

Halton Borough Council Local Plan Site Screening

Level 2 Strategic Flood Risk Assessment – Site MUA9 Screening

Draft Report

July 2019

www.jbaconsulting.com



Municipal Building

Kingsway

Widnes

WA8 7QF

JBA Project Manager

Mike Williamson
 Mersey Bank House
 Barbould Street
 WARRINGTON
 Cheshire
 UNITED KINGDOM
 WA1 1WA

Revision history

Revision Ref/Date	Amendments	Issued to
P01 / July 2019	N/A	Alasdair Cross

Contract

This report describes work commissioned by Anne Moyers, on behalf of Halton Borough Council, by an email dated 3 May 2019. Hannah Bishop, Joseph Landells-Molloy and Mike Williamson of JBA Consulting carried out this work.

Prepared by Hannah Bishop BSc (Hons)

Technical Assistant

Joseph Landells-Molloy MEng (Hons) GMICE

Assistant Engineer

Reviewed by Mike Williamson BSc MSc CGeog FRGS EADA

Principal Flood Risk Analyst

Approved by..... Howard Keeble MPhil BEng BSc CEng CEnv CSci CWEM
 MICE MCIWEM MCMi IMaPS

Technical Director

1 MUA9 (DALP Sub)

Proposed Site	MUA9 (DALP Sub)
Site area (ha)	8.97
Existing use	Mixed commercial / light industry
Existing flood risk vulnerability classification	Less vulnerable
Proposed use	Mixed use
Proposed development flood risk vulnerability classification	More vulnerable
Proposed development impermeable area (ha)	7.62

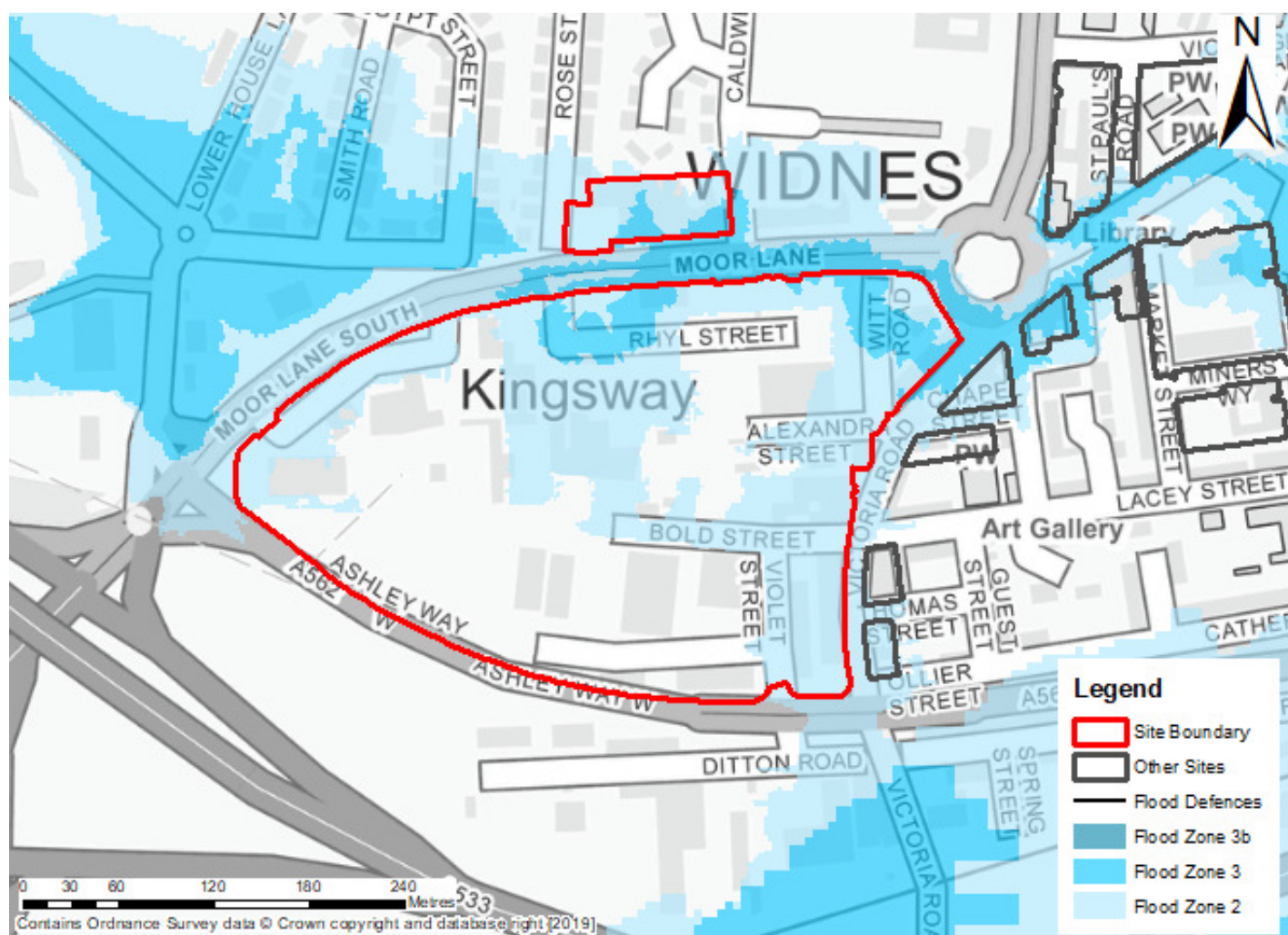


Figure 1-1 Flood zone mapping with flood defences (there are no flood defences close to the site)

Proposed Site

MUA9 (DALP Sub)

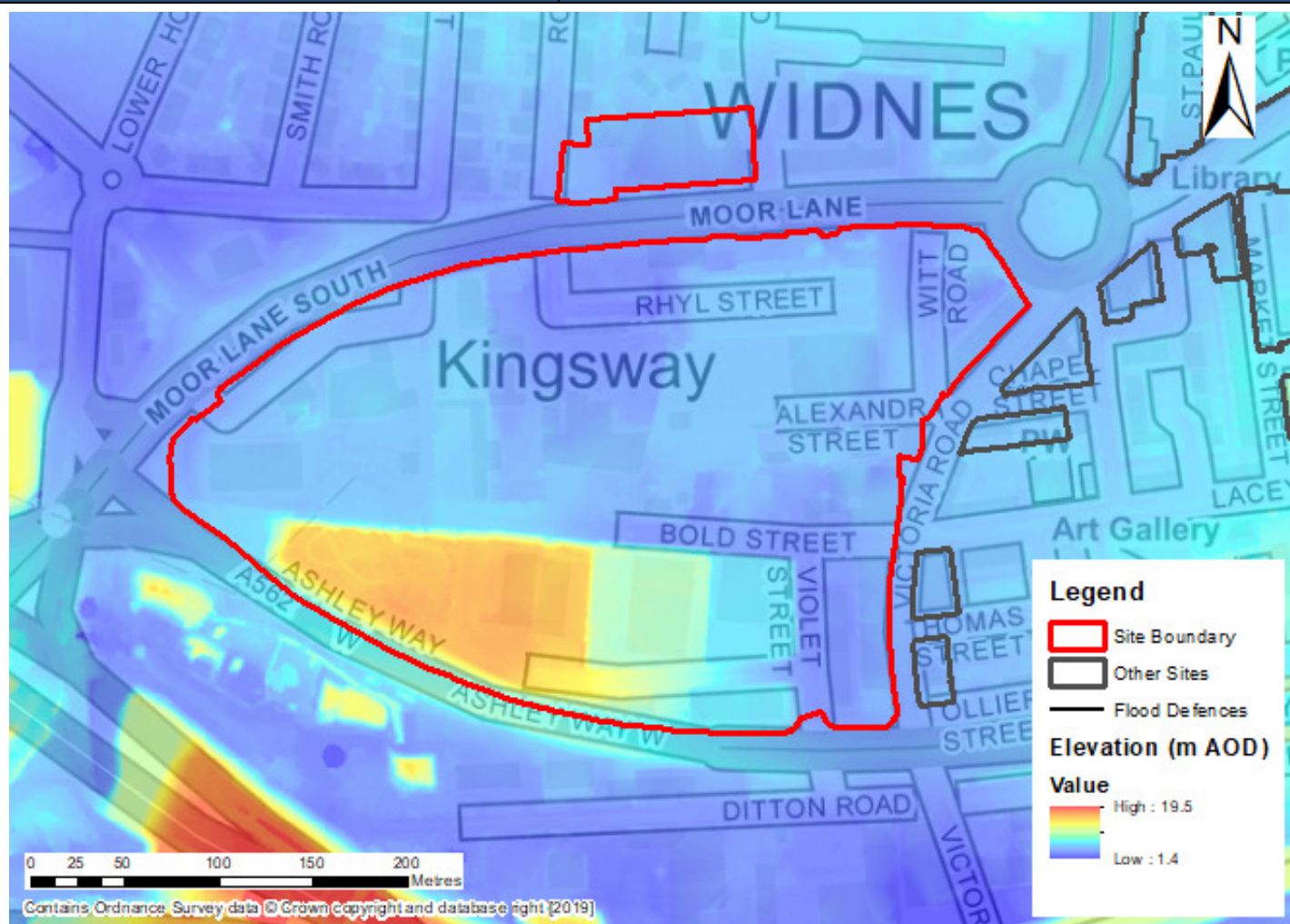


Figure 1-2 Site with 1m LiDAR (elevation data)

- The majority of the site has an average approximate elevation of 8.5m AOD with a section located in the south having a higher elevation of approximately 13.5m AOD.

© Crown Copyright, All rights reserved. 2019 License number 100018552.

Contains OS data © Crown copyright and database right (2019).

Contains public sector information licensed under the Open Government Licence v3.0.

Contains Environment Agency information © Environment Agency and/or database right.

Observations

- The site is at fluvial risk from the culverted Bower's Brook, approximately 850m to the east of the site.
- 7% of the site is located within Flood Zone 3 which is confined to the central northern and north western site boundary. More vulnerable development is not permitted in this zone. It should be possible for the developer to avoid this zone. Climate change increases this risk though the risk stays in the northern part of the site.
- There is no tidal flood risk according to the Flood Map for Planning; corroborated by the modelled tidal outlines from the Mersey Estuary 2016 model.
- The proposed use of development would see a change in risk classification from less vulnerable to more vulnerable, according to the NPPF.

Proposed Site

MUA9 (DALP Sub)

- As the site is currently developed, recommendations on development depend on proposed layouts i.e. will the layout remain the same? Are the existing buildings to remain? The FRA should investigate suitable layout.
- Approximately 10% of the total site area is at risk of surface water flooding in the 1% AEP event up to a maximum depth of 0.60-0.90m (see Figure 1-4). The extent of flooding in the 1% AEP event is limited to highways and areas of wider hardstanding, such as service yards and parking areas.
- The main access routes via the B5419 to the north and Bold Street to the east of the site are inundated with floodwaters based on the 1% AEP outline. There may be safe access routes via Ashley Way to the south.

Flood Source: Fluvial/Tidal

	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Flood Zones (%)	41.69	6.82	0.00
Fluvial: Depth (m)	0.33	0.11	Not available
Fluvial: Hazard	Moderate	Low	Not available

Modelled
Fluvial Flood
Risk and
Climate
Change

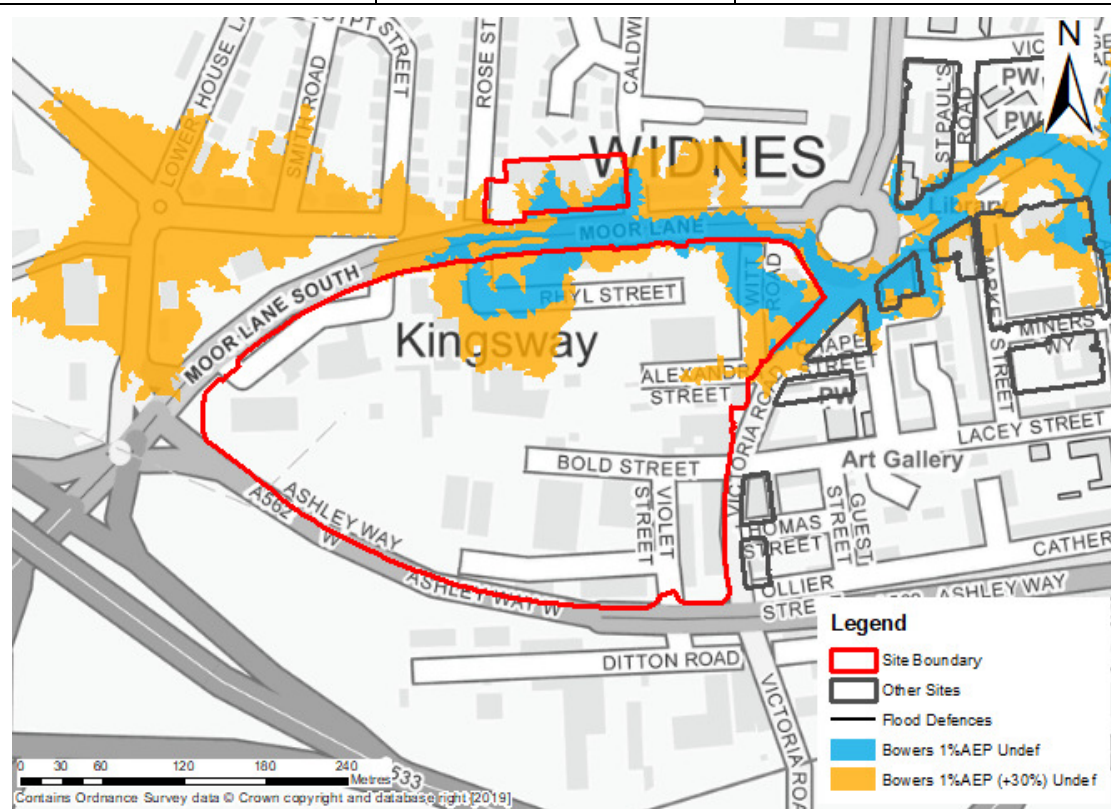


Figure 1-3 Undefended fluvial outlines for the present day 1% AEP and future risk 1% AEP with climate change (+30%).

- The modelled 1% AEP undefended outline is equivalent to Flood Zone 3 of the Flood Map, covering central northern and north eastern areas.
- Climate change affects the same areas though to a greater extent.

Historic Flooding

- The site lies outside any Environment Agency's historic flood mapping.

Proposed Site		MUA9 (DALP Sub)
Defences		There are no formal EA defences close to the site.
Flood Warning Area (FWA)		The site lies outside of any EA FWAs.
Mitigation options & site suitability		Allocation should be possible for this site. The developer should avoid developing in Flood Zone 3 and within the climate change risk area. If this is not possible then residential use should be directed towards the south and west of the site and employment or less vulnerable uses to the northern areas of the site. Modelled climate change increases this risk within the site. Any existing less vulnerable development that is to remain within the climate change flood outline should, through the FRA, be investigated for increasing minimum floor levels to prevent the 1% AEP + climate change event from entering the buildings. Average levels of floodwater in the modelled climate change event are 270mm, an increase of 300mm in finished floor level (plus 300mm freeboard) should, at this stage, be suitable. Actual levels should be ascertained through the FRA. Modelling should show what would happen to floodwaters were floor levels to be raised. Allowance in the site layout may be required to accommodate, on-site, the displaced floodwater. Retrofitting of property flood resilience techniques should be investigated. The FRA should model the higher central and upper end climate change allowances if more vulnerable development is to be placed in the north of the site.
Flood source: Groundwater		
Flood risk: groundwater		Data unavailable. Possible risk from groundwater must be assessed as part of an FRA.
Flood Source: Infrastructure Failure – Reservoirs		
Flood risk: reservoirs		There is no reservoir risk to this site according to the EA's Reservoir Flood Map (RFM).
Flood Source: Infrastructure Failure – Canals		
Flood risk: canal		Data unavailable. Possible residual risk from any nearby canals should be assessed as part of an FRA.

Flood Source: Surface Water

Surface Water Flood Risk to Proposed Development Site

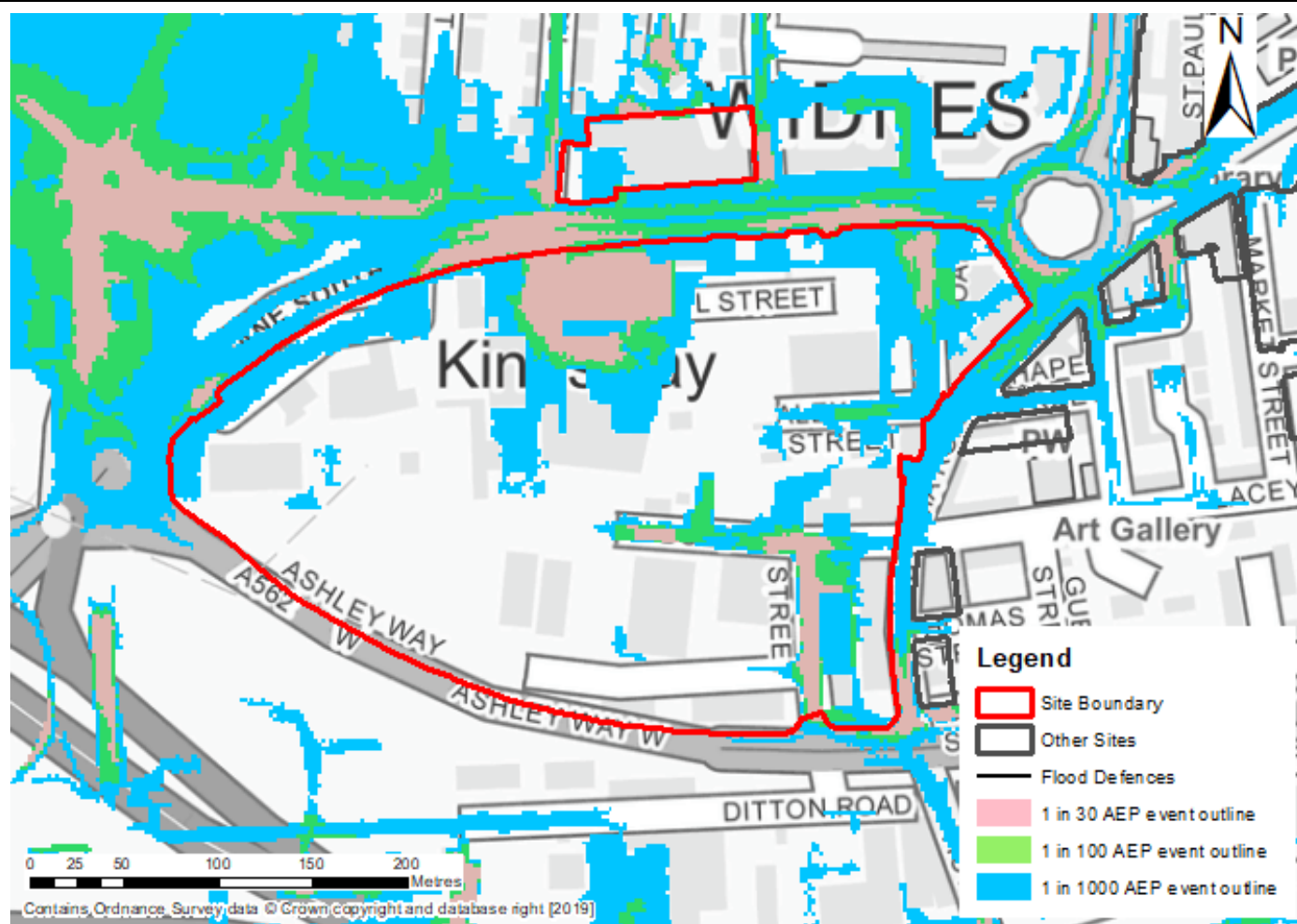


Figure 1-4 Surface water flood risk to the site

Existing development risk of flooding from surface water (%)	High Risk (3.33% AEP outline)	Medium Risk (1% AEP outline)	Low Risk (0.1% AEP outline)
	5.81	9.55	29.32
Surface water flooding depths	Max: 0.60-0.90m	Max: 0.60-0.90m	Max: >1.20m
Surface water hazards	Max: Significant Mean: Moderate	Max: Significant Mean: Moderate	Max: Significant Mean: Moderate
Climate change	The current day 0.1% AEP outline provides an indication of the likely increase in extent of the more frequent events.		
Surface water: flood risk to development site	- Approximately 10% of the total site area is at risk of surface water flooding in the 1% AEP event up to a maximum depth of 0.60-0.90m. - The extent of flooding in the 1% AEP event is limited to highways and areas of wider hardstanding, such as service yards and parking		

	areas. In the northern part of the site the 3.33% and 1% AEP events mainly flood the same areas as the fluvial risk. • Safe access and egress should be possible via Ashley Way to the south.
Surface water: mitigation options & site suitability	• Allocation should be permitted if the recommendations in this Level 2 assessment are followed. The FRA should include drainage strategy for the proposed layout and a condition and capacity assessment of the culverted section of Bower's Brook, including blockage scenario modelling. The current drainage system should be assessed for capacity and condition and whether this can accommodate any new development. • Development should avoid the 1% AEP surface water flood outline – approximately 10% of the total site area. • Surface water flow routes are mainly restricted to the existing roadways within the site. A drainage strategy should consider where these flood routes would end up were the existing roadways to be removed. • Surface water runoff should be fully attenuated to a pre-agreed runoff rate (typically, this is a betterment on the existing runoff rate for currently developed sites) and as such, ensure that there is no increase in surface water flood risk elsewhere. The required volumes of attenuation have been calculated below for discharge at the greenfield rate. This provides a conservative estimate for the storage requirements that will likely be required. • As the site is currently developed, infiltration SuDS may not be feasible (subject to ground investigation and contaminated land assessment). • Existing low-lying areas that are currently showing localised ponding may be utilised for attenuation. • Attenuation measures should avoid Flood Zone 3 (approximately 7% of the site). • Surface water flood risk, although localised in the 1% AEP event, is largely contained by existing development; therefore, redevelopment of the site may significantly change the behaviour of surface water and this must be accounted for in the FRA / drainage strategy.

Indicative Surface Water Flood Risk from Proposed Development (for Proposed Site in its Entirety)

Proposed Development limiting runoff rate: Greenfield – FEH Statistical		Qbar: 46.63 l/s Q30: 79.27 l/s Q100: 96.99 l/s				
Design flood event (inc CC)	Critical storm duration (Hrs)	Inflow volume (m ³)	Outflow volume (m ³)	Attenuation required (m ³)	Time to empty assuming no infiltration (Hrs)	Total storage required: Area (ha) and % of site area
3.33% AEP Rainfall + 20%	4	3694	799	2895	14.5	0.193 ha 2.152 %
3.33% AEP Rainfall + 40%	5	4526	999	3527	17.6	0.235 ha 2.621 %
1% AEP Rainfall + 20%	4.5	5146	1100	4046 (1151 exceedance storage)	16.5	0.270 ha 3.007 %
1% AEP Rainfall + 40%	5.25	6202	1283	4919 (1392 exceedance storage)	20.1	0.328 ha 3.656 %
Climate change	Application of the central (20%) and upper band (40%) potential change anticipated for climate change in the table above shows the estimated attenuation volumes for the 1% AEP and 3.33% AEP rainfall events.					
Surface water: flood risk impacts from development site & mitigation	- As part of this Level 2 Screening we have included calculations to provide an estimated land take if a pond with an assumed depth of 1.5m was included as part of the development. - Attenuation volumes are presented for the critical storm duration for the 1 in 30-year events with exceedance flows quantified up to the 1 in 100-year event. To prevent development worsening flood risk elsewhere, surface water runoff must be managed on site.					

Offices at:

Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Glasgow
Haywards Heath
Isle of Man
Limerick
Newcastle upon Tyne
Newport
Peterborough
Saltaire
Skipton
Tadcaster
Thirsk
Wallingford
Warrington

Registered Office:

1 Broughton Park
Old Lane North
Broughton
Skipton
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@JBA - consulting.com
www.JBA - consulting.com
Follow us:  

Jeremy Benn Associates
Limited

Registered in England
3246693

JBA - Group Ltd is certified
to:
ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007