- Front:

Offshore wind energy Netherlands
Site characterisation data Doordewind Investigation Area
Name document

- Back:

A colophon with the following content:

- The (investigation) (report) was carried out by <<name contractor>>, commissioned by RVO, an agency of the Ministry of Economic Affairs and Climate Policy. Whilst a great deal of care has been taken in compiling the contents of this document and the mentioned investigations, Netherlands Enterprise Agency (RVO) cannot be held liable for any damages resulting from any inaccuracies and/or outdated information.

- Contact

Netherlands Enterprise Agency (RVO)
Graadt van Roggenweg 200 | 3531 AH | Utrecht | The Netherlands
P.O. box 8242 | 3503 RE | Utrecht | The Netherlands
www.rvo.nl / http://english.rvo.nl

- Netherlands Enterprise Agency (RVO) | Date of publication

4.7 Other data

In the case of collected data: primary data must be delivered in regular formats.

4.8 Deliverables (results / maps)

All maps (in GIS and PDF) will, unless agreed otherwise, not show the investigation areas nor the specific Wind Farm Sites. The maps will only show the outer boundary of the Wind Farm Zone Boundary of the Doordewind (DDW) Wind Farm Zone.

4.9 Storage of data

The Netherlands Enterprise Agency will store all reports and other relevant documents for at least five years electronically.

5 Communication

5.1 Confidentiality

All information provided to contractors/ suppliers by the Ministry of Economic Affairs and Climate Policy and/or the Netherlands Enterprise Agency must be regarded confidential.

All deliverables produced by contractors/suppliers remain confidential until a deliverable has been made public by the Ministry of Economic Affairs and Climate Policy and/or the Netherlands Enterprise Agency.

5.2 Accessibility public information

- Site investigations: www.offshorewind.rvo.nl
- Wind farm Site Decisions and EIA: https://www.rvo.nl/subsidies-regelingen/bureau-energieprojecten/lopende-projecten
- General Wind at Sea information: https://www.rvo.nl/onderwerpen/windenergie-op-zee
- General Wind at Sea information: https://windopzee.nl/

5.3 Authorities

Wind Farm Site Decision ('Kavelbesluit'):
Ministry of Economic Affairs and Climate Policy
Rob Heemskerk
E r.p.c.heemskerk@minezk.nl
T +31 (0)6-11037529

Rijkswaterstaat
Raoul Syrier
E raoul.syrier@rws.nl
T +31 (0)6 11072554

Site characterisation data:
Netherlands Enterprise Agency
Matté Brijder
E matte.brijder@rvo.nl
T + 31 (0)6 27878952

Grid connection ('Transmissiesysteem op zee'):
TenneT TSO BV
Marten den Boer
E marten.den.boer@tennet.eu
T +31 (0)6 18546788

5.4 Media

All media contact is coordinated by the Ministry of Economic Affairs and Climate Policy. If a supplier is approached by press representatives than he/she should refer to the spokesman of the Ministry only.

Ministry of Economic Affairs and Climate Policy

Caspar Itz

c.itz@minez.nl
+ 31 610551061

5.5 Email

All emails related to the site investigations must be sent with the project mailbox DDW@RVO.nl in CC.

The subject of an email related to the site investigation needs to start with the site abbreviation (DDW), followed by the date (20240315), followed by the abbreviation of the type of site study (GM). E.g.: DDW_20240315_GM for the Ground Model for the Doordewind site investigation.

5.6 Emergency Response

In case of an emergency, suppliers are obliged to inform the Netherlands Enterprise Agency immediately.

6 Appendix A - GIS Metadata requirements

The goal of these metadata requirements is to make sure the future users of this data can use this data in the appropriate way and understand the data's usage constraints from the metadata.

Format
All data collected by third parties, either in the field or as part of a desktop study, must be provided with metadata. Please refer to chapter 4.1 for details regarding appropriate software and versions. When the data is supplied in either a file geodatabase or geopackage, metadata is stored within the data in the database. In case of formats where metadata cannot be stored within the database for example shapefile, GML or grid, metadata must be provided in pure XML-format as separate files.

Metadata must be compliant with the Dutch standard for metadata ISO 19115 version 2.1.0 (or the most recent version available when the data is being created). More information on the standard can be found here:
https://www.geonovum.nl/geo-standaarden/metadata/nederlands-metadataprofiel-op-iso-19115-geografie

Metadata in xml format can be validated using a validation tool to be found on the website of the Dutch national geo-standards organisation (Geonovum).
https://validatie.geostandaarden.nl/etf-webapp/testruns/create-direct?testProjectId=3dd218a5-2ba3-3f1c-98fb-10e923839a3c

Manufacture options

Creating metadata should preferably be done when the data is acquired or created and checked and finalised before delivering the data. If necessary, a valid example can be provided.
More information can also be found at:
Metadata-ISO19115/Voorbeeld_Metadata_Dataset_2022.xml at master · Geonovum/Metadata-ISO19115 · GitHub
This file has also been attached as an appendix.

An option:
Organisations that use Esri software can use the GeoSticker application to create and edit metadata: http://www.esri.nl/geosticker. When using geosticker, please make sure that you set the template to the Dutch national standard and check within the Geosticker program that the metadata is valid.

Organisations supplying data in the form of geopackages should preferably fill in the relevant metadata tables within the geopackage; gpkg_metadata and gpkg_metadata. For more information refer to the OGC documentation regarding metadata OGC® GeoPackage Encoding Standard. If these tables are not filled in, then a separate xml file should be supplied.

A General Overview Metadata Elements with some Explanation:

Contact Information

1. **File Identifier**

fileIdentifier

2. **Language**

Language

3. **Character Set**

characterSet

4. **Parent Identifier**

parentIdentifier

5. **Hierarchy Level**

hierarchyLevel

HierarchyLevelName

6. **Contact**

As this information will be made publicly available, personal information should be avoided and generic contact details should be provided. If personal email addresses are provided, that person should have given consent to use their e-mail address.

At least one contact information of client and/or creator and/or point of contact is mandatory and it should include Name organisation, role organisation (owner, processor, point of contact, administrator, provider, creator), and a generic email address of contact department.
If a website is available, name of contact and role of contact.

Due to the General Data Protection Regulation (GDPR), use of personal information in the data is no longer advisable. Use of a general email instead of a personal one and a function title instead of a person's name is preferable.

CI_Responsible Party: Individual Name: …
Organisation Name: …
Telephone: …
Address: …
Online Resource (website): …

Date

7. **DateStamp**

When was the metadata made?

8. **Metadata Standard Name**

metadataStandardName

9. Metadata Standard Version

metadataStandardVersion

10. Locale

Locale

11. Reference System Info

referenceSystemInfo

Identification (identificationInfo)

12. File title

Real name of the Title (abbreviations are acceptable)

13. Alternate Title:

No abbreviations, complete title of the dataset covering the content of the dataset.

14. date & dateType:

creation YYYY-MM-DD
publication YYYY-MM-DD (date of approval by RVO)
revision YYYY-MM-DD

15. Abstract

Short description of the content of the dataset.

16. Purpose of production:

Concise description of the original aim of the dataset

17. Status:

According to a standard list:
completed; historicalArchive; obsolete; onGoing; planned; required; underDevelopment.

18. ResourceMaintenance: Maintenance and update frequency:

N/A

19. ResourceMaintenance: Date of Next Update:

N/A

20. Graphic Overview

This can include a link to an example image online.

21. Keywords:

Keywords describing the dataset taken from the GEMET Thesaurus
https://www.eionet.europa.eu/gemet/en/themes/

22. Resource Constraints

a. useLimitation:

Applications for which the data set is not to be used. I.e., Not to be used for navigation. Not to be used on a scale larger then 1:50.000

b. accessConstraints:

None, data will be published in the public domain.

c. useConstraints:

The creative commons license 4.0 apply to this material. See hyperlink:
https://creativecommons.org/licenses/by/4.0/
This investigation was carried out by …, commissioned by RVO, an agency of the Ministry of Economic Affairs and Climate Policy. Whilst a great deal of care has been taken in compiling the contents of this investigation, RVO cannot be held liable for any damages resulting from any inaccuracies and/or outdated information.

d. otherConstraints:

Other restriction(s) if any.

23. Spatial Representation Type

https://standards.iso.org/iso/19139/resources/gmxCodelists.xml#MD_SpatialRepresentationTypeCode

eg vector, grid, textTable, tin, stereoModel

24. Spatial Resolution: Equivalent Scale (for vector data)

Denominator: Scale on which the dataset can be used

25. Spatial Resolution: MD_Resolution (grid data)

Distance: eg uom="meter">1.0 Note Only fill in the distance for grid data

26. Language

Language that the data is in eg Eng (English)

27. Topic Category:

Define the key topic(s) of the dataset eg geoscientificInformation, oceans,elevation
Nederlands metadata profiel op ISO 19115 voor geografie versie 2.1.0 (geostandaarden.nl)

28. Extent

Geographical bounding box in WGS84 with North and East in positive values eg 52.50. There is also a placeholder to fill in the SpatialTemporalExtent (beginPosition and endPosition) and the VerticalExtent (minimumValue and maximumValue)

ContentInfo

29. FeatureCatalogueDescription

Attribute information: Description of all attributes, including - if applicable – all possible values and its measurement.

Distribution Info

30. DistributorContact

The organisation responsible for the distribution of the dataset

31. ContactInfo

Includes organisational email woz@rvo and link to Offshorewind RVO

dataQualityInfo

32. Scope

https://standards.iso.org/iso/19139/resources/gmxCodelists.xml#MD_ScopeCode
eg dataset

33. Lineage: Statement

General description (statement of when, how and where the data was created / collected.

34. Lineage: ProcessStep

Processing of data (if applicable): If the data has been processed, then a description of each step is required i.e., transformation or generalisation.

35. Lineage: Source

Source datasets (if applicable): A description of used source datasets (if any). Is the dataset complete? If not, a description of the incompleteness is necessary.

7 Appendix B - mpk file of DDWWFZ

[provided separately]

8 Appendix C – sample metadata .xml

[provided separately]

9 Appendix D – Memo BRO data delivery Geotechnical works

[provided separately]

10 Appendix E – DDWWFZ Persistence tables

[provided separately]