MEC Consulting Group

UTILITIES

Chalk Road, Higham
Utilities Assessment
August 2025

Report Ref: 29524-UTIL-0701 Rev A

Chalk Road, Higham
Utilities Assessment
August 2025

REPORT REF: 29524-UTIL-0701 Rev A

CLIENT: Richborough

ENGINEER: MEC Consulting Group Ltd
The Old Chapel
Station Road
Hugglescote
Leicestershire
LE67 2GB

Tel: 01530 264 753
Email group@m-ec.co.uk

REGISTRATION OF AMENDMENTS

Date	Rev	Comment	Prepared By	Checked By	Approved By
July 2025	-	First issue	**Emma Harris** Utilities Coordinator	**Nathan Allen** MEnvSci Associate - Lighting	**Alexander Bennett** BSc(Hons) MCIHT MTPS Managing Director
August 2025	A	Updated layout plan	**Alexander Bennett** BSc (Hons) MCIHT MTPS Managing Director		

CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 MEC Consulting Group Ltd, has been commissioned by Richborough (hereafter referred to as 'the Client') to undertake a Utilities Assessment for a proposed residential development at Chalk Road, Higham (hereafter referred to as 'the Site'). A site location plan is provided in **Appendix A** and an illustrative development framework plan is contained within **Appendix B**.

1.2 The development proposals comprise;

Outline application for the demolition of existing buildings and erection up to 40 residential dwellings, public open space and associated works. Approval is sought for the principal means of vehicular access from Chalk Road and all other matters are reserved.

1.3 This assessment seeks to establish how the proposed development will be serviced with key utility supplies, whether diversion or protection of existing apparatus may be required and estimated costs for service connection and diversion works, where available.

1.4 Consultation has been undertaken with key Statutory Undertakers to establish:

- Available capacity within existing infrastructure;
- Required capacity improvement works to accommodate the development;
- Required diversions of infrastructure to accommodate the proposed development;
- Any required easements;
- Service connection locations; and
- Service connection costs.

1.5 Consultation has been undertaken with the following Statutory Undertakers:

- Southern Water (sewerage and clean water provider for Higham);
- UK Power Networks (electricity);
- Openreach (telecommunications);
- GTC (multi utility connections);
- Energy Assets (multi utility connections).

1.6 Consultation responses received from Statutory Undertakers are included within **Appendices C-H**. A utilities constraints plan has been produced from the apparatus plans, and is provided in **Appendix I**.

1.7 Following this introductory Section of the report, Section 2.0 details the existing utilities infrastructure in the vicinity of the site, Section 3.0 details proposed future supply to the site and Section 4.0 provides details on requisite diversions and easements. A summary of information is provided within Section 5.0.

Disclaimer

1.8 MEC has completed this report for the benefit of the individuals referred to in paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.

1.9 MEC accepts no responsibility or liability for:

a) The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
b) The issue of this document to any third party with whom approval for use has not been agreed.

2.0 EXISTING SERVICES

2.1 Formal requests have been made to relevant utility companies for a copy of their existing asset plans for the proposed development area. The following table summarises the Statutory Undertakers that have been approached, their response and likely requirements for diversion or extra protection measures of any existing apparatus. Further information on the diversion and extra protection of the affected apparatus can be found in Section 4.0 of this report.

Table 2.1 : Existing Services Summary

Service	Statutory Undertaker	Response Received?	Area Affected?	Diversion/Protection Required?
Foul Water	Southern Water	Yes	Yes – 175mm VC foul sewer in the carriageway of Chalk Road. Foul rising main within the southern verge of Chalk Road.	Yes – Refer to **Section 4.0**
Clean Water	Southern Water	Yes	Yes – Clean 125mm PE water main within the southern verge of Chalk Road. Service main at the current site entrance.	Yes – Refer to **Section 4.0**
Gas	SGN	Yes	No	No
Gas	National Gas Transmission	Yes	Yes – NHP gas main to the north of the site boundary (not in site boundary).	Yes – Refer to **Section 4.0**
Electricity	UK Power Networks	Yes	Yes – Overhead LV cable within the northern verge of Chalk Road that enters the site boundary to the west and a second overhead LV cable to serve the existing building.	Yes – Refer to **Section 4.0**
Electricity/Gas	GTC	Yes	No	No
Railway	Network Rail	Yes	Yes –Railway line adjacent to site boundary to the north east.	Yes – Refer to **Appendix G**
Telecoms	Openreach	Yes	Yes –Overhead supply within the northern verge of Chalk Road that enters the site boundary to the south.	Yes – Refer to **Section 4.0**
Telecoms	Virgin Media	Yes	No	No
Telecoms	Sky	Yes	No	No
Telecoms	EU Networks	Yes	No	No
Telecoms	Verizon	Yes	No	No
Telecoms	Mobile Broadband Network	Yes	No	No
Telecoms	Sota	Yes	No	No
Telecoms	CityFibre	Yes	No	No

2.2 All apparatus is shown on the utilities constraints plan (drawing number 29524_07_010_01) in **Appendix I** and is based on the records supplied by the statutory undertakers. The asset records are an approximate

location and can be inaccurate, based on this it is recommended that a utilities survey is completed at an appropriate time.

3.0 SERVICES SUPPLY

Foul Water

3.1 Southern Water (SW) have confirmed that their nearest sewer is the 175mm foul gravity sewer within the carriageway of Chalk Road. SW have advised that there is little spare capacity to accept a discharge of foul flows from the development and as such additional off-site sewers or reinforcement work is required.

3.2 SW have confirmed that have a duty to provide network capacity from the point of practical connection and this is funded by the infrastructure charges. SW aim to provide this within 24 months following from the grant of planning permission for non-strategic sites.

3.3 The foul developer enquiry can be found in **Appendix C**.

Clean Water

3.4 SW have confirmed that there is sufficient capacity to supply the proposed development with clean water, therefore, reinforcement works are not required. The point of connection for the development can be taken from the existing 125mm PE water main in Chalk Road at the site boundary. Confirmation of this can be found in the clean developer enquiry in **Appendix C**.

Electricity

3.5 UK Power Networks (UKPN) have provided a budget estimate of £284,000.00 to connect the proposed development to their existing HV network. Connection can be made to the overhead HV (11kV) cable within the northern verge of Chalk Road to the east of the site boundary. This is based on a total capacity of 300kVA which is sufficient for Air Source Heat Pumps (ASHPs) and Electric Vehicle Charging Points (EVCPs) at each dwelling. UKPN have advised that the development will require 1 substation to be centrally located. A budget quotation developer enquiry response can be found within **Appendix E**.

3.6 The typical plot of land required for a substation is 5x5m and 24/7 vehicle and pedestrian access will be required. A minimum of 9m clearance should be maintained between the substation and nearest residential dwelling in order to mitigate the risk of noise disturbance.

Telecommunications

3.7 Openreach will deploy Fibre to the Premises (FTTP), free of charge, into all new housing developments of 20 or more homes. Openreach's FTTP infrastructure is open to all communication service providers to encourage greater adoption and customers can benefit from the faster speeds of up to 1Gbps. Openreach will supply all of the materials such as ducts and joint boxes required to build and install the network free of charge, however, it is the responsibility of the developer or their appointed contractor to install the on-site ducts and joint boxes to Openreach's specification. An asset map showing Openreach infrastructure within the area of the proposed development site is included in **Appendix F**.

Multi Utility

3.8 GTC is an independent distribution network operator who has supplied a budget cost of £47,228.41 to supply electricity, clean water, waste water and fibre connections to the proposed development. This includes a rebate associated with the fibre connections and if fibre is provided by others the cost will increase to £67,828.41. A copy of the budget quote is included in **Appendix H**.

3.9 GTC have assumed water and waste connection points at the site entrance and have not included any allowance for barrier pipe for the new clean water mains. Infrastructure charges are also excluded and would be applicable as per Section 3.5 above. Clean water service connections are included.

3.10 GTC have assumed a point of connection to the LV electricity network at the site boundary. This is based on a total capacity of 116kVA which would be sufficient for ASHPs and EVCPs at each dwelling. It is to be noted that GTC do not calculate residential loads in the same way as UKPN and do not require additional capacity for EVCPs of 7.2kW or less.

4.0 DIVERSIONS AND PROTECTION OF APPARATUS

Foul Water

4.1 The SW asset map shows a 175mm VC foul sewer within the carriageway of Chalk Road. The map also shows a foul rising main within the southern verge of Chalk Road. Diversion of these sewers is not anticipated but extra precaution should be taken when excavating the new site access. The approximate route of the SW sewers is shown on the constraints plan in **Appendix I**.

Clean Water

4.2 The SW asset map shows a clean 125mm PE water main within the southern verge of Chalk Road. Diversion of this main is not anticipated but extra precaution should be taken when excavating this area. The asset map also shows a service main to the west of the current site entrance. Further survey work is required to understand the exact location of the service main. The approximate route of the SW mains is shown on the constraints plan in **Appendix I**.

Gas

4.3 The National Gas Transmission (NGT) asset map shows an LHP gas main to the north of the site boundary. Although the gas main is not within the site boundary the HSE Outer Zone easement covers 50% of the site. There would be no restrictions on the number or density of dwellings within the Outer Zone and therefore no implications on the proposed development. The HSE correspondence and National Gas Transmission (NGT) asset map is shown in **Appendix D**. The approximate location of NGT assets is shown on the constraints plan in **Appendix I**.

4.4 The HSE's Land Use Planning Methodology - Planning Advice Hazardous Installations (PADHI) guidance advises that the Consultation Distances (CD's) for the existing pipeline are: -

- Inner Zone = 78m
- Middle Zone= 90m
- Outer Zone = 270m

4.5 These distances apply on either side of the pipeline. All distances should be measured from the centre of the pipeline. Where consultation distances coincide, the inner-most zone is used to determine HSE's Land Use Planning Advice.

Electricity

4.6 The UKPN asset map shows an overhead LV cable within the northern verge of Chalk Road. The overhead LV cable also enters the site boundary to the west and a second overhead LV cable to serve the existing building. Diversion/disconnection of the cables within the site boundary will be required. UKPN have provided a budget cost of £25,000.00 to undertake the diversion/disconnection works. The approximate route of the UKPN cables is shown on the constraints plan in **Appendix I**.

Telecommunication

4.7 The Openreach asset map shows an overhead supply within the northern verge of Chalk Road crossing into the site boundary to the south at the existing site access. To facilitate the construction of the site access, diversion of the existing apparatus will be required. Openreach has advised that the pole in question is a UKPN-owned electrical pole. Before they can provide a quotation for their works, they require diversion details from UKPN regarding the pole. Openreach typically charge £1,000.00-£2,000.00 for a site visit to provide a detailed diversion cost. The Openreach apparatus is shown on the constraints plan in **Appendix I**.

5.0 SUMMARY

5.1 This report has been produced to support a proposed residential development at Chalk Road, Higham. A summary of all findings to date is provided in the below table.

Table 5.1 : Summary

Service and/or Provider	Capacity Available?	Point of Connection	Budget Costs Provided?	Are Diversions / Extra Protection Measures Required?	Additional Comments
Foul Drainage (Southern Water)	No – Reinforcement work required	Existing 175mm foul gravity sewer within the carriageway of Chalk Road	Developer to construct and offer for adoption.	Yes – 175mm VC foul sewer in the carriageway of Chalk Road. Foul rising main within the southern verge of Chalk Road.	SW developer enquiry confirms that there is little capacity within the local network therefore reinforcement work is required which will be delivered by SW
Clean water (Southern Water)	Yes	Existing 125mm PE water main in Chalk Road.	New Connection costs are provided on receipt of a formal application	Yes – Clean 125mm PE water main within the southern verge of Chalk Road. Service main at the current site entrance.	The SW developer enquiry confirms that there is capacity within the local network therefore reinforcement work is not required.
Gas (National Gas Transmission)	N/A	N/A	N/A	Yes – NHP gas main to the north of the site boundary (not in site boundary).	Outer easement within the site boundary
Electricity (UKPN)	Yes	Overhead HV (11kV) within Chalk Road.	New Connection £284,000.00 Diversion £25,000.00	Yes – Overhead LV cable within the northern verge of Chalk Road that enters the site boundary to the west and a second overhead LV cable to serve the existing building.	UKPN have confirmed that there is capacity within the local HV network therefore reinforcement work is not required.
Telecoms (Openreach)	N/A	N/A	Site Survey £1,000 - £2,000.00	Yes –Overhead supply within the northern verge of Chalk Road that enters the site boundary to the south.	Openreach will deploy FTTP, free of charge, into all new housing developments of 20 or more homes. No proposals have therefore been sought.

Service and/or Provider	Capacity Available?	Point of Connection	Budget Costs Provided?	Are Diversions / Extra Protection Measures Required?	Additional Comments
Multi Utility (GTC)	N/A	Electricity – Assumed LV at site entrance. Clean & Waste Water – Assumed at site entrance.	New Connections Inc Fibre £47,228.41 New Connections Exc Fibre £67,828.41	N/A	GTC have provided a budget cost to supply electricity, clean water and waste water to the proposed development with an option to provide fibre.

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APPENDICES

APPENDIX A

NORTH

NOTES

No dimensions should be scaled during construction and any missing dimensions required should be requested and confirmed before proceeding. All dimensions must be checked on site and agreed with the client prior to construction.

The scale bar provided is for use so that the drawings can be Scaled during the planning application process.

0 50

Scale bar 50mm at 1:1

SITE BOUNDARY

A 18.07.2025 RLB UPDATED TO INCL VIS SPLAYS. KB

Project

LAND OFF CHALK ROAD
LOWER HIGHAM
GRAVESHAM

Title

LOCATION PLAN

Scale	Date
1:1250 @A3	APRIL 2025
Drawn	Checked
JT	MB
Drawing Number	Revision
8990/P100	A

Saunders
Architecture + Urban Design
saundersarchitects.com | 01707 385300 | London | Welwyn Garden City

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APPENDICES

APPENDIX B

NORTH

SP

MP 28.25

Atlantis

7.3m

Cuckold's Corner

Michele Cottages

Avonlea

8.5m

Haselden Cottages

Orchard View

Whitebread House

Cherrydene

The Hedgerows

16

9

NOTES

This drawing to be read in accordance with the specification/Bills of Quantities and related drawings. No Dimensions to be scaled from this drawing. All stated dimensions to be verified on site and the Architect notified of any discrepancies.

0 50

Scale bar 50mm at 1:1

KEY

- Site Boundary
- Railway line
- Proposed access/egress for all modes (subject to detailed design)
- Proposed location of SuDs/Attenuation features
- Proposed Green Amenity Space (including existing pond, children's play provision, footpaths, community orchard and drainage)
- Proposed Residential Development
- Proposed area for unallocated parking
- Focal space
- Recreational footpath
- Existing Trees
- Indicative proposed trees
- Proposed location for community orchard
- Proposed location for children's play

A 22.07.2025 MINOR AMENDMENTS FOLLOWING CLIENT COMMENTS. KB

Project

LAND OFF CHALK ROAD
LOWER HIGHAM
GRAVESHAM

Title

ILLUSTRATIVE DEVELOPMENT FRAMEWORK PLAN

Scale	Date
1:1000 @A3	JULY 2025
Drawn	Checked
KB	MB

Drawing Number	Revision
8990/P103	A

Saunders
Architecture + Urban Design
saundersarchitects.com | 01707 385300 | London | Manchester | Bristol | Welwyn

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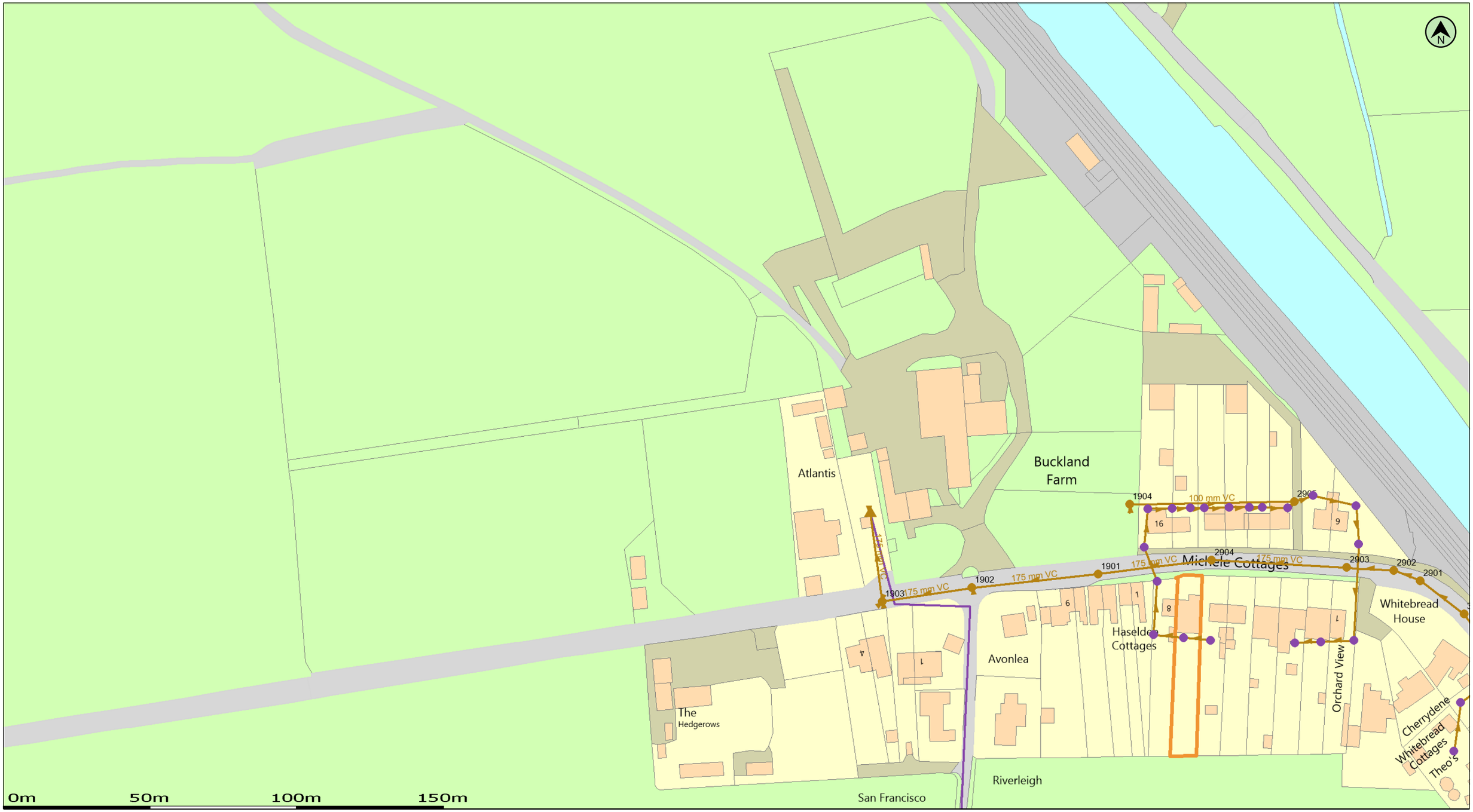
APPENDICES

APPENDIX C



Date: 14/03/25

Scale: 1:1250

Map Centre: 571054,172983

Data updated: 26/02/25

Our Ref: 1716756 - 1

Wastewater Plan A3
Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Foul Gravity Sewer
Combined Gravity Sewer
Culverted Water Course or Treated Effluent
Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon
Combined Outfall
Surface Water Outfall
Foul Outfall
Surface Water Inlet
Combined Pumping Station
Surface Water Pumping Station
Foul Pumping Station
WWTW Water Treatment Works
Section 104 Area
Building Over Agreement Area
Foul Manhole
Combined Manhole
Surface Water Manhole
Side Entry Manhole, Demarcation Chamber, Dummy Manhole or Surface Water Soakaway

emma.harris@m-ec.co.uk

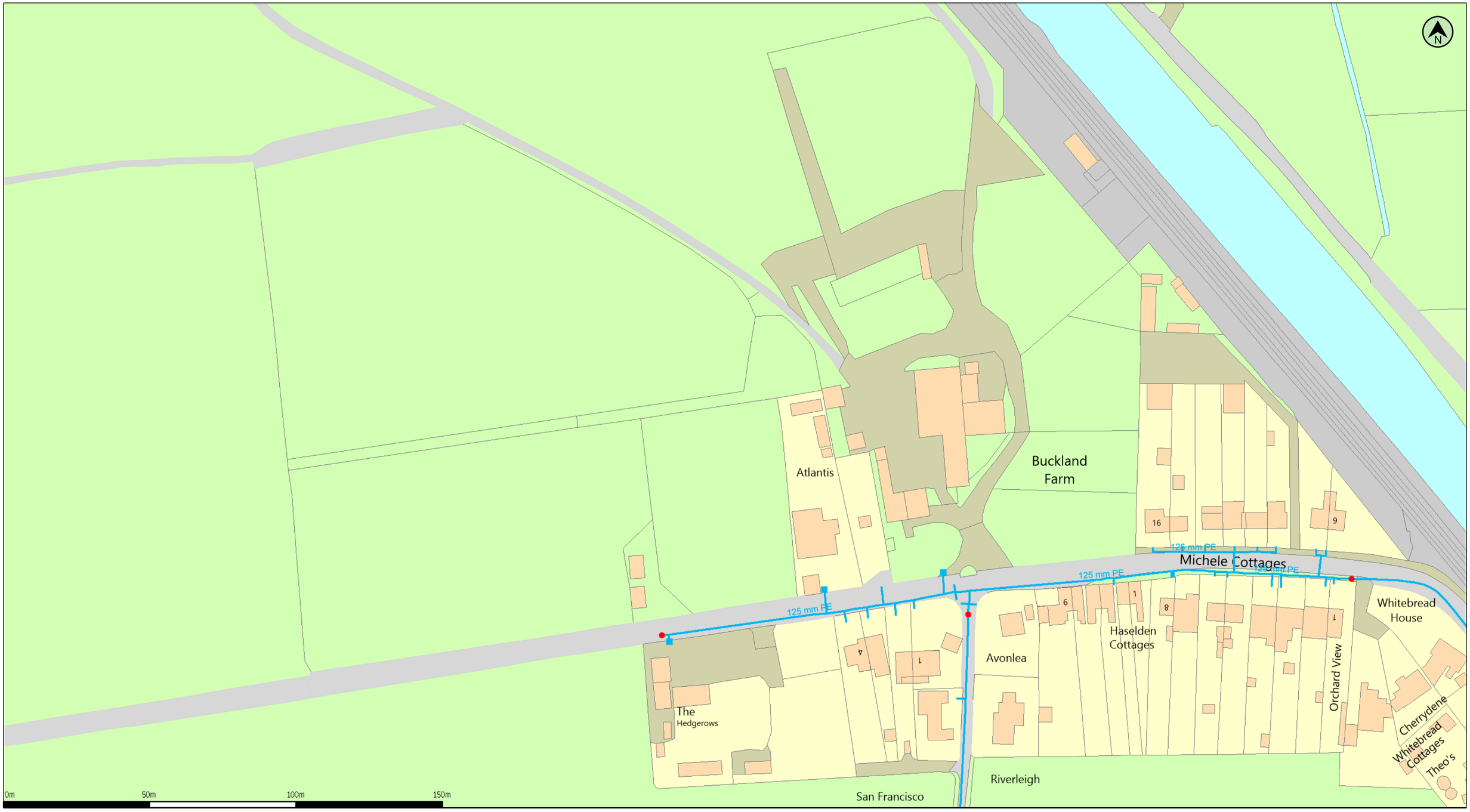
29524

WATER for LIFE from Southern Water

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
1901	F	7.46	5.90	
1902	F	7.32	5.66	
1903	F	7.36	4.63	
1904	F	0.00	0.00	
2901	F	7.85	0.00	
2902	F	0.00	0.00	
2903	F	7.54	6.18	
2904	F	7.60	6.01	
2905	F	0.00	0.00	
3901	F	8.09	6.59	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert



Date: 14/03/25

Scale: 1:1250

Map Centre: 571054,172983

Data updated: 26/02/25

Our Ref: 1716756 - 2

Clean Water Plan A3
Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Water Main
Proposed Main
Trunk Main
Non-potable Main
Abandoned Main
Water Hydrant
Water Meter
Water Valve

emma.harris@m-ec.co.uk

29524

WATER for LIFE
from Southern Water

from Southern Water

Emma Harris
The Old Chapel
Hugglescote
Leicestershire
LE67 2GB

Your ref
19603

Our ref
DSA000041866

Date
31 March 2025

Contact
Tel 0330 303 0119

Dear Mrs Harris,

Level 1 Capacity Check Enquiry: Chalk Road, Higham, Gravesham, ME3 7JY.

We have completed the capacity check for the above development site and the results are as follows:

Foul Water

The enquiry has been reassessed to determine the capacity available for 0.36 l/s at manhole reference TQ71721902 (Grid Reference: 571134, 172921).

There is currently inadequate capacity within the foul sewerage network to accommodate a foul flow of 0.36 l/s for the above development at manhole reference TQ71721902. The proposed development would increase flows to the public sewerage system which may increase the risk of flooding to existing properties and land. Additional off-site sewers or improvements to existing sewers will be required to provide sufficient capacity to service the development. Southern Water has a duty to provide Network capacity from the point of practical connection (point of equivalent or larger diameter pipe) funded by the New Infrastructure Charge.

Southern Water aim to provide this within 24 months following the date that planning has been granted for developments not identified as strategic sites in our current business plan. Strategic sites are larger developments and will often take longer than 24 months for a full solution to be provided.

The nearest point where capacity is currently available is at Whitewall Creek WwTW. Rights are not issued for a direct connection to Wastewater Treatment Works (WTW). Please note that connection to the WTW will have to be agreed by Southern Water Services before being carried out.

New Infrastructure Charging

Please note as of 1st April 2018 we have moved to the “New Connections Services Charging Arrangements”. We understand that this may cause uncertainty for customers, particularly where they may have already committed to a development based on previous charging arrangements. We have worked with our stakeholders and Water UK to agree a set of principles by which we will base our charges. Please read through our new charging arrangement documents available at the following link: Connecting Charging Arrangements - Southern Water

Alternatively, New Appointees and Variations (NAVs), also known as ‘inset’ companies, can provide new connection services or take ownership of the new water and wastewater connection

infrastructure provided for a new development. NAVs are appointed by Ofwat and replace the regional water company. It is for the developer to choose whether to use a NAV or the regional water company to supply services for new sites, according to certain legal criteria.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: developerservices.southernwater.co.uk

Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Please get in touch via the Get Connected customer dashboard if you have any queries.

Yours sincerely,

Future Growth Planning Team
Developer Services

southernwater.co.uk/developing-building/planning-your-development

from Southern Water

Emma Harris
The Old Chapel
Hugglescote
Leicestershire
LE67 2GB

Your ref
19602

Our ref
DSA000041865

Date
17 March 2025

Contact
Tel 0330 303 0119

Dear Mrs Harris,

Level 1 Capacity Check Enquiry: Chalk Road, Higham, Gravesham, ME3 7JY.

We have completed the pre-planning assessment for the above development site and the results are as follows:

Water Supply

The enquiry has been reassessed to determine the capacity available for 0.32 l/s at the 125mm PE main in Chalk Road, Grid Reference: 571050 , 172908.

There is currently adequate capacity at the 125mm PE main in Chalk Road to serve the development's water demand of 0.32l/s.

New Infrastructure Charging

Please note as of 1st April 2018 we have moved to the "New Connections Services Charging Arrangements". We understand that this may cause uncertainty for customers, particularly where they may have already committed to a development based on previous charging arrangements. We have worked with our stakeholders and Water UK to agree a set of principles by which we will base our charges. Please read through our new charging arrangement documents available at the following link: Connecting Charging Arrangements - Southern Water

Our charging arrangements also set out costs associated with a Water Main Requisition (S41), budgeting for new water supply connections (S45) and infrastructure charges.

If you are building multiple domestic or commercial properties on a site that will have new road access you will probably need a new water main. This main, and the services to each property, can either be laid by ourselves or by accredited self-lay providers (SLPs) under a Self-Lay (S51) application. We support mains laid by SLPs and adopt independently installed mains and services once they are commissioned.

If soil contamination is or was present at your site, we will require a copy of your soil report to enable us to assess any risks to the water supply network before a detailed design can be undertaken.

Alternatively, New Appointees and Variations (NAVs), also known as ‘inset’ companies, can provide new connection services or take ownership of the new water and wastewater connection infrastructure provided for a new development. NAVs are appointed by Ofwat and replace the regional water company. It is for the developer to choose whether to use a NAV or the regional water company to supply services for new sites, according to certain legal criteria.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing water network and does not grant approval for a connection to the public water supply. A formal Water Supply (S45) connection application, or Water Main Requisition (S41), Self-Lay (S51) or NAV application as appropriate, is required to be completed and approved by Southern Water Services. To make an application visit: developerservices.southernwater.co.uk

Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Please get in touch via the Get Connected customer dashboard if you have any queries.

Yours sincerely,

Future Growth Planning Team
Developer Services

southernwater.co.uk/developing-building/planning-your-development

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APPENDICES

APPENDIX D

National Gas Emergency Number: 0800 111 999*

*Available 24 hours, 7 days/week.
Calls may be recorded and monitored.
www.nationalgas.com

Asset Protection
National Gas Transmission
National Grid House
Warwick
CV34 6DA
Email: box.assetprotection@nationalgas.com
Tel: 0800 970 7000

Our Ref: 36526418 29524

Wednesday, 05 March 2025

Emma Harris
The Old chapel Station road
Hugglescote
LEC
LE67 2GB

National Gas Transmission – High Risk Response Letter

Dear Sir/ Madam,

An assessment has been carried out with respect to National Gas Transmission plc's apparatus and the proposed work location. Based on the location entered into the system for assessment the area has been found to be within the High Risk zone from National Gas Transmission plc's apparatus and you **MUST NOT PROCEED** without further assessment from Asset Protection.

Before you go ahead with these works, you are required to send your plans and a description for us to review them at box.assetprotection@nationalgas.com. We will contact you within 28 days of receipt.

It is **YOUR** responsibility to take into account whether you are required to or would benefit from referring to the HSE Land Use Planning App (LUP), available from HSE's website. (Please note for some works this is a requirement for them to take place) More information on the LUP is available at https://www.hse.gov.uk/landuseplanning/

Please note this response and any attached map(s) are valid for 28 days.

Yours sincerely

Asset Protection Team

Your Responsibilities and Obligations

The "Assessment" Section below outlines the detailed requirements that must be followed when planning or undertaking your activities at this location.

It is your responsibility to ensure that the information you have submitted is accurate and that all relevant documents including links are provided to all persons (either direct labour or contractors) working for you near National Gas Transmission plc's apparatus, e.g. as contained within the Construction (Design and Management) Regulations.

This assessment solely relates to National Gas Transmission plc (NGT)

This assessment does **NOT** include:

- National Gas Transmission's legal interest (easements or wayleaves) in the land which restricts activity in proximity to National Gas Transmission's assets in private land. You must obtain details of any such restrictions from the landowner in the first instance and if in doubt contact Asset Protection.
- Recently installed apparatus.
- Apparatus owned by other organisations, e.g. Cadent, National Grid Electricity Transmission plc, other gas distribution operators, local electricity companies, other utilities, etc.

It is **YOUR** responsibility to take into account whether the items listed above may be present and if they could be affected by your proposed activities.

This communication does not constitute any formal agreement or consent for any proposed development work; either generally or with regard to National Gas Transmission plc easements or wayleaves nor any planning or building regulations applications.

National Gas Transmission plc or their agents, servants or contractors do not accept any liability for any losses arising under or in connection with this information. This limit on liability applies to all and any claims in contract, tort (including negligence), misrepresentation (excluding fraudulent misrepresentation), breach of statutory duty or otherwise. This limit on liability does not exclude or restrict liability where prohibited by the law nor does it supersede the express terms of any related agreements.

If you require further assistance please contact the Asset Protection team via e-mail (box.assetprotection@nationalgas.com) or via the contact details at the top of this response.

Are My Works Affected?

Is your proposal an Information Only or Planned Works Application?

Information Only

As your works are at an "Information Only" stage, any maps and guidance provided are for information purposes only. This is not approval to commence work. You must submit a "Planned Works" enquiry at the earliest opportunity and failure to do this may lead to disruption to your plans and works. Asset Protection will endeavour to provide an initial assessment within 28 days of receipt of a Planned Works enquiry and, dependent on the outcome of this, further consultation may be required. In any event, for safety and legal reasons, works must not be carried out until a Planned Works enquiry has been completed and final response received.

Planned Works

Your proposal is in proximity of National Gas Transmission plc's apparatus, as shown on the attached map, which may impact, and possibly prevent, your proposed activities for safety and/or legal reasons.

You must not commence any work until you have sent details to us at box.assetprotection@nationalgas.com and have received a response back confirming that we have no objections to the work taking place. You must read and follow all the guidance provided when planning or undertaking any activities at this location.

We will contact you within 28 working days of you providing us with the details of your work at the email address above. Please email, or call us at 0800 970 7000, if you have not had a response within this time frame.

Assessment

Affected Apparatus
The apparatus that has been identified as being in the vicinity of your proposed works is:

- National Gas Transmission Pipelines and associated equipment

Requirements

National High Pressure Gas Pipelines

BEFORE carrying out any work you must:

- Ensure that no works are undertaken in the vicinity of our gas pipelines and that no heavy plant, machinery or vehicles cross the route of the pipeline until detailed consultation has taken place.
- Carefully read these requirements including the attached guidance documents and maps showing the location of apparatus.
- Contact the landowner and ensure any proposed works in private land do not infringe National Gas Transmission's legal rights (i.e. easements or wayleaves). If the works are in the road or footpath the relevant local authority should be contacted.
- Ensure that all persons, including direct labour and contractors, working for you on or near National Gas Transmission's apparatus follow the requirements of the HSE Guidance Notes HSG47 - 'Avoiding Danger from Underground Services' This guidance can be downloaded free of charge at http://www.hse.gov.uk
- In line with the above guidance, verify and establish the actual position of mains, pipes, cables, services and other apparatus on site before any activities are undertaken.

DURING any work you must:

- Ensure that the National Gas Transmission requirements are followed for work in the vicinity of High pressure pipelines including the supervision of the digging of trial holes.
- Comply with all guidance relating to general activities and any specific guidance for each asset type as specified in the Guidance Section below.
- Ensure that access to National Gas Transmission apparatus is maintained at all times.
- Prevent the placing of heavy construction plant, equipment, materials or the passage of heavy vehicles over National Gas Transmission apparatus unless specifically agreed with National Gas Transmission in advance.
- Exercise extreme caution if slab (mass) concrete is encountered during excavation works as this may be protecting or supporting National Gas Transmission apparatus.
- Maintain appropriate clearances between gas apparatus and the position of other buried plant.

GUIDANCE

National Gas Transmission Network data

The Network map for National Gas Transmission assets can be downloaded at the following link in GIS format.
www.nationalgas.com/land-and-assets/network-route-maps

High Pressure Gas Pipelines Guidance:
If working in the vicinity of a high pressure gas pipeline the following document must be followed: 'Specification for Safe Working in the Vicinity of National Gas Transmission High Pressure Gas Pipelines and Associated Installation – Requirements for Third Parties' (SSW22). This can be obtained from:
<Link to SSW22 once it has been updated and signed off>

Essential Guidance document:
https://www.nationalgas.com/sites/gas/files/documents/8589934982-Essential%20Guidance.pdf

You should be aware of the following information regarding National Gas Transmission's high pressure underground pipelines and associated apparatus:

- Our underground pipelines are protected by permanent agreements with landowners or have been laid in the public highway under our licence. These grant us legal rights that enable us to achieve efficient and reliable operation, maintenance, repair and refurbishment of our gas transmission network. Hence we require that no permanent structures are built over or under pipelines or within the zone specified in the agreement, materials or soil are not stacked or stored on top of the pipeline route and that unrestricted and safe access to any of our pipeline(s) must be maintained at all times.

- The information supplied is given in good faith and only as a guide to the location of our underground pipelines. The accuracy of this information cannot be guaranteed. The physical presence of such pipelines may also be evident from pipeline marker posts. The person(s) responsible for planning, supervising and carrying out work in proximity to our pipeline(s) shall be liable to us, as pipeline(s) owner, as well as to any third party who may be affected in any way by any loss or damage resulting from their failure to locate and avoid any damage to such a pipeline(s).

- The relevant guidance in relation to working safely near to existing underground pipelines is contained within the Health and Safety Executive's (www.hse.gov.uk) Guidance HS(G)47 "Avoiding Danger From Underground Services" and all relevant site staff should make sure that they are both aware of and understand this guidance.

- Our pipelines are normally buried to a depth of 1.2 metres or more below ground and further information may be found on the plans provided. Ground cover above our pipelines should not be reduced or increased.

- Any proposed cable crossings are subject to approval from National Gas Transmission, completion of a Deed of Consent and must remain a minimum of 600mm above or below the pipeline. All works associated with cable installation must be supervised by National Gas Transmission. Cables cannot be pulled through until a Deed of Consent is in place.

- If it is planned to use mechanical excavators and any other powered mechanical plant, it shall not be sited or moved above the pipeline.

- If it is planned to carry out excavation to a depth greater than 0.3 metres, embankment or dredging works, the actual position and depth of the pipeline must be established on site with our representative

and a safe working method agreed prior to any work taking place in order to minimise the risk of damage and ensure the final depth of cover does not affect the integrity of the pipeline.

- The digging of trial holes to locate the pipeline must be carried out under the supervision of our on-site representative following approval of RAMS. Excavation works may take place unsupervised no closer than 3 metres from the pipeline once its actual location has been confirmed. Similarly, excavation with handheld power tools may take place no closer than 1.5 metres away.

- For operational and safety reasons National Gas Transmission requires unrestricted access to our Above Ground Installations and Compressor Stations. We would request that any proposed changes to roads/layouts in the vicinity of our site have regard to the need to maintain access.

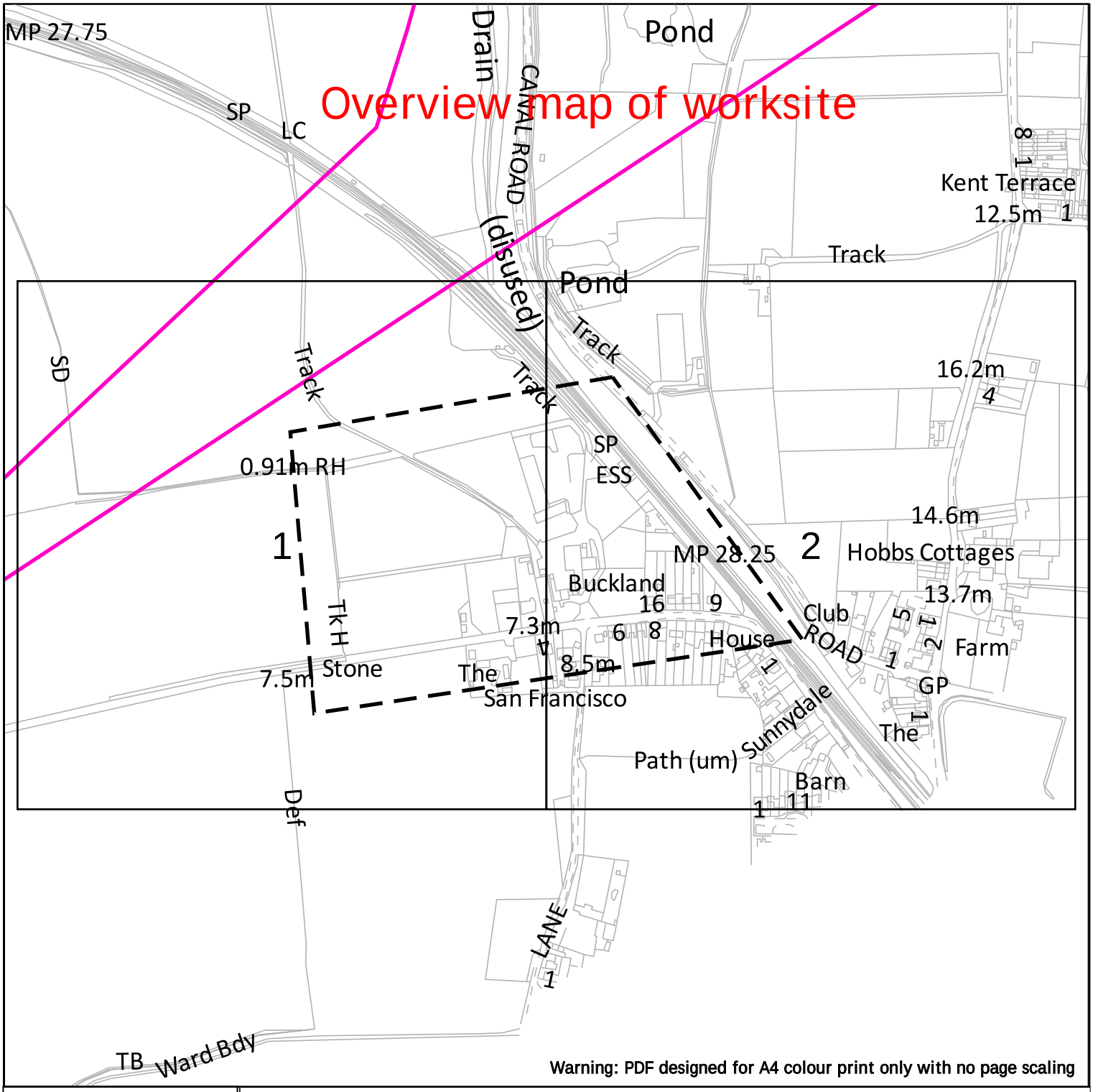
- Any construction traffic should either cross the pipeline using existing roads or at agreed crossing locations using agreed protective measures.

- Ground anchors for scaffolding stay wires should only be sited in the vicinity of the pipeline after the pipeline position has been confirmed on site with our representative and the ground anchor position agreed.

- If your proposals include the installation of wind turbines then the minimum separation between the pipeline and the nearest turbine should be 1.5 times the mast height.

- If your proposals include the installation of a Solar Farm, all assets must remain outside of the National Gas Transmission easement, all cable crossings must be agreed during the design stage, a Deed of Consent undertaken and an Earthing report must be provided for review. National Gas Transmission must retain access to its assets at all times once works have been completed.

The relocation of existing underground pipelines is not normally feasible on grounds of cost, operation and maintenance and environmental impact. Further details can be found in our specification for: safe working in the vicinity of National Gas Transmission high pressure gas pipelines and associated installations – requirements for third parties: T/SP/SSW/22 (see link above or copy enclosed)



Warning: PDF designed for A4 colour print only with no page scaling

national gas transmission

Dig Sites Area: Line:

NHP Mains

National Gas Transmission
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

box.assetprotection@nationalgas.com

Date Requested: 05/03/2025
Job Reference: 36526418
Site Location: 571066 173004
Requested by: Mrs Emma Harris

Your Scheme/Reference: 29524

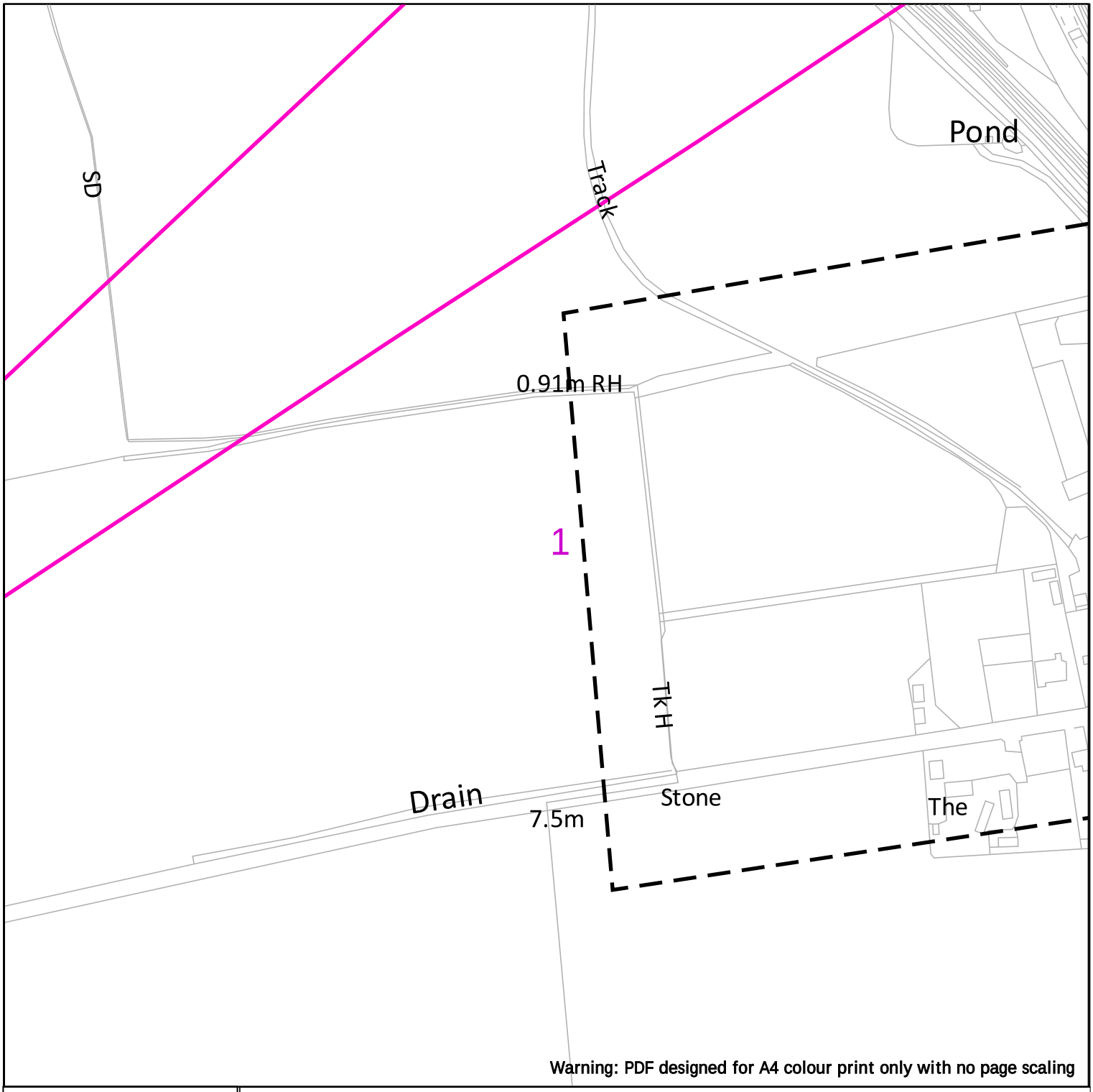
Scale: 1:5125 (When plotted at A4)

IMPORTANT NOTICES

This plan shows those pipes owned by National Gas Transmission PLC in its role as a licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regards to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc., are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Gas Transmission PLC or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before e any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

National Gas Transmission Emergency Number: 0800 111 999

Available 24 hours, 7 days/week. Calls may be recorded and monitored



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national gas transmission

National Gas Transmission
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

box.assetprotection@nationalgas.com

100m

Dig Sites Area: Line:

NHP Mains

Date Requested: 05/03/2025
Job Reference: 36526418
Site Location: 571066 173004
Requested by: Mrs Emma Harris

Your Scheme/Reference: 29524

Scale: 1:2500 (When plotted at A4)

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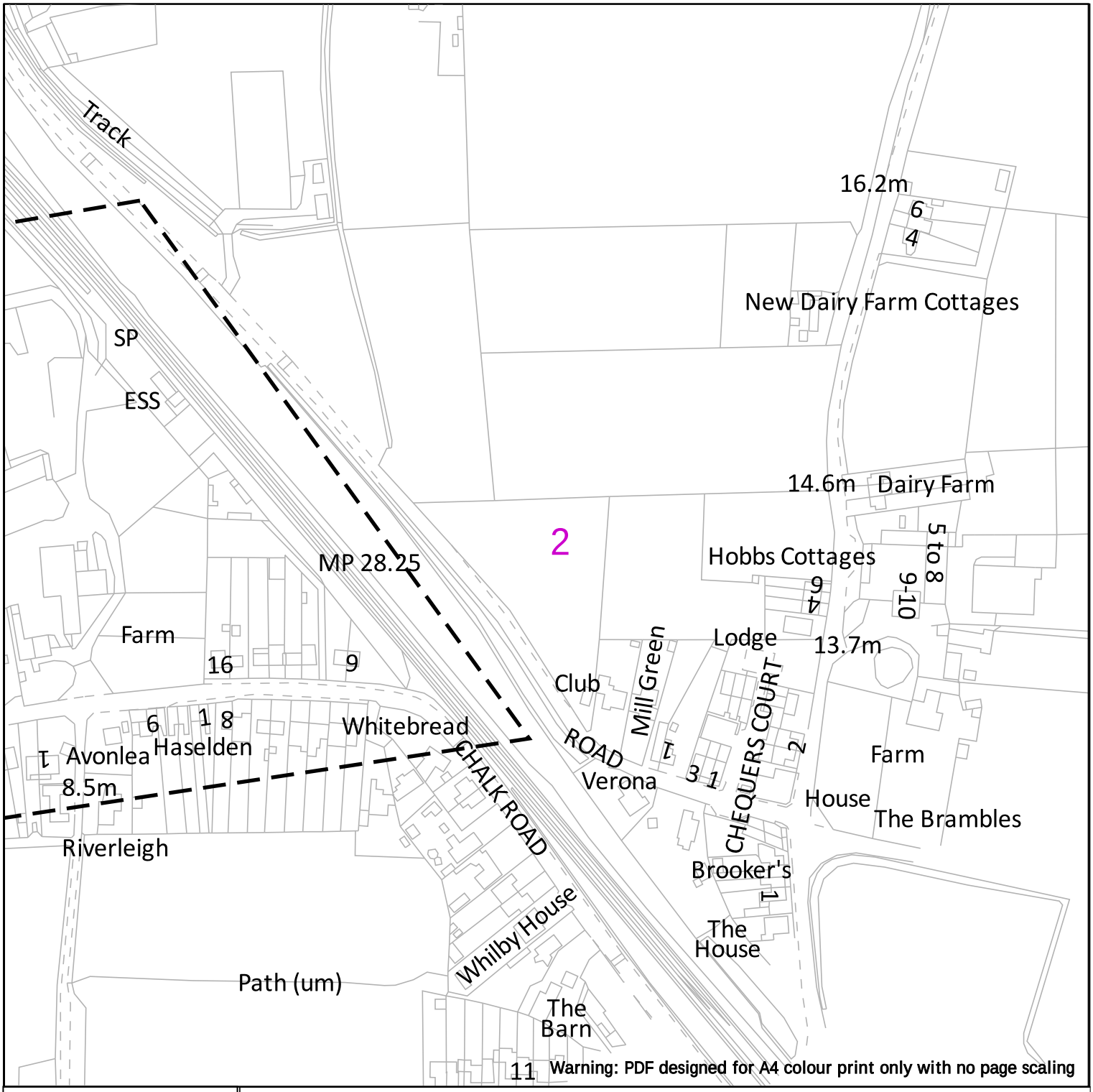

national gas transmission

100m

Dig Sites Area: Line:

NHP Mains

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National Gas Transmission Emergency Number: 0800 111 999

Available 24 hours, 7 days/week. Calls may be recorded and monitored

ENQUIRY SUMMARY

Received Date
05/03/2025 19:00

Work Start Date
06/03/2025

Your Reference
29524

Location
Centre Point: 571066 173004
X Extent:
Y Extent:
Postcode: ME3 7JX

Map Options
Paper Size: A4
Orientation: PORTRAIT
Scale: 1:2500
Real World Extents: 483m x 317m

Enquirer Details
Organisation Name: M-EC Consulting Group Ltd
Contact Name: Emma Harris
Email Address: emma.harris@m-ec.co.uk
Telephone: 01530 264753 / Not Supplied
Address: The Old chapel Station road, Hugglescote, LEC, LE67 2GB

Enquiry Type
Information Only

Activity Type
Development Projects

Work Types
Housing

Notes/Works Description (if supplied)

Site Contact Name (if supplied)

Site Contact Number (if supplied)

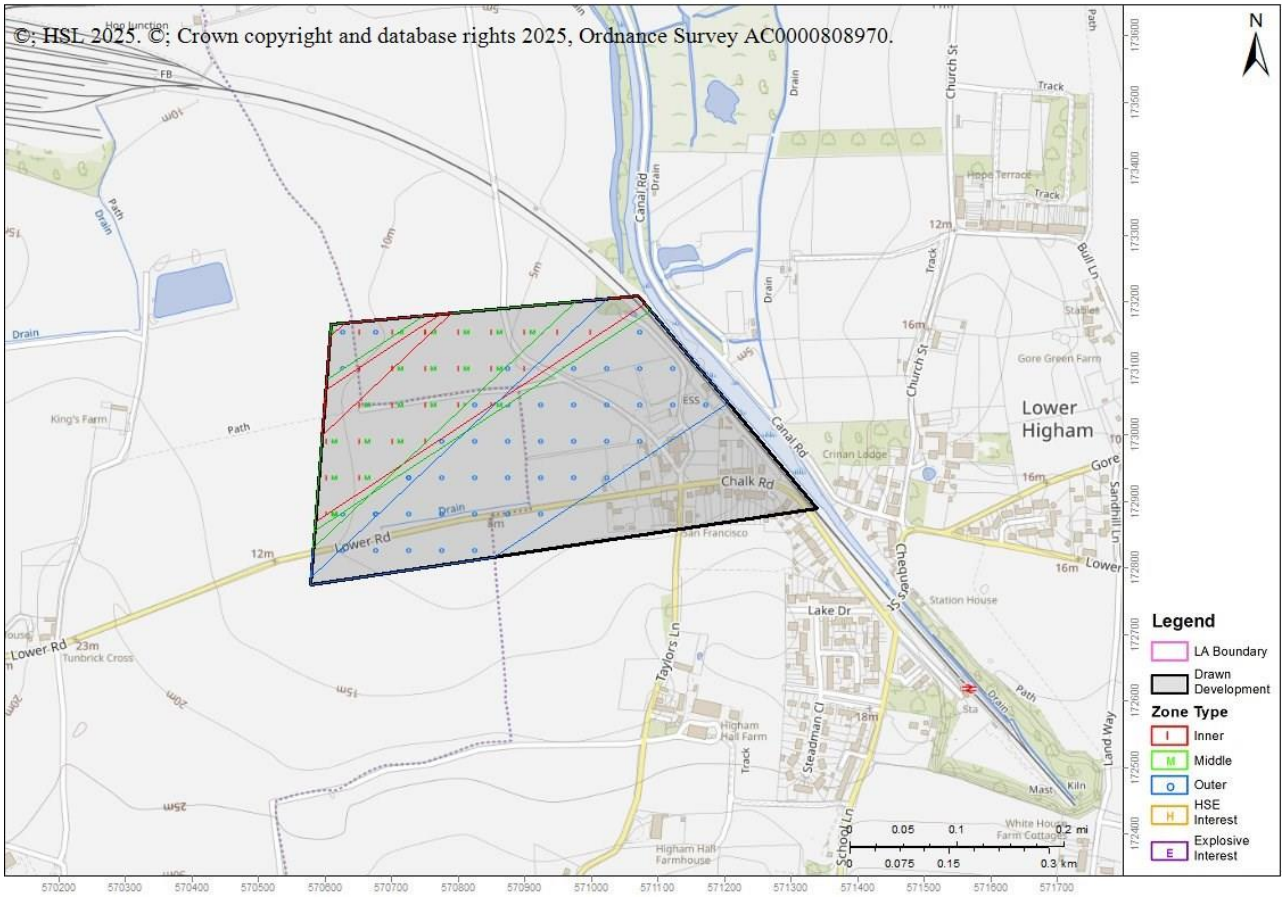
Wellington House, Leicester Road, Ibstock, Leicestershire LE67 6HP

Health and Safety Executive

Advice : HSL-250306091238-630 Crosses Consultation Zone

Please enter further details about the proposed development by continuing with the enquiry on the HSE's Planning Advice Web App from the Previous Enquiries tab either now or at a later time, unless the Web App has stopped the process and notified you to contact HSE.

Your Ref: 29524
Development Name: Chalk Road, Higham
Comments:



The proposed development site which you have identified currently lies within the consultation distance (CD) of at least one major hazard site and/or major accident hazard pipeline; HSE needs to be consulted on any developments on this site.

This advice report has been generated using information supplied by Emma Harris at Mewies Engineering Consultants Ltd on 06 March 2025.

You will also need to contact the pipeline operator as they may have additional constraints on development near their pipeline.

- 4057584_2786 National Gas
- 7095_1367 National Gas

HSL/HSE accepts no liability for the accuracy of the pipeline routing data received from a 3rd party. HSE/HSL also accepts no liability if you do not consult with the pipeline operator.

You may wish to contact HSE's Planning Advice team to discuss the above enquiry result on 0203 028 3708 or by email at lupenquiries@hse.gov.uk.

Emma Harris

From: LUP enquiries <LUPenquiries@hse.gov.uk>
Sent: 10 March 2025 12:12
To: Emma Harris
Subject: Re: 29524 - Chalk Road, Higham

Thank you for your enquiry regarding Chalk Road, Higham.

HSE is a statutory consultee for certain developments within the consultation distance of major hazard sites and major accident hazard pipelines.

I have had a look at the information you have provided and there are HSE Consultation zones for Major Accident Hazard Pipelines that affect your proposed development.

The details for the Major Accident Hazard Pipelines and their associated HSE zones are:
Name: **18 Feeder Isle of Grain/Gravesend**
HSE Ref: **4057584**
Transco Ref: **2786**
Operator: **National Gas**
HSE Consultation Zones
Inner Zone (in metres): **78**
Middle Zone (in metres): **90**
Outer Zone (in metres): **270**

Name: **5 Feeder Shorne / Isle of Grain**
HSE Ref: **7095**
Transco Ref: **1367**
Operator: **National Gas**
HSE Consultation Zones
Inner Zone (in metres): **50**
Middle Zone (in metres): **165**
Outer Zone (in metres): **195**

These distances apply on either side of the pipeline. All distances should be measured from the centre of the pipeline. Where consultation distances coincide, the inner-most zone is used to determine HSE's Land Use Planning Advice.

Please contact the operator for any constraints they may have around the pipeline, and for a map showing the pipeline route. Please note that we only have indicative maps for the pipeline routes. If you wish to know the exact layout of the pipelines you will need to contact the pipeline operator.

HSE's Land Use Planning advice is based on an assessment of the risks from the pipeline as originally notified to HSE.

You may wish to consider contacting the pipeline operator to see if the pipeline has been modified in this area; if it has, then HSE is willing to reassess the risks from the pipeline (there may be additional costs for this), relative to the proposed development, if all the following details are supplied:

a) pipeline diameter, b) wall thickness, c) grade of steel, d) depth of cover over pipeline, e) start and finish points of thick-walled sections (this is not required if it is confirmed that they are more than 750m from all

parts of the proposed development site. Please note that reassessment(s) may incur charges under our Option 3 consultancy services.

There is also further information on HSE's land use planning here: www.HSE.gov.uk/landuseplanning/

If you require any further help please contact us.

Regards

Sue Howe

HSE's Land Use Planning Support Team
Health and Safety Executive | Chemicals, Explosives and Microbiological Division 5
lupenquiries@hse.gov.uk

From: Emma Harris <emma.harris@m-ec.co.uk>
Sent: 06 March 2025 09:16
To: LUP enquiries <LUPenquiries@hse.gov.uk>
Subject: 29524 - Chalk Road, Higham

Hi,

We are involved in a project at Chalk Road, Higham, ME3 7JY (571054, 172983).

Could you please advise of the HSE easements required for the attached?

Kind Regards,

EMMA HARRIS
Utilities Coordinator

Birmingham | Brighton | Leicester

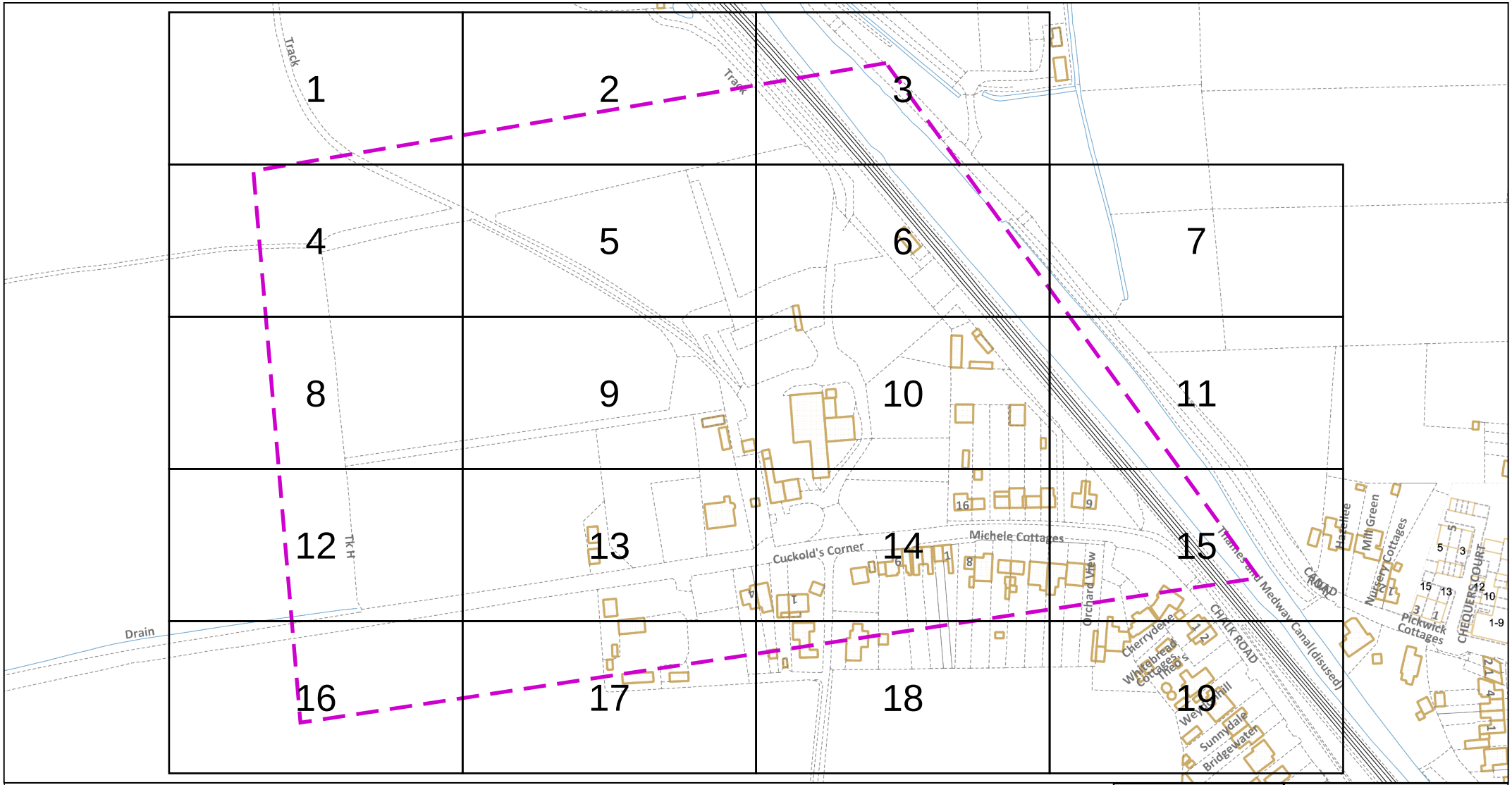
MEC Consulting Group

T: 01530 264 753
E: emma.harris@m-ec.co.uk
W: m-ec.co.uk
Follow us:

MEC
Consulting Group

APPENDICES

APPENDIX E



Dig Sites Area: Line:

The quality and accuracy of any print will depend on your printer, your computer and its print settings. Measurements scaled from this plan may not match measurements between the same points on the ground.

This plan must be used with the attached 'Symbols' document.

Date Requested: 10/03/2025
Job Reference: 36526418
Site Location: 570857 172837
Requested by:
Mrs Emma Harris
Your Scheme/Reference: 29524

Scale: 1:2563 (When plotted at A4)

1. The position of the apparatus shown on this drawing is believed to be correct but the original landmarks may have been altered since the apparatus was installed.
2. The exact position of the apparatus should be verified - use approved cable avoidance tools prior to excavation using suitable hand tools.
3. It is essential that trial holes are carefully made avoiding the use of mechanical tools or picks until the exact location of all the cables have been determined.
4. It must be assumed that there is a service cable into each property, lamp column and street sign, etc.
5. All cables must be treated as being live unless proved otherwise by UK Power Networks.
6. The information proved must be given to all people working near UK Power Networks plant and equipment. Do not use plans more than 3 months after the issue date for excavation purposes.
7. Please be aware that electric cables/lines belonging to other owners of licensed electricity distribution systems may be present and it is your responsibility to identify their location.
8. Please be aware the Low Voltage Overhead power lines are not currently displayed for the Eastern Region via this service, if you require records on the location of these please contact our Plan Provision team directly via plans@ukpowernetworks.co.uk.

1. UK Power Networks does not warrant that the information provided to you is correct. You rely upon it at your own risk.
2. UK Power Networks does not exclude or limit its liability if it causes the death of any persons or causes personal injury to a person.
3. Subject to paragraph 2 UK Power Networks has no liability to you in contract, in tort (including negligence), for breach of statutory duty or otherwise for any loss, damage, cost, claims, demands, or expenses that you or any third party may suffer or incur as a result of using the information provided whether for physical damage to property or for any economic loss (including without limitation loss of profit, loss of opportunity, loss of savings, loss of goodwill, loss of business, loss of use) or any special or consequential loss or damage whatsoever.
4. This plan has been provided to you on the basis of the terms of use set out in the covering letter that accompanies this plan. If you do not accept and/or do not understand the terms of use set out in the covering letter you must not use the plan and must return it to the sender of the letter.
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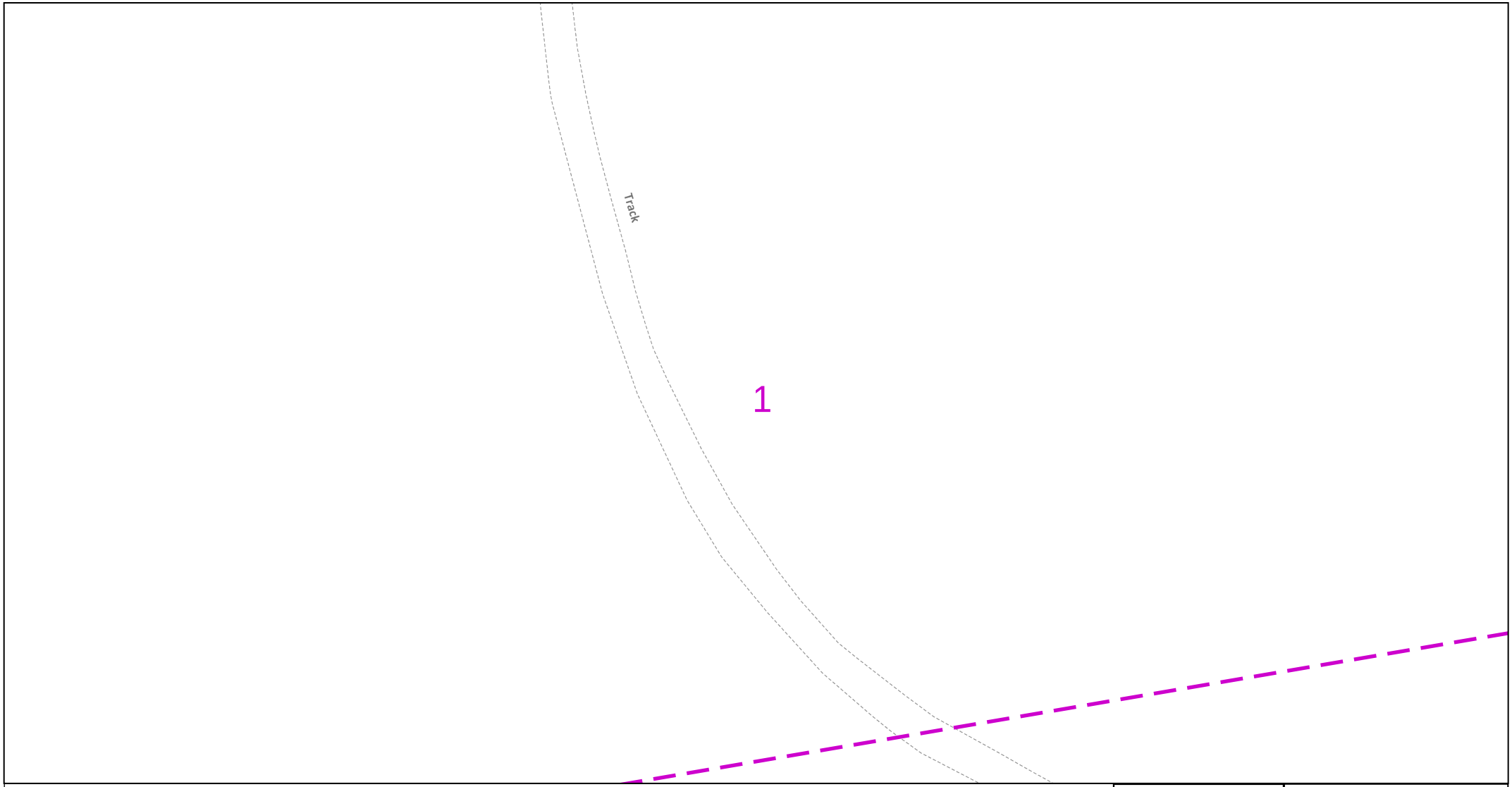
UK Power Networks

IF IN DOUBT - ASK! PHONE
0800 056 5866
EMERGENCY - If you damage a cable or line
Phone 0800 783 8838 (24hrs)
URGENTLY

ALWAYS LOOK UP BEFORE YOU START WORK
Refer to HSE Guidance note GS6

Maps produced at 1:2500 scale are Geo-Schematics which show LV mains cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.



0 12.5 25
metres

Dig Sites Area: Line:

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Date Requested: 10/03/2025
Job Reference: 36526418
Site Location: 570857 172837
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Your Scheme/Reference: 29524

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N W E S

UK Power Networks

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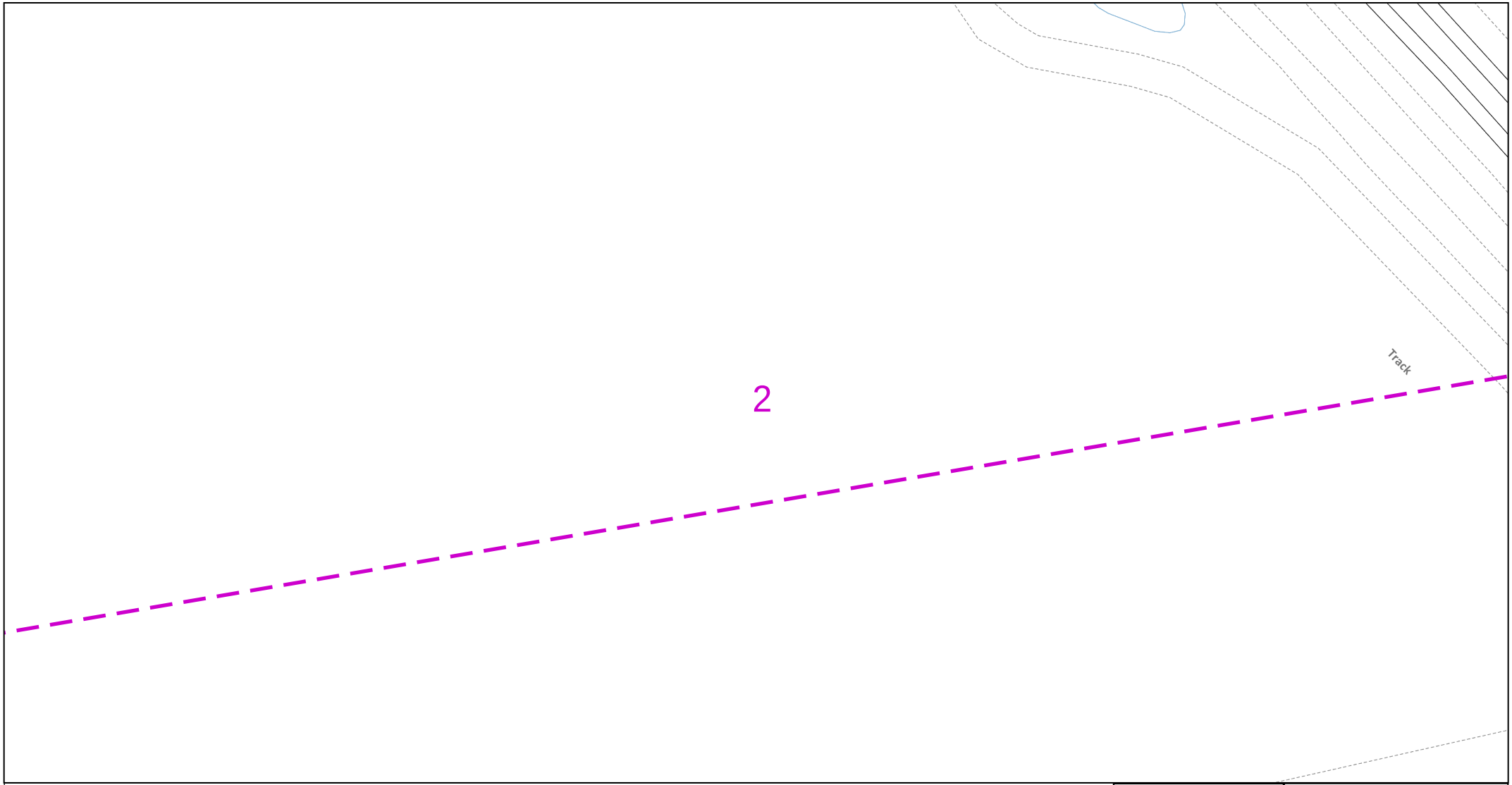

0 12.5 25
metres

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N
W E
S

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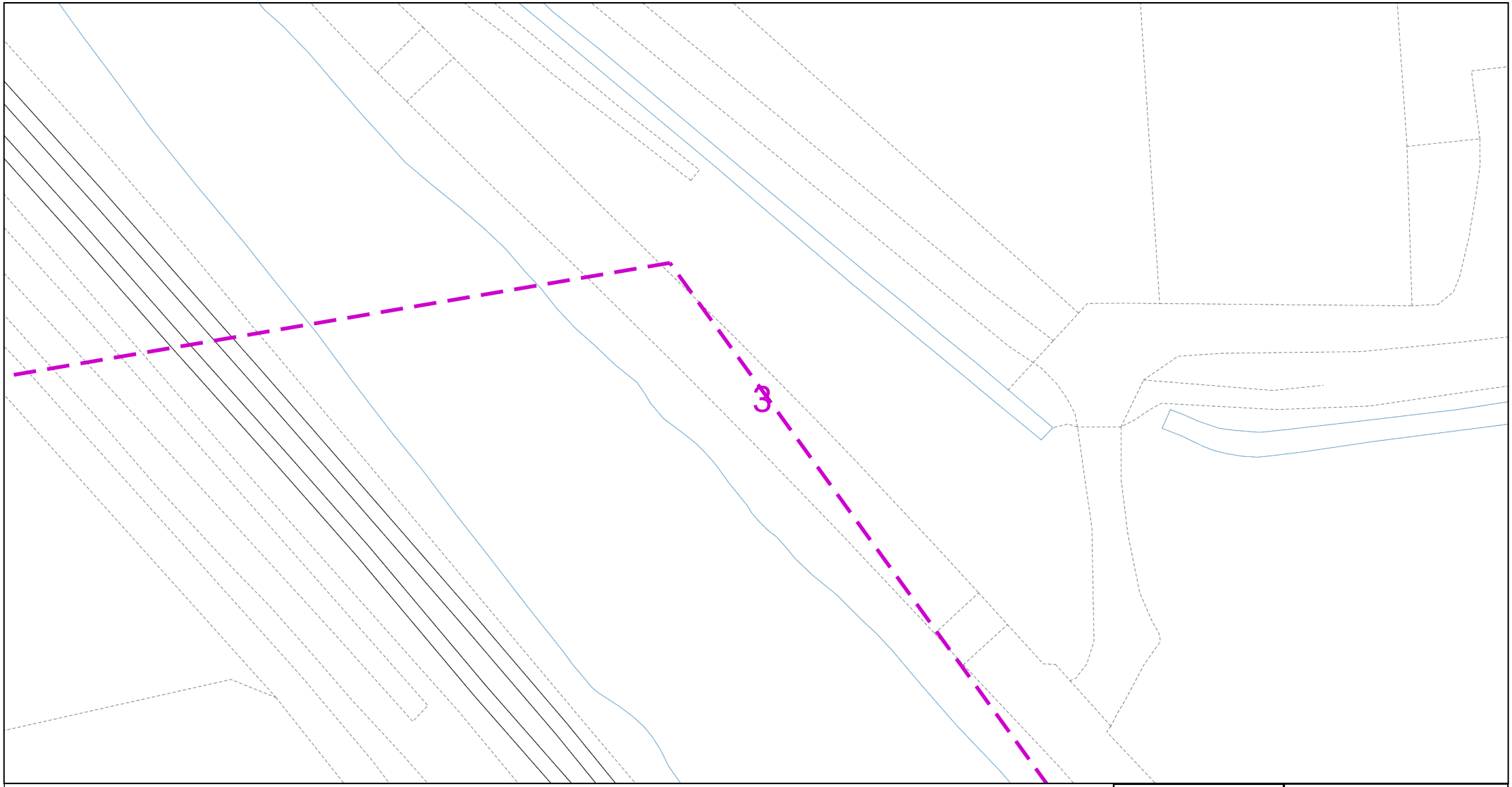

0 12.5 25
metres

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Date Requested: 10/03/2025
Job Reference: 36526418
Site Location: 570857 172837
Requested by: Mrs Emma Harris

Your Scheme/Reference: 29524

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N
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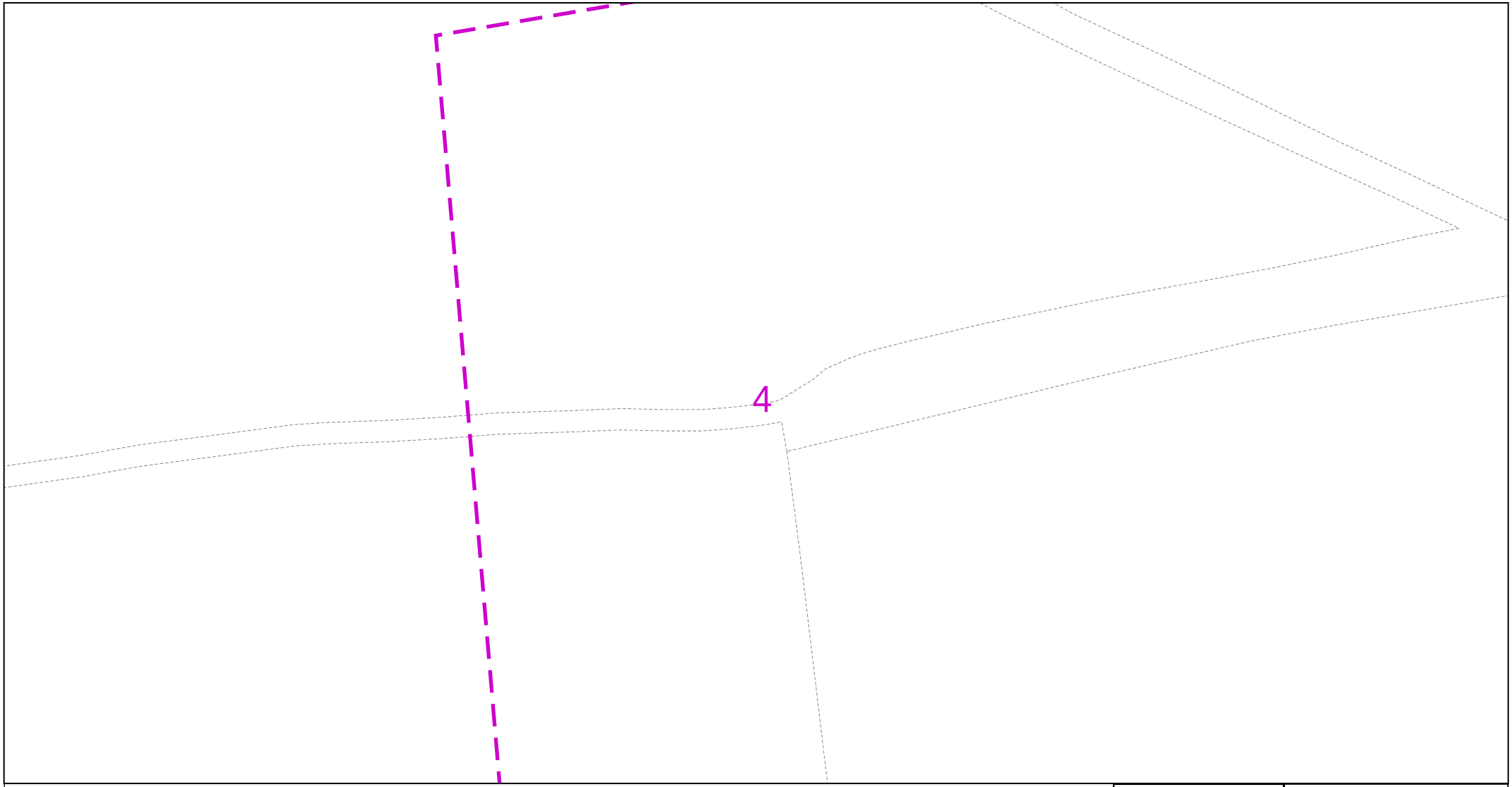

0 12.5 25
metres

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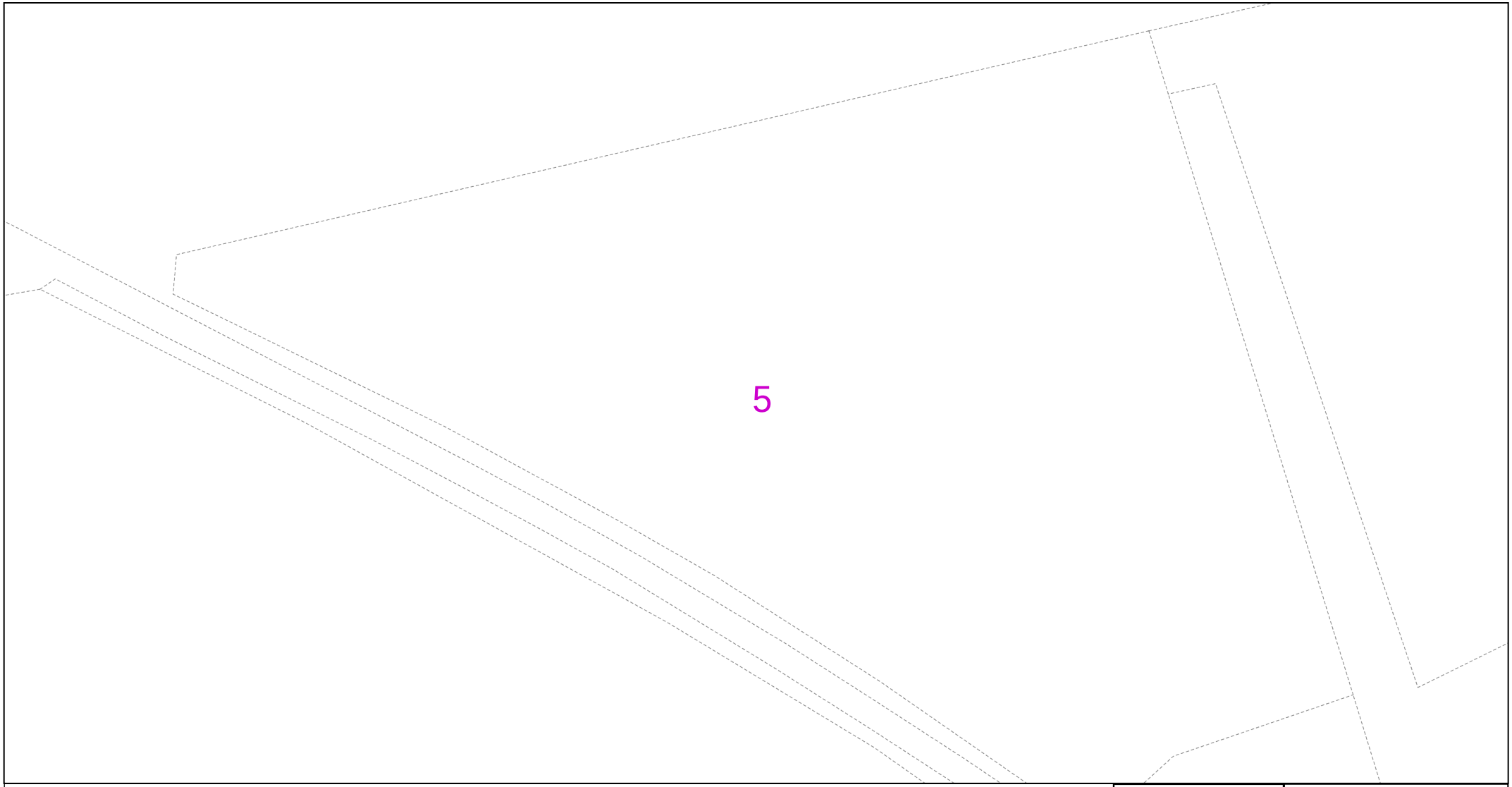

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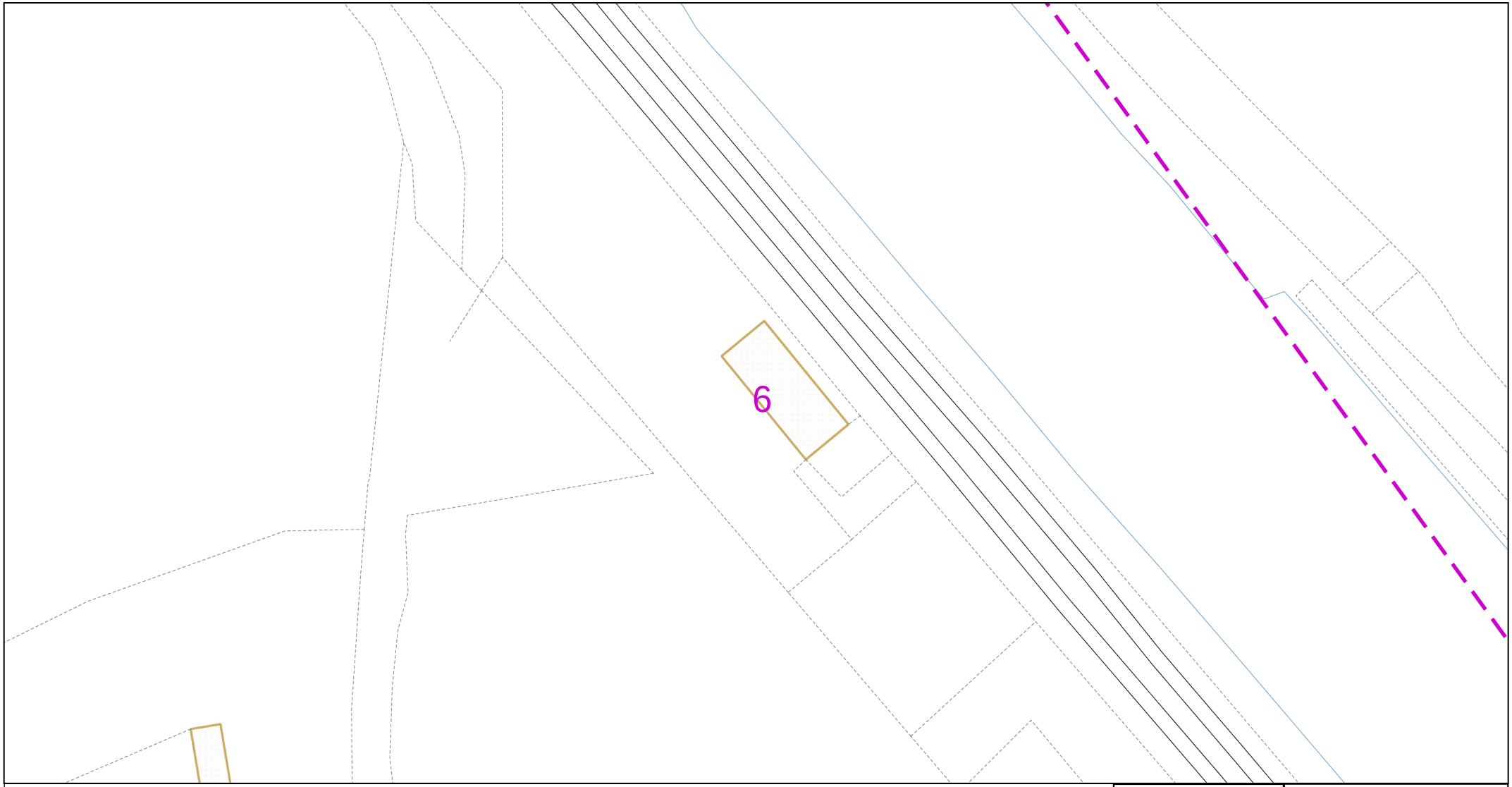

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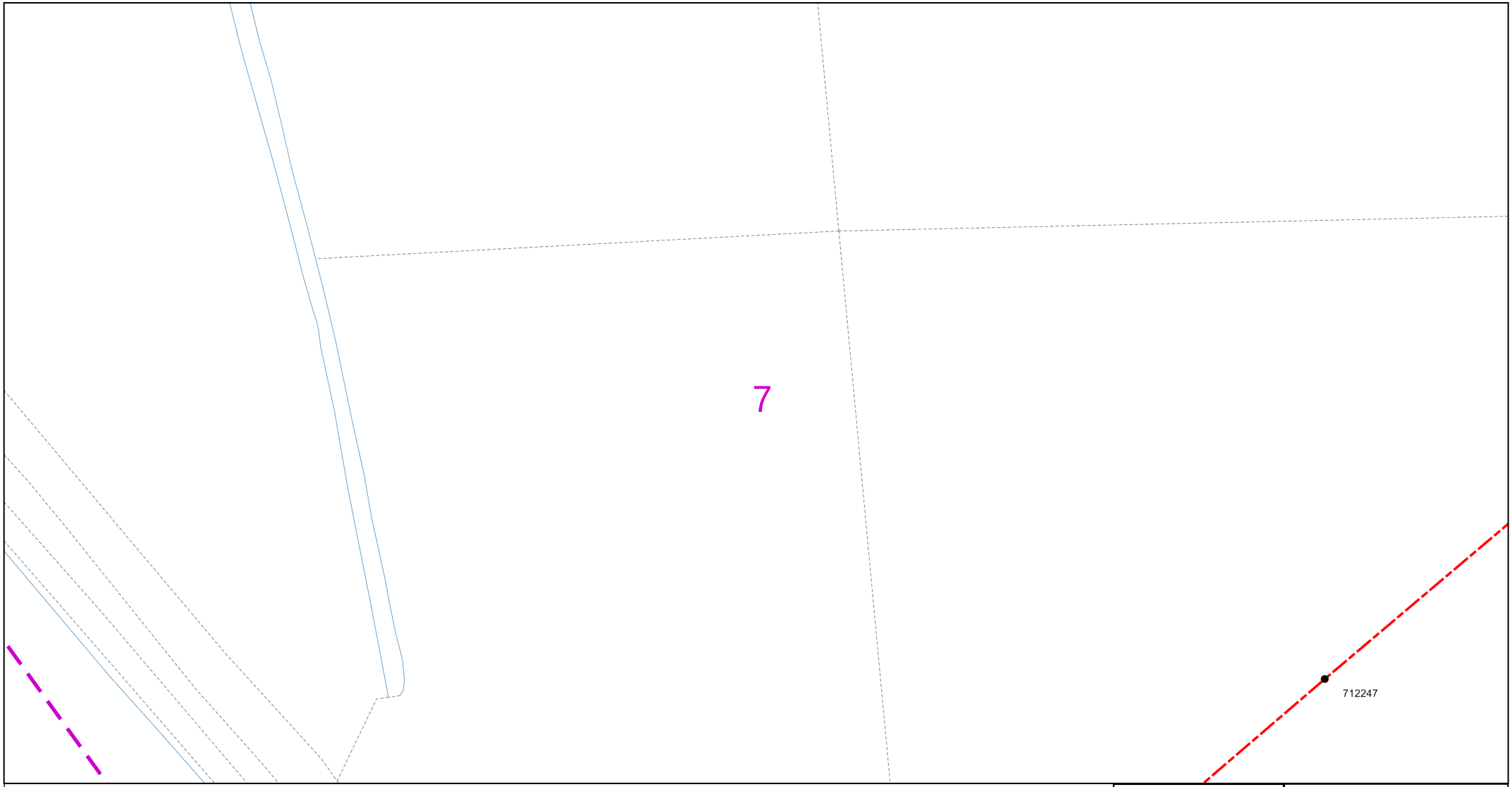

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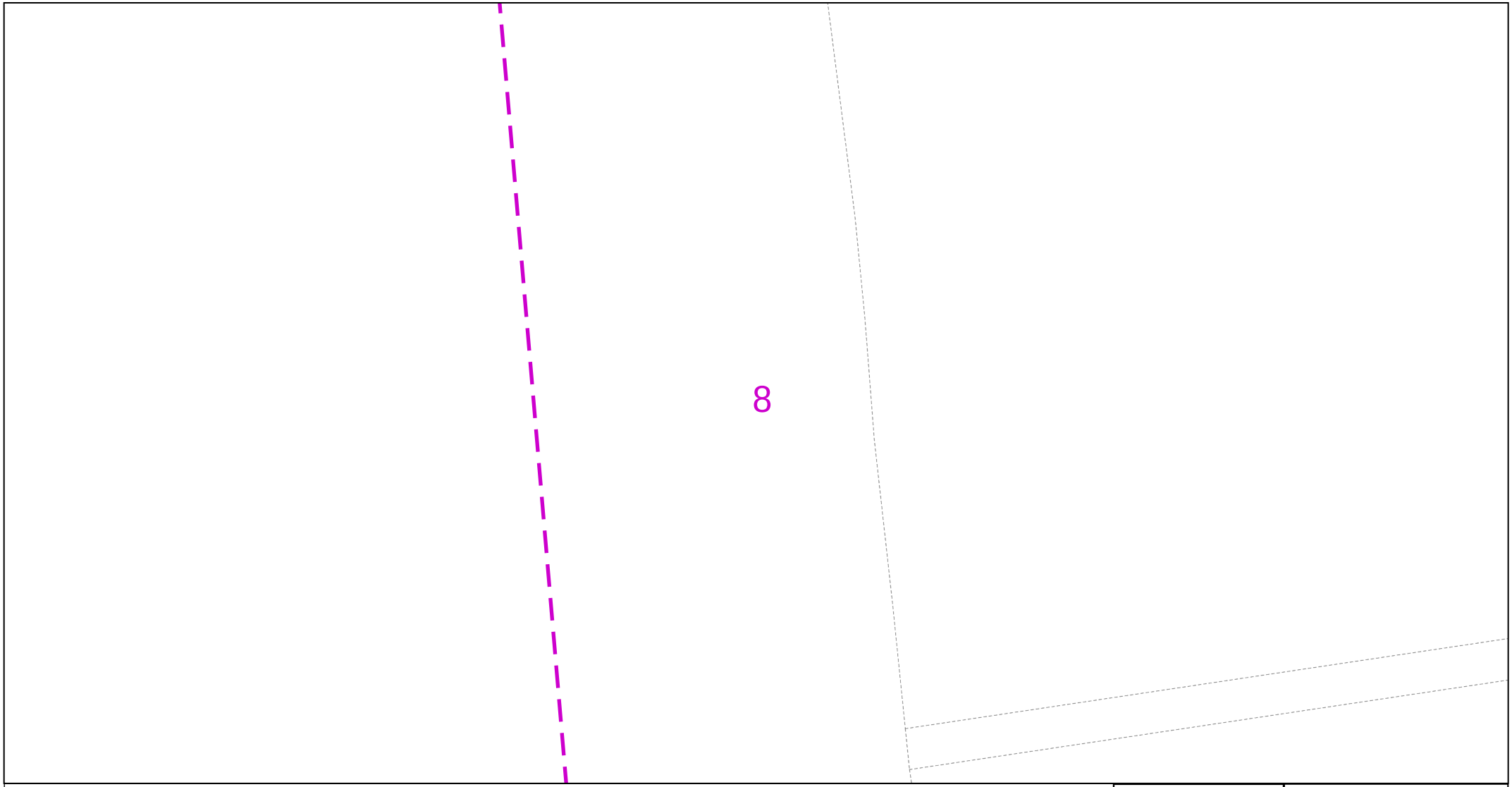

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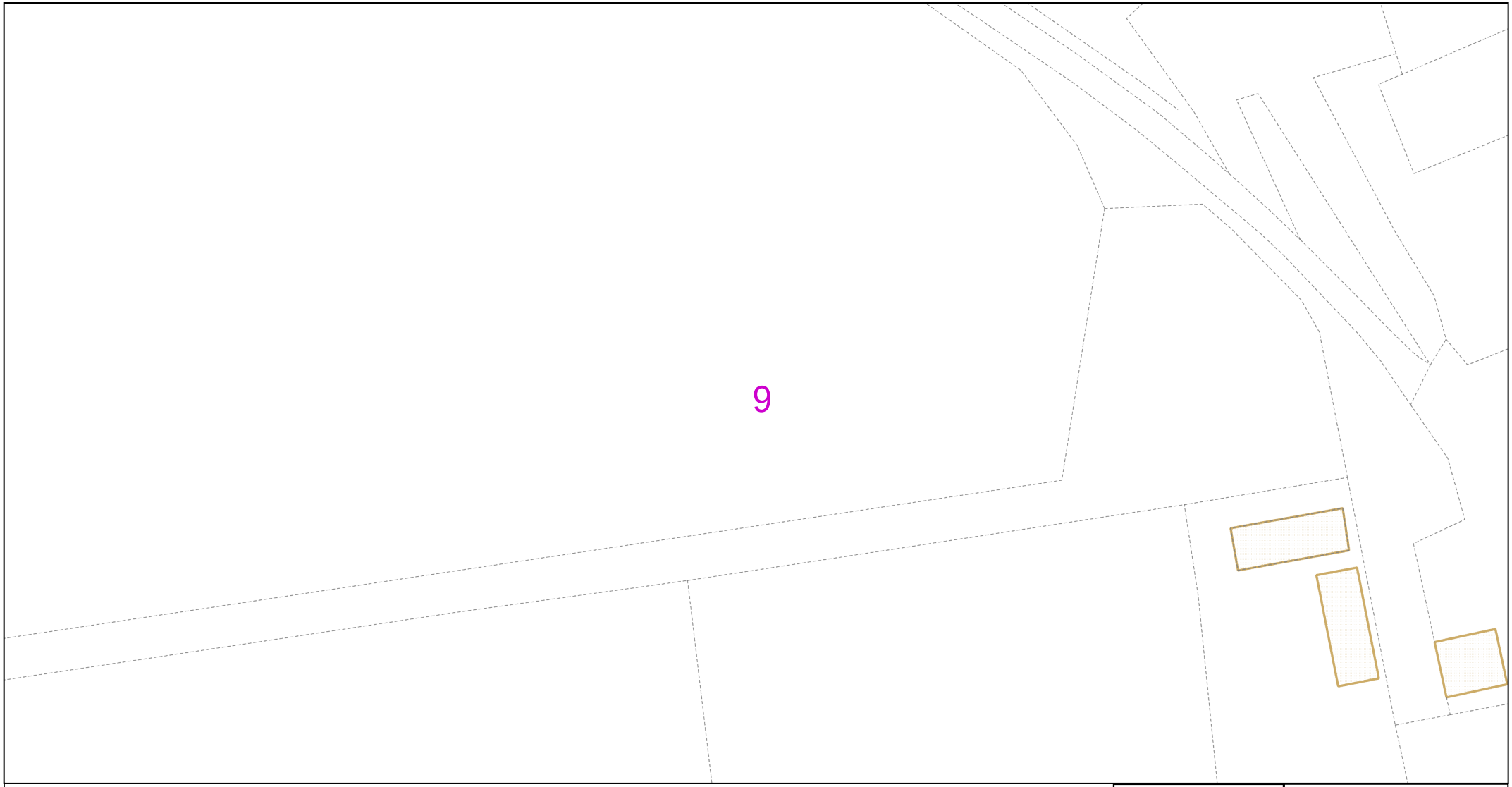

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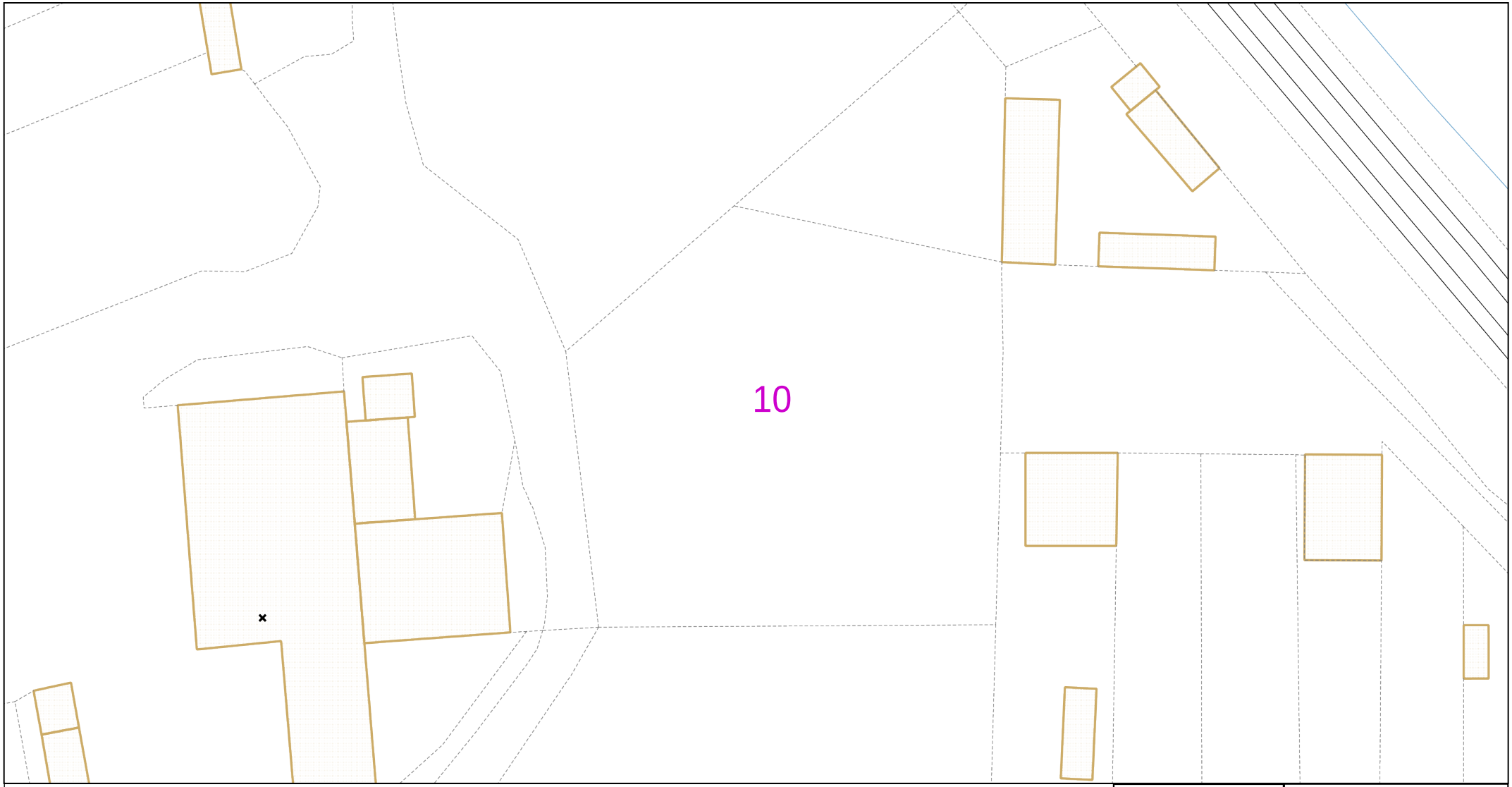

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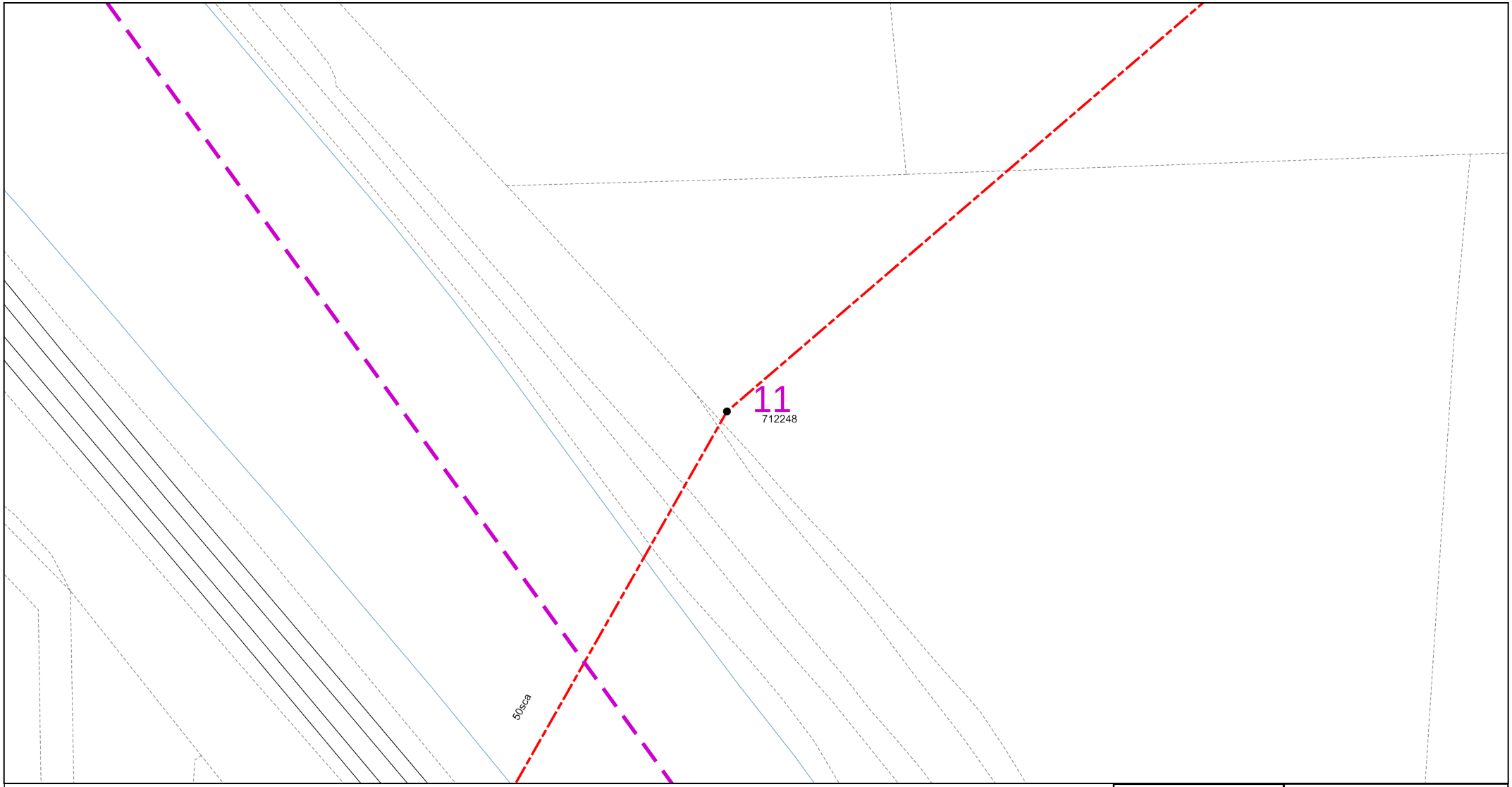

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Date Requested: 10/03/2025
Job Reference: 36526418
Site Location: 570857 172837
Requested by: Mrs Emma Harris

Your Scheme/Reference: 29524

Scale: 1:500 (When plotted at A4)

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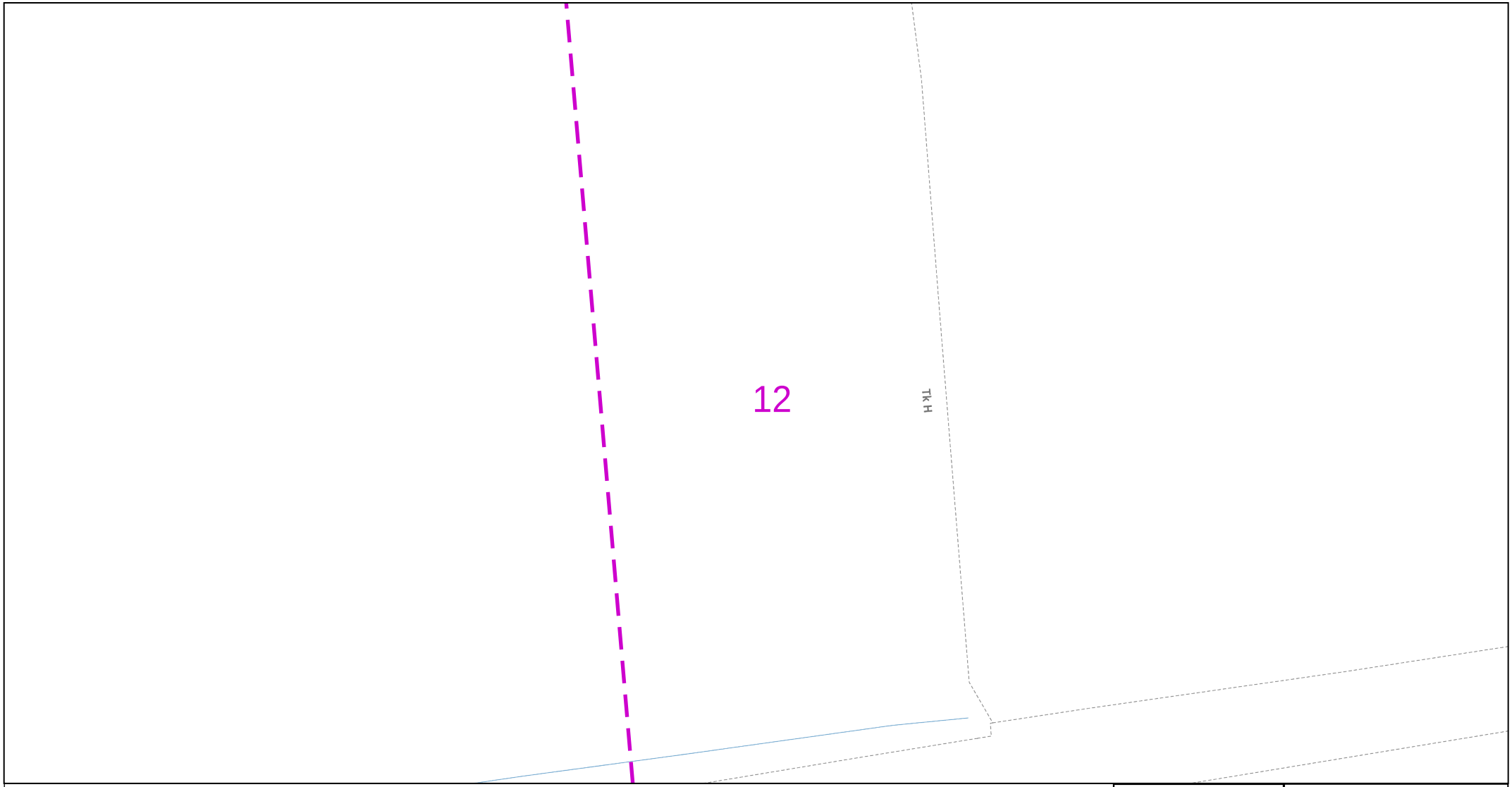

0 12.5 25
metres

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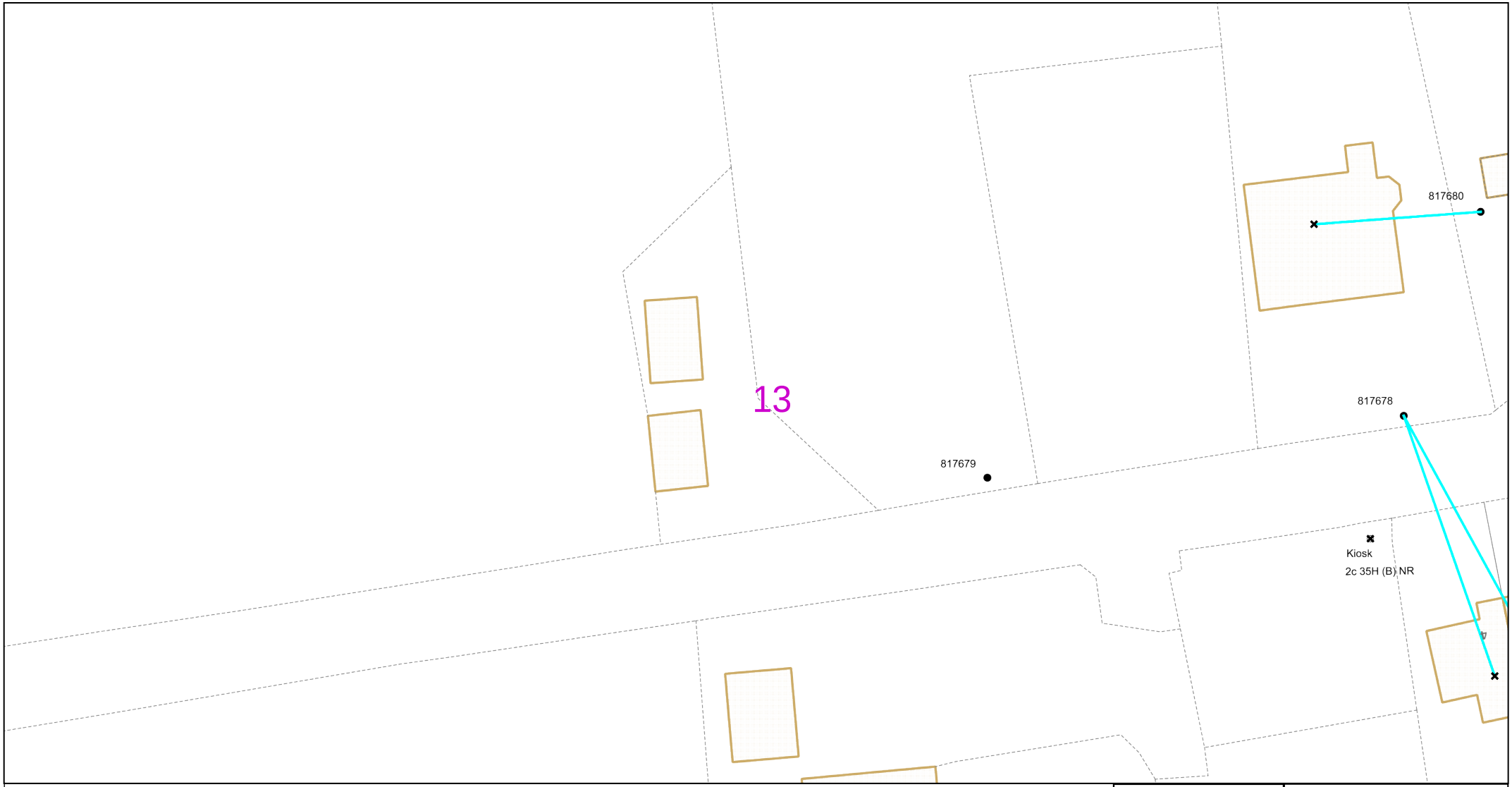

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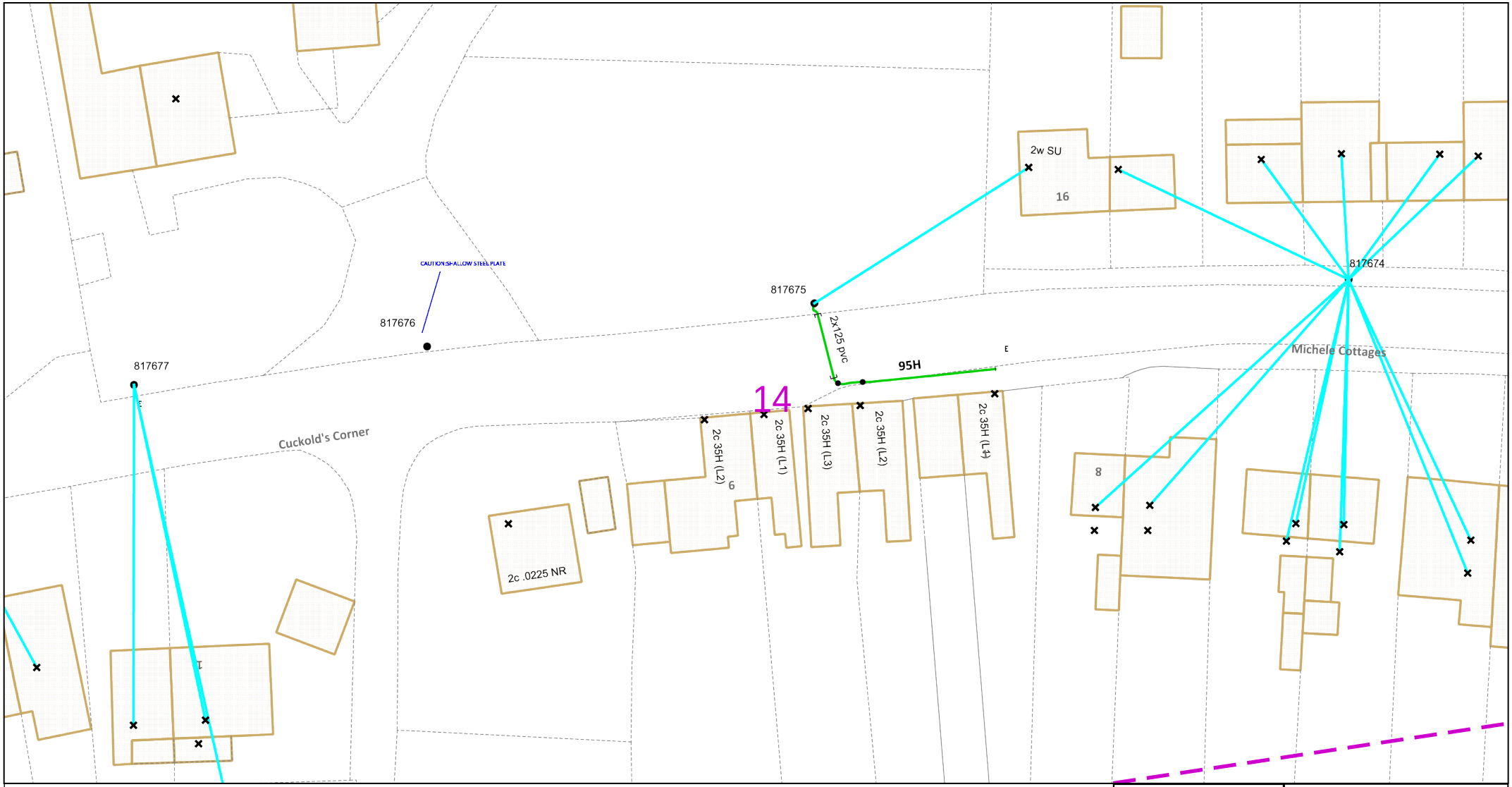

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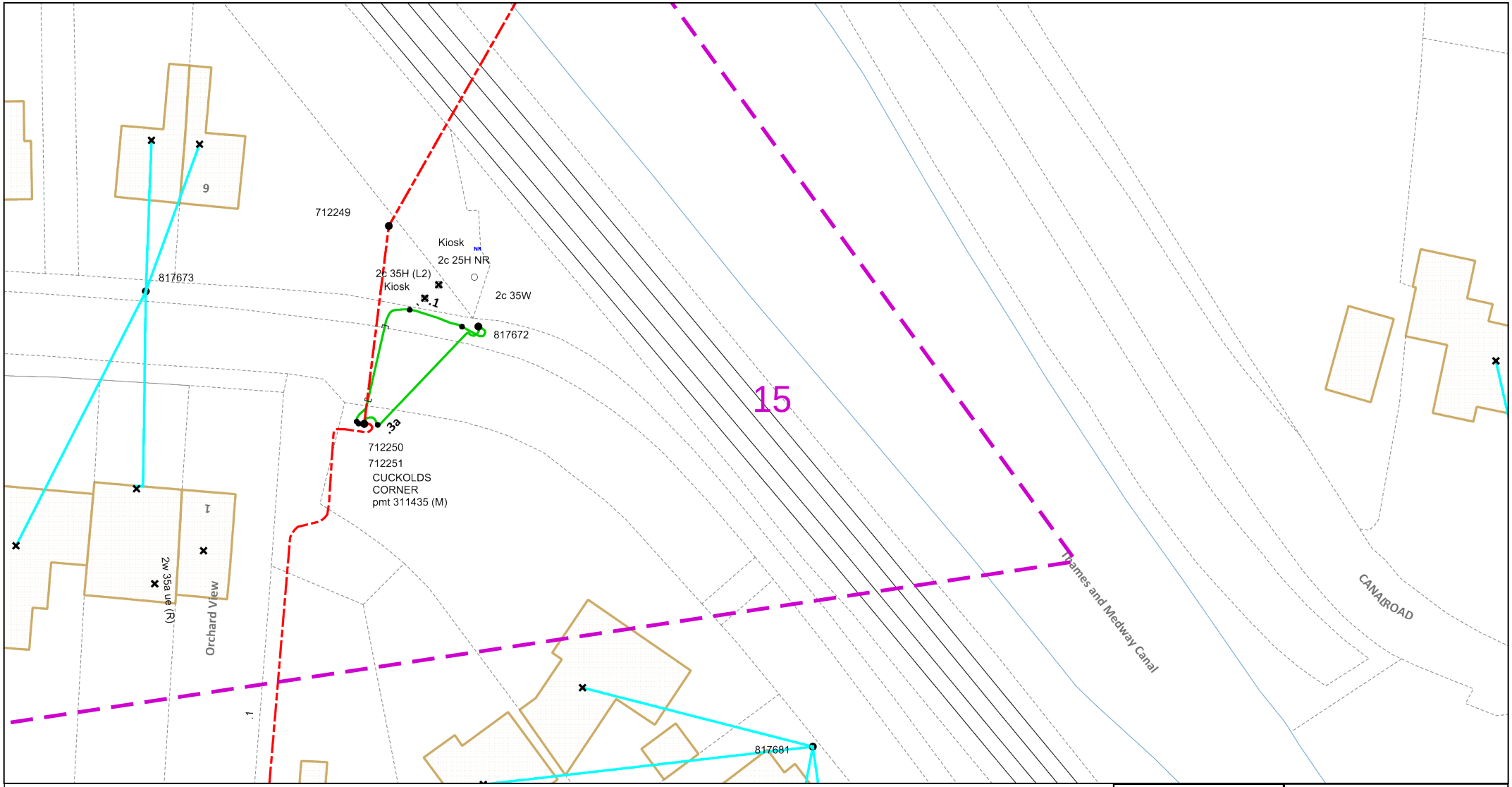

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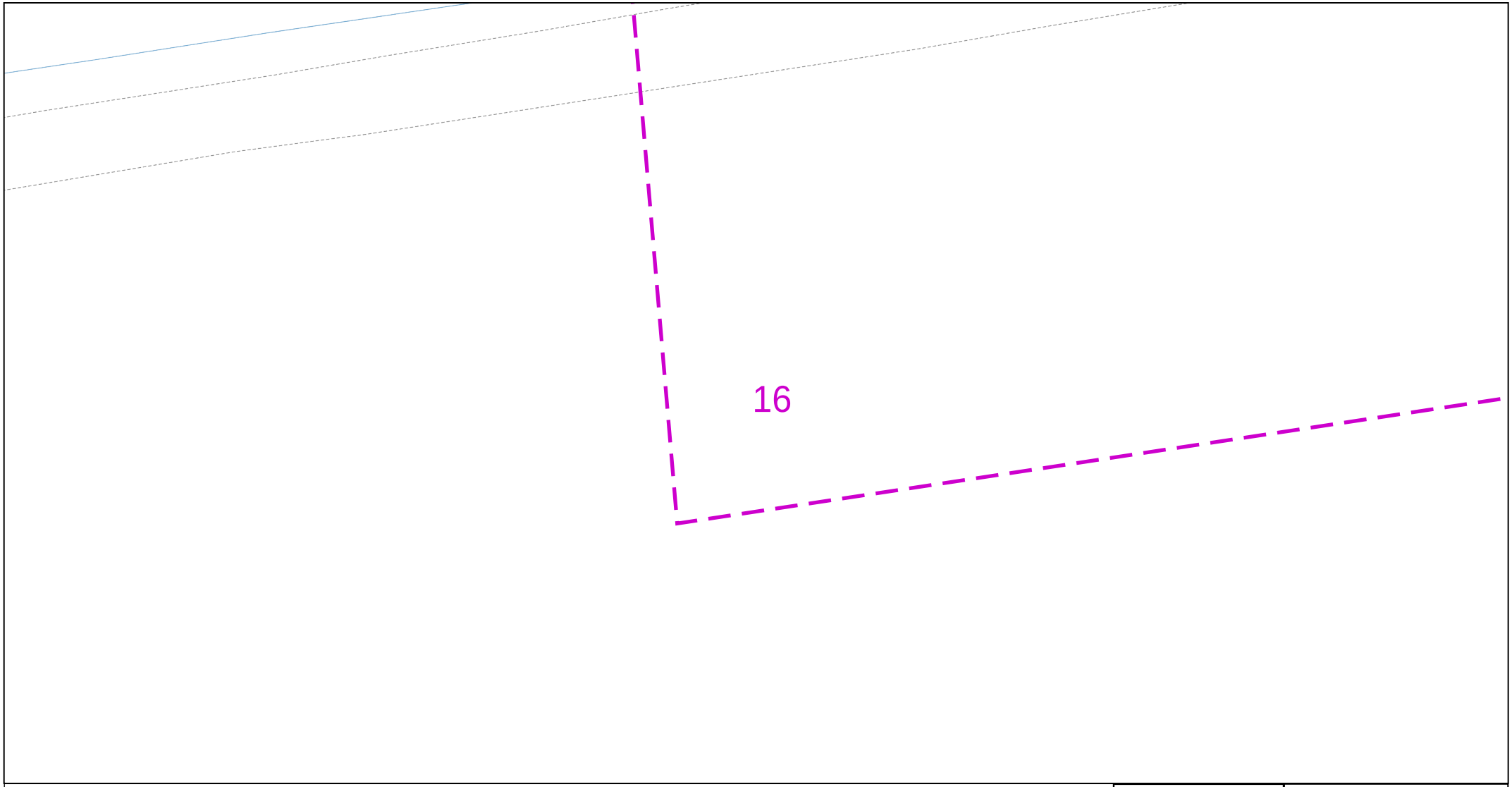

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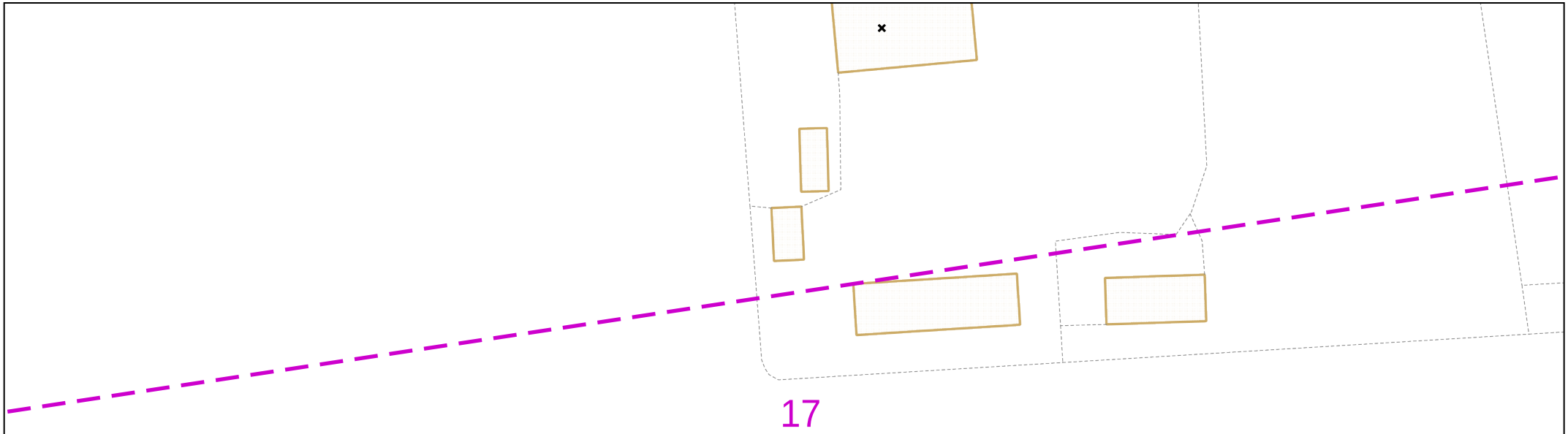

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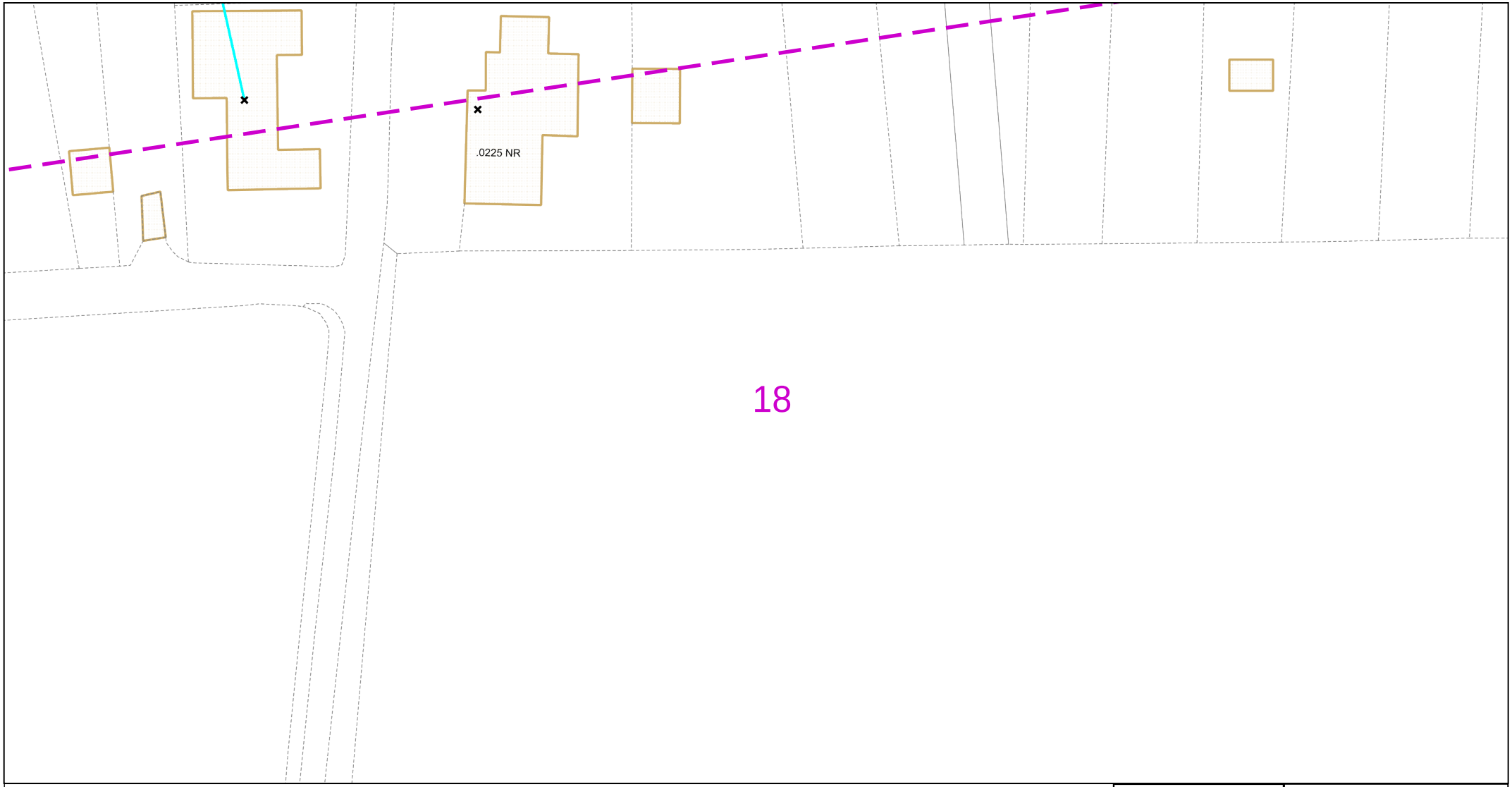

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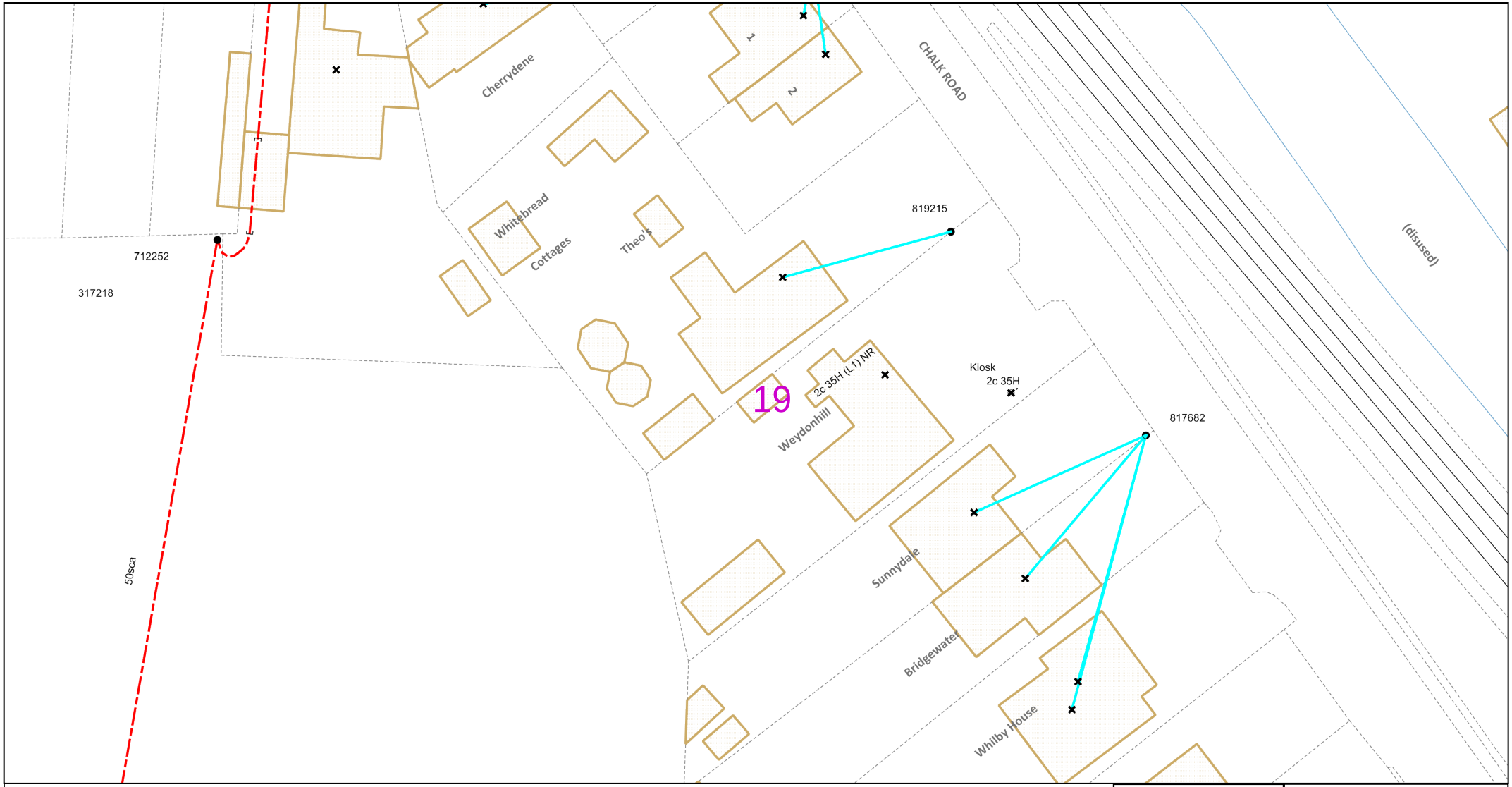

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metres

Dig Sites Area: Line:

The quality and accuracy of any print will depend on your printer, your computer and its print settings. Measurements scaled from this plan may not match measurements between the same points on the ground.

This plan must be used with the attached 'Symbols' document.

Date Requested: 10/03/2025
Job Reference: 36526418
Site Location: 570857 172837
Requested by: Mrs Emma Harris

Your Scheme/Reference: 29524

Scale: 1:500 (When plotted at A4)

1. The position of the apparatus shown on this drawing is believed to be correct but the original landmarks may have been altered since the apparatus was installed.
2. The exact position of the apparatus should be verified - use approved cable avoidance tools prior to excavation using suitable hand tools.
3. It is essential that trial holes are carefully made avoiding the use of mechanical tools or picks until the exact location of all the cables have been determined.
4. It must be assumed that there is a service cable into each property, lamp column and street sign, etc.
5. All cables must be treated as being live unless proved otherwise by UK Power Networks.
6. The information proved must be given to all people working near UK Power Networks plant and equipment. Do not use plans more than 3 months after the issue date for excavation purposes.
7. Please be aware that electric cables/lines belonging to other owners of licensed electricity distribution systems may be present and it is your responsibility to identify their location.
8. Please be aware the Low Voltage Overhead power lines are not currently displayed for the Eastern Region via this service, if you require records on the location of these please contact our Plan Provision team directly via plans@ukpowernetworks.co.uk.

1. UK Power Networks does not warrant that the information provided to you is correct. You rely upon it at your own risk.
2. UK Power Networks does not exclude or limit its liability if it causes the death of any persons or causes personal injury to a person.
3. Subject to paragraph 2 UK Power Networks has no liability to you in contract, in tort (including negligence), for breach of statutory duty or otherwise for any loss, damage, cost, claims, demands, or expenses that you or any third party may suffer or incur as a result of using the information provided whether for physical damage to property or for any economic loss (including without limitation loss of profit, loss of opportunity, loss of savings, loss of goodwill, loss of business, loss of use) or any special or consequential loss or damage whatsoever.
4. This plan has been provided to you on the basis of the terms of use set out in the covering letter that accompanies this plan. If you do not accept and/or do not understand the terms of use set out in the covering letter you must not use the plan and must return it to the sender of the letter.
5. You are responsible for the security of the information provided to you. It must not be given, sold or made available upon payment of a fee to a third party.
6. Please Note: The Overview map does not display UK Power Networks electricity network and should not be used for the location of UK Power Networks assets. For detail of the electricity network please view the relevant page as highlighted in the Overview map.

N W E S

UK Power Networks

IF IN DOUBT - ASK! PHONE
0800 056 5866
EMERGENCY - If you damage a cable or line
Phone 0800 783 8838 (24hrs)
URGENTLY

LOOK OUT LOOK UP

ALWAYS LOOK UP BEFORE YOU START WORK
Refer to HSE Guidance note GS6

Maps produced at 1:2500 scale are Geo-Schematics which show LV mains cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.

UK Power Networks Feedback Tool

Please help UK Power Networks improve the accuracy of their network records and help make it safer for all those working around them in future.

All you need to do is:

1. Use your phone camera to scan the QR code:
2. Provide feedback on what you have found on site (good or bad)
3. Upload a photo if needed

Thank you for making the area a safer place to dig.

UK Power Networks, working with LSBUD

Registered Office
Newington House
237 Southwark Bridge Road
London SE1 6NP

Company:
UK Power Networks
(Operations) Limited

Registered in England and Wales No: 3870728

Mrs Emma Harris
MEC Consulting Group Ltd
The Old Chapel
Hugglescote
Station Road
Leics
LE67 2GB

Date: 07 March 2025

Our Ref: 8500328477 / QID 3000053731

Dear Mrs Harris

Site Address: Chalk Road, Higham, ME3 7JY

Budget estimate

I am writing to you on behalf of South Eastern Power Networks plc the licensed distributor of electricity for the above address trading as and referred to in this Estimate as “UK Power Networks”. Thank you for your recent enquiry regarding the above premises.

I am pleased to be able to provide you with a budget estimate for the Works.

It is important to note that this budget estimate is intended as a guide only. It may have been prepared without carrying out a site visit or system studies. No enquiry has been made as to the availability of consents or the existence of any ground conditions that may affect the ground works and only a cursory assessment of any Reinforcement costs that may be applicable has been undertaken. A detailed evaluation of any potential Reinforcement costs, including the applicability of the High-Cost Project Threshold and associated Cost Apportionment Factor will be undertaken upon receipt of a formal application for a Connection Offer. This Budget Estimate is not an offer to provide the connection and nor does it reserve any capacity on UK Power Networks’ electricity distribution system.

Description of work included:

The budget estimation for the Works is:
We will install a ringed HV substation onto the customers site. This will provide the customer with 300kVA total load for 40 properties.

High Voltage Point Of Connection

£284,000.00 (exclusive of VAT) if the Point Of Connection (POC) is to our High Voltage network along Chalk Road.

A pole move/underground diversion maybe required for the site entrance, but no layout plan has been provided. The diversion can be in the region of £25,000.00 but this would be subject to a site visit when a Formal quotation is requested to see if a pole move, or undergrounding the LV cable would be viable.

The price would depend on site conditions, on obtaining any necessary legal consents, traffic management requirements, final load details, site layout, the route of our incoming cable(s) and a site visit to confirm available capacity at the local substation.

Additional costs may be required for off-site reinforcement. This will be decided by the results of a network study, which will be carried out during preparation of the formal quotation.

On receipt of your request for a formal quotation the file will be allocated to a Project Designer who will then contact you to arrange a site visit and provide the detailed quotation.
It will be necessary to establish a new totally enclosed substation on the development site, in situations where a standard GRP substation enclosure can be used, an area of land of at least 4m x 4m will be required. If, however, you prefer to construct a brick substation then an area of land of at least 5m x 5m will be required. Planning Permission, although not required for a GRP substation, will be required for a brick built enclosure, and it will be your responsibility to obtain this.

The substation must be located such as to minimise the need for the manual handling of heavy plant. The Manual Handling Operations Regulations 1992 require the use of mechanical handling whenever this reasonably practicable. To meet these regulations we use a lorry mounted crane to deliver substation plant. The project must therefore be planned to ensure that it is suitable for the delivery of plant from a large vehicle. The Construction (Design and Management) Regulations 2015 also require that consideration be given to the safe installation, maintenance and eventual removal of equipment. To comply with this legislation we need to be able to gain access with a suitable vehicle throughout the life of the project.

Assumptions

This budget estimate is based on the following assumptions:

- The most appropriate Point of Connection (POC) is as described above.
- A viable cable or overhead line route exists along the route we have assumed between the Point of Connection (POC) and your site
- In cases where the Point of Connection (POC) is to be at High Voltage, that a substation can be located on your premises at or close to the position we have assumed
- Where electric lines are to be installed in private land UK Power Networks will require an easement in perpetuity for its electric lines and in the case of electrical plant the freehold interest in the substation site, on UK Power Networks terms, without charge and before any work commences
- You will carry out, at no charge to UK Power Networks, all the civil works within the site boundary, including substation bases, substation buildings where applicable and the excavation/reinstatement of cable trenches
- Unless stated in your application, all loads are assumed to be of a resistive nature. Should you intend to install equipment that may cause disturbances on UK Power Networks' electricity distribution system (e.g. motors; welders; etc.) this may affect the estimate considerably
- All UK Power Networks' work is to be carried out as a continuous programme of work that can be completed substantially within 12 months from the acceptance of any subsequent Quote.

Please note that if any of the assumptions prove to be incorrect, this may have a significant impact on the price in any subsequent Quote. You should note also that UK Power Networks' formal Quote may vary considerably from the budget estimate. If you place reliance upon the budget estimate for budgeting or other planning purposes, you do so at your own risk.

If you would like to proceed

If you would like to proceed to a formal offer of connection then you must apply for a Quote. Please refer to our website click here to complete application process.

To help us progress any future enquiry as quickly as possible please quote the UK Power Networks Reference Number from this letter on all correspondence.

Any Questions?

If you have any questions about your budget estimate or need more information, please do not hesitate to contact me. The best time to call is between the hours of 9am and 4pm, Monday to Friday. If the person you need to speak to is unavailable or engaged on another call when you ring, you may like to leave a message or call back later.

Yours sincerely

Leanne Suddes

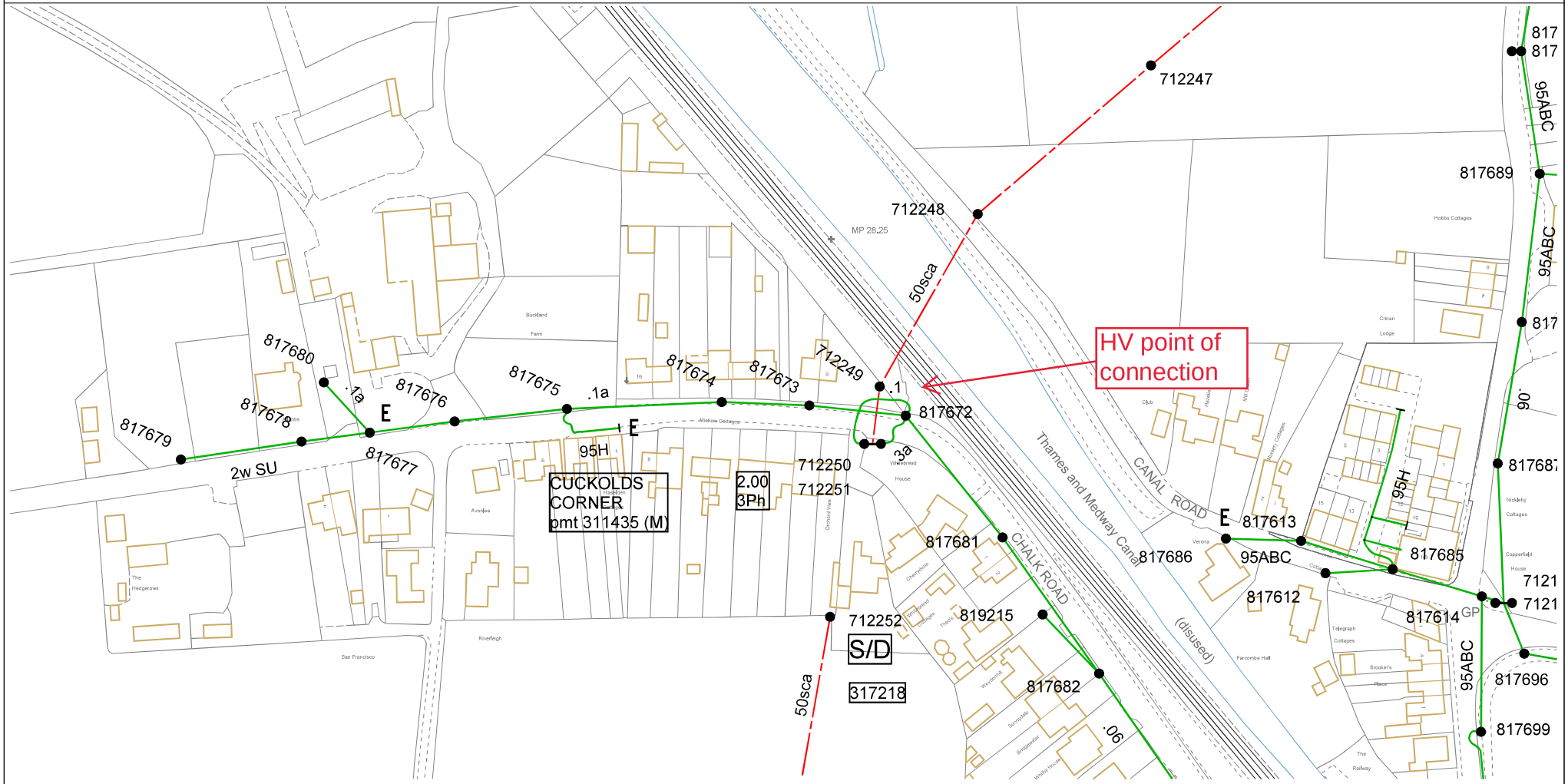
Mobile: 07763 204281
Email: leanne.suddes@ukpowernetworks.co.uk

To download your free safety leaflets and resources visit
UK Power Networks - Safety Page

Title:

JOB NO:

STANDARD PLOT



0m 40m 80m 120m 160m

The quality and accuracy of any print will depend on your printer, your computer and its print settings. Measurements scaled from this plan may not match measurements between the same points on the ground.

Grid Ref: TQ 71244 72936

Map Centre: TQ7172NW

Scale: 1:1250

(when Plotted at A3)

Plotted on: 07/03/2025

Plotted by: Leanne Suddes

UK Power Networks

LV Cable or Line

HV Cable or Line

EHV Cable or Line Approx. position

Ductline

Pole & Street Furniture

Substation & Link Box

1. The position of the apparatus shown on this drawing is believed to be correct but the original landmarks may have been altered since the apparatus was installed.
2. The exact position of the apparatus should be verified - use approved cable avoidance tools prior to excavation using suitable hand tools.
3. It is essential that trial holes are carefully made avoiding the use of mechanical tools or picks until the exact location of all cables have been determined.
4. It must be assumed that each property and item of street furniture has an electricity supply. Service cables shown only where known.
5. All cables must be treated as being live unless proved otherwise by UK Power Networks.
6. The information provided must be given to all people working near UK Power Networks plant & equipment. Do not use plans more than 3 months after the issue date for excavation purposes.
7. Please be aware that electric cables/lines belonging to other owners of licensed electricity distribution systems may be present and it is your responsibility to identify their location.

1. UK Power Networks does not warrant that the information provided to you is correct. You rely upon it at your own risk.
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3. Subject to paragraph 2 UK Power Networks has no liability to you in contract, in tort (including negligence), for breach of statutory duty or otherwise for any loss, damage, cost, claims, demands, or expenses that you or any third party may suffer or incur as a result of using the information provided whether for physical damage to property or for any economic loss (including without limitation loss of profit, loss of opportunity, loss of savings, loss of goodwill, loss of business, loss of use) or any special or consequential loss or damage whatsoever.
4. This plan has been provided to you on the basis of the terms of use set out in the covering letter that accompanies this plan. If you do not accept and/or do not understand the terms of use set out in the covering letter you must not use the plan and you must return it to the sender of the letter.
5. You are responsible for the security of the information provided to you. It must not be given, sold or made available upon payment of a fee to a third party.

Plan Provision

CHECK IT OUT BEFORE YOU DIG IT OUT
CALL 0800 056 5866
EMERGENCY- If you damage a cable or line
Phone 0800 096 3766 (24hrs) URGENTLY

ALWAYS LOOK UP BEFORE YOU START
Refer to HSE Guidance note GS6

VISITING AN OPEN POINT? Please mark on this plan all locations visited and open points as found, then return updated map to your Business Unit - Thank You.

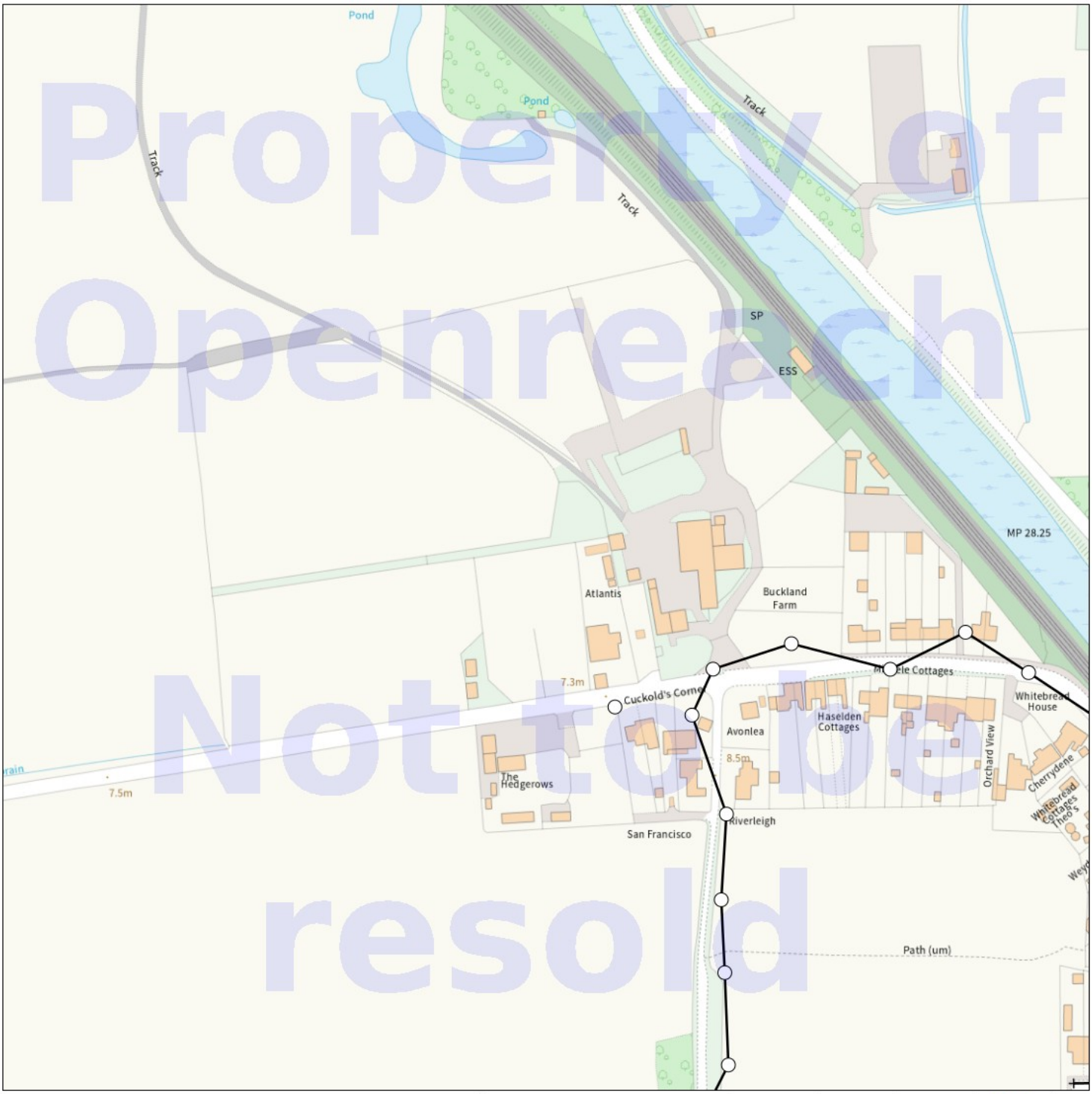
Contact UK Power Networks on 0800 056 5866 for details of EHV Cable routes before commencing work.

Maps produced at 1:2500 scale are LV Geo-Schematics which show LV mains cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.

MEC
Consulting Group

APPENDICES

APPENDIX F



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made newar to BT apparatus which may exist at various depths and may deviate from the marked route.

openreach

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED
(Office hours: Monday - Friday 08.00 to 17.00)
www.openreach.co.uk/cbyd

Accidents happen

If you do damage any Openreach equipment please let us know by calling 0800 023 2023 (opt 1 + opt 1) and we can get it fixed ASAP

KEY TO BT SYMBOLS

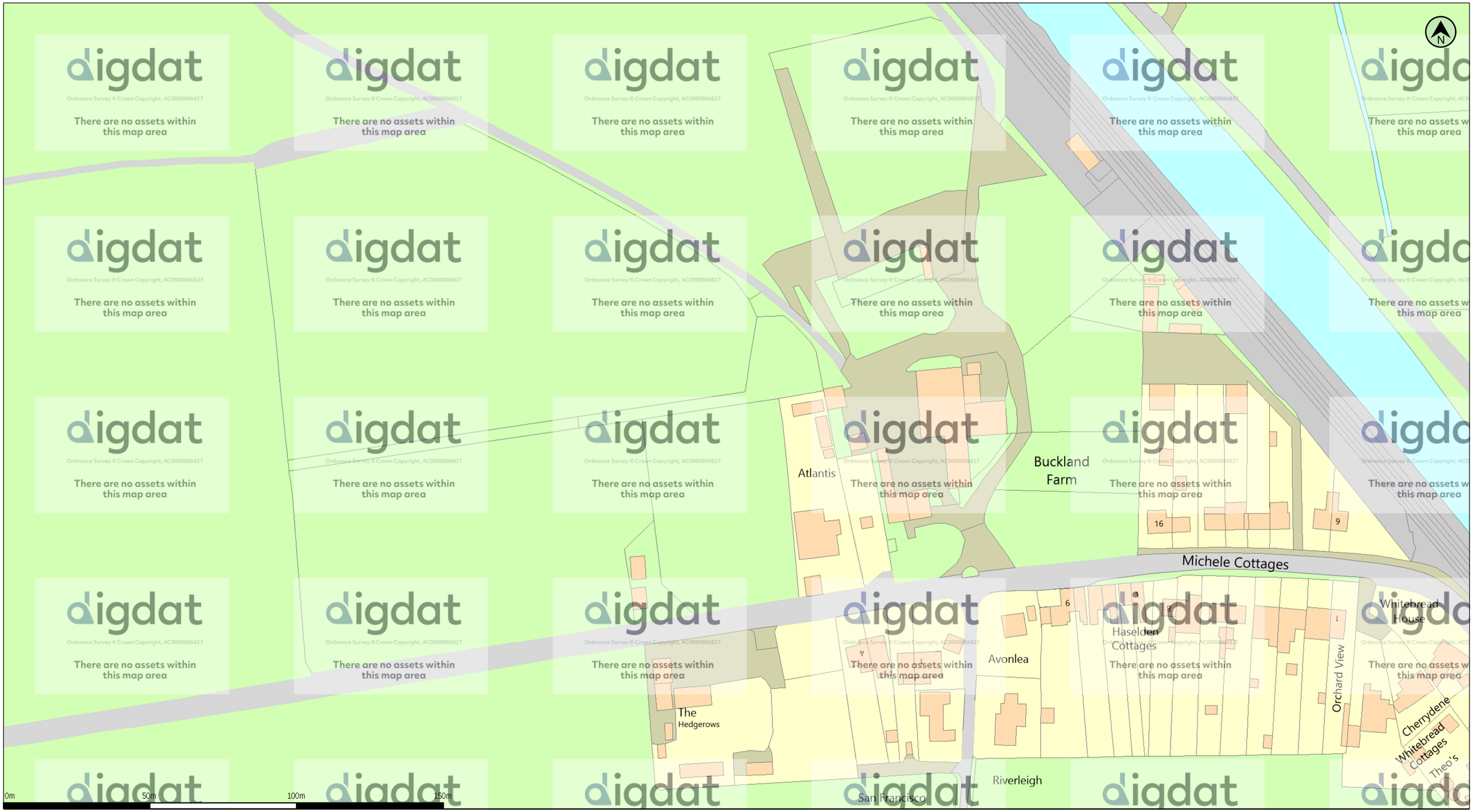
	Planned	Live
PCP		
Pole		
Box		
Manhole		
Cabinet		

Change Of State	+	Hatchings	
Split Coupling	×	Built	
Duct Tee	▲	Planned	
Building		Inferred	
Kiosk	K	Duct	

Other proposed plant is shown using dashed lines.
BT Symbols not listed above may be disregarded.
Existing BT Plant may not be recorded.
Information valid at time of preparation. Maps are only valid for 90 days after the date of publication.

	Pending Add	In Place	Pending Remove	Not In Use
Power Cable				
Power Duct				N/A

BT Ref : HWJ08292V
Map Reference : (centre) TQ7105472983
Easting/Northing : (centre) 571054,172983
Scale : 1:500



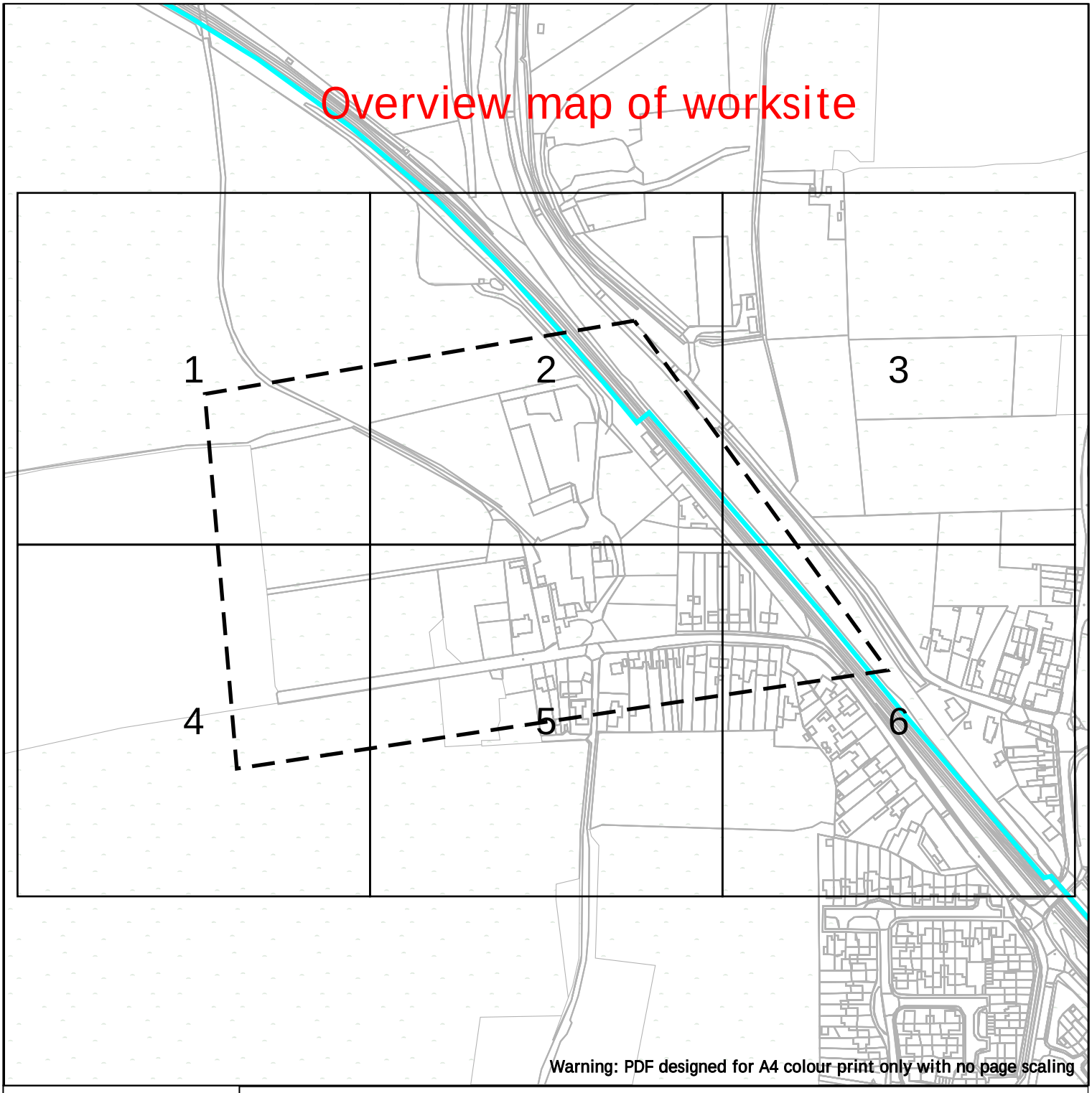
(c) Crown copyright and database rights 2025 Ordnance Survey AC0000818557 | Date: 14/03/25 | Scale: 1:1250 | Map Centre: 571054,172983 | Data updated: 03/02/25 | Our Ref: 1716756 - 3 | Telecoms Plan A3 Powered by digdat

Important Information - please read The purpose of this plan is to identify Virgin Media apparatus. We have tried to make it as accurate as possible but we cannot warrant its accuracy. In addition, we caution that within Virgin Media apparatus there may be instances where mains voltage power cables have been placed inside green, rather than black ducting. Further details can be found using the "Affected Postcodes.pdf", which can be downloaded from this website. Therefore, you must not rely solely on this plan if you are carrying out any excavation or other works in the vicinity of Virgin Media apparatus. The actual position of any underground service must be verified by cable detection equipment, etc. and established on site before any mechanical plant is used. Accordingly, unless it is due to the negligence of Virgin Media, its employees or agents, Virgin Media will not have any liability for any omissions or inaccuracies in the plan or for any loss or damage caused or arising from the use of and/or any reliance on this plan. This plan is produced by Virgin Media Limited (c) Crown copyright and database rights 2025 Ordnance Survey AC0000818557.

Duct, Trench | Chamber / Pole | Cabinet

emma.harris@m-ec.co.uk
29524

Overview map of worksite



Warning: PDF designed for A4 colour print only with no page scaling

eunetworks

Dig Sites Line: Area:

Key

Duct Long-haul (LHN) Duct Chamber Location

Contact us:

plantprotection@eunetworks.com

Date Requested: 05/03/2025
Job Reference: 36526418
Site Location: 571066 173004
Requested by: Mrs Emma Harris

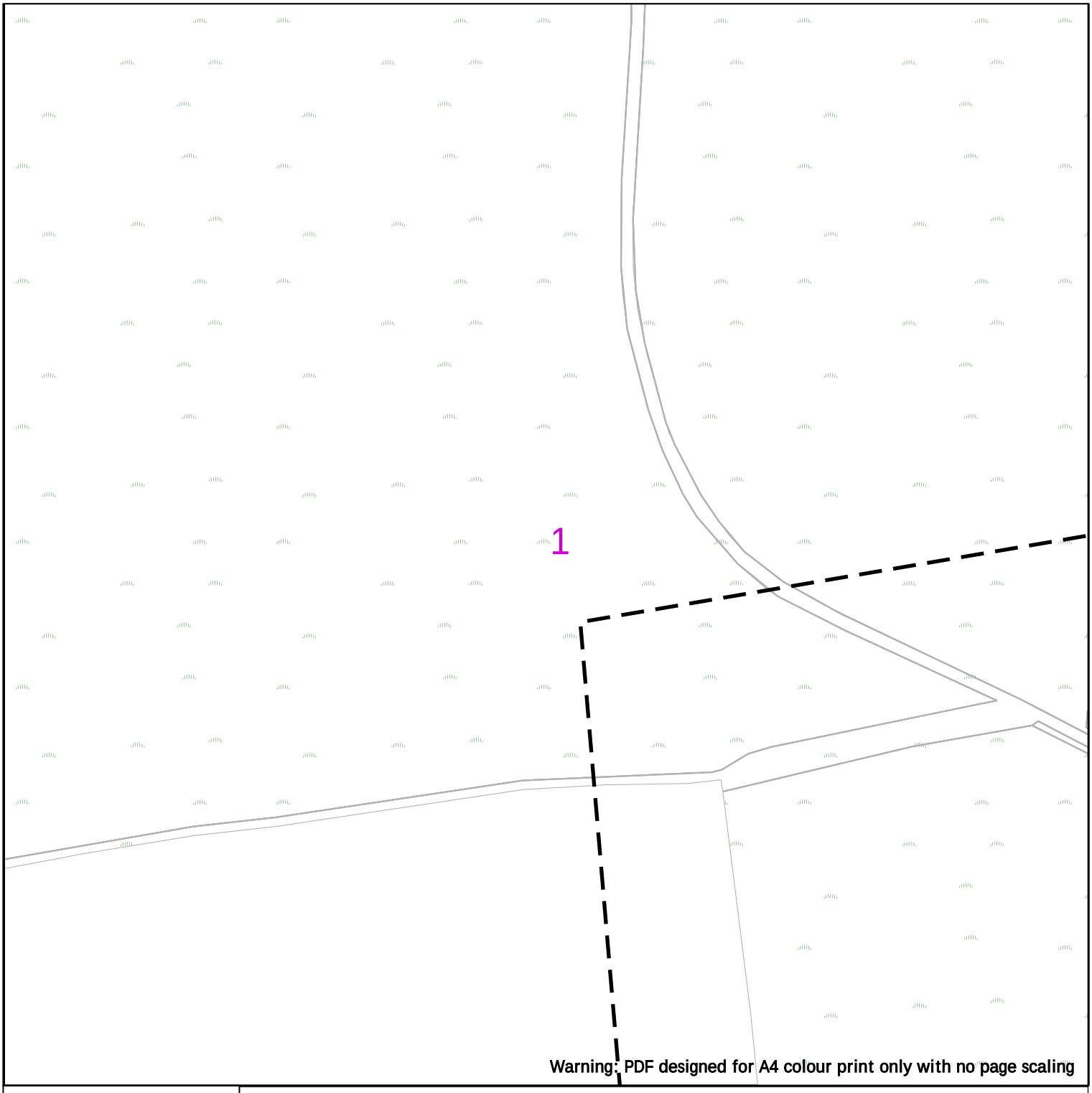
Your Scheme/Reference: 29524

IMPORTANT WARNING

The information supplied is given in good faith as a guide to locating underground apparatus. Its accuracy cannot be guaranteed, nor does it include comprehensive information about the existence or location of service pipes or cables to individual premises. The responsibility for locating and avoiding damage to apparatus on site shall be that of the persons proposing to excavate in the street shall be liable to the apparatus owner and any third party who may be affected in any way for any loss or damage caused by their failure to do so.

IF IN DOUBT PLEASE ASK!
PHONE: 07896 087585

Scale: 1:3844 (When plotted at A4)



eunetworks

100m Dig Sites Line: Area:

Key

Duct Long-haul (LHN) Duct Chamber Location

Contact us:

plantprotection@eunetworks.com

Date Requested: 05/03/2025
Job Reference: 36526418
Site Location: 571066 173004
Requested by: Mrs Emma Harris

Your Scheme/Reference: 29524

Scale: 1:1250 (When plotted at A4)

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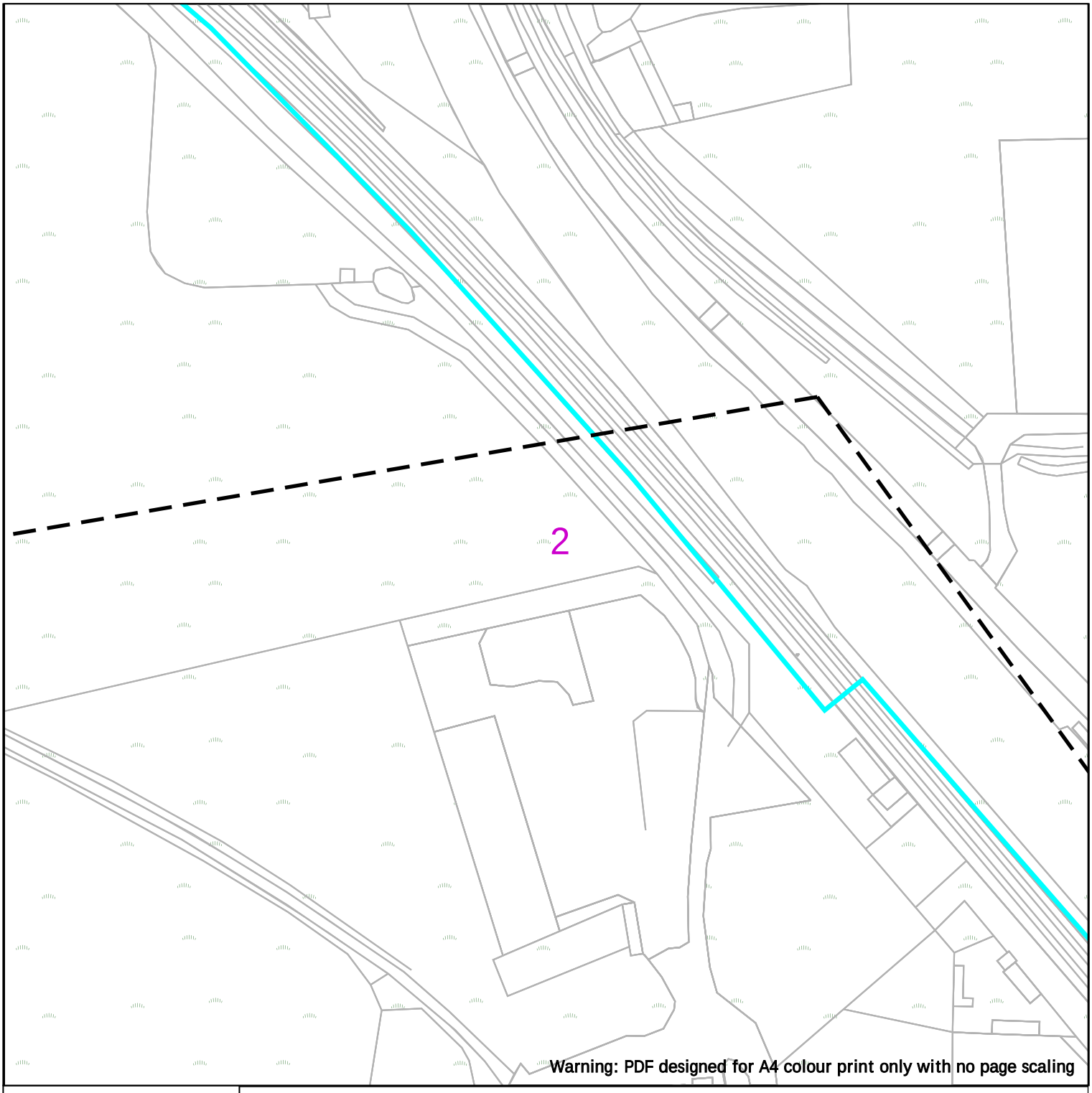

eunetworks

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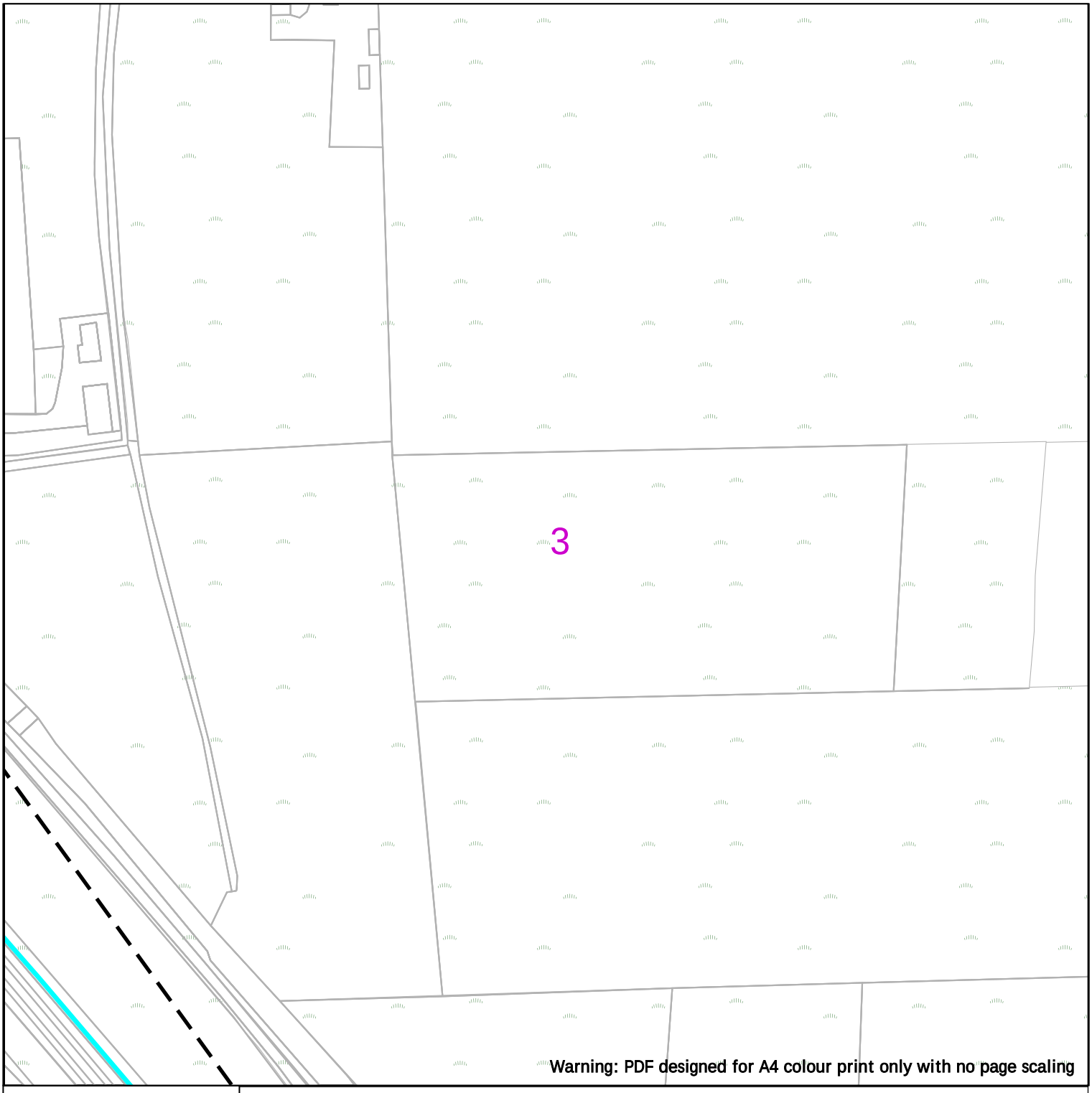

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eunetworks

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Key

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plantprotection@eunetworks.com

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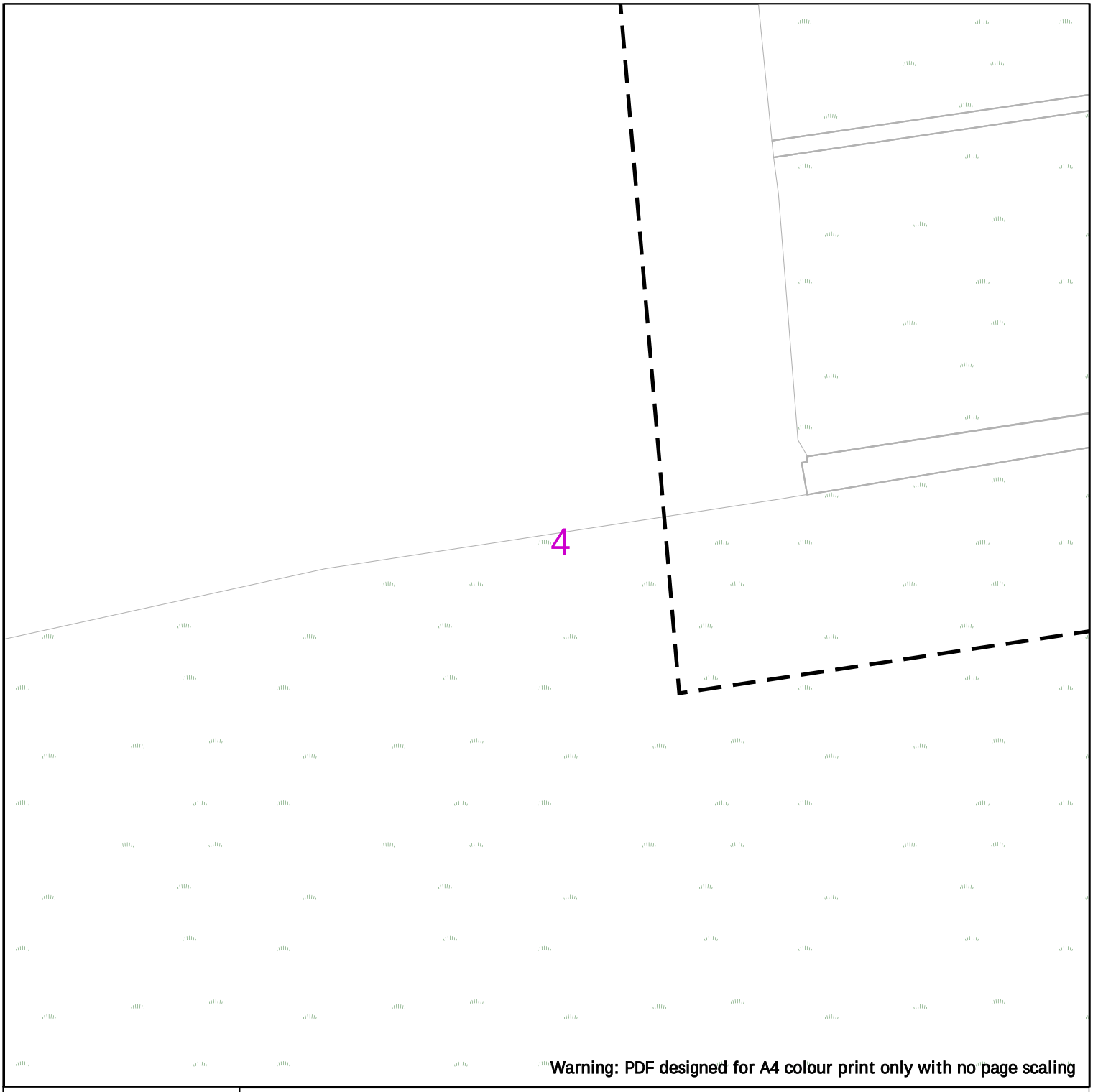

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eunetworks

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eunetworks

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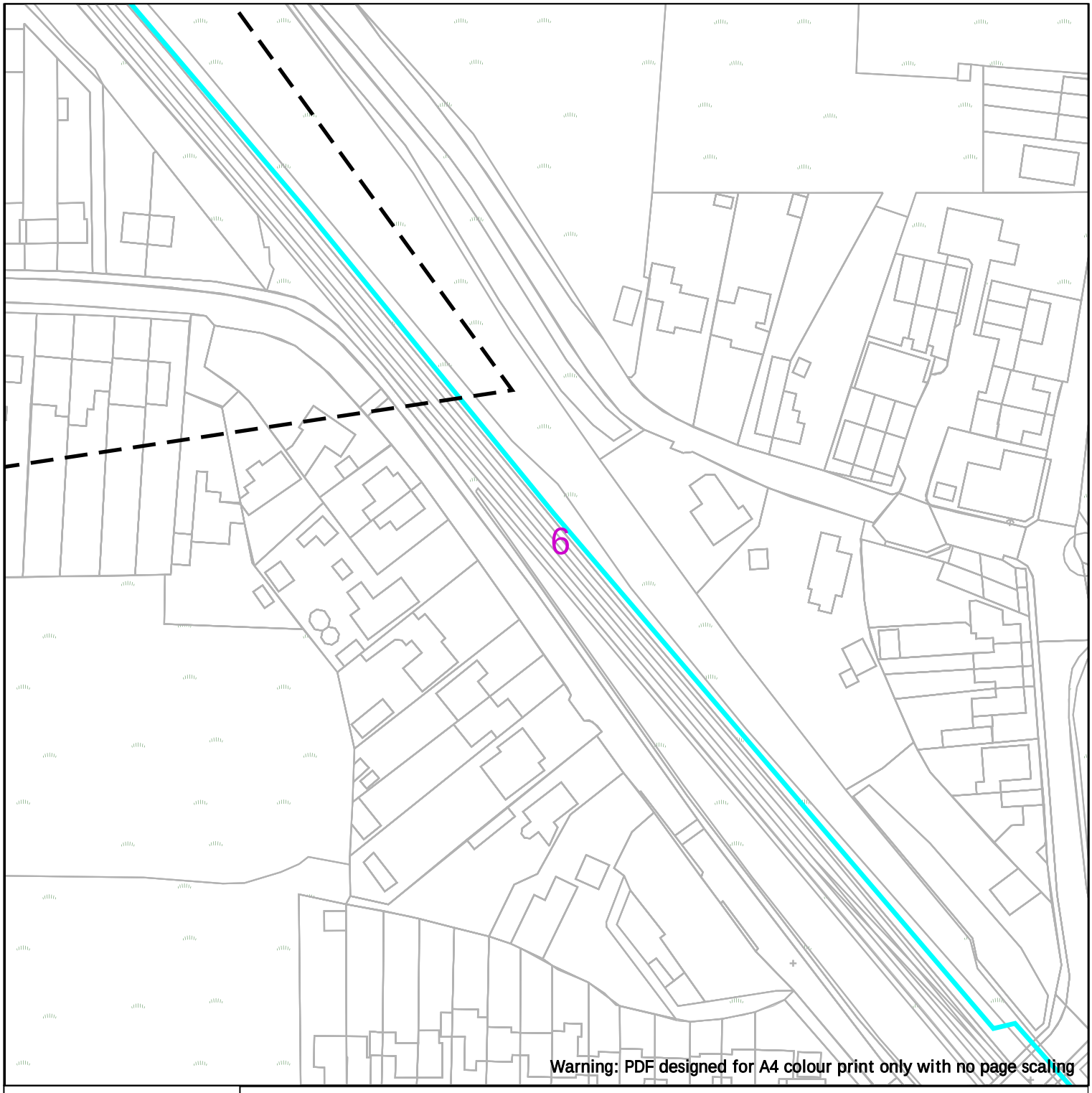

eunetworks

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PHONE: 07896 087585

MEC
Consulting Group

APPENDICES

APPENDIX G

Worksite Survey Team
National Records Centre
Audax Road
YORK

YO30 4US

NRSWA Asset Enquiries

Dear Sir/Madam,

Please find information available as per the checklist.

The information contained herein is based on Network Rail's records and, where appropriate, third parties such as utility companies. The search enclosed does not cover a search of local council records. Also, schematic Signal and Telecom (S&T) cables plans are not provided as part of the search results, therefore you must assume S&T cables are present until proven otherwise.

Although at the date of this letter the information is as up to date as possible, it is **NOT** a statement of validity, accuracy or completeness as to any of the enclosed search information and must not be relied on as such.

Your risk assessment **MUST** take into account:

- That the information supplied, including the services shown on the map from the Rail Infrastructure Network Model (RINM), does not provide any guarantee as to the accuracy of the actual location of services on site and **MUST** be considered as for guidance purposes only.
- That new/unrecorded services are likely to be present
- That the enclosed buried services search information has been collated only for the ELR and Mileage boundaries as stated on the original request form

Included in the buried services search is a list of ASPRO engineers & managers you **MUST** contact before any ground disturbance is carried out, to check whether further information is held locally.

Further guidance can be obtained from the Health and Safety Executive publication HSG47 "Avoiding Danger from Underground Services" and the Network Rail Publication NR/L2/INI/CP1030.

Should you become aware of any additional underground services or assets within the locality during your investigations and/or works, including redundant assets, please identify them as a matter of urgency to the site manager. Records of the location of these assets should be kept for onward transmission and entry into the Hazard Directory.

Yours sincerely

NRSWA Team

Worksite Survey

Buried Services Information Checklist

Your Ref	29524 - Chalk Road	Our Order Ref	247980

Network Rail Record Type	Category	Enclosed Yes/No	Notes (e.g. Nil Return)
Asset Protection National Map	Contact Ino	Y	
Hazard Directory	Hazard	Y	
Site Map	GIS Systems	Y	
eB - Corporate records management system	National Records Group	N	Nil Return
Network Rail - Drainage	GIS Systems	Y	
National Records Group - Civils Records	National Records Group	Y	

NIL RETURN: After interrogating the information made available to us, no records containing buried services information have been returned for this worksite. However, reference must be made to the guidelines supplied with this buried services search, which contain important information on safe working practices.

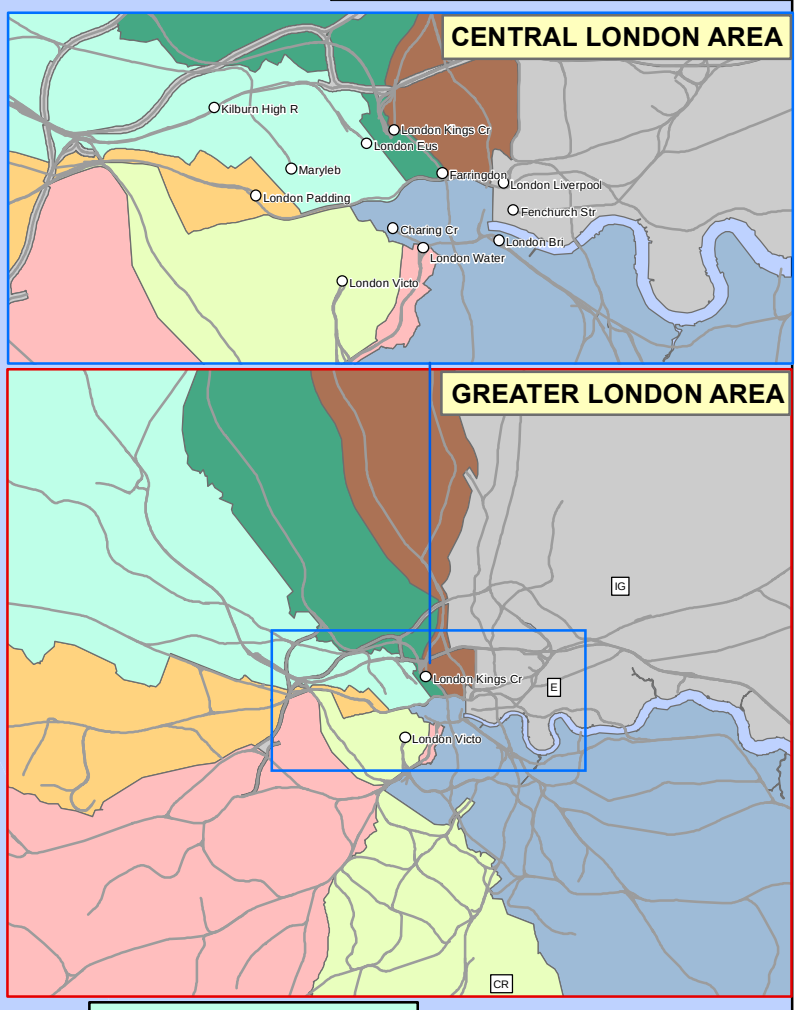
N
W E
S

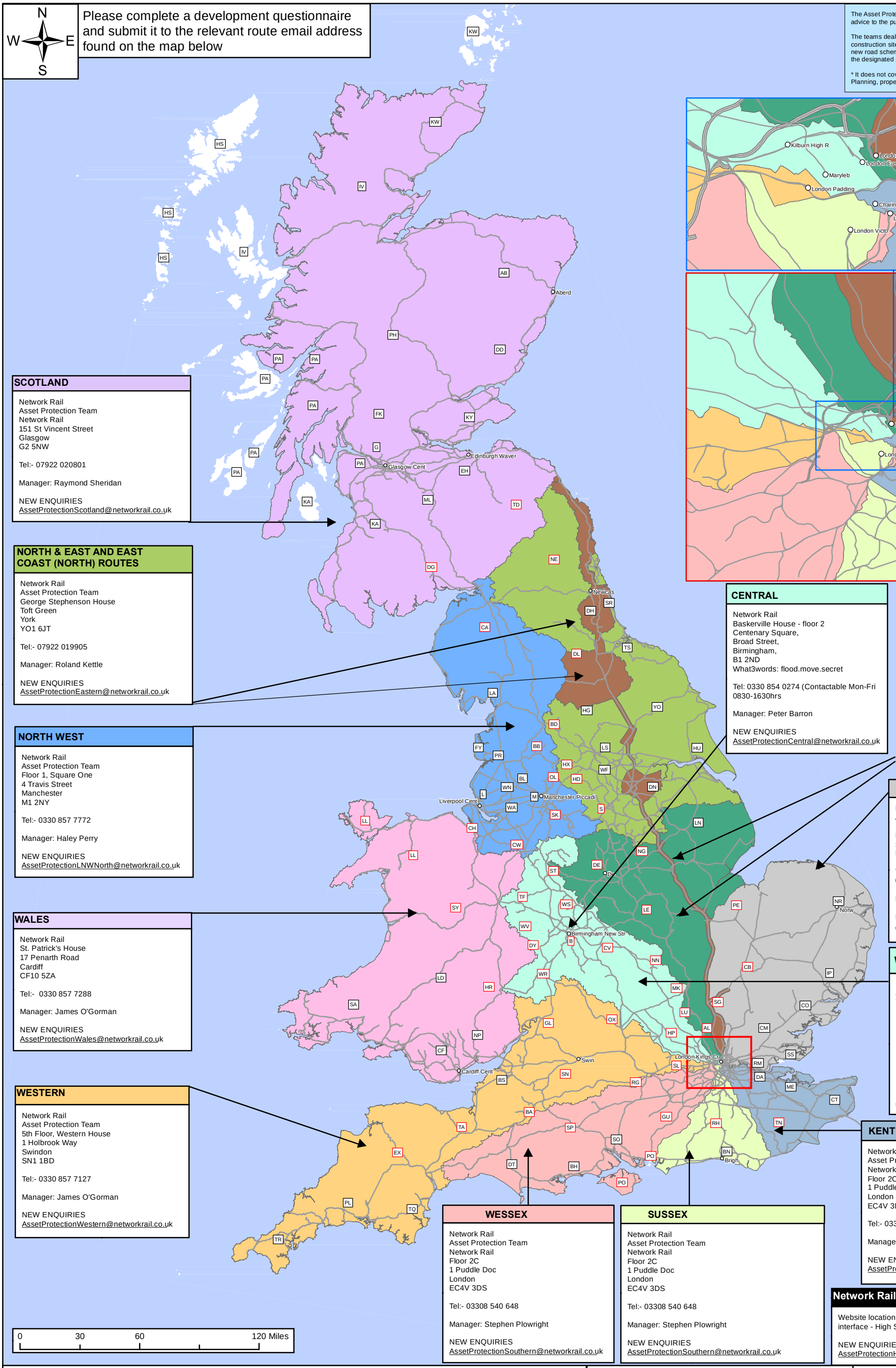
Please complete a development questionnaire and submit it to the relevant route email address found on the map below

The Asset Protection Project Managers lead dedicated teams in providing advice to the public who are planning activities on or near the railway.

The teams deal with a multitude of issues including neighbouring construction sites, utility works, bridge works, domestic maintenance, new road schemes, inspection and surveying and works within the designated precautionary area of level crossings.

* It does not cover subjects such as emergencies, Town & Country Planning, property Sales or complaints.





SCOTLAND

Network Rail
Asset Protection Team
Network Rail
151 St Vincent Street
Glasgow
G2 5NW

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Manager: Raymond Sheridan

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NORTH & EAST AND EAST COAST (NORTH) ROUTES

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Asset Protection Team
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Manager: Roland Kettle

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NORTH WEST

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M1 2NY

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WESTERN

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CENTRAL

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Centenary Square,
Broad Street,
Birmingham,
B1 2ND
What3words: flood.move.secret

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Manager: Peter Barron

NEW ENQUIRIES
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EAST MIDLANDS AND EAST COAST (SOUTH) ROUTES

Network Rail
Asset Protection Team
John Ellis House
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DE1 2RU

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ANGLIA

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Asset Protection Team
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E20 1EJ

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0203 356 2510

Manager: David Kang Gil

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WEST COAST MAINLINE SOUTH

Network Rail
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Elder Gate
Milton Keynes
MK9 1EN

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KENT

Network Rail
Asset Protection Team
Network Rail
Floor 2C
1 Puddle Dock
London
EC4V 3DS

Tel:- 03308 540 648

Manager: Stephen Plowright

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WESSEX

Network Rail
Asset Protection Team
Network Rail
Floor 2C
1 Puddle Doc
London
EC4V 3DS

Tel:- 03308 540 648

Manager: Stephen Plowright

NEW ENQUIRIES
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SUSSEX

Network Rail
Asset Protection Team
Network Rail
Floor 2C
1 Puddle Doc
London
EC4V 3DS

Tel:- 03308 540 648

Manager: Stephen Plowright

NEW ENQUIRIES
AssetProtectionSouthern@networkrail.co.uk

Network Rail (High Speed)

Website location: Network Rail / Industry and Partners / Network interface - High Speed 1

NEW ENQUIRIES
AssetProtectionHighSpeed1@networkrail.co.uk

0 30 60 120 Miles

LEGEND

CH UK Postcode (within single NR Territory)

CH UK Postcode (split between NR Territories)

Rail Network

Please note that the route boundaries for the North West & Central Region are currently under review, and therefore this layer represents the latest available data in our systems. The representation of North West & Central regional boundaries in this layer may not represent latest boundary position. Care should be taken when using this information as this information is currently not being updated.

ASPRO NATIONAL MAP

CLIENT:	TECHNICAL AUTHORITY		
JOB NO.:	10519.120	USE TYPE:	[OFFICIAL]
SCALE :	1:3,000,000 @ A3	DATE:	10/04/2024
VERSION: 01	PRODUCED BY: DJ	QA BY: DJ	

NetworkRail
Asset Information Services

GeospatialReportingAnalysis@NetworkRail.co.uk

Order ID: 247980

ELR	Start Mileage	End Mileage
HDR	28.0110	28.0519

National Hazard Directory

Terms and Conditions

The National Hazard Directory (NHD) is issued by Network Rail to provide information on those hazards recorded as present on Network Rail's infrastructure. Its' purpose is to alert users to the typical hazards they may come across whilst working on Network Rail's Infrastructure. The National Hazard Directory is maintained by Network Rail to provide its employees and contractors with information on known hazards present on the infrastructure in order to assist in the identification of the associated risks working 'on or near the line'.

The records are updated regularly and therefore Network Rail believe that the contents are reasonably accurate at the time of issue, but some of the information can vary in age and accuracy so for that reason Network Rail will give no warranty as to the suitability of its use. It is recommended that all searches (in particular for buried services) should be conducted together with a site specific risk assessment/site visit, taking into account the requirements of the appropriate track safety rules, rule books/industry standards and so on. Network Rail will accept no liability in respect of the content or subsequent use of the National Hazard Directory or any of the information contained within.

Users of the Directory must note that when working on or near the line that the appropriate requirements of the Rule Book, especially the provisions of the track safety rules, must be applied as appropriate to the activity concerned.

OnTrac Ltd does not warrant the use of the Network Rail National Hazard Directory or any of the information contained within and no representations or warranties are made as to completeness or accuracy of the data. The data should be used for reference purposes only. Accordingly, OnTrac Ltd will accept no responsibility for loss of profit or for any indirect, incidental or consequential damages.

National Hazard Directory - Customised Report

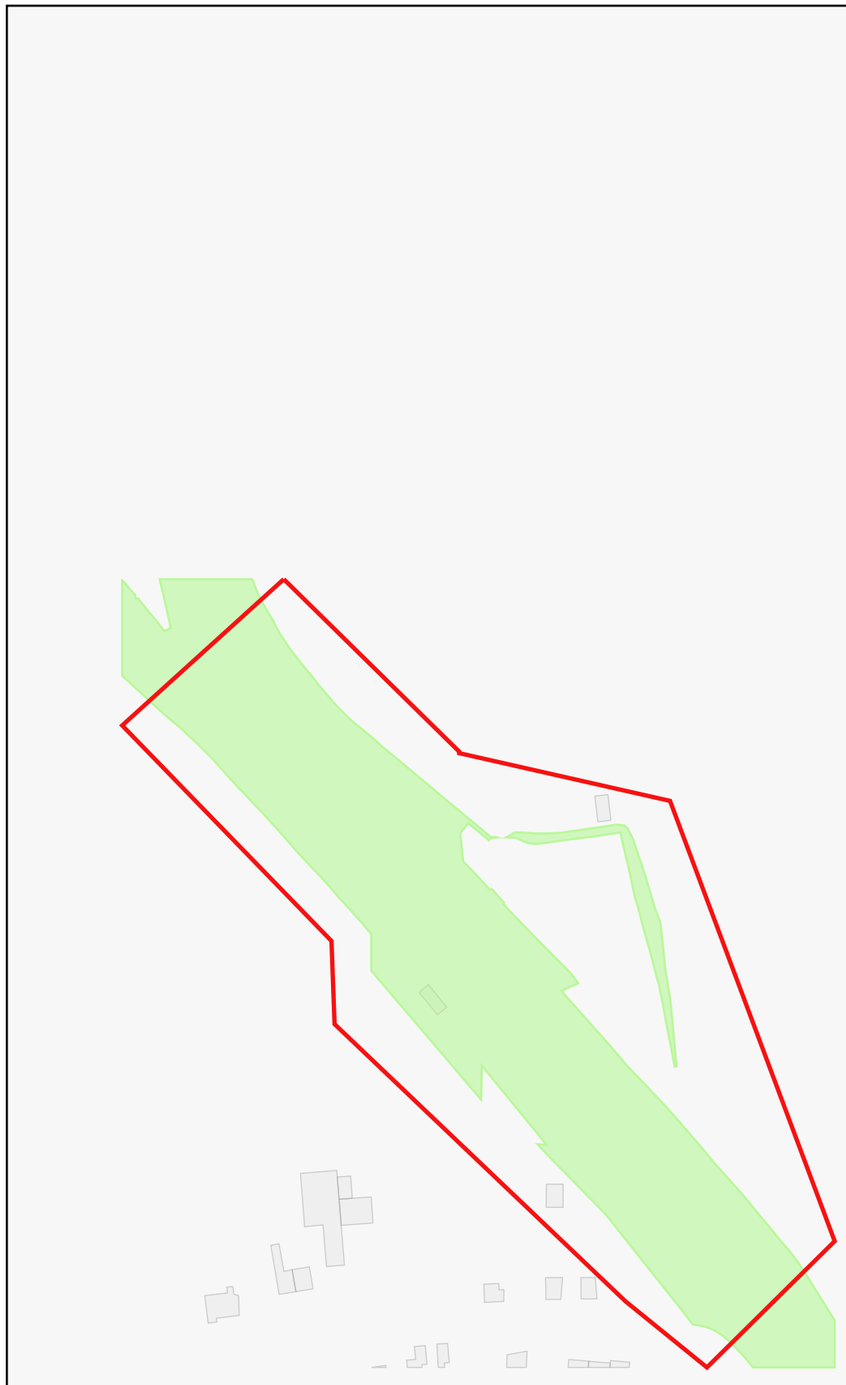
National Hazard Directory - Customised Report Template

No. of Records: **2**

Please find below buried services hazards returned from a search of the the National Hazard Directory. **All ELR extents that fall within your worksite have been searched.**
If any of those ELRs are NOT shown in the list of hazards below, buried services hazards have NOT been returned for that particular ELR/mileage.

No.	Hazard ID	ELR	Start Mileage	End Mileage	Hazard Description	Local Name	Free Text
1	70313903	HDR	25.0110	28.0924	Buried Electrical Cables	Denton S/S - Higham S/S	
2	110079824	HDR	28.0484	28.0484	Buried & Overhead Electric Cable	Higham	Elect. Line over & under Rly

Page Navigation Index Map (1:2500 scale maps)



Legend

Network Rail Company Ownership Boundary

Order Polygon

Order ID: 247980

Plot Date: 06/03/25

N

NetworkRail

User Drawn Polygon / Area of Interest - Order ID : 247980

Legend

Company Ownership

- Freehold Ownership
- Leasehold Ownership
- Prohibitive Interest
- Bridge (Rail over Rail)
- Bridge (Rail over River)
- Bridge (Rail over Road)
- Bridge (Road over Rail)
- Level Crossing
- Tunnel
- Order Polygon

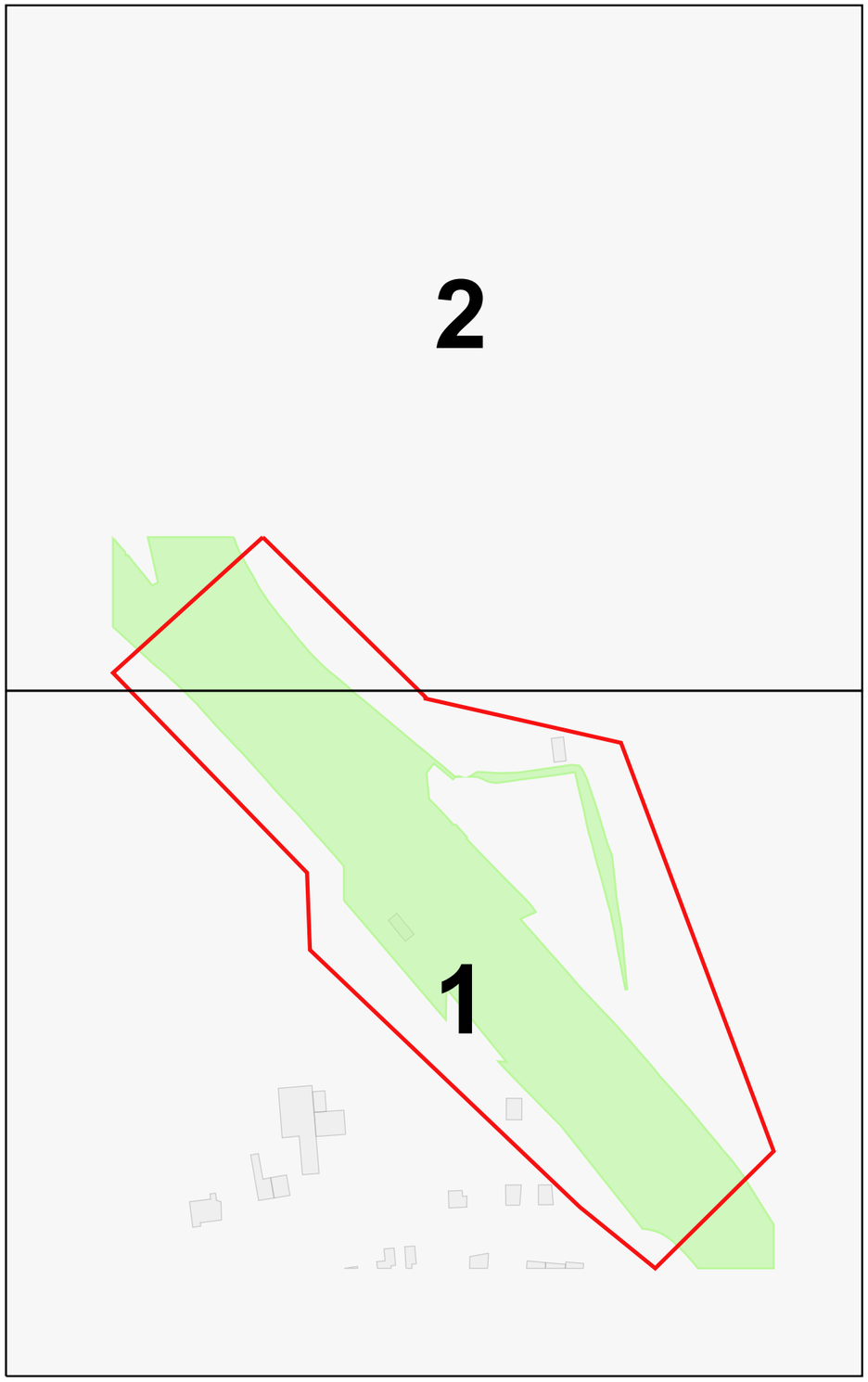
Nearest station:
Higham

Order ID: 247980

Order Ref: 247980
Plot Scale: 1:2500
Page Index: 1
Centre X, Y: 571385, 173179
Plot Date: 06/03/25

NetworkRail

Page Navigation Index Map (1:1250 scale maps)



Legend

Network Rail Company Ownership Boundary

Order Polygon

Order ID: 247980

Plot Date: 06/03/25

N

NetworkRail

Network Rail - Drainage

Legend

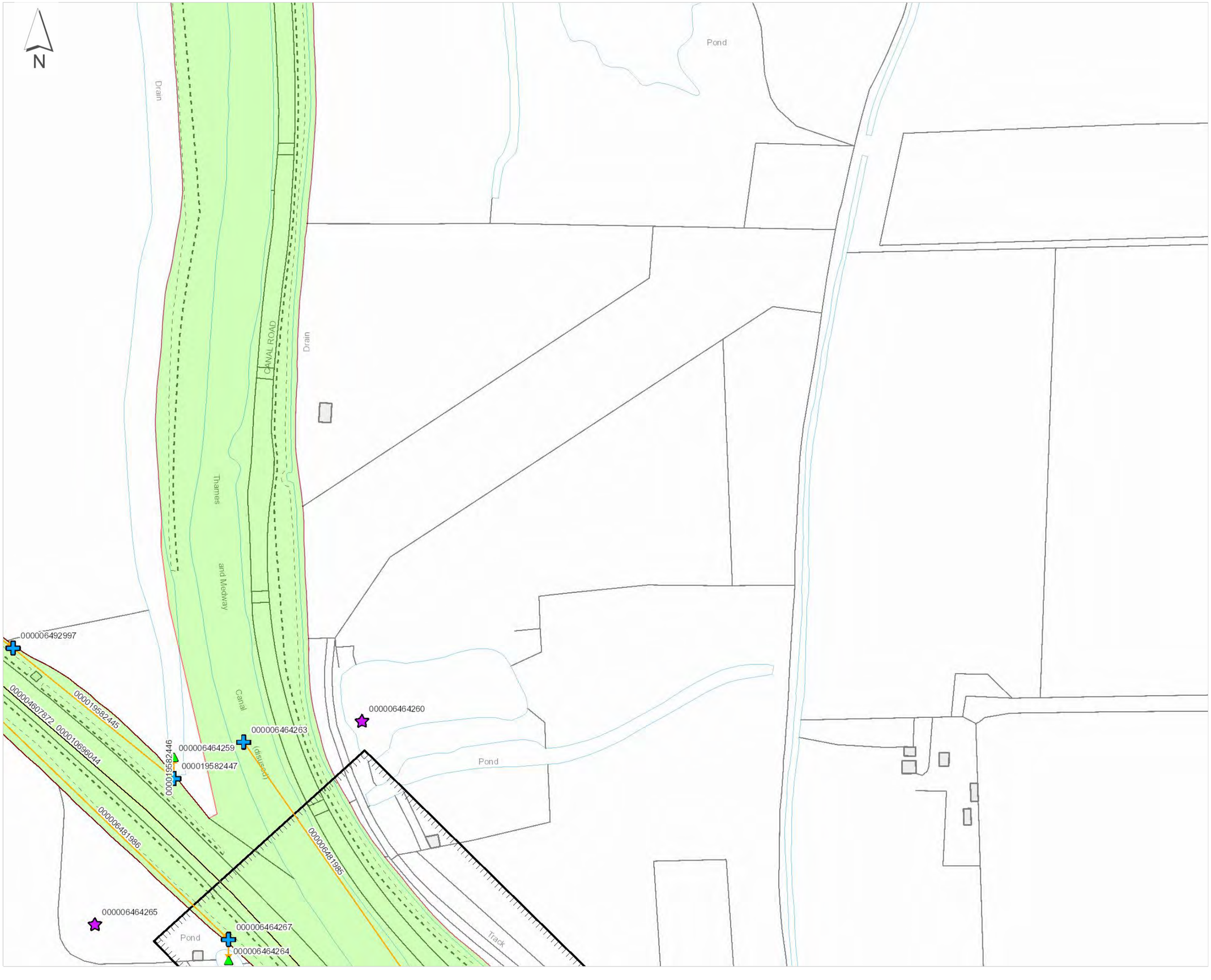
Company Ownership

- Freehold Ownership
- Leasehold Ownership
- Prohibitive Interest
- Bridge (Rail over Rail)
- Bridge (Rail over River)
- Bridge (Rail over Road)
- Bridge (Road over Rail)
- Level Crossing
- Tunnel
- Order Polygon

- DB Asset Line
- DC Asset Line
- Chamber (DD)
- Outfall (DK)
- Inflow (DL)
- Point (DM)
- Soakaway (DN)
- Pond (DY)
- Structure (DZ)
- Channel (ELR, Mileage)
- Channel (Coordinates)
- Covered Channel (ELR, Mileage)
- Covered Channel (Coordinates)
- Culvert (ELR, Mileage)
- Culvert (Coordinates)
- Granular Drain (ELR, Mileage)
- Granular Drain (Coordinates)
- Pipe (ELR and Mileage)
- Pipe (Coordinates)
- Syphon (ELR, Mileage)
- Syphon (Coordinates)

Order Ref: 247980
Plot Scale: 1:1250
Page Index: 1
Centre X, Y: 571187, 173020
Plot Date: 06/03/25

Network Rail - Drainage



Legend

Company Ownership

- Freehold Ownership
- Leasehold Ownership
- Prohibitive Interest
- Bridge (Rail over Rail)
- Bridge (Rail over River)
- Bridge (Rail over Road)
- Bridge (Road over Rail)
- Level Crossing
- Tunnel
- Order Polygon

- DB Asset Line
- DC Asset Line
- Chamber (DD)
- Outfall (DK)
- Inflow (DL)
- Point (DM)
- Soakaway (DN)
- Pond (DY)
- Structure (DZ)
- Channel (ELR, Mileage)
- Channel (Coordinates)
- Covered Channel (ELR, Mileage)
- Covered Channel (Coordinates)
- Culvert (ELR, Mileage)
- Culvert (Coordinates)
- Granular Drain (ELR, Mileage)
- Granular Drain (Coordinates)
- Pipe (ELR and Mileage)
- Pipe (Coordinates)
- Syphon (ELR, Mileage)
- Syphon (Coordinates)

Order Ref: 247980
Plot Scale: 1:1250
Page Index: 2
Centre X, Y: 571187, 173337
Plot Date: 06/03/25

NetworkRail

1. CHD: WCW 4-2-85
APP: AJG 14-4-85

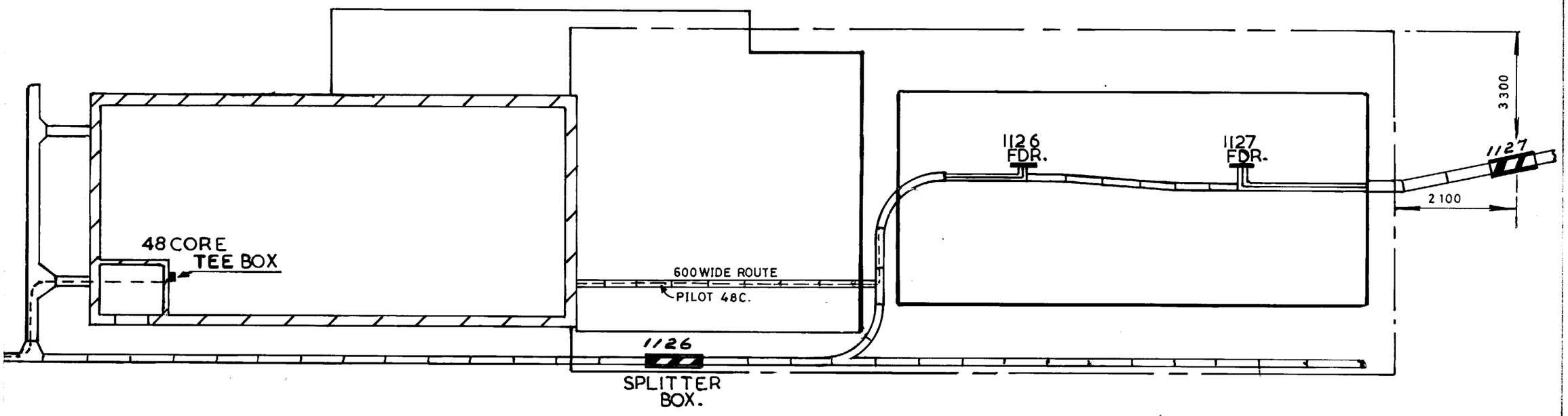
FDRS 1126 & 1127 WERE NUMBERED 126 & 127 RESPECTIVELY

HIGHAM SUBSTATION

To Hoo Junction
To Uralite T.P. Hut.

To Higham Stn.
To Strood S/stn.

← UP LINE



Standard metric troughing	S M T
Bell mouth in inspection chamber	
Surface route.	
Buried route.	
Lead to ducts.	
Surface feeder joint.	
Buried feeder joint	
Surface pilot joint	
Buried pilot joint	

Scale: 1:100

Dimensions are for route location only & do not refer to cable length

British Railways S.R. [illegible]

DENTON S/S. TO HIGHAM S/S.
FEEDER No.1126 & 48 CORE PILOT

HIGHAM S/S TO STROOD S/S
FEEDER No. 1127. & 48 CORE PILOT CABLE

Drn	App ~	Chart No TE/87B.
Chd WCW 17/12/73	Agd BJG 12-2-74	

BR 868/7

MY T00043 R

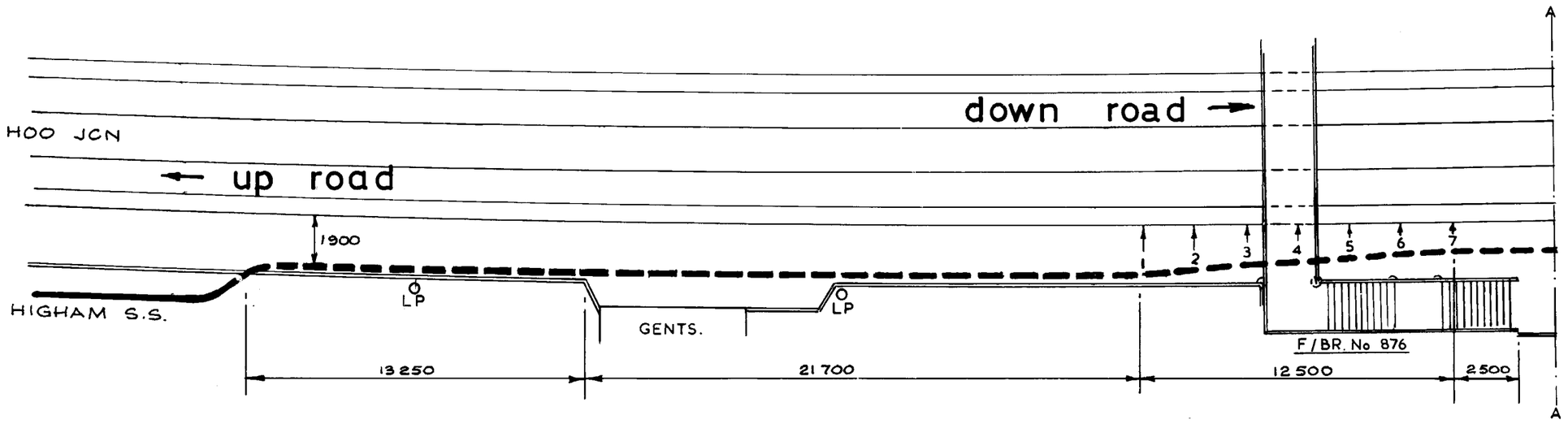
1.	CHD: KCW 4-2-88
	APP: AKOH 4-4-88

FDR WAS NUMBERED 127

← To Higham Substation, & Hoo Junction.

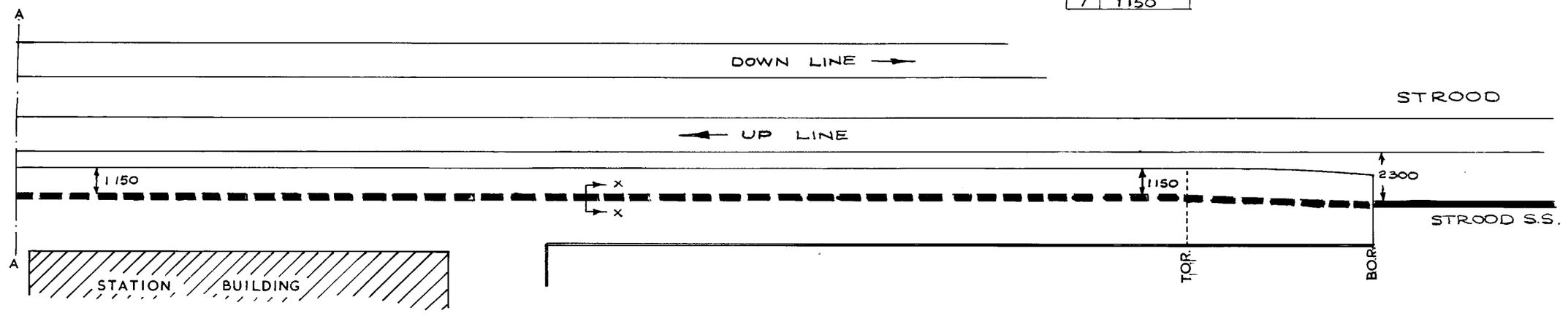
HIGHAM UP PLATFORM.

To Strood Station, & Substation →



1	1900
2	1750
3	1600
4	1450
5	1350
6	1250
7	1150

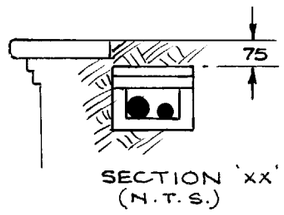
DISTANCE TO P'FORM EDGE AT 2000 INTERVALS.



Standard metric troughing:	S.M.T.
Bell mouth in inspection chamber.	
Surface route.	
Buried route.	
Lead to ducts.	
Surface feeder joint.	
Buried feeder joint.	
Surface pilot joint.	
Buried pilot joint.	

Scale: 1 : 200

Dimensions are for route location only & do not refer to cable length.



British Railways (S R) CM & E.E. Dept Southern House Croydon

HIGHAM S.S to STROOD S.S.

FEEDER 1127

48 core Pilot.

Drn	6/8/73	App.	~
Cha	17/2/88	Agd.	BJG. 12.2.74

Chart No 1E/88

BR. 888/77

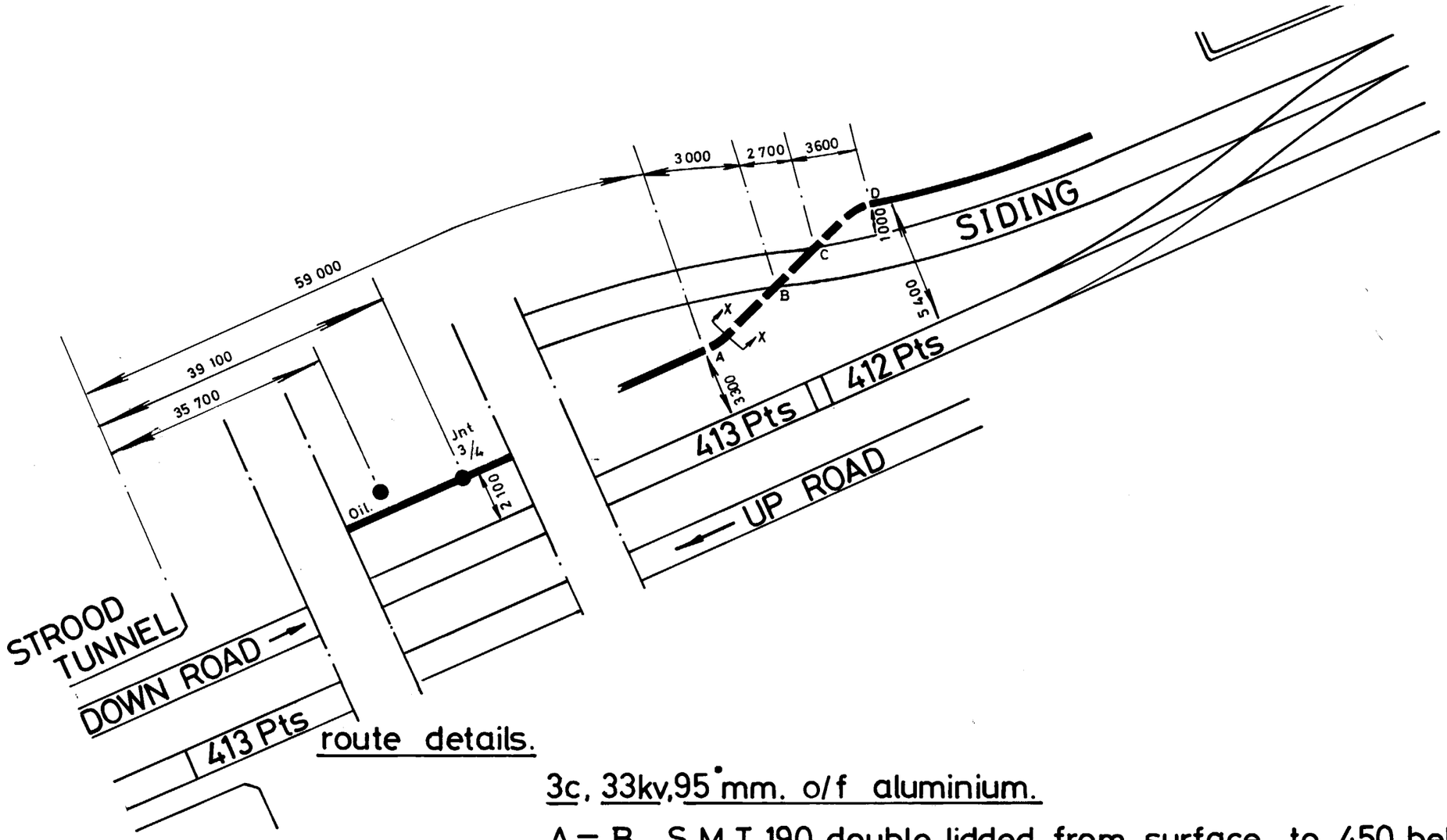
MY 100043 R

1. CHD: KCW 4·2·88
APP: AKO 14-4-88
FDR WAS NUMBERED 127

STROOD TRACK CROSSING.
(london end).

TO HIGHAM SUBSTATION.

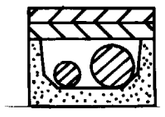
TO STROOD SUBSTATION.



route details.

3c, 33kv, 95 mm. o/f aluminium.

A – B S.M.T. 190 double lidded from surface to 450 below.
B – C " " " " at 450 below.
C – D " " " " from " " to surface.



section on XX.

Standard metric troughing:	S.M.T.
Bell mouth in inspection chamber.	
Surface route.	
Buried route.	
Lead to ducts.	
Surface feeder joint.	
Buried feeder joint.	
Surface pilot joint.	
Buried pilot joint.	
Scale:	**1 : 200**
Dimensions are for route location only & do not refer to cable length.	

British Railways (S.R.) CM & EE Dept. Southern House Croydon.

Higham S/s to Strood S/s.

FEEDER Nº. 1127.

& 48 Core Pilot Cable.

Drn	11-10-73	App ~	Chart Nº 1E/90
Chd	18-12-73	Agd BG 12-2-74	

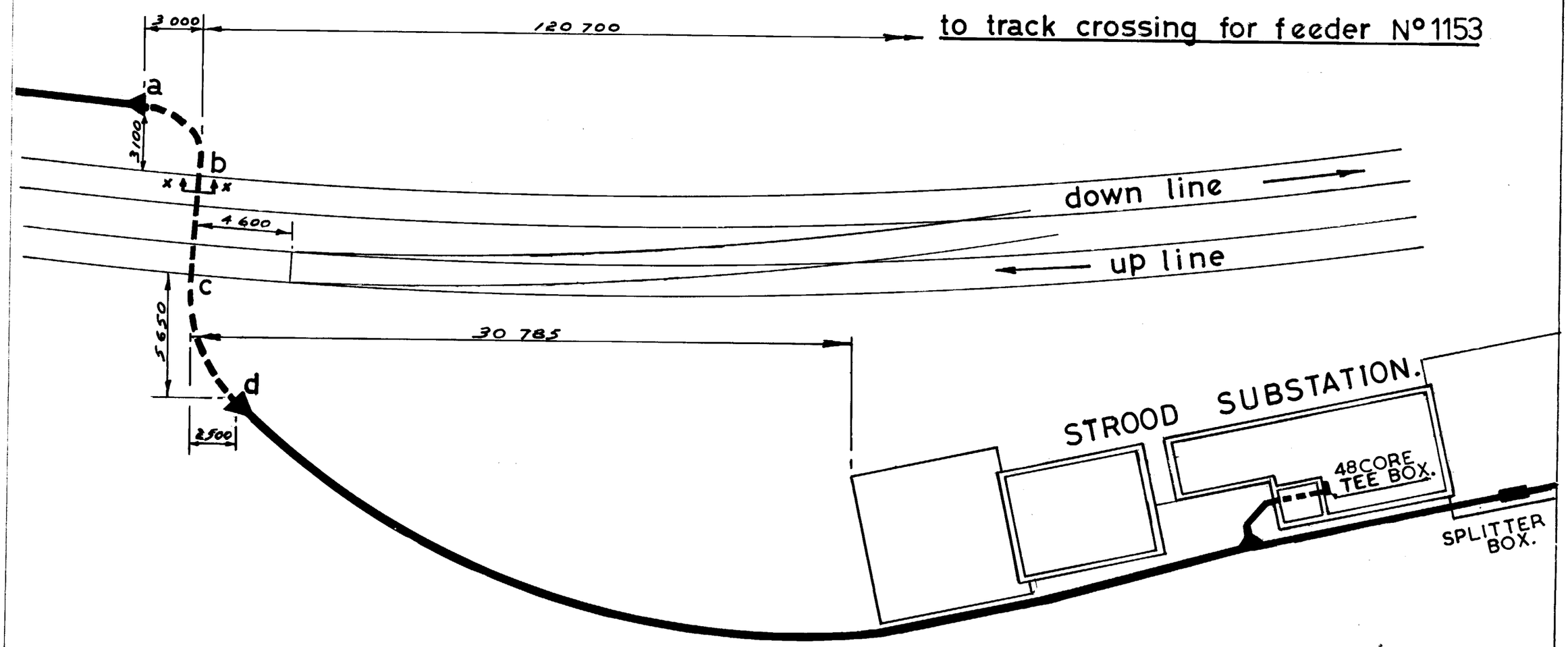
BR. 888/77

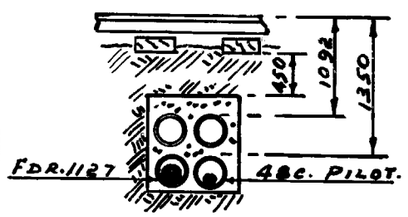
MY T00043 R

1	CHD: KCW 4-2-88 APP: AKO 4-4-88

FDRS 1127 & 1153 WERE NUMBERED 127 & 153 RESPECTIVELY

To Strood Station — 4 Way Track Crossing — To Rochester Station





View x-x

Route Notes.

a to b 4x5"a/c Tubes fall from bellmouth at surface to 1092 from top of running rail.

b to c See Section X-X

c to d 4X5"a/c Tubes rise to bellmouth at surface.

Standard metric troughing:	S.M.T.
Bell mouth in inspection chamber.	
Surface route.	
Buried route.	
Lead to ducts.	
Surface feeder joint.	
Buried feeder joint.	
Surface pilot joint.	
Buried pilot joint.	
Scale: 1:200	
Dimensions are for route location only & do not refer to cable length.	

British Railways (S R) CM. & EE. Dept. Southern House. Croydon.

Higham S/s. to Strood S/s.

FEEDER N° 1127

& 48 Core Pilot Cable.

Drn. MC. 19/12/73	App. ~	Chart No. 1E/92
Chd. MC. 19/12/73	Agd. BG 12-2-74	

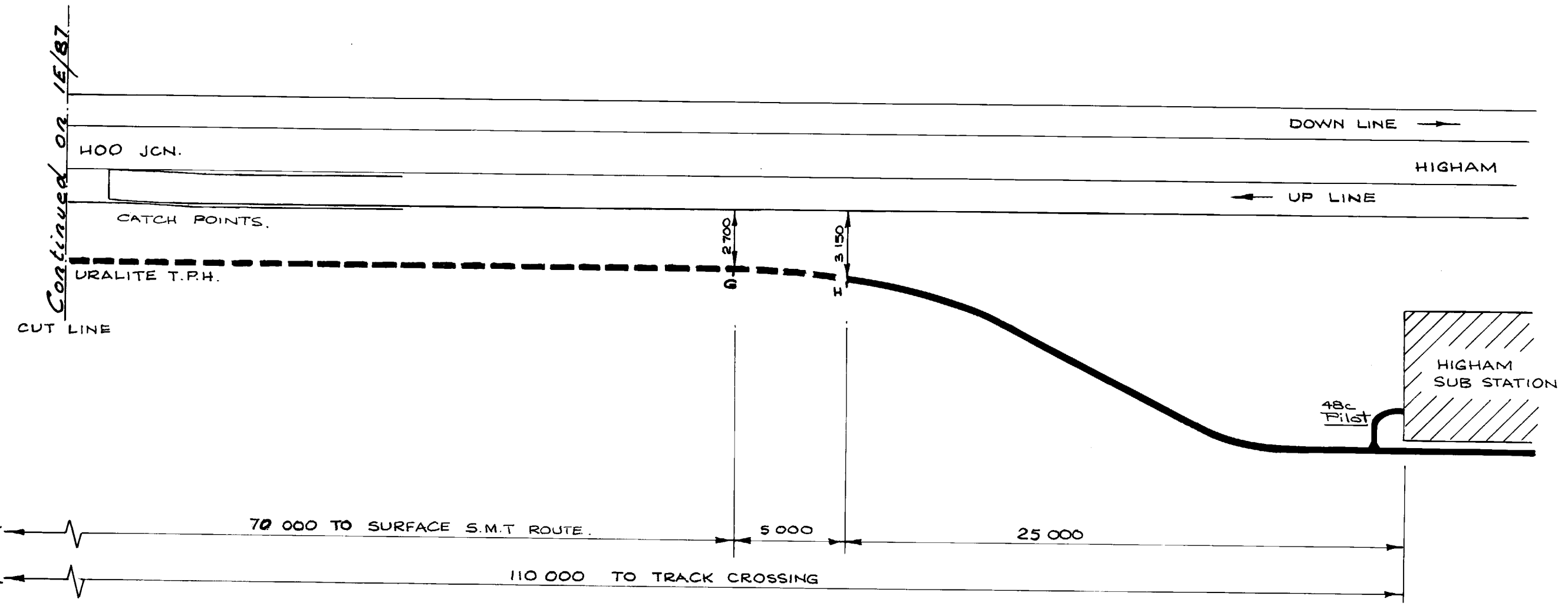
BR. 888/77

MY T00043 R

1. CHD: KCW 4-2-88
APP: AKO 14-4-88

FDR WAS NUMBERED 126

HIGHAM SUB. STATION.



Feeder : 3c, 33kv 95^{a} m.m. o/f aluminium.

ROUTE DETAILS

F – G. S.M.T 450 BELOW (See also 1E/87)

G – H. S.M.T FROM 450 BELOW TO SURFACE.

Standard metric troughing:	S.M.T.
Bell mouth in inspection chamber.	
Surface route.	
Buried route.	
Lead to ducts.	
Surface feeder joint.	
Buried feeder joint.	
Surface pilot joint.	
Buried pilot joint.	
Scale: 1 : 200	
Dimensions are for route location only & do not refer to cable length.	

SEE ALSO 1E/87B

British Railways (S R) CM & EE Dept. Southern House Croydon.

DENTON S.S to HIGHAM S.S.

FEEDER 1126

48 core Pilot.

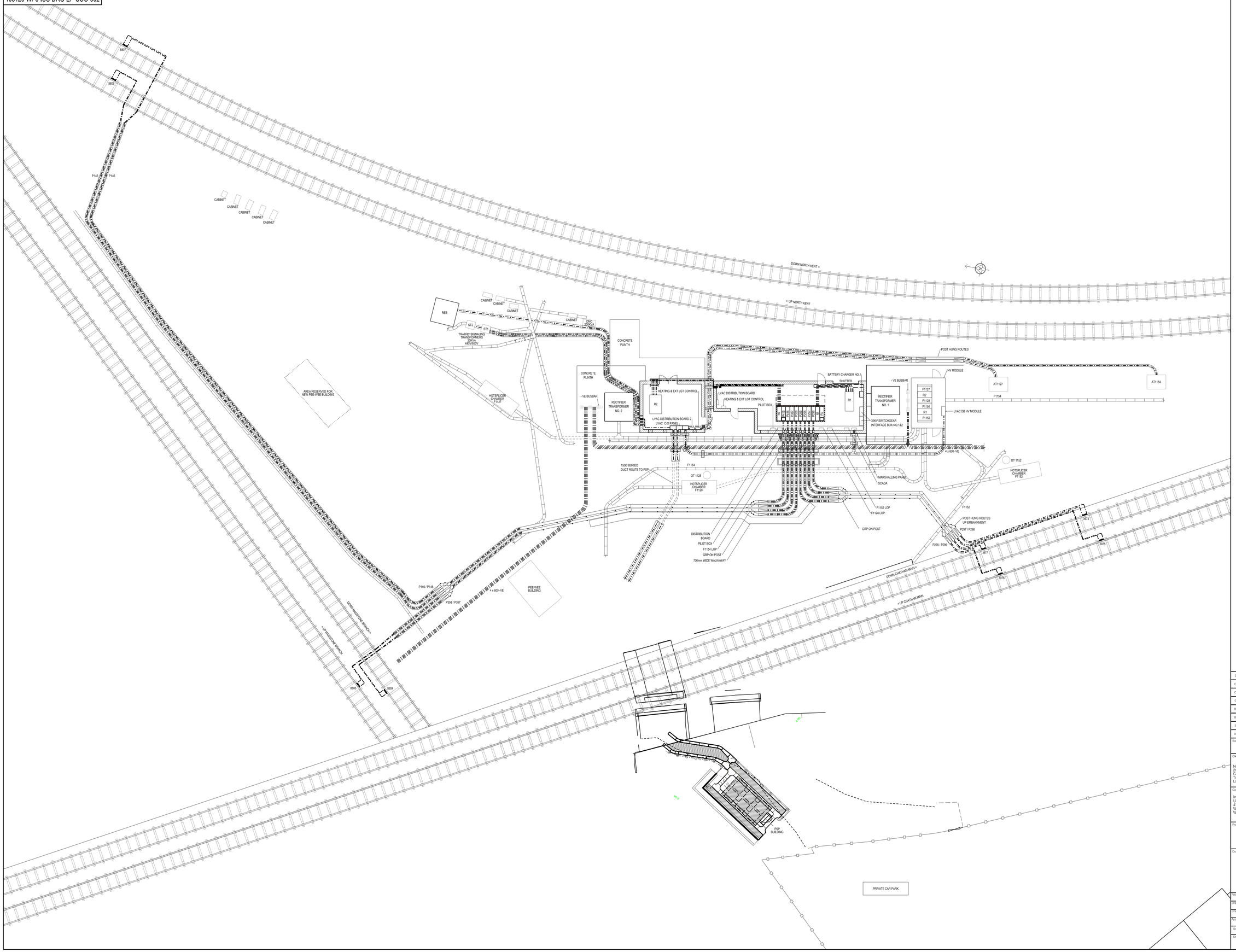
Drn JM 6/8/73.	App. ——	Chart No 1E/87/A
Chd ARC. 22-1-74	Agd. BG 29-1-74	

BR. 888/77

MY T00043 R

Drawing Number
103120-WP5-IUS-DRG-EP-SOO-002

DO NOT SCALE



KEY

- EQUIPMENT
- SURFACE LEVEL TROUGH ROUTE
- BRIDGING TROUGH ROUTE
- BURIED TROUGH ROUTE
- DC CABLES

Rev	Date	Description of Revisions	Drawn	Checked	Appr'd
Z01	05/04/16	AS BUILT ISSUE	MAD	MAZ	MAK
C03	04/01/16	CONSTRUCTION ISSUE	MAD	MAZ	MAK
C02	10/04/15	HV SWITCHGEAR RELOCATED	MAD	MAZ	MAK
C01	19/12/14	CONSTRUCTION ISSUE	MAD	MAZ	MAK
B03	04/12/14	FORM B ELECTRICAL POWER	MAD	MAZ	MAK
B02	08/01/14	FORM B ELECTRICAL POWER	SEB	MAK	MA
B01	07/07/13	FORM B ELECTRICAL POWER	DTP	MAK	MA

Status
AS BUILT ISSUE

Client
Network Rail South East
2nd Floor
Eistorns Centre
Tooley Street
London, SE1 2QG

Contractor
Integrated Utility Services
Unit 8, Brindley Way
41 Industrial Estate
Wakefield
WF2 0XQ

Project Title
103120 - WP5 - DC SWITCHGEAR RENEWALS

Drawing Title
SITE LAYOUT
STROOD SUBSTATION

Checked By	Name A.NEWSON	Sig.	Date 01/02/16
Drawn By	Name M.W.DAD	Sig.	Date 01/04/16
Checked By	Name M.AZHAR	Sig.	Date 01/04/16
Approved By	Name M.AKMAL	Sig.	Date 01/04/16

Scale 1:125 @ A0 | Sheet 1 of 1

Drawing Number
103120-WP5-IUS-DRG-EP-SOO-002

Revision
Z01

A0

DO NOT SCALE

Drawing Number
103120-WP5-IUS-DRG-EP-SOO-004

HVAC MODULAR BUILDING

H01 F1152 LOWER BUSH
H02 R1 RECTIFIER 1
H03 F1154 CHATHAM
H04 F1128 HALLING
H05 R2 RECTIFIER 2
H06 F1127 HIGHAM
H07 B1 E BUSBAR EARTH
HV MODULE DISTRIBUTION BOARD

REB MODULE

OUTDOOR EQUIPMENT

PSP SUPPLIES INSTALLED BY OTHERS

AT 1127
AT 1154
DNO
SIGNAL SUPPLY TX No.1
SIGNAL SUPPLY No.2 TX
PSP SUPPLY

RECTIFIER NO.2 ROOM BUILDING

R2 ROOM DISTRIBUTION BOARD

SUPPLY NO.1 | SUPPLY NO.2 | DNO SUPPLY
3 PANEL LVAC CHANGEOVER PANEL
SW 1 | SW 2 | SW 4 | SW 6 | SW 7 | SW 8 | SW 3 | SW 5 | IS 6

RECTIFIER 2
POSITIVE | NEGATIVE

PSP LVAC SUPPLY CABLE TO BE INSTALLED BY OTHERS

MAIN SUBSTATION BUILDING

LOP F1152
33kV SWITCHGEAR INTERFACE MARSHALLING BOX No.1
33kV SWITCHGEAR INTERFACE MARSHALLING BOX No.2
RECTIFIER 1
POSITIVE | NEGATIVE
SUBSTATION DISTRIBUTION BOARD
MARSHALLING PANEL (DC)
SCADA (RTU) PANEL
50V DC BATTERY CHARGER NO.1
DOOR ALARM
LOP F1128
LOP F1154

FRAME LEAKAGE PANEL
R1 MAIN DC BREAKER
P298 ROCHESTER DOWN
P297 ROCHESTER UP
P296 MERRALS SHAW DOWN
P295 MERRALS SHAW UP
P358 WICKHAM DOWN
P357 WICKHAM UP
P416 TUNNEL DOWN
P415 TUNNEL UP
R2 MAIN DC BREAKER

NEW DC SWITCHGEAR

300mm Cu G/Y CABLE TO 50 x 6mm Cu EARTH TAPE

TO THIRD RAIL

NOTES

1. FOR CABLE & TERMINATION SCHEDULE REFER TO 103120-WP5-IUS-DRG-EP-S00-010
2. EXISTING CABLES REMOVED FOR CLARITY
3. NEW EARTH CABLE TERMINATED ONTO EXISTING EARTHING SYSTEM
4. EXISTING R2 MAIN DCCB TO USED FOR TEMPORARY MODULES AND TO BE REMOVED AFTER FINISHING TEMPORARY WORKS

KEY

- CONTROL/INDICATION MULTI CORES
- CONTROL/INDICATION SINGLE CORES
- LV DC SUPPLIES SINGLE CORES
- LV AC SUPPLIES
- POSITIVE DC CABLING
- REFERENCE NEGATIVE
- TRACK FEEDER CABLES
- EXISTING EQUIPMENT
- INSTALLED EQUIPMENT
- ANALOGUE SIGNAL CABLE
- BUTT JOINT
- EARTH GLANDS TO INDUSTRIAL STANDARD
- INSULATED GLANDS TO INDUSTRIAL STANDARD

Rev.	Date	Description of Revisions	Drawn	Checked	Apprvd
Z01	01/04/16	AS BUILT ISSUE	MWD	MAZ	MAK
C01	19/12/14	CONSTRUCTION ISSUE	MWD	MAZ	MAK
B03	04/12/14	FORM B ELECTRICAL POWER	MWD	MAZ	MAK
B02	09/01/14	FORM B ELECTRICAL POWER	SEB	MAK	MA
B01	07/07/13	CONSTRUCTION ISSUE	DTP	MAK	MA

Status
AS BUILT ISSUE

Client
Network Rail South East
2nd Floor
Cottons Centre
Tooley Street
London, SE1 2QG

Contractor
Integrated Utility Services
Unit 8, Brindley Way
41 Industrial Estate
Wakefield
WF2 0XQ

Project Title
103120 - WP5 - DC SWITCHGEAR RENEWALS

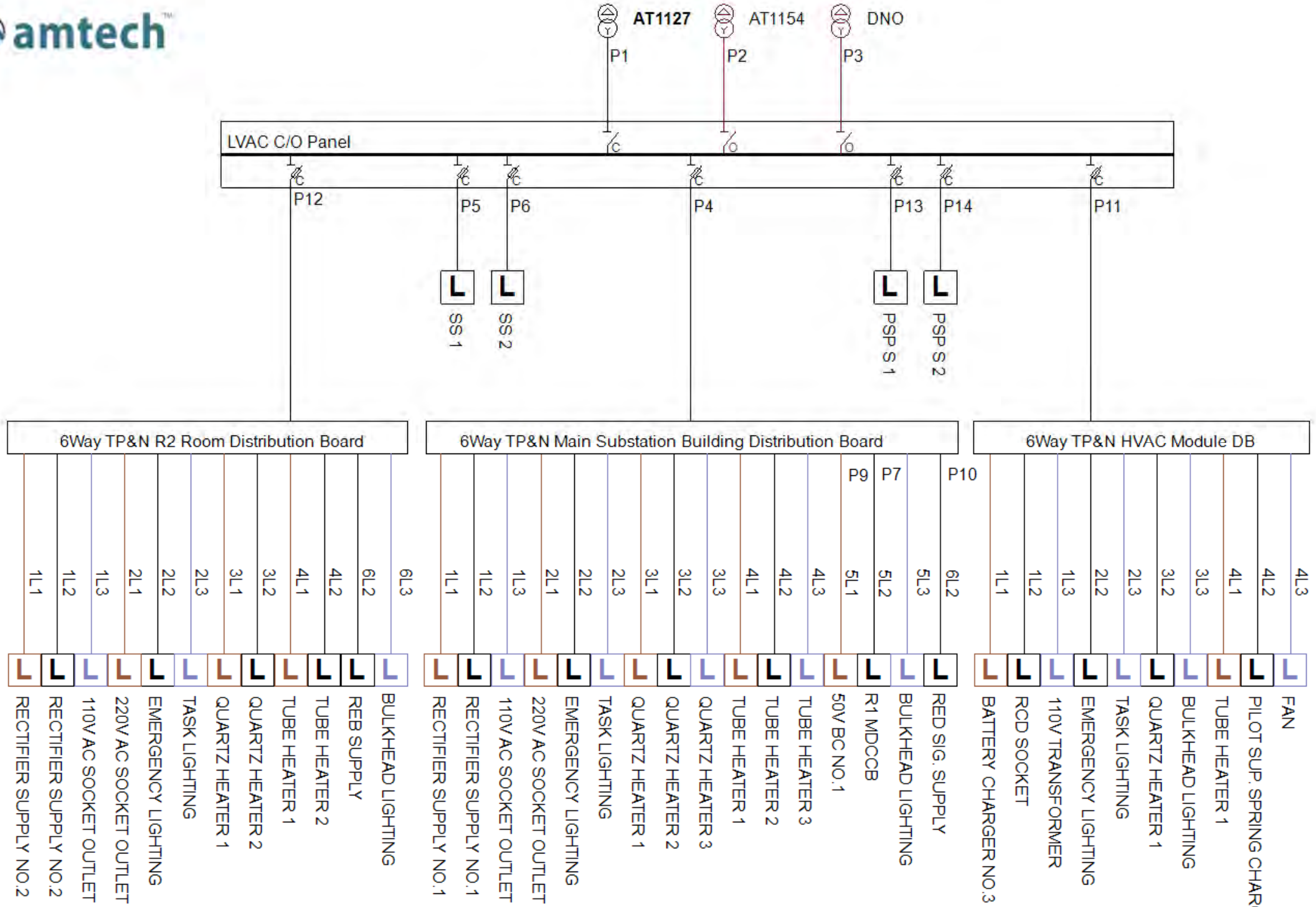
Drawing Title
CABLE BLOCK DIAGRAM
STROOD SUBSTATION

	Name	Sig.	Date
Redlined By	D.KANE		01/02/16
Drawn By	M.W.DAD		01/04/16
Checked By	M.AZHAR		01/04/16
Approved By	M.AKMAL		01/04/16

Scale NTS @ A1
Sheet 1 of 1

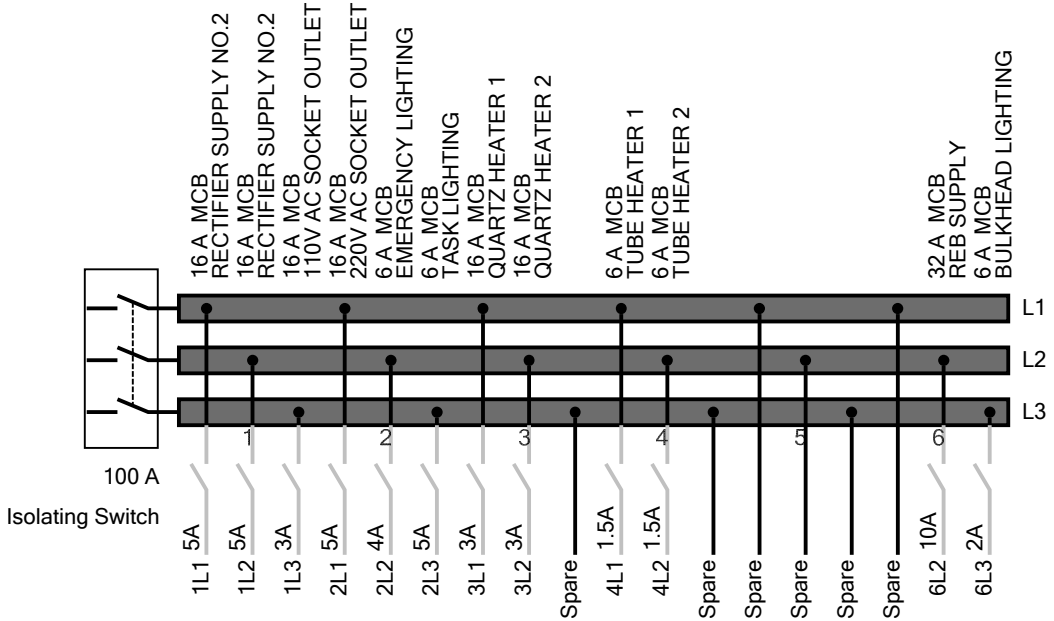
Drawing Number 103120-WP5-IUS-DRG-EP-SOO-004
Revision Z01

A1


AT1127
AT1154
DNO
P1
P2
P3
LVAC C/O Panel
C
O
O
P12
P5
P6
P4
P13
P14
P11
SS 1
SS 2
PSP S 1
PSP S 2
6Way TP&N R2 Room Distribution Board
6Way TP&N Main Substation Building Distribution Board
6Way TP&N HVAC Module DB
P9
P7
P10
1L1
1L2
1L3
2L1
2L2
2L3
3L1
3L2
4L1
4L2
6L2
6L3
5L1
5L2
5L3
4L3
RECTIFIER SUPPLY NO.2
RECTIFIER SUPPLY NO.2
110V AC SOCKET OUTLET
220V AC SOCKET OUTLET
EMERGENCY LIGHTING
TASK LIGHTING
QUARTZ HEATER 1
QUARTZ HEATER 2
TUBE HEATER 1
TUBE HEATER 2
REB SUPPLY
BULKHEAD LIGHTING
RECTIFIER SUPPLY NO.1
RECTIFIER SUPPLY NO.1
110V AC SOCKET OUTLET
220V AC SOCKET OUTLET
EMERGENCY LIGHTING
TASK LIGHTING
QUARTZ HEATER 1
QUARTZ HEATER 2
QUARTZ HEATER 3
TUBE HEATER 1
TUBE HEATER 2
TUBE HEATER 3
50V BC NO.1
R1 MDCCB
BULKHEAD LIGHTING
RED SIG. SUPPLY
BATTERY CHARGER NO.3
RCD SOCKET
110V TRANSFORMER
EMERGENCY LIGHTING
TASK LIGHTING
QUARTZ HEATER 1
BULKHEAD LIGHTING
TUBE HEATER 1
PILOT SUP. SPRING CHARG
FAN

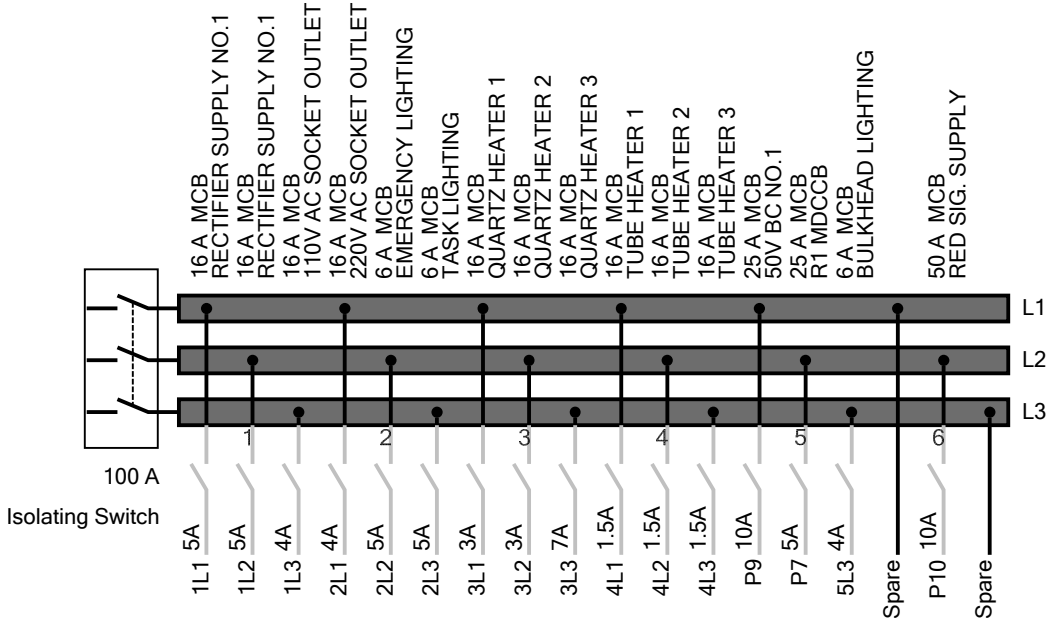
DISTRIBUTION BOARD CIRCUIT DIAGRAM

Id No. : 6Way TP&N R2 Room Distribution Board Location : West Wickham Substation



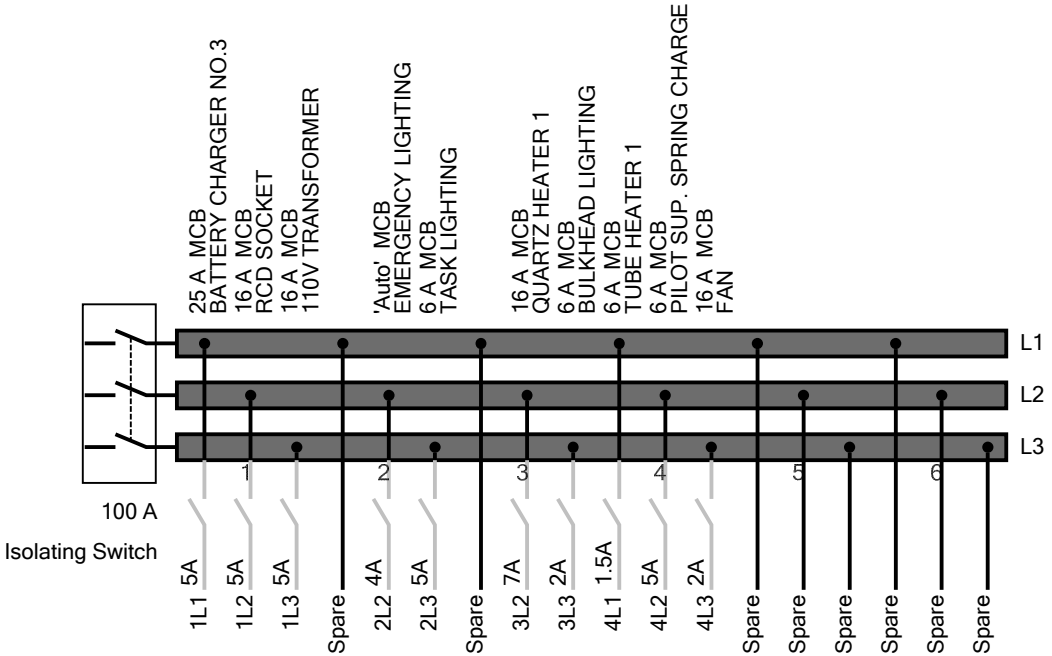
DISTRIBUTION BOARD CIRCUIT DIAGRAM

Id No. : 6Way TP&N Main Substation Building Distribution Board Location : West Wickham Substation



DISTRIBUTION BOARD CIRCUIT DIAGRAM

Id No. : 6Way TP&N HVAC Module DB Location : West Wickham Substation



Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L1** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **RECTIFIER SUPPLY NO.1**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **10**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 8	Cg	= 0.52	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 5.0			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.0			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	5.0 / 1.00	0.0 / 0.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.87 / 0.38	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.27 / 2.73	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 1.5 [a] — [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.09000	Z2 0.14500	Zs 0.42263	Max. Zs 1.43762	0.55
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.713 / 0.609
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L1** Name:

Connected From: **6Way TP&N R2 Room Distribution Board /1/L** **To:** **RECTIFIER SUPPLY NO.2**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **10**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 8	Cg	= 0.52	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 5.0			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.0			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	5.0 / 1.00	0.0 / 0.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.87 / 0.38	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.27 / 2.73	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.09000	Z2 0.14500	Zs 0.42263	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.55
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.713 / 0.609
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L1** Name:
Connected From: **6Way TP&N HVAC Module DB/1/L1** **To:** **BATTERY CHARGER NO.3**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 25 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **10 [f]**
Neutral: 10 mm² [a] **Length (m):** **40**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 5.0		Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 25	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 26.2		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 57.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	5.0 / 1.00	0.0 / 0.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.86 / 0.37	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.26 / 2.72	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 2.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.08800	Z2 0.36000	Zs 0.71510	Max. Zs 0.91996	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 2.5 [a]	0.32
CPC Adiabatic check (mm²)	CPC Section = Separate 2.5			Total = 2.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.720 / 0.615
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 1.32 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L2** Name:
Connected From: **6Way TP&N R2 Room Distribution Board /1/L** **To:** **RECTIFIER SUPPLY NO.2**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 16 [f] Overload Setting Ir (A): N/A
RCD Trip rating : 0.03A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **10**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 8	Cg	= 0.52	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 5.0			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.0			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	5.0 / 1.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.87 / 0.38	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	6.27 / 2.73	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 1.5 [a] — [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.09000	Z2 0.14500	Zs 0.42263	Max. Zs 7,668.98856	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		0.55
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.713 / 0.609
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L2** Name:

Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **RECTIFIER SUPPLY NO.1**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

RCD Trip rating : 0.03A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **10**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 8	Cg	= 0.52	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 5.0			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.0			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	5.0 / 1.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.87 / 0.38	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	6.27 / 2.73	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.09000	Z2 0.14500	Zs 0.42263	Max. Zs 7,668.98856	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.55
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.713 / 0.609
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L2** Name:

Connected From: **6Way TP&N HVAC Module DB/1/L2** **To:** **RCD SOCKET**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **40**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 5.0			Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.8			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	5.0 / 1.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	3.54 / 1.54	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	8.94 / 3.89	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.36000	Z2 0.58000	Zs 1.20399	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.19
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.302 / 0.253
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L3** Name:
Connected From: **6Way TP&N HVAC Module DB/1/L3** **To:** **110V TRANSFORMER**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **40**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 5.0			Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.8			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	5.0 / 1.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	3.54 / 1.54	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	8.94 / 3.89	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.36000	Z2 0.58000	Zs 1.20399	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.19
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.302 / 0.253
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L3** Name:

Connected From: **6Way TP&N R2 Room Distribution Board /1/L** **To:** **110V AC SOCKET OUTLET**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 3.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type D BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **10**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 8	Cg	= 0.52	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 3.0			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.4			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	3.0 / 1.00	3.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	0.52 / 0.23	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	5.92 / 2.58	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.09000	Z2 0.14500	Zs 0.42263	Max. Zs 1.02683	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.55
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.713 / 0.609
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **1L3** Name:

Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **110V AC SOCKET OUTLET**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 4.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type D BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **40**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 4.0		
Device Rating In	= 16	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.1		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	4.0 / 1.00	4.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	2.83 / 1.23	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	8.23 / 3.58	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 2.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.36000	Z2 0.36000	Zs 0.89962	Max. Zs 1.02683	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 2.5 [a]	0.26
CPC Adiabatic check (mm²)	CPC Section = Separate 2.5			Total = 2.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.302 / 0.253
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **2L1** Name:

Connected From: **6Way TP&N R2 Room Distribution Board /2/L** **To:** **220V AC SOCKET OUTLET**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C120H Type C

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

RCD Trip rating : 0.03A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **10**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 8	Cg	= 0.52	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 5.0			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.0			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	5.0 / 1.00	0.0 / 0.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.87 / 0.38	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.27 / 2.73	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.09000	Z2 0.14500	Zs 0.42263	Max. Zs 7,668.98856	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.55
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.30	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.713 / 0.609
Protective Device Breaking Capacity (kA)	Icu: 15 Ics: 7.5	

Adiabatic Check:	CPD Energy Let-through (A²s): 1,391.28	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **2L1** Name:

Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **220V AC SOCKET OUTLET**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 4.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **40**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 4.0		Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 17.1		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	4.0 / 1.00	0.0 / 0.00	0.0 / 0.00	4.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	2.83 / 1.23	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	8.23 / 3.58	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.36000	Z2 0.58000	Zs 1.11826	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.21
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.302 / 0.253
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **2L2** Name:
Connected From: **6Way TP&N HVAC Module DB/2/L2** **To:** **EMERGENCY LIGHTING**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 4.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C120H Type C
Rating In (A): 10 [a] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**
Neutral: 1.5 mm² [a] **Length (m):** **40**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 4.0			
Device Rating In	= 10	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 11.7			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	4.0 / 1.00	0.0 / 0.00	4.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	4.57 / 1.99	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	9.97 / 4.33	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.58000	Z2 0.58000	Zs 1.42330	Max. Zs 2.29997	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.01			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.16
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.13	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.205 / 0.171
Protective Device Breaking Capacity (kA)	Icu: 15 Ics: 7.5	

Adiabatic Check:	CPD Energy Let-through (A²s): 224.50	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **2L2** Name:
Connected From: **6Way TP&N R2 Room Distribution Board /2/L** **To:** **EMERGENCY LIGHTING**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 4.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**
Neutral: 1.5 mm² [a] **Length (m):** **40**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 4.0		Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 6	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 9.8		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	4.0 / 1.00	0.0 / 0.00	4.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	4.57 / 1.99	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	9.97 / 4.33	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 1.5 [a] — [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.58000	Z2 0.58000	Zs 1.33735	Max. Zs 3.83335	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.17
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.205 / 0.171
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 4,000.00	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **2L2** Name:

Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **EMERGENCY LIGHTING**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**

Neutral: 1.5 mm² [a] **Length (m):** **40**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 5.0		Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 6	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 12.2		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	5.0 / 1.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	5.73 / 2.49	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	11.13 / 4.84	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.58000	Z2 0.58000	Zs 1.33735	Max. Zs 3.83335	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.17
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.205 / 0.171
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A^2s): 4,000.00	Adiabatic Limit k^2S^2 (A^2s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **2L3** Name:
Connected From: **6Way TP&N R2 Room Distribution Board /2/L** **To:** **TASK LIGHTING**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**
Neutral: 1.5 mm² [a] **Length (m):** **40**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 5.0			
Device Rating In	= 6	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 12.2			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	5.0 / 1.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	5.73 / 2.49	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	11.13 / 4.84	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 1.5 [a] — [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.58000	Z2 0.58000	Zs 1.33735	Max. Zs 3.83335	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.17
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.205 / 0.171
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 4,000.00	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **2L3** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **TASK LIGHTING**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**
Neutral: 1.5 mm² [a] **Length (m):** **40**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 5.0			
Device Rating In	= 6	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 12.2			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	5.0 / 1.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	5.73 / 2.49	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	11.13 / 4.84	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.58000	Z2 0.58000	Zs 1.33735	Max. Zs 3.83335	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.17
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.205 / 0.171
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 4,000.00	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **2L3** Name:
Connected From: **6Way TP&N HVAC Module DB/2/L3** **To:** **TASK LIGHTING**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**
Neutral: 1.5 mm² [a] **Length (m):** **40**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 5.0		Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 6	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 12.2		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	5.0 / 1.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	5.73 / 2.49	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	11.13 / 4.84	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.58000	Z2 0.58000	Zs 1.42330	Max. Zs 3.83335	0.16
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.205 / 0.171
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 4,000.00	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **3L1** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **QUARTZ HEATER 1**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 3.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **30**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 3.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.7		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	3.0 / 1.00	0.0 / 0.00	0.0 / 0.00	3.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	1.59 / 0.69	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.99 / 3.04	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.27000	Z2 0.43500	Zs 0.88474	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.26
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.375 / 0.315
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **3L1** Name:

Connected From: **6Way TP&N R2 Room Distribution Board /3/L** **To:** **QUARTZ HEATER 1**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 3.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **30**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 3.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.7		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	3.0 / 1.00	0.0 / 0.00	0.0 / 0.00	3.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	1.59 / 0.69	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.99 / 3.04	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.27000	Z2 0.43500	Zs 0.88474	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.26
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.375 / 0.315
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **3L2** Name:

Connected From: **6Way TP&N HVAC Module DB/3/L2** **To:** **QUARTZ HEATER 1**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 7.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **30**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 7.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 19.3		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	7.0 / 1.00	0.0 / 0.00	7.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	3.74 / 1.63	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	9.14 / 3.97	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.27000	Z2 0.43500	Zs 0.97009	Max. Zs 1.43762	0.24
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.375 / 0.315
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **3L2** Name:
Connected From: **6Way TP&N R2 Room Distribution Board /3/L** **To:** **QUARTZ HEATER 2**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 3.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **30**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 3.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.7		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	3.0 / 1.00	0.0 / 0.00	3.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	1.59 / 0.69	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	6.99 / 3.04	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.27000	Z2 0.43500	Zs 0.88474	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.26
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.375 / 0.315
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **3L2** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **QUARTZ HEATER 2**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 3.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **30**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 3.0			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.7			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	3.0 / 1.00	0.0 / 0.00	3.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	1.59 / 0.69	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	6.99 / 3.04	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 1.5 [a] — [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.27000	Z2 0.43500	Zs 0.88474	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.26
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.375 / 0.315
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **3L3** Name:
Connected From: **6Way TP&N HVAC Module DB/3/L3** **To:** **BULKHEAD LIGHTING**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 2.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**
Neutral: 1.5 mm² [a] **Length (m):** **40**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Plastic

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.8 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 2.0			
Device Rating In	= 6	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 6.7			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	2.0 / 1.00	2.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	2.27 / 0.99	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	7.67 / 3.34	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.58000	Z2 0.58000	Zs 1.42330	Max. Zs 3.83335	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.16
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.205 / 0.171
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A^2s): 4,000.00	Adiabatic Limit k^2S^2 (A^2s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **3L3** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **QUARTZ HEATER 3**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 7.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C120H Type C
Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **30**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 7.0			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 19.3			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	7.0 / 1.00	7.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	3.74 / 1.63	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	9.14 / 3.97	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.27000	Z2 0.43500	Zs 0.88474	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.26
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.17	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.375 / 0.315
Protective Device Breaking Capacity (kA)	Icu: 15 Ics: 7.5	

Adiabatic Check:	CPD Energy Let-through (A²s): 519.55	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **4L1** Name:

Connected From: **6Way TP&N HVAC Module DB/4/L1** **To:** **TUBE HEATER 1**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 1.5

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**

Neutral: 1.5 mm² [a] **Length (m):** **25**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 1.5		Voltage drop limit = 18.63 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 6	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 6.4		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	1.5 / 1.00	0.0 / 0.00	0.0 / 0.00	1.5
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	1.06 / 0.46	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.47 / 2.81	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.36250	Z2 0.36250	Zs 0.98997	Max. Zs 3.83335	0.23
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.300 / 0.252
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 4,000.00	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **4L1** Name:

Connected From: **6Way TP&N R2 Room Distribution Board /4/L** **To:** **TUBE HEATER 1**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 1.5

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**

Neutral: 1.5 mm² [a] **Length (m):** **25**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 1.5			Voltage drop limit = 18.63 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 6	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 6.4			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	1.5 / 1.00	0.0 / 0.00	0.0 / 0.00	1.5
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	1.06 / 0.46	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.47 / 2.81	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.36250	Z2 0.36250	Zs 0.90458	Max. Zs 3.83335	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.26
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.300 / 0.252
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 4,000.00	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **4L1** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **TUBE HEATER 1**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 1.5

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **25**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.63 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 1.5			
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.2			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	1.5 / 1.00	0.0 / 0.00	0.0 / 0.00	1.5
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.66 / 0.29	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	6.06 / 2.64	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 1.5 [a] — [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.22500	Z2 0.36250	Zs 0.76832	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.30
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.426 / 0.359
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **4L2** Name:
Connected From: **6Way TP&N R2 Room Distribution Board /4/L** **To:** **TUBE HEATER 2**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 1.5

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [f]**
Neutral: 1.5 mm² [a] **Length (m):** **25**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 1.5			Voltage drop limit = 18.63 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 6	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 6.4			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	1.5 / 1.00	0.0 / 0.00	1.5
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	1.06 / 0.46	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	6.47 / 2.81	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 1.5 [a] — [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.36250	Z2 0.36250	Zs 0.90458	Max. Zs 3.83335	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.26
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.300 / 0.252
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 4,000.00	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **4L2** Name:

Connected From: **6Way TP&N HVAC Module DB/4/L2** **To:** **PILOT SUP. SPRING CHARGE**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **1.5 [a]**

Neutral: 1.5 mm² [a] **Length (m):** **30**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 5.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 6	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 12.2		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 17.5		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	5.0 / 1.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	4.30 / 1.87	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	9.70 / 4.22	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.43500	Z2 0.43500	Zs 1.13427	Max. Zs 3.83335	0.20
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.260 / 0.218
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 4,000.00	Adiabatic Limit k²S² (A²s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **4L2** Name:

Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **TUBE HEATER 2**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 1.5

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **25**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 1.5		Voltage drop limit = 18.63 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.2		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	1.5 / 1.00	0.0 / 0.00	1.5
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.66 / 0.29	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	6.06 / 2.64	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.22500	Z2 0.36250	Zs 0.76832	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		0.30
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.426 / 0.359
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **4L3** Name:

Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **TUBE HEATER 3**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 1.5

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898

Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**

Neutral: 2.5 mm² [a] **Length (m):** **25**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 1.5			Voltage drop limit = 18.63 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.2			[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	1.5 / 1.00	1.5
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	0.66 / 0.29	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	6.06 / 2.64	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.22500	Z2 0.36250	Zs 0.76832	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		0.30
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.426 / 0.359
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **4L3** Name:
Connected From: **6Way TP&N HVAC Module DB/4/L3** **To:** **FAN**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 2.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 16 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **2.5 [f]**
Neutral: 2.5 mm² [a] **Length (m):** **30**
6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 13	Cg	= 0.41	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 2.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 16	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 16.3		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 24.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	2.0 / 1.00	2.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	1.06 / 0.46	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	6.46 / 2.81	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.27958	Z1 0.27000	Z2 0.43500	Zs 0.97009	Max. Zs 1.43762	0.24
Disconnection time (s)	From characteristic: 0.02				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.375 / 0.315
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 82.66 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **5L3** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **BULKHEAD LIGHTING**
Load Type: **Heating and power, single phase** Design Current Ib (A): 4.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type B BS EN60898
Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **6 x 2 x 1c** **Size (mm²):** **1.5 [a]**
Neutral: 1.5 mm² [a] **Length (m):** **30**
10 - In suspended trunking Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 3	Cg	= 0.38	[BS 7671, Table 4C1]	Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 4.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 6	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 2.6		[BS 7671, Appendix 4.5, Formula (2)]
Actual Cable Rating It	= 17.5		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	4.0 / 1.00	4.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	0.57 / 0.25	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	5.97 / 2.60	-----

Earth Fault

Circuit Protective Conductor (mm²) runking 148 + Separate 1.5 [f] [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.07250	Z2 0.03067	Zs 0.29749	Max. Zs 7.66686	0.78
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Trunking 148 + Separate 1.5 [f]	
CPC Adiabatic check (mm²)	CPC Section = Trunking 60.5 + Separate 1.5			Total = 62.0	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.779 / 0.668
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A^2s): 4,000.00	Adiabatic Limit k^2S^2 (A^2s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **6L2** Name:

Connected From: **6Way TP&N R2 Room Distribution Board /6/L** **To:** **REB SUPPLY**

Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 10.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type B BS EN60898

Rating In (A): 32 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **1 x 2 x 1c** **Size (mm²):** **6 [f]**

Neutral: 6 mm² [a] **Length (m):** **10**

6 - In horizontal trunking on a wooden/masonry wall Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 8	Cg	= 0.52	[BS 7671, Table 4C1]	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 10.0		
Device Rating In	= 32	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 34.0		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 41.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	10.0 / 1.00	0.0 / 0.00	10.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.71 / 0.31	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	6.11 / 2.66	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Separate 1.5 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.03650	Z2 0.14500	Zs 0.37129	Max. Zs 1.43762	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 0.40		
Circuit Protective Conductor (mm²)					Separate 1.5 [a]	0.62
CPC Adiabatic check (mm²)	CPC Section = Separate 1.5			Total = 1.5	Min. Section = 0.91	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.958 / 0.831
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A^2s): 11.00 x 10^3	Adiabatic Limit k^2S^2 (A^2s): 476.10 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **6L3** Name:
Connected From: **6Way TP&N R2 Room Distribution Board /6/L** **To:** **BULKHEAD LIGHTING**
Load Type: **Heating and power, single phase** Design Current Ib (A): 2.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type B BS EN60898
Rating In (A): 6 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **6 x 2 x 1c** **Size (mm²):** **1.5 [f]**
Neutral: 1.5 mm² [a] **Length (m):** **30**
10 - In suspended trunking Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 3	Cg	= 0.38	[BS 7671, Table 4C1]	Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 2.0			
Device Rating In	= 6	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 2.6			[BS 7671, Appendix 4.5, Formula (2)]
Actual Cable Rating It	= 17.5			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	0.0 / 0.00	2.0 / 1.00	2.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.00 / 0.00	0.28 / 0.12	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	0.00 / 0.00	5.69 / 2.47	-----

Earth Fault

Circuit Protective Conductor (mm²) runking 148 + Separate 1.5 [f] [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.07250	Z2 0.03067	Zs 0.29749	Max. Zs 7.66686	0.78
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Trunking 148 + Separate 1.5 [f]	
CPC Adiabatic check (mm²)	CPC Section = Trunking 60.5 + Separate 1.5			Total = 62.0	Min. Section = 0.55	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 0.779 / 0.668
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A^2s): 4,000.00	Adiabatic Limit k^2S^2 (A^2s): 29.76 x 10^3

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P1** Name:
Connected From: **AT1127** **To:** **LVAC C/O Panel**
Load Type: **Main cable to Switchboard** Design Current Ib (A): 100.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Generic BS 88-2 Fuse System E
Rating In (A): 100 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **1 x 1 x 4c** **Size (mm²):** **70 [f]**
Neutral: 70 mm² [a] **Length (m):** **45**
31 - On horizontal/vertical perforated tray

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]
Circuits In Group	= 1	Cg	= 1.00	[BS 7671, Table 4C4]
3rd Harmonics (%)	= 0.00	Ch	= 1.00	

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 100.0			
Device Rating In	= 100	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 100.0			[BS 7671, Appendix 4.5, Formula (1)]
Actual Cable Rating It	= 207.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	100.0 / 1.00	100.0 / 1.00	100.0 / 1.00	0.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	1.28 / 0.56	1.28 / 0.56	1.28 / 0.56	-----
Voltage Drop - From Source (V/%)	1.28 / 0.56	1.28 / 0.56	1.28 / 0.56	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 35 [f] — [a] = Auto, [f] = Fixed

									Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze	0.09592	Z1	0.01475	Z2	0.02836	Zs	0.12033	Max. Zs 0.44231	1.92
Disconnection time (s)	From characteristic: 0.06								Maximum for circuit: 5.00	
Circuit Protective Conductor (mm²)									Separate 35 [f]	
CPC Adiabatic check (mm²)	CPC Section = Separate 35						Total = 35.0		Min. Section = 2.13	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 2.408 / 2.408	Load End: 2.256 / 2.066
Protective Device Breaking Capacity (kA)	Icu: 80 Ics: 80	

Adiabatic Check:	CPD Energy Let-through (A^2s): 60.00 x 10^3	Adiabatic Limit k^2S^2 (A^2s): 64.80 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P10** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **RED SIG. SUPPLY**
Load Type: **Heating and power, single phase** Design Current Ib (A): 10.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 50 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **6 x 2 x 1c** **Size (mm²):** **10 [f]**
Neutral: 10 mm² [a] **Length (m):** **30**
10 - In suspended trunking Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 3	Cg	= 0.38	[BS 7671, Table 4C1]	Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 10.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 50	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 21.9		[BS 7671, Appendix 4.5, Formula (2)]
Actual Cable Rating It	= 57.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	10.0 / 1.00	0.0 / 0.00	10.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.22 / 0.09	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	5.62 / 2.44	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) runking 148 + Separate 1.5 [f] — [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.01100	Z2 0.03067	Zs 0.24156	Max. Zs 0.64219	0.96
Disconnection time (s)	From characteristic: 0.02			Maximum for circuit: 5.00		
Circuit Protective Conductor (mm²)				Trunking 148 + Separate 1.5 [f]		
CPC Adiabatic check (mm²)	CPC Section = Trunking 60.5 + Separate 1.5			Total = 62.0	Min. Section = 0.95	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 1.137 / 1.000
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A^2s): 12.00 x 10^3	Adiabatic Limit k^2S^2 (A^2s): 1.32 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P11** Name:
Connected From: **LVAC C/O Panel** **To:** **6Way TP&N HVAC Module DB**
Load Type: **Distribution Board** Design Current Ib (A): 63.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Generic BS 88-2 Fuse System E
Rating In (A): 63 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **1 x 1 x 4c** **Size (mm²):** **16 [f]**
Neutral: 16 mm² [a] **Length (m):** **50**
31 - On horizontal/vertical perforated tray

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]
Circuits In Group	= 1	Cg	= 1.00	[BS 7671, Table 4C4]
3rd Harmonics (%)	= 0.00	Ch	= 1.00	

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 63.0		
Device Rating In	= 63	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 63.0		[BS 7671, Appendix 4.5, Formula (1)]
Actual Cable Rating It	= 83.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	63.0 / 1.00	63.0 / 1.00	63.0 / 1.00	0.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	4.12 / 1.79	4.12 / 1.79	4.12 / 1.79	-----
Voltage Drop - From Source (V/%)	5.40 / 2.35	5.40 / 2.35	5.40 / 2.35	-----

Earth Fault

Circuit Protective Conductor (mm²) — Armour 72 [f] — [a] = Auto, [f] = Fixed

									Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze	0.12033	Z1	0.06928	Z2	0.12980	Zs	0.27958	Max. Zs 0.82141	0.83
Disconnection time (s)	From characteristic: 0.07								Maximum for circuit: 5.00	
Circuit Protective Conductor (mm²)									Armour 72 [f]	
CPC Adiabatic check (mm²)	CPC Section = Armour 31.9						Total = 31.9		Min. Section = 1.35	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 2.256 / 2.066	Load End: 1.755 / 1.092
Protective Device Breaking Capacity (kA)	Icu: 80 Ics: 80	

Adiabatic Check:	CPD Energy Let-through (A^2s): 24.00 x 10^3	Adiabatic Limit k^2S^2 (A^2s): 3.39 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P12** Name:
Connected From: **LVAC C/O Panel** **To:** **6Way TP&N R2 Room Distribution Board**
Load Type: **Distribution Board** Design Current Ib (A): 63.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Generic BS 88-2 Fuse System E
Rating In (A): 63 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **1 x 1 x 4c** **Size (mm²):** **16 [f]**
Neutral: 16 mm² [a] **Length (m):** **50**
31 - On horizontal/vertical perforated tray

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]
Circuits In Group	= 1	Cg	= 1.00	[BS 7671, Table 4C4]
3rd Harmonics (%)	= 0.00	Ch	= 1.00	

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 63.0			
Device Rating In	= 63	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 63.0			[BS 7671, Appendix 4.5, Formula (1)]
Actual Cable Rating It	= 83.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	63.0 / 1.00	63.0 / 1.00	63.0 / 1.00	0.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	4.12 / 1.79	4.12 / 1.79	4.12 / 1.79	-----
Voltage Drop - From Source (V/%)	5.40 / 2.35	5.40 / 2.35	5.40 / 2.35	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 25 [f] — [a] = Auto, [f] = Fixed

									Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze	0.12033	Z1	0.06928	Z2	0.04363	Zs	0.20548	Max. Zs 0.82141	1.12
Disconnection time (s)	From characteristic: 0.05								Maximum for circuit: 5.00	
Circuit Protective Conductor (mm²)									Separate 25 [f]	
CPC Adiabatic check (mm²)	CPC Section = Separate 25						Total = 25.0		Min. Section = 1.35	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 2.256 / 2.066	Load End: 1.755 / 1.092
Protective Device Breaking Capacity (kA)	Icu: 80 Ics: 80	

Adiabatic Check:	CPD Energy Let-through (A^2s): 24.00 x 10^3	Adiabatic Limit k^2S^2 (A^2s): 3.39 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P13** Name:
Connected From: **LVAC C/O Panel** **To:** **PSP S 1**
Load Type: **Fixed equipment three phase and neutral** Design Current Ib (A): 10.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Generic BS 88-2 Fuse System E
Rating In (A): 63 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **1 x 1 x 4c** **Size (mm²):** **50 [f]**
Neutral: 50 mm² [a] **Length (m):** **30**
118 - In enclosed trench 450 x 300 minimum Configuration:

Rating Factors

Air Temperature (°C)	= 30.0	Ca = 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 3	Cg = 0.74		Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch = 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 10.0		
Device Rating In	= 63	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 63.3		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 163.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	10.0 / 1.00	10.0 / 1.00	10.0 / 1.00	0.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.13 / 0.06	0.13 / 0.06	0.13 / 0.06	-----
Voltage Drop - From Source (V/%)	1.41 / 0.61	1.41 / 0.61	1.41 / 0.61	-----

Earth Fault

Circuit Protective Conductor (mm²) Armour 122 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.12033	Z1 0.01407	Z2 0.04602	Zs 0.16065	Max. Zs 0.82141	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.05				Maximum for circuit: 5.00	
Circuit Protective Conductor (mm²)					Armour 122 [a]	1.44
CPC Adiabatic check (mm²)	CPC Section = Armour 54.1			Total = 54.1	Min. Section = 1.35	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 2.256 / 2.066	Load End: 2.126 / 1.778
Protective Device Breaking Capacity (kA)	Icu: 80 Ics: 80	

Adiabatic Check:	CPD Energy Let-through (A^2s): 24.00 x 10^3	Adiabatic Limit k^2S^2 (A^2s): 33.06 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P14** Name:
Connected From: **LVAC C/O Panel** **To:** **PSP S 2**
Load Type: **Fixed equipment three phase and neutral** Design Current Ib (A): 10.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Generic BS 88-2 Fuse System E
Rating In (A): 63 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **1 x 1 x 4c** **Size (mm²):** **50 [f]**
Neutral: 50 mm² [a] **Length (m):** **30**
118 - In enclosed trench 450 x 300 minimum Configuration:

Rating Factors

Air Temperature (°C)	= 30.0	Ca = 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 3	Cg = 0.74		Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch = 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 10.0		
Device Rating In	= 63	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 63.3		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 163.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	10.0 / 1.00	10.0 / 1.00	10.0 / 1.00	0.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.13 / 0.06	0.13 / 0.06	0.13 / 0.06	-----
Voltage Drop - From Source (V/%)	1.41 / 0.61	1.41 / 0.61	1.41 / 0.61	-----

Earth Fault

Circuit Protective Conductor (mm²) Armour 122 [a] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.12033	Z1 0.01407	Z2 0.04602	Zs 0.16065	Max. Zs 0.82141	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.05				Maximum for circuit: 5.00	
Circuit Protective Conductor (mm²)					Armour 122 [a]	1.44
CPC Adiabatic check (mm²)	CPC Section = Armour 54.1			Total = 54.1	Min. Section = 1.35	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 2.256 / 2.066	Load End: 2.126 / 1.778
Protective Device Breaking Capacity (kA)	Icu: 80 Ics: 80	

Adiabatic Check:	CPD Energy Let-through (A^2s): 24.00 x 10^3	Adiabatic Limit k^2S^2 (A^2s): 33.06 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P4** Name:
Connected From: **LVAC C/O Panel** **To:** **6Way TP&N Main Substation Building Distribution I**
Load Type: **Distribution Board** Design Current Ib (A): 63.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Generic BS 88-2 Fuse System E
Rating In (A): 63 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **1 x 1 x 4c** **Size (mm²):** **16 [f]**
Neutral: 16 mm² [a] **Length (m):** **50**
31 - On horizontal/vertical perforated tray

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]
Circuits In Group	= 1	Cg	= 1.00	[BS 7671, Table 4C4]
3rd Harmonics (%)	= 0.00	Ch	= 1.00	

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 63.0			
Device Rating In	= 63	Overload Setting Ir	= N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 63.0			[BS 7671, Appendix 4.5, Formula (1)]
Actual Cable Rating It	= 83.0			[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	63.0 / 1.00	63.0 / 1.00	63.0 / 1.00	0.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	4.12 / 1.79	4.12 / 1.79	4.12 / 1.79	-----
Voltage Drop - From Source (V/%)	5.40 / 2.35	5.40 / 2.35	5.40 / 2.35	-----

Earth Fault

Circuit Protective Conductor (mm²) — Separate 25 [f] — [a] = Auto, [f] = Fixed

									Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze	0.12033	Z1	0.06928	Z2	0.04363	Zs	0.20548	Max. Zs 0.82141	1.12
Disconnection time (s)	From characteristic: 0.05								Maximum for circuit: 5.00	
Circuit Protective Conductor (mm²)									Separate 25 [f]	
CPC Adiabatic check (mm²)	CPC Section = Separate 25						Total = 25.0		Min. Section = 1.35	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 2.256 / 2.066	Load End: 1.755 / 1.092
Protective Device Breaking Capacity (kA)	Icu: 80 Ics: 80	

Adiabatic Check:	CPD Energy Let-through (A^2s): 24.00 x 10^3	Adiabatic Limit k^2S^2 (A^2s): 3.39 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P5** Name:
Connected From: **LVAC C/O Panel** **To:** **SS 1**
Load Type: **Fixed equipment three phase and neutral** Design Current Ib (A): 10.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Generic BS 88-2 Fuse System E
Rating In (A): 63 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **1 x 1 x 4c** **Size (mm²):** **25 [f]**
Neutral: 25 mm² [a] **Length (m):** **30**
118 - In enclosed trench 450 x 300 minimum Configuration:

Rating Factors

Air Temperature (°C)	= 30.0	Ca = 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 3	Cg = 0.76		Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch = 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 10.0		
Device Rating In	= 63	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 63.3		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 110.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	10.0 / 1.00	10.0 / 1.00	10.0 / 1.00	0.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.24 / 0.10	0.24 / 0.10	0.24 / 0.10	-----
Voltage Drop - From Source (V/%)	1.52 / 0.66	1.52 / 0.66	1.52 / 0.66	-----

Earth Fault

Circuit Protective Conductor (mm²) — Armour 76 [a] — [a] = Auto, [f] = Fixed

									Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze	0.12033	Z1	0.02610	Z2	0.07434	Zs	0.19285	Max. Zs 0.82141	1.20
Disconnection time (s)	From characteristic: 0.05								Maximum for circuit: 5.00	
Circuit Protective Conductor (mm²)									Armour 76 [a]	
CPC Adiabatic check (mm²)	CPC Section = Armour 33.7						Total = 33.7		Min. Section = 1.35	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 2.256 / 2.066	Load End: 2.044 / 1.589
Protective Device Breaking Capacity (kA)	Icu: 80 Ics: 80	

Adiabatic Check:	CPD Energy Let-through (A²s): 24.00 x 10^3	Adiabatic Limit k²S² (A²s): 8.27 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P6** Name:
Connected From: **LVAC C/O Panel** **To:** **SS 2**
Load Type: **Fixed equipment three phase and neutral** Design Current Ib (A): 10.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Generic BS 88-2 Fuse System E
Rating In (A): 63 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **1 x 1 x 4c** **Size (mm²):** **25 [f]**
Neutral: 25 mm² [a] **Length (m):** **30**
118 - In enclosed trench 450 x 300 minimum Configuration:

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]
Circuits In Group	= 3	Cg	= 0.76	Not Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00	

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 11.5 V (User defined)

Design Current Ib	= 10.0		
Device Rating In	= 63	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 63.3		[BS 7671, Appendix 4.5, Formula (3/4)]
Actual Cable Rating It	= 110.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	10.0 / 1.00	10.0 / 1.00	10.0 / 1.00	0.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.24 / 0.10	0.24 / 0.10	0.24 / 0.10	-----
Voltage Drop - From Source (V/%)	1.52 / 0.66	1.52 / 0.66	1.52 / 0.66	-----

Earth Fault

Circuit Protective Conductor (mm²) Armour 76 [a] [a] = Auto, [f] = Fixed

									Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze	0.12033	Z1	0.02610	Z2	0.07434	Zs	0.19285	Max. Zs 0.82141	1.20
Disconnection time (s)	From characteristic: 0.05								Maximum for circuit: 5.00	
Circuit Protective Conductor (mm²)									Armour 76 [a]	
CPC Adiabatic check (mm²)	CPC Section = Armour 33.7						Total = 33.7		Min. Section = 1.35	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 2.256 / 2.066	Load End: 2.044 / 1.589
Protective Device Breaking Capacity (kA)	Icu: 80 Ics: 80	

Adiabatic Check:	CPD Energy Let-through (A²s): 24.00 x 10^3	Adiabatic Limit k²S² (A²s): 8.27 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P7** Name:

Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **R1 MDCCB**

Load Type: **Heating and power, single phase** Design Current Ib (A): 5.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type B BS EN60898

Rating In (A): 25 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Single-core, 70°C thermoplastic non-arm Cu Table 4D1 **6 x 2 x 1c** **Size (mm²):** **10 [f]**

Neutral: 10 mm² [a] **Length (m):** **30**

10 - In suspended trunking Trunking: Metal

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 3	Cg	= 0.38	[BS 7671, Table 4C1]	Subject to Simultaneous Overload
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)

Design Current Ib	= 5.0		
Device Rating In	= 25	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 11.0		[BS 7671, Appendix 4.5, Formula (2)]
Actual Cable Rating It	= 57.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	0.0 / 0.00	5.0 / 1.00	0.0 / 0.00	5.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.00 / 0.00	0.11 / 0.05	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	0.00 / 0.00	5.51 / 2.40	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) runking 148 + Separate 1.5 [f] [a] = Auto, [f] = Fixed

						Earth Fault Current (kA)
Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.01100	Z2 0.03067	Zs 0.24156	Max. Zs 1.84003	0.96
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Trunking 148 + Separate 1.5 [f]	
CPC Adiabatic check (mm²)	CPC Section = Trunking 60.5 + Separate 1.5			Total = 62.0	Min. Section = 0.73	

Phase Fault

Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 1.137 / 1.000
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 1.32 x 10^6

Cable Calculation Report

Project Reference:	ProDesign	**Job Number:**	103120-WP5-IUS-DR		
Document No:		**Created On :**	28/04/2016	**Rev Date :**	29/04/2016
Created By :	azhar.muhammad	**Modified By:**	azhar.muhammad	**Rev No:**	Z01

Calculated in accordance with BS 7671

Active Source: AT1127

Circuit

Id No.: **P9** Name:
Connected From: **6Way TP&N Main Substation Building Distribu** **To:** **50V BC NO.1**
Load Type: **Fixed equipment single phase and neutral** Design Current Ib (A): 10.0

Comments:

Protective Device

[a] = Auto, [f] = Fixed, [m] = Max.

Overcurrent protection: Schneider Multi9 MCB C60H Type C BS EN60898
Rating In (A): 25 [f] Overload Setting Ir (A): N/A

Conductors

[a] = Auto, [f] = Fixed, [d] = Double

Multicore, 70°C thermoplastic insulated, armoured Cu Table 4D4 **6 x 1 x 2c** **Size (mm²):** **10 [f]**
Neutral: 10 mm² [a] **Length (m):** **30**
31 - On horizontal/vertical perforated tray Arrangement: Horizontal Touching

Rating Factors

Air Temperature (°C)	= 30.0	Ca	= 1.00	[BS 7671, Table 4B1]	
Circuits In Group	= 3	Cg	= 0.72	[BS 7671, Table 4C4]	Subject to Simultaneous Overload
No. of trays = 1	No. of circuits per tray = 20				
3rd Harmonics (%)	= 0.00	Ch	= 1.00		

Cable sizing (A)

Sized For: Phase Current Carrying Capacity — Auto-sized for current-carrying capacity and voltage drop limits.

Design Current Ib	= 10.0		Voltage drop limit = 18.69 V (BS 7671:2008 (2011) App. 4)
Device Rating In	= 25	Overload Setting Ir = N/A	[Ir ≥ Ib]
Min. Cable Capacity Iz	= 5.8		[BS 7671, Appendix 4.5, Formula (2)]
Actual Cable Rating It	= 72.0		[It ≥ Iz]

Load Current and Voltage Drop	L1	L2	L3	Neutral
Design Current Ib (A/PF)	10.0 / 1.00	0.0 / 0.00	0.0 / 0.00	10.0
3rd Harmonic Current (A)	0.0	0.0	0.0	0.0
Voltage Drop - This circuit (V/%)	0.20 / 0.09	0.00 / 0.00	0.00 / 0.00	-----
Voltage Drop - From Source (V/%)	5.61 / 2.44	0.00 / 0.00	0.00 / 0.00	-----

Earth Fault

Circuit Protective Conductor (mm²) Armour 246 [f] [a] = Auto, [f] = Fixed

Earth Fault Loop Impedance (Ω)	Ze 0.20548	Z1 0.01100	Z2 0.02301	Zs 0.23479	Max. Zs 0.91996	Earth Fault Current (kA)
Disconnection time (s)	From characteristic: 0.01				Maximum for circuit: 0.40	
Circuit Protective Conductor (mm²)					Armour 246 [f]	0.98
CPC Adiabatic check (mm²)	CPC Section = Armour 109.1			Total = 109.1	Min. Section = 0.73	

Phase Fault

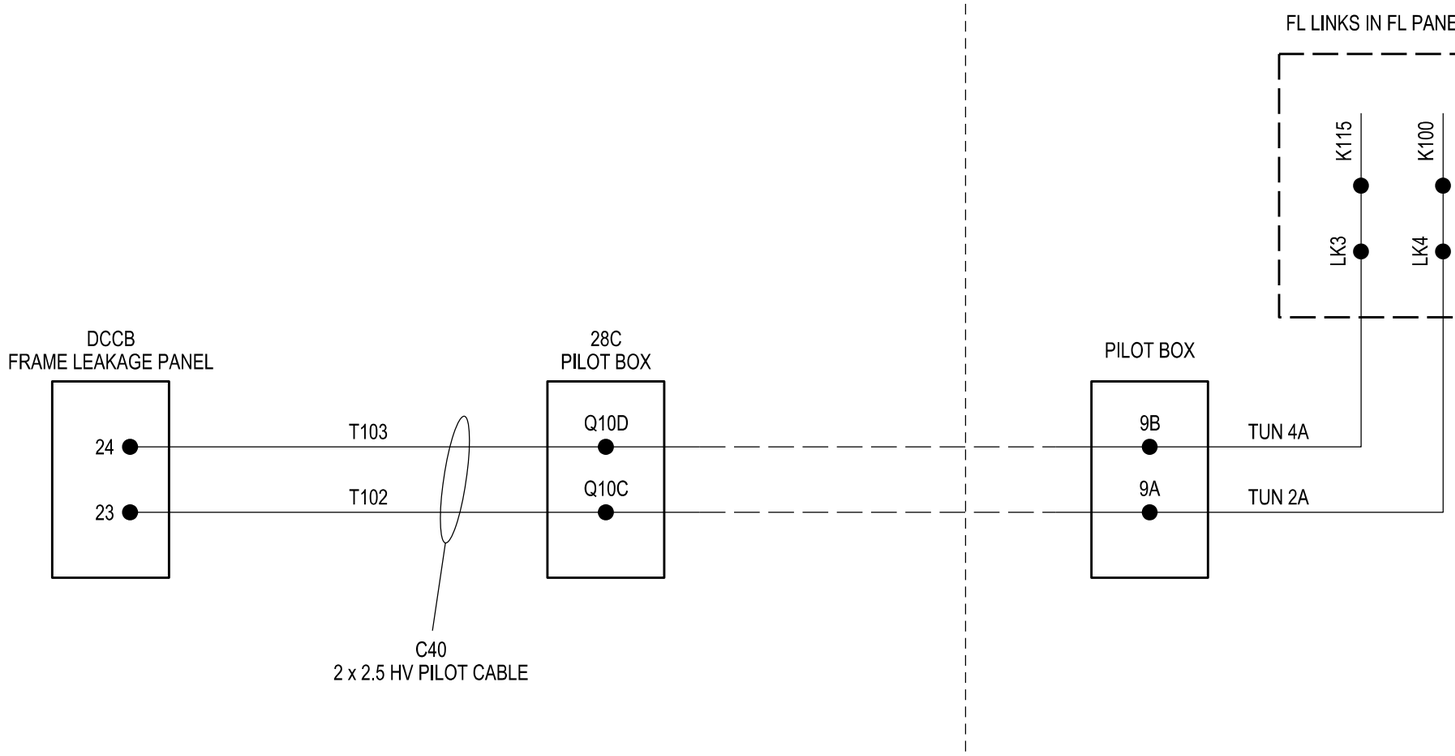
Phase Fault Current Max./Min. (kA)	Source End: 1.231 / 1.092	Load End: 1.137 / 1.000
Protective Device Breaking Capacity (kA)	Icu: 10 Ics: 10	

Adiabatic Check:	CPD Energy Let-through (A²s): 7,000.00	Adiabatic Limit k²S² (A²s): 1.32 x 10^6

DO NOT SCALE

STROOD SUBSTATION

TUNNEL TPH



Rev.	Date	Description of Revisions	Drawn	Checked	Appr'd
Z01	04/04/16	AS BUILT ISSUE	MWD	MAZ	MAK
C02	29/01/16	CONSTRUCTION ISSUE	MWD	MAZ	MA
C01	16/12/15	CONSTRUCTION ISSUE	DTP	MAZ	MAK

Status: AS BUILT ISSUE

Client:
Network Rail
Infrastructure and Investments
Suite 3, Floor 3, Desk 340
London Waterloo General Offices
Waterloo Station
London, SE1 8SW

Contractor:
Integrated Utility Services
Unit 8, Brindley Way
41 Industrial Estate
Wakefield
WF2 0XQ

Project Title: 103120 - WP5 - DC SWITCHGEAR RENEWALS

Drawing Title: 2nd STAGE FRAME LEAKAGE INTERTRIP (TUNNEL TO STROOD) DRAWING STROOD SUBSTATION

	Name	Sig.	Date
Redlined By	A.NEWSON		01/02/16
Drawn By	M.W.DAD		04/04/16
Checked By	M.AZHAR		04/04/16
Approved By	M.AKMAL		04/04/16

Scale: NTS @ A3

Sheet 1 of 1

Drawing Number: 103120-WP5-IUS-DRG-EP-SOO-21

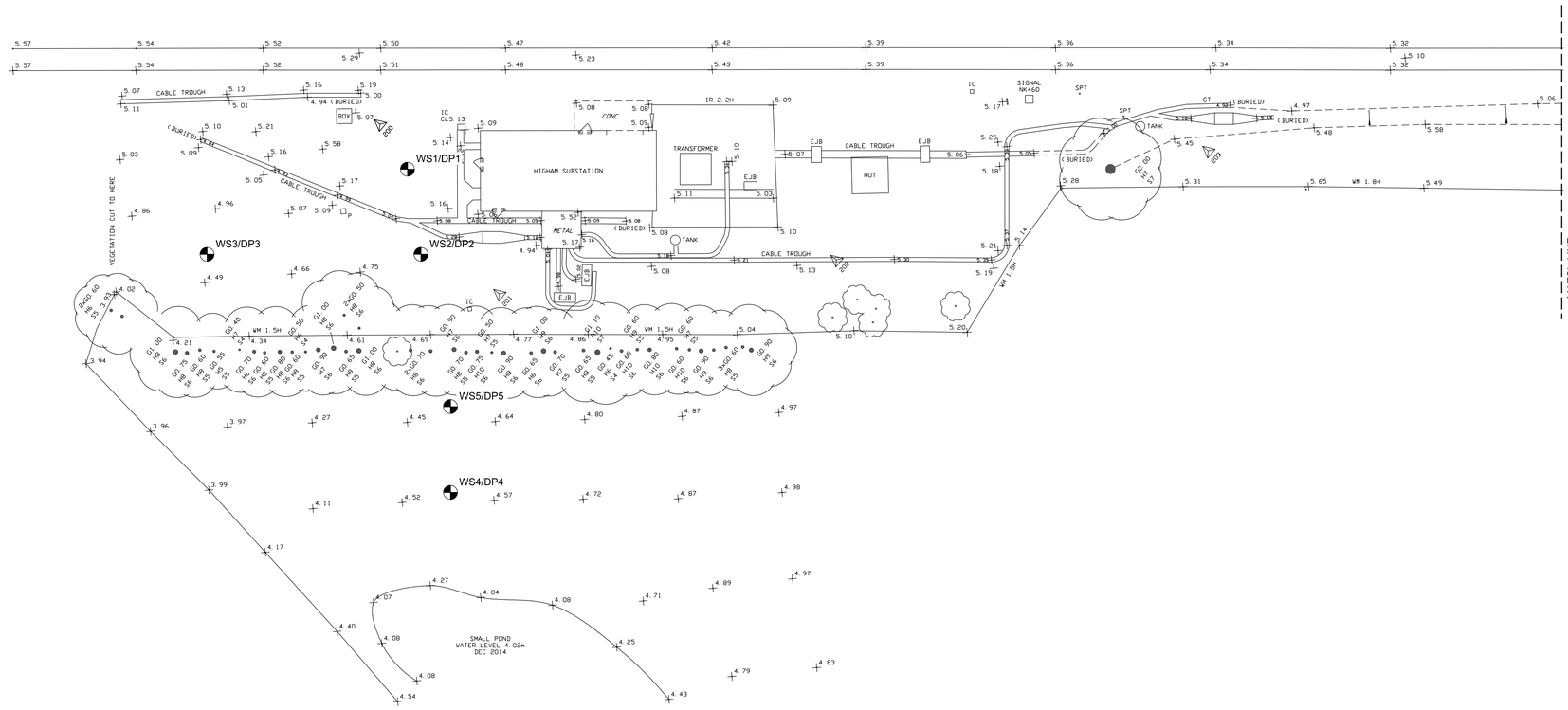
Revision: Z01

A3

Drawing Number
134943-SIE-LAY-EP-HIG-001605

STN	EASTINGS	NORTHINGS	LEVEL
200	571165.979mE	173080.887mN	5.224m
201	571162.322mE	173067.077mN	4.761m

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING NOS 134943-SIE-LAY-EP-HIG-0001601 TO 0001619
2. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METRES UNO
3. THIS DRAWING IS BASED UPON A TOPOPGRAPHICAL SURVEY CARRIED OUT BY STERLING SURVEYS LTD IN DECEMBER 2014
4. FOR THE RESULTS OF THE GROUND INVESTIGATION REFER TO DOCUMENT REF. 134943-SIE-REP-EP-HIG-001641



KEY	COLOUR	
———	BLACK	EXISTING OR UNCHANGED
———	BLUE	MODIFIED OR TO BE MOVED
———	GREEN	REDUNDANT OR TO BE REMOVED
———	RED	NEW, PROPOSED OR ADDITIONAL

0 4 8 12 16 20m

SCALE 1:200

Legend/Notes

Survey Station
Direction of Floorboards
Step Up
Banking
Fence
Hedge
Change in Ceiling Height
Foul Drainage (100mm Pipe)
Storm Drainage (100mm Pipe)
Electricity O/H
Electricity U/G
Bench Mark
+76.72 Level Position
Sloping Ceiling Sloping Masonry
Gates
G(dim) H(eight) S(pread) Tree
Telecom O/H
Telecom U/G
Fresh Water (100mm Pipe)
Gas (100mm Pipe)

FENCE TYPES

BW Barbed Wire
CB Close Boarded
CI Corrugated Iron
CLK Chain Link
CPG Chestnut Palling
IR Iron Railings
PR Post & Rail
PW Post & Wire
OB Open Boarded
WM Wire Mesh

ABBREVIATIONS (Where Applicable)

AGL Above Ground Level
ASL Arch Springer Level
AHL Arch Head Level
BOL Bollard
BRW Brick Wall
BRRW Brick Ret Wall
BSL Beam Soffit Level
BT British Telecom IC
CATV Cable TV
CBSL Clad Beam Soff Lvl
CD Cable Duct
CE Cleaning Eye
CIH Change In Height of Ceiling
CL Cover Level
CM Cable Marker
CP Catch Pit
CPS Conc Paving Slabs
CSL Ceiling Soffit Level
CT Cable Trough
D Door
DP Down Pipe
DHL Door Head Level
DSL Duct Soffit Level
ECP Elec Cable Pit
EJB Elec Junct. Box
EP Electricity Pole
ERP Earthing Point
FB Flower Bed
FCSL False Ceiling Soffit Level
FH Fire Hydrant
FIG Feeds Into Ground
FL Floor Level
G Gully
GM Gas Meter
GSC Gas Stop Cock
GV Gas Valve
H High/Height
IC Inspection Cover
IL Invert Level
KO Kerb Outlet
LL Landing Level
LP Lamp Post
MC Mercury IC
MH Manhole
MKR Marker
MR Metal Railings
NB Notice Board
NFI No Further Info.
O/H Overhead
P Post
RG Road Gully
RL Roof Level
RNB Road Name Board
RS Road Sign
RSJ Rolled Steel Joist
RW Retaining Wall
RWP Rainwater Pipe
SA Soakaway
SC Stop Cock
SP Sign Post
SPT Spotlight
SV Stop Valve
TL Threshold Level
TLT Traffic Light
TP Telephone Pole
TPS Tactile Paving
U/G Underground
UTL Unable To Lift
V Vent
VP Vent Pipe
W Window
WHB Wash Hand Basin
WHL Window Head Level
WSC Water Stop Cock
WSL Window Sill Level
WV Water Valve

NOTES

LEVEL DATUM OS GPS

BENCH MARKS USED:- N/A

THE ORIGIN AND ORIENTATION OF THE SURVEY GRID IS ORDNANCE SURVEY NATIONAL GRID.

WS1/DP1 WINDOW SAMPLE AND DYNAMIC PROBE

Rev	Date	Description of Revisions	Drawn	Chkd	Appr
Z01	23/10/15	AS BUILT	MG	CH	AJB
C01	29/06/15	GRIP 6 ISSUE	MG	CH	AJB
A02	05/06/15	GRIP 4 AND 5 ISSUE	MG	CH	AJB
A01	18/05/15	GRIP 4 AND 5 ISSUE	JRR	CH	AJB

Status
AS BUILT

Contractor(s)

SIEMENS Tony Gee

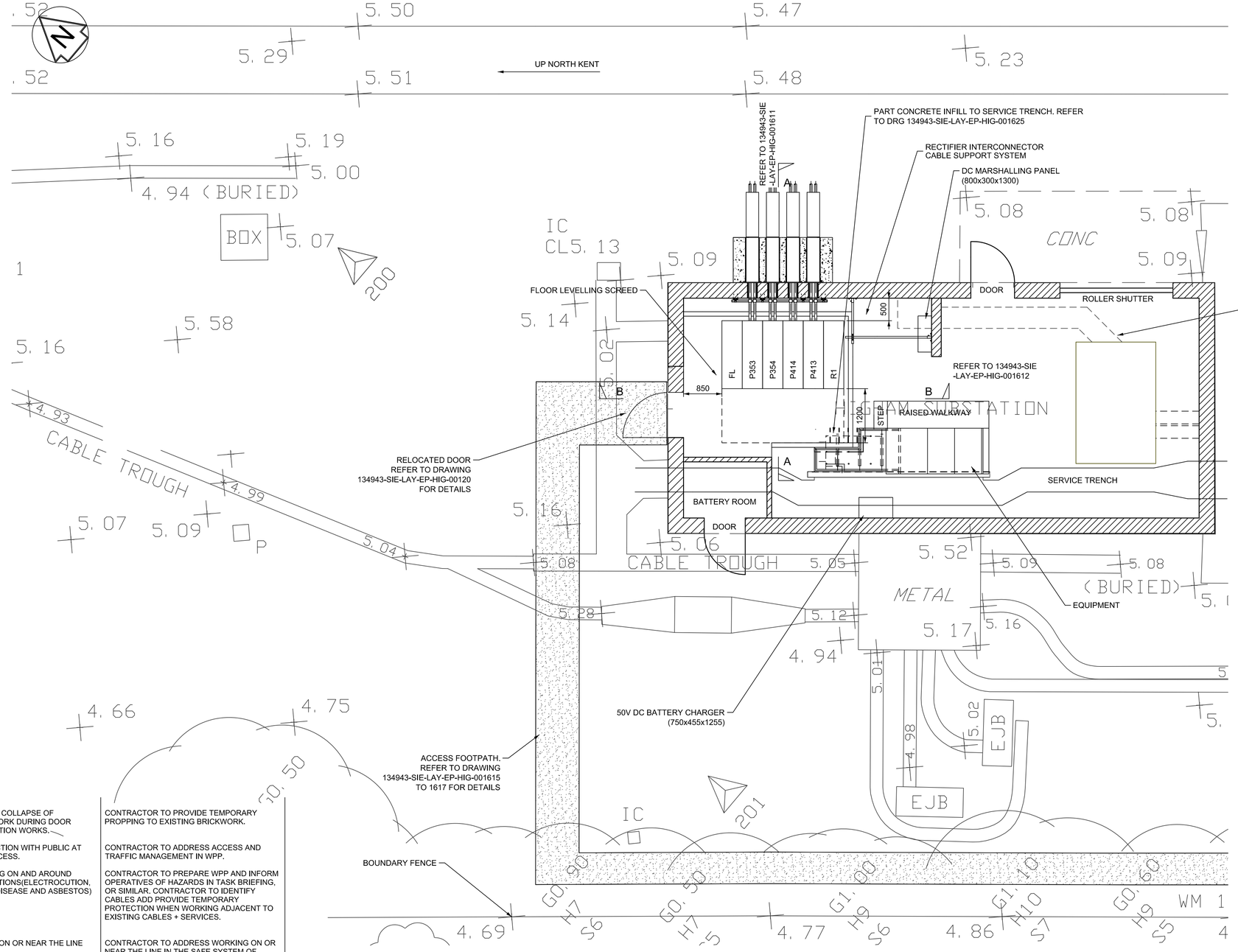
Project
134943 KENT PSE - PHASE 3
GRAVESEND TO GILLINGHAM WORKS

Drawing Title
HIGHAM SUBSTATION
TOPOGRAPHICAL SURVEY

Designed	A. BARTON	Signed	Date 23/10/15
Drawn	M. GREEN	Signed	Date 23/10/15
Checked	C. HADLOW	Signed	Date 23/10/15
Approved	A. BARTON	Signed	Date 23/10/15
Scale(s) 1:200		ELR & Mileage HDR & 28M 14CH	
Alternative Reference			Sheet 1 of 1
Drawing Number 134943-SIE-LAY-EP-HIG-001605			Revision Z01

Sheet Size A1 594 x 841

Drawing Number
134943-SIE-LAY-EP-HIG-001610



PLAN
SCALE 1:50

PARTIAL COLLAPSE OF BRICKWORK DURING DOOR RELOCATION WORKS.	CONTRACTOR TO PROVIDE TEMPORARY PROPPING TO EXISTING BRICKWORK.
INTERACTION WITH PUBLIC AT SITE ACCESS.	CONTRACTOR TO ADDRESS ACCESS AND TRAFFIC MANAGEMENT IN WPP.
WORKING ON AND AROUND SUBATATIONS(ELECTROCUTION, WEIL'S DISEASE AND ASBESTOS)	CONTRACTOR TO PREPARE WPP AND INFORM OPERATIVES OF HAZARDS IN TASK BRIEFING, OR SIMILAR. CONTRACTOR TO IDENTIFY CABLES ADD PROVIDE TEMPORARY PROTECTION WHEN WORKING ADJACENT TO EXISTING CABLES + SERVICES.
WORKS ON OR NEAR THE LINE	CONTRACTOR TO ADDRESS WORKING ON OR NEAR THE LINE IN THE SAFE SYSTEM OF WORK FOR THE SITE.
GROUND CLEARANCE AND EXCAVATION	CONTRACTOR TO ENSURE ALL APPROPRIATE TESTING OF MATERIALS IS UNDERTAKEN. ALL EXCAVATIONS ARE TO BE CAT SCANNED PRIOR TO WORKS COMMENCING AND EXCAVATED WITH INSULATED HAND TOOLS TO 1.2m CONTRACTOR TO ADDRESS WORKING IN THE VICINITY OF BURIED SERVICES WITHIN THE SAFE SYSTEM OF WORK.
LIFTING OF TEMPORARY MODULE AND/OR EQUIPMENT ONTO FOUNDATIONS	CONTRACTOR TO PROVIDE AN ADEQUATE CRANE PLATFORM AND DEVELOP A LIFTING PLAN FOR ALL LIFTS AND INCORPORATE INTO THE SAFE SYSTEM OF WORK FOR THE SITE.
MANUAL HANDLING OF HEAVY PRECAST CONCRETE SURFACE TROUGH UNITS	CONTRACTOR TO CARRY OUT RISK ASSESSMENTS AND ADDRESS IN SSOW.
RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

RESIDUAL CONSTRUCTION HAZARDS

NOTE: The hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

KEY	COLOUR	
	BLACK	EXISTING OR UNCHANGED
	BLUE	MODIFIED OR TO BE MOVED
	GREEN	REDUNDANT OR TO BE REMOVED
	RED	NEW, PROPOSED OR ADDITIONAL

0 1 2 3 4 5m
SCALE 1:50

Legend/Notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRG NOS. 134943-SIE-LAY-EP-HIG-001601 TO 001617, STANDARD DETAILS DRG NO 134943-SIE-LAY-EP-000-000101 TO 000111, DESIGNER'S RISK ASSESSMENT 134943-SIE-DRA-EP-HIG-001640, GEOTECHNICAL REPORT REF 134943-SIE-REP-EP-HIG-001641, ENVIRONMENTAL REPORT REF. 134943-SIE-REP-EP-HIG-001643 AND SUBSTATION BUILDING CONDITION SURVEY REPORT REF 134943-SIE-REP-EP-HIG-001642.
2. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METRES UNLESS NOTED OTHERWISE.
3. ALL MATERIALS AND WORKMANSHIP ARE IN ACCORDANCE WITH SPECIFICATION REF. 134943-SIE-SPE-EP-000-000130.
4. ALL CABLE ROUTE WORKS COMPLY WITH NR/SP/ELP/27224.
5. TROUGHS ARE C/1/9, C/1/19 AND C/1/37 UNLESS NOTED OTHERWISE.
6. BURIED SERVICES. CONTRACTOR COMPLIED WITH NR/L2/INI/CP1030 AND NR/L2/AIF/1040. CONTRACTOR IDENTIFIED POSITION OF EXISTING BURIED SERVICES AND PROVIDED NECESSARY TEMPORARY WORKS TO PROTECT SERVICES AS REQUIRED.
7. CABLE MINIMUM BEND RADII:
   - DC POSITIVE CABLE 530mm
   - NEGATIVE CABLE 490mm.
8. ALL CABLE APERTURES ARE SEALED WITH DENSOSEAL 16A.
9. FOOTWAYS LAID AT A MINIMUM CROSSFALL OF 1 IN 50. SURFACING COMPRISED OF 150 MIN THICKNESS SCALPINGS /DOT TYPE 1, OVERLYING TERRAM WEEDGUARD / SIMILAR APPROVED. FOOTWAY EDGINGS COMPRISE OF 150x38 TREATED TIMBER SOFTWOOD WITH 50x50x600 TREATED SOFTWOOD PEGS AT 1000 CENTRES.
10. TROUGHING LOCATED WITHIN FOOTWAYS ARE LAID FLUSH WITH FINISHED LEVELS.
11. WHERE CABLE ROUTES CROSS, STEELWORK TROUGH BRIDGES IN ACCORDANCE WITH DRG NO. 134943-SIE-LAY-EP-000-000102 MAY BE PROVIDED, PROVIDED THEY DO NOT OBSTRUCT FOOTWAYS.
12. EARTHING DESIGN IS BY OTHERS.
13. REFER TO THE SITE SPECIFIC GROUND INVESTIGATION REPORT 13943-SIE-LAY-EP-HIG-001641 FOR INFORMATION ON GROUND CONDITIONS.
14. FOR EQUIPMENT SETTING OUT REFER TO DRG No. 134943-SIE-LAY-EP-HIG-001510.

Rev	Date	Description of Revisions	Drawn	Chkd	Appr
Z02	06/11/15	AS BUILT	MG	CH	AJB
Z01	23/10/15	AS BUILT	MG	CH	AJB
C01	29/06/15	GRIP 6 ISSUE	MG	CH	AJB
A02	05/06/15	GRIP 4 AND 5 ISSUE	MG	CH	AJB
A01	18/05/15	GRIP 4 AND 5 ISSUE	JRR	CH	AJB

Status
AS BUILT

Contractor(s)
SIEMENS Tony Gee

Project
134943 KENT PSE - PHASE 3
GRAVESEND TO GILLINGHAM WORKS

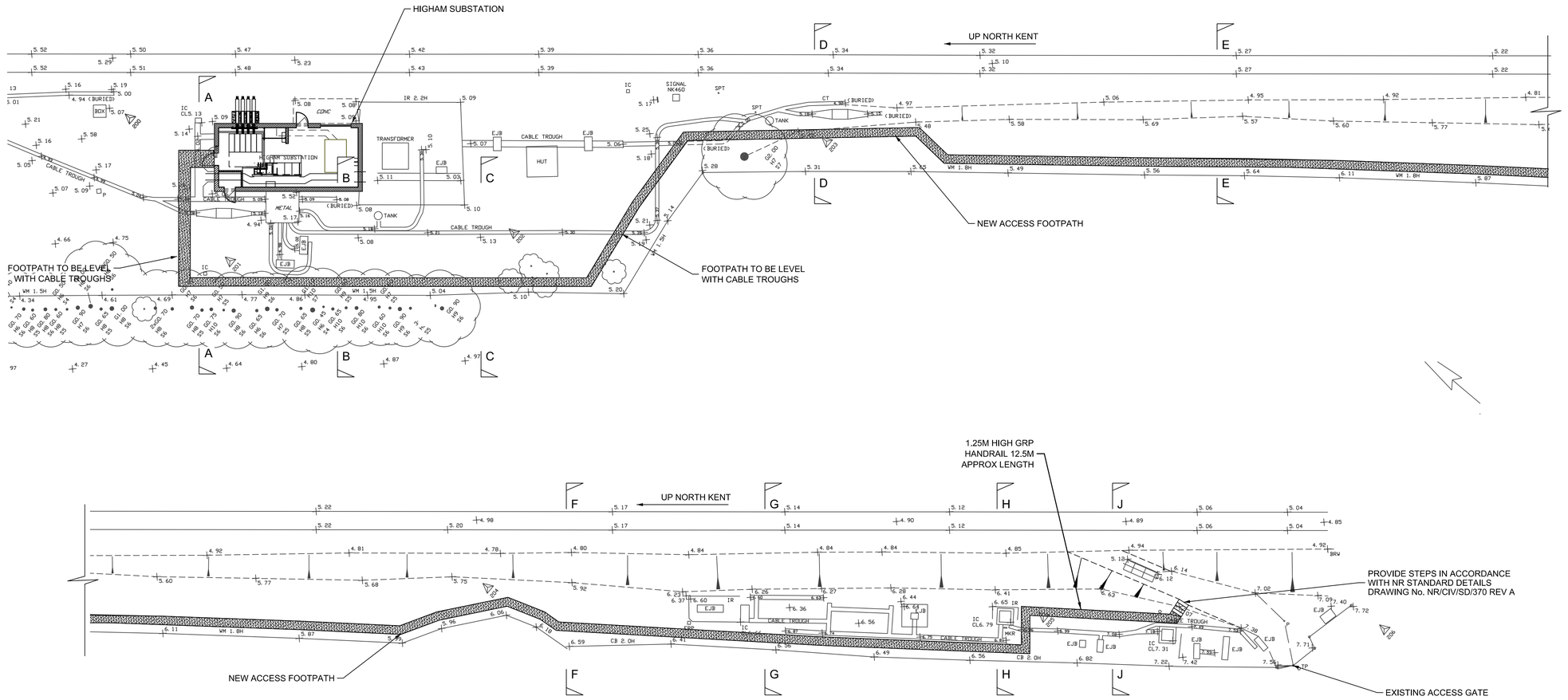
Drawing Title
HIGHAM SUBSTATION
GENERAL ARRANGEMENT

Designed	A. BARTON	Signed	Date 06/11/15
Drawn	M. GREEN	Signed	Date 06/11/15
Checked	C. HADLOW	Signed	Date 06/11/15
Approved	A. BARTON	Signed	Date 06/11/15

Scale(s): AS SHOWN
ELR & Mileage: HDR & 28M 14CH
Alternative Reference
Sheet: 1 of 1
Drawing Number: 134943-SIE-LAY-EP-HIG-001610
Revision: Z02

Sheet Size A1 594 x 841

Drawing Number
134943-SIE-LAY-EP-HIG-001615



PLAN
SCALE 1:200

REFER TO DRAWING
134943-SIE-LAY-EP-HIG-001616 AND 1617 FOR SECTIONS

KEY	COLOUR	
———	BLACK	EXISTING OR UNCHANGED
———	BLUE	MODIFIED OR TO BE MOVED
———	GREEN	REDUNDANT OR TO BE REMOVED
———	RED	NEW, PROPOSED OR ADDITIONAL

0 4 8 12 16 20m
SCALE 1:200

RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE
ACCESS PATH BECOMES OBSTRUCTED BY VEGETATION.	VEGETATION TO BE MAINTAINED ON A REGULAR BASIS.
GROUND CLEARANCE AND EXCAVATION.	CONTRACTOR TO ENSURE ALL APPROPRIATE TESTING OF MATERIALS IS UNDERTAKEN. ALL EXCAVATIONS ARE TO BE CAT SCANNED PRIOR TO WORKS COMMENCING AND EXCAVATED WITH INSULATED HAND TOOLS TO 1.2m CONTRACTOR TO ADDRESS WORKING IN THE VICINITY OF BURIED SERVICES WITHIN THE SAFE SYSTEM OF WORK.
ELECTROCUTION BY EXISTING HV FEEDER.	LOCATE EXISTING FEEDER AND PROTECT.

RESIDUAL CONSTRUCTION HAZARDS

NOTE: The hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

Legend/Notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRG NOS. 134943-SIE-LAY-EP-HIG-001601 TO 001619, STANDARD DETAILS DRG NO 134943-SIE-LAY-EP-000-000101 TO 000111, DESIGNER'S RISK ASSESSMENT 134943-SIE-DRA-EP-HIG-001640, GEOTECHNICAL REPORT REF 134943-SIE-REP-EP-HIG-001641, ENVIRONMENTAL REPORT REF. 134943-SIE-REP-EP-HIG-001643 AND SUBSTATION BUILDING CONDITION SURVEY REPORT REF 134943-SIE-REP-EP-HIG-001642.

Rev	Date	Description of Revisions	Drawn	Chkd	Appr
Z02	06/11/15	AS BUILT	MG	CH	AJB
Z01	23/10/15	AS BUILT	MG	CH	AJB
C01	29/06/15	GRIP 6 ISSUE	MG	CH	AJB
A02	05/06/15	GRIP 4 AND 5 ISSUE	MG	CH	AJB
A01	18/05/15	GRIP 4 AND 5 ISSUE	JRR	CH	AJB

Status
AS BUILT

Contractor(s)
SIEMENS Tony Gee

Project
134943 KENT PSE - PHASE 3
GRAVESEND TO GILLINGHAM WORKS

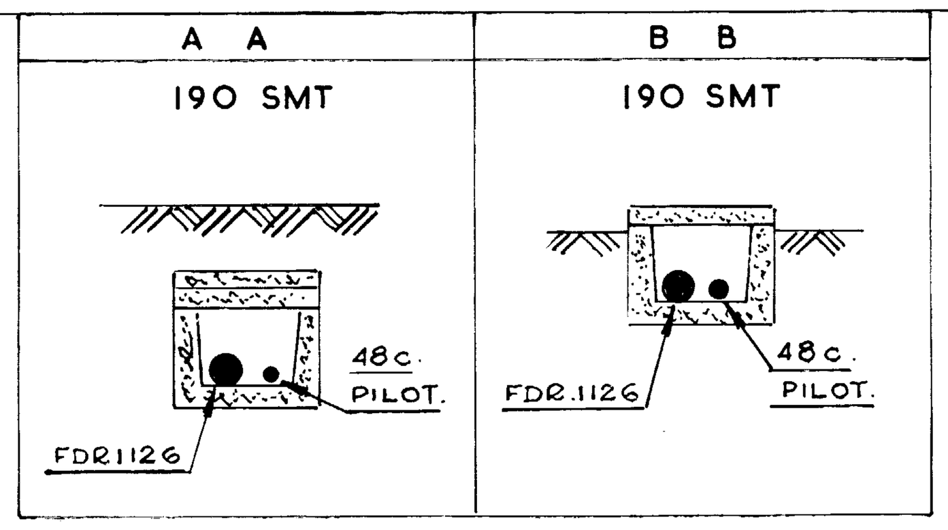
Drawing Title
HIGHAM SUBSTATION
GENERAL ARRANGEMENT
MAINTENANCE ACCESS PATH

Designed	A. BARTON	Signed	Date 06/11/15
Drawn	M. GREEN	Signed	Date 06/11/15
Checked	C. HADLOW	Signed	Date 06/11/15
Approved	A. BARTON	Signed	Date 06/11/15
Scale(s)	AS SHOWN	ELR & Mileage	HDR & 28M 14CH
Alternative Reference		Sheet	1 of 1
Drawing Number	134943-SIE-LAY-EP-HIG-001615	Revision	Z02

Sheet Size A1 594 x 841

FDR WAS NUMBERED 126.

CROSS SECTIONS OF ROUTE FACING HIGHAM SUB STN.



-9751

REFERENCE.

SURFACE ROUTE
BURIED ROUTE
33 KV. FEEDER JOINT.
PILOT JOINT

FEEDER 1126, 95mm² 3 CORE 33 KV. AL. CONDUCTOR OIL FILLED C.S.A. PVC. SHEATHED CABLE.

OVERALL LENGTH OF FEEDER No. 1126 = 5135·00 METRES.

TOTAL LENGTH PILOT CABLE FROM DENTON SUB STN. — URALITE T.P. HUT = 2540·50 METRES.

TOTAL LENGTH PILOT CABLE FROM URALITE T.P. HUT HIGHAM SUB STN. = 2561·50 METRES 48 CORE 1/1·27mm POLY INS. POLY SHEATHED. SCREENED PVC. SHEATHED.

SCALE:- 1/1250

TITLE:- BRITISH RAILWAYS SOUTHERN REGION
REPLACEMENT OF FEEDER 126, 1973.

DENTON S. STN. — HIGHAM S.STN

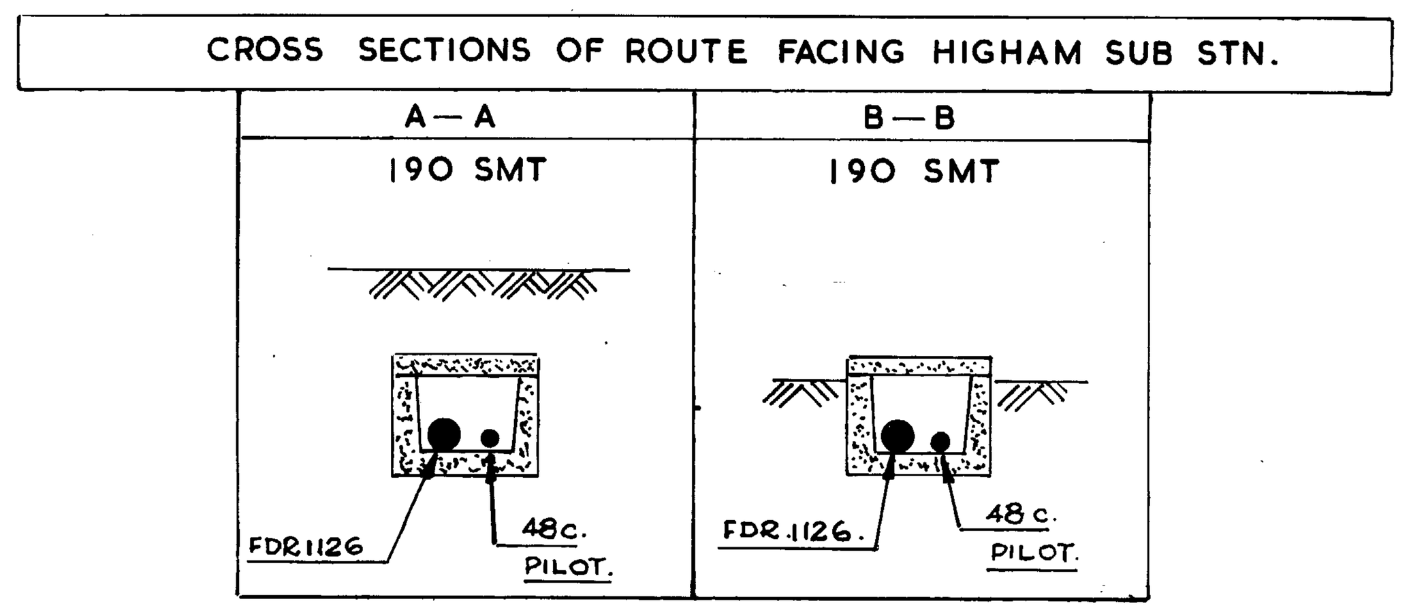
DRAWN BY.	R.M.	B.I.C.C.
DATE.	17/1/74	DRG. No. LS. 842
CH'KD. BY.		

FEEDER No. 1126 — SHEET 1 OF 5 SHEETS.

20"x44"

1.	CHD:- KCW 4-2-88
	APP:- [illegible] 28-3-88

FDR WAS NUMBERED 126



39752

REFERENCE.

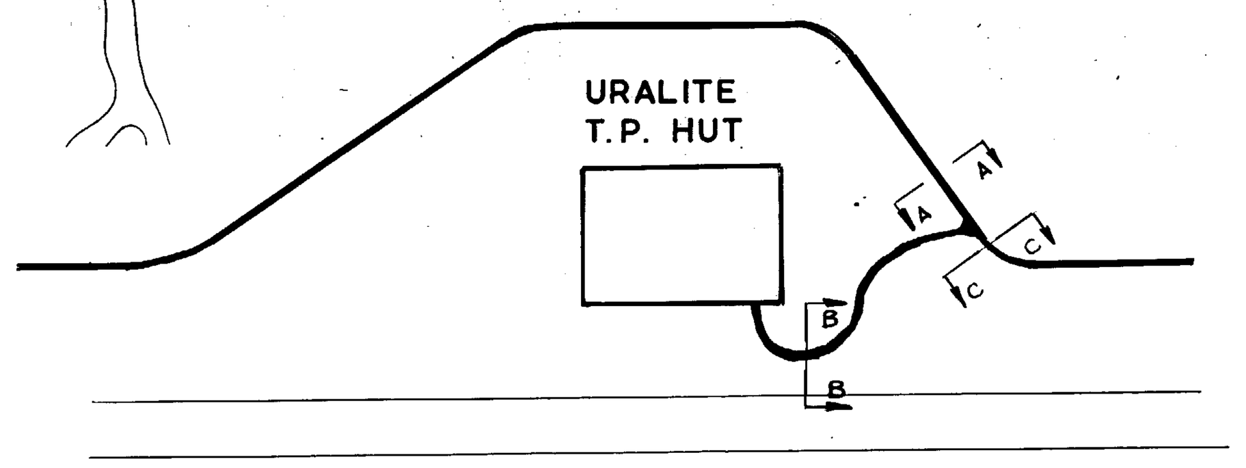
SURFACE ROUTE
BURIED ROUTE
33 KV. FEEDER JOINT.
PILOT JOINT.

SCALE:- 1/1250.

FEEDER 1126, 95mm² 3 CORE 33KV. AL. CONDUCTOR OIL FILLED C.S.A. PVC. SHEATHED CABLE.

TITLE:- BRITISH RAILWAYS SOUTHERN REGION REPLACEMENT OF FEEDER 126, 1973		
DENTON S.STN.—HIGHAM S.STN.		
DRAWN BY.		B. I. C. C.
DATE.		DRG. No. LS. 842
CH'KD. BY.		
FEEDER No.1126		SHEET 2 OF 5 SHEETS.

FDR WAS NUMBERED 126



CROSS SECTIONS OF ROUTE FACING HIGHAM SUB STN.		
A–A	B–B	C–C
190 SMT	190 SMT	190 SMT
FDR.1126 / 48c. PILOT TO T.P. HUT.	48c. PILOT TO DENTON / 48c. PILOT TO HIGHAM	FDR.1126 / 48c. PILOT.

39753

REFERENCE.

SURFACE ROUTE
BURIED ROUTE
33 KV FEEDER JOINT
PILOT JOINT

FEEDER 1126, 95 mm^2 3 CORE 33 KV. AL. CONDUCTOR OIL FILLED C.S.A. PVC. SHEATHED CABLE.

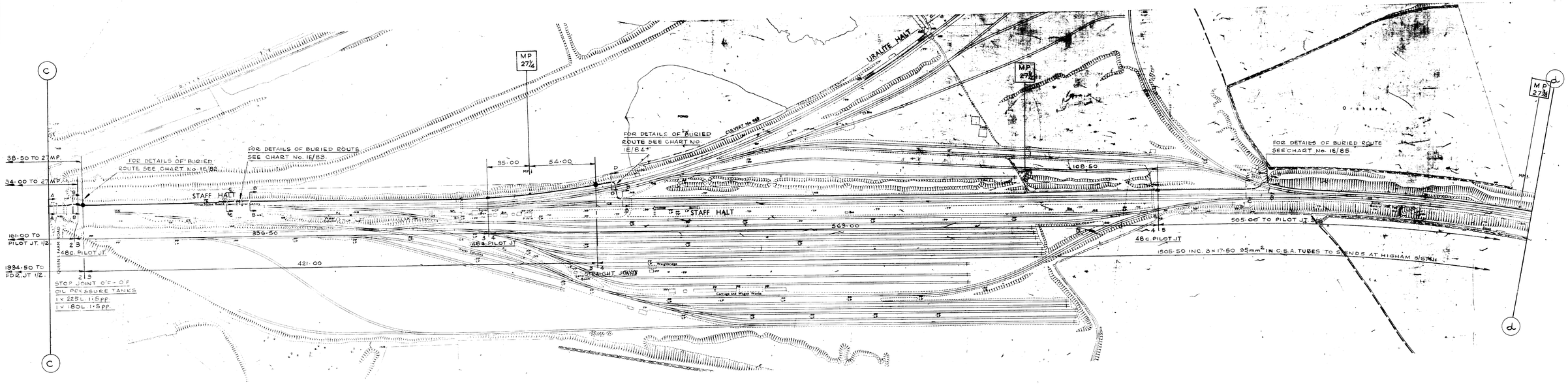
SCALE:- 1/1250

TITLE:- BRITISH RAILWAYS SOUTHERN REGION
REPLACEMENT OF FEEDER 126, 1973.

DENTON S.STN.—HIGHAM S.STN.

DRAWN BY.	R.M.	B. I. C. C.
DATE	18/1/74	DRG. No. LS. 842
CH'KD. BY.		

FEEDER No. 1126 SHEET 3 OF 5 SHEETS



CROSS SECTIONS OF ROUTE FACING HIGHAM SUB STN

A—A	B—B	C—C	D—D
127mm A.C.TUBES.	190 SMT	190 SMT	127mm A.C.TUBES.
S.E.T. CABLE. FDR1126 48c PILOT.	FDR1126 48c PILOT.	FDR1126 48c PILOT.	FDR1126 48c PILOT.

REFERENCE.

SURFACE ROUTE.
BURIED ROUTE.
33 KV. FEEDER JOINT.
PILOT JOINT.

SCALE:- 1/1250

TITLE:- BRITISH RAILWAYS SOUTHERN REGION
REPLACEMENT OF FEEDER 126, 1973

DENTON S. STN.— HIGHAM S. STN.

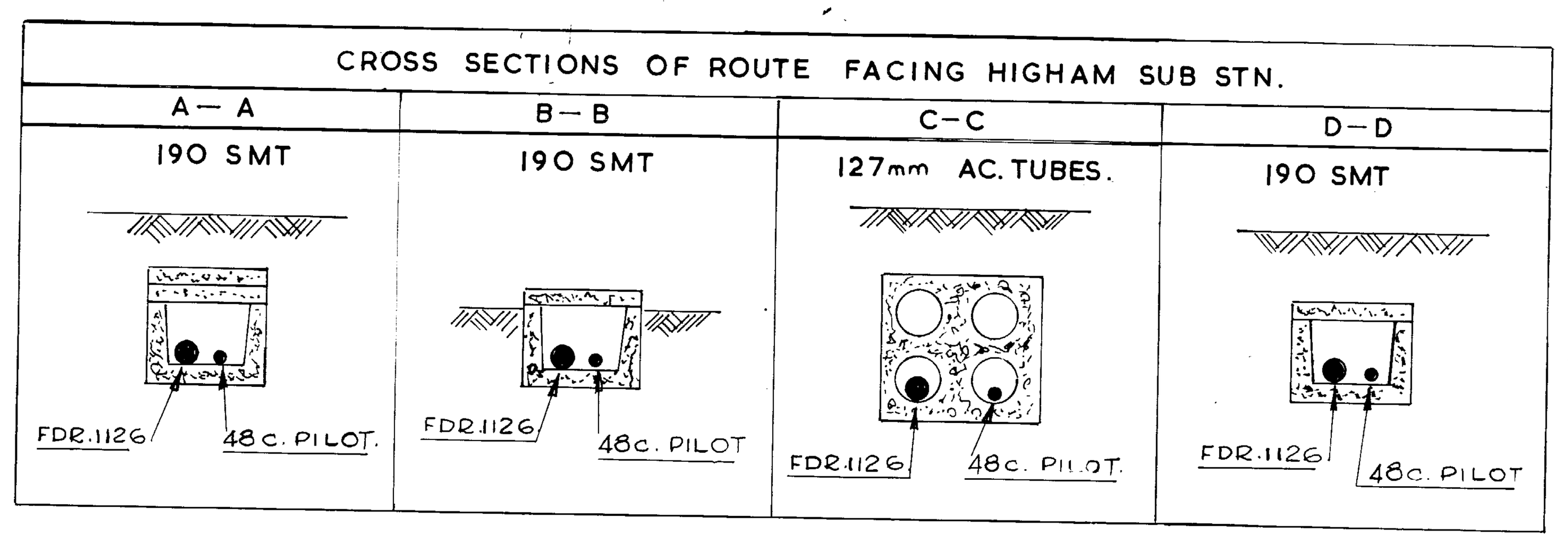
DRAWN BY.	R.M.	S. I. C. C.
DATE	18/1/74	DRG. No L.S. 842
CHKD. BY		

FEEDER No.1126

SHEET 4 OF 5 SHEETS

1.	CHD:- KCW 4-2-88
	APP:- AKO 28-3-88

FDR WAS NUMBERED 126.



FEEDER 1126, 95mm² 3 CORE 33 KV. AL. CONDUCTOR OIL FILLED CSA. PVC. SHEATHED CABLE.

REFERENCE.

SURFACE ROUTE.
BURIED ROUTE.
33 KV. FEEDER JOINT.
PILOT JOINT

SCALE:- 1/1250.

TITLE:- BRITISH RAILWAYS SOUTHERN REGION REPLACEMENT OF FEEDER 126, 1973		
DENTON S.STN. — HIGHAM S.STN.		
DRAWN BY.	R.M.	B. I. C. C.
DATE.	18/1/74	DRG. No. LS 842
CH'KD. BY.		
FEEDER No. 1126		SHEET 5 OF 5 SHEETS

1.	CHD:- KCW 4·2·86
	APP:- AKD 28-3-88
FDR WAS NUMBERED 127	
2	ALT: KS 24.1.97
	CHD: ADH 17.3.97
	APP: PWR 17.3.97
TUNNEL T.P HUT ADDED TO PILOT	

FEEDER 1127, 95mm² 3 CORE 33 KV. AL. CONDUCTOR OIL FILLED CSA. PVC. SHEATHED CABLE.

D. O. COPY

REFERENCE.

- SURFACE ROUTE.
- BURIED ROUTE.
- 33 KV. FEEDER JOINT.
- PILOT JOINT.

Master with Railtrack PDS (A.Goodchild)

39729

SCALE:- 1/1250

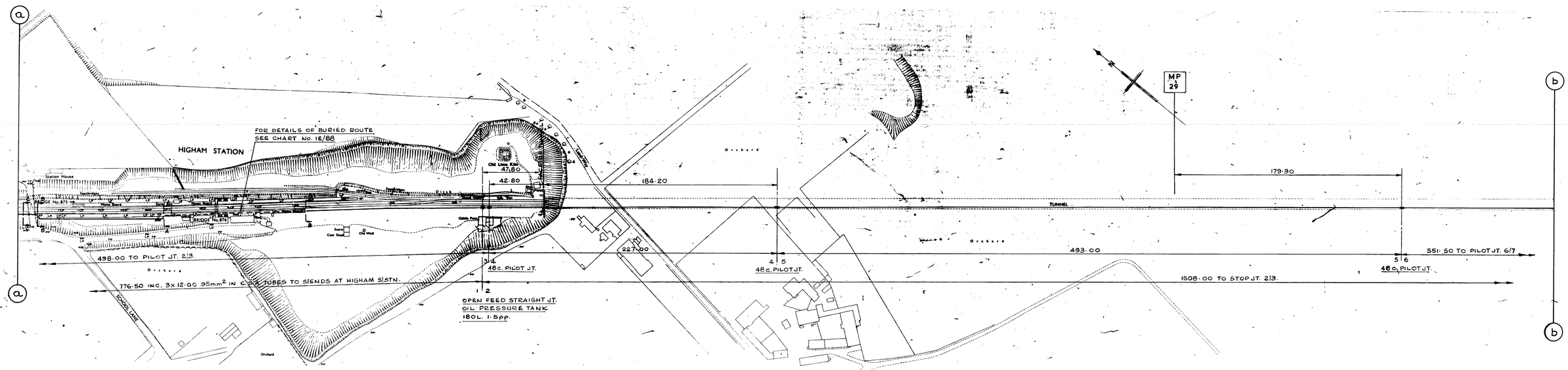
OVERALL LENGTH OF FEEDER No. 1127 = 5103·00 METRES.

TOTAL LENGTH OF PILOT CABLE
HIGHAM S/S - TUNNEL T.P HUT: 2262.5
TUNNEL T.P HUT - STROOD S/S: 2790.5
METRES 48 C 1/1·27mm POLY INS. POLY SHEATHED. SCREENED. PVC SHEATHED, EXCEPT LENGTHS 7A & 7B

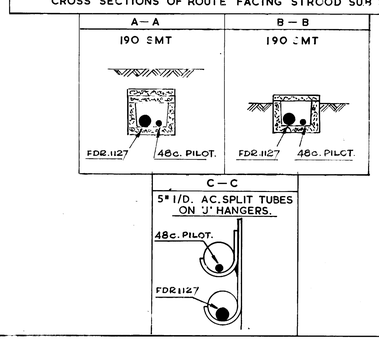
INSERTION LENGTHS 7A & 7B : 30pr
63m APPROX TOTAL

TITLE:- BRITISH RAILWAYS SOUTHERN REGION REPLACEMENT OF FEEDER 127, 1973.		
HIGHAM S.STN. — STROOD S.STN.		
DRAWN BY.	R.M.	B.I.C.C.
DATE.	29/1/74	DRG. No. LS. 844
CH' KD. BY.		
FEEDER No.1127.		SHEET 1 OF 5 SHEETS

20"x43"



CROSS SECTIONS OF ROUTE FACING STROOD SUB STN.



FEEDER 1127, 95mm² 3 CORE 33 KV. AL. CONDUCTOR OIL FILLED CSA P/C. SHEATHED CABLE.

REFERENCE.
SURFACE ROUTE.
BURIED ROUTE.
33 KV. FEEDER JOINT.
PILOT JOINT.

39780

SCALE:- 1/1250

TITLE:- BRITISH RAILWAYS SOUTHERN REGION
REPLACEMENT OF FEEDER 127, 1973

HIGHAM S. STN. — STROOD S. STN.

DRAWN BY.	R.M.	B. I. C. C.
DATE	31/1/74	DRG. No. LS. 844
CH'KD. BY		

FEEDER No. 1127. SHEET 2 OF 5 SHEETS.


PARISH OF HIGHAM
PARISH OF FRINDSBURY EXTRA
MP 29½
MP 29¾
TUNNEL T.P HUT
INSERTION JOINT
76·50
173.5
617
48c. PILOT JT.
551·50 TO PILOT JT. 5.6.
1508·00 TO FDR. JT. 1/2.
FOR DETAILS OF BURIED ROUTE
SEE CHART No. 1E/89.
63·7
CABLE LENGTH
EXACT LOCATION JT 7/7A UNKNOWN
STOP JOINT O/F - O/F
OIL PRESSURE TANKS
1 x 135L. 1·5pp.
1 x 180L. 2·0pp.
48c. PILOT JTS.
346·50
W. D. PROPERTY
2196·50 TO FDR. JT. 3/4
TUNNEL
STROOD TUNNEL
20·30
18·30
6·90
10·00
30pr PILOT
LENGTHS 7A & 7B - 10m APPROX
TO TPH
6m TO TPH
TANK D1
EXACT JOINT LOCATION UNKNOWN
JT 2/3
48c TO 30pr PILOT JT
48c TO 30pr PILOT JT
1m
DOWN
DETAIL OF PILOT INSERTIONS
FOR TUNNEL T.P. HUT
239·8C
100·8C
DOWN.
UP.
TRACK CROSSING BETWEEN HIGHAM
AND STROOD TUNNELS
CROSS SECTIONS OF ROUTE FACING STROOD
A – A
B – B
C – C
127mm
190
FDR. 1127
48c. PILOT
39781
HIGHAM
DR G. No.
844
FEEDER
1127.
SHEET 3
3 DRN: KS 24.1.97
CHD: 17.5.97
APP: 17.5.97
TUNNEL TP HUT
ADDED TO PILOT.
2 FEEDER WAS
NUMBERED 127.
INSERTION JOINT
FROM JOINT
THIS IS A CABLE
LENGTH.

1.	CHD:- KCW 4.2.88
	APP:- AKO 25-3-88

FDR WAS NUMBERED 127.

... 1127 ... OIL FILLED CSA. PVC. SHEATHED CABLE.

REFERENCE.

SURFACE ROUTE	———
BURIED ROUTE	– – – –
33 KV. FEEDER JOINT.	—●—
PILOT JOINT.	—▬—

39732

SCALE:- 1/1250

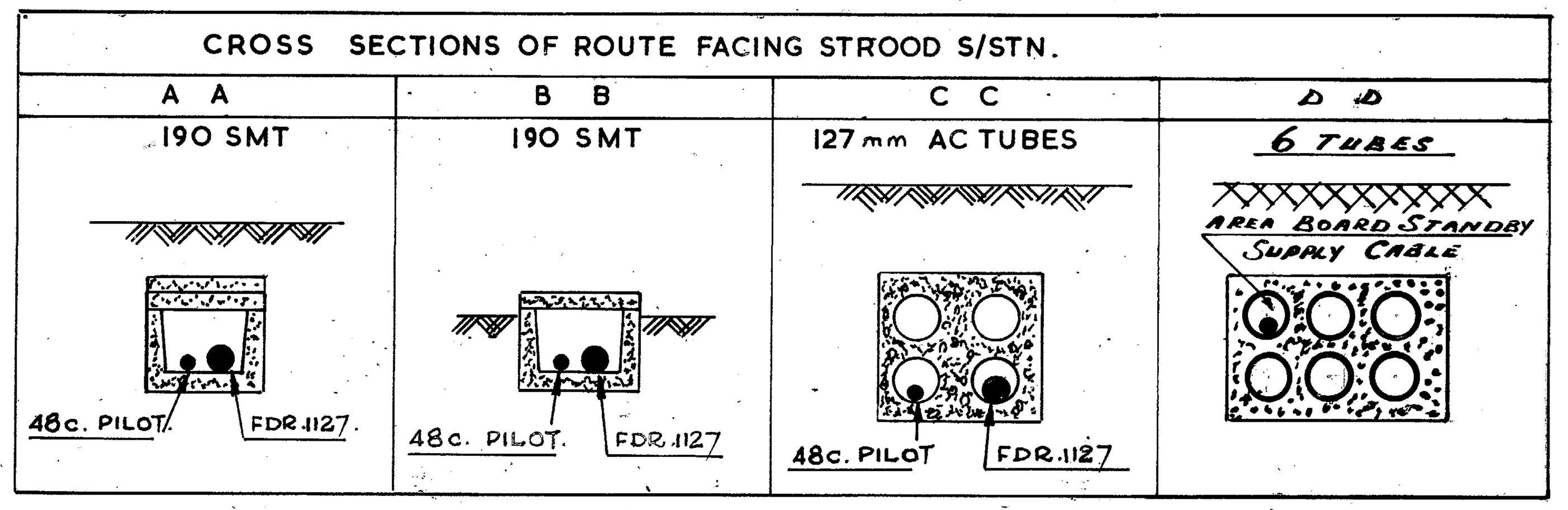
TITLE:- BRITISH RAILWAYS SOUTHERN REGION
REPLACEMENT OF FEEDER 127, 1973.

HIGHAM S.STN. — STROOD S.STN

DRAWN BY.	Q.M	B.I.C.C.
DATE	1/2/74	DRG. No. LS. 844
CH'KD. BY.		

FEEDER No.1127

Master with Railtrack PDS (A.Goodchild)



REFERENCE.

- SURFACE ROUTE
- BURIED ROUTE
- 33 KV. FEEDER JOINT
- PILOT JOINT

39733

D. O. COPY

SCALE:- 1/1250.

TITLE:- BRITISH RAILWAYS SOUTHERN REGION REPLACEMENT OF FEEDER 127, 1973.

HIGHAM S.STN. — STROOD S.STN.

DRAWN BY.	R.M.	B. I. C. C.	
DATE	1/2/74	DRG. No. LS. 844	
CH'KD. BY.			

FEEDER 1127, 95mm^2 3 CORE 33 KV. AL. CONDUCTOR OIL FILLED CSA. PVC. SHEATHED CABLE.

FDR WAS NUMBERED 127.

Standby supply cable added from supply Board to transformer at Strood Substation

FEEDER No. 1127

SHEET 5 OF 5 SHEETS.

MEC
Consulting Group

APPENDICES

APPENDIX H

GTC Ref: East Midlands/34159065/488942
GTC Contact: Christopher Base
07483 082188 / christopher.base@gtc-uk.co.uk
01359 240154 / sales@gtc-uk.co.uk

12 March 2025

Electric, Fibre, Water and Wastewater Budget Quotation

Chalk Road, Higham, ROCHESTER, Kent, ME3 7JY

Prepared for Richborough (c/o MEC Consulting Group Ltd)

1.0 INTRODUCTION

Summary of Offer

Following your request for a utility networks quotation for the development at Chalk Road, Higham, ROCHESTER, Kent, ME3 7JY GTC has used the information provided to produce a budget costing to meet your requirements. GTC's offer is inclusive of Electric, Fibre and Water infrastructure and adoption of the wastewater network constructed by you (based on the terms of offer set out in this quotation).

Breakdown of Offer

On-site works	
You pay GTC	**£20,197.69**

Off-Site Works	
You pay GTC	**£4,030.72**

Upstream Network Operator Costs	
Electricity:	£3,000.00
Water:	£20,000.00
Wastewater:	£0.00

Total	
You pay GTC	**£47,228.41**

2.0 GTC ADDED VALUE

Fibre

Fibre Rebate Information

GTC's offer above is inclusive of a fibre rebate of **£375.00 per plot** (£100 of which is conditional upon you pre-wiring the plot to enable the resident to receive Sky Q television services, via satellite dish, in accordance with the enclosed Sky Approved Developer Terms). This rebate has been deducted upfront from the on-site total giving the advantage of no administration burden for you to claim the individual plot rebates as they are connected.

Additional Fibre Network Value to Help with Comparison to Other Provider's Quotes

In addition to the rebate, this offer is based on GTC's innovative fibre installation method which means you will no longer have the cost or hassle of building the full duct and chamber network. Instead, GTC will install the duct network with the other utilities and free issue preformed chambers to be installed by you. GTC estimates that this gives a further construction cost saving to MEC Consulting Group Ltd of £515.00 per plot which you may need to take in to account when comparing to other quotes.

Estimated Value to Richborough of Construction Costs Saved	
40 plots with £515.00 per plot saving	**£20,600.00**

Water and Wastewater

Infrastructure Charge and Income Offset Credits

Infrastructure Charges and Income Offset Credits are a pass through from the incumbent water and wastewater company which are subject to annual review by the incumbent and approval by Ofwat. Following an Ofwat consultation, Income Offset Credits will cease from April 2025. As these charges and payments change over the duration of your development, it can provide uncertainty on the costs included within the original quotation. GTC has therefore excluded these charges and will apply the approved and published Infrastructure Charge and Income Offset published by the incumbent water company as the plots on your development are connected. The values shown below are the default values given by the incumbent for the current charging period.

Charges and Credits	Per Plot	Site Total
Water Infrastructure Charge:	£241.00	£9,640.00
Water Income Offset Credit:	-£150.00	-£6,000.00
Wastewater Infrastructure Charge:	£583.00	£23,320.00
Wastewater Income Offset Credit:	-£129.00	-£5,160.00
Net Infrastructure Charge:	**£545.00**	**£21,800.00**

GTC will apply for any discounts to infrastructure charges offered by incumbent water or wastewater companies subject to you or subsequent housebuilder providing evidence that the specific conditions for any discount has been achieved.

Based on the current values, the total cost for your development is shown below.

Provisional Total Project Cost	
GTC Quotation and Net Infrastructure Charge (at current rates):	**£69,028.41**

Charges Often Levied by the Water Company Included in GTC's Standard Offer

GTC's water offer is an all-inclusive offer based on the terms set out in this quotation. This offer also includes the items below that can often be excluded by others resulting in unforeseen additional costs. For comparison purposes, please check that these are also included in the offers from other providers.

Description	Included in GTC's Offer
Supply and Fit of Meter	Yes
Service connection to boundary box / manifold	Yes
Chlorination and testing	Yes
Design Fees / Deposits / Vetting	Yes
Inspections	Yes
Additional Visits	Yes

3.0 SITE DETAILS

Schedule of Domestic Plots

Property Type	2BF	2BS	3BD	3BS	3BT	4BD	Total
Electricity	4	8	2	14	2	10	40
Fibre	4	8	2	14	2	10	40
Water	4	8	2	14	2	10	40
Wastewater	4	8	2	14	2	10	40

4.0 TERMS OF OFFER

Electric Terms

POINT OF CONNECTION

GTC has assumed a low voltage (LV) point of connection (PoC) from UKPN Southern. Costs associated with the PoC are therefore subject to change. When a firm offer is received from UKPN Southern or when the Developer confirms acceptance of GTC's quotation, the PoC cost will be confirmed. Please note: PoC will be provided when UKPN Southern has provided these details in full, however the PoC and non-contestable charges will be the same regardless of who is to own the network.

GTC has calculated the total load for the site to be 116kVA.

OFF-SITE WORK

This quotation includes the excavation and reinstatement costs which will be carried out by GTC outside of the site boundary. GTC has allowed for 5m of off-site work (5m road). Please note, the off-site costs may be subject to change when UKPN Southern has confirmed the location of the PoC.

GTC has assumed that all cable routes (whether on-site or off-site) fall within either the land owned by the Developer or public highways. Should this not be the case then the Developer is responsible for obtaining all necessary land rights required by GTC and all associated legal agreements. All costs associated with any such land rights and legal agreements including, but not limited to, solicitor fees, and consideration payments made to third parties are the responsibility of the Developer (and the Developer shall reimburse GTC for any such costs incurred).

ON-SITE WORK

The Developer shall be responsible for all on-site excavation and reinstatement.

GTC has assumed all mains and services feeding 40 plots will be in trenches pre-excavated by the Developer.

Diversionary or abandonment works may be required and are excluded from GTC's quote. The details can be obtained by contacting the upstream distribution network operators.

GTC's mains will typically be laid down one side of the estate roads to minimise on road crossings, service lengths and mains lengths. This quote does not include ducting as this is the responsibility of the Developer to install suitable ducts and jointing pits at the Developers cost to GTC specifications.

GTC's quote is based on 40 Plots having electric heating (ASHP).

GTC's quote is based on meter positions for the houses to be external on the front elevation of each property. Where internal meters are to be fitted, the Developer will be responsible for establishing a metering location in accordance with GTC standards GE-TGI-IG-0015, details of which will need to be confirmed by the Developer upon acceptance of GTC's quotation.

NON-DOMESTIC LOAD ASSUMPTIONS

This quotation includes sufficient capacity on each domestic 100A service for an Electric Vehicle Charging Point (EVCP) of up to 7.2kW (32A) installed downstream of the meter on each domestic plot (excluding multi-occupancy dwellings). Larger EVCPs or multiple EVCPs may require a 3-phase arrangement, as well as a requirement for additional capacity, and costs for this arrangement have not been included in this quotation.

Based on the information provided, GTC has not made any allowance for industrial and commercial (I&C) Plots in this quotation.

OPTIONAL COSTS

GTC's quotation excludes meter boxes and hockey sticks. GTC's current price to supply these is an additional charge of £28.20 each for standard meter boxes.

GTC's quotation excludes the cost of Temporary Builders Supply (TBS). The indicative cost to connect this is £2,035.00, this cost assumes the Developer shall be responsible for all excavation and reinstatement; the Developer will provide a weatherproof lockable box/kiosk with suitable internal space to accommodate the meter board; the meter location is less than 25m from GTC's installed and energised mains; demand does not exceed 24kVA for single phase TBS or 69kVA for three phase TBS. This price includes for the disconnection of the temporary supply upon request.

GTC's quotation excludes the cost to connect adoptable street lighting columns. GTC can connect these at an additional charge, the current price for this work is £383.00 per column. This cost includes the supply and lay of 9m of service cable between GTC's existing Low Voltage (LV) mains and the streetlights, in this cost GTC has assumed you will provide ducting and excavation to GTC specifications. Prior to the energisation of the streetlights, you will need to have appointed an electricity supplier for the supply of the streetlights. Following the first energisation the terms of connection will be as set out in the National Terms of Connection or in a separate agreement between GTC and yourself.

GTC's Technical Guidelines for Electricity can be found here: http://www.gtc-uk.co.uk/technical-guidelines

Fibre Terms

OFF-SITE WORK

This quotation includes any off-site excavation and reinstatement works required to be completed for a connection from the on-site fibre duct network on the development at the site entrance to the appointed Backhaul Provider. These works will be carried out by GTC.

GTC has assumed that all fibre duct routes (whether on-site or off-site) fall within either the land owned by the Developer or public highways. Should this not be the case then the Developer is responsible for obtaining all necessary land rights required by GTC and all associated legal agreements. All costs associated with any such

land rights and legal agreements including, but not limited to, solicitor fees, and consideration payments made to third parties are the responsibility of the Developer (and the Developer shall reimburse GTC for any such costs incurred).

ON-SITE WORK

This quotation is based on GTC installing the duct and chamber infrastructure and fibre network as detailed in GTC document GF-TGI-IG-0393. All the Developer will need to install is the 54mm fibre service duct and complete installation of the chambers.

The Developer shall be responsible for all on-site excavation and reinstatement associated with the installation of the fibre network, including the mains, services and On-Site Convergence Point (OSCP).

The Developer shall be responsible for preparation within the Plots to ensure a Plot is ready to receive a fibre service. GTC will liaise with you on the specific requirements during the design stages and brief out final requirements at a fibre construction pre-start meeting.

To ensure that the homeowners moving into their new property can enjoy the maximum benefit from GTC's Ultra-Fast Fibre Optic Distribution Network, GTC strongly recommend the Developer follows the minimum in-home technical requirements as specified within the appropriate Fibre Technical Guidelines.

The Developer shall be responsible for ensuring that each Plot is pre-wired to enable the resident to receive Sky Q television services (via satellite dish or communal FIRS) in accordance with the enclosed Sky Approved Developer Terms and will highlight to purchasers of its Plots Sky Triple Play (being a phone, broadband and TV service offering provided by or on behalf of Sky) as well as the fact that Sky are the Developer's preferred solution for TV, broadband and phone services. The Developer will be required, in addition to (and separately from) GTC's Standard Terms and Conditions, to enter into (and to comply with) the enclosed Sky Approved Developer Terms. Sky pre-wiring specification documents can be found on GTC's website and via the link below.

GTC's Technical Guidelines for Fibre and Sky Q Pre-wiring Technical Specifications can be found here:
http://www.gtc-uk.co.uk/technical-guidelines

Water Terms

POINT OF CONNECTION

This quotation is based on a provisional point of connection (PoC) provided by Southern Water Services (SWS)'s network. Once SWS has provided a formal offer for these works GTC will pass this through for payment by the Developer. GTC has assumed that a suitable PoC for the whole development is available at the site entrance.

OFF-SITE WORK

This quotation includes the provisional costs for the off-site water connection work from the PoC location to the site.

GTC has assumed that all pipe routes (whether on-site or off-site) fall within either the land owned by the Developer or public highways. Should this not be the case then the Developer is responsible for obtaining all necessary land rights required by GTC and all associated legal agreements. All costs associated with any such

land rights and legal agreements including, but not limited to, solicitor fees, and consideration payments made to third parties are the responsibility of the Developer (and the Developer shall reimburse GTC for any such costs incurred).

ON-SITE WORK

The Developer shall be responsible for all on-site excavation and reinstatement. GTC shall supply and install water infrastructure inclusive of the main, communication pipe, meter box and meter. The Developer shall complete installation of the meter boxes to the final finished level. Please refer to GTC technical guidelines GW-TGI-IG-0017 for further details and definitions.

The costs of carrying out any necessary diversions to the existing water network are excluded from this quotation. Please contact the Incumbent Water Company if required.

This quotation is based on all water meters located in the footpath or publicly accessible metalled surface in an individual or multiple meter boundary box. Water meters may also be located internally within each property (at the water service entry location) subject to approval by IWNL.

This quotation does not include for the construction or adoption of any booster pumps by IWNL. Should these be required, this quotation is based on the assumption that these will be adopted by the Incumbent Water Company.

This quotation assumes there is no contamination on-site and therefore all pipe has been costed as standard polyethylene (PE) pipe. No allowance has been made for any barrier pipe in this quotation.

GTC has not sized the services to the Plots for sprinkler supplies.

The Developer is to supply, free of charge, suitable concrete for thrust blocks as necessary for the water mains.

OPTIONAL COSTS

This quotation does not include any landlord's supplies or bin store services. A quotation for these can be provided after acceptance. The standard price for these supplies is £442.00 (excluding VAT) for each connection. This assumes a 25mm service and 15mm inline meter located in a boundary box within 10m of a laid or proposed IWNL main. All excavation and reinstatement to be completed by the Developer.

GTC's quotation excludes the cost for a Temporary Builders Supply (TBS). The current cost to provide this is £699.00 (excluding VAT) per TBS. This cost assumes the Developer shall be responsible for all excavation and reinstatement. The TBS will be a standard metered arrangement consisting of 32mm service pipe, a 20mm meter and a boundary box capable of providing 4m3/hr (1.1 l/s) and located within 10m of an installed or proposed IWNL main. IWNL's main and associated upstream pipe work will need to be in place and commissioned before the TBS can be installed. This price includes for the disconnection of the temporary supply upon request. If a TBS is required before commissioning of IWNL's network is complete, it should be requested from the upstream Incumbent Water Company. Any request for a TBS to the upstream Incumbent Water Company should be made directly by the Developer as GTC cannot apply for this on your behalf.

This quotation excludes the costs for any fire hydrants. The cost for these will be chargeable upon confirmation from the local Fire Authority on the quantity and location of hydrants required.

NAV LICENCE

Any works in respect of the water distribution network will be conditional upon IWNL having been granted a NAV by Ofwat and acceptance by IWNL of a formal offer from the Incumbent Water Company to: (i) connect the Network to the Host Water Company's network; (ii) convey water from the Host Water Company's network; and (iii) perform any tasks ancillary to those contemplated in (i) or (ii) above.

INFRASTRUCTURE CHARGES

Infrastructure charges for water are payable on a per plot basis and will be chargeable in-line with the charges applicable at the time the water service connection is made to the building. Water infrastructure charges are revised on an annual basis and are regulated by Ofwat, for clarity this offer excludes these charges. GTC will apply for any discounts to infrastructure charges offered by the Incumbent Water Company subject to the Developer or subsequent housebuilder providing evidence that the specific conditions for any discount have been achieved.

GTC's Technical Guidelines for Water can be found here: http://www.gtc-uk.co.uk/technical-guidelines

Wastewater Terms

POINT OF DISCHARGE

This quotation is based on an assumed connection to Southern Water Services (SWS)'s network. GTC has assumed that a suitable wastewater point of discharge (PoD) for the whole development is available at the site entrance. Once SWS has provided a formal offer for these works GTC will pass this through for payment by the Developer. This quotation assumes the Developer will undertake all civils work for the wastewater connection.

OFF-SITE WORK

The Developer shall design, supply, install and provide all civils work for all off-site wastewater infrastructure. Please refer to GTC technical guidelines GW-TGI-IG-0575 for further details and definitions.

GTC has assumed that all pipe routes (whether on-site or off-site) fall within either the land owned by the Developer or public highways. Should this not be the case then the Developer is responsible for obtaining all necessary land rights required by GTC and all associated legal agreements. All costs associated with any such land rights and legal agreements including, but not limited to, solicitor fees, and consideration payments made to third parties are the responsibility of the Developer (and the Developer shall reimburse GTC for any such costs incurred).

ON-SITE WORK

The Developer shall design, supply and install all wastewater infrastructure. The Developer shall be responsible for all on-site excavation and reinstatement. Please refer to GTC technical guidelines GW-TGI-IG-0575 for further details and definitions.

The costs of carrying out any necessary diversions to the existing Incumbent's wastewater network are excluded from this quotation and will be arranged and undertaken through the Incumbent Wastewater Company by the Developer.

Where the surface water discharge terminates into a third-party water course, canal, drainage ditch, water body or similar, the wastewater element of this quotation is conditional upon IWNL entering into any necessary agreements (on terms acceptable to IWNL) in respect of surface water discharge with any relevant third party

(including, without limitation, the Canal & River Trust). GTC reserves the right to: (i) amend this quotation to reflect, or otherwise recover from the Developer, any amounts which IWNL is required to pay to any third party including the incumbent wastewater company in respect of surface water discharge; (ii) withdraw this quotation (in so far as it relates to wastewater) if IWNL does not reach agreement in respect of surface water discharge with any relevant third party; and/or (iii) pass through to the Developer any costs incurred by IWNL in seeking to reach agreement in respect of surface water discharge with any relevant third party.

The site wastewater drainage design is assumed to include for separate systems for sewage and surface water drainage. The separate foul sewer system will extend to the Incumbent owned public sewer and the surface water network may terminate with a connection to the Incumbent's network. A discharge application will be made by the Developer to the Incumbent Water Company for the discharge of sewage and possibly the surface water. The sewage discharge application will be for domestic wastewater only, IWNL must be consulted in respect of any proposed trade effluent discharge to the public sewer. Land and highway drainage have no right of connection to the public sewer network. Land drainage will not be allowed into a public sewer. Highway drainage, however, may be accepted under certain circumstances; for instance, if SuDS are not a viable option and there is no highway drain available and if capacity is available within the public sewer network. In this event, you will be required to enter into a formal agreement with IWNL under Section 115 Water Industry Act 1991 to discharge non-domestic flows into the public sewer network. GTC reserves the right to request the Developer provides a surety (e.g., an independent bank or financial institution such as NHBC) not exceeding 10% of the estimated construction value of the works (minimum value of the indemnity being £5,000 or the value of the works if less than £5,000).

All wastewater design approvals and network inspections as deemed necessary by GTC (both those undertaken during construction works and for final adoption of the network) are included within this offer, this is for design submissions and construction of the works that are of a conventional nature and are in accordance with the recommendations set out in the latest version of the Sewerage Sector Guidance, Design and Construction Guidance. In the event that submissions or construction of the works falls below these standards GTC reserves the right to recover any additional costs incurred as a result of such occurrence. The Developer shall provide detailed CCTV coverage and as built drawings for the wastewater networks before adoption can be made by IWNL, as well as proving the satisfactory operation of all network components through the Developer's maintenance period.

Any works in respect of the wastewater network will be conditional upon IWNL having been granted a NAV by Ofwat and acceptance by IWNL of a formal offer from the Incumbent Wastewater Company to: (i) connect the Network to the Host Water Company's network; (ii) convey wastewater to the PoD on the Host Water Company's network; and (iii) perform any tasks ancillary to those contemplated in (i) or (ii) above.

ADOPTIONS

This quotation assumes a pumping station is not required for the development and therefore does not include for the construction or adoption of any pumping stations by IWNL. Should any pumping stations be required, this quotation is based on the assumption that these will be adopted by the Incumbent Wastewater Company. GTC reserves the right to amend this quotation should the adoption of pumping stations not be agreed with the Incumbent Wastewater Company. Any temporary pumping station will be the responsibility of the Developer to design, construct and maintain and will not be adopted by IWNL.

This quotation does not include for the adoption of any of the attenuation components included as a part of the surface water sustainable drainage system (SuDS). This offer includes for the adoption of the surface water pipework only.

INFRASTRUCTURE CHARGES

Infrastructure charges for wastewater are payable on a per plot basis and will be chargeable in-line with the charges applicable at the time the water service connection is made to the building. Wastewater infrastructure charges are revised on an annual basis and are regulated by Ofwat, for clarity this offer excludes these charges. GTC will apply for any discounts to infrastructure charges offered by the Incumbent Wastewater Company subject to the Developer or subsequent housebuilder providing evidence that the specific conditions for any discount have been achieved.

GTC's Technical Guidelines for Wastewater can be found here: http://www.gtc-uk.co.uk/technical-guidelines

5.0 CONFIDENTIALITY

This quotation and associated documentation is confidential between GTC, Richborough and their associated parties for this project. It contains commercially sensitive information and should not be divulged to any other party without written permission from GTC.

6.0 PROGRESSING THIS QUOTATION

Should you be successful in obtaining and developing this site, GTC will be pleased to supply a firm quotation. Please return a detailed site plan and a completed quotation request form. GTC trust that this budget costing will be acceptable and look forward to receiving your instructions.

This quotation is given on the basis that it does not create any legal relationship between you and GTC and no agreement will come into force between us until GTC dispatches an acknowledgement of the Acceptance and Appointment of Transporters. To the fullest extent permitted by law, GTC will have no liability in contract, tort (including negligence and negligent misstatement) or otherwise for any matter set out or referred to in this quotation unless and until such an agreement comes into force (in which case any such liability will be governed by GTC's Standard Terms and Conditions).

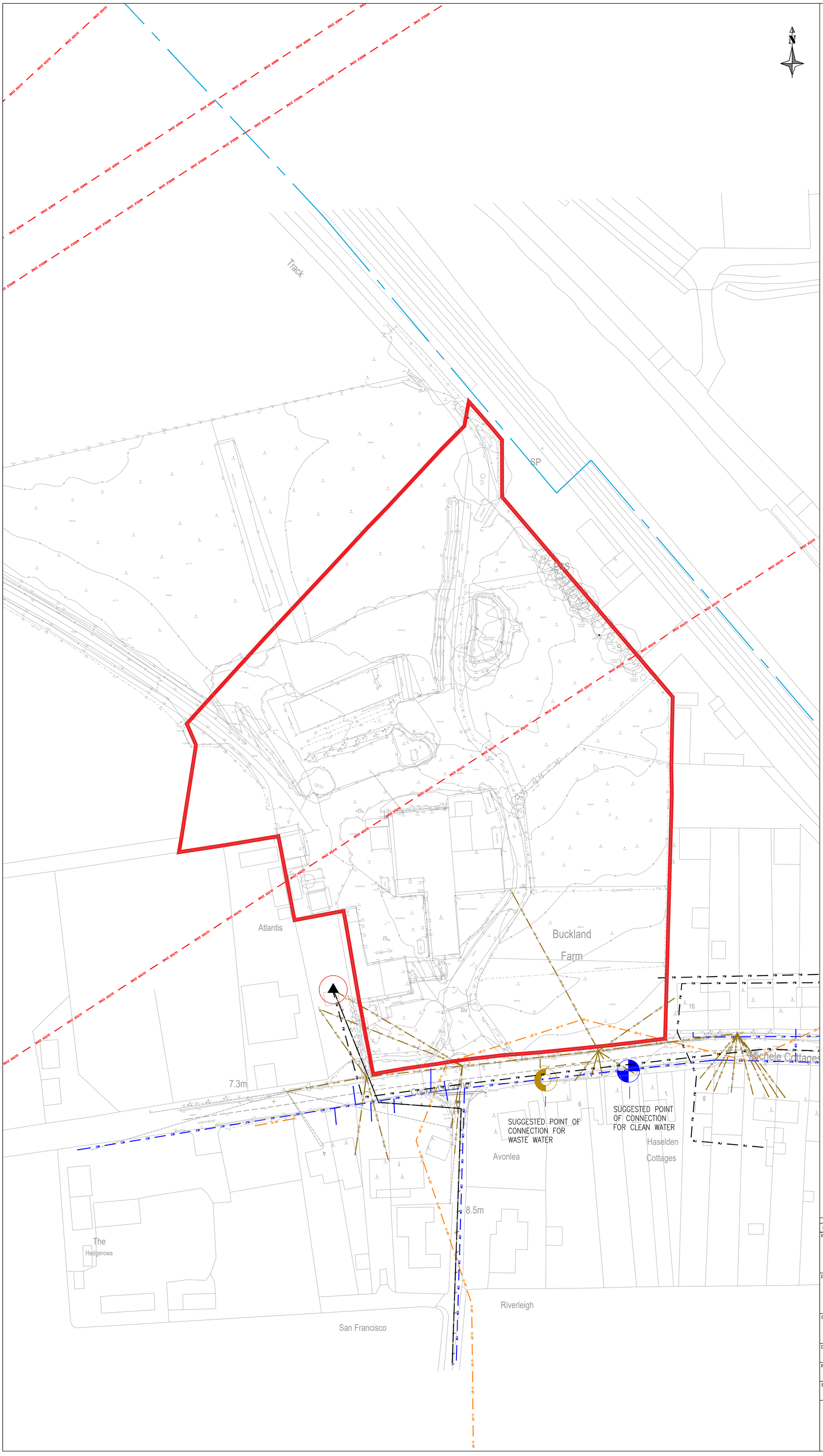
7.0 CONTACT DETAILS

Should you require further details please do not hesitate to contact your GTC Sales Contact, Christopher Base (07483 082188 / christopher.base@gtc-uk.co.uk) or the Sales Support Team (01359 240154 / sales@gtc-uk.co.uk) to discuss further.

MEC
Consulting Group

APPENDICES

APPENDIX I



NOTES:

1. DO NOT SCALE THIS DRAWING.
2. ALL LEVELS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
3. ALL DIMENSIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
4. SERVICE LOCATIONS SHOWN ON THIS PLAN ARE DERIVED FROM RECORDS OBTAINED FROM STATUTORY UNDERTAKERS. THIS DRAWING CAN NOT BE RELIED UPON FOR ACCURACY. THE SIZE, MATERIAL & DEPTH OF BURIED SERVICES ARE NOT SHOWN ON THIS DRAWING. SUCH INFORMATION MUST BE OBTAINED FROM STATUTORY UNDERTAKERS OR INTRUSIVE INVESTIGATION.
5. IT IS ESSENTIAL THAT NEW STATUTORY UNDERTAKER ENQUIRES ARE UNDERTAKEN BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION WORKS. CABLE/PIPE DETECTION TECHNIQUES, TRIAL HOLES OR OTHER SIMILAR METHODS MUST BE ADOPTED BY THE CONTRACTOR TO VERIFY THIS DRAWING AND ANY SUBSEQUENT PLANS OBTAINED FROM STATUTORY UNDERTAKERS.
6. PRIOR TO CONSTRUCTION & ALSO DURING DESIGN IT SHALL BE NECESSARY TO UNDERTAKE HAZARD IDENTIFICATION & RISK ASSESSMENT OF POTENTIAL DAMAGE TO EXISTING SERVICES. ALSO SAFEGUARDS SHOULD BE PUT IN PLACE TO PREVENT EXPLOSION, FLOOD, ELECTRIC SHOCK ETC FOR OPERATIVES & GENERAL PUBLIC.

KEY:

- SITE BOUNDARY
- CW — CLEAN WATER MAIN
- FW — FOUL WATER SEWER
- FOUL WATER PRESSURIZED SEWER
- LV — UNDERGROUND LV CABLE
- O-LV — OVERHEAD LV CABLE
- O-BT — OVERHEAD BT CABLE
- EU NETWORK
- INNER ZONE — (78) HSE INNER ZONE
- MIDDLE ZONE — (90) HSE MIDDLE ZONE
- OUTER ZONE — (270) HSE OUTER ZONE
- SUGGESTED POINT OF CONNECTION FOR WASTE WATER
- SUGGESTED POINT OF CONNECTION FOR CLEAN WATER

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
-	INITIAL	EH	BO	AB	22.07.25

PROJECT:
CHALK ROAD
HIGHAM

DRAWING TITLE:
UTILITIES CONSTRAINTS PLAN

CLIENT:
RICHBOROUGH

DRAWING NUMBER:
29524_07_010_01

REVISION:	SHEET SIZE:	SCALE:
-	A1	1:500

STATUS:
PRELIMINARY

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