Hornsea Project Three
Offshore Wind Farm

# Hornsea Project Three

# Offshore Wind Farm

## Preliminary Environmental Information Report:
## Chapter 4 - Landscape and Visual Resources (Part 3)

**Date:** July 2017

Hornsea 3
Offshore Wind Farm

DONG energy

**Environmental Impact Assessment**

**Preliminary Environmental Information Report**

**Volume 3**

**Chapter 4: Landscape and Visual Resources**

**Liability**

This report has been prepared by RPS, with all reasonable skill, care and diligence within the terms of their contracts with DONG Energy Power (UK) Ltd.

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This report is also downloadable from the Hornsea Project Three offshore wind farm website at:
www.dongenergy.co.uk/hornseaproject3

DONG Energy Power (UK) Ltd.

5 Howick Place,

London, SW1P 1WG

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Front cover picture: Kite surfer near one of DONG Energy's UK offshore wind farms © DONG Energy Hornsea Project Three (UK) Ltd., 2016.

Prepared by: RPS

Checked by: Jennifer Brack

Accepted by: Sophie Banham

Approved by: Stuart Livesey

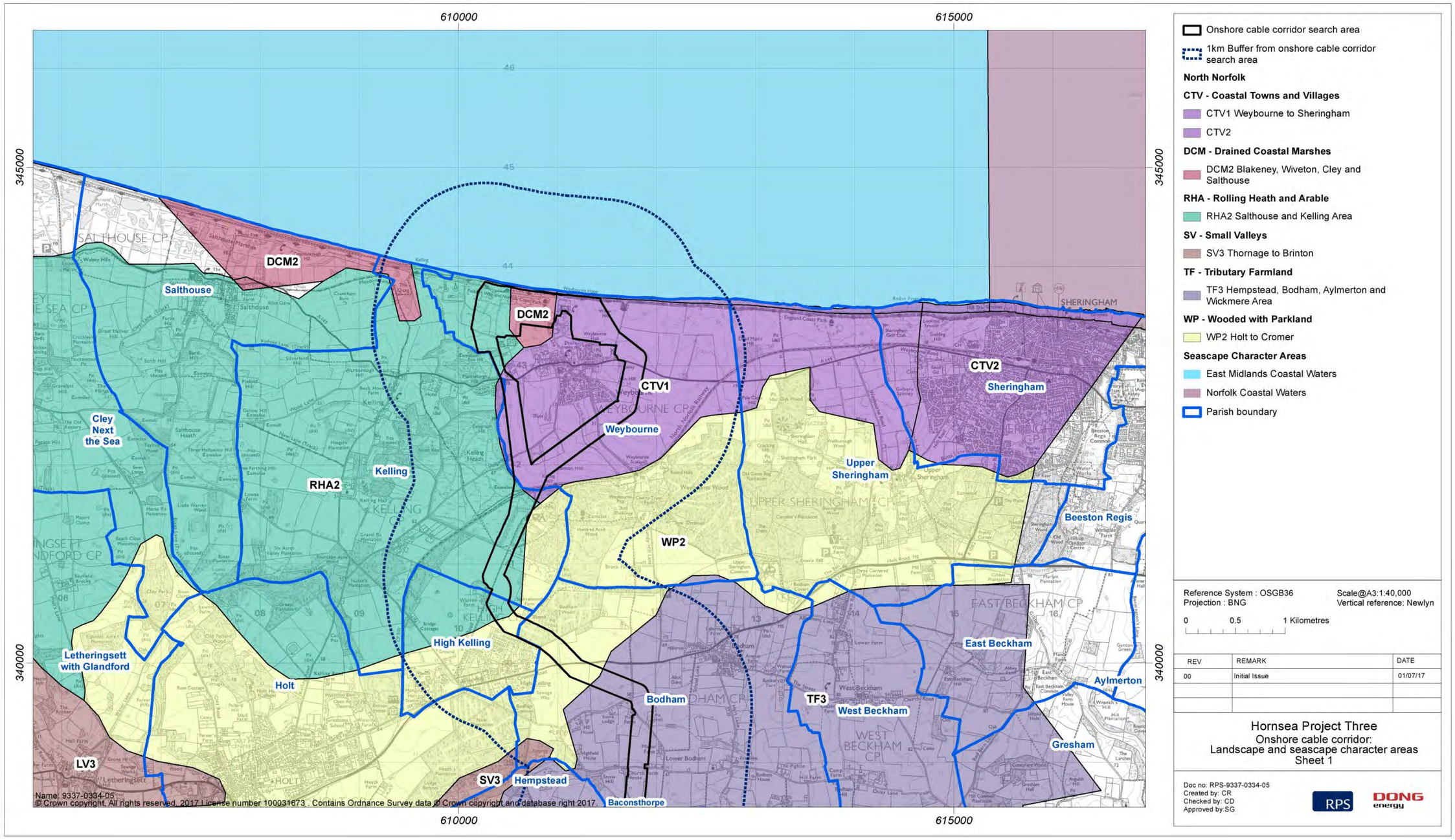


**Figure 4.7: Onshore Cable Corridor: Local Landscape Character Areas Sheet 1 of 8.**

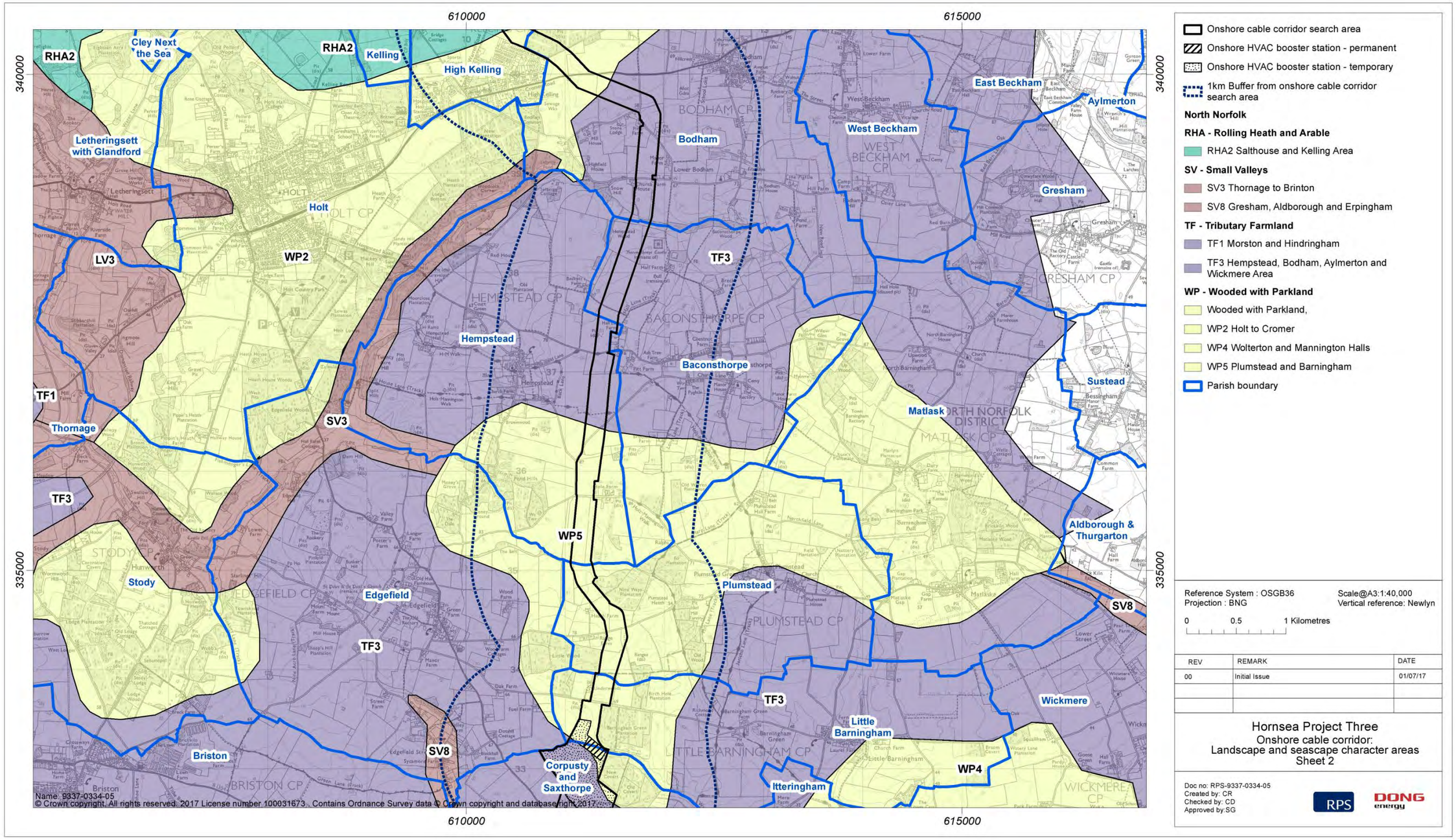


**Figure 4.7: Onshore Cable Corridor: Landscape and Seascape Character Areas Sheet 2 of 8.**

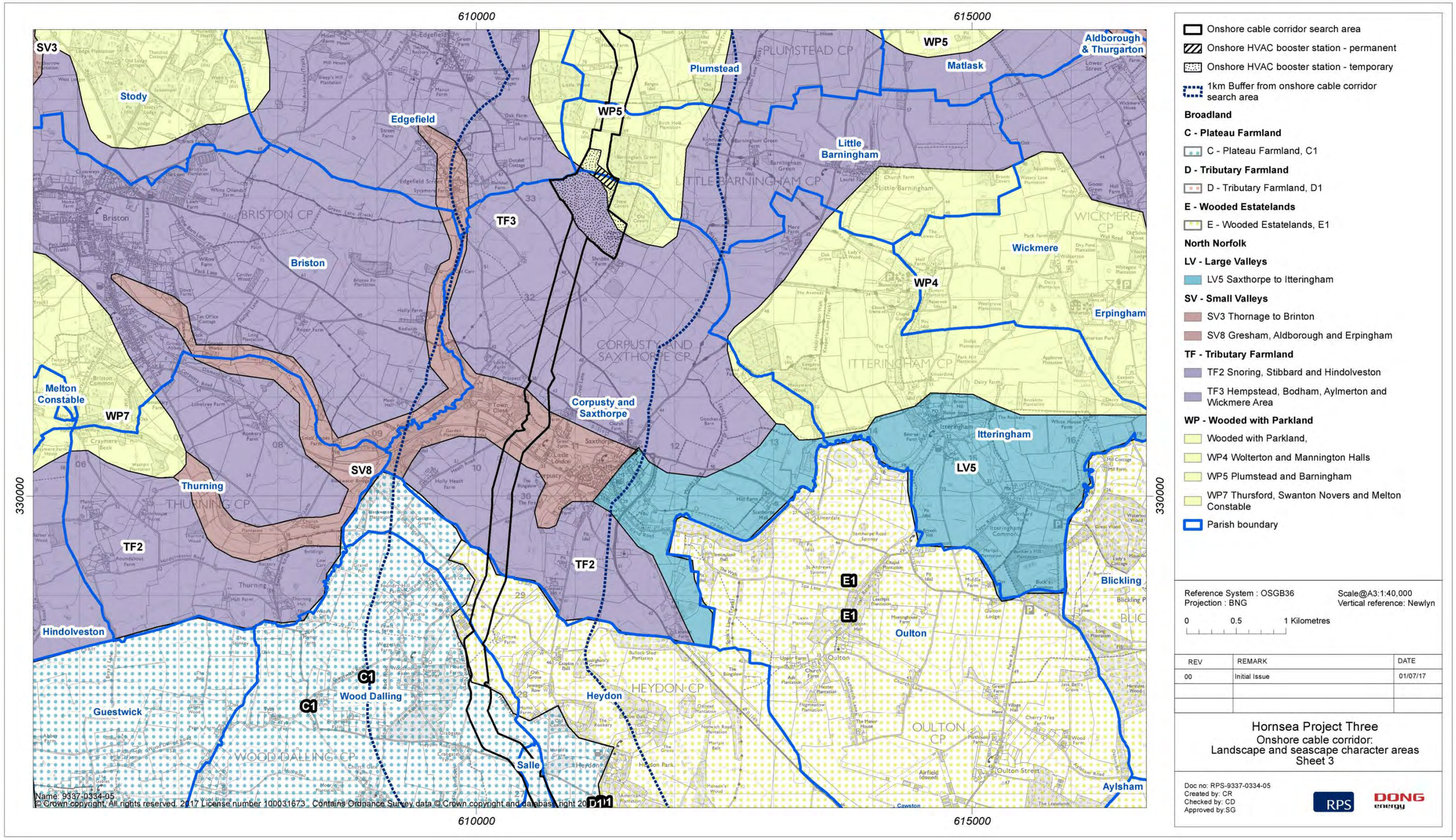


**Figure 4.7: Onshore Cable Corridor: Landscape and Seascape Character Areas Sheet 3 of 8.**

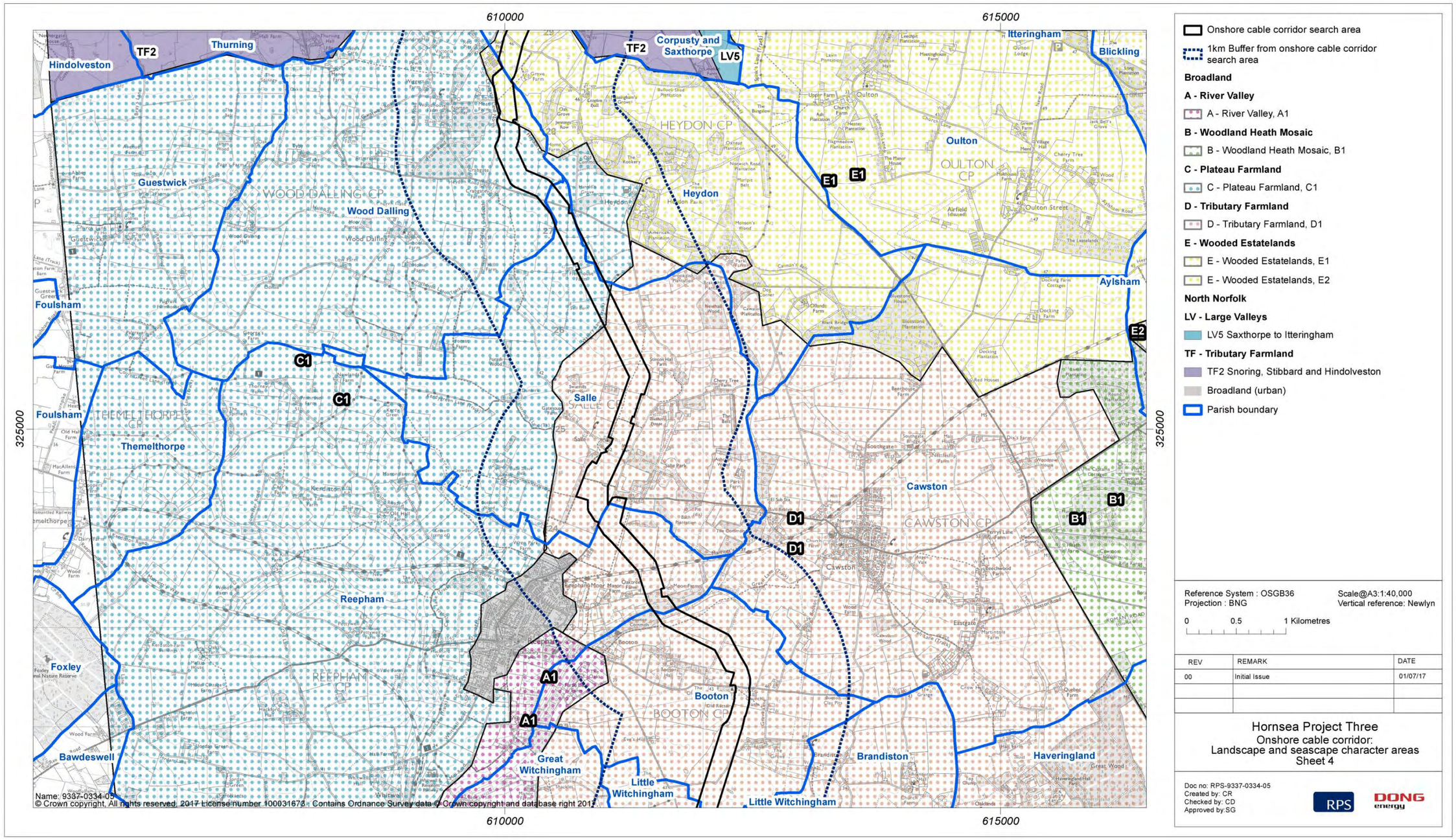


**Figure 4.7: Onshore Cable Corridor: Landscape and Seascape Character Areas Sheet 4 of 8.**

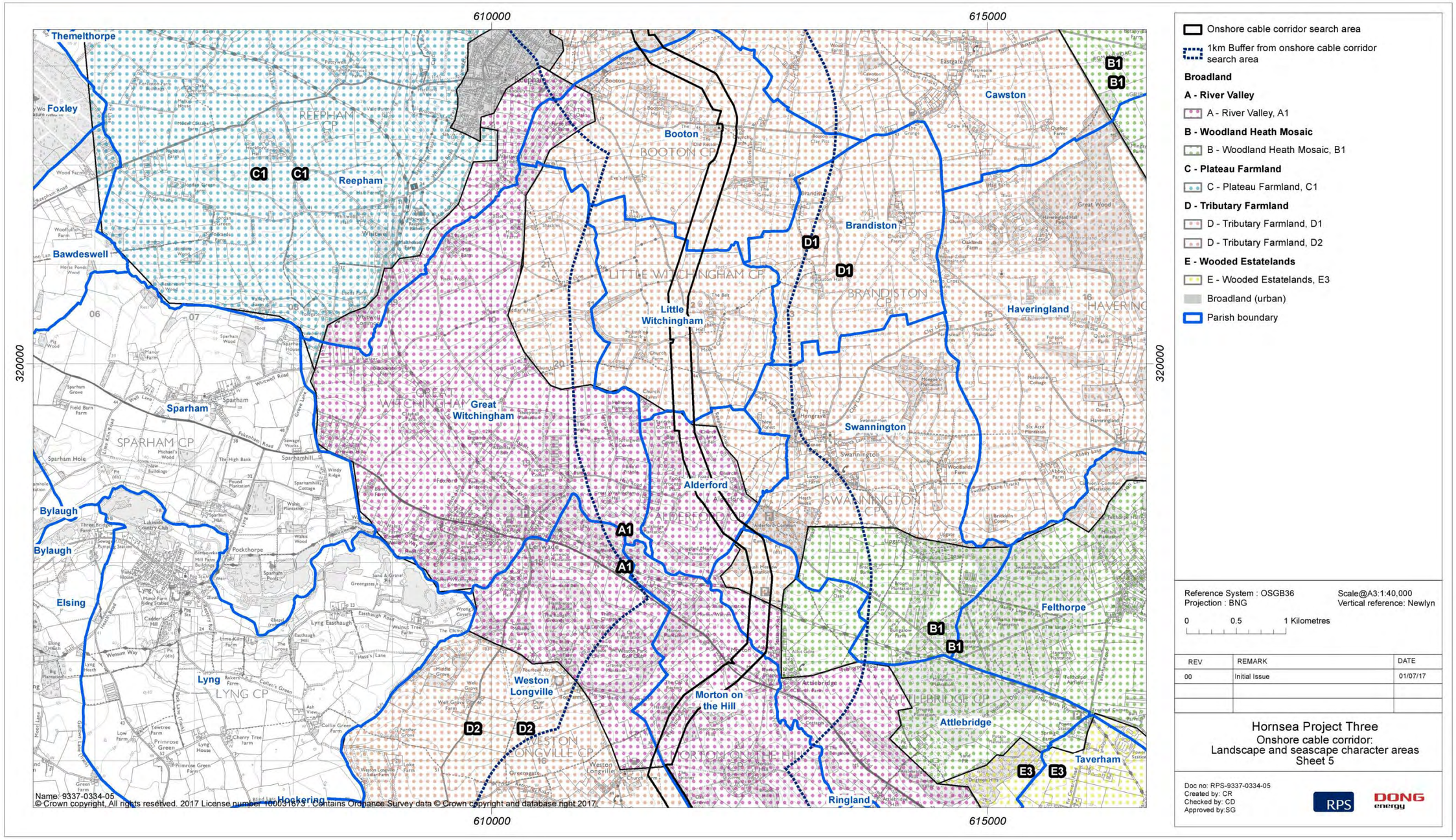


**Figure 4.7: Onshore Cable Corridor: Landscape and Seascape Character Areas Sheet 5 of 8.**

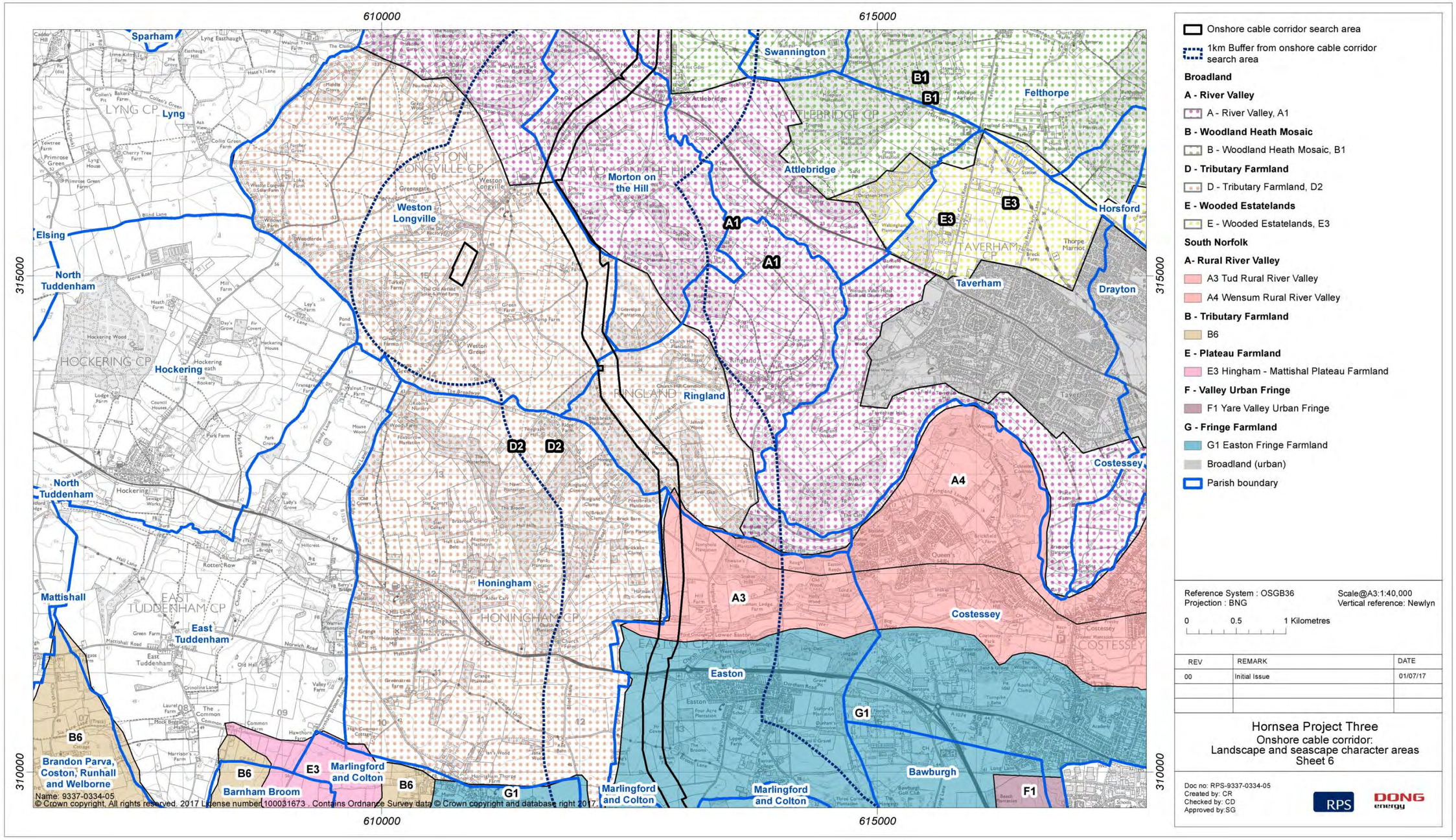


**Figure 4.7: Onshore Cable Corridor: Landscape and Seascape Character Areas Sheet 6 of 8.**

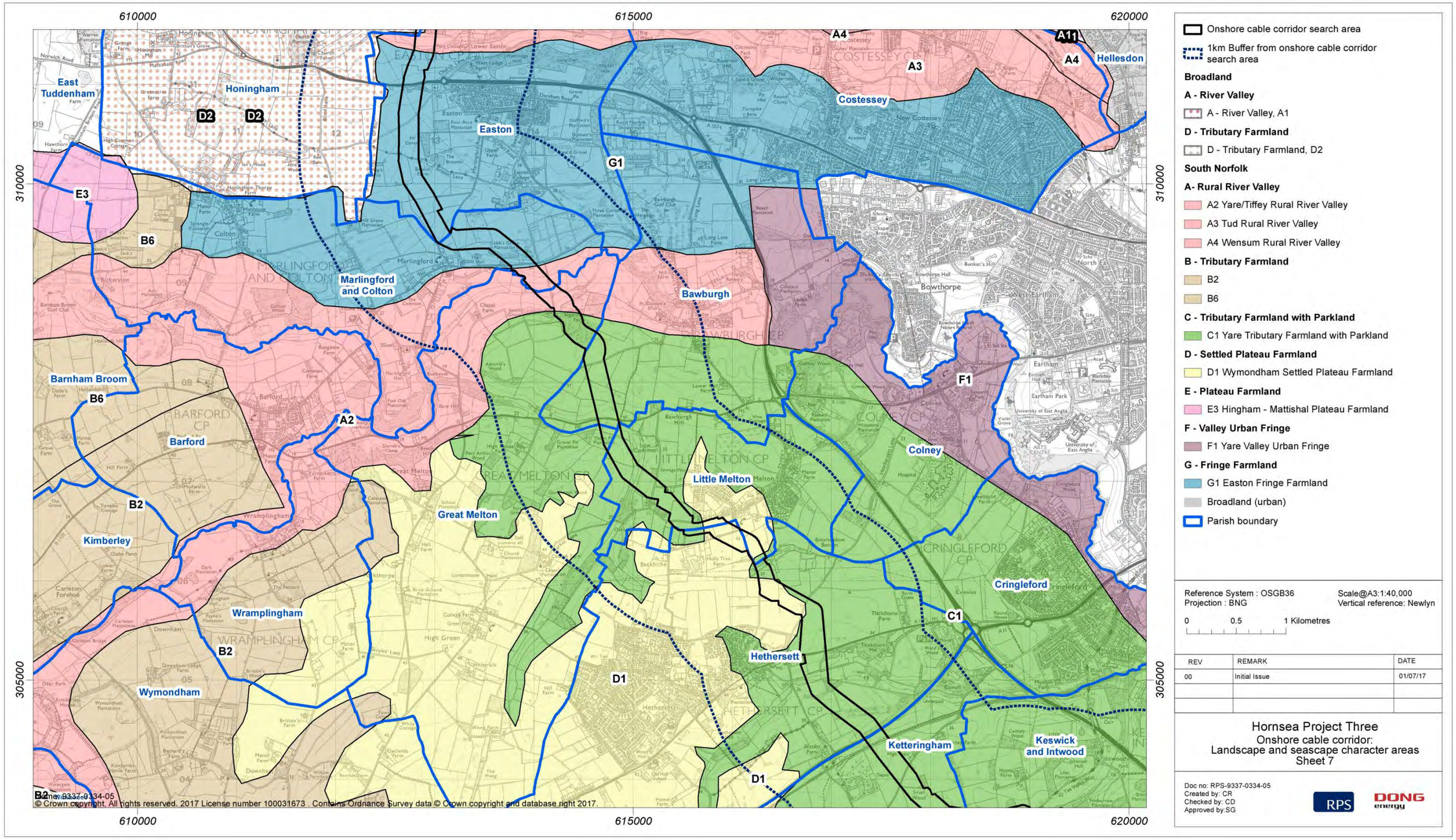


**Figure 4.7: Onshore Cable Corridor: Landscape and Seascape Character Areas Sheet 7 of 8.**

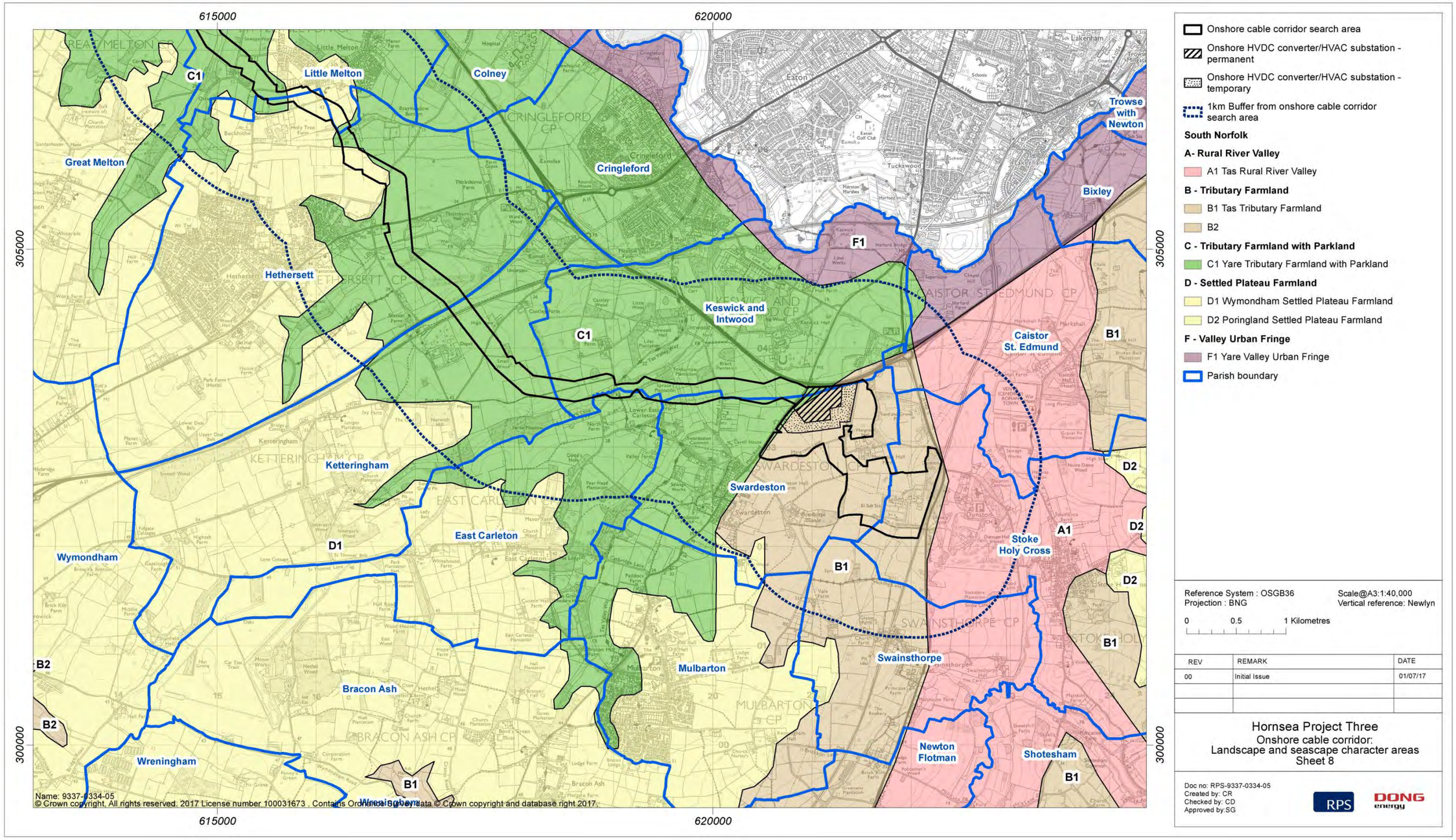


**Figure 4.7: Onshore Cable Corridor: Landscape and Seascape Character Areas Sheet 8 of 8.**

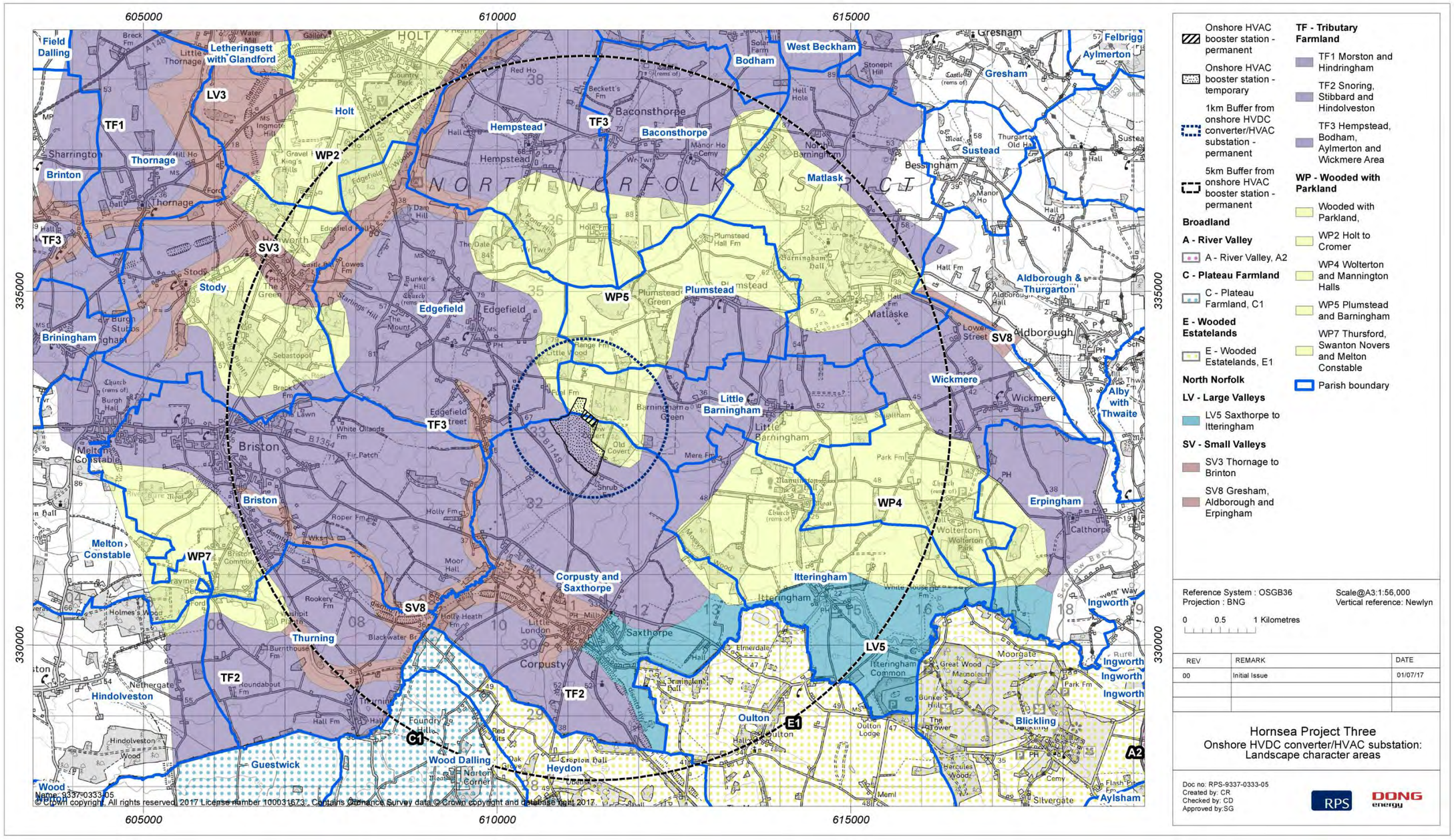


**Figure 4.8: Onshore HVAC Booster Station: Landscape Character Areas.**

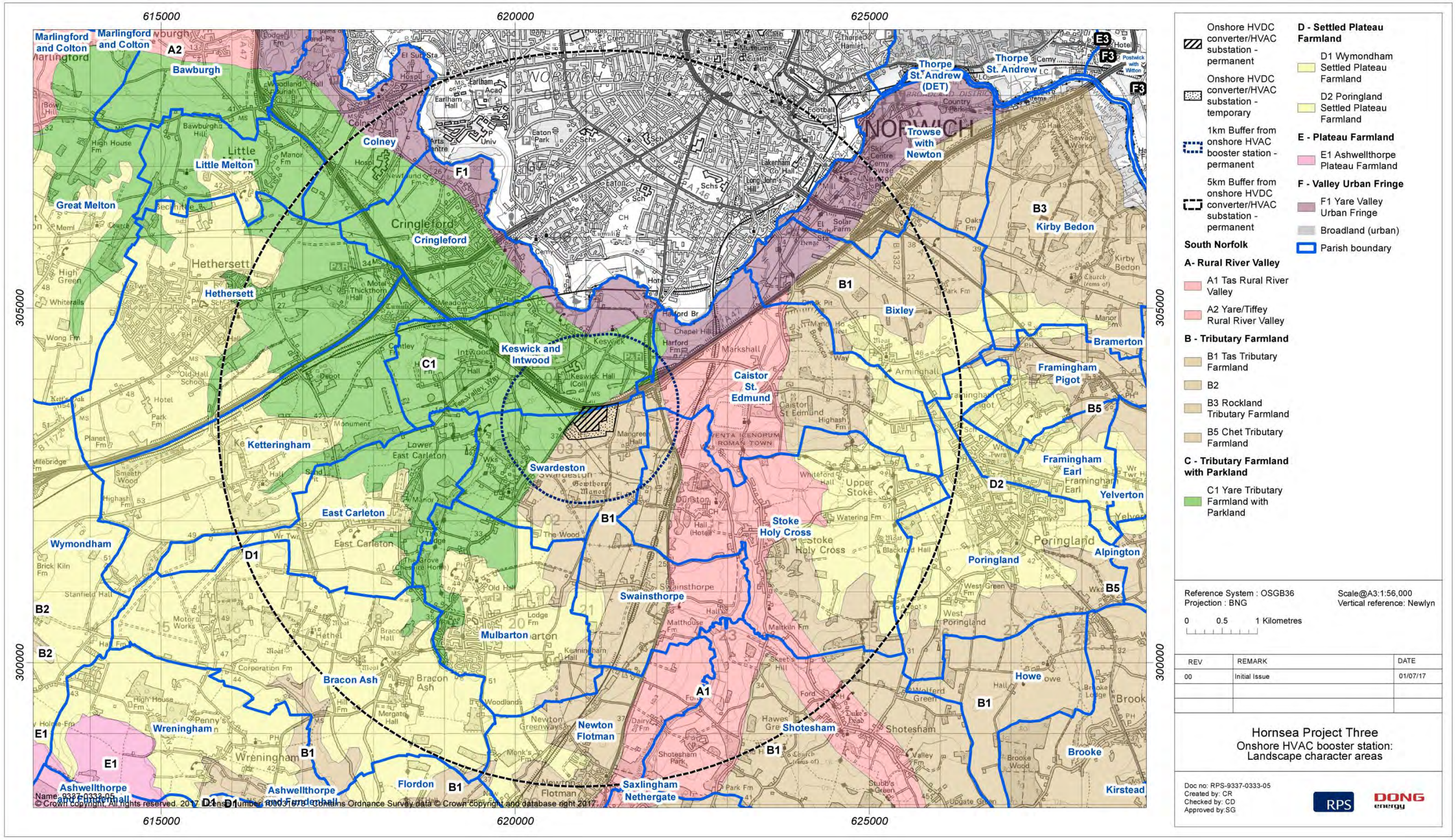


**Figure 4.9: Onshore HVDC Converter/HVAC Substation Landscape Character Areas.**

*Historic Landscape Characterisation*

4.7.1.14 The historic landscape character that the proposed onshore cable corridor, onshore HVAC booster station and onshore HVDC converter/HVAC substation are located within in chapter 5: Historic Environment.

*Visual Baseline*

4.7.1.15 The visual resources within the onshore cable route 1 km study area are dealt within this PEIR assessment by receptor type. The visual receptors that have been considered within this chapter are set out below while the sensitivity for each visual receptor type is set out in Table 4.7:

- Occupiers of residential properties;
- Users of public rights of way (PRoW) including National Trails, promoted paths, cycle routes and Access Land;
- Tourist and recreational receptors (other than users of PRoW, etc.);
- Users of community facilities;
- Receptors at commercial/business premises; and
- Dynamic receptors, i.e. occupiers of vehicles on roads, trains and marine vessels.

Onshore Cable Corridor

4.7.1.16 The effects at the landfall and along the onshore cable corridor will, generally be temporary and only exist during the construction phase. Little evidence of the onshore cable corridor will remain after construction and the construction activities are, for the purpose of the PEIR, assumed to be at a maximum height of diggers undertaking the works and lorries making deliveries. As such, the study area for the onshore cable corridor is 1 km either side of the outer extent of the onshore cable corridor search area as illustrated on Figure 4.1.

Onshore Construction Compounds

4.7.1.17 Hornsea Three will require a number of temporary onshore construction compounds along the onshore cable route. The location of these has not yet been determined. These are not included in the landscape and visual resources assessment, but will be considered in the Environmental Statement, when the locations are confirmed. Larger temporary compounds will be required at the landfall area, close to the HVAC booster station and the HVDC converter/HVAC substation sites. These are considered in the landscape and visual resources assessment at PEIR stage.

4.7.1.18 Hornsea Three will have a larger 'main compound' onshore. There potential options for that compound are considered in the PEIR. The effects in the vicinity of the three main onshore construction compounds will, also be mainly temporary and only exist during the construction phase. The compound sites will be returned to their original state during the post construction phase and little evidence will remain. The elements required to be stored on the construction compounds during the construction phase of the onshore elements are, for the purpose of the PEIR, assumed to be at a maximum height of diggers undertaking the works and lorries making deliveries. As such, the study area for the three construction compounds is set at a 1 km radius of the compound site area as illustrated on Figure 4.1.

Onshore HVAC Booster Station and Onshore HVDC Converter/HVAC Substation

4.7.1.19 ZTV maps were generated for the onshore HVAC booster station and the onshore HVDC converter/HVAC substation using a worst case height of 12.5 m and 25 m respectively to establish where, within a study area of 5 km from the proposed location, the onshore HVAC booster station and onshore HVDC converter/HVAC substation might be theoretically visible from (Figure 4.10 and Figure 4.11). The method and technical specification used to generate the ZTV is detailed in volume 6, annex 4.1: Landscape and visual impact assessment methodology. Potential representative viewpoints were agreed in this area for assessment at PEIR stage and potential receptors divided into very close range views (within a 1 km buffer) and close range views (within a 5 km study area), depending on the distance from the onshore HVDC converter/HVAC substation (Figure 4.10 and Figure 4.11). The individual visual receptors of the receptors types that are set out above, are listed in volume 6, annex 4.5: Visual Receptors for the Onshore Infrastructure. Effects on recreational receptors are also described in chapter 6: Land Use, Agriculture and Recreation.

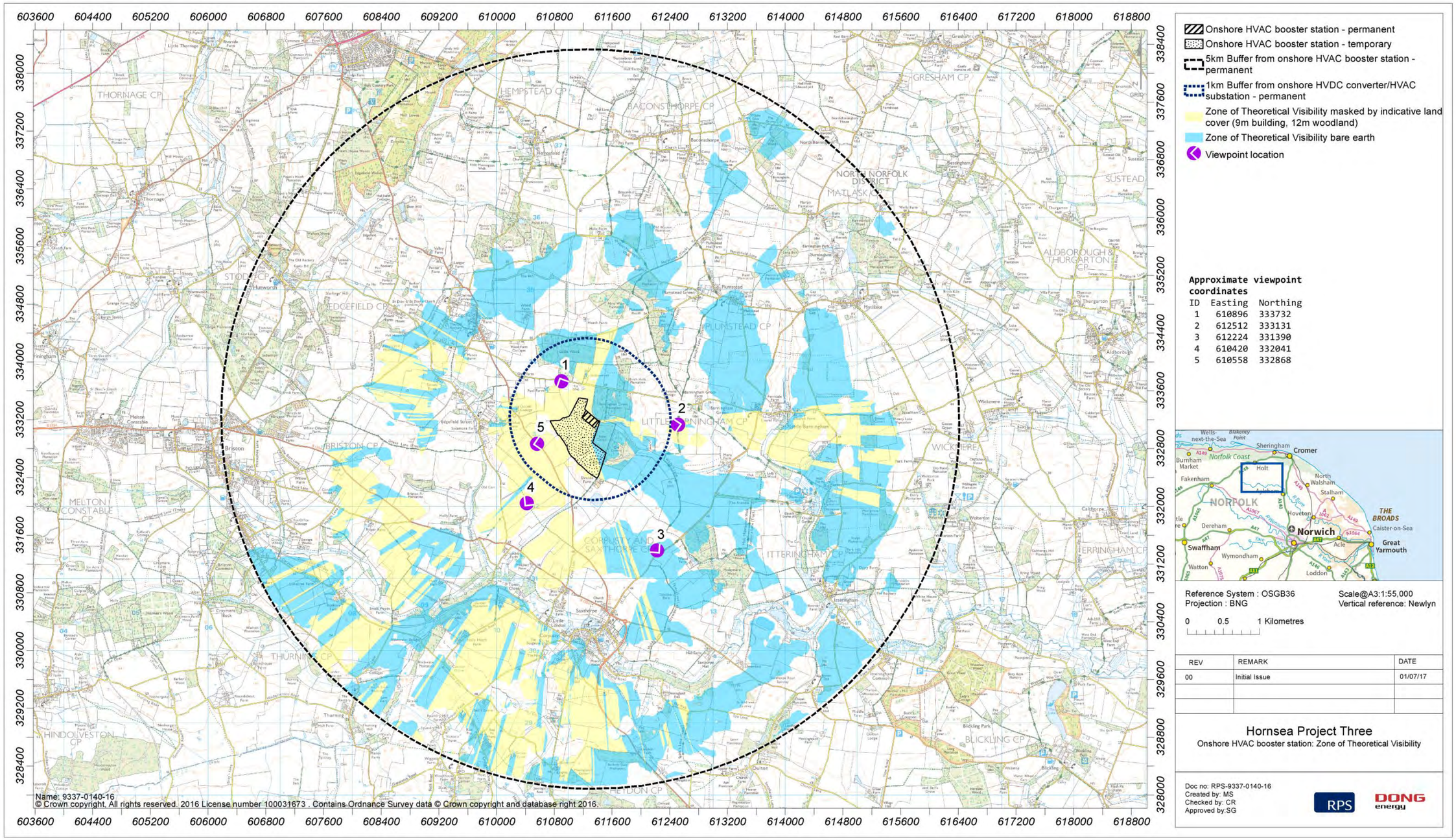


**Figure 4.10: Onshore HVAC Booster Station Zone of Theoretical Visibility and Baseline Viewpoint Locations.**

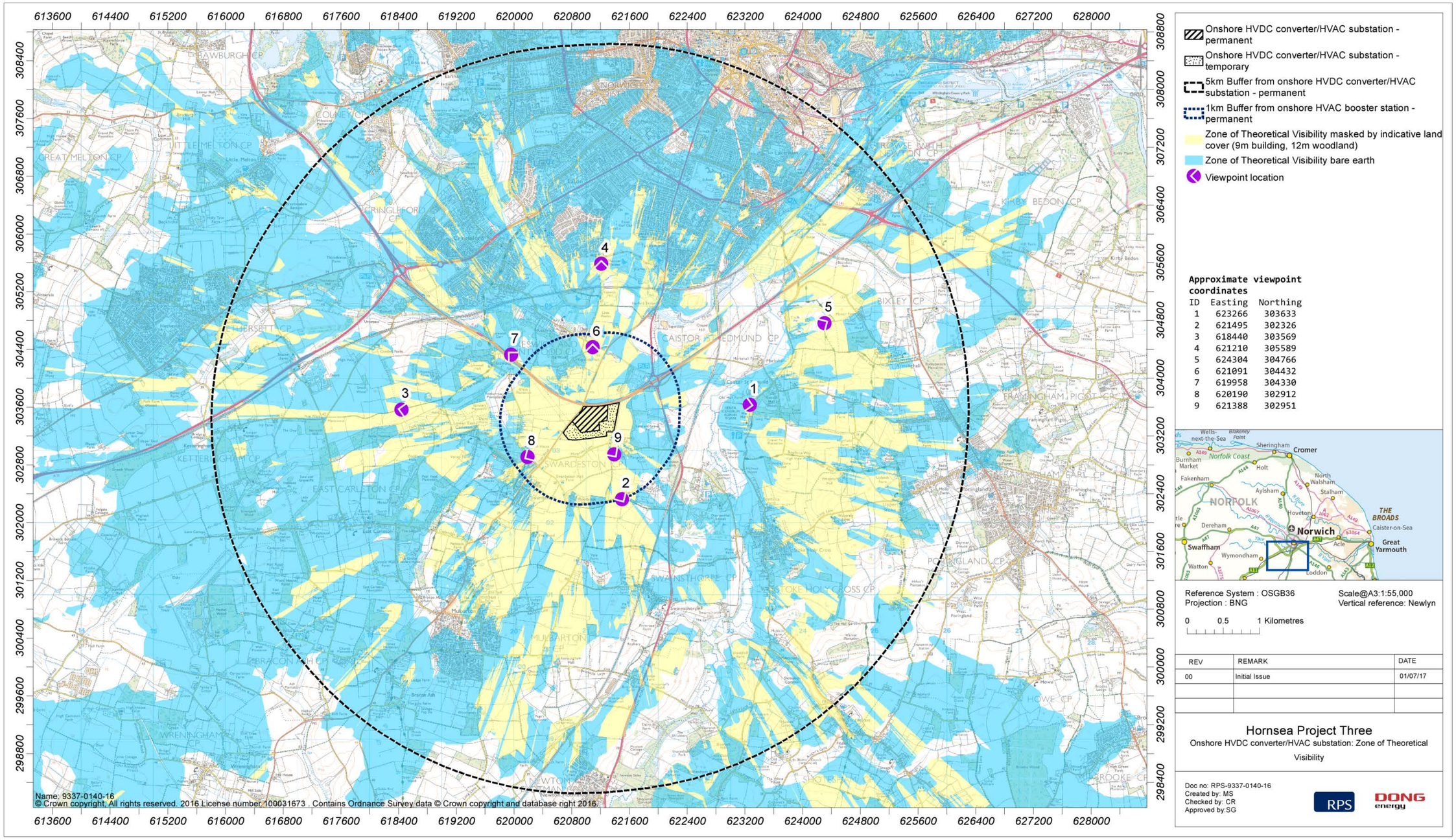


**Figure 4.11: Onshore HVDC Converter/HVAC Substation Zone of Theoretical Visibility and Baseline Viewpoint Locations.**

*Future baseline scenario*

4.7.1.20 With regard to development within the Norfolk Coast AONB, it is unlikely that there will be much change in terms of development, other than small additions to existing properties, conversions of properties and potentially, small developments within villages.

4.7.1.21 Outside the Norfolk Coast AONB small to medium sized residential developments are likely on the edges of some of the larger villages and on the edges of Norwich. The fringes of Norwich are also likely to see an increase in the amount of business and commercial development. All development will increase the amount of vehicles on the roads.

4.7.1.22 As far as long term change in the countryside is concerned, the biggest would result from climate change. The Countryside Agency (now Natural England) and Scottish Natural Heritage published 'Topic Paper 9: Climate change and natural forces – the consequences for landscape character', in 2002. The paper provides an insight into the effects of climate change on landscape character, for the different regions of the different parts of the British Isles.

4.7.1.23 Further, it is it is possible that land within the landscape and visual resources study area may be allocated for future development but such additional future land requirements are not known at this point in time. However, this situation will continue to be monitored and the baseline assessment updated as required.

### 4.7.2 Data limitations

4.7.2.1 Currently there is no known limitation in the data that has informed this chapter.

## 4.8 Key parameters for assessment

*Maximum design scenario*

4.8.1.1 The maximum design scenarios identified in Table 4.5 have been selected as those having the potential to result in the greatest effect on an identified resource, receptor or receptor group. These scenarios have been selected from the details provided in the project description (volume 1, chapter 3: Project Description). Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope (e.g. different building and infrastructure layout), to that assessed here be taken forward in the final design scheme.

### 4.8.2 *Impacts scoped out of the assessment*

4.8.2.1 On the basis of the baseline environment and the project description outlined in volume 1, chapter 3: Project Description, a number of impacts have been scoped out of the assessment for landscape and visual resources as agreed during consultation at the scoping stage (see Table 4.3). These impacts are outlined, together with a justification for scoping them out, in Table 4.6.

**Table 4.5: Maximum design scenario considered for the assessment of potential impacts on landscape and visual resources.**

| Potential impact | Maximum design scenario | Justification |
|---|---|---|
| *Construction phase* | | |
| **Intertidal**<br>The temporary impact of the construction works in the intertidal area may affect landscape and seascape receptors and change the character of designated and undesignated landscape and seascape resources, directly and indirectly.<br>The temporary impact of the construction works in the intertidal area may directly affect the views of specific visual receptors, e.g. residential views and users of Public Rights of Way (PRoWs), or change the nature of the visual resources of the area. | The number of cable ducts will be the same for both HVAC and HVDC options (i.e. eight).<br>During construction, Horizontal Directional Drilling (HDD) represents the maximum design scenario for crossing the beach as the exit pits are the largest (50 m long x 30 m wide x 4 m deep). The onshore cable corridor width is the same for all three methods (240 m). The number and dimensions of the Transition Joint Bays (TJBs) are the same for all options.<br>The two phase fully-sequential construction programme and the three phase partly-parallel construction programme both have a nine and a half year construction programme. However, the three phase programme has shorter breaks between construction campaigns and so is considered to be the maximum design scenario. | Largest area used for intertidal works has the potential to affect the largest area of landscape and seascape, as well as the largest number of visual receptors.<br>Longest and most intense time period over which the construction works take place in the intertidal area has the potential to affect the area of designated and undesignated landscape and seascape for the longest time, as well as the largest number of visual receptors. |
| **Onshore Cable Corridor**<br>The temporary impact of the construction works along the onshore cable corridor may affect designated and non-designated landscape and seascape resources, directly and indirectly.<br>The temporary impact of the construction works along the onshore cable corridor may directly affect visual receptors. | Permanent onshore cable corridor area is approximately 3,300,000 $m^2$ (60 m wide and 55 km long). Temporary onshore cable corridor working area is approximately 1,100,000 $m^2$ (20 m wide and 55 km long).<br>The HVAC solution will have the most numerous trenches (18 cables, three cables per trench). Both the HVAC and the HVDC options have the same temporary construction width (80 m).<br>Both the HVAC and HVDC options are assumed to have the same number of HDDs (50 no.) and the same number of hedgerows/landscape features removed or in close proximity.<br>The largest number of Joint Bays (JBs) and Link Boxes (LBs) is considered to be the maximum design scenario (separation distance of 750 m). The number will be the same for either HVAC or the HVDC options (up to 330 JBs and LBs (separate set for each circuit and average separation distance of 1 km).<br>The three phase partly-parallel construction programme is considered to be the maximum design scenario. | The greatest extent of works. The most numerous HDDs. The most numerous hedgerows/features crossed or in close proximity to the onshore cable corridor.<br>The largest number of construction vehicles and plant will be required for the most numerous JBs and LBs, or the construction will take the longest time. The most spoil will be temporarily stored for the largest number of JBs and LBs.<br>The longest and most intense construction period |
| **Compounds and Side Accesses**<br>The temporary impact of the construction of the compounds and side accesses may affect designated and non-designated landscape and seascape resources, directly and indirectly.<br>The temporary impact of the construction of the compounds and side accesses along the onshore cable corridor may directly affect visual receptors. | When locations for compounds have been chosen, the impacts of the compounds and the side access (including access track crossings and culvert/bridge crossings) for both options will be similar, as it is assumed that the same number of accesses and areas of compounds will be used for both HVDC and HVAC options.<br>• Construction compounds with an area up to 33,000 $m^2$ (average area 17,000 $m^2$ )located at 2 km intervals.<br>• Number of HDD crossings: 50 (provisional estimate). A HDD compound will be provide at both ends of the HDD crossing each with a minimum area of 4,900 $m^2$ (70 m x 70 m).<br>• Area required for Joint Bay compounds – 40 m x 40 m.<br>• Temporary culvert/bridge crossing: 60 $m^2$<br>The three phase partly-parallel construction programme is considered to be the maximum design scenario. | The greatest extent of works.<br>The most numerous hedgerows/features crossed or in close proximity to the site compounds and side accesses.<br>The most numerous construction compounds<br>The largest number of construction vehicles and plant.<br>The longest and most intense construction period. |

| Potential impact | Maximum design scenario | Justification |
|---|---|---|
| **Onshore HVAC Booster Station**<br>The temporary impact of the construction of the onshore HVAC booster stations may affect designated and non-designated landscape resources, directly and indirectly.<br>The temporary impact of the construction works of the onshore HVAC booster stations may directly affect visual receptors. | The onshore HVAC booster station has the largest footprint up to 25,000 m² and the largest area requirement for temporary works (25,000 m²).<br>The single building option has the largest built area (150 m long x 30 m wide x 12.5 m high). This will also be the most inflexible of the building options.<br>Firewalls of 15 m height and lightning protection height of 17.5 m.<br>In terms of construction vehicles, the maximum design scenario is likely to be the six building solution, if the six buildings are built at the same time.<br>The three phase partly-parallel construction programme is considered to be the maximum design scenario. | The greatest extent of works and therefore most likely to require the most numerous hedgerows/features removed or in close proximity to the onshore HVAC booster station.<br>The largest built area. The most inflexible building solution.<br>The largest number of construction vehicles and plant.<br>The longest and most intense construction period. |
| **Onshore HVDC Converter/HVAC Substations**<br>The temporary impact of the construction works of the onshore HVDC converter/HVAC substation may affect designated and non-designated landscape resources, directly and indirectly.<br>The temporary impact of the construction works of the onshore HVDC converter/HVAC substation may directly affect visual receptors. | Permanent area of site is 128,000 m² (including an area which may be used for landscaping) plus a temporary area of 100,000 m² '.<br>The maximum design scenario for a single building is the HVDC option as it has the largest dimensions for a single building (150 m long x 75 m wide x 25 m high). Also when proportionately split, i.e. more than one building, the HVDC buildings will be the maximum design scenario, as each building (x 5) will be 2,250 m². Both the HVDC and HVAC options have building heights of 25 m.<br>The three phase partly-parallel construction programme is considered to be the maximum design scenario.<br>Two buried 400kv lines to connect to Norwich substation | The greatest extent of works and therefore most likely to require the most numerous hedgerows/features removed or in close proximity to the onshore HVDC converter/HVAC substations.<br>The largest built area. The most inflexible building solution.<br>The largest and most numerous buildings.<br>The largest number of construction vehicles and plant.<br>The longest and most intense construction period. |
| *Operation phase* | | |
| **Intertidal**<br>The impact of the onshore cable corridor during the operation phase in the intertidal area may directly and indirectly affect designated and non-designated landscape and seascape resources.<br>The impact of the onshore cable corridor during the operation phase in the intertidal area may directly affect visual receptors. | Infrequent vehicle usage of the intertidal area to conduct maintenance and repairs. All options are considered to have equal risk of the need for maintenance and repair. | All options will experience the same weather and tidal conditions. |
| **Onshore Cable Corridor**<br>The impact of the onshore cable during the operation phase will not directly or indirectly affect designated and non-designated landscape and seascape resources as it will be underground.<br>The impact of the onshore cable during the operation and maintenance phase will not directly affect visual receptors as it will be underground. | Infrequent vehicle access required to TJBs, JBs and LBs for maintenance and repairs.<br>The largest number of JBs) and LBs is considered to be the maximum design scenario (separation distance of 750 m). The number will be the same for either HVAC or the HVDC options (up to 330 JBs and LBs (separate set for each circuit and average separation distance of 1 km).<br>Both the HVAC and the HVDC options are assumed to have the same permanent land take and require the same amount of vegetation removal and hedgerow replacement. The landscape and visual effects of the removal of mature planting and the establishment of replacement planting will be the same for both options. | The largest number of TJBs, JBs and LBs will have the potential to have the most number of vehicles conducting maintenance and repair work and therefore the most impact on landscape and visual resources. |
| **Onshore HVAC Booster Station**<br>The impact of the onshore HVAC booster stations during the operation phase may directly and indirectly affect designated and non-designated landscape resources.<br>The impact of the onshore HVAC booster stations during the operation and maintenance phase may directly affect visual receptors. | In terms of construction vehicles, the maximum design scenario is likely to be the six AIS building solution, if the six buildings are built at the same time. | The multiple AIS building option is the maximum design scenario, as there will potentially be the largest number of maintenance vehicles undertaking routine maintenance and repairs and therefore the most impact on landscape and visual resources. |

| Potential impact | Maximum design scenario | Justification |
|---|---|---|
| **Onshore HVDC Converter/HVAC Substations**<br>The impact of the onshore HVDC converter/HVAC substation during the operation phase may directly and indirectly affect designated and non-designated landscape resources.<br>The impact of the onshore HVDC converter/HVAC substation during the operation phase may directly affect visual receptors. | The multiple HVDC building option is the maximum design scenario.<br>Both the HVAC and the HVDC options are assumed to have the same permanent land take and require the same amount of vegetation removal and hedgerow replacement. The landscape and visual effects of the removal of mature planting and the establishment of replacement planting will be the same for both options.<br>Two buried 400kv lines to connect to Norwich substation | The multiple HVDC building option is the maximum design scenario, as there will potentially be the largest number of maintenance vehicles undertaking routine maintenance and repairs and therefore the most impact on landscape and visual resources. |
| *Decommissioning phase* | | |
| **Intertidal**<br>The impact of decommissioning the cables in the intertidal area may directly and indirectly affect designated and non-designated landscape and seascape resources.<br>The impact of decommissioning the onshore cable in the intertidal area may directly affect visual receptors. | Decommissioning machinery to cut, seal and securely bury the ends of the cables at the TJBs behind the beach. The number of cable ducts is the same for both the HVAC and HVDC options | The number of cable ducts is the same for both the HVAC and HVDC options. |
| **Onshore Cable Corridor**<br>The impact of decommissioning the onshore cable corridor may directly and indirectly affect designated and non-designated landscape and seascape resources.<br>The impact of decommissioning the onshore cable corridor may directly affect visual receptors. | The onshore cables will remain in situ. | The largest number of decommissioning vehicles and plant and therefore, the most impact on landscape and visual resources. |
| **Onshore HVAC Booster Station**<br>The impact of decommissioning the onshore HVAC booster station may directly and indirectly affect designated and non-designated landscape resources.<br>The impact of decommissioning the onshore HVAC booster station may directly affect visual receptors. | The multiple AIS building option, six buildings being decommissioned at the same time, is the maximum design scenario. | The largest number of decommissioning vehicles and plant and therefore, the most impact on landscape and visual resources. |
| **Onshore HVDC Converter/HVAC Substation**<br>The impact of decommissioning the onshore HVDC converter/HVAC substation may directly and indirectly affect designated and non-designated landscape resources.<br>The impact of decommissioning the onshore HVDC converter/HVAC substation may directly affect visual receptors. | The multiple HVDC building option, five buildings being decommissioned at the same time, is the maximum design scenario. | The largest number of decommissioning vehicles and plant and therefore, the most impact on landscape and visual resources. |

**Table 4.6: Impacts scoped out of the assessment for landscape and visual resources.**

| Potential impact | Justification |
|---|---|
| *Construction phase* | |
| All impacts of the offshore infrastructure, including the offshore HVAC booster station which is the closest offshore element to the coast | As set out in Table 4.3, Table 12.3 of the Scoping Report proposes scoping out any indirect impacts that fall outside the influence of the Zone of Theoretical Visibility (ZTV) for all phases of the development. Visual impacts from offshore elements are scoped out on the grounds that they are too far offshore to have any significant visual impacts onshore. |
| Landscape and visual receptors outside of the onshore cable route 1 km study area | The assessment is designed to focus on the likely significant effects of the onshore cable route. Visual receptors at distances greater than 1 km from the onshore cable corridor are not anticipated to experience significant effects. |
| Landscape and visual receptors outside of the HVAC booster station 5 km study area or the HVDC converter/HVAC substation 5 km study area | The assessment is designed to focus on the likely significant effects of the HVAC booster station or HVDC converter/HVAC substation. Visual receptors at distances greater than 5 km from these components are not anticipated to experience significant effects. |

| Potential impact | Justification |
|---|---|
| Landscape and visual receptors within the HVAC booster station 5 km study area or the HVDC converter/HVAC substation 5 km study area that do not coincide with the bare earth ZTV. | The assessment is designed to focus on the likely significant effects of the onshore cable route. Where receptors are located outside the ZTV, they will not witness any direct significant effects as a result of Hornsea Three. |
| Low and medium sensitivity visual receptors between 1 and 5 km from the HVAC booster station and the HVDC converter/HVAC substation. | The assessment is designed to focus on the likely significant effects of the onshore cable route. Low and medium sensitivity visual receptors at distances greater than 1 km are not anticipated to witness any significant effects. |
| *Operation and maintenance phase* | |
| Day time impacts of the onshore cable route | As set out in Table 4.3, Table 12.3 of the Scoping Report proposes scoping out impacts of the onshore cable route corridor are scoped out for the operational stage on the grounds that there will be no significant changes to landscape character or visual amenity as the cable will be buried underground. As such, the operation and maintenance phase of the onshore cable corridor will not be likely to give rise to any adverse landscape or visual effects that could be considered significant. The Secretary of State agreed in their Scoping Opinion that the matters identified in Table 12.3 could be scoped out of the landscape and visual impact assessment (LVIA). |
| Night time impacts of onshore cable corridor | As set out in Table 4.3, Table 12.3 of the Scoping Report proposes scoping out impacts of the onshore cable route corridor are scoped out for the operational stage on the grounds that there will be no significant changes to landscape character or visual amenity as the cable will be buried underground. Furthermore, there is no lighting proposed along the onshore cable corridor during the operation and maintenance phase. The Secretary of State agreed in their Scoping Opinion that the matters identified in Table 12.3 could be scoped out of the landscape and visual impact assessment (LVIA). |
| Assessment impacts of side access and construction compounds (day and night). | These will not be in use during the operation and maintenance phase. |
| All impacts of the offshore HVAC booster station | As set out in Table 4.3, Table 12.3 of the Scoping Report proposes scoping out any indirect impacts that fall outside the influence of the Zone of Theoretical Visibility (ZTV) for all phases of the development. Visual impacts from the offshore HVAC booster stations are scoped out on the grounds that they are too far offshore to have any significant visual impacts onshore. |
| Landscape and visual receptors outside of the HVAC booster station 5 km study area or the HVDC converter/HVAC substation 5 km study area | The assessment is designed to focus on the likely significant effects of the onshore cable route and visual receptors at distances greater than 1 km are not anticipated to witness any significant effects. |
| Landscape and visual receptors within the HVAC booster station 5 km study area or the HVDC converter/HVAC substation 5 km study area that do not coincide with the bare earth ZTV. | The assessment is designed to focus on the likely significant effects of the onshore cable route, these receptors will not witness any direct effects as a result of Hornsea Project Three. |
| Low and medium sensitivity visual receptors between 1 and 5 km from the HVAC booster station and the HVDC converter/HVAC substation. | The assessment is designed to focus on the likely significant effects of the onshore cable route. Low and medium sensitivity visual receptors at distances greater than 1 km are not anticipated to witness any significant effects. |
| *Decommissioning phase* | |
| Day time impacts of the onshore cable route | The decommissioning requirements of the onshore cable route will not cause any changes to the landscape character or visual amenity of the study area due to the minimal activities. Decommissioning activities for the onshore cable corridor will not be likely to give rise to any adverse landscape or visual effects that could be considered significant. |
| Night time impacts of the onshore cable route. | There is no lighting associated with these elements of Hornsea Three during the decommissioning phase. |
| Assessment impacts of side access and construction compounds. | At this stage, it is not known if any of the construction compounds will be used during the decommissioning of onshore infrastructure and as such, have been scoped out of the PEIR. If the requirement is identified as the scheme is further defined then the compounds would be considered at the Environmental Statement stage. |
| All impacts of the offshore HVAC booster station | As set out in Table 4.3, Table 12.3 of the Scoping Report proposes scoping out any indirect impacts that fall outside the influence of the Zone of Theoretical Visibility (ZTV) for all phases of the development. Visual impacts from the offshore HVAC booster stations are scoped out on the grounds that they are too far offshore to have any significant visual impacts onshore. |
| Landscape and visual receptors outside of the HVAC booster station 5 km study area or the HVDC converter/HVAC substation 5 km study area | The assessment is designed to focus on the likely significant effects of the onshore cable route and visual receptors at distances greater than 1 km are not anticipated to witness any significant effects. |
| Landscape and visual receptors within the HVAC booster station 5 km study area or the HVDC converter/HVAC substation 5 km study area that do not coincide with the bare earth ZTV. | The assessment is designed to focus on the likely significant effects of the onshore cable route, these receptors will not witness any direct effects as a result of Hornsea Project Three. |
| Low and medium sensitivity visual receptors between 1 and 5 km from the HVAC booster station and the HVDC converter/HVAC substation. | The assessment is designed to focus on the likely significant effects of the onshore cable route. Low and medium sensitivity visual receptors at distances greater than 1 km are not anticipated to witness any significant effects. |

## 4.9 Impact assessment criteria

4.9.1.1 The impact assessment for the construction, operation and maintenance, and decommissioning phases of the onshore elements of Hornsea Three follows the summary of LVIA methodology based upon the relevant guidance that has been set out below and in volume 6, annex 4.1: Landscape and Visual Impact Assessment Methodology. For the purpose of maintaining a document that focuses on only the likely significant effects, the effects presented in this PEIR chapter are limited to those that have been assessed as major adverse and above, based upoin the scheme definition currently available. However, a high level summary of all potential landscape and visual effects (including impacts whichy are not considered significant), is presented within volume 6, annex 4.8: Effects on Landscape and Visual Resources and Receptors. The impacts preliminary and will be revisited and expanded upon (where relevant) in the Environmental Statement when the design of Hornsea Three has been further defined.

4.9.1.2 As details of the onshore cable route are still yet to be defined, the visual impact assessment for this phase of the development is designed to highlight the likely impact that the type of receptors within the onshore cable route 1 km study area will witness, detailing their sensitivity and indicating the likely significance of effect for the receptor type rather than specific visual receptors. Similarly, the likely visual impact for visual receptors within 1 km of each of the three main construction compounds, the type of impact that they will witness and their sensitivities are set out, with an indication of the likely significance of effect. As the maximum height and type of development for the HVAC booster station and the HVDC converter/HVAC substation are known, the individually identified visual receptors within the 5 km study areas that are likely to witness significant effects as a result of each, are set out in terms of the likely magnitude of impact, sensitivity of receptors and significance of effect.

4.9.1.3 Once the project has been fully defined, a more detailed assessment of the effects that are likely to arise as a result of the onshore infrastructure will be undertaken and submitted as part of the Environmental Statement. The Environmental Statement will also include specific elements of mitigation that will be identified in order to alleviate significant adverse effects where they are likely to arise. The mitigation measures will be set out within the outline LSMP and will be agreed with the LPAs. Similarly, a detailed assessment of night time effects will be provided for submission as part of the Environmental Statement once a lighting strategy has been agreed with the LPAs.

### 4.9.2 Nature and Scope of Effects

4.9.2.1 The scope of landscape and visual impact comprises:

- Direct (primary) effects on the landscape character of the site, and on views and visual amenity; and/or
- Indirect (secondary) effects on the surrounding landscape character.

4.9.2.2 It is generally assumed that indirect effects will be intrinsically less significant than direct effects. However, this is not necessarily the case and the significance of effect is dependent on the nature of the proposal and the landscape in which it is situated.

4.9.2.3 The scope of the assessment has been limited to those that are likely to be significant, with those effects that are unlikely to be significant not considered at this early stage that presents the preliminary environmental information. A more exhaustive assessment will be provided at the Environmental Statement stage once the project and mitigation measures have been fully defined.

### 4.9.3 Assessment Criteria and Methodology

4.9.3.1 The criteria for determining the significance of effects is a two stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. The terms used to define sensitivity and magnitude are based on those used in the DMRB methodology, (Highways Agency, 2009) which is described in further detail in volume 1, chapter 5: Environmental Impact Assessment Methodology.

4.9.3.2 The assessment is based on the methodology in the 'Guidelines for Landscape and Visual Impact Assessment: Third Edition' (Landscape Institute and Institute for Environmental Management and Assessment, 2013) (GLVIA3). GLVIA3 *"concentrates on principles and process"* and *"does not provide a detailed or formulaic 'recipe'"* to assess effects, it being the *"responsibility of the professional to ensure that the approach and methodology are appropriate to the task in hand"* (preface to GLVIA3). The effects on the landscape resources or visual receptors (people) are assessed by considering the proposed change in the baseline conditions (the impact of the proposal) against the type of landscape resource or visual receptor (including the importance and sensitivity of that resource or receptor). The methodology is set out in detail in volume 6, annex 4.1: Landscape and Visual Impact Assessment Methodology.

4.9.3.3 These factors are determined through a combination of quantitative (objective) and qualitative (subjective) assessment using professional judgement. The criteria for defining sensitivity in this chapter are outlined in Table 4.7 below.

*Landscape sensitivity*

4.9.3.4 Landscape sensitivity is referred to in GLVIA3 at paragraph 5.39 "*Landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of change or development proposed and the value attached to the landsca*pe".

4.9.3.5 The sensitivity of landscape resources and visual receptors is dependent on a range of factors and is classified on a five point scale (negligible, low, medium, high and very high) as set out in volume 6, annex 4.1: Landscape and Visual Impact Assessment Methodology. Sensitivity relates to general categories rather than being project specific. Professional judgement on a number of contributing factors such as value, will be used in combination with volume 6, annex 4.1: Landscape and Visual Impact Assessment Methodology and Table 4.7 below in order to more accurately assess the sensitivity/susceptibility of the resource/receptor to the proposed Hornsea Three development.

4.9.3.6 Table 4.7 draws on GLVIA3 paragraphs 6.33 to 6.44 for these categories. However, it should be noted that paragraph 6.32 of GLVIA3 refers to the susceptibility of different visual receptors to changes in views and states that *"the occupation or activity of different people experiencing the view at particular locations"* should be recorded as well as *"the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations"*.

**Table 4.7: Definition of terms relating to the sensitivity of the receptor.**

| Sensitivity | Definition of landscape resources sensitivity used in this chapter | Definition of visual receptor sensitivity used in this chapter |
|---|---|---|
| Very High | Exceptional landscape quality, no or limited potential for substitution. Key elements features well known to the wider public.<br>Little or no tolerance to change. | Views of remarkable scenic quality, of and within internationally designated landscapes or key features or elements of nationally designated landscapes that are well known to the wider public.<br>Little or no tolerance to change. |
| High | Strong/distinctive landscape character; absence of landscape detractors.<br>Low tolerance to change. | Views from residential properties, from nationally designated countryside/landscape features with public access, from National Trails, promoted paths and cycleways, public rights of way and Access Land.<br>Low tolerance to change. |
| Medium | Some distinctive landscape characteristics; few landscape detractors.<br>Medium tolerance to change. | Views from local roads and routes crossing designated countryside/landscape features. Some public rights of way within built up areas. Some areas of recreation where the focus of the activity is not the landscape.<br>Medium tolerance to change. |
| Low (or lower) | Absence of distinctive landscape characteristics; presence of landscape detractors.<br>High tolerance to change. | Views from work places, main roads and undesignated countryside/landscape features, or areas where there are visual detractors.<br>High tolerance to change. |
| Negligible | Absence of positive landscape characteristics. Significant presence of landscape detractors.<br>High tolerance to change. | Views from within and of undesignated landscapes, with significant presence of landscape detractors.<br>High tolerance to change. |

*Duration of Impact*

4.9.3.7 The duration of impacts falls into two criteria, temporary and permanent. The definitions of which are set out below:

- *Temporary short term (0-2 years),*
- *Temporary medium term (2-5 years),*
- *Temporary long term (5-15 years), or*
- *Permanent (greater than 15 years).*

*Magnitude of Impact*

4.9.3.8 The magnitude of impact of a particular proposal depends upon the:

- Nature of proposed development and perceived change;
- Scale of proposed change;
- Duration of change; and
- Reversibility.

4.9.3.9 The magnitude of the predicted impact has been reached using professional judgement based upon the criteria set out below and detailed in volume 6, annex 4.1: Landscape and Visual Impact Assessment Methodology.

4.9.3.10 The criteria for defining magnitude in this chapter are outlined in Table 4.8 below.

**Table 4.8: Definition of terms relating to the magnitude of an impact.**

| Magnitude of impact | Definition of magnitude of impact for landscape resources used in this chapter | Definition of magnitude of impact for visual resources used in this chapter |
|---|---|---|
| Major | Total loss or/very substantial loss of key elements/features/patterns of the baseline (i.e., pre-development landscape and/or introduction of dominant, uncharacteristic elements with the attributes of the receiving landscape). | Complete or very substantial change in view, involving complete or very substantial obstruction of existing view or complete change in character and composition of baseline (e.g., through removal of key elements). |
| | Total addition or/very substantial addition of key elements/features/patterns of the baseline (i.e., pre-development landscape and/or introduction of dominant, uncharacteristic elements with the attributes of the receiving landscape). | Complete or very substantial change in view, involving complete or very substantial enhancement of existing view or complete change in character and composition of baseline (e.g., through addition of key elements). |
| Moderate | Partial loss of, or moderate alteration to, one or more key elements/features/patterns of the baseline (i.e., pre-development landscape and/or introduction of elements that may be prominent, but may not necessarily be substantially uncharacteristic with the attributes of the receiving landscape). | Moderate change in view: which may involve partial obstruction of existing view or partial change in character and composition of baseline (i.e., pre-development view through the introduction of new elements or removal of existing elements). Change may be prominent, but will not substantially alter scale and character of the surroundings and the wider setting. Composition of the views will alter. View character may be partly changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant. |

| Magnitude of impact | Definition of magnitude of impact for landscape resources used in this chapter | Definition of magnitude of impact for visual resources used in this chapter |
|---|---|---|
| | Partial addition of, or moderate alteration to, one or more key elements/features/patterns of the baseline (i.e., pre-development landscape and/or introduction of elements that may be prominent, and in character with the attributes of the receiving landscape). | Moderate change in view: which may involve partial enhancement of existing view or partial change in character and composition of baseline (i.e. pre-development view through the introduction of new elements or removal of existing uncharacteristic elements). Change may be prominent, but will not substantially alter scale and character of the surroundings and the wider setting. Composition of the views will alter. View character may be partly changed through the introduction of characteristic features. |
| Minor | Minor loss of or alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that may not be uncharacteristic with the surrounding landscape. | Minor change in baseline (i.e. pre-development view – change will be distinguishable from the surroundings whilst composition and character will be similar to the pre change circumstances). |
| | Minor addition of or alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that will be characteristic of the surrounding landscape. | Minor change in baseline (i.e. pre-development view – change will not be distinguishable from the surroundings whilst composition and character will be similar to the pre change circumstances). |
| Negligible | Very minor loss or addition of or alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that are not uncharacteristic with the surrounding landscape approximating to a 'no-change' situation. | Very slight change in baseline (i.e. pre-development view – change barely distinguishable from the surroundings). Composition and character of view substantially unaltered. |
| | Very minor loss or addition of or alteration to one or more key elements/features/patterns of the baseline i.e., pre-development landscape and/or introduction of elements that are not uncharacteristic with the surrounding landscape approximating to a 'no-change' situation. | Very slight change in baseline (i.e. pre-development view – change barely distinguishable from the surroundings). Composition and character of view substantially unaltered. |
| No change | No loss, alteration or addition to the receiving landscape resource. | No alteration to the existing view. |

*Significance of Effect*

4.9.3.11 The significance of effect upon landscape and visual resources is determined by correlating the magnitude of the impact and the sensitivity of the receptor as set out on Page 37 of the GLVIA3. The method employed for this assessment is presented in Table 4.9 where a range of significance of effect is presented.

4.9.3.12 Table 4.9, the final assessment for each effect is based upon expert judgement and supported with reasoned argument (GLVIA3 page 37). The GLVIA3 guidance recognises that the EIA directive is clear about the emphasis needing to be on the identification of likely significant environmental effects (page 9) and that there is no formulaic way of approaching this, but, that it is a matter of systematic thinking about the range of possible interactions between the various components of the development (page 35).

4.9.3.13 For the purposes of this LVIA, any effects with a significance level of moderate or less have been concluded to be not significant in terms of the EIA Regulations. This follows the principles set out within the GLVIA3 and enables the identification of whether the project is likely to cause significant effects.

**Table 4.9: Matrix used for the assessment of the Significance of effect.**

| | | Magnitude of impact | | | | |
|---|---|---|---|---|---|---|
| | | *No change* | *Negligible* | *Minor* | *Moderate* | *Major* |
| Sensitivity of receptor | *Negligible* | Negligible | Negligible | Negligible or Minor | Negligible or Minor | Minor |
| | *Low* | Negligible | Negligible or Minor | Negligible or Minor | Minor | Minor or Moderate |
| | *Medium* | Negligible | Negligible or Minor | Minor | Moderate | Moderate orMajor |
| | *High* | Negligible | Minor | Minor or Moderate | Moderate orMajor | Major or Substantial |
| | *Very high* | Negligible | Minor | Moderate orMajor | Major or Substantial | Substantial |

*Visual Assumptions and Limitations*

Night time effects

4.9.3.14 A lighting strategy has not yet been prepared for the construction phase and as such, it has been necessary to make assumptions based on experience of similar projects and good working practice. For example, site lighting during the construction phase will only operate when required and will be directional to avoid unnecessary illumination to nearby areas. At this stage, it is assumed that all aspects of the construction works may require lighting, including those along the onshore cable corridor.

4.9.3.15 Prior to construction, a lighting strategy will be agreed with the relevant LPAs as part of a Code of Construction Practice. This will identify any necessary mitigation measures to minimise the effects of lighting during the construction phase. Once a lighting strategy has been defined, a lighting assessment will be conducted to inform a detailed determination of night time effects upon landscape and visual receptors. This will be presented in the Environmental Statement.