ALDI STORES LIMITED

NATIONAL DISTRIBUTION CENTRE (NDC)

WOOD ROAD, BARDON HILL

TECHNICAL NOTE 11 (TN11) – PROPOSED ELECTRICAL SUBSTATION VEHICLE ACCESS

22ND JANUARY 2025

1.0 Appointment of Connect

1.1 Connect Consultants Limited is a transport planning and highway design consultancy that has been instructed by Aldi Stores Limited with regards to their National Distribution Centre (NDC), B585 Wood Road, Bardon.

2.0 Proposed Substation

2.1 This Technical Note (TN11) has been produced to assist Aldi and National Grid in relation to the proposed erection of a replacement substation (Nailstone Substation), to the north-east of the Aldi distribution centre.

2.2 Access to the existing substation is provided from the B585 Wood Road c510m north of the Aldi distribution centre access junction, on the inside of a bend in the B585 Wood Road, where junction vision is restricted.

2.3 National Grid are currently proposing to provide a new sub-station with new priority junction c430m north of the Aldi distribution centre access junction, which is further from the bend in the B585 Wood Road in a location which offers improved junction visibility.

2.4 The existing and proposed access positions are shown below, and on the plan at Appendix 1.

Figure 1 – Existing and Proposed Access Locations

Source: Google Earth (please note that the google impage appars to be a strange and misleadng combination of new and histocic imagray)

3.0 Vision Splays

3.1 The B585 Wood Road, at the position of the existing and proposed substation vehicle accesses, is subject to a 50mph speed limit.

3.2 A speed survey, undertaken using a speed gun, was carried out on the B585 Wood Road on Friday 1st November 2024. 200 free-flowing, off-peak vehicle speeds have been recorded in each direction in accordance with DMRB CA185 guidance.

3.3 The results of the survey are shown at Table 1 below. Each number on the table is an individual recorded speed, with the average and 85th percentile figures at the bottom.

Table 1 – Speed Survey Results

Speed Survey							
Northbound				Southbound			
40	43	64	43	42	44	40	40
45	45	44	50	32	41	37	40
39	53	47	43	38	35	44	40
42	30	49	45	36	37	51	36
49	47	50	38	42	41	49	44
39	39	49	43	41	45	47	51
47	49	45	68	43	37	37	37
38	43	44	48	45	44	33	47
36	43	37	47	37	35	43	38
46	45	48	51	38	37	39	41
46	46	58	43	41	40	39	48
48	45	52	42	40	39	37	49
46	45	43	49	50	50	41	31
41	49	49	47	41	39	37	44
34	46	52	43	43	35	35	45
46	44	49	49	39	42	34	47
33	43	52	51	48	41	35	52
42	38	49	48	32	39	36	42
42	43	44	38	33	35	34	40
46	48	38	46	32	39	39	49
48	39	43	58	39	50	40	43
36	46	41	50	38	44	31	42
46	52	42	46	30	51	40	42
45	44	40	48	42	46	46	37
45	42	53	47	42	34	41	46
Average		**85% Percentile**		**Average**		**85% Percentile**	
45.4		49.9		40.6		46.9	

3.4 The above table shows that 85th percentile speeds of just under the speed limit were recorded – 49.9mph northbound and 46.9mph southbound.

3.5 Manual for Streets 2 (MfS2) sets out the formula for calculating stopping sight distances (SSDs) at paragraph 10.1.5. The formula is shown at Figure 2 below.

Figure 2 – Stopping sight distances (SSDs) formula

$SSD = vt + v^2/2(d+0.1a)$

where:

v = speed (m/s)

t = driver perception-reaction time (seconds)

d = deceleration (m/s^2)

a = longitudinal gradient (%)

(+ for upgrades and - for downgrades)

Source: MfS2

3.6 MfS2 goes on to provide the recommended values for reaction time and deceleration rates for SSD calculations at Table 10.1, a copy is provided below at Figure 3 below.

Figure 3 – Recommended SSD Criteria

Design Speed	Vehicle Type	Reaction Time	Deceleration Rate	Comments
60kph and below	Light vehicles	1.5s	0.45g	
	HGVs	1.5s	0.375g	See 10.1.9
	Buses	1.5s	0.375g	See 10.1.10
Above 60kph	All vehicles	2s	0.375g (Absolute Min SSD)	As TD 9/93
	All vehicles	2s	0.25g (Desirable Min SSD)	As TD 9/93

Source: MfS2

3.7 As the 85th percentile speeds are above 60kph, a desirable minimum deceleration rate of 0.25g has been used, with a reaction time of 2s (as set out in DMRB).

3.8 Using the formula presented at Figure 2 above and recommended values for speeds above 60kph (Figure 3) the resultant SSDs are c149m to the south and c135m to the north.

3.9 The compliant visibility splays of 149m and 135m cannot be achieved to the edge of carriageway, at either the existing or proposed site accesses due to the presence of trees and hedgerows.

3.10 Appendix 2 shows the achievable vision splays at the existing and proposed accesses. A summary is provided below: -

Existing Access

Northern Splay – c24m to edge of carriageway, c45m to centre of carriageway.

Southern Splay – c45m to edge of carriageway, c50m to 1m from the edge of carriageway.

Proposed Access

Northern Splay – c61m to edge of carriageway, c73m to centre of carriageway.

Southern Splay – c60m to edge of carriageway, c81m to 1m from the edge of carriageway.

3.11 As detailed above, the achievable vision splays at the proposed access junction provide a substantial improvement when compared to the achievable vision splays at the existing access.

3.12 In terms of the northern splay, the proposed access position can achieve a splay of c61m to the edge of carriageway and c73m to the centre of the carriageway with some minor trimming of the existing hedge line within the Aldi site / highway land. This is better than the existing junction that can achieve a maximum of c24m to edge of carriageway and a maximum of c45m to centre of carriageway. The proposed access therefore provides c37m more vision to the edge of carriageway and c28m more vison to the centre of carriageway.

3.13 The 73m northern splay is still 62m less than the 135m compliant splay for the recorded southbound speeds on Wood Road, however as shown above, the access provides a considerable betterment in terms of vision than the existing access. To put this into perspective, if the 1.5 second reaction time and 0.45 deceleration rate values for urban speeds below 60kph were to be applied to a 46.9mph design speed, the SSD would be 83.6m (10.6m more than the achievable splay). Although not ideal, this is arguably acceptable for a very lightly trafficked access especially given the betterment which it provides.

3.14 In terms of the southern splay, the proposed access position can achieve a splay of c60m to edge of carriageway and c81m to 1m from the edge of carriageway with some minor trimming of the existing hedge line fronting Wood Road (with Aldi's ownership / highway land). This is better than the existing junction that can only achieve splays of c45m to edge of carriageway and c50m to 1m from the edge of carriageway. The proposed access therefore provides c15m more vision to the edge of carriageway and c31m more vison to 1m off the edge of the carriageway.

3.15 The 81m southern splay is still 68m less than the 149m compliant splay for the recorded northbound speeds on Wood Road, however as shown above, the access provides a considerable betterment in terms of vision than the existing access. To put this into perspective, if the 1.5 second reaction time and 0.45 deceleration rate values for urban speeds below 60kph were to be applied to a 49.9mph design speed, the SSD would be 92.2 (11.9m more than the achievable splay). Although not ideal, this is arguably acceptable for a very lightly trafficked access especially given the betterment which it provides.

4.0 Collision Analysis

4.1 As detailed at Section 6.2 of the Connect February 2020 TA, collision data was obtained from LCC, for the 5-year period of 31/10/2014 to 01/11/2019.

4.2 No collisions occurred on the B585 Wood Road at, or in the vicinity of, the existing / proposed substation access junction.

4.3 Crash map, an online database of collisions also shows that no collisions occurred on the B585 Wood Road at, or in the vicinity of, the proposed sub-station access junction between 01/11/2019 and 31/12/2022 (2022 is the most recently available data).

5.0 Trip Attraction of Proposed Sub-Station

5.1 As shown on the existing site plan at Appendix 1, the existing sub-station consists of two transformer units and a 11kv building.

5.2 The proposed sub-station consists of an additional two transformers as well as a 33kv and 11kv building and septic tank, in addition to the existing building and transformers. The infrastructure on-site will therefore more than double.

5.3 National grid has advised that the existing sub-station experiences infrequent traffic attraction, with vehicles only visiting to undertake routine monthly inspections (two people in one transit sized van lasting approximately one hour) or to attend when there are faults / maintenance needs. Maintenance frequencies on the different substation equipment vary, but typically are only needed 5 days per year (with one car and two transit sized vans).

5.4 The proposed substation, although larger, will require the same routine monthly inspections. Given the equipment will be new it is likely to experience the same or less faults / maintenance needs that the existing sub-station. Based on the above, no noticeable change in trip attraction is likely to occur as a result of the proposals.

5.5 In terms of construction, National Grid have advised that the construction phase will last approximately six months, with one car and four vans on site every day. There will be deliveries using HGVs throughout the build, more intensified towards the initial civil phase of the build when there will be 2 per day, whilst later in the build HGV deliveries will be made once every two weeks.

5.6 Based on the above, during construction the site will attract up to 14 movements per day, a negligible number.

5.7 Therefore, the future traffic attraction of the proposed substation is unlikely to change, with the construction traffic being negligible in number.

6.0 Summary

6.1 The results of the speed survey show that recorded 85th percentile speeds are just below the 50mph speed limit on the B585 Wood Road. These equate to vision splays of 149m to the south and 135m to the north.

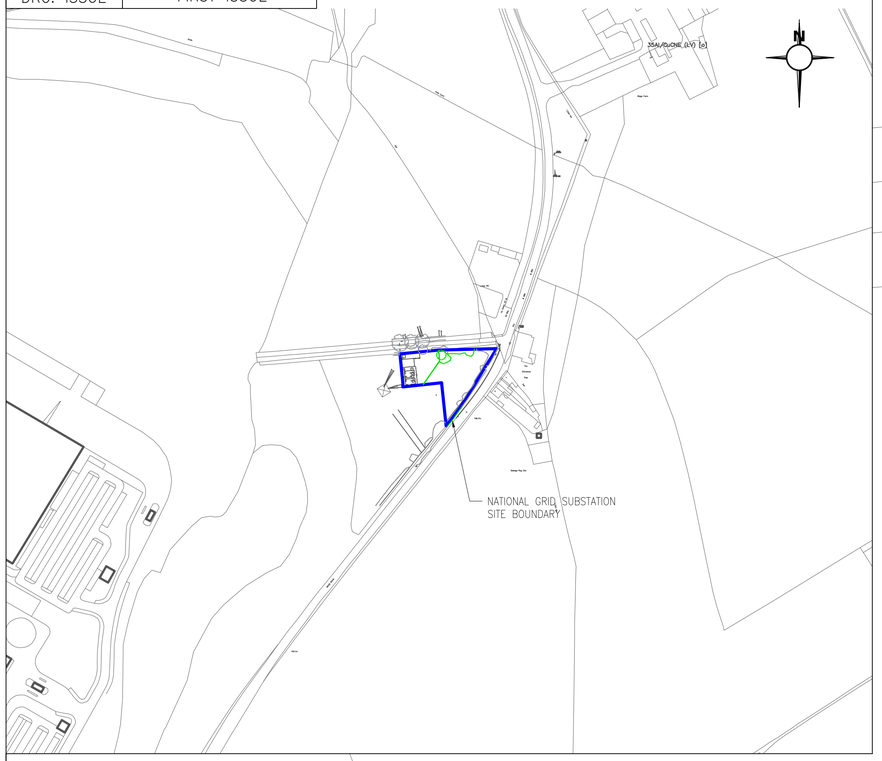
6.2 The compliant visibility splays of 149m and 135m cannot be achieved to the edge of carriageway, at either the existing or proposed site accesses due to the presence of trees and hedgerows. However, the achievable vision splays at the proposed access junction provide a substantial improvement when compared to the achievable vision splays at the existing access.

6.3 Therefore, based on the negligible traffic increase associated with the new substation, the use of the proposed access which can achieve the required southern splay and provide an improvement in terms of vision looking north (when compared to the existing access) represents an acceptable proposal. In addition, no collisions have occurred at the current access which is more sub-standard in terms of vision.

Appendix 1 – Proposed Substation Layout

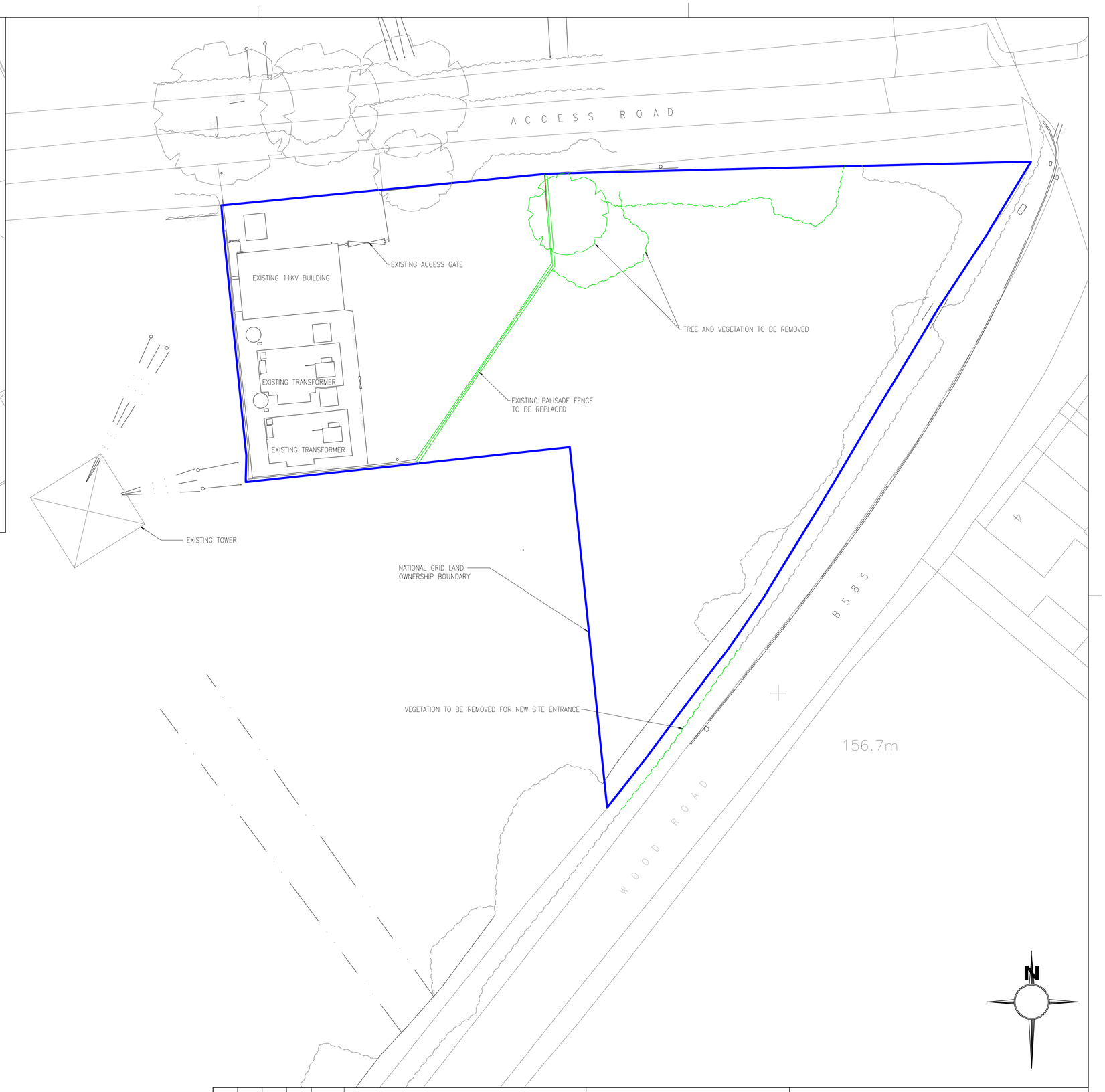
LE42_12_0001 A \\WO.7000;\\NAILSTONE 33/11KV SUBSTATION\P|PLANNING\PEXISTING SITE PLAN

DRG. ISSUE | FIRST ISSUE



LOCATION PLAN
SCALE 1:2500

GRID REFERENCE –
443259, 308929



EXISTING SITE PLAN
SCALE 1:200

BASED UPON THE ORDNANCE SURVEYS MAP WITH THE PERMISSION OF THE CONTROLLER OF HIS MAJESTY'S STATIONERY OFFICE. CROWN COPYRIGHT RESERVED NATIONAL GRID ELECTRICITY DISTRIBUTION, AVONBANK, FEEDER ROAD, BRISTOL, BS2 0TB. LICENSE NO. 100022432

Rev	Drawn	Chk'd	App'd	Date	Revision Note
B	SM	JS	PS	15.08.24	ISSUED FOR INFORMATION
A	JS	BC	KS	08.05.24	ISSUED FOR INFORMATION

nationalgrid Electricity Distribution

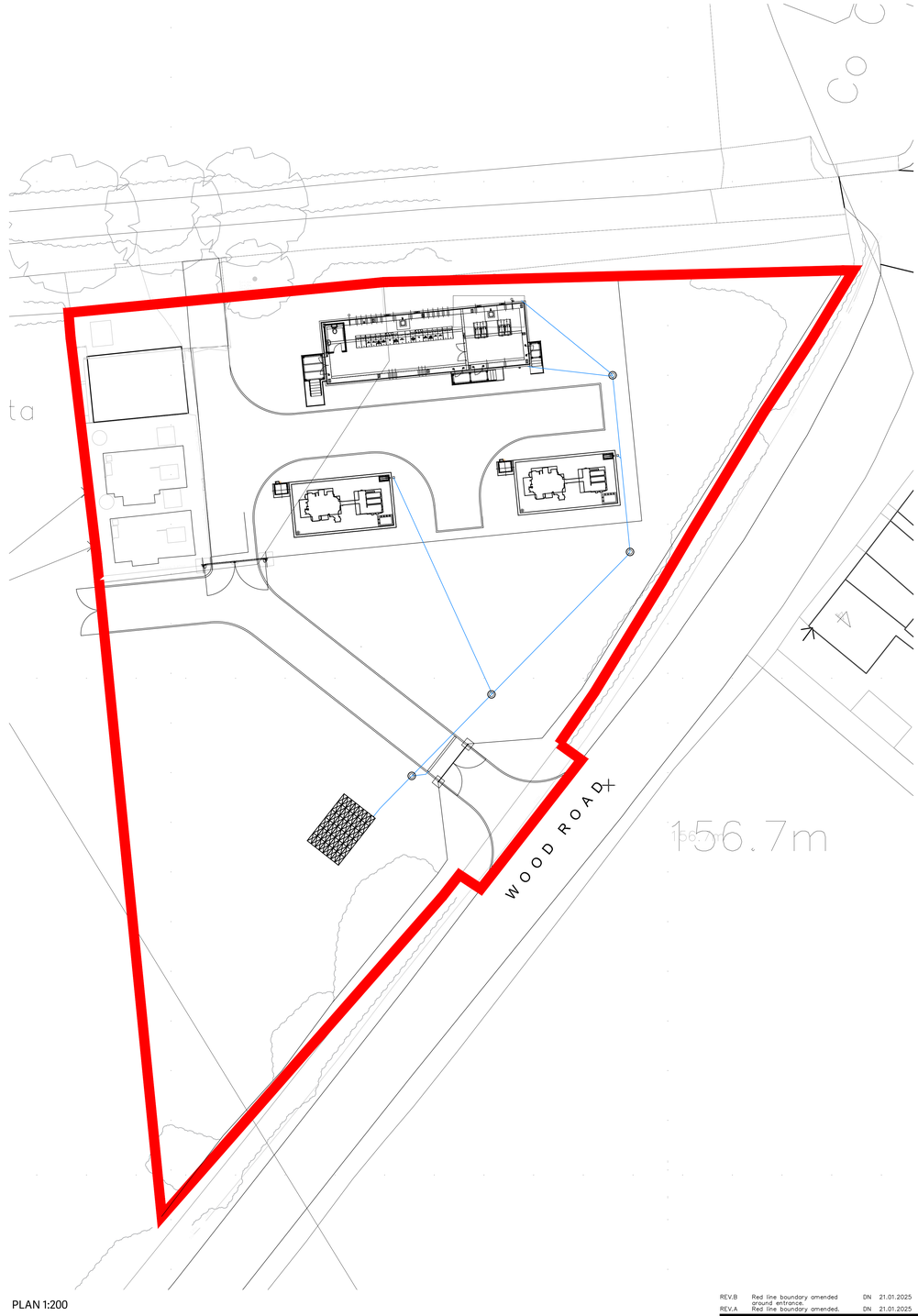
Engineering Design Department (East Midlands)
Pegasus Business Park, Castle Donington, DE74 2TU.

Title: NAILSTONE 33/11KV SUBSTATION
PLANNING
EXISTING SITE PLAN

Scale: AS SHOWN @ A1 | Drg. No. LE42_12_0001 | Rev No. A

 A1

SITE LOCATION PLAN 1:1250



PLAN 1:200

REV.B	Red line boundary amended around entrance.	DN	21.01.2025
REV.A	Red line boundary amended.	DN	21.01.2025

THE LODGE · COLESHILL MANOR · BIRMINGHAM · B46 1DL · TEL 0121 747 1943
THORNTON PLACE · DARLTON ROAD · CHRISTCHURCH · BH1 6NL · TEL 01202 481 800

CLIENT	ALDI STORES LTD.
PROJECT	INTERLINK SOUTH, BARDON, LEICESTERSHIRE, LE67 1GE
TITLE	SITE LOCATION PLAN

DATE	22.11.24	SCALE	1:1250@ A0
DRAWN	DJN	CHECKED	DJN
		NORTH	
DWG No.	G19A42-SF01	REVISION	B

DRG. ISSUE

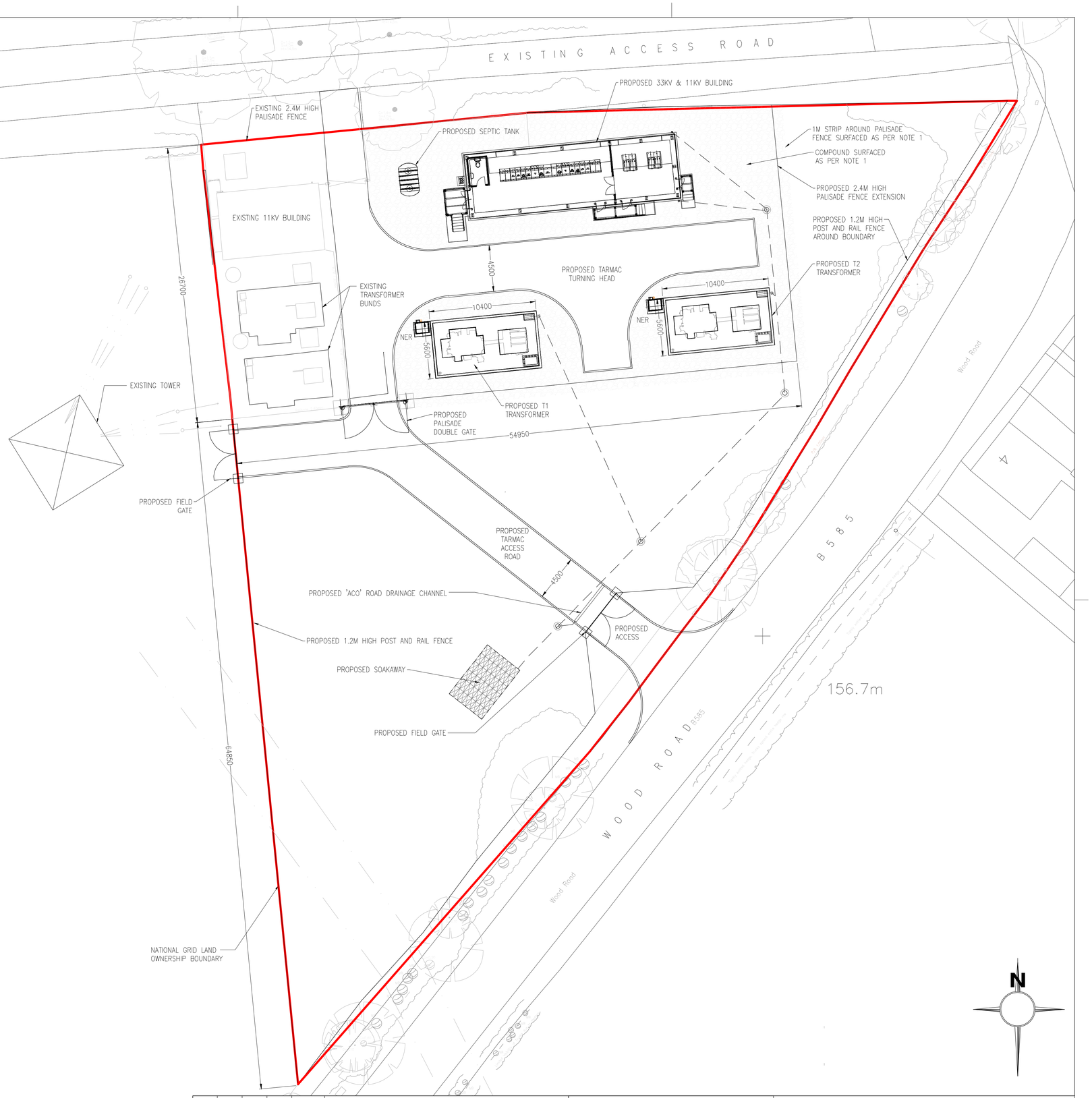
LOCATION PLAN
SCALE 1:2500

GRID REFERENCE –
443259, 308929

NOTES:

1. SITE SURFACED AREAS SHALL BE STRIPPED OFF 225mm TOP SOIL AND BACK FILLED TO FINISHED SITE LEVEL WITH 150mm THICK TYPE 1 SUB BASE AND FINISHED WITH 75mm LAYER OF 20mm SINGLE SIZED GRANITE CHIPPINGS. TERRAM T1300 GEOTEXTILE TO BE PLACED BETWEEN THE TYPE 1 SUB BASE AND GRANITE CHIPPINGS LAYERS.

PROPOSED SITE PLAN
SCALE 1:200



Rev	Drawn	Chk'd	App'd	Date	Revision Note
D	BC	JS	CH	16.01.25	UPDATED WITH PLANNING CONSULTANTS COMMENTS.
C	JS	BC	PS	14.11.24	ACCESS ROAD UPDATE
B	SM	JS	PS	15.08.24	UPDATED INFORMATION
A	JS	BC	KS	08.05.24	ISSUED FOR INFORMATION

nationalgrid Electricity Distribution

Engineering Design Department (East Midlands)
Pegasus Business Park, Castle Donington, DE74 2TU.

Title: NAILSTONE 33/11KV SUBSTATION
PLANNING
PROPOSED SITE PLAN

Scale: AS SHOWN @ A1

Drg. No. LE42_12_0002

Rev No. D

 A1

Appendix 2 – Achievable Vision Splays

A3

NORTHERN VISIBILITY SPLAY - ACHIEVABLE
24M TO KERB EDGE
45M TO CENTRE OF CARRIAGEWAY

SOUTHERN VISIBILITY SPLAY - ACHIEVABLE
45M TO KERB EDGE
50M TO 1M FROM THE EDGE OF CARRIAGEWAY

connect CONSULTANTS

CONNECT CONSULTANTS LTD, 78 BROAD STREET,
CHIPPING SODBURY, BRISTOL. BS37 6AG
Tel: 01454 320 220 Web: www.connect-consultants.com
Fax: 01454 320 099 Email: bristol@connect-consultants.com

QUALITY MANAGEMENT SYSTEM
ISO 9001 : 2015 FS 594947

client
ALDI STORES LTD

project
PROPOSED RDC DEVELOPMENT
BARDON HILL

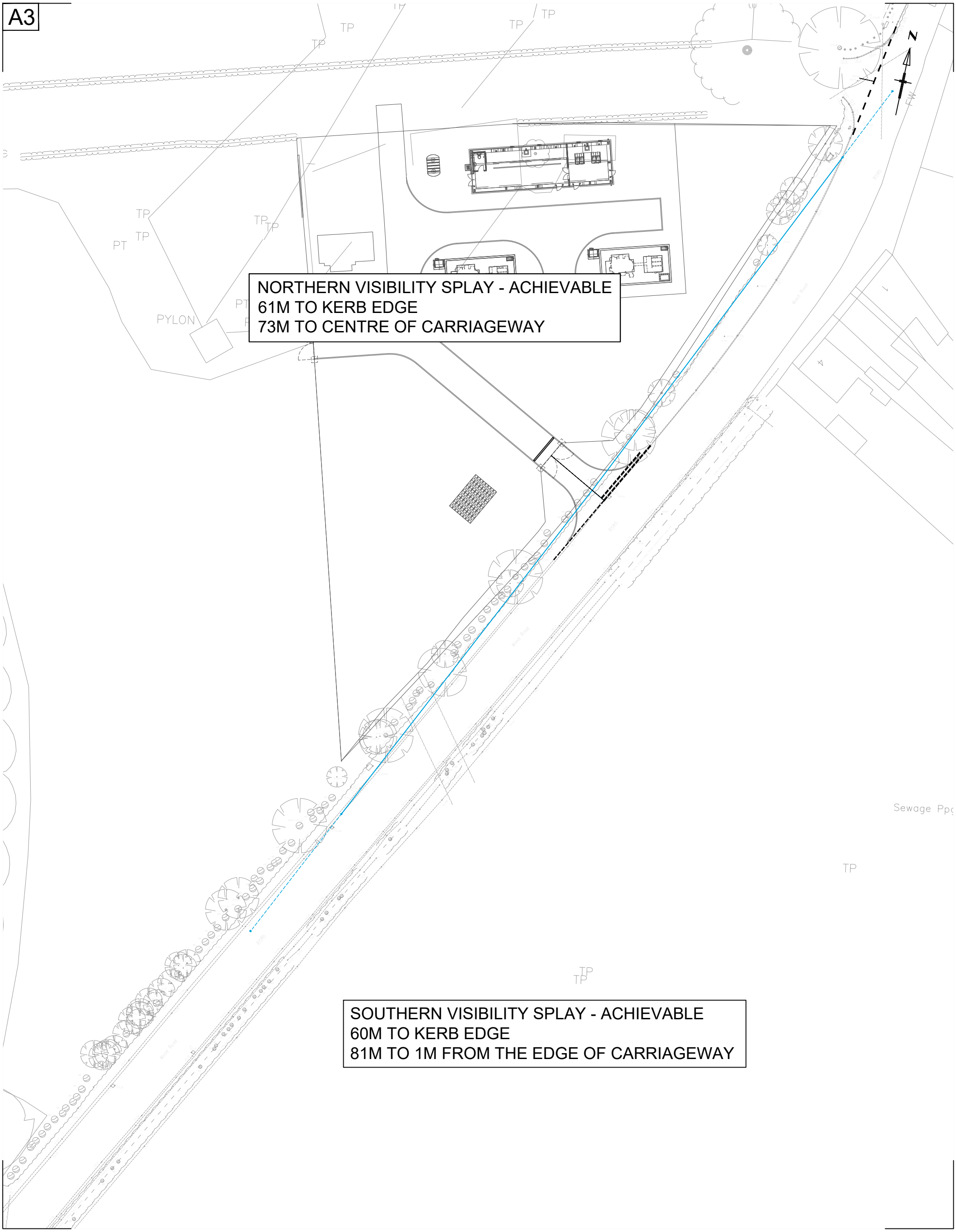
title
EXISTING SUBSTATION
ACHIEVABLE VISIBILITY SPLAYS
NORTHERN ACCESS

scale	date
1:250	JANUARY 2025
drawn by	checked by
T.A.S	N.P.B

drawing number
19105 - 013

status	rev.
PLANNING	C

A3



NORTHERN VISIBILITY SPLAY - ACHIEVABLE
61M TO KERB EDGE
73M TO CENTRE OF CARRIAGEWAY

SOUTHERN VISIBILITY SPLAY - ACHIEVABLE
60M TO KERB EDGE
81M TO 1M FROM THE EDGE OF CARRIAGEWAY

connect CONSULTANTS

CONNECT CONSULTANTS LTD, 78 BROAD STREET,
CHIPPING SODBURY, BRISTOL. BS37 6AG
Tel: 01454 320 220 Web: www.connect-consultants.com
Fax: 01454 320 099 Email: bristol@connect-consultants.com

safecontractor APPROVED

bsi. UKAS MANAGEMENT SYSTEMS
QUALITY MANAGEMENT SYSTEM
ISO 9001 : 2015 FS 594947

client	ALDI STORES LTD
project	PROPOSED RDC DEVELOPMENT BARDON HILL
title	EXISTING SUBSTATION ACHIEVABLE VISIBILITY SPLAYS SOUTHERN ACCESS
scale	N.T.S
date	JANUARY 2025
drawn by	T.A.S
checked by	N.P.B
drawing number	19105 - 014
status	PLANNING
rev.	C