14 WATER RESOURCES & FLOOD RISK

14.1 INTRODUCTION

14.1.1 Company

This chapter has been prepared by WYG Engineering Ltd.

14.1.2 Author

This chapter has been authored by Ross Armstrong (MSc, C.WEM, CEnv), a Senior Engineer at WYG, and reviewed by Tom Beavis (BSc, C.Eng, M.I.C.E.), an Associate Director at WYG. Both individuals are considered suitably qualified and experienced to prepare this chapter in the role of 'competent experts' in relation to water resources and flood risk.

14.1.3 Chapter Purpose

This chapter of the ES assesses the likely significant effects of the proposed development on the environment in terms of water resources and flood risk. The chapter and its supporting appendix describe the planning policy context, the assessment methodology; the baseline conditions at the application site and surroundings; the likely significant effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; the likely residual effects after these measures have been employed; and the cumulative effects. In summary, the objectives of the chapter are to:

- Assess the likely significant effects of the proposed development on water resources and flood risk.
- Confirm any mitigation measures required to prevent, reduce or offset any significant adverse effects identified.
- Evaluate likely residual effects of the proposed development on water resources and flood risk after any such mitigation measures have been employed.

14.1.4 Chapter Updates for Revised Layout (December 2020 Submission)

This ES chapter relating to Water Resources has been reviewed, as part of the December 2020 submission, against the revised design; planning application consultation comments; and baseline data validity, and for each it was considered that no amendments to the chapter were required, Therefore, in accordance with the methodology outlined in Chapter 2, a Level 2 update has been undertaken.

14.1.5 Chapter Updates for Revised December 2020 Submission

This ES Chapter has been reviewed against the following aspects and for each, it has been confirmed that there are no amendments required to the content of the chapter (a 'Level 1' update):

- Proposed development design changes: are of no specific relevance to this assessment;
- Legislation/policy revisions: there have been no related updates to legislation/policy that have affected either the methodology or findings of this assessment; and
- Baseline data validity: there have been no relevant changes to the baseline conditions.

14.1.6 Figures

- There are no standalone figures supporting this chapter. Relevant figures are contained within the Flood Risk & Drainage Assessment (FRDA), included in ES Volume III.

14.1.7 Appendices

The following appendices should be consulted in relation to this chapter:

- Appendix 14.1: Flood Risk & Drainage Assessment (FRDA).

14.2 METHODOLOGY

14.2.1 Guidance

Industry guidance and standards which have been consulted in the undertaking of this assessment and associated Appendices are as follows:

- Guidelines for Environmental Impact Assessment, 2004 [1].
- Guidelines for Environmental Impact Assessment, 2006 [2].
- Planning Practice Guidance (PPG) Flood Risk & Coastal Change, 2014 [3].
- Liverpool City Council Strategic Flood Risk Assessment (SFRA), 2008 [4].
- Liverpool City Council SFRA, 2018 [5].
- Liverpool City Council Preliminary Flood Risk Assessment (PFRA), 2011 [6].
- Liverpool Local Flood Risk Management Strategy (LFRMS), 2011 [7].
- Flood Risk Assessments: Climate Change Allowances, December 2019 [8].
- United Utilities' Final Water Resources Management Plan, 2019 [9].
- Sewers for Adoption 7th Edition, 2012 [10].
- Non-Statutory Technical Standards for Sustainable Drainage Systems (SuDS), 2015 [11].
- The Building Regulations, Approved Document H: Drainage and Waste Disposal, 2015 [12].
- The SuDS Manual, 2015 [13].

14.2.2 Legislation and Policy

The following summarises planning and environmental legislation and policies which are considered relevant to water resources and flood risk in relation to the proposed development, and accordingly have been consulted in the undertaking of the ES process:

- European
  - Floods Directive, 2007 [14].
- National
  - Environmental Protection Act, 1990 [15].
  - Water Industry Act, 1991, as amended by the Water Industry Act, 1999 [16].
  - Land Drainage Act, 1991, as amended by the Land Drainage Act, 1994 [17].
  - Environment Act, 1995 [18].
  - Water Act, 2003 [19].
  - Flood Risk Regulations, 2009 [20].
  - Water Resources Act, 1991 [21].
  - Flood and Water Management Act, 2010 [22].
  - National Planning Policy Framework (NPPF) (Flood Risk and Coastal Change), 2019 [23].
- Local
  - Liverpool Unitary Development Plan, 2002 [24]:
    - Policy EP12 Protection of Water Resources; and
    - Policy EP13 Flood Prevention.

14.2.3 Consultees

The following statutory bodies have been consulted in the undertaking of this assessment and associated appendix. Consultations were undertaken by CBRE in June – July 2017 as part of the Scoping Opinion exercise and in December 2019 as part of the FRDA.

- Environment Agency;
- Liverpool City Council (in their role as Lead Local Flood Authority); and
- United Utilities.

The outcome of this consultation is detailed in Table 2.1 in Chapter 2 of this ES Volume.

14.2.4 Scoping

No specific comments relating to flood risk were received as part of the Scoping Opinion.

The Environment Agency's principle concern is potential impacts to controlled water. The Environment Agency tentatively agree that the likelihood for land contamination is low, but the proposed development would be located above a Principle Aquifer, which is considered a sensitive receptor.

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14.2.5 Consideration of Climate Change

Climate change is integral to the assessment of potential effects and mitigation design in relation to water resources and flood risk.

The following climate change allowances have been adopted for the purposes of this chapter, in accordance with the Environment Agency's guidance, which requires the adoption of climate change allowances on a catchment basis, and subject to the 'flood risk vulnerability' and design life of a proposed development.

- Assessment of fluvial flood risk: for 'More Vulnerable' development located within Flood Zone 1 within the North West river basin district apply the 'Central' (30%) climate change allowance, based on a development lifetime into the '2080s' epoch.
- Assessment of surface water flood risk: for all development types within the UK and regardless of flood zones, apply the 'Central' (20%) and 'Upper End' (40%) climate change allowances, based on a development lifetime into the '2080s' epoch.
- Design of surface water drainage system: apply the 'Upper End' (40%) climate change allowance to the 1 in 100 year storm return period.

14.2.6 Consideration of Human Health

Human health is an indirect consideration within this chapter, specifically in relation to foul water drainage. This is on the basis that any increase in the rate and volume of foul water discharge from a site, if unmanaged, could result in a decrease in water quality in any receiving waterbodies, which if used for consumptive purposes, could have an adverse effect on human health. Effects on water quality are considered further in this chapter.

14.2.7 Consideration of Risk of Major Accidents and/or Disasters

Depending on their scale, flood events can be considered as major accidents / disasters, and as such the consideration of such scenarios is relevant to this chapter.

However, the likelihood of a major flood event occurring at the site is considered sufficiently low such that detailed consideration of this accident / disaster type within the main volume of the ES is not warranted.

14.2.8 Alternatives

Chapter 5 outlines the alternatives considered in relation to the proposed development.

With specific reference to this chapter, alternative design interventions / mitigation measures have been considered in relation to the potential technical solutions for surface and foul water management and disposal.

The FRDA, included as Appendix 14.1 in ES Volume III, outlines the alternative drainage management and disposal options explored, the opportunities and constraints posed by each option, and details the reasoning behind the selected proposed approach.

14.2.9 Assessment of Baseline Conditions & Receptor Sensitivity

The FRDA (included as Appendices 14.1), undertaken in accordance with the guidance described in section 14.2 and in consultation with statutory consultees, was used to inform the baseline conditions and assessment of potential significant effects in this chapter.

The baseline conditions at the application site were also established through:

- a site walkover undertaken in December 2019;
- a review of the existing stadium's foul and surface water drainage records held by Everton Football Club;
- United Utilities sewer records; and
- a review of the BGS online database in respect to anticipated ground conditions.

The study area for this chapter principally comprises the application site and an area of 500m around the application site but extends to the relevant natural and man-made water resource catchments, where necessary, and the United Utilities sewer network which serves the application site.

This chapter considers the existing baseline situation, as of 2019; the demolition / enabling works stage from 2024 – 2025; the construction stage from 2025 – 2028; and, the operational stage from 2028.

The NPPF and the PPG require consideration of a 100 year 'design life' for residential development in relation to the climate change allowance. As such, the operational stage is assessed from 2028 – 2128. This relates to the 2080s epoch when assessing the climate change allowances.

In accordance with the guidance noted above, the water resource and flood risk receptors to be assessed include:

- Flood risk (specifically in relation to flood risk within the application site and downstream catchments) including surface water and foul drainage;
- Surface water drainage (including surface water and groundwater quality);
- Foul water drainage; and
- Potable water supply.

Given that the distance to the nearest watercourse (River Mersey) is 2.7km and there are no direct discharges into the watercourse, there is unlikely to be any impact on the fluvial geomorphology of watercourses, therefore this is scoped out of this assessment and is not considered further.

Table 144.1 sets out the scale of sensitivity that has been applied to receptors identified and considered within this assessment.

Table 144.1

Scale of water resource and flood risk sensitivity used in the assessment

SENSITIVITY	DESCRIPTION
Very High	No ability to absorb effect without fundamentally altering baseline condition, and/or is of international importance, such as: ■ Within Flood Zone 3b / very high risk of flooding identified. ■ No capacity within discharge receiving environment, i.e. drainage system and/or waterbody. ■ Water resources classified as under very 'serious' water stress.
High	Little ability to absorb effect without fundamentally altering baseline condition, and/or is of national importance, such as: ■ Within Flood Zone 3a / high risk of flooding identified. ■ Restricted capacity within discharge receiving environment, i.e. drainage system and/or waterbody. ■ Water resources classified as under 'serious' water stress.
Medium	Moderate capacity to absorb effect without significantly altering baseline condition, and/or is of regional importance, such as: ■ Within Flood Zone 2 / medium risk of flooding identified. ■ Limited capacity within discharge receiving environment, i.e. drainage system and/or waterbody. ■ Water resources classified as under 'moderate' water stress.
Low	Receptor tolerant of effect without detriment to baseline condition, and/or is of local importance, such as: ■ Within Flood Zone 1 / low risk of flooding identified. ■ Unrestricted capacity within discharge receiving environment, i.e. drainage system and/or waterbody. ■ Water resources classified as under 'low' water stress.
Negligible	Receptor tolerant of effect without any effect to baseline condition, and/or is of no importance, such as: ■ Within Flood Zone 1 / negligible risk of flooding identified. ■ Unlimited capacity within discharge receiving environment, i.e. drainage system and/or waterbody. ■ No water resource stress identified.

14.2.10 Assessment of Magnitude

The assessment was undertaken based on the description of development contained in Chapter 3 of this volume of the ES. Table 144.2 indicates the scale of impact magnitude that has been used in undertaking the assessment.

Table 144.2
Scale of magnitude for water resource and flood risk impacts used in the assessment

MAGNITUDE	DESCRIPTION
Very large	Total loss or major alteration to key elements / features of the baseline conditions such that the character / composition / attributes will be fundamentally changed, such as: ■ Flood risk posed to the application site and/or within study area. ■ Capacity within discharge receiving environment, i.e. drainage system and/or waterbody. ■ Water resources available within the 'Water Resource Zone'.
Large	Loss or substantial alteration to one or more key elements / features of the baseline conditions such that character / composition / attributes of the baseline will be materially changed, i.e. loss or alteration to those attributes noted above.
Medium	A shift away from baseline conditions. Change arising from the loss / alteration will be discernible / detectable, but not material. The underlying character / composition / attributes of the baseline condition will be similar to the baseline circumstances / situation, i.e. measurable change to those attributes noted above.
Small	Very little change from baseline conditions.
Negligible	Change barely distinguishable, approximating to a 'no change' situation, i.e. no measurable change to those attributes noted above.

14.2.11 Assessment of Significance

The assessment of significance within this chapter is based on the matrix presented in Table 144.3.

Table 144.3
Significance Matrix

MAGNITUDE OF EFFECT	SENSITIVITY OF RECEPTOR				
	Very High	High	Medium	Low	Negligible
Very Large	Major	Major	[3]	Moderate	[1]
Large	Major	[3]	Moderate	Minor	[2]
Medium	[3]	Moderate	Minor	[2]	Negligible
Small	Moderate	Minor	[2]	Negligible	Negligible
Negligible	[1]	[2]	Negligible	Negligible	Negligible
[1] The choice between 'Moderate', 'Minor' and 'Negligible' significance will depend on the specifics of the impact and will be down to professional judgement and reasoning.					
[2] The choice between 'Minor' and 'Negligible' significance will depend on the specifics of the impact and will be down to professional judgement and reasoning.					
[3] The choice between 'Major' and 'Moderate' significance will depend on the specifics of the impact and will be down to professional judgement and reasoning.					
n.b. 'Negligible' significance includes 'Neutral' and 'No Impact' assessments.					

14.2.12 Relevant Associated Development

The need for off-site utility infrastructure upgrading works, such as surface water network infrastructure, foul water sewage treatment and network infrastructure, and potable water infrastructure is currently unknown, and as such will be assessed at Reserved Matters stage as part of a 'multi-stage' assessment approach.

14.2.13 Assumptions/Limitations

In undertaking the water resource and flood risk assessment of the application site and wider surrounding area, there are a number of limitations and constraints affecting the outputs from this work. These include:

- The water resource and flood risk receptors have been defined using a combination of published data sources, and project-specific assessments. The availability of published data with which to inform this assessment is considered robust and therefore this approach is considered acceptable.
- No site-specific topographical survey and site investigation work were undertaken at this stage of the assessment. In the absence of such information, the best available published data sources have been used.
- The assessment process is designed to enable good decision-making based on the best possible information about the environmental implications of a proposed development. However, there will always be some uncertainty as to the exact scale and nature of the environmental effects identified. Where this is the case, this has been highlighted in the assessment of effects. This arises through the detail of information available at the time of the assessment and the limitations of the prediction process itself.
- The application is made in outline, and the end users of the development site are not yet known. Accordingly, a number of assumptions have been made on the potential end users and uses of the site.

14.3 BASELINE CONDITIONS

14.3.1 Existing Baseline

KEY RECEPTORS	DESCRIPTION	SENSITIVITY	FURTHER INFORMATION
Flood risk at the application site	The nearest Main River to the site is the tidal River Mersey, which is located 2.7km to the west of the application site in the Mersey Estuary. The Environment Agency's Flood Map for Planning indicates that the application site is located entirely within Flood Zone 1, i.e. land having a less than 1 in 1,000 annual probability of fluvial or tidal flooding, and therefore at low risk of tidal and fluvial flooding. Stanley Park Lake is located approximately 40m to the south of the site plus it is separated from the site by Walton Lane and raised mounds on the northern side of the lake. Overall the risk of flooding from Stanley Park Lake to the application site is low. The Environment Agency's Flood Risk from Surface Water Map indicates that the surface water flood risk to the site is largely very low, with the exception of small areas of ponding on the surface car park / access road to the surface car park, which present a low risk. A review of British Geological Survey (BGS) mapping and boreholes indicates that the site is underlain by made ground overlying a bedrock geology comprising the Chester Formation (Principal Aquifer). Superficial deposits are generally not present, with the exception of a small area in the south of the site which is underlain by Devensian Till (Secondary (undifferentiated) aquifer). There is no record of the presence of any groundwater. The Preliminary Flood Risk Assessment (PFRA) for Liverpool states that records do not show any instances of groundwater flooding and the Areas Susceptible to Groundwater Flooding Map indicates that the site is not located within a 1km^2 grid that is susceptible to groundwater flood emergence. On the basis, the risk of groundwater flooding to the application site is low. There are no known records of flooding from sewers or the Leeds & Liverpool Canal and the application site is located outside of the reservoir flood extent, as shown on the Environment Agency's Flood Risk from Reservoirs Map. Based on the low risk of flooding identified at the application site, this receptor is concluded to be of low sensitivity. The above baseline conditions are considered to remain the same in the future baseline scenario, i.e. with the consented scheme in place.	Low	Section 3, FRDA, Appendix 14.1
Surface water drainage at the application site	The application site is currently developed and there is an existing drainage system in place. Existing records show that surface water runoff from the application site is drained via private drainage to the public combined sewer network. There are approximately 10 known connections from the site to the adjacent public combined sewer system located to the south of the site and in the surrounding public highways. On the basis that the existing unrestricted flow from the site does not result in any flooding either on or off the site, or discharges to the Principal Aquifer, this receptor is concluded to be of 'low' sensitivity. The above baseline conditions are considered to remain the same in the future baseline scenario, i.e. with the consented scheme in place, assuming no mitigation.	Low	Section 2.2, FRDA, Appendix 14.1
Foul water drainage at the application site	The application site is currently developed and there is an existing drainage system in place. Existing records show that foul water runoff from the application site is drained via private drainage to the public combined sewer network. There are connections to public combined sewers in the south of the site and in the surrounding public highways. On the basis that the receiving environment, i.e. public sewer, have 'unrestricted' foul capacity, this receptor is concluded to be of 'low' sensitivity. The above baseline conditions are considered to remain the same in the future baseline scenario, i.e. with the consented scheme in place, assuming no mitigation.	Low	Section 2.2, FRDA, Appendix 14.1
Potable water demand at the application site	Potable water is currently supplied to the application site by United Utilities. Based on there being no water stress identified in the 'New Strategic Resource Zone' within which the application site is located, this receptor is concluded to be of 'negligible' sensitivity. The above baseline conditions are considered to remain the same in the future baseline scenario, i.e. with the consented scheme in place, assuming no mitigation.	Negligible	

14.4 POTENTIAL SIGNIFICANT IMPACTS

PHASE	DESCRIPTION	ADVERSE/BENEFICIAL
Construction	The proposed development has the potential to result in changes to the surface water and sewer flood risk at the application site and in the surrounding area as a result of the mounding of materials and placement of other structures within the application site and/or the alteration of overland flow characteristics/routes.	Adverse

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PHASE	DESCRIPTION	ADVERSE/BENEFICIAL
Construction	The proposed development has the potential to result in changes to surface water drainage at the application site as a result of the breaking-up and removal of existing hard standing areas, which could reduce the rate and volume of surface water runoff from the application site and increase the capacity of the receiving environment (i.e. drainage system).	Beneficial
Construction	The proposed development has the potential to result in changes to foul water drainage at the application site as a result of changes to the rate and volume of foul water discharged from the application site through construction and related welfare activities. An increase in the foul water discharge rate and volume from the application site could have an adverse impact upon the capacity of the receiving environment (i.e. public sewer).	Adverse
Construction	The proposed development has the potential to result in changes to the quality of surface water entering the receiving environment (i.e. drainage system) as a result of silt-laden runoff if allowed to drain into sewers untreated and pollution from the release of any site substances (e.g. fuel, oils, cements) as the result of an accidental leak or spill if allowed to drain into sewers untreated.	Adverse
Construction	The proposed development has the potential to result in changes to the quality of groundwater, and the Principal Aquifer, if contaminants are mobilised, pass onto permeable land and percolate down to contaminate the groundwater (contamination is considered in more detail in Chapter 13 of this ES Volume). In addition, piling and excavations could alter groundwater flow movements and create preferential pathways for pollutants.	Adverse
Construction	The proposed development has the potential to result in changes to potable water demand at the application site as a result of changes to potable water use, through construction and related welfare activities. A greater and more regular demand for potable water at the application site is anticipated during construction of the application site, which could impact upon water resources available within the New Strategic Resource Zone.	Adverse
Operation	The proposed development has the potential to result in changes to the surface water and sewer flood risk at the application site and in the surrounding area as a result of the placement of proposed structures and buildings within the application site and/or the alteration of overland flow characteristics/routes.	Adverse
Operation	The proposed development has the potential to result in changes to surface water drainage at the application site as a result of a reduction in impermeable areas across the application site, which could reduce the rate and volume of surface water runoff from the application site and increase the capacity of the receiving environment (i.e. drainage system).	Beneficial
Operation	The proposed development has the potential to result in changes to foul water drainage at the application site as a result of changes to the rate and volume of foul water discharged from the application site through the occupation and use of the proposed development. An increase in the foul water discharge rate and volume from the application site could have an adverse impact upon the capacity of the receiving environment (i.e. public sewer).	Adverse
Operation	The proposed development has the potential to result in changes to the quality of surface water entering the receiving environment (i.e. drainage system) as a result of silt-laden runoff if allowed to drain into sewers untreated.	Adverse
Operation	The proposed development has the potential to result in changes to the quality of groundwater as a result of contamination of groundwater if contaminants are mobilised, pass onto permeable land and percolate down to contaminate the groundwater (contamination is considered in more detail in Chapter 13 of this ES Volume).	Adverse
Operation	The proposed development has the potential to result in changes to potable water demand at the application site as a result of changes to potable water use, through permanent habitable dwellings and other regular uses. A greater and more regular demand for potable water at the application site is anticipated due to the permanent occupancy of the site, which could impact upon water resources available within the New Strategic Resource Zone.	Adverse

14.5 DESIGN INTERVENTIONS

DESIGN INTERVENTION	DESCRIPTION	REASON FOR INTERVENTION	FURTHER INFORMATION
New surface water drainage system	The proposed surface water drainage system entails the management of rainfall within the application site by routing surface water via SuDS and attenuation features to the public sewer. The overall system has been designed to accommodate the 1 in 100 year storm event plus 40% allowance for climate change, in line with national and local policy. The inclusion of SuDS elements within the strategy also provides adequate treatment of surface water, thereby mitigating the potential impact on surface water and groundwater quality.	Ensure that surface water runoff is managed on site to avoid increasing the risk of flooding to areas elsewhere, in accordance with national and local policy guidance. The proposed system offers a more formalised strategy compared to the existing baseline condition, with a greater design capacity and reduction in surface water runoff off-site.	Section 4.5, FRDA, Appendix 14.1
New foul water drainage system	The proposed system incorporates the management of foul water within the application site by routing foul water to public sewer. The proposed foul flow and discharge strategy has been agreed in principle by United Utilities.	Ensure that foul water is managed and discharged in accordance with national guidance and United Utilities' agreement, thereby ensuring the capacity of the receiving sewer network is not exceeded and human health, including that of future application site occupants, and the general population within the study area, is not adversely impacted.	Section 6, FRDA, Appendix 14.1

14.6 ASSESSMENT PRE-MITIGATION (INCLUDING DESIGN INTERVENTIONS)

14.6.1 Proposed Development Scenario

PHASE	RECEPTOR(S) AFFECTED	IMPACT	MAGNITUDE PRE-MITIGATION	SIGNIFICANCE PRE-MITIGATION	MITIGATION PROPOSED?	FURTHER INFORMATION
Construction	Flood risk at the application site	The application site is located within Flood Zone 1 and at low risk of flooding from all other sources assessed. As such, construction activities, such as the mounding of materials and placement of other structures, are not anticipated to occur within areas identified as being at risk of flooding and therefore there will be no loss of floodplain storage and/or the alteration of overland flow characteristics / routes. The flood risk posed to the application site and in the surrounding area is not expected to change as a result of the construction of the proposed development therefore no significant effects are anticipated.	Negligible	Negligible	No	Section 3, FRDA, Appendix 14.1
Construction	Surface water drainage at the application site	Given the existing developed nature of the application site, construction activities will not alter the amount of impermeable surfacing across the application site, and therefore no significant alteration in the rate and/or volume of surface water runoff is anticipated. Furthermore, as confirmed in the Construction Strategy (Chapter 4 of this ES Volume), the main drainage and sewer system, including SuDS, will be installed early in the construction works and all construction works on site will be undertaken in accordance with Best Practice, as governed by a Construction Environmental Management Plan (CEMP). Overall, the change to the capacity of the receiving environment (i.e. public sewer) is expected to be small, therefore no significant effects are anticipated.	Negligible	Negligible	No	Section 4.5, FRDA, Appendix 14.1
Construction	Foul water drainage at the application site	There will be a peak of approximately 100 operatives and 20 staff on site, including subcontractors during demolition / site preparation and construction, the duration of which is expected to be 4 years 2 months. Foul discharges will be limited to 'standard' construction activities and associated welfare facilities. Compared to the baseline peak foul flow, which peaks and falls based on the stadium use and capacity, the peak foul flow during construction will increase. However, the change to the capacity of the receiving environment (i.e. public sewer) is expected to be small, therefore no significant effects are anticipated.	Small	Negligible	No	Section 6, FRDA, Appendix 14.1
Construction	Potable water demand at the application site	This will be a peak of approximately 100 operatives and 20 staff including subcontractors during demolition and site preparation and construction, the duration of which is expected to be 4 years 2 months. Anticipated potable water uses during the construction phase will include welfare facilities, contamination remediation (if necessary), construction activities (e.g. mortar silos, concrete mixing and internal wet trades etc.) and cleaning operations (e.g. wheel wash and road sweepers etc.). The water demands of such activities are expected to be greater than the current baseline condition but have no demonstrable adverse impact on water resources available within the New Strategic Resource Zone, therefore no significant effects are anticipated.	Medium	Negligible	Yes	
Operation	Flood risk at the application site	The application site is located within Flood Zone 1, and at low risk of flooding from all other sources assessed. As such, operational activities, such as the placement of proposed structures and buildings, are not anticipated to occur within areas identified as being at risk of flooding and therefore there will be no loss of floodplain storage and/or the alteration of overland flow characteristics / routes. The flood risk posed to the application site and in the surrounding area is not expected to change as a result of the operation of the proposed development therefore no significant effects are anticipated.	Negligible	Negligible	No	Section 3, FRDA, Appendix 14.1
Operation	Surface water drainage at the application site	Surface water runoff from the developed site will be managed on site and discharged at a controlled rate to the public sewer network, which offers a significant betterment from the existing drainage arrangements. The inclusion of SuDS elements within the surface water drainage strategy provides adequate treatment of surface water, thereby mitigating the potential impact on surface water and groundwater quality. As such, there is expected to be a substantial beneficial alteration to the capacity of the receiving environment (i.e. public sewer) as a result of the proposed 'design intervention'.	Large	Minor Beneficial	No	Section 4.5, FRDA, Appendix 14.1
Operation	Foul water drainage at the application site	Whilst the occupation and use of the proposed development will increase the rate and volume of foul water generated within the application site, no significant impact is anticipated based on the new foul water drainage system 'design intervention'. This is designed to manage and discharge foul water in accordance with current guidance, thereby ensuring the capacity of the receiving sewer network is not exceeded and human health, including that of future application site occupants, and the general population within the study area, is not adversely impacted.	Negligible	Negligible	No	Section 6, FRDA, Appendix 14.1
Operation	Potable water demand at the application site	Based on the proposed uses compared to the existing application site use, the potable water demand of the proposed development during its operation is anticipated to be greater and more frequent than the current baseline condition. However, given that there is no water stress in the New Strategic Resource Zone, no significant effects are anticipated.	Medium	Negligible	Yes	

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14.7 MITIGATION & ENHANCEMENT MEASURES

PHASE	POSSIBLE EFFECT BEING MITIGATED	MITIGATION MEASURE	HOW SECURED / TRIGGER	MAGNITUDE POST-MITIGATION	ADVERSE/BENEFICIAL	FURTHER INFORMATION
Construction	Increase in potable water demand	Given the essential use of water during the construction phase, it is not feasible to actively restrict water usage. Nevertheless, standard measures will be incorporated into the construction phase to limit potable water demand, use and wastage wherever practicable (i.e. ensure water supply connections are not leaking etc.). These measures will be formalised in the CEMP for the proposed development.	Planning condition	Small	Adverse	
Operation	Increase in potable water demand	Standard measures will be incorporated through the detailed design of the proposed development to reduce water use. Such measures will likely include installation of water efficient welfare devices, and landscaping and open space areas designed to be of low water use. Confirmation will also be sought from United Utilities to ascertain whether their existing infrastructure is sufficient to supply the proposed development, with any necessary off-site reinforcement works being undertaken as part of the construction phase.	Planning condition	Small	Adverse	

14.8 ASSESSMENT POST-MITIGATION

14.8.1 Proposed Development Scenario

PHASE	RECEPTOR	RESIDUAL IMPACT	RESIDUAL EFFECT					
			SIGNIFICANCE	ADV/BEN	ST/MT/LT	D/IND	P/T	R/IRR
Construction	Flood risk at the application site	No mitigation proposed, and therefore no change from pre-mitigation assessment.	Negligible	No impact	-	-	-	-
Construction	Surface water drainage at the application site	No mitigation proposed, and therefore no change from pre-mitigation assessment.	Negligible	No impact	-	-	-	-
Construction	Foul water drainage at the application site	No mitigation proposed, and therefore no change from pre-mitigation assessment.	Negligible	No impact	-	-	-	-
Construction	Potable water demand at the application site	With the implementation of the proposed mitigation, the magnitude of effect is expected to reduce to small, still resulting in a negligible effect.	Negligible	No impact	-	-	-	-
Operation	Flood risk at the application site	No mitigation proposed, and therefore no change from pre-mitigation assessment.	Negligible	No impact	-	-	-	-
Operation	Surface water drainage at the application site	No mitigation proposed, and therefore no change from pre-mitigation assessment.	Minor	BEN	LT	D	P	R
Operation	Foul water drainage at the application site	No mitigation proposed, and therefore no change from pre-mitigation assessment.	Negligible	No impact	-	-	-	-
Operation	Potable water demand at the application site	With the implementation of the proposed mitigation, the magnitude of effect is expected to reduce to small, still resulting in a negligible effect.	Negligible	No impact	-	-	-	-

Key: ADV/BEN = Adverse/Beneficial; ST/MT/LT = Short-term/Medium-term/Long-term; D/IND = Direct/Indirect; P/T = Permanent/Temporary; R/IRR = Reversible/Irreversible

14.9 WATER RESOURCES AND FLOOD RISK: INTER-DEVELOPMENT CUMULATIVE SCHEME EFFECTS

This assessment has considered other committed schemes within 500m of the application site, which are considered to have potential to result in cumulative scheme effects. Other committed schemes within 500m that are not deemed to have potential to result in cumulative scheme effects are not considered within this assessment, nor are any committed schemes beyond 500m as they are deemed too far away.

WATER RESOURCES & FLOOD RISK

CUMULATIVE SCHEME	SCHEME DESCRIPTION	POTENTIAL FOR CUMULATIVE EFFECTS?	CONSIDERED WITHIN ASSESSMENT?
Walton Lane, Liverpool	The development comprises the erection of a residential block containing 106 dwellings, car parking, and associated landscaping and access road.	The Walton Lane development site is located to the north of Walton Lane and east of Bullens Road adjacent to Goodison Park. The Walton Lane development site is currently vacant brownfield land with unrestricted surface water runoff to a public combined sewer in Diana Street, which drains into the combined sewer in Bullens Road then Walton Lane, i.e. the same sewer network draining Goodison Park. The Walton Lane development site proposes to attenuate surface water runoff on site and restrict discharge to the combined sewer in Bullens Road to 28 l/s, which represents a 30% betterment of the existing rate and therefore a beneficial effect on surface water drainage. There is unlikely to be a significant increase in foul flows or potable water demand, and therefore no cumulative effects are anticipated with regard to the proposed development.	No

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