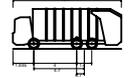




DO NOT SCALE OFF THIS DRAWING

NOTES

1. This drawing is indicative and subject to discussions with local & national highway authorities. This design is also subject to confirmation of land ownership, topography, location of statutory services, detailed design and traffic modelling.
2. This drawing is based upon drawing number HTC-PRP-ZZ-00-DR-A-10050 P1.1 supplied by PRP and Markides Associates shall not be liable for any inaccuracies or deficiencies.
3. Markides Associates accept no responsibility for any unauthorised amendments to this drawing. Do not rely on dimensions scaled from this plan.
4. A swept path analysis has been undertaken using Autodesk vehicle tracking software (AutoTRACK) and Markides Associates shall not be liable for any inaccuracies or deficiencies.



Refuse Vehicle	10.100m
Overall Length	2.200m
Overall Width	2.350m
Overall Height	3.366m
Min Body Ground Clearance	2.350m
Track to lock time	4.00s
Walk to Wheel Turning Radius	8.000m

- KEY**
- VEHICLE BODY LINE
 - VEHICLE WHEEL LINE
 - REVERSE GEAR



Revision History						
Rev	FOR INFORMATION	Comment	By	Chkd	Appr	Date
001	FOR INFORMATION		JPB	AKS	AJS	28.10.25
Current Revision						
002	FOR INFORMATION		JPB	AKS	AJS	28.10.25
Rev		Comment	By	Chkd	Appr	Date

S2 - FOR INFORMATION
HIGGINS PARTERSHIP



Project
HAYES TOWN CENTRE S73

Drawing Title
RCV MOVMENT CROWN CLOSE

Scale 1:250 @ A1 - 1:500 @ A3



VELOCITY



Appendix 5 – Cut and Fill Calculations



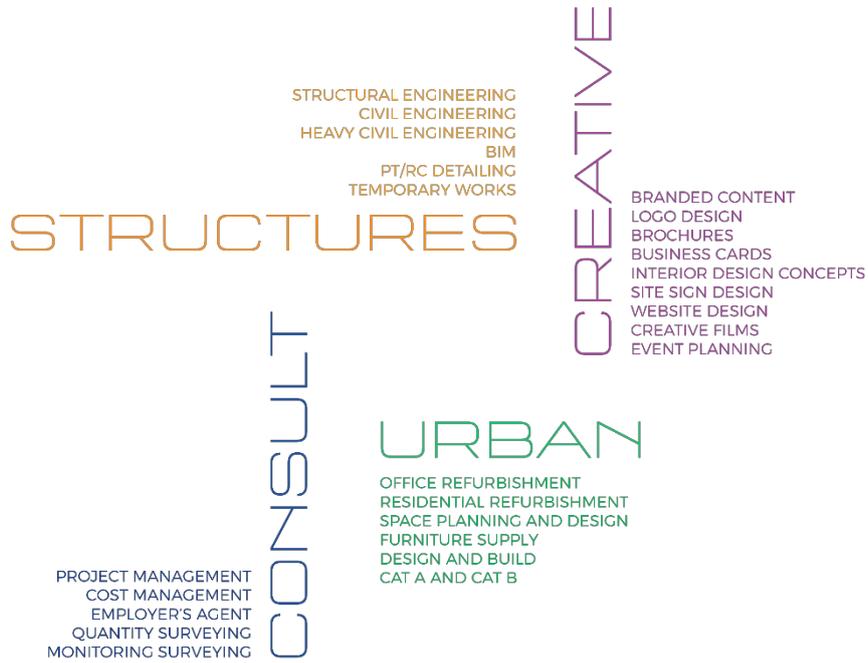
CUT AND FILL ASSESSMENT

HAYES TOWN CENTRE – PHASE 2 3 AND 4

HIGGINS PARTNERSHIP

NOVEMBER 2025

HTC-IES-XX-00-RP-C-1000



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CUT AND FILL ASSESSMENT

HTC-IES-XX-00-RP-C-1000

REPORT ISSUE

Revision	Date	Notes
P01	27/11/2025	First Issue
P02	21/01/2026	Report Amended

PREPARED BY

George Hemming November 2025

REVIEWED BY

Jakub Karolewski November 2025

DISCLAIMER

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IESISGROUP

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1 BASIS OF ASSESSMENT

1.1 INTRODUCTION

The Hayes Town Centre Estate, built in the 1970s beside the Grand Union Canal, comprises medium-rise flats, maisonettes, and a 15-storey tower. The regeneration vision is to create a high-quality, mixed-tenure development that improves living conditions for existing tenants and leaseholders while welcoming new residents. The scheme will deliver over 500 homes in five phases, following a decant strategy to minimise disruption. Early phases prioritise 247 council-rented and returning leaseholder homes, with later phases focused on private sale. The project also includes a new community centre, improved public realm, amenity spaces, and refurbished highway space. See Appendix A for masterplan of Phases 2 3 and 4 of development.

Iesis have been appointed by Higgins Partnerships to undertake a Cut and Fill Assessment for the proposed development at the Hayes Town Centre Phase 2 3 and 4. The Cut and Fill Assessment falls within the Circular Economy review for the development and is based on assumptions which are detailed further in the report.

1.2 DESIGN SOFTWARE

Site areas have been calculated using AutoCAD software. The volumetric analysis has been carried out based on these site areas and design depths. Calculations have been carried out manually using the site layout and drainage layout proposed as part of the Section 73 Application for HTC.

1.3 ACCURACY

This strategy represents an initial outline prepared in line with the current planning design. It remains subject to revision as layout updates and design amendments progress. The calculations presented are indicative and not exact, intended to provide preliminary earthworks information. While not definitive, the assessment establishes a baseline to inform and refine the future approach to groundworks once the final layout, and foundation design are confirmed.

The calculations are based on average and estimated values, therefore SLR take no responsibility for the accuracy of this information. It is recommended that the detailed Cut and Fill calculations are undertaken after the detailed design of the layout, foundations and levels are known.

1.4 PROPOSED LEVELS

Proposed finished floor levels for the development have been determined based on existing ground levels. The existing ground levels shown on the topographical survey average out to the finished floor levels of the proposed buildings and the levels proposed for the footpaths and landscaped areas between them. It has

therefore been assumed that the proposed levels for the site are that of the existing ground levels, and no fill will be required across the development.

2 ASSUMPTIONS

2.1 BUILDINGS

There are multiple proposed buildings within the development. It is assumed that the buildings will have a floor slab thickness of $0.25m$. As the finished floor levels across both buildings are assumed to be the same level as the existing ground, the amount of cut required for the buildings will be the volume of the floor slabs. The total area of the buildings has been taken from the Section 73 layout and has been calculated using AutoCAD to be $8931m^2$.

2.2 FOUNDATIONS

The foundation's cut volume has been roughly estimated as the exact volume schedule for the foundation design is not available. The proposed foundations were approximately calculated relative to the foundation design of the Avondale Drive development, the volume per metre of foundation cut at Avondale was applied to the proposed area of Hayes foundations. Proportional scaling based on building footprint area is a practical method for estimating foundation volumes when detailed schedules are unavailable. This approach is applicable as the buildings share comparable, load conditions and soil conditions, making foundation requirements roughly proportional to their footprint. The total estimation is $4364.00m^3$ of foundation cuttings, see section 3, for Calculations.

2.3 HARD AND SOFT LANDSCAPING

Surrounding the proposed buildings are areas of hard and soft landscaping. For the purpose of this assessment, it has been assumed that as the landscaping levels are to be the same as the existing ground levels, the soft landscaping will require no cut or fill to achieve this. The pedestrian hard landscaping area has a construction depth of approximately $0.18m$ for Pedestrian only block & clay paving footways and the vehicle private access (Bituminous Access Road) has a depth of $0.40m$. The area of combined hard landscaping within the site has been estimated as approximately $2310m^2$ using the landscaping layout from the Section 73 Application.

2.4 DRAINAGE

The current drainage strategy for the site features 6 below ground attenuation tanks and below ground surface water and foul water pipe systems. There are 4 attenuation tanks at a proposed depth of $0.80m$ with areas of $260m^2$, $328m^2$, $76m^2$ and $220m^2$. The two other tanks are proposed at a depth of $1.018m$ with areas of $697.6m^2$ and $89.6m^2$.

All surface water pipes have been assumed based on the diameters provided by the drainage plan design, the cross sections were then calculated, assuming inspection chambers at a depth of $2m$ and manholes at depths

of 3m, see 3.0 for Calculations. The length of surface water pipes for the development is estimated from the current drainage strategy and organised by pipe diameters. The strategy includes an estimated 45 inspection chambers of diameter 450mm and varying manhole sizes, all including a 150mm thick in-situ concrete cast based on construction standard details. For pipe sections without details on the drainage plan, the pipes were assumed as 300 diameters.

All foul water pipes have been assumed to be 225mm in diameter with a 150mm concrete surround providing the cross-sectional area. The length of foul water pipes for the development is estimated from the current drainage strategy. The strategy includes 40 inspection chambers of diameter 450mm and approximate depth of 2m, with a wall thickness of 150mm. See Appendix B for Drainage Plan.

2.5 ADOPTABLE HIGHWAY

The proposed development includes areas of adoptable highway to be constructed in accordance with local authority standards. For the purpose of this assessment, it has been assumed that the carriageway construction will comprise a total depth of 0.40m, consisting of asphalt surfacing, road base, and sub-base layers. The total area of adoptable carriageway has been estimated from the Section 73 layout drawings as approximately $3125.144m^2$. Footways adjacent to the carriageway are assumed to be constructed to a depth of 0.23m, with an estimated total area of $1849.505m^2$. All volumes and areas have been derived using AutoCAD from the Section 73 Application drawings. Details on depth have been taken from relevant construction standard detail drawings.

3 CALCULATIONS

Buildings

$$\begin{aligned} \text{Area of Buildings} &= 4745.894 + 619.008 + 1960.600 + 118.839 + 442.113 + 205.968 \\ &= 8930.583 \text{ m}^2 \end{aligned}$$

$$\text{Floor Slab Thickness} \times \text{Area of Buildings} = \text{Volume of Floor Slabs}$$

$$0.25\text{m} \times 8930.583\text{m}^2 = 2232.646\text{m}^3$$

Foundations

$$\text{Area of Similar Building: } A_1 = 5663.118 \text{ m}^2$$

$$\text{Foundation Volume of Similar Building: } V_1 = 2832.16 \text{ m}^3$$

$$\text{Area of Hayes Town Centre Building: } A_2 = 4720.278 \text{ m}^2$$

$$\frac{V_1}{A_1} = \frac{V_2}{A_2}$$

$$V_2 = V_1 \times \frac{A_2}{A_1}$$

$$V_2 = 2832.16 \times \frac{4720.278}{5663.118} = 2360.64\text{m}^3$$

Building Area (m ²)	Estimated Foundation Volume (m ³)
4720.278	2360.64
1430.880	715.59
1951.643	976.03
623.354	311.74
Total	4364.00 m³

Hard Landscaping

Construction Depth (Pedestrian Only Block & Clay Paving Footways)

$$\times \text{Area of Pedestrian Hard Landscaping} = \text{Volume of Pedestrian Hard Landscaping}$$

$$0.18m \times 1642.581m^2 = 295.665m^3$$

Construction Depth (Bituminous Access Road) × Area of Car Park/ Private Access
 = *Volume of Vehicular Hard Landscaping*

$$0.4m \times 667.149^2 = 118.266^3$$

$$Total\ Hard\ Landscaping\ Cut = 118.266^3 + 295.665m^3 = 413.931m^3$$

Attenuation Tanks

Depth of Tank × Area of Tank = Volume of Tank

$$0.8m \times 260m^2 = 208.0m^3$$

$$0.8m \times 328m^2 = 262.4m^3$$

$$0.8m \times 220m^2 = 176.0m^3$$

$$0.8m \times 76m^2 = 60.8m^3$$

$$1.018m \times 697.6m^2 = 710.2m^3$$

$$1.018m \times 89.6^2 = 91.2m^3$$

$$Total\ Volume\ of\ all\ Tanks = 1508.6m^3$$

Surface Water Drainage

$$\text{Length of Surface Water Pipe} \times \text{Cross Sectional Area of Pipe} \times \text{Area of Pipe Bedding} \\ = \text{Volume of Cut from Pipe System}$$

Pipe Diameter (mm)	Area of pipe and bedding (m ²)	Pipe Length (m)	Volume of Cut for Pipes (m ³)
225	0.276	67.62	18.663
300	0.360	109.66	39.478
375	0.456	7.78	3.548
450	0.563	140.00	78.820
750	0.766	120.67	92.104
900	1.44	103.24	148.666
300 (Assumed for pipes with no detail)	0.360	1007.20	362.592
Total:			743.871 m³

$$\text{Cross Sectional Area of 450mm Inspection Chamber} = \pi \times (0.225 + .150)^2 = 0.442m^2$$

$$\text{Cross Sectional Area of 1200mm Manhole} = \pi \times (0.600 + .150)^2 = 1.767m^2$$

$$\text{Cross Sectional Area of 1350mm Manhole} = \pi \times (0.675 + .150)^2 = 2.138m^2$$

$$\text{Cross Sectional Area of 1800mm Manhole} = \pi \times (0.900 + .150)^2 = 3.464m^2$$

$$\text{Cross Sectional Area of 2400mm Manhole} = \pi \times (1.200 + .150)^2 = 5.726m^2$$

$$\text{Depth} \times \text{Cross Sectional Area} \times \text{Number of Manholes} = \text{Volume of Cut from Manholes}$$

$$2m \times 0.442m^2 \times 45 = 39.780m^3$$

$$3m \times 1.767m^2 \times 6 = 31.806m^3$$

$$3m \times 2.138m^2 \times 8 = 51.312m^3$$

$$3m \times 3.464m^2 \times 2 = 20.784m^3$$

$$3m \times 5.7264m^2 \times 5 = 85.890m^3$$

Foul Water Drainage

$$\text{Length of Foul Water Pipe} \times \text{Cross Sectional Area of Pipe} \times \text{Area of Pipe Bedding} \\ = \text{Volume of Cut from Pipe System}$$

Pipe Diameter (mm)	Area of pipe and bedding (m ²)	Pipe Length (m)	Volume of Cut for Pipes (m ³)
All foul pipe diameters to be 225mm	0.276	736.754	203.344 m ³

$$\text{Cross Sectional Area of 450mm Inspection Chamber} = \pi \times (0.225 + .150)^2 = 0.442\text{m}^2$$

$$\text{Depth} \times \text{Cross sectional area} \times \text{Number of Manholes} = \text{Volume of Manholes}$$

$$2\text{m} \times 0.442\text{m}^2 \times 40 = 35.36\text{m}^3$$

Adoptable Highway

$$\text{Footpath Area} \times \text{Asphalt Footway Depth (based on Full Depth Construction)} = \text{Volume of Footway Cut}$$

$$1849.505\text{m}^2 \times 0.23\text{m} = 425.386\text{m}^3$$

$$\text{Carriageway Area} \times \text{Asphalt Carriageway Depth (Full)} = \text{Volume of Carriageway Cut}$$

$$3125.144\text{m}^2 \times 0.40\text{m} = 1250.058\text{m}^3$$

$$\text{Volume of Footway Cut} + \text{Volume of Carriageway Cut} = \text{Total Volume Cut of Adoptable Highway}$$

$$425.27\text{m}^3 + 1250.058\text{m}^3 = 1675.444\text{m}^3$$

4 RESULTS AND CONCLUSIONS

<i>Element of Works</i>	<i>Volume (m³)</i>
Buildings	2232.646m ³
Foundations	4364.000 m ³
Hard Landscaping	413.931m ³
Attenuation Tanks	1508.600m ³
Surface Water Drainage	973.443 m ³
Foul Water Drainage	238.704 m ³
Adoptable Highway	1675.444m ³
TOTAL	11,406.768 m ³

The total volume of cut and fill has been estimated based on assumptions detailed in Section 2 and calculated manually as detailed in Section 3. As the development is proposed to be built to existing levels, there will be no fill required. In total, there is estimated to be 11,406.768 m³ of cut from this site.

NOTE*

The calculations are based on average and estimated values only, therefore SLR take no responsibility for the accuracy of this information. It is recommended that the detailed Cut and Fill calculations are undertaken after the detailed design of layout and levels are known.

5 APPENDIX A – MASTERPLAN

6 APPENDIX B – DRAINAGE LAYOUT

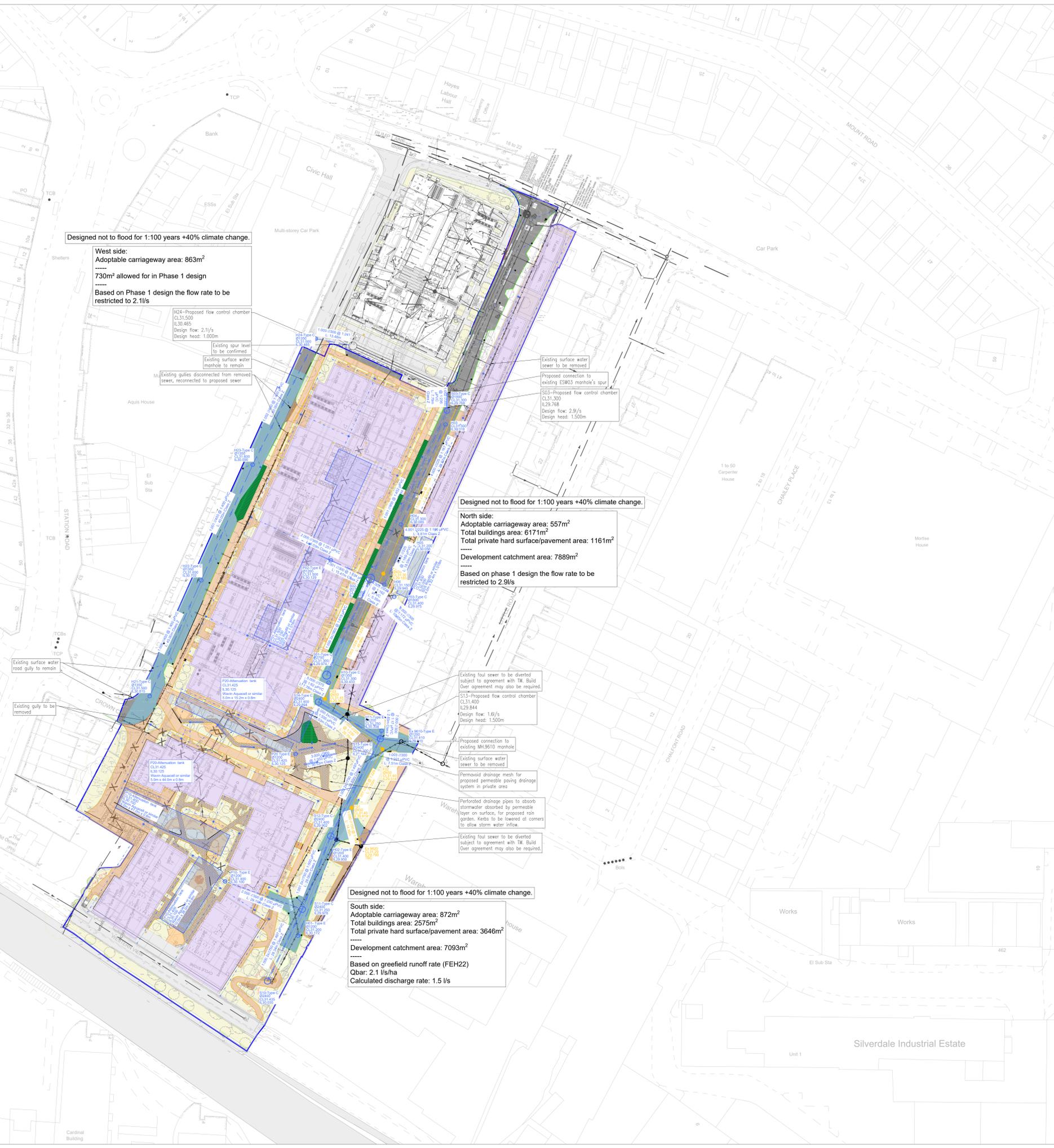


Botwell House
RC Primary School

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly, if required, take remedial action	Monthly for 3 months, then annually
Regular maintenance	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
Regular maintenance	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, silt or other matter, remove and replace surface infiltration medium as necessary	Annually
Regular maintenance	Remove sediment from pre-treatment structures and/or internal landings	Annually, or as required
Remedial actions	Repair/replace shafts, outlet, overflows and vents	As required
Remedial actions	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
Monitoring	Turn on inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

- NO PART OF THIS DRAWING MAY BE COPIED, TRANSFERRED, OR MADE AVAILABLE TO USERS OTHER THAN THE ORIGINAL RECIPIENT, INCLUDING ELECTRONICALLY, WITHOUT PRIOR PERMISSION FROM IES.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS AND SPECIALIST DRAWINGS & SPECIFICATIONS.
- ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR ACTION PRIOR TO CONSTRUCTION.
- THIS DRAWING IS BASED ON:
 - TOPOGRAPHIC SURVEY DWS 56562 DATED NOV 2021 BY SITECH SURVEYING SERVICES
 - GROUND FLOOR LAYOUT DWG: HTC-PPZ-00-DR-A-10050 - Site Plan Ground Level GA - P11
- ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY AND IN CONJUNCTION WITH ALL RELEVANT BRITISH STANDARDS, CODES OF PRACTICE AND CODE TO ADOPT AND AMENDMENTS AS APPROPRIATE. ALL DRAINAGE SHALL COMPLY WITH THE TYPICAL DRAINAGE CONSTRUCTION DETAILS AND THE REQUIREMENTS OF BS EN 752.
- ALL EXISTING DRAINAGE ON SITE TO BE CONFIRMED BY CONTRACTOR. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR ACTION PRIOR TO ANY NEW CONSTRUCTION. PROPOSED DRAINAGE SHOWN ON THIS DRAWING IS SUBJECT TO CHANGE UPON RECEIPT OF REVISED EXISTING DRAINAGE INFORMATION.
- THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS NECESSARY, TO ALL EXISTING CHANNELS, DRAINING AND GULLY LOCATIONS / REQUIREMENTS TO BE CONFIRMED BY ARCHITECT.
- THE PROPOSED BUILDING OUTLINES SHOWN ON THIS DRAWING ARE FOR INFORMATION ONLY. REFER TO ARCHITECTS PLANS FOR SETTING OUT INFORMATION AND DETAILS.
- FOR SETTING OUT DIMENSIONS OF SSS, SVPs, RWPs, FLOOR GULLY & OTHER DRAINAGE 'POP UP' LOCATIONS, REFER TO ARCHITECTS OR MECHANICAL & ELECTRICAL ENGINEERS DRAWINGS. LOCATION OF EXTERNAL CHANNEL DRAINING AND GULLY LOCATIONS / REQUIREMENTS TO BE CONFIRMED BY ARCHITECT.
- ALL DRAINAGE PIPEWORK SHOWN SHALL BE 100MM DIAMETER FOR FOUL AND 150MM FOR SURFACE WATER UNLESS NOTED OTHERWISE. ALL DRAINAGE PIPEWORK SHALL BE LAID SOFFIT TO SOFFIT UNLESS NOTED OTHERWISE.
- ALL UNDERSLAB DRAINAGE SHALL BE LAID AT GRADIENTS OF 1:40 MIN. FOR FOUL PIPEWORK AND 1:150 MIN. FOR SURFACE WATER UNLESS NOTED OTHERWISE.
- ALL SURFACE WATER PIPES 300MM Ø OR LESS TO BE UPVC OR SIMILAR APPROVED. SURFACE WATER PIPES GREATER THAN 300MM Ø TO BE CONCRETE. ALL 100MM AND 150MM DIAMETER FOUL WATER DRAINS TO BE UPVC.
- ALL UNDERSLAB DRAINAGE SHALL BE CLEAR OF FOUNDATIONS UNLESS SHOWN OTHERWISE. ALL BENDS IN PIPEWORK TO BE AS LARGE A RADIUS AS POSSIBLE (EXCLUDING CONNECTIONS TO CHAMBERS) TO ENSURE FREE FLOW. SHORT RADIUS BENDS TO BE AGREED WITH DRAINAGE ENGINEER.
- ALL SURFACE WATER DROP DOWN POSITIONS SHALL HAVE A BEND SET AT INVERT LEVEL NO GREATER THAN 1.3M BELOW FINISH FLOOR LEVEL.
- AT LEAST ONE SOIL PIPE AT THE HEAD OF EACH FOUL RUN SHALL BE VENTED TO THE ATMOSPHERE. ALL SVPs, SSS AND RWP DOWNPIPES SHALL BE ACCESSIBLE AT GROUND LEVEL FOR ROOING PURPOSES.
- COVER LEVELS SHOWN ON THIS DRAWING ARE APPROXIMATE AND SHALL BE ADJUSTED TO SUIT LEVELS ON SITE BY CONTRACTOR. COVERS SHALL BE ORIENTATED TO SUIT PAVEMENT FINISHES WHERE APPROPRIATE. ALL COVER LEVELS ARE TO BE CONFIRMED BY THE ARCHITECT
- ACCESS COVERS AND FRAMES SHALL COMPLY WITH THE LOADINGS SPECIFIED AND TO BS EN 124 AND KITEMARKED OR IF RECESSED COVERS ARE SPECIFIED THEN IN ACCORDANCE WITH FACTA ASSOCIATION EQUIVALENT. ALLOW FOR RECESS MANHOLE COVERS TO ACCEPT LANDSCAPE ARCHITECT FINISHES TO ALL LANDSCAPED AREAS
- ALL PRIVATE DRAINAGE PIPEWORK FOR FOUL AND SURFACE WATER SYSTEMS HAVE BEEN DESIGNED ON THE BASIS OF UPVC TO BS EN 1401-1, UNLESS NOTED OTHERWISE. ALL PRIVATE DRAINAGE WORKS TO BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS PART H.
- CONCRETE ENCASEMENT OF THE PIPEWORK SHALL BE REQUIRED WHERE VERTICAL CLEARANCE BETWEEN TWO PIPES CROSSING IS LESS THAN 300MM. ROCKER PIPES ARE TO BE PROVIDED AT ALL CONCRETE CASSED INTERFACES. WHERE NEW DRAINAGE IS SITUATED WITHIN 5 METRES OF NEW OR EXISTING TREES THE PIPEWORK SHALL BE ENCASED IN CONCRETE TO REDUCE THE RISK OF ROOT INGRESS.
- ALL DRAINAGE CONNECTING TO THE PUBLIC SEWER NETWORK SHALL NOT COMMENCE UNTIL RECEIPT OF THE APPROVAL FROM THE DRAINAGE AUTHORITY AND SHALL COMPLY WITH REQUIREMENTS USING ATTRIBUTED CLAY PIPEWORK TO BS EN 256 WITH FLAIN SLEEVED OR SOCKETED FLEXIBLE JOINTS SUBJECT TO APPROVAL.
- PRIOR TO CONSTRUCTION THE FLOW CONTROL MANUFACTURER'S DRAWING AND HYDRAULIC TABLE SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL.
- PRIOR TO CONSTRUCTION THE ATTENUATION TANK MANUFACTURER'S DRAWINGS SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL.
- ALL PROPOSED DRAINAGE IS SUBJECT TO APPROVAL FROM THE LFA. DISCHARGE IS SUBJECT TO FORMAL APPROVAL BY THAMES WATER, WHERE DRAINAGE WORKS ARE CARRIED OUT IN THE PUBLIC HIGHWAY THE RELEVANT NECESSARY APPROVALS AND ROAD OPENING NOTICES SHALL BE OBTAINED FROM THE HIGHWAY AUTHORITY AND UTILITY COMPANIES.
- UPON COMPLETION ALL NEW DRAINAGE INSTALLATION TOGETHER WITH ANY EXISTING DRAINAGE RETAINED SHALL BE JETTED AND CCTV SURVEYED UPON COMPLETION. CONTRACTOR TO ENSURE THAT THE DRAINAGE SYSTEM IS FULLY OPERATIONAL, FREE OF EXCESS DEBRIS/SILT AND ALL IDENTIFIED FAILURES RECTIFIED.

HAYES TOWN



Designed not to flood for 1:100 years +40% climate change.
 West side:
 Adoptable carriageway area: 863m²
 730m² allowed for in Phase 1 design
 Based on Phase 1 design the flow rate to be restricted to 2.1l/s

Designed not to flood for 1:100 years +40% climate change.
 North side:
 Adoptable carriageway area: 557m²
 Total buildings area: 6171m²
 Total private hard surface/pavement area: 1161m²
 Development catchment area: 7889m²
 Based on phase 1 design the flow rate to be restricted to 2.9l/s

Designed not to flood for 1:100 years +40% climate change.
 South side:
 Adoptable carriageway area: 872m²
 Total buildings area: 2575m²
 Total private hard surface/pavement area: 3646m²
 Development catchment area: 7093m²
 Based on greenfield runoff rate (FEH22)
 Qbar: 2.1 l/s/ha
 Calculated discharge rate: 1.5 l/s

HEALTH & SAFETY: THE WORKS SHALL BE CARRIED OUT BY SPECIALIST COMPETENT AND EXPERIENCED CONTRACTORS. ALL OPERATIVES SHALL HAVE RECEIVED FULL AND APPROPRIATE TRAINING WITH APPROPRIATE QUALIFICATIONS FOR THE OPERATIONS THEY ARE REQUIRED TO UNDERTAKE. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT HEALTH & SAFETY REGULATIONS.

ATTENUATION VOLUME HAS BEEN CALCULATED BASED ON REQUIRED STORAGE FOR A 1 IN 100YR EVENT + 40% CLIMATE CHANGE

KEY:

- Site boundary
- Existing surface water drainage
- Phase 1 & existing foul water drainage
- Proposed adoptable surface water flow control chamber
- Proposed adoptable surface water sewer and manhole
- Proposed adoptable foul water sewer and manhole
- Existing pipe to be removed
- Private surface water/ Gully connection
- Surface water inspection chamber
- Surface water manhole
- Private foul water drain
- Foul water inspection chamber
- Surface water impermeable area building
- Surface water impermeable area hard landscaping
- Surface water impermeable area carriageway
- Proposed rain garden
- Proposed permeable paving
- Proposed channel drain
- Existing surface water road gully
- Proposed surface water road gully
- Permeoid SW diffuser for permeable paving

IES STRUCTURES

PRELIMINARY

CLIENT: HIGGINS PARTNERSHIP

PROJECT: HAYES TOWN CENTRE PHASES 2-5

DRAWING TITLE: BELOW GROUND DRAINAGE GENERAL ARRANGEMENT

JOB NUMBER: SE2508 SCALE AT A3: 1:500 REV STATUS: P03

DRAWING NUMBER: HTC-IES-A1-00-DR-D-3000 REVISION: S2

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Appendix 6 – Circular Economy Workshop

MTC Phase 2 & 3

18/09/2025 meeting

Attendance: Nick Foley (Miggins), Hema Kana (Miggins), Victoria Allen (Miggins), Lucy Tindall (PRP), Bethan Craugh (PRP), Eliza Dima (PRP), Bradley Lobetta (Watkins Payne), Anna Fleming (Watkins Payne), James Daniel (Watkins Payne), Sameera Issa (Watkins Payne), John Simmonds (Bels)

Circular Economy Design Principles by Building Layer

The Circular Economy Comments table should consider where the Applicant seeks to go beyond standard practice. If there are multiple phases/buildings/areas with different measures/strategies, please specify these separately within the table below.

	Building Layer							Construction Staff (Structural Engineer)
	Site (Architect)	Substructure (Structural Engineer)	Superstructure (Structural Engineer)	Shell/Skin (e.g. Façade) (Architect)	Services (MEP Engineer)	Space (Architect)	Stuff (Architect)	
<p>Designing out waste</p> <p>Ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials</p>	<p>A Pre-Redevelopment and Pre-Demolition Audit will be produced to assess which materials could be reused/recycled on-site.</p> <p>Operational Waste Management Strategy will be prepared to reduce waste to landfill.</p>	<p>In order to decrease the carbon content of the substructure, the client and design team are exploring the below options:</p> <ul style="list-style-type: none"> Increasing the GDS content of piled foundations, core structure and/or the foundations from the currently specified with 20% GDS to 30% GDS, subject to cost analysis and design development <p>The substructure could be retained over a long period with potential for multiple reuse during its lifespan. At the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. Concrete can be recycled as hardcore. Bricks can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	<p>Material use has been optimised. Where thicker floor slabs are required, such as the podium, this has been localised to required areas only.</p> <p>In order to decrease the carbon impact/output of the superstructure, the client and design team are exploring the below options:</p> <ul style="list-style-type: none"> Increasing the GDS content of the above from the currently specified with 20% GDS to 30% GDS, subject to cost analysis and design development <p>Maintenance strategy will be developed for the structural components including steel and reinforced concrete elements to ensure prolonged design life.</p>	<p>Use of BIM in the design and detailing of the building allows greater precision in the material specifications.</p> <p>Efficient structural design - regular columns and slab arrangements to upper storey - minimises concrete</p> <p>The use of low maintenance, robust materials that require minimal maintenance will be maximised in the design to extend the developer's lifetime and reduce the need for maintenance and replacement during the developer's lifespan.</p>	<p>Residential</p> <p>Each apartment or duplex is connected to the central plant to provide heating/cooling and domestic hot water service(DHWS). The heating / cooling is provided by a duct recirculated coil in the supply duct serving the habitable rooms. This system is design to provide 50% of the heating and 100% of the beneficial cooling. This philosophy reduces the operational energy loads associated with the heating distribution mains (used at 100% and also reduces the potential of overheating to the common circulation spaces due to providing cooling in the summer months.</p> <p>The heating/cooling system and DHWS enter each apartment / duplex directly without a heat interface unit/ plate heat exchanger which reduces the amount of plant needed.</p>	<p>Space is maximised by the efficient design, stacking floor and structure. Drawings rearranged where necessary to ensure structure stacks and minimise need for transfers.</p>	<p>Standard utility and bathroom design used throughout.</p>	See substructure and superstructure section
<p>Designing for longevity</p> <p>Designing to avoid premature end of life of all components through considering maintenance and durability.</p>	<p>In order to protect the shelf life of materials a maintenance strategy will be developed for the building to include: Painting, cleaning, Lighting, Furniture</p> <p>Careful maintenance and regular inspection will ensure the components reach or exceed their shelf-life.</p>	<p>The substructure is designed to have a minimum life service of 60 years to ensure longevity, including the piles, core caps, supporting beams and ground floor slab.</p>	<p>Maintenance strategy will be developed for the structural components including steel and reinforced concrete elements to ensure prolonged design life.</p>	<p>The use of low maintenance, robust materials that require minimal maintenance will be maximised in the design to extend the developer's lifetime and reduce the need for maintenance and replacement during the developer's lifespan.</p>	<p>Residential</p> <p>Each apartment or duplex is connected to the central plant to provide heating/cooling and domestic hot water service(DHWS). The heating / cooling is provided by a duct recirculated coil in the supply duct serving the habitable rooms. This system is design to provide 50% of the heating and 100% of the beneficial cooling. This philosophy reduces the operational energy loads associated with the heating distribution mains (used at 100% and also reduces the potential of overheating to the common circulation spaces due to providing cooling in the summer months.</p> <p>The heating/cooling system and DHWS enter each apartment / duplex directly without a heat interface unit/ plate heat exchanger which reduces the amount of plant needed.</p> <p>Each apartment or duplex is provide with it's own MDRH unit.</p>	<p>Space in the buildings has been maximised with stacking floor plates from level 2 upwards while ensuring the ground floor needs are met. Where possible, dwellings have been built close to front floor and ground floor to ensure stacking. The use park spaces could be reorganised if use was reduced in the future.</p>	<p>In order to protect the shelf life of materials a maintenance strategy will be developed for the building to include: Services: Air Source Heat Pumps, PV panels, Extract fans, Powerw, Lifts, Valves, Switches, Sockets etc.</p> <p>Careful maintenance and regular inspection will ensure the components reach or exceed their shelf-life.</p>	See substructure and superstructure section
<p>Designing for adaptability or flexibility</p> <p>Designing a building that has been designed with thought of how it might be able altered to protect its life, for instance by alteration, addition, or continuation, to suit new uses or patterns of use.</p> <p>Designing a building that has been designed to allow easy reorganisation of its internal fit out and arrangement to suit the changing needs of occupants.</p>	<p>It is not foreseeable that the residential elements of the design will need to change over the design life of the building. Changes to student accommodation / coaching would require different structural requirements and therefore has not been accommodated for within the design.</p>	<p>The substructure has been designed for loaded loadings appropriate to the current spatial utilisation and has an inherent capacity that can be assessed for any change of use. The concrete foundations therefore have the potential for multiple reuse during its lifespan.</p> <p>The nature of the flat slab allows for flexibility of internal space as all internal partitions are typically non load bearing</p> <p>Variable load control will allow the building to respond to changes in load, suitable for a flexible space.</p>	<p>The structural grid allows reconfiguration of the entire layout without affecting the structural framework, to suit the changing needs of the users throughout the building's life cycle.</p> <p>The nature of the flat slab allows for flexibility of internal space as all internal partitions are typically non load bearing</p> <p>Variable load control will allow the building to respond to changes in load, suitable for a flexible space.</p>	<p>All services can be removed.</p> <p>Doors and Windows can be replaced. Floor and wall finishes can be removed. Sanitaryware can be replaced. All removed components will be recycled.</p>	<p>Residential and Community Centre</p> <p>All of the plant and equipment is specified for the environment in which it is located.</p> <p>The utility cupboards within the apartments will provide adequate maintenance space.</p>	<p>The layout of cores and columns will be designed to allow for future flexibility of the floorplate. Where possible, the residential and spaces will be designed to allow for flexibility to add internal walls for separate kitchen, dining and living areas.</p>	<p>All removed components will be recycled.</p>	See substructure and superstructure section
<p>Designing for disassembly</p> <p>Designed to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling. If designed well, it should be possible to replace any component.</p>	<p>Due to the residential use type of the development, it will be designed for ongoing use / longevity on the site, however, elements of the building will be designed for future component and material reuse and mechanical fittings will be prioritised. The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be removed. Doors and Windows can be replaced. Concrete can be recycled as hardcore. Bricks can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	<p>The substructure is not designed to be disassembled. Should it be necessary to demolish the building the concrete can be crushed and recycled as hardcore or aggregate. Steel reinforcement can be recycled.</p>	<p>The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be removed. Doors and Windows can be replaced. Concrete can be recycled as hardcore. Bricks can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	<p>The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be replaced. Concrete can be recycled as hardcore. Bricks can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	<p>Residential</p> <p>By their nature residential apartment layouts and the associated building services installations are bespoke for their purpose. However, the services have been designed in a way that it is easy to isolate each apartment so that only the apartments that require any future modifications are isolated to allow their services installations to be modified or replaced.</p> <p>Community Centre</p> <p>As the community centre has been provided with stand alone systems with the exception of sprinklers, this will allow this area to be refurbished without affecting the residential units allowing all elements to be replaced easily.</p>	<p>The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be removed. Doors and Windows can be replaced. Concrete can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	<p>The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be replaced. Concrete can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	See substructure and superstructure section
<p>Using systems, elements or materials that can be re-used and recycled</p> <p>The use of a product in its original form with minimal reprocessing. Preparation for reuse involves checking, cleaning or repairing materials so that they can be used again for their original purpose. Materials can be reused as a whole, redesigned as modules, or reused as a lot of parts on one or more different sites.</p>	<p>The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be removed. Doors and Windows can be replaced. Concrete can be recycled as hardcore. Bricks can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p> <p>Standardised white goods are provided for private residential units. To allow for easy replacement, guidance will be provided to building occupants regarding replacing white goods provided within the dwellings. Other elements of the building such as windows and services will also be designed for replaceability.</p> <p>A sustainable procurement policy will be prepared for the Proposed Development</p>	<p>The substructure could be retained over a long period with potential for multiple reuse during its lifespan. At the end of its life concrete and reinforcement steel are 100% recyclable.</p>	<p>The superstructure could be retained over a long period with potential for multiple reuse during its lifespan. Non precast concrete elements and reinforcement steel are 100% recyclable.</p> <p>The Project Team will aim to design the development to allow for layer independence, so elements of the building with different life spans are designed to be independent, accessible and removable.</p> <p>The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be removed. Doors and Windows can be replaced. Concrete can be recycled as hardcore. Bricks can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	<p>Residential and Community Centre</p> <p>Services installations consist of components and interconnecting wiring, pipework or ductwork. The majority of the materials used in the manufacture of these components can be recycled. By their nature the materials generally need an element of processing to allow them to be recycled.</p>	<p>The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be removed. Doors and Windows can be replaced. Concrete can be recycled as hardcore. Bricks can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	<p>The components within the building are designed with a max. 60 years lifespan. After a component has reached the end of its lifespan it can be reutilised or recycled should it be necessary to demolish the building. All services can be removed. Doors and Windows can be replaced. Concrete can be recycled as hardcore. Bricks can be cleaned and re-used as reclaimed versions. Steel can be recycled.</p>	<p>Standard utility and bathroom design used throughout.</p> <p>Standardised white goods are provided for private residential units. To allow for easy replacement, guidance will be provided to building occupants regarding replacing white goods provided within the dwellings. Other elements of the building such as windows and services will also be designed for replaceability.</p>	See substructure and superstructure section