

Norfolk Boreas Offshore Wind Farm Position Statement Cawston Traffic

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Photo: Ormonde Offshore Wind Farm

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1 Introduction

1. Following Issue Specific Hearing 3 on Onshore Effects including the draft Development Consent Order held on Tuesday 21st January 2020 the following actions were identified by the Examining Authority:
 - 1) Action Point 2 - Meeting to be arranged between Applicant, Norfolk County Council, Broadland District Council and Cawston Parish Council to discuss the revised Highway Intervention Scheme and the alternative Haul Road (temporary access off B1149 and construction material options) between D4 (Thursday, 30 January) and D5 (Wednesday, 26 February);
 - 2) Action Point 3 - An agenda for the meeting in 2. above to be drafted and agreed between all 4 parties; and
 - 3) Action Point 4 - Position statement on the matters discussed and agreed at the meeting referred to in 2. and 3. above.
2. A meeting was held with all requested parties on Wednesday 12th February 2020, the agreed agenda for which was submitted at Deadline 4 [REP4-020]. This position statement provides details of the matters discussed during the meeting and positions of all parties following the meeting, and identifies matters which are still to be agreed.

2 Matters Discussed at Meeting 12th February 2020

3. A meeting was held at the King's Centre in Norwich with representatives from Broadland District Council, Cawston Parish Council, Norfolk County Council Local Highways Authority and the Applicant. The representative from Norfolk County Council Highways Authority stated that any views expressed during the meeting would be their own and not necessarily representative of the Local Highways Authority as they would need to consult with the development team before providing a formal position subsequent to the meeting.
4. In accordance with the agreed agenda [REP4-020] the two items discussed were:
 - 1) Consider revised Cawston Highway Intervention Scheme and any Associated Impacts:
 - i. Traffic Management and Safety, including update on Road Safety Audit
 - ii. Noise and Vibration (including structural surveys)
 - iii. Air Quality
 - iv. Cultural Heritage

2) Consider Alternative Access and any Associated Impacts:

- i. Options for alternative access route including relocation of mobilisation area and proposed revision to cable route. Outlining opportunities and constraints and implications for Norfolk Boreas alone and cumulatively with other projects.

2.1 Revised Highways Intervention Scheme

5. The Applicant produced a Technical Note on the Revised Cawston Highway Intervention Scheme (HIS) which was submitted at Deadline 4 [REP4-016]. The note set out the details of the revised HIS and the changes made, including drawings of the revised scheme. This note was sent to all parties via email on 31st January 2020 to allow review of the information prior to the meeting.
6. During the meeting the following topics were discussed in relation to the HIS:
 - concerns over carriageway width,
 - reservations over the noise and vibration and air quality assessments and
 - potential vibration effects on listed buildings.
7. The meeting note presented in Appendix 1 records concerns as raised by all parties during the meeting. This document was compiled using handwritten notes from those present at the meeting. The note was then circulated for comment post meeting and any necessary amendments or additions included.

2.2 Cawston Alternative Access

8. The second item on the meeting agenda was discussion of alternative access routes. During Issue Specific Hearing 3 creation of an access directly off the B1149 and the use of a haul road to access mobilisation area 6 (MA6) was raised for further consideration. Cawston Parish Council also queried whether consideration could be given to moving MA6 adjacent to the B1149. A further alternative which had previously been raised by Cawston Parish Council was the implementation of a one-way system by utilising Heydon Road to divert traffic away from the village. Cawston Parish Council also requested that a re-alignment of the cable route was also considered as had been previously proposed during the Norfolk Vanguard examination
9. The Applicant considered the proposed alternatives and how they could be implemented, and identified the five options below for managing traffic around Cawston:
 - 1) **Option 1 (B1145 to MA6 - existing)** (Norfolk Boreas Scenario 1 and Scenario 2) – This is the existing option with all traffic on the B1145 to MA6 with a Highway Intervention Scheme in place at Cawston Village.

- 2) **Option 2 (B1145 Bypass)** (Norfolk Boreas Scenario 2 only) – Pre-construct a separate haulage road from B1149 to MA6, parallel to running track, to allow two-way delivery of all materials without conflicting with duct installation. Traffic diverted away from B1145 and Cawston Village.
 - 3) **Option 3 (B1145 Bypass Light)** (Norfolk Boreas Scenario 2 only) – Pre-construct a running track from B1149 to MA6 and deliver peak HGV loads (establishment of mobilisation areas, running track etc) via this route prior to duct installation. During duct installation, HGV deliveries to use B1145 to avoid conflict with construction on the running track. Reduction in HGV traffic on B1145 through Cawston Village.
 - 4) **Option 4 (Move MA6 to B1149)** (Norfolk Boreas Scenario 2 only) – Move MA6 from B1145 to B1149. Construction from MA6 achieved to south. Traffic diverted away from B1145 and Cawston Village during duct installation.
 - 5) **Option 5 (B1145 to MA6 utilising Heydon Road for one-way traffic)** (Norfolk Boreas Scenario 1 and Scenario 2) – Potential one-way system for construction HGVs to halve traffic on B1145 to the east of Heydon Road.
10. With regards to the options to access the mobilisation area directly from the B1149, some key principles had to be considered due to the change in approach. The cable route and running track were designed for construction traffic rather than HGV delivery vehicles. Firstly, that delivery traffic would need to be isolated from construction traffic; traffic which is delivering materials to the mobilisation area could not use the same access track as the traffic conducting active construction (duct installation) to ensure safety to personnel during construction activities and to ensure safe traffic movements. Secondly, the Applicant's base case construction method is for all delivery traffic to use public highways and for the running track to be for construction vehicles e.g. dumpers and tippers. In order for the running track to be able to accommodate all delivery vehicles a significantly higher specification would be required. As a minimum, this would need to be stone running track, eliminating the option to use less impactful alternatives such as trackway.
11. As a result, two options were developed and considered:
- Option 2a 'full bypass' where the issue of conflict with construction is managed spatially through the creation of a separate haulage road with a specification suitable for delivery traffic; and
 - Option 3a 'light bypass' where the issue of conflict is managed temporally by allowing delivery traffic on the running track when duct installation is not taking

place. However, the use of the running track by delivery as well as construction vehicles requires modification to the specification of the running track.

12. Following the identification of the potential options the Applicant undertook a review of all proposed options considering the following key areas:
 - construction methodology;
 - traffic and transport;
 - order limits;
 - land implications; and
 - environmental.
13. The review was undertaken to identify the constraints and benefits of the options from an overall environmental impact assessment perspective and sought to consider how the options affect the parameters which have already been assessed in the Environmental Statement (ES). A Red / Amber / Green (RAG) coding was applied to highlight the key constraints and opportunities in each area, for each of the options.
14. This information was collated into a table (see Appendix 2) and to help facilitate discussions during the meeting regarding the Alternative Access Options, this table along with some supporting materials (plans showing the proposed changes to the order limits, possible Heydon Road diversion route and typical cross-section for the bypass haulage road), were provided to all parties on Friday 7th February 2020.
15. During the meeting, each of the options was considered in turn and participants were invited to comment on any aspects of the prepared table, or to add their own comments. The meeting note provided in Appendix 1 details the feedback on options and positions documented at the end of the meeting. The representatives from Norfolk County Council Highway Authority indicated that any views they expressed during the meeting would be an informal officer opinion and did not represent the formal view of Norfolk County Council Highway Authority. It was indicated that a formal response would be provided following consultation with the development team following the meeting.
16. All parties were invited to review the meeting note and provide any further comments following the meeting. The latest position provided by all parties is documented in Section 3, which in some cases further expands on that provided at the end of the meeting.

3 Position Statement

17. Table 1 below provides the positions of all parties on the matters discussed in the meeting and then identifies where the matters are agreed or not agreed.

18. The position documented for Cawston Parish Council is in accordance with the email provided on 18th February 2020. Broadland District Council did not provide any further comments therefore their position is as stated at the meeting.

19. Norfolk County Council Highway Authority provided their formal position via email on the 26th February 2020 stating that *'At a joint meeting on 12 February, a number of alternative possibilities were discussed. These possibilities were presented before the County Council's development team on 17 February. By way of clarification, the team is made up of officers from all service areas within the Local Highway Authority who assess and give advice on major or complex planning applications. The team included an internal safety audit representative; highway design engineers; traffic management engineers; a programme manager; the local area manager; together with senior highway development management engineers.'* The resolution provided is documented as Norfolk County Council Highway's Position in Table 1.

Table 1 Position Statements

Item	The Applicant	Broadland District Council	Cawston Parish Council	Norfolk County Council Highways Authority	Status
Revised Cawston Highways Intervention Scheme – Traffic Impacts	<p>The Applicant considers that the revised Highways Intervention Scheme addresses the concerns raised by the previous Road Safety Audit and Norfolk County Council and is sufficient to mitigate potential traffic impacts through Cawston.</p> <p>An updated Road Safety Audit has been undertaken and has been submitted at Deadline 5 [ExA.AS-3.D5.V1].</p>	n/a	<p>The Cawston PC position remains that it is simply not possible to route any level of construction traffic safely through the village centre. Particular concerns are pedestrian safety, noise and vibration impacts and air quality degradation from stationary traffic.</p> <p>Due to the width of the road being too narrow in places for two large vehicles to pass safely it is inevitable that wing mirrors will overhang the pavement. Observation at the ASIs showed how common it is for larger vehicles actually to mount the pavement as well.</p>	<p>This is the highway intervention scheme already proposed. The revised drawings received from the Applicant are broadly in line with the team's expectations but we have not yet received an updated road safety audit (RSA). We understand that an updated RSA was due to be submitted to the Applicant by their auditors on 14 February 2020, but we have not yet been provided with a copy. Until such time as an acceptable RSA is received, Norfolk County Council cannot agree that a suitable mitigation scheme exists.</p>	Not Agreed
Revised Cawston Highways Intervention Scheme – Associated Impacts	<p>The revisions to the scheme do not change the impacts already assessed for noise and vibration, air quality and cultural heritage. Impacts have been assessed as not-significant and where required suitable</p>	<p>Broadland Heritage Officer noted ongoing concerns in relation to vibration affecting listed buildings.</p> <p>Broadland EH Officer agreed that noise and air quality assessments and results follow guidelines and are within allowed limits. Notes</p>	<p>Concerns for noise and vibration impacts and air quality degradation from stationary traffic.</p>	<p>Amenity issues do not fall within the remit of the Highway Authority and accordingly remain something for others to assess separately.</p>	Not Agreed

Item	The Applicant	Broadland District Council	Cawston Parish Council	Norfolk County Council Highways Authority	Status
	mitigation has been proposed.	that guidelines have changed since the assessments were undertaken.			
Cawston Alternative Access	<p>Option 2 - Due to the additional significant constraints relating to construction methodology, traffic demand, environment and land, (see Appendix 2) the full bypass option does not represent a viable alternative.</p> <p>Options 3 and 4 go against the principles of construction and associated embedded mitigation to minimise the amount of land required and duration of works and is constrained by the need for additional land outside the existing Order Limits. Therefore is not considered an appropriate alternative.</p> <p>Option 5 provides an opportunity to further reduce traffic flows through Cawston village and could be developed as further mitigation.</p>	Using both option 1 and 4 appears to be the preferred alternative to reduce HGV movements through Cawston.	<p>The suggestion that we favour a combination of options 1 and 4 is incorrect.</p> <p>The discussion at the meeting was limited to the five options presented by Vattenfall. We consider both options 1 and 5 of those offered to be unacceptable, together with option 4 in its present form.</p> <p>Option 2 is much more desirable from our point of view, but seems to bring serious administrative problems (of their own making) for the developers, as does option 3. Therefore, with some reluctance, we would be prepared to consider option 4 as a basis for development of a solution which would need to remove all construction traffic from the centre of Cawston.</p> <p>Any solution must also include Hornsea 3 and have the potential</p>	<p>Options 2 to 4: Involve a temporary access from the B1149 adjacent to the Applicant's cable crossing, which in turn links to a haul road. These options were previously dismissed by the County Council due to traffic management concerns.</p> <p>Our previous concerns have now been addressed by the Applicant as part of their assessment for traffic management at this same location relating to open cut trenching (albeit unrelated issues for open cut trenching remain).</p> <p>The resolution of the team was that as a direct result of further detailed work undertaken by the Applicant relating to traffic management for trenchless crossings at the same location, introducing traffic management at this location for a haul road would now be acceptable on highway grounds.</p> <p>Out of the four possibilities presented, development team would favour options that can be used by Hornsea 3;</p>	Not Agreed

Item	The Applicant	Broadland District Council	Cawston Parish Council	Norfolk County Council Highways Authority	Status
	<p>However, this would be subject to stakeholder agreement and the Applicant acknowledges the position provided by Norfolk County Council Highway Authority regarding this option.</p>		<p>to apply to future schemes such as the Dudgeon & Sheringham Shoal extensions.</p>	<p>Vanguard and Boreas rather than one wind farm in isolation.</p> <p>We fully recognise there are other environmental considerations which may render these options unacceptable.</p> <p>Option 5 – This option utilises a one way system through Cawston, with the return journeys directed along existing narrow rural roads. The County Council does not support this option on highway safety grounds.</p> <p>Firstly - the Applicant's concept drawings indicate the level of emerging visibility for vehicles exiting Heydon Road onto Cawston Road. However, the Applicant's vehicles will be travelling in the opposite direction. Accordingly, the assessment needs to be made against forward visibility and not emerging visibility. The County Council's concern is that HGVs will be stationary on the carriageway whilst making the turn into the junction at a point where forward visibility is restricted due to a bend in the road. This presents a risk of tail end collision. There has been one personal injury accident at this junction in the last 5</p>	

Item	The Applicant	Broadland District Council	Cawston Parish Council	Norfolk County Council Highways Authority	Status
				<p>years, involving three vehicles and 2 casualties. Forward visibility has not been checked on site and an update will be provided at the ISH on 17 March if required.</p> <p>Secondly – The Applicant's drawings indicate a visibility splay at the B1149 junction measuring 2.4 x 215m. However, the plans submitted are not based on a topographical survey and measurements need to be taken on site due to the presence of roadside trees. It may be possible to overcome the problem by introducing a temporary speed restriction but again this needs to be checked and verified on site and an update will be provided at the ISH on 17 March if required</p> <p>Thirdly - These rural lanes are used by walkers; horse riders and cyclists. The volume of HGV traffic would turn a 1.5 mile length of public highway into a private haul road for a considerable period of time, rendering it inaccessible to non-motorised users.</p> <p>Fourth – This is a highly agricultural area and accordingly some movement of crops in large vehicles - tractor/trailer combinations, tankers, or other HGVs is 'normal' and to be</p>	

Item	The Applicant	Broadland District Council	Cawston Parish Council	Norfolk County Council Highways Authority	Status
				<p>expected on the network. They would be very frequent and concentrated on this particular stretch of road over a concentrated time period each year. The Applicant's drawings show the provision of 4 passing places along a 1.5 mile stretch of road which is unlikely to be sufficient to cater for the Applicant's vehicles meeting agricultural vehicles along the route.</p> <p>From the drawing submitted, it is not possible to tell if the location for the passing places is suitable and again this needs to be checked on site and an update will be provided at the ISH on 17 March.</p> <p>This proposal would markedly intensify and exacerbate the difficulties presented by the current arrangement, in which the drivers of vehicles are obliged to reverse on the narrow road. The provision of more formal passing places would neither eliminate nor sufficiently ameliorate the consequences of the proposed increase in traffic movements of the most problematic form of vehicle and at the most problematic times.</p>	

4 Summary

20. The Applicant believes the revised HIS is suitable to mitigate traffic impacts through Cawston Village and does not result in an increased risk to any associated impacts. Cawston Parish Council believe that it is not possible to route any level of construction traffic safely through the village centre. Particular concerns are pedestrian safety, noise and vibration impacts and air quality degradation from stationary traffic. Norfolk County Council still believes a suitable access strategy can be produced that mitigates impact, however the intervention scheme drawings and the proposal before us still remain “work in progress”. Broadland District Council still have concerns regarding potential impacts on listed buildings and potential air quality effects, though acknowledging that both the noise and air quality assessments and results follow guidelines and are within allowed limits.
21. In terms of the alternative options proposed, the Applicant considers that Option 5 provides an opportunity to further reduce traffic flows through Cawston village however would be subject to stakeholder agreement and the Applicant acknowledges the position on Option 5 provided by Norfolk County Council. Cawston Parish Council favour Option 2 but would reluctantly consider Option 4 and would be prepared to consider option 4 as a basis for development of a solution which would need to remove all construction traffic from the centre of Cawston, however this is not within the scope of this Option 4. Norfolk County Council also favour Option 2 as it has the potential to remove all of the traffic from Cawston. Failing that they would also support Options 4, 3 and 1 (listed in order of preference due to traffic impact) subject to safety audit. They would not support Option 5 as the highway network is not suitable to cater for the traffic proposed. Broadland Council indicated that a combination of Option 1 and 4 would be the preferred alternative.
22. Cawston Parish Council have also indicated that any option must also include Hornsea Project Three and future project Dudgeon & Sheringham Shoal extensions. Norfolk County Council also indicated that they would favour options that can be used by Hornsea Project Three; Norfolk Vanguard and Norfolk Boreas rather than one wind farm in isolation. Currently the only option which can be applied to Hornsea Project Three and Norfolk Vanguard is, Option 1 as this has already been agreed. The Applicant is not in a position to commit other projects to use any other proposed options which will require additional land and rights or changes to their Environmental Impact Assessment, which would be required for Options 2, 3 and 4.

Appendix 1 Norfolk Boreas Cawston Meeting Note 12th February 2020

Note of the meeting convened on 12th February 9.30 – 13.00 at the King’s Centre, Norwich

The purpose of the meeting is to gather together relevant parties, as instructed by the Norfolk Boreas Project DCO application Examining Authority, to:

- consider the revised Highway Intervention Scheme at Cawston Village proposed by the Applicant to mitigate impacts associated with construction traffic, using the B1145 through Cawston, and alternatives suggested by stakeholders.
- enable a Position Statement to be completed to document positions of all participants at the end of the meeting, to be submitted at Deadline 5 (25th February).

In order to achieve the desired outcome, and to help facilitate discussions during the meeting regarding the Alternative Access Options, The Applicant prepared a table outlining the alternative options reviewed and providing a summary comparison considering the key constraints and benefits of the different options, from a technical and an overall environmental impact perspective.

During the meeting, each of the options was deliberated in turn.

Participants were invited to comment on any aspects of the prepared table, or to add their own comments, and materials provided to assist them to do that.

The Applicant also provided the following plans in advance of the meeting:

- Plan showing the different cable route alignments,
- Plan showing the possible diversion route; and
- A typical cross-section of the bypass road.

Feedback on Options and Positions at the end of the meeting:

Option / Alternative considered	Applicant	Cawston PC	Broadland Council	Norfolk CC
1 Traffic using the B1145 with the implementation of the Revised Highway	The Applicant considers that the revised Highways Intervention Scheme addresses the concerns raised by the previous Road Safety	Cawston PC maintain existing concerns in relation to Option1. These include:	Broadland Heritage Officer noted ongoing concerns in relation to vibration affecting listed buildings.	Highway representatives believed the revised highways intervention scheme is likely to address the outstanding technical

<p>Intervention Scheme</p>	<p>Audit and Norfolk County Council and is sufficient to mitigate potential traffic impacts through Cawston. The scheme has been submitted for independent Road Safety Audit and the results are pending.</p>	<ul style="list-style-type: none"> • The width of the road* does in theory, but not in practise, accommodate a articulated HGV and another car passing. • Reservations over noise and vibration impacts • Reservations over air quality surveys and assessments. 	<p>Broadland EH Officer agree that noise and air quality assessments and results follow guidelines and are within allowed limits. Notes that guidelines have changed since the assessments were undertaken.</p>	<p>highway issues but still need to see a satisfactory Safety Audit before they can offer formal support to this proposal.</p> <p>NCC also requested sight of the brief given to the Safety Auditors.</p> <p>Amenity issues do not fall within the remit of the Highway Authority and accordingly remain something for others to assess separately.</p> <p><u>Comments: -</u></p> <ul style="list-style-type: none"> • Assumes driver compliance. • Still major concerns from Cawston PC. • Need to consider other activities on the highway eg (i) Utility works (ii) agricultural activity eg Sugar beet campaign.
<p>Option 2: Full Bypass</p>	<p>Due to the additional significant constraints relating to construction methodology, traffic demand, environment and land the full bypass</p>			<p>As a result of further assessments submitted by the applicants, highways officers are now satisfied previous concerns re</p>

	option does not represent a viable alternative.			<p>temporary access from the B1149 could be addressed by temp speed Limit and a TTRO.</p> <p><u>Comments: -</u></p> <ul style="list-style-type: none"> • Need to consider the duration period before issuing final comments. • Favour options that can be used by Hornsea; Vanguard and Boreas.
Option 3: Light Bypass	This option goes against the principles and embedded mitigation to minimise amount of land and duration of works and is constrained by the need for additional land outside the existing Order Limits therefore is not considered an appropriate alternative.			<p>As a result of further assessments submitted by the applicants, highways officers are now satisfied previous concerns re temporary access from the B1149 could be addressed by Temp speed Limit and a TTRO.</p> <p><u>Comments: -</u></p> <ul style="list-style-type: none"> • Need to consider the duration period before issuing final comments. • Favour options that can be used by Hornsea; Vanguard and Boreas.

<p>Option 4: Moving MA6</p>	<p>This option goes against the principles and embedded mitigation to minimise amount of land and duration of works and is constrained by the need for additional land outside the existing Order Limits therefore is not considered an appropriate alternative.</p>	<p>Would opt for a combination of Option 1 & 4</p>	<p>Option 4 removes NB traffic through Cawston during the duct installation phase.</p> <p>Would opt for a combination of Option 1 & 4</p>	<p>As a result of further assessments submitted by the applicants, highways officers are now satisfied previous concerns re temporary access from the B1149 could be addressed by Temp speed Limit and a TTRO.</p> <p><u>Comments</u></p> <ul style="list-style-type: none"> • Need to consider the duration period before issuing final comments. • Favour options that can be used by Hornsea; Vanguard and Boreas.
<p>Option 5: Heydon Road – implementation of a one-way scheme for NV construction traffic</p>	<p>Provides an opportunity to further reduce traffic flows through Cawston village and could be developed as further mitigation subject to stakeholder agreement</p>	<p>Cawston PC felt they could not endorse an option which would mitigate impacts for people on the High Street but not on other areas of the village.</p>		<p>Whilst options 3 to 4 use a haul route, this proposal uses the existing highway network along minor rural roads. Out of the existing routes – this is probably the best one (but not necessarily suitable) owing to its relatively straight direction and construction.</p> <p>Might be feasible but would need to undertake detailed assessments.</p>

				<p><u>Comments:</u></p> <ul style="list-style-type: none"> • Probable issues with Junctions at Top Road (Heydon Road and B1149) • Issues at T junction Cawston Road • Passing Bays probably ok • Very rural route and may need introduction of speed limits at junctions.
<p>Summary of final position at the end of the meeting</p>	<p>The Applicant considers that a combination of Option 1 and Option 5 offer an appropriate solution – which mitigates potential traffic impacts through Cawston, and also potentially halves NB traffic and NV traffic through Cawston, during duct installation and cable pulling.</p>	<p>Would opt for a combination of Option 1 & Option 4</p>	<p>Would opt for a combination of Option 1 & Option 4</p>	<p>This is an informal officer opinion to aid the discussion and is not the formal view of the highway authority.</p> <p>Officers will present all 5 options to the County Councils development team on 17 February with a view to providing a formal position statement before Deadline 5.</p>

*In particular the Cawston PC representatives shared a picture showing a NCC gritting lorry with stainless steel clad wing mirrors. They made the case that mirrors on HGV, can overhang pavements, as the vehicle is in transit on the road, if passing parked cars, or cars coming in the opposite direction. They went on to argue this naturally instils fear in pedestrians.

Appendix 2 Description and Comparison of Alternative Cawston Access Options and Associated Plans

Norfolk Boreas Description and Comparison of Alternate Cawston Access Options

Description of Alternate Options

1. **Option 1 (B1145 to MA6 - existing)** – This is the existing option with all traffic on the B1145 to MA6 with a Highway Intervention Scheme in place at Cawston Village.
2. **Option 2 (B1145 Bypass)** – Pre-construct a separate haulage road from B1149 to MA6, parallel to running track, to allow two-way delivery of all materials without conflicting with duct installation. Traffic diverted away from B1145 and Cawston Village.
3. **Option 3 (B1145 Bypass Light)** – Pre-construct a running track from B1149 to MA6 and deliver peak HGV loads (establishment of mobilisation areas, running track etc) via this route prior to duct installation. During duct installation, HGV deliveries to use B1145 to avoid conflict with construction on the running track. Reduction in HGV traffic on B1145 through Cawston Village.
4. **Option 4 (Move MA6 to B1149)** – Move MA6 from B1145 to B1149. Construction from MA6 achieved to south. Traffic diverted away from B1145 and Cawston Village during duct installation.
5. **Option 5 (B1145 to MA6 utilising Heydon Road for one-way traffic)** – Potential one-way system for construction HGVs to halve traffic on B1145.

Summary Comparison of Alternate Options

The table below provides a summary comparison of the alternate access options considering the following key areas; construction methodology, traffic and transport, order limits and land and environmental. The review has been undertaken to identify the constraints and benefits of the option from an overall environmental impacts assessment perspective and seeks to consider how the options effect the parameters which have already been assessed in the Environmental Statement (ES). The following Red / Amber / Green coding has been applied to highlight the key constraints and opportunities in each area for each of the options.

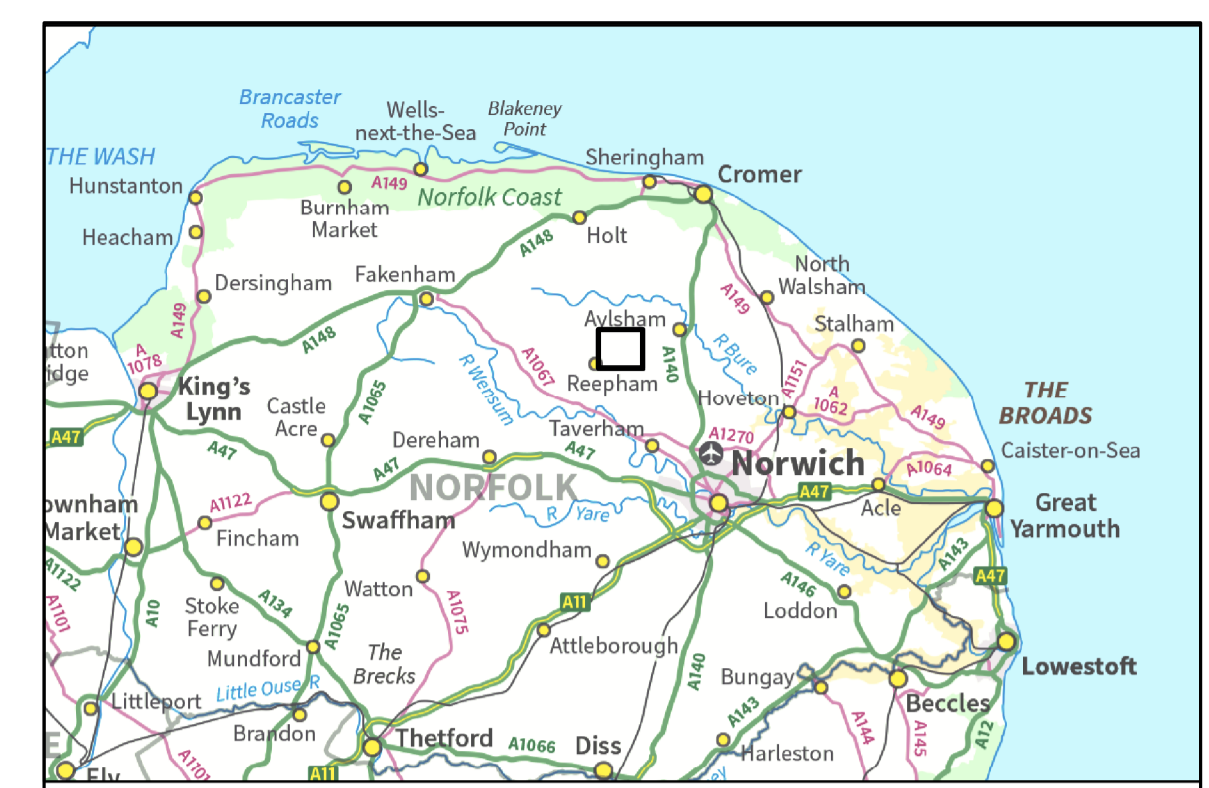
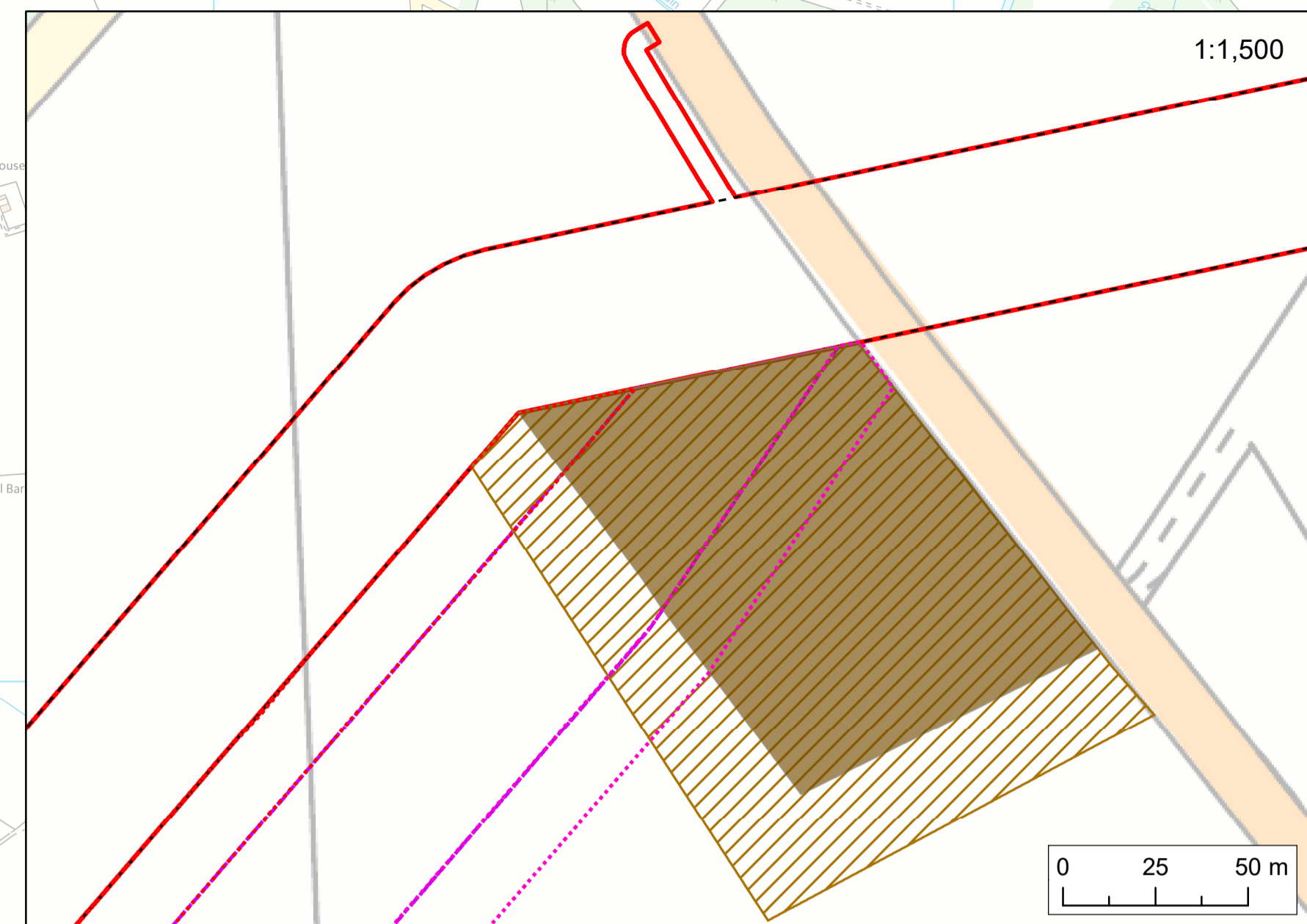
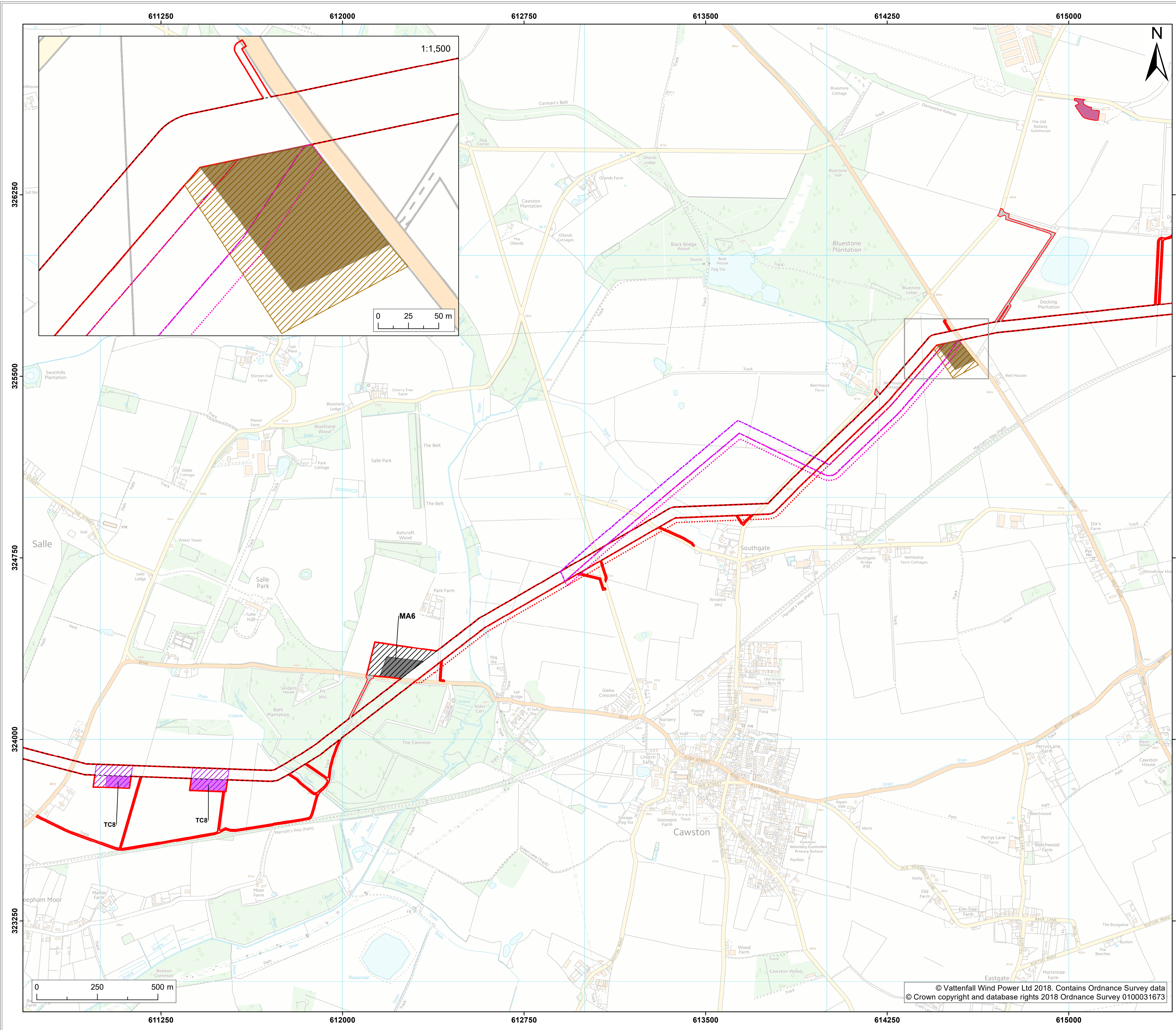
Red	Significant constraints and / or change to parameters assessed with the Environmental Statement.
Amber	Constraint such as increase or change effects of what have been assessed in the Environmental Statement but less significant.
Green	Beneficial effect or no change to parameters assessed in the Environmental Statement

	Consideration	Option 1 – B1145 to MA6 (Proposed scheme)	Option 2 – B1145 bypass	Option 3 – B1145 Bypass Light	Option 4– Move MA6 to B1149	Option 5 – B1145 to MA6 Use of Heydon Road Construction One-way System
Construction Methodology	Construction methodology variances	Construction methodology as assessed in the ES. Sectionalised approach to duct installation. Running track construction along two parallel workfronts minimises duration and number of construction vehicles using the running track, allowing greater likelihood of use of trackway or similar, rather than aggregate. Potential subsequent reduction in materials requirements and associated transport movements.	New haulage road to be installed adjacent to the existing cable route to provide separate access route for delivery traffic from construction traffic. Haulage road required to accommodate large quantity of delivery vehicles will require high specification road surface, with no potential for reduced specification or reduced material requirements. New haulage road installed 4 years for duct installation and cable pulling.	Running track pre-installed from B1149 to MA6 and retained for prolonged period (2 years). Higher specification of running track to accommodate delivery vehicles e.g. requires use of aggregate rather than trackway.	Working on one workfront from B1149 to TC7, resulting in extended period of working. Running track pre-installed and retained for prolonged period (2 years). Higher specification of running track to accommodate delivery vehicles e.g. requires use of aggregate rather than trackway.	Construction methodology as assessed in the ES (see Option 1).
	Duct installation construction duration	~ 58 weeks. Running track constructed at 150m/week as workfronts progress in both directions from MA6, as assessed in ES.	~58 weeks. No change to duct installation. Extension overall programme of works to accommodate additional 25 weeks to establish new haulage road and further 25 weeks to remove.	~108 weeks. Additional 50 weeks. Running track from B1149 to MA6 pre-installed and in place throughout the works.	~96 weeks. Additional 38 weeks. Running track constructed at 150/m week as workfront progresses and in place throughout works.	~ 58 weeks. No change to construction method from that assessed in ES
TRAFFIC AND TRANSPORT	Additional Materials and Transport Requirements	No additional materials or transport requirements as in ES.	Additional 9,024 HGV movements comprising of: 1,254 HGV movements to construct and remove new temporary construction compound at the B1149. 7,770 HGV movements to construct and remove new haulage road.	Additional 1,254 HGV movements to construct and remove temporary construction compound at the B1149 for preconstruction of the running track.	Effectively the same as materials and transport requirements as in ES. Some negligible additional movements to create access off B1149 access.	Effectively the same materials and transport requirements as in ES. Minor additional movements required to form passing places.
	Traffic implications on B1145	Project traffic on B1145 to MA6, capped at 112 daily HGV movements. Mitigated through B1145 highway intervention scheme which includes minor legacy improvements such as resurfacing and improving Primary School crossing.	All project traffic diverted off the B1145 throughout the construction. No requirement for the Highway Intervention Scheme.	45% reduction in peak daily HGV movements through use of running track for initial and post duct installation deliveries. Duration of HGV demand during duct installation reduced from 48 weeks to 19 weeks. Construction traffic required through B1145 to mitigate interaction of delivery and construction traffic during duct installation. Highway Intervention Scheme required.	All project traffic diverted off the B1145 throughout construction. No requirement for the Highway Intervention Scheme during duct installation.	50% reduction in daily HGV movements for the duration of construction, through use of one-way system. Highway Intervention Scheme required.
	Traffic implications on B1149	A minor adverse impact was assessed in the Traffic and Transport ES Chapter.	Increase of 9,024 HGV movements on B1149 to allow construction and removal of compound and new haulage road. Increase in the duration of HGV demand of additional 50 weeks.	Increase of 1,254 total HGV movements on B1149 to allow pre-construction of running track. 55% of total duct installation HGVs accessing off B1149, remaining utilising B1145 to MA6.	No change in B1149 traffic numbers however all traffic now accessing and egressing at new B1149 junction.	No change in B1149 traffic number however 50% of traffic now utilising Heydon Road/B1149 junction for egress.
		No new access required	New access required	New access required – sufficient for subset of NB vehicles only	New access required– sufficient for all NB vehicles only	No new access required
	Cumulative Use	Highway intervention scheme to be adopted by all projects; Norfolk	For cumulative use duration of installation would increase to 6 years.	Running track access not in place throughout construction and used	Running track cannot accommodate both delivery and construction vehicles.	Potential for diversion to be considered by Norfolk Vanguard,

Consideration		Option 1 – B1145 to MA6 (Proposed scheme)	Option 2 – B1145 bypass	Option 3 – B1145 Bypass Light	Option 4– Move MA6 to B1149	Option 5 – B1145 to MA6 Use of Heydon Road Construction One-way System
ORDER LIMITS AND LAND IMPLICATIONS		Boreas, Norfolk Vanguard and Hornsea Project Three.	The junction movements would increase and a higher specification of junction would be required to accommodate a right turn island.	only to offset a proportion of Norfolk Boreas traffic on B1145. Requires change to order limits and not assessed.	Requires change to order limits and not assessed.	this would require agreement by all stakeholders and interested parties.
	Within Order Limits	Yes	No - not consulted on or assessed in the ES	No - not consulted on or assessed in the ES	No - not consulted on or assessed in the ES	Yes – additional properties affected
	Additional private land requirements	No additional private land requirements.	Yes - additional temporary construction compound required at the B1149 to allow pre-construction of bypass and additional 20m width for 2.8km to accommodate bypass.	Yes - additional temporary construction compound required at the B1149 to allow pre-construction of running track.	Yes –MA6 relocated adjacent to B1149 impacting on different landowner and location.	No – temporary passing places within highways boundaries
	Land impacts	Minimised impact to land with proposed 150m/week build out of running track alongside two parallel duct installation workfronts.	Yes - additional temporary construction compound removing up to 10,000m ² of additional land from use. Pre-construction of bypass results in 56,000m ² (2.8km*20m) of additional land being out of use for up to 4 years including requirement to store and maintain topsoil and drainage over this period. Extension of works periods will impact the farming of the land and likely be opposed by the Land Interest Group and National Farmers Union.	Yes – additional temporary construction compound removing up to 10,000m ² of additional land from use. Pre-construction of running track results in 2.8km of land being out of use for approx. 2 years including requirement to store and maintain topsoil and drainage over this period. Extension of works periods will impact the farming of the land and likely be opposed by the Land Interest Group and National Farmers Union.	Yes – alternate land required to relocate MA6. Initial 2.8km of duct installation to be impacted for additional 18 weeks compared to baseline due to only single workfront (not parallel workfronts) Extension of works periods will impact the farming of the land and likely be opposed by the Land Interest Group and National Farmers Union.	No change to baseline construction methods.
	Land agreements	Heads of terms signed and discussions are ongoing over option agreements.	Impacts four separate landownership entries who have signed Heads of Terms and discussion are ongoing regarding options agreements. New negotiations for additional land required for new haulage road. New compound located in area of comprehensive drainage and irrigation, therefore securing additional land for an increased duration could be problematic.	Impacts four separate landownership entries who have signed Heads of Terms and discussion are ongoing regarding options agreements. New compound located in comprehensive drainage and irrigation, therefore securing additional land for an increased duration could be problematic.	Impacts two separate landownership entries who have signed Heads of Terms and discussion are ongoing regarding options agreements. New compound location in area of comprehensive drainage and irrigation, therefore securing additional land for an increased duration could be problematic.	No change to land agreements.
Realignment of cable route	No change to existing cable route.	Impacts four separate landownership entries who have signed Heads of Terms and discussion are ongoing regarding options agreements. The proposed route affects two further fields that are not otherwise affected. Additional land required in area of comprehensive drainage and irrigation.	Impacts four separate landownership entries who have signed Heads of Terms and discussion are ongoing regarding options agreements. The proposed route affects two further fields that are not otherwise affected. Additional land required in area of comprehensive drainage and irrigation.	No change to existing cable route	No change to existing cable route	

Consideration		Option 1 – B1145 to MA6 (Proposed scheme)	Option 2 – B1145 bypass	Option 3 – B1145 Bypass Light	Option 4– Move MA6 to B1149	Option 5 – B1145 to MA6 Use of Heydon Road Construction One-way System
ENVIRONMENTAL	Noise and Vibration	Assessment identified no significant residual noise and vibration impacts associated with construction traffic.	<p>Removal of project HGVs through Cawston village and any associated noise and vibration effects.</p> <p>The creation of a new compound at the B1149 will result in potential increased effects on a residential receptor (CRR12 – Red Houses).</p> <p>Extension of the cable route will bring the nearest receptor (CRR13 - Southgate) closer to the onshore project area, and it is anticipated that there is likely to be a greater effect upon this receptor.</p> <p>Noise impacts associated with significant additional HGV would need to be further assessed. The exact nature of these effect would need to be considered through detailed modelling of the traffic flows along new haulage road.</p> <p>The realignment of the cable route increases the separation distance for receptors around Southgate (CRR13) however unlikely to change the level of impact.</p>	<p>Reduction in project HGVs through Cawston village and any associated noise and vibration effects.</p> <p>The creation of a new compound at the B1149 will result in potential increased effects on a residential receptor (CRR12 – Red Houses). Any potential impacts could be mitigated through measures outlined in the ES.</p> <p>Noise level generated at CRR13 (Southgate) could increase but likely to remain below the significant threshold.</p> <p>Noise impacts associated with additional HGV using the running track would need to be further assessed.</p>	<p>Reduction in project HGVs through Cawston village and any associated noise and vibration effects.</p> <p>The creation of a new compound at the B1149 will result in potential increased effects on a residential receptor (CRR12 – Red Houses). Any potential impacts could be mitigated through measures outlined in the ES.</p> <p>Noise level generated at CRR13 (Southgate) could increase but likely to remain below the significant threshold.</p>	<p>50% reduction in project HGVs through Cawston village and any associated noise and vibration effects.</p> <p>No significant noise impacts on new receptors as a result of diverting project HGV.</p>
	Air Quality	Assessment identified no significant air quality impacts associated with construction traffic	<p>Removal of project HGVs through Cawston village and any associated air quality effects.</p> <p>Air Quality impacts associated with significant additional HGV along the new haulage would need to be further assessed.</p> <p>New compound brings the construction works closer to R79 (Red Houses). Realignment brings the construction works closer to Red Houses (R79) but further from properties at Southgate Bridge, Southgate (including R17 and R18) and Beerhouse Farm. Any potential impacts will be mitigated through measures outlined in the ES.</p>	<p>Reduction of project HGVs through Cawston village and any associated air quality effects.</p> <p>Air Quality impacts associated with additional HGV along the running track would need to be further assessed.</p> <p>New compound brings the construction works closer to R79 (Red Houses).</p> <p>Realignment brings the construction works closer to Red Houses (R79) but further from properties at Southgate Bridge, Southgate (including R17 and R18) and Beerhouse Far. Any potential impacts could be mitigated through measures outlined in the ES</p>	<p>Reduction of project HGVs through Cawston village and any associated air quality effects.</p> <p>New MA6 locations brings the construction works closer to R79 (Red Houses). Potential impacts can be mitigated through measures outlined in the ES.</p>	<p>50% reduction in project HGVs through Cawston village and any associated noise and vibration effects.</p> <p>No significant air quality impacts on new receptors as a result of diverting project HGV.</p>

Consideration		Option 1 – B1145 to MA6 (Proposed scheme)	Option 2 – B1145 bypass	Option 3 – B1145 Bypass Light	Option 4– Move MA6 to B1149	Option 5 – B1145 to MA6 Use of Heydon Road Construction One-way System
	Ground Conditions and contamination	Impacts as assessed in the ES.	Extension to cable route enters Source Protection Zone 1 and increases the footprint within the surrounding zone 2. Increasing risk to groundwater protection. Consultation would be required with the Environment Agency. Additional works in mineral safe guarding area, at new compound location and along extend cable route. Appropriate works and mitigations to be agreed with Norfolk County Council.	Additional works in sand and gravel safe guarding zone at area of new compound. Appropriate measures and mitigations to be agreed with Norfolk County Council	Additional works in sand and gravel safe guarding zone at area of new compound. Appropriate measures and mitigations to be agreed with Norfolk County Council	No change impacts assessed in the ES.
	Water Resources and Flood Risk	Impacts as assessed in the ES.	Increased impact on River Wensum catchment, duration and area of impact. In contradiction to agreement with Natural England that ‘existing tracks and roadways will be utilised where possible.’ Additional 56,000m ² of impact including 21,000m ² impermeable surface resulting in changes to catchment drainage over longer period of time. Additional watercourse crossing to accommodate new haulage route.	No change impacts assessed in the ES.	No change impacts assessed in the ES.	No change impacts assessed in the ES.
ENVIRONMENTAL	Ecology and Ornithology	Impacts as assessed in the ES.	Increase in impact to UK HPI (floodplain grazing marsh and hedgerow) and habitats supporting protects species including bats, ground nesting birds, reptiles, water voles, Loss of additional area of habitat for ground nest birds / hedgerow habitat for new access and new compound. Duration of installation is greater than worst-case assessed in the ES (2 years).	Loss of additional area of habitat for ground nest birds / hedgerow habitat for new access and new compound.	Loss of additional area of hedgerow habitat for access.	No change impacts assessed in the ES.
	Archaeology and Cultural Heritage	Impacts as assessed in the ES.	Increased interaction with buried heritage assets in three field parcels, but interaction with these assets will already take place under Option 1 (existing).	Impacts as assessed in the ES.	Opportunity to avoid buried heritage asset at current MA6 location	Impacts as assessed in the ES.
	Landscape and Visual and Tourism and Recreation	Impacts as assessed in the ES.	Extension of cable route and realignment of cable route brings works closer to Marriott’s Way increasing potential visual effects and duration of effects.	Impacts as assessed in the ES. Realignment of cable route brings works closer to Marriott’s Way increasing potential visual effects and duration of effects.	Moves MA6 away from the Salle Park Registered Park and Garden.	Impacts as assessed in the ES.



- Legend:**
- Norfolk Boreas red line boundary
 - Norfolk Boreas Onshore Project Infrastructure (Scenario 2)**
 - Trenchless crossing zone (e.g. HDD)
 - Indicative trenchless crossing compound
 - Mobilisation zone
 - Indicative mobilisation area compound
 - Onshore cable route
 - Cable logistics area
 - Construction access
 - Cawston Alternative Options**
 - 20m Extension to Current Cable Route
 - Alternative Cable Route
 - 20m Extension to Alternative Cable Route
 - Indicative Proposed New Compound Area
 - Proposed New Compound Zone

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Project: **Norfolk Boreas** Report: **Examination**

Title: **Cawston Traffic Alternatives**

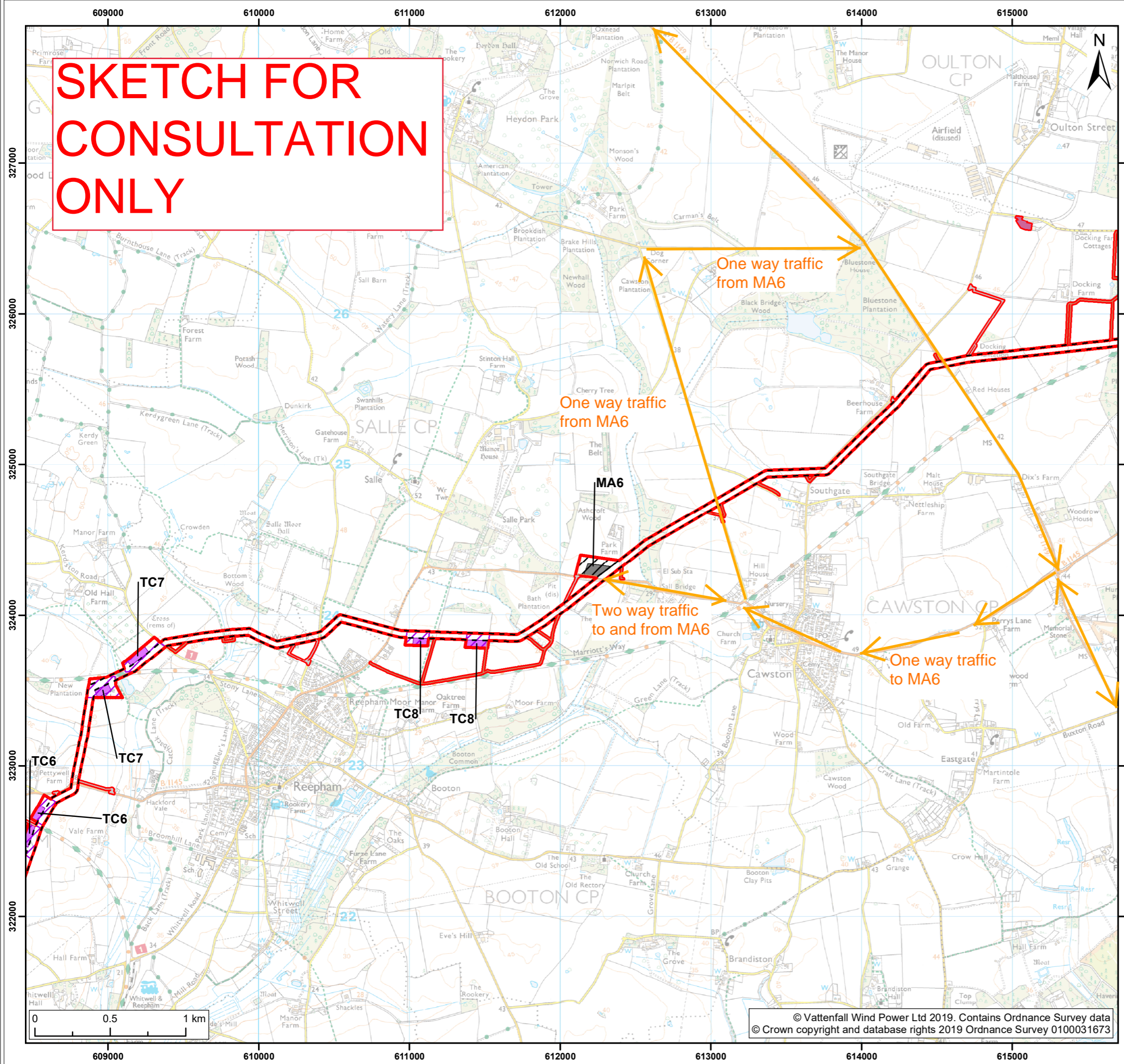
Figure: 1	Drawing No: PB5640-008-007-017				
Revision: 02	Date: 03/02/2020	Drawn: JT	Checked: CD	Size: A1	Scale: 1:7,500
01	03/02/2020	JT	CD	A1	1:1,500

Co-ordinate system: British National Grid EPSG: 27700

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Legend:

- Norfolk Boreas red line boundary
- Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)**
 - Onshore cable route
 - Cable logistics area
 - Construction access
 - Operational access
- Norfolk Boreas Onshore Project Infrastructure (Scenario 2)**
 - Trenchless crossing zone (e.g. HDD)
 - Indicative trenchless crossing compound
 - Mobilisation zone
 - Indicative mobilisation area compound
- ➔ Traffic route for construction one-way systems using Heydon Road (Option 5)

NOTE: MA = Mobilisation Area; TC = Trenchless crossing

Project:	Report:
Norfolk Boreas	Environmental Statement

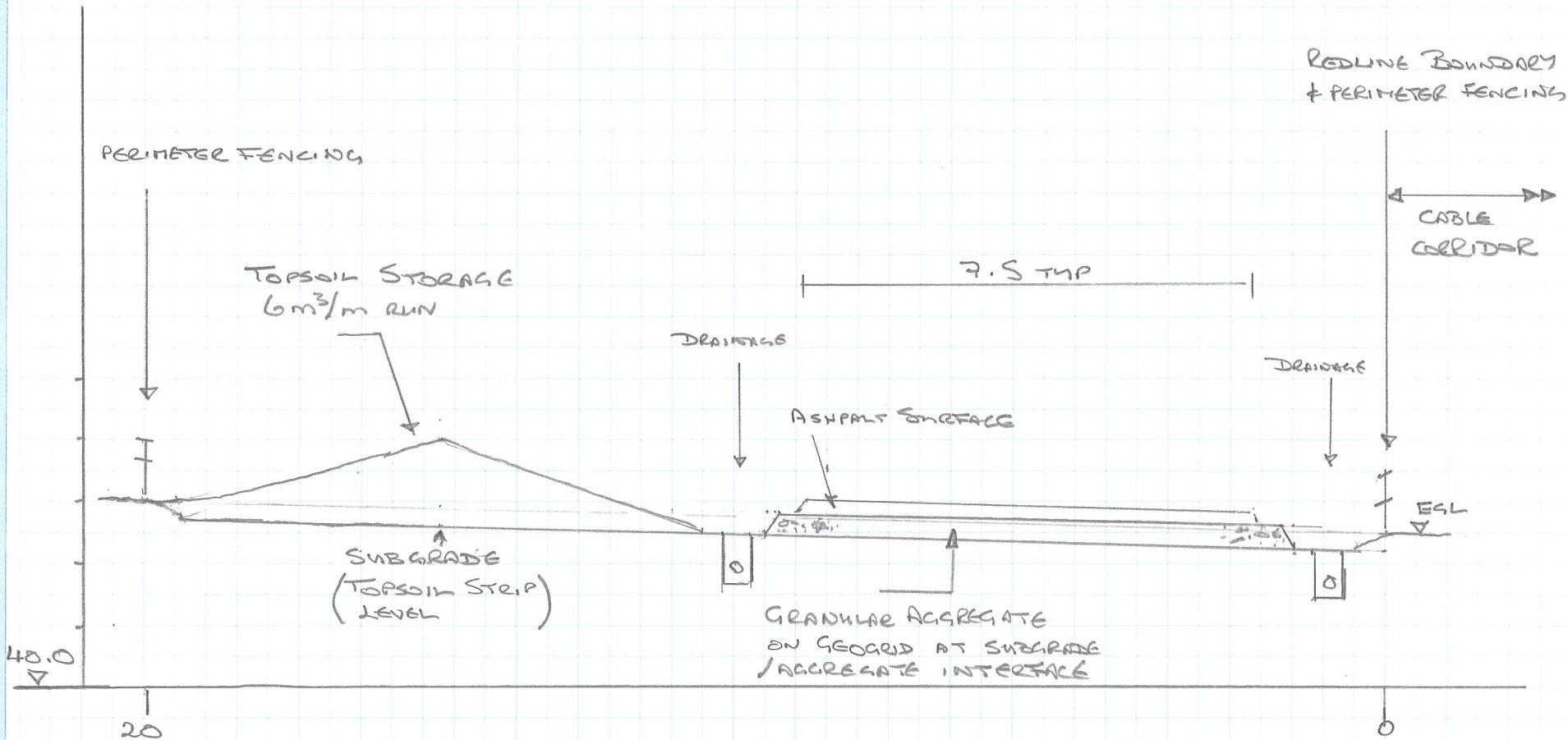
Title:
Onshore project area Scenario 1 & 2
(Map 5 of 9)

Figure: 5.4	Drawing No: PB5640-006-005-004				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	03/05/2019	JT	CD	A3	1:25,000
01	15/01/2019	LB	CD	A3	1:25,000

Co-ordinate system: British National Grid EPSG: 27700



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TYPICAL CROSS SECTION A-A

NOTES : 1. CBR% AT SUBGRADE ASSUMED TO BE 2.5%.

