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REMEDIATION OPTIONS APPRAISAL, STRATEGY AND VERIFICATION PLAN

FOR

**PROPOSED DEVELOPMENT AT
TIVERTON ESTATE
LONDON
N15 6RR**

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London, N15 6RR

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1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Alexander James Contracts Ltd ("The Client"), has commissioned Jomas Associates Ltd ("Jomas") to produce a remediation strategy prior to the redevelopment of Tiverton Estate London, N15 6RR, (herein referred to as "the site").

1.1.2 A site location plan is provided in Figure 1, Appendix 1.

1.2 Site Information

1.2.1 The site currently comprises an area of grass-covered public open space, associated trees and planting, and a parking area.

1.3 Proposed Development

1.3.1 It is understood that the proposed development comprises either two separate three- to four-storey buildings or one four-storey linear building, providing approximately 18-24 residential units. The development will also include amenity space, landscaping, cycle parking and refuse storage. Soft landscaping is assumed to include communal areas, although private amenity space may also be provided.

1.3.2 A plan of the proposed development is provided in Figure 2, Appendix 1.

1.4 Previous Reports

1.4.1 The previous reports that have been utilised by Jomas for the purposes of this document are detailed in Table 1.1.

Table 1.1: Previous Reports

Title	Author	Reference	Date
Geo-environmental & Geotechnical Assessment Ground Investigation Report for Tiverton Estate, London, N15 6RR	Jomas Associates Ltd	P4219J2428b/CLP	22 September 2026

1.5 Background

1.5.1 It is understood that planning permission is being sought from London Borough of Haringey. This document has been prepared to address an anticipated planning requirement for the production of a remediation strategy.

1.6 Objectives

1.6.1 The primary objectives of this document are as follows:

- To provide information on the site setting; identify ground conditions and potential environmental risks associated with the development.
- To provide an assessment of various options for remediation.

- To set out the remedial strategy that will provide a site that is suitable for the intended use and addresses any identified unacceptable risks.
- To provide relevant information to address anticipated planning conditions relating to contaminated land. A separate verification report will be required following the implementation of the remedial strategy.

- 1.6.2 The primary remediation objective is the mitigation of the risks associated with lead and polycyclic aromatic hydrocarbon (PAH) impacted soils identified at the site during the ground investigation (Jomas, 2026).
- 1.6.3 This document provides an assessment of potential remedial strategies and describes the methodology for the proposed remedial action.
- 1.6.4 The remedial strategy and associated remediation criteria have been developed with reference to previous works carried out at the site. The remediation criteria used to develop the proposed remedial strategy will be used for the proposed verification works.
- 1.6.5 The Principal Contractor will be responsible for implementing the appropriate methodology and site management procedures to achieve the required outcome and comply with these principles.
- 1.6.6 The works will be undertaken by experienced personnel and will be managed in accordance with the Contractor's Construction Environmental Management Plan. Detailed construction method statements will be prepared for the impacted soil removal works. Jomas will be employed as Environmental Specialist, to supervise the works and undertake soil sampling and analysis as part of the validation process.
- 1.6.7 This document should be read in conjunction with the above reports.

1.7 Limitations

- 1.7.1 Jomas Associates Ltd ("Jomas") has prepared this report for the sole use of Alexander James Contracts Ltd, in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas. No other third-party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.
- 1.7.2 This report provides an overview of conclusions drawn from previous investigations, some of which has been conducted by others. Third party information used is assumed to be correct, and Jomas has not validated any of the data provided. Jomas is unable to guarantee the accuracy of the information provided by others.

2 LAND CONTAMINATION OVERVIEW

2.1 Desk Study Findings

2.1.1 A desk study was produced for the site (Jomas, Ref: P4008J2428, dated October 2021) and issued separately. A brief overview of the findings is presented below:

- A review of historical ordnance survey maps indicated that, on the earliest available plan dated 1864, the site comprised agricultural land. By 1894, the site was shown to be occupied by a number of residential-style buildings, with a road running across the southern section. Few changes were shown until the 1970 – 1971 map, when the site was depicted as vacant. By 1991-1994, structures believed to represent brick wall planters observed during the site walkover were shown on the OS maps. No significant subsequent changes were identified on the remaining maps at the time of reporting.
- The surrounding area was utilised predominantly for residential use followed by industrial and commercial use. Industrial uses of note included various factories and works, close by, particularly to the south of the site. These included a brick works, a blouse factory, a confectionary works and a lace paper works.
- The site was reported to be directly underlain by solid deposits of the London Clay Formation. No artificial deposits were reported within the site.
- The solid deposits directly underlying the site were identified as Unproductive stratum.
- The site was reported to lie within a groundwater Source Protection Zone 1 (SPZ1).
- 18No. groundwater and 16No. potable water abstractions were reported within 2km of the site. The closest record for both referred to an active abstraction for potable water supply located 247m south of the site.
- There were no surface water abstractions reported within 2km of the site.
- There were no river entry or surface water features reported within 250m of the site.
- There were no Environment Agency Zone 2 or Zone 3 floodplains reported within 250m of the site.
- An intrusive investigation was recommended to confirm the preliminary geo-environmental risks identified and to provide geotechnical information for use in design.

2.2 Intrusive Investigation

2.2.1 The ground investigation was undertaken on 12th & 13th August 2026, and consisted of the following:

- 5No. window sampling boreholes (WS01 – WS05), drilled to depths of up to 6.00m below ground level (mbgl), with associated in-situ testing and sampling.
- 2No. cable percussive boreholes (BH1 – BH2), drilled to depths of up to 25.0mbgl, with associated in-situ testing and sampling.
- Falling head testing within selected boreholes (BH1, WS03, WS05) to enable calculation of indicative infiltration rates.
- 5No. California Bearing Ratio (CBR) tests (undertaken at exploratory locations WS01 - WS05), to determine CBR values across the site.
- Laboratory analysis for chemical and geotechnical purposes.

- 2.2.2 The ground conditions encountered during the intrusive investigation were broadly consistent with those anticipated from the Desk Study, and comprised Made Ground, to depths of up to 1.50mbgl, underlain by the London Clay Formation to the base of the boreholes (maximum proven depth of 25.00mbgl).
- 2.2.3 During drilling of the boreholes, groundwater seepages were encountered within exploratory holes WS04 and BH2 at depths of 4.00mbgl and 15.50mbgl, respectively.
- 2.3 Soil Gas Risk Assessment**
- 2.3.1 At Desk Study stage, no significant sources of soil gas generation which could impact the site were identified. No significant thicknesses of Made Ground, or evidence of putrescible materials were encountered during the intrusive investigation and on this basis no soil gas monitoring or gas protection measures are considered necessary.
- 2.4 Controlled Waters Risk Assessment**
- 2.4.1 Elevated levels of polycyclic aromatic hydrocarbons (PAHs) were reported in the Made Ground in excess of the generic assessment criteria for human health. These GAC are, however, not relevant to controlled waters risk assessment.
- 2.4.2 The only PAHs with stated “moderate” or “high” mobility rankings in groundwater (as per CL:AIRE, 2017) are naphthalene, acenaphthylene, and acenaphthene. Of these compounds, only naphthalene has a statutory water quality standard. As naphthalene was only detected at low concentrations (maximum 0.5mg/kg) within soils, with the majority of the samples reporting concentrations below the laboratory detection limit, and no visual/olfactory evidence of potentially mobile contamination was encountered, the concentrations of PAHs detected in soils were not considered to pose a risk to controlled waters.
- 2.4.3 On the basis of the above, a significant risk of impact to controlled water receptors was not considered to exist.
- 2.5 Human Health Risk Assessment**
- 2.5.1 Following a review of the site investigation reports, the following factors are noted:
- The proposed development is understood to comprise either two separate three- to four-storey buildings or one four-storey linear building, providing approximately 18-24 residential units. The development will also include amenity space, landscaping, cycle parking and refuse storage. Soft landscaping is assumed to include communal areas, although private amenity space may also be provided.
 - Following generic risk assessments, elevated concentrations of lead, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(123-cd)pyrene, and dibenzo(ah)anthracene were detected in soils in excess of generic assessment criteria for the protection of human health within a “residential with homegrown produce” end-use scenario. However, it should be noted that exceedances of such determinands would still exist (with the exception of indeno(123-cd)pyrene) if a “residential without homegrown produce” end-use scenario screening criteria was adopted.
 - Health and Safety measures will be required for the protection of construction workers.

2.6 Impact to Neighbouring Properties and Buried Services

- 2.6.1 Screening of levels of determinands potentially affecting water pipes identified exceedances relating to 3No. bands of hydrocarbons (EC5-EC10, EC10-EC16, and EC16-EC40) and therefore upgraded pipework may be required.
- 2.6.2 Requirements for potable water supply pipework should be confirmed with the relevant utility provider at an early stage of the project life cycle.

2.7 Conceptual Site Model (CSM)

- 2.7.1 The updated Conceptual Site Model (CSM) is shown below in Table 2.1.

SECTION 2

LAND CONTAMINATION OVERVIEW

Table 2.1: Plausible Pollutants Linkages Summary (Pre-Remediation, as updated for Remediation Strategy)

Source	Pathway	Receptor	Relevant Pollutant Linkage?	Comment
- Potential for Made Ground associated with previous development operations – on and off site (S1) - Potential asbestos impacted soils from demolition of previous buildings – on and off site (S2) - Potential hydrocarbon impacted ground from previous industrial use – off site (S3) - Current and previous industrial use – off site (S4)	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5)	Y	See section Error! Reference source not found. above for remedial measures. The findings of this report should be included in the construction health and safety file, with adequate measures put in place for the protection of construction and maintenance workers. Contact should be made with relevant utility providers to confirm if upgraded materials are required. The concrete classification to protect buried concrete is discussed in Section Error! Reference source not found.
	Accumulation and migration of soil gases (P5)		N	A potential source of ground gas has not been identified.
	- Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff (P3) - Horizontal and vertical migration of contaminants within groundwater (P4)	- Neighbouring site users (R3) - Building foundations and on site buried services (water mains, electricity and sewer) (R5) - Controlled waters (R6) - Potable abstraction 247m south - Source Protection Zone 1 on site	N	A significant risk of impact to controlled waters has not been identified. The concrete classification to protect buried concrete is discussed in Section Error! Reference source not found.

3 REMEDIAL OPTIONS APPRAISAL

3.1.1 Soil Screening

- A possible remedial option would be to undertake soil screening, comprising excavation of impacted soils, screening within the site to remove likely contaminative materials, and re-deposition of materials on site. Such an operation may include a variety of screening methodologies, including soil washing etc.
- Such an operation may be successful at removing materials responsible for elevated concentrations of polycyclic aromatic hydrocarbons but is less likely to be successful in reducing elevated lead concentrations.

3.1.2 Excavation and disposal

- Made Ground displaying elevated concentrations of contaminants may be excavated for disposal off site. From a review of chemical testing data, excavations to a depth of the order of 1.5mbgl minimum would be required, with the importation of a respective thickness of certified clean material to restore site level.
- The costs and vehicle movements required for such an operation may render the costs associated with this method prohibitive.

3.1.3 Encapsulation

- In order to sever the identified pathways to the most sensitive receptors (human health), encapsulation of impacted materials below building footprints or areas of hard surfacing may be undertaken. This would have the effect of removing the potential pathways of direct contact and inhalation.
- In areas of private and communal soft landscaping, impacted soils can be encapsulated beneath a minimum 600mm and 450mm thickness of clean imported subsoil/topsoil, respectively. The clean imported material should be placed over a geotextile membrane or marker layer.

3.1.4 Dust control measures will be required during the undertaking of all the remedial options identified above for the protection of site workers.

3.1.5 When issues of cost effectiveness, requirements for vehicle movements etc. are taken into account, it is recommended that encapsulation of impacted soils is adopted as the preferred remedial methodology.

3.1.6 The requirements for the remedial methodology are presented within Section 4 of this report.

4 PROPOSED REMEDIATION STRATEGY

4.1 Introduction

4.1.1 The proposed remediation scheme serves to address the potential unacceptable risks identified in the context of the proposed redevelopment of the site.

4.1.2 The remedial measures comprise:

- The encapsulation of impacted soils below areas of building footprint or hardstanding.
- A watching brief following demolition and during enabling works.
- Within areas of private soft landscaping, a cover layer comprising a minimum 600mm thickness of clean subsoil/topsoil over a geotextile membrane/marker layer will be utilised. In areas of public or communal soft landscaping, the clean subsoil/topsoil cover layer may be reduced to 450mm.
- Validation testing will be undertaken upon soils imported to site to confirm their suitability for use as a clean capping layer.

4.2 Remediation Strategy

Impacted Soils Encapsulation

4.2.1 Where buildings or hardstanding are proposed, no formal remedial works are considered necessary, beyond the construction of the building/hardstanding, as this should provide an appropriate barrier to impacted soils.

4.2.2 Within areas of soft landscaping, soils will be encapsulated below a cover layer of imported clean subsoil/topsoil. This should comprise a minimum 600mm thickness within private landscaping areas and a minimum 450mm thickness within communal soft landscaping areas, laid over a geotextile membrane/marker layer.

4.2.3 Where Made Ground is removed and the base of the Made Ground is encountered at shallower depth than the depth of the proposed clean cover, the depth of clean cover can be limited to the thickness of Made Ground removed, or thickness required for finished levels.

4.2.4 Where topsoil and sub-soil is imported to the site, the soil should be chemically suitable for use. All imported soil should conform to the following chemical specification:

Table 4.1: Topsoil Requirements

Determinand	Unit	Screening Criteria	
Arsenic	mg/kg	S4UL	37
Boron	mg/kg	S4UL	290
Cadmium	mg/kg	S4UL	11
Chromium	mg/kg	S4UL	910
Lead	mg/kg	C4SL	200
Mercury	mg/kg	S4UL	40
Nickel	mg/kg	BS3882	110

Determinand	Unit	Screening Criteria	
Selenium	mg/kg	S4UL	250
Copper	mg/kg	BS3882	200
Zinc	mg/kg	BS3882	300
Total Cyanide	mg/kg	CLEA v1.06	33
Asbestos	%	S4UL	None Detected
pH	-	S4UL	5-9
Naphthalene	mg/kg	S4UL	2.3
Acenaphthylene	mg/kg	S4UL	170
Acenaphthene	mg/kg	S4UL	210
Fluorene	mg/kg	S4UL	170
Phenanthrene	mg/kg	S4UL	95
Anthracene	mg/kg	S4UL	2400
Fluoranthene	mg/kg	S4UL	280
Pyrene	mg/kg	S4UL	620
Benzo(a)anthracene	mg/kg	S4UL	7.2
Chrysene	mg/kg	S4UL	15
Benzo(b)fluoranthene	mg/kg	S4UL	2.6
Benzo(k)fluoranthene	mg/kg	S4UL	77
Benzo(a)pyrene	mg/kg	S4UL	2.2
Indeno(123-cd)pyrene	mg/kg	S4UL	27
Dibenzo(ah)anthracene	mg/kg	S4UL	0.24
Benzo(ghi)perylene	mg/kg	S4UL	320
TPH C ₅ -C ₆	mg/kg	S4UL	42
TPH C ₆ -C ₈	mg/kg	S4UL	100
TPH C ₈ -C ₁₀	mg/kg	S4UL	27
TPH C ₁₀ -C ₁₂	mg/kg	S4UL	74
TPH C ₁₂ -C ₁₆	mg/kg	S4UL	140
TPH C ₁₆ -C ₂₁	mg/kg	S4UL	260
TPH C ₂₁ -C ₃₅	mg/kg	S4UL	1100

4.3 Health and Safety / PPE

4.3.1 Excavations will have suitable barriers and access points, with pedestrian routes clearly marked. Appropriate safety signage and instructions will be clearly visible, with accesses to be kept clear of debris, materials and cables.

4.3.2 Operatives will be briefed on sharps protection in order to ensure safety. Clean/dirty rooms will be provided for operatives working within contaminated areas

4.3.3 Standard PPE will be required at all times, namely:

- Hard hat
- Safety spectacles
- Hi-viz waistcoat or jacket
- Gloves
- Boots or shoes with steel toe and midsole protection

4.3.4 Other items may be required as per detailed in the specific method statement, such as:

- Harness
- Dust protection
- Ear protection
- Other specialist equipment

4.3.5 A method statement will be produced by the chosen contractor.

4.4 Unexpected Contamination

4.4.1 To accord with best practice if, during the construction of the development, contamination and/or materials not previously identified are found to be present at the site, then no further development (unless otherwise agreed in writing with the Local Planning Authority) shall be carried out until Jomas (or qualified environmental engineer) has been informed, and a suitable strategy implemented to the approval of the engineer and/or the Local Planning Authority.

4.4.2 Examples of such materials include:

- Suspected asbestos containing materials
- Buried drums, tanks, pipework or containers
- Soil or water with colour or odour
- Non-natural materials and wastes
- Other evidence of contamination, for example iridescent sheens (like oil or diesel) on soil or water.

4.5 Operational Standards – Summary

4.5.1 As a minimum, the following standards shall be employed during the full course of this remediation site works:

- All materials subject to excavation and disposal must be tracked throughout and evidence generated to provide an auditable trail.
- Any excavated soils will be stockpiled/stored in a designated area on site, with plastic sheeting placed at ground surface to prevent cross-contamination. The contractor shall be responsible for the removal of spoil from the site.

- Personal protective equipment shall be employed by all site remediation and ground worker personnel in accordance with site specific risk assessments. These are to be completed by all contractors following consideration of the potentially hazardous properties of contaminants within the site.
- A copy of this remediation statement together with all previous geo-environmental assessment reports shall be retained on site for reference during the full course of remediation activities.

5 VERIFICATION PLAN

5.1 Proposals for Validation & Verification

Cover Layer

5.1.1 A qualified environmental engineer shall undertake the following tasks to monitor the remedial activities described in this statement.

- Following importation of subsoil/topsoil to site, representative samples will be obtained for laboratory testing. It is anticipated that 1No sample will be collected per 50m³ of imported soil, or a minimum of 3No samples, whichever is greater. A minimum of 1No sample will be obtained from each area of private soft landscaping.
- The thickness of the clean cover layer and the presence of a geotextile/marker layer will be verified by a series of hand dug pits in areas of soft landscaping, with accompanying photographs.
- These samples shall be sent directly to an MCERTS and UKAS accredited laboratory for testing.
- The results will be screened against the criteria given previously within Table 4.1, which comprise S4UL generic assessment criteria (suitable for use levels for human health risk assessment) published by the Chartered Institute of Environmental Health (CIEH). Where these are not available, other available general assessment criteria (GAC), including the Category 4 Screening Levels (C4UL) published by DEFRA have been used. If these values become out of date, reference shall be made to industry approved superseded values.

5.2 Remediation Verification/Completion Report

5.2.1 The Verification Report shall include the following information:

- Summary of all works undertaken
- Photographic log of the works.
- A full chemical soil analysis results schedule.
- Full details of any further contamination reported during construction works
- Disposal documentation for any spoil or asbestos materials spoil.

5.3 Reporting

5.3.1 All activities will be documented (including photographs) to show compliance with the remedial options appraisal, strategy and verification plan. This documentation will be kept on site at all times during the works and updated daily as part of a field record as the works progress, which would be available for regulatory inspection at any time. All documentation would be included in a final verification report to be presented to the Local Authority.

6 REFERENCES

- A possible approach for generating site specific assessment criteria for polycyclic aromatic hydrocarbons (draft internal HPA briefing note)
- CL:AIRE (2020) *Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration*
- Environment Agency (2020); Land Contamination Risk Management (LCRM). <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>
- Environment Agency, NHBC & CIEH (2008) *Guidance for the safe development of housing on land affected by contamination*. R & D Publication 66. London: Environment Agency
- Environment Agency Technical Report P45 "Polycyclic Aromatic Hydrocarbons (PAH): Priorities for Environment Quality Standard Development
- LQM/CIEH S4ULs. LQM, 2014
- National Planning Policy Framework. Department for Communities and Local Government, March 2012

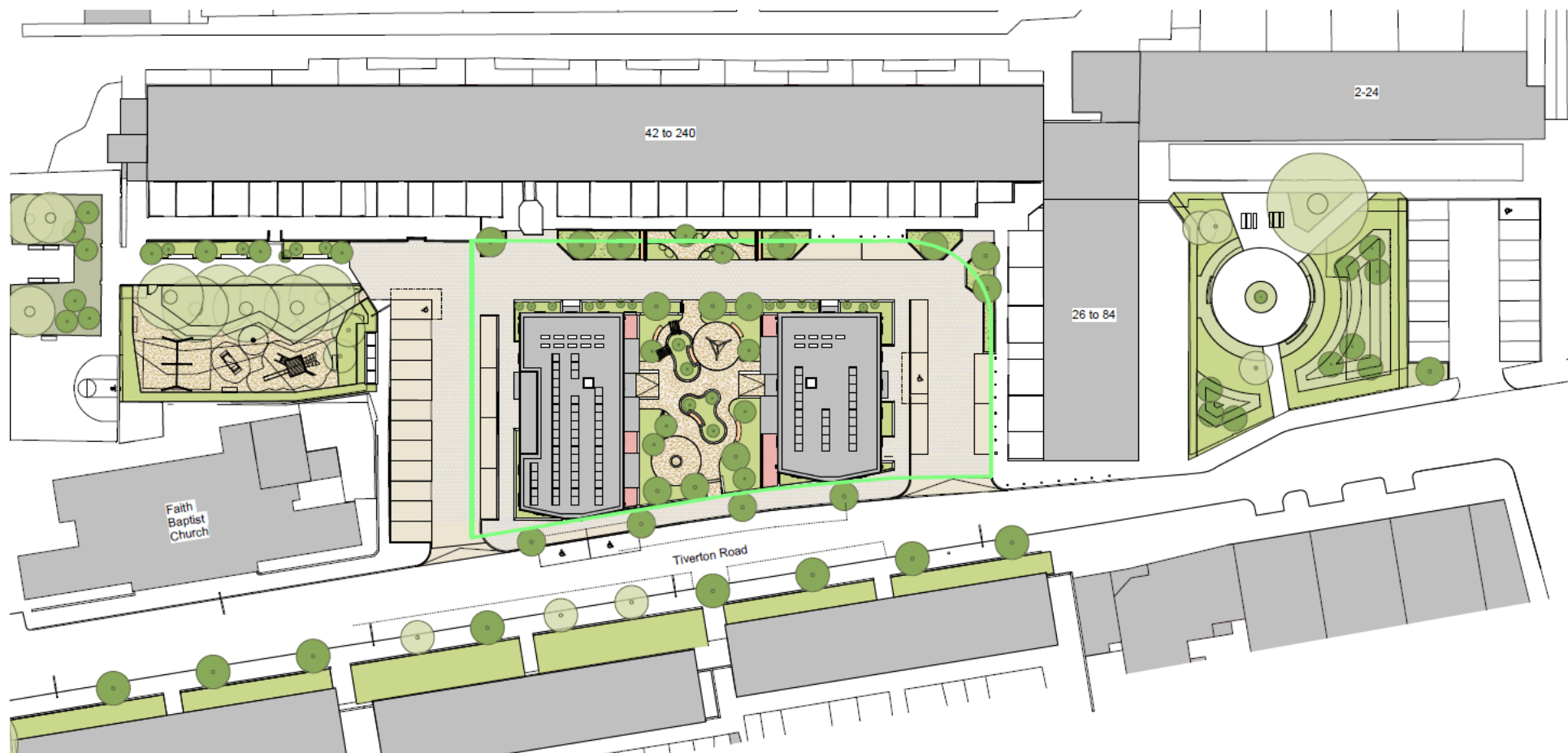
APPENDICES

APPENDIX 1 – FIGURES

PROJECT NAME	Tiverton Estate	CLIENT	Alexander James Contracts Ltd
TITLE	Site Location Plan	PROJECT NO.	P4219J2428b
DATE	September 2026	FIGURE NO.	1



PROJECT NAME	Tiverton Estate	CLIENT	Alexander James Contracts Ltd
TITLE	Proposed development layout	PROJECT NO.	P4219J2428b
DATE	September 2026	FIGURE NO.	2



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