Dogger Bank Creyke Beck
Converter Station Working Group

8 March 2012

FOREWIND
DELIVERING YOUR ENERGY FUTURE

Chair’s welcome

- Housekeeping
- Introductions
- Purpose of the group
- Terms of reference

Agenda

- Introduction to Forewind and the Dogger Bank Wind Farm
- What is a converter station?
- The site selection process so far
- Group exercise on siting the converter station
- Question and answer session
- Chair’s closing remarks

Introduction to Forewind and the Dogger Bank Wind Farm

Lee Clarke – General Manager

8 March 2012

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Forewind – Who Are We?

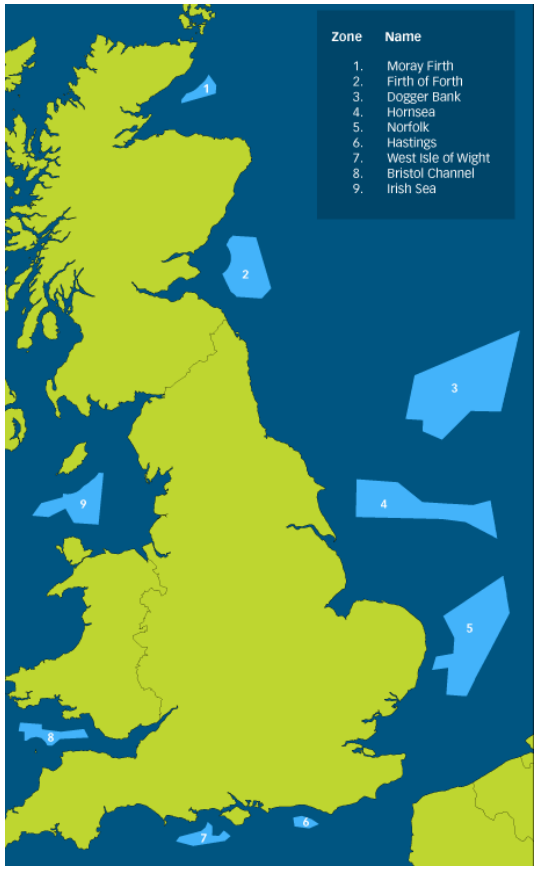
- A consortium of four major energy companies

Key Forewind Contacts

- Lee Clarke - General Manager
- Mark Baxter - Onshore Project Manager
- Amy Clark - Onshore Environmental Impact Assessment Co-ordinator
- John Hughes - Electrical Engineer
- Nikki Smith - Stakeholder Manager

About Forewind

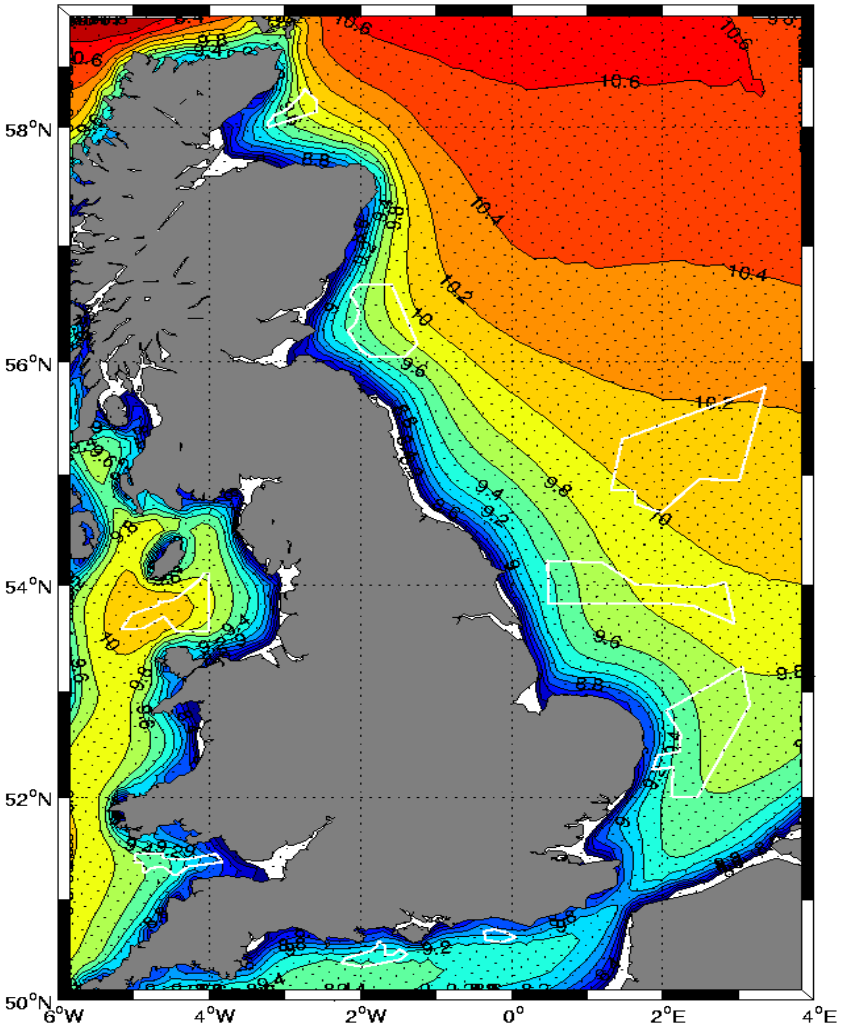
- Forewind's mission is to deliver development consents for safe, viable offshore wind capacity.



Forewind is developing Zone 3, one of the development concessions offered by The Crown Estate as part of its Round 3 Offshore Wind programme.

Dogger Bank Key Facts

- Capacity: Agreed target 9 GW, with the potential for approximately 13 GW.
- Area: 8,660km^2 (3,350 sq. miles); equivalent to size of North Yorkshire.
- Distance: 125-290 km (80-180 miles) from shore.
- Depth: 18-63 m (60-210 ft); c.4 GW in <30m water depth, c.8 GW in <35m water depth; shallow compared with other zones.
- Wind: High wind speeds of >10 m/s average wind speed across the zone.
- History: A "dogger“ was a type of Dutch fishing boat that commonly worked in the North Sea in the seventeenth century.

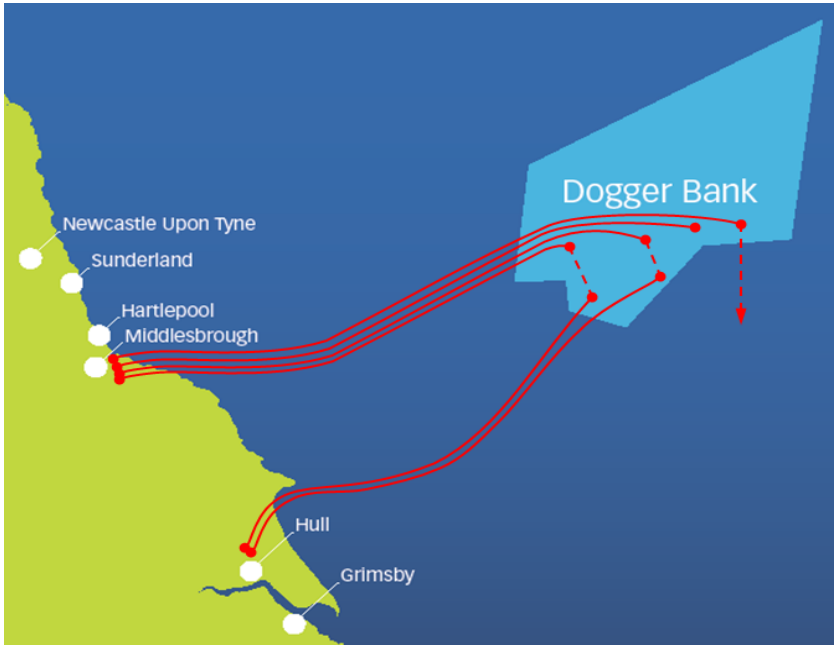


Wind speed map, offshore British Isles

Grid Connections

- Electricity generated at Dogger Bank must connect into the UK's national electricity transmission network – the National Grid
- 2000 MW of grid connection agreements with National Grid at Creyke Beck Substation
  - 500MW in 2016
  - 500MW in 2017
  - 500MW in 2019
  - 500MW in 2020

Connection point		Connection date
P1 – Creyke Beck	Yorkshire	Apr 2016
P2 – Lackenby	Teesside	Apr 2017
P3 – Lackenby	Teesside	Apr 2018
P4 – Creyke Beck	Yorkshire	Apr 2019
P5 – Tod Point	Teesside	Apr 2019
P6 – Tod Point	Teesside	Apr 2020



Forewind has secured grid connection points for 6 GW of capacity.

Consenting

- Projects of this scale are Nationally Significant Infrastructure Projects (NSIP)
- Require an environmental impact assessment (EIA)
- Development Consent Order (DCO) applications and the environmental statements (ES) prepared by Forewind
- Examined by a new national infrastructure directorate of the Planning Inspectorate http://infrastructure.independent.gov.uk/who-we-are/national-infrastructure-planning-transfer/
- Determined by the Secretary of State, not the Local Planning Authority
- The Local Planning Authority is invited to submit a Local Impact Report

Consultation

- Stakeholder consultation is a key element of the pre-application process
- Phase 1 of statutory consultation was from 5 Dec 2011 - 20 Jan 2012
- Phase 2 will be in Autumn 2012
- In between statutory consultation periods, Forewind consult certain stakeholders on specific issues e.g. siting the converter station
- All consultation will be documented in the Consultation Report

Programme

- Oct 2010 – Scoping report submitted
- Winter 2010-11 – Preliminary site selection work
- Spring - Summer 2011 – Onshore and offshore surveys
- Dec 2011 – Jan 2012 – Phase 1 of statutory consultation
- Spring – Summer 2012 – Further surveys, EIA, non-statutory consultation
- Autumn 2012 – Phase 2 of statutory consultation
- Winter 2012/13 – Submit DCO application
- Summer 2013 – Consent decision
- 2013 – 2014 – Pre-construction period
- 2015 – Construction begins

Any Questions?

What is a Converter Station
Why Do We Need One?

John Hughes – Electrical Engineer

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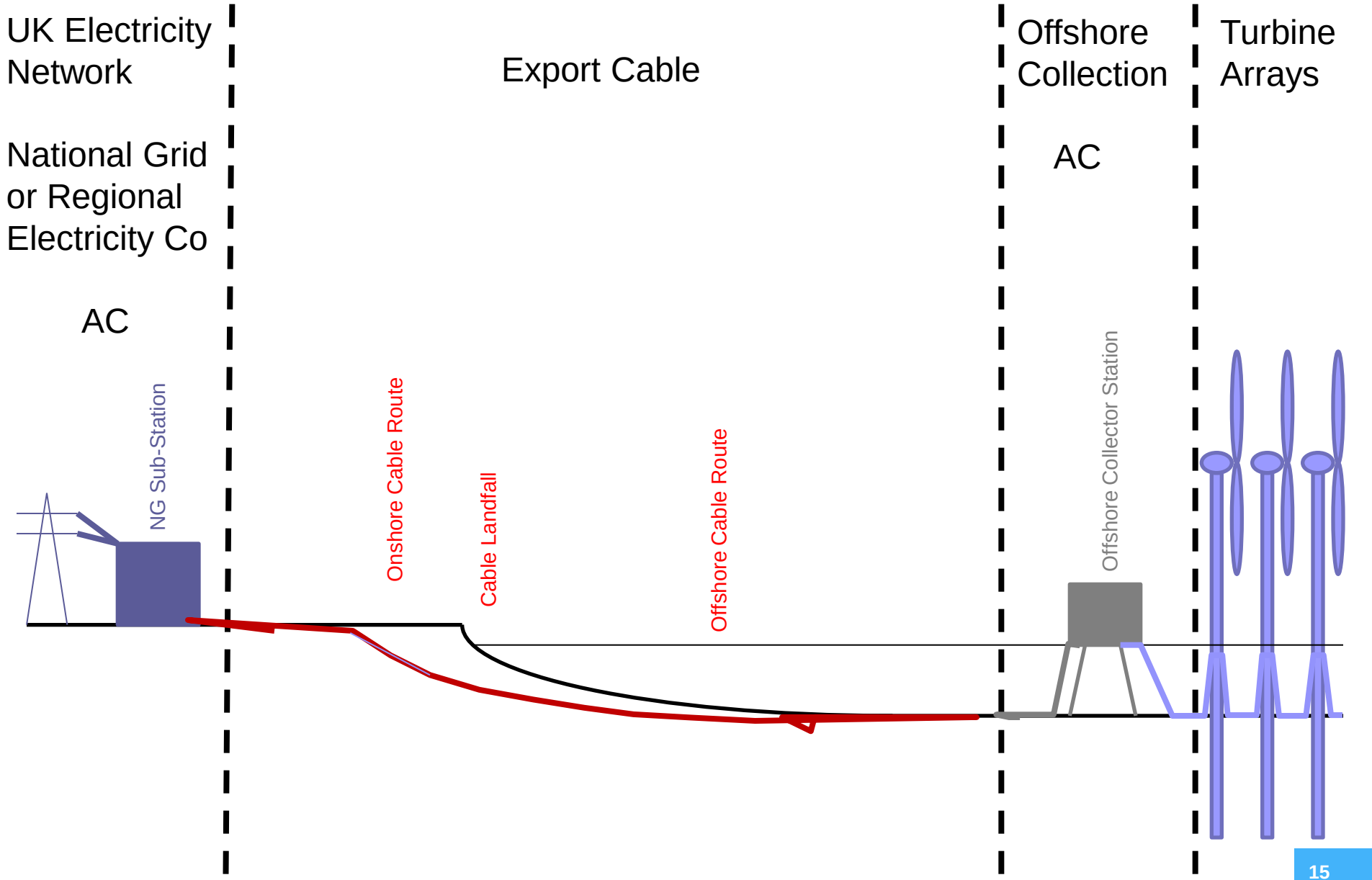
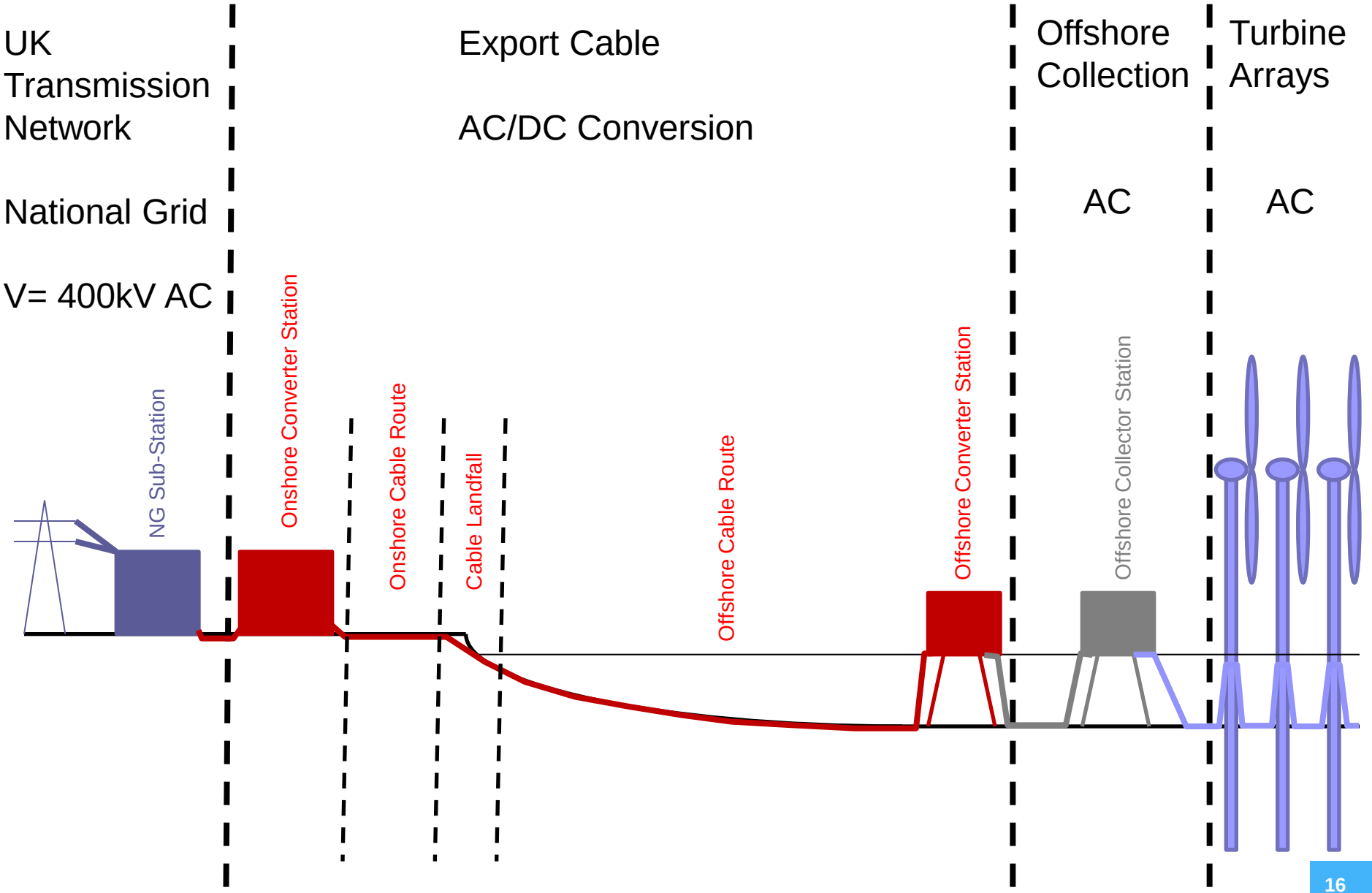
Windfarm Power Transmission



Dogger Bank Power Transmission to Shore



Why HVDC?

- The reasons for selecting HVDC instead of AC for a specific project are often numerous and complex. The most common arguments in its favour are:
- 1. Long distances to transmit electricity
- 2. Lower losses
- 3. Lower investment cost
- 4. Asynchronous interconnections
- 5. Controllability
- 6. Limited short-circuit currents
- 7. Environment.

Example 1
SIEMENS Trans Bay HVDC Station (USA)

Valve Hall is High-Tech

Indoor Filter Equipment

Example 2
ABB Estlink HVDC Station (E. Europe)

Example 3
ABB Shoreham HVDC Station (USA)

Example 4
SIEMENS Murraylink Victoria (South Australia)

Example 5
ABB Zambezi HVDC Station (Africa)

Example 5
ABB Zambezi HVDC Station - Aerial View

Example 6
ABB The Harku HVDC Station (Estonia)

Example 7
SIEMENS Thailand-Malaysia HVDC Interconnector

Example 8
SIEMENS HVDC Station in Germany

Example 9
SIEMENS Sayreville HVDC Station (USA)

Example 10
SIEMENS HVDC Station in India

ABB East-West Interconnector Film

- This film shows a typical high voltage direct current (HVDC) link

www.youtube.com/watch?v=ZWY4OczlH9s

The Converter Station Site Selection Process

Mark Baxter – Onshore Project Manager

8 March 2012

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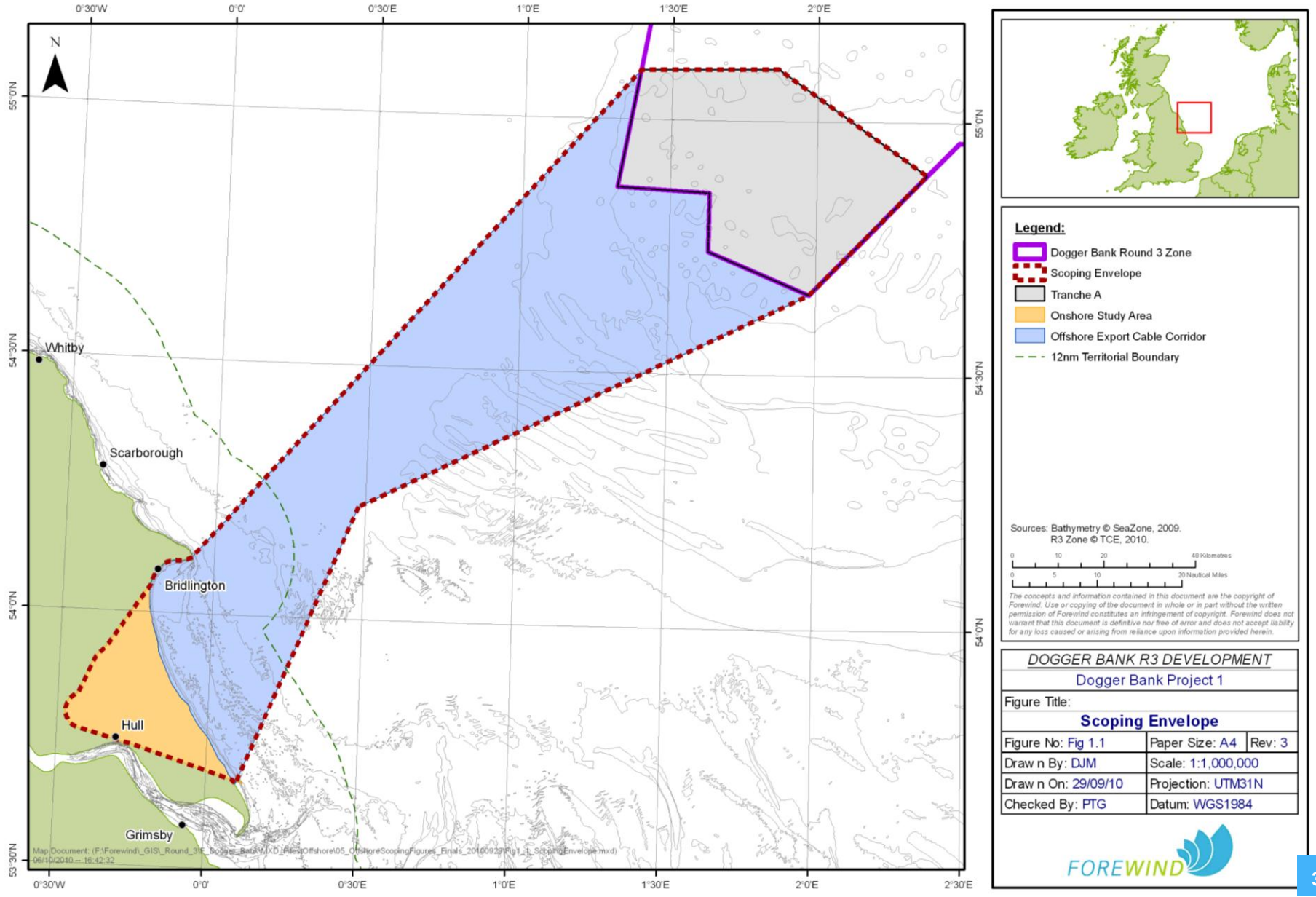
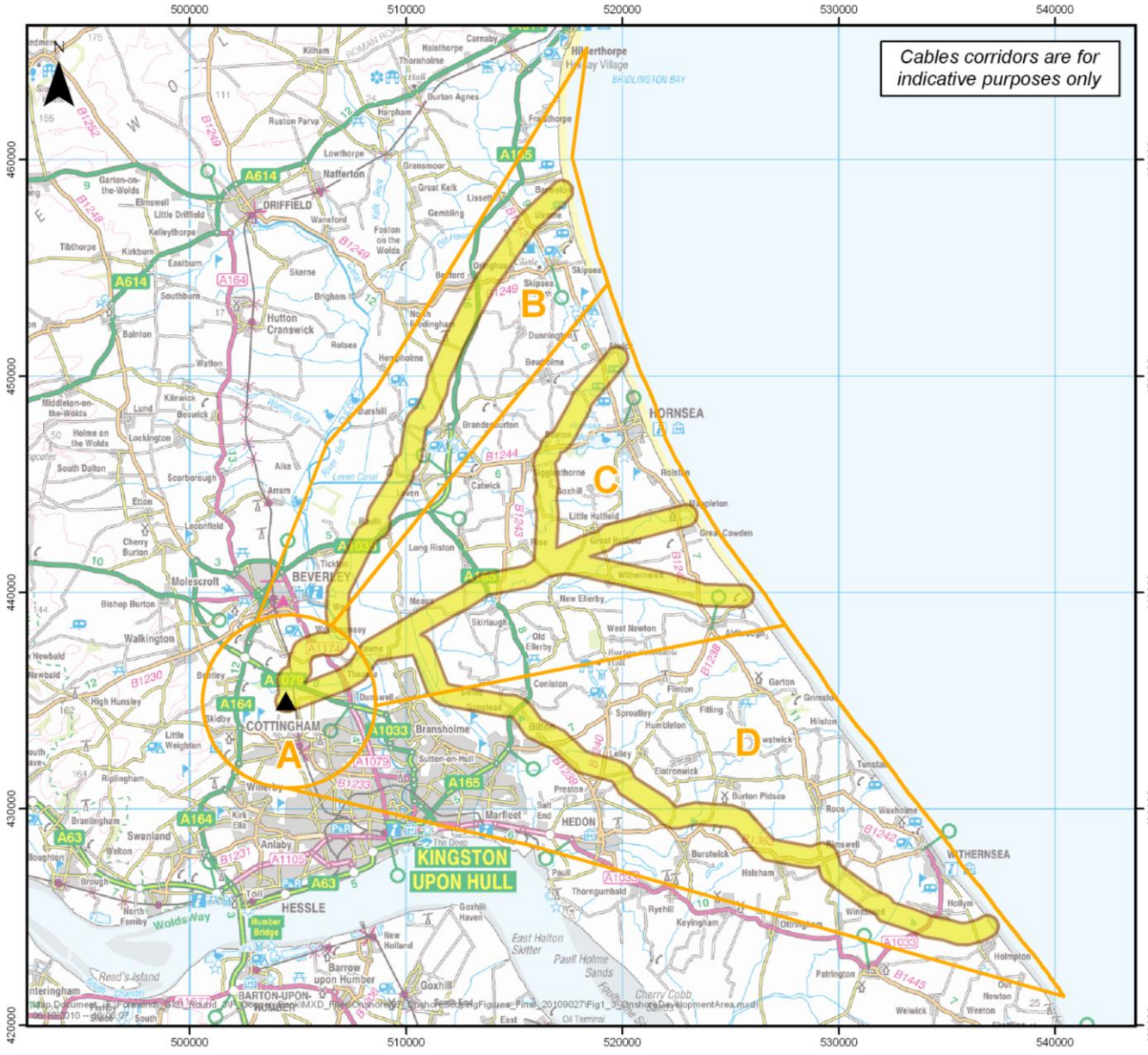
Overview

- Study area identification
- Development considerations
- Potential sites – Sectors A,B,C and D
- Identification of preferred sector
- Questions?

Scoping Envelope



Onshore Scoping Envelope Showing Indicative Cable Corridors



Legend:

- Creyke Beck Study Area (Project Areas A - D)
- Creyke Beck Substation
- Indicative Cable Corridor

0 2 4 8 Kilometres

0 1 2 4 Nautical Miles

DOGGER BANK R3 DEVELOPMENT

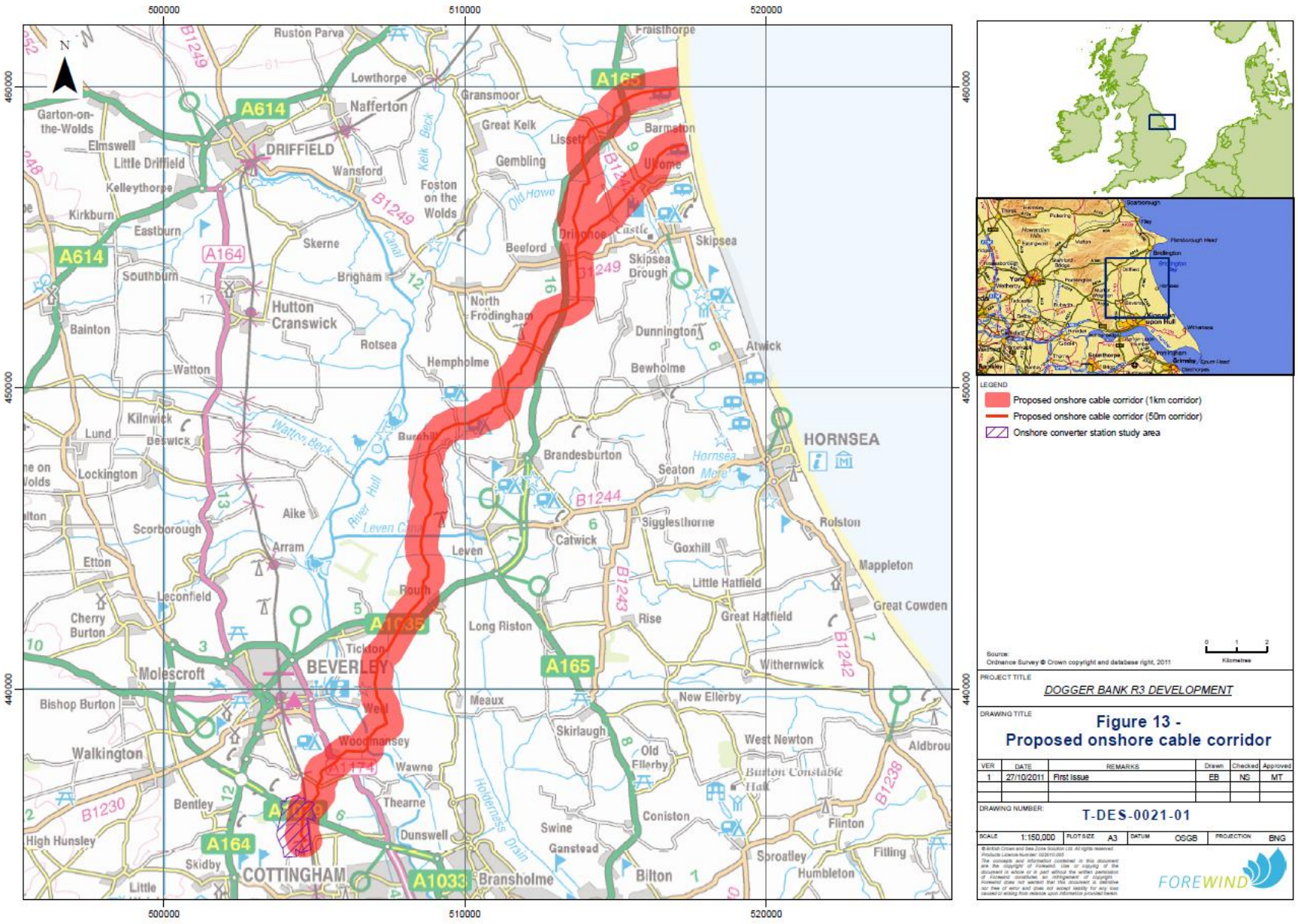
Dogger Bank Project 1

Figure Title:

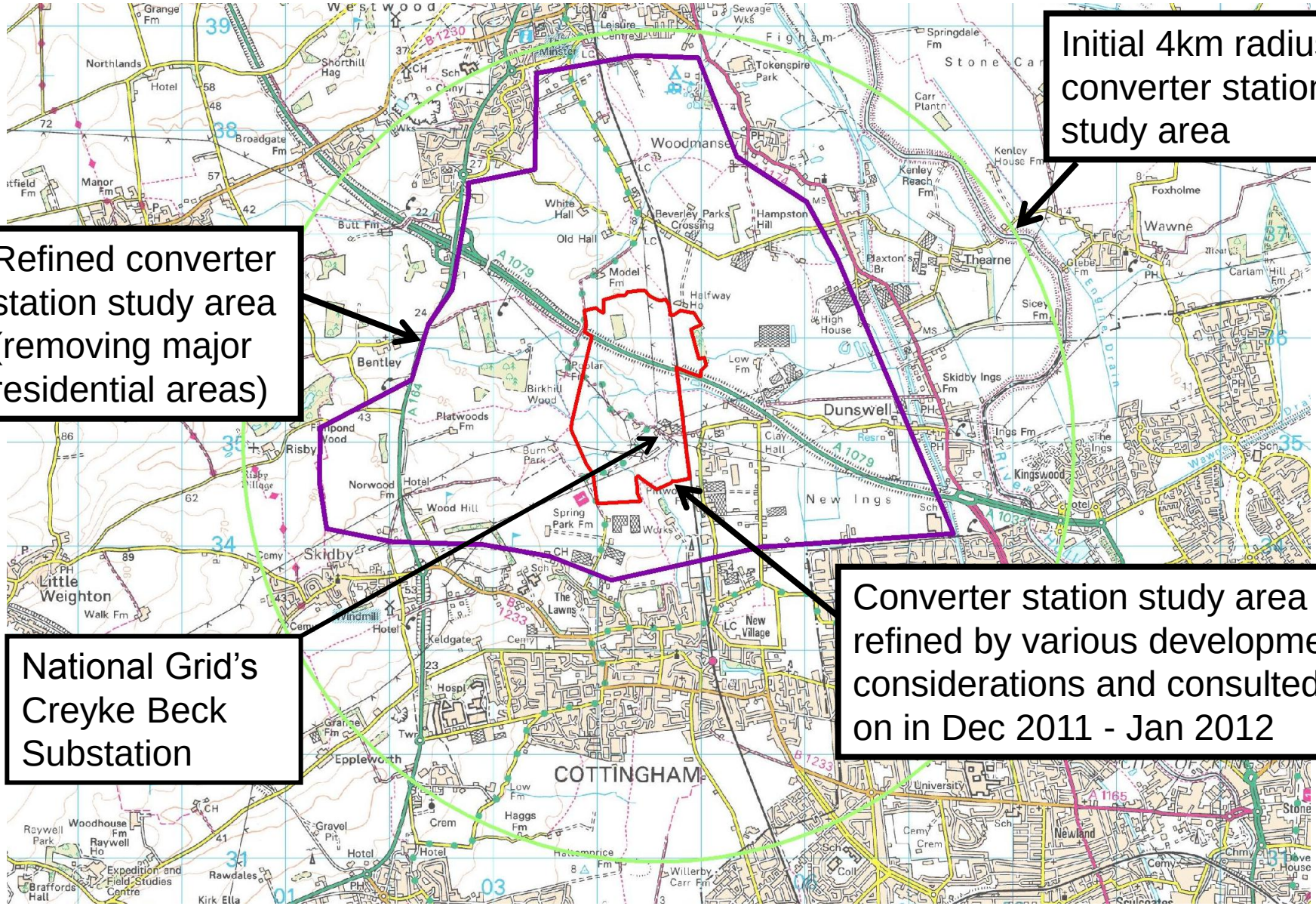
Onshore Scoping Envelope Detail

Figure No: Fig 1.3	Paper Size: A4	Rev: 9
Draw n By: DJM	Scale: 1:250,000	
Draw n On: 27/09/10	Projection: BNG	
Checked By: RH	Datum: OSGB36	

Proposed Onshore Cable Corridor and Converter Station Study Area



Converter Station Study Area Identification

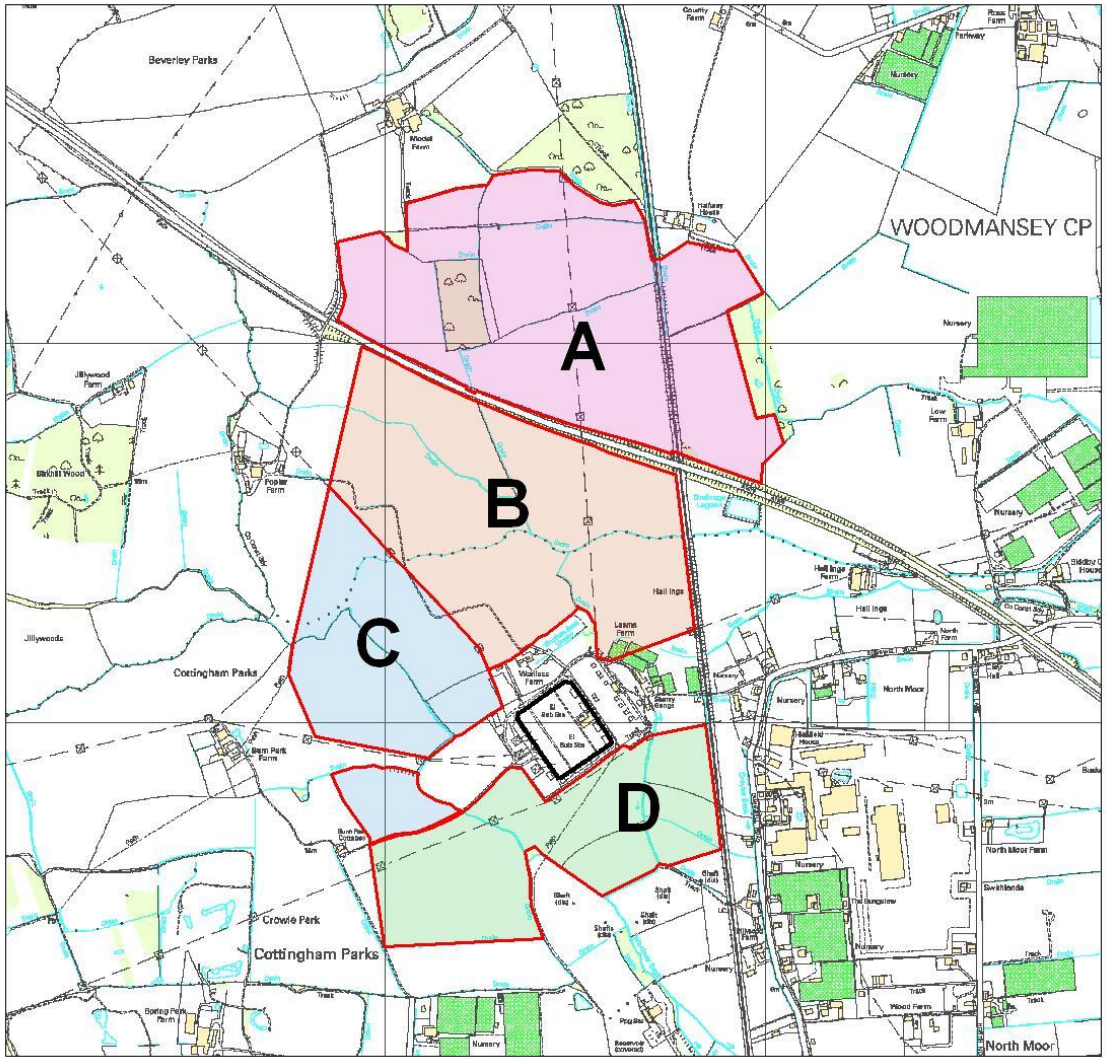


Examples of Consultation Responses

- Access from the A1079 preferred to Park Lane
- One site preferred to split sites
- Shorter buildings preferred
- Employment opportunities
- Flood risk assessment required
- View/setting of Beverley Minster, Old Hall and White Hall, Conservation Areas (Cottingham, Walkington, Skidby, Beverley)
- Use site to north of A1079 to utilise existing tree screening, minimise impact on PRoW and farms
- Screen buildings via tree planting
- Use site south of A1079

Converter Station Study Area Sectors

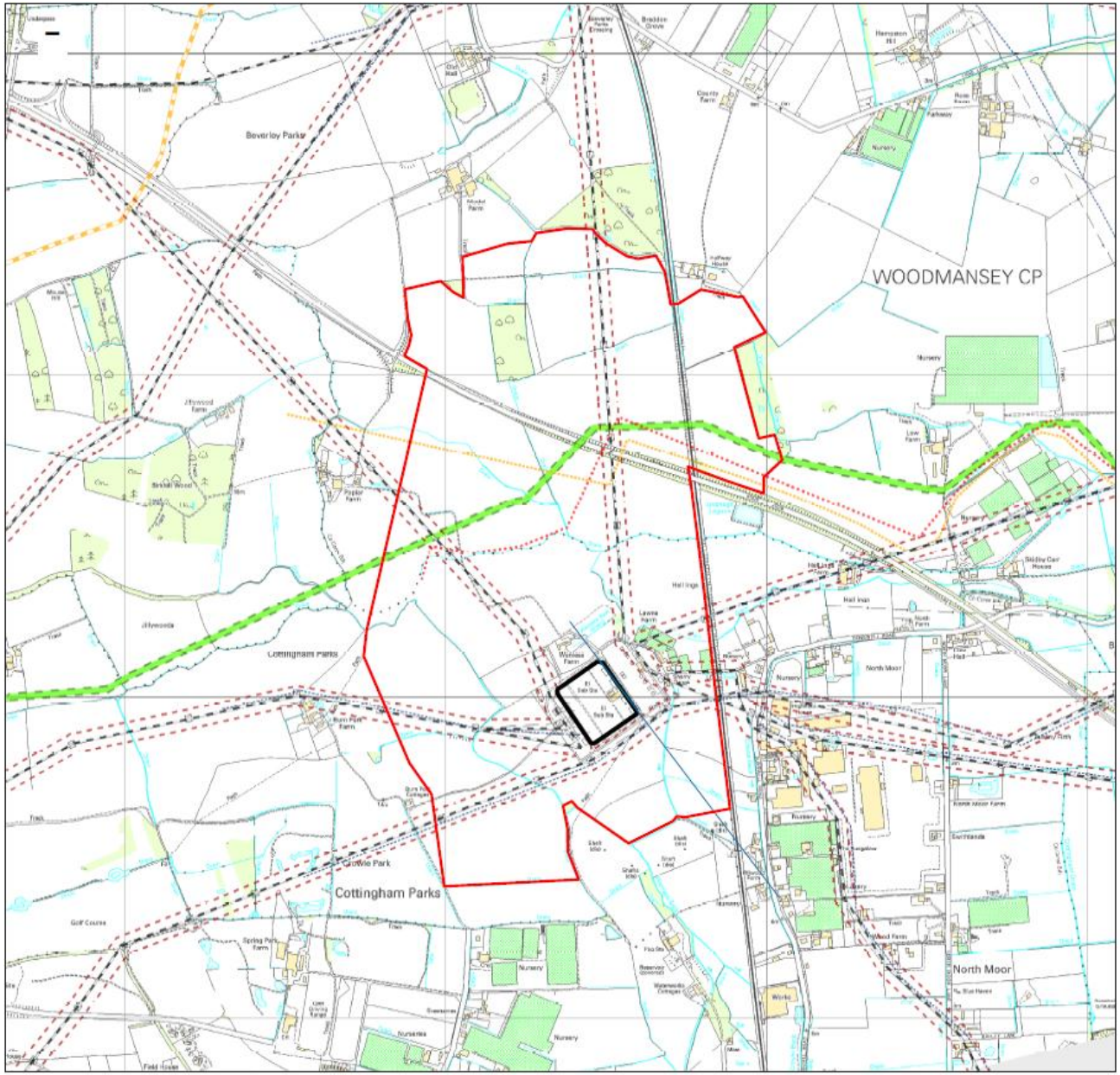
- The Study Area was split into four sectors to enable a detailed assessment and comparison of each area



Sector Level Development Considerations

- Environment (flood risk, ecology, archaeology, landscape, hydrogeology)
- Engineering (site efficiency, access)
- Community/Property (Residential properties, sensitive land uses, agricultural land)
- Planning (other development in the area)

Infrastructure



LEGEND

- Converter Station Study Area
- Existing Creyke Beck Substation
- Gas Pipeline
- Overhead Power Lines
- Overhead Power Lines Buffer
- Etheleyene Pipeline
- Gas
- Pipeline Construction Corridor 10m

0 100 200
Metres

Source:
Ordnance Survey © Crown copyright and database right, 2011

PROJECT TITLE
DOGGER BANK R3 DEVELOPMENT
Creyke Beck - Onshore Converter Station

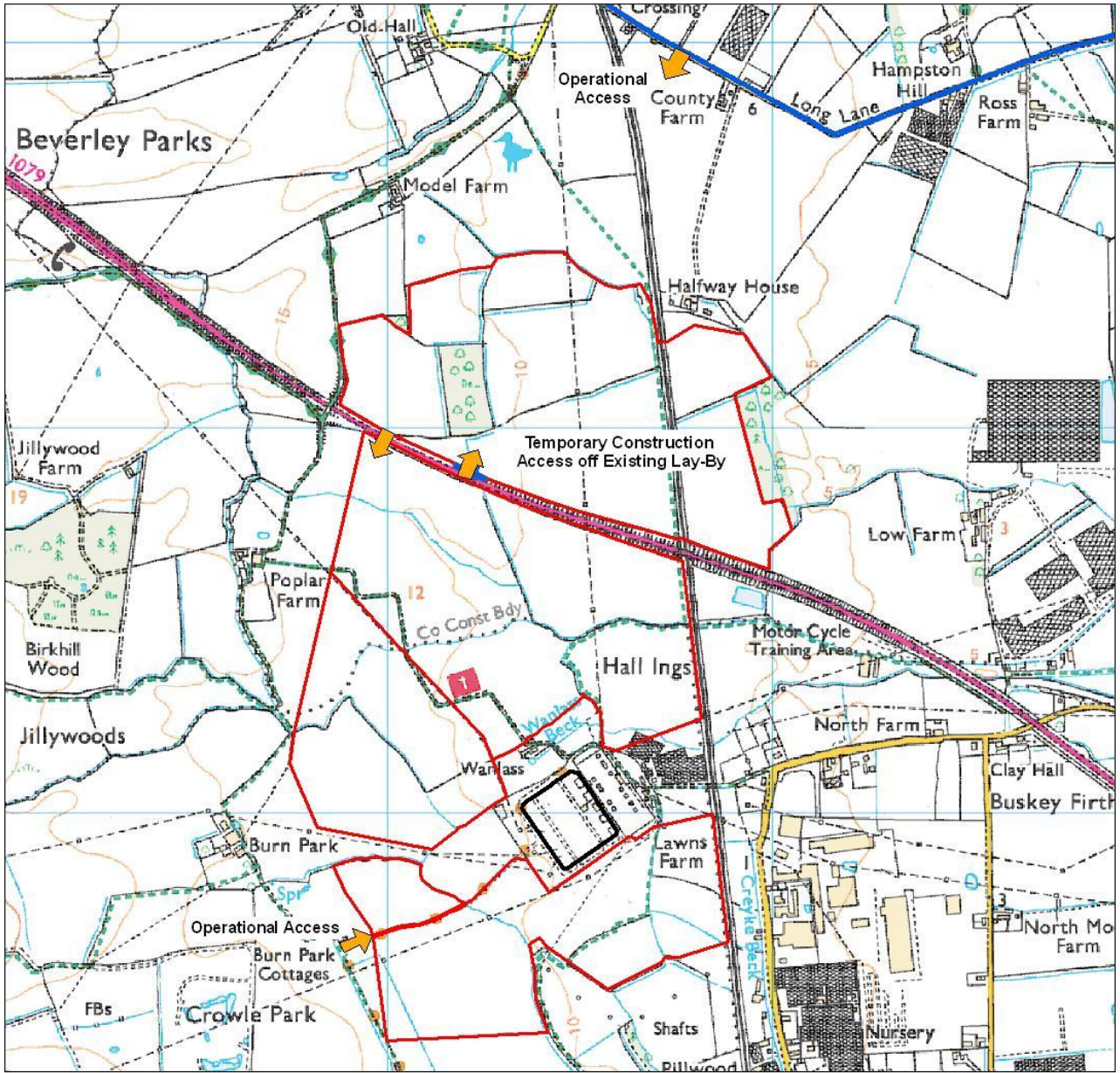
DRAWING TITLE
Converter Station Site Selection
Infrastructure

REV	DATE	REMARKS	Drn. By	Ckd. By
0	08/03/2012	Infrastructure	MCG	JPB

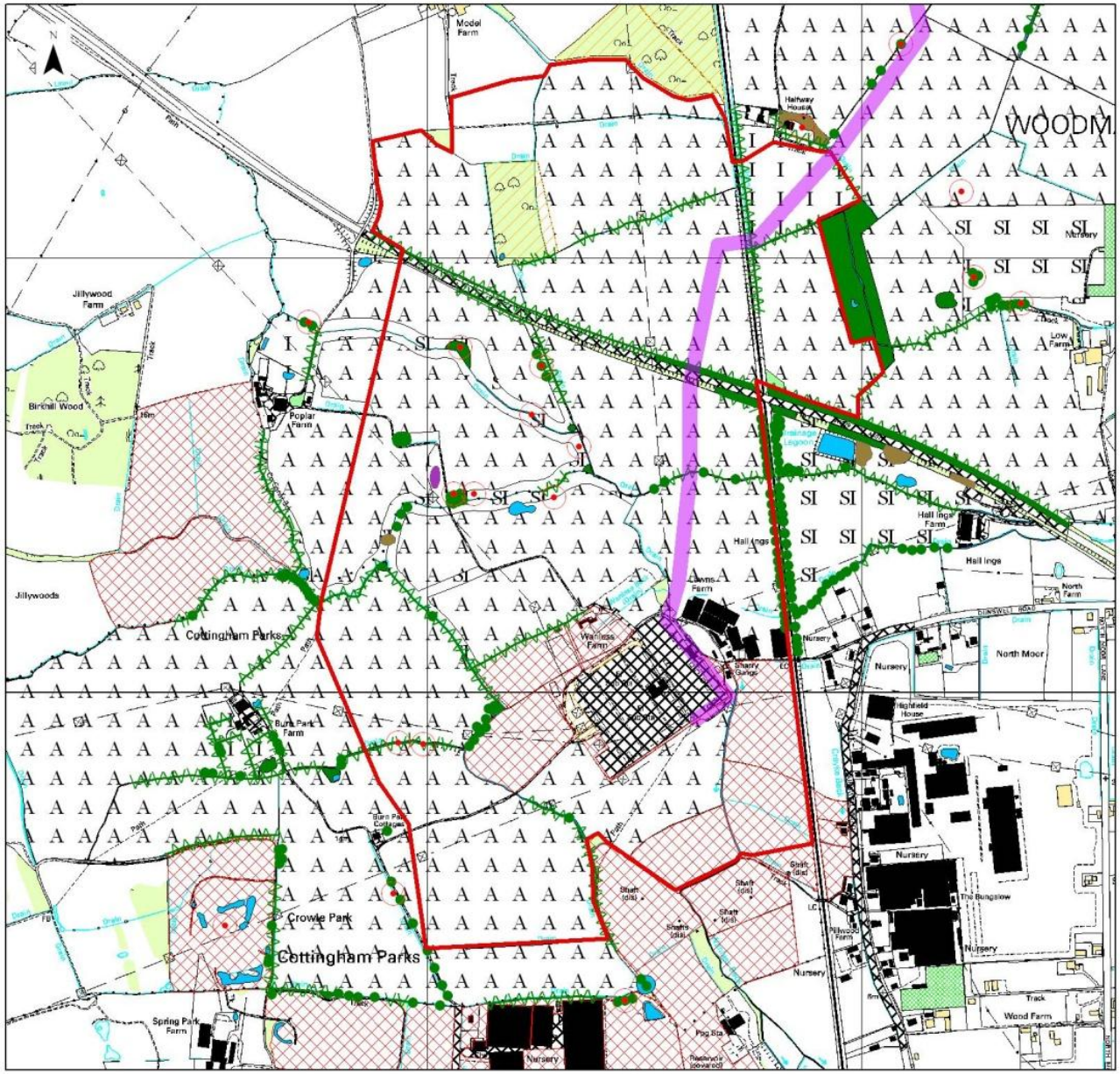
DRAWING NUMBER:
9W0421/09/A1/00

SCALE	1:12,000	PLOT SIZE	A3	DATUM	OSGB	PROJECTION	BNG

Access


Old Hall
Operational Access
County Farm
Long Lane
Hampston Hill
Ross Farm
Beverley Parks
1079
Model Farm
Halfway House
Temporary Construction Access off Existing Lay-By
Jillywood Farm
Low Farm
Poplar Farm
Co Const Bdy
Motor Cycle Training Area
Birkhill Wood
Hall Ings
Jillywoods
North Farm
Clay Hall
Buskey Firth
Burn Park
Lawns Farm
Operational Access
Burn Park Cottages
FBs
Crowle Park
Shafts
Nursery

Ecology



LEGEND

- Yorkshire Onshore Cable Route
- Converter Station Study Area
- Target Notes
- Tree/Shrub
- Hedgerow
- Amenity Grassland
- Arable
- Arable/Grass
- Awaiting Clarification
- Bare ground
- Broadleaved Woodland
- Building
- Coniferous Woodland
- Dry Pond
- Hardstanding
- Improved Grassland
- Inundation
- Manure Pile
- Neutral Grassland
- No Access
- Pond
- Rush Pasture
- Scrub
- Semi-Improved Grassland
- Semi-Improved Grassland with Scrub
- Semi-improved with Rush Pasture
- Swamp
- Tall Herb Community
- Tall Ruderal
- Water
- Woodland

0 125 250

Metres

Source: Ordnance Survey © Crown copyright and database right, 2011

PROJECT TITLE: *DOGGER BANK R3 DEVELOPMENT*
Yorkshire Package - xx

DRAWING TITLE
Phase 1 Survey Initial Results

REV	DATE	REMARKS	Drn. By	Ckd. By
0	21/09/2011	Original	HLRW	ALC

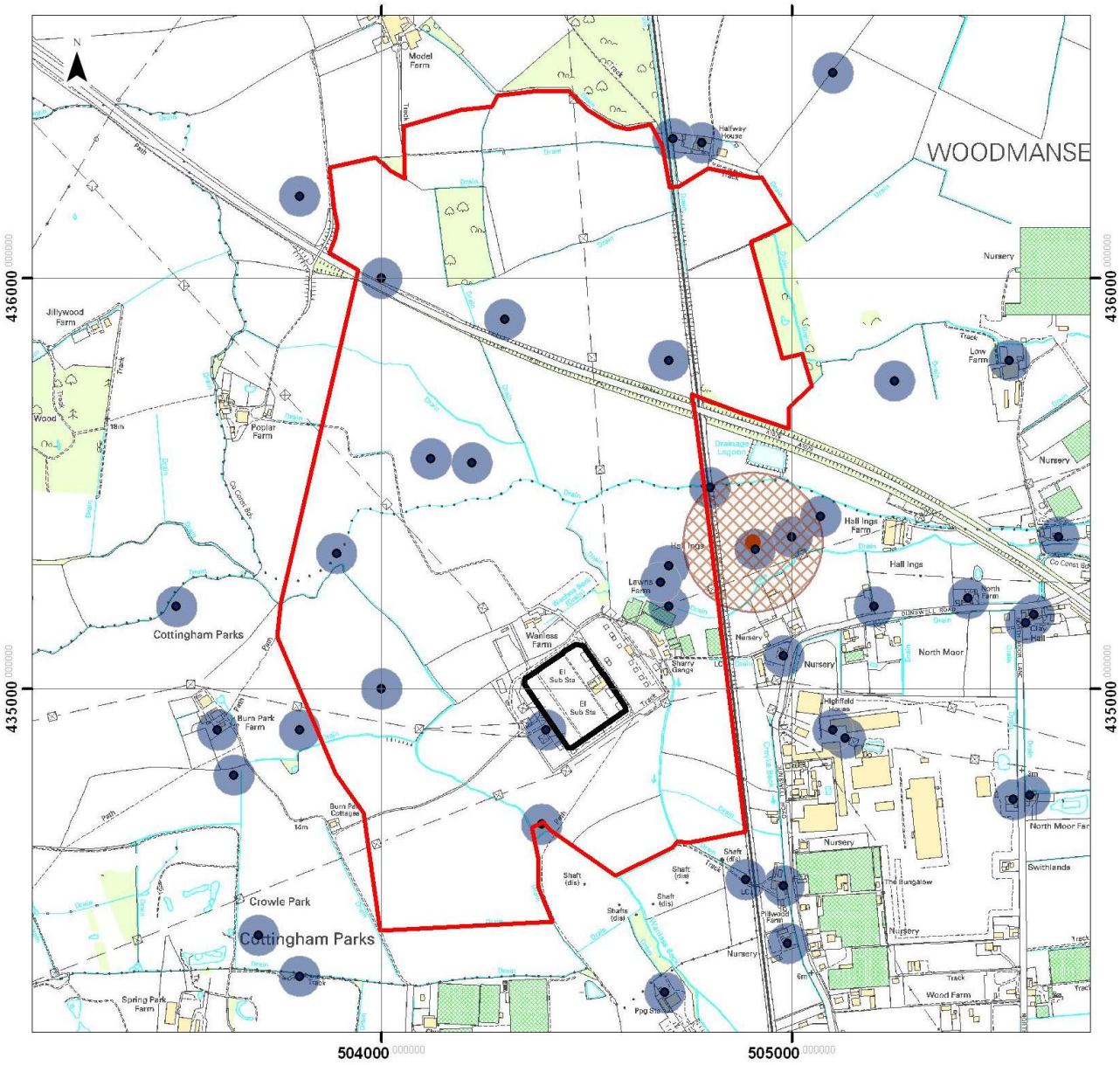
DRAWING NUMBER: 9W0421/Phase1/InitialResults/01/00

SCALE	PLOT SIZE	DATUM	PROJECTION
1:12,617	A3	OSGB	BNG

ROYAL HASKONING

FOREWIND

Archaeology



Legend

- Final Onshore Converter Station Study Area
- Existing Creyke Beck Substation
- Scheduled Ancient Monument
- Scheduled Ancient Monument 150m buffer
- Historic Environment Record
- Historic Environment Record 50m buffer

0 50 100 200 Metres

PROJECT TITLE: *DOGGER BANK R3 DEVELOPMENT*

Creyke Beck - Stage 1: Converter Station Selection

DRAWING TITLE

Figure 3.4: Archaeology

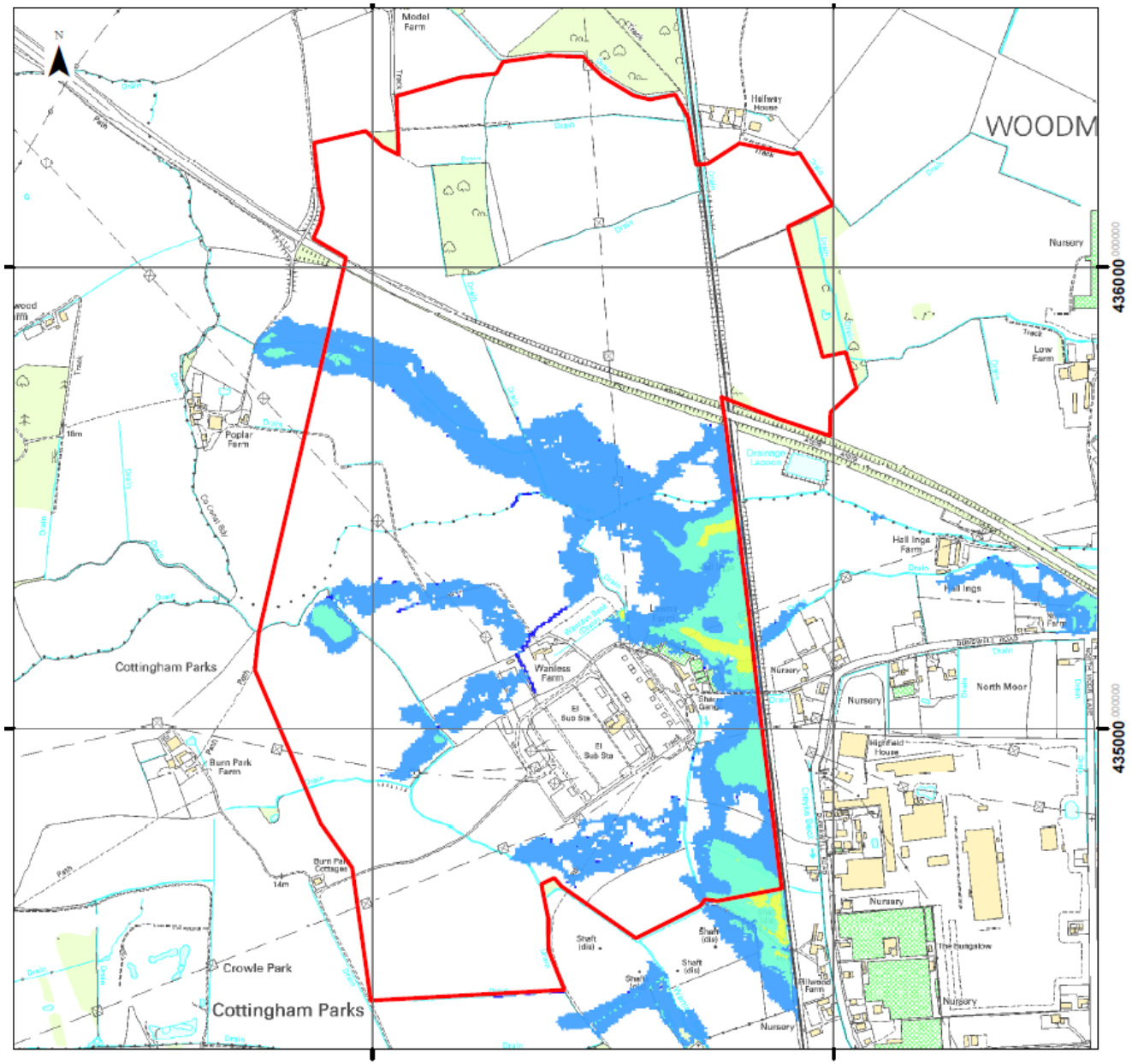
REV	DATE	REMARKS	Dm. By	Ckd. By
0	26/07/2011	Original	HLRW	RH
1	30/09/2011	Revised	JPB	ALC
2	17/11/2011	Revision	PGW	ALC

DRAWING NUMBER: **9W0421/CSSAIR/01/3.4/02**

SCALE	1:13,149	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

ROYAL HASKONING

Flood Risk



Legend

Final Onshore Converter Station Study Area (3)

1 in 1000+CC flood depth

Metres

- 0
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5

Note:
Model outputs are draft subject to EA review

0 100 200 400
Metres

PROJECT TITLE: *DOGGER BANK R3 DEVELOPMENT*
Creyke Beck - Stage 1: Converter Station Selection

DRAWING TITLE
Figure 5: Fluvial Flood Depth (1 in 1000 + CC)

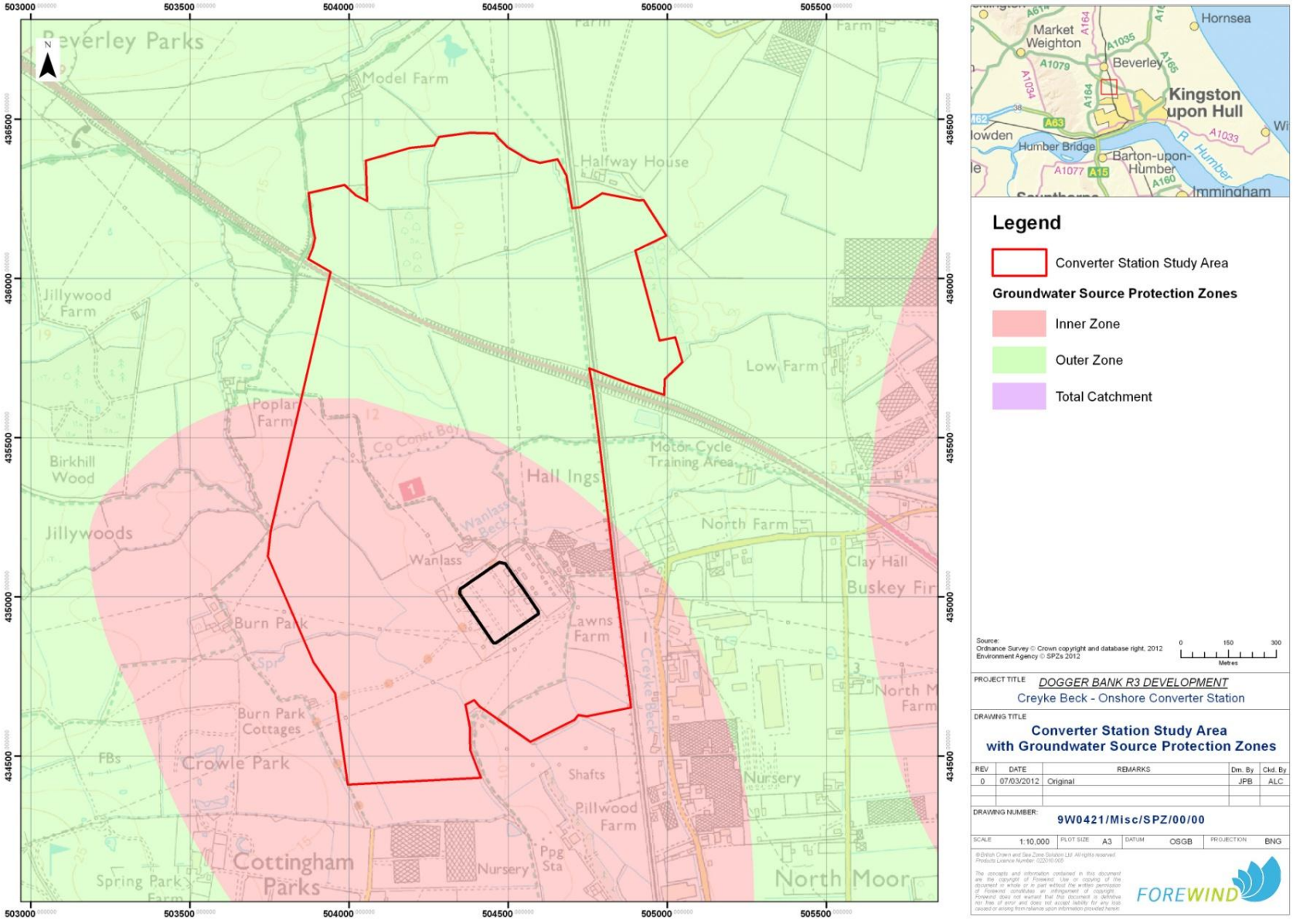
REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/11/2011	Original	PGW	ALC

DRAWING NUMBER: 9W0421/CSSAIR/01/5/00

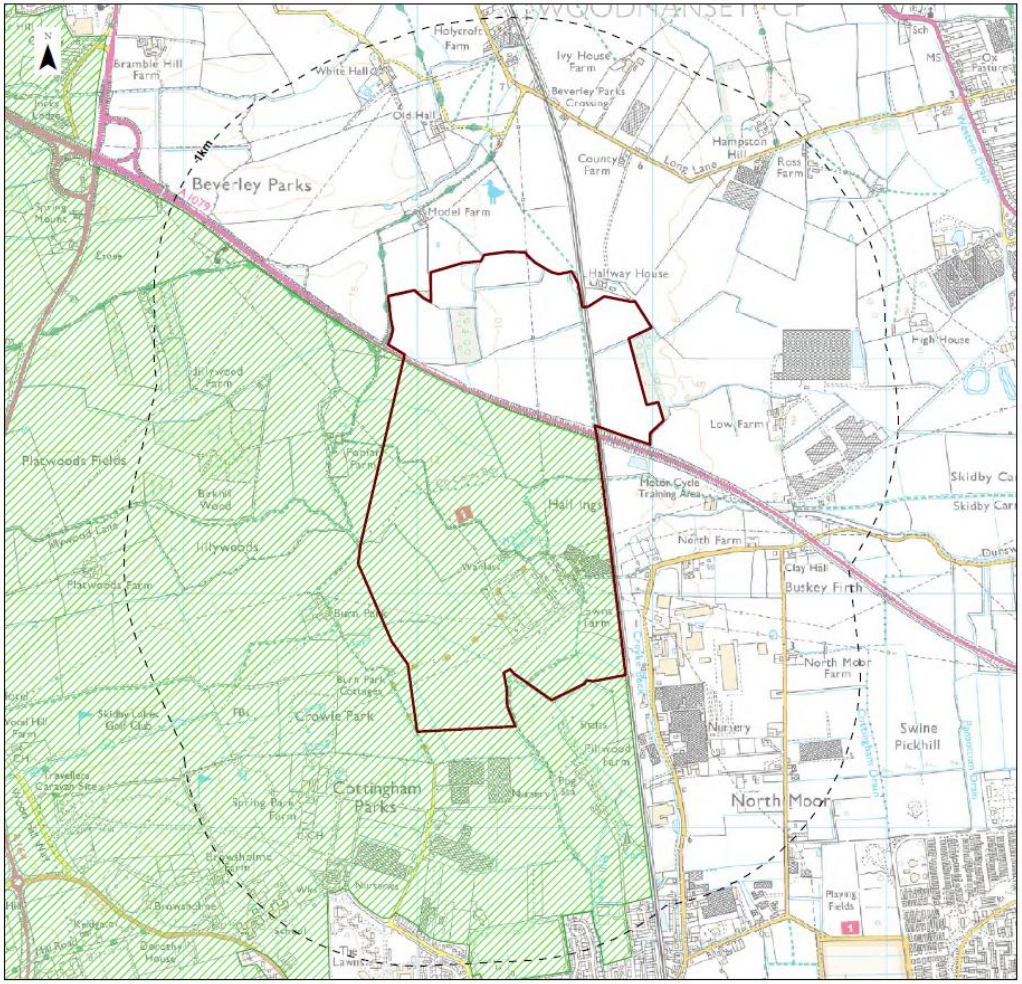
SCALE	PLOT SIZE	DATUM	PROJECTION
1:12,000	A4	OSGB	BNG

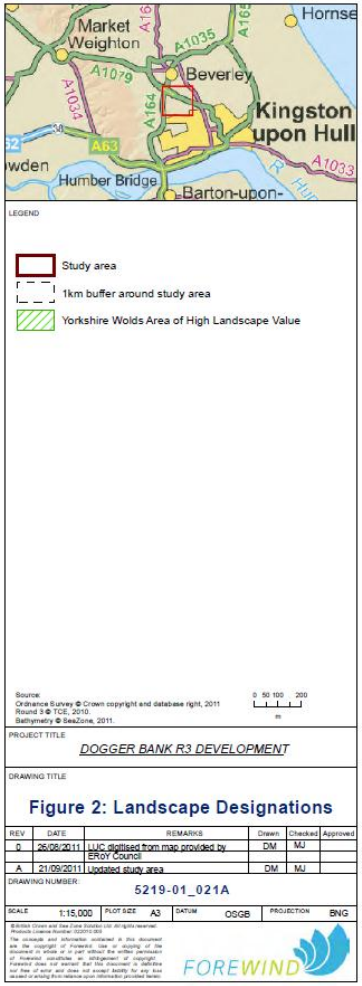
ROYAL HASKONI

Ground Water Source Protection Zones



Landscape Designations



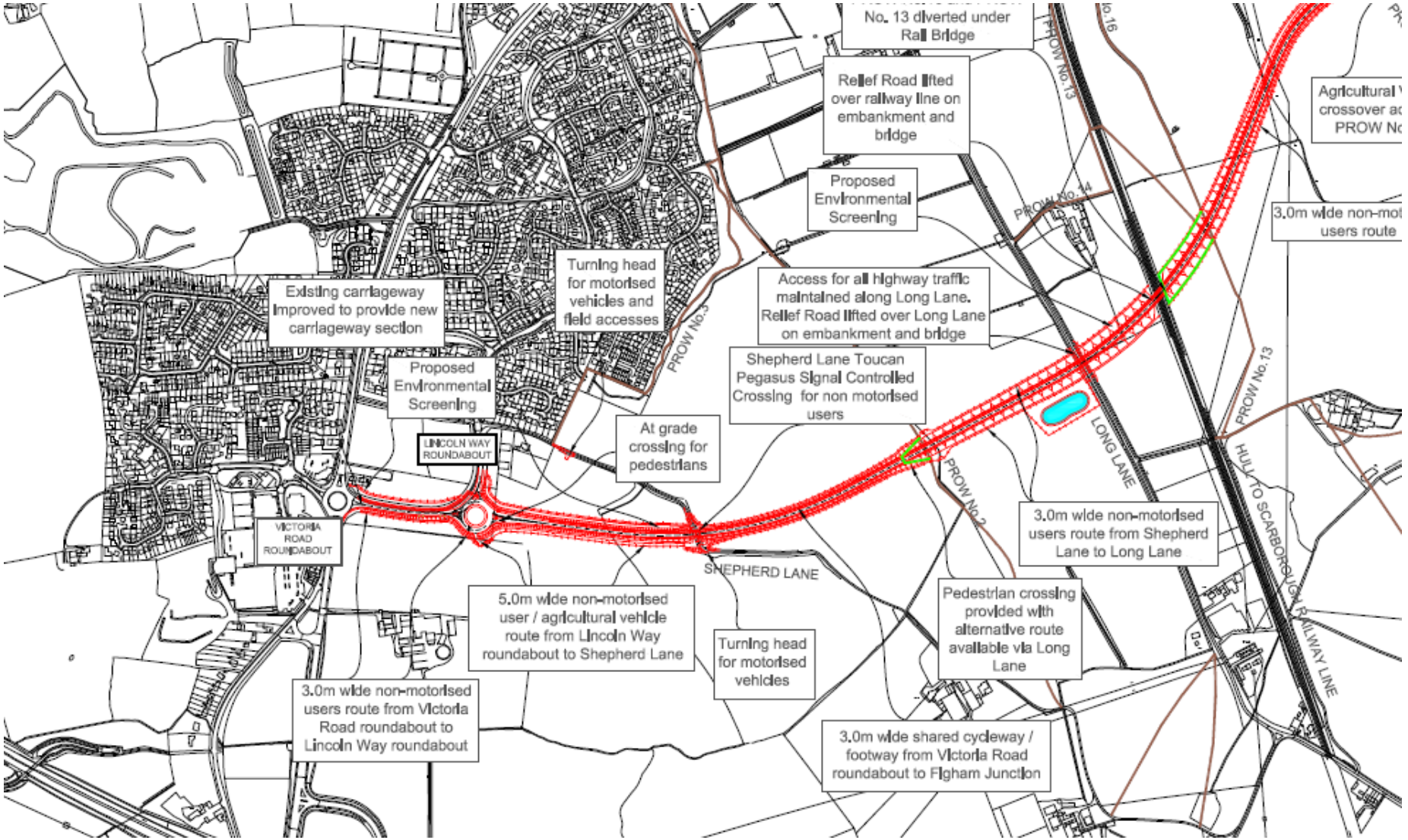


- Yorkshire Wolds Area of Great Landscape Value (AGLV)
- Open Area of Local Importance – policy E3

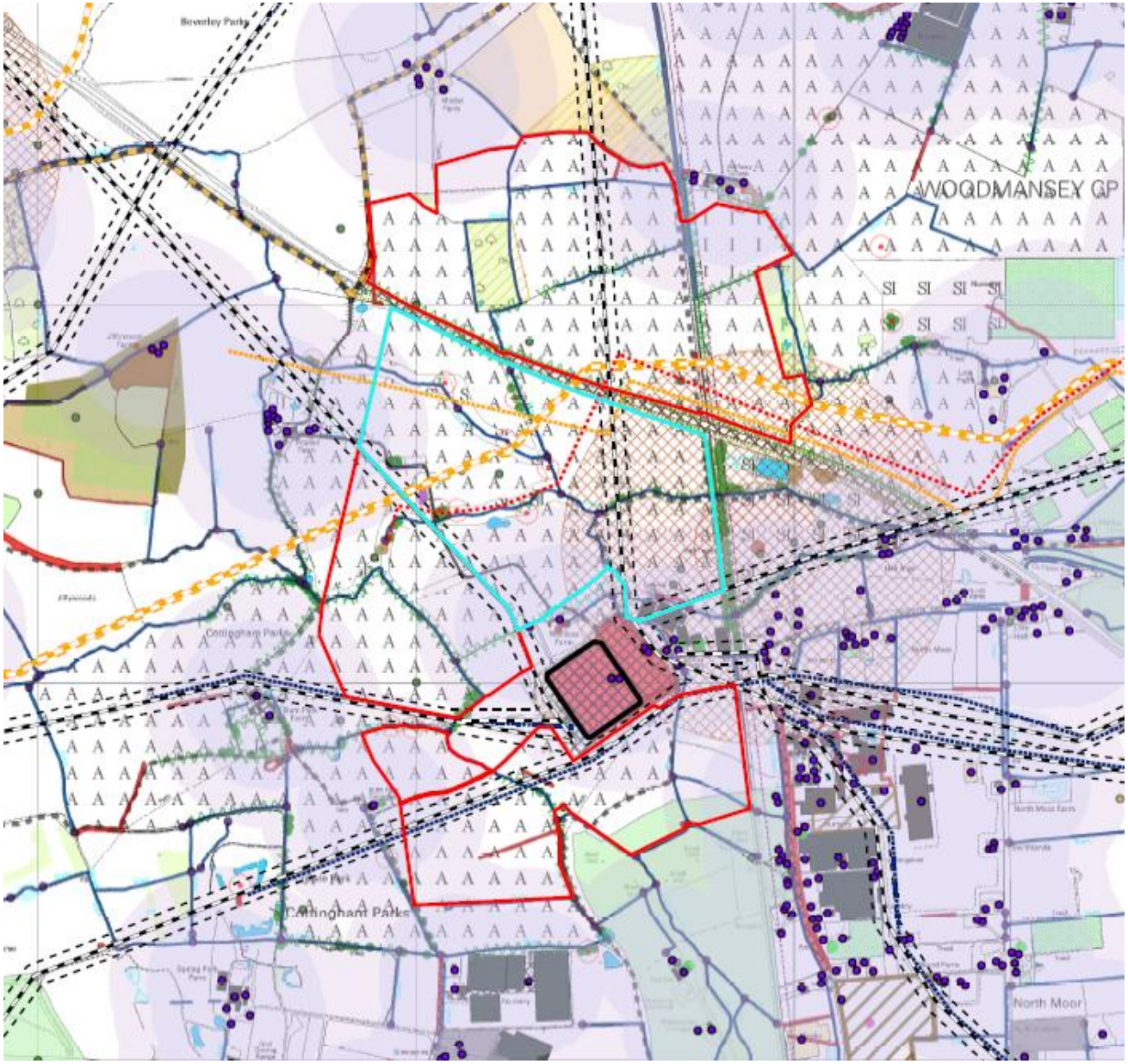
Key Visual Considerations – All Sectors

- Views from Beverley and Cottingham
- Views from scattered farms and properties
- Visual setting of Beverley Minster (views to/from)
- Screening by built structures, road embankment and existing vegetation - effectiveness and seasonality
- Lighting of the Converter
- Potential for screening of and by existing substation infrastructure
- Potential for effective mitigation – new mounding and planting
- Cumulative issues relating to existing infrastructure

Other Planning - Beverley Relief Road

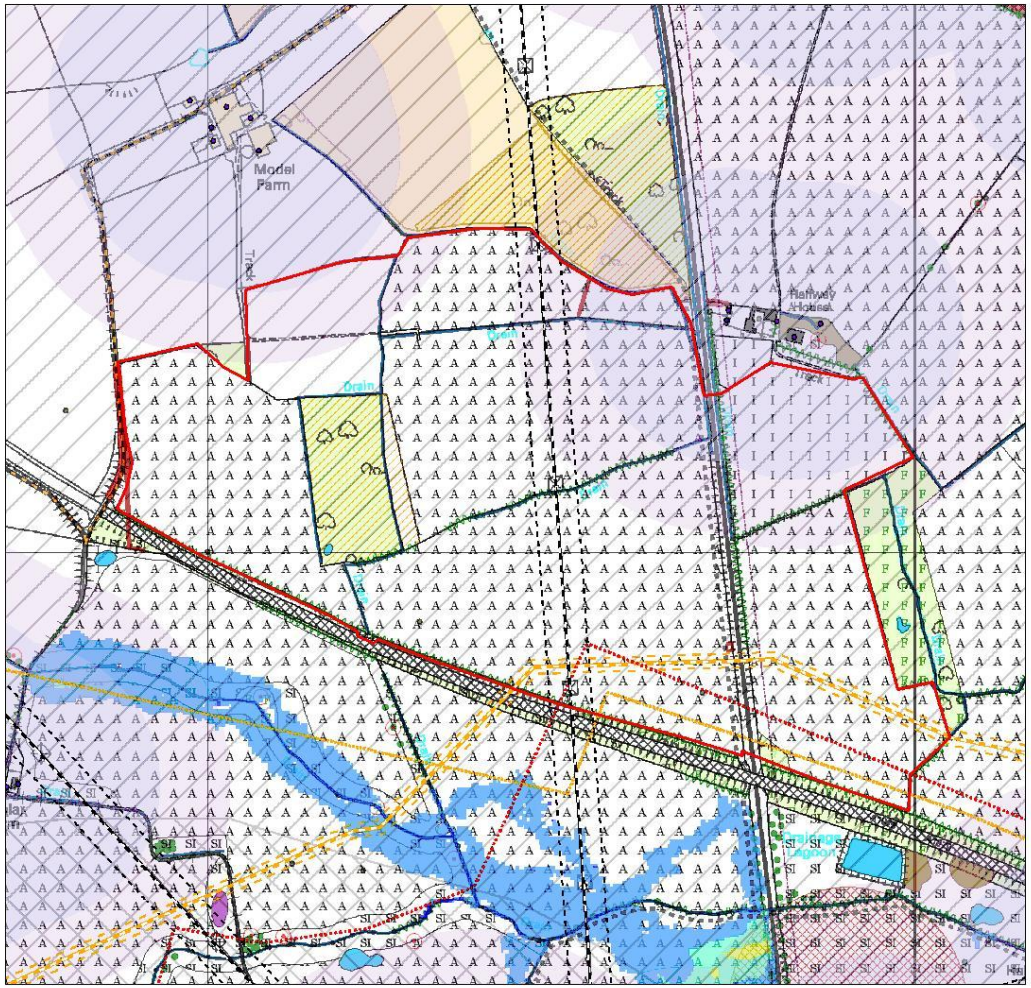


Sectors Overview of All Constraints



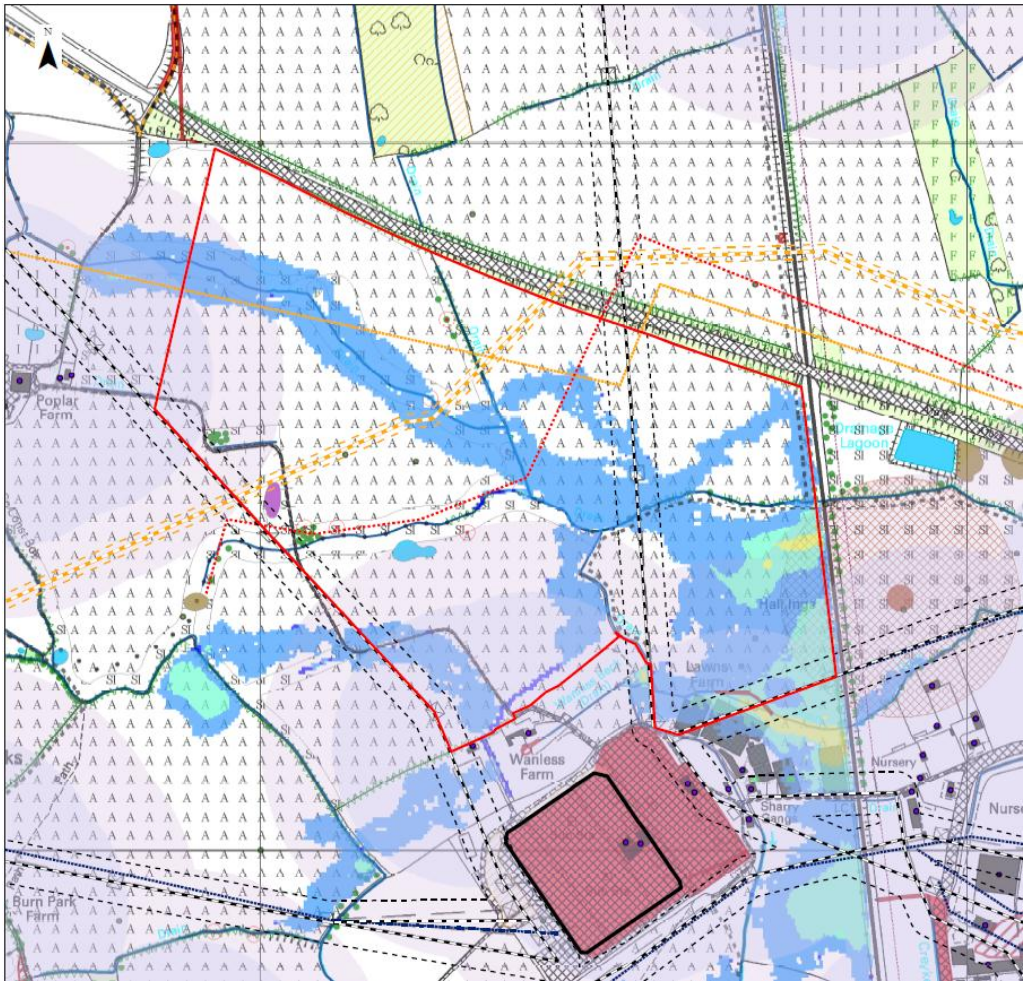
- Dark purple circle indicate a 200m sound buffer from residential properties (relevant if the two 1GW converter stations are separated)
- Light purple circles indicate a 300m sound buffer from residential properties (relevant if the two 1GW converter stations are co-located)

Sector A: Key considerations



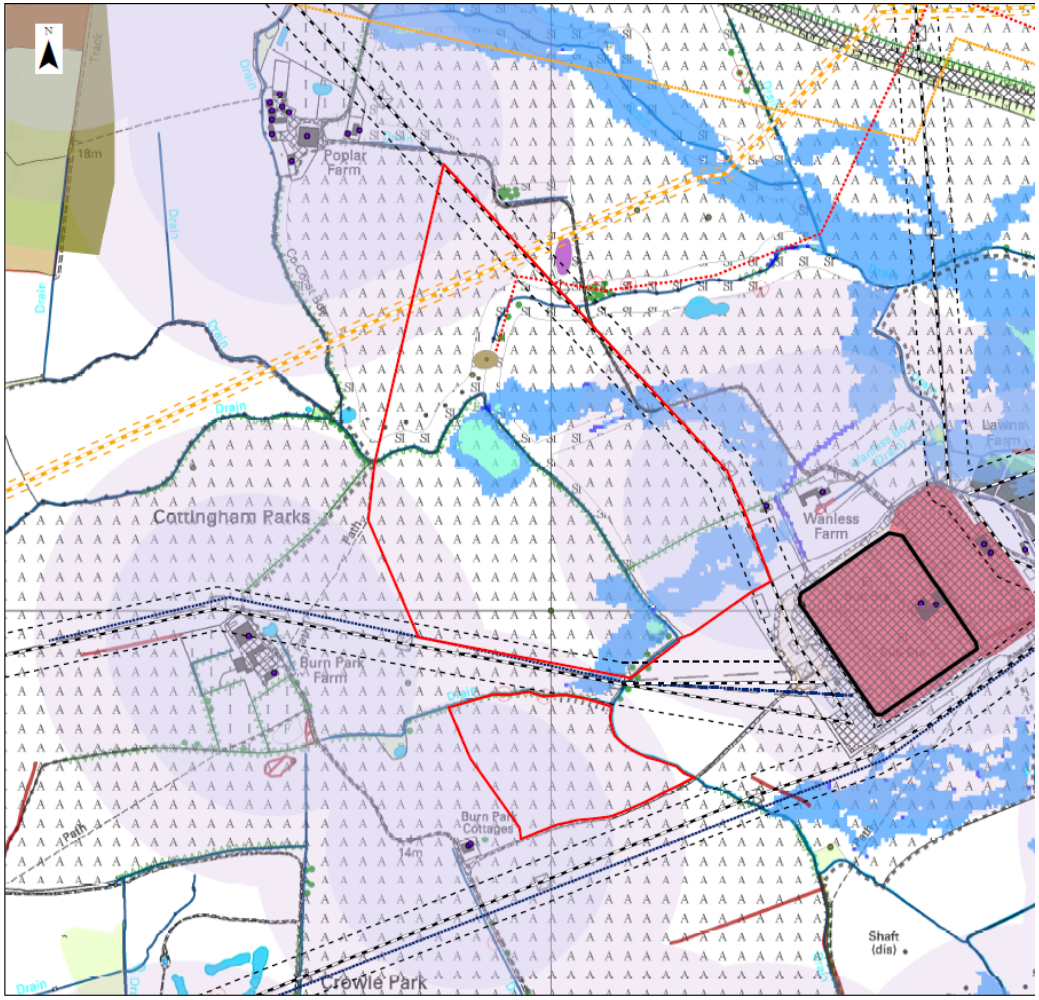
- Existing woodland, with treebelt and hedgerow planting to be effective in helping to screen localised views
- Outside the locally designated Yorkshire Wolds AHLV
- Outside of floodplain and in outer SPZ
- Construction access via A1079 and possible operational access via Long Lane
- Multiple options for co-locating 2GW
- Presence of regionally important archaeological finds
- Nearby properties

Sector B: Key Considerations



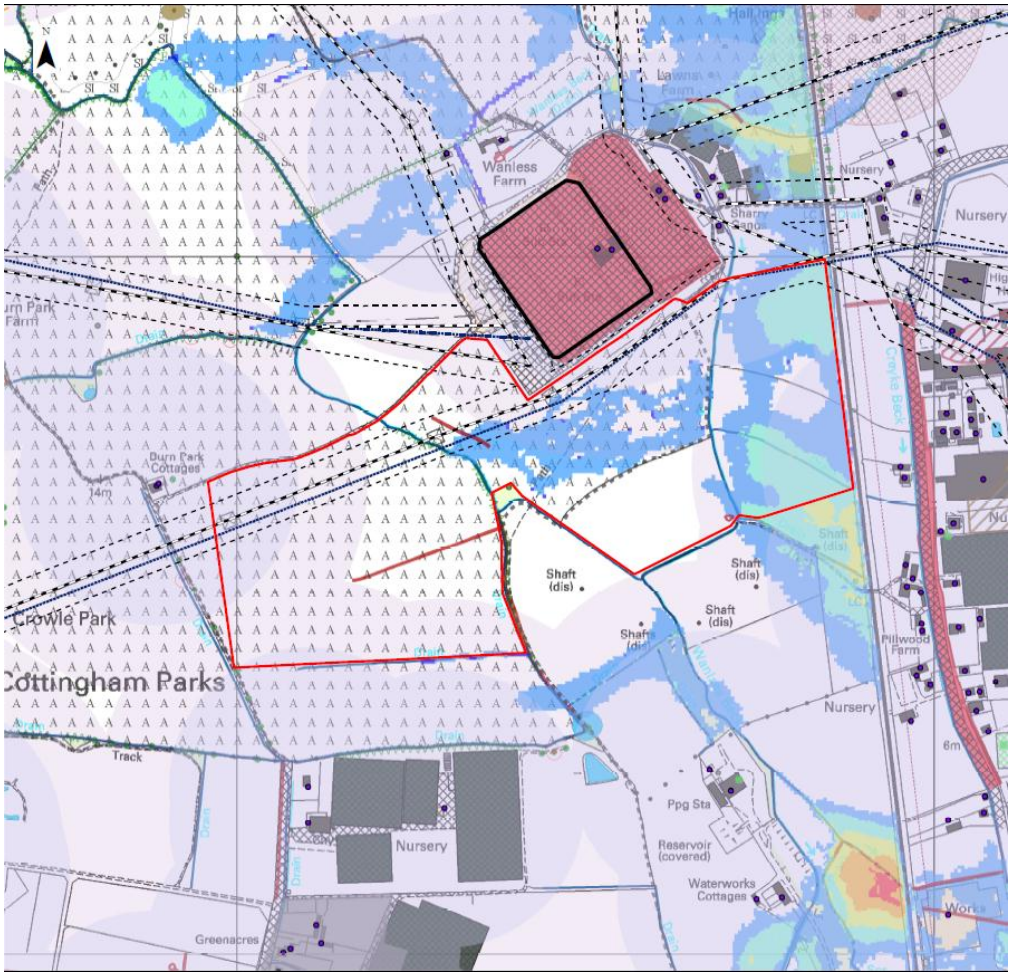
- Opportunity to set converter against mounded road corridor – partial screen
- Closer to existing infrastructure
- In areas of flood risk and inner SPZ
- More diverse habitats in associated with countryside stewardship schemes
- Potential access for construction off the A1079
- Presence of regionally archaeological finds
- Nearby properties

Sector C: Key considerations



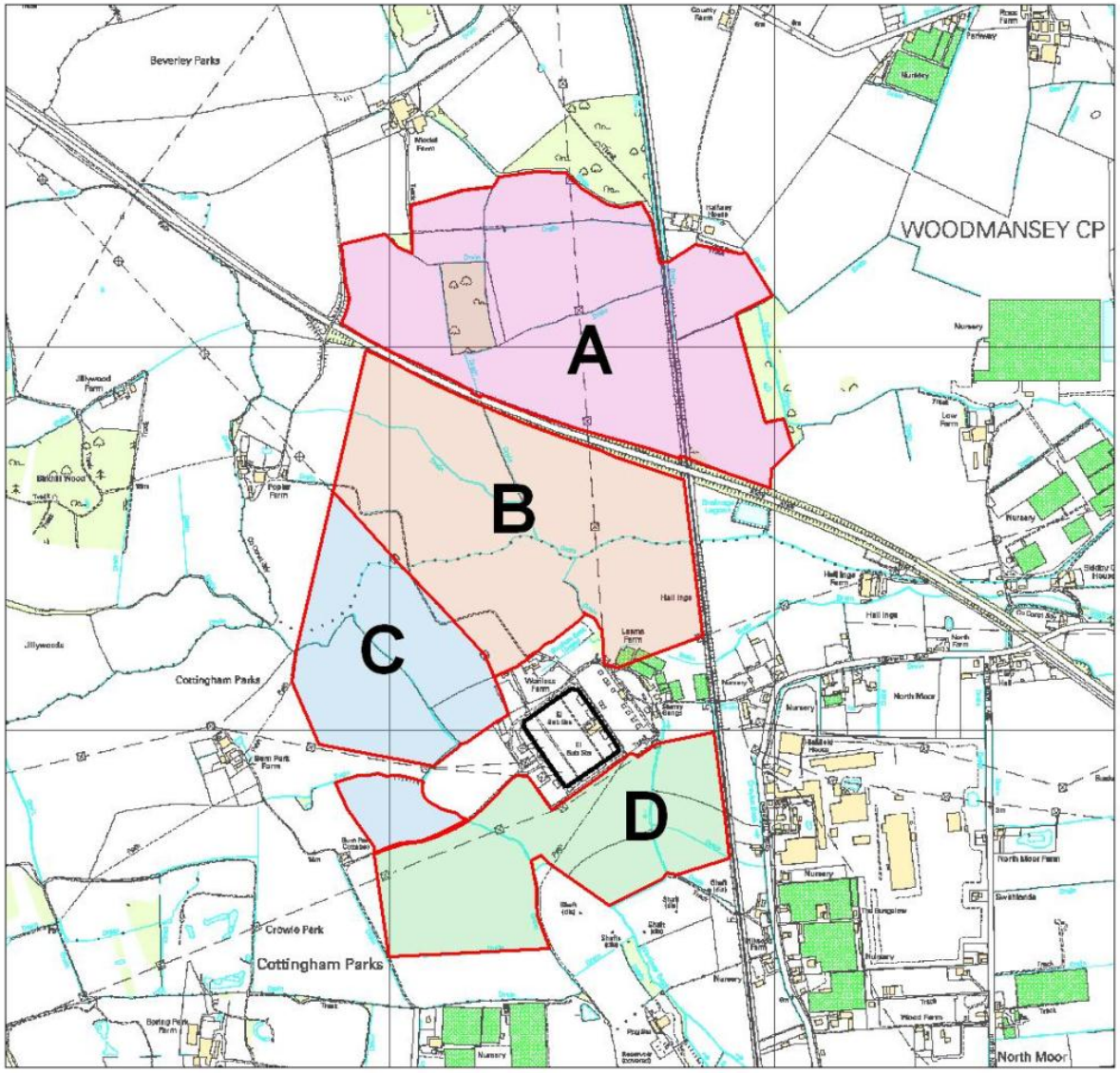
- AHLV – but existing infrastructure present to east
- Scope for reducing visual impacts through massing with existing Creyke Beck substation is limited
- Very open – new planting would be needed – take time to become effective
- Within inner SPZ and areas of flood risk
- Less options for co-locating 2GW
- Proximity to properties

Sector D: Key considerations



- Areas of flood risk and inner SPZ, proximity to YW adits system
- Scope for reducing visual impact of the existing substation in views from the east
- Offers greatest scope for massing and visually linking the converter station/s with existing substation
- Limited options to co-locate converter stations
- Areas of potentially contaminated land

Preferred Sector – Sector A



- Microsite 2 x 1GW Converter Stations within Sector A

Micrositing Break-Out Session

Mark Baxter – Onshore Project Manager

8 March 2012

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Comparison with Statutory Authority Workshop

Mark Baxter – Onshore Project Manager

8 March 2012

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Statutory Bodies Workshop

- On the 26 January a workshop was held with Statutory Consultees

- Attendees present were from:
  - East Riding of Yorkshire Council – Environmental Health, Senior Planning Officer, Major Projects Team, Landscape and Visual
  - Environment Agency - Groundwater, Flood Risk, and Planning Liaison

- Natural England, English Heritage declined attendance and wanted to be involved once the Converter Stations had been micro-sited
- Yorkshire Water was unavailable but have been involved in the process, has seen the recommendation of Sector A and supports our selection process.

Outcome of Statutory Workshop

Next Steps

- Recommendations from the Statutory Workshop and the Community Working Group will be considered in the micro-siting process.
- Review the development considerations in relation to micro-siting, including:
  - Construction and Operational Noise,
  - Construction and Operational Access,
  - Drainage, and
  - Landscape and Visual Impact.

- Discussions with Landowners on preferred sector and micro-siting
- Forewind decision on micro-siting by 31 March 2012
- Proposed AC Cable Corridor from Converter Station to Creyke Beck Substation fixed for environmental impact assessment by April 2012
- Environmental Impact Assessment from April 2012 – August 2012
- Consultation on draft Environmental Statement – Autumn 2012

Any Questions?

Question and Answer Session

- Questions taken through the Chair
- Forewind will take away any questions that cannot be answered today and will respond through the minutes or at a future working group meeting

Chair’s Closing Remarks

- Responsibility of attendees to liaise with those they represent
- Minutes of the meeting
- Who to contact between meetings
- Media
- Agreement on next meeting date

Thank you

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