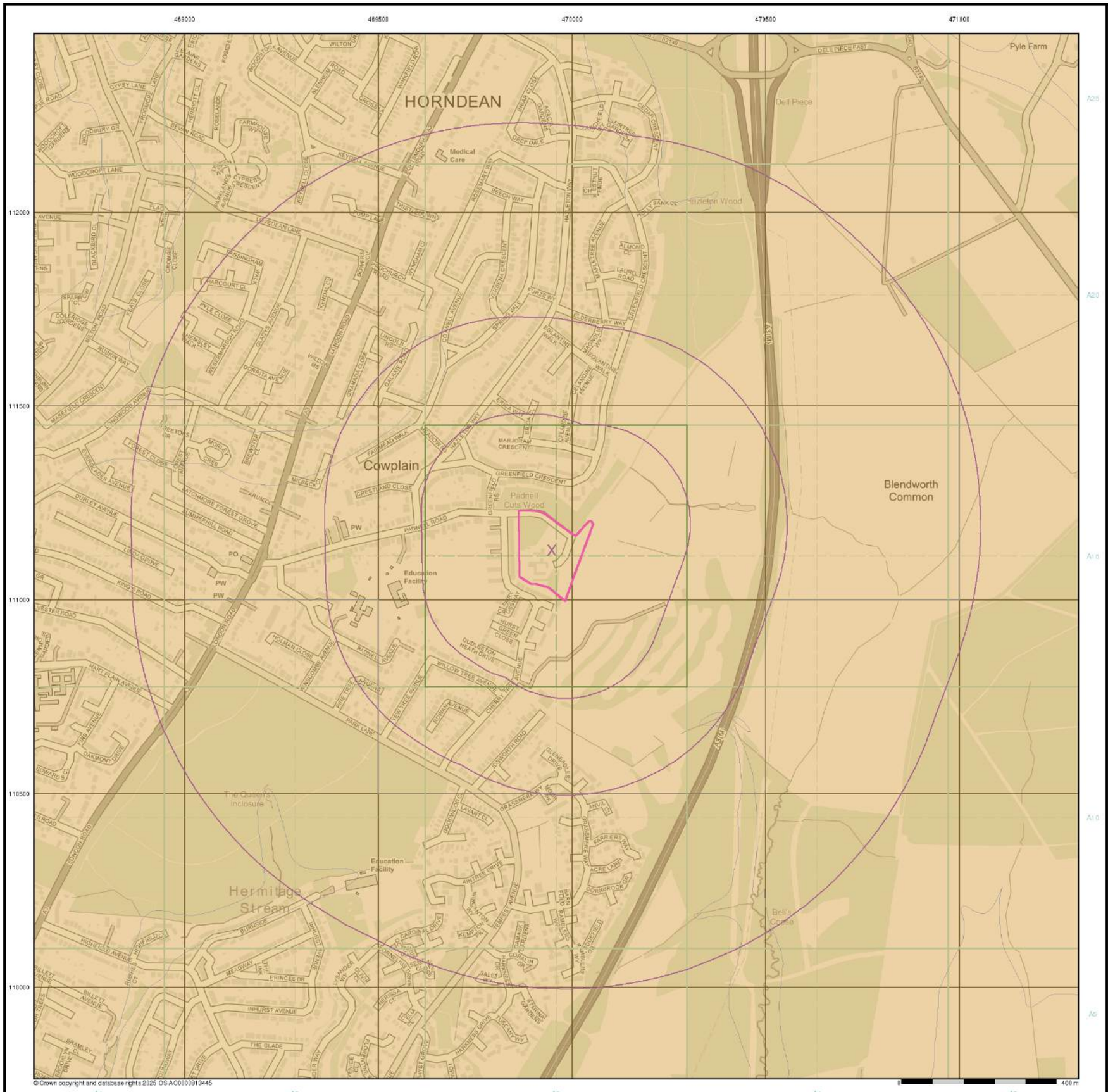


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## General

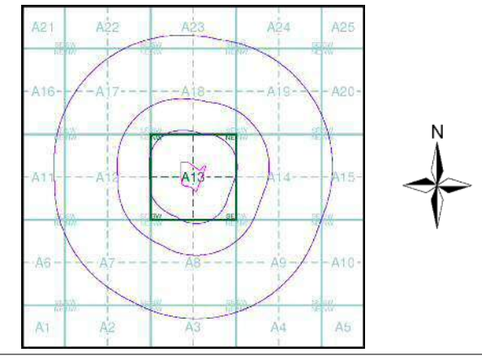
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

## Estimated Soil Chemistry Arsenic - Slice A



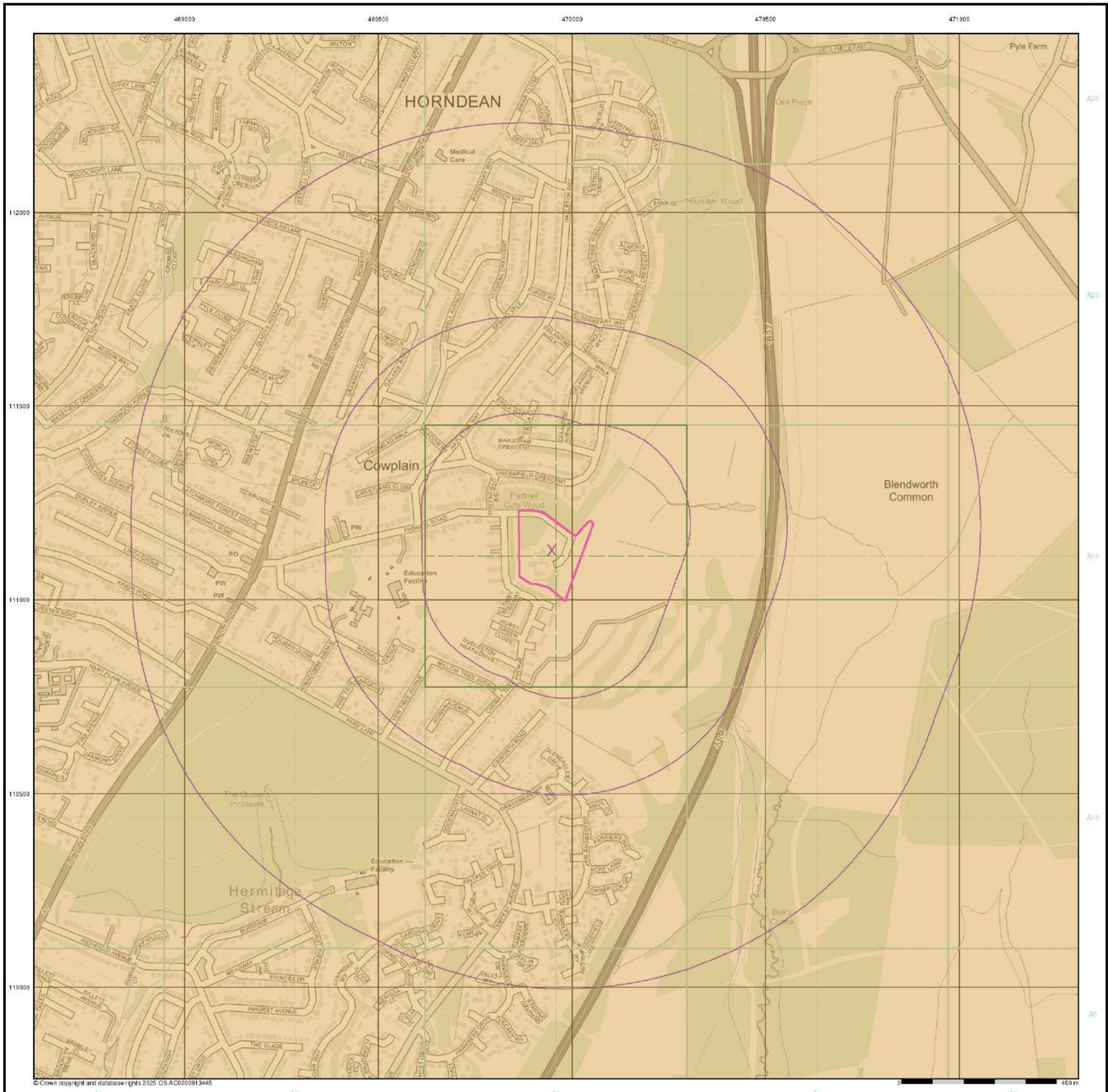

## Order Details

| | |
|---|---|
| Order Details: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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## General

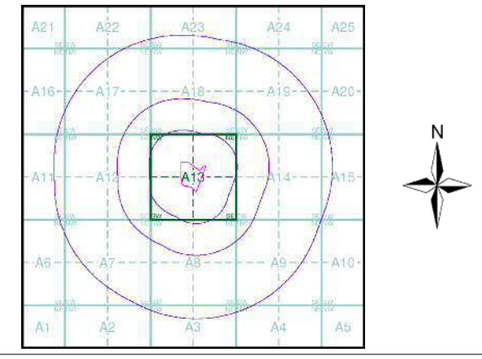
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

## Estimated Soil Chemistry Cadmium - Slice A




## Order Details

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| Customer Ref: | 22035/DEE |
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| Slice: | A |
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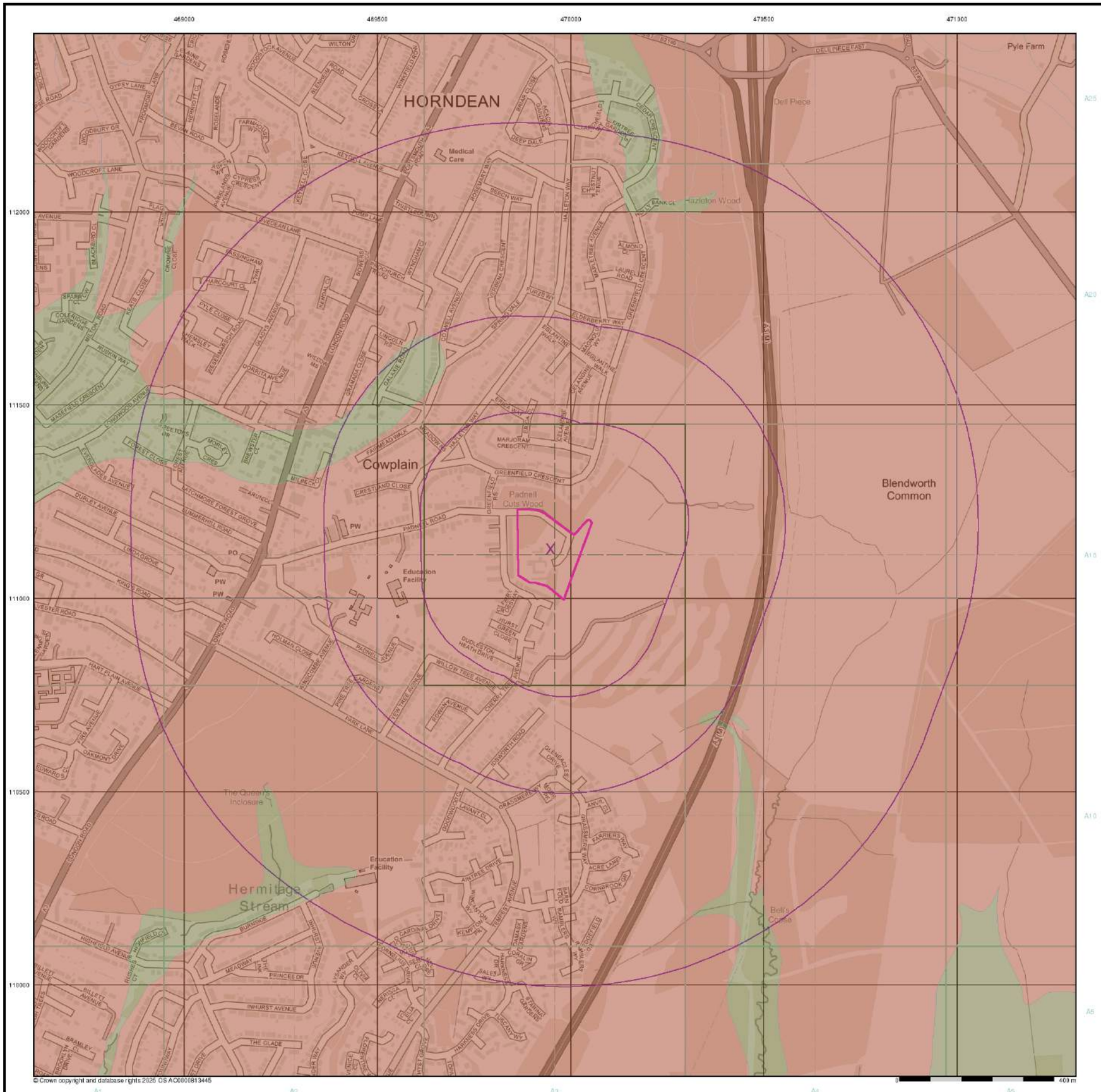


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## General

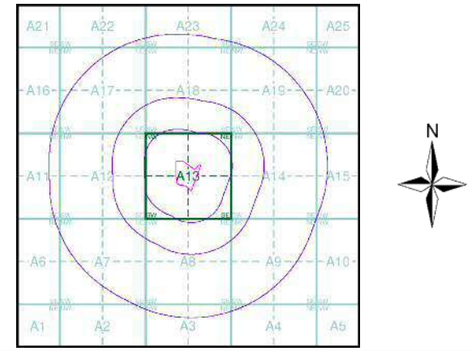
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

## Estimated Soil Chemistry Chromium - Slice A




## Order Details

| | |
|---|---|
| Order Details: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

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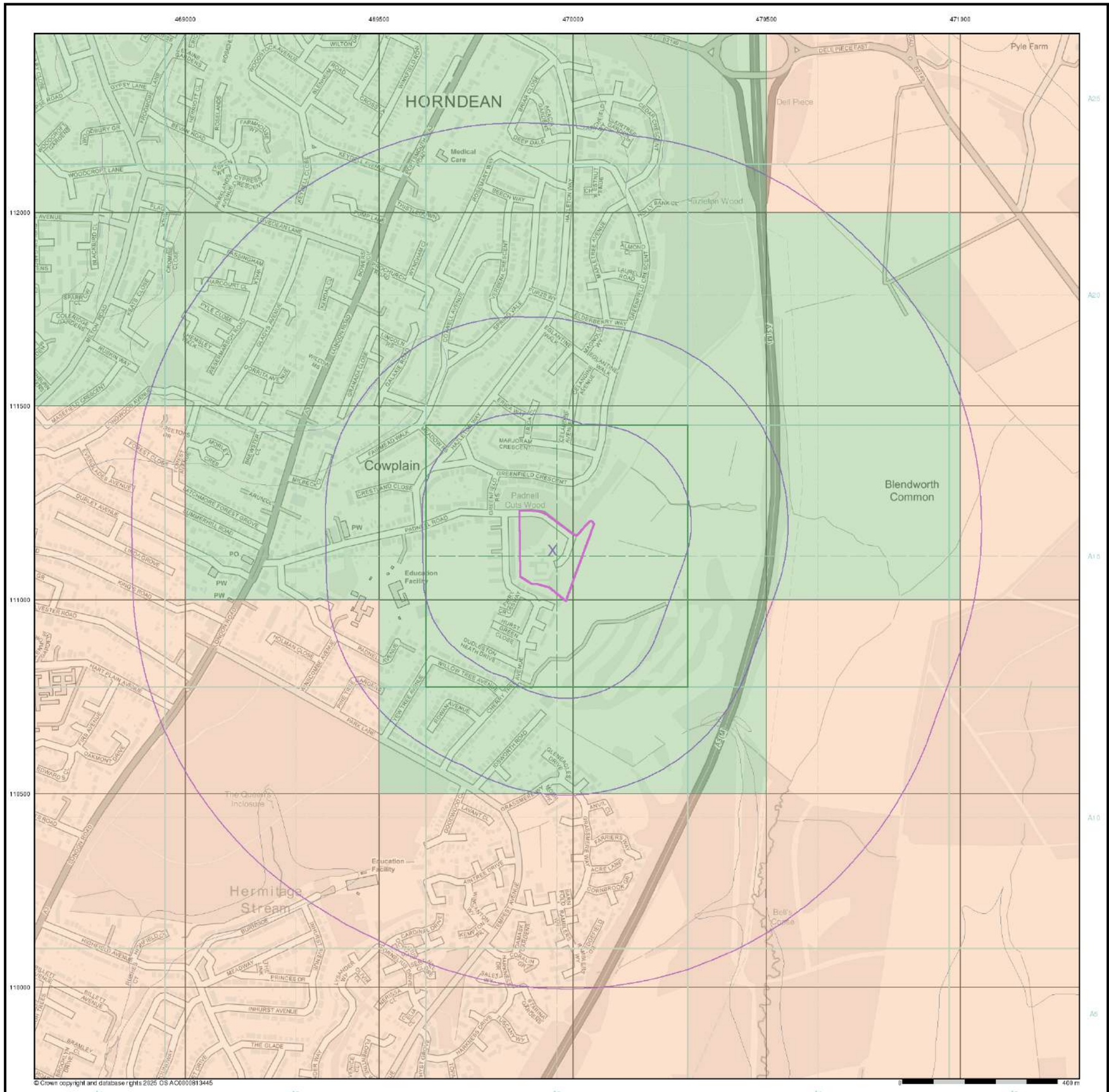


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## General

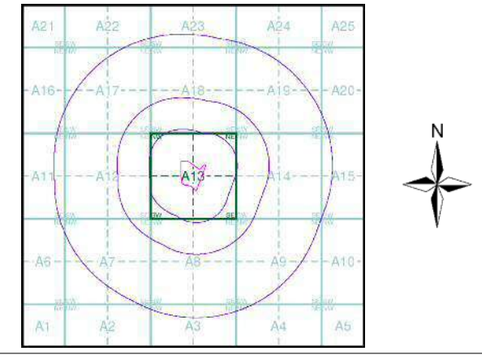
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

- <100 mg/kg
- 100 - 200
- 200 - 300
- 300 - 600
- 600 - 1200
- >1200

## Estimated Soil Chemistry Lead - Slice A




## Order Details

| | |
|---|---|
| Order Details: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

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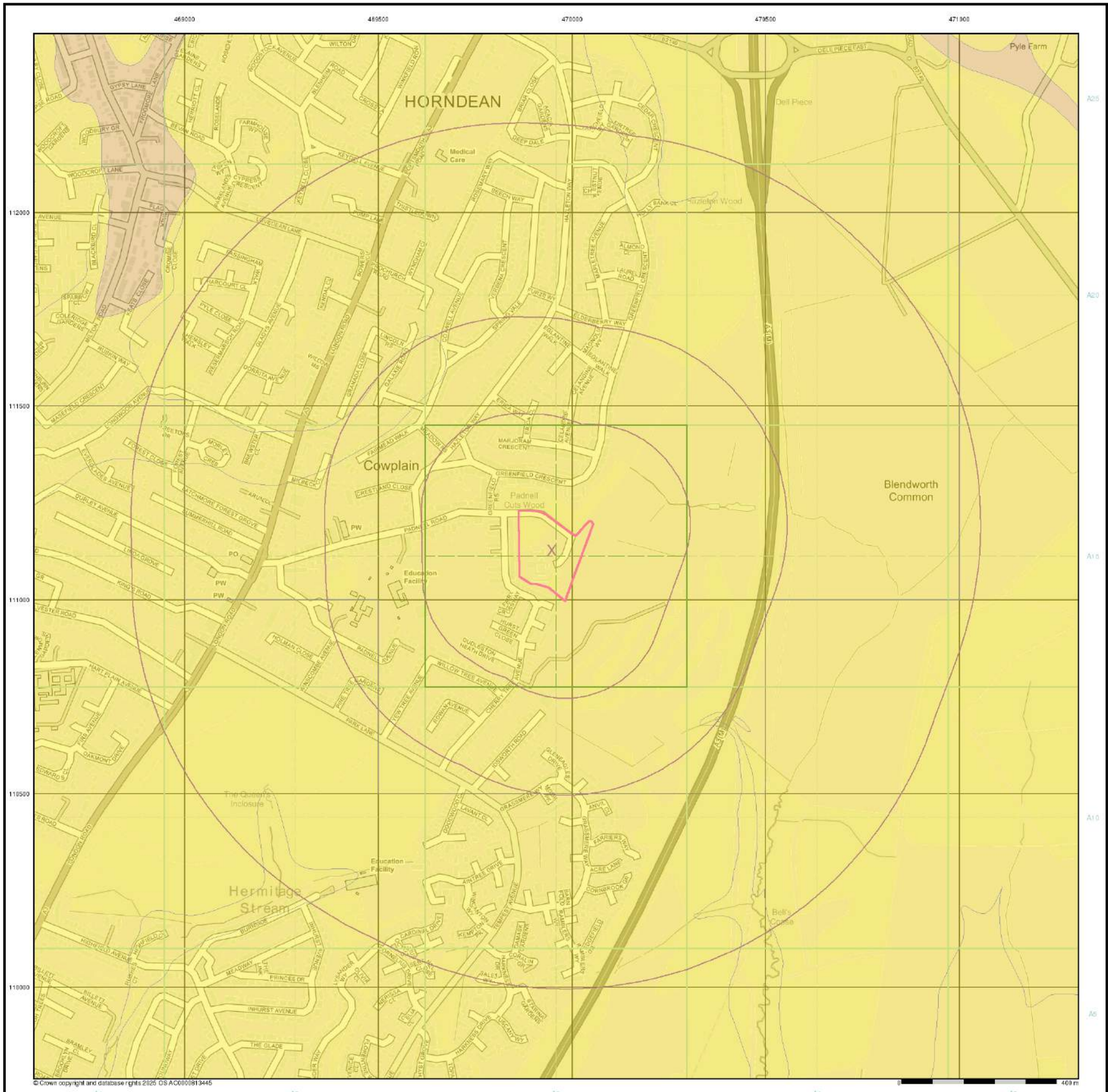


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## General

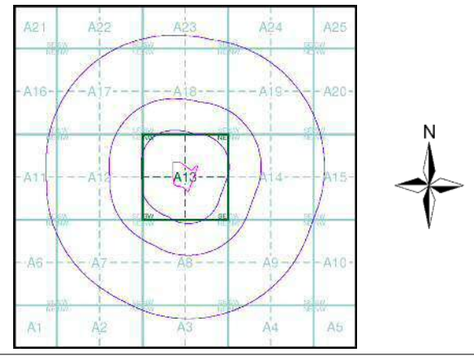
Specified Site | Specified Buffer(s) | X Bearing Reference Point

## Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

## Estimated Soil Chemistry Nickel - Slice A




## Order Details

| | |
|---|---|
| Order Details: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

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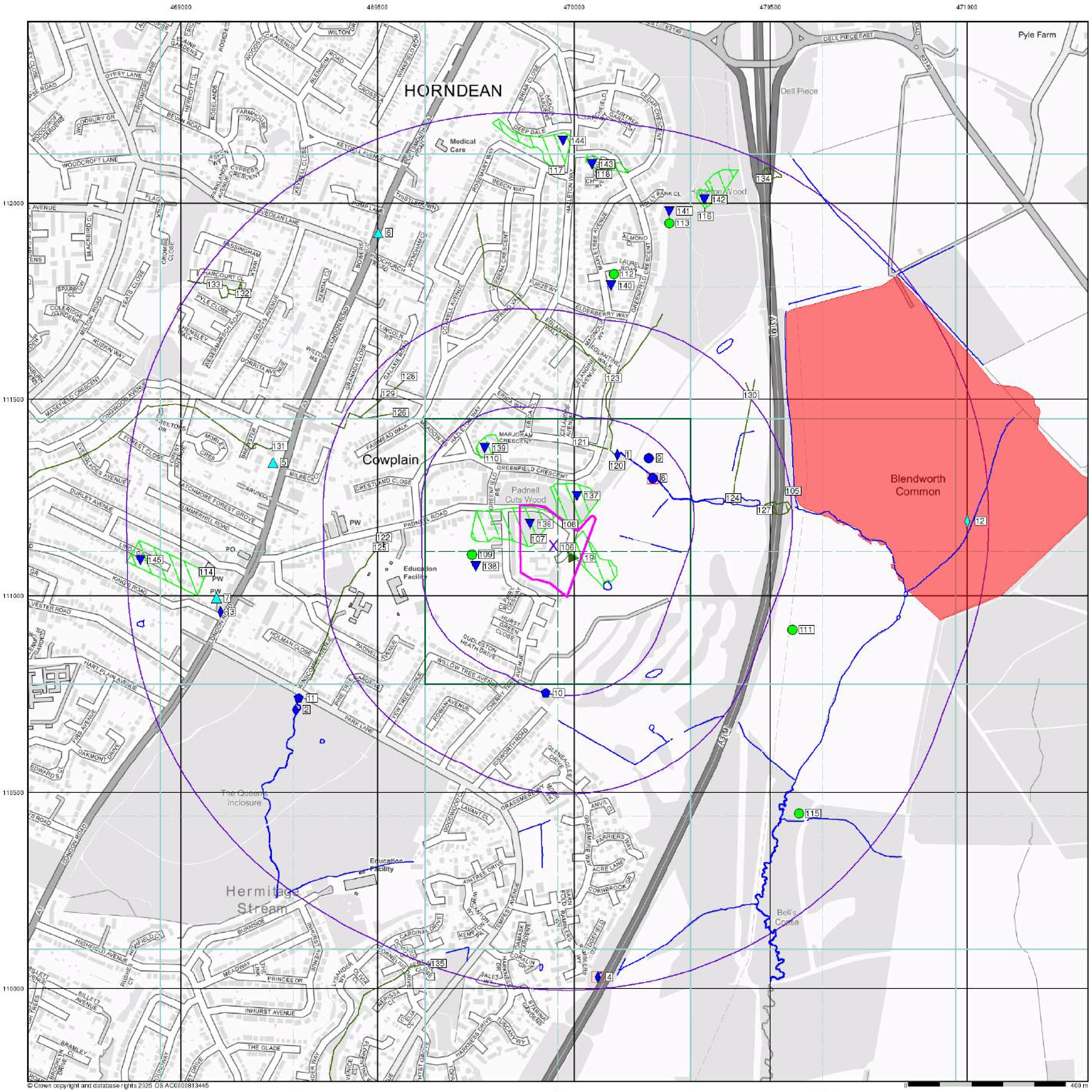


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## General
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

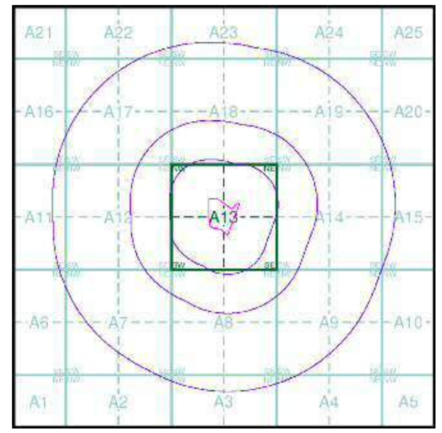
## Agency and Hydrological
- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Historical Prosecutions
- Prosecutions
- Registered Radioactive Substance
- River Network or Water Feature
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

## Hazardous Substances
- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

## Geological
- BGS Recorded Mineral Site

## Waste
- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

## Site Sensitivity Map - Slice A



## Order Details
Order Number: 382729154_1_1
Customer Ref: 22035/DEE
National Grid Reference: 469950, 111130
Slice: A
Site Area (Ha): 2.84
Search Buffer (m): 1000

## Site Details
Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

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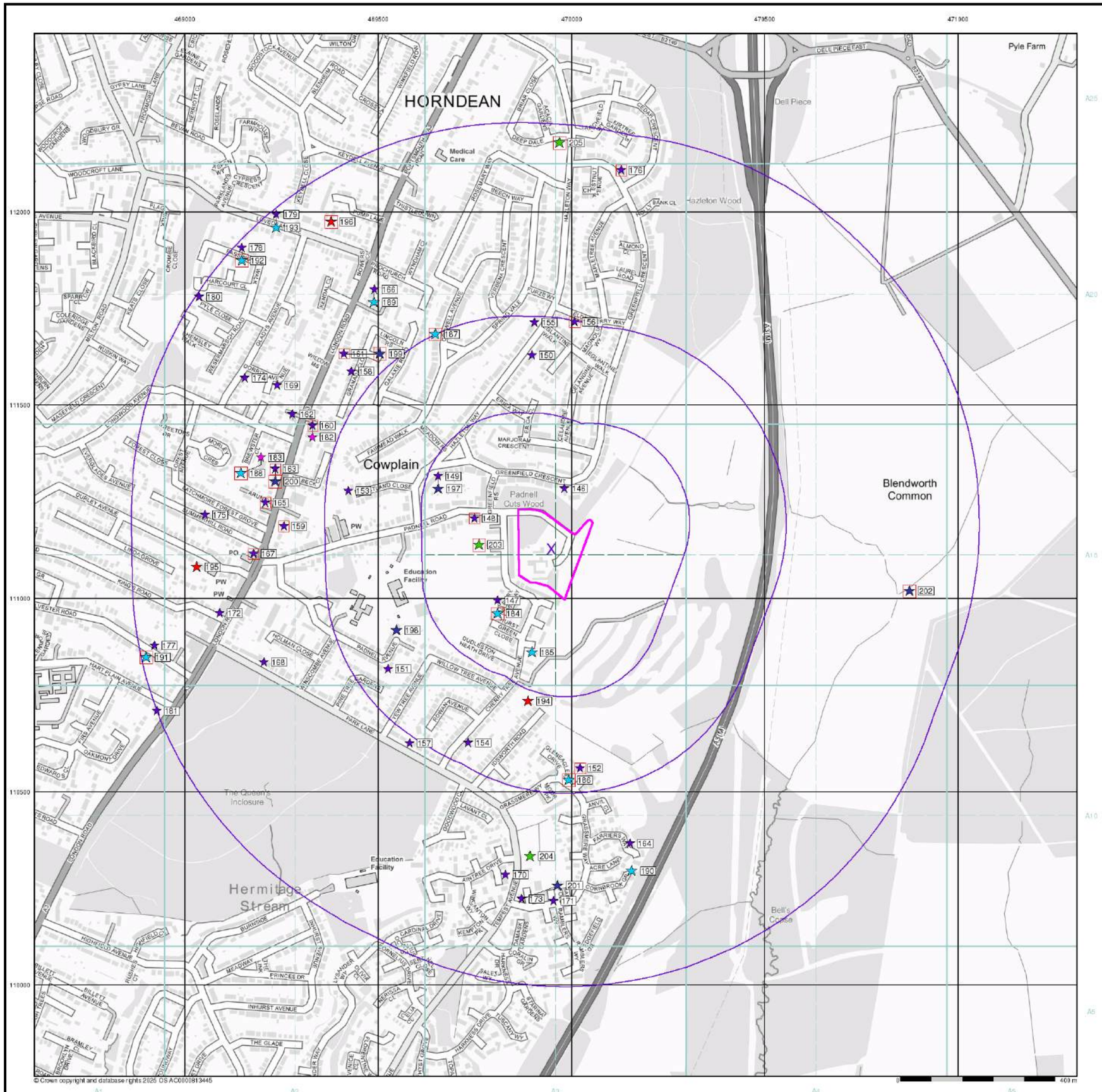


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## Industrial Land Use Map

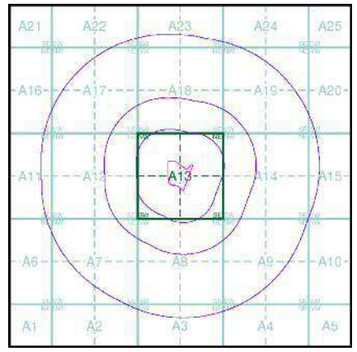
### General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

### Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

## Industrial Land Use Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

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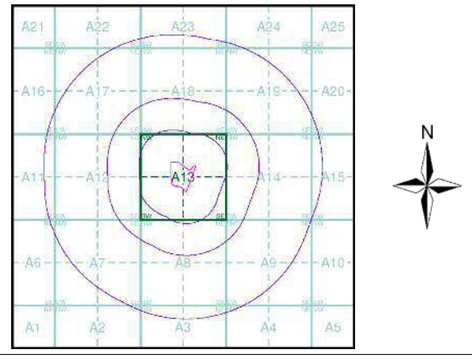
## General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

## Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

## Flood Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

Landmark INFORMATION GROUP
Tel: 0844 844 9952
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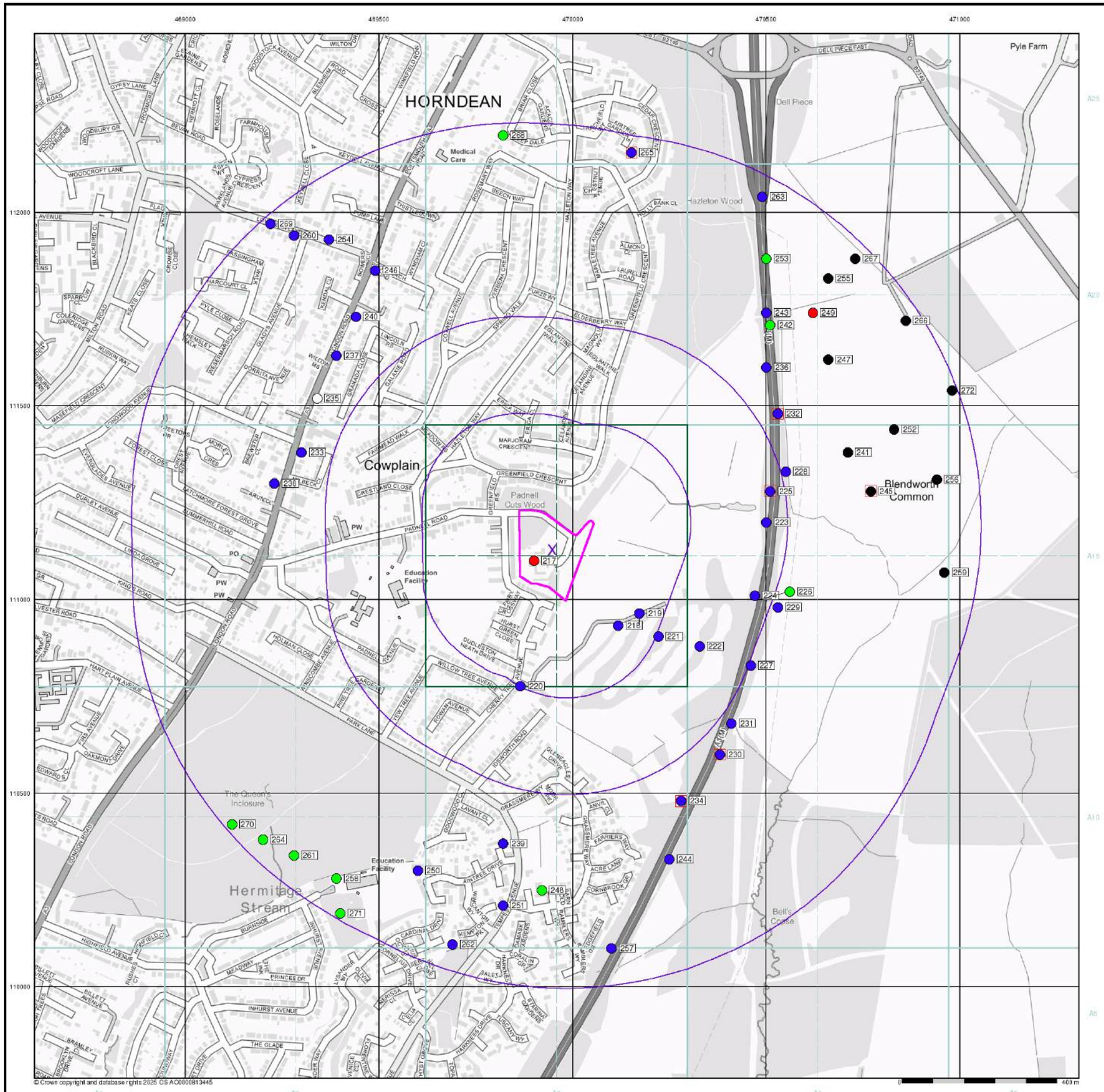


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## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

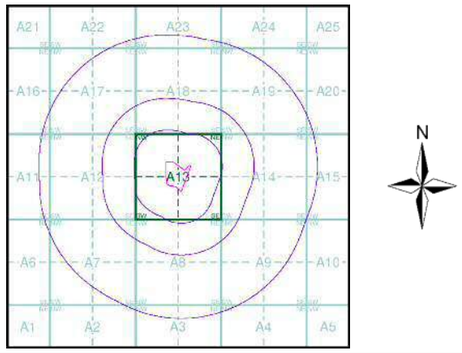
## Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

## Borehole Map - Slice A

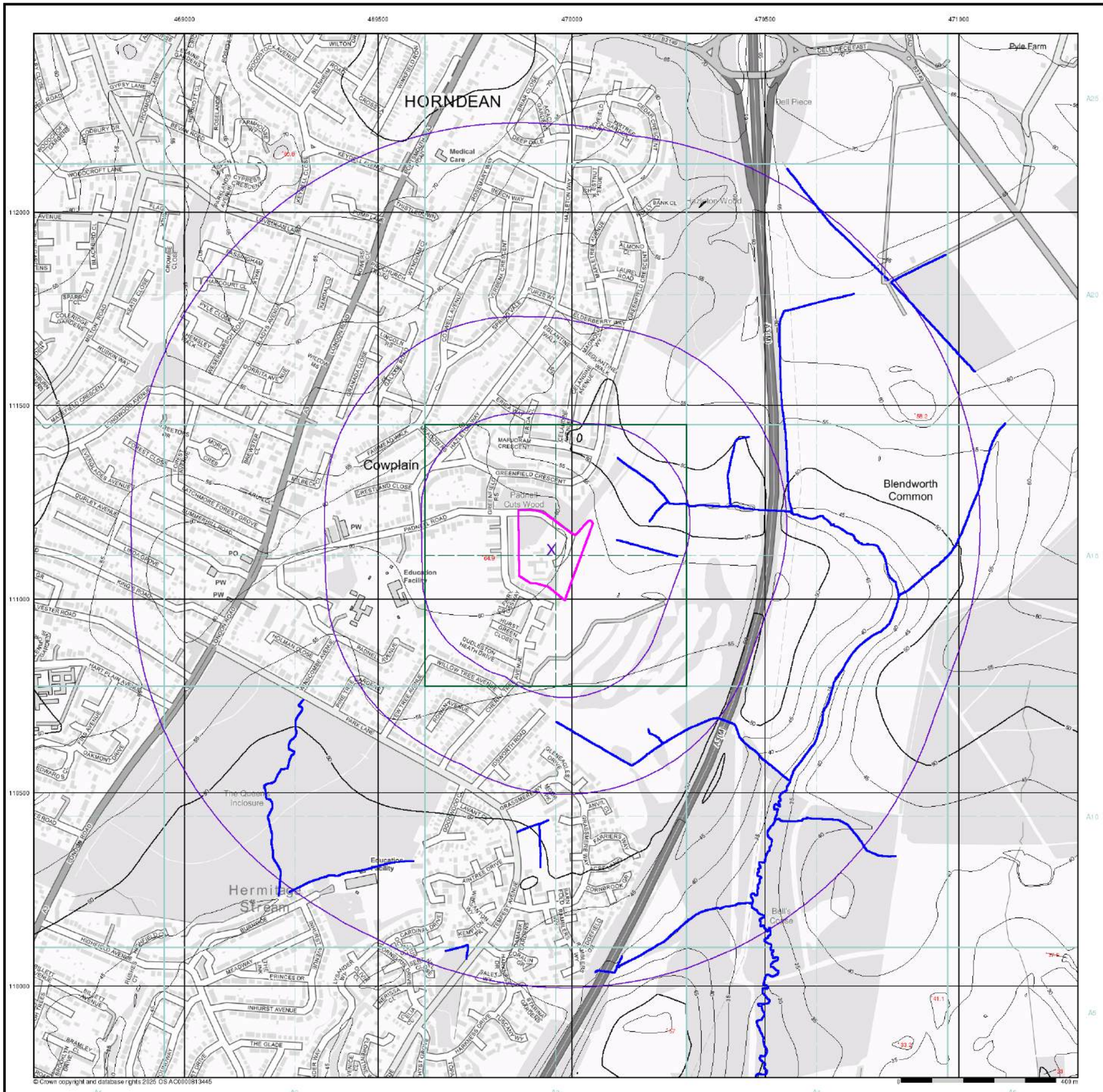



## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

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## General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

## OS Water Network Data

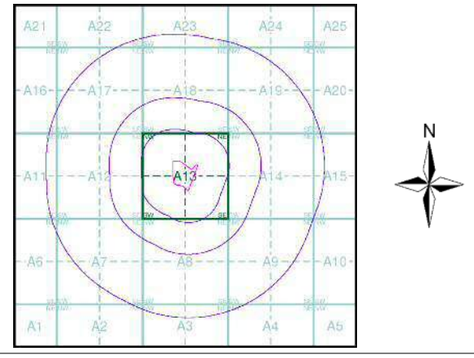
- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

## Contours (height in meters)

Standard Contour 105 100 95
Master Contour
Spot Height 167.3

- MLW Mean Low Water
- MHW Mean High Water

## OS Water Network Map - Slice A




## Order Details

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| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

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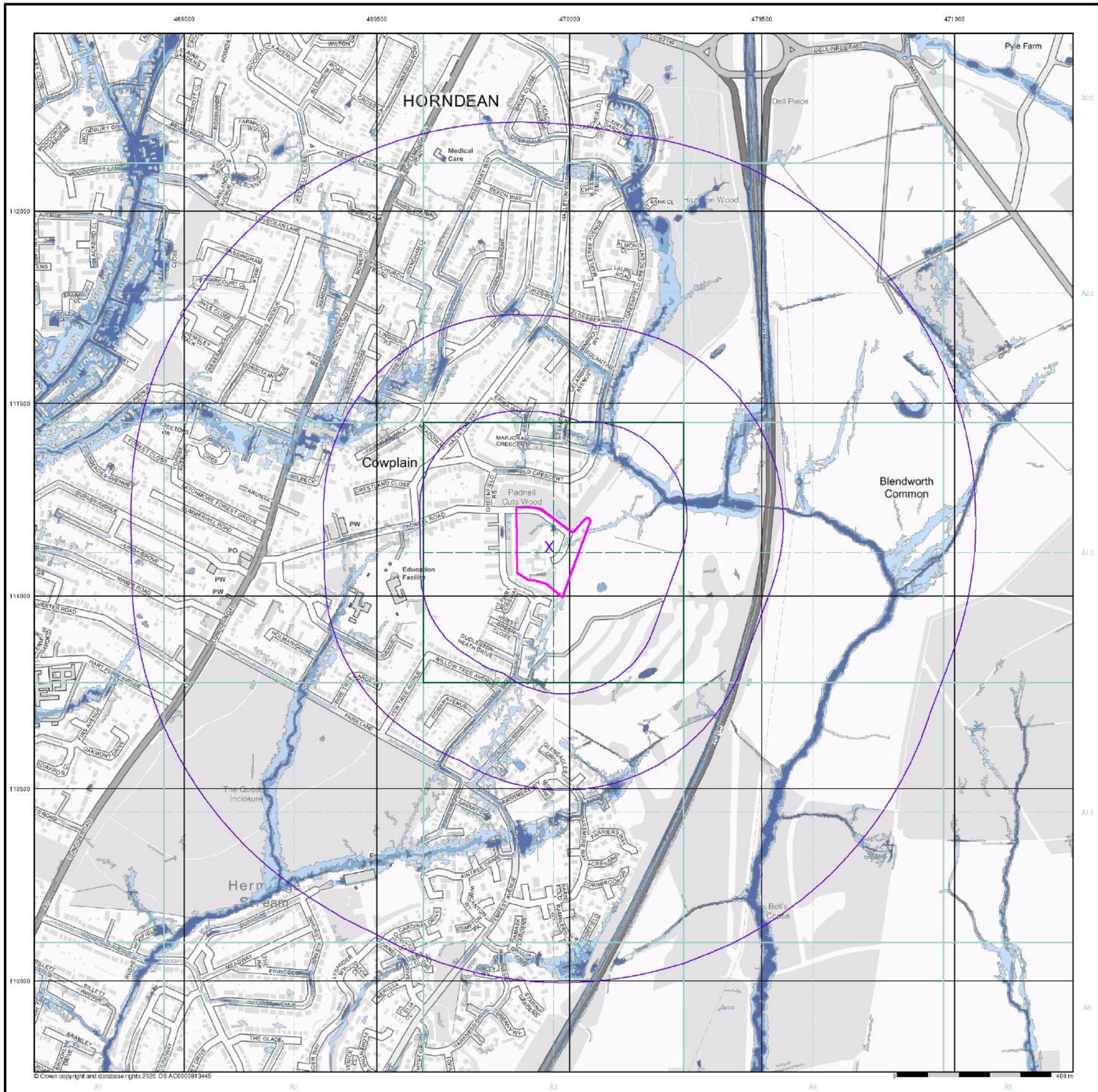


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## General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

## Risk of Flooding from Surface Water

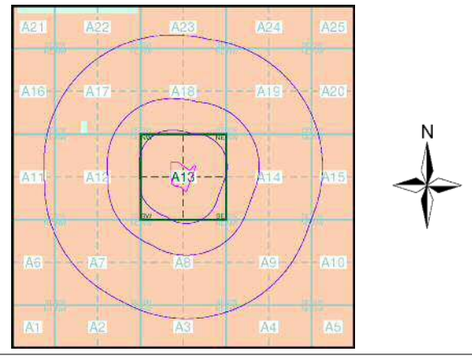
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

## Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

## EA/NRW Suitability Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

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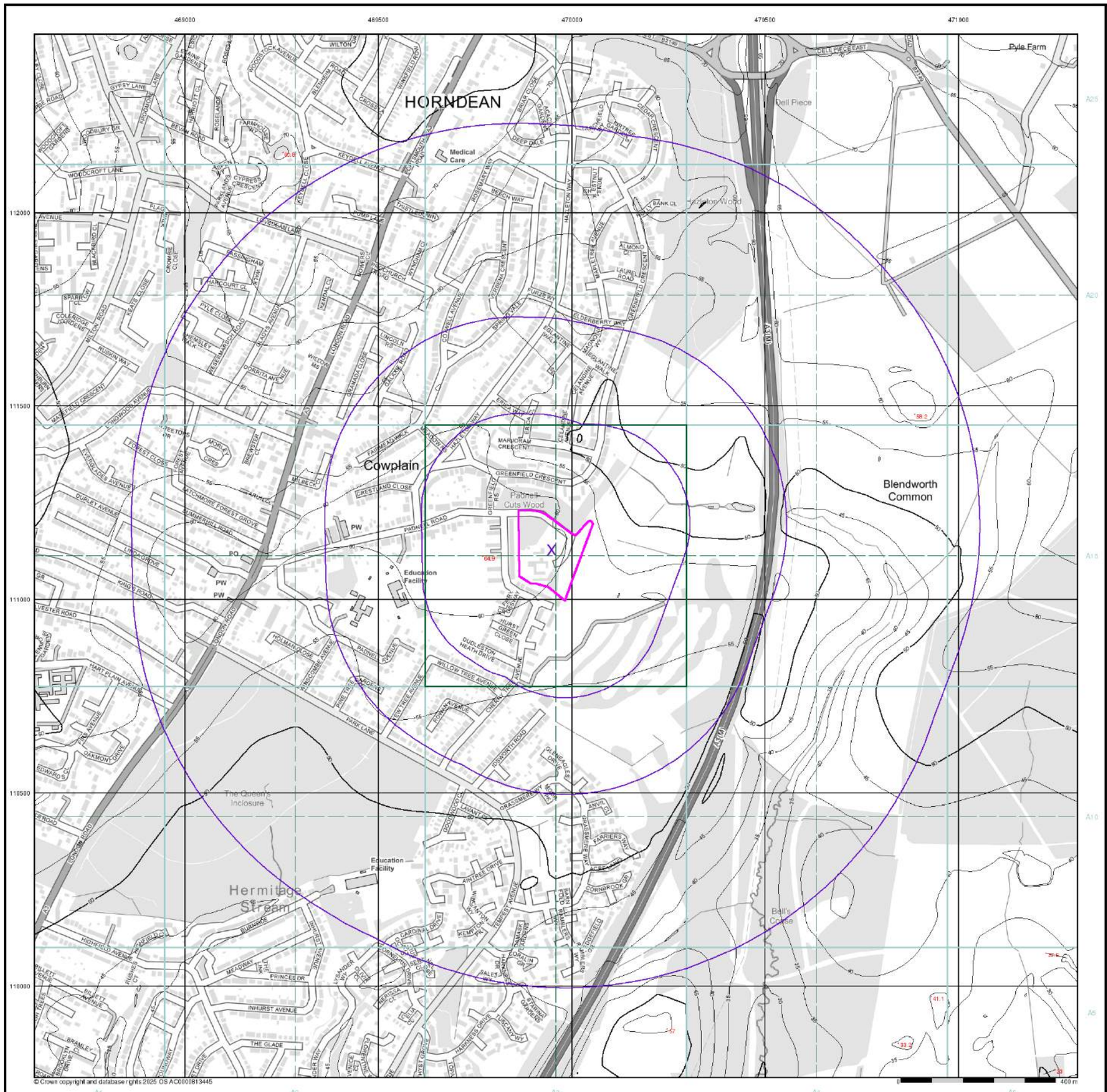


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# WFD Surface Waters Map

## General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

## Water Framework Directive - Surface Water Quality

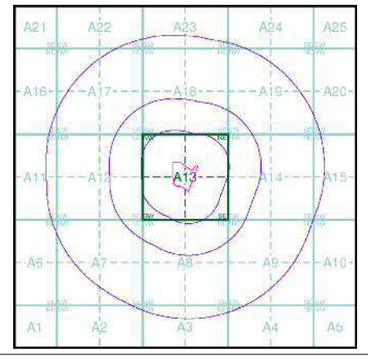
- High
- Good
- Moderate
- Poor
- Bad

## Contours (height in meters)

Standard Contour 105 100 95
Master Contour
Spot Height * 167.3

MLW Mean Low Water
MHW Mean High Water

## WFD Surface Waters Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
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Tel: 0844 844 9952
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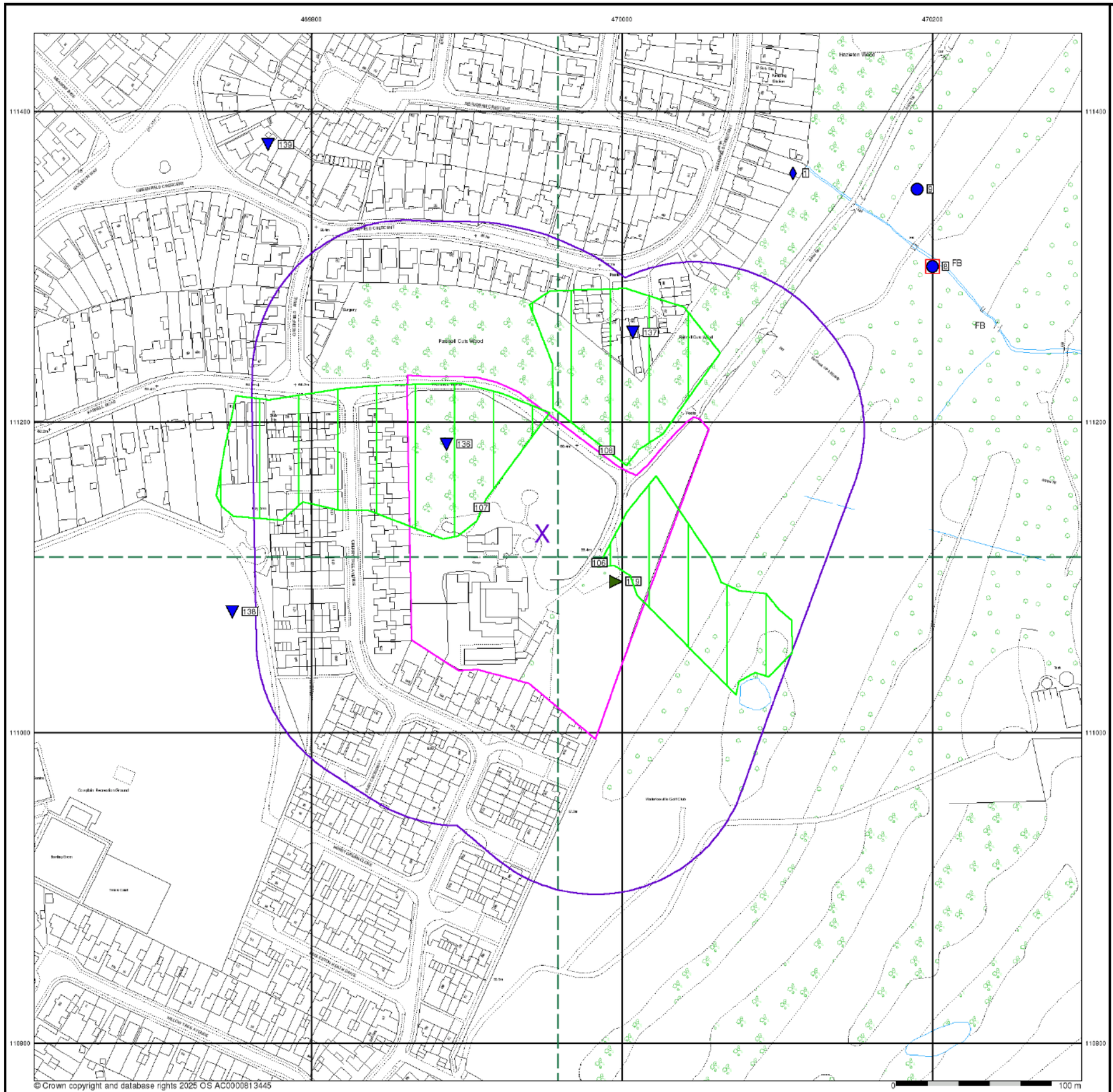


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## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

## Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Historical Prosecutions
- Prosecutions
- Registered Radioactive Substance
- River Network or Water Feature
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

## Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

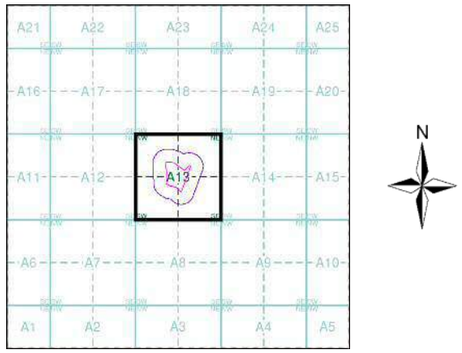
## Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

## Geological

- BGS Recorded Mineral Site

## Site Sensitivity Map - Segment A13




## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Plot Buffer (m): | 100 |

## Site Details

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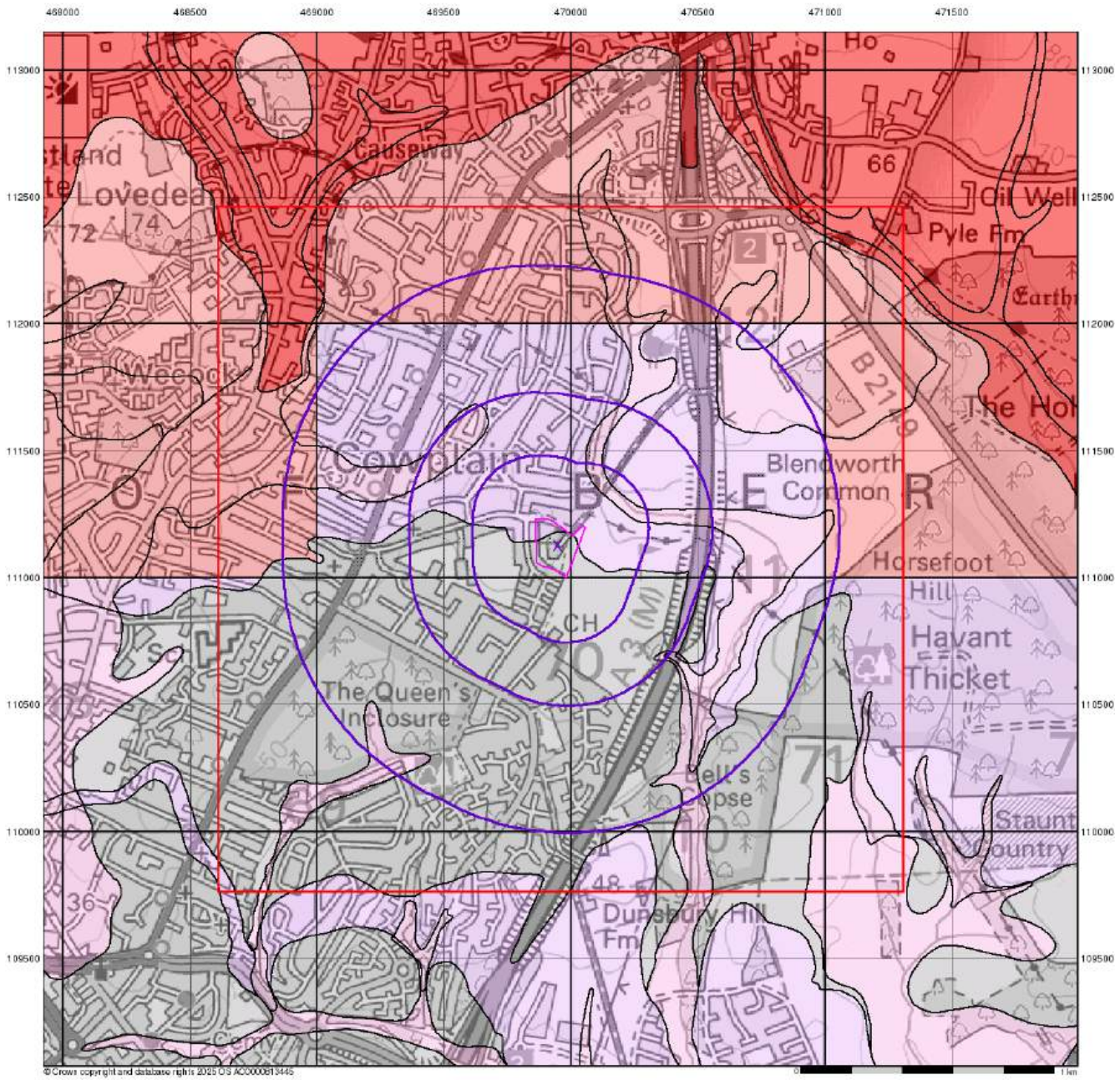
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

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# Groundwater Vulnerability

## General

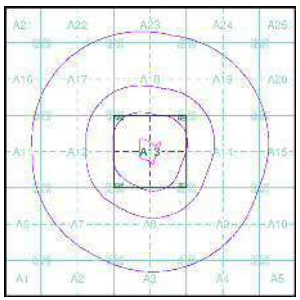
Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

## Agency and Hydrological

| Bedrock Aquifers | Superficial Aquifers |
|---|---|
| High Vulnerability, Principal Aquifer | High Vulnerability, Principal Aquifer |
| High Vulnerability, Secondary Aquifer | High Vulnerability, Secondary Aquifer |
| Medium Vulnerability, Principal Aquifer | Medium Vulnerability, Principal Aquifer |
| Medium Vulnerability, Secondary Aquifer | Medium Vulnerability, Secondary Aquifer |
| Low Vulnerability, Principal Aquifer | Low Vulnerability, Principal Aquifer |
| Low Vulnerability, Secondary Aquifer | Low Vulnerability, Secondary Aquifer |

Unproductive Aquifer
Soluble Rock

## Site Sensitivity Context Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

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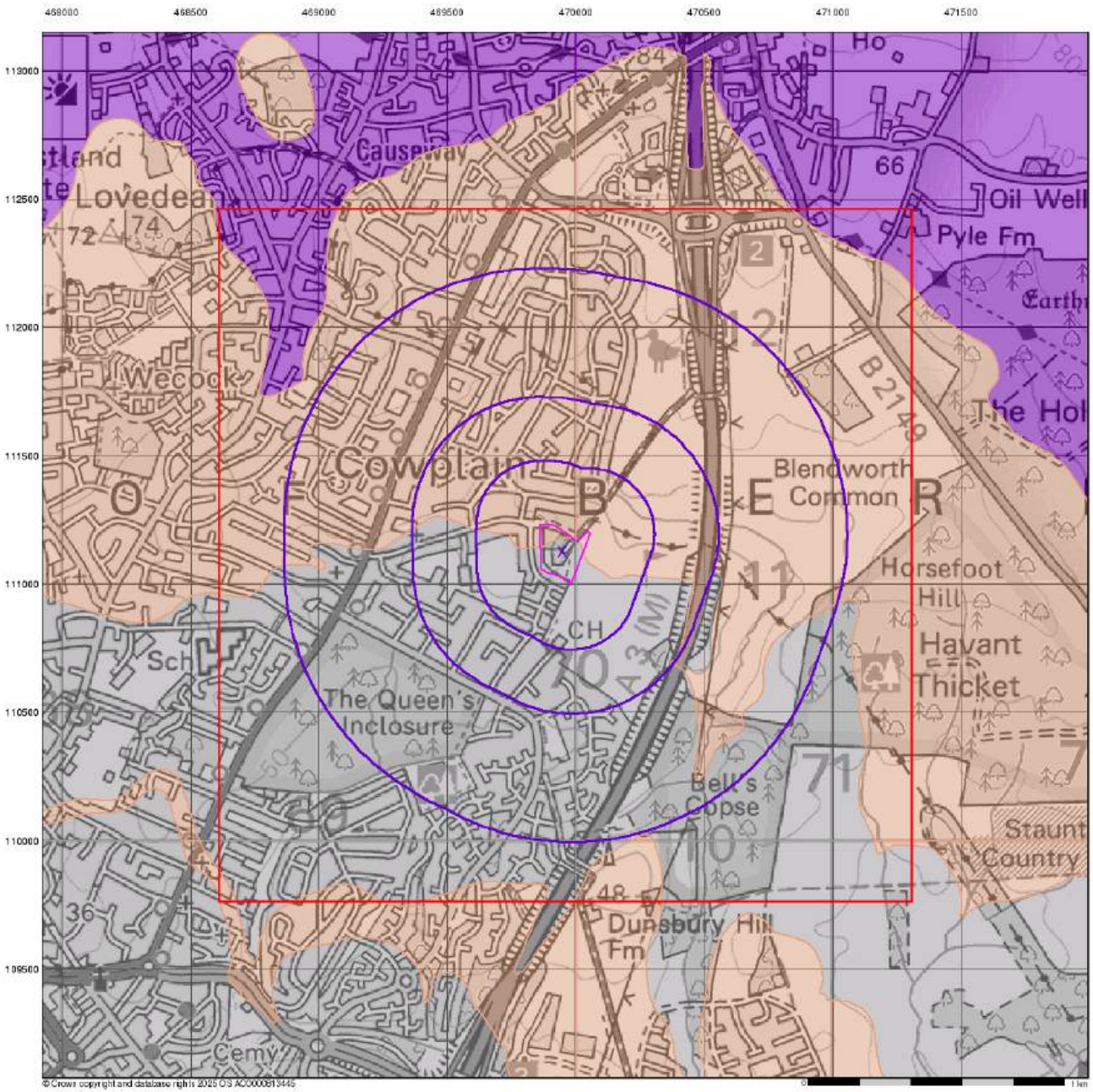
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

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# Bedrock Aquifer Designation

## General

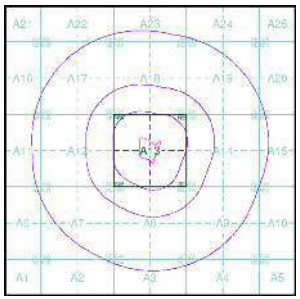
Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

## Agency and Hydrological

**Geological Classes**

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

## Site Sensitivity Context Map - Slice A

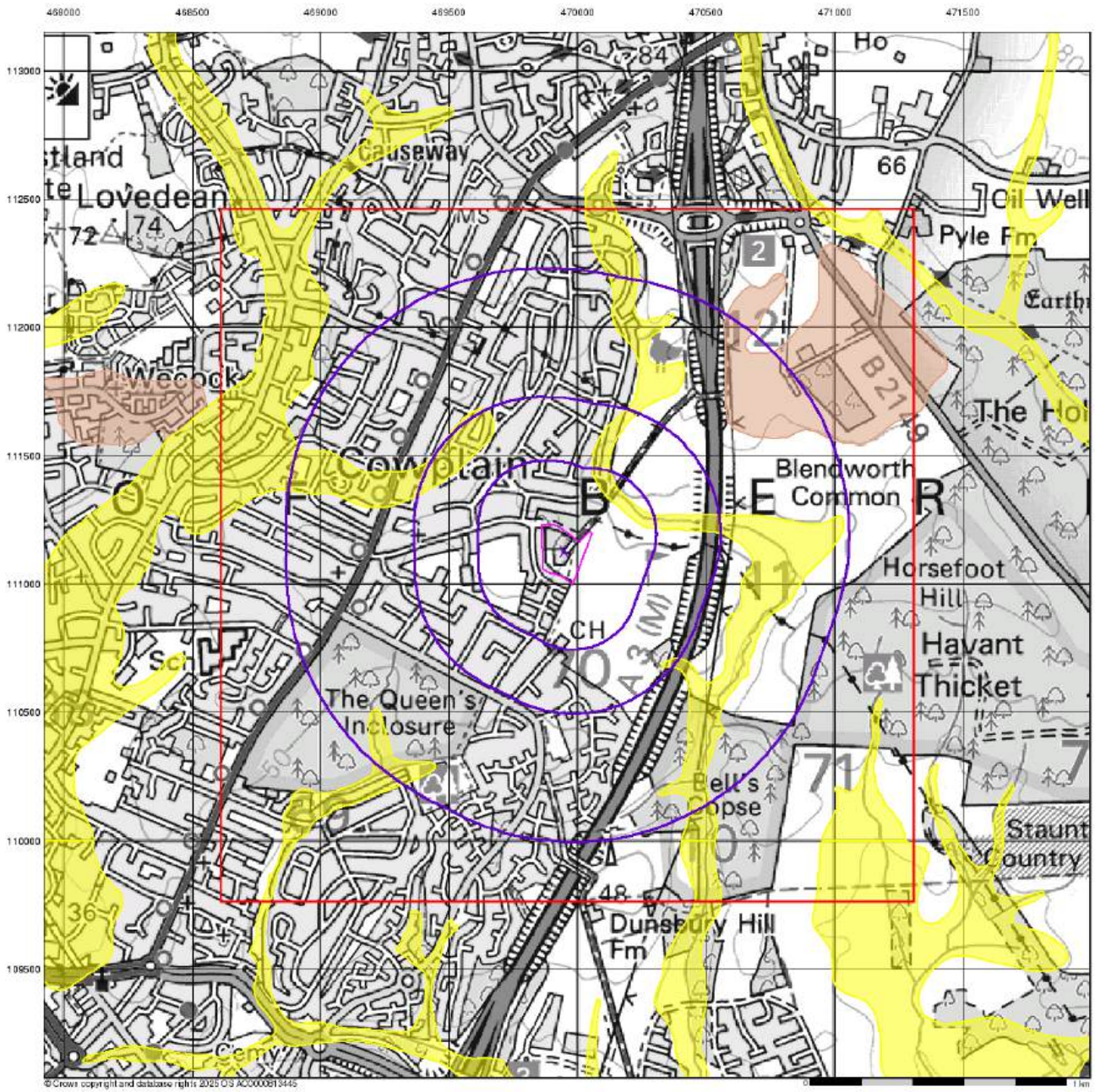



## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

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# Superficial Aquifer Designation

## General

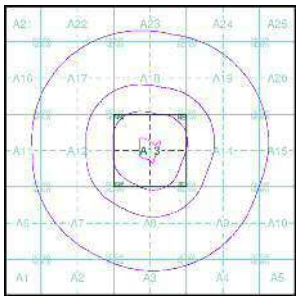
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

## Agency and Hydrological

**Geological Classes**

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

## Site Sensitivity Context Map - Slice A

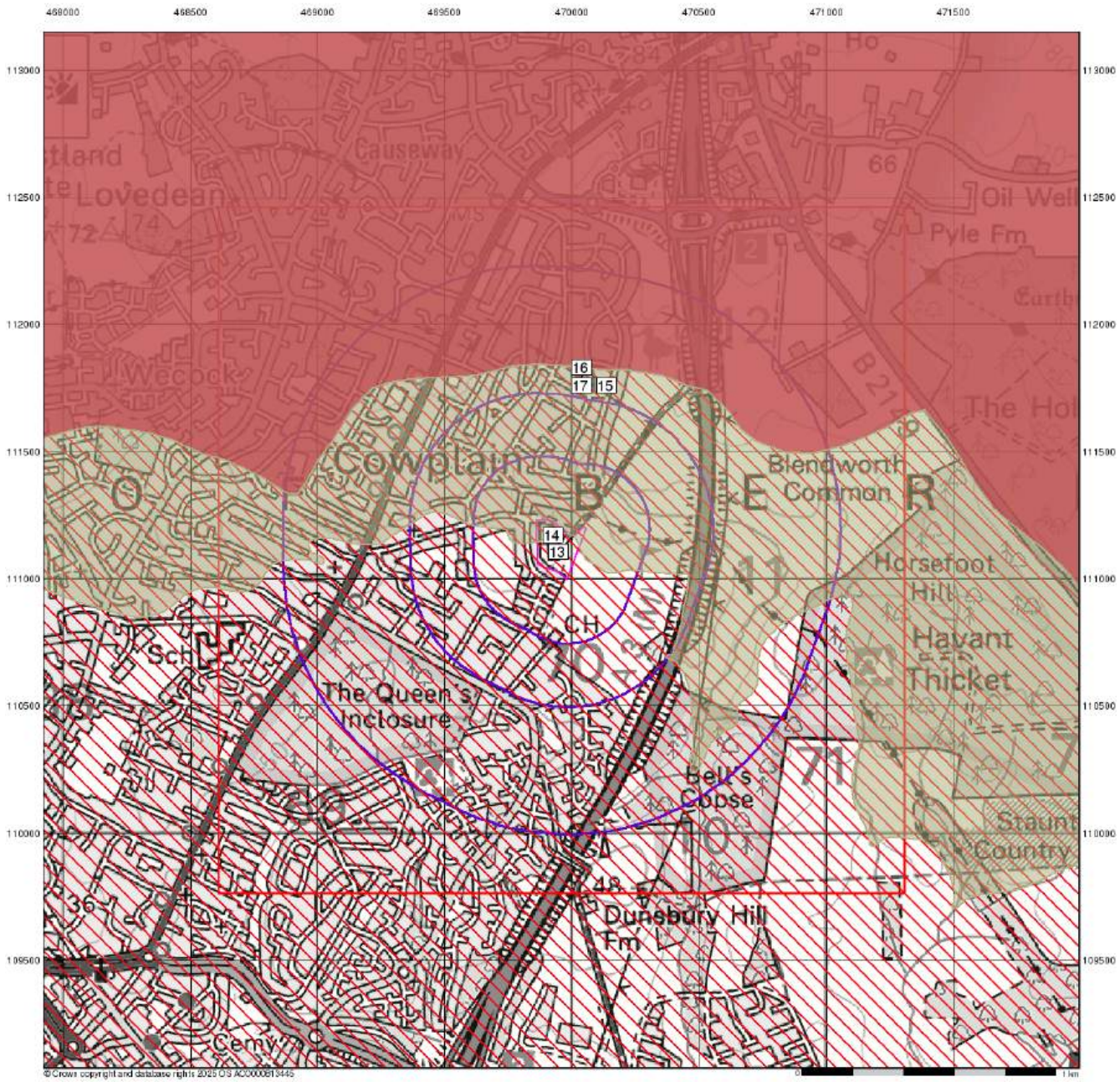



## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

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# Source Protection Zones

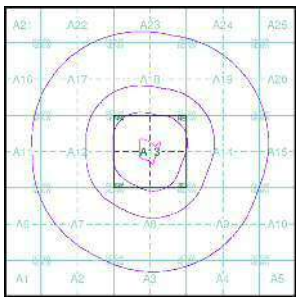
## General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

## Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

## Site Sensitivity Context Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

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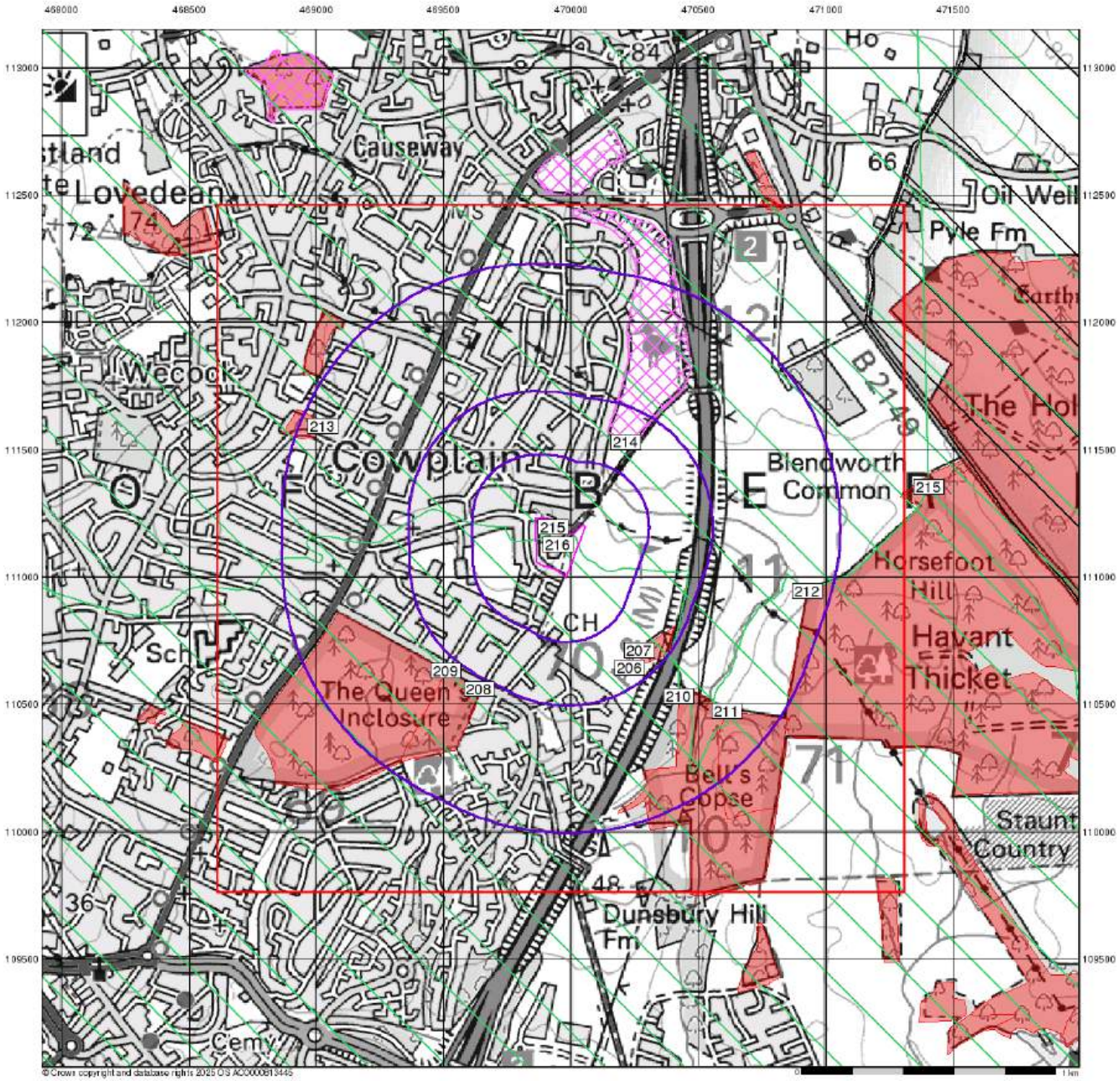


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# Sensitive Land Uses

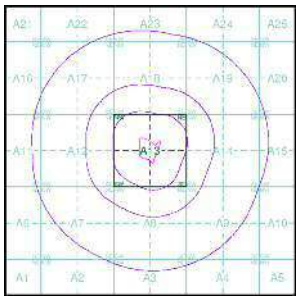
## General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

## Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

## Site Sensitivity Context Map - Slice A

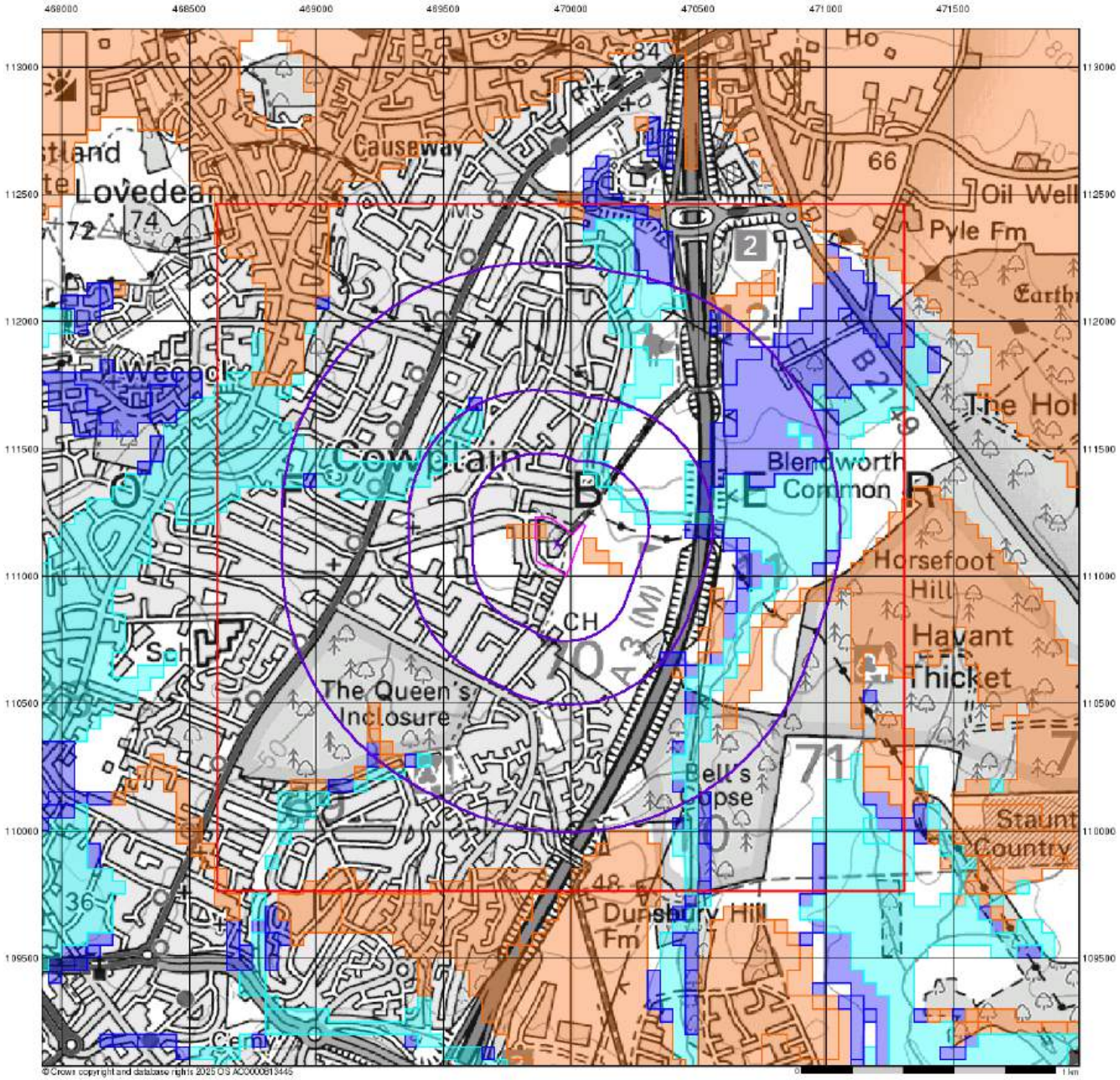


## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

## Site Details

Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

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## BGS Flood GFS Data

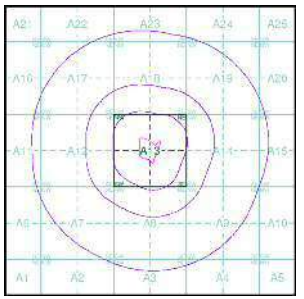
### General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice

### Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

## Site Sensitivity Context Map - Slice A



## Order Details

| | |
|---|---|
| Order Number: | 382729154_1_1 |
| Customer Ref: | 22035/DEE |
| National Grid Reference: | 469950, 111130 |
| Slice: | A |
| Site Area (Ha): | 2.84 |
| Search Buffer (m): | 1000 |

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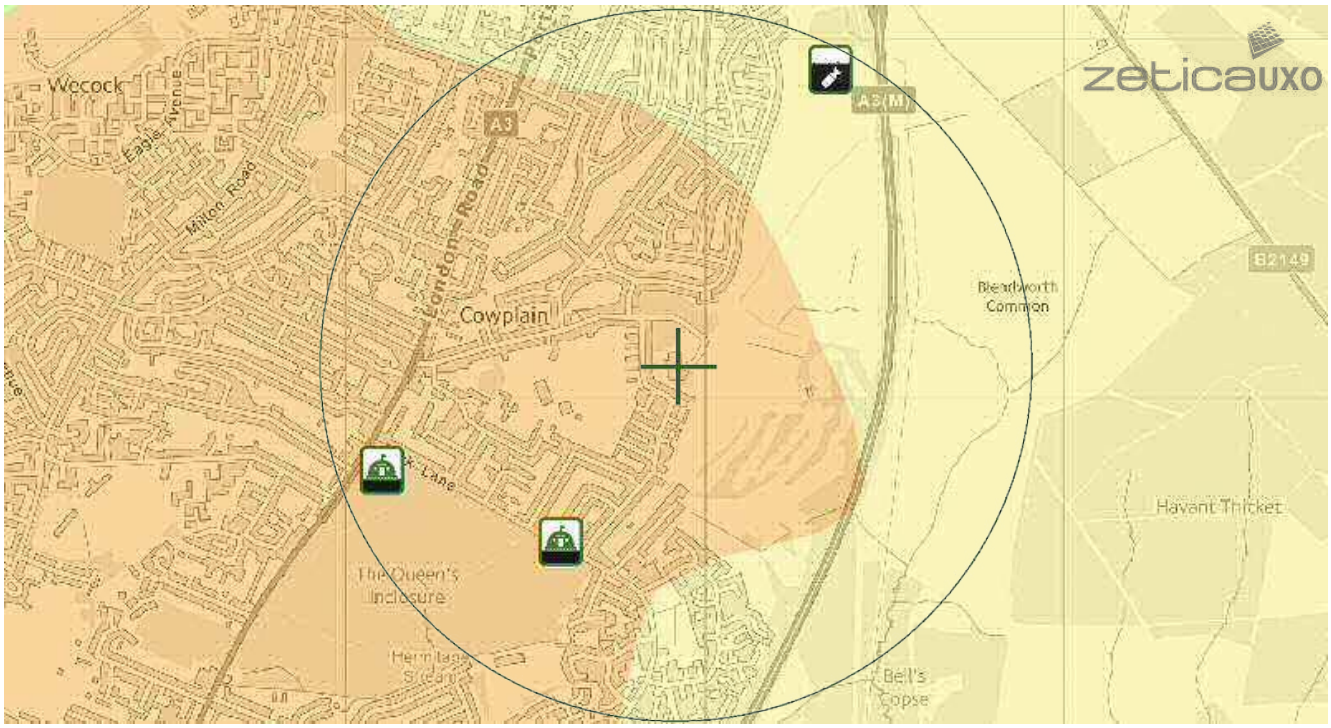
# UNEXPLODED BOMB RISK MAP

**SITE LOCATION**

Location: PO8 8ED,
Map Centre: 469891,111093




This map principally indicates a hazard from Unexploded Bombs (UXB) due to WWII bombardment. Other sources of Unexploded Ordnance (UXO) may be present. It should be noted that this map does not represent UXO risk and should not be reported as such when reproduced.

**LEGEND**

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

**Miltary** | **Industry** | **UXO find** | **Other**
**Transport** | **Docks** | **Luftwaffe targets**
**Utilities** | **Bombing decoy** | **Airfields**

## How to use your Unexploded Bomb (UXB) risk map?

This map indicates the potential for UXBs to be present because of World War Two (WWII) bombing. It can be incorporated into a technical report, such as a Phase 1 Desk Study, or similar document as an indication of the potential for UXO encounter on a Site. Other sources of UXO may also be indicated, although note that these are not comprehensive and more detailed research is required to confirm their presence.

## What if my Site is in a moderate or high density area?

We typically recommend that a detailed UXO desk study and risk assessment is undertaken for sites in an area with a moderate or high bombing density.
Additionally, if your site is in close proximity to a strategic target, military establishment, airfield or bombing decoy, then additional detailed research is recommended.

## If my site is in a low risk area, do I need to do anything?

If both the map and other research confirm that there is a low potential for UXO to be present on your site, then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

If you are unsure whether other sources of UXO may be present, you can request one of our pre-desk study assessments (PDSA) by emailing a site boundary and location to pdsa@zetica.com.

**You should never plan site work or undertake a risk assessment using these maps alone. More detail is required, to include an assessment of the likelihood of a source of UXO hazard from other military activity not reflected on these maps.**

## If I have any questions, who do I contact?

**tel:** +44 (0) 1993 886682 **email:** uxo@zetica.com **web:** www.zeticauxo.com

**The information in this UXB risk map is derived from a range of sources and should be used with the accompanying notes on our website.**

**Zetica cannot guarantee the accuracy or completeness of the information or data used and cannot accept any liability for any use of the maps. These maps can be used as part of a technical report or similar publication, subject to acknowledgement. The copyright remains with Zetica Ltd.**

# Appendix E Local Authority Search Data

**To be updated into a future revision.**

## Appendix F Site Photographs

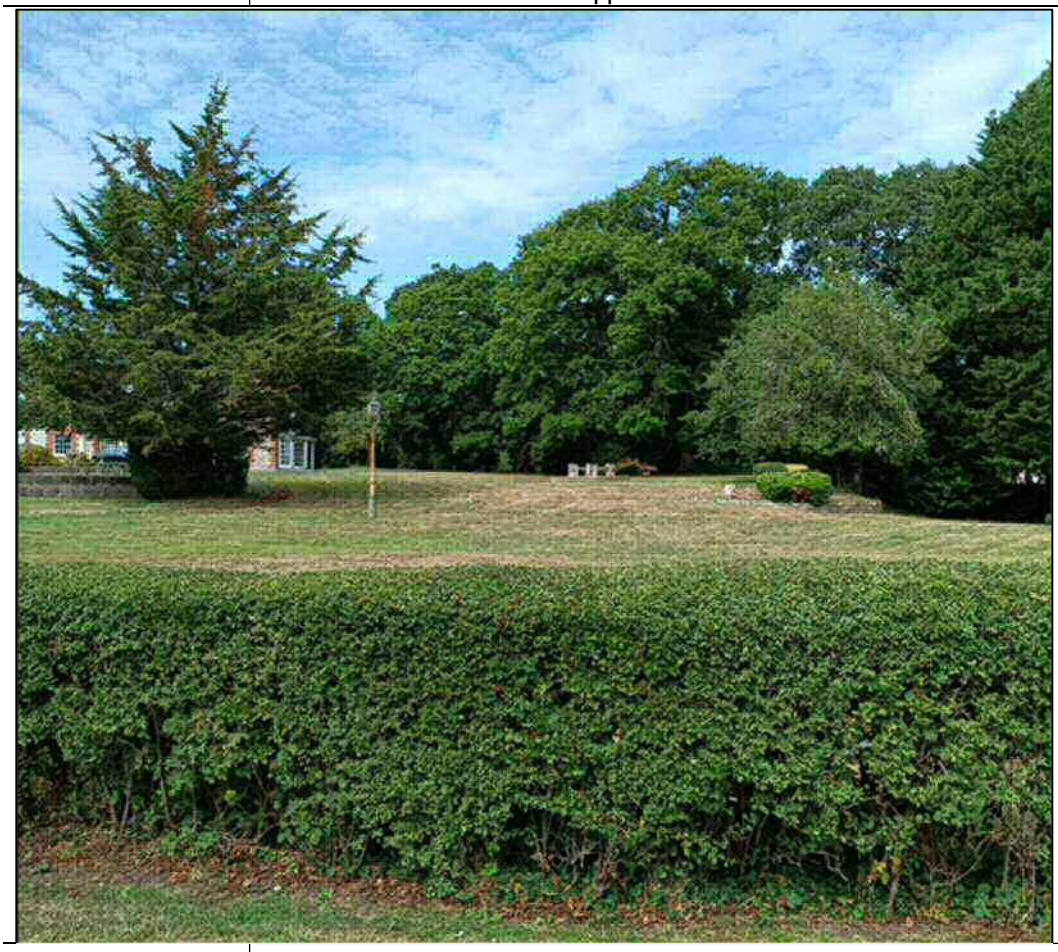
| | |
|---|---|
| **Photo 1:** | Main Former House Padnell Grange, facing west |

| | |
|---|---|
| **Photo 2:** | Dilapidated Farm buildings onsite near the southern boundary. |

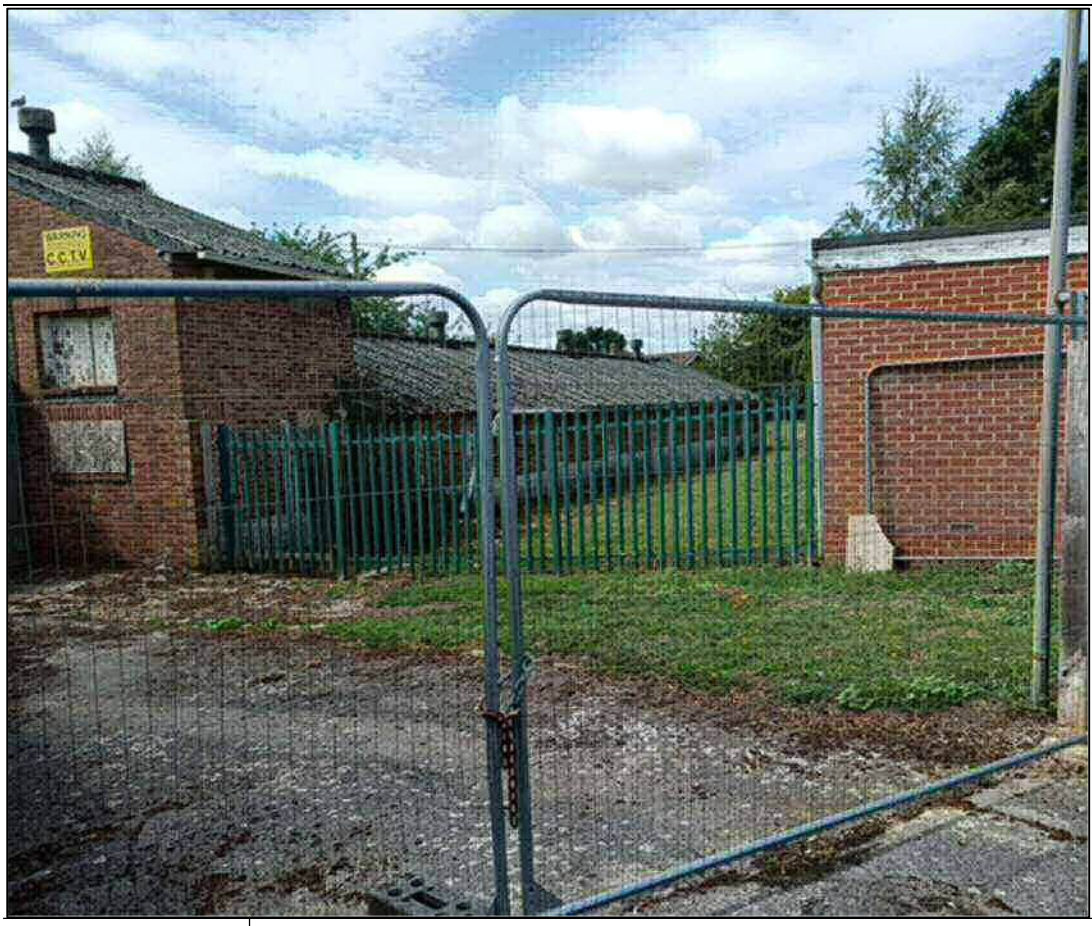
| | |
|---|---|
| **Photo 3:** | Dilapidated Farm buildings onsite near the southern boundary. |

| | |
|---|---|
| **Photo 4:** | Grass topped site, tarmac roadway visible. |

| | |
|---|---|
| **Photo 5:** | Mature trees onsite. Gravel topped area to the northwest onsite. |



| | |
|---|---|
| **Photo 6:** | Vegetation conditions around the former house. |




| | |
|---|---|
| **Photo 7:** | Potential Asbestos containing materials on dilapidated farm buildings. |

| | |
|---|---|
| **Photo 8:** | Drainage observed onsite. |

# Appendix G Risk Assessment Criteria

The classification presented in Table G.1 to Table G.4 below are modified from, 'contaminated land risk assessment: A guide to good practice, 2001, CIRIA C552'.

**Table G.1. Classification of Consequence**

| Classification | Definition |
|---|---|
| Severe | Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environmental Protection Act 1990, Part IIA. Short term risk of pollution (note: Water Recourses Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000.) |
| Medium | Chronic damage to Human Health ("significant harm" as defined in DETR, 2000). Pollution of sensitive water recourse (note: Water Recourses Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000.) |
| Mild | Pollution of non-sensitive water recourses. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the Draft Circular on Contaminated Land, DETR, 2000.) |
| Minor | Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.) |

**Table G.2. Classification of Probability**

| Classification | Definition |
|---|---|
| High likelihood | There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptors of harm or pollution. |
| Likely | There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable but possible in the short term and likely over the long term. |
| Low likelihood | There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the short term. |
| Unlikely | There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the long term. |

**Table G.3. Comparison of Consequence Against Probability**

| Probability | Consequence | | | |
|---|---|---|---|---|
| | Severe | Medium | Mild | Minor |
| High likelihood | Very high risk | High risk | Moderate risk | Moderate/low risk |
| Likely | High risk | Moderate risk | Moderate/low risk | Low risk |
| Low likelihood | Moderate risk | Moderate/low risk | Low risk | Very low risk |
| Unlikely | Moderate risk | Low risk | Very low risk | Very low risk |

**Table G.4. Risk Classifications**

| | |
|---|---|
| Very High | There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term. |
| High | Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term. |
| Moderate | It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term. |
| Low | It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited. |
| Very low | There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe. |
| None | No potential risk if no pollution linkage has been established. |

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soils LIMITED

**Main Investigation Report**

at
**Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED**

for
**Stonebond Properties (Guildford) Limited**

**Reference: 22035/MIR Rev1.0**
**September 2025**

## Control Document

**Project**
Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

**Document Type**
Main Investigation Report

**Document Reference**
22035/MIR Rev 1.0

**Document Status**
Final

**Date**
September 2025

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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

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Quality Systems Certifications Ltd ISO 45001:2018
Quality Systems Certifications Ltd ISO 9001:2015

**Commission**

This document comprises the Main Investigation Report (MIR) and incorporates the results, discussion, and conclusions to this intrusive works. General site data is recorded below:

| Commission Record | |
|---|---|
| Client | Stonebond Properties (Guildford) Limited |
| Site Name | Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED |
| Grid Reference | SU 699 111 |
| Soils Limited Quotation Ref | Q29811rev2 dated 4th June 2025 |
| Clients Purchase Order | ST0186-1560439 version 4, dated 10th July 2025 |

The record of revision to this document is presented below:

| Record Of Revisions | | |
|---|---|---|
| **Revision** | **Date** | **Reason** |
| 1.0 | September 2025 | First Issue to Client |

**Note(s):** The latest revised document supersedes all previous revisions of the MIR produced by Soils Limited.

Documents associated with this development that must be referred to are given below.

| Record Of Associated Documents | | | |
|---|---|---|---|
| **Reference** | **Type** | **Date** | **Creator** |
| 22035/DS Rev1.0 | Desk Study | August 2025 | Soils Limited |

**Limitations and Disclaimers**

The report was prepared solely for the brief described in our quotation and Section 1.1 of this report. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of our engagement.

We have exercised all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

This report is a snapshot of the site and conditions taken only at the time of our investigation works and described in our reporting. The ground is a product of continuing natural and artificial processes, and has variation by depth and location that cannot be determined absolutely. While a ground investigation will aim to understand and mitigate, risk cannot be eliminated.

Current regulations and good practice were used in the preparation of this report. Consideration of any subsequent changes to regulations or practice that may have occurred following issue of this report is the responsibility of the user.

If the term “competent person” is used in this report or any Soils Limited document, it means an engineering geologist or civil engineer with a minimum of three years post graduate experience in the understanding and application of the appropriate codes of practice.

Unless the site investigation works have been designed and specified in accordance with EC7, this report is not a Ground Investigation Report as defined by Eurocode 7.

Any reference to ground level relates to the site level at the time of the investigation, unless otherwise stated. Ground elevations and coordinates are only provided when this forms part of our engagement.

A survey of the possible presence or absence of invasive species including Japanese Knotweed is outside the scope of this investigation.

Copyright of all printed material including reports, survey data, drawings, laboratory test results, trial pit and borehole log sheets remains with Soils Limited.

Unless specifically granted, in writing, by Soils Limited, no parties other than the named client hold reliance or license over this report. The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited. Use of this report by others is wholly at their own risk.

License for and reliance on this report is only valid once we have been paid in full for this engagement. In the event of non-payment, we reserve the right to notify parties other than the client of failure to pay and our cancellation of license and reliance.

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# Section 1 Introduction

## 1.1 Objective of Investigation

The Client commissioned Soils Limited to undertake an intrusive ground investigation and to prepare a Main Investigation Report to supply the Client and their designers with information regarding ground conditions, to assist in preparing a foundation scheme for development that was appropriate to the settings present on the site.

The investigation was to be made by means of in-situ testing and geotechnical laboratory testing undertaken on soil samples taken from the exploratory holes.

Soil samples were to be taken for chemical laboratory testing to enable recommendations for the safe redevelopment of the site and the protection of site workers, end-users and the public from any contamination identified as dictated by the Conceptual Site Model (CSM) in the Preliminary Investigation Report undertaken for the site by Soils Limited (Report ref: 22035/PIR, August 2025) and/or the Revised Conceptual Site Model presented in Appendix E.1.

## 1.2 Site Description

At the time of investigation, the site comprised the former residential property, Padnell Grange, set within extensive gardens. To the rear (south) was a disused courtyard, partly enclosed by dilapidated buildings, and a series of converted farm buildings currently occupied by an office of a charitable trust.

The site was characterised by predominantly open grassed land interspersed with mature trees and bounded by hedgerows and soft landscaping around the former house. Hardstanding included a tarmac access road and paved areas around the house and farm buildings, with a gravelled area located in the northwest.

Topography was gently undulating, sloping downwards towards the southeast by approximately 2–3°. The wider surroundings featured mature trees, shrubs, and extensive green vegetation, including landscaped gardens, public open space, and a golf course.

The site location plan is given in Figure 1.

**Figure 1 – Site Location Map**

An aerial photograph of the site and its close environs has been included in Figure 2.

## 1.3 Proposed Development

The proposal comprised demolition of the existing dilapidated farm buildings and ancillary buildings pertaining to the former house of Padnell Grange, and the erection of multiple buildings to create a housing estate with 86No. total residential dwellings, the majority of which to be semi-detached and short terrace blocks. The former house onsite

was to be renovated into 5No. apartments, and there were to be 2No. additional apartment blocks housing 6No. apartments each. There was to be both hard and soft landscaping onsite with private gardens and adjoining access roads and drives. The 3No. apartment blocks were set within public open space – residential.

In compiling this report reliance was placed on drawing SK03 / SK05 dated Feb 2025, produced by OSP Architecture. The recommendations provided within this report are made exclusively in relation to the scheme outlined above and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined Development plans provided by the Client are presented in Appendix H.

### 1.4 Anticipated Geology

The 1:50,000 BGS Geology map showed the main part of the site to be situated on the London Clay Formation bedrock, and on the northwest corner the site was situated on the Lambeth Group. There was anticipated to be some Made Ground overlying part of the site as noted in the Landmark Report due to the previous site used as brick and tile works, clay mills, clay pit and kiln.

#### 1.4.1 Made Ground

Made Ground comprises material that has been placed by man or spread by man. It can comprise demolition material from former structures on the site or imported material placed to raise levels. Its composition can be very variable both laterally and with depth and may contain putrescible matter and voids.

#### 1.4.2 London Clay Formation

The London Clay Formation in the Hampshire region comprises silty and sandy clay, clayey and sandy silt, silty sand; sporadic claystones and thin beds of flint pebbles. The formation includes the Bognor Sand, Whitecliff Sand, Durley Sand, Portsmouth Sand and Nursling Sand Members. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The lowest part of the London Clay Formation rests on the Reading Formation (Lambeth Group).

#### 1.4.3 Lambeth Group

The Lambeth Group (formerly the Woolwich and Reading Beds) occurs in the London and Hampshire Basins, where it directly overlies the Chalk or Thanet Sand Formation, and is succeeded by the Harwich and London Clay Formations. The Lambeth Group comprises vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate.

The top of the Lambeth Group is marked by the eroded or interburrowed surface at the base of the overlying Thames Group. The uppermost part of the Lambeth Group can be the Reading Formation or the Woolwich Formation, depending on the local succession,

or the Upnor Formation, depending on the depth of pre-Thames Group erosion. The Lambeth Group is overlain by sands, silts, clays or gravel beds of the Harwich Formation, depending on the local sequences, or gravelly sandy clays at the base of the London Clay Formation.

The base of the Lambeth Group is taken at the base of the Upnor Formation. In the Hampshire Basin and the west of the London Basin, the Lambeth Group overlies the Chalk Group. In the centre and east of the London Basin it overlies the Thanet Formation, and in Suffolk the Ormesby Clay Member of the Lista Formation.

# Section 2 Site Works

## 2.1 Proposed Project Works

The proposed intrusive investigation was designed to provide information on the ground conditions and to aid the design of foundations for the proposed residential development. The intended investigation, as outlined within the Soils Limited quotation (Q29811Rev2 dated 4th June 2025), was to comprise the following items:

The intrusive site investigation will comprise:

- CAT and genny scan of all exploratory holes prior to work
- 8No (up to) 5m deep windowless sampler boreholes
- 8No (up to) 5m deep dynamic probe DPSH
- 2No (up to) 20m deep cable percussion boreholes
- 4No ground gas monitoring wells in windowless sampler boreholes
- Geotechnical laboratory testing
- Chemical laboratory testing

### 2.1.1 Actual Project Works

The actual project works were undertaken on 10th July to 18th July 2025, with subsequent sample logging, laboratory testing, monitoring, and reporting. The actual works comprised:

- CAT and genny scan of all exploratory holes prior to work
- 8No 5m deep windowless sampler boreholes (WS101 to WS108)
- 8No 5m deep dynamic probe DPSH (DP101 to DP108)
- 2No 20m deep cable percussion boreholes (BH101 and BH102)
- 4No ground gas monitoring wells in windowless sampler boreholes (WS101, WS103, WS105 and WS108)
- Geotechnical laboratory testing
- Chemical laboratory testing

Four windowless sampler boreholes (WS101, WS103, WS105 and WS108) were backfilled with gravel and bentonite following the installation of monitoring wells. Two cable percussion boreholes (BH101 and BH102) and four windowless sampler boreholes (WS102, WS104, WS106 and WS107) were backfilled with arisings.

All exploratory hole locations have been presented in Figure 3.

Following completion of site works, soil samples were logged, sub-sampled and sent to the laboratory for both contamination and geotechnical testing.

## 2.2 Ground Conditions

On 10th July to 18th July 2025, eight windowless sampler boreholes (WS101 to WS108) were drilled, using a Premier Compact 110 Series windowless sampler rig, to a depth of 5.00m below ground level (bgl) at locations selected by Soils Limited using a development plan provided by the Client.

A standpipe was installed within each of four windowless sampler boreholes (WS101, WS103, WS105 and WS108) to allow for continued monitoring of both groundwater and ground gas.

Eight super heavy dynamic probes, (DP101 to DP108) were driven prior and adjacent to their corresponding windowless sampler borehole to a depth of 5.00m bgl.

Two cable percussion boreholes (BH101 and BH102) were drilled, using a Dando rig, to a depth of 20.00m bgl at locations selected by Soils Limited using a development plan provided by the Client.

The maximum depths of exploratory holes have been included in Table 2.1.

**Table 2.1 Final Depth of Exploratory Holes**

| Exploratory Hole | Depth (m bgl) | Exploratory Hole | Depth (m bgl) |
|---|---|---|---|
| WS/DP101[w] | 5.00/5.00 | WS/DP106 | 5.00/5.00 |
| WS/DP 102 | 5.00/5.00 | WS/DP107 | 5.00/5.00 |
| WS/DP 103[w] | 5.00/5.00 | WS/DP108[w] | 5.00/5.00 |
| WS/DP 104 | 5.00/5.00 | BH101 | 20.00 |
| WS/DP 105[w] | 5.00/5.00 | BH102 | 20.00 |

**Note(s):** [w] - well installation. The depths given taken from the ground level on-site at the time of investigation.

The soil conditions encountered were recorded and soil sampling commensurate with the purposes of the investigation was carried out. The depths given on the exploratory hole logs and quoted in this report were measured from ground level.

The soils encountered from immediately below ground surface have been described in the following manner. Where the soil incorporated an organic content such as either decomposing leaf litter or roots or has been identified as part of the in-situ weathering profile, it has been described as Topsoil both on the logs and within this report. Where man has clearly either placed the soil, or the composition altered, with say greater than an estimated 5% of a non-natural constituent, it has been referred to as Made Ground both on the log and within this report.

For more complete information about the soils encountered within the general area of the site reference must be made to the detailed records given within Appendix B, but for the purposes of discussion, the succession of conditions encountered in the exploratory holes in descending order can be summarised as:

**Made Ground/Topsoil (MG/TS)**
**Lambeth Group (LMBE)**

**London Clay Formation (Not Encountered)**

The ground conditions encountered in the exploratory holes are summarised in Table 2.2.

**Table 2.2 Ground Conditions**

| Strata | Depth Encountered (m bgl) | | Typical Thickness (m) | Typical Description |
|---|---|---|---|---|
| | Top | Bottom | | |
| TS | G.L. | 0.15-1.00 | 0.50 | Soft reddish brown mottled light grey slightly sandy, slightly silty CLAY. Sand is fine. Occasional rootlets and roots. |
| MG | G.L. | 0.10-1.00 | 0.50 | Soft dark brown slightly sandy, slightly gravelly SILT. Sand is fine to medium. Gravel is angular to subangular, fine to coarse flint with fragments of chalk, brick, ceramic and clinker. |
| LMBE | 0.10-1.00 | 5.00[1,2] – 20.00[1,2] | Not Proven[3] | Interbedded cohesive and granular soils:<br>**Cohesive soils:** Firm to very stiff, red, grey, and yellowish brown mottled sandy silty fissured/desiccated CLAY. Sand is fine to medium and features in frequent lenses and inclusions. Gravel is angular to well-rounded, fine to coarse flint. Occasional to frequent rootlets<br>**Granular soils:** Light yellowish brown, brown slightly gravelly silty/ clayey fine to coarse SAND. Occasional clay lenses. |

**Note(s):** [1] Final depth of exploratory hole. [2] Base of strata not encountered. The depths given in this table are taken from the ground level on-site at the time of investigation.

## 2.3 Ground Conditions Encountered in Exploratory Holes

The ground conditions encountered in exploratory holes have been described below in descending order. The engineering logs are presented in Appendix B.1.

### 2.3.1 Made Ground and Topsoil

Soils described as Made Ground were encountered in nine out of the ten exploratory holes from ground level to depths ranging between 0.10m (BH102) and 1.00m bgl (BH101).

The Made Ground typically comprised soft dark brown slightly sandy, slightly gravelly SILT. Sand is fine to medium. Gravel is angular to subangular, fine to coarse flint with fragments of chalk, brick, ceramic and clinker.

Soils described as Topsoil were encountered in one exploratory hole (WS107) from ground level to a depth of 0.15m bgl.

The Topsoil comprised soft reddish brown mottled light grey slightly sandy, slightly silty CLAY. Sand is fine. Occasional rootlets and roots.

The established depth of Made Ground and Topsoil found at each exploratory hole location has been included in Table 2.3.

**Table 2.3 Established Depth of Made Ground/Topsoil**

| Exploratory Hole | Strata | Depth (m bgl) | Exploratory Hole | Strata | Depth (m bgl) |
|---|---|---|---|---|---|
| WS/DP101 | MG | 0.30 | WS/DP106 | MG | 0.20 |
| WS/DP102 | MG | 0.45 | WS/DP107 | TS | 0.15 |
| WS/DP103 | MG | 0.50 | WS/DP108 | MG | 0.30 |
| WS/DP104 | MG | 1.00 | BH101 | TS | 1.00 |
| WS/DP105 | MG | 0.40 | BH102 | MG | 0.10 |

### 2.3.2 Lambeth Group

Soils described as Lambeth Group were encountered in all exploratory holes from underneath the Made Ground/Topsoil to a maximum depth of 20.00m bgl.

The Lambeth Group was found in both cohesive and granular forms and varied in composition across the site with layers of cohesive and granular material found to be inconsistent in their order and thickness.

The cohesive soils typically comprised firm to very stiff, red, grey, and yellowish brown mottled sandy silty fissured/desiccated CLAY. Sand is fine to medium and features in frequent lenses and inclusions. Gravel is angular to well-rounded, fine to coarse flint. Occasional to frequent rootlets.

The granular soils typically comprised light yellowish brown, brown slightly gravelly silty/ clayey fine to coarse SAND. Sand is fine to medium. Occasional clay lenses.

The established depth of Lambeth Group found at each exploratory hole location has been included in Table 2.4.

**Table 2.4 Established Depth of Lambeth Group**

| Exploratory Hole | Depth (m bgl) | Exploratory Hole | Depth (m bgl) |
|---|---|---|---|
| WS/DP101 | 5.00/5.00 | WS/DP106 | 5.00/5.00 |
| WS/DP102 | 5.00/5.00 | WS/DP107 | 5.00/5.00 |
| WS/DP103 | 5.00/5.00 | WS/DP108 | 5.00/5.00 |
| WS/DP104 | 5.00/5.00 | BH101 | 20.00 |
| WS/DP105 | 5.00/5.00 | BH102 | 20.00 |

**Note(s):** [1] Final depth of exploratory hole.

## 2.4 Roots

Roots and traces of relict roots were encountered in all exploratory holes at depths ranging between 0.50m and 4.70m bgl, as detailed in Table 2.5.

**Table 2.5 Established Depth of Root Penetration**

| Exploratory Hole | Depth (m bgl) | Exploratory Hole | Depth (m bgl) |
|---|---|---|---|
| WS/DP101 | 2.50[1] | WS/DP106 | 1.00 |
| WS/DP102 | 1.70 | WS/DP107 | 2.20 |
| WS/DP103 | 1.70 | WS/DP108 | 0.50 |
| WS/DP104 | 1.00 | BH101 | 1.90 |
| WS/DP105 | 4.00[2] | BH102 | 0.70 |

**Note(s):** [1] Traces of relict root patterns only observed to 4.00m bgl.[2] Traces of root patterns to 4.70m bgl

Roots may be found to greater depth at other locations on the site particularly close to trees and/or trees that have been removed both within the site and its close environs.

It must be emphasised that the probability of determining the maximum depth of roots from a narrow diameter borehole is low. A direct observation such as from within a trial pit is necessary to gain a better indication of the maximum root depth.

A review of Google Earth™ historic images of the site for the last 20 years showed that there was no significant change in vegetation from that noted above.

### 2.5 Groundwater

No groundwater was encountered within all exploratory holes.

Changes in groundwater level occur for reasons including seasonal effects and variations in drainage. The investigation was conducted in July (2025), when groundwater levels should be falling from their annual maximum (highest) elevation, which typically occurs around March to the annual minimum (lowest) which typically occurs around September.

Further groundwater monitoring was conducted within the standpipes following completion of site works and groundwater monitoring was ongoing at the time of reporting and will be updated when complete.

The Lambeth Group was classed as a Secondary Bedrock Aquifer and could support shallow groundwater. Groundwater Source Protection Zones were recorded on site associated with the sub-surface chalk: Inner Zone1c (Inner protection Zone) and Zone III (Total Catchment).

Topography was gently undulating, sloping downwards towards the southeast by approximately 2–3°. The nearest surface water features circa 73m E, which was unnamed stream.

Groundwater equilibrium conditions may only be conclusively established, if a series of observations are made via groundwater monitoring wells.

# Section 3 Geotechnical In-Situ and Laboratory Testing

## 3.1 Standard Penetration Tests

Standard Penetration Tests (SPTs) were undertaken in BH101 and BH102. The results were interpreted based on the classifications outlined in Appendix C.1, Table C.1.1 to Table C.1.2.

**Table 3.1 Hammer Efficiency**

| SPT Hammer Ref | Energy Ratio Er (%) |
|---|---|
| SED8 | 74 |

**Table 3.2 Standard Penetration Tests (SPT) Interpretation**

| Strata | Depth Range (m bgl) | N60 Range | Soil Classification |
|---|---|---|---|
| LMBE | 1.50-20.00 | 7-50 | Low to very high (Cu = 35 - 250kPa) |

A full interpretation of the SPT results, are outlined in Appendix C.2, Table C.2.1. The trend of the strength typically increases with depth.

## 3.2 Dynamic Probe Tests

The results were converted to equivalent SPT “N60” values based on dynamic energy using commercial computer software (Geostru). Interpretation interpreted based on the classifications outlined in Appendix C.1,Table C.1.1 to Table C.1.2.

**Table 3.3 Hammer Efficiency**

| Rig Reference | Energy Ratio Er (%) |
|---|---|
| Premier 3 | 65.5 |

**Table 3.4 Inferred SPT Interpretation**

| Strata | | Depth Range (m bgl) | Inferred N60 Range | Soil Classification |
|---|---|---|---|---|
| LMBE(c) | Interbedded | 0.20-5.00 | 0-56 | Extremely low to very high ($C_u$ = <10 – 280kPa) |
| LMBE(g) | | | 9->50 | Loose to very dense |

**Note(s):** c – Cohesive soils; g – granular soils; SPT “N60” values presented have been corrected in accordance with BS EN 22476 Part 3

A full interpretation of the DPSH tests, are outlined in Appendix C.2, Table C.2.2. The trend of the strength and relative density typically increases with depth.

### 3.3 Atterberg Limit Tests

Atterberg Limit tests were performed on eleven samples from the Lambeth Group. The results were classified in accordance with BRE Digest 240 and NHBC Standards Chapter 4.2.

**Table 3.5 Atterberg Limit Results Classification**

| Strata | Depth (m bgl) | VCP | |
|---|---|---|---|
| | | NHBC | BRE 240 |
| LMBE | 0.70-9.00 | Low to high | Low to high |

Details are given in Table C.2.3, Appendix C.2 and the laboratory report in Appendix C.3.

### 3.4 Particle Size Distribution Tests

Particle Size Distribution (PSD) tests were performed on three samples from the Lambeth Group.

**Table 3.6 Particle Size Distribution Classification**

| Strata | Depth (m bgl) | VCP | |
|---|---|---|---|
| | | NHBC | BRE 240 |
| LMBE | 1.20-2.40 | No | Yes |

Note that a cohesive soil is only classified as having a volume change potential if it is also plastic and an Atterberg Limit test can be conducted on the strata.

A full interpretation of the PSD tests, are outlined in Table C.2.4, Appendix C.2 and the laboratory report in Appendix C.3.

### 3.5 Sulphate and pH Tests

Eight samples from the Lambeth Group were underwent Water soluble sulphate (2:1) and pH testing in accordance with Building Research Establishment Special Digest 1, 2005, 'Concrete in Aggressive Ground'.

**Table 3.7 Sulphate and pH Test Results**

| Strata | Depth (m bgl) | Sulphate Concentration (mg/l) | pH |
|---|---|---|---|
| LMBE | 0.70-14.00 | <10-17 | 7.0-8.0 |

The significance of the sulphate and pH Test results are discussed in Section 5.2 and the laboratory report in Appendix C.3.

# Section 4 Engineering Appraisal

## 4.1 Established Ground Conditions

An engineering appraisal of the soil types encountered during the site investigation and likely to be encountered during the redevelopment of this site is presented. Soil descriptions are based on analysis of disturbed samples taken from the exploratory holes.

### 4.1.1 Made Ground and Topsoil

Soils described as Made Ground were encountered in nine out of the ten exploratory holes from ground level to depths ranging between 0.10m (BH102) and 1.00m bgl (BH101).

Soils described as Topsoil were encountered in one exploratory hole (WS107) from ground level to a depth of 0.15m bgl.

The Topsoil comprised soft reddish brown mottled light grey slightly sandy, slightly silty CLAY. Sand is fine. Occasional rootlets and roots.

Foundations must not be placed on non-engineered fill unless such use can be justified based on a thorough ground investigation and detailed design. Foundations must be taken through any Topsoil and/or Made Ground and either into, or onto a suitable underlying natural stratum of adequate bearing characteristics.

### 4.1.2 Lambeth Group

Soils described as Lambeth Group were encountered underlying the Made Ground/Topsoil to a maximum depth of 20.00m bgl.

Soils described as Lambeth Group were encountered in all exploratory holes from underneath the Made Ground/Topsoil to a maximum depth of 20.00m bgl.

The Lambeth Group was found in both cohesive and granular forms and varied in composition across the site with layers of cohesive and granular material found to be inconsistent in their order and thickness.

The cohesive soils typically comprised firm to very stiff, red, grey, and yellowish brown mottled sandy silty fissured/desiccated CLAY. Sand is fine to medium and features in frequent lenses and inclusions. Gravel is angular to well-rounded, fine to coarse flint. Occasional to frequent rootlets.

The granular soils typically comprised light yellowish brown, brown slightly gravelly silty/ clayey fine to coarse SAND. Sand is fine to medium. Occasional clay lenses.

Soils of the Lambeth Group are over consolidated, cohesive and granular soils and as such are expected to display moderate bearing capacities with moderate settlement characteristics. The soils of the Lambeth Group were considered a suitable founding stratum for the proposed development.

### 4.1.3 Guidance on Shrinkable Soils

The ground conditions were established as cohesive soils of the bedrock of the Lambeth Group.

The volume change potential was established and presented in Table 4.1.

**Table 4.1 Established Volume Change Potential by Strata**

| Strata | Volume Change Potential | | Established Lower Boundary (m bgl) |
|---|---|---|---|
| | BRE | NHBC | |
| LMBE (c) | High | High | Not Proven |
| LMBE (g) | Yes | No | Not Proven |

The Lambeth soil mass must be considered to have **high** volume change potential with foundations designed accordingly.

### 4.1.4 Groundwater

No groundwater was encountered within all exploratory holes.

# Section 5 Foundation Scheme

## 5.1 Foundation Recommendations

Foundations **must not** be constructed within any Made Ground/Topsoil due to the likely variability and potential for large load induced settlements both total and differential.

Roots and traces of relict roots were encountered in all exploratory holes at depths ranging between 0.50m and 4.70m bgl. If roots are encountered during the construction phase foundations **must not be placed within any live root penetrated** or desiccated **cohesive soils or those with a volume change potential**. Should the foundation excavations reveal such materials, the excavations **must** be extended to greater depth to bypass these unsuitable soils. Excavations must be checked by a suitable person prior to concrete being poured.

Shallow foundations were identified as suitable for the proposed low-rise semi-detached and short-terrace blocks, based on the structural and geotechnical requirements. However, due to the high volume-change potential of the natural soils and the presence of live roots to a depth of 4.7 m bgl, piled foundations are recommended for the apartment buildings to accommodate the anticipated loads and ground conditions. If significant deep roots are encountered, foundations should be deepened accordingly, and piled solutions adopted.

### 5.1.1 Shallow Foundations into the Lambeth Group

Based on a 5.00 by 0.75m strip foundation, using commercial software Table 5.1 shows the calculated bearing values and anticipated settlement characteristics. The maximum encountered depth of Made Ground was 1.00m bgl so bearing capacities were calculated below this depth.

**Table 5.1 Allowable Bearing Capacities in the Lambeth Group**

| Depth (m bgl) | Size (m) | Bearing Capacity (kPa) | Anticipated Settlement (mm) |
|---|---|---|---|
| 1.20[1] | 5.00 x 0.75 | 75 | 25 |
| 1.50 | | 100 | 25 |

**Note(s):** [1] locally deepened, there was a zero-blow counted noted at WS102 at 1.10m bgl and if any deep roots are identified during site formation

All foundation formations must be examined, recorded, and signed off by a competent person.

Care must be exercised where foundations pass over soils of different engineering properties or different soil types to minimise the potential effects of differential settlements. Reinforced foundations are recommended due to the interbedded and variable nature of the soils.

For the allowable bearing value given above, settlements should not exceed the presented values, provided that excavation bases are carefully bottomed out and blinded or concreted as soon after excavation as possible and kept dry.

Foundations must not be constructed over former structures and other hard spots. The foundations design must be suitable for the conditions present at the site.
The anticipated settlement includes both elastic settlement and long-term drained settlement (in the case of cohesive soils).

Anticipated settlements may be taken as proportional to the bearing capacity adopted (for the same configuration of foundation), therefore if the bearing value is halved the anticipated settlement will halve.

All loose material, soft spots and Made Ground must be removed from the base of the excavations. Failure to do so could results in increased settlements.

It has been assumed that the foundations to any existing structures have been grubbed out. Where foundations have been grubbed out the new foundation must be taken through any backfill material into suitable natural ground as outlined in this report.

### 5.1.2 Piled Foundations

Piled foundations must be taken through any Made Ground into suitable strength soils of the Lambeth Group.

The construction of a piled foundation is a specialist job with the actual pile working load depending on the pile type and installation method. Prior to finalising the foundation design the advice from a reputable contractor who is familiar with the ground and groundwater conditions present at the site must be sought.

The vertical load capacities are provided for varying diameters and lengths of bored piles taken into the Lambeth Group, based on in-situ tests and must only be used for preliminary design purposes.

A factor of safety of 3 was applied to the characteristic line derived from testing undertaken, for both the shaft and base load capacities.

The bearing values given in Appendix D.1., are applicable to single vertically loaded piles. Where piles are to be constructed in groups the bearing value of each individual pile should be reduced by a factor of about 0.8 and a calculation made to check the factor of safety against block failure.

From ground level the upper 5m of the pile shaft has been ignored in the preliminary pile design given.

To prevent necking of the green concrete, temporary casing may be required where the pile passes through the Made Ground or Lambeth Group and below the groundwater table (if encountered). To achieve the full bearing value a pile should penetrate the bearing stratum by at least five times the pile diameter.

No allowance has been made for negative skin friction that could be generated where piles pass through Made Ground and any very soft cohesive and / or organic soils

deposits underlying the site. The negative skin friction must be applied to the pile working load and must not be factored.

### 5.2 Subsurface Concrete

The sulphate and pH tests carried out in accordance with BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground', established the site concrete classifications for each stratum as presented in Table 5.2.

**Table 5.2 Concrete Classification**

| Stratum | Design Sulphate Class | ACEC Class |
|---|---|---|
| LMBE | DS-1 | AC-1s |

Concrete to be placed in contact with soil or groundwater must be designed in accordance with the recommendations of Building Research Establishment Special Digest 1 2005, *'Concrete in Aggressive Ground'* taking into account any possible exposure of potentially pyrite bearing natural ground and the pH of the soils.

### 5.3 Excavations

Shallow excavations in the Made Ground/Topsoil are likely to be marginally stable in the short term at best.

Deeper excavations taken into the Lambeth Group are likely to be unstable and require support. Unsupported earth faces formed during excavation may be liable to collapse without warning and suitable safety precautions must therefore be taken to ensure that such earth faces are adequately supported or battered back to a safe angle of repose.

Excavations beneath the groundwater table are likely to be unstable and dewatering of foundation trenches may be necessary.

# Section 6 Determination of Chemical Analysis

## 6.1 Site Characterisation and Revised Conceptual Site Model

The Preliminary Investigation Report undertaken by Soils Limited (report ref: 22035/PIR dated August 2025) identified a very low to moderate/low risk of ground contamination from previous usage of the site and offsite sources.

Soils described as Made Ground were encountered in nine out of the ten exploratory holes from ground level to depths ranging between 0.10m (BH102) and 1.00m bgl (BH101).

The Made Ground typically comprised soft dark brown slightly sandy, slightly gravelly SILT. Sand is fine to medium. Gravel is angular to subangular, fine to coarse flint with fragments of chalk, brick, ceramic and clinker.

Potential hydrocarbon odours were identified in WS103 at depth of 1.30-2.80m bgl, this findings

## 6.2 Soil Sampling

Exploratory hole locations were established to provide an overview of ground conditions across the site in relation to the proposed construction, together with enabling the collection of samples to enable chemical characterisation of the underlying strata.

Representative samples for potential environmental testing were obtained from the exploratory holes at depths of between 0.10m to 2.40m allow appropriate representation of the materials encountered, with additional samples to be obtained, if necessary, where there was visual or olfactory evidence of contamination.

Unless otherwise stated, analytical testing was based initially on a screening suite of commonly identified inorganic and organic contaminants, taking into account the prevailing site conditions and the findings of the initial conceptual site model.

## 6.3 Determination of Chemical Analysis

The driver for determination of the analysis suite was the information obtained from the Preliminary Investigation Report and this intrusive investigation.

The chemical analyses were carried out on four samples of Made Ground and three samples of the Lambeth Group. The nature of the analyses is detailed in Table 6.1.

**Table 6.1 Chemical Analyses Suites - Soil**

| No. of Tests | | Determinants |
|---|---|---|
| MG | LMBE | |
| 4 | 3 | Metal suites: Arsenic, Boron (Water Soluble), Cadmium, Chromium (total & hexavalent), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc |
| 4 | 3 | Organic Matter |

| No. of Tests | | Determinants |
|---|---|---|
| MG | LMBE | |
| 4 | 3 | pH |
| 4 | 3 | Polycyclic aromatic hydrocarbons (PAH) – (EPA 16) |
| 4 | 3 | Phenols – total monohydric |
| 2 | 3 | Total petroleum hydrocarbons (TPH) – CWG banding |
| 2 | 2 | BTEX and MTBE |
| 2 | 2 | Cyanide total & free |
| 2 | 2 | Polychlorinated biphenyls (PCB) – 7 Congeners |
| 1 | 0 | Waste acceptance criteria (WAC) |
| 4 | 3 | Asbestos screening |

The soil testing was carried out in compliance with the MCERTS performance standard, and the results are shown in Appendix E.2, test report 25-07148.1.

# Section 7 Qualitative Risk Assessment

## 7.1 Assessment Criteria

The assessment criteria used to determine risks to human health are derived and explained within Appendix E.3.

## 7.2 Representative Contamination Criteria - Soil

In compiling this report reliance was placed on drawing SK03 / SK05 dated Feb 2025, produced by OSP Architecture. The recommendations provided within this report are made exclusively in relation to the scheme outlined above and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined Development plans provided by the Client are presented in Appendix H.

Based on the proposed development, the results of the chemical analysis have been compared against generic assessment criteria (GAC) for a '***Residential with home grown produce***' end use, as presented in SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination December 2014 (C4SL), derived for the protection of human health. Where this document has not published screening values for determinants, GACs derived for the same end use have been adopted from the following published guidance; DEFRA Soil Guideline Values (SGV) and LQM/CIEH/Suitable 4 Use Level (S4UL).

To assess the potential toxicity of organic determinants (Petroleum Hydrocarbons and Polyaromatic Hydrocarbons) to the human health, soils samples were analysed for Soil Organic Matter (SOM). The selected samples analysed recorded, SOM values of between 0.7% and 5.4%. For each soil sample tested, the resultant SOM allowed for the correct comparison to be made with the appropriate guideline value for each organic determinant analysed.

### 7.2.1 Risk Assessment – Made Ground

Table 7.1 outlines the samples that have exceeded their relevant assessment criteria. The full laboratory report is presented in Appendix E.2.

**Table 7.1 Summary of GAC Exceedances – Made Ground**

| Location | Depth (m bgl) | Contaminant | Concentration | Guidance Level |
|---|---|---|---|---|
| WS108 | 0.20 | Lead | 376 | 210 |
| WS102 | 0.10 | Benzo(a)anthracene | 18.9 | 11 |
| | | Benzo(b)fluoranthene | 18.3 | 3.3 |
| | | Benzo(a)pyrene | 15.3 | 5 |
| | | Di-benzo(a,h)anthracene | 1.81 | 0.28 |
| WS103 | 0.20 | Benzo(a)anthracene | 53.6 | 11 |
| | | Chrysene | 51.3 | 22 |
| | | Benzo(b)fluoranthene | 55.9 | 3.3 |
| | | Benzo(a)pyrene | 49.6 | 5 |
| | | Di-benzo(a,h)anthracene | 4.69 | 0.28 |

| Location | Depth (m bgl) | Contaminant | Concentration | Guidance Level |
|---|---|---|---|---|

**Note(s):** Units mg/kg

The risk assessment has established potential pollutant linkage in relation to human health from elevated Lead and PAH concentrations within the Made Ground across the site.

### 7.2.2 Risk Assessment – Lambeth Group

Table 7.2 outlines the sample that has exceeded its relevant assessment criteria. The full laboratory report is presented in Appendix E.2.

**Table 7.2 Summary of GAC Exceedances – Lambeth Group**

| Location | Depth (m bgl) | Contaminant | Concentration | Guidance Level |
|---|---|---|---|---|
| WS101 | 0.35 | Arsenic | 43 | 37 |

**Note(s):** Units mg/kg

The risk assessment has established a potential pollutant linkage in relation to human health from a single elevated arsenic concentration within the Lambeth Group.

## 7.3 Asbestos

The test certificate for each sample submitted for contamination analysis during this investigation includes the results of an Asbestos Screen.

In each case ‘Not detected’ was reported.

This finding does not obviate the risk of asbestos being present on the site and the Client must seek advice from qualified and competent asbestos specialist during and prior to undertaking works to ensure compliance with appropriate legislation and guidance.

## 7.4 Risk to Controlled Waters

No groundwater was encountered within all exploratory holes.

Further groundwater monitoring was conducted within the standpipes following completion of site works and groundwater monitoring was ongoing at the time of reporting and will be updated when complete.

The Lambeth Group was classed as a Secondary Bedrock Aquifer and could support shallow groundwater. The London Clay Formation bedrock underneath Lambeth Group was classified as Unproductive Strata designation. Groundwater Source Protection Zones were recorded on site associated with the sub-surface chalk: Inner Zone1c (Inner protection Zone) and Zone III (Total Catchment).

Topography was gently undulating, sloping downwards towards the southeast by approximately 2–3°. The nearest surface water features circa 73m E, which was unnamed river stream.

Local topography dictates that any surface water and shallow groundwater will flow down to the southeast – away from the Lambeth Group and the Secondary A Aquifer. Deep groundwater within the Newhaven Chalk Formation is not at risk as the cohesive layers of the overlying Lambeth Group will act as an aquiclude.

### 7.5 Risk from Ground Gas Ingression

Potential sources of ground gas within influencing distance of the site identified within the CSM comprise:

- Potentially Infilled Land (multiple, water and non-water, onsite)
- Clay Pit
- Made Ground

Ground gas monitoring is currently ongoing, including targeting periods of low and falling pressure with the results to be reported as an addendum to this report. The full programme of monitoring must be completed before final design is undertaken.

#### 7.5.1 Radon

The site is in a lower probability radon area where less than 1% of homes are estimated to be at or above the Action Level. Therefore, no radon protective measures are necessary in the construction of new dwellings or extensions.

### 7.6 Generic Quantitative Risk Assessment

Quantitative risk assessments are undertaken for the soil and groundwater. The CSM has been updated to take account of the assessments below and presented in Appendix E.1. The full laboratory chemical report is presented in Appendix E.2.

#### 7.6.1 Soils

Four of the samples tested showed concentrations of Lead, Arsenic and PAHs in excess of the relevant C4SL for a residential with home grown produce land-use scenario

The Tier 1 Quantitative risk assessment therefore established that there was **a risk to the human health receptors** of construction workers or future end-users.

#### 7.6.2 Controlled Waters

The proposed development will require the implementation of a new drainage regime, which will represent an overall betterment of existing site conditions, ensuring that surface water is appropriately managed and does not follow pathways that could adversely impact third-party land or property.

Given the vulnerability of controlled waters on site and the elevated concentrations of contaminants recorded in the shallow soils, there is a low risk to controlled waters. However, as shallow soils will be removed during site clearance works and remediation, a negligible risk will remain, and no further assessment is required.

### 7.6.3 Ground Gas

The Preliminary Investigation Report identified a low risk of ground gas associated with an infilled gravel pit 70m south-west of the site.

Monitoring of the wells installed within WS101, WS103, WS105 and WS108 have been undertaken on three occasions, including targeting periods of low and falling pressure. At the time of reporting three more visits were scheduled and therefore the results of the ground gas risk assessment will be provided in an addendum once the regime is completed.

## 7.7 Recommendations

Soil chemical analysis recorded four samples with elevated levels of Arsenic, Lead and/or PAHs.

Therefore, there was a risk to the Human Health, Building Structures and Services and Groundwater receptor, which would require a remediation strategy.

The remedial objective for the site is to ensure site clean-up removes any unacceptable risk to the identified receptors of Human Health, Building Structures and Services and Groundwater receptor.

In essence the remedial objective must sever any source-pathway-receptor pollutant linkages that have been established. Once this has been achieved, by whatever means, there can theoretically be no risk.

## 7.8 Protection of Services

Contamination of the ground may pose a risk to human health by permeating potable water supply pipes. To fulfil their statutory obligations, UK water supply companies require robust evidence from developers to demonstrate either that the ground in which new plastic supply pipes will be laid is free from contaminants specified in UKWIR Report 10/WM/03/21 Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR, 2010), or that the proposed remedial strategy will mitigate any existing risk.

## 7.9 Duty of Care

Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.

## 7.10 Excavated Material

Excavated material as waste must be defined or classified prior to any disposal, transport, recycling or re-use at or by an appropriately licensed or exempt carrier and/or off-site disposal facility. The requirements inherent in both Duty of Care and Health and Safety must also be complied with. In order to determine what is to happen, what is

suitable, appropriate and most effective in the disposal of wastes, especially those subject to CDM waste management plan requirements, several factors must be considered, and competent advice must always be sought.

### 7.11 HazWasteOnline

The waste classification tool HazWasteOnline™ followed by WAC analysis was undertaken on six samples to provide a general indication for future waste removal.

All samples were classified as Non-Hazardous, with the HazWasteOnline™ report presented in Appendix G. The WAC certificate is presented in Appendix E.2, within Test Report 25-07148.1.

### 7.12 Re-use of Excavated Material On-site

The re-use of on-site soils may be undertaken either under the Environmental Permitting Regulations 2007 (EPR), in which case soils other than uncontaminated soils are classed as waste, or under the CL:AIRE Voluntary Code of Practice (CoP) which was published in September 2008 and is accepted as an alternative regime to the EPR.

### 7.13 Imported Material

Any soil, which is to be imported onto the site, must undergo chemical analysis to permit classification prior to its importation and placement to ascertain its status with specific regard to contamination, i.e. to prove that it is suitable for the purpose for which it is intended.

### 7.14 Discovery Strategy

There may be areas of contamination not identified during the investigation. Such occurrences may also be discovered during the demolition and construction phases for the redevelopment of the site.

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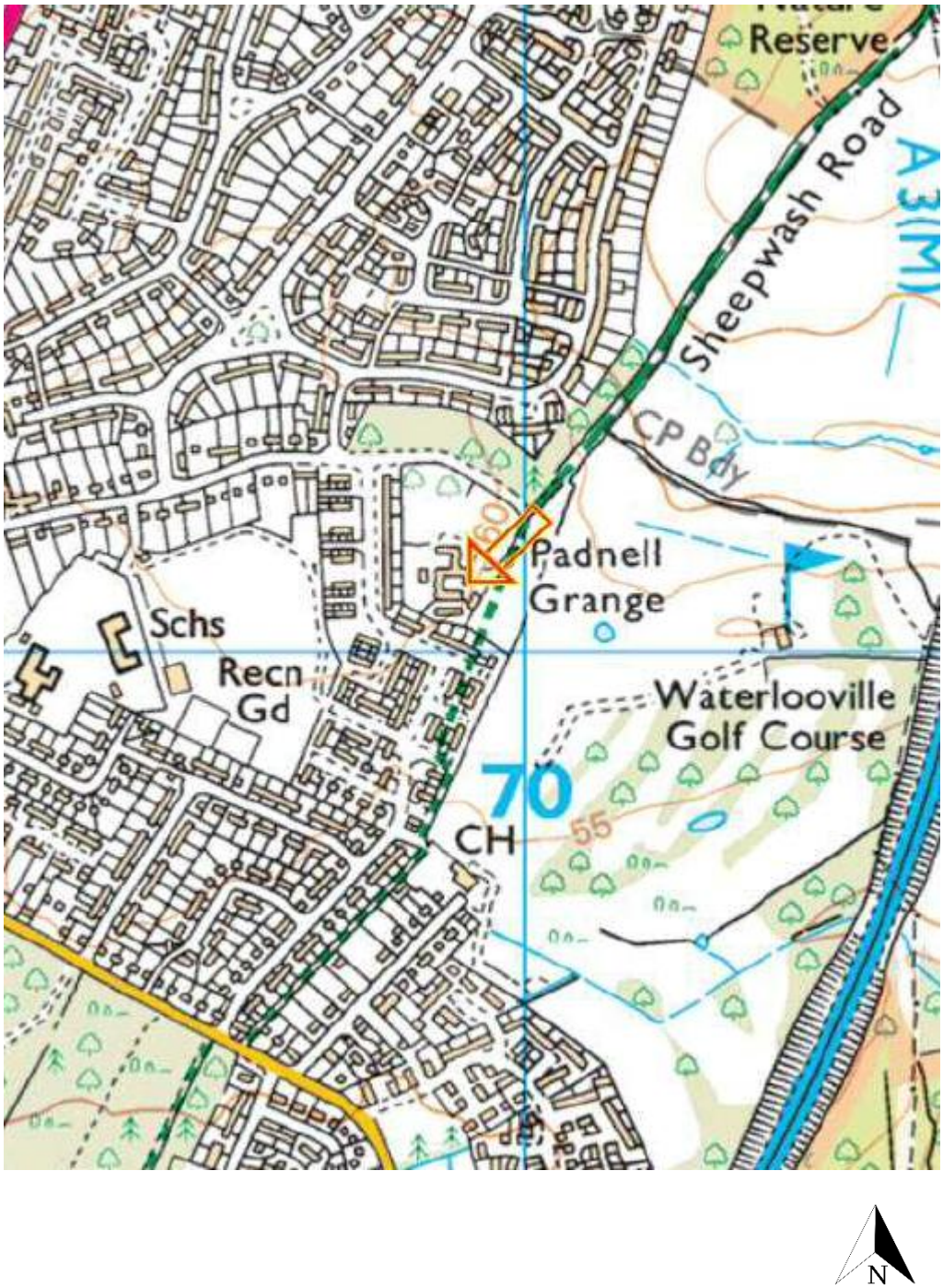



**Figure 1 – Site Location Map**

| | |
|---|---|
| **Job Number**<br>22035 | **Project**<br>Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED |
| **Client**<br>Stonebond Properties (Guildford) Limited | **Date**<br>September 2025 |

**Figure 2 – Aerial Photograph**

| | |
|---|---|
| **Job Number**<br>22035 | **Project**<br>Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED |
| **Client**<br>Stonebond Properties (Guildford) Limited | **Date**<br>September 2025 |

**Figure 3 – Exploratory Hole Plan**

| | |
|---|---|
| **Job Number**<br>22035 | **Project**<br>Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED |
| **Client**<br>Stonebond Properties (Guildford) Limited | **Date**<br>September 2025 |

## Appendix A Standards and Resources

The site works, soil descriptions and geotechnical testing were undertaken in accordance with the following standards where applicable:

- BS 5930:2015 and BS EN ISO 22476-2&3:2005+A1:2011
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design
- BS EN ISO 14688-1:2018 - Geotechnical investigation and testing - Identification and description
- BS EN ISO 14688-2:2018 - Geotechnical investigation and testing - Principles for a classification
- BS 10175:2011+A2:2017 - Investigation of potentially contaminated sites
- LCRM 2021 Environment Agency
- BS 8004:2015 – Code of practice for foundations
- BS 1377:1990 Parts 1 to 8
- BRE Digest 241 “Low-rise buildings on shrinkable clay soils: Part 2
- BRE Special Digest 1, 2005, ‘Concrete in Aggressive Ground’
- Stroud, M. A. 1974, “The Standard Penetration Test – its application and interpretation”, Proc. ICE Conf. on Penetration Testing in the UK, Birmingham. Thomas Telford, London.
- N.E. Simons, B.K. Menzies, “A Short Course in Foundation Engineering”
- NHBC Standards Chapter 4.2, January 2024.
- SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination December 2014
- CIRIA C733, Asbestos in soil and made ground: a guide to understanding and managing risks and CAR2012 regulations.
- Google Earth accessed in September 2025
- British Geological Survey Website & iGeology App accessed in September 2025

# Appendix B Field Work

## Appendix B.1 Engineers Logs

# Window Sampler

# WS101

Sheet 1 of 1

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| WS | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-28 |

**Client**
Stonebond Ltd

**Consultant**
AS

**Contractor**
Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.10 | ES | | | (0.30) 0.30 | | Stiff brownish grey mottled brown, slightly sandy, slightly gravelly CLAY. Gravel is angular to sub-angular, fine to coarse brick, flint, chalk and clinker. Frequent rootlets. MADE GROUND. |
| | | 0.35 | ES | | | (0.10) 0.40 | | |
| | | 0.50 | ES | | | (0.20) 0.60 | | Firm to stiff, brown mottled reddish brown, slightly gravelly, slightly sandy desiccated CLAY. Sand is fine. Gravel is angular to sub-angular, fine to coarse flint. Frequent rootlets. Recovered as angular gravel sized fragments. LAMBETH GROUP |
| | | 0.50 | D | | | (0.10) 0.70 | | |
| | | 0.65 | ES | | | | | |
| | | 0.80 | ES | | | | | |
| | | 0.80 | D | | | (0.90) 1.60 | | Firm to stiff, yellowish brown mottled brown and light greyish brown, slightly sandy silty desiccated CLAY. Sand is fine. Frequent rootlets. Frequent organic black staining and partings with depth. Recovered as angular gravel sized fragments. LAMBETH GROUP. |
| | | 1.30 | D | | | | | |
| | | 1.70 | D | | | | | Firm to stiff, multicoloured slightly sandy silty desiccated CLAY. Sand is fine. Frequent rootlets. Frequent organic black staining and partings. Occasional sub-rounded medium to coarse ferruginous mudstone. Recovered as angular gravel sized fragments. LAMBETH GROUP |
| | | 2.20 | D | | | | | |
| | | 2.70 | D | | | | | Firm to stiff, red, brown and grey, silty fissured desiccated CLAY. Occasional rootlets. LAMBETH GROUP. |
| | | 3.20 | D | | | (3.40) | | Stiff, locally soft, grey mottled red, silty fissured CLAY. Occasional rootlets becoming traces of former rootlets with depth. Occasional inclusions of red weak mudstone lithorelics. Occasionally with fine sand. LAMBETH GROUP. |
| | | 3.70 | D | | | | | *Sandy with fine sand. (3.00 - 3.30m)* |
| | | 4.20 | D | | | | | |
| | | 4.70 | ES | | | 5.00 | | *End of Borehole at 5.00m* |

**Remarks**
Rootlets observed to 2.50m bgl. Traces of relict root patterns only observed to 4.00m bgl.

**Method, Plant, Stability, Dimensions**
**0.00 - 5.00m** WS Premier 3

**Logger**
DEE

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Window Sampler

# WS102

Sheet 1 of 1

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| WS | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-28 |

**Client**
Stonebond Ltd

**Consultant**
AS

**Contractor**
Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Samples and Tests: Type/ Ref | Samples and Tests: Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Strata: Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.10 | ES | | | (0.45) | | Stiff brownish grey mottled brown, slightly gravelly sandy, desiccated CLAY. Gravel is angular to sub-angular, fine to coarse flint, brick, chalk and clinker. Frequent rootlets. Rare angular flint cobble. Underlain by band of broken brick. MADE GROUND. |
| | | 0.50 | ES | | | 0.45 | | |
| | | 0.50 | D | | | | | Soft to firm, yellowish brown, brown and light greyish brown mottled, silty CLAY. Sand is fine to medium. Frequent rootlets. LAMBETH GROUP |
| | | 0.90 | ES | | | | | |
| | | 0.90 | D | | | (1.25) | | |
| | | 1.40 | D | | | | | |
| | | | | | | 1.70 | | *Rare well rounded coarse flint gravel. (1.60m)* |
| | | 1.80 | D | | | | | Firm to stiff, yellowish brown, mottled brown and light greyish brown, slightly silty, sandy CLAY. Sand is fine to medium and features in frequent lenses and inclusions. Frequent rootlets. LAMBETH GROUP |
| | | | | | | (0.65) | | |
| | | 2.40 | D | | | 2.35 | | |
| | | | | | | (0.30) | | Firm to stiff, multicoloured silty CLAY interbedded with SAND and sandy CLAY. Sand is fine. Clay is fissured and disturbed. Frequent black organic staining. LAMBETH GROUP |
| | | 2.70 | D | | | 2.65 | | |
| | | | | | | (0.70) | | Loose to medium dense, yellowish brown mottled black, silty SAND. Occasional desiccated root traces. LAMBETH GROUP |
| | | 3.20 | D | | | | | |
| | | 3.40 | D | | | 3.35 | | |
| | | | | | | (0.50) | | Soft to firm yellowish brown mottled brown, slightly silty, sandy laminated CLAY. Sand is fine to medium. LAMBETH GROUP |
| | ▽ | 3.90 | D | | | 3.85 | | |
| | | | | | | (0.15) | | Soft to firm, interbedded sandy CLAY and gravelly SAND. Gravel is angular to sub-angular, fine to medium flint and mudstone. Frequent sand inclusions. Frequent clay inclusions. LAMBETH GROUP |
| | | 4.20 | D | | | 4.00 | | |
| | | | | | | (1.00) | | Firm to stiff, brown becoming red mottled yellowish brown and light grey, slightly sandy silty CLAY. Sand is fine. LAMBETH GROUP |
| | | 4.80 | D | | | 5.00 | | |
| | | | | | | | | *End of Borehole at 5.00m* |

**Remarks**
Rootlets observed to 1.70m bgL.

**Method, Plant, Stability, Dimensions**
**0.00 - 5.00m** WS Premier 3

**Logger**
DEE

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

soils LIMITED

# Window Sampler

**WS103**

**Sheet 1 of 1**

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| WS | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-28 |

**Client**
Stonebond Ltd

**Consultant**
AS

**Contractor**
Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.20 | ACM | | | (0.15) 0.15 | | Dark brown becoming reddish brown, slightly gravelly, silty SAND. Gravel is angular to sub-rounded, fine to coarse flint, brick and clinker. Frequent rootlets. MADE GROUND. |
| | | 0.40 | ES | | | (0.15) 0.30 | | |
| | | 0.60 | ES | | | (0.20) 0.50 | | |
| | | 0.60 | D | | | (0.50) | | Grey and dark grey mottled, slightly silty, sandy GRAVEL. Gravel is angular to sub-angular, fine to medium flint, clinker, brick. Frequent fine ash. Occasional rootlets. Potential cemented ACM fragment. MADE GROUND. |
| | | 1.10 | D | | | 1.00 | | |
| | | | | | | (0.60) | | Stiff multicoloured, slightly sandy, very gravelly desiccated CLAY. Gravel is angular to well rounded, fine to coarse flint, and chalk. Occasional rootlets. MADE GROUND. |
| | | 1.70 | D | | | 1.60 | | |
| | | | | | | (0.50) | | Soft to firm, yellowish brown, brown and light greyish brown mottled, slightly gravelly slightly sandy CLAY. Gravel is angular ro well rounded, fine to coarse flint. Occasional rootlets. Sand is fine to medium. Frequent rootlets. LAMBETH GROUP. |
| | | 2.20 | D | | | 2.10 | | |
| | | 2.40 | ES | | | (0.70) | | Soft to firm, light grey mottled brown and orange, slightly sandy, silty CLAY. Sand is fine to medium. Occasional rootlets. LAMBETH GROUP. |
| | | 2.65 | ES | | | | | |
| | | 2.70 | D | | | 2.80 | | |
| | | 2.90 | D | | | (0.20) 3.00 | | Firm, yellowish brown, mottled brown and light greyish brown, slightly silty, sandy CLAY. Sand is fine to medium and features in frequent lenses and inclusions. Frequent rootlets. LAMBETH GROUP. |
| | | 3.10 | D | | | | | |
| | | | | | | (0.80) | | Soft to firm, yellowish brown, mottled light blue and brown sandy silty CLAY. Sand is fine to medium and features in frequent lenses and inclusions. Frequent rootlets. Very strong fuel/diesel odour. LAMBETH GROUP. |
| | | 3.60 | D | | | 3.80 | | |
| | | 3.90 | D | | | | | Firm to stiff, yellowish brown, mottled brown and light greyish brown, slightly silty, sandy CLAY. Sand is fine to medium and features in frequent lenses and inclusions. Frequent rootlets. LAMBETH GROUP. |
| | | 4.40 | D | | | (1.20) | | Soft to stiff, yellowish brown mottled brown, slightly silty, sandy laminated CLAY. Sand is fine to medium and features in fine inclusions. Occasional fine black organic mottling. Underlain by thin multicoloured band with mudstone and fine flint gravel. LAMBETH GROUP |
| | | 4.90 | D | | | 5.00 | | *Band of multicoloured slightly sandy, slightly gravelly CLAY. With frequent sub-angular weak mudstone lithorelics and fine flint gravel. (3.75 - 3.80m)* |
| | | | | | | | | Firm to stiff, red mottled grey and yellowish brown mottled silty CLAY. Occasionally with fine sand. LAMBETH GROUP |
| | | | | | | | | *End of Borehole at 5.00m* |

**Remarks**
Rootlets observed to 1.70m bgL.

**Method, Plant, Stability, Dimensions**
**0.00 - 5.00m** WS Premier 3

**Logger**
DEE

**Checked By:** ML **Status:** FINAL

# Window Sampler

**WS104**

**Sheet 1 of 1**

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| WS | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-28 |

**Client**
Stonebond Ltd

**Consultant**
AS

**Contractor**
Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Samples and Tests: Type/ Ref | Samples and Tests: Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Strata: Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.20 | ES | | | (0.07) 0.07 | | Soft dark brown slightly sandy, slightly gravelly SILT. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse flint . Frequent rootlets. MADE GROUND |
| | | 0.50 | ES | | | (0.23) 0.30 | | |
| | | 0.60 | D | | | | | Soft greyish brown slightly gravelly . Slightly sandy SILT. Sand is fine to medium . Gravel is amgular to subrounded, fine to coarse flint with brick . Frequent rootlets MADE GROUND |
| | | 0.80 | ES | | | (0.70) 1.00 | | |
| | | 1.30 | | | | | | Soft to stiff, orangish brown slightly mottled light grey slightly sandy , slightly gravelly CLAY. Sand is fine . Gravel is angular to rounded, fine to coarse flint . Rare rootlets. LAMBETH GROUP |
| | | 1.80 | | | | (1.00) 2.00 | | Soft to firm, yellowish brown mottled light grey becoming yellowish brown slightly sandy CLAY. Sand is fine. LAMBETH GROUP |
| | | 2.30 | | | | (0.70) 2.70 | | Medium dense to dense, light yellowish brown, brown slightly gravelly silty/ clayey fine to coarse SAND. Sand is fine to medium. Occasional clay lenses. LAMBETH GROUP |
| | | 2.80 | | | | | | *Soft yellowish brown mottled light grey sandy CLAY (2.35 - 2.55m)* |
| | | 3.30 | | | | (2.30) 5.00 | | Medium dense to very dense, light grey SAND. Sand is fine to medium. Very rare clay lenses. LAMBETH GROUP |
| | | 3.80 | | | | | | *Light grey clayey SAND. (4.95 - 5.00m)* |
| | | 4.30 | | | | | | *End of Borehole at 5.00m* |
| | | 4.80 | | | | | | |

**Remarks**
Rootlets observed to 1.00m bgL.

**Method, Plant, Stability, Dimensions**
**0.00 - 5.00m** WS Premier 3

**Logger**
AN

**Checked By:** ML **Status:** FINAL

# Window Sampler

**WS105**

**Sheet 1 of 1**

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| WS | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-29 |

**Client**
Stonebond Ltd

**Consultant**
AS

**Contractor**
Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.10 | ES | | | (0.40) | | Dark grey slightly silty SAND . Sand is fine to coarse . Rare angular, fine to medium brick and clinker. MADE GROUND |
| | | 0.30 | ES | | | 0.40 | | |
| | | 0.70 | D | | | (0.60) | | Firm, orangish brown slightly sandy, slightly gravelly CLAY. Sand is fine . Gravel is angular to subangular, fine to coarse flint . LAMBETH GROUP |
| | | 0.80 | ES | | | 1.00 | | |
| | | 1.30 | | | | | | Firm to very stiff, reddish brown very slightly mottled light grey, fine to medium gravelly silty CLAY. Sand is fine. LAMBETH GROUP |
| | | 1.80 | | | | | | |
| | | 2.30 | | | | (2.60) | | |
| | | 2.87 | | | | | | |
| | | 3.30 | | | | | | |
| | | 3.80 | | | | 3.60 | | Stiff to very stiff, light reddish brown slightly mottled light grey slightly sandy CLAY . Sand is fine. LAMBETH GROUP |
| | | 4.20 | | | | (0.80) | | |
| | | 4.70 | | | | 4.40 | | Firm to stiff, light grey mottled reddish brown and yellowish brown slightly sandy CLAY . Sand is fine . LAMBETH GROUP |
| | | | | | | (0.60) | | *Soft orangish brown sandy CLAY (4.40 - 4.42m)* |
| | | | | | | 5.00 | | *End of Borehole at 5.00m* |

**Remarks**
Traces of root patterns to 4.70m bgl

**Method, Plant, Stability, Dimensions**
**0.00 - 5.00m** WS Premier 3

**Logger**
AN

**Checked By:** ML **Status:** FINAL

# Window Sampler

**WS106**

**Sheet 1 of 1**

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| WS | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-29 | 2025-07-29 |

**Client**
Stonebond Ltd

**Consultant**
AS

**Contractor**
Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.20 | ES | | | (0.20) 0.20 | | Soft dark brown slightly sandy SILT. Sand is fine to coarse with angular coarse brick . Frequent rootlets. MADE GROUND |
| | | 0.50 | ES | | | (0.80) | | Stiff, yellowish brown slightly sandy very desiccated CLAY. Rare angular coarse flint gravel and rootlets. LAMBETH GROUP |
| | | 0.70 0.80 | ES | | | 1.00 | | |
| | | 1.20 | | | | (1.00) | | Medium dense, brown silty/ clayey fine to coarse SAND. Sand is fine to medium. LAMBETH GROUP |
| | | 1.70 | | | | 2.00 | | |
| | | 2.20 | | | | (1.30) | | Firm to very stiff, light grey mottled yellowish brown slightly sandy CLAY. Sand is fine to coarse. LAMBETH GROUP<br>*Stiff light reddish brown sliglt mottled light grey slighlty sandy CLAY . Sand is fine. (2.35 - 2.55m)* |
| | | 2.70 | | | | 3.30 | | |
| | | 3.40 | | | | (1.30) | | Medium dense to very dense, light yellowish brown and light grey SAND. Sand is fine to medium. LAMBETH GROUP |
| | | 3.80 | | | | 4.60 | | |
| | | 4.30 | | | | (0.40) | | Stiff to very stiff, light grey slightly sandy CLAY. Sand is fine .Occasional sand lenses. LAMBETH GROUP |
| | | 4.80 | | | | 5.00 | | *End of Borehole at 5.00m* |

**Remarks**
Rootlets observed to 1.00m bgL.

**Method, Plant, Stability, Dimensions**
**0.00 - 5.00m** WS Premier 3

**Logger**
AN

**Checked By:** ML **Status:** FINAL

# Window Sampler

**WS107**

**Sheet 1 of 1**

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| WS | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-29 | 2025-07-29 |

**Client**
Stonebond Ltd

**Consultant**
AS

**Contractor**
Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.10 | | | | (0.15) 0.15 | | Soft dark brown slightly sandy SILT. Sand is fine to coarse . Frequent rootlets. TOPSOIL |
| | | 0.50 | | | | (0.45) 0.60 | | Firm, yellowish brown slightly sandy very desiccated CLAY. Rare rootlets. LAMBETH GROUP |
| | | 0.70 0.80 | | | | | | Firm, orangish brown mottled light grey, silty CLAY. Sand is fine. Rare rootlets. Rare sand lenses. LAMBETH GROUP |
| | | 1.30 | | | | (1.40) | | |
| | | 1.80 | | | | 2.00 | | Firm to stiff, light reddish brown mottled light grey slightly sandy CLAY. Sand is fine. Very rare decayed roots. LAMBETH GROUP |
| | | 2.30 | | | | (0.75) | | |
| | | 2.80 | | | | 2.75 | | Loose to dense, orangish brown slightly mottled light grey SAND. Sand is fine to coarse. Rare clay lenses. LAMBETH GROUP |
| | | 3.30 | | | | | | |
| | | 3.80 | | | | (2.25) | | |
| | | 4.30 | | | | | | *Firm reddish brown sandy CLAY (4.32 - 4.40m)* |
| | | 4.70 | | | | 5.00 | | *End of Borehole at 5.00m* |

**Remarks**
Decayed roots and impressions to 2.20m bgl

**Method, Plant, Stability, Dimensions**
**0.00 - 5.00m** WS Premier 3

**Logger**
AN

**Checked By:** ML **Status:** FINAL

# Window Sampler

**WS108**

**Sheet 1 of 1**

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| WS | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-29 | 2025-07-29 |

**Client**
Stonebond Ltd

**Consultant**
AS

**Contractor**
Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.20 | | | | (0.30) 0.30 | | Soft dark brown slightly sandy, slightly gravelly SILT. Sand is fine to medium . Gravel is angular to subangular, fine to coarse flint with fragments of chalk, brick, ceramic and clinker. MADE GROUND |
| | | 0.50 | | | | (0.40) | | Firm to stiff, greyish brown becoming light grey sandy CLAY. Sand is fine. Occasional rootlets. LAMBETH GROUP |
| | | 0.70 0.80 | | | | 0.70 | | Loose to medium dense, yellowish brown slightly mottled grey, slightly gravelly silty/ clayey fine to coarse SAND. LAMBETH GROUP |
| | | 1.20 | | | | (0.70) | | |
| | | 1.70 | | | | 1.40 | | Medium dense to dense, light grey slightly mottled yellowish brown SAND. Sand is fine to, medium. Rare clay lenses. LAMBETH GROUP |
| | | 2.20 | | | | (1.60) | | |
| | | 2.70 | | | | 3.00 | | Medium dense, yellowish brown slightly mottled light grey SAND. Sand is fine to medium. LAMBETH GROUP |
| | | 3.20 | | | | (1.60) | | |
| | | 3.70 | | | | 4.60 | | Firm, light grey mottled reddish brown CLAY. LAMBETH GROUP |
| | | 4.20 | | | | (0.40) | | *Soft light grey sandy CLAY. (4.85 - 4.90m)* |
| | | 4.80 | | | | 5.00 | | *End of Borehole at 5.00m* |

**Remarks**
Rootlets observed to 0.50m bgL.

**Method, Plant, Stability, Dimensions**
**0.00 - 5.00m** WS Premier 3

**Logger**
AN

**Checked By:** ML **Status:** FINAL

# Dynamic Probe

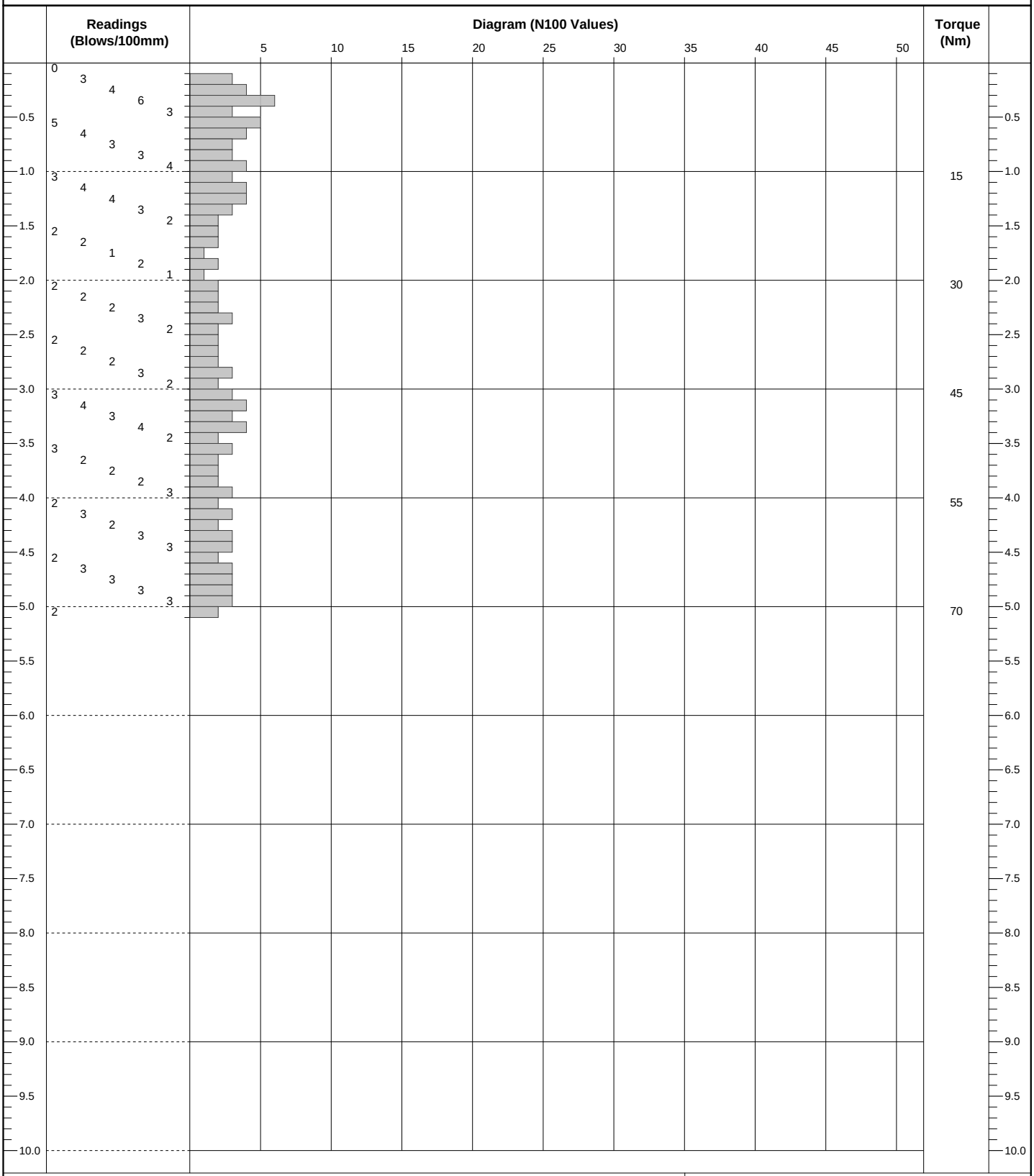
**DP101**

Sheet 1 of 1

| Probe Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| DPSH-B | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-28 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |




**Remarks**
Depth Achieved

**Method, Plant**

**Logger**

| | |
|---|---|
| **Hammer Weight (kg)** | 65.5 |
| **Hammer Drop (mm)** | |
| **Cone Diameter (mm)** | |
| **Cone Angle** | |
| **Rod Diameter (mm)** | |
| **Damper** | |

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Dynamic Probe

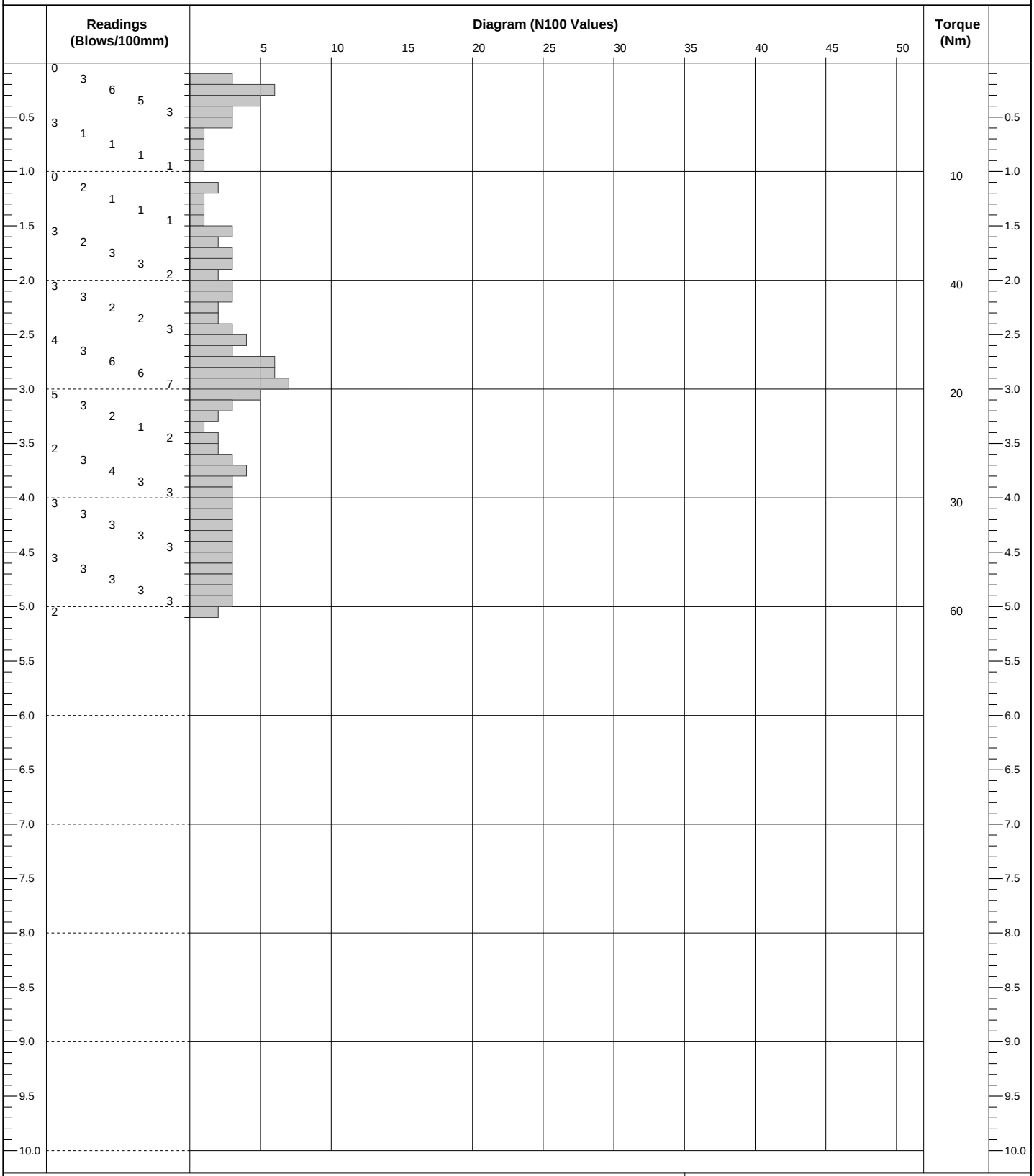
**DP102**

Sheet 1 of 1

| Probe Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| DPSH-B | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-28 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |




**Remarks**
Depth Achieved

**Method, Plant**

**Logger**

| | |
|---|---|
| **Hammer Weight (kg)** | 65.5 |
| **Hammer Drop (mm)** | |
| **Cone Diameter (mm)** | |
| **Cone Angle** | |
| **Rod Diameter (mm)** | |
| **Damper** | |

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Dynamic Probe

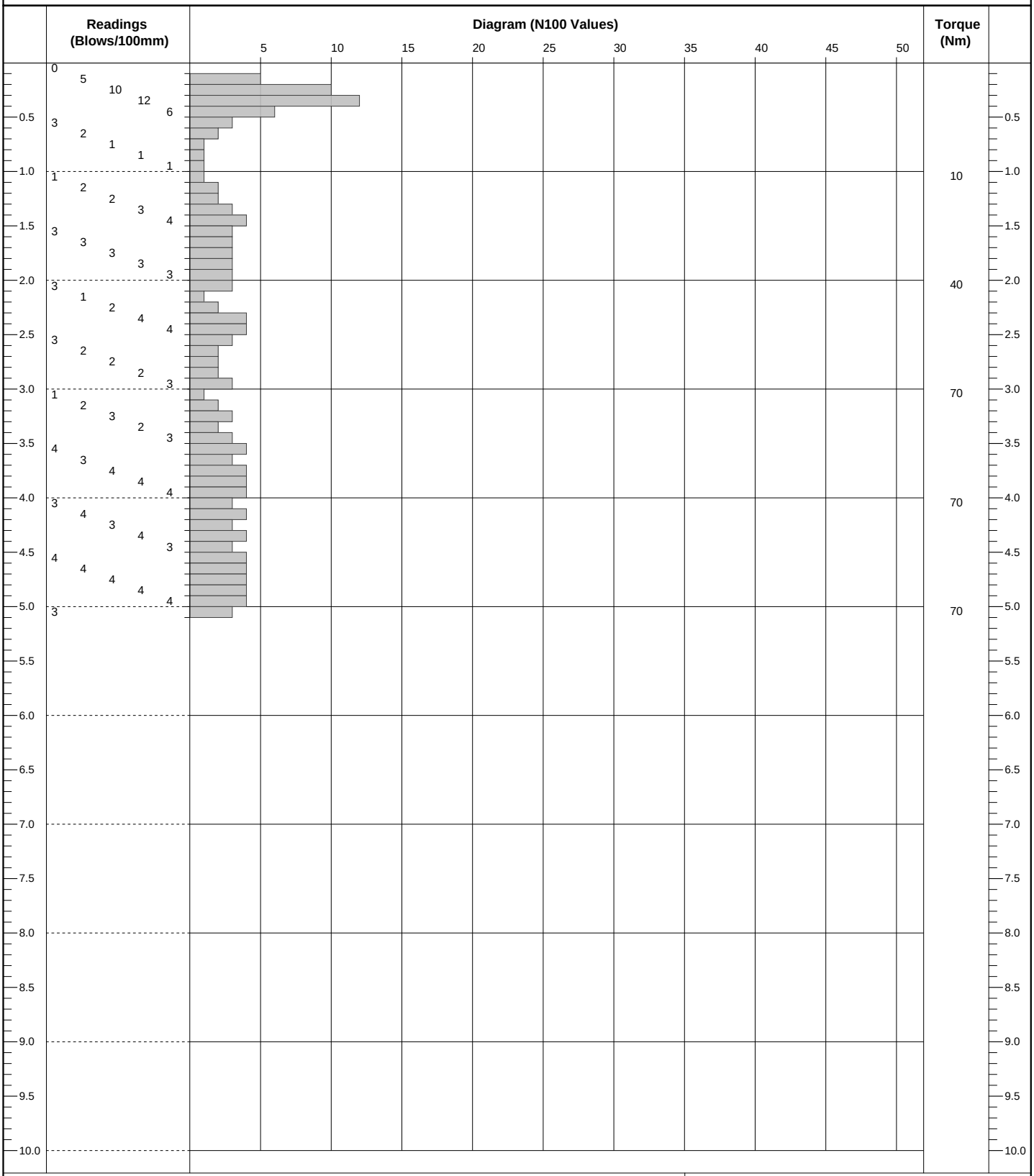
**DP103**

Sheet 1 of 1

| Probe Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| DPSH-B | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-28 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |




**Remarks**
Depth Achieved

**Method, Plant**

**Logger**

| | |
|---|---|
| **Hammer Weight (kg)** | 65.5 |
| **Hammer Drop (mm)** | |
| **Cone Diameter (mm)** | |
| **Cone Angle** | |
| **Rod Diameter (mm)** | |
| **Damper** | |

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Dynamic Probe

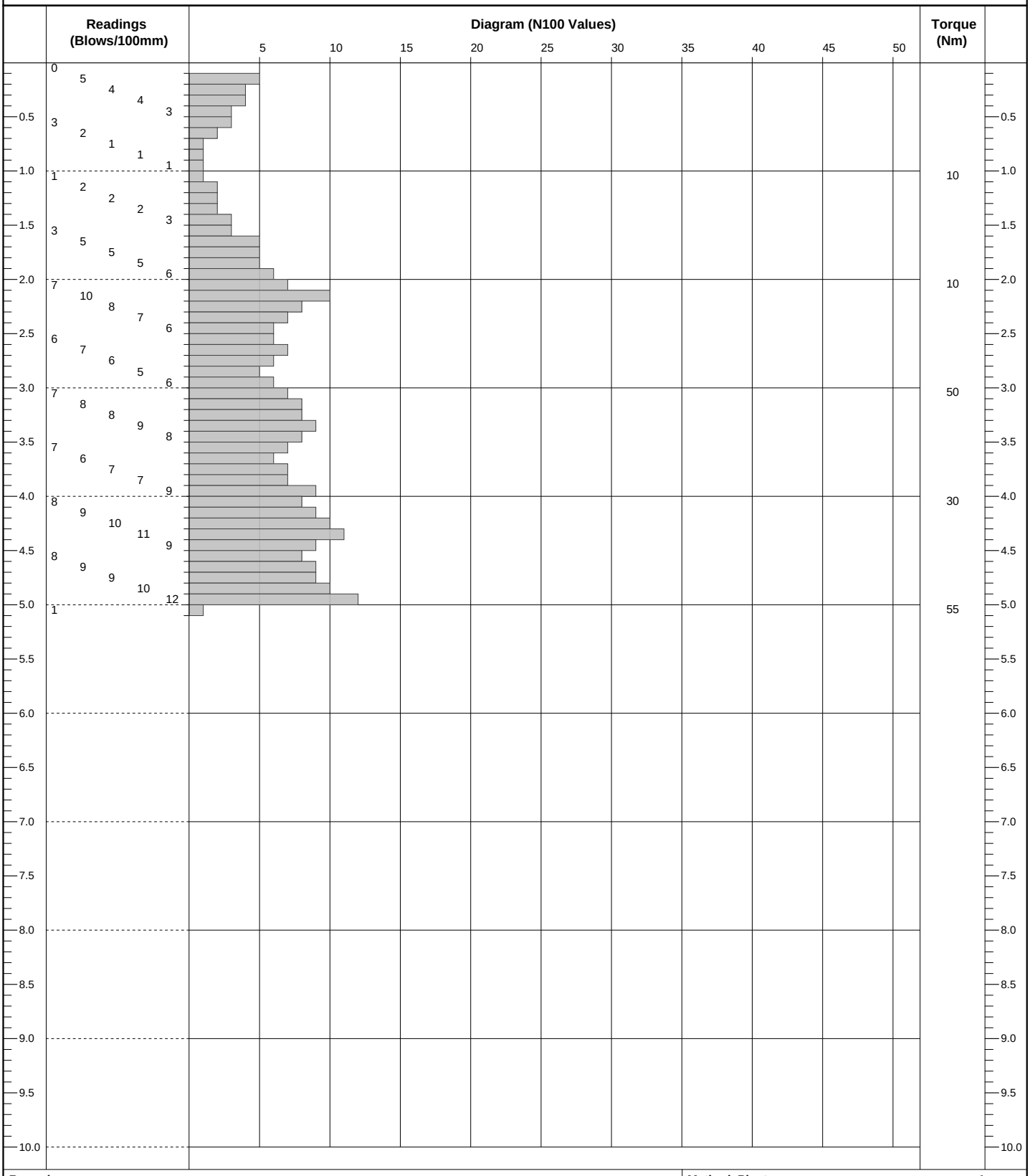
**DP104**

Sheet 1 of 1

| Probe Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| DPSH-B | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-28 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |




**Remarks**
Depth Achieved

**Method, Plant**

**Logger**

| | |
|---|---|
| **Hammer Weight (kg)** | 65.5 |
| **Hammer Drop (mm)** | |
| **Cone Diameter (mm)** | |
| **Cone Angle** | |
| **Rod Diameter (mm)** | |
| **Damper** | |

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Dynamic Probe

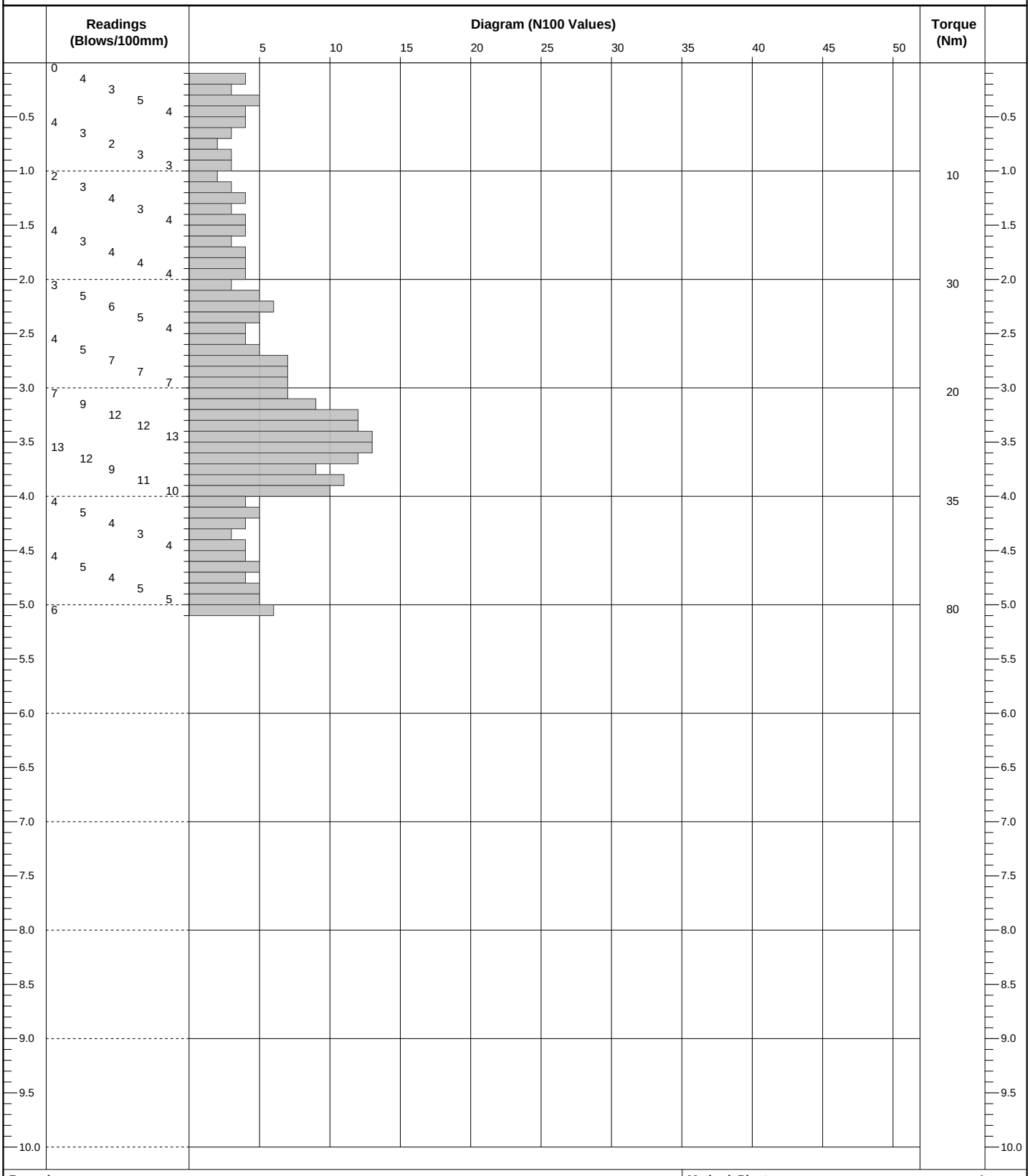
**DP105**

Sheet 1 of 1

| Probe Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| DPSH-B | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-28 | 2025-07-29 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |




**Remarks**
Depth Achieved

**Method, Plant** **Logger**

| | |
|---|---|
| **Hammer Weight (kg)** | 65.5 |
| **Hammer Drop (mm)** | |
| **Cone Diameter (mm)** | |
| **Cone Angle** | |
| **Rod Diameter (mm)** | |
| **Damper** | |

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Dynamic Probe

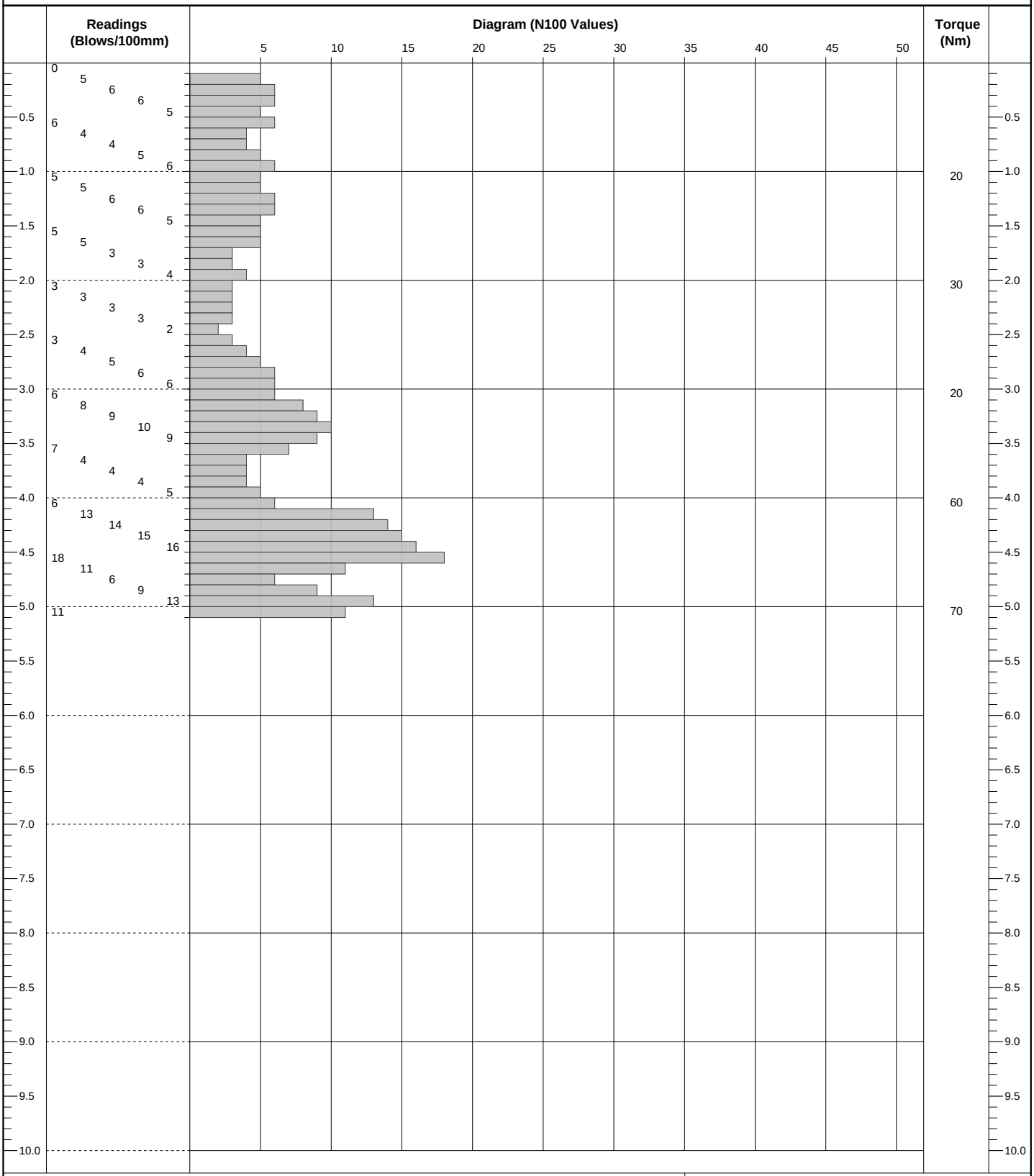
**DP106**

Sheet 1 of 1

| Probe Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| DPSH-B | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-29 | 2025-07-29 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |




**Remarks**
Depth Achieved

**Method, Plant**

**Logger**

| | |
|---|---|
| **Hammer Weight (kg)** | 65.5 |
| **Hammer Drop (mm)** | |
| **Cone Diameter (mm)** | |
| **Cone Angle** | |
| **Rod Diameter (mm)** | |
| **Damper** | |

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Dynamic Probe

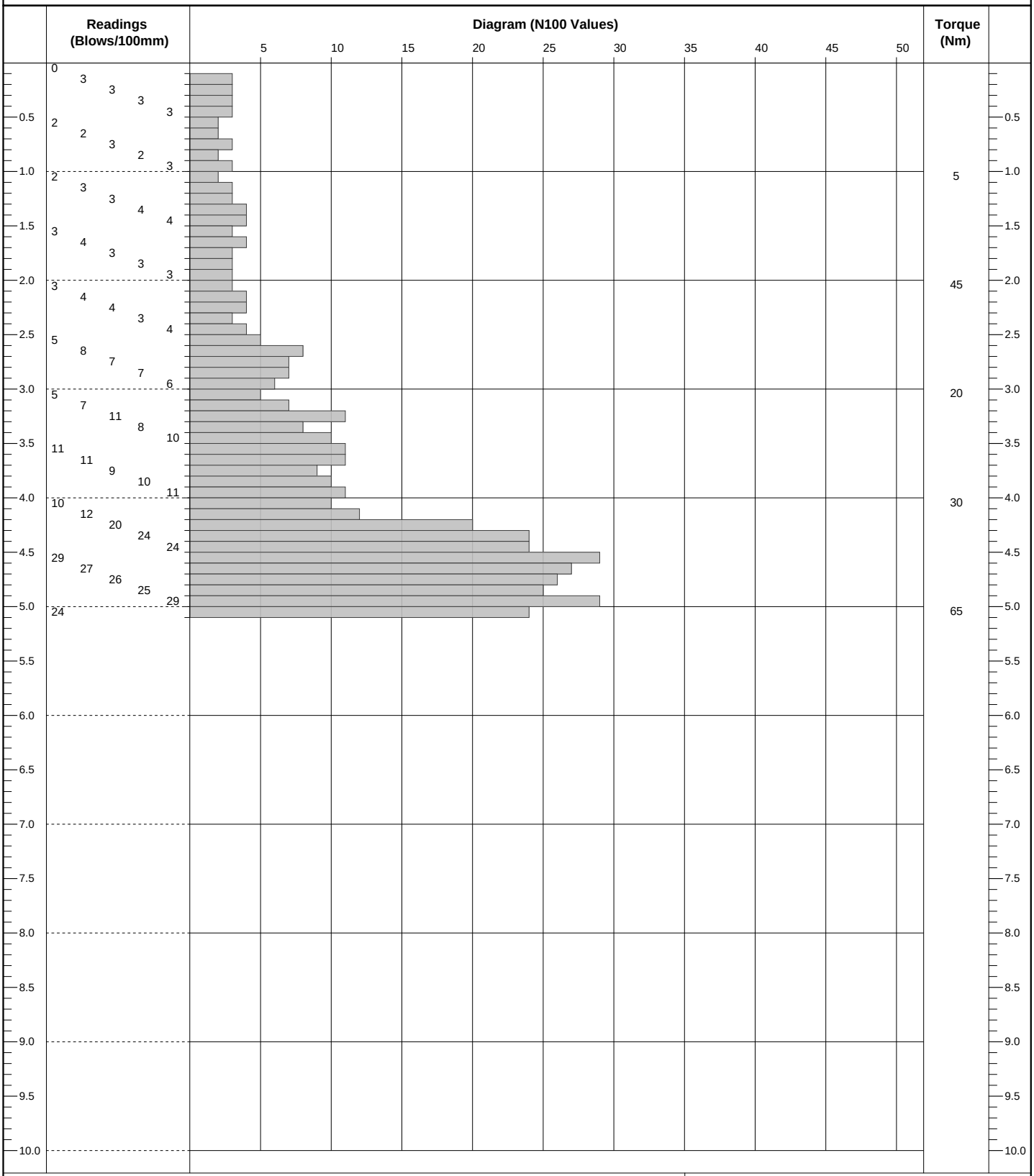
**DP107**

Sheet 1 of 1

| Probe Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| DPSH-B | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-29 | 2025-07-29 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |




**Remarks**
Depth Achieved

**Method, Plant** **Logger**

| | |
|---|---|
| **Hammer Weight (kg)** | 65.5 |
| **Hammer Drop (mm)** | |
| **Cone Diameter (mm)** | |
| **Cone Angle** | |
| **Rod Diameter (mm)** | |
| **Damper** | |

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Dynamic Probe

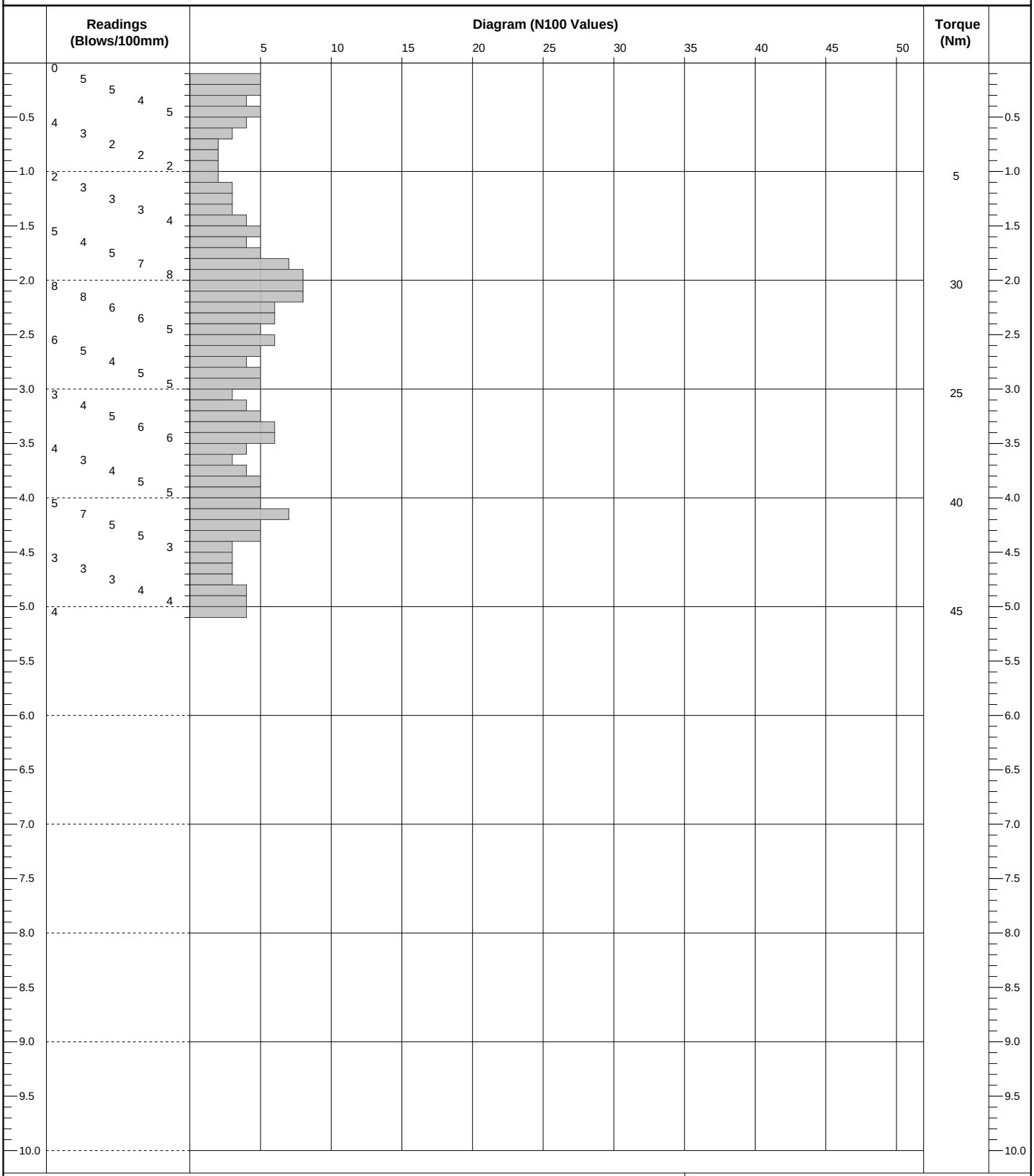
**DP108**

Sheet 1 of 1

| Probe Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| DPSH-B | | | | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Grange | 22035 | 2025-07-29 | 2025-07-29 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |




**Remarks**
Depth Achieved

**Method, Plant** **Logger**

| | |
|---|---|
| **Hammer Weight (kg)** | 65.5 |
| **Hammer Drop (mm)** | |
| **Cone Diameter (mm)** | |
| **Cone Angle** | |
| **Rod Diameter (mm)** | |
| **Damper** | |

**Checked By:** ML **Status:** FINAL

Created using Pebble Geo

# Cable Percussion Log

**BH101**



| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| CP | | | 20.00 | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Garage | 22035 | 2025-07-28 | 2025-07-28 |

| Client | Consultant | Contractor |
|---|---|---|
| Stonebond Ltd | AS | Soils Limited |

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 0.50 | B 1 | | | (1.00) | | Soft reddish brown mottled light grey slightly sandy, slightly silty CLAY. Sand isa fine . Occasional rootlets and roots. TOPSOIL |
| | | 1.00 | D 2 | | 19.00 | 1.00 | | Firm, grey slightly sandy CLAY. Sand is fine. Occasional rootlets. LAMBETH GROUP |
| | | 1.50 | SPT | N=7 (1,1/2,1,2,2) | | (0.90) | | |
| | | 2.00 | SPT | N=16 (1,1/2,2,5,7) | 18.10 | 1.90 | | Stiff, red, grey, and yellowish brown mottled silty fissured CLAY. Occasional rootlets becoming traces of former rootlets with depth. Occasional inclusions of red weak mudstone lithorelics. Occasionally with fine sand. LAMBETH GROUP |
| | | 2.00 | D 3 | | | | | |
| | | 2.50 | B 4 | | | | | |
| | | 3.00 | D 5 | | | | | |
| | | 3.50 | SPT | N=15 (2,3/3,4,4,4) | | | | |
| | | 4.00 | D 6 | | | (4.10) | | |
| | | 4.50 | SPT | N=25 (3,4/5,7,7,6) | | | | |
| | | 5.00 | D 7 | | | | | *Grey SAND. Sand is fine to medium (5.00 - 6.00m)* |
| | | 6.00 | SPT | N=29 (4,5/7,7,7,8) | 14.00 | 6.00 | | Very stiff reddish brown mottled light grey becoming grey mottled reddish brown slightly silty CLAY. LAMBETH GROUP |
| | | 6.00 | D 8 | | | | | |
| | | 7.00 | D 9 | | | | | |
| | | 7.50 | U 10 | | | | | |
| | | 8.00 | D 11 | | | (14.00) | | |
| | | 9.00 | SPT | N=39 (5,7/7,9,10,13) | | | | |
| | | 9.00 | D 12 | | | | | |

*Continued on next page*

**Remarks**

**Method, Plant, Stability, Dimensions**

**0.00 - 20.00m** CP Dando 2000

**Logger**

AN

**Checked By:** ML **Status:** FINAL

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

# Cable Percussion Log

**BH101**
**Sheet 2 of 2**

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| CP | | | 20.00 | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Garage | 22035 | 2025-07-28 | 2025-07-28 |

**Client** Stonebond Ltd
**Consultant** AS
**Contractor** Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 10.00 | D 13 | | | | | As previous page. |
| | | 10.00 | B 14 | | | | | |
| | | 10.50 | SPT | N=42 (5,6/8,10,11,13) | | | | |
| | | 11.00 | D 15 | | | | | |
| | | 12.00 | SPT | N=45 (5,6/8,10,13,14) | | | | |
| | | 12.00 | D 16 | | | | | |
| | | 13.00 | D 17 | | | | | |
| | | 13.50 | U 18 | | | | | |
| | | 14.00 | D 19 | | | | | |
| | | 15.00 | SPT | N=48 (5,7/8,11,13,16) | | | | |
| | | 15.00 | D 20 | | | | | |
| | | 15.50 | B 21 | | | | | |
| | | 16.00 | D 22 | | | | | |
| | | 16.50 | SPT | N=50 (7,9/11,15,18,6) | | | | |
| | | 17.00 | D 23 | | | | | |
| | | 18.00 | SPT | N=50 (7,9/12,16,18,4) | | | | |
| | | 18.00 | D 24 | | | | | |
| | | 19.00 | D 25 | | | | | |
| | | 19.50 | U 26 | | | | | |
| | | 19.90 | D 27 | | | | | |
| | | 20.00 | D 28 | | 0.00 | 20.00 | | *End of Borehole at 20.00m* |

**Remarks**

**Method, Plant, Stability, Dimensions**
**0.00 - 20.00m** CP Dando 2000

**Logger** AN

**Checked By:** ML **Status:** FINAL

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

# Cable Percussion Log

**BH102**



| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| CP | | | 20.00 | 1:50 |

| Project Name | Project No. | Start Date | End Date |
|---|---|---|---|
| Padnell Garage | 22035 | 2025-07-29 | 2025-07-29 |

**Client** Stonebond Ltd

**Consultant** AS

**Contractor** Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | 19.90 | (0.10) 0.10 | | Brick and Concrete. |
| | | 0.30 | B 1 | | | (0.60) | | Soft greenish grey slightly sandy CLAY. Sand is fine. Occasional rootlets. LAMBETH GROUP |
| | | | | | 19.30 | 0.70 | | Firm to stiff, brown mottled grey slightly sandy, slightly silty CLAY. Sand is fine to medium. LAMBETH GROUP |
| | | 1.00 | B 2 | | | | | |
| | | 1.50 | SPT | N=11 (1,1/2,4,2,3) | | (1.70) | | |
| | | 1.50 | B 3 | | | | | |
| | | 2.00 | D 4 | | | | | |
| | | | | | 17.60 | 2.40 | | |
| | | 2.50 | SPT | N=12 (2,2/2,3,3,4) | | | | Stiff to very stiff reddish brown mottled light grey slightly sandy CLAY. LAMBETH GROUP |
| | | 3.00 | D 5 | | | | | |
| | | 3.50 | U 6 | | | | | |
| | | 4.00 | SPT | N=28 (4,5/6,7,7,8) | | | | |
| | | 4.00 | D 7 | | | | | |
| | | 4.00 | B 8 | | | | | |
| | | 5.00 | D 9 | | | | | |
| | | 6.00 | SPT | N=34 (5,6/8,8,9,9) | | (12.60) | | |
| | | 6.00 | D 10 | | | | | |
| | | 7.00 | D 11 | | | | | |
| | | 7.50 | SPT | N=42 (5,6/8,10,12,12) | | | | |
| | | 8.00 | B 12 | | | | | |
| | | 9.00 | SPT | N=50 (4,6/10,12,14,14) | | | | |
| | | 9.00 | D 13 | | | | | |

*Continued on next page*

**Remarks**

**Method, Plant, Stability, Dimensions**
**0.00 - 20.00m** CP Dando 2000

**Logger** AN

**Checked By:** ML **Status:** FINAL

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

# Cable Percussion Log

**BH102**
**Sheet 2 of 2**

| Hole Type | Easting | Northing | Ground Level (m) | Scale |
|---|---|---|---|---|
| CP | | | 20.00 | 1:50 |
| **Project Name** | | **Project No.** | **Start Date** | **End Date** |
| Padnell Garage | | 22035 | 2025-07-29 | 2025-07-29 |

**Client** Stonebond Ltd
**Consultant** AS
**Contractor** Soils Limited

| Inst/ Backfill | Water Levels | Samples and Tests: Depth (m) | Type/ Ref | Results | Level (m) | Depth (thickness) (m) | Strata: Legend | Description |
|---|---|---|---|---|---|---|---|---|
| | | 10.00 | D 14 | | | | | As previous page. |
| | | 10.50 | U 15 | | | | | |
| | | 10.95 | D 16 | | | | | |
| | | 12.00 | SPT | N=49 (5,7/10,12,13,14) | | | | |
| | | 12.00 | D 17 | | | | | |
| | | 13.00 | D 18 | | | | | |
| | | 13.50 | SPT | N=48 (5,6/9,11,13,15) | | | | |
| | | 14.00 | D 19 | | | | | |
| | | 15.00 | SPT | N=50 (6,8/11,13,16,10) | 5.00 | 15.00 | | Very stiff grey slightly mottled reddish brown slightly silty CLAY. LAMBETH GROUP |
| | | 15.00 | D 20 | | | | | |
| | | 15.00 | B 21 | | | | | |
| | | 16.00 | D 22 | | | | | |
| | | 16.00 | U 23 | | | | | |
| | | | | | | (3.00) | | |
| | | 17.00 | D 24 | | | | | |
| | | 18.00 | SPT | N=38 (5,7/8,9,9,12) | 2.00 | 18.00 | | Very stiff grey slightly mottled reddish brown slightly sandy CLAY. LAMBETH GROUP |
| | | 18.00 | D 25 | | | | | |
| | | 19.00 | D 26 | | | (2.00) | | |
| | | 19.50 | SPT | N=42 (5,8/8,10,12,12) | | | | |
| | | 20.00 | D 27 | | 0.00 | 20.00 | | *End of Borehole at 20.00m* |

**Remarks**

**Method, Plant, Stability, Dimensions** — **Logger**
**0.00 - 20.00m** CP Dando 2000 — AN

**Checked By:** ML **Status:** FINAL

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Created using Pebble Geo

# Appendix C Geotechnical In-Situ and Laboratory Testing

## Appendix C.1 Classification

***Classification based on SPT "N" values:***
The inferred undrained strength of the cohesive soils was based on the SPT "N" blow counts, derived from the relationship suggested by Stroud (1974) and classified using Table C.1.1. (Ref: Stroud, M. A. 1974, "The Standard Penetration Test – its application and interpretation", Proc. ICE Conf. on Penetration Testing in the UK, Birmingham. Thomas Telford, London.).

### Table C.1.1 SPT "N" Blow Count Cohesive Classification

| Classification | Undrained Cohesive Strength $C_u$ (kPa) |
|---|---|
| Extremely low | <10 |
| Very low | 10 – 20 |
| Low | 20 – 40 |
| Medium | 40 – 75 |
| High | 75 – 150 |
| Very high | 150 – 300 |
| Extremely high | > 300 |

**Note(s):** (Ref: BS EN ISO 14688-2:2004+A1:2013 Clause 5.3.)

The relative density of granular soils was classified based of the relationship given in Table C.1.2.

The *UK National Annex to Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing, NA 3.7 SPT test, BS EN 1997-2:2007, Annex F* states "Relative density descriptions on borehole records should also be based on uncorrected SPT N values, unless significantly disturbed, using the density classification in BS 5930:2015, Table 7.

### Table C.1.2 SPT "N" Blow Count Granular Classification

| Classification | SPT "N" blow count (blows/300mm) |
|---|---|
| Very loose | 0 to 4 |
| Loose | 4 to 10 |
| Medium dense | 10 to 30 |
| Dense | 30 to 50 |
| Very dense | Greater than 50 |

**Note(s):** (Ref: The Standard Penetration Test (SPT): Methods and Use, CIRIA Report 143, 1995)

## Appendix C.2 Interpretation

### Table C.2.1 Interpretation of SPT Tests

| BH | Strata | SPT N60 Blow Counts | Inferred Cohesive Strength |
|---|---|---|---|
| BH101 | LMBE<br>1.50-20.00<br>Slight sandy silty CLAY | 7-50 | Low to very high<br>(Cu = 35 - 250kPa) |
| BH102 | LMBE<br>1.50-20.00<br>Slight sandy silty CLAY | 11-50 | Medium to very high<br>(Cu = 55 - 250kPa) |

### Table C.2.2 Interpretation of DPSH Blow Counts

| DP | Strata | Equivalent SPT N60 Blow Counts | Inferred Cohesive Strength/Granular Density |
|---|---|---|---|
| DP101 | LMBE<br>0.30-1.40<br>Slightly sandy CLAY | 13-26 | Medium to high<br>($C_u$ = 65 – 130kPa) |
| | LMBE<br>1.40-5.00<br>Slightly sandy CLAY | 4-17 | Low to high<br>($C_u$ = 20 – 85kPa) |
| DP102 | LMBE<br>0.50-2.65<br>Slightly sandy CLAY | 0-17 | Extremely low to high<br>($C_u$ = <10 – 85kPa) |
| | LMBE<br>2.65-3.35<br>SAND | 9-30 | Loose to medium dense |
| | LMBE<br>3.20-3.60<br>Slightly sandy CLAY | 4-9 | Low to medium<br>($C_u$ = 20 – 45kPa) |
| | LMBE<br>3.70-5.00<br>Slightly sandy CLAY | 13-17 | Medium to high<br>($C_u$ = 65 – 85kPa) |
| DP103 | LMBE<br>0.50-5.00<br>Slightly sandy CLAY | 4-17 | Low to high<br>($C_u$ = 20 – 85kPa) |
| DP104 | LMBE<br>0.30-2.00<br>Slightly sandy CLAY | 4-26 | Low to high<br>($C_u$ = 20 – 130kPa) |
| | LMBE<br>2.00-5.00<br>SAND | 26-52 | Medium to very dense |
| DP105 | LMBE<br>0.40-3.10<br>Slightly sandy CLAY | 9-30 | Medium to high<br>($C_u$ = 45 – 150kPa) |
| | LMBE<br>3.10-4.00<br>Slightly sandy CLAY | 39-56 | Very high<br>($C_u$ = 195 – 280kPa) |

| DP | Strata | Equivalent SPT N60 Blow Counts | Inferred Cohesive Strength/Granular Density |
|---|---|---|---|
| | LMBE<br>4.00-5.00<br>Slightly sandy CLAY | 13-26 | Medium to high<br>($C_u$ = 65 – 130kPa) |
| DP106 | LMBE<br>0.20-1.00<br>Slightly sandy CLAY | 17-26 | High<br>($C_u$ = 85 – 130kPa) |
| | LMBE<br>1.00-2.00<br>SAND | 13-26 | Medium dense |
| | LMBE<br>2.00-3.30<br>Slightly sandy CLAY | 9-39 | Medium to very high<br>($C_u$ = 45 – 195kPa) |
| | LMBE<br>3.30-4.60<br>SAND | 17->50 | Medium dense to very dense |
| | LMBE<br>4.60-5.00<br>Slightly sandy CLAY | 26-56 | High to very high<br>($C_u$ = 130 – 280kPa) |
| DP107 | LMBE<br>0.20-2.75<br>Slightly sandy CLAY | 9-35 | Medium to very high<br>($C_u$ = 45 – 175kPa) |
| | LMBE<br>2.75-5.00<br>SAND | 22 - >50 | Medium dense to very dense |
| DP108 | LMBE<br>0.30-0.70<br>Sandy CLAY | 13-22 | Medium to high<br>($C_u$ = 65 – 110kPa) |
| | LMBE<br>0.70-4.60<br>SAND | 9-35 | Loose to dense |
| | LMBE<br>4.60-5.00<br>CLAY | 13-17 | Medium to high<br>($C_u$ = 65 – 85kPa) |

## Table C.2.3 Interpretation of Atterberg Limit Tests

| Stratum | M/C (%) | PI (%) | >425µm (%) | Mod PI (%) | Class | VCP | |
|---|---|---|---|---|---|---|---|
| | | | | | | BRE | NHBC |
| LMBE | 12.7-28.8 | 15-58 | 72-100 | 15-58 | CI to CV | Low to high | Low to high |

**Note(s):** BRE Volume Change Potential refers to BRE Digest 240 (based on Atterberg results). VCP=Volume Change Potential
NHBC Volume Change Potential refers to NHBC Standards Chapter 4.2
Soils Classification based on British Soil Classification System
The Atterberg Limit Tests were undertaken in accordance with BS 1377:Part 2:1990 Clauses 3.2, 4.3 and 5

## Table C.2.4 Interpretation of PSD Tests

| Location | Depth (m bgl) | Soil Description | VCP | | >63µm Sieve (%) |
|---|---|---|---|---|---|
| | | | BRE | NHBC | |
| WS104 | 2.40 | Brown slightly gravelly silty/ clayey fine to coarse SAND | Yes | No | 25 |
| WS106 | 1.70 | Brown silty/ clayey fine to coarse SAND | Yes | No | 25 |
| WS108 | 1.20 | Brown slightly gravelly silty/ clayey fine to coarse SAND | No | No | 15 |

**Note(s):** (The Particle Size Distribution Tests were undertaken in accordance with BS 1377: Part 2: 1990 Clause 9).
VCP=Volume Change Potential

## Appendix C.3 Geotechnical In-Situ and Laboratory Results

# Laboratory Report

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES A PHENNA GROUP COMPANY

## Contract Number: 80245

Client Ref: **22035**
Client PO: **22035/AS**

Date Received: **08-08-2025**
Date Completed: **28-08-2025**
Report Date: **28-08-2025**

Client: **Soils Limited**

This report has been checked and approved by:

Contract Title: **Padnell Grange, Padnell Road, Cowplain, Hampshire, PO8 8ED**
For the attention of: **Alex Stratford**

B. Evans

**Brendan Evans**
Senior Office Administrator

| Description | Qty |
|---|---|
| **Determination of water content**<br>BS EN ISO 17892-1:2014 - @ Non Accredited Test | 5 |
| **1 point Liquid & Plastic Limit..**<br>BS EN ISO 17892-12 - * UKAS | 5 |
| **Particle Size Distribution**<br>BS EN ISO 17892-4 : 5.1 - * UKAS | 3 |

**Notes:** **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
**# - denotes test carried out by approved contractor**
**@ - denotes non accredited tests**

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

**Approved Signatories:**
Brendan Evans (Senior Office Administrator) - Brendan Evans (Business Support Co-ordinator) - Darren Bourne (Quality Senior Technician)
Paul Evans (Director) - Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager)
Shaun Thomas (Site Manager) - Wayne Honey (HR & HSE Manager)

GEO Site & Testing Services Ltd
Unit 3-4 Heol Aur, Dafen Ind Est, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784 040 Fax: 01554 784 040 info@gstl.co.uk https://gstl.co.uk

| GSTL GEOTECHNICAL SITE & TESTING LABORATORIES | **WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX**<br>**BS EN ISO 17892-12:2018+A2:2022 1 Point Liquid Limit**<br>**BS EN ISO 17892-1:2014+A1:2022 Determination of Water Content** | |
|---|---|---|
| Contract Number | 80245 | |
| Project Name | Padnell Grange, Padnell Road, Cowplain, Hampshire, PO8 8ED | |
| Date Tested | 27/08/2025 | |
| | **DESCRIPTIONS** | |

| Sample/Hole Reference | Sample Number | Sample Type | Depth (m) | | | Descriptions |
|---|---|---|---|---|---|---|
| WS101 | | D | 0.80 | - | | Red/brown/grey silty CLAY |
| WS102 | | D | 1.40 | - | | Grey silty CLAY |
| WS103 | | D | 2.20 | - | | Brown sandy silty CLAY |
| WS105 | | D | 1.30 | - | | Brown fine to medium gravelly silty CLAY |
| WS107 | | D | 0.70 | - | | Brown silty CLAY |
| | | | | - | | |
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| Operator |
|---|
| Aaron Hodge |

| GSTL GEOTECHNICAL SITE & TESTING LABORATORIES | WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX<br>BS EN ISO 17892-12:2018+A2:2022 1 Point Liquid Limit<br>BS EN ISO 17892-1:2014+A1:2022 Determination of Water Content | |
|---|---|---|
| Contract Number | 80245 | |
| Project Name | Padnell Grange, Padnell Road, Cowplain, Hampshire, PO8 8ED | |
| Date Tested | 27/08/2025 | |
| Test Comments | 80g/30° Fall cone used | |

| Sample/Hole Reference | Sample Number | Sample Type | Depth (m) | | | Water Content % | Liquid Limit % | Plastic Limit % | Plasticity index % | Passing 0.425mm % | Factor Applied | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WS101 | | D | 0.80 | - | | 12.7 | 48 | 17 | 31 | 100 | 1.033 | CI Intermediate Plasticity |
| WS102 | | D | 1.40 | - | | 28.8 | 82 | 24 | 58 | 100 | 1.022 | CV Very High Plasticity |
| WS103 | | D | 2.20 | - | | 22.2 | 35 | 20 | 15 | 100 | 1.027 | CL/I Low/Inter. Plasticity |
| WS105 | | D | 1.30 | - | | 27.7 | 42 | 17 | 25 | 72 | 1.000 | CI Intermediate Plasticity |
| WS107 | | D | 0.70 | - | | 16.7 | 48 | 20 | 28 | 100 | 1.016 | CI Intermediate Plasticity |
| | | | | - | | | | | | | | |
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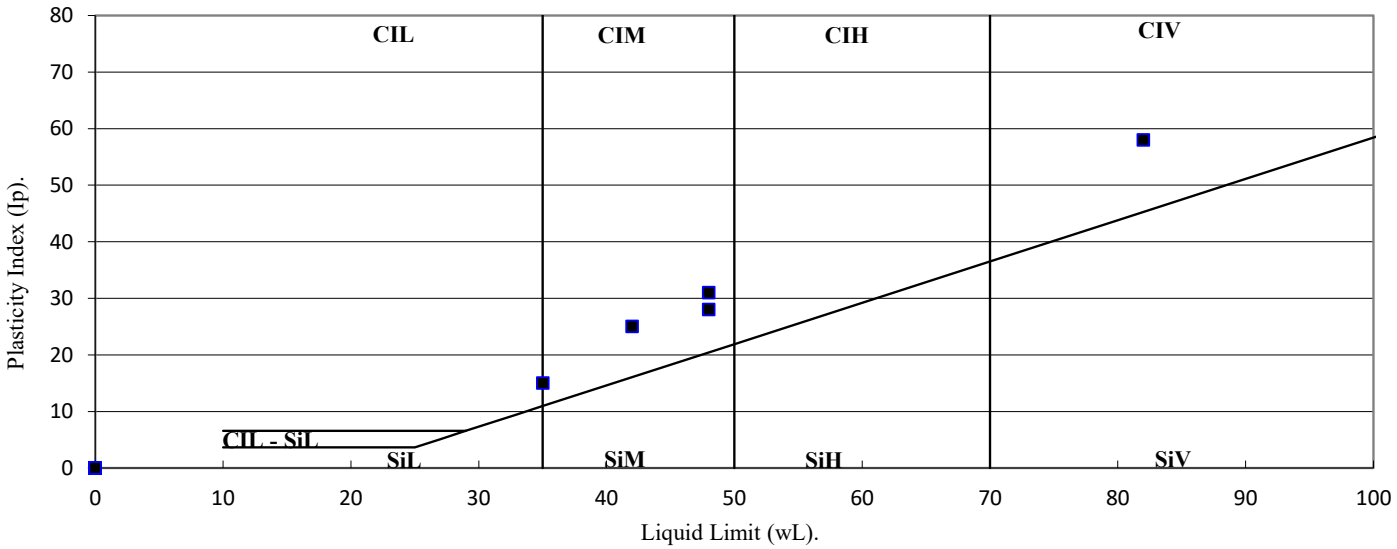
**SYMBOLS : NP = Non Plastic**

**PLASTICITY CHART**
**BS EN ISO 14688-2:2018 Clause 4.4**




***For sample descriptions please see sample descriptions sheet**

| Operator |
|---|
| Aaron Hodge |