Padgetts (Batley) Ltd

232 Bradford Road
Batley
Kirklees
WF17 6JD

Flood Risk Assessment

Prepared by EWE Associates Ltd
Draft Rev0 March 2023

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CLIENT DETAILS

Padgetts (Batley) Ltd
234 Bradford Road
Batley
Kirklees
WF17 6JD

CONTRACT

This report describes work commissioned by Padgetts (Batley) Ltd following instruction on 8th September 2023. Padgetts (Batley) Ltd representative for the contract was Mr Jim Granger. Lea Favill of EWE Associates Ltd carried out the work.

Date: 3rd March 2023

Prepared by: ..... Lea Favill
Director

REVISION HISTORY

Draft Report Rev0 issued 3rd March 2023
- 1No copy issued to Mr Jim Granger

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1. INTRODUCTION

Terms of Reference

This report was commissioned by Padgetts (Batley) Ltd to support a planning application for an extension to an existing commercial building. The site, being located at 232 Bradford Road in Batley, can presently be accessed from the west off Bradford Road. The location of the site is shown on Table 2-1.

The site lies within Zone 3 of the Environment Agency Flood Map (version 2.8.2), being the zone with risk of 1 in 100 year (1% AEP) or greater for river flooding. The overall size of the development is less than 1 hectare.

It is usual for the Agency to raise an objection to development applications within the floodplain or Zone 2 or 3 of the flood map until the question of flood risk has been properly evaluated. The Agency will also object to developments where the total site area is in excess of 1 hectare until suitable consideration has been given to surface water runoff.

Approach to the Assessment

As there are two sources of flood risk – Batley Beck and surface water runoff – it is necessary to determine flood water levels at the site for the desired return periods emanating from these sources. Consideration has also been given to the site flooding from either overland flow or ponding of localised rainfall within the site.

Kirklees District Council was included in the Calder Valley SFRA completed by JBA Consulting during November 2008. References have been taken from the assessment; however, there is very little site-specific information within the report relevant to the area close to the site.

The Batley Beck is located directly to the east of the site. In line with the site the beck is open channel. However, the beck does pass beneath a culvert downstream of the site. The beck is Main River, as such, the responsibility for flood defence and land drainage lies with the Environment Agency.

The Environment Agency has been approached for modelled flood data for the beck. The Environment Agency has modelled flood data which may assist in predicting the design flood level for the river adjacent to the proposed development site.

As the proposed development is an extension to an existing commercial building within a parking area which is paved and supported by a formalised drainage system which discharges into the Batley Beck the proposal will not increase the impermeable area. Therefore, the surface water runoff will not increase. The total area of the extension is approximately 540m². Hence, for the purposes of this assessment this mechanism has not been considered further.

A walk over of the site was conducted by Mr Lea Favill, a senior river engineer during February 2023; during the visit, a photograph survey of the site and adjacent river was undertaken. A topographical survey of the site was provided by the clients representative.

The requirements for flood risk assessments are generally as set out in National Planning Policy Framework (NPPF). The detail and complexity of the study required should be appropriate to the scale and potential impact of the development. For the purposes of this study, the following have been considered: -

- Available information on historical flooding in the area.
- Site level information.
- Details of structures, which may influence hydraulics of the watercourse and consideration of the effect of blockage of structures.
- Estimates of design levels, equivalent to a 200-year (coastal/tidal) and a 100-year (fluvial) return period flood event.
- Allowances for increased flows resulting from the effects of climate change.
- Allowances for sea level rise resulting from the effects of climate change.

Assess the existing runoff characteristics and the potential impact the proposed development will have on the runoff.

Further guidance is also provided in the CIRIA Research Project 624 “Development and Flood Risk: Guidance for the Construction Industry”.

Application of Sequential & Exceptions Test

The area for the proposed extension is located within Zone 3 of the Environment Agency Flood Map (version 2.8.2), being the zone with risk of 1 in 100 year (1% AEP) or greater for river flooding. The proposed development is commercial, as such, is less vulnerable.

Table 1: Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability classification		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	**Exception Test required**	✓
	Zone 3b	Exception Test required	✓	×	×	×

✓ Development is appropriate

× Development should not be permitted

2. DETAILS OF THE SITE

Site Location

Table 2-1: Location Plan



Ordnance Survey Licence no.: WL1005160

Site Details

Table 2-2: Site Details

Site Name	232 Bradford Road, Batley
Existing Land Use	Commercial
Proposed Development	Commercial
Grid Reference	SE 23175 24655
County	West Yorkshire
Local Planning Authority	Kirklees District Council
Internal Drainage Board	Not Applicable
Others	Not Applicable
Post Code	WF17 6JD

Site Description

The proposed development site is currently a commercial development to the east of Batley Road and the west of Batley Beck, within the centre of Batley near Dewsbury. The Batley Beck floodwall forms the eastern boundary of the site. An aerial photograph of the existing site is provided below in **Error! Reference source not found.**.

The area for the proposed development is approximately 540m². The land within this area lies at a level of between 47mOD and 47.8mOD, with the ground floor level to the existing building being approximately 47.58mOD. A plan of the site showing ground levels is provided at Appendix A.

There is existing commercial development to the north, south and west of the proposed development site.

The proposal is to construct a commercial extension to the existing commercial building. A layout plan for the development is provided at Appendix B of this report.

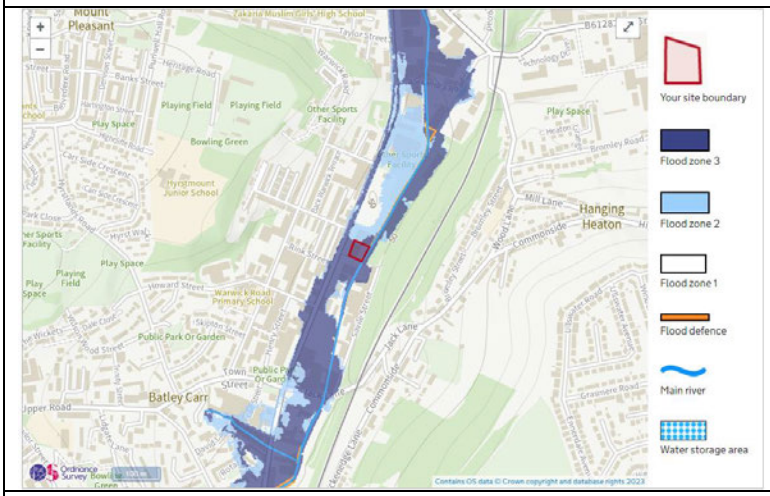
Site Photographs



3. INITIAL ASSESSMENT

Environment Agency Flood Zone Map

Figure 3-1: Environment Agency Flood Zones

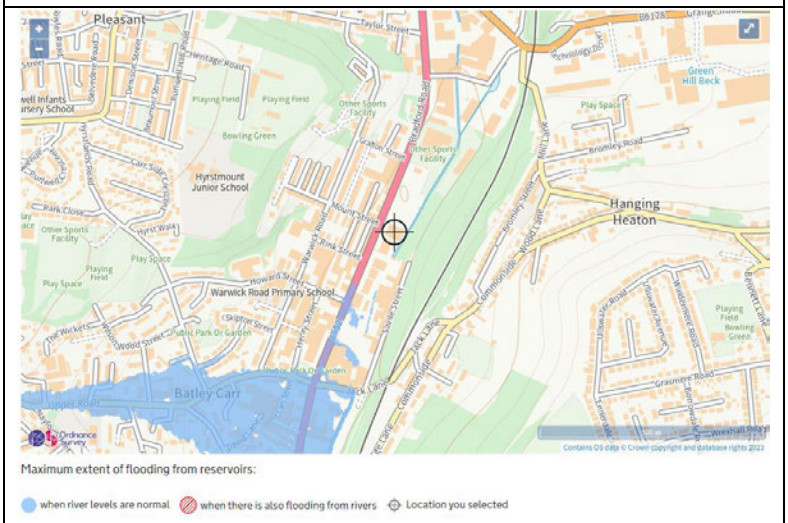


Source: Environment Agency Website (www.environment-agency.gov.uk)

Environment Agency Reservoir Flood Risk

The site is not within an area which affected by flood risk from a reservoir or canal.

Figure 3-2: Environment Agency Flood Zones



Source: Environment Agency Website (www.environment-agency.gov.uk)

Environment Agency Surface Water Flood Risk

The location of the proposed extension is within an area of low and medium risk according to the Environment Agency surface water flood risk map. As such, it is likely that the site will be flooded to a shallow depth due to surface water runoff.

Figure 3-3: Environment Agency Flood Zones



Source: Environment Agency Website (www.environment-agency.gov.uk)

Past Flooding History

A search on the British Hydrological Society Chronology of British Hydrological Events website[1] found no records of past flooding close to the site.

Undertaking an internet based search for flooding found no further reference to flooding close to the site.

SFRA Flooding History

The SFRA contained no references to the site being flooded.

Environment Agency Flooding History

The Environment Agency provided no historical references to the site being flooded.

[1] http://www.dundee.ac.uk/geography/cbhe/

Possible Flooding Mechanisms

As there is one remaining source of flood risk which requires detailed consideration – Batley Beck – it is necessary to determine flood water levels at the site for the desired return periods emanating from this source.

The Batley Beck is located along the eastern boundary of the site. The beck is open channel with walled flood defences to a level of 48.94mOD, therefore overtopping and breach of the defences will need to be considered.

There are no depressed areas within the site which could encourage ponding, therefore this flood mechanism has not been considered further.

Information on groundwater flooding is limited within the Kirklees District Council. The SFRA provided no further information. In addition, reference to the Groundwater Vulnerability Map and Source Protection Zones produced by the Environment Agency indicate that district is predominantly underlain by secondary B aquifer and are therefore unlikely to be source of significant flood risk.

Yorkshire Water is the statutory water undertaker and is responsible for the public sewer systems within Wakefield area. Yorkshire Water maintains a register of historical sewer flooding events (DG5 Register) within the area. There are no report incidents close to the site. The SFRA provided no further information.

4. FLOOD RISK ASSESSMENT

Requirements of the Environment Agency

The Environment Agency, as part of its development control procedures, generally require finished floor levels to be set above the 1% AEP plus climate change flood water level at the site. The development is commercial in nature, as such it is considered that access and egress from the development site will be desirable during times of extreme floods.

Batley Beck

The Batley Beck is located along the eastern boundary of the site. The Batley Beck runs north to south past the site eventually out falling into the River Calder within Dewsbury.

In line with the site the beck flows within a manmade channel which has vertical walls which terminate above the normal ground level as it flows along the eastern border of the site. From here the beck passes through a box culvert before becoming open channel within the Beckside Works to the south.

The top of the flood wall inline with the site is at a level of 48.94mOD. The flood wall is 450mm wide and includes a reinforced concrete wall cladded with stone.

1 in 100 year flood event within the Batley Beck

The Environment Agency has provided modelled flood levels for the Batley Beck directly in line with the site which are taken from the Batley Beck Mapping Study dated 2015. The data provided is shown at Appendix C of this report.

The modelling provided a node point upstream of the site and also one downstream of the site. Node reference 4 is located directly upstream of the site and reference 3 downstream. The following flood level have been extracted from the river model.

Table 4-1: 1 in 100 year flood levels

Node Reference	Defended level	Undefended
4	48.32	47.75
3	48.28	47.88

It is therefore considered that due to the freeboard between the flood level and the bank top level (48.94) that the flood water will be maintained within the main channel and the site will not be flooded.

Increase in estimated flood level due to Climate Change

NPPF states that *'…Flood risk assessment should be carried out to the appropriate degree at all levels of the planning process, to assess the risks of all forms of flooding to and from development taking climate change into account. The future users of the development must not be placed in danger from flood hazards and should remain safe throughout the lifetime of the plan or proposed development and land use*.'

As the proposed development is for a commercial land use, consideration has therefore been given to take into account the potential effects of climate change over the next 75 years in accordance with NPPF. The Environment Agency provided thea 1 in 100 year plus climate change 20% flood level estimate.

The following flood levels have been extracted from the river model.

Table 4-2: 1 in 100 year plus climate change flood levels

Node Reference	Defended level	Undefended
4	48.82	47.75
3	48.79	47.97

It is therefore considered that due to the freeboard between the flood level and the bank top level (48.94) that the flood water will be maintained within the main channel and the site will not be flooded.

The latest climate change guidance provides climate change increases on a catchment basis and also considers flood zones, vulnerability and life span of the project. The site is located within the Humber catchment and as the vulnerability is low the central and higher central bandings should be considered. The life span of the project is 75 years therefore climate change increases of 20% and 30% should be considered. Therefore, an estimate of the 1 in 100 year plus climate change 30% flood level is required for this assessment. As such, an increase of 0.1m has been applied to the flood level.

Therefore, the 1 in 100 year plus climate change 30% flood level is estimated at 48.92mOD which is below the top of the flood defence.

Extreme 1 in 1,000 year flood event within the Batley Beck

The modelling provided a node point upstream of the site and also one downstream of the site. Node reference 4 is located directly upstream of the site and reference 3 downstream. The following flood level have been extracted from the river model.

Table 4-3: 1 in 1,000 year flood levels

Node Reference	Defended level	Undefended
4	49.10	Not provided
3	49.11	Not provided

It is therefore considered that the flood level exceeded the bank top level of the flood defence and therefore the site could be flooded to a shallow depth during this event.

1 in 100 year plus climate change 30% breach of flood wall

The 1 in 100 year plus climate change 30% flood level in line with the site has been estimated at 48.92mOD. The top of the flood wall is at a level of 48.94mOD and therefore the flood wall will be retained within the channel.

The lowest ground level within the area proposed for the extension is currently at 47mOD. Therefore, due to the close proximity of the extension to the flood wall the site could be flooded to a depth of 1.94m if a breach occurred during a 1 in 100 year plus climate change 30% flood event.

The likelihood of a breach is low due to the fact that the flood defence is a robust flood wall and the estimated flood level is a considerable distance below the crest of the defence. Therefore, overtopping and scour of the landside of the defence is unlikely to occur.

5. MITIGATION MEASURES

Raising Floor Levels/Land Raising

The site is located directly adjacent to the Batley Beck. The 1 in 100 year flood level has been estimated at between 48.32mOD in line with the site. The 1 in 100 year plus climate change 30% flood level has been estimated at 48.92mOD. The crest of the flood wall is at a level of 48.94mOD and therefore the above flood levels will be retained within the main channel.

However, there is a risk of flooding the site if the flood wall was to breach which could result in flood depths of approximately 1.94m within the area proposed for the extension.

The proposed ground floor level of the extension will need to be constructed at the same level of the existing building (approx. 47.58mOD) to maintain continuity within the building. Therefore, the new extension and existing building could potentially be flooded to a depth of 1.34m if the floodwall was to breach during an extreme flood event.

In order to reduce the impact of a flood on the development flood resilience measures should be introduced into the design.

Emergency Access & Egress

Emergency access and egress needs only to be considered for future extreme events within the Batley Beck which result in a breach of the walled defences.

If the walled is breach during an extreme flood event the proposed extension could be flooded to a depth of 1.34m.

However, Bradford Road, as it is in flood zone one will provide a point of safety if the flood wall was to breach.

Flood Warning and Evacuation Plan

For health and safety reasons there is a preference to evacuate, as failure to do so, would put occupants and others (e.g. rescuers) at risk of injury. Therefore, it is highly recommended that the occupants prepare a flood evacuation plan, in order to ensure that they are relocated to a safe area above the flood water.

It is noted that during evacuation, the site's occupants should move towards Flood Zone 1, which lies above the flood level. The nearest location to the site within Flood Zone 1 is along Bradford Road to the west of the site.

Flood siren should be installed in order to warn occupants of a potential flood.

Flood Resilience & Protection Measures

Consideration should be given to flood proofing the building to a level equivalent to the estimated 1 in 100 year plus climate change 30% flood level of 48.94mOD to reduce the residual damages if an extreme flood was to occur. Flood proofing is a

technique by which buildings are designed to withstand the effects of flooding. There are two main categories of flood proofing, which are dry proofing and wet proofing.

Dry proofing methods are designed to keep water out of the building, and wet proofing methods are designed to improve the ability of the property to withstand the effects of flooding once the water has entered the building. Both would be required in this case, due to the possible failure of the dry proofing methods.

Where wet proofing is required it is important that a flood response plan should be prepared and practised regularly, so that any contents of the building can be moved to design flood level if required or are built to withstand immersion in water or are designed to be easily replaceable.

The differential pressures across load bearing walls and the flotation effect that will occur during flood events should be taken into account when considering dry proofing techniques. For most existing properties, this means that dry flood proofing should only be considered if the expected flood depth is under 0.6m, which in this particular case during more extreme flood events is expected to be 1.34m depth within the building and as such dry proofing is likely to be successful. The following table summarises the recommendations for flood proofing measures which can be incorporated within the design of buildings[2]:

Feature	Considerations To Improve Flood Proofing
General	Waterproof construction methods should be adopted wherever practical.
Floors	Avoid use of chipboard floors. Use concrete floors with integrated and continuous damp proof membrane and damp proof course. Solid concrete floors are preferable; if a suspended floor is to be used, provide facility for drainage of sub-floor void. Use solid insulation materials.
Fitting, Fixtures and Services	If possible, locate all fittings, fixtures and services above design floor level. Avoid chipboard and MDF. Consider use of removable plastic fittings. Use solid doors treated with waterproof coatings. Use solid wood staircases. Avoid fitted carpets. Locate electrical, gas and telephone equipment and systems above flood level. Fit anti-flooding devices to drainage systems.
Demountable flood protection	Consideration should be given to providing demountable flood barriers to all doors off Needsend Lane to reduce potential flood water ingress into the building.

Environment Agency easement

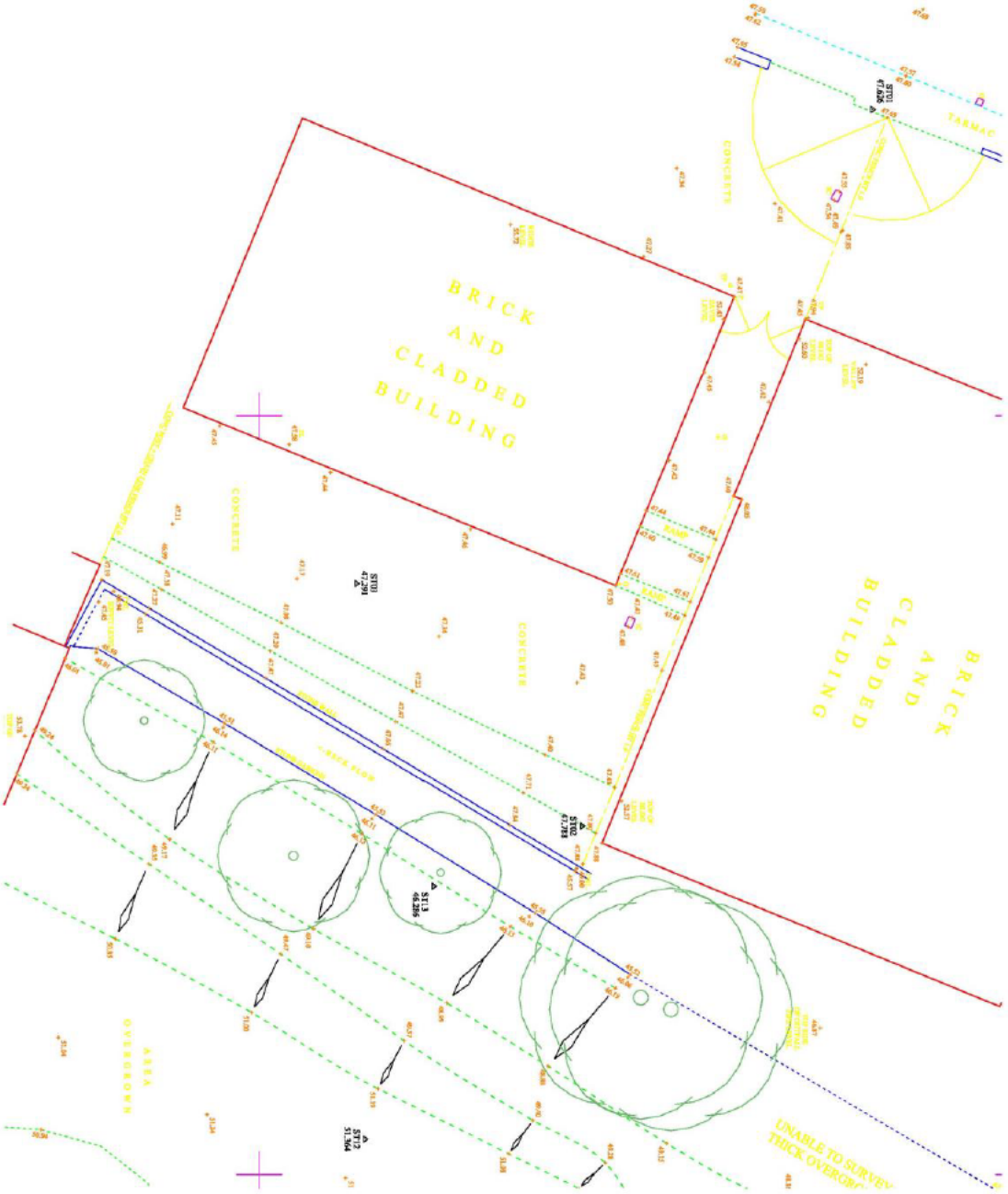
The Environment Agency have requested a 3m easement from the top of the floodwall to the new building extension.

[2] Development and Flood Risk Guidance for the Construction Industry, CIRIA C624, London 2004

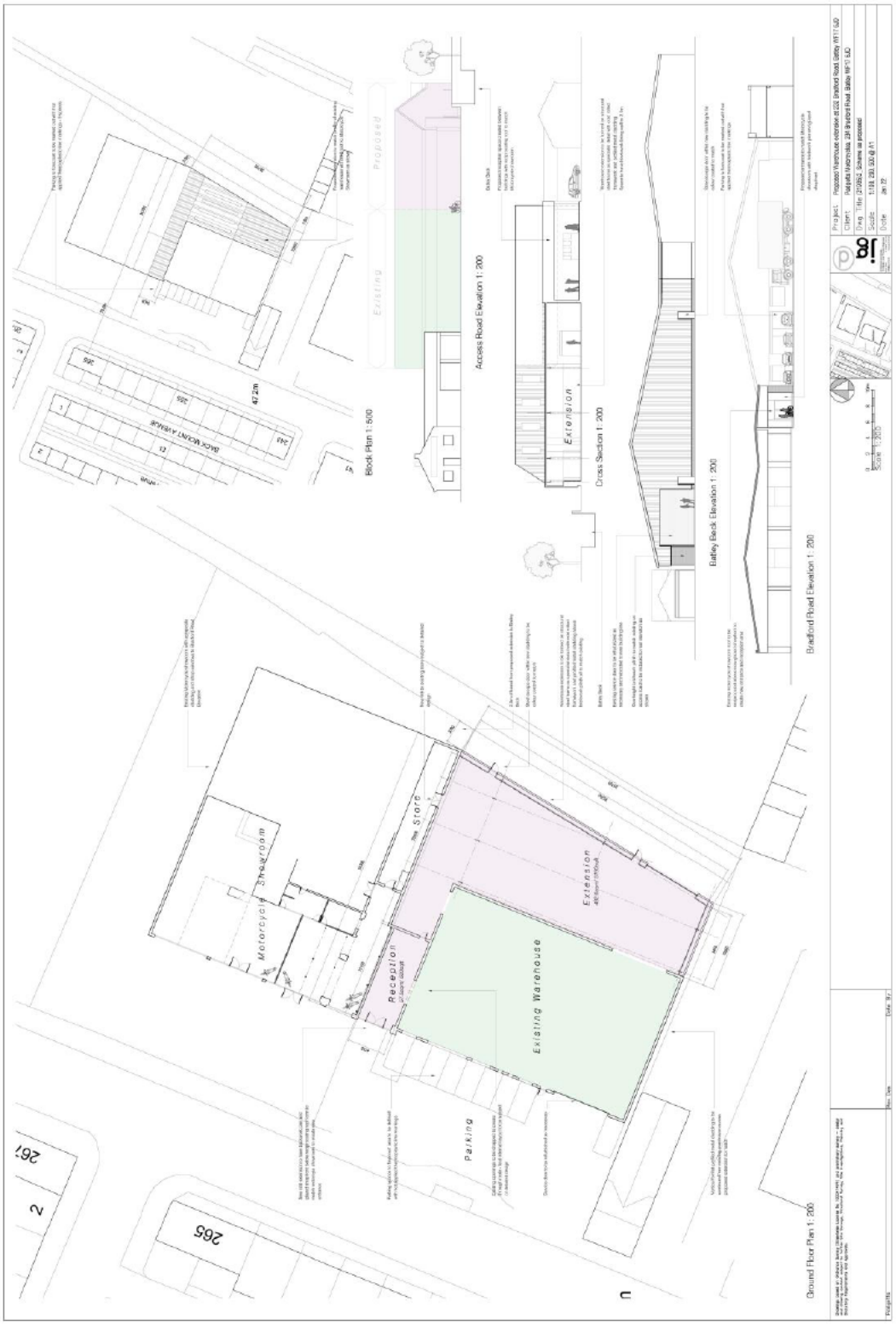
6. CONCLUSION

It is concluded that there is a risk of fluvial flooding to the proposed site from the Batley Beck, however, the existing floodwall provides protection during extreme flood events. It is unlikely that the proposed development will have any adverse impact on the surface water drainage in the area.

Appendix A: - Levels



Appendix B: - Proposed Layout Plan



Appendix C: - EA Flood Data