

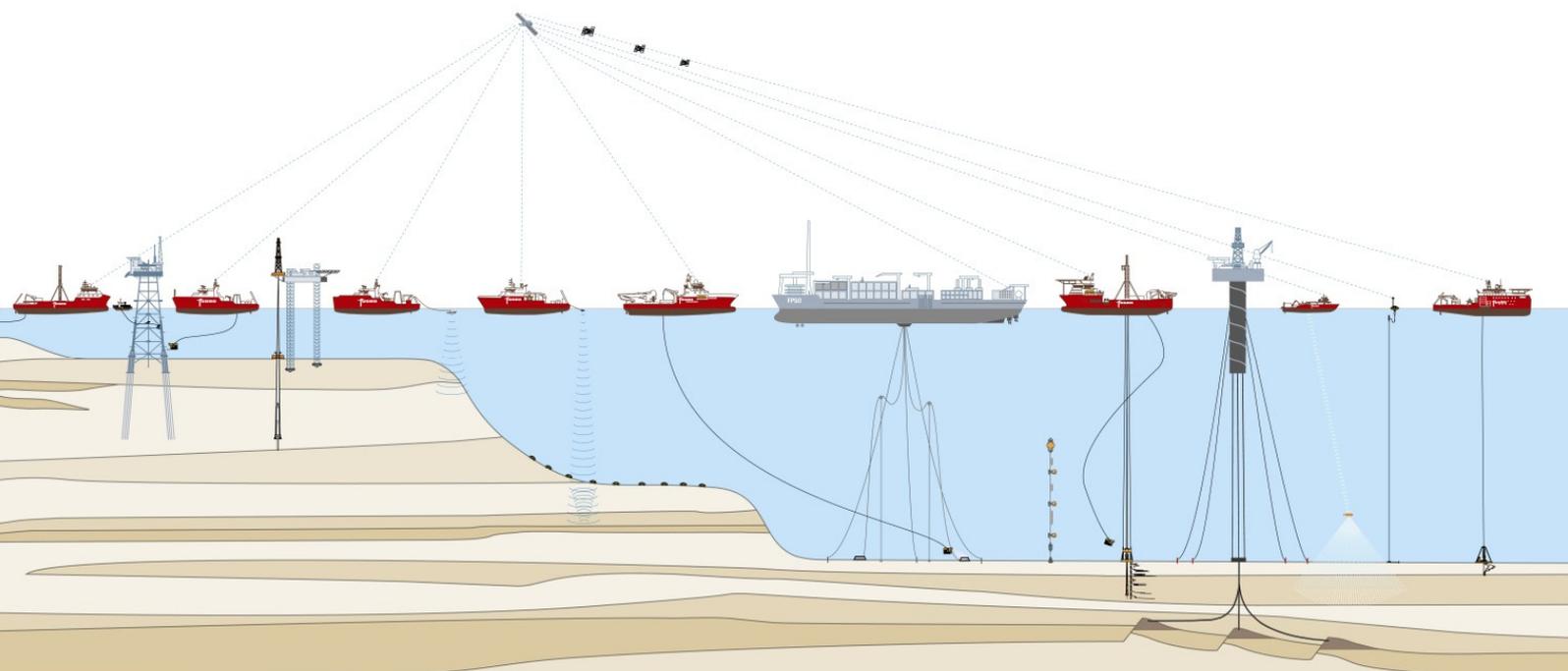
**TECHNICAL NOTE
SUPPORTING INFORMATION FOR GIS
DELIVERABLES
WIND FARM SITES III AND IV
BORSSELE WIND FARM ZONE
DUTCH SECTOR, NORTH SEA**

Client Reference WOZ1500010
Fugro Reference N6083/TN-GIS



Rijksdienst voor Ondernemend
Nederland

Rijksdienst voor Ondernemend Nederland
(RVO)



**TECHNICAL NOTE
SUPPORTING INFORMATION FOR
GIS DIGITAL DELIVERABLES
WIND FARM SITES III AND IV
BORSSELE WIND FARM ZONE
DUTCH SECTOR, NORTH SEA**

Client	Rijksdienst voor Ondernemend Nederland (RVO)
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Client Reference No.	WOZ1500010
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Date	22 March 2016

1. INTRODUCTION

This Technical Note provides background information in support of the Geographic Information System (GIS) deliverable which was prepared as part of the Geological Ground Model Reporting for the Borssele Wind Farm Sites III and IV (Fugro, 2015a and 2015b). Purpose of this technical note is to provide information on the used methodology for gridding and contouring of the depth to base and thickness of the identified units. It specifically aims to clarify minor differences in grid values and contour positions at the boundary between the Investigation Areas III and IV.

2. GRID AND CONTOUR GENERATION

The geophysical horizon interpretation is based on all multichannel seismic (MCS) lines, which cover both Investigation Area III and IV. The geophysical interpretation was done using IHS Kingdom[®] software (Kingdom) and good correlation occurs between both Investigation Areas (i.e. III and IV).

Following horizon interpretation, grids were created (in Kingdom) separately for Investigation Areas III and IV. These grids were confined by polygons that outline the Investigation Areas. The polygons were also used for the generation of the contours from both “Depth to Base”-grids and “Isopach”-grids. The resulting grids and contour-files were exported to ESRI ArcMap for preparation of report plates. Details on the gridding and contouring settings used are presented in Ground Model Reports (Fugro, 2015a and 2015b).

A consequence of the adopted methodology, i.e. preparing grids and contours for the individual investigation area separately instead of the combined investigation areas, is that data from the neighbouring Investigation Areas were not accounted for. This resulted in minor differences in contour positions and grid values at the interface between WFS III and WFS IV (Plates 1 and 2).

3. AREA OF REDUCED CONFIDENCE

An area with reduced confidence is defined to account for the noted differences in the areas where the grid values and/or contour positions are different (i.e. do not match) at the boundary between Investigation Areas. The confidence reduces towards the edge of the Investigation Area.

The area of reduced confidence is defined along the perimeter of the Investigation Area III and IV, extending approximately 100 m from the edge of the specific Investigation Area towards its centre (Plate 3). The GIS deliverables (i.e. file geodatabase) include two polygon feature classes representing the areas of reduced confidence.

The area of reduced confidence is not restricted to the boundary between Investigation Area III and IV, but also should be considered at the boundary between Investigation Area III and IV with WFS I and WFS II, and the area north-northwest and south of the Borssele Wind Farm Zone (i.e. no data acquired).

4. REFERENCES

Fugro (2015a), "Geological Ground Model, Wind Farm Site III, Borssele Wind Farm Zone, Dutch Sector North Sea", Fugro Report No. N6083/05, Issue 3, dated 22 December 2015.

Fugro (2015b), "Geological Ground Model, Wind Farm Site II, Borssele Wind Farm Zone, Dutch Sector North Sea", Fugro Report No. N6083/06, Issue 3, dated 22 December 2015.

5. USE OF THIS TECHNICAL NOTE

Fugro Engineers B.V. prepared this Technical Note according to a project specification determined by the Client.

Fugro understands that the presented information will be used for the purpose described above. That purpose was a significant factor in determining the scope and level of the services. If the purpose for which the presented information is used or the Client's proposed development or activity changes, this Technical Note may no longer be valid.

Document distribution is restricted to project participants approved by the Client.

This document is supplementary to and must be read in conjunction with Fugro (2015a and 2015b) listed in the section titled References of this Technical Note. The terms and conditions applicable to the referenced document also apply to this Technical Note.

This document has 3 pages and 3 plates, the definitive versions of which are held in Fugro's information system.

Document Check and Review: B. Klosowska – Geologist

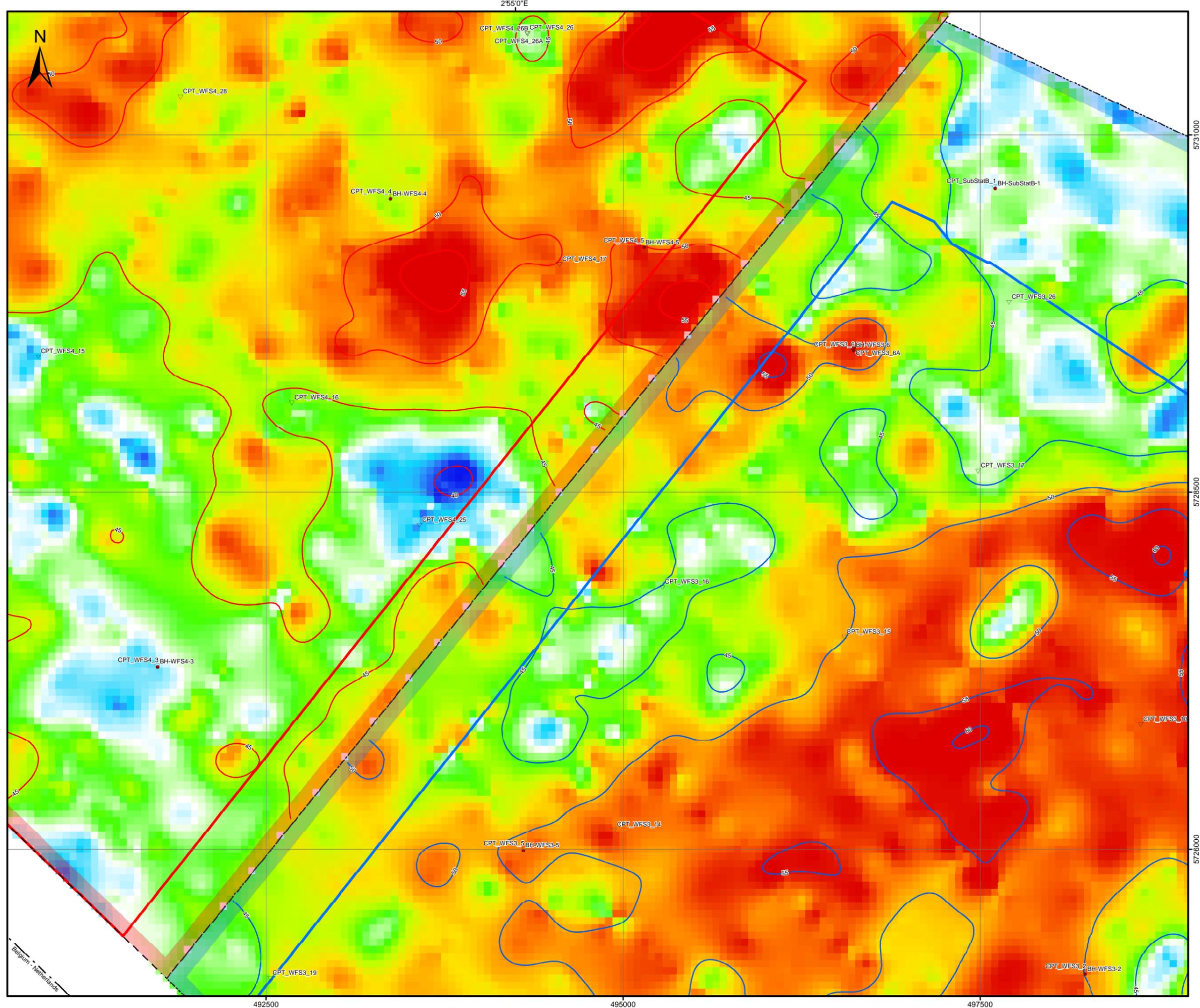
Document Approval: M. Klein – Principal Engineer

Project Lead: signed



for E. Schoute

Senior Project Engineer



LEGEND:

- Area of Reduced Confidence WFS III
- Area of Reduced Confidence WFS IV
- CPT location
- BH location
- Outline of WFS III
- Outline of WFS IV
- Investigation Area III
- Investigation Area IV
- Contour line of thickness WFS III [m]
- Contour line of thickness WFS IV [m]

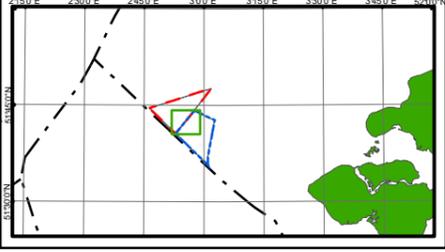
Depth to base [m below LAT]

NOTES:

- An area of reduced confidence is defined along the perimeter of the Investigation Area III and IV, extending approximately 100 m from the edge of the specific Investigation Area towards its centre.
- Grid displayed: Depth to Base Unit B
- Refer to Plates 3-18 of the Ground Model Reports (Fugro, 2015a and 2015b)

GEODETIC PARAMETERS:

DATUM	ETRS89
Ellipsoid	GRS80
Semi major axis	a = 6 378 137.000
Inverse flattening	1/f = 298.257222101
PROJECTION	UTM, Zone 31 North
Central Meridian (CM)	3°00' 00" E
Latitude of Origin	0°00' 00" N
False Easting	500 000 m
False Northing	000 000 m
Scale factor	0.9996
Units	metres/degrees



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Fugro
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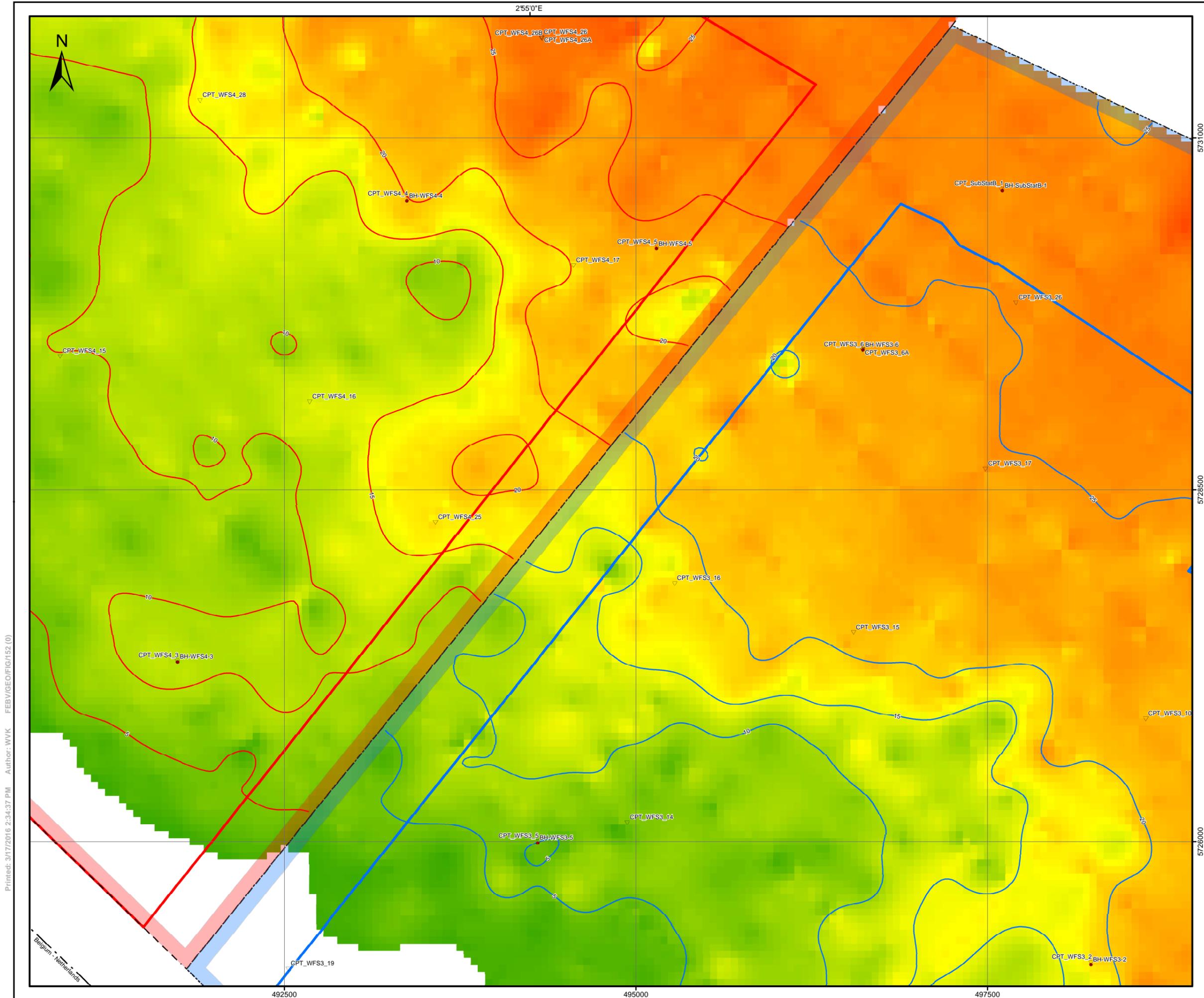
**COMPARISON GRID VALUES AND CONTOUR POSITIONS
 BOUNDARY INVESTIGATION AREA III AND IV**

BORSSELE WIND FARM ZONE, WFS III AND IV,
 DUTCH SECTOR, NORTH SEA

Scale 1:25,000
 at original A3 page size

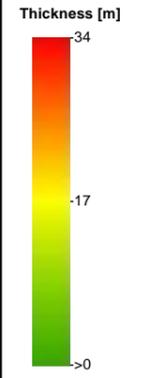
Fugro Report No. N6083/TN-GIS Issue 1 Plate 1

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LEGEND:

- Area of Reduced Confidence WFS III
- Area of Reduced Confidence WFS IV
- CPT location
- BH location
- Outline of WFS III
- Outline of WFS IV
- Investigation Area III
- Investigation Area IV
- Contour line of thickness WFS III [m]
- Contour line of thickness WFS IV [m]

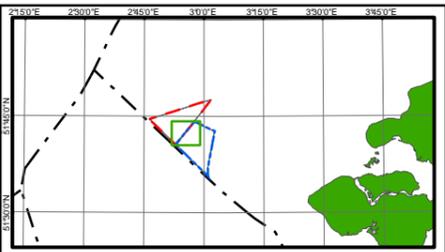


NOTES:

- An area of reduced confidence is defined along the perimeter of the Investigation Area III and IV, extending approximately 100 m from the edge of the specific Investigation Area towards its centre.
- Grid displayed: Depth to Thickness of Unit E5
- Refer to Plate 3-30 and Plate 3-34 of the Ground Model Reports (Fugro, 2015a and 2015b)

GEODETTIC PARAMETERS:

DATUM	ETRS89
Ellipsoid	GRS80
Semi major axis	a = 6 378 137.000
Inverse flattening	1/f = 298.257222101
PROJECTION	UTM, Zone 31 North
Central Meridian (CM)	3°00' 00" E
Latitude of Origin	0°00' 00" N
False Easting	500 000 m
False Northing	000 000 m
Scale factor	0.9996
Units	metres/degrees



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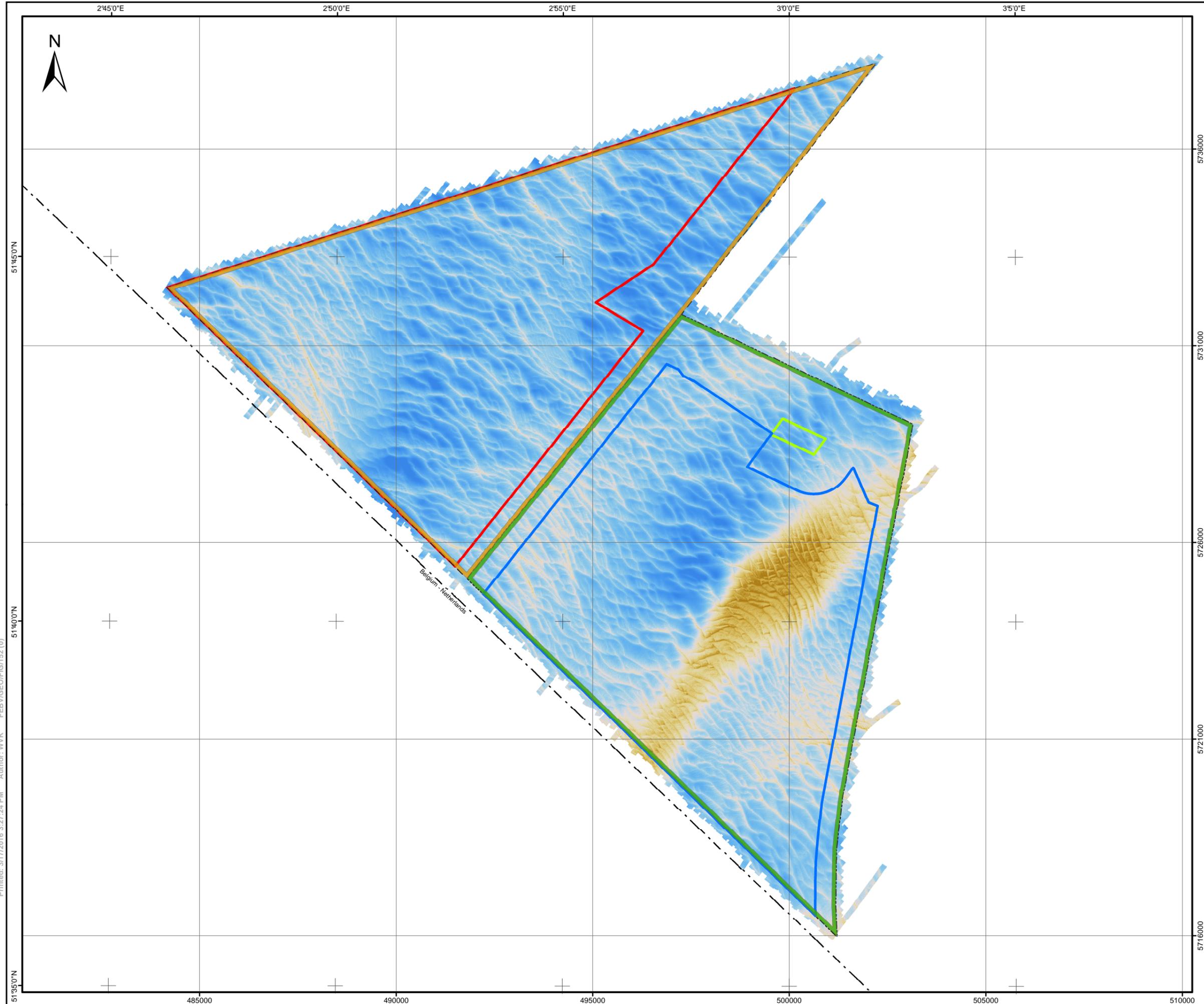
**COMPARISON GRID VALUES AND CONTOUR POSITIONS
 BOUNDARY INVESTIGATION AREA III AND IV**

**BORSSELE WIND FARM ZONE, WFS III AND IV,
 DUTCH SECTOR, NORTH SEA**

Scale 1:25,000
 at original A3 page size

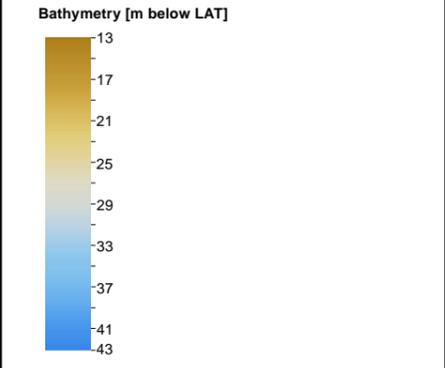
Fugro Report No. N6083/TN-GIS Issue 1 Plate 2

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LEGEND:

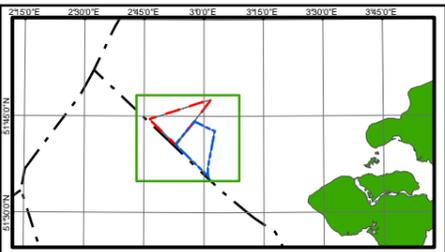
- Area of Reduced Confidence WFS III
- Area of Reduced Confidence WFS IV
- Outline of WFS III
- Outline of WFS IV
- Outline of WFS V
- Investigation Area III
- Investigation Area IV



NOTES:
 -An area of reduced confidence is defined along the perimeter of the Investigation Area III and IV, extending approximately 100 m from the edge of the specific Investigation Area towards its centre.

GEODETTIC PARAMETERS:

DATUM	ETRS89
Ellipsoid	GRS80
Semi major axis	a = 6 378 137.000
Inverse flattening	1/f = 298.257222101
PROJECTION	
Central Meridian (CM)	UTM, Zone 31 North 3°00' 00" E
Latitude of Origin	0°00' 00" N
False Easting	500 000 m
False Northing	000 000 m
Scale factor	0.9996
Units	metres/degrees

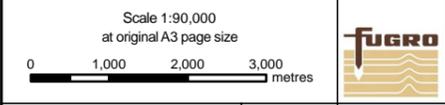


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EXTENT OF AREA OF REDUCED CONFIDENCE

 BORSELE WIND FARM ZONE, WFS III AND IV,
 DUTCH SECTOR, NORTH SEA



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