

From: [Dominika Phillips](#)
To: [Hornsea Project Three](#); [KJ Johansson](#); [Kay Sully](#)
Cc: [Andrew Guyton](#); [Stuart Livesey](#)
Subject: Hornsea Project Three (UK) Ltd response to Deadline 4 (Part 9)
Date: 15 January 2019 23:10:44
Attachments: [image001.png](#)
[D4_HOW03_Appendix 32_Option 1.pdf](#)
[D4_HOW03_Appendix 34_Herring Spawning Clarifications.pdf](#)
[D4_HOW03_Appendix 36_Aitchinson 2012.pdf](#)
[D4_HOW03_Appendix 37_Riddington et al 2008.pdf](#)

Dear Kay, K-J

Please find attached the 9th instalment of documents.

Best regards,
Dr Dominika Chalder PIEMA
Environment and Consent Manager



Environmental Management UK | Wind Power
5 Howick Place | London | SW1P 1WG



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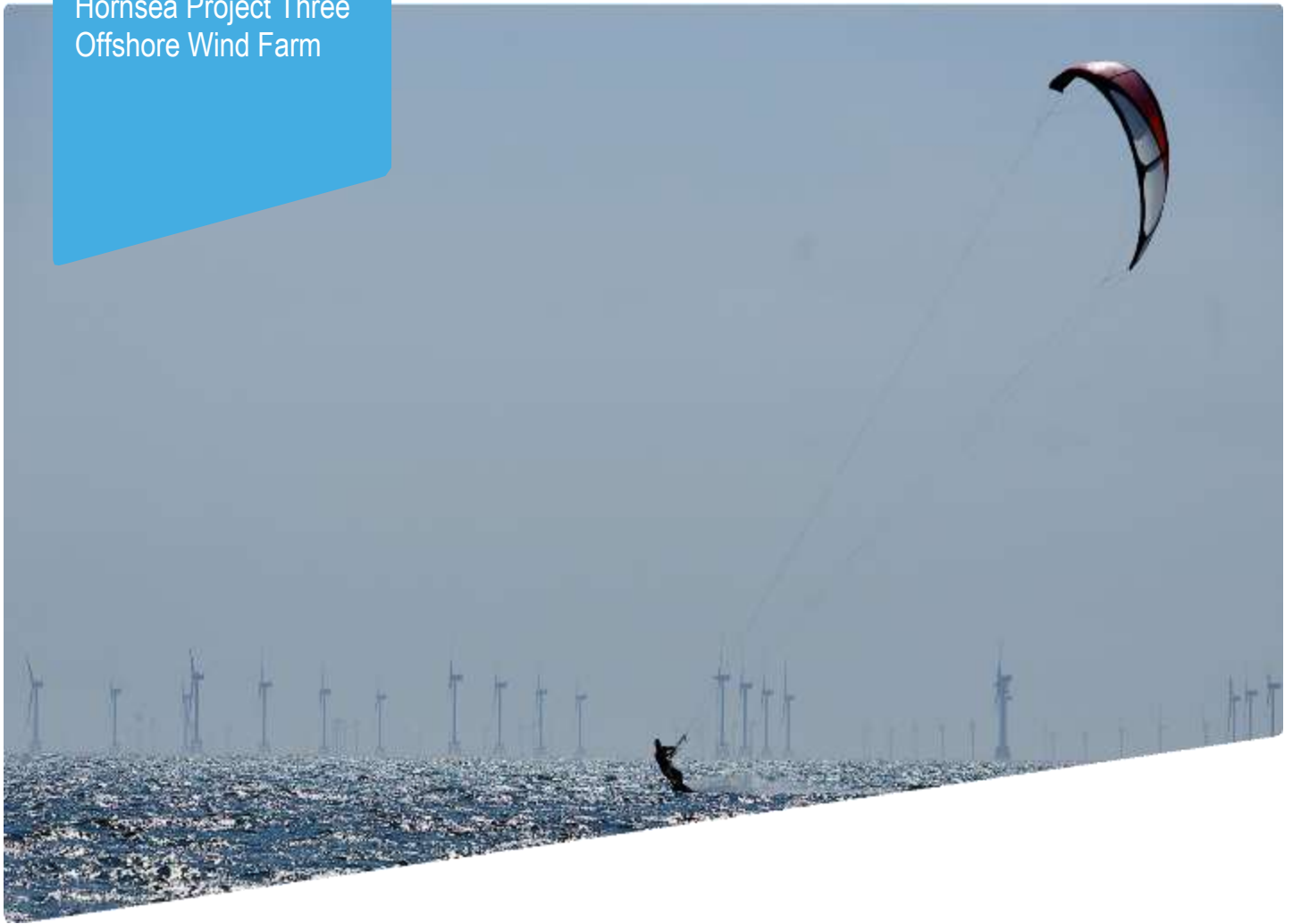
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Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three Offshore Wind Farm

Appendix 32 to Deadline 4 - Further Design Development of Option 1: Passing Places at the Main Construction Compound

Date: 15th January 2019

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Ørsted

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Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2018.

Table of Contents

1. Introduction.....	4
2. Pavement Suitability Assessment.....	5
3. Passing Bay Design	7
4. Revisions to Option 1: Passing Places following Safety Review	8
5. Regrading of the Hump adjacent to Old Railway Gatehouse.....	9
6. Conclusions.....	10
Annex A – Revised drawings 1554_03_101 and 1554_03_102.....	11
Annex B – AF Howland Associates Pavement Assessment Draft Report	12
Annex C – Drawing 1554_03_110 and Drawing 1554_03_111.....	13

Abbreviation

Abbreviation	Definition
RSA	Road Safety Audit
AD	Anaerobic Digestion
NCC	Norfolk County Council
HGVs	Heavy Goods Vehicles
CCE	Create Consulting Engineers
RPAs	Root Protection Areas

1. Introduction

- 1.1 This document with accompanying appendices and plans comprises the outline design strategy for Option 1: Passing Places along The Street, in Oulton, which is the proposed access strategy to the main construction compound for the Hornsea Project Three offshore wind farm (hereafter referred to as Hornsea Three).
- 1.2 Option 1: Passing Places has been identified as acceptable in principle by Norfolk County Council (NCC) (as set out in the Statement of Common Ground between both parties submitted at Deadline 4) subject to:
- Demonstrating the feasibility of the current pavement make up and the ability of the planned passing bays to accommodate the axle loadings for the duration of the construction period;
 - Refinement of Option 1: Passing Places to address the safety audit comments which were provided within Annex A of Appendix 20 to Deadline 1 (Document Reference REP1-176); and
 - Outline design details of the works proposed to the road hump along The Street.
- 1.3 Sections 2 and 3 of this report are provided in response to NCC's request to demonstrate the feasibility of the current pavement make up and the ability of the planned passing bays to accommodate the axle loadings for the duration of the construction period. Such details are usually developed post-consent, and therefore, the Applicant provides this outline information to provide comfort to NCC regarding feasibility only and is not seeking formal approval for the details provided in this report. The final design details for Option 1: Passing Places would be developed and agreed with NCC as the local highway authority during detailed design post-consent. This approach has been discussed and agreed with NCC.
- 1.4 Section 4 sets out the Applicant's response to the Road Safety Audit undertaken for Option 1: Passing Places, whilst Section 5 sets out the Applicant's proposals for the road hump along The Street.
- 1.5 On the basis of the above, this report is considered to address all outstanding points raised by NCC relating to Option 1: Passing Places. As such, the Applicant is now seeking approval in principle from NCC for the Option 1: Passing Places access strategy and accompanying link drawings included as Annex A of this report. Once approved in principle, the outline scheme will be included in the Outline CTMP to be updated and submitted prior to the end of the Examination. Option 1: Passing Places will then be progressed during detailed design (post-consent) in consultation with NCC.

2. Pavement Suitability Assessment

- 2.1 To demonstrate the feasibility of the delivery of the planning improvement works, determine the construction details of The Street and to assess the design of the proposed widening of the road, AF Howland Associates were commissioned to undertake geotechnical investigations on the Street, in Oulton, on the 26th November 2018. The formal approval of the detailed design and construction details would be progressed as part of the detailed CTMP and as such the following information is provided to demonstrate feasibility only.
- 2.2 A total of four coring and CBR determination tests were undertaken along The Street in the approximate locations shown in Figure 2.1 below.

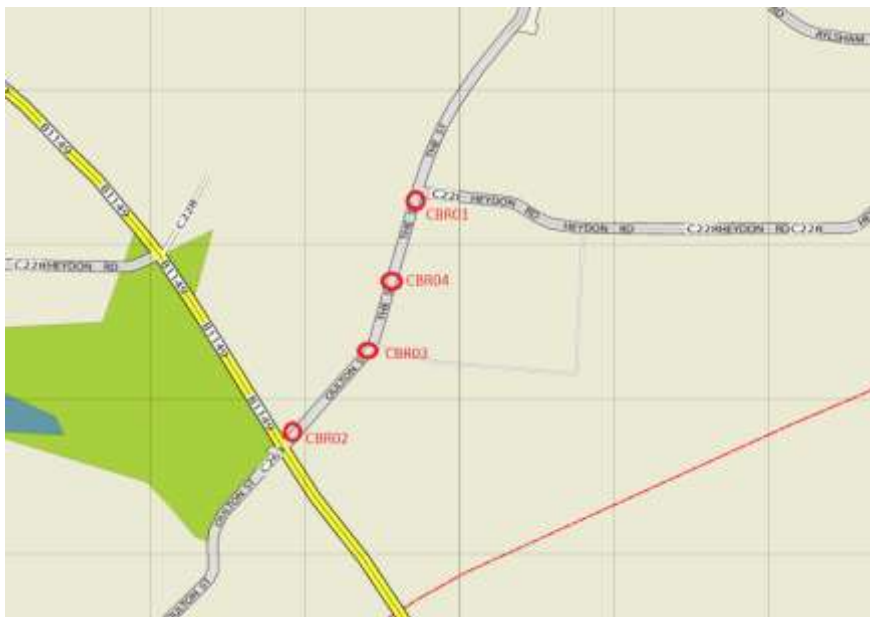


Figure 2.1: Approximate location of the coring/CBR testing

- 2.3 The excavation of the road construction was undertaken by the hand dug inspection pit method and samples of 0.3m x 0.3m were dug in the locations above. The depth of these pits varied from one another between 0.25m and 0.4m. Trial pits were backfilled with arising upon completion and reinstated with cold lay tarmacadam. No groundwater encountered during the survey and trial pits remained open and sidewalls stable during excavation.
- 2.4 The plunger penetration method was used for the determination of the California bearing Ratio (CBR) and this penetration test was undertaken at the same locations from where the road construction was assessed. Plunger CBR test were carried out at 0.2 – 0.3 m and tests were undertaken in general accordance with BS 1377:Part 9 1990.
- 2.5 The coring/CBR testing was carried out in the carriageway of The Street for CBR01 and CBR04 in order to obtain the typical road construction; i.e. coring, along The Street. However, to obtain CBR values for the design of the proposed laybys, CBR02 and CBR03 were located towards the verge (but within the tarmacked section) of the road, to avoid the results being invalidated by ground being subject to many years of settlement/compaction.

- 2.6 The coring assessment from the samples undertaken within the carriageway (i.e. CBR01 and CBR04), indicates that The Street presents a very shallow flexible construction, of 80-100mm of binder course (tarmac) followed by 70-100mm of made ground underneath.
- 2.7 The results indicate that very little penetration; i.e. maximum of 0.5mm, was obtained when applying forces of up to 3.9Kn, indicating a very high resistance to penetration from the ground.
- 2.8 The pressure required to penetrate 2.5mm and 5mm of soil or aggregate with a plunger of standard area is essential to obtain a CBR value. Given the high resistance to penetration (less than 0.5mm) a CBR value is not recordable and therefore values greatly exceeding the minimum requirements.
- 2.9 In order to assist in the understanding of how firm the ground seems to be on The Street, based on the test results, Figure 2 below, showing the technique used at the first test site (CBR01), captures the CBR reader picking up the whole back end of the 'pick-up' truck which was laden with equipment and barrels of water and still barely penetrating.



Figure 2.2: Operators carrying out the plunger penetration method at CBR01

- 2.10 The coring and CBR results of the survey have been included in Annex B of this report, however the results clearly demonstrate the suitability of the Street to accommodate the vehicle loads planned by Hornsea Three.

3. Passing Bay Design

One of the key design features of Option 1: Passing Places, is the provision of a number of passing bays along The Street. The design of these passing bays is based on the findings of the ground conditions obtained from the pavement assessment explained in detail in Section 2 of this report. The approval of such design and construction details would be progressed as part of the final CTMP and thus, this following information is provided to demonstrate feasibility only.

- 3.1 The passing bay is designed to a total length of 34m and will accommodate 2 Low loader, or typical articulated vehicles. The passing bay will adopted a Grasscrete cellular system designed to minimise impact on existing Root Protection Areas (RPAs) associated with mature tree specimen running along the Street. The locations of the passing places themselves have also been positioned to avoid RPAs where feasible. Where roots are to be encountered a hand dig approach will be adopted in accordance with the Arboriculturist requirements. Commitments to this effect have been included within the Outline Ecological Management Plan which has been updated and submitted at Deadline 4.
- 3.2 The specification of the cellular system would be a Grasscrete lay-by type GC2, 150mm deep, BS4483 mesh type A393 with a 200 x 200mm diameter mesh of 10mm. Minimum subbase depth 200mm (as pavement assessment undertaken and summarised in section 2 above concluded that a ground bearing of above 45kN/m² can be proved along The Street). This design would be sufficient to accommodate the maximum gross vehicle weight and axle loading requirements associated with the use of this link by Hornsea Three, and is thus can be reasonably expected to be sufficient to accommodate the use of this link by other agricultural, commercial and construction vehicles (including those to be used for Norfolk Vanguard/Norfolk Boreas).
- 3.3 Further details of the Grasscrete specification and the existing road construction of The Street, along with details of the proposed widening construction can be found in drawing 1554_03_110, which is included within Annex C of this report.
- 3.4 The cellular system proposed would be permeable, draining directly to the sub-strata and therefore, would not require a separate means of discharge (i.e. to ditch, or watercourse) and appropriate soakage testing (and also soil stability testing) would be carried out, in due course, as part of the detailed design work.
- 3.5 It is therefore concluded, taking account of the CBR testing and pavement coring that the HGV axle loadings generated by Hornsea Three can be accommodated with no adverse impact predicted.

4. Revisions to Option 1: Passing Places following Safety Review

- 4.1 Following the Road Safety Audit (RSA) and the designer's response to the RSA, which was presented in Annex A within Appendix 20 to Deadline 1 Submission – Main Construction Compound Briefing Note (Document Reference REP1-176), The Street is proposed to be widened approximately 400m north-east of B1149, where the existing bend of the road would restrict forward visibility. The RSA suggests that there is a risk this could result in head-on collisions on the bend and therefore further improvements need to be made at this location.
- 4.2 In order to comply with the requirements of both the RSA and NCC, Drawings 1554_03_101 and 1554_03_102 have been revised and now include the RSA requirement (Reference Para 3.2 of the RSA presented within Annex A of Appendix 20 to Deadline 1 (REP - 176) for the road widening. These drawings are included in Annex A of this report.
- 4.3 The proposed road widening, located between Passing Points D and E, would result in an improved approximately 8m wide road along the bend, on The Street, which is accommodated on land within the existing public highway and adequately addresses the comments within the RSA.

5. Regrading of the Hump adjacent to Old Railway Gatehouse

- 5.1 As part of the improvements shown on Drawings 1554_03_101 and 1554_03_102 (Annex A), the existing pronounced, localised hump in the road adjacent to Old Railway Gatehouse is to be regraded to effectively graduate the approaches to the hump. An outline design for this is shown in drawing 1554_03_111 which is included as part of Annex C of this report.
- 5.2 The top of hump level (approximately 48.5m AOD) is to remain as is currently the case (given this corresponds with the level of the private drive serving The Old Railway Gatehouse). However, the approaches to the top of the hump would be formed over an extended length meaning the severity of the change in level would be greatly reduced compared to the existing situation. Within the Statement of Common Ground with NCC (updated and submitted at Deadline 4), it has been agreed that the works planned adjacent to the Old Railway Gatehouse will be permanent and remain in place after the completion of Hornsea Three works.
- 5.3 The assessment of noise and vibration effects on the Old Railway Gatehouse as a result of the planned improvement works is ongoing and will be submitted as part of Deadline 6.

6. Conclusions

6.1 This report is considered to address all outstanding points relating to Option 1: Passing Places raised by NCC, which comprised:

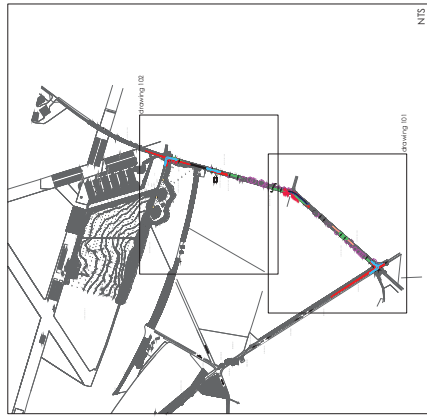
- Demonstrating the feasibility of the current pavement make up and the ability of the planned passing bays to accommodate the axle loadings for the duration of the construction period;
- Refinement of Option 1: Passing Places to address the safety audit comments provided within Annex A of Appendix 20 to Deadline 1 (Document Reference REP – 176); and
- Outline design details of the works proposed to the road hump along The Street.

6.2 As such, the Applicant is seeking approval in principle from NCC for the Option 1: Passing Places access strategy shown in the link drawings included as Annex A of this report. The main features of this strategy are as follows:

- Eight extended passing places along The Street. This would result in an overall carriageway width of 6.0m, to readily enable the passage of two-way HGVs with all construction traffic routed to/from the B1149 using The Street to the south of the proposed compound;
- Improvements to junction geometry and drainage at the B1149/The Street;
- A means of priority work for southbound vehicles in the vicinity of The Old Railway Gatehouse with a view to minimising the potential for two opposing HGVs to pass by this property simultaneously while also serving as a means of speed attenuation and mitigation to improve noise and vibration risk;
- The existing pronounced, localised hump in the road adjacent to Old Railway Gatehouse would also be regraded to effectively graduate the approaches to the hump;
- Access to the main construction compound would be improved; and
- Forward visibility through the bend adjacent to the access serving The Granary.

6.3 Once approved in principle, the outline strategy for Option 1: Passing Places will be included in the Outline CTMP to be updated and submitted prior to the end of the Examination. Option 1: Passing Places will then be progressed during detailed design (post-consent) in consultation with NCC.

Annex A - Revised drawings 1554_03_101 and 1554_03_102



OPTION 1: PASSING PLACES

GENERAL NOTES:

- PASSING PLACES (PP) TO BE FORMED BY SHALLOW-DIG CELLULAR SYSTEM (E.G. GRASSCRETE OR SIMILAR) PROVIDING LOCALISED 6.0m OVERALL ROAD WIDTH. ANY EXISTING ROAD WIDTHS LESS THAN 6.0m TO BE WIDENED TO 6.0m. CONSTRUCTION ON EXISTING TREE ROOT PROTECTION AREAS.
- THE DRAWING IS BASED ON A TOPOGRAPHIC SURVEY UNDERTAKEN BY PLANDISCIL REF 1767 IN CONJUNCTION WITH DIGITAL OS MAPPING.
- ANY EXCAVATION CLOSE TO TREES/HEDGES TO BE CARRIED OUT IN ACCORDANCE WITH NAG GUIDELINES.
- SERVICES ARE TO BE PROTECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES.
- TO BE READ IN CONJUNCTION WITH ALL OTHER LAYOUT AND DETAIL DRAWINGS.
- ACCESS FOR PEDESTRIANS AND CYCLISTS IS TO BE MAINTAINED AT ALL TIMES. ACCESS TO PROPERTIES ARE TO BE MAINTAINED AND WORKS PROGRAMMED IN CONSULTATION WITH PROPERTY OWNERS.
- ANY ROAD MARKINGS/ROAD SIGNS ARE TO BE IN ACCORDANCE WITH THE SI DOCUMENT 'TRAFFIC SIGNS REGULATIONS AND GENERAL DIRECTIONS 2016'

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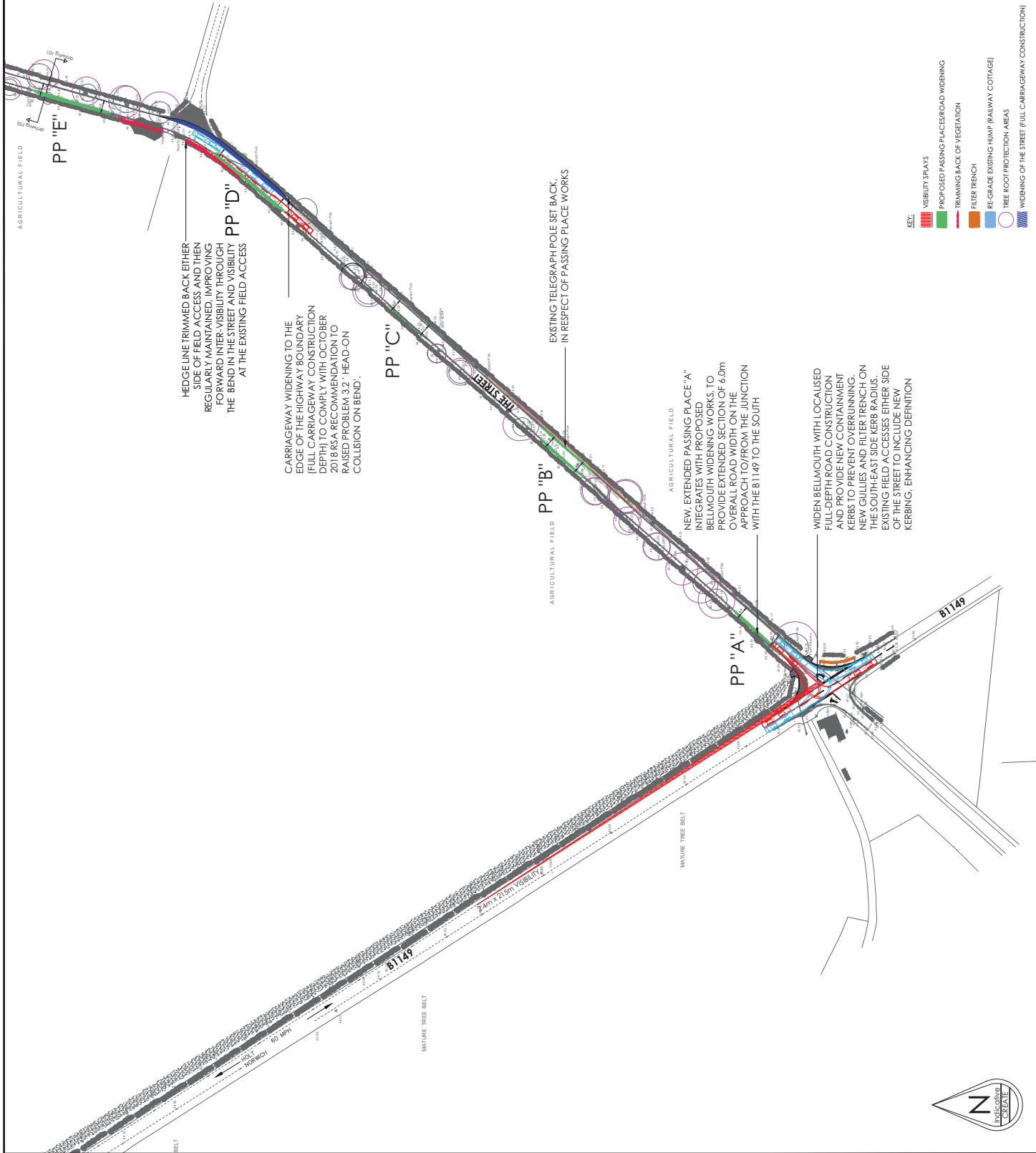
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REV	DATE	AMENDMENT DETAILS	EC	PD	APPROVED
A	15.11.18	ROAD WIDENING ON THE BEND			

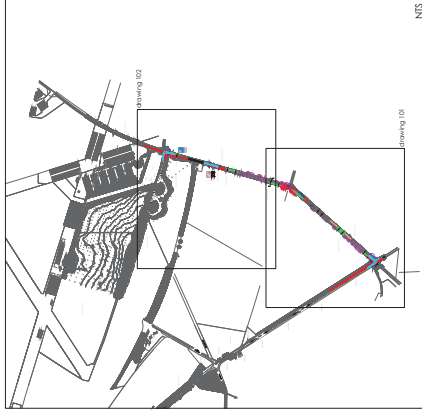
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PROJECT	18.09.18	18.09.18	18.09.18	18.09.18	18.09.18
OFF SHORE WIND FARM	DESIGNED	DESIGNED	DESIGNED	DESIGNED	DESIGNED
SCALE(S)	1:1,000	1:1,000	1:1,000	1:1,000	1:1,000
PROPOSED IMPROVEMENTS	PROPOSED IMPROVEMENTS	PROPOSED IMPROVEMENTS	PROPOSED IMPROVEMENTS	PROPOSED IMPROVEMENTS	PROPOSED IMPROVEMENTS
THE STREET, CULTON (OPTION 1)	THE STREET, CULTON (OPTION 1)	THE STREET, CULTON (OPTION 1)	THE STREET, CULTON (OPTION 1)	THE STREET, CULTON (OPTION 1)	THE STREET, CULTON (OPTION 1)
SHEET 1 OF 2	SHEET 1 OF 2	SHEET 1 OF 2	SHEET 1 OF 2	SHEET 1 OF 2	SHEET 1 OF 2
CLIENT	ORSTED	ORSTED	ORSTED	ORSTED	ORSTED
DESIGN NO.	03/101	03/101	03/101	03/101	03/101
REVISION	A	A	A	A	A

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- KEY:
- VISIBILITY SPLAYS
 - PROPOSED PASSING PLACES/ROAD WIDENING
 - TRIMMING BACK OF VEGETATION
 - FILTER TRENCH
 - RE-GRADE EXISTING HUMP (RAILWAY COTTAGE)
 - TREE ROOT PROTECTION AREAS
 - WIDENING OF THE STREET (FULL CARRIAGEWAY CONSTRUCTION)



GENERAL NOTES:

1. PASSING PLACES (PI) TO BE PROVIDED BY SHALLOWING CELLULAR SITES (E.G. GRASSFACED OR SWALE) PROVIDING LOCATED SURF OVERLAY ROAD WIDTH WITH PERMEABLE DRAINAGE TO SUB STRATA. PASSING PLACES ARE LOCATED AND SPECIFIED WITH SHALLOWING CELLULAR SYSTEM SO TO MINIMISE IMPACT OF THEIR CONSTRUCTION ON EXISTING FREE FOOTPATH AREAS.
2. THE DRAWING IS BASED ON A TOPOGRAPHIC SURVEY UNDERTAKEN BY PLANESOL REF 17697 IN CONJUNCTION WITH DIGITAL GIS MAPPING.
3. ANY EXCAVATION, CLOSE TO TREES/HEDGES TO BE CARRIED OUT IN ACCORDANCE WITH NUG GUIDELINES.
4. SERVICES ARE TO BE PROTECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES.
5. TO BE READ IN CONJUNCTION WITH ALL OTHER LAYOUT AND DETAIL DRAWINGS.
6. ACCESS FOR PEDESTRIANS AND CYCLISTS IS TO BE MAINTAINED AT ALL TIMES. ACCESS TO PROPERTIES ARE TO BE MAINTAINED AND WORKS PROGRAMMED IN CONSULTATION WITH PROPERTY OWNERS.
7. ANY ROAD MARKINGS/ROAD SIGNS ARE TO BE IN ACCORDANCE WITH THE SIGNAGE TREATMENT SPECIFICATION.

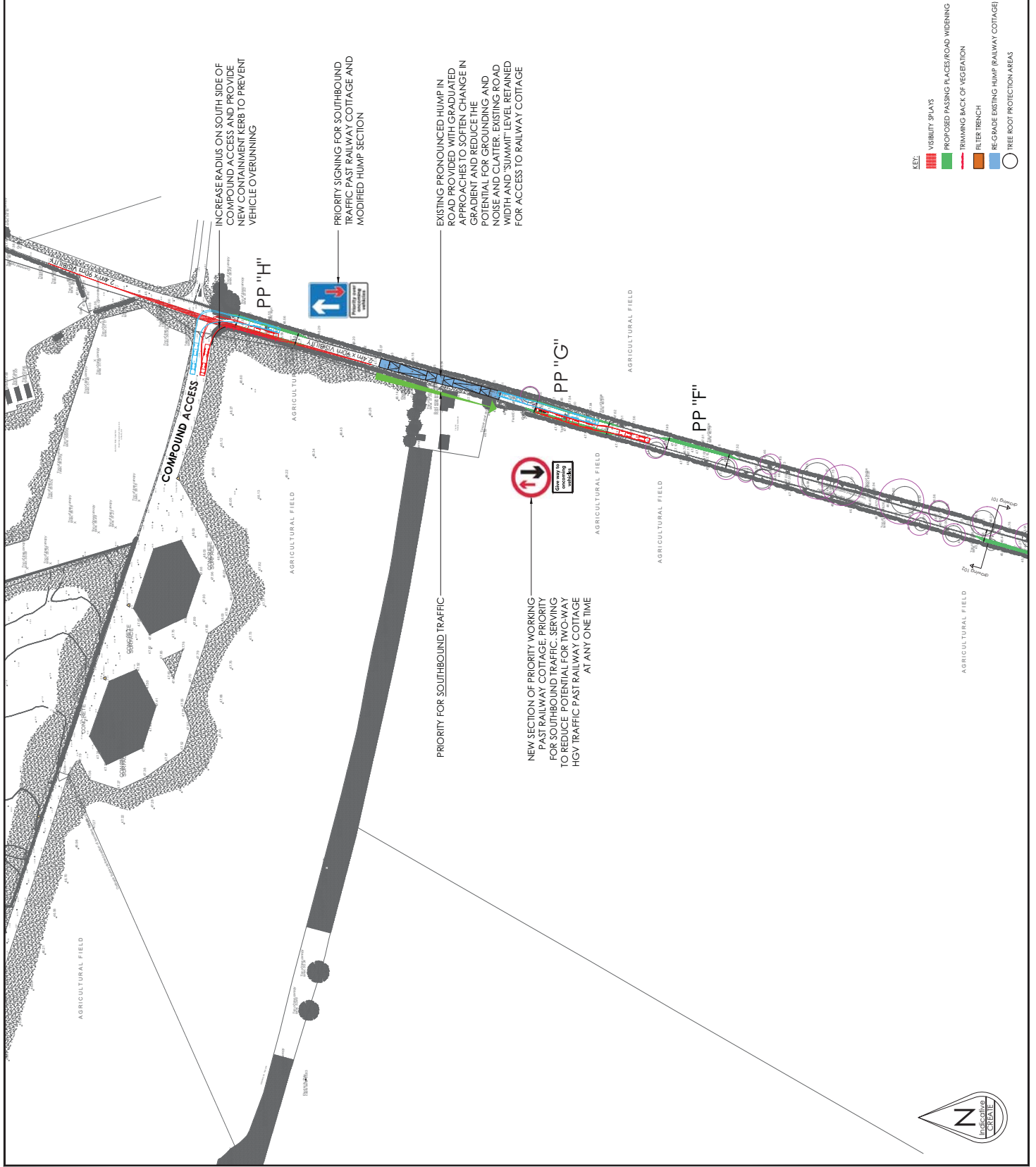
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 create CONSULTING ENGINEERS LTD	
PROJECT NO HONKEA3	DRAWING NO 1554
OFF-SHORE WIND FARM	DRAWING DATE 03/10/2
PROPOSED IMPROVEMENTS SHEET 2 OF 2	CLIENT CRSTED
DRAWING FILE THE STREET CULUTION (OPTION 1)	PROJECT TYPE INFORMATION
SCALE(S) 1:1,000	DEDICATED MDA MDA MDA PZ PZ PZ



Annex B– AF Howland Associates Pavement Assessment Draft Report



A F Howland Associates Geotechnical Engineers

Site

The Street, Cawston, NR10 4HU

**Trial Pit
Number
CBR01**

Excavation Method

Hand dug inspection pit

Dimensions

L 0.3 m x W 0.3 m x D 0.25 m

Ground Level (mOD)

48.26

Client

Create Consulting Engineers Limited

**Job
Number
18.437**

Location

614850 E 326629 N

Dates

26/11/2018

Engineer

**Sheet
1/1**

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.08	D1				(0.08)	TARMACADAM (3 cm running coarse overlying 5 cm binder coarse)		
				48.18	0.08 (0.07)	MADE GROUND (Brown mottled black sandy subangular to subrounded fine to coarse flint gravel. With rare flint cobbles)		
				48.11	0.15 (0.10)	Yellow brown silty slightly gravelly fine to medium SAND. Gravel is subrounded to rounded fine to medium flint		
0.20-0.25	D2		Plunger CBR test	48.01	0.25	Complete at 0.25m		



Remarks

1. Location CAT scanned prior to excavation
2. No groundwater encountered
3. Trial pit remained open and sidewalls stable during excavation.
4. Plunger CBR test undertaken at 0.2 m
5. Trial pit backfilled with arisings upon completion and reinstated with coldlay tarmacadam

Scale (approx)

1:5

Logged By

DJM

Figure No.

18.437.CBR01



Site : The Street, Cawston, NR10 4HU
Client : Create Consulting Engineers Limited
Engineer :

Job Number
18.437
Page
1 / 1

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

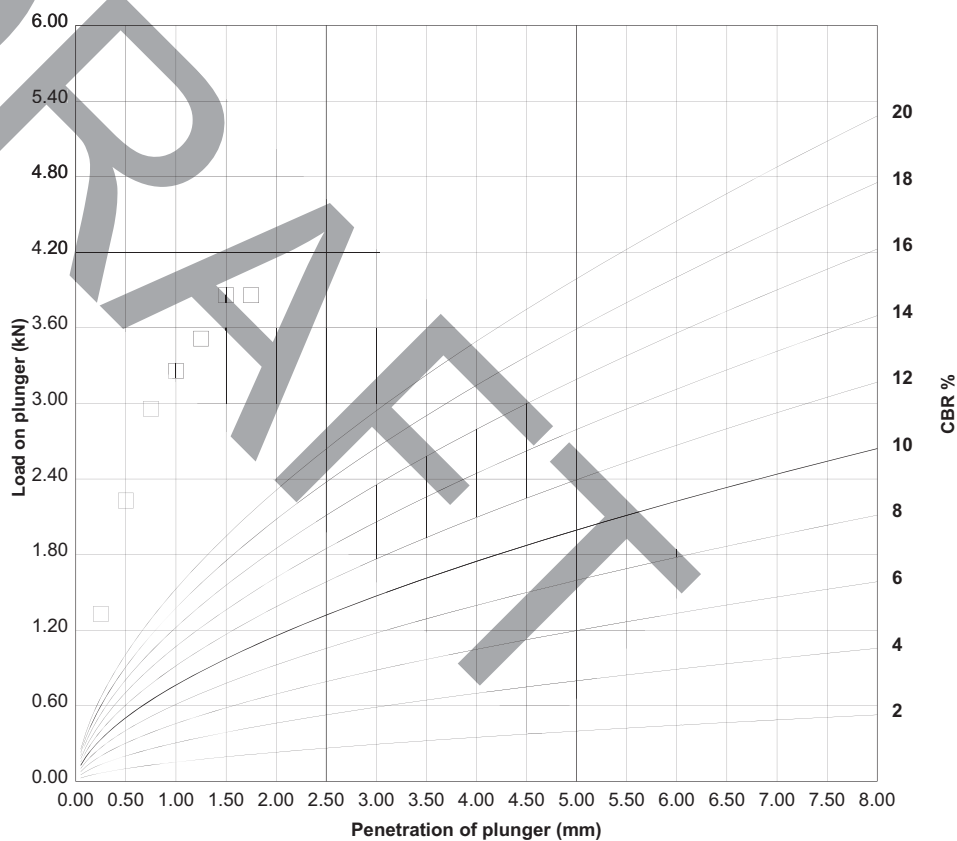
Borehole / Trial Pit	Test No.	Test Depth (m)	Sample Depth (m)	Sample Ref	Description
CBR01	1	0.20	0.20	D2	Yellow brown silty slightly gravelly fine to medium SAND

Date	26-11-2018
Easting	614849.9
Northing	326628.9
Level (mOD)	48.26
Operator	CJL

Moisture Content %	
Surcharge weight kg	2.00
Material Larger than 20mm	No

Penetration mm	2.5	5.0
Force kN	N/A	N/A
CBR %	N/A	N/A
Maximum force kN	3.858	

Reported CBR %	N/A
-----------------------	-----



Method of Test : Test undertaken in general accordance with BS 1377:Part 9 1990
Remarks : 1. Maximum applied load of 3.86 kN corresponding to a penetration of 1.5 mm



A F Howland Associates Geotechnical Engineers

Site

The Street, Cawston, NR10 4HU

Trial Pit
Number
CBR02

Excavation Method

Hand dug inspection pit

Dimensions

L 0.3 m x W 0.3 m x D 0.4 m

Ground Level (mOD)

43.83

Client

Create Consulting Engineers Limited

Job
Number
18.437

Location

614454 E 325875 N

Dates

26/11/2018

Engineer

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.25	D1		Plunger CBR test			TARMACADAM (Binder coarse)		
				43.68	0.15 (0.05)	MADE GROUND (Dark brown sandy subangular to subrounded fine to coarse flint gravel)		
				43.63	0.20 (0.20)	Yellow brown silty slightly gravelly fine to medium SAND. Gravel is subrounded to rounded fine to medium flint		
				43.43	0.40	Complete at 0.40m		



Remarks

1. Location CAT scanned prior to excavation
2. No groundwater encountered
3. Trial pit remained open and sidewalls stable during excavation.
4. Plunger CBR test undertaken at 0.25 m
5. Trial pit backfilled with arisings upon completion and reinstated with coldlay tarmacadam

Scale (approx)

1:5

Logged By

DJM

Figure No.

18.437.CBR02



Site : The Street, Cawston, NR10 4HU
Client : Create Consulting Engineers Limited
Engineer :

Job Number
18.437
Page
1 / 1

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

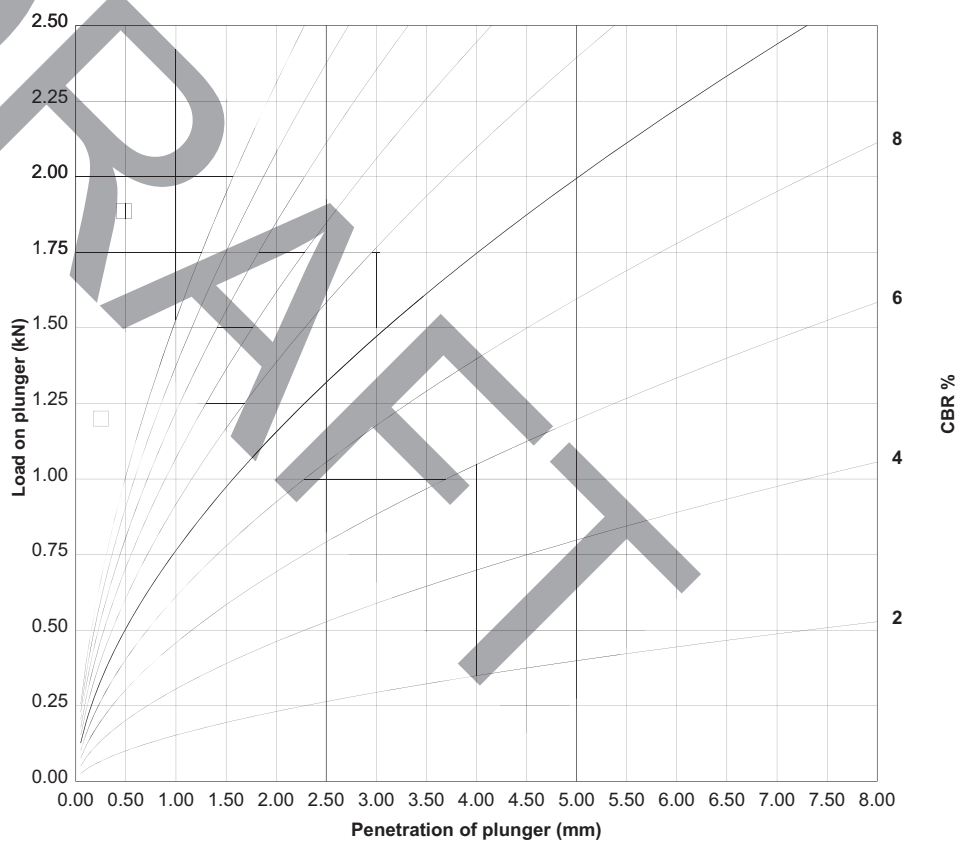
Borehole / Trial Pit	Test No.	Test Depth (m)	Sample Depth (m)	Sample Ref	Description
CBR02	1	0.20	0.25	D1	Yellow brown silty slightly gravelly fine to medium SAND

Date	26-11-2018
Easting	614454.1
Northing	325874.8
Level (mOD)	43.83
Operator	CJL

Moisture Content %	
Surcharge weight kg	2.00
Material Larger than 20mm	No

Penetration mm	2.5	5.0
Force kN	N/A	N/A
CBR %	N/A	N/A
Maximum force kN	1.886	

Reported CBR %	N/A
-----------------------	-----



Method of Test : Test undertaken in general accordance with BS 1377:Part 9 1990
Remarks : 1. Maximum applied load of 1.886 kN corresponding to a penetration of 0.48 mm



A F Howland Associates Geotechnical Engineers

Site
The Street, Cawston, NR10 4HU

Trial Pit
Number
CBR03

Excavation Method Hand dug inspection pit		Dimensions L 0.3 m x W 0.3 m x D 0.25 m		Ground Level (mOD) 44.93		Client Create Consulting Engineers Limited		Job Number 18.437	
		Location 614729 E 326218 N		Dates 26/11/2018		Engineer		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D1		Plunger CBR test			TARMACADAM (Binder coarse)		
				44.83	0.10 (0.10)	MADE GROUND (Dark grey sandy subangular to subrounded fine to medium limestone and flint gravel)		
				44.78	0.15 (0.10)	Yellow brown slightly silty slightly gravelly fine to medium SAND. Gravel is rounded fine flint		
				44.68	0.25 (0.10)	Complete at 0.25m		

No image available

Remarks 1. Location CAT scanned prior to excavation 2. No groundwater encountered 3. Trial pit remained open and sidewalls stable during excavation. 4. Plunger CBR test undertaken at 0.2 m 5. Trial pit backfilled with arisings upon completion and reinstated with coldlay tarmacadam		
Scale (approx) 1:5	Logged By DJM	Figure No. 18.437.CBR03



Site : The Street, Cawston, NR10 4HU
Client : Create Consulting Engineers Limited
Engineer :

Job Number
18.437
Page
1 / 1

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

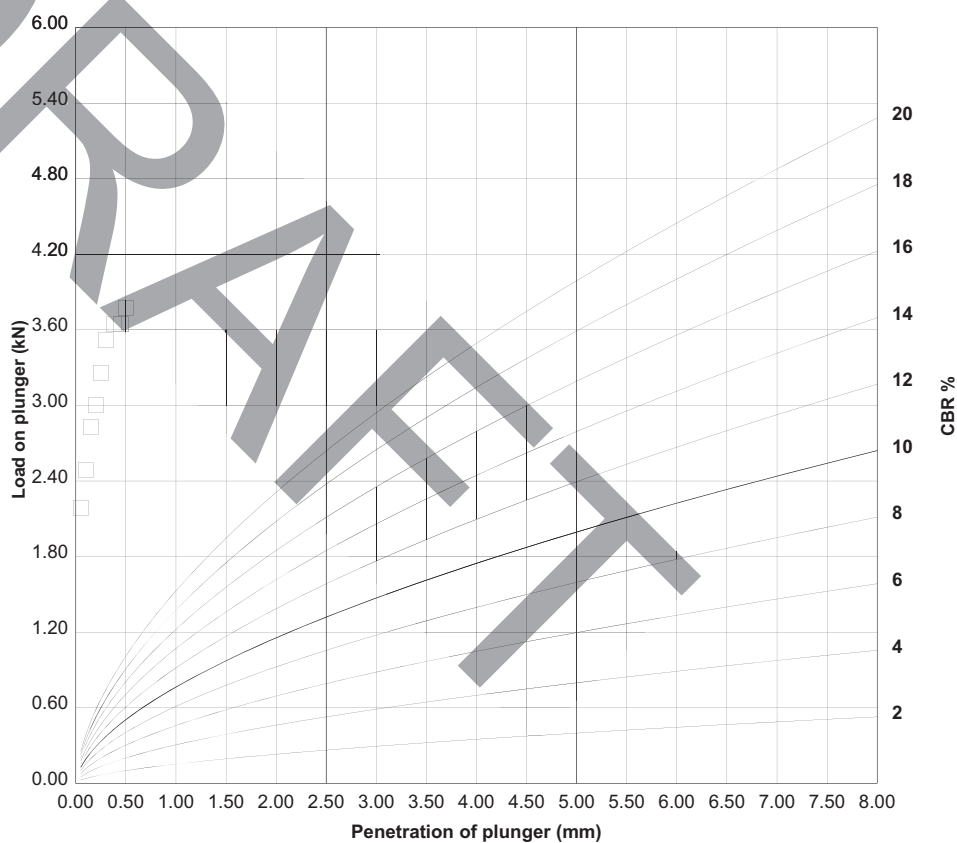
Borehole / Trial Pit	Test No.	Test Depth (m)	Sample Depth (m)	Sample Ref	Description
CBR03	1	0.20	0.20	D1	Yellow brown slightly silty slightly gravelly fine to medium SAND

Date	26-11-2018
Easting	614728.7
Northing	326218.1
Level (mOD)	44.93
Operator	CJL

Moisture Content %	
Surcharge weight kg	2.00
Material Larger than 20mm	No

Penetration mm	2.5	5.0
Force kN	N/A	N/A
CBR %	N/A	N/A
Maximum force kN	3.773	

Reported CBR %	N/A
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Method of Test : Test undertaken in general accordance with BS 1377:Part 9 1990
Remarks : 1. Maximum applied load of 3.77 kN corresponding to a penetration of 0.5 mm



A F Howland Associates Geotechnical Engineers

Site
The Street, Cawston, NR10 4HU

Trial Pit
Number
CBR04

Excavation Method Hand dug inspection pit		Dimensions L 0.3 m x W 0.3 m x D 0.4 m		Ground Level (mOD) 46.97		Client Create Consulting Engineers Limited		Job Number 18.437	
		Location 614784 E 326399 N		Dates 26/11/2018		Engineer		Sheet 1/1	

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.25-0.30	D1		Plunger CBR test		(0.10)	TARMACADAM (3.5 cm running coarse over 6.5 cm binder coarse)		
				46.87	0.10 (0.10)	MADE GROUND (Brown slightly sandy subangular to subrounded fine to coarse flint gravel. Rare flint cobbles)		
				46.77	0.20	Yellow brown silty slightly gravelly fine to medium SAND. Gravel is subrounded to rounded fine flint		
0.30-0.35	D2		Plunger CBR test		(0.20)			
				46.57	0.40	Complete at 0.40m		

No image available

Remarks

1. Location CAT scanned prior to excavation
2. No groundwater encountered
3. Trial pit remained open and sidewalls stable during excavation.
4. Plunger CBR tests undertaken at 0.25 and 0.30 m
5. Trial pit backfilled with arisings upon completion and reinstated with coldlay tarmacadam

Scale (approx)

1:5

Logged By

DJM

Figure No.

18.437.CBR04



Site : The Street, Cawston, NR10 4HU

Job Number
18.437

Client : Create Consulting Engineers Limited

Page
1 / 2

Engineer :

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

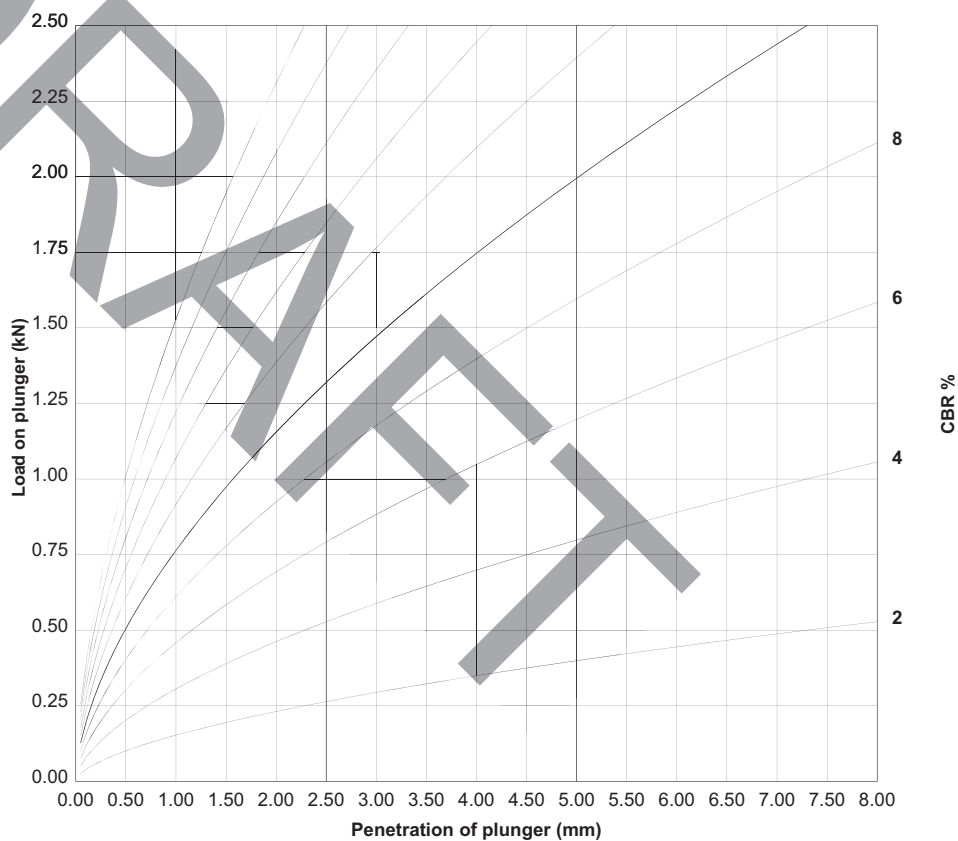
Borehole / Trial Pit	Test No.	Test Depth (m)	Sample Depth (m)	Sample Ref	Description
CBR04	1	0.25	0.25	D1	Yellow brwon silty slightly gravelly fine to medium SAND

Date	26-11-2018
Easting	614784.1
Northing	326398.8
Level (mOD)	46.97
Operator	CJL

Moisture Content %	
Surcharge weight kg	2.00
Material Larger than 20mm	No

Penetration mm	2.5	5.0
Force kN	N/A	N/A
CBR %	N/A	N/A
Maximum force kN	2.358	

Reported CBR %	N/A
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Method of Test : Test undertaken in general accordance with BS 1377:Part 9 1990

Remarks : 1. Maximum applied load of 2.36 kN corresponding to a rise in 0.28 mm



Site : The Street, Cawston, NR10 4HU

Client : Create Consulting Engineers Limited

Engineer :

Job Number
18.437

Page
2 / 2

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

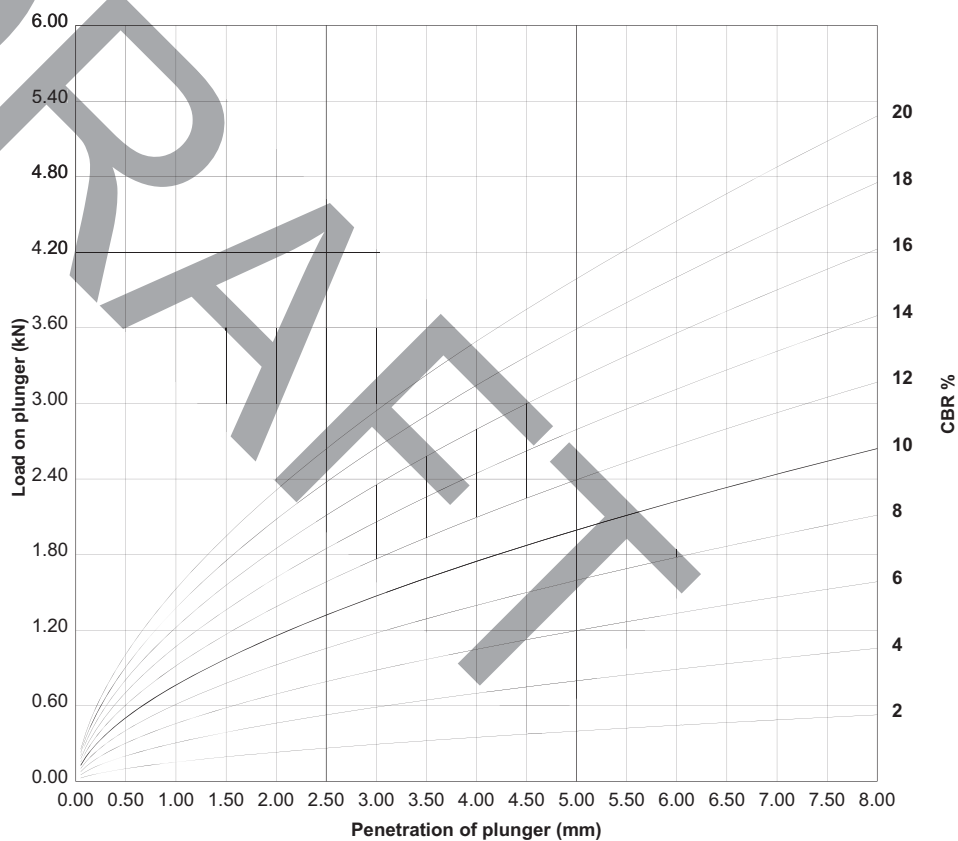
Borehole / Trial Pit	Test No.	Test Depth (m)	Sample Depth (m)	Sample Ref	Description
CBR04	2	0.30	0.30	D2	Yellow brown silty slightly gravelly fine to medium SAND

Date	26-11-2018
Easting	614784.1
Northing	326398.8
Level (mOD)	46.97
Operator	CJL

Moisture Content %	
Surcharge weight kg	
Material Larger than 20mm	No

Penetration mm	2.5	5.0
Force kN	N/A	N/A
CBR %	N/A	N/A
Maximum force kN	3.43	

Reported CBR %	N/A
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Method of Test : Test undertaken in general accordance with BS 1377:Part 9 1990

Remarks : 1. Maximum applied load of 3.43 kN corresponding to a rise in 0.3 mm

Annex C- Drawing 1554_03_110 and Drawing 1554_03_111

