Luton Rising

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June 2023

London Luton Airport Expansion

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Volume 7 Other Documents

7.03 Design and Access Statement

Volume II

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7.03 DESIGN AND ACCESS STATEMENT VOLUME II

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5 PROPOSED DEVELOPMENT

5.1 Introduction

5.1.1 This section describes the layout of the proposed expansion of the airport, covering the overall scheme and describing the key elements within the Proposed Development. It explains the design which has been informed by the following:

a. the appreciation of the site context, including justification for the sizing and location of development to make best use of the site;

b. the requirements set out in the **Need Case [TR020001/APP/7.04]** (i.e., capacity requirements) and the **Transport Assessment [TR020001/APP/7.02];**

c. the project vision, strategic objectives and how these have filtered through other considerations (such as policy requirements) to define the overall Proposed Development; and

d. the requirements of relevant policies explained in **Section 2.3** (Volume I) of this document.

5.1.2 The Proposed Development is described in three phases for the purposes of assessment: Phase 1, Phase 2a and Phase 2b. These are 'assessment phases'. In practice, the Proposed Development will be delivered in undefined increments that appropriately respond to demand over time, which may differ from the assessment phases providing delivery does not give rise to effects which are materially new or materially different to those reported in the **Environmental Statement** (the ES) **[TR020001/APP/5.01]** and **Transport Assessment [TR020001/APP/7.02]**.

5.2 Approach to flexibility

5.2.1 The Proposed Development, as described in this section, is defined in outline terms only to retain flexibility so as to be responsive to the rapidly changing nature of aviation and to allow the operator to develop detailed designs and deliver facilities that will meet the need of passengers and airlines as appropriate. Future detailed design will be developed in line with the provisions of the Development Consent Order (DCO) and the **Design Principles [TR020001/APP/7.09]**.

5.2.2 The Proposed Development is planned to be constructed in increments over a long build out programme (refer to 5.1.2). This length of time means that a degree of flexibility needs to be retained to accommodate potential changes in policy, regulatory and operational requirements, innovation and to allow the future operator to meet the needs of passengers and airlines at the time.

5.2.3 The Proposed Development would be located within certain parameters, or 'envelopes', employing a Rochdale (Design) Envelope approach. The 'Rochdale Envelope' approach allows a proposed development to be assessed in terms of its environmental impact at a stage when final design details are not yet available.

5.2.4 The parameters are set out in Requirement 6 (Parameters of authorised development) in **Schedule 2** of the **Draft Development Consent Order [TR020001/APP/2.01]**. Elements of the authorised development are listed in a table with maximum dimensions provided in relation to each element which must not be exceeded. These parameters have been developed to allow for the flexibility that is required in assets that will ultimately be delivered following a detailed design stage. The parameters have been used to assess the maximum physical extent in the Environmental Impact Assessment (EIA) i.e. reasonable 'worst-case' physical extent and environmental impacts.

5.2.5 The concept of parameters is illustrated below (Figure 5.1) which shows a building enclosed within a given parameter allowing flexibility for the developer to design and construct a building within the envelope.

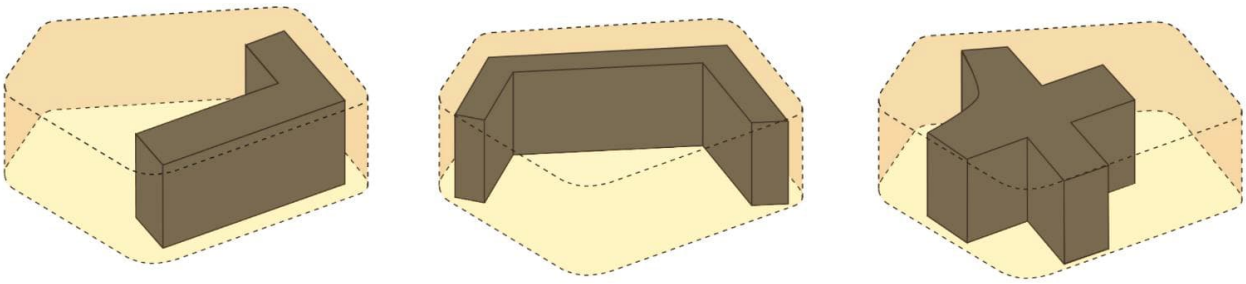

Figure 5.1: Illustration of Parameters

5.2.6 Reference designs have been developed to allow appropriate consideration of the potential scale, function and construction and operational resource requirements of each of the assets identified within the Proposed Development.

5.2.7 Further descriptive information for these illustrative designs is provided in the **General Arrangement Drawings [TR020001/APP/4.09]** and **Airport Access Road and DART Long Section Drawings [TR020001/APP/4.11]** provided as part of the application.

5.3 Baseline

5.3.1 The reference designs build on the Baseline layout of the airport.

5.3.2 The Baseline comprises the following:

a. the existing operational airport, as shown on Figure 5.2;

b. the elements of Project Curium which have not been delivered at the time of the application, refer to Section 2.4.10, and;

c. seven additional aircraft stands in the vicinity of Terminal 1 (T1) to be constructed by the operator under existing permitted development rights.

5.3.3 The baseline is shown in Figure 5.2 which indicates the location of the seven new aircraft stands (highlighted in red).

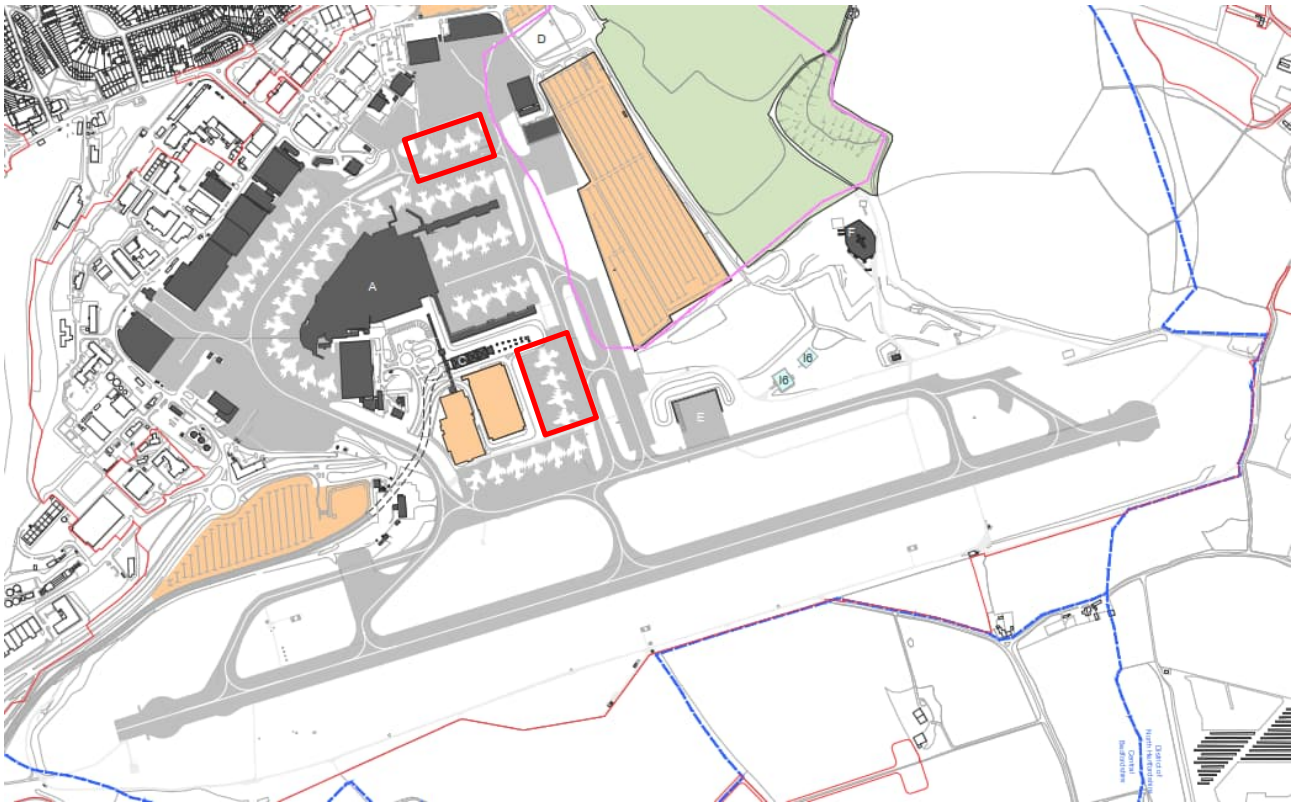

Figure 5.2: Baseline Plan (extract from drawing number - LLADCO-3C-CAP-WHS-GEN-DR-AR-1100 **[TR020001/APP/4.02])**

5.4 Airport Masterplanning

5.4.1 The proposed layout, as shown in Figure 5.3, has been developed through a multidisciplinary approach and further refined over three consultation periods. During the sift process several options were tested for capacity, potential terminal locations and runways. This process has optimised the final development proposals.

5.4.2 Applying airport materplanning principles when desiging the layout of the new Terminal and associated facilities and taking into account key existing features strongly influence the overall layout, notably:

a. the existing runway and taxiway network;
b. highway access routes; and
c. public transport access routes.

5.4.3 The key issues are described below.

Runway and Taxiway Network

5.4.4 The new Terminal 2 (T2) must be easily accessible to aircraft. Therefore, additional taxiways will be needed to enable aircraft to access T2 from the runway. The taxiways must be proximate to the aircraft parking apron (which must be adjacent to the terminal) with efficient taxiing routes to/from the runway.

5.4.5 Therefore, the layout of the taxiways and apron (of sufficient capacity to meet the requirements of the **Need Case [TR020001/APP/7.04]**) are key drivers to the location and layout of T2, to provide the interface between passengers and aircraft.

Surface Access Routes

5.4.6 Ensuring passengers and staff can access T2 is critical to the location of the terminal.

5.4.7 Throughout the Sift process it was assumed that the Airport Access Road (AAR) (formely known as CPAR) would be constructed in advance of the application for development consent under existing planning consent (refer to Section 4). The Proposed Development would provide a vehicular route along the northern edge of the airport boundary to the land east of the existing T1.

5.4.8 The design of Luton Direct Air to Rail Transit (Luton DART) (which will be operational from 2023) was future proofed to include an extension to provide a high quality public transport link to T2. The maximum length of the extension is constrained due to the drive mechanism of the system adopted in the existing design and is a key factor in positioning T2 in the land available to the east of the existing terminal.

5.4.9 These two existing design elements were key factors/constraints in designing the location of T2.

5.4.10 Therefore, the overall Proposed Development is contextually responsive, capitalises on the existing airport infrastructure, maintains and enhances the

existing access to public amenities and minimises the environmental impact of the expansion.

5.5 Proposed Development

5.5.1 This section describes the Proposed Development in its final form with all phases completed.

5.5.2 The Proposed Development builds on the current operational airport with the construction of a new passenger terminal and additional aircraft stands to the north east of the runway (see Figure 5.3).

5.5.3 This will take the overall passenger capacity from 18 mppa to 32 mppa.

5.5.4 In addition to the above and to support the initial increase in demand, the existing infrastructure and supporting facilities will be improved in line with the short-term requirements for additional capacity.

5.5.5 The key elements of the Proposed Development include the following (Refer to **Chapter 4** of the **ES [TR020001/APP/5.01]** for the full project description):

a. Extension and remodelling of the existing passenger terminal (T1) to increase the capacity;

b. New passenger terminal building and boarding piers (T2);

c. Earthworks to create an extension to the current airfield platform; the vast majority of material for these earthworks would be generated on site;

d. Airside facilities including new taxiways and aprons, together with relocated engine run-up bay and fire training facility;

e. Landside facilities, including buildings which support the operational, energy and servicing needs of the airport;

f. Enhancement of the existing surface access network, including a new dual carriageway road accessed via a new junction on the existing New Airport Way (A1081) to the new passenger terminal along with the provision of forecourt and car parking facilities;

g. Extension of the Luton DART with a station serving the new passenger terminal;

h. Landscape and ecological improvements, including the replacement of existing open space; and

i. Further infrastructure enhancements and initiatives to support the target of achieving zero emission ground operations by 2040[1], with interventions to support carbon neutrality being delivered sooner including facilities for greater public transport usage, improved thermal efficiency, electric vehicle charging, on-site energy generation and

[1] This is a Government target, for which the precise definition will be subject to further consultation following the *Jet Zero Strategy*, and which will require further mitigations beyond those secured under the DCO

storage, new aircraft fuel pipeline connection and storage facilities and sustainable surface and foul water management installations.

Figure 5.3: Proposed Development (drawing number - LLADCO-3C-CAP-WHS-GEN-DR-AR-1260 **[TR020001/APP/4.02]**)

5.6 Earthworks and landfill

5.6.1 Due to the existing site topography the Proposed Development will require significant earthworks (cut and fill) activities to form a level construction platform that will tie into the level of the existing airfield. The intention is to 'win' this material from areas within the Applicant's land ownership and to avoid, as far as is possible, the importation of new fill material. This would significantly reduce the quantity of material needing to be transported to the Application Site, with a consequential significant reduction in terms of the impact on the local road network.

5.6.2 Construction of the new terminal building will be undertaken over the former Eaton Green landfill, with some re-working of the landfill. Disposing of this excavated material off site is not considered a sustainable or feasible option because it would require excessive lorry movements. Therefore, the landfill material excavated will be processed on site to allow it to be reused within the Proposed Development.

5.6.3 The materials available for the platform construction will comprise chalk, landfill and other made ground with some natural clay arising from the site. An estimate of the various quantities is provided in Table 5.1:

Table 5.1: Estimated quantities of materials to be used in the construction of the earthworks platform

Assessment Phase	1	2a	2b	Total required
Materials excavated	(Rounded to nearest 1,000m$^{3)}$			(m^3)
Topsoil	0	39,000	89,000	128,000
Clay	0	109,000	306,000	415,000
Chalk	0	239,000	908,000	1,147,000
Landfill	31,000	335,000	21,000	387,000
Other Made Ground	82,000	595,000	168,000	845,000
Excavation of suitable stockpile	0	35,000	110,000	145,000
Excavation of landscape stockpile	0	2,000	87,000	89,000
			Total	**3,156,000**

5.6.4 An estimated 3.7 million m^3 of material will need to be excavated from a variety of locations within the site and then processed for use as engineering materials and replaced to provide the required platform. Careful sequencing of the earthworks operations will therefore be required, and temporary stockpile areas will be needed to store materials until they are needed. Whilst the vast majority of material will be generated on site, some imported granular materials will required for specific engineered fill where not available on site.

5.6.5 Figure 5.4 broadly summarises the work required to create the construction platform. To create the landform needed to enable the development it will be necessary to excavate in some parts of the Application Site and deposit

material in others. (Note that there is a vertical scale exaggeration for presentation purposes, so the actual slopes formed will be at shallower gradients than displayed).

5.6.6 As well as a reduction of HGV and plant movement, and related emissions, compared to the import or excavation of new materials and preservation of natural materials resource, the sustainable use of available materials will have long term benefits to the environment via a reduction in the volume of contaminated materials onsite and removal of contamination pathways through remediation and capping.

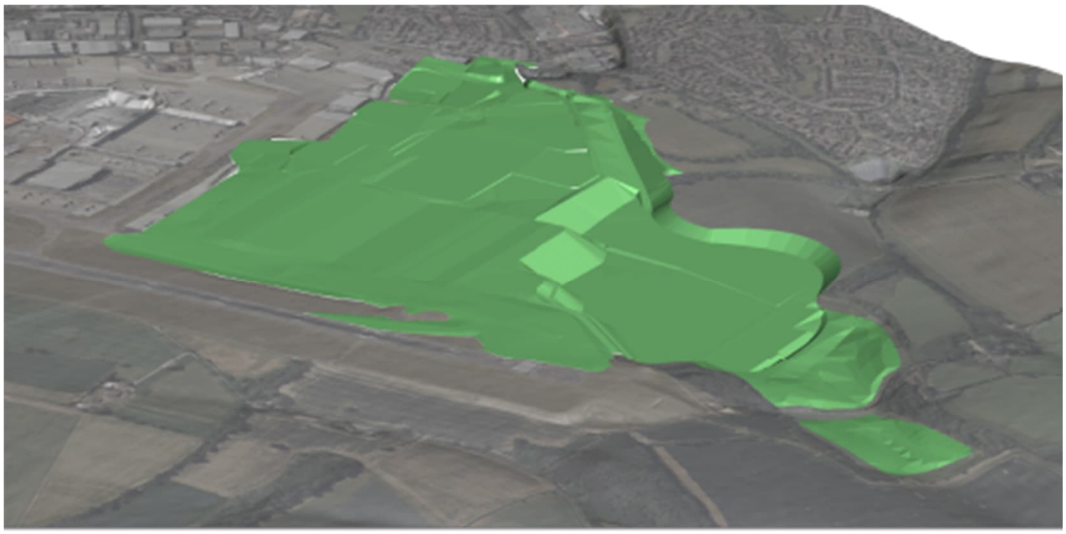

Figure 5.4: Indicative view of earthworks

5.7 Existing runway and proposed taxiways

5.7.1 The airport's single 2,162m long runway is connected to the taxiway[2] network via four link taxiways. The existing taxiway links do not provide access to the full length of the runway which results in some aircraft having to back-track along the runway. This reduces capacity and is a constraint to operations by larger aircraft or those operating longer sectors/routes.

5.7.2 In order to support the growth up to 32 mppa and reduce the distances that aircraft need to taxi on the ground, additional taxiways are proposed to provide the necessary manoeuvring for aircraft to access/egress the existing runway ends. This also enables the increased number of hourly aircraft movements as described in the **Need Case [TR020001/APP/7.04]** to be managed as

[2] A taxiway is a defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including: a) aircraft stand taxilane, a portion of an apron designated as a taxiway and intended to provide access to aircraft stands only b) apron taxiway, a portion of a taxiway system located on an apron and intended to provide a through taxi-route across the apron, and c) rapid exit taxiway, a taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other taxiways thereby minimising runway occupancy times.

described below, to optimise runway capacity and to enable air traffic control to better sequence departing aircraft and to maintain flows:

a. The existing parallel taxiway will be extended to each end of the runway to provide access to the full length of the runway and to provide two runway entry points at each end to provide flexibility to air traffic controllers.

b. A second parallel taxiway will provide separate taxiway routes for arriving and departing aircraft to/from the proposed T2 apron, to increase capacity and operational flexibility.

c. Rapid Exit Taxiways (RETs) will be provided in each runway direction to enable landing aircraft to vacate the runway at speed and improve capacity.

5.7.3 The proposed taxiway network has been tested by means of simulation modelling (Arcport) to ensure that the peak day ATM forecast can safely and efficiency operate without congestion, as described in the **Need Case [TR020001/APP/7.04]**.

5.7.4 In the context of policy, specifically Making Best Use, the proposed taxiways would improve access for departing aircraft to both the ends of the runway. This would improve taxiway routing and reduce runway occupancy time, thus maximising runway capacity.

5.7.5 In the context of the site, the new taxiways need to connect with the existing runway and taxiway network to enable aircraft to travel to the proposed apron at T2.

5.7.6 Further details on the taxiways are described below.

5.7.7 All taxiways will be accessible to Code E aircraft. However, some taxilanes (taxiways on aprons to access/egress stands) will be Code C only, dependent on the layout of the parking configuration.

5.7.8 The layout of proposed taxiways must comply with International Civil Aviation Organisation (ICAO) *Annex 14 Standards and Recommended* Practices (Ref 5.1) and and/or equivalent UK standards (Ref 5.2) which define, inter alia, taxiway widths, separation/safety clearances and maximum gradient. The layout of the proposed new taxiways accords with the ICAO requirements whilst seeking to minimise land take through adoption of compliant separation distances which provided opportunities to design taxiways closer to the runway, providing more land for other infrastructure and reducing the extent of airfield to be built over the former landfill site.

5.7.9 RETs are proposed towards the west and east end of the Runway. RETs are angled taxiways located at an appropriate position so that landing aircraft can exit the runway at higher speed thus vacating the runway earlier, freeing it up for further arrivals or departures. This would improve taxiway routing and reduce runway occupancy time. An additional taxiway link (07 link) extending Taxiway Bravo to the western end of the runway is also proposed.

5.7.10 To achieve the desired taxiway connectivity between the runway and apron stands, new parallel taxiways would be provided to the south of the apron area to connect the new apron to the existing taxiway network. These consist of a realigned parallel Taxiway Alpha and the addition of a second parallel Taxiway Charlie. The new apron would link to the main taxiways via perpendicular taxiways which includes a cul-de-sac serving the passenger apron for T2 shown as Taxiway Juliet and Taxiway Kilo in (Figure 5.5).

5.7.11 Taxiway Golf is extended to the north to connect with Taxiway Foxtrot to service the four Code C stands located west of the new terminal building. This is required to ensure that the operation of the existing taxiway network is not affected by aircraft manoeuvring onto or off these new stands.

5.7.12 An isolated aircraft parking position is proposed to the east of the main apron on a widened section of Taxiway Charlie.

5.7.13 The isolated aircraft parking position would be designated for the parking of an aircraft which is known or believed to be the subject of unlawful interference or which for other reasons needs isolation from the normal aerodrome activities.

5.7.14 The isolated parking position would be 100m from other parking positions, buildings or public areas, in accordance with ICAO Annex 14.

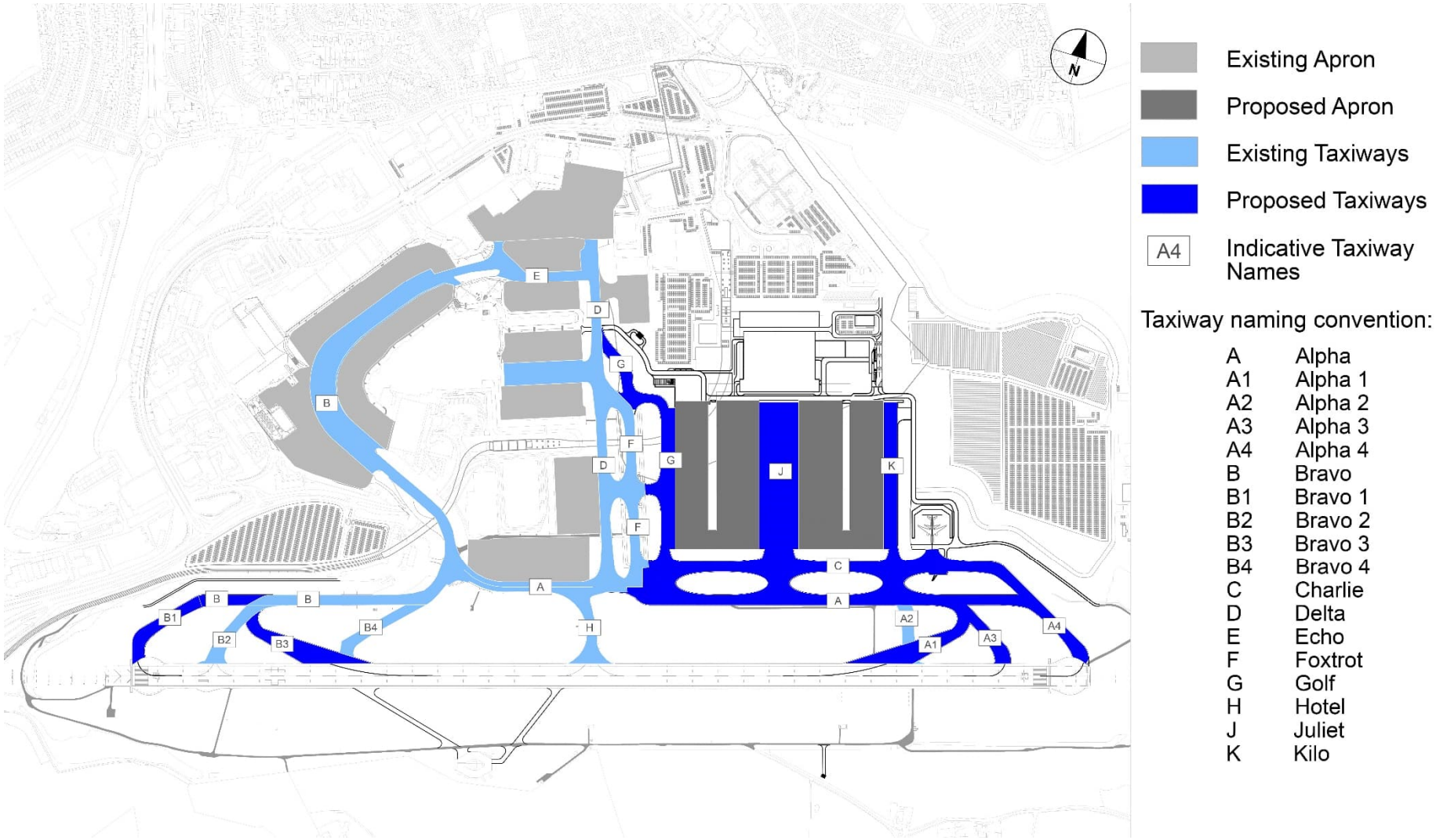

Figure 5.5: Indicative Taxiways and Naming Convention

5.8 Earthworks and Landfill

Earthworks

5.8.1 The topography in the vicinity of the existing airport is highly varied. Significant earthworks will be required to construct an earth platform to support the airport expansion, as the airfield needs to be at similar levels to the existing runway to comply with the relevant international standards and interface with the proposed terminal building. The earthworks strategy aims to make the best use of the Applicant's landholdings immediately adjacent to the existing airport to provide materials to support the proposed infrastructure.

5.8.2 During design development changes to the layout of the Proposed Development, in particular the expansion of the airfield, had a significant influence on the how the ground would need to be engineered.

5.8.3 An earthworks model has been developed to understand the site constraints and to provide a baseline for the assessment of proposed ground levels for the proposed development. This has been tested during different stages of design development.

Eaton Green Landfill

5.8.4 The Proposed Development will occupy the area of the former Eaton Green landfill which lies to the east of the existing terminal area.

5.8.5 Therefore, the location and the orientation of the Proposed Development needed to be designed to reduce the amount of landfill material that will require excavation, thereby reducing potential exposure of construction workers and adjacent site users to potential contamination.

5.8.6 To achieve the ground levels needed it will be necessary to excavate some of the landfill material and reuse it to create a part of the proposed platform. The extension of the Luton DART will necessitate excavation in the landfill. It would also be necessary to pile foundations through the landfill to support the new buildings. This work would need to be undertaken such that underlying groundwater is protected, and in accordance with Environment Agency permits.

5.8.7 The extent of work above the landfill is intricately linked to the overall earthworks strategy and recognised in the ground model.

5.8.8 The proposed option minimises the amount of remodelling of the landfill necessary to create an efficient airport layout, retains the maximum amount of the material on site and includes measures to improve the potential impact the landfill has on the environment. This means that the airport's design objectives can be achieved with the least risk and disturbance.

5.9 Terminals, piers, and aprons

5.9.1 The Proposed Development centres on the extensions to T1 and the construction of the new terminal (T2). T2 West Pier and T2 East Pier are proposed to the south of T2to provide a connection between the terminal building and the aircraft, allowing convenient access for passengers.

Terminal 1 (T1) Expansion and Aprons

5.9.2 T1 requires expansion to accommodate additional passengers up to 21.5-23 mppa.

5.9.3 Additional aircraft stands are required to accommodate peak demand up to 21.5 mppa. These stands are required to enable additional based aircraft to be parked overnight. In the context of the existing airfield layout and the wider Proposed Development, the only feasible location for additional stands, over and above those being provided by the operator to form the future baseline, is to the east of Taxiway Foxtrot in a location that will ultimately form part of the T2 apron. Construction of these stands will facilitate more passengers through T1 but, in the longer term, it is likely that these stands would be used to support T2. Hence, in the longer term, use of T1 may be limited to a lower capacity commensurate with the baseline stand provision at c. 20 mppa. This has been taken into account in defining the proposed extension of terminal facilities for T1 to ensure that the development is cost effective and efficient over the longer term.

5.9.4 The key drivers for the 21.5-23 mppa T1 terminal expansion and apron design are:

a. to avoid (where possible) extensions of the terminal with an impact on airfield and landside facilities;
b. to reduce the scale of additional building to minimise costs; and
c. to align with achieving a level of service “optimum” (ref. IATA ADRM).

5.9.5 Airport terminal buildings must cater for a series of passenger and baggage processing requirements including for departing passengers: check-in; bag drop; security screening; lounge (including retail, food and beverage); and boarding gates. Similarly, for arriving passengers: immigration; baggage reclaim; customs; landside arrivals area (meet and greet). Departing and arriving functions must be segregated and each processing area requires sufficient functional space to comply with Department for Transport (DfT) security policies.

5.9.6 T1 requires expansion to accommodate additional passengers up to 21.5-23 mppa. The solutions identified to accommodate the additional passenger demand have been defined considering two key elements: the capacity of the terminal systems and the existing operations and infrastructure. Each terminal area dedicated to the arriving and departing passengers has been assessed in order to define the capacity of the existing building footprint and then evaluate the additional demand to meet the requirements for 21.5 – 23 mppa.

5.9.7 Where the additional demand cannot be accommodated within the existing footprint through operational enhancement or internal reconfiguration, an extension is proposed to meet the busy hour passenger throughput at 21.5 mppa, with up to 23 mppa accommodated if it is possible to spread the peak. The extensions of T1, as described in this section, have been sized also in relation to the existing constraints in order to minimize any disruption to the terminal operations. The specific areas of expansion include:

a. Check-in: new facilities are required, specifically self-service kiosks, which requires an increase in internal areas;

b. Departure lounge: the existing area is insufficient to meet peak demands and has insufficient seating, requiring additional capacity;

c. Departure gates: Four new departure gates are required to service additional aircraft in the peak, to provide contact stands and a facility that can also be used to bus passengers to remote stands;

d. Outbound baggage handling: additional Hold Baggage Screening X-rays are required to cater for the increased peak hour throughput together with associated changes to conveyer lines which feed-in/out to the x-rays which requires additional floor areas; and

e. Immigration: the existing facility has sufficient space for border control check-points, however, additional space is required for the increased numbers of queuing passengers to meet service levels.

5.9.8 The additional capacity within T1 is anticipated to be achieved by five extensions. Each extension is significantly influenced by the context of the existing terminal building, in particular the existing configuration for the processing of passengers and baggage and the interface with external areas both landside and airside. Therefore, the proposed extensions are in specific locations described as follows, and indicated on Figure 5.6 (and the **General Arrangement Drawings [TR020001/APP/4.09]** and **Airport Access Road and DART Long Section Drawings [TR020001/APP/4.11])**:

a. **T1 departure lounge south extension:** An extension of the current building would be required to increase the ground floor area check-in facilities as well as the departure lounge at first floor; this would require an extension of the building on the south side. At ground floor, this extension would provide an additional area to increase the capacity of key terminal facilities such as check-in. At first floor, the extension would increase the size of the departure lounge. The additional capacity would improve passenger service levels with additional seating.

b. **T1 departure lounge north extension:** To increase the departure lounge area at the northern side of the existing building, an extension is proposed to provide additional seating dedicated to departing passengers waiting for the call to gate at the first floor (Figure 5.6). The additional capacity would improve passenger service levels.

c. **T1 New Pier C and external canopy:** A new pier is proposed to provide passenger boarding gates to service the Terminal Drop off Zone (TDOZ) stands and the south apron stands. This facility would be located to the south of, and be accessible from, an existing Pier (Pier B) with a bridge over the Luton DART T1 station. At the free end of the pier an external shelter is proposed to provide weather protection to passengers boarding/disembarking from aircraft on the south apron. The pier will improve passenger service levels and improve segregation in accordance with DfT security policies.

d. **T1 baggage hall extension:** The Baggage Handling System (BHS) is one of the key processes for the terminal operations and would be increased in capacity to accommodate additional demand. An extension of the existing baggage hall area would provide additional space for the baggage system equipment at ground floor, with operative offices on a mezzanine floor.

e. **T1 immigration extension:** An extension of the current terminal building to the north is proposed to increase the area dedicated to the immigration process for arriving passengers. This provides an additional space at ground level to increase the existing passenger queuing area, while the existing hall would be remodelled to optimise the layout of the immigration desks and electronic-gates as required and operated by UK Border Force in accordance with government immigration and security policies.

5.9.9 Assessment phase 1 includes construction of five aircraft parking stands that will be serviced from T1 to meet the demand but these will need to be constructed within the T2 apron footprint. Once T2 commences operations these six stands will be serviced from T2. Refer to Figure 5.6.

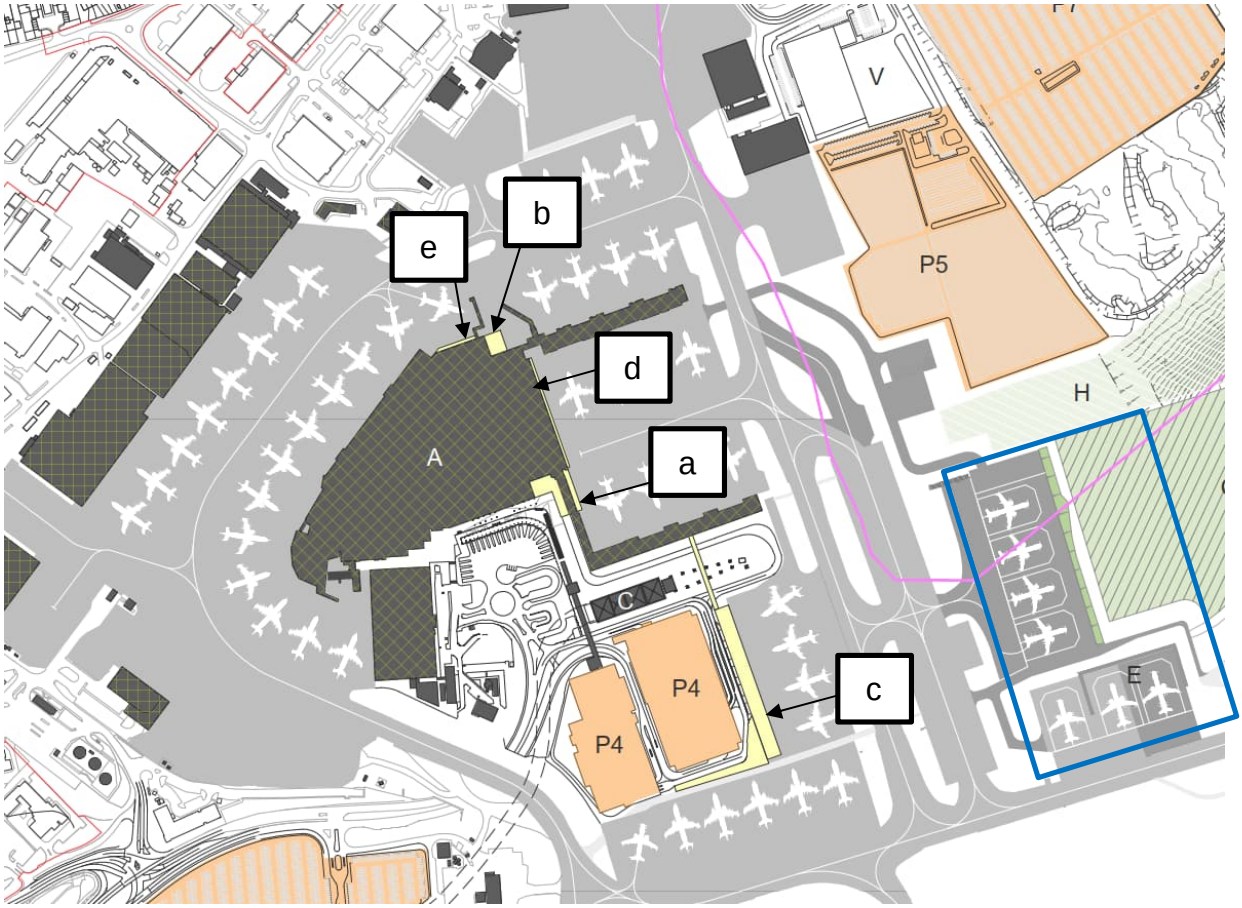

Figure 5.6: Proposed T1 Extensions, indicated in yellow, and new aprons (with blue surround) (Extract from drawing no. LLADCO-3C-CAP-WHS-GEN-DR-AR-1220)

Terminal 2 (T2)

5.9.10 T2, a new passenger terminal building would be built, comprising a main building and two piers which would interface with the aircraft parking aprons to the south. It will be ultimately sized to process up to 12 mppa.

5.9.11 The reference design has been sized based on the busiest time of day so that there are appropriate provisions made to accommodate peaks in service demand based on the forecasts and information described in the **Need Case [TR020001/APP/7.04].** Refer to Table 5.2.

Table 5.2: Summary of Key Design Metrics

Assessment Phase	Passenger and Baggage Demand		
	mppa	Arriving Passenger Busy Hour Rate	Departing Passenger Busy Hour Rate
Phase 2a	7 mppa	1,500	1,950
Phase 2b	12 mppa	2,200	2,800

5.9.12 Key considerations in establishing the preferred T2 design included the following:

a. Earthworks and topography: The level of the site falls away to the east and was a key consideration in the assessment of options. The proposed solution would minimise the volume of earth movements required by positioning the proposed terminal on existing higher ground.

b. Landfill: The footprint of the new terminal and foundation strategy was a key consideration in developing the preferred solution. The proposed solution recognises that building structures over the landfill is a viable and proven technical solution. This is preferable to building areas of hardstanding such as aprons and surface car parks and would minimise the excavation and earthwork movements within the landfill.

c. Policy: The proposed T2, airfield and support development parameters would not impact on the Green Belt.

d. Luton DART: Extending the existing automated transport system between Luton Airport Parkway railway station and the existing terminal introduces certain constraints in order to maximise the systems engineering efficiency and operational capacity. The location of the Luton DART station and associated tunnel limits the opportunity extend proposed T2 to the west.

e. Integration with the proposed airfield layout to achieve efficient routes for passengers and safe transition between the terminal and to/from aircraft.

f. Staged delivery: The complete terminal will be delivered in a phased manner in response to passenger growth forecasts, so the proposed solution has to provide flexibility in the phasing of delivery requiring the

design to be simply expanded without significant disruption to operational areas of the existing airport.

5.9.13 A progressive design approach was adopted to determine the correct solution to meet the project requirements as described below.

Establish Requirements

5.9.14 First it was necessary the key design metrics for the new terminal building. This included:

a. Defining the terminal facility and processing requirements using passenger flow figures generated from flight forecasts and predicted busy hour rates;

b. Developing requirements to align with incremental (staged) delivery of the Terminal;

c. Using industry standards relating to passenger and baggage processing strategies based upon IATA ADRM, and sense checked using experience of the UK low cost carrier market and then benchmarked against UK airport peers; and

d. Using a blend of industry standards and market trends regarding concession strategy.

Terminal Planning Model

5.9.15 Having established the key design metrics, a Terminal Planning Model was created to develop spatial parameters for the sizing of T2. The resulting area schedule and facility numbers were evaluated and benchmarked against comparable airports including Dublin, Manchester and Stansted. The model was also cross referenced to IATA Airport Design Reference Manual 11 (ADRM 11) (Ref 5.3) passenger service levels – as an internationally recognised standard for design of airport facilities.

5.9.16 The Terminal Planning Model is reproduced in Appendix A.

Concept Architectural Layouts

5.9.17 Once the Terminal Planning Model was completed, concept Architectural layouts were generated, utilising and considering the following:

a. terminal planning expertise;

b. architectural design development;

c. future-proofing strategies;

d. operational and constructability expertise; and

e. masterplan context.

5.9.18 The proposed terminal concept provides passenger operations predominantly on a single level with the necessary back of house servicing, support and BHS on the level below; interfacing directly with the apron and ramp area. Two intermediate mezzanine levels (partial building footprints) are proposed to

segregate passenger flows and provide additional accommodation or space for operational systems as follows:

a. **First Floor – Passenger Operations**: Check-In Hall, central security and the International Departure Lounge (IDL) are to the east of the plan. Immigration and baggage reclaim to the west.

b. **Ground floor – BHS & Support**: Outbound and inbound baggage halls, back-of-house, plant and support areas. The ground floor also hosts the arrivals hall, with passengers travelling by escalator to the foyer area with food and beverage and retail offers.

c. **Lower Mezzanine Level**: A suspended arrivals corridor, connected via vertical circulation cores to the two piers, sits below the first floor across the south elevation. In a separate area, there is the opportunity to position the hold baggage screening facility – dependent on the final BHS design.

d. **Upper Mezzanine Level**: Lounge facilities are located towards the airside terminal façade, offered as part of the international departure lounge. This extent of mezzanine suits current requirements but could be extended if necessary.

5.9.19 The T2 design would provide a straightforward and convenient experience for passengers throughout the departure process; from arrival at the terminal and check-in to boarding the aircraft, as well as for arriving passengers.

Establishing the Building Footprint and Location

5.9.20 The conceptual layout was integrated with the Terminal Planning Model to establish a footprint which adopted an outline area of 180 x 180m.

5.9.21 The terminal building footprint was positioned to account for the requirements of the interfacing airfield and landside operations as shown in Figure 5.7. Key considerations are as follows:

a. North Elevation – Interfaces with highways, multi-storey car park (MSCP) and coach stations;

b. South Elevation – Interface with the apron; and

c. West Elevation – Luton DART station and perimeter access to the terminal building (including inbound baggage hall).

5.9.22 The design provides a perimeter ‘buffer’ to the building footprint, allowing for design tolerance to façade design and to provide perimeter access.

5.9.23 Upon completion the terminal would have a gross internal floor area of approximately 62,800m^2.

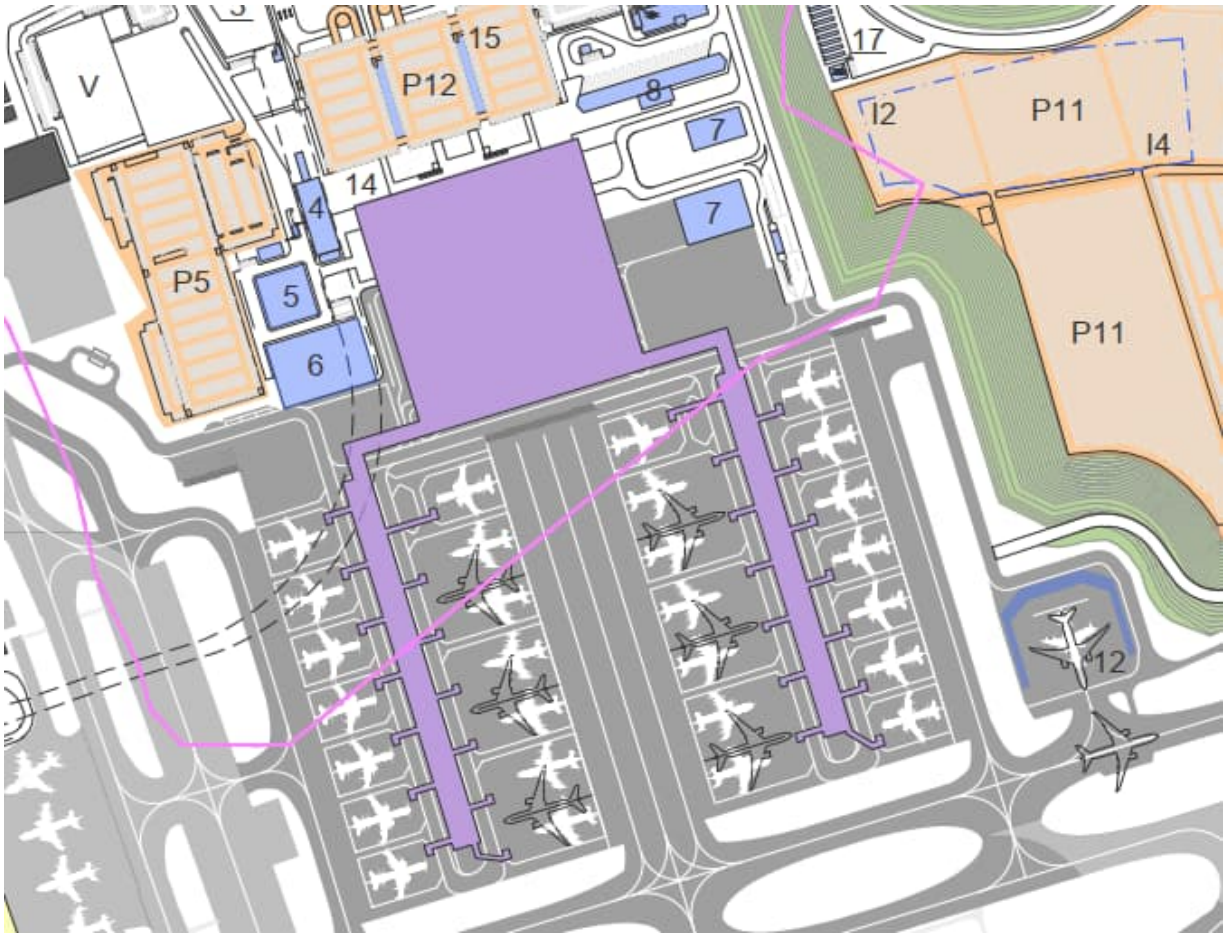

Figure 5.7: Proposed T2 Building, also showing piers and aircraft parking stands (Extract from drawing no. LLADCO-3C-CAP-WHS-GEN-DR-AR-1260)

Defining the Parameters

5.9.24 It is recognised that the proposed phasing will result in the terminal building not being constructed for more than a decade after DCO consent. This is a significant time period in the context and development of airport operations and therefore there are potentially some 'unknowns'. It is therefore prudent to allow for sufficient tolerance and flexibility of design when establishing the high-level terminal configuration. Typical developments to airport operations might include:

a. changes to operational methods;

b. changes to security processes (including government mandated changes);

c. emerging technologies;

d. changing 'trends' and passenger expectations;

e. commercial opportunities / revenue streams (landside and airside);

f. MEP and building servicing strategy (e.g. floor/ceiling depths for flexibility in design of ventilation systems, plant space – as yet undefined);

g. sustainability: on-site renewable energy and Net Zero aspirations – to include materials, shading etc;

h. lessons learnt from COVID-19 Pandemic. For example, the need for additional specialist areas and increased capacity within queuing models;

i. changes in other projects in the same period that interface with the terminal development; and

j. construction strategy and methods.

Adopted Parameters

5.9.25 The T2 parameters therefore include an allowance for an increase in building footprint and building height relative to the reference design to allow for the safeguarding of a larger extent of required terminal area.

Conclusion

5.9.26 T2 would process passengers and their baggage as they arrive and depart from the airport in an easy to understand and functionally efficient environment. The passenger experience would be supported with a range of facilities including food kiosks, cafes, restaurants, retail and welfare facilities. Figure 5.8 provides indicative images of T2. Support accommodation and operational areas are proposed for airport staff required to operate the terminal including airlines, retail, terminal management, security screening, customs, immigration, baggage handling and ground staff. It is recognised that the assessment phasing will result in the terminal building not being constructed for a decade after DCO consent. This is a significant time period in the context and development of airport design and operations and therefore there is a need for flexibility due to the time horizon of the development. It is therefore prudent to allow for sufficient tolerance and flexibility of design when establishing the high-level terminal configuration.

5.9.27 The proposed engineered servicing of the T2 building would be designed to meet exacting standards with regards to energy conservation and sustainable principles, including meeting ‘BREEAM Excellent’ criteria. For example, photovoltaic and solar water heating panels would be installed on the roof, as well as ground source heating and cooling systems under the terminal to deliver a source of sustainable energy.

Figure 5.8: Indicative visuals of T2

T2 Piers

5.9.28 The T2 proposals would incorporate two new piers. The proposed piers would be located to the south of the proposed T2 building and extend into the aprons.

5.9.29 The proposed piers would provide access for passengers to the aircraft stands. This design would reduce interaction between passengers and airside vehicles and improve safety for passengers/staff accessing to and from the building.

5.9.30 The piers would extend from the terminal with departing passengers accessing aircraft from the first floor and arriving passengers returning to the terminal at the ground floor level. The piers would include two storeys to prevent crossovers between arriving and departing passengers. The passenger flow route between the pier and the terminal will aid intuitive wayfinding and accessibility. The configuration over two storeys will also reduce land take.

5.9.31 The piers would be configured to integrate efficiently with the proposed apron layout. New aircraft parking stands would be provided in rows either side of the new terminal piers running perpendicular to the runway. The design of the piers has been developed to provide adequate space for vehicle manoeuvring to allow for effective aircraft servicing, while also providing minimal and safe pedestrian routes at apron level. Vehicular access must also be provided in the zone between the stands and passenger access must be provided to the port side of the aircraft.

5.9.32 The piers would comprise circulation, amenity, gate areas at Departures level, on the first floor, with some retail/food and beverage concessions. At ground level, an arrivals corridor connects passengers back to the main terminal, via a lift and escalator core. Plant, operational areas and staff accommodation are also provided, interfacing directly with the external apron.

5.9.33 The scale of each pier is a function of the site layout and the required operational functionality. The piers extend along the front of each stand to provide efficient and proximate boarding with gate areas for each stand of sufficient capacity to accommodate the requisite number of passengers for a Code C aircraft with c200 seats.

5.9.34 A single storey link would connect passengers from T2 to the East Pier.

5.9.35 Level access is proposed to all departure gates and lounge areas within the proposed T2 West and East Piers.

5.9.36 For access to the aircraft, departing passengers will cross a fixed link bridge to a vertical circulation node which provides a lift and stair, taking passengers to the apron level.

5.9.37 The concept design allows for future flexibility of the internal pier layout and they would be future proofed to safeguard installation of airbridges at a later date, if required.

5.9.38 The parameters for the piers includes a buffer to safeguard potential changes in operational requirements thus providing flexibility to widen or locally reposition the piers within the constraints of the apron.

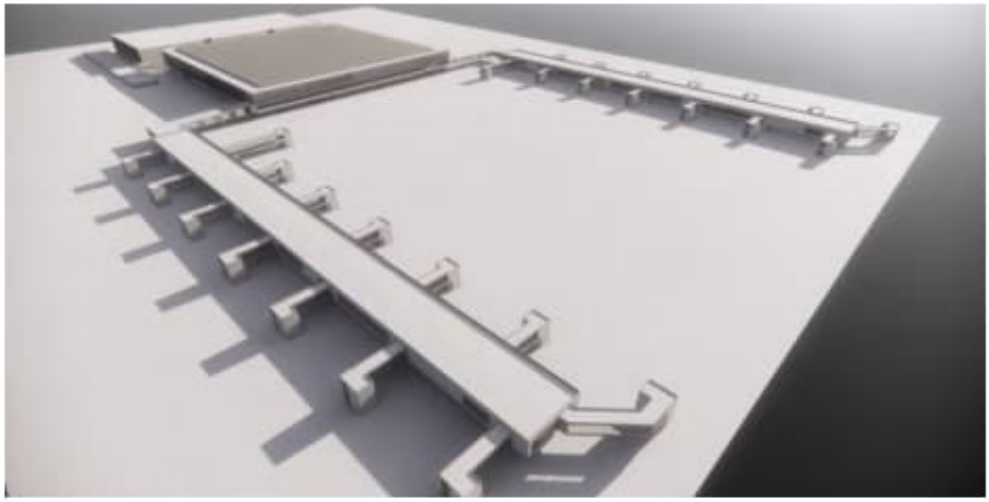

Figure 5.9: Indicative visual of T2 Piers

T2 Aprons

5.9.39 New T2 aprons are proposed to provide sufficient aircraft parking for the airport expansion.

5.9.40 In the context of the site, the proposed T2 aircraft parking aprons are located north of the runway and the existing and extended taxiway network. This location within the wider airfield would facilitate efficient aircraft movement between T2 and the runway. The location also minimises aircraft parking in relation to the landfill with only two stands overlapping the landfill site. As described in Section 5.6 due to the undulating topography of the site, significant earthworks would be required to facilitate the apron.

5.9.41 The proposed aprons would enable 28 Code C aircraft to park at T2 in accordance with the requirements of the **Need Case [TR020001/APP/7.04]**. The proposed layout includes provision of 6 stands for larger Code E aircraft, with each Code E aircraft taking the space of two Code C aircraft in a Multiple Aircraft Ramp System (MARS)[3] layouts. See Figure 5.7 and Figure 5.9.

5.9.42 Code C Stands would typically be 60m long, allowing for aircraft length of 45.5m, with 4.5m safety clearance at rear of stand (to allow for vehicles to circulate without straying onto the adjacent taxiway) and 10m at head of stand to allow a push back tug to position without blocking the head of stand road. Code C stands would be 38m wide, to safeguard maximum wingspan of Code C aircraft with 1.5m safety clearance to each wing. An interstand clearway width of 6m would be provided between stands for vehicular circulation. See Figure 5.10.

[3] Code C aircraft have a maximum wingspan on 36m. They are single aisle aircraft of up to circa 200 seats such as Boeing 737 which have a typical range from UK to destinations in Europe, North Africa and Turkey. They are favoured by low cost carriers. Code E aircraft have a maximum wingspan of 65m and include aircraft such a Boeing 777 which can fly intercontinental routes.

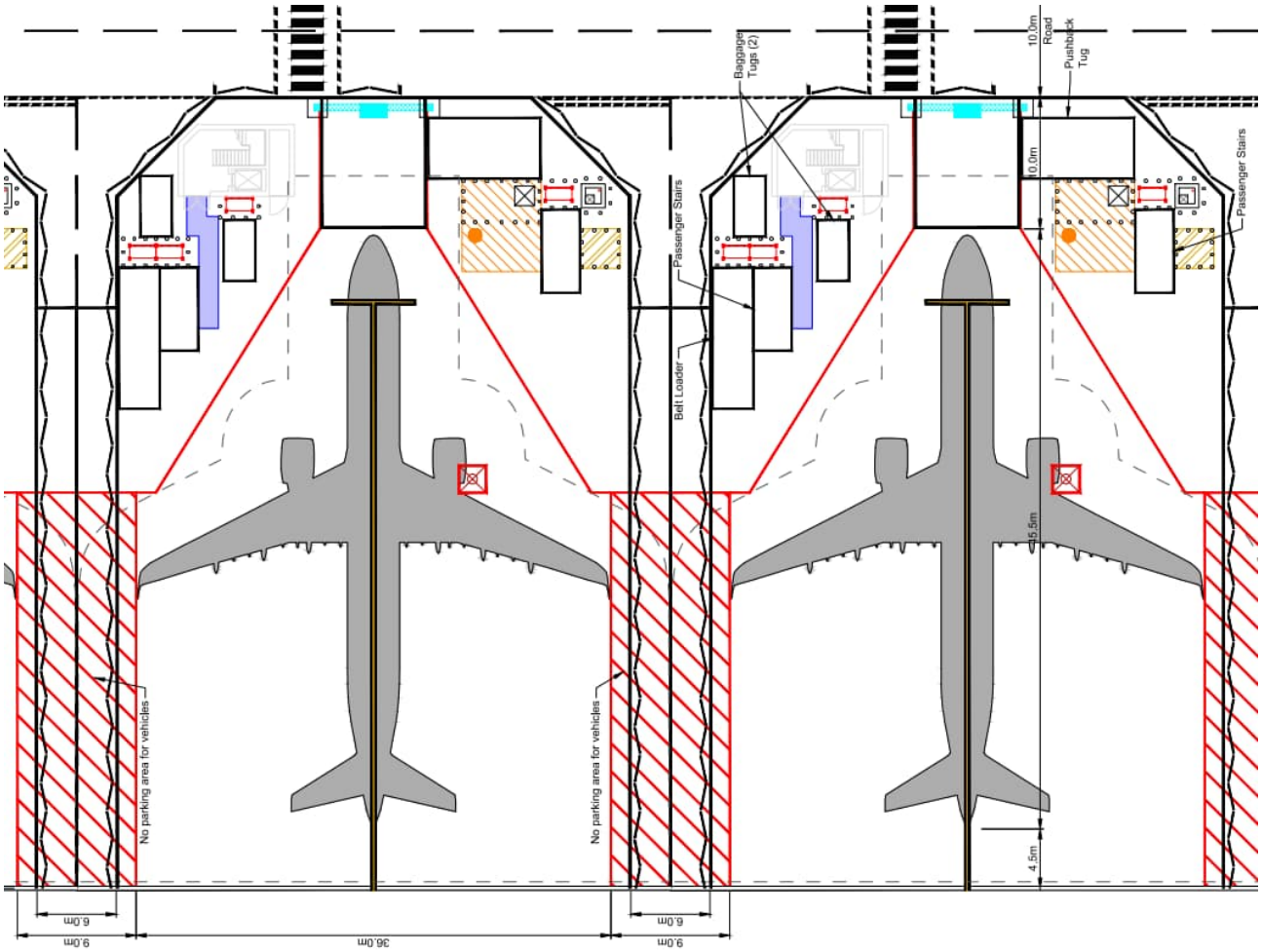

Figure 5.10: Proposed Code C Contact Stand Configuration

5.9.43 Code E stands would be 82m long, allowing for a maximum aircraft length of 86.5m and with similar clearances to head and rear of stand as Code C stands. Code E stands would straddle two Code C stands as shown in Figure 5.11.

5.9.44 The apron stands have been assessed in the context of the facilities and operational requirements to enable safe and efficient circulation of ground servicing equipment including push back tugs, fuel dispensers, baggage handling equipment and fixed installations such as electrical ground power distribution, docking guidance equipment and high mast lighting.

5.9.45 Apron taxilanes would be 31.5m wide for Code C aircraft. For Code E aircraft taxilanes would be 89m wide which would enable two Code C aircraft to taxi in parallel or to be used by one Code E aircraft.

5.9.46 The combined area of the proposed stands, apron taxilanes and circulation routes is 178,712m^2.

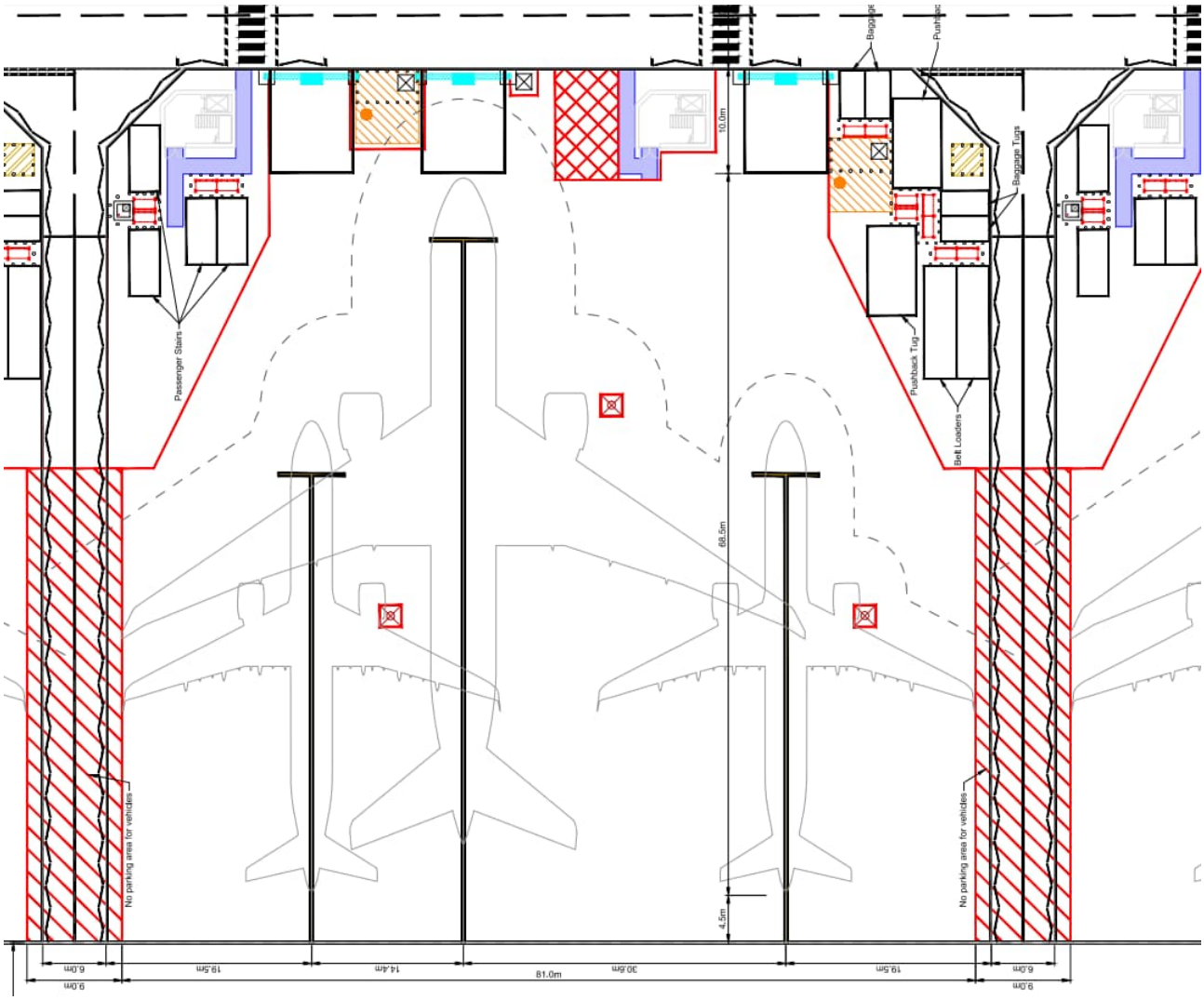

Figure 5.11: Proposed MARS Stand (two Code C or one Code E aircraft) Configuration

5.9.47 In relation to critical interfaces with the Proposed Development the stands are located parallel to the proposed T2 piers. The Proposed Development therefore provides an efficient layout for aircraft parking which minimises the extent of new apron and thereby reduces the extents of the earthworks platform.

5.9.48 The aprons are served from both sides of the two proposed piers, as described above. This layout has been configured to optimise access for passengers to the aircraft, creating the shortest route possible between the terminal and the aircraft. This also removes the need for airfield shuttle buses and minimises pedestrian access to the airfield.

5.9.49 The new aprons provide parking for aircraft in parallel rows on either side of the two terminal piers, running perpendicular to the runway. The aircraft stands would face directly onto the terminal pier frontages and provide contact service for passengers.

5.10 T2 Support buildings

5.10.1 T2 support buildings and associated hardstanding would support the terminal function and operations. In the context of the Proposed Development the functionality of these elements drives the need for solutions adjacent or close to the proposed terminal.

5.10.2 An energy centre is proposed as a separate building to the terminal. Options to incorporate the energy centre within the terminal were considered but discounted due to the need to maintain flexibility and for ease of maintenance access (Figure 5.12). The energy centre would consist of three units containing internal plant rooms to house new heat generation plant and external compound areas for chiller plant. Current technologies considered are ground and/or air source heat pumps and efficient chilled water cooling systems, thermal and electrical stores, commensurate with future technological availability.

5.10.3 A 33kV substation is proposed immediately to the west of T2 and to the north of the energy centre. The need for this substation is defined in the **Energy Statement [TR020001/APP/5.02].** The scale of the sub-station has been benchmarked against similar facilities and discussed with UK Power Networks (UKPN). It is anticipated that the in-situ UKPN supply cables would require some form of additional protection or diversion within the airport boundary.

5.10.4 A service yard would be provided for controlled access of deliveries to T2. This area would allow for deliveries to organisations which operate within the terminal building including retailers with areas for goods to be processed and stored and with sufficient vehicle manoeuvring space. The scale of the service yard has been considered with respect to typical end user requirements, including recycling facilities, and benchmarking against similar facilities at other UK airports. The waste handling strategy is described in more detail in **Chapter 19** of Volume 2 of the **ES [TR020001/APP/5.01].**

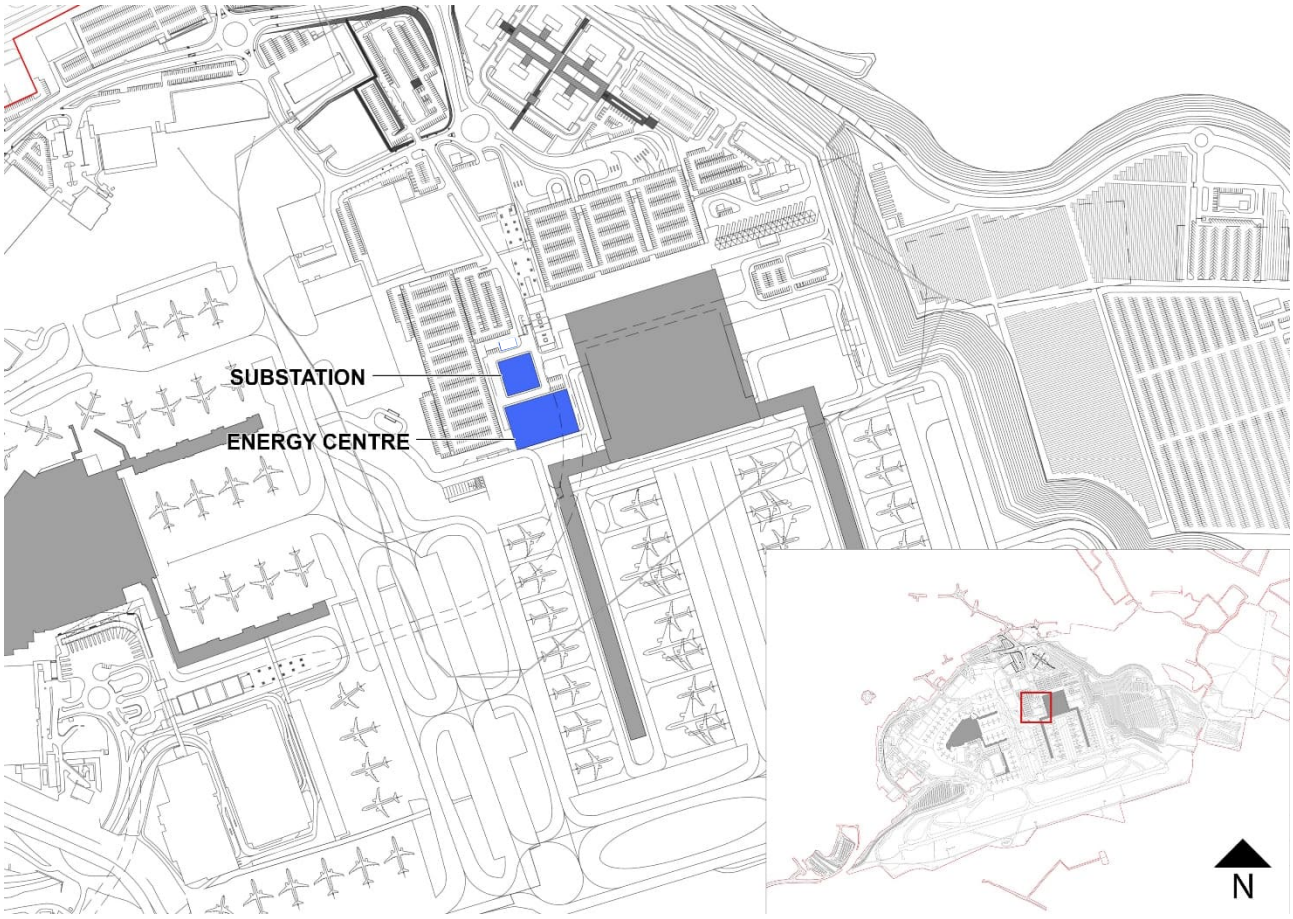

Figure 5.12: Proposed Support Buildings Plan *(indicated in blue)*

5.11 Airport operations and maintenance

5.11.1 The proposed airport operations and maintenance buildings would be a cluster of buildings that would support airfield operations and maintenance (Figure 5.13). The exact number and functions of buildings in this area would depend on the evolving nature of future airport operation and are likely to include (but not limited to) the following functions:

a. ground operations staff and vehicle facilities;
b. vehicle maintenance;
c. operational vehicle parking and charging;
d. high bay storage facilities and workshops with appropriate support; and
e. other welfare, training and office accommodation support facilities.

5.11.2 The exact construction sequence of the proposed buildings would align with the demand to suit both the capacity requirements and construction methodology.

5.11.3 The airport support buildings would be flexible in terms of end use and whether they are located airside or landside. Retaining flexibility at this stage of the design is beneficial so that security interfaces can be adapted to meet the future end user requirements.

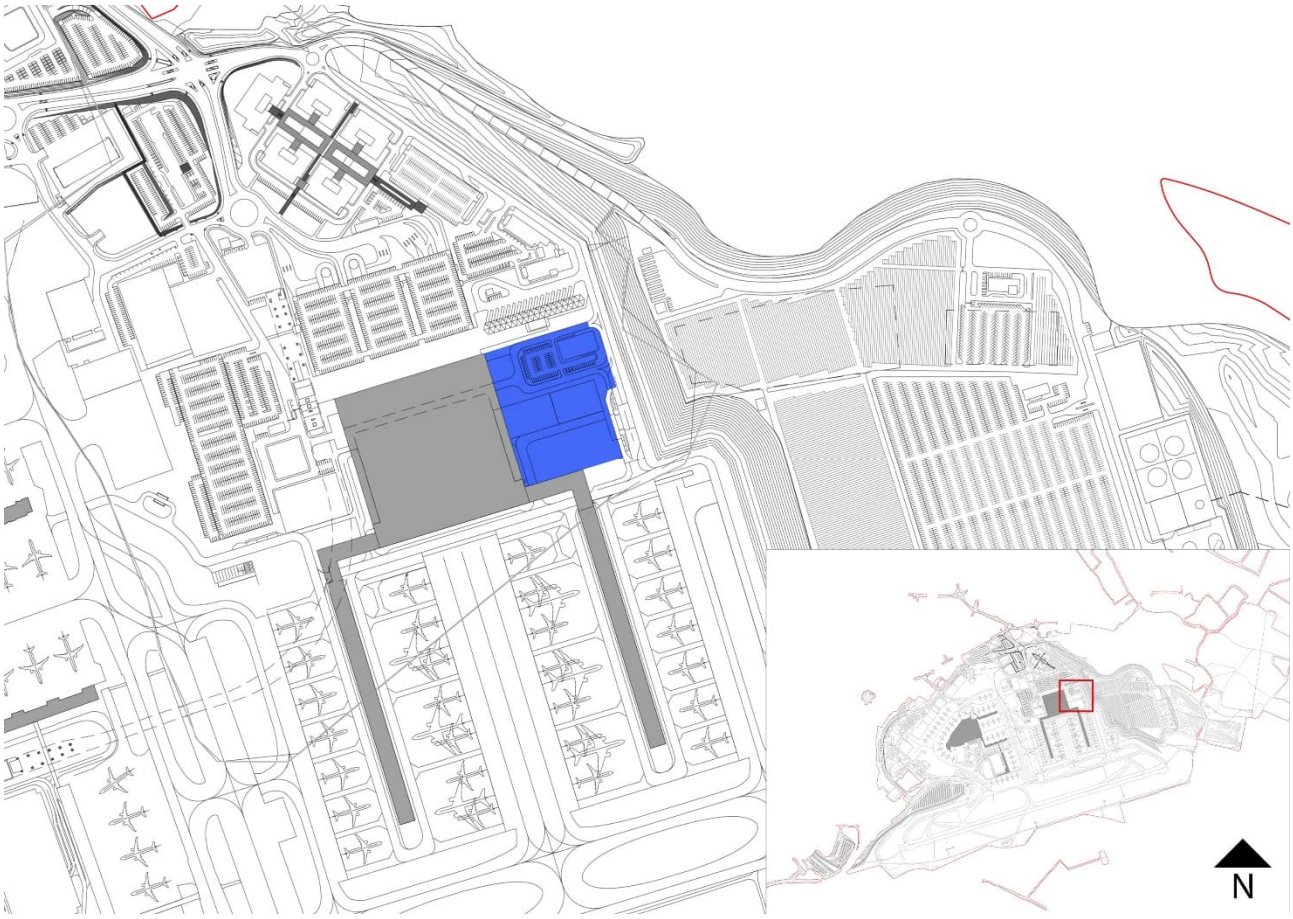

Figure 5.13 Proposed Airport Operations and Maintenance Buildings *(indicated in blue)*

5.12 Hotel

5.12.1 There will also be a requirement for additional hotel accommodation to serve a 32 mppa airport. The airport is already served by a number of hotels in the vicinity, principally located between it and Parkway Station, along Airport Way. In total, there are currently 2,775 bedrooms provided by hotels in the immediate vicinity (4 miles) of the airport. The majority of these were in operation in 2019 when the airport handled 18 mppa. These hotels are heavily used by both passengers, aircrew and other visitors associated with activity at the airport.

5.12.2 As the volume of passengers and flights using the airport grows, there will be a need for additional hotel accommodation within the vicinity of the airport. An additional 125 bedroom hotel is planned as part of the Green Horizons Business Park and there are other new hotels planned in the vicinity of the airport, providing of the order of 570 additional bedrooms. As the airport grows to 32 mppa, the additional number of hotel bedrooms required to meet the needs of passengers and other airport related visitors could exceed 2,000. The Proposed Development includes a 400 bedroom hotel adjacent to T2 in the later stage of development to provide some additional capacity.

5.12.3 In the context of the site the hotel is located north-east of the terminal building, adjacent to the coach station, drop off zone and MSCP, providing easy access for passengers driving or being dropped off. The hotel would be in close

proximity to the plaza providing convenient pedestrian access for passengers to/from the Luton DART and T2. The location of the hotel is shown on Figure 5.14 and an indicative hotel elvation is shown on Figure 5.15.

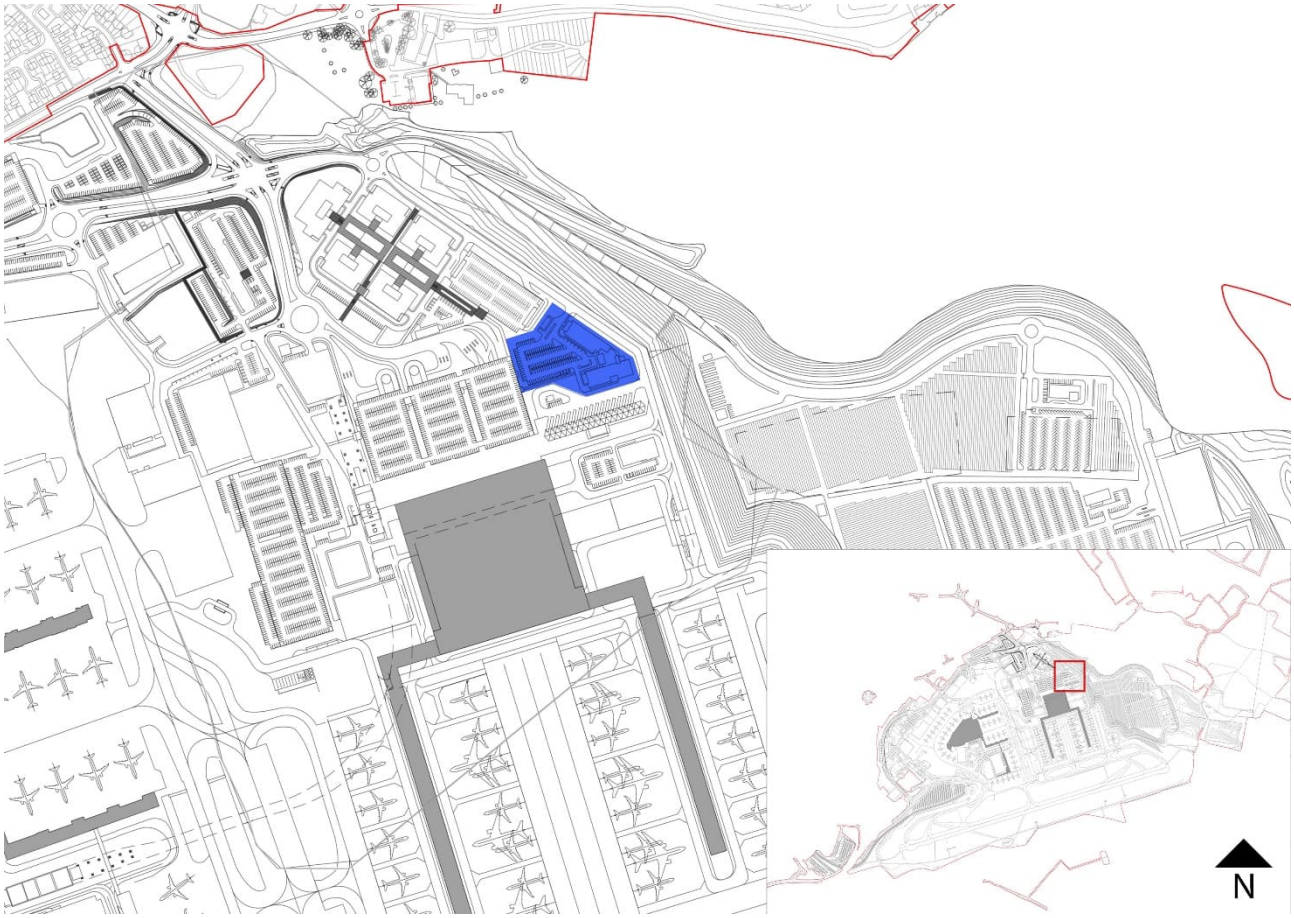

Figure 5.14: Location of Proposed Hotel *(indicated in blue)*

Figure 5.15: Indicative elevation of Proposed Hotel (No 16) (Extract from drawing no. LLADCO-3C-CAP-WHS-GEN-DR-AR-1260)

5.13 T2 Plaza

5.13.1 The T2 Plaza would be located immediately to the north of the T2 building, providing a dedicated pedestrian zone. It would provide a vehicle free circulation area for passengers and employees accessing/egressing the terminal, from the Drop off Zone (DOZ) and MSCP to the north, whilst also providing access to the coach station (located to the east) and Luton DART station (located to the west). The location of the T2 Plaza is shown on Figure 5.16 and the indicative layout shown on Figure 5.17).

5.13.2 Pedestrian movement routes would be provided along key desire lines and sufficiently sized to ensure their ability to accommodate predicted footfall. The design of this area would also consider those potentially likely to use the space, ensuring surface treatments are accessible to all users and that suitable shelter is provided along principal connecting routes. The positioning of signage would also be coordinated to ensure information is clear and routes are clearly demarcated. As well as integrating operational requirements, the T2 Plaza would also incorporate a hard and soft-landscape environment and seating areas.

5.13.3 High level pedestrian links would be provided from the MSCP to T2.

5.13.4 A key operational requirement for the T2 Plaza is to provide an exclusion zone between the terminal frontage and any vehicular area, as a safeguarding measure for public safety in accordance with security requirements.

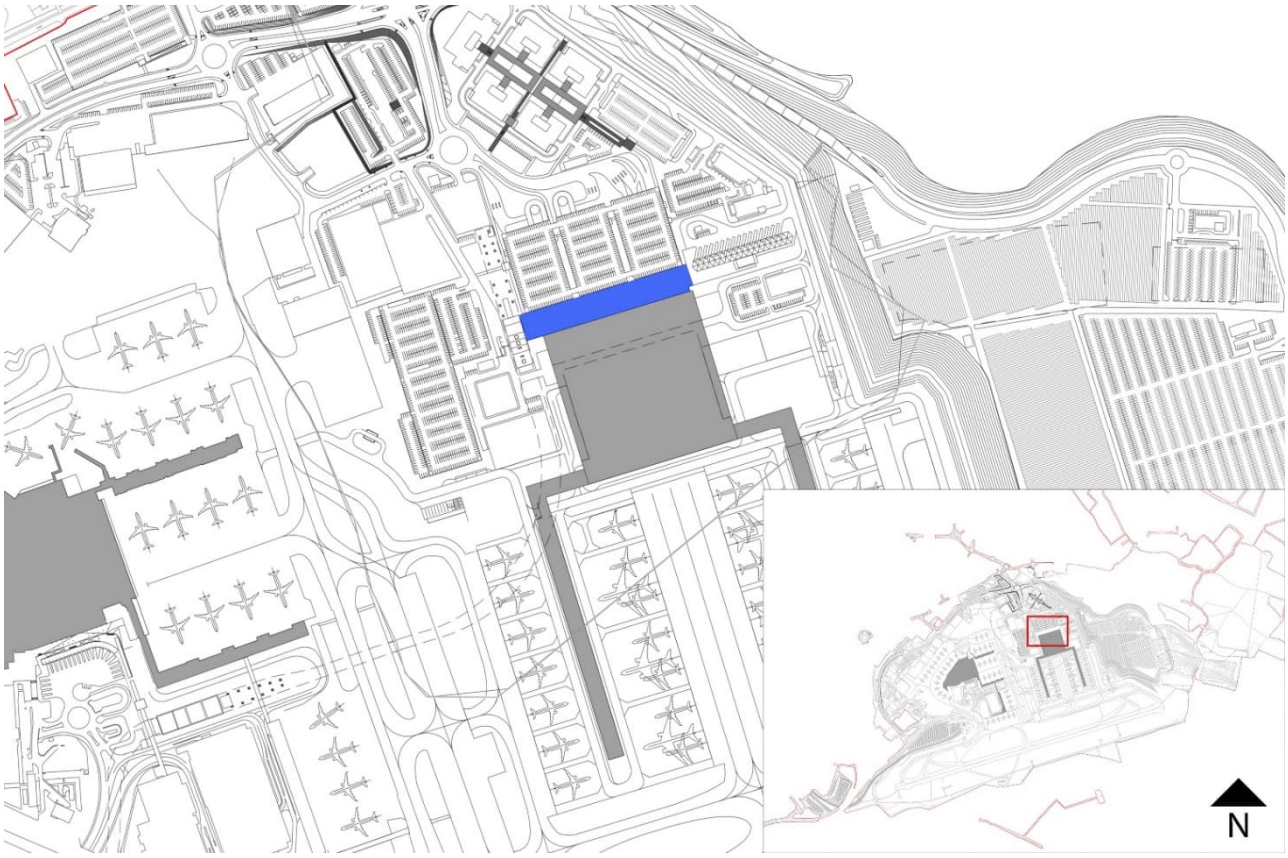

Figure 5.16: T2 Plaza *(indicated in blue)*

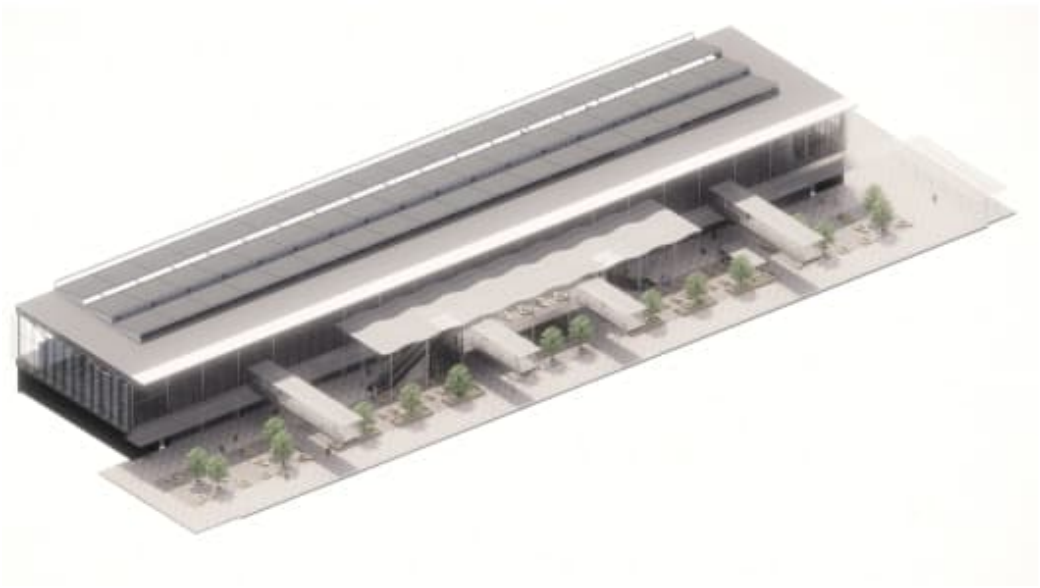

Figure 5.17: Indicative sketch for T2 Plaza

5.14 Drop off zones

5.14.1 The DOZ would provide an access route for both private and public transport to primarily drop off passengers and employees to the front of T2. The DOZ would connect to new internal airport road network, which in turn would link with the AAR (Figure 5.18).

5.14.2 To encourage the use of more sustainable forms of transportation, cycle parking would be integrated as part of the design, giving employees the option of cycling. Dedicated footpaths and crossings would be provided on the internal road network, to ensure high quality pedestrian routes and encourage walking.

5.14.3 Initially, the DOZ would be located to the north of T2. The DOZ would need to be relocated and reoriented to run along the frontage of T2, to accommodate the proposed expansion of the T2 building and construction of the T2 MSCP.

5.14.4 Both iterations of the DOZ would be constructed at surface level and would provide direct pedestrian links to T2 across the Plaza area. The DOZ would contain dedicated aisles for private car drop off, taxis, and public transport (local buses).

5.14.5 Capacity for approximately 90 cars, 8 buses and 30 taxis would be provided as part of the DOZ designs.

5.14.6 The DOZ reference design would serve the anticipated capacity requirements of the Proposed Development.

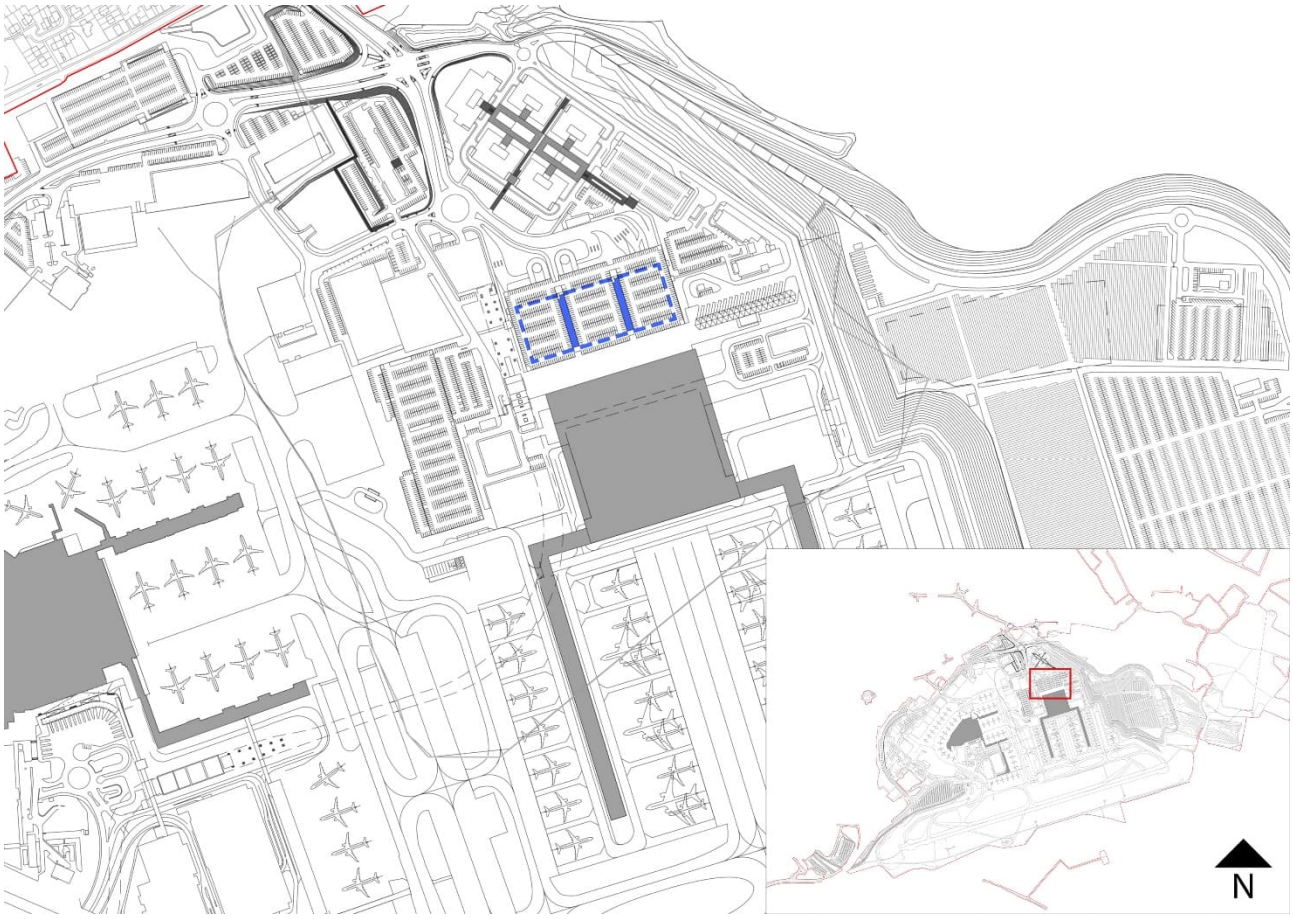

Figure 5.18: Proposed Drop Off Zone located within MSCP *(indicated in blue)*

5.15 Public transport (bus and rail)

5.15.1 Public transport provision is embedded within the Proposed Development, providing additional connections for the Luton DART rail link, bus facilities and a new coach station. Making it easier for passengers and airport employees to travel by public transport will enhance the quality of the travel experience, minimise traffic-related impacts, and encourage more sustainable forms of travel. Limiting the dominance of cars within the Proposed Development will reduce the impact on air quality, noise, and carbon emissions, and will reduce the proposed car park land take and the overall footprint of the proposed scheme. The requirements for public transport are defined in the **Framework Travel Plan [TR020001/APP/7.13]** and further described in the **Surface Access Strategy [TR020001/APP/7.12]**.

5.15.2 The fundamental principle within the **Surface Access Strategy [TR020001/APP/7.12]** is to allow for a multi modal transport accessibility approach at both the existing T1 and the new T2, where public transport is a key component.

5.15.3 The proposals are integrated with a number of improvements to public transport that are currently under development. These will all contribute to increasing the percentage of air passengers and employees arriving by bus, coach or rail:

a. Thameslink 2020 timetable and new rolling stock;
b. Luton DART system to the Terminal Area (T1);
c. Elizabeth line (interchange with Thameslink at Farringdon);
d. East Midlands Trains new franchise; and
e. East-West Rail (interchange with Thameslink at Bedford).

5.15.4 Two further improvements are included with the Proposed Development of T2:

a. extension of Luton DART to T2; and
b. development of a new coach hub.

5.15.5 **The proposed Terminal 2 Luton DART station** requires the existing track bed to be extended and the cable pulled system is limited in its overall length. This constraint has resulted in a proposed station on the west side of T2 so as to provide the shortest length of additional track.

5.15.6 The track will be constructed in a proposed extension of the existing tunnel which will pass under two taxiways and terminate below the proposed T2 station.

5.15.7 The integration between the Luton DART terminal (Figure 5.19) and Luton Airport Parkway Rail Station, as well as integrated ticketing systems, will contribute to providing a seamless travel experience.

5.15.8 **A new coach station** is proposed to be located north-east of T2. It's proposed location is convenient to the proposed AAR that would provide connectivity into the Coach Station but with coaches having a separate vehicular route to segregate them from cars and taxis using the T2 DOZ.

5.15.9 The coach station would provide additional capacity, including 16 bays for bus/coach parking, to assist public transport growth for the airport. It would provide additional stands to those already provided at T1, to facilitate easy access and egress for coaches.

5.15.10 The coach station would be integrated with and connected to the T2 Plaza to provide a convenient and short pedestrian route to T2.

5.15.11 Facilities within the coach station will be designed in detail following DCO consent, but the parameters allow for this facility to include a waiting area with food and beverage concession and facilities to enable passengers to buy their onward tickets.

5.15.12 Bus bays would also be provided within the T2 drop off zone to accommodate local services and car park shuttles.

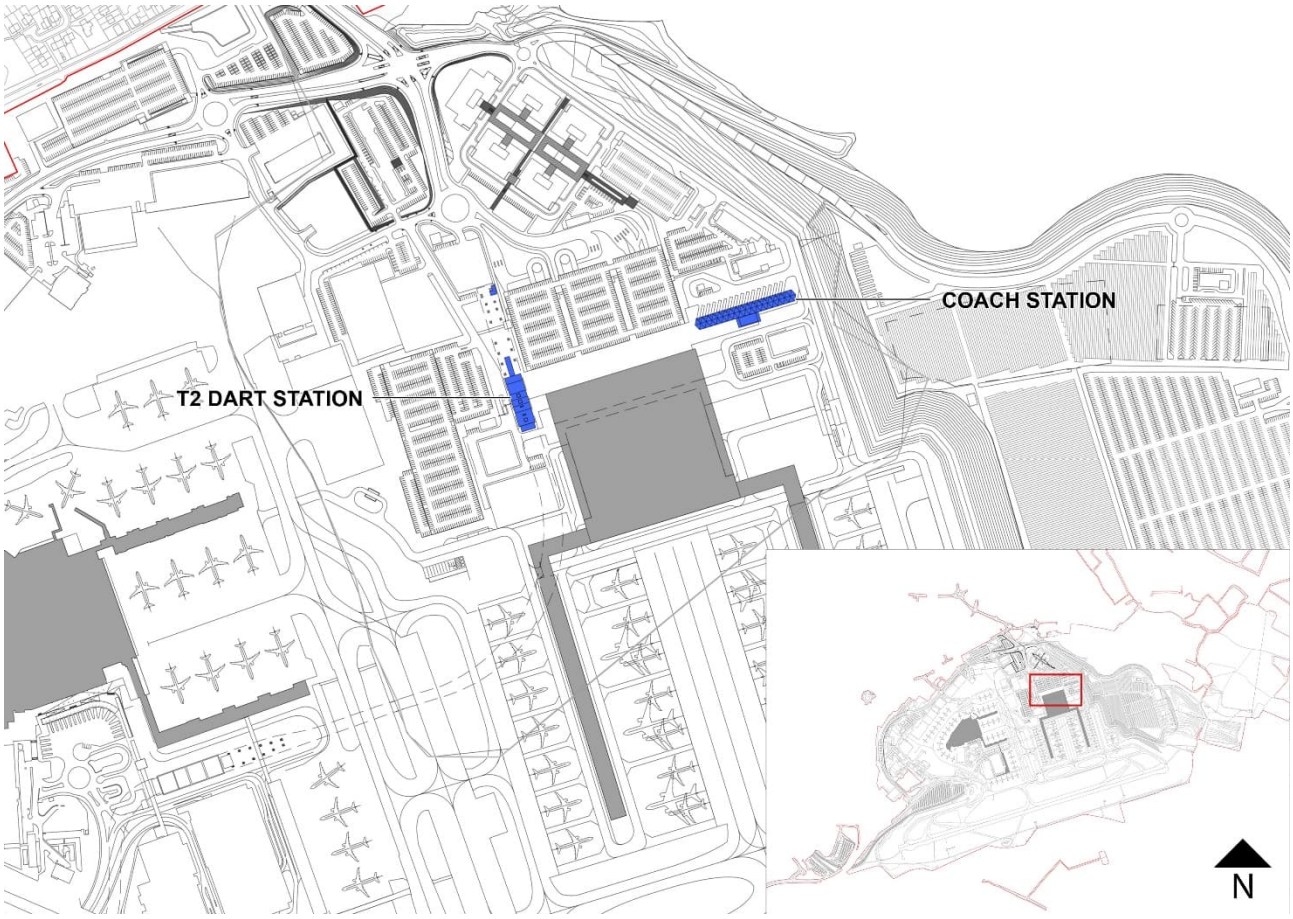

Figure 5.19: Proposed T2 Luton DART Station and Bus and Coach *(indicated in blue)*

5.16 Pedestrian and cycle provision

5.16.1 The Proposed Development would improve access to the airport on foot and bicycle from the surrounding area through a range of interventions and incentives to encourage employees to choose active travel modes such as walking and cycling.

5.16.2 The site accessibility has been appraised for walking to ensure that there would be good connectivity with existing pedestrian routes on the highway network in the vicinity of the airport. There are several Public Rights of Way (PRoW) located within the Main Application Site. They mainly link Eaton Green Road to the south and south-east PRoWs.

5.16.3 The route along Airport Approach Road to the east of the junction with Provost Way has footways along both sides of the carriageway. To the south of the road, the footway is designated as a shared route for pedestrians and cyclists. The Airport Way / Percival Way junction also has a shared footway providing access to in all directions.

5.16.4 Figure 5.20 below shows the wider existing cycling facilities around the airport as well as the National Cycle Route (NCR) 6 which runs along the River Lea Valley to the south-west of the Main Application Site, connecting Luton Airport Parkway station to the wider Luton area. Further improvements on cycling

routes are being implemented across the town by Luton Borough Council (LBC), supported by the Active Travel Fund.

5.16.5 The site accessibility for cycle users has been appraised to ensure that there would be good connectivity with cycling routes. Additional shared walking and cycling routes are also proposed within the Wigmore Valley Park area, to improve linkages with existing rural areas to the north-east of the airport.

5.16.6 The existing cycle parking provided at various locations around the airport estate was sufficient to meet demand from staff at the point when the airport was handling the permitted capacity of 18mppa. The proposed future cycle parking will provide a total of 106 cycle parking spaces and it makes allowance for the targeted increase in walking/cycling mode share and takes account of the growth in airport related airport staff. Cycle parking will be located close to staff entrances and will be secure and weatherproofed. The Proposed Development would include supporting changing facilities, lockers and showers.

5.16.7 Further information on pedestrian and cycle provision can be found in the **Transport Assessment [TR020001/APP/7.02].**

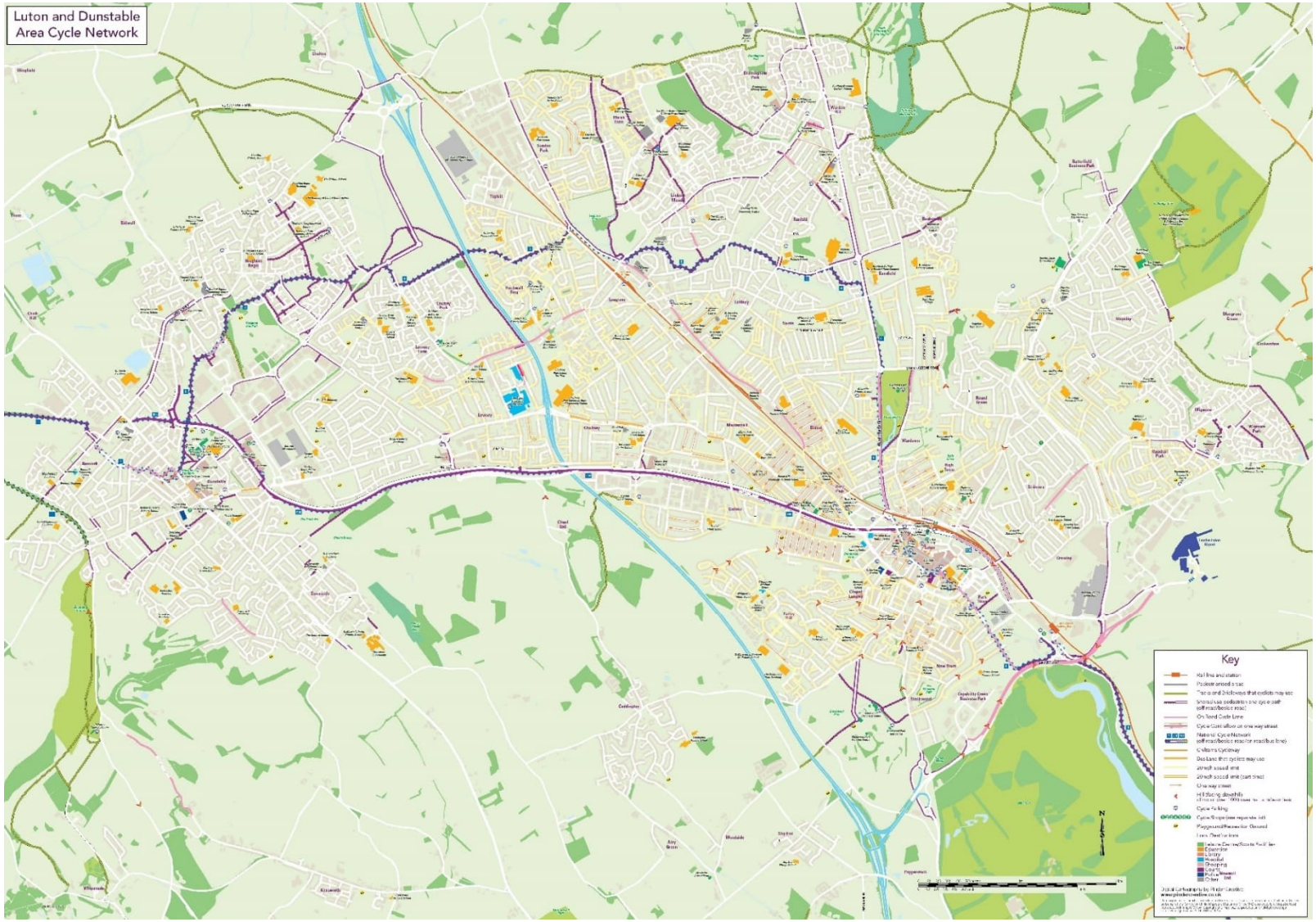

Figure 5.20: Existing cycling routes around the airport (Source: Luton and Dunstable Area Cycle Network. LBC. 2019. (Online)

5.17 Highway improvements

5.17.1 There are a number of local junctions that would experience an increase in traffic when more people travel to and from the airport. To provide greater traffic capacity to accommodate the airport related traffic, improvements are proposed at the main airport access points and at various other locations in the wider area.

5.17.2 The proposed improvements would mainly be modifications to existing junctions within the highway boundaries. These requirements for mitigation were identified through transport modelling which is explained in more detail in **Transport Assessment [TR020001/APP/7.02].**

5.17.3 A dedicated AAR would be constructed and delivered during Assessment Phase 2 to provide access to the new T2. Green Horizon Park is an undeveloped site adjacent to and north east of the airport that has planning permission for mixed use commercial development. The AAR would also support this proposed development.

5.18 Car parking

5.18.1 The Proposed Development will incorporate additional car parking provision. The types of car parking provision proposed will be similar to the existing offer and will include short stay, mid stay and long stay car parks. The requirement for car parking is described in the **Transport Assessment [TR020001/APP/7.02]**. The number of existing and proposed car parking provision is presented in Table 5.3.

Table 5.3: Existing and Proposed Car Park Provision

Parking type	Number of spaces			
	Existing	21.5 mppa	27 mppa	32 mppa
Short stay	3,700	4,150	4,800	5,800
Mid stay	2,350 (1,700 post Luton DART opening)	2,600	3,000	3,650
Long stay	4,500	4,675	5,400	6,550
Employees	3,800	4,400	4,900	5,200
Car Hire	300	500	600	700
Valet Pick-up/Drop off	100	75	100	125
Total	**14,100**	**16,400**	**18,800**	**22,025**

5.18.2 The selection process for the identification of the proposed car parking locations started by making best use of existing locations, before selecting further sites that could add to the public transport offer (e.g. by being close to the Luton

DART) and provide real choice of connectivity with the existing and proposed terminal buildings. The key criteria which were considered were as follows:

a. the location of the various types of car park relative to the terminals, i.e. short stay / mid stay / long stay at different distances from the terminals and aligned with appropriate pricing strategies;
b. the potential to reduce the volumes of traffic using the AAR i.e. with some car park locations that do not require travel along the full length of the AAR;
c. the operational efficiency which would be achievable (i.e. factors such as reducing the need for shuttle bus services to link the individual car parks and terminals, or the potential to create a mixture of block / decked long stay parking);
d. avoiding sites which are key areas for the creation or retention of parkland;
e. utilising areas within the Applicant's land ownership that would not be critical to core airport infrastructure such as the airfield, T2 and supporting facilities which need to be co-located with these core functions;
f. utilising sites outside of the Main Application site (off-site car parks), where feasible; and
g. whether the sites, in combination, provide the number of parking spaces required to support the expanded airport.

5.18.3 Parking locations have been designed to maximise use of land owned by the Applicant and to avoid third party land impacts on Green Belt land. For long- and mid-stay parking, a mixture of standard and block parking[4] is proposed in order to provide the required number of parking spaces without requiring extensive decked or MSCP structures. A maximum ratio of approximately 60:40 between block parking and standard parking respectively is proposed, to maintain flexibility of choice for car park users. All short stay parking would be standard parking, i.e. not the block arrangement.

5.18.4 The proposed car parking capacity would include provision for disabled parking and electric vehicle (EV) parking. For new car parks, 5% of the car parking capacity would be provided for disabled parking. Demand for EV parking would be monitored and the intention would be to provide the infrastructure required for future installation of EV charging in new car parks and to provide EV charging points to meet demand. More details on the approach to delivering EV charging infrastructure is included within the **Framework Travel Plan [TR020001/APP/7.13]**.

5.18.5 A MSCP would be constructed north of T2 for passenger short stay as T2 expands. The ground floor of the MSCP will be the passenger DOZ. The MSCP

[4] Block parking represents a highly efficient use of space where cars are parked in blocks according to the time of collection. Vehicles will arrive at pre-booked times, and the operator will park the vehicle to suit the collection time. This reduces the amount of circulation space required in the car park

will comprise of three storeys to provide the number of car parking spaces as required in the **Transport Assessment [TR020001/APP/7.02].** The MSCP would be directly opposite the north elevation of T2, facing the main entrance and separate from the terminal by the plaza which ensure the MSCP is well located within the context of the site providing pedestrian access over short distances between the buildings. Vehicles would access the MSCP from the north side via a short length of highway connecting directly to the AAR with vehicular access between storeys and with the DOZ on the ground floor (Figure 5.18). The built form and appearance of the MSCP would be defined during detailed design.

5.18.6 Surface car parking for mid and long stay will be provided on lower lying land to the east of the terminal in addition to the existing mid stay car park west of T1. These car parks would require shuttle buses to deliver airport passengers to the terminals.

5.18.7 Parking for staff is proposed within a decked car park on the site of the existing staff car park and car hire centre. This is currently located to the north of President Way. Additional off-site provision for dedicated airport employee parking would also be provided. The two locations for the proposed Off-site Car Parks are to the south-west of the airport, adjacent to either side of Luton Parkway railway station and the Luton DART. Employees parking in these new car parks would be able to use the Luton DART to reach T1 and T2.

5.18.8 The two locations for proposed car parks are outside the Main Application Site. Both sites are to the south-west of the airport, adjacent Luton Airport Parkway rail station, on to either side of the Midland Mainline Railway. The sites are in a commercial area dominated by existing transport infrastructure; bordered by Parkway Road and the A1081 to the south, New Airport Way and the A1081 to the east, Kimpton Road and industrial units to the north. Each site contains a border of trees and scrub.

5.18.9 The larger of the two off-site car parking sites is located to the north of the Mainline and is currently a trailer park, generally used as parking for Heavy Goods Vehicles. The smaller site is located to the south of Luton Parkway and is a disused area of hardstanding which was previously used as a car park.

5.18.10 Layout of proposed car parking is shown on Figure 5.21.

5.18.11 Surface car parks provide opportunity to include photovoltaic solar panels for energy generation as described in the **Energy Statement [TR020001/APP/5.02]** and a suitable height for such structures is included in the parameters table in **Schedule 1** of the draft **Development Consent Order [TR020001/APP/2.01].**

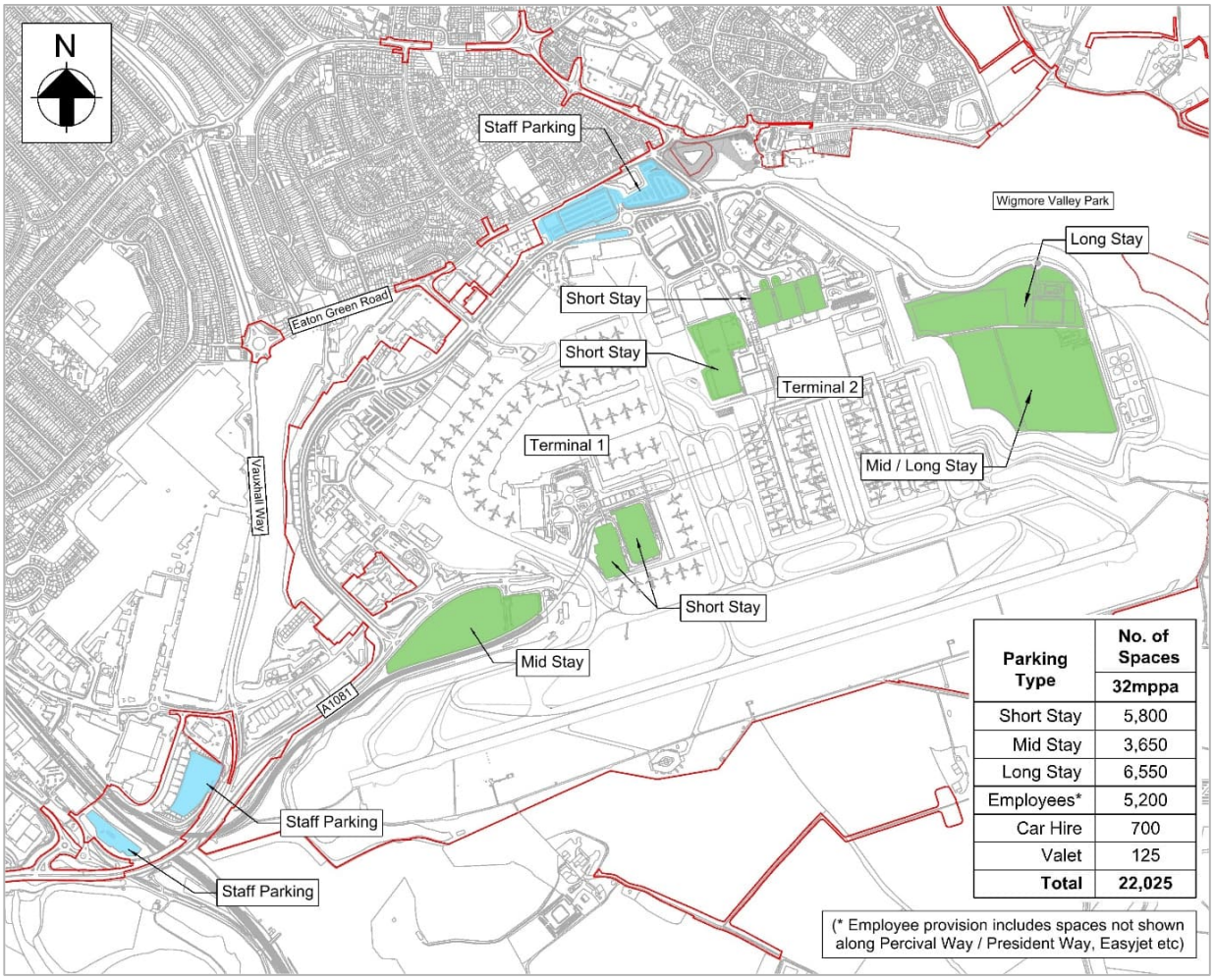

Figure 5.21: Proposed Car Parks

5.19 Hangars

5.19.1 Two new single bay hangars would be constructed for use by general aviation and/or aircraft maintenance operators to serve the increasing demand from the growing aircraft fleet. The hangars would be located to the north of the existing terminal, extending a linear arrangement of similar buildings which are contiguous to the existing aprons, thus providing access for aircraft (Figure 5.22). The proposed site is currently occupied by three existing buildings which would be demolished.

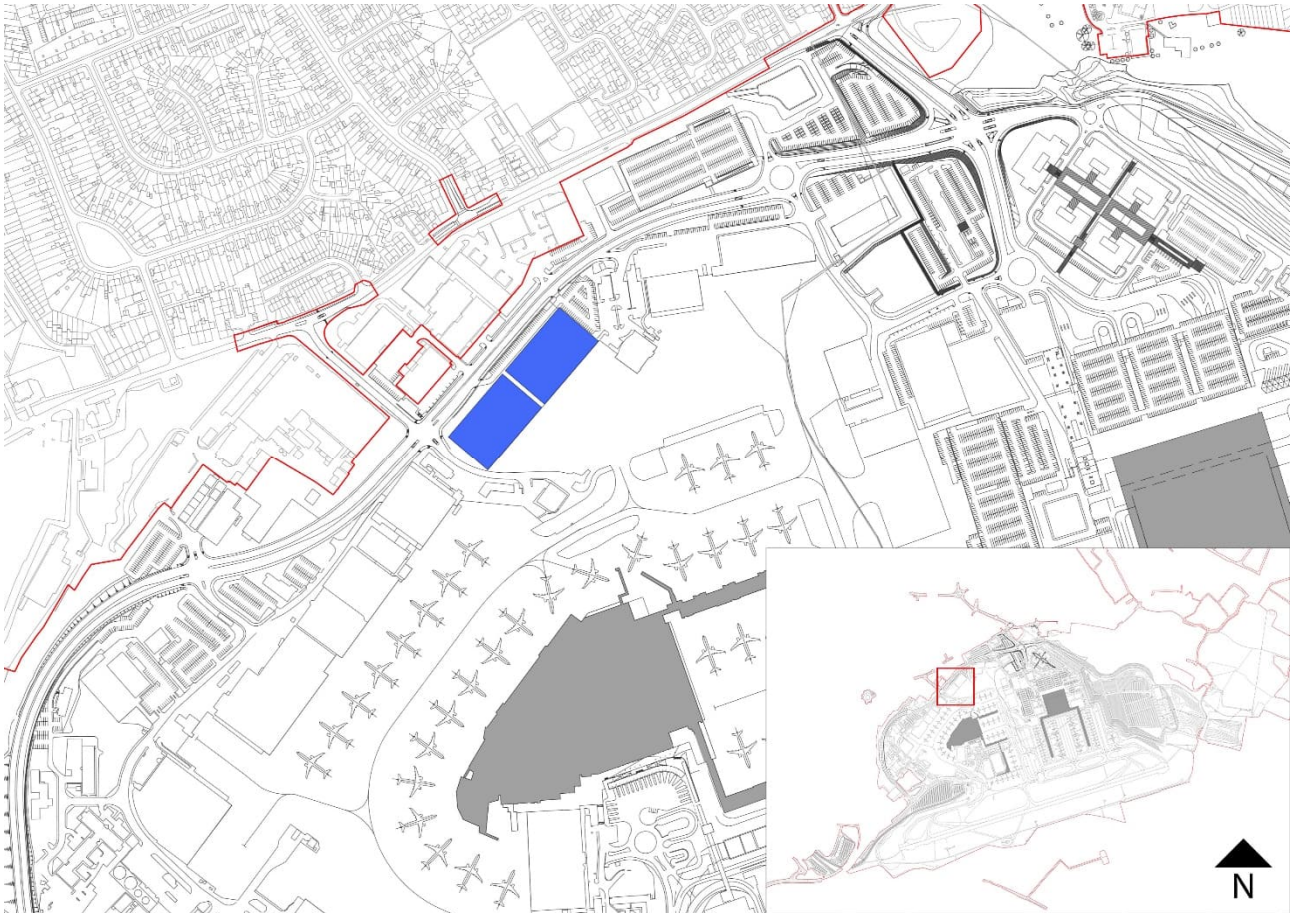

Figure 5.22: Proposed Hangars *(indicated in blue)*

5.20 Fire training ground

5.20.1 The existing fire training ground (FTG) is located airside to the east of the airport, set in a local depression (-15m) relative to the taxiway and runway to the south (Figure 5.23).

5.20.2 The existing FTG would need to be relocated to allow construction of the proposed T2 apron.

Figure 5.23: Existing Fire Training Ground. (Source: Bing Maps, 2018)

5.20.3 The Airport is certified by the CAA. Certified aerodrome operators are required to have an emergency plan. An important aspect of this plan is the requirement to provide airport rescue and firefighting services (RFFS) with adequate equipment, fire-extinguishing agents and trained personnel to respond to emergencies.

5.20.4 CAA publication CAP699 (Ref 5.4) provides guidance to assist operators in ensuring the RFFS personnel are properly trained to perform their duties in a safe, effective and efficient manner. The provision of an FTG with live fire training facilities including simulator and associated facilities are recommended.

5.20.5 The following list of requirements and considerations have been developed in consultation with the LLAOL and the RFSS.

a. The FTG facilities must be in a new location within the airfield boundary.
b. The new FTG site should provide access from the fire station (which is proposed to remain in its current location) with response times to airfield incidents compliant with CAA Rules.
c. New access tracks will need to connect to the existing perimeter road.
d. A new 767 type simulator is to be provided.

e. Consideration should be given to the siting of the FTG with regards to fume and smoke distribution. FTG facilities should ideally be placed in a location downwind of the airport, so that when used smoke does not obscure the airfield.

f. Consideration should also be given to ensure smoke and fumes are not blown towards populated areas.

5.20.6 Two potential locations options were studied in detail before choosing the preferred location (Figure 5.24). Both options are on the south side of the runway, on land owned by the Applicant, to maintain maximum distance from populated areas and the operational airport.

Figure 5.24: Options for the proposed Fire Training Ground (Source: Bing Maps, 2018)

5.20.7 The preferred option is to the west as the site to the east is within the Green Belt.

5.20.8 The fire training ground and its existing facilities would be relocated with all the facilities it currently has to the south of the runway (Figure 5.25). It is proposed that the facilities on the fire training ground site would be supplied with power and communication cabling taken from an existing substation.

5.20.9 It is proposed that an underground water tank with a capacity of 30,000 litres would be positioned adjacent to the proposed fire training ground. Options for filling this tank are either by bowser or by connection to a water supply, if available. Owing to the small, intermittent foul flows and no nearby sewer, a network connection is not deemed appropriate. The foul water from welfare facilities would be held in a tank and tankered away as required.

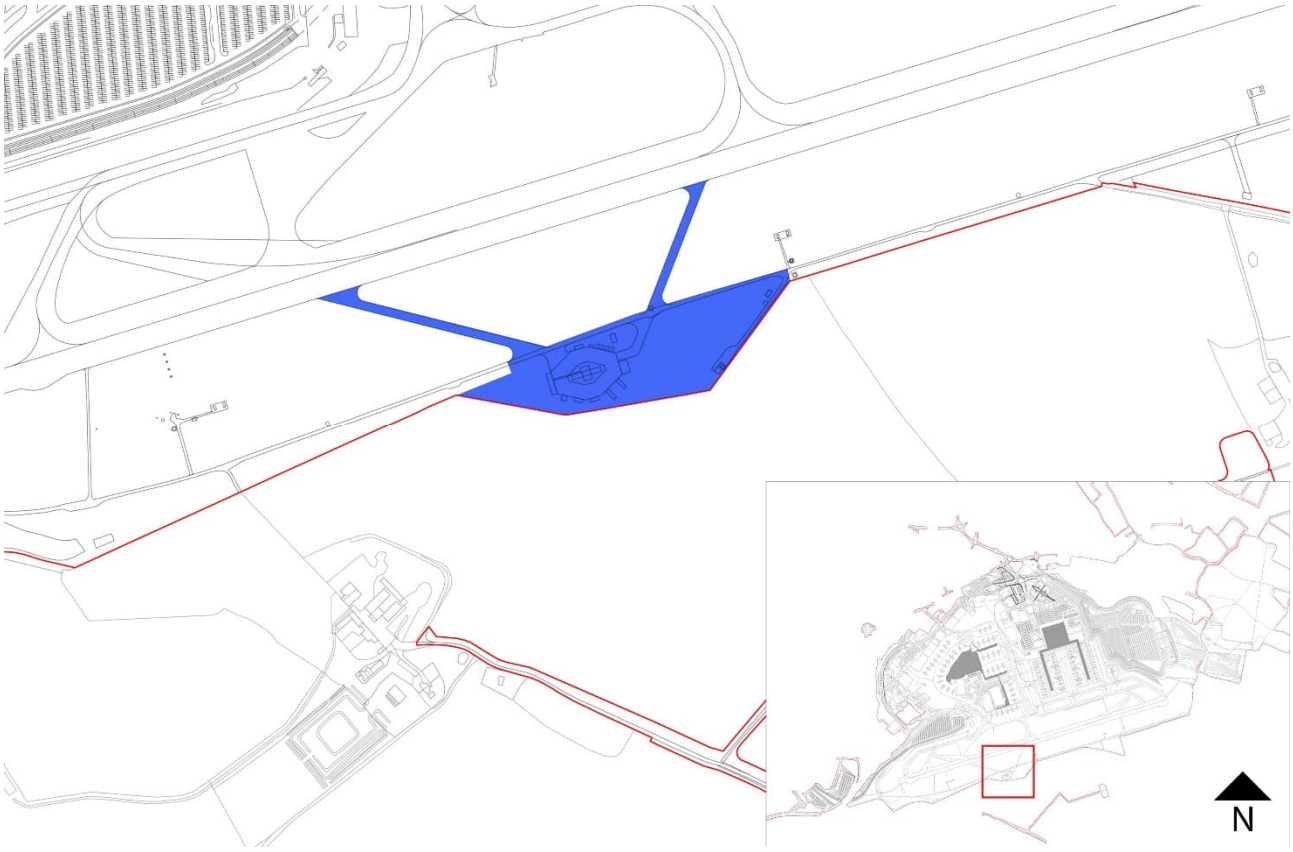

Figure 5.25: Proposed fire training ground location *(indicated in blue)*

Figure 5.26: Proposed Police *(indicated in blue)*

5.21 Police station

5.21.1 The proposed growth of the airport requires an increase in capacity of the existing police station facilities. It is proposed that a new police station would be located landside, adjacent to the existing police station which it would replace. This location is centrally located between the two terminals allowing officers to respond to emergencies at either terminal (Figure 5.26).

5.21.2 The Police station would be a two storey building of a scale and with accommodation and welfare facilities appropriate for a range of policing functions. An illustrative design has been prepared in consultation with the end users, refer to **General Arrangement Drawings [TR020001/APP/4.09]** and **Airport Access Road and DART Long Section Drawings [TR020001/APP/4.11].**

5.22 Fuel storage facilities

5.22.1 The existing fuel storage facilities have a combined capacity of c.5.4m litres. There are currently two sites, each operated independently by two incumbent fuel companies. The two existing sites are adjacent to one another, to the west of the existing terminal. The existing fuel storage facilities would be retained and continue to serve the existing terminal. However, the forecast growth at the airport would require a new larger fuel storage facility than is currently available.

5.22.2 There are two fuel delivery options available to transfer the fuel from the fuel refineries to the airport's proposed fuel storage facility to meet the increased fuel demand:

a. road tanker deliveries (approximately 68 road tankers a day) to meet the required total fuel demand; or

b. connect the new fuel storage facility to the existing fuel delivery pipeline.

5.22.3 The preferred option is a connection between the new fuel storage facility and the existing fuel delivery pipeline, thereby significantly reducing the number of road tankers using the local and national highways, and consequently reducing congestion and emissions.

5.22.4 The location of the proposed fuel storage facility is influenced by the site context and its wider surroundings, along with technical and policy issues (Figure 5.27):

a. the existing pipeline is located in Green Belt land to the east of the airport and this provides a significant opportunity to improve fuel delivery;

b. the fuel storage facility should be remote from areas of populations/passenger dwell to comply with health and safety policy, including Control of Major Accidents and Hazards (COMAH) guidance;

c. the facility does not need to be proximate to aircraft as the fuel can be delivered by a pumped hydrant system; and

d. fuel storage facility to be within the airport boundary, and the Order Limits.

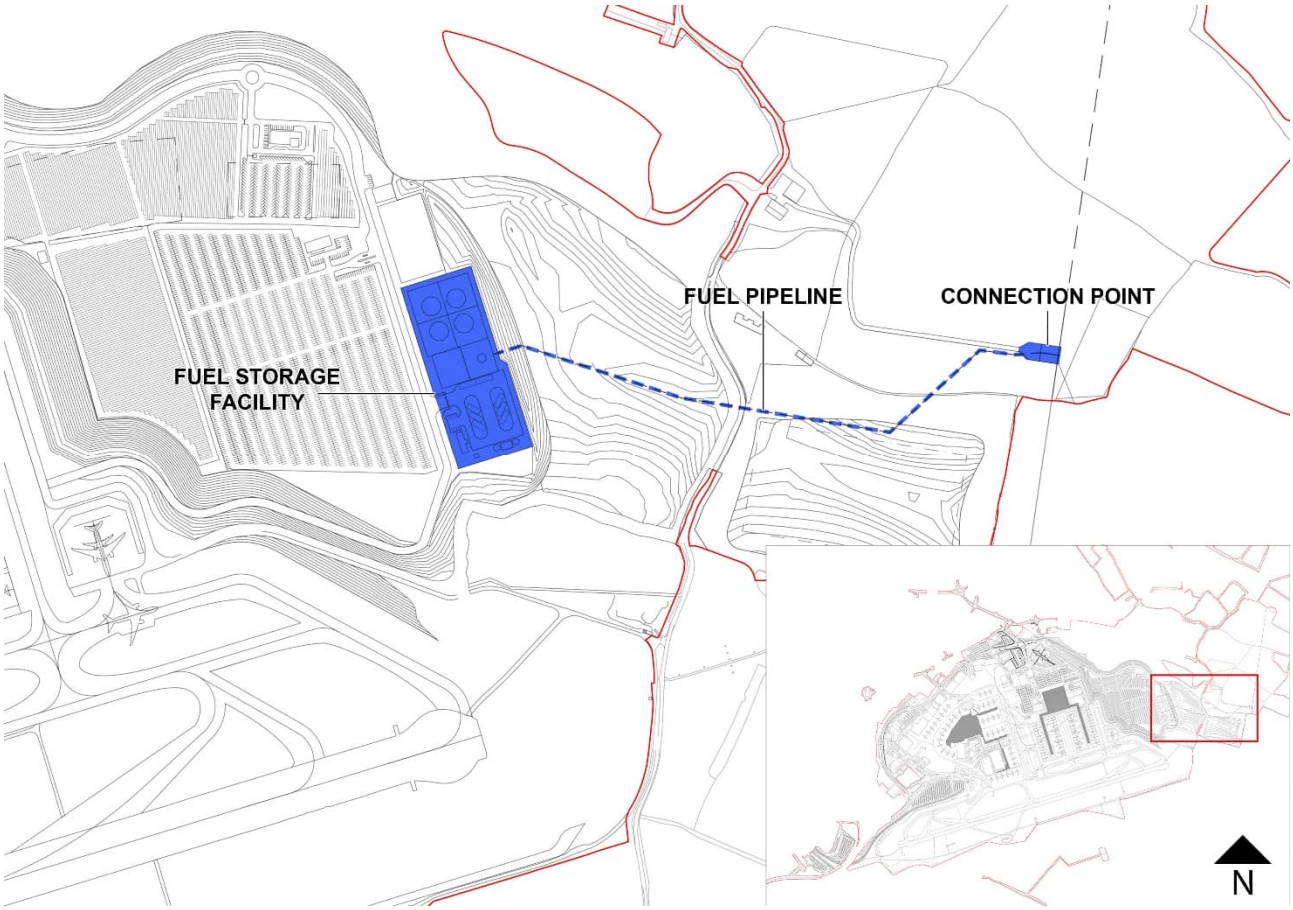

Figure 5.27 Proposed Fuel Facilities *(indicated in blue)*

5.22.5 The proposed storage facility would be sited to the east of the Proposed Development on the lower lying land with long stay car parking to the west and the proposed Water Treatment Plant (WTP) to the north to provide a buffer to the aprons and terminal areas.

5.22.6 The scale of the storage facility has been sized to provide sufficient storage to service the airport's fuel needs and retain flexibility for a vehicle-based delivery strategy depending on future operational needs.

5.22.7 However, the existing fuel delivery pipeline passes through the Green Belt, so by necessity the connection point would be located within Green Belt land. The proposed connection to the fuel pipeline would require the construction of a permanent above ground installation of approximately 460m². This would comprise of a fenced hard standing area with above ground pipework and valves for maintenance and operational purposes connected to the local road network via a single access track. This matter is considered further in the Green Belt Assessment, which can be found in **Appendix A** of the **Planning Statement [TR020001/APP/7.01]**.

5.22.8 It is proposed that aviation fuel would be distributed from the proposed fuel storage facility to the aircraft on the proposed apron at T2 via a buried fuel pipeline direct to buried hydrant pits located on the aircraft stands. This would avoid the need for large fuel bowsers to circulate on the proposed apron as fuel

can be discharged from the hydrant pits to the aircraft via smaller dispenser vehicles.

5.22.9 The existing terminal aprons would continue to be serviced with fuel bowsers from a fuel filling facility at the existing fuel storage facilities.

5.22.10 The supply of fuel from the proposed fuel storage facility to the existing fuel filling facility to service T1 will continue to be by road tankers (approximately 38 road tankers a day) as per the current operation. An option to connect the existing fuel filling facility to the proposed fuel storage facility by pipeline has been identified and included in the Proposed Development to provide future flexibility.

5.22.11 The design of the proposed fuel storage facility would include high-integrity independent tank overfill protection systems and the installation of Remotely Operated Shut Off Valves (ROSOV) in the fuel transfer pipelines and storage tanks.

Safeguarding for the future

5.22.12 It is anticipated that a variety of fuel types would need to be accommodated as changes in aircraft technology are developed, moving from traditional fuel engines to Sustainable Aviation Fuel (SAF), electric and/or hydrogen aircraft, which are recognised as playing an important role in the government's vision for decarbonising the aviation sector as set out in its Jet Zero Strategy (July 2022). Where opportunities arise, the Proposed Development has been designed to accommodate the potential uptake of, or transition to, these technologies as and when they come forward. Each of these is considered below.

SAF

5.22.13 It is anticipated that SAF will be manufactured and distributed by fuel companies using the same technology as currently used for conventional carbon-based fuels. The Proposed Development is therefore future proofed to accommodate a transition to the use of SAFs as no new or different infrastructure is anticipated to be required to support such a transition.

Electric Aircraft

5.22.14 Whilst electric aircraft are being developed now, commercially and operationally viable aircraft of the size which the Proposed Development would serve will not be available for some time. Although the impact and detail of these new technologies remains uncertain, the Proposed Development has been designed to safeguard for the potential future use of electric aircraft by providing a new electricity substation at T2 and incorporating space on each stand within the proposed apron footprint for additional infrastructure required to charge the aircraft. It is anticipated that if the industry transitions through a significant take-up of electric aircraft, additional electrical infrastructure would be needed. Initial analysis indicates that two additional 33kV sub-station may be required to support the planned growth at the airport if electric aircraft are, in future, to make up a substantive part of the aircraft fleet.

5.22.15 Because it is not yet known whether or when a transition to electric aircraft may take place, the provision of these additional substations is necessarily beyond the scope of the Proposed Development. Instead, to future proof the design of the Proposed Development, an initial assessment of potential locations for additional sub-stations has identified several land use options, for example, through the reconfiguration of a limited number of car parking spaces. The Applicant is therefore confident that the infrastructure necessary to support a transition to electric aircraft could be accommodated at the airport alongside delivery of the Proposed Development in future.

Hydrogen Aircraft

5.22.16 The use of hydrogen as fuel for aircraft is immature at present, which makes it challenging to predict at this stage what airports may need to provide to support such technology should it come forward in future. At this stage, it is expected that a transition to the use of hydrogen aircraft would require significant changes to aircraft technology, fuel distribution and fuel storage. Early studies indicate that hydrogen fuel could potentially be delivered by tankers and, as uptake increases, by pipeline.

5.22.17 A transition to hydrogen aircraft is likely to mean that existing infrastructure for current aircraft technologies will no longer be required at the same scale, and the fuelling infrastructure at the airport will need to be reconsidered as a whole to service the transition to hydrogen aircraft.

5.23 Surface Movement Radar

5.23.1 Luton currently has a single Surface Movement Radar (SMR) providing detection of aircraft, vehicles and other mobile ground level obstructions on the airfield (Figure 5.28). The SMR is an essential tool used by Air Traffic Control (ATC) that enhances the safety on the airfield and facilitates increased aircraft movement rates during hours of darkness and low visibility operations.

5.23.2 The existing SMR is located south-west of the existing ATC tower. The SMR’s rotating antenna is mounted atop of a lattice tower structure.

Figure 5.28: Photograph showing existing Surface Movement Radar (centre) with ATC to the left

5.23.3 A Zone of Visual Influence (ZVI) Assessment to analyse the theoretical SMR coverage has been conducted using the ZVI tool of AutoDesk Civil 3D (Figure 5.29). Further information on the **Landscape and Visual Impact Assessment** can be found in **Appendix 14.1 in Volume 3 of the ES [TR020001/APP/5.02].**

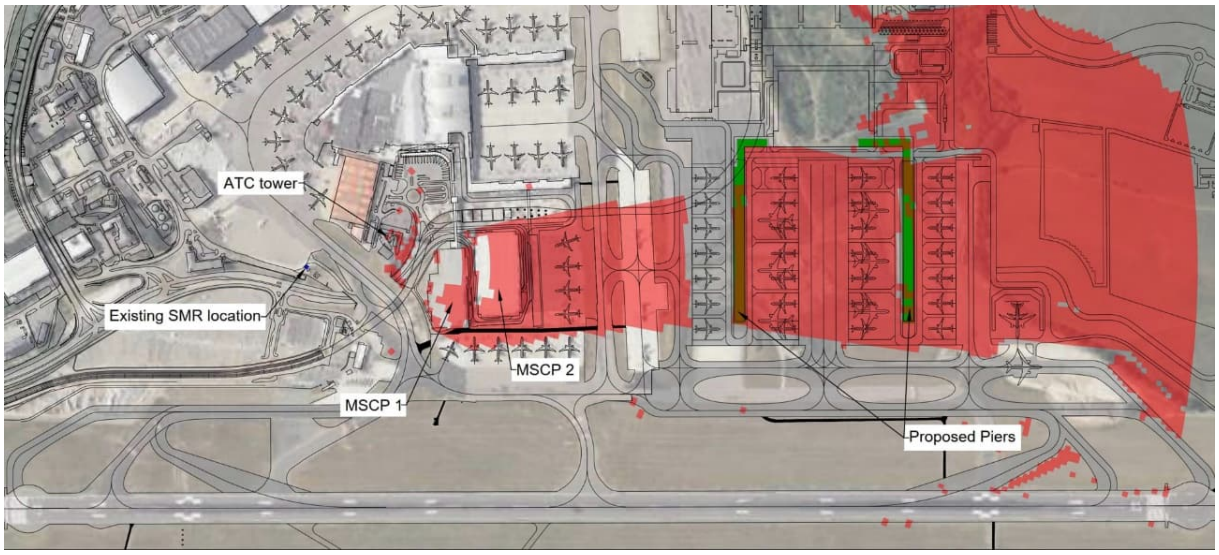

Figure 5.29: Existing SMR coverage over the proposed airfield development

Existing SMR coverage over the proposed airfield development (Ground Level +4m) which indicates significant areas where the existing SMR has no coverage (shown in red) due to existing and proposed buildings.

5.23.4 This baseline assessment demonstrated a lack of coverage to the proposed T2 apron and taxiways which should be visible to the SMR. Therefore, a second SMR will be required to 'backfill' the existing coverage.

5.23.5 A number of constraining factors reduce the opportunities for potential sites for a second SMR. The SMR needs to be elevated to achieve optimal 'line of sight' across the airfield. This eliminates any opportunity to locate the SMR in the vicinity of the runway and taxiways as the supporting structure would present a hazard to aircraft operations. The SMR must have coverage across the airfield so locations near buildings are not viable as the 'line of sight' would be compromised.

5.23.6 Three shortlisted locations for a supplementary SMR tower have been reviewed and assessed. Details of these supplementary positions are shown below:

a. the north-east corner of the proposed T2 apron. 32m high tower;

b. south-west of the runway, adjacent to the proposed Fire Training Ground. 15m high tower; and

c. south-east of the runway, opposite T2. 13m high tower.

5.23.7 Heights for each option were set to maximise coverage whilst complying to the obstacle limitation surfaces as described in ICAO Annex 14 and/or UK equivalent which limit the height of developments to safeguard aviation safety.

5.23.8 Option c was selected as it would provide optimal 'line of sight' to aircraft parked on the proposed T2 apron which would otherwise not be visible to the existing tower. The selected option was validated during stakeholder engagement with National Air Traffic Services who provide air traffic services at the airport.

5.23.9 Proposed option c is situated south-east of the runway (512944.9E, 220742.2N, 158.4 GL) at 13m height in order to avoid infringement of the runway 07-25 transitional surfaces. The site is within the Green Belt so has been located away from dwellings and trees in order to limit the impact on this area of Green Belt (Figure 5.30). The parameters for the SMR include a larger area than will actually be required. Flexibility is required as the design is not fixed and will be need to refined at detailed design stage as the make and model of SMR is not yet settled and this could result in need to refine the exact location.

5.23.10 The combination of the existing and proposed SMR option c presents the best coverage scenario from the three options reviewed. It results in only very limited areas with no coverage, principally partial areas of taxiway Delta and on the stands east of taxiway Delta at ground level. In addition, a small strip at the head of the stand east of the of the proposed East pier has no coverage.

5.23.11 It is acknowledged that the proposed site of the second SMR is in an area designated as Green Belt. This matter is considered further in the Green Belt Assessment, **Appendix A** to the **Planning Statement [TR020001/APP/7.01].**

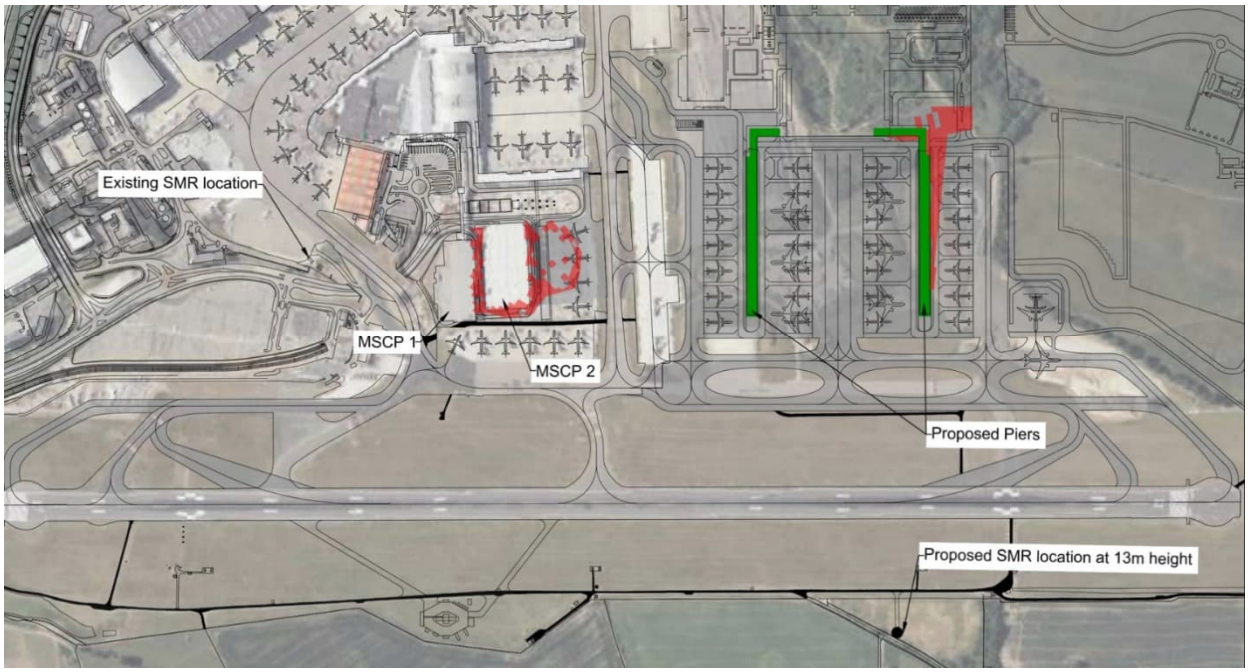

Figure 5.30: Existing SMR combined with proposed SMR at location c

Existing SMR combined with proposed SMR at location c (Ground Level +4m) indicating minimal areas with no coverage (shown in red).

5.24 Energy

5.24.1 The **Energy Statement [TR020001/APP/5.02]** proposes the airport move towards zero emissions for ground based activity through implementing an energy hierarchy. The key ambitions that influenced the Proposed Development are listed below:

a. conserving energy where possible in both retrofit of existing buildings and in the design of new buildings and facilities;

b. moving all energy use (buildings and onsite operations and vehicles) towards electricity which can be provided from renewable sources; and

c. where possible renewables (solar) will be delivered within the Order Limits, and aligned to the wider development timetable.

5.24.2 Several elements of the Proposed Development will provide the infrastructure to support the energy demand. These include the Energy Centre and 33kV sub-station to service T2. These are shown on Figure 5.31.

Additional 33kV substation

5.24.3 A 33kV substation would be provided in the north of the site within car park P9. This sub-station is required in Assessment Phase 1 to provide additional electrical capacity, primarily due to the increased demand in electrical vehicles (EVs). Three locations were considered, and the proposed site was selected due to its proximity to the existing Airport Primary sub-station (owned and operated by UKPN) on the north side of Eaton Green Road. The proposed site is an existing airport surface car park which benefits from existing screening.

Solar Battery Storage

5.24.4 Solar Battery Storage would be provided to collect energy generated by the long stay car park photovoltaic canopies and roofs and connect it into the airport network. It would be located to the north-east of T2.

5.24.5 Due to the intermittent nature of renewable generation, battery storage would be used to smooth the load which enables excess generation to be captured, stored and used by the airport at times when the generation output is less than the airport demand.

5.24.6 The Proposed Development has been designed to accommodate potential technological changes. The battery market (and the services batteries provide) are changing rapidly as costs reduce, and battery technology provides larger, lower cost, or higher energy dense systems.

Natural Gas

5.24.7 The proposed terminal and associated buildings will not include connection to the natural gas network as part of the strategy to decarbonise the existing airport in line with expected government policy. Existing buildings which rely on gas for heating or services will transition to other sources of heat and power as part of asset renewals programme.

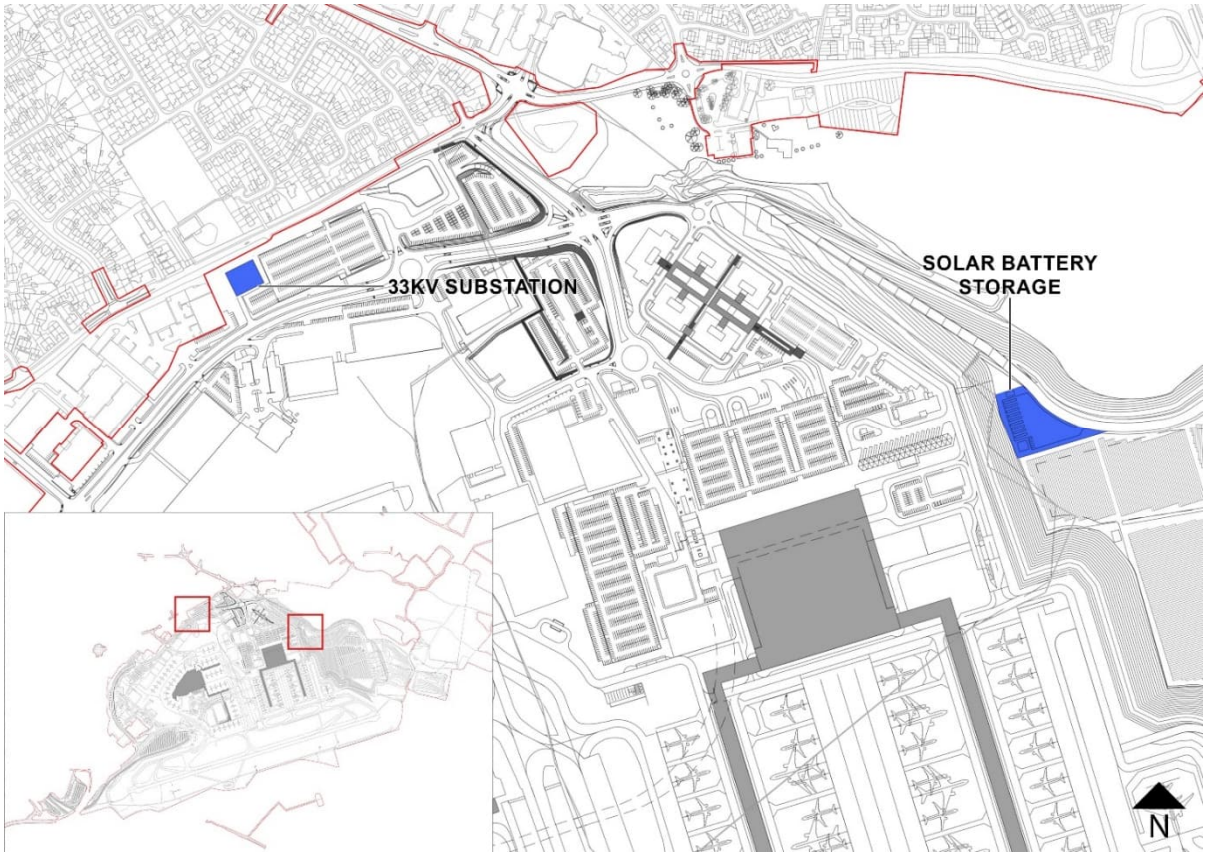

Figure 5.31: Proposed Energy Facilities *(indicated in blue)*

5.25 Flood and surface water drainage

5.25.1 The Main Application Site is at low risk of fluvial flooding. The key flood risk consideration arising from the Proposed Development in terms of flood risk is related to the management of surface water, as described in the **Flood Risk Assessment [TR020001/APP/5.07]**.

5.25.2 The existing surface water drainage networks currently discharge into a number of soakaways across the airport. The strategy for the Main Application Site replaces the existing central soakaways (which need to be removed to allow construction of the proposed taxiways and aprons) with new storage and infiltration tanks located further to the east.

5.25.3 The Proposed Development would divert the flow from the existing central soakaways (approximately 90 hectares of total impermeable catchment area) into a proposed surface water network with WTP prior to discharge to ground through controlled infiltration in line with sustainable drainage principles.

5.25.4 The proposed drainage solution is described in **Drainage Design Statement** which is **Appendix 20.4 of the ES [TR020001/APP/5.02]** but the key components can be summarised as follows:

a. proposed storage tank and soakway beneath the proposed long stay car parks in the lower lying area;

b. a new WTP, also on the lower lying land; and

c. a new infiltration basin, downstream of the WTP, located under an existing agricultural area.

5.25.5 The drainage design seeks to take advantage of the site topography to provide a predominantly gravity system.

5.25.6 The proposed surface water management strategy has been designed so that the infrastructure provided is able to collect and convey a 1 in 100 year rainfall event with a 40% uplift in rainfall intensity to account for predicted changes in rainfall pattern caused by climate change, from each area of hardstanding to the infiltration tanks. This will prevent uncontrolled flows of surface water across the Proposed Development within the Main Application Site and will protect the more vulnerable facilities from inundation so that there will not be any surface water flood risk impacts or effects as a result of the Proposed Development.

5.25.7 Each leg of the surface water catchment infrastructure from the apron, taxiway, stands, and runway would have oil separators. Surface water may contain glycol (due to de-icing operations in periods of cold weather), low concentrations of aviation fuel, diesel, petrol, other hydrocarbon based compounds as well as salt and grit.

5.25.8 The proposed water quality monitoring system will divert polluted surface water to a large storage tank located adjacent to the WTP. The diversion system will be triggered by real time total organic carbon (TOC) monitors.

5.25.9 The water in the tank will then be gradually released to the WTP (refer to 5.26).

5.25.10 Surface water generated by the existing airport stands to the north and west of T1 (which represents the Airport Way catchment) will continue to flow to the public sewerage network, operated and maintained by Thames Water. This ensures that there are no flood risk considerations associated with the existing Airport Way catchment as a result of the Proposed Development at this stage.

5.25.11 Further information on flood and surface water drainage can be found in **Chapter 20** of Volume 2 of the **ES [TR020001/APP/5.01]** and the **Drainage Design Statement** which is **Appendix 20.4 of the ES [TR020001/APP/5.02]**.

5.26 Water treatment

5.26.1 A new WTP is proposed to treat sewage from the proposed terminal and other facilities in the Proposed Development, including polluted surface water runoff from the aprons and taxiways. Sewage would be collected from within the Main Application Site via a new dedicated foul drainage system.

5.26.2 The WTP would be located in the east of the Main Application Site in the area excavated as part of the earthworks. The WTP would therefore be at a lower level than the platform created for the terminal and apron, and the open space, landscaping and habitats provided at existing ground level to the east.

5.26.3 The location of the WTP is strongly influenced by the site topography to take advantage of gravity to provide hydrostatic head. The site is also remote from the proposed T2, areas of population dwell and residential properties and adjacent to the proposed Fuel Storage Facility and solar battery storage area in a cluster of support facilities that are best located away from public areas (Figure 5.32).

5.26.4 The effluent from the WTP will be to greywater standards for re-use in terminal toilets and for irrigation.

5.26.5 Further information on water treatment can be found in **Chapter 20** of Volume 2 of the **ES [TR020001/APP/5.01]**.

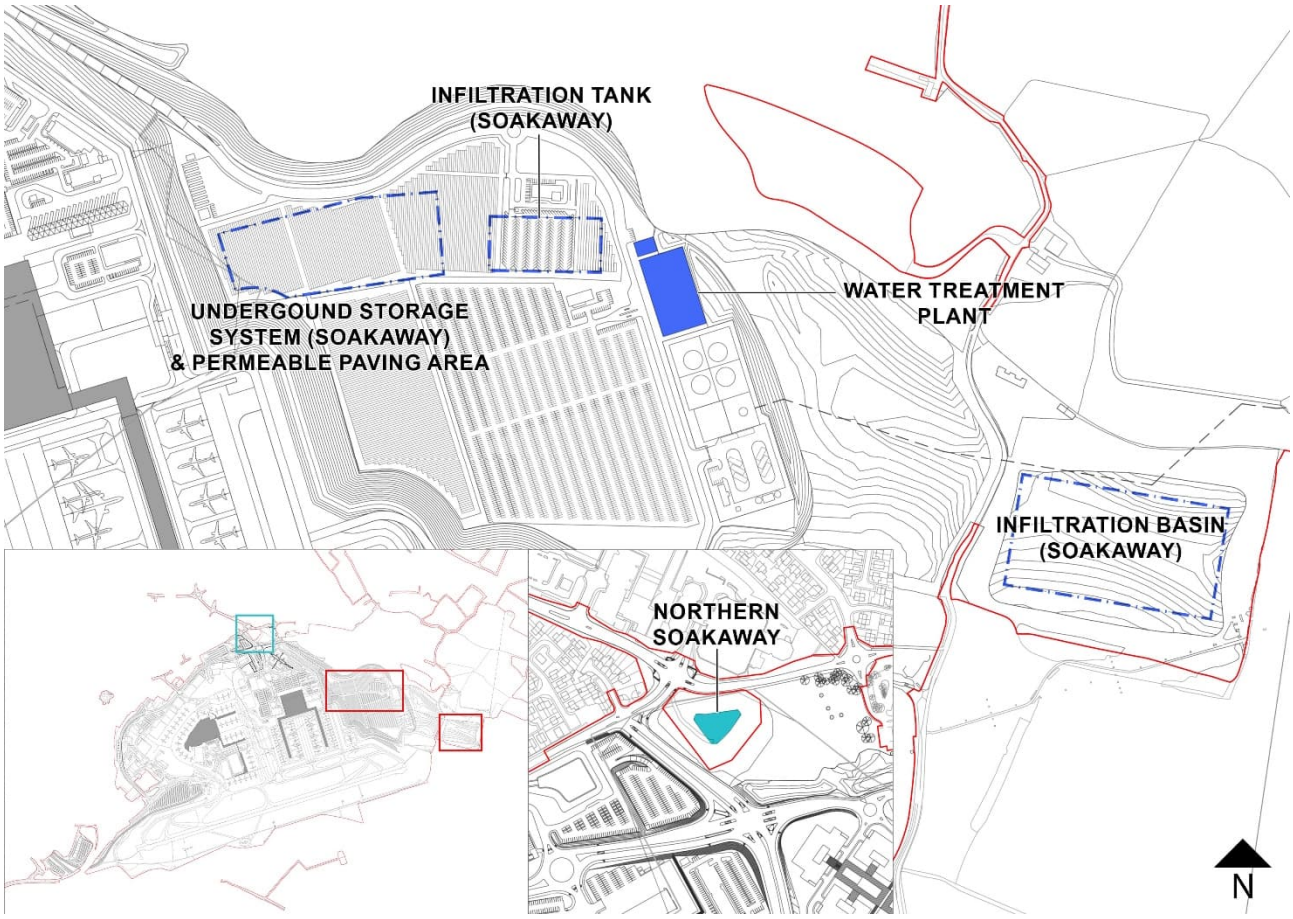

Figure 5.32: Proposed Water Treatment and Drainage System *(indicated in blue)*

5.27 Utilities

5.27.1 The proposed terminal complex will require a range of infrastructure services providing electricity, heating and cooling, ventilation, water, drainage and communications. This will involve some diversion and extension of existing services and new services to be added.

Service diversions

5.27.2 The construction of the Proposed Development would impact upon a number of existing utilities which would need to be diverted, extended, relocated or made redundant.

5.27.3 These diversion works would be carefully planned to ensure continuity of service is maintained to allow the current operation of the airport to continue.

Existing services and proposed alterations

Incoming water supply

5.27.4 A key consideration in the Drainage Design Statement is to have no net increase in potable water supply from the statutory undertaker.

5.27.5 Increases in demand will be provided from rainwater harvesting, water usage efficiencies and use of effluent from the WTP as grey water in toilets and for irrigation. Storage tanks would be constructed beneath both terminals. For more information, refer to **Drainage Design Statement** which Appendix 20.4 to the **ES [TR020001/APP/5.02]**.

5.27.6 Potable water supply to T2 will be provided from an extension to the network from within the airport or, if necessary, from the road network. This will be addressed during detailed design.

Incoming high voltage (HV) power supply

5.27.7 The existing UK Power Networks supply cables run over 150m within the airport boundary to connect to the airport main intake substation. As part of the Proposed Development two proposed 33kV substation would be constructed to the north next to car park P9, (refer to 5.24.3) and to the west of T2, (refer to 5.10.3).

Incoming Communications Supplies

5.27.8 The airport and its tenants are serviced by a number of different communications providers. Some of which are carried over the Openreach network and others via their own dedicated networks.

5.27.9 Service records indicating the location of communication services have been interrogated and areas where local diversions will be required have been identified. These would be addressed at detailed design stage.

5.27.10 New communication networks would be installed to provide connectivity to new buildings and installations.

Airport high voltage (HV), low voltage (LV) and communication cables

5.27.11 The existing HV supply network on the airport is formed from different HV rings, connecting a series of local HV substations, which then supply the LV network. The main HV diversion would involve rerouting the HV ring that follows the east perimeter of the current long-stay car park.

5.27.12 As part of the Proposed Development, two existing airfield substations would need to be relocated to enable the efficient layout of the taxiways and aprons. The two substations would be relocated to the ends of the two piers due to their proximity and to meet the needs of the proposed airfield layout. HV, LV and communication cable connections would be relocated to the new substations.

Airport Communication Networks

5.27.13 The airport communications network is wide ranging and is formed of a number of fibre optic and copper cables that are routed below ground and within existing buildings.

5.27.14 The airport communications network would grow substantially to support increased data demands. Through this growth there would be the opportunity to

expand the new network to pick up existing services at source which, if optimised, should reduce the number of diversions required.

Airport water services networks

5.27.15 The existing airport water services network consists of the potable water network and a fire hydrant system.

5.27.16 Minor diversions of the potable water network would be necessary in the location of the existing long-stay car park.

5.27.17 The proposed development of the airfield and apron extends over an area containing two existing underground emergency water supply tanks.

5.27.18 The first underground tank is to be removed. It serves the area of the existing Engine Run-Up Bay, which would be relocated and served by a hydrant system.

5.27.19 The second underground tank serves the existing FTG and is also to be removed, with a proposed emergency water tank provided at the proposed FTG.

Proposed services

5.27.20 In addition to altering the existing utilities, additional utilities would be required to support the growth of the airport and the increased infrastructure that would be delivered as part of the Proposed Development.

Incoming power supply

5.27.21 Maximising energy efficiency is key to the energy strategy, specifically in determining the principal fuel type, building fabric and the efficiency of the energy consuming equipment to be installed.

5.27.22 The conventional approach to the supply of energy is the use of electricity from the local supply network, a convention which would be retained. However, it is proposed to further supplement this arrangement with:

a. solar (photo-voltaic cells; built where practical over car parks and on roofs); and

b. battery storage for back-up power rather than solely relying on diesel generation.

5.27.23 The existing local UK Power Network HV supply to the airport does not have adequate capacity to service the increased demand required to support the proposed airport development, which is expected to increase from around the current 6MW (megawatts) to around 23MW. The estimated increase in demand includes 7MW allocated for T2 and its apron. The Luton DART would increase from 4MW (not currently provided by the airport power supply) to 6MW when connected to T2, and with the introduction of electric vehicle charging a further 4MW is anticipated. Therefore, a new UK Power Network supply would be required to a proposed substation. The new supply would be taken from two new independent connection points on UK Power Network's network. The airport would then be served via two separate diversely routed cables. Given

the increased electricity power demands, it is proposed to upgrade the existing 11kV connection to a 33kV connection.

HV, LV and communications

5.27.24 The new infrastructure would include a series of new HV rings, substations, LV networks, and communications networks. This infrastructure would be required to supply electricity and communication connections to the Proposed Development to supply for example, lighting, heating and cooling loads in addition to powering the Luton DART transit system.

5.27.25 The expansion and development of the stand equipment and Aeronautical Ground Lighting (AGL) installations also drive the need for additional power and communications infrastructure as part of the proposals.

5.27.26 It is anticipated that there would be a progression towards electric vehicles being utilised both on and off the airfield with electric vehicle charging points being considered. The electrical demand associated with electric vehicles has been assessed in the **Energy Statement [TR020001/APP/5.02]**.

Power resilience

5.27.27 A number of measures are proposed within the power system to provide resilience including:

a. the increased HV power supply for the airport would be derived from two independent connections back to the UK Power Network 132kV Network as dictated by regulatory requirements;

b. the on-site 11kV distribution network would consist of several independent ring mains, whereby each transformer substation would be serviced via two routes; and

c. operationally critical areas such as the airfield and main passenger clearing facilities would be serviced via dual ring mains where each transformer substation would effectively have four separate cables feeding two transformers.

Potable water and fire main

5.27.28 The proposed potable water and fire hydrant networks would both be connected to the existing potable water network.

5.27.29 The proposed potable water supply would run separately to the fire hydrant network. This is to safeguard for the possibility of using a grey water supply from the proposed water treatment plant in the future for the fire hydrant network.

5.27.30 The proposed fire main would serve the proposed engine ground running bay, and a new tank would be provided to serve the proposed FTG.

Surface Water and Foul Drainage

5.27.31 The proposed surface water drainage would include a new drainage system to accommodate the flows from the Proposed Development, which would ultimately discharge to a new soakaway.

5.27.32 A separate proposed foul drainage network would serve the Proposed Development and would discharge to a proposed water treatment plant, for further information refer to 5.26. Further information can also be found in **Drainage Design Statement** which is Appendix 20.4 to the **ES [TR020001/APP/5.02]**.

5.28 Biodiversity

5.28.1 The Proposed Development has been designed, as far as practical, to avoid negative effects on biodiversity through option identification, appraisal, selection and refinement. The design of the Proposed Development and the planned approach to its construction have been developed with an overarching principle of avoidance where possible.

5.28.2 The landscape design for the Proposed Development will include large areas of habitat creation to mitigate the loss of habitats from construction of the Proposed Development. Areas of habitat creation will be designed and managed to ensure their target condition exceeds that of the habitats lost and thereby contributes to achieving a net gain in biodiversity.

5.28.3 Much of the habitat creation is included within Wigmore Valley Park improvements, replacement open space, and additional mitigation planting which will be created within the north-east of the Main Application Site (refer to 5.29). This area of open space will include habitat creation measures to mitigate for those habitats lost within Wigmore Valley Park County Wildlife Site. The replacement habitat, once established, will mitigate for the loss of foraging, dispersal and shelter habitats which are used by a range of species including badger, bats, birds, reptiles, amphibians and invertebrate species (Figure 5.33).

5.28.4 Grassland habitats within the airport boundary at the south of the Proposed Development between the runway and external fencing will continue to be managed from now and through to operation of the Proposed Development at a short sward height to avoid the establishment of rough grassland and scrub to discourage encroachment of Roman snail from the adjacent habitats.

5.28.5 The Proposed Development has been designed to retain veteran/ancient trees and potential veteran/ancient trees where possible. Where such trees have been retained within or directly adjacent to the Proposed Development a buffer zone will be established to protect the roots. The buffer zone around an ancient or veteran tree will be at least 15 times larger than the diameter of the tree, the buffer will also be at least 5m from the edge of the tree's canopy. For further information refer to **Outline Landscape and Biodiversity Management Plan (LBMP)**, provided as **Appendix 8.2** of the **ES [TR020001/APP/5.02]**

5.28.6 Further information on biodiversity can be found in **Chapter 8** of Volume 2 of the **ES [TR020001/APP/5.01]**.

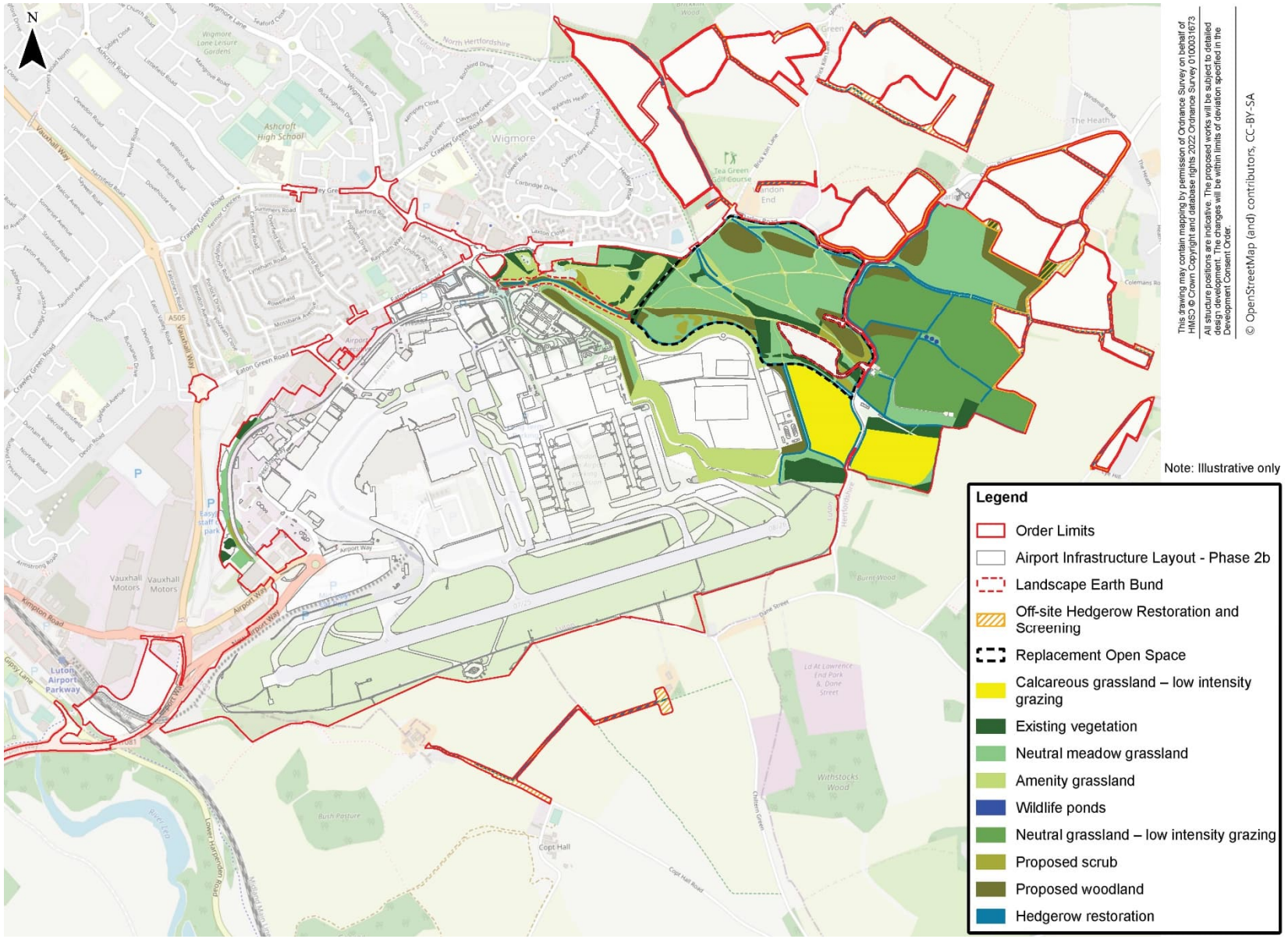

Figure 5.33: Landscape mitigation plan

Off-site areas

5.28.7 The habitat creation measures are proposed across several arable fields within the Applicant's ownership, to the east of Winch Hill Road and within the Green Belt. The off-site hedgerow restoration and screening measures are proposed across several parcels of agricultural farmland to the northeast, east and south of the proposed development site.

5.28.8 The proposals have been designed to avoid or reduce adverse effects on valued ecological features and people's visual amenity and deliver benefits for biodiversity in accordance with policy and best practice.

5.28.9 The habitat creation proposals would restore historic field boundary hedgerows that have been lost or made sparse through recent agricultural practices. New sections of mixed-species hedgerows would be planted (see Figure 5.34). Additional hedgerow trees would be introduced as well as new areas of woodland and replacement open space on land that is currently in arable use. Meadow and low intensity grazed pasture would be introduced to improve habitat connectivity and to encourage a diversity of wild flora. The proposals would also include a small, lined pond for frogs near the margin of woodland areas.

5.28.10 The proposals to restore hedgerows and plant new ones with hedgerow trees would help mitigate environmental effects on views and improve visual amenity. The boundary to these areas includes provision for access to enable planting and ongoing management of the proposed hedgerows.

5.28.11 The areas proposed for off-site planting amount to approximately 16 ha. The boundaries of these areas follow agricultural field margins both to the north-east and south of the Main Application Site.

5.28.12 Further information on off-site planting can be found in the **Landscape and Biodiversity Management Plan (LBMP)** provided as Appendix 8.2 in **Volume 4** of the ES **[TR020001/APP/5.01].**

Figure 5.34: Offsite Hedgerow restoration

5.29 Landscape

5.29.1 The design of the Proposed Development has been developed to:

a. avoid impacting on Ancient Woodland at Winch Hill Wood;

b. retain mature woodland/hedgerow vegetation and coniferous plantation woodland along the ridgeline of Winch Hill;

c. retain an area of mature woodland to the north of Dairyborn Escarpment; and

d. retain (in part) hedgerow vegetation on the retained northern part of Wigmore Valley Park.

5.29.2 The design additionally retains the existing entrance and eastern part of Wigmore Valley Park and integrates it into a new area of replacement open space, to be provided over a larger area to the east of the existing park.

5.29.3 Landscape proposals include replacement open space, green footpath network, landscape restoration area and the landscaping of terminal approach.

5.29.4 Further information on landscape can be found in **Strategic Landscape Masterplan Report [TR020001/APP/5.10].**

Replacement open space

5.29.5 The replacement open space (refer to Figure 5.35) is an integral part of the Proposed Development. The proposals retain the existing main entrance into Wigmore Valley Park that adjoins Wigmore Pavilion; protect valued landscape, heritage, and biodiversity features; and build on the improved amenity facilities proposed through the Luton Rising's Green Horizons Park planning application. The proposals would retain and enhance the mature hedgerows and woodland vegetation to the southeast of the existing parkland and would largely maintain the existing landform within the area. Public access within the replacement open space would be encouraged through the surfacing and upgrading of rights of way, and through the creation of new surfaced paths, accessible to a range of users, which would connect with the wider rights of way network and provide circuitous parkland routes.

5.29.6 The replacement open space would also provide additional opportunities for unstructured or natural play and additional recreational facilities (e.g. additional play provision, gym equipment, trim trail area) that would encourage use of the replacement open space, including but not limited to families, teenagers, school groups, the elderly, walkers, joggers, plane spotters, cyclists, skaters and horse riders. The proposals would accommodate appropriate signage and facilities to help support these various user groups.

5.29.7 In the context of the site, the design of the replacement open space is constrained by Eaton Green Road to the north and the proposed airport development to the west. The proposals for the extended park also needed to be within land owned or controlled by the Applicant, or readily acquirable. A key design input was to integrate the replacement park holistically with the remainder of the existing parkland to create a new enlarged and accessible park facility. Other constraints included the aspiration to maintain the existing vehicular park entrance, the existing pavilion and to avoid impacting on key heritage and ecological features including archaeological artefacts, a badger sett and protected woodland.

5.29.8 Further information on replacement open space can be found in **Chapter 4** of Volume 2 of the **ES [TR020001/APP/5.01]**.

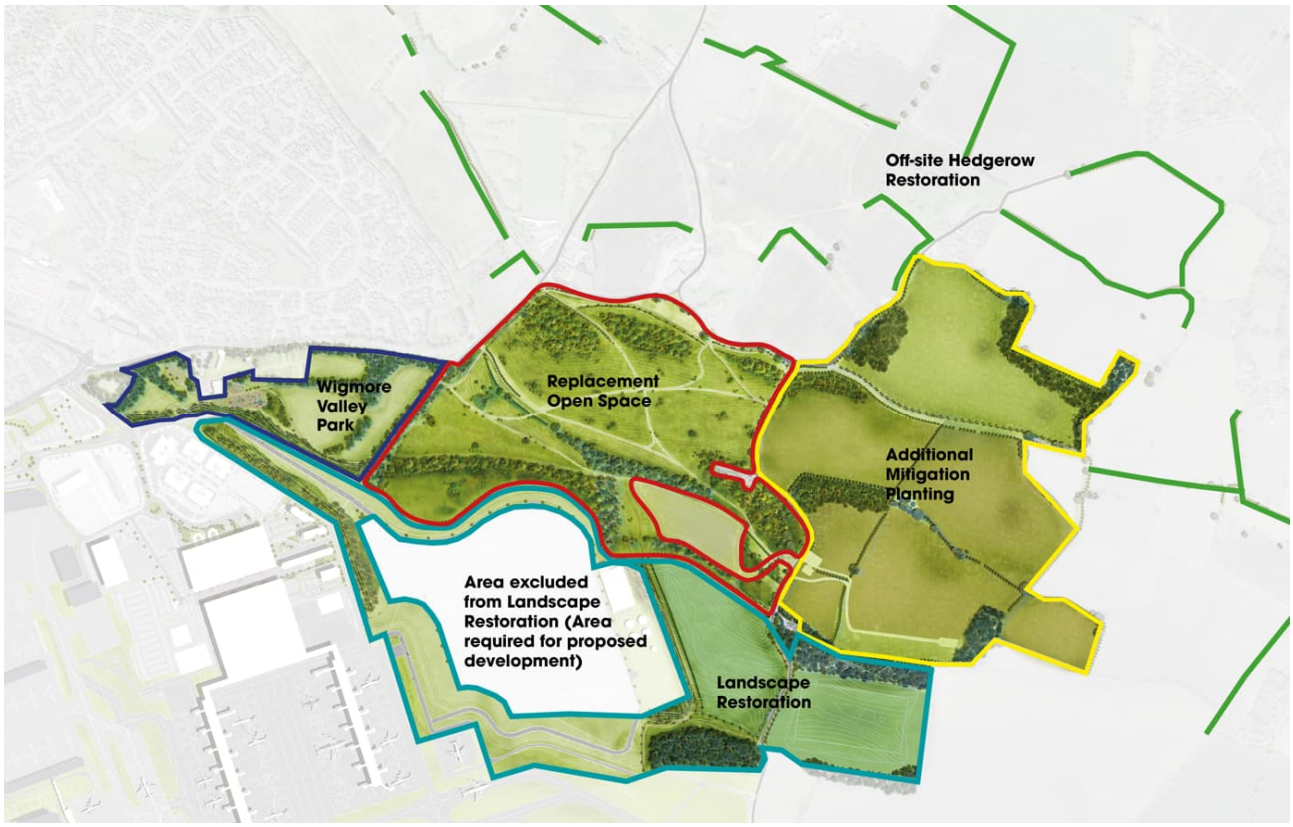

Figure 5.35: Proposed Replacement Open Space

Terminal Approach

5.29.9 The terminal approach landscape area adjoins the AAR, proposed hotel, offices and support buildings, and the entrance to the proposed terminal building. This would create the setting and public face of the airport expansion. These areas would be functional, easily maintained and safe but would also be visually attractive and contribute to the quality of the area into which they are located. As much as possible they would contribute to a strong sense of place and be sympathetic to their surroundings. The landscape design for the proposed terminal approach is shown on Figure 5.36.

5.29.10 Landscape treatments adjoining the AAR would help to reduce adverse effects on valued ecological features and people's visual amenity and deliver benefits for biodiversity in accordance with policy and best practice. Landscape finishes will vary dependent upon their location and use. For further information refer to **Design Principles [TR020001/APP/7.09]**.

Figure 5.36: Proposed Terminal Approach

Landscape Restoration Area

5.29.11 The landscape restoration area includes existing parkland to the east of the former landfill site within Wigmore Valley Park, a large area of arable farmland to the east of the airport, a further smaller area of formerly arable farmland to the east of Winch Hill Road and land within the curtilage of Winch Hill House.

5.29.12 Winch Hill Wood would be retained, however most of the other vegetation will be removed over a number of stages to minimise the effects on views from the east. Amenity grassland would be created on the earthworks platform slope. A new hedgerow line along the bridleway would also be added to restore the connection to the ancient woodland.

5.29.13 Further information on landscape can be found in **Chapter 14** of Volume 2 of the **ES [TR020001/APP/5.01]**.

5.30 Green Belt

5.30.1 The layout of the Proposed Development within the Main Application Site has been designed to avoid encroaching on the Green Belt except where absolutely necessary.

5.30.2 The following supporting facilities are located in the Green Belt for the reasons stated:

a. The national fuel delivery pipeline route passes through the Green Belt, so the proposed connection point and above ground pipework installation needs to be located at this point within the Green Belt. Refer to 5.22.

b. The new fuel pipeline that runs between the national fuel delivery pipeline and the new fuel storage facility is also within the Green Belt. However, since the pipeline will be buried the land above it will be reinstated as Green Belt once constructed.

c. Infiltration tank 2 is proposed below ground within an area of designated Green Belt.

d. A second SMR will be required to supplement the existing SMR and provide coverage for the proposed development. Refer to 5.23. This SMR will be located south of the runway in an area of land owned by the Applicant and designated as Green Belt.

5.30.3 Further information on Green Belt can be found in the **Planning Statement [TR020001/APP/7.01]**.

5.31 Heritage

5.31.1 The design of the Proposed Development has been evolved mainly utilising previously disturbed areas avoiding the risk of physically impacting buried archaeological remains and minimising the impacts on heritage assets both within the site as well as those outside the boundary which could be affected by the proposals.

5.31.2 A number of mitigation measures have been incorporated into the design of the Proposed Development. During the preparation of the design proposals, a number of different layout options were assessed. These included alternative locations of the proposed buildings, car parks and other hard standing areas as well as variations in height of the new buildings. Areas that have been subject to previous disturbance, such as the landfill site and previously landscaped areas within the existing airport have been identified to be used as the primary areas for development. The Proposed Development will utilise this previously disturbed area for multi-storey, block, and surface parking car parking, offices and hotel facilities, expansion of T2, and for extensions to the existing airfield.

5.31.3 The design of the Proposed Development seeks to enhance the historic landscape by including provision for the planting of hedgerows and hedgerow trees that are in keeping with the historic landscape character of the area. In addition, effects on the identified Iron Age and Roman settlement within the Main Application Site have been avoided through changes to the extent of earthworks required for the Proposed Development.

5.31.4 Further information on cultural heritage can be found in **Chapter 10** of Volume 2 of the **ES [TR020001/APP/5.01]**.

5.32 Off-Site Highway Interventions

5.32.1 The Proposed Development includes several sites where highway improvements would be required to facilitate the increased airport capacity. The

location and nature of these interventions has been determined by detailed traffic modelling. Further information can be found within the **Transport Assessment [TR020001/APP/7.02].**

5.32.2 The off-site highways intervention areas are restricted, as far as possible, to existing highway boundaries and each of these locations therefore consists of existing highway infrastructure set within a developed and urban environment.

5.32.3 The boundary for the off-site highways interventions represent a total area of approximately 24ha.

GLOSSARY AND ABBREVIATIONS

Terminology	Description
Development	
Proposed Development	Expansion of London Luton Airport
Planning Process	
Associated Development	All development on and off-site associated with the expansion of London Luton Airport
Application Site	The area covered by the proposed planning application boundary – this term should be used in most instances.
Main Application Site	The airport site excluding off-site works – to be used in specific circumstances where distinction is needed, typically the ES.
Examination	Examination of the application, including examination and hearings
Examining Authority (ExA)	Group of Inspectors appointed by the Planning Inspectorate to examine a specific application
The Planning Act 2008 (referred to as “the Act” after the first mention in a document)	Legislation that must be adhered to when undertaking statutory consultation and preparing to submit an application
Planning Obligations	Planning S106 agreements and obligations
Planning Requirements	Planning conditions, controls and requirements
General	
Code C aircraft	Aircraft typically used for short haul journeys with a maximum wingspan of 36m.
Code E aircraft	Aircraft of maximum wingspan of 65m.
Long haul	A flight of length more than 2,000 miles (APD Band B), typically outside of Europe/N Africa
Relevant highways authority	Luton Borough Council in their role as highways authority
Short haul	A flight of length less than 2,000 miles (APD Band A), typically within Europe/N Africa

Acronym	Description
AAR	Airport Access Road
ACI	Airports Council International
ADRM 11	Airport Design Reference Manual 11
AGL	Aeronautical Ground Lighting
ANPS / Airports NPS	Airports National Policy Statement
AONB	Area of Outstanding Natural Beauty
ATC	Air Traffic Control
ATM	Air Transport Movements
BHS	Baggage Handling System
BREEAM	Building Research Establishment Environmental Assessment Method
CAA	Civil Aviation Authority
COMAH	Control of Major Accidents and Hazards
CPAR	Century Park Access Road
DAS	Design and Access Statement
DCO	Development Consent Order
DLUHC	The Department for Levelling Up, Housing and Communities
DOZ	Drop off Zone
EIA	Environmental Impact Assessment
ERUB	Engine Run-up Bay
ES	Environmental Statement
EV	Electric Vehicle
FTG	Fire Training Ground
HV	High Voltage
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IDL	International Departure Lounge
LBC	Luton Borough Council
LBMP	Landscape and Biodiversity Management Plan
LLAOL	London Luton Airport Operations Limited
LLP	Luton Local Plan (2011–2031)
LR	Luton Rising
Luton DART	Luton Direct Air-Rail Transit
LV	Low Voltage
MARS	Multiple Aircraft Ramp System

Acronym	Description
MEP	Mechanical, Electrical and Plumbing
MHCLG	Ministry for Housing, Communities and Local Government (Renamed: DLUHC)
mppa	Million Passengers Per Annum
MSCP	Multi-Storey Car Park
NCR	National Cycle Route
NIC	National Infrastructure Commission
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
NZS	Net Zero Strategy
Pax	Passengers
PRoW	Public Right of Way
PSZ	Public Safety Zones
RETS	Rapid Exit Taxiways
RFFS	Rescue and Firefighting Services
ROSOV	Remotely Operated Shut Off Valves
SAF	Sustainable Aviation Fuel
SMR	Surface Movement Radar
SS	Sustainability Statement
T1	Terminal 1 (existing terminal)
T2	Terminal 2 (proposed terminal)
TDOZ	Temporary Drop Off Zone
TOC	Total Organic Carbon
UKPN	UK Power Networks
WTP	Water Treatment Plant
WVP	Wigmore Valley Park
ZVI	Zone of Visual Influence

REFERENCES

Ref 5.1 International Civil Aviation Organisation, International Standards and Recommended Practices, Annex 14 to the Convention on International Civil Aviation, Volume 1 Aerodrome Design and Operation, Ninth Edition, July 2022.
Ref 5.2 UK Certification Specification & Guidance Material for Aerodrome Design CS-ADR-DSN For Regulation (EU) No. 139/2014 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018
Ref 5.3 International Air Transport Association, & Airports Council International (ACI). Airport Development Reference Manual, 11th Edition. 2019. Montreal—Geneva. (ISBN 978-92-9229-853-1)
Ref 5.4 CAP 699: framework for the competence of rescue and fire fighting services (RFFS) personnel. Civil Aviation Authority, London 2017

Appendix A

TERMINAL DESIGN PARAMETERS

Traffic Data	Phase 2a	Phase 2b
Annual Pax	7,000,000	12,000,000
Design Hour Pax (one-way)	1,950	2,800

Headline Summary		
Assessment Phases		
Planned Capacity	**Phase 2a**	**Phase 2b**
Annual Passengers (mppa)	7	12
Design Hour Passengers (one-way)	1,950	2,800
Total Terminal Area (m^2)	39,940	62,800

Terminal Area (m^2)		
Assessment Phases	**Phase 2a**	**Phase 2b**
Terminal Area (m^2)		
Annual Passengers (mppa)	7.0	12.0
Design Hour Passengers (one-way)	1,950	2,800
Check-in & landside concessions (m2)	4,170	7,510
Boarding pass and security control (m2)	810	1,040
Departure Lounge & Airside Concessions (m2)	6,880	11,280
Immigration(m2)	480	640
Baggage Reclaim & Customs (m2)	4,300	7,260
Arrival Hall (m2)	1,560	2,370
Area for Authorities	140	140
Area for Airlines & Handlers	540	900
Area for Airport Operator	440	440
Area for Supporting Areas	260	260
Total Area Main Processor (m2)	**19,580**	**31,840**
Total Distribution Plant (m2)	2,549	4,146
Total Toilets (m2)	1,569	2,551
Total Structure (m2)	1,961	3,189
Total Vertical Circulation (m2)	1,569	2,551
Total Lateral Circulation (m2)	2,942	4,784
Total Baggage Handling System (m2)	9,770	13,730
Grand Total (m^2)	**39,940**	**62,800**
Area per Peak Hour Passenger (m^2)	**18**	**19**

Summary of Facilities	Phase 2a	Phase 2b
Annual Passengers (mppa)	7.0	12.0
Design Hour Passengers (one-way)	1,950	2,800
Traditional Check-in desks & Fast Bag Drop Off	23	33
Self service kiosk	26	36
Number of OOG points	1	1
Boarding Pass Control points	6	9
Security Control points	9	12
Security control Points Transfer	0	0
CIP/Executive Lounges	1	1
Immigration Control Points Total	16	23
Reclaim belts - Domestic	1	1
Reclaim belts - International	3	5
Lost Baggage Offices	1	1
Level 1/2 screening facilities	1	2
Level 3 screening facilities	1	1
OOG screening facilities	1	1

Terminal Facilities		
Assessment Phases	**Phase 2a**	**Phase 2b**
Planned Capacity		
Annual Passengers (mppa)	0	0
Design Hour Passengers (one-way)	1,950	2,800
Check-in + Bag drop desks	#N/A	#N/A
Security Screening Positions	9	12
Emigration Desks	0	0
Departure Gates	30	41
Immigration Desks	16	23
Baggage Reclaim Devices	4	6

Concessions Requirements		
Assessment Phases	Phase 2a	Phase 2b
Concessions Requirements		
Landside		
Retail (m^2)	788	1,350
Food and Beverage (m^2)	263	450
Storage Area (m^2)	158	270
Total Concessions area (m^2)	1,210	2,070
Airside		
Retail (m^2)	3,150	5,400
Food and Beverage (m^2)	1,050	1,800
Storage Area (m^2)	630	1,080
Total Concessions area (m^2)	4,830	8,280
Arrivals Airside		
Retail (m^2)	21	36
Food and Beverage (m^2)	189	324
Storage Area (m^2)	32	54
Total Concessions area (m^2)	242	414
Arrivals Landside		
Retail (m^2)	84	144
Food and Beverage (m^2)	756	1,296
Storage Area (m^2)	126	216
Total Concessions area (m^2)	966	1,656