

5 DEMOLITION AND CONSTRUCTION

Introduction

- 5.1 Impacts arising during the demolition and construction processes are temporary, generally short-term and intermittent. Nevertheless, they can be sources of potentially significant effects on environmental resources and residential amenity. This chapter of the ES provides a description of the demolition and construction works for the purposes of identifying and assessing the potential environmental impacts and likely environment effects of the proposed development in the technical assessments of ES Volume 1 (Chapters 6 - 14) and ES Volume 2.
- 5.2 In accordance with the EIA Regulations, this chapter sets out the demolition and construction works of the proposed development and the key activities that would be undertaken during the works. This chapter also describes the management controls that form part of the proposed development that would be implemented to avoid, minimise and where they are not possible to avoid, mitigate the magnitude of potential environmental impacts.
- 5.3 Although the detailed construction method statements and specifications have not yet been prepared and construction sub-contractors not yet appointed, it is possible to establish the potential broad environmental impacts associated with the works and to determine a framework for the management of these impacts to ensure there are no significant environmental effects. The framework would form the basis for a Construction Environmental Management Plan (CEMP) to be implemented during the demolition and construction works. A detailed CEMP would be secured by means of an appropriately worded planning condition.
- 5.4 The CEMP would be prepared in accordance with standard best practice and regulatory requirements, as well as the RBG's Code of Practice for Construction Firms relating to site noise. The detailed CEMP, which will be produced post planning, will include a Construction Traffic Management Plan (CTMP), as well as a Site Waste Management Plan (SWMP).

- 5.5 More specifically, the CEMP would define relevant policies, legislative requirements, thresholds/limits, procedures, roles and responsibilities for the implementation of environmental and management controls throughout the duration of the works. The CEMP would be discussed and agreed with the RBG in advance of works commencing on-site.
- 5.6 An outline of all the anticipated environmental issues and necessary management controls that would be covered within the CEMP is provided within this chapter.
- 5.7 It is standard practice to allow the appointed contractor's substantial input into documents such as the CEMP, CTMP and SWMP; however at this stage of planning, sub-contractors have not yet been appointed and detailed method statements have not yet been prepared. Nevertheless, the likely content of such documents can be predicted with a reasonable degree of certainty having regard to the standard requirements of the RBG and the experience of the Applicant and project team in developments of this scale. As such it is considered that the likely environmental effects are still capable of assessment in this ES.
- 5.8 It is important to note that this chapter does not assess the magnitude of potential impacts, nor the significance of likely effects during the demolition and construction works, as this is addressed within individual technical assessments within ES Volume 1 (Chapters 6 - 14) and ES Volume 2. Controls set out in this chapter are considered within each technical assessment whether as standard control measures, or as mitigation, to enable the assessment of demolition and construction effects within a particular technical assessment.

Scope and Programme of Works

- 5.9 The application site comprises two parcels of land referred to as 'Plot A' and 'Plot B'.
- 5.10 The proposed works would comprise the demolition of all existing industrial and commercial units, hardstanding areas and remaining foundations; the excavation of a semi-basement car park; the construction of a variety of residential typologies and uses, with a mix of public and private spaces at ground and building roof levels.

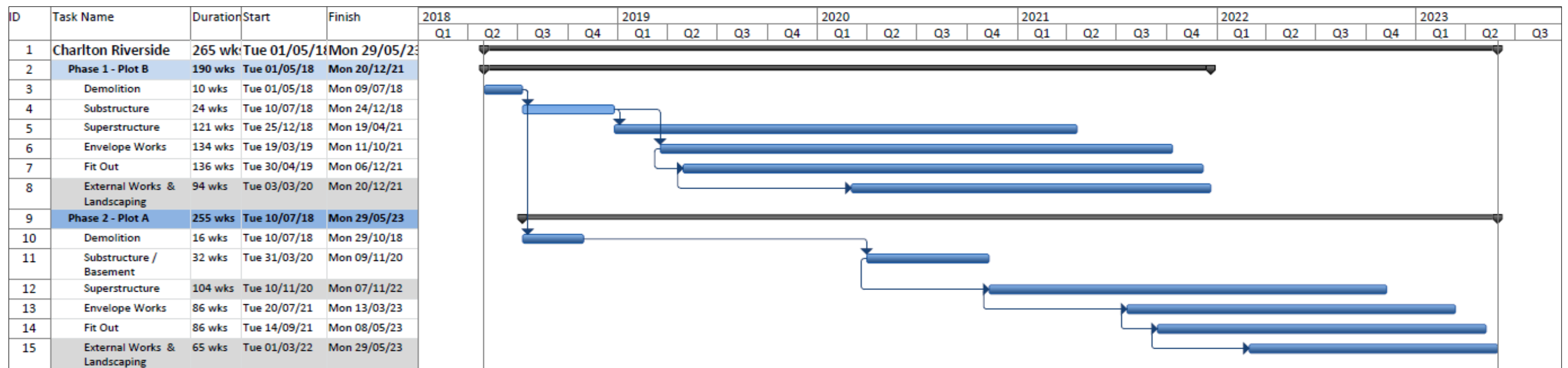


Figure 5.1: Anticipated Demolition and Construction Programme

- 5.11 A detailed development programme has not yet been prepared. To enable assessment of likely environmental effects within this ES, an indicative, but feasible, programme has been developed by the Applicant based on a number of assumptions. These assumptions have been informed by an understanding of current and future projected market conditions, logistical arrangements, technical considerations and professional experience, all of which are considered to be reliable.
- 5.12 The indicative development programme is shown in Figure 5.1 and is based on the assumption that planning consent is secured by May 2017 and vacant possession of all tenanted units is obtained by May 2018.
- 5.13 For the purpose of this EIA, based on commencement of works in Q2 2018, the development works are anticipated to be undertaken over an approximate 62 month period with completion targeted for Q2 2023.
- 5.14 Figure 5.2 illustrates the anticipated sequencing of the proposed works across the two plots of the application site.

- minimise the potential environmental impacts of the proposed development. Monitoring and record-keeping requirements will also be addressed in the CEMP.
- 5.17 There are also a number of technical approvals that will be required for the proposed development from third parties. These include approvals for works adjacent to the RBG Highways, Thames Water assets and other utilities assets. Party wall awards will also be required for a number of adjacent properties. These will all be addressed individually during the detailed design of the proposed development using analysis and site investigation targeted to investigate and mitigate effects on these assets.
- 5.18 In addition to liaison with the RBG, TfL and other statutory consultees, a key aspect of the successful management of the proposed development would be the maintenance of good relations with the application site neighbours and the general public. The Applicant would consider other developments that may proceed at the same time and ensure close liaison with the other parties to co-ordinate and minimise potential impacts from the demolition and construction works.

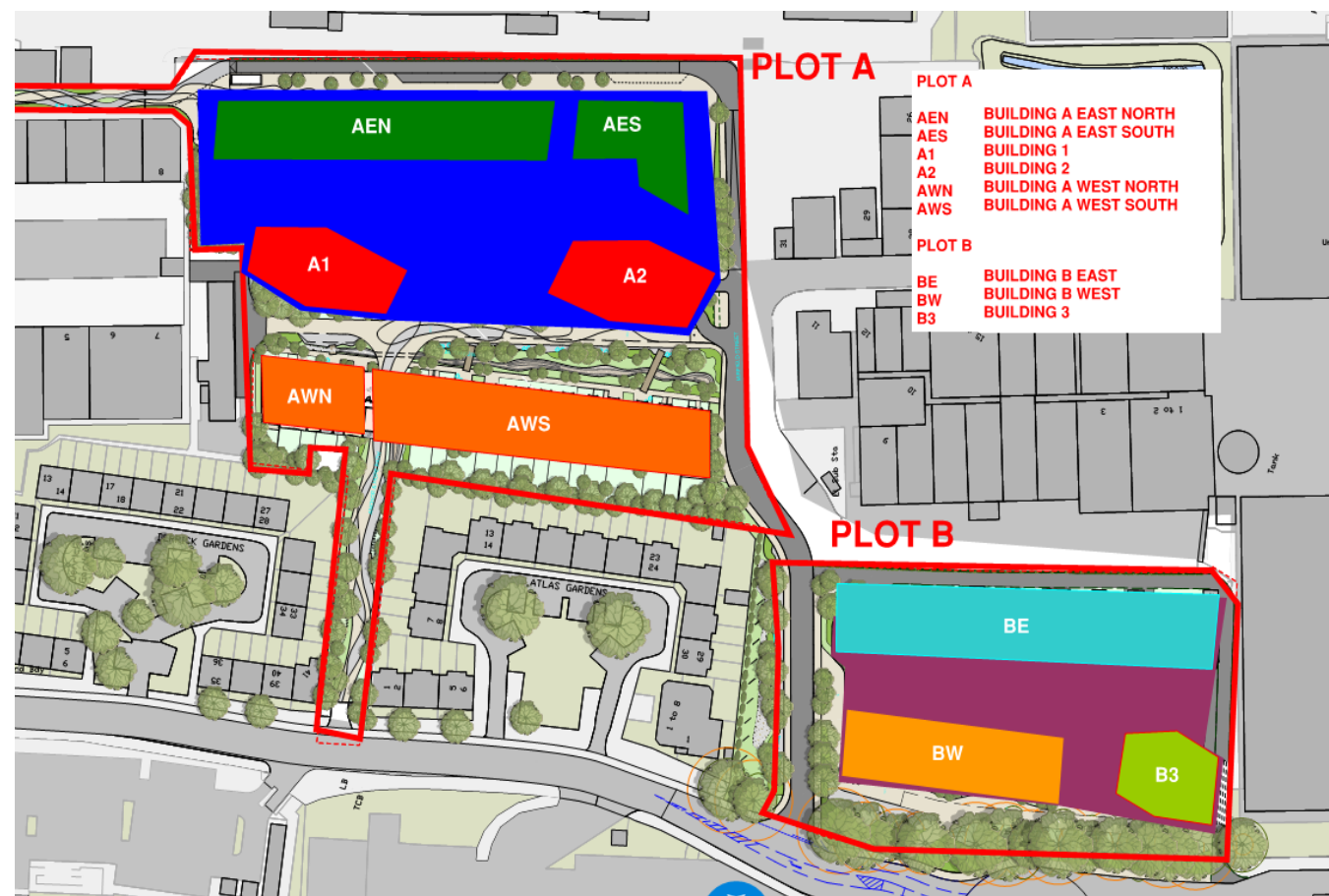


Figure 5.2: Anticipated Sequencing Plan of Proposed Development

Description of Works

Background

- 5.15 Early discussions would be held with the RBG and other relevant statutory consultees, such as TfL and Thames Water. These discussions would include site logistics, management, access and egress and hoarding arrangements.
- 5.16 Prior to work starting on-site, the CEMP and CTMP would be produced and agreed with the RBG. These would include roles and responsibilities, details on the control measures and actions to be taken to

Enabling and Demolition Works

Enabling Works

Pre-Commencement Surveys and Works

- 5.19 Enabling works would comprise the following:
- Removal of all loose rubble and debris;
 - Removal of all vegetation;
 - Commissioning of a utilities survey to establish existing utilities on-site and adjacent to the application site prior to any preparatory works for the perimeter retaining wall construction. Services identified would be either diverted, capped, cut off or isolated, as appropriate;
 - Preparation of a Pre-Tender Health and Safety Plan and Construction Tender Document;
 - Commissioning of a Phase II geo-environmental investigation to establish site-specific conditions in respect of ground contamination, asbestos, groundwater and geotechnical data; and
 - Preparation of an appropriate Remediation Strategy for the application site.

Site Offices/Welfare Facilities and General Site Access

- 5.20 Prior to demolition 2.4 m high perimeter site hoarding and access/egress gates would be erected and maintained throughout the duration of the works around the application site perimeter. This would segregate pedestrians and the general public from works and help to contain the work within the application site boundary.
- 5.21 Construction compounds, including welfare facilities and offices for construction staff would be constructed on-site, the location of which would be confirmed in the CEMP and CTMP.

Tower Crane Locations

- 5.22 Ten tower cranes would be positioned on-site at various stages during the construction works, the key parameters are provided in Table 5.1.

Tower Crane	Duration On-Site	Height (m)	Radius (m)
TC1	Q3 2018 – Q4 2020	60	40
TC2	Q3 2018 – Q4 2020	100	35
TC3	Q4 2018 – Q3 2021	110	40
TC4	Q2 2020 – Q3 2022	60	45

TC	Operational Period	Height (m)	Capacity (t)
TC5	Q3 2020 – Q1 2023	70	35
TC6	Q3 2020 – Q1 2023	70	35
TC7	Q4 2021 – Q4 2023	80	35
TC8	Q1 2022 – Q1 2023	80	35
TC9	Q2 2022 – Q4 2023	45	35
TC10	Q2 2022 – Q4 2023	35	35

5.23 The approximate locations of the tower cranes are shown in Figure 5.3.

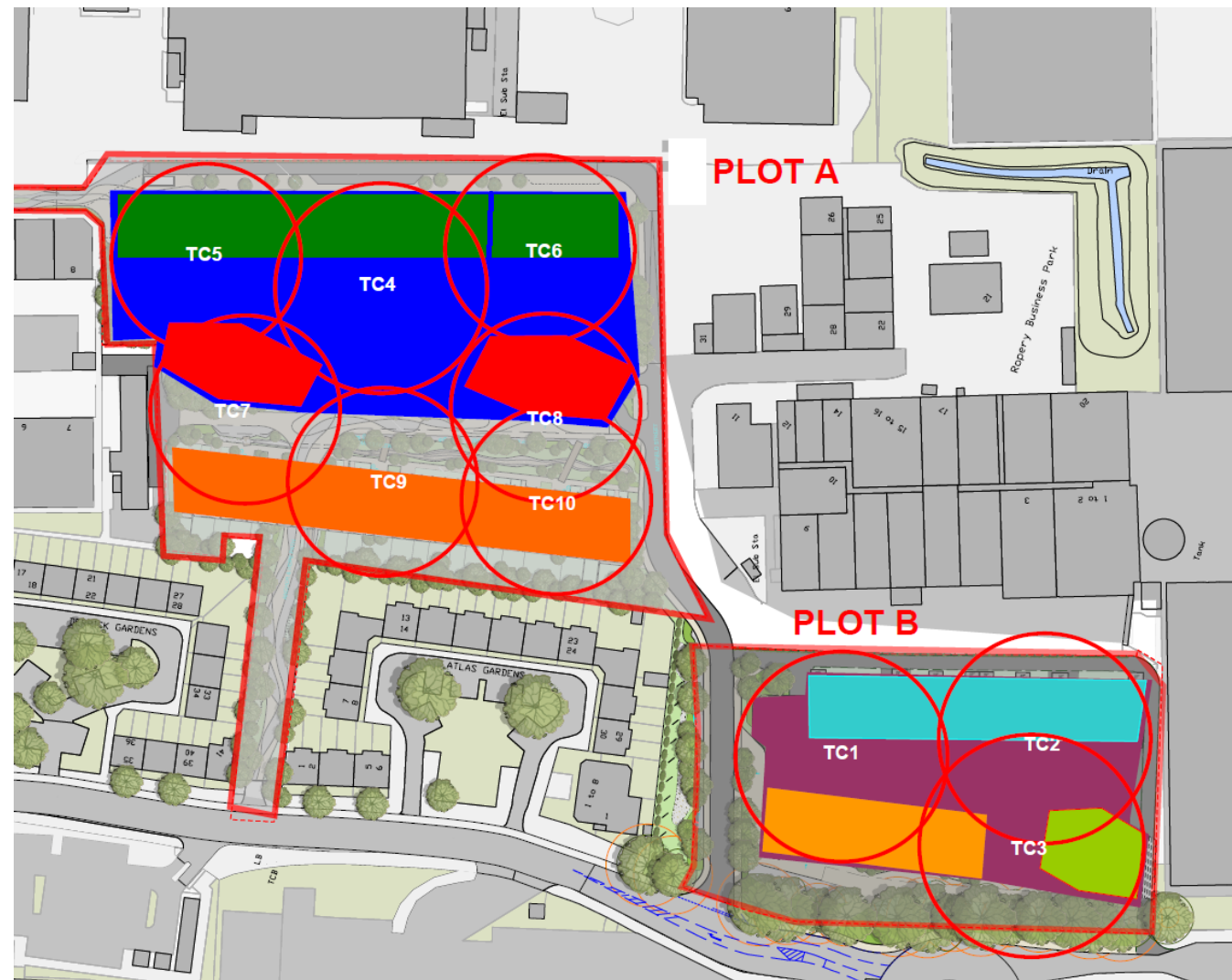


Figure 5.3: Proposed Tower Crane Locations on-Site

Temporary Works

5.24 Some temporary works would be necessary during the course of the development works, in order to protect the public and ensure the structural integrity of the works as they progress. These would range from simple propping of hoardings to scaffold protection fans, temporary propping of walls and other temporary structures such as loading platforms. In all cases these works would comply with legislation, and would be designed and managed by the Applicant who is obliged by law to employ a temporary Works Co-ordinator.

5.25 In addition, some temporary works in the form of propping may be required for the perimeter pile walls during the excavation process.

Demolition Works

5.26 The existing foundations, hardstanding and concrete slab areas (approximately 44,515m³) would be demolished by means of a pneumatic concrete breaker. Materials would be crushed, graded and stockpiled with approximately 90 % targeted for on-site re-use within the piling mat for the perimeter retaining walls and bearing piles for the tower foundations. The remaining 10 % is likely to be transferred to suitable tipper or waste haulage vehicles and removed off-site.

Substructure Works

5.27 Substructure works would comprise the installation of a piled retaining wall for the basement structure; excavations, basement construction and foundations.

5.28 Historic and recent ground investigations undertaken at the application site indicate the following ground stratigraphy:

- 0.9m of Made Ground comprising tarmac and concrete over ash stone fill and sandy gravel of tarmac, concrete and brick;
- Made Ground underlain by silty Clay/Peat/Alluvium to a depth of approximately 9.1m;
- Alluvium underlain by coarse sandy flint gravel recorded as the Lambeth Group to a depth of 14.0m;
- White chalk underlying the Lambeth Group to final depth of 20.0m bgl (below ground level); and
- Groundwater between 9.5m and 7.7m bgl.

5.29 These investigations are summarised in the Preliminary Risk Assessment (PRA) of the application site.

Basement Perimeter Piling, Excavation and Construction Works

5.30 A basement would be constructed within Plot A. The majority of the basement would be located within the eastern half of the Plot, with a small area of basement within the western half. Plot B does not have a basement.

5.31 The Plot A basement excavations are approximately 3.0 - 5.0m deep. A stiff embedment wall is therefore required to retain the sides of the excavation. The wall needs to be suitable for both the temporary construction phases and the permanent condition once the proposed development is complete.

5.32 The perimeter basement embedment wall piles would be either sheet or augured secant piles. The length of the piles would vary, depending on whether they are to support superstructure column loads. A concrete capping beam is to be used to tie the top of the basement embedment wall together and distribute superstructure loads. During construction it will also act to take lateral loads into the temporary basement propping.

5.33 The top of the secant wall is connected together with a reinforced concrete capping beam. The capping beam will distribute local concentrated loads from load bearing columns and also distribute lateral forces to the temporary props.

5.34 The method of construction used to form the perimeter basement embedment wall would take into account the ground conditions and environmental considerations such as noise levels, although it is anticipated that the piles will be advanced using continuous flight auger (CFA), rotary bored piles or 'vibrationless' sheet piling techniques.

5.35 It is anticipated that the basement would be constructed using a traditional 'bottom-up' approach using temporary beams and props to support the perimeter retaining walls whilst the basement is excavated. It is anticipated that piling would be carried out from existing grade.

- 5.36 There is potential for the water table to be located near to or above basement formation level. If ground conditions allow, the embedment wall would be used to prevent excessive water ingress. However, the application site may require pumping during construction to ensure it is kept dry.

Foundations

- 5.37 The foundations for the proposed development would typically comprise of a piled solution. Depending on ground conditions this could be in the form of local piles and pile caps below columns with a suspended basement slab or a combined piled raft solution. The raft would vary depending on the building height and ground conditions.

Cores

- 5.38 The cores would incorporate the lifts, stairs and service risers and would be designed to provide the main lateral stability system for the buildings.
- 5.39 The concrete walls would be constructed from reinforced concrete using either slip-form construction or jump-formed techniques. Concrete would be pumped and a hydraulic placing boom used to assist concrete placement. Tower cranes would be positioned to suit the application site logistics and used to lift reinforcement cages for the cores. Stairs would be installed once the cores are complete. In the meantime external hoists would be erected to provide vertical transportation of labour and materials.

Superstructure Works

- 5.40 The buildings would all consist of reinforced concrete frames and slabs.
- 5.41 The construction of the superstructure within each building would involve the erection of reinforced concrete cores (to provide for the overall stability of the structure), followed by the formation of reinforced concrete columns and slabs, to roof level. Flat slab construction is currently proposed which will provide a flat soffit to help facilitate service strategy.
- 5.42 Slab thicknesses are intended to remain fairly constant throughout the proposed development at the application site. Where step-backs or changes to columns positions occur, slab thicknesses are likely to increase to help transfer loads. In addition to thickenings, the slabs would also need to be stepped down at terrace locations to allow for a deeper external finishes zone.
- 5.43 Wherever possible, columns would be located within party walls or internal partition walls. Long thin blade columns or walls are therefore preferable in most cases. In order to achieve 90 minutes fire resistance a minimum 800x200mm blade column is to be adopted generally. Where columns are exposed circular columns are proposed. In some instances transfer structure would be required to offset column locations at lower levels and also to create penthouse setbacks. Where facades are inclined, an inclined column will be required with the tie forces being taken out by the floor slabs.
- 5.44 Also, the use of concrete will be selected to provide adequate sound insulation within each block and to comply with fire protection requirements. Cement replacement content and secondary/recycled aggregate content would be considered once the sub-contractors have been appointed, to minimise environment impacts.
- 5.45 The winter gardens would be formed monolithically with the primary slab and will require thermal wrapping if located outside the thermal envelope.
- 5.46 Construction (sub- and superstructure) waste volumes have been estimated based on Building Research Establishment (BRE) Benchmarks which are provided in Table 5.6.

Envelope and Fit out Works

- 5.47 Facades would be designed in accordance with air quality and noise performance criteria as detailed in Chapter 8: Air Quality and Chapter 9: Noise and Vibration. Façades would consist of a mixture of pre-fabrication (brick piers) and unitised (window bays) cladding systems to assist in the ease of erection

and installation. Each cladding unit would be supported from brackets from the floor slabs and installed from the floors using mono-rail systems to guide the unit into position.

- 5.48 As the building envelope is completed, the tower cranes would be dismantled and electric hoists would be positioned to handle operative movements and positioning of materials for the fitting out of the building.
- 5.49 Internal fit out of the proposed residential units would be undertaken as part of the proposed development and would include light fittings, kitchens and bathrooms.
- 5.50 Non-residential uses would be delivered to 'shell and core' only.

Landscaping Works

- 5.51 Landscaping of the proposed development, including public amenity areas, private residential gardens and perimeter public realm would be undertaken in accordance with the Landscaping Strategy, following completion of the key construction works.

Utilities and Service Installation

- 5.52 An existing UKPN substations is located in the corner of the application site. As part of the proposed development, the substation would be decommissioned by UKPN and demolished.
- 5.53 Main cold water supplied from the external Thames Water infrastructure would enter the proposed development and be routed to the various cold water storage tanks located at basement and ground level. These tanks would provide a storage volume to cater for peaks in demand and potential short term loss of mains supply. The building potable water system would be supplied from the storage tanks via a multistage booster set.
- 5.54 Thames Water would act as the sewerage provider for the proposed development. A complete new system of above ground foul water drainage pipework would be provided to convey foul water discharges from each residential unit as well as domestic elements of other use types on the application site, by gravity, to connect to the buried foul water drainage system. Foul drainage would be routed into local Thames Water combined sewers within Anchor and Hope Lane via separate connections for each Plot. The proposed development would have a foul water discharge rate of approximately 24.9 L/s from Plot A and 20.3 L/s from Plot B (or 45.1 L/s in total). Discussions with Thames Water are yet to begin in this regard and the necessary impact studies would be undertaken by the Applicant to quantify the magnitude of any additional capacity required by the proposed development in advance of construction works commencing. However, it is not anticipated that this would pose any constraints to the proposed development.

Construction Vehicles and Plant

Construction HGV Trips

- 5.55 Table 5.2 summarises the estimated number of HGV trips associated with the demolition, excavation and construction of the application site as provided by the Applicant. A proportion of the HGV trips would be associated with the delivery of machinery and construction materials. Deliveries of construction materials may utilise a wide range of vehicle types and would be dependent on the supply chain arrangements of the selected sub-contractors. The most intensely used HGVs on the application site would likely comprise tipper trucks for the removal of excavated material, ready mix concrete trucks for the delivery of concrete and articulated lorries for the delivery of cladding panels. Based on the Applicant's experience, deliveries would be less than the trips associated with waste removals.

Table 5.2: Predicted Demolition and Construction Trips

Works	Duration of Works (months)	Average HGV Trips/Week	Average 2-way HGV Movements/Week
Site Enabling, Demolition and Clearance Works	6	5	10
Plot B			
Substructure Works	6	220	440
Superstructure Works	28	60	120
Envelope Works	31	24	48
Internal Fit Out	31	100	200
External Works and Landscaping	22	25	50
Plot A			
Substructure Works	7	220	440
Superstructure Works	24	80	160
Envelope Works	20	36	72
Internal Fit Out	20	100	200
External Works and Landscaping	15	50	100

5.56 As can be seen in Table 5.3 and based on the experience of the Applicant, the most intensive period for demolition and construction vehicle activity would occur over the Substructure Works.

5.57 From experience of similar construction projects, it is considered that there would be a maximum of six HGVs serving the application site during any given daytime hour. This is based upon the knowledge that it takes on average 10 minutes to load a lorry with spoil. As such, the two-way HGV traffic would be highly unlikely to exceed 12 vehicle movements per hour, two way (i.e. 6 vehicles in: 6 out), at any point of the day. Based on a 10 hour day and a 5.5 day week, 12 vehicle movements per hour this would equate to a maximum peak of 660 vehicles movements per week, two-way (i.e. 330 vehicles in: 330 out) . As can be seen from the averages provided in Table 5.2, this provides a robust worst case assessment.

Typical Construction Plant and Machinery

5.58 The types of plant and machinery that would be likely to be used on-site per development works activity are listed in Table 5.3.

Table 5.3: Likely Plant and Machinery

Plant	Site Enabling Works	Demolition	Excavation and Remediation	Substructure	Superstructure	Fit-out	Roads and Landscaping
Bulldozers	✓	✓	✓	✓			✓
Compaction plant				✓			✓
Cranes and hoists	✓	✓	✓	✓	✓	✓	
Cutters, drills and small tools	✓	✓		✓	✓	✓	
Crushers		✓	✓				

Table 5.3: Likely Plant and Machinery

360° excavators		✓	✓				✓
Floodlights	✓	✓	✓	✓	✓		✓
Fork lift truck		✓		✓	✓	✓	✓
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			✓	✓	✓		

Construction and Contracting Strategy

5.59 The Applicant and Main Contractor and would be responsible for a number of sub-contractors (piling, concrete, cladding etc.) and ultimately for environmental management during the construction process.

Construction Employment

5.60 The construction of the proposed development would generate employment; a proportion of the construction employment is expected to be generated on-site, with the rest being elsewhere in the construction supply chain. It is estimated that approximately 35 net full-time equivalent construction jobs would be created within the RBG during the construction of the proposed development, once leakage and displacement have been taken into account. The construction works would have local benefits through construction training and targeting the local labour force. This would be achieved through employment and training initiatives.

5.61 Full details of construction employment are provided in ES Chapter 6: Socio-Economics.

Hours of Work

5.62 Working hours would be agreed with the RBG, but are expected to be:

- 08:00 to 18:00 hours Monday to Friday;
- 08:00 to 13:00 hours Saturday; and
- No working on Sundays or Bank Holidays.

5.63 All work which is intended outside of these hours, excluding emergencies, would be subject to prior agreement, and/or reasonable notice to the RBG in terms of Section 61 (S61) of the Control of Pollution Act 1974¹.

¹Secretary of State, 1974. Control of Pollution Act, London: HMSO.

Health and Safety

- 5.64 All works on-site would be undertaken in accordance with the provisions of the Construction (Design and Management) (CDM) Regulations 2007². A CDM Coordinator would be appointed by the Applicant and would work with the Project Team to ensure compliance with these Regulations.
- 5.65 All method statements would incorporate regulatory safety matters and a Health and Safety File would be maintained on-site for inspection by the Health Executive, the RBG and others as appropriate.

Access Management

- 5.66 At this stage it is anticipated that all demolition and construction traffic would enter the application site via existing accesses on Anchor and Hope Lane, through secure hoarded gates in either Plot A or B. All construction traffic would exit the application site onto Anchor and Hope Lane and on towards the A206 Woolwich Road, or via Bugsby's Way to the A102 which leads to the A2, A20 and the M25. The A206 forms part of the Strategic Road Network (SRN) and the A102 forms part of the Transport for London Road Network (TLRN) and are therefore the most appropriate routes for HGV traffic. The Applicant may consider alternative options that would further minimise vehicular impacts during the construction process, in which case any alternative arrangements proposed at the detailed design stage would be subject to prior approval of RBG and/or TfL as necessary. All contractors would be supplied with a vehicle route card and details of all access routes would be provided.
- 5.67 It is also noted that there are local concrete batching plants at Angerstein Wharf (CEMEX) on Bugsby's Way and Victoria Deep Water Terminal (Hanson) on Tunnel Avenue that are within 3km of the application site which are both served by the river. Both of these would be considered by the main contractor and, if used, would reduce the travel distances by road for the provision of concrete etc.
- 5.68 Figure 5.4 illustrates the expected primary construction routes to and from the SRN and TLRN, whilst taking into account the restricted junction movements in the vicinity of the application site.

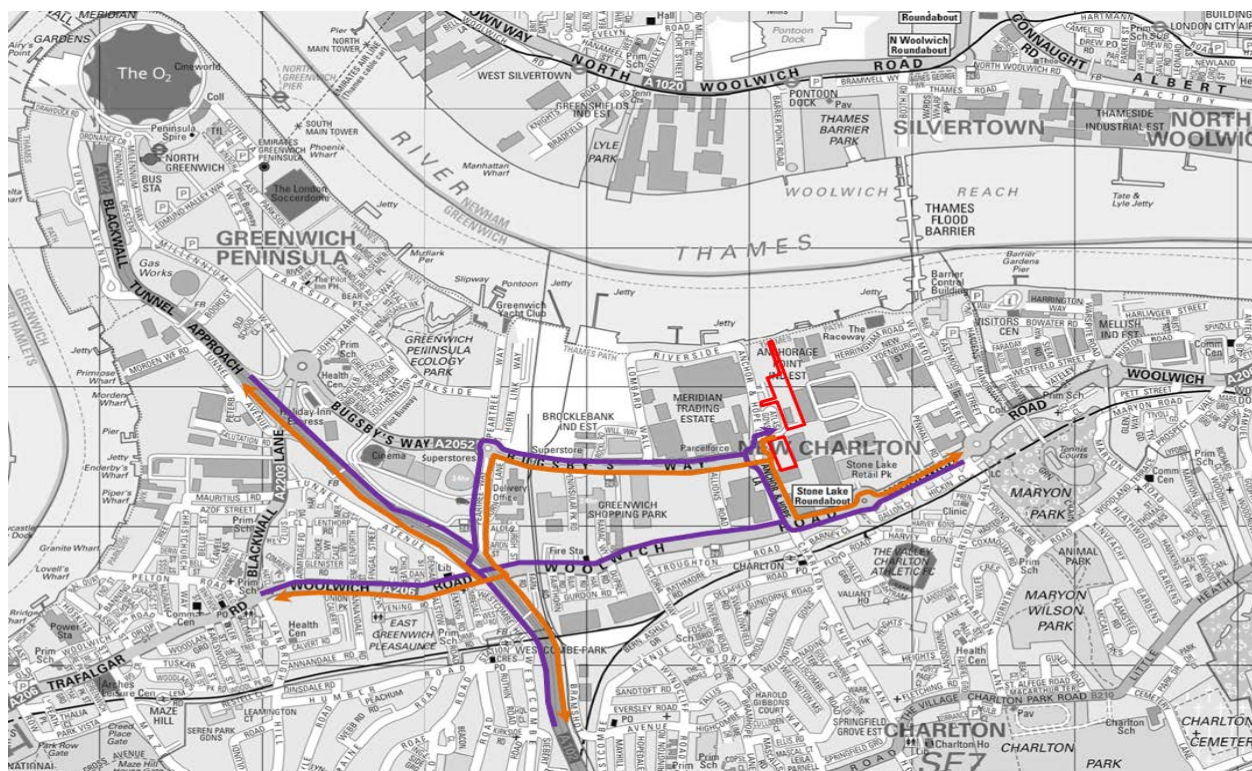


Figure 5.4: Primary Construction Traffic Routing

²Secretary of State, 2007. Construction (Design and Management) Regulations. London: HMSO.

- 5.69 If in the unlikely event that any temporary traffic management or stopping-up notices are required on the surrounding roads, specific applications to the RBG Highways and/or TfL relating to any road closures would be implemented by the Applicant in accordance with all statutory notice periods.

Consultation

- 5.70 The Applicant would engage with and inform the local community and local stakeholders of particular construction tasks and indicative timelines across the individual construction phases and would ensure that both parties were fully involved in any such dialogue.
- 5.71 Matters for public consultation during the demolition, bulk excavation and piling works would be brought to the public's attention through staging drop-in exhibitions and the circulation of bespoke newsletters within the established catchment area. Local stakeholders would be engaged in direct communication with the Applicant, design team and other such consultants as required from time to time through the established Resident's and Community Liaison Groups. These groups would be open to new members as and when required and would be run in accordance with the stipulations of the RBG.
- 5.72 The Applicant's procedures would allow for:
- a clear point of contact for the public to make enquiries and to submit complaints;
 - details of how enquiries would be registered and progressed;
 - advising of the intended timescale for responding to the matter raised;
 - records of any responses given, and to whom; and
 - escalation procedures if the Applicant's response was not considered satisfactory.

Materials Management Selection

- 5.73 Construction materials would be selected following the Building Research Establishment (BRE) 'Green Guide to Specification'. These include:
- Minimising embodied energy content (the energy used in manufacture);
 - Using recyclable materials where they have high embodied energy; and
 - Maximising the recycled content of the material, ease of maintenance, appropriate sourcing of materials and totally excluding deleterious and hazardous materials.
- 5.74 Key materials required for the proposed development are envisaged to include those indicated in Table 5.4.

Table 5.4: Indicative Key Construction Materials

Materials	Materials Required For
Concrete	Foundations, substructure, superstructure (including concrete piling), cores, stairs and shear walls
Steelwork	Foundations, superstructures, minor structural elements
Brick/Blockwork/Stonework	External Envelope, External and Internal walls
Cladding	External Envelope
Glazing	External Envelope (windows)
Partitioning (gypsum board)	Internal walls

Storage and Handling

- 5.75 The 'sustainability' of raw materials would be considered during the procurement process. All construction materials would be appropriately stored on-site to minimise damage by vehicles, vandals, weather or theft.
- 5.76 Due to the limited space on-site, contractors would be required to operate a 'just in time' policy for delivery of material. This means that materials would be brought to the application site just before their incorporation into the works, thereby minimising the need for on-site storage.
- 5.77 Where possible, prefabricated elements would be lifted directly into position from delivery vehicles. This would assist in reducing on-site storage and labour requirements and construction noise levels, thereby reducing potential nuisances to the surrounding receptors.

Waste Volumes and Management

- 5.78 Anticipated volumes of demolition waste to be generated at the application site, are provided in the demolition section of this chapter.
- 5.79 In estimating the waste generation during construction works (sub and superstructure), consideration has been given to the guidance and indicators developed by the BRE. These performance indicators (PI) and benchmark, as shown in Table 5.6, have been developed based on data entered into the SMARTStart system, which relies on companies supplying waste data. The PIs are quantifiable metrics that provide businesses with a tool for measurement. The indicators include:
- Environmental Performance Indicators (EPI): m³ of waste/100m² of floor area; and
 - Key Performance Indicators (KPI): m³ of waste/£100,000 of project value.

Project Type	EPI (m ³ /100m ²)	KPI (m ³ /£100,000 Project Value)
Residential	18.1	12.3
Public Buildings	20.9	10.7
Leisure	14.4	9.2
Industrial Buildings	13.0	10.8
Healthcare	19.1	9.1
Education	20.7	10.0
Commercial Other	17.4	9.7
Commercial Offices	19.8	9.3
Commercial Retail	20.9	15.0

Notes: These EPIs and KPI's were issued on 26 June 2012 as part of BRE Waste Benchmarking Data.

- 5.80 Based upon the average EPIs of Table 5.5, Table 5.6 provides an estimate of the potential waste arisings during construction of the proposed development at the application site.

Use	Floor Area	EPI (m ³ /100m ²)	Waste Arising EPI (m ³)
Residential (C3) (Residential EPI)	61,689	18.1	11,166
Fitness Centre (Leisure EPI)	864	14.4	124
Community Use (assumed to be education for this exercise for worst)	407	20.7	84

case assumption)			
Retail (A1/ A3) (Commercial Retail EPI)	690	20.9	144
Offices (Commercial Offices EPI)	1,560	19.8	309

Notes: Rounded to nearest whole number.

Environmental Management Controls and Mitigation

- 5.81 The following mitigation controls would be committed to and delivered pursuant to either planning conditions, or obligations contained in a legal agreement (under Section 106 of the Town and Country Planning Act, 1990) and supported as necessary by contract obligation between the Applicant and relevant sub- contractors or regulatory provisions in force from time-to-time.

Considerate Constructors

- 5.82 All contractors would be required to register the application site under the Considerate Constructors Scheme.

Principal Contractor and Management of Sub Contractors

- 5.83 All contractors would have responsibility for monitoring any sub-contractors' environmental performance; acting as a point of contact for consultation and feedback and for developing mechanisms to solve on-site issues as and when required.

Neighbourhood Plan/Public Liaison

- 5.84 The Applicant would be expected to nominate a manager who would act as the Project Environmental Manager (PEM), who would be named at all site entrances, with a contact telephone number. The contact name and details would be provided to all the relevant stakeholders by the Applicant prior to the start of the demolition and construction works.
- 5.85 The PEM would have primary responsibility for liaising with the RBG, the GLA and other stakeholders on environmental matters, and all key stakeholders would be notified whenever a change of responsibility occurs for the PEM role. The PEM would keep neighbours, the RBG and other relevant parties informed of the nature of the on-going works, their duration and programme to establish and maintain good relationships with them.
- 5.86 It is anticipated that regular meetings would take place between the PEM and key stakeholder groups to review progress and to agree any necessary actions. The PEM would also deal with enquiries from the general public, including any complaints. Any complaints would be logged and reported to the relevant individual within the RBG (and vice versa) as soon as practicable.
- 5.87 The PEM would coordinate responses to queries and address issues in a timely and satisfactory manner.

Monitoring, Inspection and Auditing

- 5.88 The CEMP would define responsibilities and procedures for the management of the potential impacts on the environment arising during demolition, enabling and construction. A monitoring programme of the environmental effects of demolition and construction would be implemented to agreed RBG requirements. This programme would:
- evaluate the effectiveness of environmental mitigation, and identify environmental problems and appropriate responses at an early stage;
 - ensure that the works are carried out in accordance with the provisions of the CEMP; and

- identify and implement any environmental improvements that would contribute to the overall environmental performance of the Proposed Development.
- 5.89 The Applicant would wish to reassure itself that the CEMP is being adhered to by all sub-contractors. To this end, site inspections and more formal audits would be undertaken and a checklist pro-forma, which would cover the environmental issues addressed in the CEMP, used.
- 5.90 Where a problem is identified, corrective action would be identified and implemented in conjunction with the Applicant, Site Manager and sub-contractors.
- 5.91 It is envisaged that there would be a requirement for regular reporting of monitoring and auditing to the RBG, and the RBG would be asked to review implementation of the protective measures as necessary during demolition and construction, and would have direct access to the monitoring representative to ensure that any non-compliances with the requirements of the CEMP would be speedily rectified.

Emergencies and Environmental Incidences

- 5.92 Protocols to be implemented on-site in instances of emergencies and environmental incidences would be set out within the CEMP for approval by the RBG.

Housekeeping and General Site Management

- 5.93 Hoardings would be erected around the application site to provide a clear and secure demarcation between operational activities and other areas and to provide information regarding the proposed development and its progress. Particular attention would be paid to locations supporting higher volumes of pedestrian movement (for example on the entrance to Ropery Business Park), demolition and construction routes, access gates and security arrangements.
- 5.94 A 'clean site' policy would be maintained and contractors and their subcontractors would be expected to maintain a tidy site. A street sweeper would be employed as required during the demolition, piling and excavation periods of the construction programme to make sure that the streets around the application site would be kept clean during the works.
- 5.95 Hoardings would be lit from half an hour after sunset to half an hour before sunrise. Prior to the erection of any external floodlighting details would be agreed with the RBG. On-site floodlights would be fixed to the tower cranes and on the hoarding or lighting poles to illuminate the basement. Emergency escape lighting would identify the escape route.

Contaminated Soil

- 5.96 According to a Preliminary Risk Assessment undertaken of the application site (Technical Appendix 2.4, ES Volume 3) there is limited contamination across the application site; however a local pocket of hydrocarbon impacted perched groundwater has been identified in the northern extents of the application site.
- 5.97 Further site investigations would be undertaken in advance of development to quantify the extent of the contamination and also an asbestos risk to construction workers and surrounding residents during ground disturbance and excavation works. Any material which potentially contains asbestos would be disposed of in line with best practise guidance and current regulatory requirements. The site investigations would also inform an appropriate remediation strategy for the application site and would be prepared in consultation with the RBG.
- 5.98 It has been concluded that the risk to future site occupants, off-site receptors and construction workers is likely to be low subject to the implementation of the following mitigation measures:
- Using appropriate, safe working practices;
 - Providing health and safety training;
 - Installing guidance notes and signs at the application site;

- Developing a contingency plan in case of accidents as required under the Guide for Site Investigations and Remediation, as well as an Incident Reporting Procedure; and
 - Using PPE.
- 5.99 A piling risk assessment would also be undertaken during the detailed design stage as the proposed piling strategy is developed by the structural engineers to determine the most appropriate method of piling and to minimise the risk of potential contamination to groundwater from piling. This piling risk assessment would be submitted to the EA for approval.
- 5.100 During construction works, it is anticipated that a number of potentially contaminative liquids and chemicals including diesel could be stored on-site. The following management and control measures would be included in the CEMP:
- Storing all liquids and solids of a potentially hazardous nature on surfaced areas, with bunding, in accordance with the EA's Pollution and Prevention Guidelines 2 ('PPG2 – Above Ground Oil Storage Tanks')³ preventing pollution from above ground storage tanks;
 - Ensuring that contractors control and bund any hazardous substances used on-site (although at this stage none are anticipated), including oil drums or containers on-site, in accordance with Control of Substances Hazardous to Health (COSHH) Regulations (as amended) and ensure that oil or other contaminants are not allowed to reach water courses or ground water sources including aquifers;
 - Storing all oils and chemicals in banded areas in order to contain any spillages, should these occur. Bunding would be specified to ensure secondary containment of at least 110 % of the volume of the largest tank within the bund;
 - Siting all filling points, gauges and vents within the bund;
 - Placing tanks on impermeable bases to reduce the risk of spillage to groundwater. Integral or self-banded tanks would be favoured; and
 - Sealing the drainage system of the bund with no discharge to any watercourse, land or underground strata. Associated pipe work would be located above ground and protected from accidental damage.
- 5.101 Furthermore, all site works would be undertaken in accordance with the EA's Pollution Prevention Guidance Note 6 ('PPG6 – Working at Construction and Demolition Sites')⁴ and Guidance Note 3 ('PPG3 – Use and Design of Oil Separators')⁵.
- 5.102 Demolition and construction vehicles would be properly maintained to reduce the risk of hydrocarbon contamination and would only be active when required. Construction materials would be stored, handled and managed with due regard to underlying soil and thus the risk of accidental spillage or release would be minimised.

Water Resources

- 5.103 The Applicant would hold plans on the application site which would show the location of all surface and foul water drains and would make relevant staff aware of the drainage network.
- 5.104 To ensure that no contaminant-pathway-receptors pathways are created and to reduce the potential for contamination to occur during the Demolition and Construction stage, all site activities would be undertaken in accordance with the requirements of the Water Resources Act 1991⁶, Water Act 2014⁷, Control of Pollution (Oil Storage) Regulations 2001⁸, the EA's PPG1⁹, PPG2, PPG3 and PPG6. The

³ Environment Agency, 2011. Pollution Prevention Guidelines 3: Above Ground Oil Storage Tanks. EA

⁴ Environment Agency, 2010. Pollution Prevention Guidelines 6 Working at Construction and Demolition Sites. EA.

⁵ Environment Agency, 2006. Pollution Prevention Guidelines 3 Use and Design of Oil Separators. EA.

⁶ Secretary of State, 2009. Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009. London. HMSO

⁷ Secretary of State, 2014. Water Act 2014. London. HMSO

⁸ Secretary of State, 2001. Control of Pollution (Oil Storage) Regulations 2001. London. HMSO.

Applicant would also be responsible for obtaining all necessary consents and ensuring compliance with the conditions of the consents.

- 5.105 The CEMP for the proposed development would include the following provisions:
- Regularly maintaining construction vehicles to reduce the risk of hydrocarbon contamination;
 - Storing, handling and managing construction materials with due regard to the sensitivity of the local aquatic environment and thus the risk of accidental spillage or release;
 - Locating above ground storage tanks on designated areas of hardstanding;
 - Not using any underground storage tanks;
 - Storing liquids such as degreasers, solvents, lubricants and paints in segregated, bunded enclosures; and
 - Ensuring that any tanks storing more than 200 litres of oil on-site, would have secondary bunding. Bunding would be specified as having a minimum capacity of *"not less than 110 % of the container's storage capacity or, if there is more than one container within the system, of not less than 110 % of the largest container's storage capacity or 25 % of their aggregate storage capacity, whichever is the greater."*
- 5.106 In addition, the construction drainage system for the application site would be designed and managed to comply with BS 6031:2009¹⁰, which details methods that should be considered for the general control of drainage on construction sites. Further advice is also contained within BS 8004:1986¹¹.
- 5.107 Wherever possible, the Applicant would be encouraged to minimise the amounts of wastewater discharged from the application site. Surface drainage and wastewater would pass through settlement tanks and oil interception facilities before discharge to sewer. The Applicant would ensure that all potentially contaminated water e.g. dewatering effluent is disposed of in accordance with the Water Resources Act 1991¹² and Water Industry Act 1999¹³, to the satisfaction of the EA and Thames Water.
- 5.108 An Emergency Incident Plan would be in place for the application site to deal with potential spillages and/or pollution incidents. This would include the provision of on-site equipment for containing spillages, such as emergency booms and chemicals to soak up spillages.
- 5.109 Any pollution incidents would be reported immediately to the RBG and the regulatory bodies such as the EA.

Ecology

- 5.110 Dust generated from demolition and construction works would be managed by means of 2.8m high site hoarding and adopting dust suppression measures, such as the use of water sprays, dampening down of roads and covering of storage areas, such that the potential for adverse dust generation is reduced.
- 5.111 The existing hardstanding areas would be regularly maintained to ensure site conditions do not become attractive to protected species.
- 5.112 Measures to protect breeding birds during the demolition and construction works would be detailed in the CEMP.
- 5.113 All lighting would appropriately aimed, controlled and switched off when the application site is not operational (where practicable).

⁹ Environment Agency, 2013. Pollution Prevention Guidelines: PPG1. London. Environment Agency.

¹⁰ British Standard Institution, 2009. BS6031:2009 British Standard Code of Practice for Earthworks. London. BSI.

¹¹ British Standard Institution, 2015. BS8004:2015 Code of Practice for Foundations. London. BSI.

¹² Secretary of State, 1991. The Water Act 1991. HMSO.

¹³ Secretary of State, 1999. Water Industry Act. London. HMSO.

Transport

- 5.114 The construction vehicles would be managed in accordance with a CLP and the CEMP. These documents would be agreed with the RBG prior to the commencement of works.
- 5.115 Other potential effects as a result of construction would be on road surfaces from mud and dirt, as well as temporary footway closures, if and when required, which would also be actively managed in accordance with measures set out in the EMP and the CLP. These measures would be expected to be incorporated as planning conditions / Section 106 measures and are therefore considered as mitigation measures. These measures are summarised as follows:
- Restricted hours of work;
 - Demolition and construction method statements;
 - Considerate Constructors Scheme;
 - Management of deliveries and trade contractors;
 - Management of noise vibration and dust;
 - Management of construction waste; and
 - CDM regulations.

HGV Management

- 5.116 It is anticipated that construction HGV movements would generally take place out of peak hours when congestion on the local road network is lower.
- 5.117 Loading and unloading of vehicles, dismantling of equipment such as scaffolding or moving equipment or materials around the application site would be conducted in such a manner as to minimise noise impacts to existing surrounding residential properties.

Parking Management and Staff Travel

- 5.118 Construction workers would be encouraged to access the application site by public transport with limited parking provision provided on-site. Information would be provided on the local bus, rail and underground rail services to ensure workers are aware of the choices available to them.
- 5.119 Where practicable all loading and unloading of contractors' vehicles would be within the application site boundary. Contractors would avoid parking vehicles on the public highway and vehicle movements would be staggered to avoid queuing outside the application site access points.

Noise and Vibration

- 5.120 Effective co-ordination and time management of demolition and construction activities would be used to avoid noise and vibration nuisance to surrounding uses. Early and helpful communications with the surrounding and on-site receptors would assist in managing any complaints arising during the demolition and construction works of the proposed development.
- 5.121 Contractors would be required to ensure that works are carried out in accordance with best practicable means as stipulated in the Control of Pollution Act 1974¹⁴. A full explanation of measures to control construction noise would be incorporated within the CEMP and detailed in all construction method statements. All work intended outside of working hours, presented earlier in this chapter, would be subject to prior agreement and/or reasonable notice to the RBG in accordance with the terms of a consent under section 61 of the Act.

Noise Emissions

- 5.122 The precise means of noise control would be specified when detailed construction method statements are complete. However, the following standard best practice would be implemented as a minimum:

¹⁴ Secretary of State, 1974. Control of Pollution Act. HMSO.

- Planning deliveries and removals out of peak hours where possible;
- Parking construction traffic off the public highway;
- Controlling the discharge of trucks from the application site to avoid congestion;
- Implementing traffic management systems at the entrances to the application site at all times to control the traffic into the application site;
- Maintaining the 2.8m site hoarding around the application site boundary to screen noise from low level sources and/or street level receptors;
- Agreeing working hours with the RBG - compliance with the Council's preferred working hours, with no working on Sundays or bank holidays;
- provision of rest periods during any prolonged noisy activities;
- Using 'silenced' plant and equipment wherever possible and maintaining plant on a regular basis;
- Selecting electrically driven equipment where possible in preference to internal combustion powered; hydraulic power in preference to pneumatic; and wheeled in lieu of tracked plant;
- plant used on site to comply with the EC Directive on Noise Emissions for Outdoor Equipment (2000/14/EC), where applicable;
- Selection of inherently quiet plant where appropriate. All major compressors to be 'sound reduced' models fitted with properly lined and sealed acoustic covers which are kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools to be fitted with mufflers or silencers of the type recommended by the manufacturers;
- all plant used on site would be regularly maintained, paying particular attention to the integrity of silencers and acoustic enclosures;
- Machines in intermittent use to be shut down in the intervening periods between work or throttled down to a minimum;
- fixed and semi-fixed ancillary plant such as generators, compressors etc. which can be located away from receptors and positioned so as to cause minimum noise disturbance. If necessary, acoustic barriers or enclosures would be provided for specific items of fixed plant
- Implementing noise monitoring to accord with maximum levels set out in the ES;
- Minimising disturbance from reversing beepers through measures such as site layout, provision of screening or use of broadband sound emitting reversing alarms;
- Switching off vehicle engines where vehicles are standing for an extended period of time;
- Lowering materials whenever practicable rather than dropping; and
- Adherence to the codes of practice for construction working and piling given in BS 5228:2009+A1:2014 and the guidance given therein for minimising noise and vibration emissions from the application site.

Vibration

- 5.123 There are sensitive receptors located immediately along the north-western and western boundaries of the application site.
- 5.124 BS 5228 Part 2 contains historic vibration measurement data for piling works, including the CFA method proposed for the proposed development. Historic data presented in Table D.6 4 of BS 5228 suggest that vibration levels would fall to below 1mm/s within 10m of the piling works. Vibration of less than 1mm/s is unlikely to generate complaints from those living within nearby off-site sensitive properties. The historic data suggests that this method of piling is unlikely to lead to vibration that would cause damage to buildings, not even cosmetic damage.
- 5.125 The following measures would be included within the CEMP for the application site:

- Sequencing the piling programme so that numerous piles within 10m of an affected property or buried utilities are not installed successively. A maximum of three piles would be installed out within 10m of an affected property or buried utilities with a break before continuing in that area;
- Carrying out vibration monitoring during early piling works, away from any affected property or buried utilities, to quantify the levels of vibration likely to be attained; and
- Compiling an appropriate action plan for incorporation into the CEMP to ensure that the adverse effects of subsequent piling work, if identified, are minimised.

Air Quality

- 5.126 Non Road Mobile machinery (NRMM) of net power between 27kW and 560kW used in London will be required to meet certain emission standards. Construction plant associated with the demolition and construction phases will be compliant with this standard.
- 5.127 The following standard best practice construction control measures will be applied:
- Implement a stakeholder communication plan.
 - Display name and contact details of responsible person for dust issues on site boundary in addition to head/regional office contact information.
 - Sign up to the NRMM register.
 - Develop and implement a Dust Management Plan (DMP), to be approved by the Local Authority.
 - Record all complaints and incidents in a site log.
 - Make the complaints log available to the Local Authority if requested.
 - Ensure vehicles switch off engines when stationary.
 - Avoid use of diesel or petrol powered generators where possible.
 - Produce a Construction Logistics Plan to manage the sustainable delivery of materials.
 - Implement a sustainable travel plan for site workers.
 - Ensure suitable cleaning material is available at all times to clean up spills.
 - Avoid bonfires.
 - Inspect on-site haul roads for integrity and repair as necessary.
 - Inspections of haul roads to be recorded in site log, including any remedial action taken.
- 5.128 Dust mitigation measures, as set out in Table 5.7 will be applied.

Table 5.7: Dust Mitigation Measures	
Monitoring	<ul style="list-style-type: none"> • Undertake daily on and off site visual inspections where there are nearby receptors. • Carry out regular inspections to ensure compliance with the DMP and record results in the site log book. • Increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather. • Consider installing dust monitoring equipment at the site boundary to determine if incorporated mitigation measures are sufficient to manage dust emissions.
Preparing and Maintaining the Site	<ul style="list-style-type: none"> • Plan site layout to locate dust generating activities as far as possible from receptors. • Use solid screens around dusty activities and around stockpiles. • Avoid site runoff of water and mud. • Keep site fencing barriers and scaffolding clean using wet methods. • Remove dusty materials from site as soon as possible. Minimise emissions from stockpiles by covering, seeding, fencing or damping down. • Remove materials that have a potential to produce dust from the site as

Table 5.7: Dust Mitigation Measures	
	<p>soon as possible, or cover if they are being reused on site.</p> <ul style="list-style-type: none"> Enforce an on-site speed limit of 15mph on surfaced roads and 10mph on unsurfaced areas.
Operations	<ul style="list-style-type: none"> Cutting, grinding or sawing equipment only to be used with suitable dust suppression equipment or techniques. Ensure adequate water supply for effective dust and particulate matter suppression. Use enclosed chutes, conveyors and covered skips. Minimise drop heights of materials. Ensure suitable cleaning material is available at all times to clean up spills.
Measures Specific to Earthworks	<ul style="list-style-type: none"> Re-vegetate earthworks and exposed areas/soil stockpiles as soon as practicable. Use hessian, mulch or trackifiers where it is not possible to re-vegetate or cover with topsoil. Only expose small areas of ground or stockpile when working.
Measures Specific to Construction	<ul style="list-style-type: none"> Ensure aggregates are stored in bunded areas and are not allowed to dry out. Avoid concrete scabbling where possible. Ensure bulk cement and other fine powder is delivered in tankers and stored in silos with suitable emission control. Smaller supplies of fine powder material to be in sealed containers and stored appropriately.
Measures Specific to Trackout	<ul style="list-style-type: none"> Use water-assisted dust sweepers to clean access and local roads. Avoid dry sweeping of large areas. Ensure vehicles entering and leaving the site are appropriately covered. Implement a wheel washing system.

5.129 The Applicant would give detailed dust control protocols as part of their contracts for the application site.

Aviation

5.130 During the construction works, crane operators would comply with the recommendations of BS 7121:2012¹⁵. In addition, medium intensity steady red obstacle lighting would be fitted to the completed tower buildings to provide 360 degree visibility and to the temporary construction crange when operating above 100mAOD, as agreed with London City Airport before work starts on-site.

Waste Management

5.131 As a principal waste mitigation measure during the proposed development's construction works, the Applicant would be required to prepare and implement a SWMP at the application site.

5.132 The scope of the SWMP would include the following:

- Identification of the likely types and quantities of waste to be generated (including waste acceptance criteria testing to assist in confirming appropriate waste disposal options for any contaminated materials);
- Identification of waste management options in consideration of the waste hierarchy, on- and off-site options, and the arrangements for identifying and managing any hazardous wastes produced;
- A plan for efficient materials and waste handling taking into account constraints imposed by the application site;

- Targets for the diversion of waste from landfill;
- Identification of waste management sites and contractors for all wastes, ensuring that contracts are in place and emphasising compliance with legal responsibilities; and
- A commitment to undertaking waste audits to monitor the amount and type of waste generated and to determine if the targets set out in the SWMP have been achieved. Targets would be reviewed and where necessary, amended. All results would be communicated to the employees working on the application site.

5.133 In particular, the following measures would be proposed in the SWMP to minimise waste generation on-site:

- Ordering the quantity of materials required for the job, thus reducing over-ordering;
- Determining when and where materials are required and requesting 'just in time' deliveries;
- Returning damaged goods or incomplete deliveries;
- Requesting suppliers to minimise packaging and to guarantee a take-back service, especially for pallets;
- Ordering materials that are cut to size, rather than standard sizes;
- Where possible and appropriate to do so, using prefabrication off-site;
- Having appropriate storage areas ready - these should be covered to protect against rain and ideally have a hard standing surface;
- Determining where special handling is required;
- Securing the application site to avoid theft and vandalism; and
- Ensuring good on-site segregation of wastes.

5.134 Any waste that is not re-used on-site and therefore requires off-site disposal would be dealt with in accordance with the Waste Hierarchy, the requirements of the EA and in line with relevant legislation.

Recycling

5.135 Segregation (on-site or off-site) and recycling of cardboard, timber, metal, plastics, plasterboard and gypsum based products would be strongly encouraged by the Applicant and Project Team. The segregation of polythene film waste from other plastics would also be considered and local collections investigated.

5.136 It is proposed that waste would be segregated and stored for collection on-site, through the use of a series of colour coded skips to take different materials and equipped with compactors where appropriate to take different materials. Additionally, colour coded wheelie bins would be placed at appropriate locations for each material type for manual loading. These bins would be transferred to the relevant skip storage location.

5.137 Where standard sized pallets are used for material storage, then regular collections would be organised for removal and for re-use rather than disposal in timber skips.

5.138 Where on-site segregation of waste is not deemed possible due to spatial constraints at the application site, the Waste Carriers would be required to ensure off-site segregation for waste and diversion from landfill is undertaken.

Disposal

5.139 All construction materials that cannot be re-used or recycled or are classified as 'hazardous', following the Waste Acceptance Criteria testing, would be disposed of at appropriately licensed disposal facilities. The destination of all waste or other materials from the application site would be notified to the relevant authority for approval. Deposition would be in accordance with the requirements of the:

- EA;

¹⁵ British Standards Institution, 2012. BS 7121:2012 Code of Practice for Safe Use of Cranes. BSI

- Environmental Protection Act 1990¹⁶;
- Controlled Waste (England and Wales) Regulations 2012¹⁷;
- Waste Regulations 2011¹⁸;
- Hazardous Waste (England and Wales) Regulations 2005¹⁹; and
- Environmental Permitting (Amended) Regulations 2015²⁰.

5.140 To provide evidence of licensed tipping and to prevent the likelihood of fly tipping, a docket system would be used. The Applicant and sub-contractors would operate a sequential numbered docket system to confirm that each load has been received at the approved disposal site. Copies of these dockets would be kept at the application site and would be available for inspection.

5.141 No burning of construction waste would take place on-site.

Deconstruction of Proposed Development

5.142 Table 5.8 sets out the design life periods for the various components of the proposed development.

Development Component	Design Life Period
Structure/Substructure	60 years
Floor Structure	60 years
Roof Structure	60 years
Roof Membrane Systems	18 years
Roof Metal Flashings	10 years
Metal Roof Coverings	40 years
Masonry Precast	60 years
Cladding	40 years
Render	30 years
Internal Wall Finishes	15 years
Lifts	15 years
Internal Finishes	15 years

5.143 The deconstruction of the proposed development would follow a demolition method and sequence. Safe working practices would be devised and implemented and would be undertaken according to typical dismantling techniques prevalent at the time, incorporating relevant environmental controls.

Summary

5.144 The development programme for the application site comprises the demolition of existing hardstanding, and construction of the proposed development as described in ES Chapter 4: The Proposed Development. Assuming planning permission is secured by May 2017, demolition and construction works are projected to start in Q2 2018 and be completed by Q2 2023.

¹⁶ Security of State, 1990. Environmental Protection Act 1990. London. HMSO

¹⁷ Department of the Environment, Food and Rural Affairs (DEFRA), 2012. Controlled Waste (Amended) Regulations 2012. London. HMSO.

¹⁸ Security of State, 2011. The Waste (England and Wales) Regulations. London. HMSO.

¹⁹ Department of the Environment, Food and Rural Affairs (DEFRA), 2005. Hazardous Waste (England and Wales) Regulations, 2005. London. HMSO.

²⁰ Security of State, 2015. Environmental Permitting (England and Wales) (Amended) Regulations. London. HMSO.