

Halton Borough Council Local Plan Site Screening

**Level 2 Strategic Flood Risk
Assessment – Site R21 Screening**

Draft Report

June 2019

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Revision history

Revision Ref/Date	Amendments	Issued to
P01 / June 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.

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1 R21 (DALP Sub)

Proposed Site	R21 (DALP Sub)
Site area (ha)	2.51
Existing use	Informal open space
Existing flood risk vulnerability classification	Water-compatible
Proposed use	Residential
Proposed development flood risk vulnerability classification	More vulnerable
Proposed development impermeable area (ha)	2.13

Flood outlines (current day)

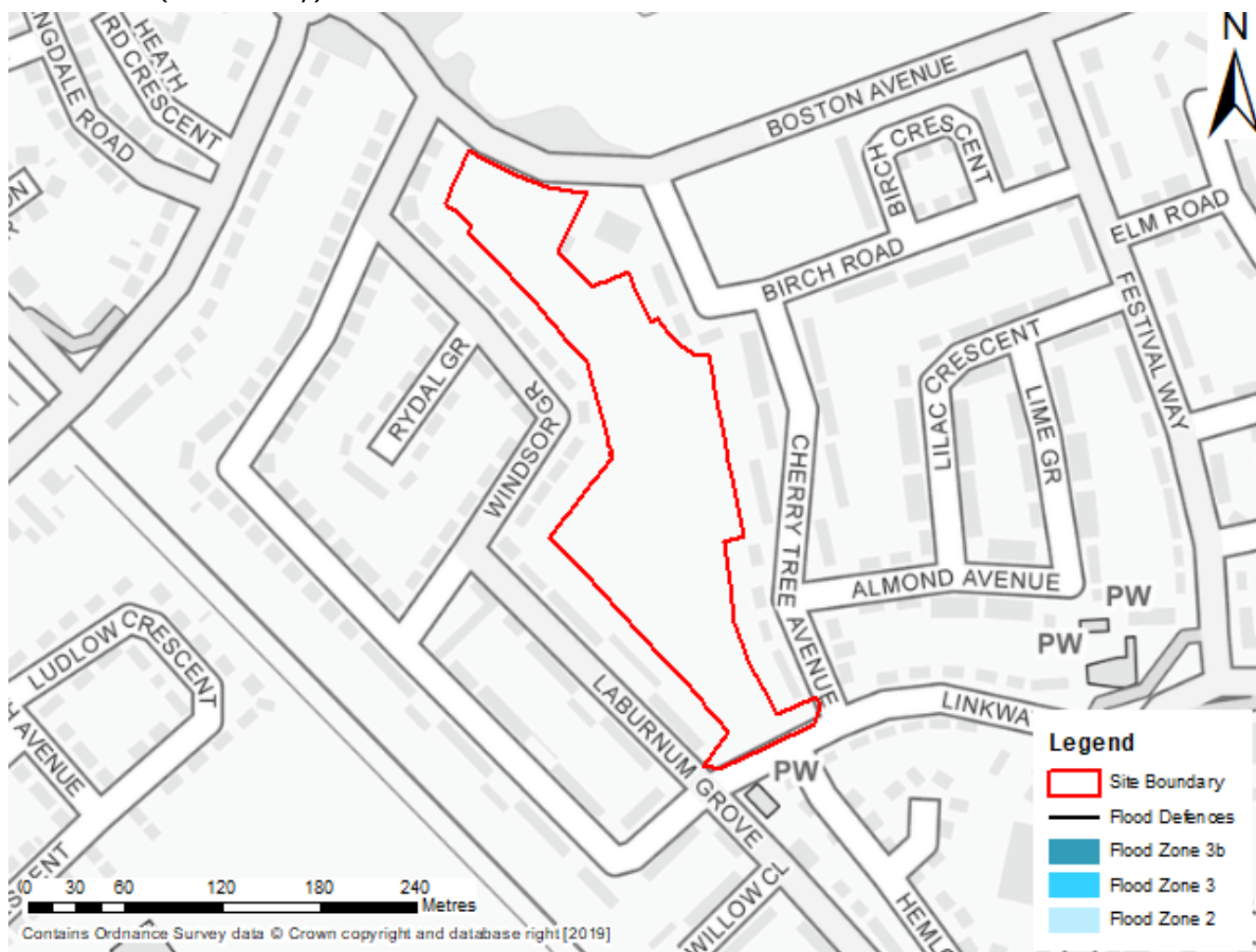


Figure 1-1: Site boundary with Flood Defences (no flood zone mapping immediately close to the site)

Proposed Site

R21 (DALP Sub)

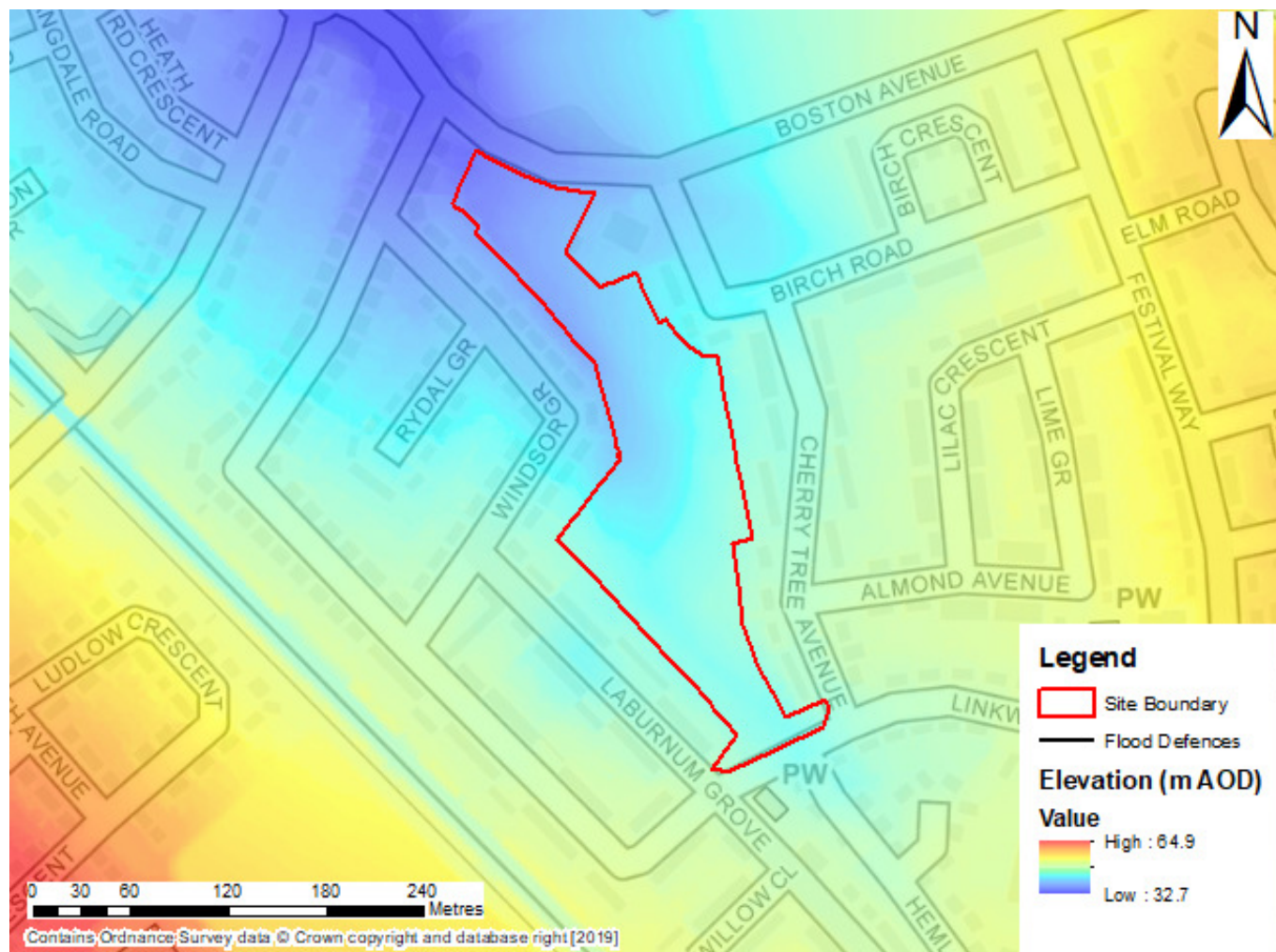


Figure 1-2: Site with 1m LIDAR (elevation data)

- The proposed site is located on an area of relatively low ground compared to the surrounding residential area. The surrounding areas to the east and south-west see ground levels rising to approximately 60m AOD compared to elevation within the site at approximately 40m AOD.

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Observations

- The site experiences significant barriers to development as there is a significant surface water flow path that runs through the site (see Figure 1-3). This would rule out development in a large proportion of the site which would considerably reduce residential yields. An FRA would be required to determine appropriate layout and design including SuDS to account for the surface water flow path. The creation of a blue/green corridor with added amenity value may be appropriate.
- The risk classification of the site changes from water-compatible open space where flood waters can flow freely to more vulnerable developed land where water could be obstructed, according to the NPPF.

Proposed Site		R21 (DALP Sub)	
- The site is 100% within Flood Zone 1 with more vulnerable development therefore allowed at this location, based on the NPPF. - There is no direct risk from fluvial or tidal sources according to the Flood Map for Planning, corroborated by the modelled outputs produced from the Mersey Estuary 2016 model. - Surface water presents the greatest flood risk to the site. - Approximately 22% of the total site area is at risk of surface water flooding in the 1% AEP event to a maximum depth of 0.30-0.60m (see Figure 1-3:). The extent of surface water flooding is associated with an existing, offsite flow route in the 3.33% AEP outline (increases in extent in the 1% and 0.1% AEP events) that, based on topography (see Figure 1-2:), flows south to north through the site. - The main access routes via Linkway to the south and Boston Avenue to the north of the site are inundated with floodwaters based on the 1% AEP outline.			
Flood Source: Fluvial/Tidal			
	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Flood Zones (%)	0.00	0.00	0.00
Tidal: Depth (m)	N/A	N/A	N/A
Tidal: Hazard	N/A	N/A	N/A
Modelled Flood Risk and Climate Change	The site lies outside any modelled flood risk from fluvial and/or tidal sources.		
Historic Flooding	The site lies outside of any Environment Agency historic flood outlines.		
Defences	There are no flood defences located close to the site according to the EA’s spatial flood defence database.		
Flood Warning Area (FWA)	The site is not located within any current EA FWA.		
Mitigation options & site suitability	The entirety of the site lies within Flood Zone 1, outside fluvial or tidal modelled risk outlines from the Mersey Estuary 2016 model. This site should pass the Exception Test at the FRA stage given it is wholly in Flood Zone 1, however, development will prove difficult due to the surface water risk on and off-site.		
Flood source: Groundwater			
Flood risk: groundwater	Data unavailable. Residual risk from groundwater must be assessed as part of an FRA.		
Flood Source: Infrastructure Failure – Reservoirs			
Flood risk: reservoirs	There is no reservoir inundation risk to the site according to the EA’s Reservoir Flood Map (RFM).		
Flood Source: Infrastructure Failure – Canals			
Flood risk: canal	Data unavailable. Residual risk from canals (if applicable) must be assessed as part of an FRA		

Proposed Site R21 (DALP Sub)

Flood Source: Surface Water

Surface Water Flood Risk to Proposed Development Site

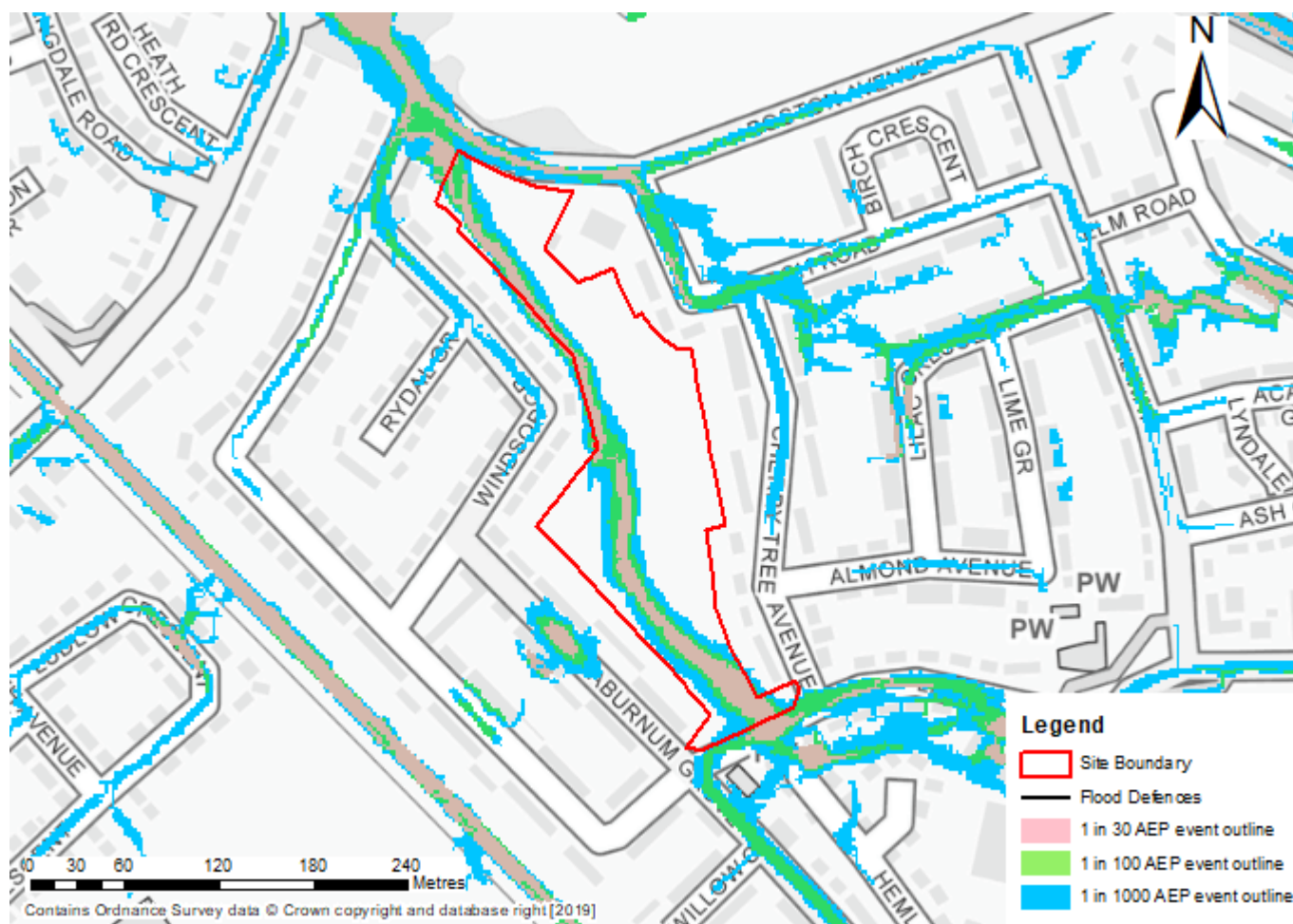


Figure 1-3: Surface Water Flood Risk to the site

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)
	12.67	22.15	35.74
Surface water flooding depths	Max: 0.30-0.60m	Max: 0.30-0.60m	Max: 0.60-0.90m
Surface water hazards	Max: Moderate Mean: Low	Max: Significant Mean: Moderate	Max: Significant Mean: Significant
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 22% of the total site area is at risk of surface water flooding in the 1% AEP event to a maximum depth of 0.30-0.60m.		

Proposed Site		R21 (DALP Sub)				
		- The extent of surface water flooding is associated with an existing, offsite flow route in the 3.33% AEP outline (increases in extent in the 1% and 0.1% AEP events) that, based on topography, flows south to north through the site. This is considered to be classified as a Significant hazard in the 1% and 0.1% AEP events. - The main access routes via Linkway to the south and Boston Avenue to the north of the site are inundated with floodwaters based on the 1% AEP outline.				
Surface water: mitigation options & site suitability		This site should pass the Exception Test at the FRA stage given it is wholly in Flood Zone 1, however, development will prove difficult due to the surface water risk on and off-site Development should avoid the surface water flow path entirely. This flow path forms off-site and flows naturally via topography through the site. The flow path could be integrated within the site through either a blue/green corridor providing amenity/ecological value or could be used as the post-development access road, with suitable drainage, through the site from Linkway to Boston Avenue. A detailed drainage strategy for the site would have to be carried out as part of the site design. The FRA should include detailed surface water modelling. Safe access and egress are not considered to be achievable based on the 1% AEP outline, alternative access/egress should be proposed. Surface water runoff should be fully attenuated to the greenfield runoff rate, and as such, ensure that there is no increase in surface water flood risk elsewhere. The required volumes of attenuation have been calculated below. The site is currently open greenfield and therefore, infiltration SuDS may be feasible (subject to ground investigation).				
Indicative Surface Water Flood Risk from Proposed Development (for Proposed Site in its Entirety)						
Proposed Development limiting runoff rate: Greenfield – FEH Statistical		Qbar: 12.27 l/s Q30: 20.86 l/s Q100: 25.53 l/s				
Design flood event (inc CC)	Critical storm duration (Hrs)	Inflow volume (m³)	Outflow volume (m³)	Attenuation required (m³)	Time to empty assuming no infiltration (Hrs)	Total storage required: Area (ha) and % of site area
3.33% AEP Rainfall + 20%	4.75	1087	250	838	15.9	0.056 ha 2.226 %

Proposed Site			R21 (DALP Sub)			
3.33% AEP Rainfall + 40%	6	1340	315	1024	19.4	0.068 ha 2.720 %
1% AEP Rainfall + 20%	5.25	1517	338	1179 (341 exceedance storage)	18.3	0.079 ha 3.131 %
1% AEP Rainfall + 40%	6	1822	386	1436 (412 exceedance storage)	22.3	0.096 ha 3.814 %
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.					

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