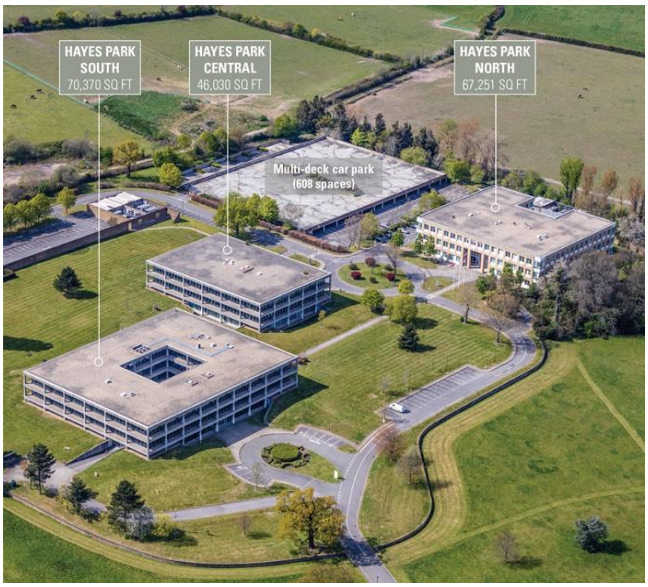


Project Hayes Park,

Hayes Park, Hayes End Road, Hayes, UB4 8FE

Pre-Refurbishment Audit

Date: March 2023

WPS Compliance Consulting Ltd

Executive Summary

This report aims to improve the sustainable management of waste materials arising from the refurbishment and partial demolition at Hayes Park, Hayes End Road, Hayes, UB4 8FE.

The recommendations made in this report are based on the findings of the pre-refurbishment audit carried out by WPS Compliance Consulting Ltd (WPSCC Ltd).

WPSCC Ltd has been conducting Pre-Demolition and Pre-Refurbishment Audits since 2011 and the Project Lead on this project was Lara Ayris.

The report includes the results of the audit and a reclamation valuation survey. Together these identify the Key Demolition Products (KDPs), their potential for being recycled or re-used and their economic potential.
The information in the report can be used to:

- Reduce the cost of disposal of Hayes Park
- Inform the project's Site Waste Management Plan
- Inform the project's Circular Economy Statement
- Realise financial returns from the recovered materials

The overall Diversion from Landfill is 595.61 tonnes (99.02%).

The results from the audit show an overall waste volume, for Hayes Park of 601.51 tonnes. The selected key demolition products (KDP) could have a potential income/saving of approximately £29,768.

The key findings and conclusions for Hayes Park are:

- Of the 601.51 tonnes predicted to be produced, 595.61 (99.02%) is targeted for recycling, 5.77 (0.98%) is targeted for disposal.
- There are financial savings to be made from the recycling of the inert, whereas the majority of the income is from the metals.
- It is estimated that the economic returns from recycling the inert materials would fetch between £9.00 and £11.00 per tonne. This could result in the demolition contractors receiving between £1368 - £1672.
- It is estimated that the value of metals would be in the region of £26,000.
- The KDPs present represent approximately 93.5% by weight of the total demolition products.
- In this instance, 40% of the doors were found to be viable for reuse, particularly those from Hayes Park Central. To preserve the value of the doors, they should be stripped out carefully and segregated away from the other Timber materials, reducing the opportunity for futher cosmetic damage. It should be noted that the suspended ceilings and raised floors were considered for reuse, however, their overall condition was considered not viable. As well as the likelihood of damage during strip out, which in our experience, we have found very probable. The remaining materials should be segregated and recycled according to the waste hierarchy.

The demolition materials resulting are as follows:-

Product	EWC Code	Weight (Tonnes)	Sequested Carbons in each materials kgCo2/kg	Embodied Carbons per KG (sequested*quantity)
Binders	17 01 01	1.15	0.05	0.06
Concrete	17 01 01	9.22	0.1	0.92
Inert	17 01 07	131.13	0.15	19.67
Tiles & Ceramics	17 01 03	11.24	0.15	1.69
Timber	17 02 01	28.22	-1.2	-33.87
Other Metals	17 04 07	10.05	2	20.09
Steel	17 04 05	76.05	2.8	212.94
Aliminium	17 04 02	169.56	6.5	1102.13
Copper	17 04 01	1.34	2.7	3.60
Gypsum	17 08 02	145.37	0	0.00
Carpet / Vinyl Flooring	20 01 11	15.24	0.1	1.52
Insulation	17 06 04	2.95	0.3	0.89
Total		**601.51**		**1329.65**

Contents

1: Introduction

1.1 Project Introduction

This pre-refurbishment audit has been undertaken for Iceni Projects Ltd, and contributes towards the GLA Policy S17 for the project referred to as Hayes Park. This report identifies the potential for reusing and recycling components and materials from Hayes Park due to be stripped out / demolished.

The opportunities to reclaim materials and to generate economic and environmental benefits are often overlooked and the majority tends to end up in landfill. This report will identify the feasibility of, and opportunities for, re-use and recycling as alternatives to landfilling.

The report will focus on the complete proposed demolition works, once all furniture and loose items have been removed. Included in the report will be:

- A pre-refurbishment audit identifying key demolition products (KDP)
- A recycling valuation of three / four KDPs

The information in this report will help to demonstrate the benefits of recycling and re-use of KDPs.

The criteria used to select the KDPs include economic value, the number of units and the viability of deconstruction.

NB. The findings and values contained in the report represent the best estimate of the materials and components within Hayes Park that comprise the scope of this project, by means of using plans, site surveys and photos of the different materials and components of Hayes Park.

1.2 Competence

Background

At WPSCC we have been successfully conducting Pre-Demolition and Pre-Refurbishment Audits since 2011, either as standalone works, or as a part of a larger works package. During this time the team has worked to a range of GLA POLICY S17 standards, including the most recent, 2018 set.

Whenever original drawings are not available (which is often) our survey team complete a comprehensive site survey in order to complete the calculations for the Audit.

Previous clients for similar works include: Leeds Teaching Hospitals Trust, Morgan Sindall, Gardiner & Theobold and Kier. Significant sites / projects have included Stophill Hospital (Glasgow), Leeds General Infirmary, Queen Mary University London.

Resume: Lara Ayris – Project Manager

Lara is both well educated in her subject [BSc Hons, Earth Sciences, MSc, Environmental Management and MSc, Advanced Industrial Practice (Wastes Management)] and has a great depth of experience gained from a career that has included employment at the Chartered Institution of Wastes Management (CIWM) and Building Research Establishment (BRE). Lara is a Chartered Waste Manager and Fellow of CIWM (FCIWM) and also, a Chartered Environmentalist (CEnv). In May 2022 Lara was included on the ENDS Power List of the 100 most influential Environmental Consultants in the UK !

Lara founded WPS in 2009 and now, with her team, provides specialist environmental & compliance consulting services to several sectors of industry, but primarily the Construction and Waste industries.

Lara is also an accomplished speaker, participates in the Right Waste Right Place campaign (RWRP) events, as well as at exhibition forums and relevant symposiums. In addition, Lara is a part time University Lecturer and 'guest lectures' at other times too.

She is a published academic author and was Project Lead on the 2 year Innovate (UK) funded grant project (DRIM), collaborating with 2 Universities and a commercial partner.

Both Lara and WPS are award winners, with Lara having won Outstanding Woman in Construction in 2012 and WPS won Compliance Team of the Year at the International Women in Compliance Awards in 2018.

For more information, including testimonials from Clients, please see Lara's LinkedIn Profile: https://www.linkedin.com/in/lara-ayris-14620a1b/ or the WPSCC website: https://www.wpsccltd.co.uk/

2: Methodology

2.1 Brief Overview

The buildings (Hayes Park Central / Hayes Park South) located at Hayes Park, Hayes End Road, Hayes, UB4 8FE are to be comprehensively refurbished, along with the proposed partial demolition of Hayes Park Central to create a courtyard.

Currently, the buildings are unoccupied and often used as temporary buildings for hire.

2.2 Method

This audit is based on a non-intrusive survey methodology. While some site plans were available to aid the survey, not all construction details were evident, hence certain assumptions have had to be made. To clarify, the majority of the internal materials were considered – for example, the core structures, the partition walls and facades, the flooring and carpets as well as the M&E / Plant. Furniture and loose items have not been included, but fittings such as WC's, fitted kitchens, etc. have been included where they were found during the site audit on the 23rd March 2023.

Where access was not possible, any information not available from Plans or from external investigations has had to be assumed with reference and relevance to other documents and previous knowledge, particularly in regards to parts of the basement, roof and some of the locked office/security areas.

During the survey, individual measurements were taken of all relevant materials and possible waste arisings; these measurements were calculated into overall quantities to form the basis of the Key Demolition Products. Calculations of the overall quanities was found by the total height x width x length x density of each individual material expressed as tonnes.

Where access was not possible, any information not available from Plans or from external investigations has had to be assumed with reference and relevance to other documents and previous knowledge.

This report does not cover hazardous wastes: for example, asbestos fibres may be present in insulation or other materials, and it is recommended that an asbestos survey is carried out and asbestos-containing materials are removed by a licenced contractor.

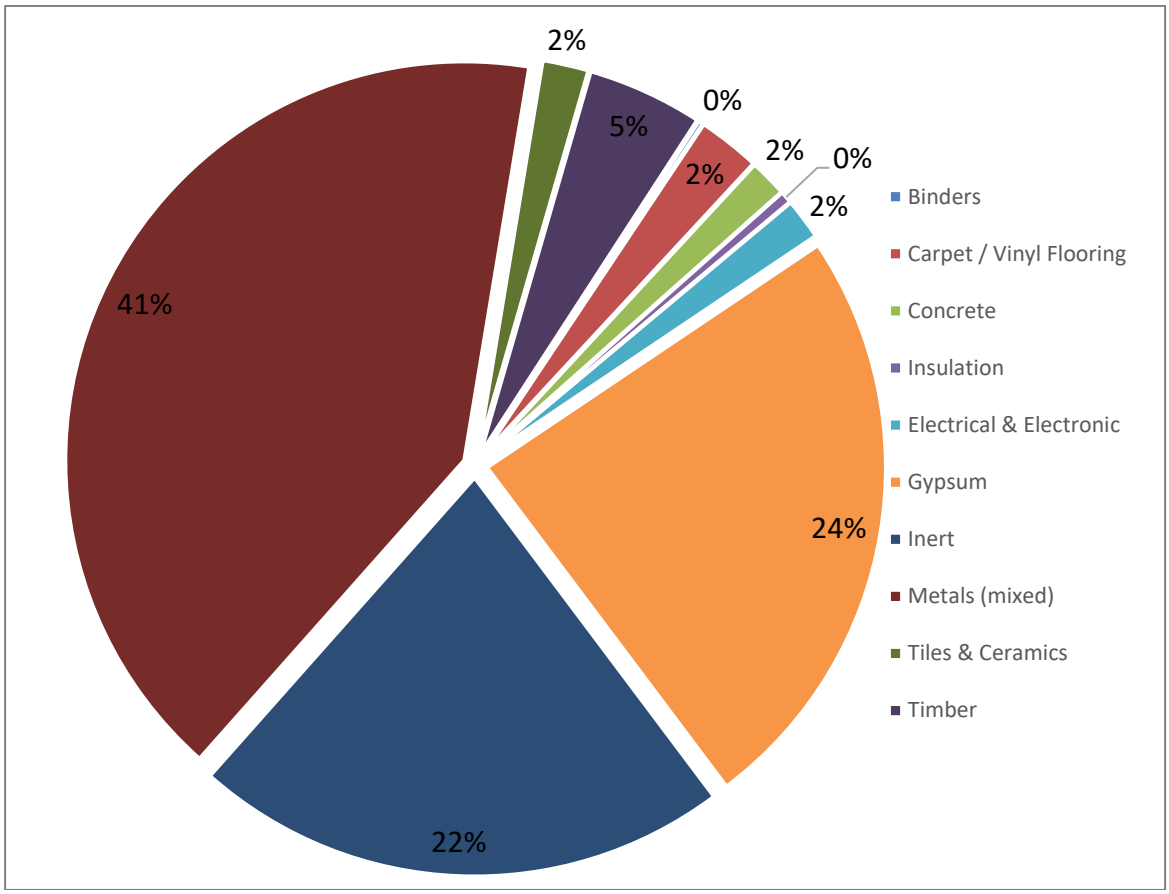
Results of the survey have been analysed according to the principal material types present, these being aggregated into Key Demolition Products (KDPs) with approximate total quantities indicated and recommendations made for their reclamation, recycling or disposal. The condition of products and materials and their suitability for various reclamation or recycling options cannot be guaranteed, however all materials have been considered with respect to the waste hierarchy (Reduce > Re-use > Recycle > Dispose) during the survey and also in preparation for the report.

Reclamation is taken to mean the segregation of products and materials for re-use in the same form, whilst recycling refers to the reprocessing of materials into new products. A brick is reclaimed if used as a brick, recycled if crushed and used for fill material. Recycling may be "closed loop", resulting in a new product of the same type or "open loop", resulting in a new product of a different nature, and potentially lower grade. Generally speaking, reclamation is environmentally preferable to recycling as it displaces the environmental impact of manufacturing new construction products and involves little or no re-manufacturing.

3: Pre-Demolition Audit Results for Hayes Park.

It was decided to concentrate on certain KDPs that present the most potential for re-use and recycling. The selection was made by looking at the quantity, value and viability for deconstruction, reclamation and recycling.

3.1 Overall volumes of waste produced from Hayes Park.



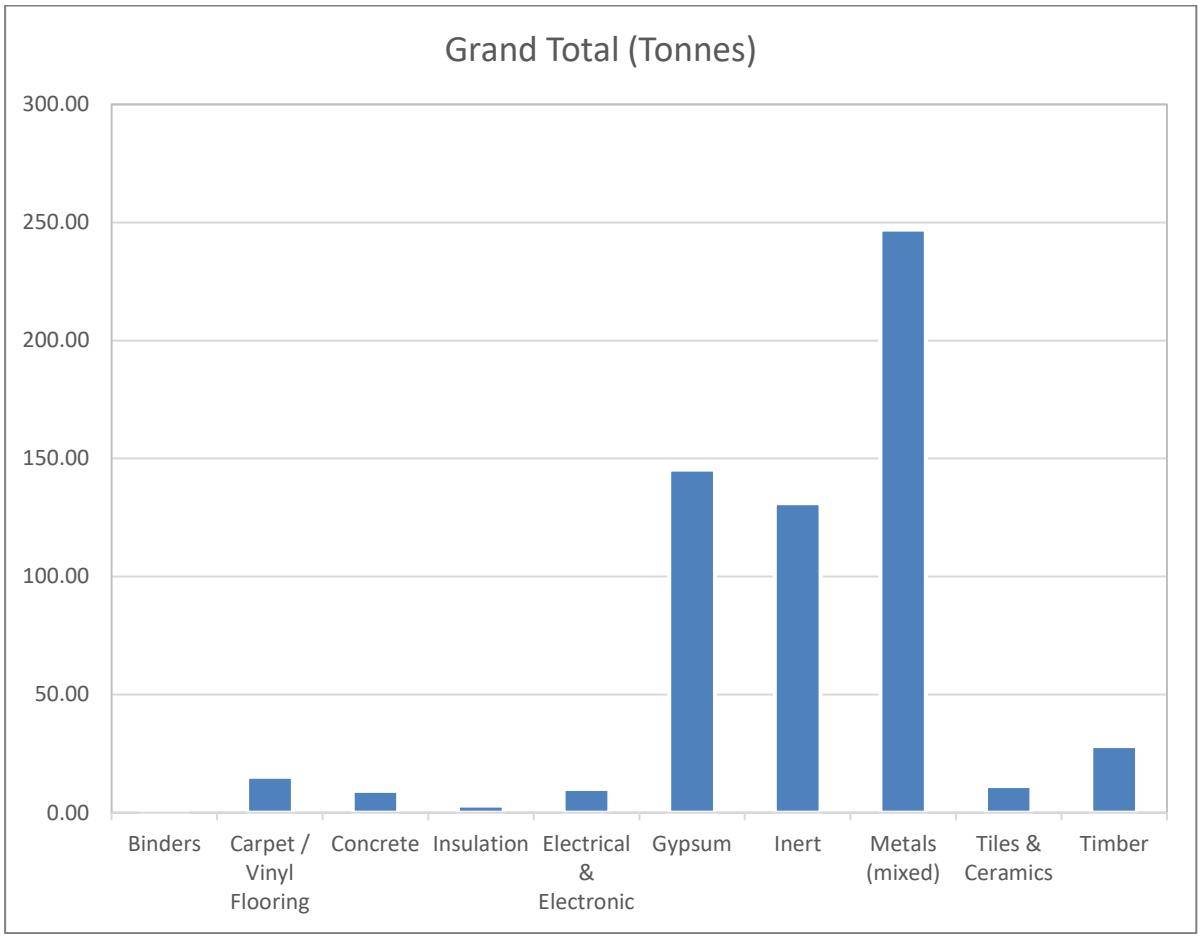


Figure 1 - Overall tonnage of waste produced from Hayes Park

3.2 Material Recovery Options for Hayes Park

(Approximate percentages based on report recommendation)

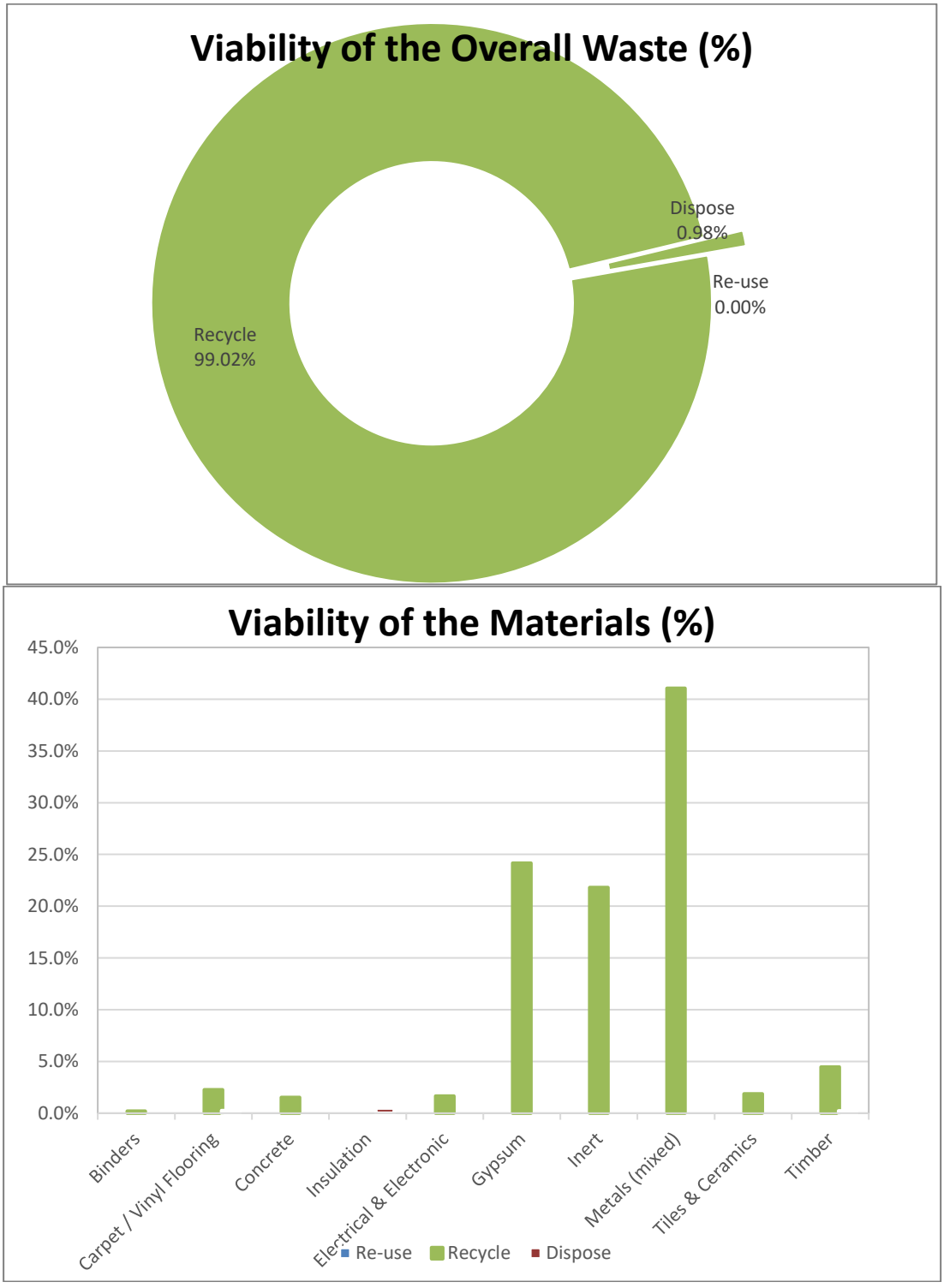


Figure 2 - Material Recovery Options for Hayes Park

4: Key Demolition Product Details for Hayes Park

This section of the report presents the waste produced as KDPs. There are four KDPs; Inert (including Concrete & Bricks), Timber, Metal (including M & E elements) and Gypsum, representing approximately 93% of all waste occurring on-site.

4.1 Inert (including Concrete & Bricks)

- Product description:

Inert materials from this refurbishment are generated mainly from the: glass partitions, some of the tiled floors / walls and the proposed demolition works in Hayes Park Central.

- Product detail:

Product	European Waste Classification (EWC)	Weight (Tonnes)	Suggested Reclamation Rate %	Suggested Recycling Rate %
Binders	17 01 01	1.15	0%	100%
Concrete	17 01 01	9.22	0%	100%
Inert	17 01 07	131.13	0%	100%
Tiles & Ceramics	17 01 03	11.24	0%	100%
Total		**152.74**	**0%**	**100%**

- Recommendations for Hayes Park:

Reclamation of some bricks could be attempted, but their quality and condition and the time that would be required to 'clean' them, deems their recovery / re-use to be not a viable option in this case. This decision is based on recovered bricks having a value of 20p – 40p per brick which is negligible when considering the costs incurred in reclamation. Furthermore, if we disregard the financial disincentive and consider the other potential methods of reuse and/or recovery with respect to waste hierarchy, the site's best option is still to recycle the bricks. When considering the provided specifications of work by Iceni Projects Ltd, there is limited scope for additional core partitions and large amounts of crushed materials, as well as this, the likelihood of removing sound whole brick/blocks is very small and thus direct reuse in the redevelopment is infeasible.

The recycling of demolition arisings, such as concrete, to produce recycled aggregates is now a mainstream activity usually driven by the cost benefits to be made (Demolition Protocol, 2008). Case study results from implementing the Demolition Protocol (2008) indicate that close to 100% recycling performance can be achieved for concrete and masonry where a soft strip process has removed materials / wastes that would be considered contamination. More recently, it has become routine to also crush and recycle asphalt (tarmac) scrapings from road / pavement surfaces.

Disposal of this inert material could cost £2,400 based on a waste management charge of approximately £300 per 20yd container (excluding a possible extra charge of £98.60 per tonne disposal/recycling cost).

These inert materials should be crushed on-site and used as Recycled Aggregate (RA) where possible. The lower value material should be kept separate from Recycled Concrete Aggregate; its first use would be as fill material on-site, with any surplus sold locally. For the remaining inert waste, it could fetch up to £9.00 per tonne. Maximum benefit is to be realised by using the recycled material on-site in the highest value applications first, thereby displacing the procurement of virgin materials. Based on this valuation the overall potential value to the project of on-site recycling of this material is in the region of £1,368 less the cost of processing.

The overall maximum benefit achievable therefore, including disposal savings if retained on-site, could be in the region of £3,768, excluding any processing costs.

4.2 Timber

- Product description:

Timber products arise from the internal elements, such as: the partition wall stud-work, the internal doors and frames, the skirting board and some of the wall facades.

- Product detail:

Product	European Waste Classification (EWC)	Weight (Tonnes)	Suggested Reclamation Rate %	Suggested Recycling Rate %
Timber	17 02 01	28.22	0%	95%
Total		**28.22**	**0%**	**95%**

- Recommendations:

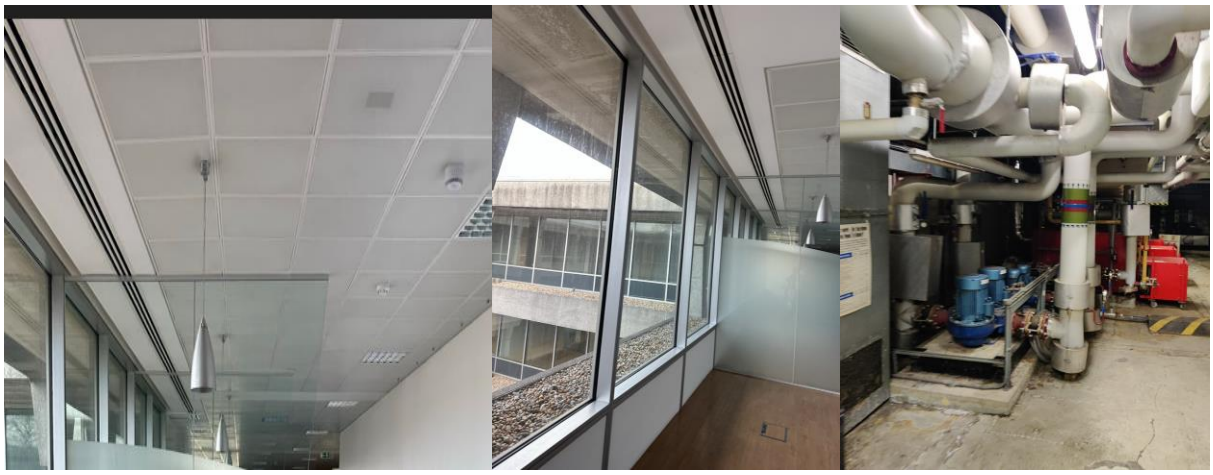
The type and condition of majority of the timber from Hayes Park, is not reusable in its current state; therefore, the recommended recovery route would be to recycle with regards to the waste hierarchy. Although, the doors found in Hayes Park South could potentially be reused, this assumption is largely based on whether they are stripped out carefully, as these were found to be in excellent condition.

Sound, whole materials should be offered via material exchange websites (for example Recipro: www.recipro-uk.com), the Community Wood Recycling scheme (http://www.communitywoodrecycling.org.uk/about-us/) or local reclamation merchants.

4.3 Metals

- Product description:

Metals are found in the M&E elements such as the: pipework, ducting and air conditioning units. However, the majority of the metals can be found internally, for example in the: fluorescent lighting and spotlights, the glass partition frames, the suspended ceiling tiles and frames, as well as the lifts.



- Product detail:

Product	European Waste Classification (EWC)	Weight (Tonnes)	Suggested Reclamation Rate %	Suggested Recycling Rate %
Ferrous / Non-Ferrous	17 04 07	256.99	0%	100%
Total		**256.99**	**0%**	**100%**

- Recommendations:

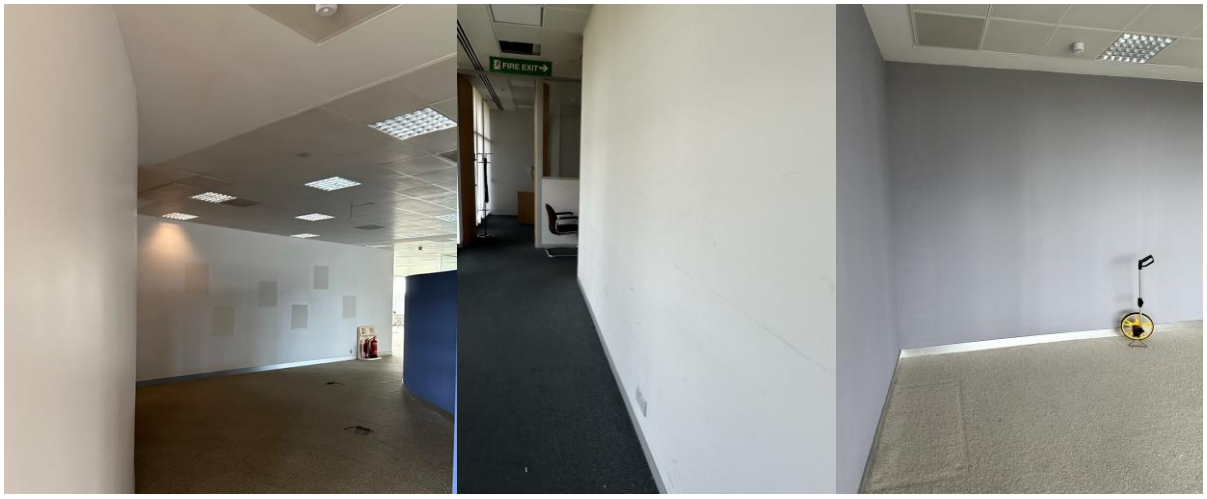
  In this instance, there were no metals found to be viable for reuse. All other metals should be segregated for recycling, which is both cost-effective and preserves a large part of their environmental value. Disposal of the metals via a waste management company may realise a net rebate in the order of £26,000.

  The 'Metals' considered are formed from traditional metal elements – i.e., copper, aluminium and steel – as well as reclaimable 'Electrical and Electronic' metals from air conditioning units, server housing, intercoms and internal wiring.

4.4 Gypsum

- Product description:

Gypsum products arise from the building's internal walls and ceilings, particularly the partition walls.



- Product detail:

Product	European Waste Classification (EWC)	Weight (Tonnes)	Suggested Reclamation Rate %	Suggested Recycling Rate %
Gypsum	17 08 02	145.37	0%	100%
Total		**145.37**	**0%**	**100%**

- Recommendations:

  For several reasons it is accepted that the reuse of Gypsum (plasterboard) is not viable, however, a very high recycling level is possible as the following step in the waste hierarchy. To maximise the recycling rate achieved this material must be fully segregated and sent to a specialist disposal plant, either directly, or via a local Waste Contractor.

  This waste stream, compromising predominantly plasterboard can be recycled and recent advances in technology enable 100% recycling (Aasvogel/British Gypsum).

5: Reclamation: General note

In order to maximise reclamation value, it is advisable to have a long lead-in time and maximum exposure to sell architectural salvage items. To maximise environmental and economic benefits, it is advised that any materials / items be re-used as near to site as possible and they are either:

- Used in the re-development
- Used by the same client locally
- Sold or given away locally

It is important that salvaged items are removed and stored so that components remain together, e.g., exterior doors with their frames. Salvo operates a demolition alert service on their website which brings forthcoming demolition products to the attention of potential buyers. Demolition alerts are also available on the BREMAP system.

5.1 Reclamation / Recycling recommendations

The following recommendations may assist in maximising the reclamation and recycling potential of KDPs:

- Discuss with the client the findings of the report and ensure that all options for on-site re-use are considered, especially for high value items such as entrance doors and fire alarms.
- Consider setting aside storage on-site for segregation of salvage items.
- For useful advice / guidance consult WRAP Construction Contractors (http://www.wrap.org.uk/content/construction-contractors) for resources to help manage waste.
- Consult http://www.ciria.com/recycling/ for a list of construction related recycling sites.
- Timber waste can be segregated and removed through the National Community Wood Recycling Project (NCWRP) www.communitywoodrecycling.org.uk. Timber is then utilised in the most ecological way based on its condition.
- EMR metal recycling is a nationwide network of scrap metal processors (www.emrgroup.com).
- For Plasterboard recycling British Gypsum (https://www.british-gypsum.com/about-us/csr/environmental-challenges/plasterboard-recycling) is a good resource.
- Contact Goldfinger Factory materials recycling (www.goldfingerfactory.com) for the recycling of Factory Contents.
- Contact local architectural salvage merchants about specific items. Salvo publishes a directory on their website. Local options are listed on the NetRegs Waste Directory (www.wastedirectory.netregs.gov.uk), and are listed below.
- Any switch boxes, distribution boxes and fluorescent light fittings should be disposed of according to the WEEE Regulations. We strongly recommend that this is discussed with your demolition contractor or with a specialist WEEE handler.

5.2 Local Waste Contractors

This is a sample of local Waste Contractors who could be used on the project:

Waste Contractor	Waste Carriers License number	PAS 402	Address	Contact	Distance
Quattro (UK)	CBDU145950	Yes	Boden House 114. 120 Victoria Road, Park Royal, NW10 6NY	02088382648	9 miles
Powerday Ltd	CBDU123332	Yes	Crossan House, Old Oak Ln, White City, London, NW10 6RJ	02038580504	11 miles
PB Donoghue	CBDU112878	Yes	3 Shannon Close, Claremont Road, Cricklewood, London Greater London, NW2 1RR	02082082211	13 miles
GBN Edmonton	CBDU90075	Yes	Gibbs Road, London, N18 3PU	02038875345	21 miles
O'Donovan Waste Disposal	CBDU116673	No	Markfield House, 82 Markfield Rd, London N15 4QF	02088019561	21 miles

6: Conclusion and Recommendations

Metals will be the dominant demolition product. This product should be treated in terms of the priorities of the waste hierarchy of Reduce > Re-use > Recycle > Dispose. Unsuitable and damaged inert materials can be crushed for recycled aggregate. Other inert materials should be segregated where possible. These actions will significantly reduce the environmental impact of the demolition process.

6.1 Breakdown of Recovery Options for Hayes Park

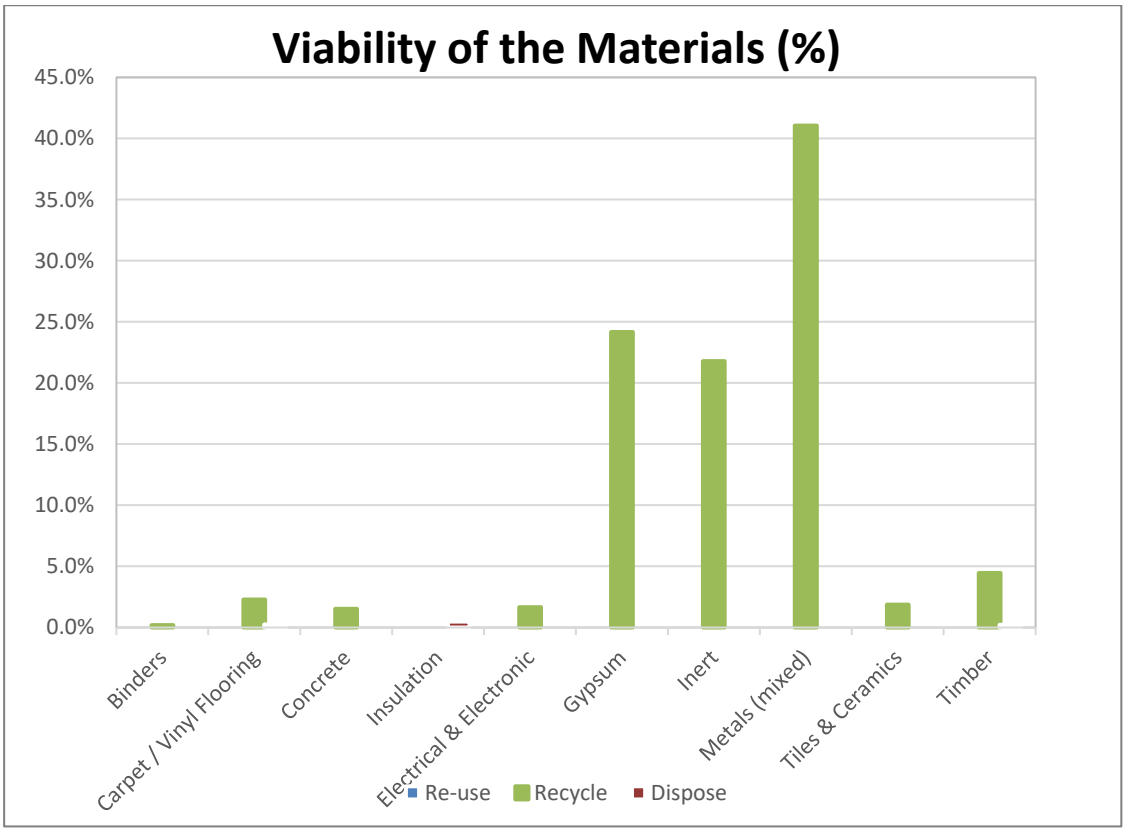


Figure 3 - Breakdown of Recovery Options for Hayes Park

6.2 Economic potential for Hayes Park

Key Demolition Product	Economic Potential
Inert (including Concrete & Bricks)	£3,768
Timber	Variable
Metal	£26,000
Gypsum	Variable
TOTAL	**£29,768**

Table - Economic potential for Hayes Park

6.5 General

The client, architect and demolition contractor should be involved in the implementation of the recommendations of this report. Re-use on-site or in a similar project is the ideal option from an environmental and economic point of view, and the client and architect are best placed to facilitate these actions.

The above recommendations should be considered concerning reclamation, specific segregation, storage and advertising using the suggested routes.

It is recommended that, as part of this process, a plan is drafted for management of demolition waste, the key features of which would be:

1. Targets set for segregation and recycling of key demolition products (KDP), based on the above, to be agreed with the demolition contractor
2. Targets for reclamation of specific materials and named items, based on the above, to be agreed with the demolition contractor
3. Adequate on-site practices for removal and storage of products and materials for reclamation and recycling
4. A template for monitoring waste management routes, with which contractors will be asked to comply.

6.6 Waste Monitoring

Measuring systems such as WPS Compliance Consulting's SitePlan (www.siteplan.online) could be implemented on-site in order to reflect the waste management plan, because:-

- Reference to this Audit must be made in the Resource Management Plan (RMP)
- The data from this Audit must be used as the Forecast data in the project's RMP
- The data from this Audit must be included in Appendix D of the Circular Economy Statement
- At the end of the project the Waste Actuals should be compared to the Forecast values (as is the norm in the Review section of the RMP), with any deviations from the planned targets being investigated and explained.

Without this adequate waste monitoring it will not be possible to check the performance of contractors, or to verify the success of the waste management plan.

Inert materials will be the dominant demolition product. This product should be treated in terms of the priorities of the waste hierarchy of Reduce > Re-use > Recycle > Dispose. Where possible any bricks should be reclaimed for future re-use on-site or for sale or exchange. Unsuitable and damaged inert materials can be crushed for recycled aggregate. Other inert materials should be segregated where possible. These actions will significantly reduce the environmental impact of the demolition process.

REFERENCES:

Aasvogel (2022). *Plasterboard Recycling* [online] Available at: Plasterboard Recycling | Aasvogel Waste Management (Accessed: 30th March 2023)

Anon A, *Used Carpet Tiles* [online] Available at: https://www.ebay.co.uk/ (Accessed: 30th March 2023)

Anon B (2019) *Used Carpet Tiles* [online] Available at: Used Carpet Tiles | 100% Recycled | Nation Wide Delivery available (Accessed: 30th March 2023)

British Standards Institute (2002) *Standards for Concrete*. BS8500-1. London: BSI

Bull. J, (22nd April 2011) OCO-Carbon, *Highlights the sequestrated carbons in insulation materials.* Available at: Embodied carbon of insulation - oCoCarbon (oco-carbon.com) (Accessed: 30th March 2023)

Butler, J *(16th October 2020) Embodied Carbon.* Available at: Embodied Carbon - what is it and how to compare materials? Sustainable building materials Part 4 — John Butler - Sustainable Building Consultancy (sustainablebuildconsultancy.com) (table) (Accessed: 30th March 2023)

Institute of Civil Engineers (2008) *Demolition Protocol*. London: ICE

Jones B, and Sutherland E (2022) The School of Natural Building, *The UpStraw project.* Available at: Welcome to The School of Natural Building (SNaB to our friends) - School of Natural Building (Accessed: 30th March 2023)

National Community Wood Recycling Scheme (2016) *About the NCWRP* [online] Available at: http://www.communitywoodrecycling.org.uk/about-us/ (Accessed: 30th March 2023)

Recipro (2016) *What is Recipro?* [online] Available at: http://www.recipro-uk.com/ (Accessed: 30th March 2023)

Scrap Metal (2022) *Scrap metal prices* [online] Available at: http://scrapmetalreaders.co.uk/scrap-metal-prices (Accessed: 30th March 2023)

Timber Trade Federation (2021) *Technical Paper - For calculating embodied carbons in timber.* Version1.2 Available at: https://ttf.co.uk/download/tduk-technical-paper/ (Accessed: 30th March 2023)

Waste and Resource Action Programme (2005) *The quality protocol for the production of aggregates from inert waste.* Oxon: WRAP

Appendix A

Car Park

Hayes Park North

Hayes Park Central

Hayes Park South

Line of Posts

Track

ON CLOSE

General Notes

No implied licence exists. This drawing should not be used to calculate areas for the purposes of valuation.
Do not scale this drawing for construction purposes. All dimensions to be checked on site by the contractor and such dimensions to be their responsibility.
All work must comply with relevant British Standards and Building Regulations requirements. Drawing errors and omissions to be reported to the architect.

Notes

Key

Planning Application Boundary

Key Plan

0 20m
@ 1:500

For Planning

Project No.	0419
Project Name	Hayes Park

Drawing Title

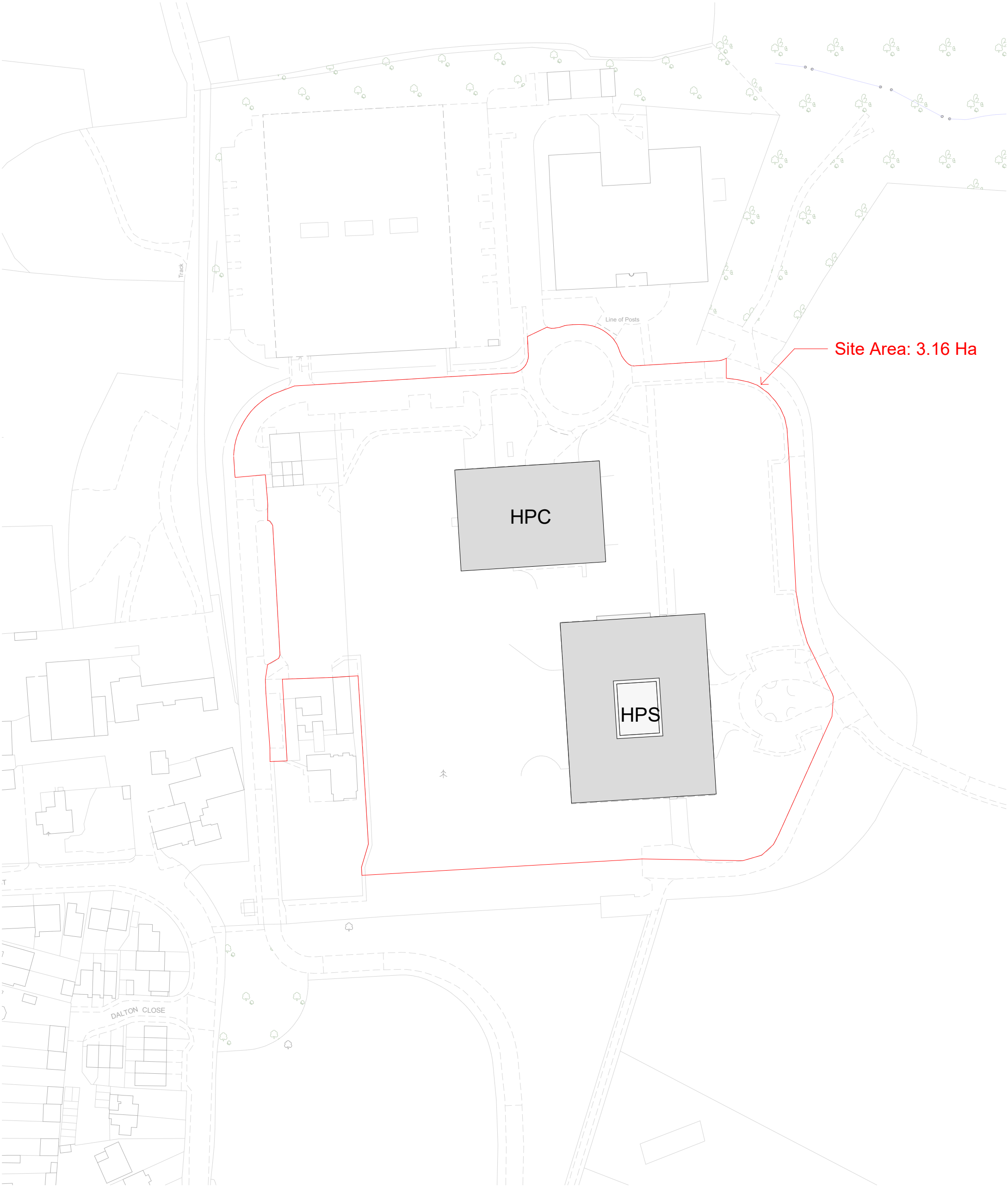
Site Plan

Client	Shall Do Hayes Developments Limited
Scale @A1	1 : 500
Date	01/05/23
Drawn by	ML
Checked by	SEW

Rev	Date	Reason	Chk
P1	12/05/23	For Planning	SEW

Studio Egret West
3 Brewhouse Yard
London, EC1V 4JQ
hello@egretwest.com
+44 (0) 20 7549 1730

Drawing Number	Rev
0419-SEW-ZZ-ZZ-DR-A-000001	P1



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Notes

Status	For Planning
Project No.	0419
Project Name	
	Hayes Park
Drawing Title	
	Existing Location Plan

Client	Shall Do Hayes Developments Limited
Scale @A3	1 : 1250
Date	01/05/2023
Drawn by	PJ
Checked by	GLJ

Rev	Date	Reason	Chk
P1	12/05/23	For Planning	SEW

Studio Egret West
3 Brewhouse Yard
London, EC1V 4JQ
hello@egretwest.com
+44 (0) 20 7549 1730

0 50m
@ 1:1250

Drawing Number	Rev
0419-SEW-ZZ-ZZ-DR-A-000003	P1