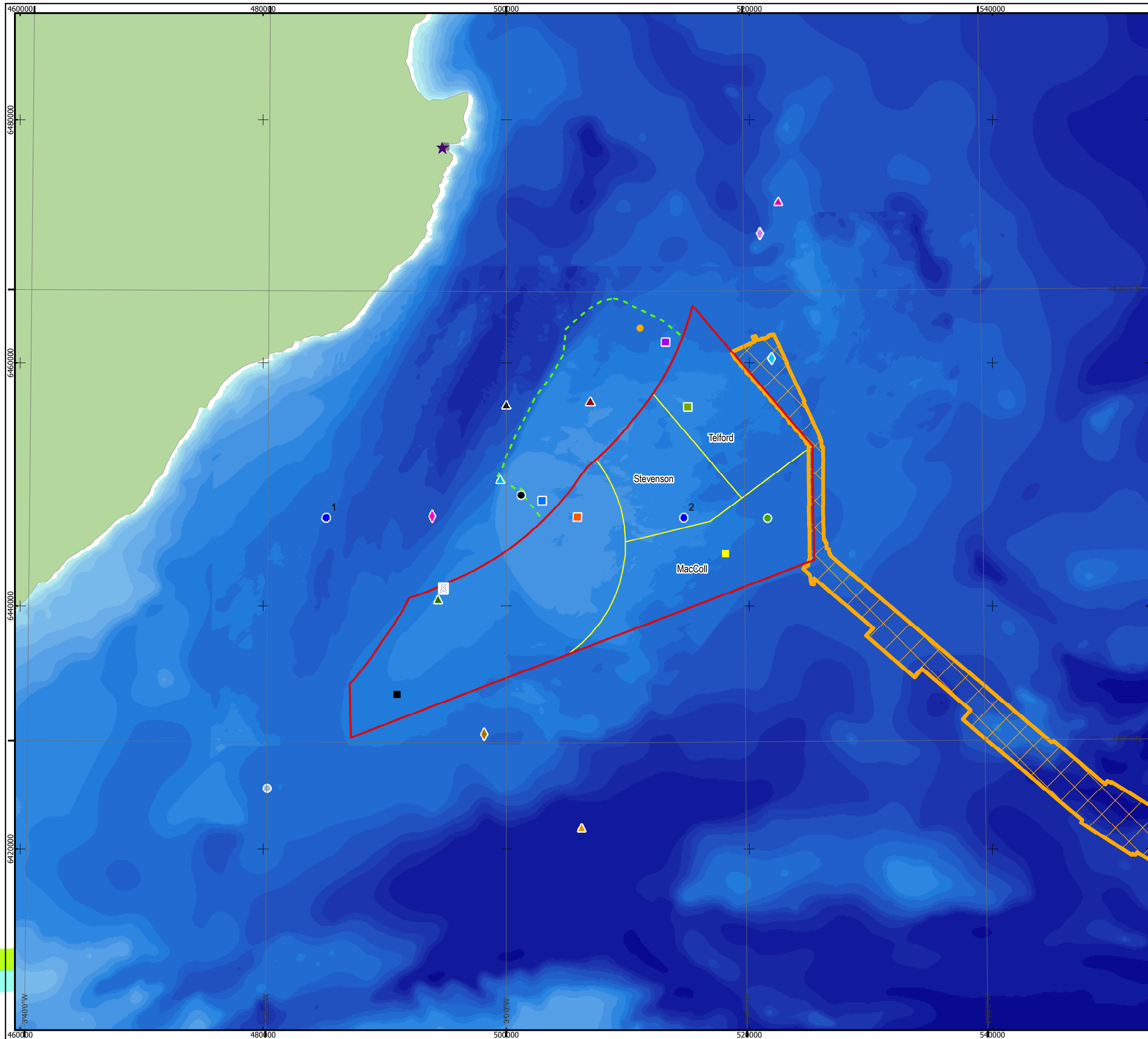


NOTE: For bathymetry legend see Figure 1. © ABPmer. All rights reserved, 2012. This document is the property of contractors and sub-contractors and shall not be reproduced nor transmitted without prior written approval. Moray Offshore Renewables Ltd © 2012.



**Moray Offshore Renewables Ltd**

**KEY**

- MORL Zone Boundary
  - Windfarm Boundaries
  - Offshore Export Cable Route
  - BOWL Zone Boundary
  - NOC Surge Predictions (Centroid)
  - Moray AWAC 3c
  - Moray AWAC 4c
  - ▲ Analysis Point 1
  - Beatrice AWAC 2a
  - Beatrice AWAC 3a
  - Beatrice Wave Buoy
  - Moray Wave Buoy
  - Jacky Platform Wave Buoy
  - ⊠ Beatrice Alpha Oil Platform
  - Moray AWAC 2c
  - Moray AWAC 5c
  - WaveNet Moray Firth Wave Buoy
  - ◆ Tidal Diamond F
  - ◆ Tidal Diamond G
  - ◆ Tidal Diamond M
  - ◆ Tidal Diamond N
  - ★ Wick Airport Weather Station
  - Wick Tide Gauge
  - ▲ Analysis Point
  - Beatrice Wave Buoy
- BODC Data Locations**
- ▲ b0014185
  - ▲ b0020756
  - ▲ b0020953
  - ▲ b0029252
  - ▲ b0049799

Horizontal Scale: 1:300,000 A3 Chart  
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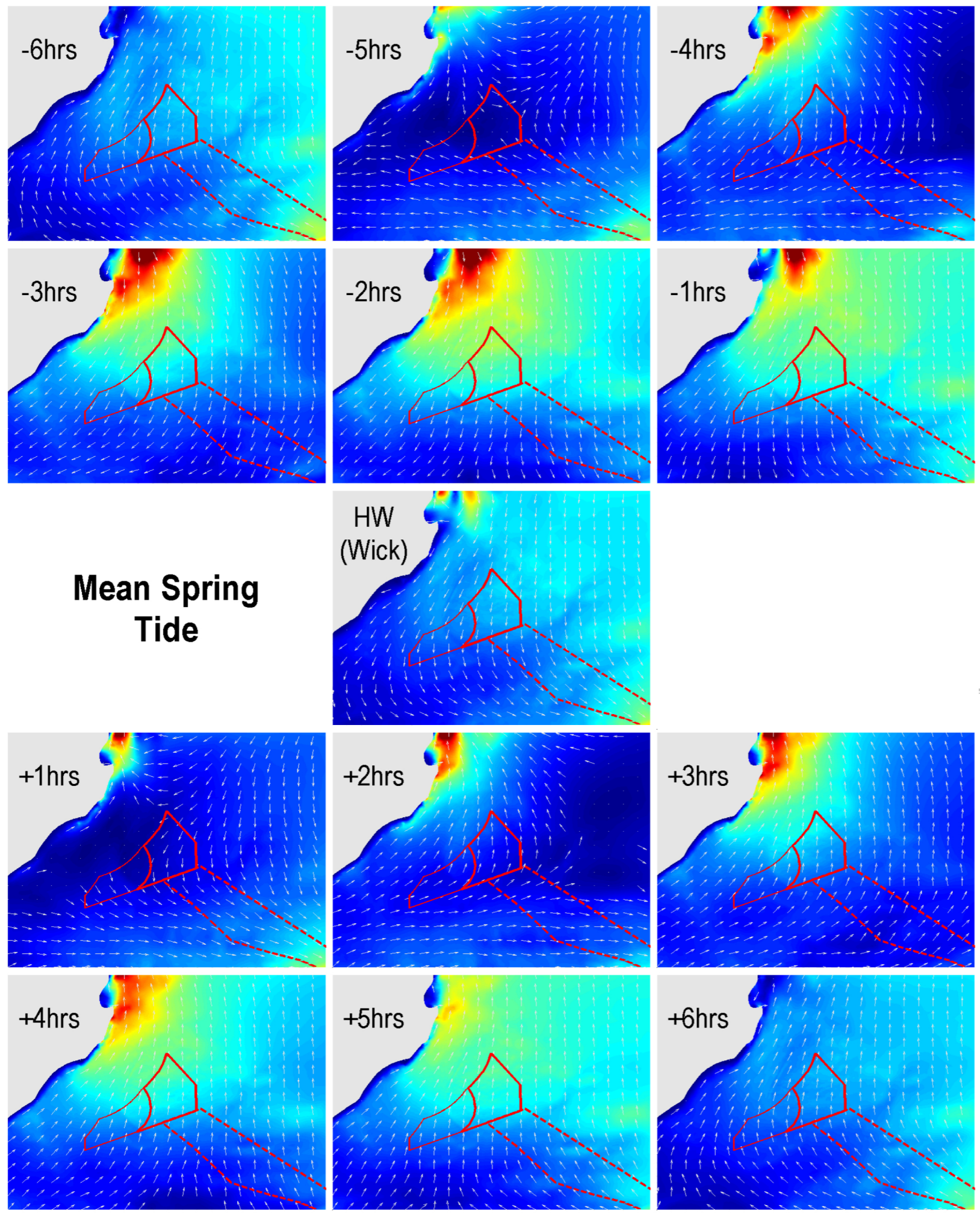
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Produced: MCE  
 Reviewed: NMW  
 Approved: PH

Date: 04/05/2012 Revision: A  
 REF: 8460001-PPW0201-ABP-MAP-004

**Fig 3.4-1 - Data and Deployment Locations in the Moray Firth**

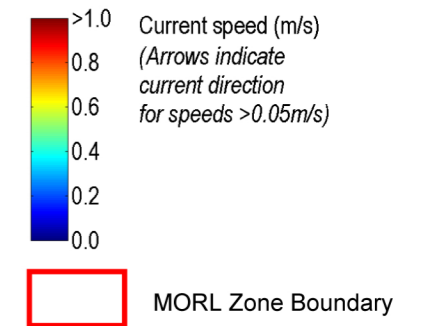
Moray Offshore Renewables Ltd



**Mean Spring  
Tide**



Moray Offshore Renewables Ltd



A3 Chart

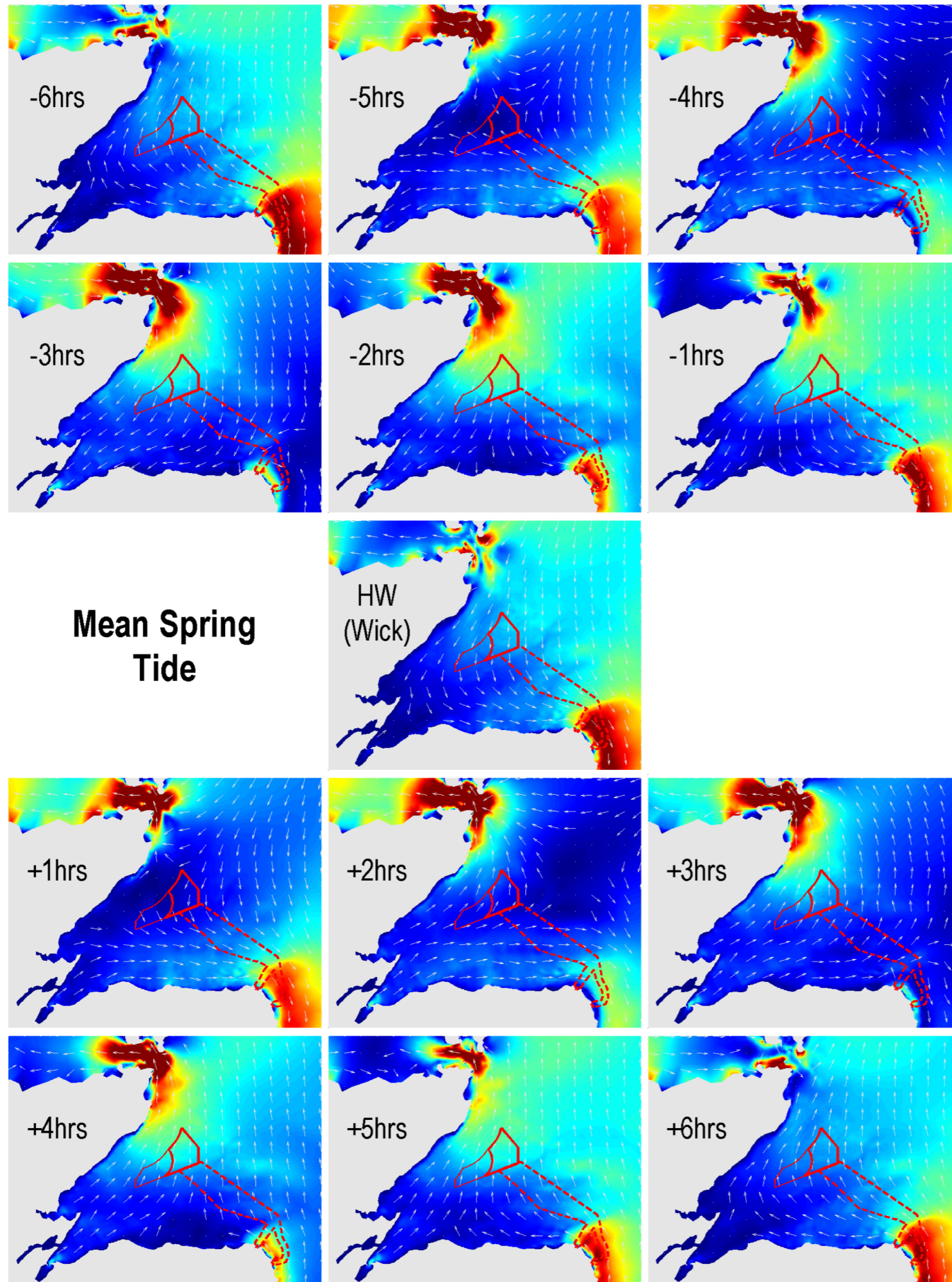
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Reviewed: CLH  
Approved: PH

Date: 30/5/12 | Revision: A

REF: 8460001-PPW0201-SMR-MAP-005

Fig 3.4-2 - Modelled Near-Field Spring Tidal Flow Patterns

Moray Offshore  
Renewables Ltd



Moray Offshore Renewables Ltd

>1.0 Current speed (m/s)  
 0.8 (Arrows indicate  
 0.6 current direction  
 0.4 for speeds >0.05m/s)  
 0.2  
 0.0

MORL Zone Boundary

A3 Chart

Produced: DOL  
 Reviewed: CLH  
 Approved: PH

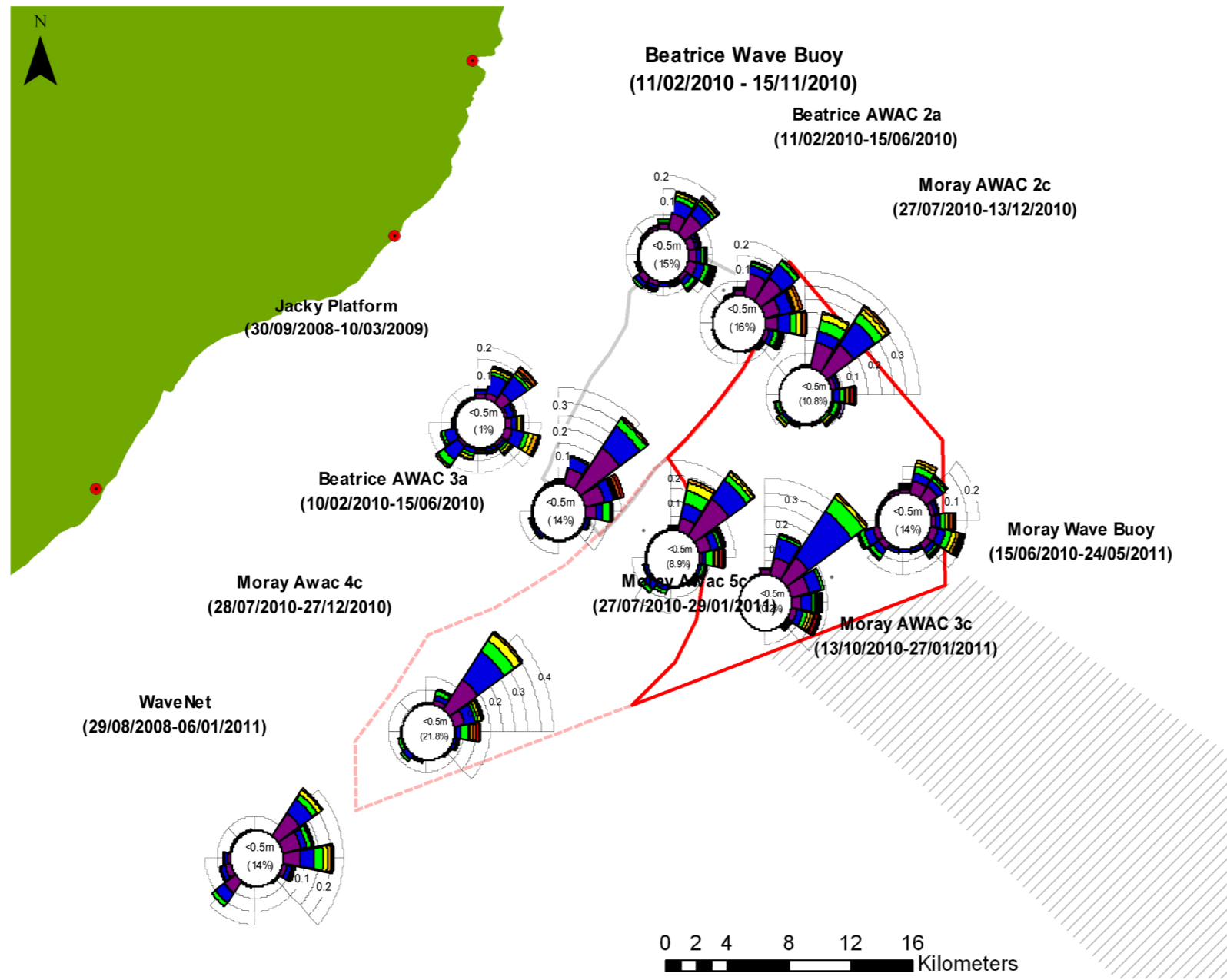
Date: 30/5/12

Revision: A

REF: 8460001-PPW0201-ABP-MAP-006

Fig 3.4-3 - Modelled Far-Field Spring Tidal Flow Patterns

Moray Offshore  
 Renewables Ltd



Produced: DOL  
 Reviewed: CLH  
 Approved: PH

Date: 30/5/12      Revision: A

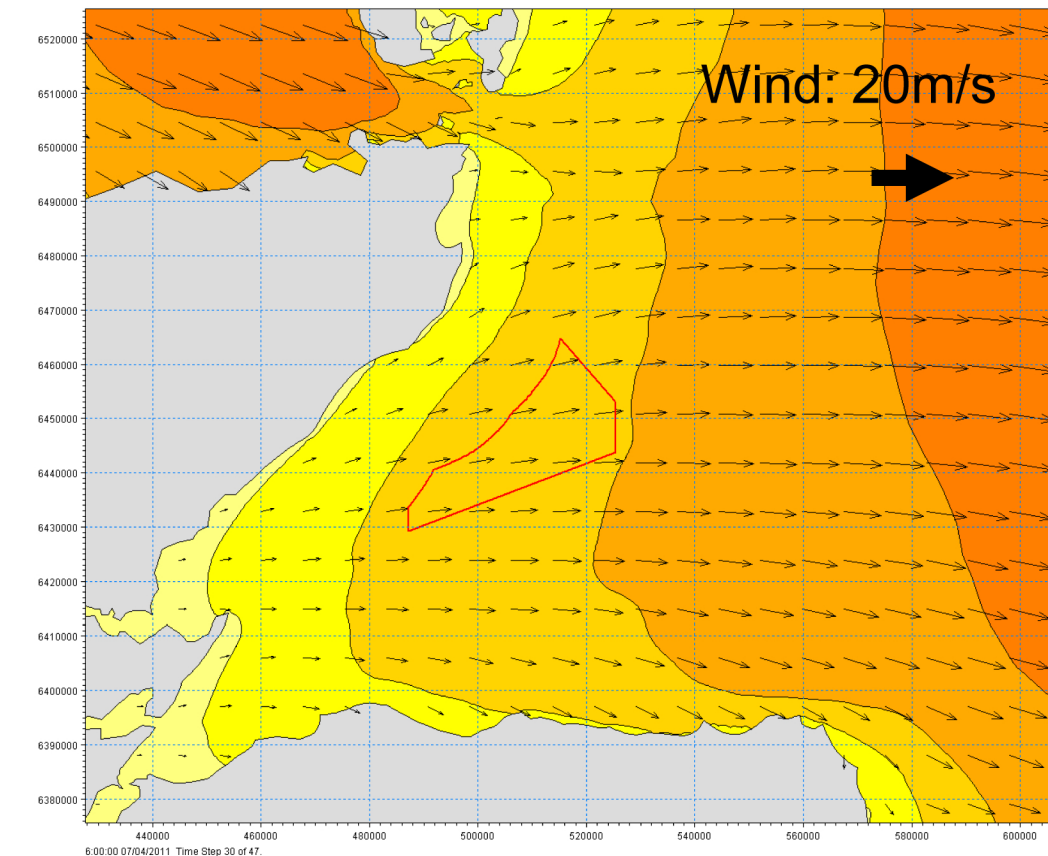
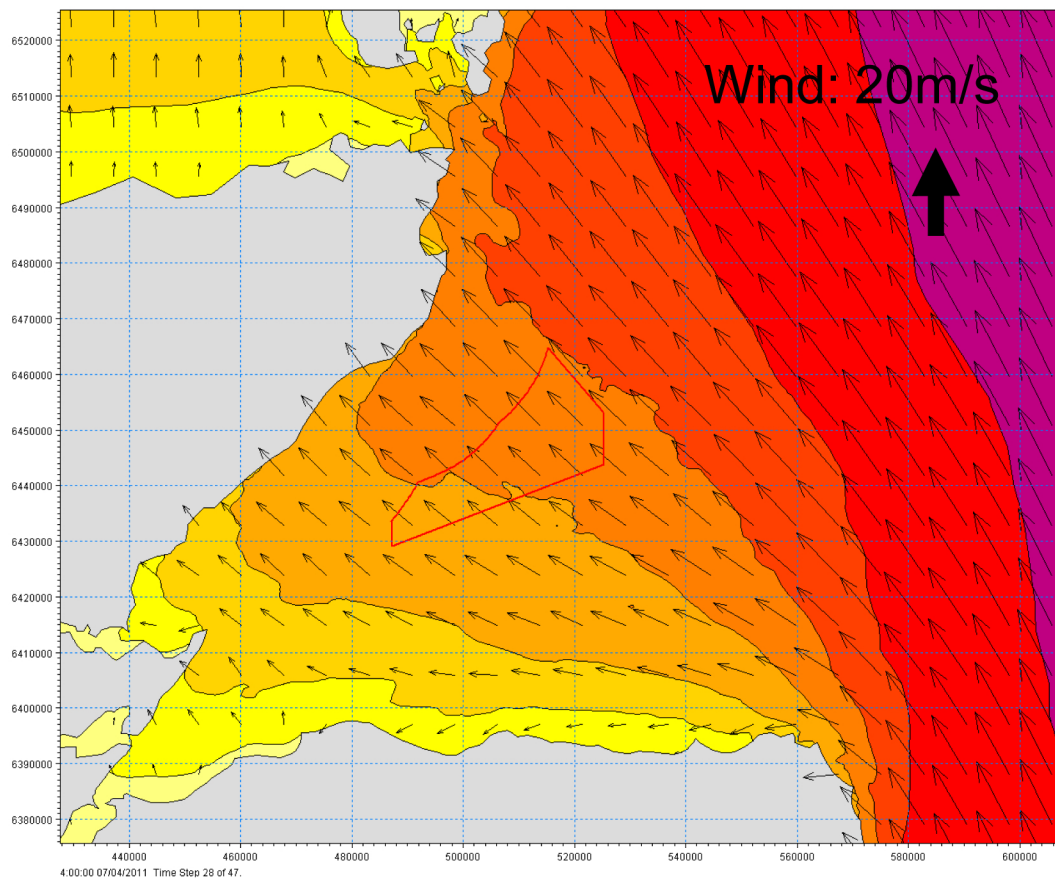
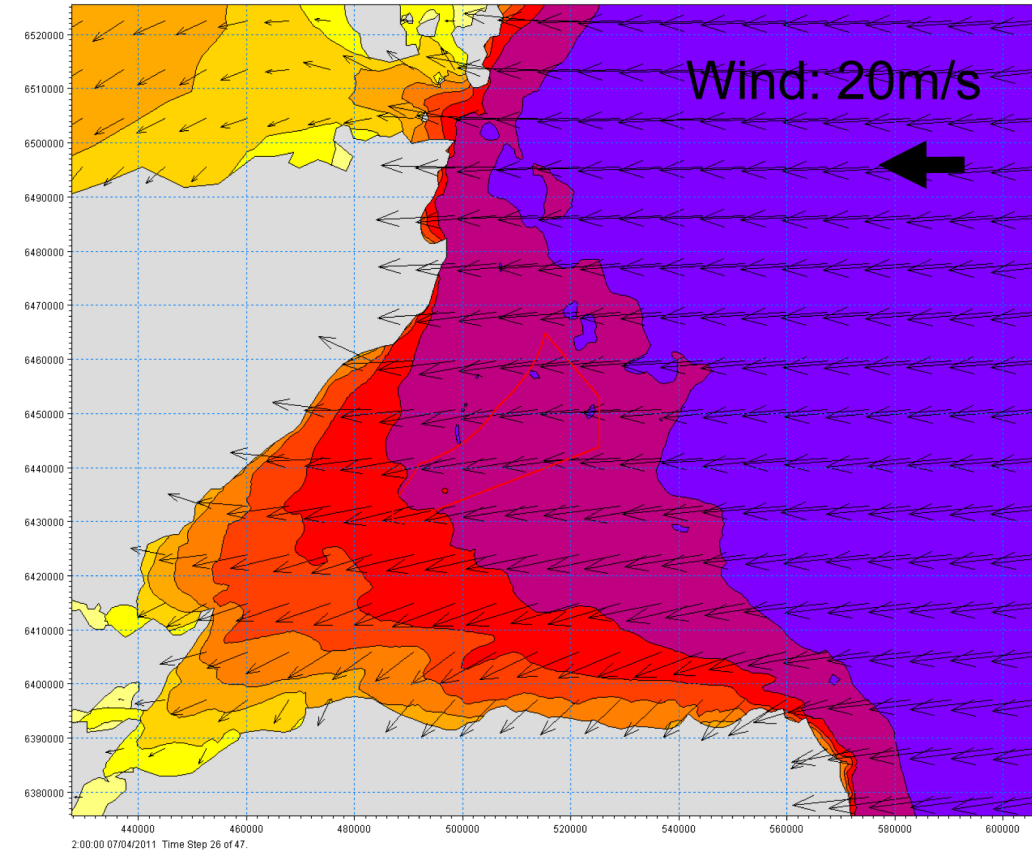
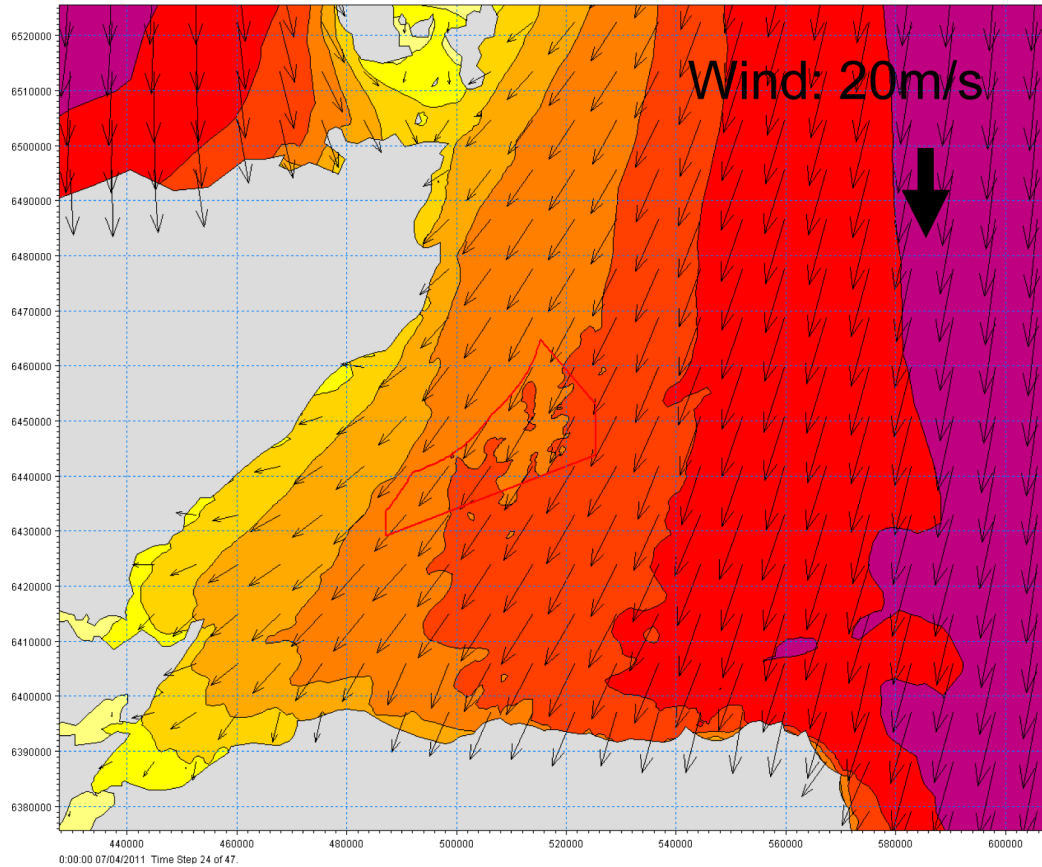
REF: 8460001-PPW0201-ABP-MAP-007

Fig 3.4-4 - Observational Wave Records from within and Nearby to the Project Area

**Significant Wave Height (m)**



MORL Zone Boundary



A3 Chart

Produced: DOL  
Reviewed: CLH  
Approved: PH

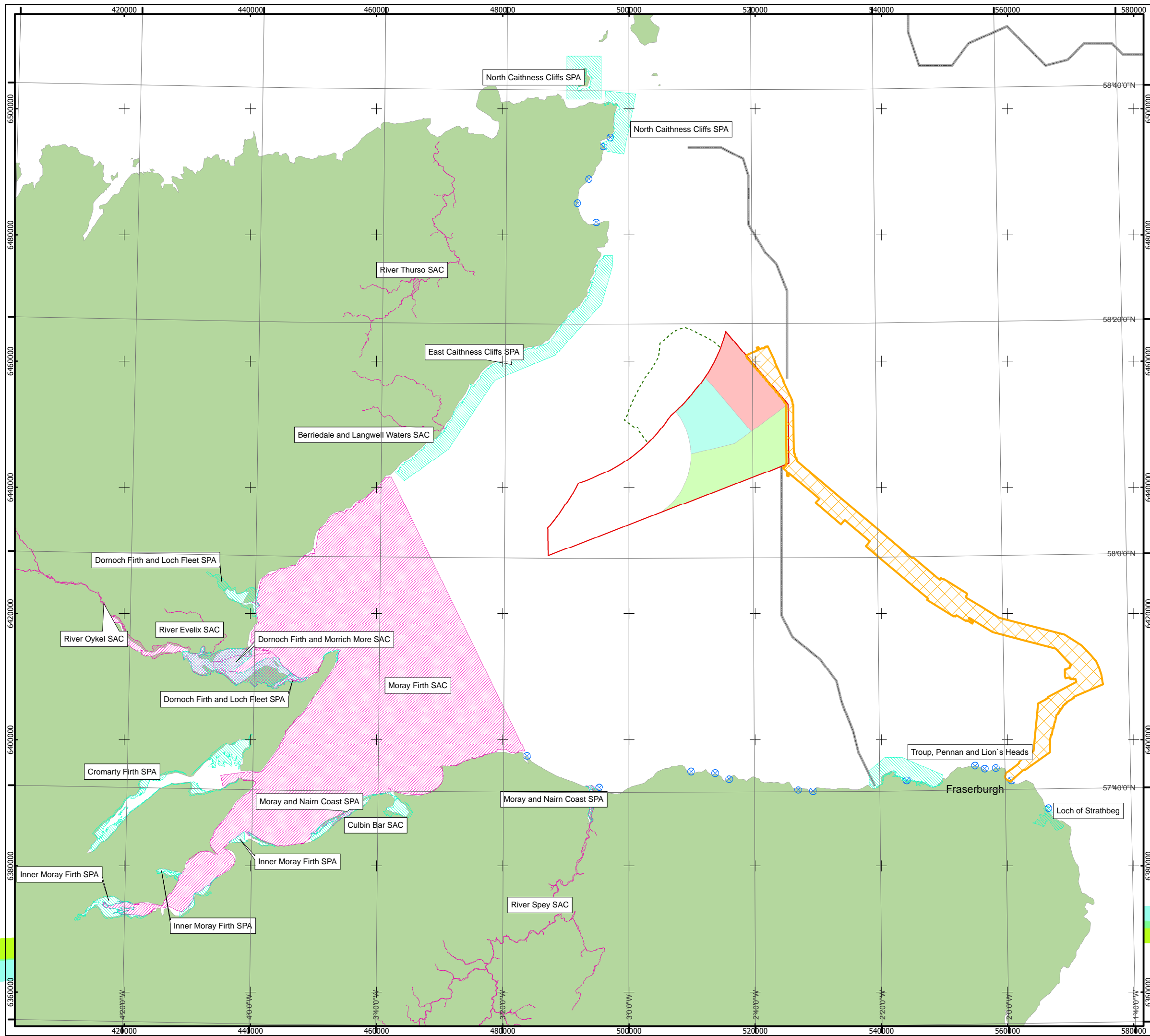
Date: 30/5/12

Revision: A

REF: 8460001-PPW0201-ABP-MAP-008

**Fig 3.4-5 - Significant Wave Heights Resulting from Key Wind Directions**

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**Moray Offshore Renewables Ltd**

**KEY**

- Offshore Export Cable Route
- MORL Zone Boundary
- MacColl Windfarm
- Stevenson Windfarm
- Telford Windfarm
- BOWL Zone Boundary
- SPA Sites
- SAC Sites
- Surfing Locations
- Fronts

Horizontal Scale: 1:575,000 A3 Chart  

 0 15,000 30,000 Metres

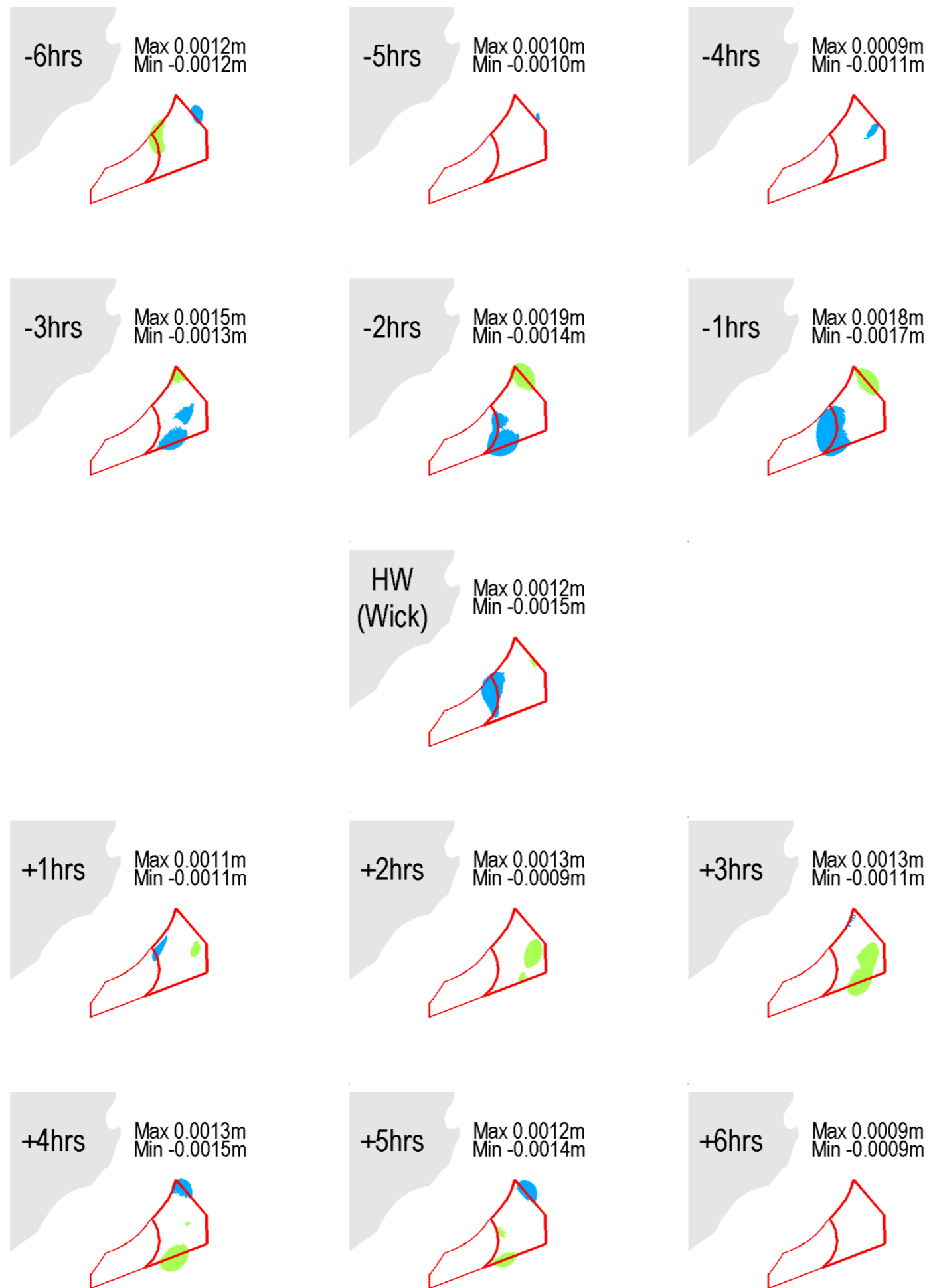
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Produced: MCE  
 Reviewed: NMW  
 Approved: PH

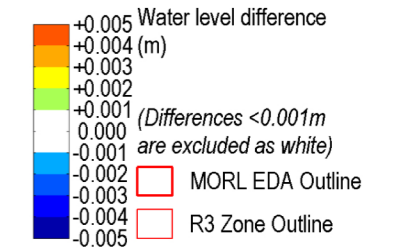
Date: 04/05/2012 Revision: A  
 REF: 8460001-PPW0201-ABP-MAP-009

**Fig 3.4-6 - Identified Physical and Coastal Process Receptors**

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd



Corresponding effects on neap tides and for jackets at all times are <0.001m

A3 Chart

Produced: DOL  
Reviewed: CLH  
Approved: PH

Date: 30/5/12

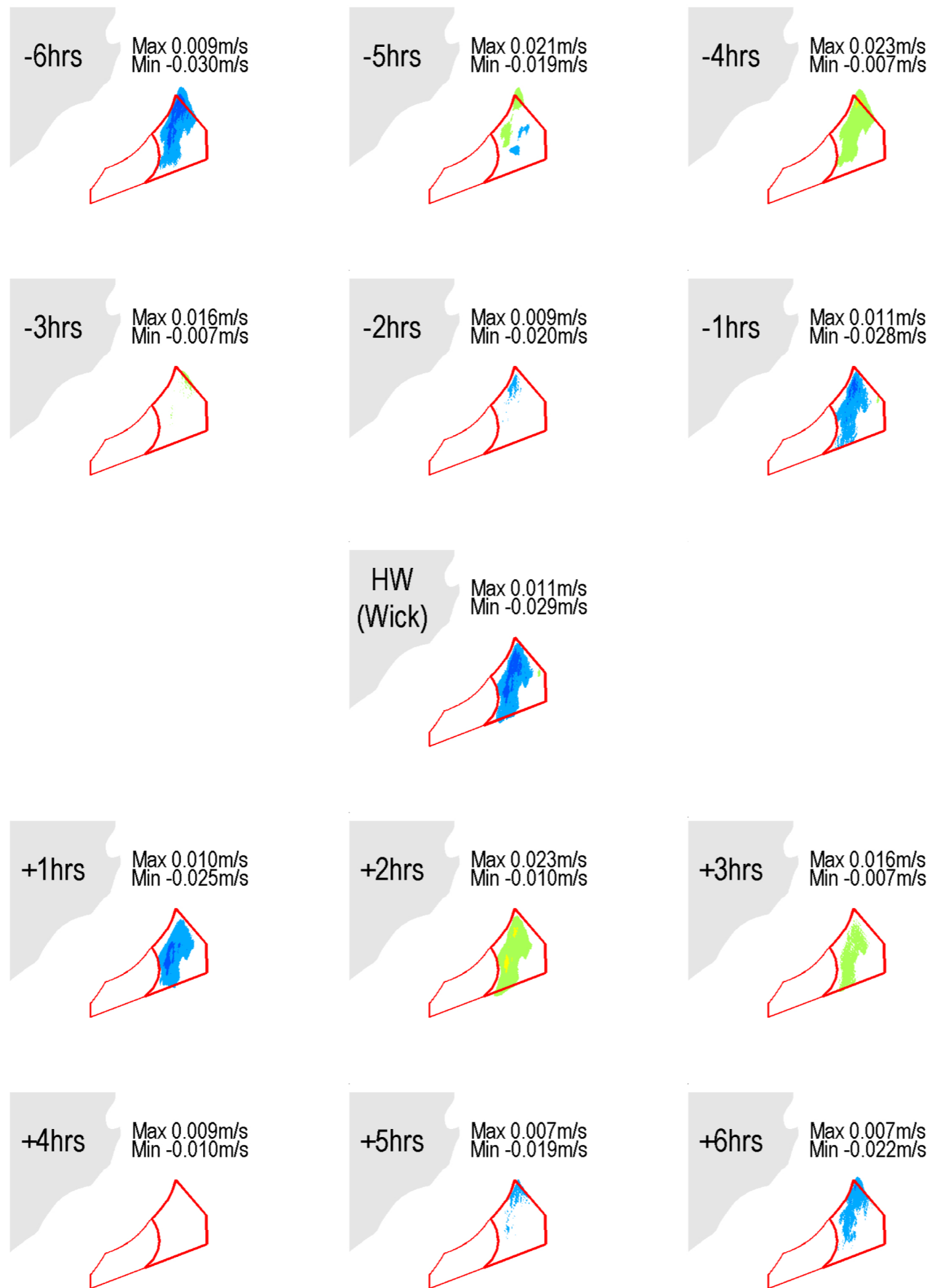
Revision: A

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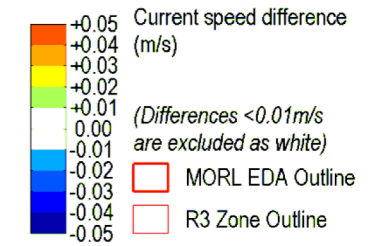
Fig 6.1-1 - Effect of the Project on Tidal Water Levels

Moray Offshore Renewables Ltd

(GBS, Development Scenario T3\_S5\_M5, Mean Spring Tide)



Moray Offshore Renewables Ltd



Corresponding effects on neap tides and for jackets at all times are <0.01m/s

A3 Chart

Produced: DOL  
 Reviewed: CLH  
 Approved: PH

Date: 30/5/12

Revision: A

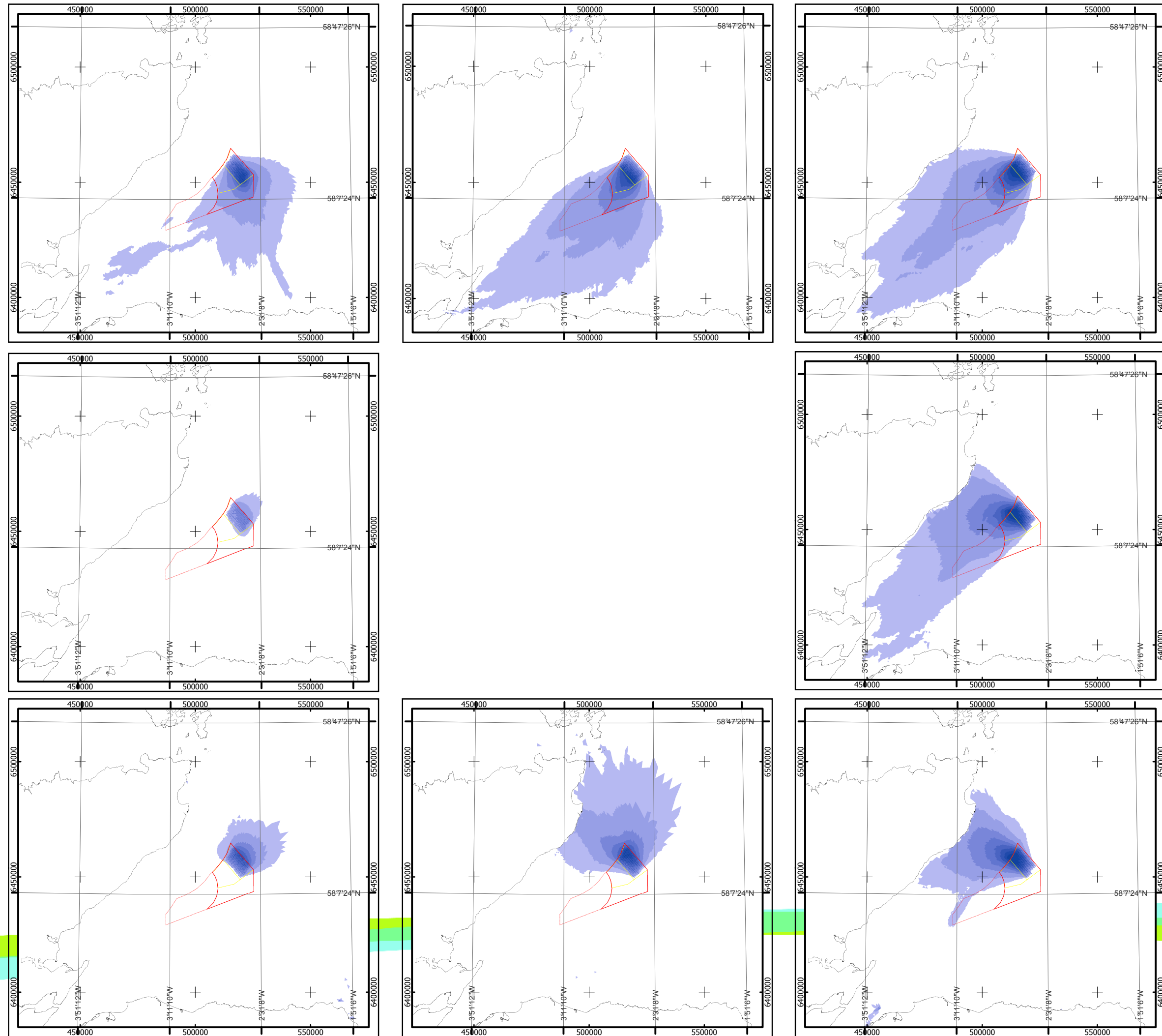
REF: 8460001-PPW0201-ABP-MAP-010

Fig 6.1-2 - Effect of the Project on Tidal Current Speed

Moray Offshore Renewables Ltd

(GBS, Development Scenario T3\_S5\_M5, Mean Spring Tide)





**Moray Offshore Renewables Ltd**

**KEY**

- MORL Zone Boundary
- Windfarm Boundaries

**Scenario T3**

**Wave Height Difference**

- Above -0.05
- 0.10 - -0.05
- 0.20 - -0.10
- 0.30 - -0.20
- 0.40 - -0.30
- 0.50 - -0.40
- 0.60 - -0.50
- 0.70 - -0.60
- Below -0.70

Horizontal Scale: 1:1,600,000 A3 Chart

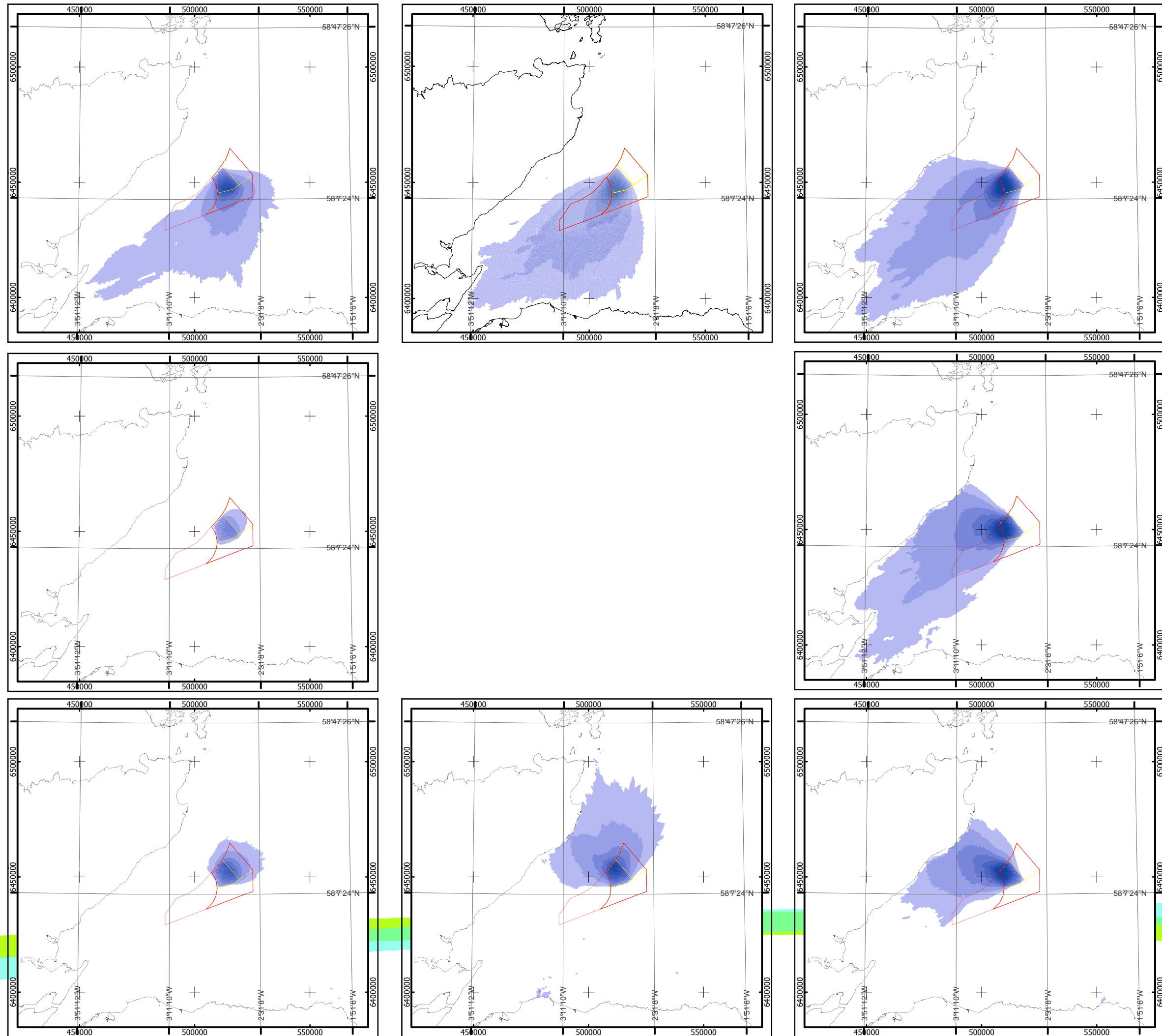
Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE  
 Reviewed: NMW  
 Approved: PH

Date: 08/05/2012 Revision: B  
 REF: 8460001-PPW0201-ABP-MAP-012

**Fig 6.1-3 - Effect of the Project on Wave Height (T3, 1in50yr)**

**Moray Offshore Renewables Ltd**



**Moray Offshore Renewables Ltd**

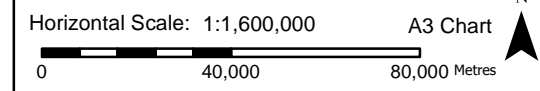
**KEY**

- MORL Zone Boundary
- Windfarm Boundaries

Scenario S3

Sig Wave Height Difference

- Above -0.05
- 0.10 - -0.05
- 0.20 - -0.10
- 0.30 - -0.20
- 0.40 - -0.30
- 0.50 - -0.40
- 0.60 - -0.50
- 0.70 - -0.60
- Below -0.70

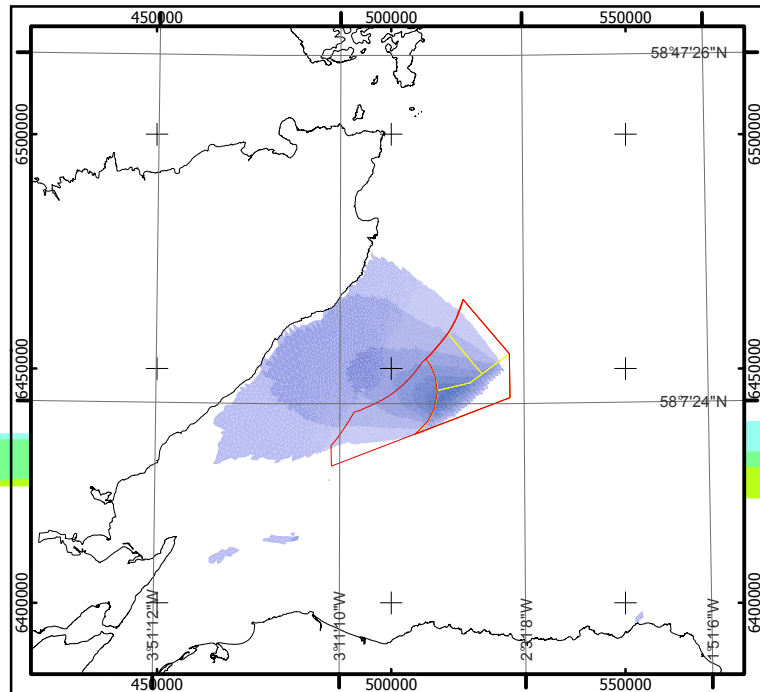
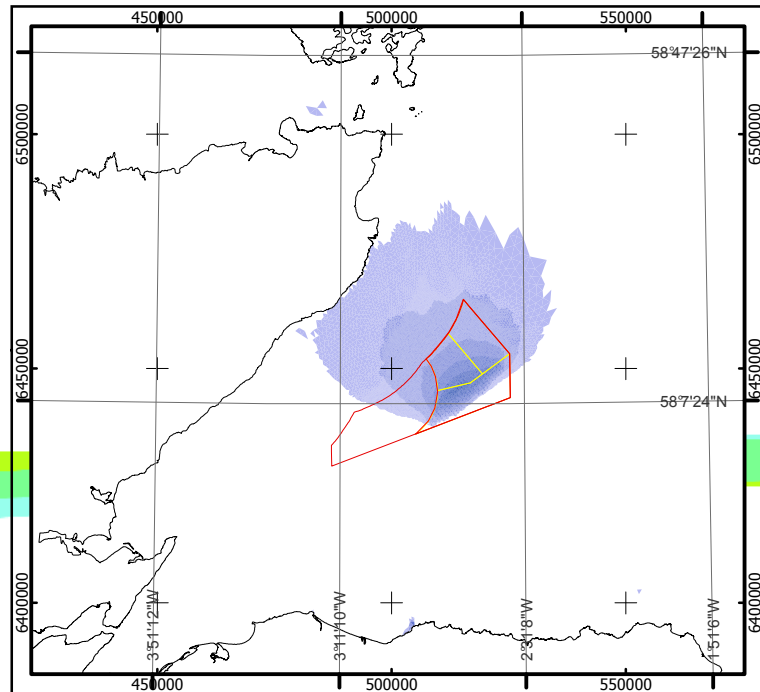
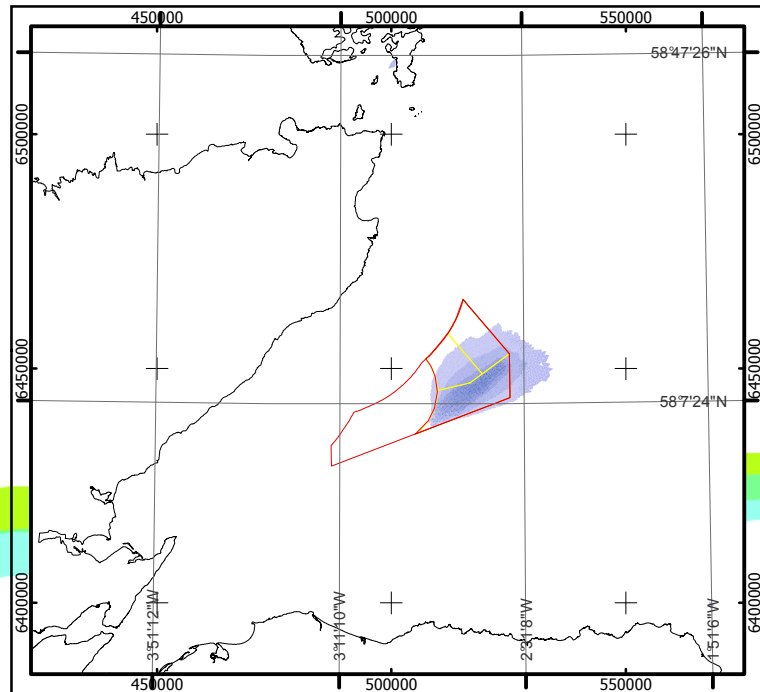
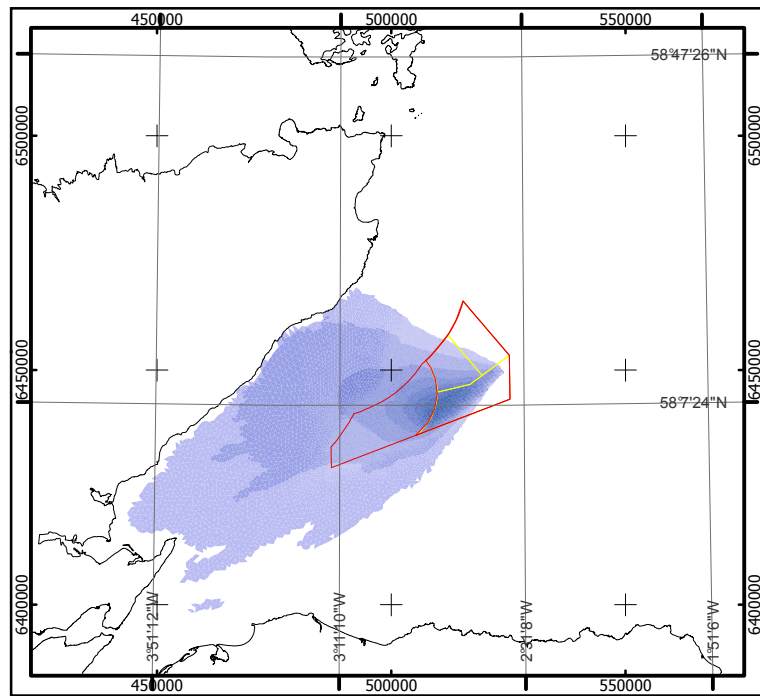
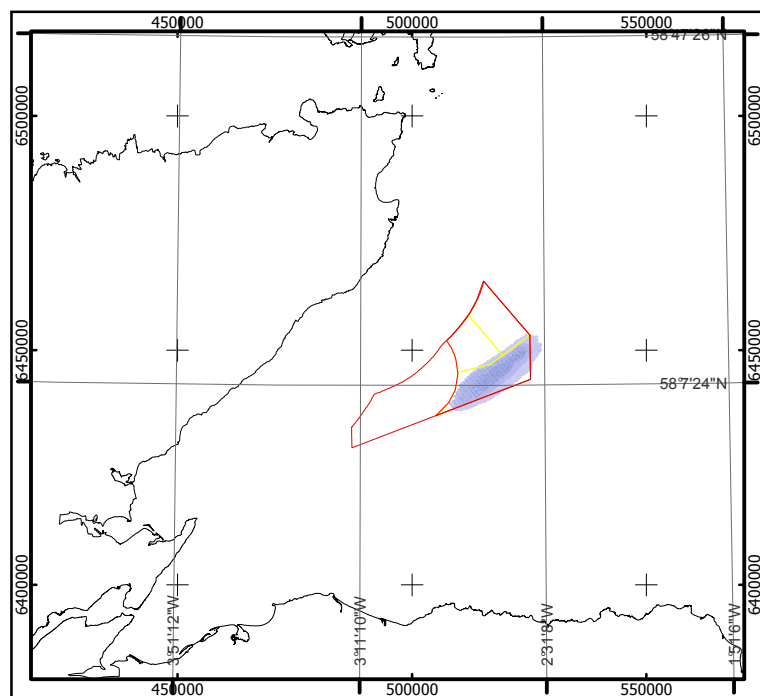
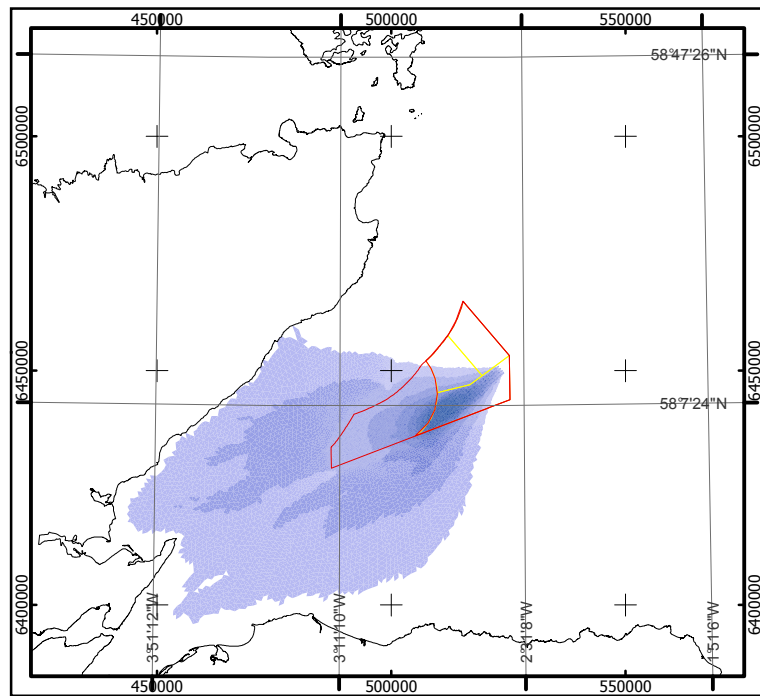
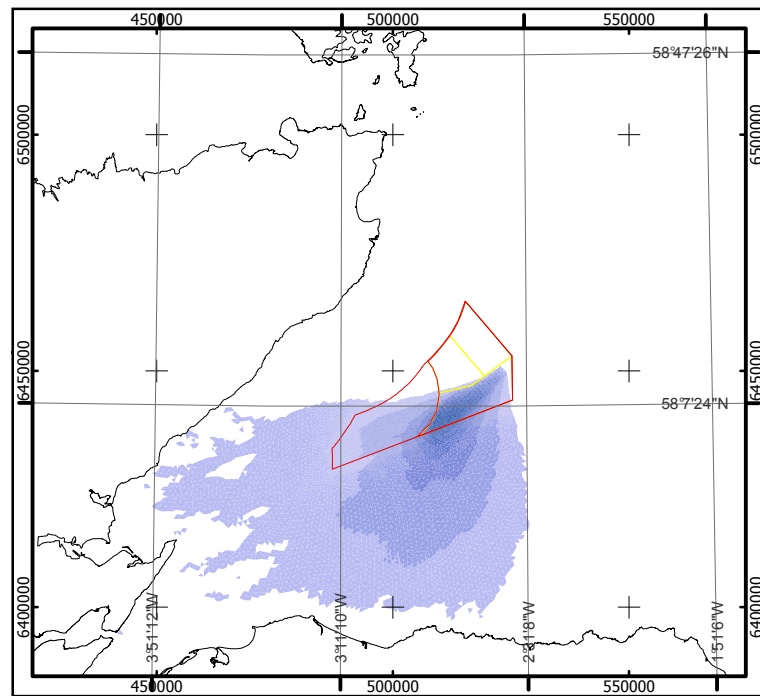
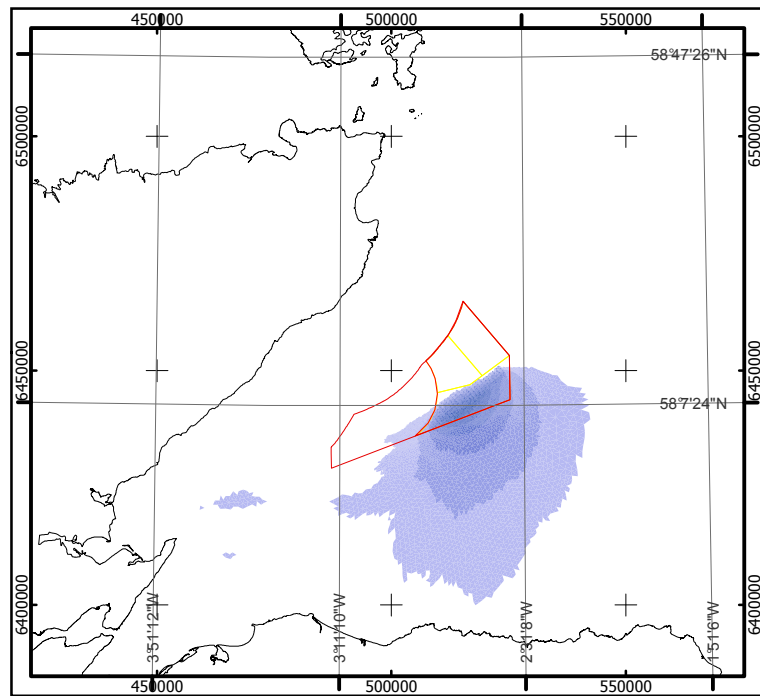


Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE  
Reviewed: NMW  
Approved: PH

Date: 08/05/2012      Revision: B  
REF: 8460001-PPW0201-ABP-MAP-013

**Fig 6.1-4 - Effect of the Project on Wave Height (S3, 1in50yr)**



**Moray Offshore Renewables Ltd**

**KEY**

MORL Zone Boundary

Windfarm Boundaries

Scenario M3

Significant Wave Height Difference

- Above -0.05
- 0.10 - -0.05
- 0.20 - -0.10
- 0.30 - -0.20
- 0.40 - -0.30
- 0.50 - -0.40
- 0.60 - -0.50
- 0.70 - -0.60
- Below -0.70

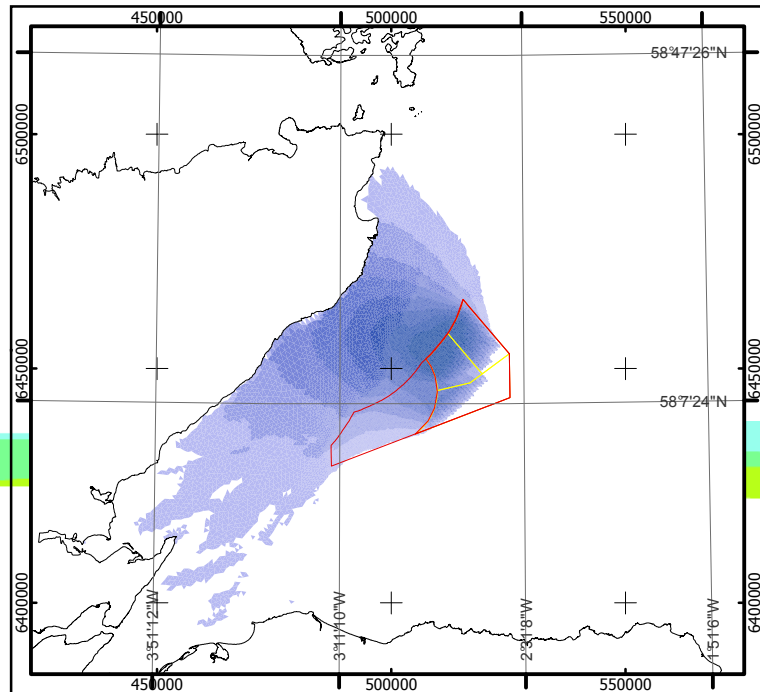
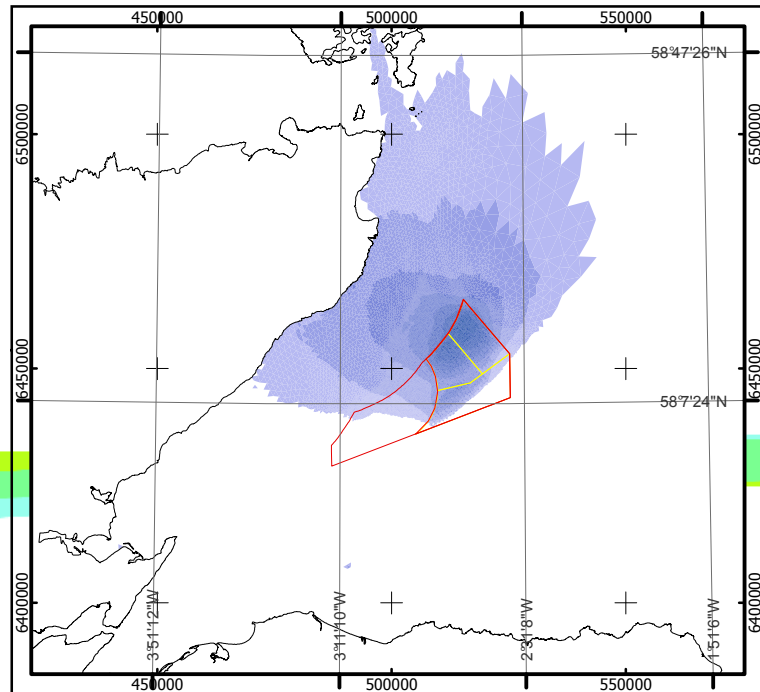
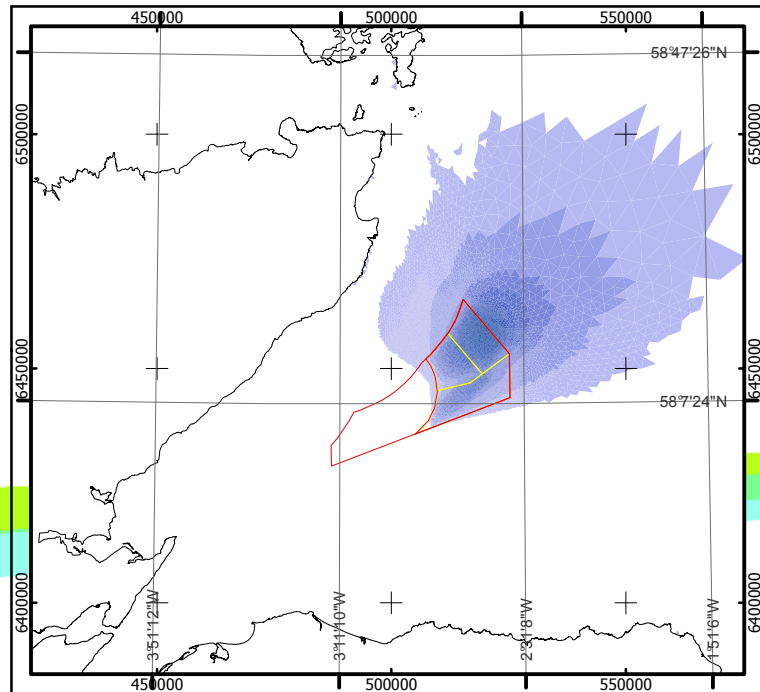
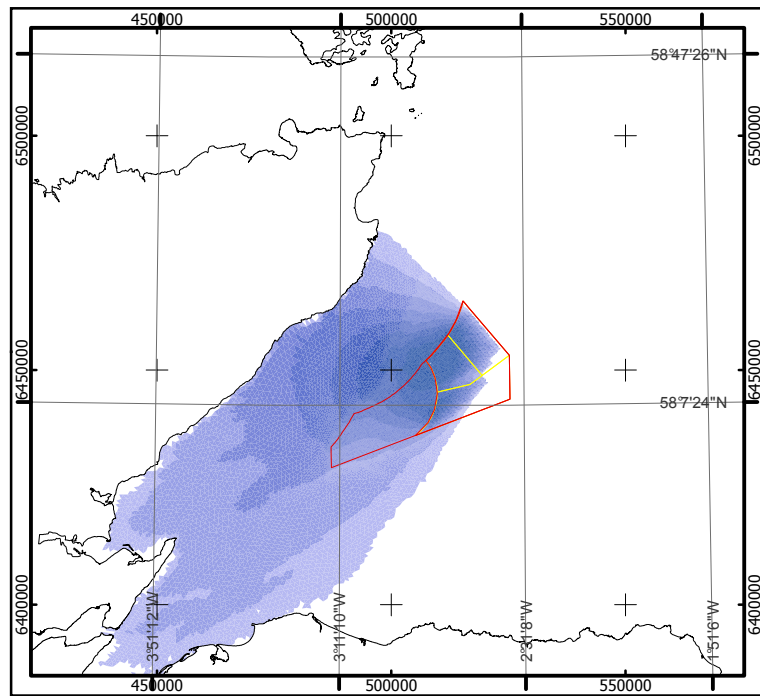
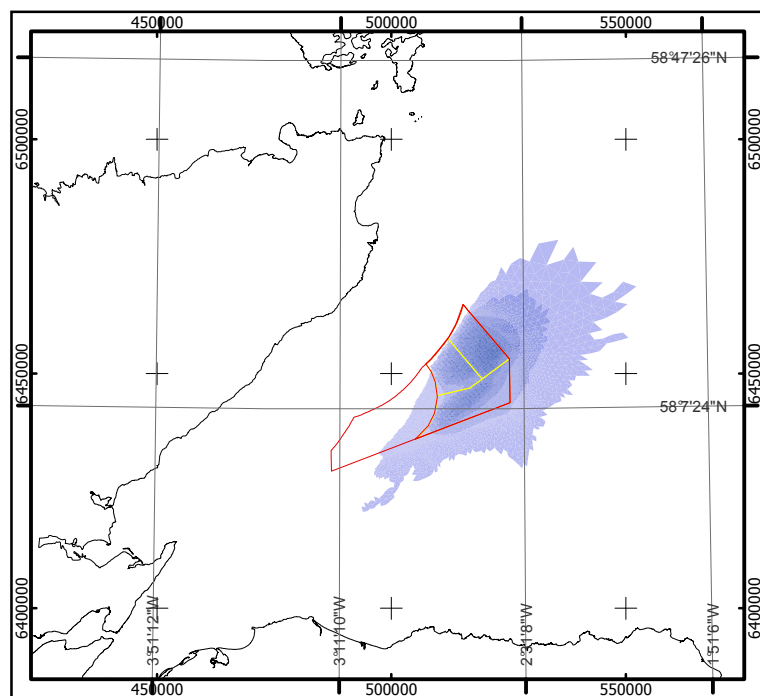
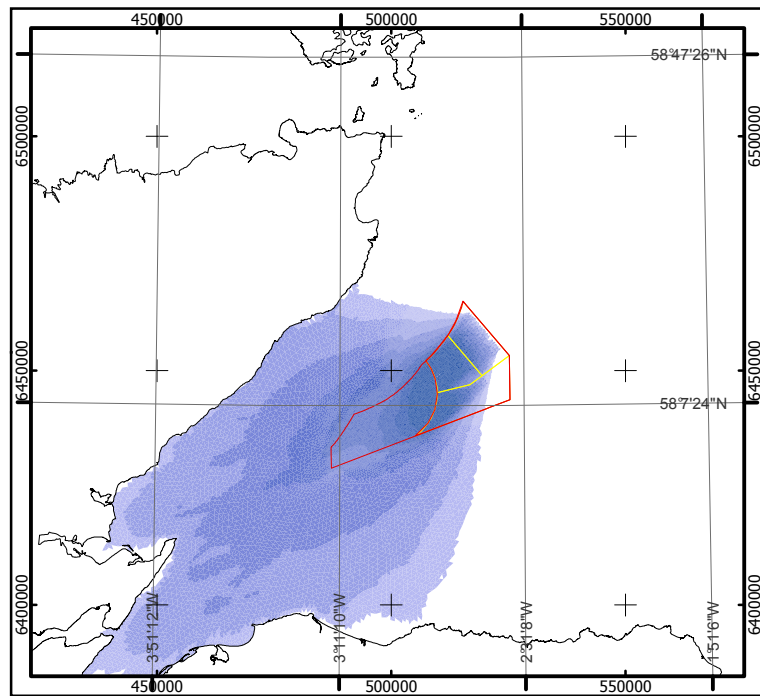
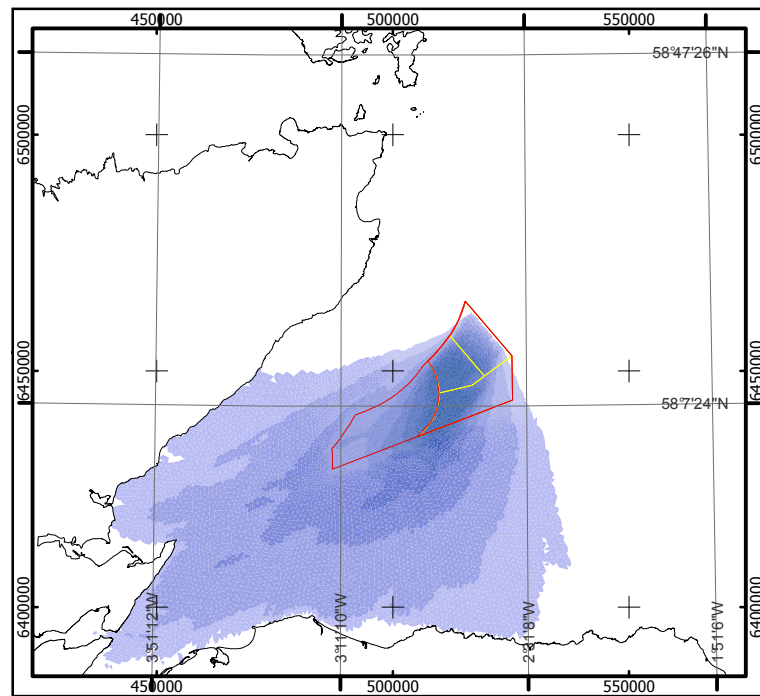
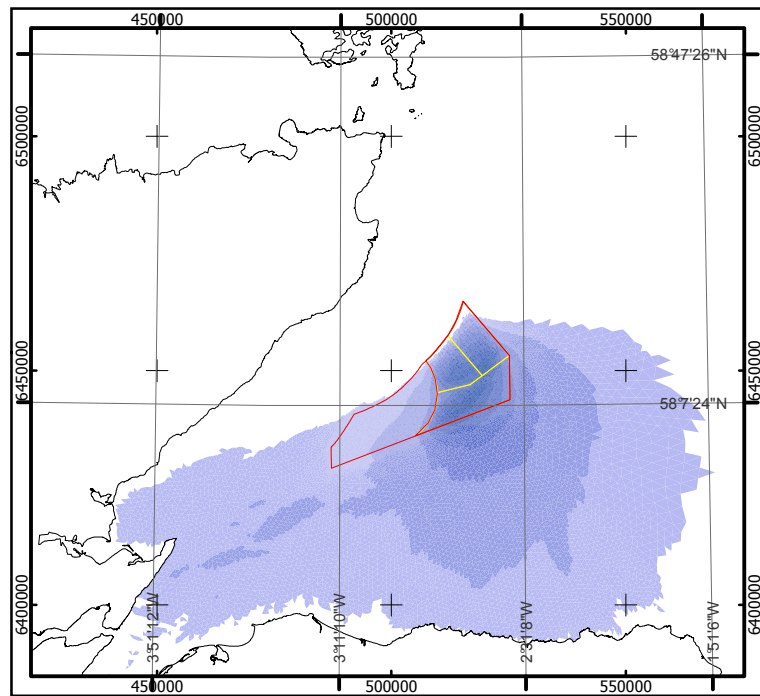
Horizontal Scale: 1:1,600,000      A3 Chart

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE  
 Reviewed: NMW  
 Approved: PH

Date: 09/05/2012      Revision: B  
 REF:8460001-PPW0201-ABP-MAP-014

**Fig 6.1-5 Effect of the Project on Wave Height (M3, 1in50yr)**



**Moray Offshore Renewables Ltd**

**KEY**

MORL Zone Boundary

Windfarm Boundaries

Scenarios T3, S5, M5

Significant Wave Height Difference

Above -0.05

-0.10 - -0.05

-0.20 - -0.10

-0.30 - -0.20

-0.40 - -0.30

-0.50 - -0.40

-0.60 - -0.50

-0.70 - -0.60

Below -0.70

Horizontal Scale: 1:1,600,000

A3 Chart

0 40,000 80,000 Metres

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE

Reviewed: NMW

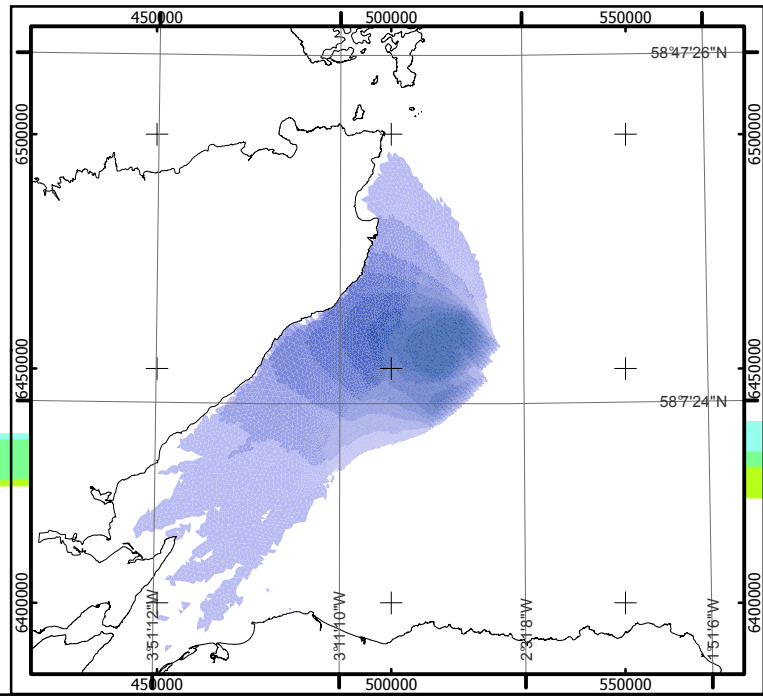
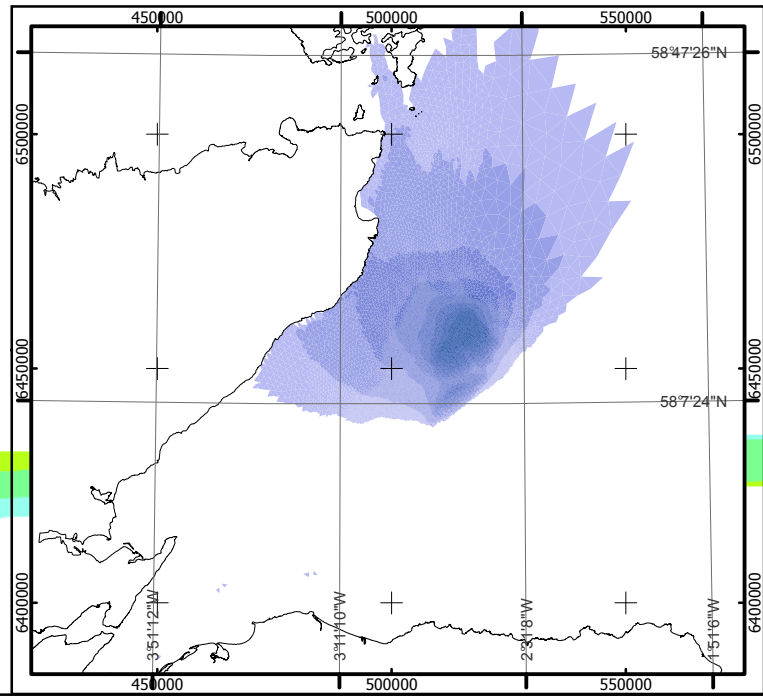
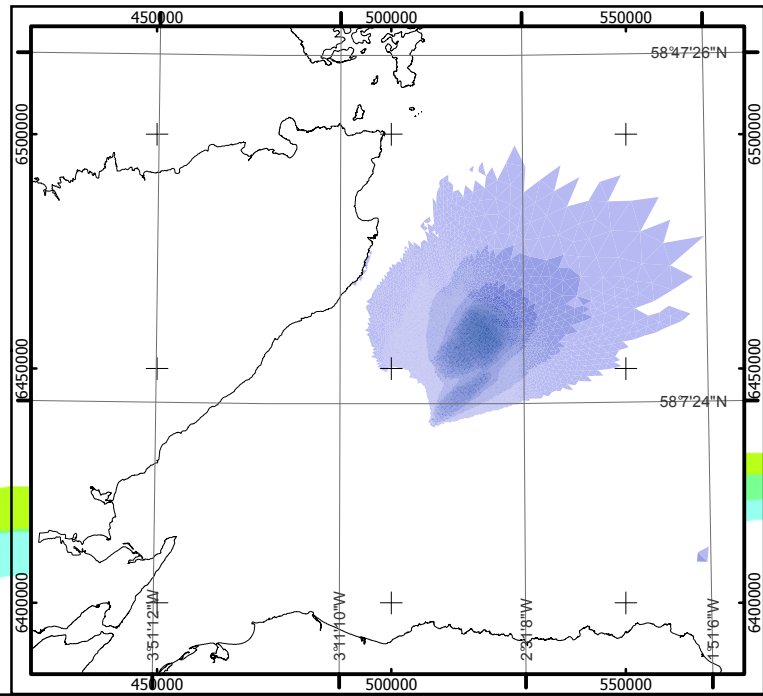
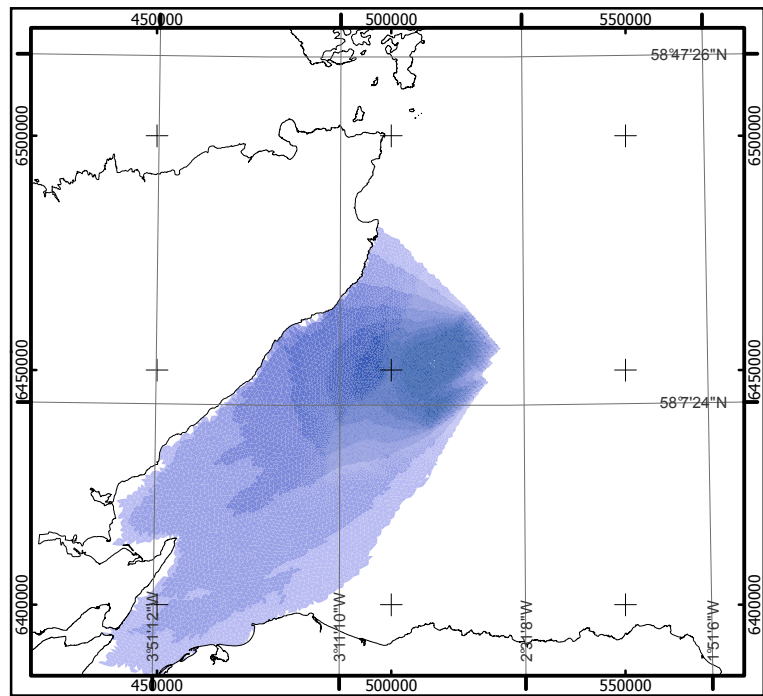
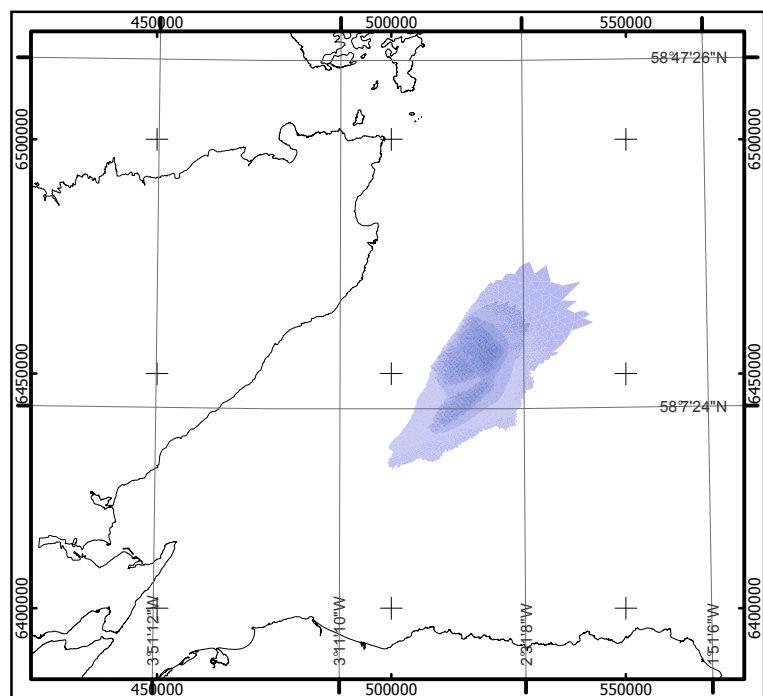
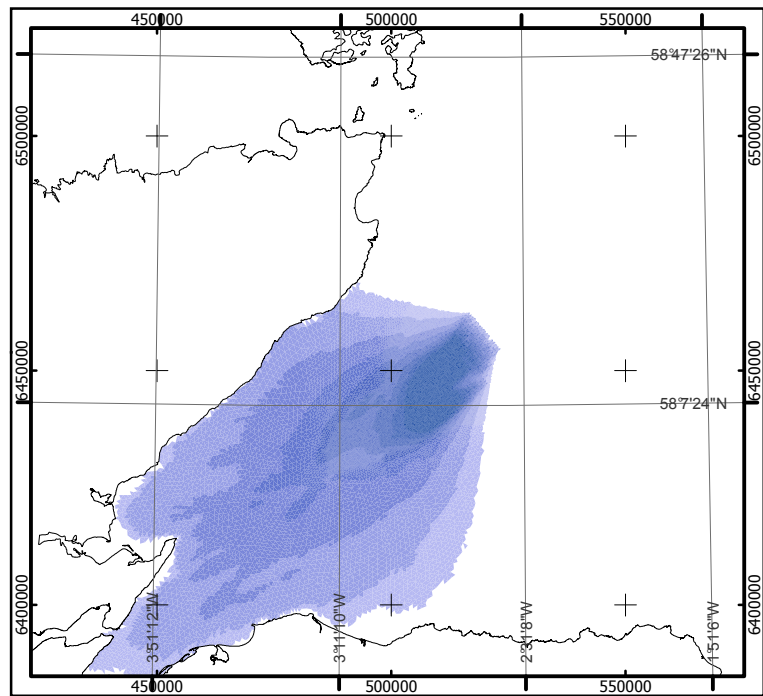
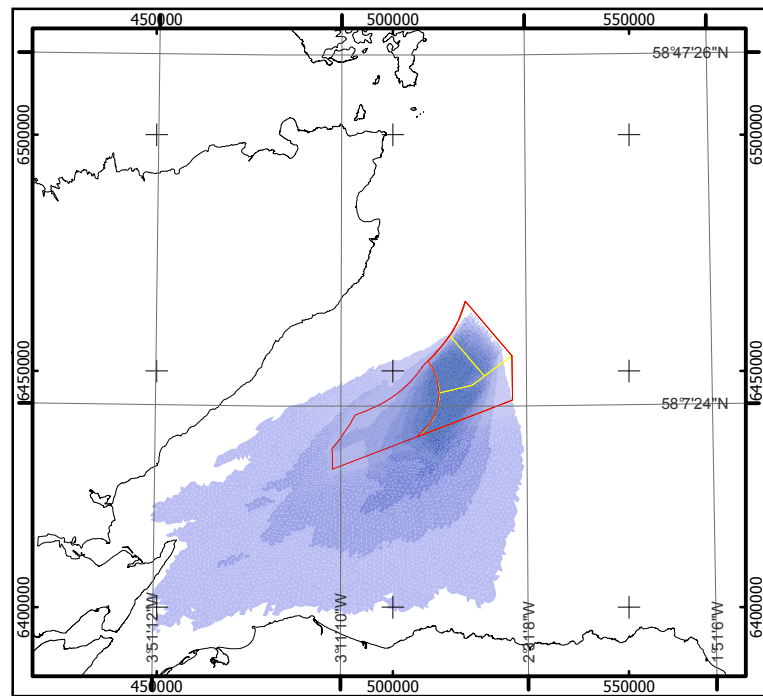
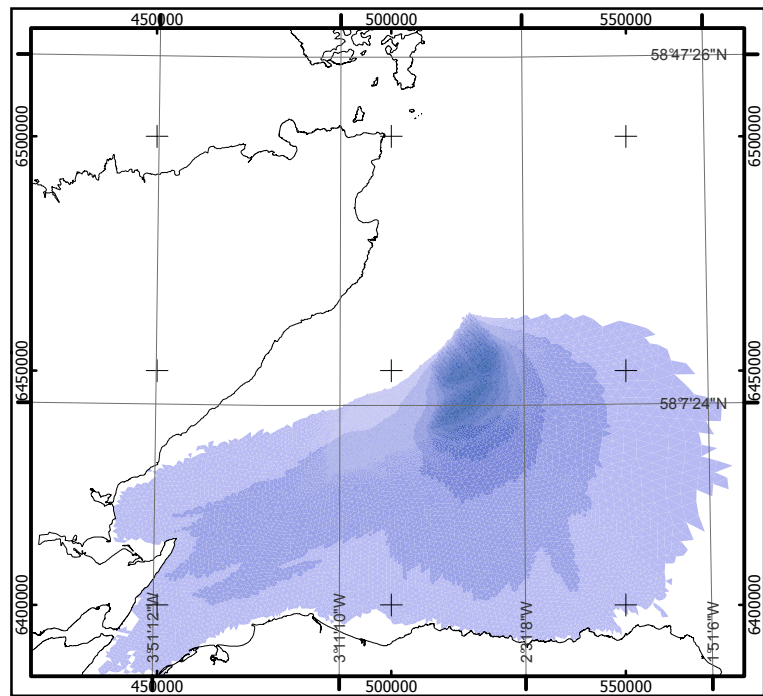
Approved: DOL

Date: 08/05/2012

Revision: B

REF: 8460001-PPW0201-ABP-MAP-015

**Fig 6.1- 6 Effect of the Project on Wave Height (T3, S5, M5) 1 in 1 yr**



**Moray Offshore Renewables Ltd**

**KEY**

- MORL Zone Boundary
- Windfarm Boundaries

Scenarios T3, S5, M5

Significant Wave Height Difference

- 0.09 - -0.05
- 0.19 - -0.10
- 0.29 - -0.20
- 0.39 - -0.30
- 0.49 - -0.40
- 0.59 - -0.50
- 0.69 - -0.60
- 1.99 - -0.70
- 1.30 - -2.00

Horizontal Scale: 1:1,600,000      A3 Chart

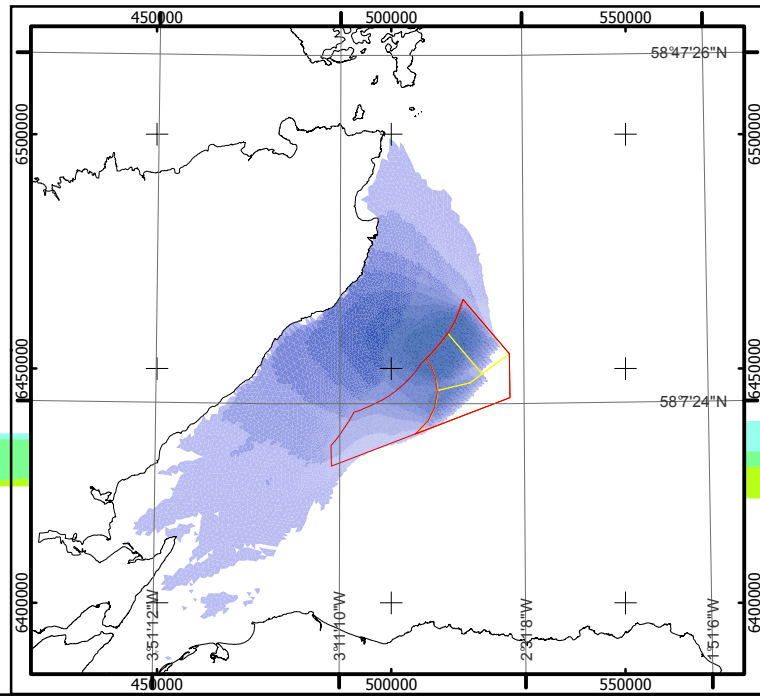
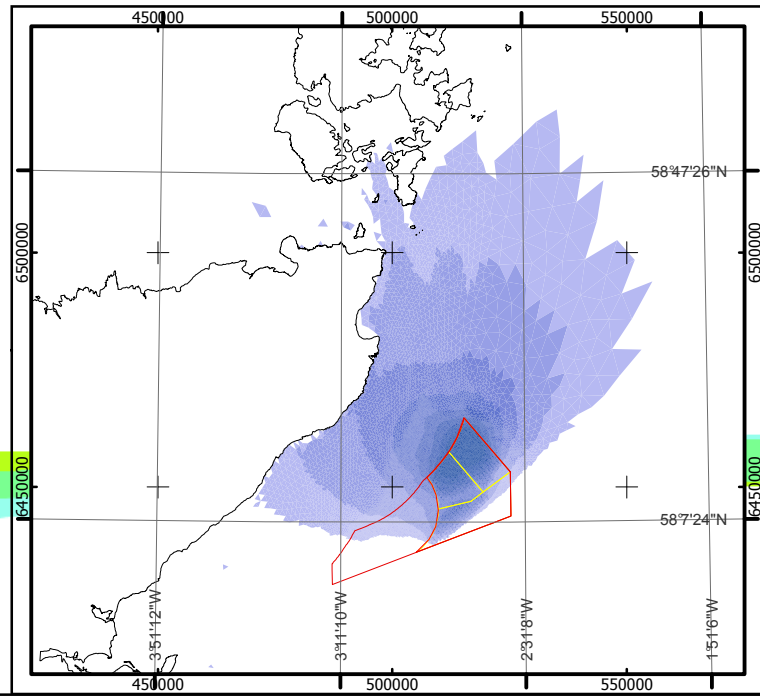
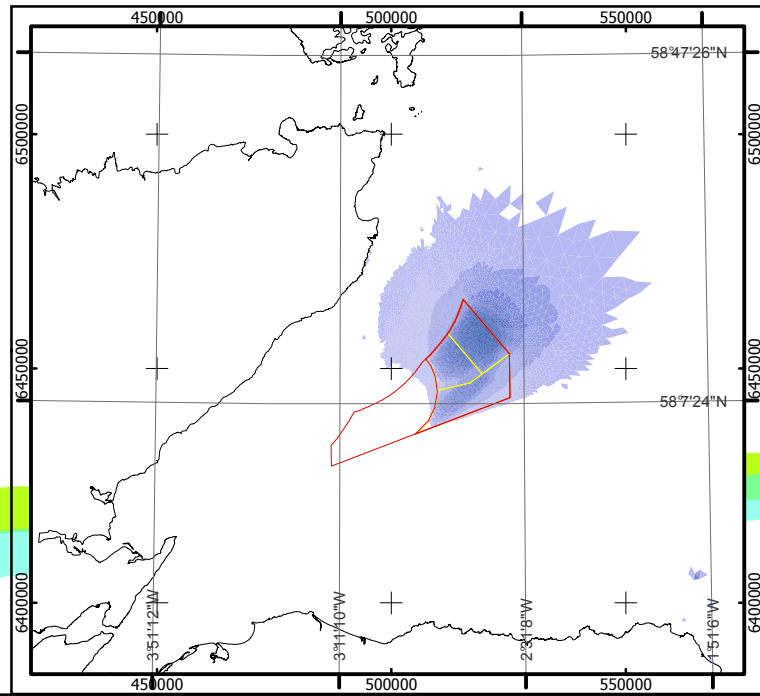
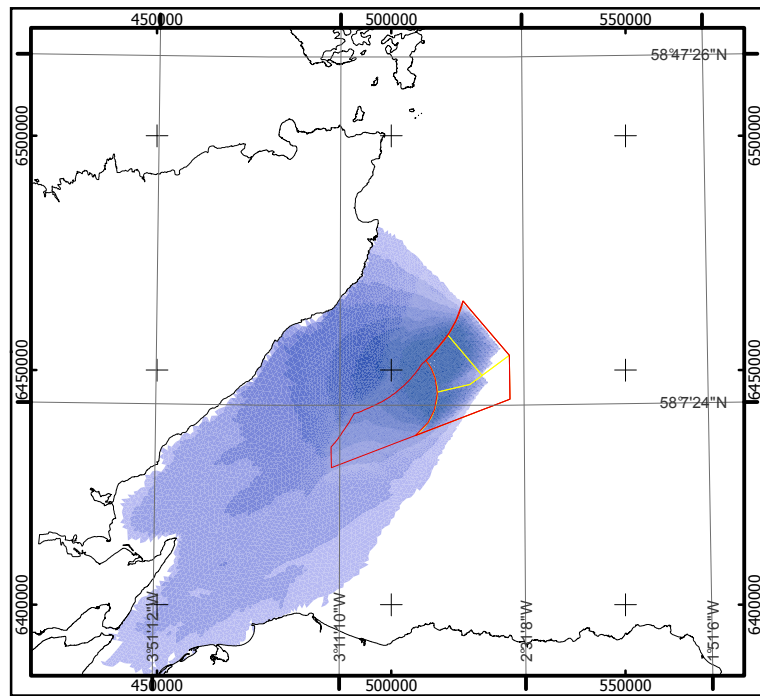
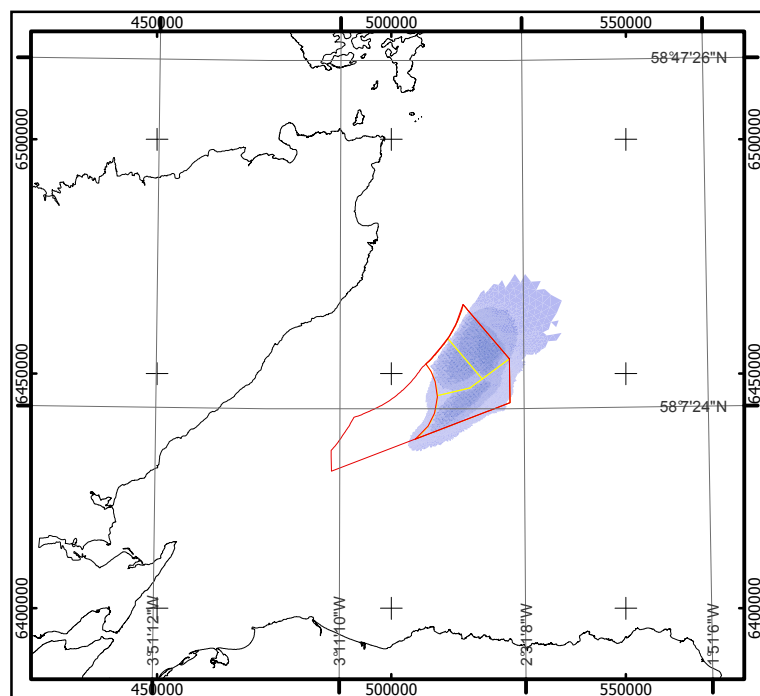
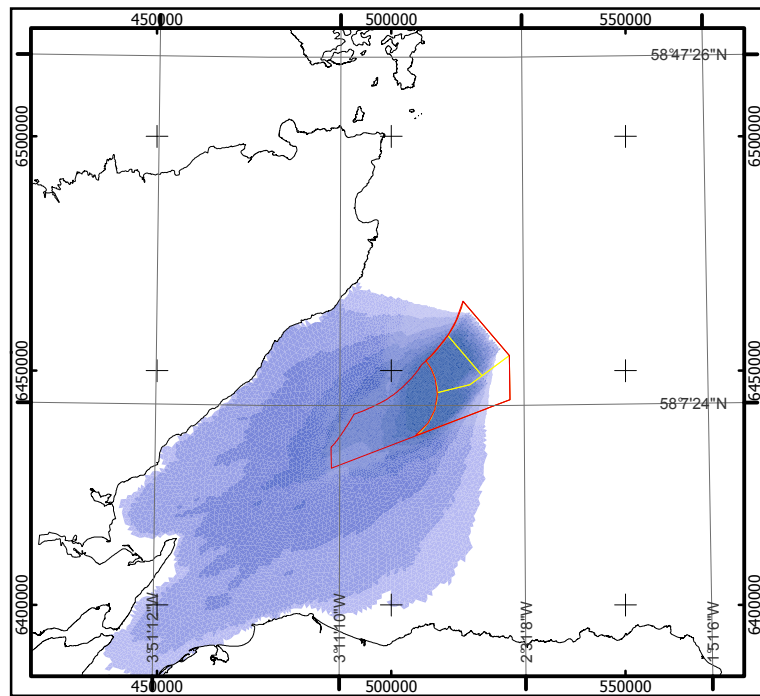
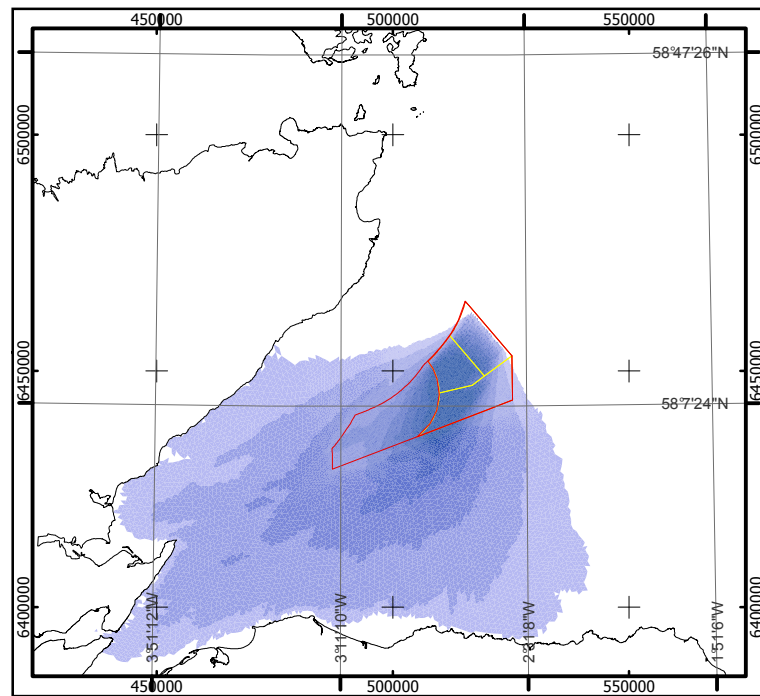
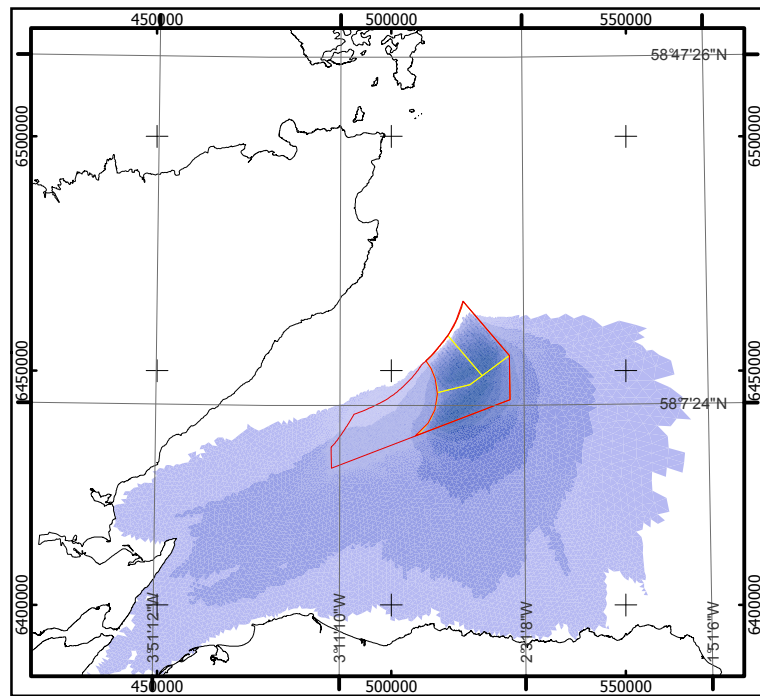
Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE  
 Reviewed: NMW  
 Approved: DOL

Date: 08/05/2012      Revision: B  
 REF: 8460001-PPW0201-ABP-MAP-016

**Fig 6.1-7 - Effect of the Project on Wave Height (T3, S5, M5) 1 in 10yrs**

**Moray Offshore Renewables Ltd**



**Moray Offshore Renewables Ltd**

**KEY**

- MORL Zone Boundary
- Windfarm Boundaries

Scenario T3, S5, M5

Significant Wave Height Difference

- Above -0.05
- 0.10 - -0.05
- 0.20 - -0.10
- 0.30 - -0.20
- 0.40 - -0.30
- 0.50 - -0.40
- 0.60 - -0.50
- 0.70 - -0.60
- Below -0.70

Horizontal Scale: 1:1,600,000      A3 Chart

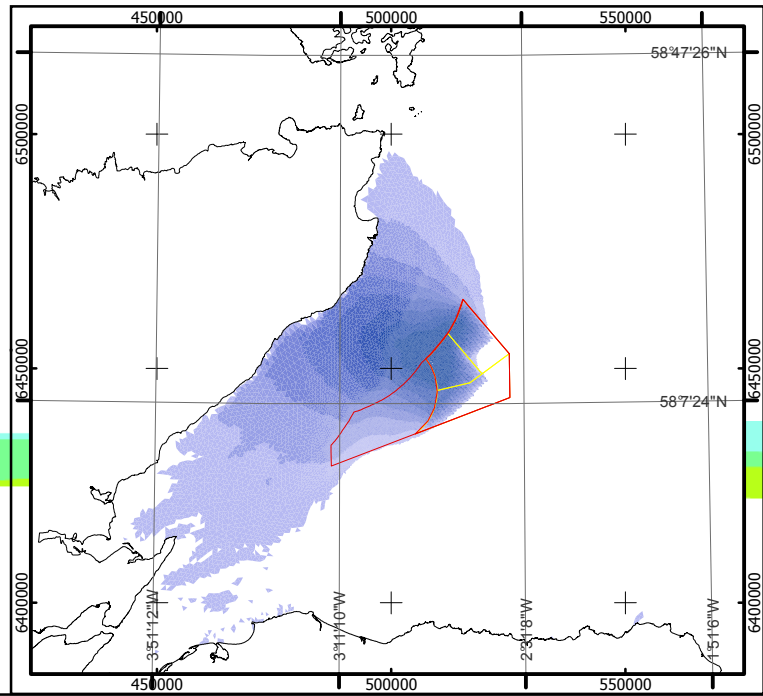
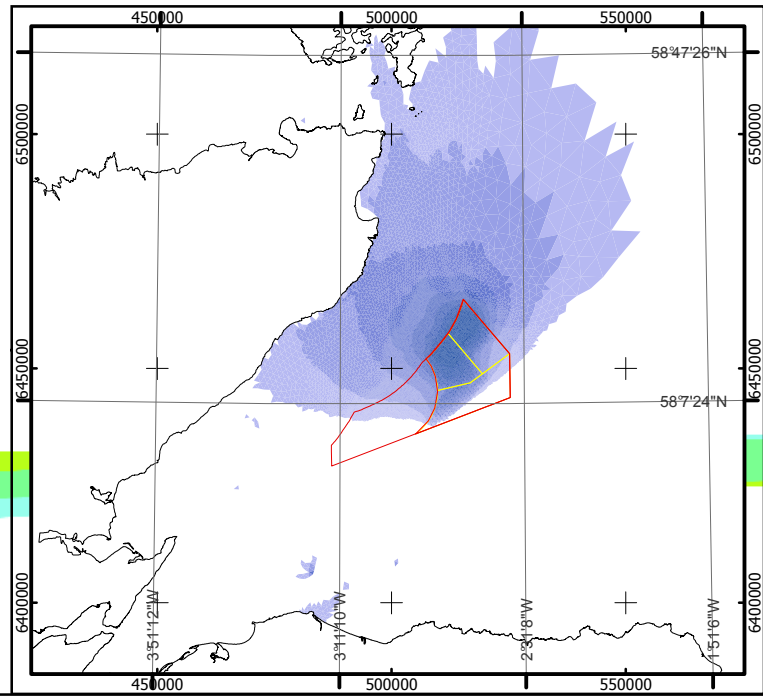
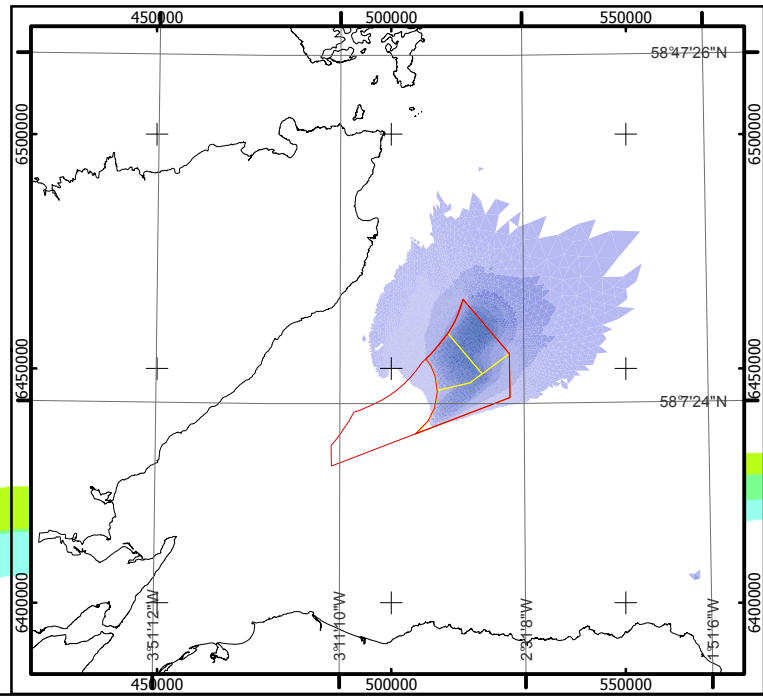
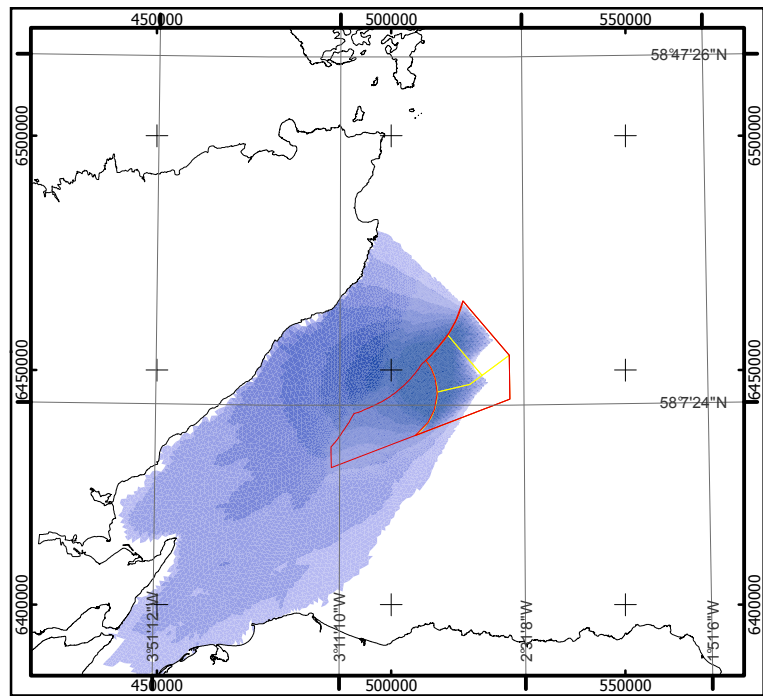
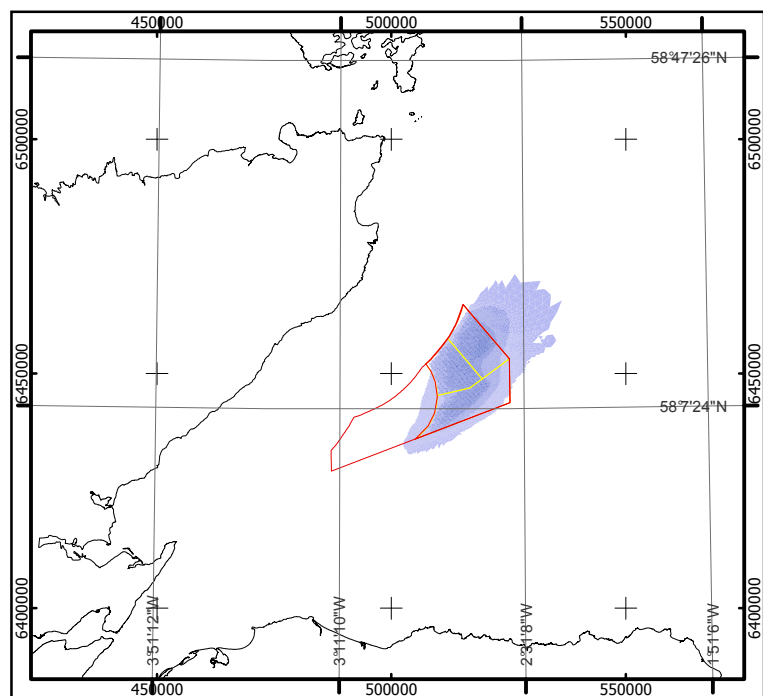
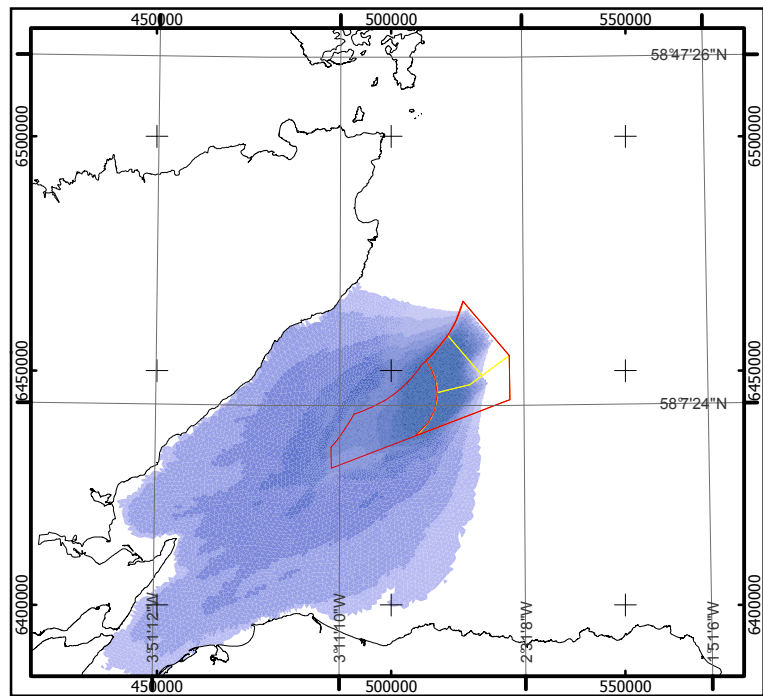
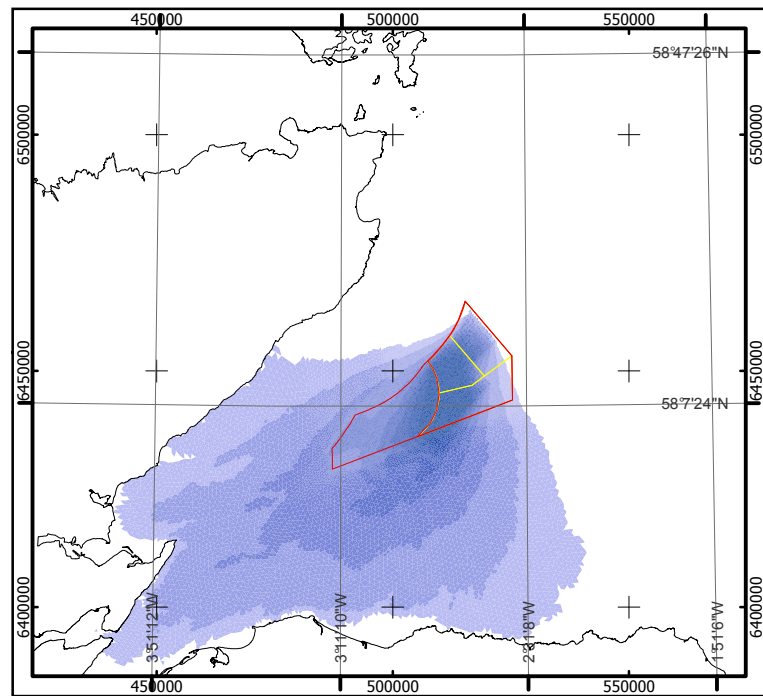
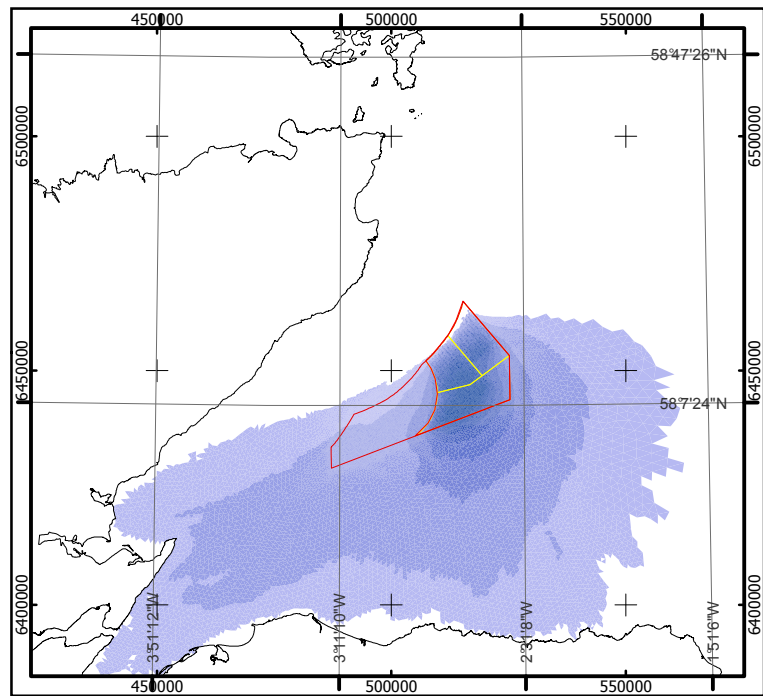
Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE  
 Reviewed: NMW  
 Approved: PH

Date: 08/05/2012      Revision: B  
 REF: 8460001-PPW0201-ABP-MAP-017

**Fig 6.1-8 Effect of the Project on Wave Height (T3, S5, M5) 1 in 50 yrs**

**Moray Offshore Renewables Ltd**



**Moray Offshore Renewables Ltd**

**KEY**

- MORL Zone Boundary
- Windfarm Boundaries

**Scenarios T5 S3, M5**

**Significant Wave Height Difference**

- 0.04 - 0.50
- 0.09 - -0.10
- 0.19 - -0.20
- 0.29 - -0.30
- 0.39 - -0.40
- 0.49 - -0.50
- 0.69 - -0.70
- 1.36 - -2.00

Horizontal Scale: 1:1,600,000      A3 Chart

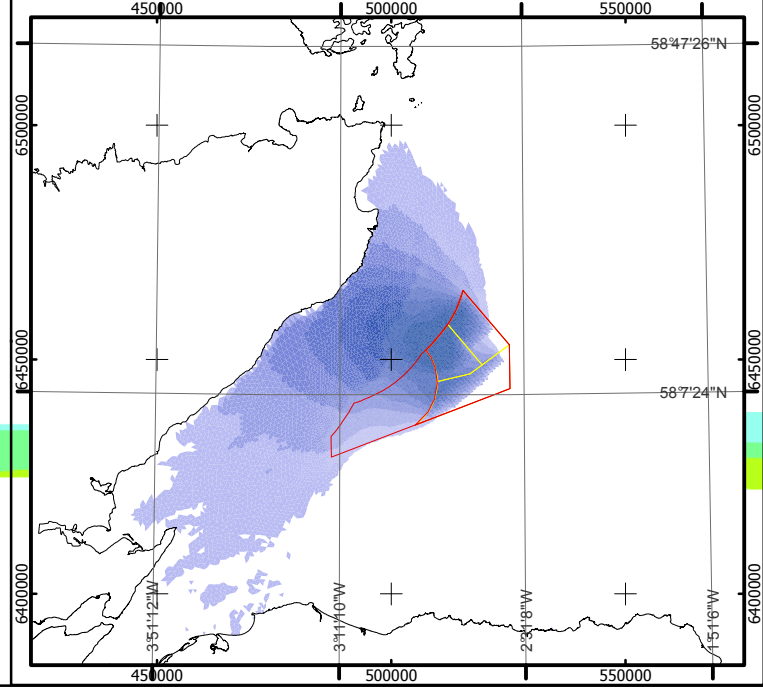
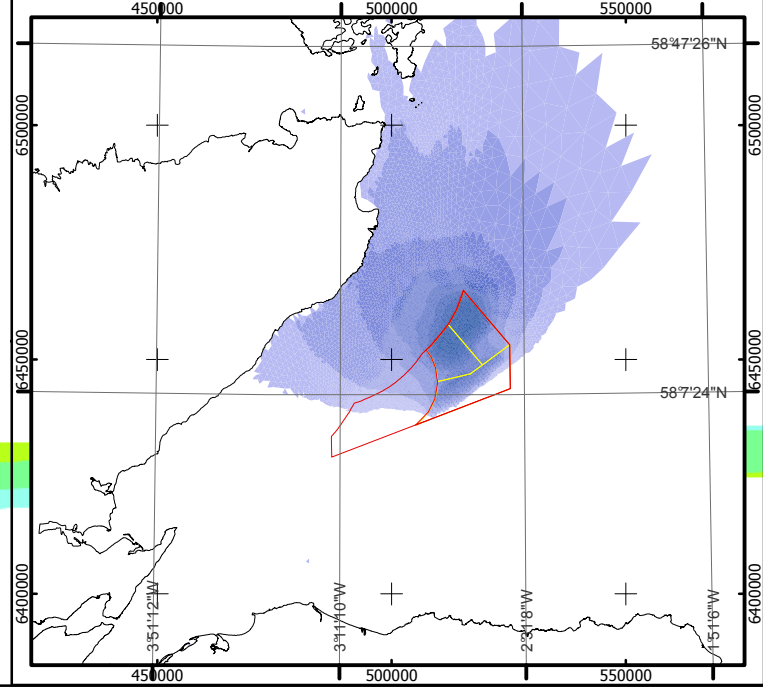
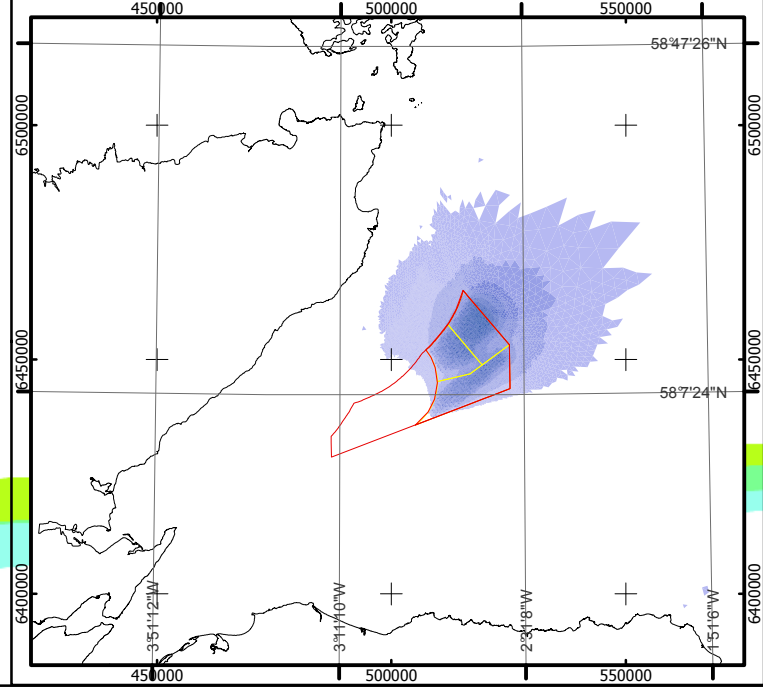
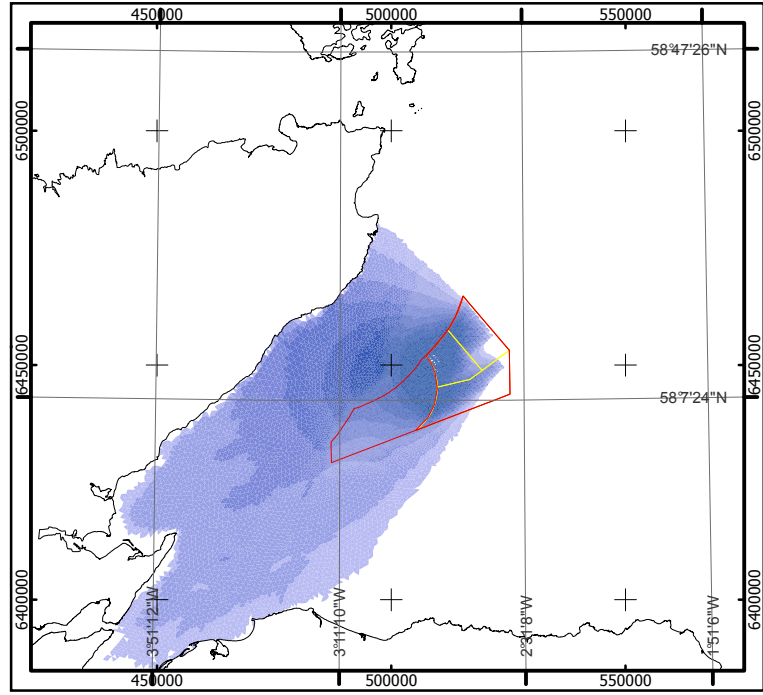
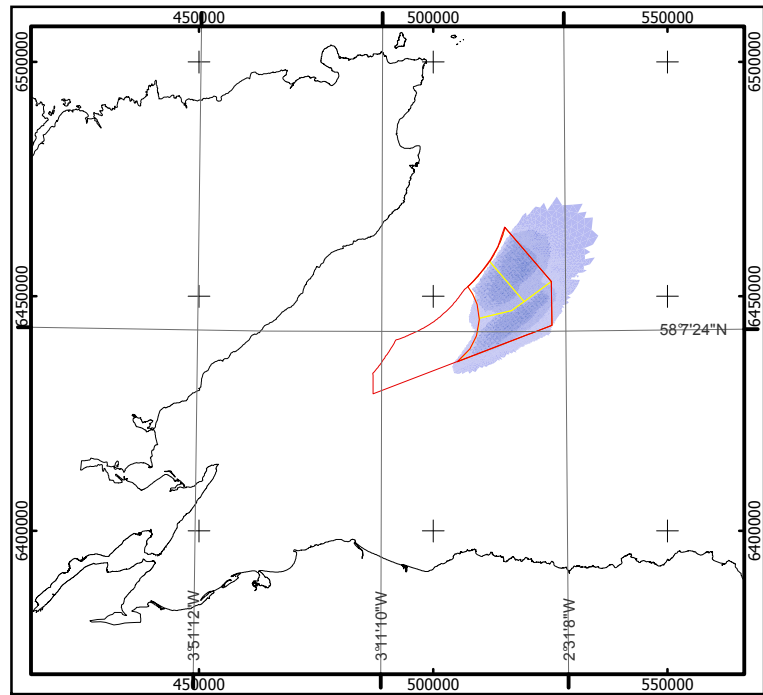
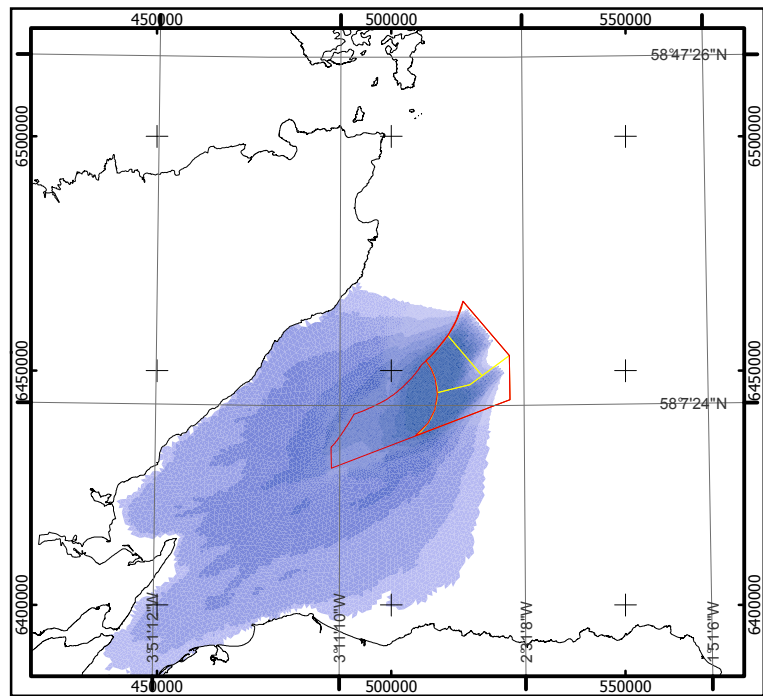
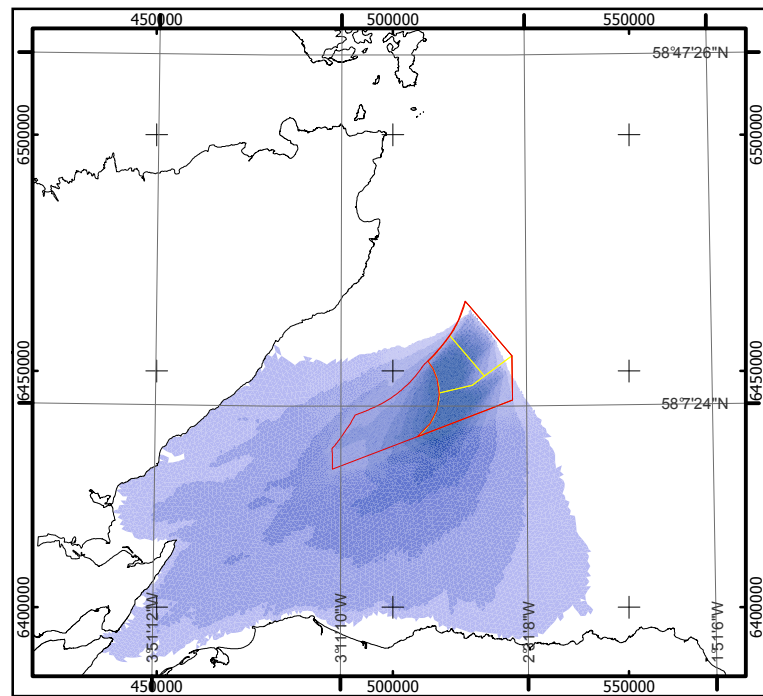
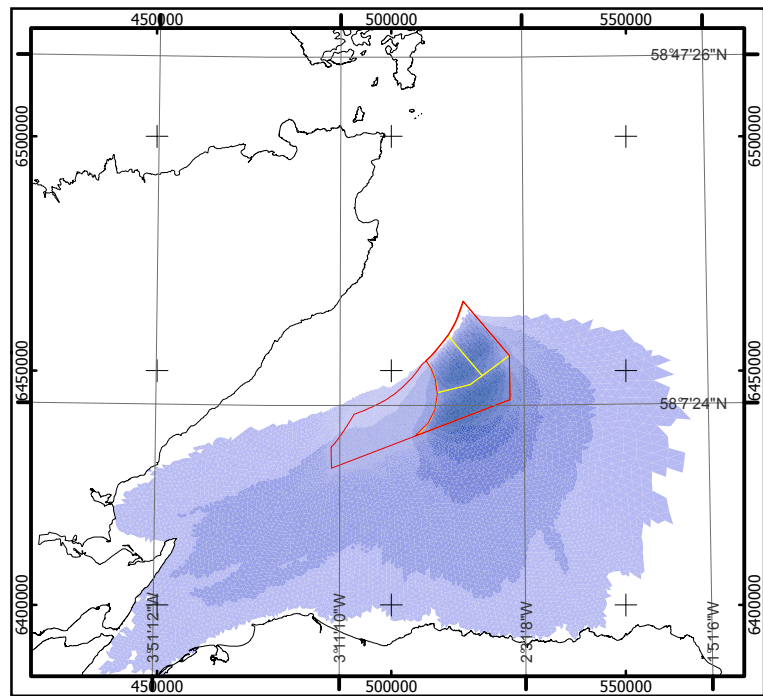
Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE  
 Reviewed: DOL  
 Approved: PH

Date: 08/05/2012      Revision: B  
 REF: 8460001-PPW0201-ABP-MAP-018

**Fig 6.1-9 - Effect of the Project on Wave Height (T5, S3, M5) 1 in 50yrs**

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**Moray Offshore Renewables Ltd**

**KEY**

MORL Zone Boundary

Windfarm Boundaries

Scenarios T5, S5, M3

Significant Wave Height Difference

Above -0.05

-0.10 - -0.05

-0.20 - -0.10

-0.30 - -0.20

-0.40 - -0.30

-0.50 - -0.40

-0.60 - -0.50

-0.70 - -0.60

Below -0.70

Horizontal Scale: 1:1,600,000



A3 Chart  
0 40,000 80,000 Metres

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE

Reviewed: NMW

Approved: PH

Date: 08/05/2012

Revision: B

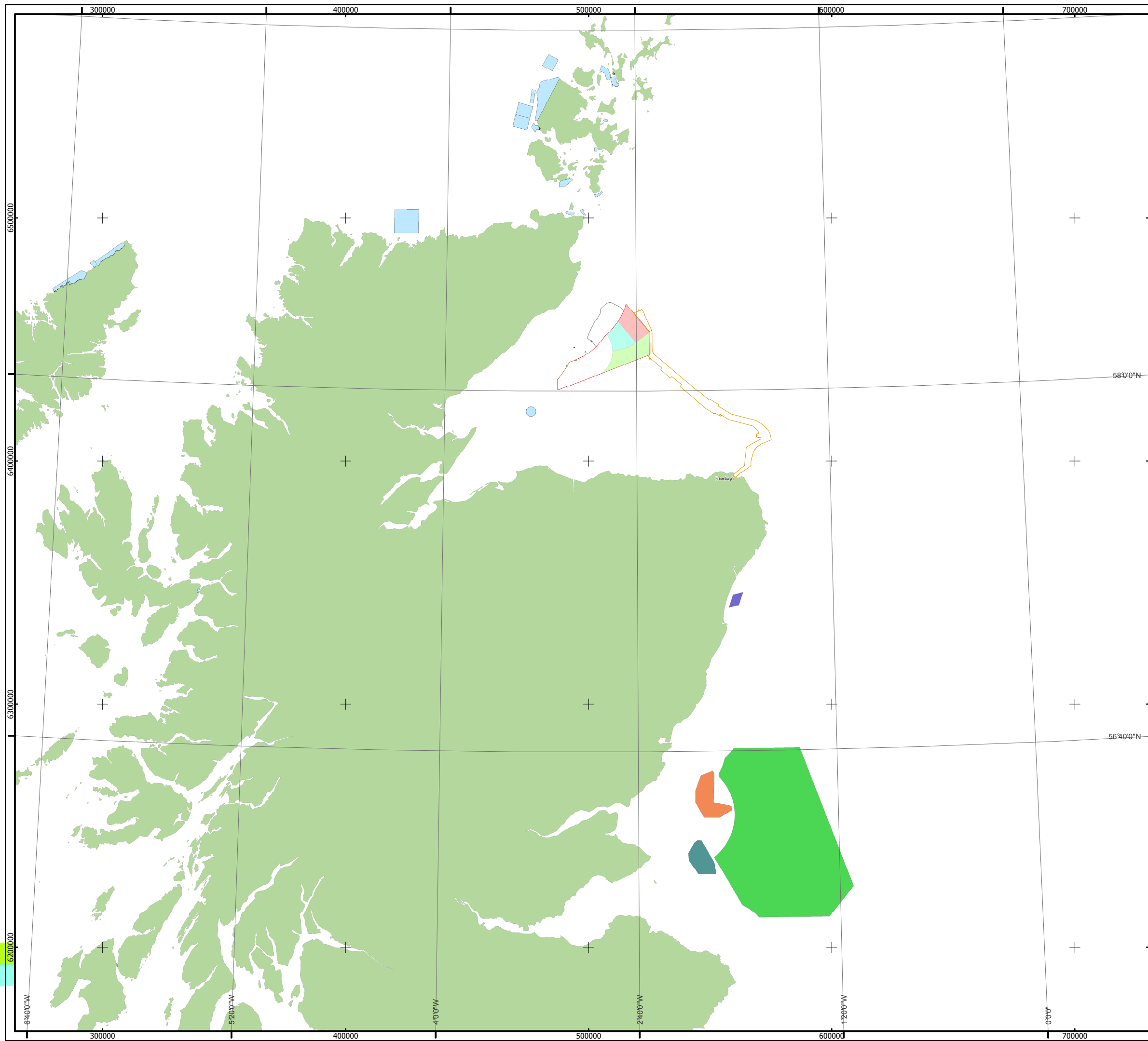
REF: 8460001-PPW0201-ABP-MAP-019

**Fig 6.1-10 - Effect of the Project on Wave Height (T5, S5, M3) 1 in 50yrs**

**Moray Offshore Renewables Ltd**



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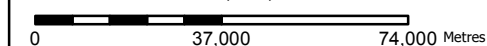
### Moray Offshore Renewables Ltd

#### KEY

-  Jacky Platform
-  Beatrice Platforms
-  Beatrice Demonstrator Turbines
-  Offshore Export Cable Route
-  MacColl Windfarm
-  Stevenson Windfarm
-  Telford Windfarm
-  MORL Zone Boundary
-  Beatrice Offshore Wind Farm
-  EMEC Tidal Power Test Facility
-  EMEC Wave Power Test Facility
-  TCE Lease Areas for Tide & Wave
-  European Wind Development Centre
-  Firth of Forth
-  Inch Cape
-  Neart na Gaoithe

Horizontal Scale: 1:1,500,000

A3 Chart



Geodetic Parameters: WGS84 UTM Zone 30N

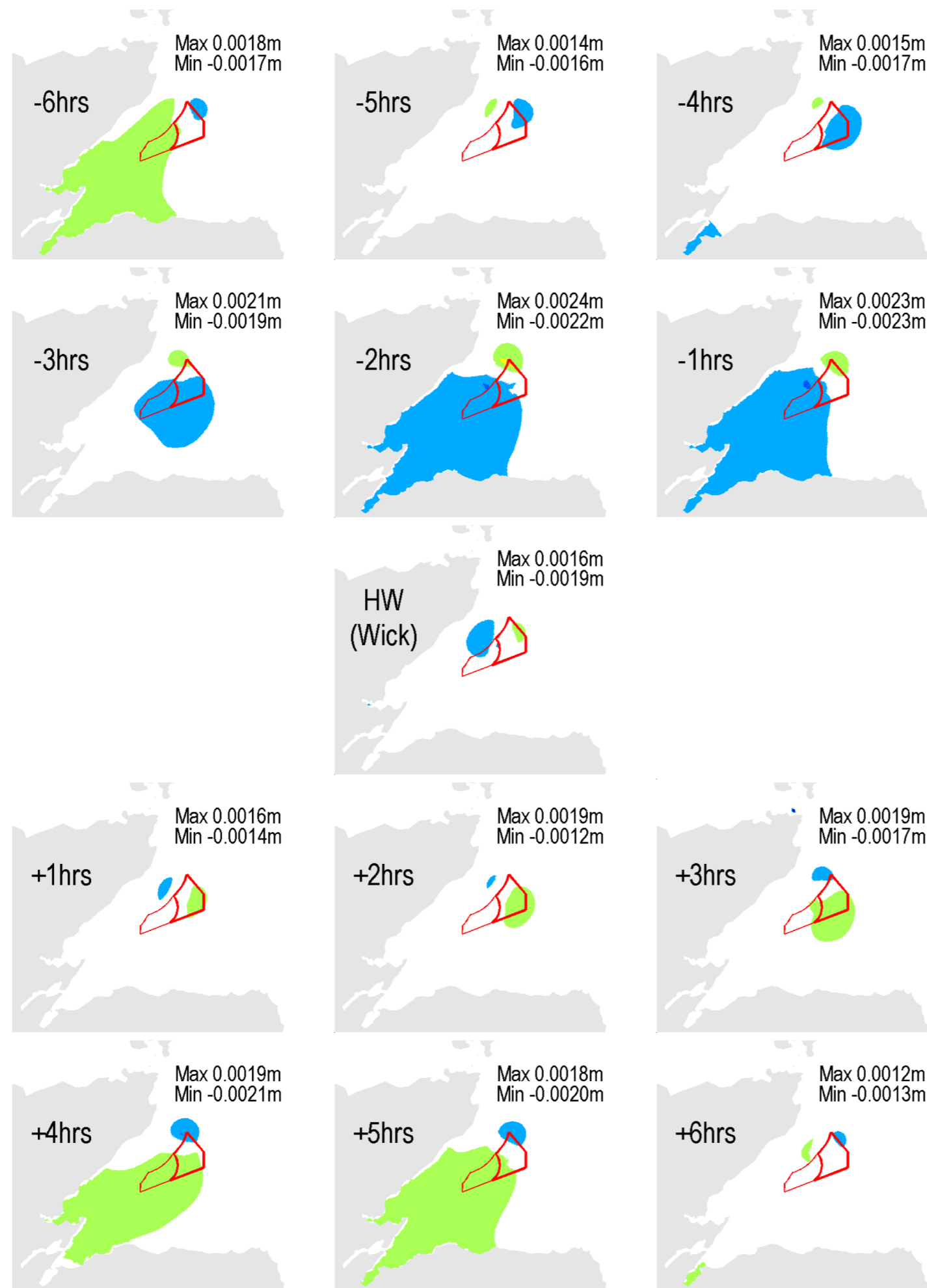
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Approved: PH

Date: 04/05/2012      Revision: A

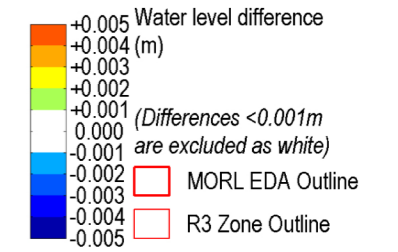
REF: 8460001-PPW0201-ABP-MAP-020

**Fig 13.1-1 - Location of Cumulative Developments**

Moray Offshore  
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Corresponding effects on neap tides and for jackets at all times are <0.001m

A3 Chart

Produced: DOL  
Reviewed: CLH  
Approved: PH

Date: 30/5/12

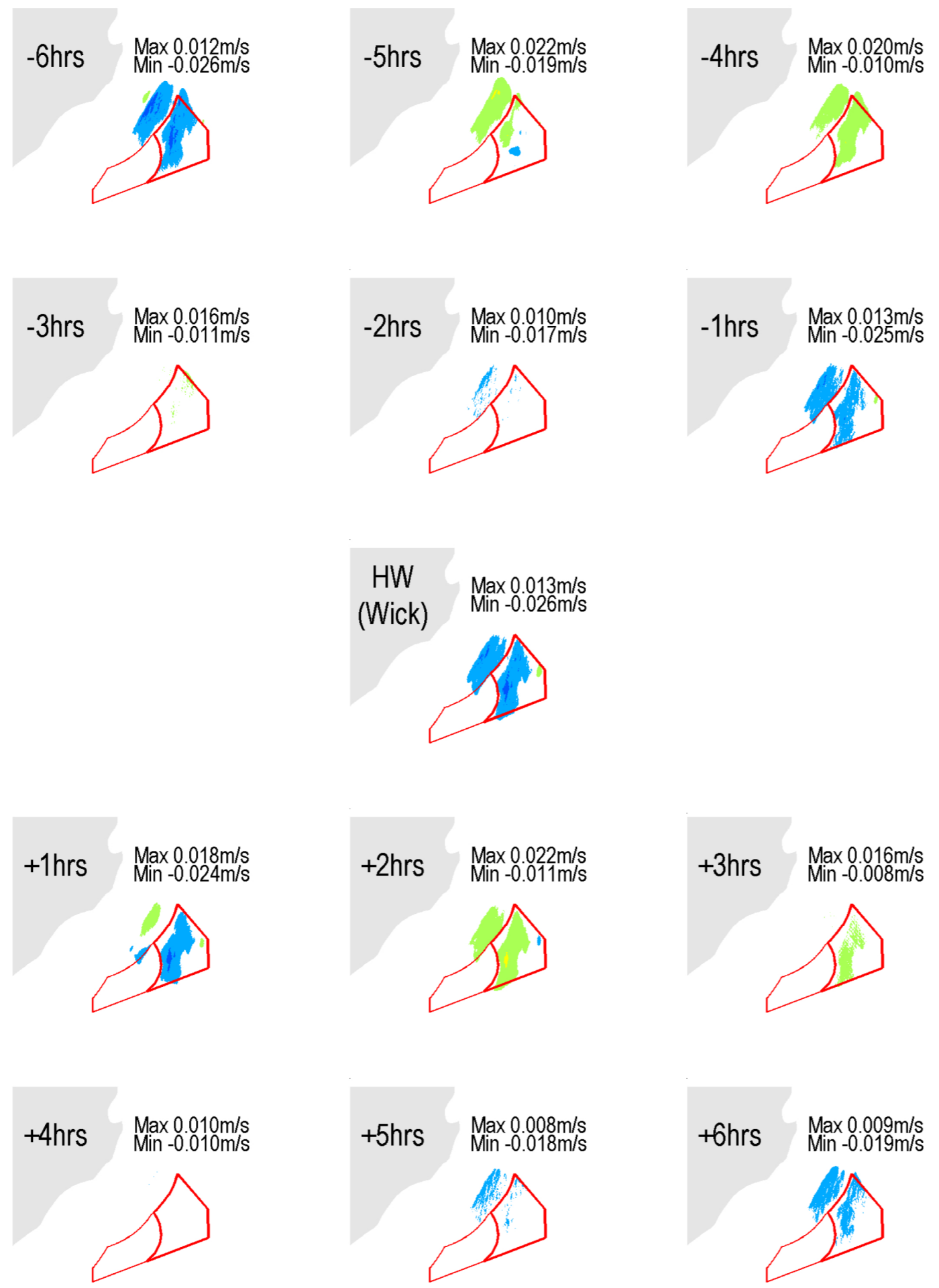
Revision: A

REF: 8460001-PPW0201-ABP-MAP-022

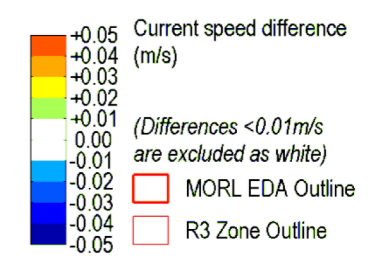
Fig 13.1-2 - Cumulative Effect of MORL and BOWL Developments on Tidal Water Levels

Moray Offshore Renewables Ltd

(GBS, MORL Development Scenario T3\_S5\_M5, plus BOWL (3.6MW), Spring Tide)



Moray Offshore Renewables Ltd



Corresponding effects on neap tides and for jackets at all times are <0.01m/s

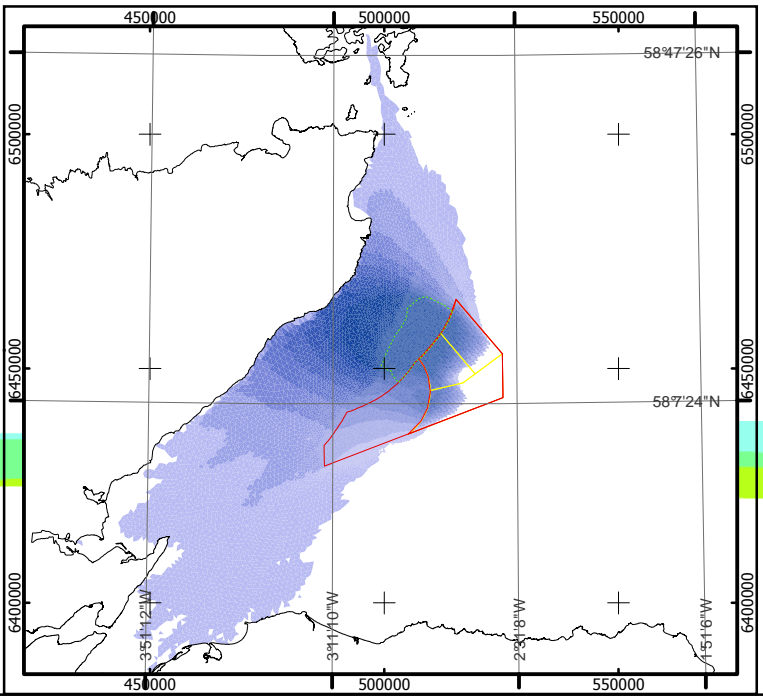
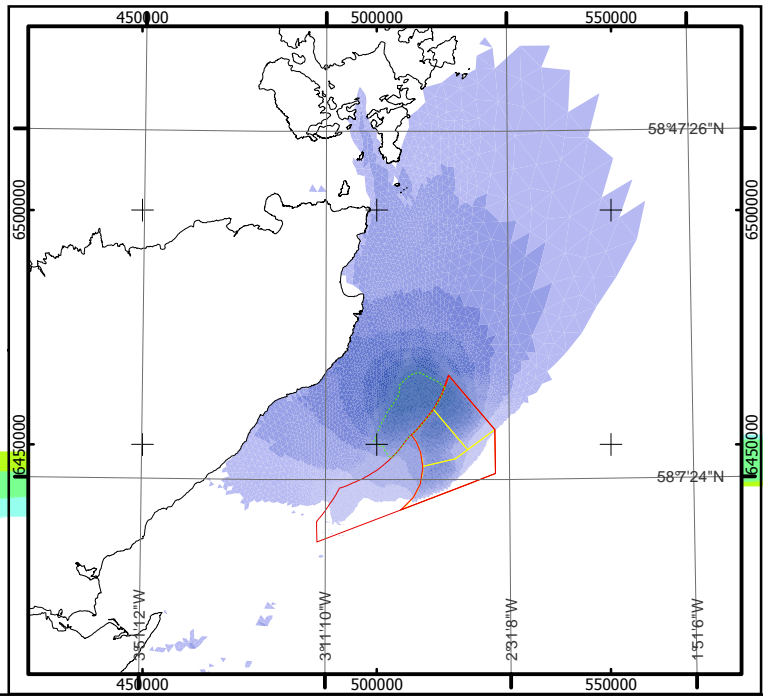
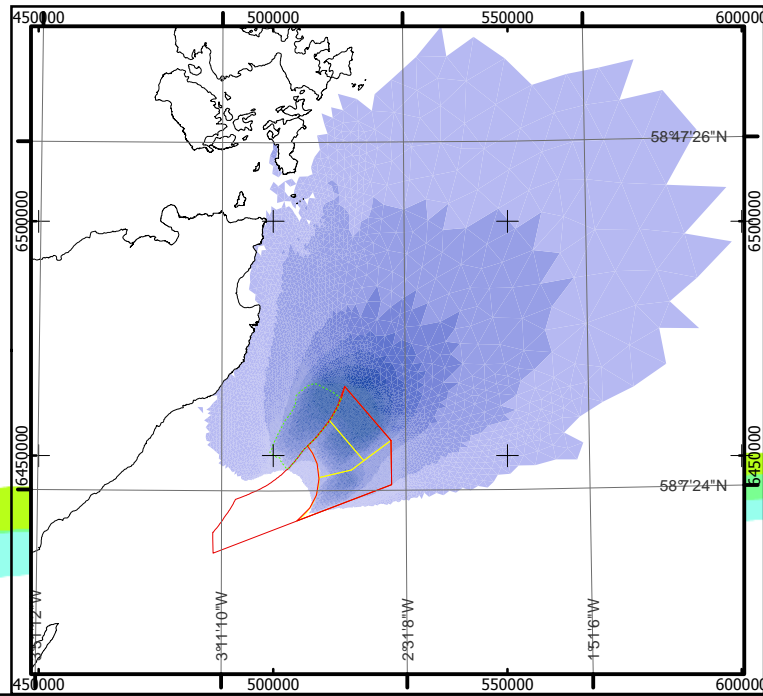
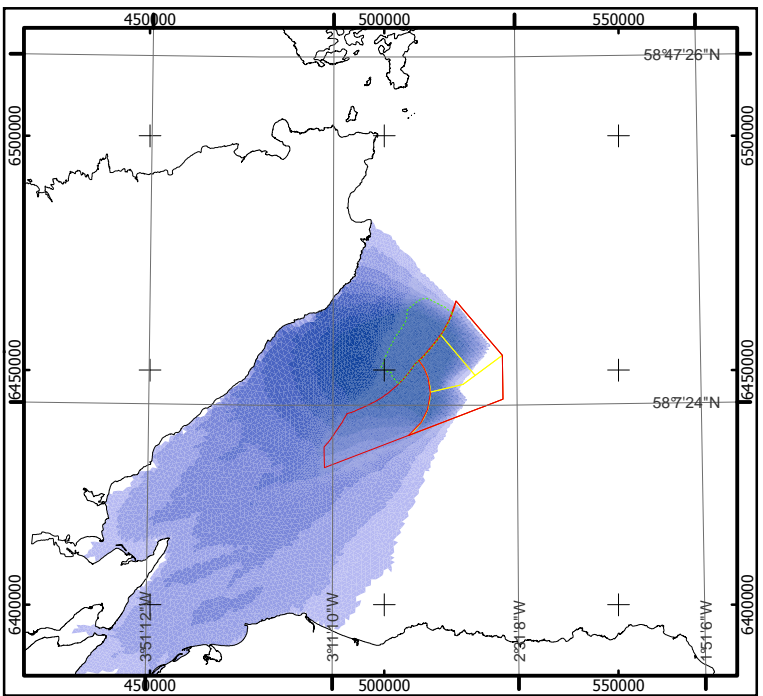
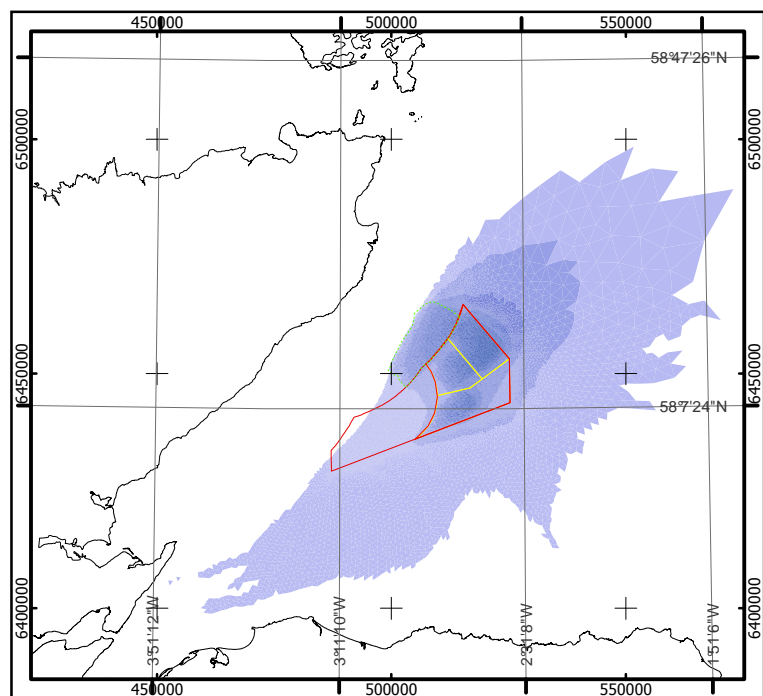
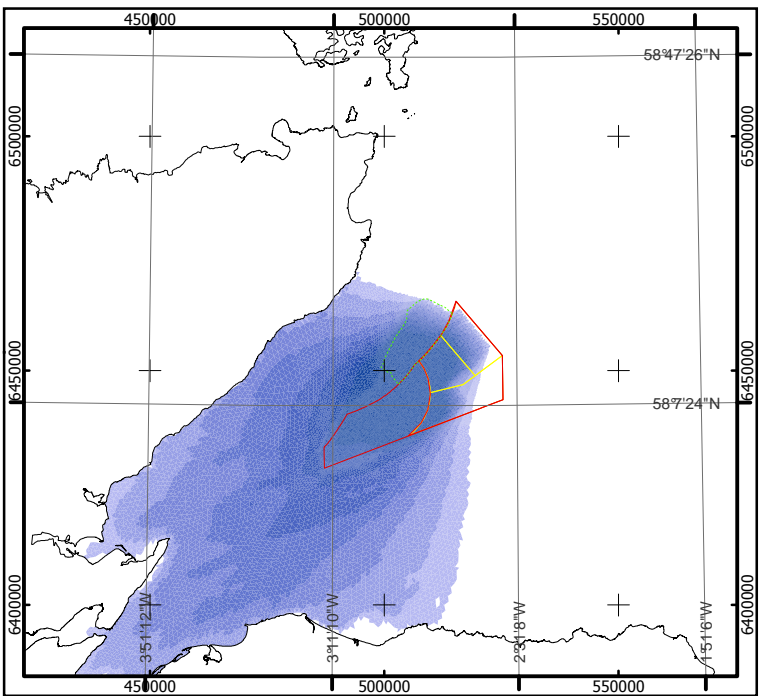
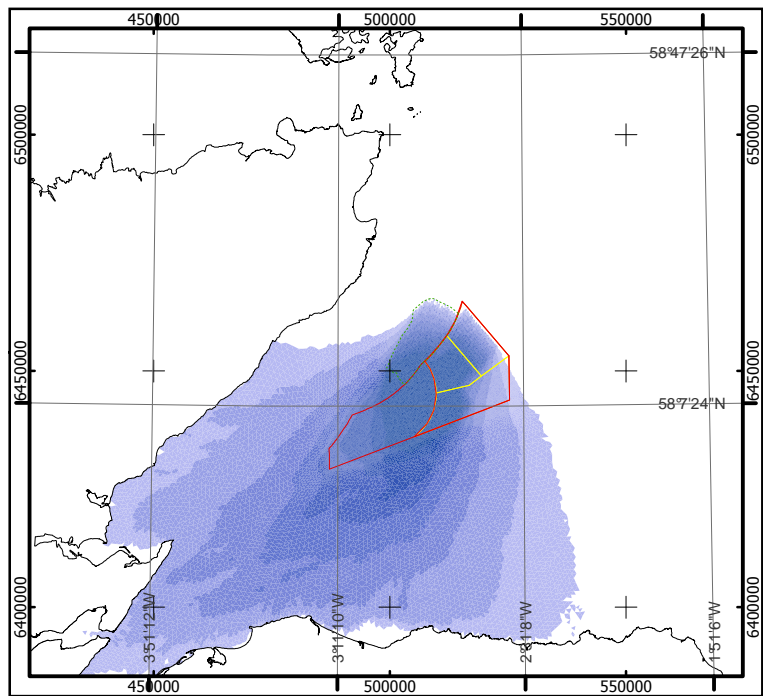
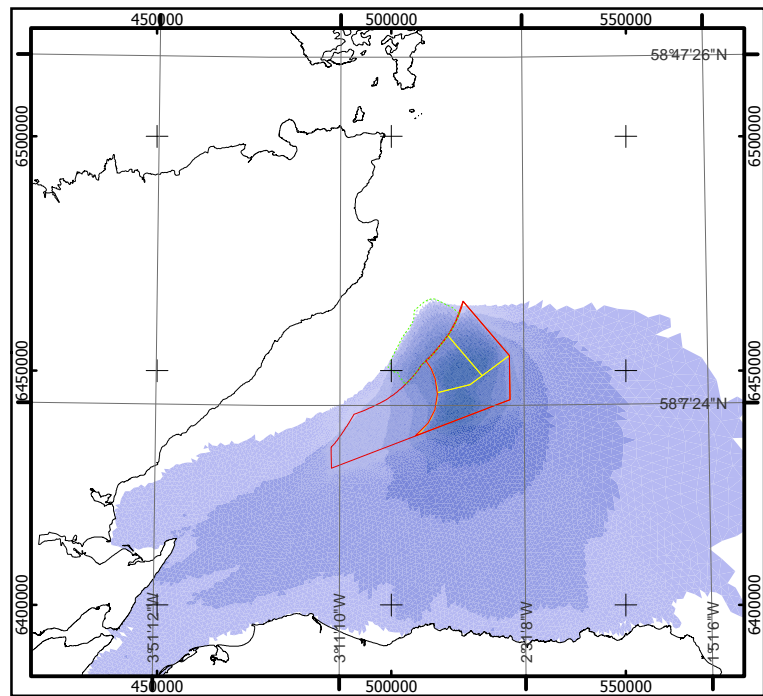
A3 Chart

Produced: DOL	
Reviewed: CLH	
Approved: PH	
Date: 30/5/12	Revision: A
REF: 8460001-PPW0201-ABP-MAP-023	

Fig 13.1-3 - Cumulative Effect of MORL and BOWL Developments on Tidal Current Speed

Moray Offshore Renewables Ltd

(GBS, MORL Development Scenario T3\_S5\_M5, plus BOWL (3.6MW), Mean Spring Tide)



Combined Effect of the MORL  
(Development Scenario 4)  
and BOWL Developments



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**KEY**

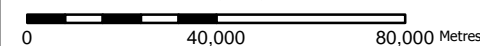
- BOWL Zone Boundary
- MORL Zone Boundary
- Windfarm Boundaries

**Significant Wave Height Difference**

- 0.04 - 0.50
- 0.09 - -0.05
- 0.19 - -0.10
- 0.29 - -0.20
- 0.39 - -0.30
- 0.49 - -0.40
- 0.59 - -0.50
- 0.69 - -0.60
- Below -0.70

Horizontal Scale: 1:1,600,000

A3 Chart



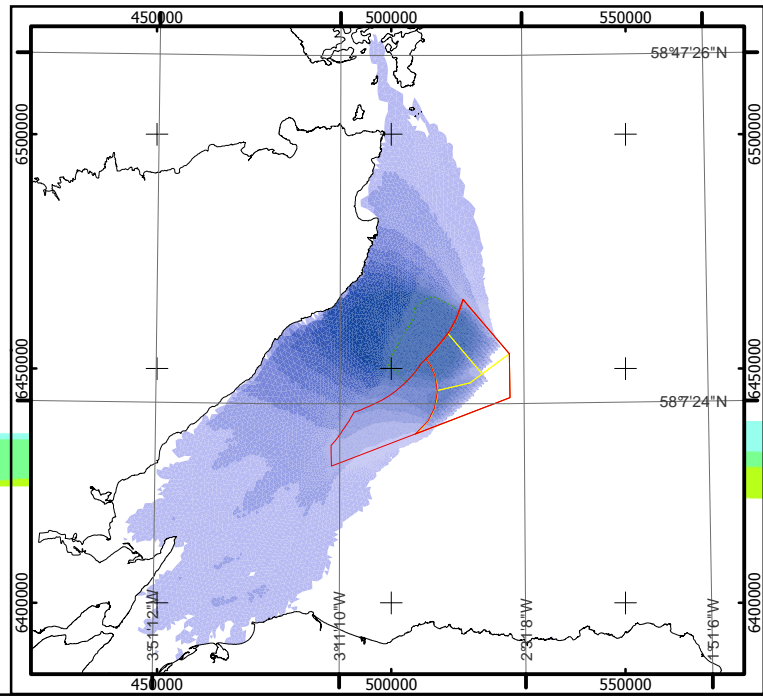
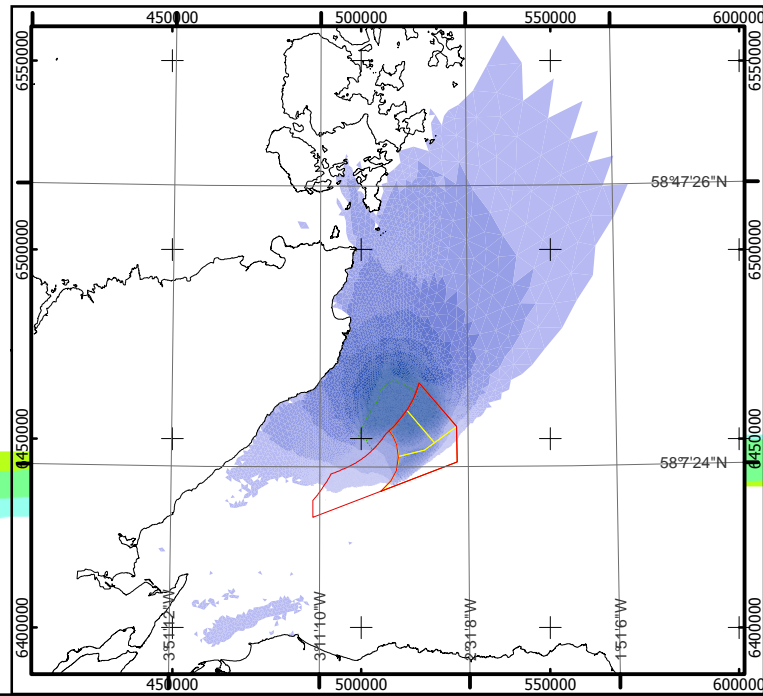
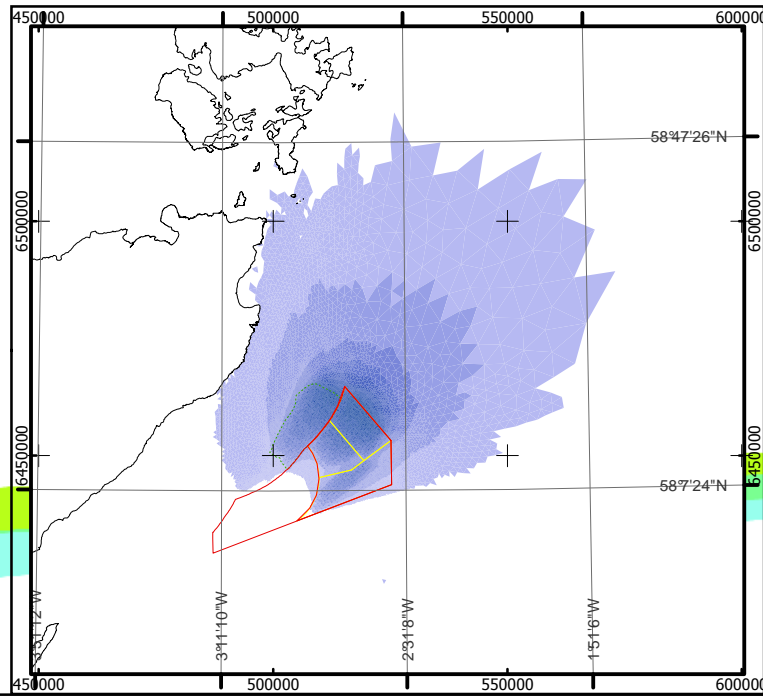
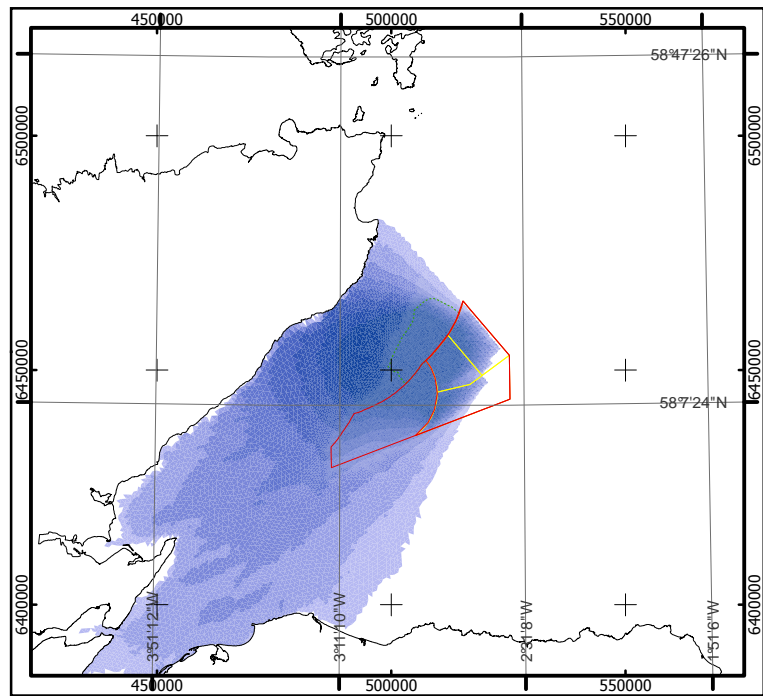
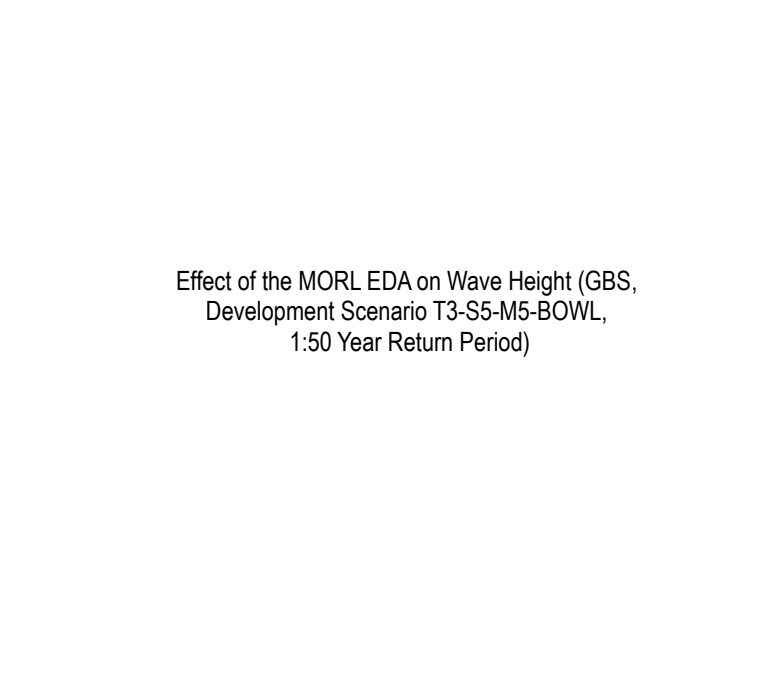
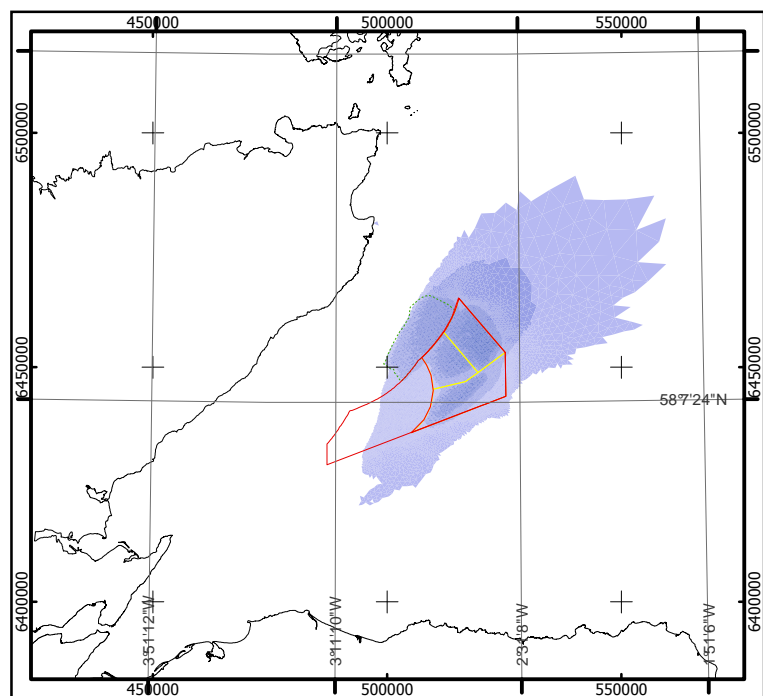
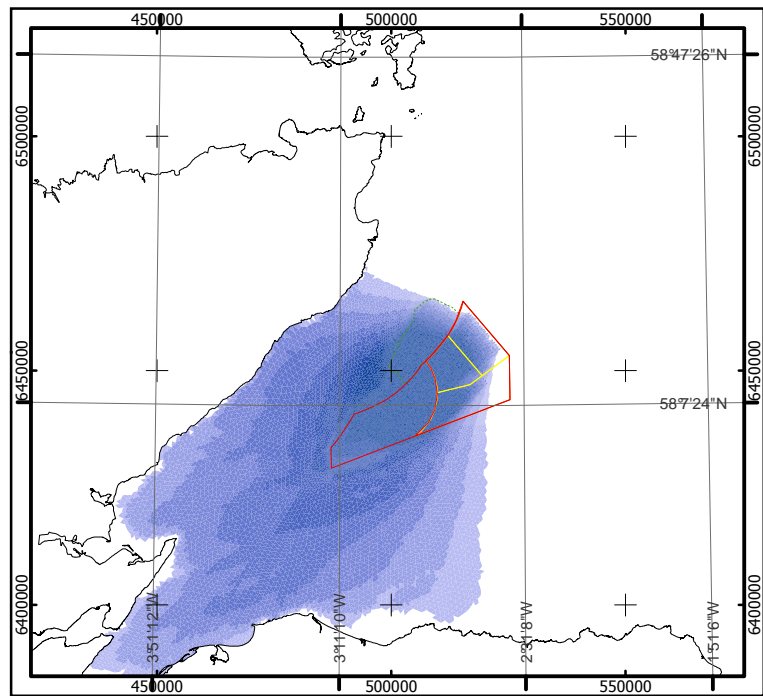
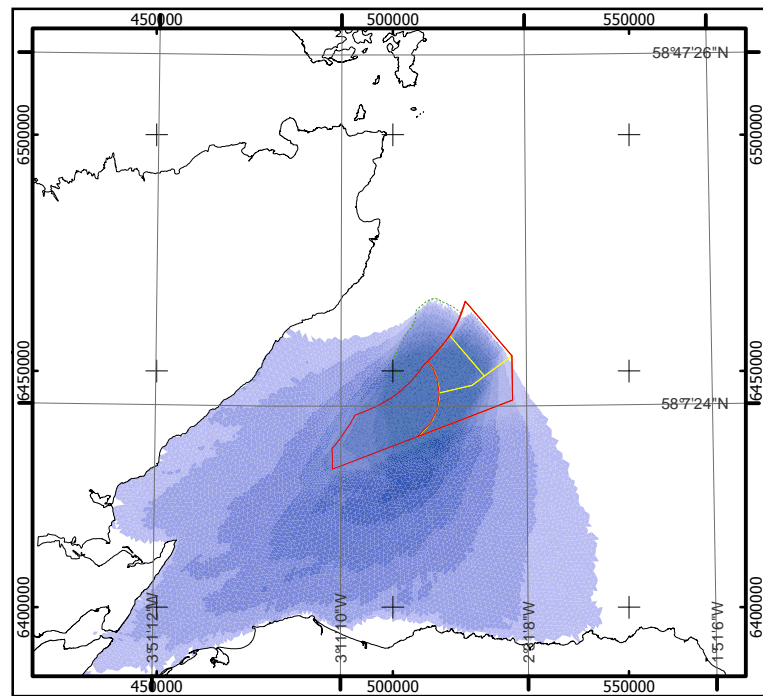
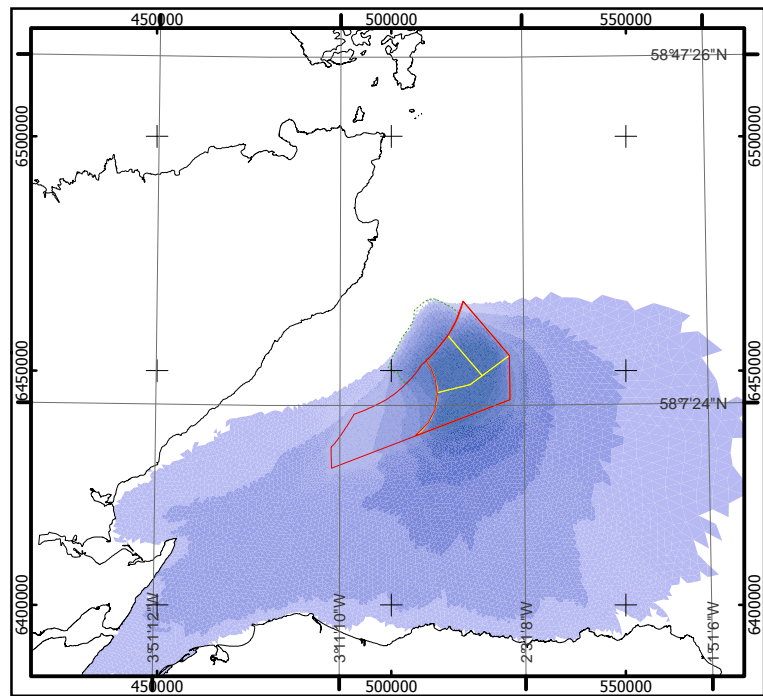
Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE  
Reviewed: NMW  
Approved: PH

Date: 23/11/2011      Revision: A  
REF: 8460001-PPW0201-ABP-MAP-023

**Fig 13.1-4 - Cumulative Effect  
of MORL and BOWL Developments  
on Wave Height (1in1yr)**

**Moray Offshore  
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Effect of the MORL EDA on Wave Height (GBS,  
Development Scenario T3-S5-M5-BOWL,  
1:50 Year Return Period)



**Moray Offshore Renewables Ltd**

**KEY**

- MORL Zone Boundary
- Windfarm Boundaries
- BOWL Zone Boundary

Significant Wave Height Difference

- 0.04 - 0.50
- 0.09 - -0.05
- 0.19 - -0.10
- 0.29 - -0.20
- 0.39 - -0.30
- 0.49 - -0.40
- 0.59 - -0.50
- 0.69 - -0.60
- Below -0.70

Horizontal Scale: 1:1,600,000      A3 Chart  

 0      40,000      80,000 Metres

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: MCE  
 Reviewed: NMW  
 Approved: PH

Date: 17/05/2012      Revision: B  
 REF: 8460001-PPW0201-ABP-MAP-024

**Fig 13.1-5 - Cumulative Effect  
of MORL and BOWL Developments  
on Wave Height (1in50yr)**

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