Mugen Geo Ltd.

SITE-SPECIFIC

FLOOD RISK ASSESSMENT

TODMORDEN LEARNING CENTRE AND COMMUNITY HUB (TLCCH)
AT TOD COLLEGE
BURNLEY ROAD
TODMORDEN
WEST YORKSHIRE
OL14 7BX

Document Status: FINAL Revision: v1	For Todmorden Learning Centre and Community Hub (TLCCH) at Tod College Burnley Road Todmorden OL14 7BX

Prepared by Mugen Geo Ltd
Machpelah House,
Hebden Bridge HX7 8AU
www.mugengeo.co.uk

Job Nº MGEO 2312 OL14 7BX

Date: January 2024

Table of Contents

Note: This report has been formatted to be read as a PDF.

1 Introduction

Mugen Geo Ltd (Mugen Geo) was commissioned, on behalf of Todmorden Learning Centre and Community Hub (TLCCH) at Tod College to carry out a site-specific flood risk assessment of 'Flood Risk Assessment for Todmorden Learning Centre and Community Hub (TLCCH) at Tod College Burnley Road Todmorden West Yorkshire OL14 7BX' (the site).

1.1 Scope and objective of the report

This report has been prepared in support of an planning application for a change of use. It is understood that it is planned to undertake the following improvement works:

- Extension to include a toilet block and store
- Insulation and cladding to north and east elevations
- Windows and doors to north and east elevations
- Landscape works to include public realm and ramped and stepped access

The Flood Risk Assessment (FRA) comprised a desk-based review of current and historical information, environmental, geological and hydrological information, together with the findings of a site walkover.

The simple purpose of this report is to appraise the flood risk and establish whether the development is likely to be affected by current or future flooding from any source. The study has not included geotechnical considerations or checks on services on or adjacent to the site, and no structural, ecological or asbestos surveys have been carried out.

1.2 Information Sources

This report has been prepared from published information and information provided by the client and other parties, including anecdotal information.

This FRA is based on the following information:

- Topographic Survey
- Proposed Plans
- British Geological Survey Drift & Geology Maps
- Environment Agency Data
- British Geological Survey Hydrogeology Data
- Site visit

1.3 Limitations

This report has been prepared for the sole use and reliance of the Client named above and cannot be relied upon by any other parties without the express written authorisation of Mugen Geo Ltd. Any unauthorised third party relies on this report at their own risk and the authors owe them no duty of care.

Draft versions of this report cannot be relied upon and Mugen Geo Ltd accept no liability for decisions made based upon any draft versions circulated as part of project development. Please refer to the FINAL report only for decision making purposes.

The findings and opinions conveyed in this report is based on information obtained from sources which Mugen Geo Ltd believe are reliable. All reasonable endeavours have been made to source the information from reputable organisations; however, Mugen Geo Ltd accepts no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data. No attempt has been made to independently verify any data collected by others or from other sources. The Report does not constitute any legal advice. As such, the advice of a Solicitor may also be required.

The utilised environmental dataset reports are based upon known, published information and may not comprise a complete record of all features of relevance. An explanation of the datasets used, their sources, assumed definitions and limitations is available on request.

Mugen Geo Ltd reserves the right to amend their conclusions and recommendations in the light of further information that may become available.

2 Site Setting and Description

2.1 Site Location

The site is situated in the centre of Todmorden in Calderdale and located on Burnley Road which forms the eastern site boundary. A large food retail premises is present immediately south of the site with a shared boundary. Residential housing is present immediately north of the site. A retaining wall was present to the west and the ground level rose steeply thereafter.

The site location is shown in figures 1 & 2 below and the site photos included as appendix C.

The site is utilised by the Todmorden Learning Centre and Community Hub (TLCCH) and run by a community group. The building, formerly Todmorden Community College, was transferred to the community benefit society from Calderdale Council in the Spring of 2021.

Site details are summarised in Table 2.1 below:

Detail	Remarks
Location	Todmorden Learning Centre and Community Hub Burnley Road, Todmorden, Lancashire OL14 7BX
NGR	396086E 424800N
Area	Estimated to be >0.1ha

Table 2.1 – Site Summary

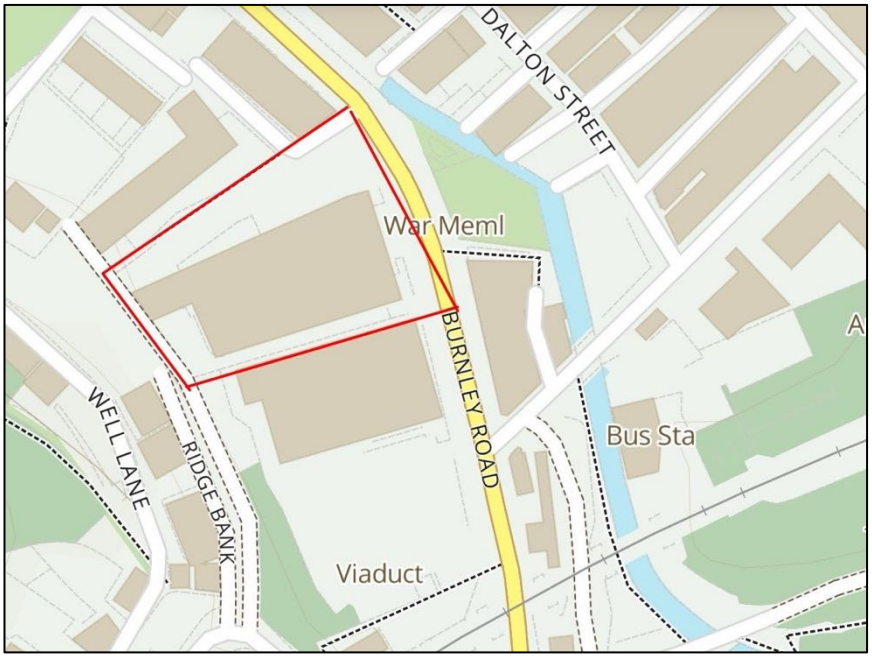


Figure 1 – Indicative site location plan

2.2 General Description of Site

A site visit was undertaken by Mugen Geo on the 20th December 2023 to examine the current site condition. The immediate surroundings of the site were observed from public rights of way.

The site comprised the existing building and car park at the time of inspection. The existing macadam cover of the car park was in good condition. The ground level rose towards the main building with the threshold accessed via concrete steps. The building was surrounded by hardstanding which slopes gently away from the building.

Figure 2 – Indicative existing site plan

2.3 Geology

The British Geological Survey (BGS) 1:50,000 scale map solid & drift Digital Geological Map of Great Britain indicates the site is underlain by the solid geology of Hebden Formation, a Carboniferous age sequence of mudstone, siltstones and sandstones. These strata will weather to both cohesive and granular strata depending on the site aspect and local conditions.

2.4 Hydrogeology

Within all aquifers, groundwater tends to flow from areas where groundwater is recharged and follows the topography from elevated escarpments to lower slopes. Variation in groundwater flow directions can occur where local groundwater recharge is impacted by spatial differences in precipitation & surface infiltration rates.

The complexity of the regional fault system of the Carboniferous deposits in the area leads to significant spatial variability in the regional groundwater flow pattern and groundwater contour levels. Faulting can isolate blocks of rock and create new

connexions affecting hydraulic conductivity at a local scale. It can also be impacted by coal mining and associated dewatering activities. Due to the complex hydrogeology, the whole sequence is considered in general terms as an aquifer.

Since April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive.

The aquifers within the bedrock deposits are designated as 'Secondary A'. These are described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

2.5 Hydrology

2.5.1 Surface Waters

The nearest surface water features was the River Calder located approximately 20m east of the site, immediately east of Burnley Road and flowed to the south east and converged with Walsden Water to the south of the site. The River Calder is channelised through much of the centre of Todmorden.

2.6 Flood Zone 3

The site is identified to be within an area of land at risk of flooding, when the presence of flood defences are ignored. Zone 3 assumes flooding from rivers or the sea with a 1 in 100 (0.1%) chance of flooding each year.

3 Flood Risk Planning Policy

The National Planning Policy Framework (NPPF) sets out the Government's national policies planning in England and includes guidance with respect to flood risk.

Four Flood Zones are utilised to characterise flood risk based upon the probability of river and sea flooding, ignoring the presence of defences.

3.1 Sequential Test

As set out in the National Planning Policy Framework, the aim of the Sequential Test is to steer new development to areas at the lowest probability of flooding. The Flood Zones are the starting point for the sequential approach and provide the basis for applying the Test.

Flood Zone Definitions:

Flood Zone 1	Low probability (1 in 1000 annual probability of river or sea flooding (<0.1%))
Flood Zone 2	Medium probability (between 1 in 100 and 1 in 1000 annual probability of river flooding (1.0%.-.0.1%) or between 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%.-.0.1%) in any given year).
Flood Zone 3a	High probability (1 in 100 or great annual probability of river flooding (>1.0%) or 1 in 200 or greater annual probability of sea flooding (>0.5%) in any given year).
Flood Zone 3b	Land where water must flow or be stored in times of flood. Land which would flood with an annual probability of 1 in 20 (5.0%), or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain

The Flood Zones do not consider the projected effects of climate change and may not represent potential flooding from smaller watercourses.

The guidance is intended to apply to new development and encourage development to Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, Local Planning Authorities will consider the flood risk vulnerability of land uses and reasonably available sites in Flood Zone 2, applying the Exception Test if required.

Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, considering the flood risk vulnerability of land uses and applying the Exception Test if required.

The guidance also sets out the vulnerability to flooding of different land uses and this land use is highlighted below.

3.2 Flood Risk Vulnerability Classification

3.2.1 Essential Infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood.
- Wind turbines.
- Solar farms

3.2.2 Highly Vulnerable

- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent

3.2.3 More Vulnerable

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non–residential uses for health services, nurseries and **educational establishments**.
- Landfill and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

3.2.4 Less Vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.

- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

3.2.5 Water Compatible

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan

3.3 Appropriate Development

Appropriate Development is assessed based on the vulnerability of a development and the guidance states what Flood Zone(s) the development is appropriate within. The site lies within Flood Zone 3, with a high probability of flooding from rivers.

The application is for improvements to the existing educational facility, which is considered to be a 'more vulnerable' land use in Annex 3 of the National Planning Policy Framework. For new development it is therefore necessary for a site-specific flood risk assessment (FRA), which can demonstrate that the 'development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall'.

3.4 Exception Test

The Exception Test is utilised to demonstrate the feasibility of and ensure that flood risk to people and property is managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

The first part of the Exception Test is to show that the proposed development will provide wider sustainability benefits to the community that outweigh flood risk. The second part is the requirement for a FRA to demonstrate that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

3.5 Site Specific Exception Test

Whilst the development is considered appropriate a Flood Risk Assessment is required by the Environment Agency to ensure the proposed works will remain safe over its lifetime from all sources of flooding and not increase flood risk elsewhere.

4 Climate Change

There is a body of scientific evidence that demonstrates that the global climate is changing, in part, as a result of human activity. Past, present and future emissions of greenhouse gases are expected to cause significant global climate change during this century. Models suggest that at a regional level affects will vary: for the UK, more frequent short-duration, high intensity rainfall and more frequent periods of long-duration rainfall of the type responsible for the 2000 floods could be expected. Sea levels will continue to rise.

The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change.

As the Government's expert on flood risk the Environment Agency, (EA), published revised climate change allowances to support the NPPF in February 2016. The sea level rise allowances were revised in December 2019 and the peak river flows revised July 2021. The peak rainfall allowances were revised in May 2022.

The climate change allowances are based on projections and different scenarios of carbon dioxide (CO2) emissions to the atmosphere and provide predictions of anticipated change for:

- peak river flow and peak rainfall intensity by river Management Catchment;
- sea level rise;
- offshore wind speed and extreme wave height.

4.1 Peak River Flow Allowances

The peak river flow allowances show the anticipated changes to peak flow by Management Catchment with three allowances; central; higher central and upper end.

The climate change allowance for the Humber river basin district is tabulated below:

River Basin District	Allowance Category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Humber	Upper End	20%	30%	50%
	Higher Central	15%	20%	25%
	Central	10%	15%	20%

The planned improvement works are considered to apply as an exception and the Upper End Allowances are considered to appropriate and therefore flood risk mitigation is required.

The site is located on land near to the fluvial floodplain on adjacent land. The impact of climate change has to be taken into account in any assessment of future risk. Flood risk mitigation options are discussed in the later sections of this report.

4.2 Peak Rainfall Intensity Allowance

Increased rainfall affects river levels and land and urban drainage and should be applied to surface water drainage systems. However, the proposed improvement works proposal does not increase the impermeable area enough for these allowances to apply.

4.3 Sea Level Allowances

There is a range of allowances for each region and epoch or time frame for sea level rise. However, this site is not affected from tidal sources.

5 Flood Risk Sources

Flood risk sources have been identified and where mitigation is required to reduce the flood risk this is discussed in the subsequent section.

5.1 Flooding from Rivers and Sea

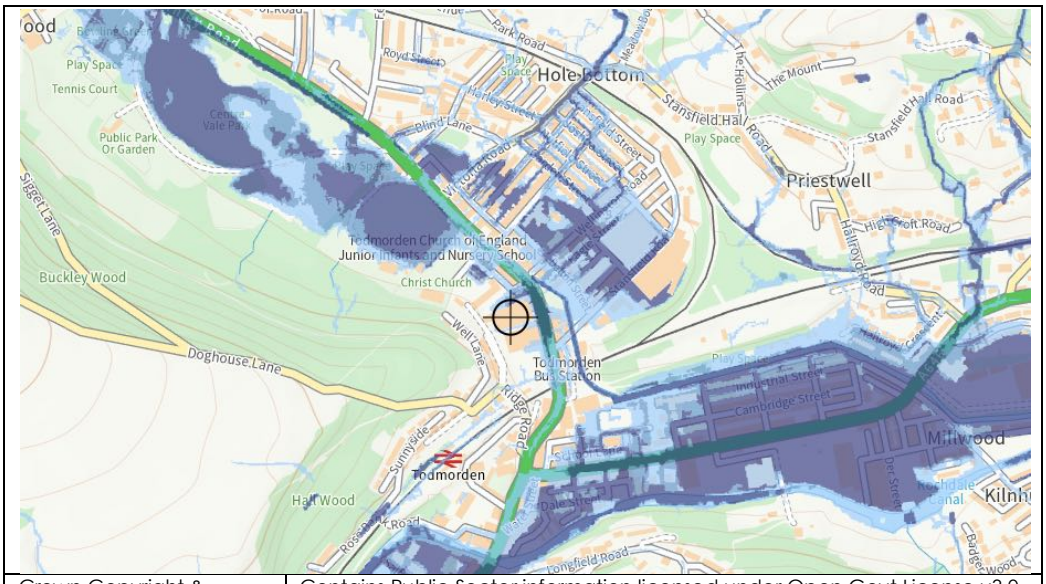
The River Calder has been identified approximately 20m east of the site.

The possible causes of flooding within the local catchment area include:

- Overflow of watercourses and existing flood defences including water retention facilities such as flood storage reservoirs/washlands and storm water balancing ponds;
- Breaching of flood defences (including flood storage areas);
- Mechanical, structural or operational failure (including due to blockages) of hydraulic structures, pumps etc;
- Localised surface water flooding (including sewer flooding, highway drainage flooding and overland flooding);
- Manmade waterways such as reservoirs and canals;
- Functional Floodplains or Washlands; and
- Groundwater flooding.

5.1.1 Surface Water Flooding

Public record surface water (pluvial) Flood mapping identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. These maps illustrate potential flooding when rainwater lies or flows over the ground.



Crown Copyright & database rights 2023	Contains Public Sector information licensed under Open Govt License v3.0

Figure 2 – Surface water flooding within site vicinity

This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event. Unlike fluvial mapping, which is based on a detailed hydraulic model, this mapping is more illustrative. The surface water flooding extents are produced above as figure 2 to highlight the potential worst case scenario modelling that could impact the wider area.

5.1.2 Groundwater Flooding

Groundwater flooding risk is considered as low. Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property.

5.1.3 Sewers

Public maintained combined and surface water sewers are located in Burnley Road and it is understood both flow in a southerly direction past the site.

The risk of flooding from existing sewers is considered moderate. The site could be at risk of flooding from local sewers that are blocked or have insufficient capacity.

5.1.4 Reservoirs

The reservoir failure flood risk mapping shows areas that might be flooded if a reservoir were to fail and release the water it holds. The site is considered to not be at significant risk of flooding from reservoirs.

5.1.5 Canals and Artificial Water Bodies

The Rochdale Canal is considered sufficiently distant from the site. The site is considered to not be at significant risk of flooding from canals.

5.1.6 Development Foul & Surface Water

The proposed improvements include additional toilet facilities and will require the disposal of foul and surface water which could impact on existing systems at the site.

6 Site-specific Flood Risk Assessment

6.1 Introduction

It is assumed a Site Specific Flood Risk Assessment is required by the Environment Agency to ensure the proposed works will remain safe over its lifetime from all sources of flooding and not increase flood risk elsewhere.

6.1.1 Preliminary Assessment

The guidance for the assessment of risk on a site-specific basis is normally undertaken for new planning developments. For an existing development, such as at this site, the judgements and considerations relating to flood risk are somewhat different and the overall assessment of risk at the site is based upon the considerations below.

The site is occupied by the existing college and has evidently been constructed with consideration of periodic flooding. The partial basement and steps up to the ground floor level has raised the property above the majority of previous flood levels and existing flood mitigation measures are in place. It is understood that the basement was flooded although flood waters did not reach the reception floor level (refer to site photos).

Based on the past history of the site the probability of the main building being affected by flooding from the noted sources is considered to be moderate and as part of the improvement works some mitigation measures are recommended. The car park and open space areas are considered to be at moderate risk of flooding. It is evidenced from the construction that the building design was able to accommodate flood waters and remains in reasonable structural condition.

Overall the improvement works are considered unlikely to create significant new hazards however some appropriate mitigation is recommended. It should be assumed that a future flooding event will occur but understanding that these are infrequent and several flood warning systems should allow adequate time to protect site users and interior fixtures and fittings in all but the most extreme events.

6.2 Mitigation Measures

The existing basement is assumed to have been constructed to accommodate intermittent flood waters. A stepped access down to the basement is present along the north elevation and a kerb has been installed to defend against flood water within the car park. It is recommended that this access is protected by a masonry wall to at least 127.60m AOD in this area and a flood gate/door installed to protect the basement.

The Applicant has a Flood Response Plan in place, is signed up to the EA 'social media flood alerts'. Local flood sirens are in place and provide sufficient time for evacuation if needed.

It is understood that two '500L per minute' sump pumps have been installed and are considered appropriate mitigation.

The Calderdale Council website notes, in its coverage of flood risk that 'It is not possible to totally remove the risk of flooding which is why it is important that every home and business does everything possible to reduce its own risk'.

Flood resilience is being planned as part of the design of the change of use. The use of materials such as soft woods and plaster and plaster board for formwork should be avoided where possible at basement and ground floor level. It is recommended that detailed development proposals reference BRE Digest 523 and where possible ensure that new construction materials are suitable. Features such as flood barriers and could be installed at the building entrances and exits although flood waters will rise within the basement reducing their effectiveness in some scenarios.

Water levels in the area will rise incrementally in the most likely scenarios and a detailed flood evacuation plan should be prepared for the building. People remaining on site would make use of the upper floor of the existing building as a place of refuge and for the storage of furniture and other items from the basement. Existing egress from the site to higher ground to the west remains possible at all times via public footpaths.

6.2.1 Finished Development Levels

The existing internal floor level within the reception area is at approximately 126m AOD. It is understood that no changes to the existing floor levels are planned.

6.2.2 Flood Barriers

The existing site entrance will be subject to largely cosmetic changes with external cladding. The existing site entrance does not have flood barriers installed and it is understood that the main access to the site will be moved to Burnley Road and will include a flood barrier although detailed proposals are not available.

6.2.3 Development Foul and Surface Water

No changes to the sewer system are planned. Existing foul and surface waters are understood to discharge to the public foul sewer in Burnley Road.

Given the site setting and location it is considered that a soakaway system will be unsuitable for the site. The site is located within an urban area with nearby structures on site and surrounding land. The underlying geology is likely to be largely impermeable and it is evident that infiltration is unlikely to provide significant mitigation.

6.3 Residual Risks

Residual risks are those that remain even once mitigation measures are put in place to minimise the impact of flooding at a site. There is always a possibility of a flood in excess of that allowed for which might conceivably cause some flooding to the development. However, such an event would have a very low probability and the risk of flooding to development, above that which has been allowed for within the site design, would be extremely small.

If, at any stage during the construction any significant changes from the assumed ground conditions or building condition are found, this should be brought to the attention of Mugen Geo Ltd and appropriate advice sought.

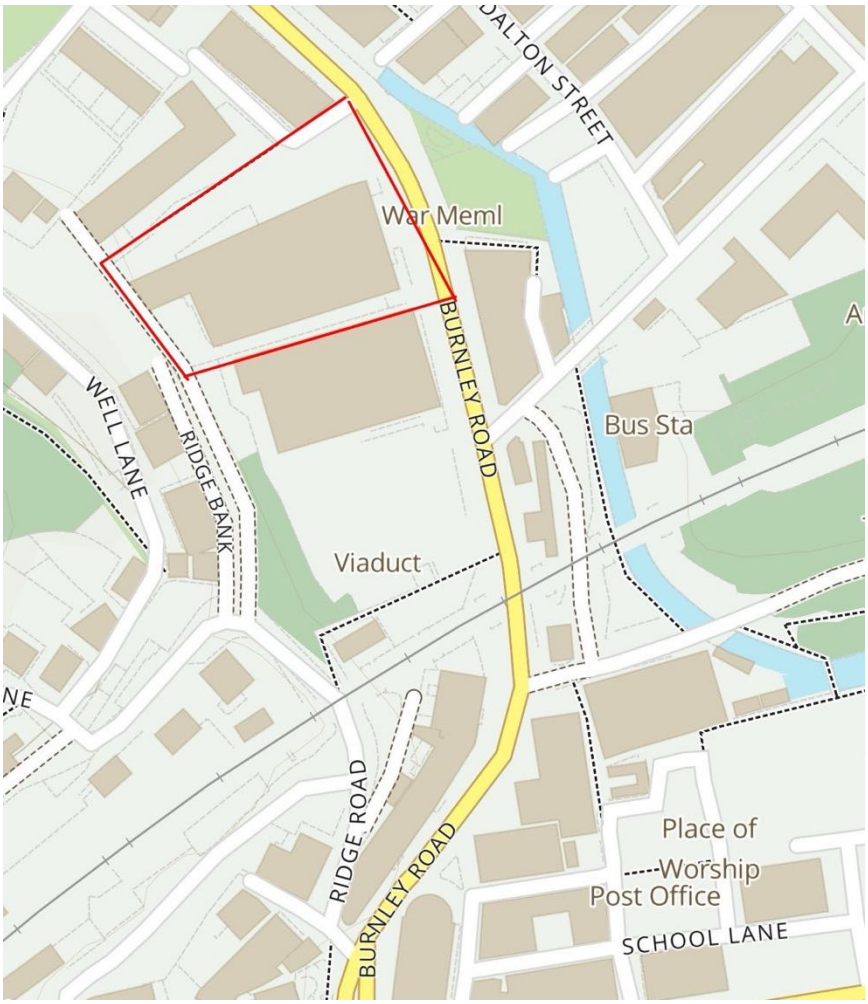
7 Conclusion

This Flood Risk Assessment has considered planned improvements to the existing premises and car park. It is considered to be compliant with the requirements set out in the NPPF and the associated guidance.

The planned improvements are considered 'minor' changes with minimal change with respect to flood risk, however, the risk assessment and recommendations have been prepared to demonstrate that the improvements will not increase flood risk to others, subject to the recommended flood mitigation strategies being implemented.

APPENDIX A

SITE LOCATION PLAN



EXTRACT OF LOCATION PLAN
[Not to scale]

↑
NORTH

APPENDIX B

SITE PHOTOS

General view to the west along north elevation of the building and car park

General view of access to partial basement – note kerb utilised to provide flood protection

General view to the east along north elevation of the building and car park attempting to show the gentle slope towards Burnley Road

General view to the west along north elevation of the building retaining wall at the west of the site

View of southern elevation showing the basement light well with a cast iron grill cover

View of new flood protection adjacent to the River C

View within basement room utilised for storage

END