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Ref: 13-887-L4
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Landcare (East Manchester)

BY Email

Dear Sirs

FORMER MANOX SITE – MILES PLATTING GROUND STABILITY CONDITION - 59

E3P are appointed as Geotechnical Engineer by Engie to provide professional consultancy services as part of the regeneration of the subject site for a low-rise residential end use.

Manchester City Council has granted planning permission (131895/JO/2021) for a *housing-led mixed-use redevelopment comprising: a maximum of 410 new dwellings (Class C3); and comprising Class E (maximum floorspace 744 sq.m GIA in total); recreation open space and landscaping; and associated access off Hulme Hall Lane, Varley Street and Iron Street, infrastructure provision and car parking.*

A number of conditions specifically relate to ground conditions and the assessment of risk from historical pollution to the soil and groundwater and the subsequent proposals, for remediation works to ensure the site is developed in a safe, economic and sustainable manner.

E3P has prepared this letter to address Condition 59 within the approved planning consent.

"Prior to the commencement of development (excluding Phase 0 works) and as per the agreed remediation phasing plan a Ground Stabilisation works plan shall be developed, and shall be submitted to, and approved in writing by the City Council as local planning authority. The Ground Stabilisation works plan should include details, per phase, as to how identified ground hazardous (such as underground structures, mine shafts; workings, and boreholes) are to be addressed and decommissioned. The development shall be implemented in full accordance with the details so approved."

EXCAVATION, BREAKING AND PROCESSING OF ALL ABOVE- AND BELOW-GROUND STRUCTURES

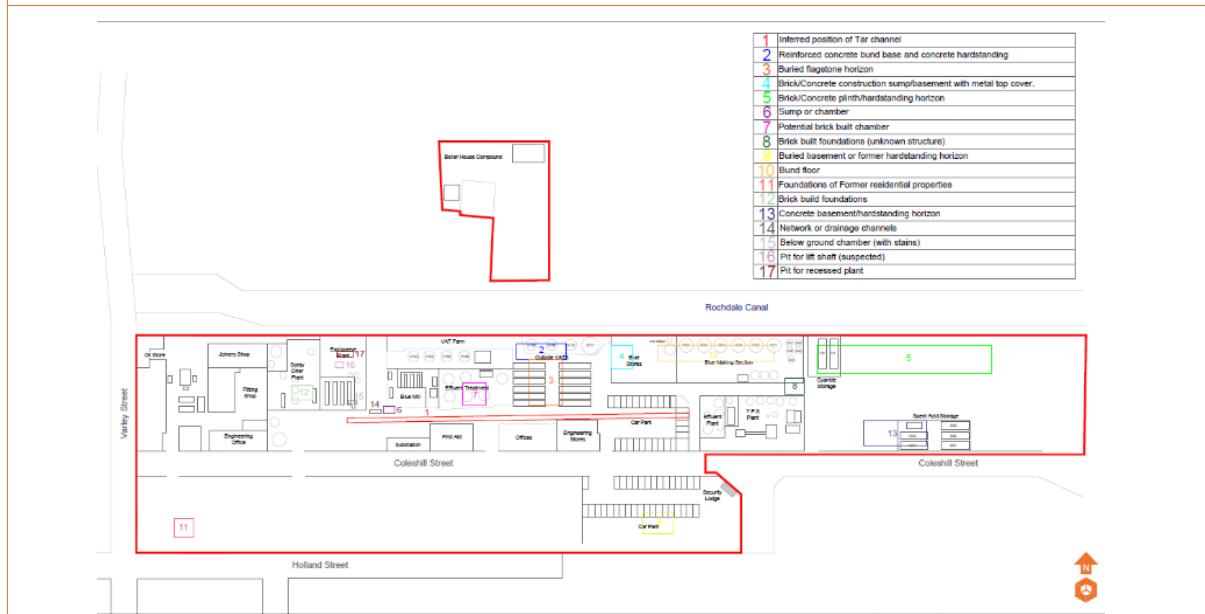
Obstructions, relict foundations, infrastructure (apart from live services) and historical structures (Figure 1) are to be removed from all areas of proposed residential development, to include plot footprints, rear gardens, private driveways, adopted highway and utilities infrastructure (road box) in their entirety.

Artificially hard materials should be broken out and crushed. Stockpiles will be made, validation testing undertaken, and site-won material reused on site where required. Materials will be processed as per the specifications provided in the approved Remediation and Enabling Works Strategy (report ref: 13-887-R6-4, dated February 2023) using licensed plant.

The extensive and detailed investigations suggest that all relict structures and infrastructure are limited to the near surface (<3.0m below current GL), with no evidence of any deep historical pile foundations or infrastructure.

In the event that a relict structure / piece of infrastructure is identified that cannot be removed either due to its depth or constraining site features, all such features will be surveyed and recorded prior to being encapsulated to ensure no potential migration pathway.

FIGURE 1 SCREENSHOT OF KNOWN EXISTING UNDERGROUND STRUCTURES



GROUTING AND SEALING OF ALL HISTORICAL BOREHOLES

Historical boreholes present across the site, as shown in Figure 2, present a risk to deeper strata beneath the site through the creation of a preferential pathway for contaminants to migrate vertically at the site. As such, all historical boreholes will be grouted and sealed to prevent this hazard prior to any remediation works.

The decommissioning of the boreholes will include the removal of all casing and monitoring instrumentation prior to the sealing of the well using a bentonite powder to be fed into the borehole using a Tremie Pipe. Upon removal of all borehole monitoring infrastructure and the sealing with a Bentonite, the borehole will be surveyed and photographed to demonstrate that the viable migration pathway is removed.

Where it is not possible to fully remove the casing and monitoring pipework, the borehole will be assessed with the ability to form a suitable low permeability seal within the glacial till overlying the more permeable glaciofluvial sand and gravel to be assessed by the supervising engineer.

In the event that a suitable seal cannot be established, boreholes within the Manox sector will require 'over drilling' to remove the redundant casing and instrumentation prior to sealing with low permeability bentonite using a Tremie Pile inserted to the base of the new borehole and sealed in stage lifts.

FIGURE 2 SCREENSHOT OF KNOWN EXISTING DEEP BOREHOLES



CONSTRUCTION AND INSTALLATION OF PROPOSED RETAINING WALL

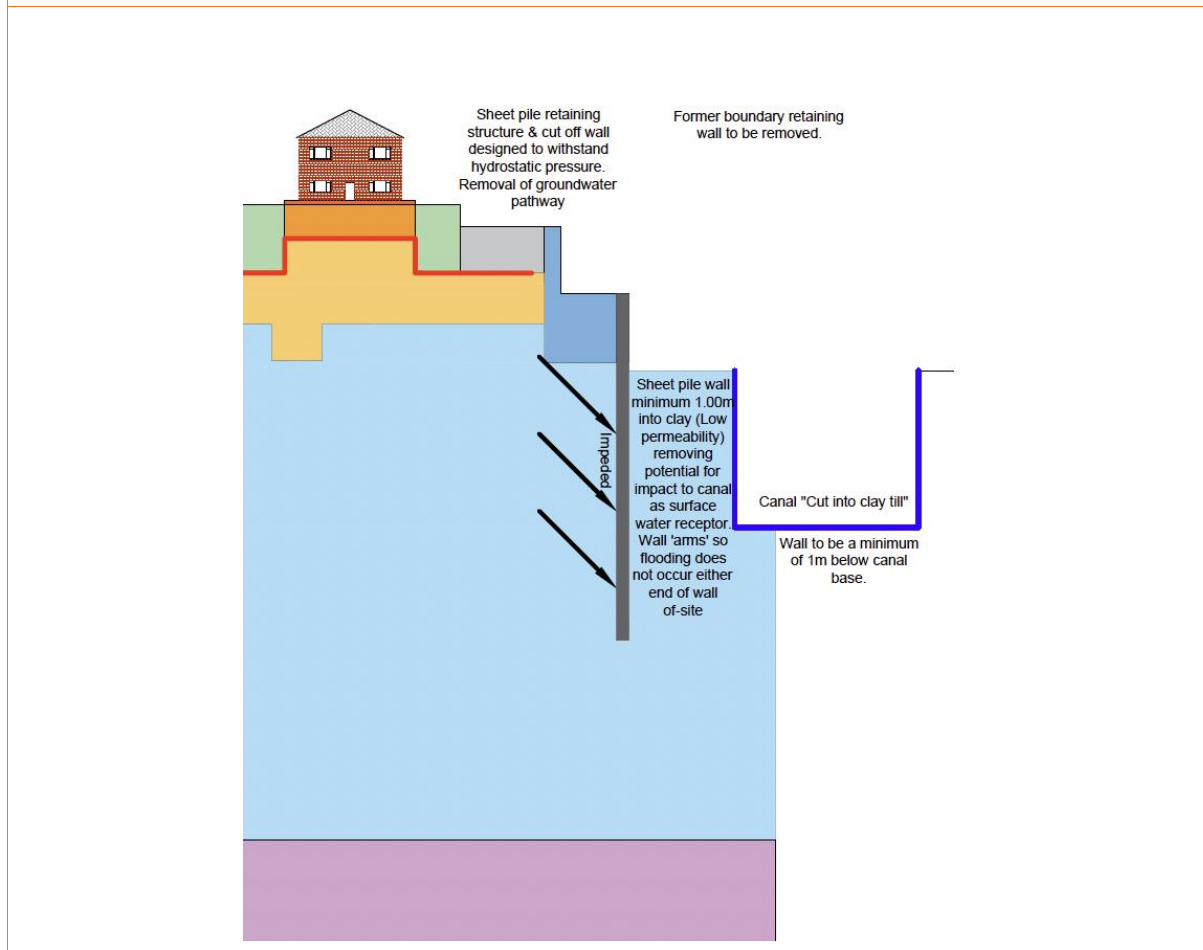
In order to ensure the western boundary of the site is geotechnically sound, the canal and towpath protected, and the development is appropriately supported with respect to its load, a new retaining wall is proposed along the full length of the western boundary in the place of the existing one.

As part of this retaining wall, a sheet pile wall will be installed, which will act as the low permeability barrier. This sheet pile wall will be installed upon commencement of the remediation works (prior to any remediation of the contaminated materials) and will be installed directly on the boundary with the canal to avoid the potential for any un-remediated materials being left outside of this wall.

Steel as a construction material is inherently 100% low permeability to the passage of water, however steel sheet piles have interlocks at discrete centres along the wall length, usually at 600 to 800mm centres, which if left unsealed can allow the water to pass through.

To ensure the sheet pile wall is installed as a low permeability barrier, the application of a sealant at the interlocks will be required. The specific sealant to be used will be determined by the specialist designer to create the design. Figure 1 demonstrates the post-development CSM in relation to the installation of the sheet pile wall.

FIGURE 3 SCREENSHOT OF POST DEVELOPMENT CSM



SUMMARY AND CONCLUSION

Upon completion of the site remediation and enabling works, all relict structures will be removed in their entirety, or where it is not practicable to ensure complete removal, they will be surveyed, encased and sealed.

All existing boreholes and monitoring instrumentation considered as a possible conduit that would facilitate the migration of pollution will be fully sealed and removed in a phased manner as works progress across the site.

Shallow mine workings within the underlying Pennine Coal Measures will be subject to pressure grouting using a liquid OPC / PFA grout. Boreholes will be pressure grouted from the workings to ground level to ensure no potential migratory pathway.

I trust this information is satisfactory to your requirements, and should I be able to be of any further assistance, please do not hesitate to contact me.

Yours sincerely,

For and on behalf of E3P Ltd

Martin Dyer
Director