Luton Rising
Our airport.
Our community.
Our planet.

November 2023

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 5 Environmental Statement and Related Documents

5.02 Appendix 20.5 Water Cycle Strategy

Application Document Ref: TR020001/APP/5.02
APFP Regulation: 5(2)(a)

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

London Luton Airport Expansion Development Consent Order 202x

5.02 ENVIRONMENTAL STATEMENT APPENDIX 20.5 WATER CYCLE STRATEGY

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1 INTRODUCTION

1.1 Report Context

1.1.1 This document is an appendix to the Environmental Statement (ES) submitted as part of Luton Rising's (a trading name of London Luton Airport Limited ('the Applicant')) application for development consent to expand London Luton Airport ('the airport') from the currently permitted capacity of 18 million passengers per annum (mppa) to 32 mppa (the Proposed Development, as described in **Chapter 4** of the ES **[TR020001/APP/5.01]**).

1.1.2 This Water Cycle Strategy (WCS) is a supporting document to **Chapter 20** Water Resources and Flood Risk of this ES **[TR020001/APP/5.01]**.

1.1.3 This report has been prepared with reference to Luton Borough Council's (LBC) Luton WCS (Ref. 1) and aims to determine the existing baseline conditions of the local water environment in relation to the existing airport. It therefore identifies the following:

a. existing direct rainfall inputs to the airport;
b. how this relates to volumes of water generated and where this water is directed under existing conditions;
c. existing water consumption by passengers, staff and airport operations; and
d. existing foul water effluent rates and volumes.

1.1.4 The report then details the potential changes to the existing water balance caused by the Proposed Development and outlines a strategy of measures to reduce the impact of the Proposed Development on the water environment.

1.2 Proposed Development

1.2.1 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. This would take the overall passenger capacity from 18 mppa to 32 mppa.

1.2.2 The Proposed Development would be delivered incrementally in response to forecast passenger demand. For the purposes of assessment three assessment phases are considered (assessment Phase 1, assessment Phase 2a and assessment Phase 2b as described in **Chapter 4** Proposed Development of the ES **[TR020001/APP/5.01]**), within which construction and operation may take place simultaneously:

a. Assessment Phase 1 – to achieve a capacity of 21.5 mppa at the existing terminal (referred to as Terminal 1) by 2027;
b. Assessment Phase 2a – to achieve a capacity of 27 mppa with the new terminal opening in 2039 (referred to as Terminal 2); and
c. Assessment Phase 2b – progressive expansion of Terminal 2 to achieve a capacity of 32 mppa by 2043.

1.2.3 An overview of the Application Site is provided in **Chapter 2** Site and Surroundings of the ES **[TR020001/APP/5.01]** which outlines that the Proposed Development is split into four distinct geographical components in assessments to aid reference:

a. the Main Application Site;
b. Off-site Car Parks;
c. Off-site Highway Interventions; and
d. Off-site Planting.

1.2.4 The Main Application Site, Off-site Car Parks, Off-site Highway Intervention boundaries and locations for Off-site Planting are shown in **Figure 2.2** of the ES **[TR020001/APP/5.03]**.

1.2.5 A detailed description of the Proposed Development is provided in **Chapter 4** The Proposed Development of the ES **[TR020001/APP/5.01]**.

1.2.6 The expansion of the airport is limited in all directions, other than to the east of the existing airport, due to existing development. Therefore, it is considered appropriate to consider development to the east of the existing airport the 'Expansion Area' for the purpose of this WCS.

1.3 Local Stakeholders and Operating Authorities

1.3.1 With regards to development planning and water related issues, there are a number of key local and national stakeholders and these are described as follows:

a. Environment Agency (EA). The EA have wide ranging powers for main rivers and groundwater bodies under the Water Resources Act (1991) (Ref. 2) and the Environment Act (1995) (Ref. 3). Under the Flood and Water Management Act (FWMA) (2010) (Ref. 4) they have a responsibility to produce a national framework setting out requirements for the management of water resources and are a statutory planning consultee for development and flood risk issues.
b. Lead Local Flood Authorities (LLFA). Under the FWMA the LLFA have responsibility for local flood risk and sustainable drainage. This includes ordinary watercourses, groundwater and surface water (including the implementation of sustainable drainage (SUDs) techniques. The Main Application Site and the Off-site Highway Interventions (as defined in **Chapter 2** in of the ES **[TR020001/APP/5.01]**) extend across the boundaries of three LLFA's: LBC; Central Bedfordshire Council (CBC); and Hertfordshire County Council (HCC).
c. Planning Inspectorate. The nature and scale of the Proposed Development means that the application will be examined by the Planning Inspectorate and recommendations made to the Secretary of State as to whether to grant permission for the Proposed Development by way of a Development Consent Order (DCO). This would include ensuring the Proposed Development is safe in terms of water resources

management, does not increase flood risk elsewhere and seeks to implement SUDs, in conjunction with the LLFA.

d. Thames Water (TW). TW is the public sewerage undertaker under The Water Industry Act 1991 (Ref. 5). They operate and maintain notable infrastructure, for example the East Hyde Treatment Works, in proximity to the Main Application Site as well as in proximity to the Off-site Highway Interventions.

e. Affinity Water (AW). Affinity Water is the primary supplier of public potable water with powers under The Water Industry Act 1991 (Ref. 5) to the Proposed Development. They operate and maintain notable infrastructure in proximity to the Main Application Site as well as in proximity to the Off-site Highway Interventions.

f. Veolia Water (VW). Veolia Water are commissioned by London Luton Airport Operations Limited (LLAOL) (the current operator of the airport) to operate and maintain some of the existing water related infrastructure within the existing airport. This includes the foul water systems that connect into the public sewerage network and private water supply network that takes potable water from the public system. LLAOL manages the surface water network.

1.4 Data Sources

1.4.1 The key data sources used in compiling this WCS include:

a. Hydrogeological Characterisation Report (**Appendix 20.3** of this ES **[TR020001/APP/5.02]**).

b. Drainage Design Statement (DDS) (**Appendix 20.4** of this ES **[TR020001/APP/5.02]**).

c. Information on the existing airport drainage and water supply infrastructure, owned by the Applicant and operated by LLAOL and Veolia Water on behalf of LLAOL, respectively. This includes an 'Asset Management Plan Report' authored by Mott MacDonald in 2008 (Ref. 6) and data available in the DDS, provided in **Appendix 20.4** of this ES **[TR020001/APP/5.02]**, regarding the baseline and the proposed surface water management design.

d. Information on existing public drainage (surface water and foul) infrastructure owned and operated by TW (Ref. 7).

e. Information on existing public water supply distribution infrastructure owned and operated by Affinity Water (Ref. 8).

f. Water Cycle Strategy and Study documents for the three local authorities with LLFA responsibilities (LBC, CBC, HCC):

   i. LBC (2015) Luton Water Cycle Strategy (Ref. 1);
   ii. CBC (2017) Water Cycle Study (Ref. 9); and
   iii. HCC (2017) Hertfordshire Water Study[1].

[1] A water study dated 2017 is available, which covers similar scope to a Water Cycle Study. It covers the period 2021-2051 and is therefore relevant to the Proposed Development.

1.4.2 This report was also informed by a site walkover undertaken on the 10 April 2018 which provided an overview of the topography of the Main Application Site and key operational assets in the existing airport. Further surveys undertaken for the purpose of the ES (e.g. biodiversity and landscape) have identified that there have been no changes to the Main Application Site that would impact on the work undertaken as part of this WCS.

2 WATER RESOURCES PLANNING AND LEGISLATIVE CONTEXT

2.1 Airports National Planning Statement

2.1.1 The Airports National Policy Statement (ANPS) (Ref. 10) does not have effect in relation to an application for development consent for an airport development not comprised of an application relating to the Heathrow Northwest Runway. Nevertheless, as set out within paragraph 1.41 of the ANPS, the Secretary of State considers that the contents of the ANPS will be both important and relevant considerations in the determination of such an application, particularly where it relates to London or the south east of England. In particular, the ANPS makes clear that, alongside the provision of a new Northwest Runway at Heathrow, the government supports other airports making best use of their existing runways as set out in Beyond the Horizon: Making best use of existing runways (MBU) (Ref. 11), which is the specific policy context for this application.

2.1.2 In addition, whilst the ANPS does not have effect in relation to the Proposed Development, it sets out a number of principles for environmental impact assessment and compliance, and these will be an important and relevant consideration in the determination of the application for development consent. The relevant provisions of the ANPS considered in this WCS include:

a. paragraphs 5.158-5.165 address the need for flood risk mitigation and management. They also provide advice on the use of sustainable drainage systems (SuDS) with the aim of ensuring that the volumes and peak flow rates of surface water leaving the site are no greater than the baseline rates, taking climate change into account;

b. paragraphs 5.172-5.177 outline assessment considerations for water quality and resources;

c. paragraphs 5.182-5.186 outlines requirements for the Proposed Development to consider interactions with Environment Agency requirements for water quality and resources.

2.2 National Planning Policy Framework

2.2.1 The National Planning Policy Framework (NPPF) (Ref. 12) introduced in 2012 and revised in 2021, is the overarching planning framework guiding the development process at a national level across England. Although paragraph 5 makes clear that it does not contain specific policies for nationally significant infrastructure projects, such as the Proposed Development, it will be an important and relevant consideration. In terms of water resources, the NPPF states that all development should help to improve local water quality and should take a proactive approach to mitigating potential impacts on water supply and consider the impacts of climate change.

2.3 Water Resources Legislation

2.3.1 The following legislation is also relevant to this WCS:

a. The Water Act 2014 (Ref. 13) outlining provisions regarding water industry infrastructure.
b. The Environment Act 1995 (Ref. 3) providing for the establishment of the Environment Agency and functions in relation to drainage and flood risk.
c. Water Resources Act 1991 (Ref. 2), Water Industry Act (Amendment) (England and Wales) Regulations 2009 (Ref. 14) and Water Act 2003 (Ref. 15) which provide requirements for regulation of water resources, water quality and pollution risk.
d. Water Resources (Environmental Impact Assessment (EIA)) Regulations 2003 (Ref. 16), Water Resources (EIA) (England and Wales) Regulations 2006 (Ref. 17) and Infrastructure Planning (EIA) Regulations 2017 (Ref. 18) outline procedural requirements for assessing impacts on water resources.
e. Environment Act 2021 (Ref. 19) which relates to the Secretary of State for Environment, Food and Rural Affairs' ability to manage water resources and wastewater infrastructure. It gives powers to the Secretary of State to specify which chemicals should be taken into account when assessing water quality and further controls over licensed abstractions. The Act primarily affects the water utility providers, but is relevant to developers creating and managing new infrastructure that will connect to the water network.

3 WATER CYCLE STRATEGY ASSUMPTIONS AND LIMITATIONS

3.1.1 The following assumptions and limitations have been applied in preparing the WCS. These are listed below:

a. Projected water use across the whole airport has been profiled based on an average demand of potable water of 7.5l/s in 2019 (adopted from the DDS **Appendix 20.4** of the ES **[TR020001/APP/5.02])** and based on data provided by Veolia). This has been complimented with data on water use provided by LLAOL that indicates total water consumption from the Terminal 1 building is 4.2l/s.

b. The WCS covers operational aspects associated with the Main Application Site and Off-site Car Parks only. The Off-site Highway Interventions and Off-site Planting included in the Proposed Development are not anticipated to include activities that will consume water. Water demand requirements during construction are outlined in the Construction Method Statement and Programme Report provided as **Appendix 4.1** of this ES **[TR020001/APP/5.02]**.

c. No detailed information has been received with regards to the other water uses outside of the Terminal 1 building. It has been assumed that this equates to 3.3l/s, making up the total water use of 7.5l/s.

4 BASELINE CONDITIONS

4.1 Site description

Main Application Site

4.1.1 The Main Application Site covers approximately 428ha including land to the east of the existing airport, across Luton and North Hertfordshire to the east. A description of the Application Site, including the Main Application Site, Off-site Highway Interventions and Off-site Car Parks, and the surrounding area is provided in **Chapter 2** of the ES **[TR020001/APP/5.01]**. These development areas are shown in **Figure 2.2** of the ES **[TR020001/APP/5.03]**.

4.1.2 In addition to the existing airport infrastructure, land use within the Main Application Site comprises Wigmore Valley Park, which is characterised by areas of scrub, rough grassland and wooded areas. This is located over a historic landfill site. To the east and south of the park the land is used for arable farming. The Main Application Site extends beyond Winch Hill Road, to the east.

4.1.3 The Proposed Development includes the Airport Access Road (AAR) that connects to New Airport Way and Percival Way to the proposed T2. The majority of the western half of the alignment is proposed to occupy a corridor of undeveloped land between Vauxhall Way and Percival Way. The alignment arcs around to the north east through existing industrial and commercial properties associated with airport operations and connects into Percival Way.

4.2 Existing surface water features

4.2.1 There are no watercourses located within the footprint of the Main Application Site or Off-site Car Parks.

4.2.2 The nearest watercourses are the River Lee situated 450m to the south west of the boundary of the Main Application Site and the River Mimram situated 3.5km east of the boundary of the Main Application Site. The River Lee is crossed by the Off-Site Highway Interventions at the A1081 New Airport Way / B653 / Gipsy Lane and the Windmill Road / Manor Road / St Mary's Road / Crawley Green Road gyratory.

4.2.3 The airport is located north east of the River Lee on an elevated escarpment area that forms part of a scarp slope of the Chilterns Hills.

4.2.4 The Main Application Site is located within two river valleys, the River Lee and the River Mimram. The existing airport sits on a plateau between these two river valleys at an elevation of approximately 160m Above Ordnance Datum (AOD).

4.2.5 The east of the Main Application Site is located within the head of the River Mimram valley. The land here dips to the south east with elevations ranging between approximately 115m and 160m AOD. This change in topography is reflected by a network of surface water flow paths and dry valleys to the east of the existing Main Application Site.

4.2.6 One of these dry valleys has been infilled and is a historic landfill site. The design of the Proposed Development has considered this feature with the assessment of the risk discussed in the Detailed Quantitative Risk Assessment (DQRA) Controlled Waters (**Appendix 17.4** of this ES **[TR020001/APP/5.02]**), which accompanies the ES and may support the future application for appropriate Environmental Permit for works in this area.

4.2.7 The Environment Agency's 'Long term flood risk information, flood risk from surface water, data set' (Ref. 20) identifies two surface water flow paths that convey water from the land to the east of the existing airport. These combine, pass under Winch Hill Road, continue east towards Lye Hill and then gradually arc to the south flowing along Whitewaybottom Lane towards Kimpton.

4.3 Hydrogeology

4.3.1 The hydrogeology underlying the airport is dominated by the chalk aquifer. This is comprised of a thick unit of chalk that has been designated 'Principal Aquifer', which means it is able to provide a high level of water storage and provides a significant proportion of river base flow. Within proximity of the Main Application Site, the underlying aquifer is categorised as the most important aquifer unit in the Thames Basin supplying potable water for public consumption.

4.3.2 Within the chalk aquifer there are two local groundwater catchments, one related to the River Lee and one related to the River Mimram. The flow of water in the Lee groundwater catchment is to the west, this is partly influenced by abstractions located to the west of the airport. The flow of groundwater within the Mimram catchment is to the east and is also affected by a potable abstraction at Kings Walden. The groundwater divide between these two catchments is located across the existing airport as shown in **Figure 20.2** of the ES **[TR020001/APP/5.03]**).

4.3.3 Groundwater levels underlying the airport and within the wider aquifer have been monitored. Monitoring completed indicates that the groundwater levels beneath the former landfill range between 105m AOD and 125mAOD, at a depth of approximately 30 metres Below Ground Level (mBGL) to 45mBGL. The highest groundwater level recorded was 124.46mBGL (28.55mBGL) in June 2018 in a borehole located to the south west of the landfill as shown on Figure 2 in the DQRA, **Appendix 17.4** of this ES **[TR020001/APP/5.02]**. Groundwater levels in this borehole have been identified as consistently higher than the levels recorded elsewhere. This indicates that it is possible that groundwater levels in this borehole are being influenced by the nearby central soakaway for the airport.

4.3.4 Groundwater levels beneath the landfill have been identified as showing seasonal variability of up to 7.6m and also variability on an annual basis. Larger seasonal and year-to-year variations in groundwater levels were observed beneath the landfill area than within the dry valley. Within the dry valley, most of the boreholes displayed a seasonal variation of less than 5m. Though due to the lower topographical elevation within the dry valley, groundwater levels are closer to the surface (15mBGL to 25mBGL). Monitoring of groundwater levels supports the outputs of the Environment Agency Hertfordshire Groundwater Model (Ref. 21) that covers the Luton area.

4.3.5 There are a number of potential springs located to the east of the airport. The closest is Netherfield Spring, located approximately 550m to the east of the eastern end of the existing runway and Diamond End Spring located approximately 780m to the south east of the eastern end of the runway. It is noted that based on the modelled groundwater levels and topography, any springs in these areas are unlikely to be Chalk fed.

4.3.6 The Upper Lee Abstraction Licensing Strategy (February 2019) is a document produced by the Environment Agency that analyses the catchment wide water balance to determine the sustainability of existing abstraction regime. This concludes that there is no water available for any additional groundwater abstraction within the catchment.

4.3.7 For further detail on the geology and hydrogeology of the local area please refer to the Hydrogeological Characterisation Report provided as **Appendix 20.3** of this ES **[TR020001/APP/5.02]**. The surface water drainage characteristics are described in **Section 4.2**.

4.4 Drainage and Sewerage

4.4.1 In addition to the natural hydrology and hydrogeology, the existing airport has artificially affected the surface water catchments of the land occupied by the existing airport by the introduction of a surface water drainage system.

4.4.2 There are a number of surface water catchments within the existing airport (see **Figure 20.6** of the ES **[TR020001/APP/5.03]**). It also shows the surface water catchments within the proposed Expansion Area (as defined in **Section 1.2.6**).

4.4.3 **Table 4.1** provides details of each catchment identified in the Main Application Site:

a. the existing drainage infrastructure receptor and/or flow direction and information on how water is conveyed to the receptor and the type of water quality (if any) provided (column 2);

b. the impermeable area (hectares) of each surface water catchment (column 3); and

c. the permeable area (hectares) of each surface water catchment (column 4).

Table 4.1: Details of existing surface water catchments falling within the Main Application Site (including existing airport and Expansion Area)

Catchment name	Receptor and/or flow direction	Developed area (ha)	Undeveloped area (ha)
Existing airport			
Central Soakaway (SW1)	Central Soakaway	65.62	18.00 (SW22)

Catchment name	Receptor and/or flow direction	Developed area (ha)	Undeveloped area (ha)
Airport Way (SW2)	Public sewerage system owned and operated by TW. First flush system in operation. Routine flows to the River Lee at Luton Hoo Park via a 1500mm sewer	40.9	All developed
Northern Soakaway (SW3)	Northern Soakaway	18.68	0.7
Runway West (SW7)	Contributes to Airport Way	5.33	All developed
Easton Green Road (GKN) (SW7)	Public sewerage system owned and operated by TW. Flows to the River Lee at Luton Hoo Park via a 1500mm sewer	5.29	All developed
Easton Green Road (Kerry Ingredients) (SW6)	Public sewerage system owned and operated by TW. Flows to the River Lee at Luton Hoo Park via a 1,500mm sewer	4.05	All developed
Frank Lester Way (SW8)	Public sewerage system owned and operated by TW. Flows to the River Lee at Luton Hoo Park via a 1,500mm sewer	1.55	All developed
President Way (SW9)	Direct to small local soakaways in the vicinity of the medium stay car park and areas of development to the west of Terminal 1	0.42	All developed
North west of existing runway (SW16)	-	Taxiway drains to SW4	12.1
South western end of runway (SW4)	Airport Way	6.6	All developed
South of western end of runway (SW17)	Flows in a southerly direction and infiltrates	N/A	10.9
South of runway (SW18)	Flows in a southerly direction and infiltrates	N/A	24.0
South eastern end of runway (SW5)	North east balancing pond	2.86	All developed
To the south of eastern end of runway end (SW19)	South eastern soakaway (SW19)	N/A	5.9

Catchment name	Receptor and/or flow direction	Developed area (ha)	Undeveloped area (ha)
Land to the east of runway (SW20)	Flows in an easterly direction and infiltrates	N/A	3.84
North of eastern end of runway (SW21)	Flows in an easterly direction and infiltrates directly. Although north east balancing pond is located within this catchment it does not collect all surface water flow	N/A	12.76
Central development area (SW22)	Flows in an easterly direction and infiltrates	6.7	11.73
Expansion Area			
NW of existing Wigmore Park (NW WP)	North towards existing pond off Eaton Green Road	N/A	12.87
North east Wigmore Park (NE WP)	Flow eastwards to Mimram catchment	N/A	36.9
Mid Wigmore Park (MID WP)	Flows eastwards to Mimram catchment	N/A	48.54
Southern rural (SE WP)	Flows eastwards to Mimram catchment	N/A	23.35

4.4.4 The airport currently drains via a combination of discharges to surface water and foul water public sewers and a number of infiltration-based systems. In a meeting with Veolia Water in May 2021, Veolia Water confirmed that as an organisation they work on behalf of LLAOL to look after the following assets within the existing airport site:

a. the potable water network; and
b. the foul water network.

4.4.5 The surface water network is directly managed by LLAOL.

4.4.6 Surveys of the existing potable water and drainage network are discussed in the DDS provided in **Appendix 20.4** of the ES **[TR020001/APP/5.02]**. Further surveys may be required to confirm existing drainage, and inform the detailed drainage design which would be developed and submitted for approval as a requirement of the DCO.

4.4.7 From correspondence with LLAOL and Veolia Water, it is understood that surface water flows generated by the existing airport are discharged to either the River Lee via the TW sewerage system or the underlying chalk aquifer via a number of soakaways.

4.4.8 A first flush system is employed that has been designed to direct the most heavily polluted runoff such as effluent from de-icing activities, to the TW combined sewer network and treatment at East Hyde Sewage Treatment Works.

4.4.9 All foul water from the existing terminal and other buildings associated with operation of the airport is discharged to the public foul water network owned and operated by TW.

4.4.10 Contaminated effluent from the Fire Training Ground is collected in an isolated system and tankered off-site for treatment.

4.4.11 A water quality monitoring programme has also been implemented by LLAOL consisting of water quality spot samples at nine locations across the existing airport site. Samples are completed once during the summer and monthly over the winter period (November and March inclusive).

4.5 Rainfall

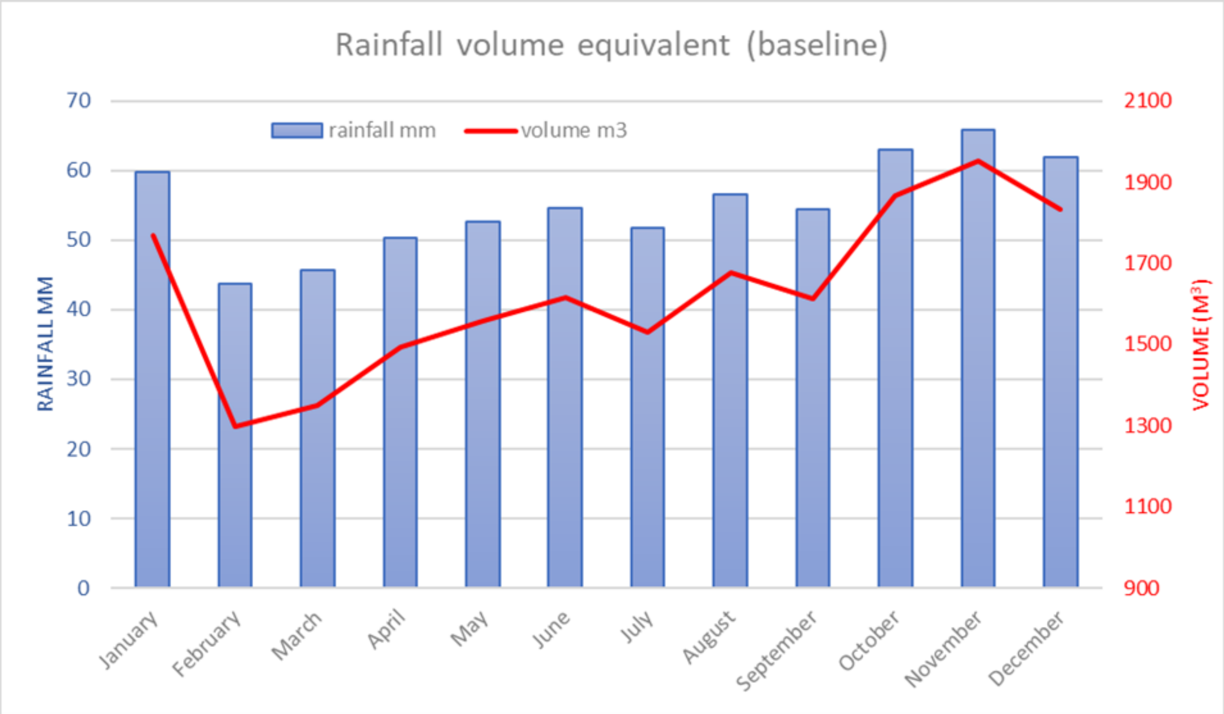
4.5.1 Information on existing rainfall patterns affecting the airport and the local area have been obtained from the following sources:

a. Runley Wood pumping station rainfall gauge (4.7 km from Main Application Site); and
b. the rainfall gauge at the River Mimram gauge location at Whitwell (station 38017) (3.9 km from Main Application Site) accessed via the National River Flow Archive (NRFA).

4.5.2 The overall average monthly rainfall from the Mimram catchment gauge has been plotted based on the observed totals from 1961 to 2017 (as the Mimram catchment gauge stopped recording rainfall at end of 2017), and is shown in **Inset 1.**

4.5.3 The volumes of water generated by these monthly rainfall totals has been calculated and has also been plotted on **Inset 1**. This indicates that average monthly volumes of rainwater range between 1,350m^3 and 1,900 m^3. This is based on the catchments described in **Section 4.4**.

Inset 1: Monthly average rainfall data from gauge at River Mimram at Whitwell (38017) and volumes of water generated across the existing airport and the Expansion Area



4.6 River Water Availability

4.6.1 To understand the availability of rainwater across the existing airport and the Expansion Area the catchments have been reconsidered and simplified in terms of the following receptors, as shown on **Inset 2**.

a. River Lee groundwater catchment;

b. River Mimram groundwater catchment; and

c. the existing public sewerage network and onto the River Lee.

4.6.2 The rainwater availability generated by these catchments is expressed in **Table** 4.2**.**

Inset 2: Simplified London Luton Airport catchments.

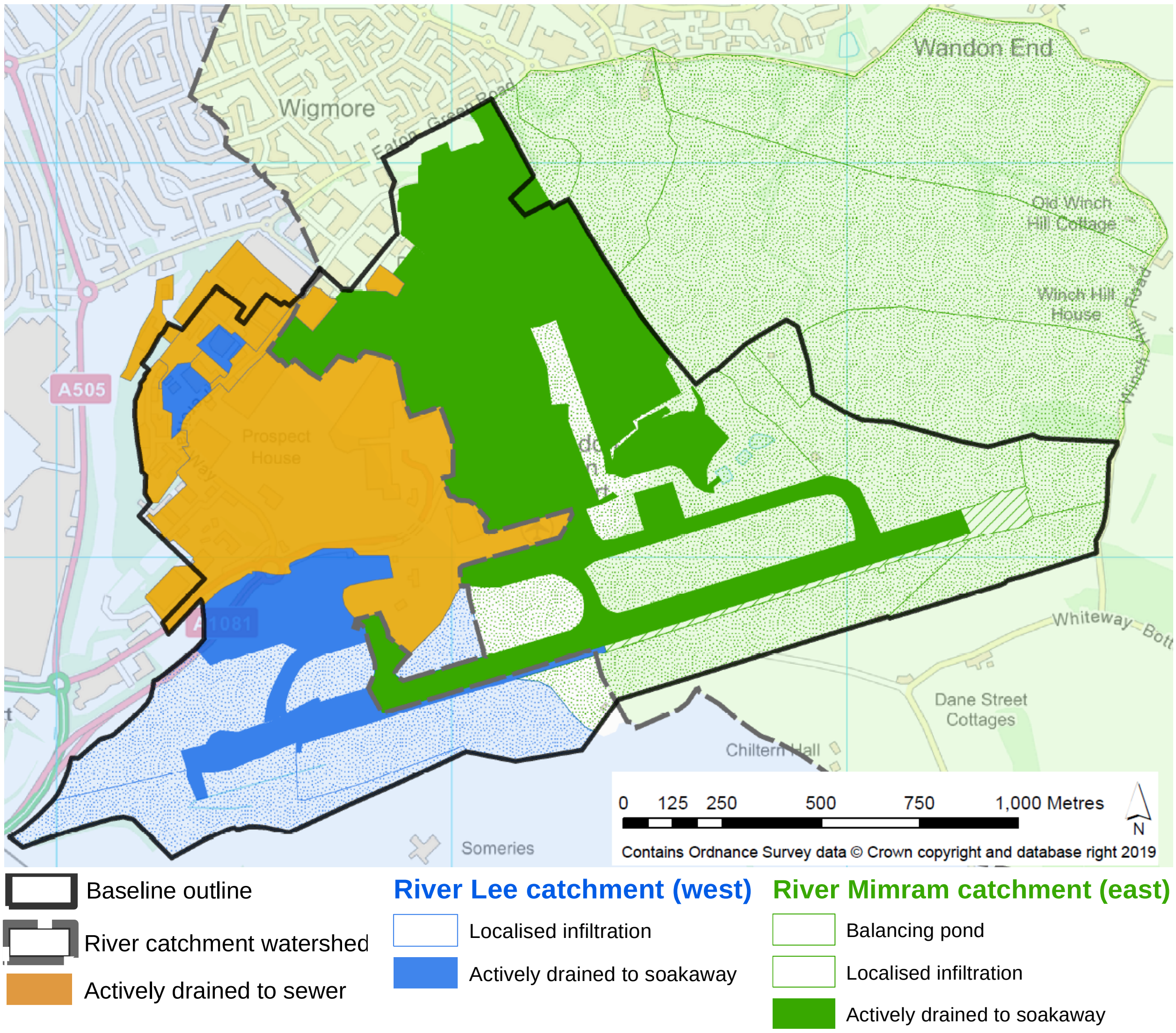


Table 4.2: Rainfall availability assessment

Rainfall and drainage catchment characteristics	Rainfall (mm)	River Mimram catchment	River Lee catchment	Sewer
Actively drained land area (ha)		74.8	16.9	52.6
		Volumes in megalitres (ML)		
Mean annual rainfall	660	494	112	347

Rainfall and drainage catchment characteristics	Rainfall (mm)	River Mimram catchment	River Lee catchment	Sewer
1 in 100 yr plus climate change allowance of +40%	56.56	42	10	30
95th percentile	8.9	7	2	5
Naturally drained area (ha)		189.7	36.4	-
		Volumes in megalitres (ML)		
Mean annual rainfall	660	1252	240	-
1 in 100 yr plus climate change allowance of +40%	56.56	107	21	-
95th percentile	8.9	17	3	-
		Volume in metres cubed (m^3)		
50th percentile *(all data)*	0.1	190	36	-
50th percentile *(rainfall affected days)*	1.5	2846	456	-
Total land area (ha)		264.5	53.3	52.6
		Volume in megalitres (ML)		
Mean annual rainfall	660	1746	352	347
1 in 100 yr plus climate change	56.56	150	30	30

Rainfall and drainage catchment characteristics	Rainfall (mm)	River Mimram catchment	River Lee catchment	Sewer
allowance of +40%				
95th percentile	8.9	24	5	5
		Volume in metres cubed (m^3)		
50th percentile *(all data)*	0.1	265	53	53
50th percentile *(rainfall affected days)*	1.5	3968	800	789

4.7 Water supply

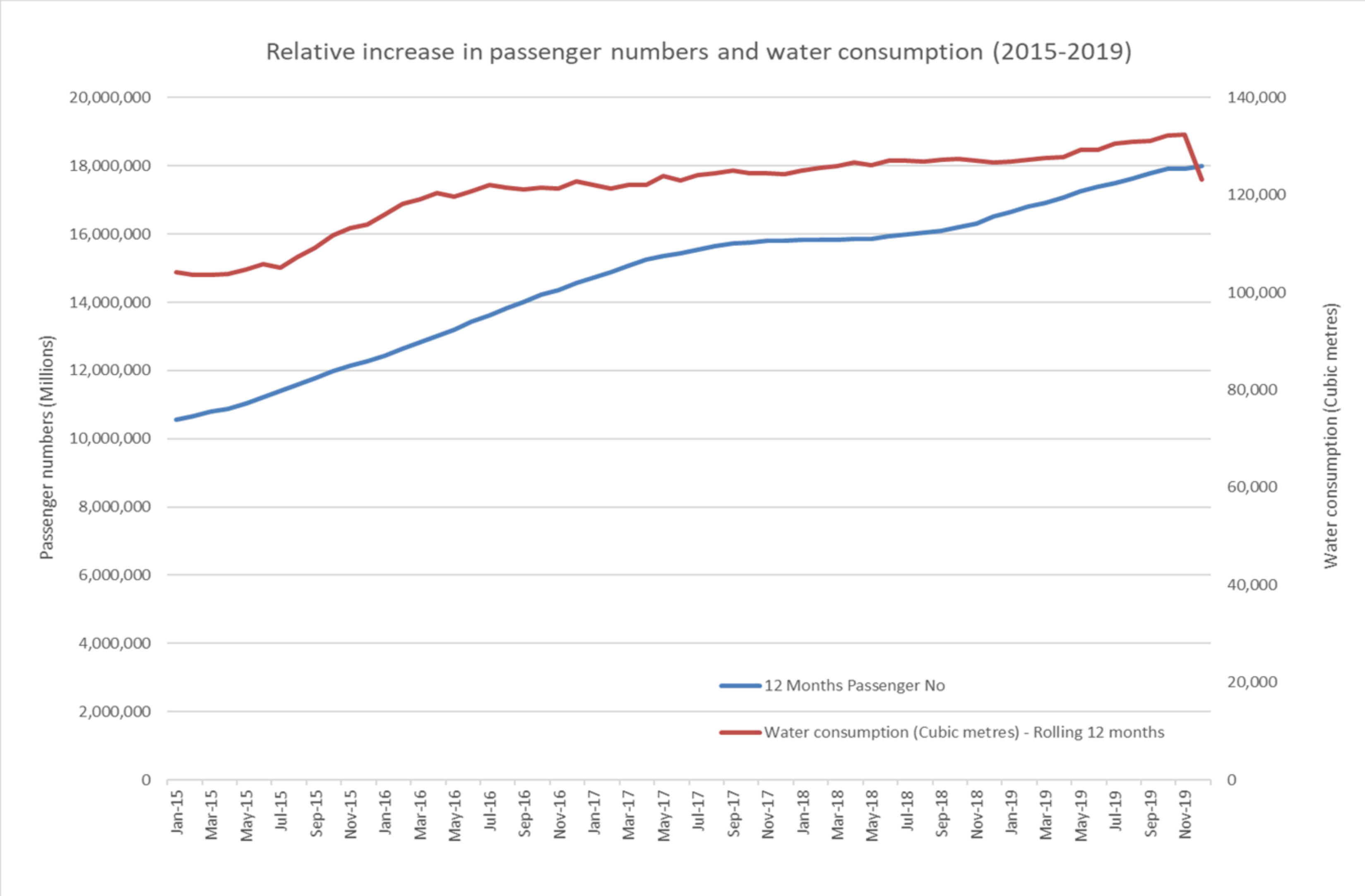
4.7.1 All water currently used by LLAOL is provided by the local statutory potable water undertaker, Affinity Water. Within the existing airport this water is distributed via a private network of water supply assets operated by Veolia Water.

4.8 Water consumption and supply data

4.8.1 Water demand data has been provided by LLAOL which accounts for the demand of the existing airport from the public potable water supply.

4.8.2 **Inset 3** presents the potable water consumption data and passenger numbers as a total for each month between January 2015 and December 2019. Later data was obtained but is affected by the COVID-19 pandemic (see **paragraph 4.8.4**).

Inset 3: Passenger numbers and water consumption (2015-2019)

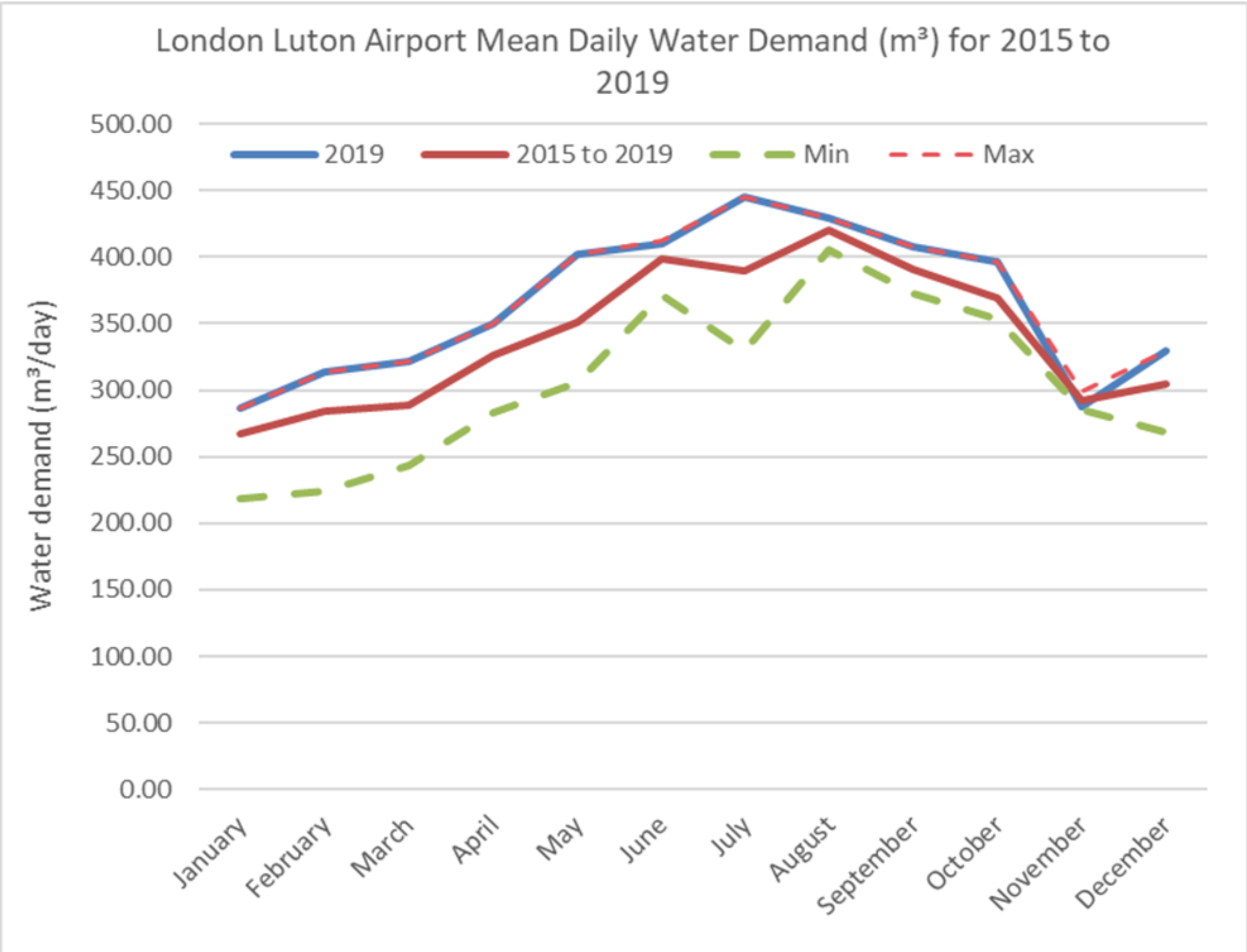


4.8.3 **Inset 3** highlights how the relationship between passenger numbers and water consumption is not linear. Following an initial increase, water consumption appears to show a gradual increase before showing a slight decrease followed by a decline at the end of 2019. A reason for the decline in water consumption at the end of 2019 has not been identified, therefore it cannot be assumed to continue.

4.8.4 From this data the twelve-month total for 2019 was 133,334m^3. This equates to an average of 365m^3 per day for the terminal. This can also be expressed as approximately 4.2 l/s, assuming 24 hours of operation. The latest data (2020-2022) was not used in this WCS, as it is atypical due to the Covid pandemic. Water consumption dropped from 133,334m^3 in 2019 to 52,693m^3 and 47,386m^3 in 2020 and 2021 respectively.

4.8.5 Higher average daily water demand is observed to occur from June to October, with the highest average daily demand observed for July (2019) at 445 m^3 per day (5.1 l/s). This is likely associated with typically higher temperatures in the summer and higher passenger demand from June-October. The daily trends, based on the 'Utility Data Sheet' data is shown in **Inset 4**.

Inset 4: Daily water consumption trends (2015-2019)



4.8.6 As outlined in **Section 3**, Veolia have stated that the supply of potable water is provided to the airport at 7.5l/s (adopted from the DDS (**Appendix 20.4** of the

ES **[TR020001/APP/5.02]**), based on data provided by Veolia/LLUA). The data provided by LLAOL indicates that on average in 2019, the water consumption for the airport was 4.2 l/s, with a peak in July 2019 of 5.1 l/s.

4.8.7 Calculations in the DDS (**Appendix 20.2** of the **[TR020001/APP/5.02])** have been based on the figure of 7.5 l/s (provided by Veolia) representing an average water consumption figure across the entire airport, while the values obtained from the 'Utility Data Sheet' which yields a value of 4.2 l/s represents an average use for the existing terminal building only. It is therefore assumed that the data in the 'Utility Data Sheet' excludes the water required for airside activities. This is assumed to constitute an average requirement of 3.3 l/s, based on the Affinity Water figure.

4.8.8 Therefore, the 2019 baseline represents the airports water demand as follows:

a. Terminal use: 4.2 l/s (passengers and staff); and
b. Other water uses associated with airside activities: 3.3 l/s.

5 WATER DEMAND THROUGH THE ASSESSMENT PHASES

5.1.1 A future water demand profile has been developed based on the existing water demand for different uses as described in **Section 4**. The approach presented here is a conservative estimate (reasonable worst case scenario) of water demand through the assessment phases, based on a pro rata increase according to projected passenger numbers.

5.1.2 **Paragraph 1.2.2** outlines the changes in passenger numbers associated with each of the assessment phases. **Table 5.1** outlines the water use associated with each of these phases, assuming no mitigation measures.

5.1.3 The peak monthly water demand was calculated based on the 2019 empirical data provided by LLAOL. Monthly average consumption of 4.2l/s compared to 5.2l/s peak demand in July yields a peak factor of 1.2. This has been applied for a monthly peak in the table below.

Table 5.1: Water use through the assessment phases (assuming pro rata increase without mitigation measures such as higher efficiency, water reuse or rainwater harvesting and application of monthly peak factor)

Assessment Phase/Year	Passenger no. / capacity (mppa)	Water demand (m^3/day)	Water demand (l/s)	Peak monthly water demand (l/s)
2019 (Baseline)	18	648	7.5	9
Assessment Phase 1	21.5	769	8.9	10.7
Assessment Phase 2a	27	968	11.1	13.3
Assessment Phase 2b	32	1141	13.2	15.8

6 MEASURES FOR REDUCING WATER USE AND IMPROVING WATER EFFICIENCY

6.1.1 The measures outlined in this section have been introduced into the design to reduce the potential large increase in water demand associated with the Proposed Development. The implementation of these measures aims to reduce the need to increase water demand from the potable water supply and increase the use of recycled water from the terminal buildings, attenuated surface water and rainwater harvesting (RWH) to meet the projected demand.

6.1.2 The effectiveness of these measures is based on the implementation of options in the proposed DDS (**Appendix 20.4** of this ES **[TR020001/APP/5.02]**) for both surface and foul water.

6.2 Assessment Phase 1

Drainage Design Proposals

6.2.1 In assessment phase 1, the following key changes would occur in relation to drainage:

a. Integration of RWH strategy for Terminal 1 (area of 41,000 m^2 identified) and the other buildings (37,000 m^2 identified) within the Main Application Site.

b. The existing long stay car park (LSCP) is to remain but the area reduced by 64,400 m^2, reducing the amount discharged into the Central Soakaway.

c. New temporary car park proposed north east of existing LSCP, comprising an area of 68,500 m^2 to discharge into the TW network north east of the airport at a rate of 5 l/s/Ha from an attenuation tank.

d. New apron south east of the airport, encompassing an area of 44,250 m^2 to discharge into the Central Soakaway.

6.2.2 During this assessment phase the surface water would continue to discharge to the existing Central Soakaway located east of the existing engine run-up bay. The discharge rate of the airfield surface water has been calculated to the green field run-off rate (GRR) and to achieve this, an attenuation tank of approximately 4,000 m^3 is required under the apron to limit the discharge to the soakaway.

6.2.3 Contaminated water stored under the apron during this assessment phase would be discharged into the TW foul water main at a discharge rate of 2 l/s, as agreed with TW.

6.2.4 The impact on the existing surface water discharges across the Main Application Site including the Central Soakaway and TW network is summarised in **Table 6.1**.

Table 6.1: Changes in area discharging to Central Soakaway and Thames Water catchment in assessment Phase 1

Reason for diversion of discharge away from/to Central Soakaway	**Central Soakaway catchment area discharge (m^2)**
Roof rainwater harvesting (to storage tanks)	-14,600
Reduction in existing long stay car park area	-64,400
Total area diverted away from Central Soakaway (m^2)	-79,000
Total area of proposed aprons discharging to Central Soakaway (m^2)	+44,250
Net discharge area into Central Soakaway (m^2)	-34,750
Reason for diversion of discharge away from/to Thames Water network	**Thames Water catchment area (m^2)**
Roof rainwater harvesting	-57,000
Additional car park area	+68,500
Net area discharge into Thames Water network (m^2)	+11,500

6.2.5 Water efficiency measures for Terminal 1 would also be considered for assessment Phase 1 including:

a. Reduction in water consumption per passenger – reduced demand and foul water discharge. This aligns with LLAOL's objectives to reduce total water consumption to less than 6.98 litres/pax by the end of 2023.

b. Reduction in use of potable water in applications where non-potable water can be used.

c. Introduction of water efficient appliances and equipment to be used within the terminal.

6.2.6 As Terminal 1 throughput increases to 21.5 mppa, this would increase the foul water discharge through the existing TW network. As described in the DDS (**Appendix 20.4** of the EA **[TR020001/APP/5.02]**), the proposals for foul water discharge at peak times are to accommodate the resulting increase with an additional 6 m^3 in storage tank volume and discharging it into the network at later hours of the day when the network is not at capacity.

Water cycle strategy for assessment Phase 1

6.2.7 It is assumed that the water efficiency measures are able to reduce water demand by 10% (see DDS, **Appendix 20.4** of the **[TR020001/APP/5.02]**). Given the pro rata approach and the water efficiency savings, assessment

Phase 1 would require an additional 0.6 l/s to meet the increased demand, if demand simply increased proportionally with passenger throughput (0.9*9 l/s – 7.5l/s = 0.6 l/s). However, the strategy objective is to maintain the total potable demand at 7.5 l/s (adopted from DDS, **Appendix 20.4** of the ES **[TR020001/APP/5.02]**, based on data provided by Veolia) as set out in the Design Principles **[TR020001/APP/7.09]**. The description below outlines to what extent this can be achieved.

6.2.8 Based on the changes proposed at assessment Phase 1 it is assumed that the entire increase in water demand is generated by the increase in passengers and staff within the existing terminal and no other changes in demand would occur.

6.2.9 A preliminary assessment has been undertaken looking at the catchment areas and the volume of water that can be generated through RWH, taking account of the reliability of this source of water.

6.2.10 Based on rainfall data in the Luton area, it is assumed a total volume for the storage tanks required is approximately 3,000 m^3 to maintain a constant monthly supply of approximately 3,400 m^3 (1.3 l/s) to the airport throughout the year; this assumes that all rainfall from existing buildings from the Main Application Site can be collected and stored. This figure would be checked at detailed design stage and incorporated into the detailed design. Accordingly, assuming a maximum of 50% of water demand is potable (a conservative reasonable worst case estimate, based on data reported for other airports (Ref. 22) (Ref. 23) (Ref. 24), the increased demand in assessment Phase 1 (0.6 l/s) can be more than compensated for by increased water efficiency and RWH measures without increasing the demand above the 2019 baseline.

6.2.11 Harvested rainwater would require treatment to ensure the quality is fit for the intended non-potable use. The treatment process would be designed to ensure that all coarse solids and organic matter is removed from the network such that the maximum particle size is equal or less than 1 mm. As outlined in the DDS (**Appendix 20.4** of the ES **[TR020001/APP/5.02]**), the systems must also be accessible for maintenance and adhere to the requirements set by BS EN 16941-1:2018 (Ref. 25) (or equivalent at time of implementation).

6.3 Assessment Phase 2a and assessment Phase 2b

Drainage Design Proposals

6.3.1 The main drainage infrastructure for the Proposed Development would be installed during assessment Phase 2a. This includes the installation of the proposed new WTP, attenuation tanks and infiltration tanks. It would also involve the removal of the Central Soakaway and the diversion of this discharge into a new network that would control the pathway of the contaminated runoff and would terminate with end of pipe treatment.

6.3.2 In assessment Phase 2a, the drainage has been categorised as follows:

a. Landside – surface water (SW) runoff from the new terminal building, plus that from the new car parks to the north of Terminal 2, would be directed into the untreated infiltration tank (referred to as Tank 2) or permeable paving. This water would not be contaminated by the airside de-icing agents and oil separators would be provided locally as required. The infiltration tank would be underground to reduce the risk of bird strikes.

b. Airside - SW runoff would also be directed towards the infiltration tank (Tank 2). The water quality would be continuously monitored and diverted to a storage tank (referred to as Tank 1) when de-icing trigger levels are reached. Contaminated water would then either be discharged to the Thames Water network (preferred option) or treated by the WTP and discharged to the treated effluent infiltration tank (referred to as Tank 3) north of the WTP (reserve option). If low or no compounds are detected, the inlet actuated valve to the storage tanks would be closed and the water would avoid the WTP and discharge directly to the south infiltration tank (Tank 2).

6.3.3 All underground water tanks (storage and infiltration) have been positioned with the bottom of the tanks at least 1 m above the 1:100 maximum water table level, so approximately 9 m above the maximum seasonal water table level. This ensures the structural integrity of the tanks is not impacted by buoyancy effects.

6.3.4 The SW drainage would be designed, where possible, as a gravity system. The drainage system is to be designed in accordance with Sewers for Adoption (Ref. 26), namely no surcharging during a critical storm event of 1 in 2 years return period and no exceedance flooding during a critical storm event of 1 in 30 years return period. All SW drainage is to be assessed for a 1 in 100 year return period with 40% added for climate change, so that any flooding is contained on site and does not impact surrounding buildings.

6.3.5 Suitable upstream management consisting of source control and continuous quality monitoring and end of pipe treatment would maximise the use of SuDS. Full retention separators would be strategically positioned for all runoff from aprons, taxiways and the runway to capture and contain the spread of fuels and oils, which otherwise could become a hazard.

6.3.6 Live monitoring of chemical loads and volumes would allow contaminated water to be diverted into the storage tanks. The DDS (**Appendix 20.4** of the ES **[TR020001/APP/5.02])** states that improved methodologies for applying the de-icing agents are under consideration (for example bunds and vacuum systems) which would limit the volume entering the drainage system and increase the re-cycled volume of de-icing agents.

6.3.7 Dependent on the drainage option implemented, the WTP would consist of up to three processes: one process for the sewage load - the sewage treatment process (STP) from Terminal 2, a second process for the potentially contaminated surface runoff - the effluent treatment process (ETP), and a third process for surface water treatment (such as solids removal) prior to re-use.

6.3.8 For the reserve option, the treated final effluent from the water treatment plant would be recycled for irrigation with the remainder suitable for discharge to the ground. The recycled water would be pumped by rising main to a tank with location to be confirmed during detailed design. All excess treated final effluent from the water treatment plant would be channelled to a separate 15,600 m^3 infiltration tank, as described in the DDS (**Appendix 20.4** of the ES **[TR020001/APP/5.02]**).

6.3.9 For both the preferred and reserve option, it is proposed to re-use some of the attenuated surface water from Tank 2 which is pumped to the water treatment plant for the removal of grit using centrifugal separators (or similar appropriate process). After this process, the greywater will be returned to the terminals via a holding tank.

6.3.10 The Northern Soakaway is not to be diverted into the Proposed Development. The areas of the Green Horizons Park (formerly New Century Park) extant planning permission, which during assessment Phase 1 discharge into the Northern Soakaway, would be diverted to discharge into the new infiltration tank (Tank 2).

6.3.11 A small section of the western end of the existing runway would continue to discharge to a local soakaway at the west end of the airport. This section of runway would also be subject to monitoring, with flows being redirected to the storage and treatment facility should Total Organic Carbon (TOC) levels trigger treatment requirements.

6.3.12 The existing connections to the TW network from the existing Terminal 1 and aprons are not proposed to be re-routed and would continue to discharge into the TW network and be treated at East Hyde Treatment Works.

Water cycle strategy for assessment Phase 2a

6.3.13 Following the pro rata approach (see **Table 5.1**), assessment Phase 2a will require 10.1 l/s (accounting for 10% water efficiency improvement measures). This constitutes an increase of 2.6 l/s against the 2019 baseline of 7.5 l/s.

6.3.14 As with assessment Phase 1 the strategy objective is to maintain the total potable demand at 7.5 l/s (adopted from DDS, **Appendix 20.4** of the ES **[TR020001/APP/5.02])** and based on data provided by Veolia). The description below outlines how this can be achieved.

Terminal water use

6.3.15 It is assumed that the water demand from Terminal 1 would remain at 4.2l/s, a conservative (reasonable worst-case) estimate considering the anticipated improvements in water efficiency. As previously described, it is assumed that 50% (2.1 l/s) of this would have to be of potable standard, while the other 50% (2.1 l/s) can be recycled water.

6.3.16 Based on the existing supply/demand profile it is assumed that Terminal 2 would require approximately 2.1 l/s (4.2 l/s * 9 mppa/18 mppa).

6.3.17 The proposed WTP would be operational and accepting all foul water from Terminal 2 building. It has been estimated that this could generate approximately 1.5 l/s of recycled water, taking account of losses during processing (assumed approximately 30% losses, which is a conservative, reasonable worst case, estimate based on professional judgement). Alternatively, the recycled water could come from the treated attenuated surface water runoff, and the final selection will be dependent on which foul water disposal option in the DDS is selected.

6.3.18 For the purpose of calculations with conservative estimates, it is assumed that 1.1 l/s of the water demand from Terminal 2 would be for potable water and 1 l/s for non-potable.

6.3.19 In this scenario the amount of recycled water available is sufficient to serve Terminal 2 with non-potable water. This leaves a surplus of 0.5 l/s of recycled water available for Terminal 1.

6.3.20 Combining the above with the rainwater from RWH introduced in assessment Phase 1 (1.3 l/s), 1.8 l/s of non-potable water available for Terminal 1. This still leaves a deficit of 0.3 l/s of non-potable water for Terminal 1 (2.1 l/s-1.8 l/s) which will need to be met by potable water.

6.3.21 This leads to a total potable water demand of both Terminal 1 and 2 of 3.5 l/s (2.1 l/s+0.3 l/s+1.1 l/s).

6.3.22 This achieves the supply and demand budget for the two terminal buildings for assessment Phase 2a (2019 baseline for terminal potable water use: 4.2 l/s). This water balance is summarised in **Table 6.2**.

Table 6.2 Water balance for Terminal water use (assessment Phase 2a)

Terminal 2					
Demand (l/s)			Non-potable supply (l/s)		Non-potable balance (l/s)
Total demand	Potable	Non-potable	Recycled wastewater	Rainwater	
2.1	1.1	1.0	1.5	-	+0.5
Terminal 1					
Demand [l/s]			Non-potable supply		Non-potable balance
Total demand	Potable	Non-potable	Recycled wastewater	Rainwater	
4.2	2.1	2.1	0.5 (T2)	1.3	-0.3

Terminal potable water baseline comparison			
Terminal 1	Terminal 2	Total	Baseline
(l/s)	(l/s)	(l/s)	(l/s)
2.4	1.1	3.5	4.2

Non-Terminal water use

6.3.23 The potable water demand for non-terminal water use is not expected to increase based on the following assumptions. The pro rata projection for non-terminal water use rises from 3.3 l/s (2019 baseline) to 5 l/s (1.7 l/s increase). Assuming conservatively (a reasonable worst case), 70% of this water is reusable and non-consumptive (non-terminal usage is unlikely to require potable grade), 3.5 l/s is available for reuse. Assuming 30% losses as before during treatment, approximately 2.5 l/s is available for reuse, which can compensate the increased demand against the 2019 baseline.

Water cycle strategy for assessment Phase 2b

6.3.24 Following the pro rata approach (see **Table 5.1**), assessment Phase 2b will require 12 l/s (13.3 l/s * 0.9 water efficiency measures). This constitutes an increase of 4.5 l/s against the 2019 baseline (7.5 l/s).

6.3.25 As with assessment Phase 1 and 2a the strategy objective is to maintain the total potable demand at 7.5l/s (adopted from DDS, **Appendix 20.4** of the ES **[TR020001/APP/5.02]**) and based on data provided by Veolia). The description below outlines how this can be achieved.

Terminal water use

6.3.26 It is assumed that, as for assessment Phase 2a, the water demand from Terminal 1 building would remain as per existing, at 4.2 l/s of water required. It is assumed that 50% (2.1 l/s) of this would have to be of potable standard, while the other 50% (2.1 l/s) can be recycled water.

6.3.27 Based on the existing supply/demand profile it is assumed proportionately that the Terminal 2 building would require approximately 3.4 l/s (extrapolated from baseline).

6.3.28 The proposed WTP would be operational and accept all foul water from Terminal 2 building. It has been estimated that this could generate approximately 2.3 l/s of recycled water, taking account of losses during processing (assumed to be 30% of water sent for processing). Alternatively, the recycled water could come from the treated attenuated surface water runoff and the final selection will be dependent on which foul water disposal option in the DDS is selected.

6.3.29 Assuming a 50-50 split of potable/non potable in Terminal 2, the rate of water supply required will be ~1.7 l/s from both sources.

6.3.30 In this scenario the amount of recycled water available is sufficient to serve Terminal 2 with non-potable water, while leaving 0.6 l/s available for Terminal 1.

6.3.31 Therefore, the total potable water demand for Terminals 1 and 2 is 4.0l/s. This is the sum of Terminal 1 potable water demand (2.1 l/s), Terminal 2 potable water demand (1.7l/s) and the deficit of Terminal 1 non-potable water demand that cannot be met with reuse or RWH of 0.2 l/s [2.1 l/s (non-potable demand) - 0.6 l/s (Terminal 2 surplus) – 1.3 l/s (RWH)].

6.3.32 This achieves a supply and demand budget for the two terminal buildings for assessment Phase 2b that does not exceed the 2019 baseline of 4.2 l/s for terminal use, as summarised in **Table 6.3**.

Table 6.3 Water balance for Terminal water use (assessment Phase 2b)

Terminal 2					
Demand (l/s)			Non-potable supply (l/s)		Non-potable balance (l/s)
Total demand	Potable	Non-potable	Recycled wastewater	Rainwater	
3.4	1.7	1.7	2.3	-	+0.6
Terminal 1					
Demand [l/s]			Non-potable supply [l/s]		Non-potable balance [l/s]
Total demand	Potable	Non-potable	Recycled wastewater	Rainwater	
4.2	2.1	2.1	0.6 (T2)	1.3	-0.2

Terminal potable water baseline comparison			
Terminal 1	Terminal 2	Total	Baseline
(l/s)	(l/s)	(l/s)	(l/s)
2.3	1.7	4.0	4.2

Non-Terminal water use

6.3.33 The potable water demand for non-terminal water use is not expected to increase based on the following assumptions. The pro rata projection for non-terminal water use rises from 3.3 l/s (2019 baseline) to 5.8 l/s (2.5 l/s increase). Assuming 70% of this water is reusable and non-consumptive (as non-terminal usage is unlikely to require potable grade), 4.1 l/s is available for reuse. Assuming 70% recovery, approximately 2.9 l/s is available for reuse, which can compensate the increased demand against the 2019 baseline.

7 SUMMARY AND CONCLUSIONS

7.1.1 A water supply and demand profile for the existing airport, based on an average water demand figure of 7.5 l/s has been compiled. The demand figure has been adopted from the DDS (**Appendix 20.4** of the ES **[TR020001/APP/5.02]**) and is based on data provided by Veolia.

7.1.2 This data has been used to determine a water supply/demand profile for the Proposed Development based on limiting potable water to the existing average rate of 7.5 l/s (2019 baseline), and the reuse of treated recycled effluent and attenuated surface water where possible and appropriate. To maintain the 2019 potable water baseline, 12 l/s of non-potable water should be available across the Proposed Development across all assessment phases. As described in the DDS (**Appendix 20.4** of the ES **[TR020001/APP/5.02])**, the WTP will recycle 6 l/s for irrigation purposes and the remaining non-potable demand (6 l/s) will be supplied through attenuated surface water, but the final breakdown will be dependent on which foul water disposal option in the DDS is selected.

7.1.3 A successful water balance has been achieved for the terminal buildings and the non-terminal water usage throughout assessment Phases 1, 2a and 2b that does not exceed the 7.5 l/s baseline, by showing individually that the potable water demand of the terminals and the non-terminal water usage will not exceed the 2019 baseline of 4.2 and 3.3 l/s respectively.

7.1.4 All foul water flows from Terminal 1 would still be discharged to the public foul water sewerage network, operated and maintained by TW. As a result, this water would not be available for on-site treatment and would not be available for reuse.

7.1.5 Calculations have been undertaken to determine the water available if a general rainwater harvesting system was adopted, as is proposed, across the Proposed Development. Further design considerations and the interaction of the rainwater harvesting systems with the treatment works would be undertaken at detailed design stage to confirm the findings of this WCS, take into account more detailed and recent information, and ensure this water balance objective is achieved.

GLOSSARY AND ABBREVIATIONS

Term	Definition
AAR	Airport Access Road
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
AWB	Artificial Water Bodies
BGS	British Geological Society
CBC	Central Bedfordshire Council
CoCP	Code of Construction Practice
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EHTW	East Hyde Treatment Works
ES	Environmental Statement
EU	European Union
Expansion Area	The area of Proposed Development to the east of the existing airport within the Main Application Site where works are proposed to take place.
FRA	Flood Risk Assessment
FWMA	Flood and Water Management Act
HCC	Hertfordshire County Council
HEWRAT	Highways England Water Risk Assessment Tool
HWMB	Heavily Modified Water Bodies
LBC	Luton Borough Council
Luton Rising	A trading name for London Luton Airport Limited
LLAOL	London Luton Airport Operation Limited
LLFA	Lead Local Flood Authority
NPPF	National Planning Policy Framework
PFRA	Preliminary Flood Risk Assessment
RBD	River Basin District
RBMP	River Basin Management Plan
ROFSW	Risk of Flooding from Surface Water
RWH	Rainwater harvesting
SFRA	Strategic Flood Risk Assessment
STW	Sewage Treatment Works
SuDS	Sustainable Urban Drainage Systems

Term	Definition
SWMP	Surface Water Management Plan
TW	Thames Water
WFD	Water Framework Directive
WTP	Water Treatment Plant

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