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REMEDIATION STATEMENT

COMMERCIAL DEVELOPMENT PROJECTS LTD

PROPOSED COMMERCIAL DEVELOPMENT

LAND OFF ESTUARY BOULEVARD

SPEKE

LIVERPOOL

L24 8RL

Project No: 16-433

Prepared By:

Mark Berriman

A handwritten signature in black ink, appearing to read 'Mark Berriman', with a long horizontal flourish extending to the right.

Date:

19th August 2016

Approved By:

Matt Bradford

Date:

19th August 2016

The information and/or advice contained in this Remediation Statement is based solely on, and is limited to, the boundaries of the site, the immediate area around the site, and the historical use(s) unless otherwise stated. This 'Report' has been prepared in order to collate information relating to the physical, environmental and industrial setting of the site, and to highlight, where possible, the likely problems that might be encountered when considering the future development of this site for the proposed end use. All comments, opinions, diagrams, cross sections and/or sketches contained within the report, and/or any configuration of the findings is conjectural and given for guidance only and confirmation of the anticipated ground conditions should be considered before development proceeds. Agreement for the use or copying of this report by any Third Party must be obtained in writing from Arc Environmental Limited (ARC). If a change in the proposed land use is envisaged, then a reassessment of the site should be carried out.

Report Type:- Remediation Statement.

Project: - 16-433 – Proposed Commercial Development, Land Off Estuary Boulevard, Speke, Liverpool L24 8RL.

Prepared For:- Commercial Development Projects Ltd.

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1.0 Introduction

August 2016

As requested by Adept Consulting Engineers on behalf of their client Commercial Development Projects Ltd., a Remediation Statement (RS) has been prepared for the proposed commercial development situated off Estuary Boulevard, Liverpool Business Park, Speke, Liverpool, and a copy of the proposed development layout plan is contained in Appendix I.

The ground conditions and potential contamination issues associated with this site have been investigated and assessed in detail through the completion of both a Phase 1: Desk Top Study (DTS) report) and a Phase 2: Ground Investigation Report (GIR). These documents have been used to aid the completion of this RS and this document should be read in conjunction with the following reports:-

- Phase 1: Desk Study Report (DTS), Report Ref. 16-433, Arc Environmental Ltd, May 2016.
- Phase 2: Ground Investigation Report (GIR) Report Ref. 16-433, Arc Environmental Ltd., June 2016.

2.0 Site Details

Table 2.1

Site Name & Address:	Proposed Commercial Development, Land Off Estuary Boulevard, Speke, Liverpool L24 9RL.
National Grid Reference:	341760, 383060 (representative for the central part of the site).
Description of Location:	The site is located in a commercial / industrial setting within Speke, Liverpool.
Site Boundaries:	N = Commercial unit, E = A wooded area leading to undeveloped land, S = Garston Shore Road leading to undeveloped land with the River Mersey beyond, W = Estuary Boulevard.
Site Location plan:	See Appendix I.
Layout plan (existing):	See Appendix I.
Layout plan (proposed):	See Appendix I.
Client:	Commercial Development Projects Ltd.
Project Type:	Commercial development comprising 3 proposed industrial units with associated car parking, service yards & soft landscaping.
Preliminary Remediation Statement	Following the results of the Phase 2: GIR, a preliminary remediation assessment identified that whilst there were no significant risks to the end users on this site from any of the made ground present, the trapped water encountered within the historically recorded backfilled pond feature at the location of TPL would require remediation works, comprising either treatment, removal, protection measures and/or further detailed quantitative risk assessment, to be undertaken. Consequently, there would be a requirement for the completion of a Remediation Statement detailing the chosen scope of remediation works and a Validation Report to confirm that these works have been completed.

3.0 Scope of Works

This RS has been prepared generally in accordance with CLR11: Model Procedures for the Management of Land Contamination, in order to provide a framework for establishing the most appropriate remediation option(s) for this site, based upon the findings of the previous GIR. The RS can be used to support the current planning application for the proposed development, and allow the Design team, Main Contractor and chosen Sub-contractors to incorporate the necessary remediation works into the overall development design and construction works.

The information contained in this RS is limited to the areas of the site as indicated on the existing and proposed development layout plans attached in Appendix I. The validation of the implementation of the RS will be dealt with in a final Validation Report, once the remediation works have been completed.

4.0 Summary of Ground Contamination Assessment

From the results of the Phase 1: DTS and Phase 2: GIR, there are no sources of ground contamination on this site that represent a potential risk to the end users and all the made ground encountered on this site can remain on site, without requiring remediation works. The only potential source of contamination requiring remediation works on this site is the presence of TPH contaminated surface water, trapped within an former backfilled pond, identified at the location of TPL, and which will need to be dealt with as part of the proposed development works. There is always the possibility of unknown or unrecorded contamination being present on portions of the site not covered by the intrusive site investigation works completed to date and therefore there is also the requirement to undertake a watching brief during the initial site strip to ascertain whether any unknown or unrecorded areas of potential contamination are present on this site. If any new areas of potentially contaminated materials are identified then appropriate sampling, screening and risk assessment should be undertaken to determine whether any remedial measures are required.

5.0 Options Appraisal & Remediation Statement

5.1 Options Appraisal:-

When considering the findings of the Phase 1: DTS and Phase 2: GIR and the potential contamination issues outlined within the previous section, along with discussions with the design team, it can be seen that if the trapped contaminated surface water remains on site, there is the potential for this water to migrate and reach potentially sensitive receptors (Controlled Waters and/or adjacent sites), albeit that the risk is considered to be remote given the ground conditions present on this site. Consequently, the use of a barrier systems to try and contain contaminated water and protect any receptors, during and post construction, is not considered appropriate or practical for this site.

Similarly, due to the physio-chemical nature of the contaminants (Arsenic, speciated TPH's and PAH's) present within the trapped surface water, as well as the unknown condition of the groundwater regime within the Principle Aquifer below this site, neither treatment nor further detailed quantitative risk assessment will prove a practical, environmentally sustainable or economically viable solution for this site.

5.2 Remediation Statement:-

Bearing this in mind, it is felt the most appropriate remediation option for this site will be to remove the trapped contaminated surface water from this site. A summary of the proposed remediation works for this development is as follows:

- A 'watching brief' to confirm that there are no unknown or unforeseen areas of potential contamination on this site.
- Removal of the contaminated trapped surface water within the former backfilled pond at TPL. The water should be pumped out from the former pond feature, removed from site (via tankers of similar) and disposed of appropriately. The location of the pond feature and estimated size are shown, as an enlarged extract from the Investigation Locations and Revised Proposed Layout Plan (copy in Appendix I), on the Historic Pond Cross Sections drawing, a copy of which is given in Appendix II.
- The made ground within the former pond, which is most likely causing the contamination of the trapped surface water, should be excavated and removed to avoid cross contamination of any new surface water migrating into the former pond feature. The materials requiring excavation and removal comprise the layers identified as STRATA 4 and STRATA 5 on the Historic Pond Cross Sections drawing, a copy of which is attached in Appendix II. These materials can be used as a general fill across any soft landscaping areas of the site or areas where a general granular type fill (Class 1) would be suitable as a subgrade below new buildings and areas of hardstanding.

5.0 Options Appraisal & Remediation Statement (Cont'd)

5.2 Remediation Statement (Cont'd):-

- Following excavation of the made ground requiring removal (STRATA 4 & STRATA 5), the former pond will be backfilled with a clean inert graded granular fill (typically a 6F2 or similar type material), and compacted to achieve a minimum insitu CBR value of 5% at formation level.

6.0 Validation Requirements

In order to ensure that all elements of the RS are properly implemented, the following validation works should be undertaken and documented within a final Validation Report, confirming that each element of the remediation works has been properly completed.

- The Main Contractor, in conjunction with any appointed subcontractor, should prepare a suitable Method Statement identifying how they will suitably implement this Remediation Statement, detailing how they will deal with each element of the remediation and validation works, including but not exclusively, any unknown or unforeseen ground contamination. This Method Statement shall be provided to ARC Environmental Ltd., for approval, 1 month prior to commencement of the site strip and remediation works.
- A 'watching brief' during the initial site strip will be undertaken by ARC Environmental Ltd., comprising periodical site attendance and photographic records, to confirm the presence of not of any unknown or unforeseen contamination. The results of the watching brief will be included in the final Validation Report following the completion of the remediation works, along with any variations to the RS and subsequent additional sampling, screening and risk assessment results.
- Validation screening to verify that only non-contaminated water remains on site will be undertaken by ARC Environmental Ltd., once all the trapped contaminated surface water has been removed.
- Validation screening of any imported materials used to backfill the former pond will be undertaken by ARC Environmental Ltd., following delivery to site. The screening will meet the criteria given in Table 7.1 on the following page.
- Prior to delivery the Main Contractor will be responsible for providing screening results of any imported materials to site, to verify that they meet the criteria given in Table 7.1 on the following page. These results should be passed onto ARC Environmental Ltd. a minimum of 1 week prior to delivery and not be more than 3 months old.
- The Main Contractor will be responsible for ensuring that the materials used to backfill the former pond comprise a clean inert graded granular 6F2 or similar material, and are adequately compacted to achieve a minimum insitu CBR value of 5% at formation level. The Main Contractor will also be responsible for completing the insitu CBR tests, with the results passed onto ARC Environmental Ltd. for verification within 2 working days of completion of the tests.

It should also be noted that if during the site strip and/or remediation works phases, any visual and/or olfactory evidence of unidentified or unforeseen potentially contaminated materials are identified then the site should notify ARC Environmental Limited as soon as it is possible to allow for further sampling and screening to be undertaken. Details of the appropriate course of action undertaken to deal with these materials will be provided to the Local Authority, prior to carrying out any additional remediation works, if required.

When considering the potential risks to the construction workforce, it will be necessary to ensure that the appropriate level of protection is provided, and these should be detailed in the site health and safety management scheme (designed by the Main Contractor), during all construction activities. These will include, suitable PPE (typically dust masks, disposal overalls, etc.) and the dampening down of the made ground during any excavations to prevent windblown particles from becoming airborne (especially during dry periods).

6.0 Validation Requirements (Cont'd)

These measures should include appropriate PPE and good site practice, and the results of all the contamination screening undertaken (all results contained within all the site investigation reports) can be used when assessing the required level of protection (based on the acute exposure risk). For further guidance reference should be made to the Health and Safety Executive (HSE) document EH40/2005 (Second edition, published 2011) Workplace Exposure Limits.

Validation screening for imported fill materials, to ensure they are suitable for use on this site, should meet the criteria given in Table 7.1 below – this is based on the Yorkshire & Humberside Pollution Advisory Council (YHPAC) ‘Verification for Cover Systems’, October 2014, and the sampling frequency as follows:

Table 1

<u>Type</u>	<u>Number of Samples</u>	<u>Testing Schedule</u>	<u>Assessment Criteria</u>
Virgin quarried material.	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals / metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se & Zn).	The Assessment criteria needs to be UK based, e.g. LQM / CIEH S4UL's.
Crushed hardcore, stone, brick.	Minimum 1 per 1000m ³ .	Standard metals / metalloids (as above), PAH (16 USEPA specification) & Asbestos.	
Greenfield soils / manufacture d soils.	Minimum 3 or 1 per 250m ³ (Whichever is greater).	Standard metals / metalloids (as above), PAH (16 USEPA specification) & Asbestos.	
Brownfield soils / screened soils.	Minimum 6 or 1 per 100m ³ (Whichever is greater).	Standard metals / metalloids (as above), PAH (16 USEPA specification), TPH (CWG banded) & Asbestos. Also any additional analysis dependant on the history of the donor site.	

Table taken from the Verification Requirements for Cover Systems – Technical Guidance for Developers and Consultants – Yorkshire and Humberside Advisory Council

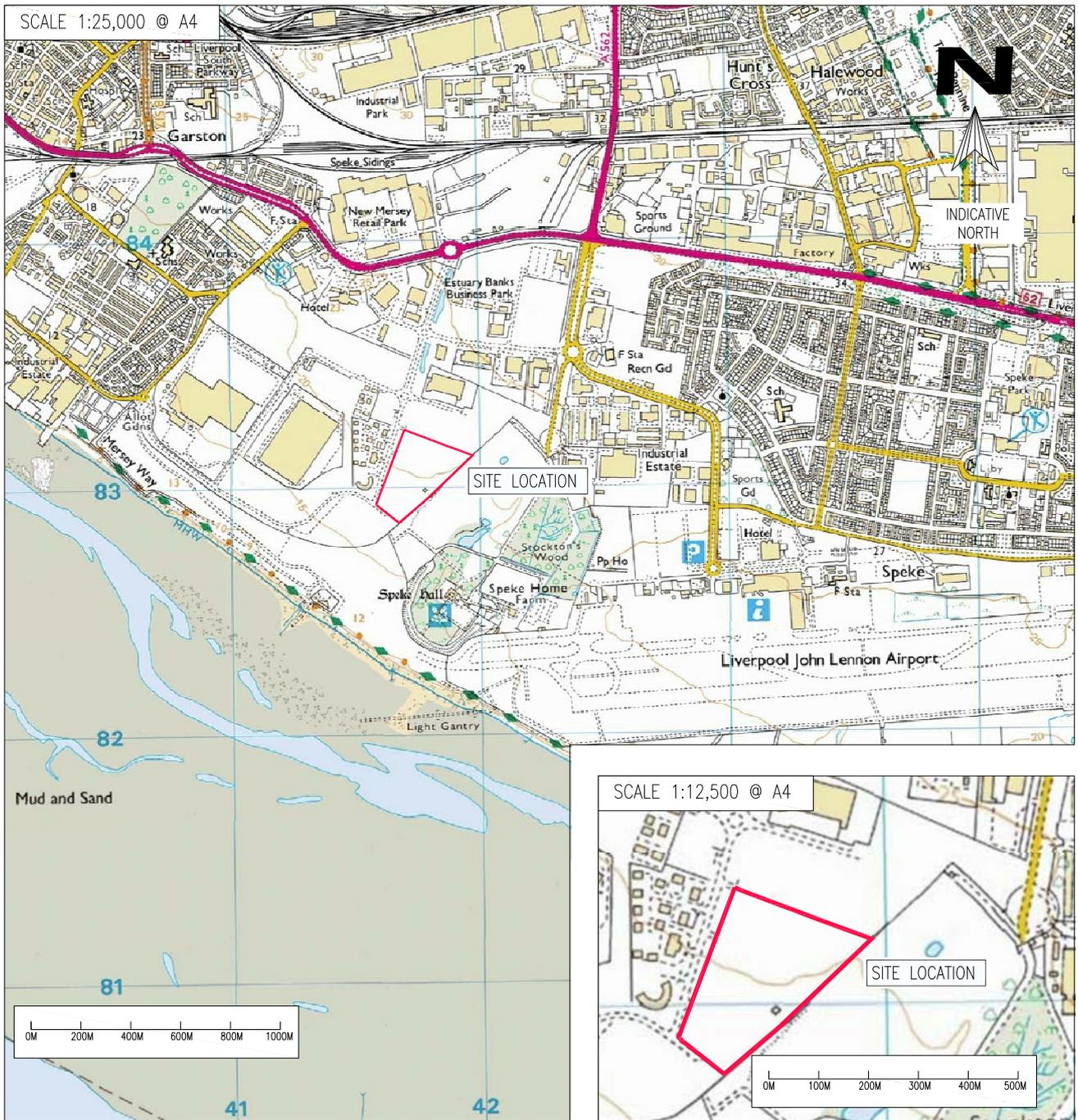
All validation screening will be assessed against the appropriate Validation Screening Assessment Values, based on the current Level 1 Critical Concentrations (C_c) values for *Commercial*, with a copy of the validation assessment values given in Appendix II.

Following completion of the required remediation works, a final Validation Report will need to be completed and should be submitted to the LA confirming all the works undertaken and verification that the RS has met all the requirements for the development of this site, including all details relating to the identification and remediation of any unforeseen or unknown ground contamination (if present). The production of this report should also allow the LA to discharge any outstanding planning conditions associated with land contamination on this site.

END OF REPORT

APPENDIX I

**Location Plan, Aerial Photograph,
Existing Site Layout Plan, Proposed Development Layout Plan,
Site Photographic Record Sheet (1), Investigation Locations and Revised Proposed
Site Layout Plan
&
Conceptual Site Model.**



Client:
ADEPT CONSULTING ENGINEERS LTD

Project Title:
 Proposed Commercial Development
 Estuary Boulevard
 Speke, Liverpool, LS24 8RL

Drawing Title:
 Location Plan

Job Reference:
 16-433

Drawing Number:
 -

Revision:
 -

Drawn by:
 P.D

Date:
 23.05.16

Scale at A4:
 As Shown

Checked by:
 M.P.B

Approved by:
 M.P.B

The contractor shall check all dimensions on site before commencement of any works. No dimensions to be scaled off this drawing.
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rev.	date	amendments	drawn	chckd

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