

029/5088/AG/ASw

27th August 2026



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Dear George

Royal Victoria Court, Mendalgief Road, Newport – (Foundation Works Risk Assessment)

Further to your recent request this foundation works risk assessment has been produced in line with current guidance published by CL:AIRE¹ to allow assessment of the risk of contamination to groundwater from residual contamination in the made ground during installation of piled foundations.

Background

The site is located off Mendalgief Road, approximately 1km south of Newport town centre, and currently comprises a single parcel of derelict land. The site's location is shown on Drawing 5088/1 presented in Appendix A to this letter report.

Lithos have produced the following reports for the site which included a review of third-party reports, the site's history and environmental setting, and a ground investigation comprising 9 trial pits and 3 cable percussive boreholes together with monitoring for hazardous gas.

- 'Geoenvironmental Appraisal Report for land at Royal Victoria Court, Mendalgief Road, Newport, South Wales', Lithos Report No. 5088/1, dated January 2025.
- Hazardous Gas Risk Assessment, Lithos letter ref. 020/5088/REG/jr, dated 30th April 2025.

The above reports should be read in conjunction with this letter report.

Proposed Development and planning

It is understood that consideration is being given to redevelopment of the site with a 66 bed, 3 storey 'C' shaped care home with associated landscaping, parking and area of public open space (POS).

A site layout has been provided by LNT Construction (Drawing reference NP20 2NW-F-01, dated March 2024) which is reproduced as Drawing 5088/2 in Appendix A to this letter report

It is understood that the site has planning permission (Application Reference 25/0375, dated January 2026) with conditions applied to the proposed development.

¹ 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention', published by CL:AIRE, March 2025



Specifically related to foundations, Condition 19 of the Decision Notices states:

"No piling or other penetrative foundation works shall be carried out unless otherwise approved in writing by the Local Planning Authority. Any request for such approval shall be supported by sufficient information to demonstrate that the proposed method would not result in an unacceptable risk to groundwater. The development shall only be carried out in accordance with the approved details thereafter".

"Reason: To prevent pollution of controlled waters from inappropriate penetrative methods, in accordance with Policy GP2, GP5 and GP7 of the NLDP 2011-2026 (adopted January 2015)".

As such, the following comprises a review of the ground conditions and contamination identified at the site with recommendations for appropriate mitigation measures, where appropriate, to allow discharge of Condition 19.

Previous remediation.

The site has been subject to previous investigation and remedial works as discussed in Section 5 of Lithos Report 5088/1. Most notably, with respect to contamination, remedial works comprised:

- Excavation of contaminated soil hotspots as described by Arup (this includes the former gas plant (BH05), footprint of Bay 8, and the excavation of soils within the waste pit in Bay 7 which are located within the current red line boundary).
- Validation testing of all excavations.
- Design and construct a fully contained temporary ex-situ bioremediation soil windrow treatment facility with a capacity to treat approximately 8,000m², including a contingency to treat a further volume if necessary.
- Ex-situ bioremediation of soils to meet required re-use specifications.
- Design and construct a suitable water treatment system to treat shallow groundwater (perched water) contamination.
- Soil stabilisation and/or off-site disposal of untreatable or difficult to treat soils.

On completion of the remedial works the following verification report was produced and issued by Celtic enGlobe in June 2017.

- Factual Remediation Verification Report Version 2 (Ref. R1664/17/4768).

The above verification report details all the remediation works, verification testing and treatment activities undertaken in line with the above remediation strategy (Report 5). Any agreed alterations, details of unexpected ground/contamination and results of all validation tests are also included.

The verification report covers both the wider site and the area within the current red line boundary of the proposed care home.

Whole site chemical remediation target concentration values for site-won re-use material were agreed with Newport City Council and Natural Resources Wales as part of the regulatory consultation for discharge of relevant planning conditions.

With respect to controlled waters, this report suggests that the excavation and remedial treatment of made ground contamination would ensure that any ongoing sources of groundwater contamination would be removed.

A total of 345 samples of soil from turnover material were analysed, 11 of which failed the remedial targets, however, after further assessment the mean value of soil contamination concentrations were significantly below the remedial targets and therefore these were not considered significant.

A total volume of 274,345m³ of soils were excavated and turned over during the remediation works (including hotspot areas). Of this, 5,175m³ of soils were quarantined to undergo further bioremediation treatment.

A total of 9,804m³ of perched water was treated by the Celtic treatment system and discharged via the foul sewer network. Monthly samples pre & post treatment were collected for analysis.

Contaminated perched groundwater encountered in excavations and any water leaching from the biopiles during treatment was pumped to a temporary retention lagoon and then into the water treatment system.

Verification soil samples recovered from the turnover and backfilled cells were taken on a 25m x 25m grid across the site. Samples from the side walls and base of hotspot removal areas confirmed that the backfilled materials to the Final Remediation Level met the remediation requirements of the strategy.

It was considered that remediation works were successfully carried out in accordance with the remediation strategy and subsequent agreements with Newport City Council and Natural Resources Wales. The works removed and identified all contamination sources and turnover of soils was completed to a minimum of 2.0m depth within made ground areas.

As a result of the remedial work, it was stated by Celtic that the site was chemically verified for the future development based on meeting the Remediation Strategy requirements, subject to any conditions and restrictions imposed by planning or regulatory authorities and the specific requirements of future development works.

Environmental setting

The site is not located within a Groundwater Source Protection Zone.

The underlying Drift Soils are classified as 'Unproductive' with the St Maughans Formation (mudstone) bedrock classed as a 'Secondary A' Aquifer. The Mudstone is likely to be of low permeability.

There are no groundwater abstractions within 1km of the site.

The site has been subjected to remediation with only residual contamination remaining in the made ground, albeit at acceptable levels for the proposed care home development.

Therefore, in accordance with Table 6.2 of the CL:AIRE guidance, initial screening shows that the piling works at this site would be classified as '**Low Risk**'.

Lithos Ground investigation.

Post remediation fieldwork was supervised by Lithos between the 9th to 12th December 2024 and comprised the exploratory holes listed below.

Technique	Exploratory holes	Final depth(s)	Remarks
Trial pitting (machine dug)	TPs 01 to 09	2.8m to 3.5m	Vane tests in cohesive soils
Cable percussive boreholes	BHs 01 to 03	13.7m to 14.3m	SPTs typically at 1.0m centres. Monitoring wells installed in all BHs

Exploratory hole logs are presented in Appendix B of Lithos report 5088/1.

Ground conditions.

Made Ground

Made ground was encountered across the site to between 1.6m and 2.9m depth; average 2.3m and comprised the following strata.

- **Macadam Hardstand:** encountered in one location to 0.05m depth.
- **Cohesive Made Ground:** Light brown sandy gravelly Clay. Gravel comprised mixed lithologies including brick, concrete, wood and plastic. Encountered in 7 trial pits and one borehole to depths of between 0.3m and 2.8m (average depth of 0.8m).
- **Granular Made Ground:** Dark grey ashy sandy angular fine to coarse Gravel of brick, concrete, mudstone, wood and clinker encountered in all 9 trial pits and two boreholes to depths of between 1.6m and 2.6m (depth to base of 2.2m).
- **Brickfill:** encountered in one location between 0.2m and 0.3m depth as a slightly sandy angular to subangular fine to coarse Gravel of brick.

The thickest made ground was encountered in the north of the site. Made ground less than 2.0m thick was only encountered in one location.

Natural Ground

Natural ground was encountered in all exploratory holes, and typically comprised:

- **Cohesive Tidal Flat Deposits:** encountered beneath the made ground as a firm light grey gleyed brown, slightly sandy Clay to depths of between 3.4m and 5.3m. **Peat**, typically 0.6m to 0.8m thick, was encountered directly beneath the firm clay with soft Clay to depths of between 9.5m and 12.7m.
- **Granular Tidal Flat Deposits:** encountered in one borehole from 9.5m as a reddish-brown slightly clayey Sand to 11.8m, underlain by Gravel of mixed lithologies to 12.2m depth.
- **Bedrock** (St Maughans Formation Mudstone) was encountered in all 3 boreholes from between 12.2m and 12.7m depth.

Each of the boreholes refused in bedrock, with penetration of between c.1.4m and 1.6m.

Groundwater

Significant inflows of groundwater were encountered during the ground investigation. Groundwater was encountered across the site from 0.9m depth, with the Granular Made Ground typically being fully saturated. This groundwater appears to be perched within the Made Ground, which has also previously been confirmed in the third-party investigations.

Groundwater levels recorded in the monitoring wells installed in the 3 boreholes by Lithos (6 visits over a 3-month period, between December 2024 and April 2025) are summarised below.

Hole	Response zone - depth range & (strata)	Groundwater body	Range of standing water levels
			m bgl
BH01	1.0 – 3.0m (Granular Made Ground)	Perched	0.8m to 1.8m
BH02	3.0 – 6.0m (Cohesive Alluvium & Peat)		0.8m to 1.9m
BH03	3.2 – 5.2m (Cohesive Alluvium)		0.9m to 1.2m

estimated from topo survey data to inform foundation design.

Dip data suggests a shallow perched water table within the made ground. After an initial dip to record standing water level, the wells were bailed-out to establish an approximate rate of recharge on. Findings were:

Hole	Vol. removed /litres	Water level lowered by /m	From / to m bgl	Water level recovered to /m bgl	After / mins	Recovery rate
BH01	8	0.46	1.68 to 2.14	2.11	12	Moderate
BH02	12	1.82	1.90 to 3.72	3.69	11	Moderate
BH03	12	Unable to locate the well on visit where bailing was undertaken				

Note: In a 50mm diameter well pipe there is approximately 2 litres of water per metre of water column.

Wells could not be bailed below 2.0m depth (BH01) and 3.7m depth (BH02) due to rapid recharge; therefore, it is apparent from the above that permeability of the ground is high.

No monitoring wells were installed in the deeper bedrock underlying the site, however, given the anticipated low permeability of the Mudstone strata encountered no significant groundwater was anticipated.

Contamination

General

The site formerly comprised the Courtybella Steelworks between the 1930's and 2009. Following demolition, the site was subject to reclamation works. More recently, the site was used as a temporary overflow car park for the adjacent hospital, before being used as a storage compound for ongoing residential development to the west of the site.

Whilst records suggest the site was remediated and confirmed to be suitable for a proposed mixed end use including a school, residential and commercial, recent post remediation usage may have given rise to some (likely minor) ground contamination.

As such, further chemical laboratory testing of samples recovered from the site was undertaken as part of the Lithos ground investigation.

Chemical laboratory testing

Lithos submitted a test schedule (summarised in the table below) to a UKAS accredited laboratory.

Type of sample	No. of samples	Determinands
Made ground	18	pH, water soluble boron, and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc) & Asbestos ID
Natural soil	2	TOC, Speciated Polycyclic Aromatic Hydrocarbons (PAH), Banded Total Petroleum Hydrocarbons (TPH)
Macadam Hardstand	1	Speciated PAH including coronene

The results and laboratory test certificates are presented in Lithos Report 5088/1, however, a summary is provided below.

Inorganic determinands

Of the 20 samples analysed for inorganic parameters, 9 were classified as uncontaminated and 11 were classified as contaminated, with elevated concentrations of zinc recorded in the made ground and the natural soils (up to 2,300mg/kg in BH02 at 2.4m depth within the Cohesive Tidal Flat Deposits).

However, zinc is not considered a contaminant risk to groundwater and as such is not considered further in this letter report.

Organic determinands

Given the remediation works, which records indicate were completed in 2016/17, and the absence of visual/olfactory evidence of any hydrocarbon contamination, only a simple banded TPH (cf. full speciation) was scheduled on 10 samples of Granular Made Ground, 7 samples of Cohesive Made Ground, one sample of Brickfill and two samples of Cohesive Tidal Flat Deposits.

Elevated concentrations of DRO (C₁₀ to C₂₁) up to 319mg/kg were recorded in 4 samples of Granular Made Ground above the Lithos Tier 1 Value of 215mg/kg.

In the context of the proposed development of the site with a residential care home, no significant risks were identified, and no further remedial measures were considered necessary.

Proposed foundations

Lithos Report 5088/1 concluded that piled foundations, end bearing in bedrock, will be the most suitable foundation solution for the proposed three storey care home.

Detailed pile design has been undertaken by M&D Foundations (Contract Design ref LS03755, dated 24th February 2026) which allows for a total of 206 no. steel tube top driven piles of 178mm diameter. No final depth of the piles is provided, with each pile to be driven until refusal, likely in bedrock which was encountered from around 12m depth.

Discussion

Current guidance from CL:AIRE provides seven possible pollution scenarios from piling through contaminated ground as summarised below:

- **Scenario 1** - Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer;
- **Scenario 2** - The driving of solid contaminants down into an aquifer during pile driving;
- **Scenario 3** - Contamination of groundwater and, subsequently, surface waters by turbidity, support fluids, concrete, cement paste or grout;
- **Scenario 4** - Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration);
- **Scenario 5** - Creation of preferential pathways, including through a low permeability layer, to allow upward migration of landfill gas, soil gas, mine gas or contaminant vapours (e.g. Volatile Organic Compounds (VOCs)) to the surface;
- **Scenario 6** - Causing off site migration of ground gas or increased vertical emissions as a result of vibration or other effects from the pile installation process; and
- **Scenario 7** - Direct contact of site workers and others with contaminated soil arisings which have been brought to the surface.

At this site, driven steel piles are proposed through made ground and natural drift soils (Clay) to found in underlying bedrock (Mudstone). The Lithos hazardous gas risk assessment did not identify any significant concentrations of hazardous gas, with the site categorised as Characteristic Situation 1 (CS1).

Therefore, Scenarios 3, 5, 6 & 7 do not apply here.

With regards to **Scenario 1**, piles will be driven through the low permeability Clay soils to refusal, likely founding in the Mudstone bedrock (also low permeability). Closed or infilled steel driven piles displace and compact soil laterally rather than removing soils (replacement piles). The soil surrounding the pile is densified and high stresses are induced in the surrounding ground when driving displacement piles. These stresses increase with the size of the pile and magnitude of displacement. In most soils these stresses will tend to force the soil to 'close up' around the pile shaft, which means that the development of preferential flow paths around the outside of the piles is, in general, **unlikely**.

With regards to **Scenario 2**, the driving down of contaminants is minimal, especially with relatively small diameter piles. Material dragged down by shaft friction is unlikely to be displaced by more than a few centimetres and can further be reduced by between 1 and 3 orders of magnitude by the use of a conical driving shoe. Given the low volumes of residual contamination remaining in the made ground, significant down-drag of contaminants is **not** considered likely.

With regards to **Scenario 4**, significant degradation of the pile materials is considered **unlikely** given the nature of the made ground and underlying natural soils and the type of pile (steel) to be utilised. Any significant contamination within the soils and perched water within the made ground have been treated, removed or stabilised during the remedial works. Unless the soils are strongly acidic (pH <4), the underground corrosion of steel piles driven into undisturbed soils is negligible. Values of pH at this site were all above 7, typically above 11 in the made ground.

A revised conceptual site model (piling) is presented as Drawing 5088/7A, which considers the ground conditions and contaminants recorded on site post remediation, together with the proposed foundations for the care home and the above contamination pathways.

Conclusions

Given the risks identified in this assessment, it is considered **highly unlikely** that underlying deep groundwater will be significantly impacted by any residual contamination in the shallow made ground during piling and as such, no significant mitigation, monitoring or verification is considered necessary at this site during, or on completion of piling.

Should you require any further information, please contact the undersigned.

Yours sincerely

A handwritten signature in blue ink, appearing to read "A. Swales".

Alan Swales
Associate Director
for and on behalf of
LITHOS CONSULTING LIMITED

enc

Appendix A – Drawings

Appendix A

Drawings



Reproduced from OS Explorer map 1:25,000 scale by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. Crown copyright. All rights reserved. Licence number 100049696.



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CLIENT

LNT
CONSTRUCTION

JOB TITLE

ROYAL VICTORIA
COURT,
NEWPORT

DRAWING TITLE

SITE LOCATION
PLAN

DRAWN

CC

23 01 2025

CHECKED

AG

23 01 2025

STATUS

FOR COMMENT ☐

DRAFT ☐

FOR APPROVAL ☐

FINAL ☒

SCALE

1:25,000

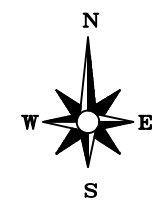
SHEET

A4

DRAWING NO.

5088/1

REVISION



NOTES

— APPROXIMATE SITE BOUNDARY

REPRODUCED FROM LNT CONSTRUCTION'S
DRAWING REFERENCE NP20-2NW-F-01,
DATED MARCH 2024

REV.	DESCRIPTION	DATE



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CLIENT

LNT
CONSTRUCTION

JOB TITLE

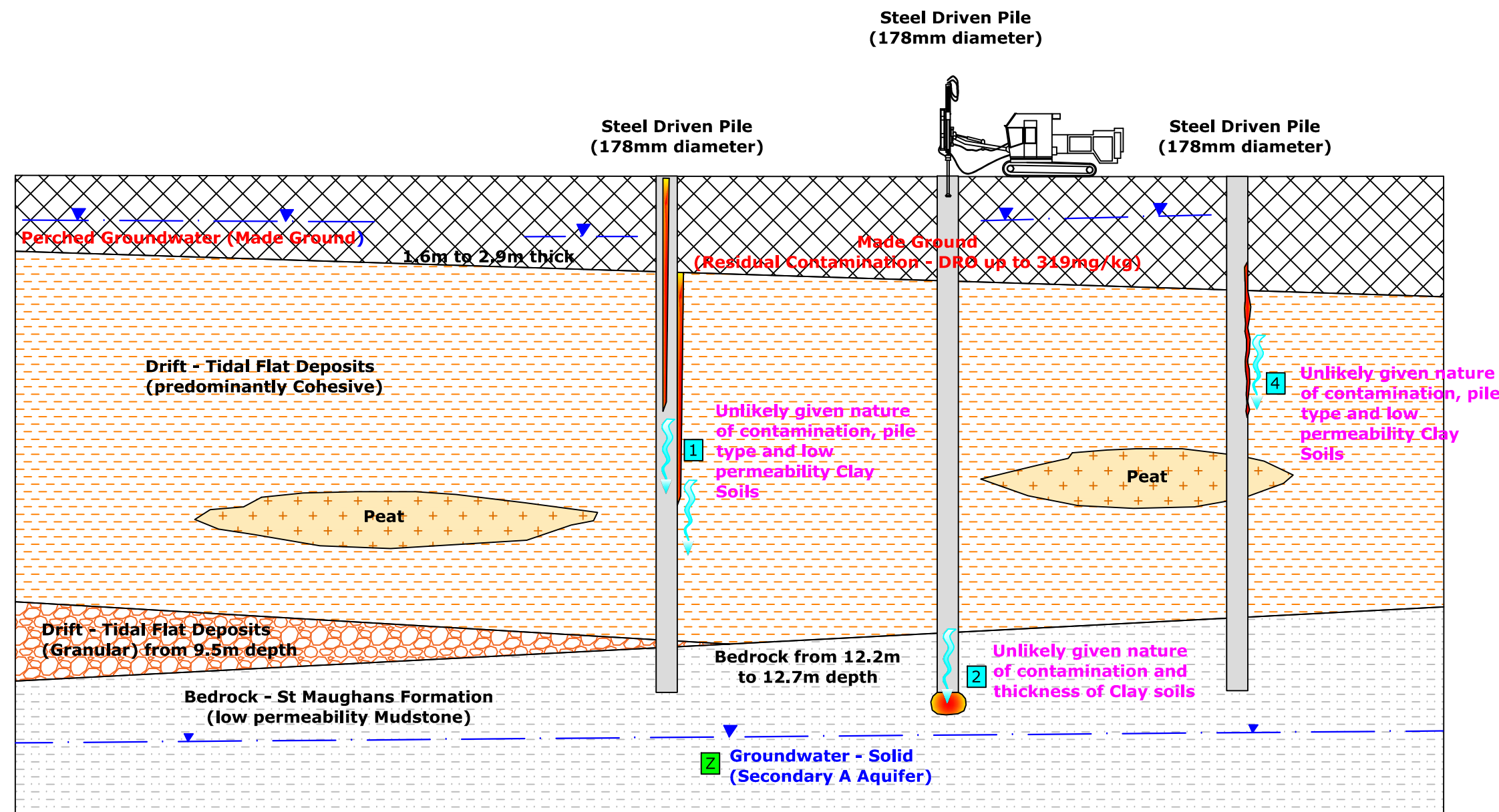
ROYAL VICTORIA
COURT,
NEWPORT

DRAWING TITLE

PROPOSED SITE LAYOUT

DRAWN	CC	DATE	23 01 2025	STATUS	FOR COMMENT ☐
CHECKED	AG	DATE	23 01 2024	FOR APPROVAL	☐
				DRAFT	☐
				FINAL	☒

SCALE	1:500	SHEET	A3	DRAWING NO.	5088/2	REVISION	
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SOURCES	
A	RESIDUAL CONTAMINATION IN MADE GROUND (DRO up to 319mg/kg)

PATHWAY SCENARIO	
1	VERTICAL PATHWAY DOWN SIDE OF, OR WITHIN, THE PILE
2	DRIVING OF CONTAMINANTS AT TOE OF PILE (DIRECT PUSH)
4	DEGREDDATION OF PILE WITH CONTAMINANT MIGRATION

RECEPTORS	
Z	GROUNDWATER

NOTES		
REV.	DESCRIPTION	DATE



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CLIENT
LNT CONSTRUCTION

JOB TITLE
ROYAL VICTORIA COURT, NEWPORT

DRAWING TITLE
REVISED CONCEPTUAL SITE MODEL (PILING)

DRAWN		DATE		STATUS	
ASw		26 08 26		FOR COMMENT ☐	
CHECKED		DATE		FOR APPROVAL ☐	
AG		26 08 26		DRAFT ☐	
				FINAL ☒	

SCALE		SHEET		DRAWING NO.		REVISION	
Not to scale		A3		5088/7A			