

E1.6

ES Chapter 6 - The Works

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THE CROWN
 ESTATE

East Hemel

6. The Works

6.1 Introduction

6.1.1 This Chapter describes the anticipated programme of construction and the key activities that would be undertaken to deliver the Development (the 'Works'). It identifies, in general terms, the potential effects associated with the Works and outlines the proposals for the mitigation of potential likely significant effects. Detailed consideration of likely significant environmental effects and proposed mitigation related to the Works are presented within **ES Volume 2, Chapters 7 to 17**.

6.1.2 Planning for the Works is necessarily broad at this stage as specific specifications have not been prepared and may be subject to modification during future detailed construction planning. However, it is considered that sufficient planning has taken place at this stage to enable the likely significant environmental effect relating to the Works to be identified and assessed. Similarly, where reasonable assumptions have been made by the Applicant, these allow a reasonable worst-case scenario to be assessed in **ES Volume 2, Chapters 7 to 17**.

6.1.3 This Chapter has been prepared by the Applicant's construction advisor, Turner & Townsend.

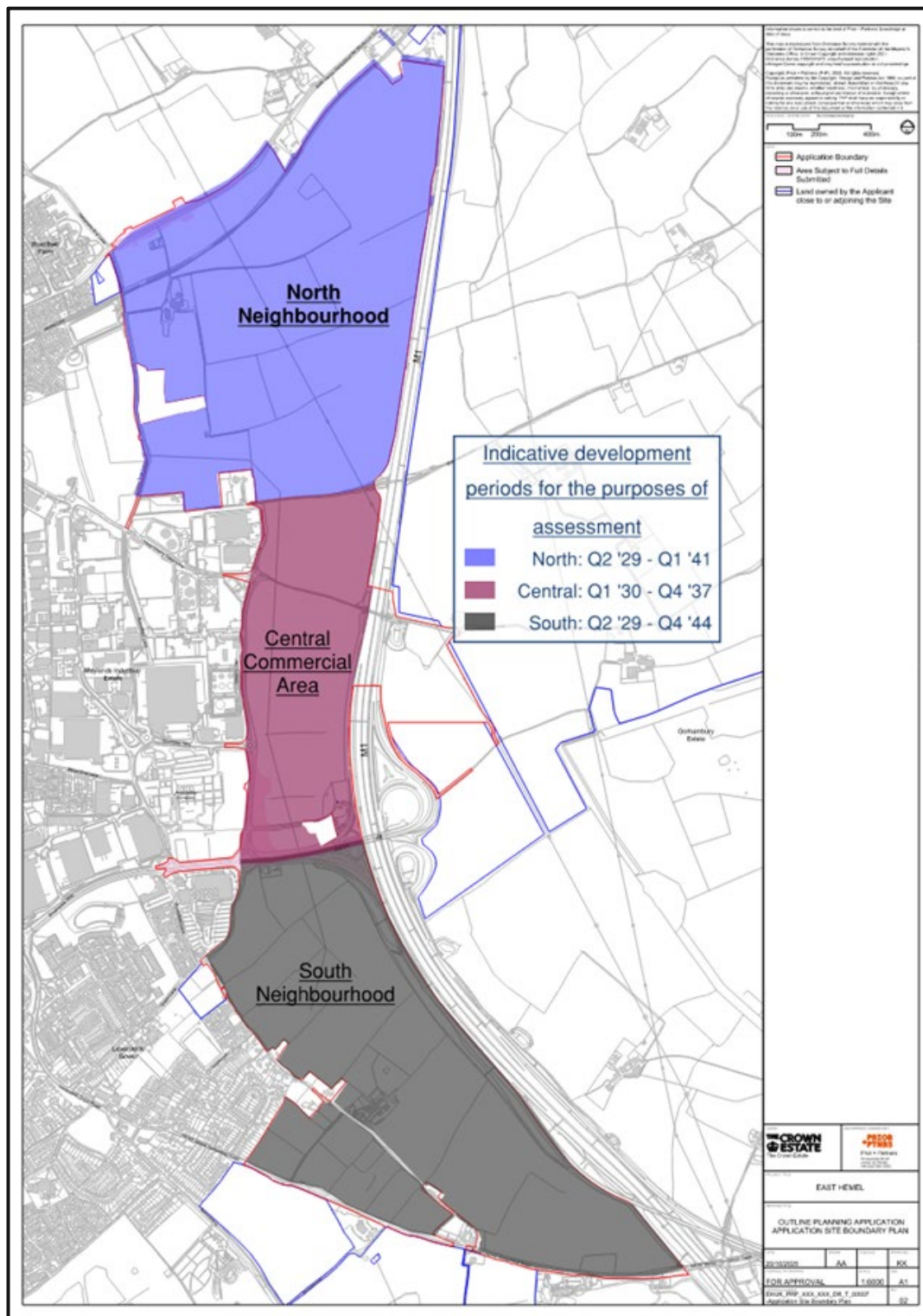
6.2 Construction Programme

6.2.1 Enabling and construction works are anticipated to be delivered in the Northern and Southern neighbourhoods and the Central commercial area over a 17-year period from commencement of construction anticipated to be in 2028 (Year 1) until 2044 (Year 17). An indicative enabling and construction programme is provided below in **Figure 6.1**. Each area is anticipated to be built in line with the development trajectory shown in **Table 6.1**.

Table 6.1: Construction Phases

Area	Duration (Months)	Start Date	End Date
Sitewide Infrastructure	59	Q2 '28	Q1 '33
Northern Neighbourhood	140	Q2 '29	Q1 '41
Central Commercial Area	94	Q1 '30	Q4 '37
Southern Neighbourhood	206	Q2 '29	Q4 '44

Figure 6.2: Indicative Proposed Development Layout



6.3 Description of the Works

6.3.1 A description of the anticipated method for the enabling and construction works is provided below and provides a reasonable basis of assessment for the EIA. A detailed methodology of these works will be set out in the final Construction Environmental Management Plan (CEMP) prior to these works commencing.

Pre-Commencement and Enabling Works

6.3.2 The following pre-commencement and enabling works activities would be carried out (on a phased basis or as required prior to the commencement of the construction works:

- Preparation of a CEMP and approval by St Albans City & District Council (SADC) and Dacorum Borough Council (DBC);
- Securing of construction site boundaries via the use of hoardings / fencing;
- Set-up of contractor welfare and site accommodation;
- Protection of existing trees, hedgerows and ecologically sensitive areas to be retained within and adjacent to the proposed areas of development via the implementation of appropriate fenced off Root Protection Zones (RPZs) in accordance with the requirements of BS5837:2012 'Trees in Relation to Design, Demolition and Construction'¹;
- Appropriately timed tree and vegetation clearance;
- Implementation of site investigation works and any required remediation works;
- Archaeological geophysical surveys, evaluations and building record surveys;
- Implementation of any necessary service infrastructure works, such as re-routing existing utilities;
- Lighting for construction purposes;
- Ecological mitigation works;
- Temporary access and highways works to enable construction;
- Demolition (subject to any listed building curtilage considerations);
- Works to stabilise existing buildings (subject to Listed Building considerations); and
- Trial holes for utilities and drainage.

Surveys, Investigations and Consents / Licenses

6.3.3 Several surveys and investigations will need to be undertaken prior to the commencement of works on site for each phase as identified below, although it is likely that some of the surveys and investigations will need to be

¹ BSI Standards Publication BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations

undertaken once the construction site is fully established to facilitate ease of access to the site for exploratory purposes. The surveys and investigations could include, but are not limited to the following:

- Ecological surveys to facilitate site clearance;
- Geotechnical and contamination surveys and remediation;
- Unexploded ordnance check; and
- Asbestos surveys of the buildings to be demolished (after full vacant possession).

6.3.4 Statutory, Local Planning Authority (LPA) consents and licences would be obtained ahead of the relevant works commencing with the appropriate notice period. Applications will include but not necessarily be limited to:

- A works license for any works on the public highway will be entered into for works on the existing highway in accordance with the Highways Act 1980 and Road Traffic Act 1998;
- Hoarding and scaffold licenses for works on the perimeter boundary;
- Public Right of Way temporary diversions, which will be locally diverted at various stages of the enabling and construction programme to facilitate construction and to maintain public health and safety;
- Submission and approval from the Lead Local Flood Authority (LLFA) for the surface water drainage design for the Site;
- Ordinary water consents and environmental permitting to be obtained for any works associated with the watercourses (i.e. drainage outfalls etc.).

Site Preparation and Groundworks

6.3.5 Any further remediation works identified as being required to ensure the Site is suitable for use in accordance with the requirements of Part IIA of the Environmental Protection Act 1990 following the site investigation works would be implemented at this stage. Any geotechnically and / or chemically unsuitable soils encountered during the earthworks would be treated for re-use within the Site or removed for off-site disposal to a suitably licensed waste disposal facility.

6.3.6 An earthworks exercise would be undertaken to create formation levels for the Development. It is assumed that all land within the residential, commercial and secondary school uses in the Built Development areas shown on the Land Use Parameter Plan would be subject to earthworks and material movements.

6.3.7 There would be areas where levels would reduce (areas of cut) and areas where levels would increase (area of fill). It is assumed that a broad cut and fill balance would be achieved within the Site and no significant import or export of material would be required. The presence of unstable and compressible ground may also be identified during the ground investigations and enabling works prior to the commencement of the main construction activities. The results of the ground investigations would be used to design appropriate remedial measures to address any issues with unstable and compressible ground during the Works. All earthworks would be undertaken in accordance with

relevant industry guidance including CIRIA Report C572: Treated ground engineering properties and performance², British Research Establishment document FB75: Building on Fill - Geotechnical Aspects³ and British Standard 6031:2009: Code of Practice for Earthworks⁴. In addition, all proposed buildings and their foundations would be designed in accordance with Building Regulations Approved Document A - Structure⁵. It is assumed that movement of materials would adhere to the guidance set out in the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.

6.3.8 Specific infrastructure works may need to be undertaken in the initial stages before the commencement of the actual construction works on certain parts of the Site. Some potential works are listed below;

- S278 works required to allow construction traffic to enter the Site (if any);
- Utilities diversions;
- Constructing a new UKPN sub-station;
- Primary utilities corridor; and
- Establishing primary haul roads.

² CIRIA (2002) C572: Treated ground engineering properties and performance.

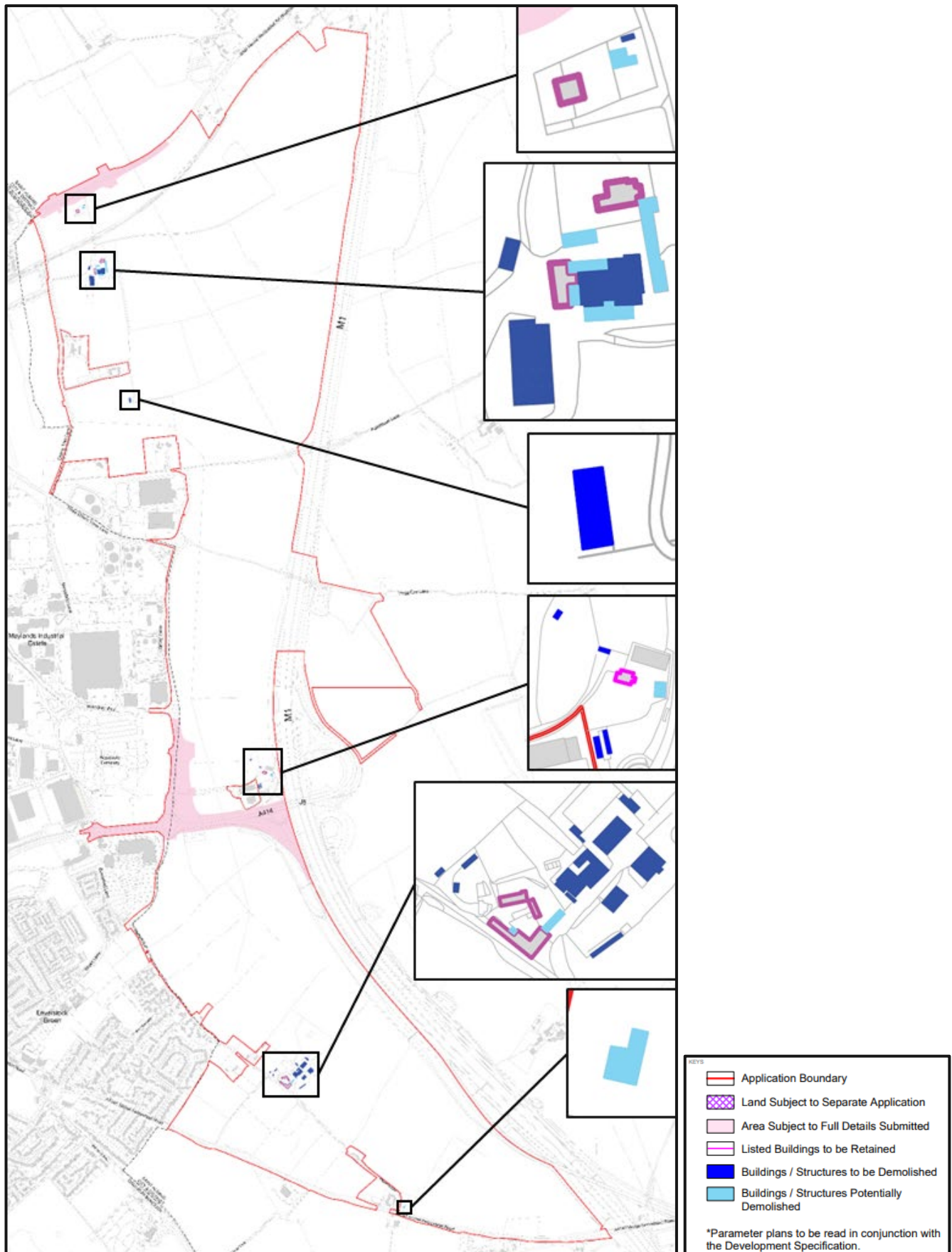
³ British Research Establishment (2015) Document FB75: Building on Fill - Geotechnical Aspects.

⁴ British Standard 6031:2009: Code of Practice for Earthworks.

⁵ HM Government (2013) Approved Document A - Structure (2004 Edition incorporating 2004, 2010 and 2013 amendments).

Demolition of Existing Structures

Figure 6.3: Existing Buildings to be Demolished

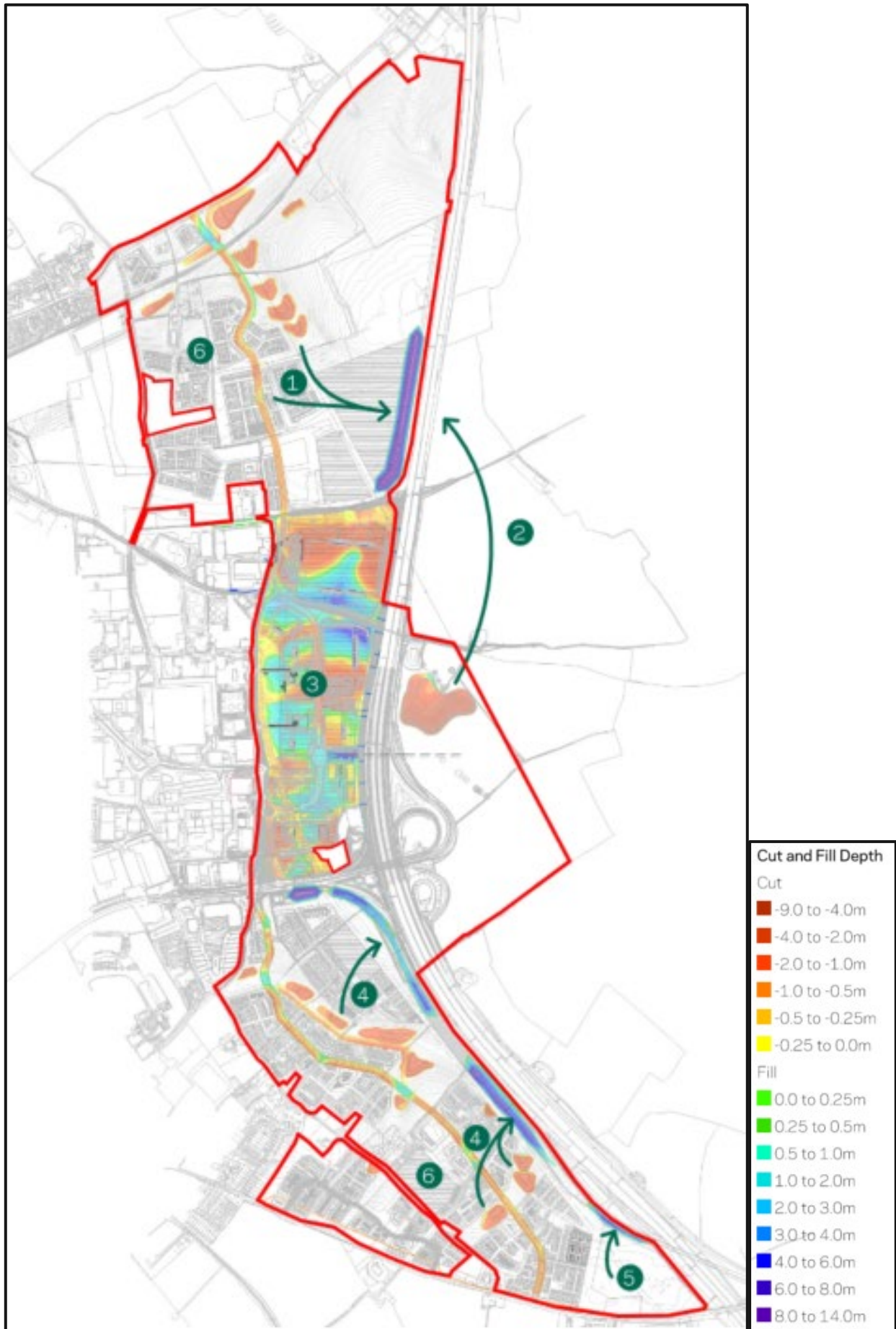


- 6.3.9 Structures to be demolished, or which may potentially be demolished subject to further surveys and / or detailed design are shown in the Demolition Plan also submitted as part of the Outline Planning Application.
- 6.3.10 Prior to any demolition taking place, a pre-refurbishment / demolition asbestos survey would be undertaken. If asbestos is found, it would be removed and disposed of in accordance with UK best practice.
- 6.3.11 It is intended that the following methodology would be adopted to minimise the potential impacts associated with the demolition works, along with any other necessary environmental procedures to ensure the highest level of environmental control is achieved:
- Buildings are likely to be demolished using long reach mechanical plant incorporating breakers and crunchers working from inside the Site boundary;
 - Plant used for demolition will be selected to minimise noise and dust production;
 - Demolition on any road boundaries or boundaries with existing occupied properties will principally be carried out by hand or remote-controlled breakers from the perimeter scaffolds which will allow for screening and the control of dust;
 - Localised water/mist systems will be used at the point of origin during demolition activities and processing areas to suppress and reduce the generations and/or migration of airborne dust;
 - Opportunities will be explored for the recycling of concrete on-Site to form the piling mats and ramps. This method will reduce the number of Heavy Good Vehicle (HGV) movements into and around the Site during the Works;
 - During the Works, noise, dust, and vibration levels will be monitored from various locations around the Site and results analysed to ensure that the agreed levels are not exceeded; and
 - Baseline noise and vibration readings will be carried out during the site surveys to determine background readings and assist in the location of monitors to minimise disruption to key receptors.

Site Excavation

- 6.3.12 The exact method proposed for site excavation will be determined by the Principal Contractor(s), once appointed, ahead of any works being undertaken on-Site. It is anticipated that the excavation will be carried out using different types and sizes of excavators, including but not limited to back actors, bulldozers and graders. The Works will be closely monitored by a surveyor to ensure that the required formation level is reached and no over excavation occurs. It is anticipated that excavated materials shall be hauled and stored at a dedicated stockpile area. The Construction Method Statement (CMS) for the RMA stages of the Development will detail the site excavation method. **Figure 6.4** shows the indicative areas of excavation, as well as the areas to be infilled across the Site.

Figure 6.4: Sitewide Earthworks Strategy



6.3.13 An initial site wide cut and fill assessment has been undertaken, as summarised in **Table 6.2**. The assessment has indicated 33,000m³ of topsoil need to be removed from site, i.e. 6000m³ from Northern Residential, 19000m³ from Central Commercial, and 8000m³ from Southern Residential. **Figure 6.5** shows the breakdown of the areas to be cut and filled.

Table 6.2: Extract from Cut and Fill Assessment – Overall Site Bulk Earthworks (Excluding Topsoil Strip and Reuse)

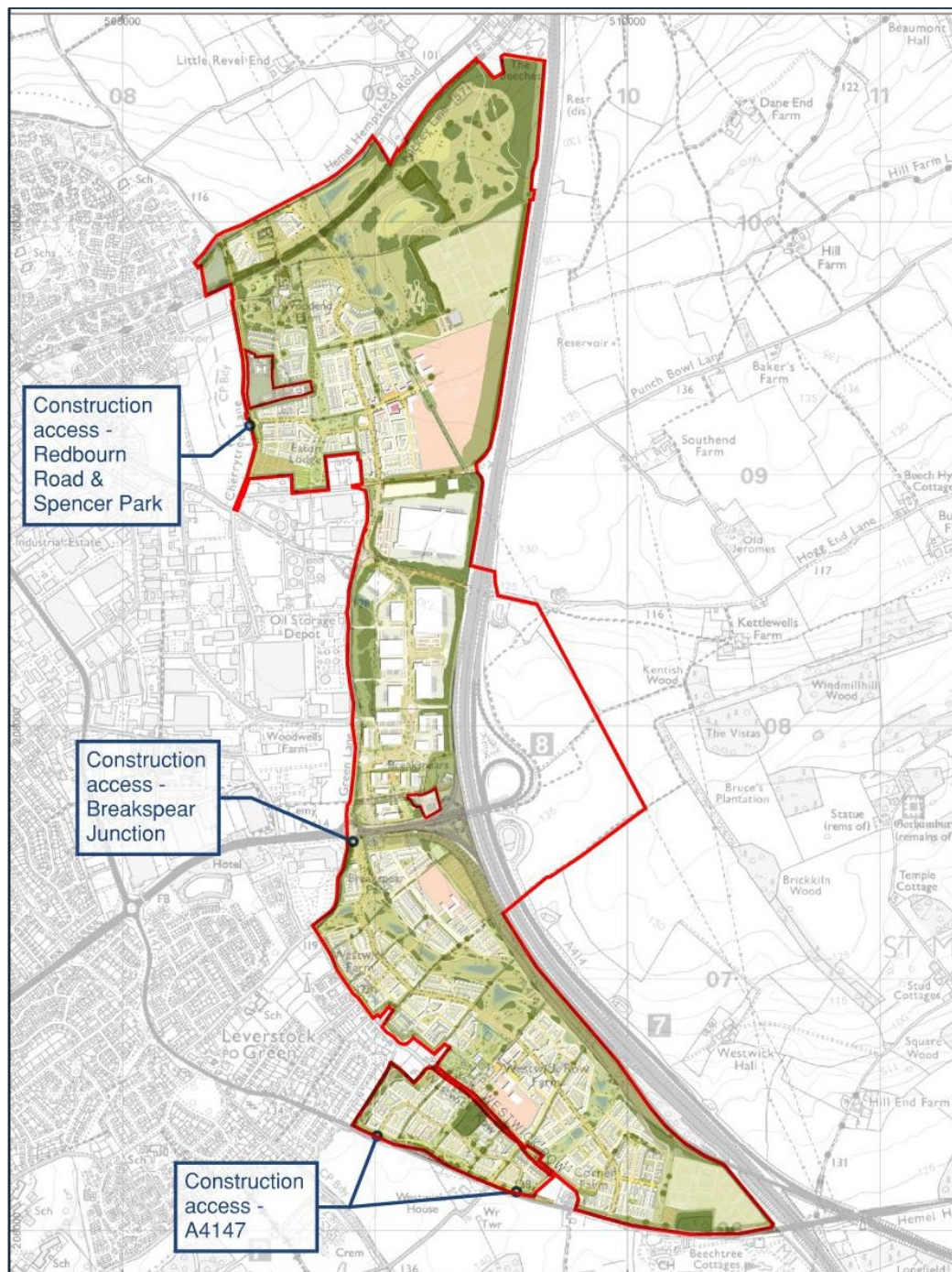
	Northern Residential	Central Commercial	Southern Residential
Cut	112,000m ³	262,000m ³	101,000m ³
Additional Cut on Playing Fields	23,000m ³ (200m)	-	31,000m ³ (500mm)
Fill	181,000m ³	216,000m ³	132,000m ³
Balance	-46,000m ³	46,000m ³	0m ³

Figure 6.5: Extract from Cut and Fill Assessment – Site Topsoil Strip and Reuse

SITE TOPSOIL STRIP AND REUSE			
	NORTHERN RESIDENTIAL	CENTRAL COMMERCIAL	SOUTHERN RESIDENTIAL
STRIP	23,000 m ³	94,000 m ³	31,000 m ³
REUSE	17,000 m ³	75,000 m ³	23,000 m ³
BALANCE	6,000 m ³	19,000 m ³	8,000 m ³

Traffic Management and Construction Site Access

Figure 6.6: Construction Site Access Points



6.3.14 Appropriate traffic management controls will be implemented during the Works in line with Health and Safety Executive (HSE) standards to ensure the safety of other road users and to protect the environment including:

- Appropriate signing of the delivery route(s) to ensure vehicles use the approved route(s) to and from the Site.
- Warning signs where appropriate in the vicinity of the Site's permanent and temporary access(es), both for vehicles and other road users.
- Layout of working areas to allow adequate space for goods vehicle manoeuvring within the Site.

- Temporary traffic management for short periods during delivery of abnormal / oversized loads, as required.
- Design of the Site access(es) to ensure that vehicles have appropriate visibility upon leaving the Site.
- Wheel washing facilities for vehicles leaving the Site.

6.3.15 The CEMP would include measures to mitigate the movements of construction traffic on the local road network as far as possible. While the routing of construction traffic would not be determined until the Principal Contractor(s) is appointed, it has been assumed for the purposes of the EIA that construction traffic would primarily access the Site from the A414 and M1. Some construction traffic from local businesses (with 3 miles) and may approach the Site via Breakspear Way and other local traffic network.

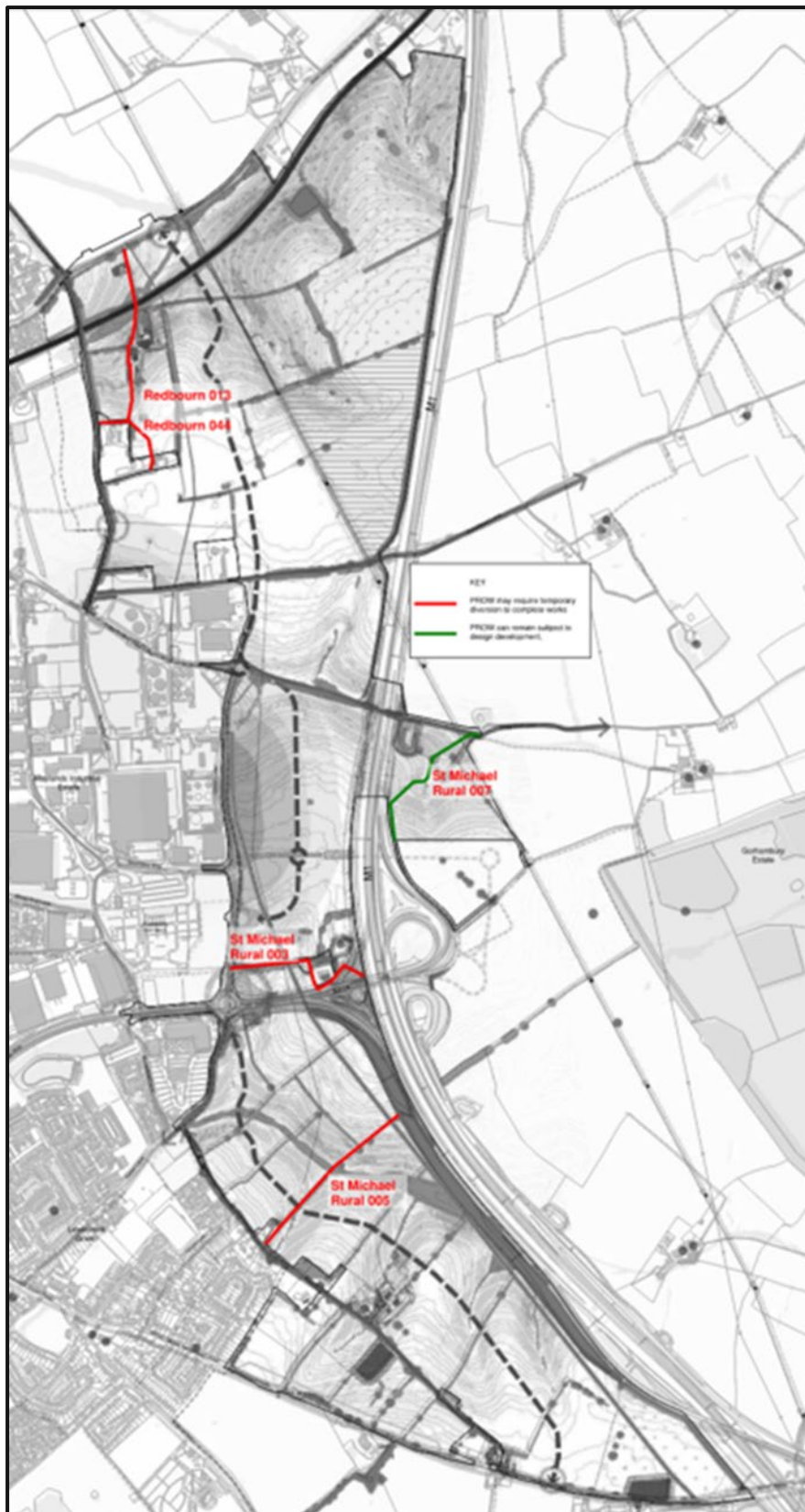
Figure 6.7: Construction Access Approach Routes



6.3.16 A suitable level of parking for construction works would be provided on-Site during the Works. No off-Site parking along the roads around the Site would be permitted unless otherwise agreed with Local Highway Authorities.

Construction Public Rights of Way Strategy

Figure 6.8: Public Rights of Way Plan



6.3.17 There are three existing Public Right of Way (PRoW) (Redlined) located within the North, South and Central areas of the Site which will need to be temporary diverted during the enabling works and final landscaping works.

Temporary controlled vehicle crossing will need to be formed to all the development affected. It's currently anticipated that the fourth PRoW (Greenlined) will not require to be relocated.

- 6.3.18 Permission to temporarily divert existing Public Footpaths, as shown in **Figure 6.8**, where required for construction activities will be the responsibility of the Principal Contractor(s) to secure and will be subject to approval from SADC and DBC. Temporary diversions and the duration of each diversion will be confirmed with the councils prior to construction activities commencing for each development phase. Once construction activities are completed access to the PRoW will be reinstated along its existing alignment.
- 6.3.19 Construction site areas will be made safe and secure prior to works commencing and the public will be separated from the Works, with the use of solid and well maintained, 2.4m high hoardings. Secure access points with wheel cleaning facilities will be established at all Site access and egress locations. Pedestrian access points for operatives will generally be located close to the main vehicular access gates with separate pedestrian gates and footpaths provided. Public access to neighbouring buildings will be safeguarded and will be entirely separate from construction areas.
- 6.3.20 For the infrastructure and enabling phase of the Works, a traditional arrangement of temporary site set up is anticipated utilising portacabins. Temporary utility connections would be made to existing utility services for temporary accommodation and for construction use where no existing connections exist.
- 6.3.21 Following completion of the enabling works, good quality welfare facilities will be provided on the Site including, toilets, washing and changing facilities, and canteen with a kitchen. All Principal Contractors will be responsible for maintaining adequate provision for each development plot within the agreed plot specific boundaries. Where possible, a centrally located facility supplemented by satellite facilities and plot specific facilities will be provided to consolidate welfare requirements. A detailed layout of these facilities will be set out in the final CEMP prior to the Works commencing.

Construction Works

- 6.3.22 There are three types of building assumed for the Development subject to the detailed design development:
- Homes – Terraced, Detached & Semi-detached, Bungalows. The construction methodology for Homes shown in **Table 6.3**.
 - Flats, Maisonettes, Extra Care, Co-living – The construction methodology for is shown in **Table 6.4**.
 - Commercial Buildings – The construction methodology for commercial buildings is shown in **Table 6.5**.

Table 6.3: Construction Methodology (Homes)

Construction Stage	Description	Deliveries
Site setup	Following vacant possession, establishment of security measures and hoarding. Survey works as required for design and demolition. Excavation and ground investigations.	<ul style="list-style-type: none"> Materials of hoarding Equipment for survey works Welfare and security cabins Plant deliveries
Foundations and Substructure	Piled foundation installation and associated concrete works, assumed to be Continuous Flight Auger (CFA) or rotary piles at this stage. Pile caps and ground floor slab construction.	<ul style="list-style-type: none"> Concrete Removal of spoil Reinforcement Timber plywood
Superstructure	Timber frames / floors with steel transfer beams and blockwork / brickwork walls.	<ul style="list-style-type: none"> Steelwork Scaffolding Ancillaries Timber SIPs panels (if detailed)
Cladding and roofing	Installation of brickwork façade, windows and doors. Pitched roofs using roof tiles.	<ul style="list-style-type: none"> Façade materials Glazing Roofing material Insulation
MEP	Installation of services to each unit, note, substations where required are located in the blocks.	<ul style="list-style-type: none"> Pipework Insulation/ lagging Plaster board Stone Fill material Stones / paving Plants and trees Insulation

Table 6.4: Construction Methodology (Flats)

Construction Stage	Description	Deliveries
Site setup	Following vacant possession, establishment of security measures and hoarding. Survey works as required for design and demolition. Excavation and ground investigations.	<ul style="list-style-type: none"> Materials of hoarding Equipment for survey works Welfare and security cabins Plant deliveries
Foundations and Substructure	Piled foundation installation and associated concrete works, assumed to be Continuous Flight Auger (CFA) or rotary piles at this stage. Pile caps and ground floor slab construction.	<ul style="list-style-type: none"> Concrete Removal of spoil Reinforcement Timber plywood
Superstructure	Concrete column and beams with reinforced concrete slab. Steelwork balconies installed. Installation of residential modules (subject to design).	<ul style="list-style-type: none"> Concrete Reinforcement Steelwork Temporary propping Ancillaries Timber
Cladding and roofing	Installation of brickwork façade, glazing. Insulation and waterproofing of roof to achieve weather tightness.	<ul style="list-style-type: none"> Façade materials Glazing Roofing material Insulation
MEP	Installation of risers and MEP primary plant, riser distribution pipework, to each floor and core, from either ground level or from roof. Installation of lifts.	<ul style="list-style-type: none"> Pipework Insulation / lagging Plaster board Stone Lift ancillaries Fill material Stones / paving Plants and trees Insulation

Table 6.5: Construction Methodology (Commercial Buildings)

Construction Stage	Description	Deliveries
Site setup	Following vacant possession, establishment of security measures and hoarding. Survey works as required for design and demolition. Excavation and ground investigations.	<ul style="list-style-type: none"> Materials of hoarding Equipment for survey works Welfare and security cabins Plant deliveries
Foundations and Substructure	Piled foundation installation and associated concrete works, assumed to be CFA or rotary piles at this stage. Pile caps and ground floor slab construction.	<ul style="list-style-type: none"> Concrete Removal of spoil Reinforcement Timber plywood
Superstructure	Concrete column and beams with reinforced concrete slab. Steelwork mezzanine installed.	<ul style="list-style-type: none"> Concrete Reinforcement Steelwork Temporary propping Ancillaries Timber
Cladding and roofing	Installation of brickwork façade, glazing. Insulation and waterproofing of roof to achieve weather tightness.	<ul style="list-style-type: none"> Façade materials Glazing Roofing material Insulation
MEP	Installation of risers and MEP primary plant, riser distribution pipework, to each floor and core, from either ground level or from roof. Installation of lifts.	<ul style="list-style-type: none"> Pipework Insulation / lagging Plaster board Stone Lift ancillaries Fill material Stones / paving Plants and trees Insulation

Fit Out and Landscaping

- 6.3.23 Following the achievement of water tightness, fit out works would commence with builders work holes, installation of drainage stacks, floor screening, if required, and internal partitions and walls.
- 6.3.24 Electrical and plumbing services would then proceed followed by boarding to walls and ceilings and plastering ready for kitchen and bathroom installation, floor and wall finishes and joinery. Decoration and final activities would then follow. Installation of passenger lifts would commence following the completion and acceptance for formed lift shafts.
- 6.3.25 Roof level plant will be placed using mobile cranes.
- 6.3.26 The landscaping will be constructed in a similar phasing strategy to the associated building works and would generally take place in the last six months of the adjacent building construction.
- 6.3.27 Similarly, the landscaping of the adjacent open spaces would be phased to complete at the same time as the adjacent building(s). External landscaping works will also include the completion of any associated temporary or permanent vehicle, pedestrian, or cycle routes through the Development. The Works may be constrained to agreed temporary routes to suit the ongoing phasing and handover of the Works areas.
- 6.3.28 Temporary landscaping and boundaries will be provided to separate completed buildings and public realm from ongoing construction works at the end of each phase.

Construction Related Mitigation for EIA

- 6.3.29 For the purposes of the technical assessments provided as part of this ES, the following construction related mitigation measures are taken as 'embedded' and so factored into the technical assessments to define the potential for likely significant effects. All other construction related mitigation that has been identified as being required to reduce the scale and so significance of residual effects is 'additional mitigation'.
- A CMS providing details for how demolition and construction vehicles will be managed throughout the process and how any mitigation required will be implemented;
 - A CEMP will be produced containing:
 - Dust management measures in accordance with the IAQM guidance for sites at 'high' risk of dust soiling;
 - Measures which would reduce the effects of construction on built heritage assets via limited noise and dust and restricted hours of work;
 - Any asbestos-containing materials will be managed in accordance with The Control of Asbestos Regulations, which will prevent cross contamination of site soils during any demolition and construction works and protect workers from exposure to asbestos. Where required, materials would be handled by a specialist contractor;

- The use of protective sheeting on earth stockpiles and vehicles;
- Minimising vehicle speed on-Site; and
- The cleansing of roads and tyres.
- Interceptor fencing and bunds, with all materials including fuels and oils stored in well-contained and secure areas; and
- To minimise lighting impacts during the demolition and construction works it is expected that lighting will be directional and avoid the use of white mercury vapour lamps.

6.3.30 Additionally, mitigation also includes compliance with measures set out within the:

- The Control of Pollution Act (COPA) 1974 with particular reference to part III;
- The Environmental Protection Act 1990;
- The Control of Noise at Work Regulations 2005; and
- The Health and Safety at Work Act 1974.

Estimated Construction Quantities

6.3.31 **Table 6.6** provides a high level estimate of construction material quantities (not including the infrastructure works as this information is not currently available).

Table 6.6: High Level Estimate of Construction Material Quantities

Construction Materials	Quantities (m ²)	Quantities (m ³)	Quantities (Tn)
Concrete	0	260,976	0
Reinforcement	0	0	35,402
Blockwork	450,211	2,746	0
Drylining	623,938	0	0
Façade Inc Glazing	581,924	0	0
Ceiling Finish	103,736	0	0
Roof Finishes	210,123	0	0
Floor Finishes	525,112	0	0
Structural Steel	0	0	2,702
Timber	279,767	0	0

Waste

6.3.32 **Table 6.7** provides a high level estimate of excavation waste.

Table 6.7: Excavation Waste

	Quantities (m ³)
Excavation Waste	
Site Topsoil	148,000
Bulk Earthworks	529,000
Parcel Foundations	149,000
Recycling Targets	
Reuse on Site	644,000
Balance	182,000

6.3.33 Detailed cut and fill investigations and proposals will form part of the future RMAs. For the purposes of the EIA, the above quantity has been assumed for across all three main development areas.

6.3.34 Site-wide excavation would be required to re-grade the Site, as well as to construct service trenches within the various phases. Substructure works will be carried out on a plot-by-plot basis in line with the phasing programme.

6.3.35 There is low risk of contamination on the Site. If unexpected contamination is encountered during construction works then further Site Investigation works (SIs) may be required to delineate the contamination and a Remediation Strategy would be prepared in consultation with SADC and the Environment Agency (EA), as relevant. Remediation works would then be undertaken in accordance with the Remediation Strategy and the results would be reported within an updated Verification Report.

Construction Waste

6.3.36 **Table 6.8** and **Table 6.9** provide a high-level estimate of construction waste.

Table 6.8: Construction Waste - North & South Residential

Construction Waste	Cost £100k	Residential Waste Benchmark (Tn/£100k)	Waste Quantity (Tn)
Waste Generation	1,084,000,000.00	11	120,000
Recycling Targets			
% Recycled		80%	96,000
% Residual		20%	24,000

Table 6.9: Construction Waste - Central Commercial

Construction Waste	Cost £100k	Residential Waste Benchmark (Tn/£100k)	Waste Quantity (Tn)
Waste Generation	331,000,000.00	10	34,000
Recycling Targets			
% Recycled		80%	27,200
% Residual		20%	7,063

Construction Compound

6.3.37 A construction compound would be established within the Site boundary to provide an area to offload, store and handle materials as well as for welfare facilities where appropriate. The location of the construction compound would be appropriate to the current phase and location of the Works to enable materials to be offloaded in one controlled area and then moved within the Site to the required building area. The construction compound will be carefully positioned within the Site to avoid unnecessary visual or noise nuisance to adjacent land users. It is envisaged that strict management of loading zones will be implemented by way of a delivery booking system, which will ensure that material movements are efficiently managed and will also facilitate a 'just in time' delivery regime. Where possible, material movements will be managed to coincide with quiet periods.

Construction Plant and Equipment

6.3.38 Consideration was given to the types of plant and equipment likely to be used during the Works. An indication of the typical types of plant and equipment associated with each key element of the Works are shown in **Table 6.10**.

Table 6.10: Indicative Plant and Equipment

Plant and Equipment	Site Enabling Works and Demolition	Ground Works	Construction Works	Open Space and Landscaping
Bulldozers	✓	✓		
Compaction plant	✓	✓	✓	✓
Cranes and hoists			✓	
Cutters, drills and small tools	✓	✓	✓	✓
Crushers	✓			
360 excavators	✓	✓		
Floodlights	✓	✓	✓	
Fork lift trucks			✓	✓
Generators	✓	✓	✓	✓
Hydraulic benders and cutters	✓		✓	
HGVs / lorries / vans	✓	✓	✓	✓
Piling rigs			✓	
Scaffolding and mobile hydraulic access platforms	✓		✓	
Ready-mix concrete lorry			✓	
Concrete pump			✓	
Mortar batching plant			✓	
Water pump			✓	
Temporary supports			✓	

Vehicle Numbers

6.3.39 Construction traffic includes Heavy Goods Vehicles (HGVs), Light Goods Vehicles (LGVs) and cars which will travel to and access the Site during the enabling, demolition and construction period. The maximum number of monthly vehicles trips expected to be travelling to and from the Site is 1,624 (one way) during year 2030 of the construction

period. Of these vehicles it is estimated that 53 per day (65%) are expected to be HGVs and the remaining 28 per day (35%) will be Light Goods Vehicles (LGVs) and general construction traffic.

6.3.40 **Table 6.11** shows the anticipated daily vehicles peaks during each year of the demolition and construction period, for all construction traffic.

Table 6.11: Construction Traffic – One Way Trips Peaks per Year

Year	Per Month			Per Day		
	Total	HGV	LGV	Total	HGV	LGV
2028	798	478	320	40	24	16
2029	1469	951	530	73	48	27
2030	1624	1056	568	81	53	28
2031	1133	779	354	57	39	18
2032	1256	841	415	63	42	21
2033	1051	718	333	53	36	17
2034	550	400	150	28	20	7
2035	550	400	150	28	20	7
2036	550	400	150	28	20	7
2037	500	370	130	25	19	6
2038	340	274	65.5	17	14	3
2039	373	302	72	19	15	4
2040	373	302	72	19	15	4
2041	373	302	72	19	15	4
2042	220	178	42	11	9	2
2043	220	178	42	11	9	2
2044	220	178	42	11	9	2

Table 6.12: Construction Traffic – Labour Numbers

Year	Total	Blue	White
2028	270	251	19
2029	817	698	125
2030	1155	1036	119
2031	1078	955	123
2032	1078	955	123
2033	1028	905	123
2034	872	768	104
2035	872	768	104
2036	872	768	104
2037	860	756	104
2038	819	716	103
2039	842	735	107
2040	842	735	107
2041	611	504	107
2042	465	404	61
2043	465	404	61
2044	465	404	61

Site Working Hours and Days

6.3.41 Noisy construction working hours will be agreed with the SADC / DBC, but are expected to be:

- Monday to Friday – 7:30am to 6:00pm;
- Saturdays – 8:00am to 1:00pm; and
- No noisy works allowed on Sundays and Bank and Public Holidays.

6.3.42 Start-up and close-down periods of up to an hour before and after core working hours (6:30am to 7:00pm Monday – Friday / 7:00am to 2:00pm Saturday) will be used for activities such as arrival of workforce and staff on-Site;

deliveries and unloading; maintenance and checking of plant and machinery; general refuelling; site inspections, and safety checks prior to commencing work; site meetings; and general site clean-up and departure.

6.3.43 Some activities may need to be conducted outside the agreed working hours such as the following:

- Seasonal and / or weather dependent / daylight hours dependent.
- Construction plant repair and maintenance work.
- Major concrete operations and other continuous operations.
- Setting up of traffic management schemes.
- Short-term construction activities requiring road and railway closures / possessions.
- Delivery of abnormal loads in accordance with the requirements of the Highways Authority and Police, for example during mobilisation and demobilisation.

6.3.44 For these works the Principal Contractor will apply for dispensation in accordance with the SADC and DBC noise nuisance guidance.

Environmental Management and Mitigation

Environmental Management Plans

6.3.45 Each phase of the Works would be managed by a CEMP. The CEMPs would be conditioned as part of the planning permission and would be agreed with SADC and DBC and other relevant bodies prior to the commencement of the Works. The appointed Principal Contractor(s) for the Works would be obliged, via planning condition and contractually, to adhere to the CEMP.

6.3.46 The CEMP will detail the environmental controls, protection measures and safety procedures that would be adopted during the Works, providing a tool to ensure the successful management of the likely environmental effects as a result of construction activities. The CEMP would be prepared in-line with SADC's and DBC's guidance⁶ and would include any relevant mitigation measures identified within **ES Volume 2, Chapters 7 to 16**.

Management of Construction Works

6.3.47 In terms of quality management, the Proposed Development will be constructed by the relevant appointed contractor in line with the principles set out in the externally accredited to BS ISO 9001: 2015⁷ (or recognised equivalent). The Site will also be registered with the Considerate Constructors Scheme.

⁶ Refer to any CEMP preparation guidance available from SADC / DBC

⁷ International Organization of Standardisation. <https://www.iso.org/standard/62085.html>. 2015.

6.3.48 All Works will be undertaken in line with the relevant legislative requirements, including the Construction (Design and Management) Regulations 2015⁸ and Environmental Protection Act.

Community Liaison

6.3.49 The Applicant / Principal Contractor(s) would continue to undertake liaison with the local community, SADC, DBC and other stakeholders, as appropriate, during the Works.

6.3.50 In advance of the Works commencing on-Site, a public briefing/information session for the local community on the Works that will be undertaken will be held at a local venue. These drop-in briefing / information sessions will be held periodically (particularly in advance of key milestones in the construction programme) over the duration of the construction period and will provide an opportunity not only for the Principal Contractor(s) and the Applicant to disseminate information but also for local residents, businesses and stakeholders to ask questions of the Principal Contractor(s) and the Applicant and raise any particular concerns. The public briefings / information sessions will be publicised via a variety of channels and be open on specified days so those with differing commitments can attend.

6.3.51 In advance of and during the demolition and construction works, the Principal Contractor(s) / Applicant will maintain a number of other methods to communicate with the local community to keep them informed of progress on the scheme and enable concerns to be voiced and listened to. These methods will also be used as appropriate to inform local residents and neighbours of any emergency work required on-Site. These methods will likely include newsletters, drop-in sessions, updates via a dedicated website and email address, a dedicated hotline and text alerts for targeted communications (including in the event of emergency works).

Complaints Procedure

6.3.52 A staffed hotline will be available 24/7. This will provide local residents with the ability to communicate directly with the appropriate personnel allowing escalation procedures to be instigated, ensuring all enquiries are handled promptly.

6.3.53 The hotline will allow any complaints to be logged and fully investigated, and responded to quickly, advising what action has been taken. If necessary, complaints will be reported to the relevant department of SADC and DBC as appropriate.

6.3.54 The hotline will be operational 24/7, so will be available during normal operational hours and outside of normal working hours. The requirements for the hotline will be set out within the CEMP.

⁸ Construction (Design and Management) Regulations (Statutory Instrument No. 51) (online) Available at: <http://www.legislation.gov.uk/ukSI/2015/51/contents/made>

Security, Emergencies and Accidents

- 6.3.55 The site security arrangements for the Works would be in line with the requirements set out within the Construction (Design and Management) Regulations. It is also anticipated that the Development will include appropriate levels of security, including fencing, CCTV and on-Site security personnel.
- 6.3.56 All works will be undertaken in line with the Health and Safety at Work Act⁹. In addition, as part of the CEMP, there will be a requirement for the preparation of risk assessments and method statements prior to the commencement of activities. This will aid with the identification of risks and the Development mitigation measures to reduce any risk to an acceptable level.
- 6.3.57 The CEMP will also contain a series of procedures / measures for emergencies / accidents that could occur alongside contact details for relevant organisations that need to be notified.

Materials Storage and Handling

- 6.3.58 Environmental issues would be considered in the procurement of raw materials and all such materials would be appropriately stored in order to minimise damage by vehicles, vandals, weather or theft.
- 6.3.59 Contractors and their subcontractors would be expected to maintain a tidy site and where practical, to operate a 'just-in-time' policy for the delivery and supply of materials for the Works.
- 6.3.60 Tanks and drums of liquid chemicals and fuels would be stored in bunded compounds and, where feasible, packaging would be returned.

Waste Management and Minimisation

- 6.3.61 It is anticipated that waste will be generated during the Works, for example, packaging from deliveries and off-cuts of materials that are surplus to requirements. A Site Waste Management Plan (SWMP) will be prepared by the Principal Contractor(s) and will set out management / control measures to ensure that waste generated from carrying out the Works is kept to a minimum.
- 6.3.62 The movement of materials will adhere to the guidance set out in the 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites'¹⁰.

Control of Noise and Vibration

- 6.3.63 Noise mitigation measures and the Best Working Practices as outlined in British Standard 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1 noise'¹¹ and British

⁹ Health and Safety at Work Act 1974 (as amended) (Statutory Instrument No. 37) (as amended) (online) Available at: <http://www.legislation.gov.uk/ukpga/1974/37/contents>

¹⁰ Defra. Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. 2009.

¹¹ British Standards Institution. British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 noise. 2014.

Standard 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 2 vibration'¹², will be implemented. Mitigation measures that will be considered include using quiet construction methods, locating plant and equipment away from noise sensitive receptors, limiting hours of construction, and ongoing monitoring.

6.3.64 Consents under Section 61 of the Control of Pollution Act 1974 will be obtained for the construction works. The Works will be carried out in accordance with the conditions of the consent.

6.3.65 The Principal Contractor may agree with the local authority that for certain activities not anticipated to be noise sensitive such as site investigation and site set up, a Section 61 will not be necessary.

6.3.66 In any event Best Practicable Means (BPM) as defined under Section 72 of the Control of Pollution Act (CoPA) 1974 will be applied to all activities. These will include:

- All equipment used should be maintained in good mechanical order, fitted with appropriate silencers, mufflers or acoustic covers.
- Site stationary noise sources - for example, a generator - as far away from neighbouring properties as possible or, build acoustic barriers (which may consist of site materials - for example, bricks / earth mounds or proprietary types) when this is not possible.
- Piling should be carried out by methods causing minimum noise and vibration.
- Workers on site must be aware to keep general site / disruption noise - for example, shouting, radios, vehicles, equipment / plant machinery - to a minimum.
- Vehicle movement to / from site must be controlled, minimising noise and disturbance to neighbouring properties.

6.3.67 To effectively control nuisance vibration levels caused by the construction activity taking place, the risk of vibration being produced and the potential to have a detrimental effect on surrounding properties, amenities and personal wellbeing will be evaluated by the appointed Principal Contractor(s).

6.3.68 Techniques will be used to minimise, as far as is appropriate, the level of vibration to which operators and others in the neighbourhood of site operations will be exposed. The priority will be to avoid the generation of vibration, and where vibration is unavoidable, to control vibration at source.

6.3.69 Measures which should be taken include the following.

- All activities with the potential to cause vibration levels greater than or equal to 1.0 mm s⁻¹ PPV, eg piling, will be identified in the CMS prior to works commencing;
- Compaction will be via vibrating rollers wherever possible; and

¹² British Standards Institution. British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 vibration. 2014.

- A mitigation plan will be set out, including justification for siting of plant, types of plant selected, periods of use, working hours, access points, schedule of works likely to cause complaints (if not pre-notified).

6.3.70 Construction activities will be carried out using the guidance in 'BS 6472-1: 2008 'Guide to evaluation of human exposure to vibration in buildings, Vibration sources other than blasting"' and 'BS 7385-2: 1993, 'Guide to damage levels from ground borne vibration"' and 'BS 5228-2:2009 'Code of practice for noise and vibration control on construction and open site, Vibration'".

6.3.71 In accordance with BS6472-1:2008, vibration levels should not exceed 0.4 m.s-1.75 in neighboring properties. If vibration at a sensitive receptor, such as residential, is likely to exceed 0.4 m.s-1.75, the sensitive receptor and LPA must be pre-notified, in writing, at least 5 full working days prior to work commencing, with the following information:

- Site location - the location of a site in relation to the sensitive receptor;
- Duration of site operations, including schedule of operations likely to cause vibration and their hours of work;
- Vibration characteristics - e.g. whether it is continuous, intermittent or impulsive;
- Effect on buildings;
- Details of community liaison; and
- Vibration levels which have the potential to cause building damage will not be tolerated.

Control of Dust and Lighting

6.3.72 To effectively control the dust particles being airborne, on-site monitoring system will be implemented with real-time baseline monitoring done prior to start of works through monitors with automatic site trigger alert levels.

6.3.73 The following measures will be implemented:

- Bonfires are not permitted;
- Precautions should be taken prior to works starting to prevent smoke from machinery, vehicles or combustion on site;
- Petrol / diesel powered equipment must not emit dark smoke once running temperature is achieved and should be checked and maintained regularly;
- Adequate water supply must be provided ensuring all parts of the site are reached accordingly; and
- Wastewater must be disposed of properly.

6.3.74 All dust and air quality pollutant emission incidents and complaints will be recorded and responded and will be made available for local authority when requested. Equipment like disc cutters, table saws, sanders, etc., will have dust suppression or a dust collection facility fitted. Stockpiles of earth and other aggregates will be stored in bunded areas and not allowed to dry out, unless they are required for a particular process, in which case it will be ensured that appropriate additional control measures are in place. Additionally, stockpile of bulk cement and other

fine powder materials will be delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

6.3.75 A wheel washing system will be implemented for all construction vehicles and wherever possible, adequate hard surfaced area will be ensured to the site exit.

6.3.76 Commercial road vehicles attending the site will meet European Emission Standards pursuant to the EC Directive 98/69/EC of Euro 4 for petrol vehicles and Euro 6 for diesel vehicles and Euro VI for all lorries and heavy goods vehicles.

6.3.77 Good practice guidance documents prepared by the CIRIA¹³ note that lighting on construction sites is typically part of on-site security and health and safety requirements. As such, it is assumed that the following sources of lighting will be present during the Works:

- Health, safety and security lighting associated with the Site perimeter, access(es), working areas, temporary car parking areas and construction compound(s). It is assumed that construction lighting will not include floodlighting;
- Vehicular / plant lighting required for particular work tasks; and
- Internal lighting associated with any temporary office units / welfare facilities in the construction compound(s).

6.3.78 There would be a curfew to ensure that no lighting would be kept switched on overnight aside from low level lighting (for security / safety purposes), which would be implemented along the perimeter of the Works area(s) as part of a presence detection type security system.

6.3.79 Measures to minimise light spill and glare would be adopted during the Works, including use of baffles / shields, directional lighting and advanced notice / prior notification of works that would require construction lighting in proximity to sensitive receptors and post-installation checks, to ensure that any temporary lighting is suitably controlled.

Pollution Control

6.3.80 The Works will be managed in accordance with the CIRIA guidance 'C532 - Control of Water Pollution from Construction Sites'¹⁴ and the relevant Good Practice Guidelines for Pollution Prevention, as follows:

- GPP 5: Works and maintenance in or near water¹⁵;
- PPG 6: Working at construction and demolition sites¹⁶;

¹³ Construction Industry Research and Information Association. Environmental good practice on-site 5th edition (C692). 2023.

¹⁴ Construction Industry Research and Information Association. Control of Water Pollution from Construction Sites. Guidance for consultants and contractors (C532) (online). 2001.

¹⁵ Environment Agency. GPP 5: Works and maintenance in or near water. Version 1.2. 2018.

¹⁶ Environment Agency. PPG 6: Working at construction and demolition sites. 2012.

- GPP8: Safe storage and disposal of used oils¹⁷;
- GPP 13: Vehicle washing and cleaning¹⁸;
- GPP 21: Pollution incident response planning¹⁹; and
- GPP 22: Dealings with spills²⁰.

6.3.81 Bunding will be provided around any source of potential pollutants required for construction (e.g. mortar mixers, fuel stores etc.). This will ensure that in the unlikely event of an accidental spillage, surface and ground water will remain protected.

Protection of Ecological Resources and Trees

6.3.82 As part of the CEMP, procedures and management measures to ensure the protection of ecological resources, including habitats (where retained) and protected species will be included. A suitable Ecological Mitigation, Enhancement and Management Strategy (EMEMS) and Landscape and Ecological Management Plan would also be created to ensure long-term management of the retained and proposed habitats, specific to each phase of the Development.

6.3.83 The Preliminary Arboricultural Impact Assessment (AIA) submitted with the Outline Planning Application details the procedures that should be implemented into a detailed Arboricultural Method Statement (AMS) that could be secured by way of an appropriately-worded planning condition, including:

- A schedule and specification of tree removal and pruning works;
- Specifications for tree protection barriers and ground protection;
- Procedures for any specialist construction techniques;
- Phasing of work; and
- Site monitoring (where required); and a Tree Protection Plan.

¹⁷ Environment Agency. GPP8: Safe storage and disposal of used oils. Version 1.2. 2021.

¹⁸ Environment Agency. GPP 13: Vehicle washing and cleaning. 2017.

¹⁹ Environment Agency. GPP 21: Pollution incident response planning. 2017.

²⁰ Environment Agency. GPP 22: Dealings with spills. 2018.