Title: Phase 1 Geo-environmental Assessment Summary

Date: August 2020

1.0 Introduction

1.1 Jubb Consulting Engineers (Jubb) have been appointed to undertake a Phase 1 Geo-environmental Assessment of land at Roxton by Rainier Developments Ltd.

1.2 This note provides a summary of the findings of the report.

2.0 Preliminary Geotechnical Assessment

Expected Ground Conditions

2.1 The site is anticipated to be underlain by a thin layer of made ground associated with farming activities, which will likely be underlain by river terrace deposits comprising sand and gravel locally with lenses of silt and clay.

2.2 Beneath the superficial deposits, the solid geology will likely comprise of Peterborough Member which is described as mainly brownish-grey, fissile, organic-rich (bituminous) mudstones.

Groundwater

2.3 Groundwater has the potential to be relatively shallow under the site within the sand and gravel deposits. The BGS has the site to be within an area that has the potential for groundwater flooding to occur at the surface.

2.4 Historical boreholes carried out within 200m of the site have recorded groundwater levels at between 2.0m and 3.5m below ground level.

Foundation Options

2.5 Given the likely proposed development is for residential housing, foundation loads are not anticipated to be that high, so shallow foundations placed within the sand and gravel deposits will be likely be suitable for the site, providing they are of sufficient density.

2.6 If higher foundation loads are likely then, depending on the density and thickness of the gravel layer, foundations may have to extend into the underlying mudstone bedrock, where a deeper foundation option may be required.

2.7 Any excavations could encounter shallow groundwater within the sand and gravels, with this likelihood increasing during the winter months. Groundwater monitoring should be carried out as part of any ground investigation.

Floor Slab Design

2.8 Given that the site is likely to be underlain by granular deposits, then a ground bearing floor slab should be suitable, providing the subgrade is proof rolled and any soft spots removed and replaced with a suitable engineered fill.

Soakaways

2.9 The granular deposits expected to directly underlie the site are likely to be suitable for a soakaway infiltration system, providing the deposit has a limited amount of fines contained within. Groundwater is expected to be relatively shallow, so this may preclude the use of soakaways on site, if a 1m freeboard between the base of the proposed soakaway and groundwater level is not maintained, as advised by the Environment Agency.

2.10 Soakaway testing should form part of any ground investigation so an infiltration rate of the superficial deposits can be obtained, which will aid in the suitability of any SUDs design.

3.0 Environmental Assessment

3.1 The primary contamination risks at the site arise from the previous agricultural site uses, and the relevant pollutant linkages that are potentially in operation at the site are as follows:

- Heavy Metal/ Semi-metals in any historic made ground (risk to construction workers and future site users);
- Organics (Hydrocarbons/PAH's/) from agricultural vehicles and historic made grounds (risk to construction workers and future site users);
- Asbestos in made ground from barn structure (risk to construction workers and future site users).

3.2 In general, the contamination potential of the site is considered to be low.

3.3 Further site investigation will be required to confirm the contaminative potential of the site.

4.0 Recommendations

4.1 Prior to redevelopment, an intrusive phase II ground investigation should be carried out over the site to identify and quantify any contamination, determine depth and strength of underlying strata, and obtain suitable parameters for geotechnical design. A proposed scope for site investigation works depends on the layout of the proposed development, but is likely to comprise the following:

- Suitable spread of machine excavated trial pits;
- Soakaway tests;
- Window sample/cable percussion boreholes;
- Installation of gas/groundwater monitoring wells and program of monitoring;
- In-situ CBR testing (Plate bearing tests/TRL DCP);
- Programme of contamination and geotechnical testing.

4.2 Contamination testing should include an appropriate suite of contaminants for solids and leachates to include Metals, Organics/Hydrocarbons and Sulphates/pH. Waste Acceptance Criteria Testing (WAC) should also be captured as part of the Phase II investigation, if it is anticipated that soils are to be disposed of offsite.

4.3 A suitable Interpretative Report will be required, to determine foundation and floor slab solutions, parameters for road pavement design, and an assessment of contamination risk.

A search of statutory service information held by service providers should be undertaken prior to any site investigation, and appropriate onsite precautions employed by site investigation contractors to protect any services identified.