



Halton Borough Council Local Plan Site Screening

**Level 2 Strategic Flood Risk
Assessment – Site SL-0088 Screening**

Draft Report

July 2019

www.jbaconsulting.com



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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.

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Technical Director

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Proposed Site	SL-0088
Site area (ha)	1.53
Existing use	Community use
Existing flood risk vulnerability classification	Less vulnerable
Proposed use	Mixed Use
Proposed development flood risk vulnerability classification	More vulnerable
Proposed development impermeable area (ha)	1.30

Flood outlines (current day)

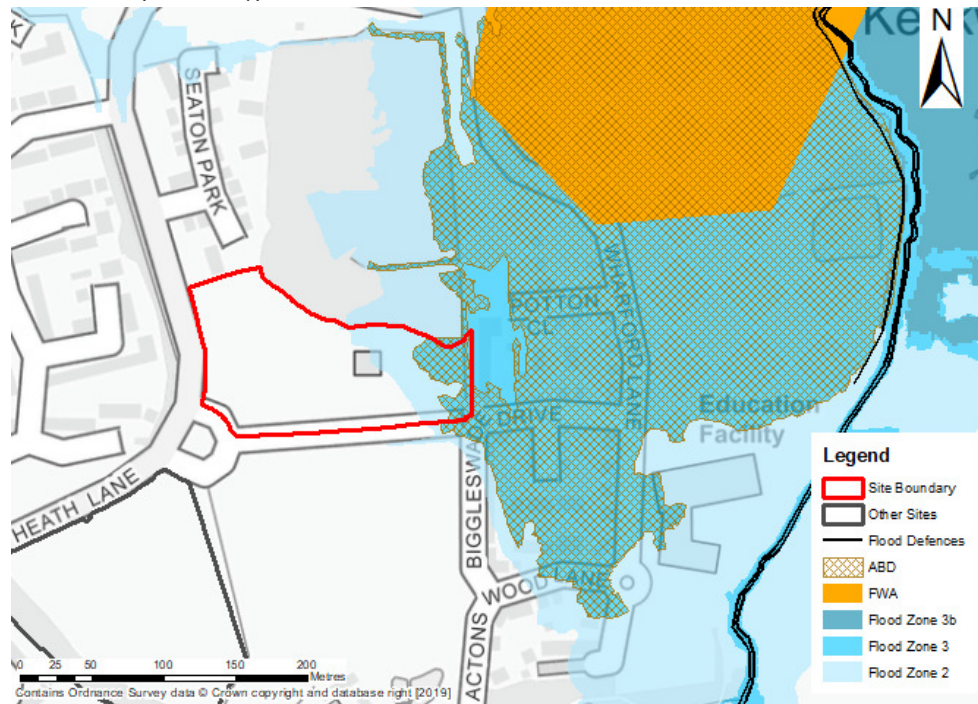


Figure 1-1: Flood Zone Mapping with flood defences and ABDs

- The site has partial ABD coverage protecting the site from Flood Zone 3. The Flood Map for Planning states the risk fluvial. The fluvial risk comes from Keckwick Brook.

Proposed Site

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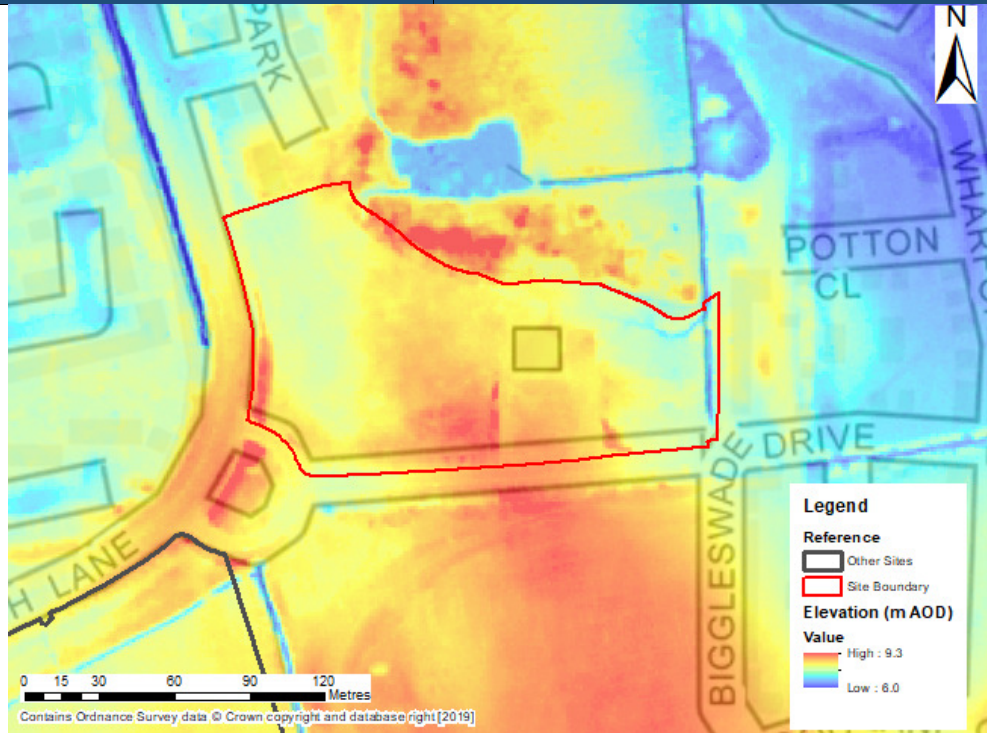


Figure 1-2: Site with 1m LIDAR (elevation data)

- The proposed site is located on relatively level ground, the LiDAR indicates an average height across the site of 8.5m AOD.

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Observations

- There are discrepancies between the EA Flood Map and the modelled data for Keckwick Brook. Flood Zone 3 should be the same as the 1% AEP undefended flood outline from the Keckwick Brook model. Figure 1-3 below shows the discrepancy where blue is Flood Zone 3 and orange is the 1% undefended outline from the model. In terms of site development, it is important to know why this discrepancy exists as Flood Zone 3 is shown to enter the eastern area of the site whereas the modelling shows this is not the case. It may be that the EA has not yet updated the Flood Map with the outputs from the Keckwick Brook modelling. Before making any recommendations with regards to fluvial risk and future development at the site, we require clarification from the EA.

Commented [MW1]: Clarification required from EA

Proposed Site

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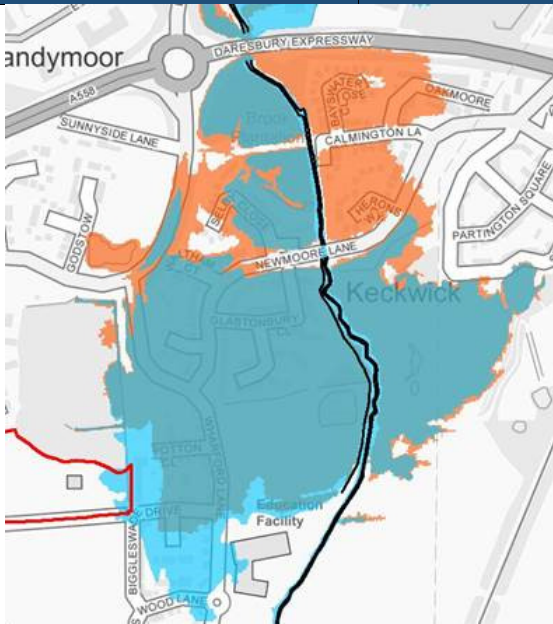


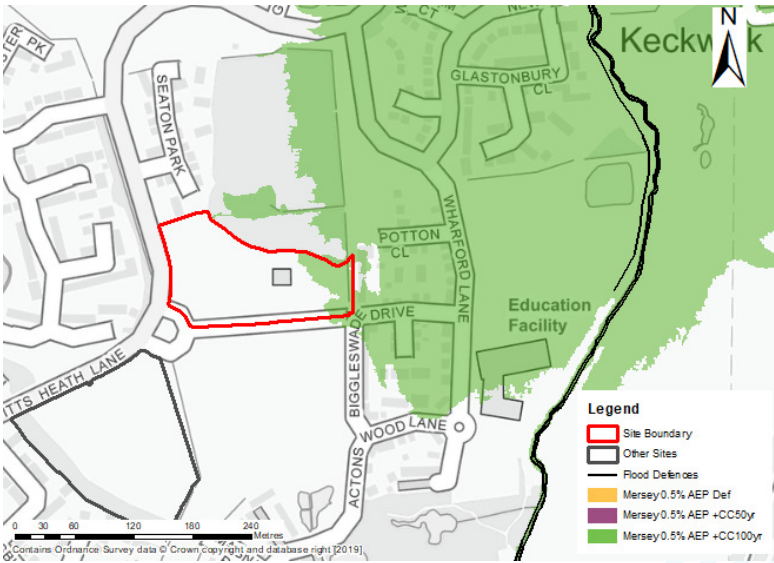
Figure 1-3: Flood Zone discrepancy (blue = Flood Zone 3; orange = 1% AEP undefended event outline from Keckwick Brook model)

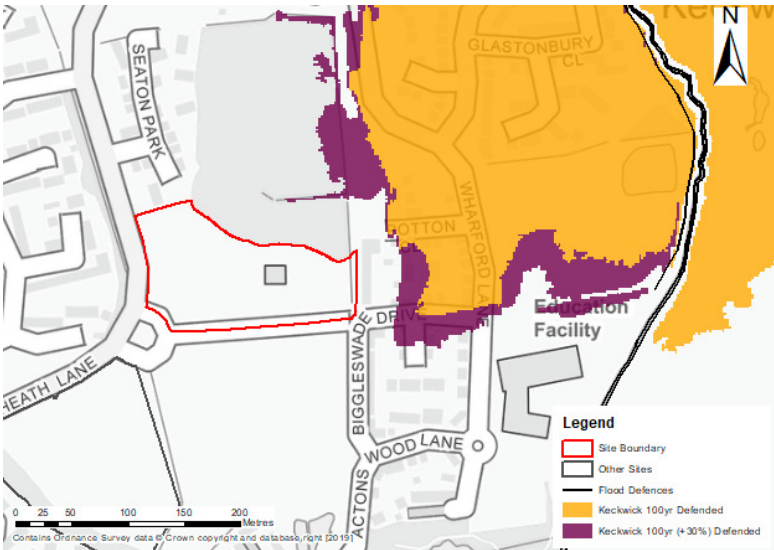
- The site includes existing buildings (Sandymoor Community Hall), car parking and grassed areas. Current drainage arrangements should be assessed. Impermeable areas on-site will likely be increased with development.
- The proposed vulnerability of the site will see a change from less vulnerable to more vulnerable, according to the NPPF.
- According to the Flood Map for Planning, 76% of the site is located within Flood Zone 1.
- According to the Flood Map for Planning, 9% of the site is located within Flood Zone 3a, this includes an ABD (see Figure 1-1). The ABD should cover all of Flood Zone 3, however there is a hole in it to the east of the site boundary. Require clarification from the EA as to why this is the case. Possibly related to the flood zone discrepancy.
- Less than 1% of the total site area is at risk of surface water flooding in the 1% AEP event (see Figure 1-6), and as such, the site is considered to be at very low risk of surface water flooding.
- Safe access and egress are achievable via Pitts Heath Lane and Otterburn Street based on the 1% AEP outline.

Commented [MW2]: EA clarification required

Flood Source: Fluvial/Tidal

	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Flood Zones (%)	14.62	9.06	0.00
Tidal: Depth (m)	Not available	Not available	Not available

Proposed Site		SL-0088	
Tidal: Hazard	Not available	Not available	Not available
Modelled Tidal Flood Risk and Climate Change	 Figure 1-4: Defended tidal outlines, from the Mersey Estuary 2016 model, for the current day 0.5% AEP event and future risk 0.5% AEP with climate change uplifts of 50yr (2065) and 100yr (2115). - Only the climate change uplift of 100yr on the 0.5% AEP event had any impact upon the site with the east becoming partially covered. - Depths and hazard grids were unavailable from the Mersey Estuary 2016 model for the site location.		

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Modelled Fluvial Flood Risk and Climate Change	 Figure 1-5: Defended fluvial outlines for the current day 1% AEP event and future risk 1% AEP with 30% climate change uplift. Even though Keckwick Brook floods during the current day 1% AEP event and the extent grows with the climate change uplift, the modelled fluvial outlines do not impact the site.	
Historic Flooding	The site lies outside of any Environment Agency historic flood outlines.	
Defences	Part of the site benefits from Keckwick Brook flood defences to the east. These defences consist of an embankment that has been assessed at condition grade 3 (Table 1.1 Condition Assessment Manual 2012¹), and areas of high ground.	
Flood Warning Area (FWA)	The site is not within any current EA FWAs.	
Mitigation options & site suitability	Allocation of this site should be possible if the recommendations in this Level 2 assessment are followed. An FRA should direct more vulnerable development away from Flood Zone 3 at the eastern boundary. This area is currently greenfield and should be left as such, possibly as an amenity area. Safe access and egress routes are multiple around the site.	

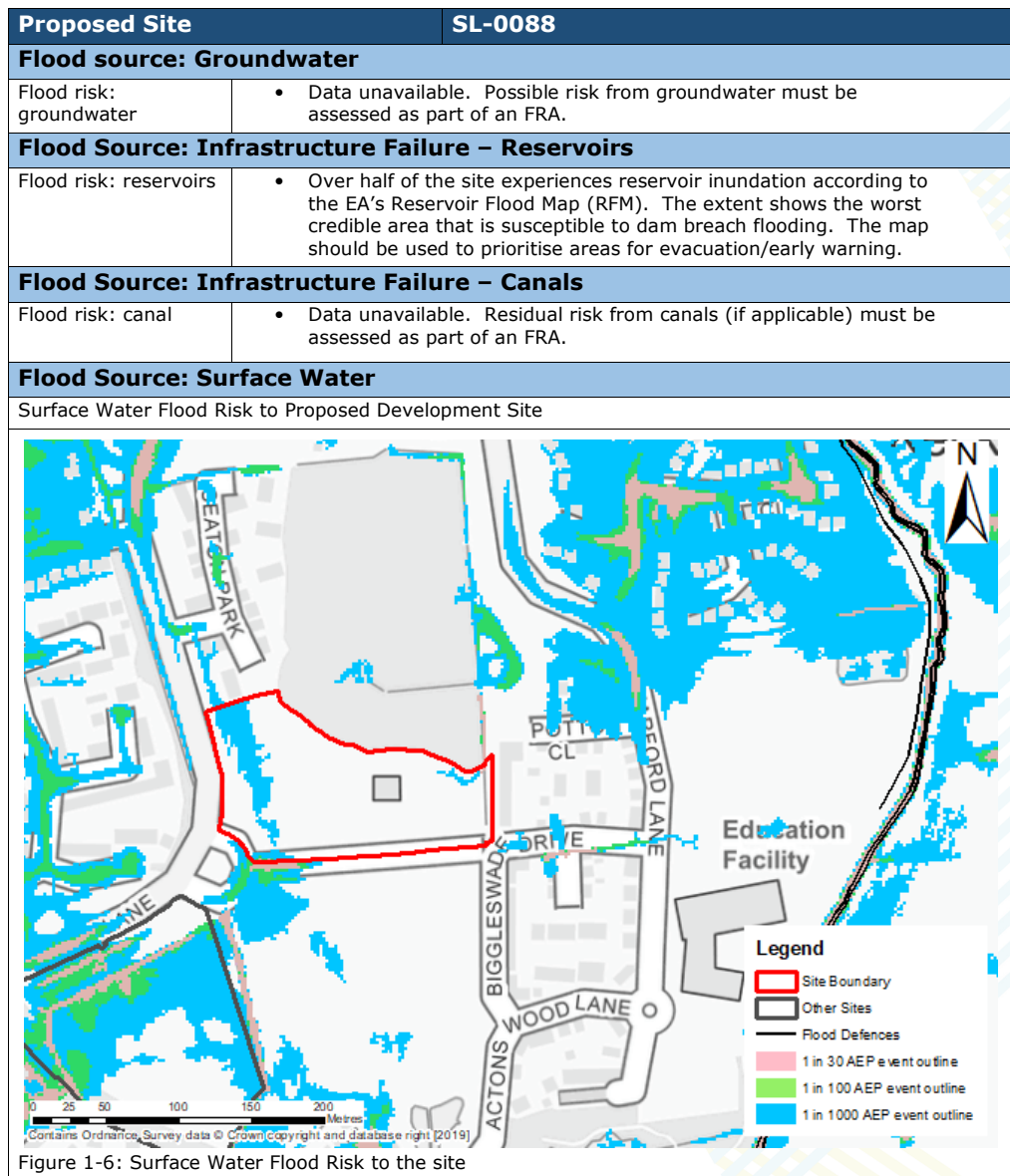
¹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291126/scho0509bqat-e-e.pdf

Commented [MW3]: If this is defended, how come the ABD covers the whole area? Should this figure therefore show zero flooding for the 1% defended event?

Commented [HB4R3]: I'm unsure how to answer this

Commented [JP5R3]: I've checked outlines and model files, they are correct, unsure on ABD query, follow up with EA. Especially when FZs show site at fluvial risk

Commented [MW6R3]: Does the fluvial undefended match FZ3? If not then the most likely issues is the Flood Map hasn't been updated...



Proposed Site		SL-0088	
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)
	0.23	0.48	11.77
Surface water flooding depths	Max: 0.15-0.30m	Max: 0.15-0.30m	Max: 0.30-0.60m
Surface water hazards	Max: Low Mean: Low	Max: Low Mean: Low	Max: Moderate Mean: Low
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	- Less than 1% of the total site area is at risk of surface water flooding in the 1% AEP event, and as such, the site is considered to be at very low risk of surface water flooding. - The main access routes via Pitts Heath Lane and Otterburn Street are at very low risk of surface water flooding. There is a localised area of surface water flooding at the western end of Otterburn Street (running along the south of the site), however, this is not considered to impact on development proposals. The placement of access and egress routes can avoid this at risk area entirely.		
Surface water: mitigation options & site suitability	If possible, site layout should direct development away from the surface water flow path to the west of the site, albeit this being a flow path in only extreme events. Safe access and egress are achievable via Pitts Heath Lane and Otterburn Street (road to south of site) based on the 1% AEP outline. 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. Greenfield runoff rate has been assumed based on large areas of green space within the site, however, there are also existing buildings which may need to be accounted for if they are to remain in place. Ground investigations will be required to ascertain the suitability of infiltration SuDS for the discharge of surface water runoff. Attenuation measures should avoid Flood Zone 3 (approximately 9% of the site).		

Proposed Site		SL-0088				
Indicative Surface Water Flood Risk from Proposed Development (for Proposed Site in its Entirety)						
Proposed Development limiting runoff rate: Greenfield – FEH Statistical		Qbar: 5.15 l/s Q30: 8.75 l/s Q100: 10.71 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%	7.75	761	171	590	26.7	0.039 ha 2.571 %
3.33% AEP Rainfall + 40%	9.25	924	204	720	32.6	0.048 ha 3.137 %
1% AEP Rainfall + 20%	7.75	1040	209	831 (241 exceedance storage)	30.7	0.055 ha 3.621 %
1% AEP Rainfall + 40%	9.25	1258	250	1008 (288 exceedance storage)	37.2	0.067 ha 4.392 %
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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