

6 Construction

6.1 Introduction

- 6.1.1 This chapter describes the demolition, earthworks, construction activities expected as part of the Development. It also provides an indicative programme for the works and provides an indication of the nature and quantity of materials and resources likely to be used.
- 6.1.2 This is an informative chapter prepared with input from the Applicant, design and EIA team. Information on construction activities is based on the detailed design and collective experience of the project team with similar schemes.
- 6.1.3 Assessments of the environmental effects from the construction stage are provided in each technical chapter of this ES (i.e. Chapters 7 to 17). These chapters also assess the cumulative impacts of the construction stage of the Development in conjunction with other schemes.
- 6.1.4 This chapter is accompanied by Appendix 6.1: Outline Construction Environmental Management Plan (CEMP).
- 6.1.5 The Outline CEMP provides a framework from which detailed CEMP (or CEMPs) will be developed to avoid, minimise or mitigate construction effects on the environment. Detailed CEMP will be prepared and agreed with SADC, prior to construction commencing. This will be secured by a suitably worded planning condition. The Outline CEMP sets out principles that will be taken forward into the detailed CEMP. All relevant contractors will be required to operate in accordance with the detailed CEMP.

6.2 Programme of Works and Phasing

- 6.2.1 The construction programme and phasing of the Development will be subject to market demand, although, for assessment purposes it was assumed to be complete and fully occupied by 2041. The indicative programme for construction works is approximately 13 years, with works assumed to commence in 2028 and complete by 2041. The peak year of construction is assumed to be 2033. It is possible that the construction programme may be longer or shorter as delivery will depend on market conditions.
- 6.2.2 Assessments are based on reasonable worst-case assumptions relating to construction methods, activities around the duration of works based on the collective experience of the Applicant and EIA team.
- 6.2.3 Information on construction methods and details of phasing are expected to be agreed with SADC as appropriate, for example through subsequent reserved matters applications, planning conditions and/or detailed CEMPs.
- 6.2.4 An indicative construction phasing is provided below:
 - 1) Access (B487 Western and Eastern Junctions).

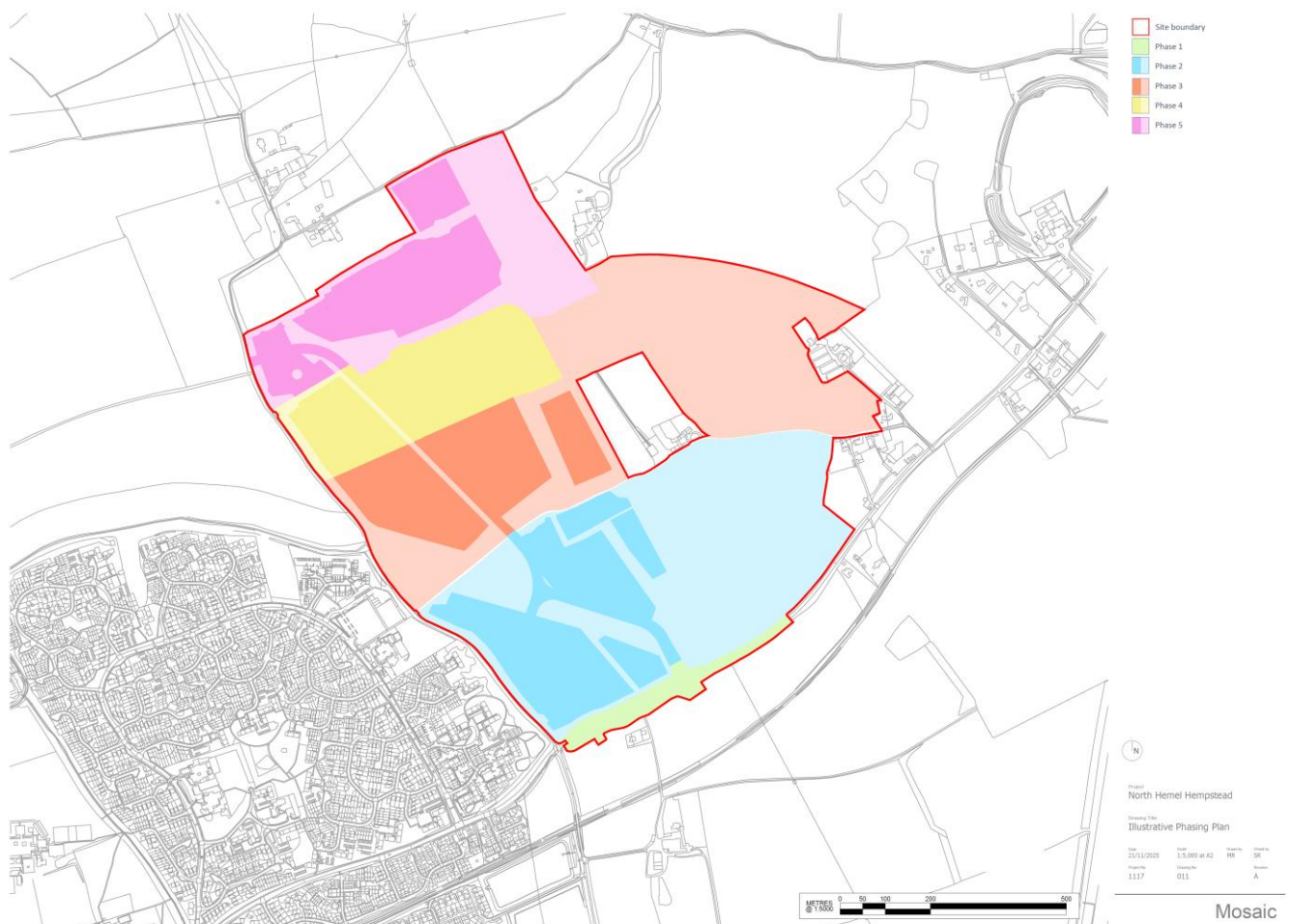
- 2) Bus link, southern (Pigeon) plots, care home and part of STC with SANG to the south of Little Revel End Lane and the SANG car park;
- 3) Continuation of STC into northern (Bloor) plots for delivery of school. Start of Bloor plots – and SANG to the north of Little Revel End Lane;
- 4) Continuation of STC and northern plots. Sports pitches; and
- 5) Continuation of STC to Site boundary and balance of northern (Bloor) plots. Delivery of allotments and community orchard.

6.2.5 An Illustrative Phasing Plan has been prepared and submitted as part of the Application which is shown on Figure 6.1. This remains indicative although demonstrates the intent for scheme delivery via a preferred sequence, including the construction of the Eastern Junction and Western Junction within Phase 1.

6.2.6 The exact sequence and timing of the phases may be subject to variation dependent on market demand and other factors. As it is indicative, the phasing plan does not comprise a control document and the application submission and assessment does not rely on this sequence of phasing.

6.2.7 The following sections provide a description of the likely activities involved in construction of the Development.

Figure 6.1: Illustrative Phasing Plan



Enabling Work, Infrastructure and Services

6.2.8 The following works are likely to form the basis of the enabling works, infrastructure and services stage, where relevant, for all phases of the Development, as required:

- **Site surveys / investigations** – additional site investigations to be undertaken as required including further archaeological evaluation and ground investigation;
- **Site Establishment** – site establishment will comprise the erection of hoarding or safety fencing located around the boundary of construction areas and protective fencing for trees and other vegetation to be retained. This will secure the Site and allow for the erection of construction compound(s) and welfare facilities. Construction access for vehicles, internal haul roads and vehicle unloading areas / construction compound(s) will be established. Protective easements and permits would be in place for HV infrastructure, pipeline and other infrastructure across the Site. Temporary diversions of PRowS and permissive paths would be undertaken as required across the Site. Construction compounds including laydown and welfare areas would be sited away from residential properties as far as practicable and would be secured using hoarding/safety fencing as appropriate;
- **Enabling Works** - utilities and any further infrastructure and services required by the Development will be implemented. This may include but is not limited to, vegetation clearance capping-off or removal of redundant utilities and boreholes, new supplies, diversions and connections for electrical, telecommunications, potable water, foul water and surface water drainage infrastructure (including SuDS), as agreed with the statutory authorities. Gas will not be provided to the Development;
- **Ground Works** – below ground works, drainage and utilities work will be undertaken, as required. Protective provisions would be agreed where utility infrastructure is in place, including safeguarding zones / setbacks around pipelines;
- **Drainage Works** – to provide surface water management during construction, the proposed SuDS and associated drainage infrastructure would be constructed on a phased basis for surface water management (including silt management and pollution prevention measures); and
- **Engineering Work / Site Levelling** – To provide suitable development platforms and gradients across the Site, engineering works including excavation, grading and preparation of surfaces including the placement / compaction of fill will be required. This will also involve the removal of topsoil and vegetation where required. An indicative earthworks strategy has been carefully developed by the design team with regard to existing constraints such as flood risk, infrastructure easements as well as landscape and visual considerations. See Section 6.4 for further details.

Site Access and Highway Works

6.2.9 As part of the planning application, detailed approved is sought for a new Western Access and Eastern Access on the B487 as described in Chapter 5. Access to the Development is expected to be delivered as the first phase of the Development and is expected to be in place prior to occupation of new homes. It would also serve as a construction access to the Site once in place.

- 6.2.10 Highway works will be undertaken under a Section 278 Agreement under the Highways Act following discussions with HCC (Highways Authority). Therefore, these will be subject to separate construction management processes to the wider Development.
- 6.2.11 A series of off-site highway interventions have been identified within the Transport Assessment (Appendix 9.1). These interventions have been identified to address both the impacts of the Development and cumulative impacts of proposed development across Hemel Hempstead. The delivery of the off-site highway works is to be agreed with HCC, the Development is supportive of providing an appropriate, proportionate contribution towards these off-site highway works. Although this is regarded as embedded mitigation, given that its implementation is expected, the exact timing of its delivery in relation to the Development remains uncertain.

Construction

- 6.2.12 Construction would commence on building structures following the commencement of enabling works.
- 6.2.13 The method of construction is dependent on the nature of the buildings and detailed design and has therefore not been fixed at this outline planning stage.
- 6.2.14 The main stages of standard construction activities are outlined below:
- **Foundations** - The specific type of foundations would depend on the design of the building and would be determined at detailed design stage for the outline component. Given that the majority of buildings are proposed as low-rise housing units it is likely that strip foundations would be used to create a continuous, linear strip of shallow foundation. If buildings require piles, e.g. flats within the Maximum Height Zones, it is likely that either Continued Flight Auger (CFA) or 'mini' piles would be used. A piling mat – a platform providing a stable base on which piling rigs can move around the site and operate – would be prepared for the rig, following which piled foundations to support each building would be installed
 - **Structure** – The specific type of building structure would depend on the design of the building and would be determined at the detailed design stage. It is expected that scaffolding would be used to progress construction vertically up each of the building's superstructure (assuming standard construction methods - pouring of concrete, construction load bearing brick walls, reinforced masonry and the external building fabric).
 - **Fit Out** – Once each building structure is sufficiently progressed, interior fit out and installation of mechanical, electrical and plumbing systems would then commence;
 - **Access Roads** – Involves the construction of the road surface (known as the 'pavement') over an earthwork foundation (known as the 'formation layer') over the area allocated for the internal road network. The installation of kerbing and paved areas concerning footways, cycleways, road restraint systems (e.g. vehicle and pedestrian safety barriers), road markings (e.g. white lining) and road signs would also be undertaken during construction of the pavement and formation layer; and
 - **External Works and Landscaping** – Areas of landscaping and open space would be prepared to establish the green spaces within the Development in accordance with the Development Specification (Appendix 5.2). This would include vegetation

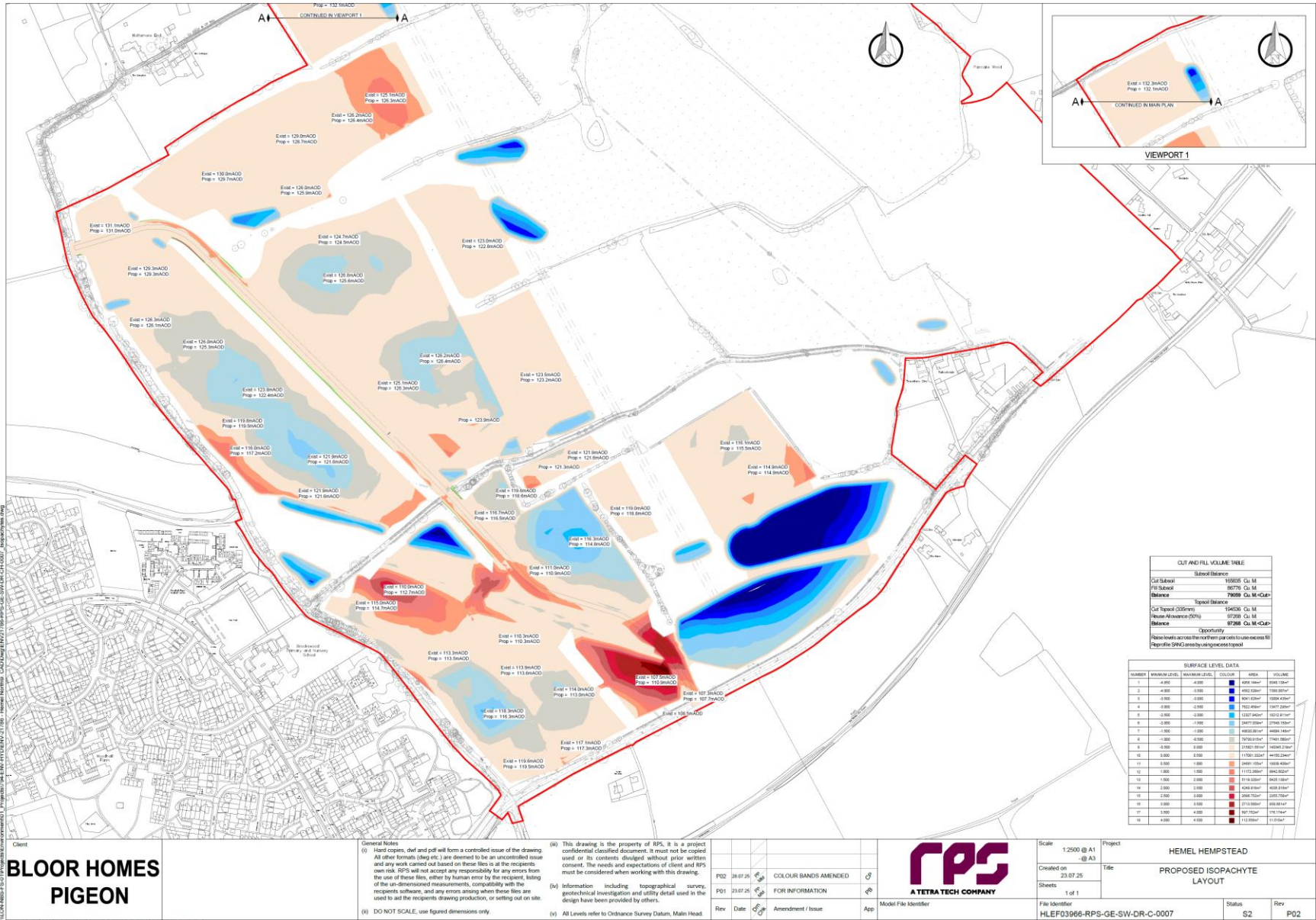
removal, planting, seeding and the sustainable drainage systems to relevant design standards.

6.3 Materials and Waste

Excavation and Groundwork Activities

- 6.3.1 Construction of the Development will result in soils being disturbed over much of the Site. This will be from activities such as topsoil stripping, formation of plot platforms, external road pavements and hardstandings and excavation of any below ground infrastructure at the Site. An indicative cut and full indicative at this stage and will be developed in detail as part of reserved matters applications in line with the principal of ensuring that material is retained within the Site and significant volumes of material would not need to be imported, i.e. there would be a balance of materials across the Site.
- 6.3.2 Where feasible, excavated materials and materials generated through excavation (e.g. subsoil, topsoil and any hardstanding) would be re-used to create suitable platforms for development. Re-use of such materials would be dependent on it meeting relevant geotechnical specification requirements and being inert. Reuse of material reduces deliveries to the Site and the amount of waste for disposal. Where required, materials may be stored on-Site in stockpiles for future use.
- 6.3.3 The indicative earthworks strategy (cut and fill drawing) is shown on Figure 6.2. This estimates a net cut of approximately 79,000m³ of subsoil and a net cut of approximately 97,000m³ of topsoil across the Site. Excess fill could be re-used on-Site to achieve proposed levels, landscaping and the creation of development platforms.
- 6.3.4 Soils excavated in order to create platforms for development would be re-purposed as general fill and landscaping. A detailed cut and fill strategy will be developed with the intention of avoiding any export of material from the Site and avoiding the need for significant imports of material. Where soil is to be disturbed it will be removed (stripped) prior to construction operations and will be stored for reuse at the Site, where possible.

Figure 6.2: Indicative Earthworks Strategy



Construction Waste and Materials Management

- 6.3.5 The NPPF¹ encourages that all construction waste should be minimised. Furthermore 'Circular Economy' methods of pre-planning how materials will be re-used, reduces waste and in-turn the need for virgin building materials. Construction aims to implement Waste Hierarchy Principles (Prevention; Preparing for Re-use; Recycling; Other Recovery; and Disposal) and the principles of the circular economy, within both the design and construction of the development. In addition, a site waste management plan will be implemented to ensure minimal waste on site.
- 6.3.6 An indicative breakdown of construction material requirements has been provided by the Applicant and is detailed in Table 6.1. This information will be updated in later stages of design and construction once information on material sourcing and specification is available from contractors and suppliers.

Table 6.1: Indicative Schedule of Materials

Material Type	Approx. Quantity
Concrete in Foundations	20,000 m ³
Beam and Block and Screed	62,500 m ²
Mortar in Superstructures	21,250 m ³
Windows	17,250 m ²
Roof tiles	119,750 m ²
Bricks	167,500 m ²
Blocks (no internal block walls)	265,000 m ²
Ceilings	125,000 m ²
Road / shared surface	62,500 m ²
Footpaths	35,000 m ²
Drives	70,000 m ²
Topsoil and Subsoil	176,327 m ³

- 6.3.7 At detailed design stage it is reasonable to assume that in line with industry good practice the developer will explore opportunities to minimise materials use and avoid waste as far as practicable. The relevant contractors will also be required to carry out works in a way that, as far as is reasonably practicable, minimises the amount of waste to be disposed of. These measures could include:
- Design to facilitate re-use of materials wherever feasible, e.g. re-use of hardstanding and soil for landscaping;
 - Selecting materials with minimal packaging and products which can be recycled or re-used (design and construction);
 - Accurately estimating materials to avoid over-ordering or unnecessary purchases;
 - Implementing lean construction principles to minimise waste;
 - Including good practice waste management requirements in contracts; and
 - Implement tracking systems to monitor the types and quantities of waste generated and using this data to identify areas for improvement.

- 6.3.8 Waste produced during all construction activities on-site will be subject to the ‘Duty of Care’ under the Environmental Protection Act (1990)². Under Section 34 of the Act, a duty of care is placed on all those involved in the handling of waste, including storage, transportation, and disposal. It will be the joint responsibility between the Principal Contractor and the Client to ensure that waste produced on-site is disposed of in accordance with legislation.
- 6.3.9 Prior to commencement of the works, a Construction Environmental Management Plan (CEMP) would be prepared by the prepared by the Principal Contractor which would include waste management measures. The principal aims of the measures included in the CEMP will be to ensure compliance with relevant waste legislation, reduce the amount of waste generated and exported, and ensure activities are in line with the waste hierarchy (whereby the intention is first to minimise, then to treat at source or compact and, finally, to dispose of off-site as necessary). All relevant contractors will be required to operate in accordance with the CEMP and will be required to investigate opportunities to minimise and reduce waste generation in line with the Government aim of “*Work towards eliminating all avoidable waste by 2050*”.
- 6.3.10 Materials and waste will be stored in appropriate conditions to prevent damage or contamination of storage areas. All hazardous materials including chemicals, cleaning agents, solvents and solvent containing products will be properly sealed in containers at the end of each day, prior to storage in appropriately protected and bunded storage areas. Containers should be sited away from drains or unsurfaced areas and should be regularly maintained and inspected for damage.
- 6.3.11 Waste will be sorted into different waste types such as timber, copper, metal, paints, plasterboard and either disposed of into larger skips, or if suitable, placed into a compactor to reduce the volume of the waste before it is taken off-site. Hazardous waste will be kept separately from other wastes and in appropriate containers and Duty of Care will be ensured for the transfer and removal of all site wastes.
- 6.3.12 Stockpiling of contaminated materials on site would be avoided where practicable. Soils would be stored away from surface watercourses and placed within suitably constructed bunded areas and covered to prevent migration of contaminants via rainwater run-off.
- 6.3.13 The Principal Contractor will audit waste carriers and disposal facilities and maintain documentary evidence that these requirements are being met. A register of waste carriers, disposal sites (including transfer stations) and relevant licensing details will be produced and maintained on site.

6.4 Construction Methods

Plant and Equipment

- 6.4.1 An indicative list of large plant and equipment that are likely to be used at various stages of construction are presented in Table 6.2.

Table 6.2: Indicative Plant and Equipment

Plant and Equipment	Stage of Works					
	Enabling Works,	Foundations	Structures	Fit-Out	Internal Access Roads	External Works and Landscaping
360° Excavator	✓	✓	X	X	✓	✓
Tower / Mobile Crane	X	X	✓	X	X	X
Breaker	X	✓	✓	X	✓	X
Compressor & Air Tools	✓	✓	✓	✓	✓	X
Drills / Cutters	✓	✓	✓	✓	✓	✓
Piling Rigs	X	✓	X	X	X	X
Compacter / Roller	✓	✓	✓	X	✓	✓
Concrete Pumps	X	✓	✓	✓	X	X
Generators	✓	✓	✓	✓	✓	✓
Concrete Vibration Equipment	X	✓	✓	X	✓	X
Scaffolding	X	✓	✓	X	X	X
Fork Lift Truck	X	✓	✓	✓	✓	✓
Mechanical Road Sweeper	✓	✓	✓	✓	✓	✓
Floodlights	✓	✓	✓	✓	✓	✓
Hydraulic benders and cutters	X	✓	X	X	✓	X
Lorries and Vans	✓	✓	✓	✓	✓	✓
Ready mix concrete trucks	✓	✓	✓	✓	✓	✓

Hours of Work

6.4.2 The prescribed nature and hours of work would be agreed with SADC. Noisy building work would only be carried out between the following hours:

- Monday to Friday 7:30am to 6pm;

- Saturday 8am to 1pm; and
- At no time on a Sunday or Bank Holiday.

6.4.3 Noisy work operations outside of these hours would be agreed with SADC. Non-noisy activities could be undertaken within the period before and after normal working hours, e.g. arrival and departure of workforce, deliveries and unloading, plant inspections and maintenance, site inspections and clean-up.

6.5 Site Security, Hoarding and Lighting

- 6.5.1 The Site shall be kept secure at all times with signage indicating that it is a building site with associated dangers in accordance with the Health and Safety Authority Regulations. A site boundary in the form of hoarding or fencing will be established around each of the working areas before any significant construction activities commence in that working area.
- 6.5.2 The Principal Contractor will provide adequate security to prevent unauthorised entry to or from the construction area. The following measures likely to be used may be used to prevent unauthorised access: CCTV and security systems, locked gates and fencing, security staff.
- 6.5.3 Lighting will be provided with a minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the Site hoarding on surrounding footpaths, roads and amenity areas. Motion sensor lighting and low energy consumption fittings will be installed to reduce usage and energy consumption

6.6 Construction Traffic Access and Management

- 6.6.1 HGVs (rigid and articulated) are expected to access the Site via Hemel Hempstead Road. The full details of the location and form of construction access is yet to be confirmed. However, the two accesses proposed to serve the Development offer the opportunity for flexibility during construction, allowing the separation of construction vehicle movements and development vehicle movements.
- 6.6.2 The anticipated routing from the access to the strategic road network is east along the B487, then north along the A5183 to junction 9 of the M1. The construction traffic routing is shown on Figure 9.4 (Chapter 9: Transport and Access).
- 6.6.3 LGVs and cars associated with construction are expected to utilise the highway network in a standard manner as these will be primarily related to worker commuting trips and small-scale deliveries and servicing likely to come from more local providers.
- 6.6.4 As part of any contractual agreement between the developer and contractors, the developer will ensure that HGVs are encouraged to follow this route. This will ensure that contractors and suppliers will be aware of the routing before undertaking any journeys to the site. This routing will also be communicated in later stages through delivery and contractor confirmations
- 6.6.5 A Framework Construction Traffic Management Plan (CTMP) is provided as Appendix 9.3 with details to be submitted for approval to SADC and HCC as the highway authority prior to construction.

- 6.6.6 The Framework CTMP sets out the principles for the control and management of construction traffic to minimise impacts where possible including working practices, construction traffic routing and the construction access strategy. The CTMP will include measures to encourage construction workers to car-share and use sustainable modes of transport (bus, cycle and/or walking) wherever possible to reduce impact of road traffic on local communities.
- 6.6.7 Wheel and chassis underside washing facilities would be provided on-site to ensure that mud and debris is not spread onto the adjacent public highway.
- 6.6.8 On-site parking for construction workers will be provided but will be restricted to a reasonable minimum. Local traffic management measures for Site access will be agreed HCC prior to construction commencing.

6.7 Construction Environmental Management and Mitigation

- 6.7.1 All of the construction operations carry with them a range of issues to be dealt with in their design, preparation and execution. Standard good practice in construction management will be required to minimise the potential environmental effects and disruption that could be caused by the construction works.
- 6.7.2 Construction will be managed through the implementation of a CEMP. The purpose of the CEMP will be to:
- Provide effective, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the construction phase of the Development; and
 - Ensure that construction activities so far as is practical do not adversely impact amenity, traffic or the environment in the surrounding area.
- 6.7.3 A detailed CEMP, plans and method statements, will be prepared during the pre-construction period once a Principal Contractor is appointed. The detailed CEMP will include a range of measures, in relation to aspects such as noise and vibration, dust and air pollution, ecology, and water resources, which will be utilised to manage and mitigate construction environmental impacts.
- 6.7.4 The Principal Contractor(s) will be responsible for preparing and implementing the detailed CEMP, which will be agreed with the SADC in advance of the commencement of construction. The CEMP will be a live document throughout the construction period and will be updated to respond to changes to legislation, standards, available techniques, etc. as well as any changes to construction techniques.
- 6.7.5 The CEMP will refer to industry standards, good practice and guidance, such as the Guidance for Pollution Prevention (GPPs) notes and British Standards. The CEMP will include information on the following:
- Project Description to include general arrangements (e.g. construction traffic, lighting, working hours, storage of materials, site waste management, layout, compound and welfare facilities, site lighting, security, emergency planning and response, fire prevention and control);

- Roles and Responsibilities;
- Training and Site Briefings;
- Environmental Impacts – To include consideration of emissions to air, water and land, e.g. noise and vibration, dust, general discharges, lighting, traffic impacts, ground contamination, archaeology, ground water and drainage, and ecology;
- Environmental Mitigation Measures - appropriate mitigation measures and control plans, having regard to identified environmental impacts (to include protection of existing vegetation, biodiversity (including protected species and priority habitats), dust and air quality, noise and vibration, water resources, ground conditions, soil resources and light pollution). An emergency management plan would also be included;
- Materials and Resource Use;
- Communication (including local community engagement);
- Monitoring and Auditing; and
- Documentation.

- 6.7.6 The detailed CEMP will include also include Construction Method Statements when available as an appendix covering environmental considerations of each activity.
- 6.7.7 The CEMP will form part of Employers' Requirements and therefore part of each Contractors' contract documents. Each Contractor will be responsible for implementing the requirements of the CEMP.
- 6.7.8 The mitigation measures set out within ES Chapters 7 – 17 will be included in the detailed CEMP where relevant to construction. The CEMP will include a requirement to periodically review the CEMP(s) and undertake regular environmental audits of its implementation during construction of the Development.

References

¹ Ministry of Housing, Communities and Local Government, (2023). National Planning Policy Framework. December 2023

² Her Majesty's Stationary Office (1990). The Environmental Protection Act 1990.