Halton Borough Council Local Plan Site Screening

Level 2 Strategic Flood Risk Assessment – Site MUA4 Screening

Draft Report

July 2019

www.jbaconsulting.com

Municipal Building

Kingsway

Widnes

WA8 7QF

JBA Project Manager

Mike Williamson
Mersey Bank House
Barbauld 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 MUA4 (DALP Sub)

Proposed Site	MUA4 (DALP Sub)
Site area (ha)	1.01
Existing use	Industrial / car park
Existing flood risk vulnerability classification	Less vulnerable
Proposed use	Mixed use
Proposed development flood risk vulnerability classification	More vulnerable
Proposed development impermeable area (ha)	0.86

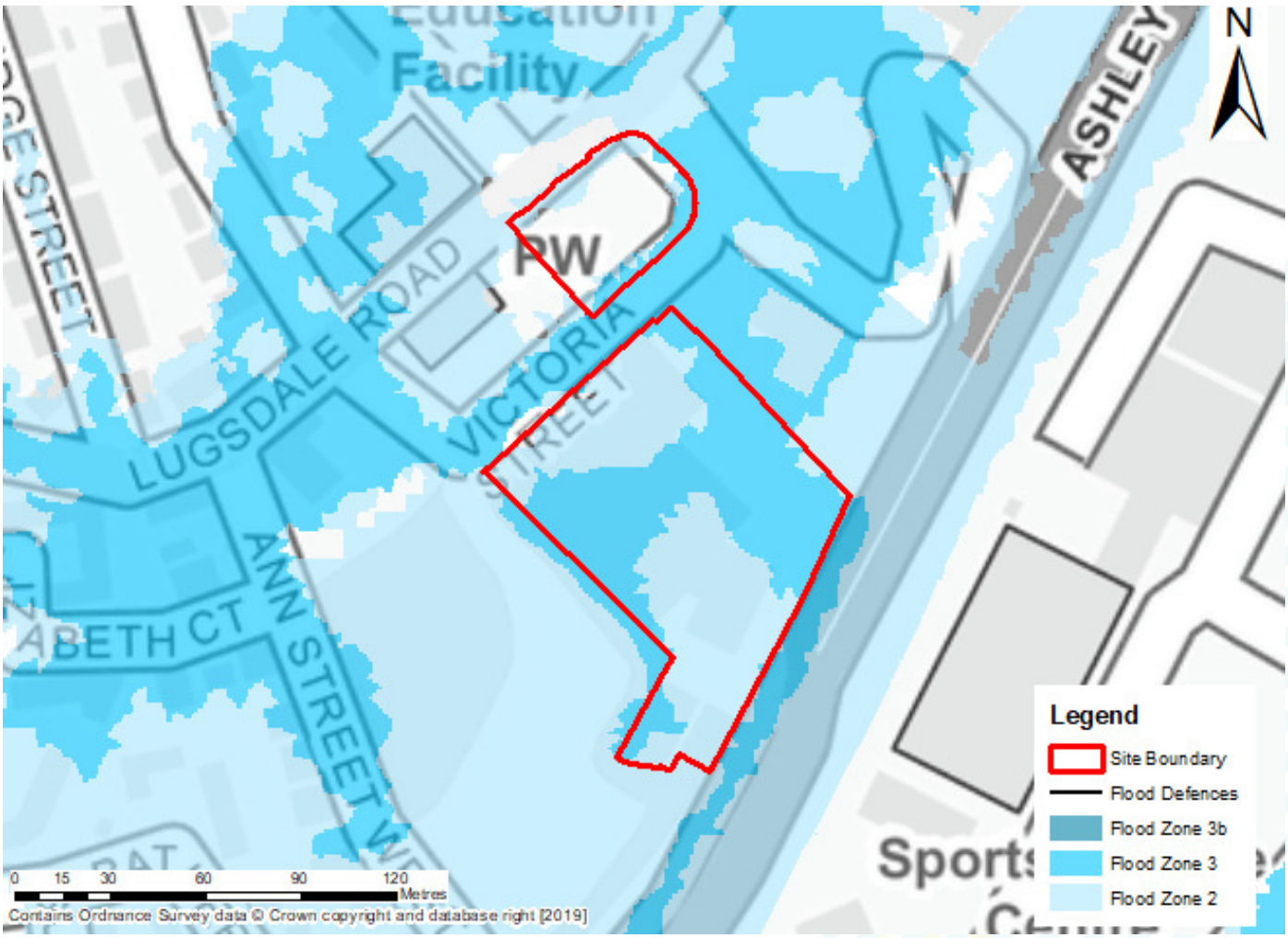

Figure 1-1: Flood zone mapping of the site with flood defences (there are no flood defences close to the site)

Proposed Site	MUA4 (DALP Sub)

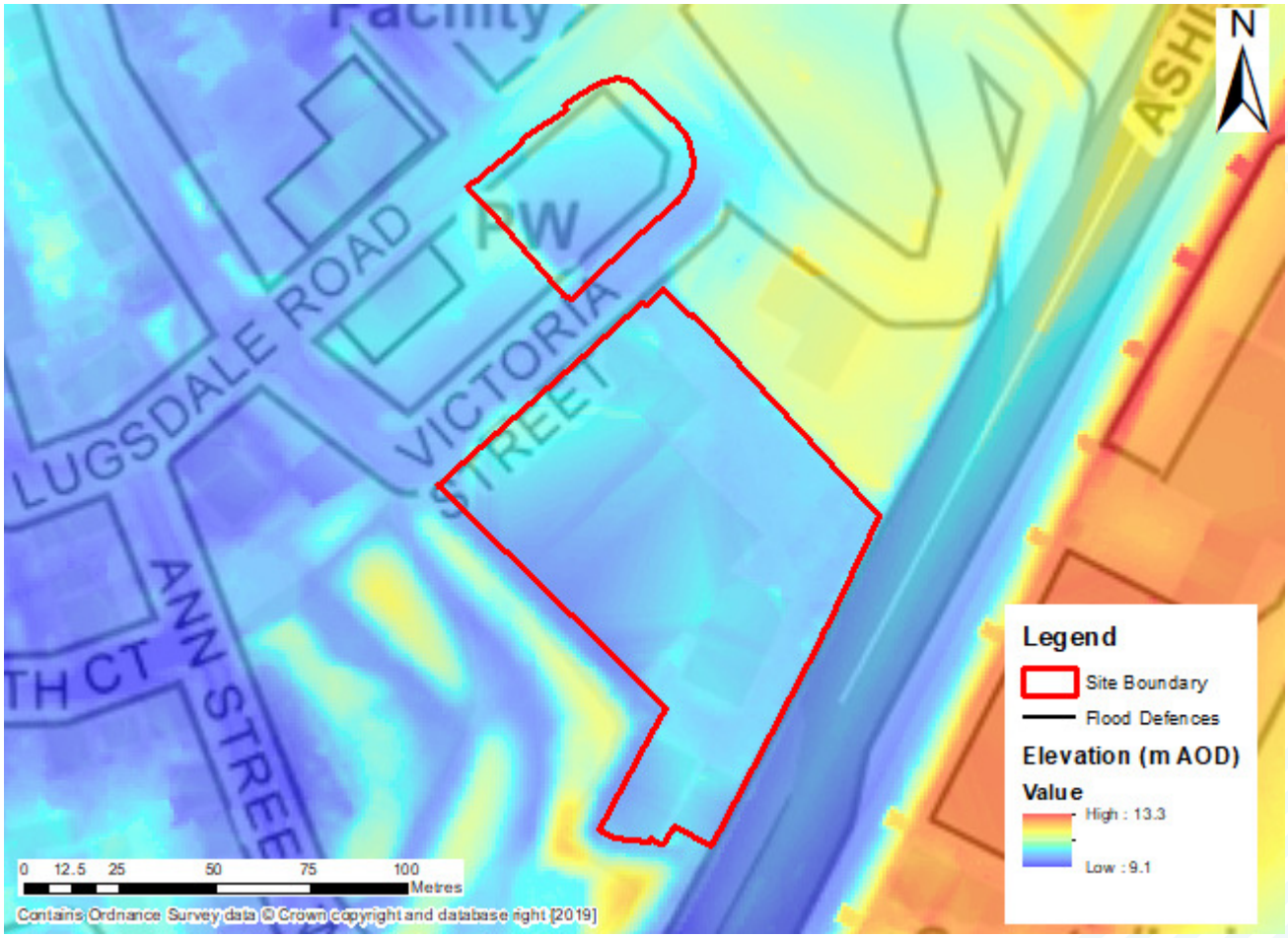

Figure 1-2: Site with 1m LiDAR (elevation data)

- The site elevation is approximately 10m AOD across its entirety with the surrounding areas having consistent elevation. There is a slight increase in elevation on the other side of the A557 to approximately 12.5m AOD.

Observations

- There are 2 land parcels making up the site. The smaller, northern parcel is currently a car park. The larger, southern land parcel currently contains a large industrial building
- There is a change in risk classification from less vulnerable to more vulnerable according to the NPPF, given that mixed use may include residential.
- Over 40% of the site is located within Flood Zone 3a, with higher vulnerability land uses being advised to avoid these areas. The industrial site is most at risk (see Figure 1-1).
- Fluvial flooding presents the greatest risk to this site, primarily from Bower's Brook.
- There is no direct risk from tidal sources in the flood zone mapping, this is corroborated by the modelled outputs produced from the Mersey Estuary 2016 model.

Proposed Site	MUA4 (DALP Sub)

- 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 (see Figure 1-4).
- The main access route via Victoria Street are at low risk of surface water flooding in the 1% AEP event.

Flood Source: Fluvial/Tidal

	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Flood Zones (%)	46.34	40.82	0.00
Fluvial: Depth (m)	0.14	0.10	Not available
Fluvial: Hazard	Moderate	Low	Not available

Modelled Fluvial Flood Risk and Climate Change

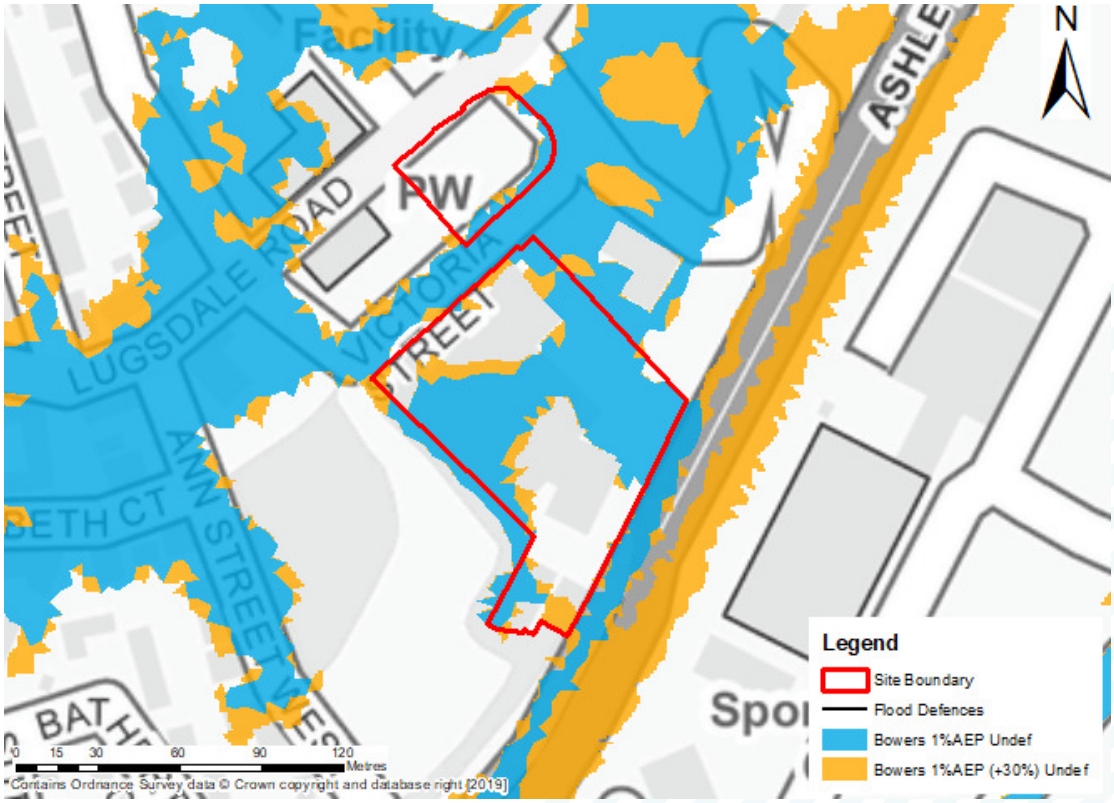

Figure 1-3: Undefended fluvial outlines for the present day 1% AEP and future risk 1% AEP with climate change (+30%).

- The 1% AEP outline for Bowers Brook covers approximately 40% of the site with the climate change uplift increasing the coverage to 50%. The 1% modelled flood outline is equivalent to Flood Zone 3 of the Flood Map for Planning.

Proposed Site	MUA4 (DALP Sub)
Historic Flooding	 • The site lies outside of any Environment Agency's historic flood mapping. The historic flood areas provided by HBC show that there is an area that the southern site has been subject to flooding in the past and that the culverted section of Bower's Brook may become surcharged during extreme events. This is backed up by the flood mapping.
Defences	• There are no EA defences that directly impact upon the site.
Flood Warning Area (FWA)	• The site lies outside any EA FWAs.
Mitigation options & site suitability	• **This depends on the plans for the site. i.e. is the large industrial unit to remain? Or is it to be replaced by a new building? If so what will be it's use? Recommend that higher vulnerability land uses be directed away from the southern site and towards the northern land parcel with lower vulnerability uses in place in the southern parcel. Redevelopment of the industrial site should investigate possible retrofitting/new flood resilience measures and also opportunities for raising current floor levels above the 1% plus climate change event level of a maximum of 0.3m.** • **It may be possible for the site to pass the Exception Test if the recommendations within this Level 2 assessment are followed. If this is not possible it is likely development will not be permitted.**

Proposed Site	MUA4 (DALP Sub)
	• **Design and layout should focus higher vulnerability uses to areas outside of the flood zone, lower vulnerability uses could be directed to the ground floor.** • **Safe access and egress during a flood may prove difficult from the southern site with both Victoria Street and Ashley Way being within Flood Zone 3.**
Flood source: Groundwater	
Flood risk: groundwater	• Data unavailable. Risk from groundwater must be assessed as part of the FRA.
Flood Source: Infrastructure Failure – Reservoirs	
Flood risk: reservoirs	• The is no risk of reservoir inundation 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 the FRA.

Flood Source: Surface Water

Surface Water Flood Risk to Proposed Development Site

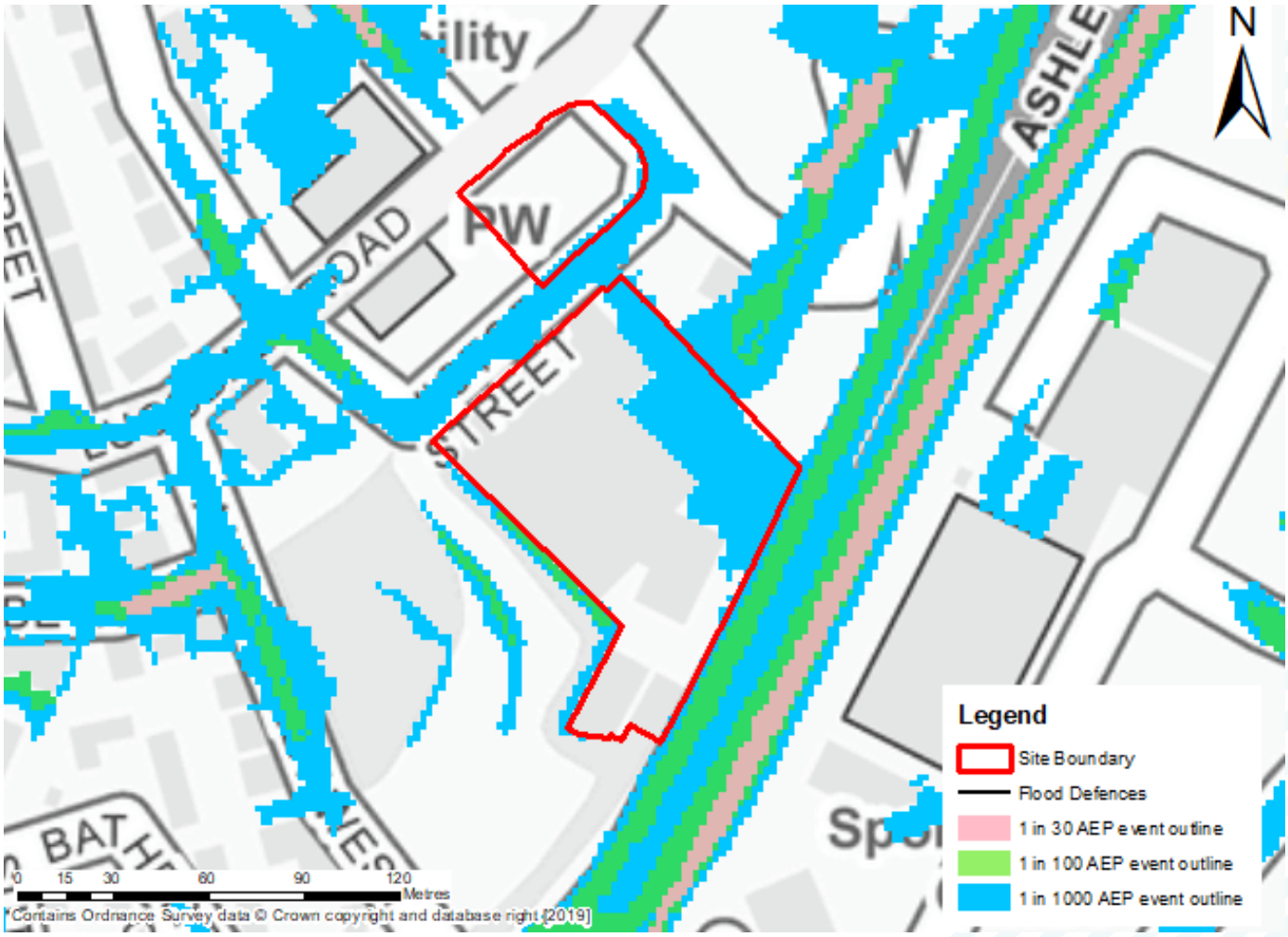

Figure 1-4: Surface water flood risk to the site

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)
	0.00	0.02	22.27
Surface water flooding depths	N/A	Max: 0.00-0.15m	Max: 0.30-0.60m
Surface water hazards	N/A	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 route via Victoria Street are at low risk of surface water flooding in the 1% AEP event.
Surface water: mitigation options & site suitability	• **It should be possible for this site to pass the Exception Test if the recommendations from this Level 2 assessment are followed. An FRA should assess the current drainage systems of both the industrial site and the car park to determine if they are adequate for any change in use. Runoff should not exceed the current level and should achieve betterment if feasible.** • **Condition and capacity assessment of the culverted section of Bower's Brook should be carried out, including blockage scenario modelling.** • **Investigations into current drainage arrangements should be carried out and as this site is currently developed, betterment on the existing runoff rate should be sought (typically 30% as a minimum) to ensure that there is no increase in surface water flood risk elsewhere. Ideally, surface water runoff should be fully attenuated to the greenfield rate, but this is considered unlikely for the southern site, depending on the plans for redevelopment.** • **The required volumes of attenuation for greenfield discharge have been calculated below - note that this provides an upper limit indication of the required volumes of attenuation and a betterment on the existing brownfield runoff rate would reduce attenuation requirements.** • **The site is currently developed and therefore, infiltration SuDS may not be feasible (subject to ground investigation and contaminated land assessment).** • **Attenuation measures should avoid Flood Zone 3 (approximately 41% of the site).** • **The minimum discharge rate for the site has been set at 5l/s/ha to provide a practical limit below which it is not reasonable to limit flows based on Rainfall runoff management for developments.**

Indicative Surface Water Flood Risk from Proposed Development (for Proposed Site in its Entirety)						
Proposed Development limiting runoff rate: Greenfield – FEH Statistical		Qbar: 5 l/s Q30: 8.15 l/s Q100: 9.97 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%	4.75	434	98	336	16.3	0.022 ha 2.218 %
3.33% AEP Rainfall + 40%	5.5	522	113	409	19.9	0.027 ha 2.700 %
1% AEP Rainfall + 20%	5	596	126	470 (134 exceedance storage)	18.7	0.031 ha 3.102 %
1% AEP Rainfall + 40%	5.75	715	144	571 (162 exceedance storage)	22.6	0.038 ha 3.769 %
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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Registered Office:
1 Broughton Park
Old Lane North
Broughton
Skipton
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@JBA - consulting.com
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