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REMEDIATION STRATEGY

for land at

**PHASE 3A, EDGEHILL
PARK, WHITEHAVEN**

Prepared for

STORY HOMES LIMITED

Report No. 4046-G-R021

Date: June 2021

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	The Commission and Brief	1
1.2	Regulatory Correspondence	1
2	SITE DESCRIPTION & DEVELOPMENT PROPOSALS	2
2.2	The Proposed Development	2
3	BACKGROUND	3
3.1	Scope of Ground Investigation.....	3
3.2	Ground Investigation	3
3.3	Made Ground.....	3
3.4	Natural Ground	3
3.5	Groundwater.....	4
3.6	Mining.....	4
3.7	Hazardous Gas	4
3.8	Contamination	4
3.9	Conceptual Site Model.....	4
4	RISK ASSESSMENT & TARGET CONCENTRATIONS.....	5
4.1	General.....	5
6	REMEDIATION STRATEGY (GENERAL).....	6
6.1	Aims	6
6.2	Overview of Preparatory Works	6
6.3	Overview of Remedial Works.....	6
6.4	Site Set-up, Organisation and Safety	6
6.5	Contractor’s Responsibilities.....	7
7	REMEDIATION REQUIREMENTS	8
7.1	Delineation & Excavation of Lead Hotspot at TP733	8
7.2	Further Investigation of the Former Phosphate Storage Area.....	8
7.3	Provision of Topsoil in Garden and POS Areas.....	8
7.4	Contingency for previously unidentified contamination (hotspot protocol).....	9
7.5	Export to Landfill.....	9
8	ENGINEERING SUPERVISION AND VERIFICATION	10
9	POST REMEDIATION WORKS REQUIRING VALIDATION	10
9.1	Provision of Topsoil in Garden and POS Areas.....	10

APPENDICES

Appendix A – Drawings

4046-G-D048	Site Location Plan
4046-G-D049	Exploratory Hole Location Plan
20078.90.0.GA Rev A	
7503-3A/16 Rev D	Proposed Cut & Fill Earthworks Plan (Coopers Consulting Engineers)

Appendix B – Correspondence

Appendix C – Soil Protocol

Revision History

From	Date	Comments
4046-G-R021	June 2021	Original Report

**REMEDICATION STRATEGY
for land at
PHASE 3A EDGEHILL PARK, WHITEHAVEN**

1 INTRODUCTION

1.1 The Commission and Brief

1.1.1 ID Geoenvironmental Limited (IDG), were commissioned by Story Homes (the Client) to prepare a Remediation Strategy for the Phase 3A site at Edgehill park, Whitehaven hereafter referred to as the site.

1.1.2 The site location is shown on Drawing No. 4046-G-D048 in Appendix A.

1.1.3 IDG have been provided with copies of the following reports prepared by Integra on behalf of Story Homes which relate to the site:

- Geotechnical Ground Investigation at Land at High Road, Rhodia, Whitehaven, Cumbria for Story Homes Limited (Draft), reference 2546 dated September 2011.
- Phase 2 Environmental Ground Investigation at Land at High Road, Rhodia, Whitehaven, Cumbria for Story Homes Limited (Draft), reference 2725 Rev A dated February 2014.

1.1.4 IDG have recently prepared the following reports on behalf of Story Homes:

- Shallow Mining Report for land at Magellan Park/Edgehill Park Phase 2, Whitehaven, Cumbria, reference 4046-G-R002 dated February 2017
- Supplementary Geoenvironmental Appraisal of land at Phase 3, Edgehill Park, Whitehaven, Cumbria. Report Reference No. 4046-G-R019 Rev B dated December 2020

1.1.1 Report reference 4046-G-R002 details the findings of a shallow mining investigation carried out within Phase 3 and adjacent Phase 2A and 2B. IDG Report 4046-G-R019 Rev B provides a detailed review of all of the preceding investigations together with the findings of supplementary ground investigation undertaken by IDG during 2020.

1.1.2 Supplementary trial pitting (TP908-TP921), was carried out during June 2021 to further understand ground conditions and to obtain bulk samples within areas of proposed cut/fill operations.

1.1.5 This document outlines the remediation objectives necessary to protect environmental receptors, and render the site suitable for the proposed development. Revision to this document may be required upon receipt of any further Regulatory comments.

1.1.6 A Method Statement should be prepared by the Contractor undertaking the works, in order to detail how the objectives will be achieved.

1.1.7 It may be the case that the remediation works are to be undertaken by more than one contractor, for example where initial works are undertaken by a demolition and remediation contractor, with placement of soil cover by the groundworker later in the project. In this situation, the Client should ensure that each Contractor has confirmed that they understand their responsibilities.

1.1.8 The Contractor's Method Statement should be submitted to, and approved by, the Client.

1.2 Regulatory Correspondence

1.1.3 The above reports were submitted to the Local Authority and the Environment Agency for comment. Comments received from the Environment Agencies are presented in correspondence reference NO/2020/113153/01-LO01 dated 22nd December 2020. Detailed responses to the

Environment Agencies comments are provided in IDG correspondence reference 4046-GLR016 Rev A. Comments specific to the formulation of the remediation of Phase 3A are summarised below.

- 1.1.4 In response to the Environment Agencies comments, IDG revised and re-submitted the Report reference 4046-G-R019 Rev B in February 2021, incorporating a revised Preliminary Conceptual Model (PCM). The revised report has been submitted to the Local Authority and Environment Agency for further comment (awaited).
- 1.2.1 The revised PCM included assessment of un-named water course which issues into a ravine, approximately 20m southeast of the Phase 3A site. However, Investigations by Story Homes undertaken at the request of the Local Lead Flood Authority (LLFA) during April 2021 to establish a possible culvert associated with the infilled reservoir, determined that a shallow and narrow stone slab lined culvert runs from infilled former clay pits on the site's eastern boundary to its issue at the head of the ravine. It is considered that the culvert was constructed to drain the clay pits during historical clay extraction operations and that the culvert does not represent a natural spring.
- 1.2.2 All correspondence is presented in Appendix B.

2 SITE DESCRIPTION & DEVELOPMENT PROPOSALS

- 2.1.1 Site details are summarised in Table 2.1 and discussed further in Section 2.1.2.

Table 2.1: Summary of Phase 3A Details

Current Access	Off Wilson Pit Road
Topography	Steep slopes down from "ridge" to the eastern boundary.
Current Uses	Vacant grassland Subsoil/topsoil stockpiles

- 2.1.2 The Phase 3 site boundary and features are shown on Drawing No 4046-G-D049 in Appendix A.
- 2.1.3 The northern half) of the site comprises vacant fields which slope gently to the south, east and southeast. A ridge of higher ground extends southwards into the site from the north. The site surface falls steeply from the ridge to the site's eastern and south-eastern boundary.
- 2.1.4 The southwest of the site is currently occupied by topsoil and subsoil stockpiles associated with the adjacent Phase 2B development. A public footpath which enters the sites south-eastern corner has been re-instated which bounds the soil stockpiles and exits to the west.
- 2.1.5 There is evidence of historical surface excavation within and beyond the site's eastern boundary.

2.2 The Proposed Development

- 1.1.5 It is understood that consideration is being given to redevelopment of the site with 111 two-storey domestic dwellings, associated gardens, Public Open Space (POS) areas and adoptable roads and sewers. The proposed layout is provided on Story Homes General Arrangement Drawing No. 10078.90.9.GA Rev A presented in Appendix A.
- 1.1.6 The Local Planning Authority have agreed planning permission for redevelopment of this site (ref 4/20/2474/OR1).

3 BACKGROUND

3.1 Scope of Ground Investigation

- 3.1.1 IDG carried out an intrusive ground investigation within Phase 3A and adjacent Phase 3B during July and September 2020 which, within Phase 3A, comprised a total of 16 trial pits (TP712-TP719 TP724-TP727 & TP730-TP733), associated soil sampling and laboratory testing, a coal mining investigation comprising 22 rotary probeholes (RBH603, RBH606-RBH619 & RBH622-RBH629) and a ground gas investigation comprising installation of 3 ground gas monitoring wells and a gas monitoring programme.
- 3.1.2 Supplementary trial pitting (TP908-TP922), was carried out during June 2021 to further understand ground conditions and to obtain bulk samples within areas of proposed cut/fill operations depicted on Coopers Proposed Cut & Fill Earthworks, Drawing No. 7503-3A/16 Revision D and inform an Earthworks Specification.
- 3.1.3 The findings of these investigations are summarised in the sections below. Exploratory Hole locations are shown on Drawing No. 4046-G-D049 in Appendix A.

3.2 Ground Investigation

- 3.2.1 The site can be divided into 2 areas based on ground conditions and site operations. These areas are shown on Drawing 4046-G-D049 and are summarised below:

Table 3.1: Site Areas based on Ground Conditions

General Location	Approximate area (m ²)
Open/vacant fields	46,159m ²
Soil Stockpiles	4,800m ²

- 3.2.2 Historical plans indicate that a Phosphorite Storage Area was present in the south west of the site (currently occupied by soil stockpiles) and clay extraction took place associated with a brickfield in the northeast of the site.
- 3.2.3 Limited access was available in the southwest of the site due to the soil stockpiles and consequently only one trial pit was excavated within the former Phosphate Storage Area. Further investigation was recommended in this area.

3.3 Made Ground

- 3.3.1 Made Ground was encountered as summarised in the Table 3.2.

Table 3.2: Summary of Made Ground Conditions

Site Area	Exploratory Locations	Nature of Made Ground & Typical depth (m)
Open/vacant fields	TP719, TP725 & TP726	0.35 - 0.6m Topsoil Made Ground including slag, brick, glass & pottery.
	TP727 & TP912	0.3 – 0.4m Possible anhydrite gravel within reworked natural Topsoil
	PH614	0.0 – 3.2m Grey and black mudstone & siltstone (Granular Made Ground)
Stockpiles & former Phosphorite storage Area	TP730 & TP922	0.2 - >1.0m Sandy gravelly cobbly clay including boulders of sandstone, masonry and concrete with timber, plastic pipe, brick and rebar building materials

3.4 Natural Ground

Superficial Deposits

- 3.4.1 Thin superficial deposits comprising firm to stiff gravelly clay (Glacial Till) were proven to depths

of between 0.5m (TP715, TP919) and in excess of 2.6m bgl (TP713) across the site, although were absent in TP716 and TP913-TP918 near the crest of the north-south ridge.

Solid Strata

3.4.2 Solid strata were encountered at 0.2m-0.3m directly beneath Topsoil in TP716 and TP913 - TP918 on the crest of the north-south ridge in the northwest of the site. The solid strata comprise either weak, partially weathered, purple-grey mudstone/ muddy siltstone, or residual purple brown and yellow-brown clayey sandy gravel and cobbles interpreted to be weathered sandstone.

3.5 Groundwater

3.5.1 Shallow perched water seepages were recorded within the weathered solid strata between 1.7m and 3.1m which were considered associated with infiltration of surface water. Deeper groundwater entries were recorded at depths in excess of 7.0m bgl within rotary probeholes in the east of the site.

3.6 Mining

1.1.7 No significant risk from shallow mining has been identified. However, the Coal Authority have records of several mine shafts both west and east of the site associated with deep mineworkings beneath the site and adjacent land. It is possible that unrecorded shafts or shafts misplaced by the Coal Authority are present within the site.

3.7 Hazardous Gas

1.1.8 A gas monitoring programme and risk assessment has classified the site as 'Characteristic Situation 1'. Therefore, gas protection measures are not required.

1.1.9 The site is not indicated to be at risk from Radon gas.

3.8 Contamination

3.8.1 The following source of contamination has been identified:

- A hotspot of lead contamination which exceeds residential with gardens end use screening criteria in Topsoil at IDG TP733.

3.9 Conceptual Site Model

3.9.1 In terms of the proposed redevelopment plausible pollutant linkages, and feasible remediation options, are summarised in Table 3.2.

Table 3.3: Revised Conceptual Site Model and Potential Remediation Options

Sources	Receptors	Plausible Pathways	Potential Remediation Options	Post-Remediation Pollutant Linkage
Lead hotspot within Topsoil TP733	Human Health (future site users –residential with consumption of homegrown produce)	Direct contact, inhalation of dust	Delineation, excavation and placement in POS	Contaminant source removed
	Groundwater within Secondary A Aquifer	Downwards migration of leachable metal oxide/sulphate contamination	Positive surface water drainage to minimise surface water infiltration: Further investigation following slab demolition	Mitigation of impact

◊ transient risks to construction workers will be addressed by the adoption of appropriate health and safety measures in accordance with the Health and Safety at Work Act 1974, and regulations made under the Act including for example the COSHH Regulations.

4 RISK ASSESSMENT & TARGET CONCENTRATIONS

4.1 General

- 4.1.1 As detailed in Table 3.3, only one hotspot of lead contamination has been detected and, subject to fulfilment of the proposed remediation option, no soil remediation measures are indicated to be required across the site. However it is anticipated that topsoil will be placed within gardens and landscaped areas as growing medium. This topsoil should be suitable for its proposed end use and not represent a risk to future residents and soils testing will be required to demonstrate its suitability for the proposed end use.
- 4.1.2 Acceptance criteria for site derived or imported subsoil and topsoil to be used in the gardens and landscaped areas of the site are based on S4UL criteria for a residential end-use with homegrown produce. These Soil Protocols are presented in Appendix C.

5 DEVELOPMENT LEVELS, EARTHWORKS MODELLING & ANTICIPATED FOUNDATIONS

5.1 Development Layout and Ground Levels

- 5.1.1 Significant re-profiling within the east of the site is required to facilitate the proposed Phase 3A development. Proposed site levels for Phase 3A are indicated on Coopers Drawing Reference 7503-3A/16 Rev D presented in Appendix A. The Site Levels Drawing indicates a combination of superficial clay deposits and siltstone/sandstone/mudstone bedrock will be cut from the north-south trending ridge on the northeast of the site which will be placed in the east of the site.

5.2 Earthworks Specification

- 5.2.1 An earthworks specification to enable adoption of vibro-improvement in the east of the site where it is proposed to raise site levels and will be provided by IDG upon receipt of awaited geotechnical laboratory test results.

5.3 Foundations

- 5.3.1 It is anticipated that foundations will comprise a combination of reinforced strip and trenchfill. Vibro-improvement will be utilised in the east of the site following significant cut and fill operations.

5.4 Materials Management Plan

- 5.4.1 Remediation works require significant re-profiling of the site. Excavated materials may be considered to be waste by the Environment Agency (EA). Placement of such materials back in the ground may be considered to be a permitted activity. It is therefore recommended that a Materials Management Plan be prepared for the remediation works in order to ensure that materials are not considered to be waste by the EA.

6 REMEDIATION STRATEGY (GENERAL)

6.1 Aims

6.1.1 The principal aim of the Remediation works is to provide an appropriate development platform and resolve contamination issues in order to protect environmental receptors, and render the site suitable for the proposed development.

6.2 Overview of Preparatory Works

6.2.1 The following site preparatory works are required which do not require supervision by the Engineer:

- Stripping of turf and stockpiling for potential re-use in gardens and POS areas.
- Re-grade of site to remediated levels specified by Story Homes (anticipated to be approximately 300mm below final garden and POS areas, 450mm below proposed floor slab levels).

6.3 Overview of Remedial Works

6.3.1 The following remedial works are required which will require supervision by the Engineer:

- Excavation and removal of localised lead soil contamination at TP733.
- Contingency for previously unidentified contamination (hotspot protocol).
- Provision of clean soil in garden and public open space areas.

6.3.2 Any major deviation from the works required in this Remediation Strategy must be agreed with the Local Planning Authority (LPA). In addition, any unexpected contamination encountered during the remediation works should be brought to the attention of the LPA.

6.3.3 Following completion of remediation works, and as noted in Section 3, regrading of the site will be carried out. The proposed regrading work does not form part of this Remediation Strategy; however, it is important to note that the Contractor shall be required to ensure that all imported materials are tested to verify that they are free from contamination. A scheme for this testing shall be developed as part of the Materials Management Plan (MMP). This Remediation Strategy will form part of the MMP.

6.3.4 The MMP will need to be developed using the CL:AIRE *Definition of Waste Code of Practice* for the site, in order to avoid excavated and imported materials being considered as waste by the Environment Agency. A detailed volumetric modelling exercise will need to be undertaken prior to the MMP being completed.

6.3.5 A Materials Management Plan (MMP) will need to be developed by the Remediation Contractor using the CL:AIRE *Definition of Waste Code of Practice* for the site, in order to avoid excavated and imported materials being considered as waste by the Environment Agency. A volumetric modelling exercise will need to be undertaken prior to the MMP being completed.

6.3.6 This Remediation Strategy should form the basis of the MMP.

6.4 Site Set-up, Organisation and Safety

6.4.1 The Client shall ensure that the Contractor is provided with copies of all reports produced by IDG, in order that they can carry out their own risk assessments for the works. IDG will provide information on request relating to specific hazards associated with contamination issues respectively.

- 6.4.2 A detailed Method Statement will be prepared by the Contractor undertaking the remediation and preparatory works. This should demonstrate how the Contractor intends to carry out the works in order to achieve the remediation objectives. In particular, details of the way in which different material types are to be kept separate should be clearly stated. The Contractor's Method Statement should be forwarded to IDG to enable comments to be made prior to works commencing and a pre-start meeting is advised.
- 6.4.3 The Contractor's Method Statement should include details of how the site will be organised in order to minimise the risks to workers and the public, associated with handling contaminated materials. The following measures may need to be considered:
- Designated 'clean' and 'dirty' areas
 - Wheel washing facilities for vehicles
 - Protective clothing, footwear and gloves
 - Boot-washing facilities
 - Refuelling of mobile plant in a designated area to prevent contamination of soils on site.
- 6.4.4 Although carbon dioxide concentrations in the ground are likely to be relatively low, access into excavations must be controlled and only undertaken in accordance with the Confined Spaces Regulations 1997. The atmosphere in shored trenches in excess of 1.2m should be monitored for oxygen and hazardous gas (methane & carbon dioxide), prior to personnel entering such excavations. Monitoring should continue whilst personnel are working in deep excavations.
- 6.4.5 The remediation works summarised above shall be supervised by a suitably qualified Geoenvironmental Engineer, and the Contractor will need to provide notice of works being carried out that require supervision.

6.5 Contractor's Responsibilities

- 6.5.1 Prior to the commencement of any works the Contractor, in agreement with the Client, will:
- Fulfil any requirements of the Client's contract documentation.
 - Establish the boundaries of the site and the working areas.
 - Undertake a dilapidation survey of site boundaries, adjacent properties and highways, via dated photographs or video footage.
 - Liaise with the Local Authority regarding working hours, noise\dust\odour control, and protected trees.
 - Liaise with the Local Water Company regarding any proposed discharge to sewer.
 - Complete a full services search and liaise with all relevant utility companies regarding work in close proximity to their apparatus.
 - Prepare a detailed Method Statement outlining how the objectives of this Remedial Strategy will be achieved (and obtain approvals).
 - Inform the Engineer of any risk, identified and assessed, which could impact upon the Engineer's activities.
 - Prepare the necessary COSHH statements and Health & Safety Plan in accordance with CDM regulations.
- 6.5.2 The Contractor shall satisfy the Health & Safety Executive with regard to all matters concerning the health, safety and welfare of persons on the site.
- 6.5.3 The Contractor shall ensure that:
- Personnel, plant, materials and other equipment related to the contract are confined within the boundaries of the site.
 - Any live services lying within the site boundary are marked and protected, or appropriate arrangements made to truncate them.

- Good practices relating to personal hygiene are adopted.
- Suitable precautions are implemented at all times to prevent off-site migration of pollutants via airborne dust.
- Suitable precautions are taken to prevent the spread of mud and debris on public highways.
- Refuelling of mobile plant is undertaken in a designated area. Above ground oil storage tanks shall comply with the requirements of Pollution Prevention Guideline PPG2. A spill kit shall be kept on site, adjacent to the designated refuelling area.

7 REMEDIATION REQUIREMENTS

7.1 Delineation & Excavation of Lead Hotspot at TP733

7.1.1 Slightly elevated concentration of lead has been detected in Topsoil (0.25m) within TP733.

7.1.2 Further investigation of the TP733 area, including excavation to establish whether a source of lead may be present will be supervised by the Engineer.

7.1.3 The location of TP733 is shown on Drawing No. 4046-G-D045 presented in Appendix A.

Contractor Requirements

7.1.4 Topsoil will be excavated under the full-time supervision of the Engineer.

7.1.5 Impacted soils will be excavated and placed in temporary bunded stockpiles on hardstand or visqueen and be suitably covered.

Validation Requirements

7.1.6 A minimum of 5 verification samples of Topsoil will be obtained from the base and sidewalls of the delineation excavation which will be dispatched to a UKAS accredited laboratory where they will be scheduled for the presence of pH and toxic metals to demonstrate complete removal of the lead impacted Topsoil.

7.1.7 On receipt of the chemical analysis results, the Engineer will liaise with the Contractor regarding the most appropriate remediation option.

7.1.8 The Engineer will instruct continued removal of soil\fill if verification samples yield concentrations in excess of the clean-up criteria stated in Section 3.

7.2 Further Investigation of the Former Phosphate Storage Area

7.2.1 Site operations and soil stockpiles have prevented appropriate investigation within the footprint of the former Phosphate Storage Area depicted on Drawing 4046-G-D049 in Appendix A.

7.2.2 Upon removal of the soil stockpiles and exposure of the original ground surface, trial pits shall be excavated under supervision of the Engineer to determine ground conditions and to assess whether any sources of contamination are present.

7.2.3 Soils samples will be obtained for chemical analysis and contamination assessment in accordance with the sites proposed residential end use.

7.2.4 The findings of the supplementary investigation will be presented in a brief factual and interpretive letter report. In the event that the investigation identifies any previously undetected sources of contamination, the Engineer will liaise with the Local Authority EHO to obtain approval for the modification or amendment of the Remediation Strategy for the site.

7.3 Provision of Topsoil in Garden and POS Areas

7.3.1 The site is surfaced with natural topsoil which will be excavated and stockpiled for re-use within the development. The Engineer will inspect any stockpiles generated and assess their suitability

for use as cover material (i.e. free of visual evidence of Made Ground, contamination and foreign objects). Samples will be collected and dispatched to a UKAS accredited laboratory where they will be scheduled for chemical analysis in accordance the protocol for topsoil and subsoil presented in Appendix C.

Validation

7.3.2 Validation of the suitability of the topsoil for its use in residential gardens shall be undertaken in accordance with IDG Soil protocol presented in Appendix C.

7.3.3 Validation of cover thickness is not required.

7.4 Contingency for previously unidentified contamination (hotspot protocol)

7.4.1 Even after an appropriate preliminary investigation and ground investigation a geoenvironmental appraisal is typically based on inspection of the ground underlying less than 0.5% of the total site area. Consequently, there is always a possibility that unanticipated ground conditions will be encountered during the remediation works. Should this occur during remediation or site development works, the Contractor shall immediately seek further advice from the Engineer.

7.4.2 Any unanticipated grossly contaminated soils will be placed in temporary stockpiles on hardstand or visqueen, suitably covered and bunded.

7.4.3 The Engineer will liaise with the Local Authority EHO to obtain approval for the modification or amendment of the Remediation Strategy for the site.

Validation

7.4.4 Analysis of at least 3 samples, for an appropriate range of determinands will be undertaken. On receipt of the results, the Engineer will liaise with the Contractor regarding the most appropriate remediation option.

7.4.5 Full details of the location and nature of the contaminant source together with chemical test results and the fate of any arisings, together with regulatory correspondence will be provided in the Verification report.

7.5 Export to Landfill

7.5.1 It is anticipated that the majority of materials excavated from the site will comprise inert natural arisings. Excavation arisings that are unsuitable for retention and re-use on site will be placed in temporary stockpiles prior to removal from the site.

Contractor Requirements

7.5.2 Any material exported from site to an alternative site or to landfill should be hauled by a registered waste carrier in accordance with the requirements of the current regulations.

7.5.3 A transfer note will be completed, signed and retained by the parties involved. The transfer note should include the volume of waste, the nature of the material and a statement of its chemical composition, details of the source and destination sites, and details of the haulier.

7.5.4 In order to protect the general public from dust and vapour emissions, vehicles that are to be used for the haulage of the contaminated material from the site must be sheeted. In addition, the Contractor must ensure that no fluids seep from the wagons.

Validation

7.5.5 In order to provide the landfill facility with information regarding the chemical composition of the waste, the Contractor should request the Engineer to undertake analysis of material that requires removal from site.

8 ENGINEERING SUPERVISION AND VERIFICATION

- 8.1.1 Provided that the Contractor's advises their intended programme of works in a timely fashion, the Geoenvironmental Engineer will ensure that the requirements of this Remediation Strategy are complied with.
- 8.1.2 The responsibilities of the Geoenvironmental Engineer shall include the following:
- Supervision of the remediation works outlined above.
 - Advice on the correct handling of materials encountered.
 - Retrieval of soil samples and the subsequent scheduling of appropriate laboratory analysis to enable verification of various aspects of the works, as required.
 - Liaison with statutory authorities as required.
- 8.1.3 On satisfactory completion of all the works the Geoenvironmental Engineer will prepare a Verification Report. Copies of the Verification Report will be issued to the Client and the Local Authority. The Verification Report will stand as certification that the remediation and ground preparatory works have been carried out in accordance with this Remediation Strategy.
- 8.1.4 The Verification Report will include:
- A summary of the remediation works undertaken, including any works associated with unforeseen ground conditions
 - Verification test results associated with "hot-spot" treatment, including plans showing sample locations & levels, and the extent of any "hot-spot" excavations.
 - Details of the fate of any arisings excavated from contamination "hot-spots".
 - Verification test results associated with site won and imported fill materials.
 - Verification test results associated with the placement of any fill material to an engineering specification.
 - Verification test results associated with proposed source materials for clean cover.
 - Copies of any correspondence with Regulators relating to specific aspects of the remediation works.
 - A summary of any constraints, such as easements associated with live services or culverts, that may have led to the remedial tasks not being completed in specific areas of the site.

9 POST REMEDIATION WORKS REQUIRING VALIDATION

9.1 Provision of Topsoil in Garden and POS Areas

- 9.1.1 Validation of the suitability of either site sourced or imported topsoil for its use in residential gardens and areas of public open space shall be undertaken in accordance with IDG Soil protocol presented in Appendix C. No validation of cover depth is required.

APPENDIX A



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CLIENT	Story Homes		
JOB TITLE	Phase 3A, Edgehill Park, Whitehaven		
DRAWING TITLE	Site Location Plan		

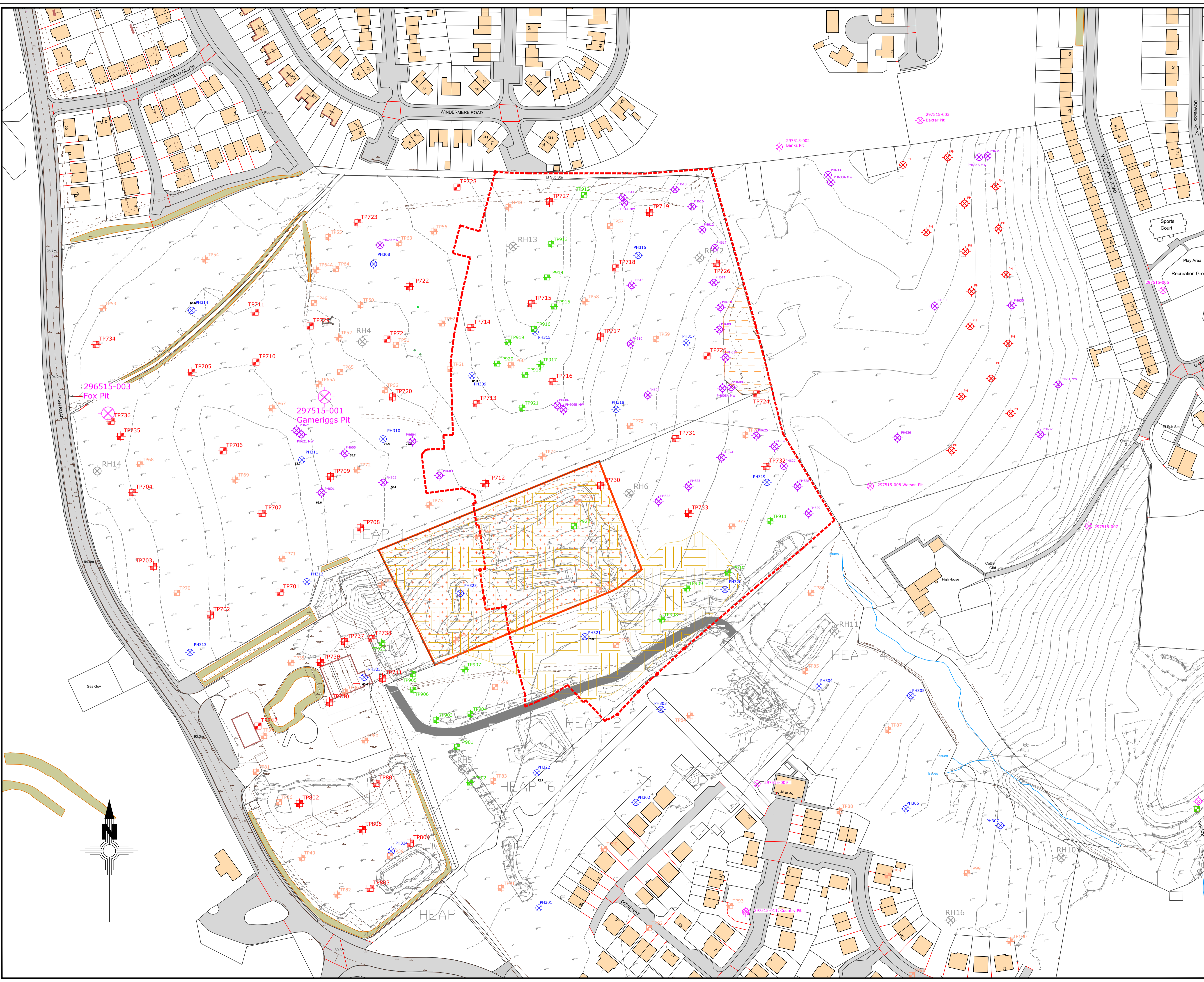
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APPROVED BRB	SIGNATURE	DATE 18-06-21	SCALE 1:25,000@A4	DRG No. 4046-G-D048

A4 border: 186 x 218

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- KEY**
- P3A Site Boundary
 - Former Phosphate Storage Area
 - Soil Stockpiles
 - Evidence of Excavation

- Exploratory Holes 2010-2021**
- TP900 IDG Trial Pit 2021
 - ⊗ PH600 IDG Probehole 2020
 - ⊗ TP700 IDG Trial Pit 2020
 - ⊗ PH300 IDG Probehole Dec 2016
 - ⊗ PH500 IDG Probeholehole Sept 2018
 - ⊕ TP Integra Trial Pit (June 2011)
 - ⊗ RH5 Integra Probehole (2009-11)
 - ⊗ 296515-001 CA Recorded Mine Shaft



Revision	Description	Date

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CLIENT
Story Homes

JOB TITLE
Edgehill Park Phase 3A

DRAWING TITLE
Exploratory Hole Location Plan

STATUS
FINAL

DRAWN BY NW	SIGNATURE	DATE 17-06-21
APPROVED BRB	SIGNATURE	DATE 18-06-21

SCALE 1:1000@A1	DRG No. 4046-G-D049
---------------------------	-------------------------------

DO NOT SCALE



El Sub Sta

Legend

- 0.5 Cut Depth
 - +0.5 Fill Depth
 - FFL 80.00 Proposed finished floor level
- Between existing and proposed profiles

Note

Contours shown are proposed finished levels at 200mm intervals.

Proposed Volumes to formation
 Taken between post site scrape surface (extg -270mm) and proposed site formation levels (-400 average)

Cut	16,530 m ³
Fill	18,660 m ³
Net	-2,130 m ³

Assumed Construction thicknesses:

Highway	= 800mm
Footway	= 280mm
Shared Drive	= 360mm
Private Drive	= 330mm
Building	= 400mm
Garage	= 300mm
Garden	= 300mm

Note:

Approx 14,600cu.m. of topsoil will be generated by a 270mm site scrape based on 5.40Ha

Approx 6,900cu.m. of topsoil will be required in proposed garden and POS areas (300mm thick) based on 2.3Ha

7,700cu.m. topsoil surplus to be exported off-site

Arising Calculations:

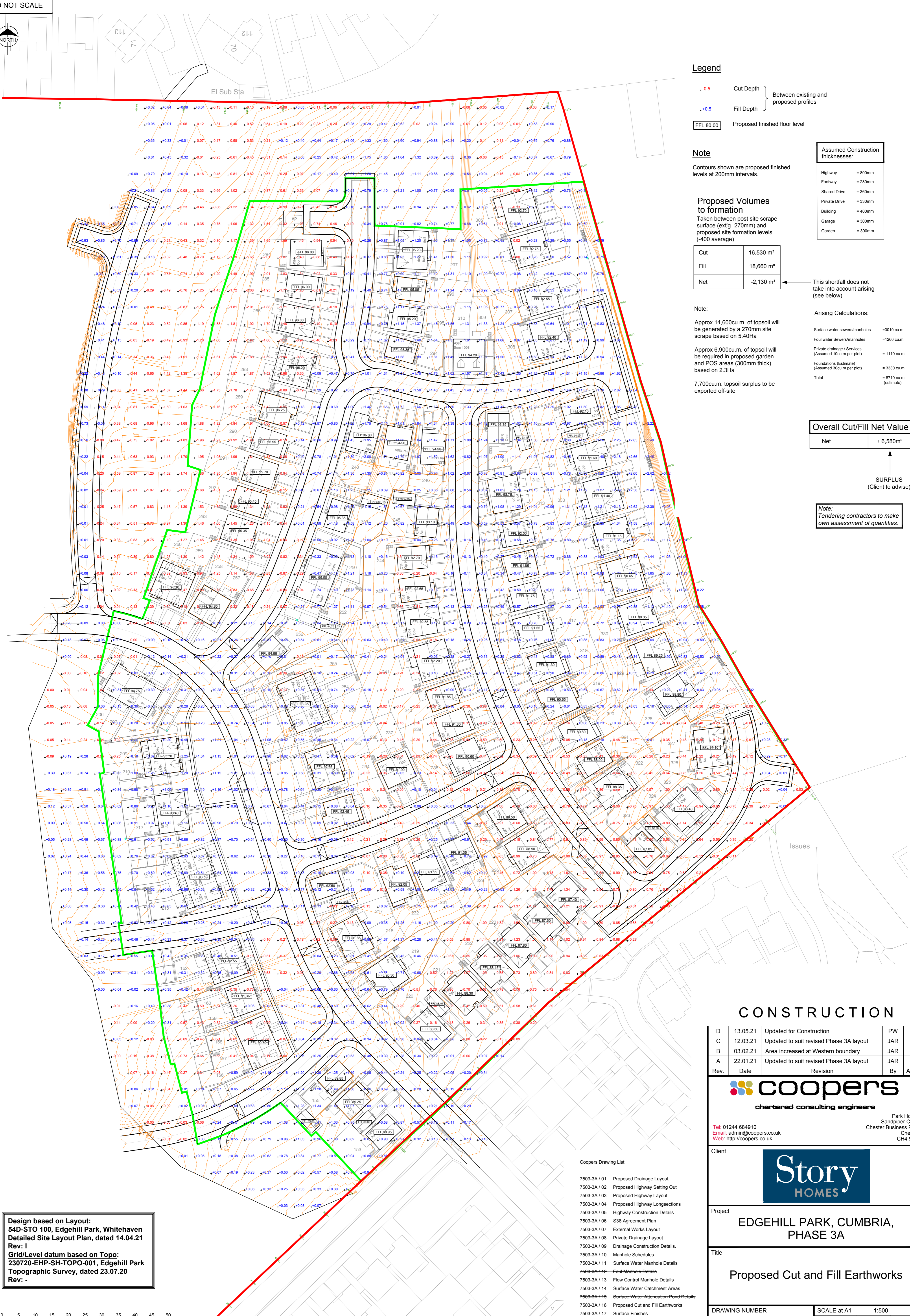
Surface water sewers/manholes	=3010 cu.m.
Foul water Sewers/manholes	=1260 cu.m.
Private drainage / Services (Assumed 10cu.m per plot)	= 1110 cu.m.
Foundations (Estimate) (Assumed 30cu.m per plot)	= 3330 cu.m.
Total	= 8710 cu.m. (estimate)

Overall Cut/Fill Net Value

Net	+ 6,580m ³
-----	-----------------------

SURPLUS (Client to advise)

Note: Tenders contractors to make own assessment of quantities.



CONSTRUCTION

D	13.05.21	Updated for Construction	PW	AJ
C	12.03.21	Updated to suit revised Phase 3A layout	JAR	AJ
B	03.02.21	Area increased at Western boundary	JAR	AJ
A	22.01.21	Updated to suit revised Phase 3A layout	JAR	AJ
Rev.	Date	Revision	By	Appd.



Tel: 01244 684910
 Email: admin@coopers.co.uk
 Web: http://coopers.co.uk



Client: **Story HOMES**

Project: **EDGEHILL PARK, CUMBRIA, PHASE 3A**

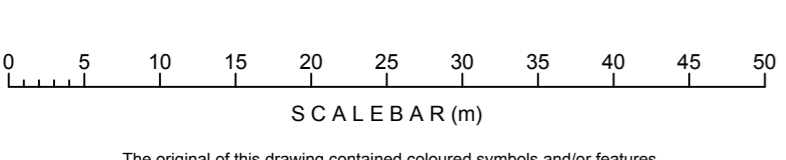
Title: **Proposed Cut and Fill Earthworks**

DRAWING NUMBER	7503-3A / 16	SCALE at A1	1:500
DATE	Sept '20	REVISION	D
DRAWN	JAR	CHECKED	AJ





Coopers Drawing List:

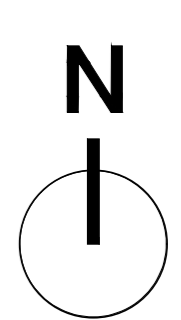
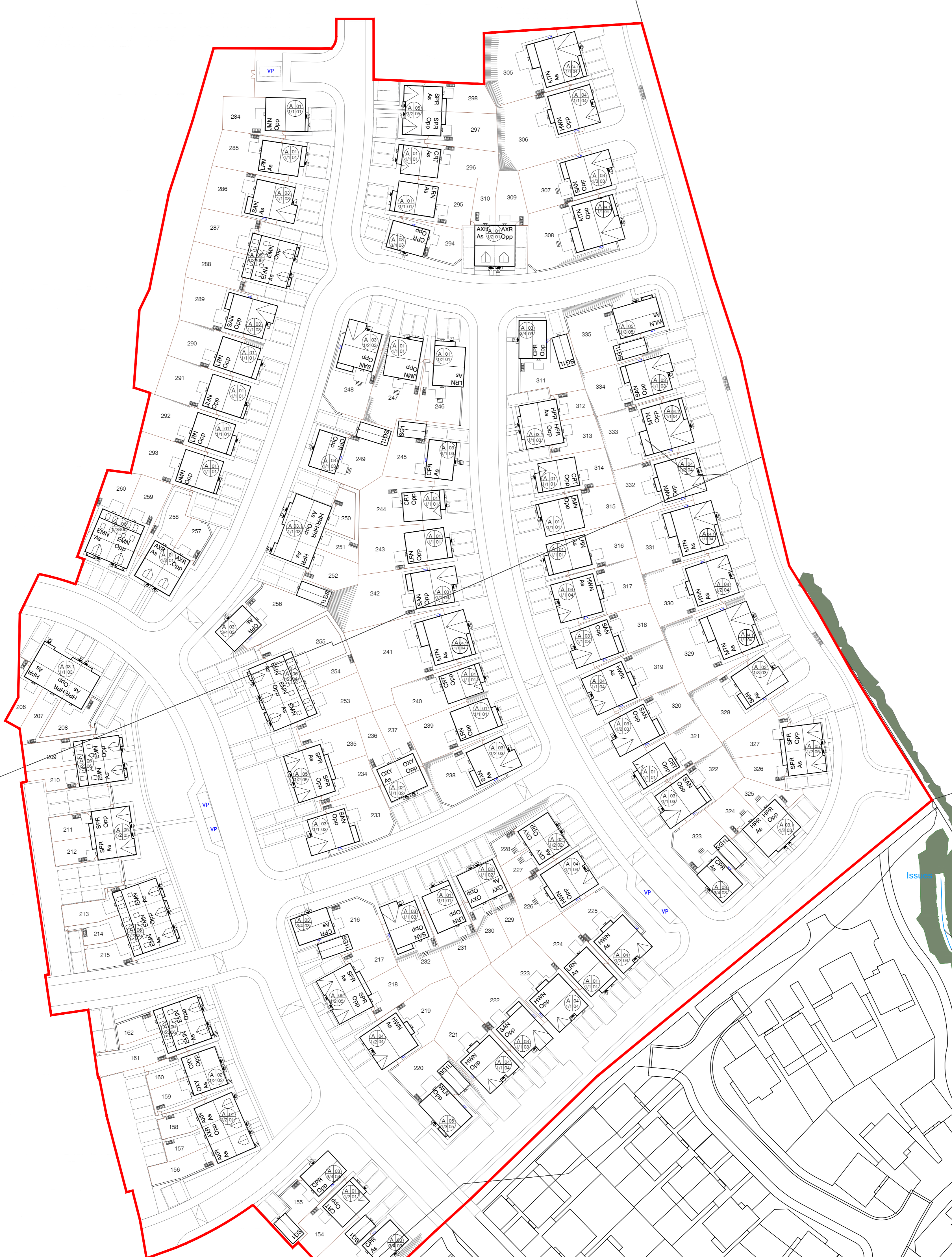
- 7503-3A / 01 Proposed Drainage Layout
- 7503-3A / 02 Proposed Highway Setting Out
- 7503-3A / 03 Proposed Highway Layout
- 7503-3A / 04 Proposed Highway Longsections
- 7503-3A / 05 Highway Construction Details
- 7503-3A / 06 S38 Agreement Plan
- 7503-3A / 07 External Works Layout
- 7503-3A / 08 Private Drainage Layout
- 7503-3A / 09 Drainage Construction Details.
- 7503-3A / 10 Manhole Schedules
- 7503-3A / 11 Surface Water Manhole Details
- 7503-3A / 12 Foul Manhole Details
- 7503-3A / 13 Flow Control Manhole Details
- 7503-3A / 14 Surface Water Catchment Areas
- 7503-3A / 15 Surface Water Attenuation Pond-Details
- 7503-3A / 16 Proposed Cut and Fill Earthworks
- 7503-3A / 17 Surface Finishes
- 7503-3A / 18 S104 Sewer Easement Plan

Design based on Layout:
 54D-STO 100, Edgehill Park, Whitehaven
 Detailed Site Layout Plan, dated 14.04.21
 Rev: I
 Grid/Level datum based on Topo:
 230720-EHP-SH-TOPO-001, Edgehill Park
 Topographic Survey, dated 23.07.20
 Rev: -



Legend

-  Level Access Plots
-  Garden Batter
-  Bin Store
-  Pack Information - Refer to Housetype Drawings



FOR CONSTRUCTION



Edgehill, Phase 3

General Arrangement

DRAWN BY	MQ	DATE	05/01/21
CHECKED BY	-	SCALE	1:500 @ A0
DRAWING NUMBER	20078.90.9.GA	REVISION	A
SITE REFERENCE	20078		

Revisions		
A	Drawing status changed to construction. Private shared drive between plots 331-332 linked.	24.05.21

Development Scheme - Edgehill Park Phase 3

Ref	House Name	Range	House Type	Sq Ft Garage/Parking	RSL No.	INT No.	Open No.	Total Sq Ft	
OXY	Oxley	A Series	2 Bed Semi	691	Parking		8	523	
HPR	HARPER	A Series	3 Bed Semi	855	Parking		4	3420	
HPR	HARPER	A Series	3 Bed Terraced	855	Parking		4	5130	
SPR	SPENCER	A Series	3 Bed Semi	960	Parking		10	9600	
CTR	CARTER	A Series	3 Bed Detached	956	Single Integ		6	5748	
COO	COOPER	A Series	3 Bed Detached	1031	Single Det		9	9279	
AXR	ALEXANDER	A Series	3 Bed Semi	1114	Parking		4	4456	
AXR	ALEXANDER	A Series	3 Bed Terraced	1114	Parking		3	3342	
LRN	LARSON	A Series	4 Bed Detached	1109	Single Integ		10	11090	
JSN	JAMISON	A Series	4 Bed Detached	1207	Single Integ		5	6035	
EMN	EMMERSON	A Series	4 Bed Semi	1292	Parking		8	10336	
EMN	EMMERSON	A Series	4 Bed Terraced	1292	Parking		6	7752	
SAN	SANDERSON	A Series	4 Bed Detached	1412	Single Integ		14	13768	
WLN	WILSON	A Series	4 Bed Detached	1425	Single Det		2	2850	
HWN	HEWSON	A Series	4 Bed Detached	1561	Single Integ		10	15610	
MTN	MASTERSTON	A Series	5 Bed Detached	1803	Integ		6	10818	
Total Number of Units and Square Foot								111	130762

APPENDIX B

Copeland Borough Council
Development Control
The Copeland Centre Catherine Street
Whitehaven
Cumbria
CA28 7SJ

Our ref: NO/2020/113153/01-L01
Your ref: 4/20/2474/OR1
Date: 22 December 2020

Dear Sir/Madam

**RESERVED MATTERS APPLICATION (ACCESS, APPEARANCE, LANDSCAPING, LAYOUT AND SCALE) FOR ERECTION OF 335 DWELLINGS INCLUDING ASSOCIATED INFRASTRUCTURE PURSUANT TO OUTLINE PLANNING APPROVAL 4/13/2235/001
LAND BOUND BY WOODHOUSE TO NORTH & HIGH ROAD / WILSON PIT ROAD TO WEST & SOUTH, WHITEHAVEN**

Thank you for consulting us on the above application, which we received 2 December 2020.

Environment Agency position

We have no specific comments to make regarding the Reserved Matters application for access, appearance, landscaping, layout or scale.

We have reviewed the supplementary Geoenvironmental Appraisal –Phase 3 Edgehill park, Whitehaven report 4046 –G-RO19 November 2020. We would like to make the following comments and observations, prior to any submission to discharge the contaminated land conditions (Condition 27) for Phase 3.

The comments below relate to the specified sections of the report.

The commission and Brief

1.14 – The agreed scope of works does not appear to include a quantitative risk assessment for Controlled Waters – has this been undertaken?

Site Description and general development proposals

2.2.4 - The 17,000 m³ of stockpiled material from the carpark was determined as waste at the time. It was granted temporary storage for a year under the Waste Regulations Exemption, but this has now been exceeded. See 3.4.10

3.2.8 –Integra’s proposal to place the geotechnically unsuitable material 300mm below

Environment Agency
Lutra House Walton Summit, Bamber Bridge, Preston, PR5 8BX.
Customer services line: 03708 506 506
www.gov.uk/environment-agency

Cont/d..

POS should comply with waste permitting Regulations.

4.2.2 Importantly one BGS borehole NX91 NE 405 in the tanker depot shows slag infill directly over bedrock, with protective cover of clay.

Preliminary Conceptual Site Model

6.1.4 – potential contamination- There is no detail regarding the remediation of the loss of PCB contaminated oil when the transformer was removed. Further detail is required concerning the excavation of, volume removed and verification/validation of that material.

6.1.13-15 The proximity of the spring discharge (20m) and the limited natural till cover over the aquifer are sufficient evidence to require the revision of the risk to Controlled Waters to 'moderate' sensitivity.

6.2 The conceptual site model has omitted the risk to Surface water and groundwater in the table and should be revised accordingly.

7.1.3 PCB compounds should be included in the list of potential contaminants.

Contaminant Sources

13.2.2 – The re-use of the clay should comply with Waste Regulations or DOWCOP.

Made ground / Hydrocarbon contamination

13.2.7 / 13.2.10– whilst the more recent soil testing did not show any evidence of significant contamination, The EA support the need for further testing following removal of the concrete slab and testing for the presence of anhydrite/gypsum material and hydrocarbons. The thin clay, or lack of clay (see BGS borehole) suggests there is a higher degree of risk of contamination to the underlying aquifer.

Groundwater

13.2.11 – 'No significant groundwater contamination was encountered..' this wording should be revised to reflect the groundwater monitoring that was undertaken, and should specifically address the status of contamination in the different groundwater systems.

Pollutant Linkages

13.3.2 The table for actions beneath the former tanker depot should be revised to reflect the need for further investigation for risk to Controlled Waters. Also the removal of the stockpiles is a necessity for breach of its temporary storage under the Waste Regulations. The fact that the material is geotechnically unsuitable supports the need for its removal. 13.5.11 addresses EA concerns

Potential Remedial options

13.5.2 /13.5.3/ 13.5.6 / 13.5.9 – Waste Permitting or DOWCOP may apply for relocation of contaminated materials which are regarded as a Controlled Waste

13.5.4 – The 2 year timescale to allow weathering of the Anhydrite stockpile is at odds with Waste Regulations for temporary storage of waste.

13.5.8 Retention of contaminants in the clay cell forming the reservoir needs further understanding and environmental assessment from a water quality perspective. The proposal of permeable topsoils and /or subsoils to form the 600mm cap over the reservoir, will need to address impact on the isolated groundwater body within the reservoir and the possible consequence of total saturation /overspill .The benefits of a low permeability cap should be considered.

13.5.11 – EA support this recommendation

13.5.12- covering is acceptable for non/low-soluble organic contaminants. Proposed mitigation is required in the event of free product and soluble contaminants in soils and groundwater.

17.7 – A contingency plan is required for removal of groundwater from excavations. Most dewatering requires permitting, but under Regulation 5 of water Abstraction and impoundment (exemptions) Regs 2017 there are exemptions if abstraction <6 months and it either discharges to soakaway or <100m³/day (or <50m³/day or less than 500m from a designated site)

Further works

17.10.2 – agree. But this needs to include assessment of hydrocarbon contaminants and mitigation proposals for remediation of mobile contaminants of concern.

17.10.3 – trial pit investigations should undertake total and leachable tests to determine solubility and assess risk.

17.10.4 – agree

Detail of oil remediation in the former transformer should be reviewed and if necessary, further investigative work undertaken

FOR INFORMATION

All surplus contaminated material should be regarded as waste and assessed for disposal under the terms of waste regulatory controls. Re-use of material (in the absence of waste permit or exemption) is acceptable if it complies with requirements CL:AIRE Definition of Waste Code of Practice (DOWCOP) for waste management. Relocation and burial of arsenic contaminated materials under roads for example will need to be compliant with DOWCOP providing geotechnical and geoenvironmental assessments for suitability are acceptable.

The CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2) provides operators with a framework for determining whether or not excavated material arising from site during remediation and/or land development works is waste or has ceased to be waste. Under the Code of Practice:

- excavated materials that are recovered via a treatment operation can be reused on-site providing they are treated to a standard such that they are fit for purpose and unlikely to cause pollution
- treated materials can be transferred between sites as part of a hub and cluster project
- some naturally occurring clean material can be transferred directly between sites

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, and that the permitting status of any proposed on-site operations are clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

We recommend that developers should refer to:

the [position statement](#) on the Definition of Waste: Development Industry Code of Practice

The [waste management](#) page on GOV.UK

Waste to be taken off-site

Contaminated soil that is (or must be) disposed of is waste. Therefore, its handling, transport, treatment and disposal are subject to waste management legislation, which includes:

- Duty of Care Regulations 1991
- Hazardous Waste (England and Wales) Regulations 2005
- Environmental Permitting (England and Wales) Regulations 2016

- The Waste (England and Wales) Regulations 2011

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically in line with British Standard BS EN 14899:2005 'Characterization of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays. If the total quantity of hazardous waste material produced or taken off-site is 500kg or greater in any 12 month period, the developer will need to register with us as a hazardous waste producer. Refer to the [hazardous waste](#) pages on GOV.UK for more information.

Consultation regarding COMAH regulations

This planning permission consultation has also been received by HSE, and passed to the Environment Agency for comment regarding any implications under the COMAH regulations. We have no comment to make concerning this regime.

Yours faithfully

Mrs Liz Locke
Sustainable Places Officer

e-mail clplanning@environment-agency.gov.uk

Our Ref: 4046-G-LR016 Rev A

Date: 14th February 2021

Mr Craig Kerr
Story Homes
Story House
Lords Way
Kingmoor Business Park
Carlisle
CA6 4SL



North West & Midlands
Caledonian House, Tatton Street,
Knutsford, Cheshire, WA16 6AG
t: 01565 755557

North East & Yorkshire
The Stables, Aske Hall, Aske,
Richmond
North Yorkshire, DL10 5HG
t: 01748 889010

Dear Mr Kerr,

Environment Agency Correspondence Reference NO/2020/113153/01-L01 in Respect of Reserved Matters - Outline Planning Application 4/13/2235/0/O1 – Wilson Pit Road/High Road, Whitehaven

We have reviewed the above Environment Agency consultation received by Copeland Borough Council and are pleased to present our comments in the order presented in the Agencies correspondence. A copy of the correspondence is provided in Appendix A to this letter.

Commission & Brief

1.4; We were not appointed to undertake a quantitative controlled waters risk assessment – previous reports by Integra Consulting which relate to the subject site have been submitted to the regulator and, on the basis of their conceptual site model, have not necessitated a quantitative controlled waters risk assessment prior to approval of the previous phases of development. However, we note that we did not present a summary of Integra’s PCM, nor did we provide a detailed qualitative discussion of the site’s groundwater regime indicated by our exploration findings. In light of the revised conceptual model, we shall be presenting a revised report which provides fuller discussion of the site’s groundwater regime and influence of contamination sources.

Site Description & General Development Proposals

2.2.4 & 3.2.8; Acknowledged – further discussion regarding anhydrite waste stockpile is provided below.
4.4.2; Acknowledged, although we note that we incorrectly referenced NX91 NE405 as BH01. It was NX91 NE303.

Preliminary Conceptual Site Model

6.1.4: As stated in IDG Report 4046-G-R019, remediation (delineation and excavation) of the transformer fluids was supervised by Integra Consulting and is presented in Report Post Remediation Validation Report for the Site at the Former TDG Tanker Depot, High Road, Whitehaven Cumbria for Story Land reference 2074 dated June 2010. It is understood that the spillage had accumulated in a 0.2m thick granular made ground directly over natural boulder clay. Approximately 50m³ of material was removed, stockpiled and sampled. Further detail is presented in the copy of Integra’s validation report presented in Appendix B.

6.1-6.13-15 & 6.2: Acknowledged – Further assessment of risks to surface water and groundwater presented in 4046-G-R019 Rev B.

7.1.3: Integra’s validation report demonstrates that all of the spilled PCBs were removed. In the absence of any further source we do not consider further analysis to be necessary.

Contaminant Sources

13.2.2: Acknowledged.

Made Ground/Hydrocarbon Contamination

13.2.7/ 13.2.10: Any further risk to the secondary aquifer will be undertaken during assessment of the made ground exposed following the concrete slab removal works within the former TDG Depot.

Groundwater

13.2.11: Acknowledged – the groundwater regime is re-assessed in the revised report reference 4046-G-R019 Rev B.

We note that the anhydrite stockpile was granted temporary storage under a Waste Regulations Exemption and that this has now been exceeded. We are carrying out further geotechnical, chemical and mineralogical testing as part of ongoing remediation options appraisal. We have also advised our Client placement of the anhydrite beneath 300mm of soil cover (or anywhere else within the site) should be subject to waste permitting regulations.

Pollutant Linkages

13.3.2: Acknowledged. Further assessment of the anhydrite stockpile is ongoing to determine an appropriate means of re-use or deposition.

Potential Remedial Options

13.5.2/13.5.3/13.5.6/13.5.9 – The correspondence indicates that Waste Permitting or DOWCOP (CL:AIRE Definition of Waste Code of Practice) procedures may apply to relocation of contaminated materials which are regarded as Controlled Waste (i.e. the Anhydrite Stockpile). IDG have corresponded with the Environment Agency (email 20-1-21) and the Environment Agency have confirmed that they will not object to re-use on site in accordance with DoWCoP provided an appropriate Remediation Strategy is provided which fully complies with DoWCoP. A copy of the Environment Agencies response dated 10th February 2021 is presented in Appendix C to this letter.

13.5.4: Acknowledged, see above email comments received from the Environment Agency.

13.5.8: Further investigation to establish the chemistry, mineralogy, potential for gypsification (letter Report 4046-G-LR015) and leachability of the Anhydrite is ongoing to establish the most appropriate means of retention of the Anhydrite within the site.

13.5.11: Acknowledged.

13.5.12: Acknowledged. Further assessment of the potential for mobile/leachable contaminants beneath the TDG Depot will be required during site remediation and preparatory works.

17.7: Acknowledged. Clarification of the requirements for dewatering excavations will be presented in the Remediation Strategy Report.

Further Works

17.10.2/17.10.3/17.10.4: Acknowledged. Confirmation of the satisfactory remediation at the site of the former transformer spillage is provided in Appendix B to this letter.

We trust that that the above clarifications are appropriate. Please do not hesitate to contact us if you have any questions.

Yours sincerely,

Nick Ward BSc (Hons), FGS
for and on behalf of
iD GEOENVIRONMENTAL LIMITED

Appendix A: Environment Agency Correspondence NO/2020/113153/01-L01
Appendix B: Integra Validation Report Reference 2074 Rev SS (2010)
Appendix C : Environment Agency Correspondence dated 10th February 2021

Nick Ward

From: Drewery, Sarah
Sent: 10 February 2021 13:51
To: Nick Ward
Cc: McFarlin, Matthew; Bardsley, Peter; Locke, Liz
Subject: Anhydrite stockpile - Correspondence reference NO/2020/113153/01-LO1

Hi Nick,

As discussed earlier, as the original plan was for re-use on site under DoWCoP and the stockpiled material is site-derived we will not object to the use of DoWCoP on this occasion provided we agree with your amended remediation strategy and provided you comply fully with DoWCoP. It is unfortunate that it has been stockpiled for so long but re-use on site under an MMP would clearly be the best environmental option for the material.

Regards,

Sarah

Sarah Drewery | Senior Environment Officer, Cumbria & Lancashire Area
Environment Agency | Lutra House, Dodd Way, Walton Summit, Preston PR5 8BX
Direct Tel: 02030231420 Internal: 31420

INCIDENT HOTLINE (24 hrs) - 0800 80 70 60
GENERAL ENQUIRIES (Mon-Fri, 8am-6pm) - 03708 506 506
FLOODLINE (24 hrs) - 0345 988 1188
WEBSITE - www.gov.uk/environment-agency

Document Protective Marking (GSC): OFFICIAL



Waste crime - see it, report it 0800 555 111

RIGHT WASTE, RIGHT PLACE



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APPENDIX C

IDG Protocol for Soil Cover Validation Residential with Consumption of Homegrown Produce



Introduction

Isolation of Made Ground material beneath a cover of “clean” subsoil and topsoil in residential gardens is often recommended where Made Ground is to be left in-situ; most notably when it contains some inorganic and organic contaminants at concentrations above guidance threshold values.

A cover is only required in residential gardens underlain by Made Ground. The soil cover breaks direct contact pollutant linkages between the contaminants in the Made Ground and future residents.

The Local Authority’s Environmental Health Department and the NHBC (or other warranty providers) generally require as a condition of planning a validation report be submitted to confirm the thickness and chemical suitability of the cover soils placed in residential garden areas. Validation reports are normally prepared by independent geoenvironmental consultants such as ID Geoenvironmental Limited.

Soil cover validation requires independent assessment of;

- Confirmation of the chemical/physical suitability of the cover soil (i.e. topsoil and subsoil).
- Verification of the thickness of the placed cover soils.

Sources of Cover Soils

Site Won Materials

It is often possible to “win” suitable subsoil and/or topsoil materials from a development site. However, in order to ensure that materials are suitable for use, and remain suitable for use during the development process, careful assessment, segregation and handling of the soil will be required.

Natural clay or sand excavated during site remediation works or during development (such as during the excavation of service trenches or foundations) can often be suitable for use as a subsoil. Topsoil can sometimes be won from landscaped areas of the site during the remediation and preparatory works stages of the development.

Site won materials should be subject to the same validation requirements as for imported materials.

Imported Cover Soils

Imported cover soils can be derived from three different sources;

- Greenfield
- Brownfield
- Recycling Centre

IDG advocates the sampling of cover soils after importation to site. Where soil is sampled at source, additional confirmatory testing may be required following import to site.

Inspection and Sampling of cover soil following import to site by IDG

In most cases, soil is delivered to site prior to sampling and chemical testing. Such soils should be stockpiled in a secure location on site and IDG should be contacted to arrange for visual inspection, sampling and chemical testing. Once the stockpile has been sampled no further material should be added to the stockpile. It is strongly recommended that soils should not be placed in gardens, prior to confirmation of the suitability of the soil by IDG. This normally takes two weeks from initial notification.

IDG Protocol for Soil Cover Validation Residential with Consumption of Homegrown Produce



Soil Suitability

Physical Suitability

Suitable soil material should:

- Principally comprise natural materials.
- Be clean and free of foreign debris, building waste materials or contaminants.
- Not have a stone content of greater than 20% by visual estimation.
- Have a maximum stone size of 150mm in any one direction.
- Not have been sourced from an area within 7m laterally, or 3m vertically, of Japanese Knotweed plants, and not contain any Japanese Knotweed fragments (rhizomes, leaves, stems etc).

Chemical Suitability

A summary of recommended sampling frequencies and chemical analysis suites for varying sources of cover soils is presented in Table 1 overleaf. In addition further analysis may be required depending on the historical land uses of the sites the cover soils are derived from.

IDG will inspect soil chemical test results provided by the soil supplier or in certain circumstances visit and sample the source location. On receipt of written confirmation from IDG, the Client should instruct his Contractor to commence importation. It is recommended that each imported batch of soil be placed in separate stockpiles whilst chemical test results are awaited.

On importation to site, IDG should inspect the stockpiled material and the Contractor should provide the Client with appropriate haulage notes detailing the source and volume of material imported.

The number of samples to be tested and the chemical analysis suite undertaken will be dependent on the nature of the source and the quantity of material to be imported. Both the testing ratios and chemical analysis suites presented in Table 1 should be agreed with the Local Authority (EHO) before testing is undertaken.

A less frequent sampling rate may be appropriate where large volumes (say >2,000m³) of soil are imported from a single, relatively homogenous greenfield source.

The Client\Contractor will be notified of the soil's suitability (or otherwise) immediately following receipt of the results (typically taking 7 working days). Chemical assessment criteria for cover soils are presented in Tables 2 and 3 below.

Chemical testing to determine the relative concentrations of determinands present should be supplemented by total organic carbon analysis (TOC). It is widely accepted that soil organic matter contains 58% carbon. Therefore the soil organic matter (SOM) content may be derived by means of the following equation:

$$\text{SOM} = \text{TOC} / 0.58$$

The appropriate screening criteria presented in Tables 2 and 3 should be relative to the average SOM of the proposed cover soils.

**IDG Protocol for Soil Cover Validation
Residential with Consumption of Homegrown Produce**



Table 1 – Sampling Frequency and Chemical Analysis Suites Summary Table

	Nature of Source Material	Sampled	Sampling Frequency	Minimum Testing Suite	Sampling Requirements	
Site Won Material	Greenfield	On site	1:100m ³ - Topsoil	pH, metals, speciated PAH, Total Organic Carbon	Minimum of 3 samples to be tested from each designated stockpile. No further material to be added to the stockpile once it has been sampled.	
			1:250m ³ - Subsoil			
	Brownfield	On site	1:50m ³ - Topsoil	pH, metals, speciated PAH, Banded TPH, BTEX, Total Organic Carbon & Asbestos Screen	Minimum of 3 samples to be tested from each designated stockpile. No further material to be added to the stockpile once it has been sampled.	
			1:100m ³ - Subsoil			
Imported Cover Soils	Greenfield	At source	1:100m ³ - Topsoil	pH, metals, speciated PAH, Total Organic Carbon	Two sampling methodologies can be used; <ul style="list-style-type: none"> • Sampling from stockpile. Minimum of 3 samples to be tested from each designated stockpile. No further material to be added to the stockpile once it has been sampled. • In-situ sampling of cover soils on a grid pattern across a designated area of the site. An adequate number of samples should be taken to satisfy the sampling frequency. 	
			1:250m ³ - Subsoil			
		Following delivery to site		1:100m ³ - Topsoil	pH, metals, speciated PAH, Total Organic Carbon	Minimum of 3 samples to be tested from each imported batch of stockpiled material. No further material to be added to the stockpile once it has been sampled.
				1:250m ³ - Subsoil		
	Brownfield	At source		1:50m ³ - Topsoil	pH, metals, speciated PAH, Banded TPH, BTEX, Total Organic Carbon & Asbestos Screen	Minimum of 3 samples to be tested from each designated stockpile. No further material to be added to the stockpile once it has been sampled.
				1:100m ³ - Subsoil		
		Following delivery to site		1:50m ³ - Topsoil	pH, metals, speciated PAH, Banded TPH, BTEX, Total Organic Carbon & Asbestos Screen	Minimum of 3 samples to be tested from each imported batch of stockpiled material. No further material to be added to the stockpile once it has been sampled.
				1:100m ³ - Subsoil		
	Recycling Centre	At recycling centre		1:50m ³ – Topsoil & Subsoil	pH, metals, speciated PAH, Banded TPH, BTEX, cyanide, phenols, Total Organic Carbon & Asbestos Screen	Minimum of 3 samples to be tested from each designated stockpile. No further material to be added to the stockpile once it has been sampled.
		Following delivery to site		1:50m ³ – Topsoil & Subsoil		

**IDG Protocol for Soil Cover Validation
Residential with Consumption of Homegrown Produce**



Hard to Excavate Layers

Cover layers can often include a “difficult to dig” or capillary break layer of coarse natural or recycled aggregate. Where this aggregate is sourced from recycled materials (such as crushed demolition arisings) asbestos screening tests should also be undertaken.

Table 2 - Common Inorganic Determinands

Contaminant	Assessment Concentration (mg/kg)			Source
	% Soil Organic Matter			
	1%	2.5%	6%	
pH	>6 to <8			Initial assessment only
Arsenic	37			S4UL LQM/CIEH 2015
Cadmium	11			S4UL LQM/CIEH 2015
Chromium	910			S4UL LQM/CIEH 2015 value for Chromium III
	6			S4UL LQM/CIEH 2015 value for Chromium VI
Copper	2,400			S4UL LQM/CIEH 2015
Lead	200			SP1010: Development of C4SLs for Assessment of Land Affected by Contamination-Policy Companion Document, December 2014.
Mercury	40			S4UL LQM/CIEH 2015
Nickel	130			S4UL LQM/CIEH Revised Aug 2015
Selenium	250			S4UL LQM/CIEH 2015
Zinc	3,700			S4UL LQM/CIEH 2015
Asbestos	Not Detected			UKAS accredited asbestos screen

Table 3 - Common Organic Determinands

Contaminant	Assessment Concentration (mg/kg)			Source
	% Soil Organic Matter			
	1%	2.5%	6%	
Benzene	0.21	0.23	0.49	IDG Assessment criteria based on S4UL parameters and C4SL exposures for residential with homegrown produce without indoor inhalation pathway
Toluene	280	337	770	
Ethyl Benzene	200	253	580	
Xylenes (p-xylene)	360	454	1000	
**Benzo(a)pyrene (as surrogate marker)	1.6	1.95	2.14	
Acenaphthene	222	528	1,150	
Acenaphthylene	180	431	954	
Anthracene	2,390	5,440	10,900	
Benz(a)anthracene	9.15	12.3	14.3	
Benzo(a)pyrene	2.25	2.74	3.00	
Benzo(b)fluoranthene	2.63	3.33	3.71	
Benzo(g,h,i)perylene	318	340	349	
Benzo(k)fluoranthene	78	93	101	

IDG Protocol for Soil Cover Validation Residential with Consumption of Homegrown Produce

Contaminant	Assessment Concentration (mg/kg)			Source	
	% Soil Organic Matter				
	1%	2.5%	6%		
Chrysene	15.3	22.3	27.1		
Dibenzo(a,h)anthracene	0.25	0.29	0.31		
Fluoranthene	286	561	898		
Fluorene	173	409	880		
Indeno(1,2,3-cd)pyrene	27.7	36.4	41.4		
Naphthalene	27	64.4	147		
Phenanthrene	97	221	442		
Pyrene	622	1,250	2,040		
GRO C ₅ -C ₆	90*	180*	380*		IDG Assessment criteria based on S4UL parameters and C4SL exposures for residential with homegrown produce without indoor inhalation pathway
GRO C ₆ -C ₈	150*	340*	770*		
GRO C ₈ -C ₁₀	58	130	300		
DRO C ₁₀ -C ₁₂	83	190	420		
DRO C ₁₂ -C ₁₆	150	330	670		
DRO C ₁₆ -C ₂₁	270	550	940		
LRO C ₂₁ -C ₃₅	1,100	1500	1,700		
Phenol	152	278	535		

* BTEX compounds must also be assessed with Aromatic C5-C7, Aromatic C7-C8, GRO C5-C6 and TPH C6-C8 bandings

**Benzo(a)pyrene assessed as surrogate marker for genotoxic PAH. Oral HCV based on minimal risk value (CLAIRE 2014, Appendix E Table 2.2) ID_{Oral} of 0.021 ug/kgBW/day compared to oral, dermal and inhalation exposures and ID_{Inhal} of 0.0003 ug/kgBW/day compared to inhalation exposure.

Placed Thickness Validation

Thickness can only be checked after placement, but should be done before turfing, fencing etc. Thickness will be checked via the excavation of an appropriate number of inspection trial pits. Typically one trial pit for every two gardens will be required.

The thickness of cover is dependent on the nature and degree of contamination (and often the Local Authority whose area the site lies within), but typically between 600mm and 1,000mm is required. Where underlying materials do not contain contaminants above critical concentrations but contains materials generally considered undesirable as a near-surface material in garden areas (i.e. construction rubble) then a 300mm thick cover, in accordance with NHBC Standards, Chapter 9.2, should be adequate.

Soil cover is usually placed many weeks after completion of the preparatory\remedial works, and issue of the associated Verification Report. Consequently, site visits, to generate supplementary letter reports, are typically required after soil cover has been placed in the gardens of each plot, or set of plots.

Issue of Soil Cover Validation Reports

Validation reports will be issued by IDG following the confirmation of the placed thickness within each plot, or set of plots. Each report will contain the following information;

- Details of the provenance of the subsoil and topsoil.
- Chemical test data.
- An interpretation of the chemical data indicating whether the soils are suitable for use in a clean cover layer.
- Photographs of the excavated trial pits confirming the thickness of placed soils.
- A data table indicating the thickness of cover soils within each trial pit excavated.

Soil Cover Validation Reports will be issued to the Client, Local Authority and to the NHBC by email.